



Florida Onsite Sewage Nitrogen Reduction Strategies Study

TASK C.21 PROGRESS REPORT

GCREC Mound Monitoring Sample Event Report No. 3

Prepared for:

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FDOH Contract CORCL

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Prepared by:



In Association With:





GCREC Mound Monitoring Sample Event Report No. 3

1.0 Background

Task C of the Florida Onsite Sewage Nitrogen Reduction Strategies Study includes monitoring at field sites in Florida to evaluate nitrogen reduction in soil and groundwater, to assess groundwater impacts from various onsite wastewater systems, and to provide data for parameter estimation, verification, and validation of models developed in Task D. The existing mound system at the Gulf Coast Research and Education Center (GCREC) is being monitored to serve as a bridge between the controlled GCREC pilot-scale testing conducted within the same type of soils and the uncontrolled monitoring at home sites in different soils throughout the state. The Task C.5 QAPP documents the objectives, monitoring framework, sample frequency and duration, and analytical methods to be used at the GCREC existing mound system site. The Task C.20 Instrumentation of GCREC Mound System and Plume Progress Reports No. 1 and 2 document the test area design, number and location of monitoring points, and preliminary sample collection and analyses.

2.0 Purpose

This sample event report documents data collected from the third GCREC mound monitoring and sampling event conducted June 27, 2011 through June 29, 2011. This monitoring event consisted of measurement of flowrates dosed to the system, groundwater elevation measured within the standpipe piezometers, measurement of field parameters, and collection of groundwater samples and their analyses by a NELAC certified laboratory.

3.0 Materials and Methods

3.1 Project Site

The GCREC mound is located at the University of Florida Gulf Coast Research and Education Center (GCREC) in southeast Hillsborough County, Florida. The facility is situated on 475 acres of land that were donated by Hillsborough County government. At the GCREC, wastewater from the research offices and onsite dormitories flow to an existing OSTDS. Lab waste from Facility laboratories is not directed to the OSTDS. This

existing OSTDS consists of a pressure dosed mound system designed for 2,850 gallons per day. Two septic tanks (2,500 and 1,250 gallons) provide primary treatment followed by a dosing tank (3,000 gallons). The mound drainfield has 4,351 ft² of infiltrative area (design hydraulic loading rate of 0.65 gpd/ft²) with each half of the drainfield receiving alternating doses. As part of this project, two flow meters were installed to monitor the actual daily flow to the drainfield.

3.2 Operational Monitoring

Wastewater flow to the mound system is measured via two (2) flow meters located on the dose lines to the mound. The two flow meters were installed in December 2009. Prior to July 16, 2010, the GCREC air conditioning systems were discharging considerable quantities of A/C condensate to the sewer. The PNRS II test facility programmable logic controller (PLC) records flow data from these meters. Appendix A summarizes the recorded wastewater flow data for the GCREC mound pumps since PNRS II test facility start-up.

In addition, a weather station is located at the GCREC facility with weather conditions recorded every minute and stored on a private website. Table 1 provides the recorded meteorological data daily averages leading up to and during the sample event. Appendix B provides summary tables of the average monthly recorded meteorological data.

Table 1
Meteorological Data Daily Averages Measured June 24, 2011 – June 29, 2011

Date	Temp Avg 60 cm (°F)	Temp Avg 10 m (°F)	Temp Soil Avg -10 cm (°F)	Dewpoint Avg 2m (°F)	Relative Humidity Avg 2m (%)	Rain Total 2m (in)	Wind Speed Avg 10m (mph)	ET (in)
June 24, 2011	79.04	78.61	82.00	73.08	84	1.05	6.22	0.17
June 25, 2011	76.52	76.24	81.15	72.09	88	0.06	5.18	0.15
June 26, 2011	77.08	76.95	80.43	71.39	84	0.00	5.30	0.13
June 27, 2011	78.11	77.83	80.83	71.64	83	0.04	4.82	0.14
June 28, 2011	76.42	76.22	80.49	71.52	87	0.23	4.70	0.12
June 29, 2011	76.79	76.36	80.53	72.01	87	0.02	5.77	0.15

3.3 Monitoring and Sampling Locations and Identification

A sampling grid for groundwater screening was developed downgradient of the soil treatment unit as depicted in Figure 1. A 25-ft by 25-ft grid was staked then locations

surveyed (x, y, and z). Transect lines AA through R are parallel to the southern edge of the mound and increase (higher letter identification) moving southward from the mound. Transect lines 1 through 15 (from east to west) are perpendicular to the southern edge of the mound. Groundwater monitoring points were installed in May, June, and November 2010. Two types of monitoring points were installed using either hand or drilling methods: drive point samplers and standpipe piezometers. Drive point samplers consist of a stainless steel drive tip and attached 1-in. long screen with a protective "umbrella" (to prevent soil entering and clogging the screen), and flexible tubing that extends to the ground surface (Figure 2). Standpipe piezometers consist of either ¾-in., 1¼-in., or 2-in. diameter PVC with 1-ft, 4-ft, 5-ft, or 10-ft long 0.010 slot PVC screens and PVC riser extending to the ground surface (refer to the Task C QAPP and Task C.20 Progress Reports No. 1 and No. 2 for additional detail).

Each monitoring location has been assigned a unique identification indicating the type of monitoring point (DP = drive point, PZ = standpipe piezometer), grid location (self explanatory), and depth below ground surface (bottom of the drive point or well screen in feet). For example DP-AA9-14 is a drive point sampler located on the grid at AA9 at 14 ft below ground surface. A schematic of the GCREC monitoring network is shown in Figure 1. Figure 3 depicts an installed ¾-in. diameter PVC standpipe piezometer. A complete list of all installed drive points and standpipe piezometers is included in Appendix C.

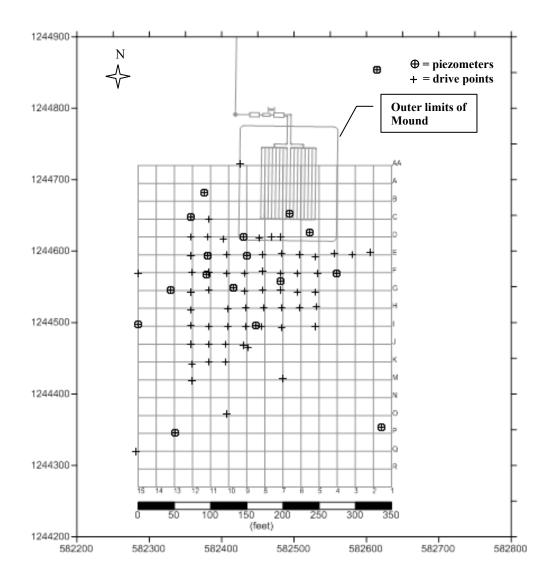


Figure 1
Schematic of GCREC Monitoring Network (UTM coordinates are used)

⊕ denotes piezometers and + denotes drive points



Figure 2 Stainless Steel Drive Point with Mesh Screen, Umbrella and Tubing



Figure 3
Installed 3/4" Diameter PVC Standpipe Piezometer

3.4 Soil Characteristics

During the instrumentation of the mound, soil cores were collected to the spodic layer at four locations (CD6.5, E9, F4, and west side of the mound [near A9]), and at one location (G10) a continuous soil core was collected to the confining Hawthorn clay layer. The shallow soil cores will provide information on vadose zone properties, and the deep soil core will provide a general idea of the soil properties within the aquifer. The information will be used when determining appropriate parameters to be used in model development. During the installation of monitoring points during the summer of 2010, a prominent spodic layer was discovered at approximately 4-6 feet below the ground surface. At several locations the top elevation of this layer was determined with handheld methods during this time. Attempts were also made to determine the top and the thickness of the spodic layer at the remaining monitoring well locations during the November drilling event. Whenever this proved impossible, estimations were made.

3.5 Groundwater Elevation Measurements

Groundwater level measurements are used to determine hydraulic gradients, directions of flow, rates of flow, locations of groundwater recharge and discharge, the amount of water in storage, the change in storage over time, and aquifer hydraulic characteristics. Groundwater levels were measured using a hand-cranked steel tape graduated in feet. Groundwater elevations have been monitored frequently at the site to determine the direction and gradient of flow.

3.6 Water Quality Sample Collection and Analyses

Groundwater and septic tank effluent (STE) were collected June 27, 2011 through June 29, 2011 for water quality analysis. A peristaltic pump was used to collect STE directly into the analysis-specific container supplied by the analytical laboratory. Samples were collected from the existing lift station, which supplies STE to the GCREC mound. Groundwater samples were obtained using a peristaltic pump, which was either attached directly to the drive point tubing or to dedicated standpipe piezometer tubing. Samples were collected into the analysis-specific containers after sufficient purging had occurred. The analysis-specific containers were supplied by the analytical laboratory and contained appropriate preservatives. The analysis-specific containers were labeled, placed in coolers and transported on ice to the analytical laboratory. Each sample container was secured in packing material as appropriate to prevent damage and spills, and was recorded on chain-of-custody forms, provided in Appendix D, supplied by the laboratory.

In addition, equipment blank, field blank, and field sample duplicates were taken. The equipment blank was collected by pumping deionized water (provided by the laboratory) through the cleaned pump tubing. These samples were then analyzed for the same parameters as the GW samples. One field blank was collected by filling sample containers with deionized water that had been transported from the laboratory into the field along with other sample containers. The field sample duplicates were collected immediately subsequent to the regular samples.

Field parameters (pH, specific conductance, temperature (Temp), and dissolved oxygen (DO)) were measured using portable electronic probes with probe tips placed in a flow-cell device as groundwater was being pumped. All samples were analyzed by the laboratory for total alkalinity, total Kjeldahl nitrogen (TKN-N), ammonia nitrogen (NH $_3$ -N), and nitrate/nitrite nitrogen (NO $_X$ -N). Additionally, at some of the locations with elevated conductivity in previous preliminary sampling, total organic carbon (TOC) and dissolved organic carbon (DOC) were included. All analyses were performed by an independent and fully certified analytical laboratory (Southern Analytical Laboratory). Table 2 lists the analytical parameters, analytical methods, and detection limits for these analyses.

Table 2

Analytical Parameters, Method of Analysis, and Detection Limits

Analytical Parameters,	Method of Analysis, and	
Analytical Parameter	Method of Analysis	Laboratory Detection Limit (mg/L)
Total Alkalinity as CaCO ₃	SM 2320B	2 mg/L
Chemical Oxygen Demand (COD)	EPA 410.4	10 mg/L
Total Kjeldahl Nitrogen (TKN-N)	EPA 351.2	0.05 mg/L
Ammonia Nitrogen (NH ₃ -N)	EPA 350.1	0.005 mg/L
Nitrate/Nitrite Nitrogen (NO _X -N)	EPA 300.0	0.02 mg/L
Total Phosphorus	SM 4500P-E	0.01 mg/L
Dissolved Organic Carbon (DOC)	SM 5310B	0.5 mg/L
Total Organic Carbon (TOC)	SM 5310B	0.5 mg/L
Anions		
Fluoride	EPA 300.0	0.01 mg/L
Chloride	EPA 300.0	0.05 mg/L
Nitrate-N	EPA 300.0	0.01 mg/L
Nitrite-N	EPA 300.0	0.01 mg/L
Orthophosphate-P	EPA 300.0	0.01 mg/L
Sulfate	EPA 300.0	0.20 mg/L
Cations		
Boron	EPA 200.7	0.05 mg/L
Calcium	EPA 200.7	0.01 mg/L
Iron	EPA 200.7	0.02 mg/L
Magnesium	EPA 200.7	0.01 mg/L
Manganese	EPA 200.7	0.001 mg/L
Potassium	EPA 200.7	0.01 mg/L
Sodium	EPA 200.7	0.01 mg/L

4.0 Results

Once analytical results are obtained from the laboratory, GCREC Mound Data Summary Report No. 3 (Task C22) will be prepared describing the results from this sampling event.

4.1 Groundwater Flow, Gradient and Velocity

Groundwater level monitoring has been conducted over a larger area since additional piezometers were installed in November 2010. Although the groundwater elevations have been found to fluctuate due to periods of dry weather and/or heavy precipitation, continuous monitoring of the groundwater elevations indicates that the general flow-path does not change. Table 3 shows the actual measured water levels during this sample event.

Table 3
Standpipe Piezometer Groundwater Level
Measured on June 28, 2011

Fig 2 & 3 Identification	Location	Identification	Water Table Elevation (ft) June 28, 2011
1	Bkgd, North	PZ01-BKG-9	123.24
2	PQ1.75	PZ02-P02-9	119.78
3	H11	PZ03-H11-6	120.60
4	Bkgd, North	PZ04-BKG-9	122.08
5	Bkgd, East	PZ05-BKG-9	NR
6	Bkgd, NW	PZ06-BKG-12	123.50
7	D5.5	PZ07-D05-7	121.10
8	FG7	PZ08-FG7-6	120.81
9	18.5	PZ09-I08-5	120.53
10	CD6.5	PZ10-CD6-13	121.21
11	E9	PZ11-E09-10	120.85
12	F4	PZ13-F04-8	121.12
13	G13	PZ14-G13-7	119.99
14	A11	PZ15-A11-6	120.82
15	C12	PZ16-C12-28	120.53
16	l15	PZ17-I15-26	119.82
17	R12	PZ18-R12-26	119.82
18	G9.75	PZ19-G10-26	120.48
19	G9.75	PZ20-G10-15	120.49
20	E11	PZ21-E11-26	120.48
21	E11	PZ22-E11-15	120.47
22	D9	PZ23-D09-27	120.77
23	Bkgd, North	PZ24-BKG-26	121.81
24	AA9	PZ25-AA9-13	121.35

Notes: PZ12 abandoned; If blank - no data was collected

4.2 Water Quality Analyses

4.2.1 Field Parameters

Field parameters (temperature, pH, dissolved oxygen (DO), and specific conductivity) were measured at all the sampling locations during the June 2011 sampling event. The complete field parameter data set is included in Appendix E.





