PUMPING TEST AND SAMPLING OF HEADWATERS GROUNDWATER CONSERVATION DISTRICT

MONITOR WELL 16

KERR COUNTY, TEXAS

LBG-GUYTON ASSOCIATES

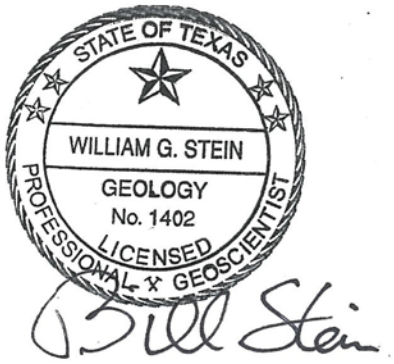
Professional Groundwater and Environmental Engineering Services

A Division of Leggette, Brashears & Graham, Inc.

Pumping Test and Sampling of
Headwaters Groundwater Conservation District
Monitor Well 16
Kerr County, Texas

Prepared For

Mr. Gene Williams
General Manager
Headwaters Groundwater Conservation District



October 22, 2015

LBG-GUYTON ASSOCIATES
Professional Groundwater and Environmental Services
12702 Toepperwein Road, Suite 212
San Antonio, Texas 78233

INTRODUCTION

Mr. Gene William, General Manager of the Headwaters Groundwater Conservation District asked LBG-Guyton Associates to perform a pumping test and retrieve a water sample from a newly constructed Monitor Well 16 located in the northern portion of Kerr County just southwest of the intersection of IH 10 and US 290. The well was constructed in January and February 2015 by Bee Cave Drilling of Dripping Springs, Texas. The Driller's report is included in Appendix 1.

The latitude and longitude for the monitor well are listed in the following table, along with surface elevations:

Well	**Latitude**	**Longitude**	**Approximate Surface Elevation** (feet above MSL)	**Water-Level Depth** (feet below land surface)
Monitor Well 16	30º 16' 22"	99º 30' 01"	2204	311

The latitude and longitude were measured using Apple I-phone Map. The approximate surface elevations listed are also taken from Google Earth.

PUMPING TEST ANALYSES

General Information on Pumping Tests

When a well is pumped and water is withdrawn from an aquifer, water levels in the vicinity are drawn down to form an inverted cone with its apex located at the pumping well. This is referred to as a cone of depression. Groundwater flows from higher water levels to lower water levels and, therefore, in the case of a pumping well, toward the well or the center of the cone of depression. The shape and size of the cone is directly related to the aquifer parameters.

Various hydrologic parameters are required to make a quantitative evaluation of an aquifer. The primary aquifer characteristics of concern are transmissivity (T), which is an index of the aquifer's ability to transmit water measured in gallons per day per foot (gpd/ft), and its storage coefficient (unitless), which is an index of the amount of water released from or taken into storage as water levels change. Hydraulic conductivity can be calculated by dividing the

calculated T by the aquifer thickness; the unit of measurement is gallons per day per foot squared (gpd/ft^2). Important measurements made during a pumping test are well discharge and water-level decline versus time.

One of the basic assumptions in determining these parameters from pumping-test data is that flow takes place through a homogeneous medium having the same properties in all directions. In properly applying the results, however, one must be mindful of their limitations and take into consideration the physical characteristics of the aquifer, which are usually not the same in all directions.

Monitor Well 16 Pumping Test

Bee Cave Drilling installed a 20-horsepower, Goulds submersible pump at a depth of 680 feet in Monitoring Well 16. A trailer-mounted generator was used to supply energy to the pumps. A totalizing water meter was also installed in the discharge line to observe flow rate and total number of gallons discharged during testing.

During the pumping test, LBG-Guyton Associates installed an In-Situ Level Troll transducer in the well just above the pump. The transducer is rated for 100 pounds per square inch (psi) (2.31 feet/psi x 100 psi = 231 feet) and records water pressure, which is converted to feet of water above the probe. These data are then converted to depth of water from land surface by comparing the transducer readings to measurements made with a calibrated electrical tape. Data from the pumping test were analyzed using the Cooper-Jacob method. This method is described in detail in a number of hydrology textbooks, including Freeze and Cherry (1979) and Driscoll (1986).

Hydrographs of the water levels measured in Monitor Well 16 are shown in Figures 1. The results are graphed on a semi-log scale and calculations are shown in Figures 2. The following table lists the pumping rate and summarizes the results calculated from the pumping tests:

Date Pumping Test Started	Average Pumping Rate (gpm)	Draw-down (feet)	Specific Capacity (gpm/ft)	Transmissivity (gpd/ft)
9/22/15	94.7	16.3	5.8	5,210

WATER QUALITY ANALYSES

All groundwater contains minerals that are dissolved and transported in solution. The types and concentrations of the minerals depend upon the history of the water, its source, movement and environment. Specifically, the dissolved solids depend upon the solubility of the minerals present in the rocks through which the water moves, the length of time the water is in contact with the rocks and the chemical activity of the water. In general, the concentration of dissolved minerals in groundwater increases with depth. This is especially true where circulation in the deeper sediments is restricted by low permeability. Restricted circulation retards the flushing action of water moving through the aquifer and causes the water to become more stagnant and highly mineralized. The Trinity Aquifer in Central Texas generally yield water that ranges from fresh, which is less than 1,000 milligrams per liter (mg/l) total dissolved solids (TDS), to slightly saline (1,000 to 3,000 mg/l TDS).

LBG-Guyton Associates collected a water sample from the well near the end of the pumping test. The following table lists the field parameters measured near the time of sampling.

