



Florida Onsite Sewage Nitrogen Reduction Strategies Study

Task A.26

PNRS II Test Facility Data Summary Report No. 2

Progress Report

September 2010

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Environmental Engineers & Scientists

In association with



AET
Applied Environmental Technology

**OTIS
ENVIRONMENTAL
CONSULTANTS, LLC**

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TASK A.26 PROGRESS REPORT

PNRS II Test Facility Data Summary Report No. 2

Prepared for:

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1.0 Background

Task A of the Florida Onsite Sewage Nitrogen Reduction Strategies Study includes the evaluation of passive treatment systems to remove nitrogen from septic tank effluent. The Passive Nitrogen Removal Study II (PNRS II) is a follow-up to the previous experimental evaluations of passive nitrogen removal technologies conducted in Passive Nitrogen Removal Study I. The objective of the PNRS II study is to extend and expand into field pilot testing the two-stage biofiltration process that was initiated in PNRS I. A unique test facility was constructed for the purpose of this evaluation. The Task A.15 PNRS II QAPP documents the objectives, experimental biofiltration systems, monitoring framework, sample frequency and duration, and analytical methods to be used at the PNRS II Test Facility.

2.0 Purpose

This data summary report documents data that was collected in the PNRS II monitoring and sampling event which was conducted August 31 - September 1, 2010. The sample event report was submitted as Sample Event Report No. 2, August 2010, as deliverable under Task A.25. The monitoring event consisted of an assessment and evaluation of PNRS II operation, measurement of flowrates for all systems, measurement of field parameters, collection of biofilter influent and effluent samples, and their analyses in a NE-LAC certified laboratory.

3.0 Materials and Methods

3.1 Project Site

The PNRS II Test Facility is located at the University of Florida Gulf Coast Research and Education Center (GCREC) in southeast Hillsborough County, Florida. The specially designed facility enables the simultaneous operation and performance testing of numerous biofilter treatment trains in parallel using the same wastewater source. The source of the influent wastewater is the septic tank effluent from the existing onsite wastewater system serving the GCREC. Details of the design and construction of the PNRS II test facility were presented previously in Task A.17, A.18, A.19 and A.24 documents.

3.2 Monitoring and Sampling Locations and Identification

A schematic of the PNRS II test facility is shown in Figure 1. Septic tank effluent (STE) from GCREC is pumped from PNRS II-STE-T1 into the PNRS II systems through three points of entry: Hydro-1, Hydro-2, and UNSAT-IS-1. PNRS II biofilters are grouped into the four types of systems shown in Figure 1. The nomenclature and reactor/sample identification used for the PNRS II test facility sampling events are listed in Table 1. The sample designations listed in Table 1 also largely correspond to the locations at which flow volumes are measured in each monitoring event.

Table 1
PNRS II Sample Identification

Group (Figure 1)	Sample Location	Sample Identification
	STE PNRS II Storage Tank 1	PNRS II-STE-T1
I	Stage 1 Single Pass Biofilters	UNSAT-EC1
		UNSAT-EC3
		UNSAT-CL1
		UNSAT-CL3
		UNSAT-PS1
	Stage 2 Single Pass Upflow Biofilters	DENIT-SU4
		DENIT-LS3
		DENIT-SU3
		DENIT-LS2
		DENIT-LS4
II	Recirculation Tanks	RC1
		RC2
		RC3
		RC4
	Stage 1 Recirculating Biofilters	UNSAT-SA2
		UNSAT-EC4
		UNSAT-CL2
		UNSAT-CL4
III	Denite Feed Collection Tank	DFT
	Stage 2 Horizontal Biofilters	UNSAT-SU1
		UNSAT-SU2
		UNSAT-LS1
		UNSAT-GL1
IV	In-Situ In-Tank Simulator Single Pass Biofilter	UNSAT-IS1
		UNSAT-IS2

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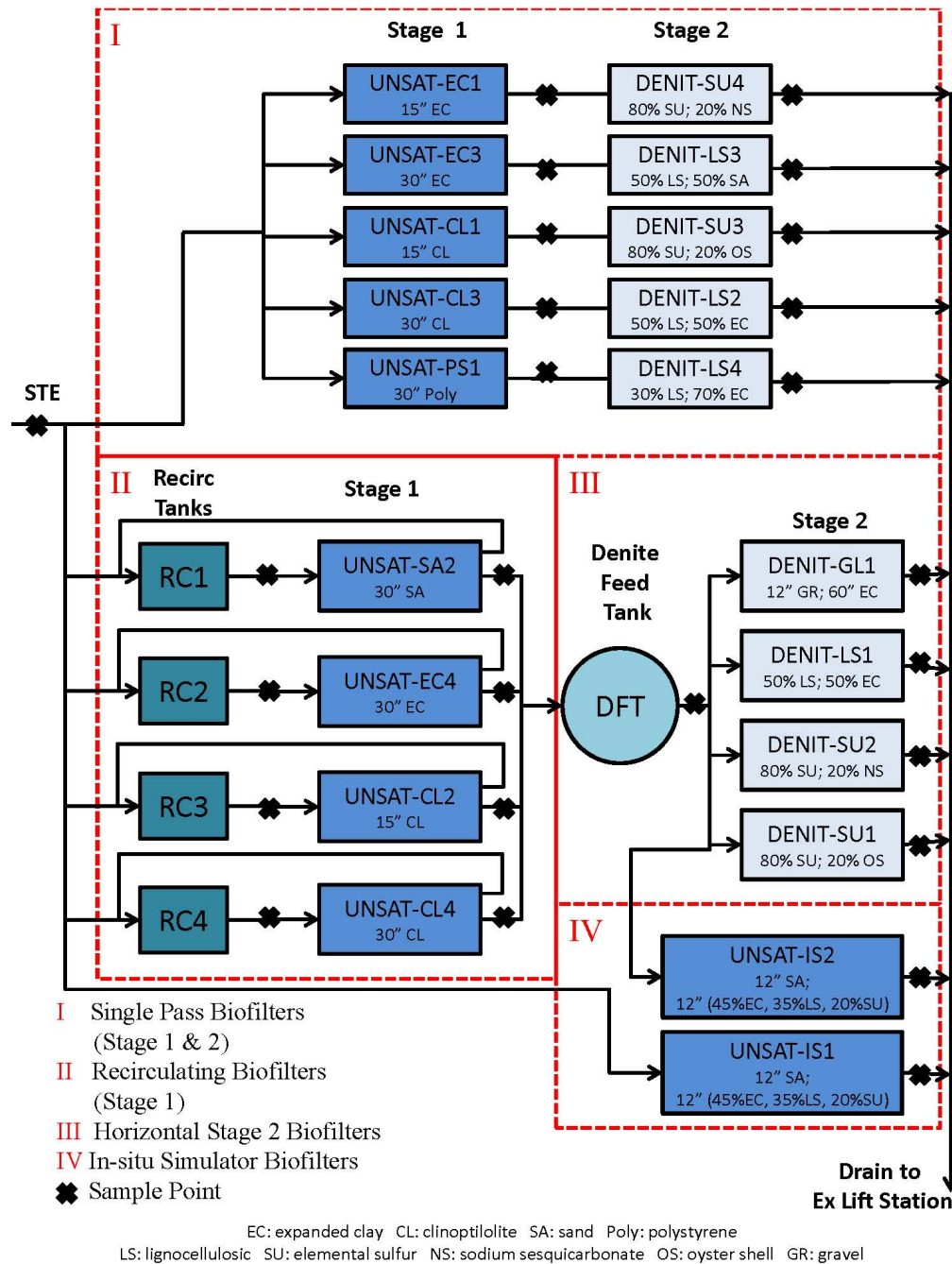


Figure 1
PNRS II Test Facility System Schematic

3.3 Operational Monitoring

Start-up of the PNRS II test facility start-up occurred on May 17th, 2010 and all systems have operated continually since that time. The entire facility operation is checked at least once per week and a detailed log of operational observations and activities is maintained. The programmable logic controller (PLC) which controls many of the dosing and pump controls also records pump run times and flow data from flow meters at the facility, and these data can provide useful insight on facility operations.

3.4 Water Quality Sample Collection and Analyses

Influent and effluent water quality samples from the PNRS II test systems for Sample Event 2 were collected August 31, 2010. A sample of STE was collected from the feed line connecting STE Storage Tank 1 (PNRS II-STE-T1) to Hydrosplitter 1 which supplies STE to the single pass Stage 1 biofilters (Figure 1). A manual dose event was initiated on the control panel until sufficient STE sample volume was collected in a clean sample container. Stage 1, 2, and in-situ simulator biofilter and recirculation tank effluents were each sampled by directing the entire flow from the biofilter into a large, clean sample container over a period of time sufficient to obtain the desired sample volume (approximately 3.5 liters). Sample containers were immediately placed in coolers on ice prior to subdivision of the composited sample.

The composite samples in the 3.5 liter sample containers were then subdivided into analysis-specific sample containers. The analysis-specific containers were supplied by the analytical laboratory and contained the 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 supplied by the laboratory.

Equipment blank, field blank, and field sample duplicates were taken. The equipment blank was collected using a previously cleaned STE sample collection bottle. The bottle was filled with distilled water provided by the laboratory and allowed to sit for eight minutes. The sample containers were then analyzed for the same parameters as the samples. The field blank was collected by filling sample containers with distilled water that had been transported from the laboratory into the field along with other sample containers. The four field sample duplicate sample containers were collected with the regular samples. The total alkalinity, CBOD₅, TSS and TDS duplicate sample container was filled with DENIT-LS4 effluent. The nutrient duplicate sample container was filled with UNSAT-CL4 effluent. The first fecal duplicate sample container was filled with UNSAT-EC1 effluent, and the second was filled with UNSAT-CL1 effluent. The sulfate and H₂S

duplicate sample containers were not filled because there was not enough effluent volume available at the time that a duplicate could have been taken.

Field parameters were measured using portable electronic probes with probe tips placed in flow through samplers located directly in the outlet pipe at each sample location. Field parameter measurements were made immediately following collection of liquid samples. Field parameters included pH, specific conductance, temperature (Temp), dissolved oxygen (DO), and oxidation-reduction potential (ORP). Table 2 lists the analytical parameters, analytical methods, and detection limits for the laboratory wet chemistry analyses. Influent and effluent samples were analyzed for: total alkalinity, total Kjeldahl nitrogen (TKN-N), ammonia nitrogen (NH₃-N), nitrate/nitrite nitrogen (NO_x-N), carbonaceous biochemical oxygen demand (CBOD₅), total dissolved solids (TDS), total suspended solids (TSS), chemical oxygen demand (COD), total phosphorus (TP), and fecal coliform (fecal). For the denitrification biofilters with elemental sulfur media, influent and effluent sample analyses were also conducted for sulfate (SO₄) and hydrogen sulfide (H₂S). 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 Parameter	Method of Analysis	Laboratory Detection Limit (mg/L)
Total Alkalinity as CaCO ₃	SM 2320B	2 mg/L
Total Kjeldahl Nitrogen (TKN-N)	EPA351.2	0.05 mg/L
Ammonia Nitrogen (NH ₃ -N)	EPA350.1	0.01 mg/L
Nitrate/Nitrite Nitrogen (NO _x -N)	EPA353.2	0.01 mg/L
Carbonaceous BOD (CBOD ₅)	SM 5210B	2 mg/L
Total Dissolved Solids (TDS)	SM 2540C	10 mg/L
Total Suspended Solids (TSS)	SM 2540D	1 mg/L
Chemical Oxygen Demand (COD)	EPA 410.4	10 mg/L
Total Phosphorus (TP)	SM 4500PE	0.01 mg/L
Fecal Coliform (fecal)	SM9222D	1 ct/100mL
Sulfate (SO ₄)	EPA300.0	0.2 mg/L
Hydrogen Sulfide Unionized (H ₂ S)	SM4500S F	0.01 mg/L
Sulfide	SM4500S F	0.1 mg/L

3.5 Flow Monitoring

Flow rates for all PNRS II systems were calibrated at initial start-up. The influent and effluent flow rates are then measured and recorded at each sampling event and adjusted as necessary to maintain flow rates consistent with the experimental design following the sampling event. Flow volumes are measured just after sampling and field analyses and

represent the flow rates in effect during the water quality monitoring. Flow rates are then adjusted as necessary to correspond to the target flow rates in the experimental design. For this Sampling Event, influent and effluent flow volumes were measured on September 1st and 10th and reported in the Sampling Event No. 2 Report.

4.0 Results and Discussion

4.1 Operational Monitoring

Start up of the PNRS II test facility occurred on May 17, 2010. The test systems have been operated continuously since the May 17th start up, with the exception of power outages that occurred June 20th, June 28th, July 12th, July 16th and August 19th. The power outages were of relatively short duration. For the most part, the pilot biofilters automatically resumed operation when power was restored. The only exceptions were the two peristaltic pumps: Pump 5 which supplies the two In-Situ simulators and Pump 11 which supplies the four horizontal flow denitrification biofilters. The peristaltic pumps displayed an error message, required manual restarting, and their off times were somewhat longer than the other system pumps. The peristaltic pump settings were saved through the power outage, and the pumps resumed operation once the error code was acknowledged. The peristaltic pumps have since been reprogrammed to start automatically in the event of temporary discontinuance of the power supply. Appendix A provides the operation and maintenance log which includes actions taken since start-up. Appendix B provides summary tables of the PLC recorded data of daily runtimes and flows for the test facility between July 1st and August 31st (Day 45 through Day 106 since start-up) used to check general pump operation and performance.

The recycle rates to the recirculating systems are monitored and recorded in the PLC as Pumps 5, 6, 7, and 8 flows. The data shows that the recycle flows are very close to the initially set 44 gpd rate for these four systems, indicating that the desired recycle ratio of approximately 3:1 is being met.

4.2 Water Quality Analyses

Water quality analytical results for Sample Event No. 2 are listed in Table 3. A statistical summary of the water quality data collected to date for the PNRS II systems is presented in Table 4. The following discussion summarizes these results. The laboratory report containing the raw analytical data is included in Appendix D.