Appendix A: GCREC Mound Wastewater Flow Data

Table A.1
GCREC Mound Metered Wastewater Flow Data

Date Range	Flow Meter Totalized Pump 1 to GCREC Mound (avg. gpd)	Flow Meter Totalized Pump 2 to GCREC Mound (avg. gpd)	Total Recorded Flow (avg. gpd)
Before A/C Condensate D	Diversion		
12/21/10 – 7/16/10	1,650	591	2,241
After A/C Condensate Div	/ersion		
7/19/10 – 7/5/11	994	1,235	2,229

Table A.2
Summary of Daily Wastewater Flows (PLC Recorded)

3	ullillaly of Dally	wastewater i lows (FL	o Necolue	:u <i>)</i>	
	Date Range	Average Recorded Flow	Std. Dev.	MIN	MAX
	Date Nange	(gpd)	Sid. Dev.	(gpd)	(gpd)
Before A/C Condens	sate Diversion				
Pump 1 to Mound		5,422	1,565	3,013	9,117
Pump 2 to Mound	6/14/10 – 7/16/10	-	ı	-	-
Sum of Both Pumps		5,422	1,565	3,013	9,117
After A/C Condensa	te Diversion				
Pump 1 to Mound		984	680	0	3,548
Pump 2 to Mound	7/16/10 – 6/27/11	1,249	784	0	5,022
Sum of Both Pumps		2,233	1,017	584	5,730

Appendix A June 2011

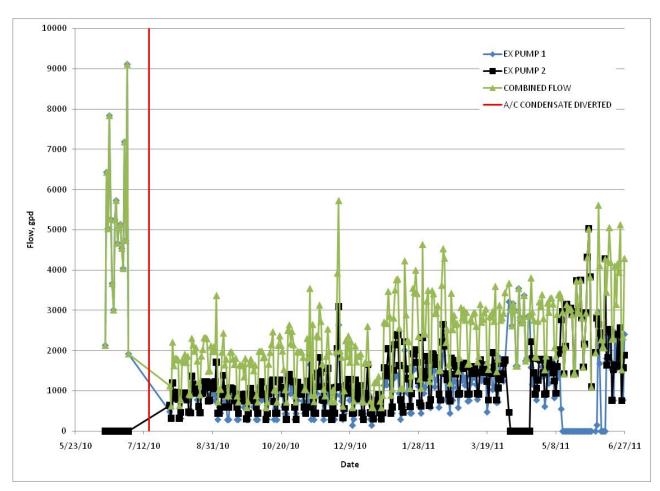


Figure A.1
PLC Recorded Daily Wastewater Flows
(6/14/10 – 6/27/11)



Appendix B: GCREC Weather Station Data

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Table B.1
Monthly Recorded Meteorological Data

Period	60cm T avg (°F)	60cm T min (°F)	60cm T max (°F)	Tsoil avg - 10cm (°F)	Tsoil min(avg) -10cm (°F)	Tsoil max(avg) -10cm (°F)	2m DewPt avg (°F)	Relative Humidity avg 2m (%)	2m Rain total (in)	2m Rain max over 15min (in)	10m Wind avg (mph)	10m Wind max (mph)	WDir avg 10m (deg)	ET avg (in)
Jan-10	53.10	23.97	82.38	59.67	51.13	66.63	44.57	76	3.19	0.57	7.60	32.80	348	0.05
Feb-10	53.75	30.84	78.96	59.86	54.32	65.75	43.97	74	2.22	0.47	7.85	36.13	348	0.07
Mar-10	59.24	32.89	82.26	62.09	55.31	68.11	48.75	73	6.15	0.44	8.25	38.27	289	0.10
Apr-10	69.78	44.74	88.54	70.78	63.00	75.72	59.50	74	2.79	0.52	7.46	44.17	94	0.15
May-10	77.78	62.37	93.63	79.11	73.17	83.97	68.62	77	0.89	0.13	6.75	31.10	126	0.18
Jun-10	80.91	65.84	99.09	82.32	76.69	88.63	72.87	80	8.25	1.30	5.85	50.47	116	0.19
Jul-10	80.67	68.00	96.21	82.58	77.49	87.03	74.05	82	7.30	0.48	5.95	35.37	103	0.18
Aug-10	80.54	70.59	96.87	82.63	79.11	87.85	75.03	85	13.51	1.74	5.78	43.53	154	0.16
Sep-10	78.91	63.43	95.88	80.83	78.17	83.39	72.11	82	3.42	0.55	6.33	41.60	84	0.16
Oct-10	71.98	51.24	93.00	74.97	71.83	78.62	61.55	73	0.01	0.01	5.56	32.00	31	0.11
Nov-10	65.75	39.95	86.77	69.47	64.33	75.34	56.97	76	1.24	0.16	6.52	30.53	55	0.07
Dec-10	50.64	22.86	78.37	60.71	54.61	71.33	39.83	71	0.50	0.05	7.33	36.77	354	0.04
Jan-11	57.65	29.23	79.54	61.34	56.86	65.07	49.01	77	4.13	0.49	7.08	44.07	319	0.06
Feb-11	62.95	34.76	85.21	63.94	57.76	69.58	54.40	78	0.47	0.07	6.38	35.57	75	0.09
Mar-11	66.56	39.12	88.66	68.35	61.45	73.83	56.59	75	6.89	0.47	7.41	44.13	82	0.12
Apr-11	73.3	46.33	93.02	74.09	66.49	79.99	62.81	73	0.94	0.31	6.67	26.67	2877	0.17
May-11	76.07	50.68	96.04	78.67	73.58	84.22	64.22	71	1.05	0.28	6.61	44.47	2976	0.19
Jun-11	79.5	63.07	98.83	81.83	76.96	87.12	69.97	76	4.86	0.43	6.08	37.53	2880	0.18





Appendix C: GCREC Mound Sample Identification

Table C.1
GCREC Mound Sample Identification

	Grid Location	Sample Identification	Notes	Bottom Elevation (ft)
1	Lift Station	STE PumpTank	Wastewater Sample	N/A
2	Bkgd, North	PZ01-BKG-9	1 1/4" Standpipe Piezometer, 4' screen	120.33
3	Bkgd, North	PZ04-BKG-9	1 1/4" Standpipe Piezometer, 4' screen	118.66
4	Bkgd, North	PZ24-BKG-26	2" Standpipe Piezometer, 5' screen	101.41
5	Bkgd, East	PZ05-BKG-9	1 1/4" Standpipe Piezometer, 4' screen	117.39
6	Bkgd, NW	PZ06-BKG-12	1 1/4" Standpipe Piezometer, 4' screen	118.10
7	AA9	DP-AA9-14	SST Drive Point	110.68
8	AA9	DP-AA9-22	SST Drive Point	103.08
9	AA9	DP-AA9-27	SST Drive Point	98.28
10	A6.5	PZ25-A6.5-10	3/4" Standpipe Piezometer, 3.5' screen	119.62
11	A11	PZ15-A11-6	3/4" Standpipe Piezometer, 5' screen	118.84
12	CD6.5	PZ10-CD6-13	3/4" Standpipe Piezometer, 5' screen	116.03
13	C11	DP-C11-8	SST Drive Point	116.18
14	C12	PZ16-C12-28	3/4" Standpipe Piezometer, 1' screen	94.75
15	D5.5	PZ07-D05-7	1 1/4" Standpipe Piezometer, 4' screen	118.89
16	D7	DP-D07-5	SST Drive Point	120.82
17	D7	DP-D07-7	SST Drive Point	118.86
18	D7	DP-D07-9	SST Drive Point	116.79
19	D7.5	DP-D7.5-14	SST Drive Point	111.24
20	D7.5	DP-D7.5-20	SST Drive Point	105.31
21	D7.5	DP-D7.5-26	SST Drive Point	99.24
22	D8	DP-D08-9	SST Drive Point	116.31
23	D9	DP-D09-6	SST Drive Point	118.35
24	D9	DP-D09-8	SST Drive Point	116.45
25	D9	DP-D09-15	SST Drive Point, taped to PZ riser	109.45
26	D9	DP-D09-21	SST Drive Point, taped to PZ riser	103.45
27	D9	DP-D09-27	SST Drive Point, taped to PZ riser	97.45
28	D9	PZ23-D09-27	2" Standpipe Piezometer, 5' screen	97.41
29	D10	DP-D10-8	SST Drive Point	116.31

	Grid Location	Sample Identification	Notes	Bottom Elevation (ft)
30	D11	DP-D11-11	SST Drive Point	113.29
31	D12	DP-D12-11	SST Drive Point	112.46
32	E2	DP-E02-6	SST Drive Point	119.55
33	E2	DP-E02-8	SST Drive Point	117.55
34	E3	DP-E03-10	SST Drive Point	115.26
35	E4	DP-E04-6	SST Drive Point	119.71
36	E4	DP-E04-8	SST Drive Point	117.71
37	E5	DP-E05-6	SST Drive Point	118.58
38	E6	DP-E06-6	SST Drive Point	118.86
39	E6	DP-E06-8	SST Drive Point	116.86
40	E7	DP-E07-10	SST Drive Point	114.74
41	E8	DP-E08-6	SST Drive Point	118.41
42	E8	DP-E08-8	SST Drive Point	116.41
43	E9	PZ11-E09-10	3/4" Standpipe Piezometer, 5' screen	114.56
44	E10	DP-E10-6	SST Drive Point	118.21
45	E11	DP-E11-12	SST Drive Point	111.98
46	E11	PZ21-E11-26	2" Standpipe Piezometer, 5' screen	111.98
47	E11	PZ22-E11-15	3/4" Standpipe Piezometer, 10' screen	111.98
48	E12	DP-E12-10	SST Drive Point	113.22
49	E12	DP-E12-15	SST Drive Point	107.75
50	E12	DP-E12-22	SST Drive Point	101.65
51	E12	DP-E12-28	SST Drive Point	95.80
52	F3	DP-F03-8	SST Drive Point	116.44
53	F4	PZ13-F04-8	3/4" Standpipe Piezometer, 5' screen	116.31
54	F4	DP-F04-17	SST Drive Point	108.06
55	F4	DP-F04-22	SST Drive Point	102.95
56	F4	DP-F04-32	SST Drive Point	92.85
57	F5	DP-F05-5	SST Drive Point	119.94
58	F5	DP-F05-31	SST Drive Point	93.89
59	F6	DP-F06-10	SST Drive Point	115.03
60	F7	DP-F07-6	SST Drive Point	118.25
61	FG7	PZ08-FG7-6	1 1/4" Standpipe Piezometer, 4' screen	118.25

	Grid Location	Sample Identification	Notes	Bottom Elevation (ft)
62	F8	DP-F08-14	SST Drive Point	110.43
63	F8	DP-F08-20	SST Drive Point	103.96
64	F8	DP-F08-28	SST Drive Point	96.18
65	F9	DP-F09-5	SST Drive Point	118.98
66	F10	DP-F10-11	SST Drive Point	112.93
67	F11	DP-F11-11	SST Drive Point	112.68
68	F11	DP-F11-15	SST Drive Point	108.88
69	F11	DP-F11-18	SST Drive Point	105.73
70	F11	DP-F11-21	SST Drive Point	102.93
71	F11	DP-F11-24	SST Drive Point	99.88
72	F11	DP-F11-27	SST Drive Point	96.73
73	F12	DP-F12-10	SST Drive Point	112.77
74	F15	DP-F15-14	SST Drive Point	108.81
75	F15	DP-F15-20	SST Drive Point	102.84
76	F15	DP-F15-26	SST Drive Point	97.00
77	G5	DP-G05-6	SST Drive Point	118.51
78	G6	DP-G06-7	SST Drive Point	116.95
79	G7	DP-G07-13	SST Drive Point	111.63
80	G7	DP-G07-15	SST Drive Point	109.56
81	G7	DP-G07-17	SST Drive Point	106.76
82	G7	DP-G07-21	SST Drive Point	103.31
83	G7	DP-G07-24	SST Drive Point	100.51
84	G7	DP-G07-27	SST Drive Point	97.61
85	G8	DP-G08-5	SST Drive Point	119.54
86	G9	DP-G09-11	SST Drive Point	112.99
87	G9.75	PZ19-G10-26	2" Standpipe Piezometer, 5' screen	97.55
88	G9.75	PZ20-G10-15	3/4" Standpipe Piezometer, 10' screen	108.50
89	G11	DP-G11-8	SST Drive Point	115.27
90	G12	DP-G12-9	SST Drive Point	114.44
91	G12	DP-G12-15	SST Drive Point	108.37
92	G12	DP-G12-18	SST Drive Point	105.27
93	G12	DP-G12-21	SST Drive Point	102.32

	0.11			Bottom
	Grid Location	Sample Identification	Notes	Elevation
	Location	identification		(ft)
94	G12	DP-G12-24	SST Drive Point	99.72
95	G12	DP-G12-27	SST Drive Point	96.37
96	G13	PZ14-G13-7	1 1/4" Standpipe Piezometer, 4' screen	115.11
97	H5	DP-H05-7	SST Drive Point	117.13
98	H6	DP-H06-7	SST Drive Point	117.33
99	H7	DP-H07-8	SST Drive Point	116.32
100	H8	DP-H08-10	SST Drive Point	113.84
101	H9	DP-H09-12	SST Drive Point	111.74
102	H10	DP-H10-11	SST Drive Point	112.68
103	H11	PZ03-H11-6	1 1/4" Standpipe Piezometer, 4' screen	121.47
104	H12	DP-H12-5	SST Drive Point	118.01
105	16	DP-I06-14	SST Drive Point	110.24
106	16	DP-106-20	SST Drive Point	103.99
107	16	DP-106-26	SST Drive Point	97.94
108	17	DP-107-8	SST Drive Point	115.67
109	18	DP-108-5	SST Drive Point	118.56
110	18.5	PZ09-I08-5	1 1/4" Standpipe Piezometer, 4' screen	118.93
111	19	DP-I09-11	SST Drive Point	112.96
112	I10	DP-I10-6	SST Drive Point	117.72
113	I11	DP-I11-10	SST Drive Point	113.50
114	I12	DP-I12-6	SST Drive Point	117.54
115	I15	PZ17-I15-26	3/4" Standpipe Piezometer,1' screen	97.09
116	J8	DP-J08-6	SST Drive Point	118.02
117	J9	DP-J09-12	SST Drive Point	112.05
118	J9	DP-J09-14	SST Drive Point	109.61
119	J9	DP-J09-20	SST Drive Point	103.36
120	J9	DP-J09-26	SST Drive Point	97.11
121	J10	DP-J10-6	SST Drive Point	117.32
122	J11	DP-J11-12	SST Drive Point	111.99
123	J12	DP-J12-13	SST Drive Point	110.44
124	J12	DP-J12-15	SST Drive Point	108.26
125	J12	DP-J12-20	SST Drive Point	102.61

Appendix C June 2011

Table C.1
GCREC Mound Sample Identification

		GCKLC W	ound Sample Identification	
	Grid Location	Sample Identification	Notes	Bottom Elevation (ft)
126	J12	DP-J12-27	SST Drive Point	96.36
127	K10	DP-K10-7	SST Drive Point	116.41
128	K11	DP-K11-13	SST Drive Point	110.43
129	K12	DP-K12-5	SST Drive Point	117.68
130	M7	DP-M07-15	SST Drive Point	108.98
131	M7	DP-M07-21	SST Drive Point	102.65
132	M7	DP-M07-27	SST Drive Point	96.95
133	M12	DP-M12-10	SST Drive Point	112.79
134	N12	DP-N12-14	SST Drive Point	108.40
135	N12	DP-N12-18	SST Drive Point	104.75
136	N12	DP-N12-21	SST Drive Point	101.73
137	N12	DP-N12-24	SST Drive Point	98.75
138	N12	DP-N12-27	SST Drive Point	95.63
139	O10	DP-O10-12	SST Drive Point	110.71
140	O10	DP-O10-18	SST Drive Point	104.56
141	O10	DP-O10-24	SST Drive Point	98.56
142	PQ1.75	PZ02-P02-9	1 1/4" Standpipe Piezometer, 4' screen	115.24
143	Q15	DP-Q15-15	SST Drive Point	108.20
144	Q15	DP-Q15-21	SST Drive Point	102.29
145	Q15	DP-Q15-26	SST Drive Point	96.40
146	R12	PZ18-R12-26	3/4" Standpipe Piezometer, 1' screen	96.56



