

Rule 908.b(9-10) Groundwater and Surface Water Monitoring

**Piceance Energy LLC
Harrison Creek Water Treatment
Facility – DAF Unit**

OA Project No. 014-0465

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GROUNDWATER SAMPLING AND ANALYSIS PLAN

**PICEANCE ENERGY
MESA COUNTY OPERATIONS
MESA COUNTY, COLORADO**

Prepared for:

Piceance Energy, LLC.

Prepared by:



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1.0 INTRODUCTION

This groundwater sampling and analysis plan (SAP) is intended for use on Piceance Energy (Piceance) projects to monitor the quality of ground water, and to assure quality and consistency in data collection. The SAP will be used to accomplish the following:

- Collection of groundwater samples from wells, springs, and seeps;
- Collection of groundwater data;
- Documentation of data collection activities;
- Decontamination procedures; and
- Analytical Program and Quality Assurance.

The primary objectives of this SAP are to:

- Provide consistency in data collection;
- Guarantee consistency with regulatory requirements; and
- Sufficiently document all field activities.
- Determine compliance with groundwater standards

Because the data collected for the various assessment activities is to be used for potentially diverse purposes, the specific quality assurance/quality control (QA/QC) measures implemented for the data collection activities have been developed to reflect in the specific data quality needs of the sample types. For example, a primary purpose of assessment activities may be to monitor potential hazards and/or exposures to individuals living in the vicinity of a contaminated or affected area. This, along with the potential for litigation, indicates the need for high-quality data from the groundwater samples collected during the assessment. The specific quality assurance and quality control (QA/QC) measures required to guarantee data quality provided by various sampling activities, along with sampling frequencies and sampling protocols are described in the following sections.

2.0 FIELD DATA COLLECTION ACTIVITIES

The field data collection methods and procedures that will be used to assess the nature and extent of the impacts and potential hazards are described in this section. Recommendations and requirements of the Colorado Oil and Gas Conservation Commission (COGCC) Rules and Regulations, Rules of Practice and Procedure, and Oil and Gas Conservation Act (as Amended), USEPA protocol and practical experience have been incorporated into this sampling and analysis plan.

2.1 Documentation

One of the most important data collection tasks is the recording of information that can be easily transferred and interpreted by those not familiar with the field activities that are being recorded. In addition, each page should be legible when copied and an indelible-ink pen should be used for all recordings. Olsson will maintain bound field logbooks that have numbered or dated pages or field data sheets to record all data collection activities. Notes should be taken in a manner such that the information can readily be transferred to a database or similar data tabulation and storage system. If field data sheets are used, at a minimum a logbook should be maintained that describes individuals on site and the task or tasks accomplished, as well as any other pertinent information that is not addressed on the data sheet. All entries into the logbook will include the date and initials of the person making the entry and/or page numbers on the top of the page. In addition to the specific information identified for each of the field activities described above, other general information should be recorded in the log book such as, equipment used for the activity, equipment calibration records, daily weather conditions (temperature, wind direction, precipitation), locations and times of sampling, any extra level of effort that was extended to perform the duties, and any individuals present during the sampling activities, including any visitors or members of the general public. An example of data to be recorded in a logbook is shown in Attachment A.

2.2 Groundwater Sampling

The following procedures apply to the collection of groundwater samples from domestic and irrigation water supply wells. Prior to collecting a groundwater sample, the well should be purged for a standard time of fifteen minutes, and an average flow rate will be measured. The groundwater samples collected from domestic wells should be collected from the wellhead tap or other sampling port located upstream of any water treatment system or holding tank used for the water supply system. Samples collected from domestic wells will follow the protocols established by the state engineers' office. The individual collecting the samples should wear disposable "exam-type" gloves to prevent cross contamination of the samples and/or the domestic water supply. The gloves should be changed following the collection of each sample from each sample location.

The following procedures apply to the collection of groundwater samples from sources such as seeps and springs. If possible, a flow rate measurement should be taken at the time of sampling. The groundwater samples should be collected using an appropriate water collection device as determined by site conditions. In some cases it will be necessary to collect samples at a point down gradient of a spring or seep in order to have the required flow needed to fill sample containers. The individual collecting the samples will wear disposable “exam-type” rubber gloves to prevent cross contamination of the samples.

At a minimum, field parameters including pH, temperature, conductivity, dissolved oxygen (in % O₂), and turbidity, when possible, should be measured and recorded prior to the collection of the sample. Initial field parameters also should be measured and recorded so that well development and collection of formation water can be proven. Whenever possible, down hole measurement of dissolved oxygen (DO) should be attempted. It is imperative that all instruments be calibrated according to respective manufacturer specifications and that the calibration and response of all instruments be checked daily before sampling activities begin. Each sample will be given a distinct ID (i.e. sample location or well number) and labeled with the requested analyses, date, time and initials of the sampler. The groundwater samples collected for volatile analyses should be placed in clean non-preserved sample containers with zero headspace, labeled, and placed into an iced cooler immediately. (Note: Current CDPHE sampling guidance states that no volatile samples should be preserved with HCl, primarily due to the potential of off gassing caused by carbonate water generally found in Colorado.) Samples collected for dissolved metal analyses should be field filtered using a portable peristaltic sampling pump and a 0.45 micron in-line filter prior to collection in a clean non-preserved sampling container. Samples collected for other analyses should be placed into the appropriate sample containers that contain the appropriate sample preservative as designated by the laboratory. All samples should be shipped in iced coolers and delivered to the laboratory under chain-of-custody procedures.

2.3 Dissolved Methane Sample Collection

Water samples collected for Methane analysis should be collected in 40 mL glass vials with Teflon® septa. The samples are collected at a low flow of water, and with as little agitation or disturbance to the water as possible. The vial is filled slowly until there is a meniscus present at the opening of the vial. Any bubbles on the surface of the meniscus should be gently removed with the vial cap, and the vial then firmly sealed. After it has been capped, the sample vial should be inverted and inspected to insure that there are no bubbles in the vial. If bubbles are visible, collect another sample. Samples should be bagged and packed in a cooler filled with ice, and shipped overnight to the analytical laboratory. Samples should be kept on ice or refrigerated until analyzed, and analyses should routinely be completed within 24 hours of the time they are collected.

The vials may be preserved or unpreserved by the addition of acid preservatives (such as HCl and H₂SO₄). In water with high bicarbonate contents, the addition these preservatives cause water samples to degas and lose methane. Values reported using this sampling method will underestimate the amount of dissolved methane in water. For this reason current CDPHE sampling guidelines state that no volatile samples should be preserved with HCl, due to the carbonate generally found in Colorado water.

2.4 Isotopic Methane Sampling in Water

If the total dissolved methane concentration from a water sample is reported by the laboratory at or above 2.0 mg/L, then an isotopic methane sample should be collected from the same location. All other sampling protocols should be followed as described above (for instance: pump purge rates, field parameters, etc.). Isotopic samples can be collected in 1-liter Boston round, amber glass bottles with a septum cap, without a bactericide, provided that a 48-hour holding time is not exceed for laboratory extraction and analysis. Otherwise, a 1-liter square plastic bottle with a septum cap and bactericide (benzalkonium chloride) can be used to extend the holding time to 14 days and to avoid breakage of sample containers during shipment.

The sample is collected by first filling the sample bottle with source water flowing at a slow rate. At this point the bottle should not contain any gas bubbles. The bottle is then inverted while submerged in source water. Depending on the conditions of the source water, this can be done in the source water or in a clean bucket that contains the source water. The water flow should then be directed, via clean plastic tubing, to the base or mouth of the bottle. If the water does not effervesce, the low flow rate should be maintained and water allowed to flow through the bottle for several minutes. If the water does effervesce, the water flow rate should be increased to allow the effervescing gas to displace a headspace of $\frac{1}{3}$ to $\frac{1}{2}$ of the bottle volume. The sample tube should be slowly removed and the bottle capped under water (See Attachment B for a diagram of the effervescent water procedure).

Once the desired amount of headspace is created by trapped gas, the bottle is capped while submerged. The sample bottle should remain inverted during transfer and shipment to the laboratory under chain-of-custody procedures in an iced cooler.

2.5 Analytical Program and Quality Assurance

High quality laboratory data assurance will be applied for all samples collected. These laboratory quality assurance/quality control (QA/QC) measures are based on guidance published in the most current edition of the EPA Test Methods for Evaluating Solid Waste SW-846. Laboratory quality assurance samples will include one duplicate sample per 20 samples collected plus matrix spike/matrix spike duplicates as specified by the EPA laboratory methods. Equipment blank samples should be collected if using an external pump and associated tubing is used after the collection of five samples using

distilled water. Trip blanks should be submitted along with other environmental samples if high volatiles are expected. If there is a potential for cross-contamination of the samples from hydrocarbon emission sources in the vicinity of the sample collection activities such as a well head, compressors or generators, then a field blank containing distilled water should be collected by removing the cap on the sample container during the entire time of volatile sampling.

In general, surface and groundwater samples will be analyzed as listed in Attachment C. Associated holding times for each analyses are also listed. All samples should be shipped to the laboratory in iced coolers under chain-of-custody procedures by overnight courier.

2.6 Decontamination

This procedure applies to all sample collection equipment. The sampling equipment used will be thoroughly cleaned prior to initiation of sampling activities and between each use at the site. Decontamination of field instruments, small items (slip caps) or delicate materials (i.e. soft plastics) will include an alconox wash and scrubbing with bristle brush or paper towel as appropriate to remove potential contaminants, and then a deionized water rinse.

2.7 Personal Protective Equipment

Reasonable caution, including use of proper handling techniques and use of personal protective equipment (PPE), should be practiced whenever hazardous or unknown substances are encountered during sampling activities. PPE to be used includes, but may not be limited to, Tyvek body suits, safety glasses or face shields, respiratory protective equipment, and rubber gloves and boots.