Influent Water Quality Water quality characteristics of STE collected in Sample Event 2 were closer to typical STE composition than were previous STE samples from GCREC, but some parameters were atypical. The earlier modification of redirecting the A/C condensate from the GCREC wastewater collection system appears to have alleviated the low measured STE strength that occurred from dilution. STE parameters that were lower than typical in Sample Event 2 were TSS, COD, and CBOD₅. TSS and COD were somewhat lower than for typical STE, while CBOD₅ was atypically low.

The measured STE total nitrogen (TN) concentration was 67 mg/L, which is within the expected range. The performance of the various biofilter systems was compared by considering the changes through treatment of nitrogen species (TKN-N, NH₃-N, and NO_x-N), as well as supporting chemistry parameters.

Group 1 Single Pass Biofilters Effluent NH₃-N levels were at or below 0.01 mg/L for four of the five Stage 1 single pass biofilters and DO were greater than 5.5 mg/L (Table 3). Organic N ranged from 2.8 to 4.3 mg/L in these same four systems. The ammonia and organic N concentrations in UNSAT-PS1 effluent were 46 mg/L and 7 mg/L, respectively. The limited nitrogen reduction in UNSAT-PS1 was likely due to non-equal STE distribution over the total area of the media surface. At the time of this sampling event, UNSAT-PS1 was being dosed using a splash plate which concentrated the applied STE in a central area of the total media surface. Visual observations of UNSAT-PS1 suggested that the percentage of filter surface area receiving STE was less than 10%. Unlike expanded clay and clinoptilolite, the large particle size of the polystyrene media and its limited water retention characteristics may affect limited horizontal spreading through the media as the wastewater is transported downward. NO_x was significantly increased in all Stage 1 biofilter effluents corresponding to decreased in TKN, with UNSAT-PS-1 having significantly lower effluent NO_x corresponding to its higher NH₃-N.

Effluent NO_x-N was less than 0.2 mg/L in the two Stage 2 single pass denitrification biofilters with sulfur media and one lignocellulosic media biofilter. Two of the three lignocel-

lulosic biofilters (DENIT-LS2, DENIT-LS3) exhibited incomplete denitrification, with effluent $\text{NO}_x\text{-N}$ of 29 and 31 mg/L. These two biofilters did not drive effluent DO and ORP to the low levels that are found in the successfully denitrifying biofilters in this study and in the previous PNRS 1. The influent to the DENIT-LS4 biofilter was effluent from the polystyrene biofilter (UNSAT-PS1) which contained 46 mg/L $\text{NH}_3\text{-N}$ and 8.2 mg/L $\text{NO}_x\text{-N}$. While successfully denitrifying the relatively low influent $\text{NO}_x\text{-N}$, DENIT-LS4 effluent contained 33 mg/L $\text{NH}_3\text{-N}$. This again confirms that $\text{NH}_3\text{-N}$ can be readily transported through anoxic denitrification biofilters which at the same time achieve virtually complete NO_x reduction. This result reaffirms the importance of efficiently removing ammonia nitrogen prior to denitrification. One unexplainable analytical result is the high TKN (67 mg/L) in the effluent from DENIT-LS4, of which ammonia is only about one half. The calculated organic N in DENIT-LS4 is higher than in the influent STE and is not expected. Possible explanations included sample collection procedures and analytical error and are under investigation.

Group 2 Stage 1 Recirculating Biofilters $\text{NH}_3\text{-N}$ levels were at or below 0.01 mg/L for all five recirculating Stage 1 biofilters and effluent DO was 6.3 to 7.1 mg/L. Effluent $\text{NO}_x\text{-N}$ ranged from 36 to 43 mg/L and organic N from 2.2 to 3.3 mg/L. The nitrification performance of these biofilters was quite acceptable. TN reduction by the recirculating biofilters averaged 36%.

Group 3 Stage 2 Horizontal Biofilters Effluent $\text{NO}_x\text{-N}$ was 0.076 mg/L and less in all four Stage 2 horizontal biofilters. The low $\text{NO}_x\text{-N}$ were accompanied by depressed DO and ORP of -174 to -317 mV. Thus, all four horizontal biofilters were highly effective in producing a highly reducing environment and achieving their $\text{NO}_x\text{-N}$ reduction goal. The DENIT-GL1 effluent had a CBOD_5 of 810 mg/L and COD of 1,100 mg/L. This may be possibly attributed to overdosing of glycerol and glycerol dosing calculations and procedures will be reevaluated. DENIT-GL1 also has an unexpectedly high effluent TSS of 100 mg/L. Possible explanations are some type of non-steady event that washed out accumulated biomass from the biofilter during sample collection. Sample collection procedures and analytical methods are also under consideration. The high TKN (66 mg/L) in the effluent from DENIT-GL1 and the $\text{NH}_3\text{-N}$ level of 29 mg/L are unexpected. According to these results, TN in the effluent of DENIT-GL1 is higher than in the influent. Possible explanations included sample collection procedures and analytical error; these are under investigation.

Group 4 In-Situ Simulator Systems UNSAT-IS2 exhibited the lowest effluent Total Nitrogen of all of the PNRS II systems, with TN concentration less than 1 mg/L and $\text{NO}_x\text{-N}$ below detection levels. For UNSAT-IS1, the effluent $\text{NO}_x\text{-N}$ was also below detection

level but effluent $\text{NH}_3\text{-N}$ was 20 mg/L. This contrasts with Sample Event 1, in which UNSAT-IS1 achieved virtually complete nitrification. The less complete nitrification in Sample Event 2 is likely related to the UNSAT-IS1 modification that increased the saturation water depth to the top of the sulfur media and reduced the total depth of unsaturated media. In-situ simulator effluents SO_4 were 300 and 470 mg/L in Sample Event 2, which are much lower than the Sample Event 1 levels and are due to saturation of the sulfur media to prevent oxygen ingress and its stimulation of sulfur oxidation. Efforts are underway to investigate designs of vertically stacked media biofilters (in-situ simulators) that are most effective in reducing nitrogen while also limiting sulfate levels in the effluent. These are discussed in section 5.2.6.

Table 3
Water Quality Analytical Results

Group (Figure 1)	Sample ID	Media Composition	Sample Date/Time	Sample Type	Temp (°C)	pH	Total Alkalinity (mg/L)	DO (mg/L)	ORP (mV)	Specific Conductance (µS)	TDS (mg/L)	TSS (mg/L)	CBOD ₅ (mg/L)	COD (mg/L)	TN (mg/L N) ¹	TKN (mg/L N)	Organic N (mg/L N) ²	NH ₃ -N (mg/L N)	NOx (mg/L N)	TIN (mg/L N) ³	TP (mg/L)	Sulfide (mg/L)	H ₂ S (mg/L)	SO ₄ (mg/L)	Fecal (Ct/100 mL)		
1	STE Sample																										
	PNRS II STE-Tank 1		8/31/10 13:35	G	27.9	7.2	370	0.0	-263.9	1,092	380	70	27	210	67.05	67	8.00	59	0.053	59.05	7.4					800	
	Stage 1 Single Pass Biofilters Effluent																										
	UNSAT-EC1	15" Expanded Clay	8/31/10 12:40	G	28.6	7.0	130	6.8	137.5	1,055	670	1	2	13	46.30	4.3	4.29	0.01	42	42.01	3.9	0.1	0.05	51		1	
	UNSAT-EC1-D	15" Expanded Clay	8/31/10 12:40	G																						1	
	UNSAT-EC3	30" Expanded Clay	8/31/10 12:50	G	29.2	7.0	150	6.7	117.0	1,133	740	1	2	16	45.30	3.3	3.29	0.01	42	42.01	3.9					1	
	UNSAT-CL1	15" Clinoptilolite	8/31/10 12:30	G	29.5	7.4	250	5.5	116.2	1,271	750	1	2	20	40.80	2.8	2.79	0.01	38	38.01	8.0	0.3	0.08	48		12	
	UNSAT-CL1-D	15" Clinoptilolite	8/31/10 12:30	G																						10	
	UNSAT-CL3	30" Clinoptilolite	8/31/10 12:00	G	28.7	7.8	340	7.1	83.8	1,388	850	1	2	20	40.00	4.0	3.99	0.01	36	36.01	6.8					3	
	UNSAT-PS1	30" Polystyrene	8/31/10 11:40	G	28.6	7.6	280	2.5	60.0	1,010	420	2	5.7	48	61.20	53	7.00	46	8.2	54.20	5.9					930	
	Stage 2 Single Pass Upflow Biofilters Effluent																										
	DENIT-SU4	80% Sulfur; 20% Sodium Sesqui.	8/31/10 10:25	G	28.1	6.6	150	0.2	-106.6	1,395	950	1	2	22	1.39	1.3	0.99	0.31	0.091	0.40	3.2	0.1	0.01	550		1	
	DENIT-LS3	50% Lignocellulosic; 50% Sand	8/31/10 10:15	G	27.8	7.3	220	1.3	-21.0	1,114	680	1	2	29	34.20	3.2	3.05	0.15	31	31.15	3.3					1	
	DENIT-SU3	80% Sulfur; 20% Oyster Shell	8/31/10 10:00	G	28.4	6.7	270	0.1	-279.6	1,655	1,100	1	2	39	2.04	2.0	1.20	0.80	0.089	0.84	6.2	7.0	4.5	550		1	
	DENIT-LS2	50% Lignocellulosic; 50% Expanded Clay	8/31/10 9:50	G	27.3	7.8	380	4.1	-11.5	1,448	850	1	2	24	32.10	3.1	2.80	0.30	29	29.30	5.7					1	
	DENIT-LS4	30% Lignocellulosic; 70% Expanded Clay	8/31/10 9:40	G	27.1	7.6	360	0.4	-43.7	1,120	430	1	2	35	67.17	67	34.00	33	0.17	33.17	6.9					12	
	DENIT-LS4-D	30% Lignocellulosic; 70% Expanded Clay	8/31/10 9:40	G			350				420	1	2														
	Recirculation Tanks Effluent																										
	2	RC1		8/31/10 13:00	G	30.0	7.3	210	0.0	-128.3	1,011	550	1	6	22	53.00	17	4.00	13	36	49.00	5.8					114
		RC2		8/31/10 13:10	G	30.2	7.3	180	0.1	-108.2	1,031	560	1	2	24	40.00	17	2.00	15	23	38.00	4.2					99
RC3			8/31/10 13:20	G	30.2	7.6	160	0.1	89.0	1,128	590	1	3.3	61	45.00	12	3.30	8.7	33	41.70	6.4					109	
RC4			8/31/10 13:30	G	30.4	7.8	180	0.0	73.0	1,112	620	12	3.0	29	38.00	11	2.60	8.4	27	35.40	6.7					112	
Stage 1 Recirculating Biofilters Effluent																											
UNSAT-CL4		30" Clinoptilolite	8/31/10 10:55	G	29.3	7.8	170	7.1	35.5	1,174	680	1	2	13	45.10	2.1	2.09	0.01	43	43.01	7.6					1	
UNSAT-CL4-D		30" Clinoptilolite	8/31/10 10:55	G																							
UNSAT-CL2		15" Clinoptilolite	8/31/10 11:05	G	26.8	7.4	120	6.4	30.2	1,050	650	1	2	22	45.10	3.1	3.09	0.01	42	42.01	7.1					4	
UNSAT-EC4		30" Expanded Clay	8/31/10 11:20	G	28.5	7.0	130	6.9	78.8	1,000	640	1	2	13	40.90	2.9	2.89	0.01	38	38.01	3.8					1	
UNSAT-SA2		30" Sand	8/31/10 11:30	G	28.2	6.9	110	6.3	89.2	953	638	1	2	13	39.30	3.3	3.29	0.01	36	36.01	6.3					1	
Denite Feed Tank (Tank 3)																											
3	DFT		8/31/10 14:30	G	28.1	7.6	130	7.4	25.5	1,020	660	1	2	18	42.80	2.8	2.79	0.01	40	40.01	6.5	0.1	0.01	52		1	
	Stage 2 Horizontal Biofilters Effluent																										
	DENIT-SU1	80% Sulfur; 20% Oyster Shell	8/31/10 8:55	G	25.1	7.0	240	0.1	-317.2	1,473	1,000	1	24	63	2.74	2.7	0.30	2.4	0.04	2.44	5.0	25	12	450		3	
	DENIT-SU2	80% Sulfur; 20% Sodium Sesqui.	8/31/10 9:05	G	24.8	7.0	210	0.5	-279.0	1,402	930	2	20	50	1.83	1.8	0.88	0.92	0.025	0.95	4.8	14	6.7	470		1	
	DENIT-LS1	50% Lignocellulosic; 50% Expanded Clay	8/31/10 9:20	G	25.2	7.7	250	0.2	-199.7	962	530	1	3.9	44	1.81	1.8	1.10	0.70	0.01	0.71	0.46					1	
	DENIT-GL1	12" Gravel; 60" Expanded Clay	8/31/10 9:30	G	25.2	6.4	660	0.00	-174.9	1,686	1,200	100	810	1,100	66.08	66	37.00	29	0.076	29.08	2.9					800	
4	In-situ Simulator Biofilters Effluent																										
	UNSAT-IS1 (STE)	12" Sand; 12" Mix (45% EC, 35% Ligno, 20% Sulfur)	8/31/10 13:35	G	29.5	6.5	270	0.1	-42.5	1,206	780	3	8.4	57	20.09	20	0.00	20	0.086	20.09	1.2	0.9	0.7	300		1	
	UNSAT-IS2 (NO ₃)	12" Sand; 12" Mix (45% EC, 35% Ligno, 20% Sulfur)	9/1/10 10:20	G																							
	Field Blank	Reagent Water	8/31/10 8:30				2				10	1	2	10	0.06	0.05	0.04	0.01	0.01	0.02	0.01	0.1			0.2		
	Equipment Blank	Reagent Water	8/31/10 8:40				2				10	1	2	10	0.06	0.05	0.04	0.01	0.01	0.02	0.01	0.1			0.2		

Notes:
¹Total Nitrogen (TN) is a calculated value equal to the sum of TKN and NO_x.
²Organic Nitrogen (ON) is a calculated value equal to the difference of TKN and NH₃.
³Total Inorganic Nitrogen (TIN) is a calculated value equal to the sum of NH₃ and NO_x.
EC: expanded clay, CL: clinoptilolite, PS: polystyrene, SU: elemental sulfur, LS: lignocellulosic, GL: glycerol, OS: oyster shell, NS: sodium sesquicarbonate, GR: gravel
D.O. - Dissolved oxygen
G - Grab sample
Gray-shaded data points indicate values below method detection level (mdl), mdl value used for statistical analyses.
Yellow-shaded data points indicate the reported value is between the laboratory method detection limit and the laboratory practical quantitation limit, value used for statistical analysis.
Orange - shaded data points indicate too many colonies were present. The numeric value represents the dilution factor times the maximum reportable number of colonies.
Purple-shaded data points indicate results based upon colony counts outside the method indicated ideal range.

