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January 15, 2016

Mr. Don Heardon
Compliance Unit
NCDENR-DVM, Solid Waste Section
1646 Mail Service Center
Raleigh, NC 27699-1646

RE: Facility Permit # 4203
Low Ground Landfill Semi-annual Environmental Monitoring Report
Roanoke Rapids, NC
EarthCon Consultants of North Carolina, P.C. Project No. 25.20090383.15

Dear Mr. Heardon;

On behalf of International Paper Company, EarthCon Consultants of North Carolina, P.C. (EarthCon) is submitting the attached Semi-annual Environmental Monitoring Report for the November 17, 2015 sampling event completed for the above referenced site. Also enclosed is the North Carolina (NC) Solid Waste Section summary table, field sampling forms the laboratory analytical report and the EarthCon Quality Assurance Review of the laboratory data.

The November 2015 sampling activities were conducted by EarthCon and included obtaining depth to groundwater measurements from five site monitoring wells (MWLG-1, MWLG-3, MWLG-5, MWLG-6, and MWLG-7), and sampling those wells in general accordance with low flow purging and sampling EPA Operating Procedures. Copies of the field sampling forms and field notes completed by EarthCon personnel are attached to this report. The groundwater samples were preserved according to EPA protocol and shipped to Pace Analytical Services, Inc. (Pace) in Huntersville, NC, a North Carolina certified laboratory. The laboratory analytical results for this sampling event are attached and have been compared to applicable 15A NCAC 02L.0202 (NC 2L) Groundwater Standards. The following bullet points summarize the results of this comparison.

- The total dissolved solids (TDS) results from three wells MW-LG3 (664 mg/L), MW-LG6 (1,170 mg/L) and MW-LG7 (600 mg/L) exceeded the NC 2L standard of 500 mg/L.

- The total iron results from four wells MW-LG1 (3,380 ug/L), MW-LG5 (1,030 ug/L), MW-LG6 (3,530 ug/L) and LG-7 (410 ug/L) exceeded the NC 2L standard of 300 ug/L.

- The total manganese results from the five wells MW-LG1 (375 ug/L), MW-LG3 (818 ug/L), MW-LG5 (1,230 ug/L), MW-LG6 (924 ug/L) and MW-LG7 (221 ug/L) exceeded the NC 2L standard of 50 ug/L.

- The sulfate result from one well MW-LG7 (321 mg/L) exceeded the NC 2L standard of 250 mg/L.

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- The nitrate as nitrogen result from one well MW-LG3 (16.7) exceeded the NC 2L standard of 10 mg/L.

The EarthCon Quality Assurance Review of the laboratory data is attached. The following sample results were qualified during the review and are noted on the attached NC Solid Waste Section Summary Table:

- The copper and total dissolved solids results for LG-1 and Dup-1 are qualified as estimated (J).

- The pH analyses were performed beyond the method holding time of ASAP (usually interpreted as less than 15 minutes). The pH result of each sample was qualified as estimated (J).

The TDS, iron, manganese, nitrate as nitrogen and sulfate constituent concentrations, including those detected above the NC 2L groundwater standards, are reported within previous historic ranges that have been established for the Site wells. In previous correspondence with International Paper, the NC Solid Waste Section has waived the requirement to prepare a Water Quality Assessment Plan for this site. EarthCon continues to concur with this waiver and does not recommend any changes to the monitoring program at this time.

If you have any questions on this report feel free to call the undersigned at 770-973-2100.

Sincerely,

Peter Ramsey, PG
Project Manager

Russell K. Schlecht, PE
Principal Engineer

cc: Brent Sasser, International Paper

Attachments:
- NC Environmental Monitoring Report Form
- NC Solid Waste Section Summary Table
- Field Sampling Forms, Field Notes and Chain-of- Custody
- Pace Analytical Services, Inc. Laboratory Analytical Report
- EarthCon Consultants, Inc. Quality Assurance Review

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NC Environmental Monitoring Report Form

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DENR USE ONLY: ☐ Paper Report ☐ Electronic Data - Email CD (data loaded: Yes / No) Doc/Event #:

NC DENR
Division of Waste Management - Solid Waste

Environmental Monitoring Reporting Form

Notice: This form and any information attached to it are "Public Records" as defined in NC General Statute 132-1. As such, these documents are available for inspection and examination by any person upon request (NC General Statute 132-6).

Instructions:

- **Prepare one form for each individually monitored unit.**
- **Please type or print legibly.**
- Attach a notification table with values that attain or exceed NC 2L groundwater standards or NC 2B surface water standards. The notification must include a preliminary analysis of the cause and significance of each value. (e.g. naturally occurring, off-site source, pre-existing condition, etc.).
- Attach a notification table of any groundwater or surface water values that equal or exceed the reporting limits.
- Attach a notification table of any methane gas values that attain or exceed explosive gas levels. This includes any structures on or nearby the facility (NCAC 13B .1629 (4)(a)(i).
- Send the original signed and sealed form, any tables, and Electronic Data Deliverable to: Compliance Unit, NCDENR-DWM, Solid Waste Section, 1646 Mail Service Center, Raleigh, NC 27699-1646.

Solid Waste Monitoring Data Submittal Information

Name of entity submitting data (laboratory, consultant, facility owner):

EarthCon Consultants of North Carolina, P.C.

Contact for questions about data formatting. Include data preparer's name, telephone number and E-mail address:

Name: Peter E. Ramsey Phone: 770-973-2100 ext. 2882

E-mail: pramsey@earthcon.com

Facility name:	Facility Address:	Facility Permit #	NC Landfill Rule: (.0500 or .1600)	Actual sampling dates (e.g., October 20-24, 2006)
International Paper Company Low Ground Landfill Roanoke Rapids, NC	Kapstone Mill 100 Gaston Road Roanoke Rapid, NC	42 03	.0500	November 17, 2015

Environmental Status: (Check all that apply)

☐ Initial/Background Monitoring ☒ Detection Monitoring ☐ Assessment Monitoring ☐ Corrective Action

Type of data submitted: (Check all that apply)

☒ Groundwater monitoring data from monitoring wells
☐ Groundwater monitoring data from private water supply wells
☐ Leachate monitoring data
☐ Surface water monitoring data
☐ Methane gas monitoring data
☐ Corrective action data (specify) _____
☐ Other(specify) _____

Notification attached?

☐ No. No groundwater or surface water standards were exceeded.
☒ Yes, a notification of values exceeding a groundwater or surface water standard is attached. It includes a list of groundwater and surface water monitoring points, dates, analytical values, NC 2L groundwater standard, NC 2B surface water standard or NC Solid Waste GWPS and preliminary analysis of the cause and significance of any concentration.
☐ Yes, a notification of values exceeding an explosive methane gas limit is attached. It includes the methane monitoring points, dates, sample values and explosive methane gas limits.

Certification

To the best of my knowledge, the information reported and statements made on this data submittal and attachments are true and correct. Furthermore, I have attached complete notification of any sampling values meeting or exceeding groundwater standards or explosive gas levels, and a preliminary analysis of the cause and significance of concentrations exceeding groundwater standards. I am aware that there are significant penalties for making any false statement, representation, or certification including the possibility of a fine and imprisonment.

Peter E. Ramsey — Senior Geologist — 770-973-2100 ext. 2882

Facility Representative Name (Print) — Title — (Area Code) Telephone Number

Peter E. Ramsey — 1/15/16

Signature — Date

Affix NC Licensed/Professional Geologist Seal

NORTH CAROLINA LICENSED SEAL 2107 GEOLOGIST PETER E. RAMSEY

1880 West Oak Parkway, Building 100, Suite 106, Marietta, Georgia 30062

Facility Representative Address

NC PE Firm License Number (if applicable effective May 1, 2009)

Revised 6/2009

NC Solid Waste Section Summary Table
Samples Collected by EarthCon Consultants of North Carolina, P.C.