3.0 DATA MANAGEMENT

All analytical data received from the laboratories will be compiled in a spreadsheet detailing location information, site identification, sample collection date, sample source, person conducting the sampling, field parameters, and the nearest Piceance production well. In addition, water quality standards from various entities including the Environmental Protection Agency, and the Colorado Department of Public Health and Environment, Water Quality Control Commission (CDPHE-WQCC) will be compared with all incoming analytical data to verify that certain analytes are within appropriate levels for human consumption. Construction of the current spreadsheet will allow for future expansion and transfer into a working database.

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ATTACHMENT A
FIELD DATA FORM EXAMPLE

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Olsson Associates, Inc.
Water Sampling Field Form

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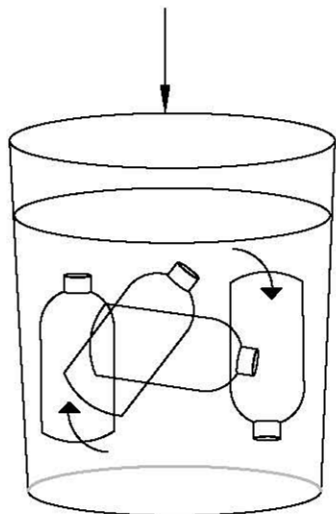
Olsson Associates, Inc.
Water Sampling Field Form

Sampler comments:

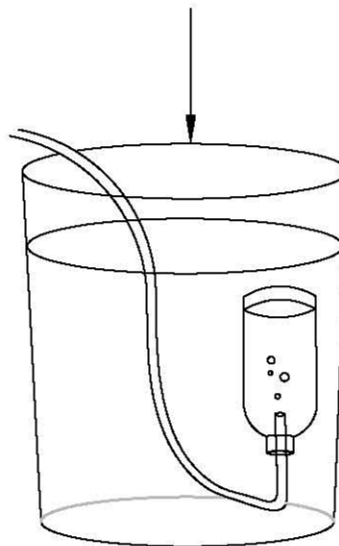
ATTACHMENT B
ISOTOPIC METHANE SAMPLE COLLECTION PROCEDURE

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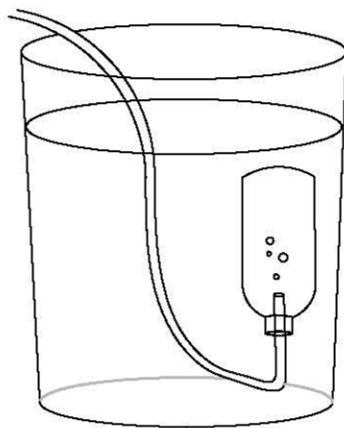
STEP 1: SUBMERGE SAMPLE BOTTLE UNTIL FILLED. INVERT WHILE SUBMERGED. VERIFY THAT NO TRAPPED GAS IS PRESENT IN BOTTLE.



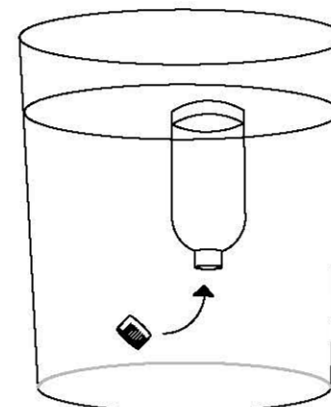
STEP 3: ALLOW HEAD SPACE TO FORM IN THE BOTTLE. APPROXIMATELY 0.5 INCHES OF HEAD SPACE IS OPTIMAL.



STEP 2: FEED FLOWING SAMPLE HOSE INTO BOTTLE. GAS COMING OUT OF SOLUTION WILL BEGIN TO COLLECT IN BOTTLE.



STEP 4: WHILE SUBMERGED, REMOVE HOSE FROM BOTTLE AND AFFIX SEPTUM CAP.



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Figure 1
Sample Collection Procedure
Isotopic Methane

Piceance Energy, LLC
Baseline Water Sampling
Mesa County, CO

Revision Date: 12/7/2010
Drawn By: JLS

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ATTACHMENT C
ANALYTE AND SAMPLE CONTAINER LIST

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TABLE 1 - Water Analytical List

Analyte	Method	Sample Container	Preservative	Holding time
Anions*	E300.0	(1) 1 L poly	None	28 days
Nitrogen, Nitrite	A4500-NO2 B			48 hrs
Fluoride	A4500-F C			28 days
Alkalinity	A2320 B			28 days
Conductivity	A2510 B			28 days
pH	A4500-H B			Immediate
Solids, Total Dissolved	A2540 C			7 days
Metals by ICP/ICPMS, Dissolved**	E200.7 _8			28 days - 6 mos
Sample Filtering	NA			48 hrs
Nitrogen, Ammonia	A4500-NH3 G	(1) 500 mL poly	H2SO4	28 days
Nitrogen, Nitrate + Nitrite	E353.2			28 days
Sulfide, Iodine Titrimetric	A4500-S F	(1) 500 mL poly	ZnAc NaOH	7 days
Diesel Range Organics	SW8015B	(3) 1 L clear glass narrow mouth	H2SO4	14 days
Methane	SW8015M	(3) 40 mL clear glass VOA	None	NA
BTEX	SW8021B	(3) 40 mL clear glass VOA	None	14 days
Gasoline Range Organics	SW8015B	(3) 40 mL clear glass VOA	None	14 days

* Anions - Cl, F, Br, NO2, NO3, SO4

** Metals - Ca, Fe, K, Mg, Mn, Na, Se, As, Ba, Cd, CU, Ag, Pb, Cr

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TABLE 6. SEASONAL SUMMARY OF BASELINE WATER QUALITY - 2008/2009
BUZZARD CREEK, MESA COUNTY, COLORADO
DELTA PETROLEUM CORPORATION

Location ID	Date Sampled	Acenaph- thene (mg/L)	Acenaph- thylene (mg/L)	Acetone (mg/L)	Acrolein (mg/L)	Acrylo Nitrile (mg/L)	Alkalinity (mg/L)	Aluminum, Dissolved (mg/L)	Americium 241 (pCi/L)	Aniline (mg/L)	Anthracene (mg/L)	Arsenic, Potentially Dissolved (mg/L)	Arsenic, Total (mg/L)	Azo- benzene (mg/L)	Bacteria, Fecal Coliform (Count)
Buzzard Creek	03/25/08	ND(0.01)	ND(0.01)	--	ND(0.1)	ND(0.1)	200 J	0.062B J/ND (0.062)U*	--	--	ND(0.01)	--	ND(0.015)	ND(0.01)	2
	07/31/08	--	--	ND(0.02)	--	--	--	--	ND(0)	--	--	0.0057B J/ND (0.0057)U*	ND(0.015)	--	--
	10/07/08 01/14/09	-- ND(0.004)	-- ND(0.004)	ND(0.01) ND(0.01)	-- --	-- --	-- 220	-- --	-- --	-- ND(0.01)	-- ND(0.004)	0.0054 ND(0.015)	0.0098 ND(0.015)	-- --	-- --

Notes:
U-Result less than the method detection limit
B or J-Estimated result less than reporting limit
ND(RL)-Not detected with reporting limit listed parenthetically
-- Constituent not analyzed
* - The first result represents the laboratory reported concentration. The second result was evaluated to be undetected at the reported concentration by the data validator. The result was determined to be a false positive.

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DELTA PETROLEUM CORPORATION

Location ID	Date Sampled	Benzene (mg/L)	Benzo(a)- anthracene (mg/L)	Benzo(a)- pyrene (mg/L)	Benzo(b)- fluor- anthene (mg/L)	Benzo(ghi)- perylene (mg/L)	Benzo(k) fluor- anthene (mg/L)	Benzoic Acid (mg/L)	Benzyl Alcohol (mg/L)	Bicarbonate (mg/L)	Bis(2chloro ethoxy)- methane (mg/L)	Bis(2- chloro ethyl)ether (mg/L)	Bis(2chloro isopropyl)- ether (mg/L)	Bis(2-ethyl hexyl)- phthalate (mg/L)	BOD, (5-Day) Carbonaceous (mg/L)
Buzzard Creek	03/25/08	ND(0.005)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	--	--	--	--	ND(0.01)	ND(0.01)	ND(0.01)	ND(2)
	07/31/08	ND(0.005)	--	--	--	--	--	--	--	130	--	--	--	--	--
	10/07/08 01/14/09	ND(0.001) ND(0.001)	-- ND(0.004)	-- ND(0.004)	-- ND(0.004)	-- ND(0.004)	-- ND(0.004)	-- ND(0.025)	-- ND(0.01)	200 220	-- ND(0.01)	-- ND(0.01)	-- ND(0.01)	-- ND(0.01)	-- --

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BUZZARD CREEK, MESA COUNTY, COLORADO
DELTA PETROLEUM CORPORATION

Location ID	Date Sampled	Boron, Total (mg/L)	Bromo- benzene (mg/L)	Bromo- chloro- methane (mg/L)	Bromo- dichloro- methane (mg/L)	Bromoform (mg/L)	Bromo- methane (mg/L)	4-Bromo- phenyl- phenylether (mg/L)	Butanol (mg/L)	2-Butanone (mg/L)	n-Butyl- benzene (mg/L)	sec- Butylbenzene (mg/L)	tert-Butyl- benzene (mg/L)	Benzyl Butyl Phthalate (mg/L)	Cadmium, Potentially Dissolved (mg/L)
Buzzard Creek	03/25/08	0.014B/ND (0.014)U*	--	--	ND(0.005)	ND(0.005)	ND(0.01)	ND(0.01)	--	--	--	--	--	ND(0.01)	--
	07/31/08	0.053	--	--	--	--	--	--	--	--	--	--	--	--	ND(0.0004)
	10/07/08	0.019	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.002)	--	ND(0.06)	ND(0.006)	ND(0.001)	ND(0.001)	ND(0.001)	--	ND(0.0004)
	01/14/09	0.017	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.002)	--	ND(0.06)	ND(0.006)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.004)	ND(0.0004)