Table 4
Statistical Summary of Water Quality Data

Sample ID	Media Composition	Statistical Parameter	Temp (°C)	pH	Total Alkalinity (mg/L)	DO (mg/L)	ORP (mV)	Specific Conductance (µS)	TDS (mg/L)	TSS (mg/L)	CBOD ₅ (mg/L)	COD (mg/L)	TN (mg/L N) ¹	TKN (mg/L N)	Organic N (mg/L N) ²	NH ₃ -N (mg/L N)	NO _x (mg/L N)	TIN (mg/L N) ³	TP (mg/L)	Sulfide (mg/L)	H ₂ S (mg/L)	SO ₄ (mg/L)	Fecal (Ct/100 mL)	
STE Sample																								
STE-Tank 1		n	5	5	5	2	1	5	5	5	5	3	5	5	5	5	5	5	5	3				2
		MEAN	27.4		284.8	0.1	-263.9	885.0	349.4	28.0	60.0	233.7	45.0	45.0	6.7	38.3	0.0	38.4	7.0					
		STD. DEV.	0.9		78.6	0.1		204.4	65.1	23.8	36.4		20.4	20.4	5.7	20.4	0.0	20.4						
		MIN	26.0	6.4	210.0	0.0	-263.9	649.0	240.0	12.8	22.0	210.0	25.9	25.9	-0.7	20.0	0.0	20.0	6.6					80
		MAX	28.3	7.3	370.0	0.1	-263.9	1108.0	400.0	70.0	100.0	270.0	67.1	67.0	15.0	62.0	0.1	62.1	7.4					800
Stage 1 Single Pass Biofilters Effluent																								
UNSAT-EC1	15" Expanded Clay	n	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	1	2	2	2	2	1
		MEAN	27.9		120.0	6.9	137.5	836.0	510.0	1.0	2.0	13.0	33.8	3.3	3.2	0.0	30.5	30.5	3.9	0.1	0.1	48.5		
		STD. DEV.	1.0		14.1	0.2		309.7	226.3	0.0	0.0		17.7	1.5	1.5	0.0	16.3	16.3		0.0	0.0	3.5		
		MIN	27.2	7.0	110.0	6.8	137.5	617.0	350.0	1.0	2.0	13.0	21.2	2.2	2.2	0.0	19.0	19.0	3.9	0.1	0.1	46.0	1.0	
		MAX	28.6	7.3	130.0	7.1	137.5	1055.0	670.0	1.0	2.0	13.0	46.3	4.3	4.3	0.0	42.0	42.0	3.9	0.2	0.1	51.0	1.0	
UNSAT-EC3	30" Expanded Clay	n	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	1					1
		MEAN	28.4		117.0	6.8	117.0	922.5	575.0	1.5	2.0	16.0	33.3	2.8	2.7	0.0	30.5	30.5	3.9					
		STD. DEV.	1.1		46.7	0.2		297.7	233.3	0.7	0.0		17.0	0.8	0.8	0.0	16.3	16.3						
		MIN	27.6	7.0	84.0	6.7	117.0	712.0	410.0	1.0	2.0	16.0	21.2	2.2	2.2	0.0	19.0	19.0	3.9					1.0
		MAX	29.2	7.3	150.0	6.9	117.0	1133.0	740.0	2.0	2.0	16.0	45.3	3.3	3.3	0.0	42.0	42.0	3.9					1.0
UNSAT-CL1	15" Clinoptilolite	n	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	1	2	2	2	2	2
		MEAN	28.4		240.0	4.5	116.2	1064.0	610.0	4.0	2.0	20.0	30.8	2.8	2.7	0.0	28.0	28.0	8.0	0.2	0.0	42.5		
		STD. DEV.	1.6		14.1	1.4		292.7	198.0	4.2	0.0		14.2	0.1	0.1	0.0	14.1	14.1		0.1	0.0	7.8		
		MIN	27.2	7.4	230.0	3.5	116.2	857.0	470.0	1.0	2.0	20.0	20.7	2.7	2.7	0.0	18.0	18.0	8.0	0.1	0.0	37.0	10	
		MAX	29.5	8.3	250.0	5.5	116.2	1271.0	750.0	7.0	2.0	20.0	40.8	2.8	2.8	0.0	38.0	38.0	8.0	0.3	0.1	48.0	12	
UNSAT-CL3	30" Clinoptilolite	n	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	1					1
		MEAN	27.7		305.0	7.0	83.8	1181.0	700.0	1.0	2.0	20.0	31.4	3.4	3.4	0.0	28.0	28.0	6.8					
		STD. DEV.	1.5		49.5	0.2		292.7	212.1	0.0	0.0		12.2	0.8	0.8	0.0	11.3	11.3						
		MIN	26.6	7.8	270.0	6.9	83.8	974.0	550.0	1.0	2.0	20.0	22.8	2.8	2.8	0.0	20.0	20.0	6.8					3.0
		MAX	28.7	8.6	340.0	7.1	83.8	1388.0	850.0	1.0	2.0	20.0	40.0	4.0	4.0	0.0	36.0	36.0	6.8					3.0
UNSAT-PS1	30" Polystyrene	n	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	1					1
		MEAN	27.8		220.0	2.6	60.0	804.5	345.0	3.0	4.4	48.0	43.3	34.5	8.3	26.2	8.8	35.0	5.9					
		STD. DEV.	1.1		84.9	0.1		290.6	106.1	1.4	1.9		25.4	26.2	1.8	28.0	0.8	27.2						
		MIN	27.0	7.3	160.0	2.5	60.0	599.0	270.0	2.0	3.0	48.0	25.3	16.0	7.0	6.4	8.2	15.7	5.9					930
		MAX	28.6	7.6	280.0	2.7	60.0	1010.0	420.0	4.0	5.7	48.0	61.2	53.0	9.6	46.0	9.3	54.2	5.9					930
Stage 2 Single Pass Upflow Biofilters Effluent																								
DENIT-SU4	80% Sulfur; 20% Sodium Sesqui.	n	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	1	2	2	2	2	1
		MEAN	27.6		145.0	0.2	-106.6	1162.0	755.0	1.0	3.0	22.0	1.1	1.0	0.8	0.2	0.1	0.3	3.2	1.0	0.3	405.0		
		STD. DEV.	-		7.1	0.1		329.5	275.8	0.0	1.3		0.4	0.4	0.2	0.1	0.1	0.2		1.2	0.4	205.1		
		MIN	27.1	6.6	140.0	0.1	-106.6	929.0	560.0	1.0	2.0	22.0	0.8	0.8	0.7	0.1	0.0	0.1	3.2	0.1	0.0	260.0	1.0	
		MAX	28.1	7.3	150.0	0.2	-106.6	1395.0	950.0	1.0	3.9	22.0	1.4	1.3	1.0	0.3	0.1	0.4	3.2	1.8	0.6	550.0	1.0	
DENIT-LS3	50% Lignocellulosi; 50% Sand	n	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	1					1
		MEAN	28.0		210.0	0.7	-21.0	904.5	525.0	1.5	7.0	29.0	18.1	2.6	2.1	0.6	15.5	16.1	3.3					
		STD. DEV.	0.2		14.1	0.8		296.3	219.2	0.7	7.1		22.8	0.8	1.4	0.6	21.9	21.3						
		MIN	27.8	7.3	200.0	0.1	-21.0	695.0	370.0	1.0	2.0	29.0	2.0	2.0	1.1	0.2	0.0	1.0	3.3					1.0
		MAX	28.1	7.7	220.0	1.3	-21.0	1114.0	680.0	2.0	12.0	29.0	34.2	3.2	3.1	1.0	31.0	31.2	3.3					1.0
DENIT-SU3	80% Sulfur; 20% Oyster Shell	n	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	1	2	2	2	2	1
		MEAN	28.0		220.0	0.1	-279.6	1456.0	905.0	8.5	7.5	39.0	2.4	2.4	1.7	0.6	0.0	0.7	6.2	5.9	3.2	445.0		
		STD. DEV.	-		70.7	0.0		281.4	275.8	10.6	7.8		0.5	0.5	0.7	0.2	0.0	0.3		1.6	1.9	148.5		
		MIN	27.6	6.7	170.0	0.1	-279.6	1257.0	710.0	1.0	2.0	39.0	2.0	2.0	1.2	0.5	0.0	0.5	6.2	4.7	1.8	340.0	1.0	
		MAX	28.4	7.2	270.0	0.1	-279.6	1655.0	1100.0	16.0	13.0	39.0	2.7	2.7	2.2	0.8	0.0	0.8	6.2	7.0	4.5	550.0	1.0	
DENIT-LS2	50% Lignocellulosi; 50% Expanded Clay	n	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	1					1
		MEAN	27.3		375.0	2.1	-11.5	1223.0	680.0	5.0	3.8	24.0	17.5	2.3	2.0	0.3	15.2	15.5	5.7					
		STD. DEV.	0.1		7.1	2.8		318.2	240.4	5.7	2.5		20.7	1.2	1.2	0.0	19.5	19.6						
		MIN	27.2	7.8	370.0	0.1	-11.5	998.0	510.0	1.0	2.0	24.0	2.8	1.4	1.2	0.2	1.4	1.6	5.7					1.0
		MAX	27.3	8.1	380.0	4.1	-11.5	1448.0	850.0	9.0	5.5	24.0	32.1	3.1	2.8	0.3	29.0	29.3	5.7					1.0
DENIT-LS4	30% Lignocellulosi; 70% Expanded Clay	n	2	2	3	2	1	2	3	3	3	1	2	2	2	2	2	2	1					1
		MEAN	27.6		296.7	0.4	-43.7	869.0	373.3	1.0	4.4	35.0	40.6	40.5	21.1	19.4	0.1	19.5	6.9					
		STD. DEV.	0.7		101.2	0.0		355.0	89.6	0.0	4.1		37.6	37.5	18.2	19.2	0.1	19.3						
		MIN	27.1	7.6	180.0	0.4	-43.7	618.0	270.0	1.0	2.0	35.0	14.0	14.0	8.2	5.8	0.0	5.8	6.9					12.0
		MAX	28.1	7.6	360.0	0.5	-43.7	1120.0	430.0	1.0	9.1	35.0	67.2	67.0	34.0	33.0	0.2	33.2	6.9					12.0