Prepared by BGM 12/12/15 and Checked by PER 01/7/16

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FACILITY PERMIT	WELL ID	CAS Number	SWS ID	PARAMETER	RESULT	UNITS	QUALIFIER	METHOD	MDL	MRL	SWSL	DILUTION FACTOR	COLLECT DATE	EXTRACTION DATE	ANALYSIS DATE	NC LABORATORY CERTIFICATION NUMBER
42-03	4203-LG1	7440-38-2	14	Arsenic, Total	0.76	ug/L	J	EPA 6020	0.5	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG1	7440-39-3	15	Barium, Total	85.8	ug/L		EPA 6020	0.5	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG1	7440-43-9	34	Cadmium, Total	0.059	ug/L	J	EPA 6020	0.05	0.1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG1	7440-47-3	51	Chromium, Total	1.2	ug/L		EPA 6020	0.5	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG1	7440-50-8	54	Copper, Total	8.1	ug/L	J	EPA 6020	0.93	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG1	7439-92-1	131	Lead, Total	2.4	ug/L		EPA 6020	0.5	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG1	7439-97-6	132	Mercury, Total	0.1	ug/L	U	EPA 7470	0.1	0.2		1	11/17/2015	11/28/2015	11/30/2015	527
42-03	4203-LG1	7782-49-2	183	Selenium, Total	0.5	ug/L	U	EPA 6020	0.5	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG1	7440-22-4	184	Silver, Total	0.05	ug/L	U	EPA 6020	0.05	0.1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG1	7440-66-6	213	Zinc, Total	4.4	ug/L	J	EPA 6020	2.5	5		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG1	16887-00-6	301	Chloride	4200	ug/L	J	EPA 300.0	2500	5000		1	11/17/2015	11/22/2015	11/22/2015	527
42-03	4203-LG1	14797-55-8	303	Nitrate as Nitrogen	10	ug/L	U	EPA 353.2	10	20		1	11/17/2015	11/18/2015	11/18/2015	527
42-03	4203-LG1		311	Solids, Total Dissolved (TDS)	88000	ug/L	J	SM 2540C	25000	25000		1	11/17/2015	11/19/2015	11/19/2015	527
42-03	4203-LG1	16984-48-8	312	Fluoride	100	ug/L		EPA 300.0	34	50		1	11/17/2015	11/22/2015	11/22/2015	527
42-03	4203-LG1	14808-79-8	315	Sulfate	9300	ug/L		EPA 300.0	2500	5000		1	11/17/2015	11/22/2015	11/22/2015	527
42-03	4203-LG1		316	Biochemical Oxygen Demand (BOD)	2000	ug/L	U	SM 5210B	2000	2000		1	11/17/2015	11/19/2015	11/23/2015	527
42-03	4203-LG1		317	Chemical Oxygen Demand (COD)	22000	ug/L	J	SM 5220D	12500	25000		1	11/17/2015	11/24/2015	11/24/2015	527
42-03	4203-LG1	12408-02-5	320	pH	6.3	PH	J	SM 4500-H+B	0.1	1		1	11/17/2015	11/19/2015	11/19/2015	527
42-03	4203-LG1		323	Conductivity	168	uMHOS/cm		Field Collected	1	1		1	11/17/2015	11/17/2015	11/17/2015	527
42-03	4203-LG1	7439-89-6	340	Iron, Total	3380	ug/L		EPA 6020	6.9	10		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG1	7439-96-5	342	Manganese, Total	375	ug/L		EPA 6020	0.69	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG1	7440-44-0	357	Carbon, Total Organic (TOC)	7100	ug/L		SM 5310B	500	1000		1	11/17/2015	11/25/2015	11/25/2015	527
42-03	4203-LG1		396	Halides, Total Organic (TOX)	10	ug/L	U	EPA 9020B	10	20		1	11/17/2015	12/13/2015	12/13/2015	527
42-03	4203-LG3	7440-38-2	14	Arsenic, Total	0.5	ug/L	U	EPA 6020	0.5	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG3	7440-39-3	15	Barium, Total	56.9	ug/L		EPA 6020	0.5	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG3	7440-43-9	34	Cadmium, Total	0.05	ug/L	U	EPA 6020	0.05	0.1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG3	7440-47-3	51	Chromium, Total	2	ug/L		EPA 6020	0.5	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG3	7440-50-8	54	Copper, Total	0.93	ug/L	U	EPA 6020	0.93	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG3	7439-92-1	131	Lead, Total	0.5	ug/L	U	EPA 6020	0.5	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG3	7439-97-6	132	Mercury, Total	0.1	ug/L	U	EPA 7470	0.1	0.2		1	11/17/2015	11/28/2015	11/30/2015	527
42-03	4203-LG3	7782-49-2	183	Selenium, Total	0.5	ug/L	J	EPA 6020	0.5	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG3	7440-22-4	184	Silver, Total	0.05	ug/L	U	EPA 6020	0.05	0.1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG3	7440-66-6	213	Zinc, Total	2.5	ug/L	U	EPA 6020	2.5	5		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG3	16887-00-6	301	Chloride	34300	ug/L		EPA 300.0	12500	25000		5	11/17/2015	11/22/2015	11/22/2015	527
42-03	4203-LG3	14797-55-8	303	Nitrate as Nitrogen	16700	ug/L		EPA 353.2	100	200		10	11/17/2015	11/19/2015	11/19/2015	527
42-03	4203-LG3		311	Solids, Total Dissolved (TDS)	664000	ug/L		SM 2540C	100000	100000		1	11/17/2015	11/19/2015	11/19/2015	527
42-03	4203-LG3	16984-48-8	312	Fluoride	340	ug/L		EPA 300.0	170	250		5	11/17/2015	11/22/2015	11/22/2015	527
42-03	4203-LG3	14808-79-8	315	Sulfate	163000	ug/L		EPA 300.0	12500	25000		5	11/17/2015	11/22/2015	11/22/2015	527
42-03	4203-LG3		316	Biochemical Oxygen Demand (BOD)	2000	ug/L	U	SM 5210B	2000	2000		1	11/17/2015	11/19/2015	11/23/2015	527
42-03	4203-LG3		317	Chemical Oxygen Demand (COD)	24000	ug/L	J	SM 5220D	12500	25000		1	11/17/2015	11/24/2015	11/24/2015	527
42-03	4203-LG3	12408-02-5	320	pH	6.8	PH	J	SM 4500-H+B	0.1	1		1	11/17/2015	11/19/2015	11/19/2015	527
42-03	4203-LG3		323	Conductivity	1458	uMHOS/cm		Field Collected	1	1		1	11/17/2015	11/17/2015	11/17/2015	527
42-03	4203-LG3	7439-89-6	340	Iron, Total	300	ug/L		EPA 6020	6.9	10		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG3	7439-96-5	342	Manganese, Total	818	ug/L		EPA 6020	3.4	5		5	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG3	7440-44-0	357	Carbon, Total Organic (TOC)	4900	ug/L		SM 5310B	1000	2000		2	11/17/2015	11/25/2015	11/25/2015	527
42-03	4203-LG3		396	Halides, Total Organic (TOX)	53	ug/L		EPA 9020B	10	20		1	11/17/2015	12/12/2015	12/12/2015	527
42-03	4203-LG5	7440-38-2	14	Arsenic, Total	1.2	ug/L		EPA 6020	0.5	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG5	7440-39-3	15	Barium, Total	137	ug/L		EPA 6020	0.5	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG5	7440-43-9	34	Cadmium, Total	0.25	ug/L		EPA 6020	0.05	0.1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG5	7440-47-3	51	Chromium, Total	2.5	ug/L		EPA 6020	0.5	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG5	7440-50-8	54	Copper, Total	3.1	ug/L		EPA 6020	0.93	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG5	7439-92-1	131	Lead, Total	0.5	ug/L	U	EPA 6020	0.5	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG5	7439-97-6	132	Mercury, Total	0.1	ug/L	U	EPA 7470	0.1	0.2		1	11/17/2015	11/28/2015	11/30/2015	527
42-03	4203-LG5	7782-49-2	183	Selenium, Total	1.2	ug/L		EPA 6020	0.5	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG5	7440-22-4	184	Silver, Total	0.05	ug/L	U	EPA 6020	0.05	0.1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG5	7440-66-6	213	Zinc, Total	18.7	ug/L		EPA 6020	2.5	5		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG5	16887-00-6	301	Chloride	4900	ug/L	J	EPA 300.0	2500	5000		1	11/17/2015	11/24/2015	11/24/2015	527
42-03	4203-LG5	14797-55-8	303	Nitrate as Nitrogen	1300	ug/L		EPA 353.2	10	20		1	11/17/2015	11/18/2015	11/18/2015	527
42-03	4203-LG5		311	Solids, Total Dissolved (TDS)	202000	ug/L		SM 2540C	25000	25000		1	11/17/2015	11/19/2015	11/19/2015	527
42-03	4203-LG5	16984-48-8	312	Fluoride	150	ug/L		EPA 300.0	34	50		1	11/17/2015	11/24/2015	11/24/2015	527
42-03	4203-LG5	14808-79-8	315	Sulfate	62600	ug/L		EPA 300.0	2500	5000		1	11/17/2015	11/24/2015	11/24/2015	527
42-03	4203-LG5		316	Biochemical Oxygen Demand (BOD)	2000	ug/L	U	SM 5210B	2000	2000		1	11/17/2015	11/19/2015	11/23/2015	527
42-03	4203-LG5		317	Chemical Oxygen Demand (COD)	29000	ug/L		SM 5220D	12500	25000		1	11/17/2015	11/24/2015	11/24/2015	527
42-03	4203-LG5	12408-02-5	320	pH	6	PH	J	SM 4500-H+B	0.1	1		1	11/17/2015	11/19/2015	11/19/2015	527
42-03	4203-LG5		323	Conductivity	286	uMHOS/cm		Field Collected	1	1		1	11/17/2015	11/17/2015	11/17/2015	527
42-03	4203-LG5	7439-89-6	340	Iron, Total	1030	ug/L		EPA 6020	6.9	10		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG5	7439-96-5	342	Manganese, Total	1230	ug/L		EPA 6020	3.4	5		5	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG5	7440-44-0	357	Carbon, Total Organic (TOC)	73400	ug/L		SM 5310B	1000	2000		2	11/17/2015	11/25/2015	11/25/2015	527
42-03	4203-LG5		396	Halides, Total Organic (TOX)	10	ug/L	U	EPA 9020B	10	20		1	11/17/2015	12/12/2015	12/12/2015	527
42-03	4203-LG6	7440-38-2	14	Arsenic, Total	0.5	ug/L	U	EPA 6020	0.5	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG6	7440-39-3	15	Barium, Total	540	ug/L		EPA 6020	2.5	5		5	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG6	7440-43-9	34	Cadmium, Total	0.053	ug/L	J	EPA 6020	0.05	0.1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG6	7440-47-3	51	Chromium, Total	3.5	ug/L		EPA 6020	0.5	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG6	7440-50-8	54	Copper, Total	0.93	ug/L	U	EPA 6020	0.93	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG6	7439-92-1	131	Lead, Total	0.5	ug/L	U	EPA 6020	0.5	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG6	7439-97-6	132	Mercury, Total	0.1	ug/L	U	EPA 7470	0.1	0.2		1	11/17/2015	11/28/2015	11/30/2015	527
42-03	4203-LG6	7782-49-2	183	Selenium, Total	0.5	ug/L	U	EPA 6020	0.5	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG6	7440-22-4	184	Silver, Total	0.05	ug/L	U	EPA 6020	0.05	0.1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG6	7440-66-6	213	Zinc, Total	2.5	ug/L	U	EPA 6020	2.5	5		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG6	16887-00-6	301	Chloride	13000	ug/L		EPA 300.0	2500	5000		1	11/17/2015	11/23/2015	11/23/2015	527
42-03	4203-LG6	14797-55-8	303	Nitrate as Nitrogen	8800	ug/L		EPA 353.2	50	100		5	11/17/2015	11/19/2015	11/19/2015	527
42-03	4203-LG6		311	Solids, Total Dissolved (TDS)	1170000	ug/L		SM 2540C	250000	250000		1	11/17/2015	11/19/2015	11/19/2015	527
42-03	4203-LG6	16984-48-8	312	Fluoride	340	ug/L		EPA 300.0	34	50		1	11/17/2015	11/23/2015	11/23/2015	527
42-03	4203-LG6	14808-79-8	315	Sulfate	28700	ug/L		EPA 300.0	2500	5000		1	11/17/2015	11/23/2015	11/23/2015	527
42-03	4203-LG6		316	Biochemical Oxygen Demand (BOD)	2000	ug/L	U	SM 5210B	2000	2000		1	11/17/2015	11/19/2015	11/23/2015	527
42-03	4203-LG6		317	Chemical Oxygen Demand (COD)	44000	ug/L		SM 5220D	12500	25000		1	11/17/2015	11/24/2015	11/24/2015	527
42-03	4203-LG6	12408-02-5	320	pH	7.2	PH	J	SM 4500-H+B	0.1	1		1	11/17/2015	11/19/2015	11/19/2015	527
42-03	4203-LG6		323	Conductivity	3047	uMHOS/cm		Field Collected	1	1		1	11/17/2015	11/17/2015	11/17/2015	527
42-03	4203-LG6	7439-89-6	340	Iron, Total	3530	ug/L		EPA 6020	6.9	10		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG6	7439-96-5	342	Manganese, Total	924	ug/L		EPA 6020	3.4	5		5	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG6	7440-44-0	357	Carbon, Total Organic (TOC)	12800	ug/L		SM 5310B	2500	5000		5	11/17/2015	11/25/2015	11/25/2015	527
42-03	4203-LG6		396	Halides, Total Organic (TOX)	10	ug/L	U	EPA 9020B	10	20		1	11/17/2015	12/12/2015	12/12/2015	527
42-03	4203-LG7	7440-38-2	14	Arsenic, Total	0.5	ug/L	U	EPA 6020	0.5	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG7	7440-39-3	15	Barium, Total	179	ug/L		EPA 6020	0.5	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG7	7440-43-9	34	Cadmium, Total	0.05	ug/L	U	EPA 6020	0.05	0.1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG7	7440-47-3	51	Chromium, Total	0.5	ug/L	U	EPA 6020	0.5	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG7	7440-50-8	54	Copper, Total	0.93	ug/L	U	EPA 6020	0.93	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG7	7439-92-1	131	Lead, Total	0.5	ug/L	U	EPA 6020	0.5	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG7	7439-97-6	132	Mercury, Total	0.1	ug/L	U	EPA 7470	0.1	0.2		1	11/17/2015	11/28/2015	11/30/2015	527
42-03	4203-LG7	7782-49-2	183	Selenium, Total	2.8	ug/L		EPA 6020	0.5	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG7	7440-22-4	184	Silver, Total	0.05	ug/L	U	EPA 6020	0.05	0.1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG7	7440-66-6	213	Zinc, Total	2.5	ug/L	U	EPA 6020	2.5	5		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG7	16887-00-6	301	Chloride	27300	ug/L		EPA 300.0	12500	25000		5	11/17/2015	11/22/2015	11/22/2015	527
42-03	4203-LG7	14797-55-8	303	Nitrate as Nitrogen	7500	ug/L		EPA 353.2	50	100		5	11/17/2015	11/19/2015	11/19/2015	527
42-03	4203-LG7		311	Solids, Total Dissolved (TDS)	600000	ug/L		SM 2540C	250000	250000		1	11/17/2015	11/19/2015	11/19/2015	527
42-03	4203-LG7	16984-48-8	312	Fluoride	270	ug/L		EPA 300.0	170	250		5	11/17/2015	11/22/2015	11/22/2015	527
42-03	4203-LG7	14808-79-8	315	Sulfate	321000	ug/L		EPA 300.0	12500	25000		5	11/17/2015	11/22/2015	11/22/2015	527
42-03	4203-LG7		316	Biochemical Oxygen Demand (BOD)	2000	ug/L	U	SM 5210B	2000	2000		1	11/17/2015	11/19/2015	11/23/2015	527
42-03	4203-LG7		317	Chemical Oxygen Demand (COD)	22000	ug/L	J	SM 5220D	12500	25000		1	11/17/2015	11/24/2015	11/24/2015	527
42-03	4203-LG7	12408-02-5	320	pH	7	PH	J	SM 4500-H+B	0.1	1		1	11/17/2015	11/19/2015	11/19/2015	527
42-03	4203-LG7		323	Conductivity	2479	uMHOS/cm		Field Collected	1	1		1	11/17/2015	11/17/2015	11/17/2015	527
42-03	4203-LG7	7439-89-6	340	Iron, Total	410	ug/L		EPA 6020	6.9	10		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG7	7439-96-5	342	Manganese, Total	221	ug/L		EPA 6020	0.69	1		1	11/17/2015	11/24/2015	11/25/2015	527
42-03	4203-LG7	7440-44-0	357	Carbon, Total Organic (TOC)	5800	ug/L		SM 5310B	500	1000		1	11/17/2015	11/25/2015	11/25/2015	527
42-03	4203-LG7		396	Halides, Total Organic (TOX)	30	ug/L		EPA 9020B	10	20		1	11/17/2015	12/13/2015	12/13/2015	527

Checked by: PER 1/7/16

Field Sampling Forms, Field Notes and Chain-of-Custody

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Groundwater Sampling Record

WELL No. LG-1	PROJECT # 2225.2009.0343.15	LOCATION Roanoke Rapids, NC	DATE 11/17/15
SAMPLE No.	PROJECT NAME Roanoke Rapids	FIELD PERSONNEL/COMPANY K. Davis	
SAMPLE TIME: 1430	SITE International Paper	FIELD CONDITIONS/WEATHER	

Well Condition Inspection (circle one)

cover: locked / not locked
number: legible / not legible
outer casing: good / fair / poor
inner casing: good / fair / poor
well photographed: yes / no

Equipment Cleaning Procedures

- potable water and phosphate-free soap ✓
- potable water rinse
- water rinse: distilled ✓ / deionized
- solvent rinse: acetone / hexane
- air dry

Casing Diameter: (circle one) 2" 4" 6" Other ____

Casing Volume Calculation: (~~r²πh7.48 gal/ft³~~)
Casing Volume (gallons/ft) for: 2" = 0.163; 4" = 0.653; 6" = 1.47

Depth to Water (feet): 7.92
Depth of Well (feet): 16.36
Water Column (feet): 8.44
Casing Volume (gallons): 1.37
Calculated Purge Volume (gallons): 4.13
Actual Purge Volume (gallons): 2.15

Measuring Point Elevation (feet):
Groundwater Surface Elevation:
LNAPL present: ____ thickness:
DNAPL present: ____ thickness:
Remarks:

Well Evacuation

Water level recovery is: very slow / slow / moderate / fast

Bailed dry: yes / no WL

TIME 2400 hrs	CUMULATIVE VOLUME (gal)	TEMP (°C)	pH	CONDUCTIVITY (µs/cm)	DISSOLVED OXYGEN (ppm)	Eh	TURBIDITY (NTU)	ODOR/COLOR/ REMARKS
1246	0							PURGE START
1250	—	16.91	7.43	241	7.19	74.7	72.95	9.55
1300	0.3	16.93	6.61	200	0.43	80.0	48.7	9.22
1310	0.7	16.96	6.46	184	0.31	90.8	19.57	9.88
1320	1.0	16.97	6.34	179	0.27	94.3	14.97	10.49
1330	1.3	16.96	6.29	166	0.23	74.0	19.09	11.06
1340	1.7	16.89	6.24	161	0.23	64.0	15.31	11.54
1350	2.0	16.89	6.16	168	0.25	22.4	13.10	12.00