Appendix D: Chain of Custody Forms

SAL Project No. 105H3

SOUTHERN ANALYTICAL LABORATORIES, INC. 110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813 855-2218

i.	+ Ni coco ci									Contact / Phone	900						
<u> </u>	Calcata Marine Hazen (Hazen and Sawyer)		j						
Proje	Project Name / Location	-															
		GCREC Mound Groundwater Analyses	er Analyses						_								
Sam	Samplers: (Signature)			1				à	ARAME 1	TER / COI	\TAINER	PARAMETER / CONTAINER DESCRIPTION	TION				
	Matrix Codes. DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water						-13° COD			вИ ,gM	21010	ctivity					
SAL Use Only Sample	Sample Description	ətsQ əmiT	xintsM	Somposite Grab	1LP, Cool Chloride	1LP, Cool Total Alkalini OP, SO ₄	250mL P, H ₂ TKN, Nox, NI	250mLaG, C DOC 40mLaV, HC	ZEOML P, HA	B' Cq' K' E¢'	Field Tempe	Field pH	Eield DO				
2	DP-AA9-14	812411 8:28	\perp	 	+-					74	<i>5 6</i>	75£ 0	2 1.32	~			
02	DP-AA9-22	-	9W	×	-					t 1x	61'S E	54 2 6	20.0	577	_		
03		91:b 1/AZ/9	QW	×	-					24	7	562 305	+10 S	7			
9	DP-C11-8	£.	8W	×		-	-	-	2	1 27	8 58	38 58	5 3 95	io			
05	DE DOTE 11054B -054 EFFSTA	1 250 1 250	QW	×		1	1	7	4	1	4	A P	2 Fra	T (1)	: 23	-	
90	DP-D07-9	067811 0805	GW	×	-					74.4	.पं पि. 0प्	04 539	9 1.86	و د			
07	DP-D08-9	05'51 11/27/9	o GW	×	₩.					27	65 hi	33 41	11/7	3			
80		5124/1 12:38	GW.	×		-	-	-	2	1 27.	0 4.38	S8 670	0 1.09	1			
60	DP-D09-15	01:81/1/27/0	, ew	×		1	1	-	2	126	1137	14 46	0	88			
10	DP-D11-11	42:01:11/ELJ9	0W	×	-					26.3	3535	3 469	4 1.06	Ģ			
7	DP-D12-11	6/24/1 10:30	GW	×		1	1		2	1 2%	2 494		7 0.34	۶,			-
12	DP-D7.5-14	LITHIN 1225	W9	×	4					j r.h2	خ	5 483	isi	B			
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l'	11111	N		67	1112			Receive	Received on ice? Temp	Temp	ر 	NA .					
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Kelin	C 30 // Date/Time.	Received:		Date/Time:		1,4		Proper c	Proper containers used?	nsed?) AN					
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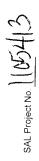
Chain of Gustody.xls Rev Date 11/19/01

SAL Project No. 1054 3

SOUTHERN ANALYTICAL LABORATORIES, INC. 110 BAYVIEW BOULEVARD, OLD SWAR, FL 34877 813-855-1844 fax 813-855-2218

Clen	Client Name									Conta	Contact / Phone:						
		Hazen and Sawyer	wyer							1							
<u> </u>	Project Name / Location	()															
Samo	Samples: (Signatura)	GCREC Mound Groundwater Analyses	d Groundwate	r Analyses						-			3				
ğ)	professional (Johnson)								Δ Δ	AMETE	PARAMETER / CONTAINER DESCRIPTION	מבות מבות	ACITAIA.	-			
	Matrix Codes: DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water	Ja:		·				3, COD		ε S S No. No.	ature		tivity				
SAL Use Only Sample No.		Date	Time	XintsM	Composite Grab	1LP, Cool Chloride	1LP, Cool Total Alkalinity OP, SO ₄	250mLaG, Co TKN, Nox, NH TKN, Nox, NH	40mLaV, HCI TOC	B' Cq' K' E ⁶ ' V 220 ^{III}	Field Tempera	Hq bləiF	onbnoO blei∓	Field DO			
25	DP-F08-20	0,618	062811 10 946	GW	×	-			 		12	~	3	0.45			
26	DP-F08-28	NEX	067311094S	GW	×	-					£.,h2	ごご	523.7	27.0			
27	DP-F10-11	Xo. CS	06.2811 0950	GW	×	1					5.53	4,9	2.14	6.33			
28	DP-F11-11	56.28	6608110955	GW	×	-	_				26.0	8.5	447.0	0.37			
29	DP-F11-15	K B	16 B11 1000	GW	×	1		!			3.þ2.	7,7	<i>> 78</i> 5	5, 5			
30	DP-F11-18	OC 18	Oc 2811 1005	GW	×	1						ં	- 4	0.32			
31	DP-F11-21	OK 28	0101 118290	GW	×	-					7.52	5'5	3,6.1			-	
32	DP-F11-24	(1678	Cless (1020	ΒM	×	-					٦,	δh	-	0.23			
33	DP-F11-27	S2 9(C	06 2811 1025	GW	×	-					24.3			0.18			
34	DP-F12-10	್ಯಚಿತ್ರ	06011 1030	МS	×	-					_		-	0.16			
35	DP-F15-14	11 529	1750	МS	×	_					2'h2	2.5	186.9	32.0			
36	0	62411	11 1055	GW	×	_					4.42			52.9			
Contair	Containers Prepared/ Relinquished:	SS /	N		Date/Time	ne: 7	1000	Š	Seal intact?			N N	$\overline{}$	Instructions / Remarks:	emarks:		
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Relinquished	Date/fine:	3c Received			Date/Time	io		ě.	Proper preservatives indicated?	ervatives	indicated?	V					
Relinqu	sned	Received			Date/Time	o o		* ×	Rec'd w ithin holding time? Volatiles rec'd w /out head	holding tii 'd w/out h	Rec'd w ithin holding time? Volatiles rec'd w /out headspace?	$\frac{z}{2}$	()				
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Chain of Custody.xls Rev.Date 11/19/01



SOUTHERN ANALYTICAL LABORATORIES, INC. 110BAYVIEW BOULEVARD, 0LOSWAR, FL 34677 813-855-1844 fax 813-855-2218

Clien	Client Name										Co	Contact / Phone	ia				
		Hazen	Hazen and Sawyer					į					i				
Proje	Project Name / Location																
	i (i	GCRE	C Mound G	GCREC Mound Groundwater Analyses	Analyses												
Sam	Samplers: (Signature)	$\langle \rangle$								ď	PRAME	PARAMETER / CONTAINER DESCRIPTION	AINER DE	OITalaus	Z		
	Matrix Codes: DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other	Vastewater ge SO-Soil /ater O-Other						F, NO ₃ ,	COD			J, Na ure		Vity			
SAL Use Only	R-Reagent Water		ә.	Э		nposite di	looD , c onide	?, Cool al Alkalinity, , SO₄	mL P, H ₂ SO 4, Mox, MH _{3,} mLaG, Cool			d Temperat	Hq b	ritoubnoO b	q DO		
No.		ption		niT 2	1		СЫ	toT	TKI	ОО	OT	B, (j Fiel	ləia r		
13			11877	27.70	MS S	×	-					7.57	5 =	100	Á,		
4 5	DP-F08-8			0000	A A	××				+	-		ハ フ フ	5. (1.) 6 2. 8. 2.	0.33		
16			047811	0380	MS GW	×	-					5:13	+	WA L			
17	DP-E12-10			ez go	0W	×	-				-	2%	4.9	205	ं		
18	DP-E12-15		Ch. CE 11 0825	5280	GW	×	-					L'h2	25	462.4	2		
19	DP-E12-22		1120 10	0830	ВW	×		-	1	1	2 1	74.2	9.6	38.2	3510		
20	DP-E12-22-D		067811	5880	GW	×		~	-	-	2	27/2	1.3	326.2	0.75		
21	DP-E12-28		CKB11084	0840	GW	×	1					24.2	8.4	320 2	15.0		
22	DP-F04-17		06811091	5260	GW	×	-) ' \$2	6,1	573.8	0.53		
23	DP-F04-32		0678110930	06430	GW	×	-					24.6	100	335.3	0.26		
24	DP-F05-5		=	0435	GW	×	-					ria	1 Oth	מיז	Dr.		
Contai	Containers Prepared/ Relinquished:	Date/Time: / 中いり	Received:	, 1		ate/Time		000/	-	Seal intact?	ct?		- \	L (AM)	Instructions / Remarks.	marks:	
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SAL Project No 105H3

SOUTHERN ANALYTICAL LABORATORIES, INC. 110 BAYVIEW BOULEVARD, OLD SWAR, FL 34677 813-855-1844 fax 813-855-2218

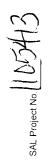
CORC Mannel Groundwarer Analyses Composition Composi	Hazen and Sawyer
PARAMETER Composite	
PARAMETER / CONTAINER DESCRIPTION PARAMETER / CONTAINER DESCRIPTION PARAMETER / CONTAINER DESCRIPTION Compositie Compositie Container / Co	Mound
Composite Comp	
Composite Comp	
GW X 1 1 2 14.2 5/6.2 6.	Date
GW X 1 1 2 1 24.9 5.0 25.0 5.0 GW X 1 1 1 2 1 24.9 5.1 533.9 1.5 GW X 1 1 1 2 1 24.9 5.1 533.9 1.5 GW X 1 1 1 2 1 24.9 5.1 533.9 1.5 GW X 1 1 1 2 1 24.9 5.1 533.9 1.5 GW X 1 1 1 2 1 24.9 5.1 25.0 5.0 5.0 5.0 5.0 GW X 1 1 1 2 1 24.9 5.1 25.0 5.0 GW X 1 1 1 2 1 24.9 5.1 25.0 GW X 1 1 1 2 1 24.9 5.1 25.0 GW X 1 1 1 2 1 24.9 5.1 25.0 GW X 1 1 1 2 1 24.9 5.1 25.0 GW X 1 1 1 2 1 24.9 5.1 25.0 GW X 1 1 1 2 1 24.9 5.1 25.0 GW X 1 1 1 2 1 24.9 5.1 25.0 GW X 1 1 1 2 1 24.9 5.1 25.0 GW X 1 1 1 2 1 24.9 5.1 25.0 GW X 1 1 1 2 1 24.9 GW X 1 1 1 1 2 1 24.9 GW X 1 1 1 1 2 1 24.9 GW X 1 1 1 2 1 24.9 GW X 1 1 1 2 1 24.9 GW X 1 1 1 1 2 1 24.9 GW X 1 1 1 1 2 1 24.9 GW X 1 1 1 2 1 24.9 GW X 1 1 1 1 1 2 1 24.9 GW X 1 1 1 1 2 1 24.9 GW X 1 1 1 1 2 1 24.9 GW X 1 1 1 1 1 2 1 24.9 GW X 1 1 1 1 1 1 1 2 1 GW X 1 1	111629
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GW X 1 1 2 1 24.5 5.0 337.3 C. GW X 1 1 2 1 24.6 4.9 285.5 O. GW X 1 1 2 1 27.6 5.0 37.3 C. GW X 1 1 2 1 27.6 5.0 37.4 1.1 GW X 1 1 2 1 27.6 4.6 37.0 1.1 GW X 1 1 2 1 27.6 4.1 GW X 1 1 1 2 1 27.6 GW X 1 1 1 1 2 1 27.6 GW X 1 1 1 1 2 1 27.6 GW X 1 1 1 1 2 1 27.6 GW X 1 1 1 2 1 27.6 GW X 1 1 1 1 2 1 27.6 GW X 1 1 1 1 1 2 1 27.6 GW X 1 1 1 1 2 1 27.6 GW X 1 1 1 2 1 27.6 GW X 1 1 1 2 1 27.6 GW X 1 1 1 1 2 1 27.6 GW X 1 1 1 1 2 1 27.6 GW X 1 1 1 1 2 1 27.6 GW X 1 1 1 1 2 1 27.6 GW X 1 1 1 2 2 1 27.6 GW X 1 1 2 2 2 2 2 GW X	062811
GW X 1 1 2 1 24.6 4/9 785.5 0 GW X 1	06411 M20
GW X 1	Ox 05/11 1235
GW X 1	11 11220
GW X 1 1 2 1 1 2 1 1 2 1 1	21 119290
GW X 1 1 2 1 2 4 6 1 1 1 2 4 6 1 1 1 1 2 1 2 4 6 1 1 1 1 2 1 2 1 2 4 1 2 1 2 4 1 2 6 1 1 2 6 1 1 1 1 1 1 1 2 1 1	Blank 612 WATT DOD
GW X 1 1 2 1 2 4 6 212.0 1.0	
GW X 1 1 2 1 15.1 4,11 3(8,4 0.1 GW X 1 1 2 1 15.1 4,17 10,7 Date/Time:	C681111
GW X 1 1 2 1 15.2 4.7 4.7.7 0.7 Date/Time: C 2 4 1 Seal intact? Volatiles rec'd w/out headspace? Volatiles rec'd w/out heads	5401 118279
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SAL Project No. 110543

SOUTHERN ANALYTICAL LABORATORIES, INC. 110 BAYVIEW BOULEVARD, OLD SWAR, FL. 34677 813-855-1844 fax 813-855-2218

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מופון ואפון	Hazen	Hazen and Sawver								<u>S</u> _	Contact / Phone	äi					
Project Name / Location																	
	GCRE	GCREC Mound Groundwater Analyses	oundwater /	Analyses													
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Sample Description	cription	Date	-Time	XinteM	Compo	1LP, Co	OP, SO		DOC Seomes	40mLa) TOC Jm02S	B' Cq' l	Field pl	Field C	Field Di			
49 DP-G12-18		CAMI	2011	GW	×	+					24.16	1.2	42.7	S		-	-
50 DP-G12-21		OCESII	011	GW	×		-	-	-	2	ار <u>ان</u>	9. P	361.3				
51 DP-G12-27 24		064911	115	GW	×		+	4	7	4	7 74.3	3 6	345.8	51.72	_		
52 DP-G12- 37 27		062811	1130	GW	×	-	*****	_		2	24.8	875	3.24,2	07.0			1 -
53 DP-H06-7		114290		Q.W	×	-			_		35		3		15.7 AX		10 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
54 DP-H09-12		C. L.		GW	×	-					25.3	<i>و</i> ک	274.7	0,76	<u>, </u>		7
55 DP-H10-11		De all	1325	GW	×		-	-	-	2	28.5) 15	5822	80,2			
56 DP-106-14		62911 430	430	ВW	×		-	-	-	2 1	721.4	4.7	5412	12 2			
57 DP-106-20		62411 6	935	ВW	×	-					1 h2	4.9	h 198	68.0			
58 DP-106-26		of 6 11429	3	GW	×	-					2.72	5,0	4,515	0.25			
59 DP-I12-6		(1111)	526	GW	×	1					26.6	4.7				_	
60 DP-J08-6		_	950	GW	×	_					27.3	9'6	8.281	3.12	track Web	Ι.	700
Containers Prepared/ Relinquished:	Date/Time: 1450	Received:		<u> </u>	Date/Time	,	بردد	•	Seal intact?	ct?		∑ ≻	(V	Instruction	Remarks	1	-
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いり	1/820								Received	Received on ice? Temp	due)(~	- × Z	-))	<u> </u>		
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Chain of Custody xls Rev.Date 11/19/01