Table 4 (con't)
Statistical Summary of Water Quality Data

Sample ID	Media Composition	Statistical Parameter	Temp (°C)	pH	Total Alkalinity (mg/L)	DO (mg/L)	ORP (mV)	Specific Conductance (µS)	TDS (mg/L)	TSS (mg/L)	CBOD ₅ (mg/L)	COD (mg/L)	TN (mg/L N) ¹	TKN (mg/L N)	Organic N (mg/L N) ²	NH ₃ -N (mg/L N)	NO _x (mg/L N)	TIN (mg/L N) ³	TP (mg/L)	Sulfide (mg/L)	H ₂ S (mg/L)	SO ₄ (mg/L)	Fecal (Ct/100 mL)	
Recirculation Tanks Effluent																								
RC1		n	2	2	2	1	1	2	2	2	2	1	2	2	2	2	2	2	2	1				1
		MEAN	30.4		185.0	0.0	-128.3	824.0	440.0	3.0	4.4	22.0	40.0	16.0	6.7	9.4	24.0	33.4	5.8					
		STD. DEV.	0.6		35.4			264.5	155.6	2.8	2.3			18.4	1.4	3.7	5.2	17.0	22.1					
		MIN	30.0	7.3	160.0	0.0	-128.3	637.0	330.0	1.0	2.8	22.0	27.0	15.0	4.0	5.7	12.0	17.7	5.8				114.0	
		MAX	30.8	7.3	210.0	0.0	-128.3	1011.0	550.0	5.0	6.0	22.0	53.0	17.0	9.3	13.0	36.0	49.0	5.8				114.0	
RC2		n	2	2	2	1	1	2	2	2	2	1	2	2	2	2	2	2	2	1				1
		MEAN	30.4		160.0	0.1	-108.2	855.0	450.0	2.0	2.0	24.0	33.5	16.0	5.9	10.2	17.5	27.7	4.2					
		STD. DEV.	0.2		28.3			248.9	155.6	1.4	0.0		9.2	1.4	5.4	6.9	7.8	14.6						
		MIN	30.2	7.3	140.0	0.1	-108.2	679.0	340.0	1.0	2.0	24.0	27.0	15.0	2.0	5.3	12.0	17.3	4.2				99.0	
		MAX	30.5	7.3	180.0	0.1	-108.2	1031.0	560.0	3.0	2.0	24.0	40.0	17.0	9.7	15.0	23.0	38.0	4.2				99.0	
RC3		n	2	2	2	1	1	2	2	2	2	1	2	2	2	2	2	2	2	1				1
		MEAN	29.7		180.0	0.1	89.0	944.0	475.0	3.5	2.7	61.0	36.0	14.0	6.9	7.1	22.0	29.1	6.4					
		STD. DEV.	0.7		28.3			260.2	162.6	3.5	0.9		12.7	2.8	5.1	2.3	15.6	17.8						
		MIN	29.2	7.6	160.0	0.1	89.0	760.0	360.0	1.0	2.0	61.0	27.0	12.0	3.3	5.5	11.0	16.5	6.4				109.0	
		MAX	30.2	7.6	200.0	0.1	89.0	1128.0	590.0	6.0	3.3	61.0	45.0	16.0	10.5	8.7	33.0	41.7	6.4				109.0	
RC4		n	2	2	2	1	1	2	2	2	2	1	2	2	2	2	2	2	2	1				1
		MEAN	29.6		200.0	0.0	73.0	961.5	510.0	16.5	2.9	29.0	32.5	13.5	6.6	7.0	19.0	26.0	6.7					
		STD. DEV.	1.1		28.3			212.8	155.6	6.4	0.2		7.8	3.5	5.6	2.1	11.3	13.4						
		MIN	28.8	7.6	180.0	0.0	73.0	811.0	400.0	12.0	2.7	29.0	27.0	11.0	2.6	5.5	11.0	16.5	6.7				112.0	
		MAX	30.4	7.8	220.0	0.0	73.0	1112.0	620.0	21.0	3.0	29.0	38.0	16.0	10.5	8.4	27.0	35.4	6.7				112.0	
Stage 1 Recirculating Biofilters Effluent																								
UNSAT-CL4	30" Clinoptilolite	n	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	2	1				1
		MEAN	28.5		195.0	7.2	35.5	1017.0	580.0	4.5	2.0	13.0	27.7	2.3	2.2	0.0	25.5	25.5	7.6					
		STD. DEV.	1.2		35.4	0.1		222.0	141.4	4.9	0.0		24.6	0.2	0.2	0.0	24.8	24.8						
		MIN	27.6	6.7	170.0	7.1	35.5	860.0	480.0	1.0	2.0	13.0	10.3	2.1	2.1	0.0	7.9	7.9	7.6				1.0	
		MAX	29.3	7.8	220.0	7.3	35.5	1174.0	680.0	8.0	2.0	13.0	45.1	2.4	2.4	0.0	43.0	43.0	7.6				1.0	
UNSAT-CL2	15" Clinoptilolite	n	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	2	1				1
		MEAN	27.0		160.0	6.5	30.2	915.5	545.0	2.0	2.0	22.0	31.1	2.6	2.6	0.0	28.5	28.5	7.1					
		STD. DEV.	0.2		56.6	0.2		190.2	148.5	1.4	0.0		19.8	0.7	0.7	0.0	19.1	19.1						
		MIN	26.8	7.4	120.0	6.4	30.2	781.0	440.0	1.0	2.0	22.0	17.1	2.1	2.1	0.0	15.0	15.0	7.1				4.0	
		MAX	27.1	7.9	200.0	6.7	30.2	1050.0	650.0	3.0	2.0	22.0	45.1	3.1	3.1	0.0	42.0	42.0	7.1				4.0	
UNSAT-EC4	30" Expanded Clay	n	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	2	1				1
		MEAN	28.0		145.0	7.1	78.8	830.5	495.0	1.0	2.0	13.0	29.9	2.4	2.4	0.0	27.5	27.5	3.8					
		STD. DEV.	0.8		21.2	0.2		239.7	205.1	0.0	0.0		15.6	0.7	0.7	0.0	14.8	14.8						
		MIN	27.4	7.0	130.0	6.9	78.8	661.0	350.0	1.0	2.0	13.0	18.9	1.9	1.9	0.0	17.0	17.0	3.8				1.0	
		MAX	28.5	7.3	160.0	7.2	78.8	1000.0	640.0	1.0	2.0	13.0	40.9	2.9	2.9	0.0	38.0	38.0	3.8				1.0	
UNSAT-SA2	30" Sand	n	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	2	1				1
		MEAN	27.5		110.0	6.6	89.2	778.5	484.0	1.0	2.0	13.0	29.3	2.8	2.7	0.0	26.5	26.5	6.3					
		STD. DEV.	1.1		0.0	0.5		246.8	217.8	0.0	0.0		14.2	0.8	0.8	0.0	13.4	13.4						
		MIN	26.7	6.0	110.0	6.3	89.2	604.0	330.0	1.0	2.0	13.0	19.2	2.2	2.2	0.0	17.0	17.0	6.3				1.0	
		MAX	28.2	6.9	110.0	7.0	89.2	953.0	638.0	1.0	2.0	13.0	39.3	3.3	3.3	0.0	36.0	36.0	6.3				1.0	

Table 4 (con't)
Statistical Summary of Water Quality Data

Sample ID	Media Composition	Statistical Parameter	Temp (°C)	pH	Total Alkalinity (mg/L)	DO (mg/L)	ORP (mV)	Specific Conductance (µS)	TDS (mg/L)	TSS (mg/L)	CBOD ₅ (mg/L)	COD (mg/L)	TN (mg/L N) ¹	TKN (mg/L N)	Organic N (mg/L N) ²	NH3-N (mg/L N)	NOx (mg/L N)	TIN (mg/L N) ³	TP (mg/L)	Sulfide (mg/L)	H ₂ S (mg/L)	SO ₄ (mg/L)	Fecal (Ct/100 mL)
Denite Feed Tank (Tank 3)																							
DFT		n	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	1	2	2	2	1
		MEAN	27.5		145.0	7.4	25.5	882.0	525.0	1.0	2.0	18.0	32.0	3.0	3.0	0.0	29.0	29.0	6.5	0.1	0.0	49.0	
		STD. DEV.	0.8		21.2	0.1		195.2	190.9	0.0	0.0		15.3	0.3	0.3	0.0	15.6	15.6		0.0	0.0	4.2	
		MIN	26.9	7.6	130.0	7.3	25.5	744.0	390.0	1.0	2.0	18.0	21.2	2.8	2.8	0.0	18.0	18.0	6.5	0.1	0.0	46.0	1.0
		MAX	28.1	8.1	160.0	7.4	25.5	1020.0	660.0	1.0	2.0	18.0	42.8	3.2	3.2	0.0	40.0	40.0	6.5	0.1	0.0	52.0	1.0
Stage 2 Horizontal Biofilters Effluent																							
DENIT-SU1	80% Sulfur; 20% Oyster Shell	n	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	1	2	2	2	1
		MEAN	26.3		220.0	0.3	-317.2	1332.5	830.0	1.0	25.0	63.0	2.6	2.6	0.6	2.0	0.0	2.0	5.0	27.0	11.5	340.0	
		STD. DEV.	1.7		28.3	0.3		198.7	240.4	0.0	1.4		0.2	0.2	0.4	0.6	0.0	0.7		2.8	0.7	155.6	
		MIN	25.1	7.0	200.0	0.1	-317.2	1192.0	660.0	1.0	24.0	63.0	2.4	2.4	0.3	1.5	0.0	1.5	5.0	25.0	11.0	230.0	3.0
		MAX	27.5	7.2	240.0	0.5	-317.2	1473.0	1000.0	1.0	26.0	63.0	2.7	2.7	0.9	2.4	0.0	2.4	5.0	29.0	12.0	450.0	3.0
DENIT-SU2	80% Sulfur; 20% Sodium Sesqui.	n	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	1	2	2	2	1
		MEAN	26.4		235.0	0.9	-279.0	1400.0	810.0	1.5	12.5	50.0	4.1	1.5	1.0	0.5	2.6	3.1	4.8	7.1	3.4	305.0	
		STD. DEV.	2.2		35.4	0.5		2.8	169.7	0.7	10.7		3.2	0.4	0.2	0.6	3.7	3.0		9.8	4.7	233.3	
		MIN	24.8	7.0	210.0	0.5	-279.0	1398.0	690.0	1.0	4.9	50.0	1.8	1.2	0.9	0.0	0.0	0.9	4.8	0.1	0.0	140.0	1.0
		MAX	27.9	9.1	260.0	1.2	-279.0	1402.0	930.0	2.0	20.0	50.0	6.4	1.8	1.2	0.9	5.2	5.2	4.8	14.0	6.7	470.0	1.0
DENIT-LS1	50% Lignocellulosic; 50% Expanded Clay	n	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	1				1
		MEAN	26.3		250.0	0.3	-199.7	850.0	450.0	1.0	30.0	44.0	1.7	1.7	0.9	0.7	0.0	0.8	0.5				
		STD. DEV.	1.5		0.0	0.2		158.4	113.1	0.0	36.8		0.2	0.2	0.3	0.0	0.0	0.1					
		MIN	25.2	7.5	250.0	0.2	-199.7	738.0	370.0	1.0	3.9	44.0	1.5	1.5	0.7	0.7	0.0	0.7	0.5				1.0
		MAX	27.3	7.7	250.0	0.5	-199.7	962.0	530.0	1.0	56.0	44.0	1.8	1.8	1.1	0.8	0.0	0.8	0.5				1.0
DENIT-GL1	12" Gravel; 60" Expanded Clay	n	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	1				1
		MEAN	26.5		440.0	0.8	-174.9	1240.0	790.0	50.5	424.5	1100.0	36.3	34.0	19.0	15.0	2.4	17.4	2.9				
		STD. DEV.	1.8		311.1	1.1		630.7	579.8	70.0	545.2		42.1	45.3	25.5	19.8	3.3	16.6					
		MIN	25.2	6.4	220.0	0.0	-174.9	794.0	380.0	1.0	39.0	1100.0	6.6	1.9	0.9	1.0	0.1	5.7	2.9				800.0
		MAX	27.8	8.0	660.0	1.5	-174.9	1686.0	1200.0	100.0	810.0	1100.0	66.1	66.0	37.0	29.0	4.7	29.1	2.9				800.0
In-situ Simulator Biofilters Effluent																							
UNSAT-IS1 (STE)	12" Sand; 12" Mix (45% EC, 35% Ligno, 20% Sulfur)	n	3	3	3	3	2	3	3	3	3	1	3	3	3	3	3	3	2	3	3	3	2
		MEAN	28.6		216.7	0.2	-144.4	1621.0	1050.0	42.7	9.7	57.0	10.2	10.1	0.5	9.6	0.0	9.7	1.5	0.6	0.4	553.3	
		STD. DEV.	-		75.7	0.1	144.0	707.6	476.3	61.1	2.8		9.8	9.8	0.6	10.0	0.0	10.0	0.4	0.4	0.4	473.8	
		MIN	26.7	6.4	130.0	0.1	-246.2	1206.0	770.0	3.0	7.8	57.0	0.4	0.4	0.0	0.0	0.0	0.1	1.2	0.1	0.0	260.0	1.0
		MAX	29.7	6.5	270.0	0.3	-42.5	2438.0	1600.0	113.0	13.0	57.0	20.1	20.0	1.1	20.0	0.1	20.1	1.7	0.9	0.7	1100.0	1.0
UNSAT-IS2 (NO ₃)	12" Sand; 12" Mix (45% EC, 35% Ligno, 20% Sulfur)	n	3	3	3	3	2	3	3	3	3	1	3	3	3	3	3	3	2	3	3	3	2
		MEAN	28.5		170.0	0.3	-193.0	2168.0	1550.0	86.7	7.7	50.0	0.9	0.9	0.7	0.2	0.0	0.2	4.3	0.3	0.2	873.3	
		STD. DEV.	1.7		60.8	0.2	26.2	1159.6	1261.9	24.4	5.5		0.5	0.5	0.4	0.1	0.0	0.1	3.9	0.4	0.3	804.8	
		MIN	26.6	6.1	100.0	0.1	-211.5	1455.0	700.0	60.0	2.0	50.0	0.6	0.6	0.4	0.1	0.0	0.1	1.5	0.1	0.0	350.0	1.0
		MAX	30.0	6.3	210.0	0.4	-174.5	3506.0	3000.0	108.0	13.0	50.0	1.5	1.5	1.2	0.3	0.0	0.3	7.0	0.7	0.6	1800.0	1.0

Notes:

¹Total Nitrogen (TN) is a calculated value equal to the sum of TKN and NO_x.

²Organic Nitrogen (ON) is a calculated value equal to the difference of TKN and NH₃.

³Total Inorganic Nitrogen (TIN) is a calculated value equal to the sum of NH₃ and NO_x.

EC: expanded clay, CL: clinoptilolite, PS: polystyrene, SU: elemental sulfur, LS: lignocellulosic, GL: glycerol, OS: oyster shell, NS: sodium sesquicarbonate, GR: gravel

DO - Dissolved oxygen

4.3 Flow Monitoring

Influent and effluent flows were measured, recorded, and adjusted as necessary to maintain flow rates consistent with the experimental design following the sampling event. Flow measurements and adjustments are made after collection of liquid samples and field parameter analyses.

An effluent flow test was conducted September 1, 2010. Appendix C, Table 1 provides the influent and effluent volumes measured on September 1st and 10th as well as the relative errors of measured flow rates versus the target flow rates as per the experimental design. For the Group 1 systems, measured STE inputs to the Stage 1 biofilters were within 7% of the target input volume, which is well within the 15% operational target that is considered acceptable for PNRS II flow rates. Measured effluent volumes for Stage 1 single pass biofilters were within 4% of the target volume for four of the five systems (Appendix C, Table 1). The UNSAT-PS1 measured effluent volume was substantially greater than the target volume (and the measured influent volume) and appears to have been caused by a clog in the line between the PS1 and LS4 biofilters. When the PS1 discharge sample port was opened, water flowed out much more rapidly than previously witnessed, and a greater volume was collected than had been dosed. Three of five measured effluent volumes of the Stage 2 biofilters that followed the single pass Stage 1 systems were substantially greater (19 to 48%) than target volume and also substantially greater than the measured Stage 1 output volume. This result appears contradictory as the volume exiting the Stage 2 biofilters should be, and is in fact likely to be, equal to the output volume of the upstream Stage 1 biofilters. The discrepancy may be due to the method of collecting volume from the Stage 2 biofilters and will be further examined. The low measured flow to the DENIT-LS4 (RE = -23.3%) is associated with the clogging issue in the upstream UNSAT-PS1 biofilter that was described previously.

For the Group 2 systems, all measured STE volumes to the Stage 1 recirculation tanks were within 9% of target volumes. All recycle flow volumes as recorded by the PLC were also within 9% of target volumes based on the experimental design recycle ratio of 3.0. All measured effluent volumes were within 10% of target (Appendix C, Table 1). The calculated recycle ratios (i.e. recycle flow volume divided by the STE flow volume) were all within 5% of the target recycle ratio of 3.0.

For Group 3 systems, the measured influent volumes to the Stage 2 horizontal denitrification biofilters were all within 9% of target. The measured effluent volumes averaged 16.3% less than target. The measured effluent volume collection methods need to be evaluated to determine a possible explanation for lower effluent volume as compared to

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influent dose. This may be resolved by increasing the time period that flow volume is measured.

For Group 4 biofilters, the measured influent volumes were within 8% of target volumes to both in-situ simulators. The measured effluent volume of UNSAT-IS 2 was within 5% of the target volume and is considered acceptable. The measured effluent volume from UNSAT-IS1 was 26.2% less than target and 28.5% less than the measured influent volume. The measured effluent volume collection methods need to be evaluated to determine explanation for lower effluent volume as compared to influent. This may be resolved by increasing the time period that flow volume is measured.