Measurement and Sampling Equipment

Type	Manufacturer	Model #	Calibration Date
Water Quality	YSI	556	11/17/15
Nephelometer	HF Scientific	Micro TPW 20000	11/17/15
Peri Pump	Geotech	Geo Pump	

SAMPLE NUMBER	ANALYTICAL METHOD	BOTTLE TYPE/ PRESERVATIVES	QA REMARKS
3	TOC 40ml / H_3PO_4	1	TDS 500ml / —
2	TOX 250ml / H_2SO_4	1	BOD 1L / —
1	COD 125ml / H_2SO_4	1	Nitrate pH 250ml / —
1	Metals 250ml / HNO_3	1	Cl, F, SO_4 250ml / —

glass

Start Purge - 1246
End Purge - 1350

Sample - 1430

Dup-1 collected

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Groundwater Sampling Record

WELL No. LG-3	PROJECT # 25.2009 0383.15	LOCATION Pawtuxet Rapids, RI	DATE 11/17/15
SAMPLE No.	PROJECT NAME IP Pawtuxet Rapids	FIELD PERSONNEL/COMPANY K. Davis	
SAMPLE TIME: 1115	SITE International Paper	FIELD CONDITIONS/WEATHER	

Well Condition Inspection (circle one)

cover: locked / not locked
number: legible / not legible
outer casing: good / fair / poor
inner casing: good / fair / poor
well photographed: yes / no

Equipment Cleaning Procedures

- potable water and phosphate-free soap ✓
- potable water rinse
- water rinse: distilled ✓ / deionized
- solvent rinse: acetone / hexane
- air dry

Casing Diameter: (circle one) 2" / 4" / 6" / Other____

Casing Volume Calculation: ($\pi r^2 h$)(7.48 gal/ft^3)
Casing Volume (gallons/ft) for 2" = 0.163; 4" = 0.653; 6" = 1.47

Depth to Water (feet): 6.65
Depth of Well (feet): 19.83
Water Column (feet): 13.18
Casing Volume (gallons): 2.15
Calculated Purge Volume (gallons): 6.45
Actual Purge Volume (gallons): 1.25

Measuring Point Elevation (feet):
Groundwater Surface Elevation:
LNAPL present: thickness:
DNAPL present: thickness:
Remarks:

Well Evacuation

Water level recovery is: very slow / slow / moderate / fast

Bailed dry: yes / no WL

TIME 2400 hrs	CUMULATIVE VOLUME (gal)	TEMP (°C)	pH	CONDUCTIVITY (µs/cm)	DISSOLVED OXYGEN (ppm)	Eh	TURBIDITY (NTU)	ODOR/COLOR/ REMARKS
1013	0							PURGE START
1018	—	18.44	6.45	1790	5.13	215.5	3.65	7.06
1025	0.25	18.21	6.54	1658	1.42	203.8	3.62	7.21
1035	0.50	18.44	6.77	1525	2.42	206.3	1.93	7.33
1045	0.75	18.50	6.82	1480	2.80	213.7	1.55	7.43
1055	1.0	18.32	6.84	1458	2.80	220.3	1.39	7.52

Measurement and Sampling Equipment

Type	Manufacturer	Model #	Calibration Date
Cond/Temp	YSI	556	11/17/15
Turbidity	HF Scientific	Micro TPW 20000	11/17/15
Peri pump	Geotech	Geo pump	

SAMPLE NUMBER	ANALYTICAL METHOD	BOTTLE TYPE/ PRESERVATIVES	QA REMARKS
3	BC 40ml / H_3PO_4	1	TDS 500ml / —
2	TOX 250ml / H_2SO_4	1	BOD 1 liter / —
1	COD 125ml / H_2SO_4	1	Nitrate pH 250ml / —
1	Metals 250ml / HNO_3	1	Cl, F, SO_4 250ml / —

glass

Start purge - 1013
End purge - 1055

Sample - 1115

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Groundwater Sampling Record

WELL No. CG-5	PROJECT # 02-2009 0383.15	LOCATION Roanoke Rapids, NC	DATE 11/17/15
SAMPLE No.	PROJECT NAME Roanoke Rapids	FIELD PERSONNEL/COMPANY R. Davis	
SAMPLE TIME: 0955	SITE International Paper	FIELD CONDITIONS/WEATHER	

Well Condition Inspection (circle one)

cover: locked / not locked
number: legible / not legible
outer casing: good / fair / poor
inner casing: good / fair / poor
well photographed: yes / no

Equipment Cleaning Procedures

- potable water and phosphate-free soap ✓
- potable water rinse
- water rinse: distilled ✓ / deionized
- solvent rinse: acetone / hexane
- air dry

Casing Diameter: (circle one) 2" / 4" / 6" / Other____

Casing Volume Calculation: ($\pi r^2 h$)(7.48 gal/ft³)
Casing Volume (gallons/ft) for 2" = 0.163; 4" = 0.653; 6" = 1.47

Depth to Water (feet): 9.37
Depth of Well (feet): 18.98
Water Column (feet): 9.61
Casing Volume (gallons): 1.26
Calculated Purge Volume (gallons): 3.8
Actual Purge Volume (gallons): 1.35

Measuring Point Elevation (feet):
Groundwater Surface Elevation:
LNAPL present: thickness:
DNAPL present: thickness:
Remarks:

Well Evacuation

Water level recovery is: very slow / slow / moderate / fast Bailed dry: yes / no WL

TIME 2400 hrs	CUMULATIVE VOLUME (gal)	TEMP (°C)	pH	CONDUCTIVITY (µs/cm)	DISSOLVED OXYGEN (ppm)	Eh	TURBIDITY (NTU)	ODOR/COLOR/ REMARKS
0853	0							
0857	—	18.26	6.87	348	2.51	64.3	16.72	PURGE START 10.14
0905	0.25	18.34	5.92	292	0.38	109.3	14.81	10.62
0915	0.60	18.45	5.72	277	0.23	148.4	12.17	11.17
0925	0.85	19.11	5.62	277	0.16	172.2	10.46	11.73
0935	1.20	19.45	5.60	286	0.16	175.8	9.74	12.27

Measurement and Sampling Equipment

Type	Manufacturer	Model #	Calibration Date
Water Quality	YSI	556	11/17/15
Turbidity	HF Scientific	MicroTPW 20000	11/17/15
PDB Pump	GeoTech	GeoPump	

SAMPLE NUMBER	ANALYTICAL METHOD	BOTTLE TYPE/ PRESERVATIVES	QA REMARKS
3	TOC 40ml / H_3PO_4	1 TDS 500ml / –	
2	TOX 250ml glass / H_2SO_4	1 BOD 1L HDPE / –	
1	COD 125ml HDPE / H_2SO_4	1 Nitrate pH 250ml HDPE / –	
1	Metals 250ml / HNO_3	1 Cl, FSO4 250ml HDPE / –	

glass

Start Purge - 0853
End Purge - 0935

Sample - 0955

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Groundwater Sampling Record

WELL No. LG-6	PROJECT # 25.2009.0383.15	LOCATION Roanoke Rapids, NC	DATE 11/17/15
SAMPLE No.	PROJECT NAME IP Roanoke Rapids	FIELD PERSONNEL/COMPANY K. Davis	
SAMPLE TIME: 0835	SITE International Paper	FIELD CONDITIONS/WEATHER	

Well Condition Inspection (circle one)

cover: locked / not locked
number: legible / not legible
outer casing: good / fair / poor
inner casing: good / fair / poor
well photographed: yes / no

Equipment Cleaning Procedures

- potable water and phosphate-free soap ✓
- potable water rinse
- water rinse: distilled ✓ / deionized
- solvent rinse: acetone / hexane
- air dry

Casing Diameter: (circle one) 2" / 4" / 6" / Other____

Casing Volume Calculation: (m^2 x 7.48 gal/m^3)
Casing Volume (gallons/ft) for: 2" = 0.163; 4" = 0.653; 6" = 1.47

Depth to Water (feet):	8.76
Depth of Well (feet):	18.72
Water Column (feet):	9.96
Casing Volume (gallons):	1.62
Calculated Purge Volume (gallons):	4.8
Actual Purge Volume (gallons):	1.1

Measuring Point Elevation (feet):
Groundwater Surface Elevation:
LNAPL present: ____ thickness:
DNAPL present: ____ thickness:
Remarks:

Well Evacuation

Water level recovery is: very slow / slow / moderate / fast Bailed dry: yes / no WL

TIME 2400 hrs	CUMULATIVE VOLUME (gal)	TEMP (°C)	pH	CONDUCTIVITY (µs/cm)	DISSOLVED OXYGEN (ppm)	Eh	TURBIDITY (NTU)	ODOR/COLOR/ REMARKS
0742	0							
0747	—	17.23	6.94	2849	4.34	-62.8	4.70	PURGE START 9.80
0755	0.3	17.50	6.92	2992	0.66	-82.5	2.24	10.25
0805	0.7	17.98	6.94	3019	0.42	-86.9	2.62	10.82
0815	0.9	18.19	6.97	3047	0.28	-88.8	5.59	11.19

Measurement and Sampling Equipment

Type	Manufacturer	Model #	Calibration Date
Water Quality	YSI	556	11/17/15
Turbidity	HF Scientific	MicroTPW 20000	11/17/15
PPE Pump	GeoTech	Geo Pump	

SAMPLE NUMBER	ANALYTICAL METHOD	BOTTLE TYPE/ PRESERVATIVES	QA REMARKS
3	TOC 40ml / H_3PO_4	1	1L TDS 500ml / —
2	TOX 250ml glass / ~~Hg~~ H_2SO_4	1	1L BOD / 1L HDPE / —
1	COD 125ml HDPE / H_2SO_4	pH 11	NITRATE 250ml HDPE / —
1	Metals 250ml HDPE / HNO_3	1	CL, F, SO_4 250ml HDPE / —

glass

START Purge - 0742
End Purge - 0815

Sample - 0835

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Groundwater Sampling Record

WELL No. LG-7	PROJECT # 25.2009.0383.15	LOCATION Roanoke Rapids, NC	DATE 11/17/15
SAMPLE No.	PROJECT NAME IP Roanoke Rapids	FIELD PERSONNEL/COMPANY K. Davis	
SAMPLE TIME: 1230	SITE International Paper	FIELD CONDITIONS/WEATHER	

Well Condition Inspection (circle one)

cover: locked / not locked
number: legible / not legible
outer casing: good / fair / poor
inner casing: good / fair / poor
well photographed: yes / no

Equipment Cleaning Procedures

- potable water and phosphate-free soap ✓
- potable water rinse
- water rinse: distilled ✓ / deionized
- solvent rinse: acetone / hexane
- air dry

Casing Diameter: (circle one) 2" / 4" / 6" / Other ____

Casing Volume Calculation: ($\pi r^2 h$)(7.48 gal/ft^3)
Casing Volume (gallons/ft) for 2" = 0.163; 4" = 0.653; 6" = 1.47

Depth to Water (feet): 10.06
Depth of Well (feet): 16.85
Water Column (feet): 6.79
Casing Volume (gallons): 1.10
Calculated Purge Volume (gallons): 3.32
Actual Purge Volume (gallons): 1.2

Measuring Point Elevation (feet):
Groundwater Surface Elevation:
LNAPL present: thickness:
DNAPL present: thickness:
Remarks:

Well Evacuation

Water level recovery is: very slow / slow / moderate / fast

Bailed dry: yes / no NA

TIME 2400 hrs	CUMULATIVE VOLUME (gal)	TEMP (°C)	pH	CONDUCTIVITY (µs/cm)	DISSOLVED OXYGEN (ppm)	Eh	TURBIDITY (NTU)	ODOR/COLOR/ REMARKS
1135	0							
1140	—	16.98	7.09	2446	7.61	219.9	2.23	PURGE START 10.20
1150	0.3	16.79	7.04	2477	2.19	225.5	0.85	10.16
1200	0.7	16.79	7.06	2478	1.97	226.2	1.31	10.17
1210	1.0	16.78	7.08	2479	1.95	225.3	1.36	10.19

Measurement and Sampling Equipment

Type	Manufacturer	Model #	Calibration Date
Water Quality	YSI	556	11/17/15
Turbidity	HF Scientific	Micro TPW 20000	11/17/15
Peri Pump	Geotech	Geo Pump	

SAMPLE NUMBER	ANALYTICAL METHOD	BOTTLE TYPE/ PRESERVATIVES	QA REMARKS
3	TOC 40ml / H_3PO_4	1	TDS 500ml / —
2	TOX 250ml / H_2SO_4	1	BOD 1L / —
1	COD 125ml / H_2SO_4	1	Nitrate pH / — 250ml
1	Metals 250ml / HNO_3	1	CL, F, SO4 250ml / —

glass

START Purge - 1135

End Purge - 1210

Sample 1230

Tuesday 11/17/15 Clear 45°

0645 - Arrived on Site
0530 - Calibrate equipment
pH, 4, 7, 10 - ok
Spcond 1409 - ok
ORP - ok
DO - ok
Turbidity 1000, 10, 0.02 - ok

05 - Hike w/ Neil Davis
230 - Setup on LG-6
242 - Start purge
315 - End purge
335 - Sample LG-6

845 - Setup on LG-5
853 - Start purge
935 - End purge
955 - Sample LG-5

002 - LG-4 DTW = 16.57

010 - Setup on LG-3
013 - Start purge
055 - End purge
115 - Sample LG-3

1123 - LG-2 DTW = 10.59

1130 - Setup on LG-7
1135 - Start purge
1210 - End purge
1230 - Sample LG-7

1240 - Setup on LG-1
1246 - Start purge
1350 - End purge
1430 - Sample LG-1
Dup-1 collected

1450 - Depart Site
1500 - get Eye
1510 - Meet Cochran

KMD

River level 6.75" below orange ~~X~~
on ~~boat~~ ramp
River level highest I have seen

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

1995399

Section A Required Client Information:
Company: EARTH CON CONSULTANTS, INC
Address: 1000 WEST OAK PKWY BLDG 100 STE 100 MARIETTA, GA 30062
Email To: PRAMSEY@EARTHCON.COM
Phone: 770-973-2100 Fax: 770-973-7395
Requested Due Date/TAT: Standard

Section B Required Project Information:
Report To: PETER RAMSEY
Copy To:
Purchase Order No.:
Project Name: JPM ROANOKE POINTE
Project Number: CL 20091383.15

Section C Invoice Information:
Attention: JANE
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER
Site Location STATE: NC

Section D Required Client Information

Matrix Codes MATRIX / CODE: Drinking Water DW, Water WT, Waste Water WW, Product P, Soil/Solid SL, Oil OL, Wipe WP, Air AR, Tissue TS, Other OT

SAMPLE ID (A-Z, 0-9 / -) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other H_3PO_4	Analysis Test (Y/N): BOD	COD	Cl, F, SO_4	Metals	Nitrate/pH	TDS	TOC	TOX	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	LG-6	WT	G	11/17/15		0835			11	4	3	1					3	1	1	1	1	1	1	3	2		
2	LG-5	WT	G	11/17/15		0955			11	4	3	1					3	1	1	1	1	1	1	3	2		
3	LG-3	WT	G	11/17/15		1115			11	4	3	1					3	1	1	1	1	1	1	3	2		
4	LG-7	WT	G	11/17/15		1230			11	4	3	1					3	1	1	1	1	1	1	3	2		
5	DUP-1	WT	G	11/17/15		—			11	4	3	1					3	1	1	1	1	1	1	3	2		
6	LG-1	WT	G	11/17/15		1430			11	4	3	1					3	1	1	1	1	1	1	3	2		
7																											
8																											
9																											
10																											
11																											
12																											

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	[signature]	11/17/15	1510	[signature] Pace			

3

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: KANT DAVIS
SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11/17/15

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Pace Analytical Services, Inc.

