

TECHNICAL MEMO

July 18, 2013

To: Prashant K. Gupta (Honeywell), John Morris (Honeywell)
 From: Richard F. Carbonaro; Robert D. Mutch (Mutch Associates, LLC), James O'Loughlin (Parsons)
 Subject: CO₂ Sparging Proof of Concept – 6 month post-sparge monitoring results, LCP Chemicals Site, Brunswick, GA

Mutch Associates, LLC, in collaboration with Parsons Corporation (Parsons), have prepared this technical memo describing the analytical results of the 6 month post-sparge monitoring for the CO_2 sparging Proof of Concept test conducted at the LCP Chemical Site in Brunswick, Georgia. The Proof of Concept test was conducted in accordance with the "Final Work Plan for CO_2 Sparging Proof of Concept Test, LCP Chemical Site, Brunswick, GA" (Mutch Associates, 2012) dated September 11, 2012. The Proof of Concept test was designed to evaluate the feasibility of CO_2 sparging to remediate a subsurface caustic brine pool (CBP) formed by historical production of industrial chemicals on the site. The purpose of the post-sparge sampling events is to assess changes in groundwater chemistry following CO_2 sparging, including the potential for rebound of pH and other constituents of concern.

This technical memo describes the results of the third and final post-sparge monitoring event that occurred on May 15, 2013. The first post-sparge monitoring event occurred approximately 1 week after the end of the sparging on November $26^{th} - 28^{th}$, 2012. The second event occurred on February 4^{th} and 5^{th} of 2013.

Groundwater Sampling

A site plan showing the location of all wells within the Proof of Concept area is provided in Figure 1. In accordance with the work plan, five out of 13 monitoring wells were selected for rebound monitoring pending the outcome of pH and geochemistry results from the first post-sparging sampling round at one week. The wells selected were SW-1, MW-1C, MW-2C, MW-519B and MW-115C. These wells were sampled at 3 and 6 months post-sparging. SW-1 was selected to serve as a field duplicate for the 6 month sampling bringing the total number of samples to six. The distance from sparge wells to monitoring wells is shown on Table 1.

The five monitoring wells were purged and sampled using the low flow "Tubing-in-Screened-Interval" method, pursuant to US EPA Region IV Environmental Investigations Standard Operating Procedure (SOP) – October 2011. The guidance document *Groundwater Sampling Guidelines for Superfund and RCRA Project Managers* was also referenced for additional technical support. Per the method, the tubing intake was lowered to the middle of the screened interval of the well, and a peristaltic pump was used to purge the groundwater at a very low flow rate. Throughout the purge process, depths to water measurements were collected to assess and maintain stable drawdown. A minimum one equipment volume was purged prior to stabilization parameters (pH, specific conductivity, dissolved oxygen, and turbidity) being collected. Although not considered stabilization parameters, temperature and oxidation reduction potential were also recorded. The field sampling logs are included as Appendix A to this report. Once the required parameters were stable for three consecutive readings, groundwater samples were collected for laboratory analysis as described in Table 3-2 of the Proof of Concept Report (Mutch Associates and Parsons, 2013). The groundwater samples were preserved on ice and submitted to TestAmerica Laboratories in Savannah, GA for analysis. Once the groundwater samples had been collected, approximately 900 mL of groundwater were pumped into a graduated cylinder and the specific gravity was determined using a hydrometer.



Figure 1: Proof of Concept Test Site Plan

Table 1: Summary of Deep Satilla Monitoring Wells and Inter-well Distances											
Monitoring Well	Distance from SW-1 (ft)	Distance from MW-1C (ft)	Screened Interval (ft)								
MW-115C	18.7	24.6	40-42								
MW-1C	8.4	0.0	45 - 50								
MW-2C	13.1	19.9	45 - 50								
MW-519B	20.6	15.1	42-48								

Sampling Results

A summary of the results from the groundwater analysis is presented in Table 2. All of the analytical data from TestAmerica and the well purge/sampling logs are provided at the end of this Technical Memo.

event						
	4					1
	SW-1	SW-1 (FD)	MW-1C	MW-2C	MW-519B	MW-115C
pH (field)	6.54		8.57	8.84	7.24	11.24
Hg (µg/L)	4.5	3.8	53	46	28	180
As (µg/L)	< 20	< 20	< 200	< 200	< 200	220
Cr (µg/L)	69	69	330	180	340	140
V (μg/L)	130	140	780	690	470	1,600
Si (mg/L)	61	60	57	75	46	2,000
TDS (mg/L)	16,000	13,000	43,000	30,000	44,000	31,000
Specific gravity	1.012		1.030	1.022	1.032	1.026
21 200						
FD indicates sampl	e was a field	duplicate				

Table 2: Summary of field and lab results from the 6 month post-sparge monitoring

A comparison of these results to the pre-sparge and post-sparge monitoring events is shown in Table 3 for pH. Results for mercury, arsenic and chromium are presented in Table 3.

Table 3: Comparise	on of mercury	, arsenic and chi	omium resu	lts from the three post-
sparge monitoring e	vents			5 -
1 8 8				
		Post-sparge		
Mercury, Hg (µg/L)	Pre-sparge	1 week	3 months	6 months
SW-1	110	11	4.4	4.5
MW-1C	110	21	44	53
MW-2C	110	33 top / 64.5 mid	41	46
MW-519B	120	89 top / 99 mid	68	28
MW-115C	120	110	110	180
	2	8		
Arsenic, As (µg/L)	6			
SW-1		45	9.5	< 20
MW-1C	320	120	23	5.6
MW-2C	260	26 top / 44 mid	24	18
MW-519B	390	130 top / 170 mid	120	< 20
MW-115C	280	98	180	210
	8 00000			
Chromium, Cr (µg/L)				
SW-1		200	110	69
MW-1C	500	320	420	310
MW-2C	370	300 top / 320 mid	290	160
MW-519B	610	390 top / 380 mid	440	330
MW-115C	340	340	340	140

Changes in pH

Results for pre- and post-sparge pH are shown in Figure 2. Pre-sparge pH results are shown for the low-flow sampling event (performed by Parsons on October 2 - 3, 2012), and for the initial measurement from the continuous pH monitoring (performed by Mutch Associates on October 29, 2012). Note that only a continuous monitoring sample is available for SW-1. In general, the two pre-sparge pH readings are within 0.5 units of one another. Pre-sparge pH values ranged between 11.2 and 12.3 for deep Satilla wells. Post-sparge monitoring results are shown after 1 week, 3 months and 6 months. Results for 1 week are shown for both the low-flow sampling event (performed by Parsons on November 26 - 28, 2012), and continuous pH monitoring (performed by Mutch Associates on November 28, 2012). Filled squares shown on Figure 2 indicate the pH values found when sampling was performed at the top of the well screen during the 1 week post sparge sampling.