After evaluating the effluent flow test results, a few maintenance items were conducted:

- The discharge pipe of UNSAT-PS1 was unclogged using a drain pipe snake on September 10th
- Pump 7 runtime was reduced September 17th
- Peristaltic Pump 5 pump tubing was replaced and calibrated September 9th

The flows were rechecked after modifications to the systems were made and are provided in Appendix C, Table 2. The UNSAT-PS1 measured effluent volume is closer to the target as measured on September 21st which will continue to be monitored. The Pump 7 recirculation volume to UNSAT-EC4 is closer to the target as measured on September 20th. After replacing and calibrating the Pump 5 pump tubing on September 9th, the in-situ simulator biofilters influent doses are closer to the target volume. However, the measured effluent volumes were 15% greater than the influent measured volumes. The influent dose rates will be checked from now on at each sampling event. Flow rates are measured and adjusted after each sampling event so as not to change flow conditions immediately prior to sampling.

5.0 PNRS II Sample Event No. 2: Summary and Recommendations

5.1 Summary

The results of the second sampling event serve to confirm that the experimental systems are functioning as intended and provide the basis upon which to make system adjustments and modifications. The Sample Event No. 2 results indicate that:

- Delivered flowrates to all biofilters continued to be generally within 10% of target;

- Nine out of ten Stage 1 unsaturated biofilters produced effluent $\text{NH}_3\text{-N}$ of 0.01 mg/L or less;
- Seven out of nine Stage 2 saturated biofilters produced effluent $\text{NO}_x\text{-N}$ of 0.17 mg/L or less;
- The vertically stacked biofilter receiving nitrified effluent (UNSAT-IS2) produced effluent with close to detection levels of both NH_3 and NO_x ; and
- The vertically stacked biofilter receiving STE (UNSAT-IS1) produced effluent with close to detection level of NO_x .

These results provide continuing confirmation of the nitrogen reduction effectiveness of the PNRS II biofiltration systems. Where expected or desired PNRS II outcomes are not being achieved, they appear to be due to tractable issues that can be solved and are currently being addressed, as discussed in the following sections.

5.2 Recommendations

Careful observation of PNRS II systems and the results of Sample Event No. 1 and 2 were used to formulate recommendations for adjustments and modifications to the test systems and the GCREC pilot facility. The issues to be addressed, recommended modifications and their rationale, and expected outcomes are presented below. Recommendations are made for each of the PNRS II performance issues that have identified. It is believed that each issue can be resolved by implementing the recommendations. All recommendations are based on the overriding PNRS II goal of providing functional specifications for modular biofiltration components for passive onsite nitrogen reducing treatment systems. The project team will continuously evaluate all PNRS II results including those that particularly result from implementation of the recommendations and make further adaptations as needed.

5.2.1 Septic Tank Effluent (STE) Quality

In PNRS II biofilter performance evaluation, the two highly important input factors are the composition of Septic Tank Effluent (STE) and the system flowrates. It has been verified in Sample Events 1 and 2 that target flow rates have been successfully achieved. Composition of STE at the GCREC site is continuing to provide a challenge. Sample Event No. 1 revealed that GCREC Septic Tank Effluent exhibited low concentrations of key parameters when compared to typical residential STE. Examination of GCREC records indicated unexpectedly high wastewater flowrates. Upon further investigation, it was found that condensate from the facility air conditioning (A/C) system was draining into

the wastewater collection system and diluting the GCREC wastewater. The A/C condensate from GCREC air conditioning units was rerouted in mid July and no longer discharges to the wastewater collection system. Following removal of condensate, the influent feed to the PNRS II systems (GCREC STE) was more characteristic of typical STE from single family residences. The nitrogen level in the STE feed was highly acceptable for PNRS II testing. However, some STE parameters continue to show relatively low values. TSS and COD were somewhat lower than for typical STE, while CBOD₅ was atypically low.

Multiple approaches will be pursued to address STE quality issues. The project team will a. perform additional specialized monitoring of the GCREC tank from which STE is diverted for PNRS II as well as the PNRS II dosing tank, b. sample from both the inlet and outlet of the PNRS II dosing tank, and c. examine more critically the analytical methods that produced Sample Event 2 results. In addition, a hydraulic modification will be made to the two-chamber PNRS II dosing tank. STE from the GCREC tank enters the first chamber of the PNRS II dosing tank and then flows to the second chamber which contains the PNRS II dosing pumps. To decrease residence time, a new pipe will be installed to direct STE from the GCREC tank directly to the second chamber in the PNRS II dosing tank. Depending on the results of this effort, another option that may be pursued is to withdraw STE from the GCREC tank that is located upstream of the present withdrawal tank. The result of these efforts will be to provide influent STE to the PNRS II systems that reasonably approximates STE characteristics typical of single family residences.

Status: Ongoing

5.2.2 Polystyrene Biofilter (UNSAT-PS1)

In Sample Event 1, the unsaturated single pass biofilter with polystyrene media (UNSAT-PS1) exhibited limited reduction of organic nitrogen and ammonia as well as a lower effluent dissolved oxygen than the other single pass Stage 1 unsaturated biofilters. Visual observations of the media surface suggested that the STE application system resulted in a majority of dosing in the central area of the horizontal cross section of media surface. Flow monitoring confirmed that water transported rapidly through the polystyrene media following an applied STE dose, unlike the other single pass Stage 1 biofilters. This not unexpected result can be attributed to the much larger media size of polystyrene media and its limited water retention characteristics versus other Stage 1 media. The results of Sample Event 2 also showed unacceptable performance of the polystyrene biofilter as currently configured. Devices to more uniformly distribute the flow were investigated. Upon further evaluation and analyses, however, it was concluded that the properties of

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polystyrene media would not be compatible with a practical single pass unsaturated biofilter. It was determined that polystyrene media could be feasibly deployed in a recirculation biofilter configuration. The polystyrene biofilter will be re-configured as a recirculation biofilter. Effluent from the re-configured polystyrene biofilter will continue to be directed to the directly coupled Stage 2 biofilter DENIT-LS4. The outcome of these efforts will be to provide evaluation of total nitrogen reduction using a recirculating Stage 1 biofilter with polystyrene media that is directly coupled to a Stage 2 denitrification biofilter.

Status: Ongoing

5.2.3 Upflow Denitrification Biofilters (DENIT-LS2, DENIT-LS3)

Two upflow denitrification biofilters with lignocellulosic media showed limited NO_x reduction in Sample Event 2. Possible explanations are inadequate flow distribution across the biofilter area, lack of adequate electron donor release from media, and inhibition due to release of chemical constituents from the media. The project team will initially employ dye tests to visually determine if there is a tendency for effluent to exit the biofilter media in a concentrated form at specific locations. An example is preferential flow along the biofilter walls, which would lead to low water residence times and limited contact with media. If the results indicate that flow distribution is a concern, hydraulic modification could entail reconfiguration of the underflow system beneath the biofilter media to affect more uniform flow distribution. Other options are to examine the lignocellulosic media properties. The outcome of these modifications will be to achieve efficient NO_x reduction in these upflow lignocellulosic biofilters.

Status: Ongoing

5.2.4 Glycerol Fed Horizontal Denitrification Biofilter (DENIT-GL1)

In Sample Event 2, the effluent $\text{NO}_x\text{-N}$ was less than 0.1 mg/L in the glycerol supplied saturated horizontal denitrification biofilter. The DENIT-GL1 biofilter is therefore meeting its primary objective. The effluent COD and CBOD_5 were quite high, and other water quality parameters exhibited puzzling results. A possible explanation for the high levels of bulk organic parameters is glycerol dosing. The strategy for DENIT-GL1 was to supply glycerol in excess and to reduce the dosing level once denitrification was established. It therefore appears likely that glycerol dosing can account for at least a portion of the elevated COD and CBOD_5 in the effluent. The project team will perform a complete review of glycerol dosing including a. evaluation of stoichiometric glycerol requirement for influent oxygen, nitrate and other electron acceptors, b. dosing rates and glycerol stock solution concentrations, and c. measured glycerol stock reservoir depletion rates. The glycerol dosing rate will likely be lowered, resulting in a decrease in effluent

COD and CBOD₅ while effluent NO_x remains at low levels. Another action will be to more closely examine the composition of the glycerol supply. Future sampling will also provide insight into other unexplained analytical results for DENIT-GL1 effluent in Sample Event 2 including TSS, TKN and NH₃.

Status: Ongoing

5.2.5 Replace Alkalinity Supplement (DENIT-SU4, DENIT-SU2)

Sodium sesquicarbonate was supplied as alkalinity supplement in one upflow denitrification biofilter (DENIT-SU4) and one horizontal denitrification biofilter (DENIT-SU2). Sodium sesquicarbonate has exhibited a relatively rapid dissolution rate and possibly reprecipitation in preliminary testing. Sodium sesquicarbonate dissolution rates are too rapid to enable this media to be applied in passive PNRS II systems that are intended for long term deployment. Limestone will replace sodium sesquicarbonate in DENIT-SU4. Additionally, the sulfur content in DENIT-SU4 will be reduced to 30%. The media composition in DENIT-SU4 will be modified to 30% elemental sulfur, 10% limestone, and 60% expanded clay. DENIT-SU4 effluent will possibly have lower effluent SO₄ than upflow biofilter DENIT-SU3 which contains 80% sulfur media. The media mixture in horizontal denitrification biofilter DENIT-SU2 will also be modified to 30% elemental sulfur, 10% limestone, and 60% expanded clay. The outcome of these modifications will be evaluation of DENIT-SU4 and DENIT-SU-2 denitrification biofilters that are suitable for long term on-site deployment.

Status: Ongoing

5.2.6 In-Situ Simulator Effluent Sulfate Concentration (UNSAT-IS3, UNSAT-IS4)

In-Situ Simulators contain vertically stacked media layers intended to affect enhanced simultaneous nitrification and denitrification in a single pass vertical downflow system. The concept of employing a vertically stacked media configuration is to accomplish nitrification and organics oxidation in an upper unsaturated media layer, which then supplies nitrified water to one or more underlying layers containing denitrification media. The enhancement of nitrification/denitrification is due to the inclusion of electron donor (i.e. lignocellulosic material and/or elemental sulfur) in the unsaturated media in the lower layer. The In-Situ Simulators deployed a mixed media of expanded clay, lignocellulosic material and elemental sulfur in an unsaturated condition in the lower layer. It was anticipated that placement of sulfur in an unsaturated location would enable oxygen ingress and greater sulfur oxidation than if sulfur were maintained in a saturated condition. High effluent SO₄ levels were anticipated but the extent to which this would occur was not known.

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In Sample Event 1, UNSAT-IS1 and UNSAT-IS2 both produced very low $\text{NH}_3\text{-N}$, $\text{NO}_x\text{-N}$ and organic nitrogen concentrations, but sulfate levels were high. In an attempt to decrease sulfur oxidation in the lower layer, the discharge pipe of both In-Situ Simulators was modified on July 20th to saturate the lower 12" of the media bed. The denitrification media was fully encompassed within the saturated layer. The results of Sample Event 2 showed that effluent sulfate levels decreased. The modification resulted in increase of ammonia to 20 mg/L in UNSAT-IS1 that receives STE.

The overall PNRS II objective is to incorporate PNRS II results into the design of full scale testing at homeowner sites in FOSNRS Task B, and the In-situ simulator results are critical for Task B activities. Due to the need to develop functional specifications for vertically stacked single pass biofiltration systems, two additional vertically stacked biofilter systems will be constructed to evaluate alternative media designs. The revised media designs will provide enhanced simultaneous nitrification/denitrification in unsaturated media while minimizing sulfate in the effluent. Two six-inch diameter biofilters will be constructed and will be dosed at the same frequency (once per 4 hours) and average hydraulic loading rate (0.8 gal/ft²-day) as the currently deployed UNSAT-IS1 and UNSAT-IS2. One of the new biofilters will receive STE and the second will receive nitrified effluent. UNSAT-IS3 will receive STE and UNSAT-IS4 will receive nitrified STE. The media configuration of UNSAT-IS3 from top to bottom will be: 3 in. coarse sand, 9 in. filter sand, 10 in. mixed lignocellulosic media and expanded clay, 2 in. pea gravel, 3 in. elemental sulfur, and 2 in. gravel as underdrain. The media configuration of UNSAT-IS4 from top to bottom will be: 12 in. filter sand, 12 in. mixed lignocellulosic media and expanded clay, 2 in. pea gravel, 3 in. elemental sulfur, and 2 in. gravel as underdrain. STE will be applied by peristaltic pump to a drip plate at the biofilter center point. Effluent will exit the underdrain from a bottom port located at centerline. STE and nitrified STE supplied to UNSAT-IS3 and UNSAT-IS4 will be the same as that supplied to UNSAT-IS1 and UNSAT-IS2. Effluent will exit the underdrain from a bottom port located at centerline. The effluent line will be directed in an upward direction external to the biofilter column and will be used to control the saturation level within the biofilter media. The saturation levels in UNSAT-IS3 and UNSAT-IS4 will be maintained within and slightly below the gravel layer that underlies the lignocellulosic/expanded clay mixture to maintain sulfur in a completely saturated condition. A shutoff valve will be placed just below the effluent port to enable maintenance of effluent tubing while not draining the biofilter. The effluent line will contain a sampling port for measurement of final effluent. Another sampling location will be in the gravel layer below the lignocellulosic/expanded clay media and above the sulfur media. This port will pass through the column sidewall and extend radially several inches into the media. Monitoring will be conducted of system effluent as well as intermediate nitrogen species within the biofilter below the unsaturated expanded clay and lignocellulosic layer and above the saturated sulfur layer. The effectiveness of the unsaturated system

with only lignocellulosic electron donor and the added effect of underlying sulfur will be delineated.

The outcome of these efforts will be specification of the optimal media configuration to be employed in the In-Situ (mini-mound) systems, which will then be constructed at GCREC. In-Situ Simulator results from PNRS II are one critical path in the overall PNRS II project. Modifications to the existing In-situ simulators and deployment of additional vertically stacked systems will provide the functional specifications required in order to proceed with construction of the In-Situ mini-mounds in a timely manner. Effluents from these systems will be also be used in Additives Rule testing.

