



December 1, 2017

Todd Emmert  
Elm Springs, Inc.  
5700 Highway 19 South  
Magnolia, Arkansas, 71753

RE: Abandoned Water Well Sampling Letter Report  
Grand Cane  
Desoto Parish, Louisiana

Dear Mr. Emmert:

At the request of Elm Springs, Inc. (Elm Springs), Michael Pisani & Associates, Inc. (MP&A), conducted environmental sampling at two abandoned water wells located near Grand Cane, DeSoto Parish, Louisiana (Figures 1 and 2). Sampling activities were conducted by MP&A on October 28, 2017, and an LDNR representative, Mr. David Barnhill, and Elm Springs representatives were present to observe. Sampling was conducted in accordance with Louisiana Department of Natural Resources (LDNR) and Louisiana Department of Environmental Quality (LDEQ) protocol. This report provides a summary of background information, a summary of field activities, and presents the laboratory testing results.

### Background

The area of investigation is located near Grand Cane, DeSoto Parish, Louisiana. The area is generally rural with oil and gas exploration production activities located in the vicinity.

MP&A was contracted by Elm Springs to collect gas, soil and water samples from the vicinity of two, abandoned water wells (031-5055Z and 031-5054Z) which were discharging gas from around the wellheads. LDNR provided laboratory data for a gas sample collected on December 13, 2016 from a well identified as the "Indigo Minerals" well (031-802) for comparison to the gas sampling results at the referenced wells (See Figure 2). The Indigo Minerals well log and laboratory report are provided in Attachment A.

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## Summary of Field Activities

### *Well 031-5055Z*

Well 031-5055Z is an, abandoned, former rig supply water well (Figure 3). According to the LDNR SONRIS database, the well is 4-inch diameter, 450 feet deep, and screened in the Wilcox formation. The well was identified in the database as plugged and abandoned. A copy of the well log is provided in Attachment B.

Standing water in the area of the former well was first identified by a third party who notified LDNR. During the LDNR site visit, it was reported that bubbling could be heard in the direction of the former well, but the area was not accessible for inspection. Elm Springs cleared the area of trees and brush to provide access to the area and to allow standing water around the former well site to run off. Following the site clearing, LDNR observed an approximate 30-inch diameter pool of bubbling water at the former well location. No well pad or well casing was visible.

Sampling activities included the collection of a gas sample of the bubbles and a sample of the water coming up from the subsurface. No wellhead casing or well pad was visible. Some concrete could be felt beneath the surface of the water and the base of the area around the bubbling was sandy.

A gas sample was collected in one summa canister provided by Element Materials Technology laboratory (Element), Lafayette, Louisiana, and two Cali-5 impermeable gas sample bags. Sampling was conducted as follows:

- A threaded brass barb plumbing fitting was screwed into a hole in the bottom of a new and decontaminated 5-gallon bucket;
- The bucket was inverted over the bubbling water, and the lip of the bucket was pushed into the sand at the base of the pool, leaving approximately 5 inches of headspace above the water for the gas to accumulate;
- New, clean, poly tubing, with an in-line valve, was attached to the barb on the outside of the bucket;
- The headspace and tubing were allowed to purge/vent for approximately 20 minutes prior to sample collection;
- The tubing was attached to a bulb sampler and a Cali-5 bag. The bag was filled by pumping the bulb until the bag was approximately 1-1/4 inches in thickness. A second bag was filled in the same manner; and,
- The tubing was disconnected from the bulb sampler and attached to the sample port on the Summa Canister. The canister was opened until the pressure equalized then the port was closed.

The gas sample was labelled in the field and recorded on a chain of custody document for hydrocarbon analysis by Gas Processors Association (GPA) Method 2261. The sample was delivered to Element and analyzed by Element's gas laboratory in Scott, Louisiana. In addition, the sample was analyzed by Isotech Laboratories, Inc., Champagne, Illinois (Isotech), for fixed gases and specific carbon and deuterium isotopes.

A water sample was collected from the bubbling water pool. Sample containers were filled directly from the water pool or using a dip container to avoid the loss of preservatives. The sample bottles were labelled in the field and recorded on the chain of custody document. The water sample bottles were immediately placed on ice and maintained until delivered to Element for analysis.

The water sample was analyzed for the following parameters:

- Benzene, toluene, ethylbenzene and total xylenes (BTEX) by SW-846 Method 8260B
- Total petroleum hydrocarbon (TPH) fractions by the Massachusetts method for volatile petroleum hydrocarbons/extractible petroleum hydrocarbons (VPH/EPH)
- Polycyclic aromatic hydrocarbons (PAHs) by SW-846 Method 8270C
- Chloride and Sulfate by SW-846 Method 9056
- Total dissolved solids (TDS) by SM-2540C
- pH by SM-4500H-B
- Magnesium, calcium, sodium, potassium by SW-846 Method 6010B
- Carbonate/bicarbonate alkalinity by SM-2320B

A photolog and photographs of the former wellhead and the immediate area are provided in Attachment C. A copy of the field notes documenting on-site activities is provided in Attachment D.

#### ***Well 031-5054Z***

Well 031-5054Z is an, abandoned, former rig supply water well (Figure 3). The well is a 4-inch diameter, 340-foot deep well, and screened in the Wilcox formation. A copy of the well log is provided in Attachment B. Prior to MP&A's visit, LDNR observed water, sand and gas blowing out of the well to a height of approximately 40 feet. Wet sand was present around wellhead area and on the trees around the perimeter of the well. A photolog and photographs of the wellhead and surrounding area are provided in Attachment C, and field notes documenting on-site activities are provided in Attachment D.

Elm Springs personnel indicated the well was cemented to stop the flow from the well. No water or sand was flowing from the well on October 28, 2017; however, when the wellhead was opened, gas under pressure was evident. A gas sample was collected from this well as follows:

- A threaded brass barb plumbing fitting was screwed into a hole in the bottom of a decontaminated 5-gallon bucket;
- An approximate one-foot of 4-inch diameter PVC pipe was placed over of the wellhead to provide a conduit for the gas from the wellhead to the sample port;
- The bucket was inverted directly over the PVC;
- New, clean, poly tubing was attached to the barb on the outside of the bucket;
- The PVC pipe was allowed to purge for approximately 5 minutes prior to the collection of the gas sample;

- The tubing was attached to a bulb sampler and Cali-5 bag. The bag was filled by pumping the bulb until the bag was approximately 1-1/4 inches in thickness. A second bag was filled in the same manner
- No Summa canister was collected at this location.

The gas sample was labelled in the field and recorded on a chain of custody document for hydrocarbon analysis by Method GPA 2261. The sample was delivered to Element and analyzed by Element's gas laboratory in Scott, Louisiana. In addition, the sample were analyzed by Isotech Laboratories, Inc., Champagne, Illinois (Isotech), for fixed gases and specific carbon and deuterium isotopes.

A sample of the wet sand material surrounding the wellhead was collected. A background soil sample was also collected from a location approximately 325 feet northeast of the wellhead (Figure 3). The soil samples were analyzed for the following:

- Statewide Order 29-B parameters:
  - Metals by SW-846 Method 6010
  - True Total Barium by LDNR 29B methodology
  - Oil and grease by SW-846 Method 9071
  - Mercury by SW-846 Method 7471
  - Percent moisture by LDNR 29B methodology
- BTEX by SW-846 Method 8260B
- TPH fractions by the Massachusetts method for VPH/EPH
- PAHs by SW-846 Method 8270C

No water samples were collected from the vicinity of well 031-5054Z as all water had runoff prior to MP&A's site visit.

### **Summary of Results**

The gas, water, and soil sampling results are presented in Tables 1 through 3. A discussion of the results is presented below. The laboratory reports are provided in Attachment E.

#### ***031-5055Z***

The results of gas sampling at the former rig supply well 031-5055Z indicate the majority of the gas by weight was methane. Isotopic analyses indicate the gas is thermogenic in origin (Figure 4).

A comparison of the gas sample results from 031-5055z with the results from the Indigo Minerals well (031-802) indicates there are some differences in the gas compositions. The Indigo Minerals sample contained heavier carbon chain constituents not present in the 031-5055z sample (Figure 5).

The water sample results indicate that the constituent concentrations were below acceptable limits established by LDEQ and EPA.



**031-5054Z**

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The soil sample results indicate the constituent concentrations were below acceptable limits established by LDEQ for both soil samples. The sample of wet sand material that had been previously blown out of the well only exhibits exceedances of LDNR's Statewide Order 29-B upland standards for Exchangeable Sodium Percentage (ESP) and Sodium Adsorption Ratio (SAR). The background soil sample exhibited no exceedances of Statewide Order 29-B parameters.

The gas samples from 031-5054z and 031-5055z appear to be from a similar thermogenic source based upon the methane isotopic data.

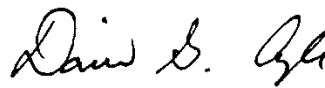
We appreciate the opportunity to provide environmental services to Elm Springs. If you have any questions or comments, please do not hesitate to contact our office at (281) 242-5700.

Sincerely,

MICHAEL PISANI & ASSOCIATES, INC.



Anna B. Fix, P.G.



David G. Angle, P.G., CGWP



Attachments

## **Figures**

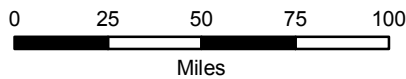
*Abandoned Water Well Sampling*

*Grand Cane  
Desoto Parish, Louisiana*




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 Site Location



**Figure 1**  
**Location Map**  
**Grand Cane**

*Elm Springs, Inc.*  
*DeSoto Parish, Louisiana*

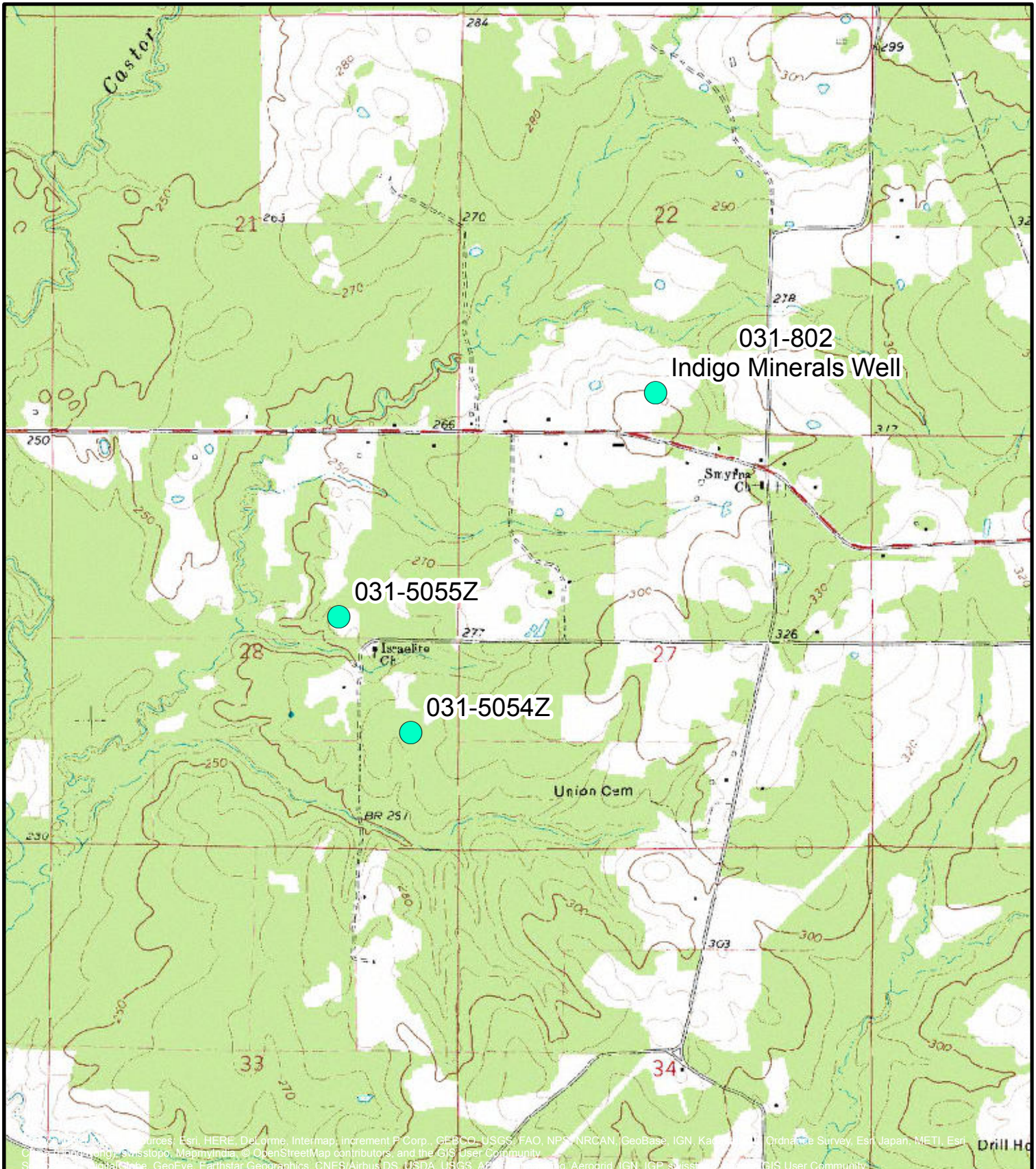
**N**  
  
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 Date: 11/28/2017  
 Drawn: ABF  
 Checked: DGA



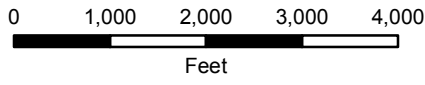
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 Water Wells



**Figure 2**  
**Topographic Map**  
**Grand Cane**

Elm Springs, Inc.  
DeSoto Parish, Louisiana

N  
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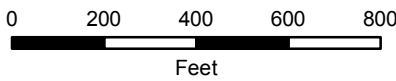




Background Soil Sample Location



Water Wells



Notes:

- Well coordinates obtained from water well logs from LDNR SONRIS database- October 2017
- Background soil sample location based on hand-held GPS

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**Figure 3**  
**Water Well and**  
**Background Soil Sample Locations**

**Grand Cane**

*Elm Springs, Inc.*  
*DeSoto Parish, Louisiana*



Project: 191-01

Date: 11/30/2017

Drawn: ABF

Checked: DGA

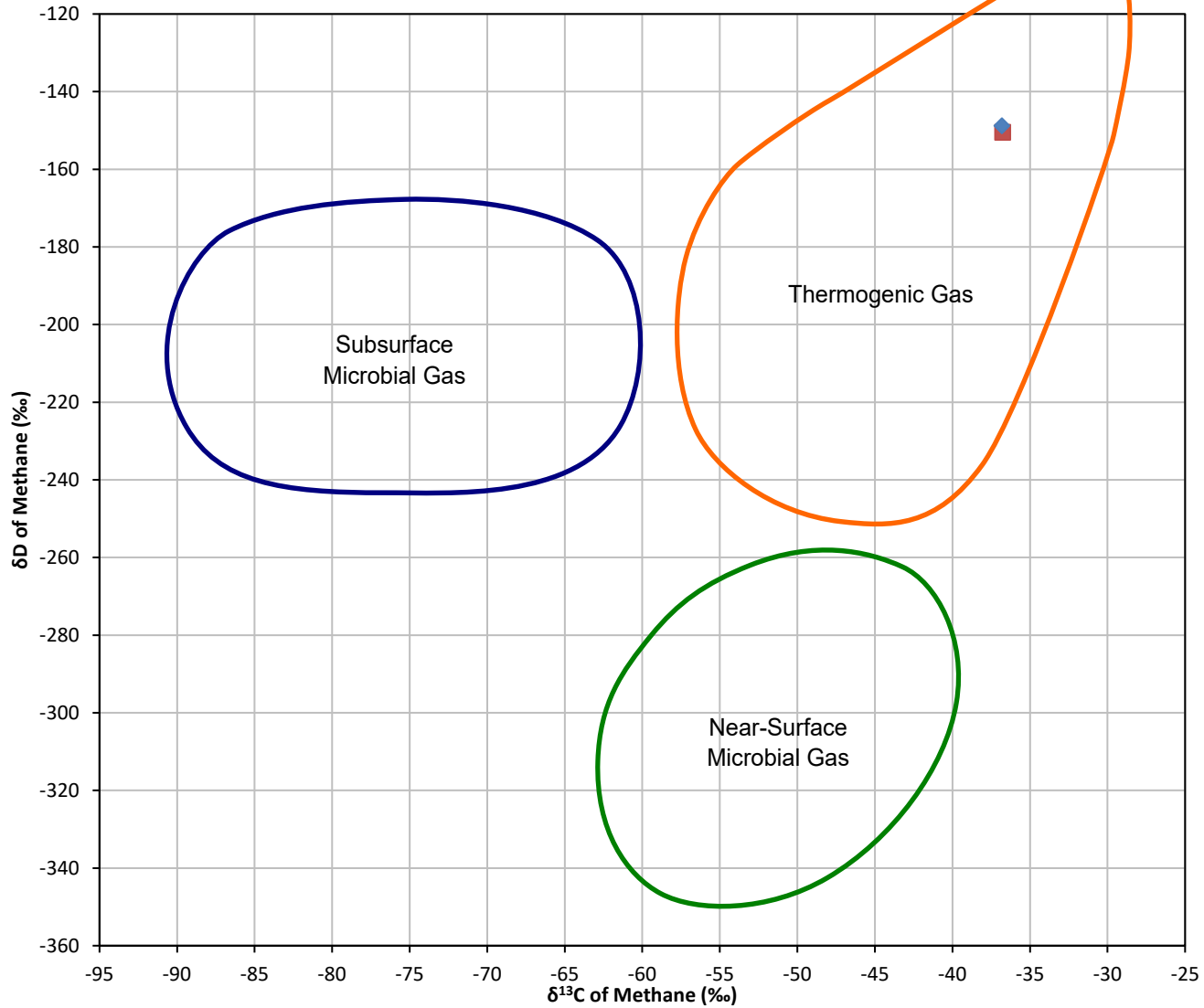


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# Methane Isotopes



## LDNR Registered Water Well Locations

- ◆ 031-5055Z
- 031-5054Z

Notes:  
 Gas classification based on  
 Schoell, M. (1980), The hydrogen and  
 carbon isotopic composition of methane  
 from natural gases of various origins,  
*Geochimica et Cosmochimica Acta*,  
 vol. 44, pp. 649-661.

## Figure 4 Methane Isotopic Composition

*Elm Springs, Inc.  
 Desoto Parish, Louisiana*

Project: 191-01

Date: 11/28/2017

Drawn: SAH

Checked: DGA

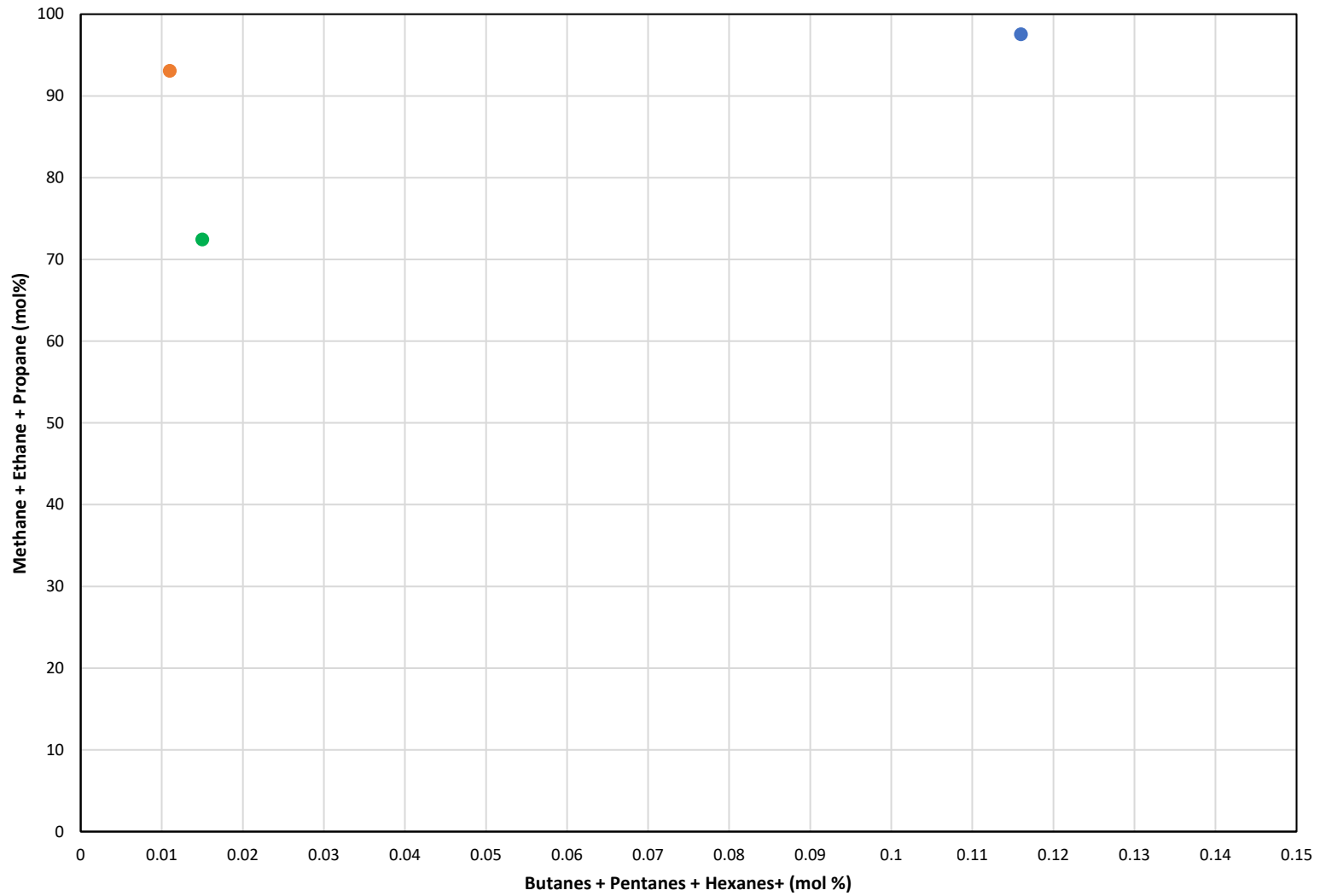


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## "Light" vs. "Heavy" Hydrocarbon Ratio



**Gas Sample ID**

- 031-802 (Indigo Minerals well)
- 031-5055Z
- 031-5054Z

### Figure 5 Gas Composition Ratios

*Elm Springs, Inc.  
Desoto Parish, Louisiana*

Project: 191-01

Date: 11/29/2017

Drawn: SAH

Checked: DGA



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## **Tables**

*Abandoned Water Well Sampling*

*Grand Cane  
Desoto Parish, Louisiana*



**Table 1**  
**Gas Sample Results**  
 Elm Springs, Inc.  
 Grand Cane, DeSoto Parish, Louisiana

		Element Laboratory	Isotech Laboratory	Element Laboratory	Isotech Laboratory	Element Laboratory	
	Sample ID	031-5055Z		031-5054Z		Indigo Minerals	
	Lab ID	1710071-002B	17101071-002A / Gas 031-5055Z	17101071-005B	17101071-005A / Gas 031-5054Z	CPG	
Date Sampled	Units	28-Oct-17		28-Oct-17		13-Dec-16	
<b>Gas Component</b>							
Carbon Dioxide	CO2	%	0.096	0.12	0.016	0.018	2.288
Nitrogen	N2	%	6.815	4.70	27.537	8.13	0.054
Methane	C1	%	92.465	93.87	71.804	89.04	96.686
Ethane	C2	%	0.575	0.617	0.584	0.764	0.740
Propane	C3	%	0.038	0.0376	0.044	0.0552	0.116
Iso-butane	IC4	%	0.008	0.0077	0.01	0.0120	0.024
N-butane	NC4	%	0.003	0.0032	0.005	0.0058	0.026
Iso-pentane	IC5	%	0.000	0.0008	0.000	0.0018	0.014
N-pentane	NC5	%	0.000	0.0002	0.000	0.0007	0.007
Hexanes	C6	%	0.000	0.0004	0.000	0.0015	0.045
Heptanes Plus	C7+	%	0.000	--	0.000	--	--
Helium	He	%	NR	ND	NR	ND	NR
Hydrogen	H <sub>2</sub>	%	NR	ND	NR	ND	NR
Argon	Ar	%	NR	0.0641	NR	0.0828	NR
Oxygen	O <sub>2</sub>	%	NR	0.58	NR	1.89	NR
Carbon Monoxide	CO	%	NR	ND	NR	ND	NR
Ethene	C <sub>2</sub> H <sub>4</sub>	%	NR	ND	NR	ND	NR
Propene	C <sub>3</sub> H <sub>6</sub>	%	NR	ND	NR	ND	NR
<b>Isotopes</b>							
	$\delta^{13}\text{C}_1$	%	NR	-36.81	NR	-36.76	NR
	$\delta\text{DC}_1$	%	NR	-148.80	NR	-150.50	NR
	$\delta^{13}\text{C}_2$	%	NR	-24.64	NR	-23.89	NR
<b>Characteristics</b>							
	MOL Weight		16.980	NR	19.440	NR	16.89
	BTU/LB <sup>(a)</sup>		949	964	740	918	1002
	Compressibility Factor		0.998	NR	0.999	NR	0.9979
	Specific Gravity at 60°F		0.587	0.582	0.672	0.603	0.584
	Sulfur Analyses	ppm (wt.)	ND	NR	ND	NR	ND

**Notes**

Analysis by Element Materials Technology, Scott, Louisiana and Isotech Laboratories, Inc., Champagne, Illinois

NR - not reported

ND - not detected

(a) - Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated

**Table 2**  
**Water Sample Results - Well 031-5055Z**

*Grand Cane*  
*Desoto Parish, Louisiana*

	<b>Sample ID</b>	<b>SW 031-5055Z (102817)</b>
	Date Sampled	10/28/2017
	Units	Results
<b>Petroleum Hydrocarbons</b>		
C8-C10 Aromatics	mg/L	ND (<0.0225)
C10-C12 Aromatics	mg/L	ND (<0.135)
C12-C16 Aromatics	mg/L	ND (<0.135)
C16-C21 Aromatics	mg/L	ND (<0.135)
C21-C35 Aromatics	mg/L	ND (<0.135)
C6-C8 Aliphatics	mg/L	ND (<0.0200)
C8-C10 Aliphatics	mg/L	ND (<0.0200)
C10-C12 Aliphatics	mg/L	ND (<0.135)
C12-C16 Aliphatics	mg/L	ND (<0.135)
C16-C35 Aliphatics	mg/L	ND (<1.04)
Benzene	mg/L	ND (<0.00500)
Ethylbenzene	mg/L	ND (<0.00500)
Toluene	mg/L	ND (<0.00500)
Xylenes, Total	mg/L	ND (<0.0150)
<b>Polycyclic Aromatic Hydrocarbons</b>		
2-Methylnaphthalene	mg/L	ND (<0.000521)
Acenaphthene	mg/L	ND (<0.00104)
Acenaphthylene	mg/L	ND (<0.00104)
Anthracene	mg/L	ND (<0.00104)
Benzo(a)anthracene	mg/L	ND (<0.000521)
Benzo(a)pyrene	mg/L	ND (<0.000156)
Benzo(b)fluoranthene	mg/L	ND (<0.000521)
Benzo(k)fluoranthene	mg/L	ND (<0.000521)
Chrysene	mg/L	ND (<0.000521)
Dibenz(a,h)anthracene	mg/L	ND (<0.00104)
Fluoranthene	mg/L	ND (<0.00104)
Fluorene	mg/L	ND (<0.000625)
Indeno(1,2,3-cd)pyrene	mg/L	ND (<0.000521)
Naphthalene	mg/L	ND (<0.00208)
Phenanthrene	mg/L	ND (<0.00104)
Pyrene	mg/L	ND (<0.00104)
<b>Groundwater Parameters</b>		
Total Dissolved Solids (Residue, Filterable)	mg/L	535
Chloride	mg/L	58.9
Alkalinity, Bicarbonate (As CaCO3)	mgCaCO3/L	400
Alkalinity, Carbonate (As CaCO3)	mgCaCO3/L	ND (<10.0)
Alkalinity, Total (As CaCO3)	mgCaCO3/L	400
Sulfate	mg/L	1.10
Calcium	mg/L	10.4
Magnesium	mg/L	7.93
Potassium	mg/L	6.04
Sodium	mg/L	217
pH	S.U.	7.51

**Notes**

Analysis by Element Materials Technology, Scott, Louisiana

NR - not reported

ND - not detected above limit shown in parentheses

**Table 3**  
**Soil Sample Results - 031-5054Z**

*Grand Cane*  
*DeSoto Parish, Louisiana*

			Sample ID	SS-1 031-5054Z (102817)	SS-2 031-5054Z (102817)
	RECAP Screening Standard	29B Standard	Date Sampled	October 28,2017	October 28,2017
<b>Petroleum Hydrocarbons</b>			Units		
Benzene	0.051	--	mg/Kg	ND (<0.0372)	ND (<0.0430)
Ethylbenzene	19	--	mg/Kg	ND (<0.232)	ND (<0.269)
Toluene	20	--	mg/Kg	ND (<0.232)	ND (<0.269)
Xylenes, Total	18	--	mg/Kg	ND (<0.697)	ND (<0.806)
C8-C10 Aromatics	65	--	mg/Kg	ND (< 10.5)	ND (<12.1)
C10-C12 Aromatics	100	--	mg/Kg	ND (<40.0)	ND (<40.0)
C12-C16 Aromatics	180	--	mg/Kg	ND (<50.0)	ND (<50.0)
C16-C21 Aromatics	150	--	mg/Kg	ND (<50.0)	ND (<50.0)
C21-C35 Aromatics	180	--	mg/Kg	ND (<30.0)	ND (<30.0)
C6-C8 Aliphatics	1200	--	mg/Kg	ND (<09.29)	ND (<10.8)
C8-C10 Aliphatics	120	--	mg/Kg	ND (<09.29)	ND (<10.8)
C10-C12 Aliphatics	230	--	mg/Kg	ND (< 20.0)	ND (< 20.0)
C12-C16 Aliphatics	370	--	mg/Kg	ND (< 20.0)	ND (< 20.0)
C16-C35 Aliphatics	7100	--	mg/Kg	ND (< 90.0)	ND (< 90.0)
<b>Polycyclic Aromatic Hydrocarbons</b>					
2-Methylnaphthalene	1.7	--	mg/Kg	ND (<0.0600)	ND (<0.0600)
Acenaphthene	220	--	mg/Kg	ND (<0.0600)	ND (<0.0600)
Acenaphthylene	88	--	mg/Kg	ND (<0.0600)	ND (<0.0600)
Anthracene	120	--	mg/Kg	ND (<0.0600)	ND (<0.0600)
Benzo(a)anthracene	0.62	--	mg/Kg	ND (<0.0600)	ND (<0.0600)
Benzo(a)pyrene	0.33	--	mg/Kg	ND (<0.0600)	ND (<0.0600)
Benzo(b)fluoranthene	0.62	--	mg/Kg	ND (<0.0600)	ND (<0.0600)
Benzo(k)fluoranthene	6.2	--	mg/Kg	ND (<0.0600)	ND (<0.0600)
Chrysene	62	--	mg/Kg	ND (<0.0600)	ND (<0.0600)
Dibenz(a,h)anthracene	0.33	--	mg/Kg	ND (<0.0600)	ND (<0.0600)
Fluoranthene	220	--	mg/Kg	ND (<0.0600)	ND (<0.0600)
Fluorene	230	--	mg/Kg	ND (<0.0600)	ND (<0.0600)
Indeno(1,2,3-cd)pyrene	0.62	--	mg/Kg	ND (<0.0600)	ND (<0.0600)
Naphthalene	1.5	--	mg/Kg	ND (<0.0600)	ND (<0.0600)
Phenanthrene	660	--	mg/Kg	ND (<0.0600)	ND (<0.0600)
Pyrene	230	--	mg/Kg	ND (<0.0600)	ND (<0.0600)

**Notes**

Analysis by Element Materials Technology, Scott, Louisiana

ND - not detected above limit shown in parentheses

Bold - exceeds regulatory standard

**Table 3**  
**Soil Sample Results - 031-5054Z**

*Grand Cane*  
*DeSoto Parish, Louisiana*

			Sample ID	SS-1 031-5054Z (102817)	SS-2 031-5054Z (102817)
	RECAP Screening Standard	29B Standard	Date Sampled	October 28,2017	October 28,2017
<b>29B Parameters</b>					
Arsenic	12	10	mg/Kg	3.37	2.69
Barium	550		mg/Kg	18.0	69.1
True Total Barium	--	40000	mg/Kg-dry	70.2	86.9
Cadmium	3.9	10	mg/Kg	ND (< 0.252)	ND (<0.261)
Chromium	100	500	mg/Kg	3.70	10.2
Lead	100	500	mg/Kg	3.89	7.92
Selenium	20	10	mg/Kg	ND (<2.02)	ND (<2.09)
Silver	39	200	mg/Kg	ND (<0.252)	ND (<0.261)
Zinc	2300	500	mg/Kg	21.8	5.73
Mercury	2.3	10	mg/Kg	ND (<0.106)	ND (<0.101)
Cation Exchange Capacity	--	--	meq/100g	5.51	9.66
Electrical Conductivity	--	4	mmhos/cm	1.1	0.32
Exchangeable Sodium %	--	15	%	<b>23.8</b>	0.27
HEM, Oil & Grease	--	1	% dry wt	ND (< 0.05)	ND (<0.05)
Percent Moisture	--	--	wt%	20.0	6.90
Sodium Adsorption Ratio	--	12		<b>15.3</b>	1.22
Soluble Calcium	--	--	meq/L	0.77	0.89
Soluble Magnesium	--	--	meq/L	0.15	0.76
Soluble Sodium	--	--	meq/L	10.4	1.11
pH Measurement	--	6-9	S.U.	11.27	4.94

Notes

Analysis by Element Materials Technology, Scott, Louisiana

ND - not detected above limit shown in parentheses

Bold - exceeds regulatory standard

**Attachment A**  
**Indigo Minerals Well Log and**  
**Laboratory Report**

*Abandoned Water Well Sampling*

*Grand Cane*  
*Desoto Parish, Louisiana*

LOUISIANA DEPARTMENT OF NATURAL RESOURCES  
 OFFICE OF CONSERVATION, ENVIRONMENTAL DIVISION  
**WATER WELL REGISTRATION LONG FORM (DNR-GW-1)**

Office of Conservation

JAN 09 2017

Environmental Division

1. USE OF WELL (Check appropriate box):
- Irrigation/Agriculture     Community Public Supply\*     Industrial\*\*     Power Generation  
 Dewatering     Non-Community Public Supply\*     Observation     Test Hole  
 Other (please specify): Relief well for gas in the aquifer
- \*If well is for Public Supply purpose, check appropriate box to indicate primary use:  
 Municipal     Rural     Commercial     Therapeutic     Institutional/Government     Other: \_\_\_\_\_
- \*\*If well is for Industrial purpose, check appropriate box to indicate primary use:  
 Food & Kindred Products     Textile Mill Products     Lumber & Wood Products (Except furniture)     Primary Metal Industries  
 Paper & Allied Products     Chemicals & Allied Products     Petroleum Refining & Related Industries     Frac Supply  
 Other: \_\_\_\_\_

2. WELL OWNER: Indigo Minerals LLC    Phone: 713-237-5000  
 Well Owner's Address: c/o Brammer Engineering, Inc. 400 Texas Street, Suite 600 Shreveport, LA 71101  
 Well Owner's Number or Name (if any): Barbara Relief Well

3. WATER WELL NOTIFICATION INFORMATION:  
 If water well is not exempt under LAC43:VI.701.B, please provide the assigned GWR Number: \_\_\_\_\_  
 Non-exempt well use types include: dewatering, power generation, irrigation, industrial, and public supply

4. WELL INFORMATION:  
 Date Completed: 12-23-16    Depth of Hole: 320 ft    Depth of Completed Well: 320 ft  
 Static water level: \_\_\_\_\_ ft.  below  above ground surface    Date completed: \_\_\_\_\_  
 Name of person who drilled the well: Dennis Johnson

5. CASING AND SCREEN INFORMATION:  
 Casing Type: J-55 40.50# STC    Screen Type: \_\_\_\_\_  
 10.75 in. from 0 ft. to 320 ft.    \_\_\_\_\_ in. from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.  
 \_\_\_\_\_ in. from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.    \_\_\_\_\_ in. from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.  
 \_\_\_\_\_ in. from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.    \_\_\_\_\_ in. from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.  
 Cemented from: \_\_\_\_\_ ft. to ground surface    Slot Size: \_\_\_\_\_ in.    Screen Length: \_\_\_\_\_ ft.  
 Using:  Pump down Method     Gravity Method    Cementing Method Used:  Inside Casing     Outside Casing

6. LOCATION OF WELL: GPS Coordinates: Latitude: 32 ° 05 ' 41.58 "    Longitude: -93 ° 53 ' 36.33 "  
 Parish: DeSoto    Physical Address: \_\_\_\_\_  
 Well is Near: Grand Canal    Approximately 1 miles from (Crossroads, Railroad, any Landmark, etc.): West of the cross roads of 3015 and Smyrna rd.