Figure 2: Summary of pH results from pre- and post-sparge monitoring.

Key observations from the post-sparge pH monitoring include:

- SW-1 has remained below 7.0 over the entire 6 month post-sparge monitoring period.
- MW-1C stayed below 7.0 through the 3 month sampling, but increased to 8.57 at the 6 month sampling
- MW-519B (24.6 ft from MW-1C) has trended downward from 8.73 (continuous monitoring) to 7.24 at the 6 month sampling
- MW-2C (19.9 ft from MW-1C) has stayed relatively constant over the 6 month post-sparge period; currently the pH is 8.84
- MW-115C (15.1 ft from MW-1C) increased after the 1 week sampling from 10.20 to 11.73 and 11.24 at 3 and 6 months, respectively. This well is outside of the 20-foot sparging radius of influence (ROI) determined from the 1 week post-sparge pH data (Mutch Associates and Parsons, 2013).

Overall, the monitoring results show that pH has remained low during the 6 month period after the Proof of Concept Test. Increases in pH in selected wells (i.e. MW-1C) have been balanced by decreases in nearby wells (i.e. MW-519B) within the 20-foot ROI. All wells within the 20-foot ROI have stayed below pH 9.0 up to 6 months after the Proof of Concept Test.

The Proof of Concept monitoring wells are arranged along a line oriented N-45°W (northwest) (Figure 1). This is approximately the direction of groundwater flow according to the natural hydraulic gradient. Thus, water within the Satilla has the potential to move slowly from MW-115C to MW-1C to MW-519B. The potential movement of groundwater in the northwest direction is supported by the changes in pH over the course of the 6 month post-sparge monitoring period. Specifically, the increase in pH observed in MW-115C is possibly the result of untreated water entering the well screen from upgradient, the increase in MW-1C the result of movement of water from near MW-115C, and the decrease in MW-519B the result of movement of water that was formerly near MW-1C.

Changes in Mercury Concentrations

Pre- and post-sparge mercury concentrations are shown in Figure 3. Filled squares shown on Figure 3 indicate mercury results from sampling that was performed at the top of the well screen during the 1 week post-sparge sampling. Key observations from the post-sparge mercury concentrations include:

- SW-1 showed the lowest dissolved mercury concentrations after 1 week (11 μ g/L), and has decreased to 4.4 and 4.5 μ g/L at 3 and 6 months respectively.
- MW-1C has risen from 21 μ g/L at the 1 week sampling to 53 μ g/L at the 6 month sampling, concomitant with an increase in pH from 6.74 to 8.57
- MW-519B has shown a decrease from 99 μ g/L to 28 μ g/L at the 6 month sampling concomitant with a decrease in pH from 9.22 to 7.24.
- MW-2C has decreased slightly from 64.5 to 46 μ g/L over the 6 month period.
- MW-115C did not change appreciably from pre-sparge (120 μg/L) through the 3 month post-sparge (110 μg/L). At 6 months post-sparge, concentrations increased to 180 μg/L.

Changes in mercury concentrations over the 6 month period closely mirror changes in pH discussed earlier. Decreases in pH are generally accompanied by decreases in dissolved mercury and vice versa. The relationship between mercury concentrations and pH is further illustrated in Figure 4. Data from the pre-sparge and post-sparge monitoring events from deep Satilla wells are shown. Data from the 1 week post-sparge monitoring (green circles and squares) show a curvilinear relationship where decreases in pH are reflected in decreases in mercury concentrations. A non-linear regression of these data (solid line) is provided for reference.

Data collected from the 3 and 6 month sampling events generally fall below the line formed by the pre-sparge and 1 week post-sparge data (Figure 4). This indicates a gradual lowering of dissolved mercury concentrations over time at a given pH. This effect appears after 3 months (blue circles, Figure 4) and is sustained through 6 months (grey circles, Figure 4).

Percent removals of mercury in individual monitoring wells are inversely proportional to pH. The largest percent removal of mercury from pre-sparge to post-sparge was 96% in SW-1. The average percent removal among the four deep Satilla wells within the radius of influence was 71%.

MW-115C is outside of the sparging ROI and did not experience a significant lowering of mercury at any time during the post-sparge monitoring period. Prior to the 6 month sampling, mercury concentrations were steady at 110 to 120 μ g/L. As discussed earlier, changes in pH from 3 to 6 months suggest groundwater may be traveling to MW-115C from upgradient. This water may have slightly different water quality which resulted in an increase in MW-115C dissolved mercury 180 μ g/L at 6 months.



Figure 3: Summary of mercury results from pre- and post-sparge monitoring.

Arsenic and Chromium

The three deep Satilla monitoring wells within the sparging ROI (MW-1C, MW-2C and MW-519B) all showed large decreases in arsenic concentrations from pre- to post-sparge. Deep Satilla arsenic concentrations within the Proof of Concept test area were between 260 and 390 μ g/L prior to CO₂ sparging. At 6 months post-sparge, concentrations in deep Satilla wells within the sparging ROI were all less than 20 μ g/L. These wells have also shown decreases in arsenic concentrations over time from 1 week to 6 months. As a result, the average percent removal of these wells has increased from 67% (1 week) to 84% (3 months) to 96% (6 months)¹.

Total chromium concentrations in deep Satilla monitoring wells have also decreased from pre- to post-sparge. Deep Satilla chromium concentrations within the Proof of Concept test area were between 340 and 610 μ g/L prior to CO₂ sparging. After 6 months post-sparge, concentrations in deep Satilla wells

¹ The percent removal for arsenic at 6 months was calculated by assuming "U qualified" concentrations are one-half the reporting limit.

within the sparging ROI were between 69 and 310 μ g/L. The average percent removal in these wells at 6 months was 47%. These wells have also shown decreases in chromium concentration over time from 1 week to 6 months. Most notable is SW-1 which decreased from 200 to 69 μ g/L after 6 months.