Status: Ongoing

Appendix A: Operation & Maintenance Log

Table A.1
Operation and Maintenance Log

Date	Description
5/17/2010	Start-up
5/20/2010	Pump 1 not in Auto, LL float alarm, refilled Tank 1 to HIGH float
5/24/2010	Glycerol batch #1 prepared (125 mL glycerol; 1875 mL DI water), feed rate ~ 8 mL/dose
5/26/2010	LL float alarm, refilled Tank 1 to HIGH float
6/1/2010	Replaced glycerol tubing
6/4/2010	LL float alarm, refilled Tank 1 to HIGH float, determined that LOW float is faulty Revised floats so that old Low Float is now High float Revised program installed so that only LOW Float turns on/off Pump 1
6/8/2010	Glycerol batch #2 prepared (125 mL glycerol; 1875 mL DI water), feed rate ~ 8 mL/dose
6/18/2010	Pump 1 screen cleaned with hose
6/21/2010	Pump 5 and 11 Error Code 18, cleared alarm and restarted pumps Pump 8 was on "OFF", turned back to "AUTO"
6/22/2010	Pump 5 had turned off, turned back on at 9:32 am
6/28/2010	Pump 5 and 11 Error Code 18, cleared alarm and restarted pumps Replaced glycerol tubing, kink in top, added elbow Russ replaced existing GCREC mound Pump 2 ~ 11:00 am
7/2/2010	Pump 1 screen cleaned with hose
7/8/2010	Glycerol tubing had released to bottom of container, replaced with polyethylene tubing Tank 1 LOW Float alarm, revised magnet distance to shorten Pump 1 runtime Pump 1 screen cleaned with hose
7/12/2010	Pump 5 Error Code 18, cleared alarm and restarted pump
7/14/2010	UPS beeping, problem with receptacle, temporary fix with extension cord
7/15/2010	Electrician fixed receptacle
7/16/2010	Per Dr. Stanley all condensate flow diverted from septic system Russ fixed existing GCREC Mound Pump 2 which had not been running Pump 5 and 11 Error Code 18, cleared alarm and restarted pumps Glycerol batch #3 prepared (125 mL glycerol; 1875 mL DI water), feed rate ~ 8 mL/dose Capillary mat added to PS-1
7/19/2010	IS 1 changed discharge (rotated 180°) now 15 inches of saturation from bottom of tank

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7/20/2010 IS 2 changed discharge (rotated 180°) now 15 inches of saturation from bottom of tank

7/26/2010 Removed PS1 capillary mat from inside mesh bag, replaced with new mat on top of bag
Glycerol batch #4 (70 mL glycerol; 1930 mL DI water), feed rate ~ 10 mL/dose

8/3/2010 Glycerol batch #5 (70 mL glycerol; 1930 mL DI water), feed rate ~ 10 mL/dose

8/4/2010 Cleaned crosses in Stage 1 Recirculating Biofilters
Added tees to outlet of RC1 and RC4 tanks to alleviate blockage build-up
Replaced Hydrosplitter 1 & 2 tubing
Replaced Stage 2 horizontal tubing from Pump 11
Cleaned Stage 2 horizontal sample ports
Lowered Pump 1 Low Float 2 wraps to decrease volume in tank(decrease residence time)

8/10/2010 Glycerol batch #6 (70 mL glycerol; 1930 mL DI water), feed rate ~ 10 mL/dose
Raised Pump 1 Low Float 1 wrap because float down was below the hole

8/12/2010 Revised tubing connection at top of In-Situ simulator tanks to elbow

8/17/2010 Glycerol batch #7 (70 mL glycerol; 1930 mL DI water), feed rate ~ 10 mL/dose
Added tees to outlet in RC2 and RC3 tanks as well
Revised RC tanks discharge piping to flexible hose

8/19/2010 Pump 5 and 11 Error Code 18, cleared alarm and restarted pumps

8/23/2010 Possible leak detected at Recirc Tank #2 for P7

8/27/2010 Glycerol batch #8 (70 mL glycerol; 1930 mL DI water), feed rate ~ 10 mL/dose

9/1/2010 Replaced elbow for Recirc Tank #2 (STE tubing) to fix leak

9/7/2010 Glycerol batch #9 (70 mL glycerol; 1930 DI water), feed rate ~ 10 mL/dose
Removed PS1 capillary mat

9/9/2010 Replaced Pump 5 pump tubing

9/10/2010 Cut the LS4 inlet pipe and used a drain snake to unclog both elbows

9/13/2010 Glycerol batch #10 (70 mL glycerol; 1980 DI water), feed rate ~ 10 mL/dose

9/17/2010 Modified Pump 7 runtime to 15 seconds per dose

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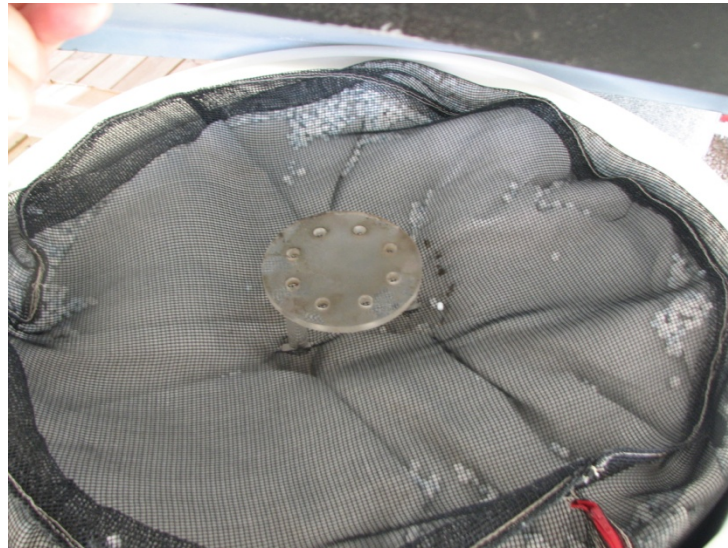


Figure A.1
Capillary Mat Installed above Polystyrene Media



Figure A.2
Revised In-situ Simulators Discharge Piping

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Figure A.3
RC1 Outlet Tee



Figure A.4
UNSAT-CL4 before Cleaning

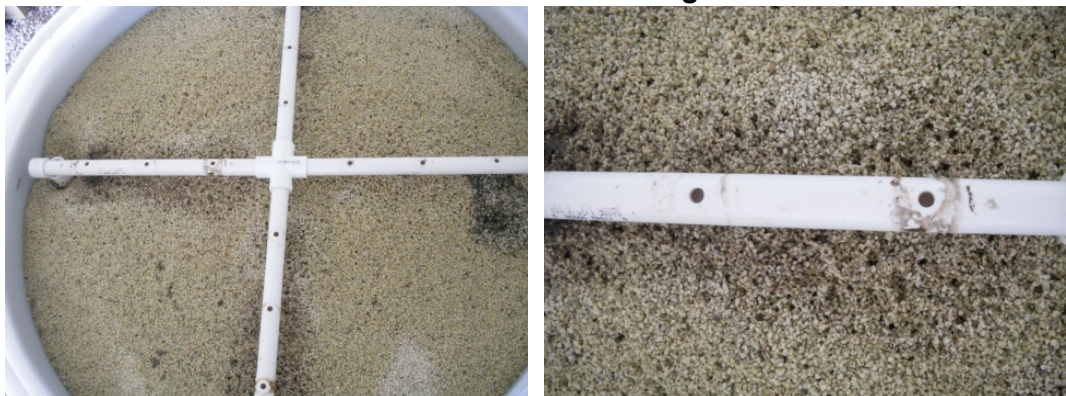


Figure A.5
UNSAT-CL4 after Cleaning

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Figure A.6
Outlet Tee in Recirculation Tank



Figure A.7
Unclogging UNSAT-LS4 Influent Pipe

Appendix B: PLC Data Tables

Table B.1
Summary of PLC Recorded Daily Flows
(7/1/10 – 8/31/10)

	Average Recorded Flow (gpd)	Std. Dev.	MIN (gpd)	MAX (gpd)	Target Flow (gpd)	Relative Error ¹ (%)
Pump 4 to Hydro 1	74.4	1.8	64.0	78.0	73.7	1.0%
Pump 14 to Hydro 2	67	2.77	59	74	58.9	11.4%
Pump 6 to Recirc. System 1	44	0.78	40	45	44.2	0.2%
Pump 7 to Recirc. System 2	48	0.72	44	48	44.2	7.0%
Pump 8 to Recirc. System 3	44	0.71	40	45	44.2	-0.2%
Pump 9 to Recirc. System 4	44	0.68	41	45	44.2	0.4%

¹Relative Error = (Recorded Flow – Target Flow)/ Target Flow *100

Table B.2
Summary of PLC Recorded Daily Runtimes
(7/1/10 – 8/31/10)

	Average Recorded Daily Runtime (minutes/day)	Std. Dev.	MIN (minutes)	MAX (minutes)	Target Daily Runtime (minutes)	Relative Error ¹ (%)
Pump 4 to Hydro 1	12.8	0.4	12.0	13.0	12.4	3.1%
Pump 14 to Hydro 2	10.8	0.4	10.0	12.0	10.4	3.6%
Pump 6 to Recirc. System 1	6.4	0.5	6.0	7.0	6.0	5.8%
Pump 7 to Recirc. System 2	6.8	0.4	6.0	7.0	6.0	11.4%
Pump 8 to Recirc. System 3	6.4	0.5	6.0	7.0	6.0	6.1%
Pump 9 to Recirc. System 4	6.4	0.5	6.0	7.0	6.0	6.1%

¹Relative Error = (Recorded Runtime – Target Runtime)/ Target Runtime *100

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Appendix C: Flow Test Results

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**Table C.1
Flow Test Results**

Group (Figure 1)	Biofilter/Flow	Target Input			Measured Input		Measured Output		Recycle Ratio	
		Target Input Volume	Dose/day	Target Input Volume	Measured Input Volume	Relative Error (%)	Measured Output Volume	Relative Error (%)	Calculated Recycle Ratio (RR)	Relative Error (%)
		(mL/day)	(Dose/day)	(mL/dose)	(mL/dose)	(Measured Input - Target Input) / Target Input * 100	(mL/dose)	(Measured Output - Target Input) / Target Input * 100	Volume Recycle / Volume STE	Measured RR - Target RR / Measured RR * 100
1	Stage 1 Single Pass Biofilters (Hydrosplitter 1)									
	Date				9/10/2010 Dose @ 10:00 am		9/1/10 12:53 - 1:53 pm			
	UNSAT-PS1	55,656	24	2,319	2,175	-6.2%	3,575	54.2%		
	UNSAT-CL3				2,295	-1.0%	2,405	3.7%		
	UNSAT-CL1				2,330	0.5%	2,303	-0.7%		
	UNSAT-EC3				2,245	-3.2%	2,368	2.1%		
	UNSAT-EC1				2,330	0.5%	2,405	3.7%		
	Mean				2,275	-1.9%	2,611	12.6%		
	Stage 2 Single Pass Upflow Biofilters									
	Date						9/1/10 8:42 - 9:42 am			
	DENIT-LS4	55,656	24	2,319			1,779	-23.3%		
	DENIT-LS2						3,437	48.2%		
	DENIT-SU3						2,857	23.2%		
	DENIT-LS3						2,770	19.4%		
	DENIT-SU4						2,407	3.8%		
	Mean						2,650	14.3%		
2	Stage 1 Recirculating Biofilters (Hydrosplitter 2)									
	Date				(9/10/10) dose @ 10:30 am					
	RC1 : UNSAT-SA2	55,656	24	2,319	2,300	-0.8%				
	RC2 : UNSAT-EC4				2,520	8.7%				
	RC3 : UNSAT-CL2				2,410	3.9%				
	RC4 : UNSAT-CL4				2,380	2.6%				
	Mean				2,403	3.6%				
	Stage 1 Recirculating Biofilters (Recycle)				PLC Recorded (9/10/2010)					
	RC1 : UNSAT-SA2	166,968	24	6,957	6,939	-0.3%			3.02	0.6%
	RC2 : UNSAT-EC4				7,570	8.8%			3.00	0.1%
	RC3 : UNSAT-CL2				6,939	-0.3%			2.88	-4.2%
	RC4 : UNSAT-CL4				6,939	-0.3%			2.92	-2.9%
	Mean				7,097	2.0%			2.95	-1.6%
	Stage 1 Recirculating Biofilters (Hydrosplitter 2 + Recycle)						9/1/2010 10:10 - 11:10 am			
	RC1 : UNSAT-SA2	222,624	24	9,276			9,290	0.2%		
	RC2 : UNSAT-EC4						10,170	9.6%		
	RC3 : UNSAT-CL2						9,325	0.5%		
	RC4 : UNSAT-CL4						9,184	-1.0%		
	Mean						9,492	2.3%		
3	Horizontal Denitrification Biofilters									
	Date				9/10/10 dose @ 12:06 pm		9/1/2010 12:58 - 1:58 pm			
	DENIT-SU1	7,409	24	308.7	298	-3.5%	239	-22.6%		
	DENIT-SU2				296	-4.1%	275	-10.9%		
	DENIT-GL1				295	-4.4%	272	-11.9%		
	DENIT-LS1				282	-8.6%	248	-19.7%		
	Mean				293	-5.2%	259	-16.3%		
4	In-Situ Simulators									
	Date				9/1/2010 manual dose		9/1/10 8:49 - 12:49 pm			
	UNSAT-IS1 (STE)	14,814	6	2,469	2,551	3.3%	1,823	-26.2%		
	UNSAT-IS2 (Nitrified STE)				2,288	-7.3%	2,360	-4.4%		

Notes: Yellow-shaded cells are measured values; grey-shaded cells are calculated values

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Table C.2
Flow Test Results following Modifications

Group (Figure 1)	Biofilter/Flow	Target Input			Measured Input		Measured Output		Recycle Ratio	
		Target Input Volume	Dose/day	Target Input Volume	Measured Input Volume	Relative Error (%)	Measured Output Volume	Relative Error (%)	Calculated Recycle Ratio (RR)	Relative Error (%)
		(mL/day)	(Dose/day)	(mL/dose)	(mL/dose)	(Measured Input - Target Input) / Target Input * 100	(mL/dose)	(Measured Output - Target Input) / Target Input * 100	Volume Recycle / Volume STE	Measured RR - Target RR / Measured RR * 100
1	Stage 1 Single Pass Biofilters (Hydrosplitter 1)									
	Date				9/10/2010 Dose @ 10:00 am		9/21/10 9:00 - 10:00 am			
	UNSAT-PS1	55,656	24	2,319	2,175	-6.2%	2,565	10.6%		
	UNSAT-CL3				2,295	-1.0%	2,355	1.6%		
	UNSAT-CL1				2,330	0.5%	2,335	0.7%		
	UNSAT-EC3				2,245	-3.2%	2,240	-3.4%		
	UNSAT-EC1				2,330	0.5%	2,290	-1.3%		
	Mean				2,275	-1.9%	2,357	1.6%		
	Stage 2 Single Pass Upflow Biofilters									
	Date						9/1/10 8:42 - 9:42 am			
	DENIT-LS4	55,656	24	2,319			1,779	-23.3%		
	DENIT-LS2						3,437	48.2%		
	DENIT-SU3						2,857	23.2%		
	DENIT-LS3						2,770	19.4%		
	DENIT-SU4						2,407	3.8%		
	Mean						2,650	14.3%		
2	Stage 1 Recirculating Biofilters (Hydrosplitter 2)									
	Date				9/10/10) dose @ 10:30 am					
	RC1 : UNSAT-SA2	55,656	24	2,319	2,300	-0.8%				
	RC2 : UNSAT-EC4				2,520	8.7%				
	RC3 : UNSAT-CL2				2,410	3.9%				
	RC4 : UNSAT-CL4				2,380	2.6%				
	Mean				2,403	3.6%				
	Stage 1 Recirculating Biofilters (Recycle)				PLC Recorded (9/20/2010)					
	RC1 : UNSAT-SA2	166,968	24	6,957	6,939	-0.3%			3.02	0.6%
	RC2 : UNSAT-EC4				7,097	2.0%			2.82	-6.5%
	RC3 : UNSAT-CL2				6,939	-0.3%			2.88	-4.2%
	RC4 : UNSAT-CL4				7,097	2.0%			2.98	-0.6%
	Mean				7,018	0.9%			2.92	-2.6%
	Stage 1 Recirculating Biofilters (Hydrosplitter 2 + Recycle)						9/21/10 8:30 - 9:30 am			
	RC1 : UNSAT-SA2	222,624	24	9,276			9,070	-2.2%		
	RC2 : UNSAT-EC4						9,190	-0.9%		
	RC3 : UNSAT-CL2						9,185	-1.0%		
	RC4 : UNSAT-CL4						9,135	-1.5%		
	Mean						9,145	-1.4%		
3	Horizontal Denitrification Biofilters									
	Date				9/10/10 dose @ 12:06 pm		9/1/2010 12:58 - 1:58 pm			
	DENIT-SU1	7,409	24	308.7	298	-3.5%	239	-22.6%		
	DENIT-SU2				296	-4.1%	275	-10.9%		
	DENIT-GL1				295	-4.4%	272	-11.9%		
	DENIT-LS1				282	-8.6%	248	-19.7%		
	Mean				293	-5.2%	259	-16.3%		
4	In-Situ Simulators									
	Date				9/9/2010 manual dose		9/10/10 8:30 - 12:30 pm			
	UNSAT-IS1 (STE)	14,814	6	2,469	2,340	-5.2%	1,950	-21.0%		
	UNSAT-IS2 (Nitrified STE)				2,460	-0.4%	1,530	-38.0%		

Notes: Green-shaded cells are measured values following completion of system modifications; yellow-shaded cells are measured values; grey-shaded cells are calculated values

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Appendix D: Laboratory Report

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Hazen and Sawyer, PC
10002 Princess Palm Avenue
Suite 200
Tampa, FL 33619-

September 22, 2010
Project No: 104686

Laboratory Report

Project Name **PNRS II Wastewater System Analyses**

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
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Sample Description	PNRS II STE-T1
Matrix	Wastewater
SAL Sample Number	104686.01
Date/Time Collected	08/31/10 13:35
Date/Time Received	08/31/10 16:25

Field Parameter

Specific Conductance	umhos/cm	1,092	DEP FT1200	0.1	08/31/10 13:35		TDD
Temperature	C	27.9	DEP FT1400	0.1	08/31/10 13:35		TDD
pH	SU	7.2	DEP FT1100	0.1	08/31/10 13:35		TDD
Dissolved Oxygen	mg/l	0.0	DEP FT1500	0.01	08/31/10 13:35		TDD

Inorganics

Total Alkalinity as CaCO3	mg/l	370	SM 2320B	2	09/03/10 13:30		KTC
Ammonia Nitrogen	mg/l N	59	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	27	SM 5210 B	2	09/07/10 08:47	09/02/10 09:30	MEJ
Chemical Oxygen Demand	mg/l	210	EPA 410.4	10	09/03/10 09:00	09/03/10 09:00	ARM
Nitrate-Nitrite (as N)	mg/l	0.053	EPA 353.2	0.01	09/01/10 11:00		SMB
Total Dissolved Solids	mg/l	380	SM 2540C	10	09/02/10 14:30	09/01/10 11:30	MJV
Total Kjeldahl Nitrogen	mg/l N	67	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	7.4	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	70	SM 2540D	1	09/02/10 13:00	09/01/10 13:00	MJV

Microbiology

Fecal Coliform	Ct/100 ml	800 Z	SM 9222 D	1	09/01/10 17:00	08/31/10 18:15	MEJ
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Sample Description	RC1
Matrix	Wastewater
SAL Sample Number	104686.02
Date/Time Collected	08/31/10 13:00
Date/Time Received	08/31/10 16:25

Field Parameter

Specific Conductance	umhos/cm	1,011	DEP FT1200	0.1	08/31/10 13:00		TDD
Temperature	C	30.0	DEP FT1400	0.1	08/31/10 13:00		TDD
pH	SU	7.3	DEP FT1100	0.1	08/31/10 13:00		TDD
Dissolved Oxygen	mg/l	0.0	DEP FT1500	0.01	08/31/10 13:00		TDD

Inorganics

Total Alkalinity as CaCO3	mg/l	210	SM 2320B	2	09/03/10 13:30		KTC
Ammonia Nitrogen	mg/l N	13	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	6.0	SM 5210 B	2	09/07/10 08:47	09/02/10 09:30	MEJ
Chemical Oxygen Demand	mg/l	22 I	EPA 410.4	10	09/01/10 09:00	09/01/10 09:00	ARM
Nitrate-Nitrite (as N)	mg/l	36	EPA 353.2	0.01	09/01/10 11:00		SMB

Hazen and Sawyer, PC
 10002 Princess Palm Avenue
 Suite 200
 Tampa, FL 33619-

September 22, 2010
 Project No: 104686

Laboratory Report

Project Name **PNRS II Wastewater System Analyses**

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
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Sample Description	RC1						
Matrix	Wastewater						
SAL Sample Number	104686.02						
Date/Time Collected	08/31/10 13:00						
Date/Time Received	08/31/10 16:25						

Inorganics

Total Dissolved Solids	mg/l	550	SM 2540C	10	09/02/10 14:30	09/01/10 11:30	MJV
Total Kjeldahl Nitrogen	mg/l N	17	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	5.8	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	1 U	SM 2540D	1	09/02/10 13:00	09/01/10 13:00	MJV

Microbiology

Fecal Coliform	Ct/100 ml	114	SM 9222 D	1	09/01/10 17:00	08/31/10 18:15	MEJ
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Sample Description	RC2						
Matrix	Wastewater						
SAL Sample Number	104686.03						
Date/Time Collected	08/31/10 13:10						
Date/Time Received	08/31/10 16:25						

Field Parameter

Specific Conductance	umhos/cm	1,031	DEP FT1200	0.1	08/31/10 13:10		TDD
Temperature	C	30.2	DEP FT1400	0.1	08/31/10 13:10		TDD
pH	SU	7.3	DEP FT1100	0.1	08/31/10 13:10		TDD
Dissolved Oxygen	mg/l	0.1	DEP FT1500	0.01	08/31/10 13:10		TDD

Inorganics

Total Alkalinity as CaCO ₃	mg/l	180	SM 2320B	2	09/03/10 13:30		KTC
Ammonia Nitrogen	mg/l N	15	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	2 U	SM 5210 B	2	09/07/10 08:47	09/02/10 09:30	MEJ
Chemical Oxygen Demand	mg/l	24 I	EPA 410.4	10	09/01/10 09:00	09/01/10 09:00	ARM
Nitrate-Nitrite (as N)	mg/l	23	EPA 353.2	0.01	09/01/10 11:00		SMB
Total Dissolved Solids	mg/l	560	SM 2540C	10	09/02/10 14:30	09/01/10 11:30	MJV
Total Kjeldahl Nitrogen	mg/l N	17	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	4.2	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	1 U	SM 2540D	1	09/02/10 13:00	09/01/10 13:00	MJV

Microbiology

Fecal Coliform	Ct/100 ml	99	SM 9222 D	1	09/01/10 17:00	08/31/10 18:15	MEJ
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Hazen and Sawyer, PC
10002 Princess Palm Avenue
Suite 200
Tampa, FL 33619-

September 22, 2010
Project No: 104686

Laboratory Report

Project Name **PNRS II Wastewater System Analyses**

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Sample Description	RC3						
Matrix	Wastewater						
SAL Sample Number	104686.04						
Date/Time Collected	08/31/10 13:20						
Date/Time Received	08/31/10 16:25						

Field Parameter

Specific Conductance	umhos/cm	1,128	DEP FT1200	0.1	08/31/10 13:20		TDD
Temperature	C	30.2	DEP FT1400	0.1	08/31/10 13:20		TDD
pH	SU	7.6	DEP FT1100	0.1	08/31/10 13:20		TDD
Dissolved Oxygen	mg/l	0.1	DEP FT1500	0.01	08/31/10 13:20		TDD

Inorganics

Total Alkalinity as CaCO3	mg/l	160	SM 2320B	2	09/03/10 13:30		KTC
Ammonia Nitrogen	mg/l N	8.7	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	3.3	SM 5210 B	2	09/07/10 08:47	09/02/10 09:30	MEJ
Chemical Oxygen Demand	mg/l	61	EPA 410.4	10	09/01/10 09:00	09/01/10 09:00	ARM
Nitrate-Nitrite (as N)	mg/l	33	EPA 353.2	0.01	09/01/10 11:00		SMB
Total Dissolved Solids	mg/l	590	SM 2540C	10	09/02/10 14:30	09/01/10 11:30	MJV
Total Kjeldahl Nitrogen	mg/l N	12	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	6.4	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	1	SM 2540D	1	09/02/10 13:00	09/01/10 13:00	MJV

Microbiology

Fecal Coliform	Ct/100 ml	109	SM 9222 D	1	09/01/10 17:00	08/31/10 18:15	MEJ
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Sample Description	RC4						
Matrix	Wastewater						
SAL Sample Number	104686.05						
Date/Time Collected	08/31/10 13:30						
Date/Time Received	08/31/10 16:25						

Field Parameter

Specific Conductance	umhos/cm	1,112	DEP FT1200	0.1	08/31/10 13:30		TDD
Temperature	C	30.4	DEP FT1400	0.1	08/31/10 13:30		TDD
pH	SU	7.8	DEP FT1100	0.1	08/31/10 13:30		TDD
Dissolved Oxygen	mg/l	0.0	DEP FT1500	0.01	08/31/10 13:30		TDD

Inorganics

Total Alkalinity as CaCO3	mg/l	180	SM 2320B	2	09/03/10 13:30		KTC
Ammonia Nitrogen	mg/l N	8.4	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	3.0	SM 5210 B	2	09/07/10 08:47	09/02/10 09:30	MEJ
Chemical Oxygen Demand	mg/l	29	EPA 410.4	10	09/01/10 09:00	09/01/10 09:00	ARM
Nitrate-Nitrite (as N)	mg/l	27	EPA 353.2	0.01	09/01/10 11:00		SMB

SOUTHERN ANALYTICAL LABORATORIES, INC.

