

March 28, 2018

Via Electronic and First Class Mail

Dana Drake, P.E.
Environmental Program Manager
Waterway and Wetlands Program
Pennsylvania Department of Environmental Protection
Southwest Regional Office
400 Waterfront Drive
Pittsburgh, PA 15222-4745

**Re: Hydrological Reevaluation Report
HDD S2-0070, Permit No. E11-352
William Penn Avenue Crossing
Jackson Township, Cambria County**

Dear Ms. Drake:

In compliance with the Corrected Stipulated Order dated August 10, 2017 a Reevaluation Report on the above-referenced horizontal directional drill (“HDD”) was submitted to the Department on January 2, 2018. In a letter dated February 27, 2018, the Department requested further information. Please accept this letter as a response. Your requests are bolded below followed by the response.

- 1. Sunoco (SPLP) states that HDD activities could affect individual well us during active drilling for wells located within 150 linear feet of either side of the profile. SPLP offers no justification of how the 150 linear feet designation was determined. Please provide justification, sealed by a Pennsylvania Professional Geologist, that wells outside of 150 feet of the profile will not be impacted.**

As a result of the Consent Order Agreement executed February 8, 2018, SPLP has authored and DEP has approved a new Operations Plan that provides that SPLP will offer all landowners with a private water supply source located within 450 ft of the HDD alignment an alternative temporary water supply. Accordingly, the previous statement concerning the potential effects within 150 ft is now moot. In accordance with the Operations Plan, SPLP has made this offer via letter to the 12 landowners with identified private water supply wells. To date only one (1) offer has been accepted; however, several of the other well owners are considering the offer. SPLP’s offer to the landowners for the temporary supply of water during the HDD operations will remain open until HDD operations are complete. Moreover, in accordance with its Chapter 105 permit, during HDD activities SPLP will address to the satisfaction of the landowner any landowner complaints concerning water supply that are shown to be associated with HDD activities.

2. **With regard to water supplies that might be impacted by these HDD activities, SPLP must address those impacts in an acceptable manner. SPLP has the option to enter into written agreements with all private water supply owners whose water supplies may be impacted by this Drill, regardless of their location from the Drill, as part of this re-evaluation, and in advance of commencing the HDD. Under the agreements, SPLP must provide short and long-term replacement potable water supplies adequate in quantity and quality for the purposes served, to the satisfaction of all potentially affected water supply owners. The agreements should provide for SPLP to conduct water quality and quantity testing of each potentially affected water supply prior to, during, and after the HDD activities. SPLP needs to provide proof of these agreements to DEP with a response to this letter.**

In the alternative, if SPLP chooses not to pursue these agreements with the private water supply owners, it must provide a discussion of actions to be taken by SPLP to prevent water supply impacts from occurring. SPLP needs to demonstrate how, in the absence of the agreements described above, SPLP will avoid impacts to all water supplies. SPLP's approach should include the utilization of technical and non-technical measures to avoid and minimize such impacts, including, but not limited to, the conversion of the HDD to a trench installation, use of other trenchless construction methods, the use of American Standards Institute/National Sanitation Foundation (ANSI/NSF) Standard 60 approved gels or other approved additives that could prevent such impacts from the Drill, or some combination of the above. To the extent SPLP proposes to use any ANSI/NSF 60 certified HDD additives, consistent with Special Condition H.5 contained in DEP Permit No. E11-352, SPLP will need to demonstrate that the manner in which SPLP anticipates using each additive is consistent with the manner indicated in the ANSI/NSF Standard 60 certification for that additive. In addition, SPLP should state whether it will be following all conditions included as part of the additive's certification or, if not, provide an explanation for any deviation(s) from the certification and why that deviation is necessary and acceptable.

As noted above, SPLP previously provided notice and offered temporary water supplies to all water supply owners within 450 feet of HDD profiles. Significantly, the facts regarding water supply wells within 450 feet of the HDD profile are:

- (i) There are 7 known water supply wells and 1 possible parcel with a water supply well within 450 feet of this HDD profile. All have received written notification that they are entitled to temporary water supplies at this time.
- (ii) One of the 8 landowners has accepted temporary water replacement. The remaining landowners have stated a preference to monitor their own wells and take action, if necessary, upon observing any adverse changes in water quality or quantity.

- (iii) Seven (7) parcels are vacant, *i.e.*, there are no structures on these parcels that would reasonably be expected to be associated with human habitation or occupation.

Attachment 1 to this letter presents an updated Water Supply illustration identifying the known well locations, 1 potential well location, and vacant tracts discussed above. SPLP's goal, as noted above, is to minimize any potential impacts to water supply wells.

The Reevaluation report submitted to the Department on January 2, 2018, provided an alternatives analysis that set forth the direct impacts to natural resources if this HDD were to be converted to a conventional construction plan, and discussed the feasibility of other trenchless construction methods. The one item that was not discussed in detail this section was the aesthetic impacts of a conventional construction plan. As the Department knows, conventional open trench construction and conventional bore applications at the crossings of road, streams, and other conflicting features requires the clearing of not only a standard 75-ft wide corridor, but also the clearing of additional temporary workspaces as needed. Implementation of such a plan would result in 3.4 acres of cleared open grounds, whereas currently, the existing 8-inch SPLP pipeline is a narrow maintained open strip of land. This effect to the first 1,700 ft of what is proposed as an HDD would significantly and negatively alter the aesthetics of the general area, and view shed of and between the individual residences of the area. These concerns further support the conclusion of the HDD Reevaluation report that the current construction method is the most practicable alternative.

In addition, SPLP now plans to add DrilPlex to its drilling mud for the western 1,500 length of pilot hole progress. DrilPlex is an ANSI/NSF-60 approved drinking water certified additive that allows the drilling mud to gel in the formation thereby minimizing the risk of impact to any of the nearby wells in question. SPLP will add DrilPlex in a 1:10 ratio to the raw bentonite during mixing of the drilling fluid, in accordance with the manufacturer's recommendations. In addition, SPLP intends to follow all conditions included as part of DrilPlex's ANSI/NSF-60 certification. An application guide and Safety Data Sheet for DrilPlex is provided as Attachment 2 for the Department's reference.

3. **The Report discusses potential changes in water *quality*, but also needs to discuss potential changes to water *quantity*, as the potential exists for the HDD bore to adversely impact the yield of private water supply wells. Please describe how this will be done consistent with applicable provisions of the latest versions of the Inadvertent Return Assessment, Preparedness, Prevention and Contingency Plan (February 6, 2018), and the Operations Plan (January 2018).**

As an initial matter, it is unclear what the Department has requested in asking for a description as to "how this will be done" with respect to potential adverse effects to water supply well yields. SPLP assumes that the Department has requested a description of what actions SPLP intends to take to

address any potential adverse effects on water quantity. To that end, SPLP notes that the water protection measures discussed in the answer to Item 2 of the Departments letter will also serve to reduce the risk of any potential adverse impacts to water quantity. Specifically, the use of DrilPlex in the pilot phase of the HDD should reduce the risk that HDD activities will create additional preferential pathways for groundwater that could cause groundwater to migrate away from the recharge zone for each of these water supplies. In addition, both the Inadvertent Return Assessment, Preparedness, Prevention and Contingency Plan (“IR Plan”) and the Operations Plan require SPLP to offer alternative water supplies to landowners with water supply wells within 450 ft of the drill profile. Obviously, to the extent a landowner accepts this offer, their water supply will not be adversely affected during HDD activities. Moreover, even if the landowner does not accept an offer of alternative water supply, the IR Plan requires SPLP to address to the satisfaction of the landowner any complaints associated with water quantity during HDD activities. Finally, if a landowner identifies any impact to a private water supply attributable to pipeline construction after post-construction sampling, including impacts to yield, the IR Plan obligates SPLP to restore or replace the impacted water supply to the satisfaction of the private water supply owner.

4. Additionally, DEP requests the following information related to the project’s potential effect on well production zones and water supplies:

a. An analysis of private water supply well production zones and how the proposed HDD activities will interact with them (listing the depths of wells and pumps is insufficient).

As stated in paragraph 3 on page 3 in Reevaluation report for this HDD, *“The production zone for waters wells is from the well bottom to highest point of water inflow from the water bearing seams, joints, and fractures in the rock formation”*. Water wells in bedrock can only pump water from the well bore and water volumes within the annulus of the well bore from the bottom level of the pump setting.

SPLP’s licensed Professional Geologist believes the intended subject matter of the question listed in Item 2. bullet 1, is the “recharge” of these wells from the surrounding geologic formation.

As stated in the Reevaluation Report in the Hydrogeology section, *“Groundwater occurs within the secondary porosity created by fractures, bedding plan partings, and faults. Given this HDD location is a groundwater discharge zone, the water table is shallow at some locations and occupies unconsolidated alluvium associated with the Hinckston Run flood plain”*. This means that available groundwater is stored within, and moves through, fissures and bedding plane partings in the bedrock. A water well in a bedrock formation is a simple vertical hole in the bedrock that intercepts water bearing fissures and bedding plane partings and provides an open vertical annulus for the water within the bedrock to flow into and fill (recharge) with a volume of water rising towards the land’s surface until equilibrium with the piezometric surface in bedrock formation is achieved.

Any technically defensible analysis of this subject in this unique geology is dependent upon information on the orientation of the fissures and bedding plane partings; their width; do they dip or incline; and to what extent hydrostatic forces or the effects of gravity influence the movement of water in these bedrock features. This information, however, cannot be determined for a given well location in this geology even with extensive geologic coring and water investigation because the bedrock characteristics for these features and behavior can vary significantly in each core. Furthermore, the private water supply yields are governed by well construction and resulting well efficiency and its relation to the available water bearing fissures and bedding plane parting horizons they intercept and does not reflect a homogenous consistency as seen in layered unconsolidated aquifers.

In addition, the effect of the HDD on a given water supply well will depend upon the level of use and resultant groundwater draw at a specific time. According to water use data published by Pennsylvania State University (<https://extension.psu.edu/water-system-planning-estimating-water-needs>), in general, a household will use 50 to 100 gallons per person per day (200 to 400 gallons per day for a family of four). For a drilled well, the borehole provides a significant amount of water storage. A typical 6-inch-diameter well will store about 1.5 gallons of water for every foot of standing water in the borehole and a 10-inch well stores about 4 gallons of water per foot. Therefore, a 6-inch-diameter well with about 100 feet of standing water in the borehole would contain about 150 gallons of stored water.

Use of this water and the resulting draw upon adjacent groundwater within the fractured bedrock is cyclic throughout the day, with the greatest demand occurring during morning and evening hours and on weekend days and holidays when residents are generally home.

In sum, the variability of the well yield and production can and often varies greatly over relatively short distances and time periods in these complex rock formations. The well production can be influenced by seasonal variability in precipitation, well construction, well consumption rates, recharge rates, infiltration rates, radius of influence (ROI) of other well systems, multiple production zones, and known and unknown geologic structural features (i.e., fissures, bedding planes and rock type). For these reasons discussed above, and consistent with the permit and incorporated plans, as amended, SPLP will offer baseline, active drilling, and post drilling monitoring of all wells in the 450 feet buffer zone. This data will be used to evaluate the water chemistry and other physical characteristics of the water quality at the specific well location before, during and after construction, and if an impact occurs, the permit requires replacement of the water supply to the satisfaction of the well owner.

b. A map showing all the private water supplies in the correct, surveyed locations.

The revised Hydrogeologic Report contains an updated Water Supply Illustration. The well or spring locations were recorded by Global Positioning System equipment and are accurate. An updated version of this illustration is provided as Attachment 1.

- c. The location and depths of private water supplies should be shown on a profile map to show the correlation of the well depth with the HDD profile.**

A set of enhanced HDD plan and profiles with the water well information is provided with this response as Attachment 3.

- d. A description of the following: if there is short tripping of the tooling during the HDD, what are the changes of a plunger-effect occurring during either the drilling or reaming phases or during pipe pullback, and could this affect private water supplies?**

The “plunger effect” is only a concern during the complete removal of stem and tooling during the pilot phase of a HDD, since there is only one exit annulus for any pressures created while returning the tool and drive stem to the bedrock face for continued progress.

By contrast, during a routine “short-tripping” of the drilling stem and tooling, the length of tripping is typically 2-5 joints of drilling stem, 60-150 foot (ft) of length, as needed to ensure that the annulus surrounding the drill stem is not blocked and the full circulation of returns is being maintained. The return trip or “re-insertion” is so minor in extent that it does not create a “plunger effect” since the drilling fluids and cuttings have no settling time for phase separation to occur.

Similarly, there is no plunger effect during the reaming or pipe pullback phases of an HDD since an open pathway exists between the entry and exit for pressure relief and movement of materials within the reamed borehole.

- e. Water quality sample results of the private water supplies that may be affected.**

The results of water quality testing for the sampled wells is provided as Attachment 4.

- f. Water quantity test results (pump yield tests) of the private water supplies that may be affected.**

SPLP has notified each water supply well owner within 450 feet of the HDD profile that they have the option to have water quantity tests of their well. To date, these water supply well owners have not asked to perform any water quantity tests at any well location.

- 5. SPLP states that all landowners with property located within 450 feet of the Right-of-Way (ROW) were sent a notification letter. DEP requests copies of all letters sent to individual landowners within 450 feet of the HDD. Please provide both a redacted version for posting on DEP’s webpage and an unredacted copy of each letter for our information. DEP also requests the property owners’ response to the notifications, if any were received by SPLP. Please provide both a redacted (landowner information) and unredacted copy of each response.**

Attachment 5 provided with this letter of response contains an un-redacted set of the requested landowner communications.

6. Boring B2-2E and B2-3E were installed to locate competent bedrock. According to the profile map, the locations of these borings are outside the terminal ends of the HDD. Please provide the justification for placing these borings outside the limits of the HDD.

Like all borings associated with the ME II HDD geotechnical boring program instituted in 2017, B2-2E and B2-3E were sited to provide representative boring logs and obtain representative cores for mechanical strength testing in the bedrock intervals through which the HDDs will be drilled.

In general, SPLP was able to expedite the geotechnical boring program and still meet the guideline stated above by:

- Locating borings where SPLP did not have to obtain land owner permission.
- Locating borings where access was readily available (existing dirt and gravel roads)
- Locating borings within open trench right-of ways (ROWS)
- Keeping borings within the Limits of Disturbance (LODs) around HDD entry/exit sites, valve stations and other pipeline facilities.

In western Pennsylvania and in this area of interest, the published geologic data indicates that the cyclic sequences of mudstones (shales, siltstones and claystones), sandstones, limestones and coal are persistent over considerable distances because the dips on bedding are slight. For example, the dip on bedrock estimated for the area of HDD S2-0070 is approximately 2.8 degrees southeast, meaning that some surety exists to extrapolate the data obtained from these cores across the geologic profile crossed through by the HDD profile.

Obtaining geotechnical cores inside the HDD profile is not a recommended best management practice. The risk of a fault in the grouting closure of these bores, and resulting IR potential, overweighs the data value potential.

SPLP submits that we have been, and are, in complete compliance with the agreed terms and requirements of analysis of the Order, as agreed to by the Department, and that no further analysis is required for the Department to consent to the start of this HDD. We therefore request that the Department approve the Reevaluation Report for the William Penn Avenue crossing (S2-0070) as soon as possible.

Sincerely,



Matthew Gordon

Attachment 1
Water Supply Illustration

GES Well ID	Distance to HDD Perpendicular (Feet)	Distance to HDD Entry/Exit (Feet)	Well Information		
			Reported DTB (Feet)	Reported DTW (Feet)	Reported Pump Depth
WL-11022016-499-02	21	126	25-40	20	25
WL-12202016-551-04	227	680	80	1	60
WL-12202016-551-01	94	716	80	0.5	60
WL-12202016-551-02	77	1,052	80	1	75
SP-06062017-604-01	177	281	NA	NA	NA
WL-11062017-614-02	475	749	79	69	Unknown
WL-11142017-614-01	347	865	Unknown	Unknown	Unknown
WL-11212017-612-01	156	167	40	20	Unknown
SP-11142017-614-02	1,273	1,273	NA	NA	NA
WL-11292017-614-01	467	498	Unknown	Unknown	Unknown
WL-01222018-639-01	436	448	Unknown	Unknown	Unknown

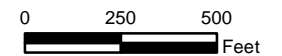
Legend

- LOD
- Parcel
- PPP Centerline
- HDD
- 450 foot buffer of HDD alignment
- Public Water Supply/Landowner Confirmed No Well
- Well Present; Testing Denied

****Testing locations current as of 02/06/2018**

- GES Testing Location
- GES Spring Testing Location
- Testing Scheduled, Well Location is Approximate

Location



Well Location Map
HDD# PA-CA-0023.0000-RD
Cambria County, PA.

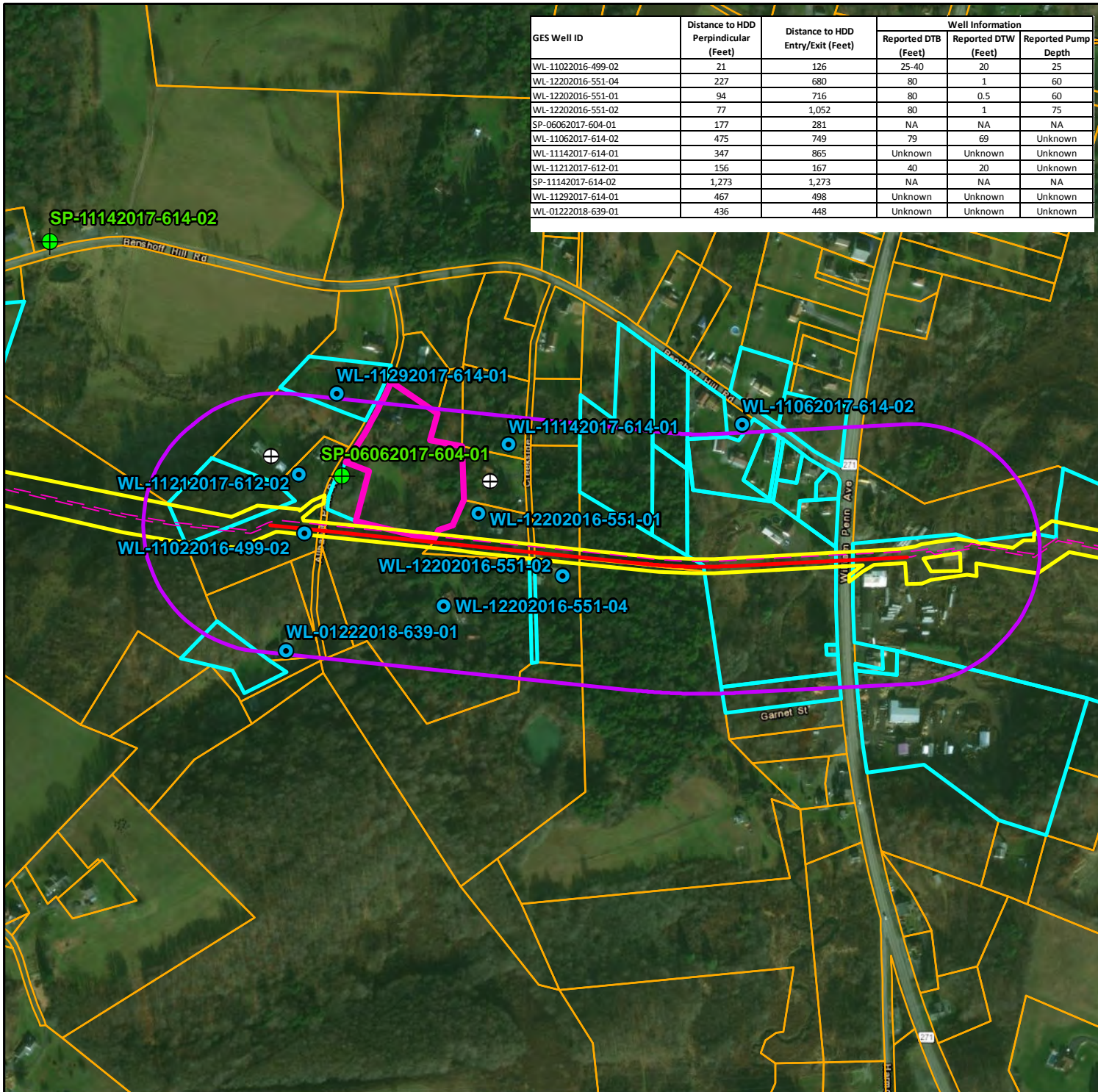
Prepared By:



Date:
2/8/2018

Base Map:
ESRI World Imagery, 09/24/2015

Coordinate System: NAD 83 Stateplane, PA South, Feet



C:\GIS\workspace\Tetra\Projects\PA\CA\WellLocations\WellLocations_PA_CA_0023_0000.mxd

Attachment 2

DrilPlex™: Additive Use and Safety Data Sheet

DRILPLEX

DRILPLEX* Mixed Metal Oxide (MMO) is a bentonite extender and secondary shale stabilizer designed to give improved carrying capacity and suspending ability in water-base drilling fluids.

It has particular application in drilling of high-angle and horizontal wells, lost circulation zones, production reservoirs as a reservoir drill-in fluids (RDF) and for casing milling operations. It is effective over a broad range of temperatures.

Typical Physical Properties

Physical appearance	Granular, free flowing, off-white powder
Odor	Odorless
Specific gravity	2.6 – 2.9
pH	9.5 – 10.0 (1% slurry in water)
Solubility (in water)	Slight
Bulk density	40.51 lb/ft ³ (648 kg/m ³)

Applications

DRILPLEX mixed metal oxide extends the rheology of bentonite slurries by adsorbing onto the clay platelets to form a strong, stable complex that is sensitive to anionic products and some salts. It provides improvements in shale stabilization and solids tolerance.

The addition of this product structures the bentonite to produce a very flat, shear-thinning rheological profile with low plastic viscosity, high yield point and flat gel strengths.

The high viscosities achieved at lower shear rates (3 and 6 rpm) allow excellent hole cleaning capabilities and suspension properties and reduced flow through fractures. Flow at the wellbore face is low-to-zero, so mechanical washout is minimized.

The DRILPLEX bentonite complex is an excellent bridging agent and acts to prevent solids invasion when drilling into many reservoirs. The filtercake is external and easily removed.

DRILPLEX extender is not compatible with anionic materials. The use of dispersants and anionic polymers (such as CMC and PAC) will destroy the rheological advantages.

A 1:10 ratio of DRILPLEX extender to bentonite specially designed for this application is normally recommended although salinity and density affect the ratio. Typical concentrations are 0.8 to 1.2 lb/bbl (2.3 to 3.4 kg/m) of DRILPLEX extender and 8 to 12 lb/bbl (23 to 34 kg/m) of bentonite.

Higher concentrations may be needed for casing milling applications. The ratio of DRILPLEX extender to bentonite should be increased to 1:8 for reservoir drilling to ensure that an excess of polymer is present.

Advantages

- Excellent milling fluid
- Protects reservoir from solids invasion
- Minimizes mechanical washout
- Superior hole cleaning and suspension
- Controls losses

Limitations

- Sensitive to dispersants and anionic polymers

Toxicity and Handling

Bioassay information is available upon request.

Handle as an industrial chemical, wearing protective equipment and observing the precautions as described in the Material Safety Data Sheet (MSDS).

Packaging and Storage

DRILPLEX extender is packaged in 25-lb (11.35-kg) multi-wall, polyester bags, impregnated with a 1.0-mm aluminum liner.

Store in a dry location away from sources of heat or ignition, and minimize dust.



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**SAFETY DATA SHEET
DRILPLEX***

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Product name DRILPLEX*

1.2. Relevant identified uses of the substance or mixture and uses advised against

Identified uses Rheology modifier

1.3. Details of the supplier of the safety data sheet

Supplier M-I Australia Pty Ltd
Level 11
251 Adelaide Terrace
Perth
WA 6000
T = 08 9440 2900

Manufacturer M-I SWACO
A Schlumberger Company
Endeavour Drive
Arnhall Business Park, Westhill
Aberdeen AB32 6UF
Scotland UK
T = +44 (0)1224-742200
F = +44 (0)1224-742288
E-mail = MBXMSDS-EH@miswaco.slb.com

1.4. Emergency telephone number

(24 Hour) Australia +61 2801 44558, Asia Pacific +65 3158 1074, China +86 10 5100 3039, Europe +44 (0) 1235 239 670, Middle East and Africa +44 (0) 1235 239 671, New Zealand +64 9929 1483, USA 001 281 561 1600.

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

Classification (1999/45/EEC) Not classified.

2.2. Label elements

Risk Phrases

NC Not classified.

Safety Phrases

NC Not classified.

2.3. Other hazards

Not Classified as PBT/vPvB by current EU criteria.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.2. Mixtures

ALUMINIUM OXIDE/HYDROXIDE	30-60%
Classification (EC 1272/2008) Not classified.	Classification (67/548/EEC) Not classified.

DRILPLEX*

UREA		10-30%
CAS-No.: 57-13-6	EC No.: 200-315-5	
Classification (EC 1272/2008) Not classified.	Classification (67/548/EEC) Not classified.	
MAGNESIUM OXIDE		10-30%
Classification (EC 1272/2008) Not classified.	Classification (67/548/EEC) Not classified.	
SODIUM CARBONATE		1-5%
CAS-No.: 497-19-8	EC No.: 207-838-8	
Classification (EC 1272/2008) Eye Irrit. 2 - H319	Classification (67/548/EEC) Xi;R36	

The Full Text for all R-Phrases and Hazard Statements are Displayed in Section 16.

Composition Comments

The data shown is in accordance with the latest EC Directives.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

Inhalation

Move the exposed person to fresh air at once. If respiratory problems, artificial respiration/oxygen. Get medical attention if any discomfort continues.

Ingestion

Do not induce vomiting. Immediately give a couple of glasses of water or milk, provided the victim is fully conscious. Get medical attention if any discomfort continues.

Skin contact

Remove contaminated clothing immediately and wash skin with soap and water. Get medical attention promptly if symptoms occur after washing.

Eye contact

Make sure to remove any contact lenses from the eyes before rinsing. Promptly wash eyes with plenty of water while lifting the eye lids. Continue to rinse for at least 15 minutes and get medical attention.

4.2. Most important symptoms and effects, both acute and delayed

Inhalation.

Irritation of nose, throat and airway.

Ingestion

Nausea, vomiting.

Skin contact

Prolonged skin contact may cause redness and irritation.

Eye contact

Irritating and may cause redness and pain.

4.3. Indication of any immediate medical attention and special treatment needed

Get medical attention if any discomfort continues.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media

DRILPLEX***Extinguishing media**

Use fire-extinguishing media appropriate for surrounding materials.

5.2. Special hazards arising from the substance or mixture**Hazardous combustion products**

When heated, vapours/gases hazardous to health may be formed.

Unusual Fire & Explosion Hazards

High concentrations of dust may form explosive mixture with air.

5.3. Advice for firefighters**Special Fire Fighting Procedures**

Containers close to fire should be removed immediately or cooled with water.

Protective equipment for fire-fighters

Self contained breathing apparatus and full protective clothing must be worn in case of fire.

SECTION 6: ACCIDENTAL RELEASE MEASURES**6.1. Personal precautions, protective equipment and emergency procedures**

Wear protective clothing as described in Section 8 of this safety data sheet.

6.2. Environmental precautions

Do not allow to enter drains, sewers or watercourses.

6.3. Methods and material for containment and cleaning up

Avoid generation and spreading of dust. Shovel into dry containers. Cover and move the containers. Flush the area with water. Product becomes slippery when wet.

6.4. Reference to other sections

Wear protective clothing as described in Section 8 of this safety data sheet.

SECTION 7: HANDLING AND STORAGE**7.1. Precautions for safe handling**

Avoid inhalation of dust and contact with skin and eyes. Avoid handling which leads to dust formation.

7.2. Conditions for safe storage, including any incompatibilities

Store in tightly closed original container in a dry, cool and well-ventilated place.

7.3. Specific end use(s)

The identified uses for this product are detailed in Section 1.2.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION**8.1. Control parameters**

Name	STD	TWA - 8 Hrs		STEL - 15 Min		Notes
ALUMINIUM OXIDE/HYDROXIDE	WEL		10 mg/m ³			
MAGNESIUM OXIDE	WEL		10 mg/m ³			as Mg

WEL = Workplace Exposure Limit.

SODIUM CARBONATE (CAS: 497-19-8)**DNEL**

Inhalation.	Long Term	Local Effects	10 mg/m ³
Inhalation.	Short Term	Local Effects	10 mg/m ³

UREA (CAS: 57-13-6)**DNEL**

Dermal	Short Term	Systemic Effects	580 mg/kg
Inhalation.	Short Term	Systemic Effects	292 mg/m ³
Dermal	Long Term	Systemic Effects	580 mg/kg
Inhalation.	Long Term	Systemic Effects	292 mg/m ³

PNEC

Freshwater	0.047 mg/L
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8.2. Exposure controls**Protective equipment**

DRILPLEX*

**Process conditions**

All chemical Personal Protective Equipment (PPE) should be selected based on an assessment of both the chemical hazard present and the risk of exposure to those hazards. The PPE recommendations below are based on an assessment of the chemical hazards associated with this product. Where this product is used in a mixture with other products or fluids, additional hazards may be created and as such further assessment of risk may be required. The risk of exposure and need of respiratory protection will vary from workplace to workplace and should be assessed by the user in each situation.

Engineering measures

Provide adequate general and local exhaust ventilation.

Respiratory equipment

No specific recommendation made, but respiratory protection may still be required under exceptional circumstances when excessive air contamination exists. Wear mask supplied with: Dust filter P2 (for fine dust).

Hand protection

Use protective gloves made of: Neoprene. or Nitrile.

Eye protection

Wear approved chemical safety goggles where eye exposure is reasonably probable.

Other Protection

Wear appropriate clothing to prevent any possibility of skin contact. Provide eyewash station.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

<u>Appearance</u>	Powder, dust
<u>Colour</u>	Off-white
<u>Odour</u>	Odourless.
<u>Solubility</u>	Slightly soluble in water.
<u>Relative density</u>	2.6 - 2.9 sg @20°C
<u>Bulk Density</u>	650 - 800 kg/m ³
<u>pH-Value, Diluted Solution</u>	9.0 - 10.5 @ 1%

9.2. Other information

Not relevant

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

There are no known reactivity hazards associated with this product.

10.2. Chemical stability

Stable under normal temperature conditions and recommended use.

10.3. Possibility of hazardous reactions

Not known.

10.4. Conditions to avoid

Avoid wet and humid conditions.

10.5. Incompatible materials**Materials To Avoid**

Not known.

10.6. Hazardous decomposition products

When heated, vapours/gases hazardous to health may be formed.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects**Aspiration hazard:**

DRILPLEX*

Not anticipated to present an aspiration hazard based on chemical structure.

Inhalation

Dust may irritate respiratory system or lungs.

Ingestion

May cause gastric distress, nausea and vomiting if ingested.

Skin contact

Prolonged and frequent contact may cause redness and irritation.

Eye contact

Particles in the eyes may cause irritation and smarting.

Route of entry

No route of entry noted.

Target Organs

No specific target organs noted

SECTION 12: ECOLOGICAL INFORMATION**Ecotoxicity**

Contact M-I SWACO's QHSE Department for ecological information at env@miswaco.slb.com.

12.1. Toxicity**Acute Fish Toxicity**

Not considered toxic to fish.

12.2. Persistence and degradability**Degradability**

There are no data on the degradability of this product.

12.3. Bioaccumulative potential**Bioaccumulative potential**

No data available on bioaccumulation.

12.4. Mobility in soil**Mobility:**

Slightly soluble in water.

12.5. Results of PBT and vPvB assessment

Not Classified as PBT/vPvB by current EU criteria.

12.6. Other adverse effects

None known.

SECTION 13: DISPOSAL CONSIDERATIONS**13.1. Waste treatment methods**

Recover and reclaim or recycle, if practical. Dispose of waste and residues in accordance with local authority requirements.

SECTION 14: TRANSPORT INFORMATION**General**

The product is not covered by international regulation on the transport of dangerous goods (IMDG, IATA, ADR/RID).

14.1. UN number

Not applicable.

14.2. UN proper shipping name

DRILPLEX*

Not applicable.

14.3. Transport hazard class(es)

Not applicable.

14.4. Packing group

Not applicable.

14.5. Environmental hazards**Environmentally Hazardous Substance/Marine Pollutant**

No.

14.6. Special precautions for user

Not applicable.

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Not applicable.

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**Uk Regulatory References**

Chemicals (Hazard Information & Packaging) Regulations. Control of Substances Hazardous to Health Regulations 2002 (as amended) Workplace Exposure Limits EH40.

EU Legislation

Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC, including amendments.

Water hazard classification

WGK 1

New Zealand Hazard Classification

Not Classified.

HSNO Approval No.

Not required.

15.2. Chemical Safety Assessment**International Chemical Inventories**

Contact REACH@miswaco.slb.com for REACH information. Complies with the following national/regional chemical inventory requirements: Canada (DSL / NDSL), China (IECSC), Europe (EINECS / ELINCS), Japan (METI / ENCS), New Zealand (NZIoC), Phillipines (PICCS),

SECTION 16: OTHER INFORMATION

Abbreviations and acronyms used in the safety data sheet

*a mark of M-I L.L.C.

General information

HMIS Health - 2 HMIS Flammability - 1 HMIS Physical Hazard - 0 E - Safety glasses, Gloves, Dust Respirator

Information Sources

Product information provided by the commercial vendor(s). Material Safety Data Sheet, Misc. manufacturers. LOLI. European Chemicals Bureau - ESIS (European Chemical Substances Information).

Revision Comments

General revision. Compiled or revised by Sandra McWilliam

Issued By Bill Cameron

Revision Date 17-Apr-12

Revision 4

Supersedes date 05-May-09

SDS No. 12564

Risk Phrases In Full

R36 Irritating to eyes.

NC Not classified.

DRILPLEX*

Hazard Statements In Full

H319

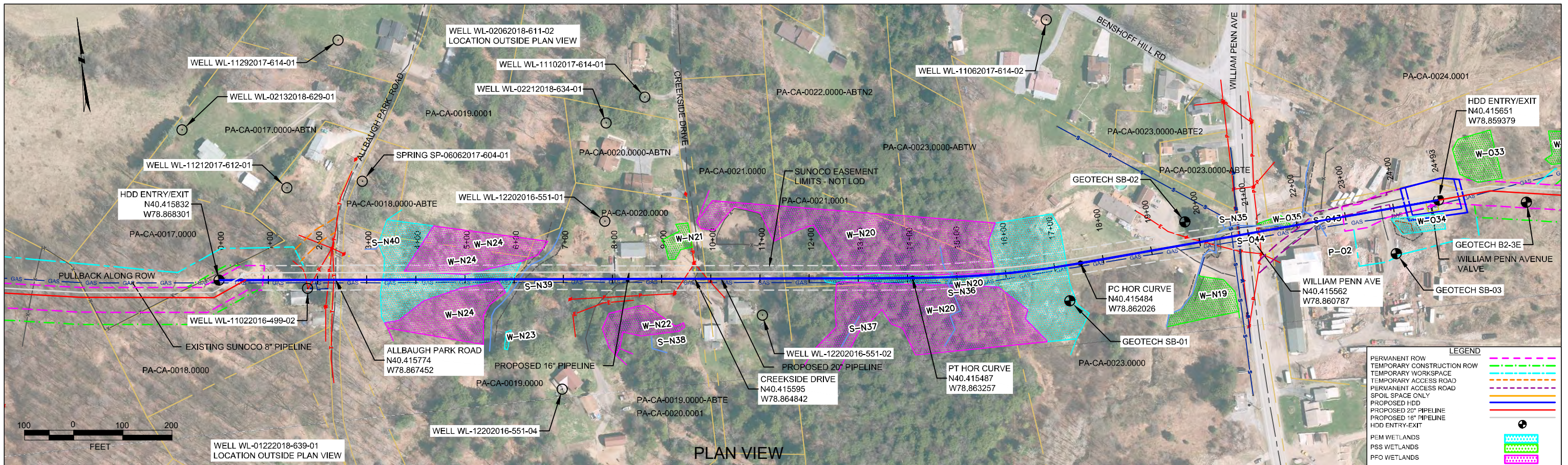
Causes serious eye irritation.

Disclaimer

MSDS furnished independent of product sale. While every effort has been made to accurately describe this product, some of the data are obtained from sources beyond our direct supervision. We cannot make any assertions as to its reliability or completeness; therefore, user may rely only at user's risk. We have made no effort to censor or conceal deleterious aspects of this product. Since we cannot anticipate or control the conditions under which this information and product may be used, we make no guarantee that the precautions we have suggested will be adequate for all individuals and/or situations. It is the obligation of each user of this product to comply with the requirements of all applicable laws regarding use and disposal of this product. Additional information will be furnished upon request to assist the user; however, no warranty, either expressed or implied, nor liability of any nature with respect to this product or to the data herein is made or incurred hereunder.

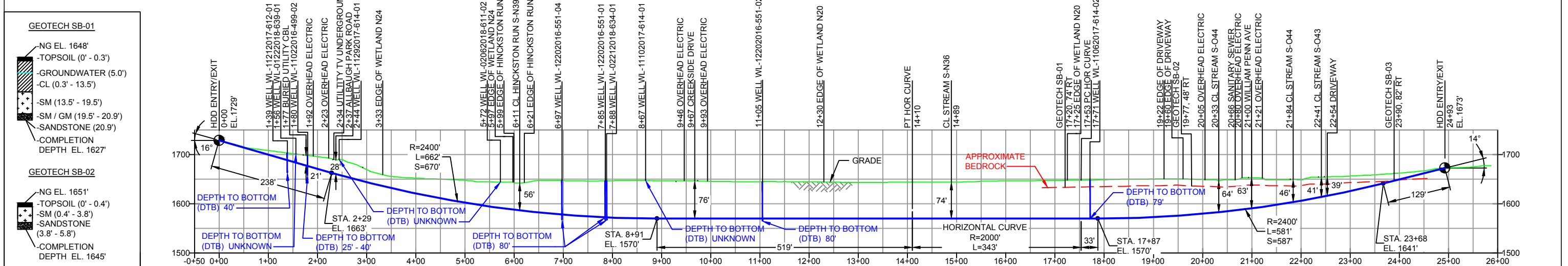
Attachment 3

HDD Plan and Profiles with Water Well Data



CAMBRIA COUNTY, PENNSYLVANIA - JACKSON TOWNSHIP S2-0070

PROFILE VIEW



DESIGN AND CONSTRUCTION:

- CONTRACTOR SHALL FIELD VERIFY DEPTH OF ALL EXISTING UTILITIES SHOWN OR NOT SHOWN ON THIS DRAWING.
- THE MINIMUM SEPARATION DISTANCE FROM EXISTING SUBSURFACE UTILITIES SHALL NOT BE LESS THAN 10 FEET AS MEASURED FROM THE OUTSIDE EDGE OF THE UTILITY TO OUTSIDE OF PROPOSED PIPELINE.
- DESIGNED IN ACCORDANCE WITH CFR 49 195 & ASME B31.4
- CROSSING PIPE SPECIFICATION:
HDD HORZ LENGTH (L)= 2493'
HDD PIPE LENGTH (S)= 2519'
20" x 0.456" W.T., X-85, API5L PSL2, ERW, BFW
COATING: 14-16 MILS FBE WITH 40 MILS MIN. ARO (POWERCRETE R95)
- INTERNAL DESIGN PRESSURE 1480 PSIG (SEAM FACTOR 1.0, DESIGN FACTOR 0.50 (HOOP STRESS)).
- INSTALLATION METHOD: HORIZONTAL DIRECTIONAL DRILL (HDD).
- PIPELINE WARNING MARKERS SHALL BE INSTALLED ON BOTH SIDES OF ALL ROAD, RAILWAY, AND STREAM CROSSINGS.
- CARRIER PIPE NOT ENCASED.
- PIPE / AMBIENT TEMPERATURE MUST BE NO LESS THAN 30°F DURING PULLBACK WITHOUT PRIOR WRITTEN APPROVAL FROM THE ENGINEER.
- CONDUCT 4-HOUR PRE-INSTALLATION HYDROTEST OF HDD PIPE STRING TO MINIMUM 1850 PSIG.
- SEE SUNOCO PENNSYLVANIA PIPELINE PROJECT ESRI WEBMAP FOR ACCESS ROAD ALIGNMENT.

NOTES

- ALL COORDINATES SHOWN ARE IN LATITUDE AND LONGITUDE. ALL MSL ELEVATIONS ARE NAD83
- STATIONING IS BASED ON HORIZONTAL DISTANCES.
- ROONEY ENGINEERING, INC. AND SUNOCO PIPELINE, LP ARE NOT RESPONSIBLE FOR LOCATION OF FOREIGN UTILITIES SHOWN IN PLOT PLAN OR PROFILE. THE INFORMATION SHOWN HEREON IS FURNISHED WITHOUT LIABILITY ON THE PART OF ROONEY ENGINEERING, INC. AND SUNOCO PIPELINE, LP. FOR ANY DAMAGES RESULTING FROM ERRORS OR OMISSIONS THEREIN.
- CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UTILITIES. CONTACT ONE CALL AT 811 PRIOR TO DIGGING.
- SUNOCO EMERGENCY HOTLINE NUMBER IS #1-800-786-7440.

REF. DRAWING		EROSION AND SEDIMENT PLAN		ADDED WELL AND SPRING DATA PER CLIENT REQUEST	
ES-2.15	TO	ES-2.17	EROSION AND SEDIMENT PLAN	EP6	ADDED WELL AND SPRING DATA PER CLIENT REQUEST
SHEET 10	TO	SHEET 11	AERIAL SITE PLAN	EP5	UPDATED GEOTECH LOCATION PROVIDED BY DPS
				EP4	UPDATED GEOTECH INFO PROVIDED BY DPS
				EP3	RELOCATED DRILL ENTRY / EXIT - DESIGN CHANGE PER LONE STAR
				EP2	REVISED PER PADEP COMMENTS RECEIVED 09-06-16
				EP1	REVISED PER PADEP COMMENTS
DWG NO	TO	DWG NO	DESCRIPTION	NO.	DESCRIPTION

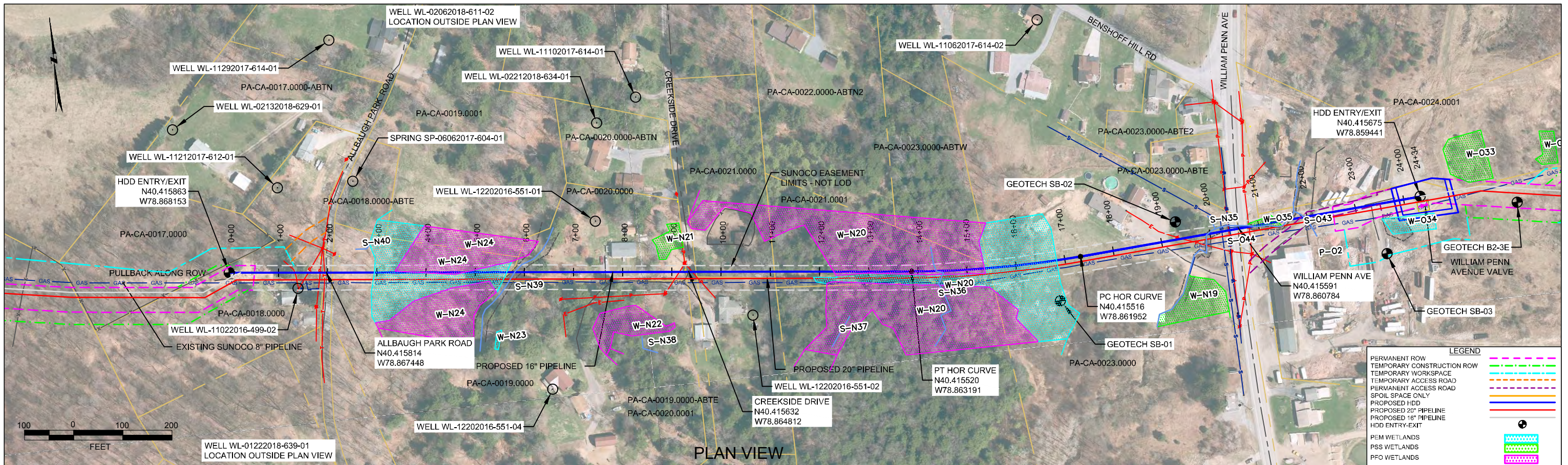
Sunoco Logistics Partners L.P.

TETRA TECH ROONEY
(303) 792-5911

SUNOCO PIPELINE, L.P.

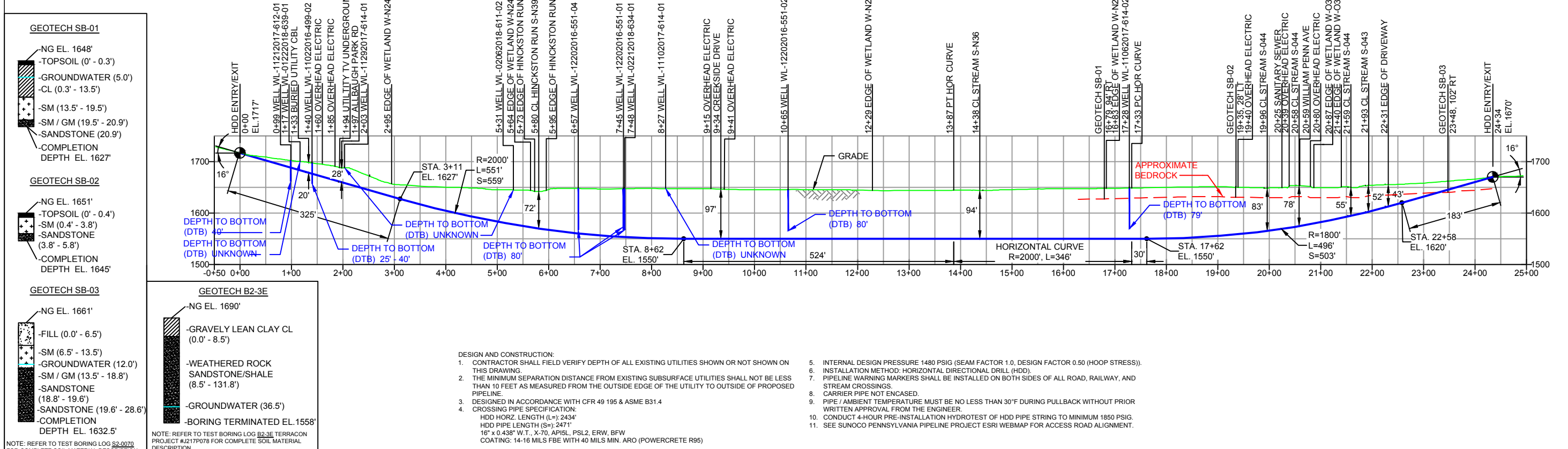
HORIZONTAL DIRECTIONAL DRILL
WILLIAM PENN AVE
PENNSYLVANIA PIPELINE PROJECT

SCALE: 1"=200'
DWG. NUMBER: PA-CA-0023.0000-RD



CAMBRIA COUNTY, PENNSYLVANIA - JACKSON TOWNSHIP
S2-0070-16

PROFILE VIEW



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REF. DRAWING		REVISIONS		
ES-2.15	TO	ES-2.17	DESCRIPTION	
SHEET 10	TO	SHEET 11	AERIAL SITE PLAN	
		EP6	ADDED WELL AND SPRING DATA PER CLIENT REQUEST	
		EP5	UPDATED GEOTECH LOCATION PROVIDED BY DPS	
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		EP2	REVISED PER PADEP COMMENTS RECEIVED 09-06-16	
		EP1	REVISED PER PADEP COMMENTS	
DWG NO	DWG NO	DESCRIPTION	NO.	DESCRIPTION

<p>SUNOCO PIPELINE, L.P.</p>					<p>HORIZONTAL DIRECTIONAL DRILL WILLIAM PENN AVE PENNSYLVANIA PIPELINE PROJECT</p>				
<p>SCALE: 1"=200'</p>					<p>DWG. NO. PA-CA-0023.0000-RD-16</p>				

Attachment 5

Landowner Communications



SUNOCO PIPELINE
An ENERGY TRANSFER Partnership

P.O. Box 2218
Altoona, PA 16602

February 8, 2018

BY CERTIFIED AND FIRST CLASS MAIL

[REDACTED]
[REDACTED]
[REDACTED] 9

Re: Mariner East 2 – Pennsylvania Pipeline Project
Horizontal Directional Drilling Construction Notification
and Offer of Alternative Temporary Water Supply

Dear [REDACTED]:

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Thank you for your cooperation.

Mark McConnell
Land Project Manager
Representing Sunoco Pipeline L.P.
Office: (814) 204-0450

Percheron Field Services
 Representing Sunoco Logistics
 P.O. Box 2218
 Altoona PA 16602

CERTIFIED MAIL



9407 1118 9956 0596 3203 46

PS Form 3800 6/02

\$3.920
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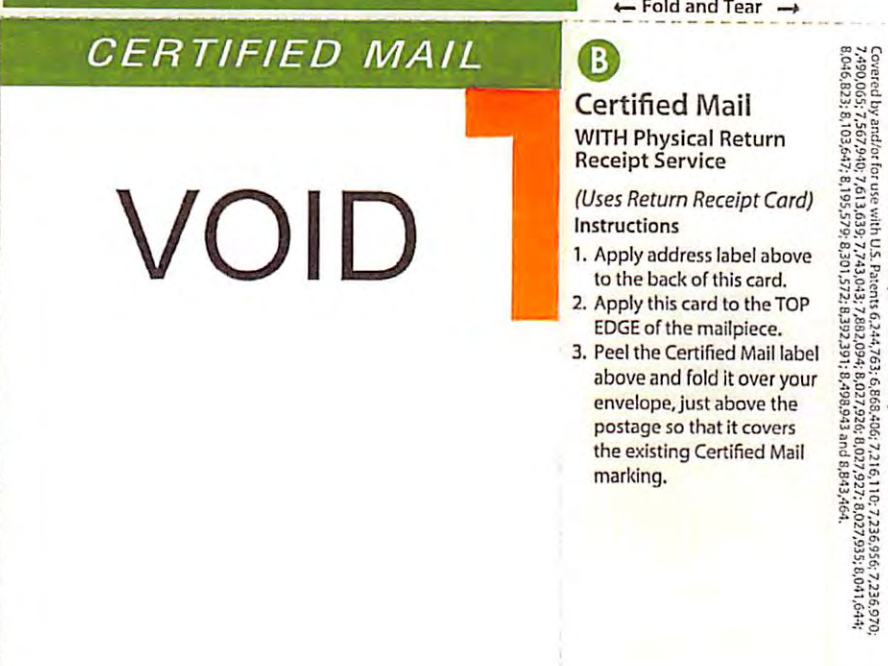
Certified Mail Labels (SDC-3930)
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 7, 490, 001, 7, 407, 940, 7, 630, 029, 7, 230, 045, 7, 882, 094, 8, 01, 7, 236, 8, 02, 7, 921, 6, 02, 7, 953, 6, 00, 1, 644,
 6, 046, 823, 8, 1, 03, 247, 6, 195, 579, 6, 50, 1, 2, 6, 52, 2, 91, 6, 95, 6, 94, and 6, 95, 4, 64.

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 Total Postage & Fees: \$3.920

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2. Article Number (Transfer from service label)

COMPLETE THIS SECTION ON DELIVERY

A. Signature: (Addressee or Agent)

X

B. Received By: (Printed Name)

C. Date of Delivery

D. Is delivery address different from item 1? Yes
 If YES, enter delivery address below: No

3. Service Type



SUNOCO PIPELINE
An ENERGY TRANSFER Partnership

P.O. Box 2218
Altoona, PA 16602

February 8, 2018

BY CERTIFIED AND FIRST CLASS MAIL

[REDACTED]
[REDACTED]
[REDACTED]

Re: Mariner East 2 – Pennsylvania Pipeline Project
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Percheron Field Services
 Representing Sunoco Logistics
 P.O. Box 2218
 Altoona PA 16602

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 when used with **B**



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 8,046,823; 8,103,647; 8,195,579; 8,301,572; 8,392,391; 8,498,943 and 8,843,464.

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 Total Postage & Fees: \$3.920

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B. Received By: (Printed Name) _____

C. Date of Delivery _____

1. Article Addressed to:

D. Is delivery address different from item 1? Yes
 If YES, enter delivery address below: No

3. Service Type _____

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SUNOCO PIPELINE
An ENERGY TRANSFER Partnership

P.O. Box 2218
Altoona, PA 16602

February 8, 2018

BY CERTIFIED AND FIRST CLASS MAIL

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Office: (814) 204-0450

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Percheron Field Services
 Representing Sunoco Logistics
 P.O. Box 2218
 Altoona PA 16602



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<p>OUTBOUND TRACKING NUMBER 9407 1118 9956 0596 3270 79</p> <p>ARTICLE ADDRESS TO:</p> <p>[Redacted Address]</p>	<p>FEES</p> <table style="width: 100%;"> <tr> <td>Postage per piece</td> <td style="text-align: right;">\$0.470</td> </tr> <tr> <td>Certified Fee</td> <td style="text-align: right;">\$3.450</td> </tr> <tr> <td>Total Postage & Fees:</td> <td style="text-align: right;">\$3.920</td> </tr> </table> <p style="text-align: center;">Postmark Here</p>	Postage per piece	\$0.470	Certified Fee	\$3.450	Total Postage & Fees:	\$3.920
Postage per piece	\$0.470						
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Total Postage & Fees:	\$3.920						

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B. Received By: (Printed Name)	C. Date of Delivery		
<p>1. Article Addressed to:</p>	<p>D. Is delivery address different from item 1? <input type="checkbox"/> Yes If YES, enter delivery address below: <input type="checkbox"/> No</p>		
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 8,046,053; 8,103,647; 8,192,579; 8,201,172; 8,392,371; 8,452,945 and 8,543,464.

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SUNOCO PIPELINE
An ENERGY TRANSFER Partnership

P.O. Box 2218
Altoona, PA 16602

February 8, 2018

BY CERTIFIED AND FIRST CLASS MAIL

[REDACTED]
[REDACTED]
[REDACTED]

Re: Mariner East 2 – Pennsylvania Pipeline Project
Horizontal Directional Drilling Construction Notification
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Office: (814) 204-0450

CERTIFIED MAIL

Percheron Field Services
 Representing Sunoco Logistics
 P.O. Box 2218
 Altoona PA 16602



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PS Form 3800 6/02

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Certified Fee	\$3.450
Total Postage & Fees:	\$3.920

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 Covered by and/or for use with U.S. Postage: 244,763; 6,868,406; 7,216,110; 7,236,936; 7,236,970;
 7,490,005; 7,672,940; 7,613,639; 7,743,043; 7,882,094; 8,027,926; 8,027,927; 8,027,935; 8,041,644;
 8,046,823; 8,103,647; 8,195,579; 8,301,572; 8,392,391; 8,498,943 and 8,643,464.

SENDER: COMPLETE THIS SECTION

- Ensure items 1, 2, and 3 are completed.
- Attach this card to the back of the mailpiece, or on the front if space permits.

COMPLETE THIS SECTION ON DELIVERY

A. Signature: (Addressee or Agent)
X

B. Received By: (Printed Name) _____ C. Date of Delivery _____

1. Article Addressed to:

D. Is delivery address different from Item 1? Yes No
 If YES, enter delivery address below:

3. Service Type _____

2. Article Number (Transfer from service label) _____

CERTIFIED MAIL

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14P Laser Form
 USA CNE - 134 0417



SUNOCO PIPELINE
An ENERGY TRANSFER Partnership

P.O. Box 2218
Altoona, PA 16602

February 8, 2018

BY CERTIFIED AND FIRST CLASS MAIL

Re: Mariner East 2 – Pennsylvania Pipeline Project
Horizontal Directional Drilling Construction Notification
and Offer of Alternative Temporary Water Supply

Dear [REDACTED]

Previously, Sunoco Pipeline L.P. (“SPLP”) wrote to inform you that certain construction activity known as Horizontal Directional Drilling (“HDD”) for Mariner East 2, also known as the Pennsylvania Pipeline Project, is located within 450 feet of your property boundary. In that letter, SPLP offered private water supply/well testing at SPLP’s expense if you have a private water supply/well located within 450 feet of the HDD alignments. If you have not yet requested testing of your qualifying private water supply/well, but now would like SPLP to have your private water supply/well tested, please contact the Sunoco representative for your area by calling Amy Abramowich at (814) 204-0450.

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Thank you for your cooperation.

Mark McConnell
Land Project Manager
Representing Sunoco Pipeline L.P.
Office: (814) 204-0450

CERTIFIED MAIL

Percheron Field Services
 Representing Sunoco Logistics
 P.O. Box 2218
 Altoona PA 16602



9407 1118 9956 0596 3217 01

PS Form 3800 6/02

\$3.920
 US POSTAGE
 FIRST-CLASS
 FROM 16652
 02/08/2018
 stamps
 endicia



062SC008766220

A

Certified Mail
 WITHOUT Physical Return
 Receipt Service

(No Return Receipt Card)
 Instructions

1. Apply this label to the TOP EDGE of the mailpiece.
2. Apply address label below to the CENTER of the mailpiece.
3. Peel the Certified Mail label below and fold it over your envelope, just above the postage so that it covers the existing Certified Mail marking.

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 .com

Top of the page

U.S. Postal Service
 Certified Mail Receipt

OUTBOUND TRACKING NUMBER
 9407 1118 9956 0596 3217 01

FEES

Postage per piece \$0.470
 Certified Fee \$3.450
 Total Postage & Fees: \$3.920

ARTICLE ADDRESS TO:



Postmark
 Here



Delivery Address
 when used with **A**
 or Return Address
 when used with **B**



← Fold and Tear →



B

Certified Mail
 WITH Physical Return
 Receipt Service

(Uses Return Receipt Card)
 Instructions

1. Apply address label above to the back of this card.
2. Apply this card to the TOP EDGE of the mailpiece.
3. Peel the Certified Mail label above and fold it over your envelope, just above the postage so that it covers the existing Certified Mail marking.

Certified Mail Labels (SDC-3930)
 Covered by and/or for use with U.S. Patents 6,244,763; 6,868,406; 7,216,110; 7,236,956; 7,236,970;
 7,490,065; 7,567,910; 7,613,639; 7,743,043; 7,882,094; 8,027,926; 8,027,927; 8,027,935; 8,041,644;
 8,046,823; 8,103,647; 8,195,579; 8,301,572; 8,392,391; 8,498,943 and 8,843,484.

SENDER: COMPLETE THIS SECTION

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- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

COMPLETE THIS SECTION ON DELIVERY

A. Signature: (Addressee or Agent)

X

B. Received By: (Printed Name)

C. Date of Delivery

D. Is delivery address different from item 1? Yes
 If YES, enter delivery address below: No

3. Service Type

2. Article Number (Transfer from service label)

CERTIFIED MAIL

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* 1-Up Laser Form *
 * USPSA CMF - 134 0417 *



SUNOCO PIPELINE
An ENERGY TRANSFER Partnership

P.O. Box 2218
Altoona, PA 16602

February 8, 2018

BY CERTIFIED AND FIRST CLASS MAIL

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Mark McConnell
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Representing Sunoco Pipeline L.P.
Office: (814) 204-0450

CERTIFIED MAIL

Percheron Field Services
 Representing Sunoco Logistics
 P.O. Box 2218
 Altoona PA 16602



9407 1118 9956 0596 3592 16

PS Form 3800 6/02

\$3.920
 US POSTAGE
 FIRST-CLASS
 FROM 16652
 02/08/2018
 stamps
 endicia



062S0008766220

A

Certified Mail
 WITHOUT Physical Return
 Receipt Service

(No Return Receipt Card)
 Instructions

1. Apply this label to the TOP EDGE of the mailpiece.
2. Apply address label below to the CENTER of the mailpiece.
3. Peel the Certified Mail label below and fold it over your envelope, just above the postage so that it covers the existing Certified Mail marking.

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Top of the page

U.S. Postal Service
 Certified Mail Receipt

OUTBOUND TRACKING NUMBER
 9407 1118 9956 0596 3592 16

FEES
 Postage per piece \$0.470
 Certified Fee \$3.450
 Total Postage & Fees: \$3.920

ARTICLE ADDRESS TO:



Postmark
 Here



Delivery Address
 when used with **A**
 or Return Address
 when used with **B**

CERTIFIED MAIL

CERTIFIED MAIL

← Fold and Tear →

CERTIFIED MAIL

VOID

B

Certified Mail
 WITH Physical Return
 Receipt Service

(Uses Return Receipt Card)
 Instructions

1. Apply address label above to the back of this card.
2. Apply this card to the TOP EDGE of the mailpiece.
3. Peel the Certified Mail label above and fold it over your envelope, just above the postage so that it covers the existing Certified Mail marking.

Certified Mail Labels (SDC-3930)
 Created by and/or for use with U.S. Patents: 6,244,763; 6,868,406; 7,216,110; 7,236,956; 7,236,970;
 7,490,055; 7,507,940; 7,613,639; 7,743,093; 7,882,004; 8,027,926; 8,027,927; 8,027,935; 8,041,644;
 8,046,823; 8,103,647; 8,195,579; 8,301,572; 8,392,301; 8,498,943 and 8,843,464.

SENDER: COMPLETE THIS SECTION **COMPLETE THIS SECTION ON DELIVERY**

■ Ensure items 1, 2, and 3 are completed.
 ■ Attach this card to the back of the mailpiece, or on the front if space permits.

A. Signature: (Addressee or Agent)
X

B. Received By: (Printed Name) C. Date of Delivery

1. Article Addressed to:

D. Is delivery address different from item 1? Yes
 If YES, enter delivery address below: No

3. Service Type

2. Article Number (Transfer from service label)

CERTIFIED MAIL

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* 1-Up Laser Form *
 U.S.A. CNF - 134 0417



SUNOCO PIPELINE
An ENERGY TRANSFER Partnership

P.O. Box 2218
Altoona, PA 16602

February 8, 2018

BY CERTIFIED AND FIRST CLASS MAIL

[REDACTED]

Re: Mariner East 2 – Pennsylvania Pipeline Project
Horizontal Directional Drilling Construction Notification
and Offer of Alternative Temporary Water Supply

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Mark McConnell
Land Project Manager
Representing Sunoco Pipeline L.P.
Office: (814) 204-0450

CERTIFIED MAIL

Percheron Field Services
 Representing Sunoco Logistics
 P.O. Box 2218
 Altoona PA 16602



9407 1118 9956 0596 3590 87

PS Form 3800 6/02

\$3.920
 US POSTAGE
 FIRST-CLASS
 FROM 16652
 02/08/2018
 stamps
 endicia



A

Certified Mail
 WITHOUT Physical Return
 Receipt Service
 (No Return Receipt Card)
 Instructions

1. Apply this label to the TOP EDGE of the mailpiece.
2. Apply address label below to the CENTER of the mailpiece.
3. Peel the Certified Mail label below and fold it over your envelope, just above the postage so that it covers the existing Certified Mail marking.

stamps
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Top of the page

U.S. Postal Service
 Certified Mail Receipt

OUTBOUND TRACKING NUMBER
 9407 1118 9956 0596 3590 87

FEES

Postage per piece \$0.470
 Certified Fee \$3.450
 Total Postage & Fees: \$3.920

ARTICLE ADDRESS TO:



Postmark
 Here



CERTIFIED MAIL

Delivery Address
 when used with **A**
 or Return Address
 when used with **B**

← Fold and Tear →

CERTIFIED MAIL

VOID

B

Certified Mail
 WITH Physical Return
 Receipt Service
 (Uses Return Receipt Card)
 Instructions

1. Apply address label above to the back of this card.
2. Apply this card to the TOP EDGE of the mailpiece.
3. Peel the Certified Mail label above and fold it over your envelope, just above the postage so that it covers the existing Certified Mail marking.