Figure 4: Relationship between mercury and pH in deep Satilla wells sampled as part of the Proof of Concept test. Curved line is an inverse cubic fit to the pre-sparge and 1 week post-sparge data.

Conclusions

The key conclusions drawn from the post-sparge monitoring are the following:

- Overall, pH has remained low during the 6 month period after the Proof of Concept Test. All wells within the 20-foot ROI have stayed below pH 9.0 through the 6 month sampling.
- Increases in pH in selected wells (i.e. MW-1C) have been balanced by decreases in nearby wells (i.e. MW-519B) within the 20-foot ROI.
- Changes in mercury concentrations over the 6 month period closely mirror changes in pH. Decreases in pH are generally accompanied by decreases in dissolved mercury and vice versa.
- Mercury, arsenic and chromium show a gradual lowering of dissolved concentrations over time at a given pH.

		Field Sample ID	MW-519B-051513		SW-1-051513		SW-1#2-051513	1	MW-1C-051513	MW-2C-051513		EQB-051513		MW-115C-051513	
9		Location	MW-519B	-	SW-1		SW-1#2		MW-1C	MW-2C		Equipment Blank		MW-115C	
		Sample Date	5/15/2013		5/15/2013		5/15/2013		5/15/2013	5/15/2013		5/15/2013		5/15/2013	
		SDG	680-90380-1		680-90380-1		680-90380-1		680-90380-1	680-90380-1		680-90380-1		680-90380-1	
8		Matrix	WATER		WATER		WATER		WATER	WATER		WATER		WATER	
		Sample Purpose	Regular sample		Regular sample		Regular sample		Regular sample	Regular sample		Equipment blank	2	Regular sample	
		Sample Type	Ground Water	-	Ground Water		Ground Water		Ground Water	Ground Water		Blank water		Ground Water	L
Method	Parameter Name	Units													L
SM2320B	ALKALINITY, CARBONATE (AS CaCO ₃)	mg/L	61		25	U	25	U	410	410		5	U	4,000	
SM2320B	BICARBONATE ALKALINITY (AS CaCO ₃)	mg/L	8,100		4,000		4,100		6,500	4,300		5	U	1,000	
SM2320B	TOTAL ALKALINITY	mg/L	8,200		4,000		4,100		6,900	4,800		5	U	5.100	
SM2540C	TOTAL DISSOLVED SOLIDS	mg/L	44,000		16,000		13,000		43,000	30,000		14		31,000	
SM3500-FeD	FERROUS IRON	µg/L	2,600	HF	6,700	HF	6,700	HF	1,400 HF	1,100	HF	36	J HF	1,700	HF
SM4500S2-F	SULFIDE	mg/L	27		10	U	10	U	24	27		1	U	6.3	
SM5310B	DISSOLVED ORGANIC CARBON	mg/L	350		220		170		280	760		0.67	J	1,400	
SM5310B	TOTAL ORGANIC CARBON	mg/L	340		180		180		340	910		1	U	1,400	
SW6010	ALUMINUM	mg/L	0.2	U	0.12	J	0.12	J	0.2 U	0.2	U	0.01	U	0.2	U
SW6010	ANTIMONY	mg/L	0.015	J	0.0081	J	0.014	J	0.013 J	0.023		0.02	U	0.015	J
SW6010	ARSENIC	mg/L	0.02	U	0.02	U	0.02	U	0.056 J	0.018	J	0.02	U	0.21	
SW6010	BARIUM	mg/L	0.140		0.160		0.160		0.076	0.085		0.01	U	0.017	1
SW6010	BERYLLIUM	mg/L	0.003	J	0.003	J	0.003	J	0.0033 J	0.0027	J	0.004	U	0.0017	J
SW6010	CADMIUM	mg/L	0.0024	J	0.005	U	0.005	U	0.0022 J	0.005	U	0.005	U	0.005	U
SW6010	CALCIUM	mg/L	13		18	8	18		8.2	11		0.5	U	0.63	
SW6010	CHROMIUM	mg/L	0.330	85	0.069	8	0.069		0.310	0.16		0.01	U	0.14	
SW6010	COBALT	mg/L	0.01	U	0.01	U	0.01	U	0.01 U	0.01	U	0.01	U	0.01	U
SW6010	COPPER	mg/L	0.078	J	0.02	U	0.002	J	0.0083 J	0.0036	J	0.01	U	0.0035	J
SW6010	IRON	mg/L	2.4	8	7.3	1	7.4		0.98	0.51		0.1	U	0.89	
SW6010	LEAD	mg/L	0.011	2	0.012	<i>6</i>	0.0065	J	0.0076 J	0.0085	J	0.01	U	0.012	
SW6010	MAGNESIUM	mg/L	9.3	2	12		12		3.8	5.2		0.5	U	0.036	J
SW6010	MANGANESE	mg/L	0.12		0.078		0.078		0.021	0.043		0.01	U	0.065	J
SW6010	NICKEL	mg/L	0.017	J	0.0045	J	0.0044	J	0.023 J	0.014	J	0.04	U	0.027	J
SW6010	POTASSIUM	mg/L	69		11	1	12		50	23		1	U	11	
SW6010	RESPIRABLE QUARTZ	mg/L	46		61	1	60		57	75		0.5	U	2,000	í
SW6010	SELENIUM	ma/L	0.02	U	0.02	U	0.02	U	0.02 U	0.02	J	0.02	U	0.02	U
SW6010	SILVER	mg/L	0.01	U	0.01	U	0.01	U	0.01 U	0.01	U	0.01	U	0.01	U
SW6010	SODIUM	ma/L	16,000	60 - 1474 B	5,800		5,800		15,000	11.000		0.68	J	13.000	
SW6010	THALLIUM	ma/L	0.025	U	0.025	U	0.025	U	0.025 U	0.025	U	0.025	U	0.025	U
SW6010	VANADIUM	ma/L	0.46		0.130	a	0.140	1000	0.730	0.630		0.01	U	1.5	10000
SW6010	ZINC	ma/L	0.02	U	0.02	U	0.020	U	0.0087 J	0.020	U	0.02	U	0.02	
SW7470	MERCURY	ua/L	28		4.5		3.8		53	46	11720	0.2	U	180	
SW9040	Н	S.U.	8.34	Н	8.08	Н	8.1	Н	8.6 H	8.76	Н	6.74	H	10.4	Н
SW9056	CHLORIDE	ma/L	20.000	83 8	6.400	-	6400	1937.477.	19.000	14.000	3 SECES	5	U	16.000	1000
SW9056	SULFATE	mg/L	1,200	2	240	U	250	U	1,200	720		5	U	930	