(Provide a map or sketch on back of original or attach to registration)

7. DRILLER'S LOG (Description and color of cuttings, such as shale, sand, etc. in feet below ground surface):

FROM	TO	DESCRIPTION	FROM	TO	DESCRIPTION
		Drilled 15" hole to 202'			
		Set 6 joints of casing on btm. Cemented			
		Drilled out with 8.5" bit to 320'			
		Well static with 11.2 ppg mud			
		1/8 dp and rig down rotating head.			
		Install 1 1/2" X 5m head, valves and gauges.			

8. ABANDONMENT INFORMATION (Check appropriate boxes):  
 If well is new, does it replace an existing well?  Yes  No  
 If yes, has owner been informed of state regulations requiring plugging of abandoned wells?  Yes  No

9. WATER LEVEL AND YIELD INFORMATION:  
 Ground Elevation (GPS) 298 ft.    Diameter of Hole: 8.5 in.    Is well gravel-packed?  Yes  No    Extension Pipe: \_\_\_\_\_ in.  
 from: \_\_\_\_\_ ft. to: \_\_\_\_\_ ft.    How was static water level determined? \_\_\_\_\_  
 The pumping water level was \_\_\_\_\_ ft. below ground surface.    The well yielded \_\_\_\_\_ gpm with a drawdown of \_\_\_\_\_ ft. after \_\_\_\_\_ hours of continuous pumping on (date) \_\_\_\_\_.    Describe how yield was measured: \_\_\_\_\_  
 It is planned to pump the well at a rate of \_\_\_\_\_ gpm for \_\_\_\_\_ hours per day for \_\_\_\_\_ days per year.    Proposed average daily pump rate: \_\_\_\_\_ gallons.    Motor HP: \_\_\_\_\_    Pump Setting: \_\_\_\_\_ ft. (below ground surface)

10. AVAILABLE INFORMATION (Check appropriate boxes):  
 Is an electric log or other borehole/geophysical log available?  Yes  No    (If yes, please attach a copy of log)  
 Is a mechanical analysis of drill cuttings available?  Yes  No    (If yes, please attach a copy)  
 Is a chemical analysis of water available?  Yes  No    (If yes, please attach a copy)  
 Is a bacteriological analysis available?  Yes  No    (If yes, please attach a copy)  
 Are aquifer test results available?  Yes  No    (If yes, please attach a copy)  
 Pump Test available?  Yes  No    (If yes, please attach a copy)

11. REMARKS (e.g., engineer, pump information, acreage irrigated, subcontractor name & license no., etc.): \_\_\_\_\_

I certify that this work was done and completed in accordance with Rules and Regulations of the State of Louisiana, including Chapter XII of Title 51, Public Health - Sanitary Code, if applicable, on: 12-23-16 (Date)  
 by: Barbara Relief Well (Name of Water Well Contractor), License No. WWC-7449  
 Authorized Signature: [Signature]    Date: 1-8-2017

MAIL ORIGINAL TO:  
 Louisiana Department of Natural Resources  
 Attn: Ground Water Resources  
 P O Box 94275 Baton Rouge, LA 70804-9275  
 (225) 242-8244 Pk. (225) 242-3505 Fax

ONLINE ACCESS:  
 1) Go to  
 2) Click on Data Access in the left hand panel  
 3) Under the section labeled Conservation, click on Ground Water Information.

FOR OFFICE USE ONLY

PARISH: 031    WELL NO: 8102    GEOLOGIC UNIT: 124WLCX  
 LATITUDE:    LONGITUDE:    SECTION:  
 TOWNSHIP:    RANGE:    ALTIMETER:    QUAD NO:  
 REGISTERED BY: T.T.    DATE: 1-13-17  
 INSPECTED BY:    DATE:  
 REMARKS:

Serial Number / Incident Number <b>DERBONNE 27-34 RELIEF WELL</b>	Date <b>12/29/16</b>	Operator <b>INDIGO MINERALS, LLC</b>	( <b>60005</b> )
Lease Name <b>DERBONNE 27-34 RELEIF WATER WELL</b>	Address <b>400 TEXAS STREET. SITE 600</b>		
Location (Sec, Twp, Rng / Parish) <b>022, 13N, 15W / DESOTO</b>	<b>SHREVEPORT, LA 71101</b>		
Field <b>BETHANY LONGSTREET</b>	( <b>1464</b> )	Phone ( <b>318</b> ) <b>429 - 2277</b>	
		Contact <b>ADYONYA DRYDEN</b>	

**R E M A R K S**

**OBSERVATIONS ON RELIEF WELL TO VENT GAS AT 310' SAND SEEN IN WATER WELL & SN 249866 SURFACE.**

**12/21/16 VISIT WELL SITE, DRILLING RELIEF WELL TO 260 +- TO SET SURFACE CASING. PILOT 8 3/4" HOLE DRILLED TO 260', REAMING TO 15" @ 60' AT TIME OF VISIT. PICTURES ATTACHED**

**12/27/2016 VISIT WELL SITE, SURFACE CASING SET & CEMENTED, HOLE TD'D @ 340'+-, 11 # MUD IN HOLE AND NO GAS HAS BEEN SEEN. RIGGED UP COIL TUBING UNIT TO DISPLACE 11 # MUD WITH FRESH WATER. SDFN, PICTURES ATTACHED**

**12/28/16 VISIT WELL SITE, GO IN HOLE W/ COIL DISPLACING MUD W/ FRESH WATER TO TD 340'+-, GAS TO SURFACE FLOWING GAS AND WATER. RIG DOWN COIL TUBING UNIT AND MOVE OFF WELL. WELL FLOWING ON 3/4" CHOKE WITH 75# ON CHOKE TO RESERVE PIT. APPEARS CLEAR WATER. PICTURES ATTACHED**

**12/29/2016 VISIT WELL SITE, WELL CONTINUES TO FLOW, PRESSURE HAS DROPPED TO 61# AND CONTINUES TO FLOW ON THE 3/4" CHOKE. WELL IS BEING MONITORED 24 HRS / DAY. WELL FLOWING INTO RESERVE PIT**

**DAVID BARNHILL CES-3**

text\_2

well is open and dead. I was advised it died Friday, started flowing Sunday night and flowed yesterday, died again late yesterday and same to now! Talk later David









( 60005 )

ET. SITE 600

A 71101

429 - 2277

DEN

& SN 249866 SURFACE.

NG. PILOT 8 3/4" HOLE DRILLED

+, 11 # MUD IN HOLE AND NO

FRESH WATER. SDFM,

TO TD 340 +/-, GAS TO SURFACE

WELL FLOWING ON 3/4" CHOKE

HED

TO 51# AND CONTINUES TO

ING INTO RESERVE PIT



## Robert Romero

---

**From:** David Barnhill  
**Sent:** Wednesday, January 04, 2017 2:51 PM  
**To:** Robert Romero  
**Subject:** Re: Derbonne Relief Well

Just rechecked and pressure at 5#, less fluid that yesterday. David

Sent from my iPhone

On Jan 4, 2017, at 10:28 AM, Robert Romero <[Robert.Romero@LA.GOV](mailto:Robert.Romero@LA.GOV)> wrote:

Thank you.

---

**From:** David Barnhill  
**Sent:** Wednesday, January 04, 2017 10:04 AM  
**To:** Robert Romero  
**Subject:** Derbonne Relief Well

Mr. Robert, here is the narratives up to date. David

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# NARRATIVE REPORT

DNR/Office of Conservation  
Operations Division

Serial Number / Incident Number <b>DERBONNE 27-34 RELIEF WELL</b>	Date <b>01/03/17</b>	Operator INDIGO MINERALS, LLC <span style="float: right;">( 60005 )</span>
Lease Name <b>DERBONNE 27-34 RELEIF WATER WELL</b>		Address <b>400 TEXAS STREET. SITE 600</b>
Location (Sec, Twp, Rng / Parish) <b>022, 13N, 15W / DESOTO</b>		<b>SHREVEPORT, LA 71101</b>
Field <b>BETHANY LONGSTREET</b>	( 1464 )	Phone ( 318 ) 429 - 2277
		Contact <b>ADYONYA DRYDEN</b>

## R E M A R K S

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**12/29/2016 VISIT WELL SITE, WELL CONTINUES TO FLOW, PRESSURE HAS DROPPED TO 61# AND CONTINUES TO FLOW ON THE 3/4" CHOKE. WELL IS BEING MONITURED 24 HRS / DAY. WELL FLOWING INTO RESERVE PIT**

**01/03/2017 VISIT WELL SITE, WELL CONTINUES TO FLOW, PRESSURE HAS DROPPED TO 7-10# AND CONTINUES TO FLOW ON THE 3/4" CHOKE, WELL IS STILL BEING MONITURED 24 HRS/DAY INTO THE RESERVE PIT. APPEARS LESS FLUID (MORE DRILLING MUD) AT THIS TIME.**

**DAVID BARNHILL CES-3**

Original / Baton Rouge, Yellow / Operator, Pink / Inspector

## Robert Romero

---

**From:** Jackie Devall  
**Sent:** Tuesday, January 03, 2017 9:45 AM  
**To:** Robert Romero  
**Cc:** Patrick Raley  
**Subject:** FW: Derbone  
**Attachments:** [NE\_LOGANSPORT-CPG-12132016-231311-1].PDF; ATT00001.txt

-----Original Message-----

**From:** David Barnhill  
**Sent:** Monday, January 02, 2017 4:44 PM  
**To:** Jackie Devall  
**Subject:** FW: Derbone

I received this gas test info on the Derbonne Relief Well from Ben Aycock. He advised the gas does not appear coming from lower and may just be methane in the area. Pressure has dropped from 75# to 20# on the 3/4" open choke. So it does appear to be bleeding down. I will visit site tomorrow if possible. David

---

**From:** Ben Aycock [b.aycock@indigominerals.com]  
**Sent:** Monday, January 02, 2017 4:14 PM  
**To:** David Barnhill  
**Subject:** Derbone

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Element Material Technology  
2129 West Willow Street  
Scott, LA  
70583-5301 USA

P 337 232 3568  
F 337 232 3621  
T 888 786 7555  
info.scott@element.com  
element.com

**Gas Analysis Report No:** 231311

231311-1 -34

**Reported Date:** 12/13/2016

**For:** INDIGO MINERALS

Attn: ACCOUNTS PAYABLE  
600 TRAVIS  
SUITE 5500  
HOUSTON, TX 77002

**Sample Identification:**

**Company:** INDIGO MINERALS  
**Field:** NE LOGANSFORT  
**Lease:** CPG  
**STA # :** 6039

**Sample Data:** **Date Collected:** 12/13/2016  
**PSIG:** 870.2

**Date Received:** 12/13/2016  
**Temp:** 71.3 DEG. F.

**By:** C. O.

**Remarks:**

CYL # 10412

**Sample Type:** SPOT

**Effective Date:** 12/01/2016

**To:** 01/18/2038

**Analyst:** MB

**Hydrocarbon Analysis - GPA 2261-13**

Component Name	Mol Percent	GPM @ 15.025 PSIA
Carbon Dioxide (CO2)	2.288	
Nitrogen (N2)	0.054	
Methane (C1)	96.686	
Ethane (C2)	0.740	0.202
Propane (C3)	0.116	0.033
Iso-Butane (IC4)	0.024	0.008

N-Butane	(NC4)	0.026	0.008
Iso-Pentane	(IC5)	0.014	0.005
N-Pentane	(NC5)	0.007	0.002
Hexanes Plus	(C6+)	0.045	0.021
Total		100.000	

Mol Weight: 16.89  
BTU/LB: 22403.62

Ethane + GPM: 0.279  
Propane + GPM: 0.077  
Iso-Pentane + GPM: 0.028

Compressibility Factor: 0.9979  
Specific Gravity @ 60 Deg. F. (Air = 1): 0.584

BTU/Cuft. (Real) 60 Deg. F. - PSIA:	14.650	14.696	14.730	15.025
Dry:	996.3	999.4	1001.7	1021.8
Sat:	979.2	982.3	984.6	1004.4

Reviewed By:

  
Tina Venable, Customer Service Representative

Data Reviewer

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2129 W. Willow St. Scott, LA 70583 337-232-3568





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Scott, LA  
70583-5301 USA

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F 337 232 3621  
T 888 786 7555  
info.scott@element.com  
element.com

**Gas Analysis Report No:** 231311

231311-1 -31

**Date:** 12/13/2016

**For:** INDIGO MINERALS

Attn: ACCOUNTS PAYABLE  
600 TRAVIS  
SUITE 5500  
HOUSTON, TX 77002

**Sample Identification:**

**Company:** INDIGO MINERALS  
**Field:** NE LOGANSPOUT  
**Lease:** CPG  
**STA # :** 6039

231311-1

**CAPILLARY ANALYSIS - METHOD GPA 2286-95  
COMPONENT AS % OF TOTAL SAMPLE**

COMPONENT NAME	MOL %	WEIGHT %
METHANE	0.0000	0.0000
ETHANE	0.0000	0.0000
PROPANE	0.0000	0.0000
ISO-BUTANE	0.0000	0.0000
N-BUTANE	0.0000	0.0000
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.0000	0.0000

ISOPENTANE	0.0000	0.0000
N-PENTANE	0.0000	0.0000
2,2-DIMETHYLBUTANE (NEOHEXANE)	0.0012	0.0061
2,3-DIMETHYLBUTANE CYCLOPENTANE	0.0015	0.0066
2-METHYLPENTANE	0.0041	0.0197
3-METHYLPENTANE	0.0024	0.0117
N-HEXANE	0.0037	0.0183
2,2-DIMETHYLPENTANE	0.0004	0.0023
METHYLCYCLOPENTANE	0.0013	0.0064
2,4-DIMETHYLPENTANE	0.0004	0.0022
2,2,3-TRIMETHYLBUTANE	0.0001	0.0007
BENZENE	0.0020	0.0087
3,3-DIMETHYLPENTANE	0.0002	0.0012
CYCLOHEXANE	0.0017	0.0079
2-METHYLHEXANE	0.0018	0.0100
2,3-DIMETHYLPENTANE	0.0005	0.0029
1,1-DIMETHYLCYCLOPENTANE 3-METHYLHEXANE	0.0019	0.0106
1,3-DIMETHYLCYCLOPENTANE	0.0002	0.0010

231311-1

CAPILLARY ANALYSIS - METHOD GPA 2286-95  
COMPONENT AS % OF TOTAL SAMPLE

COMPONENT NAME	MOL %	WEIGHT %
1,c3-DIMETHYLCYCLOPENTANE	0.0003	0.0016
3-ETHYLPENTANE		
1,12-DIMETHYLCYCLOPENTANE	0.0003	0.0015
2,2,4-TRIMETHYLPENTANE		
N-HEPTANE	0.0024	0.0139
METHYLCYCLOHEXANE	0.0027	0.0151
1,1,3-TRIMETHYLCYCLOPENTANE		
2,2-DIMETHYLHEXANE		
1,C2-DIMETHYLCYCLOPENTANE	0.0000	0.0000
2,5-DIMETHYLHEXANE	0.0002	0.0016
2,4-DIMETHYLHEXANE	0.0004	0.0024
2,2,3-TRIMETHYLPENTANE		
ETHYLCYCLOPENTANE		
1,12,c4-TRIMETHYLCYCLOPENTANE	0.0002	0.0011
3,3-DIMETHYLHEXANE		
1,12,C3-TRIMETHYLCYCLOPENTANE	0.0000	0.0002
2,3,4-TRIMETHYLPENTANE	0.0000	0.0000
TOLUENE	0.0037	0.0192
2,3-DIMETHYLHEXANE	0.0002	0.0011
1,1,2-TRIMETHYLCYCLOPENTANE	0.0000	0.0002
2-METHYLHEPTANE	0.0010	0.0062
4-METHYLHEPTANE	0.0004	0.0023

3,4-DIMETHYLHEXANE	0.0001	0.0004
3-METHYLHEPTANE	0.0011	0.0068
3-ETHYLHEXANE		
1,c3-DIMETHYLCYCLOHEXANE	0.0003	0.0021
1,c2,t3-TRIMETHYLCYCLOPENTANE		
1,c2,t4-TRIMETHYLCYCLOPENTANE		
1,t4-DIMETHYLCYCLOHEXANE	0.0001	0.0009
2,2,5-TRIMETHYLHEXANE	0.0000	0.0003
1,1-DIMETHYLCYCLOHEXANE	0.0001	0.0007
1,methyl-t3-ETHYLCYCLOPENTANE		
1-methyl-C3-ETHYLCYCLOPENTANE	0.0001	0.0003
1-methyl-t2-ETHYLCYCLOPENTANE	0.0000	0.0000
2,2,4-TRIMETHYLHEXANE		
1-methyl-1-ETHYLCYCLOPENTANE	0.0015	0.0095
CYCLOHEPTANE		
N-OCTANE		
1,T2-DIMETHYLCYCLOCHEXANE	0.0001	0.0007
UNKNOWN	0.0000	0.0002
1,t3-DIMETHYLCYCLOHEXANE	0.0001	0.0006
1,c4-DIMETHYLCYCLOHEXANE		
1,c2,c3-TRIMETHYLCYCLOPENTANE		
2,4,4-TRIMETHYLHEXANE	0.0000	0.0002
ISOPROPYLCYCLOPENTANE	0.0000	0.0000
UNKNOWN	0.0000	0.0000

231311-1

CAPILLARY ANALYSIS - METHOD GPA 2286-95  
COMPONENT AS % OF TOTAL SAMPLE

COMPONENT NAME	MOL %	WEIGHT %
2,2-DIMETHYLHEPTANE	0.0001	0.0008
2,4-DIMETHYLHEPTANE	0.0001	0.0006
1-methyl-c2-ETHYLCYCLOPENTANE		
2,2,3-TRIMETHYLHEXANE	0.0000	0.0000
1,c2-DIMETHYLCYCLOHEXANE	0.0001	0.0007
2,6-DIMETHYLHEPTANE		
N-PROPYLCYCLOPENTANE	0.0000	0.0003
1,c3,c5-TRIMETHYLCYCLOHEXANE		
2,5-DIMETHYLHEPTANE	0.0004	0.0023
3,5-DIMETHYLHEPTANE		
ETHYLCYCLOHEXANE		
1,1,3-TRIMETHYLCYCLOHEXANE	0.0001	0.0004
2,3,3-TRIMETHYLHEXANE		
3,3-DIMETHYLHEPTANE		
1,1,4-TRIMETHYLCYCLOHEXANE	0.0000	0.0003
UNKNOWN	0.0000	0.0001
2,3,4-TRIMETHYLHEXANE	0.0000	0.0003
ETHYLBENZENE	0.0002	0.0010
1,t2,t4-TRIMETHYLCYCLOHEXANE	0.0001	0.0007
1,c3,t5-TRIMETHYLCYCLOHEXANE		
2,3-DIMETHYLHEPTANE		
M-XYLENE	0.0011	0.0065
P-XYLENE		
3,4-DIMETHYLHEPTANE		
2-METHYLOCTANE	0.0005	0.0039

4-METHYLOCTANE		
UNKNOWN	0.0000	0.0000
3-METHYLOCTANE	0.0002	0.0017
UNKNOWN	0.0000	0.0001
1,t2,c3-TRIMETHYLCYCLOHEXANE	0.0000	0.0001
1,t2,c4-TRIMETHYLCYCLOHEXANE		
O-XYLENE	0.0002	0.0015
1,1,2-TRIMETHYLCYCLOHEXANE	0.0001	0.0005
UNKNOWN	0.0000	0.0000
ISOBUTYLCYCLOPENTANE	0.0000	0.0002
N-NONANE	0.0003	0.0023
UNKNOWN	0.0000	0.0000
1,c2,c3-TRIMETHYLCYCLOHEXANE	0.0001	0.0006
1,c2,t3-TRIMETHYLCYCLOHEXANE		
UNKNOWN	0.0000	0.0000
ISOPROPYLBENZENE	0.0001	0.0008
2,2-DIMETHYLOCTANE	0.0000	0.0001
ISOPROPYLCYCLOHEXANE	0.0000	0.0002
CYCLOOCTANE		
UNKNOWN	0.0000	0.0000
N-BUTYLCYCLOPENTANE	0.0000	0.0002
N-PROPYLCYCLOHEXANE		

231311-1

CAPILLARY ANALYSIS - METHOD GPA 2286-95  
COMPONENT AS % OF TOTAL SAMPLE

COMPONENT NAME	MOL %	WEIGHT %
3,3-DIMETHYLOCTANE	0.0001	0.0006
UNKNOWN	0.0001	0.0004
N-PROPYLBENZENE	0.0000	0.0001
UNKNOWN	0.0000	0.0003
M-ETHYLTOLUENE	0.0001	0.0009
P-ETHYLTOLUENE	0.0000	0.0002
2,3-DIMETHYLOCTANE		
4-METHYLNONANE	0.0000	0.0002
5-METHYLNONANE		
1,3,5-TRIMETHYLBENZENE		
2-METHYLNONANE	0.0001	0.0009
3-ETHYLOCTANE	0.0000	0.0001
O-ETHYLTOLUENE	0.0000	0.0003
3-METHYLNONANE		
UNKNOWN	0.0000	0.0001
1,2,4-TRIMETHYLBENZENE	0.0000	0.0001
t-BUTYLBENZENE		
METHYLCYCLOOCTANE		
tert-BUTYLCYCLOHEXANE	0.0000	0.0003
ISO-BUTYLCYCLOHEXANE	0.0000	0.0002
N-DECANE	0.0001	0.0007

ISOBUTYLBENZENE	0.0000	0.0001
sec-BUTYLBENZENE	0.0000	0.0001
UNKNOWN	0.0000	0.0003
1-METHYL-3-ISOPROPYLBENZENE	0.0000	0.0002
1,2,3-TRIMETHYLBENZENE	0.0000	0.0002
1-METHYL-4-ISOPROPYLBENZENE		
UNKNOWN	0.0000	0.0001
1-METHYL-2-ISOPROPYLBENZENE	0.0001	0.0005
UNKNOWN	0.0000	0.0002
N-BUTYLCYCLOHEXANE	0.0000	0.0001
UNKNOWN	0.0000	0.0000
1,3-DIETHYLBENZENE	0.0000	0.0003
1-METHYL-3-PROPYLBENZENE		
1,2-DIETHYLBENZENE	0.0000	0.0002
N-BUTYLBENZENE		
1-METHYL-4-PROPYLBENZENE		
1,4-DIETHYLBENZENE	0.0000	0.0002
1-METHYL-2-PROPYLBENZENE	0.0000	0.0001
1,4-DIMETHYL-2-ETHYLBENZENE	0.0000	0.0003
UNKNOWN	0.0000	0.0002
1,2-DIMETHYL-4-ETHYLBENZENE	0.0000	0.0001



231311-1

CAPILLARY ANALYSIS - METHOD GPA 2286-95  
COMPONENT AS % OF TOTAL SAMPLE

COMPONENT NAME	MOL %	WEIGHT %
1,3-DIMETHYL-2-ETHYLBENZENE	0.0000	0.0001
UNKNOWN	0.0000	0.0000
1,2-DIMETHYL-3-ETHYLBENZENE	0.0001	0.0004
UNKNOWN	0.0000	0.0000
N-UNDECANE	0.0001	0.0005
UNKNOWN	0.0000	0.0001
1,2,4,5-TETRAMETHYLBENZENE	0.0001	0.0005
1,2,3,5-TETRAMETHYLBENZENE	0.0001	0.0005
UNKNOWN	0.0000	0.0003
1,2,3,4-TETRAMETHYLBENZENE	0.0000	0.0002
CYCLODECANE		
UNKNOWN	0.0000	0.0002
NAPHTHALENE	0.0000	0.0001
N-DODECANE	0.0000	0.0004
ISOTRIDECANES PLUS	0.0008	0.0101
<b>Total:</b>	<b>0.0450</b>	<b>0.2537</b>

TOTAL HEXANES	0.0131	0.0624
TOTAL HEPTANES	0.0134	0.0709
TOTAL OCTANES	0.0121	0.0711
TOTAL NONANES	0.0038	0.0254
TOTAL DECANES PLUS	0.0026	0.0239

**BTEX COMPONENTS**

N-HEXANE	0.0037	0.0183
BENZENE	0.0020	0.0087
TOLUENE	0.0037	0.0192
ETHYLBENZENE	0.0002	0.0010
XYLENE	0.0013	0.0080



Element Material Technology  
2129 West Willow Street  
Scott, LA  
70583-5301 USA

P 337 232 3568  
F 337 232 3621  
T 888 786 7555  
info.scott@element.com  
element.com

231311-1

**CAPILLARY ANALYSIS - METHOD GPA 2286-95  
HEAVY END FRACTION**

COMPONENT NAME	MOL %	WEIGHT %
METHANE	0.000	0.000
ETHANE	0.000	0.000
PROPANE	0.000	0.000
ISO-BUTANE	0.000	0.000
N-BUTANE	0.000	0.000
2,2-DIMETHYLPROPANE (NEOPENTANE)	0.000	0.000
ISOPENTANE	0.000	0.000
N-PENTANE	0.000	0.000
2,2-DIMETHYLBUTANE (NEOHEXANE)	2.769	2.391
2,3-DIMETHYLBUTANE	3.342	2.617
CYCLOPENTANE		
2-METHYLPENTANE	9.010	7.780

3-METHYLPENTANE	5.328	4.601
N-HEXANE	8.332	7.195
2,2-DIMETHYLPENTANE	0.899	0.903
METHYLCYCLOPENTANE	2.995	2.526
2,4-DIMETHYLPENTANE	0.860	0.863
2,2,3-TRIMETHYLBUTANE	0.290	0.291
BENZENE	4.365	3.417
3,3-DIMETHYLPENTANE	0.463	0.465
CYCLOHEXANE	3.679	3.103
2-METHYLHEXANE	3.930	3.946
2,3-DIMETHYLPENTANE	1.128	1.133
1,1-DIMETHYLCYCLOPENTANE	4.186	4.194
3-METHYLHEXANE		
1,3-DIMETHYLCYCLOPENTANE	0.418	0.412
1,3-DIMETHYLCYCLOPENTANE	0.642	0.633
3-ETHYLPENTANE		
1,2-DIMETHYLCYCLOPENTANE	0.588	0.588
2,2,4-TRIMETHYLPENTANE		
N-HEPTANE	5.444	5.466
METHYLCYCLOHEXANE	5.947	5.938
1,1,3-TRIMETHYLCYCLOPENTANE		

231311-1

CAPILLARY ANALYSIS - METHOD GPA 2286-95  
HEAVY END FRACTION

COMPONENT NAME	MOL %	WEIGHT %
2,2-DIMETHYLHEXANE		
1,C2-DIMETHYLCYCLOPENTANE	0.010	0.010
2,5-DIMETHYLHEXANE	0.535	0.612
2,4-DIMETHYLHEXANE	0.921	0.950
2,2,3-TRIMETHYLPENTANE		
ETHYLCYCLOPENTANE		
1,1,2,4-TRIMETHYLCYCLOPENTANE	0.385	0.433
3,3-DIMETHYLHEXANE		
1,1,2,C3-TRIMETHYLCYCLOPENTANE	0.087	0.098
2,3,4-TRIMETHYLPENTANE	0.000	0.000
TOLUENE	8.191	7.563
2,3-DIMETHYLHEXANE	0.385	0.440
1,1,2-TRIMETHYLCYCLOPENTANE	0.056	0.062
2-METHYLHEPTANE	2.150	2.461
4-METHYLHEPTANE	0.794	0.909
3,4-DIMETHYLHEXANE	0.122	0.139
3-METHYLHEPTANE	2.355	2.695
3-ETHYLHEXANE		
1,C3-DIMETHYLCYCLOHEXANE	0.723	0.813
1,C2,1,3-TRIMETHYLCYCLOPENTANE		
1,C2,1,4-TRIMETHYLCYCLOPENTANE		

1,2,4-TRIMETHYLCYCLOPENTANE		
1,t4-DIMETHYLCYCLOHEXANE	0.307	0.345
2,2,5-TRIMETHYLHEXANE	0.102	0.131
1,1-DIMETHYLCYCLOHEXANE	0.229	0.258
1,methyl-t3-ETHYLCYCLOPENTANE		
1-methyl-C3-ETHYLCYCLOPENTANE	0.117	0.131
1-methyl-t2-ETHYLCYCLOPENTANE	0.011	0.013
2,2,4-TRIMETHYLHEXANE		
1-methyl-1-ETHYLCYCLOPENTANE	3.273	3.747
CYCLOHEPTANE		
N-OCTANE		
1,t2-DIMETHYLCYCLOHEXANE	0.260	0.292
UNKNOWN	0.057	0.073
1,t3-DIMETHYLCYCLOHEXANE	0.219	0.247
1,c4-DIMETHYLCYCLOHEXANE		
1,c2,c3-TRIMETHYLCYCLOPENTANE		
2,4,4-TRIMETHYLHEXANE	0.061	0.078
ISOPROPYLCYCLOPENTANE	0.012	0.013
UNKNOWN	0.000	0.000
2,2-DIMETHYLHEPTANE	0.257	0.331
2,4-DIMETHYLHEPTANE	0.203	0.245
1-methyl-c2-ETHYLCYCLOPENTANE		
2,2,3-TRIMETHYLHEXANE	0.000	0.000



231311-1

CAPILLARY ANALYSIS - METHOD GPA 2286-95  
HEAVY END FRACTION

COMPONENT NAME	MOL %	WEIGHT %
1,c2-DIMETHYLCYCLOHEXANE	0.252	0.292
2,6-DIMETHYLHEPTANE		
N-PROPYLCYCLOPENTANE	0.085	0.101
1,c3,c5-TRIMETHYLCYCLOHEXANE		
2,5-DIMETHYLHEPTANE	0.810	0.924
3,5-DIMETHYLHEPTANE		
ETHYLCYCLOHEXANE		
1,1,3-TRIMETHYLCYCLOHEXANE	0.113	0.144
2,3,3-TRIMETHYLHEXANE		
3,3-DIMETHYLHEPTANE		
1,1,4-TRIMETHYLCYCLOHEXANE	0.079	0.100
UNKNOWN	0.045	0.057
2,3,4-TRIMETHYLHEXANE	0.094	0.121
ETHYLBENZENE	0.354	0.377
1,12,14-TRIMETHYLCYCLOHEXANE	0.214	0.270
1,c3,15-TRIMETHYLCYCLOHEXANE		
2,3-DIMETHYLHEPTANE		
M-XYLENE	2.398	2.562
P-XYLENE		
3,4-DIMETHYLHEPTANE		
2-METHYLOCTANE	1.205	1.549
4-METHYLOCTANE		
UNKNOWN	0.000	0.000
2-METHYLOCTANE	0.500	0.604

3-METHYLOCTANE	0.532	0.584
UNKNOWN	0.021	0.030
1,12,c3-TRIMETHYLCYCLOHEXANE	0.029	0.037
1,12,c4-TRIMETHYLCYCLOHEXANE		
O-XYLENE	0.547	0.582
1,1,2-TRIMETHYLCYCLOHEXANE	0.159	0.202
UNKNOWN	0.000	0.000
ISOBUTYLCYCLOPENTANE	0.047	0.059
N-NONANE	0.716	0.921
UNKNOWN	0.000	0.000
1,c2,c3-TRIMETHYLCYCLOHEXANE	0.188	0.238
1,c2,t3-TRIMETHYLCYCLOHEXANE		
UNKNOWN	0.000	0.000
ISOPROPYLBENZENE	0.256	0.308
2,2-DIMETHYLOCTANE	0.037	0.052
ISOPROPYLCYCLOHEXANE	0.069	0.082
CYCLOOCTANE		
UNKNOWN	0.000	0.000
N-BUTYLCYCLOPENTANE	0.049	0.062
N-PROPYLCYCLOHEXANE		
3,3-DIMETHYLOCTANE	0.154	0.219

231311-1

CAPILLARY ANALYSIS - METHOD GPA 2286-95  
HEAVY END FRACTION

COMPONENT NAME	MOL %	WEIGHT %
UNKNOWN	0.116	0.157
N-PROPYLBENZENE	0.037	0.044
UNKNOWN	0.096	0.129
M-ETHYLTOLUENE	0.301	0.362
P-ETHYLTOLUENE	0.064	0.077
2,3-DIMETHYLOCTANE		
4-METHYLNONANE	0.069	0.089
5-METHYLNONANE		
1,3,5-TRIMETHYLBENZENE		
2-METHYLNONANE	0.249	0.355
3-ETHYLOCTANE	0.033	0.047
O-ETHYLTOLUENE	0.100	0.131
3-METHYLNONANE		
UNKNOWN	0.018	0.024
1,2,4-TRIMETHYLBENZENE	0.031	0.039
t-BUTYLBENZENE		
METHYLCYCLOOCTANE		
tert-BUTYLCYCLOHEXANE	0.095	0.134
ISO-BUTYLCYCLOHEXANE	0.069	0.097
N-DECANE	0.187	0.266
ISOBUTYLBENZENE	0.040	0.052