Well	Date	Temperature (^oC)	Specific Conductivity (μmhos)	pH
Well 16	9/23/15	25.9	810	7.6

Even though this is a monitor well with the water not intended for public consumption, the Primary and Secondary Safe Drinking Water Standards mandated by the U. S. Environmental Protection Agency and the Texas Commission on Environmental Quality are listed below for

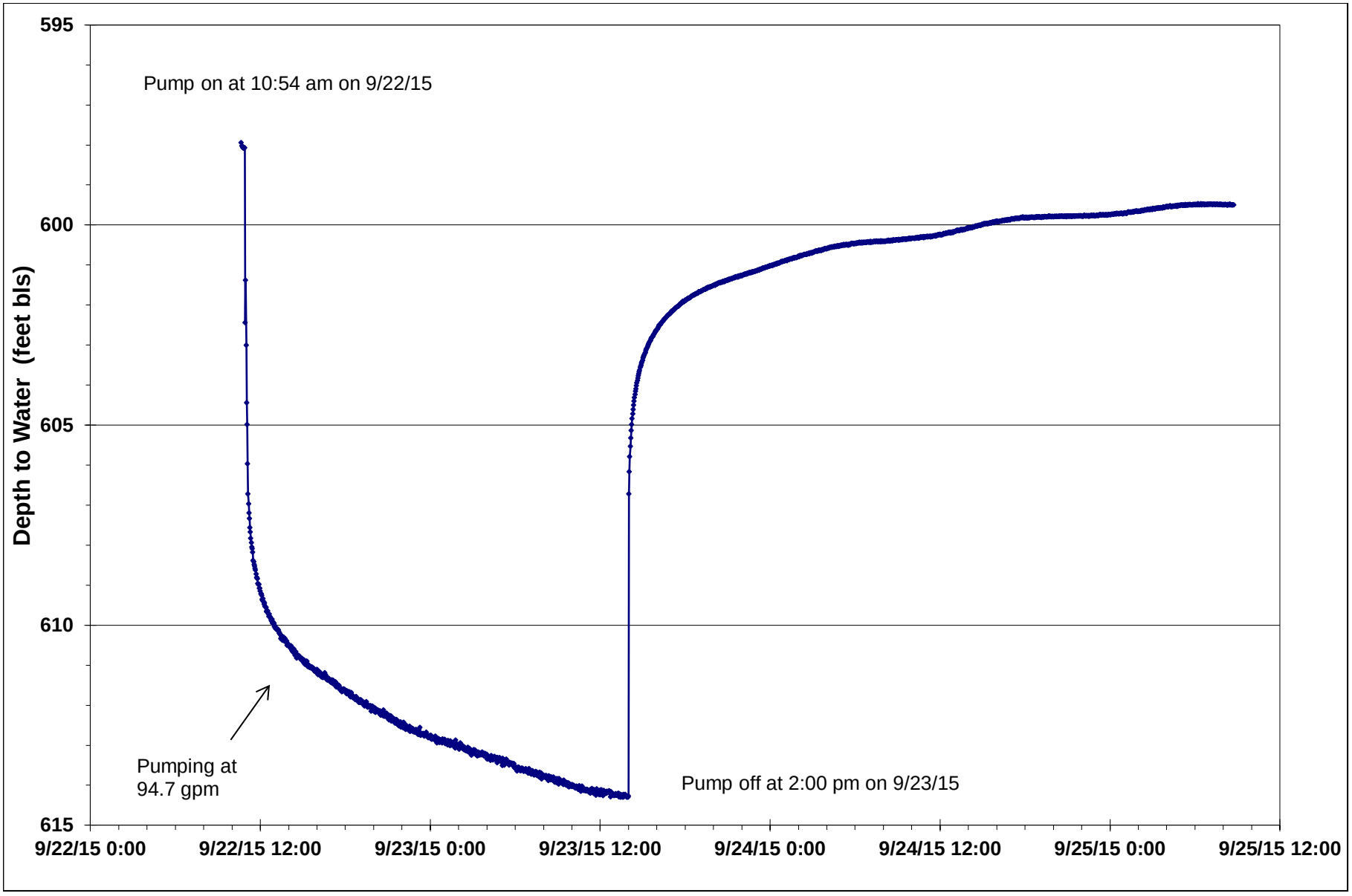
comparison. Primary Standards are concerned with dissolved constituents that are known to have adverse effects on human health. Secondary Standards are concerned with aesthetic qualities of drinking water (e.g., taste and odor).

The samples were analyzed for metals (calcium, iron, magnesium, potassium and sodium), minor metals (aluminum, arsenic, copper, manganese, and zinc), anions (chloride, fluoride, nitrate and nitrite as N, sulfate and bicarbonate alkalinity as $CaCO_3$), total dissolved solids and radionuclide. The Pollution Control Services in San Antonio, Texas performed the analyses. The laboratory reports for these analyses are provided in Appendix 2. The results are summarized in the following tables listed with standards for public drinking water for comparison:

Primary Standards		**Well 16 (mg/l)**
Constituent		
Fluoride (mg/l)	4	0.86
Nitrate (mg/l as N)	10	.4
Nitrite (mg/l as N)	1	<0.20
Arsenic (mg/l)	0.05	<0.0005
Secondary Standards		
Constituent		
Aluminum (mg/l)	0.2	0.020
Chloride (mg/l)	300	16
Copper (mg/l)	1	0.0006
Fluoride (mg/l)	2	0.86
Iron (mg/l)	0.3	0.031
Manganese (mg/l)	0.05	<0.010
Sulfate (mg/l)	300	29
Zinc (mg/l)	5.0	0.586
Dissolved Solids (mg/l)	1,000	376

Radionuclide Primary Standards		**Well 16**
Constituents	**pCi/l**	
Gross alpha (pCi/l)	15	9.64
Radium-226/228 (pCi/l)	5	1.62
Beta particle (pCi/l)	50	12.8
Uranium (µg/l)	30	0.0170