Certified Mail Labels (SDC-3930)
 Created by and/or for use with U.S. Patents 6,244,763; 6,868,406; 7,216,110; 7,236,956; 7,236,970;
 7,490,066; 7,567,940; 7,613,639; 7,743,043; 7,882,094; 8,027,926; 8,027,927; 8,027,935; 8,041,644;
 8,046,823; 8,102,471; 8,195,579; 8,301,572; 8,392,391; 8,798,943 and 8,843,464.

SENDER: COMPLETE THIS SECTION

- Ensure items 1, 2, and 3 are completed.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

2. Article Number (Transfer from service label)

COMPLETE THIS SECTION ON DELIVERY

A. Signature: (Addressee or Agent)

X

B. Received By: (Printed Name)

C. Date of Delivery

D. Is delivery address different from Item 1? Yes
 If YES, enter delivery address below: No

3. Service Type

CERTIFIED MAIL

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 NUSA CMF - 134 0417



SUNOCO PIPELINE
An ENERGY TRANSFER Partnership

P.O. Box 2218
Altoona, PA 16602

February 8, 2018

BY CERTIFIED AND FIRST CLASS MAIL

Re: Mariner East 2 – Pennsylvania Pipeline Project
Horizontal Directional Drilling Construction Notification
and Offer of Alternative Temporary Water Supply

Dear [REDACTED]:

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Land Project Manager
Representing Sunoco Pipeline L.P.
Office: (814) 204-0450

CERTIFIED MAIL

Percheron Field Services
 Representing Sunoco Logistics
 P.O. Box 2218
 Altoona PA 16602



9407 1118 9956 0596 3531 15

PS Form 3800 6/02

\$3.920
 US POSTAGE
 FIRST-CLASS
 FROM 16652
 02/08/2018
 stamps
 endicia



06250009766220

A
Certified Mail
 WITHOUT Physical Return
 Receipt Service

(No Return Receipt Card)
 Instructions
 1. Apply this label to the TOP
 EDGE of the mailpiece.
 2. Apply address label below
 to the CENTER of the
 mailpiece.

3. Peel the Certified Mail label
 below and fold it over your
 envelope, just above the
 postage so that it covers
 the existing Certified Mail
 marking.

Delivery Address
 when used with **A**
 or Return Address
 when used with **B**

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Top of the page

U.S. Postal Service
 Certified Mail Receipt

OUTBOUND TRACKING NUMBER 9407 1118 9956 0596 3531 15	FEES
	Postage per piece \$0.470
	Certified Fee \$3.450
	Total Postage & Fees: \$3.920
ARTICLE ADDRESS TO:	
[Redacted Address]	
	Postmark Here



← Fold and Tear →

SENDER: COMPLETE THIS SECTION **COMPLETE THIS SECTION ON DELIVERY**

■ Ensure items 1, 2, and 3 are completed. ■ Attach this card to the back of the mailpiece, or on the front if space permits.	A. Signature: (<input type="checkbox"/> Addressee or <input type="checkbox"/> Agent) X	
	B. Received By: (Printed Name)	C. Date of Delivery
1. Article Addressed to:	D. Is delivery address different from item 1? <input type="checkbox"/> Yes If YES, enter delivery address below: <input type="checkbox"/> No	
2. Article Number (Transfer from service label)	3. Service Type	



B
Certified Mail
 WITH Physical Return
 Receipt Service

(Uses Return Receipt Card)
 Instructions
 1. Apply address label above
 to the back of this card.
 2. Apply this card to the TOP
 EDGE of the mailpiece.
 3. Peel the Certified Mail label
 above and fold it over your
 envelope, just above the
 postage so that it covers
 the existing Certified Mail
 marking.

Certified Mail Labels (SDC-3930)
 Covered by and/or for use with U.S. Patents: 6,244,763; 6,868,406; 7,216,110; 7,236,956; 7,236,970;
 7,490,065; 7,507,590; 7,613,639; 7,743,033; 7,882,099; 8,027,926; 8,027,927; 8,027,933; 8,041,644;
 8,046,823; 8,103,647; 8,195,579; 8,301,572; 8,392,391; 8,498,943 and 8,843,464.

CERTIFIED MAIL

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* 1-Up Laser Form *
 **USA CMF - 131 0417*



SUNOCO PIPELINE
An ENERGY TRANSFER Partnership

P.O. Box 2218
Altoona, PA 16602

February 8, 2018

BY CERTIFIED AND FIRST CLASS MAIL

[REDACTED]
[REDACTED]
[REDACTED]

Re: Mariner East 2 – Pennsylvania Pipeline Project
Horizontal Directional Drilling Construction Notification
and Offer of Alternative Temporary Water Supply

Dear [REDACTED]:

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Mark McConnell
Land Project Manager
Representing Sunoco Pipeline L.P.
Office: (814) 204-0450

CERTIFIED MAIL

Percheron Field Services
 Representing Sunoco Logistics
 P.O. Box 2218
 Altoona PA 16602



9407 1118 9956 0596 3546 00

PS Form 3800 6/02

\$3.920
 US POSTAGE
 FIRST-CLASS
 FROM 16652
 02/08/2018
 stamps
 endicia



062S00087662210

A

Certified Mail WITHOUT Physical Return Receipt Service

(No Return Receipt Card)
 Instructions

1. Apply this label to the TOP EDGE of the mailpiece.
2. Apply address label below to the CENTER of the mailpiece.
3. Peel the Certified Mail label below and fold it over your envelope, just above the postage so that it covers the existing Certified Mail marking.

Delivery Address
 when used with **A**
 or Return Address
 when used with **B**

stamps.com®

Top of the page

U.S. Postal Service
 Certified Mail Receipt

<p>OUTBOUND TRACKING NUMBER 9407 1118 9956 0596 3546 00</p> <p>ARTICLE ADDRESS TO:</p> <p>[Redacted Address]</p>	<p>FEES</p> <table style="width: 100%;"> <tr> <td>Postage per piece</td> <td style="text-align: right;">\$0.470</td> </tr> <tr> <td>Certified Fee</td> <td style="text-align: right;">\$3.450</td> </tr> <tr> <td>Total Postage & Fees:</td> <td style="text-align: right;">\$3.920</td> </tr> </table> <p style="text-align: center;">Postmark Here</p>	Postage per piece	\$0.470	Certified Fee	\$3.450	Total Postage & Fees:	\$3.920
Postage per piece	\$0.470						
Certified Fee	\$3.450						
Total Postage & Fees:	\$3.920						



← Fold and Tear →

SENDER: COMPLETE THIS SECTION	COMPLETE THIS SECTION ON DELIVERY		
<ul style="list-style-type: none"> Ensure items 1, 2, and 3 are completed. Attach this card to the back of the mailpiece, or on the front if space permits. 	<p>A. Signature: (<input type="checkbox"/> Addressee or <input type="checkbox"/> Agent)</p> <p style="font-size: 2em; font-weight: bold; text-align: center;">X</p> <table style="width: 100%;"> <tr> <td style="width: 50%;">B. Received By: (Printed Name)</td> <td style="width: 50%;">C. Date of Delivery</td> </tr> </table>	B. Received By: (Printed Name)	C. Date of Delivery
B. Received By: (Printed Name)	C. Date of Delivery		
<p>1. Article Addressed to:</p>	<p>D. Is delivery address different from item 1? <input type="checkbox"/> Yes <input type="checkbox"/> No If YES, enter delivery address below:</p>		
<p>2. Article Number (Transfer from service label)</p>	<p>3. Service Type</p>		



VOID

B

Certified Mail WITH Physical Return Receipt Service

(Uses Return Receipt Card)
 Instructions

1. Apply address label above to the back of this card.
2. Apply this card to the TOP EDGE of the mailpiece.
3. Peel the Certified Mail label above and fold it over your envelope, just above the postage so that it covers the existing Certified Mail marking.

Certified Mail Labels (SD-C-3930)
 Created by and/or for use with U.S. Postage: 6244, 7639, 6868, 406, 7216, 110, 7236, 956, 7236, 970,
 7490, 058, 7, 567, 940, 7, 613, 639, 7, 743, 003, 7, 882, 004, 8, 027, 076, 8, 027, 027, 8, 027, 935, 8, 041, 644,
 8, 046, 823, 8, 103, 647, 8, 195, 579, 8, 301, 572, 8, 392, 391, 8, 998, 943, and 8, 943, 464.

CERTIFIED MAIL

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 **NLSA CMF-131 04/17*



SUNOCO PIPELINE
An ENERGY TRANSFER Partnership

P.O. Box 2218
Altoona, PA 16602

February 8, 2018

BY CERTIFIED AND FIRST CLASS MAIL

[REDACTED]
[REDACTED]
[REDACTED]

Re: Mariner East 2 – Pennsylvania Pipeline Project
Horizontal Directional Drilling Construction Notification
and Offer of Alternative Temporary Water Supply

Dear [REDACTED]:

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Land Project Manager
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Office: (814) 204-0450

CERTIFIED MAIL

Percheron Field Services
 Representing Sunoco Logistics
 P.O. Box 2218
 Altoona PA 16602



9407 1118 9956 0596 3556 14

PS Form 3800 6/02

\$3.920
 US POSTAGE
 FIRST-CLASS
 FROM 16652
 02/08/2018
 stamps
 endicia



A

Certified Mail
 WITHOUT Physical Return
 Receipt Service

(No Return Receipt Card)
 Instructions

1. Apply this label to the TOP EDGE of the mailpiece.
2. Apply address label below to the CENTER of the mailpiece.
3. Peel the Certified Mail label below and fold it over your envelope, just above the postage so that it covers the existing Certified Mail marking.

Delivery Address when used with **A** or Return Address when used with **B**

stamps.com

Top of the page

U.S. Postal Service
 Certified Mail Receipt

OUTBOUND TRACKING NUMBER
 9407 1118 9956 0596 3556 14

FEES

Postage per piece \$0.470
 Certified Fee \$3.450
 Total Postage & Fees: \$3.920

ARTICLE ADDRESS TO:



Postmark Here



CERTIFIED MAIL
CERTIFIED MAIL

← Fold and Tear →

CERTIFIED MAIL

B

Certified Mail
 WITH Physical Return
 Receipt Service

(Uses Return Receipt Card)
 Instructions

1. Apply address label above to the back of this card.
2. Apply this card to the TOP EDGE of the mailpiece.
3. Peel the Certified Mail label above and fold it over your envelope, just above the postage so that it covers the existing Certified Mail marking.

VOID

Certified Mail Labels (SDC-3930)
 Covered by and/or for use with U.S. Patents 6,244,763; 6,868,406; 7,216,110; 7,236,956; 7,236,970; 7,490,065; 7,567,940; 7,613,639; 7,743,043; 7,882,094; 8,027,916; 8,027,927; 8,027,935; 8,041,644; 8,046,823; 8,103,647; 8,195,579; 8,301,572; 8,392,391; 8,498,943 and 8,843,464.

SENDER: COMPLETE THIS SECTION		COMPLETE THIS SECTION ON DELIVERY	
<ul style="list-style-type: none"> Ensure Items 1, 2, and 3 are completed. Attach this card to the back of the mailpiece, or on the front if space permits. 		A. Signature: (<input type="checkbox"/> Addressee or <input type="checkbox"/> Agent) X	
1. Article Addressed to:		B. Received By: (Printed Name)	C. Date of Delivery
2. Article Number (Transfer from service label)		D. Is delivery address different from item 1? <input type="checkbox"/> Yes If YES, enter delivery address below: <input type="checkbox"/> No	
		3. Service Type	

CERTIFIED MAIL

stamps.com

* 1-4p Laser Form *
 **USA CMF - 134 0417*



SUNOCO PIPELINE
An ENERGY TRANSFER Partnership

P.O. Box 2218
Altoona, PA 16602

February 8, 2018

BY CERTIFIED AND FIRST CLASS MAIL

[REDACTED]

Re: Mariner East 2 – Pennsylvania Pipeline Project
Horizontal Directional Drilling Construction Notification
and Offer of Alternative Temporary Water Supply

Dear [REDACTED]

Previously, Sunoco Pipeline L.P. (“SPLP”) wrote to inform you that certain construction activity known as Horizontal Directional Drilling (“HDD”) for Mariner East 2, also known as the Pennsylvania Pipeline Project, is located within 450 feet of your property boundary. In that letter, SPLP offered private water supply/well testing at SPLP’s expense if you have a private water supply/well located within 450 feet of the HDD alignments. If you have not yet requested testing of your qualifying private water supply/well, but now would like SPLP to have your private water supply/well tested, please contact the Sunoco representative for your area by calling Amy Abramowich at (814) 204-0450.

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Thank you for your cooperation.

Mark McConnell
Land Project Manager
Representing Sunoco Pipeline L.P.
Office: (814) 204-0450

CERTIFIED MAIL

Percheron Field Services
 Representing Sunoco Logistics
 P.O. Box 2218
 Altoona PA 16602



9407 1118 9956 0596 3529 96

PS Form 3800 6/02

\$3.920
 US POSTAGE
 FIRST-CLASS
 FROM 16652
 02/08/2018
 stamps
 endicia



06250009766220

A

Certified Mail
 WITHOUT Physical Return
 Receipt Service

(No Return Receipt Card)
 Instructions

1. Apply this label to the TOP EDGE of the mailpiece.
2. Apply address label below to the CENTER of the mailpiece.

3. Peel the Certified Mail label below and fold it over your envelope, just above the postage so that it covers the existing Certified Mail marking.

Delivery Address when used with **A** or Return Address when used with **B**



← Fold and Tear →



VOID

B

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 Instructions

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U.S. Postal Service
 Certified Mail Receipt

OUTBOUND TRACKING NUMBER
 9407 1118 9956 0596 3529 96

FEES

Postage per piece \$0.470
 Certified Fee \$3.450
 Total Postage & Fees: \$3.920

ARTICLE ADDRESS TO:



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2. Article Number (Transfer from service label)

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A. Signature: (Addressee or Agent)

X

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C. Date of Delivery

D. Is delivery address different from item 1? Yes
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3. Service Type

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Certified Mail Labels (SDC-3930)
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 7,490,005; 7,627,940; 7,613,639; 7,743,043; 7,882,094; 8,027,926; 8,027,927; 8,027,928; 8,041,644;
 8,046,823; 8,103,647; 8,195,579; 8,301,572; 8,392,391; 8,495,943 and 8,843,464.

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Percheron Field Services
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 Altoona PA 16602



9407 1118 9956 0596 3640 81

PS Form 3800 6/02

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062S00008766220

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Certified Mail
 WITHOUT Physical Return
 Receipt Service
 (No Return Receipt Card)
 Instructions

1. Apply this label to the TOP EDGE of the mailpiece.
2. Apply address label below to the CENTER of the mailpiece.
3. Peel the Certified Mail label below and fold it over your envelope, just above the postage so that it covers the existing Certified Mail marking.

Delivery Address
 when used with **A**
 or Return Address
 when used with **B**

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Top of the page

U.S. Postal Service
 Certified Mail Receipt

OUTBOUND TRACKING NUMBER
 9407 1118 9956 0596 3640 81

FEES
 Postage per piece \$0.470
 Certified Fee \$3.450
 Total Postage & Fees: \$3.920

ARTICLE ADDRESS TO:



Postmark
 Here



CERTIFIED MAIL
 CERTIFIED MAIL

← Fold and Tear →

CERTIFIED MAIL

VOID

B
Certified Mail
 WITH Physical Return
 Receipt Service
 (Uses Return Receipt Card)
 Instructions

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 8,046,823; 8,103,447; 8,195,579; 8,301,572; 8,392,901; 8,498,943 and 8,843,464.

SENDER: COMPLETE THIS SECTION	COMPLETE THIS SECTION ON DELIVERY	
<p><input type="checkbox"/> Ensure items 1, 2, and 3 are completed.</p> <p><input type="checkbox"/> Attach this card to the back of the mailpiece, or on the front if space permits.</p>	<p>A. Signature: (<input type="checkbox"/> Addressee or <input type="checkbox"/> Agent)</p> <p style="font-size: 24px; font-weight: bold; text-align: center;">X</p>	
	<p>B. Received By: (Printed Name)</p>	<p>C. Date of Delivery</p>
<p>1. Article Addressed to:</p>	<p>D. Is delivery address different from item 1? <input type="checkbox"/> Yes If YES, enter delivery address below: <input type="checkbox"/> No</p>	
<p>2. Article Number (Transfer from service label)</p>	<p>3. Service Type</p>	

CERTIFIED MAIL

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 NUSA CMF - 101 0417



SUNOCO PIPELINE
An ENERGY TRANSFER Partnership

P.O. Box 2218
Altoona, PA 16602

February 8, 2018

BY CERTIFIED AND FIRST CLASS MAIL

[REDACTED]
[REDACTED]
[REDACTED]

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CERTIFIED MAIL

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 P.O. Box 2218
 Altoona PA 16602



9407 1118 9956 0596 3626 74

PS Form 3800 6/02

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A
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Delivery Address
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U.S. Postal Service
 Certified Mail Receipt

OUTBOUND TRACKING NUMBER
 9407 1118 9956 0596 3626 74

FEES
 Postage per piece \$0.470
 Certified Fee \$3.450
 Total Postage & Fees: \$3.920

ARTICLE ADDRESS TO:



Postmark
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B
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 Receipt Service
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Certified Mail Labels (SDC-3930)
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VOID

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X

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C. Date of Delivery

D. Is delivery address different from item 1? Yes
 If YES, enter delivery address below: No

3. Service Type

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 Altoona PA 16602



9407 1118 9956 0596 3682 56

PS Form 3800 6/02

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Instructions
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U.S. Postal Service
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<p>OUTBOUND TRACKING NUMBER 9407 1118 9956 0596 3682 56</p> <p>ARTICLE ADDRESS TO:</p> <p>[Redacted Address]</p>	<p>FEES</p> <table style="width: 100%;"> <tr> <td>Postage per piece</td> <td style="text-align: right;">\$0.470</td> </tr> <tr> <td>Certified Fee</td> <td style="text-align: right;">\$3.450</td> </tr> <tr> <td>Total Postage & Fees:</td> <td style="text-align: right;">\$3.920</td> </tr> </table> <p style="text-align: center;">Postmark Here</p>	Postage per piece	\$0.470	Certified Fee	\$3.450	Total Postage & Fees:	\$3.920
Postage per piece	\$0.470						
Certified Fee	\$3.450						
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<ul style="list-style-type: none"> ■ Ensure items 1, 2, and 3 are completed. ■ Attach this card to the back of the mailpiece, or on the front if space permits. 	<p>A. Signature: (<input type="checkbox"/> Addressee or <input type="checkbox"/> Agent)</p> <p style="font-size: 2em; text-align: center;">X</p>	
<p>1. Article Addressed to:</p>	<p>B. Received By: (Printed Name)</p>	<p>C. Date of Delivery</p>
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	<p>3. Service Type</p>	



B Certified Mail WITH Physical Return Receipt Service (Uses Return Receipt Card)

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Certified Mail Labels (SDC-C-3930)
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 NUSA CMF - 134 0417



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ARTICLE ADDRESS TO:



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X

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C. Date of Delivery

1. Article Addressed to:

D. Is delivery address different from item 1? Yes
 If YES, enter delivery address below: No

3. Service Type

2. Article Number (Transfer from service label)

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 * U.S. Only - 1-800-375-8749

Attachment 4
Water Quality Test Results

June 15, 2017

GES, Inc - Sunoco

Sample Delivery Group: L914384
Samples Received: 06/08/2017
Project Number: 0204730-06-160-XX
Description: Pre-Construction Sampling HDD
Site: ME2
Report To: Holly Smoker
440 Creamery Way, Ste 500
Exton, PA 19341

Entire Report Reviewed By:



Mark W. Beasley
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



Cp: Cover Page	1	1 Cp
Tc: Table of Contents	2	
Ss: Sample Summary	3	2 Tc
Cn: Case Narrative	4	
Sr: Sample Results	5	3 Ss
06062017-604-02 L914384-01	5	4 Cn
Qc: Quality Control Summary	7	
Gravimetric Analysis by Method 2540 C-2011	7	5 Sr
Gravimetric Analysis by Method 2540 D-2011	8	
Wet Chemistry by Method 130.1	9	6 Qc
Wet Chemistry by Method 2130 B-2011	10	
Wet Chemistry by Method 2320 B-2011	11	7 Gl
Wet Chemistry by Method 9040C	12	
Wet Chemistry by Method 9050A	13	8 Al
Wet Chemistry by Method 9056A	14	
Metals (ICP) by Method 6010B	16	9 Sc
Volatile Organic Compounds (GC) by Method RSK175	17	
Volatile Organic Compounds (GC/MS) by Method 8260B	18	
Gl: Glossary of Terms	19	
Al: Accreditations & Locations	20	
Sc: Chain of Custody	21	

SAMPLE SUMMARY



06062017-604-02 L914384-01 GW

Collected by: Jacob Gonzalez
 Collected date/time: 06/06/17 12:30
 Received date/time: 06/08/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Gravimetric Analysis by Method 2540 C-2011	WG987191	1	06/09/17 15:09	06/09/17 16:18	MMF
Gravimetric Analysis by Method 2540 D-2011	WG987719	1	06/13/17 16:24	06/13/17 17:11	MMF
Wet Chemistry by Method 130.1	WG987769	1	06/14/17 01:13	06/14/17 01:13	ASK
Wet Chemistry by Method 2130 B-2011	WG987071	1	06/08/17 12:12	06/08/17 12:12	MA
Wet Chemistry by Method 2320 B-2011	WG987667	1	06/12/17 10:29	06/12/17 10:29	MCG
Wet Chemistry by Method 9040C	WG987049	1	06/09/17 13:03	06/09/17 13:03	GB
Wet Chemistry by Method 9050A	WG987234	1	06/08/17 18:33	06/08/17 18:33	MAJ
Wet Chemistry by Method 9056A	WG987992	1	06/12/17 14:41	06/12/17 14:41	DR
Metals (ICP) by Method 6010B	WG988169	1	06/12/17 17:13	06/13/17 00:25	ST
Volatile Organic Compounds (GC) by Method RSK175	WG987215	1	06/09/17 11:15	06/09/17 11:15	AMC
Volatile Organic Compounds (GC/MS) by Method 8260B	WG987923	1	06/10/17 13:29	06/10/17 13:29	DWR

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Mark W. Beasley
Technical Service Representative

- ¹ Cp
- ² Tc
- ³ Ss
- ⁴ Cn
- ⁵ Sr
- ⁶ Qc
- ⁷ Gl
- ⁸ Al
- ⁹ Sc



Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
Dissolved Solids	139		10.0	1	06/09/2017 16:18	WG987191

1 Cp

2 Tc

Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
Suspended Solids	76.8		2.50	1	06/13/2017 17:11	WG987719

3 Ss

4 Cn

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
Hardness (colorimetric) as CaCO3	110		30.0	1	06/14/2017 01:13	WG987769

5 Sr

6 Qc

Wet Chemistry by Method 2130 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
Turbidity	0.310	B	0.100	1	06/08/2017 12:12	WG987071

7 Gl

8 Al

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
Alkalinity	74.5		20.0	1	06/12/2017 10:29	WG987667

9 Sc

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis	Batch
pH	6.60	T8	1	06/09/2017 13:03	WG987049

Sample Narrative:

9040C L914384-01 WG987049: 6.60 at 19.8c

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	Dilution	Analysis	Batch
Specific Conductance	217		1	06/08/2017 18:33	WG987234

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
Bromide	ND		1.00	1	06/12/2017 14:41	WG987992
Chloride	5.38		1.00	1	06/12/2017 14:41	WG987992
Sulfate	22.0		5.00	1	06/12/2017 14:41	WG987992

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
Barium	0.177		0.00500	1	06/13/2017 00:25	WG988169
Calcium	29.8		1.00	1	06/13/2017 00:25	WG988169
Iron	3.77		0.100	1	06/13/2017 00:25	WG988169
Magnesium	7.28		1.00	1	06/13/2017 00:25	WG988169
Manganese	0.975		0.0100	1	06/13/2017 00:25	WG988169
Potassium	1.87		1.00	1	06/13/2017 00:25	WG988169
Sodium	4.39		1.00	1	06/13/2017 00:25	WG988169



Collected date/time: 06/06/17 12:30

L914384

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Methane	0.0251		0.0100	1	06/09/2017 11:15	WG987215
Ethane	ND		0.0130	1	06/09/2017 11:15	WG987215
Ethene	ND		0.0130	1	06/09/2017 11:15	WG987215
Propane	ND		0.0190	1	06/09/2017 11:15	WG987215

1 Cp

2 Tc

3 Ss

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	06/10/2017 13:29	WG987923
Toluene	ND		0.00100	1	06/10/2017 13:29	WG987923
Ethylbenzene	ND		0.00100	1	06/10/2017 13:29	WG987923
Total Xylenes	ND		0.00300	1	06/10/2017 13:29	WG987923
(S) Toluene-d8	102		80.0-120		06/10/2017 13:29	WG987923
(S) Dibromofluoromethane	103		76.0-123		06/10/2017 13:29	WG987923
(S) a,a,a-Trifluorotoluene	99.6		80.0-120		06/10/2017 13:29	WG987923
(S) 4-Bromofluorobenzene	99.5		80.0-120		06/10/2017 13:29	WG987923

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3225284-1 06/09/17 16:18

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Dissolved Solids	U		2.82	10.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

L914174-01 Original Sample (OS) • Duplicate (DUP)

(OS) L914174-01 06/09/17 16:18 • (DUP) R3225284-4 06/09/17 16:18

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Dissolved Solids	1370	1380	1	0.581		5

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3225284-2 06/09/17 16:18 • (LCSD) R3225284-3 06/09/17 16:18

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Dissolved Solids	8800	8680	8740	98.6	99.3	85.0-115			0.689	5

⁷ Gl

⁸ Al

⁹ Sc



Method Blank (MB)

(MB) R3225480-1 06/13/17 17:11

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Suspended Solids	U		0.350	2.50

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

L914263-01 Original Sample (OS) • Duplicate (DUP)

(OS) L914263-01 06/13/17 17:11 • (DUP) R3225480-4 06/13/17 17:11

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Suspended Solids	280	280	1	0.000		5

⁶ Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3225480-2 06/13/17 17:11 • (LCSD) R3225480-3 06/13/17 17:11

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Suspended Solids	773	796	804	103	104	85.0-115			1.00	5

⁷ Gl

⁸ Al

⁹ Sc



Method Blank (MB)

(MB) R3225356-1 06/14/17 00:49

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Hardness (colorimetric) as CaCO3	3.07	J	1.43	30.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L913699-01 Original Sample (OS) • Duplicate (DUP)

(OS) L913699-01 06/14/17 00:52 • (DUP) R3225356-4 06/14/17 00:52

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Hardness (colorimetric) as CaCO3	117	114	1	3		20

L914368-01 Original Sample (OS) • Duplicate (DUP)

(OS) L914368-01 06/14/17 01:05 • (DUP) R3225356-5 06/14/17 01:06

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Hardness (colorimetric) as CaCO3	175	173	1	1		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3225356-2 06/14/17 00:50 • (LCSD) R3225356-3 06/14/17 00:51

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Hardness (colorimetric) as CaCO3	150	147	146	98	97	85-115			1	20

L914374-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L914374-01 06/14/17 01:07 • (MS) R3225356-6 06/14/17 01:09 • (MSD) R3225356-7 06/14/17 01:10

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Hardness (colorimetric) as CaCO3	150	40.6	185	183	96	95	1	80-120			1	20



Method Blank (MB)

(MB) WG987071-1 06/08/17 12:12

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Turbidity	0.0890	J	0.0310	0.100

1 Cp

2 Tc

3 Ss

L914366-01 Original Sample (OS) • Duplicate (DUP)

(OS) L914366-01 06/08/17 12:12 • (DUP) WG987071-4 06/08/17 12:12

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Turbidity	1.69	1.68	1	0.593		20

4 Cn

5 Sr

6 Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG987071-2 06/08/17 12:12 • (LCSD) WG987071-3 06/08/17 12:12

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Turbidity	40.0	39.8	39.7	99.5	99.3	90.0-110			0.252	20

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3225066-2 06/12/17 09:57

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Alkalinity	2.76	J	2.71	20.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L914374-01 Original Sample (OS) • Duplicate (DUP)

(OS) L914374-01 06/12/17 10:05 • (DUP) R3225066-3 06/12/17 10:11

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	21.7	21.8	1	1.00		20

L914488-06 Original Sample (OS) • Duplicate (DUP)

(OS) L914488-06 06/12/17 14:31 • (DUP) R3225066-6 06/12/17 14:39

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	90.0	81.0	1	10.0		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3225066-4 06/12/17 11:05 • (LCSD) R3225066-5 06/12/17 12:38

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Alkalinity	100	112	108	112	108	85.0-115			4.00	20



L914303-03 Original Sample (OS) • Duplicate (DUP)

(OS) L914303-03 06/09/17 13:03 • (DUP) WG987049-3 06/09/17 13:03

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.29	7.29	1	0.000	<u>T8</u>	1

1 Cp

2 Tc

3 Ss

L914488-01 Original Sample (OS) • Duplicate (DUP)

(OS) L914488-01 06/09/17 13:03 • (DUP) WG987049-4 06/09/17 13:03

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.37	7.38	1	0.136	<u>T8</u>	1

4 Cn

5 Sr

6 Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG987049-1 06/09/17 13:03 • (LCSD) WG987049-2 06/09/17 13:03

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
pH	6.38	6.39	6.39	100	100	98.7-101			0.000	1

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) WG987234-5 06/08/17 18:33

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Specific Conductance	1.19		umhos/cm	umhos/cm

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L914309-01 Original Sample (OS) • Duplicate (DUP)

(OS) L914309-01 06/08/17 18:33 • (DUP) WG987234-1 06/08/17 18:33

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Specific Conductance	307	308	1	0.325		20

L914573-04 Original Sample (OS) • Duplicate (DUP)

(OS) L914573-04 06/08/17 18:33 • (DUP) WG987234-4 06/08/17 18:33

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Specific Conductance	882	882	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG987234-2 06/08/17 18:33 • (LCSD) WG987234-3 06/08/17 18:33

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Specific Conductance	1070	1070	1070	100	100	90.0-110			0.000	20



Method Blank (MB)

(MB) R3225089-1 06/12/17 11:33

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Bromide	U		0.079	1.00
Chloride	U		0.0519	1.00
Sulfate	U		0.0774	5.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L914458-01 Original Sample (OS) • Duplicate (DUP)

(OS) L914458-01 06/12/17 15:26 • (DUP) R3225089-4 06/12/17 15:40

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Bromide	ND	0.000	1	0		15
Chloride	7.55	7.49	1	1		15
Sulfate	17.1	17.1	1	0		15

L914530-06 Original Sample (OS) • Duplicate (DUP)

(OS) L914530-06 06/12/17 18:39 • (DUP) R3225089-6 06/12/17 18:54

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Bromide	ND	0.000	1	0		15
Chloride	3.11	3.14	1	1		15
Sulfate	21.5	21.5	1	0		15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3225089-2 06/12/17 11:48 • (LCSD) R3225089-3 06/12/17 12:03

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Bromide	40.0	39.5	39.5	99	99	80-120			0	15
Chloride	40.0	39.2	39.2	98	98	80-120			0	15
Sulfate	40.0	39.4	39.4	99	98	80-120			0	15

L914513-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L914513-01 06/12/17 15:55 • (MS) R3225089-5 06/12/17 16:10

Analyte	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Bromide	50.0	U	48.9	98	1	80-120	
Chloride	50.0	2.54	52.1	99	1	80-120	



L914513-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L914513-01 06/12/17 15:55 • (MS) R3225089-5 06/12/17 16:10

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Sulfate	50.0	2.73	52.6	100	1	80-120	

L914530-09 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L914530-09 06/12/17 20:09 • (MS) R3225089-7 06/12/17 20:24 • (MSD) R3225089-8 06/12/17 20:39

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	ND	49.9	48.6	100	97	1	80-120			3	15
Chloride	50.0	ND	50.8	50.9	100	100	1	80-120			0	15
Sulfate	50.0	ND	52.6	52.5	101	101	1	80-120			0	15

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Method Blank (MB)

(MB) R3225026-1 06/12/17 23:27

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Barium	U		0.0017	0.00500
Calcium	0.286	↓	0.0463	1.00
Iron	U		0.0141	0.100
Magnesium	0.0328	↓	0.0111	1.00
Manganese	U		0.0012	0.0100
Potassium	U		0.102	1.00
Sodium	0.34	↓	0.0985	1.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3225026-2 06/12/17 23:29 • (LCSD) R3225026-3 06/12/17 23:32

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Barium	1.00	1.07	1.06	107	106	80-120			1	20
Calcium	10.0	10.6	10.4	106	104	80-120			2	20
Iron	10.0	10.5	10.5	105	105	80-120			1	20
Magnesium	10.0	10.9	10.8	109	108	80-120			1	20
Manganese	1.00	1.03	1.02	103	102	80-120			0	20
Potassium	10.0	9.95	9.99	99	100	80-120			0	20
Sodium	10.0	10.4	10.4	104	104	80-120			1	20

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L914379-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L914379-01 06/12/17 23:35 • (MS) R3225026-5 06/12/17 23:40 • (MSD) R3225026-6 06/12/17 23:43

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Barium	1.00	0.239	1.28	1.26	104	103	1	75-125			1	20
Calcium	10.0	8.26	18.2	18.1	99	99	1	75-125			0	20
Iron	10.0	ND	10.3	10.2	103	102	1	75-125			1	20
Magnesium	10.0	4.43	15.0	14.9	105	104	1	75-125			1	20
Manganese	1.00	ND	1.00	0.995	100	100	1	75-125			1	20
Potassium	10.0	3.56	13.3	13.2	97	96	1	75-125			1	20
Sodium	10.0	6.98	16.8	16.7	98	97	1	75-125			1	20



Method Blank (MB)

(MB) R3224390-1 06/09/17 10:50

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Methane	U		0.00291	0.0100
Ethane	U		0.00407	0.0130
Ethene	U		0.00426	0.0130
Propane	U		0.00548	0.0190

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

L914366-01 Original Sample (OS) • Duplicate (DUP)

(OS) L914366-01 06/09/17 11:01 • (DUP) R3224390-2 06/09/17 11:23

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	0.131	0.127	1	3.19		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

⁶ Qc

⁷ Gl

⁸ Al

L914428-02 Original Sample (OS) • Duplicate (DUP)

(OS) L914428-02 06/09/17 11:30 • (DUP) R3224390-3 06/09/17 11:52

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	ND	0.000	1	0.000		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3224390-4 06/09/17 11:54 • (LCSD) R3224390-5 06/09/17 11:56

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Methane	0.0678	0.0702	0.0732	104	108	85.0-115			4.25	20
Ethane	0.129	0.124	0.124	96.2	96.4	85.0-115			0.180	20
Ethene	0.127	0.120	0.120	94.7	94.7	85.0-115			0.0600	20
Propane	0.186	0.183	0.186	98.2	100	85.0-115			1.95	20



Method Blank (MB)

(MB) R3224665-3 06/10/17 09:18

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000412	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	102			80.0-120
(S) Dibromofluoromethane	102			76.0-123
(S) a,a,a-Trifluorotoluene	101			80.0-120
(S) 4-Bromofluorobenzene	99.2			80.0-120

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3224665-1 06/10/17 08:14 • (LCSD) R3224665-2 06/10/17 08:26

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Benzene	0.0250	0.0217	0.0207	86.7	82.8	69.0-123			4.67	20
Ethylbenzene	0.0250	0.0223	0.0210	89.1	83.8	77.0-120			6.16	20
Toluene	0.0250	0.0216	0.0208	86.4	83.1	77.0-120			3.92	20
Xylenes, Total	0.0750	0.0662	0.0621	88.3	82.8	77.0-120			6.39	20
(S) Toluene-d8				101	102	80.0-120				
(S) Dibromofluoromethane				105	105	76.0-123				
(S) a,a,a-Trifluorotoluene				100	99.8	80.0-120				
(S) 4-Bromofluorobenzene				98.3	94.6	80.0-120				

7 Gl

8 Al

9 Sc



Abbreviations and Definitions

SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
Rec.	Recovery.

Qualifier	Description
B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
T8	Sample(s) received past/too close to holding time expiration.

- ¹ Cp
- ² Tc
- ³ Ss
- ⁴ Cn
- ⁵ Sr
- ⁶ Qc
- ⁷ Gl
- ⁸ Al
- ⁹ Sc



ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE**.
 * Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Connecticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee ¹⁴	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

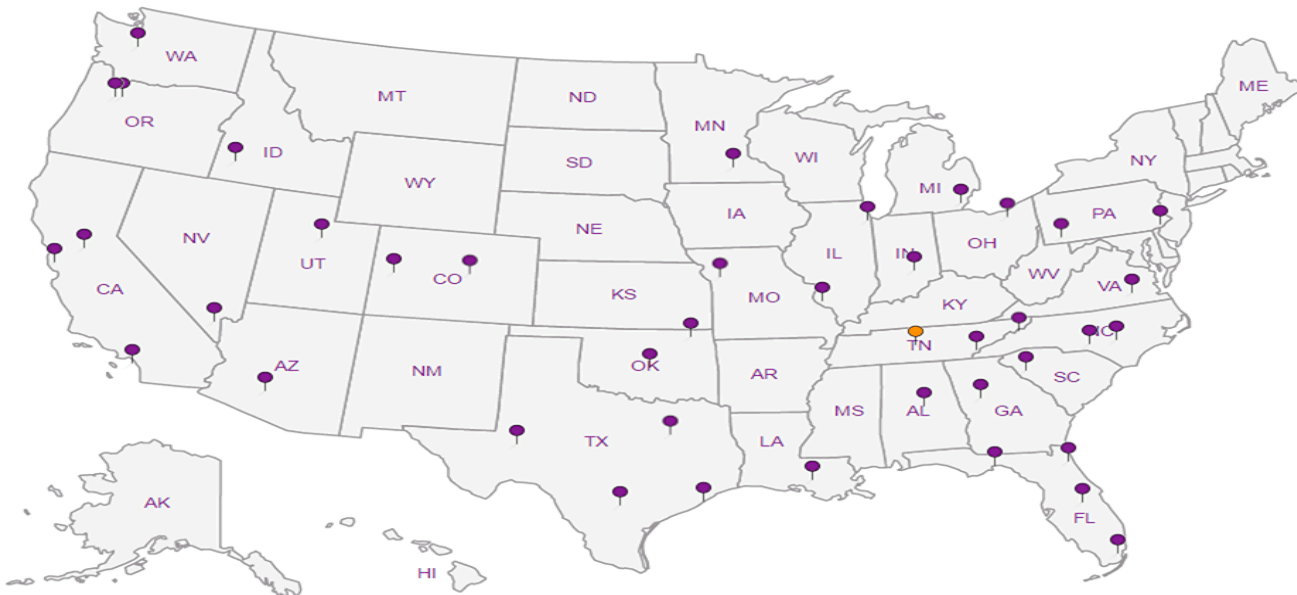
Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ^{n/a} Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. **ESC Lab Sciences performs all testing at our central laboratory.**



1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc

Company Name/Address:
GES, Inc - Sunoco
 440 Creamery Way, Suite 500
 Exton, PA 19341

Billing Information:
Accounts Payable
 440 Creamery Way, Suite 500
 Exton, PA 19341

Report to:
Holly Smoker

Email To:
hsmoker@gesonline.com

Project Description:
Pre-Construction Sampling

City/State Collected:
Johnstown, PA

Phone: **610-458-1077**
 Fax: **NA**


Client Project #
NA

Lab Project #
SUNGES-GRILLO

Collected by (print):
Jacob Gonzalez

Site/Facility ID #
ME2

P.O. #
NA

Collected by (signature):

 Immediately Packed on Ice N ___ Y

Rush? (Lab MUST Be Notified)
 ___ Same Day200%
 ___ Next Day100%
 ___ Two Day50%
 ___ Three Day25%

Date Results Needed
Standard
 Email? ___ No Yes
 FAX? ___ No ___ Yes

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs
06062017-604-02	Grab	DW	—	6/6/17	1230	8

Analysis / Container / Preservative							
**pH,SPCON,TDS,TURB*	250mlHDPE-NoPres						
ALK, Br, Cl, SO4	250mlHDPE-NoPres						
Total Metals, Hardness	250mlHDPE-HNO3						
RSK175 + Propane	40mlAmb-HCl						
TSS 1L-HDPE	NoPres						
V8260BTEX	40mlAmb-HCl						

Chain of Custody Page 1 of 1



L.A.B S.C.I.E.N.C.E.S

YOUR LAB OF CHOICE

12065 Lebanon Rd
 Mount Juliet, TN 37122
 Phone: 615-758-5858
 Phone: 800-767-5859
 Fax: 615-758-5859



L# **914387**

T **A095**

Acctnum: **SUNGES**

Template: **T114657**

Prelogin: **P564159**

TSR: **Mark Beasley**

Cooler:

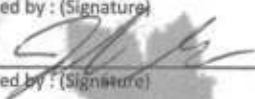


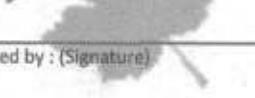

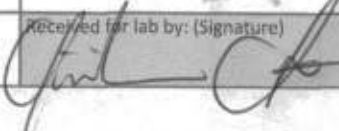
Shipped Via: **Fed Ex**

Rem./Contaminant	Sample # (lab only)
	67

* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other _____

TRK# 7215 4518 9850

Remarks: **Metals = Ba,Ca,Fe,K,Mg,Mn,Na. Project #: 0204730-06-160-xx Org 1402**

Relinquished by: (Signature) 	Date: 6/6/17	Time: 1500	Received by: (Signature) 	Received by: (Signature) 6/6/17 1500 Fedex	Samples returned via: <input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> Courier <input type="checkbox"/> _____	Condition: (lab use only) 
Relinquished by: (Signature) 	Date:	Time:	Received by: (Signature)	Temp: °C 2.3m	Bottles Received: 8	COC Seal Intact: ___ Y ___ N <input checked="" type="checkbox"/> NA
Relinquished by: (Signature) 	Date:	Time:	Received for lab by: (Signature) 	Date: 6-8-17	Time: 8:45	pH Checked: NCF:

ESC LAB SCIENCES Cooler Receipt Form

Client: <i>Sunbes</i>	SDG#	914384	
Cooler Received/Opened On: 6/8/17	Temperature:	23	
Received by : Timiesha Scott			
Signature: <i>[Signature]</i>			
Receipt Check List	NP	Yes	No
COC Seal Present / Intact?	/		
COC Signed / Accurate?		/	
Bottles arrive intact?		/	
Correct bottles used?		/	
Sufficient volume sent?		/	
If Applicable			
VOA Zero headspace?		/	
Preservation Correct / Checked?		/	

December 13, 2017

Ms. Holly Smoker
Groundwater & Environmental Services, Inc.
(Exton)
1500 Sycamore Road
Suite 340
Montoursville, PA 17754

RE: Project: 0350
Pace Project No.: 30237774

Dear Ms. Smoker:

Enclosed are the analytical results for sample(s) received by the laboratory on November 27, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

The samples were subcontracted to EAG Laboratories, 810 Kifer Road, Sunnyvale, CA 94086 for XRD analysis. Results of the analysis are reported on the EAG Laboratories data tables.

Revision 1 - This report replaces the December 6, 2017 report. This report was reissued on December 12, 2017 with a correction to the EAG report.

Revision 2 - This report replaces the December 12, 2017 report. This report was reissued on December 13, 2017 with a correction to the EAG report.

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

Sincerely,

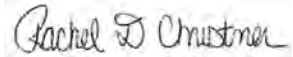


REPORT OF LABORATORY ANALYSIS

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without the written consent of Pace Analytical Services, LLC.

December 13, 2017

Page 2



Rachel Christner
rachel.christner@pacelabs.com
724-850-5611
Project Manager

Enclosures

cc: Mr. David Demko, GES (Exton)
Ms. Stephanie Grillo, Groundwater & Environmental
Services, Inc.
Lab Reports, Groundwater & Environmental Services Inc
(Exton)



REPORT OF LABORATORY ANALYSIS

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without the written consent of Pace Analytical Services, LLC.



CHAIN-OF-CUSTODY / Analytical Request Document

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

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company: GES, Inc.	Report To: Holly Smoker	Attention: ges-invoices@gesonline.com	Company Name: GES, Inc.	Address: 440 Creamery Way, Suite 500, Exton, PA	Regulatory Agency: NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER <input type="checkbox"/>
Address: 440 Creamery Way Suite 500 Exton, PA 19341	Copy To:	Purchase Order No.: N/A, #C0HWV995	Address: 440 Creamery Way, Suite 500, Exton, PA	Pace Quote Reference: Justin Hall	Site Location STATE: PA
Email To: hsmoker@gesonline.com	Project Name: 0350	Project Number: 0254130_06-160; ORG 1402	Pace Project Manager: Justin Hall	Pace Profile #:	
Phone: 610-458-1077 3067 Fax:					
Requested Due Date/TAT: 5 Day					

ITEM #	Valid Matrix Codes MATRIX CODE DRINKING WATER DW WASTE WATER WW WASTE WATER VVW PRODUCT P SOIL/SOLID SL OIL OL WIPE WP AIR AR OTHER OT TISSUE TS	SAMPLE ID (A-Z, 0-9 /, -) Sample IDs MUST BE UNIQUE	COLLECTED		SAMPLE TYPE (G=GRAB C=COMP) (see valid codes to left)	MATRIX CODE (see valid codes to left)	DATE	TIME	DATE	TIME	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS	
			COMPOSITE START	COMPOSITE END/GRAB														
1		11212017-612-01			WT G		11/21/17	13:45										
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
11																		
12																		

COHYJ032 22 Nov 2017 XRD
Pace Analytical Services, Inc.
 Justin Hall
 (717) 377-5423
 Disposition 17 Jan 2018

No Billing Type

Barcode: [Barcode]

Requested Analysis Filtered (Y/N):

Y	N	XRD (Residual Bentonite)	X															
		Unpreserved	X															
		H ₂ SO ₄																
		HNO ₃																
		HCl																
		NaOH																
		Na ₂ O ₃																
		Methanol																
		Other																

Temp in °C: _____

Received on Ice (Y/N): _____

Custody Sealed Cooler (Y/N): _____

Samples Intact (Y/N): _____

DATE Signed (MM/DD/YY): 11/21/17

PRINT Name of SAMPLER: Matthew Kocis

SIGNATURE of SAMPLER: [Signature]

SAMPLER NAME AND SIGNATURE: [Signature]

**X-RAY DIFFRACTION (XRD)
ANALYSIS REPORT
03 Dec 2017**

**JOB NUMBER C0HYJ032
PO NUMBER pending**

for

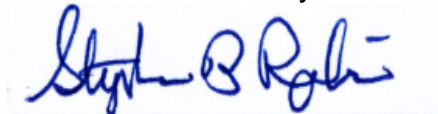
Justin Hall
Pace Analytical Services, Inc.

Prepared by:



Bich Nguyen
Scientist, XRD Services
(Tel. 408-530-3834; bnguyen@eag.com)

Reviewed by:



Stephen B. Robie, Ph.D.
Senior Specialist, XRD Services
(Tel. 408-530-3638; srobie@eag.com)

EAG Laboratories
810 Kifer Rd
Sunnyvale, CA 94086-5203 USA

Requester:
Job Number:
Analysis Date:

Justin Hall
COHYJ032
03 Dec 2017

X-RAY DIFFRACTION ANALYSIS REPORT

Purpose: Use x-ray diffraction to identify the phases present in a water sample with particular emphasis on the presence of bentonite. The sample was identified as 11212017-612-01.

Summary:

Best Matches from the ICDD/ICSD data bases

Sample ID	Primary Phases	Possible Trace Phases
Sample 11212017-612-01 (Top part)	CaCO ₃ – Calcite Hexagonal, S.G.: R-3c (167) PDF# 00-005-0586 CaCO ₃ - Aragonite Orthorhombic, S.G.: Pmcn (62) PDF# 00-061-0390	SiO ₂ - Silicon Dioxide / Quartz Hexagonal, S.G.: P3221 (154) PDF# 00-046-1045 γ- Ca(SO ₄) – Calcium Sulfate Hexagonal, S.G.: P6222 (180) PDF# 04-013-2161 Al ₂ Si ₂ O ₅ (OH) ₄ – Kaolinite-2M Monoclinic, S.G.: Cc (9) PDF# 01-075-0938
Sample 11212017-612-01 (Bottom part)	CaCO ₃ – Calcite Hexagonal, S.G.: R-3c (167) PDF# 00-005-0586 CaCO ₃ - Aragonite Orthorhombic, S.G.: Pmcn (62) PDF# 00-061-0390	SiO ₂ - Silicon Dioxide / Quartz Hexagonal, S.G.: P3221 (154) PDF# 00-046-1045 γ- Ca(SO ₄) – Calcium Sulfate Hexagonal, S.G.: P6222 (180) PDF# 04-013-2161 Al ₂ Si ₂ O ₅ (OH) ₄ – Kaolinite-2M Monoclinic, S.G.: Cc (9) PDF# 01-075-0938 (K,H ₃₀)Al ₂ (Si ₃ Al)O ₁₀ (OH) ₂ .xH ₂ O – Illite-2M2 Monoclinic PDF# 00-058-2015

Sample 11212017-612-01 (dried residues)		$K_{0.93}Na_{0.07}Al_{1.66}Fe_{0.18}Mg_{0.16}(Al_{0.82}Si_{3.18}O_{10})(OH)_2$ – Muscovite-2M1 Monoclinic, S.G.: C2/c (15) PDF# 01-073-9867
	$CaCO_3$ – Calcite Hexagonal, S.G.: R-3c (167) PDF# 00-005-0586	SiO_2 - Silicon Dioxide / Quartz Hexagonal, S.G.: P3221 (154) PDF# 00-046-1045
	$CaCO_3$ - Aragonite Orthorhombic, S.G.: Pmcn (62) PDF# 00-061-0390	$CaSO_4 \cdot 0.5H_2O$ – Bassanite Monoclinic, S.G.: M12 (5) PDF# 00-041-0224
		$Al_2Si_2O_5(OH)_4$ – Kaolinite-2M Monoclinic, S.G.: Cc (9) PDF# 01-075-0938

Results and Interpretations: The water sample was transferred into a beaker and settled for one day. Water from the top of this sample (which should contain the highest concentration of clay minerals) was pipetted onto a special zero-background sample holder and dried using a hot plate. More water was added until the sample surface was fully covered with solid material. This sample is identified in this report as the oriented sample because the clay minerals will tend to align with the c-axis perpendicular to the surface. In order to check whether any other phases were present in the sample, the bottom part of the settled sample was also collected and was prepared as the same way as the top part. Because there were many small residues at the bottom of the beaker, another preparation was made by grinding them in a mortar and pestle after drying. These dried residues were also placed onto a zero-background sample holder. All three parts of the sample were mounted onto a diffractometer for analysis. XRD data was collected by a coupled Theta:2-Theta scan on a Rigaku Ultima-III diffractometer equipped with copper x-ray tube with Ni beta filter, parafocusing optics, computer-controlled slits, and D/teX Ultra 1D strip detector.

[Figure 1](#), [Figure 2](#) and [Figure 3](#) shows the best matches results obtained by comparing the background-subtracted experimental data for all three methods of sample preparation to the ICDD/ICSD diffraction database. Aragonite and calcite are primarily observed in all three patterns. In addition, quartz, calcium sulfate and kaolinite trace phases are present in the top and bottom oriented samples. Illite is only detected at the bottom part. Muscovite and bassanite trace phases are only observed in the dried residues along with quartz and kaolinite. Note that most of calcite peaks are shifted from the reference pattern in all three patterns. This could be due to solid solution effects.

After reviewing this report, you may assess our services using an electronic service evaluation form. This can be done by clicking on the link below, or by pasting it into your internet browser. Your comments and suggestions allow us to determine how to better serve you in the future.

<http://www.eag.com/main-survey.html?job=C0HYJ032>

If you would like to run further analyses on samples like those for which you have just received data, please click here: <http://www.eag.com/customer-portal.html> to generate a new job number and reserve your place in our queue. A customer service representative will contact you to confirm details with you soon after you fill out the short form.

For your other analytical needs please click here: <http://www.eag.com/mc/contact-us-mc.html>

This analysis report should not be reproduced except in full, without the written approval of EAG.

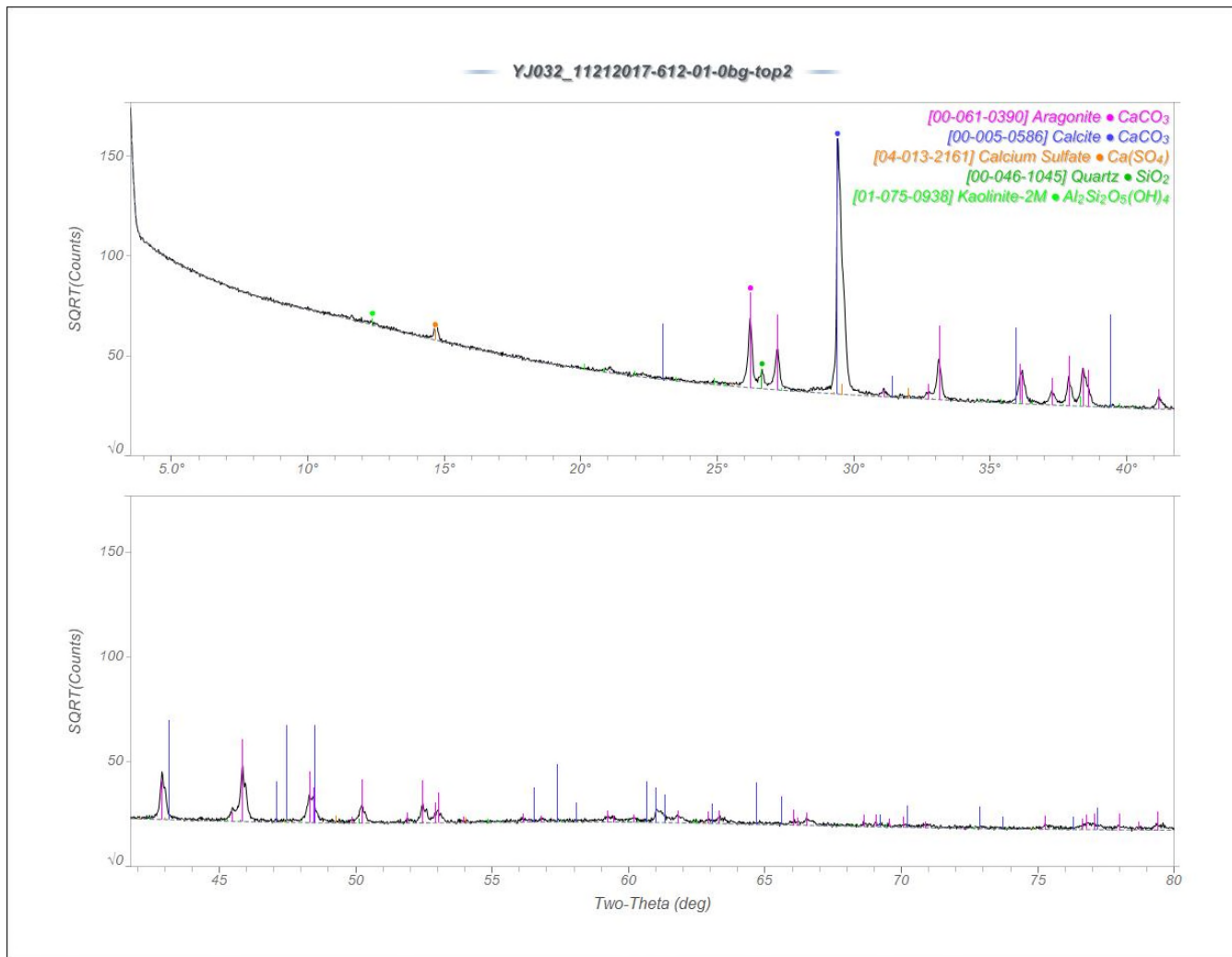


Figure 1: Phase identification for sample 11212017-612-01 (top part)

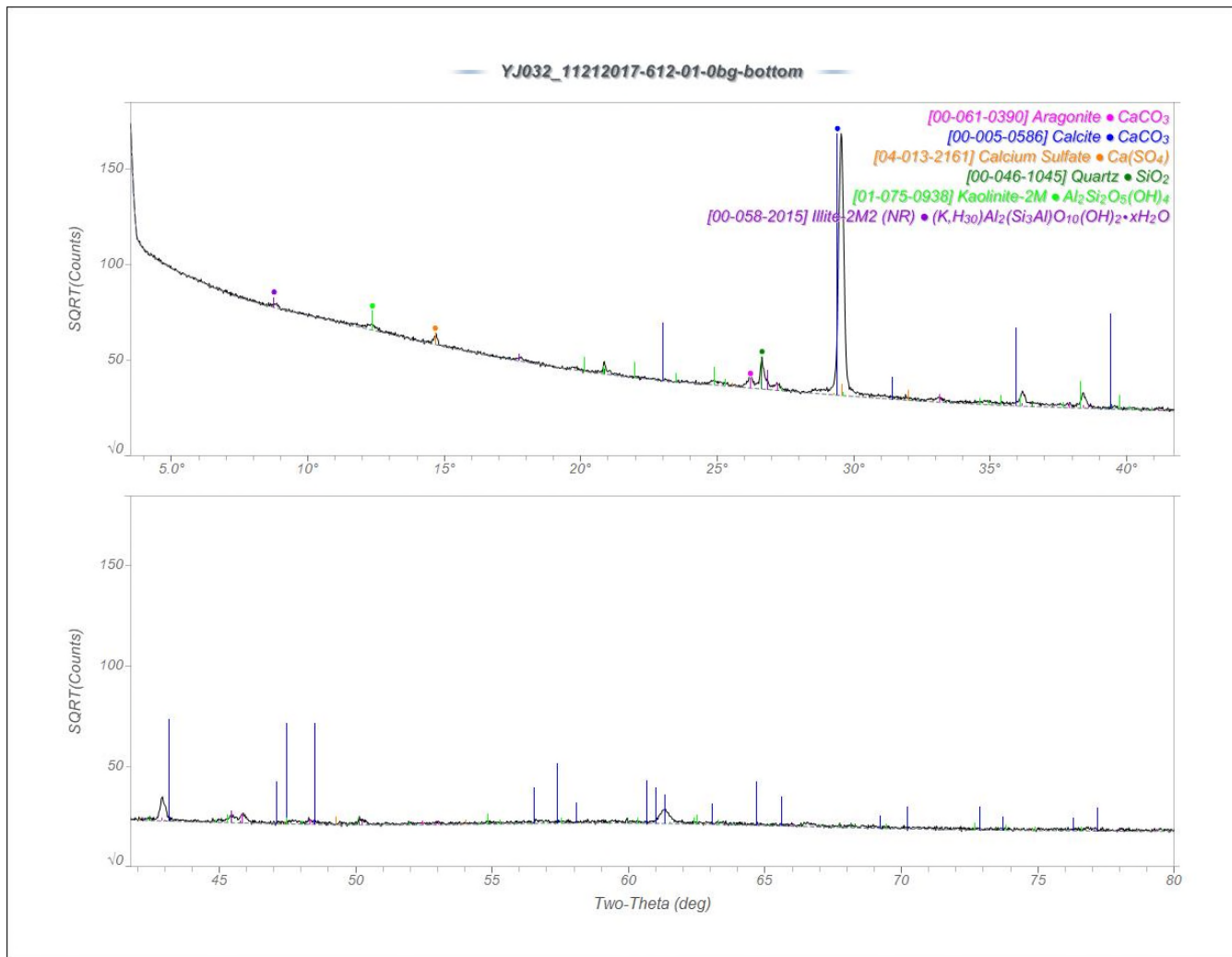


Figure 2: Phase identification for sample 11212017-612-01 (bottom part)

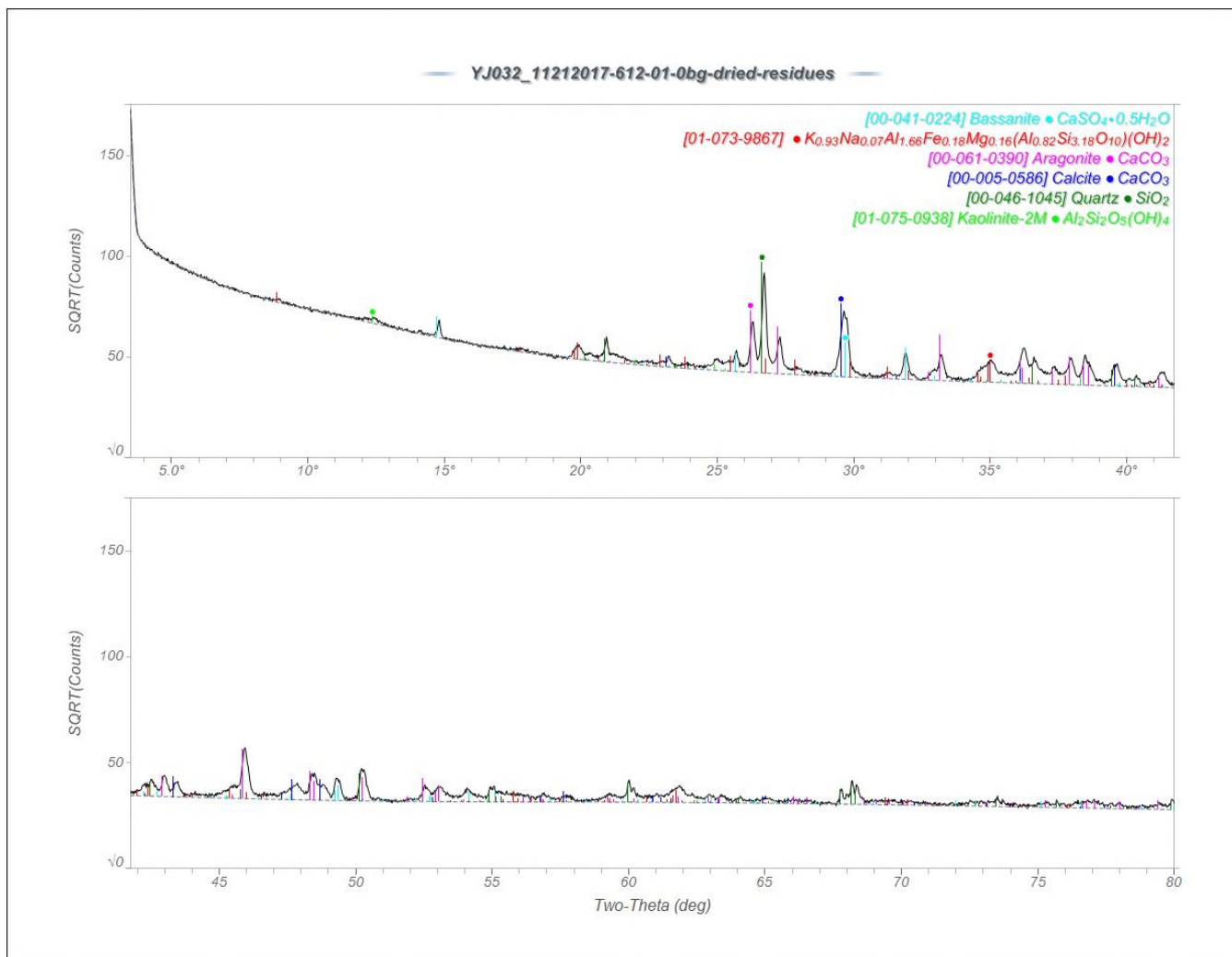


Figure 3: Phase identification for sample 11212017-612-01 (dried residues)

Appendix

Measurement Uncertainty:

There are two types of uncertainty in XRD analysis; uncertainty in the number of x-ray counts at a particular angle and uncertainty in the diffraction angle. Because the arrival of X-ray quanta in the detector is random with respect to time, the accuracy of X-ray counting rate measurements is governed by the laws of probability. In particular, the size of the one sigma standard deviation in an X-ray measurement is equal to the square root of the number of X-rays counted. A conservative criterion for the detection of a weak peak in a XRD pattern must have amplitude of greater than three standard deviations above background. As a result, the more slowly a measurement is made, the lower the relative standard deviation in the number of counts measured and the more likely is detection of trace diffraction peaks. If X-ray data is acquired at a constant speed, the relative standard deviation for the major diffraction peaks in a pattern will be on the order of a few percent or less while the relative standard deviation for the weaker peaks in a pattern will be on the order of tens of percent or more. This also implies that the uncertainty in the concentrations of the major phases in a sample will be lower than for the trace phases. Please note that there are a number of sample related factors that can influence peak intensity. These include (but are not limited to): average crystallite size, preferred orientation (texture), strain, and absorption.

