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SEMI-ANNUAL VRP PROGRESS REPORT

(24 MONTH)

DIAMOND CRYSTAL DULUTH, LLC
DULUTH, GA
HSI SITE NO. 10844

JUNE 2017

PREPARED FOR:

DIAMOND CRYSTAL DULUTH, LLC
3245 N. BERKELEY LAKE ROAD
DULUTH, GA, 30096-4972

Matthew S. Mudge
Project Manager

Howard J. Frank, P.G.
Senior Geologist

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PG Certification

"I certify under penalty of law that this report and all attachments were prepared by me or under my direct supervision in accordance with the Voluntary Remediation Program Act (O.C.G.A. Section 12-8-101, et.seq.). I am a professional engineer/professional geologist who is registered with the Georgia State Board of Registration for Professional Engineers and Land Surveyors/Georgia State Board of Registration for Professional Geologists and I have the necessary experience and am in charge of the investigation and remediation of this release of regulated substances.

Furthermore, to document my direct oversight of the Voluntary Remediation Plan development, implementation of corrective action, and long term monitoring, I have attached a monthly summary of hours invoiced and description of services provided by me to the Voluntary Remediation Program participant since the previous submittal to the Georgia Environmental Protection Division.

The information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Howard J. Frank, P.G. 1698
Senior Geologist

Date: 6.26.17

1.0 INTRODUCTION

The Voluntary Investigation and Remediation Plan (VIRP) application for the Diamond Crystal Duluth, LLC (Diamond Crystal Duluth) facility, located at 3245 North Berkeley Lake Road in Duluth, Gwinnett County, Georgia (HSI Site No. 10844), was submitted to the Georgia Environmental Protection Division (EPD) on May 11, 2015. The VIRP was approved by the EPD in a letter dated June 8, 2015.

An initial Progress Report was submitted in December 2015 summarizing activities completed during the first six months in the Voluntary Remediation Program (VRP). A semi-annual Progress Report was submitted in June 2016 summarizing activities completed during the second six month period (first 12 months) of the VRP as well as in December 2016 for the third six month period (first 18 months). This Progress Report provides a summary of activities conducted from December 2016 through June 2017, the fourth six month period (first 24 months) in the VRP.

2.0 SUMMARY OF SITE ACTIVITIES

As described in the VIRP application, certain activities are scheduled to be completed within the fourth six month period (first 24 months) after entry to the VRP. Based on previous Progress Reports, as well as comments received from the EPD, additional activities were added to the milestone schedule and reported herein; these activities include:

- Continue to evaluate the leachability pathway for site soils leaching to groundwater;
- Update on subsurface conditions on adjacent property;
- Report on progress with site paving and controls; and,
- Update the Conceptual Site Model (CSM) and Corrective Action Plan (CAP), if necessary.

A summary of the activities conducted from December 2016 through June 2017 (up to the date of this report) are described in the following sections.

2.1 Leachability Evaluation

The Georgia EPD responded to the June 2016 Progress Report in a letter dated July 11, 2016. The letter included a comment that if proposing Type 4 soil Risk Reduction Standards (RRS), the leachability requirement must be met prior to approval of the overall site-specific soil RRS for the site.

The purpose of evaluating the soil leaching to groundwater pathway is to determine acceptable contaminant concentrations in soil that will not cause impacts to groundwater above an acceptable level (*i.e.*, the Georgia Rule for Safe Drinking Water Maximum Contaminant Level [MCL]).

The New Jersey Department of Environmental Protection Guidance Document for *Development of Site Specific Impact to Groundwater Soil Remediation Standards Using the Synthetic Precipitation Leaching Procedure* (Version 3.0, November 2013) and the Georgia EPD ****DRAFT*** Frequently Asked Questions for Evaluating the Soil-to-Groundwater Pathway* (February, 2015), were reviewed to aid in evaluating the soil leaching to groundwater pathway.

Findings of the soil leachability evaluation are included in **Appendix A** and discussed in this section of the report. During the groundwater assessment completed at the site

in October and November 2016 (with results provided in the December 2016 Progress Report), soil samples were collected from each 5-foot section of soil core from the borings installed on the property. The six (6) borings extended from the ground surface to bedrock refusal using direct-push and hollow-stem auger drilling techniques; boring locations are shown on **Figure A-1**.

For the soil leaching to groundwater evaluation, one soil sample from each boring was selected and submitted to an analytical laboratory for further testing for a total of six (6) samples. The soil samples selected for analysis ranged in depth, soil type, and detected total arsenic concentrations (including the highest value detected on site); an approach recommended by the guidance documents reviewed. Boring logs illustrating the soil sample depth interval for leachate analysis are included in **Appendix A** and the total arsenic concentrations for these soil samples are presented in **Table A-1**. These soil samples were analyzed by synthetic precipitation leaching procedure (SPLP) for arsenic, pH, and dry weight by GCAL Analytical Laboratories, LLC of Baton Rouge, Louisiana. A summary of the testing results is provided in **Table A-1** with the laboratory report included in **Appendix A**.

Using the testing data obtained, site-specific soil-water partition coefficients (K_d values) were calculated for arsenic following Equation 10 identified in Section A.3.3.2 of the Georgia EPD guidance. **Table A-2** provides the calculations completed as well as the parameters and their associated values. It should be noted, only two (2) of the SPLP tests for arsenic resulted in detections above the laboratory method reporting limit (MDL). For the four (4) non-detect samples, the MDL value was *conservatively* used in the calculations.

The site-specific K_d calculations for arsenic resulted in a range of values from 55,358 liters per kilogram (L/kg) to 819,980 L/kg. The lowest calculated K_d value (55,358 L/kg) provides a conservative estimate of site-specific K_d for arsenic.

Following Section 4 of the Georgia EPD guidance, the Partitioning Equation (Equation 1) was used to determine an acceptable contaminant concentration in soil that will not cause impacts to groundwater above an acceptable level (in this case, the MCL for arsenic [10 micrograms per liter, µg/L]). Using the site-specific K_d values determined above (in **Table A-2**), and parameter values prescribed by the guidance (including several default values where site-specifics were not available), acceptable soil concentrations were calculated. The Partitioning Equation, the parameters included in the calculation and their corresponding values, as well as the results determined are provided in **Table A-3**.

There are many conservative assumptions that apply to the use of the Partitioning Equation and the results should be used as a screening level model. If actual soil concentrations from samples collected at the site exceed the calculated acceptable contaminant concentration in soil, then additional assessment is typically warranted. Based on the Partitioning Equation calculations presented in **Table A-3**, the acceptable soil contaminant concentrations for arsenic ranged from 554 milligrams per kilogram (mg/kg) to 8,200 mg/kg. The lowest calculated value (554 mg/kg) is considered a conservative (*i.e.*, protective) estimate of the maximum arsenic concentration in soil that will not result in an exceedance of the groundwater MCL (10 µg/L).

2.1.1 Proposed RRS

The soil leaching to groundwater evaluation for the site resulted in a site-specific soil RRS of 554 mg/kg for this pathway and is considered protective of groundwater. Based on the approach and values/assumptions included in the calculations completed, this proposed RRS is conservative.

The proposed Type 4 non-residential RRS for arsenic in soil at the Diamond Crystal Duluth site will be used to further assess the need for potential corrective action and to develop the site CAP.

2.2 Neighboring Property Conditions

2.2.1 Berkeley Lake Village Owners Association

Additional site assessment activities were completed at the Berkeley Lake Village Owners Association (BLVOA) property located at 3351 North Berkeley Lake Road NW, Duluth, Georgia. The property is located north of the Diamond Crystal Duluth facility. BLVOA conducted further assessment on the property as part of the VIRP and a third VRP Progress Report was submitted to the EPD in December 2016. The BLVOA December 2016 Semi-Annual Progress Report was not available for review on the EPD website but EPD comments on the report and meeting minutes from a March 28, 2017 meeting were available. Based upon the agency's letter, the BLVOA is still working on the horizontal delineation of contamination and needs to install additional monitoring wells to provide a better understanding of impacts to groundwater on the property.

Previous assessment activities consisted of collecting surface soil and sediment samples from the property which confirmed the widespread presence of arsenic ranging in concentrations from 35.3 to 239.7 mg/kg. Two groundwater monitoring wells were installed on the property and groundwater samples show

arsenic was detected above the laboratory method detection limit at MW-1 (located near the southwest corner of the property).

2.3 Preliminary Paving and Site Controls Plan

A preliminary site paving and controls plan is continuing to be developed for the Diamond Crystal Duluth site. No updates to the preliminary site paving/capping controls plan were made during the fourth six month period (first 24 months) in the VRP. It is premature to identify areas requiring corrective action since all proposed site RRS values have yet to be reviewed/approved in conjunction with the EPD.

The preliminary site paving and controls plan will continue to be evaluated as Diamond Crystal Duluth progresses through the VRP and identifies areas requiring corrective action based on applicable exposure pathways/receptors and site RRS values.

2.4 Conceptual Site Model

No changes to the CSM are required at this time.

2.5 Corrective Action Plan

No adjustments to the proposed CAP are required at this time.