ISOBUTYLBENZENE	0.019	0.020
sec-BUTYLBENZENE	0.033	0.044
UNKNOWN	0.082	0.128
1-METHYL-3-ISOPROPYLBENZENE	0.061	0.082
1,2,3-TRIMETHYLBENZENE	0.073	0.091
1-METHYL-4-ISOPROPYLBENZENE		
UNKNOWN	0.017	0.027
1-METHYL-2-ISOPROPYLBENZENE	0.133	0.179
UNKNOWN	0.058	0.090
N-BUTYLCYCLOHEXANE	0.018	0.026
UNKNOWN	0.000	0.000
1,3-DIETHYLBENZENE	0.097	0.130
1-METHYL-3-PROPYLBENZENE		
1,2-DIETHYLBENZENE	0.050	0.068
N-BUTYLBENZENE		
1-METHYL-4-PROPYLBENZENE		
1,4-DIETHYLBENZENE	0.062	0.083
1-METHYL-2-PROPYLBENZENE	0.039	0.052
1,4-DIMETHYL-2-ETHYLBENZENE	0.082	0.111
UNKNOWN	0.047	0.074
1,2-DIMETHYL-4-ETHYLBENZENE	0.034	0.046

231311-1

CAPILLARY ANALYSIS - METHOD GPA 2286-95  
HEAVY END FRACTION

COMPONENT NAME	MOL %	WEIGHT %
1,3-DIMETHYL-2-ETHYLBENZENE	0.028	0.038
UNKNOWN	0.000	0.000
1,2-DIMETHYL-3-ETHYLBENZENE	0.122	0.164
UNKNOWN	0.003	0.005
N-UNDECANE	0.118	0.185
UNKNOWN	0.032	0.055
1,2,4,5-TETRAMETHYLBENZENE	0.153	0.206
1,2,3,5-TETRAMETHYLBENZENE	0.151	0.203
UNKNOWN	0.065	0.111
1,2,3,4-TETRAMETHYLBENZENE	0.045	0.062
CYCLODECANE		
UNKNOWN	0.053	0.091
NAPHTHALENE	0.016	0.020
N-DODECANE	0.091	0.156
ISOTRIDECANES PLUS	1.866	3.971
Total:	100.000	100.000
Specific Gravity @ 60 Deg. F. (Air = 1)	3.4320	
Moisture Weight	00.00	

<b>molecular weight</b>	99.88
<b>Compressibility Factor</b>	0.8433
<b>Summation Factor</b>	0.1033
<b>Cu. Ft. Vapor/Gal @ 14.696 &amp; 60 Deg. F.</b>	24.146
<b>Cu. Ft. Vapor/Gal @ 14.730 &amp; 60 Deg. F.</b>	24.090
<b>Cu. Ft. Vapor/Gal @ 14.650 &amp; 60 Deg. F.</b>	24.222
<b>Btu/cu. Ft. @ 14.696 PSIA, Dry</b>	5335.34
<b>Btu/cu. Ft. @ 14.730 PSIA, Dry</b>	5347.68
<b>BTU/LB</b>	20287



Serial Number / Incident Number <b>DERBONNE 27-34 RELIEF WELL</b>	Date <b>12/29/16</b>	Operator <b>INDIGO MINERALS, LLC</b>	( <b>60005</b> )
Lease Name <b>DERBONNE 27-34 RELIEF WATER WELL</b>	Address <b>400 TEXAS STREET, SITE 600</b>		
Location (Sec, Twp, Rng / Parish) <b>022, 13N, 15W / DESOTO</b>	<b>SHREVEPORT, LA 71101</b>		
Field <b>BETHANY LONGSTREET</b>	( <b>1464</b> )	Phone ( <b>318</b> ) <b>429 - 2277</b>	
		Contact <b>ADYONYA DRYDEN</b>	

## R E M A R K S

**OBSERVATIONS ON RELIEF WELL TO VENT GAS AT 310' SAND SEEN IN WATER WELL & SN 249866 SURFACE.**

**12/21/16 VISIT WELL SITE, DRILLING RELIEF WELL TO 260 +- TO SET SURFACE CASING. PILOT 8 3/4" HOLE DRILLED TO 260', REAMING TO 15" @ 60' AT TIME OF VISIT. PICTURES ATTACHED**

**12/27/2016 VISIT WELL SITE, SURFACE CASING SET & CEMENTED, HOLE TD'D @ 340'+-, 11 # MUD IN HOLE AND NO GAS HAS BEEN SEEN. RIGGED UP COIL TUBING UNIT TO DISPLACE 11 # MUD WITH FRESH WATER. SDFN, PICTURES ATTACHED**

**12/28/16 VISIT WELL SITE, GO IN HOLE W/ COIL DISPLACING MUD W/ FRESH WATER TO TD 340'+-, GAS TO SURFACE FLOWING GAS AND WATER. RIG DOWN COIL TUBING UNIT AND MOVE OFF WELL. WELL FLOWING ON 3/4" CHOKE WITH 75# ON CHOKE TO RESERVE PIT. APPEARS CLEAR WATER. PICTURES ATTACHED**

**12/29/2016 VISIT WELL SITE, WELL CONTINUES TO FLOW, PRESSURE HAS DROPPED TO 61# AND CONTINUES TO FLOW ON THE 3/4" CHOKE. WELL IS BEING MONITORED 24 HRS / DAY. WELL FLOWING INTO RESERVE PIT**

**DAVID BARNHILL CES-3**

## Robert Romero

---

**From:** David Wilkinson <dcwcgs@bellsouth.net>  
**Sent:** Tuesday, December 20, 2016 3:11 PM  
**To:** Robert Romero  
**Cc:** Gary Snellgrove; 'Keatchie Water System'  
**Subject:** RE: Keatchie Water System Water Well near Indigo Minerals Gas Well Site - LA 3015  
**Attachments:** KWS 11.jpg

Hi Bob,

The DOTD GW-1 form you sent is from an active well the Keatchie WS uses.  
It is located 8000 LF west of the booster station on LA 3015.

The coordinates are  
32 D 5.635'N  
93 D 55.120'W

If you need any more information, please advise.

David

David C. Wilkinson P.E.  
Cothren, Graff, Smoak Engineering, Inc.  
6305 Westport Avenue  
Shreveport, LA 71129  
318-687-3732 Office



**From:** Robert Romero [mailto:Robert.Romero@LA.GOV]  
**Sent:** Tuesday, December 20, 2016 12:59 PM  
**To:** 'David Wilkinson' <dcwcgs@bellsouth.net>  
**Cc:** Gary Snellgrove <Gary.Snellgrove@LA.GOV>  
**Subject:** RE: Keatchie Water System Water Well near Indigo Minerals Gas Well Site - LA 3015

David, find attached PDF file of the registration for the 3015 well we discussed earlier.  
As soon as we have information on the subject relief well we will forward that to you and Keatchie water system.  
bob

---

**From:** David Wilkinson [mailto:dcwcgs@bellsouth.net]  
**Sent:** Tuesday, December 20, 2016 12:09 PM

**To:** Robert Romero  
**Cc:** 'Keatchie Water System'  
**Subject:** Keatchie Water System Water Well near Indigo Minerals Gas Well Site - LA 3015

Hello Bob,

I checked with the Keatchie Water System, and they do not have a water well located at their water booster station on LA3015.

The water for this station is from a well approximately 8000 LF west of the there.

Can you please provide me with the information about the water well that needs to have a P/A report?

Is there a copy of any correspondence between Indigo Minerals and the DNR I can have to share with the Keatchie Water System?

The water system has asked me to look into the gas discovered in the Wilcox aquifer issue at the new gas well site 500 feet north of their booster station.

Any news of the progress of the relief well is greatly appreciated.

Thank you,

David

David C. Wilkinson P.E.  
Cothren, Graff, Smoak Engineering, Inc.  
6305 Westport Avenue  
Shreveport, LA 71129  
318-687-3732 Office



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our map.



KWS Well #11

015

90



ALL BEARINGS, DISTANCES AND COORDINATES SHOWN HEREON ARE BASED ON THE LOUISIANA COORDINATE SYSTEM, NORTH ZONE, NAD 27. THIS PLAT DOES NOT REPRESENT A BOUNDARY SURVEY, DISTANCES AND BEARINGS SHOWN ARE NOT INTENDED TO BE DEFINITIVE IN ESTABLISHING ACTUAL TITLE BOUNDARIES.

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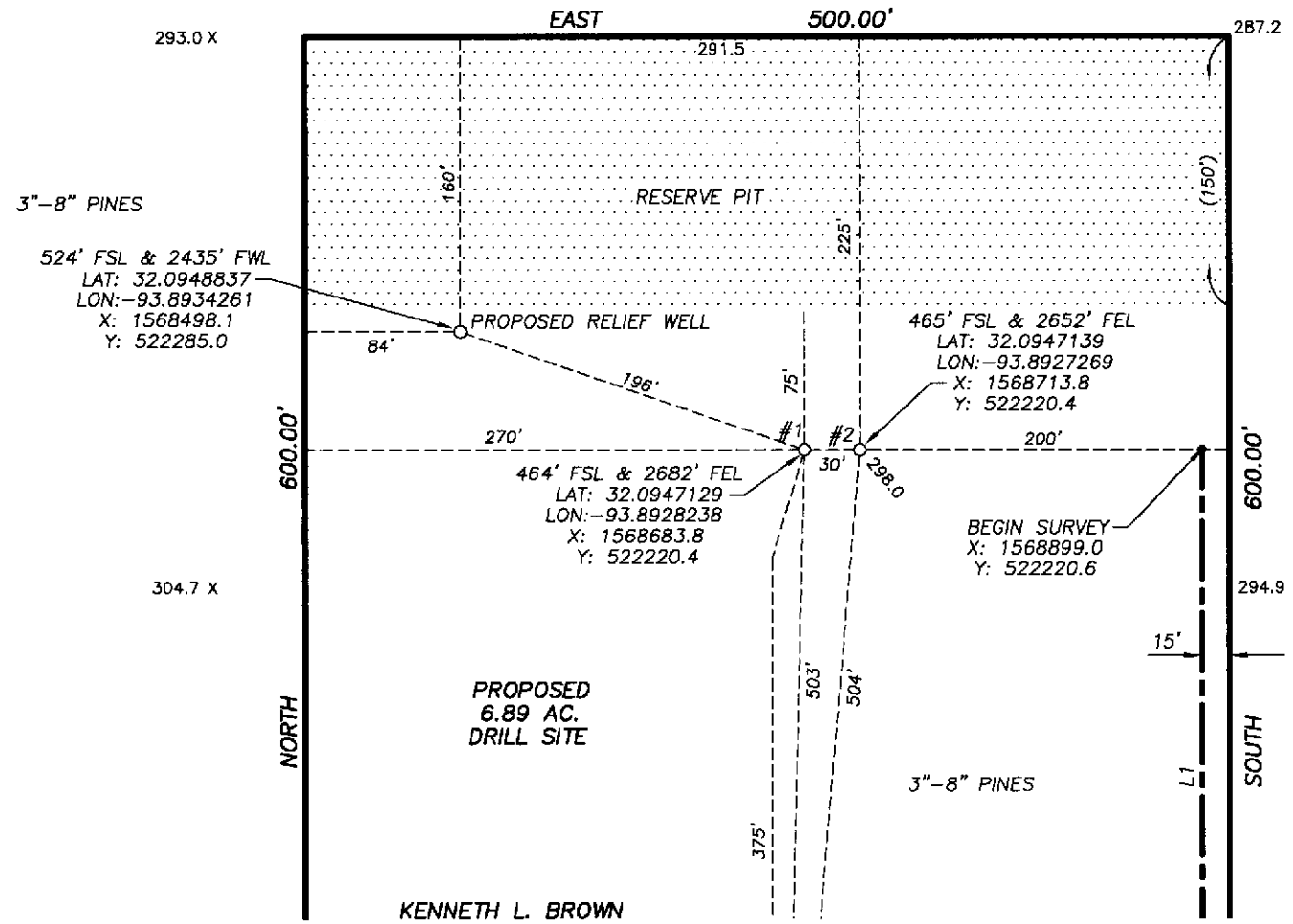
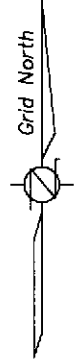
# EXHIBIT "A"

## PROPOSED 30' R-O-W

LINE	BEARING	DISTANCE
L1	S 00°00'01" W	360.04'
L2	N 89°58'10" W	109.91'
L3	S 14°39'54" W	109.76'

TOTAL = 579.71'/0.40 AC./35.13 RODS

### T 13 N - R 15 W



T 13 N - R 13 W

T 13 N - R 15 W

EAST

500.00'

293.0 X

287.2

NORTH

SOUTH

Keatchie water System

318-933-0330

3"-8" PINES

RESERVE PIT

524' FSL & 2435' FWL  
LAT: 32.0948837  
LON: -93.8934261  
X: 1568498.1  
Y: 522285.0

PROPOSED RELIEF WELL

465' LA) LO) X: Y:

Mud Public Supply  
215' deep  
Keatchie water supply line - 6"  
031-82442  
Water Well  
607.5

270'

464' FSL & 2682' FEL  
LAT: 32.0947129  
LON: -93.8928238  
X: 1568683.8  
Y: 522220.4

BEGIN SURVEY  
X: 1568899.0  
Y: 522220.6

PROPOSED  
6.89 AC.  
DRILL SITE

KENNETH L. BROWN  
CALLED 60 AC.  
BK. 748, PG. 317

3"-8" PINES

BEGIN SURVEY

PROPOSED 40' ROAD  
(0.093 AC. IN R-O-W)

PROPOSED 30' R-O-W  
(FOR PROPOSED PIPELINE)

WEST

500.00'

SEC 22/NEC 27  
X: 1571359.8  
Y: 521697.8

SECTION 22  
SECTION 27

JACK GORDON CONNELL  
RES. CALLED 19 AC.  
BOOK 347, PG. 109

END SURVEY  
X: 1568761.3  
Y: 521754.4

AUDREY JEAN HAYMOND  
CALLED 5.2 AC. (TR. 2)  
BOOK 277, PG. 19

NOTE: FLARE ENTRANCE FROM END SURVEY  
⊙ R-O-W LA. 3015 TO 90' WIDE  
⊙ EDGE OF PAVEMENT OF SAME.

JACK GORDON CONNELL  
RES. CALLED 19 AC.  
BOOK 347, PG. 109

FENCE CORNER  
X: 1568693.7  
Y: 521579.6

STANGER  
SURVEYING TYLER, LLC  
1595 E. Grande Blvd.  
Tyler, Texas 75703  
(903) 534-0174



INDIGO MINERALS LLC

DATE: 5/17/16

SCALE: 1" = 100'

EXHIBIT PLAT

## Gary Snellgrove

---

**From:** Jackie Devall  
**Sent:** Monday, December 19, 2016 11:29 AM  
**To:** Todd Keating; Gary Snellgrove; Robert Gray  
**Subject:** FW: Relief Well

FYI

-----Original Message-----

**From:** Adonya Dryden [mailto:Adonya.Dryden@brammer.com]  
**Sent:** Monday, December 19, 2016 10:01 AM  
**To:** Jackie Devall  
**Subject:** Fwd: Relief Well

Here is the proposed plan for the relief well. Please advise

Sent from my iPhone

Begin forwarded message:

**From:** Shara Mayers <s.mayers@indigominerals.com<mailto:s.mayers@indigominerals.com>>  
**Date:** December 19, 2016 at 7:18:49 AM CST  
**To:** Adonya Dryden <Adonya.Dryden@brammer.com<mailto:Adonya.Dryden@brammer.com>>  
**Subject:** Fwd: Relief Well

Shara N. Mayers  
Senior Drilling Engineer  
Indigo Minerals LLC  
600 Travis, Suite 5500<x-apple-data-detectors://1/1>  
Houston, Texas 77002<x-apple-data-detectors://1/1>  
(O) (713) 237-5070<tel:(713)%20237-5070>  
(C) (713) 204-2636<tel:(713)%20204-2636> [Signature]

Begin forwarded message:

**From:** Dennis Johnson <ddjm85@aol.com<mailto:ddjm85@aol.com>>  
**Date:** December 18, 2016 at 2:44:27 PM CST  
**To:** <s.mayers@indigominerals.com<mailto:s.mayers@indigominerals.com>>  
**Subject:** Relief Well

Shara,

Here's what we plan on doing on the Derbonne relief well.

1. Drill 14 1/4" hole to 255'
2. Set 10 3/4" casing J-55 stc 40.5. Land collar just below ground level. With 1 joint shoe track, shoe, float collar and 5 cent. 1 middle of shoe track. one on each joint to surface.



3. Cement with DOC. Bump plug.
4. Install rotating head by making it up in casing collar.
5. Let cement set up, TIH with 6 3/4 bit and prepare to drill out when cement is determined to be good.
6. Have tanks filled with 11.5- 12# mud in tanks. Displace lite mud out of hole at Float collar.
7. Drill out float equipment and drill to 310' or where gas comes in. Take flow to reserve pit.
8. Have DOC pump truck on location and kill well at 5-6 gpm with 16.5-16.8 mud that will be on location.
9. Determine well is static. POOH filling backside continuously. POOH to rotating head and verify that well is static.
10. If good, lay down bit and back off Rotating head.
11. Install a 11" X 3m Cameron head that will have a sub already welded in the bottom of it. Make it up in the 10 3/4" casing collar. I'll send you a drawing of head assembly.
12. Get everything rigged down.
13. Rig up coil tubing with lubricator. Displace heavy mud out of hole so it can flow. Take flow to reserve pit.

Dennis Johnson  
Drlg. Superintendent  
Indigo Minerals  
[ddjm85@aol.com](mailto:ddjm85@aol.com)<<mailto:ddjm85@aol.com>>  
318-458-0908

---

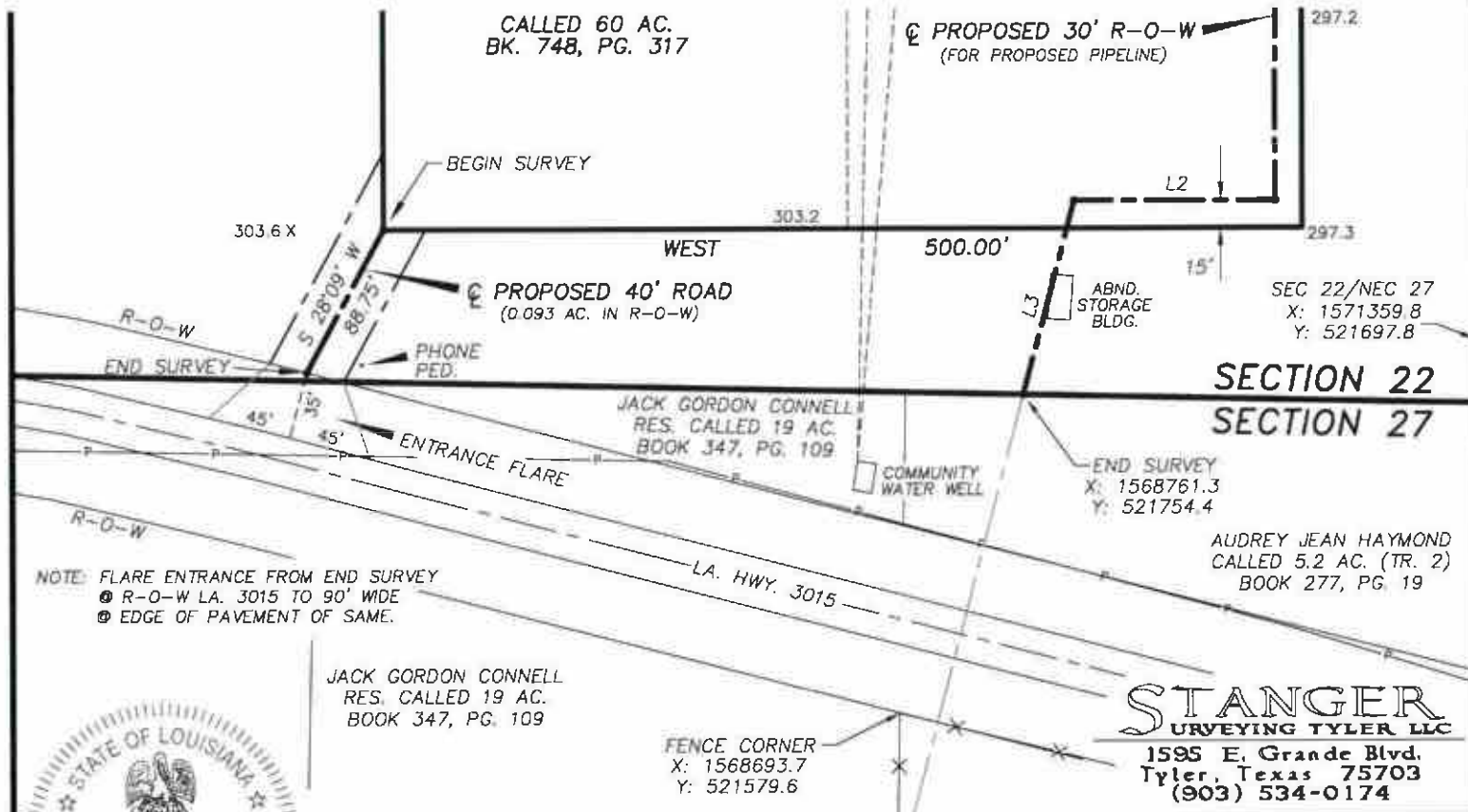
**CONFIDENTIALITY NOTICE**

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32.09472222 -93.8927778

2640 Found 7 records

Well Distance Ft	SECTION	TOWNSHIP	RANGE	PARISH NAME	PARISH NUMBER	LOCAL WELL NUMBER	WELL USE	DESCRIPTION	WELL STATUS	OWNERS NUMBER	OWNERS NAME	DRILLERS NAME	WELL DEPTH	CASING DIAMETER	DATE COMPLETED	WATER LEVEL	DATE MEASURED	GEOLOGIC UNIT	LATITUDE	LONGITUDE
505.13	27	13N	15W	DE SOTO	31	8244Z	P	Public Supply	Active	SMYRNA WELL	KEATCHIE WATER SYSTEM, INC.	HANLIN	215	6	5-Mar	25	3/21/2005	124WLCK	320536	935334
1516.58	27	13N	15W	DE SOTO	31	262 H		Domestic	Active		MASON, TURNER	MASON TURNER	250	4	1945	0		124WLCK	320530	935322
2375.56	27	13N	15W	DE SOTO	31	176 Z		Other	Active		FREDERICK, P A	SIMMONS L E	237	4	Aug-49	60	8/1/1949	124WLCK	320531	935309



I, John R. Nowlin, Registered Professional Land Surveyor, do hereby certify that this survey meets the requirements by Louisiana Professional Engineering and Surveying Board for a Class "D" Survey under my supervision.

BY: *[Signature]*  
 Registered Professional Land Surveyor No. 4801  
 State of Louisiana

**STANGER**  
 SURVEYING TYLER LLC  
 1595 E. Grande Blvd.  
 Tyler, Texas 75703  
 (903) 534-0174

## INDIGO MINERALS LLC

DATE: 5/17/16	<b>EXHIBIT PLAT          SHOWING PROPOSED DRILL SITE          &amp; PIPELINE FOR          DERBONNE 27-34HC #1 &amp; #2          DESOTO PARISH, LA</b>				
SCALE: 1" = 100'					
DRAWN BY: J.F.K.					
FILE: T160125/DRILLSITE					
REV.	ADDED RELIEF WELL	J.B.E.	12/19/16		
REV.	REVISED 40' ROAD	J.F.K.	10/13/16		
REV.	REVISION DESCRIPTION	BY	DATE	CHK'D	DATE

**Attachment B**  
**Well Logs**  
**031-5054Z**  
**031-5055Z**

*Abandoned Water Well Sampling*

*Grand Cane*  
*Desoto Parish, Louisiana*



LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT  
OFFICE OF PUBLIC WORKS  
WATER-WELL REGISTRATION (State Act 535 (1972))

(Check Appropriate Boxes)

If well is new does it replace an existing well?  YES  NO Is well gravel-packed?  YES  NO

1. Well Owner: ~~XXXXXXXXXX~~ May Petroleum, Inc.  
Address: ~~XXXXXXXXXX~~ One Energy Square, Suite 1000  
~~XXXXXXXXXX~~ Dallas, TX 75206  
Owner's Well Number or Name (If Any) ~~XXXXXXXXXX~~ C. H. Hanson #1

2. LOCATION OF WELL: Parish: DeSoto Section: 28 Township: 13N  
Range: 15W Well is Near: Grand Cane Approximately \_\_\_\_\_ miles from \_\_\_\_\_  
(Crossroads, Town, City, Railroad, Any Landmark, etc.)

3. WELL INFORMATION: Ground Elevation \_\_\_\_\_ ft. M.S.L., Depth of Hole: 360 ft.  
Diameter of Hole 6 3/4 in. Depth of Completed Well: 360 ft.  
Date Completed: 7/7/80 by \_\_\_\_\_  
(Give Name and Address of Water Well Contractor) Keithville Well Service  
P. O. Box 84 Keithville, La. 71047

4. CASING AND SCREEN INFORMATION: CASING: TYPE Schedule # 40 PVC 4 in. from 0 ft. to 360 ft.  
SCREEN: TYPE PVC slotted 4 in. from 320 ft. to 360 ft.  
Extension Pipe \_\_\_\_\_ in. from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.  
Give details on size and length of casing cemented and method used to cement.  
Gravel Packed

5. WATER LEVEL AND YIELD INFORMATION: On \_\_\_\_\_ Date \_\_\_\_\_ the static water level in well was \_\_\_\_\_ ft.  below  above How determined? \_\_\_\_\_  
No test made The well yielded \_\_\_\_\_ gpm with a draw down of \_\_\_\_\_ ft. after \_\_\_\_\_ hours of continuous pumping on (date) \_\_\_\_\_. Describe how yield was measured Developed with air. It is planned to pump the well at a rate \_\_\_\_\_ gpm for \_\_\_\_\_ hours per day for \_\_\_\_\_ days per year. Proposed average daily pumping rate: \_\_\_\_\_ gallons. Motor HP \_\_\_\_\_ Pump setting \_\_\_\_\_ ft.

6. USE OF WELL (Check Appropriate Box)  
Irrigation/Agricultural  Industrial  Public Supply  Domestic/Rural  Power Generation   
(If industrial or public supply is checked please see bottom of this form)  
OTHER (Please Specify) \_\_\_\_\_

7. AVAILABLE INFORMATION (Check Appropriate Boxes)  
Is an electrical log or other borehole geophysical log available?  YES  NO (if yes, please attach a copy of log)  
Is a driller's log available? (Complete bottom of form)  YES  NO  
Is a mechanical analysis of the drill cuttings available?  YES  NO  
Is a chemical analysis of water available?  YES  NO  
Is a biological or bacteriological analysis available?  YES  NO  
Are aquifer test results available?  YES  NO

8. ABANDONMENT INFORMATION:  
If this is a replacement well has owner been informed by contractor of need to plug abandoned well?  YES  NO  
Has the owner been informed of state regulations requiring the plugging and (or) sealing of all abandoned wells?  YES  NO

9. REMARKS (Such as engineer, pump information, acreage irrigated, etc.) C. H. HANSON #1 (SEE 031-50547)

10. DRILLER'S LOG (Description and color of cuttings, such as, shale, sand, etc. in feet below ground level)

FROM	TO	DESCRIPTION	FROM	TO	DESCRIPTION	FROM	TO	DESCRIPTION
0	15	Clay	180	195	Shale			
15	45	Sand	195	225	Sand			
45	105	Shale	225	315	Shale			
105	120	Sand	315	330	Shale & Sand			
120	165	Shale	330	360	Sand & Shale			
165	180	Stripping						

(If necessary, continue log on back of original form.)

PUBLIC SUPPLY: (If well is for public-supply purpose please check one of the following to indicate principal category of public-supply use.)  
 Municipal  Therapeutic  
 Rural  Institutional/Government  
 Commercial  Other \_\_\_\_\_ Specify \_\_\_\_\_

INDUSTRIAL: (If well is for industrial purpose please check one of the following to indicate the standard industrial category representing the principal industrial use.)  
 Food and Kindred Products  Paper and Allied Products  
 Textile Mill Products  Chemicals and Allied Products  
 Lumber & Wood Products (Except Furniture)  Petroleum Refining & Related Industries  
 Other \_\_\_\_\_  Primary Metal Products

Form Completed By: Bruce Massey 8-7-80  
(Name) (Date)  
P. O. Box 517, Madison, MS  
(Address)  
*Bruce Massey*  
(Signature)

PLEASE PRINT OR TYPE WHEN COMPLETING THIS FORM  
MAIL ORIGINAL TO  
Department of Transportation and Development  
Office of Public Works  
P. O. BOX 44155  
BATON ROUGE, LA. 70804  
For Details Regarding Entries on This Form, SEE INSTRUCTIONS.

DO NOT USE—OFFICE USE ONLY  
STATE: 22 PARISH: 031 LOCAL WELL NO.: -50547  
IDENTIFICATION NUMBER: 320458093541202  
OWNER'S NAME: MAY PETROLEUM  
WELL DEPTH: 360 Ft. Use of Well: 2 RS  
Date Completed: 0780 OWNER'S NO.: CHHI  
Geologic Unit: \_\_\_\_\_  
Registration Status: \_\_\_\_\_  
AVAILABLE INFORMATION: \_\_\_\_\_  
Additions, Changes or Deletions: \_\_\_\_\_ Card No. 180

REFER TO INSTRUCTION FOR CODES  
Coded By \_\_\_\_\_ on \_\_\_\_\_  
Location Verified On \_\_\_\_\_  
By \_\_\_\_\_  
The Correct Location is \_\_\_\_\_  
Remarks: NO PLAT  
DNR SN 169060  
Copy of Registration Form to USGS  YES  NO  
Copy of Form to Water Comm.  YES  NO



LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT  
OFFICE OF PUBLIC WORKS

WATER-WELL REGISTRATION (State Act 535 (1972))

(Check Appropriate Boxes)

If well is new does it replace an existing well?  YES  NO Is well gravel-packed?  YES  NO

1. Well Owner: IMC Exploration Co.  
Address: Suite 1100, The American Tower 401 Market St.  
Shreveport, La. 71101  
Owner's Well Number or Name (If Any) off 3015 out of Grand Care

2. LOCATION OF WELL: Parish: De Soto Section: 28 Township: 13 N  
Range: 15W Well is Near Grand Care Approximately 5 miles from 171+3015  
(Crossroads, Town, City, Railroad, Any Landmark, etc.)

3. WELL INFORMATION: Ground Elevation 261' ft. M.S.L., Depth of Hole: 450 ft.  
Diameter of Hole 6 3/4 in. Depth of Completed Well: 450 ft.  
Date Completed: 10/29/80 by  
(Give Name and Address of Water Well Contractor) Keithville Well Service  
P.O. Box 84 Keithville, La. 71047

4. CASING AND SCREEN INFORMATION:  
CASING: TYPE Schedule # 40 PVC SCREEN: TYPE PVC slotted  
4 in. from 450 ft. to 450 ft. 4 in. from 410 ft. to 450 ft.  
Extension Pipe \_\_\_\_\_ in. from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.  
Give details on size and length of casing cemented and method used to cement.  
Gravel Packed

5. WATER LEVEL AND YIELD INFORMATION: On \_\_\_\_\_ Date \_\_\_\_\_ the static water level in well was \_\_\_\_\_ ft.  below  above \_\_\_\_\_ How determined? \_\_\_\_\_  
No test made. The well yielded \_\_\_\_\_ gpm with a draw down of \_\_\_\_\_ ft. after \_\_\_\_\_ hours of continuous pumping on (date) \_\_\_\_\_. Describe how yield was measured developed with air. It is planned to pump the well at a rate \_\_\_\_\_ gpm for \_\_\_\_\_ hours per day for \_\_\_\_\_ days per year. Proposed average daily pumping rate: \_\_\_\_\_ gallons. Motor HP \_\_\_\_\_ Pump setting: \_\_\_\_\_ ft.

6. USE OF WELL (Check Appropriate Box)  
Irrigation/Agricultural  Industrial  Public Supply  Domestic/Rural  Power Generation   
(If industrial or public supply is checked please see bottom of this form)  
OTHER (Please Specify) \_\_\_\_\_

7. AVAILABLE INFORMATION (Check Appropriate Boxes)  
Is an electrical log or other borehole geophysical log available?  YES  NO (if yes, please attach a copy of log)  
Is a driller's log available? (Complete bottom of form)  YES  NO  
Is a mechanical analysis of the drill cuttings available?  YES  NO  
Is a chemical analysis of water available?  YES  NO  
Is a biological or bacteriological analysis available?  YES  NO  
Are aquifer test results available?  YES  NO

8. ABANDONMENT INFORMATION:  
If this is a replacement well has owner been informed by contractor of need to plug abandoned well?  YES  NO  
Has the owner been informed of state regulations requiring the plugging and/or sealing of all abandoned wells?  YES  NO

9. REMARKS (Such as engineer, pump information, acreage irrigated, etc.) \_\_\_\_\_

10. DRILLER'S LOG (Description and color of cuttings, such as, shale, sand, etc. in feet below ground level)

FROM	TO	DESCRIPTION	FROM	TO	DESCRIPTION	FROM	TO	DESCRIPTION
0	15	Clay	352	405	Shale			
15	35	Sand (red)	405	450	Sand (coarse gray)			
35	180	Shale						
180	190	Sand (gray fine)						
190	345	Shale						
345	352	Sand						

(If necessary, continue log on back of original form.)

PUBLIC SUPPLY: (If well is for public-supply purpose please check one of the following to indicate principal category of public-supply use.)  
 Municipal  Therapeutic  
 Rural  Institutional/Government  
 Commercial  Other \_\_\_\_\_ Specify \_\_\_\_\_

INDUSTRIAL: (If well is for industrial purpose please check one of the following to indicate the standard industrial category representing the principal industrial use.)  
 Food and Kindred Products  Paper and Allied Products  
 Textile Mill Products  Chemicals and Allied Products  
 Lumber & Wood Products (Except Furniture)  Petroleum Refining & Related Industries  
 Other \_\_\_\_\_  Primary Metal Products

Form Completed By: Paul E. Underwood 11-3-80  
(Name) (Date)  
(Address)  
(Signature)

PLEASE PRINT OR TYPE WHEN COMPLETING THIS FORM  
MAIL ORIGINAL TO  
Department of Transportation and Development  
Office of Public Works  
P. O. BOX 44155  
BATON ROUGE, LA. 70804  
For Details Regarding Entries on This Form, SEE INSTRUCTIONS.