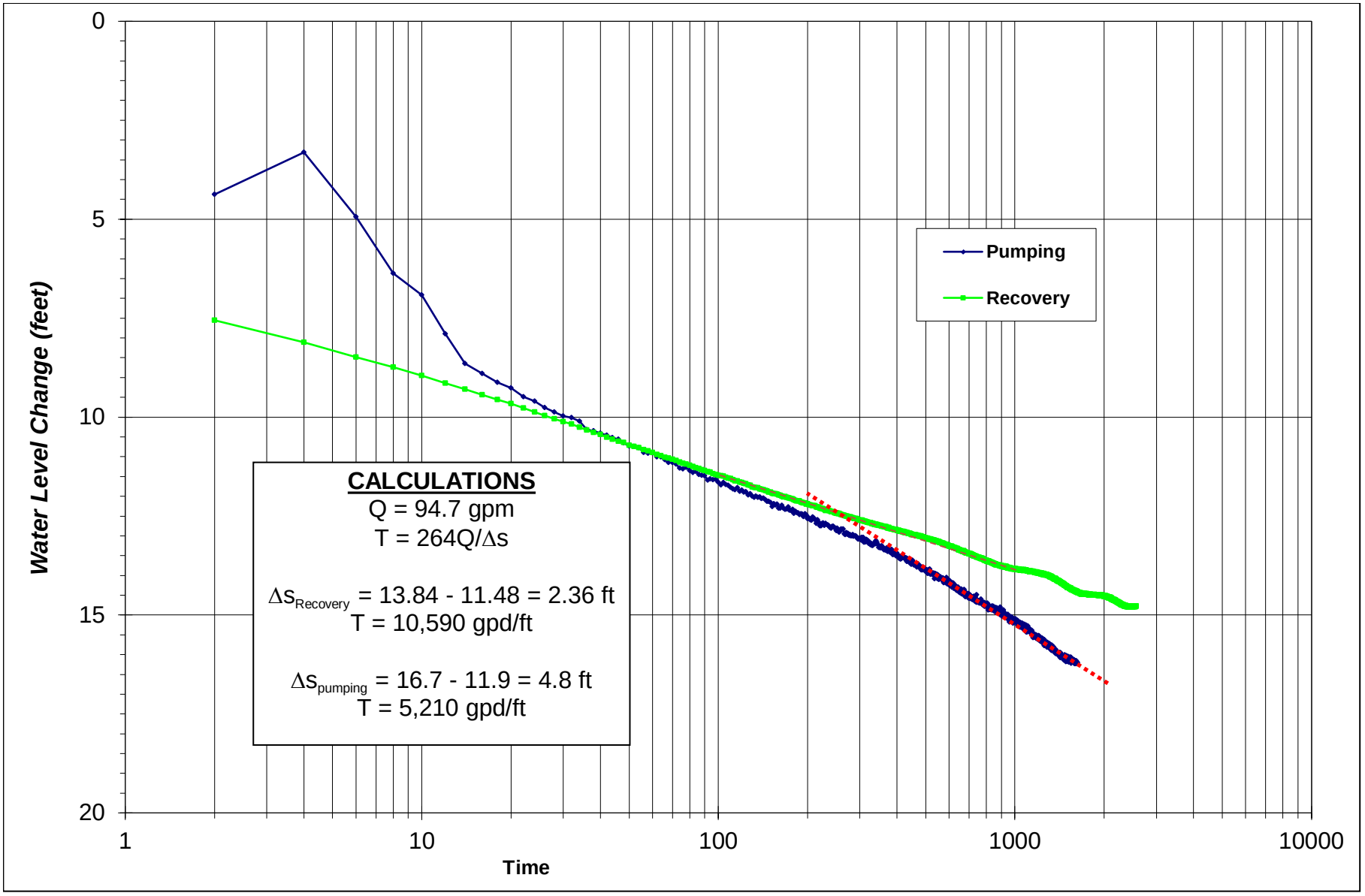
FIGURES



HYDROGRAPH OF PUMPING TEST FOR HEADWATERS MONITOR WELL 16

FIGURE 1

LBG-GUYTON ASSOCIATES



SEMI-LOG PLOT AND CALCULATIONS FOR HEADWATERS MONITOR WELL 16 **FIGURE 2**

LBG-GUYTON ASSOCIATES

APPENDIX 1 - DRILLER'S REPORTS

STATE OF TEXAS WELL REPORT for Tracking #391210

Owner:	**Headwaters Groundwater District**	Owner Well #:	**No Data**
Address:	**125 Lehmann Dr. #201 Kerrville, TX 78028**	Grid #:	**56-44-9**
Well Location:	**I-10 near mile marker 480 Kerrville, TX 78028**	Latitude:	**30° 16' 22" N**
		Longitude:	**099° 30' 00" W**
Well County:	**Kerr**	Elevation:	**2199 ft. above sea level**
Type of Work:	**New Well**	Proposed Use:	**Monitor**

Drilling Start Date: **1/26/2015** Drilling End Date: **2/11/2015**

Borehole:

Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
12	**0**	**750**
7.875	**750**	**1040**

Drilling Method: **Air Hammer; Air Rotary**

Borehole Completion: **Open Hole**

Annular Seal Data:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
0	**750**	**88 ben & 25 cem**

Seal Method: **tremmie tube**

Sealed By: **Steve Stewart**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Surface Slab Installed**

Water Level: **No Data**

Packers: **No Data**

Type of Pump: **No Data**

Well Tests: **Jetted** **Yield: 100+ GPM**

Water Quality:

Strata Depth (ft.)	Water Type
No Data	**Trinity**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Bee Cave Drilling, Inc.**

185 Angel Fire Dr.
Dripping Springs, TX 78620

Driller Name: **Jim Blair** License Number: **54416**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

From (ft)	To (ft)	Description
0	1	topsoil
1	3	tan caliche
3	190	tan Edwards limestone
190	210	tan & white Edwards limestone
210	350	tan Edwards limestone wb
350	480	gray shale & silt
480	500	red sandstone
500	680	gray limestone & shale
680	1000	course red sand & sandstone
wb 400 tds 100+ gpm		
1000	1040	red, white, & tan Ellenburger

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
8 5/8	new	steel	0 750
6 5/8	new	steel	683 1040
6 5/8	steel	casing torch slots	from 740-1040

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

APPENDIX 2 - LABORATORY REPORT

POLLUTION CONTROL SERVICES

Report of Sample Analysis

Client Information	Sample Information	Laboratory Information
Landon Yosko LBG — Guyton Associates - SA 12702 Toepperwein Road, Suite 212 San Antonio, TX 78233	Project Name: TCEQ - Headwater #16 Sample ID: Well Water Matrix: Drinking Water Date/Time Taken: 09/23/2015 1300	**PCS Sample #: 408904** **Page 1 of 4** Date/Time Received: 09/23/2015 14:40 Report Date: 10/21/2015 Approved by: Chuck Wallgren Chuck Wallgren, President