3.0 RESPONSE TO 18-MONTH VRP PROGRESS REPORT COMMENTS

The Diamond Crystal Duluth 18-Month Semi-Annual VRP Progress Report was submitted to the EPD in December 2016. No comments were received from the EPD as of the date of this report.

4.0 SITE ACTIVITIES PLANNED FOR NEXT 6 MONTHS

The following activities will be conducted in the next 6 months and summarized in the (30 Month) Semi-Annual VRP Progress Report to be submitted in December 2017:

- Identify areas requiring corrective action based on EPD acceptance of the proposed site-specific soil and groundwater RRS;
- Report on progress with site paving and controls;
- Update on subsurface conditions on adjacent property; and,
- Update the CSM and CAP, if necessary.

5.0 SUMMARY

All activities related to the VIRP implementation to be completed within the fourth six month period (first 24 months) after entry to the VRP have been completed. A revised milestone schedule is provided in **Table 1**, below.

Table 1.0 Revised Milestone Schedule

Timeline	Date	Activity	Status
-	June 8, 2015	VIRP Application Approved	Complete
Within 45 days of VRP entry	July 21, 2015	Filing of Affidavit with clerk of Superior Court of Gwinnett County pursuant to O.C.G.A. §44-2-20	Complete
Within 30 days of filing affidavit	August 10, 2015	Submittal of copy of receipt of recorded Affidavit to EPD	Complete
Due within first 6 months	December 2015	Provide results of additional horizontal delineation of arsenic in surface soil	Complete
		Update on subsurface conditions on adjacent County Property	
		Submittal of Soil Management Plan	
		Submittal of preliminary paving and site controls plan	
Due within first 12 Months	June 2016	Review RRS for applicable exposure pathways and proposed RRS for the Diamond Crystal Duluth site	Complete
		Report on progress with site paving and controls plan	
		Update on subsurface conditions on adjacent property	
		Adjustments to CSM and CAP, if necessary	
Due within first 18 Months	December 2016	Evaluate overland run-off route and the potential for offsite impacts to surface water/sediment as a result of surface erosion of impacted soils	Complete
		Complete a site groundwater assessment	
		Evaluate the leachability pathway for site soils leaching to groundwater (initiated)	
		Report on progress with site paving and controls plan	
		Update on subsurface conditions on adjacent property	
		Adjustments to CSM and CAP, if necessary	

Table 1.0 Revised Milestone Schedule (cont.)

Timeline	Date	Activity	Status
Due within first 24 Months	June 2017	Continue to evaluate the leachability pathway for site soils leaching to groundwater	Complete
		Report on progress with site paving and controls	
		Update on subsurface conditions on adjacent properties	
		Adjustments to CSM and CAP, if necessary	
Due within first 30 Months	December 2017	Identify areas requiring corrective action based on EPD acceptance of the proposed site-specific soil and groundwater RRS	Pending
		Report on progress with site paving and controls	
		Update on subsurface conditions on adjacent properties	
		Adjustments to CSM and CAP, if necessary	
Due within first 60 Months	June 2020	Report on progress with site paving and controls	
		Submit the final Compliance Status Report certifying completion of the CAP	

6.0 MONTHLY INVOICE SUMMARY

The VRP requires that a professional engineer/geologist oversee the implementation of the VIRP in accordance with the provisions, purposes, standards and policies of the Georgia Voluntary Remediation Program Act. During the period from December 2016 through June 2017 (as of the date of this report), SynTerra staff invoiced 64.5 hours on this project. A monthly summary of hours invoiced and a description of services provided is shown in **Table 2**, below.

Table 2.0 Summary of Monthly Hours Invoiced

Month	Hours Billed	Description of Activities
December 2016	32.75	Groundwater assessment (data review, memorandum preparation)(cont.) RRS review for groundwater (cont.) Leachability evaluation (planning, reviewed guidance)(cont.) Review available progress reports and assessments from other properties included in HSI Site No. 10844 and adjacent to Diamond Crystal Duluth (cont.) Compiled 18 Month VRP Progress Report (cont.)
January 2017	0	2017 planning
February 2017	0	
March 2017	0	
April 2017	0	
May 2017	3	Leachability evaluation (reviewed approach, planning, data review)
June 2017	28.75	Leachability evaluation (reviewed approach, planning, data review)(cont.) Review available progress reports and assessments from other properties included in HSI Site No. 10844 and adjacent to Diamond Crystal Duluth Compiled 24 Month VRP Progress Report

7.0 REFERENCES

Geosyntec. 2016. Voluntary Remediation Program Progress Report, Berkeley Lake Village Owners Association Site, Duluth, Georgia, HSI #10844. July, 2016.

Georgia EPD. 2015. ****DRAFT*** Frequently Asked Questions for Evaluating the Soil-to-Groundwater Pathway*. February 18, 2015.

Georgia EPD. 2016. Comments: Semi-Annual VRP Progress Report, Diamond Crystal Duluth Property, North Berkeley Lake Road Site, Duluth, Gwinnett County, HSI # 10844. March 18, 2016.

Georgia EPD. 2016. Comparison of Existing Risk Reduction Standards. https://epd.georgia.gov/comparison-existing-contamination-risk-reduction-standards-391-3-19-07. Accessed May 2016.

Georgia EPD. 2016. Hazardous Site Response Act. https://epd.georgia.gov/hazardous-facility-response-act-guidance. Accessed May 2016.

Georgia EPD. 2016. Comments: Semi-Annual VRP Progress Report #2, Diamond Crystal Duluth Property, North Berkeley Lake Road Site, Duluth, Gwinnett County, HSI # 10844. July 11, 2016.

Georgia EPD. 2017. 2016 VRP Progress Report Nos. 2 and 3, HSI #10844, Berkeley Lake Village Owners Association, 3351 North Berkeley Lake Road, Duluth, Gwinnett County. April 21, 2017.

Georgia EPD. 2017. Record of Communication, March 28, 2017 Meeting Minutes, Berkeley Lake Village Owners Association, HSI #10844, Duluth, Gwinnett County. March 29, 2017.

New Jersey DEP. 2013. Development of Site-Specific Impact to Ground Water Soil Remediation Standards Using the Synthetic Precipitation Leaching Procedure. Version 3.0 – November 2013.
http://www.nj.gov/dep/srp/guidance/rs/splp_guidance.pdf

SynTerra. 2015. Semi-Annual VRP Progress Report (6 Month), Diamond Crystal Duluth LLC, Duluth, GA, HSI Site No. 10844. December, 2015.

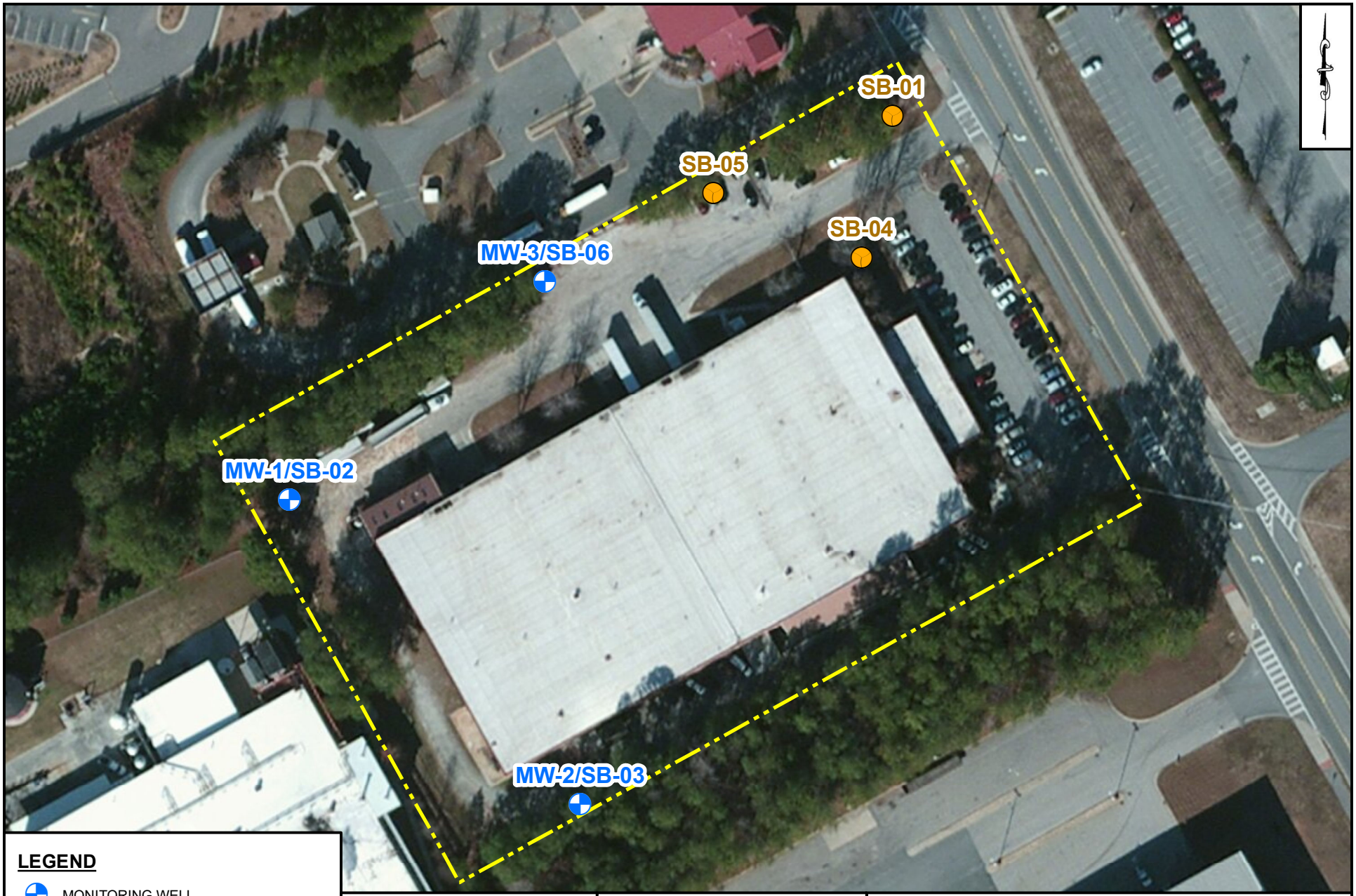
SynTerra. 2016. Semi-Annual VRP Progress Report (12 Month), Diamond Crystal Duluth LLC, Duluth, GA, HSI Site No. 10844. June, 2016.