DO NOT USE—OFFICE USE ONLY  
STATE: 22 PARISH: 031 LOCAL WELL NO.: -50552  
1 2 3 5 6 11  
IDENTIFICATION NUMBER  
320515093542301  
12 26

OWNER'S NAME  
IMC EXPLOR  
27 WELL DEPTH 450 Ft. Use of Well Z RS  
42 45 46 47 48  
Date Completed 1080 OWNER'S NO. \_\_\_\_\_  
49 52 53 56  
Geologic Unit \_\_\_\_\_  
57 64  
Registration Status  Proposed  Daily  Pumping  
65 Rate 66 72

AVAILABLE INFORMATION  
 L  \_\_\_\_\_  \_\_\_\_\_  \_\_\_\_\_  
73 74 75 76 77 78  
Additions, Changes or Deletions  Card No. 1  
79 80

REFER TO INSTRUCTION FOR CODES  
Coded By \_\_\_\_\_ on \_\_\_\_\_  
Location Verified On \_\_\_\_\_  
By \_\_\_\_\_  
The Correct Location is \_\_\_\_\_  
Remarks \_\_\_\_\_  
DNR 171 884  
Copy of Registration Form to USGS  YES  NO  
Copy of Form to Water Comm.  YES  NO

031-5055Z



171 884

of 2015 out of State (one  
The City  
171 884

171 884

RECEIVED  
DEC 01 1980  
OFFICE OF PUBLIC WORKS  
DEPT. OF TRANS. & DEVEL.  
BATON ROUGE, LA.

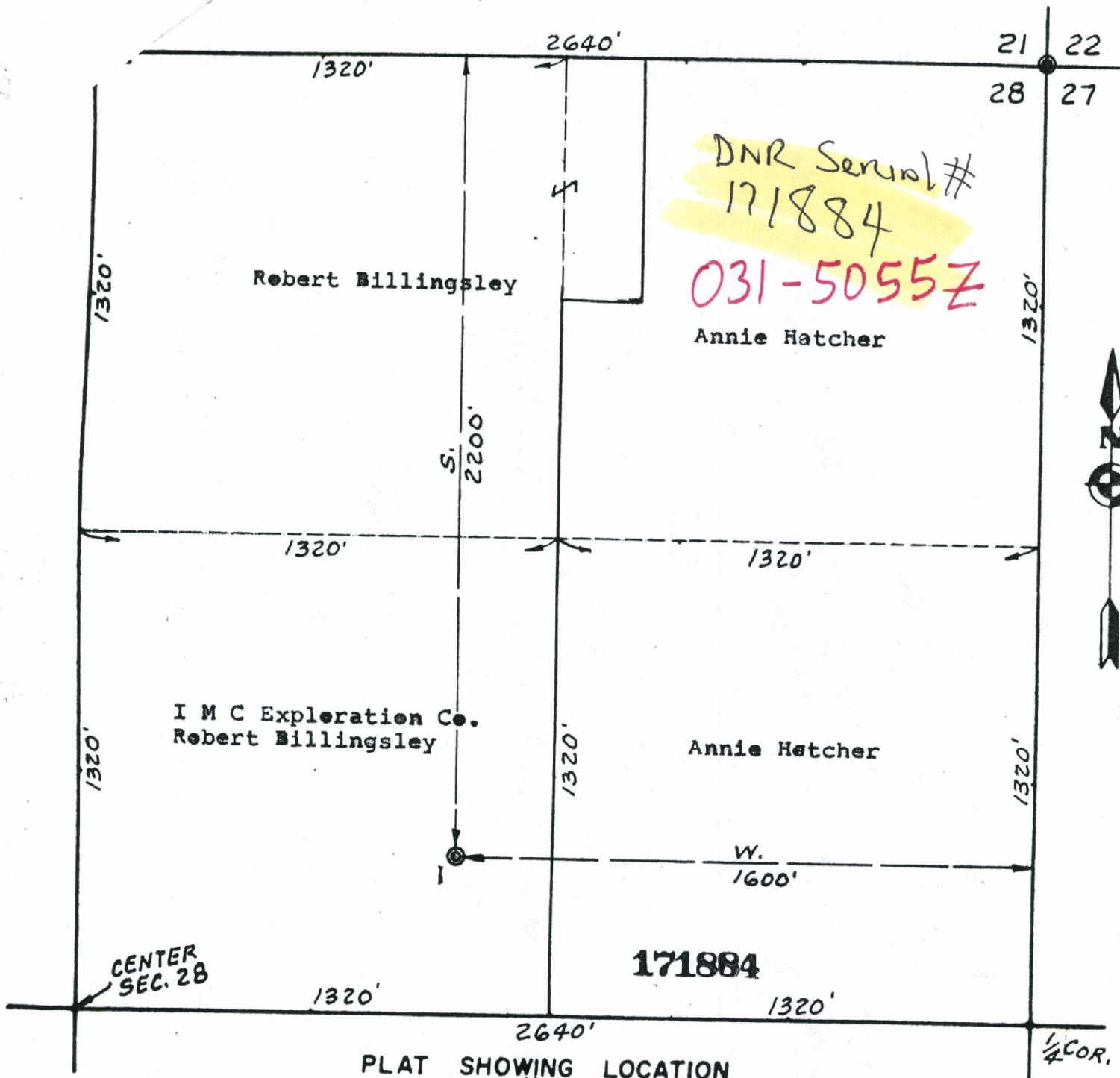
Hoss RA SU 29 Bethany  
Robert Billingsley  
171 884

28 13N 15W  
2200' FROM NORTH LINE  
1660' FROM EAST LINE

RECEIVED JUL 28 1992



TOWNSHIP 13 NORTH , RANGE 15 WEST  
DESOTO PARISH , LOUISIANA.



PLAT SHOWING LOCATION  
I M C EXPLORATION COMPANY *Hoss RA 54 29* Robert Billingsley No. 1  
Located 2200 ft. South and 1600 ft. West from the NE  
corner of section 28 township 13 North , range 15 West,  
DeSete Parish , Louisiana.

Scale 1" = 400'

9- 5-80

I hereby certify that the above plat  
correctly represents this location as  
staked by me on the ground.

GROUND ELEV. 261 FEET.



*Ben E. Ramsey*  
REG. C.E.



**Attachment C**  
**Photolog and Photographs**

*Abandoned Water Well Sampling*

*Grand Cane*  
*Desoto Parish, Louisiana*

**Photolog  
10/28/2017**

*Well 031-5054Z  
Well 031-5055Z  
Grand Cane, Louisiana*

Photo ID	x	y	Image ID	Photographer	Date	Direction	Description
2	414455	3550451	2517	ABF	10/28/2017	S	Bubbling at well 031-5055Z
3	414455	3550451	2518	ABF	10/28/2017	S	Collecting gas samples at 031-5055Z
4	414455	3550451	2519	ABF	10/28/2017	S	Collecting gas samples at 031-5055Z
6	414467	3550443	2521	ABF	10/28/2017	W	Runoff area north of 031-5055Z
7	414467	3550443	2522	ABF	10/28/2017	N	Runoff area north of 031-5055Z
8	414467	3550443	2523	ABF	10/28/2017	E	Runoff area north of 031-5055Z
9	414451	3550452	2524	ABF	10/28/2017	W	Runoff
10	414451	3550452	2525	ABF	10/28/2017	N	Runoff
11	414425	3550438	2526	ABF	10/28/2017	W	End of ditch
13	414425	3550438	2530	ABF	10/28/2017	SE	Runoff
15	414422	3550444	2532	ABF	10/28/2017	NE	Elevated area - potential berm?
16	414459	3550465	2540	ABF	10/28/2017	N	Possibly old pad area
19	NA		2544	ABF	10/28/2017	E	Well 031-5045Z
20	NA		2545	ABF	10/28/2017	E	Well 031-5045Z
21	414733	3549994	2546	ABF	10/28/2017	SE	Sand around Well 031-5045Z
22	414733	3549994	2547	ABF	10/28/2017	SE	Sand around Well 031-5045Z
23	414733	3549994	2548	ABF	10/28/2017	SE	Sand around Well 031-5045Z
24	414733	3549994	2549	ABF	10/28/2017	SE	Sand around Well 031-5045Z
25	414733	3549994	2550	ABF	10/28/2017	SE	Sand around Well 031-5045Z
26	414733	3549994	2551	ABF	10/28/2017	SE	Sand around Well 031-5045Z
27	414733	3549994	2552	ABF	10/28/2017	S	Sand around Well 031-5045Z
28	414733	3549994	2554	ABF	10/28/2017	E	Well 031-5045Z
29	414733	3549994	2555	ABF	10/28/2017	N	Sand around Well 031-5045Z
30	414733	3549994	2556	ABF	10/28/2017	N	Sand around Well 031-5045Z
31	414740	3549974	2557	ABF	10/28/2017	S	Sand on ROW south of well
32	414740	3549974	2558	ABF	10/28/2017	S	Sand on ROW south of well
34	414740	3549974	2560	ABF	10/28/2017	S	Sand on ROW south of well
36	414740	3549974	2562	ABF	10/28/2017	SE	Sand on ROW south of well
37	414740	3549974	2563	ABF	10/28/2017	SE	Sand on ROW south of well
38	414740	3549974	2564	ABF	10/28/2017	SW	Sand on ROW south of well
39	414738	3549967	2565	ABF	10/28/2017	N	Sand runoff from well
40	NA		2566	ABF	10/28/2017	N	Pipe on well for gas sampling
43	414810	3550025	2569	ABF	10/28/2017	N	SS-2 location
44	NA		2570	ABF	10/28/2017	NA	Bubbling at well 031-5054Z
47	414822	3549966	2573	ABF	10/28/2017	W	Looking west down ROW south of well
48	414772	3549972	2574	ABF	10/28/2017	S	Sand on trees south of the well
49	414707	3549966	2575	ABF	10/28/2017	NE	South of 031-5054Z
50	414676	3549969	2576	ABF	10/28/2017	W	Runoff southwest from 031-5054Z
51	414676	3549969	2577	ABF	10/28/2017	N	Runoff southwest from 031-5054Z
53	414676	3549969	2579	ABF	10/28/2017	S	Runoff southwest from 031-5054Z
54	414671	3549975	2580	ABF	10/28/2017	NE	Ponded area SW of well

**NOTES:**

ABF - Anna Fix - Michael Pisani & Associates, Inc.



IMG\_2517



IMG\_2518



IMG\_2519





IMG\_2521



IMG\_2522



IMG\_2523



IMG\_2524





IMG\_2525



IMG\_2526



IMG\_2530



IMG\_2532





IMG\_2540



IMG\_2544



IMG\_2545

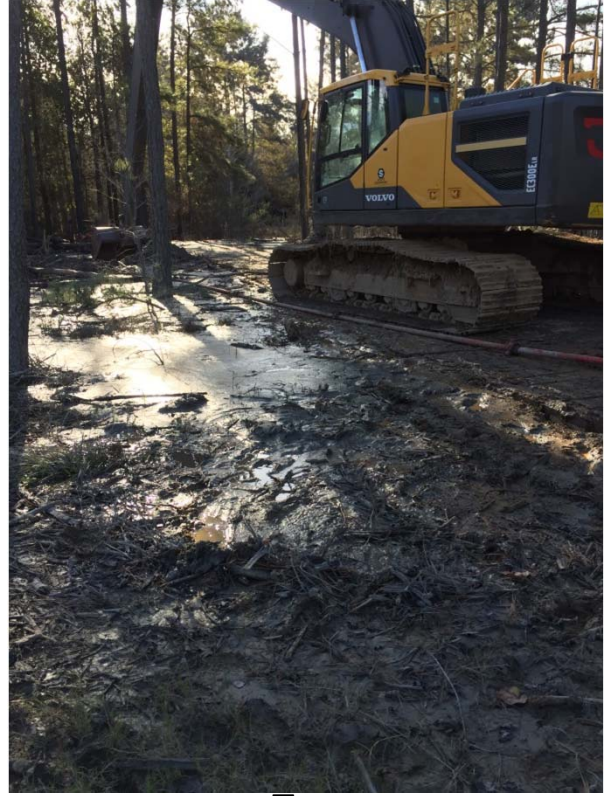


IMG\_2546





IMG\_2547



IMG\_2548



IMG\_2549



IMG\_2550





IMG\_2551



IMG\_2552



IMG\_2554



IMG\_2555





IMG\_2556



IMG\_2557



IMG\_2558





IMG\_2560



IMG\_2562





IMG\_2563



IMG\_2564





IMG\_2565



IMG\_2566



IMG\_2569



IMG\_2570





IMG\_2573



IMG\_2574



IMG\_2575



IMG\_2576





IMG\_2577



IMG\_2579



IMG\_2580

**Attachment D**  
**Field Notes**

*Abandoned Water Well Sampling*

*Grand Cane*  
*Desoto Parish, Louisiana*





ALL-WEATHER  
**ENVIRONMENTAL  
FIELD BOOK**

Name GRAND CANE

191-01

Address MPSA

11409 Pennywood Ave

BATON ROUGE, LA

Phone 225 755 2250

Project \_\_\_\_\_



**RiteintheRain.com**

© 2015  
JL DARLING LLC  
Tacoma, WA 98424 1017 USA

US Pat No. 6,863,940  
1-16

**CONTENTS**

PAGE

REFERENCE

DATE

David Barnhill LDNR  
318 332 9045

**Reference Page Index**

147	Error codes, Hazardous classifications, Container types
148	Sampling guidelines (Liquids)
149	Sampling guidelines (Solids)
150	Approximate Volume of Water in Casing or Hole, Ground Water Monitoring Well
151	PVC Pipe casing tables
152	Soil Classification
153	Soil Classification
154	Maximum Concentration of Contaminants for the Toxicity Characteristic
155	Conversions (Concentrations, Volume/Flow or Time, Velocity, Acceleration)
156	Conversions (Length, Weight, Volume, Temp, etc.)



## CONTENTS

PAGE	REFERENCE	DATE

Location GRAND CAVE Date 10/22/17

Project / Client 191-01

Cold, clear, 30-50's

0720 Arrive site at well  
031-~~55052~~ 50552

414455 / 3550451 155

former rig supply well

History:

- Bob Romero asked David to find the well - saw water but no wellhead
- Returned next day with help - heard bubbling and found it

0800 LDNR on site - David Barnhill

- Safety meeting  
Elm Springs - Todd Emmert  
Benny Emmert  
2 helpers

- Walk site - see bubbling well - area has been dug up to direct water away from well

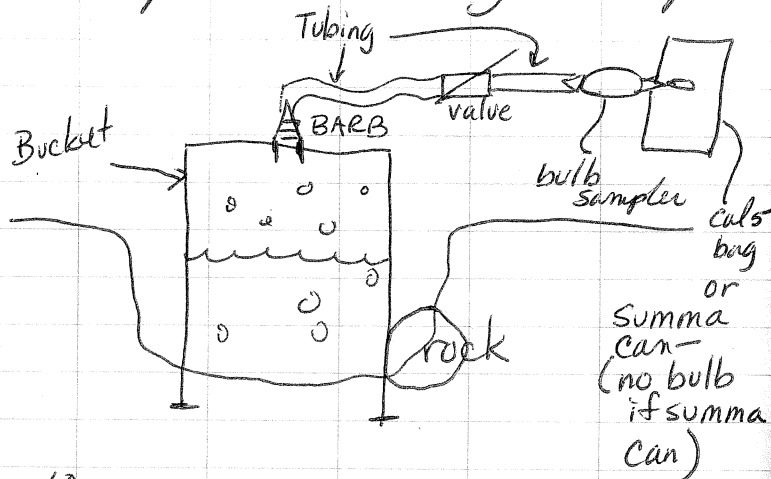
ANNAFIX CASH

Location Grand Cune Date 10/27/17

Project / Client 191-01

Cold Clear 30'-50's

- Odor at well - swamp odor
- Set up to collect gas sample



- 0840
  - Start purging air from ~~the~~ head space of bucket
  - Can feel air moving out of the tubing
  - Purge until 0900
  - Collect <sup>50552</sup> gas 031-~~5052~~ @ 0900
  - Collect surface water sample directly from the bubbling water
- ANNA FIX *Anna*

Location Grand Cune Date 10/27/17

Project / Client 191-01

Cold, Clear 40's - 50's

- Collect <sup>50552</sup> SW 031-~~5052~~ @ 0910
- BTEX, PAH's, TPH fractions, chloride, TDS, pH, sulfate, calcium, mg, Na, K, BALK/CALK

- Samples to go to Element

- SW readings
- EC - 1041  $\mu$ S
- ORP - 195
- pH - 6.61
- TDS - 748.1
- 19.1 °C - temp

Use ultrameter @ 0930

- Canister info
- QA File - 615-170905C06
- CAN - 6529
- Pressure - 29.9

ANNA FIX

*Anna*

6

Location GRAND CANE Date 10/27/17

Project / Client 191-01

COLD 40-50's CLEAR

Photo#	Dir.	Coord.	Description	50552
2516-17	S	414455	Bubbling	031-55052
2518-2520	S	3550451	Collecting samples (Gas)	
2521	W	414467	Collecting samples	
2522	N	3550443	Runoff area near well	
2523	E			
2524	W	414451	Runoff	
2525	N	3550452		
2526	W	414425	end of runoff ditch	
2527	W	3550438	spread overland here	
2530	SE	"	Runoff	
2531	SE	"	"	
2532	NE	4144227 3550444	Elevated area <sup>old</sup> berm?	
2540	N	414454	Possible old pad area	
2543	N	3550465		
2546	SE	414733	SAND AROUND WELL	
2551	S	3549994		
2552	S	"	"	
2554	E	"	Well 031-50452	5054 NR
2555	N	"	Sand around well	
2556	N	"	"	
2557	S	414740/ 3549974	Sand on ROW	

Location GRAND CANE Date 10/27/17

Project / Client 191-01

COLD 40-50's CLEAR

Move to HANSON WELLS?

- SAND was blowing out of this well - Can see sand and debris on trees all around the well - sand is all around the well.

- the well is blowing gas when uncapped - no water or sand

- history - well was blowing sand 40 or greater feet in the air (higher than the pine trees)

Tag the well - estimate by pacing off string line w/ weight on end

47  
x 3  
141' to hard bottom

17  
x 3  
51' to fluid



8

Location Grand Cane Date 10/27/17Project / Client 191-01Cold, clear

Collect Gas sample in 2 CAL bags

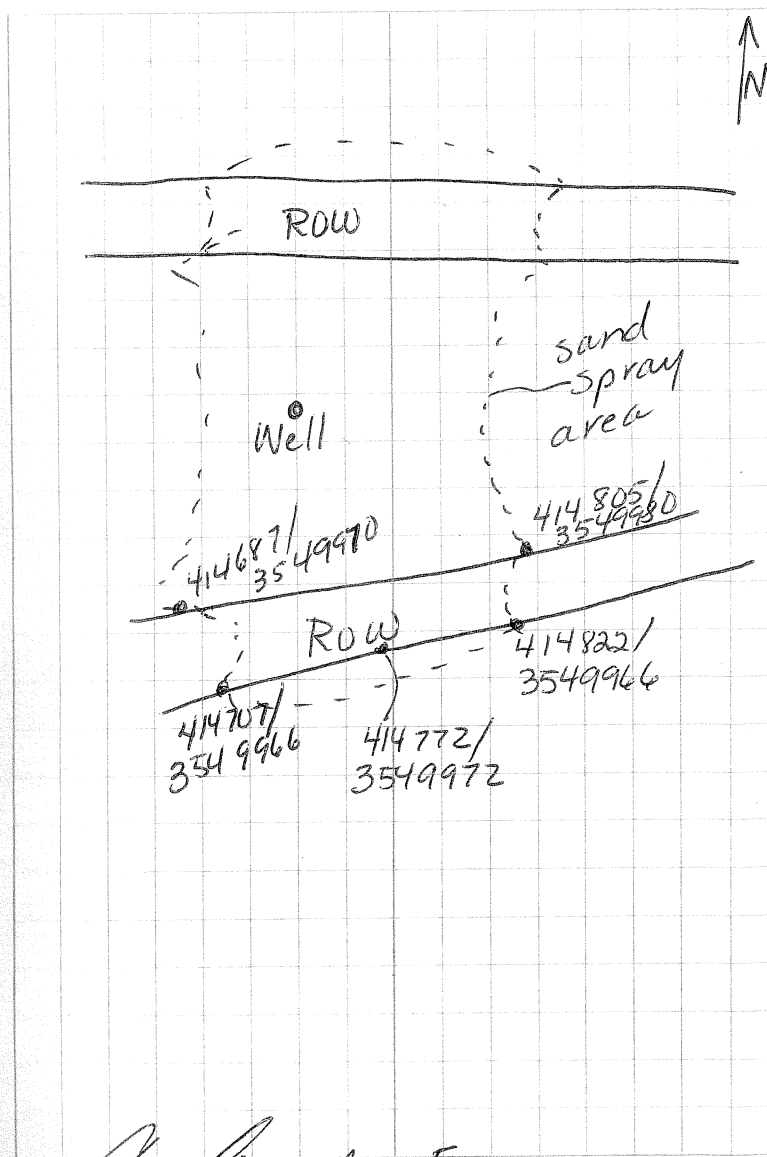
GAS 031-50542<sup>450K</sup> @ 1030  
(102717)

- Collect sample of sand from approx 30' NE of well

SS-1 031-50542<sup>450K</sup> (102717) @ 1040  
from BTEX, TPH fractions, PAH's,  
Full 29 B- Collect background sample off ROW, north side, outside area where spray occurredSS-2 031-50542<sup>450K</sup> (102717) @ 1050- Well holding  $\approx$  20 lbs of pressure  
25 lbsfor  $>30$  min- well is  $>300'$  deep- Grabbed swater sample SW of well in ponded area @ 1120  
(did not submit to lab)

Anna Fix ANNA FIX

9

Location Grand Cane Date 10/27/17Project / Client 191-01Cold, clear

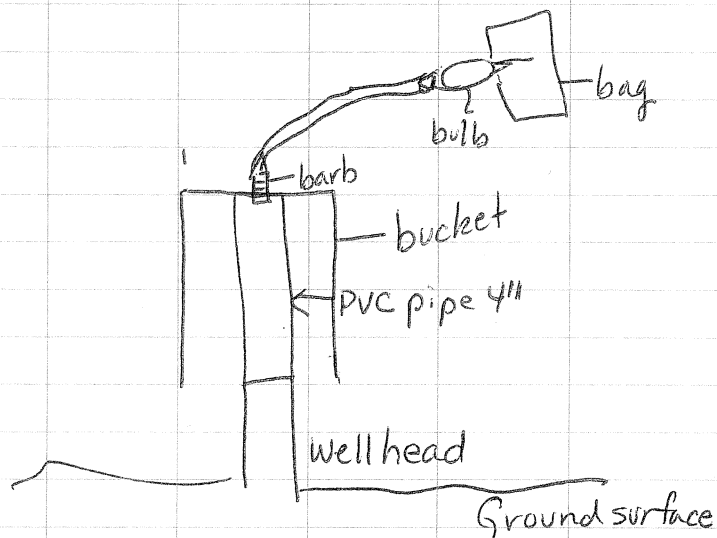
Anna Fix ANNA FIX

Rite in the Rain

Location GRAND CANYON Date 10/27/17

Project / Client 191-01

COLD, 40-50's

GAS SAMPLE Collection at  
~~HANSON~~ HANSON Well

 AMANDA FIX

Location GRAND CANYON Date 10/27/17

Project / Client 191-01

COLD, clear 50's

Photo	Dir	Coord	Description
2558	S	414740/ 3549974	Sand on Row S of Well
2559	S	"	"
2562	SE	"	"
2563	"	"	"
2564	SW	"	"
2565	N	414738/ 3549967	Sand runoff
2566	N	"	Pipe on well
68			
2569	N	414810/ 3550025	SS-2 (Background)
2570	-72		Bubbling at 031-50752
2573	W	44822 3549966	Row south of well
2574	S	414772/ 3549972	Sand on floor of well
2575	NE	414707/3549966	sof well
2576	W	414676/3549969	Runoff SW
2577-78	N	"	Runoff SW
2579	S	"	"
2580	NE	414737/3550004	Ponded area SW Rats in the Rain

 AMANDA FIX

**Attachment E**  
**Laboratory Report**

*Abandoned Water Well Sampling*

*Grand Cane*  
*Desoto Parish, Louisiana*



Element Materials Technology Lafayette  
2417 W. Pinhook Road  
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Website: www.element.com

November 28, 2017

Dave Angle  
Michael Pisani & Associates Inc  
13313 Southwest Fwy #21  
SUGAR LAND, TX 77478  
TEL: (281) 242-5700  
FAX

RE: 191-01 Grand Cane

Order No.: 17101071

Dear Dave Angle:

Element Materials Technology Lafayette received 7 sample(s) on 10/30/2017 for the analyses presented in the following report.

In accordance with your instructions Element Lafayette conducted the analysis shown on the following pages on samples submitted by your company. The results related only to the items tested. Unless otherwise noted, all analyses were conducted using EPA approved methodologies and all test results meet all requirements of TNI. All relevant sampling information is on the attached Chain-of-Custody form.

All soil data, except for 29-B, are on a wet-weight basis unless otherwise indicated in the units field as –dry.

LELAP Certification No.: 01997. TCEQ Certification No.: T104704261. A scope of accredited parameters is available upon request. A "#" by the test method or analyte indicates this parameter is outside the scope of accreditation.

Estimated uncertainty is available upon request. This report shall not be reproduced except in full, without the written approval of the laboratory.

If you have any questions regarding these test results, please feel free to call.

A handwritten signature in blue ink that reads "Cristina Thibeaux".

Cristina Thibeaux  
Customer Service Supervisor  
2417 W. Pinhook Road  
Lafayette, LA 70508-3344





Element Materials Technology Lafayette  
2417 W. Pinhook Road  
Lafayette, LA 70508-3344  
TEL: (337) 235-0483 FAX: (337) 233-6540  
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## Case Narrative

WO#: 17101071  
Date: 11/28/2017

---

**CLIENT:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

---

Unless specified by the client, a duplicate or MS/MSD, wherever applicable, is randomly selected and analyzed from each analytical batch provided sample volume is sufficient. The sample chosen for duplicate or MS/MSD may or may not be a sample submitted in this workorder. A method blank and/or a lab control sample (LCS)/lab control sample duplicate (LCSD), wherever applicable, are processed as a quality control check for each analytical batch. When the matrix QC data is not available due to insufficient sample volume or when the results indicate possible matrix effect, the validity of the batch is determined by the method blank and LCS/LCSD.

The results of the laboratory internal quality control data are provided in the QC Summary Report section of the report for your review. Laboratory-related QC exceptions that may impact the validity of data are discussed in the case narrative. Sample-related QC exceptions are flagged either in the results page(s) or in the QC report page(s). End users should consider QC exceptions when evaluating sample data against data quality objectives.

Any other exceptions associated with this report will be footnoted in the results page(s) or the QC summary page(s).

The Extended Gas and Sulphur analyses (Methods GPA 2261-13 and GPA2199/ASTM D5504) were subcontracted to Element Materials Technologies, Hydrocarbon Lab. The NC-1 analysis (Full GC and d13C & dD of methane) analyses were subcontracted to ISOTECH Laboratories, INC. Their respective reports are attached in their entirety.



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 Lafayette, LA 70508-3344  
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 Website: www.element.com

# Analytical Report

(consolidated)

WO#: 17101071

Date Reported 11/28/2017

**CLIENT:** Michael Pisani & Associates Inc **Collection Date:** 10/28/2017 9:10:00 AM  
**Project:** 191-01 Grand Cane  
**Lab ID:** 17101071-001 **Matrix:** AQUEOUS  
**Client Sample ID** SW 031-5055Z (102817)

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
<b>EPH RECAP IN WATER BY MAEPH</b>		<b>MOD. MAEPH</b>		<b>SW3511</b>	Analyst: CRM	
C10-C12 Aliphatics	< 0.135	0.135		mg/L	1	11/9/2017 1:40:00 AM
C10-C12 Aromatics	< 0.135	0.135		mg/L	1	11/9/2017 3:49:00 AM
C12-C16 Aliphatics	< 0.135	0.135		mg/L	1	11/9/2017 1:40:00 AM
C12-C16 Aromatics	< 0.135	0.135		mg/L	1	11/9/2017 3:49:00 AM
C16-C21 Aromatics	< 0.135	0.135		mg/L	1	11/9/2017 3:49:00 AM
C16-C35 Aliphatics	< 1.04	1.04		mg/L	1	11/9/2017 1:40:00 AM
C21-C35 Aromatics	< 0.135	0.135		mg/L	1	11/9/2017 3:49:00 AM
Surr: 1-Chlorooctadecane	61.9	40 - 140		%Rec	1	11/9/2017 1:40:00 AM
Surr: 2-Bromonaphthalene	104	40 - 140		%Rec	1	11/9/2017 3:49:00 AM
Surr: 2-Fluorobiphenyl	105	40 - 140		%Rec	1	11/9/2017 3:49:00 AM
Surr: o-Terphenyl	101	40 - 140		%Rec	1	11/9/2017 3:49:00 AM
<b>VPH RECAP IN WATER BY MAVPH</b>		<b>MAVPH</b>		Analyst: CRM		
C6-C8 Aliphatics	< 0.0200	0.0200		mg/L	1	10/30/2017 4:55:00 PM
C8-C10 Aliphatics	< 0.0200	0.0200		mg/L	1	10/30/2017 4:55:00 PM
C8-C10 Aromatics	< 0.0225	0.0225		mg/L	1	10/30/2017 4:55:00 PM
Surr: 2,5-Dibromotoluene (FID)	87.9	70 - 130		%Rec	1	10/30/2017 4:55:00 PM
Surr: 2,5-Dibromotoluene (PID)	86.0	70 - 130		%Rec	1	10/30/2017 4:55:00 PM
<b>INORGANIC ANIONS IN WATER BY IC</b>		<b>SW9056A</b>		Analyst: SGP		
Chloride	58.9	5.00		mg/L	20	11/2/2017 11:49:58 PM
Sulfate	1.10	0.250		mg/L	1	11/6/2017 3:25:42 PM
<b>METALS IN WATER BY ICP, TOTALS</b>		<b>SW6010B</b>		Analyst: STS		
Calcium	10.4	0.500		mg/L	1	11/9/2017 9:31:05 PM
Magnesium	7.93	0.500		mg/L	1	11/9/2017 9:31:05 PM
Potassium	6.04	5.00		mg/L	1	11/9/2017 9:31:05 PM
Sodium	217	10.0		mg/L	1	11/9/2017 9:31:05 PM
<b>PAH IN WATER BY EPA 8270C</b>		<b>SW8270C</b>		<b>SW3511</b>	Analyst: CRM	

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	C	Value is below Minimum Compound Limit.
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 17101071

Date Reported 11/28/2017

**CLIENT:** Michael Pisani & Associates Inc

**Collection Date:** 10/28/2017 9:10:00 AM

**Project:** 191-01 Grand Cane

**Lab ID:** 17101071-001

**Matrix:** AQUEOUS

**Client Sample ID** SW 031-5055Z (102817)

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
<b>PAH IN WATER BY EPA 8270C</b>					<b>SW8270C</b>	<b>SW3511</b> Analyst: CRM

2-Methylnaphthalene	< 0.000521	0.000521		mg/L	1	11/6/2017 3:29:00 PM
Acenaphthene	< 0.00104	0.00104		mg/L	1	11/6/2017 3:29:00 PM
Acenaphthylene	< 0.00104	0.00104		mg/L	1	11/6/2017 3:29:00 PM
Anthracene	< 0.00104	0.00104		mg/L	1	11/6/2017 3:29:00 PM
Benzo(a)anthracene	< 0.000521	0.000521		mg/L	1	11/6/2017 3:29:00 PM
Benzo(a)pyrene	< 0.000156	0.000156		mg/L	1	11/6/2017 3:29:00 PM
Benzo(b)fluoranthene	< 0.000521	0.000521		mg/L	1	11/6/2017 3:29:00 PM
Benzo(k)fluoranthene	< 0.000521	0.000521		mg/L	1	11/6/2017 3:29:00 PM
Chrysene	< 0.000521	0.000521		mg/L	1	11/6/2017 3:29:00 PM
Dibenz(a,h)anthracene	< 0.00104	0.00104		mg/L	1	11/6/2017 3:29:00 PM
Fluoranthene	< 0.00104	0.00104		mg/L	1	11/6/2017 3:29:00 PM
Fluorene	< 0.000625	0.000625		mg/L	1	11/6/2017 3:29:00 PM
Indeno(1,2,3-cd)pyrene	< 0.000521	0.000521		mg/L	1	11/6/2017 3:29:00 PM
Naphthalene	< 0.00208	0.00208		mg/L	1	11/6/2017 3:29:00 PM
Phenanthrene	< 0.00104	0.00104		mg/L	1	11/6/2017 3:29:00 PM
Pyrene	< 0.00104	0.00104		mg/L	1	11/6/2017 3:29:00 PM
Surr: 4-Terphenyl-d14	78.4	70 - 130		%Rec	1	11/6/2017 3:29:00 PM

<b>BTEX IN WATER BY GC/MS</b>					<b>SW8260B</b>	Analyst: KSK
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Benzene	< 0.00500	0.00500		mg/L	1	10/30/2017 1:51:00 PM
Ethylbenzene	< 0.00500	0.00500		mg/L	1	10/30/2017 1:51:00 PM
Toluene	< 0.00500	0.00500		mg/L	1	10/30/2017 1:51:00 PM
Xylenes, Total	< 0.0150	0.0150		mg/L	1	10/30/2017 1:51:00 PM
Surr: 4-Bromofluorobenzene	110	65.1 - 136		%Rec	1	10/30/2017 1:51:00 PM
Surr: Dibromofluoromethane	81.4	40.4 - 143		%Rec	1	10/30/2017 1:51:00 PM
Surr: Toluene-d8	85.7	58.2 - 127		%Rec	1	10/30/2017 1:51:00 PM

<b>ALKALINITY; TOTAL, CARB, BICARB</b>					<b>SM2320 B</b>	Analyst: MRM
--	--	--	--	--	-----------------	--------------

Alkalinity, Bicarbonate (As CaCO3)	400	10.0		mgCaCO3/L	1	11/3/2017 10:18:24 AM
Alkalinity, Carbonate (As CaCO3)	< 10.0	10.0		mgCaCO3/L	1	11/3/2017 10:18:24 AM
Alkalinity, Total (As CaCO3)	400	10.0		mgCaCO3/L	1	11/3/2017 10:18:24 AM

<b>Qualifiers:</b>	* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.
	H Holding times for preparation or analysis exceeded	M Matrix Interference
	ND Not Detected at the Reporting Limit	RL Reporting Limit
	S Spike Recovery outside accepted recovery limits	SDL Sample detection limit
	U Analyte not detected	W Sample container temperature is out of limit as specified at testcode





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 Website: www.element.com

# Analytical Report

(consolidated)