Test Description	Flag	Result	Units	RL	Analysis Date/Time	Analyst	Method
pH	!, I	7.3	S.U.	N/A	09/23/2015 15:52	GWF	SM 4500-H+ B
Conductivity, Specific		634	umhos/cm	1	10/06/2015 12:45	CS	SM 2510B
Total Dissolved Solids		376	mg/L	10	09/24/2015 09:10	CFS	SM 2540C
Nitrate-N		0.4	mg/L	0.1	09/23/2015 16:18	ALH	EPA 300.0
Chloride		16	mg/L	1	09/23/2015 16:18	ALH	EPA 300.0
Sulfate		29	mg/L	1	09/23/2015 16:18	ALH	EPA 300.0
Nitrite-N		<0.20	mg/L	0.1	09/23/2015 16:18	ALH	EPA 300.0

Quality Assurance Summary

Test Description	Precision	Limit	LCL	MS	MSD	UCL	LCS	LCS Limit
pH	N/A	N/A	N/A			N/A		
Conductivity, Specific	N/A	N/A	N/A			N/A		
Total Dissolved Solids	<1	10	N/A	N/A	N/A	N/A		
Nitrate-N	1	20	70	109	108	130	99	85 - 115
Chloride	2	10	90	*87	*89	110	97	85 - 115
Sulfate	1	10	90	*89	90	110	93	85 - 115
Nitrite-N	1	10	79	88	87	121	92	85 - 115

Quality Statement: ***All supporting quality control data adhered to data quality objectives and test results meet the requirements of NELAC unless otherwise noted as flagged exceptions or in a case narrative attachment. Reports with full quality data deliverables are available on request. TCEQ Certificate No. T104704361-08-TX***

! *Not NELAP Certifiable Parameter*
I *Informational purposes only*
* *Approved for release per QA Plan, Exception to Limits - QAM Section 13-4*

These analytical results relate only to the sample tested.
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RL = Reporting Limits
QC Data Reported in %, Except BOD in mg/L

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1532 Universal City Blvd, Suite 100
Universal City, TX 78148-3318
210-340-0343
FAX # 210-658-7903

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Client Information	Sample Information	Laboratory Information
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Test Description	Flag	Result	Units	RL	Analysis Date/Time	Analyst	Method
Fluoride		0.86	mg/L	0.10	09/23/2015 16:18	ALH	EPA 300.0
Alkalinity, Bicarbonate	!	286	mg/L	10	09/26/2015 18:10	SLH	SM 2320 B
Alkalinity, Total	!	286	mg/L	10	09/26/2015 18:10	SLH	SM 2320 B
Copper/ICP (Total)		0.006	mg/L	0.005	09/24/2015 09:28	DL	EPA 200.7 / 6010 B
Iron/ICP (Total)		0.031	mg/L	0.010	09/24/2015 09:28	DL	EPA 200.7 / 6010 B
Calcium/ICP (Total)		47.6	mg/L	1.00	09/25/2015 09:01	DL	EPA 200.7 / 6010 B
Magnesium/ICP (Total)		36.4	mg/L	0.50	09/25/2015 09:01	DL	EPA 200.7 / 6010 B

Quality Assurance Summary

Test Description	Precision	Limit	LCL	MS	MSD	UCL	LCS	LCS Limit
Fluoride	1	10	90	92	91	110	93	85 - 115
Alkalinity, Bicarbonate	<1	10	95	100	100	107	100	85 - 115
Alkalinity, Total	<1	10	95	100	100	107	100	85 - 115
Copper/ICP (Total)	<1	20	75	92	93	125	96	85 - 115
Iron/ICP (Total)	<1	20	75	90	91	125	95	85 - 115
Calcium/ICP (Total)	<1	20	75	*N/C	*N/C	125	102	85 - 115
Magnesium/ICP (Total)	<1	20	75	*N/C	*N/C	125	101	85 - 115

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N/C = Not Calculated, Sample Concentration Greater than 5 Times the Spike Level

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Test Description	Result	Units	RL	Analysis Date/Time	Analyst	Method
Aluminum/ICP (Total)	0.020	mg/L	0.010	09/24/2015 09:28	DL	EPA 200.7 / 6010 B
Strontium/ICP (Total)	9.72	mg/L	0.005	09/24/2015 09:28	DL	EPA 200.7 / 6010 B
Potassium/ICP (Total)	8.53	mg/L	0.50	09/25/2015 09:01	DL	EPA 200.7 / 6010 B
Sodium/ICP (Total)	25.9	mg/L	0.50	09/25/2015 09:01	DL	EPA 200.7 / 6010 B
Manganese/ICP (Total)	<0.010	mg/L	0.010	09/24/2015 09:28	DL	EPA 200.7 / 6010 B
Zinc/ICP (Total)	0.586	mg/L	0.010	09/24/2015 09:28	DL	EPA 200.7 / 6010 B
Arsenic/ICP MS	<0.0005	mg/L	0.0005	09/24/2015 13:34	DL	EPA 200.8

Quality Assurance Summary

Test Description	Precision	Limit	LCL	MS	MSD	UCL	LCS	LCS Limit
Aluminum/ICP (Total)	<1	20	75	97	98	125	101	85 - 115
Strontium/ICP (Total)	<1	20	75	*N/C	*N/C	125	97	85 - 115
Potassium/ICP (Total)	<1	20	75	110	110	125	101	85 - 115
Sodium/ICP (Total)	<1	20	75	*N/C	*N/C	125	96	85 - 115
Manganese/ICP (Total)	<1	20	75	89	89	125	95	85 - 115
Zinc/ICP (Total)	<1	20	75	95	95	125	98	85 - 115
Arsenic/ICP MS	2	20	70	99	98	130	98	85 - 115

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Test Description	Result	Units	RL	Analysis Date/Time	Analyst	Method
Uranium (Total)	See Attached					
Gross Alpha/Beta	See Attached					
Combined Radium 226/228	See Attached					

Quality Assurance Summary

Test Description	Precision	Limit	LCL	MS	MSD	UCL	LCS	LCS Limit
Uranium (Total)	See Attached							
Gross Alpha/Beta	See Attached							
Combined Radium 226/228	See Attached							

Quality Statement: ***All supporting quality control data adhered to data quality objectives and test results meet the requirements of NELAC unless otherwise noted as flagged exceptions or in a case narrative attachment. Reports with full quality data deliverables are available on request. TCEQ Certificate No. T104704361-08-TX***