SynTerra. 2016. Semi-Annual VRP Progress Report (18 Month), Diamond Crystal Duluth LLC, Duluth, GA, HSI Site No. 10844. December, 2016.

APPENDIX A

SOIL LEACHABILITY EVALUATION INFORMATION

FIGURE



LEGEND

- MONITORING WELL
- SOIL BORING
- APPROXIMATE PARCEL BOUNDARY

NOTES:

1) MAY 7, 2016 AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH PRO.

GRAPHIC SCALE
50 25 0 50 100
IN FEET

148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA 29601
PHONE 864-421-9999
www.synterracorp.com

DRAWN BY: ADAM FEIGL
PROJECT MANAGER: MATT MUDGE
CHECKED BY: EVAN YURKOVICH
DATE: 06/20/2017

FIGURE A-1
BORING & MONITORING WELL LOCATIONS
DIAMOND CRYSTAL DULUTH, LLC
3245 NORTH BERKELEY LAKE ROAD
DULUTH, GEORGIA

P:\Hormel ,918\05.Diamond Crystal Brands\07. GW Assessment\Figures\MXD\A-1 - DIAMOND CRYSTAL SOIL SAMPLE.mxd

GEOLOGIST LOGS AND WELL CONSTRUCTION RECORDS

PROJECT:	Diamond Crystal Duluth, LLC	WELL / BORING NO:	**SB-01**
PROJECT NO:	918.05	STARTED: 10/31/16	COMPLETED: 10/31/16
DRILLING COMPANY:	Geolab Drilling	NORTHING:	EASTING:
DRILLING METHOD:	Dual Tube/ HSA	G.S. ELEV: ft MSL	M.P. ELEV: ft MSL
BOREHOLE DIAMETER:	2/4.25 IN	DEPTH TO WATER: ft TOC	TOTAL DEPTH: 21.0 ft BGS
NOTES:	BGS- Below Ground Surface	LOGGED BY: E. Yurkovich	CHECKED BY: M. Mudge

DEPTH (ft)	USCS	DESCRIPTION	SAMPLE	RECOV. (%)	BLOW COUNTS	PID (ppm)	WELL CONSTRUCTION
	OL	Topsoil, pine needles, small rocks					
	SP SM	Silty SAND, light brown, dry, loose					
5	SP SM	Silty SAND, light brown, white, dry, loose					
10	SP SM	Silty SAND, light brown, micaceous, loose, dry. Hard zone around 14 ft-bgs					
15				SPLP Analysis			
	ML	Sandy SILT, brown, micaceous, dry. Rocks observed at 18 ft-bgs					
20		Boring terminated due to refusal at 21.0' bgs.					
25							
30							
35							

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Greenville, South Carolina 29601
Phone: 864-421-9999

CLIENT: Diamond Crystal Duluth, LLC
PROJECT LOCATION: Duluth, GA

PROJECT:	Diamond Crystal Duluth, LLC	WELL / BORING NO:	**MW-01/SB-02**
PROJECT NO:	918.05	STARTED: 10/31/16	COMPLETED: 10/31/16
DRILLING COMPANY:	Geolab Drilling	NORTHING: 1448476.73	EASTING: 2295573.97
DRILLING METHOD:	Dual Tube/ HSA	G.S. ELEV: 1068.64 ft MSL	M.P. ELEV: 1068.18 ft MSL
BOREHOLE DIAMETER:	2/4.25 IN	DEPTH TO WATER: 33.62 ft TOC	TOTAL DEPTH: 35.0 ft BGS
NOTES:	BGS- Below Ground Surface	LOGGED BY: E. Yurkovich	CHECKED BY: M. Mudge

DEPTH (ft)	USCS	DESCRIPTION	SAMPLE	RECOV. (%)	BLOW COUNTS	PID (ppm)
	GP	Gravel, grey, mixed with topsoil				
	ML	SILT, brownish red, brittle, small rocks				
	ML	Sandy SILT, reddish brown, mottled red/white				
5	ML	Clayey SILT, brownish red, loose				
	CL	CLAY, red, stiff, mottled white				
10	CL	CLAY, brownish red, micaceous, firm		SPLP Analysis		
	CL	CLAY, red, firm.				
15	CL ML	Silty CLAY, red				
	CL	CLAY, red, firm				
20	CL	Dark brown/black staining (approximately 4-in thick)				
	CL	CLAY, red, firm				
25	CL	CLAY, light brown/red, firm, moist				
30	CL	CLAY, light brown, firm moist. Wet area at 31 ft-bgs. Saprolite at 34 ft-bgs.				
35		Boring terminated at 35.0' bgs.				

WELL CONSTRUCTION - Flush Mount Monument

- 2" Sch. 40 threaded PVC riser
- Cement grout
- Bentonite seal
- Sand pack (No. 2)
- Well screen

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CLIENT: Diamond Crystal Duluth, LLC
PROJECT LOCATION: Duluth, GA

PROJECT:	Diamond Crystal Duluth, LLC	WELL / BORING NO:	**MW-02/SB-03**
PROJECT NO:	918.05	STARTED: 10/31/16	COMPLETED: 10/31/16
DRILLING COMPANY:	Geolab Drilling	NORTHING: 1448314.65	EASTING: 2295384.28
DRILLING METHOD:	Dual Tube/ HSA	G.S. ELEV: 1070.20 ft MSL	M.P. ELEV: 1070.38 ft MSL
BOREHOLE DIAMETER:	2/4.25 IN	DEPTH TO WATER: 23.78 ft TOC	TOTAL DEPTH: 32.5 ft BGS
NOTES:	BGS- Below Ground Surface	LOGGED BY: E. Yurkovich	CHECKED BY: M. Mudge

DEPTH (ft)	USCS	DESCRIPTION	SAMPLE	RECOV. (%)	BLOW COUNTS	PID (ppm)
		Asphalt				
	ML	Clayey SILT, orangish brown, micaceous				
	CL	CLAY, brownish red, micaceous, firm				
	CL	Silty CLAY, brownish red, micaceous, firm				
5	ML	Sandy SILT, yellowish brown, loose				
	ML	SILT, orangish/light brown, loose, saprolitic				
10	SM	Silty SAND, orangish brown/grey				
	SM	Silty SAND, greyish brown, saprolitic				
15		Saprolite, orangish brown, layered				
	ML	Sandy SILT, greyish brown, loose. DPT refusal at 21 ft-bgs, switch to HSAs.				
20			SPLP Analysis			
	SM	Silty SAND, brown, loose				
	ML	Sandy SILT, greyish brown				
25	ML	Clayey SILT, greyish brown, moist				
	CL	Silty CLAY, brown, moist				
30		Boring terminated due to auger refusal at 32.5 ft-bgs				
35						

WELL CONSTRUCTION
- Flush Mount Monument
- Cement grout
- 2" Sch. 40 threaded PVC riser
- Bentonite seal
- Sand pack (No. 2)
- Well screen

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CLIENT: Diamond Crystal Duluth, LLC
PROJECT LOCATION: Duluth, GA

PROJECT:	Diamond Crystal Duluth, LLC	WELL / BORING NO:	**SB-04**
PROJECT NO:	918.05	STARTED: 11/1/16	COMPLETED: 11/1/16
DRILLING COMPANY:	Geolab Drilling	NORTHING:	EASTING:
DRILLING METHOD:	Dual Tube/ HSA	G.S. ELEV: ft MSL	M.P. ELEV: ft MSL
BOREHOLE DIAMETER:	2/4.25 IN	DEPTH TO WATER: ft TOC	TOTAL DEPTH: 15.0 ft BGS
NOTES:	BGS- Below Ground Surface	LOGGED BY: E. Yurkovich	CHECKED BY: M. Mudge