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Location ID	Date Sampled	Cadmium, Total Recoverable (mg/L)	Calcium, Dissolved (mg/L)	Carbon Disulfide (mg/L)	Carbon tetrachloride (mg/L)	Cesium 134 (pCi/L)	Chemical Oxygen Demand (mg/L)	Chloride (mg/L)	4-Chloro-3- Methyl phenol (mg/L)	Chlorobenzene (mg/L)	Chloroethane (mg/L)	2-Chloro- ethyl vinyl ether (mg/L)	Chloroform (mg/L)	Chloromethane (mg/L)	2-Chloro- naphthalene (mg/L)
Buzzard Creek	03/25/08	0.000042 J	57	--	ND(0.005)	--	5.8 J	5.7	ND(0.01)	ND(0.005)	ND(0.01)	ND(0.005)	ND(0.005)	ND(0.01)	ND(0.01)
	07/31/08	--	30	--	--	ND(20)	--	2.8 J	--	--	--	--	--	--	--
	10/07/08	--	54	ND(0.002)	ND(0.001)	--	--	5.5	--	ND(0.001)	ND(0.002)	--	ND(0.001)	ND(0.002)	--
	01/14/09	--	64	ND(0.002)	ND(0.001)	--	--	5	ND(0.01)	ND(0.001)	ND(0.002)	--	ND(0.001)	ND(0.002)	ND(0.004)

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BUZZARD CREEK, MESA COUNTY, COLORADO
DELTA PETROLEUM CORPORATION

Location ID	Date Sampled	2-Chloro-phenol (mg/L)	4-Chloro-phenyl-phenylether (mg/L)	2-Chloro-toluene (mg/L)	4-Chloro-toluene (mg/L)	Chromium, Hexavalent (mg/L)	Chromium, Total (mg/L)	Chromium, Trivalent (mg/L)	Chrysene (mg/L)	Cobalt, Total (mg/L)	Specific Conductance @25C, Lab Calc (umhos/cm)	Specific Conductance Field (umhos/cm)	Copper, Potentially Dissolved (mg/L)	Copper, Total Recoverable (mg/L)	Cyanide, Total (mg/L)
Buzzard Creek	03/25/08	ND(0.01)	ND(0.01)	--	--	0.02/ND(0.02) U*	ND(0.01)	ND(0.02)	ND(0.01)	ND(0.01)	410 J	437	0.0011B/ND (0.002)U*	0.001B/ND (0.002)U*	ND(0.01)
	07/31/08	--	--	--	--	--	ND(0.005)	--	--	--	280	277	0.001B J/ND (0.002)U*	--	--
	10/07/08	--	--	ND(0.001)	ND(0.001)	--	ND(0.005)	--	--	--	410	384	0.00073	--	--
	01/14/09	ND(0.01)	ND(0.01)	ND(0.001)	ND(0.001)	ND(0.02)	ND(0.005)	--	ND(0.004)	--	480	484	0.00055	--	--

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BUZZARD CREEK, MESA COUNTY, COLORADO
DELTA PETROLEUM CORPORATION

Location ID	Date Sampled	Cyanide, WAD (mg/L)	Cyclohexanone (mg/L)	Dibenz (a,h) anthracene (mg/L)	Dibenzo- furan (mg/L)	1,2-Dibromo 3-chloro- propane (mg/L)	Dibromo- chloromethane (mg/L)	1,2- Dibromo- ethane (mg/L)	Dibromometha ne (mg/L)	1,2-Di- chloro- benzene (mg/L)	1,3-Di- chloro- benzene (mg/L)	1,4-Di- chloro- benzene (mg/L)	3,3'-Di- chloro- benzidine (mg/L)	Dichloro- difluoro- methane (mg/L)	1,1-Dichloro- ethane (mg/L)
Buzzard Creek	03/25/08	ND(0.01)	--	ND(0.01)	--	--	ND(0.005)	--	--	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.05)	--	ND(0.005)
	07/31/08	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/07/08	--	ND(0.1)	--	--	ND(0.005)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	--	ND(0.002)	ND(0.001)
	01/14/09	--	ND(0.1)	ND(0.004)	ND(0.004)	ND(0.005)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.004)	ND(0.004)	ND(0.004)	ND(0.05)	ND(0.002)	ND(0.001)

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BUZZARD CREEK, MESA COUNTY, COLORADO
DELTA PETROLEUM CORPORATION

Location ID	Date Sampled	1,2-Dichloro-ethane (mg/L)	1,1-Dichloro-ethene (mg/L)	cis-1,2-Dichloro-ethene (mg/L)	trans-1,2-Dichloro-ethene (mg/L)	2,4-Dichloro-phenol (mg/L)	2,6-Dichloro-phenol (mg/L)	1,2-Dichloro-propane (mg/L)	1,3-Dichloro-propane (mg/L)	2,2-Dichloro-propane (mg/L)	1,1-Dichloro-propene (mg/L)	1,3-Dichloro-propene (mg/L)	Cis-1,3-dichloro-propene (mg/L)	trans-1,3-Dichloro-propene (mg/L)	Diethyl ether (mg/L)
Buzzard Creek	03/25/08	ND(0.005)	ND(0.005)	--	ND(0.005)	ND(0.01)	--	ND(0.005)	--	--	--	ND(0.005)	--	--	--
	07/31/08	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/07/08	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	--	--	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.001)	--	ND(0.001)	ND(0.003)	ND(0.002)
	01/14/09	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.01)	ND(0.01)	ND(0.001)	ND(0.001)	ND(0.005)	ND(0.001)	--	ND(0.001)	ND(0.003)	ND(0.002)

Notes:
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TABLE 6. SEASONAL SUMMARY OF BASELINE WATER QUALITY - 2008/2009
BUZZARD CREEK, MESA COUNTY, COLORADO
DELTA PETROLEUM CORPORATION

Location ID	Date Sampled	Diethyl-phthalate (mg/L)	2,4-Dimethyl-phenol (mg/L)	Dimethyl Phthalate (mg/L)	Di-n-butyl-phthalate (mg/L)	2-Methyl-4,6-dinitro phenol (mg/L)	2,4-Dinitro-phenol (mg/L)	2,4-Dinitro Toluene (mg/L)	2,6-Dinitro Toluene (mg/L)	Di-n-octyl-phthalate (mg/L)	1,2-Diphenyl hydrazine (mg/L)	Ethyl acetate (mg/L)	Ethyl-benzene (mg/L)	Fluor-anthene (mg/L)	Fluorene (mg/L)
Buzzard Creek	03/25/08	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.06)	ND(0.06)	ND(0.01)	ND(0.01)	ND(0.01)	--	--	ND(0.005)	ND(0.01)	ND(0.01)
	07/31/08	--	--	--	--	--	--	--	--	--	--	--	ND(0.005)	--	--
	10/07/08 01/14/09	-- ND(0.004)	-- ND(0.01)	-- ND(0.004)	-- ND(0.004)	-- ND(0.05)	-- ND(0.03)	-- ND(0.01)	-- ND(0.01)	-- ND(0.004)	-- ND(0.004)	ND(0.005) ND(0.005)	ND(0.001) ND(0.001)	-- ND(0.004)	-- ND(0.004)

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TABLE 6. SEASONAL SUMMARY OF BASELINE WATER QUALITY - 2008/2009
BUZZARD CREEK, MESA COUNTY, COLORADO
DELTA PETROLEUM CORPORATION

Location ID	Date Sampled	Fluoride, Total (mg/L)	Gross Alpha (pCi/L)	Gross Beta (pCi/L)	Hardness as CaCO3 (mg/L)	Hexachloro Benzene (mg/L)	Hexachloro- butadiene (mg/L)	Hexachloro- cyclopenta- diene (mg/L)	Hexachloro- ethane (mg/L)	Indeno- (1,2,3-cd) pyrene (mg/L)	Iron, Dissolved (mg/L)	Iron, Total Recoverable (mg/L)	Isobutyl- Alcohol (mg/L)	Isophorone (mg/L)	Isopropyl- benzene (mg/L)
Buzzard Creek	03/25/08	0.16 J	3.4	3.2 J	180	ND(0.01)	ND(0.01)	ND(0.05)	ND(0.01)	ND(0.01)	0.057 J	0.75	--	ND(0.01)	--
	07/31/08	--	--	--	120	--	--	--	--	--	--	0.045 J	--	--	--
	10/07/08	--	--	--	190	--	ND(0.001)	--	--	--	--	0.28	ND(0.11)	--	ND(0.001)
	01/14/09	--	4.2	2.2	210	ND(0.01)	ND(0.01)	ND(0.05)	ND(0.01)	ND(0.004)	--	0.17	ND(0.11)	ND(0.01)	ND(0.001)

Notes:
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TABLE 6. SEASONAL SUMMARY OF BASELINE WATER QUALITY - 2008/2009
BUZZARD CREEK, MESA COUNTY, COLORADO
DELTA PETROLEUM CORPORATION

Location ID	Date Sampled	p-Isopropyl- toluene (mg/L)	Lead, Potentially Dissolved (mg/L)	Lead, Total Recoverable (mg/L)	Magnesium, Dissolved (mg/L)	Manganese, Dissolved (mg/L)	Manganese, Potentially Dissolved (mg/L)	Manganese, Total Recoverable (mg/L)	Mercury, Total (mg/L)	Methanol (mg/L)	4-Methyl- 2-Pentanone (mg/L)	Methylene Chloride (mg/L)	2-Methyl- naphthalene (mg/L)	2-Methyl phenol (mg/L)	3,4- Methyl phenol (mg/L)
Buzzard Creek	03/25/08	--	0.00019 J	0.00027 J	12	0.033	--	0.05	ND(0.0002)	ND(1)	--	0.0014J B/ND (0.005)U*	--	--	--
	07/31/08	--	ND(0.001)	--	9.4	--	0.0099 J	--	ND(0.0002) R	ND(1)	--	--	--	--	--
	10/07/08	ND(0.001)	0.00015	--	13	--	0.014	--	ND(0.0002)	--	ND(0.005)	0.00069	--	--	--
	01/14/09	ND(0.001)	0.00015	--	13	--	0.024	--	ND(0.0002)	--	ND(0.005)	ND(0.005)	ND(0.004)	ND(0.01)	ND(0.01)

Notes:
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TABLE 6. SEASONAL SUMMARY OF BASELINE WATER QUALITY - 2008/2009
BUZZARD CREEK, MESA COUNTY, COLORADO
DELTA PETROLEUM CORPORATION