SOUTHERN ANALYTICAL LABORATORIES, INC. 110 BAYVIEW BOULEVARD, OLDSWAR, FL 34677 813-855-1844 fax 813-855-2218

Client Name									Contac	Contact / Phone:						
	Hazen	Hazen and Sawyer					•									
Project Name / Location	(-	-	-												
	A CORP	GCREC Mound Groundwater Analyses	undwater Ar	alyses												
Samplers: (Signature)					-			PAR	PARAMETER /	CONTAINER DESCRIPTION	ER DESC	RIPTION				
Matrix Codes: DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water	Vastewater ge SO-Soil /ater O-Other					.у, F, NО ₃ ,	-3° COD			rature		ctivity				
SAL Use Only Sample No Sample Description	ption	Date	əmiT	Matrix Composite	Grab 1LP, Cool Chloride	1LP, Cool Total Alkalinii OP, SO ₄	250mLaG, C TKN, Nox, NI 250mLaG, C	DOC 40mLaV, HC TOC	В' СЧ' К' Е ⁶ ' 520ШГ Б' НИ	Field Tempe	Field pH	ubnoO bləi刊	Field DO			
61 DP-J09-12 ,		62411	202	GW.	×					15.7	ci.8	189.1	0.37			
		11529	1005	GW	×					24.8	1.5	249.3 6	020			
63 DP-J09-20		11519	ioio	GW	×						4,7	2.8.2 6	0.7C			
64 DP-J09-26		11629	iois	GW	×					24.0	4.5	306.4C	0.21			
65 DP-J12-13		11129	1020	GW	×					24.9	6	244, 2 (0.27			
66 DP-J12-15			1015	GW	×					24.7	۲, د	2870 1	67.0			
67 DP-J12-20		62411	1030	GW	×					24. S	٦, 9	355.8 (Ö. 41			
68 DP-J12-27		11529	1035	GW	×					24.4	7	310.1 C	0.19			
69 DP-K10-7		66911104S	Sho	GW	×					77.7	5,1	175.6	120 0	WEAT	Š	
70 DP-K12-5 ·		102911 104	OVO	GW	×					27.5	۲.7		0:71		-	
71 DP-M07-21		501 11529	050	GW	×					5.42	4.9	366.10	17.0			
72 DP-M07-27		11629	افكر	GW	×					24.3	5.0	3029	0,18			
Containers Prepared/ Relinquished:	Date/Time: 14.5	Received	0	Date	Date/Time:	,0/	69	Seal intact?			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	u (v)	Instructions / Remarks:	/ Remarks		
Dalinamichod	66.33//	5 January			C C C	151		Samples int	Samples intact upon arrival?	ival?	2		1105413	13		
Policebulan	2(5)							Received on ice? Temp	ice? Temp		NA NA					
Reinquished	Date/Time 73¢	Received:		Date	Date/Time:			Proper preservatives indicated?	ervatives in	dicated?		4				
Relinquished:	(5. %) / (Received:		Date	Date/Time:			Rec'd within holding time?	holding tim	92						
Relinquished	Date/Time:	Received:		Dat	Date/Time:			Volatiles Led d Wybut Heal	in w your ing	auspace:) §				
Chain of Custody vis																

Chain of Custody xls Rev.Date 11/19/01

SAL Project No. 105413

SOUTHERN ANALYTICAL LABORATORIES, INC. 110 BAYVIEW BOULEVARD, OLD SWAR, FL. 34677 813-855-1844 fax 813-855-2218

Client Name	- Lane									0	Contact / Phone	hone:		:			
		Hazen	Hazen and Sawyer														
Project N	Project Name / Location																
		GCREC	Mound Gr	GCREC Mound Groundwater Analyses	nalyses												
Sampler	Samplers: (Signature)								_	PARAME	PARAMETER / CONTAINER DESCRIPTION	NTAINE	R DESCF	NOITAIS			
9	Matrix Codes: DW-Drinking Water WWW-Wastewater SW-Surface/Water SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water	Vastewater ge SO-Soil ater O-Other					y, F, NO3,		loc		BN ,gM	rafure		ctivity			
SAL Use Only Sample No	Sample Description	otion	Date	əmi T	Matrix Composite	Grab	Chloride 1LP, Cool Total Alkalinit	250mL P, H ₂ 9 0P, SO ₄	DOC S20 ^{LL} aG, Co	40mLaV, HCI TOC 250mL P, HN	B' Cq' K' E ⁶ '	Field Tempe	Field pH	ubnoO blei7	Field DO		
73 D	DP-M12-10		1129	0911	M5	×	_				12	2.0 J	1119	98 7/1	.84		
1	DP-N12-14		11129	0]]	QW CW	×	_				25.	h h '.	il b.	17.77	6.18		
75 D	DP-N12-18		11 429	1115	GW	×	_				25	2 4	. 7	2 15 9/12	6.32		
76 D	DP-N12-21		11 529	1120	МS	×	1		1	2	1 24	24.9 4	8	309.2 C	0.20		
	DP-N12-24		11 520	1130	GW	×	1				12	4 2 42	4.6 3	254:2	0.13		
78 D	DP-N12-27		11 620	(135	МS	×	1		1	2	1 24	24.6 4.	7	364.40	01.0		
79 D	DP-N12-27-D		111/20	1140	ВW	×		_	-	2	1 24.1	٦ م	.7	364.90	01		
80	DP-O10-18		1122	أكاتا	ВW	×	_				.52	ξ, f - U _r	ę.	335.4 C	6.69		
81	DP-O10-24		01911	1215	GW	×	-				2	24.7 4	,7	366,11	0,31		
82 D	DP-Q15-21			1235	GW	×					.52	1.2 4	8	357 8 12	0.32		
83 D	DP-Q15-26		13 13	0h 2!	GW	×	_				23.	5.34	8 3%	384,9 6	6.35		
84 P	84 PZ03-H11-6 .		111270	≥02/	GW	×	1		-	2	1 73	<i>((((((((((</i>	15/	169.9	301		
Containers Relinquish	Containers Prepared/ Relinquished:	Date/Time: /450	Received		D	Date/Time:	0/	es •s	Seal intact?	ntact?			Y MYNA		Instructions / Remarks:	arks:	
odei corilo O		Date/Time	Received		Dag	C C C	4 11		Sampl	les intact u	Samples intact upon arrival?	~	AN N N		1105413		
V		24 8/							Recei	Received on ice? Temp	Temp		(c)	_			
Reinquished:	; pag	Date/Time: 736	Received		D	Date/Time:			Prope	r preserva)	Proper preservatives indicated?	ted?	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	-			
Relinquished		GAS/Ine:	Received		Da	Date/Time:			- Rec'd	Rec'd within holding time?	ling time?		₹ ~ {				
									Volatil	es rec'd w	Volatiles rec'd w /out headspace?	pace?	(Ž) ∠ ≻(
Relinquished	:pai	Date/Time:	Received		ă	Date/Time:			Propei	Proper containers used?	s used?		ۆ _N ر≻				
and the state of t	abo other													-			

Chain of Custody.xls Rev Date 11/19/01

SAL Project No. 1054/3

SOUTHERN ANALYTICAL LABORATORIES, INC. 110 BAYVIEW BOULEVARD, OLDSWAR, FL 34677 813-855-1844 fax 813-855-2218

0.10	Oliont Momo															}			
<u>.</u>	- Naile	Hazen	Hazen and Sawver								Contact / Phone:	/ Phone:							
Proje	Project Name / Location																		
		GCREC	Mound Gr	GCREC Mound Groundwater Analyses	nalyses														
Samp	Samplers: (Signature)									PARAM	FTER /	CONTAIN	PARAMETER / CONTAINER DESCRIPTION	NOIL					
	Matrix Codes: DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water	astewater e SO-Soil ater O-Other					, F, иО ₃ ,	²' COD ⊅*			εV , εξ	ıture		ivity					
SAL Use Only Sample No.		tíon	Date	əmi⊺	xinteM	Composite Grab 1LP, Cool	Chloride 1LP, Cool Total Alkalinity	OP, SO₄ 250mL P, H₂S(TKN, Nox, NH ₂	250mLaG, Coo	40mLaV, HCI TOC	3' Cq' K' E6' M	Field Tempera	Hq bləi-	toubnoO blei	Od blei				
85	PZ04-BKG-9		1122 231	2840			ļ					6.52	3 :	2	4.75	1			
86	PZ07-D05-7		06.74	0611	GW	×	_					01.00	11.7	787.5	es 2		-		
87	PZ11-E09-10		2600	1100	GW	×		1	-	2	1	612	5,3	4534	1,77		-		
88	PZ11-E09-10-D		necess	Sall	QW	×	τ	_	-	2	-	3	\$ \$	63.9	1.77				
88	PZ15-A11-6			040	GW	×					1.7	000		1.50	. <u>m</u>			-	T
06	PZ16-C12-28		062711	1032	GW	×					2	1 52	5.5	3059	C. 47				
91	PZ17-115-26		Cl62711	1239	GW	×					2	h 152	4.9	-	000				
92	PZ18-R12-26		111290	1302	GW	×					N	7.92	2 / 3	152,9	650		-		
93	PZ19-G10-26		11/2211	0931	- MS	×						6 22	2 0.5	7 4 462	0,67				
94	PZ20-G10-15		112277	0905	GW	×					2	24.7	5,3		19.5				
95	PZ21-E11-26		DV-111 C95	0956	GW	×					2	3.42	4.9	267,6	0,87				
96	3-26		CE 2711	0829	GW	×					2	24, y	4,9 7	73.52	6.73				
Containers Pri Relinquished:	epared	Date/Time: 14.25	Received	<	വ്	Date/Time:		0001	Seal intact?	itact?			Y IN NA		Instructions / Remarks:	Remarks:			
Relinquisher	1	Date/Time: 1930	Received:		Ö	Date/Time :			Sampl	es intact u	Samples intact upon arrival?	al?	NA NA		1105413	က			
1		11820							Receiv	Received on ice? Temp	? Temp_		\$ \$ (2)	-					
Relingar		3c	Received:		۵	Date/Time:			Proper	preserva	Proper preservatives indicated?	sated?	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	₫					
Relinquished		Date/Time:	Received		Ö	Date/Time:			Rec'd	within hole	Rec'd w ithin holding time? Volatiles rec'd w/out headspace?	Canada	Y Z Z	a la					
Relinquished		Date/Time:	Received:		Page 1	Date/Time:	:		Proper	Proper containers used?	s used?) &					
Chain of Custody xls	six opolsr																		1

Chain of Custody xls Rev Date 11/19/01

SAL Project No. 1105413

SOUTHERN ANALYTICAL LABORATORIES, INC. 110 BAYVIEW BOULEVARD. OLD SMAR, FL 34677 813-855-1844 fax 813-855-2218

Client Name									Contact / Phone:	Phone:					
Orginal Name (1 proping	Hazen	Hazen and Sawyer		1											
Project Name / Location	GCREC	GCREC Mound Groundwater Analyses	undwater Ar	alyses											
Samplers: (Signature)	X							PARA	METER / C	PINTAINE	PARAMETER / CONTAINER DESCRIPTION	N C			
Matrix Codes: DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-R-Rappent Water	Mastewater Ige SO-Soil Vater O-Other						3, COD		EN , gN	ature	i vity				
SAL Use Only Sample No.	rtion	Date	əmi <u>r</u>	Matrix Composite	Grab 1LP, Cool Chloride	1LP, Cool Total Alkalinit) OP, SO ₄	250mLaG, Co TKN, Nox, NH 250mL P, H₂S	DOC 40mLaV, HCI TOC	8, Са, К, Fe, I В, Са	Field Temper	Field pH Field Conduc	Field DO			
97 PZZ5-406-10 EG Blank	1152 62411	*	1313		×					9.6	H	1			
E1 +5011	-97 A								2	7 882	8 9.8	4.90			
110548-054	315	11/2/90	Bso			Ţ						† -			
,	4 Frotin				G	90	, ,		•						
					CX 6	27-	()								
								_							
												_			
												-			
Containers Prepared/ Relinquished	Date/Time; 452	Received:		Dat	Date/Time:	2001		Seal intact?			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Instruc	Instructions / Remarks:		
Relinquished	Date/Time: 1550	Received:		Dat	Date/Time:		~ 	amples intac	Samples intact upon arrival?	٤	C> X	110	1105413	۳	# **** ***
Relinguist de l'Article de l'Ar	ċ 28 (/ Date/Time:	Received		Dat	Date/Time:		~ 	Received on ice? Temp	ce? Temp		₹ (×)	<u></u>	1-924-527	δ ε	Ť
J.	13.30 1						<u>~</u>	roper preser	Proper preservatives indicated?	sted?		ن 	Sect For	3 3	
Reinquished:	Date/Time:	Received:		Dat	Date/Time:		æ >	Rec'd within holding time? Volatiles rec'd wiout head	Rec'd within holding time? Volatiles rec'd w/out headspace?	bace?	K K K	න <u>ද</u>	conk, per Jesquin	per Josephis ir	\$
Relinquished:	Date/Time:	Received:		Dat	Date/Time:		<u> </u>	Proper containers used?	ners used?	1	N N N	.			
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Chain of Custody.xls Rev.Date 11/19/01