WO#: 17101071

Date Reported 11/28/2017

**CLIENT:** Michael Pisani & Associates Inc **Collection Date:** 10/28/2017 9:10:00 AM  
**Project:** 191-01 Grand Cane  
**Lab ID:** 17101071-001 **Matrix:** AQUEOUS  
**Client Sample ID** SW 031-5055Z (102817)

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
<b>PH</b>				<b>SM4500H-B</b>		Analyst: <b>DXH</b>
pH	7.51	1.68	H	S.U.	1	10/31/2017 10:10:00 AM
<b>TOTAL DISSOLVED SOLIDS</b>				<b>SM2540C</b>		Analyst: <b>GMS</b>
Total Dissolved Solids (Residue, Filterable)	535	20.0		mg/L	1	10/30/2017 11:50:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	C	Value is below Minimum Compound Limit.
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
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# Analytical Report

(consolidated)

WO#: 17101071

Date Reported 11/28/2017

**CLIENT:** Michael Pisani & Associates Inc **Collection Date:** 10/28/2017 10:40:00 AM  
**Project:** 191-01 Grand Cane  
**Lab ID:** 17101071-006 **Matrix:** SOIL  
**Client Sample ID** SS-1 031-5054Z (102817)

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
<b>LA STATEWIDE ORDER 29-B TESTING</b>						
<b>CATION EXCHANGE CAPACITY</b>						
Cation Exchange Capacity	5.51	0.100		meq/100g	1	11/13/2017 2:54:00 PM
<b>LDNR 29-B</b>						
<b>ANALYST: MMT</b>						
<b>LA STATEWIDE ORDER 29-B TESTING</b>						
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>						
Electrical Conductivity	1.10	0.10		mmhos/cm	1	11/9/2017 8:10:00 AM
<b>LDNR 29-B</b>						
<b>ANALYST: MMT</b>						
<b>LA STATEWIDE ORDER 29-B TESTING</b>						
<b>EXCHANGEABLE SODIUM PERCENTAGE</b>						
Exchangeable Sodium %	23.8	0.10	*	%	1	11/13/2017 2:54:00 PM
<b>LDNR 29-B</b>						
<b>ANALYST: MMT</b>						
<b>LA STATEWIDE ORDER 29-B TESTING</b>						
<b>HEM, OIL &amp; GREASE</b>						
HEM, Oil & Grease	< 0.05	0.05		% dry wt	1	11/3/2017 8:10:00 AM
<b>SW9071B</b>						
<b>ANALYST: MMT</b>						
<b>LA STATEWIDE ORDER 29-B TESTING</b>						
<b>PH MEASUREMENT</b>						
pH Measurement	11.27	1.68	*	S.U.	1	11/9/2017 9:10:00 AM
<b>LDNR 29-B</b>						
<b>ANALYST: MMT</b>						
<b>LA STATEWIDE ORDER 29-B TESTING</b>						
<b>SODIUM ADSORPTION RATIO</b>						
Sodium Adsorption Ratio	15.3	0.10	*		1	11/10/2017
Soluble Calcium	0.77	0.02		meq/L	1	11/10/2017
Soluble Magnesium	0.15	0.05		meq/L	1	11/10/2017
Soluble Sodium	10.4	0.25		meq/L	1	11/10/2017
<b>LDNR 29-B</b>						
<b>ANALYST: STS</b>						
<b>EPH RECAP IN SOIL BY MAEPH</b>						
<b>MOD. MAEPH</b>						
<b>ANALYST: CRM</b>						
C10-C12 Aliphatics	< 20.0	20.0		mg/Kg	1	11/3/2017 4:05:00 PM
C10-C12 Aromatics	< 40.0	40.0		mg/Kg	1	11/3/2017 7:45:00 PM
C12-C16 Aliphatics	< 20.0	20.0		mg/Kg	1	11/3/2017 4:05:00 PM
C12-C16 Aromatics	< 50.0	50.0		mg/Kg	1	11/3/2017 7:45:00 PM
C16-C21 Aromatics	< 50.0	50.0		mg/Kg	1	11/3/2017 7:45:00 PM
C16-C35 Aliphatics	< 90.0	90.0		mg/Kg	1	11/3/2017 4:05:00 PM
C21-C35 Aromatics	< 30.0	30.0		mg/Kg	1	11/3/2017 7:45:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	C	Value is below Minimum Compound Limit.
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
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# Analytical Report

(consolidated)

WO#: 17101071

Date Reported 11/28/2017

**CLIENT:** Michael Pisani & Associates Inc **Collection Date:** 10/28/2017 10:40:00 AM  
**Project:** 191-01 Grand Cane  
**Lab ID:** 17101071-006 **Matrix:** SOIL  
**Client Sample ID** SS-1 031-5054Z (102817)

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
<b>EPH RECAP IN SOIL BY MAEPH</b>			<b>MOD. MAEPH</b>		Analyst: CRM	
Surr: 1-Chlorooctadecane	66.6	40 - 140	%Rec		1	11/3/2017 4:05:00 PM
Surr: 2-Bromonaphthalene	88.8	40 - 140	%Rec		1	11/3/2017 7:45:00 PM
Surr: 2-Fluorobiphenyl	86.9	40 - 140	%Rec		1	11/3/2017 7:45:00 PM
Surr: o-Terphenyl	72.6	40 - 140	%Rec		1	11/3/2017 7:45:00 PM
<b>VPH RECAP IN SOIL BY MAVPH</b>			<b>MOD. MAVPH</b>		Analyst: CRM	
C6-C8 Aliphatics	< 9.29	9.29	mg/Kg		500	10/30/2017 3:46:00 PM
C8-C10 Aliphatics	< 9.29	9.29	mg/Kg		500	10/30/2017 3:46:00 PM
C8-C10 Aromatics	< 10.5	10.5	mg/Kg		500	10/30/2017 3:46:00 PM
Surr: 2,5-Dibromotoluene (FID)	88.8	70 - 130	%Rec		500	10/30/2017 3:46:00 PM
Surr: 2,5-Dibromotoluene (PID)	86.6	70 - 130	%Rec		500	10/30/2017 3:46:00 PM
<b>LA STATEWIDE ORDER 29-B TESTING MERCURY IN SOIL OR SLUDGE</b>			<b>SW7471A</b>		<b>SW7471A</b> Analyst: MRM	
Mercury	< 0.106	0.106	mg/Kg		1	11/2/2017 12:59:38 PM
<b>LA STATEWIDE ORDER 29-B TESTING METALS IN SOIL OR SLUDGE BY ICP</b>			<b>SW6010B</b>		<b>SW3050B</b> Analyst: STS	
Arsenic	3.37	1.01	mg/Kg		1	11/6/2017 5:07:32 PM
Barium	18.0	0.504	mg/Kg		1	11/6/2017 5:07:32 PM
Cadmium	< 0.252	0.252	mg/Kg		1	11/6/2017 5:07:32 PM
Chromium	3.70	0.504	mg/Kg		1	11/6/2017 5:07:32 PM
Lead	3.89	0.504	mg/Kg		1	11/6/2017 5:07:32 PM
Selenium	< 2.02	2.02	mg/Kg		1	11/6/2017 5:07:32 PM
Silver	< 0.252	0.252	mg/Kg		1	11/6/2017 5:07:32 PM
Zinc	21.8	0.504	mg/Kg		1	11/6/2017 5:07:32 PM
<b>LA STATEWIDE ORDER 29-B TESTING TRUE TOTAL BARIUM</b>			<b>LDNR 29-B</b>		Analyst: STS	
True Total Barium	70.2	47.1	mg/Kg-dry		1	11/6/2017 2:55:36 PM
<b>PAH IN SOIL BY EPA 8270C</b>			<b>SW8270C</b>		Analyst: KSK	

<b>Qualifiers:</b>	* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.
	H Holding times for preparation or analysis exceeded	M Matrix Interference
	ND Not Detected at the Reporting Limit	RL Reporting Limit
	S Spike Recovery outside accepted recovery limits	SDL Sample detection limit
	U Analyte not detected	W Sample container temperature is out of limit as specified at testcode





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# Analytical Report

(consolidated)

WO#: 17101071

Date Reported 11/28/2017

**CLIENT:** Michael Pisani & Associates Inc

**Collection Date:** 10/28/2017 10:40:00 AM

**Project:** 191-01 Grand Cane

**Lab ID:** 17101071-006

**Matrix:** SOIL

**Client Sample ID** SS-1 031-5054Z (102817)

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
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**PAH IN SOIL BY EPA 8270C** **SW8270C** Analyst: KSK

2-Methylnaphthalene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 8:30:00 PM
Acenaphthene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 8:30:00 PM
Acenaphthylene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 8:30:00 PM
Anthracene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 8:30:00 PM
Benzo(a)anthracene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 8:30:00 PM
Benzo(a)pyrene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 8:30:00 PM
Benzo(b)fluoranthene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 8:30:00 PM
Benzo(k)fluoranthene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 8:30:00 PM
Chrysene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 8:30:00 PM
Dibenz(a,h)anthracene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 8:30:00 PM
Fluoranthene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 8:30:00 PM
Fluorene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 8:30:00 PM
Indeno(1,2,3-cd)pyrene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 8:30:00 PM
Naphthalene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 8:30:00 PM
Phenanthrene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 8:30:00 PM
Pyrene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 8:30:00 PM
Surr: 4-Terphenyl-d14	103	29.1 - 128		%Rec	1	11/6/2017 8:30:00 PM

**BTEX IN SOIL BY GC/MS** **SW8260B** Analyst: KSK

Benzene	< 0.0372	0.0372		mg/Kg	50	10/30/2017 2:36:00 PM
Ethylbenzene	< 0.232	0.232		mg/Kg	50	10/30/2017 2:36:00 PM
Toluene	< 0.232	0.232		mg/Kg	50	10/30/2017 2:36:00 PM
Xylenes, Total	< 0.697	0.697		mg/Kg	50	10/30/2017 2:36:00 PM
Surr: 1,2-Dichlorobenzene-d4	70.6	56.1 - 140		%Rec	50	10/30/2017 2:36:00 PM
Surr: 4-Bromofluorobenzene	114	55.7 - 152		%Rec	50	10/30/2017 2:36:00 PM
Surr: Dibromofluoromethane	82.3	57.3 - 120		%Rec	50	10/30/2017 2:36:00 PM
Surr: Toluene-d8	84.4	63.1 - 120		%Rec	50	10/30/2017 2:36:00 PM

**LA STATEWIDE ORDER 29-B TESTING** **LDNR 29-B** Analyst: MMT  
**PERCENT MOISTURE**

Percent Moisture	20.0	1.00		wt%	1	10/30/2017 1:50:00 PM
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Qualifiers:	*	Value exceeds Maximum Contaminant Level.	C	Value is below Minimum Compound Limit.
	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	RL	Reporting Limit
	S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
	U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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 Website: www.element.com

# Analytical Report

(consolidated)

WO#: 17101071

Date Reported 11/28/2017

**CLIENT:** Michael Pisani & Associates Inc **Collection Date:** 10/28/2017 10:50:00 AM  
**Project:** 191-01 Grand Cane  
**Lab ID:** 17101071-007 **Matrix:** SOIL  
**Client Sample ID** SS-2 031-5054Z (102817)

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
<b>LA STATEWIDE ORDER 29-B TESTING</b>						
<b>CATION EXCHANGE CAPACITY</b>						
Cation Exchange Capacity	9.66	0.100		meq/100g	1	11/13/2017 2:54:00 PM
<b>LA STATEWIDE ORDER 29-B TESTING</b>						
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>						
Electrical Conductivity	0.32	0.10		mmhos/cm	1	11/9/2017 8:10:00 AM
<b>LA STATEWIDE ORDER 29-B TESTING</b>						
<b>EXCHANGEABLE SODIUM PERCENTAGE</b>						
Exchangeable Sodium %	0.27	0.10		%	1	11/13/2017 2:54:00 PM
<b>LA STATEWIDE ORDER 29-B TESTING</b>						
<b>HEM, OIL &amp; GREASE</b>						
HEM, Oil & Grease	< 0.05	0.05		% dry wt	1	11/2/2017 10:30:00 AM
<b>LA STATEWIDE ORDER 29-B TESTING</b>						
<b>PH MEASUREMENT</b>						
pH Measurement	4.94	1.68	C	S.U.	1	11/9/2017 9:10:00 AM
<b>LA STATEWIDE ORDER 29-B TESTING</b>						
<b>SODIUM ADSORPTION RATIO</b>						
Sodium Adsorption Ratio	1.22	0.10			1	11/10/2017
Soluble Calcium	0.89	0.02		meq/L	1	11/10/2017
Soluble Magnesium	0.76	0.05		meq/L	1	11/10/2017
Soluble Sodium	1.11	0.25		meq/L	1	11/10/2017
<b>EPH RECAP IN SOIL BY MAEPH</b>						
<b>MOD. MAEPH</b>						
C10-C12 Aliphatics	< 20.0	20.0		mg/Kg	1	11/3/2017 4:33:00 PM
C10-C12 Aromatics	< 40.0	40.0		mg/Kg	1	11/3/2017 8:12:00 PM
C12-C16 Aliphatics	< 20.0	20.0		mg/Kg	1	11/3/2017 4:33:00 PM
C12-C16 Aromatics	< 50.0	50.0		mg/Kg	1	11/3/2017 8:12:00 PM
C16-C21 Aromatics	< 50.0	50.0		mg/Kg	1	11/3/2017 8:12:00 PM
C16-C35 Aliphatics	< 90.0	90.0		mg/Kg	1	11/3/2017 4:33:00 PM
C21-C35 Aromatics	< 30.0	30.0		mg/Kg	1	11/3/2017 8:12:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	C	Value is below Minimum Compound Limit.
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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 Website: www.element.com

# Analytical Report

(consolidated)

WO#: 17101071

Date Reported 11/28/2017

**CLIENT:** Michael Pisani & Associates Inc **Collection Date:** 10/28/2017 10:50:00 AM  
**Project:** 191-01 Grand Cane  
**Lab ID:** 17101071-007 **Matrix:** SOIL  
**Client Sample ID** SS-2 031-5054Z (102817)

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
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**EPH RECAP IN SOIL BY MAEPH** **MOD. MAEPH** Analyst: CRM

Surr: 1-Chlorooctadecane	61.6	40 - 140		%Rec	1	11/3/2017 4:33:00 PM
Surr: 2-Bromonaphthalene	87.0	40 - 140		%Rec	1	11/3/2017 8:12:00 PM
Surr: 2-Fluorobiphenyl	85.3	40 - 140		%Rec	1	11/3/2017 8:12:00 PM
Surr: o-Terphenyl	67.9	40 - 140		%Rec	1	11/3/2017 8:12:00 PM

**VPH RECAP IN SOIL BY MAVPH** **MOD. MAVPH** Analyst: CRM

C6-C8 Aliphatics	< 10.8	10.8		mg/Kg	500	10/30/2017 4:21:00 PM
C8-C10 Aliphatics	< 10.8	10.8		mg/Kg	500	10/30/2017 4:21:00 PM
C8-C10 Aromatics	< 12.1	12.1		mg/Kg	500	10/30/2017 4:21:00 PM
Surr: 2,5-Dibromotoluene (FID)	88.7	70 - 130		%Rec	500	10/30/2017 4:21:00 PM
Surr: 2,5-Dibromotoluene (PID)	87.0	70 - 130		%Rec	500	10/30/2017 4:21:00 PM

**LA STATEWIDE ORDER 29-B TESTING MERCURY IN SOIL OR SLUDGE** **SW7471A** **SW7471A** Analyst: MRM

Mercury	< 0.101	0.101		mg/Kg	1	11/2/2017 1:14:55 PM
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**LA STATEWIDE ORDER 29-B TESTING METALS IN SOIL OR SLUDGE BY ICP** **SW6010B** **SW3050B** Analyst: STS

Arsenic	2.69	1.04		mg/Kg	1	11/6/2017 5:34:59 PM
Barium	69.1	0.521		mg/Kg	1	11/6/2017 5:34:59 PM
Cadmium	< 0.261	0.261		mg/Kg	1	11/6/2017 5:34:59 PM
Chromium	10.2	0.521		mg/Kg	1	11/6/2017 5:34:59 PM
Lead	7.92	0.521		mg/Kg	1	11/6/2017 5:34:59 PM
Selenium	< 2.09	2.09		mg/Kg	1	11/6/2017 5:34:59 PM
Silver	< 0.261	0.261		mg/Kg	1	11/6/2017 5:34:59 PM
Zinc	5.73	0.521		mg/Kg	1	11/6/2017 5:34:59 PM

**LA STATEWIDE ORDER 29-B TESTING TRUE TOTAL BARIUM** **LDNR 29-B** Analyst: STS

True Total Barium	86.9	48.0		mg/Kg-dry	1	11/6/2017 2:58:58 PM
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**PAH IN SOIL BY EPA 8270C** **SW8270C** Analyst: KSK

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	C	Value is below Minimum Compound Limit.
	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
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# Analytical Report

(consolidated)

WO#: 17101071

Date Reported 11/28/2017

**CLIENT:** Michael Pisani & Associates Inc

**Collection Date:** 10/28/2017 10:50:00 AM

**Project:** 191-01 Grand Cane

**Lab ID:** 17101071-007

**Matrix:** SOIL

**Client Sample ID** SS-2 031-5054Z (102817)

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
<b>PAH IN SOIL BY EPA 8270C</b>				<b>SW8270C</b>	Analyst: KSK	

2-Methylnaphthalene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 9:04:00 PM
Acenaphthene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 9:04:00 PM
Acenaphthylene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 9:04:00 PM
Anthracene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 9:04:00 PM
Benzo(a)anthracene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 9:04:00 PM
Benzo(a)pyrene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 9:04:00 PM
Benzo(b)fluoranthene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 9:04:00 PM
Benzo(k)fluoranthene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 9:04:00 PM
Chrysene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 9:04:00 PM
Dibenz(a,h)anthracene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 9:04:00 PM
Fluoranthene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 9:04:00 PM
Fluorene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 9:04:00 PM
Indeno(1,2,3-cd)pyrene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 9:04:00 PM
Naphthalene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 9:04:00 PM
Phenanthrene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 9:04:00 PM
Pyrene	< 0.0600	0.0600		mg/Kg	1	11/6/2017 9:04:00 PM
Surr: 4-Terphenyl-d14	106	29.1 - 128		%Rec	1	11/6/2017 9:04:00 PM

<b>BTEX IN SOIL BY GC/MS</b>				<b>SW8260B</b>	Analyst: KSK	
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Benzene	< 0.0430	0.0430		mg/Kg	50	10/31/2017 11:44:00 AM
Ethylbenzene	< 0.269	0.269		mg/Kg	50	10/31/2017 11:44:00 AM
Toluene	< 0.269	0.269		mg/Kg	50	10/31/2017 11:44:00 AM
Xylenes, Total	< 0.806	0.806		mg/Kg	50	10/31/2017 11:44:00 AM
Surr: 1,2-Dichlorobenzene-d4	84.6	56.1 - 140		%Rec	50	10/31/2017 11:44:00 AM
Surr: 4-Bromofluorobenzene	126	55.7 - 152		%Rec	50	10/31/2017 11:44:00 AM
Surr: Dibromofluoromethane	88.1	57.3 - 120		%Rec	50	10/31/2017 11:44:00 AM
Surr: Toluene-d8	87.0	63.1 - 120		%Rec	50	10/31/2017 11:44:00 AM

<b>LA STATEWIDE ORDER 29-B TESTING PERCENT MOISTURE</b>				<b>LDNR 29-B</b>	Analyst: MMT	
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Percent Moisture	6.90	1.00		wt%	1	10/30/2017 1:50:00 PM
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<b>Qualifiers:</b>	* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.
	H Holding times for preparation or analysis exceeded	M Matrix Interference
	ND Not Detected at the Reporting Limit	RL Reporting Limit
	S Spike Recovery outside accepted recovery limits	SDL Sample detection limit
	U Analyte not detected	W Sample container temperature is out of limit as specified at testcode



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24775

Sample ID: <b>MB-24775</b>	SampType: <b>MBLK</b>	TestCode: <b>6010_W</b>	Units: <b>mg/L</b>	Prep Date: <b>10/31/2017</b>	RunNo: <b>65416</b>						
Client ID: <b>PBW</b>	Batch ID: <b>24775</b>	TestNo: <b>SW6010B</b>	Analysis Date: <b>11/9/2017</b>	SeqNo: <b>1619008</b>							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	< 0.500	0.500									
Magnesium	< 0.500	0.500									
Potassium	< 5.00	5.00									
Sodium	< 10.0	10.0									

Sample ID: <b>LCS-24775</b>	SampType: <b>LCS</b>	TestCode: <b>6010_W</b>	Units: <b>mg/L</b>	Prep Date: <b>10/31/2017</b>	RunNo: <b>65416</b>						
Client ID: <b>LCSW</b>	Batch ID: <b>24775</b>	TestNo: <b>SW6010B</b>	Analysis Date: <b>11/9/2017</b>	SeqNo: <b>1619009</b>							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	45.2	0.500	50.00	0	90.5	80	120				
Magnesium	45.7	0.500	50.00	0	91.4	80	120				
Potassium	45.8	5.00	50.00	0	91.6	80	120				
Sodium	48.0	10.0	50.00	0	96.0	80	120				

Sample ID: <b>LCSD-24775</b>	SampType: <b>LCSD</b>	TestCode: <b>6010_W</b>	Units: <b>mg/L</b>	Prep Date: <b>10/31/2017</b>	RunNo: <b>65416</b>						
Client ID: <b>LCSS02</b>	Batch ID: <b>24775</b>	TestNo: <b>SW6010B</b>	Analysis Date: <b>11/9/2017</b>	SeqNo: <b>1619010</b>							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	46.0	0.500	50.00	0	91.9	80	120	45.23	1.58	20	
Magnesium	45.8	0.500	50.00	0	91.6	80	120	45.72	0.153	20	
Potassium	46.5	5.00	50.00	0	93.0	80	120	45.78	1.60	20	
Sodium	47.8	10.0	50.00	0	95.6	80	120	48.01	0.417	20	

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24775

Sample ID: 17101071-001EMS	SampType: MS	TestCode: 6010_W	Units: mg/L	Prep Date: 10/31/2017	RunNo: 65416						
Client ID: SW 031-5055Z (1028)	Batch ID: 24775	TestNo: SW6010B		Analysis Date: 11/9/2017	SeqNo: 1619048						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	56.9	0.500	50.00	10.45	92.8	75	125				
Magnesium	57.2	0.500	50.00	7.933	98.5	75	125				
Potassium	57.4	5.00	50.00	6.040	103	75	125				
Sodium	267	10.0	50.00	217.0	99.4	75	125				

Sample ID: 17101071-001EMSD	SampType: MSD	TestCode: 6010_W	Units: mg/L	Prep Date: 10/31/2017	RunNo: 65416						
Client ID: SW 031-5055Z (1028)	Batch ID: 24775	TestNo: SW6010B		Analysis Date: 11/9/2017	SeqNo: 1619048						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	57.3	0.500	50.00	10.45	93.7	75	125	56.86	0.736	20	
Magnesium	56.8	0.500	50.00	7.933	97.7	75	125	57.20	0.719	20	
Potassium	57.8	5.00	50.00	6.040	104	75	125	57.44	0.625	20	
Sodium	269	10.0	50.00	217.0	105	75	125	266.7	0.970	20	

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		





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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24779-1

Sample ID: <b>17101071-007BMS</b>	SampType: <b>MS</b>	TestCode: <b>EPH_S_REC</b>	Units: <b>mg/Kg</b>	Prep Date: <b>10/31/2017</b>	RunNo: <b>65283</b>						
Client ID: <b>SS-2 031-5054Z (102)</b>	Batch ID: <b>24779-1</b>	TestNo: <b>Mod. MAEPH</b>		Analysis Date: <b>11/3/2017</b>	SeqNo: <b>1614246</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
C10-C12 Aliphatics	22.6	20.0	40.00	0.4726	55.2	40	140				
C12-C16 Aliphatics	24.3	20.0	40.00	1.569	56.9	40	140				
C16-C35 Aliphatics	124	90.0	180.0	8.897	63.7	40	140				
Surr: 1-Chlorooctadecane	11.1		20.00		55.6	40	140				

Sample ID: <b>17101071-007BMSD</b>	SampType: <b>MSD</b>	TestCode: <b>EPH_S_REC</b>	Units: <b>mg/Kg</b>	Prep Date: <b>10/31/2017</b>	RunNo: <b>65283</b>						
Client ID: <b>SS-2 031-5054Z (102)</b>	Batch ID: <b>24779-1</b>	TestNo: <b>Mod. MAEPH</b>		Analysis Date: <b>11/3/2017</b>	SeqNo: <b>1614247</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
C10-C12 Aliphatics	27.1	20.0	40.00	0.4726	66.5	40	140	22.57	18.2	50	
C12-C16 Aliphatics	31.5	20.0	40.00	1.569	74.9	40	140	24.33	25.8	50	
C16-C35 Aliphatics	141	90.0	180.0	8.897	73.3	40	140	123.5	13.1	50	
Surr: 1-Chlorooctadecane	13.3		20.00		66.3	40	140		0	50	

Sample ID: <b>LCS-24779</b>	SampType: <b>LCS</b>	TestCode: <b>EPH_S_REC</b>	Units: <b>mg/Kg</b>	Prep Date: <b>10/31/2017</b>	RunNo: <b>65283</b>						
Client ID: <b>LCSS</b>	Batch ID: <b>24779-1</b>	TestNo: <b>Mod. MAEPH</b>		Analysis Date: <b>11/3/2017</b>	SeqNo: <b>1614248</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
C10-C12 Aliphatics	28.6	20.0	40.00	0	71.6	40	140				
C12-C16 Aliphatics	32.0	20.0	40.00	0	80.0	40	140				
C16-C35 Aliphatics	153	90.0	180.0	0	84.9	40	140				
Surr: 1-Chlorooctadecane	14.0		20.00		70.0	40	140				

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24779-1

Sample ID: <b>LCSD-24779</b>	SampType: <b>LCSD</b>	TestCode: <b>EPH_S_REC</b>	Units: <b>mg/Kg</b>	Prep Date: <b>10/31/2017</b>	RunNo: <b>65283</b>						
Client ID: <b>LCSS02</b>	Batch ID: <b>24779-1</b>	TestNo: <b>Mod. MAEPH</b>	Analysis Date: <b>11/3/2017</b>	SeqNo: <b>1614249</b>							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
C10-C12 Aliphatics	25.2	20.0	40.00	0	63.0	40	140	28.62	12.8	25	
C12-C16 Aliphatics	29.7	20.0	40.00	0	74.3	40	140	31.98	7.39	25	
C16-C35 Aliphatics	142	90.0	180.0	0	78.9	40	140	152.8	7.32	25	
Surr: 1-Chlorooctadecane	12.8		20.00		64.1	40	140		0	25	

Sample ID: <b>MB-24779</b>	SampType: <b>MBLK</b>	TestCode: <b>EPH_S_REC</b>	Units: <b>mg/Kg</b>	Prep Date: <b>10/31/2017</b>	RunNo: <b>65283</b>						
Client ID: <b>PBS</b>	Batch ID: <b>24779-1</b>	TestNo: <b>Mod. MAEPH</b>	Analysis Date: <b>11/3/2017</b>	SeqNo: <b>1614250</b>							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
C10-C12 Aliphatics	< 20.0	20.0									
C12-C16 Aliphatics	< 20.0	20.0									
C16-C35 Aliphatics	< 90.0	90.0									
Surr: 1-Chlorooctadecane	14.5		20.00		72.4	40	140				

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		



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 Website: www.element.com

# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24779-1

Sample ID: <b>17101071-007BMS</b>	SampType: <b>MS</b>	TestCode: <b>EPH_S_REC</b>	Units: <b>mg/Kg</b>	Prep Date: <b>10/31/2017</b>	RunNo: <b>65284</b>						
Client ID: <b>SS-2 031-5054Z (102)</b>	Batch ID: <b>24779-1</b>	TestNo: <b>Mod. MAEPH</b>		Analysis Date: <b>11/3/2017</b>	SeqNo: <b>1614253</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
C10-C12 Aromatics	38.7	35.0	80.00	0	48.3	40	140				
C12-C16 Aromatics	54.3	50.0	100.0	0	54.3	40	140				
C16-C21 Aromatics	52.4	50.0	100.0	0	52.4	40	140				
C21-C35 Aromatics	30.5	30.0	60.00	1.758	47.9	40	140				
Surr: 2-Bromonaphthalene	19.0		20.00		95.0	40	140				
Surr: 2-Fluorobiphenyl	18.8		20.00		93.8	40	140				
Surr: o-Terphenyl	11.6		20.00		57.9	40	140				

Sample ID: <b>17101071-007BMSD</b>	SampType: <b>MSD</b>	TestCode: <b>EPH_S_REC</b>	Units: <b>mg/Kg</b>	Prep Date: <b>10/31/2017</b>	RunNo: <b>65284</b>						
Client ID: <b>SS-2 031-5054Z (102)</b>	Batch ID: <b>24779-1</b>	TestNo: <b>Mod. MAEPH</b>		Analysis Date: <b>11/3/2017</b>	SeqNo: <b>1614254</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
C10-C12 Aromatics	39.7	35.0	80.00	0	49.6	40	140	38.66	2.61	50	
C12-C16 Aromatics	60.1	50.0	100.0	0	60.1	40	140	54.29	10.1	50	
C16-C21 Aromatics	57.8	50.0	100.0	0	57.8	40	140	52.39	9.85	50	
C21-C35 Aromatics	31.5	30.0	60.00	1.758	49.6	40	140	30.49	3.34	50	
Surr: 2-Bromonaphthalene	17.5		20.00		87.5	40	140		0	50	
Surr: 2-Fluorobiphenyl	17.0		20.00		85.1	40	140		0	50	
Surr: o-Terphenyl	14.0		20.00		69.8	40	140		0	50	

**Qualifiers:**

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W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24779-1

Sample ID: <b>LCS-24779</b>	SampType: <b>LCS</b>	TestCode: <b>EPH_S_REC</b>	Units: <b>mg/Kg</b>	Prep Date: <b>10/31/2017</b>	RunNo: <b>65284</b>						
Client ID: <b>LCSS</b>	Batch ID: <b>24779-1</b>	TestNo: <b>Mod. MAEPH</b>	Analysis Date: <b>11/3/2017</b>	SeqNo: <b>1614255</b>							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
C10-C12 Aromatics	47.1	35.0	80.00	0	58.9	40	140				
C12-C16 Aromatics	66.3	50.0	100.0	0	66.3	40	140				
C16-C21 Aromatics	64.7	50.0	100.0	0	64.7	40	140				
C21-C35 Aromatics	37.1	30.0	60.00	0	61.8	40	140				
Surr: 2-Bromonaphthalene	21.6		20.00		108	40	140				
Surr: 2-Fluorobiphenyl	21.1		20.00		106	40	140				
Surr: o-Terphenyl	15.6		20.00		77.9	40	140				

Sample ID: <b>LCSD-24779</b>	SampType: <b>LCSD</b>	TestCode: <b>EPH_S_REC</b>	Units: <b>mg/Kg</b>	Prep Date: <b>10/31/2017</b>	RunNo: <b>65284</b>						
Client ID: <b>LCSS02</b>	Batch ID: <b>24779-1</b>	TestNo: <b>Mod. MAEPH</b>	Analysis Date: <b>11/3/2017</b>	SeqNo: <b>1614256</b>							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
C10-C12 Aromatics	38.9	35.0	80.00	0	48.6	40	140	47.13	19.2	25	
C12-C16 Aromatics	56.7	50.0	100.0	0	56.7	40	140	66.35	15.7	25	
C16-C21 Aromatics	55.5	50.0	100.0	0	55.5	40	140	64.74	15.4	25	
C21-C35 Aromatics	32.2	30.0	60.00	0	53.7	40	140	37.06	14.0	25	
Surr: 2-Bromonaphthalene	22.1		20.00		111	40	140		0	25	
Surr: 2-Fluorobiphenyl	21.7		20.00		108	40	140		0	25	
Surr: o-Terphenyl	13.4		20.00		66.8	40	140		0	25	

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
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W Sample container temperature is out of limit as specified at testcode		





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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24779-1

Sample ID: <b>MB-24779</b>	SampType: <b>MBLK</b>	TestCode: <b>EPH_S_REC</b>	Units: <b>mg/Kg</b>	Prep Date: <b>10/31/2017</b>	RunNo: <b>65284</b>						
Client ID: <b>PBS</b>	Batch ID: <b>24779-1</b>	TestNo: <b>Mod. MAEPH</b>		Analysis Date: <b>11/3/2017</b>	SeqNo: <b>1614257</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
C10-C12 Aromatics	< 40.0	40.0									
C12-C16 Aromatics	< 50.0	50.0									
C16-C21 Aromatics	< 50.0	50.0									
C21-C35 Aromatics	< 30.0	30.0									
Surr: 2-Bromonaphthalene	22.3		20.00		111	40	140				
Surr: 2-Fluorobiphenyl	21.9		20.00		110	40	140				
Surr: o-Terphenyl	15.8		20.00		79.2	40	140				

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	C	Value is below Minimum Compound Limit.	H	Holding times for preparation or analysis exceed
M	Matrix Interference	ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode				



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24792

Sample ID: <b>MB-24792</b>	SampType: <b>MBLK</b>	TestCode: <b>6010_S</b>	Units: <b>mg/Kg</b>	Prep Date: <b>11/1/2017</b>	RunNo: <b>65354</b>						
Client ID: <b>PBS</b>	Batch ID: <b>24792</b>	TestNo: <b>SW6010B</b>	<b>SW3050B</b>	Analysis Date: <b>11/6/2017</b>	SeqNo: <b>1616168</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Arsenic	< 1.00	1.00									
Barium	< 0.500	0.500									
Cadmium	< 0.250	0.250									
Chromium	< 0.500	0.500									
Lead	< 0.500	0.500									
Selenium	< 2.00	2.00									
Silver	< 0.250	0.250									
Zinc	< 0.500	0.500									

Sample ID: <b>LCS-24792</b>	SampType: <b>LCS</b>	TestCode: <b>6010_S</b>	Units: <b>mg/Kg</b>	Prep Date: <b>11/1/2017</b>	RunNo: <b>65354</b>						
Client ID: <b>LCSS</b>	Batch ID: <b>24792</b>	TestNo: <b>SW6010B</b>	<b>SW3050B</b>	Analysis Date: <b>11/6/2017</b>	SeqNo: <b>1616169</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Arsenic	23.8	1.00	25.00	0	95.3	80	120				
Barium	24.9	0.500	25.00	0	99.5	80	120				
Cadmium	23.2	0.250	25.00	0	92.9	80	120				
Chromium	24.6	0.500	25.00	0	98.5	80	120				
Lead	23.9	0.500	25.00	0	95.6	80	120				
Selenium	23.3	2.00	25.00	0	93.2	80	120				
Silver	4.62	0.250	5.000	0	92.5	80	120				
Zinc	23.2	0.500	25.00	0	92.8	80	120				