Location ID	Date Sampled	MTBE (mg/L)	Naphthalene (mg/L)	Nickel, Potentially Dissolved (mg/L)	Nickel, Total Recoverable (mg/L)	2-Nitro- aniline (mg/L)	3-Nitro- aniline (mg/L)	4-Nitro- aniline (mg/L)	Nitro- benzene (mg/L)	Nitrogen, Ammonia (mg/L)	Nitrogen, Kjeldahl (mg/L)	Nitrogen, Nitrate (mg/L)	Nitrogen, Nitrite (mg/L)	2-Nitro- phenol (mg/L)	Nitrogen, Organic (mg/L)
Buzzard Creek	03/25/08	--	ND(0.01)	0.0017 J	0.0025	--	--	--	ND(0.01)	0.14 J	1.9	ND(0.5)	ND(0.5)	ND(0.02)	1.8
	07/31/08	--	--	ND(0.04)	--	--	--	--	--	--	--	--	--	--	--
	10/07/08 01/14/09	ND(0.005) ND(0.005)	ND(0.001) ND(0.004)	ND(0.04) ND(0.04)	-- --	-- ND(0.01)	-- ND(0.01)	-- ND(0.01)	-- ND(0.01)	-- 0.061	-- 0.36	-- --	-- --	-- ND(0.01)	-- 0.3

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TABLE 6. SEASONAL SUMMARY OF BASELINE WATER QUALITY - 2008/2009
BUZZARD CREEK, MESA COUNTY, COLORADO
DELTA PETROLEUM CORPORATION

Location ID	Date Sampled	4-Nitro-phenol (mg/L)	N-Nitroso-dimethyl-amine (mg/L)	N-Nitrosodi-n-propyl-amine (mg/L)	N-Nitroso-diphenyl-amine (mg/L)	Oil & Grease (mg/L)	Oxygen, Dissolved (mg/L)	Penta-chloro-phenol (mg/L)	pH (Std Units)	Phen-anthrene (mg/L)	Phenol (mg/L)	Phenols (mg/L)	Phosphorous, Total (mg/L)	Plutonium 239/40 (pCi/L)	n-Propyl-benzene (mg/L)
Buzzard Creek	03/25/08	ND(0.05)	ND(0.01)	ND(0.01)	ND(0.01)	1.7B/ND(5)U*	6.98	ND(0.06)	7.63	ND(0.01)	ND(0.01)	0.011B/ND (0.02)U*	0.016 J	--	--
	07/31/08	--	--	--	--	2.7B/ND(5)U*	6.85	--	7.19	--	--	--	--	ND(1)	--
	10/07/08 01/14/09	-- ND(0.01)	-- ND(0.01)	-- ND(0.01)	-- ND(0.01)	1.5 2	-- 5.5	-- ND(0.05)	7.24 7.41	-- ND(0.004)	-- ND(0.01)	-- 0.014	-- --	-- --	ND(0.001) ND(0.001)

Notes:
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TABLE 6. SEASONAL SUMMARY OF BASELINE WATER QUALITY - 2008/2009
BUZZARD CREEK, MESA COUNTY, COLORADO
DELTA PETROLEUM CORPORATION

Location ID	Date Sampled	Pyrene (mg/L)	Radium 226 (pCi/L)	Radium 228 (pCi/L)	Selenium, Potentially Dissolved (mg/L)	Selenium, Total Recoverable (mg/L)	Silver, Potentially Dissolved (mg/L)	Silver, Total Recoverable (mg/L)	Sodium Adsorption Ratio	Sodium, Dissolved (mg/L)	Total Dissolved Solids (mg/L)	Solids, Total Suspended (mg/L)	Strontium 90 (pCi/L)	Styrene (mg/L)	Sulfate (mg/L)
Buzzard Creek	03/25/08	ND(0.01)	0.2 UJ	ND(1)	--	ND(0.005)	ND(0.001)	ND(0.001)	0.6	20	230	17	--	--	19
	07/31/08	--	ND(1)	ND(1)	ND(0.015)	--	ND(0.0002)	--	0.6 U	12 JB	160	2 J	ND(30) J	--	4.9 J
	10/07/08 01/14/09	-- ND(0.01)	-- ND(1)	-- ND(1)	ND(0.015) ND(0.015)	-- --	ND(0.0002) ND(0.0002)	-- --	0.5 0.81	16 26	220 270	5.2 2.4	-- --	ND(0.001) ND(0.001)	8.7 26

Notes:
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B or J-Estimated result less than reporting limit
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-- Constituent not analyzed
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TABLE 6. SEASONAL SUMMARY OF BASELINE WATER QUALITY - 2008/2009
BUZZARD CREEK, MESA COUNTY, COLORADO
DELTA PETROLEUM CORPORATION

Location ID	Date Sampled	Total Sulfide (mg/L)	Temperature (oC)	1,1,1,2-Tetrachloro-ethane (mg/L)	1,1,2,2-Tetrachloro-ethane (mg/L)	Tetrachloro-ethene (mg/L)	Tetrachloro-phenols (mg/L)	Thorium 230 (pCi/L)	Thorium 232 (pCi/L)	Toluene (mg/L)	1,2,3-Trichloro-benzene (mg/L)	1,2,4-Trichloro-benzene (mg/L)	1,1,1-Trichloro-ethane (mg/L)	1,1,2-Trichloro-ethane (mg/L)	Trichloro-ethene (mg/L)
Buzzard Creek	03/25/08	ND(0.05)	2.5	--	ND(0.005)	ND(0.005)	--	--	--	ND(0.005)	--	ND(0.01)	ND(0.005)	ND(0.005)	ND(0.005)
	07/31/08	--	30.1	--	--	--	--	0.66 U	ND(1)	ND(0.005) J	--	--	--	--	--
	10/07/08	--	6.5	ND(0.001)	ND(0.001)	ND(0.001)	--	--	--	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
	01/14/09	--	0.1	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.05)	--	--	ND(0.001)	ND(0.001)	ND(0.004)	ND(0.001)	ND(0.001)	ND(0.001)

Notes:
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-- Constituent not analyzed
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TABLE 6. SEASONAL SUMMARY OF BASELINE WATER QUALITY - 2008/2009
BUZZARD CREEK, MESA COUNTY, COLORADO
DELTA PETROLEUM CORPORATION

Location ID	Date Sampled	Trichloro- fluoromethane (mg/L)	2,4,5-Tri- chloro- phenol (mg/L)	2,4,6-Tri- chloro- phenol (mg/L)	1,2,3- Trichloro- propane (mg/L)	1,1,2- Trichloro- trifluoro- ethane (mg/L)	1,2,4- Trimethyl- benzene (mg/L)	2-Nitropropane (mg/L)	1,3,5-Trimethyl- benzene (mg/L)	Tritium (pCi/L)	Uranium, Total (mg/L)	Uranium, Total Recoverable (mg/L)	Vinyl Chloride (mg/L)	Xylenes, Total (mg/L)	Zinc, Potentially Dissolved (mg/L)
Buzzard Creek	03/25/08	--	--	ND(0.02)	--	--	--	--	--	--	--	0.0027	ND(0.01)	--	0.0078B/ND (0.0078)U*
	07/31/08	--	--	--	--	--	--	--	--	ND(500)	ND(0.06)	--	--	ND(0.01)	0.01B/ND(0.02) U*
	10/07/08	ND(0.002)	--	--	ND(0.0025)	ND(0.003)	ND(0.001)	ND(0.003)	ND(0.001)	--	--	0.037	ND(0.001)	ND(0.002)	0.015
	01/14/09	ND(0.002)	ND(0.01)	ND(0.01)	ND(0.0025)	ND(0.003)	ND(0.001)	ND(0.003)	ND(0.001)	--	--	ND(0.03)	ND(0.001)	ND(0.002)	0.013

Notes:
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TABLE 6. SEASONAL SUMMARY OF BASELINE WATER QUALITY - 2008/2009
BUZZARD CREEK, MESA COUNTY, COLORADO
DELTA PETROLEUM CORPORATION

Location ID	Date Sampled	Zinc, Total Recoverable (mg/L)
Buzzard Creek	03/25/08	0.003B J/ND (0.003)U*
	07/31/08	--
	10/07/08	--
	01/14/09	--

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Est. 1970

Ken Kreie
Cordilleran Compliance - GJ, CO
826 21 1/2 Road

Grand Junction, CO 81505

Report Summary

Thursday April 16, 2009

Report Number: L396818

Samples Received: 04/09/09

Client Project:

Description:

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:

John D. Blackman, ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - I-2327, CT - PH-0197, FL - E87487
GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375, DW21704, ND - R-140
NJ - TN002, SC - 84004, TN - 2006, VA - 00109, WV - 233
AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910

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Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

3 Samples Reported: 04/16/09 14:22 Printed: 04/16/09 14:22

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REPORT OF ANALYSIS

Ken Kreie
Cordilleran Compliance - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

April 16, 2009

Date Received : April 09, 2009
Description :

Sample ID : DELT1

Collected By : Ken Kreie
Collection Date : 04/08/09 11:50

ESC Sample # : L396818-01

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Bromide	BDL	1.0	mg/l	9056	04/09/09	1
Chloride	12.	1.0	mg/l	9056	04/09/09	1
Fluoride	8.0	0.10	mg/l	9056	04/09/09	1
Nitrate	BDL	0.10	mg/l	9056	04/09/09	1
Nitrite	BDL	0.10	mg/l	9056	04/09/09	1
Sulfate	76.	5.0	mg/l	9056	04/09/09	1
pH	8.9		su	9040C	04/16/09	1
Specific Conductance	730		umhos/cm	9050A	04/14/09	1
Dissolved Solids	430	10.	mg/l	2540C	04/15/09	1
Calcium	1.8	0.50	mg/l	6010B	04/11/09	1
Iron	0.46	0.10	mg/l	6010B	04/11/09	1
Lead	BDL	0.0050	mg/l	6010B	04/11/09	1
Magnesium	0.30	0.10	mg/l	6010B	04/11/09	1
Manganese	BDL	0.010	mg/l	6010B	04/11/09	1
Potassium	0.87	0.50	mg/l	6010B	04/11/09	1
Selenium	BDL	0.020	mg/l	6010B	04/11/09	1
Sodium	160	0.50	mg/l	6010B	04/11/09	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.