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 FAX 813-855-2218

GROUNDWATER SAMPLING LOG

			GF	ROUND	NATER	SAMPL	ING LO	3			
Client Name:	ŀ	lazen and Sawye	er	Location:				Contact:	Josefi	n Edeback-Hı	
Date Sampled	06	7-711		SAL Project	117	V 11	2	Phone:	CCRECMO	813-630-449	-
Well Number	()(4)	PZ15-A11-6	7,41	# Sample ID	110	<u> 1541 :</u>	2	Project Name GPS LAT	GCREC IVIO	una Grounaw	ater Analyses
Well (Marriber		7 Z 13-A 11-0			LIDOING	399 200		GPS LONG			
				Р	URGINO	5 DATA					
WELL DIAMETER (Inches)	1.05	WELL CAPACITY (gal/ft)	0.06	Screen Interval (Feet)	UNK	То	UNK	Static Depth to Water (Feet)	6.35	PURGE PUMP CODE	PP GP
TOTAL WELL DEPTH (Feet)	7.50	REFERENCE ELEVATION (NGVD)		ELEV.	O WATER ATION CE-STATIC)			TUBING DIAMETER (Inches)		TUBING CAPACITY (gal/ft)	
		bmerged Screen TAL DEPTH - ST			rged Screen (1 ICITY =	EQ Volume, 3	3, 3 Minutes)	q Partially Sub	merged Scree	en (1 Well, 3,3	3 minutes)
ONE WELL VOLUME	· · · · · ·	069	1/4 WELL VOLUME	0.0		3 WELL VOLUMES			5 WELL VOLUMES		<u> </u>
		EQUIPMENT V					L BING LEGNTH	l) + FLOW CEL		L .	
PUMP VOLUME			TUBING LEGNTH			FLOW CELL VOLUME			EQUIPMEN T VOLUME		
INITIAL TUBII IN WELL			FINAL TUBII IN WELL	NG LEGNTH _ (FEET)		PURGE TIME START	1006	PURGE TIME END		TOTAL PURGED	
INST. ID	\geq	\geq	\times	\geq	SAL-SAM-63	SAL-SAM - 65- <u>4</u>	SAL-SAM-63-	SAL-SAM-55-	SAL-SAM- 0_Z	\geq	\times
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) (Δ <0.2)	TEMP (οC) (Δ <0.2)	SP COND (uS/cm) (Δ <5%)	DO (mg/L) (% SAT <20)	TURBIDITY (NTUs) (<20 NTU)	COLOR (Describe)	ODOR (Describe)
1009	0.30	0.30	0.10	& Diy	5.74	24 4	195.1	3.13		dody	1011
1012	07.0	0 00		,						,	
1015	0.30	5.00									
	Well Capacity (gallons/foot): 0.7 TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1					6, 3"=0.37	, 4"=0.65,	5"=1.02, 6	'=1.47, 12"	5.88	
TUBIN	NG INSIDE DIA	A. CAPACITY (Ga	I./Ft.): 1/8" =			/4" = 0.0026;	5/16" = 0.004	3/8" = 0.000	6; 1/2" = 0.0	010; 5/8" =	0.016
				<u> </u>	<u>AMPLIN</u>	GDATA	١				
SAMPLED BY (PRI	V.	EA					PLER(S) .TURES:		Markey Markey Markey . Walley		
TUBING MATI (CIRCLE		PP PE NE			TUBING WELL (FEET)			SAMPLE PL RATE (n			
SAMPLING INITIATED FIELD FILTERED?	10tt Page	SAMPLING ENDED FILTER SIZE (µm)	16+6,	FIELD CLEANED DUPLICATE	Y (N)		LECTED BY SE FLOW?	Y N (N/A)	SEMI-VOLS THROUG	COLLECTED SH TRAP?	Y N WA
PRESER CHECKED		Y N N/A	LIST PRESI ADI	ERVATIVES DED		•			1		
WEAT CONDI		clew									
COMM	1ENTS		sayle.	+ 700	oli ice	16(OV	per c	hough	· wool	aw d not	
	TIID	PUMP CO ING MATERIAL (-place Bladder		flon	
D.		ING WATERIAL (JUDES: PP=	r orypropylene	, ru-roiyetr	iyiche, NF-1	Date:		micu, Ti-Te		
Re	eviewed By:	<u> </u>					L Date:	I			

get all readings.

SOUTHERN ANALYTICAL LABORATORIES, INC. 110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 FAX 813-855-2218

GROUNDWATER SAMPLING LOG

Client Name:	- -	lazen and Sawye	r	Location:		-		Contact: Phone:	Josefi	n Edeback-Hu 813-630-449	•
Date Sampled	062	711		SAL Project #	117	5413	3	Project Name	GCREC Mo	und Groundw	
Well Number	- UW =	PZ24-BKG-26-D		Sample ID		96		GPS LAT GPS LONG			
<u></u>				Р	URGINO	G DATA		GF3 LONG			
WELL DIAMETER (Inches)	7.0	WELL CAPACITY (gal/ft)	016	Screen Interval (Feet)	UNK	То	UNK	Static Depth to Water (Feet)	10.82	PURGE PUMP CODE	(PP) GP
TOTAL WELL DEPTH (Feet)	30.3	REFERENCE ELEVATION (NGVD)		ELEV	O WATER ATION CE-STATIC)			TUBING DIAMETER (Inches)		TUBING CAPACITY (gal/ft)	
		omerged Screen (TAL DEPTH - ST				IEQ Volume, 3	3, 3 Minutes)	q Partially Sub	merged Scree	en (1 Well, 3,3	3 minutes)
ONE WELL VOLUME	SLOME = (10	17	1/4 WELL VOLUME	0.7	9	3 WELL VOLUMES			5 WELL VOLUMES		
<u> </u>		EQUIPMENT VO		IP VOLUME +	(TUBING CA		BING LEGNTH	l) + FLOW CEL		I	
PUMP VOLUME		:	TUBING LEGNTH		T	FLOW CELL VOLUME			EQUIPMEN T VOLUME		
INITIAL TUBIN			FINAL TUBIN			PURGE TIME START	0215	PURGE TIME END	0872	TOTAL PURGED	6.5
INST. ID	\geq	$\geq \leq$	\times	\geq	SAL-SAM-63	SAL-SAM- 65	SAL-SAM-63	SAL-SAM-55-	SAL-SAM- 0_2	\times	\geq
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) (Δ <0.2)	TEMP (oC) (Δ <0.2)	SP COND (uS/cm) (Δ <5%)	DO (mg/L) (% SAT <20)	TURBIDITY (NTUs) (<20 NTU)	COLOR (Describe)	ODOR (Describe)
0877	3.5	3,5	6.50	12.2	4.9	24.4	795.4	0.91	146	clew	nem
0825	1.5	5.0			4,9	24.4	796.0	0.84	144	1	ł ł
0828	1.5	65			4.9	24.4	295.6	0.73	141		
				02, 1.25"=0	0.06, 2"=0.1	16, 3"=0.37,	, 4"=0.65,	5"=1.02, 6	"=1.47, 12	15.00	
Well Capacity (gallons/foot): 0.7 TUBING INSIDE DIA. CAPACITY (Gal./Ft.):							5/16" = 0.004			"5.88 010; 5/8" =	0.016
				S	AMPLIN	G DATA			,		
SAMPLED BY (PRII		SI	71				LER(S) TURES:	3	1		
TUBING MATE (CIRCLE		PP PE NF	· (С) тт		TUBING WELL (FEET)			SAMPLE PU RATE (r			
SAMPLING INITIATED	0829	SAMPLING ENDED	0829	FIELD CLEANED	Y (10)	CLEANING STEPS					
FIELD FILTERED?	Y (N)	FILTER SIZE (μm)		DUPLICATE	√ Ø		ECTED BY E FLOW?	Y N (N/A)		COLLECTED 3H TRAP?	Y ICNA
PRESER' CHECKED		N N/A	LIST PRESE ADD								
WEAT CONDI		clea									
СОММ	ENTS										,
***								ı-place Bladder			
R≏	TUB viewed By:	ING MATERIAL (CODES: PP=1	Polypropylene	, PE= Polyeth	nylene, NP= N	on-inert Plasti Date:		ined, TT= Te	flon	
110	оод Бу.						Date.	<u> </u>			

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 FAX 813-855-2218

GROUNDWATER SAMPLING LOG

		GROUNDW	ATER SAMPLING L	OG	
Client Name:	Hazen and Sawyer	Location:		Contact:	Josefin Edeback-Hurst, PE
	- Idazon and Gawyer	Location.		Phone:	813-630-4498
Date Sampled	062711	SAL Project #	1105413	Project Name	GCREC Mound Groundwater Analyses
Well Number	PZ20-G10-15	Sample ID	94	GPS LAT	
	1 223 310 13	Oample 15	9/9/	GPS LONG	
		PU	RGING DATA		
WELL	WELL	Screen		Static Depth	PURGE PP GP

					OKGINO	DAIA					
WELL DIAMETER (Inches)	0.115	WELL CAPACITY (gal/ft)	0.02	Screen Interval (Feet)	UNK	То	UNK	Static Depth to Water (Feet)	8.08	PURGE PUMP CODE	(PP) GP
TOTAL WELL DEPTH (Feet)	13 04	REFERENCE ELEVATION (NGVD)			O WATER ATION CE-STATIC)			TUBING DIAMETER (Inches)		TUBING CAPACITY (gal/ft)	
Purge Ted	hnique: q Su	bmerged Screen	(1,1/4,1/4 Well) q Submer	rged Screen (1	EQ Volume, 3	3, 3 Minutes)	q Partially Sub	merged Scree	en (1 Well, 3,3	minutes)
	OLUME = (TO	TAL DEPTH - ST		x WELL CAPI	CITY =						
ONE WELL VOLUME	C. 7	7	1/4 WELL VOLUME	0.0	- (3 WELL VOLUMES			5 WELL VOLUMES		
	1	EQUIPMENT V	JLUME = PUM	P VOLUME +	(TUBING CAI	PACITY X TU	BING LEGNTH	l) + FLOW CEL	L VOLUME		
PUMP VOLUME			TUBING LEGNTH			FLOW CELL VOLUME			EQUIPMEN T VOLUME		
INITIAL TUBI IN WELL			FINAL TUBII IN WELL			PURGE TIME START	0255	PURGE TIME END	0904	TOTAL PURGED	0.90
INST.	\times	\geq	\times	\geq	SAL-SAM-63	SAL-SAM - 65- O	SAL-SAM-63	SAL-SAM-55-	SAL-SAM-	\times	\times
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) (Δ <0.2)	TEMP (οC) (Δ <0.2)	SP COND (µS/cm) (4 <5%)	DO (mg/L) (% SAT <20)	TURBIDITY (NTUs) (<20 NTU)	COLOR (Describe)	ODOR (Describe)
0858	C-30	0.30	0.10	13.62	5.4	758	299.4	7.54	COC	1310WN	NON
0901	C-30	C.BO			5.4	25,7	249.9	7.60	(KOVO)	#	
0904	0.30	0.90			5, 3	25.7	300,3	7/01	BOX S	A	شعدو
		-						SH			
		apacity (gallons/f		,			4"=0.65,	5"=1.02, 6"	"=1.47, 12"	'5.88	
TUBIN	IG INSIDE DIA	. CAPACITY (Ga	I./Ft.): 1/8" = (0.0006; 3/16"	= 0.0014; 1/	4" = 0.0026;	5/16" = 0.004	; 3/8" = 0.000	6; 1/2" = 0.0	010; 5/8" = 0).016

SAMPLING DATA SAMPLED BY / COMPANY SAMPLER(S) (PRINT) SIGNATURES: TUBING MATERIAL CODE SAMPLE TUBING SAMPLE PUMP FLOW PP PE NP (TL) TT (CIRCLE ONE) LEGNTH IN WELL (FEET) RATE (mL/min) SAMPLING SAMPLING FIELD CLEANING N INITIATED ENDED CLEANED STEPS FIELD FILTER SIZE VOC COLLECTED BY SEMI-VOLS COLLECTED (N DUPLICATE $Y(\hat{N})$ Y N (N/A Y N (N/A FILTERED? THROUGH TRAP? (µm) REVERSE FLOW? PRESERVATION LIST PRESERVATIVES Y N N/A CHECKED IN FIELD? ADDED WEATHER clear CONDITIONS COMMENTS PUMP CODES: PP=Peristaltic Pump, GP= Submersible Grundfos Pump, IBP= In-place Bladder Pump TUBING MATERIAL CODES: PP= Polypropylene, PE= Polyethylene, NP= Non-inert Plastic, TL= Teflon Lined, TT= Teflon Reviewed By Date:

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GROUNDWATER SAMPLING LOG

			GF	ROUNDI	NATER	SAMPL	ING LO	G			
Client Name:		Hazen and Sawye		Location:				Contact:	Josefi	n Edeback-Hu 813-630-449	
Date Sampled	062	711		SAL Project #	il	0541	3	Project Name	GCREC Mo	und Groundw	ater Analyses
Well Number		PZ04-BKG-9		Sample ID		35		GPS LAT GPS LONG			
	•			Р	URGINO	G DATA		_ 0/ 0 20/10	I .		
WELL DIAMETER (Inches)	1.25	WELL CAPACITY (gal/ft)	0.06	Screen Interval (Feet)	UNK	То	UNK	Static Depth to Water (Feet)	7.90	PURGE PUMP CODE	PP GP
TOTAL WELL DEPTH (Feet)	{'''	REFERENCE ELEVATION (NGVD)		ELEV. (REFEREN	O WATER ATION CE-STATIC)			TUBING DIAMETER (Inches)		TUBING CAPACITY (gal/ft)	
Purge Ted WELL V	chnique: q Su OLUME = (TC	bmerged Screen TAL DEPTH - ST	(1,1/4,1/4 Well ATIC DEPTH)) q Subme x WELL CAP	rged Screen (1 ICITY =	IEQ Volume, 3	3, 3 Minutes)	q Partially Sub	merged Scree	en (1 Well, 3,3	minutes)
ONE WELL VOLUME	0.	072	1/4 WELL VOLUME	Ö.	018	3 WELL VOLUMES			5 WELL VOLUMES		J
PUMP	Ī	EQUIPMENT VO		1P VOLUME +	· (TUBING CA		BING LEGNTH	l) + FLOW CEL			
VOLUME			TUBING LEGNTH			FLOW CELL VOLUME			EQUIPMEN T VOLUME		
INITIAL TUBI IN WELL	NG LEGNTH . (FEET)			NG LEGNTH . (FEET)		PURGE TIME START	0830	PURGE TIME END	0839	TOTAL PURGED	0.90
INST. ID	\times		\times	\times	SAL-SAM-63	SAL-SAM -	SAL-SAM-63	SAL-SAM-55-	SAL-SAM-	><	> <
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) (Δ <0.2)	TEMP (οC) (Δ <0.2)	SP COND (uS/cm) (Δ <5%)	DO (mg/L) (% SAT <20)	TURBIDITY (NTUs) (<20 NTU)	COLOR (Describe)	ODOR (Describe)
0833	0,30	0.30	0.10	8:75	5.6	100/1	75.9	4.60	i63	Elm	Mone
0636	0.30	0,60			5.4	99.6	725.9	4.31	161		j
0839	0.30	0. 90			5.4	100.2	75.4	4.25	161		
		(H) (H)	e-78-11			Swite	The TY				
	Woll C	apacity (gallons/fo	oot): 0.75"=0.0	02, 1.25"=0	00 01 0 4	0, 0, 0, 0					
TUBIN		A. CAPACITY (Gal					4"=0.65, 5/16" = 0.004			5.88 10; 5/8" = (0.016
	W					G DATA		, 0,0 0,000	, 1/2 0.0	710, 3/0 - 0	0.010
SAMPLED BY (PRI		S.A	1			SAMPI SIGNAT	ER(S)	A			
TUBING MATI (CIRCLE		PP PE NP	TL TT	SAMPLE LEGNTH IN V				SAMPLE PU RATE (m	1		
SAMPLING INITIATED	0840	SAMPLING ENDED	0840	FIELD CLEANED	YN	CLEANING STEPS					
FIELD FILTERED? PRESER	Y N VATION	FILTER SIZE (μm)	LIST PRESE	DUPLICATE	Y(N)	VOC COLL REVERS		Y N (N/A)	SEMI-VOLS (THROUG		Y N(N)
CHECKED	IN FIELD?	M N/A	ADD					_			
WEAT CONDI		Clea									
СОММ	ENTS										
	TUE	PUMP COD	ES: PP=Peris	staltic Pump, C	SP= Submersil	ble Grundfos F	ump, IBP= In-	place Bladder F	ump		
Re	viewed By:	NG MATERIAL C	ODES: PP= F	olypropylene,	PE= Polyethy	/lene, NP= No I	on-inert Plastic Date:	, TL= Teflon Lir	ned, TT= Tefl	оп	
							Date.				