Analytical Data from 6-month Post Sparge Monitoring Event

- Analytical Lab was TestAmerica Savannah (5102 LaRoche Avenue, Savannah, GA 31404)

 Qualifiers:
 U
 Indicates the analyte was analyzed for but not detected.

 J
 Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

 H
 Sample was prepped or analyzed beyond the specified holding time

 HF
 Field parameter with a holding time of 15 minutes

Groundwater Sampling Logs

SITE NAME: LC	P Chemical Sit	e			SI	TE CATION: Bri	inswid	k GA					
WELL NO:	MW-1C			SAMPLE	ID: MW-1C					DATE:	5/15/20	013	
					PURG		ТΑ						
WELL	R (inches): 2	TUBING	G TER (inches):	WEL	L SCREEN I TH(ft btoc): 4	INTERVAL 18.5 to 53.5		STATIC E	DEPTH ER (ft btoc): 9.4	0	PURG OR BA	E PUMP TY AILER: PP	PE
Tubing–in	-Screen Interv	al purge: 1 EC =	S (0.0026	OL. = (TUBING (gallons/foot X 5	CAPACITY 4 feet) + 0.	X TU .13 gallons		LENGTH) .27 gallo	+ FLOW CELL '	VOLUME	E		
INITIAL PU DEPTH IN	JMP OR TUBIN WELL (ft btoc)	G : 50.5	FINAL PU DEPTH IN	MP OR TUBING I WELL (ft btoc):	50.5	PURGIN	IG ED AT:	0848	PURGING ENDED AT:	0951		TOTAL VOL PURGED (gi	UME allons): ~1.7
TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet btoc)	pH (standard units)	TEMP. ([°] C)	'EMP. SP COND. ([°] C) (mS/cm)		DISSOLVED OXYGEN (% saturation)	TUR (N	BIDITY TUs)	ORP (mV)	SP Gravity (sg)
0910	0.5	0.5	0.02	9.65	8.46	21.48	5	6.02	6.4	8	.02	-185.5	
0918	0.25	0.75	0.03	9.65	8.53	21.45	5	6.71	7.1	7	.12	-189.9	
0928	0.25	1.0	0.03	9.67	8.56	21.76	5	7.36	6.8	5	.48	-193.8	
0938	0.35	1.35	0.04	9.67	8.57	21.75	5	7.81	6.5	5	.30	-195.6	ie -
0950	0.35	1.7	0.03	9.66	8.57	21.81	5	8.03	6.2	4	.76	-197.6	1.030
		C 							2. 2.				
WELL CAPACITY (Gallons Per Foot): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88 TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016 BTOC = Below top of casing – feet below top of casing which includes above grade riser 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016													
PURGING EQUIPMENT CODES: B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; PP = Peristaltic Pump; O = Other (Specify)													
SAMPLED Christin	e Jaynes/F	FFILIATION: Parsons		SAMPLER(S)	SIGNATURE	E(S):			SAMPLING INITIATED A	T: 1029		SAMPLING ENDED A	G T: 1056
PUMP OR DEPTH IN	TUBING WELL (feet): 5	0.5		TUBING MATERIAL CO	DE: Teflon	-lined PE		FIELD	-FILTERED: Y	/esSM4 vpe: In-	500 Su line filt	lfide FILTEI er	R SIZE: <u>0.45</u> μm
FIELD DE	CONTAMINATIO	ON: PUN	1PYI	No	TUBING	Yes I	No (rep	placed)	DUPLICATE	:	N	10	
SAM			ATION		SAMPLE PR	RESERVATIO	N	-0101		ED	SA		Additional
ID CODE	# CONTAINERS	CODE	VOLUME	USED		OTAL VOL FINAL D IN FIELD (mL) pH			METHOD 6010B TAI		0	CODE	Comments
1C	1	PE	250mL	HNO3	2			144	Metals/ 747	70A Hg		APP	
MW- 1C	1	PE	125mL	Y. <u>222</u> 0			Ĩ		3500 FE/ 9 pH	9040B		APP	
MW- 1C	1	PE	250mL	1,555				1776	6010B Dis Silica 9056A_2	solved a 28D		APP	
1C	1	PE	125mL	1.0700					Chlorid Sulfat	e & te		APP	
MW- 1C	1	AG	125mL		÷.				SM 5310	DOC		APP	
MW- 1C	2	PE	250mL	NaOH Zinc Acetat	e				SM4500 S	Sulfide		APP	Field-Filtered
MW- 1C	1	PE	500mL					••	2540C 1	rds		APP	
MW- 1C	1	PE	250mL						2320B Alk	alinity		APP	
1C	1 Per SOD	AG	125mL	HCI	ollection	 Purgo wa	ater o		SM5310	TOC	Mini	APP	resign noted
in the bucket and tubing.													
MATERIA	L CODES:	AG = Amber	Glass; CG	= Clear Glass;	PE = Poly	ethylene;	PP =	Polypropy	lene; S = Silic	one; T	r = Teflo	on; 0 = 0	ther (Specify)
SAMPLIN	G EQUIPMENT	CODES: /	APP = After P	eristaltic Pump; se Flow Peristal	B = Bai	ler; BP = SM = Straw	Bladd	er Pump; d (Tubing	ESP = Elect	tric Subn 0 =	nersible Other (S	Pump; Specify)	