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L396818-01 (PH) - 8.9@18.1c



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REPORT OF ANALYSIS

Ken Kreie
Cordilleran Compliance - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

April 16, 2009

Date Received : April 09, 2009
Description :

Sample ID : DELT1

Collected By : Ken Kreie
Collection Date : 04/08/09 11:50

ESC Sample # : L396818-02

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Alkalinity, Bicarbonate	330	10.	mg/l	2320B	04/10/09	1
Alkalinity, Carbonate	BDL	10.	mg/l	2320B	04/10/09	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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REPORT OF ANALYSIS

Ken Kreie
Cordilleran Compliance - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

April 16, 2009

Date Received : April 09, 2009
Description :

Sample ID : DELT1

Collected By : Ken Kreie
Collection Date : 04/08/09 11:50

ESC Sample # : L396818-03

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	BDL	1.0	ug/l	8260B	04/09/09	1
Toluene	BDL	5.0	ug/l	8260B	04/09/09	1
Ethylbenzene	BDL	1.0	ug/l	8260B	04/09/09	1
Total Xylenes	BDL	3.0	ug/l	8260B	04/09/09	1
Methyl tert-butyl ether	BDL	1.0	ug/l	8260B	04/09/09	1
Surrogate Recovery						
Toluene-d8	83.3		% Rec.	8260B	04/09/09	1
Dibromofluoromethane	106.		% Rec.	8260B	04/09/09	1
4-Bromofluorobenzene	74.1		% Rec.	8260B	04/09/09	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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Attachment A
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L396818-01	WG417038	SAMP	pH	R712667	T8
L396818-03	WG416050	SAMP	Toluene-d8	R706446	J2
	WG416050	SAMP	4-Bromofluorobenzene	R706446	J2

Attachment B
Explanation of QC Qualifier Codes

Qualifier	Meaning
J2	Surrogate recovery limits have been exceeded; values are outside lower control limits
T8	(ESC) - Additional method/sample information: Sample(s) received past/too close to holding time expiration.

Qualifier Report Information

ESC utilizes sample and result qualifiers as set forth by the EPA Contract Laboratory Program and as required by most certifying bodies including NELAC. In addition to the EPA qualifiers adopted by ESC, we have implemented ESC qualifiers to provide more information pertaining to our analytical results. Each qualifier is designated in the qualifier explanation as either EPA or ESC. Data qualifiers are intended to provide the ESC client with more detailed information concerning the potential bias of reported data. Because of the wide range of constituents and variety of matrices incorporated by most EPA methods, it is common for some compounds to fall outside of established ranges. These exceptions are evaluated and all reported data is valid and useable unless qualified as 'R' (Rejected).

Definitions

- Accuracy - The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.
- Precision - The agreement between a set of samples or between duplicate samples. Relates to how close together the results are and is represented by Relative Percent Difference.
- Surrogate - Organic compounds that are similar in chemical composition, extraction, and chromatography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses.
- TIC - Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, or surrogates.

Summary of Remarks For Samples Printed
04/16/09 at 14:22:43

TSR Signing Reports: 151
R5 - Desired TAT

cb-1/05;Run ALKs on separate dash, 1 day TAT, R3 priority; Client sends unpreserved vials for all projects; Run BTEXM by 8260 on separate dash.

Sample: L396818-01 Account: CORCOMGCO Received: 04/09/09 09:00 Due Date: 04/16/09 00:00 RPT Date: 04/16/09 14:22

Sample: L396818-02 Account: CORCOMGCO Received: 04/09/09 09:00 Due Date: 04/10/09 00:00 RPT Date: 04/16/09 14:22

Sample: L396818-03 Account: CORCOMGCO Received: 04/09/09 09:00 Due Date: 04/16/09 00:00 RPT Date: 04/16/09 14:22



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Ken Kreie
826 21 1/2 Road

Quality Assurance Report Level II

Grand Junction, CO 81505

L396818

April 16, 2009

Analyte	Result	Laboratory Blank		Limit	Batch	Date Analyzed
		Units	% Rec			
Bromide	< 1	mg/l			WG416021	04/09/09 10:02
Chloride	< 1	mg/l			WG416021	04/09/09 10:02
Fluoride	< .1	mg/l			WG416021	04/09/09 10:02
Nitrate	< .1	mg/l			WG416021	04/09/09 10:02
Nitrite	< .1	mg/l			WG416021	04/09/09 10:02
Sulfate	< 5	mg/l			WG416021	04/09/09 10:02
Benzene	< .001	mg/l			WG416050	04/09/09 12:47
Ethylbenzene	< .001	mg/l			WG416050	04/09/09 12:47
Methyl tert-butyl ether	< .001	mg/l			WG416050	04/09/09 12:47
Toluene	< .005	mg/l			WG416050	04/09/09 12:47
4-Bromofluorobenzene		% Rec.	91.40	75-128	WG416050	04/09/09 12:47
Dibromofluoromethane		% Rec.	101.6	79-125	WG416050	04/09/09 12:47
Toluene-d8		% Rec.	101.1	87-114	WG416050	04/09/09 12:47
a,a,a-Trifluorotoluene		% Rec.	104.4	84-114	WG416050	04/09/09 12:47
Calcium	< .5	mg/l			WG416322	04/11/09 15:40
Iron	< .1	mg/l			WG416322	04/11/09 15:40
Lead	< .005	mg/l			WG416322	04/11/09 15:40
Magnesium	< .1	mg/l			WG416322	04/11/09 15:40
Manganese	< .01	mg/l			WG416322	04/11/09 15:40
Potassium	< .5	mg/l			WG416322	04/11/09 15:40
Selenium	< .02	mg/l			WG416322	04/11/09 15:40
Sodium	< .5	mg/l			WG416322	04/11/09 15:40
Specific Conductance	1.40	umhos/cm			WG416394	04/14/09 08:44
Dissolved Solids	< 10	mg/l			WG416478	04/15/09 13:00
pH	6.90	su			WG417038	04/16/09 09:35

Analyte	Units	Duplicate		RPD	Limit	Ref Samp	Batch
		Result	Duplicate				
Bromide	mg/l	0.00	0.0650	NA	20	L396783-02	WG416021
Chloride	mg/l	37.8	39.0	3.13	20	L396783-02	WG416021
Fluoride	mg/l	0.316	0.328	3.73	20	L396783-02	WG416021
Nitrate	mg/l	2.83	2.80	1.07	20	L396783-02	WG416021
Nitrite	mg/l	0.00	0.0420	NA	20	L396783-02	WG416021
Sulfate	mg/l	28.7	29.6	3.09	20	L396783-02	WG416021
Bromide	mg/l	0.00	0.00	0.00	20	L396799-16	WG416021
Chloride	mg/l	11.6	12.0	3.39	20	L396799-16	WG416021
Fluoride	mg/l	0.00	0.00	0.00	20	L396799-16	WG416021
Nitrate	mg/l	5.13	4.62	10.5	20	L396799-16	WG416021
Nitrite	mg/l	0.00	0.00	0.00	20	L396799-16	WG416021
Sulfate	mg/l	0.00	0.643	NA	20	L396799-16	WG416021
Calcium	mg/l	2.16	2.14	0.930	20	L396730-01	WG416322
Iron	mg/l	0.563	0.570	1.24	20	L396730-01	WG416322
Lead	mg/l	0.00	0.00748	NA	20	L396730-01	WG416322
Magnesium	mg/l	1.82	1.82	0.00	20	L396730-01	WG416322
Manganese	mg/l	0.0317	0.0323	1.88	20	L396730-01	WG416322

* Performance of this Analyte is outside of established criteria.

For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'



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Grand Junction, CO 81505

L396818

April 16, 2009

Analyte	Units	Result	Duplicate		RPD	Limit	Ref Samp	Batch
			Duplicate					
Potassium	mg/l	0.696	0.770		10.1	20	L396730-01	WG416322
Selenium	mg/l	0.00	0.00		0.00	20	L396730-01	WG416322
Sodium	mg/l	3.70	3.89		5.01	20	L396730-01	WG416322
Specific Conductance	umhos/cm	720.	730.		1.38	20	L396818-01	WG416394
Dissolved Solids	mg/l	436.	430.		1.39	5	L396818-01	WG416478
pH	su	8.90	8.90		0.00	20	L396818-01	WG417038
pH	su	8.10	8.10		0.00	20	L397338-03	WG417038

Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
Bromide	mg/l	40	38.4	96.0	90-110	WG416021
Chloride	mg/l	40	39.3	98.3	90-110	WG416021
Fluoride	mg/l	8	7.72	96.5	90-110	WG416021
Nitrate	mg/l	8	7.98	99.8	90-110	WG416021
Nitrite	mg/l	8	7.90	98.8	90-110	WG416021
Sulfate	mg/l	40	38.7	96.8	90-110	WG416021
Benzene	mg/l	.05	0.0430	86.0	67-126	WG416050
Ethylbenzene	mg/l	.05	0.0530	106.	76-129	WG416050
Methyl tert-butyl ether	mg/l	.05	0.0447	89.4	51-142	WG416050
Toluene	mg/l	.05	0.0527	105.	72-122	WG416050
4-Bromofluorobenzene				103.6	75-128	WG416050
Dibromofluoromethane				94.81	79-125	WG416050
Toluene-d8				113.2	87-114	WG416050
a,a,a-Trifluorotoluene				111.5	84-114	WG416050
Calcium	mg/l	11.3	9.79	86.6	85-115	WG416322
Iron	mg/l	1.13	1.02	90.3	85-115	WG416322
Lead	mg/l	1.13	0.984	87.1	85-115	WG416322
Magnesium	mg/l	11.3	10.2	90.3	85-115	WG416322
Manganese	mg/l	1.13	0.993	87.9	85-115	WG416322
Potassium	mg/l	11.3	10.8	95.6	85-115	WG416322
Sodium	mg/l	11.3	10.8	95.6	85-115	WG416322
Selenium	mg/l	1.13	0.968	85.7	85-115	WG416322
Specific Conductance	umhos/cm	589	530.	90.0	85-115	WG416394
Dissolved Solids	mg/l	8800	8660	98.5	85-115	WG416478
pH	su	9.04	9.00	99.6	97.4-102.6	WG417038