SOUTHERN ANALYTICAL LABORATORIES, INC. 110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 FAX 813-855-2218

			GF	ROUND	<u>VATER</u>	SAMPL	ING LO	3			
Client Name:		Hazen and Sawye	r	Location:				Contact:	Josefi	n Edeback-Hu	
Date Sampled	017	- 11		SAL Project				Phone:		813-630-4498	
Date Sampled	067	. / []		#	110	1541	<u> </u>	Project Name	GCREC Mo	und Groundwa	ater Analyse
Well Number		PZ19-G10-26		Sample ID		93		GPS LAT			
				Р	URGINO	G DATA			1		
WELL DIAMETER	_	WELL CAPACITY		Screen				Static Depth	4 4 4	PURGE	(PP) GI
(Inches)	7.0	(gal/ft)	0,1632	Interval (Feet)	UNK	То	UNK	to Water (Feet)	7 95	PUMP CODE	IBP
TOTAL WELL		REFERENCE			WATER			TUBING		TUBING	
DEPTH (Feet)	30.0	ELEVATION (NGVD)			ATION CE-STATIC)			DIAMETER (Inches)		CAPACITY (gal/ft)	
Purge Tec	hnique: q Su	bmerged Screen	1,1/4,1/4 Well) q Submei	rged Screen (1	EQ Volume, 3	3, 3 Minutes)	q Partially Sub	merged Scre		l minutes)
ONE WELL		TAL DEPTH - ST	1/4 WELL	1		3 WELL	 	<u> </u>	5 WELL		<u> </u>
VOLUME	5.	59	VOLUME	0.8	1	VOLUMES			VOLUMES		
		EQUIPMENT VO		IP VOLUME +	(TUBING CA		BING LEGNTH	I) + FLOW CEL	L VOLUME		
PUMP VOLUME			TUBING LEGNTH			FLOW CELL VOLUME			EQUIPMEN T VOLUME		
INITIAL TUBII IN WELL				NG LEGNTH _ (FEET)		PURGE TIME START	0907	PURGE TIME END	0931	TOTAL PURGED	5.75
INST.	\geq	><	\geq	\times	SAL-SAM-63	SAL-SAM - 65-	SAL-SAM-63	SAL-SAM-55-	SAL-SAM- 2_0	\times	\times
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) (Δ <0.2)	TEMP (oC) (Δ <0.2)	SP COND (uS/cm) (Δ <5%)	DO (mg/L) (% SAT <20)	TURBIDITY (NTUs) (<20 NTU)	COLOR (Describe)	ODOR (Describe
0972	3.75	3.75	0.25	10.63	50	74.1	739.7	0.71	ψ2. 3	Joudy	Non
0926	1,0	4.75		10.63	5,0	रप ए	293.5	0.70	401	,	
0430	1.0	5 75		10.63	5.0	23.9	7.94, 4	0.65	38.3		
TURIN		apacity (gallons/fo				6, 3"=0.37, 4" = 0.0026;	4"=0.65, 5/16" = 0.004			5.88	2010
TOBIN	O INCIDE DIP	JAI AOITT (Gal	5H			4 = 0.0026; G DATA		3/8" = 0.006	6; 1/2" = 0.0	010; 5/8" = 0	J.U16
SAMPLED BY (PRII		-6	<u> </u>		AL	SAMPI	LER(S) TURES:	-6			
TUBING MATE (CIRCLE		PP PE NP	(TL) TT	SAMPLE LEGNTH IN V	TUBING VELL (FEET)			SAMPLE PU RATE (m		3.72	

			5JH	SA	MPLIN	<u>G</u> DATA	\			
SAMPLED BY (PRI		6		5,	FL		LER(S) TURES:	6		
TUBING MAT (CIRCLI		PP PE NE	· (TL) TT	SAMPLE LEGNTH IN V	TUBING VELL (FEET)			SAMPLE PUMP FLOW RATE (mL/min)		
	0931	SAMPLING ENDED	0931	FIELD CLEANED	Y(N)	CLEANING STEPS				
FIELD FILTERED?	Y(N)	FILTER SIZE (μm)		DUPLICATE	Y (N)		ECTED BY E FLOW?		COLLECTED GH TRAP?	Y N NA
PRESER CHECKED	-	Y N N/A		ERVATIVES DED					.	
WEAT CONDI	. —	cle	a		· ·					
СОММ	IENTS									
	TUD	PUMP COI	DES: PP=Per	istaltic Pump, (GP= Submersi	ble Grundfos I	Pump, IBP= In	-place Bladder Pump		
	TUB	ING MATERIAL (ODES: PP=	Polypropylene,	PE= Polyethy	ylene, NP= No		c, TL= Teflon Lined, TT= Te	flon	
Re	viewed By:			-			Date:			

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			GF	ROUND	VATER	SAMPL	ING LO	3			
Client Name:		Hazen and Sawye	er .	Location:		· -		Contact: Phone:	Josefi	n Edeback-Hu 813-630-4498	
Date Sampled	CiCi	7711		SAL Project #	110	541	 პ	Project Name	GCREC Mo	und Groundwa	_
Well Number	- 	PZ21-E11-26		Sample ID		15		GPS LAT			
	I			Р	URGINO	DATA		GPS LUNG			
WELL DIAMETER (Inches)	7.0	WELL CAPACITY (gal/ft)	01632	Screen Interval (Feet)	UNK	То	UNK	Static Depth to Water (Feet)	7.45	PURGE PUMP CODE	PP GP
TOTAL WELL DEPTH (Feet)	215	REFERENCE ELEVATION (NGVD)		ELEV.	O WATER ATION CE-STATIC)			TUBING DIAMETER (Inches)		TUBING CAPACITY (gal/ft)	.,,,,,
		bmerged Screen TAL DEPTH - ST			rged Screen (1	EQ Volume, 3	3, 3 Minutes)	q Partially Sub	merged Scree		minutes)
ONE WELL	- (TC	7 I	1/4 WELL			3 WELL			5 WELL		
VOLUME	L - '	EQUIPMENT V	VOLUME - DIM	() . S		VOLUMES	DINC LECNIL	I) + ELOW CEL	VOLUMES		
PUMP VOLUME		EQUI WENT V	TUBING LEGNTH	II VOLONIL I	(TOBING CA	FLOW CELL VOLUME	ING LEGITIF	i) + FLOW CEL	EQUIPMEN T VOLUME		
INITIAL TUBII IN WELL				NG LEGNTH . (FEET)		PURGE TIME START	0940	PURGE TIME END		TOTAL PURGED	
INST. ID			><	><	SAL-ŞAM-63-	SAL-SAM - 65-	SAL-SAM-63	SAL-SAM-55-	SAL-SAM-	\times	\times
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) (Δ <0.2)	TEMP (οC) (Δ <0.2)	SP COND (uS/cm) (Δ <5%)	DO (mg/L) (% SAT <20)	TURBIDITY (NTUs) (<20 NTU)	COLOR (Describe)	ODOR (Describe)
0949	2.25	7.75	0.25	\$9.63	5.0	74.9	784.5	1,16	Z3. \$	clear	work
0952	0.75	3.00			4,9	24.6	2846	0.99	75.6	1	1
0955	C1.75	3.75			49	24.6	287.6	0.87	<i>7</i> 8 3		
				i.							
TUBIA		Capacity (gallons/f					4"=0.65, 5/16" = 0.004	<u>-</u>		'5.88 010; 5/8" = (0.040
			1.71 1.7. 170		AMPLIN			, 3/0 = 0.00	5, 1/2 - 0.0	010, 0/6 - 0	0.016
SAMPLED BY		-ر	- A .	•		SAMP	LER(S)		$\overline{}$		
TUBING MATI (CIRCLE	ERIAL CODE	PP PE NF	» (пі) пт		TUBING WELL (FEET)	SIGNA	TURES:	SAMPLE PL RATE (n			
SAMPLING INITIATED	0956	SAMPLING ENDED	0956	FIELD CLEANED	YN	CLEANING STEPS		(,		
FIELD FILTERED? PRESER		FILTER SIZE (μm) (Y) N N/A	LIST PRESE		Y(N)	1	ECTED BY E FLOW?	Y N (N/A)		COLLECTED 6H TRAP?	Y N(N)A
CHECKED WEAT CONDI	THER	Chec	ADD	DED							
COMM	ENTS							, ,,,,,,,,,			
	TUR	PUMP COI ING MATERIAL C	DES: PP=Peri	staltic Pump, (GP= Submersi	ble Grundfos I	Pump, IBP= In-	place Bladder I	oump		
	viewed By:	IIII III C		отургоругене.	, L- roiyeth	yielle, NE- N	Date:	, IL- Letion Li	nea, TT= Tet	ion	

Date:

Reviewed By:

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			GF	ROUND	VATER	<u>SAM</u> PL	ING LO	<u> </u>			
Client Name:		Hazen and Sawye	er	Location:				Contact: Phone:	Josefi	n Edeback-Hu 813-630-4498	
Date Sampled	00	2/11		SAL Project #	110	541	3	Project Name	GCREC Mo	und Groundwa	
Well Number		PZ16-C12-28		Sample ID		90		GPS LAT GPS LONG			
				Р	URGINO	3 DATA					
WELL DIAMETER (Inches)	0.75	WELL CAPACITY (gal/ft)	6.00	Screen Interval (Feet)	UNK	То	UNK	Static Depth to Water (Feet)	3.93	PURGE PUMP CODE	PP GP
TOTAL WELL DEPTH (Feet)	790	REFERENCE ELEVATION (NGVD)		GROUNI ELEV	D WATER ATION CE-STATIC)			TUBING DIAMETER (Inches)		TUBING CAPACITY (gal/ft)	
		bmerged Screen		l) q Subme	rged Screen (1	I EQ Volume, 3	3, 3 Minutes)	q Partially Sub	merged Scree		minutes)
	1	TAL DEPTH - ST		x WELL CAP	ICITY =						
ONE WELL VOLUME	0.50	EOLIDMENT W	1/4 WELL VOLUME	C.I		3 WELL VOLUMES	DINO LEGALE	. 51 011 051	5 WELL VOLUMES		
	I	EQUIPMENT V		AP VOLUME +	- (TUBING CAI		BING LEGNIF	I) + FLOW CEL	L VOLUME		
PUMP VOLUME			TUBING LEGNTH			FLOW CELL VOLUME			EQUIPMEN T VOLUME		
INITIAL TUBI IN WELL			l .	NG LEGNTH _ (FEET)		PURGE TIME START	1020	PURGE TIME END		TOTAL PURGED	
INST. ID	\geq	><	><		SAL-SAM-63	SAL-SAM - 65-	SAL-SAM-63	SAL-SAM-55-	SAL-SAM- 0_C_	\times	\times
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) (Δ <0.2)	TEMP (oC) (Δ <0.2)	SP COND (uS/cm) (Δ <5%)	DO (mg/L) (% SAT <20)	TURBIDITY (NTUs) (<20 NTU)	COLOR (Describe)	ODOR (Describe)
1075	୍ୟ ତ	0.50	0,10	MA	5.6	250	295.2	C 79	64.6	Housely	hou
1028	0.30	0.80	C. IC		5.5	25,1	301.6	0.62	63.1		
1631	C.30	1.10	0.10	1	5.5	25	301.9	0.47	60.8		
TUDIA		apacity (gallons/f		,						5.88	
TOBIN	NG INSIDE DIA	. CAPACITY (Ga	i./Ft.): 1/8 =				5/16" = 0.004	; 3/8" = 0.000	6; 1/2" = 0.0)10; 5/8" = (0.016
SAMPLED BY	/ COMPANY			3/	AMPLIN						
(PRI			76				LER(S) TURES:	4	<u> </u>		
TUBING MATI (CIRCLE		PP PE NF	, (LĽ)1.1		TUBING WELL (FEET)			SAMPLE PU RATE (m			<u></u>
SAMPLING INITIATED	1037	SAMPLING ENDED	1037	FIELD CLEANED	Y (N)	CLEANING STEPS					
FIELD FILTERED?	Y (2)	FILTER SIZE (μm)	110 T DD 501	DUPLICATE	Y (N)		ECTED BY E FLOW?	Y N (N/A)		COLLECTED H TRAP?	Y N (N/A
PRESER CHECKED		Y N N/A	LIST PRESE ADD		, , , , , , , , , , , , , , , , , , , ,						
WEAT CONDI		Clea									
СОММ	ENTS										
	TUD	PUMP COL	DES: PP=Peri	staltic Pump, (GP= Submersi	ble Grundfos F	Pump, IBP= In-	place Bladder f	Pump		
Ro	viewed By:	NG MATERIAL C	ODES: PP= F	olypropylene,	, PE= Polyethy	ylene, NP= No	on-inert Plastic	, TL= Teflon Li	ned, TT= Tef	lon	

Date:

Reviewed By:

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			GF	ROUNDY	VATER	SAMPL	ING LO	G			
Client Name:		Hazen and Sawye	r	Location:				Contact:	Josefi	n Edeback-Hu	ırst, PE
				Location.				Phone:		813-630-4498	3
Date Sampled	C	162711		SAL Project #	110	1541	3	Project Name	GCREC Mo	und Groundwa	ater Analyses
Well Number		PZ07-D05-7		Sample ID		Or 1		GPS LAT			
77611774111661		1 201 000-1		Sample ID		86		GPS LONG			
				P	URGING	DATA					
WELL DIAMETER (Inches)	1.25	WELL CAPACITY (gal/ft)	0.06	Screen Interval (Feet)	UNK	То	UNK	Static Depth to Water (Feet)	7.44	PURGE PUMP CODE	(PP) GP IBP
TOTAL MELL		REFERENCE		GROUND	WATER			TUBING		TUBING	