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (%)	BLOW COUNTS	PID (ppm)	WELL CONSTRUCTION
			Topsoil					
		SM	Silty SAND, reddish brown					
		ML	Sandy SILT, reddish brown to white/grey brown, soft, loose, dry					
5		SM	Silty SAND, grey		SPLP Analysis			
		SM	Silty SAND, whitish grey to reddish brown, firm, small rocks					
10			Saprolite, layered, dark staining, micaceous. DPT refusal at 10 ft-bgs, switch to HSAs.					
15			Boring terminated due to auger refusal at 15 ft-bgs					
20								
25								
30								
35								

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CLIENT: Diamond Crystal Duluth, LLC
PROJECT LOCATION: Duluth, GA

PROJECT:	Diamond Crystal Duluth, LLC	WELL / BORING NO:	**SB-05**
PROJECT NO:	918.05	STARTED: 11/1/16	COMPLETED: 11/1/16
DRILLING COMPANY:	Geolab Drilling	NORTHING:	EASTING:
DRILLING METHOD:	Direct-Push	G.S. ELEV: ft MSL	M.P. ELEV: ft MSL
BOREHOLE DIAMETER:	2 IN	DEPTH TO WATER: ft TOC	TOTAL DEPTH: 8.0 ft BGS
NOTES:	BGS- Below Ground Surface	LOGGED BY: E. Yurkovich	CHECKED BY: M. Mudge

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (%)	BLOW COUNTS	PID (ppm)	WELL CONSTRUCTION
		OL	Topsoil, pine needles					
		ML	SILT, light brown, soft, dry					
5					SPLP Analysis			
			Saprolite, reddish brown. Rock layer at 7 ft-bgs, grey/white small rocks					
		SM	Silty SAND, light brown, rocks					
			Boring terminated due to DPT refusal at 8 ft-bgs.					
10								
15								
20								
25								
30								
35								

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CLIENT: Diamond Crystal Duluth, LLC
PROJECT LOCATION: Duluth, GA

PROJECT:	Diamond Crystal Duluth, LLC	WELL / BORING NO:	**MW-03/SB-06**
PROJECT NO:	918.05	STARTED: 11/1/16	COMPLETED: 11/1/16
DRILLING COMPANY:	Geolab Drilling	NORTHING: 1448088.81	EASTING: 2295599.97
DRILLING METHOD:	Dual Tube/ HSA	G.S. ELEV: 1071.66 ft MSL	M.P. ELEV: 1071.37 ft MSL
BOREHOLE DIAMETER:	2/4.25 IN	DEPTH TO WATER: 25.97 ft TOC	TOTAL DEPTH: 39.0 ft BGS
NOTES:	BGS- Below Ground Surface	LOGGED BY: E. Yurkovich	CHECKED BY: M. Mudge

DEPTH (ft)	USCS	DESCRIPTION	SAMPLE	RECOV. (%)	BLOW COUNTS	PID (ppm)
0	GM	Gravel and topsoil				
	SM	Silty SAND, reddish brown, loose				
	SM	Silty SAND, reddish light brown, soft				
5	SM	Silty SAND, brownish red				
	ML	Sandy SILT, reddish brown, saprolitic				
10	ML	Sandy SILT, reddish light brown, soft				
	SM	Silty SAND, light brown, whitish,				
	ML	Sandy SILT, brown, soft				
15	ML	Sandy SILT, brown, micaceous, compact				
	ML	Sandy SILT, brown, saprolitic, micaceous, layered with quartz				
20						
	ML	Clayey SILT, brown, saprolitic, micaceous	SPLP Analysis			
25						
30						
35	ML	SILT, dark brown, saprolite				
		Boring terminated due to auger refusal at 39 ft-bgs				

WELL CONSTRUCTION
- Flush Mount Monument
- 2" Sch. 40 threaded PVC riser
- Cement grout
- Bentonite seal
- Sand pack (No. 2)
- Well screen

SynTerra
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Phone: 864-421-9999

CLIENT: Diamond Crystal Duluth, LLC
PROJECT LOCATION: Duluth, GA

TABLES

Table A-1
Summary of Soil Total Arsenic and SPLP Analytical Results
Diamond Crystal Duluth, LLC
Duluth, Georgia

Boring Location / Sample ID	Date	Sampling Method	Depth (feet bgs)	USCS Soil Type	Arsenic Concentration[2] (mg/kg) <CAS 7440-38-2>	SPLP Arsenic Concentration[3] (ug/L) <CAS 7440-38-2>	pH[4] <CAS pH>	Total Moisture[5] % <CAS WET-037>
SB-01_1	10/31/2016	Direct Push Core[1]	1	SP-SM	18.1			
SB-01_7	10/31/2016	Direct Push Core[1]	7	SP-SM	9.37			
SB-01_13	10/31/2016	Direct Push Core[1]	13	SP-SM	**33**			
SB-01_16	10/31/2016	Direct Push Core[1]	16	ML	**50.5**	0.67J	6.49	15.4
SB-02_2	10/31/2016	Direct Push Core[1]	2	ML	**141**			
SB-02_7	10/31/2016	Direct Push Core[1]	7	ML	**52**			
SB-02_12	10/31/2016	Direct Push Core[1]	12	CL	**116**	<0.251U	5.25	21.3
SB-02_17	10/31/2016	Direct Push Core[1]	17	CL	**100**			
SB-02_23	10/31/2016	Direct Push Core[1]	23	CL	**134**			
SB-02_28	10/31/2016	Direct Push Core[1]	28	CL	**26**			
SB-03_2	10/31/2016	Direct Push Core[1]	2	ML	7.36			
SB-03_8	10/31/2016	Direct Push Core[1]	8	ML	**46.7**			
SB-03_14	10/31/2016	Direct Push Core[1]	14	SM	**69.5**			
SB-03_23	10/31/2016	Direct Push Core[1]	23	ML	**31.1**	<0.251U	5.74	20
SB-03_23 DUP	10/31/2016	Direct Push Core[1]	23	ML	**34**			
SB-03_28	10/31/2016	Direct Push Core[1]	28	ML	**106**			
SB-04_2	11/1/2016	Direct Push Core[1]	2	SM	**357**			
SB-04_6	11/1/2016	Direct Push Core[1]	6	SM	**369**	0.45J	5.67	16
SB-04_12	11/1/2016	Direct Push Core[1]	12	Saprolite	**362**			
SB-05_2	11/1/2016	Direct Push Core[1]	2	ML	**50.2**			
SB-05_6	11/1/2016	Direct Push Core[1]	6	ML/Saprolite	**111**	<0.251U	5.9	3.74
SB-06_2	11/1/2016	Direct Push Core[1]	2	SM	10.6			
SB-06_9	11/1/2016	Direct Push Core[1]	9	ML	9.41			
SB-06_12	11/1/2016	Direct Push Core[1]	12	ML	**20.5**			
SB-06_16	11/1/2016	Direct Push Core[1]	16	ML	6.19			
SB-06_23	11/1/2016	Direct Push Core[1]	23	ML	10.6			
SB-06_26	11/1/2016	Direct Push Core[1]	26	ML	13.9	<0.251U	6.49	26.7
SB-06_26 DUP	11/1/2016	Direct Push Core[1]	26	ML	13.9			
SB-06_31	11/1/2016	Direct Push Core[1]	31	ML	**88.6**			
SB-06_35	11/1/2016	Direct Push Core[1]	35	ML	**65.9**			

Notes:

Prepared by: EMY Checked by: JYT & MSM

[1] = Direct push approach using stainless steel soil coring device

[2] = Total arsenic by US EPA Method 6020A; results initially provided in Appendix B of the December 2016 Semi-Annual VRP Progress Report (Gulf Coast Analytical Laboratories, Inc. [GCAL] Report No. 216110370).

[3] = SPLP arsenic by US EPA 1312/6020A; results provided in Appendix A (GCAL Report No. 216112308)

[4] = pH by US EPA 9045D; results provided in Appendix A (GCAL Report No. 216112308)

[5] = Total Moisture by SM 2540 G-2011; results provided in Appendix A (GCAL Report No. 216112308)

bgs = below ground surface

J = Indicates the result is between the Method Detection Limit (MDL) and Limit of Quantitation (LOQ).

mg/kg = milligrams per kilogram

SPLP = Synthetic Precipitation Leaching Procedure

U = Indicates the compound was not detected above the MDL.

ug/L = micrograms per liter

USCS = Unified Soil Classification System

Bold value indicates the constituent is detected at a concentration above the "generic' non-residential Type 3 Risk Reduction Standard (20 mg/kg - Table 2 of Appendix III, Georgia EPD Risk Reduction Standards 391-3-19-.07).

Shaded cells indicate the value exceeds the site-specific Type 4 non-residential Risk Reduction Standard for Construction Workers (322 mg/kg; provided in Appendix A of the June 2016 Semi-Annual VRP Progress Report).