NOTES: Stabilization Criteria for Range of Variation of Last Three Consecutive Readings:-pH: <u>+</u> 0.1 unit Specific Conductance: <u>+</u> 5% Dissolved Oxygen: all readings <u><</u> 10% saturation; optionally, <u>+</u> 0.2 mg/L Turbidity: all readings <u><</u> 10 NTU; or <u>+</u> 10%

SITE NAME: LCP	SITE SITE NAME: LCP Chemical Site LOCATION: Brunswick, GA													
WELL NO:	MW-2C			SAMPLE	ID: MW-2C				2	DATE:	5/15/20	13		
	PURGING DATA													
WELL DIAMETER	(inches): 2	TUBIN	G TER (inches)	: 1/4 WEL	L SCREEN I TH (ft btoc): 4	NTERVAL 48 to 53	ST. TO	ATIC DI WATEI	EPTH R (ft btoc): 8.46	r.	PURG OR BA	e pump t' Iler: Pp	YPE	
Tubing–in-\$	Screen-Interva	al purge: 1 E =	QUIPMENT V (0.0026 ga	/OL. = (TUBING allons/foot X 54	CAPACITY feet) + 0.13	X TL 3 gallons =	BING LE	NGTH) gallons	+ FLOW CELL '	VOLUM	E			
INITIAL PUI DEPTH IN V	VP OR TUBIN	G c): 50.5	FINAL PU DEPTH IN	MP OR TUBING WELL (feet bto	; c): 50.5	PURGIN INITIATE	G ED AT: 12	218	PURGING ENDED AT:	1436	T F	OTAL VOI PURGED (g	UME gallons): 2.6	
TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet btoc)	pH (standard units)	TEMP. (^O C)	SP CO (mS/c	SP COND. (mS/cm) DISSOLVED OXYGEN (% saturation		VED TURBIDITY EN (NTUs)		ORP (mV)	SP Gravity (sg)	
1405	2.2	2.2	0.02	12.87	8.77	27.52	42.7	7	6.1	8	.90	-391.	7	
1418	0.15	2.35	0.01	12.84	8.82	27.70	42.9	4	5.8	7	.07	-402.	7	
1425	0.15	2.5	0.02	12.81	8.83	27.50	43.0	4	5.8	6	.16	-404.	5	
1435 0.1 2.6 0.01 12.73 8.84 27.77 43.17 5.9 6.07 -407.9 1.022														
	-		-									-	~	
		5	a:					5					2	
WELL CAP	WELL CAPACITY (College Der Foot): $0.75^{\prime\prime} = 0.02;$ $4^{\prime\prime} = 0.04;$ $4.25^{\prime\prime} = 0.06;$ $2^{\prime\prime} = 0.46;$ $2^{\prime\prime} = 0.27;$ $4^{\prime\prime} = 0.65;$ $5^{\prime\prime} = 4.02;$ $6^{\prime\prime} = 4.47;$ $4.0^{\prime\prime} = 5.00;$													
TUBING INS	WELL CAPACITY (Gallons Per Foot): $0.75" = 0.02;$ $1" = 0.04;$ $1.25" = 0.06;$ $2" = 0.16;$ $3" = 0.37;$ $4" = 0.65;$ $5" = 1.02;$ $6" = 1.47;$ $12" = 5.88$ TUBING INSIDE DIA. CAPACITY (Gal./Ft.): $1/8" = 0.0006;$ $3/16" = 0.0014;$ $1/4" = 0.0026;$ $5/16" = 0.004;$ $3/8" = 0.006;$ $1/2" = 0.010;$ $5/8" = 0.016;$													
	EQUIPMENT C	ODES: E	low top of cas	BP = Bladder P	ump E	SP = Flectric	Submersi	ible Pun	no: PP = P	eristaltic	Pump.	0=0	ther (Specify)	
i onconto i			Buildi,	Di Didddori	SAMP				л р, с е со	onotanio	i unp,	• •		
SAMPLED E	BY (PRINT) / A	FFILIATION:		SAMPLER(S)	SIGNATURE	.(S):			CAMPLING		36			
Christine	e Jaynes/P	arsons		\sim	ayns	20)			INITIATED A	T: 1438		1516	IG ENDED AT.	
PUMP OR T	UBING	15		TUBING MATERIAL CO	DE: Teflon	lined PF		FIELD-I	FILTERED: Yes	/SM 450	0 Sulfic	de FILTER	SIZE: <u>0.45</u> μm	
FIELD DEC		DN: PUN	IP Y	No	TUBING	Y No	(replace	d)	DUPLICATE:	рс. ш	No			
SAMP	LE CONTAINE	R SPECIFIC	ATION		SAMPLE PR	ESERVATIO	N							
SAMPLE ID CODE	# CONTAINE	MATERIAL CODE	VOLUME	PRESERVATI USED	VE T ADDEI	OTAL VOL D IN FIELD (I	F mL)	INAL pH	ANALYSIS A METHO	ED ND/OR DD	EQU	IPMENT ODE	Additional Comments	
MW-2C-	2	PE	250mL	HNO3					6010B T Metals/747	AL 0A Hg	1	APP		
MW-2C-	2	PE	125mL						Mercui 3500 FE/ 9	ry 0040B		APP		
MW-2C-	2	PE	250mL	(1)				-	6010B Diss	solved	1	APP		
MW-2C-	2	PE	125mL		2		32	-	9056A_2 Chloride	28D 2 &	1	APP		
MW-2C-	2	AG	125mL	5252					SM 5310	DOC		APP		
MW-2C-	4	PE	250mL	NaOH Zinc Acetat	P				SM4500 S	ulfide		APP	Field-Filtered	
MW-2C-	2	PE	500mL		-	222			2540C T	DS		APP		
MW-2C-	2	PE	250mL			(7).7)			2320B Alk	alinity	1	APP		
MW-2C-	Per SOP	AG	125mL stable priv	HCI or to sample	collection		rs for th	 10 Wat	SM5310	10C abilize	Pure	APP 10 Water	clear, brown	
NEWARNO:	I U UUF,	anameters	stable pri	or to sample	Soneouori.	1.0 1100		ic wal		abilize		u wale	oroca, prowit	
odor note	d.											5	. 50	

 MATERIAL CODES:
 AG = Amber Glass;
 CG = Clear Glass;
 PE = Polyethylene;
 PP = Polypropylene;
 S = Silicone;
 I = Tetion;
 O = Other (Specify)