WELL DIAMETER (Inches)	1.25	WELL CAPACITY (gal/ft)	0.06	Screen Interval (Feet)	UNK	То	UNK	Static Depth to Water (Feet)	7.44	PURGE PUMP CODE	(PP) GP IBP
TOTAL WELL DEPTH (Feet)	9.02	REFERENCE ELEVATION (NGVD)		GROUND ELEVA (REFERENC	ATION			TUBING DIAMETER (Inches)		TUBING CAPACITY (gal/ft)	
		bmerged Screen (TAL DEPTH - ST	<u></u>	, , , , , , , , , , , , , , , , , , , ,	ged Screen (1	EQ Volume, 3	, 3 Minutes)	q Partially Sub	merged Scree	en (1 Well, 3,3	minutes)
ONE WELL VOLUME		O C1	1/4 WELL VOLUME	0.0	12	3 WELL VOLUMES		22.00	5 WELL VOLUMES		
PUMP VOLUME		EQUIPMENT VO	TUBING LEGNTH	1P VOLUME +	(TUBING CAF	FLOW CELL VOLUME	BING LEGNTH) + FLOW CEL	EQUIPMEN T VOLUME		
INITIAL TUBII IN WELL			FINAL TUBII IN WELL			PURGE TIME START	1130	PURGE TIME END	1139	TOTAL PURGED	C.90
INST. ID	\times	\times	\times	\times	SAL-SAM-63-	SAL-SAM - 65	SAL-SAM-63-	SAL-SAM-55-	SAL-SAM-	\times	\times
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) (∆ <0.2)	TEMP (oC) (∆ <0.2)	SP COND (uS/cm) (Δ <5%)	DO (mg/L) (% SAT <20)	TURBIDITY (NTUs) (<20 NTU)	COLOR (Describe)	ODOR (Describe)
1133	0.30	0.30	0.16	8.73	4.7	27.2	287.8	3.29	13,33	clew	νς⊶و
1136	0.36	C. 60		8.73	4.7	27.3	288.U	2.71	10.45	١	{
1139	()-30	0.90		8.73	117	773	787.5	750	9.18		
											,
										_	
TUBIN		apacity (gallons/for apacity (•	·	4"=0.65, 5/16" = 0.004			'5.88)10; 5/8" = (0.016

SAMPLING DATA

		OAIVIF LIN	ODAIA		
SAMPLED BY / COMPANY (PRINT)	SAL		SAMPLER(S) SIGNATURES:	-6-	
TUBING MATERIAL CODE (CIRCLE ONE)	PP PE NP (TL) TT	SAMPLE TUBING LEGNTH IN WELL (FEET)		SAMPLE PUMP FLOW RATE (mL/min)	
SAMPLING INITIATED	SAMPLING ENDED 4 C	FIELD Y N	CLEANING STEPS		
FIELD Y N	FILTER SIZE (μm)	DUPLICATE Y N	VOC COLLECTED BY REVERSE FLOW?	1 V NI 201/A I	COLLECTED Y N N/A
PRESERVATION CHECKED IN FIELD?	I/ V / NI NI/A I	ERVATIVES DED		···	
WEATHER CONDITIONS	clear				
COMMENTS					
	PUMP CODES: PP=Per	istaltic Pump, GP= Submersi	ble Grundfos Pump, IBP= In	-place Bladder Pump	
TUB	ING MATERIAL CODES: PP=	Polypropylene, PE= Polyeth	ylene, NP= Non-inert Plastic	c, TL= Teflon Lined, TT= Tef	lon
Reviewed By:			Date:		

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			GF	ROUND	NATER	SAMPL	ING LO	3									
Client Name:		Hazen and Sawye	er	Location:		"		Contact: Phone:	Josefi	n Edeback-Hu 813-630-4498							
Date Sampled	CI	2711		SAL Project	110	541	3	Project Name	GCREC Mo	und Groundwa							
Well Number		PZ03-H11-6		Sample ID		4		GPS LAT									
	<u> </u>			P	URGINO			GPS LONG	<u> </u>								
WELL DIAMETER (Inches)	1.75	WELL CAPACITY (gal/ft)	0.06	Screen Interval (Feet)	UNK	То	UNK	Static Depth to Water (Feet)	7.34	PURGE PUMP CODE	PP) GP						
TOTAL WELL DEPTH (Feet)	9.05	REFERENCE ELEVATION (NGVD)		ELEV.	O WATER ATION CE-STATIC)			TUBING DIAMETER (Inches)		TUBING CAPACITY (gal/ft)	16.00						
Purge Ted WELL V	chnique: q Su	bmerged Screen TAL DEPTH - ST	(1,1/4,1/4 Well) q Subme	rged Screen (1	EQ Volume, 3	3, 3 Minutes)	q Partially Sub	merged Scree	en (1 Well, 3,3	minutes)						
ONE WELL VOLUME		O	1/4 WELL VOLUME	0.0	7.7	3 WELL VOLUMES			5 WELL VOLUMES								
	T	EQUIPMENT V		MP VOLUME +	· (TUBING CA		BING LEGNTH) + FLOW CEL	L VOLUME								
PUMP VOLUME		.	TUBING LEGNTH			FLOW CELL VOLUME			EQUIPMEN T VOLUME								
INITIAL TUBI IN WELL				NG LEGNTH _ (FEET)		PURGE TIME START	1253	PURGE TIME END	7.07	TOTAL PURGED	0.90						
INST. ID			><	><	SAL-SAM-63	SAL-SAM - 65	SAL-SAM-63	SAL-SAM-55-	SAL-SAM- 0_Z_	\times	\times						
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) (Δ <0.2)	TEMP (οC) (Δ <0.2)	SP COND (uS/cm) (Δ <5%)	DO (mg/L) (% SAT <20)	TURBIDITY (NTUs) (<20 NTU)	COLOR (Describe)	ODOR (Describe)						
1836	0.30	0. 3 0	0.10	8.85	4.5	28 cj	168,3	2.01	6,34	Clear	Nece						
1159	0.30	0.60		8.85	4.5	28.3	1660	303	3.89	1.							
1202	0.30	0.90		2.85	45	28.4	164.9	3-01	764		-						
-		Capacity (gallons/f					,		'=1.47, 12'	5.88							
TUBIN	NG INSIDE DIA	A. CAPACITY (Ga	l./Ft.): 1/8" =				5/16" = 0.004	; 3/8" = 0.000	6; 1/2" = 0.0	010; 5/8" = 0	0.016						
SAMPLED BY	//COMPANY			5/	AMPLIN												
(PRI		S	+ -				LER(S) TURES:										
TUBING MAT (CIRCLI		PP PE NF	Y (TL, TT		TUBING WELL (FEET)			SAMPLE PU RATE (m									
SAMPLING INITIATED	1203	SAMPLING ENDED	1203	FIELD CLEANED	Y (N)	CLEANING STEPS											
FIELD FILTERED?	Y (N)	FILTER SIZE (μm)		DUPLICATE	Y (N)		ECTED BY E FLOW?	Y N (N/A)		COLLECTED H TRAP?	Y N/A						
PRESER CHECKED		N N/A	LIST PRESE ADE	ERVATIVES DED													
WEAT CONDI		clea	Γ														
СОММ	IENTS										i						
	חוד	PUMP CO	DES: PP=Peri	staltic Pump,	GP= Submersi	ble Grundfos I	Pump, IBP= In	-place Bladder I	⊃ump								
Re		ING WATERIAL (ODES: PP=1	-oiypropylene	, P⊏= Polyeth	yiene, NP= Ni		, IL= Teflon Li	ned, TT= Tef	lon							
				·			TUBING MATERIAL CODES: PP= Polypropylene, PE= Polyethylene, NP= Non-inert Plastic, TL= Teflon Lined, TT= Teflon Reviewed By: Date:										

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			GF	ROUND	WATER	SAMPL	ING LO	3			
Client Name:		Hazen and Sawye	er er	Location:				Contact:	Josefi	n Edeback-Hu	
Date Sampled	063	711		SAL Project	11/	541	<u></u>	Phone: Project Name	GCREC Mo	813-630-4498 und Groundwa	
Well Number		PZ17-I15-26		# Sample ID		71		GPS LAT			
	l				URGINO	<u> </u>		GPS LONG			
WELL		WELL			OKGIN	JUAIA			·		
DIAMETER (Inches)	0.75	CAPACITY (gal/ft)	0.02	Screen Interval (Feet)	UNK	То	UNK	Static Depth to Water (Feet)	8.42	PURGE PUMP CODE	PP GP
TOTAL WELL DEPTH (Feet)	3005	REFERENCE ELEVATION (NGVD)		ELEV	O WATER ATION CE-STATIC)			TUBING DIAMETER (Inches)		TUBING CAPACITY	
Purge Ted	chnique: q Su	I Screen	I (1,1/4,1/4 Weli	I) a Subme	raed Screen (1	EQ Volume, 3	3, 3 Minutes)	q Partially Sub	merged Scre	(gal/ft) en (1 Well, 3,3	minutes)
ONE WELL		TAL DEPTH - ST	T			0.14/5/1	· · · · · · · · · · · · · · · · · · ·				
VOLUME	0.	43	1/4 WELL VOLUME	C		3 WELL VOLUMES			5 WELL VOLUMES		
*****		EQUIPMENT V		IP VOLUME +	· (TUBING CAI	PACITY X TUI	BING LEGNTH	l) + FLOW CEL	L VOLUME		
PUMP VOLUME			TUBING LEGNTH		-	FLOW CELL VOLUME			EQUIPMEN T VOLUME		
INITIAL TUBI IN WELL				NG LEGNTH L (FEET)		PURGE TIME START	1227	PURGE TIME END		TOTAL PURGED	
INST. ID	\geq	\geq	\geq	\geq	SAL-SAM-63	SAL-SAM - 65- <u>↓</u>	SAL-SAM-63	SAL-SAM-55-	SAL-SAM- 0_Z	\times	\times
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) (Δ <0.2)	TEMP (oC) (Δ <0.2)	SP COND (uS/cm) (Δ <5%)	DO (mg/L) (% SAT <20)	TURBIDITY (NTUs) (<20 NTU)	COLOR (Describe)	ODOR (Describe)
1232	G 50	<u>८,5</u> °	0.10	NIA	49	75.5	307.2	1,91	68,9	(loody	New
1235	0.3c	0.80			4.9	25,4	307,3	.80	67.3		1
1238	0.30	1.10	\		4,9	75.4	307.3	1.60	25.5		/_
	Mall C	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	1\ 0.75" 0.	00 105# 0	00 00 0						
TUBIN		Capacity (gallons/f A. CAPACITY (Ga			,		4"=0.65, 5/16" = 0.004			5.88	
			1.71 1.71 1.70		AMPLIN			3/8" = 0.000	6; 1/2" = 0.0	010; 5/8" = 0).016
SAMPLED BY (PRI		SAC				SAMPI	LER(S) TURES:	€.	-1		
TUBING MATI (CIRCLE		PP PE NF	P (T) IT		TUBING WELL (FEET)			SAMPLE PU RATE (m			
SAMPLING INITIATED	1739	SAMPLING ENDED	1239	FIELD CLEANED	Y(N)	CLEANING STEPS					
FIELD FILTERED?	¥(2)	FILTER SIZE (μm)		DUPLICATE	× (2)		ECTED BY E FLOW?	Y N (N/A)		COLLECTED H TRAP?	Y N N/A
PRESER CHECKED		(Y) N N/A	LIST PRESE ADD								
WEAT CONDI											
СОММ	ENTS										
	TUS	PUMP COI	DES: PP=Peri	staltic Pump, (GP= Submersi	ble Grundfos F	Pump, IBP= In-	place Bladder f	Pump		
	TUB	ING MATERIAL C	ODES: PP= F	olypropylene,	PE= Polyethy	ylene, NP= No	on-inert Plastic	, TL= Teflon Li	ned, TT=Tef	lon	

Date:

Reviewed By:

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GROUNDWATER SAMPLING LOG

Client Name:		Hazen and Sawy	er	Location:				Contact: Phone:	Josef	in Edeback-H	
Date Sampled	067	2711		SAL Project #	110	5413		Project Name	GCREC Mo		ater Analyses
Well Number		PZ18-R12-26	· · · · ·	Sample ID		12		GPS LAT			
	<u>.</u>			P	URGINO			GPS LONG	l		
WELL DIAMETER (Inches)	0.15	WELL CAPACITY (gal/ft)	0.01	Screen Interval (Feet)	UNK	То	UNK	Static Depth to Water (Feet)	7.56	PURGE PUMP CODE	PP GP
TOTAL WELL DEPTH (Feet)	775	REFERENCE ELEVATION (NGVD)		ELEV (REFEREN	O WATER ATION CE-STATIC)			TUBING DIAMETER (Inches)		TUBING CAPACITY (gal/ft)	
WELL V	nnique: q Su OLUME = (TC	bmerged Screen TAL DEPTH - ST	(1,1/4,1/4 Wel ATIC DEPTH)	y Subme x WELL CAP	rged Screen (1 ICITY =	IEQ Volume, 3	3, 3 Minutes)	q Partially Sub	merged Scree	en (1 Well, 3,3 	minutes)
ONE WELL VOLUME	0.	95	1/4 WELL VOLUME	0.1	(3 WELL VOLUMES		·	5 WELL VOLUMES		1 .
		EQUIPMENT V	OLUME = PUN	IP VOLUME +	(TUBING CA	PACITY X TUI	BING LEGNTH	i) + FLOW CEL	L VOLUME		
PUMP VOLUME			TUBING LEGNTH			FLOW CELL VOLUME			EQUIPMEN T VOLUME		
INITIAL TUBII IN WELL				NG LEGNTH _ (FEET)		PURGE TIME START	125c	PURGE TIME END	1301	TOTAL PURGED	1,10
INST.	\geq	\geq	\times	\geq	SAL-SAM-63	SAL-SAM -	SAL-SAM-63	SAL-SAM-55-	SAL-SAM-	><	\times
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) (Δ <0.2)	TEMP (oC) (Δ <0.2)	SP COND (uS/cm) (Δ <5%)	DO (mg/L) (% SAT <20)	TURBIDITY (NTUs) (<20 NTU)	COLOR (Describe)	ODOR (Describe)
1255	0.50	0.50	0.10	NIA	5.1	76.8	2521	0.71	635.0	Brown	None
1755	0.30	080			5.1	76.6	751,8	C.79	397.0		1
1301	0.30	1.10			5.1	76.6	751.9	0.59	2600		
	Well C	apacity (gallons/fo	not): 0.75"=0.1	02, 1.25"=0	.06, 2"=0.1	6, 3"=0.37.	4"=0.65.	5"-4.02	4.47	5.00	
TUBIN		. CAPACITY (Ga					5/16" = 0.004			5.88 010; 5/8" = 0	0.016
				SA	MPLIN	G DATA				· · · .	
SAMPLED BY (PRII		5	AC			SAMPI SIGNAT		56	~		
TUBING MATE (CIRCLE		PP PE NF	, (ІГ _, Ш	SAMPLE LEGNTH IN V				SAMPLE PU RATE (m	-		
SAMPLING INITIATED	1302	SAMPLING ENDED	1302	FIELD CLEANED	Y (N)	CLEANING STEPS				<u> </u>	
FIELD FILTERED?	Y (N)	FILTER SIZE (μm)		DUPLICATE	Y(N)	VOC COLL REVERSI		Y N (N/A	SEMI-VOLS	COLLECTED	Y N W/A
PRESER\ CHECKED I		Y N N/A	LIST PRESE			TEVERO	LILOW		/ THROUG	H IRAP?	
WEAT CONDIT		clear									
СОММЕ	ENTS	-									
		PUMP COD	DES: PP=Peri	staltic Pump, (GP= Submersil	ble Grundfos F	Pump, IBP= In-	place Bladder F	ump		
Rev	TUBI riewed By:	NG MATERIAL C	ODES: PP= F	Polypropylene,	PE= Polyethy	/lene, NP= No	n-inert Plastic	, TL= Teflon Lir	ned, TT= Tefl	on	
1,01							Date:				