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SUMMIT ENVIRONMENTAL TECHNOLOGIES, INC.
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Summit Environmental Technologies, Inc.
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Cuyahoga Falls, Ohio 44223
TEL: (330) 253-8211 FAX: (330) 253-4489
Website: http://www.settek.com

Analytical Report

(consolidated)

WO#: **15092224**

Date Reported: **10/21/2015**

CLIENT: Pollution Control Services
Project: 408904
Lab ID: 15092224-001
Client Sample ID 408904

Collection Date: 9/23/2015 1:00:00 PM

Matrix: NON-POTABLE WATER

Analyses	Result	RL	Qual	Units	Uncertainty	DF	Date Analyzed
GROSS ALPHA/BETA ANALYSIS (9310)					**SW9310 E900**		Analyst: **BRD**
ALPHA, Gross	9.64	3.00		pCi/L	± 3.90pCi/L	1	10/10/2015 2:43:00 PM
BETA, Gross	12.8	4.00		pCi/L	± 3.04pCi/L	1	10/10/2015 2:43:00 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
H	Holding times for preparation or analysis exceeded
MC	Value is below Minimum Compound Limit.
ND	Not Detected at the Reporting Limit
P	Second column confirmation exceeds
R	RPD outside accepted recovery limits
E	Value above quantitation range
M	Manual Integration used to determine area response
N	Tentatively identified compounds
O	RSD is greater than RSDlimit
PL	Permit Limit
RL	Reporting Detection Limit

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Analytical Report

(consolidated)

WO#: **15092224**

Date Reported: **10/21/2015**

CLIENT: Pollution Control Services
Project: 408904
Lab ID: 15092224-001
Client Sample ID 408904

Collection Date: 9/23/2015 1:00:00 PM

Matrix: NON-POTABLE WATER

Analyses	Result	RL	Qual	Units	Uncertainty	DF	Date Analyzed
COMBINEDRADIUM226/228-NPW **COMBINED RADIUM-226/228 ANALYSIS (903.0/904.0)**					**MBDRA226RA22**	**E903-904**	Analyst: **BRD**
Radium-226/Radium-228 Combined	1.62	1.00		pCi/L	± 0.68	1	10/16/2015
COMBINEDRADIUM226/228-NPW **RADIUM-226 ANALYSIS (903.0)**					**E903.0**	**E903-904**	Analyst: **BRD**
Radium-226	ND	1.00		pCi/L	± 0.14	1	10/12/2015 10:44:00 A
Yield	1.00					1	10/12/2015 10:44:00 A
COMBINEDRADIUM226/228-NPW **RADIUM-228 ANALYSIS (904.0)**					**E904.0**	**E903-904**	Analyst: **BRD**
Radium-228	1.62	1.00		pCi/L	± 0.54	1	10/16/2015 2:38:00 PM
Yield	1.00					1	10/16/2015 2:38:00 PM

Qualifiers:

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H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
MC	Value is below Minimum Compound Limit.	N	Tentatively identified compounds
ND	Not Detected at the Reporting Limit	O	RSD is greater than RSDlimit
P	Second column confirmation exceeds	PL	Permit Limit

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Analytical Report

(base report)

WO#: **15092224**

Date Reported: **10/21/2015**

CLIENT: Pollution Control Services
Matrix: NON-POTABLE WATER
Lab ID: 15092224-001B
Project: 408904
Client Sample ID 408904

Tag Number:
Collection Date: 9/23/2015 1:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
METALS ANALYSIS (200.8)				**E200.8**	**E200.2**	Analyst: **TIN**
Uranium(U)	0.0170	0.00200		mg/L	1	9/30/2015 3:31:33 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Manual Integration used to determine area response
MC	Value is below Minimum Compound Limit	N	Tentatively identified compounds
ND	Not Detected at the Reporting Limit	O	RSD is greater than RSDlimit
P	Second column confirmation exceeds	PL	Permit Limit
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
U	Samples with CalcVal < MDL		

POLLUTION CONTROL SERVICES

LAB NUMBER **408904**

SINGLE SAMPLE ANALYSIS REQUEST AND CHAIN OF CUSTODY FORM

Container Extensions: ☐ S ☐ B1 ☐ B2 ☒ N ☐ HEM ☐ P Other -1,-2,-3,-4,-5

CUSTOMER INFORMATION	REPORT INFORMATION
Name: LBG - San Antonio	Attention: Landon Yosko Telephone: FAX:

SAMPLE INFORMATION *(Please complete all items as they pertain to your sample)*

Sample Collection	☒ Grab Sample Date: 9-23-15 Sample Time: 1300			Collected By: L.Y.	Project Name: Headwater #16
	☐ Composite Start Date: End Date: Start Time: End Time:			☐ Time/Equal Portion or ☐ Flow Weighed ☐ 3 Part ☐ 6 Part ☐ 12 Part ☐ 24 Hour	Project Number: Project Location:
Sample Identification	☐ Wastewater	☐ Domestic ☐ Industrial	☐ Sludge	☐ Liquid ☐ Aeration ☐ Reain ☐ RAS ☐ Track ☐ Digestor ☐ Solid	Commercial Carrier ID Number:
			☐ Influent ☐ Effluent	Other Misc Description/Location	Comments/Precautions/Special Instructions:
	☒ Water	☐ Surface	☐ Stream ☐ Lake		
		☐ Groundwater	☒ Well Water ☐ Monitor Well		Report ☐ As Is or ☐ Dry Weight
	☐ Soil				

Field Parameters	pH: S.U.	Chlorine Res: mg/l	Water Temp.: C / F	D.O. mg/l	Sp.Cond.	umhos/cm @ 25 C
Sample Preservation	☑ Cool 4°	pH<2 ☑ HNO3-Mtls	☐ H2SO4-COD,FOG,Nutrients,Phenol	pH>12 - ☐ NaOH - T.CN	Other:	

ANALYSIS REQUEST *Check analysis desired below. (See Schedule of Services for other available analysis.)*