Laboratory Analytical Report

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Pace Analytical Services, Inc.
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

December 15, 2015

Peter Ramsey
EarthCon Consultants, Inc
1880 West Oak Parkway
Building 100, Suite 106
Marietta, GA 30062

RE: Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

Dear Peter Ramsey:
Enclosed are the analytical results for sample(s) received by the laboratory on November 17, 2015. 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.

Analyses were performed at the Pace Analytical Services location indicated on the sample analyte page for analysis unless otherwise footnoted.

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

Sincerely,

Nicole Gasiorowski

Nicole Gasiorowski
nicole.gasiorowski@pacelabs.com
Project Manager

Enclosures

cc: Danielle Edwards, EarthCon Consultants, Inc

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CERTIFICATIONS

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

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

Ormond Beach Certification IDs
8 East Tower Circle, Ormond Beach, FL 32174
Alabama Certification #: 41320
Connecticut Certification #: PH-0216
Delaware Certification: FL NELAC Reciprocity
Florida Certification #: E83079
Georgia Certification #: 955
Guam Certification: FL NELAC Reciprocity
Hawaii Certification: FL NELAC Reciprocity
Illinois Certification #: 200068
Indiana Certification: FL NELAC Reciprocity
Kansas Certification #: E-10383
Kentucky Certification #: 90050
Louisiana Certification #: FL NELAC Reciprocity
Louisiana Environmental Certificate #: 05007
Maryland Certification: #346
Michigan Certification #: 9911
Mississippi Certification: FL NELAC Reciprocity
Missouri Certification #: 236
Montana Certification #: Cert 0074
Nebraska Certification: NE-OS-28-14
Nevada Certification: FL NELAC Reciprocity
New Hampshire Certification #: 2958
New York Certification #: 11608
North Carolina Environmental Certificate #: 667
North Carolina Certification #: 12710
North Dakota Certification #: R-216
Oklahoma Certification #: D9947
Pennsylvania Certification #: 68-00547
Puerto Rico Certification #: FL01264
South Carolina Certification: #96042001
Tennessee Certification #: TN02974
Texas Certification: FL NELAC Reciprocity
US Virgin Islands Certification: FL NELAC Reciprocity
Virginia Environmental Certification #: 460165
West Virginia Certification #: 9962C
Wisconsin Certification #: 399079670
Wyoming (EPA Region 8): FL NELAC Reciprocity

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
West Virginia Certification #: 356
Virginia/VELAP Certification #: 460222

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SAMPLE SUMMARY

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92276498001	LG-6	Water	11/17/15 08:35	11/17/15 16:40
92276498002	LG-5	Water	11/17/15 09:55	11/17/15 16:40
92276498003	LG-3	Water	11/17/15 11:15	11/17/15 16:40
92276498004	LG-7	Water	11/17/15 12:30	11/17/15 16:40
92276498005	DUP-1	Water	11/17/15 00:00	11/17/15 16:40
92276498006	LG-1	Water	11/17/15 14:30	11/17/15 16:40

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SAMPLE ANALYTE COUNT

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92276498001	LG-6	EPA 6020	CKJ, DRS	11	PASI-O
		EPA 7470	CKJ	1	PASI-O
		SM 2540C	SAM	1	PASI-A
		SM 4500-H+B	MLS	1	PASI-A
		SM 5210B	BRJ	1	PASI-A
		EPA 300.0	KEK	3	PASI-O
		EPA 353.2	DMN	1	PASI-A
		SM 5220D	WRC	1	PASI-A
		SM 5310B	MDW	1	PASI-A
		EPA 9020B	JRP	1	PASI-N
92276498002	LG-5	EPA 6020	CKJ, DRS	11	PASI-O
		EPA 7470	CKJ	1	PASI-O
		SM 2540C	SAM	1	PASI-A
		SM 4500-H+B	MLS	1	PASI-A
		SM 5210B	BRJ	1	PASI-A
		EPA 300.0	KEK	3	PASI-O
		EPA 353.2	DMN	1	PASI-A
		SM 5220D	WRC	1	PASI-A
		SM 5310B	MDW	1	PASI-A
		EPA 9020B	JRP	1	PASI-N
92276498003	LG-3	EPA 6020	CKJ, DRS	11	PASI-O
		EPA 7470	CKJ	1	PASI-O
		SM 2540C	SAM	1	PASI-A
		SM 4500-H+B	MLS	1	PASI-A
		SM 5210B	BRJ	1	PASI-A
		EPA 300.0	CMB	3	PASI-O
		EPA 353.2	DMN	1	PASI-A
		SM 5220D	WRC	1	PASI-A
		SM 5310B	MDW	1	PASI-A
		EPA 9020B	JRP	1	PASI-N
92276498004	LG-7	EPA 6020	CKJ, DRS	11	PASI-O
		EPA 7470	CKJ	1	PASI-O
		SM 2540C	SAM	1	PASI-A
		SM 4500-H+B	MLS	1	PASI-A
		SM 5210B	BRJ	1	PASI-A
		EPA 300.0	CMB	3	PASI-O
		EPA 353.2	DMN	1	PASI-A

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SAMPLE ANALYTE COUNT

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 5220D	WRC	1	PASI-A
		SM 5310B	MDW	1	PASI-A
		EPA 9020B	JRP	1	PASI-N
92276498005	DUP-1	EPA 6020	CKJ, DRS	11	PASI-O
		EPA 7470	CKJ	1	PASI-O
		SM 2540C	SAM	1	PASI-A
		SM 4500-H+B	MLS	1	PASI-A
		SM 5210B	TEP	1	PASI-A
		EPA 300.0	CMB	3	PASI-O
		EPA 353.2	DMN	1	PASI-A
		SM 5220D	WRC	1	PASI-A
		SM 5310B	MDW	1	PASI-A
		EPA 9020B	JRP	1	PASI-N
92276498006	LG-1	EPA 6020	CKJ, DRS	11	PASI-O
		EPA 7470	CKJ	1	PASI-O
		SM 2540C	SAM	1	PASI-A
		SM 4500-H+B	MLS	1	PASI-A
		SM 5210B	BRJ	1	PASI-A
		EPA 300.0	CMB	3	PASI-O
		EPA 353.2	DMN	1	PASI-A
		SM 5220D	WRC	1	PASI-A
		SM 5310B	MDW	1	PASI-A
		EPA 9020B	JRP	1	PASI-N

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ANALYTICAL RESULTS

Project: IP Roanoke Rapid 02 2009383.15
Pace Project No.: 92276498

Sample: LG-6 **Lab ID: 92276498001** Collected: 11/17/15 08:35 Received: 11/17/15 16:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Arsenic	ND	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:11	7440-38-2	
Barium	**540**	ug/L	5.0	2.5	5	11/24/15 12:55	11/30/15 19:13	7440-39-3	D4
Cadmium	**0.053J**	ug/L	0.10	0.050	1	11/24/15 12:55	11/25/15 16:11	7440-43-9	
Chromium	**3.5**	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:11	7440-47-3	
Copper	ND	ug/L	1.0	0.93	1	11/24/15 12:55	11/25/15 16:11	7440-50-8	
Iron	**3530**	ug/L	10.0	6.9	1	11/24/15 12:55	11/25/15 16:11	7439-89-6	
Lead	ND	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:11	7439-92-1	
Manganese	**924**	ug/L	5.0	3.4	5	11/24/15 12:55	11/30/15 19:13	7439-96-5	D4
Selenium	ND	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:11	7782-49-2	
Silver	ND	ug/L	0.10	0.050	1	11/24/15 12:55	11/25/15 16:11	7440-22-4	
Zinc	ND	ug/L	5.0	2.5	1	11/24/15 12:55	11/25/15 16:11	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	ND	ug/L	0.20	0.10	1	11/28/15 05:57	11/30/15 20:58	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**1170**	mg/L	250	250	1		11/19/15 14:37		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**7.2**	Std. Units	1.0	0.10	1		11/19/15 15:55		H6
5210B BOD, 5 day	Analytical Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	11/19/15 04:33	11/23/15 22:45		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**13.0**	mg/L	5.0	2.5	1		11/23/15 23:42	16887-00-6	
Fluoride	**0.34**	mg/L	0.050	0.034	1		11/23/15 23:42	16984-48-8	
Sulfate	**28.7**	mg/L	5.0	2.5	1		11/23/15 23:42	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, Nitrate	**8.8**	mg/L	0.10	0.050	5		11/19/15 00:09		
5220D COD	Analytical Method: SM 5220D								
Chemical Oxygen Demand	**44.0**	mg/L	25.0	12.5	1		11/24/15 15:40		
5310B TOC	Analytical Method: SM 5310B								
Total Organic Carbon	**12.8**	mg/L	5.0	2.5	5		11/25/15 16:22	7440-44-0	
Total Organic Halides	Analytical Method: EPA 9020B								
Total Organic Halides	ND	mg/L	0.020	0.010	1		12/12/15 10:48		

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ANALYTICAL RESULTS

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

Sample: LG-5 **Lab ID: 92276498002** Collected: 11/17/15 09:55 Received: 11/17/15 16:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Arsenic	**1.2**	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:13	7440-38-2	
Barium	**137**	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:13	7440-39-3	
Cadmium	**0.25**	ug/L	0.10	0.050	1	11/24/15 12:55	11/25/15 16:13	7440-43-9	
Chromium	**2.5**	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:13	7440-47-3	
Copper	**3.1**	ug/L	1.0	0.93	1	11/24/15 12:55	11/25/15 16:13	7440-50-8	
Iron	**1030**	ug/L	10.0	6.9	1	11/24/15 12:55	11/25/15 16:13	7439-89-6	
Lead	ND	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:13	7439-92-1	
Manganese	**1230**	ug/L	5.0	3.4	5	11/24/15 12:55	11/30/15 19:15	7439-96-5	D4
Selenium	**1.2**	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:13	7782-49-2	
Silver	ND	ug/L	0.10	0.050	1	11/24/15 12:55	11/25/15 16:13	7440-22-4	
Zinc	**18.7**	ug/L	5.0	2.5	1	11/24/15 12:55	11/25/15 16:13	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	ND	ug/L	0.20	0.10	1	11/28/15 05:57	11/30/15 21:00	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**202**	mg/L	25.0	25.0	1		11/19/15 14:37		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**6.0**	Std. Units	1.0	0.10	1		11/19/15 15:55		H6
5210B BOD, 5 day	Analytical Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	11/19/15 04:33	11/23/15 22:45		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**4.9J**	mg/L	5.0	2.5	1		11/24/15 00:04	16887-00-6	
Fluoride	**0.15**	mg/L	0.050	0.034	1		11/24/15 00:04	16984-48-8	
Sulfate	**62.6**	mg/L	5.0	2.5	1		11/24/15 00:04	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, Nitrate	**1.3**	mg/L	0.020	0.010	1		11/18/15 23:35		
5220D COD	Analytical Method: SM 5220D								
Chemical Oxygen Demand	**29.0**	mg/L	25.0	12.5	1		11/24/15 15:40		
5310B TOC	Analytical Method: SM 5310B								
Total Organic Carbon	**73.4**	mg/L	2.0	1.0	2		11/25/15 16:58	7440-44-0	M1,R1
Total Organic Halides	Analytical Method: EPA 9020B								
Total Organic Halides	ND	mg/L	0.020	0.010	1		12/12/15 11:40		