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24792

Sample ID: <b>LCSD-24792</b>	SampType: <b>LCSD</b>	TestCode: <b>6010_S</b>	Units: <b>mg/Kg</b>	Prep Date: <b>11/1/2017</b>	RunNo: <b>65354</b>						
Client ID: <b>LCSS02</b>	Batch ID: <b>24792</b>	TestNo: <b>SW6010B</b>	<b>SW3050B</b>	Analysis Date: <b>11/6/2017</b>	SeqNo: <b>1616170</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	23.7	1.00	25.00	0	95.0	80	120	23.82	0.336	20	
Barium	24.5	0.500	25.00	0	97.9	80	120	24.87	1.56	20	
Cadmium	23.1	0.250	25.00	0	92.4	80	120	23.22	0.561	20	
Chromium	24.6	0.500	25.00	0	98.2	80	120	24.62	0.264	20	
Lead	24.0	0.500	25.00	0	96.1	80	120	23.90	0.542	20	
Selenium	22.7	2.00	25.00	0	90.7	80	120	23.30	2.72	20	
Silver	4.63	0.250	5.000	0	92.6	80	120	4.625	0.108	20	
Zinc	23.1	0.500	25.00	0	92.3	80	120	23.20	0.583	20	

Sample ID: <b>17101071-006CMS</b>	SampType: <b>MS</b>	TestCode: <b>6010_S</b>	Units: <b>mg/Kg</b>	Prep Date: <b>11/1/2017</b>	RunNo: <b>65354</b>						
Client ID: <b>SS-1 031-5054Z (102)</b>	Batch ID: <b>24792</b>	TestNo: <b>SW6010B</b>	<b>SW3050B</b>	Analysis Date: <b>11/6/2017</b>	SeqNo: <b>1616172</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	28.8	1.02	25.58	3.366	99.4	75	125				
Barium	46.1	0.512	25.58	18.02	110	75	125				
Cadmium	25.4	0.256	25.58	0.1612	98.7	75	125				
Chromium	32.0	0.512	25.58	3.698	111	75	125				
Lead	29.7	0.512	25.58	3.895	101	75	125				
Selenium	22.3	2.05	25.58	0	87.2	75	125				
Silver	4.97	0.256	5.116	0	97.2	75	125				
Zinc	49.1	0.512	25.58	21.81	107	75	125				

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24792

Sample ID: 17101071-006CMSD	SampType: MSD	TestCode: 6010_S	Units: mg/Kg	Prep Date: 11/1/2017	RunNo: 65354						
Client ID: SS-1 031-5054Z (102)	Batch ID: 24792	TestNo: SW6010B	SW3050B	Analysis Date: 11/6/2017	SeqNo: 1616173						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	28.5	1.01	25.36	3.366	99.2	75	125	28.80	1.00	20	
Barium	45.5	0.507	25.36	18.02	108	75	125	46.13	1.44	20	
Cadmium	25.3	0.254	25.36	0.1612	98.9	75	125	25.42	0.640	20	
Chromium	31.5	0.507	25.36	3.698	110	75	125	31.98	1.37	20	
Lead	29.6	0.507	25.36	3.895	101	75	125	29.69	0.260	20	
Selenium	22.7	2.03	25.36	0	89.6	75	125	22.31	1.88	20	
Silver	4.91	0.254	5.072	0	96.8	75	125	4.973	1.27	20	
Zinc	48.4	0.507	25.36	21.81	105	75	125	49.14	1.51	20	

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		





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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24792

Sample ID: <b>MB-24792</b>	SampType: <b>MBLK</b>	TestCode: <b>6010_S</b>	Units: <b>mg/Kg</b>	Prep Date: <b>11/1/2017</b>	RunNo: <b>65476</b>						
Client ID: <b>PBS</b>	Batch ID: <b>24792</b>	TestNo: <b>SW6010B</b>	<b>SW3050B</b>	Analysis Date: <b>11/13/2017</b>	SeqNo: <b>1620933</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Arsenic	< 1.00	1.00									
Barium	< 0.500	0.500									
Cadmium	< 0.250	0.250									
Chromium	< 0.500	0.500									
Lead	< 0.500	0.500									
Selenium	< 2.00	2.00									
Silver	< 0.250	0.250									
Zinc	< 0.500	0.500									

Sample ID: <b>LCS-24792</b>	SampType: <b>LCS</b>	TestCode: <b>6010_S</b>	Units: <b>mg/Kg</b>	Prep Date: <b>11/1/2017</b>	RunNo: <b>65476</b>						
Client ID: <b>LCSS</b>	Batch ID: <b>24792</b>	TestNo: <b>SW6010B</b>	<b>SW3050B</b>	Analysis Date: <b>11/13/2017</b>	SeqNo: <b>1620934</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Arsenic	25.9	1.00	25.00	0	104	80	120				
Barium	27.3	0.500	25.00	0	109	80	120				
Cadmium	26.8	0.250	25.00	0	107	80	120				
Chromium	27.3	0.500	25.00	0	109	80	120				
Lead	26.5	0.500	25.00	0	106	80	120				
Selenium	26.2	2.00	25.00	0	105	80	120				
Silver	5.39	0.250	5.000	0	108	80	120				
Zinc	26.8	0.500	25.00	0	107	80	120				

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24792

Sample ID: <b>LCSD-24792</b>	SampType: <b>LCSD</b>	TestCode: <b>6010_S</b>	Units: <b>mg/Kg</b>	Prep Date: <b>11/1/2017</b>	RunNo: <b>65476</b>						
Client ID: <b>LCSS02</b>	Batch ID: <b>24792</b>	TestNo: <b>SW6010B</b>	<b>SW3050B</b>	Analysis Date: <b>11/13/2017</b>	SeqNo: <b>1620935</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	26.6	1.00	25.00	0	106	80	120	25.88	2.78	20	
Barium	27.4	0.500	25.00	0	110	80	120	27.32	0.402	20	
Cadmium	26.9	0.250	25.00	0	108	80	120	26.75	0.522	20	
Chromium	27.4	0.500	25.00	0	110	80	120	27.32	0.438	20	
Lead	26.7	0.500	25.00	0	107	80	120	26.51	0.752	20	
Selenium	26.2	2.00	25.00	0	105	80	120	26.18	0.0764	20	
Silver	5.42	0.250	5.000	0	108	80	120	5.390	0.647	20	
Zinc	27.0	0.500	25.00	0	108	80	120	26.82	0.484	20	

Sample ID: <b>17101071-006CMS</b>	SampType: <b>MS</b>	TestCode: <b>6010_S</b>	Units: <b>mg/Kg</b>	Prep Date: <b>11/1/2017</b>	RunNo: <b>65476</b>						
Client ID: <b>SS-1 031-5054Z (102)</b>	Batch ID: <b>24792</b>	TestNo: <b>SW6010B</b>	<b>SW3050B</b>	Analysis Date: <b>11/13/2017</b>	SeqNo: <b>1620952</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	25.8	1.02	25.58	2.000	93.1	75	125				
Barium	44.8	0.512	25.58	19.40	99.2	75	125				
Cadmium	23.6	0.256	25.58	0.1159	91.9	75	125				
Chromium	30.4	0.512	25.58	3.985	103	75	125				
Lead	27.6	0.512	25.58	3.728	93.4	75	125				
Selenium	19.8	2.05	25.58	0	77.3	75	125				
Silver	4.52	0.256	5.116	0	88.3	75	125				
Zinc	47.4	0.512	25.58	22.99	95.5	75	125				

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		



Element Materials Technology Lafayette  
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 TEL: (337) 235-0483 FAX: (337) 233-6540  
 Website: www.element.com

# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24792

Sample ID: 17101071-006CMSD	SampType: MSD	TestCode: 6010_S	Units: mg/Kg	Prep Date: 11/1/2017	RunNo: 65476						
Client ID: SS-1 031-5054Z (102)	Batch ID: 24792	TestNo: SW6010B	SW3050B	Analysis Date: 11/13/2017	SeqNo: 1620953						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	25.9	1.01	25.36	2.000	94.3	75	125	25.81	0.419	20	
Barium	45.3	0.507	25.36	19.40	102	75	125	44.78	1.25	20	
Cadmium	24.0	0.254	25.36	0.1159	94.2	75	125	23.64	1.60	20	
Chromium	31.0	0.507	25.36	3.985	107	75	125	30.44	1.87	20	
Lead	28.1	0.507	25.36	3.728	96.2	75	125	27.62	1.86	20	
Selenium	20.3	2.03	25.36	0	80.2	75	125	19.78	2.75	20	
Silver	4.57	0.254	5.072	0	90.2	75	125	4.517	1.27	20	
Zinc	48.7	0.507	25.36	22.99	101	75	125	47.43	2.66	20	

**Qualifiers:**

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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24795

Sample ID: <b>17101071-006CMS</b>	SampType: <b>MS</b>	TestCode: <b>HG_S_7471A</b>	Units: <b>mg/Kg</b>	Prep Date: <b>11/1/2017</b>	RunNo: <b>65242</b>						
Client ID: <b>SS-1 031-5054Z (102)</b>	Batch ID: <b>24795</b>	TestNo: <b>SW7471A</b>	<b>SW7471A</b>	Analysis Date: <b>11/2/2017</b>	SeqNo: <b>1612822</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury 0.912 0.104 0.8683 0 105 75 125

Sample ID: <b>17101071-006CMSD</b>	SampType: <b>MSD</b>	TestCode: <b>HG_S_7471A</b>	Units: <b>mg/Kg</b>	Prep Date: <b>11/1/2017</b>	RunNo: <b>65242</b>						
Client ID: <b>SS-1 031-5054Z (102)</b>	Batch ID: <b>24795</b>	TestNo: <b>SW7471A</b>	<b>SW7471A</b>	Analysis Date: <b>11/2/2017</b>	SeqNo: <b>1612826</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury 0.827 0.105 0.8767 0 94.3 75 125 0.9124 9.83 20

Sample ID: <b>MB-24795</b>	SampType: <b>MBLK</b>	TestCode: <b>HG_S_7471A</b>	Units: <b>mg/Kg</b>	Prep Date: <b>11/1/2017</b>	RunNo: <b>65242</b>						
Client ID: <b>PBS</b>	Batch ID: <b>24795</b>	TestNo: <b>SW7471A</b>	<b>SW7471A</b>	Analysis Date: <b>11/2/2017</b>	SeqNo: <b>1612877</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury < 0.100 0.100

Sample ID: <b>LCS-24795</b>	SampType: <b>LCS</b>	TestCode: <b>HG_S_7471A</b>	Units: <b>mg/Kg</b>	Prep Date: <b>11/1/2017</b>	RunNo: <b>65242</b>						
Client ID: <b>LCSS</b>	Batch ID: <b>24795</b>	TestNo: <b>SW7471A</b>	<b>SW7471A</b>	Analysis Date: <b>11/2/2017</b>	SeqNo: <b>1612878</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury 0.889 0.100 0.8330 0 107 80 120

**Qualifiers:**

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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24795

Sample ID: <b>LCSD-24795</b>	SampType: <b>LCSD</b>	TestCode: <b>HG_S_7471A</b>	Units: <b>mg/Kg</b>	Prep Date: <b>11/1/2017</b>	RunNo: <b>65242</b>						
Client ID: <b>LCSS02</b>	Batch ID: <b>24795</b>	TestNo: <b>SW7471A</b>	<b>SW7471A</b>	Analysis Date: <b>11/2/2017</b>	SeqNo: <b>1612879</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.914	0.100	0.8330	0	110	80	120	0.8888	2.77	20	

**Qualifiers:**

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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24823

Sample ID: <b>MB-24823</b>	SampType: <b>MBLK</b>	TestCode: <b>8270_W_LVI_</b>	Units: <b>mg/L</b>	Prep Date: <b>11/3/2017</b>	RunNo: <b>65318</b>						
Client ID: <b>PBW</b>	Batch ID: <b>24823</b>	TestNo: <b>SW8270C</b>	<b>SW3511</b>	Analysis Date: <b>11/6/2017</b>	SeqNo: <b>1614971</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2-Methylnaphthalene	< 0.000522	0.000522									
Acenaphthene	< 0.00104	0.00104									
Acenaphthylene	< 0.00104	0.00104									
Anthracene	< 0.00104	0.00104									
Benzo(a)anthracene	< 0.000522	0.000522									
Benzo(a)pyrene	< 0.000157	0.000157									
Benzo(b)fluoranthene	< 0.000522	0.000522									
Benzo(k)fluoranthene	< 0.000522	0.000522									
Chrysene	< 0.000522	0.000522									
Dibenz(a,h)anthracene	< 0.00104	0.00104									
Fluoranthene	< 0.00104	0.00104									
Fluorene	< 0.000627	0.000627									
Indeno(1,2,3-cd)pyrene	< 0.000522	0.000522									
Naphthalene	< 0.00209	0.00209									
Phenanthrene	< 0.00104	0.00104									
Pyrene	< 0.00104	0.00104									
Surr: 4-Terphenyl-d14	0.00252		0.002392		105	70	130				

Sample ID: <b>LCS-24823</b>	SampType: <b>LCS</b>	TestCode: <b>8270_W_LVI_</b>	Units: <b>mg/L</b>	Prep Date: <b>11/3/2017</b>	RunNo: <b>65318</b>						
Client ID: <b>LCSW</b>	Batch ID: <b>24823</b>	TestNo: <b>SW8270C</b>	<b>SW3511</b>	Analysis Date: <b>11/6/2017</b>	SeqNo: <b>1615017</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2-Methylnaphthalene	0.00244	0.000521	0.002381	0	102	70	130				
Acenaphthene	0.00207	0.00104	0.002385	0	86.8	70	130				
Acenaphthylene	0.00201	0.00104	0.002385	0	84.4	70	130				

**Qualifiers:**

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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24823

Sample ID:	SampType:	TestCode:	Units:	Prep Date:	RunNo:						
LCS-24823	LCS	8270_W_LVI_	mg/L	11/3/2017	65318						
Client ID:	Batch ID:	TestNo:	SW3511	Analysis Date:	SeqNo:						
LCSW	24823	SW8270C	SW3511	11/6/2017	1615017						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Anthracene	0.00210	0.00104	0.002385	0	87.9	70	130				
Benzo(a)anthracene	0.00210	0.000521	0.002385	0	87.8	70	130				
Benzo(a)pyrene	0.00222	0.000156	0.002385	0	93.1	70	130				
Benzo(b)fluoranthene	0.00207	0.000521	0.002385	0	86.6	70	130				
Benzo(k)fluoranthene	0.00218	0.000521	0.002385	0	91.3	70	130				
Chrysene	0.00197	0.000521	0.002385	0	82.6	70	130				
Dibenz(a,h)anthracene	0.00211	0.00104	0.002385	0	88.5	70	130				
Fluoranthene	0.00193	0.00104	0.002385	0	80.9	70	130				
Fluorene	0.00237	0.000625	0.002385	0	99.5	70	130				
Indeno(1,2,3-cd)pyrene	0.00206	0.000521	0.002385	0	86.3	70	130				
Naphthalene	0.00314	0.00208	0.002385	0	132	70	130				S*
Phenanthrene	0.00206	0.00104	0.002385	0	86.4	70	130				
Pyrene	0.00203	0.00104	0.002385	0	85.0	70	130				
Surr: 4-Terphenyl-d14	0.00253		0.002385		106	70	130				

**NOTES:**

S\* - High recovery(ies) indicate high bias. Data deemed acceptable as the specific target analyte(s) were not observed in the field sample(s).

Sample ID:	SampType:	TestCode:	Units:	Prep Date:	RunNo:						
LCSD-24823	LCSD	8270_W_LVI_	mg/L	11/3/2017	65318						
Client ID:	Batch ID:	TestNo:	SW3511	Analysis Date:	SeqNo:						
LCSS02	24823	SW8270C	SW3511	11/6/2017	1615018						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2-Methylnaphthalene	0.00247	0.000518	0.002369	0	104	70	130	0.002436	1.43	40	
Acenaphthene	0.00203	0.00104	0.002373	0	85.6	70	130	0.002071	2.00	40	
Acenaphthylene	0.00200	0.00104	0.002373	0	84.3	70	130	0.002014	0.710	40	
Anthracene	0.00205	0.00104	0.002373	0	86.5	70	130	0.002097	2.20	40	
Benzo(a)anthracene	0.00197	0.000518	0.002373	0	83.1	70	130	0.002095	6.07	40	

**Qualifiers:**

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- ND Not Detected at the Reporting Limit
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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24823

Sample ID: <b>LCSD-24823</b>	SampType: <b>LCSD</b>	TestCode: <b>8270_W_LVI_</b>	Units: <b>mg/L</b>	Prep Date: <b>11/3/2017</b>	RunNo: <b>65318</b>						
Client ID: <b>LCSS02</b>	Batch ID: <b>24823</b>	TestNo: <b>SW8270C</b>	<b>SW3511</b>	Analysis Date: <b>11/6/2017</b>	SeqNo: <b>1615018</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzo(a)pyrene	0.00203	0.000155	0.002373	0	85.7	70	130	0.002221	8.87	40	
Benzo(b)fluoranthene	0.00195	0.000518	0.002373	0	82.3	70	130	0.002067	5.73	40	
Benzo(k)fluoranthene	0.00211	0.000518	0.002373	0	88.9	70	130	0.002178	3.22	40	
Chrysene	0.00187	0.000518	0.002373	0	78.7	70	130	0.001971	5.47	40	
Dibenz(a,h)anthracene	0.00193	0.00104	0.002373	0	81.4	70	130	0.002110	8.80	40	
Fluoranthene	0.00192	0.00104	0.002373	0	81.1	70	130	0.001929	0.270	40	
Fluorene	0.00224	0.000622	0.002373	0	94.6	70	130	0.002374	5.57	40	
Indeno(1,2,3-cd)pyrene	0.00176	0.000518	0.002373	0	74.4	70	130	0.002059	15.4	40	
Naphthalene	0.00316	0.00207	0.002373	0	133	70	130	0.003139	0.667	40	S*
Phenanthrene	0.00202	0.00104	0.002373	0	85.1	70	130	0.002061	2.01	40	
Pyrene	0.00198	0.00104	0.002373	0	83.5	70	130	0.002029	2.34	40	
Surr: 4-Terphenyl-d14	0.00244		0.002373		103	70	130		0	40	

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
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- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceed
- RL Reporting Limit
- U Analyte not detected





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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24824

Sample ID: <b>LCS-24824</b>	SampType: <b>LCS</b>	TestCode: <b>EPH_W_REC</b>	Units: <b>mg/L</b>	Prep Date: <b>11/3/2017</b>	RunNo: <b>65429</b>						
Client ID: <b>LCSW</b>	Batch ID: <b>24824</b>	TestNo: <b>Mod. MAEPH SW3511</b>		Analysis Date: <b>11/9/2017</b>	SeqNo: <b>1619326</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
C10-C12 Aliphatics	0.192	0.133	0.2343	0	82.1	40	140				
C12-C16 Aliphatics	0.226	0.133	0.2343	0	96.4	40	140				
C16-C35 Aliphatics	1.00	0.923	1.054	0	95.2	40	140				
Surr: 1-Chlorooctadecane	0.0815		0.1172		69.6	40	140				

Sample ID: <b>LCSD-24824</b>	SampType: <b>LCSD</b>	TestCode: <b>EPH_W_REC</b>	Units: <b>mg/L</b>	Prep Date: <b>11/3/2017</b>	RunNo: <b>65429</b>						
Client ID: <b>LCSS02</b>	Batch ID: <b>24824</b>	TestNo: <b>Mod. MAEPH SW3511</b>		Analysis Date: <b>11/9/2017</b>	SeqNo: <b>1619327</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
C10-C12 Aliphatics	0.183	0.134	0.2349	0	78.0	40	140	0.1924	4.90	25	
C12-C16 Aliphatics	0.217	0.134	0.2349	0	92.5	40	140	0.2260	3.93	25	
C16-C35 Aliphatics	0.961	0.925	1.057	0	90.9	40	140	1.004	4.32	25	
Surr: 1-Chlorooctadecane	0.0756		0.1174		64.4	40	140		0	25	

Sample ID: <b>MB-24824</b>	SampType: <b>MBLK</b>	TestCode: <b>EPH_W_REC</b>	Units: <b>mg/L</b>	Prep Date: <b>11/3/2017</b>	RunNo: <b>65429</b>						
Client ID: <b>PBW</b>	Batch ID: <b>24824</b>	TestNo: <b>Mod. MAEPH SW3511</b>		Analysis Date: <b>11/9/2017</b>	SeqNo: <b>1619328</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
C10-C12 Aliphatics	< 0.135	0.135									
C12-C16 Aliphatics	< 0.135	0.135									
C16-C35 Aliphatics	< 1.04	1.04									
Surr: 1-Chlorooctadecane	0.0675		0.1185		57.0	40	140				

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24824

Sample ID: <b>LCS-24824</b>	SampType: <b>LCS</b>	TestCode: <b>EPH_W_REC</b>	Units: <b>mg/L</b>	Prep Date: <b>11/3/2017</b>	RunNo: <b>65430</b>						
Client ID: <b>LCSW</b>	Batch ID: <b>24824</b>	TestNo: <b>Mod. MAEPH SW3511</b>		Analysis Date: <b>11/9/2017</b>	SeqNo: <b>1619330</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
C10-C12 Aromatics	0.418	0.133	0.4687	0	89.1	40	140				
C12-C16 Aromatics	0.555	0.133	0.5858	0	94.7	40	140				
C16-C21 Aromatics	0.562	0.133	0.5858	0	95.9	40	140				
C21-C35 Aromatics	0.285	0.133	0.3515	0	81.2	40	140				
Surr: 2-Bromonaphthalene	0.0862		0.08787		98.1	40	140				
Surr: 2-Fluorobiphenyl	0.0872		0.08787		99.3	40	140				
Surr: o-Terphenyl	0.108		0.1172		92.5	40	140				

Sample ID: <b>LCSD-24824</b>	SampType: <b>LCSD</b>	TestCode: <b>EPH_W_REC</b>	Units: <b>mg/L</b>	Prep Date: <b>11/3/2017</b>	RunNo: <b>65430</b>						
Client ID: <b>LCSS02</b>	Batch ID: <b>24824</b>	TestNo: <b>Mod. MAEPH SW3511</b>		Analysis Date: <b>11/9/2017</b>	SeqNo: <b>1619331</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
C10-C12 Aromatics	0.456	0.134	0.4698	0	97.2	40	140	0.4177	8.88	25	
C12-C16 Aromatics	0.614	0.134	0.5872	0	105	40	140	0.5546	10.1	25	
C16-C21 Aromatics	0.628	0.134	0.5872	0	107	40	140	0.5617	11.2	25	
C21-C35 Aromatics	0.320	0.134	0.3523	0	90.9	40	140	0.2854	11.5	25	
Surr: 2-Bromonaphthalene	0.0904		0.08808		103	40	140		0	25	
Surr: 2-Fluorobiphenyl	0.0919		0.08808		104	40	140		0	25	
Surr: o-Terphenyl	0.119		0.1174		101	40	140		0	25	

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		



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 TEL: (337) 235-0483 FAX: (337) 233-6540  
 Website: www.element.com

# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24824

Sample ID: <b>MB-24824</b>	SampType: <b>MBLK</b>	TestCode: <b>EPH_W_REC</b>	Units: <b>mg/L</b>	Prep Date: <b>11/3/2017</b>	RunNo: <b>65430</b>						
Client ID: <b>PBW</b>	Batch ID: <b>24824</b>	TestNo: <b>Mod. MAEPH SW3511</b>		Analysis Date: <b>11/9/2017</b>	SeqNo: <b>1619332</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
C10-C12 Aromatics	< 0.135	0.135									
C12-C16 Aromatics	< 0.135	0.135									
C16-C21 Aromatics	< 0.135	0.135									
C21-C35 Aromatics	< 0.135	0.135									
Surr: 2-Bromonaphthalene	0.0838		0.08889		94.3	40	140				
Surr: 2-Fluorobiphenyl	0.0838		0.08889		94.3	40	140				
Surr: o-Terphenyl	0.112		0.1185		94.9	40	140				

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	C	Value is below Minimum Compound Limit.	H	Holding times for preparation or analysis exceed
M	Matrix Interference	ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode				



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24826

Sample ID: <b>MB-24826</b>	SampType: <b>MBLK</b>	TestCode: <b>TTBA</b>	Units: <b>mg/Kg-dry</b>	Prep Date: <b>11/3/2017</b>	RunNo: <b>65319</b>						
Client ID: <b>PBS</b>	Batch ID: <b>24826</b>	TestNo: <b>LDNR 29-B</b>		Analysis Date: <b>11/6/2017</b>	SeqNo: <b>1614979</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

True Total Barium < 50.0 50.0

Sample ID: <b>LCS-24826</b>	SampType: <b>LCS</b>	TestCode: <b>TTBA</b>	Units: <b>mg/Kg-dry</b>	Prep Date: <b>11/3/2017</b>	RunNo: <b>65319</b>						
Client ID: <b>LCSS</b>	Batch ID: <b>24826</b>	TestNo: <b>LDNR 29-B</b>		Analysis Date: <b>11/6/2017</b>	SeqNo: <b>1614980</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

True Total Barium 4,970 50.0 5,000 0 99.4 75 125

Sample ID: <b>LCSD-24826</b>	SampType: <b>LCSD</b>	TestCode: <b>TTBA</b>	Units: <b>mg/Kg-dry</b>	Prep Date: <b>11/3/2017</b>	RunNo: <b>65319</b>						
Client ID: <b>LCSS02</b>	Batch ID: <b>24826</b>	TestNo: <b>LDNR 29-B</b>		Analysis Date: <b>11/6/2017</b>	SeqNo: <b>1614981</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

True Total Barium 5,090 50.0 5,000 0 102 75 125 4,970 2.39 20

Sample ID: <b>17101059-003AMS</b>	SampType: <b>MS</b>	TestCode: <b>TTBA</b>	Units: <b>mg/Kg-dry</b>	Prep Date: <b>11/3/2017</b>	RunNo: <b>65319</b>						
Client ID: <b>ZZZZZZ</b>	Batch ID: <b>24826</b>	TestNo: <b>LDNR 29-B</b>		Analysis Date: <b>11/6/2017</b>	SeqNo: <b>1614984</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

True Total Barium 5,770 48.4 4,845 768.7 103 75 125

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		





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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24826

Sample ID: 17101059-003AMSD	SampType: MSD	TestCode: TTBA	Units: mg/Kg-dry	Prep Date: 11/3/2017	RunNo: 65319						
Client ID: ZZZZZZ	Batch ID: 24826	TestNo: LDNR 29-B		Analysis Date: 11/6/2017	SeqNo: 1614985						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
True Total Barium	5,510	47.3	4,730	768.7	100	75	125	5,766	4.60	20	

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24831-2

Sample ID: <b>MB-24831</b>	SampType: <b>MBLK</b>	TestCode: <b>8270_S_PAH</b>	Units: <b>mg/Kg</b>	Prep Date: <b>11/5/2017</b>	RunNo: <b>65335</b>						
Client ID: <b>PBS</b>	Batch ID: <b>24831-2</b>	TestNo: <b>SW8270C</b>		Analysis Date: <b>11/6/2017</b>	SeqNo: <b>1615378</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2-Methylnaphthalene	< 0.0600	0.0600									
Acenaphthene	< 0.0600	0.0600									
Acenaphthylene	< 0.0600	0.0600									
Anthracene	< 0.0600	0.0600									
Benzo(a)anthracene	< 0.0600	0.0600									
Benzo(a)pyrene	< 0.0600	0.0600									
Benzo(b)fluoranthene	< 0.0600	0.0600									
Benzo(k)fluoranthene	< 0.0600	0.0600									
Chrysene	< 0.0600	0.0600									
Dibenz(a,h)anthracene	< 0.0600	0.0600									
Fluoranthene	< 0.0600	0.0600									
Fluorene	< 0.0600	0.0600									
Indeno(1,2,3-cd)pyrene	< 0.0600	0.0600									
Naphthalene	< 0.0600	0.0600									
Phenanthrene	< 0.0600	0.0600									
Pyrene	< 0.0600	0.0600									
Surr: 4-Terphenyl-d14	1.80		1.667		108	29.1	128				

Sample ID: <b>17110161-001BMS</b>	SampType: <b>MS</b>	TestCode: <b>8270_S_PAH</b>	Units: <b>mg/Kg</b>	Prep Date: <b>11/5/2017</b>	RunNo: <b>65335</b>						
Client ID: <b>ZZZZZ</b>	Batch ID: <b>24831-2</b>	TestNo: <b>SW8270C</b>		Analysis Date: <b>11/6/2017</b>	SeqNo: <b>1615380</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2-Methylnaphthalene	2.43	0.0600	3.300	0	73.6	59.8	105				
Acenaphthene	2.43	0.0600	3.300	0	73.5	56.4	104				
Acenaphthylene	2.31	0.0600	3.300	0	70.0	51.9	109				

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	C	Value is below Minimum Compound Limit.	H	Holding times for preparation or analysis exceed
M	Matrix Interference	ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode				



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24831-2

Sample ID: <b>17110161-001BMS</b>	SampType: <b>MS</b>	TestCode: <b>8270_S_PAH</b>	Units: <b>mg/Kg</b>	Prep Date: <b>11/5/2017</b>	RunNo: <b>65335</b>
Client ID: <b>ZZZZZ</b>	Batch ID: <b>24831-2</b>	TestNo: <b>SW8270C</b>		Analysis Date: <b>11/6/2017</b>	SeqNo: <b>1615380</b>

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Anthracene	2.74	0.0600	3.300	0	83.1	63.1	106				
Benzo(a)anthracene	2.90	0.0600	3.300	0	88.0	54.3	114				
Benzo(a)pyrene	3.07	0.0600	3.300	0	93.0	50.2	129				
Benzo(b)fluoranthene	3.10	0.0600	3.300	0	93.9	40.7	122				
Benzo(k)fluoranthene	2.63	0.0600	3.300	0	79.8	50.3	121				
Chrysene	2.92	0.0600	3.300	0	88.4	51.2	119				
Dibenz(a,h)anthracene	2.92	0.0600	3.300	0	88.5	37.2	136				
Fluoranthene	2.59	0.0600	3.300	0	78.6	65.1	102				
Fluorene	2.41	0.0600	3.300	0	73.2	56.7	104				
Indeno(1,2,3-cd)pyrene	2.97	0.0600	3.300	0	90.0	29.1	140				
Naphthalene	2.52	0.0600	3.300	0	76.3	67.6	105				
Phenanthrene	2.76	0.0600	3.300	0	83.7	67.3	105				
Pyrene	2.80	0.0600	3.300	0.01222	84.4	55.1	136				
Surr: 4-Terphenyl-d14	1.95		3.300		59.0	29.1	128				

Sample ID: <b>17110161-001BMSD</b>	SampType: <b>MSD</b>	TestCode: <b>8270_S_PAH</b>	Units: <b>mg/Kg</b>	Prep Date: <b>11/5/2017</b>	RunNo: <b>65335</b>
Client ID: <b>ZZZZZ</b>	Batch ID: <b>24831-2</b>	TestNo: <b>SW8270C</b>		Analysis Date: <b>11/6/2017</b>	SeqNo: <b>1615381</b>

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2-Methylnaphthalene	2.50	0.0600	3.300	0	75.8	59.8	105	2.430	2.85	40	
Acenaphthene	2.52	0.0600	3.300	0	76.4	56.4	104	2.426	3.81	40	
Acenaphthylene	2.37	0.0600	3.300	0	71.9	51.9	109	2.309	2.78	40	
Anthracene	2.85	0.0600	3.300	0	86.3	63.1	106	2.744	3.71	40	
Benzo(a)anthracene	3.05	0.0600	3.300	0	92.5	54.3	114	2.905	4.96	40	
Benzo(a)pyrene	3.23	0.0600	3.300	0	97.8	50.2	129	3.069	5.04	40	

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24831-2

Sample ID: 17110161-001BMSD	SampType: MSD	TestCode: 8270_S_PAH	Units: mg/Kg	Prep Date: 11/5/2017	RunNo: 65335						
Client ID: ZZZZZZ	Batch ID: 24831-2	TestNo: SW8270C		Analysis Date: 11/6/2017	SeqNo: 1615381						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzo(b)fluoranthene	3.16	0.0600	3.300	0	95.8	40.7	122	3.097	2.10	40	
Benzo(k)fluoranthene	2.78	0.0600	3.300	0	84.2	50.3	121	2.632	5.36	40	
Chrysene	3.04	0.0600	3.300	0	92.2	51.2	119	2.918	4.16	40	
Dibenz(a,h)anthracene	3.05	0.0600	3.300	0	92.4	37.2	136	2.920	4.30	40	
Fluoranthene	2.79	0.0600	3.300	0	84.6	65.1	102	2.593	7.42	40	
Fluorene	2.49	0.0600	3.300	0	75.6	56.7	104	2.414	3.22	40	
Indeno(1,2,3-cd)pyrene	3.09	0.0600	3.300	0	93.6	29.1	140	2.971	3.84	40	
Naphthalene	2.56	0.0600	3.300	0	77.7	67.6	105	2.519	1.74	40	
Phenanthrene	2.85	0.0600	3.300	0	86.3	67.3	105	2.763	3.01	40	
Pyrene	2.94	0.0600	3.300	0.01222	88.7	55.1	136	2.798	4.98	40	
Surr: 4-Terphenyl-d14	1.92		3.300		58.2	29.1	128		0	40	

Sample ID: LCSD-24831	SampType: LCSD	TestCode: 8270_S_PAH	Units: mg/Kg	Prep Date: 11/5/2017	RunNo: 65335						
Client ID: LCSS02	Batch ID: 24831-2	TestNo: SW8270C		Analysis Date: 11/6/2017	SeqNo: 1615387						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2-Methylnaphthalene	2.37	0.0600	3.300	0	71.9	59.8	105	2.414	1.78	40	
Acenaphthene	2.32	0.0600	3.300	0	70.4	56.4	104	2.334	0.515	40	
Acenaphthylene	2.19	0.0600	3.300	0	66.4	51.9	109	2.203	0.455	40	
Anthracene	2.62	0.0600	3.300	0	79.3	63.1	106	2.661	1.67	40	
Benzo(a)anthracene	2.86	0.0600	3.300	0	86.5	54.3	114	2.853	0.0736	40	
Benzo(a)pyrene	2.86	0.0600	3.300	0	86.8	50.2	129	2.957	3.23	40	
Benzo(b)fluoranthene	2.88	0.0600	3.300	0	87.1	40.7	122	2.996	4.11	40	
Benzo(k)fluoranthene	2.48	0.0600	3.300	0	75.1	50.3	121	2.542	2.59	40	
Chrysene	2.83	0.0600	3.300	0	85.9	51.2	119	2.870	1.24	40	

**Qualifiers:**

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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24831-2