GENERAL CHEMISTRY

☐ pH	☐ D.O.	☐ T.Acidity
☐ BOD5	☐ COD	☑ T.Alk. BICARB
☐ CBOD5	☐ FOG	☐ P.Alk
☐ TSS	☐	☐ Sp.Cond.
☐ VSS	☐	☐ TDS
☐ MLSS	☐	☐ T.Hard
☐ VMLSS	☐	☐ Cl
☐ NH3N	☐ T.CN	☐ SO4
☐ NO3N	☐	☑ TCEQ Well Wtr
☐ NO2N	☐	**Std. Well Water**
☐ TKN	☐ % Org N	☐ w/ Coliform
☐ TPO4P	☐ % Ash	☐ w/o Coliform

METALS ☐ Total ☐ Dissolved

☐ Ag	☐ Hg	☑ Sr
☐ Al	☑ K	☐ Tl
☐ As	☑ Mg	☐ V
☐ Ba	☐ Mn	☐ Zn
☐ Be	☐ Mo	
☑ Ca	☑ Na	
☐ Cd	☐ Ni	
☐ Cr	☐ Pb	
☐ HexCr	☐ Sb	
☐ Cu	☐ Se	
☐ Fe	☐ Sn	

RCRA WASTE PROFILE

- ☐ RCI
- ☐ TCLP - Full
- ☐ TCLP - Full w/o H/P
- ☐ TCLP - Vol
- ☐ TCLP - Semi Vol
- ☐ TCLP 8 Metals
- ☐ TCLP - Pb
- ☐ RCRA 8 Metals
- ☐ BTEX
- ☐ TPH
- ☐ MTBE

✓ RADIOLOGICAL

BACTERIOLOGICAL

- ☐ F.Coliform - col/100 ml
- ☐ F.Coliform - col/gm dry wt
- ☐ T.Coliform - col/100 ml, P/A
- ☐ Quanti Tray - MPN
- ☐ *E. coli* - MPN

MISCELLANEOUS

- ☐ 503 Metals
- ☐ Soil/Sludge Nutrients
- ☐ F.Coli (7 Replicate)
- ☐ S.O.U.R.

REQUIRED TURNAROUND: ○ Routine (6-10 days) ***EXPEDITE:*** (See Surcharg ○ < 8 Hrs. ○ < 16 Hrs. ○ < 24 Hrs. ○ 5 days ○ Other: ***Rush Charges Authorized by:***

SAMPLE Archive/Disposal: ☐ Laboratory Standard ☐ Hold for client pick up **Container Type / #:** ☐ Plastic Number: ☐ Glass Number: ☐ Other Number:

Relinquished By:	Date: 9/23/15	Time: 14:40	Received By:	Date: 9-23-15	Time: 1440
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By	Date:	Time:	Received By:	Date:	Time:

Single Sample COC 20110127

1532 Universal City Blvd., Ste. 100, Universal City, Texas 78148
P (210) 340-0343 or (800) 880-4616 - F (210) 658-7903

Login at www.pcslab.net
TCEQ NELAP T104704361-TX

SUMMIT ENVIRONMENTAL TECHNOLOGIES, INC
Analytical Laboratories

Summit Environmental Technologies, Inc.
3310 Win St.
Cuyahoga Falls, Ohio 44223
TEL: (330) 253-8211 FAX: (330) 253-4489
Website: http://www.settek.com

October 21, 2015

Chuck Wallgren
Pollution Control Services
1532 Universal City Blvd. Suite 100
Universal City, TX 78148
TEL:
FAX:

RE: 408904

Dear Chuck Wallgren: Order No.: 15092224

Summit Environmental Technologies, Inc. received 1 sample(s) on 9/28/2015 for the analyses presented in the following report.

There were no problems with the analytical events associated with this report unless noted in the Case Narrative.

Quality control data is within laboratory defined or method specified acceptance limits except where noted.

If you have any questions regarding these tests results, please feel free to call the laboratory.

Sincerely,

Cecilia Markovich

Technical Director

3310 Win St.
Cuyahoga Falls, Ohio 44223

A2LA 0724.01, Alabama 41600, Arizona AZ0788, Arkansas 88-0735, California 07256CA, Colorado, Connecticut PH-0105, Delaware, Florida NELAC E87688, Georgia E87688 and 943, Idaho OH00923, Illinois 200061 and Reg.5, Indiana C-OH-13, Kansas E-10347, Kentucky (Underground Storage Tank) 3, Kentucky 90146, Louisiana 04061 and LA12004, Maine 2012015, Maryland 339, Massachusetts M-OPH923, Minnesota 409711, Montana CERT0099, New Hampshire 2996, New Jersey OH006, New York 11777, North Carolina 39705 and 631, Ohio Drinking Water 4170, Ohio VAP CL0052, Oklahoma 9940, Oregon OH200001, Rhode Island LA000317, South Carolina 92016001, Tennessee TN04018, Texas T104704466-11-5, Region 8 8TMS-L, USDA/APHIS P330-11-00244, Utah OH009232011-1, Vermont VT-87688, Virginia 00440 and 1581, Washington C891, West Virginia 248 and 9957C and E87688, Wisconsin 399013010

SUMMIT ENVIRONMENTAL TECHNOLOGIES, INC.
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Cuyahoga Falls, Ohio 44223
TEL: (330) 253-8211 FAX: (330) 253-4489
Website: http://www.settek.com

Case Narrative

WO#: **15092224**
Date: **10/21/2015**

CLIENT: Pollution Control Services
Project: 408904

This report in its entirety consists of the documents listed below. All documents contain the Summit Environmental Technologies, Inc., Work Order Number assigned to this report.

Paginated Report including Cover Letter, Case Narrative, Analytical Results, Applicable Quality Control Summary Reports, and copies of the Chain of Custody Documents are supplied with this sample set.

Concentrations reported with a J-Flag in the Qualifier Field are values below the Limit of Quantitation (LOQ) but greater than the established Method Detection Limit (MDL).

Method numbers, unless specified as SM (Standard Methods) or ASTM, are EPA methods.

Estimated uncertainty values are available upon request.

Analysis performed by DBM, VRM, or SFG were performed at Summit Labs 2704 Eatonton Highway Haddock, GA 31033

All results for Solid Samples are reported on an "as received" or "wet weight" basis unless indicated as "dry weight" using the "-dry" designation on the reporting units.