 SAMPLING EQUIPMENT CODES:
 APP = After Peristaltic Pump;
 B = Bailer;
 BP = Bladder Pump;
 ESP = Electric Submersible Pump;

 RFPP = Reverse Flow Peristaltic Pump;
 SM = Straw Method (Tubing Gravity Drain);
 O = Other (Specify)

NOTES: Stabilization Criteria for Range of Variation of Last Three Consecutive Readings:-**pH**: \pm 0.1 unit **Specific Conductance**: \pm 5% **Dissolved Oxygen**: all readings \leq 10% saturation; optionally, \pm 0.2 mg/L **Turbidity**: all readings \leq 10 NTU; or \pm 10%

SITE SITE LCP Chemical Site LOCATION: Brunswick, GA												
WELL NO:	SW-1			SAMPLE	ID: SW-1				DATE: 5/15	2013		
	ADAMINING CONTRACT			A CONTRACTOR CONTRACTOR	PURG	ING DA	ТА					
WELL		TUBING	8	WE	LL SCREEN IN	NTERVAL	STATIC	DEPTH	PU		/PE	
DIAMETER	R (inches): 4	DIAMET	ER (inches): 1	I/4 DEF	PTH(ft btoc): 4	3 to 48	TO WAT	ER (ft btoc): 8.45	5 OR	BAILER: PP		
Tubing-in	-Screen-Interva	al purge: 1 EG =	UIPMENT VC (0.0026 gall	DL. = (TUBING ons/foot X 49	CAPACITY feet) + 0.13	X TL gallons =	BING LENGTH 0.26 gallon	I) + FLOW CELL s	VOLUME			
INITIAL PU DEPTH IN	MP OR TUBIN	G c): 45.5	FINAL PUM DEPTH IN V	IP OR TUBING	G bc): 45.5	PURGIN	IG ED AT: 1235	PURGING ENDED AT:	1432	TOTAL VOL PURGED (g	UME allons): 4.70	
TIME	VOLUME PURGED (gallons)	CUMUL. VOLUME PURGED (gallons)	PURGE RATE (gpm)	DEPTH TO WATER (feet btoc)	TO pH T WATER (standard T (feet units) btoc)		SP COND. (mS/cm)	DISSOLVED OXYGEN (% saturation)	TURBIDIT (NTUs)	Y ORP (mV)	SP Gravity (sg)	
1256	0.8	0.8	0.04	24.3	22.2	-77.0	()					
1307	0.45	1.25	0.04	8.53	6.54	24.61	21.95	18.8	19.1	-79.4		
1317	0.5	1.75	0.05	8.55	6.53	24.03	22.24	16.2	20.3	-82.0	£	
1323 0.35 2.15 0.06 8.55 6.53 24.00 22.36 14.9 21.9 -81.6												
1330 0.35 2.5 0.05 8.53 6.55 24.41 22.57 13.5 21.9 -80.5												
1341 0.5 3.0 0.05 8.53 6.57 24.57 22.92 11.7 24.1 -82.3												
1352 0.5 3.5 0.05 8.53 6.53 24.66 23.30 9.9 27.0 -80.5												
1358	0.4	3.9	0.07	8.53	6.54	24.81	23.62	9.1	32.4	-80.2		
1414	0.35	4.25	0.02	8.47	6.55	26.07	24.00	6.2	39.1	-76.1		
14.23	0.25	4.5	0.03	8.47	6.55	26.00	24.13	6.5	40.8	-79.2	4 1	
14.31	0.2	4.70	0.03	8.47	6.54	26.17	24.30	5.0	42.6	-77.6	1.012	
WELL CAPACITY (Gallons Per Foot): $0.75" = 0.02;$ $1" = 0.04;$ $1.25" = 0.06;$ $2" = 0.16;$ $3" = 0.37;$ $4" = 0.65;$ $5" = 1.02;$ $6" = 1.47;$ $12" = 5.88;$ TURING INSIDE DIA CAPACITY (Gal/Et): $1/8" = 0.0006;$ $3/16" = 0.0014;$ $1/4" = 0.0026;$ $5/16" = 0.004;$ $3/9" = 0.006;$ $4/2" = 0.014;$												
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016 BTOC = Below top of casing – feet below top of casing which includes above grade riser 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016												
PURGING EQUIPMENT CODES: B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; PP = Peristaltic Pump; O = Other (Specify)												
SAMPLING DATA												
Christin	e Jaynes/P	arsons			aufine	(S):		SAMPLING INITIATED A	T: 1449	SAMPLIN ENDED A	G T: 1535	
PUMP OR							FIELD	D-FILTERED: Yes	s/SM 4500 Su	Ifide FILTER	SIZE: <u>0.45</u> μm	
		DN: PUM			TUBING		(replaced)		/pe: in-line i	Yes		
CAM				•			N					
SAMPLE ID CODE	# CONTAINERS	MATERIAL	VOLUME	PRESERVAT USED		OTAL VOL	FINAL	ANALYSIS A METHO	ND/OR E	QUIPMENT	Additional Comments	
SW-1	1	PE	250mL	HNO3				6010B T	TAL	APP		
SW-1	1	PE	125mL	1000	2		8	3500 FE/ 9	04 Hg 040B	APP		
SW-1	1	PE	250mL					6010B Dise Silica	solved	APP		
SW-1	1	PE	125mL	()				9056A_2 Chloride	28D e &	APP		
SW-1	1	AG	125mL	200	66			Sulfat SM 5310	e DOC	APP		
SW-1	2	PF	250ml	NaOH	2			SM4500 S	ulfide	APP	Field-Filtered	
SW 1	4	DE	500ml	Zinc Aceta	te			25400 1				
SVV-1	1	PE	250mL	Charles		55.A.		25400 1	DS			
SVV-1	1	PE	230mL		2			ZJZUB AIK				
BEMARKS	Per SOP 1	narameters	stable prior	r to sample	collection:	although	 turbidity > 1	0 NTU: turbid	ity +/- 10%	The decir	sion was	
made to brown, n	REMARKS: Per SOP, parameters stable prior to sample collection; although turbidity > 10 NTU; turbidity +/- 10%. The decision was made to collect the sample as the turbidity was increasing and I did not want the turbidity to exceed 50 NTU. Purge water clear, light brown, no odor. It appeared that residual CO2 still remains as bubbles were present in the tubing, the bubbles decreased as the purge											
continued. Turbidity post sample collection was 31.3 NTU												
	CODES:		DIASS; CG =	ristaltic Dump	R = Polye	erry ene;	Rladder Dump	FSP - Elect	vite; I = le	O = C	шег (эресіту)	
SAMPLING		R	FPP = Revers	e Flow Perista	ltic Pump;	SM = Straw	Method (Tubing	g Gravity Drain);	O = Othe	r (Specify)		