Uncertainty in the position of X-ray diffraction peaks is due to both instrumental and sample effects. Instrumental position uncertainty is primarily due to diffractometer misalignment. Repeat measurements of NIST standard reference materials has shown that the maximum positional uncertainty is less than +/- 0.05 degrees 2-Theta and is typically much less than that. Positional uncertainty due to sample effects are related to sample displacement (displacement of the sample surface either above or below the diffractometer focusing circle) and sample transparency (the effect gets larger as the sample matrix becomes more transparent to the incident X-rays. Through careful sample preparation, the uncertainty due to these two sample effects should be less than +/- 0.03 degrees 2-Theta. Please note that in addition to these factors, solid solution effects, where one element is partially substituted for another within a given crystal structure, can produce significant shifts in measured peak positions. Unlike sample and instrumental peak position effects, solid solution effects can result in phase misidentification.



CHAIN-OF-CUSTODY / Analytical Request Document

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

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company: GES, Inc.	Report To: Holly Smoker	Attention: ges-invoices@gesonline.com	Company Name: GES, Inc.	Address: 440 Creamery Way, Suite 500, Exton, PA	Regulatory Agency: NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER <input type="checkbox"/>
Address: 440 Creamery Way Suite 500 Exton, PA 19341	Copy To:	Purchase Order No.: N/A, #C0HWV995	Address: 440 Creamery Way, Suite 500, Exton, PA	Pace Quote Reference: Justin Hall	Site Location STATE: PA
Email To: hsmoker@gesonline.com	Project Name: 0350	Project Number: 0254130_06-160; ORG 1402	Pace Project Manager: Justin Hall	Pace Profile #:	
Phone: 610-458-1077 3067 Fax:					
Requested Due Date/TAT: 5 Day					

ITEM #	Valid Matrix Codes MATRIX CODE DRINKING WATER DW WASTE WATER WW WASTE WATER VVW PRODUCT P SOIL/SOLID SL OIL OL WIPE WP AIR AR OTHER OT TISSUE TS	SAMPLE ID (A-Z, 0-9 /, -) Sample IDs MUST BE UNIQUE	COLLECTED		SAMPLE TYPE (G=GRAB C=COMP) (see valid codes to left)	MATRIX CODE (see valid codes to left)	DATE	TIME	DATE	TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives Unpreserved H ₂ SO ₄ HNO ₃ HCl NaOH Na ₂ O ₃ Methanol Other	Y/N	Requested Analysis Filtered (Y/N)	Pace Project No./ Lab I.D.	
			COMPOSITE START	COMPOSITE END/GRAB													
1		11212017-612-01			WT G			11/21/17	1345			1		X		XRD (Residual Bentonite)	N
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	

COHYJ032 22 Nov 2017 XRD
Pace Analytical Services, Inc.
 Justin Hall
 (717) 377-5423
 Disposition 17 Jan 2018



ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	<i>Steph Bobbie</i>	11/21/17	1700	FEDEX	11/21/17	1700	Received on Ice (Y/N) N Custody Sealed Cooler (Y/N) Y Samples Intact (Y/N) Y

SAMPLER NAME AND SIGNATURE
 PRINT Name of SAMPLER: *Matthew Kocis*
 SIGNATURE of SAMPLER: *Matthew Kocis*
 DATE Signed (MM/DD/YY): 11/21/17

November 10, 2016

GES, Inc - Sunoco

Sample Delivery Group: L870101
Samples Received: 11/03/2016
Project Number:
Description: Pre-Construction Sampling
Site: ME2
Report To: Stephanie Grillo
440 Creamery Way, Ste 500
Exton, PA 19341
















Entire Report Reviewed By:



Mark W. Beasley
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



¹Cp: Cover Page	1	
²Tc: Table of Contents	2	
³Ss: Sample Summary	3	
⁴Cn: Case Narrative	4	
⁵Sr: Sample Results	5	
11022016-499-02 L870101-01	5	
⁶Qc: Quality Control Summary	7	
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Gravimetric Analysis by Method 2540 D-2011	8	
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Wet Chemistry by Method 2320 B-2011	11	
Wet Chemistry by Method 9040C	12	
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Volatile Organic Compounds (GC/MS) by Method 8260B	18	
⁷Gl: Glossary of Terms	19	
⁸Al: Accreditations & Locations	20	
⁹Sc: Chain of Custody	21	

SAMPLE SUMMARY



11022016-499-02 L870101-01 GW

Collected by
Zack P.

Collected date/time
11/02/16 13:30

Received date/time
11/03/16 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Gravimetric Analysis by Method 2540 C-2011	WG923815	1	11/06/16 00:49	11/07/16 04:02	JM
Gravimetric Analysis by Method 2540 D-2011	WG924019	1	11/07/16 12:56	11/07/16 13:51	MMF
Metals (ICP) by Method 6010B	WG923493	1	11/03/16 17:21	11/03/16 22:15	ST
Volatile Organic Compounds (GC) by Method RSK175	WG924515	1	11/08/16 14:36	11/08/16 14:36	MJ
Volatile Organic Compounds (GC/MS) by Method 8260B	WG923615	1	11/05/16 16:48	11/05/16 16:48	ACG
Wet Chemistry by Method 130.1	WG924308	1	11/08/16 11:44	11/08/16 11:44	JER
Wet Chemistry by Method 2130 B-2011	WG923457	1	11/03/16 18:19	11/03/16 18:19	MHM
Wet Chemistry by Method 2320 B-2011	WG923559	1	11/04/16 08:25	11/04/16 08:25	AMC
Wet Chemistry by Method 9040C	WG924324	1	11/09/16 10:12	11/09/16 10:12	JJL
Wet Chemistry by Method 9050A	WG923434	1	11/03/16 18:40	11/03/16 18:40	MZ
Wet Chemistry by Method 9056A	WG923847	1	11/05/16 18:34	11/05/16 18:34	CM

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Mark W. Beasley
 Technical Service Representative

Sample Handling and Receiving

The following samples were prepared and/or analyzed past recommended holding time. Concentrations should be considered minimum values.

<u>ESC Sample ID</u>	<u>Project Sample ID</u>	<u>Method</u>
L870101-01	11022016-499-02	9040C

- ¹ Cp
- ² Tc
- ³ Ss
- ⁴ Cn
- ⁵ Sr
- ⁶ Qc
- ⁷ Gl
- ⁸ Al
- ⁹ Sc



Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	192		10.0	1	11/07/2016 04:02	WG923815

1 Cp

2 Tc

Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	2.50		2.50	1	11/07/2016 13:51	WG924019

3 Ss

4 Cn

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hardness, Total (mg/L as CaCO3)	132		30.0	1	11/08/2016 11:44	WG924308

5 Sr

6 Qc

Wet Chemistry by Method 2130 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Turbidity	3.36		0.100	1	11/03/2016 18:19	WG923457

7 Gl

8 Al

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Alkalinity	89.9		20.0	1	11/04/2016 08:25	WG923559

9 Sc

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.49		1	11/09/2016 10:12	WG924324

Sample Narrative:

9040C L870101-01 WG924324: 7.49 at 14.7c

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	263		1	11/03/2016 18:40	WG923434

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	11/05/2016 18:34	WG923847
Chloride	3.35		1.00	1	11/05/2016 18:34	WG923847
Sulfate	12.6		5.00	1	11/05/2016 18:34	WG923847

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	0.0226		0.00500	1	11/03/2016 22:15	WG923493
Calcium	45.5		1.00	1	11/03/2016 22:15	WG923493
Iron	ND		0.100	1	11/03/2016 22:15	WG923493
Magnesium	3.67		1.00	1	11/03/2016 22:15	WG923493
Manganese	0.0519		0.0100	1	11/03/2016 22:15	WG923493
Potassium	ND		1.00	1	11/03/2016 22:15	WG923493
Sodium	1.63		1.00	1	11/03/2016 22:15	WG923493



Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Methane	0.0748		0.0100	1	11/08/2016 14:36	WG924515
Ethane	ND		0.0130	1	11/08/2016 14:36	WG924515
Ethene	ND		0.0130	1	11/08/2016 14:36	WG924515
Propane	ND		0.0190	1	11/08/2016 14:36	WG924515

1 Cp

2 Tc

3 Ss

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	11/05/2016 16:48	WG923615
Toluene	ND		0.00500	1	11/05/2016 16:48	WG923615
Ethylbenzene	ND		0.00100	1	11/05/2016 16:48	WG923615
Total Xylenes	ND		0.00300	1	11/05/2016 16:48	WG923615
(S) Toluene-d8	105		90.0-115		11/05/2016 16:48	WG923615
(S) Dibromofluoromethane	103		79.0-121		11/05/2016 16:48	WG923615
(S) a,a,a-Trifluorotoluene	101		90.4-116		11/05/2016 16:48	WG923615
(S) 4-Bromofluorobenzene	95.2		80.1-120		11/05/2016 16:48	WG923615

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3176639-1 11/07/16 04:02

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Dissolved Solids	U		2.82	10.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

L870101-01 Original Sample (OS) • Duplicate (DUP)

(OS) L870101-01 11/07/16 04:02 • (DUP) R3176639-4 11/07/16 04:02

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Dissolved Solids	192	187	1	2.64		5

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3176639-2 11/07/16 04:02 • (LCSD) R3176639-3 11/07/16 04:02

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Dissolved Solids	8800	8090	8200	91.9	93.2	85.0-115			1.35	5

⁷ Gl

⁸ Al

⁹ Sc



Method Blank (MB)

(MB) R3176393-1 11/07/16 13:51

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Suspended Solids	U		0.350	2.50

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L870072-01 Original Sample (OS) • Duplicate (DUP)

(OS) L870072-01 11/07/16 13:51 • (DUP) R3176393-4 11/07/16 13:51

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	245	245	1	0.000		5

L870108-01 Original Sample (OS) • Duplicate (DUP)

(OS) L870108-01 11/07/16 13:51 • (DUP) R3176393-5 11/07/16 13:51

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	235	235	1	0.000		5

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3176393-2 11/07/16 13:51 • (LCSD) R3176393-3 11/07/16 13:51

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Suspended Solids	773	812	844	105	109	85.0-115			3.86	5



Method Blank (MB)

(MB) R3176899-1 11/08/16 11:24

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Hardness	3.67	J	1.43	30.0

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L869521-02 Original Sample (OS) • Duplicate (DUP)

(OS) L869521-02 11/08/16 11:28 • (DUP) R3176899-4 11/08/16 11:29

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Hardness	124	112	1	10.0		20

L870222-03 Original Sample (OS) • Duplicate (DUP)

(OS) L870222-03 11/08/16 11:47 • (DUP) R3176899-5 11/08/16 11:48

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Hardness	60.1	59.5	1	1.00		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3176899-2 11/08/16 11:25 • (LCSD) R3176899-3 11/08/16 11:26

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Hardness	150	156	155	104	103	85.0-115			1.00	20



Method Blank (MB)

(MB) WG923457-1 11/03/16 18:19

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Turbidity	U		0.0310	0.100

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

L870101-01 Original Sample (OS) • Duplicate (DUP)

(OS) L870101-01 11/03/16 18:19 • (DUP) WG923457-4 11/03/16 18:19

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Turbidity	3.36	3.34	1	0.597		20

⁷ Gl

⁸ Al

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG923457-2 11/03/16 18:19 • (LCSD) WG923457-3 11/03/16 18:19

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Turbidity	40.0	42.1	42.0	105	105	90.0-110			0.238	20

⁹ Sc



[L870101-01](#)

Method Blank (MB)

(MB) R3176227-1 11/04/16 07:35

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Alkalinity	U		2.71	20.0

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

L870101-01 Original Sample (OS) • Duplicate (DUP)

(OS) L870101-01 11/04/16 08:25 • (DUP) R3176227-4 11/04/16 08:32

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	89.9	87.2	1	3.00		20

L870105-01 Original Sample (OS) • Duplicate (DUP)

(OS) L870105-01 11/04/16 11:03 • (DUP) R3176227-7 11/04/16 11:11

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	226	228	1	1.00		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3176227-5 11/04/16 08:39 • (LCSD) R3176227-6 11/04/16 10:17

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Alkalinity	100	95.6	101	96.0	101	85.0-115			5.00	20

L870062-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L870062-02 11/04/16 07:50 • (MS) R3176227-2 11/04/16 07:57 • (MSD) R3176227-3 11/04/16 08:04

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Alkalinity	100	671	696	613	26.0	0.000	1	80.0-120	V	V	13.0	20



L870020-01 Original Sample (OS) • Duplicate (DUP)

(OS) L870020-01 11/09/16 10:12 • (DUP) WG924324-3 11/09/16 10:12

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	8.72	8.71	1	0.115		1

¹Cp

²Tc

³Ss

L870611-01 Original Sample (OS) • Duplicate (DUP)

(OS) L870611-01 11/09/16 10:12 • (DUP) WG924324-4 11/09/16 10:12

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.00	7.01	1	0.143		1

⁴Cn

⁵Sr

⁶Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG924324-1 11/09/16 10:12 • (LCSD) WG924324-2 11/09/16 10:12

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
pH	6.11	6.12	6.12	100	100	98.4-102			0.000	1

⁷Gl

⁸Al

⁹Sc



Method Blank (MB)

(MB) WG923434-1 11/03/16 18:40

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Specific Conductance	umhos/cm		umhos/cm	umhos/cm
	1.07			

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L869540-01 Original Sample (OS) • Duplicate (DUP)

(OS) L869540-01 11/03/16 18:40 • (DUP) WG923434-4 11/03/16 18:40

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Specific Conductance	umhos/cm	umhos/cm		%		%
	572	572	1	0.000		20

L870105-01 Original Sample (OS) • Duplicate (DUP)

(OS) L870105-01 11/03/16 18:40 • (DUP) WG923434-5 11/03/16 18:40

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Specific Conductance	umhos/cm	umhos/cm		%		%
	447	448	1	0.223		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG923434-2 11/03/16 18:40 • (LCSD) WG923434-3 11/03/16 18:40

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Specific Conductance	umhos/cm	umhos/cm	umhos/cm	%	%	%			%	%
	542	548	548	101	101	90.0-110			0.000	20



Method Blank (MB)

(MB) R3176152-1 11/05/16 11:38

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Bromide	U		0.079	1.00
Chloride	U		0.0519	1.00
Sulfate	U		0.0774	5.00

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

L868947-01 Original Sample (OS) • Duplicate (DUP)

(OS) L868947-01 11/05/16 12:55 • (DUP) R3176152-4 11/05/16 14:58

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0		15
Chloride	26.5	26.5	1	0		15
Sulfate	29.3	29.4	1	0		15

L869723-03 Original Sample (OS) • Duplicate (DUP)

(OS) L869723-03 11/05/16 16:46 • (DUP) R3176152-6 11/05/16 17:32

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0		15
Chloride	30.6	30.7	1	0		15
Sulfate	43.6	43.6	1	0		15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3176152-2 11/05/16 11:53 • (LCSD) R3176152-3 11/05/16 12:08

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Bromide	40.0	40.3	40.1	101	100	80-120			1	15
Chloride	40.0	39.7	39.6	99	99	80-120			0	15
Sulfate	40.0	41.6	41.6	104	104	80-120			0	15

L869540-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L869540-01 11/05/16 15:29 • (MS) R3176152-5 11/05/16 16:00

Analyte	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
	mg/l	mg/l	mg/l	%		%	
Bromide	50.0	ND	46.4	93	1	80-120	
Chloride	50.0	3.23	52.7	99	1	80-120	



L869540-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L869540-01 11/05/16 15:29 • (MS) R3176152-5 11/05/16 16:00

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Sulfate	50.0	21.4	72.7	103	1	80-120	

¹Cp

²Tc

³Ss

L869003-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L869003-01 11/05/16 13:10 • (MS) R3176152-7 11/05/16 19:20 • (MSD) R3176152-8 11/05/16 19:35

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	ND	45.3	45.3	18	18	5	80-120	J6	J6	0	15
Chloride	50.0	70.9	119	120	19	20	5	80-120	J6	J6	1	15
Sulfate	50.0	149	193	196	17	19	5	80-120	J6	J6	1	15

⁴Cn

⁵Sr

⁶Qc

L869723-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L869723-01 11/05/16 16:15 • (MS) R3176152-9 11/05/16 20:22 • (MSD) R3176152-10 11/05/16 20:37

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	ND	47.8	48.4	96	97	1	80-120			1	15
Chloride	50.0	90.2	137	137	93	93	1	80-120	E	E	0	15
Sulfate	50.0	21.4	74.3	74.3	106	106	1	80-120			0	15

⁷Gl

⁸Al

⁹Sc



Method Blank (MB)

(MB) R3175742-1 11/03/16 21:34

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Barium	U		0.0017	0.00500
Calcium	U		0.0463	1.00
Iron	U		0.0141	0.100
Magnesium	0.0157	J	0.0111	1.00
Manganese	U		0.0012	0.0100
Potassium	U		0.102	1.00
Sodium	U		0.0985	1.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3175742-2 11/03/16 21:37 • (LCSD) R3175742-3 11/03/16 21:39

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Barium	1.00	1.02	1.02	102	102	80-120			0	20
Calcium	10.0	9.96	9.97	100	100	80-120			0	20
Iron	10.0	10.1	10.1	101	101	80-120			0	20
Magnesium	10.0	10.1	10.2	101	102	80-120			0	20
Manganese	1.00	0.974	0.977	97	98	80-120			0	20
Potassium	10.0	9.73	9.75	97	97	80-120			0	20
Sodium	10.0	9.96	9.99	100	100	80-120			0	20

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L869997-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L869997-01 11/03/16 21:42 • (MS) R3175742-5 11/03/16 21:47 • (MSD) R3175742-6 11/03/16 21:50

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Barium	1.00	0.144	1.16	1.15	101	101	1	75-125			0	20
Calcium	10.0	13.1	24.0	23.9	109	108	1	75-125			0	20
Iron	10.0	ND	10.2	10.1	101	100	1	75-125			1	20
Magnesium	10.0	12.1	21.9	21.9	98	98	1	75-125			0	20
Manganese	1.00	ND	0.984	0.981	98	98	1	75-125			0	20
Potassium	10.0	49.0	57.5	57.2	86	83	1	75-125			1	20
Sodium	10.0	68.1	75.9	75.8	77	77	1	75-125			0	20



Method Blank (MB)

(MB) R3176591-1 11/08/16 14:00

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Methane	U		0.00291	0.0100
Ethane	U		0.00407	0.0130
Ethene	U		0.00426	0.0130
Propane	U		0.00548	0.0190

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

L870445-18 Original Sample (OS) • Duplicate (DUP)

(OS) L870445-18 11/08/16 15:21 • (DUP) R3176591-3 11/08/16 15:53

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	3.99	4.19	20	4.90		20
Ethane	U	0.000	20	0.000		20
Ethene	U	0.000	20	0.000		20
Propane	U	0.000	20	0.000		20

⁶ Qc

⁷ Gl

⁸ Al

L870156-01 Original Sample (OS) • Duplicate (DUP)

(OS) L870156-01 11/08/16 14:42 • (DUP) R3176591-2 11/08/16 15:10

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	U	0.000	1	0.000		20
Ethane	U	0.000	1	0.000		20
Ethene	U	0.000	1	0.000		20
Propane	U	0.000	1	0.000		20

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3176591-4 11/08/16 16:09 • (LCSD) R3176591-5 11/08/16 16:12

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Methane	0.0678	0.0622	0.0643	91.8	94.9	85.0-115			3.34	20
Ethane	0.129	0.117	0.121	91.0	93.7	85.0-115			2.93	20
Ethene	0.127	0.116	0.119	91.3	93.6	85.0-115			2.42	20
Propane	0.186	0.169	0.172	90.7	92.3	85.0-115			1.71	20



Method Blank (MB)

(MB) R3176726-2 11/05/16 13:38

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000780	0.00500
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	102			90.0-115
(S) Dibromofluoromethane	91.0			79.0-121
(S) a,a,a-Trifluorotoluene	107			90.4-116
(S) 4-Bromofluorobenzene	96.0			80.1-120

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3176726-1 11/05/16 12:33 • (LCSD) R3176726-3 11/05/16 14:00

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Benzene	0.0250	0.0208	0.0223	83.3	89.3	73.0-122			6.91	20
Ethylbenzene	0.0250	0.0235	0.0254	94.0	102	80.9-121			7.93	20
Toluene	0.0250	0.0228	0.0247	91.2	98.8	77.9-116			7.98	20
Xylenes, Total	0.0750	0.0723	0.0760	96.5	101	79.2-122			4.99	20
(S) Toluene-d8				102	102	90.0-115				
(S) Dibromofluoromethane				91.5	90.4	79.0-121				
(S) a,a,a-Trifluorotoluene				107	107	90.4-116				
(S) 4-Bromofluorobenzene				99.1	98.0	80.1-120				



Abbreviations and Definitions

SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
Rec.	Recovery.

Qualifier	Description
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
V	The sample concentration is too high to evaluate accurate spike recoveries.

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE**.
 * Not all certifications held by the laboratory are applicable to the results reported in the attached report.

1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Connecticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee ¹⁴	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

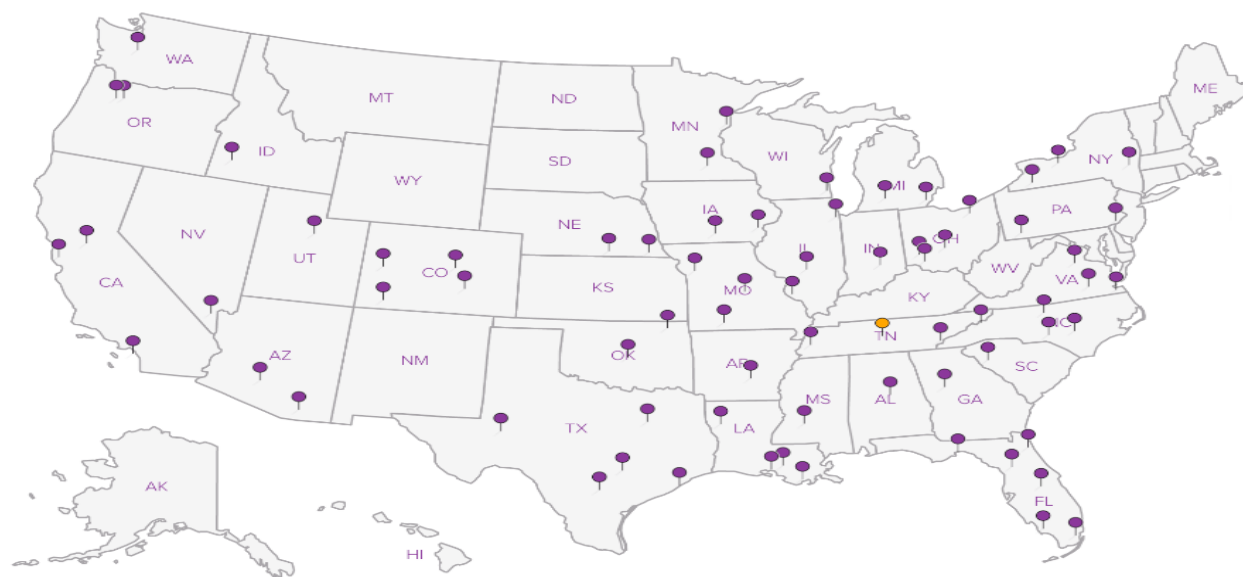
Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ^{n/a} Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. **ESC Lab Sciences performs all testing at our central laboratory.**



Company Name/Address:

GES, Inc - Sunoco

440 Creamery Way, Suite 500
Exton, PA 19341

Billing Information:

Accounts Payable
440 Creamery Way, Suite 500
Exton, PA 19341

Analysis / Container / Preservative

Chain of Custody Page 1 of 1



YOUR LAB OF CHOICE

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859



Report to:
Holly Smoker

Email To:
hsmoker@gesonline.com

Project Description:
Pre-Construction Sampling

City/State Collected:
Johnstown, PA

Phone: **610-458-1077**
Fax: **NA**

Client Project #
NA

Lab Project #
SUNGES-GRILLO

Collected by (print):
Zach Padgett

Site/Facility ID #
ME2

P.O. #
NA

Collected by (signature):
Zach Padgett

Rush? (Lab MUST Be Notified)
___ Same Day200%
___ Next Day100%
___ Two Day50%
___ Three Day25%

Date Results Needed
Standard

Email? ___ No Yes
FAX? ___ No ___ Yes

No. of Cntrs

Immediately Packed on Ice N ___ Y

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	**pH,SPCON,TDS,TURB*	TURB*	250mlHDPE-NoPres	ALK, Br, Cl, SO4	250mlHDPE-HNO3	Total Metals, Hardness	250mlHDPE-HNO3	RSK175 + Propane	40mlAmb-HCI	TSS 1L-HDPE NoPres	V8260BTEX	40mlAmb-HCI
11022016-499-02	Grab	DW	—	11/2/16	1330	8	X	X	X	X	X	X	X	X	X	X	X	X

L# **870101**
J215

Acctnum:**SUNGES**
Template:**T114657**
Prelogin: **P564159**
TSR: **Mark Beasley**
Cooler:

Shipped Via: **Fed Ex**

Rem./Contaminant	Sample # (lab only)
	01

* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other

Remarks: **Metals = Ba,Ca,Fe,K,Mg,Mn,Na**

Project #: **0204679** / 06/2016

pH _____ Temp _____
Flow _____ Other _____

Hold # **7775 9326 4092**

Relinquished by: (Signature) *Zach Padgett*

Date: **11/2/16** Time: **1600**

Received by: (Signature) *FC&EY* **11/2/16/1600**

Samples returned via: UPS FedEx Courier

Condition: (lab use only) **A 0**

Relinquished by: (Signature)

Date: Time:

Received by: (Signature)

Temp: **3.3** °C Bottles Received: **8**

COC Seal Intact: Y N NA

Relinquished by: (Signature)

Date: Time:

Received for lab by: (Signature) *PH/*

Date: **11-3-16** Time: **400**

pH Checked: **8.2** NCF:



LAB SCIENCES

YOUR LAB OF CHOICE

Cooler Receipt Form

Client:	<i>SUNGES</i>	SDG#	<i>870101</i>
Cooler Received/Opened On:	<i>11/3/2016</i>	Temperature Upon Receipt:	<i>3.3 °c</i>
Received By: Richard Hughes			
Signature: <i>[Signature]</i>			
Receipt Check List			
	Yes	No	N/A
Were custody seals on outside of cooler and intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were custody papers properly filled out?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Did all bottles arrive in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were correct bottles used for the analyses requested?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was sufficient amount of sample sent in each bottle?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were all applicable sample containers correctly preserved and checked for preservation? (Any not in accepted range noted on COC)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If applicable, was an observable VOA headspace present?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Non Conformance Generated. (If yes see attached NCF)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

November 30, 2017

GES, Inc - Sunoco

Sample Delivery Group: L952782
Samples Received: 11/22/2017
Project Number: 0204730-06-160-XX
Description: Pre-Construction Sampling

Report To: Holly Smoker
440 Creamery Way, Ste 500
Exton, PA 19341

Entire Report Reviewed By:



Mark W. Beasley
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



Cp: Cover Page	1	¹Cp
Tc: Table of Contents	2	²Tc
Ss: Sample Summary	3	³Ss
Cn: Case Narrative	4	⁴Cn
Sr: Sample Results	5	⁵Sr
11212017-612-02 L952782-01	5	⁴Cn
Qc: Quality Control Summary	7	⁶Qc
Gravimetric Analysis by Method 2540 C-2011	7	⁵Sr
Gravimetric Analysis by Method 2540 D-2011	8	⁶Qc
Wet Chemistry by Method 130.1	9	⁷Gl
Wet Chemistry by Method 2130 B-2011	10	⁸Al
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SAMPLE SUMMARY



11212017-612-02 L952782-01 GW

Collected by: Malcolm Morrin
 Collected date/time: 11/21/17 15:00
 Received date/time: 11/22/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Microbiology by Method 9222D	WG1045795	1	11/22/17 12:30	11/22/17 12:30	KMR
Microbiology by Method 9223 B-1997	WG1045801	1	11/22/17 12:10	11/22/17 12:10	MH
Gravimetric Analysis by Method 2540 C-2011	WG1046441	1	11/27/17 08:48	11/27/17 09:17	BS
Gravimetric Analysis by Method 2540 D-2011	WG1046438	1	11/27/17 13:18	11/27/17 14:02	BS
Wet Chemistry by Method 130.1	WG1046756	1	11/28/17 11:40	11/28/17 11:40	KK
Wet Chemistry by Method 2130 B-2011	WG1045620	1	11/22/17 12:00	11/22/17 12:00	ER
Wet Chemistry by Method 2320 B-2011	WG1047131	1	11/29/17 13:22	11/29/17 13:22	MCG
Wet Chemistry by Method 9040C	WG1045713	1	11/24/17 10:42	11/24/17 10:42	ER
Wet Chemistry by Method 9050A	WG1045840	1	11/22/17 22:50	11/22/17 22:50	MZ
Wet Chemistry by Method 9056A	WG1045903	1	11/24/17 14:41	11/24/17 14:41	KCF
Metals (ICP) by Method 6010B	WG1045643	1	11/22/17 20:33	11/24/17 09:51	CCE
Volatile Organic Compounds (GC) by Method RSK175	WG1046546	1	11/27/17 13:59	11/27/17 13:59	BG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1045975	1	11/23/17 21:53	11/23/17 21:53	ACG

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Mark W. Beasley
Technical Service Representative

- ¹Cp
- ²Tc
- ³Ss
- ⁴Cn
- ⁵Sr
- ⁶Qc
- ⁷Gl
- ⁸Al
- ⁹Sc



Microbiology by Method 9222D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Coliform,fecal	<1		1	11/22/2017 12:30	WG1045795

1 Cp

2 Tc

Microbiology by Method 9223 B-1997

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	2.00		1	11/22/2017 12:10	WG1045801
Coliform,Total	1990		1	11/22/2017 12:10	WG1045801

3 Ss

4 Cn

5 Sr

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	90.0		10.0	1	11/27/2017 09:17	WG1046441

6 Qc

7 Gl

Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	31.2		2.50	1	11/27/2017 14:02	WG1046438

8 Al

9 Sc

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	57.1		30.0	1	11/28/2017 11:40	WG1046756

Wet Chemistry by Method 2130 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Turbidity	13.5		0.300	1	11/22/2017 12:00	WG1045620

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Alkalinity	36.7		20.0	1	11/29/2017 13:22	WG1047131

Sample Narrative:

L952782-01 WG1047131: Endpoint pH 4.5

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	6.89	<u>T8</u>	1	11/24/2017 10:42	WG1045713

Sample Narrative:

L952782-01 WG1045713: 6.89 at 18.4C

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	130		10.0	1	11/22/2017 22:50	WG1045840



Collected date/time: 11/21/17 15:00

L952782

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	11/24/2017 14:41	WG1045903
Chloride	5.64		1.00	1	11/24/2017 14:41	WG1045903
Sulfate	14.6		5.00	1	11/24/2017 14:41	WG1045903

1 Cp

2 Tc

3 Ss

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	0.0431		0.00500	1	11/24/2017 09:51	WG1045643
Calcium	18.0		1.00	1	11/24/2017 09:51	WG1045643
Iron	2.96		0.100	1	11/24/2017 09:51	WG1045643
Magnesium	2.62		1.00	1	11/24/2017 09:51	WG1045643
Manganese	0.0316		0.0100	1	11/24/2017 09:51	WG1045643
Potassium	ND		1.00	1	11/24/2017 09:51	WG1045643
Sodium	1.80		1.00	1	11/24/2017 09:51	WG1045643

4 Cn

5 Sr

6 Qc

7 Gl

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Methane	ND		0.0100	1	11/27/2017 13:59	WG1046546
Ethane	ND		0.0130	1	11/27/2017 13:59	WG1046546
Ethene	ND		0.0130	1	11/27/2017 13:59	WG1046546
Propane	ND		0.0190	1	11/27/2017 13:59	WG1046546

8 Al

9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	11/23/2017 21:53	WG1045975
Toluene	ND		0.00100	1	11/23/2017 21:53	WG1045975
Ethylbenzene	ND		0.00100	1	11/23/2017 21:53	WG1045975
Total Xylenes	ND		0.00300	1	11/23/2017 21:53	WG1045975
(S) Toluene-d8	106		80.0-120		11/23/2017 21:53	WG1045975
(S) Dibromofluoromethane	99.6		76.0-123		11/23/2017 21:53	WG1045975
(S) a,a,a-Trifluorotoluene	103		80.0-120		11/23/2017 21:53	WG1045975
(S) 4-Bromofluorobenzene	98.3		80.0-120		11/23/2017 21:53	WG1045975



Method Blank (MB)

(MB) R3269138-1 11/27/17 09:17

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Dissolved Solids	U		2.82	10.0

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

L952753-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952753-01 11/27/17 09:17 • (DUP) R3269138-4 11/27/17 09:17

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Dissolved Solids	305	303	1	0.658		5

7 Gl

8 Al

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3269138-2 11/27/17 09:17 • (LCSD) R3269138-3 11/27/17 09:17

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Dissolved Solids	8800	8620	8680	98.0	98.6	85.0-115			0.694	5

9 Sc



Method Blank (MB)

(MB) R3268799-1 11/27/17 14:02

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Suspended Solids	U		0.350	2.50

¹ Cp

² Tc

³ Ss

⁴ Cn

L952748-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952748-01 11/27/17 14:02 • (DUP) R3268799-4 11/27/17 14:02

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	15.8	16.0	1	1.57		5

⁵ Sr

⁶ Qc

L952758-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952758-01 11/27/17 14:02 • (DUP) R3268799-5 11/27/17 14:02

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	13.8	14.2	1	2.86		5

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3268799-2 11/27/17 14:02 • (LCSD) R3268799-3 11/27/17 14:02

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Suspended Solids	773	832	872	108	113	85.0-115			4.69	5



Method Blank (MB)

(MB) R3268737-1 11/28/17 11:33

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Hardness (colorimetric) as CaCO3	2.38	J	1.43	30.0

1 Cp

2 Tc

3 Ss

L952782-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952782-01 11/28/17 11:40 • (DUP) R3268737-4 11/28/17 11:41

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Hardness (colorimetric) as CaCO3	57.1	52.6	1	8		20

4 Cn

5 Sr

6 Qc

L953185-01 Original Sample (OS) • Duplicate (DUP)

(OS) L953185-01 11/28/17 11:48 • (DUP) R3268737-5 11/28/17 11:49

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Hardness (colorimetric) as CaCO3	70.1	59.5	1	16		20

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3268737-2 11/28/17 11:34 • (LCSD) R3268737-3 11/28/17 11:35

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Hardness (colorimetric) as CaCO3	150	132	131	88	87	85-115			1	20

L953262-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L953262-01 11/28/17 11:50 • (MS) R3268737-6 11/28/17 11:51 • (MSD) R3268737-7 11/28/17 11:53

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Hardness (colorimetric) as CaCO3	150	39.7	159	158	80	79	1	80-120	J6		1	20



Method Blank (MB)

(MB) R3267677-1 11/22/17 12:00

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Turbidity	0.0520	↓	0.0310	0.300

¹ Cp

² Tc

³ Ss

L952739-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952739-01 11/22/17 12:00 • (DUP) R3267677-4 11/22/17 12:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Turbidity	0.457	0.450	1	2.00		20

⁴ Cn

⁵ Sr

⁶ Qc

L952810-07 Original Sample (OS) • Duplicate (DUP)

(OS) L952810-07 11/22/17 12:00 • (DUP) R3267677-5 11/22/17 12:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Turbidity	3.51	3.54	1	1.00		20

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3267677-2 11/22/17 12:00 • (LCSD) R3267677-3 11/22/17 12:00

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Turbidity	40.0	41.9	42.0	105	105	90.0-110			0.000	20



L952780-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952780-01 11/29/17 13:09 • (DUP) R3269450-1 11/29/17 13:15

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	122	122	1	0.0184		20

Sample Narrative:

OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

L953370-04 Original Sample (OS) • Duplicate (DUP)

(OS) L953370-04 11/29/17 17:13 • (DUP) R3269450-8 11/29/17 17:21

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	488	487	1	0.207		20

Sample Narrative:

OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3269450-6 11/29/17 14:28 • (LCSD) R3269450-7 11/29/17 16:57

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Alkalinity	100	103	102	103	102	85.0-115			1.33	20

Sample Narrative:

LCS: Endpoint pH 4.5
LCSD: Endpoint pH 4.5



L952600-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952600-01 11/24/17 10:42 • (DUP) R3267993-3 11/24/17 10:42

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
su	su			%		%
pH	7.41	7.47	1	0.806		1

Sample Narrative:

OS: 7.41 at 19C
DUP: 7.47 at 18.9C

L952782-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952782-01 11/24/17 10:42 • (DUP) R3267993-4 11/24/17 10:42

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
su	su			%		%
pH	6.89	6.87	1	0.291		1

Sample Narrative:

OS: 6.89 at 18.4C
DUP: 6.87 at 18.3C

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3267993-1 11/24/17 10:42 • (LCSD) R3267993-2 11/24/17 10:42

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
su	su	su	su	%	%	%			%	%
pH	5.96	5.96	5.96	100	100	98.3-102			0.000	1

Sample Narrative:

LCS: 5.96 at 19.3C
LCSD: 5.96 at 19.3C

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) WG1045840-1 11/22/17 22:50

Analyte	MB Result umhos/cm	MB Qualifier	MB MDL umhos/cm	MB RDL umhos/cm
Specific Conductance	U		10.0	10.0

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

L952750-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952750-01 11/22/17 22:50 • (DUP) WG1045840-4 11/22/17 22:50

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Specific Conductance	427	427	1	0.000		20

L952849-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952849-01 11/22/17 22:50 • (DUP) WG1045840-5 11/22/17 22:50

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Specific Conductance	309	309	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG1045840-2 11/22/17 22:50 • (LCSD) WG1045840-3 11/22/17 22:50

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCSD Result umhos/cm	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Specific Conductance	559	556	556	99.5	99.5	85.0-115			0.000	20



Method Blank (MB)

(MB) R3268139-1 11/24/17 07:38

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Bromide	U		0.079	1.00
Chloride	U		0.0519	1.00
Sulfate	U		0.0774	5.00

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

L952761-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952761-01 11/24/17 13:29 • (DUP) R3268139-5 11/24/17 14:12

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0		15
Chloride	21.0	21.0	1	0		15
Sulfate	32.8	32.9	1	0		15

L952824-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952824-01 11/24/17 15:10 • (DUP) R3268139-6 11/24/17 15:24

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0		15
Chloride	68.5	68.4	1	0		15
Sulfate	33.6	33.8	1	1		15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3268139-2 11/24/17 07:52 • (LCSD) R3268139-3 11/24/17 08:07

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Bromide	40.0	40.1	40.1	100	100	80-120			0	15
Chloride	40.0	39.7	40.0	99	100	80-120			1	15
Sulfate	40.0	39.9	39.9	100	100	80-120			0	15



[L952782-01](#)

L952753-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L952753-01 11/24/17 12:31 • (MS) R3268139-4 11/24/17 12:46

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>
Bromide	50.0	ND	47.2	94	1	80-120	
Chloride	50.0	20.2	68.6	97	1	80-120	
Sulfate	50.0	42.0	89.0	94	1	80-120	

L952871-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L952871-04 11/24/17 16:22 • (MS) R3268139-7 11/24/17 17:05 • (MSD) R3268139-8 11/24/17 17:19

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	RPD Limits %
Bromide	50.0	ND	46.0	49.6	92	99	1	80-120			8	15
Chloride	50.0	21.1	69.0	71.4	96	101	1	80-120			3	15
Sulfate	50.0	43.9	90.3	93.3	93	99	1	80-120			3	15

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc



Method Blank (MB)

(MB) R3267974-1 11/24/17 08:45

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Barium	U		0.0017	0.00500
Calcium	U		0.0463	1.00
Iron	0.0161	↓	0.0141	0.100
Magnesium	0.0325	↓	0.0111	1.00
Manganese	U		0.0012	0.0100
Potassium	U		0.102	1.00
Sodium	U		0.0985	1.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3267974-2 11/24/17 08:48 • (LCSD) R3267974-3 11/24/17 08:52

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Barium	1.00	1.00	0.988	100	99	80-120			1	20
Calcium	10.0	9.60	9.45	96	95	80-120			2	20
Iron	10.0	9.65	9.53	96	95	80-120			1	20
Magnesium	10.0	9.95	9.79	100	98	80-120			2	20
Manganese	1.00	0.947	0.934	95	93	80-120			1	20
Potassium	10.0	9.61	9.50	96	95	80-120			1	20
Sodium	10.0	9.69	9.57	97	96	80-120			1	20

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L952760-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L952760-01 11/24/17 08:55 • (MS) R3267974-5 11/24/17 09:01 • (MSD) R3267974-6 11/24/17 09:04

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Barium	1.00	0.0489	1.03	1.04	98	99	1	75-125			1	20
Calcium	10.0	24.8	34.4	34.6	97	99	1	75-125			1	20
Iron	10.0	0.192	9.72	9.84	95	96	1	75-125			1	20
Magnesium	10.0	5.81	15.5	15.6	97	98	1	75-125			0	20
Manganese	1.00	ND	0.938	0.947	94	94	1	75-125			1	20
Potassium	10.0	1.33	10.8	10.9	94	95	1	75-125			1	20
Sodium	10.0	12.0	21.1	21.3	92	93	1	75-125			1	20



Method Blank (MB)

(MB) R3268485-1 11/27/17 12:37

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Methane	U		0.00291	0.0100
Ethane	U		0.00407	0.0130
Ethene	U		0.00426	0.0130
Propane	U		0.00548	0.0190

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

L952746-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952746-01 11/27/17 13:15 • (DUP) R3268485-2 11/27/17 13:37

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	ND	0.000	1	0.000		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

L952761-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952761-01 11/27/17 13:53 • (DUP) R3268485-3 11/27/17 14:19

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	ND	0.000	1	0.000		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3268485-4 11/27/17 14:21 • (LCSD) R3268485-5 11/27/17 14:25

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Methane	0.0678	0.0695	0.0693	103	102	85.0-115			0.380	20
Ethane	0.129	0.112	0.111	86.7	85.9	85.0-115			0.882	20
Ethene	0.127	0.115	0.115	90.6	90.2	85.0-115			0.356	20
Propane	0.186	0.182	0.182	97.8	98.0	85.0-115			0.204	20



Method Blank (MB)

(MB) R3269198-2 11/23/17 19:31

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000412	0.00100
Xylenes, Total	U		0.00106	0.00300
<i>(S) Toluene-d8</i>	109			80.0-120
<i>(S) Dibromofluoromethane</i>	99.0			76.0-123
<i>(S) a,a,a-Trifluorotoluene</i>	103			80.0-120
<i>(S) 4-Bromofluorobenzene</i>	99.8			80.0-120

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

Laboratory Control Sample (LCS)

(LCS) R3269198-1 11/23/17 18:31

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
Benzene	0.0250	0.0207	82.7	69.0-123	
Ethylbenzene	0.0250	0.0240	95.9	77.0-120	
Toluene	0.0250	0.0213	85.1	77.0-120	
Xylenes, Total	0.0750	0.0673	89.7	77.0-120	
<i>(S) Toluene-d8</i>			103	80.0-120	
<i>(S) Dibromofluoromethane</i>			96.8	76.0-123	
<i>(S) a,a,a-Trifluorotoluene</i>			104	80.0-120	
<i>(S) 4-Bromofluorobenzene</i>			102	80.0-120	

7 Gl

8 Al

9 Sc



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
T8	Sample(s) received past/too close to holding time expiration.



ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE**.
 * Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Connecticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee ¹⁴	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

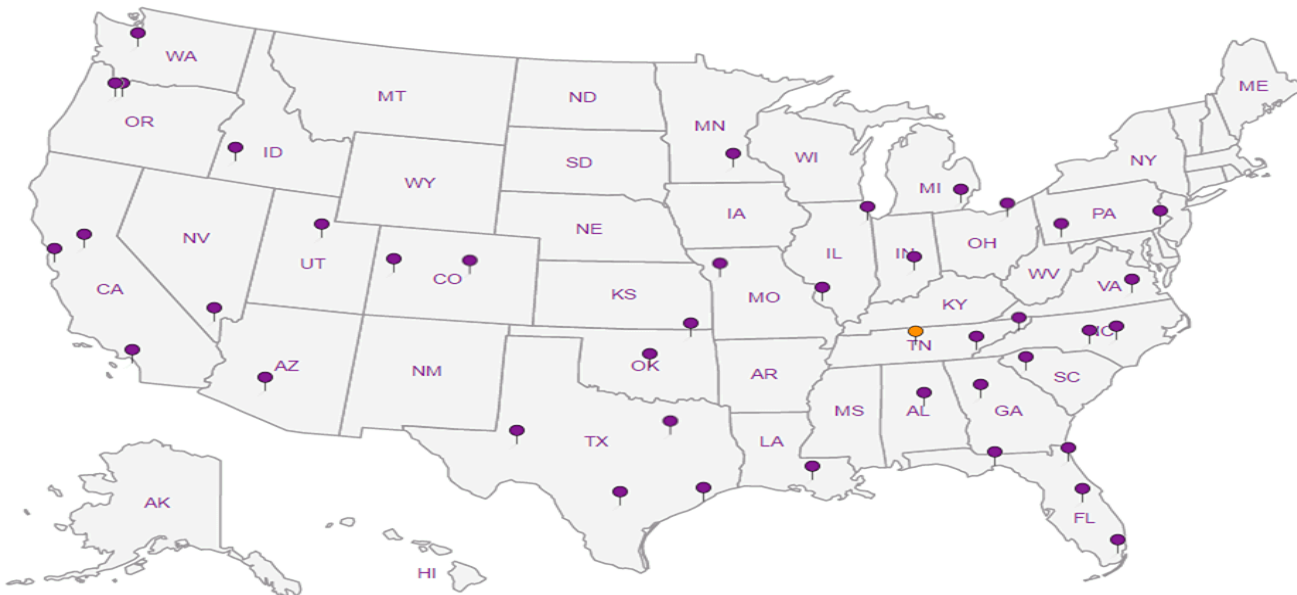
Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ^{n/a} Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. **ESC Lab Sciences performs all testing at our central laboratory.**



1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

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Holly Smoker

Email To:
sgrillo@gesonline.com, hsmoker@geso

Project Description: Pre-Construction Sampling

City/State Collected: Johnstown PA

Phone: 406-578-4501
Fax:

Client Project #
0204730

Lab Project #
SUNGES-GRILLO

Collected by (print):
Makolu Morris

Site/Facility ID #

P.O. #

Collected by (signature):
Makolu Morris

Rush? (Lab MUST Be Notified)

Same Day Five Day
 Next Day 5 Day (Rad Only)
 Two Day 10 Day (Rad Only)
 Three Day

Quote #

Date Results Needed

Standard TAT

Immediately
Packed on Ice N Y

Pres Chk

Analysis / Container / Preservative

Chain of Custody Page 1 of 1



YOUR LAB OF CHOICE

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859



L# L957782

Tab C157

Acctnum: SUNGES

Template: T126128

Prelogin: P611030

TSR: 134 - Mark Beasley

PB:

Shipped Via: FEDEX

Remarks Sample # (lab only)

-01

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	**pH,SPCON,TDS,TURB* 250ml plastic NP	ALK, Br, Cl, SO4 250ml plastic NP	Total Mtls, Hardness 250ml plastic HNO3	RSK175 + Propane 40ml vial w/ HCL	TSS 1L plastic NP	V8260BTEX 40ml vial w/ HCL	*****DW COLILERT**** microbiological	*****DW Fecal**** microbiological
11/21/2017-612-02	Grab	DW	-	11/21/17	1500	12	X	X	X	X	X	X	X	X

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other

Remarks:
Metals = Ba,Ca,Fe,K,Mg,Mn,Na
****Log COLILERT & FC as DW matrix****

Sample returned via:
 UPS FedEx Courier

Tracking #

4094 8308 1992

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Trip Blank Received: Yes No

HCL / MeOH
TBR

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Temp: 3.7% °C Bottles Received: 12

If preservation required by Login: Date/Time

Relinquished by: (Signature)

Date:

Time:

Received for lab by: (Signature)

Date: 11/22/17 Time: 0845

Hold:

Condition:
NCF / OK

Sample Receipt Checklist

COC Seal Present/Intact:	<input type="checkbox"/> NP	<input type="checkbox"/> Y	<input type="checkbox"/> N
COC Signed/Accurate:	<input type="checkbox"/>	<input type="checkbox"/> Y	<input type="checkbox"/> N
Bottles arrive intact:	<input type="checkbox"/>	<input type="checkbox"/> Y	<input type="checkbox"/> N
Correct bottles used:	<input type="checkbox"/>	<input type="checkbox"/> Y	<input type="checkbox"/> N
Sufficient volume sent:	<input type="checkbox"/>	<input type="checkbox"/> Y	<input type="checkbox"/> N
If Applicable			
VOA Zero Headspace:	<input type="checkbox"/>	<input type="checkbox"/> Y	<input type="checkbox"/> N
Preservation Correct/Checked:	<input type="checkbox"/>	<input type="checkbox"/> Y	<input type="checkbox"/> N

November 27, 2017

GES, Inc - Sunoco

Sample Delivery Group: L952783
Samples Received: 11/22/2017
Project Number: 0204730-06-160-XX
Description: Pre-Construction Sampling

Report To: Holly Smoker
440 Creamery Way, Ste 500
Exton, PA 19341

Entire Report Reviewed By:



Olivia Studebaker
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



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SAMPLE SUMMARY



11212017-612-01 L952783-01 GW

Collected by: Malcolm Morrin
 Collected date/time: 11/21/17 13:45
 Received date/time: 11/22/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Microbiology by Method 9222D	WG1045795	1	11/22/17 12:30	11/22/17 12:30	KMR
Microbiology by Method 9223 B-1997	WG1045801	1	11/22/17 12:10	11/22/17 12:10	MH
Gravimetric Analysis by Method 2540 C-2011	WG1045741	1	11/22/17 17:36	11/22/17 17:53	MMF
Gravimetric Analysis by Method 2540 D-2011	WG1045743	1	11/22/17 16:11	11/22/17 16:33	MMF
Wet Chemistry by Method 130.1	WG1045612	1	11/22/17 15:32	11/22/17 15:32	KK
Wet Chemistry by Method 2130 B-2011	WG1045620	1	11/22/17 12:00	11/22/17 12:00	ER
Wet Chemistry by Method 2320 B-2011	WG1045271	1	11/24/17 13:28	11/24/17 13:28	MCG
Wet Chemistry by Method 9040C	WG1045051	1	11/22/17 10:57	11/22/17 10:57	ER
Wet Chemistry by Method 9050A	WG1045387	1	11/22/17 10:32	11/22/17 10:32	MA
Wet Chemistry by Method 9056A	WG1045640	1	11/22/17 18:18	11/22/17 18:18	KCF
Metals (ICP) by Method 6010B	WG1045643	1	11/22/17 20:33	11/24/17 09:55	CCE
Volatile Organic Compounds (GC) by Method RSK175	WG1045735	1	11/22/17 14:30	11/22/17 14:30	BG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1045621	1	11/22/17 13:29	11/22/17 13:29	LRL

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Olivia Studebaker
Technical Service Representative

Project Narrative

Fecal coliform confirmed to be positive for E. coli. -SWS 11/27/17

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Microbiology by Method 9222D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Coliform,fecal	1.00		1	11/22/2017 12:30	WG1045795

1 Cp

2 Tc

Microbiology by Method 9223 B-1997

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	<1		1	11/22/2017 12:10	WG1045801
Coliform,Total	1990		1	11/22/2017 12:10	WG1045801

3 Ss

4 Cn

5 Sr

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	141		10.0	1	11/22/2017 17:53	WG1045741

6 Qc

7 Gl

Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	16.8		2.50	1	11/22/2017 16:33	WG1045743

8 Al

9 Sc

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	127		30.0	1	11/22/2017 15:32	WG1045612

Wet Chemistry by Method 2130 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Turbidity	9.67		0.300	1	11/22/2017 12:00	WG1045620

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Alkalinity	93.3		20.0	1	11/24/2017 13:28	WG1045271

Sample Narrative:

L952783-01 WG1045271: Endpoint pH 4.5

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.28	<u>T8</u>	1	11/22/2017 10:57	WG1045051

Sample Narrative:

L952783-01 WG1045051: 7.28 at 15.9C

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	262		10.0	1	11/22/2017 10:32	WG1045387



Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	11/22/2017 18:18	WG1045640
Chloride	3.74		1.00	1	11/22/2017 18:18	WG1045640
Sulfate	12.2		5.00	1	11/22/2017 18:18	WG1045640

1 Cp

2 Tc

3 Ss

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	0.0400		0.00500	1	11/24/2017 09:55	WG1045643
Calcium	44.9		1.00	1	11/24/2017 09:55	WG1045643
Iron	1.18		0.100	1	11/24/2017 09:55	WG1045643
Magnesium	4.37		1.00	1	11/24/2017 09:55	WG1045643
Manganese	0.586		0.0100	1	11/24/2017 09:55	WG1045643
Potassium	ND		1.00	1	11/24/2017 09:55	WG1045643
Sodium	1.44		1.00	1	11/24/2017 09:55	WG1045643

4 Cn

5 Sr

6 Qc

7 Gl

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Methane	0.0790		0.0100	1	11/22/2017 14:30	WG1045735
Ethane	ND		0.0130	1	11/22/2017 14:30	WG1045735
Ethene	ND		0.0130	1	11/22/2017 14:30	WG1045735
Propane	ND		0.0190	1	11/22/2017 14:30	WG1045735

8 Al

9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	11/22/2017 13:29	WG1045621
Toluene	ND		0.00100	1	11/22/2017 13:29	WG1045621
Ethylbenzene	ND		0.00100	1	11/22/2017 13:29	WG1045621
Total Xylenes	ND		0.00300	1	11/22/2017 13:29	WG1045621
(S) Toluene-d8	107		80.0-120		11/22/2017 13:29	WG1045621
(S) Dibromofluoromethane	90.9		76.0-123		11/22/2017 13:29	WG1045621
(S) a,a,a-Trifluorotoluene	110		80.0-120		11/22/2017 13:29	WG1045621
(S) 4-Bromofluorobenzene	99.6		80.0-120		11/22/2017 13:29	WG1045621



Method Blank (MB)

(MB) R3267990-1 11/22/17 17:53

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Dissolved Solids	U		2.82	10.0

1 Cp

2 Tc

3 Ss

L952656-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952656-01 11/22/17 17:53 • (DUP) R3267990-4 11/22/17 17:53

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Dissolved Solids	86.0	86.0	1	0.000		5

4 Cn

5 Sr

6 Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3267990-2 11/22/17 17:53 • (LCSD) R3267990-3 11/22/17 17:53

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Dissolved Solids	8800	8480	8430	96.4	95.8	85.0-115			0.591	5

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3267961-1 11/22/17 16:33

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Suspended Solids	U		0.350	2.50

1 Cp

2 Tc

3 Ss

L952668-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952668-01 11/22/17 16:33 • (DUP) R3267961-4 11/22/17 16:33

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	23.1	24.0	1	3.64		5

4 Cn

5 Sr

6 Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3267961-2 11/22/17 16:33 • (LCSD) R3267961-3 11/22/17 16:33

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Suspended Solids	773	812	824	105	107	85.0-115			1.47	5

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3267785-1 11/22/17 15:06

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	3.18	J	1.43	30.0

1 Cp

2 Tc

3 Ss

L952428-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952428-01 11/22/17 15:17 • (DUP) R3267785-4 11/22/17 15:18

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	182	171	1	6		20

4 Cn

5 Sr

6 Qc

L952434-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952434-01 11/22/17 15:21 • (DUP) R3267785-5 11/22/17 15:22

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	87.6	82.7	1	6		20

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3267785-2 11/22/17 15:07 • (LCSD) R3267785-3 11/22/17 15:08

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	150	156	155	104	103	85-115			1	20



Method Blank (MB)

(MB) R3267677-1 11/22/17 12:00

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Turbidity	0.0520	↓	0.0310	0.300

¹ Cp

² Tc

³ Ss

L952739-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952739-01 11/22/17 12:00 • (DUP) R3267677-4 11/22/17 12:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Turbidity	0.457	0.450	1	2.00		20

⁴ Cn

⁵ Sr

⁶ Qc

L952810-07 Original Sample (OS) • Duplicate (DUP)

(OS) L952810-07 11/22/17 12:00 • (DUP) R3267677-5 11/22/17 12:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Turbidity	3.51	3.54	1	1.00		20

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3267677-2 11/22/17 12:00 • (LCSD) R3267677-3 11/22/17 12:00

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Turbidity	40.0	41.9	42.0	105	105	90.0-110			0.000	20



L952448-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952448-01 11/24/17 10:45 • (DUP) R3268050-1 11/24/17 10:51

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	626	631	1	0.737		20

Sample Narrative:

OS: Endpoint pH 4.5
 DUP: Endpoint pH 4.5

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

L952399-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952399-01 11/24/17 12:12 • (DUP) R3268050-5 11/24/17 12:20

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	121	118	1	2.60		20

Sample Narrative:

OS: Endpoint pH 4.5
 DUP: Endpoint pH 4.5

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3268050-2 11/24/17 11:12 • (LCSD) R3268050-6 11/24/17 12:48

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Alkalinity	100	109	104	109	104	85.0-115			5.24	20

Sample Narrative:

LCS: Endpoint pH 4.5
 LCSD: Endpoint pH 4.5



L951429-07 Original Sample (OS) • Duplicate (DUP)

(OS) L951429-07 11/22/17 10:57 • (DUP) R3267676-3 11/22/17 10:57

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
su	su			%		%
pH	6.85	6.90	1	0.727		1

Sample Narrative:

OS: 6.85 at 18.7C

DUP: 6.9 at 18.6C

L952783-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952783-01 11/22/17 10:57 • (DUP) R3267676-4 11/22/17 10:57

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
su	su			%		%
pH	7.28	7.31	1	0.411		1

Sample Narrative:

OS: 7.28 at 15.9C

DUP: 7.31 at 15.8C

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3267676-1 11/22/17 10:57 • (LCSD) R3267676-2 11/22/17 10:57

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
su	su	su	su	%	%	%			%	%
pH	5.96	6.00	5.98	101	100	98.3-102			0.334	1

Sample Narrative:

LCS: 6 at 18.6C

LCSD: 5.98 at 18.6C

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) WG1045387-1 11/22/17 10:32

Analyte	MB Result umhos/cm	MB Qualifier	MB MDL umhos/cm	MB RDL umhos/cm
Specific Conductance	U		10.0	10.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L952399-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952399-01 11/22/17 10:32 • (DUP) WG1045387-4 11/22/17 10:32

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Specific Conductance	256	256	1	0.000		20

L952457-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952457-01 11/22/17 10:32 • (DUP) WG1045387-5 11/22/17 10:32

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Specific Conductance	274	274	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG1045387-2 11/22/17 10:32 • (LCSD) WG1045387-3 11/22/17 10:32

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCSD Result umhos/cm	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Specific Conductance	559	559	559	100	100	85.0-115			0.000	20



Method Blank (MB)

(MB) R3267924-1 11/22/17 11:07

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Bromide	U		0.079	1.00
Chloride	U		0.0519	1.00
Sulfate	U		0.0774	5.00

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

L952745-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952745-01 11/22/17 14:08 • (DUP) R3267924-4 11/22/17 14:22

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	0.918	0.938	1	2	<u>J</u>	15
Sulfate	77.6	77.5	1	0		15

L952745-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952745-01 11/22/17 15:04 • (DUP) R3267924-7 11/22/17 15:18

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Chloride	458	464	10	1		15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3267924-2 11/22/17 12:03 • (LCSD) R3267924-3 11/22/17 12:17

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Bromide	40.0	39.3	39.5	98	99	80-120			0	15
Chloride	40.0	39.8	39.8	100	100	80-120			0	15
Sulfate	40.0	39.7	40.2	99	101	80-120			1	15

L952745-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L952745-01 11/22/17 14:08 • (MS) R3267924-5 11/22/17 14:36 • (MSD) R3267924-6 11/22/17 14:50

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Bromide	50.0	0.918	47.5	48.6	93	95	1	80-120			2	15
Sulfate	50.0	77.6	124	125	93	95	1	80-120	<u>E</u>	<u>E</u>	1	15



Method Blank (MB)

(MB) R3267974-1 11/24/17 08:45

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Barium	U		0.0017	0.00500
Calcium	U		0.0463	1.00
Iron	0.0161	↓	0.0141	0.100
Magnesium	0.0325	↓	0.0111	1.00
Manganese	U		0.0012	0.0100
Potassium	U		0.102	1.00
Sodium	U		0.0985	1.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3267974-2 11/24/17 08:48 • (LCSD) R3267974-3 11/24/17 08:52

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Barium	1.00	1.00	0.988	100	99	80-120			1	20
Calcium	10.0	9.60	9.45	96	95	80-120			2	20
Iron	10.0	9.65	9.53	96	95	80-120			1	20
Magnesium	10.0	9.95	9.79	100	98	80-120			2	20
Manganese	1.00	0.947	0.934	95	93	80-120			1	20
Potassium	10.0	9.61	9.50	96	95	80-120			1	20
Sodium	10.0	9.69	9.57	97	96	80-120			1	20

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L952760-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L952760-01 11/24/17 08:55 • (MS) R3267974-5 11/24/17 09:01 • (MSD) R3267974-6 11/24/17 09:04

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Barium	1.00	0.0489	1.03	1.04	98	99	1	75-125			1	20
Calcium	10.0	24.8	34.4	34.6	97	99	1	75-125			1	20
Iron	10.0	0.192	9.72	9.84	95	96	1	75-125			1	20
Magnesium	10.0	5.81	15.5	15.6	97	98	1	75-125			0	20
Manganese	1.00	ND	0.938	0.947	94	94	1	75-125			1	20
Potassium	10.0	1.33	10.8	10.9	94	95	1	75-125			1	20
Sodium	10.0	12.0	21.1	21.3	92	93	1	75-125			1	20



Method Blank (MB)

(MB) R3267772-1 11/22/17 13:54

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Methane	U		0.00291	0.0100
Ethane	U		0.00407	0.0130
Ethene	U		0.00426	0.0130
Propane	U		0.00548	0.0190

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L952783-01 Original Sample (OS) • Duplicate (DUP)

(OS) L952783-01 11/22/17 14:30 • (DUP) R3267772-2 11/22/17 14:33

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	0.0790	0.0842	1	6.37		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3267772-5 11/22/17 15:17 • (LCSD) R3267772-6 11/22/17 15:20

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Methane	0.0678	0.0744	0.0682	110	101	85.0-115			8.77	20
Ethane	0.129	0.110	0.116	85.6	90.2	85.0-115			5.19	20
Ethene	0.127	0.113	0.118	89.2	93.1	85.0-115			4.34	20
Propane	0.186	0.181	0.189	97.1	102	85.0-115			4.54	20

L952256-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L952256-01 11/22/17 14:19 • (MS) R3267772-3 11/22/17 14:42 • (MSD) R3267772-4 11/22/17 14:50

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Methane	0.0678	37.5	43.1	44.1	413	490	20	85.0-115	V	V	2.39	20
Ethane	0.129	6.23	9.33	9.55	120	129	20	85.0-115	J5	J5	2.29	20
Ethene	0.127	U	2.61	2.55	103	101	20	85.0-115			2.01	20
Propane	0.186	2.64	6.66	6.68	108	109	20	85.0-115			0.292	20



Method Blank (MB)

(MB) R3267761-3 11/22/17 10:21

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000412	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	108			80.0-120
(S) Dibromofluoromethane	90.4			76.0-123
(S) a,a,a-Trifluorotoluene	111			80.0-120
(S) 4-Bromofluorobenzene	100			80.0-120

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3267761-1 11/22/17 09:23 • (LCSD) R3267761-2 11/22/17 09:42

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Benzene	0.0250	0.0231	0.0233	92.5	93.2	69.0-123			0.721	20
Ethylbenzene	0.0250	0.0262	0.0261	105	104	77.0-120			0.373	20
Toluene	0.0250	0.0261	0.0265	105	106	77.0-120			1.47	20
Xylenes, Total	0.0750	0.0794	0.0798	106	106	77.0-120			0.503	20
(S) Toluene-d8				107	107	80.0-120				
(S) Dibromofluoromethane				90.7	90.1	76.0-123				
(S) a,a,a-Trifluorotoluene				110	111	80.0-120				
(S) 4-Bromofluorobenzene				98.3	99.5	80.0-120				

7 Gl

8 Al

9 Sc

L952256-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L952256-01 11/22/17 14:08 • (MS) R3267761-4 11/22/17 18:44 • (MSD) R3267761-5 11/22/17 19:03

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Benzene	0.0250	0.000707	0.0200	0.0205	77.1	79.2	1	34.0-147			2.67	20
Ethylbenzene	0.0250	U	0.0220	0.0234	88.2	93.5	1	42.0-147			5.89	20
Toluene	0.0250	U	0.0217	0.0228	87.0	91.3	1	42.0-141			4.79	20
Xylenes, Total	0.0750	U	0.0670	0.0704	89.3	93.9	1	41.0-148			4.95	20
(S) Toluene-d8					106	109		80.0-120				
(S) Dibromofluoromethane					90.9	91.2		76.0-123				
(S) a,a,a-Trifluorotoluene					111	111		80.0-120				
(S) 4-Bromofluorobenzene					97.1	97.4		80.0-120				



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc

Qualifier	Description
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
T8	Sample(s) received past/too close to holding time expiration.
V	The sample concentration is too high to evaluate accurate spike recoveries.



ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE**.
 * Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Connecticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee ¹⁴	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

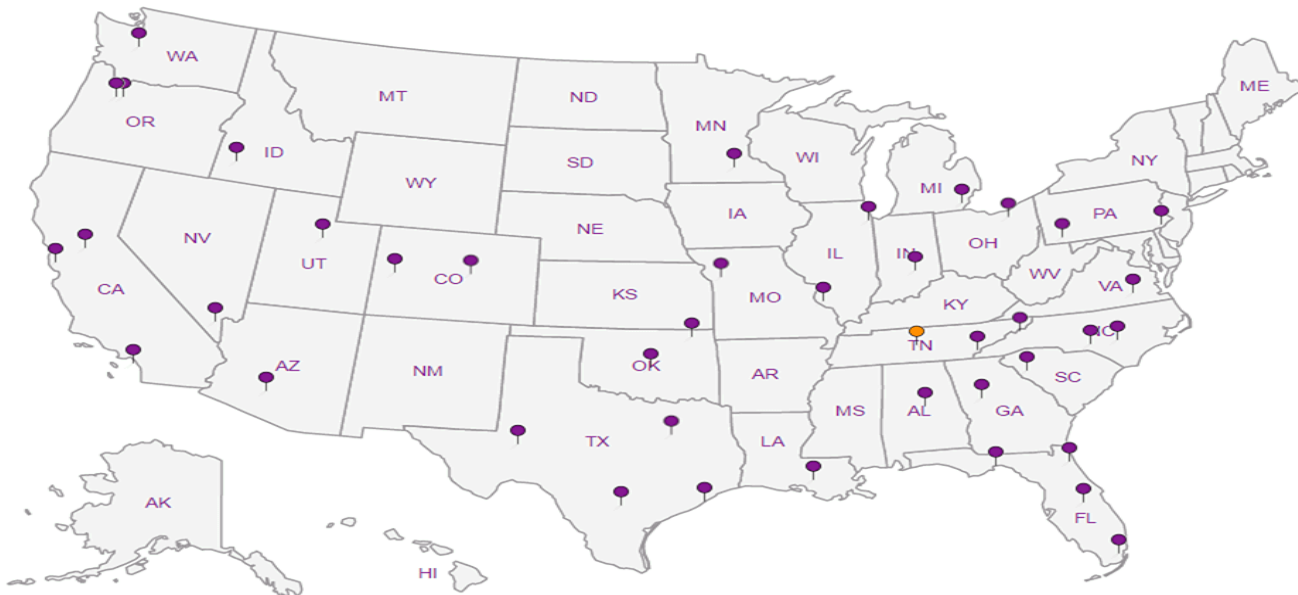
Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ^{n/a} Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. **ESC Lab Sciences performs all testing at our central laboratory.**



1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc

GES, Inc. - Sunoco

440 Creamery Way, Suite 500
Exton, PA 19341

Billing Information:

Accounts Payable
440 Creamery Way, Suite 500
Exton, PA 19341

Report to:
Holly Smoker

Email To:
sgrillo@gesonline.com, hsmoker@geso

Project Description:
Pre-Construction Sampling

City/State Collected:
Johnstown PA

Phone: 406-578-4501
Fax:

Client Project #
0204730 -06-160-XX
Lab Project #
SUNGES-GRILLO

Collected by (print):
Malcolm Kocin

Site/Facility ID #
P.O. #

Collected by (signature):
Malcolm Kocin

Rush? (Lab MUST Be Notified)

Quote #

Immediately Packed on Ice N ___ Y

Same Day ___ Five Day ___
 Next Day ___ 5 Day (Rad Only) ___
Two Day ___ 10 Day (Rad Only) ___
Three Day ___

Date Results Needed

Standard-TAT *SMB*

No. of
Cntrs

Analysis / Container / Preservative

Chain of Custody Page 1 of 1



YOUR LAB OF CHOICE
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859



L# *1952783*

Tab **C156**

Acctnum: **SUNGES**

Template: **T126128**

Prelogin: **P611030**

TSR: **134 - Mark Beasley**

PB:

Shipped Via: **FEDEX**

Remarks Sample # (lab only)

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	**pH,SPCON,TDS,TURB* 250ml plastic NP	ALK, Br, Cl, SO4 250ml plastic NP	Total Mtls, Hardness 250ml plastic HNO3	RSK175 + Propane 40ml vial w/ HCL	TSS 1L plastic NP	V8260BTEX 40ml vial w/ HCL	*****DW COLILERT***** microbiological	*****DW Fecal***** microbiological
11/21/2017-612-01	Grab	DW	-	11/21/17	1345	12	X	X	X	X	X	X	X	X

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other

Remarks:
Metals = Ba,Ca,Fe,K,Mg,Mn,Na
*****Log COLILERT & FC as DW matrix*****

Samples returned via:
UPS FedEx Courier

Tracking # *409483081992*

pH ___ Temp ___

Flow ___ Other ___

Sample Receipt Checklist
COC Seal Present/Intact: Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VGA Zero Headspace: Y N
Preservation Correct/Checked: Y N

Relinquished by: (Signature)
Malcolm Kocin

Date: *11/21/17* Time: *1700*

Received by: (Signature)
FEDEX *11/21/17 1700*

Trip Blank Received: Yes No
HCL / MeOH
TAB

Relinquished by: (Signature)

Date: Time:

Received by: (Signature)

Temp: °C *27* Bottles Received: *12*

If preservation required by Login; Date/Time

Relinquished by: (Signature)

Date: Time:

Received for by: (Signature)
Holly Smoker *841*

Date: *11/22/17* Time: *0845*

Hold: Condition: NCF / OK

November 22, 2017

GES, Inc - Sunoco

Sample Delivery Group: L951346
Samples Received: 11/16/2017
Project Number: 0204730-06-160-XX
Description: Pre-Construction Sampling

Report To: Holly Smoker
440 Creamery Way, Ste 500
Exton, PA 19341

Entire Report Reviewed By:



Mark W. Beasley
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



Cp: Cover Page	1	1 Cp
Tc: Table of Contents	2	
Ss: Sample Summary	3	2 Tc
Cn: Case Narrative	4	
Sr: Sample Results	5	3 Ss
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Gravimetric Analysis by Method 2540 D-2011	8	
Wet Chemistry by Method 130.1	9	6 Qc
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Wet Chemistry by Method 2320 B-2011	11	7 Gl
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Wet Chemistry by Method 9050A	13	8 Al
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Sc: Sample Chain of Custody	21	

SAMPLE SUMMARY



11142017-614-02 L951346-01 GW

Collected by: Jackie Burke
 Collected date/time: 11/14/17 13:15
 Received date/time: 11/16/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Microbiology by Method 9222D	WG1043628	1	11/16/17 13:00	11/16/17 13:00	KMR
Microbiology by Method 9223 B-1997	WG1043594	1	11/16/17 12:13	11/16/17 12:13	KMR
Gravimetric Analysis by Method 2540 C-2011	WG1043662	1	11/17/17 11:16	11/17/17 11:59	MMF
Gravimetric Analysis by Method 2540 D-2011	WG1043952	1	11/17/17 16:50	11/17/17 17:23	BS
Wet Chemistry by Method 130.1	WG1044758	1	11/20/17 10:29	11/20/17 10:29	KK
Wet Chemistry by Method 2130 B-2011	WG1043541	1	11/16/17 11:16	11/16/17 11:16	ER
Wet Chemistry by Method 2320 B-2011	WG1043602	1	11/17/17 10:56	11/17/17 10:56	MCG
Wet Chemistry by Method 9040C	WG1043597	1	11/16/17 13:00	11/16/17 13:00	ER
Wet Chemistry by Method 9050A	WG1043611	1	11/16/17 14:50	11/16/17 14:50	TH
Wet Chemistry by Method 9056A	WG1043901	1	11/17/17 10:57	11/17/17 10:57	MAJ
Metals (ICP) by Method 6010B	WG1043637	1	11/16/17 16:16	11/17/17 04:51	CCE
Volatile Organic Compounds (GC) by Method RSK175	WG1043716	1	11/17/17 13:58	11/17/17 13:58	BG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1044190	1	11/17/17 20:09	11/17/17 20:09	DWR

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Mark W. Beasley
 Technical Service Representative

- ¹ Cp
- ² Tc
- ³ Ss
- ⁴ Cn
- ⁵ Sr
- ⁶ Qc
- ⁷ Gl
- ⁸ Al
- ⁹ Sc

Sample Narrative

FC test was confirmed to be positive for both fecal coliform and E. coli. BE 11-20-17



Microbiology by Method 9222D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Coliform,fecal	1.00		1	11/16/2017 13:00	WG1043628

1 Cp

2 Tc

Microbiology by Method 9223 B-1997

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	<1		1	11/16/2017 12:13	WG1043594
Coliform,Total	291		1	11/16/2017 12:13	WG1043594

3 Ss

4 Cn

5 Sr

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	48.0		10.0	1	11/17/2017 11:59	WG1043662

6 Qc

7 Gl

Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	26.6		2.50	1	11/17/2017 17:23	WG1043952

8 Al

9 Sc

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	ND		30.0	1	11/20/2017 10:29	WG1044758

Wet Chemistry by Method 2130 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Turbidity	1.71		0.300	1	11/16/2017 11:16	WG1043541

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Alkalinity	ND		20.0	1	11/17/2017 10:56	WG1043602

Sample Narrative:

L951346-01 WG1043602: Endpoint pH 4.5

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	5.91	<u>T8</u>	1	11/16/2017 13:00	WG1043597

Sample Narrative:

L951346-01 WG1043597: 5.91 at 14.7C

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	84.9		10.0	1	11/16/2017 14:50	WG1043611



Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	11/17/2017 10:57	WG1043901
Chloride	4.66		1.00	1	11/17/2017 10:57	WG1043901
Sulfate	11.6		5.00	1	11/17/2017 10:57	WG1043901

1 Cp

2 Tc

3 Ss

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	0.0304		0.00500	1	11/17/2017 04:51	WG1043637
Calcium	7.46		1.00	1	11/17/2017 04:51	WG1043637
Iron	0.256		0.100	1	11/17/2017 04:51	WG1043637
Magnesium	2.70		1.00	1	11/17/2017 04:51	WG1043637
Manganese	ND		0.0100	1	11/17/2017 04:51	WG1043637
Potassium	1.01		1.00	1	11/17/2017 04:51	WG1043637
Sodium	1.40		1.00	1	11/17/2017 04:51	WG1043637

4 Cn

5 Sr

6 Qc

7 Gl

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Methane	ND		0.0100	1	11/17/2017 13:58	WG1043716
Ethane	ND		0.0130	1	11/17/2017 13:58	WG1043716
Ethene	ND		0.0130	1	11/17/2017 13:58	WG1043716
Propane	ND		0.0190	1	11/17/2017 13:58	WG1043716

8 Al

9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	11/17/2017 20:09	WG1044190
Toluene	ND		0.00100	1	11/17/2017 20:09	WG1044190
Ethylbenzene	ND		0.00100	1	11/17/2017 20:09	WG1044190
Total Xylenes	ND		0.00300	1	11/17/2017 20:09	WG1044190
(S) Toluene-d8	112		80.0-120		11/17/2017 20:09	WG1044190
(S) Dibromofluoromethane	108		76.0-123		11/17/2017 20:09	WG1044190
(S) a,a,a-Trifluorotoluene	107		80.0-120		11/17/2017 20:09	WG1044190
(S) 4-Bromofluorobenzene	108		80.0-120		11/17/2017 20:09	WG1044190



Method Blank (MB)

(MB) R3266865-1 11/17/17 11:59

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Dissolved Solids	U		2.82	10.0

1 Cp

2 Tc

3 Ss

4 Cn

L951248-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951248-01 11/17/17 11:59 • (DUP) R3266865-4 11/17/17 11:59

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Dissolved Solids	93.0	91.0	1	2.17		5

5 Sr

6 Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3266865-2 11/17/17 11:59 • (LCSD) R3266865-3 11/17/17 11:59

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Dissolved Solids	8800	8430	8440	95.8	95.9	85.0-115			0.119	5

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3267179-1 11/17/17 17:23

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Suspended Solids	U		0.350	2.50

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

L951451-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951451-01 11/17/17 17:23 • (DUP) R3267179-4 11/17/17 17:23

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	20.5	21.0	1	2.41		5

L951526-02 Original Sample (OS) • Duplicate (DUP)

(OS) L951526-02 11/17/17 17:23 • (DUP) R3267179-5 11/17/17 17:23

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	166	169	1	1.49		5

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3267179-2 11/17/17 17:23 • (LCSD) R3267179-3 11/17/17 17:23

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Suspended Solids	773	860	844	111	109	85.0-115			1.88	5



[L951346-01](#)

Method Blank (MB)

(MB) R3266980-1 11/20/17 10:06

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Hardness (colorimetric) as CaCO3	4.31	<u>J</u>	1.43	30.0

¹ Cp

² Tc

³ Ss

L951329-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951329-01 11/20/17 10:17 • (DUP) R3266980-4 11/20/17 10:18

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Hardness (colorimetric) as CaCO3	82.8	73.9	1	11		20

⁴ Cn

⁵ Sr

⁶ Qc

L951362-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951362-01 11/20/17 10:30 • (DUP) R3266980-7 11/20/17 10:31

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Hardness (colorimetric) as CaCO3	122	119	1	2		20

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3266980-2 11/20/17 10:07 • (LCSD) R3266980-3 11/20/17 10:08

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Hardness (colorimetric) as CaCO3	150	139	138	93	92	85-115			1	20

L951335-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L951335-01 11/20/17 10:21 • (MS) R3266980-5 11/20/17 10:22 • (MSD) R3266980-6 11/20/17 10:23

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Hardness (colorimetric) as CaCO3	150	101	196	195	63	63	1	80-120	<u>J6</u>	<u>J6</u>	1	20



Method Blank (MB)

(MB) R3266092-1 11/16/17 11:16

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Turbidity	0.0520	↓	0.0310	0.300

1 Cp

2 Tc

3 Ss

L951343-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951343-01 11/16/17 11:16 • (DUP) R3266092-4 11/16/17 11:16

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Turbidity	3.13	3.12	1	0.000		20

4 Cn

5 Sr

6 Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3266092-2 11/16/17 11:16 • (LCSD) R3266092-3 11/16/17 11:16

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Turbidity	40.0	41.8	41.7	105	104	90.0-110			0.000	20

7 Gl

8 Al

9 Sc



L951346-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951346-01 11/17/17 10:56 • (DUP) R3266639-1 11/17/17 11:02

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	ND	12.6	1	14.0	J	20

Sample Narrative:

OS: Endpoint pH 4.5
 DUP: Endpoint pH 4.5

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

L951474-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951474-01 11/17/17 14:44 • (DUP) R3266639-4 11/17/17 14:53

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	266	269	1	1.00		20

Sample Narrative:

OS: Endpoint pH 4.5
 DUP: Endpoint pH 4.5

6 Qc

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3266639-2 11/17/17 12:11 • (LCSD) R3266639-5 11/17/17 13:25

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Alkalinity	100	96.9	99.1	97.0	99.0	85.0-115			2.00	20

Sample Narrative:

LCS: Endpoint pH 4.5
 LCSD: Endpoint pH 4.5



L951343-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951343-01 11/16/17 13:00 • (DUP) R3266187-3 11/16/17 13:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
su	su			%		%
pH	7.72	7.73	1	0.129		1

Sample Narrative:

OS: 7.72 at 15.2C
DUP: 7.73 at 15.4C

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

L951439-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951439-01 11/16/17 13:00 • (DUP) R3266187-4 11/16/17 13:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
su	su			%		%
pH	8.43	8.50	1	0.827		1

Sample Narrative:

OS: 8.43 at 15C
DUP: 8.5 at 15.3C

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3266187-1 11/16/17 13:00 • (LCSD) R3266187-2 11/16/17 13:00

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
su	su	su	su	%	%	%			%	%
pH	5.96	6.01	5.97	101	100	98.3-102			0.668	1

Sample Narrative:

LCS: 6.01 at 18.8C
LCSD: 5.97 at 18.8C



Method Blank (MB)

(MB) WG1043611-1 11/16/17 14:50

Analyte	MB Result umhos/cm	MB Qualifier	MB MDL umhos/cm	MB RDL umhos/cm
Specific Conductance	U		10.0	10.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L950855-01 Original Sample (OS) • Duplicate (DUP)

(OS) L950855-01 11/16/17 14:50 • (DUP) WG1043611-4 11/16/17 14:50

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Specific Conductance	1740	1740	1	0.000		20

L951409-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951409-01 11/16/17 14:50 • (DUP) WG1043611-5 11/16/17 14:50

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Specific Conductance	514	512	1	0.390		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG1043611-2 11/16/17 14:50 • (LCSD) WG1043611-3 11/16/17 14:50

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCSD Result umhos/cm	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Specific Conductance	559	557	555	99.6	99.3	85.0-115			0.360	20



Method Blank (MB)

(MB) R3266637-1 11/17/17 06:34

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Bromide	U		0.079	1.00
Chloride	U		0.0519	1.00
Sulfate	U		0.0774	5.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L951329-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951329-01 11/17/17 08:04 • (DUP) R3266637-4 11/17/17 08:18

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0		15
Chloride	17.0	17.2	1	1		15
Sulfate	16.6	16.7	1	0		15

L951362-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951362-01 11/17/17 11:40 • (DUP) R3266637-6 11/17/17 11:54

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0		15
Chloride	36.3	36.7	1	1		15
Sulfate	25.1	25.1	1	0		15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3266637-2 11/17/17 06:48 • (LCSD) R3266637-3 11/17/17 07:03

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Bromide	40.0	39.7	39.7	99	99	80-120			0	15
Chloride	40.0	39.5	39.4	99	98	80-120			0	15
Sulfate	40.0	40.0	39.9	100	100	80-120			0	15



L951335-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L951335-01 11/17/17 09:16 • (MS) R3266637-5 11/17/17 09:59

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>
Bromide	50.0	ND	48.8	98	1	80-120	
Chloride	50.0	38.2	86.5	97	1	80-120	
Sulfate	50.0	20.2	70.1	100	1	80-120	

L951337-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L951337-02 11/17/17 14:33 • (MS) R3266637-7 11/17/17 14:47 • (MSD) R3266637-8 11/17/17 15:02

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	RPD Limits %
Bromide	50.0	ND	47.9	49.8	96	100	1	80-120			4	15
Chloride	50.0	5.50	53.1	56.7	95	102	1	80-120			6	15
Sulfate	50.0	ND	52.0	54.9	97	103	1	80-120			5	15

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Method Blank (MB)

(MB) R3266418-1 11/17/17 04:01

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Barium	U		0.0017	0.00500
Calcium	U		0.0463	1.00
Iron	U		0.0141	0.100
Magnesium	U		0.0111	1.00
Manganese	U		0.0012	0.0100
Potassium	U		0.102	1.00
Sodium	U		0.0985	1.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3266418-2 11/17/17 04:05 • (LCSD) R3266418-3 11/17/17 04:08

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Barium	1.00	1.07	1.03	107	103	80-120			4	20
Calcium	10.0	10.4	9.98	104	100	80-120			5	20
Iron	10.0	10.5	10.0	105	100	80-120			4	20
Magnesium	10.0	10.9	10.3	109	103	80-120			5	20
Manganese	1.00	1.03	0.978	103	98	80-120			5	20
Potassium	10.0	10.4	9.87	104	99	80-120			5	20
Sodium	10.0	10.6	10.1	106	101	80-120			4	20

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L951337-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L951337-02 11/17/17 04:11 • (MS) R3266418-5 11/17/17 04:17 • (MSD) R3266418-6 11/17/17 04:21

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Barium	1.00	0.0403	1.06	1.06	102	102	1	75-125			0	20
Calcium	10.0	40.7	50.4	50.2	97	96	1	75-125			0	20
Iron	10.0	ND	9.92	9.91	99	99	1	75-125			0	20
Magnesium	10.0	6.84	16.9	16.8	101	100	1	75-125			1	20
Manganese	1.00	ND	0.974	0.971	97	97	1	75-125			0	20
Potassium	10.0	1.45	11.2	11.2	98	98	1	75-125			0	20
Sodium	10.0	1.73	11.7	11.7	100	100	1	75-125			0	20



Method Blank (MB)

(MB) R3266597-1 11/17/17 12:01

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Methane	U		0.00291	0.0100
Ethane	U		0.00407	0.0130
Ethene	U		0.00426	0.0130
Propane	U		0.00548	0.0190

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L951329-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951329-01 11/17/17 13:25 • (DUP) R3266597-2 11/17/17 13:40

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	ND	0.000	1	0.000		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

L951337-04 Original Sample (OS) • Duplicate (DUP)

(OS) L951337-04 11/17/17 13:45 • (DUP) R3266597-3 11/17/17 14:25

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	ND	0.000	1	0.000		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3266597-4 11/17/17 14:28 • (LCSD) R3266597-5 11/17/17 14:31

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Methane	0.0678	0.0762	0.0739	112	109	85.0-115			3.06	20
Ethane	0.129	0.115	0.115	89.0	89.1	85.0-115			0.167	20
Ethene	0.127	0.118	0.119	92.5	93.3	85.0-115			0.875	20
Propane	0.186	0.188	0.188	101	101	85.0-115			0.243	20



Method Blank (MB)

(MB) R3267365-2 11/17/17 14:40

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000412	0.00100
Xylenes, Total	U		0.00106	0.00300
<i>(S) Toluene-d8</i>	106			80.0-120
<i>(S) Dibromofluoromethane</i>	116			76.0-123
<i>(S) a,a,a-Trifluorotoluene</i>	102			80.0-120
<i>(S) 4-Bromofluorobenzene</i>	103			80.0-120

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3267365-1 11/17/17 13:20 • (LCSD) R3267365-3 11/17/17 14:59

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Benzene	0.0250	0.0255	0.0263	102	105	69.0-123			3.09	20
Ethylbenzene	0.0250	0.0255	0.0252	102	101	77.0-120			1.37	20
Toluene	0.0250	0.0244	0.0258	97.6	103	77.0-120			5.47	20
Xylenes, Total	0.0750	0.0755	0.0759	101	101	77.0-120			0.528	20
<i>(S) Toluene-d8</i>				106	109	80.0-120				
<i>(S) Dibromofluoromethane</i>				111	107	76.0-123				
<i>(S) a,a,a-Trifluorotoluene</i>				106	105	80.0-120				
<i>(S) 4-Bromofluorobenzene</i>				116	113	80.0-120				



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
T8	Sample(s) received past/too close to holding time expiration.

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc



ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE**.
 * Not all certifications held by the laboratory are applicable to the results reported in the attached report.



State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Connecticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee ¹⁴	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

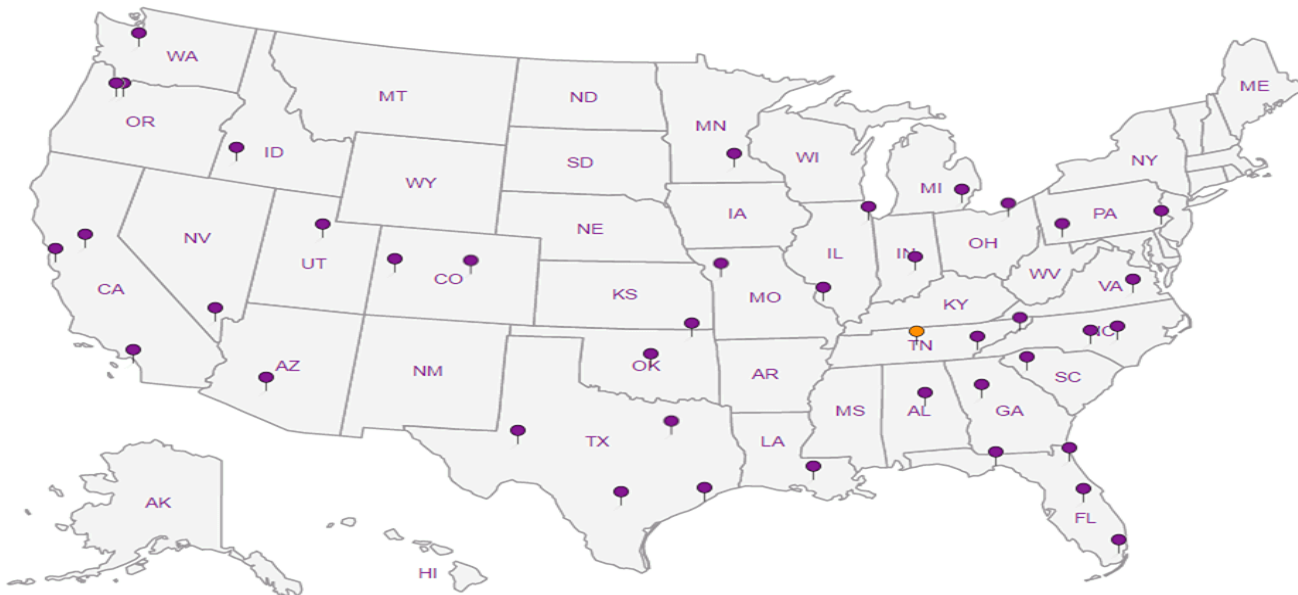
Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ^{n/a} Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. **ESC Lab Sciences performs all testing at our central laboratory.**



GES, Inc. - Sunoco
440 Creamery Way, Suite 500
Exton, PA 19341

Billing Information:
Accounts Payable
440 Creamery Way, Suite 500
Exton, PA 19341

Pres
 Chk

Report to:
Holly Smoker

Email To:
sgrillo@gesonline.com, hsmoker@geso

Project Description:
Pre-Construction Sampling

City/State Collected:
Johnstown, PA

Phone: **406-578-4501**
 Fax:

Client Project #
0204730 -06-160-XX

Lab Project #
SUNGES-GRILLO

Collected by (print):
Jackie Burke

Site/Facility ID #

P.O. #

Collected by (signature):
Jan Ber

Rush? (Lab MUST Be Notified)
 Same Day Five Day
 Next Day 5 Day (Rad Only)
 Two Day 10 Day (Rad Only)
 Three Day

Quote #
 Date Results Needed
Standard TAT

Immediately Packed on ice N Y

No. of
 Cntrs

Analysis / Container / Preservative

Chain of Custody Page ___ of ___



YOUR LAB OF CHOICE

12065 Lebanon Rd
 Mount Juliet, TN 37122
 Phone: 615-758-5858
 Phone: 800-767-5859
 Fax: 615-758-5859



L# *951346*

F139

Acctnum: **SUNGES**
 Template: **T126128**
 Prelogin: **P611030**
 TSR: **134 - Mark Beasley**
 PB:

Shipped Via: *Fedex*

Remarks Sample # (lab only)

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	***pH,SPCON,TDS,TURB* 250ml plastic NP	ALK, Br, Cl, SO4 250ml plastic NP	Total Mtls, Hardness 250ml plastic HNO3	RSK175 + Propane 40ml vial w/ HCL	TSS 1L plastic NP	V8260BTEX 40ml vial w/ HCL	*****DW COLILERT***** microbiological	*****DW Fecal***** microbiological
<i>11142017-614-02</i>	<i>Grob</i>	<i>GW</i>	<i>-</i>	<i>11-14-17</i>	<i>1315</i>	<i>12/10</i>	X	X	X	X	X	X	X	X

* Matrix:
 SS - Soil AIR - Air F - Filter
 GW - Groundwater B - Bioassay
 WW - WasteWater
 DW - Drinking Water
 OT - Other

Remarks:
Metals = Ba,Ca,Fe,K,Mg,Mn,Na
******Log COLILERT & FC as DW matrix******

pH _____ Temp _____
 Flow _____ Other _____

Samples returned via:
 UPS FedEx Courier

Tracking # *4094 8306 5069*

Sample Receipt Checklist
 COC Seal Present/Intact: Y N
 COC Signed/Accurate: Y N
 Bottles arrive intact: Y N
 Correct bottles used: Y N
 Sufficient volume sent: Y N
 IF Applicable
 VOA Zero Headspace: Y N
 Preservation Correct/Checked: Y N

Relinquished by: (Signature)
Jan Ber

Date: *11-14-17*
 Time: *1520*

Received by: (Signature)
Fedex 11-14-17 1520

Trip Blank Received: Yes No
 HCL / MeOH
 TBR

Relinquished by: (Signature)

Date: _____
 Time: _____

Received by: (Signature)

Temp: *1.6* °C
 Bottles Received: *10*

If preservation required by Login: Date/Time

Relinquished by: (Signature)

Date: _____
 Time: _____

Received for lab by: (Signature)
RJ Ber 834 11/16/17 0845

Date: _____
 Time: _____

Hold: _____
 Condition: NCF

Report to: Holly Smoker
 Email To: sgriлло@gesonline.com, hsmoker@geso

Project: Pre-Construction Sampling
 Description: *Johnstown PA*

City/State: *Johnstown PA*
 Client Project #: *0007700*
 Lab Project #: *-06-160-XX SUNGES-GRILLO*

Phone: 406-578-4501
 Fax: *0007700*
 Site/Facility ID #: *-06-160-XX SUNGES-GRILLO*
 P.O. #

Collected by (print): *Dakle Burtel*
 Collected by (signature): *Dakle Burtel*

Immediately Packed on Ice N Y X

Rush? (Lab MUST Be Notified)
 Same Day Five Day
 Next Day 5 Day (Red Only)
 Two Day 10 Day (Red Only)
 Three Day

Date Results Needed: *Standard TAT*

Quote #

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Ctr's	Analysis / Container / Preservative
<i>11-14-17-614-02</i>	<i>Grab</i>	<i>SW-up</i>	<i>-</i>	<i>11-14-17</i>	<i>1315</i>	<i>12</i>	<i>*pH,SPCON,TDS,TURB* 250ml plastic NP</i>
							<i>X ALK, Br, Cl, SO4 250ml plastic NP</i>
							<i>X Total Mtls, Hardness 250ml plastic HNO3</i>
							<i>X RSK175 + Propane 40ml vial w/ HCL</i>
							<i>X TSS 1L plastic NP</i>
							<i>X V8260BTEX 40ml vial w/ HCL</i>
							<i>X ****DW COLILERT**** microbiological</i>
							<i>X ****DW Fecal**** microbiological</i>

Remarks: **Metals = Ba,Ca,Fe,K,Mg,Mn,Na**
******Log COLILERT & FCas DW matrix******

Matrix: **SS - Soil** **AIR - Air** **F - Filter**
GW - Groundwater **B - Bioassay**
WW - Wastewater
DW - Drinking Water
OT - Other

Retinquished by: (Signature) *[Signature]* Date: *11-14-17* Time: *1530*

Retinquished by: (Signature) *[Signature]* Date: *11-14-17* Time: *1530*

Tracking # *Fedex 11-14-17*

Received by: (Signature) *[Signature]* Date: *11-14-17* Time: *1530*

Received for lab by: (Signature) *[Signature]* Date: *11-14-17* Time: *1530*

Trip Blank Received: Yes / No *HCL / MeOH*
 Bottles Received: *TBR*

PH Temp
 Flow Other

VOA Zero Headspace: Y N
 Preservation Correct/Checked: Y N

Sample Receipt Checklist

COC Seal Present/Intact: Y N
 COC Signed/Accurate: Y N
 Bottles arrive Intact: Y N
 Correct bottles used: Y N
 Sufficient volume sent: Y N

If Applicable
 VOA Zero Headspace: Y N
 Preservation Correct/Checked: Y N

Accum: **SUNGES**
 Template: **T126128**
 Prelogin: **P611030**
 TSR: **134 - Mark Beasley**
 PB: *Fedex*

Shipped Via: *Fedex*

Remarks: *[Blank]* Sample # (lab only)

Hold: Condition: **NCF / OK**



November 22, 2017

GES, Inc - Sunoco

Sample Delivery Group: L951343
Samples Received: 11/16/2017
Project Number: 0204730-06-160-XX
Description: Pre-Construction Sampling

Report To: Holly Smoker
440 Creamery Way, Ste 500
Exton, PA 19341

Entire Report Reviewed By:

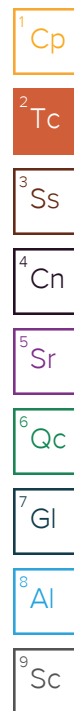


Mark W. Beasley
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



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SAMPLE SUMMARY



11142017-614-01 L951343-01 GW

Collected by: Jackie Burke
 Collected date/time: 11/14/17 11:25
 Received date/time: 11/16/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Microbiology by Method 9222D	WG1043628	1	11/16/17 13:00	11/16/17 13:00	KMR
Microbiology by Method 9223 B-1997	WG1043594	1	11/16/17 12:13	11/16/17 12:13	KMR
Gravimetric Analysis by Method 2540 C-2011	WG1043662	1	11/17/17 11:16	11/17/17 11:59	MMF
Gravimetric Analysis by Method 2540 D-2011	WG1043952	1	11/17/17 16:50	11/17/17 17:23	BS
Wet Chemistry by Method 130.1	WG1044758	1	11/20/17 10:24	11/20/17 10:24	KK
Wet Chemistry by Method 2130 B-2011	WG1043541	1	11/16/17 11:16	11/16/17 11:16	ER
Wet Chemistry by Method 2320 B-2011	WG1043602	1	11/17/17 10:49	11/17/17 10:49	MCG
Wet Chemistry by Method 9040C	WG1043597	1	11/16/17 13:00	11/16/17 13:00	ER
Wet Chemistry by Method 9050A	WG1043611	1	11/16/17 14:50	11/16/17 14:50	TH
Wet Chemistry by Method 9056A	WG1043901	1	11/17/17 10:42	11/17/17 10:42	MAJ
Metals (ICP) by Method 6010B	WG1043637	1	11/16/17 16:16	11/17/17 04:47	CCE
Volatile Organic Compounds (GC) by Method RSK175	WG1043716	1	11/17/17 13:56	11/17/17 13:56	BG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1044190	1	11/17/17 19:49	11/17/17 19:49	DWR

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Mark W. Beasley
Technical Service Representative

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Microbiology by Method 9222D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Coliform,fecal	<1		1	11/16/2017 13:00	WG1043628

1 Cp

2 Tc

Microbiology by Method 9223 B-1997

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	<1		1	11/16/2017 12:13	WG1043594
Coliform,Total	13.4		1	11/16/2017 12:13	WG1043594

3 Ss

4 Cn

5 Sr

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	153		10.0	1	11/17/2017 11:59	WG1043662

6 Qc

7 Gl

Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	3.20		2.50	1	11/17/2017 17:23	WG1043952

8 Al

9 Sc

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	121		30.0	1	11/20/2017 10:24	WG1044758

Wet Chemistry by Method 2130 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Turbidity	3.13		0.300	1	11/16/2017 11:16	WG1043541

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Alkalinity	114		20.0	1	11/17/2017 10:49	WG1043602

Sample Narrative:

L951343-01 WG1043602: Endpoint pH 4.5

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.72	<u>T8</u>	1	11/16/2017 13:00	WG1043597

Sample Narrative:

L951343-01 WG1043597: 7.72 at 15.2C

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	281		10.0	1	11/16/2017 14:50	WG1043611



Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	11/17/2017 10:42	WG1043901
Chloride	9.81		1.00	1	11/17/2017 10:42	WG1043901
Sulfate	9.92		5.00	1	11/17/2017 10:42	WG1043901

1 Cp

2 Tc

3 Ss

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	0.323		0.00500	1	11/17/2017 04:47	WG1043637
Calcium	39.6		1.00	1	11/17/2017 04:47	WG1043637
Iron	0.481		0.100	1	11/17/2017 04:47	WG1043637
Magnesium	7.40		1.00	1	11/17/2017 04:47	WG1043637
Manganese	0.0901		0.0100	1	11/17/2017 04:47	WG1043637
Potassium	ND		1.00	1	11/17/2017 04:47	WG1043637
Sodium	7.22		1.00	1	11/17/2017 04:47	WG1043637

4 Cn

5 Sr

6 Qc

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Methane	0.0467		0.0100	1	11/17/2017 13:56	WG1043716
Ethane	ND		0.0130	1	11/17/2017 13:56	WG1043716
Ethene	ND		0.0130	1	11/17/2017 13:56	WG1043716
Propane	ND		0.0190	1	11/17/2017 13:56	WG1043716

7 Gl

8 Al

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	11/17/2017 19:49	WG1044190
Toluene	ND		0.00100	1	11/17/2017 19:49	WG1044190
Ethylbenzene	ND		0.00100	1	11/17/2017 19:49	WG1044190
Total Xylenes	ND		0.00300	1	11/17/2017 19:49	WG1044190
(S) Toluene-d8	111		80.0-120		11/17/2017 19:49	WG1044190
(S) Dibromofluoromethane	106		76.0-123		11/17/2017 19:49	WG1044190
(S) a,a,a-Trifluorotoluene	106		80.0-120		11/17/2017 19:49	WG1044190
(S) 4-Bromofluorobenzene	107		80.0-120		11/17/2017 19:49	WG1044190

9 Sc



Method Blank (MB)

(MB) R3266865-1 11/17/17 11:59

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Dissolved Solids	U		2.82	10.0

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

L951248-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951248-01 11/17/17 11:59 • (DUP) R3266865-4 11/17/17 11:59

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Dissolved Solids	93.0	91.0	1	2.17		5

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3266865-2 11/17/17 11:59 • (LCSD) R3266865-3 11/17/17 11:59

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Dissolved Solids	8800	8430	8440	95.8	95.9	85.0-115			0.119	5



Method Blank (MB)

(MB) R3267179-1 11/17/17 17:23

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Suspended Solids	U		0.350	2.50

¹ Cp

² Tc

³ Ss

L951451-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951451-01 11/17/17 17:23 • (DUP) R3267179-4 11/17/17 17:23

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	20.5	21.0	1	2.41		5

⁴ Cn

⁵ Sr

⁶ Qc

L951526-02 Original Sample (OS) • Duplicate (DUP)

(OS) L951526-02 11/17/17 17:23 • (DUP) R3267179-5 11/17/17 17:23

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	166	169	1	1.49		5

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3267179-2 11/17/17 17:23 • (LCSD) R3267179-3 11/17/17 17:23

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Suspended Solids	773	860	844	111	109	85.0-115			1.88	5



[L951343-01](#)

Method Blank (MB)

(MB) R3266980-1 11/20/17 10:06

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	4.31	<u>J</u>	1.43	30.0

¹ Cp

² Tc

³ Ss

L951329-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951329-01 11/20/17 10:17 • (DUP) R3266980-4 11/20/17 10:18

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	82.8	73.9	1	11		20

⁴ Cn

⁵ Sr

⁶ Qc

L951362-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951362-01 11/20/17 10:30 • (DUP) R3266980-7 11/20/17 10:31

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	122	119	1	2		20

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3266980-2 11/20/17 10:07 • (LCSD) R3266980-3 11/20/17 10:08

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	150	139	138	93	92	85-115			1	20

L951335-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L951335-01 11/20/17 10:21 • (MS) R3266980-5 11/20/17 10:22 • (MSD) R3266980-6 11/20/17 10:23

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	150	101	196	195	63	63	1	80-120	<u>J6</u>	<u>J6</u>	1	20



Method Blank (MB)

(MB) R3266092-1 11/16/17 11:16

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Turbidity	0.0520	↓	0.0310	0.300

¹ Cp

² Tc

³ Ss

L951343-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951343-01 11/16/17 11:16 • (DUP) R3266092-4 11/16/17 11:16

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Turbidity	3.13	3.12	1	0.000		20

⁴ Cn

⁵ Sr

⁶ Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3266092-2 11/16/17 11:16 • (LCSD) R3266092-3 11/16/17 11:16

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Turbidity	40.0	41.8	41.7	105	104	90.0-110			0.000	20

⁷ Gl

⁸ Al

⁹ Sc



L951346-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951346-01 11/17/17 10:56 • (DUP) R3266639-1 11/17/17 11:02

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	ND	12.6	1	14.0	J	20

Sample Narrative:

OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

L951474-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951474-01 11/17/17 14:44 • (DUP) R3266639-4 11/17/17 14:53

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	266	269	1	1.00		20

Sample Narrative:

OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

6 Qc

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3266639-2 11/17/17 12:11 • (LCSD) R3266639-5 11/17/17 13:25

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Alkalinity	100	96.9	99.1	97.0	99.0	85.0-115			2.00	20

Sample Narrative:

LCS: Endpoint pH 4.5
LCSD: Endpoint pH 4.5



L951343-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951343-01 11/16/17 13:00 • (DUP) R3266187-3 11/16/17 13:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
su	su			%		%
pH	7.72	7.73	1	0.129		1

Sample Narrative:

OS: 7.72 at 15.2C
DUP: 7.73 at 15.4C

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

L951439-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951439-01 11/16/17 13:00 • (DUP) R3266187-4 11/16/17 13:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
su	su			%		%
pH	8.43	8.50	1	0.827		1

Sample Narrative:

OS: 8.43 at 15C
DUP: 8.5 at 15.3C

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3266187-1 11/16/17 13:00 • (LCSD) R3266187-2 11/16/17 13:00

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
su	su	su	su	%	%	%			%	%
pH	5.96	6.01	5.97	101	100	98.3-102			0.668	1

Sample Narrative:

LCS: 6.01 at 18.8C
LCSD: 5.97 at 18.8C



Method Blank (MB)

(MB) WG1043611-1 11/16/17 14:50

Analyte	MB Result umhos/cm	MB Qualifier	MB MDL umhos/cm	MB RDL umhos/cm
Specific Conductance	U		10.0	10.0

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L950855-01 Original Sample (OS) • Duplicate (DUP)

(OS) L950855-01 11/16/17 14:50 • (DUP) WG1043611-4 11/16/17 14:50

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Specific Conductance	1740	1740	1	0.000		20

L951409-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951409-01 11/16/17 14:50 • (DUP) WG1043611-5 11/16/17 14:50

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Specific Conductance	514	512	1	0.390		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG1043611-2 11/16/17 14:50 • (LCSD) WG1043611-3 11/16/17 14:50

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCSD Result umhos/cm	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Specific Conductance	559	557	555	99.6	99.3	85.0-115			0.360	20



Method Blank (MB)

(MB) R3266637-1 11/17/17 06:34

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Bromide	U		0.079	1.00
Chloride	U		0.0519	1.00
Sulfate	U		0.0774	5.00

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L951329-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951329-01 11/17/17 08:04 • (DUP) R3266637-4 11/17/17 08:18

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0		15
Chloride	17.0	17.2	1	1		15
Sulfate	16.6	16.7	1	0		15

L951362-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951362-01 11/17/17 11:40 • (DUP) R3266637-6 11/17/17 11:54

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0		15
Chloride	36.3	36.7	1	1		15
Sulfate	25.1	25.1	1	0		15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3266637-2 11/17/17 06:48 • (LCSD) R3266637-3 11/17/17 07:03

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Bromide	40.0	39.7	39.7	99	99	80-120			0	15
Chloride	40.0	39.5	39.4	99	98	80-120			0	15
Sulfate	40.0	40.0	39.9	100	100	80-120			0	15



L951335-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L951335-01 11/17/17 09:16 • (MS) R3266637-5 11/17/17 09:59

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>
Bromide	50.0	ND	48.8	98	1	80-120	
Chloride	50.0	38.2	86.5	97	1	80-120	
Sulfate	50.0	20.2	70.1	100	1	80-120	

L951337-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L951337-02 11/17/17 14:33 • (MS) R3266637-7 11/17/17 14:47 • (MSD) R3266637-8 11/17/17 15:02

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	RPD Limits %
Bromide	50.0	ND	47.9	49.8	96	100	1	80-120			4	15
Chloride	50.0	5.50	53.1	56.7	95	102	1	80-120			6	15
Sulfate	50.0	ND	52.0	54.9	97	103	1	80-120			5	15

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc



Method Blank (MB)

(MB) R3266418-1 11/17/17 04:01

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Barium	U		0.0017	0.00500
Calcium	U		0.0463	1.00
Iron	U		0.0141	0.100
Magnesium	U		0.0111	1.00
Manganese	U		0.0012	0.0100
Potassium	U		0.102	1.00
Sodium	U		0.0985	1.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3266418-2 11/17/17 04:05 • (LCSD) R3266418-3 11/17/17 04:08

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Barium	1.00	1.07	1.03	107	103	80-120			4	20
Calcium	10.0	10.4	9.98	104	100	80-120			5	20
Iron	10.0	10.5	10.0	105	100	80-120			4	20
Magnesium	10.0	10.9	10.3	109	103	80-120			5	20
Manganese	1.00	1.03	0.978	103	98	80-120			5	20
Potassium	10.0	10.4	9.87	104	99	80-120			5	20
Sodium	10.0	10.6	10.1	106	101	80-120			4	20

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L951337-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L951337-02 11/17/17 04:11 • (MS) R3266418-5 11/17/17 04:17 • (MSD) R3266418-6 11/17/17 04:21

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Barium	1.00	0.0403	1.06	1.06	102	102	1	75-125			0	20
Calcium	10.0	40.7	50.4	50.2	97	96	1	75-125			0	20
Iron	10.0	ND	9.92	9.91	99	99	1	75-125			0	20
Magnesium	10.0	6.84	16.9	16.8	101	100	1	75-125			1	20
Manganese	1.00	ND	0.974	0.971	97	97	1	75-125			0	20
Potassium	10.0	1.45	11.2	11.2	98	98	1	75-125			0	20
Sodium	10.0	1.73	11.7	11.7	100	100	1	75-125			0	20



Method Blank (MB)

(MB) R3266597-1 11/17/17 12:01

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Methane	U		0.00291	0.0100
Ethane	U		0.00407	0.0130
Ethene	U		0.00426	0.0130
Propane	U		0.00548	0.0190

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

L951329-01 Original Sample (OS) • Duplicate (DUP)

(OS) L951329-01 11/17/17 13:25 • (DUP) R3266597-2 11/17/17 13:40

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	ND	0.000	1	0.000		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

⁶ Qc

⁷ Gl

⁸ Al

L951337-04 Original Sample (OS) • Duplicate (DUP)

(OS) L951337-04 11/17/17 13:45 • (DUP) R3266597-3 11/17/17 14:25

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	ND	0.000	1	0.000		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3266597-4 11/17/17 14:28 • (LCSD) R3266597-5 11/17/17 14:31

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Methane	0.0678	0.0762	0.0739	112	109	85.0-115			3.06	20
Ethane	0.129	0.115	0.115	89.0	89.1	85.0-115			0.167	20
Ethene	0.127	0.118	0.119	92.5	93.3	85.0-115			0.875	20
Propane	0.186	0.188	0.188	101	101	85.0-115			0.243	20



Method Blank (MB)

(MB) R3267365-2 11/17/17 14:40

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000412	0.00100
Xylenes, Total	U		0.00106	0.00300
<i>(S) Toluene-d8</i>	106			80.0-120
<i>(S) Dibromofluoromethane</i>	116			76.0-123
<i>(S) a,a,a-Trifluorotoluene</i>	102			80.0-120
<i>(S) 4-Bromofluorobenzene</i>	103			80.0-120

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3267365-1 11/17/17 13:20 • (LCSD) R3267365-3 11/17/17 14:59

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	0.0250	0.0255	0.0263	102	105	69.0-123			3.09	20
Ethylbenzene	0.0250	0.0255	0.0252	102	101	77.0-120			1.37	20
Toluene	0.0250	0.0244	0.0258	97.6	103	77.0-120			5.47	20
Xylenes, Total	0.0750	0.0755	0.0759	101	101	77.0-120			0.528	20
<i>(S) Toluene-d8</i>				106	109	80.0-120				
<i>(S) Dibromofluoromethane</i>				111	107	76.0-123				
<i>(S) a,a,a-Trifluorotoluene</i>				106	105	80.0-120				
<i>(S) 4-Bromofluorobenzene</i>				116	113	80.0-120				



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

J	The identification of the analyte is acceptable; the reported value is an estimate.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
T8	Sample(s) received past/too close to holding time expiration.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE**.
 * Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Connecticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee ¹⁴	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

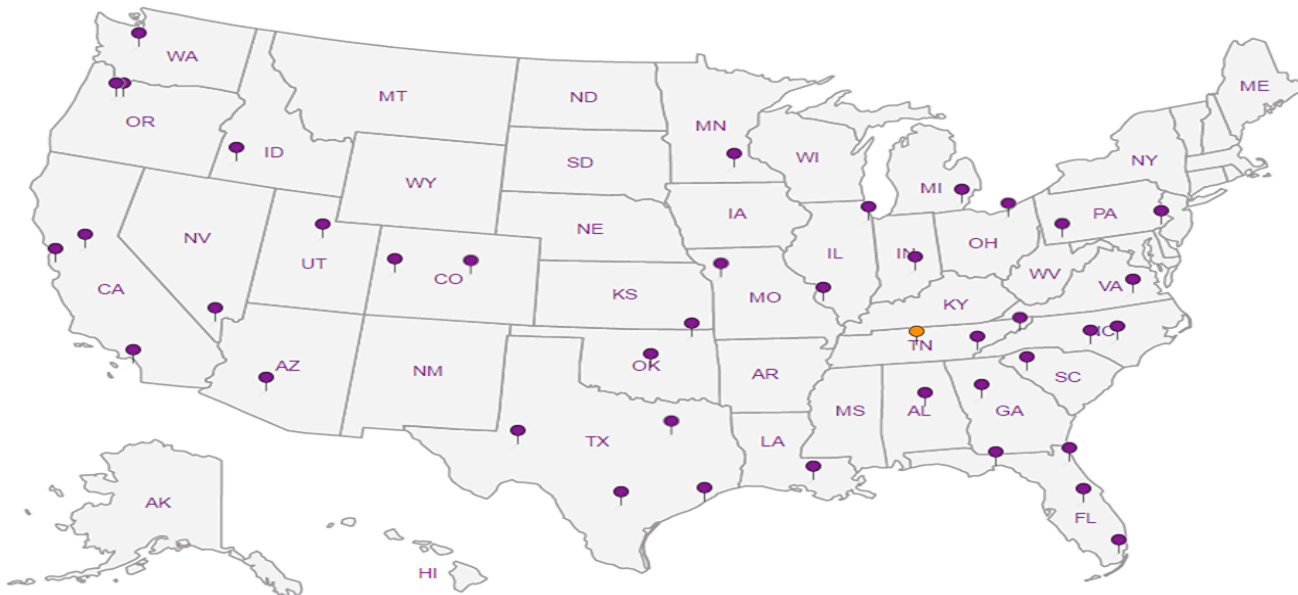
Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ^{n/a} Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. **ESC Lab Sciences performs all testing at our central laboratory.**



1 Cp

2 Tc

3 Ss

4 Cn


5 Sr

6 Qc

7 Gl

8 Al

9 Sc

GES, Inc. - Sunoco		Billing Information:		Pres Chk	Analysis / Container / Preservative	Chain of Custody Page ___ of ___
440 Creamery Way, Suite 500 Exton, PA 19341		Accounts Payable 440 Creamery Way, Suite 500 Exton, PA 19341				 ESC L·A·B S·C·I·E·N·C·E·S YOUR LAB OF CHOICE 12065 Lebanon Rd Mount Juliet, TN 37122 Phone: 615-758-5858 Phone: 800-767-5859 Fax: 615-758-5859
Report to: Holly Smoker		Email To: sgrillo@gesonline.com, hsmoker@geso				
Project Description: Pre-Construction Sampling		City/State Collected: <i>Johnstown, PA</i>				
Phone: 406-578-4501	Client Project # <i>0204730</i>	Lab Project # SUNGES-GRILLO				
Fax:	-06-160-XX					
Collected by (print): <i>Jackie Burke</i>		Site/Facility ID #		P.O. #		
Collected by (signature): <i>[Signature]</i>		Rush? (Lab MUST Be Notified)		Quote #		
Immediately Packed on Ice N ___ Y <input checked="" type="checkbox"/>		<input type="checkbox"/> Same Day <input type="checkbox"/> Five Day <input type="checkbox"/> Next Day <input type="checkbox"/> 5 Day (Rad Only) <input type="checkbox"/> Two Day <input type="checkbox"/> 10 Day (Rad Only) <input type="checkbox"/> Three Day		Date Results Needed Standard TAT		No. of Cntrs

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	**pH,SPCON,TDS,TURB* 250ml plastic NP	ALK, Br, Cl, SO4 250ml plastic NP	Total Mtls, Hardness 250ml plastic HNO3	RSK175 + Propane 40ml vial w/ HCL	TSS 1L plastic NP	V8260BTEX 40ml vial w/ HCL	****DW COLILERT**** microbiological	****DW Fecal**** microbiological	Remarks	Sample # (lab only)
11142017-614-01	Grab	DW up GW	—	11-14-17	1125	12 10 up	X	X	X	X	X	X	X	X		01

* Matrix: SS - Soil AIR - Air F - Filter GW - Groundwater B - Bioassay WW - WasteWater DW - Drinking Water OT - Other _____		Remarks: Metals = Ba,Ca,Fe,K,Mg,Mn,Na ****Log COLILERT & FC as DW matrix**** Samples returned via: <input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> Courier				pH _____ Temp _____ Flow _____ Other _____				Sample Receipt Checklist COC Seal Present/Intact: <input checked="" type="checkbox"/> NP <input type="checkbox"/> Y <input type="checkbox"/> N COC Signed/Accurate: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N Bottles arrive intact: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N Correct bottles used: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N Sufficient volume sent: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N If Applicable VOA Zero Headspace: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N Preservation Correct/Checked: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N					
Relinquished by: (Signature) <i>[Signature]</i>		Date: 11-14-17	Time: 051520	Received by: (Signature) <i>Fedex</i>		Trip Blank Received: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		HCL/MeOH TBR		If preservation required by Login: Date/Time					
Relinquished by: (Signature)		Date:	Time:	Received by: (Signature)		Temp: <i>1.6</i> °C		Bottles Received: <i>10</i>		Hold:					
Relinquished by: (Signature)		Date:	Time:	Received for lab by: (Signature) <i>[Signature]</i>		Date: 11-16-17		Time: 0845		Condition: NCF / <input checked="" type="checkbox"/>		Tracking # <i>4094 8306 5069</i>			

December 07, 2017

GES, Inc - Sunoco

Sample Delivery Group: L953915
Samples Received: 11/30/2017
Project Number: 0204730-06-160-XX
Description: Pre-Construction Sampling

Report To: Holly Smoker
440 Creamery Way, Ste 500
Exton, PA 19341

Entire Report Reviewed By:



Mark W. Beasley
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



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SAMPLE SUMMARY



11292017-614-01 L953915-01 GW

Collected by: Jackie Burke
 Collected date/time: 11/29/17 12:55
 Received date/time: 11/30/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Microbiology by Method 9222D	WG1047406	1	11/30/17 11:50	11/30/17 11:50	CM
Microbiology by Method 9223 B-1997	WG1047888	1	11/30/17 11:25	11/30/17 11:25	CM
Gravimetric Analysis by Method 2540 C-2011	WG1048084	1	12/01/17 11:03	12/01/17 11:31	MMF
Gravimetric Analysis by Method 2540 D-2011	WG1048490	1	12/02/17 11:00	12/02/17 13:11	MMF
Wet Chemistry by Method 130.1	WG1049515	1	12/06/17 09:50	12/06/17 09:50	KK
Wet Chemistry by Method 2130 B-2011	WG1047996	1	12/01/17 09:09	12/01/17 09:09	ER
Wet Chemistry by Method 2320 B-2011	WG1048525	1	12/04/17 15:24	12/04/17 15:24	MCG
Wet Chemistry by Method 9040C	WG1048090	1	12/01/17 10:39	12/01/17 10:39	ER
Wet Chemistry by Method 9050A	WG1049056	1	12/03/17 16:17	12/03/17 16:17	TH
Wet Chemistry by Method 9056A	WG1047991	1	11/30/17 17:44	11/30/17 17:44	MAJ
Metals (ICP) by Method 6010B	WG1047847	1	11/30/17 17:32	12/01/17 08:20	CCE
Volatile Organic Compounds (GC) by Method RSK175	WG1049211	1	12/04/17 10:30	12/04/17 10:30	BG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1047957	1	11/30/17 16:36	11/30/17 16:36	RAS

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Mark W. Beasley
Technical Service Representative

- ¹ Cp
- ² Tc
- ³ Ss
- ⁴ Cn
- ⁵ Sr
- ⁶ Qc
- ⁷ Gl
- ⁸ Al
- ⁹ Sc



Microbiology by Method 9222D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Coliform,fecal	<1		1	11/30/2017 11:50	WG1047406

1 Cp

2 Tc

Microbiology by Method 9223 B-1997

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	<1		1	11/30/2017 11:25	WG1047888
Coliform,Total	<1		1	11/30/2017 11:25	WG1047888

3 Ss

4 Cn

5 Sr

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	179		10.0	1	12/01/2017 11:31	WG1048084

6 Qc

7 Gl

Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	ND		2.50	1	12/02/2017 13:11	WG1048490

8 Al

9 Sc

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	ND		30.0	1	12/06/2017 09:50	WG1049515

Wet Chemistry by Method 2130 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Turbidity	ND		0.300	1	12/01/2017 09:09	WG1047996

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Alkalinity	128		20.0	1	12/04/2017 15:24	WG1048525

Sample Narrative:

L953915-01 WG1048525: Endpoint pH 4.5

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.69	<u>T8</u>	1	12/01/2017 10:39	WG1048090

Sample Narrative:

L953915-01 WG1048090: 7.69 at 18.7C

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	276		10.0	1	12/03/2017 16:17	WG1049056



Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	11/30/2017 17:44	WG1047991
Chloride	9.04		1.00	1	11/30/2017 17:44	WG1047991
Sulfate	6.08		5.00	1	11/30/2017 17:44	WG1047991

1 Cp

2 Tc

3 Ss

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	ND		0.00500	1	12/01/2017 08:20	WG1047847
Calcium	ND		1.00	1	12/01/2017 08:20	WG1047847
Iron	ND		0.100	1	12/01/2017 08:20	WG1047847
Magnesium	ND		1.00	1	12/01/2017 08:20	WG1047847
Manganese	ND		0.0100	1	12/01/2017 08:20	WG1047847
Potassium	ND		1.00	1	12/01/2017 08:20	WG1047847
Sodium	69.4		1.00	1	12/01/2017 08:20	WG1047847

4 Cn

5 Sr

6 Qc

7 Gl

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Methane	0.195		0.0100	1	12/04/2017 10:30	WG1049211
Ethane	ND		0.0130	1	12/04/2017 10:30	WG1049211
Ethene	ND		0.0130	1	12/04/2017 10:30	WG1049211
Propane	ND		0.0190	1	12/04/2017 10:30	WG1049211

8 Al

9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	11/30/2017 16:36	WG1047957
Toluene	ND		0.00100	1	11/30/2017 16:36	WG1047957
Ethylbenzene	ND		0.00100	1	11/30/2017 16:36	WG1047957
Total Xylenes	ND		0.00300	1	11/30/2017 16:36	WG1047957
(S) Toluene-d8	110		80.0-120		11/30/2017 16:36	WG1047957
(S) Dibromofluoromethane	91.3		76.0-123		11/30/2017 16:36	WG1047957
(S) a,a,a-Trifluorotoluene	110		80.0-120		11/30/2017 16:36	WG1047957
(S) 4-Bromofluorobenzene	102		80.0-120		11/30/2017 16:36	WG1047957



Method Blank (MB)

(MB) R3270064-1 12/01/17 11:31

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Dissolved Solids	3.00	↓	2.82	10.0

1 Cp

2 Tc

3 Ss

L953684-01 Original Sample (OS) • Duplicate (DUP)