Analyte	Units	Laboratory Control Sample Duplicate			Limit	RPD	Limit	Batch
		Result	Ref	%Rec				
Bromide	mg/l	38.4	38.4	96.0	90-110	0.00	20	WG416021
Chloride	mg/l	39.2	39.3	98.0	90-110	0.255	20	WG416021

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L396818

April 16, 2009

Analyte	Units	Laboratory Control Sample Duplicate			Limit	RPD	Limit	Batch
		Result	Ref	%Rec				
Fluoride	mg/l	7.69	7.72	96.0	90-110	0.389	20	WG416021
Nitrate	mg/l	7.96	7.98	100.	90-110	0.251	20	WG416021
Nitrite	mg/l	7.88	7.90	99.0	90-110	0.253	20	WG416021
Sulfate	mg/l	38.6	38.7	97.0	90-110	0.259	20	WG416021
Benzene	mg/l	0.0432	0.0430	86.0	67-126	0.410	20	WG416050
Ethylbenzene	mg/l	0.0524	0.0530	105.	76-129	1.19	20	WG416050
Methyl tert-butyl ether	mg/l	0.0440	0.0447	88.0	51-142	1.55	20	WG416050
Toluene	mg/l	0.0515	0.0527	103.	72-122	2.23	20	WG416050
4-Bromofluorobenzene				101.9	75-128			WG416050
Dibromofluoromethane				96.09	79-125			WG416050
Toluene-d8				111.8	87-114			WG416050
a,a,a-Trifluorotoluene				113.8	84-114			WG416050
Specific Conductance	umhos/	520.	530.	88.0	85-115	1.90	20	WG416394
Dissolved Solids	mg/l	8660	8660	98.0	85-115	0.00	20	WG416478
pH	su	9.00	9.00	100.	97.4-102.6	0.00	20	WG417038

Analyte	Units	Matrix Spike			% Rec	Limit	Ref Samp	Batch
		MS Res	Ref Res	TV				
Bromide	mg/l	46.0	0.0700	50	91.9	80-120	L396783-01	WG416021
Chloride	mg/l	81.6	34.7	50	93.8	80-120	L396783-01	WG416021
Fluoride	mg/l	5.02	0.379	5	92.8	80-120	L396783-01	WG416021
Nitrate	mg/l	8.67	4.10	5	91.4	80-120	L396783-01	WG416021
Nitrite	mg/l	5.07	0.228	5	96.8	80-120	L396783-01	WG416021
Sulfate	mg/l	75.5	28.5	50	94.0	80-120	L396783-01	WG416021
Benzene	mg/l	0.0350	0.00	.05	69.9	16-158	L396488-21	WG416050
Ethylbenzene	mg/l	0.0425	0.00	.05	85.0	29-150	L396488-21	WG416050
Methyl tert-butyl ether	mg/l	0.0359	0.00	.05	71.8	24-167	L396488-21	WG416050
Toluene	mg/l	0.0396	0.00	.05	79.1	22-152	L396488-21	WG416050
4-Bromofluorobenzene					106.4	75-128		WG416050
Dibromofluoromethane					98.29	79-125		WG416050
Toluene-d8					111.1	87-114		WG416050
a,a,a-Trifluorotoluene					108.9	84-114		WG416050
Calcium	mg/l	12.3	2.14	11.3	89.9	75-125	L396730-01	WG416322
Iron	mg/l	1.61	0.570	1.13	92.0	75-125	L396730-01	WG416322
Lead	mg/l	1.02	0.00748	1.13	89.6	75-125	L396730-01	WG416322
Magnesium	mg/l	12.3	1.82	11.3	92.7	75-125	L396730-01	WG416322
Manganese	mg/l	1.06	0.0323	1.13	90.9	75-125	L396730-01	WG416322
Potassium	mg/l	11.4	0.770	11.3	94.1	75-125	L396730-01	WG416322
Selenium	mg/l	0.962	0.00	1.13	85.1	75-125	L396730-01	WG416322
Sodium	mg/l	14.7	3.89	11.3	95.7	75-125	L396730-01	WG416322

Analyte	Units	Matrix Spike Duplicate			Limit	RPD	Limit	Ref Samp	Batch
		MSD	Ref	%Rec					
Bromide	mg/l	45.6	46.0	91.1	80-120	0.873	20	L396783-01	WG416021

* Performance of this Analyte is outside of established criteria.

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L396818

April 16, 2009

Analyte	Units	MSD	Matrix Spike Duplicate		Limit	RPD	Limit	Ref	Samp	Batch
			Ref	%Rec						
Chloride	mg/l	80.8	81.6	92.2	80-120	0.985	20	L396783-01	WG416021	
Fluoride	mg/l	4.99	5.02	92.2	80-120	0.599	20	L396783-01	WG416021	
Nitrate	mg/l	8.56	8.67	89.2	80-120	1.28	20	L396783-01	WG416021	
Nitrite	mg/l	5.03	5.07	96.0	80-120	0.792	20	L396783-01	WG416021	
Sulfate	mg/l	74.6	75.5	92.2	80-120	1.20	20	L396783-01	WG416021	
Benzene	mg/l	0.0425	0.0350	84.9	16-158	19.4	21	L396488-21	WG416050	
Ethylbenzene	mg/l	0.0502	0.0425	100.	29-150	16.6	24	L396488-21	WG416050	
Methyl tert-butyl ether	mg/l	0.0435	0.0359	87.0	24-167	19.1	22	L396488-21	WG416050	
Toluene	mg/l	0.0486	0.0396	97.1	22-152	20.4	22	L396488-21	WG416050	
4-Bromofluorobenzene				102.1	75-128				WG416050	
Dibromofluoromethane				97.09	79-125				WG416050	
Toluene-d8				109.0	87-114				WG416050	
a,a,a-Trifluorotoluene				110.1	84-114				WG416050	
Calcium	mg/l	12.2	12.3	89.0	75-125	0.816	20	L396730-01	WG416322	
Iron	mg/l	1.61	1.61	92.0	75-125	0.00	20	L396730-01	WG416322	
Lead	mg/l	1.01	1.02	88.7	75-125	0.985	20	L396730-01	WG416322	
Magnesium	mg/l	12.3	12.3	92.7	75-125	0.00	20	L396730-01	WG416322	
Manganese	mg/l	1.05	1.06	90.1	75-125	0.948	20	L396730-01	WG416322	
Potassium	mg/l	11.4	11.4	94.1	75-125	0.00	20	L396730-01	WG416322	
Selenium	mg/l	0.955	0.962	84.5	75-125	0.730	20	L396730-01	WG416322	
Sodium	mg/l	14.6	14.7	94.8	75-125	0.683	20	L396730-01	WG416322	

Batch number /Run number / Sample number cross reference

WG416021: R704646: L396818-01
WG416270: R705186: L396818-02
WG416050: R706446: L396818-03
WG416322: R706906: L396818-01
WG416394: R708567: L396818-01
WG416478: R711826: L396818-01
WG417038: R712667: L396818-01

* * Calculations are performed prior to rounding of reported values .
* Performance of this Analyte is outside of established criteria.
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April 16, 2009

The data package includes a summary of the analytic results of the quality control samples required by the SW-846 or CWA methods. The quality control samples include a method blank, a laboratory control sample, and the matrix spike/matrix spike duplicate analysis. If a target parameter is outside the method limits, every sample that is effected is flagged with the appropriate qualifier in Appendix B of the analytic report.

Method Blank - an aliquot of reagent water carried through the entire analytic process. The method blank results indicate if any possible contamination exposure during the sample handling, digestion or extraction process, and analysis. Concentrations of target analytes above the reporting limit in the method blank are qualified with the "B" qualifier.

Laboratory Control Sample - is a sample of known concentration that is carried through the digestion/extraction and analysis process. The percent recovery, expressed as a percentage of the theoretical concentration, has statistical control limits indicating that the analytic process is "in control". If a target analyte is outside the control limits for the laboratory control sample or any other control sample, the parameter is flagged with a "J4" qualifier for all effected samples.

Matrix Spike and Matrix Spike Duplicate - is two aliquots of an environmental sample that is spiked with known concentrations of target analytes. The percent recovery of the target analytes also has statistical control limits. If any recoveries that are outside the method control limits, the sample that was selected for matrix spike/matrix spike duplicate analysis is flagged with either a "J5" or a "J6". The relative percent difference (%RPD) between the matrix spike and the matrix spike duplicate recoveries is all calculated. If the RPD is above the method limit, the effected samples are flagged with a "J3" qualifier.



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Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

Report Summary

Monday May 10, 2010

Report Number: L456662

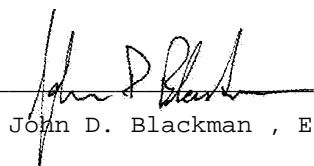
Samples Received: 04/30/10

Client Project:

Description:

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:


John D. Blackman , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - I-2327, CT - PH-0197, FL - E87487
GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375/DW21704, ND - R-140
NJ - TN002, NJ NELAP - TN002, SC - 84004, TN - 2006, VA - 00109, WV - 233
AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032008A

Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.

Note: The use of the preparatory EPA Method 3511 is not approved or endorsed by the CA ELAP.

This report may not be reproduced, except in full, without written approval from ESC Lab Sciences.
Where applicable, sampling conducted by ESC is performed per guidance provided
in laboratory standard operating procedures: 060302, 060303, and 060304.

REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

May 10, 2010

Date Received : April 30, 2010
Description :

Sample ID : DELT 1

Collected By : Jeff Stoddart
Collection Date : 04/28/10 15:35

ESC Sample # : L456662-01

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Bromide	BDL	1.0	mg/l	9056	04/30/10	1
Chloride	18.	1.0	mg/l	9056	04/30/10	1
Fluoride	7.0	0.10	mg/l	9056	05/05/10	1
Nitrate	BDL	0.10	mg/l	9056	04/30/10	1
Nitrite	BDL	0.10	mg/l	9056	04/30/10	1
Sulfate	68.	5.0	mg/l	9056	04/30/10	1
Alkalinity	280	20.	mg/l	2320B	05/04/10	1
Alkalinity,Bicarbonate	280	20.	mg/l	2320B	05/04/10	1
Alkalinity,Carbonate	BDL	20.	mg/l	2320B	05/04/10	1
pH	9.0		su	9040C	05/01/10	1
Specific Conductance	740		umhos/cm	9050A	05/05/10	1
Dissolved Solids	1000	10.	mg/l	2540C	05/06/10	1
Calcium	50.	0.50	mg/l	6010B	05/05/10	1
Iron	97.	0.10	mg/l	6010B	05/05/10	1
Lead	0.20	0.0050	mg/l	6010B	05/05/10	1
Magnesium	33.	0.10	mg/l	6010B	05/05/10	1
Manganese	1.1	0.010	mg/l	6010B	05/05/10	1
Potassium	29.	0.50	mg/l	6010B	05/05/10	1
Selenium	BDL	0.020	mg/l	6010B	05/05/10	1
Sodium	180	0.50	mg/l	6010B	05/05/10	1
Benzene	BDL	0.0010	mg/l	8260B	05/09/10	1
Toluene	BDL	0.0050	mg/l	8260B	05/09/10	1
Ethylbenzene	BDL	0.0010	mg/l	8260B	05/09/10	1
Total Xylenes	BDL	0.0030	mg/l	8260B	05/09/10	1
Surrogate Recovery						
Toluene-d8	100.		% Rec.	8260B	05/09/10	1
Dibromofluoromethane	96.9		% Rec.	8260B	05/09/10	1
a,a,a-Trifluorotoluene	112.		% Rec.	8260B	05/09/10	1
4-Bromofluorobenzene	106.		% Rec.	8260B	05/09/10	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.

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Reported: 05/10/10 17:30 Printed: 05/10/10 17:30
L456662-01 (PH) - 9.0@15.9c

REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

May 10, 2010

Date Received : April 30, 2010
Description :

Sample ID : HCSS-1

Collected By : Jeff Stoddart
Collection Date : 04/28/10 14:20

ESC Sample # : L456662-02

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Bromide	BDL	1.0	mg/l	9056	04/30/10	1
Chloride	10.	1.0	mg/l	9056	04/30/10	1
Fluoride	0.20	0.10	mg/l	9056	05/06/10	1
Nitrate	BDL	0.10	mg/l	9056	04/30/10	1
Nitrite	BDL	0.10	mg/l	9056	04/30/10	1
Sulfate	49.	5.0	mg/l	9056	04/30/10	1
Alkalinity	250	20.	mg/l	2320B	05/04/10	1
Alkalinity,Bicarbonate	250	20.	mg/l	2320B	05/04/10	1
Alkalinity,Carbonate	BDL	20.	mg/l	2320B	05/04/10	1
pH	8.5		su	9040C	05/01/10	1
Specific Conductance	580		umhos/cm	9050A	05/05/10	1
Dissolved Solids	340	10.	mg/l	2540C	05/06/10	1
Calcium	73.	0.50	mg/l	6010B	05/05/10	1
Iron	5.4	0.10	mg/l	6010B	05/05/10	1
Lead	BDL	0.0050	mg/l	6010B	05/05/10	1
Magnesium	16.	0.10	mg/l	6010B	05/05/10	1
Manganese	0.12	0.010	mg/l	6010B	05/05/10	1
Potassium	4.2	0.50	mg/l	6010B	05/05/10	1
Selenium	BDL	0.020	mg/l	6010B	05/05/10	1
Sodium	41.	0.50	mg/l	6010B	05/05/10	1
Benzene	BDL	0.0010	mg/l	8260B	05/09/10	1
Toluene	BDL	0.0050	mg/l	8260B	05/09/10	1
Ethylbenzene	BDL	0.0010	mg/l	8260B	05/09/10	1
Total Xylenes	BDL	0.0030	mg/l	8260B	05/09/10	1
Surrogate Recovery						
Toluene-d8	101.		% Rec.	8260B	05/09/10	1
Dibromofluoromethane	99.4		% Rec.	8260B	05/09/10	1
a,a,a-Trifluorotoluene	108.		% Rec.	8260B	05/09/10	1
4-Bromofluorobenzene	107.		% Rec.	8260B	05/09/10	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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Reported: 05/10/10 17:30 Printed: 05/10/10 17:30
L456662-02 (PH) - 8.5@16.2c

Attachment A
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L456662-01	WG476124	SAMP	pH	R1202748	T8
L456662-02	WG476124	SAMP	pH	R1202748	T8

Attachment B
Explanation of QC Qualifier Codes

Qualifier	Meaning
T8	(ESC) - Additional method/sample information: Sample(s) received past/too close to holding time expiration.

Qualifier Report Information

ESC utilizes sample and result qualifiers as set forth by the EPA Contract Laboratory Program and as required by most certifying bodies including NELAC. In addition to the EPA qualifiers adopted by ESC, we have implemented ESC qualifiers to provide more information pertaining to our analytical results. Each qualifier is designated in the qualifier explanation as either EPA or ESC. Data qualifiers are intended to provide the ESC client with more detailed information concerning the potential bias of reported data. Because of the wide range of constituents and variety of matrices incorporated by most EPA methods, it is common for some compounds to fall outside of established ranges. These exceptions are evaluated and all reported data is valid and useable "unless qualified as 'R' (Rejected)."

Definitions

- Accuracy - The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.
- Precision - The agreement between a set of samples or between duplicate samples. Relates to how close together the results are and is represented by Relative Percent Difference.
- Surrogate - Organic compounds that are similar in chemical composition, extraction, and chromatography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses.
- TIC - Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, or surrogates.

Summary of Remarks For Samples Printed
05/10/10 at 17:30:28

TSR Signing Reports: 151
R5 - Desired TAT

Client sends unpreserved vials for all projects; Run BTEXM by 8260 on separate dash. DO NOT
RUSH ALK!!!

Sample: L456662-01 Account: CORCOMGCO Received: 04/30/10 09:00 Due Date: 05/07/10 00:00 RPT Date: 05/10/10 17:30

Sample: L456662-02 Account: CORCOMGCO Received: 04/30/10 09:00 Due Date: 05/07/10 00:00 RPT Date: 05/10/10 17:30



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Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

May 10, 2010

Analyte	Result	Laboratory Blank		Limit	Batch	Date Analyzed
		Units	% Rec			
Bromide	< 1	mg/l			WG476017	04/30/10 08:08
Chloride	< 1	mg/l			WG476017	04/30/10 08:08
Nitrate	< .1	mg/l			WG476017	04/30/10 08:08
Nitrite	< .1	mg/l			WG476017	04/30/10 08:08
Sulfate	< 5	mg/l			WG476017	04/30/10 08:08
pH	5.60	su			WG476124	05/01/10 09:08
Alkalinity	< 20	mg/l			WG476336	05/04/10 10:40
Fluoride	< .1	mg/l			WG476507	05/04/10 20:14
Calcium	< .5	mg/l			WG476608	05/05/10 09:26
Iron	< .1	mg/l			WG476608	05/05/10 09:26
Lead	< .005	mg/l			WG476608	05/05/10 09:26
Magnesium	< .1	mg/l			WG476608	05/05/10 09:26
Manganese	< .01	mg/l			WG476608	05/05/10 09:26
Potassium	< .5	mg/l			WG476608	05/05/10 09:26
Selenium	< .02	mg/l			WG476608	05/05/10 09:26
Sodium	< .5	mg/l			WG476608	05/05/10 09:26
Specific Conductance	0.180	umhos/cm			WG476559	05/05/10 12:43
Fluoride	< .1	mg/l			WG476792	05/05/10 18:54
Dissolved Solids	< 10	mg/l			WG476653	05/06/10 13:47
Benzene	< .001	mg/l			WG477350	05/09/10 04:08
Ethylbenzene	< .001	mg/l			WG477350	05/09/10 04:08
Toluene	< .005	mg/l			WG477350	05/09/10 04:08
Total Xylenes	< .003	mg/l			WG477350	05/09/10 04:08
4-Bromofluorobenzene		% Rec.	105.1	75-128	WG477350	05/09/10 04:08
Dibromofluoromethane		% Rec.	101.2	79-125	WG477350	05/09/10 04:08
Toluene-d8		% Rec.	100.9	87-114	WG477350	05/09/10 04:08
a,a,a-Trifluorotoluene		% Rec.	104.0	84-114	WG477350	05/09/10 04:08

Analyte	Units	Result	Duplicate		RPD	Limit	Ref Samp	Batch
			Duplicate					
Sulfate	mg/l	610.	650.		6.02	20	L455986-02	WG476017
Chloride	mg/l	5.60	5.60		0	20	L456671-05	WG476017
Nitrate	mg/l	0.650	0.640		0.933	20	L456671-05	WG476017
Sulfate	mg/l	5.60	5.50		2.16	20	L456671-05	WG476017
pH	su	7.80	7.80		0	1	L456605-01	WG476124
pH	su	12.0	12.0		0	1	L456768-01	WG476124
Alkalinity	mg/l	210.	210.		1.42	20	L456869-07	WG476336
Alkalinity	mg/l	360.	360.		1.10	20	L456426-01	WG476336

* Performance of this Analyte is outside of established criteria.

For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'



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Analyte	Units	Result	Duplicate		RPD	Limit	Ref Samp	Batch
			Duplicate					
Fluoride	mg/l	0	0		0	20	L456474-16	WG476507
Fluoride	mg/l	0	0		0	20	L456474-28	WG476507
Calcium	mg/l	0	0.279		NA	20	L456764-10	WG476608
Iron	mg/l	0	0.0299		NA	20	L456764-10	WG476608
Lead	mg/l	0	0.00130		NA	20	L456764-10	WG476608
Magnesium	mg/l	0	0.0103		NA	20	L456764-10	WG476608
Manganese	mg/l	0	0.00110		NA	20	L456764-10	WG476608
Potassium	mg/l	0	0.311		NA	20	L456764-10	WG476608
Selenium	mg/l	0	0.00850		NA	20	L456764-10	WG476608
Sodium	mg/l	6.10	7.60		21.9*	20	L456764-10	WG476608
Specific Conductance	umhos/cm	430.	430.		0.700	20	L456205-01	WG476559
Specific Conductance	umhos/cm	400.	400.		0.250	20	L456871-01	WG476559
Dissolved Solids	mg/l	200.	200.		0.501	5	L456497-01	WG476653

Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
Bromide	mg/l	40	39.8	99.5	90-110	WG476017
Chloride	mg/l	40	39.8	99.5	90-110	WG476017
Nitrate	mg/l	8	8.14	102.	90-110	WG476017
Nitrite	mg/l	8	7.93	99.1	90-110	WG476017
Sulfate	mg/l	40	39.2	98.0	90-110	WG476017
pH	su	6.46	6.40	99.1	97.9-100.8	WG476124
Alkalinity	mg/l	40	41.8	105.	85-115	WG476336
Fluoride	mg/l	8	8.22	103.	90-110	WG476507
Calcium	mg/l	11.3	11.2	99.1	85-115	WG476608
Iron	mg/l	1.13	1.11	98.2	85-115	WG476608
Lead	mg/l	1.13	1.16	103.	85-115	WG476608
Magnesium	mg/l	11.3	11.5	102.	85-115	WG476608
Manganese	mg/l	1.13	1.10	97.3	85-115	WG476608
Potassium	mg/l	11.3	10.8	95.6	85-115	WG476608
Selenium	mg/l	1.13	1.08	95.6	85-115	WG476608
Sodium	mg/l	11.3	11.2	99.1	85-115	WG476608
Specific Conductance	umhos/cm	406	410.	101.	85-115	WG476559
Fluoride	mg/l	8	8.11	101.	90-110	WG476792
Dissolved Solids	mg/l	8800	8510	96.7	85-115	WG476653
Benzene	mg/l	.025	0.0233	93.1	67-126	WG477350

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Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
Ethylbenzene	mg/l	.025	0.0242	96.6	76-129	WG477350
Toluene	mg/l	.025	0.0238	95.3	72-122	WG477350
Total Xylenes	mg/l	.075	0.0735	98.0	75-128	WG477350
4-Bromofluorobenzene				101.6	75-128	WG477350
Dibromofluoromethane				101.8	79-125	WG477350
Toluene-d8				103.9	87-114	WG477350
a,a,a-Trifluorotoluene				101.4	84-114	WG477350

Analyte	Units	Laboratory Control Sample Duplicate			Limit	RPD	Limit	Batch
		Result	Ref	%Rec				
Bromide	mg/l	39.9	39.8	100.	90-110	0.251	20	WG476017
Chloride	mg/l	39.8	39.8	100.	90-110	0	20	WG476017
Nitrate	mg/l	8.14	8.14	102.	90-110	0	20	WG476017
Nitrite	mg/l	7.93	7.93	99.0	90-110	0	20	WG476017
Sulfate	mg/l	39.2	39.2	98.0	90-110	0	20	WG476017
pH	su	6.40	6.40	99.0	97.9-100.8	0	20	WG476124
Alkalinity	mg/l	42.4	41.8	106.	85-115	1.43	20	WG476336
Fluoride	mg/l	8.21	8.22	103.	90-110	0.122	20	WG476507
Specific Conductance	umhos/	410.	410.	101.	85-115	0	20	WG476559
Fluoride	mg/l	8.11	8.11	101.	90-110	0	20	WG476792
Dissolved Solids	mg/l	8560	8510	97.0	85-115	0.656	20	WG476653
Benzene	mg/l	0.0241	0.0233	96.0	67-126	3.34	20	WG477350
Ethylbenzene	mg/l	0.0258	0.0242	103.	76-129	6.75	20	WG477350
Toluene	mg/l	0.0245	0.0238	98.0	72-122	3.01	20	WG477350
Total Xylenes	mg/l	0.0776	0.0735	103.	75-128	5.33	20	WG477350
4-Bromofluorobenzene				106.0	75-128			WG477350
Dibromofluoromethane				101.6	79-125			WG477350
Toluene-d8				103.0	87-114			WG477350
a,a,a-Trifluorotoluene				105.6	84-114			WG477350

Analyte	Units	Matrix Spike			% Rec	Limit	Ref Samp	Batch
		MS Res	Ref Res	TV				
Chloride	mg/l	61.0	14.0	50	94.0	80-120	L456659-01	WG476017
Nitrate	mg/l	5.40	0.570	5	96.6	80-120	L456659-01	WG476017
Alkalinity	mg/l	236.	77.0	200	79.5*	80-120	L456808-03	WG476336
Fluoride	mg/l	5.13	0.100	5	101.	80-120	L456474-14	WG476507
Calcium	mg/l	11.6	0.279	11.3	100.	75-125	L456764-10	WG476608

* Performance of this Analyte is outside of established criteria.

For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'



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Analyte	Units	MS Res	Matrix Spike		% Rec	Limit	Ref Samp	Batch
			Ref Res	TV				
Iron	mg/l	1.13	0.0299	1.13	97.4	75-125	L456764-10	WG476608
Lead	mg/l	1.17	0.00130	1.13	103.	75-125	L456764-10	WG476608
Magnesium	mg/l	11.5	0.0103	11.3	102.	75-125	L456764-10	WG476608
Manganese	mg/l	1.12	0.00110	1.13	99.0	75-125	L456764-10	WG476608
Potassium	mg/l	10.4	0.311	11.3	89.3	75-125	L456764-10	WG476608
Selenium	mg/l	1.08	0.00850	1.13	94.8	75-125	L456764-10	WG476608
Sodium	mg/l	16.7	7.60	11.3	80.5	75-125	L456764-10	WG476608
Benzene	mg/l	3.70	0	.025	740.*	16-158	456251-01	WG477350
Ethylbenzene	mg/l	0.699	0	.025	140.	29-150	456251-01	WG477350
Toluene	mg/l	0.700	0	.025	140.	22-152	456251-01	WG477350
Total Xylenes	mg/l	2.58	0	.075	172.*	27-151	456251-01	WG477350

Analyte	Units	MSD	Matrix Spike Duplicate		Limit	RPD	Limit	Ref Samp	Batch
			Ref	%Rec					
Chloride	mg/l	60.5	61.0	93.0	80-120	0.823	20	L456659-01	WG476017
Nitrate	mg/l	5.34	5.40	95.4	80-120	1.12	20	L456659-01	WG476017
Alkalinity	mg/l	238.	236.	80.5	80-120	0.844	20	L456808-03	WG476336
Fluoride	mg/l	5.00	5.13	98.0	80-120	2.57	20	L456474-14	WG476507
Calcium	mg/l	11.2	11.6	96.6	75-125	3.51	20	L456764-10	WG476608
Iron	mg/l	1.16	1.13	100.	75-125	2.62	20	L456764-10	WG476608
Lead	mg/l	1.18	1.17	104.	75-125	0.851	20	L456764-10	WG476608
Magnesium	mg/l	11.6	11.5	102.	75-125	0.866	20	L456764-10	WG476608
Manganese	mg/l	1.09	1.12	96.4	75-125	2.71	20	L456764-10	WG476608
Potassium	mg/l	10.8	10.4	92.8	75-125	3.77	20	L456764-10	WG476608
Selenium	mg/l	1.08	1.08	94.8	75-125	0	20	L456764-10	WG476608
Sodium	mg/l	16.9	16.7	82.3	75-125	1.19	20	L456764-10	WG476608
Benzene	mg/l	2.31	3.70	462.*	16-158	46.3*	21	456251-01	WG477350
Ethylbenzene	mg/l	0.639	0.699	128.	29-150	9.04	24	456251-01	WG477350
Toluene	mg/l	0.782	0.700	156.*	22-152	11.1	22	456251-01	WG477350
Total Xylenes	mg/l	2.24	2.58	149.	27-151	14.2	23	456251-01	WG477350

Batch number /Run number / Sample number cross reference

WG476017: R1202048: L456662-01 02
WG476124: R1202748: L456662-01 02
WG476336: R1204028: L456662-01 02
WG476507: R1205548: L456662-01
WG476608: R1205850: L456662-01 02
WG476559: R1206028: L456662-01 02
WG476792: R1207528: L456662-02
WG476653: R1207748: L456662-01 02
WG477350: R1210948: L456662-01 02

* * Calculations are performed prior to rounding of reported values .
* Performance of this Analyte is outside of established criteria.
For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'



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Est. 1970

May 10, 2010

The data package includes a summary of the analytic results of the quality control samples required by the SW-846 or CWA methods. The quality control samples include a method blank, a laboratory control sample, and the matrix spike/matrix spike duplicate analysis. If a target parameter is outside the method limits, every sample that is effected is flagged with the appropriate qualifier in Appendix B of the analytic report.

Method Blank - an aliquot of reagent water carried through the entire analytic process. The method blank results indicate if any possible contamination exposure during the sample handling, digestion or extraction process, and analysis. Concentrations of target analytes above the reporting limit in the method blank are qualified with the "B" qualifier.

Laboratory Control Sample - is a sample of known concentration that is carried through the digestion/extraction and analysis process. The percent recovery, expressed as a percentage of the theoretical concentration, has statistical control limits indicating that the analytic process is "in control". If a target analyte is outside the control limits for the laboratory control sample or any other control sample, the parameter is flagged with a "J4" qualifier for all effected samples.

Matrix Spike and Matrix Spike Duplicate - is two aliquots of an environmental sample that is spiked with known concentrations of target analytes. The percent recovery of the target analytes also has statistical control limits. If any recoveries that are outside the method control limits, the sample that was selected for matrix spike/matrix spike duplicate analysis is flagged with either a "J5" or a "J6". The relative percent difference (%RPD) between the matrix spike and the matrix spike duplicate recoveries is all calculated. If the RPD is above the method limit, the effected samples are flagged with a "J3" qualifier.

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