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ANALYTICAL RESULTS

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

Sample: LG-3 **Lab ID: 92276498003** Collected: 11/17/15 11:15 Received: 11/17/15 16:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Arsenic	ND	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:16	7440-38-2	
Barium	56.9	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:16	7440-39-3	
Cadmium	ND	ug/L	0.10	0.050	1	11/24/15 12:55	11/25/15 16:16	7440-43-9	
Chromium	2.0	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:16	7440-47-3	
Copper	ND	ug/L	1.0	0.93	1	11/24/15 12:55	11/25/15 16:16	7440-50-8	
Iron	300	ug/L	10.0	6.9	1	11/24/15 12:55	11/25/15 16:16	7439-89-6	
Lead	ND	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:16	7439-92-1	
Manganese	818	ug/L	5.0	3.4	5	11/24/15 12:55	11/30/15 19:18	7439-96-5	D4
Selenium	0.50J	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:16	7782-49-2	
Silver	ND	ug/L	0.10	0.050	1	11/24/15 12:55	11/25/15 16:16	7440-22-4	
Zinc	ND	ug/L	5.0	2.5	1	11/24/15 12:55	11/25/15 16:16	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	ND	ug/L	0.20	0.10	1	11/28/15 05:57	11/30/15 21:02	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	664	mg/L	100	100	1		11/19/15 14:37		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	6.8	Std. Units	1.0	0.10	1		11/19/15 15:55		H6
5210B BOD, 5 day	Analytical Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	11/19/15 04:33	11/23/15 22:45		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	34.3	mg/L	25.0	12.5	5		11/22/15 16:09	16887-00-6	
Fluoride	0.34	mg/L	0.25	0.17	5		11/22/15 16:09	16984-48-8	
Sulfate	163	mg/L	25.0	12.5	5		11/22/15 16:09	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, Nitrate	16.7	mg/L	0.20	0.10	10		11/19/15 00:12		
5220D COD	Analytical Method: SM 5220D								
Chemical Oxygen Demand	24.0J	mg/L	25.0	12.5	1		11/24/15 15:40		
5310B TOC	Analytical Method: SM 5310B								
Total Organic Carbon	4.9	mg/L	2.0	1.0	2		11/25/15 17:12	7440-44-0	
Total Organic Halides	Analytical Method: EPA 9020B								
Total Organic Halides	0.053	mg/L	0.020	0.010	1		12/12/15 12:21		

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ANALYTICAL RESULTS

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

Sample: LG-7 **Lab ID: 92276498004** Collected: 11/17/15 12:30 Received: 11/17/15 16:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Arsenic	ND	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:19	7440-38-2	
Barium	179	ug/L	1.0	0.50	1	11/24/15 12:55	11/30/15 19:26	7440-39-3	
Cadmium	ND	ug/L	0.10	0.050	1	11/24/15 12:55	11/25/15 16:19	7440-43-9	
Chromium	ND	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:19	7440-47-3	
Copper	ND	ug/L	1.0	0.93	1	11/24/15 12:55	11/25/15 16:19	7440-50-8	
Iron	410	ug/L	10.0	6.9	1	11/24/15 12:55	11/25/15 16:19	7439-89-6	
Lead	ND	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:19	7439-92-1	
Manganese	221	ug/L	1.0	0.69	1	11/24/15 12:55	11/30/15 19:26	7439-96-5	
Selenium	2.8	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:19	7782-49-2	
Silver	ND	ug/L	0.10	0.050	1	11/24/15 12:55	11/25/15 16:19	7440-22-4	
Zinc	ND	ug/L	5.0	2.5	1	11/24/15 12:55	11/25/15 16:19	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	ND	ug/L	0.20	0.10	1	11/28/15 05:57	11/30/15 21:04	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	600	mg/L	250	250	1		11/19/15 14:38		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	7.0	Std. Units	1.0	0.10	1		11/19/15 15:55		H6
5210B BOD, 5 day	Analytical Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	11/19/15 04:33	11/23/15 22:45		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	27.3	mg/L	25.0	12.5	5		11/22/15 16:30	16887-00-6	
Fluoride	0.27	mg/L	0.25	0.17	5		11/22/15 16:30	16984-48-8	
Sulfate	321	mg/L	25.0	12.5	5		11/22/15 16:30	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, Nitrate	7.5	mg/L	0.10	0.050	5		11/19/15 00:13		
5220D COD	Analytical Method: SM 5220D								
Chemical Oxygen Demand	22.0J	mg/L	25.0	12.5	1		11/24/15 15:40		
5310B TOC	Analytical Method: SM 5310B								
Total Organic Carbon	5.8	mg/L	1.0	0.50	1		11/25/15 17:36	7440-44-0	
Total Organic Halides	Analytical Method: EPA 9020B								
Total Organic Halides	0.030	mg/L	0.020	0.010	1		12/13/15 11:01		

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ANALYTICAL RESULTS

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

Sample: DUP-1 **Lab ID: 92276498005** Collected: 11/17/15 00:00 Received: 11/17/15 16:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Arsenic	**0.86J**	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:21	7440-38-2	
Barium	**87.8**	ug/L	1.0	0.50	1	11/24/15 12:55	11/30/15 19:21	7440-39-3	
Cadmium	**0.074J**	ug/L	0.10	0.050	1	11/24/15 12:55	11/25/15 16:21	7440-43-9	
Chromium	**2.0**	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:21	7440-47-3	
Copper	**11.8**	ug/L	1.0	0.93	1	11/24/15 12:55	11/25/15 16:21	7440-50-8	
Iron	**3840**	ug/L	10.0	6.9	1	11/24/15 12:55	11/25/15 16:21	7439-89-6	
Lead	**3.3**	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:21	7439-92-1	
Manganese	**355**	ug/L	1.0	0.69	1	11/24/15 12:55	11/30/15 19:21	7439-96-5	
Selenium	ND	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:21	7782-49-2	
Silver	ND	ug/L	0.10	0.050	1	11/24/15 12:55	11/25/15 16:21	7440-22-4	
Zinc	**5.5**	ug/L	5.0	2.5	1	11/24/15 12:55	11/25/15 16:21	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	ND	ug/L	0.20	0.10	1	11/28/15 05:57	11/30/15 21:06	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**29.0**	mg/L	25.0	25.0	1		11/19/15 10:19		D6
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**6.2**	Std. Units	1.0	0.10	1		11/19/15 15:55		H6
5210B BOD, 5 day	Analytical Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	11/18/15 23:28	11/23/15 17:50		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**4.2J**	mg/L	5.0	2.5	1		11/22/15 16:52	16887-00-6	
Fluoride	**0.13**	mg/L	0.050	0.034	1		11/22/15 16:52	16984-48-8	
Sulfate	**10.2**	mg/L	5.0	2.5	1		11/22/15 16:52	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, Nitrate	ND	mg/L	0.020	0.010	1		11/18/15 23:28		
5220D COD	Analytical Method: SM 5220D								
Chemical Oxygen Demand	**24.0J**	mg/L	25.0	12.5	1		11/24/15 15:40		
5310B TOC	Analytical Method: SM 5310B								
Total Organic Carbon	**7.1**	mg/L	1.0	0.50	1		11/25/15 18:14	7440-44-0	
Total Organic Halides	Analytical Method: EPA 9020B								
Total Organic Halides	**0.010J**	mg/L	0.020	0.010	1		12/13/15 11:44		

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ANALYTICAL RESULTS

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

Sample: LG-1 **Lab ID: 92276498006** Collected: 11/17/15 14:30 Received: 11/17/15 16:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Arsenic	**0.76J**	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:24	7440-38-2	
Barium	**85.8**	ug/L	1.0	0.50	1	11/24/15 12:55	11/30/15 19:23	7440-39-3	
Cadmium	**0.059J**	ug/L	0.10	0.050	1	11/24/15 12:55	11/25/15 16:24	7440-43-9	
Chromium	**1.2**	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:24	7440-47-3	
Copper	**8.1**	ug/L	1.0	0.93	1	11/24/15 12:55	11/25/15 16:24	7440-50-8	
Iron	**3380**	ug/L	10.0	6.9	1	11/24/15 12:55	11/25/15 16:24	7439-89-6	
Lead	**2.4**	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:24	7439-92-1	
Manganese	**375**	ug/L	1.0	0.69	1	11/24/15 12:55	11/30/15 19:23	7439-96-5	
Selenium	ND	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:24	7782-49-2	
Silver	ND	ug/L	0.10	0.050	1	11/24/15 12:55	11/25/15 16:24	7440-22-4	
Zinc	**4.4J**	ug/L	5.0	2.5	1	11/24/15 12:55	11/25/15 16:24	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	ND	ug/L	0.20	0.10	1	11/28/15 05:57	11/30/15 21:08	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**88.0**	mg/L	25.0	25.0	1		11/19/15 10:20		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**6.3**	Std. Units	1.0	0.10	1		11/19/15 15:55		H6
5210B BOD, 5 day	Analytical Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	11/19/15 04:33	11/23/15 22:45		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**4.2J**	mg/L	5.0	2.5	1		11/22/15 18:39	16887-00-6	
Fluoride	**0.10**	mg/L	0.050	0.034	1		11/22/15 18:39	16984-48-8	
Sulfate	**9.3**	mg/L	5.0	2.5	1		11/22/15 18:39	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, Nitrate	ND	mg/L	0.020	0.010	1		11/18/15 23:55		
5220D COD	Analytical Method: SM 5220D								
Chemical Oxygen Demand	**22.0J**	mg/L	25.0	12.5	1		11/24/15 15:40		
5310B TOC	Analytical Method: SM 5310B								
Total Organic Carbon	**7.1**	mg/L	1.0	0.50	1		11/25/15 18:29	7440-44-0	
Total Organic Halides	Analytical Method: EPA 9020B								
Total Organic Halides	ND	mg/L	0.020	0.010	1		12/13/15 13:00		

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QUALITY CONTROL DATA

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

QC Batch: MERP/6393 Analysis Method: EPA 7470
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
Associated Lab Samples: 92276498001, 92276498002, 92276498003, 92276498004, 92276498005, 92276498006

METHOD BLANK: 1403776 Matrix: Water
Associated Lab Samples: 92276498001, 92276498002, 92276498003, 92276498004, 92276498005, 92276498006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	ND	0.20	0.10	11/30/15 20:08	

LABORATORY CONTROL SAMPLE: 1403777

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	2	2.2	108	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1403778 1403779

Parameter	Units	35217114008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	0.10U	2	2	2.2	2.1	108	106	75-125	1	20	

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QUALITY CONTROL DATA

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

QC Batch: MPRP/27526 Analysis Method: EPA 6020
QC Batch Method: EPA 3010 Analysis Description: 6020 MET
Associated Lab Samples: 92276498001, 92276498002, 92276498003, 92276498004, 92276498005, 92276498006

METHOD BLANK: 1402167 Matrix: Water
Associated Lab Samples: 92276498001, 92276498002, 92276498003, 92276498004, 92276498005, 92276498006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	ug/L	ND	1.0	0.50	11/25/15 15:55	
Barium	ug/L	ND	1.0	0.50	11/25/15 15:55	
Cadmium	ug/L	ND	0.10	0.050	11/25/15 15:55	
Chromium	ug/L	ND	1.0	0.50	11/25/15 15:55	
Copper	ug/L	ND	1.0	0.93	11/25/15 15:55	
Iron	ug/L	ND	10.0	6.9	11/25/15 15:55	
Lead	ug/L	ND	1.0	0.50	11/25/15 15:55	
Manganese	ug/L	ND	1.0	0.69	11/25/15 15:55	
Selenium	ug/L	ND	1.0	0.50	11/25/15 15:55	
Silver	ug/L	ND	0.10	0.050	11/25/15 15:55	
Zinc	ug/L	ND	5.0	2.5	11/25/15 15:55	

LABORATORY CONTROL SAMPLE: 1402168

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	50	49.9	100	80-120	
Barium	ug/L	50	49.6	99	80-120	
Cadmium	ug/L	5	4.9	98	80-120	
Chromium	ug/L	50	49.0	98	80-120	
Copper	ug/L	50	50.9	102	80-120	
Iron	ug/L	500	494	99	80-120	
Lead	ug/L	50	49.2	98	80-120	
Manganese	ug/L	50	49.5	99	80-120	
Selenium	ug/L	50	48.1	96	80-120	
Silver	ug/L	5	4.9	98	80-120	
Zinc	ug/L	250	258	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1402171 1402172

Parameter	Units	92276534004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	ND	50	50	48.8	48.8	97	97	75-125	0	20	
Barium	ug/L	82.7	50	50	131	130	96	95	75-125	0	20	
Cadmium	ug/L	0.42	5	5	5.2	5.3	95	98	75-125	2	20	
Chromium	ug/L	ND	50	50	50.1	50.6	100	101	75-125	1	20	
Copper	ug/L	ND	50	50	48.8	48.1	97	96	75-125	1	20	
Iron	ug/L	120	500	500	616	615	99	99	75-125	0	20	
Lead	ug/L	ND	50	50	48.8	49.2	98	98	75-125	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1402171 1402172

Parameter	Units	92276534004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Manganese	ug/L	6030	50	50	5950	5190	-156	-1680	75-125	14	20	D4,M6
Selenium	ug/L	ND	50	50	45.9	46.1	92	92	75-125	0	20	
Silver	ug/L	ND	5	5	4.7	4.7	94	94	75-125	0	20	
Zinc	ug/L	80.9	250	250	315	388	93	123	75-125	21	20	R1

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QUALITY CONTROL DATA

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

QC Batch: WET/41480 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 92276498001, 92276498002, 92276498003, 92276498004

METHOD BLANK: 1610214 Matrix: Water
Associated Lab Samples: 92276498001, 92276498002, 92276498003, 92276498004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	11/19/15 14:29	

LABORATORY CONTROL SAMPLE: 1610215

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	250	242	97	90-110	

SAMPLE DUPLICATE: 1610216

Parameter	Units	92276507001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	42.0	53.0	23	5	D6

SAMPLE DUPLICATE: 1610217

Parameter	Units	92276391001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	127	121	5	5	

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QUALITY CONTROL DATA

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

QC Batch: WET/41488 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 92276498005, 92276498006

METHOD BLANK: 1610306 | Matrix: Water
Associated Lab Samples: 92276498005, 92276498006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	25.0	25.0	11/19/15 10:18	

LABORATORY CONTROL SAMPLE: 1610307

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	250	236	94	90-110	

SAMPLE DUPLICATE: 1610308

Parameter	Units	92276498005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	29.0	94.0	106	5	D6

SAMPLE DUPLICATE: 1610309

Parameter	Units	92276513004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	110	132	18	5	D6

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QUALITY CONTROL DATA

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

QC Batch: WET/41490 Analysis Method: SM 4500-H+B
QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH
Associated Lab Samples: 92276498001, 92276498002, 92276498003, 92276498004, 92276498005, 92276498006

SAMPLE DUPLICATE: 1610418

Parameter	Units	92276498005 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	6.2	6.3	0	10	H6

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QUALITY CONTROL DATA

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

QC Batch: WET/41477
QC Batch Method: SM 5210B
Analysis Method: SM 5210B
Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 92276498005

METHOD BLANK: 1610158
Matrix: Water
Associated Lab Samples: 92276498005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	2.0	11/23/15 17:50	

LABORATORY CONTROL SAMPLE: 1610159

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	169	85	84.6-115.4	

SAMPLE DUPLICATE: 1610160

Parameter	Units	92276411001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	3.9	4.0	3	10	

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QUALITY CONTROL DATA

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

QC Batch: WET/41478 Analysis Method: SM 5210B
QC Batch Method: SM 5210B Analysis Description: 5210B BOD, 5 day
Associated Lab Samples: 92276498001, 92276498002, 92276498003, 92276498004, 92276498006

METHOD BLANK: 1610211 Matrix: Water
Associated Lab Samples: 92276498001, 92276498002, 92276498003, 92276498004, 92276498006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
BOD, 5 day	mg/L	ND	2.0	2.0	11/23/15 22:45	

LABORATORY CONTROL SAMPLE: 1610212

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
BOD, 5 day	mg/L	198	169	85	84.6-115.4	

SAMPLE DUPLICATE: 1610213

Parameter	Units	92276498001 Result	Dup Result	RPD	Max RPD	Qualifiers
BOD, 5 day	mg/L	ND	2.1		10	

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QUALITY CONTROL DATA

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

QC Batch: WETA/52382 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 92276498001, 92276498002, 92276498003, 92276498004, 92276498005, 92276498006

METHOD BLANK: 1400954 Matrix: Water
Associated Lab Samples:

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	ND	5.0	2.5	11/22/15 12:56	
Fluoride	mg/L	ND	0.050	0.034	11/22/15 12:56	
Sulfate	mg/L	ND	5.0	2.5	11/22/15 12:56	

LABORATORY CONTROL SAMPLE: 1400955

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	50	47.0	94	90-110	
Fluoride	mg/L	5	4.9	98	90-110	
Sulfate	mg/L	50	47.0	94	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1400956 1400957

Parameter	Units	35217825003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	5.3	50	50	51.3	51.2	92	92	90-110	0	20	
Fluoride	mg/L	0.070	5	5	4.9	4.9	96	96	90-110	0	20	
Sulfate	mg/L	57.5	50	50	111	110	106	106	90-110	0	20	E

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1400958 1400959

Parameter	Units	92276498005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	4.2J	50	50	49.4	49.2	90	90	90-110	0	20	
Fluoride	mg/L	0.13	5	5	4.9	4.9	95	95	90-110	0	20	
Sulfate	mg/L	10.2	50	50	56.6	56.4	93	93	90-110	0	20	

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QUALITY CONTROL DATA

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

QC Batch: WETA/25461 Analysis Method: EPA 353.2
QC Batch Method: EPA 353.2 Analysis Description: 353.2 Nitrate + Nitrite, Unpres.
Associated Lab Samples: 92276498001, 92276498002, 92276498003, 92276498004, 92276498005, 92276498006

METHOD BLANK: 1610149 Matrix: Water
Associated Lab Samples: 92276498001, 92276498002, 92276498003, 92276498004, 92276498005, 92276498006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, Nitrate	mg/L	ND	0.020	0.010	11/18/15 23:25	

LABORATORY CONTROL SAMPLE: 1610150

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Nitrate	mg/L	2.5	2.6	103	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1610151 1610152

Parameter	Units	92276498001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, Nitrate	mg/L	8.8	2.5	2.5	11.5	11.5	107	107	90-110	0	10	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1610153 1610154

Parameter	Units	92276498002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, Nitrate	mg/L	1.3	2.5	2.5	3.8	3.8	99	99	90-110	0	10	

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QUALITY CONTROL DATA

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

QC Batch: WETA/25528 Analysis Method: SM 5220D
QC Batch Method: SM 5220D Analysis Description: 5220D COD
Associated Lab Samples: 92276498001, 92276498002, 92276498003, 92276498004, 92276498005, 92276498006

METHOD BLANK: 1614043 Matrix: Water
Associated Lab Samples: 92276498001, 92276498002, 92276498003, 92276498004, 92276498005, 92276498006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chemical Oxygen Demand	mg/L	ND	25.0	12.5	11/24/15 15:40	

LABORATORY CONTROL SAMPLE: 1614044

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	750	749	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1614045 1614046

Parameter	Units	92276946001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chemical Oxygen Demand	mg/L	ND	750	750	801	801	104	104	90-110	0	3	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1614047 1614048

Parameter	Units	92277263001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chemical Oxygen Demand	mg/L	ND	750	750	712	712	93	93	90-110	0	3	

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QUALITY CONTROL DATA

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

QC Batch: WETA/25554 Analysis Method: SM 5310B
QC Batch Method: SM 5310B Analysis Description: 5310B TOC
Associated Lab Samples: 92276498001, 92276498002, 92276498003, 92276498004, 92276498005, 92276498006

METHOD BLANK: 1615208 Matrix: Water
Associated Lab Samples: 92276498001, 92276498002, 92276498003, 92276498004, 92276498005, 92276498006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Organic Carbon	mg/L	ND	1.0	0.50	11/25/15 15:45	

LABORATORY CONTROL SAMPLE: 1615209

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	25	24.1	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1615210 1615211

Parameter	Units	92276498001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	12.8	25	25	38.2	38.6	102	103	90-110	1	5	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1615212 1615213

Parameter	Units	92276498002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Total Organic Carbon	mg/L	73.4	25	25	28.2	31.5	-181	-167	90-110	11	5	M1,R1

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QUALITY CONTROL DATA

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

QC Batch: WETA/8299 Analysis Method: EPA 9020B
QC Batch Method: EPA 9020B Analysis Description: 9020B W TOX
Associated Lab Samples: 92276498004, 92276498005, 92276498006

METHOD BLANK: 183354 Matrix: Water
Associated Lab Samples:

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Organic Halides	mg/L	ND	0.020	0.010	12/13/15 10:42	

LABORATORY CONTROL SAMPLE: 183355

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Halides	mg/L	.1	0.094	94	85-115	

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QUALITY CONTROL DATA

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

QC Batch: WETA/8307 Analysis Method: EPA 9020B
QC Batch Method: EPA 9020B Analysis Description: 9020B W TOX
Associated Lab Samples: 92276498001, 92276498002, 92276498003

METHOD BLANK: 183443 Matrix: Water
Associated Lab Samples:

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Organic Halides	mg/L	ND	0.020	0.010	12/12/15 09:50	

LABORATORY CONTROL SAMPLE: 183444

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Halides	mg/L	.1	0.096	96	85-115	

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QUALIFIERS

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

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.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether, Styrene, and Vinyl chloride.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

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-N	Pace Analytical Services - New Orleans
PASI-O	Pace Analytical Services - Ormond Beach

BATCH QUALIFIERS

Batch: WETA/8299

[M5] A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

Batch: WETA/8307

[M5] A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

ANALYTE QUALIFIERS

D4	Sample was diluted due to the presence of high levels of target analytes.
D6	The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
H6	Analysis initiated outside of the 15 minute EPA recommended holding time.
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.
R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92276498001	LG-6	EPA 3010	MPRP/27526	EPA 6020	ICPM/11219
92276498002	LG-5	EPA 3010	MPRP/27526	EPA 6020	ICPM/11219
92276498003	LG-3	EPA 3010	MPRP/27526	EPA 6020	ICPM/11219
92276498004	LG-7	EPA 3010	MPRP/27526	EPA 6020	ICPM/11219
92276498005	DUP-1	EPA 3010	MPRP/27526	EPA 6020	ICPM/11219
92276498006	LG-1	EPA 3010	MPRP/27526	EPA 6020	ICPM/11219
92276498001	LG-6	EPA 7470	MERP/6393	EPA 7470	MERC/6380
92276498002	LG-5	EPA 7470	MERP/6393	EPA 7470	MERC/6380
92276498003	LG-3	EPA 7470	MERP/6393	EPA 7470	MERC/6380
92276498004	LG-7	EPA 7470	MERP/6393	EPA 7470	MERC/6380
92276498005	DUP-1	EPA 7470	MERP/6393	EPA 7470	MERC/6380
92276498006	LG-1	EPA 7470	MERP/6393	EPA 7470	MERC/6380
92276498001	LG-6	SM 2540C	WET/41480		
92276498002	LG-5	SM 2540C	WET/41480		
92276498003	LG-3	SM 2540C	WET/41480		
92276498004	LG-7	SM 2540C	WET/41480		
92276498005	DUP-1	SM 2540C	WET/41488		
92276498006	LG-1	SM 2540C	WET/41488		
92276498001	LG-6	SM 4500-H+B	WET/41490		
92276498002	LG-5	SM 4500-H+B	WET/41490		
92276498003	LG-3	SM 4500-H+B	WET/41490		
92276498004	LG-7	SM 4500-H+B	WET/41490		
92276498005	DUP-1	SM 4500-H+B	WET/41490		
92276498006	LG-1	SM 4500-H+B	WET/41490		
92276498001	LG-6	SM 5210B	WET/41478	SM 5210B	WET/41481
92276498002	LG-5	SM 5210B	WET/41478	SM 5210B	WET/41481
92276498003	LG-3	SM 5210B	WET/41478	SM 5210B	WET/41481
92276498004	LG-7	SM 5210B	WET/41478	SM 5210B	WET/41481
92276498005	DUP-1	SM 5210B	WET/41477	SM 5210B	WET/41479
92276498006	LG-1	SM 5210B	WET/41478	SM 5210B	WET/41481
92276498001	LG-6	EPA 300.0	WETA/52382		
92276498002	LG-5	EPA 300.0	WETA/52382		
92276498003	LG-3	EPA 300.0	WETA/52382		
92276498004	LG-7	EPA 300.0	WETA/52382		
92276498005	DUP-1	EPA 300.0	WETA/52382		
92276498006	LG-1	EPA 300.0	WETA/52382		
92276498001	LG-6	EPA 353.2	WETA/25461		
92276498002	LG-5	EPA 353.2	WETA/25461		
92276498003	LG-3	EPA 353.2	WETA/25461		
92276498004	LG-7	EPA 353.2	WETA/25461		
92276498005	DUP-1	EPA 353.2	WETA/25461		
92276498006	LG-1	EPA 353.2	WETA/25461		
92276498001	LG-6	SM 5220D	WETA/25528		
92276498002	LG-5	SM 5220D	WETA/25528		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92276498003	LG-3	SM 5220D	WETA/25528		
92276498004	LG-7	SM 5220D	WETA/25528		
92276498005	DUP-1	SM 5220D	WETA/25528		
92276498006	LG-1	SM 5220D	WETA/25528		
92276498001	LG-6	SM 5310B	WETA/25554		
92276498002	LG-5	SM 5310B	WETA/25554		
92276498003	LG-3	SM 5310B	WETA/25554		
92276498004	LG-7	SM 5310B	WETA/25554		
92276498005	DUP-1	SM 5310B	WETA/25554		
92276498006	LG-1	SM 5310B	WETA/25554		
92276498001	LG-6	EPA 9020B	WETA/8307		
92276498002	LG-5	EPA 9020B	WETA/8307		
92276498003	LG-3	EPA 9020B	WETA/8307		
92276498004	LG-7	EPA 9020B	WETA/8299		
92276498005	DUP-1	EPA 9020B	WETA/8299		
92276498006	LG-1	EPA 9020B	WETA/8299		

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Pace Analytical www.pacelabs.com	Document Name: Sample Condition Upon Receipt (SCUR)	Document Revised: May 15, 2015 Page 1 of 2*
	Document No.: F-RAL-CS-001-rev.03	Issuing Authorities: Pace Raleigh Quality Office

*Page 2 of 2 is for Internal Use Only

Client Name: Earthcon Consultants

Courier (Circle): Fed Ex UPS USPS Client Commercial (Pace) Other_____

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals Intact: ☑ yes ☐ no

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other_____

Circle Thermometer Used: IR Gun SN:122065387 Type of Ice: (Wet) Blue None ☐ Samples on ice, cooling process has begun

IR Gun Back Up SN:122065371

Temp Correction Factor: Add / (Subtract) 0.1 C

Corrected Cooler Temp.: 0.4 C Biological Tissue is Frozen: Yes No (N/A)

Temp should be above freezing to 6°C

Date and Initials of person examining contents/ Preservation check: NMG 11/17/15

		Comments:
Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
Short Hold Time Analysis (<72hr):	☑Yes ☐No ☐N/A	6. Cool, NO_2NO_3
Rush Turn Around Time Requested:	☐Yes ☑No ☐N/A	7.
Sufficient Volume:	☑Yes ☐No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No ☐N/A	9.
-Pace Containers Used:	☑Yes ☐No ☐N/A	
Containers Intact:	☑Yes ☐No ☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC:	☑Yes ☐No ☐N/A	12.
-Includes date/time/ID/Analysis Matrix: WT		
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	☑Yes ☐No	
Samples checked for dechlorination:	☑Yes ☐No ☐N/A	14.
Headspace in VOA Vials (>6mm):	☐Yes ☐No ☑N/A	15.
Trip Blank Present:	☐Yes ☐No ☑N/A	16.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

SCURF /SRF Review::	NMG NMG	Date:	11-17-15 11-18-15

WO#: 92276498

92276498

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)

Pace Analytical
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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

1995399

Section A Required Client Information:

Company: EarthCon Consultants, Inc
Address: 1000 West Oak Ally Rd/100 Stento
Marietta, GA 30062
Email To: PRamsey@EarthCon.com
Phone: 770-973-2100 Fax: 770-973-7395
Requested Due Date/TAT: Standard

Section B Required Project Information:

Report To: Peter Ramsey
Copy To:
Purchase Order No.:
Project Name: JP Roanoke Rapids
Project Number: 02-2005393.15

Section C Invoice Information:

Attention: Same
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: NC

Section D Required Client Information

Matrix Codes MATRIX / CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start Date	Composite Start Time	Composite End/Grab Date	Composite End/Grab Time	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other H_2PO_4	BOD	COD	Cl, F, SO4	Metals	Nitrate / Nit	TDS	TOC	TOX	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	LG-6	WT	G	11/17/15		0835			11	4	3	1					3	1	1	1	1	1	1	3	2		001
2	LG-5	WT	G	11/17/15		0955			11	4	3	1					3	1	1	1	1	1	1	3	2		002
3	LG-3	WT	G	11/17/15		1115			11	4	3	1					3	1	1	1	1	1	1	3	2		003
4	LG-7	WT	G	11/17/15		1230			11	4	3	1					3	1	1	1	1	1	1	3	2		004
5	Dup-1	WT	G	11/17/15		—			11	4	3	1					3	1	1	1	1	1	1	3	2		005
6	LG-1	WT	G	11/17/15		1430			11	4	3	1					3	1	1	1	1	1	1	3	2		006
7																											~~00~~ NRG
8																											11/17/15
9																											
10																											
11																											
12																											

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	[signature]	11/17/15	1510	[signature] Pace						
	[signature] Pace	11-17-15	1640	[signature]	11/17/15	1640	0.4	Y	N	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Kevin Davis

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11/17/15

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

EarthCon Consultants, Inc.

Quality Assurance Review

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Environmental Challenges
BUSINESS SOLUTIONS ®

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Memorandum

DATE:	December 16, 2015
TO:	Peter Ramsey
FROM:	Mary Ann Brookshire
SUBJECT:	Quality Assurance Review
PROJECT:	International Paper - Roanoke Rapids, NC - Low Ground Landfill
SAMPLING DATE:	November 17, 2015
PROJECT NUMBER:	25.20090383.14

1.0 Introduction

This memorandum presents the cursory validation of the water sample analyses listed in Table 1. The analyses were performed by Pace Analytical Services, Inc., located in Huntersville, NC.

The criteria used to qualify the data are from the *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA 2010), the analytical methods, or the professional judgment of the validation chemist. The following laboratory deliverables were reviewed during the validation process:

- Chain-of-custody (COC) documentation to assess holding times and verify report completeness
- Laboratory quality control (QC) sample results, including method blanks, laboratory control samples (LCS), matrix spike/matrix spike duplicates (MS/MSD), and laboratory duplicates
- Field QC sample results including field duplicates
- Analytical results to verify reporting limits

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Table 1 – Sample Data Reviewed

Sample ID	Laboratory ID	Total Metals[a]	Wet Chemistry Parameters[b]
LG-6	92276498001	X	X
LG-5	92276498002	X	X
LG-3	92276498003	X	X
LG-7	92276498004	X	X
DUP-1	92276498005	X	X
LG-1	92276498006	X	X

[a] Total metals by methods 6020 and 7470 (USPEPA 1996)
[b] BOD by Method SM5210B, TOC by SM 5310B, COD by Method 5220D, pH by Method 4500-H+B, TDS by Method SM 2540C, TOX by Method 9020B, nitrate nitrogen by Method EPA 353.2, and sulfate, fluoride and chloride by Method 300.0 (SM 1992, USEPA 1983, USEPA 1996, and USEPA 1999b)

2.0 Data Validation Findings

2.1 Custody, Preservation, and Completeness

Sample custody was maintained from sample collection to receipt at the laboratory. The report is complete and contains results for the samples and tests requested on the COC form. The samples were received intact and were properly preserved.

2.2 Metals Analyses

The samples listed on Table 1 were analyzed for total iron, manganese, arsenic, barium, cadmium, chromium, copper, lead, selenium, silver, and zinc by Method 6020 and total mercury by Method 7470.

2.2.1 Holding Times

The samples were analyzed within the method-required holding times of 28 days for mercury and 180 days for the other metals.

2.2.2 Blank Analyses

2.2.2.1 Method Blanks

Method blanks were analyzed at the required frequency of one per digestion batch. Target metals were not detected at concentrations above the method detection limits (MDLs) in the method blanks.

2.2.2.2 Field Blanks

Field blank samples were not collected. Data qualification is not required.

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2.2.3 Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

MS/MSDs were analyzed at the required frequency of one per digestion batch. The recovery and RPD values for the MS/MSD are within the laboratory QC limits with the following exceptions.

- The MS and MSD recovery values were outside laboratory QC limits for manganese. Data qualification is not required as the concentration of manganese in the spiked sample is greater than four times the spike value and overwhelms the spike amount.
- The zinc RPD between a batch MS and MSD is 21, which exceeds the laboratory QC limit of 20. Data qualification is not required as the batch sample does not reflect the sample matrix.

2.2.4 Laboratory Control Sample Analyses

LCS samples were analyzed at the required frequency of one per digestion batch. The recovery values are within the laboratory QC limits 80 to 120 percent.

2.2.5 Laboratory Reporting Limits

Project specific reporting limits were not specified. The reporting limits used by the laboratory are reasonable for the analytical methods.

2.2.6 Field Duplicates

One field duplicate pair (LG-1/ DUP-1) was collected with these samples. Field duplicate RPD values less than 35 are considered acceptable precision for water samples. The field duplicate RPD values are acceptable with the exception of copper as shown in the table below. The copper results for samples LG-1 and DUP-1 are qualified as estimated (J) based on the field duplicate RPD.

Analyte	Units	PQL	LG-1	DUP-1	RPD
Arsenic	ug/L	1	0.78 J	0.86 J	NC
Barium	ug/L	1	85.8	87.8	2.3
Cadmium	ug/L	0.1	0.059 J	0.074 J	NC
Chromium	ug/L	1	1.2	2.0	0.8
Copper	ug/L	1	8.1	11.8	37.2
Iron	ug/L	10	3380	3840	12.7
Lead	ug/L	1	2.4	3.3	0.9
Manganese	ug/L	1	375	355	5.5
Zinc	ug/L	5	4.4 J	5.5	NC

NC - not calculated. One or more results is less than the PQL.
*For results < 5x PQL, the RPD is the absolute difference between the duplicate values and the control limit is the PQL.

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2.2.7 Overall Assessment of Data Usability

The usability of the data is based on the EPA guidance documents noted previously. Based upon the information presented here, the data are acceptable with qualification.

2.3 General Chemistry Analyses

The samples were analyzed for biochemical oxygen demand (BOD), total organic carbon (TOC), chemical oxygen demand (COD), pH, conductivity, total dissolved solids (TDS), nitrate nitrogen, fluoride, sulfate, chloride, and total organic halides (TOX).

2.3.1 Holding Times

The samples were analyzed within the method-required holding times with the following exceptions.

- The pH analyses were performed beyond the method holding time of ASAP (usually interpreted as less than 15 minutes). The pH result for each sample is qualified as estimated (J).

2.3.2 Blank Analyses

2.3.2.1 Method Blanks

Method blanks were analyzed at the required frequency of one per batch. Target analytes were not detected in the method blanks.

2.3.2.2 Field Blanks

Field blank samples were not collected. Data qualification is not required.

2.3.3 Matrix Spike Analyses

Except as noted below, matrix spikes were reported as required. The recovery values are within the laboratory QC limits with the following exceptions.

- Matrix spike analyses were not reported for TOX. Data qualifiers are not required based on a lack of laboratory QC samples. The LCS results are acceptable, demonstrating the analytical system is in-control.
- The recovery values for TOC in batch MS and MSD samples are outside the 90 to 110 percent QC limit. Data qualification is not required as the batch sample does not reflect the sample matrix. The LCS recovery and the site-specific MS/MSD recovery values are within laboratory QC limits demonstrating the analytical system is in-control.

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2.3.4 Matrix Duplicate Analyses

Matrix duplicates were analyzed for pH, BOD, and TDS as required. The RPD values are within the laboratory QC limits with the following exceptions.

- The RPD for TDS in a batch sample is 23, which exceeds the laboratory QC limit of 5. Data qualification is not required as the batch sample does not reflect the sample matrix.
- The RPD for TDS in a batch sample is 18, which exceeds the laboratory QC limit of 5. Data qualification is not required as the batch sample does not reflect the sample matrix.
- The RPD for TDS in sample DUP-1 is 106, which exceeds the laboratory QC limit of 5. The result for TDS in sample DUP-1 is qualified as estimated (J).

2.3.5 Laboratory Control Sample Analyses

LCS were analyzed as required. The recovery and RPD values are within the laboratory QC limits.

2.3.6 Laboratory Reporting Limits

Project specific reporting limits were not specified. The reporting limits used by the laboratory are reasonable for the analytical methods.

2.3.7 Field Duplicates Analyses

One field duplicate pair (LG-1/DUP-1) was collected with the samples. The field duplicate results are consistent with the sample results with the exception of the TDS RPD. The TDS RPD is 59, which exceeds the guideline of 35 for water samples. The TDS results for both samples LG-1 and DUP-1 are qualified as estimated (J). The RPD values for the detected analytes are provided in the table below.

Analyte	Units	PQL	LG-1	DUP-1	RPD
Total Organic Carbon	mg/L	1	7.1	7.1	0.0
Chemical Oxygen Demand	mg/L	25	22 J	24 J	NC
Chloride	mg/L	5	4.2 J	4.2 J	NC
Fluoride	mg/L	0.05	0.1	0.13	0.03
pH	S.U.	1	6.30	6.20	1.6
Total Dissolved Solids	mg/L	25	88	29	59.0
Total Organic Halides	mg/L	0.02	<0.01	0.10 J	NC
Sulfate	mg/L	5	9.3	10.2	0.9

NC - not calculated. One or more results are less than the PQL.
*For results < 5x PQL, the RPD is the absolute difference between the duplicate values and the control limit is the PQL.

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2.3.8 Overall Assessment of Data Usability

The usability of the data is based on the EPA guidance documents noted previously. Based upon the information presented here, the data are acceptable with qualification.

3.0 Data Qualifier Definitions

The following data validation qualifiers were used in the review of this data set. These qualifiers are from *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA 2004).

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

R The data are unusable. The sample result was rejected due to serious deficiencies in meeting quality control criteria. The Analyte may or may not be present in the sample.

4.0 References

SM 1992. Standard Methods for the Examination of Water and Waste, 18th Edition. 1992.

USEPA. 1983. Methods for Chemical Analysis of Water and Waste EPA/600/4-79/020. United States Environmental Protection Agency. Office of Research and Development. March 1983.

USEPA. 1996. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846) Third Edition, Updates I, II, IIA, IIB, and III. United States Environmental Protection Agency. Office of Solid Waste. December 1996.

USEPA. 2010. Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. U.S. Environmental Protection Agency Office of Superfund Remediation and Technology Innovation. EPA 540-R-04-004. January 2010.

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5.0 Summary of Qualified Data

The following sample results were qualified during the review of this data set.