(OS) L953684-01 12/01/17 11:31 • (DUP) R3270064-4 12/01/17 11:31

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Dissolved Solids	6000	6020	1	0.333		5

4 Cn

5 Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3270064-2 12/01/17 11:31 • (LCSD) R3270064-3 12/01/17 11:31

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Dissolved Solids	8800	8580	8520	97.5	96.8	85.0-115			0.702	5

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3269956-1 12/02/17 13:11

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Suspended Solids	U		0.350	2.50

1 Cp

2 Tc

3 Ss

4 Cn

L953718-01 Original Sample (OS) • Duplicate (DUP)

(OS) L953718-01 12/02/17 13:11 • (DUP) R3269956-4 12/02/17 13:11

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	192	207	1	7.36	J3	5

5 Sr

6 Qc

L953906-01 Original Sample (OS) • Duplicate (DUP)

(OS) L953906-01 12/02/17 13:11 • (DUP) R3269956-5 12/02/17 13:11

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	175	176	1	0.570		5

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3269956-2 12/02/17 13:11 • (LCSD) R3269956-3 12/02/17 13:11

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Suspended Solids	773	808	780	105	101	85.0-115			3.53	5



Method Blank (MB)

(MB) R3270676-1 12/06/17 09:30

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	4.14	<u>J</u>	1.43	30.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L953361-03 Original Sample (OS) • Duplicate (DUP)

(OS) L953361-03 12/06/17 09:37 • (DUP) R3270676-4 12/06/17 09:40

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	163	164	1	1		20

L954472-01 Original Sample (OS) • Duplicate (DUP)

(OS) L954472-01 12/06/17 09:51 • (DUP) R3270676-7 12/06/17 09:52

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	65.9	61.2	1	7		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3270676-2 12/06/17 09:30 • (LCSD) R3270676-3 12/06/17 09:31

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	150	161	159	107	106	85-115			1	20

L953388-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L953388-03 12/06/17 09:44 • (MS) R3270676-5 12/06/17 09:45 • (MSD) R3270676-6 12/06/17 09:46

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	150	169	256	254	58	57	1	80-120	<u>E J6</u>	<u>E J6</u>	1	20



Method Blank (MB)

(MB) R3269664-1 12/01/17 09:09

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Turbidity	0.0480	↓	0.0310	0.300

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

L953915-01 Original Sample (OS) • Duplicate (DUP)

(OS) L953915-01 12/01/17 09:09 • (DUP) R3269664-4 12/01/17 09:09

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Turbidity	ND	ND	1	6.00	↓	20

7 Gl

8 Al

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3269664-2 12/01/17 09:09 • (LCSD) R3269664-3 12/01/17 09:09

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Turbidity	40.0	42.7	42.7	107	107	90.0-110			0.000	20

9 Sc



[L953915-01](#)

L953915-01 Original Sample (OS) • Duplicate (DUP)

(OS) L953915-01 12/04/17 15:24 • (DUP) R3270210-1 12/04/17 15:32

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	128	130	1	1.73		20

Sample Narrative:

OS: Endpoint pH 4.5
 DUP: Endpoint pH 4.5

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L953974-03 Original Sample (OS) • Duplicate (DUP)

(OS) L953974-03 12/04/17 18:26 • (DUP) R3270210-6 12/04/17 18:34

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	445	453	1	1.74		20

Sample Narrative:

OS: Endpoint pH 4.5
 DUP: Endpoint pH 4.5

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3270210-2 12/04/17 16:40 • (LCSD) R3270210-5 12/04/17 18:13

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Alkalinity	100	108	108	108	108	85.0-115			0.243	20

Sample Narrative:

LCS: Endpoint pH 4.5
 LCSD: Endpoint pH 4.5



L953943-01 Original Sample (OS) • Duplicate (DUP)

(OS) L953943-01 12/01/17 10:39 • (DUP) R3269711-3 12/01/17 10:39

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
su	su	su		%		%
pH	7.43	7.41	1	0.270		1

Sample Narrative:

OS: 7.43 at 19.3C
DUP: 7.41 at 19.2C

L954128-01 Original Sample (OS) • Duplicate (DUP)

(OS) L954128-01 12/01/17 10:39 • (DUP) R3269711-4 12/01/17 10:39

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
su	su	su		%		%
pH	6.44	6.49	1	0.773		1

Sample Narrative:

OS: 6.44 at 17.7C
DUP: 6.49 at 17.6C

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3269711-1 12/01/17 10:39 • (LCSD) R3269711-2 12/01/17 10:39

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
su	su	su	su	%	%	%			%	%
pH	5.96	5.97	5.97	100	100	98.3-102			0.000	1

Sample Narrative:

LCS: 5.97 at 18C
LCSD: 5.97 at 18C

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) WG1049056-1 12/03/17 16:17

Analyte	MB Result umhos/cm	MB Qualifier	MB MDL umhos/cm	MB RDL umhos/cm
Specific Conductance	U		10.0	10.0

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

L953915-01 Original Sample (OS) • Duplicate (DUP)

(OS) L953915-01 12/03/17 16:17 • (DUP) WG1049056-4 12/03/17 16:17

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Specific Conductance	276	276	1	0.000		20

7 Gl

8 Al

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG1049056-2 12/03/17 16:17 • (LCSD) WG1049056-3 12/03/17 16:17

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCSD Result umhos/cm	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Specific Conductance	559	557	555	99.6	99.3	85.0-115			0.360	20

9 Sc



Method Blank (MB)

(MB) R3269715-1 11/30/17 15:24

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Bromide	U		0.079	1.00
Chloride	0.0787	↓	0.0519	1.00
Sulfate	U		0.0774	5.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L953915-01 Original Sample (OS) • Duplicate (DUP)

(OS) L953915-01 11/30/17 17:44 • (DUP) R3269715-4 11/30/17 17:58

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0		15
Chloride	9.04	9.01	1	0		15
Sulfate	6.08	6.09	1	0		15

L954058-01 Original Sample (OS) • Duplicate (DUP)

(OS) L954058-01 11/30/17 21:49 • (DUP) R3269715-7 11/30/17 22:03

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	U	0.000	1	0		15
Chloride	19.6	19.4	1	1		15
Sulfate	2.87	2.77	1	4	↓	15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3269715-2 11/30/17 15:38 • (LCSD) R3269715-3 11/30/17 15:53

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Bromide	40.0	41.4	41.3	104	103	80-120			0	15
Chloride	40.0	40.2	40.2	100	100	80-120			0	15
Sulfate	40.0	41.0	40.9	102	102	80-120			0	15



[L953915-01](#)

L953915-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L953915-01 11/30/17 17:44 • (MS) R3269715-5 11/30/17 18:42 • (MSD) R3269715-6 11/30/17 18:56

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	ND	45.7	46.3	91	93	1	80-120			1	15
Chloride	50.0	9.04	59.8	59.2	102	100	1	80-120			1	15
Sulfate	50.0	6.08	54.5	54.5	97	97	1	80-120			0	15

L954058-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L954058-01 11/30/17 21:49 • (MS) R3269715-8 11/30/17 22:18

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Bromide	50.0	U	44.0	88	1	80-120	
Chloride	50.0	19.6	70.5	102	1	80-120	
Sulfate	50.0	2.87	50.5	95	1	80-120	

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3269662-1 12/01/17 06:43

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Barium	0.00275	U	0.0017	0.00500
Calcium	U		0.0463	1.00
Iron	0.0162	U	0.0141	0.100
Magnesium	0.013	U	0.0111	1.00
Manganese	U		0.0012	0.0100
Potassium	U		0.102	1.00
Sodium	U		0.0985	1.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3269662-2 12/01/17 06:46 • (LCSD) R3269662-3 12/01/17 06:49

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Barium	1.00	1.05	1.04	105	104	80-120			1	20
Calcium	10.0	9.96	9.87	100	99	80-120			1	20
Iron	10.0	10.1	9.99	101	100	80-120			1	20
Magnesium	10.0	10.4	10.3	104	103	80-120			1	20
Manganese	1.00	1.02	1.01	102	101	80-120			1	20
Potassium	10.0	9.96	9.88	100	99	80-120			1	20
Sodium	10.0	9.96	9.82	100	98	80-120			1	20

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L953846-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L953846-02 12/01/17 06:53 • (MS) R3269662-5 12/01/17 06:59 • (MSD) R3269662-6 12/01/17 07:02

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Barium	1.00	0.162	1.18	1.19	102	103	1	75-125			1	20
Calcium	10.0	142	150	149	73	70	1	75-125	V	V	0	20
Iron	10.0	0.0442	9.94	10.0	99	100	1	75-125			1	20
Magnesium	10.0	19.2	29.0	29.0	97	98	1	75-125			0	20
Manganese	1.00	0.0213	1.02	1.03	100	100	1	75-125			1	20
Potassium	10.0	2.58	12.5	12.6	99	100	1	75-125			0	20
Sodium	10.0	11.5	21.1	21.1	96	96	1	75-125			0	20



Method Blank (MB)

(MB) R3270042-1 12/04/17 09:27

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Methane	U		0.00291	0.0100
Ethane	U		0.00407	0.0130
Ethene	U		0.00426	0.0130
Propane	U		0.00548	0.0190

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L953913-09 Original Sample (OS) • Duplicate (DUP)

(OS) L953913-09 12/04/17 10:23 • (DUP) R3270042-2 12/04/17 11:22

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	U	0.000	1	0.000		20
Ethane	U	0.000	1	0.000		20
Ethene	U	0.000	1	0.000		20
Propane	U	0.000	1	0.000		20

L954139-02 Original Sample (OS) • Duplicate (DUP)

(OS) L954139-02 12/04/17 11:53 • (DUP) R3270042-3 12/04/17 12:22

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	0.0341	0.0287	1	17.3		20
Ethane	U	0.000	1	0.000		20
Ethene	U	0.000	1	0.000		20
Propane	U	0.000	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3270042-4 12/04/17 12:25 • (LCSD) R3270042-5 12/04/17 12:29

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Methane	0.0678	0.0693	0.0737	102	109	85.0-115			6.19	20
Ethane	0.129	0.114	0.113	88.1	87.4	85.0-115			0.740	20
Ethene	0.127	0.115	0.114	90.9	90.0	85.0-115			1.01	20
Propane	0.186	0.186	0.183	100	98.5	85.0-115			1.56	20



Method Blank (MB)

(MB) R3269839-3 11/30/17 13:55

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000412	0.00100
Xylenes, Total	U		0.00106	0.00300
<i>(S) Toluene-d8</i>	108			80.0-120
<i>(S) Dibromofluoromethane</i>	91.1			76.0-123
<i>(S) a,a,a-Trifluorotoluene</i>	111			80.0-120
<i>(S) 4-Bromofluorobenzene</i>	102			80.0-120

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3269839-1 11/30/17 12:57 • (LCSD) R3269839-2 11/30/17 13:16

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Benzene	0.0250	0.0211	0.0210	84.5	84.1	69.0-123			0.466	20
Ethylbenzene	0.0250	0.0244	0.0241	97.4	96.6	77.0-120			0.907	20
Toluene	0.0250	0.0244	0.0239	97.5	95.7	77.0-120			1.80	20
Xylenes, Total	0.0750	0.0739	0.0730	98.5	97.3	77.0-120			1.23	20
<i>(S) Toluene-d8</i>				107	108	80.0-120				
<i>(S) Dibromofluoromethane</i>				91.2	90.7	76.0-123				
<i>(S) a,a,a-Trifluorotoluene</i>				112	110	80.0-120				
<i>(S) 4-Bromofluorobenzene</i>				98.5	98.4	80.0-120				

⁷ Gl

⁸ Al

⁹ Sc



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
T8	Sample(s) received past/too close to holding time expiration.
V	The sample concentration is too high to evaluate accurate spike recoveries.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE**.
 * Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Connecticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee ¹⁴	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

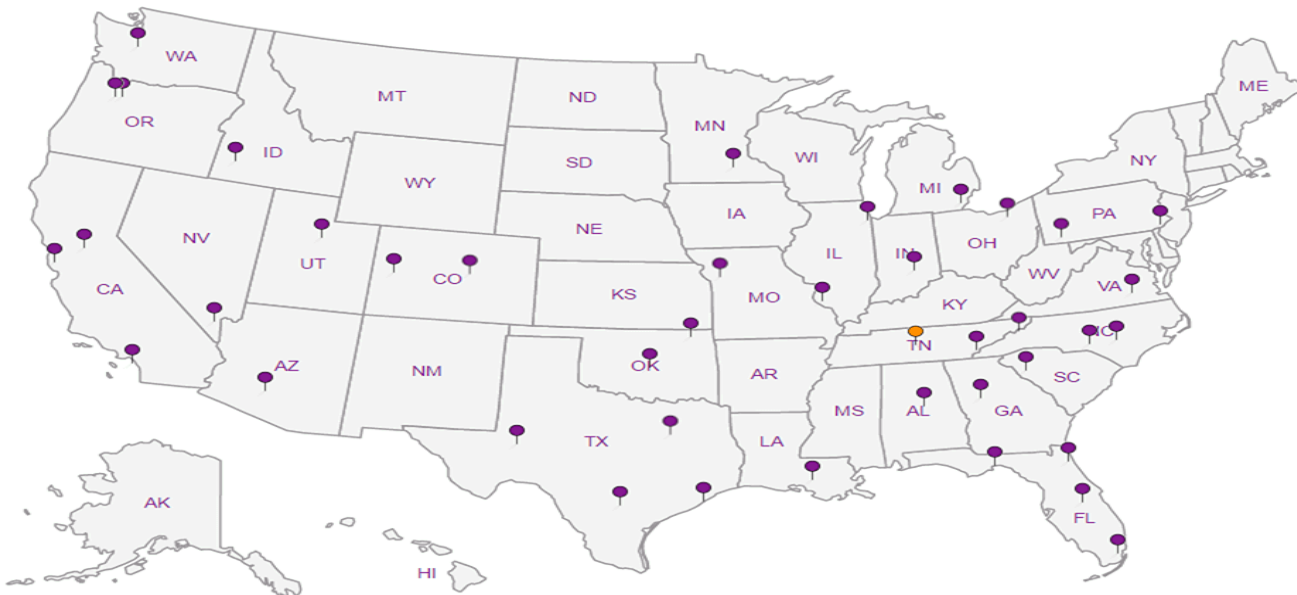
Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ^{n/a} Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. **ESC Lab Sciences performs all testing at our central laboratory.**



¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

GES, Inc. - Sunoco
440 Creamery Way, Suite 500
Exton, PA 19341

Billing Information:
Accounts Payable
440 Creamery Way, Suite 500
Exton, PA 19341

Pres
 Chk

Report to:
Holly Smoker

Email To:
sgrillo@gesonline.com, hsmoker@geso

Project Description:
Pre-Construction Sampling

City/State Collected:
Johnstown PA

Phone: **406-578-4501**
 Fax:

Client Project #
03024730-06-160-XX **SUNGES-GRILLO**

Collected by (print):
Jackie Burke

Site/Facility ID #

Lab Project #

Collected By (signature):
[Signature]
 Immediately Packed on Ice N Y

Rush? (Lab MUST Be Notified)
 Same Day Five Day
 Next Day 5 Day (Rad Only)
 Two Day 10 Day (Rad Only)
 Three Day

Quote #
 Date Results Needed
Standard TAT
 No. of
 Cntrs

Analysis / Container / Preservative

Chain of Custody Page ___ of ___



YOUR LAB OF CHOICE
 12065 Lebanon Rd
 Mount Juliet, TN 37122
 Phone: 615-758-5858
 Phone: 800-767-5859
 Fax: 615-758-5859



L#

1953915

H070

Acctnum: **SUNGES**
 Template: **T126128**
 Prelogin: **P611030**
 TSR: **134 - Mark Beasley**
 PB:
 Shipped Via: **Fedex**

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	**pH,SPCON,TDS,TURB* 250ml plastic NP	ALK, Br, Cl, SO4 250ml plastic NP	Total Mtls, Hardness 250ml plastic HNO3	RSK175 + Propane 40ml vial w/ HCL	TSS 1L plastic NP	V8260BTEX 40ml vial w/ HCL	*****DW COLILERT***** microbiological	*****DW Fecal***** microbiological
11292017-614-01	Grab	DW	-	11-29-17	1255	12	X	X	X	X	X	X	X	X

* Matrix:
 SS - Soil AIR - Air F - Filter
 GW - Groundwater B - Bioassay
 WW - WasteWater
 DW - Drinking Water
 OT - Other

Remarks:
Metals = Ba,Ca,Fe,K,Mg,Mn,Na
*******Log COLILERT & FC as DW matrix*******

pH _____ Temp _____
 Flow _____ Other _____

Samples returned via:
 UPS FedEx Courier

Tracking # **4094 8306 4989**

Sample Receipt Checklist

COC Seal Present/Intact:	Y	N
COC Signed/Accurate:	Y	N
Bottles arrive intact:	Y	N
Correct bottles used:	Y	N
Sufficient volume sent:	Y	N
VGA Zero Headspace:	Y	N
Preservation Correct/Checked:	Y	N

Relinquished by: (Signature)
[Signature]

Date: **11-29-17**
 Time: **1750**

Received by: (Signature)
Fedex 11-29-17 1750

Trip Blank Received: Yes/ No
 HCL / MeOH
 TBR

Relinquished by: (Signature)

Date: _____
 Time: _____

Received by: (Signature)

Temp: **1.8** °C
 Bottles Received: **10**

If preservation required by Login: Date/Time

Relinquished by: (Signature)

Date: _____
 Time: _____

Received for lab by: (Signature)
[Signature]

Date: **11-30-17**
 Time: **8:45**

Hold: _____ Condition: **NCF / OK**

February 14, 2018

GES, Inc - Sunoco

Sample Delivery Group: L968068
Samples Received: 02/07/2018
Project Number: 0204730-06-160-XX
Description: Pre-Construction Sampling

Report To: Stephanie Grillo
440 Creamery Way, Ste 500
Exton, PA 19341

Entire Report Reviewed By:



Mark W. Beasley
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



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SAMPLE SUMMARY



02062018-611-02 L968068-01 GW

Collected by: Key Slocum
 Collected date/time: 02/06/18 15:35
 Received date/time: 02/07/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Microbiology by Method 9222D	WG1071099	1	02/07/18 15:00	02/07/18 15:00	CM
Microbiology by Method 9223 B-1997	WG1070964	1	02/07/18 12:18	02/07/18 12:18	CM
Gravimetric Analysis by Method 2540 C-2011	WG1070986	1	02/08/18 14:44	02/08/18 15:18	BS
Gravimetric Analysis by Method 2540 D-2011	WG1070990	1	02/08/18 14:08	02/08/18 16:17	MMF
Wet Chemistry by Method 130.1	WG1072906	1	02/13/18 11:12	02/13/18 11:12	KK
Wet Chemistry by Method 2130 B-2011	WG1070898	1	02/07/18 11:40	02/07/18 11:40	GB
Wet Chemistry by Method 2320 B-2011	WG1071733	1	02/11/18 16:49	02/11/18 16:49	MCG
Wet Chemistry by Method 9040C	WG1070921	1	02/08/18 09:59	02/08/18 09:59	GB
Wet Chemistry by Method 9050A	WG1071250	1	02/08/18 17:54	02/08/18 17:54	MZ
Wet Chemistry by Method 9056A	WG1070970	1	02/07/18 14:35	02/07/18 14:35	DR
Metals (ICP) by Method 6010B	WG1070846	1	02/07/18 12:24	02/07/18 21:22	ST
Volatile Organic Compounds (GC) by Method RSK175	WG1071252	1	02/08/18 10:54	02/08/18 10:54	BG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1070963	1	02/07/18 18:05	02/07/18 18:05	JHH

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Mark W. Beasley
Technical Service Representative

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Microbiology by Method 9222D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Coliform,fecal	<1		1	02/07/2018 15:00	WG1071099

1 Cp

2 Tc

Microbiology by Method 9223 B-1997

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	<1		1	02/07/2018 12:18	WG1070964
Coliform,Total	<1		1	02/07/2018 12:18	WG1070964

3 Ss

4 Cn

5 Sr

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	192		10.0	1	02/08/2018 15:18	WG1070986

6 Qc

7 Gl

Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	ND		2.50	1	02/08/2018 16:17	WG1070990

8 Al

9 Sc

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	83.1		30.0	1	02/13/2018 11:12	WG1072906

Wet Chemistry by Method 2130 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Turbidity	1.66		0.300	1	02/07/2018 11:40	WG1070898

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Alkalinity	144		20.0	1	02/11/2018 16:49	WG1071733

Sample Narrative:

L968068-01 WG1071733: Endpoint pH 4.5

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.06	<u>T8</u>	1	02/08/2018 09:59	WG1070921

Sample Narrative:

L968068-01 WG1070921: 8.06 at 20.7C

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	323		10.0	1	02/08/2018 17:54	WG1071250



Collected date/time: 02/06/18 15:35

L968068

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	02/07/2018 14:35	WG1070970
Chloride	11.4		1.00	1	02/07/2018 14:35	WG1070970
Sulfate	5.64		5.00	1	02/07/2018 14:35	WG1070970

1 Cp

2 Tc

3 Ss

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	0.531		0.00500	1	02/07/2018 21:22	WG1070846
Calcium	25.7		1.00	1	02/07/2018 21:22	WG1070846
Iron	0.207		0.100	1	02/07/2018 21:22	WG1070846
Magnesium	5.19		1.00	1	02/07/2018 21:22	WG1070846
Manganese	0.0442		0.0100	1	02/07/2018 21:22	WG1070846
Potassium	ND		1.00	1	02/07/2018 21:22	WG1070846
Sodium	38.0		1.00	1	02/07/2018 21:22	WG1070846

4 Cn

5 Sr

6 Qc

7 Gl

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Methane	0.245		0.0100	1	02/08/2018 10:54	WG1071252
Ethane	ND		0.0130	1	02/08/2018 10:54	WG1071252
Ethene	ND		0.0130	1	02/08/2018 10:54	WG1071252
Propane	ND		0.0190	1	02/08/2018 10:54	WG1071252

8 Al

9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	02/07/2018 18:05	WG1070963
Toluene	ND		0.00100	1	02/07/2018 18:05	WG1070963
Ethylbenzene	ND		0.00100	1	02/07/2018 18:05	WG1070963
Total Xylenes	ND		0.00300	1	02/07/2018 18:05	WG1070963
(S) Toluene-d8	113		80.0-120		02/07/2018 18:05	WG1070963
(S) Dibromofluoromethane	99.4		76.0-123		02/07/2018 18:05	WG1070963
(S) <i>o,o</i> -Trifluorotoluene	107		80.0-120		02/07/2018 18:05	WG1070963
(S) 4-Bromofluorobenzene	98.6		80.0-120		02/07/2018 18:05	WG1070963



Method Blank (MB)

(MB) R3285443-1 02/08/18 15:18

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Dissolved Solids	U		2.82	10.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

L968189-03 Original Sample (OS) • Duplicate (DUP)

(OS) L968189-03 02/08/18 15:18 • (DUP) R3285443-4 02/08/18 15:18

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Dissolved Solids	2290	2200	1	3.79		5

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3285443-2 02/08/18 15:18 • (LCSD) R3285443-3 02/08/18 15:18

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Dissolved Solids	8800	8720	8670	99.1	98.5	85.0-115			0.575	5

⁷ Gl

⁸ Al

⁹ Sc



Method Blank (MB)

(MB) R3285473-1 02/08/18 16:17

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Suspended Solids	U		0.350	2.50

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L968093-01 Original Sample (OS) • Duplicate (DUP)

(OS) L968093-01 02/08/18 16:17 • (DUP) R3285473-4 02/08/18 16:17

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	1350	1320	1	2.63		5

L968113-01 Original Sample (OS) • Duplicate (DUP)

(OS) L968113-01 02/08/18 16:17 • (DUP) R3285473-5 02/08/18 16:17

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	80.6	77.6	1	3.72		5

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3285473-2 02/08/18 16:17 • (LCSD) R3285473-3 02/08/18 16:17

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Suspended Solids	773	760	792	98.3	102	85.0-115			4.12	5



Method Blank (MB)

(MB) R3285890-1 02/13/18 11:01

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Hardness (colorimetric) as CaCO3	4.24	<u>J</u>	1.43	30.0

¹ Cp

² Tc

³ Ss

L968029-03 Original Sample (OS) • Duplicate (DUP)

(OS) L968029-03 02/13/18 11:03 • (DUP) R3285890-4 02/13/18 11:04

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Hardness (colorimetric) as CaCO3	58.8	51.2	1	13.8		20

⁴ Cn

⁵ Sr

⁶ Qc

L968120-02 Original Sample (OS) • Duplicate (DUP)

(OS) L968120-02 02/13/18 11:18 • (DUP) R3285890-7 02/13/18 11:27

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Hardness (colorimetric) as CaCO3	140	146	1	4.2		20

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3285890-2 02/13/18 11:01 • (LCSD) R3285890-3 02/13/18 11:02

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Hardness (colorimetric) as CaCO3	150	139	139	92.7	92.7	85-115			0	20

L968029-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L968029-06 02/13/18 11:06 • (MS) R3285890-5 02/13/18 11:07 • (MSD) R3285890-6 02/13/18 11:08

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Hardness (colorimetric) as CaCO3	150	57.9	165	164	71.4	70.7	1	80-120	<u>J6</u>	<u>J6</u>	0.608	20



Method Blank (MB)

(MB) R3284630-1 02/07/18 11:40

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Turbidity	0.0580	↓	0.0310	0.300

1 Cp

2 Tc

3 Ss

L967996-01 Original Sample (OS) • Duplicate (DUP)

(OS) L967996-01 02/07/18 11:40 • (DUP) R3284630-4 02/07/18 11:40

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Turbidity	10.8	11.0	1	1.83		20

4 Cn

5 Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3284630-2 02/07/18 11:40 • (LCSD) R3284630-3 02/07/18 11:40

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Turbidity	40.0	42.2	42.3	106	106	90.0-110			0.237	20

6 Qc

7 Gl

8 Al

9 Sc



L968273-07 Original Sample (OS) • Duplicate (DUP)

(OS) L968273-07 02/11/18 15:49 • (DUP) R3285542-1 02/11/18 15:55

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	405	405	1	0.180		20

Sample Narrative:

OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L968563-01 Original Sample (OS) • Duplicate (DUP)

(OS) L968563-01 02/11/18 21:13 • (DUP) R3285542-6 02/11/18 21:20

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	161	163	1	1.65		20

Sample Narrative:

OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3285542-5 02/11/18 16:57 • (LCSD) R3285542-7 02/11/18 21:27

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Alkalinity	100	99.9	101	99.9	101	85.0-115			1.36	20

Sample Narrative:

LCS: Endpoint pH 4.5
LCSD: Endpoint pH 4.5



L967831-02 Original Sample (OS) • Duplicate (DUP)

(OS) L967831-02 02/08/18 09:59 • (DUP) R3284857-3 02/08/18 09:59

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.11	7.11	1	0.000		1

Sample Narrative:

OS: 7.11 at 20.8C
DUP: 7.11 at 20.8C

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

L968337-01 Original Sample (OS) • Duplicate (DUP)

(OS) L968337-01 02/08/18 09:59 • (DUP) R3284857-4 02/08/18 09:59

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.48	7.47	1	0.134		1

Sample Narrative:

OS: 7.48 at 15.6C
DUP: 7.47 at 15.7C

6 Qc

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3284857-1 02/08/18 09:59 • (LCSD) R3284857-2 02/08/18 09:59

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
pH	6.38	6.34	6.35	99.4	99.5	98.4-102			0.158	1

Sample Narrative:

LCS: 6.34 at 19.4C
LCSD: 6.35 at 19.4C



Method Blank (MB)

(MB) WG1071250-1 02/08/18 17:54

Analyte	MB Result umhos/cm	MB Qualifier	MB MDL umhos/cm	MB RDL umhos/cm
Specific Conductance	U		10.0	10.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L968068-01 Original Sample (OS) • Duplicate (DUP)

(OS) L968068-01 02/08/18 17:54 • (DUP) WG1071250-4 02/08/18 17:54

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Specific Conductance	323	323	1	0.000		20

L968735-01 Original Sample (OS) • Duplicate (DUP)

(OS) L968735-01 02/08/18 17:54 • (DUP) WG1071250-5 02/08/18 17:54

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Specific Conductance	40200	40300	1	0.248		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG1071250-2 02/08/18 17:54 • (LCSD) WG1071250-3 02/08/18 17:54

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCSD Result umhos/cm	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Specific Conductance	559	560	560	100	100	85.0-115			0.000	20



Method Blank (MB)

(MB) R3284778-1 02/07/18 12:48

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Bromide	U		0.079	1.00
Chloride	U		0.0519	1.00
Sulfate	U		0.0774	5.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L968077-02 Original Sample (OS) • Duplicate (DUP)

(OS) L968077-02 02/07/18 15:32 • (DUP) R3284778-4 02/07/18 16:15

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	ND	0.263	1	0		15
Chloride	7.84	7.88	1	0.485		15
Sulfate	7.10	6.75	1	5.06		15

L968210-01 Original Sample (OS) • Duplicate (DUP)

(OS) L968210-01 02/07/18 20:06 • (DUP) R3284778-7 02/07/18 20:20

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0		15
Chloride	10.6	10.5	1	0.445		15
Sulfate	20.8	20.7	1	0.543		15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3284778-2 02/07/18 13:02 • (LCSD) R3284778-3 02/07/18 13:17

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Bromide	40.0	40.0	40.0	99.9	100	80-120			0.0558	15
Chloride	40.0	39.7	39.7	99.2	99.2	80-120			0.0184	15
Sulfate	40.0	40.1	40.0	100	100	80-120			0.187	15



[L968068-01](#)

L968077-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L968077-02 02/07/18 15:32 • (MS) R3284778-5 02/07/18 16:30 • (MSD) R3284778-6 02/07/18 16:44

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	ND	49.0	50.2	97.5	99.9	1	80-120			2.45	15
Chloride	50.0	7.84	58.1	58.2	100	101	1	80-120			0.292	15
Sulfate	50.0	7.10	57.5	57.1	101	100	1	80-120			0.7	15

L968210-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L968210-01 02/07/18 20:06 • (MS) R3284778-8 02/07/18 20:35

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Bromide	50.0	ND	48.9	97.9	1	80-120	
Chloride	50.0	10.6	61.1	101	1	80-120	
Sulfate	50.0	20.8	70.6	99.5	1	80-120	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc



Method Blank (MB)

(MB) R3284781-1 02/07/18 21:12

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Barium	U		0.0017	0.00500
Calcium	U		0.0463	1.00
Iron	U		0.0141	0.100
Magnesium	U		0.0111	1.00
Manganese	U		0.0012	0.0100
Potassium	U		0.102	1.00
Sodium	U		0.0985	1.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3284781-2 02/07/18 21:15 • (LCSD) R3284781-3 02/07/18 21:18

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Barium	1.00	1.00	1.02	100	102	80-120			1.47	20
Calcium	10.0	9.58	9.70	95.8	97	80-120			1.21	20
Iron	10.0	9.60	9.72	96	97.2	80-120			1.16	20
Magnesium	10.0	10.0	10.1	100	101	80-120			1	20
Manganese	1.00	0.956	0.970	95.6	97	80-120			1.43	20
Potassium	10.0	9.50	9.61	95	96.1	80-120			1.15	20
Sodium	10.0	9.60	9.66	96	96.6	80-120			0.658	20

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L968068-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L968068-01 02/07/18 21:22 • (MS) R3284781-5 02/07/18 21:28 • (MSD) R3284781-6 02/07/18 21:31

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Barium	1.00	0.531	1.53	1.53	99.4	99.8	1	75-125			0.213	20
Calcium	10.0	25.7	35.4	35.5	97.8	97.9	1	75-125			0.0338	20
Iron	10.0	0.207	9.93	10.0	97.3	98.1	1	75-125			0.807	20
Magnesium	10.0	5.19	15.1	15.2	99.1	100	1	75-125			0.615	20
Manganese	1.00	0.0442	1.01	1.01	97	97.1	1	75-125			0.059	20
Potassium	10.0	ND	10.4	10.5	95.9	96.4	1	75-125			0.475	20
Sodium	10.0	38.0	46.5	47.0	84.9	90.2	1	75-125			1.14	20



Method Blank (MB)

(MB) R3284889-1 02/08/18 09:44

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Methane	U		0.00291	0.0100
Ethane	U		0.00407	0.0130
Ethene	U		0.00426	0.0130
Propane	U		0.00548	0.0190

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L968080-01 Original Sample (OS) • Duplicate (DUP)

(OS) L968080-01 02/08/18 11:31 • (DUP) R3284889-2 02/08/18 11:49

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	ND	0.000	1	0.000		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

L968347-01 Original Sample (OS) • Duplicate (DUP)

(OS) L968347-01 02/08/18 11:59 • (DUP) R3284889-3 02/08/18 13:39

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	0.0572	0.0576	1	0.727		20
Ethane	U	0.000	1	0.000		20
Ethene	U	0.000	1	0.000		20
Propane	U	0.000	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3284889-4 02/08/18 13:42 • (LCSD) R3284889-5 02/08/18 13:48

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Methane	0.0678	0.0717	0.0681	106	101	85.0-115			5.15	20
Ethane	0.129	0.111	0.112	86.3	86.9	85.0-115			0.722	20
Ethene	0.127	0.115	0.115	90.2	90.7	85.0-115			0.548	20
Propane	0.186	0.184	0.185	98.9	99.7	85.0-115			0.801	20



Method Blank (MB)

(MB) R3284675-2 02/07/18 13:04

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000412	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	116			80.0-120
(S) Dibromofluoromethane	99.7			76.0-123
(S) a,a,a-Trifluorotoluene	109			80.0-120
(S) 4-Bromofluorobenzene	82.5			80.0-120

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

Laboratory Control Sample (LCS)

(LCS) R3284675-1 02/07/18 12:24

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.0250	0.0204	81.8	69.0-123	
Ethylbenzene	0.0250	0.0283	113	77.0-120	
Toluene	0.0250	0.0260	104	77.0-120	
Xylenes, Total	0.0750	0.0884	118	77.0-120	
(S) Toluene-d8			111	80.0-120	
(S) Dibromofluoromethane			98.5	76.0-123	
(S) a,a,a-Trifluorotoluene			108	80.0-120	
(S) 4-Bromofluorobenzene			93.8	80.0-120	

7 Gl

8 Al

9 Sc



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
T8	Sample(s) received past/too close to holding time expiration.



ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey-NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Connecticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio-VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee ¹⁴	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

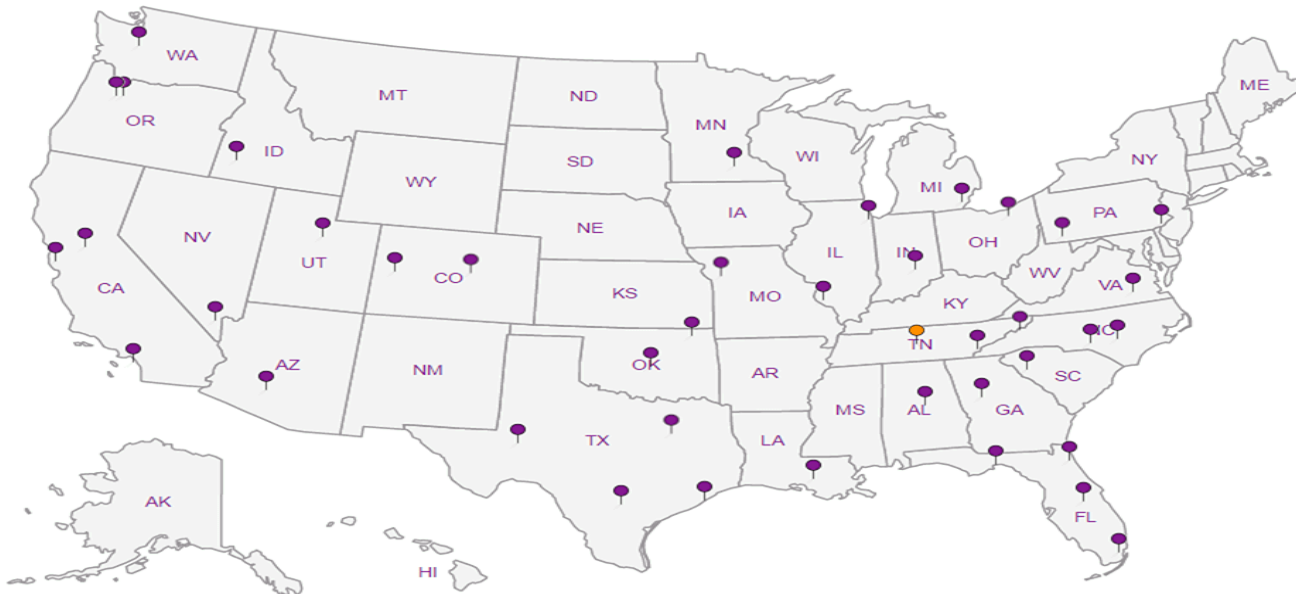
Third Party Federal Accreditations



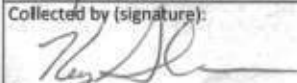
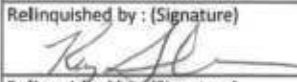
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA-Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold n/a Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. ESC Lab Sciences performs all testing at our central laboratory.



GES, Inc. - Sunoco		Billing Information:		Analysis / Container / Preservative										Chain of Custody Page <u> </u> of <u> </u>											
440 Creamery Way, Suite 500 Exton, PA 19341		Accounts Payable 440 Creamery Way, Suite 500 Exton, PA 19341		<div style="float: right; text-align: right;">Pres Chk <u> </u></div> <div style="float: right; text-align: right;">  <p>12065 Lebanon Rd Mount Juliet, TN 37122 Phone: 615-758-5858 Phone: 800-767-5859 Fax: 615-758-5859</p> </div>										 <p>YOUR LAB OF CHOICE</p>											
Report to: Holly Smoker		Email To: sgrillo@gesonline.com, hsmoker@geso		<div style="float: right; text-align: right;">L# <u> </u></div> <div style="float: right; text-align: right;"> <p>F197</p> </div>										<p>Acctnum: SUNGES Template: T126128 Prelogin: P611030 TSR: 134 - Mark Beasley PB: <u> </u></p>											
Project Description: Pre-Construction Sampling		City/State <u>Johnstown PA</u> Collected: <u>Summer Hill PA</u>																						Shipped Via:	
Phone: 406-578-4501	Client Project # <u>0204730</u>	Lab Project # SUNGES-GRILLO																						Remarks	
Fax:	<u>06-160-XX</u>	P.O. #												Sample # (lab only)											
Collected by (print): <u>Key Slocum</u>	Site/Facility ID #	Quote #												<u> </u>											
Collected by (signature): 	Rush? (Lab MUST Be Notified)	Date Results Needed																							
Immediately Packed on Ice N <u> </u> Y <u>X</u>	<u> </u> Same Day <u> </u> Five Day <u> </u> Next Day <u> </u> 5 Day (Rad Only) <u> </u> Two Day <u> </u> 10 Day (Rad Only) <u> </u> Three Day	Standard TAT																							
Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	**pH,SPCON,TDS,TURB* 250ml plastic NP	ALK, Br, Cl, SO4 250ml plastic NP	Total Mtls, Hardness 250ml plastic HNO3	RSK175 + Propane 40ml vial w/ HCL	TSS 1L plastic NP	V8260BTEX 40ml vial w/ HCL	****DW COLILERT**** microbiological	****DW Fecal**** microbiological											
<u>02062018-611-02</u>	<u>Grab</u>	<u>DW</u>	<u>/</u>	<u>2/6/18</u>	<u>1535</u>	<u>12</u>	X	X	X	X	X	X	X	X	<u> </u>										
* Matrix:		Remarks:												Sample Receipt Checklist											
SS - Soil AIR - Air F - Filter GW - Groundwater B - Bioassay WW - WasteWater DW - Drinking Water OT - Other		Metals = Ba,Ca,Fe,K,Mg,Mn,Na ****Log COLILERT & FC as DW matrix****												<p>pH _____ Temp _____</p> <p>Flow _____ Other _____</p> <p>VOA Zero HeadSpace: <u> </u> <u> </u> <u> </u></p> <p>Preservation Correct/Checked: <u> </u> <u> </u> <u> </u></p>											
Samples returned via: <u> </u> UPS <u> </u> FedEx <u> </u> Courier <u> </u>		Tracking # <u>7474 0935 9110</u>												<p>COC Seal Present/Intact: <u> </u> <u> </u> <u> </u></p> <p>COC Signed/Accurate: <u> </u> <u> </u> <u> </u></p> <p>Bottles arrive intact: <u> </u> <u> </u> <u> </u></p> <p>Correct bottles used: <u> </u> <u> </u> <u> </u></p> <p>Sufficient volume sent: <u> </u> <u> </u> <u> </u></p> <p>IF Applicable</p>											
Relinquished by: (Signature) 	Date: <u>2/6/18</u>	Time: <u>1700</u>	Received by: (Signature) <u>FedEx</u>	Date: <u>2/6/18</u>		Time: <u>1700</u>		Trip Blank Received: Yes (No) HCL/MeOH TBR		Temp: <u>1.2</u>		Bottles Received: <u>12</u>		If preservation required by Login: Date/Time											
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:		Time:		Hold:		Date: <u>2-7-18</u>		Time: <u>0845</u>		Condition: NCF <u>1 OK</u>											

February 21, 2018

GES, Inc - Sunoco

Sample Delivery Group: L970013
Samples Received: 02/14/2018
Project Number: 0204730-06-160-XX
Description: Pre-Construction Sampling

Report To: Stephanie Grillo
440 Creamery Way, Ste 500
Exton, PA 19341

Entire Report Reviewed By:



Mark W. Beasley
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



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SAMPLE SUMMARY



02132018-629-01 L970013-01 GW

Collected by Robert Faccenda	Collected date/time 02/13/18 13:40	Received date/time 02/14/18 08:45
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Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Microbiology by Method 9222D	WG1073511	1	02/14/18 13:34	02/14/18 13:34	KMR
Microbiology by Method 9223 B-1997	WG1073509	1	02/14/18 13:25	02/14/18 13:25	KMR
Gravimetric Analysis by Method 2540 C-2011	WG1073646	1	02/15/18 18:28	02/15/18 18:51	BS
Gravimetric Analysis by Method 2540 D-2011	WG1073642	1	02/15/18 14:32	02/15/18 15:41	MMF
Wet Chemistry by Method 130.1	WG1075083	1	02/19/18 12:50	02/19/18 12:50	KK
Wet Chemistry by Method 2130 B-2011	WG1073395	1	02/14/18 11:38	02/14/18 11:38	EEM
Wet Chemistry by Method 2320 B-2011	WG1073463	1	02/15/18 12:27	02/15/18 12:27	MCG
Wet Chemistry by Method 9040C	WG1073457	1	02/15/18 11:17	02/15/18 11:17	EEM
Wet Chemistry by Method 9050A	WG1073239	1	02/15/18 09:12	02/15/18 09:12	TH
Wet Chemistry by Method 9056A	WG1073451	1	02/14/18 19:46	02/14/18 19:46	DR
Metals (ICP) by Method 6010B	WG1073466	1	02/14/18 16:01	02/14/18 20:39	CCE
Volatile Organic Compounds (GC) by Method RSK175	WG1074047	1	02/16/18 11:04	02/16/18 11:04	BG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1073750	1	02/15/18 05:59	02/15/18 05:59	BMB

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Mark W. Beasley
Technical Service Representative

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Microbiology by Method 9222D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Coliform,fecal	<1		1	02/14/2018 13:34	WG1073511

1 Cp

2 Tc

Microbiology by Method 9223 B-1997

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	<1		1	02/14/2018 13:25	WG1073509
Coliform,Total	7.50		1	02/14/2018 13:25	WG1073509

3 Ss

4 Cn

5 Sr

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	123		10.0	1	02/15/2018 18:51	WG1073646

6 Qc

7 Gl

Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	ND		2.50	1	02/15/2018 15:41	WG1073642

8 Al

9 Sc

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	121		30.0	1	02/19/2018 12:50	WG1075083

Wet Chemistry by Method 2130 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Turbidity	3.72		0.300	1	02/14/2018 11:38	WG1073395

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Alkalinity	100		20.0	1	02/15/2018 12:27	WG1073463

Sample Narrative:

L970013-01 WG1073463: Endpoint pH 4.5

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.20	<u>T8</u>	1	02/15/2018 11:17	WG1073457

Sample Narrative:

L970013-01 WG1073457: 7.2 at 18.2C

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	256		10.0	1	02/15/2018 09:12	WG1073239



Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	02/14/2018 19:46	WG1073451
Chloride	9.96		1.00	1	02/14/2018 19:46	WG1073451
Sulfate	10.3		5.00	1	02/14/2018 19:46	WG1073451

1 Cp

2 Tc

3 Ss

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	0.228		0.00500	1	02/14/2018 20:39	WG1073466
Calcium	31.0		1.00	1	02/14/2018 20:39	WG1073466
Iron	1.80		0.100	1	02/14/2018 20:39	WG1073466
Magnesium	7.65		1.00	1	02/14/2018 20:39	WG1073466
Manganese	0.255		0.0100	1	02/14/2018 20:39	WG1073466
Potassium	ND		1.00	1	02/14/2018 20:39	WG1073466
Sodium	6.69		1.00	1	02/14/2018 20:39	WG1073466

4 Cn

5 Sr

6 Qc

7 Gl

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Methane	0.0889		0.0100	1	02/16/2018 11:04	WG1074047
Ethane	ND		0.0130	1	02/16/2018 11:04	WG1074047
Ethene	ND		0.0130	1	02/16/2018 11:04	WG1074047
Propane	ND		0.0190	1	02/16/2018 11:04	WG1074047

8 Al

9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	02/15/2018 05:59	WG1073750
Toluene	ND		0.00100	1	02/15/2018 05:59	WG1073750
Ethylbenzene	ND		0.00100	1	02/15/2018 05:59	WG1073750
Total Xylenes	ND		0.00300	1	02/15/2018 05:59	WG1073750
(S) Toluene-d8	102		80.0-120		02/15/2018 05:59	WG1073750
(S) Dibromofluoromethane	94.2		76.0-123		02/15/2018 05:59	WG1073750
(S) a,a,a-Trifluorotoluene	96.2		80.0-120		02/15/2018 05:59	WG1073750
(S) 4-Bromofluorobenzene	107		80.0-120		02/15/2018 05:59	WG1073750



Method Blank (MB)

(MB) R3287179-1 02/15/18 18:51

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Dissolved Solids	U		2.82	10.0

1 Cp

2 Tc

3 Ss

4 Cn

L970002-16 Original Sample (OS) • Duplicate (DUP)

(OS) L970002-16 02/15/18 18:51 • (DUP) R3287179-4 02/15/18 18:51

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Dissolved Solids	640	650	1	1.55		5

5 Sr

6 Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3287179-2 02/15/18 18:51 • (LCSD) R3287179-3 02/15/18 18:51

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Dissolved Solids	8800	8560	8470	97.3	96.3	85.0-115			1.06	5

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3287147-1 02/15/18 15:41

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Suspended Solids	U		0.350	2.50

1 Cp

2 Tc

3 Ss

4 Cn

L969948-03 Original Sample (OS) • Duplicate (DUP)

(OS) L969948-03 02/15/18 15:41 • (DUP) R3287147-4 02/15/18 15:41

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	1830	1770	1	3.33		5

5 Sr

6 Qc

L969971-01 Original Sample (OS) • Duplicate (DUP)

(OS) L969971-01 02/15/18 15:41 • (DUP) R3287147-5 02/15/18 15:41

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	269	267	1	0.995		5

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3287147-2 02/15/18 15:41 • (LCSD) R3287147-3 02/15/18 15:41

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Suspended Solids	773	748	760	96.8	98.3	85.0-115			1.59	5



Method Blank (MB)

(MB) R3287336-1 02/19/18 12:38

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Hardness (colorimetric) as CaCO3	U		1.43	30.0

¹ Cp

² Tc

³ Ss

⁴ Cn

L969973-01 Original Sample (OS) • Duplicate (DUP)

(OS) L969973-01 02/19/18 12:44 • (DUP) R3287336-4 02/19/18 12:45

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Hardness (colorimetric) as CaCO3	68.9	64.5	1	6.6		20

⁵ Sr

⁶ Qc

L970221-02 Original Sample (OS) • Duplicate (DUP)

(OS) L970221-02 02/19/18 12:52 • (DUP) R3287336-5 02/19/18 12:53

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Hardness (colorimetric) as CaCO3	194	193	1	0.517		20

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3287336-2 02/19/18 12:38 • (LCSD) R3287336-3 02/19/18 12:39

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Hardness (colorimetric) as CaCO3	150	157	151	105	101	85-115			3.9	20

L970309-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L970309-01 02/19/18 12:55 • (MS) R3287336-6 02/19/18 12:58 • (MSD) R3287336-7 02/19/18 12:59

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Hardness (colorimetric) as CaCO3	150	71.0	189	187	78.7	77.3	1	80-120	<u>J6</u>	<u>J6</u>	1.06	20



Method Blank (MB)

(MB) R3286240-1 02/14/18 11:38

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Turbidity	0.0530	↓	0.0310	0.300

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3286240-2 02/14/18 11:38 • (LCSD) R3286240-3 02/14/18 11:38

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Turbidity	40.0	42.3	42.3	106	106	90.0-110			0.000	20

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc



[L970013-01](#)

L969700-01 Original Sample (OS) • Duplicate (DUP)

(OS) L969700-01 02/15/18 09:00 • (DUP) R3286830-1 02/15/18 09:08

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	mg/l	mg/l		%		%
Alkalinity	547	559	1	2.06		20

Sample Narrative:

OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

L970013-01 Original Sample (OS) • Duplicate (DUP)

(OS) L970013-01 02/15/18 12:27 • (DUP) R3286830-7 02/15/18 12:35

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	mg/l	mg/l		%		%
Alkalinity	100	100	1	0.0962		20

Sample Narrative:

OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

6 Qc

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3286830-5 02/15/18 10:24 • (LCSD) R3286830-6 02/15/18 11:36

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Alkalinity	mg/l	mg/l	mg/l	%	%	%			%	%
Alkalinity	100	98.2	100	98.2	100	85.0-115			1.99	20

Sample Narrative:

LCS: Endpoint pH 4.5
LCSD: Endpoint pH 4.5



L969947-01 Original Sample (OS) • Duplicate (DUP)

(OS) L969947-01 02/15/18 11:17 • (DUP) R3286589-3 02/15/18 11:17

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
su	su			%		%
pH	7.17	7.19	1	0.279		1

Sample Narrative:

OS: 7.17 at 19.2C

DUP: 7.19 at 19.2C

L970416-01 Original Sample (OS) • Duplicate (DUP)

(OS) L970416-01 02/15/18 11:17 • (DUP) R3286589-4 02/15/18 11:17

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
su	su			%		%
pH	8.22	8.23	1	0.122		1

Sample Narrative:

OS: 8.22 at 13.5C

DUP: 8.23 at 13.8C

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3286589-1 02/15/18 11:17 • (LCSD) R3286589-2 02/15/18 11:17

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
su	su	su	su	%	%	%			%	%
pH	6.38	6.39	6.39	100	100	98.4-102			0.000	1

Sample Narrative:

LCS: 6.39 at 20.4C

LCSD: 6.39 at 20.4C

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) WG1073239-1 02/15/18 09:12

Analyte	MB Result umhos/cm	MB Qualifier	MB MDL umhos/cm	MB RDL umhos/cm
Specific Conductance	U		10.0	10.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L969129-01 Original Sample (OS) • Duplicate (DUP)

(OS) L969129-01 02/15/18 09:12 • (DUP) WG1073239-4 02/15/18 09:12

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Specific Conductance	599	600	1	0.167		20

L970013-01 Original Sample (OS) • Duplicate (DUP)

(OS) L970013-01 02/15/18 09:12 • (DUP) WG1073239-5 02/15/18 09:12

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Specific Conductance	256	257	1	0.390		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG1073239-2 02/15/18 09:12 • (LCSD) WG1073239-3 02/15/18 09:12

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCSD Result umhos/cm	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Specific Conductance	559	557	558	99.6	99.8	85.0-115			0.179	20



Method Blank (MB)

(MB) R3286722-1 02/14/18 11:07

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Bromide	U		0.079	1.00
Chloride	U		0.0519	1.00
Sulfate	U		0.0774	5.00

L969947-01 Original Sample (OS) • Duplicate (DUP)

(OS) L969947-01 02/14/18 16:03 • (DUP) R3286722-4 02/14/18 16:13

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	ND	0.237	1	200	J P1	15
Chloride	1.62	1.68	1	3.24		15
Sulfate	9.44	9.94	1	5.23		15

L970013-01 Original Sample (OS) • Duplicate (DUP)

(OS) L970013-01 02/14/18 19:46 • (DUP) R3286722-7 02/14/18 19:57

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	ND	0.258	1	9.88	J	15
Chloride	9.96	11.0	1	10.2		15
Sulfate	10.3	11.0	1	6.93		15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3286722-2 02/14/18 11:18 • (LCSD) R3286722-3 02/14/18 11:28

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Bromide	40.0	40.1	40.1	100	100	80-120			0.079	15
Chloride	40.0	39.6	39.7	99.1	99.2	80-120			0.0918	15
Sulfate	40.0	39.3	39.3	98.3	98.3	80-120			0.0249	15

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



[L970013-01](#)

L969947-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L969947-01 02/14/18 16:03 • (MS) R3286722-5 02/14/18 16:24 • (MSD) R3286722-6 02/14/18 16:35

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	ND	46.3	50.3	92.6	101	1	80-120			8.29	15
Chloride	50.0	1.62	52.3	52.6	101	102	1	80-120			0.465	15
Sulfate	50.0	9.44	60.8	60.5	103	102	1	80-120			0.45	15

L970013-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L970013-01 02/14/18 19:46 • (MS) R3286722-8 02/14/18 20:08

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Bromide	50.0	ND	46.2	91.9	1	80-120	
Chloride	50.0	9.96	60.1	100	1	80-120	
Sulfate	50.0	10.3	61.4	102	1	80-120	

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc



[L970013-01](#)

Method Blank (MB)

(MB) R3286470-1 02/14/18 20:11

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Barium	U		0.0017	0.00500
Calcium	U		0.0463	1.00
Iron	U		0.0141	0.100
Magnesium	U		0.0111	1.00
Manganese	U		0.0012	0.0100
Potassium	U		0.102	1.00
Sodium	U		0.0985	1.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3286470-2 02/14/18 20:13 • (LCSD) R3286470-3 02/14/18 20:15

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Barium	1.00	1.02	1.03	102	103	80-120			0.603	20
Calcium	10.0	9.78	9.74	97.8	97.4	80-120			0.404	20
Iron	10.0	9.80	9.76	98	97.6	80-120			0.373	20
Magnesium	10.0	10.2	10.3	102	103	80-120			1.03	20
Manganese	1.00	0.982	0.994	98.2	99.4	80-120			1.23	20
Potassium	10.0	9.61	9.63	96.1	96.3	80-120			0.197	20
Sodium	10.0	10.0	10.0	100	100	80-120			0.347	20

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L970155-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L970155-04 02/14/18 20:18 • (MS) R3286470-5 02/14/18 20:23 • (MSD) R3286470-6 02/14/18 20:25

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Barium	1.00	0.00977	1.02	1.03	101	102	1	75-125			1.38	20
Calcium	10.0	90.2	98.9	98.5	87.1	82.8	1	75-125			0.437	20
Iron	10.0	0.0373	9.60	9.72	95.6	96.9	1	75-125			1.34	20
Magnesium	10.0	3.35	13.3	13.3	99.2	99.6	1	75-125			0.301	20
Manganese	1.00	0.0141	0.989	1.01	97.5	99.4	1	75-125			1.87	20
Potassium	10.0	1.91	12.0	11.6	101	97	1	75-125			3.18	20
Sodium	10.0	28.6	38.7	38.0	101	94.7	1	75-125			1.61	20



Method Blank (MB)

(MB) R3286906-1 02/16/18 09:37

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Methane	U		0.00291	0.0100
Ethane	U		0.00407	0.0130
Ethene	U		0.00426	0.0130
Propane	U		0.00548	0.0190

L969976-01 Original Sample (OS) • Duplicate (DUP)

(OS) L969976-01 02/16/18 10:58 • (DUP) R3286906-2 02/16/18 11:33

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	ND	0.000	1	0.000		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

L970047-07 Original Sample (OS) • Duplicate (DUP)

(OS) L970047-07 02/16/18 11:39 • (DUP) R3286906-3 02/16/18 12:25

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	0.439	0.435	1	0.826		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3286906-4 02/16/18 12:28 • (LCSD) R3286906-5 02/16/18 13:23

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Methane	0.0678	0.0671	0.0731	98.9	108	85.0-115			8.53	20
Ethane	0.129	0.113	0.113	87.5	87.5	85.0-115			0.00160	20
Ethene	0.127	0.116	0.116	91.4	91.3	85.0-115			0.148	20
Propane	0.186	0.185	0.183	99.7	98.6	85.0-115			1.08	20

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3287429-2 02/15/18 03:25

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000412	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	104			80.0-120
(S) Dibromofluoromethane	96.5			76.0-123
(S) a,a,a-Trifluorotoluene	98.2			80.0-120
(S) 4-Bromofluorobenzene	102			80.0-120

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

Laboratory Control Sample (LCS)

(LCS) R3287429-1 02/15/18 02:47

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.0250	0.0254	102	69.0-123	
Ethylbenzene	0.0250	0.0260	104	77.0-120	
Toluene	0.0250	0.0259	104	77.0-120	
Xylenes, Total	0.0750	0.0779	104	77.0-120	
(S) Toluene-d8			103	80.0-120	
(S) Dibromofluoromethane			94.6	76.0-123	
(S) a,a,a-Trifluorotoluene			98.9	80.0-120	
(S) 4-Bromofluorobenzene			109	80.0-120	

6 Qc

7 Gl

8 Al

9 Sc



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
 * Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey-NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Connecticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio-VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee ¹⁴	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

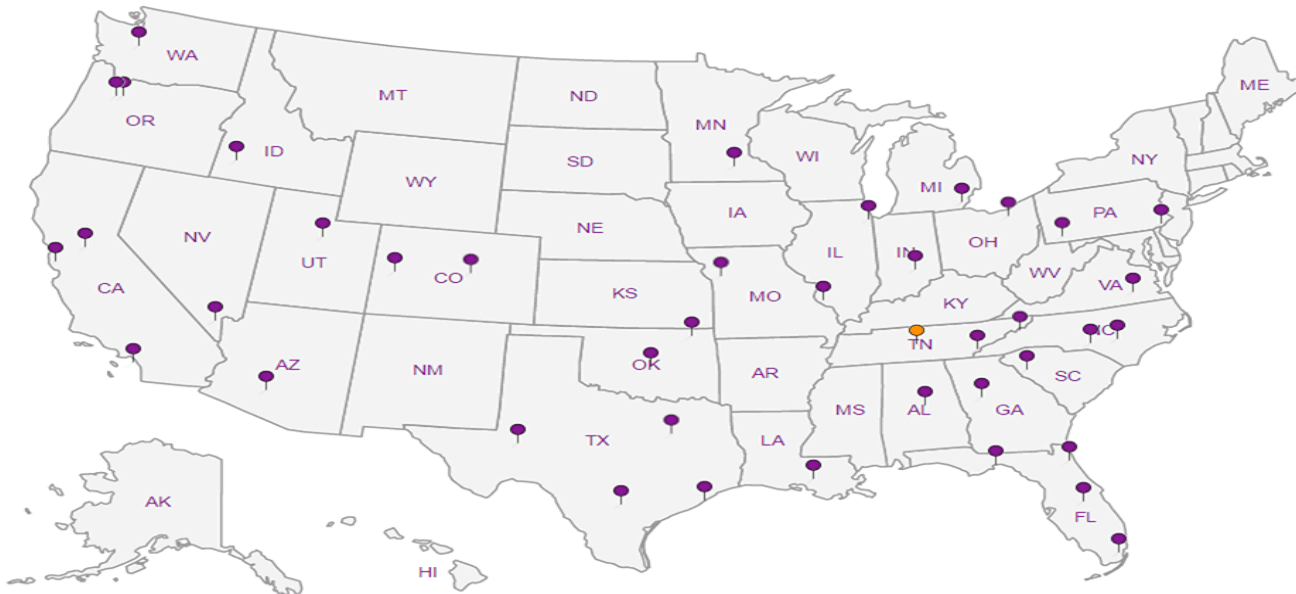
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA-Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold n/a Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. ESC Lab Sciences performs all testing at our central laboratory.



February 09, 2018

Ms. Holly Smoker
Groundwater & Environmental Services, Inc.
(Exton)
1500 Sycamore Road
Suite 340
Montoursville, PA 17754

RE: Project: 0350
Pace Project No.: 30242467

Dear Ms. Smoker:

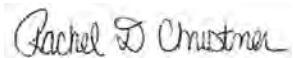
Enclosed are the analytical results for sample(s) received by the laboratory on January 23, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

The samples were subcontracted to EAG Laboratories, 810 Kifer Road, Sunnydale, CA 94086 for XRD. Results of the analysis are reported on the EAG data tables.

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

Sincerely,



Rachel Christner
rachel.christner@pacelabs.com
724-850-5611
Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

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February 09, 2018
Page 2

cc: Mr. David Demko, GES (Exton)
Ms. Stephanie Grillo, Groundwater & Environmental
Services, Inc.
Lab Reports, Groundwater & Environmental Services Inc
(Exton)



REPORT OF LABORATORY ANALYSIS

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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.

Section A
Required Client Information:
 Company: GES, Inc.
 Address: 440 Creamery Way Suite 500
 Exton, PA 19341
 Email To: hsmoker@gesonline.com
 Phone: 610-458-1077 3067 Fax:
 Requested Due Date/TAT: 5 Day

Section B
Required Project Information:
 Report To: Holly Smoker
 Copy To:
 Purchase Order No.: N/A, #C0HWV995
 Project Name: 0350
 Project Number: 0201130 -06-160; ORG 1402

Section C
Invoice Information:
 Attention: ges-invoices@gesonline.com
 Company Name: GES, Inc.
 Address: 440 Creamery Way, Suite 500, Exton,
 Pace Quote Reference: N/A
 Pace Project Manager: Justin Hall
 Pace Profile #:

REGULATORY AGENCY
 NPDES GROUND WATER DRINKING WATER
 UST RCRA OTHER _____
 Site Location: PA
 STATE: PA

ITEM #	Section D Required Client Information	Valid Matrix Codes MATRIX CODE DRINKING WATER DW WATER WT WASTE WATER WW PRODUCT P SOIL/SOLID SL OIL OL WIPE WP AIR AR OTHER OT TISSUE TS	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED		# OF CONTAINERS	Preservatives H ₂ SO ₄ HNO ₃ HCl NaOH Na ₂ S ₂ O ₃ Methanol Other	Requested Analysis Filtered (Y/N)	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
					COMPOSITE START	COMPOSITE END/GRAB							
1	01222018 039+02		WT G	G	DATE: 1/22/18 1455	TIME: 1455	1	Unpreserved	X				
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													

ADDITIONAL COMMENTS
 Relinquished by / Affiliation: Alison Emmans
 Date: 01/22/18 1630
 Time: 1630
 Accepted by / Affiliation: Fed Ex
 Date: 01/22/18 1630
 Time: 1630

SAMPLER NAME AND SIGNATURE
 PRINT Name of SAMPLER: Alison Emmans
 SIGNATURE of SAMPLER: Alison Emmans
 DATE Signed (MM/DD/YY): 01/22/18

**X-RAY DIFFRACTION (XRD)
ANALYSIS REPORT
09 Feb 2018**

**JOB NUMBER C0JYS324
PO NUMBER**

for

Rachel Christner
Pace Analytical Services, Inc.
1638 Roseytown Rd
Suite 3
Greensburg, PA 15601

Prepared by:



Bich Nguyen
Scientist, XRD Services
(Tel. 408-530-3834; bnguyen@eag.com)

Reviewed by:



William R. Woerner, Ph.D.
Scientist
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EAG Laboratories
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Sunnyvale, CA 94086-5203 USA

Requester: Rachel Christner
 Job Number: C0JYS324
 Analysis Date: 08 Feb 2018

X-RAY DIFFRACTION ANALYSIS REPORT

Purpose: Use X-ray diffraction to identify the phases present in a water sample with particular emphasis on the presence of bentonite. The sample was identified as 01222018-639-02.