Table A-2
Site-Specific K_d Calculations
Diamond Crystal Duluth, LLC
Duluth, Georgia

Parameter	Value	Units	Source
K_d – Soil-water partition coefficient	calculated	L/kg	
C_{SPLP} – SPLP leachate concentration	see below	mg/L	GCAL Lab Report[1]
V_L – Volume of leachate	see below	L	GCAL Lab Report[1]
C_T – Total contaminant soil concentration (prior to leaching)	see below	mg/kg	GCAL Lab Report[1]
M_S – Dry weight of soil used for leaching test	see below	kg	GCAL Lab Report[1]

Site-Specific K_d Equation[2]

$$K_d = \frac{C_T M_S - C_{SPLP} V_L}{M_S C_{SPLP}}$$

Prepared by: EMY
Checked by: MSM

Sample ID	Arsenic SPLP[1] (ug/L)	Arsenic SPLP[1] (mg/L)	C_T[3] (mg/kg)	pH[1]	Moisture[1] (%)	V_L[1] (L)	M_S[1] (kg)	K_d (L/kg)
SB-01_16	0.67J	0.00067	50.5	6.49	15.4	0.604	0.0302	75,353
SB-02_12	<0.251U	0.000251	116	5.25	21.3	0.602	0.0301	462,131
SB-03_23	<0.251U	0.000251	31.1	5.74	20.0	0.606	0.0303	123,884
SB-04_6	0.45J	0.00045	369	5.67	16.0	0.61	0.0305	819,980
SB-05_6	<0.251U	0.000251	111	5.90	3.74	0.612	0.0306	442,211
SB-06_26	<0.251U	0.000251	13.9	6.49	26.7	0.600	0.0300	55,358

	K_d (L/kg)
min	55,358
max	819,980

Notes:

[1] = Information from laboratory analytical results provided in Appendix A; GCAL Analytical Laboratories, LLC Report No. 216112308.

[2] = Equation 10 from Georgia Department of Natural Resources Environmental Protection Division (EPD) ***DRAFT*** *Frequently Asked Questions for Evaluating the Soil-to-Groundwater Pathway* , February 18, 2015.

[3] = Information from laboratory analytical results provided in Appendix B of the December 2016 Semi-Annual VRP Progress Report (GCAL Analytical Laboratories, LLC Report No. 216110370).

J = Indicates the result is between the Method Detection Limit (MDL) and Limit of Quantitation (LOQ).

U = Indicates the compound was not detected above the MDL.

**For non-detect SPLP leachate concentrations, the MDL was *conservatively* used in the site-specific K_d calculations.

Table A-3
Partitioning Equation Calculation
Diamond Crystal Duluth, LLC
Duluth, Georgia

Parameter	Value	Units	Source
C_t – Acceptable soil concentration	calculated	mg/kg	
C_w – Target leachate concentration	0.01	mg/L	Georgia/EPA MCL
K_d – Soil-water partition coefficient	calculated	L/kg	GA EPD Draft Guidance[2]
θ_w – Water-filled soil porosity	0.3	L_{water}/L_{soil}	GA EPD Draft Guidance[3]
θ_a – Air-filled soil porosity	0.13	L_{air}/L_{soil}	GA EPD Draft Guidance[3]
n – Total soil porosity	0.43	L_{pore}/L_{soil}	GA EPD Draft Guidance[3]
P_b – Dry soil bulk density	1.5	kg/L	GA EPD Draft Guidance[3]
P_s – Soil particle density	2.65	kg/L	GA EPD Draft Guidance[3]
H' – Dimensionless Henry's Law Constant	0	unitless	EPA RSL[4]

Partitioning Equation[1]

$$C_t = C_w \left[K_d + \frac{\theta_w + \theta_a H'}{P_b} \right]$$

Prepared by: EMY
Checked by: MSM

Sample ID	K_d[2] (L/kg)	C_t (mg/kg)
SB-01_16	75,353	754
SB-02_12	462,131	4,621
SB-03_23	123,884	1,239
SB-04_6	819,980	8,200
SB-05_6	442,211	4,422
SB-06_26	55,358	554

	C_t (mg/kg)
min	554
max	8,200

Notes:

[1] = Equation 1 from Georgia Department of Natural Resources Environmental Protection Division (EPD) ****DRAFT*** Frequently Asked Questions for Evaluating the Soil-to-Groundwater Pathway* , February 18, 2015.

[2] = Equation 10 from Georgia Department of Natural Resources Environmental Protection Division (EPD) ****DRAFT*** Frequently Asked Questions for Evaluating the Soil-to-Groundwater Pathway* , February 18, 2015. Results presented in Table A-2.

[3] = Table 2 (Section 4.1) from Georgia Department of Natural Resources Environmental Protection Division (EPD) ****DRAFT*** Frequently Asked Questions for Evaluating the Soil-to-Groundwater Pathway* , February 18, 2015.

[4] = Information from US EPA Regional Screening Levels May (EPA 2016).

LABORATORY ANALYTICAL REPORT

ANALYTICAL RESULTS

PERFORMED BY

GCAL, LLC
7979 Innovation Park Dr.
Baton Rouge, LA 70820

Report Date 12/01/2016

GCAL Report 216112308

Project DCB / 918.05.07

Deliver To	***Additional Recipients***
Matt Mudge Synterra Corp 148 River st Suite 220 Greenville, SC 29601 864-421-9999	NONE

Laboratory Endorsement

Sample analysis was performed in accordance with approved methodologies provided by the Environmental Protection Agency or other recognized agencies. The samples and their corresponding extracts will be maintained for a period of 30 days unless otherwise arranged. Following this retention period the samples will be disposed in accordance with GCAL's Standard Operating Procedures.

Common Abbreviations that may be Utilized in this Report

ND	Indicates the result was Not Detected at the specified reporting limit
NO	Indicates the sample did not ignite when preliminary test performed for EPA Method 1030
DO	Indicates the result was Diluted Out
MI	Indicates the result was subject to Matrix Interference
TNTC	Indicates the result was Too Numerous To Count
SUBC	Indicates the analysis was Sub-Contracted
FLD	Indicates the analysis was performed in the Field
DL	Detection Limit
DL	Diluted analysis – when appended to Client Sample ID
LOD	Limit of Detection
LOQ	Limit of Quantitation
RE	Re-analysis
CF	HPLC or GC Confirmation
00:01	Reported as a time equivalent to 12:00 AM

Reporting Flags that may be Utilized in this Report

J or I	Indicates the result is between the MDL and LOQ
J	DOD flag on analyte in the parent sample for MS/MSD outside acceptance criteria
U	Indicates the compound was analyzed for but not detected
B or V	Indicates the analyte was detected in the associated Method Blank
Q	Indicates a non-compliant QC Result (See Q Flag Application Report)
*****	Indicates a non-compliant or not applicable QC recovery or RPD – see narrative
E	The result is estimated because it exceeded the instrument calibration range
E	Metals - % diference for the serial dilution is > 10%
P	RPD between primary and confirmation result is greater than 40

Sample receipt at GCAL is documented through the attached chain of custody. In accordance with NELAC, this report shall be reproduced only in full and with the written permission of GCAL. The results contained within this report relate only to the samples reported. The documented results are presented within this report.

This report pertains only to the samples listed in the Report Sample Summary and should be retained as a permanent record thereof. The results contained within this report are intended for the use of the client. Any unauthorized use of the information contained in this report is prohibited.

I certify that this data package is in compliance with The NELAC Institute (TNI) Standard 2009 and terms and conditions of the contract and Statement of Work both technically and for completeness, for other than the conditions in the case narrative. Release of the data contained in this hardcopy data package and in the computer readable data submitted has been authorized by the Quality Assurance Manager or his/her designee, as verified by the following signature.

Estimated uncertainty of measurement is available upon request. This report is in compliance with the DOD QSM as specified in the contract if applicable.

Authorized Signature
GCAL Report 216112308

Certifications

Certification	Certification Number
DOD ELAP	L14-243
Alabama	01955
Arkansas	12-060-0
Colorado	01955
Delaware	01955
Florida	E87854
Georgia	01955
Hawaii	01955
Idaho	01955
Illinois	200048
Indiana	01955
Kansas	E-10354
Kentucky	95
Louisiana	01955
Maryland	01955
Massachusetts	01955
Michigan	01955
Mississippi	01955
Missouri	01955
Montana	N/A
Nebraska	01955
New Mexico	01955
North Carolina	618
North Dakota	R-195
Oklahoma	9403
South Carolina	73006001
South Dakota	01955
Tennessee	01955
Texas	T104704178
Vermont	01955
Virginia	460215
USDA Soil Permit	P330-10-00117

Case Narrative

Client: Synterra **Report:** 216112308

Gulf Coast Analytical Laboratories received and analyzed the sample(s) listed on the Report Sample Summary page of this report. Receipt of the sample(s) is documented by the attached chain of custody. This applies only to the sample(s) listed in this report. No sample integrity or quality control exceptions were identified unless noted below.

No anomalies were found for the analyzed sample(s).