Sample ID: <b>LCS-D-24831</b>	SampType: <b>LCS-D</b>	TestCode: <b>8270_S_PAH</b>	Units: <b>mg/Kg</b>	Prep Date: <b>11/5/2017</b>	RunNo: <b>65335</b>						
Client ID: <b>LCS02</b>	Batch ID: <b>24831-2</b>	TestNo: <b>SW8270C</b>		Analysis Date: <b>11/6/2017</b>	SeqNo: <b>1615387</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dibenz(a,h)anthracene	2.68	0.0600	3.300	0	81.1	37.2	136	2.774	3.54	40	
Fluoranthene	2.67	0.0600	3.300	0	80.8	65.1	102	2.671	0.135	40	
Fluorene	2.30	0.0600	3.300	0	69.8	56.7	104	2.319	0.657	40	
Indeno(1,2,3-cd)pyrene	2.72	0.0600	3.300	0	82.5	29.1	140	2.780	2.12	40	
Naphthalene	2.45	0.0600	3.300	0	74.3	67.6	105	2.495	1.81	40	
Phenanthrene	2.59	0.0600	3.300	0	78.6	67.3	105	2.600	0.293	40	
Pyrene	2.82	0.0600	3.300	0	85.4	55.1	136	2.862	1.56	40	
Surr: 4-Terphenyl-d14	2.04		1.667		122	29.1	128		0	40	

Sample ID: <b>LCS-24831</b>	SampType: <b>LCS</b>	TestCode: <b>8270_S_PAH</b>	Units: <b>mg/Kg</b>	Prep Date: <b>11/5/2017</b>	RunNo: <b>65335</b>						
Client ID: <b>LCS</b>	Batch ID: <b>24831-2</b>	TestNo: <b>SW8270C</b>		Analysis Date: <b>11/6/2017</b>	SeqNo: <b>1615388</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2-Methylnaphthalene	2.41	0.0600	3.300	0	73.1	59.8	105				
Acenaphthene	2.33	0.0600	3.300	0	70.7	56.4	104				
Acenaphthylene	2.20	0.0600	3.300	0	66.7	51.9	109				
Anthracene	2.66	0.0600	3.300	0	80.6	63.1	106				
Benzo(a)anthracene	2.85	0.0600	3.300	0	86.5	54.3	114				
Benzo(a)pyrene	2.96	0.0600	3.300	0	89.6	50.2	129				
Benzo(b)fluoranthene	3.00	0.0600	3.300	0	90.8	40.7	122				
Benzo(k)fluoranthene	2.54	0.0600	3.300	0	77.0	50.3	121				
Chrysene	2.87	0.0600	3.300	0	87.0	51.2	119				
Dibenz(a,h)anthracene	2.77	0.0600	3.300	0	84.1	37.2	136				
Fluoranthene	2.67	0.0600	3.300	0	80.9	65.1	102				
Fluorene	2.32	0.0600	3.300	0	70.3	56.7	104				

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24831-2

Sample ID: <b>LCS-24831</b>	SampType: <b>LCS</b>	TestCode: <b>8270_S_PAH</b>	Units: <b>mg/Kg</b>	Prep Date: <b>11/5/2017</b>	RunNo: <b>65335</b>						
Client ID: <b>LCSS</b>	Batch ID: <b>24831-2</b>	TestNo: <b>SW8270C</b>		Analysis Date: <b>11/6/2017</b>	SeqNo: <b>1615388</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Indeno(1,2,3-cd)pyrene	2.78	0.0600	3.300	0	84.2	29.1	140				
Naphthalene	2.50	0.0600	3.300	0	75.6	67.6	105				
Phenanthrene	2.60	0.0600	3.300	0	78.8	67.3	105				
Pyrene	2.86	0.0600	3.300	0	86.7	55.1	136				
Surr: 4-Terphenyl-d14	2.12		1.667		127	29.1	128				

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	C	Value is below Minimum Compound Limit.	H	Holding times for preparation or analysis exceed
M	Matrix Interference	ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode				



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24897

Sample ID: 17101071-007CDUP	SampType: DUP	TestCode: SAR_S	Units:	Prep Date: 11/10/2017	RunNo: 65444						
Client ID: SS-2 031-5054Z (102)	Batch ID: 24897	TestNo: LDNR 29-B	LDNR 29-B	Analysis Date: 11/10/2017	SeqNo: 1620083						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sodium Adsorption Ratio	1.22	0.10						1.22	0.15	20	
Soluble Calcium	0.91	0.02						0.89	1.61	20	
Soluble Magnesium	0.77	0.05						0.76	1.37	20	
Soluble Sodium	1.12	0.25						1.11	0.90	20	

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		



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 Website: www.element.com

# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24913

Sample ID: <b>17101058-016ADUP</b>	SampType: <b>dup</b>	TestCode: <b>ESP_S</b>	Units: %	Prep Date: <b>11/6/2017</b>	RunNo: <b>65472</b>						
Client ID: <b>ZZZZZZ</b>	Batch ID: <b>24913</b>	TestNo: <b>LDNR 29-B</b>	<b>LDNR 29-B</b>	Analysis Date: <b>11/13/2017</b>	SeqNo: <b>1620824</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Exchangeable Sodium %	19.6	0.10						19.53	0.52	20	*

Sample ID: <b>17101071-007CDUP</b>	SampType: <b>dup</b>	TestCode: <b>ESP_S</b>	Units: %	Prep Date: <b>11/6/2017</b>	RunNo: <b>65472</b>						
Client ID: <b>SS-2 031-5054Z (102)</b>	Batch ID: <b>24913</b>	TestNo: <b>LDNR 29-B</b>	<b>LDNR 29-B</b>	Analysis Date: <b>11/13/2017</b>	SeqNo: <b>1620828</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Exchangeable Sodium %	0.26	0.10						0.27	4.35	20	

**Qualifiers:**

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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** 24916

Sample ID: 17101058-016ADUP	SampType: dup	TestCode: CEC	Units: meq/100g	Prep Date: 11/6/2017	RunNo: 65471						
Client ID: ZZZZZZ	Batch ID: 24916	TestNo: LDNR 29-B	LDNR 29-B	Analysis Date: 11/13/2017	SeqNo: 1620801						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cation Exchange Capacity	42.7	0.100						39.17	8.57	20	

Sample ID: 17101071-007CDUP	SampType: dup	TestCode: CEC	Units: meq/100g	Prep Date: 11/6/2017	RunNo: 65471						
Client ID: SS-2 031-5054Z (102)	Batch ID: 24916	TestNo: LDNR 29-B	LDNR 29-B	Analysis Date: 11/13/2017	SeqNo: 1620805						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cation Exchange Capacity	9.51	0.100						9.657	1.54	20	

Sample ID: lcs-24916	SampType: lcs	TestCode: CEC	Units: meq/100g	Prep Date: 11/6/2017	RunNo: 65471						
Client ID: LCSS	Batch ID: 24916	TestNo: LDNR 29-B	LDNR 29-B	Analysis Date: 11/13/2017	SeqNo: 1620806						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cation Exchange Capacity	22.2	0.100	25.00	0	88.6	76	124				

Sample ID: lcsd-24916	SampType: lcsd	TestCode: CEC	Units: meq/100g	Prep Date: 11/6/2017	RunNo: 65471						
Client ID: LCSS02	Batch ID: 24916	TestNo: LDNR 29-B	LDNR 29-B	Analysis Date: 11/13/2017	SeqNo: 1620807						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cation Exchange Capacity	21.8	0.100	25.00	0	87.2	76	124	22.16	1.66	20	

**Qualifiers:**

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M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
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W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65133

Sample ID: <b>MB-R65133</b>	SampType: <b>MBLK</b>	TestCode: <b>TDS_2540C</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>65133</b>						
Client ID: <b>PBW</b>	Batch ID: <b>R65133</b>	TestNo: <b>SM2540C</b>		Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1611272</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Total Dissolved Solids (Residue, Filterable) < 20.0 20.0

Sample ID: <b>LCS-R65133</b>	SampType: <b>LCS</b>	TestCode: <b>TDS_2540C</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>65133</b>						
Client ID: <b>LCSW</b>	Batch ID: <b>R65133</b>	TestNo: <b>SM2540C</b>		Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1611273</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Total Dissolved Solids (Residue, Filterable) 988 20.0 1,000 0 98.8 85 115

Sample ID: <b>LCSD-R65133</b>	SampType: <b>LCSD</b>	TestCode: <b>TDS_2540C</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>65133</b>						
Client ID: <b>LCSS02</b>	Batch ID: <b>R65133</b>	TestNo: <b>SM2540C</b>		Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1611274</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Total Dissolved Solids (Residue, Filterable) 993 20.0 1,000 0 99.3 85 115 988.0 0.505 10

Sample ID: <b>17101050-008ADUP</b>	SampType: <b>DUP</b>	TestCode: <b>TDS_2540C</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>65133</b>						
Client ID: <b>ZZZZZ</b>	Batch ID: <b>R65133</b>	TestNo: <b>SM2540C</b>		Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1611277</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Total Dissolved Solids (Residue, Filterable) 21,900 2,000 22,000 0.456 10

**Qualifiers:**

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W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65133

Sample ID: 17101050-008ADUP	SampType: DUP	TestCode: TDS_2540C	Units: mg/L	Prep Date:	RunNo: 65133						
Client ID: ZZZZZZ	Batch ID: R65133	TestNo: SM2540C		Analysis Date: 10/30/2017	SeqNo: 1611277						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID: 17101050-012ADUP	SampType: DUP	TestCode: TDS_2540C	Units: mg/L	Prep Date:	RunNo: 65133						
Client ID: ZZZZZZ	Batch ID: R65133	TestNo: SM2540C		Analysis Date: 10/30/2017	SeqNo: 1611282						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filterable)	2,720	100						2,755	1.46	10	

**Qualifiers:**

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W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65167

Sample ID: <b>17100693-002AMS</b>	SampType: <b>MS</b>	TestCode: <b>VPH_S_REC</b>	Units: <b>mg/Kg</b>	Prep Date:	RunNo: <b>65167</b>						
Client ID: <b>ZZZZZ</b>	Batch ID: <b>R65167</b>	TestNo: <b>Mod. MAVPH</b>	Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1610208</b>							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

C8-C10 Aromatics	342	21.8	217.6	131.3	96.8	70	130				
Surr: 2,5-Dibromotoluene (PID)	232		193.4		120	70	130				

Sample ID: <b>17100693-002AMSD</b>	SampType: <b>MSD</b>	TestCode: <b>VPH_S_REC</b>	Units: <b>mg/Kg</b>	Prep Date:	RunNo: <b>65167</b>						
Client ID: <b>ZZZZZ</b>	Batch ID: <b>R65167</b>	TestNo: <b>Mod. MAVPH</b>	Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1610209</b>							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

C8-C10 Aromatics	339	21.8	217.6	131.3	95.3	70	130	342.0	0.966	50	
Surr: 2,5-Dibromotoluene (PID)	231		193.4		119	70	130		0	50	

Sample ID: <b>LCS VPH</b>	SampType: <b>LCS</b>	TestCode: <b>VPH_S_REC</b>	Units: <b>mg/Kg</b>	Prep Date:	RunNo: <b>65167</b>						
Client ID: <b>LCSS</b>	Batch ID: <b>R65167</b>	TestNo: <b>Mod. MAVPH</b>	Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1610215</b>							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

C8-C10 Aromatics	126	11.2	112.5	0	112	70	130				
Surr: 2,5-Dibromotoluene (PID)	112		100.0		112	70	130				

Sample ID: <b>LCSD VPH</b>	SampType: <b>LCSD</b>	TestCode: <b>VPH_S_REC</b>	Units: <b>mg/Kg</b>	Prep Date:	RunNo: <b>65167</b>						
Client ID: <b>LCSS02</b>	Batch ID: <b>R65167</b>	TestNo: <b>Mod. MAVPH</b>	Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1610216</b>							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

C8-C10 Aromatics	119	11.2	112.5	0	106	70	130	126.0	5.46	25	
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**Qualifiers:**

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M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		





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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65167

Sample ID: <b>LCSD VPH</b>	SampType: <b>LCSD</b>	TestCode: <b>VPH_S_REC</b>	Units: <b>mg/Kg</b>	Prep Date:	RunNo: <b>65167</b>						
Client ID: <b>LCSS02</b>	Batch ID: <b>R65167</b>	TestNo: <b>Mod. MAVPH</b>		Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1610216</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Surr: 2,5-Dibromotoluene (PID)	112		100.0		112	70	130		0	25	
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Sample ID: <b>MB- MEOH</b>	SampType: <b>MBLK</b>	TestCode: <b>VPH_S_REC</b>	Units: <b>mg/Kg</b>	Prep Date:	RunNo: <b>65167</b>						
Client ID: <b>PBS</b>	Batch ID: <b>R65167</b>	TestNo: <b>Mod. MAVPH</b>		Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1610217</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

C8-C10 Aromatics	< 11.2	11.2									
Surr: 2,5-Dibromotoluene (PID)	87.9		100.0		87.9	70	130				

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
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W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65168

Sample ID: <b>LCS VPH</b>	SampType: <b>LCS</b>	TestCode: <b>VPH_W_REC</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>65168</b>						
Client ID: <b>LCSW</b>	Batch ID: <b>R65168</b>	TestNo: <b>MAVPH</b>		Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1610220</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

C8-C10 Aromatics	0.252	0.0225	0.2250	0	112	70	130				
Surr: 2,5-Dibromotoluene (PID)	0.223		0.2000		112	70	130				

Sample ID: <b>LCSD VPH</b>	SampType: <b>LCSD</b>	TestCode: <b>VPH_W_REC</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>65168</b>						
Client ID: <b>LCSS02</b>	Batch ID: <b>R65168</b>	TestNo: <b>MAVPH</b>		Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1610221</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

C8-C10 Aromatics	0.239	0.0225	0.2250	0	106	70	130	0.2520	5.46	25
Surr: 2,5-Dibromotoluene (PID)	0.224		0.2000		112	70	130		0	25

Sample ID: <b>MB- ACID</b>	SampType: <b>MBLK</b>	TestCode: <b>VPH_W_REC</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>65168</b>						
Client ID: <b>PBW</b>	Batch ID: <b>R65168</b>	TestNo: <b>MAVPH</b>		Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1610222</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

C8-C10 Aromatics	< 0.0225	0.0225									
Surr: 2,5-Dibromotoluene (PID)	0.165		0.2000		82.7	70	130				

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
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W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65169

Sample ID: <b>LCS VPH</b>	SampType: <b>LCS</b>	TestCode: <b>VPH_W_REC</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>65169</b>						
Client ID: <b>LCSW</b>	Batch ID: <b>R65169</b>	TestNo: <b>MAVPH</b>		Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1610226</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

C6-C8 Aliphatics	0.192	0.0200	0.1500	0	128	70	130				
C8-C10 Aliphatics	0.101	0.0200	0.1000	0	101	70	130				
Surr: 2,5-Dibromotoluene (FID)	0.227		0.2000		114	70	130				

Sample ID: <b>LCSD VPH</b>	SampType: <b>LCSD</b>	TestCode: <b>VPH_W_REC</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>65169</b>						
Client ID: <b>LCSS02</b>	Batch ID: <b>R65169</b>	TestNo: <b>MAVPH</b>		Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1610226</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

C6-C8 Aliphatics	0.174	0.0200	0.1500	0	116	70	130	0.1915	9.40	25
C8-C10 Aliphatics	0.0989	0.0200	0.1000	0	98.9	70	130	0.1009	2.00	25
Surr: 2,5-Dibromotoluene (FID)	0.228		0.2000		114	70	130		0	25

Sample ID: <b>MB- ACID</b>	SampType: <b>MBLK</b>	TestCode: <b>VPH_W_REC</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>65169</b>						
Client ID: <b>PBW</b>	Batch ID: <b>R65169</b>	TestNo: <b>MAVPH</b>		Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1610227</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

C6-C8 Aliphatics	< 0.0200	0.0200									
C8-C10 Aliphatics	< 0.0200	0.0200									
Surr: 2,5-Dibromotoluene (FID)	0.168		0.2000		83.9	70	130				

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
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W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65170

Sample ID: <b>17100693-002AMS</b>	SampType: <b>MS</b>	TestCode: <b>VPH_S_REC</b>	Units: <b>mg/Kg</b>	Prep Date:	RunNo: <b>65170</b>						
Client ID: <b>ZZZZZ</b>	Batch ID: <b>R65170</b>	TestNo: <b>Mod. MAVPH</b>	Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1610229</b>							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

C6-C8 Aliphatics	181	19.3	145.1	31.33	103	70	130				
C8-C10 Aliphatics	90.4	19.3	96.71	14.99	78.0	70	130				
Surr: 2,5-Dibromotoluene (FID)	238		193.4		123	70	130				

Sample ID: <b>17100693-002AMSD</b>	SampType: <b>MSD</b>	TestCode: <b>VPH_S_REC</b>	Units: <b>mg/Kg</b>	Prep Date:	RunNo: <b>65170</b>						
Client ID: <b>ZZZZZ</b>	Batch ID: <b>R65170</b>	TestNo: <b>Mod. MAVPH</b>	Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1610230</b>							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

C6-C8 Aliphatics	170	19.3	145.1	31.33	95.9	70	130	181.1	6.11	50	
C8-C10 Aliphatics	92.0	19.3	96.71	14.99	79.6	70	130	90.43	1.70	50	
Surr: 2,5-Dibromotoluene (FID)	237		193.4		122	70	130		0	50	

Sample ID: <b>LCS VPH</b>	SampType: <b>LCS</b>	TestCode: <b>VPH_S_REC</b>	Units: <b>mg/Kg</b>	Prep Date:	RunNo: <b>65170</b>						
Client ID: <b>LCSS</b>	Batch ID: <b>R65170</b>	TestNo: <b>Mod. MAVPH</b>	Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1610236</b>							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

C6-C8 Aliphatics	95.8	10.0	75.00	0	128	70	130				
C8-C10 Aliphatics	50.4	10.0	50.00	0	101	70	130				
Surr: 2,5-Dibromotoluene (FID)	114		100.0		114	70	130				

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		





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 Website: www.element.com

# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65170

Sample ID: <b>LCSD VPH</b>	SampType: <b>LCSD</b>	TestCode: <b>VPH_S_REC</b>	Units: <b>mg/Kg</b>	Prep Date:	RunNo: <b>65170</b>						
Client ID: <b>LCSS02</b>	Batch ID: <b>R65170</b>	TestNo: <b>Mod. MAVPH</b>		Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1610237</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

C6-C8 Aliphatics	87.2	10.0	75.00	0	116	70	130	95.75	9.40	25	
C8-C10 Aliphatics	49.4	10.0	50.00	0	98.9	70	130	50.45	2.00	25	
Surr: 2,5-Dibromotoluene (FID)	114		100.0		114	70	130		0	25	

Sample ID: <b>MB- MEOH</b>	SampType: <b>MBLK</b>	TestCode: <b>VPH_S_REC</b>	Units: <b>mg/Kg</b>	Prep Date:	RunNo: <b>65170</b>						
Client ID: <b>PBS</b>	Batch ID: <b>R65170</b>	TestNo: <b>Mod. MAVPH</b>		Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1610238</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

C6-C8 Aliphatics	< 10.0	10.0									
C8-C10 Aliphatics	< 10.0	10.0									
Surr: 2,5-Dibromotoluene (FID)	88.4		100.0		88.4	70	130				

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65174

Sample ID: <b>MB</b>	SampType: <b>MBLK</b>	TestCode: <b>8260_W_BTE</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>65174</b>						
Client ID: <b>PBW</b>	Batch ID: <b>R65174</b>	TestNo: <b>SW8260B</b>		Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1610257</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	< 0.00500	0.00500									
Ethylbenzene	< 0.00500	0.00500									
Toluene	< 0.00500	0.00500									
Xylenes, Total	< 0.0150	0.0150									
Surr: 4-Bromofluorobenzene	0.0352		0.03000		117	65.1	136				
Surr: Dibromofluoromethane	0.0278		0.03000		92.6	40.4	143				
Surr: Toluene-d8	0.0274		0.03000		91.4	58.2	127				

Sample ID: <b>LCSD 17221A-3</b>	SampType: <b>LCSD</b>	TestCode: <b>8260_W_BTE</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>65174</b>						
Client ID: <b>LCSS02</b>	Batch ID: <b>R65174</b>	TestNo: <b>SW8260B</b>		Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1610260</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	0.0404	0.00500	0.05000	0	80.8	67.8	125	0.04566	12.2	20	
Ethylbenzene	0.0523	0.00500	0.05000	0	105	76.9	118	0.05582	6.43	20	
Toluene	0.0444	0.00500	0.05000	0	88.8	73.3	120	0.04794	7.69	20	
Xylenes, Total	0.149	0.0150	0.1500	0	99.1	79.8	120	0.1589	6.70	20	
Surr: 4-Bromofluorobenzene	0.0373		0.03000		124	65.1	136		0	20	
Surr: Dibromofluoromethane	0.0247		0.03000		82.2	40.4	143		0	20	
Surr: Toluene-d8	0.0267		0.03000		88.9	58.2	127		0	20	

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65174

Sample ID: <b>LCS 17221A-30</b>	SampType: <b>LCS</b>	TestCode: <b>8260_W_BTE</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>65174</b>						
Client ID: <b>LCSW</b>	Batch ID: <b>R65174</b>	TestNo: <b>SW8260B</b>	Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1610261</b>							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	0.0457	0.00500	0.05000	0	91.3	67.8	125				
Ethylbenzene	0.0558	0.00500	0.05000	0	112	76.9	118				
Toluene	0.0479	0.00500	0.05000	0	95.9	73.3	120				
Xylenes, Total	0.159	0.0150	0.1500	0	106	80	120				
Surr: 4-Bromofluorobenzene	0.0367		0.03000		122	65.1	136				
Surr: Dibromofluoromethane	0.0253		0.03000		84.2	40.4	143				
Surr: Toluene-d8	0.0266		0.03000		88.7	58.2	127				

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	C	Value is below Minimum Compound Limit.	H	Holding times for preparation or analysis exceed
M	Matrix Interference	ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode				



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65175

Sample ID: <b>MB MEOH</b>	SampType: <b>MBLK</b>	TestCode: <b>8260_S_BTE</b>	Units: <b>mg/Kg</b>	Prep Date:	RunNo: <b>65175</b>						
Client ID: <b>PBS</b>	Batch ID: <b>R65175</b>	TestNo: <b>SW8260B</b>		Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1610262</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	< 0.0400	0.0400									
Ethylbenzene	< 0.250	0.250									
Toluene	< 0.250	0.250									
Xylenes, Total	< 0.750	0.750									
Surr: 1,2-Dichlorobenzene-d4	4.29		5.000		85.8	56.1	140				
Surr: 4-Bromofluorobenzene	1.80		1.500		120	55.7	152				
Surr: Dibromofluoromethane	1.24		1.500		82.9	57.3	120				
Surr: Toluene-d8	1.32		1.500		87.9	63.1	120				

Sample ID: <b>LCSD 17221A-3</b>	SampType: <b>LCSD</b>	TestCode: <b>8260_S_BTE</b>	Units: <b>mg/Kg</b>	Prep Date:	RunNo: <b>65175</b>						
Client ID: <b>LCSS02</b>	Batch ID: <b>R65175</b>	TestNo: <b>SW8260B</b>		Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1610264</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	2.02	0.0400	2.500	0	80.8	71.1	120	2.283	12.2	20	
Ethylbenzene	2.62	0.250	2.500	0	105	80	120	2.791	6.43	20	
Toluene	2.22	0.250	2.500	0	88.8	75.6	120	2.397	7.69	20	
Xylenes, Total	7.43	0.750	7.500	0	99.1	80	120	7.945	6.70	20	
Surr: 1,2-Dichlorobenzene-d4	4.15		5.000		83.0	56.1	140		0	20	
Surr: 4-Bromofluorobenzene	1.86		1.500		124	55.7	152		0	20	
Surr: Dibromofluoromethane	1.23		1.500		82.2	57.3	120		0	20	
Surr: Toluene-d8	1.33		1.500		88.9	63.1	120		0	20	

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		





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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65175

Sample ID: <b>LCS 17221A-30</b>	SampType: <b>LCS</b>	TestCode: <b>8260_S_BTE</b>	Units: <b>mg/Kg</b>	Prep Date:	RunNo: <b>65175</b>						
Client ID: <b>LCSS</b>	Batch ID: <b>R65175</b>	TestNo: <b>SW8260B</b>		Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1610265</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	2.28	0.0400	2.500	0	91.3	71.1	120				
Ethylbenzene	2.79	0.250	2.500	0	112	80	120				
Toluene	2.40	0.250	2.500	0	95.9	75.6	120				
Xylenes, Total	7.94	0.750	7.500	0	106	80	120				
Surr: 1,2-Dichlorobenzene-d4	4.37		5.000		87.3	56.1	140				
Surr: 4-Bromofluorobenzene	1.83		1.500		122	55.7	152				
Surr: Dibromofluoromethane	1.26		1.500		84.2	57.3	120				
Surr: Toluene-d8	1.33		1.500		88.7	63.1	120				

Sample ID: <b>17101071-006AMS</b>	SampType: <b>MS</b>	TestCode: <b>8260_S_BTE</b>	Units: <b>mg/Kg</b>	Prep Date: <b>10/30/2017</b>	RunNo: <b>65175</b>						
Client ID: <b>SS-1 031-5054Z (102)</b>	Batch ID: <b>R65175</b>	TestNo: <b>SW8260B</b>		Analysis Date: <b>10/30/2017</b>	SeqNo: <b>1610266</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	1.69	0.0372	2.323	0	72.7	37.9	142				
Ethylbenzene	2.12	0.232	2.323	0	91.2	78.4	120				
Toluene	1.81	0.232	2.323	0	77.9	80	120				SM
Xylenes, Total	6.07	0.697	6.970	0	87.1	80	120				
Surr: 1,2-Dichlorobenzene-d4	3.05		4.647		65.6	56.1	140				
Surr: 4-Bromofluorobenzene	1.65		1.394		118	55.7	152				
Surr: Dibromofluoromethane	1.06		1.394		76.2	57.3	120				
Surr: Toluene-d8	1.18		1.394		84.6	63.1	120				

**NOTES:**

Note: The matrix spike duplicate was lost during analysis due to instrument error. The method is in control according to the LCS/LCSD.

<b>Qualifiers:</b>	* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M	Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65180

Sample ID: 17101083-002ADUP	SampType: DUP	TestCode: PH_4500H-B	Units: S.U.	Prep Date:	RunNo: 65180						
Client ID: ZZZZZZ	Batch ID: R65180	TestNo: SM4500H-B		Analysis Date: 10/31/2017	SeqNo: 1610330						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
pH	6.20	1.68						6.18	0.32	20	H

Sample ID: LCS-R65180	SampType: LCS	TestCode: PH_4500H-B	Units: S.U.	Prep Date:	RunNo: 65180						
Client ID: LCSW	Batch ID: R65180	TestNo: SM4500H-B		Analysis Date: 10/31/2017	SeqNo: 1610331						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
pH	7.00	1.68	7.00	0	100	97	103				

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65185

Sample ID: <b>MB MEOH</b>	SampType: <b>MBLK</b>	TestCode: <b>8260_S_BTE</b>	Units: <b>mg/Kg</b>	Prep Date:	RunNo: <b>65185</b>						
Client ID: <b>PBS</b>	Batch ID: <b>R65185</b>	TestNo: <b>SW8260B</b>		Analysis Date: <b>10/31/2017</b>	SeqNo: <b>1611682</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	< 0.0400	0.0400									
Ethylbenzene	< 0.250	0.250									
Toluene	< 0.250	0.250									
Xylenes, Total	< 0.750	0.750									
Surr: 1,2-Dichlorobenzene-d4	4.22		5.000		84.3	56.1	140				
Surr: 4-Bromofluorobenzene	1.82		1.500		121	55.7	152				
Surr: Dibromofluoromethane	1.27		1.500		84.3	57.3	120				
Surr: Toluene-d8	1.30		1.500		86.6	63.1	120				

Sample ID: <b>LCSD 17221A-3</b>	SampType: <b>LCSD</b>	TestCode: <b>8260_S_BTE</b>	Units: <b>mg/Kg</b>	Prep Date:	RunNo: <b>65185</b>						
Client ID: <b>LCSS02</b>	Batch ID: <b>R65185</b>	TestNo: <b>SW8260B</b>		Analysis Date: <b>10/31/2017</b>	SeqNo: <b>1611685</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	1.92	0.0400	2.500	0	76.8	71.1	120	2.096	8.76	20	
Ethylbenzene	2.38	0.250	2.500	0	95.2	80	120	2.610	9.28	20	
Toluene	2.06	0.250	2.500	0	82.3	75.6	120	2.254	9.14	20	
Xylenes, Total	6.86	0.750	7.500	0	91.5	80	120	7.415	7.70	20	
Surr: 1,2-Dichlorobenzene-d4	4.01		5.000		80.1	56.1	140		0	20	
Surr: 4-Bromofluorobenzene	1.87		1.500		125	55.7	152		0	20	
Surr: Dibromofluoromethane	1.19		1.500		79.5	57.3	120		0	20	
Surr: Toluene-d8	1.32		1.500		88.1	63.1	120		0	20	

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65185

Sample ID: <b>LCS 17221A-30</b>	SampType: <b>LCS</b>	TestCode: <b>8260_S_BTE</b>	Units: <b>mg/Kg</b>	Prep Date:	RunNo: <b>65185</b>						
Client ID: <b>LCSS</b>	Batch ID: <b>R65185</b>	TestNo: <b>SW8260B</b>		Analysis Date: <b>10/31/2017</b>	SeqNo: <b>1611686</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	2.10	0.0400	2.500	0	83.8	71.1	120				
Ethylbenzene	2.61	0.250	2.500	0	104	80	120				
Toluene	2.25	0.250	2.500	0	90.1	75.6	120				
Xylenes, Total	7.42	0.750	7.500	0	98.9	80	120				
Surr: 1,2-Dichlorobenzene-d4	4.24		5.000		84.7	56.1	140				
Surr: 4-Bromofluorobenzene	1.82		1.500		122	55.7	152				
Surr: Dibromofluoromethane	1.16		1.500		77.6	57.3	120				
Surr: Toluene-d8	1.33		1.500		88.5	63.1	120				

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	C	Value is below Minimum Compound Limit.	H	Holding times for preparation or analysis exceed
M	Matrix Interference	ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode				





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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65222

Sample ID: <b>MB-R65222</b>	SampType: <b>MBLK</b>	TestCode: <b>HEM_S</b>	Units: <b>% dry wt</b>	Prep Date:	RunNo: <b>65222</b>						
Client ID: <b>PBS</b>	Batch ID: <b>R65222</b>	TestNo: <b>SW9071B</b>		Analysis Date: <b>11/2/2017</b>	SeqNo: <b>1613160</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

HEM, Oil & Grease

< 0.05 0.05

Sample ID: <b>LCS-R65222</b>	SampType: <b>LCS</b>	TestCode: <b>HEM_S</b>	Units: <b>% dry wt</b>	Prep Date:	RunNo: <b>65222</b>						
Client ID: <b>LCSS</b>	Batch ID: <b>R65222</b>	TestNo: <b>SW9071B</b>		Analysis Date: <b>11/2/2017</b>	SeqNo: <b>1613161</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

HEM, Oil & Grease

0.16 0.05 0.20 0 81.8 70 130

Sample ID: <b>LCSD-R65222</b>	SampType: <b>LCSD</b>	TestCode: <b>HEM_S</b>	Units: <b>% dry wt</b>	Prep Date:	RunNo: <b>65222</b>						
Client ID: <b>LCSS02</b>	Batch ID: <b>R65222</b>	TestNo: <b>SW9071B</b>		Analysis Date: <b>11/2/2017</b>	SeqNo: <b>1613162</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

HEM, Oil & Grease

0.22 0.05 0.20 0 108 70 130 0.16 27.4 40

Sample ID: <b>17101071-007CMS</b>	SampType: <b>MS</b>	TestCode: <b>HEM_S</b>	Units: <b>% dry wt</b>	Prep Date:	RunNo: <b>65222</b>						
Client ID: <b>SS-2 031-5054Z (102)</b>	Batch ID: <b>R65222</b>	TestNo: <b>SW9071B</b>		Analysis Date: <b>11/2/2017</b>	SeqNo: <b>1613163</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

HEM, Oil & Grease

0.24 0.05 0.21 0.05 91.5 70 130

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
- C Value is below Minimum Compound Limit.
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceed
- RL Reporting Limit
- U Analyte not detected



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 Website: www.element.com

# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65222

Sample ID: 17101071-007CDUP	SampType: DUP	TestCode: HEM_S	Units: % dry wt	Prep Date:	RunNo: 65222						
Client ID: SS-2 031-5054Z (102)	Batch ID: R65222	TestNo: SW9071B		Analysis Date: 11/2/2017	SeqNo: 1613164						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
HEM, Oil & Grease	< 0.05	0.05						0	0	40	

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65243

Sample ID: <b>MBLK</b>	SampType: <b>MBLK</b>	TestCode: <b>9056_W</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>65243</b>						
Client ID: <b>PBW</b>	Batch ID: <b>R65243</b>	TestNo: <b>SW9056A</b>		Analysis Date: <b>11/2/2017</b>	SeqNo: <b>1613517</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Chloride < 0.250 0.250

Sample ID: <b>LCS</b>	SampType: <b>LCS</b>	TestCode: <b>9056_W</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>65243</b>						
Client ID: <b>LCSW</b>	Batch ID: <b>R65243</b>	TestNo: <b>SW9056A</b>		Analysis Date: <b>11/2/2017</b>	SeqNo: <b>1613518</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Chloride 10.2 0.250 10.00 0 102 80 120

Sample ID: <b>LCSD</b>	SampType: <b>LCSD</b>	TestCode: <b>9056_W</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>65243</b>						
Client ID: <b>LCSS02</b>	Batch ID: <b>R65243</b>	TestNo: <b>SW9056A</b>		Analysis Date: <b>11/2/2017</b>	SeqNo: <b>1613519</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Chloride 10.2 0.250 10.00 0 102 80 120 10.24 0.104 15

Sample ID: <b>17101053-005AMS</b>	SampType: <b>MS</b>	TestCode: <b>9056_W</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>65243</b>						
Client ID: <b>ZZZZZZ</b>	Batch ID: <b>R65243</b>	TestNo: <b>SW9056A</b>		Analysis Date: <b>11/2/2017</b>	SeqNo: <b>1613541</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Chloride 100 2.50 50.00 47.62 105 80 120

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65243

Sample ID: 17101053-005AMSD	SampType: MSD	TestCode: 9056_W	Units: mg/L	Prep Date:	RunNo: 65243						
Client ID: ZZZZZZ	Batch ID: R65243	TestNo: SW9056A		Analysis Date: 11/2/2017	SeqNo: 1613542						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	101	2.50	50.00	47.62	107	80	120	100.0	0.914	15	