SITE NAME: LCP Chemical Site SITE LOCATION: Brunswick, GA

WELL NO: MW-115C SAMPLE ID: MW-115C DATE: 5/16/2013 **PURGING DATA** TUBING WELL SCREEN INTERVAL STATIC DEPTH PURGE PUMP TYPE WELL DIAMETER (inches): 2 DIAMETER (inches): 1/4 TO WATER (feet btoc): 7.40 OR BAILER: PP DEPTH (ft btoc): 43.5 to 45 Tubing-in-Screen-Interval purge: 1 EQUIPMENT VOL. = (TUBING CAPACITY TUBING LENGTH) + FLOW CELL VOLUME X = (0.0026 gallons/foot X 47.75 feet) + 0.13 gallons = 0.25 gallons INITIAL PUMP OR TUBING FINAL PUMP OR TUBING PURGING PURGING TOTAL VOLUME DEPTH IN WELL (feet btoc): 44.25 DEPTH IN WELL (feet btoc): 44.25 INITIATED AT: 0749 ENDED AT: 0911 PURGED (gallons): 1.75 DEPTH CUMUL. то DISSOLVED pH VOLUME VOLUME PURGE SP COND. TURBIDITY ORP SP Gravity TEMP TIME WATER (standard OXYGEN PURGED RATE (°C) PURGED (NTUs) (mS/cm) (mV)(sg) (% saturation) (feet units) (gallons) (qpm) (gallons) btoc) 0819 0.02 8.01 11.01 20.55 48.27 -173.1 0.6 0.6 6.8 5.67 0.25 0.02 8.00 4.6 -180.1 0830 0.85 11.06 20.57 48.32 3.96 0.35 4.70 0845 1.2 0.01 8.01 11.13 20.68 48.33 4.7 -177.7 0901 0.3 1.5 0.02 8.03 11.21 20.77 48.33 4.0 4.47 -187.3 0910 0.25 1.75 0.03 48.30 3.3 1.026 8.02 11.24 20.81 4.51 -188.1
 WELL CAPACITY (Gallons Per Foot):
 0.75" = 0.02;
 1" = 0.04;
 1.25" = 0.06;
 2" = 0.16;

 TUBING INSIDE DIA. CAPACITY (Gal./Ft.):
 1/8" = 0.0006;
 3/16" = 0.0014;
 1/4" = 0.0026;
 3" = 0.37: 4" = 0.65; **6**" = 1.47; 5" = 1.02; 12" = 5.885/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016 BTOC = Below top of casing - feet below top of casing which includes above grade riser PURGING EQUIPMENT CODES: B = Bailer: BP = Bladder Pump; ESP = Electric Submersible Pump; PP = Peristaltic Pump; O = Other (Specify) SAMPLING DATA SAMPLED BY (PRINT) / AFFILIATION: SAMPLER(S) SIGNATURE(S): SAMPLING SAMPLING ENDED AT: Christine Jaynes/Parsons 1 aynos INITIATED AT: 0914 0943 PUMP OR TUBING FIELD-FILTERED: Yes/SM 4500 Sulfide FILTER SIZE: 0.45 µm TUBING

DEPTH IN	WELL (feet): 4	4.25		MATERIAL CODE:	Teflon-lined PE	Filtratio	n Equipment Type: In-line filter				
FIELD DE	CONTAMINATI	ON: PU	MP Y	No T	UBING Y No (rep	laced)	DUPLICATE:	No	7		
SAM	IPLE CONTAIN	ER SPECIFIC	ATION	SAM	IPLE PRESERVATION		INTENDED	SAMPLING	Additional		
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVATIVE USED	SERVATIVE TOTAL VOL FINAL AU USED ADDED IN FIELD (mL) pH		ANALYSIS AND/OR METHOD	CODE	Comments		
MW- 115C	1	PE	250mL	HNO3			6010B TAL Metals/7470A Hg	APP			
MW- 115C	1	PE	125mL				3500 FE/ 9040B pH	APP			
MW- 115C	1	PE	250mL			-	6010B Dissolved Silica	APP			
MW- 115C	1	PE	125mL				9056A_28D Chloride & Sulfate	APP			
MW- 115C	1	AG	125mL				SM 5310 DOC	APP			
MW- 115C	2	PE	250mL	NaOH Zinc Acetate		175.0	SM4500 Sulfide	APP	Field-Filtered		
MW- 115C	1	PE	500mL	1222			2540C TDS	APP			
MW- 115C	1	PE	250mL	- 2016	-	. 113 4	2320B Alkalinity	APP			
MW- 115C	1	AG	125mL	HCI			SM5310 TOC	APP			
REMARKS	s: Per SOP,	parameter	s stable pri	or to sample coll	ection. Purge water	clear brow	n, slight odor noted	ł.			
MATERIA	L CODES:	AG = Ambe	r Glass; CG	= Clear Glass; P	E = Polyethylene; PP =	Polypropyle	ene; S = Silicone; T	= Teflon; O = 0	Other (Specify)		
SAMPLIN	SAMPLING EQUIPMENT CODES: APP = After Peristaltic Pump; B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; RFPP = Reverse Flow Peristaltic Pump; SM = Straw Method (Tubing Gravity Drain); O = Other (Specify)										

NOTES: Stabilization Criteria for Range of Variation of Last Three Consecutive Readings: **pH**: \pm 0.1 unit **Specific Conductance**: \pm 5% **Dissolved Oxygen**: all readings \leq 10% saturation; optionally, \pm 0.2 mg/L **Turbidity**: all readings \leq 10 NTU; or \pm 10%