Summary:

Best Matches from the ICDD/ICSD data bases

Sample ID	Primary Phases	Possible Trace Phases
Sample 01222018-639-02 (Top part)	Ca(CO ₃) – Calcite Hexagonal, S.G.: R-3c (167) PDF# 04-006-6528	Si – Silicon ?? Cubic, S.G.: Fd-3m (227) PDF# 00-005-0565
Sample 01222018-639-02 (Bottom part)	Ca(CO ₃) – Calcite Hexagonal, S.G.: R-3c (167) PDF# 04-006-6528	Ca(SO ₄)(H ₂ O) _{0.5} - Bassanite Monoclinic, S.G.: C2 (5) PDF# 01-078-8131 CaPO ₃ (OH).2H ₂ O – Brushite ?? Monoclinic, S.G.: Ia (9) PDF# 00-011-0293

Results and Interpretations: The water sample was transferred into a beaker and settled for one day. Water from the top of this sample (which should contain the highest concentration of clay minerals) was pipetted onto a special zero-background sample holder and dried using a hot plate. More water was added until the sample surface was fully covered with solid material. This sample is identified in this report as the oriented sample because the clay minerals will tend to align with the c-axis perpendicular to the surface. In order to check whether any other phases were present in the sample, the bottom part of the settled sample was also collected and was prepared as the same way as the top part. Both samples were mounted onto a diffractometer for analysis. XRD data was collected by a coupled Theta:2-Theta scan on a Rigaku Ultima-III diffractometer equipped with copper X-ray tube with Ni beta filter, parafocusing optics, computer-controlled slits, and D/teX Ultra 1D strip detector.

[Figure 1a](#) and [Figure 1b](#) shows the best matches obtained by comparing the background-subtracted experimental data to the ICDD/ICSD diffraction database. Intensity was displayed in square root (counts) to overemphasize the weaker peaks. Calcite is the major phase in both patterns of the sample. Silicon trace phase was observed in the top part while bassanite and brushite appear to be present in the bottom part of the sample. However, a single matching

peak for these trace phases could be considered as speculative matches. No clay minerals were detected in this sample.

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<http://www.eag.com/main-survey.html?job=C0JYS324>

If you would like to run further analyses on samples like those for which you have just received data, please click here: <http://www.eag.com/customer-portal.html> to generate a new job number and reserve your place in our queue. A customer service representative will contact you to confirm details with you soon after you fill out the short form.

For your other analytical needs please click here: <http://www.eag.com/mc/contact-us-mc.html>

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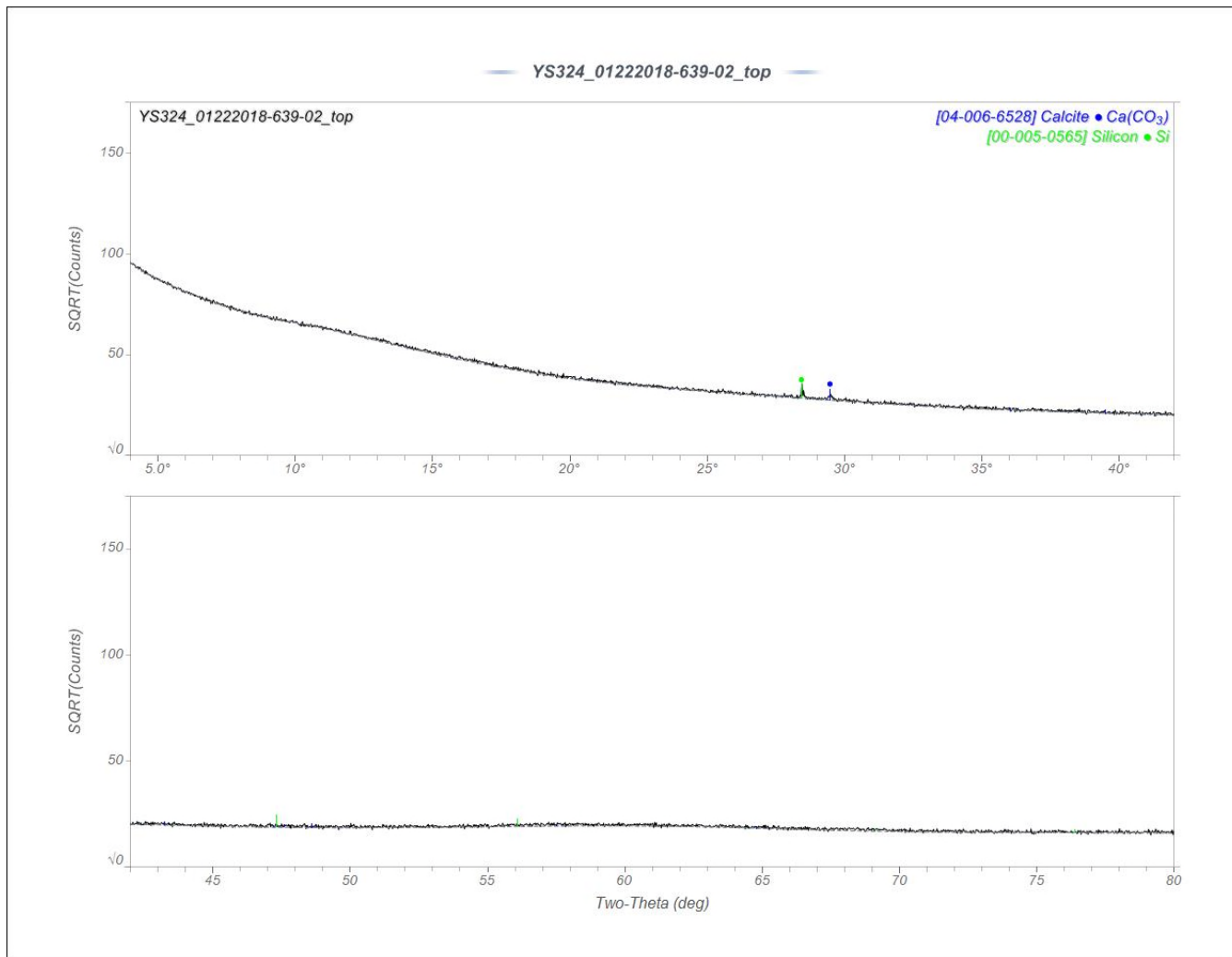


Figure 1a: Phase identification for the top part of sample (01222018-639-02)

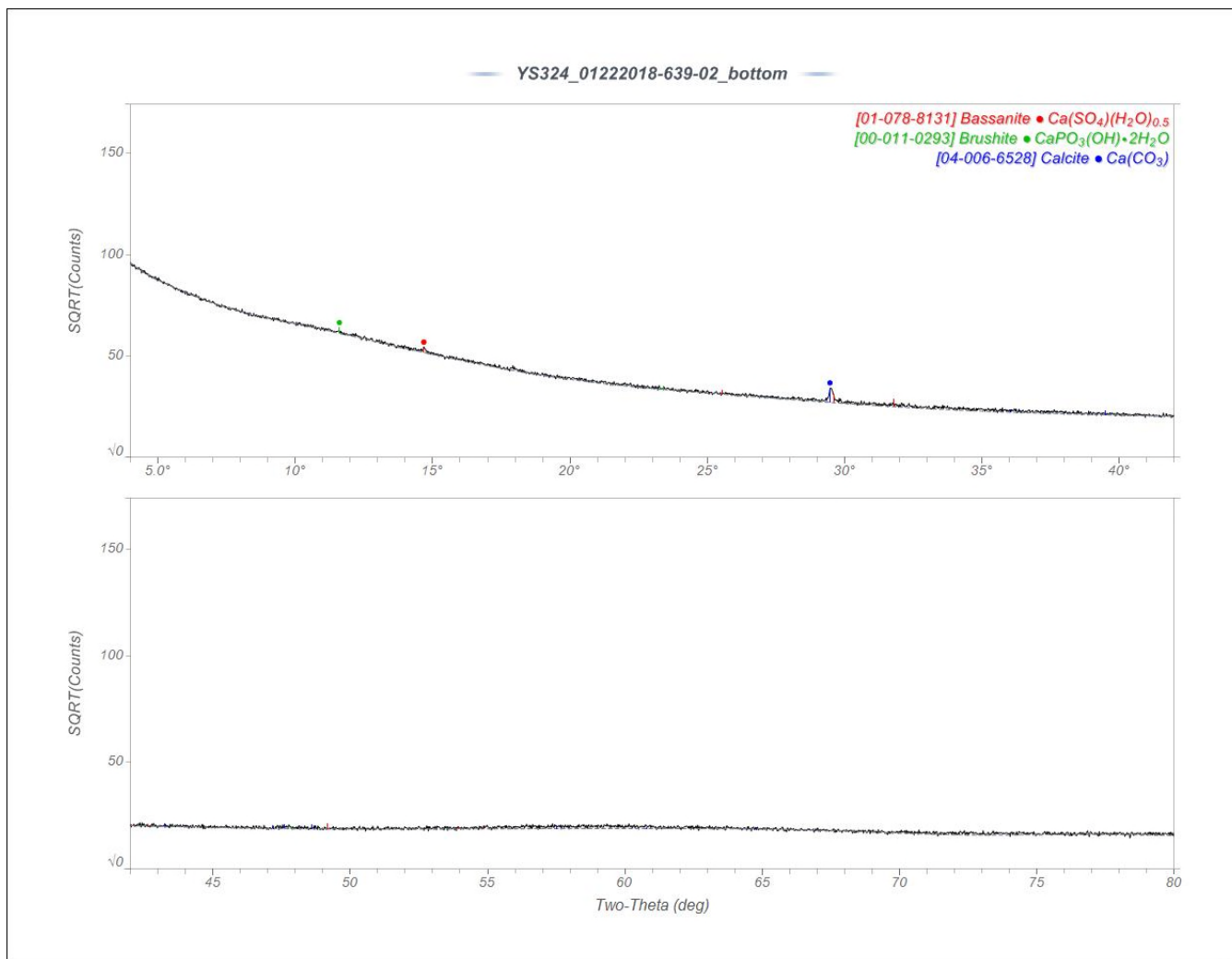


Figure 1b: Phase identification for the bottom part of sample (01222018-639-02)

Appendix

Measurement Uncertainty:

There are two types of uncertainty in XRD analysis; uncertainty in the number of X-ray counts at a particular angle and uncertainty in the diffraction angle. Because the arrival of X-ray quanta in the detector is random with respect to time, the accuracy of X-ray counting rate measurements is governed by the laws of probability. In particular, the size of the one sigma standard deviation in an X-ray measurement is equal to the square root of the number of X-rays counted. A conservative criterion for the detection of a weak peak in a XRD pattern must have amplitude of greater than three standard deviations above background. As a result, the more slowly a measurement is made, the lower the relative standard deviation in the number of counts measured and the more likely is detection of trace diffraction peaks. If X-ray data is acquired at a constant speed, the relative standard deviation for the major diffraction peaks in a pattern will be on the order of a few percent or less while the relative standard deviation for the weaker peaks in a pattern will be on the order of tens of percent or more. This also implies that the uncertainty in the concentrations of the major phases in a sample will be lower than for the trace phases. Please note that there are a number of sample related factors that can influence peak intensity. These include (but are not limited to): average crystallite size, preferred orientation (texture), strain, and absorption.

Uncertainty in the position of X-ray diffraction peaks is due to both instrumental and sample effects. Instrumental position uncertainty is primarily due to diffractometer misalignment. Repeat measurements of NIST standard reference materials has shown that the maximum positional uncertainty is less than +/- 0.05 degrees 2-Theta and is typically much less than that. Positional uncertainty due to sample effects are related to sample displacement (displacement of the sample surface either above or below the diffractometer focusing circle) and sample transparency (the effect gets larger as the sample matrix becomes more transparent to the incident X-rays. Through careful sample preparation, the uncertainty due to these two sample effects should be less than +/- 0.03 degrees 2-Theta. Please note that in addition to these factors, solid solution effects, where one element is partially substituted for another within a given crystal structure, can produce significant shifts in measured peak positions. Unlike sample and instrumental peak position effects, solid solution effects can result in phase misidentification.

CHAIN-OF-CUSTODY / Analytical Request Document

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



Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: GES, Inc.	Report To: Holly Smoker	Attention: ges-invoices@gesonline.com
Address: 440 Creamery Way Suite 500	Copy To:	Company Name: GES, Inc.
Exton, PA 19341	Purchase Order No.: N/A, #C0HWV995	Address: 440 Creamery Way, Suite 500, Exton,
Email To: hsmoker@gesonline.com	Project Name: 0350	RCRA <input type="checkbox"/> UST <input type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER
Phone: 610-458-1077 3067 Fax:	Project Number: 0201132 -06-160; ORG 1402	RCRA <input type="checkbox"/> UST <input type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER
Requested Due Date/TAT: 5 Day		Site Location STATE: PA

ITEM #	Section D Required Client Information	Valid Matrix Codes MATRIX CODE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED		# OF CONTAINERS	Preservatives	Requested Analysis Filtered (Y/N)	Pace Project No./ Lab I.D.
					COMPOSITE START	COMPOSITE END/GRAB				
1	01222018039+02	DW WT WW P SL OL WP AR OT TS	WT G	G	DATE: 1/22/18	TIME: 1455	1	H ₂ O ₄ HNO ₃ HCl NaOH Na ₂ S ₂ O ₃ Methanol Other	X	N
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Alison Emmans	01/22/18	1630	FedEx	01/22/18	1630	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)	
	Steph B. Roberts/EA	1/23/18	1045				Y	Y	Y	

*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. F-ALL-Q-020rev.06, 2-Feb-2007

January 26, 2018

GES, Inc - Sunoco

Sample Delivery Group: L964724
Samples Received: 01/23/2018
Project Number: 0204730-06-160-XX
Description: Pre-Construction Sampling

Report To: Stephanie Grillo
440 Creamery Way, Ste 500
Exton, PA 19341

Entire Report Reviewed By:



Olivia Studebaker
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



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SAMPLE SUMMARY



01222018-639-02 L964724-01 GW

Collected by: Alison Emmons
 Collected date/time: 01/22/18 14:55
 Received date/time: 01/23/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Microbiology by Method 9222D	WG1065983	1	01/23/18 11:35	01/23/18 11:35	BGE
Microbiology by Method 9223 B-1997	WG1065555	1	01/23/18 11:17	01/23/18 11:17	SMK
Gravimetric Analysis by Method 2540 C-2011	WG1065489	1	01/23/18 14:31	01/23/18 15:03	MMF
Gravimetric Analysis by Method 2540 D-2011	WG1065484	1	01/23/18 15:17	01/23/18 16:10	MMF
Wet Chemistry by Method 130.1	WG1065387	1	01/24/18 14:43	01/24/18 14:43	KK
Wet Chemistry by Method 2130 B-2011	WG1065356	1	01/23/18 10:50	01/23/18 10:50	ER
Wet Chemistry by Method 2320 B-2011	WG1065260	1	01/23/18 15:44	01/23/18 15:44	MCG
Wet Chemistry by Method 9040C	WG1065355	1	01/23/18 11:00	01/23/18 11:00	ER
Wet Chemistry by Method 9050A	WG1065362	1	01/23/18 15:23	01/23/18 15:23	MA
Wet Chemistry by Method 9056A	WG1065413	1	01/23/18 15:46	01/23/18 15:46	MAJ
Metals (ICP) by Method 6010B	WG1065194	1	01/23/18 10:10	01/23/18 13:07	TRB
Volatile Organic Compounds (GC) by Method RSK175	WG1065664	1	01/24/18 11:12	01/24/18 11:12	BG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1065432	1	01/23/18 14:49	01/23/18 14:49	DWR

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Olivia Studebaker
Technical Service Representative

- ¹ Cp
- ² Tc
- ³ Ss
- ⁴ Cn
- ⁵ Sr
- ⁶ Qc
- ⁷ Gl
- ⁸ Al
- ⁹ Sc

Sample Narrative

FC test was confirmed to be positive for both fecal coliform and E. coli. BE 1/26/18



Microbiology by Method 9222D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Coliform,fecal	1.00		1	01/23/2018 11:35	WG1065983

1 Cp

2 Tc

Microbiology by Method 9223 B-1997

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	8.60	P1	1	01/23/2018 11:17	WG1065555
Coliform,Total	>2419.6		1	01/23/2018 11:17	WG1065555

3 Ss

4 Cn

5 Sr

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	61.0		10.0	1	01/23/2018 15:03	WG1065489

6 Qc

7 Gl

Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	ND		2.50	1	01/23/2018 16:10	WG1065484

8 Al

9 Sc

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	45.0		30.0	1	01/24/2018 14:43	WG1065387

Wet Chemistry by Method 2130 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Turbidity	2.17		0.300	1	01/23/2018 10:50	WG1065356

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Alkalinity	25.5		20.0	1	01/23/2018 15:44	WG1065260

Sample Narrative:

L964724-01 WG1065260: Endpoint pH 4.5

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.38	T8	1	01/23/2018 11:00	WG1065355

Sample Narrative:

L964724-01 WG1065355: 7.38 at 10C

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	112		10.0	1	01/23/2018 15:23	WG1065362



Collected date/time: 01/22/18 14:55

L964724

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	01/23/2018 15:46	WG1065413
Chloride	2.27		1.00	1	01/23/2018 15:46	WG1065413
Sulfate	17.5		5.00	1	01/23/2018 15:46	WG1065413

1 Cp

2 Tc

3 Ss

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	0.0203		0.00500	1	01/23/2018 13:07	WG1065194
Calcium	13.2		1.00	1	01/23/2018 13:07	WG1065194
Iron	0.172	B	0.100	1	01/23/2018 13:07	WG1065194
Magnesium	3.31		1.00	1	01/23/2018 13:07	WG1065194
Manganese	0.0292		0.0100	1	01/23/2018 13:07	WG1065194
Potassium	2.04		1.00	1	01/23/2018 13:07	WG1065194
Sodium	2.98		1.00	1	01/23/2018 13:07	WG1065194

4 Cn

5 Sr

6 Qc

7 Gl

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Methane	ND		0.0100	1	01/24/2018 11:12	WG1065664
Ethane	ND		0.0130	1	01/24/2018 11:12	WG1065664
Ethene	ND		0.0130	1	01/24/2018 11:12	WG1065664
Propane	ND		0.0190	1	01/24/2018 11:12	WG1065664

8 Al

9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	01/23/2018 14:49	WG1065432
Toluene	ND		0.00100	1	01/23/2018 14:49	WG1065432
Ethylbenzene	ND		0.00100	1	01/23/2018 14:49	WG1065432
Total Xylenes	0.00311		0.00300	1	01/23/2018 14:49	WG1065432
(S) Toluene-d8	102		80.0-120		01/23/2018 14:49	WG1065432
(S) Dibromofluoromethane	104		76.0-123		01/23/2018 14:49	WG1065432
(S) a,a,a-Trifluorotoluene	97.9		80.0-120		01/23/2018 14:49	WG1065432
(S) 4-Bromofluorobenzene	108		80.0-120		01/23/2018 14:49	WG1065432



Method Blank (MB)

(MB) R3281575-1 01/23/18 15:03

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Dissolved Solids	U		2.82	10.0

1 Cp

2 Tc

3 Ss

4 Cn

L964752-04 Original Sample (OS) • Duplicate (DUP)

(OS) L964752-04 01/23/18 15:03 • (DUP) R3281575-4 01/23/18 15:03

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Dissolved Solids	170	177	1	4.03		5

5 Sr

6 Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3281575-2 01/23/18 15:03 • (LCSD) R3281575-3 01/23/18 15:03

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Dissolved Solids	8800	8560	8580	97.3	97.5	85.0-115			0.233	5

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3281397-1 01/23/18 16:10

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Suspended Solids	U		0.350	2.50

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L964716-01 Original Sample (OS) • Duplicate (DUP)

(OS) L964716-01 01/23/18 16:10 • (DUP) R3281397-4 01/23/18 16:10

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	58.0	58.0	1	0.000		5

L964737-01 Original Sample (OS) • Duplicate (DUP)

(OS) L964737-01 01/23/18 16:10 • (DUP) R3281397-5 01/23/18 16:10

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	18.0	17.4	1	3.39		5

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3281397-2 01/23/18 16:10 • (LCSD) R3281397-3 01/23/18 16:10

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Suspended Solids	773	812	784	105	101	85.0-115			3.51	5



Method Blank (MB)

(MB) R3281549-1 01/24/18 14:32

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	1.81	J	1.43	30.0

1 Cp

2 Tc

3 Ss

L964683-01 Original Sample (OS) • Duplicate (DUP)

(OS) L964683-01 01/24/18 14:35 • (DUP) R3281549-4 01/24/18 14:36

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	103	102	1	0.976		20

4 Cn

5 Sr

6 Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3281549-2 01/24/18 14:33 • (LCSD) R3281549-3 01/24/18 14:34

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	150	149	147	99.3	98	85-115			1.35	20

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3281081-1 01/23/18 10:50

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Turbidity	0.0530	↓	0.0310	0.300

1 Cp

2 Tc

3 Ss

L964721-01 Original Sample (OS) • Duplicate (DUP)

(OS) L964721-01 01/23/18 10:50 • (DUP) R3281081-4 01/23/18 10:50

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Turbidity	10.3	10.2	1	0.976		20

4 Cn

5 Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3281081-2 01/23/18 10:50 • (LCSD) R3281081-3 01/23/18 10:50

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Turbidity	40.0	42.7	42.7	107	107	90.0-110			0.000	20

6 Qc

7 Gl

8 Al

9 Sc



L964711-01 Original Sample (OS) • Duplicate (DUP)

(OS) L964711-01 01/23/18 13:29 • (DUP) R3281351-1 01/23/18 13:36

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	649	659	1	1.55		20

Sample Narrative:

OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

L964781-01 Original Sample (OS) • Duplicate (DUP)

(OS) L964781-01 01/23/18 15:50 • (DUP) R3281351-5 01/23/18 15:56

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	38.1	38.7	1	1.52		20

Sample Narrative:

OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

6 Qc

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3281351-2 01/23/18 14:40 • (LCSD) R3281351-6 01/23/18 16:35

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Alkalinity	100	107	105	107	105	85.0-115			2.46	20

Sample Narrative:

LCS: Endpoint pH 4.5
LCSD: Endpoint pH 4.5



L964708-01 Original Sample (OS) • Duplicate (DUP)

(OS) L964708-01 01/23/18 11:00 • (DUP) R3281091-3 01/23/18 11:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.35	7.38	1	0.407		1

Sample Narrative:

OS: 7.35 at 12.2C
DUP: 7.38 at 11.9C

L964790-01 Original Sample (OS) • Duplicate (DUP)

(OS) L964790-01 01/23/18 11:00 • (DUP) R3281091-4 01/23/18 11:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	6.77	6.78	1	0.148		1

Sample Narrative:

OS: 6.77 at 10.8C
DUP: 6.78 at 10.8C

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3281091-1 01/23/18 11:00 • (LCSD) R3281091-2 01/23/18 11:00

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
pH	6.38	6.34	6.33	99.4	99.2	98.4-102			0.158	1

Sample Narrative:

LCS: 6.34 at 16.2C
LCSD: 6.33 at 16.2C

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) WG1065362-1 01/23/18 15:23

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Specific Conductance	U		10.0	10.0

¹ Cp

² Tc

³ Ss

L964735-01 Original Sample (OS) • Duplicate (DUP)

(OS) L964735-01 01/23/18 15:23 • (DUP) WG1065362-4 01/23/18 15:23

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Specific Conductance	491	490	1	0.204		20

⁴ Cn

⁵ Sr

⁶ Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG1065362-2 01/23/18 15:23 • (LCSD) WG1065362-3 01/23/18 15:23

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Specific Conductance	559	561	559	100	100	85.0-115			0.357	20

⁷ Gl

⁸ Al

⁹ Sc



Method Blank (MB)

(MB) R3281316-1 01/23/18 06:42

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Bromide	U		0.079	1.00
Chloride	U		0.0519	1.00
Sulfate	U		0.0774	5.00

L964722-01 Original Sample (OS) • Duplicate (DUP)

(OS) L964722-01 01/23/18 14:52 • (DUP) R3281316-4 01/23/18 15:05

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0		15
Chloride	7.61	7.52	1	1.23		15
Sulfate	7.16	7.16	1	0.00419		15

L964752-02 Original Sample (OS) • Duplicate (DUP)

(OS) L964752-02 01/23/18 20:14 • (DUP) R3281316-7 01/23/18 20:27

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	U	0.000	1	0		15
Chloride	3.73	3.59	1	3.82		15
Sulfate	6.56	6.71	1	2.15		15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3281316-2 01/23/18 06:56 • (LCSD) R3281316-3 01/23/18 07:09

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Bromide	40.0	39.5	39.5	98.7	98.8	80-120			0.0932	15
Chloride	40.0	39.6	39.5	99	98.8	80-120			0.182	15
Sulfate	40.0	39.7	39.8	99.3	99.5	80-120			0.195	15

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



[L964724-01](#)

L964722-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L964722-01 01/23/18 14:52 • (MS) R3281316-5 01/23/18 15:19 • (MSD) R3281316-6 01/23/18 15:32

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	ND	67.5	76.6	135	153	1	80-120	<u>J5</u>	<u>J5</u>	12.6	15
Chloride	50.0	7.61	76.6	85.7	138	156	1	80-120	<u>J5</u>	<u>J5</u>	11.2	15
Sulfate	50.0	7.16	76.5	85.5	139	157	1	80-120	<u>J5</u>	<u>J5</u>	11.1	15

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

L964752-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L964752-02 01/23/18 20:14 • (MS) R3281316-8 01/23/18 20:41

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Bromide	50.0	U	48.0	96.1	1	80-120	
Chloride	50.0	3.73	53.6	99.8	1	80-120	
Sulfate	50.0	6.56	56.4	99.7	1	80-120	



Method Blank (MB)

(MB) R3281146-8 01/23/18 13:33

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Barium	U		0.0017	0.00500
Calcium	U		0.0463	1.00
Iron	0.0348	⌵	0.0141	0.100
Magnesium	U		0.0111	1.00
Manganese	U		0.0012	0.0100
Potassium	U		0.102	1.00
Sodium	0.176	⌵	0.0985	1.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3281146-3 01/23/18 11:53 • (LCSD) R3281146-4 01/23/18 11:55

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Barium	1.00	1.08	1.07	108	107	80-120			0.165	20
Calcium	10.0	10.5	10.5	105	105	80-120			0.482	20
Iron	10.0	10.7	10.7	107	107	80-120			0.241	20
Magnesium	10.0	10.9	10.8	109	108	80-120			0.6	20
Manganese	1.00	1.03	1.03	103	103	80-120			0.225	20
Potassium	10.0	10.4	10.5	104	105	80-120			0.75	20
Sodium	10.0	10.5	10.5	105	105	80-120			0.559	20

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L964622-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L964622-05 01/23/18 11:58 • (MS) R3281146-6 01/23/18 12:03 • (MSD) R3281146-7 01/23/18 12:05

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Barium	1.00	0.0455	1.13	1.12	108	108	1	75-125			0.352	20
Calcium	10.0	151	156	158	56.2	67.2	1	75-125	⌵	⌵	0.702	20
Iron	10.0	0.628	11.3	11.4	107	108	1	75-125			0.333	20
Magnesium	10.0	34.2	43.7	44.4	94.3	101	1	75-125			1.58	20
Manganese	1.00	1.54	2.53	2.52	99.4	98.5	1	75-125			0.349	20
Potassium	10.0	9.30	19.7	19.8	104	105	1	75-125			0.625	20
Sodium	10.0	133	139	140	62.1	72.7	1	75-125	⌵	⌵	0.758	20



Method Blank (MB)

(MB) R3281449-1 01/24/18 09:37

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Methane	U		0.00291	0.0100
Ethane	U		0.00407	0.0130
Ethene	U		0.00426	0.0130
Propane	U		0.00548	0.0190

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L964711-01 Original Sample (OS) • Duplicate (DUP)

(OS) L964711-01 01/24/18 11:00 • (DUP) R3281449-2 01/24/18 11:24

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	ND	0.000	1	0.000		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3281449-3 01/24/18 11:29 • (LCSD) R3281449-4 01/24/18 11:32

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Methane	0.0678	0.0727	0.0756	107	111	85.0-115			3.85	20
Ethane	0.129	0.113	0.117	87.8	90.9	85.0-115			3.43	20
Ethene	0.127	0.116	0.120	91.6	94.4	85.0-115			2.97	20
Propane	0.186	0.184	0.193	99.0	104	85.0-115			4.71	20



Method Blank (MB)

(MB) R3281381-3 01/23/18 11:45

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000412	0.00100
Xylenes, Total	U		0.00106	0.00300
<i>(S) Toluene-d8</i>	99.8			80.0-120
<i>(S) Dibromofluoromethane</i>	102			76.0-123
<i>(S) a,a,a-Trifluorotoluene</i>	99.0			80.0-120
<i>(S) 4-Bromofluorobenzene</i>	105			80.0-120

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3281381-1 01/23/18 10:38 • (LCSD) R3281381-2 01/23/18 10:55

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	0.0250	0.0234	0.0240	93.8	96.0	69.0-123			2.37	20
Ethylbenzene	0.0250	0.0243	0.0250	97.1	99.9	77.0-120			2.78	20
Toluene	0.0250	0.0235	0.0240	94.0	95.9	77.0-120			1.93	20
Xylenes, Total	0.0750	0.0726	0.0744	96.8	99.2	77.0-120			2.45	20
<i>(S) Toluene-d8</i>				99.8	102	80.0-120				
<i>(S) Dibromofluoromethane</i>				99.9	102	76.0-123				
<i>(S) a,a,a-Trifluorotoluene</i>				102	99.6	80.0-120				
<i>(S) 4-Bromofluorobenzene</i>				106	102	80.0-120				

7 Gl

8 Al

9 Sc



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc

Qualifier	Description
B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.
V	The sample concentration is too high to evaluate accurate spike recoveries.



ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
 * Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey-NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Connecticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio-VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee ^{1,4}	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

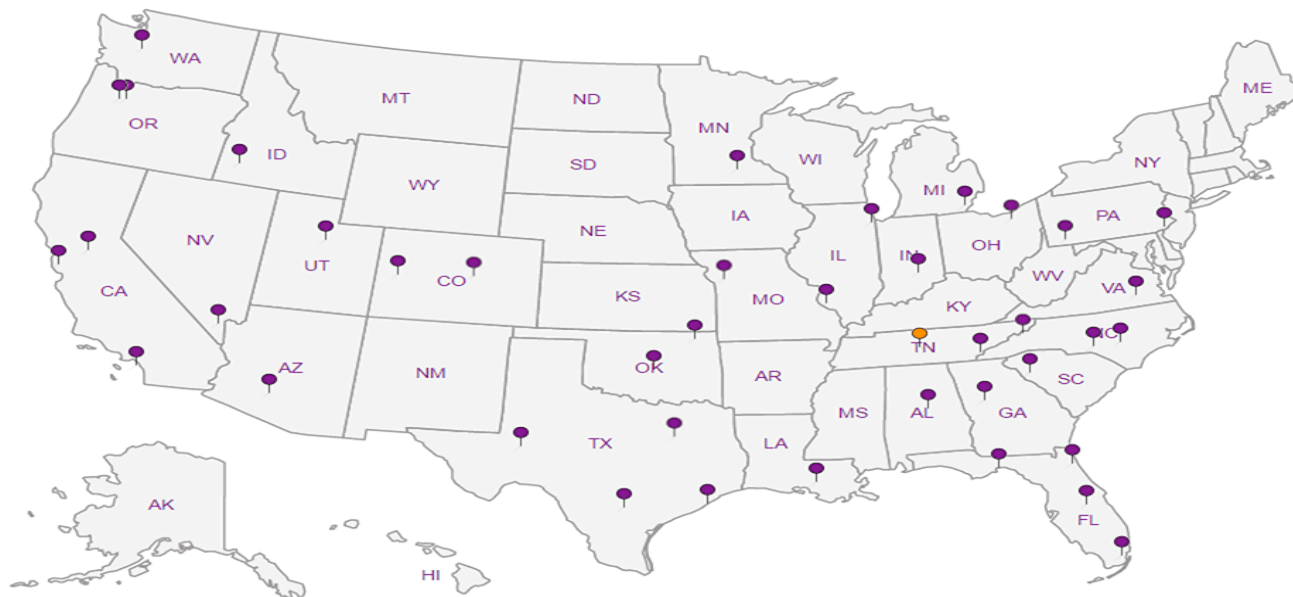
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA-Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold n/a Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. ESC Lab Sciences performs all testing at our central laboratory.



February 09, 2018

Ms. Holly Smoker
Groundwater & Environmental Services, Inc.
(Exton)
1500 Sycamore Road
Suite 340
Montoursville, PA 17754

RE: Project: 0350
Pace Project No.: 30242465

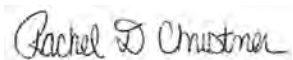
Dear Ms. Smoker:

Enclosed are the analytical results for sample(s) received by the laboratory on January 23, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

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

Sincerely,



Rachel Christner
rachel.christner@pacelabs.com
724-850-5611
Project Manager

Enclosures

cc: Mr. David Demko, GES (Exton)
Ms. Stephanie Grillo, Groundwater & Environmental
Services, Inc.
Lab Reports, Groundwater & Environmental Services Inc
(Exton)



REPORT OF LABORATORY ANALYSIS

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without the written consent of Pace Analytical Services, LLC.

CHAIN-OF-CUSTODY / Analytical Request Document

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



Section A
Required Client Information:
 Company: GES, Inc.
 Address: 440 Creamery Way Suite 500
 Exton, PA 19341
 Email To: hsmoker@gesonline.com
 Phone: 610-458-1077 3067
 Fax: 610-458-1077
 Requested Due Date/TAT: 5 Day

Section B
Required Project Information:
 Report To: Holly Smoker
 Copy To:
 Purchase Order No.: N/A, #COHWV995
 Project Name: 0350
 Project Number: 0304130-06-160; ORG 1402

Section C
Invoice Information:
 Attention: ges-invoices@gesonline.com
 Company Name: GES, Inc.
 Address: 440 Creamery Way, Suite 500, Exton, PA
 Pace Quote Reference:
 Pace Project Manager: Justin Hall
 Pace Profile #:

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

ITEM #	Valid Matrix Codes MATRIX CODE DRINKING WATER DW WATER WT WASTE WATER WW PRODUCT P SOIL/SOLID SL OIL OL WIPE WP AIR AR OTHER OT TISSUE TS	COLLECTED		SAMPLE TYPE (G=GRAB C=COMP)	MATRIX CODE (see valid codes to left)	# OF CONTAINERS	Preservatives Unpreserved H ₂ SO ₄ HNO ₃ HCl NaOH Na ₂ O ₃ Methanol Other	Analysis Test ↑ Y/N	Requested Analysis Filtered (Y/N)	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
		COMPOSITE START	COMPOSITE END/GRAB										
1	01222018-039-01			G	WT	1		X	N				
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													

ADDITIONAL COMMENTS
 23 Jan 2018
 XRD
COJYS324
Pace Analytical Services, Inc.
 Rachel Christler
 724-850-5611
 Disp: 20 Mar 2018
 No Billing Type

RELIQUISHED BY / AFFILIATION
 Alison Emmers
 01/22/18 1630
 FedEx

DATE
 01/22/18 1630

ACCEPTED BY / AFFILIATION
 Alison Emmers
 1/23/18 1645
 FedEx

DATE
 01/22/18 1630

DATE SIGNED (MM/DD/YYYY)
 01/22/18

SAMPLER NAME AND SIGNATURE
 PRINT Name of SAMPLER: Alison Emmers
 SIGNATURE of SAMPLER: Alison Emmers

**X-RAY DIFFRACTION (XRD)
ANALYSIS REPORT
08 Feb 2018**

**JOB NUMBER C0JYS324
PO NUMBER**

for

Rachel Christner
Pace Analytical Services, Inc.
1638 Roseytown Rd
Suite 3
Greensburg, PA 15601

Prepared by:



Bich Nguyen
Scientist, XRD Services
(Tel. 408-530-3834; bnguyen@eag.com)

Reviewed by:



William R. Woerner, Ph.D.
Scientist
(Tel. 408-530-3837; wwoerner@eag.com)

EAG Laboratories
810 Kifer Rd
Sunnyvale, CA 94086-5203 USA

Requester: Rachel Christner
 Job Number: C0JYS324
 Analysis Date: 08 Feb 2018

X-RAY DIFFRACTION ANALYSIS REPORT

Purpose: Use X-ray diffraction to identify the crystalline phases present in a water sample with particular emphasis on the presence of bentonite. The sample was identified as 01222018-639-01.

Summary:

Best Matches from the ICDD/ICSD data bases

Sample ID	Primary Phases	Possible Trace Phases
Sample 01222018-639-01 (Top part)	Ca(CO ₃) – Calcite Hexagonal, S.G.: R-3c (167) PDF# 04-006-6528	CaCO ₃ - Aragonite Orthorhombic, S.G.: Pmcn (62) PDF# 00-061-0390
Sample 01222018-639-01 (Bottom part)	Ca(CO ₃) – Calcite Hexagonal, S.G.: R-3c (167) PDF# 04-006-6528	CaCO ₃ - Aragonite Orthorhombic, S.G.: Pmcn (62) PDF# 00-061-0390

Results and Interpretations: The water sample was transferred into a beaker and settled for one day. Water from the top of this sample (which should contain the highest concentration of clay minerals) was pipetted onto a special zero-background sample holder and dried using a hot plate. More water was added until the sample surface was fully covered with solid material. This sample is identified in this report as the oriented sample because the clay minerals will tend to align with the c-axis perpendicular to the surface. In order to check whether any other phases were present in the sample, the bottom part of the settled sample was also collected and was prepared as the same way as the top part. Both samples were mounted onto a diffractometer for analysis. XRD data was collected by a coupled Theta:2-Theta scan on a Rigaku Ultima-III diffractometer equipped with copper X-ray tube with Ni beta filter, parafocusing optics, computer-controlled slits, and D/teX Ultra 1D strip detector.

[Figure 1a](#) and [Figure 1b](#) shows the phase identification results for sample 01222018-639-01 based on the best matches obtained by comparing the background-subtracted experimental data to the ICDD/ICSD diffraction database. The intensity was plotted using square root (counts) to overemphasize the weaker peaks. Both parts of this sample are primarily composed of calcite with trace amounts of aragonite. Note that XRD is sensitive to crystal structure and much less to composition. In particular, note that the principle experimental peak assigned to calcite is shifted toward higher angle with respect to the reference marker. This is an indication that this phase may be a solid solution with another cation substituted for some of

the calcium. There is a weak peak near $26^{\circ} 2\theta$ that is due to the detector artifact. No clay minerals are observed in the sample.

After reviewing this report, you may assess our services using an electronic service evaluation form. This can be done by clicking on the link below, or by pasting it into your internet browser. Your comments and suggestions allow us to determine how to better serve you in the future.
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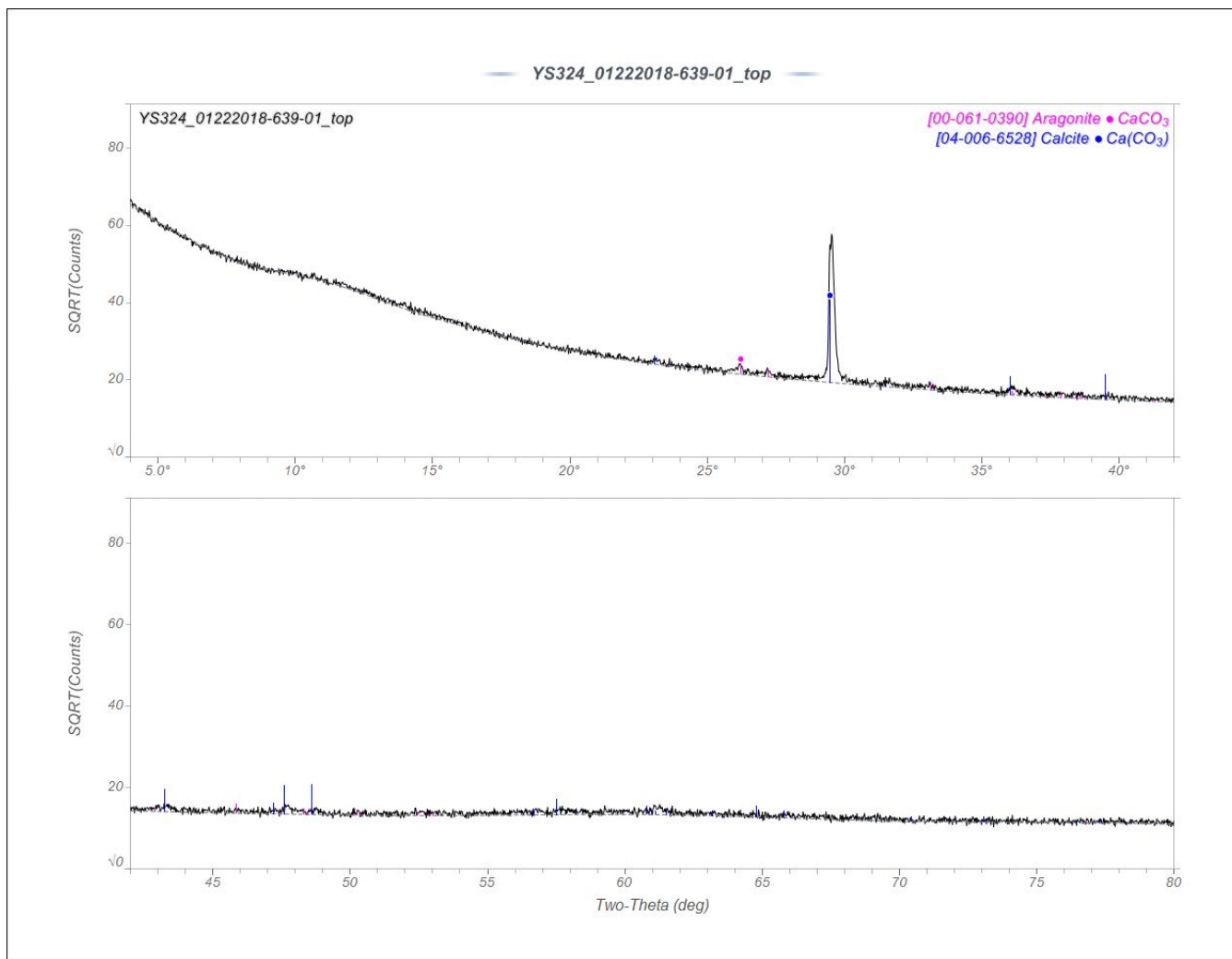


Figure 1a: Phase identification for the top part of sample (01222018-639-01)

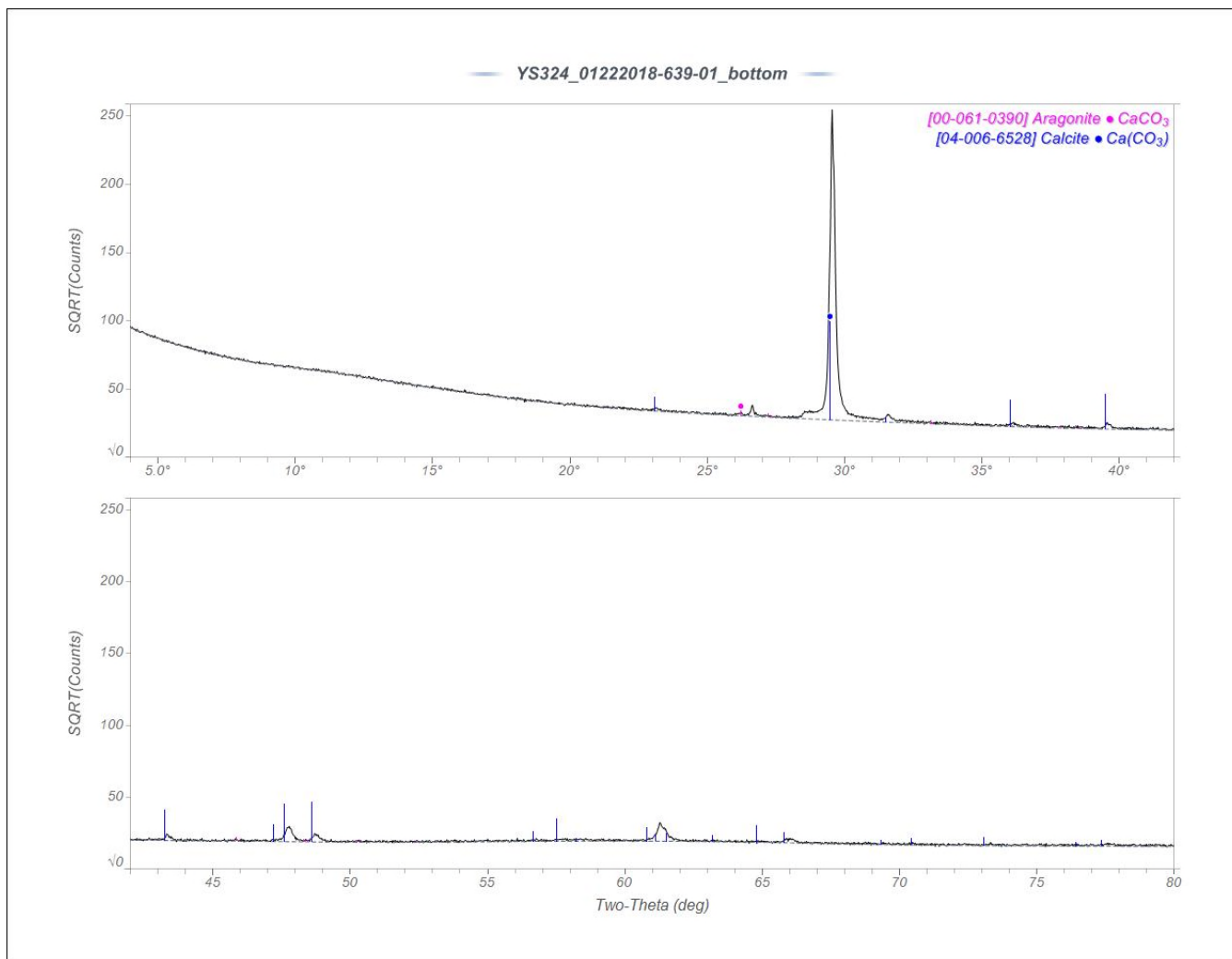


Figure 1b: Phase identification for the bottom part of sample (01222018-639-01)

Appendix

Measurement Uncertainty:

There are two types of uncertainty in XRD analysis; uncertainty in the number of X-ray counts at a particular angle and uncertainty in the diffraction angle. Because the arrival of X-ray quanta in the detector is random with respect to time, the accuracy of X-ray counting rate measurements is governed by the laws of probability. In particular, the size of the one sigma standard deviation in an X-ray measurement is equal to the square root of the number of X-rays counted. A conservative criterion for the detection of a weak peak in a XRD pattern must have amplitude of greater than three standard deviations above background. As a result, the more slowly a measurement is made, the lower the relative standard deviation in the number of counts measured and the more likely is detection of trace diffraction peaks. If X-ray data is acquired at a constant speed, the relative standard deviation for the major diffraction peaks in a pattern will be on the order of a few percent or less while the relative standard deviation for the weaker peaks in a pattern will be on the order of tens of percent or more. This also implies that the uncertainty in the concentrations of the major phases in a sample will be lower than for the trace phases. Please note that there are a number of sample related factors that can influence peak intensity. These include (but are not limited to): average crystallite size, preferred orientation (texture), strain, and absorption.

Uncertainty in the position of X-ray diffraction peaks is due to both instrumental and sample effects. Instrumental position uncertainty is primarily due to diffractometer misalignment. Repeat measurements of NIST standard reference materials has shown that the maximum positional uncertainty is less than +/- 0.05 degrees 2-Theta and is typically much less than that. Positional uncertainty due to sample effects are related to sample displacement (displacement of the sample surface either above or below the diffractometer focusing circle) and sample transparency (the effect gets larger as the sample matrix becomes more transparent to the incident X-rays. Through careful sample preparation, the uncertainty due to these two sample effects should be less than +/- 0.03 degrees 2-Theta. Please note that in addition to these factors, solid solution effects, where one element is partially substituted for another within a given crystal structure, can produce significant shifts in measured peak positions. Unlike sample and instrumental peak position effects, solid solution effects can result in phase misidentification.

GES, Inc - Sunoco

Sample Delivery Group: L879982
Samples Received: 12/21/2016
Project Number: 0204678
Description: Pre-Construction Sampling
Site: ME2
Report To: Stephanie Grillo
440 Creamery Way, Ste 500
Exton, PA 19341










Entire Report Reviewed By:



Mark W. Beasley
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



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⁷Gl: Glossary of Terms	19	
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SAMPLE SUMMARY



12202016-551-02 L879982-01 GW

Collected by: Dan Sivco
 Collected date/time: 12/20/16 11:30
 Received date/time: 12/21/16 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Gravimetric Analysis by Method 2540 C-2011	WG937971	1	12/22/16 22:07	12/23/16 03:38	JM
Gravimetric Analysis by Method 2540 D-2011	WG938170	1	12/23/16 13:17	12/23/16 14:05	MMF
Metals (ICP) by Method 6010B	WG937570	1	12/21/16 18:22	12/22/16 14:12	LTB
Volatile Organic Compounds (GC) by Method RSK175	WG938724	1	12/27/16 11:15	12/27/16 11:15	MJ
Volatile Organic Compounds (GC/MS) by Method 8260B	WG938376	1	12/24/16 16:36	12/24/16 16:36	ACG
Wet Chemistry by Method 130.1	WG937903	1	12/22/16 14:51	12/22/16 14:51	JER
Wet Chemistry by Method 2130 B-2011	WG937662	1	12/21/16 17:25	12/21/16 17:25	MHM
Wet Chemistry by Method 2320 B-2011	WG937555	1	12/22/16 10:01	12/22/16 10:01	MCG
Wet Chemistry by Method 9040C	WG937665	1	12/22/16 23:41	12/22/16 23:41	ASK
Wet Chemistry by Method 9050A	WG937569	1	12/21/16 18:13	12/21/16 18:13	MAJ
Wet Chemistry by Method 9056A	WG937591	1	12/22/16 18:19	12/22/16 18:19	KCF

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Mark W. Beasley
 Technical Service Representative

Sample Handling and Receiving

The following samples were prepared and/or analyzed past recommended holding time. Concentrations should be considered minimum values.

<u>ESC Sample ID</u>	<u>Project Sample ID</u>	<u>Method</u>
L879982-01	12202016-551-02	9040C

- ¹ Cp
- ² Tc
- ³ Ss
- ⁴ Cn
- ⁵ Sr
- ⁶ Qc
- ⁷ Gl
- ⁸ Al
- ⁹ Sc



Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	176		10.0	1	12/23/2016 03:38	WG937971

1 Cp

2 Tc

Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	ND		2.50	1	12/23/2016 14:05	WG938170

3 Ss

4 Cn

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hardness, Total (mg/L as CaCO3)	143		30.0	1	12/22/2016 14:51	WG937903

5 Sr

6 Qc

Wet Chemistry by Method 2130 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Turbidity	0.987		0.100	1	12/21/2016 17:25	WG937662

7 Gl

8 Al

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Alkalinity	112		20.0	1	12/22/2016 10:01	WG937555

9 Sc

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.28		1	12/22/2016 23:41	WG937665

Sample Narrative:

9040C L879982-01 WG937665: 8.28 at 19.2c

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	264		1	12/21/2016 18:13	WG937569

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	12/22/2016 18:19	WG937591
Chloride	7.59		1.00	1	12/22/2016 18:19	WG937591
Sulfate	7.46		5.00	1	12/22/2016 18:19	WG937591

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	0.231		0.00500	1	12/22/2016 14:12	WG937570
Calcium	37.6		1.00	1	12/22/2016 14:12	WG937570
Iron	0.223		0.100	1	12/22/2016 14:12	WG937570
Magnesium	8.62		1.00	1	12/22/2016 14:12	WG937570
Manganese	0.0364		0.0100	1	12/22/2016 14:12	WG937570
Potassium	ND		1.00	1	12/22/2016 14:12	WG937570
Sodium	5.27		1.00	1	12/22/2016 14:12	WG937570



Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Methane	0.0970		0.0100	1	12/27/2016 11:15	WG938724
Ethane	ND		0.0130	1	12/27/2016 11:15	WG938724
Ethene	ND		0.0130	1	12/27/2016 11:15	WG938724
Propane	ND		0.0190	1	12/27/2016 11:15	WG938724

1 Cp

2 Tc

3 Ss

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	12/24/2016 16:36	WG938376
Toluene	ND		0.00100	1	12/24/2016 16:36	WG938376
Ethylbenzene	ND		0.00100	1	12/24/2016 16:36	WG938376
Total Xylenes	ND		0.00300	1	12/24/2016 16:36	WG938376
(S) Toluene-d8	98.0		90.0-115		12/24/2016 16:36	WG938376
(S) Dibromofluoromethane	86.7		79.0-121		12/24/2016 16:36	WG938376
(S) a,a,a-Trifluorotoluene	99.5		90.4-116		12/24/2016 16:36	WG938376
(S) 4-Bromofluorobenzene	98.3		80.1-120		12/24/2016 16:36	WG938376

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3187238-1 12/23/16 03:38

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Dissolved Solids	U		2.82	10.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

L879787-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879787-01 12/23/16 03:38 • (DUP) R3187238-4 12/23/16 03:38

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Dissolved Solids	177	178	1	0.563		5

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3187238-2 12/23/16 03:38 • (LCSD) R3187238-3 12/23/16 03:38

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Dissolved Solids	8800	8540	8510	97.0	96.7	85.0-115			0.352	5

⁷ Gl

⁸ Al

⁹ Sc



Method Blank (MB)

(MB) R3187242-1 12/23/16 14:05

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Suspended Solids	U		0.350	2.50

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

L879987-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879987-01 12/23/16 14:05 • (DUP) R3187242-4 12/23/16 14:05

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	152	152	1	0.000		5

L880021-01 Original Sample (OS) • Duplicate (DUP)

(OS) L880021-01 12/23/16 14:05 • (DUP) R3187242-5 12/23/16 14:05

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	45.5	45.0	1	1.10		5

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3187242-2 12/23/16 14:05 • (LCSD) R3187242-3 12/23/16 14:05

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Suspended Solids	773	792	788	102	102	85.0-115			0.506	5



Method Blank (MB)

(MB) R3186757-4 12/22/16 14:40

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Hardness	3.39	J	1.43	30.0

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L879800-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879800-01 12/22/16 14:44 • (DUP) R3186757-7 12/22/16 14:45

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Hardness	79.7	80.5	1	1		20

L880148-01 Original Sample (OS) • Duplicate (DUP)

(OS) L880148-01 12/22/16 15:58 • (DUP) R3186757-10 12/22/16 15:59

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Hardness	475	499	10	5		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3186757-5 12/22/16 14:41 • (LCSD) R3186757-6 12/22/16 14:42

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Hardness	150	159	159	106	106	85-115			0	20



Method Blank (MB)

(MB) WG937662-1 12/21/16 17:25

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Turbidity	U		0.0310	0.100

¹ Cp

² Tc

³ Ss

L879980-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879980-01 12/21/16 17:25 • (DUP) WG937662-4 12/21/16 17:25

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Turbidity	2.12	2.13	1	0.471		20

⁴ Cn

⁵ Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG937662-2 12/21/16 17:25 • (LCSD) WG937662-3 12/21/16 17:25

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Turbidity	40.0	42.1	41.9	105	105	90.0-110			0.476	20

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Method Blank (MB)

(MB) R3187044-1 12/22/16 07:49

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Alkalinity	U		2.71	20.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L879764-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879764-01 12/22/16 08:34 • (DUP) R3187044-3 12/22/16 08:40

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	27.6	24.5	1	12.0		20

L880069-03 Original Sample (OS) • Duplicate (DUP)

(OS) L880069-03 12/22/16 11:35 • (DUP) R3187044-6 12/22/16 11:46

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	134	134	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3187044-4 12/22/16 09:08 • (LCSD) R3187044-5 12/22/16 11:13

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Alkalinity	100	95.1	96.9	95.0	97.0	85.0-115			2.00	20



L879756-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879756-01 12/22/16 23:41 • (DUP) WG937665-1 12/22/16 23:41

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	6.50	6.50	1	0.000		1

L880076-02 Original Sample (OS) • Duplicate (DUP)

(OS) L880076-02 12/22/16 23:41 • (DUP) WG937665-2 12/22/16 23:41

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	10.2	10.2	1	0.000		1

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG937665-3 12/22/16 23:41 • (LCSD) WG937665-4 12/22/16 23:41

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
pH	6.07	6.10	6.09	100	100	98.4-102			0.164	1

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) WG937569-7 12/21/16 18:13

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Specific Conductance	0.850		umhos/cm	umhos/cm

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L879980-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879980-01 12/21/16 18:13 • (DUP) WG937569-1 12/21/16 18:13

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Specific Conductance	266	267	1	0.413		20

L880091-04 Original Sample (OS) • Duplicate (DUP)

(OS) L880091-04 12/21/16 18:13 • (DUP) WG937569-6 12/21/16 18:13

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Specific Conductance	4580	4550	1	0.657		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG937569-2 12/21/16 18:13 • (LCSD) WG937569-3 12/21/16 18:13

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Specific Conductance	542	549	547	101	101	90.0-110			0.365	20



Method Blank (MB)

(MB) R3186888-1 12/22/16 12:40

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Bromide	U		0.079	1.00
Chloride	U		0.0519	1.00
Sulfate	U		0.0774	5.00

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

L879270-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879270-01 12/22/16 16:06 • (DUP) R3186888-4 12/22/16 16:20

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0		15
Chloride	15.8	15.8	1	0		15
Sulfate	13.0	13.0	1	0		15

L879690-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879690-01 12/22/16 19:34 • (DUP) R3186888-6 12/22/16 19:49

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	2.77	2.69	1	3		15
Chloride	47.1	47.1	1	0		15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3186888-2 12/22/16 12:55 • (LCSD) R3186888-3 12/22/16 13:10

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Bromide	40.0	40.4	40.4	101	101	80-120			0	15
Chloride	40.0	40.2	40.2	101	100	80-120			0	15
Sulfate	40.0	40.3	40.3	101	101	80-120			0	15

L879554-21 Original Sample (OS) • Matrix Spike (MS)

(OS) L879554-21 12/22/16 16:35 • (MS) R3186888-5 12/22/16 16:50

Analyte	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
	mg/l	mg/l	mg/l	%		%	
Bromide	50.0	0.0937	50.1	100	1	80-120	
Sulfate	50.0	2.03	53.2	102	1	80-120	



L879920-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L879920-06 12/22/16 20:34 • (MS) R3186888-7 12/22/16 20:49 • (MSD) R3186888-8 12/22/16 21:03

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits
Bromide	50.0	ND	50.9	49.7	102	99	1	80-120			2	15
Chloride	50.0	ND	51.6	51.4	101	101	1	80-120			0	15
Sulfate	50.0	ND	50.3	50.3	101	101	1	80-120			0	15

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Method Blank (MB)

(MB) R3186852-1 12/22/16 13:41

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Barium	U		0.0017	0.00500
Calcium	0.0657	J	0.0463	1.00
Iron	U		0.0141	0.100
Magnesium	U		0.0111	1.00
Manganese	U		0.0012	0.0100
Potassium	U		0.102	1.00
Sodium	U		0.0985	1.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3186852-2 12/22/16 13:43 • (LCSD) R3186852-3 12/22/16 13:46

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Barium	1.00	1.01	1.03	101	103	80-120			2	20
Calcium	10.0	9.84	9.89	98	99	80-120			0	20
Iron	10.0	9.84	9.99	98	100	80-120			2	20
Magnesium	10.0	10.1	10.2	101	102	80-120			1	20
Manganese	1.00	1.00	1.01	100	101	80-120			1	20
Potassium	10.0	9.91	10.0	99	100	80-120			1	20
Sodium	10.0	10.0	10.1	100	101	80-120			1	20

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L879967-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L879967-04 12/22/16 13:48 • (MS) R3186852-5 12/22/16 13:53 • (MSD) R3186852-6 12/22/16 13:56

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Barium	1.00	0.204	1.21	1.20	101	100	1	75-125			0	20
Calcium	10.0	167	176	176	82	86	1	75-125			0	20
Iron	10.0	0.515	10.4	10.4	99	99	1	75-125			0	20
Magnesium	10.0	32.2	41.9	42.1	97	99	1	75-125			0	20
Manganese	1.00	1.49	2.42	2.47	93	98	1	75-125			2	20
Potassium	10.0	0.561	10.8	10.8	102	102	1	75-125			0	20
Sodium	10.0	49.0	58.6	58.5	96	95	1	75-125			0	20



Method Blank (MB)

(MB) R3187353-1 12/27/16 10:56

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Methane	U		0.00291	0.0100
Ethane	U		0.00407	0.0130
Ethene	U		0.00426	0.0130
Propane	U		0.00548	0.0190

1 Cp

2 Tc

3 Ss

4 Cn

L879702-02 Original Sample (OS) • Duplicate (DUP)

(OS) L879702-02 12/27/16 11:05 • (DUP) R3187353-2 12/27/16 11:26

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	U	0.000	1	0.000		20
Ethane	U	0.000	1	0.000		20
Ethene	U	0.000	1	0.000		20
Propane	U	0.000	1	0.000		20

5 Sr

6 Qc

7 Gl

8 Al

L880254-04 Original Sample (OS) • Duplicate (DUP)

(OS) L880254-04 12/27/16 12:06 • (DUP) R3187353-3 12/27/16 12:08

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	ND	0.000	1	0.000		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3187353-4 12/27/16 12:10 • (LCSD) R3187353-5 12/27/16 12:12

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Methane	0.0678	0.0602	0.0601	88.8	88.6	85.0-115			0.190	20
Ethane	0.129	0.115	0.115	89.2	88.9	85.0-115			0.350	20
Ethene	0.127	0.111	0.111	87.6	87.7	85.0-115			0.160	20
Propane	0.186	0.164	0.162	88.0	87.4	85.0-115			0.750	20



Method Blank (MB)

(MB) R3187358-3 12/24/16 14:30

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000412	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	98.4			90.0-115
(S) Dibromofluoromethane	86.7			79.0-121
(S) a,a,a-Trifluorotoluene	99.2			90.4-116
(S) 4-Bromofluorobenzene	97.5			80.1-120

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3187358-1 12/24/16 13:53 • (LCSD) R3187358-2 12/24/16 14:05

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Benzene	0.0250	0.0227	0.0234	90.7	93.5	73.0-122			2.97	20
Ethylbenzene	0.0250	0.0247	0.0264	98.7	106	80.9-121			6.79	20
Toluene	0.0250	0.0228	0.0241	91.3	96.3	77.9-116			5.25	20
Xylenes, Total	0.0750	0.0735	0.0790	98.0	105	79.2-122			7.25	20
(S) Toluene-d8				99.8	99.1	90.0-115				
(S) Dibromofluoromethane				88.1	85.5	79.0-121				
(S) a,a,a-Trifluorotoluene				100	98.7	90.4-116				
(S) 4-Bromofluorobenzene				95.7	96.5	80.1-120				

7 Gl

8 Al

9 Sc



Abbreviations and Definitions

SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
Rec.	Recovery.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE**.
 * Not all certifications held by the laboratory are applicable to the results reported in the attached report.