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65253

Sample ID: <b>MB-R65253</b>	SampType: <b>MBLK</b>	TestCode: <b>ALK</b>	Units: <b>mgCaCO3/L</b>	Prep Date:	RunNo: <b>65253</b>						
Client ID: <b>PBW</b>	Batch ID: <b>R65253</b>	TestNo: <b>SM2320 B</b>		Analysis Date: <b>11/3/2017</b>	SeqNo: <b>1613938</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Alkalinity, Bicarbonate (As CaCO3) < 10.0 10.0  
 Alkalinity, Carbonate (As CaCO3) < 10.0 10.0  
 Alkalinity, Total (As CaCO3) < 10.0 10.0

Sample ID: <b>LCS-R65253</b>	SampType: <b>LCS</b>	TestCode: <b>ALK</b>	Units: <b>mgCaCO3/L</b>	Prep Date:	RunNo: <b>65253</b>						
Client ID: <b>LCSW</b>	Batch ID: <b>R65253</b>	TestNo: <b>SM2320 B</b>		Analysis Date: <b>11/3/2017</b>	SeqNo: <b>1613939</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Alkalinity, Total (As CaCO3) 42.5 10.0 50.00 0 85.0 80 120

Sample ID: <b>17101058-019DDUP</b>	SampType: <b>DUP</b>	TestCode: <b>ALK</b>	Units: <b>mgCaCO3/L</b>	Prep Date:	RunNo: <b>65253</b>						
Client ID: <b>ZZZZZ</b>	Batch ID: <b>R65253</b>	TestNo: <b>SM2320 B</b>		Analysis Date: <b>11/3/2017</b>	SeqNo: <b>1613941</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Alkalinity, Bicarbonate (As CaCO3) 322 10.0 310.0 3.95 20  
 Alkalinity, Carbonate (As CaCO3) < 10.0 10.0 0 0 20  
 Alkalinity, Total (As CaCO3) 322 10.0 310.0 3.95 20

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		





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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65295

Sample ID: 17101071-007CDUP	SampType: dup	TestCode: PMOIST	Units: wt%	Prep Date:	RunNo: 65295						
Client ID: SS-2 031-5054Z (102)	Batch ID: R65295	TestNo: LDNR 29-B		Analysis Date: 10/30/2017	SeqNo: 1614431						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	7.15	1.00						6.897	3.58	20	

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65295

Sample ID: 17101071-007cdup	SampType: dup	TestCode: psolid	Units: wt%	Prep Date:	RunNo: 65295						
Client ID: SS-2 031-5054Z (102)	Batch ID: R65295	TestNo: SW9071B		Analysis Date: 10/30/2017	SeqNo: 1614452						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Solids	92.9	0.500						93.10	0.271	20	

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65301

Sample ID: <b>MBLK</b>	SampType: <b>MBLK</b>	TestCode: <b>9056_W</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>65301</b>						
Client ID: <b>PBW</b>	Batch ID: <b>R65301</b>	TestNo: <b>SW9056A</b>		Analysis Date: <b>11/6/2017</b>	SeqNo: <b>1615153</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sulfate < 0.250 0.250

Sample ID: <b>LCS</b>	SampType: <b>LCS</b>	TestCode: <b>9056_W</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>65301</b>						
Client ID: <b>LCSW</b>	Batch ID: <b>R65301</b>	TestNo: <b>SW9056A</b>		Analysis Date: <b>11/6/2017</b>	SeqNo: <b>1615154</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sulfate 10.5 0.250 10.00 0 105 80 120

Sample ID: <b>LCSD</b>	SampType: <b>LCSD</b>	TestCode: <b>9056_W</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>65301</b>						
Client ID: <b>LCSS02</b>	Batch ID: <b>R65301</b>	TestNo: <b>SW9056A</b>		Analysis Date: <b>11/6/2017</b>	SeqNo: <b>1615155</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sulfate 10.9 0.250 10.00 0 109 80 120 10.47 4.08 15

Sample ID: <b>17110115-001DMS</b>	SampType: <b>MS</b>	TestCode: <b>9056_W</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>65301</b>						
Client ID: <b>ZZZZZZ</b>	Batch ID: <b>R65301</b>	TestNo: <b>SW9056A</b>		Analysis Date: <b>11/6/2017</b>	SeqNo: <b>1615178</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sulfate 255 12.5 250.0 0 102 80 120

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65301

Sample ID: 17110115-001DMSD	SampType: MSD	TestCode: 9056_W	Units: mg/L	Prep Date:	RunNo: 65301						
Client ID: ZZZZZZ	Batch ID: R65301	TestNo: SW9056A		Analysis Date: 11/6/2017	SeqNo: 1615179						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	259	12.5	250.0	0	104	80	120	255.5	1.47	15	

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65375

Sample ID: <b>MB-R65375</b>	SampType: <b>MBLK</b>	TestCode: <b>EC_S</b>	Units: <b>mmhos/cm</b>	Prep Date:	RunNo: <b>65375</b>						
Client ID: <b>PBS</b>	Batch ID: <b>R65375</b>	TestNo: <b>LDNR 29-B</b>		Analysis Date: <b>11/9/2017</b>	SeqNo: <b>1616800</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Electrical Conductivity < 0.10 0.10

Sample ID: <b>LCS1-R65375</b>	SampType: <b>LCS1</b>	TestCode: <b>EC_S</b>	Units: <b>mmhos/cm</b>	Prep Date:	RunNo: <b>65375</b>						
Client ID: <b>ZZZZZ</b>	Batch ID: <b>R65375</b>	TestNo: <b>LDNR 29-B</b>		Analysis Date: <b>11/9/2017</b>	SeqNo: <b>1616801</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Electrical Conductivity 0.44 0.10 0.46 0 95.5 90.06 109.93

Sample ID: <b>LCS2-R65375</b>	SampType: <b>LCS2</b>	TestCode: <b>EC_S</b>	Units: <b>mmhos/cm</b>	Prep Date:	RunNo: <b>65375</b>						
Client ID: <b>ZZZZZ</b>	Batch ID: <b>R65375</b>	TestNo: <b>LDNR 29-B</b>		Analysis Date: <b>11/9/2017</b>	SeqNo: <b>1616802</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Electrical Conductivity 48.3 0.10 53.00 0 91.1 90 110

Sample ID: <b>17101071-007CDUP</b>	SampType: <b>DUP</b>	TestCode: <b>EC_S</b>	Units: <b>mmhos/cm</b>	Prep Date:	RunNo: <b>65375</b>						
Client ID: <b>SS-2 031-5054Z (102</b>	Batch ID: <b>R65375</b>	TestNo: <b>LDNR 29-B</b>		Analysis Date: <b>11/9/2017</b>	SeqNo: <b>1616805</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Electrical Conductivity 0.32 0.10 0.32 0.94 20

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		





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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65375

Sample ID: 17101112-001ADUP	SampType: DUP	TestCode: EC_S	Units: mmhos/cm	Prep Date:	RunNo: 65375						
Client ID: ZZZZZZ	Batch ID: R65375	TestNo: LDNR 29-B		Analysis Date: 11/9/2017	SeqNo: 1616811						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Electrical Conductivity	0.15	0.10						0.18	19.7	20	

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 17101071  
 29-Nov-17

**Client:** Michael Pisani & Associates Inc  
**Project:** 191-01 Grand Cane

**BatchID:** R65379

Sample ID: <b>LCS-R65379</b>	SampType: <b>LCS</b>	TestCode: <b>PH_S</b>	Units: <b>S.U.</b>	Prep Date:	RunNo: <b>65379</b>						
Client ID: <b>LCSS</b>	Batch ID: <b>R65379</b>	TestNo: <b>LDNR 29-B</b>		Analysis Date: <b>11/9/2017</b>	SeqNo: <b>1616982</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

pH Measurement                      7.04                      1.68                      7.00                      0                      101                      97.14                      102.86

Sample ID: <b>17101071-007CDUP</b>	SampType: <b>DUP</b>	TestCode: <b>PH_S</b>	Units: <b>S.U.</b>	Prep Date:	RunNo: <b>65379</b>						
Client ID: <b>SS-2 031-5054Z (102)</b>	Batch ID: <b>R65379</b>	TestNo: <b>LDNR 29-B</b>		Analysis Date: <b>11/9/2017</b>	SeqNo: <b>1616987</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

pH Measurement                      4.90                      1.68                                                                                                                                                    4.94                      0.81                      20                      C

**Qualifiers:**

* Value exceeds Maximum Contaminant Level.	C Value is below Minimum Compound Limit.	H Holding times for preparation or analysis exceed
M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
W Sample container temperature is out of limit as specified at testcode		

Client Name: **M\_PISANI\_HOU**

Work Order Number: **17101071**

RcptNo: **1**

Logged by:	<b>Danielle Hollier</b>	<b>10/30/2017 9:30:00 AM</b>	<i>Danielle Hollier</i>
Completed By:	<b>Danielle Hollier</b>	<b>10/30/2017 3:20:53 PM</b>	<i>Danielle Hollier</i>
Reviewed By:	<b>Caitlin Duplantis</b>	<b>10/30/2017 3:26:55 PM</b>	<i>Caitlin Duplantis</i>

**Chain of Custody**

1. Is Chain of Custody complete? Yes  No  Not Present   
 2. How was the sample delivered? Element

**Log In**

3. Coolers are present? Yes  No  NA   
 4. Shipping container/cooler in good condition? Yes  No   
 Custody seals intact on shipping container/cooler? Yes  No  Not Present   
 No. Seal Date: Signed By:  
 5. Was an attempt made to cool the samples? Yes  No  NA   
 6. Were all samples received at a temperature of >0° C to 6.0°C Yes  No  NA   
 7. Sample(s) in proper container(s)? Yes  No   
 8. Sufficient sample volume for indicated test(s)? Yes  No   
 9. Are samples (except VOA and ONG) properly preserved? Yes  No   
 10. Was preservative added to bottles? Yes  No  NA   
 11. Is the headspace in the VOA vials less than 1/4 inch or 6 mm? Yes  No  No VOA Vials   
 12. Were any sample containers received broken? Yes  No   
 13. Does paperwork match bottle labels? Yes  No   
 (Note discrepancies on chain of custody)  
 14. Are matrices correctly identified on Chain of Custody? Yes  No   
 15. Is it clear what analyses were requested? Yes  No   
 16. Were all holding times able to be met? Yes  No   
 (If no, notify customer for authorization.)

**Special Handling (if applicable)**

17. Was client notified of all discrepancies with this order? Yes  No  NA

Person Notified:	<input type="text" value="Anna Fix"/>	Date:	<input type="text" value="10/30/2017"/>
By Whom:	<input type="text" value="Caitlin Duplantis"/>	Via:	<input checked="" type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	<input type="text" value="Field Blank not received."/>		
Client Instructions:	<input type="text" value="Please revise COC from Field Blank to Trip Blank. Hold for analysis."/>		

18. Additional remarks:

See attached email for instruction regarding the gas samples submitted. On 10/30/17, the samples listing 031-05505Z were corrected to 031-5055Z, as per Dave Angle via phone.

**Cooler Information**



Element Materials Technology Lafayette  
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# Sample Log-In Check List

Client Name: **M\_PISANI\_HOU**

Work Order Number: **17101071**

RcptNo: **1**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	0.3	Good	Not Present			



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 Scott, LA  
 70583-5301 USA

P 337 232 3568  
 F 337 232 3621  
 T 888 786 7555  
 info.scott@element.com  
 element.com

GAS ANALYSIS REPORT NO.: 4-110917-6 (402343)

DATE: 11/09/17

FOR: ELEMENT  
 ATTN:  
 2417 WEST PINHOOK ROAD  
 LAFAYETTE LA 70508

SAMPLE IDENTIFICATION:  
 COMPANY: ELEMENT  
 FIELD: GRAND CANE  
 LEASE: 1710071-002B  
 STA #: N/P

SAMPLE DATA: DATE: 10/28/17 09:00 BY: N/P  
 PSIG: N/P TEMP: N/P DEG.F. DP: N/P LBS H2O

REMARKS:

CYL #BAG 1

HYDROCARBON ANALYSIS - METHOD GPA 2261-13

LAB ANALYST: AL

COMPONENT NAME	MOL PERCENT	GPM @ 15.025 PSIA
CARBON DIOXIDE (CO2)	0.096	
NITROGEN ( N2)	6.815	
METHANE ( C1)	92.465	
ETHANE ( C2)	0.575	0.157
PROPANE ( C3)	0.038	0.011
ISO-BUTANE (IC4)	0.008	0.003
N-BUTANE (NC4)	0.003	0.001
ISO-PENTANE (IC5)	0.000	0.000
N-PENTANE (NC5)	0.000	0.000
HEXANES (C6)	0.000	0.000
HEPTANES PLUS (C7+)	0.000	0.000
TOTAL	100.000	
MOL WEIGHT: 16.98		ETHANE + GPM: 0.172
BTU/LB: 21127.5		PROPANE + GPM: 0.015
		ISO-PENTANE + GPM: 0.000

COMPRESSIBILITY FACTOR: 0.9981

SPECIFIC GRAVITY @ 60 DEG. F. (AIR = 1): 0.587

BTU/CUFT. (REAL) 60 DEG.F. - PSIA:	14.650	14.696	14.730	15.025
DRY:	944.2	947.2	949.4	968.4
SAT:	927.7	930.7	932.9	951.9

REVIEWED BY:

Tina Venable - Customer Service Representative

Testing performed by Element Materials Technology Scott :: 2129 W. Willow St., Scott, LA 70583 :: 337-232-3568.

This document shall not be reproduced, except in full, without the approval of the testing laboratory. Our letters and reports apply only to the sample tested and/or inspected, and are not indicative of the quantities of apparently identical or similar products.





Element Materials Technology  
 2129 West Willow Street  
 Scott, LA  
 70583-5301 USA

P 337 232 3568  
 F 337 232 3621  
 T 888 786 7555  
 info.scott@element.com  
 element.com

**GAS ANALYSIS REPORT NO.:** 5-110917-0 (402344)

**DATE:** 11/09/17

**FOR:** ELEMENT  
 ATTN:  
 2417 WEST PINHOOK ROAD  
 LAFAYETTE LA 70508

**SAMPLE IDENTIFICATION:**  
**COMPANY:** ELEMENT  
**FIELD:** GRAND CANE  
**LEASE:** 1710071-002B  
**STA #:** N/P

**SAMPLE DATA:** **DATE:** 10/28/17 **BY:** N/P  
**PSIG:** N/P **TEMP:** N/P **DEG.F.**

**REMARKS:**

CYL #BAG 1

SULFUR ANALYSIS (GPA-2199/ASTM D5504)

**LAB ANALYST:** AL

<u>SULFIDES</u>		<u>MERCAPTANS</u>		<u>DiSULFIDES</u>	
	PPM (WT.)		PPM (WT.)		PPM (WT.)
HYDROGEN	N/D	METHYL	N/D	CARBON	N/D
CARBONYL	N/D	ETHYL	N/D	DiMETHYL	N/D
DiMETHYL	N/D	ISOPROPYL	N/D	METHYL-ETHYL	N/D
METHYL ETHYL	N/D	N-PROPYL	N/D	DiETHYL	N/D
DiETHYL	N/D	ISOBUTYL	N/D	DiISOPROPYL	N/D
DiISOPROPYL	N/D	sec-BUTYL	N/D	Di-N-PROPYL	N/D
Di-N-PROPYL	N/D	tert-BUTYL	N/D	DiISOBUTYL	N/D
DiISOBUTYL	N/D	N-BUTYL	N/D	Di-sec-BUTYL	N/D
Di-sec-BUTYL	N/D	ISOAMYL	N/D	Di-tert-BUTYL	N/D
Di-tert-BUTYL	N/D	pri-AMYL	N/D	Di-N-BUTYL	N/D
Di-N-BUTYL	N/D	N-AMYL	N/D		
				<u>OTHERS</u>	
					PPM (WT.)
<b>TOTAL SULFUR (GPA-2199/ASTM D5504)</b>		N/D ppm by wt		THIOPHENE	N/D
				UNKNOWN	N/D
				SULFUR DIOXIDE	N/D

(N/D = None Detected)

REVIEWED BY:

Tina Venable – Customer Service Representative



Element Materials Technology  
 2129 West Willow Street  
 Scott, LA  
 70583-5301 USA

P 337 232 3568  
 F 337 232 3621  
 T 888 786 7555  
 info.scott@element.com  
 element.com

GAS ANALYSIS REPORT NO.: 2-110917-6 (402345)

DATE: 11/09/17

FOR: ELEMENT  
 ATTN:  
 2417 WEST PINHOOK ROAD  
 LAFAYETTE LA 70508

SAMPLE IDENTIFICATION:  
 COMPANY: ELEMENT  
 FIELD: GRAND CANE  
 LEASE: 17101071-005B  
 STA #: N/P

SAMPLE DATA: DATE: 10/28/17 10:30 BY: N/P  
 PSIG: N/P TEMP: N/P DEG.F. DP: N/P LBS H2O

REMARKS:

CYL #bag 2

HYDROCARBON ANALYSIS - METHOD GPA 2261-13

LAB ANALYST: AL

COMPONENT NAME	MOL PERCENT	GPM @ 15.025 PSIA		
CARBON DIOXIDE (CO2)	0.016			
NITROGEN ( N2)	27.537			
METHANE ( C1)	71.804			
ETHANE ( C2)	0.584	0.159		
PROPANE ( C3)	0.044	0.012		
ISO-BUTANE (IC4)	0.010	0.003		
N-BUTANE (NC4)	0.005	0.002		
ISO-PENTANE (IC5)	0.000	0.000		
N-PENTANE (NC5)	0.000	0.000		
HEXANES (C6)	0.000	0.000		
HEPTANES PLUS (C7+)	0.000	0.000		
TOTAL	100.000			
MOL WEIGHT: 19.44		ETHANE + GPM: 0.176		
BTU/LB: 14387.6		PROPANE + GPM: 0.017		
		ISO-PENTANE + GPM: 0.000		
	COMPRESSIBILITY FACTOR: 0.9986			
	SPECIFIC GRAVITY @ 60 DEG. F. (AIR = 1): 0.672			
BTU/CUFT. (REAL) 60 DEG.F. - PSIA:	14.650	14.696	14.730	15.025
DRY:	735.9	738.2	739.9	754.7
SAT:	723.0	725.3	727.0	741.8

REVIEWED BY:

Tina Venable - Customer Service Representative



Element Materials Technology  
 2129 West Willow Street  
 Scott, LA  
 70583-5301 USA

P 337 232 3568  
 F 337 232 3621  
 T 888 786 7555  
 info.scott@element.com  
 element.com

**GAS ANALYSIS REPORT NO.:** 3-110917-0 (402346)

**DATE:** 11/09/17

**FOR:** ELEMENT  
 ATTN:  
 2417 WEST PINHOOK ROAD  
 LAFAYETTE LA 70508

**SAMPLE IDENTIFICATION:**  
**COMPANY:** ELEMENT  
**FIELD:** GRAND CANE  
**LEASE:** 17101071-005B  
**STA #:** N/P

**SAMPLE DATA:** **DATE:** 10/28/17 **BY:** N/P  
**PSIG:** N/P **TEMP:** N/P **DEG.F.**

**REMARKS:**

CYL #BAG 2

SULFUR ANALYSIS (GPA-2199/ASTM D5504)

**LAB ANALYST:** AL

<u>SULFIDES</u>		<u>MERCAPTANS</u>		<u>DiSULFIDES</u>	
	PPM (WT.)		PPM (WT.)		PPM (WT.)
HYDROGEN	N/D	METHYL	N/D	CARBON	N/D
CARBONYL	N/D	ETHYL	N/D	DiMETHYL	N/D
DiMETHYL	N/D	ISOPROPYL	N/D	METHYL-ETHYL	N/D
METHYL ETHYL	N/D	N-PROPYL	N/D	DiETHYL	N/D
DiETHYL	N/D	ISOBUTYL	N/D	DiISOPROPYL	N/D
DiISOPROPYL	N/D	sec-BUTYL	N/D	Di-N-PROPYL	N/D
Di-N-PROPYL	N/D	tert-BUTYL	N/D	DiISOBUTYL	N/D
DiISOBUTYL	N/D	N-BUTYL	N/D	Di-sec-BUTYL	N/D
Di-sec-BUTYL	N/D	ISOAMYL	N/D	Di-tert-BUTYL	N/D
Di-tert-BUTYL	N/D	pri-AMYL	N/D	Di-N-BUTYL	N/D
Di-N-BUTYL	N/D	N-AMYL	N/D		
				<u>OTHERS</u>	
					PPM (WT.)
<b>TOTAL SULFUR (GPA-2199/ASTM D5504)</b>		N/D ppm by wt		THIOPHENE	N/D
				UNKNOWN	N/D
				SULFUR DIOXIDE	N/D

(N/D = None Detected)

REVIEWED BY:

Tina Venable – Customer Service Representative



**CHAIN OF CUSTODY RECORD**

Omega COCID 6534 PAGE: 1 OF: 1

**ADDRESS**

Element Materials Technology  
Lafayette  
2417 W. Pinhook Road  
Lafayette, LA 70508-3344  
TEL: (337) 235-0483  
FAX: (337) 233-6540  
Website: www.element.com

SUB CONTRACTOR: <b>ELEMENT_WILLOW</b> COMPANY: <b>Element Materials Technology</b>		SPECIAL INSTRUCTIONS / COMMENTS:	
ADDRESS: <b>2129 West Willow</b>		Extended analysis and H2S.	
CITY, STATE, ZIP: <b>Scott, LA 70583 70583</b>			
PHONE: <b>(337) 232-3568</b>	FAX: _____ EMAIL: _____		
ACCOUNT #: _____			

ITEM #	SAMPLE ID	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	DATE COLLECTED	NUMBER OF CONTAINERS	COMMENTS: Methanol Preserved Weights HOT Sample Notation, Additional Sample Description.
1	17101071-002B	Gas 031-5505Z(10)	16OZAMGU	Air	10/28/2017 9:00:00 AM	1	
	MISC (N/A #)	031-5055Z(10)					
2	17101071-005B	Gas 031-5504Z(10)	16OZAMGU	Air	10/28/2017 10:30:00 AM	1	
	MISC (N/A #)	Gas 031-5054Z					

11/28/17CD

Relinquished By: <i>[Signature]</i>	Date: 10/30/2017	Time: 1500	Received By: <i>[Signature]</i>	Date: 10-30-17	Time: 1500	REPORT TRANSMITTAL DESIRED: <input type="checkbox"/> HARDCOPY (extra cost) <input type="checkbox"/> FAX <input type="checkbox"/> EMAIL <input type="checkbox"/> ONLINE  FOR LAB USE ONLY Temp of samples _____ °C    Attempt to Cool? _____ Comments: _____ Page 76 of 82
Relinquished By:	Date:	Time:	Received By:	Date:	Time:	
Relinquished By: <i>[Signature]</i>	Date: 10-31-17	Time: 0820	Received By: <i>[Signature]</i>	Date: 10-31-17	Time: 0820	
TAT:    Standard <input type="checkbox"/> RUSH <input type="checkbox"/> Next BD <input type="checkbox"/> 2nd BD <input type="checkbox"/> 3rd BD <input type="checkbox"/> Note: RUSH requests will incur surcharges!						

Lab #: 636269      Job #: 36478      IS-65223      Co. Job#: \_\_\_\_\_  
 Sample Name: 17101071-002A / Gas 031-5055Z      Co. Lab#: \_\_\_\_\_  
 Company: Element Materials Technology  
 API/Well: \_\_\_\_\_  
 Container: Cali-5-Bond Bag  
 Field/Site Name: \_\_\_\_\_  
 Location: \_\_\_\_\_  
 Formation: \_\_\_\_\_  
 Sampling Point: \_\_\_\_\_  
 Date Sampled: 10/28/2017 9:00      Date Received: 10/31/2017      Date Reported: 11/27/2017

Component	Chemical mol. %	$\delta^{13}\text{C}$ ‰	$\delta\text{D}$ ‰	$\delta^{15}\text{N}$ ‰
Carbon Monoxide -----	nd			
Helium -----	nd			
Hydrogen -----	nd			
Argon -----	0.0641			
Oxygen -----	0.58			
Nitrogen -----	4.70			
Carbon Dioxide -----	0.12			
Methane -----	93.87	-36.81	-148.8	
Ethane -----	0.617	-24.64		
Ethylene -----	nd			
Propane -----	0.0376			
Propylene -----	nd			
Iso-butane -----	0.0077			
N-butane -----	0.0032			
Iso-pentane -----	0.0008			
N-pentane -----	0.0002			
Hexanes + -----	0.0004			

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 964  
 Specific gravity, calculated: 0.582

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. All gas component carbon isotope values are reported on a scale defined by a two point calibration of LSVEC and NBS 19. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %



Lab #: 636270      Job #: 36478      IS-65223      Co. Job#: \_\_\_\_\_  
 Sample Name: 17101071-005A / Gas 031-5054Z      Co. Lab#: \_\_\_\_\_  
 Company: Element Materials Technology  
 API/Well: \_\_\_\_\_  
 Container: Cali-5-Bond Bag  
 Field/Site Name: \_\_\_\_\_  
 Location: \_\_\_\_\_  
 Formation: \_\_\_\_\_  
 Sampling Point: \_\_\_\_\_  
 Date Sampled: 10/28/2017 10:30      Date Received: 10/31/2017      Date Reported: 11/27/2017

Component	Chemical mol. %	$\delta^{13}\text{C}$ ‰	$\delta\text{D}$ ‰	$\delta^{15}\text{N}$ ‰
Carbon Monoxide -----	nd			
Helium -----	nd			
Hydrogen -----	nd			
Argon -----	0.0828			
Oxygen -----	1.89			
Nitrogen -----	8.13			
Carbon Dioxide -----	0.018			
Methane -----	89.04	-36.76	-150.5	
Ethane -----	0.764	-23.89		
Ethylene -----	nd			
Propane -----	0.0552			
Propylene -----	nd			
Iso-butane -----	0.0120			
N-butane -----	0.0058			
Iso-pentane -----	0.0018			
N-pentane -----	0.0007			
Hexanes + -----	0.0015			

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 918

Specific gravity, calculated: 0.603

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. All gas component carbon isotope values are reported on a scale defined by a two point calibration of LSVEC and NBS 19. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %



**CHAIN OF CUSTODY RECORD**

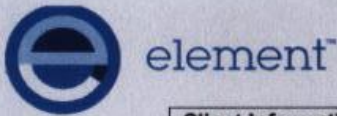
Omega COCID 6533	PAGE: 1	OF: 1
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**ADDRESS**  
 Element Materials Technology  
 Lafayette  
 2417 W. Pinhook Road  
 Lafayette, LA 70508-3344  
 TEL: (337) 235-0483  
 FAX: (337) 233-6540  
 Website: www.element.com

SUB CONTRACTOR: <b>ISOTECH</b>		COMPANY: <b>Isotech Laboratories</b>		SPECIAL INSTRUCTIONS / COMMENTS: NG with Methane Isotopes			
ADDRESS: <b>1308 Parkland Court</b>							
CITY, STATE, ZIP: <b>Champaign, IL 61821</b>							
PHONE: <b>(877) 362-4190</b>	FAX:	EMAIL:					
ACCOUNT #:							

ITEM #	SAMPLE ID	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	DATE COLLECTED	NUMBER OF CONTAINERS	COMMENTS: Methanol Preserved Weights HOT Sample Notation, Additional Sample Description.
1	17101071-002A	Gas 031-5055Z	16OZAMGU	Air	10/28/2017 9:00:00 AM	1	
	MISC (N/A #)						
2	17101071-005A	Gas 031-5054Z	16OZAMGU	Air	10/28/2017 10:30:00 AM	1	
	MISC (N/A #)						

Relinquished By: <i>[Signature]</i>	Date: 10/30/2017	Time:	Received By: <i>Adi Puckett - Isotech Labs</i>	Date: 10/31/17	Time: 08:45	REPORT TRANSMITTAL DESIRED: <input type="checkbox"/> HARDCOPY (extra cost) <input type="checkbox"/> FAX <input type="checkbox"/> EMAIL <input type="checkbox"/> ONLINE	
Relinquished By:	Date:	Time:	Received By:	Date:	Time:	FOR LAB USE ONLY Temp of samples _____ °C    Attempt to Cool? _____ Comments: _____	
Relinquished By:	Date:	Time:	Received By:	Date:	Time:		
TAT:    Standard <input type="checkbox"/> <b>RUSH</b> Next BD <input type="checkbox"/> 2nd BD <input type="checkbox"/> 3rd BD <input type="checkbox"/>						Note: RUSH requests will incur surcharges!	



# Chain of Custody

Laboratory Number: 17101071

Company Name: Contact Name: Address: City, State Zip: Phone Number: Fax Number: E-mail Address:	<b>Client Information:</b> Michael Pisani & Assoc Inc	<b>Billing Information:</b> Michael Pisani & Assoc, Inc	PO Number: 191-01	Project Name/Number: 191-01 Grand Cane	Page 1 of 1 <b>Matrix Code</b> DW = Drinking Water WW = Waste Water GW = Ground Water AQ = Aqueous OT = Other SL = Sludge SOL = Solid O = Oil SO = Soil F = Food SW = Swab NG = Natural Gas NGL = Natural Gas Liquid PW = Produced Water CF = Completion Fluid
	Dave Angle	C. Carruba	Quote Number:	Sampler's Signature 	
	13313 Southwest Freeway	1100 Poydras	Required QC Level	Shipping Method: UPS / FedEx / Airborne DHL / Element / Hand / Mail	
	Suite 221	Suite 1430	Bill Monthly <input type="checkbox"/> Yes <input type="checkbox"/> No		
	Houston, TX 77478	New Orleans, LA 70613			
	281-224-5700 Ext: Dangle@mpisani.com	504-582-2468 Ext: Ccarruba@mpisani.com			

Which Regulations Apply:	Turn Time	(Rush turn times will incur a surcharge and must be pre-approved by lab.)	Container		Pres.	Requested Tests												Comments			
			Quantity	Type		BTEX	PAHs	TPH Fractions (EPH/APH)	Full 29B	Chloride	TDS	pH	Sulfate	Mg, Ca, Na, K	Carb/bicarb alkalinity						
<input type="checkbox"/> RCRA <input type="checkbox"/> POTW <input type="checkbox"/> NPDES <input type="checkbox"/> USDA/FDA <input type="checkbox"/> RECAP/RISC <input type="checkbox"/> Drinking Water <input type="checkbox"/> Distribution <input type="checkbox"/> Special <input type="checkbox"/> State <input type="checkbox"/> Other	<input checked="" type="checkbox"/> Standard <input type="checkbox"/> 1 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> Other																				
Collection Information			Date	Time	Grab / Composite	Matrix	Quantity	Type	Pres.	BTEX	PAHs	TPH Fractions (EPH/APH)	Full 29B	Chloride	TDS	pH	Sulfate	Mg, Ca, Na, K	Carb/bicarb alkalinity	Comments	
Sample ID/Description																					
SW 031-5505Z (102817)			10/28/17	0910	G	W	10	G/P	Various	x	x	x		x	x	x	x	x	x	x	
Gas 031-5505Z (102817)			10/28/17	0900	G	Gas	2	Call5													As discussed with Carlyle Bourgeois
Gas 031-5505Z (102817)			10/28/17	0900	G	Gas	1	Summa													
Field-Blank										x	HOLD										
Gas 031-5054Z (102817)			10/28/17	1030	G	Gas	2	Call5													As discussed with Carlyle Bourgeois
SS-1 031-5054Z (102817)			10/28/17	1040	G	Soil	6	G		X	X	X	X								
SS-2 031-5054Z (102817)			10/28/17	1050	G	Soil	6	G		x	x	x	x								

	Relinquished by	Date/Time	Received by	Date/Time	Field Notes:
1		10/29/17 1100		10/29/17 1100	
2		10/30/17 0930		10-30-17 0930	Received at lab on ice? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Temp: 0-3°C
3					

All samples submitted to Element Materials Technology for analysis are accepted on a custodial basis only. Ownership of the material remains with the client submitting the samples. Element Materials Technology reserves the right to return unused sample portions.

- 9301 Innovation Drive, Suite 115 Daleville, IN 47334-0569 USA P 765-378-4103 F 765-378-4109
- 629 Washington St. Suite 300 Columbus, IN 47201-6231 USA P 812-375-0531 F 812-375-0731
- 2121 East Washington Boulevard Fort Wayne, IN 46803-1328 USA P 260-471-7000 F 260-471-7177
- 560 South Zimmer Road Warsaw, IN 46580-2368 USA P 574-267-3305 F 574-269-6569
- 3371 Cleveland Road, Suite 100A South Bend, IN 46628-9780 USA P 574-277-0707 F 574-273-5699
- 2417 W. Pinhook Rd Lafayette, LA 70508-3344 USA P 337-235-0483 F 337-233-6540

## Caitlin Duplantis

---

**From:** Anna Fix <afix@mpisani.com>  
**Sent:** Monday, October 30, 2017 11:01 AM  
**To:** Caitlin Duplantis  
**Cc:** Dave Angle  
**Subject:** Field blank

Caitlin,

Please revise the chain of custody from Field Blank to Trip Blank. Hold for analysis. Anna

Anna B. Fix  
Michael Pisani & Associates, Inc.  
11409 Pennywood Avenue  
Baton Rouge, LA 70809  
(225) 755-2250  
(225) 955-0186 (cell)

Confidentiality Notice: The information contained in this message is intended only for the use of the addressee, and may be confidential and/or privileged. If the reader of this message is not the intended recipient, or the employee or agent responsible to deliver it to the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited. If you have received this communication in error, please notify the sender immediately.

## Caitlin Duplantis

---

**From:** Dave Angle <dangle@mpisani.com>  
**Sent:** Monday, October 30, 2017 3:07 PM  
**To:** Caitlin Duplantis  
**Cc:** Anna Fix  
**Subject:** Shipment of 2 Cali5 Bag Gas Samples to Isotech Laboratories, Inc., DeSoto Parish, LA project  
**Attachments:** 12-13-16 Elem Gas Analysis.pdf

Caitlin,

Please ship one Cali5 bag from each of the following samples to Isotech Laboratories, Inc. in Champaign, IL tonight for NG-1: Level 1 Natural Gas Characterization analysis:

1. Gas 031-5054z (102817) Collected 10/28/17 at 1030
2. Gas 031-5055z (102817) Collected 10/28/17 at 0900 (We understand you have corrected the incorrect name (5505z) for this sample identified on the COC submitted with the samples this morning)

Please have Element's Scott, LA lab run the full suite of analytes listed for the attached 2016 gas sample and H<sub>2</sub>S on the 2 remaining Cali5 bag sample in your possession. Please retain any remaining volume of each sample.

Please hold the summa cannister sample - Gas 031-5055z (102817) Collected at 10/28/17 at 0900.

Can you also please email me a copy of the COC you send to Isotech tonight?

Please call or email with any questions.

Thanks,

Dave Angle  
Michael Pisani & Associates, Inc.  
13313 Southwest Freeway, Suite 221  
Sugar Land, Texas 77478  
(281) 242-5700 Office  
(281) 242-1737 Fax  
dangle@mpisani.com