SITE NAME: LC	SITE SITE LCP Chemical Site LOCATION: Brunswick, GA												
WELL NO:	MW-519B			SAMPL	E ID: MW-5	19B				DATE:	5/15/20	13	
PURGING DATA													
WELL	R (inches): 2	TUBIN	G TER (inches):	1/4 DE	ELL SCREEN EPTH (feet bt	NINTERVAL oc): 42.55 to 4	7.55	STATIC TO WA	DEPTH TER (feet btoc):	8.18	PURG OR BA	E PUMP T	YPE
Tubing-in	-Screen Interva	al Purge: 1 E	QUIPMENT V (0.0026 g	OL. = (TUBIN allons/foot X	IG CAPACITY 48.55 feet) +	Y X TI 0.13 gallon	JBING s = 0	LENGTH).26 gal) + FLOW CELL lons	VOLUN	IE		
INITIAL PU DEPTH IN	JMP OR TUBIN	G c): 45.05	FINAL PU	MP OR TUBII WELL (feet b	NG (toc): 45.05	PURGIN	NG ED AT:	0755	PURGING ENDED AT:	0922		TOTAL VOI PURGED (LUME gallons): 2.0
		CUMUL.		DEPTH				CA-12 / DOM 13	DIGGOLVER				
TIME	VOLUME PURGED (gallons)	VOLUME PURGED (gallons)	PURGE RATE (gpm)	TO pH TEMP. SP COND. DISSOLVED WATER (standard (°C) (mS/cm) (% saturation) btoc)						TUR (N	BIDITY ITUs)	ORP (mV)	SP Gravity (sg)
0850	1.25	1.25	0.02	10.6	7.34	22.66	5	7.10	12.7	8	8.76	-298.	8
0901	0.25	1.5	0.02	10.44	7.26	22.98	50	6.73	9.7	4	1.99	-352.	0
Water level fluctuation due to the pump not maintaining a constant RPM													
0913 0.25 1.75 0.02 10.53 7.22 23.02 57.89 8.7 2.56 -314.3													
0920 0.25 2.0 0.04 10.54 7.24 23.08 58.56 8.2 3.23 -330.1 1.032													
WELL CAPACITY (Gallons Per Foot): 0.75" = 0.02; 1" = 0.04; 1.25" = 0.06; 2" = 0.16; 3" = 0.37; 4" = 0.65; 5" = 1.02; 6" = 1.47; 12" = 5.88 TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016 BTOC = Below top of casing – feet below top of casing which includes above grade riser state state state state													
PURGING EQUIPMENT CODES: B = Bailer; BP = Bladder Pump; ESP = Electric Submersible Pump; PP = Peristaltic Pump; O = Other (Specify)													
SAMPLED BY (PRINT) / AFFILIATION: SAMPLER(S) SIGNATURE(S): SAMPLING ENDED AT: Christine Jaynes/Parsons Image: Sampling ended at: 1005													
PUMP OR DEPTH IN	TUBING WELL (feet): 4	5.05		TUBING MATERIAL	CODE: Teflo	on-lined PE		FIELD Filtrati	on Equipment Ty	s/SM 45 /pe: In	00 Sulfi -line filt	de FILTER er	SIZE: <u>0.45</u> μm
FIELD DE	CONTAMINATIO	DN: PU	MP Y I	No	TUBING	G Y No	o (repla	iced)	DUPLICATE:		N	lo	
SAM	PLE CONTAINE	R SPECIFIC	ATION		SAMPLE F	PRESERVATIO	DN .				SA		Additional
SAMPLE ID CODE	# CONTAINERS	MATERIAL CODE	VOLUME	PRESERVA USED	ADE	TOTAL VOL DED IN FIELD	(mL)	FINAL pH	METHO 6010B 1	(CODE	Comments	
519B-	1	PE	250mL	HNO3	l .	6 <u>425</u> 2			Metals/747	0A Hg		APP	
MW- 519B-	1	PE	125mL	(# - 1	-				3500 FE/ 9 pH	9040B		APP	
MW- 519B-	1	PE	250mL						6010B Diss Silica	solved	100	APP	
MW- 519B-	1	PE	125mL	1.55	2				9056A_2 Chloride Sulfat	28D e & e	j	APP	
MW- 519B-	1	AG	125mL			()(SM 5310	DOC	3	APP	
MW- 519B-	2	PE	250mL	NaOH Zinc Ace	tate	102221		7 <u>0.0</u> 0	SM4500 S	ulfide	k	APP	Field-Filtered
MW- 519B-	1	PE	500mL					-	2540C T	DS	3	APP	
MW- 519B-	1	PE	250mL		2	-		-	2320B Alk	alinity		APP	
MW- 519B-	1	AG	125mL	HCI	0 250 3040				SM5310	тос	2	APP	2
REMARKS	s: Per SOP, j rown, sulfur	oarameters -like odor	s stable prie Black res	or to sampl sign-like fi	e collectio Im noted	n. Water le in the bucl	vel sta ket af	abilized ter the	l prior to colle purge wate	cting r had	param been	eters. P dumpeo	urge water d.
MATERIA	L CODES:	AG = Amber	Glass; CG	= Clear Glass	; PE = Po	lyethylene;	PP = F	Polypropy	lene; S = Silico	one;	T = Teflo	on; O = C	Other (Specify)
SAMPLIN	G EQUIPMENT	CODES:	APP = After P RFPP = Rever	eristaltic Pum se Flow Peris	p; B = Ba taltic Pump;	ailer; BP = SM = Straw	Bladde Metho	er Pump; d (Tubing	ESP = Elect Gravity Drain);	ric Subr 0 =	nersible Other (S	Pump; Specify)	

RFPP = Reverse Flow Peristaltic Pump; **SM** = Straw Method (Tubing Gravity Drain); **NOTES:** Stabilization Criteria for Range of Variation of Last Three Consecutive Readings: **pH**: \pm 0.1 unit **Specific Conductance**: \pm 5% **Dissolved Oxygen**: all readings \leq 10% saturation; optionally, \pm 0.2 mg/L **Turbidity**: all readings \leq 10 NTU; or \pm 10%