1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Connecticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee ¹⁴	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

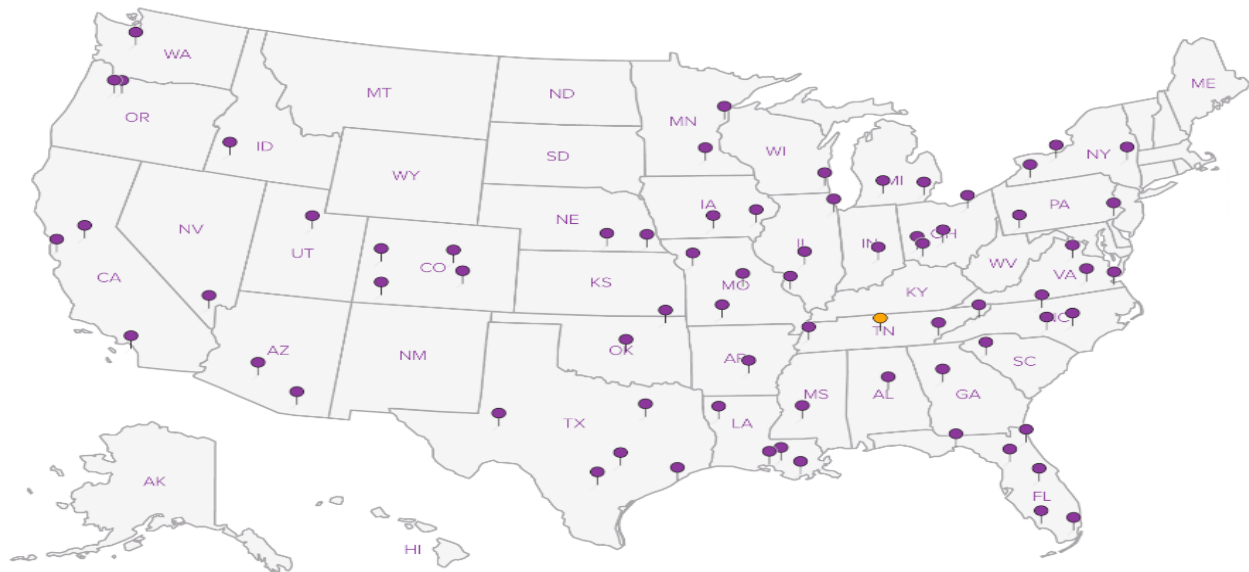
Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ^{n/a} Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. **ESC Lab Sciences performs all testing at our central laboratory.**



Company Name/Address:
GES, Inc - Sunoco
 440 Creamery Way, Suite 500
 Exton, PA 19341

Billing Information:
 Accounts Payable
 440 Creamery Way, Suite 500
 Exton, PA 19341

Report to:
Holly Smoker

Email To:
hsmoker@gesonline.com

Project Description:
Pre-Construction Sampling

City/State Collected:
Johnstown, PA

Phone: **610-458-1077**
 Fax: **NA**

Client Project #
NA

Lab Project #
SUNGES-GRILLO

Collected by (print):
DAN SINCO

Site/Facility ID #
ME2

P.O. #
NA

Collected by (signature):
[Signature]
 Immediately Packed on Ice N Y

Rush? (Lab MUST Be Notified)
 Same Day200%
 Next Day100%
 Two Day50%
 Three Day25%

Date Results Needed
STANDARD
 Email? No Yes
 FAX? No Yes

Analysis / Container / Preservative											
**pH,SPCON,TDS,TURB* 250mlHDPE-NoPres	ALK, Br, Cl, SO4 250mlHDPE-NoPres	Total Metals, Hardness 250mlHDPE-HNO3	RSK175 + Propane 40mlAmb-HCl	TSS 1L-HDPE NoPres	V8260BTEX 40mlAmb-HCl						

Chain of Custody Page 1 of 1

YOUR LAB OF CHOICE

12065 Lebanon Rd
 Mount Juliet, TN 37122
 Phone: 615-758-5858
 Phone: 800-767-5859
 Fax: 615-758-5859

L# **187998**
C067
 Spectrum: **SUNGES**
 Template: **T114657**
 Prelogin: **P564159**
 TSR: **Mark Beasley**
 Cooler:
 Shipped Via: **Fed Ex**

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	**pH,SPCON,TDS,TURB* 250mlHDPE-NoPres	ALK, Br, Cl, SO4 250mlHDPE-NoPres	Total Metals, Hardness 250mlHDPE-HNO3	RSK175 + Propane 40mlAmb-HCl	TSS 1L-HDPE NoPres	V8260BTEX 40mlAmb-HCl					Rem./Contaminant	Sample # (lab only)
12202016-551-02	Grab	DW	-	12/20/16	1130	8	X	X	X	X	X	X						-01

* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other _____

Remarks: **Metals = Ba,Ca,Fe,K,Mg,Mn,Na. Project #: 0204678 -06-160-xx Org 1402**

pH _____ Temp _____
 Flow _____ Other _____

Relinquished by: (Signature)
[Signature]
 Date: **12/20/16**
 Time: **1530**

Received by: (Signature)
FEDEX 12/20/16 1530
 Received by: (Signature)
Joseph
 Date: **12-21-16**
 Time: **0900**

Samples returned via: UPS
 FedEx Courier _____
 Temp: **2.8** °C Bottles Received: **8**

Hold #
 Condition: (lab use only)
TDI
 COC Seal Intact: Y N NA
 pH Checked: **LT** NCF:



Cooler Receipt Form

Client: <u>SVNGGS</u>	SDG#	<u>L879982</u>		
Cooler Received/Opened On: <u>12/21</u> /16	Temperature Upon Receipt:	<u>2.1</u> °C		
Received By: Joseph Roberts				
Signature: <u>Joseph Roberts</u>				
Receipt Check List		Yes	No	N/A
Were custody seals on outside of cooler and intact?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were custody papers properly filled out?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Did all bottles arrive in good condition?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were correct bottles used for the analyses requested?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was sufficient amount of sample sent in each bottle?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were all applicable sample containers correctly preserved and checked for preservation? (Any not in accepted range noted on COC)		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If applicable, was an observable VOA headspace present?		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Non Conformance Generated. (If yes see attached NCF)		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

January 24, 2018

GES, Inc - Sunoco

Sample Delivery Group: L964722
Samples Received: 01/23/2018
Project Number: 0204730-06-160-XX
Description: Pre-Construction Sampling

Report To: Stephanie Grillo
440 Creamery Way, Ste 500
Exton, PA 19341

Entire Report Reviewed By:



Jason Romer
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



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SAMPLE SUMMARY



01222018-639-01 L964722-01 GW

Collected by Alison Emmons	Collected date/time 01/22/18 13:20	Received date/time 01/23/18 08:45
-------------------------------	---------------------------------------	--------------------------------------

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Microbiology by Method 9222D	WG1065779	1	01/23/18 11:35	01/23/18 11:35	BGE
Microbiology by Method 9223 B-1997	WG1065555	1	01/23/18 11:17	01/23/18 11:17	SMK
Gravimetric Analysis by Method 2540 C-2011	WG1065489	1	01/23/18 14:31	01/23/18 15:03	MMF
Gravimetric Analysis by Method 2540 D-2011	WG1065484	1	01/23/18 15:17	01/23/18 16:10	MMF
Wet Chemistry by Method 130.1	WG1065387	1	01/24/18 14:42	01/24/18 14:42	KK
Wet Chemistry by Method 2130 B-2011	WG1065356	1	01/23/18 10:50	01/23/18 10:50	ER
Wet Chemistry by Method 2320 B-2011	WG1065260	1	01/23/18 15:37	01/23/18 15:37	MCG
Wet Chemistry by Method 9040C	WG1065355	1	01/23/18 11:00	01/23/18 11:00	ER
Wet Chemistry by Method 9050A	WG1065362	1	01/23/18 15:23	01/23/18 15:23	MA
Wet Chemistry by Method 9056A	WG1065413	1	01/23/18 14:52	01/23/18 14:52	DR
Metals (ICP) by Method 6010B	WG1065194	1	01/23/18 10:10	01/23/18 13:04	TRB
Volatile Organic Compounds (GC) by Method RSK175	WG1065664	1	01/24/18 11:09	01/24/18 11:09	BG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1065432	1	01/23/18 14:32	01/23/18 14:32	DWR

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Jason Romer
Technical Service Representative

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Microbiology by Method 9222D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Coliform,fecal	<1		1	01/23/2018 11:35	WG1065779

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn

Microbiology by Method 9223 B-1997

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	<1		1	01/23/2018 11:17	WG1065555
Coliform,Total	<1		1	01/23/2018 11:17	WG1065555

- 5 Sr
- 6 Qc
- 7 Gl

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	138		10.0	1	01/23/2018 15:03	WG1065489

Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	ND		2.50	1	01/23/2018 16:10	WG1065484

- 8 Al
- 9 Sc

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	128		30.0	1	01/24/2018 14:42	WG1065387

Wet Chemistry by Method 2130 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Turbidity	1.14		0.300	1	01/23/2018 10:50	WG1065356

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Alkalinity	121		20.0	1	01/23/2018 15:37	WG1065260

Sample Narrative:

L964722-01 WG1065260: Endpoint pH 4.5

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.86	T8	1	01/23/2018 11:00	WG1065355

Sample Narrative:

L964722-01 WG1065355: 7.86 at 9.7C

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	281		10.0	1	01/23/2018 15:23	WG1065362



Collected date/time: 01/22/18 13:20

L964722

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Bromide	ND	J5	1.00	1	01/23/2018 14:52	WG1065413
Chloride	7.61	J5	1.00	1	01/23/2018 14:52	WG1065413
Sulfate	7.16	J5	5.00	1	01/23/2018 14:52	WG1065413

1 Cp

2 Tc

3 Ss

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	0.244		0.00500	1	01/23/2018 13:04	WG1065194
Calcium	37.3		1.00	1	01/23/2018 13:04	WG1065194
Iron	0.219	B	0.100	1	01/23/2018 13:04	WG1065194
Magnesium	9.13		1.00	1	01/23/2018 13:04	WG1065194
Manganese	0.0387		0.0100	1	01/23/2018 13:04	WG1065194
Potassium	1.21		1.00	1	01/23/2018 13:04	WG1065194
Sodium	6.05		1.00	1	01/23/2018 13:04	WG1065194

4 Cn

5 Sr

6 Qc

7 Gl

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Methane	0.119		0.0100	1	01/24/2018 11:09	WG1065664
Ethane	ND		0.0130	1	01/24/2018 11:09	WG1065664
Ethene	ND		0.0130	1	01/24/2018 11:09	WG1065664
Propane	ND		0.0190	1	01/24/2018 11:09	WG1065664

8 Al

9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	01/23/2018 14:32	WG1065432
Toluene	ND		0.00100	1	01/23/2018 14:32	WG1065432
Ethylbenzene	ND		0.00100	1	01/23/2018 14:32	WG1065432
Total Xylenes	ND		0.00300	1	01/23/2018 14:32	WG1065432
(S) Toluene-d8	101		80.0-120		01/23/2018 14:32	WG1065432
(S) Dibromofluoromethane	102		76.0-123		01/23/2018 14:32	WG1065432
(S) a,a,a-Trifluorotoluene	98.3		80.0-120		01/23/2018 14:32	WG1065432
(S) 4-Bromofluorobenzene	105		80.0-120		01/23/2018 14:32	WG1065432



Method Blank (MB)

(MB) R3281575-1 01/23/18 15:03

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Dissolved Solids	U		2.82	10.0

1 Cp

2 Tc

3 Ss

L964752-04 Original Sample (OS) • Duplicate (DUP)

(OS) L964752-04 01/23/18 15:03 • (DUP) R3281575-4 01/23/18 15:03

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Dissolved Solids	170	177	1	4.03		5

4 Cn

5 Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3281575-2 01/23/18 15:03 • (LCSD) R3281575-3 01/23/18 15:03

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Dissolved Solids	8800	8560	8580	97.3	97.5	85.0-115			0.233	5

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3281397-1 01/23/18 16:10

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Suspended Solids	U		0.350	2.50

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

L964716-01 Original Sample (OS) • Duplicate (DUP)

(OS) L964716-01 01/23/18 16:10 • (DUP) R3281397-4 01/23/18 16:10

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	58.0	58.0	1	0.000		5

⁷ Gl

⁸ Al

L964737-01 Original Sample (OS) • Duplicate (DUP)

(OS) L964737-01 01/23/18 16:10 • (DUP) R3281397-5 01/23/18 16:10

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	18.0	17.4	1	3.39		5

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3281397-2 01/23/18 16:10 • (LCSD) R3281397-3 01/23/18 16:10

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Suspended Solids	773	812	784	105	101	85.0-115			3.51	5



Method Blank (MB)

(MB) R3281549-1 01/24/18 14:32

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	1.81	J	1.43	30.0

1 Cp

2 Tc

3 Ss

L964683-01 Original Sample (OS) • Duplicate (DUP)

(OS) L964683-01 01/24/18 14:35 • (DUP) R3281549-4 01/24/18 14:36

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	103	102	1	0.976		20

4 Cn

5 Sr

6 Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3281549-2 01/24/18 14:33 • (LCSD) R3281549-3 01/24/18 14:34

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	150	149	147	99.3	98	85-115			1.35	20

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3281081-1 01/23/18 10:50

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Turbidity	0.0530	↓	0.0310	0.300

¹ Cp

² Tc

³ Ss

L964721-01 Original Sample (OS) • Duplicate (DUP)

(OS) L964721-01 01/23/18 10:50 • (DUP) R3281081-4 01/23/18 10:50

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Turbidity	10.3	10.2	1	0.976		20

⁴ Cn

⁵ Sr

⁶ Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3281081-2 01/23/18 10:50 • (LCSD) R3281081-3 01/23/18 10:50

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Turbidity	40.0	42.7	42.7	107	107	90.0-110			0.000	20

⁷ Gl

⁸ Al

⁹ Sc



L964711-01 Original Sample (OS) • Duplicate (DUP)

(OS) L964711-01 01/23/18 13:29 • (DUP) R3281351-1 01/23/18 13:36

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	649	659	1	1.55		20

Sample Narrative:

OS: Endpoint pH 4.5
 DUP: Endpoint pH 4.5

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

L964781-01 Original Sample (OS) • Duplicate (DUP)

(OS) L964781-01 01/23/18 15:50 • (DUP) R3281351-5 01/23/18 15:56

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	38.1	38.7	1	1.52		20

Sample Narrative:

OS: Endpoint pH 4.5
 DUP: Endpoint pH 4.5

6 Qc

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3281351-2 01/23/18 14:40 • (LCSD) R3281351-6 01/23/18 16:35

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Alkalinity	100	107	105	107	105	85.0-115			2.46	20

Sample Narrative:

LCS: Endpoint pH 4.5
 LCSD: Endpoint pH 4.5



L964708-01 Original Sample (OS) • Duplicate (DUP)

(OS) L964708-01 01/23/18 11:00 • (DUP) R3281091-3 01/23/18 11:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.35	7.38	1	0.407		1

Sample Narrative:

OS: 7.35 at 12.2C
DUP: 7.38 at 11.9C

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

L964790-01 Original Sample (OS) • Duplicate (DUP)

(OS) L964790-01 01/23/18 11:00 • (DUP) R3281091-4 01/23/18 11:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	6.77	6.78	1	0.148		1

Sample Narrative:

OS: 6.77 at 10.8C
DUP: 6.78 at 10.8C

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3281091-1 01/23/18 11:00 • (LCSD) R3281091-2 01/23/18 11:00

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
pH	6.38	6.34	6.33	99.4	99.2	98.4-102			0.158	1

Sample Narrative:

LCS: 6.34 at 16.2C
LCSD: 6.33 at 16.2C



Method Blank (MB)

(MB) WG1065362-1 01/23/18 15:23

Analyte	MB Result umhos/cm	MB Qualifier	MB MDL umhos/cm	MB RDL umhos/cm
Specific Conductance	U		10.0	10.0

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

L964735-01 Original Sample (OS) • Duplicate (DUP)

(OS) L964735-01 01/23/18 15:23 • (DUP) WG1065362-4 01/23/18 15:23

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Specific Conductance	491	490	1	0.204		20

7 Gl

8 Al

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG1065362-2 01/23/18 15:23 • (LCSD) WG1065362-3 01/23/18 15:23

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCSD Result umhos/cm	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Specific Conductance	559	561	559	100	100	85.0-115			0.357	20

9 Sc



Method Blank (MB)

(MB) R3281316-1 01/23/18 06:42

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Bromide	U		0.079	1.00
Chloride	U		0.0519	1.00
Sulfate	U		0.0774	5.00

L964722-01 Original Sample (OS) • Duplicate (DUP)

(OS) L964722-01 01/23/18 14:52 • (DUP) R3281316-4 01/23/18 15:05

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0		15
Chloride	7.61	7.52	1	1.23		15
Sulfate	7.16	7.16	1	0.00419		15

L964752-02 Original Sample (OS) • Duplicate (DUP)

(OS) L964752-02 01/23/18 20:14 • (DUP) R3281316-7 01/23/18 20:27

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	U	0.000	1	0		15
Chloride	3.73	3.59	1	3.82		15
Sulfate	6.56	6.71	1	2.15		15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3281316-2 01/23/18 06:56 • (LCSD) R3281316-3 01/23/18 07:09

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Bromide	40.0	39.5	39.5	98.7	98.8	80-120			0.0932	15
Chloride	40.0	39.6	39.5	99	98.8	80-120			0.182	15
Sulfate	40.0	39.7	39.8	99.3	99.5	80-120			0.195	15

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



[L964722-01](#)

L964722-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L964722-01 01/23/18 14:52 • (MS) R3281316-5 01/23/18 15:19 • (MSD) R3281316-6 01/23/18 15:32

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	ND	67.5	76.6	135	153	1	80-120	<u>J5</u>	<u>J5</u>	12.6	15
Chloride	50.0	7.61	76.6	85.7	138	156	1	80-120	<u>J5</u>	<u>J5</u>	11.2	15
Sulfate	50.0	7.16	76.5	85.5	139	157	1	80-120	<u>J5</u>	<u>J5</u>	11.1	15

L964752-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L964752-02 01/23/18 20:14 • (MS) R3281316-8 01/23/18 20:41

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Bromide	50.0	U	48.0	96.1	1	80-120	
Chloride	50.0	3.73	53.6	99.8	1	80-120	
Sulfate	50.0	6.56	56.4	99.7	1	80-120	

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc



Method Blank (MB)

(MB) R3281146-8 01/23/18 13:33

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Barium	U		0.0017	0.00500
Calcium	U		0.0463	1.00
Iron	0.0348	⌵	0.0141	0.100
Magnesium	U		0.0111	1.00
Manganese	U		0.0012	0.0100
Potassium	U		0.102	1.00
Sodium	0.176	⌵	0.0985	1.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3281146-3 01/23/18 11:53 • (LCSD) R3281146-4 01/23/18 11:55

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Barium	1.00	1.08	1.07	108	107	80-120			0.165	20
Calcium	10.0	10.5	10.5	105	105	80-120			0.482	20
Iron	10.0	10.7	10.7	107	107	80-120			0.241	20
Magnesium	10.0	10.9	10.8	109	108	80-120			0.6	20
Manganese	1.00	1.03	1.03	103	103	80-120			0.225	20
Potassium	10.0	10.4	10.5	104	105	80-120			0.75	20
Sodium	10.0	10.5	10.5	105	105	80-120			0.559	20

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L964622-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L964622-05 01/23/18 11:58 • (MS) R3281146-6 01/23/18 12:03 • (MSD) R3281146-7 01/23/18 12:05

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Barium	1.00	0.0455	1.13	1.12	108	108	1	75-125			0.352	20
Calcium	10.0	151	156	158	56.2	67.2	1	75-125	⌵	⌵	0.702	20
Iron	10.0	0.628	11.3	11.4	107	108	1	75-125			0.333	20
Magnesium	10.0	34.2	43.7	44.4	94.3	101	1	75-125			1.58	20
Manganese	1.00	1.54	2.53	2.52	99.4	98.5	1	75-125			0.349	20
Potassium	10.0	9.30	19.7	19.8	104	105	1	75-125			0.625	20
Sodium	10.0	133	139	140	62.1	72.7	1	75-125	⌵	⌵	0.758	20



Method Blank (MB)

(MB) R3281449-1 01/24/18 09:37

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Methane	U		0.00291	0.0100
Ethane	U		0.00407	0.0130
Ethene	U		0.00426	0.0130
Propane	U		0.00548	0.0190

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L964711-01 Original Sample (OS) • Duplicate (DUP)

(OS) L964711-01 01/24/18 11:00 • (DUP) R3281449-2 01/24/18 11:24

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	ND	0.000	1	0.000		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3281449-3 01/24/18 11:29 • (LCSD) R3281449-4 01/24/18 11:32

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Methane	0.0678	0.0727	0.0756	107	111	85.0-115			3.85	20
Ethane	0.129	0.113	0.117	87.8	90.9	85.0-115			3.43	20
Ethene	0.127	0.116	0.120	91.6	94.4	85.0-115			2.97	20
Propane	0.186	0.184	0.193	99.0	104	85.0-115			4.71	20



Method Blank (MB)

(MB) R3281381-3 01/23/18 11:45

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000412	0.00100
Xylenes, Total	U		0.00106	0.00300
<i>(S) Toluene-d8</i>	99.8			80.0-120
<i>(S) Dibromofluoromethane</i>	102			76.0-123
<i>(S) a,a,a-Trifluorotoluene</i>	99.0			80.0-120
<i>(S) 4-Bromofluorobenzene</i>	105			80.0-120

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3281381-1 01/23/18 10:38 • (LCSD) R3281381-2 01/23/18 10:55

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Benzene	0.0250	0.0234	0.0240	93.8	96.0	69.0-123			2.37	20
Ethylbenzene	0.0250	0.0243	0.0250	97.1	99.9	77.0-120			2.78	20
Toluene	0.0250	0.0235	0.0240	94.0	95.9	77.0-120			1.93	20
Xylenes, Total	0.0750	0.0726	0.0744	96.8	99.2	77.0-120			2.45	20
<i>(S) Toluene-d8</i>				99.8	102	80.0-120				
<i>(S) Dibromofluoromethane</i>				99.9	102	76.0-123				
<i>(S) a,a,a-Trifluorotoluene</i>				102	99.6	80.0-120				
<i>(S) 4-Bromofluorobenzene</i>				106	102	80.0-120				

7 Gl

8 Al

9 Sc



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc

Qualifier	Description
B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
T8	Sample(s) received past/too close to holding time expiration.
V	The sample concentration is too high to evaluate accurate spike recoveries.



ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
 * Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey-NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Connecticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio-VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee ¹⁴	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

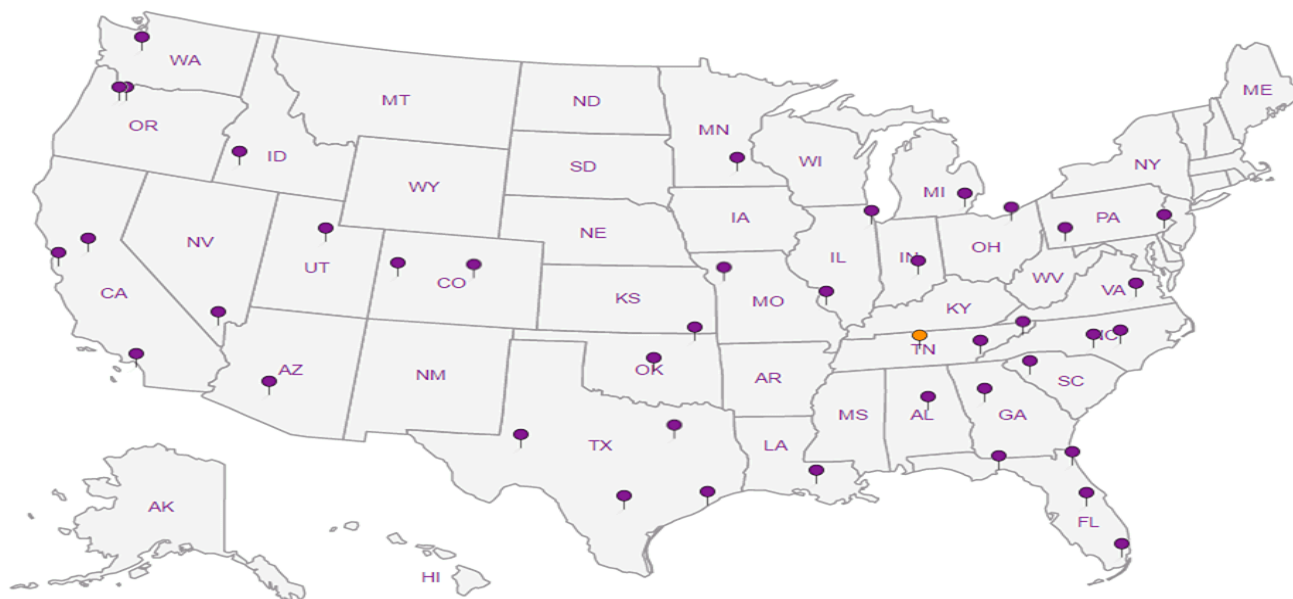
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA-Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold n/a Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. ESC Lab Sciences performs all testing at our central laboratory.



GES, Inc - Sunoco

Sample Delivery Group: L972109
Samples Received: 02/22/2018
Project Number: 0204730-06-160-XX
Description: Pre-Construction Sampling

Report To: Holly Smoker
440 Creamery Way, Ste 500
Exton, PA 19341

Entire Report Reviewed By:



Mark W. Beasley
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



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SAMPLE SUMMARY



02212018-634-01 L972109-01 GW

Collected by: Alex Smith
 Collected date/time: 02/21/18 10:05
 Received date/time: 02/22/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Microbiology by Method 9222D	WG1076712	1	02/22/18 14:33	02/22/18 14:33	SMK
Microbiology by Method 9223 B-1997	WG1076730	1	02/22/18 14:13	02/22/18 14:13	KMR
Gravimetric Analysis by Method 2540 C-2011	WG1076622	1	02/22/18 19:04	02/22/18 19:33	BS
Gravimetric Analysis by Method 2540 D-2011	WG1076623	1	02/22/18 21:05	02/22/18 21:21	BS
Wet Chemistry by Method 130.1	WG1076632	1	02/23/18 12:51	02/23/18 12:51	KK
Wet Chemistry by Method 2130 B-2011	WG1076520	1	02/22/18 13:50	02/22/18 13:50	GB
Wet Chemistry by Method 2320 B-2011	WG1076281	1	02/22/18 14:46	02/22/18 14:46	MCG
Wet Chemistry by Method 9040C	WG1076517	1	02/22/18 12:57	02/22/18 12:57	EEM
Wet Chemistry by Method 9050A	WG1076594	1	02/22/18 13:25	02/22/18 13:25	MA
Wet Chemistry by Method 9056A	WG1076556	1	02/22/18 14:41	02/22/18 14:41	MAJ
Metals (ICP) by Method 6010B	WG1076510	1	02/22/18 12:26	02/22/18 16:04	ST
Volatile Organic Compounds (GC) by Method RSK175	WG1076626	1	02/22/18 14:10	02/22/18 14:10	BG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1076541	1	02/22/18 17:20	02/22/18 17:20	RAS

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Mark W. Beasley
Technical Service Representative

- ¹ Cp
- ² Tc
- ³ Ss
- ⁴ Cn
- ⁵ Sr
- ⁶ Qc
- ⁷ Gl
- ⁸ Al
- ⁹ Sc



Microbiology by Method 9222D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Coliform,fecal	<1		1	02/22/2018 14:33	WG1076712

1 Cp

2 Tc

Microbiology by Method 9223 B-1997

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	1.00		1	02/22/2018 14:13	WG1076730
Coliform,Total	45.7		1	02/22/2018 14:13	WG1076730

3 Ss

4 Cn

5 Sr

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	149		10.0	1	02/22/2018 19:33	WG1076622

6 Qc

7 Gl

Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	ND		2.50	1	02/22/2018 21:21	WG1076623

8 Al

9 Sc

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	132		30.0	1	02/23/2018 12:51	WG1076632

Wet Chemistry by Method 2130 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Turbidity	2.14		0.300	1	02/22/2018 13:50	WG1076520

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Alkalinity	112		20.0	1	02/22/2018 14:46	WG1076281

Sample Narrative:

L972109-01 WG1076281: Endpoint pH 4.5

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.64	<u>T8</u>	1	02/22/2018 12:57	WG1076517

Sample Narrative:

L972109-01 WG1076517: 7.64 at 16C

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	272		10.0	1	02/22/2018 13:25	WG1076594



Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	02/22/2018 14:41	WG1076556
Chloride	8.20		1.00	1	02/22/2018 14:41	WG1076556
Sulfate	8.76		5.00	1	02/22/2018 14:41	WG1076556

1 Cp

2 Tc

3 Ss

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	0.306		0.00500	1	02/22/2018 16:04	WG1076510
Calcium	34.8		1.00	1	02/22/2018 16:04	WG1076510
Iron	0.317		0.100	1	02/22/2018 16:04	WG1076510
Magnesium	7.49		1.00	1	02/22/2018 16:04	WG1076510
Manganese	0.0549		0.0100	1	02/22/2018 16:04	WG1076510
Potassium	ND		1.00	1	02/22/2018 16:04	WG1076510
Sodium	8.13		1.00	1	02/22/2018 16:04	WG1076510

4 Cn

5 Sr

6 Qc

7 Gl

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Methane	0.0669		0.0100	1	02/22/2018 14:10	WG1076626
Ethane	ND		0.0130	1	02/22/2018 14:10	WG1076626
Ethene	ND		0.0130	1	02/22/2018 14:10	WG1076626
Propane	ND		0.0190	1	02/22/2018 14:10	WG1076626

8 Al

9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	02/22/2018 17:20	WG1076541
Toluene	ND		0.00100	1	02/22/2018 17:20	WG1076541
Ethylbenzene	ND		0.00100	1	02/22/2018 17:20	WG1076541
Total Xylenes	ND		0.00300	1	02/22/2018 17:20	WG1076541
(S) Toluene-d8	107		80.0-120		02/22/2018 17:20	WG1076541
(S) Dibromofluoromethane	101		76.0-123		02/22/2018 17:20	WG1076541
(S) a,a,a-Trifluorotoluene	95.9		80.0-120		02/22/2018 17:20	WG1076541
(S) 4-Bromofluorobenzene	104		80.0-120		02/22/2018 17:20	WG1076541



Method Blank (MB)

(MB) R3288588-1 02/22/18 19:33

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Dissolved Solids	U		2.82	10.0

¹Cp

²Tc

³Ss

⁴Cn

L971940-02 Original Sample (OS) • Duplicate (DUP)

(OS) L971940-02 02/22/18 19:33 • (DUP) R3288588-4 02/22/18 19:33

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Dissolved Solids	24600	24700	1	0.649		5

⁵Sr

⁶Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3288588-2 02/22/18 19:33 • (LCSD) R3288588-3 02/22/18 19:33

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Dissolved Solids	8800	8510	8610	96.7	97.8	85.0-115			1.17	5

⁷Gl

⁸Al

⁹Sc



Method Blank (MB)

(MB) R3288511-1 02/22/18 21:21

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Suspended Solids	U		0.350	2.50

1 Cp

2 Tc

3 Ss

4 Cn

L972029-01 Original Sample (OS) • Duplicate (DUP)

(OS) L972029-01 02/22/18 21:21 • (DUP) R3288511-4 02/22/18 21:21

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	18.4	19.6	1	6.32	J3	5

5 Sr

6 Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3288511-2 02/22/18 21:21 • (LCSD) R3288511-3 02/22/18 21:21

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Suspended Solids	773	804	796	104	103	85.0-115			1.00	5

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3288543-1 02/23/18 12:25

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	4.09	<u>J</u>	1.43	30.0

¹ Cp

² Tc

³ Ss

⁴ Cn

L971380-04 Original Sample (OS) • Duplicate (DUP)

(OS) L971380-04 02/23/18 12:47 • (DUP) R3288543-6 02/23/18 12:48

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	78.4	64.4	1	19.6		20

⁵ Sr

⁶ Qc

L964038-23 Original Sample (OS) • Duplicate (DUP)

(OS) L964038-23 02/23/18 12:55 • (DUP) R3288543-7 02/23/18 12:56

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	42.1	42.3	1	0.474		20

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3288543-2 02/23/18 12:26 • (LCSD) R3288543-3 02/23/18 12:27

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	150	158	157	105	105	85.0-115			0.635	20

L971380-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L971380-01 02/23/18 12:43 • (MS) R3288543-4 02/23/18 12:46 • (MSD) R3288543-5 02/23/18 12:46

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	150	75.2	194	204	79.2	85.9	1	80.0-120	<u>J6</u>	<u>E</u>	5.03	20



Method Blank (MB)

(MB) R3288241-1 02/22/18 13:50

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Turbidity	0.0530	↓	0.0310	0.300

1 Cp

2 Tc

3 Ss

L972157-02 Original Sample (OS) • Duplicate (DUP)

(OS) L972157-02 02/22/18 13:50 • (DUP) R3288241-4 02/22/18 13:50

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Turbidity	58.0	58.5	1	0.858		20

4 Cn

5 Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3288241-2 02/22/18 13:50 • (LCSD) R3288241-3 02/22/18 13:50

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Turbidity	40.0	42.4	42.4	106	106	90.0-110			0.000	20

6 Qc

7 Gl

8 Al

9 Sc



L972106-01 Original Sample (OS) • Duplicate (DUP)

(OS) L972106-01 02/22/18 14:32 • (DUP) R3288434-1 02/22/18 14:39

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	154	159	1	2.81		20

Sample Narrative:

OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

L971893-03 Original Sample (OS) • Duplicate (DUP)

(OS) L971893-03 02/22/18 18:36 • (DUP) R3288434-9 02/22/18 18:42

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	679	690	1	1.56		20

Sample Narrative:

OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

6 Qc

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3288434-7 02/22/18 15:59 • (LCSD) R3288434-8 02/22/18 18:28

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Alkalinity	100	103	103	103	103	85.0-115			0.00799	20

Sample Narrative:

LCS: Endpoint pH 4.5
LCSD: Endpoint pH 4.5



L972043-01 Original Sample (OS) • Duplicate (DUP)

(OS) L972043-01 02/22/18 12:57 • (DUP) R3288236-3 02/22/18 12:57

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	6.83	6.84	1	0.146		1

Sample Narrative:

OS: 6.83 at 16.8C

DUP: 6.84 at 17C

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L972140-02 Original Sample (OS) • Duplicate (DUP)

(OS) L972140-02 02/22/18 12:57 • (DUP) R3288236-4 02/22/18 12:57

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.72	7.75	1	0.388		1

Sample Narrative:

OS: 7.72 at 13.3C

DUP: 7.75 at 13.8C

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3288236-1 02/22/18 12:57 • (LCSD) R3288236-2 02/22/18 12:57

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
pH	6.38	6.39	6.39	100	100	98.4-102			0.000	1

Sample Narrative:

LCS: 6.39 at 19.8C

LCSD: 6.39 at 19.8C



Method Blank (MB)

(MB) WG1076594-1 02/22/18 13:25

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Specific Conductance	U		10.0	10.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L972009-01 Original Sample (OS) • Duplicate (DUP)

(OS) L972009-01 02/22/18 13:25 • (DUP) WG1076594-4 02/22/18 13:25

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Specific Conductance	574	575	1	0.174		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG1076594-2 02/22/18 13:25 • (LCSD) WG1076594-3 02/22/18 13:25

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Specific Conductance	559	563	561	101	100	85.0-115			0.356	20



[L972109-01](#)

Method Blank (MB)

(MB) R3288506-1 02/22/18 10:48

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Bromide	U		0.0790	1.00
Chloride	U		0.0519	1.00
Sulfate	U		0.0774	5.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L972109-01 Original Sample (OS) • Duplicate (DUP)

(OS) L972109-01 02/22/18 14:41 • (DUP) R3288506-4 02/22/18 14:57

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0.000		15
Chloride	8.20	8.18	1	0.200		15
Sulfate	8.76	8.72	1	0.514		15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3288506-2 02/22/18 11:04 • (LCSD) R3288506-3 02/22/18 11:19

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Bromide	40.0	39.3	39.8	98.3	99.5	80.0-120			1.24	15
Chloride	40.0	39.3	39.3	98.2	98.2	80.0-120			0.0196	15
Sulfate	40.0	40.2	40.6	101	101	80.0-120			0.885	15

L972109-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L972109-01 02/22/18 14:41 • (MS) R3288506-5 02/22/18 15:12 • (MSD) R3288506-6 02/22/18 15:28

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Bromide	50.0	ND	50.0	50.5	99.9	101	1	80.0-120			1.06	15
Chloride	50.0	8.20	59.4	59.0	102	102	1	80.0-120			0.763	15
Sulfate	50.0	8.76	62.3	62.1	107	107	1	80.0-120			0.240	15



[L972109-01](#)

Method Blank (MB)

(MB) R3288303-1 02/22/18 14:40

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Barium	U		0.00170	0.00500
Calcium	U		0.0463	1.00
Iron	U		0.0141	0.100
Magnesium	U		0.0111	1.00
Manganese	U		0.00120	0.0100
Potassium	0.564	↓	0.102	1.00
Sodium	0.328	↓	0.0985	1.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3288303-2 02/22/18 14:43 • (LCSD) R3288303-3 02/22/18 14:46

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Barium	1.00	0.995	1.02	99.5	102	80.0-120			2.35	20
Calcium	10.0	9.57	9.74	95.7	97.4	80.0-120			1.75	20
Iron	10.0	9.54	9.71	95.4	97.1	80.0-120			1.77	20
Magnesium	10.0	9.95	10.1	99.5	101	80.0-120			1.40	20
Manganese	1.00	0.932	0.951	93.2	95.1	80.0-120			2.04	20
Potassium	10.0	9.95	10.1	99.5	101	80.0-120			1.95	20
Sodium	10.0	9.94	10.3	99.4	103	80.0-120			3.11	20

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L972054-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L972054-01 02/22/18 14:49 • (MS) R3288303-5 02/22/18 14:55 • (MSD) R3288303-6 02/22/18 14:59

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Barium	1.00	0.676	1.66	1.65	98.5	97.1	1	75.0-125			0.855	20
Calcium	10.0	101	109	107	81.9	66.0	1	75.0-125		↓	1.47	20
Iron	10.0	0.839	10.4	10.3	95.4	94.4	1	75.0-125			0.963	20
Magnesium	10.0	55.5	64.2	63.8	86.3	82.8	1	75.0-125			0.552	20
Manganese	1.00	0.0820	1.02	1.01	94.2	93.0	1	75.0-125			1.17	20
Potassium	10.0	2.97	12.2	12.3	92.3	93.6	1	75.0-125			1.04	20
Sodium	10.0	13.7	23.5	22.9	98.0	92.3	1	75.0-125			2.48	20



Method Blank (MB)

(MB) R3288270-1 02/22/18 13:51

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Methane	U		0.00291	0.0100
Ethane	U		0.00407	0.0130
Ethene	U		0.00426	0.0130
Propane	U		0.00548	0.0190

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L972106-01 Original Sample (OS) • Duplicate (DUP)

(OS) L972106-01 02/22/18 14:07 • (DUP) R3288270-2 02/22/18 14:17

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	0.0384	0.0395	1	2.91		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3288270-3 02/22/18 14:20 • (LCSD) R3288270-4 02/22/18 14:24

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Methane	0.0678	0.0699	0.0680	103	100	85.0-115			2.79	20
Ethane	0.129	0.118	0.114	91.1	88.4	85.0-115			3.04	20
Ethene	0.127	0.119	0.117	93.9	92.1	85.0-115			1.90	20
Propane	0.186	0.193	0.189	104	101	85.0-115			2.16	20



Method Blank (MB)

(MB) R3288368-3 02/22/18 11:46

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000412	0.00100
Xylenes, Total	U		0.00106	0.00300
<i>(S) Toluene-d8</i>	105			80.0-120
<i>(S) Dibromofluoromethane</i>	99.7			76.0-123
<i>(S) a,a,a-Trifluorotoluene</i>	99.2			80.0-120
<i>(S) 4-Bromofluorobenzene</i>	103			80.0-120

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

Laboratory Control Sample (LCS)

(LCS) R3288368-1 02/22/18 10:09

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.0250	0.0256	102	69.0-123	
Ethylbenzene	0.0250	0.0261	104	77.0-120	
Toluene	0.0250	0.0259	104	77.0-120	
Xylenes, Total	0.0750	0.0787	105	77.0-120	
<i>(S) Toluene-d8</i>			103	80.0-120	
<i>(S) Dibromofluoromethane</i>			98.7	76.0-123	
<i>(S) a,a,a-Trifluorotoluene</i>			98.3	80.0-120	
<i>(S) 4-Bromofluorobenzene</i>			101	80.0-120	

7 Gl

8 Al

9 Sc



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
T8	Sample(s) received past/too close to holding time expiration.
V	The sample concentration is too high to evaluate accurate spike recoveries.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
 * Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey-NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Connecticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio-VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee ^{1,4}	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		



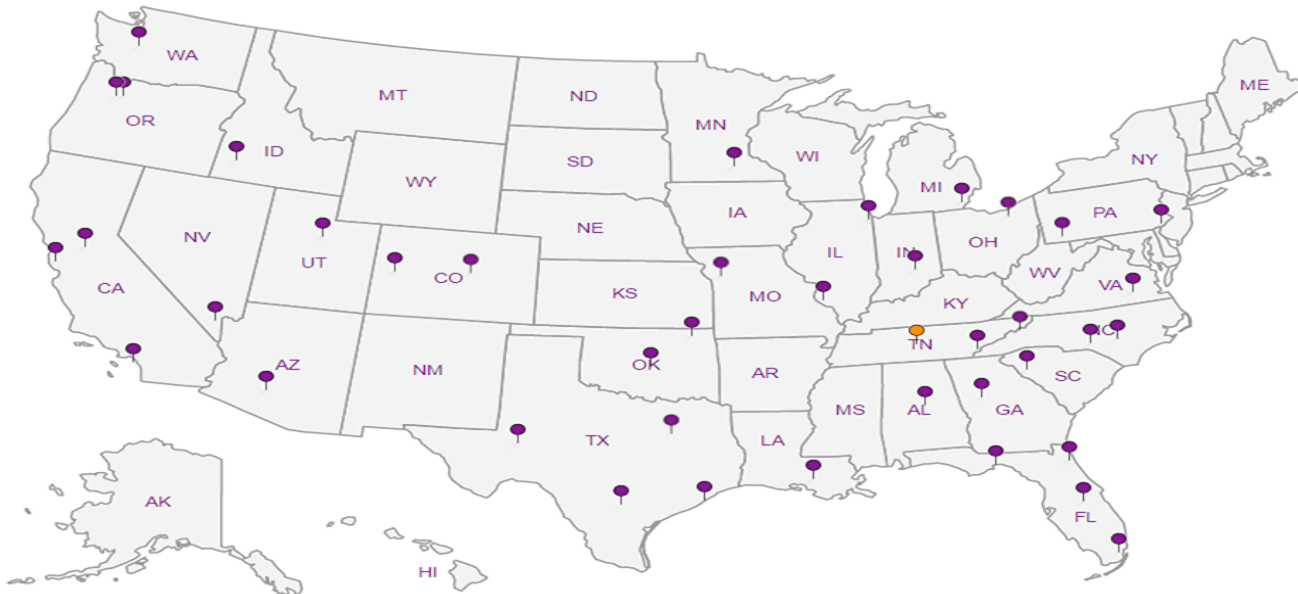
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA-Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold n/a Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. ESC Lab Sciences performs all testing at our central laboratory.



January 03, 2017

GES, Inc - Sunoco

Sample Delivery Group: L879988
Samples Received: 12/21/2016
Project Number: 0204678
Description: Pre-Construction Sampling
Site: ME2
Report To: Stephanie Grillo
440 Creamery Way, Ste 500
Exton, PA 19341








Entire Report Reviewed By:



Mark W. Beasley
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



¹Cp: Cover Page	1	
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SAMPLE SUMMARY



12202016-551-04 L879988-01 GW

Collected by
Dan Sivco

Collected date/time
12/20/16 14:20

Received date/time
12/21/16 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Gravimetric Analysis by Method 2540 C-2011	WG937971	1	12/22/16 22:07	12/23/16 03:38	JM
Gravimetric Analysis by Method 2540 D-2011	WG938170	1	12/23/16 13:17	12/23/16 14:05	MMF
Metals (ICP) by Method 6010B	WG937570	1	12/21/16 18:22	12/22/16 14:17	LTB
Volatile Organic Compounds (GC) by Method RSK175	WG938724	1	12/27/16 11:23	12/27/16 11:23	MJ
Volatile Organic Compounds (GC/MS) by Method 8260B	WG938376	1	12/24/16 17:01	12/24/16 17:01	ACG
Wet Chemistry by Method 130.1	WG937903	1	12/22/16 14:53	12/22/16 14:53	JER
Wet Chemistry by Method 2130 B-2011	WG937662	1	12/21/16 17:25	12/21/16 17:25	MHM
Wet Chemistry by Method 2320 B-2011	WG937555	1	12/22/16 10:15	12/22/16 10:15	MCG
Wet Chemistry by Method 9040C	WG937665	1	12/22/16 23:41	12/22/16 23:41	ASK
Wet Chemistry by Method 9050A	WG937569	1	12/21/16 18:13	12/21/16 18:13	MAJ
Wet Chemistry by Method 9056A	WG937591	1	12/22/16 19:19	12/22/16 19:19	KCF

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Mark W. Beasley
Technical Service Representative

Sample Handling and Receiving

The following samples were prepared and/or analyzed past recommended holding time. Concentrations should be considered minimum values.

<u>ESC Sample ID</u>	<u>Project Sample ID</u>	<u>Method</u>
L879988-01	12202016-551-04	9040C

- ¹ Cp
- ² Tc
- ³ Ss
- ⁴ Cn
- ⁵ Sr
- ⁶ Qc
- ⁷ Gl
- ⁸ Al
- ⁹ Sc



Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	76.0		10.0	1	12/23/2016 03:38	WG937971

1 Cp

2 Tc

Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	ND		2.50	1	12/23/2016 14:05	WG938170

3 Ss

4 Cn

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hardness, Total (mg/L as CaCO3)	110		30.0	1	12/22/2016 14:53	WG937903

5 Sr

6 Qc

Wet Chemistry by Method 2130 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Turbidity	1.10		0.100	1	12/21/2016 17:25	WG937662

7 Gl

8 Al

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Alkalinity	133		20.0	1	12/22/2016 10:15	WG937555

9 Sc

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.15		1	12/22/2016 23:41	WG937665

Sample Narrative:

9040C L879988-01 WG937665: 8.15 at 18.7c

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	296		1	12/21/2016 18:13	WG937569

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	12/22/2016 19:19	WG937591
Chloride	6.33		1.00	1	12/22/2016 19:19	WG937591
Sulfate	5.79		5.00	1	12/22/2016 19:19	WG937591

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	0.414		0.00500	1	12/22/2016 14:17	WG937570
Calcium	31.3		1.00	1	12/22/2016 14:17	WG937570
Iron	0.197		0.100	1	12/22/2016 14:17	WG937570
Magnesium	7.06		1.00	1	12/22/2016 14:17	WG937570
Manganese	0.0161		0.0100	1	12/22/2016 14:17	WG937570
Potassium	ND		1.00	1	12/22/2016 14:17	WG937570
Sodium	23.3		1.00	1	12/22/2016 14:17	WG937570



Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Methane	0.0727		0.0100	1	12/27/2016 11:23	WG938724
Ethane	ND		0.0130	1	12/27/2016 11:23	WG938724
Ethene	ND		0.0130	1	12/27/2016 11:23	WG938724
Propane	ND		0.0190	1	12/27/2016 11:23	WG938724

1 Cp

2 Tc

3 Ss

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	12/24/2016 17:01	WG938376
Toluene	ND		0.00100	1	12/24/2016 17:01	WG938376
Ethylbenzene	ND		0.00100	1	12/24/2016 17:01	WG938376
Total Xylenes	ND		0.00300	1	12/24/2016 17:01	WG938376
(S) Toluene-d8	98.8		90.0-115		12/24/2016 17:01	WG938376
(S) Dibromofluoromethane	87.9		79.0-121		12/24/2016 17:01	WG938376
(S) a,a,a-Trifluorotoluene	100		90.4-116		12/24/2016 17:01	WG938376
(S) 4-Bromofluorobenzene	97.7		80.1-120		12/24/2016 17:01	WG938376

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3187238-1 12/23/16 03:38

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Dissolved Solids	U		2.82	10.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

L879787-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879787-01 12/23/16 03:38 • (DUP) R3187238-4 12/23/16 03:38

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Dissolved Solids	177	178	1	0.563		5

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3187238-2 12/23/16 03:38 • (LCSD) R3187238-3 12/23/16 03:38

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Dissolved Solids	8800	8540	8510	97.0	96.7	85.0-115			0.352	5

⁷ Gl

⁸ Al

⁹ Sc



Method Blank (MB)

(MB) R3187242-1 12/23/16 14:05

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Suspended Solids	U		0.350	2.50

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

L879987-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879987-01 12/23/16 14:05 • (DUP) R3187242-4 12/23/16 14:05

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	152	152	1	0.000		5

L880021-01 Original Sample (OS) • Duplicate (DUP)

(OS) L880021-01 12/23/16 14:05 • (DUP) R3187242-5 12/23/16 14:05

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	45.5	45.0	1	1.10		5

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3187242-2 12/23/16 14:05 • (LCSD) R3187242-3 12/23/16 14:05

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Suspended Solids	773	792	788	102	102	85.0-115			0.506	5



Method Blank (MB)

(MB) R3186757-4 12/22/16 14:40

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Hardness	3.39	J	1.43	30.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L879800-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879800-01 12/22/16 14:44 • (DUP) R3186757-7 12/22/16 14:45

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Hardness	79.7	80.5	1	1		20

L880148-01 Original Sample (OS) • Duplicate (DUP)

(OS) L880148-01 12/22/16 15:58 • (DUP) R3186757-10 12/22/16 15:59

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Hardness	475	499	10	5		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3186757-5 12/22/16 14:41 • (LCSD) R3186757-6 12/22/16 14:42

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Hardness	150	159	159	106	106	85-115			0	20



Method Blank (MB)

(MB) WG937662-1 12/21/16 17:25

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Turbidity	U		0.0310	0.100

¹ Cp

² Tc

³ Ss

L879980-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879980-01 12/21/16 17:25 • (DUP) WG937662-4 12/21/16 17:25

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Turbidity	2.12	2.13	1	0.471		20

⁴ Cn

⁵ Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG937662-2 12/21/16 17:25 • (LCSD) WG937662-3 12/21/16 17:25

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Turbidity	40.0	42.1	41.9	105	105	90.0-110			0.476	20

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Method Blank (MB)

(MB) R3187044-1 12/22/16 07:49

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Alkalinity	U		2.71	20.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L879764-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879764-01 12/22/16 08:34 • (DUP) R3187044-3 12/22/16 08:40

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	27.6	24.5	1	12.0		20

L880069-03 Original Sample (OS) • Duplicate (DUP)

(OS) L880069-03 12/22/16 11:35 • (DUP) R3187044-6 12/22/16 11:46

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	134	134	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3187044-4 12/22/16 09:08 • (LCSD) R3187044-5 12/22/16 11:13

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Alkalinity	100	95.1	96.9	95.0	97.0	85.0-115			2.00	20



[L879988-01](#)

L879756-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879756-01 12/22/16 23:41 • (DUP) WG937665-1 12/22/16 23:41

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	6.50	6.50	1	0.000		1

L880076-02 Original Sample (OS) • Duplicate (DUP)

(OS) L880076-02 12/22/16 23:41 • (DUP) WG937665-2 12/22/16 23:41

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	10.2	10.2	1	0.000		1

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG937665-3 12/22/16 23:41 • (LCSD) WG937665-4 12/22/16 23:41

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
pH	6.07	6.10	6.09	100	100	98.4-102			0.164	1

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Method Blank (MB)

(MB) WG937569-7 12/21/16 18:13

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Specific Conductance	0.850		umhos/cm	umhos/cm

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L879980-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879980-01 12/21/16 18:13 • (DUP) WG937569-1 12/21/16 18:13

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Specific Conductance	266	267	1	0.413		20

L880091-04 Original Sample (OS) • Duplicate (DUP)

(OS) L880091-04 12/21/16 18:13 • (DUP) WG937569-6 12/21/16 18:13

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Specific Conductance	4580	4550	1	0.657		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG937569-2 12/21/16 18:13 • (LCSD) WG937569-3 12/21/16 18:13

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Specific Conductance	542	549	547	101	101	90.0-110			0.365	20



Method Blank (MB)

(MB) R3186888-1 12/22/16 12:40

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Bromide	U		0.079	1.00
Chloride	U		0.0519	1.00
Sulfate	U		0.0774	5.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L879270-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879270-01 12/22/16 16:06 • (DUP) R3186888-4 12/22/16 16:20

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0		15
Chloride	15.8	15.8	1	0		15
Sulfate	13.0	13.0	1	0		15

L879690-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879690-01 12/22/16 19:34 • (DUP) R3186888-6 12/22/16 19:49

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	2.77	2.69	1	3		15
Chloride	47.1	47.1	1	0		15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3186888-2 12/22/16 12:55 • (LCSD) R3186888-3 12/22/16 13:10

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Bromide	40.0	40.4	40.4	101	101	80-120			0	15
Chloride	40.0	40.2	40.2	101	100	80-120			0	15
Sulfate	40.0	40.3	40.3	101	101	80-120			0	15

L879554-21 Original Sample (OS) • Matrix Spike (MS)

(OS) L879554-21 12/22/16 16:35 • (MS) R3186888-5 12/22/16 16:50

Analyte	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
	mg/l	mg/l	mg/l	%		%	
Bromide	50.0	0.0937	50.1	100	1	80-120	
Sulfate	50.0	2.03	53.2	102	1	80-120	



[L879988-01](#)

L879920-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L879920-06 12/22/16 20:34 • (MS) R3186888-7 12/22/16 20:49 • (MSD) R3186888-8 12/22/16 21:03

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits
Bromide	50.0	ND	50.9	49.7	102	99	1	80-120			2	15
Chloride	50.0	ND	51.6	51.4	101	101	1	80-120			0	15
Sulfate	50.0	ND	50.3	50.3	101	101	1	80-120			0	15

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Method Blank (MB)

(MB) R3186852-1 12/22/16 13:41

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Barium	U		0.0017	0.00500
Calcium	0.0657	J	0.0463	1.00
Iron	U		0.0141	0.100
Magnesium	U		0.0111	1.00
Manganese	U		0.0012	0.0100
Potassium	U		0.102	1.00
Sodium	U		0.0985	1.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3186852-2 12/22/16 13:43 • (LCSD) R3186852-3 12/22/16 13:46

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Barium	1.00	1.01	1.03	101	103	80-120			2	20
Calcium	10.0	9.84	9.89	98	99	80-120			0	20
Iron	10.0	9.84	9.99	98	100	80-120			2	20
Magnesium	10.0	10.1	10.2	101	102	80-120			1	20
Manganese	1.00	1.00	1.01	100	101	80-120			1	20
Potassium	10.0	9.91	10.0	99	100	80-120			1	20
Sodium	10.0	10.0	10.1	100	101	80-120			1	20

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L879967-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L879967-04 12/22/16 13:48 • (MS) R3186852-5 12/22/16 13:53 • (MSD) R3186852-6 12/22/16 13:56

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Barium	1.00	0.204	1.21	1.20	101	100	1	75-125			0	20
Calcium	10.0	167	176	176	82	86	1	75-125			0	20
Iron	10.0	0.515	10.4	10.4	99	99	1	75-125			0	20
Magnesium	10.0	32.2	41.9	42.1	97	99	1	75-125			0	20
Manganese	1.00	1.49	2.42	2.47	93	98	1	75-125			2	20
Potassium	10.0	0.561	10.8	10.8	102	102	1	75-125			0	20
Sodium	10.0	49.0	58.6	58.5	96	95	1	75-125			0	20



Method Blank (MB)

(MB) R3187353-1 12/27/16 10:56

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Methane	U		0.00291	0.0100
Ethane	U		0.00407	0.0130
Ethene	U		0.00426	0.0130
Propane	U		0.00548	0.0190

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L879702-02 Original Sample (OS) • Duplicate (DUP)

(OS) L879702-02 12/27/16 11:05 • (DUP) R3187353-2 12/27/16 11:26

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	U	0.000	1	0.000		20
Ethane	U	0.000	1	0.000		20
Ethene	U	0.000	1	0.000		20
Propane	U	0.000	1	0.000		20

L880254-04 Original Sample (OS) • Duplicate (DUP)

(OS) L880254-04 12/27/16 12:06 • (DUP) R3187353-3 12/27/16 12:08

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	ND	0.000	1	0.000		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3187353-4 12/27/16 12:10 • (LCSD) R3187353-5 12/27/16 12:12

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Methane	0.0678	0.0602	0.0601	88.8	88.6	85.0-115			0.190	20
Ethane	0.129	0.115	0.115	89.2	88.9	85.0-115			0.350	20
Ethene	0.127	0.111	0.111	87.6	87.7	85.0-115			0.160	20
Propane	0.186	0.164	0.162	88.0	87.4	85.0-115			0.750	20



Method Blank (MB)

(MB) R3187358-3 12/24/16 14:30

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000412	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	98.4			90.0-115
(S) Dibromofluoromethane	86.7			79.0-121
(S) a,a,a-Trifluorotoluene	99.2			90.4-116
(S) 4-Bromofluorobenzene	97.5			80.1-120

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3187358-1 12/24/16 13:53 • (LCSD) R3187358-2 12/24/16 14:05

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Benzene	0.0250	0.0227	0.0234	90.7	93.5	73.0-122			2.97	20
Ethylbenzene	0.0250	0.0247	0.0264	98.7	106	80.9-121			6.79	20
Toluene	0.0250	0.0228	0.0241	91.3	96.3	77.9-116			5.25	20
Xylenes, Total	0.0750	0.0735	0.0790	98.0	105	79.2-122			7.25	20
(S) Toluene-d8				99.8	99.1	90.0-115				
(S) Dibromofluoromethane				88.1	85.5	79.0-121				
(S) a,a,a-Trifluorotoluene				100	98.7	90.4-116				
(S) 4-Bromofluorobenzene				95.7	96.5	80.1-120				

7 Gl

8 Al

9 Sc



Abbreviations and Definitions

SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
Rec.	Recovery.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

ACCREDITATIONS & LOCATIONS

ONE LAB. NATIONWIDE.



ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE**.
 * Not all certifications held by the laboratory are applicable to the results reported in the attached report.