Summit Environmental Technologies, Inc., holds the accreditations/certifications listed at the bottom of the cover letter that may or may not pertain to this report.

 The results contained in this report are only representative of the samples received. Conditions can vary at different times and at different sampling conditions. Summit Environmental Technologies, Inc. is not responsible for use or interpretation of the data included herein.

This report is believed to meet all of the requirements of NELAC or the accrediting / certifying agency. Any comments or problems with the analytical events associated with this report are noted below.

SUMMIT ENVIRONMENTAL TECHNOLOGIES, INC
Analytical Laboratories

Summit Environmental Technologies, In
3310 Win S
Cuyahoga Falls, Ohio 4422
TEL: (330) 253-8211 FAX: (330) 253-446
Website: http://www.settek.co

Qualifiers and Acronyms

WO#: **15092224**
Date: **10/21/2015**

These commonly used Qualifiers and Acronyms may or may not be present in this report.

Qualifiers

U	The compound was analyzed for but was not detected.
J	The reported value is greater than the Method Detection Limit but less than the Reporting Limit.
H	The hold time for sample preparation and/or analysis was exceeded.
D	The result is reported from a dilution.
E	The result exceeded the linear range of the calibration or is estimated due to interference.
MC	The result is below the Minimum Compound Limit.
*	The result exceeds the Regulatory Limit or Maximum Contamination Limit.
m	Manual integration was used to determine the area response.
N	The result is presumptive based on a Mass Spectral library search assuming a 1:1 response.
P	The second column confirmation exceeded 25% difference.
C	The result has been confirmed by GC/MS.
X	The result was not confirmed when GC/MS Analysis was performed.
B/MB+	The analyte was detected in the associated blank.
G	The ICB or CCB contained reportable amounts of analyte.
QC-/+	The CCV recovery failed low (-) or high (+).
R/QDR	The RPD was outside of accepted recovery limits.
QL-/+	The LCS or LCSD recovery failed low (-) or high (+).
QLR	The LCS/LCSD RPD was outside of accepted recovery limits.
QM-/+	The MS or MSD recovery failed low (-) or high (+).
QMR	The MS/MSD RPD was outside of accepted recovery limits.
QV-/+	The ICV recovery failed low (-) or high (+).
S	The spike result was outside of accepted recovery limits.
Z	Deviation; A deviation from the method was performed; Please refer to the Case Narrative for additional information

Acronyms

ND	Not Detected	**RL**	Reporting Limit
QC	Quality Control	**MDL**	Method Detection Limit
MB	Method Blank	**LOD**	Level of Detection
LCS	Laboratory Control Sample	**LOQ**	Level of Quantitation
LCSD	Laboratory Control Sample Duplicate	**PQL**	Practical Quantitation Limit
QCS	Quality Control Sample	**CRQL**	Contract Required Quantitation Limit
DUP	Duplicate	**PL**	Permit Limit
MS	Matrix Spike	**RegLvl**	Regulatory Limit
MSD	Matrix Spike Duplicate	**MCL**	Maximum Contamination Limit
RPD	Relative Percent Different	**MinCL**	Minimum Compound Limit
ICV	Initial Calibration Verification	**RA**	Reanalysis
ICB	Initial Calibration Blank	**RE**	Reextraction
CCV	Continuing Calibration Verification	**TIC**	Tentatively Identified Compound
CCB	Continuing Calibration Blank	**RT**	Retention Time
RLC	Reporting Limit Check	**CF**	Calibration Factor
DF	Dilution Factor	**RF**	Response Factor

This list of Qualifiers and Acronyms reflects the most commonly utilized Qualifiers and Acronyms for reporting. Please refer to the Analytical Notes in the Case Narrative for any Qualifiers or Acronyms that do not appear in this list or for additional information regarding the use of these Qualifiers on reported data.

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Workorder Sample Summary

WO#: **15092224**
21-Oct-15

CLIENT: Pollution Control Services
Project: 408904

Lab SampleID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
15092224-001	408904		9/23/2015 1:00:00 PM	9/28/2015 11:45:00 AM	Non-Potable Water
15092224-001	408904		9/23/2015 1:00:00 PM	9/28/2015 11:45:00 AM	Non-Potable Water

POLLUTION CONTROL SERVICES
1532 Universal City Blvd, Suite 100
Universal City, TX 78148-3318
Facsimile 210.658.7903
210.340.0343

CHAIN OF CUSTODY & SUBCONTRACT TRACKING SHEET

TO: Summit Environmental Technologies, Inc
3310 Win Street
Cuyahoga Falls, OH 44223-3790

Relinquished by: Bruce Wallgren
Date/Time: 9/23/2015 Bruce Wallgren
Received by: Gillian Cottrell
Date/Time: 9-28-15 11:45AM

PCS#	Date	Time	Analysis Requested	Pres	T. A. T.
408904	09/23/2015	1300	Combined Radium 226/228	None	
408904	———	—	Gross Alpha/Beta		—
408904	———	—	Uranium (Total)		—
			1509222 4-001 sc		

Comments/Special Instructions:

Unless otherwise requested, send results and invoice to:

Chuck Wallgren
Pollution Control Services
1532 Universal City Blvd, Suite 100
Universal City, TX 78148-3318

Bruce Wallgren 9-23-15

Document

Summit Environmental Technologies, Inc.
Cooler Receipt Form

Initials of person inspecting cooler and samples: F.C.

Client: P.C.S. Order Number: 1509224

Date Received: 9.22.15 Time Received: 11:45 AM Date cooler(s) opened and samples inspected: 9.22.15

Number of Coolers/Boxes: 1 N/A

Shipper: (FED EX) UPS DHL Airborne US Postal Walk-in Pickup Other: _____

Packaging: Peanuts (Bubble Wrap) Paper Foam None Other: _____

Tape on cooler/box	(Y)	N	N/A
Custody Seals intact	(Y)	N	N/A
C-O-C in plastic	(Y)	N	N/A
Ice_____ Blue ice _____	present / (absent) / melted		N/A
Sample Temperature IR Gun #16020459 CF 0.0 °C	22.1 °C		N/A
Radiological Testing Instrument serial #35127 (see page 2 for scan results)	(Y)	N	N/A

**Use 1 sheet per sample for Radiological Testing. If sample is HOT, the Radiological Safety Officer must be notified immediately.

C-O-C filled out properly	(Y)	N	N/A
Samples in separate bags	Y	(N)	N/A
Sample containers intact*	(Y)	N	N/A

*If no, list broken sample(s): _____

Sample label(s) complete (ID, date, etc.)	(Y)	N	N/A
Label(s) agree with C-O-C	(Y)	N	N/A
Correct containers used	(Y)	N	N/A
Sufficient sample received	(Y)	N	N/A
Samples received within holding time	(Y)	N	
Bubbles absent from 40 mL vials**	Y	N	(N/A)

** Samples with bubbles <6mm are acceptable. Indicate bubble size if >6mm. _____

Was client contacted about samples	Y	N
Will client send new samples	Y	N

Client contact: _____

Date/Time: _____

Logged in by: _____

Comments: _____

Summit Environmental Technologies, Inc.
Sample Receipt

pH and Chlorine test on samples

pH strip SET (0-14)# OES-01-0207 pH strip (2.8-4.6) SET#OES-01-0149
Total DPD packet SET#_____ Free DPD packet SET#_____
Disp. Pipette SET# WC-03-0510

ID	Method	pH	Chlorine (±)	Comments
408904	524.2	6		
	8260			

Radiological scan on sample

ID	scan	CPM
408904	✓	22

P = Permanganate interference
504.1, 508, 515.1, 525.2, 547, 548.1, 549.1, 531.2, 1613 methods checked for Total chlorine
552.2 checked for Free chlorine
531.2 pH is checked for ~3.8 (SET# OES-01-0149)
524.2 = pH and Chlorine checked at bench and not log in department

After printing this label:

1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: IMPORTANT: TRANSMIT YOUR SHIPPING DATA AND PRINT A MANIFEST:
At the end of each shipping day, you should perform the FedEx Ground End of Day Close procedure to transmit your shipping data to FedEx. To do so, click on the Ground End of Day Close Button. If required, print the pickup manifest that appears. A printed manifest is required to be tendered along with your packages if they are being picked up by FedEx Ground. If you are dropping your packages off at a FedEx drop off location, the manifest is not required.

Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide and applicable tariff, available upon request. FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim. Limitations, including limitations on our liability, can be found in the current FedEx Service Guide and applicable tariff apply. In no event shall FedEx Ground be liable for any special, incidental, or consequential damages, including, without limitation, loss of profit, loss to the intrinsic value of the package, loss of sale, interest income or attorney's fees. Recovery cannot exceed actual documented loss. Items of extraordinary value are subject to separate limitations of liability set forth in the Service Guide and tariff. Written claims must be filed within strict time limits, see current FedEx Service Guide.

22 lbs

Pollution Control Services
Sample Log-In Checklist

PCS Sample No(s) 408904 **COC No.** 408904

Client/Company Name: LBG - SA **Checklist Completed by:** BW

Sample Delivery to Lab Via:
Client Drop Off Y
Commercial Carrier: Bus ____ UPS ____ Lone Star ____ FedEx ____ USPS ____
PCS Field Services: Collection/Pick Up____ Other:____

Sample Kit/Coolers
Sample Kit/Cooler? Yes Y No____ Sample Kit/Cooler: Intact? Yes Y No___
Custody Seals on Sample Kit/Cooler: Not Present Y If Present, Intact ___ Broken ___
Sample Containers Intact; Unbroken and Not Leaking? Yes Y No ___
Custody Seals on Sample Bottles: Not Present Y If Present, Intact ___ Broken ___
COC Present with Shipment or Delivery or Completed at Drop Off? Yes Y No ___
Has COC sample date/time and other pertinent information been provided by client/sampler? Yes: Y No: ___
Has COC been properly Signed when Received/Relinquished? Yes Y No ___
Does COC agree with Sample Bottle Information, Bottle Types, Preservation, etc.? Yes Y No ___
All Samples Received before Hold Time Expiration? Yes Y No ___
Sufficient Sample Volumes for Analysis Requested? Yes Y No ___
Zero Headspace in VOA Vial if Present? Yes ___ No ___

Sample Preservation
* ***Cooling:*** **Not Required** ____ or **Required** Y If Required, record temperature of submitted samples 6 °C
Is Ice Present in Sample Kit/Cooler? Y Yes ____ No Samples received same day as collected? ____ Yes ____ No

Acid Preserved Sample - If present, is pH <2? **Yes** Y **No** ____** ____H_2SO_4 Y HNO_3 ____H_3PO_4
Base Preserved Sample - If present, is pH >12? Yes ____ No ____ ____NaOH
Other Preservation:____ If Present, Meets Requirements? Yes____ No____
Sample Preservations Checked by: BW Date 9-23-15 Time 1445
pH paper used to check sample preservation (PCS log #): 15-252 (HEM pH checked at analysis).
Samples Preserved/Adjusted by Lab:

Lab #	Parameters Preserved	Preservative Used	Log #

Adjusted by Tech/Analyst:____ Date :____Time:____

Client Notification/ Documentation for "No" Responses Above/ Discrepancies/ RevisionComments
Person Notified: ____ Contacted by:____
Notified Date: ____Time: ____
Method of Contact: At Drop Off:____ Phone ___ Left Voice Mail ____ E-Mail ____ Fax ____
Unable to Contact____ Authorized Laboratory to Proceed :____(Lab Director)
Regarding:____
Comments:____
Actions taken to correct problems/discrepancies:____
Revision Comments____

** Samples submitted for Metals Analysis (except Hex Cr) or Drinking Water for Coliform Bacteria Only are not required to be iced. Samples collected prior day to receipt at the laboratory must meet method specific thermal cooling requirements, "or will be flagged accordingly". Samples delivered the same day as collected may not meet thermal criteria, but shall be considered acceptable if evidence that the chilling process has begun, such as arrival on ice (EPA 815-F-08-006, June 2008). ** Water samples for metals analysis that are not acid preserved prior to shipment may be acceptably preserved by the laboratory on receipt – however, the sample digestion procedure must be delayed for at least 24 hours after preservation by the laboratory.*