Sample Summary

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21611230801	SB-01_16	Solid	10/31/2016 11:24	11/03/2016 10:00
21611230802	SB-02_12	Solid	10/31/2016 12:41	11/03/2016 10:00
21611230803	SB-03_23	Solid	10/31/2016 17:25	11/03/2016 10:00
21611230804	SB-04_6	Solid	11/01/2016 10:53	11/03/2016 10:00
21611230805	SB-05_6	Solid	11/01/2016 11:30	11/03/2016 10:00
21611230806	SB-06_26	Solid	11/01/2016 13:10	11/03/2016 10:00

Summary of Compounds Detected

SB-01_16

Collect Date 10/31/2016 11:24 **GCAL ID** 21611230801
Receive Date 11/03/2016 10:00 **Matrix** Solid

EPA 1312/6020A

CAS#	Parameter	Result	DL	LOQ	Units
7440-38-2	Arsenic	0.67J	0.25	1.00	ug/L

EPA 9045D

CAS#	Parameter	Result	DL	LOQ	Units
pH	pH	6.49	1.00	1.00	pH unit

SM 2540 G-2011

CAS#	Parameter	Result	DL	LOQ	Units
WET-037	Total Moisture	15.4	0.010	0.010	%

SB-02_12

Collect Date 10/31/2016 12:41 **GCAL ID** 21611230802
Receive Date 11/03/2016 10:00 **Matrix** Solid

EPA 9045D

CAS#	Parameter	Result	DL	LOQ	Units
pH	pH	5.25	1.00	1.00	pH unit

SM 2540 G-2011

CAS#	Parameter	Result	DL	LOQ	Units
WET-037	Total Moisture	21.3	0.010	0.010	%

Summary of Compounds Detected

SB-03_23

Collect Date 10/31/2016 17:25 **GCAL ID** 21611230803
Receive Date 11/03/2016 10:00 **Matrix** Solid

EPA 9045D

CAS#	Parameter	Result	DL	LOQ	Units
pH	pH	5.74	1.00	1.00	pH unit

SM 2540 G-2011

CAS#	Parameter	Result	DL	LOQ	Units
WET-037	Total Moisture	20.0	0.010	0.010	%

SB-04_6

Collect Date 11/01/2016 10:53 **GCAL ID** 21611230804
Receive Date 11/03/2016 10:00 **Matrix** Solid

EPA 1312/6020A

CAS#	Parameter	Result	DL	LOQ	Units
7440-38-2	Arsenic	0.45J	0.25	1.00	ug/L

EPA 9045D

CAS#	Parameter	Result	DL	LOQ	Units
pH	pH	5.67	1.00	1.00	pH unit

SM 2540 G-2011

CAS#	Parameter	Result	DL	LOQ	Units
WET-037	Total Moisture	16.0	0.010	0.010	%

Summary of Compounds Detected

SB-05_6

Collect Date 11/01/2016 11:30 **GCAL ID** 21611230805
Receive Date 11/03/2016 10:00 **Matrix** Solid

EPA 9045D

CAS#	Parameter	Result	DL	LOQ	Units
pH	pH	5.90	1.00	1.00	pH unit

SM 2540 G-2011

CAS#	Parameter	Result	DL	LOQ	Units
WET-037	Total Moisture	3.74	0.010	0.010	%

SB-06_26

Collect Date 11/01/2016 13:10 **GCAL ID** 21611230806
Receive Date 11/03/2016 10:00 **Matrix** Solid

EPA 9045D

CAS#	Parameter	Result	DL	LOQ	Units
pH	pH	6.49	1.00	1.00	pH unit

SM 2540 G-2011

CAS#	Parameter	Result	DL	LOQ	Units
WET-037	Total Moisture	26.7	0.010	0.010	%

Sample Results

SB-01_16

Collect Date	10/31/2016 11:24	**GCAL ID**	21611230801
Receive Date	11/03/2016 10:00	**Matrix**	Solid

EPA 1312/6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
11/25/2016 11:35	599549	EPA 3010A	1	11/29/2016 21:21	AWG	599802

CAS#	Parameter	Result	DL	LOQ	Units
7440-38-2	**Arsenic**	**0.67J**	**0.25**	**1.00**	**ug/L**

EPA 9045D

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	11/23/2016 11:20	GDG	599483

CAS#	Parameter	Result	DL	LOQ	Units
pH	**pH**	**6.49**	**1.00**	**1.00**	**pH unit**

SM 2540 G-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	11/05/2016 10:18	AJE	599904

CAS#	Parameter	Result	DL	LOQ	Units
WET-037	**Total Moisture**	**15.4**	**0.010**	**0.010**	**%**

SB-02_12

Collect Date	10/31/2016 12:41	**GCAL ID**	21611230802
Receive Date	11/03/2016 10:00	**Matrix**	Solid

EPA 1312/6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
11/25/2016 11:35	599549	EPA 3010A	1	11/29/2016 21:42	AWG	599802

CAS#	Parameter	Result	DL	LOQ	Units
7440-38-2	Arsenic	0.251U	0.25	1.00	ug/L

Sample Results

SB-02_12

Collect Date 10/31/2016 12:41 **GCAL ID** 21611230802
Receive Date 11/03/2016 10:00 **Matrix** Solid

EPA 9045D

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	11/23/2016 11:20	GDG	599483

CAS#	Parameter	Result	DL	LOQ	Units
pH	pH	5.25	1.00	1.00	pH unit

SM 2540 G-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	11/05/2016 10:18	AJE	599904

CAS#	Parameter	Result	DL	LOQ	Units
WET-037	Total Moisture	21.3	0.010	0.010	%

SB-03_23

Collect Date 10/31/2016 17:25 **GCAL ID** 21611230803
Receive Date 11/03/2016 10:00 **Matrix** Solid

EPA 1312/6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
11/25/2016 11:35	599549	EPA 3010A	1	11/29/2016 21:46	AWG	599802

CAS#	Parameter	Result	DL	LOQ	Units
7440-38-2	Arsenic	0.251U	0.25	1.00	ug/L

EPA 9045D

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	11/23/2016 11:20	GDG	599483

CAS#	Parameter	Result	DL	LOQ	Units
pH	pH	5.74	1.00	1.00	pH unit

Sample Results

SB-03_23

Collect Date 10/31/2016 17:25 **GCAL ID** 21611230803
Receive Date 11/03/2016 10:00 **Matrix** Solid

SM 2540 G-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	11/05/2016 10:18	AJE	599904

CAS#	Parameter	Result	DL	LOQ	Units
WET-037	Total Moisture	20.0	0.010	0.010	%

SB-04_6

Collect Date 11/01/2016 10:53 **GCAL ID** 21611230804
Receive Date 11/03/2016 10:00 **Matrix** Solid

EPA 1312/6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
11/25/2016 11:35	599549	EPA 3010A	1	11/29/2016 21:51	AWG	599802

CAS#	Parameter	Result	DL	LOQ	Units
7440-38-2	Arsenic	0.45J	0.25	1.00	ug/L

EPA 9045D

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	11/23/2016 11:20	GDG	599483

CAS#	Parameter	Result	DL	LOQ	Units
pH	pH	5.67	1.00	1.00	pH unit

SM 2540 G-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	11/05/2016 10:18	AJE	599904

CAS#	Parameter	Result	DL	LOQ	Units
WET-037	Total Moisture	16.0	0.010	0.010	%

Sample Results

SB-05_6

Collect Date 11/01/2016 11:30 **GCAL ID** 21611230805
Receive Date 11/03/2016 10:00 **Matrix** Solid

EPA 1312/6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
11/25/2016 11:35	599549	EPA 3010A	1	11/29/2016 21:55	AWG	599802

CAS#	Parameter	Result	DL	LOQ	Units
7440-38-2	Arsenic	0.251U	0.25	1.00	ug/L

EPA 9045D

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	11/23/2016 11:20	GDG	599483

CAS#	Parameter	Result	DL	LOQ	Units
pH	**pH**	**5.90**	**1.00**	**1.00**	**pH unit**

SM 2540 G-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	11/05/2016 11:48	AJE	599905

CAS#	Parameter	Result	DL	LOQ	Units
WET-037	**Total Moisture**	**3.74**	**0.010**	**0.010**	**%**

SB-06_26

Collect Date 11/01/2016 13:10 **GCAL ID** 21611230806
Receive Date 11/03/2016 10:00 **Matrix** Solid

EPA 1312/6020A

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
11/25/2016 11:35	599549	EPA 3010A	1	11/29/2016 21:59	AWG	599802

CAS#	Parameter	Result	DL	LOQ	Units
7440-38-2	Arsenic	0.251U	0.25	1.00	ug/L

Sample Results

SB-06_26	**Collect Date**	11/01/2016 13:10	**GCAL ID**	21611230806
	Receive Date	11/03/2016 10:00	**Matrix**	Solid

EPA 9045D

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	11/23/2016 11:20	GDG	599483

CAS#	Parameter	Result	DL	LOQ	Units
pH	pH	6.49	1.00	1.00	pH unit

SM 2540 G-2011

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
NA	NA	NA	1	11/05/2016 11:48	AJE	599905

CAS#	Parameter	Result	DL	LOQ	Units
WET-037	Total Moisture	26.7	0.010	0.010	%

Inorganics QC Summary

Analytical Batch	Client ID	MB599549		LCS599549			
599582	GCAL ID	1632206		1632207			
Prep Batch	Sample Type	MB		LCS			
599549	Prep Date	11/25/2016 11:35		11/25/2016 11:35			
Prep Method	Analysis Date	11/25/2016 15:00		11/25/2016 15:04			
EPA 3010A	Matrix	Water		Water			
EPA 1312/6020A		Units Result	ug/L DL	Spike Added	Result	%R	Control Limits%R
Arsenic	7440-38-2	0.251	0.25	50.0	50.1	100	80 - 120