1 Cp
 2 Tc
 3 Ss
 4 Cn
 5 Sr
 6 Qc
 7 Gl
 8 Al
 9 Sc

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Connecticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee ¹⁴	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

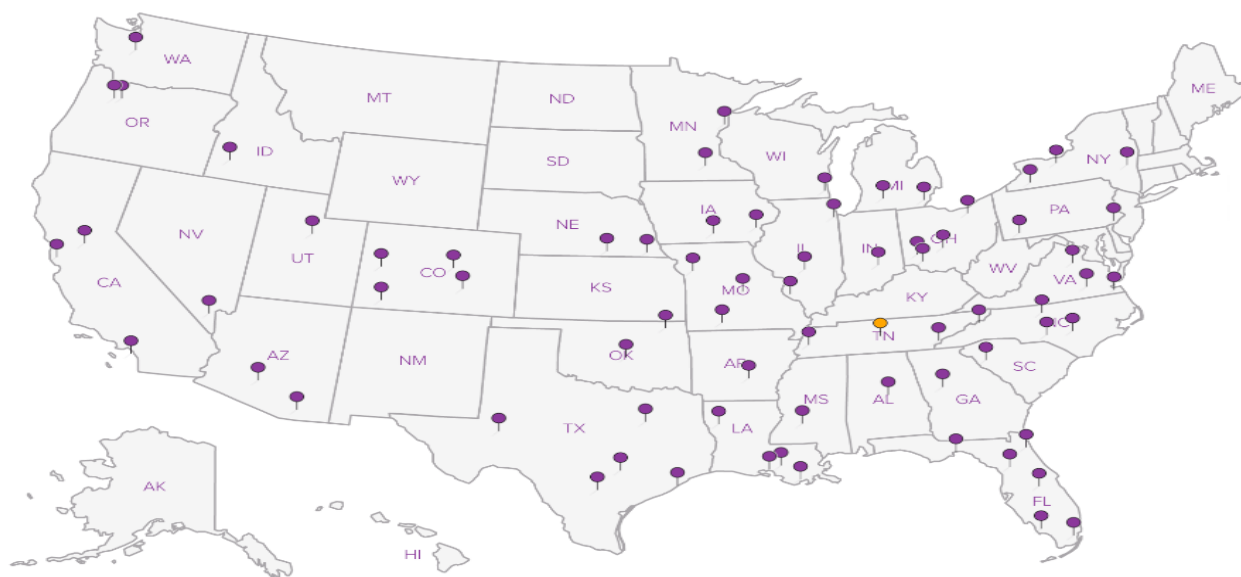
Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ^{n/a} Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. **ESC Lab Sciences performs all testing at our central laboratory.**



Company Name/Address: GES, Inc - Sunoco 440 Creamery Way, Suite 500 Exton, PA 19341		Billing Information: Accounts Payable 440 Creamery Way, Suite 500 Exton, PA 19341		Analysis / Container / Preservative						Chain of Custody Page 1 of 1	
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YOUR LAB OF CHOICE
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859



Report to: Holly Smoker		Email To: hsmoker@gesonline.com		<p>**pH,SPCON,TDS,TURB* 250mlHDPE-NoPres</p> <p>ALK, Br, Cl, SO4 250mlHDPE-NoPres</p> <p>Total Metals, Hardness 250mlHDPE-HNO3 < 2</p> <p>RSK175 + Propane 40mlAmb-HCl</p> <p>TSS 1L-HDPE NoPres</p> <p>V8260BTEX 40mlAmb-HCl</p>						L# L879988	
Project Description: Pre-Construction Sampling		City/State Collected: Johnstown, PA								Acctnum: SUNGES	
Phone: 610-458-1077	Client Project # NA	Lab Project # SUNGES-GRILLO								Template: T114657	
Fax: NA	Site/Facility ID # ME2	P.O. # NA								Prelogin: P564159	
Collected by (print): DAN SINCO	Rush? (Lab MUST Be Notified) Same Day200% Next Day100% Two Day50% Three Day25%	Date Results Needed STANDARD		TSR: Mark Beasley							
Collected by (signature): <i>[Signature]</i>	Immediately Packed on Ice N ___ Y <input checked="" type="checkbox"/>	Email? ___ No <input checked="" type="checkbox"/> Yes		Cooler:							
		FAX? ___ No ___ Yes		Shipped Via: Fed Ex							

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	**pH,SPCON,TDS,TURB* 250mlHDPE-NoPres	ALK, Br, Cl, SO4 250mlHDPE-NoPres	Total Metals, Hardness 250mlHDPE-HNO3 < 2	RSK175 + Propane 40mlAmb-HCl	TSS 1L-HDPE NoPres	V8260BTEX 40mlAmb-HCl	Rem./Contaminant	Sample # (lab only)
12202016-551-04	Grab	DW	-	12/20/16	1420	8	X	X	X	X	X	X		-01

* Matrix: **SS** - Soil **GW** - Groundwater **WW** - WasteWater **DW** - Drinking Water **OT** - Other _____

Remarks: **Metals = Ba,Ca,Fe,K,Mg,Mn,Na. Project #: 0204678 -06-160-xx Org 1402**

pH _____ Temp _____

Flow _____ Other _____

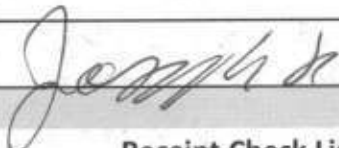
Relinquished by: (Signature) <i>[Signature]</i>	Date: 12/20/16	Time: 1530	Received by: (Signature) FEDEX	Samples returned via: <input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> Courier <input type="checkbox"/> _____	Hold #
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp: 21°C Bottles Received: 8	Condition: (lab use only) <i>[Signature]</i> T011
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature) <i>[Signature]</i>	Date: 12-21-16 Time: 0900	COC Seal Intact: ___ Y ___ N ___ NA pH Checked: <i>CC</i> NCF:



L · A · B S · C · I · E · N · C · E · S

YOUR LAB OF CHOICE

Cooler Receipt Form

Client: <u>SUNGS</u>	SDG#	<u>LS7998B</u>	
Cooler Received/Opened On: <u>12/9/16</u>	Temperature Upon Receipt:	<u>2.1</u> °c	
Received By: Joseph Roberts			
Signature: 			
Receipt Check List			
	Yes	No	N/A
Were custody seals on outside of cooler and intact?	<input checked="" type="checkbox"/>		
Were custody papers properly filled out?	<input checked="" type="checkbox"/>		
Did all bottles arrive in good condition?	<input checked="" type="checkbox"/>		
Were correct bottles used for the analyses requested?	<input checked="" type="checkbox"/>		
Was sufficient amount of sample sent in each bottle?	<input checked="" type="checkbox"/>		
Were all applicable sample containers correctly preserved and checked for preservation? (Any not in accepted range noted on COC)	<input checked="" type="checkbox"/>		
If applicable, was an observable VOA headspace present?		<input checked="" type="checkbox"/>	
Non Conformance Generated. (If yes see attached NCF)			

GES, Inc - Sunoco

Sample Delivery Group: L879980
Samples Received: 12/21/2016
Project Number: 0204678
Description: Pre-Construction Sampling
Site: ME2
Report To: Stephanie Grillo
440 Creamery Way, Ste 500
Exton, PA 19341










Entire Report Reviewed By:



Mark W. Beasley
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



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SAMPLE SUMMARY



12202016-551-01 L879980-01 GW

Collected by: Dan Sivco
 Collected date/time: 12/20/16 10:30
 Received date/time: 12/21/16 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Gravimetric Analysis by Method 2540 C-2011	WG937971	1	12/22/16 22:07	12/23/16 03:38	JM
Gravimetric Analysis by Method 2540 D-2011	WG938170	1	12/23/16 13:17	12/23/16 14:05	MMF
Metals (ICP) by Method 6010B	WG937570	1	12/21/16 18:22	12/22/16 14:04	LTB
Volatile Organic Compounds (GC) by Method RSK175	WG938724	1	12/27/16 11:13	12/27/16 11:13	MJ
Volatile Organic Compounds (GC/MS) by Method 8260B	WG938376	1	12/24/16 16:23	12/24/16 16:23	ACG
Wet Chemistry by Method 130.1	WG937903	1	12/22/16 15:54	12/22/16 15:54	JER
Wet Chemistry by Method 2130 B-2011	WG937662	1	12/21/16 17:25	12/21/16 17:25	MHM
Wet Chemistry by Method 2320 B-2011	WG937555	1	12/22/16 09:54	12/22/16 09:54	MCG
Wet Chemistry by Method 9040C	WG937665	1	12/22/16 23:41	12/22/16 23:41	ASK
Wet Chemistry by Method 9050A	WG937569	1	12/21/16 18:13	12/21/16 18:13	MAJ
Wet Chemistry by Method 9056A	WG937591	1	12/22/16 18:04	12/22/16 18:04	KCF

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Mark W. Beasley
Technical Service Representative

Sample Handling and Receiving

The following samples were prepared and/or analyzed past recommended holding time. Concentrations should be considered minimum values.

<u>ESC Sample ID</u>	<u>Project Sample ID</u>	<u>Method</u>
L879980-01	12202016-551-01	9040C

- ¹ Cp
- ² Tc
- ³ Ss
- ⁴ Cn
- ⁵ Sr
- ⁶ Qc
- ⁷ Gl
- ⁸ Al
- ⁹ Sc



Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	140		10.0	1	12/23/2016 03:38	WG937971

1 Cp

2 Tc

Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	ND		2.50	1	12/23/2016 14:05	WG938170

3 Ss

4 Cn

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hardness, Total (mg/L as CaCO3)	136		30.0	1	12/22/2016 15:54	WG937903

5 Sr

6 Qc

Wet Chemistry by Method 2130 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Turbidity	2.12		0.100	1	12/21/2016 17:25	WG937662

7 Gl

8 Al

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Alkalinity	112		20.0	1	12/22/2016 09:54	WG937555

9 Sc

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.53		1	12/22/2016 23:41	WG937665

Sample Narrative:

9040C L879980-01 WG937665: 8.53 at 19.0c

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	266		1	12/21/2016 18:13	WG937569

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	12/22/2016 18:04	WG937591
Chloride	8.27		1.00	1	12/22/2016 18:04	WG937591
Sulfate	8.68		5.00	1	12/22/2016 18:04	WG937591

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	0.327		0.00500	1	12/22/2016 14:04	WG937570
Calcium	37.8		1.00	1	12/22/2016 14:04	WG937570
Iron	0.293		0.100	1	12/22/2016 14:04	WG937570
Magnesium	7.85		1.00	1	12/22/2016 14:04	WG937570
Manganese	0.0581		0.0100	1	12/22/2016 14:04	WG937570
Potassium	ND		1.00	1	12/22/2016 14:04	WG937570
Sodium	7.55		1.00	1	12/22/2016 14:04	WG937570



Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Methane	0.0829		0.0100	1	12/27/2016 11:13	WG938724
Ethane	ND		0.0130	1	12/27/2016 11:13	WG938724
Ethene	ND		0.0130	1	12/27/2016 11:13	WG938724
Propane	ND		0.0190	1	12/27/2016 11:13	WG938724

1 Cp

2 Tc

3 Ss

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	12/24/2016 16:23	WG938376
Toluene	ND		0.00100	1	12/24/2016 16:23	WG938376
Ethylbenzene	ND		0.00100	1	12/24/2016 16:23	WG938376
Total Xylenes	ND		0.00300	1	12/24/2016 16:23	WG938376
(S) Toluene-d8	98.9		90.0-115		12/24/2016 16:23	WG938376
(S) Dibromofluoromethane	86.7		79.0-121		12/24/2016 16:23	WG938376
(S) a,a,a-Trifluorotoluene	99.9		90.4-116		12/24/2016 16:23	WG938376
(S) 4-Bromofluorobenzene	97.4		80.1-120		12/24/2016 16:23	WG938376

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3187238-1 12/23/16 03:38

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Dissolved Solids	U		2.82	10.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

L879787-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879787-01 12/23/16 03:38 • (DUP) R3187238-4 12/23/16 03:38

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Dissolved Solids	177	178	1	0.563		5

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3187238-2 12/23/16 03:38 • (LCSD) R3187238-3 12/23/16 03:38

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Dissolved Solids	8800	8540	8510	97.0	96.7	85.0-115			0.352	5

⁷ Gl

⁸ Al

⁹ Sc



Method Blank (MB)

(MB) R3187242-1 12/23/16 14:05

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Suspended Solids	U		0.350	2.50

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

L879987-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879987-01 12/23/16 14:05 • (DUP) R3187242-4 12/23/16 14:05

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	152	152	1	0.000		5

L880021-01 Original Sample (OS) • Duplicate (DUP)

(OS) L880021-01 12/23/16 14:05 • (DUP) R3187242-5 12/23/16 14:05

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	45.5	45.0	1	1.10		5

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3187242-2 12/23/16 14:05 • (LCSD) R3187242-3 12/23/16 14:05

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Suspended Solids	773	792	788	102	102	85.0-115			0.506	5



Method Blank (MB)

(MB) R3186757-4 12/22/16 14:40

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Hardness	3.39	J	1.43	30.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L879800-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879800-01 12/22/16 14:44 • (DUP) R3186757-7 12/22/16 14:45

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Hardness	79.7	80.5	1	1		20

L880148-01 Original Sample (OS) • Duplicate (DUP)

(OS) L880148-01 12/22/16 15:58 • (DUP) R3186757-10 12/22/16 15:59

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Hardness	475	499	10	5		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3186757-5 12/22/16 14:41 • (LCSD) R3186757-6 12/22/16 14:42

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Hardness	150	159	159	106	106	85-115			0	20



Method Blank (MB)

(MB) WG937662-1 12/21/16 17:25

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Turbidity	U		0.0310	0.100

¹ Cp

² Tc

³ Ss

L879980-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879980-01 12/21/16 17:25 • (DUP) WG937662-4 12/21/16 17:25

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Turbidity	2.12	2.13	1	0.471		20

⁴ Cn

⁵ Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG937662-2 12/21/16 17:25 • (LCSD) WG937662-3 12/21/16 17:25

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Turbidity	40.0	42.1	41.9	105	105	90.0-110			0.476	20

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Method Blank (MB)

(MB) R3187044-1 12/22/16 07:49

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Alkalinity	U		2.71	20.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L879764-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879764-01 12/22/16 08:34 • (DUP) R3187044-3 12/22/16 08:40

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	27.6	24.5	1	12.0		20

L880069-03 Original Sample (OS) • Duplicate (DUP)

(OS) L880069-03 12/22/16 11:35 • (DUP) R3187044-6 12/22/16 11:46

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	134	134	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3187044-4 12/22/16 09:08 • (LCSD) R3187044-5 12/22/16 11:13

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Alkalinity	100	95.1	96.9	95.0	97.0	85.0-115			2.00	20



L879756-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879756-01 12/22/16 23:41 • (DUP) WG937665-1 12/22/16 23:41

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	6.50	6.50	1	0.000		1

L880076-02 Original Sample (OS) • Duplicate (DUP)

(OS) L880076-02 12/22/16 23:41 • (DUP) WG937665-2 12/22/16 23:41

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	10.2	10.2	1	0.000		1

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG937665-3 12/22/16 23:41 • (LCSD) WG937665-4 12/22/16 23:41

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
pH	6.07	6.10	6.09	100	100	98.4-102			0.164	1

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) WG937569-7 12/21/16 18:13

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Specific Conductance	0.850		umhos/cm	umhos/cm

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L879980-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879980-01 12/21/16 18:13 • (DUP) WG937569-1 12/21/16 18:13

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Specific Conductance	266	267	1	0.413		20

L880091-04 Original Sample (OS) • Duplicate (DUP)

(OS) L880091-04 12/21/16 18:13 • (DUP) WG937569-6 12/21/16 18:13

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Specific Conductance	4580	4550	1	0.657		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG937569-2 12/21/16 18:13 • (LCSD) WG937569-3 12/21/16 18:13

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Specific Conductance	542	549	547	101	101	90.0-110			0.365	20



Method Blank (MB)

(MB) R3186888-1 12/22/16 12:40

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Bromide	U		0.079	1.00
Chloride	U		0.0519	1.00
Sulfate	U		0.0774	5.00

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

L879270-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879270-01 12/22/16 16:06 • (DUP) R3186888-4 12/22/16 16:20

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0		15
Chloride	15.8	15.8	1	0		15
Sulfate	13.0	13.0	1	0		15

L879690-01 Original Sample (OS) • Duplicate (DUP)

(OS) L879690-01 12/22/16 19:34 • (DUP) R3186888-6 12/22/16 19:49

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	2.77	2.69	1	3		15
Chloride	47.1	47.1	1	0		15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3186888-2 12/22/16 12:55 • (LCSD) R3186888-3 12/22/16 13:10

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Bromide	40.0	40.4	40.4	101	101	80-120			0	15
Chloride	40.0	40.2	40.2	101	100	80-120			0	15
Sulfate	40.0	40.3	40.3	101	101	80-120			0	15

L879554-21 Original Sample (OS) • Matrix Spike (MS)

(OS) L879554-21 12/22/16 16:35 • (MS) R3186888-5 12/22/16 16:50

Analyte	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
	mg/l	mg/l	mg/l	%		%	
Bromide	50.0	0.0937	50.1	100	1	80-120	
Sulfate	50.0	2.03	53.2	102	1	80-120	



L879920-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L879920-06 12/22/16 20:34 • (MS) R3186888-7 12/22/16 20:49 • (MSD) R3186888-8 12/22/16 21:03

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits
Bromide	50.0	ND	50.9	49.7	102	99	1	80-120			2	15
Chloride	50.0	ND	51.6	51.4	101	101	1	80-120			0	15
Sulfate	50.0	ND	50.3	50.3	101	101	1	80-120			0	15

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Method Blank (MB)

(MB) R3186852-1 12/22/16 13:41

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Barium	U		0.0017	0.00500
Calcium	0.0657	J	0.0463	1.00
Iron	U		0.0141	0.100
Magnesium	U		0.0111	1.00
Manganese	U		0.0012	0.0100
Potassium	U		0.102	1.00
Sodium	U		0.0985	1.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3186852-2 12/22/16 13:43 • (LCSD) R3186852-3 12/22/16 13:46

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Barium	1.00	1.01	1.03	101	103	80-120			2	20
Calcium	10.0	9.84	9.89	98	99	80-120			0	20
Iron	10.0	9.84	9.99	98	100	80-120			2	20
Magnesium	10.0	10.1	10.2	101	102	80-120			1	20
Manganese	1.00	1.00	1.01	100	101	80-120			1	20
Potassium	10.0	9.91	10.0	99	100	80-120			1	20
Sodium	10.0	10.0	10.1	100	101	80-120			1	20

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L879967-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L879967-04 12/22/16 13:48 • (MS) R3186852-5 12/22/16 13:53 • (MSD) R3186852-6 12/22/16 13:56

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Barium	1.00	0.204	1.21	1.20	101	100	1	75-125			0	20
Calcium	10.0	167	176	176	82	86	1	75-125			0	20
Iron	10.0	0.515	10.4	10.4	99	99	1	75-125			0	20
Magnesium	10.0	32.2	41.9	42.1	97	99	1	75-125			0	20
Manganese	1.00	1.49	2.42	2.47	93	98	1	75-125			2	20
Potassium	10.0	0.561	10.8	10.8	102	102	1	75-125			0	20
Sodium	10.0	49.0	58.6	58.5	96	95	1	75-125			0	20



Method Blank (MB)

(MB) R3187353-1 12/27/16 10:56

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Methane	U		0.00291	0.0100
Ethane	U		0.00407	0.0130
Ethene	U		0.00426	0.0130
Propane	U		0.00548	0.0190

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

L879702-02 Original Sample (OS) • Duplicate (DUP)

(OS) L879702-02 12/27/16 11:05 • (DUP) R3187353-2 12/27/16 11:26

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	U	0.000	1	0.000		20
Ethane	U	0.000	1	0.000		20
Ethene	U	0.000	1	0.000		20
Propane	U	0.000	1	0.000		20

6 Qc

7 Gl

8 Al

L880254-04 Original Sample (OS) • Duplicate (DUP)

(OS) L880254-04 12/27/16 12:06 • (DUP) R3187353-3 12/27/16 12:08

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	ND	0.000	1	0.000		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3187353-4 12/27/16 12:10 • (LCSD) R3187353-5 12/27/16 12:12

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Methane	0.0678	0.0602	0.0601	88.8	88.6	85.0-115			0.190	20
Ethane	0.129	0.115	0.115	89.2	88.9	85.0-115			0.350	20
Ethene	0.127	0.111	0.111	87.6	87.7	85.0-115			0.160	20
Propane	0.186	0.164	0.162	88.0	87.4	85.0-115			0.750	20



Method Blank (MB)

(MB) R3187358-3 12/24/16 14:30

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000412	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	98.4			90.0-115
(S) Dibromofluoromethane	86.7			79.0-121
(S) a,a,a-Trifluorotoluene	99.2			90.4-116
(S) 4-Bromofluorobenzene	97.5			80.1-120

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3187358-1 12/24/16 13:53 • (LCSD) R3187358-2 12/24/16 14:05

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Benzene	0.0250	0.0227	0.0234	90.7	93.5	73.0-122			2.97	20
Ethylbenzene	0.0250	0.0247	0.0264	98.7	106	80.9-121			6.79	20
Toluene	0.0250	0.0228	0.0241	91.3	96.3	77.9-116			5.25	20
Xylenes, Total	0.0750	0.0735	0.0790	98.0	105	79.2-122			7.25	20
(S) Toluene-d8				99.8	99.1	90.0-115				
(S) Dibromofluoromethane				88.1	85.5	79.0-121				
(S) a,a,a-Trifluorotoluene				100	98.7	90.4-116				
(S) 4-Bromofluorobenzene				95.7	96.5	80.1-120				

⁷ Gl

⁸ Al

⁹ Sc



Abbreviations and Definitions

SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
Rec.	Recovery.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE**.
 * Not all certifications held by the laboratory are applicable to the results reported in the attached report.



State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Connecticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee ¹⁴	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

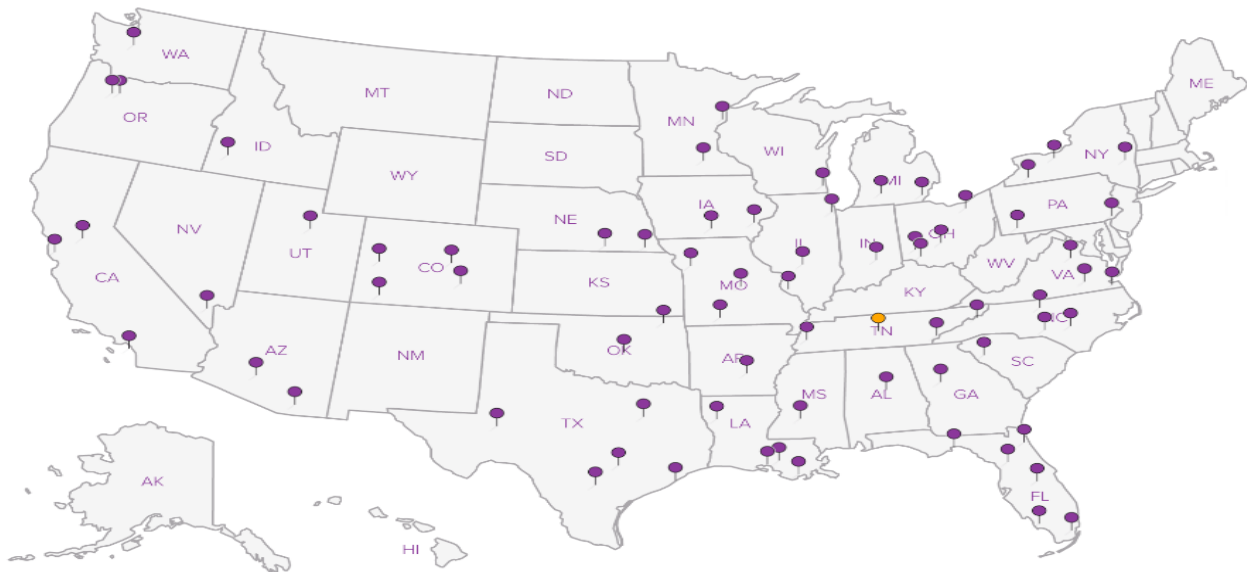
Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ^{n/a} Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. **ESC Lab Sciences performs all testing at our central laboratory.**



Company Name/Address:
GES, Inc - Sunoco
 440 Creamery Way, Suite 500
 Exton, PA 19341

Billing Information:
Accounts Payable
 440 Creamery Way, Suite 500
 Exton, PA 19341

Report to:
Holly Smoker

Email To:
hsmoker@gesonline.com

Project Description:
Pre-Construction Sampling

City/State Collected:
Jehnstown, PA

Phone: **610-458-1077**
 Fax: **NA**

Client Project #
NA

Lab Project #
SUNGES-GRILLO

Collected by (print):
DAW SINCO

Site/Facility ID #
ME2

P.O. #
NA

Collected by (signature):
D.S.
 Immediately Packed on Ice N Y

Rush? (Lab MUST Be Notified)
 Same Day200%
 Next Day100%
 Two Day50%
 Three Day25%

Date Results Needed
STANDARD
 Email? No Yes
 FAX? No Yes

							Analysis / Container / Preservative						Chain of Custody Page 1 of 1		
							**pH,SPCON,TDS,TURB* 250mlHDPE-NoPres	ALK, Br, Cl, SO4 250mlHDPE-NoPres	Total Metals, Hardness 250mlHDPE-HNO3 <<	RSK175 + Propane 40mlAmb-HCl	TSS 1L-HDPE NoPres	V8260BTEX 40mlAmb-HCl			<p>12065 Lebanon Rd Mount Juliet, TN 37122 Phone: 615-758-5858 Phone: 800-767-5859 Fax: 615-758-5859</p> <p>YOUR LAB OF CHOICE</p> <p>L# 187998</p> <p>C066</p> <p>Acctnum: SUNGES Template: T114657 Prelogin: P564159 TSR: Mark Beasley Cooler: Shipped Via: Fed Ex</p>
Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs									
12202016-SS1-01	Grab	DW	—	12/20/16	1030	8	X	X	X	X	X	X		-01	

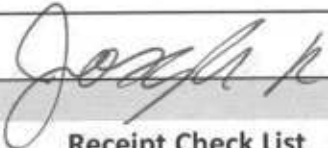
* Matrix: **SS** - Soil **GW** - Groundwater **WW** - WasteWater **DW** - Drinking Water **OT** - Other _____

Remarks: **Metals = Ba,Ca,Fe,K,Mg,Mn,Na. Project #: 0204678-06-160-xx Org 1402**

Relinquished by: (Signature) <i>D.S.</i>	Date: 12/20/16	Time: 1530	Received by: (Signature) FEDEX	Received by: (Signature) 12/20/16 1530	Samples returned via: <input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> Courler <input type="checkbox"/> _____	Hold #
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Received by: (Signature)	Temp: 2.12 °C Bottles Received: 8	Condition: (lab use only) full
Relinquished by: (Signature)	Date:	Time:	Received for Lab by: (Signature) <i>Joseph</i>	Received for Lab by: (Signature)	Date: 12-21-16 Time: 0900	COC Seal Intact: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> NA
					pH Checked: 12	NCF:



Cooler Receipt Form

Client: <u>SUNBGS</u>	SDG#	<u>187780</u>		
Cooler Received/Opened On: <u>12/7/16</u>	Temperature Upon Receipt:	<u>2.1</u> °C		
Received By: Joseph Roberts				
Signature: 				
Receipt Check List		Yes	No	N/A
Were custody seals on outside of cooler and intact?		<input checked="" type="checkbox"/>		
Were custody papers properly filled out?		<input checked="" type="checkbox"/>		
Did all bottles arrive in good condition?		<input checked="" type="checkbox"/>		
Were correct bottles used for the analyses requested?		<input checked="" type="checkbox"/>		
Was sufficient amount of sample sent in each bottle?		<input checked="" type="checkbox"/>		
Were all applicable sample containers correctly preserved and checked for preservation? (Any not in accepted range noted on COC)		<input checked="" type="checkbox"/>		
If applicable, was an observable VOA headspace present?			<input checked="" type="checkbox"/>	
Non Conformance Generated. (If yes see attached NCF)				

November 17, 2017

GES, Inc - Sunoco

Sample Delivery Group: L949898
Samples Received: 11/10/2017
Project Number: 0204730-06-160-XX
Description: PRe-Construction Sampling

Report To: Holly Smoker
440 Creamery Way, Ste 500
Exton, PA 19341

Entire Report Reviewed By:



Mark W. Beasley
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



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SAMPLE SUMMARY



11092017-634-01 L949898-01 GW

Collected by: Alex Smith
 Collected date/time: 11/09/17 11:40
 Received date/time: 11/10/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Microbiology by Method 9222D	WG1042447	1	11/10/17 15:00	11/10/17 15:00	SWS
Microbiology by Method 9223 B-1997	WG1041499	1	11/10/17 14:43	11/10/17 14:43	BGE
Gravimetric Analysis by Method 2540 C-2011	WG1042641	1	11/15/17 20:43	11/15/17 21:16	BS
Gravimetric Analysis by Method 2540 D-2011	WG1041743	1	11/14/17 12:49	11/14/17 13:58	MMF
Wet Chemistry by Method 130.1	WG1043013	1	11/16/17 11:09	11/16/17 11:09	KK
Wet Chemistry by Method 2130 B-2011	WG1041495	1	11/10/17 16:40	11/10/17 16:40	ER
Wet Chemistry by Method 2320 B-2011	WG1041419	1	11/13/17 16:09	11/13/17 16:09	MCG
Wet Chemistry by Method 9040C	WG1042176	1	11/14/17 09:47	11/14/17 09:47	ER
Wet Chemistry by Method 9050A	WG1042092	1	11/14/17 01:59	11/14/17 01:59	MZ
Wet Chemistry by Method 9056A	WG1041586	1	11/11/17 13:48	11/11/17 13:48	KCF
Metals (ICP) by Method 6010B	WG1042024	1	11/14/17 08:42	11/14/17 18:47	ST
Volatile Organic Compounds (GC) by Method RSK175	WG1042257	1	11/14/17 09:47	11/14/17 09:47	BG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1041585	1	11/11/17 07:35	11/11/17 07:35	ACG

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Mark W. Beasley
Technical Service Representative

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Microbiology by Method 9222D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Coliform,fecal	<1		1	11/10/2017 15:00	WG1042447

1 Cp

2 Tc

Microbiology by Method 9223 B-1997

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	<1		1	11/10/2017 14:43	WG1041499
Coliform,Total	<1		1	11/10/2017 14:43	WG1041499

3 Ss

4 Cn

5 Sr

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	100		10.0	1	11/15/2017 21:16	WG1042641

6 Qc

7 Gl

Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	15.0		2.50	1	11/14/2017 13:58	WG1041743

8 Al

9 Sc

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	117		30.0	1	11/16/2017 11:09	WG1043013

Wet Chemistry by Method 2130 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Turbidity	22.2		0.300	1	11/10/2017 16:40	WG1041495

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Alkalinity	114		20.0	1	11/13/2017 16:09	WG1041419

Sample Narrative:

L949898-01 WG1041419: Endpoint pH 4.5

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.76	<u>T8</u>	1	11/14/2017 09:47	WG1042176

Sample Narrative:

L949898-01 WG1042176: 7.76 at 19.3C

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	269		10.0	1	11/14/2017 01:59	WG1042092



Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	11/11/2017 13:48	WG1041586
Chloride	7.72		1.00	1	11/11/2017 13:48	WG1041586
Sulfate	7.99		5.00	1	11/11/2017 13:48	WG1041586

1 Cp

2 Tc

3 Ss

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	0.325		0.00500	1	11/14/2017 18:47	WG1042024
Calcium	36.3		1.00	1	11/14/2017 18:47	WG1042024
Iron	1.25		0.100	1	11/14/2017 18:47	WG1042024
Magnesium	7.77		1.00	1	11/14/2017 18:47	WG1042024
Manganese	0.0636		0.0100	1	11/14/2017 18:47	WG1042024
Potassium	ND		1.00	1	11/14/2017 18:47	WG1042024
Sodium	6.85		1.00	1	11/14/2017 18:47	WG1042024

4 Cn

5 Sr

6 Qc

7 Gl

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Methane	0.132		0.0100	1	11/14/2017 09:47	WG1042257
Ethane	ND		0.0130	1	11/14/2017 09:47	WG1042257
Ethene	ND		0.0130	1	11/14/2017 09:47	WG1042257
Propane	ND		0.0190	1	11/14/2017 09:47	WG1042257

8 Al

9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	11/11/2017 07:35	WG1041585
Toluene	ND		0.00100	1	11/11/2017 07:35	WG1041585
Ethylbenzene	ND		0.00100	1	11/11/2017 07:35	WG1041585
Total Xylenes	ND		0.00300	1	11/11/2017 07:35	WG1041585
(S) Toluene-d8	109		80.0-120		11/11/2017 07:35	WG1041585
(S) Dibromofluoromethane	104		76.0-123		11/11/2017 07:35	WG1041585
(S) a,a,a-Trifluorotoluene	105		80.0-120		11/11/2017 07:35	WG1041585
(S) 4-Bromofluorobenzene	108		80.0-120		11/11/2017 07:35	WG1041585



Method Blank (MB)

(MB) R3266347-1 11/15/17 21:16

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Dissolved Solids	U		2.82	10.0

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

L949986-03 Original Sample (OS) • Duplicate (DUP)

(OS) L949986-03 11/15/17 21:16 • (DUP) R3266347-4 11/15/17 21:16

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Dissolved Solids	24400	25500	1	4.49		5

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3266347-2 11/15/17 21:16 • (LCSD) R3266347-3 11/15/17 21:16

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Dissolved Solids	8800	8010	8080	91.0	91.8	85.0-115			0.870	5



Method Blank (MB)

(MB) R3265715-1 11/14/17 13:58

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Suspended Solids	U		0.350	2.50

1 Cp

2 Tc

3 Ss

4 Cn

L949879-01 Original Sample (OS) • Duplicate (DUP)

(OS) L949879-01 11/14/17 13:58 • (DUP) R3265715-4 11/14/17 13:58

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	205	191	1	7.07	J3	5

5 Sr

6 Qc

L949886-01 Original Sample (OS) • Duplicate (DUP)

(OS) L949886-01 11/14/17 13:58 • (DUP) R3265715-5 11/14/17 13:58

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	1570	1620	1	3.14		5

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3265715-2 11/14/17 13:58 • (LCSD) R3265715-3 11/14/17 13:58

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Suspended Solids	773	816	788	106	102	85.0-115			3.49	5



Method Blank (MB)

(MB) R3266101-1 11/16/17 10:56

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	4.05	<u>J</u>	1.43	30.0

¹ Cp

² Tc

³ Ss

L950163-08 Original Sample (OS) • Duplicate (DUP)

(OS) L950163-08 11/16/17 11:19 • (DUP) R3266101-7 11/16/17 11:20

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	327	322	5	2		20

⁴ Cn

⁵ Sr

⁶ Qc

L949892-01 Original Sample (OS) • Duplicate (DUP)

(OS) L949892-01 11/16/17 11:07 • (DUP) R3266101-4 11/16/17 11:08

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	30.0	23.9	1	23	<u>J P1</u>	20

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3266101-2 11/16/17 10:57 • (LCSD) R3266101-3 11/16/17 10:58

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	150	132	131	88	87	85-115			1	20



Method Blank (MB)

(MB) R3264744-1 11/10/17 16:40

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Turbidity	0.0510	↓	0.0310	0.300

1 Cp

2 Tc

3 Ss

L949842-01 Original Sample (OS) • Duplicate (DUP)

(OS) L949842-01 11/10/17 16:40 • (DUP) R3264744-4 11/10/17 16:40

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Turbidity	2.50	2.46	1	2.00		20

4 Cn

5 Sr

6 Qc

L949898-01 Original Sample (OS) • Duplicate (DUP)

(OS) L949898-01 11/10/17 16:40 • (DUP) R3264744-5 11/10/17 16:40

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Turbidity	22.2	21.9	1	1.00		20

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3264744-2 11/10/17 16:40 • (LCSD) R3264744-3 11/10/17 16:40

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Turbidity	40.0	42.1	42.1	105	105	90.0-110			0.000	20



L949820-01 Original Sample (OS) • Duplicate (DUP)

(OS) L949820-01 11/13/17 15:29 • (DUP) R3265309-1 11/13/17 15:34

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	ND	19.7	1	1.00	J	20

Sample Narrative:

OS: Endpoint pH 4.5
 DUP: Endpoint pH 4.5

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

L949897-01 Original Sample (OS) • Duplicate (DUP)

(OS) L949897-01 11/13/17 18:28 • (DUP) R3265309-6 11/13/17 18:35

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	257	260	1	1.00		20

Sample Narrative:

OS: Endpoint pH 4.5
 DUP: Endpoint pH 4.5

6 Qc

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3265309-2 11/13/17 16:39 • (LCSD) R3265309-5 11/13/17 18:19

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Alkalinity	100	101	104	101	104	85.0-115			4.00	20

Sample Narrative:

LCS: Endpoint pH 4.5
 LCSD: Endpoint pH 4.5



L949878-01 Original Sample (OS) • Duplicate (DUP)

(OS) L949878-01 11/14/17 09:47 • (DUP) R3265365-3 11/14/17 09:47

Analyte	Original Result	DUP Result	Dilution	DUP RPD	<u>DUP Qualifier</u>	DUP RPD Limits
	su	su		%		%
pH	7.24	7.28	1	0.551		1

Sample Narrative:

OS: 7.24 at 19.4C
 DUP: 7.28 at 19.2C

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

L950042-03 Original Sample (OS) • Duplicate (DUP)

(OS) L950042-03 11/14/17 09:47 • (DUP) R3265365-4 11/14/17 09:47

Analyte	Original Result	DUP Result	Dilution	DUP RPD	<u>DUP Qualifier</u>	DUP RPD Limits
	su	su		%		%
pH	6.74	6.74	1	0.000		1

Sample Narrative:

OS: 6.74 at 18.9C
 DUP: 6.74 at 18.6C

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3265365-1 11/14/17 09:47 • (LCSD) R3265365-2 11/14/17 09:47

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD	RPD Limits
	su	su	su	%	%	%			%	%
pH	5.96	5.96	5.96	100	100	98.3-102			0.000	1

Sample Narrative:

LCS: 5.96 at 18.7C
 LCSD: 5.96 at 18.8C



Method Blank (MB)

(MB) WG1042092-1 11/14/17 01:59

Analyte	MB Result umhos/cm	MB Qualifier	MB MDL umhos/cm	MB RDL umhos/cm
Specific Conductance	U		10.0	10.0

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L949856-02 Original Sample (OS) • Duplicate (DUP)

(OS) L949856-02 11/14/17 01:59 • (DUP) WG1042092-4 11/14/17 01:59

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Specific Conductance	746	746	1	0.000		20

L949986-07 Original Sample (OS) • Duplicate (DUP)

(OS) L949986-07 11/14/17 01:59 • (DUP) WG1042092-5 11/14/17 01:59

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Specific Conductance	22200	22200	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG1042092-2 11/14/17 01:59 • (LCSD) WG1042092-3 11/14/17 01:59

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCSD Result umhos/cm	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Specific Conductance	559	555	555	99.3	99.3	85.0-115			0.000	20



Method Blank (MB)

(MB) R3265020-1 11/11/17 06:39

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Bromide	U		0.079	1.00
Chloride	U		0.0519	1.00
Sulfate	U		0.0774	5.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L949898-01 Original Sample (OS) • Duplicate (DUP)

(OS) L949898-01 11/11/17 13:48 • (DUP) R3265020-4 11/11/17 14:03

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0		15
Chloride	7.72	7.72	1	0		15
Sulfate	7.99	7.95	1	1		15

L950033-02 Original Sample (OS) • Duplicate (DUP)

(OS) L950033-02 11/11/17 18:10 • (DUP) R3265020-7 11/11/17 18:25

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	U	0.000	1	0		15
Chloride	68.4	68.3	1	0		15
Sulfate	U	0.000	1	0		15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3265020-2 11/11/17 06:54 • (LCSD) R3265020-3 11/11/17 07:09

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Bromide	40.0	39.8	39.8	100	100	80-120			0	15
Chloride	40.0	39.8	39.6	100	99	80-120			0	15
Sulfate	40.0	40.5	39.9	101	100	80-120			2	15



[L949898-01](#)

L949898-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L949898-01 11/11/17 13:48 • (MS) R3265020-5 11/11/17 14:18 • (MSD) R3265020-6 11/11/17 14:33

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	ND	50.8	51.3	102	103	1	80-120			1	15
Chloride	50.0	7.72	59.7	59.8	104	104	1	80-120			0	15
Sulfate	50.0	7.99	60.8	60.8	106	106	1	80-120			0	15

L950033-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L950033-02 11/11/17 18:10 • (MS) R3265020-8 11/11/17 19:39

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Bromide	50.0	U	49.5	99	1	80-120	
Chloride	50.0	68.4	117	97	1	80-120	E
Sulfate	50.0	U	50.4	101	1	80-120	

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3265595-1 11/14/17 17:41

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Barium	U		0.0017	0.00500
Calcium	U		0.0463	1.00
Iron	U		0.0141	0.100
Magnesium	U		0.0111	1.00
Manganese	U		0.0012	0.0100
Potassium	U		0.102	1.00
Sodium	U		0.0985	1.00



Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3265595-2 11/14/17 17:44 • (LCSD) R3265595-3 11/14/17 17:47

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Barium	1.00	1.02	0.996	102	100	80-120			2	20
Calcium	10.0	9.94	9.71	99	97	80-120			2	20
Iron	10.0	9.93	9.70	99	97	80-120			2	20
Magnesium	10.0	10.3	10.1	103	101	80-120			2	20
Manganese	1.00	0.957	0.933	96	93	80-120			3	20
Potassium	10.0	9.88	9.62	99	96	80-120			3	20
Sodium	10.0	9.63	9.41	96	94	80-120			2	20



L949832-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L949832-01 11/14/17 17:50 • (MS) R3265595-5 11/14/17 17:57 • (MSD) R3265595-6 11/14/17 18:00

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Barium	1.00	0.0142	1.00	1.02	99	100	1	75-125			1	20
Calcium	10.0	9.22	18.5	18.7	93	95	1	75-125			1	20
Iron	10.0	1.13	10.9	10.9	98	97	1	75-125			0	20
Magnesium	10.0	1.64	11.7	11.8	100	101	1	75-125			1	20
Manganese	1.00	0.0185	0.951	0.962	93	94	1	75-125			1	20
Potassium	10.0	2.36	11.8	11.9	95	96	1	75-125			1	20
Sodium	10.0	45.0	53.3	53.3	83	83	1	75-125			0	20



Method Blank (MB)

(MB) R3265389-1 11/14/17 08:12

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Methane	U		0.00291	0.0100
Ethane	U		0.00407	0.0130
Ethene	U		0.00426	0.0130
Propane	U		0.00548	0.0190

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L949816-01 Original Sample (OS) • Duplicate (DUP)

(OS) L949816-01 11/14/17 09:11 • (DUP) R3265389-2 11/14/17 09:44

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	ND	0.000	1	0.000		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

L950205-01 Original Sample (OS) • Duplicate (DUP)

(OS) L950205-01 11/14/17 10:09 • (DUP) R3265389-3 11/14/17 10:55

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	ND	0.000	1	0.000		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3265389-4 11/14/17 10:59 • (LCSD) R3265389-5 11/14/17 11:03

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Methane	0.0678	0.0742	0.0760	110	112	85.0-115			2.30	20
Ethane	0.129	0.116	0.117	89.7	90.5	85.0-115			0.896	20
Ethene	0.127	0.118	0.119	93.2	93.6	85.0-115			0.428	20
Propane	0.186	0.189	0.192	102	103	85.0-115			1.29	20



Method Blank (MB)

(MB) R3265664-3 11/11/17 04:17

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000412	0.00100
Xylenes, Total	U		0.00106	0.00300
<i>(S) Toluene-d8</i>	111			80.0-120
<i>(S) Dibromofluoromethane</i>	106			76.0-123
<i>(S) a,a,a-Trifluorotoluene</i>	104			80.0-120
<i>(S) 4-Bromofluorobenzene</i>	109			80.0-120

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3265664-1 11/11/17 03:17 • (LCSD) R3265664-2 11/11/17 03:37

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	0.0250	0.0261	0.0266	104	107	69.0-123			2.01	20
Ethylbenzene	0.0250	0.0259	0.0268	104	107	77.0-120			3.23	20
Toluene	0.0250	0.0258	0.0267	103	107	77.0-120			3.36	20
Xylenes, Total	0.0750	0.0773	0.0779	103	104	77.0-120			0.773	20
<i>(S) Toluene-d8</i>				108	110	80.0-120				
<i>(S) Dibromofluoromethane</i>				107	106	76.0-123				
<i>(S) a,a,a-Trifluorotoluene</i>				104	105	80.0-120				
<i>(S) 4-Bromofluorobenzene</i>				113	120	80.0-120				

7 Gl

8 Al

9 Sc



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc



ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE**.
 * Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Connecticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee ¹⁴	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

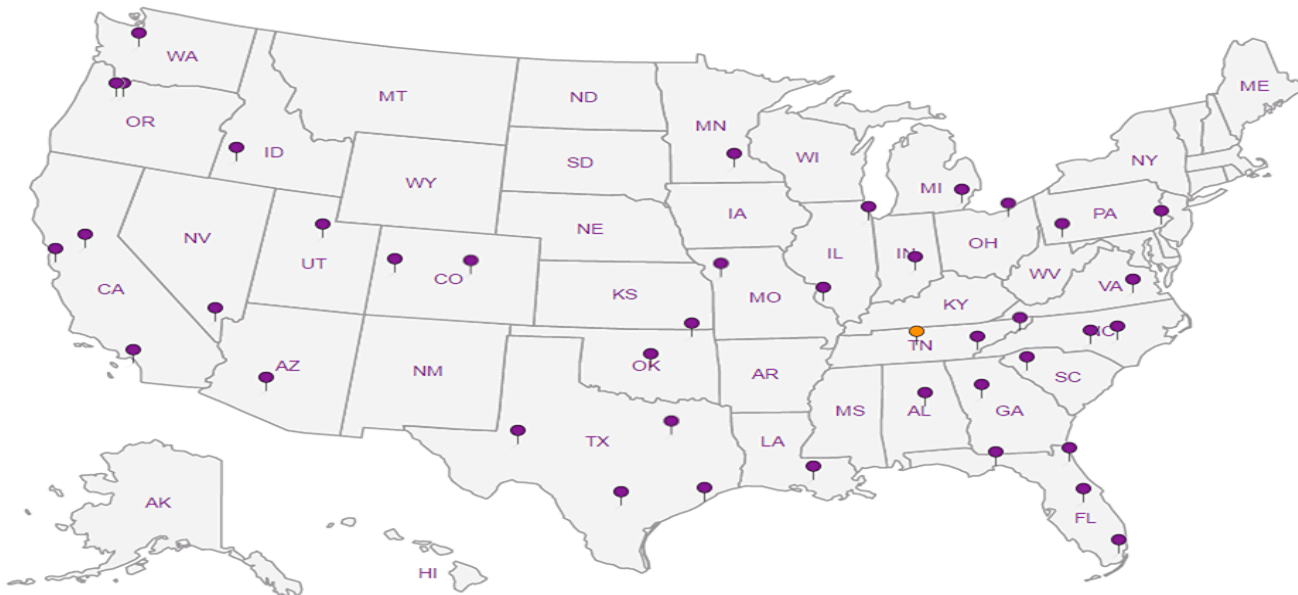
Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ^{n/a} Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. **ESC Lab Sciences performs all testing at our central laboratory.**



1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

November 14, 2017

GES, Inc - Sunoco

Sample Delivery Group: L948695
Samples Received: 11/07/2017
Project Number: 0204730-06-160-XX
Description: Pre-Construction Sampling

Report To: Holly Smoker
440 Creamery Way, Ste 500
Exton, PA 19341










Entire Report Reviewed By:



Mark W. Beasley
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



Cp: Cover Page	1	
Tc: Table of Contents	2	
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Cn: Case Narrative	4	
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SAMPLE SUMMARY



11062017-614-02 L948695-01 GW

Collected by: Jackie Burke
 Collected date/time: 11/06/17 13:50
 Received date/time: 11/07/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Microbiology by Method 9222D	WG1040088	1.04	11/07/17 15:46	11/07/17 15:46	SWS
Microbiology by Method 9223 B-1997	WG1040085	1	11/07/17 15:00	11/07/17 15:00	SWS
Gravimetric Analysis by Method 2540 C-2011	WG1040452	1	11/09/17 10:57	11/09/17 11:24	MMF
Gravimetric Analysis by Method 2540 D-2011	WG1040046	1	11/08/17 16:26	11/08/17 17:15	MMF
Wet Chemistry by Method 130.1	WG1040281	1	11/08/17 11:39	11/08/17 11:39	KK
Wet Chemistry by Method 2130 B-2011	WG1039699	1	11/07/17 16:09	11/07/17 16:09	ER
Wet Chemistry by Method 2320 B-2011	WG1039907	1	11/07/17 18:54	11/07/17 18:54	MCG
Wet Chemistry by Method 9040C	WG1040972	1	11/10/17 10:55	11/10/17 10:55	ER
Wet Chemistry by Method 9050A	WG1040189	1	11/08/17 15:59	11/08/17 15:59	MA
Wet Chemistry by Method 9056A	WG1040015	1	11/07/17 16:21	11/07/17 16:21	DR
Metals (ICP) by Method 6010B	WG1039556	1	11/08/17 09:10	11/08/17 13:49	TRB
Volatile Organic Compounds (GC) by Method RSK175	WG1040112	1	11/08/17 10:05	11/08/17 10:05	BG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1039917	1	11/07/17 16:19	11/07/17 16:19	BMB

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Mark W. Beasley
Technical Service Representative

Project Narrative

Colilert qualified for positive control not being spiked. -SWS 11/13/17

- ¹ Cp
- ² Tc
- ³ Ss
- ⁴ Cn
- ⁵ Sr
- ⁶ Qc
- ⁷ Gl
- ⁸ Al
- ⁹ Sc



Microbiology by Method 9222D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Coliform,fecal	<1		1.04	11/07/2017 15:46	WG1040088

1 Cp

2 Tc

Microbiology by Method 9223 B-1997

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	<1	<u>U</u>	1	11/07/2017 15:00	WG1040085
Coliform,Total	<1	<u>U</u>	1	11/07/2017 15:00	WG1040085

3 Ss

4 Cn

5 Sr

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	182		10.0	1	11/09/2017 11:24	WG1040452

6 Qc

7 Gl

Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	ND		2.50	1	11/08/2017 17:15	WG1040046

8 Al

9 Sc

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hardness (colorimetric) as CaCO3	151		30.0	1	11/08/2017 11:39	WG1040281

Wet Chemistry by Method 2130 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Turbidity	12.9		0.300	1	11/07/2017 16:09	WG1039699

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Alkalinity	139		20.0	1	11/07/2017 18:54	WG1039907

Sample Narrative:

L948695-01 WG1039907: Endpoint pH 4.5

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.88	<u>T8</u>	1	11/10/2017 10:55	WG1040972

Sample Narrative:

L948695-01 WG1040972: 7.88 at 14.4C

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	350		10.0	1	11/08/2017 15:59	WG1040189



Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	11/07/2017 16:21	WG1040015
Chloride	19.5		1.00	1	11/07/2017 16:21	WG1040015
Sulfate	5.26		5.00	1	11/07/2017 16:21	WG1040015

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	0.378		0.00500	1	11/08/2017 13:49	WG1039556
Calcium	40.5		1.00	1	11/08/2017 13:49	WG1039556
Iron	1.07		0.100	1	11/08/2017 13:49	WG1039556
Magnesium	8.07		1.00	1	11/08/2017 13:49	WG1039556
Manganese	0.217		0.0100	1	11/08/2017 13:49	WG1039556
Potassium	ND		1.00	1	11/08/2017 13:49	WG1039556
Sodium	12.0		1.00	1	11/08/2017 13:49	WG1039556

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Methane	0.106		0.0100	1	11/08/2017 10:05	WG1040112
Ethane	ND		0.0130	1	11/08/2017 10:05	WG1040112
Ethene	ND		0.0130	1	11/08/2017 10:05	WG1040112
Propane	ND		0.0190	1	11/08/2017 10:05	WG1040112

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	11/07/2017 16:19	WG1039917
Toluene	ND		0.00100	1	11/07/2017 16:19	WG1039917
Ethylbenzene	ND		0.00100	1	11/07/2017 16:19	WG1039917
Total Xylenes	ND		0.00300	1	11/07/2017 16:19	WG1039917
(S) Toluene-d8	105		80.0-120		11/07/2017 16:19	WG1039917
(S) Dibromofluoromethane	103		76.0-123		11/07/2017 16:19	WG1039917
(S) a,a,a-Trifluorotoluene	114		80.0-120		11/07/2017 16:19	WG1039917
(S) 4-Bromofluorobenzene	97.6		80.0-120		11/07/2017 16:19	WG1039917



Method Blank (MB)

(MB) R3264872-1 11/09/17 11:24

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Dissolved Solids	U		2.82	10.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

L948718-01 Original Sample (OS) • Duplicate (DUP)

(OS) L948718-01 11/09/17 11:24 • (DUP) R3264872-4 11/09/17 11:24

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Dissolved Solids	529	533	1	0.753		5

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3264872-2 11/09/17 11:24 • (LCSD) R3264872-3 11/09/17 11:24

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Dissolved Solids	8800	8430	8540	95.8	97.0	85.0-115			1.30	5



Method Blank (MB)

(MB) R3264301-1 11/08/17 17:15

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Suspended Solids	U		0.350	2.50

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

L948427-01 Original Sample (OS) • Duplicate (DUP)

(OS) L948427-01 11/08/17 17:15 • (DUP) R3264301-4 11/08/17 17:15

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	12.8	13.5	1	5.71	J3	5

L948561-02 Original Sample (OS) • Duplicate (DUP)

(OS) L948561-02 11/08/17 17:15 • (DUP) R3264301-5 11/08/17 17:15

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	155	159	1	2.62		5

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3264301-2 11/08/17 17:15 • (LCSD) R3264301-3 11/08/17 17:15

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Suspended Solids	773	812	788	105	102	85.0-115			3.00	5



Method Blank (MB)

(MB) R3263994-1 11/08/17 11:34

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	3.5	<u>J</u>	1.43	30.0

¹ Cp

² Tc

³ Ss

L948718-01 Original Sample (OS) • Duplicate (DUP)

(OS) L948718-01 11/08/17 11:41 • (DUP) R3263994-4 11/08/17 11:44

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	57.6	45.7	1	23	<u>P1</u>	20

⁴ Cn

⁵ Sr

⁶ Qc

L948952-01 Original Sample (OS) • Duplicate (DUP)

(OS) L948952-01 11/08/17 11:56 • (DUP) R3263994-7 11/08/17 11:57

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	64.4	55.8	1	14		20

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3263994-2 11/08/17 11:35 • (LCSD) R3263994-3 11/08/17 11:36

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	150	158	157	105	105	85-115			1	20

L948731-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L948731-01 11/08/17 11:47 • (MS) R3263994-5 11/08/17 11:48 • (MSD) R3263994-6 11/08/17 11:49

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	150	60.2	204	202	96	95	1	80-120	<u>E</u>	<u>E</u>	1	20



Method Blank (MB)

(MB) R3263770-1 11/07/17 16:09

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Turbidity	0.0680	↓	0.0310	0.300

1 Cp

2 Tc

3 Ss

4 Cn

L948386-01 Original Sample (OS) • Duplicate (DUP)

(OS) L948386-01 11/07/17 16:09 • (DUP) R3263770-4 11/07/17 16:09

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Turbidity	ND	ND	1	3.00	↓	20

5 Sr

6 Qc

L948728-01 Original Sample (OS) • Duplicate (DUP)

(OS) L948728-01 11/07/17 16:09 • (DUP) R3263770-5 11/07/17 16:09

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Turbidity	95.4	95.7	1	0.000		20

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3263770-2 11/07/17 16:09 • (LCSD) R3263770-3 11/07/17 16:09

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Turbidity	40.0	41.9	41.9	105	105	90.0-110			0.000	20



L948720-01 Original Sample (OS) • Duplicate (DUP)

(OS) L948720-01 11/07/17 19:20 • (DUP) R3263946-6 11/07/17 19:27

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	161	164	1	1.00		20

Sample Narrative:

OS: Endpoint pH 4.5
 DUP: Endpoint pH 4.5

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

L948423-18 Original Sample (OS) • Duplicate (DUP)

(OS) L948423-18 11/07/17 19:58 • (DUP) R3263946-8 11/07/17 20:06

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Alkalinity	117	104	1	12.0		20

Sample Narrative:

OS: Endpoint pH 4.5
 DUP: Endpoint pH 4.5

6 Qc

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3263946-5 11/07/17 18:20 • (LCSD) R3263946-7 11/07/17 19:34

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Alkalinity	100	110	108	110	108	85.0-115			2.00	20

Sample Narrative:

LCS: Endpoint pH 4.5
 LCSD: Endpoint pH 4.5



L948688-01 Original Sample (OS) • Duplicate (DUP)

(OS) L948688-01 11/10/17 10:55 • (DUP) R3264645-3 11/10/17 10:55

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
su	su			%		%
pH	7.55	7.56	1	0.132		1

Sample Narrative:

OS: 7.55 at 12.3C
DUP: 7.56 at 12.5C

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

L948780-01 Original Sample (OS) • Duplicate (DUP)

(OS) L948780-01 11/10/17 10:55 • (DUP) R3264645-4 11/10/17 10:55

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
su	su			%		%
pH	7.33	7.29	1	0.547		1

Sample Narrative:

OS: 7.33 at 16.8C
DUP: 7.29 at 16.7C

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3264645-1 11/10/17 10:55 • (LCSD) R3264645-2 11/10/17 10:55

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
su	su	su	su	%	%	%			%	%
pH	5.96	5.95	5.95	99.8	99.8	98.3-102			0.000	1

Sample Narrative:

LCS: 5.95 at 19.3C
LCSD: 5.95 at 19.4C



Method Blank (MB)

(MB) WG1040189-1 11/08/17 15:59

Analyte	MB Result umhos/cm	MB Qualifier	MB MDL umhos/cm	MB RDL umhos/cm
Specific Conductance	U		10.0	10.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L947736-01 Original Sample (OS) • Duplicate (DUP)

(OS) L947736-01 11/08/17 15:59 • (DUP) WG1040189-4 11/08/17 15:59

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Specific Conductance	1070	1070	1	0.000		20

L948730-01 Original Sample (OS) • Duplicate (DUP)

(OS) L948730-01 11/08/17 15:59 • (DUP) WG1040189-5 11/08/17 15:59

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Specific Conductance	1820	1820	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG1040189-2 11/08/17 15:59 • (LCSD) WG1040189-3 11/08/17 15:59

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCSD Result umhos/cm	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Specific Conductance	559	559	559	100	100	85.0-115			0.000	20



Method Blank (MB)

(MB) R3263817-1 11/07/17 11:32

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Bromide	U		0.079	1.00
Chloride	U		0.0519	1.00
Sulfate	U		0.0774	5.00

L948695-01 Original Sample (OS) • Duplicate (DUP)

(OS) L948695-01 11/07/17 16:21 • (DUP) R3263817-4 11/07/17 16:35

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0		15
Chloride	19.5	19.6	1	1		15
Sulfate	5.26	5.31	1	1		15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3263817-2 11/07/17 11:46 • (LCSD) R3263817-3 11/07/17 11:59

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Bromide	40.0	40.0	39.8	100	99	80-120			1	15
Chloride	40.0	39.5	39.2	99	98	80-120			1	15
Sulfate	40.0	39.5	39.4	99	98	80-120			0	15

L948695-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L948695-01 11/07/17 16:21 • (MS) R3263817-5 11/07/17 17:15 • (MSD) R3263817-6 11/07/17 17:28

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Bromide	50.0	ND	47.6	48.8	95	98	1	80-120			2	15
Chloride	50.0	19.5	69.4	69.7	100	100	1	80-120			0	15
Sulfate	50.0	5.26	57.3	55.8	104	101	1	80-120			3	15

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3264066-1 11/08/17 13:10

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Barium	U		0.0017	0.00500
Calcium	U		0.0463	1.00
Iron	0.0377	↓	0.0141	0.100
Magnesium	U		0.0111	1.00
Manganese	U		0.0012	0.0100
Potassium	U		0.102	1.00
Sodium	0.113	↓	0.0985	1.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3264066-2 11/08/17 13:13 • (LCSD) R3264066-3 11/08/17 13:15

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Barium	1.00	1.01	0.978	101	98	80-120			4	20
Calcium	10.0	9.56	9.27	96	93	80-120			3	20
Iron	10.0	9.69	9.44	97	94	80-120			3	20
Magnesium	10.0	9.84	9.41	98	94	80-120			4	20
Manganese	1.00	0.973	0.943	97	94	80-120			3	20
Potassium	10.0	9.64	9.36	96	94	80-120			3	20
Sodium	10.0	9.86	9.58	99	96	80-120			3	20

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L948740-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L948740-04 11/08/17 13:18 • (MS) R3264066-5 11/08/17 13:23 • (MSD) R3264066-6 11/08/17 13:26

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Barium	1.00	0.0426	1.03	1.06	99	102	1	75-125			3	20
Calcium	10.0	17.5	26.6	26.9	91	94	1	75-125			1	20
Iron	10.0	94.2	103	103	85	91	1	75-125			1	20
Magnesium	10.0	4.63	14.0	14.4	93	97	1	75-125			3	20
Manganese	1.00	15.0	15.4	15.4	44	39	1	75-125	EV	EV	0	20
Potassium	10.0	0.560	10.1	10.4	96	98	1	75-125			3	20
Sodium	10.0	0.807	10.5	10.8	97	100	1	75-125			3	20



Method Blank (MB)

(MB) R3263986-1 11/08/17 08:28

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Methane	U		0.00291	0.0100
Ethane	U		0.00407	0.0130
Ethene	U		0.00426	0.0130
Propane	U		0.00548	0.0190

¹ Cp

² Tc

³ Ss

⁴ Cn

L948184-03 Original Sample (OS) • Duplicate (DUP)

(OS) L948184-03 11/08/17 09:40 • (DUP) R3263986-2 11/08/17 10:49

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	ND	0.000	1	0.000		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

L948718-01 Original Sample (OS) • Duplicate (DUP)

(OS) L948718-01 11/08/17 10:57 • (DUP) R3263986-3 11/08/17 11:21

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Methane	ND	0.000	1	0.000		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3263986-4 11/08/17 11:30 • (LCSD) R3263986-5 11/08/17 11:41

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Methane	0.0678	0.0743	0.0749	110	110	85.0-115			0.700	20
Ethane	0.129	0.120	0.121	92.8	93.5	85.0-115			0.780	20
Ethene	0.127	0.116	0.118	91.1	92.7	85.0-115			1.79	20
Propane	0.186	0.174	0.177	93.4	94.9	85.0-115			1.58	20



Method Blank (MB)

(MB) R3263749-3 11/07/17 10:29

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000412	0.00100
Xylenes, Total	U		0.00106	0.00300
<i>(S) Toluene-d8</i>	108			80.0-120
<i>(S) Dibromofluoromethane</i>	100			76.0-123
<i>(S) a,a,a-Trifluorotoluene</i>	111			80.0-120
<i>(S) 4-Bromofluorobenzene</i>	99.7			80.0-120

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3263749-1 11/07/17 09:30 • (LCSD) R3263749-2 11/07/17 09:49

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Benzene	0.0250	0.0239	0.0244	95.4	97.5	69.0-123			2.16	20
Ethylbenzene	0.0250	0.0251	0.0252	101	101	77.0-120			0.100	20
Toluene	0.0250	0.0231	0.0234	92.4	93.6	77.0-120			1.20	20
Xylenes, Total	0.0750	0.0799	0.0783	107	104	77.0-120			2.02	20
<i>(S) Toluene-d8</i>				104	104	80.0-120				
<i>(S) Dibromofluoromethane</i>				106	105	76.0-123				
<i>(S) a,a,a-Trifluorotoluene</i>				110	107	80.0-120				
<i>(S) 4-Bromofluorobenzene</i>				96.2	99.7	80.0-120				

⁷ Gl

⁸ Al

⁹ Sc



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.
U	Below Detectable Limits: Indicates that the analyte was not detected.
V	The sample concentration is too high to evaluate accurate spike recoveries.

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc



ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE**.
 * Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Connecticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee ¹⁴	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

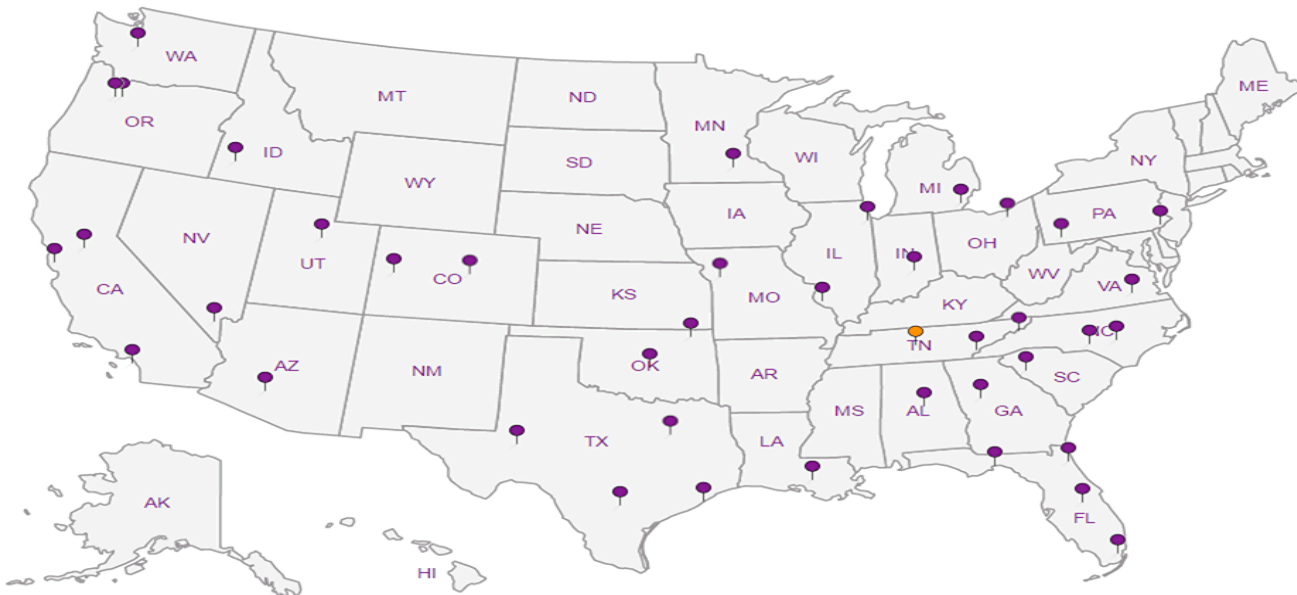
Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ^{n/a} Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. **ESC Lab Sciences performs all testing at our central laboratory.**



1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc