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GROUNDWATER SAMPLING LOG

Client Name:	ļ .	Hazen and Sawye	er	Location:	***			Contact:	Josefi	n Edeback-Hu	
Date Sampled	Λ:	,2711		SAL Project	11/34	5413		Phone: Project Name	GCREC Mo	813-630-4498 und Groundwa	
Well Number	<i>U</i> (5	PZ23-D09-27	EQ	#				GPS LAT	GONEO WO		ater Analyses
Well Mulliber		F223-D09-27	Black	Sample ID		7		GPS LONG			
		PZ 25			URGINO	3 DATA					
WELL DIAMETER (Inches)	0.75	WELL CAPACITY (gal/ft)	0.07	Screen Interval (Feet)	UNK	То	UNK	Static Depth to Water (Feet)	12 71	PURGE PUMP CODE	(PP) GP
TOTAL WELL DEPTH (Feet)	13.60	REFERENCE ELEVATION (NGVD)			WATER ATION CE-STATIC)			TUBING DIAMETER (Inches)		TUBING CAPACITY (gal/ft)	
		bmerged Screen TAL DEPTH - ST				EQ Volume, 3	, 3 Minutes)	q Partially Sub	merged Scree	en (1 Well, 3,3	minutes)
ONE WELL		_	1/4 WELL			3 WELL		, ,, ==	5 WELL		
VOLUME	<u> </u>	<u>0173</u>	VOLUME - DUA	U, U	045	VOLUMES	10 50 51		VOLUMES		
DUMD		EQUIPMENT V		IP VOLUME +	(TUBING CA		SING LEGNIH) + FLOW CEL			
PUMP VOLUME			TUBING LEGNTH			VOLUME			EQUIPMEN T VOLUME		
INITIAL TUBII			FINAL TUBII IN WELL			PURGE TIME START	1320	PURGE TIME END		TOTAL PURGED	:
INST. ID	\times	\geq	\times	\times	SAL-SAM-63	SAL-SAM - 65	SAL-SAM-63- ———	SAL-SAM-55-	SAL-SAM- 0	\times	\times
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) (Δ <0.2)	TEMP (οC) (Δ <0.2)	SP COND (uS/cm) (Δ <5%)	DO (mg/L) (% SAT <20)	TURBIDITY (NTUs) (<20 NTU)	COLOR (Describe)	ODOR (Describe)
1323	0.30	0.30	010								
1326	0.30	C. & C			DA	-1/					
1329	0.30	5-40)	1					
							·				
		apacity (gallons/f					4"=0.65,			5.88	
IUBIN	G INSIDE DIA	. CAPACITY (Ga	l./Ft.): 1/8" = 1				5/16" = 0.004	; 3/8" = 0.006	6; 1/2" = 0.0)10; 5/8" = C	0.016
SAMPLED BY	/ COMPANY			5/	AMPLIN	G DATA		- 7			
(PRII		\leq	AL			SAMPI SIGNA	TURES:	Z-	1		
TUBING MATE (CIRCLE		PP PE NF	' TL TT	SAMPLE LEGNTH IN V				SAMPLE PU RATE (m			
SAMPLING INITIATED	MA	SAMPLING ENDED	ΛA	FIELD CLEANED	YN	CLEANING STEPS					, , , , , , , , , , , , , , , , , , , ,
FIELD FILTERED?	YN	FILTER SIZE (μm)	, I	DUPLICATE	ΥN	VOC COLL REVERS		Y N N/A	SEMI-VOLS (THROUG	COLLECTED H TRAP?	Y N N/A
PRESER\ CHECKED I		Y N N/A	LIST PRESE ADD								
WEAT CONDIT		E	Ž								
СОММ	ENTS		1			-	ECCUE:				
	THE	PUMP COI NG MATERIAL C	DES: PP=Peri	staltic Pump, (SP= Submersi	ble Grundfos F	on incrt Direct	place Bladder F	oump		
Re	viewed By:	110 MATERIAL C	ODEO. FF=1	отургоругене,	r == Polyeth	yiene, NP= No	Date:	, IL= Letton Li	nea, i!= lefi	on	
							Date.				

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							ING LO				
Client Name:			Location:				Contact: Phone:	Josefin Edeback-Hurst, PE 813-630-4498			
Date Sampled	067711		SAL Project #	1105413		Project Name	GCREC Mound Groundwater Analys				
Well Number			Sample ID	37		GPS LAT					
				Р	URGINO	<u> </u>		O G E CINO	I		
WELL DIAMETER (Inches)	0.75	WELL CAPACITY (gal/ft)	0.07	Screen Interval (Feet)	UNK	То	UNK	Static Depth to Water (Feet)	4.35	PURGE PUMP CODE	PP GF
TOTAL WELL DEPTH (Feet)	9.9	REFERENCE ELEVATION (NGVD)		ELEV	O WATER ATION CE-STATIC)			TUBING DIAMETER (Inches)		TUBING CAPACITY (gal/ft)	
Purge Tec	chnique: q Su	bmerged Screen TAL DEPTH - ST	(1,1/4,1/4 Well) q Subme	rged Screen (1	EQ Volume, 3	3, 3 Minutes)	q Partially Sub	merged Scree	en (1 Well, 3,3	minutes)
ONE WELL VOLUME	0.1		1/4 WELL VOLUME	0.0		3 WELL VOLUMES		L	5 WELL VOLUMES		
	·	EQUIPMENT V	OLUME = PUM	1P VOLUME +	· (TUBING CAI	PACITY X TUI	BING LEGNTH) + FLOW CEL			
PUMP VOLUME			TUBING LEGNTH			FLOW CELL VOLUME			EQUIPMEN T VOLUME		
INITIAL TUBII IN WELL			FINAL TUBII IN WELL	NG LEGNTH - (FEET)		PURGE TIME START	1050	PURGE TIME END	1059	TOTAL PURGED	0.90
INST. ID	\times				SAL-SAM-63-	SAL-SAM - 65- <u>4</u>	SAL-SAM-63	SAL-SAM-55-	SAL-SAM- 0Z_	\times	\times
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) (Δ <0.2)	TEMP (oC) (Δ <0.2)	SP COND (uS/cm) (Δ <5%)	DO (mg/L) (% SAT <20)	TURBIDITY (NTUs) (<20 NTU)	COLOR (Describe)	ODOR (Describe)
1053	0.30	0.30	010	N/A	5.3	27.6	451.6	1,92	9.36	clew	12.U
1056	0.30	0.60			5,3	27.6	452.7	1.81	9.01	1	
1059	0.30	0.90			5. <i>3</i>	27.6	457.9	1.77	8.77		
· · · · · · · · · · · · · · · · · · ·											
TUDIA		Capacity (gallons/f		<u> </u>						5.88	
10810	IG INSIDE DIA	A. CAPACITY (Ga	II./Ft.); 1/8" =		= 0.0014; 1/ AMPLIN			; 3/8" = 0.00	6; 1/2" = 0.0	010; 5/8" = 0	0.016
SAMPLED BY	/ COMPANY	1			ZIVII LIIV		LER(S)				
(PRI	NT)	SAC	_			SIGNA	TURÈS:		7		
TUBING MATI (CIRCLE		PP PE NE	» (П) тт		TUBING WELL (FEET)			SAMPLE PU RATE (m			
SAMPLING INITIATED	1100	SAMPLING ENDED	1/00	FIELD CLEANED	Y(N)	CLEANING STERS					
FIELD FILTERED?	Y (N)	FILTER SIZE (μm)		DUPLICATE		ADC COLL REVERS	ECTED BY E FLOW?	Y N (N/A)	SEMI-VOLS THROUG	COLLECTED H TRAP?	Y N (N//
PRESER' CHECKED		Y)N N/A	LIST PRESE ADD								
WEAT CONDI		clea	5								
СОММ	ENTS										
	7110	PUMP CO	DES: PP=Peri	staltic Pump,	GP= Submersi	ble Grundfos I	Pump, IBP= In-	place Bladder I	Pump		
Po	viewed By:	ING MATERIAL (JUDES: PP= F	olypropylene.	, PE= Polyethy	ylene, NP= N	on-inert Plastic	, TL= Teflon Li	ned, TT= Tef	lon	

Date:

Reviewed By:



Appendix E: Field Parameter Analyses

Table E.1
Field Parameter Results
(June 27 – June 29, 2011)

	(June 27 – June 29, 2011)							
	Sample Identification	Temperature (°C)	рН	Specific Conductance (μS)	Dissolved Oxygen (mg/L)			
1	STE-EX Pump Tank	31.0	6.6	875	0.1			
2	PZ03-H11-6	28.4	4.5	165	3.0			
3	PZ04-BKG-9	25.9	5.6	100	4.3			
4	PZ07-D05-7	27.3	4.7	288	2.5			
5	PZ11-E09-10	27.6	5.3	454	1.8			
6	PZ11-E09-10-D	27.6	5.3	454	1.8			
7	PZ15-A11-6	29.2	5.3	195	3.1			
8	PZ16-C12-28	25.1	5.5	306	0.5			
9	PZ17-I15-26	25.4	4.9	307	1.6			
10	PZ18-R12-26	26.6	5.1	252	0.6			
11	PZ19-G10-26	23.9	5.0	294	0.7			
12	PZ20-G10-15	25.7	5.3	300	2.6			
13	PZ21-E11-26	24.8	4.9	288	0.9			
14	PZ24-BKG-26	24.4	4.9	296	0.7			
15	DP-AA9-14	24.5	4.6	752	1.3			
16	DP-AA9-22	24.7	5.2	279	0.3			
17	DP-AA9-27	24.7	5.1	295	0.7			
18	DP-C11-8	27.8	5.8	385	3.1			
19	DP-D07-5	Dry	Dry	Dry	Dry			
20	DP-D07-9	24.4	4.0	539	1.9			
21	DP-D08-9	27.4	5.3	411	1.8			
22	DP-D09-8	27.0	4.4	670	1.1			
23	DP-D09-15	26.2	5.1	461	0.9			
24	DP-D11-11	26.3	5.2	464	1.1			
25	DP-D12-11	26.2	4.9	487	0.3			

	Sample Identification	Temperature (°C)	рН	Specific Conductance (μS)	Dissolved Oxygen (mg/L)
26	DP-D7.5-14	24.4	4.5	483	0.4
27	DP-E04-8	26.0	4.7	185	1.6
28	DP-E07-10	25.5	4.5	245	0.2
29	DP-E08-8	25.8	4.5	348	0.3
30	DP-E11-12	24.9	5.0	489	0.3
31	DP-E12-10	25.1	4.9	502	0.3
32	DP-E12-15	24.7	5.2	462	0.4
33	DP-E12-22	24.2	4.8	328	0.4
34	DP-E12-22-D	24.2	4.8	328	0.4
35	DP-E12-28	24.2	4.8	320	0.3
36	DP-F04-17	25.1	6.1	374	0.3
37	DP-F04-32	24.6	6.1	335	0.3
38	DP-F05-5	Dry	Dry	Dry	Dry
39	DP-F08-20	24.2	5.3	347	0.5
40	DP-F08-28	24.3	5.4	324	0.3
41	DP-F10-11	25.3	4.9	492	0.4
42	DP-F11-11	26.0	4.8	447	0.3
43	DP-F11-15	24.6	4.7	487	0.2
44	DP-F11-18	24.5	5.0	354	0.3
45	DP-F11-21	24.4	4.9	310	0.4
46	DP-F11-24	24.4	4.8	610	0.2
47	DP-F11-27	24.3	4.9	331	0.2
48	DP-F12-10	25.3	4.3	500	0.2
49	DP-F15-14	24.2	4.5	487	0.3
50	DP-F15-20	24.4	4.6	359	0.3
51	DP-F15-26	24.2	4.3	320	0.2
52	DP-G07-13	29.9	5.4	255	3.1
53	DP-G07-15	25.6	5.0	296	0.8
54	DP-G07-17	24.5	5.0	337	0.8
55	DP-G07-21	24.8	5.1	333	1.3
56	DP-G07-24	24.6	4.9	286	0.6
57	DP-G07-27	25.0	5.0	325	1.8
58	DP-G08-5	Dry	Dry	Dry	Dry

	Sample	Temperature	рН	Specific Conductance	Dissolved Oxygen
	Identification	(°C)	рп	(μS)	(mg/L)
59	DP-G09-11	27.9	5.4	279	2.9
60	DP-G11-8	27.6	4.6	312	1.1
61	DP-G12-9	26.5	4.2	359	0.2
62	DP-G12-15	25.2	4.7	478	0.2
63	DP-G12-18	24.6	4.8	443	0.2
64	DP-G12-21	24.4	4.9	361	0.1
65	DP-G12-24	24.3	4.8	346	0.1
66	DP-G12-27	24.8	4.8	334	0.2
67	DP-H06-7	30.2	5.9	164	4.7
68	DP-H09-12	25.8	5.0	274	0.8
69	DP-H10-11	28.5	5.6	229	5.1
70	DP-I06-14	24.4	4.7	218	0.3
71	DP-I06-20	24.1	4.9	368	0.3
72	DP-I06-26	24.2	5.0	312	0.3
73	DP-I12-6	26.6	4.7	138	0.4
74	DP-J08-6	27.3	5.9	183	3.1
75	DP-J09-12	25.7	4.8	189	0.4
76	DP-J09-14	24.8	4.5	249	0.3
77	DP-J09-20	24.1	4.7	368	0.2
78	DP-J09-26	24.0	4.5	306	0.2
79	DP-J12-13	24.9	4.6	249	0.3
80	DP-J12-15	24.7	4.6	287	0.3
81	DP-J12-20	24.5	4.9	356	0.4
82	DP-J12-27	24.4	4.7	310	0.2
83	DP-K10-7	27.4	5.1	176	1.3
84	DP-K12-5	27.5	4.7	80	0.7
85	DP-M07-21	24.5	4.9	366	0.3
86	DP-M07-27	24.3	5.0	303	0.2
87	DP-M12-10	27.0	5.1	177	0.8
88	DP-N12-14	25.4	4.4	177	0.2
89	DP-N12-18	25.2	4.7	247	0.3
90	DP-N12-21	24.9	4.8	309	0.2
91	DP-N12-24	24.7	4.6	354	0.1

Appendix E June 2011

	Sample Identification	Temperature (°C)	рН	Specific Conductance (μS)	Dissolved Oxygen (mg/L)
92	DP-N12-27	24.6	4.7	365	0.1
93	DP-N12-27-D	24.6	4.7	365	0.1
94	DP-O10-18	25.1	4.9	335	0.7
95	DP-O10-24	24.7	4.7	366	0.3
96	DP-Q15-21	25.2	4.8	358	0.3
97	DP-Q15-26	25.3	4.8	385	0.4
98	Equipment Rinsate	28.8	6.8	10	4.9