Analytical Batch	Client ID	SB-01_16		1631926MS				1631926MSD				
599802	GCAL ID	21611230801		1632208				1632219				
Prep Batch	Sample Type	SAMPLE		MS				MSD				
599549	Prep Date	11/25/2016 11:35		11/25/2016 11:35				11/25/2016 11:35				
Prep Method	Analysis Date	11/29/2016 21:21		11/29/2016 21:26				11/29/2016 21:30				
EPA 3010A	Matrix	Solid		Solid				Solid				
EPA 1312/6020A		Units Result	ug/L DL	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Arsenic	7440-38-2	0.79	0.30	59.1	60.3	101	80 - 120	59.1	58.5	98	3	20

General Chemistry QC Summary

Analytical Batch 599483	Client ID	SB-01_16		1631926DUP		
	GCAL ID	21611230801		1631992		
	Sample Type	SAMPLE		DUP		
	Prep Date	NA		NA		
	Analysis Date	11/23/2016 11:20		11/23/2016 11:20		
	Matrix	Solid		Solid		
EPA 9045D		Units Result	pH unit DL	Result	RPD	RPD Limit
pH	pH	6.49	1.00	6.52	1	6

Analytical Batch 599905	Client ID	SB-05_6		1631930DUP		
	GCAL ID	21611230805		1633689		
	Sample Type	SAMPLE		DUP		
	Prep Date	NA		NA		
	Analysis Date	11/05/2016 11:48		11/05/2016 11:48		
	Matrix	Solid		Solid		
SM 2540 G-2011		Units Result	% DL	Result	RPD	RPD Limit
Total Moisture	WET-037	3.74	0.010	3.59	4	25

GCAL
ANALYTICAL LABORATORIES, LLC

7979 Innovation Park Dr., Baton Rouge, LA 70820-7402
Phone: 225.769.4900 • Fax: 225.767.5717 • www.gcal.com

CHAIN OF CUSTODY RECORD

Client ID: 4945 - Synterra
SDG: 216112308
PM: SAB3

Report to:	Bill to:
Client: SYNTERRA	Client: SYNTERRA
Address: 148 RIVER ST GREENVILLE SC 29601	Address: 148 RIVER ST, SUITE 220 GREENVILLE SC 29601
Contact: MATT MUDGE	Contact:
Phone: 864-527-4633	Phone: 864-421-9999
E-mail: mmudge@synterracorp.com	E-mail:

P.O. Number:
Project Name/Number: DCB / 918.05.07
Sampled By: EHY

Analytical Requests & Method: Total Arsenic (KTBB); pH; SPLP for Arsenic; Dry Weight

GCAL use only:
Custody Seal used ☑ yes ☐ no
intact ☑ yes ☐ no
Temperature °C 0.4, 1.1 E2 (?) 32, 55 cpm

☐ Dissolved Analysis Requested
☐ Field filtered
☐ Lab filtered

Matrix[1]	Date	Time (2400)	Comp	Grab	Sample Description	No Containers	Total Arsenic	pH	SPLP for Arsenic	Dry Weight	Preservative
~~S~~	~~10/31/16~~	~~1115~~			~~SB-01-1~~	1	X				1
~~S~~	~~10/31/16~~	~~1118~~		~~✓~~	~~SB-01-7~~	1	X				2
~~S~~	~~10/31/16~~	~~1121~~		~~✓~~	~~SB-01-13~~	1	X				3
S	10/31/16	1124		✓	SB-01-16	1	X	ⓧ	ⓧ	ⓧ 11/22/16 MGM	4 * 1
~~S~~	~~10/31/16~~	~~1133~~		~~✓~~	~~SB-02-[illegible]~~	1	X				5
~~S~~	~~10/31/16~~	~~1336~~		~~✓~~	~~SB-02-7~~	1	X				6
S	10/31/16	1341		✓	SB-02-12	1	X	ⓧ	ⓧ	ⓧ 11/22/16 MGM	7 * 2
~~S~~	~~10/31/16~~	~~1345~~		~~✓~~	~~SB-02-14~~	1	X				8
~~S~~	~~10/31/16~~	~~1348~~		~~✓~~	~~SB-02-23~~	1	X				9
~~S~~	~~10/31/16~~	~~1351~~		~~✓~~	~~SB-02-28~~	1	X				10
~~S~~	~~10/31/16~~	~~1355~~		~~✓~~	~~SB-02-33~~ (EHY)	~~1~~	~~X~~ (EHY)				
~~S~~	~~10/31/16~~	~~1718~~		~~✓~~	~~SB-03-[illegible]~~	1	X				11
~~S~~	~~10/31/16~~	~~1720~~		~~✓~~	~~SB-03-8~~	1	X				12

Air Bill No: 7976 1556 6522

* ONLY SAMPLES ON 11/23/16 TO BE RUN - DNM 11-23-16

Turn Around Time (Business Days): ☐ 24h* ☐ 48h* ☐ 3 days* ☐ 1 week* ☑ Standard (Per Contract/Quote)

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
EHY	11/2/16	915	Hugo Anez	11/2/16	9:15
Hugo Anez	11/02/16		FedEx	11/02/16	
FedEx	11-3-16	1000	[signature]	11-3-16	1000

Note: ARCHIVE FOR FUTURE SAMPLES.
* FOLLOW UP TBD BASED UPON ARSENIC RESULTS

By submitting these samples, you agree to GCAL's terms and conditions contained in our most recent schedule of services.

Matrix[1]: W = water, S = solid, L = liquid, T = tissue

*Requires prior approval, rush charges may apply.

We cannot accept verbal changes. Please email written changes to your PM.

WHITE: CLIENT FINAL REPORT - CANARY: CLIENT

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Contact: MATT MUDGE	Contact:
Phone: 864-527-4633	Phone: 864-421-9999
E-mail: mmudge@synterracorp.com	E-mail:

P.O. Number:

Project Name/Number: DCB / 918.05.07

Sampled By: BMY

Analytical Requests & Method: Total Arsenic * 918 weekly; pH; SPLP for Arsenic; Dry Weight

GCAL use only:
Custody Seal used ☑ yes ☐ no
intact ☑ yes ☐ no
Temperature °C 0.4, 1.1 E26 32, 55gm

☐ Dissolved Analysis Requested
☐ Field filtered
☐ Lab filtered

Matrix'	Date	Time (2400)	Comp	Grab	Sample Description	No Containers	Total Arsenic	pH	SPLP for Arsenic	Dry Weight	Preservative	
~~S~~	~~10/31/16~~	~~1700~~		~~✓~~	~~SB-03_[illegible]~~	1	X				13	
S	10/31/16	1725		✓	SB-03_23	1	X	⊗	⊗	⊗ 11/22/16 MSM	14 *	3
~~S~~	~~10/31/16~~	~~1726~~		~~✓~~	~~SB-03-23 DUP~~	1	X				15	
~~S~~	~~10/31/16~~	~~1729~~		~~✓~~	~~SB-03_28~~	1	X				16	
~~S~~	~~11/1/16~~	~~1050~~		~~✓~~	~~SB-04_2~~	1	X				17	
S	11/1/16	1053		✓	SB-04_6	1	X	⊗	⊗	⊗ 11/22/16 MSM	18 *	4
~~S~~	~~11/1/16~~	~~1057~~		~~✓~~	~~SB-04_12~~	1	X				19	
~~S~~	~~11/1/16~~	~~1105~~		~~✓~~	~~SB-05_2~~	1	X				20	
S	11/1/16	1130		✓	SB-05_6	1	X	⊗	⊗	⊗ 11/22/16 MSM	21 *	5
~~S~~	~~11/1/16~~	~~1255~~		~~✓~~	~~SB-06_2~~	1	X				22	
~~S~~	~~11/1/16~~	~~1258~~		~~✓~~	~~SB-06_7~~	2	X				23	
~~S~~	~~11/1/16~~	~~1301~~		~~✓~~	~~SB-06_12~~	2	X				24	
~~S~~	~~11/1/16~~	~~1304~~		~~✓~~	~~SB-06_18~~	2	X				25	

Air Bill No: 7776 1556 6522

Turn Around Time (Business Days): ☐ 24h* ☐ 48h* ☐ 3 days* ☐ 1 week* ☑ Standard (Per Contract/Quote)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
[signature]	11/2/16	915	HUGO ANEZ	11/02/16	9:15
HUGO ANEZ	11/02/16		FedEx	11/02/16	
FedEx	11-7-16	1000	[signature]	11-3-16	1000

Note: ARCHIVE FOR FUTURE SAMPLES
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Bill to:
Client: SYNTERRA
Address: 148 RIVER ST SUITE 220 GREENVILLE SC 29601
Contact:
Phone: 864-421-9999
E-mail:

P.O. Number:
Project Name/Number: DCB / 918.05.07
Sampled By: BM

Analytical Requests & Method: TOTAL ARSENIC; pH; SPLP for Arsenic; DRY WEIGHT

GCAL use only:
Custody Seal used ☑ yes ☐ no
intact ☑ yes ☐ no
Temperature °C 0.4, LIE26 32, 55cpm
☐ Dissolved Analysis Requested
☐ Field filtered
☐ Lab filtered

Matrix¹	Date	Time (2400)	Comp	Grab	Sample Description	No. Containers	Total Arsenic	pH	SPLP for Arsenic	Dry Weight	Preservative
~~S~~	~~11/1/16~~	~~1307~~		~~✓~~	~~SB-06-02~~	2	X				26
S	11/1/16	1310		✓	SB-06-26	1	X	⊗	⊗	⊗	27 *
~~S~~	~~11/1/16~~	~~1310~~		~~✓~~	~~SB-06-26 DUP~~	1	X				28
~~S~~	~~11/1/16~~	~~1313~~		~~✓~~	~~SB-06-31~~	2	X				29
~~S~~	~~11/1/16~~	~~1430~~		~~✓~~	~~SB-06-35~~	1	X				30

Air Bill No: 7776 1556 6522

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Relinquished by	Date	Time	Received by	Date	Time
[signature]	11/2/16	915	HUGO ANEZ	11/02/16	9:15
HUGO ANEZ	11/02/16		FEDEX	11/02/16	
Fedex	11-3-16	1000	[signature]	11-3-16	1000

Note: ARCHIVE FOR FUTURE SAMPLES
* FOLLOW UP TBD BASED UPON ARSENIC RESULTS

By submitting these samples, you agree to GCAL's terms and conditions contained in our most recent schedule of services.

Matrix¹: W = water, S = solid, L = liquid, T = tissue
*Requires prior approval, rush charges may apply.
We cannot accept verbal changes. Please email written changes to your PM.

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SAMPLE RECEIVING CHECKLIST

* 2 1 6 1 1 2 3 0 8 *

SAMPLE DELIVERY GROUP 216112308

Client PM SAB3 4945 - Synterra	**Transport Method** FEDEX
Profile Number 271914	**Received By** McCune, Dodie N.
Line Item(s) 1 - Solid- SPLP Arsenic/pH	**Receive Date(s)** 11/03/16

CHECKLIST	YES	NO	NA
Samples received with proper thermal and chemical preservation?	☑	☐	☐
Radioactivity is <1600 cmp? If no, record cmp value in notes section.	☑	☐	☐
Custody seals present and intact?	☑	☐	☐
COC relinquished and complete (including sample IDs, collect dates/times, and sampler name)?	☑	☐	☐
Short holds or RUSH samples received?	☐	☑	☐
All containers received in good condition and within hold time?	☑	☐	☐
All sample labels and containers received match the chain of custody?	☑	☐	☐
Preservation checked at receipt? Exceptions: VOC, Coliform, TOC, Oil and Grease, DOC	☐	☐	☑
Preservative added to any containers?	☐	☑	☐
VOC water containers received with headspace < 6mm?	☐	☐	☑
Received filtered sample volume for dissolved analysis?	☐	☐	☑
Trip blank present in all coolers containing VOC waters?	☐	☐	☑
Samples collected in containers provided by GCAL?	☑	☐	☐

COOLERS

Airbill	Thermometer ID: E26	Temp(°C)
777615566522		0.4
		1.1

DISCREPANCIES

None

LAB PRESERVATIONS

None

NOTES

Revision 1.5

Page 1 of 1

GCAL ANALYTICAL LABORATORIES, LLC

SPLP EXTRACTIONS

ANALYST: BMH
DATE: 11/23/16

HBN: 599532
BATCH: 10600

Temp. Controls: 23 ± 2 °C
Min. Temp °C: 18.8
Max. Temp °C: 23.1

Sample Number:		S-Blank	216112308 01	216112308 02	216112308 03
Sample Description		VESBK	Soil	Soil	Soil
Matrix Spike Required			MS		
100% solid (Skip to 3)*	(√)		✓	✓	✓
Sample is <100%	(√)				
1. FILTRATION (Pressure Filtration is Required if Solids are ³ 10%)					
Filter Weight	(F)				
Filtrate Vessel Weight	(V)				
Subsample Weight (100 g minimum)	(S)				
Weight of Liquid Phase (V+liquid)-V	(L)				
Weight of Solid Phase (S-L)	(SP)				
% Solids (SP/S) x 100 *	(%S)				
%Dry Solids = [(Dried SP-F)/S] x 100*	(%DS)				
2.EXTRACTION FLUID DETERMINATION					
Sample is from East side of MS river - Fluid 1	(√)	✓	✓	✓	✓
Sample is from West side of MS river - Fluid 2	(√)				
Waste Sample - Fluid 1	(√)				
Possible Containing Cyanide - Use DI H_2O	(√)				
3. PREPARATION FOR EXTRACTION PROCEDURE*					
Particle Size Reduced (95. mm max)	(√)				
Weight of Solids to be Extracted	(X)		30.2	30.1	30.3
Filtrate Vessel Weight (multiphasic)	(EV)				
Weight of Filtrate + Vessel (multiphasic)	(EF)				
Amount of Fluid Needed = 20 x X			604	602	606
4. SPLP ROTATION (Rotate for 18 ± 2 hours at 23 ± 2°C and 30 ± 2 rpm)					
Start Time/ Stop Time		2315/1900	———		
5. FINAL SPLP EXTRACT					
If the phases will be analyzed separately, determine the volume of each phase:					
Volume Extract obtained in Step 5 (EF-EV)		500	500	500	500
Volume filtrate from Step 4 (L)					
pH of SPLP Extract (If two phase,record pH for each phase)			5.73	5.26	5.71

* If sample is <0.5 %S or <0.5 %DS; Filter sample , collect filtrate and skip to 6. If sample is 100% solid, use 100 grams sample and 2000mLs fluid.
%DS is only performed if it is suspected that after drying, the %S will be <0.5%.

Ext. Fluid #1 pH/ID: 602-14-1 / 4.21 pH
Ext. Fluid #2 pH/ID: N/a
Balance ID: 1117331003

Rotator ID: 6
Rotation Start Date: 11/23/16
Rotation Stop Date: 11/24/16

Reviewer/Date: SKB 12/01/16

Revision 005: 5/7/2014

GCAL ANALYTICAL LABORATORIES, LLC

SPLP EXTRACTIONS

ANALYST: BMH
DATE: 11/23/16

HBN: 599532
BATCH: 10600

Temp. Controls: 23 ± 2 °C
Min. Temp °C: 18.8
Max. Temp °C: 23.1

Sample Number:		216112308 04	216112308 05	216112308 06	
Sample Description		Soil	Soil	Soil	
Matrix Spike Required					
100% solid (Skip to 3)*	(√)	✓	✓	✓	
Sample is <100%	(√)				
1. FILTRATION (Pressure Filtration is Required if Solids are ³ 10%)					
Filter Weight	(F)				
Filtrate Vessel Weight	(V)				
Subsample Weight (100 g minimum)	(S)				
Weight of Liquid Phase (V+liquid)-V	(L)				
Weight of Solid Phase (S-L)	(SP)				
% Solids (SP/S) x 100 *	(%S)				
%Dry Solids = [(Dried SP-F)/S] x 100*	(%DS)				
2.EXTRACTION FLUID DETERMINATION					
Sample is from East side of MS river - Fluid 1	(√)	✓	✓	✓	
Sample is from West side of MS river - Fluid 2	(√)				
Waste Sample - Fluid 1	(√)				
Possible Containing Cyanide - Use DI H_2O	(√)				
3. PREPARATION FOR EXTRACTION PROCEDURE*					
Particle Size Reduced (95. mm max)	(√)				
Weight of Solids to be Extracted	(X)	30.5	30.6	30.0	
Filtrate Vessel Weight (multiphasic)	(EV)				
Weight of Filtrate + Vessel (multiphasic)	(EF)				
Amount of Fluid Needed = 20 x X		610	612	600	
4. SPLP ROTATION (Rotate for 18 ± 2 hours at 23 ± 2°C and 30 ± 2 rpm)					
Start Time/ Stop Time		2315/1900			
5. FINAL SPLP EXTRACT					
If the phases will be analyzed separately, determine the volume of each phase:					
Volume Extract obtained in Step 5 (EF-EV)		500	500	500	
Volume filtrate from Step 4 (L)					
pH of SPLP Extract (If two phase,record pH for each phase)		5.21	5.01	5.04	

* If sample is <0.5 %S or <0.5 %DS; Filter sample , collect filtrate and skip to 6. If sample is 100% solid, use 100 grams sample and 2000mLs fluid.
%DS is only performed if it is suspected that after drying, the %S will be <0.5%.

Ext. Fluid #1 pH/ID: 602-14-1 / 4.21 pH
Ext. Fluid #2 pH/ID: N/a
Balance ID: 1117331003

Rotator ID: 6
Rotation Start Date: 11/23/16
Rotation Stop Date: 11/24/16

Reviewer/Date: SKB 12/01/16

Revision 005: 5/7/2014