Sample ID	Analyte	Qualifier	Reason for Qualification
LG-1	Copper	J	Field duplicate RPD > 35
DUP-1	Copper	J	Field duplicate RPD > 35
LG-6	pH	J	Analysis holding time exceeded
LG-5	pH	J	Analysis holding time exceeded
LG-3	pH	J	Analysis holding time exceeded
LG-7	pH	J	Analysis holding time exceeded
DUP-1	pH	J	Analysis holding time exceeded
LG-1	pH	J	Analysis holding time exceeded
DUP-1	TDS	J	RPD between MS/MSD > criteria
LG-1	TDS	J	Field duplicate RPD > criteria
DUP-1	TDS	J	Field duplicate RPD > criteria

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ANALYTICAL RESULTS

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

Sample: LG-1 Lab ID: 92276498006 Collected: 11/17/15 14:30 Received: 11/17/15 16:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Arsenic	0.76J	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:24	7440-38-2	
Barium	85.8	ug/L	1.0	0.50	1	11/24/15 12:55	11/30/15 19:23	7440-39-3	
Cadmium	0.059J	ug/L	0.10	0.050	1	11/24/15 12:55	11/25/15 16:24	7440-43-9	
Chromium	1.2	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:24	7440-47-3	
Copper	8.1 J	ug/L	1.0	0.93	1	11/24/15 12:55	11/25/15 16:24	7440-50-8	
Iron	3380	ug/L	10.0	6.9	1	11/24/15 12:55	11/25/15 16:24	7439-89-6	
Lead	2.4	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:24	7439-92-1	
Manganese	375	ug/L	1.0	0.69	1	11/24/15 12:55	11/30/15 19:23	7439-96-5	
Selenium	ND	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:24	7782-49-2	
Silver	ND	ug/L	0.10	0.050	1	11/24/15 12:55	11/25/15 16:24	7440-22-4	
Zinc	4.4J	ug/L	5.0	2.5	1	11/24/15 12:55	11/25/15 16:24	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	ND	ug/L	0.20	0.10	1	11/28/15 05:57	11/30/15 21:08	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	88.0 J	mg/L	25.0	25.0	1		11/19/15 10:20		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	6.3 J	Std. Units	1.0	0.10	1		11/19/15 15:55		H6
5210B BOD, 5 day	Analytical Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	11/19/15 04:33	11/23/15 22:45		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	4.2J	mg/L	5.0	2.5	1		11/22/15 18:39	16887-00-6	
Fluoride	0.10	mg/L	0.050	0.034	1		11/22/15 18:39	16984-48-8	
Sulfate	9.3	mg/L	5.0	2.5	1		11/22/15 18:39	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, Nitrate	ND	mg/L	0.020	0.010	1		11/18/15 23:55		
5220D COD	Analytical Method: SM 5220D								
Chemical Oxygen Demand	22.0J	mg/L	25.0	12.5	1		11/24/15 15:40		
5310B TOC	Analytical Method: SM 5310B								
Total Organic Carbon	7.1	mg/L	1.0	0.50	1		11/25/15 18:29	7440-44-0	
Total Organic Halides	Analytical Method: EPA 9020B								
Total Organic Halides	ND	mg/L	0.020	0.010	1		12/13/15 13:00		

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ANALYTICAL RESULTS

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

Sample: LG-3 **Lab ID: 92276498003** Collected: 11/17/15 11:15 Received: 11/17/15 16:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Arsenic	ND	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:16	7440-38-2	
Barium	56.9	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:16	7440-39-3	
Cadmium	ND	ug/L	0.10	0.050	1	11/24/15 12:55	11/25/15 16:16	7440-43-9	
Chromium	2.0	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:16	7440-47-3	
Copper	ND	ug/L	1.0	0.93	1	11/24/15 12:55	11/25/15 16:16	7440-50-8	
Iron	300	ug/L	10.0	6.9	1	11/24/15 12:55	11/25/15 16:16	7439-89-6	
Lead	ND	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:16	7439-92-1	
Manganese	818	ug/L	5.0	3.4	5	11/24/15 12:55	11/30/15 19:18	7439-96-5	D4
Selenium	0.50J	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:16	7782-49-2	
Silver	ND	ug/L	0.10	0.050	1	11/24/15 12:55	11/25/15 16:16	7440-22-4	
Zinc	ND	ug/L	5.0	2.5	1	11/24/15 12:55	11/25/15 16:16	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	ND	ug/L	0.20	0.10	1	11/28/15 05:57	11/30/15 21:02	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	664	mg/L	100	100	1		11/19/15 14:37		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	6.8	Std. Units J	1.0	0.10	1		11/19/15 15:55		H6
5210B BOD, 5 day	Analytical Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	11/19/15 04:33	11/23/15 22:45		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	34.3	mg/L	25.0	12.5	5		11/22/15 16:09	16887-00-6	
Fluoride	0.34	mg/L	0.25	0.17	5		11/22/15 16:09	16984-48-8	
Sulfate	163	mg/L	25.0	12.5	5		11/22/15 16:09	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, Nitrate	16.7	mg/L	0.20	0.10	10		11/19/15 00:12		
5220D COD	Analytical Method: SM 5220D								
Chemical Oxygen Demand	24.0J	mg/L	25.0	12.5	1		11/24/15 15:40		
5310B TOC	Analytical Method: SM 5310B								
Total Organic Carbon	4.9	mg/L	2.0	1.0	2		11/25/15 17:12	7440-44-0	
Total Organic Halides	Analytical Method: EPA 9020B								
Total Organic Halides	0.053	mg/L	0.020	0.010	1		12/12/15 12:21		

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ANALYTICAL RESULTS

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

Sample: LG-5 Lab ID: 92276498002 Collected: 11/17/15 09:55 Received: 11/17/15 16:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Arsenic	1.2	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:13	7440-38-2	
Barium	137	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:13	7440-39-3	
Cadmium	0.25	ug/L	0.10	0.050	1	11/24/15 12:55	11/25/15 16:13	7440-43-9	
Chromium	2.5	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:13	7440-47-3	
Copper	3.1	ug/L	1.0	0.93	1	11/24/15 12:55	11/25/15 16:13	7440-50-8	
Iron	1030	ug/L	10.0	6.9	1	11/24/15 12:55	11/25/15 16:13	7439-89-6	
Lead	ND	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:13	7439-92-1	
Manganese	1230	ug/L	5.0	3.4	5	11/24/15 12:55	11/30/15 19:15	7439-96-5	D4
Selenium	1.2	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:13	7782-49-2	
Silver	ND	ug/L	0.10	0.050	1	11/24/15 12:55	11/25/15 16:13	7440-22-4	
Zinc	18.7	ug/L	5.0	2.5	1	11/24/15 12:55	11/25/15 16:13	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	ND	ug/L	0.20	0.10	1	11/28/15 05:57	11/30/15 21:00	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	202	mg/L	25.0	25.0	1		11/19/15 14:37		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	6.0	Std. Units J	1.0	0.10	1		11/19/15 15:55		H6
5210B BOD, 5 day	Analytical Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	11/19/15 04:33	11/23/15 22:45		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	4.9J	mg/L	5.0	2.5	1		11/24/15 00:04	16887-00-6	
Fluoride	0.15	mg/L	0.050	0.034	1		11/24/15 00:04	16984-48-8	
Sulfate	62.6	mg/L	5.0	2.5	1		11/24/15 00:04	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, Nitrate	1.3	mg/L	0.020	0.010	1		11/18/15 23:35		
5220D COD	Analytical Method: SM 5220D								
Chemical Oxygen Demand	29.0	mg/L	25.0	12.5	1		11/24/15 15:40		
5310B TOC	Analytical Method: SM 5310B								
Total Organic Carbon	73.4	mg/L	2.0	1.0	2		11/25/15 16:58	7440-44-0	M1,R1
Total Organic Halides	Analytical Method: EPA 9020B								
Total Organic Halides	ND	mg/L	0.020	0.010	1		12/12/15 11:40		

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ANALYTICAL RESULTS

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

Sample: LG-6 Lab ID: 92276498001 Collected: 11/17/15 08:35 Received: 11/17/15 16:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Arsenic	ND	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:11	7440-38-2	
Barium	540	ug/L	5.0	2.5	5	11/24/15 12:55	11/30/15 19:13	7440-39-3	D4
Cadmium	0.053J	ug/L	0.10	0.050	1	11/24/15 12:55	11/25/15 16:11	7440-43-9	
Chromium	3.5	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:11	7440-47-3	
Copper	ND	ug/L	1.0	0.93	1	11/24/15 12:55	11/25/15 16:11	7440-50-8	
Iron	3530	ug/L	10.0	6.9	1	11/24/15 12:55	11/25/15 16:11	7439-89-6	
Lead	ND	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:11	7439-92-1	
Manganese	924	ug/L	5.0	3.4	5	11/24/15 12:55	11/30/15 19:13	7439-96-5	D4
Selenium	ND	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:11	7782-49-2	
Silver	ND	ug/L	0.10	0.050	1	11/24/15 12:55	11/25/15 16:11	7440-22-4	
Zinc	ND	ug/L	5.0	2.5	1	11/24/15 12:55	11/25/15 16:11	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	ND	ug/L	0.20	0.10	1	11/28/15 05:57	11/30/15 20:58	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	1170	mg/L	250	250	1		11/19/15 14:37		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	7.2	Std. Units J	1.0	0.10	1		11/19/15 15:55		H6
5210B BOD, 5 day	Analytical Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	11/19/15 04:33	11/23/15 22:45		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	13.0	mg/L	5.0	2.5	1		11/23/15 23:42	16887-00-6	
Fluoride	0.34	mg/L	0.050	0.034	1		11/23/15 23:42	16984-48-8	
Sulfate	28.7	mg/L	5.0	2.5	1		11/23/15 23:42	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, Nitrate	8.8	mg/L	0.10	0.050	5		11/19/15 00:09		
5220D COD	Analytical Method: SM 5220D								
Chemical Oxygen Demand	44.0	mg/L	25.0	12.5	1		11/24/15 15:40		
5310B TOC	Analytical Method: SM 5310B								
Total Organic Carbon	12.8	mg/L	5.0	2.5	5		11/25/15 16:22	7440-44-0	
Total Organic Halides	Analytical Method: EPA 9020B								
Total Organic Halides	ND	mg/L	0.020	0.010	1		12/12/15 10:48		

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ANALYTICAL RESULTS

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

Sample: LG-7 Lab ID: **92276498004** Collected: 11/17/15 12:30 Received: 11/17/15 16:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Arsenic	ND	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:19	7440-38-2	
Barium	**179**	ug/L	1.0	0.50	1	11/24/15 12:55	11/30/15 19:26	7440-39-3	
Cadmium	ND	ug/L	0.10	0.050	1	11/24/15 12:55	11/25/15 16:19	7440-43-9	
Chromium	ND	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:19	7440-47-3	
Copper	ND	ug/L	1.0	0.93	1	11/24/15 12:55	11/25/15 16:19	7440-50-8	
Iron	**410**	ug/L	10.0	6.9	1	11/24/15 12:55	11/25/15 16:19	7439-89-6	
Lead	ND	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:19	7439-92-1	
Manganese	**221**	ug/L	1.0	0.69	1	11/24/15 12:55	11/30/15 19:26	7439-96-5	
Selenium	**2.8**	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:19	7782-49-2	
Silver	ND	ug/L	0.10	0.050	1	11/24/15 12:55	11/25/15 16:19	7440-22-4	
Zinc	ND	ug/L	5.0	2.5	1	11/24/15 12:55	11/25/15 16:19	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	ND	ug/L	0.20	0.10	1	11/28/15 05:57	11/30/15 21:04	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**600**	mg/L	250	250	1		11/19/15 14:38		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	**7.0**	Std. Units J	1.0	0.10	1		11/19/15 15:55		H6
5210B BOD, 5 day	Analytical Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	11/19/15 04:33	11/23/15 22:45		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**27.3**	mg/L	25.0	12.5	5		11/22/15 16:30	16887-00-6	
Fluoride	**0.27**	mg/L	0.25	0.17	5		11/22/15 16:30	16984-48-8	
Sulfate	**321**	mg/L	25.0	12.5	5		11/22/15 16:30	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, Nitrate	**7.5**	mg/L	0.10	0.050	5		11/19/15 00:13		
5220D COD	Analytical Method: SM 5220D								
Chemical Oxygen Demand	**22.0J**	mg/L	25.0	12.5	1		11/24/15 15:40		
5310B TOC	Analytical Method: SM 5310B								
Total Organic Carbon	**5.8**	mg/L	1.0	0.50	1		11/25/15 17:36	7440-44-0	
Total Organic Halides	Analytical Method: EPA 9020B								
Total Organic Halides	**0.030**	mg/L	0.020	0.010	1		12/13/15 11:01		

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ANALYTICAL RESULTS

Project: IP Roanoke Rapid 02.2009383.15
Pace Project No.: 92276498

Sample: DUP-1 Lab ID: 92276498005 Collected: 11/17/15 00:00 Received: 11/17/15 16:40 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS	Analytical Method: EPA 6020 Preparation Method: EPA 3010								
Arsenic	0.86J	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:21	7440-38-2	
Barium	87.8	ug/L	1.0	0.50	1	11/24/15 12:55	11/30/15 19:21	7440-39-3	
Cadmium	0.074J	ug/L	0.10	0.050	1	11/24/15 12:55	11/25/15 16:21	7440-43-9	
Chromium	2.0	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:21	7440-47-3	
Copper	11.8 J	ug/L	1.0	0.93	1	11/24/15 12:55	11/25/15 16:21	7440-50-8	
Iron	3840	ug/L	10.0	6.9	1	11/24/15 12:55	11/25/15 16:21	7439-89-6	
Lead	3.3	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:21	7439-92-1	
Manganese	355	ug/L	1.0	0.69	1	11/24/15 12:55	11/30/15 19:21	7439-96-5	
Selenium	ND	ug/L	1.0	0.50	1	11/24/15 12:55	11/25/15 16:21	7782-49-2	
Silver	ND	ug/L	0.10	0.050	1	11/24/15 12:55	11/25/15 16:21	7440-22-4	
Zinc	5.5	ug/L	5.0	2.5	1	11/24/15 12:55	11/25/15 16:21	7440-66-6	
7470 Mercury	Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	ND	ug/L	0.20	0.10	1	11/28/15 05:57	11/30/15 21:06	7439-97-6	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	29.0 J	mg/L	25.0	25.0	1		11/19/15 10:19		D6
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	6.2	Std. Units J	1.0	0.10	1		11/19/15 15:55		H6
5210B BOD, 5 day	Analytical Method: SM 5210B								
BOD, 5 day	ND	mg/L	2.0	2.0	1	11/18/15 23:28	11/23/15 17:50		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	4.2J	mg/L	5.0	2.5	1		11/22/15 16:52	16887-00-6	
Fluoride	0.13	mg/L	0.050	0.034	1		11/22/15 16:52	16984-48-8	
Sulfate	10.2	mg/L	5.0	2.5	1		11/22/15 16:52	14808-79-8	
353.2 Nitrogen, NO2/NO3 unpres	Analytical Method: EPA 353.2								
Nitrogen, Nitrate	ND	mg/L	0.020	0.010	1		11/18/15 23:28		
5220D COD	Analytical Method: SM 5220D								
Chemical Oxygen Demand	24.0J	mg/L	25.0	12.5	1		11/24/15 15:40		
5310B TOC	Analytical Method: SM 5310B								
Total Organic Carbon	7.1	mg/L	1.0	0.50	1		11/25/15 18:14	7440-44-0	
Total Organic Halides	Analytical Method: EPA 9020B								
Total Organic Halides	0.010J	mg/L	0.020	0.010	1		12/13/15 11:44		

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