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



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September 22, 2010
Project No: 104686

Laboratory Report

Project Name PNRS II Wastewater System Analyses

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
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Sample Description	RC4						
Matrix	Wastewater						
SAL Sample Number	104686.05						
Date/Time Collected	08/31/10 13:30						
Date/Time Received	08/31/10 16:25						

Inorganics

Total Dissolved Solids	mg/l	620	SM 2540C	10	09/02/10 14:30	09/01/10 11:30	MJV
Total Kjeldahl Nitrogen	mg/l N	11	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	6.7	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	12	SM 2540D	1	09/02/10 13:00	09/01/10 13:00	MJV

Microbiology

Fecal Coliform	Ct/100 ml	112	SM 9222 D	1	09/01/10 17:00	08/31/10 18:15	MEJ
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Sample Description	UNSAT-IS1						
Matrix	Wastewater						
SAL Sample Number	104686.06						
Date/Time Collected	08/31/10 13:45						
Date/Time Received	08/31/10 16:25						

Field Parameter

Specific Conductance	umhos/cm	1,206	DEP FT1200	0.1	08/31/10 13:45		TDD
Temperature	C	29.5	DEP FT1400	0.1	08/31/10 13:45		TDD
pH	SU	6.5	DEP FT1100	0.1	08/31/10 13:45		TDD
Dissolved Oxygen	mg/l	0.1	DEP FT1500	0.01	08/31/10 13:45		TDD

Inorganics

Total Alkalinity as CaCO3	mg/l	270	SM 2320B	2	09/03/10 13:30		KTC
Ammonia Nitrogen	mg/l N	20	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	8.4	SM 5210 B	2	09/07/10 08:47	09/02/10 09:30	MEJ
Chemical Oxygen Demand	mg/l	57	EPA 410.4	10	09/01/10 09:00	09/01/10 09:00	ARM
Hydrogen Sulfide (Unionized)	mg/l	0.7	SM 4500S F	0.01	09/01/10 14:00		KTC
Sulfide	mg/l	0.9	SM 4500S F	0.1	09/01/10 14:00		KTC
Nitrate-Nitrite (as N)	mg/l	0.086	EPA 353.2	0.01	09/01/10 11:00		SMB
Sulfate	mg/l	300	EPA 300.0	0.2	09/03/10 22:58		MEJ
Total Dissolved Solids	mg/l	780	SM 2540C	10	09/02/10 14:30	09/01/10 11:30	MJV
Total Kjeldahl Nitrogen	mg/l N	20	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	1.2	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	3	SM 2540D	1	09/02/10 13:00	09/01/10 13:00	MJV

Microbiology

Fecal Coliform	Ct/100 ml	1 U	SM 9222 D	1	09/01/10 17:00	08/31/10 18:15	MEJ
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Hazen and Sawyer, PC
10002 Princess Palm Avenue
Suite 200
Tampa, FL 33619-

September 22, 2010
Project No: 104686

Laboratory Report

Project Name **PNRS II Wastewater System Analyses**

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Sample Description	UNSAT-IS2						
Matrix	Wastewater						
SAL Sample Number	104686.07						
Date/Time Collected	09/01/10 10:20						
Date/Time Received	09/01/10 14:43						

Field Parameter

Specific Conductance	umhos/cm	1,543 D1	DEP FT1200	0.1	09/01/10 10:20		Client
Temperature	C	29.0 D1	DEP FT1400	0.1	09/01/10 10:20		Client
pH	SU	6.29 D1	DEP FT1100	0.1	09/01/10 10:20		Client
Dissolved Oxygen	mg/l	0.09 D1	DEP FT1500	0.01	09/01/10 10:20		Client

Inorganics

Total Alkalinity as CaCO3	mg/l	200	SM 2320B	2	09/03/10 13:30		KTC
Ammonia Nitrogen	mg/l N	0.21	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	2 U	SM 5210 B	2	09/08/10 08:15	09/03/10 10:15	KTC
Chemical Oxygen Demand	mg/l	50	EPA 410.4	10	09/03/10 09:00	09/03/10 09:00	ARM
Hydrogen Sulfide (Unionized)	mg/l	0.01 U	SM 4500S F	0.01	09/08/10 14:00		KTC
Sulfide	mg/l	0.1 U	SM 4500S F	0.1	09/08/10 14:00		KTC
Nitrate-Nitrite (as N)	mg/l	0.01 U	EPA 353.2	0.01	09/03/10 07:36		SMB
Sulfate	mg/l	470	EPA 300.0	0.2	09/03/10 00:13		MEJ
Total Dissolved Solids	mg/l	950	SM 2540C	10	09/08/10 13:00	09/07/10 09:30	MJV
Total Kjeldahl Nitrogen	mg/l N	0.64	EPA 351.2	0.05	09/09/10 10:40	09/08/10 11:15	SMB
Total Phosphorus	mg/l P	1.5	SM 4500P E	0.01	09/09/10 12:52	09/08/10 15:55	SMB
Total Suspended Solids	mg/l	60	SM 2540D	1	09/08/10 12:30	09/07/10 13:00	MJV

Microbiology

Fecal Coliform	Ct/100 ml	1 U	SM 9222 D	1	09/02/10 14:30	09/01/10 16:10	MEJ
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Sample Description	UNSAT-EC1						
Matrix	Wastewater						
SAL Sample Number	104686.08						
Date/Time Collected	08/31/10 12:40						
Date/Time Received	08/31/10 16:25						

Field Parameter

Specific Conductance	umhos/cm	1,055	DEP FT1200	0.1	08/31/10 12:40		TDD
Temperature	C	28.6	DEP FT1400	0.1	08/31/10 12:40		TDD
pH	SU	7.0	DEP FT1100	0.1	08/31/10 12:40		TDD
Dissolved Oxygen	mg/l	6.8	DEP FT1500	0.01	08/31/10 12:40		TDD

Inorganics

Total Alkalinity as CaCO3	mg/l	130	SM 2320B	2	09/03/10 13:30		KTC
Ammonia Nitrogen	mg/l N	0.01 U	EPA 350.1	0.01	09/02/10 09:41		SMB

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Sample Description	UNSAT-EC1
Matrix	Wastewater
SAL Sample Number	104686.08
Date/Time Collected	08/31/10 12:40
Date/Time Received	08/31/10 16:25

Inorganics

Carbonaceous BOD	mg/l	2 U	SM 5210 B	2	09/07/10 08:47	09/02/10 09:30	MEJ
Chemical Oxygen Demand	mg/l	13 I	EPA 410.4	10	09/01/10 09:00	09/01/10 09:00	ARM
Hydrogen Sulfide (Unionized)	mg/l	0.05	SM 4500S F	0.01	09/01/10 14:00		KTC
Sulfide	mg/l	0.1 I	SM 4500S F	0.1	09/01/10 14:00		KTC
Nitrate-Nitrite (as N)	mg/l	42	EPA 353.2	0.01	09/01/10 11:00		SMB
Sulfate	mg/l	51	EPA 300.0	0.2	09/03/10 00:30		MEJ
Total Dissolved Solids	mg/l	670	SM 2540C	10	09/02/10 14:30	09/01/10 11:30	MJV
Total Kjeldahl Nitrogen	mg/l N	4.3	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	3.9	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	1 U	SM 2540D	1	09/02/10 13:00	09/01/10 13:00	MJV

Microbiology

Fecal Coliform	Ct/100 ml	1 U	SM 9222 D	1	09/01/10 17:00	08/31/10 18:15	MEJ
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Sample Description	UNSAT-SA2
Matrix	Wastewater
SAL Sample Number	104686.09
Date/Time Collected	08/31/10 11:30
Date/Time Received	08/31/10 16:25

Field Parameter

Specific Conductance	umhos/cm	953	DEP FT1200	0.1	08/31/10 11:30		TDD
Temperature	C	28.2	DEP FT1400	0.1	08/31/10 11:30		TDD
pH	SU	6.9	DEP FT1100	0.1	08/31/10 11:30		TDD
Dissolved Oxygen	mg/l	6.3	DEP FT1500	0.01	08/31/10 11:30		TDD

Inorganics

Total Alkalinity as CaCO3	mg/l	110	SM 2320B	2	09/03/10 13:30		KTC
Ammonia Nitrogen	mg/l N	0.01 U	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	2 U	SM 5210 B	2	09/07/10 08:47	09/02/10 09:30	MEJ
Chemical Oxygen Demand	mg/l	13 I	EPA 410.4	10	09/01/10 09:00	09/01/10 09:00	ARM
Nitrate-Nitrite (as N)	mg/l	36	EPA 353.2	0.01	09/01/10 11:00		SMB
Total Dissolved Solids	mg/l	638	SM 2540C	10	09/01/10 14:30	09/01/10 11:30	MJV
Total Kjeldahl Nitrogen	mg/l N	3.3	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	6.3	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	1 U	SM 2540D	1	09/02/10 13:00	09/01/10 13:00	MJV

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Sample Description		UNSAT-SA2					
Matrix		Wastewater					
SAL Sample Number		104686.09					
Date/Time Collected		08/31/10 11:30					
Date/Time Received		08/31/10 16:25					

Microbiology

Fecal Coliform	Ct/100 ml	1 U	SM 9222 D	1	09/01/10 14:00	08/31/10 17:00	MEJ
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Sample Description		UNSAT-EC3					
Matrix		Wastewater					
SAL Sample Number		104686.10					
Date/Time Collected		08/31/10 12:50					
Date/Time Received		08/31/10 16:25					

Field Parameter

Specific Conductance	umhos/cm	1,133	DEP FT1200	0.1	08/31/10 12:50		TDD
Temperature	C	29.2	DEP FT1400	0.1	08/31/10 12:50		TDD
pH	SU	7.0	DEP FT1100	0.1	08/31/10 12:50		TDD
Dissolved Oxygen	mg/l	6.7	DEP FT1500	0.01	08/31/10 12:50		TDD

Inorganics

Total Alkalinity as CaCO3	mg/l	150	SM 2320B	2	09/03/10 13:30		KTC
Ammonia Nitrogen	mg/l N	0.01 U	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	2 U	SM 5210 B	2	09/07/10 08:47	09/02/10 09:30	MEJ
Chemical Oxygen Demand	mg/l	16 I	EPA 410.4	10	09/01/10 09:00	09/01/10 09:00	ARM
Nitrate-Nitrite (as N)	mg/l	42	EPA 353.2	0.01	09/01/10 11:00		SMB
Total Dissolved Solids	mg/l	740	SM 2540C	10	09/02/10 14:30	09/01/10 11:30	MJV
Total Kjeldahl Nitrogen	mg/l N	3.3	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	3.9	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	1 U	SM 2540D	1	09/02/10 13:00	09/01/10 13:00	MJV

Microbiology

Fecal Coliform	Ct/100 ml	1 U	SM 9222 D	1	09/01/10 17:00	08/31/10 18:15	MEJ
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Sample Description	UNSAT-EC4						
Matrix	Wastewater						
SAL Sample Number	104686.11						
Date/Time Collected	08/31/10 11:20						
Date/Time Received	08/31/10 16:25						

Field Parameter

Specific Conductance	umhos/cm	1,000	DEP FT1200	0.1	08/31/10 11:20		TDD
Temperature	C	28.5	DEP FT1400	0.1	08/31/10 11:20		TDD
pH	SU	7.0	DEP FT1100	0.1	08/31/10 11:20		TDD
Dissolved Oxygen	mg/l	6.9	DEP FT1500	0.01	08/31/10 11:20		TDD

Inorganics

Total Alkalinity as CaCO3	mg/l	130	SM 2320B	2	09/03/10 13:30		KTC
Ammonia Nitrogen	mg/l N	0.01 U	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	2 U	SM 5210 B	2	09/07/10 08:47	09/02/10 10:45	MEJ
Chemical Oxygen Demand	mg/l	13 I	EPA 410.4	10	09/01/10 09:00	09/01/10 09:00	ARM
Nitrate-Nitrite (as N)	mg/l	38	EPA 353.2	0.01	09/01/10 11:00		SMB
Total Dissolved Solids	mg/l	640	SM 2540C	10	09/02/10 14:30	09/01/10 11:30	MJV
Total Kjeldahl Nitrogen	mg/l N	2.9	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	3.8	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	1 U	SM 2540D	1	09/02/10 13:00	09/01/10 13:00	MJV

Microbiology

Fecal Coliform	Ct/100 ml	1 U	SM 9222 D	1	09/01/10 14:00	08/31/10 17:00	MEJ
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Sample Description	UNSAT-CL1						
Matrix	Wastewater						
SAL Sample Number	104686.12						
Date/Time Collected	08/31/10 12:30						
Date/Time Received	08/31/10 16:25						

Field Parameter

Specific Conductance	umhos/cm	1,271	DEP FT1200	0.1	08/31/10 12:30		TDD
Temperature	C	29.5	DEP FT1400	0.1	08/31/10 12:30		TDD
pH	SU	7.4	DEP FT1100	0.1	08/31/10 12:30		TDD
Dissolved Oxygen	mg/l	5.5	DEP FT1500	0.01	08/31/10 12:30		TDD

Inorganics

Total Alkalinity as CaCO3	mg/l	250	SM 2320B	2	09/03/10 13:30		KTC
Ammonia Nitrogen	mg/l N	0.01 U	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	2 U	SM 5210 B	2	09/07/10 08:47	09/02/10 10:45	MEJ
Chemical Oxygen Demand	mg/l	20 I	EPA 410.4	10	09/01/10 09:00	09/01/10 09:00	ARM
Hydrogen Sulfide (Unionized)	mg/l	0.08	SM 4500S F	0.01	09/01/10 14:00		KTC

SOUTHERN ANALYTICAL LABORATORIES, INC.

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Sample Description	UNSAT-CL1
Matrix	Wastewater
SAL Sample Number	104686.12
Date/Time Collected	08/31/10 12:30
Date/Time Received	08/31/10 16:25

Inorganics

Sulfide	mg/l	0.3 I	SM 4500S F	0.1	09/01/10 14:00		KTC
Nitrate-Nitrite (as N)	mg/l	38	EPA 353.2	0.01	09/01/10 11:00		SMB
Sulfate	mg/l	48	EPA 300.0	0.2	09/03/10 00:47		MEJ
Total Dissolved Solids	mg/l	750	SM 2540C	10	09/03/10 14:30	09/02/10 09:30	MJV
Total Kjeldahl Nitrogen	mg/l N	2.8	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	8.0	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	1 U	SM 2540D	1	09/02/10 13:00	09/01/10 13:00	MJV

Microbiology

Fecal Coliform	Ct/100 ml	12	SM 9222 D	1	09/01/10 17:00	08/31/10 18:15	MEJ
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Sample Description	UNSAT-CL2
Matrix	Wastewater
SAL Sample Number	104686.13
Date/Time Collected	08/31/10 11:05
Date/Time Received	08/31/10 14:50

Field Parameter

Specific Conductance	umhos/cm	1,050	DEP FT1200	0.1	08/31/10 11:05		TDD
Temperature	C	26.8	DEP FT1400	0.1	08/31/10 11:05		TDD
pH	SU	7.4	DEP FT1100	0.1	08/31/10 11:05		TDD
Dissolved Oxygen	mg/l	6.4	DEP FT1500	0.01	08/31/10 11:05		TDD

Inorganics

Total Alkalinity as CaCO3	mg/l	120	SM 2320B	2	08/31/10 16:00		KTC
Ammonia Nitrogen	mg/l N	0.01 U	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	2 U	SM 5210 B	2	09/07/10 08:47	09/02/10 10:45	MEJ
Chemical Oxygen Demand	mg/l	22 I	EPA 410.4	10	09/01/10 09:00	09/01/10 09:00	ARM
Nitrate-Nitrite (as N)	mg/l	42	EPA 353.2	0.01	09/01/10 11:00		SMB
Total Dissolved Solids	mg/l	650	SM 2540C	10	09/02/10 14:30	09/01/10 11:30	MJV
Total Kjeldahl Nitrogen	mg/l N	3.1	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	7.1	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	1	SM 2540D	1	09/02/10 13:00	09/01/10 13:00	MJV

Microbiology

Fecal Coliform	Ct/100 ml	4	SM 9222 D	1	09/01/10 14:00	08/31/10 15:45	MEJ
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Sample Description	UNSAT-CL3						
Matrix	Wastewater						
SAL Sample Number	104686.14						
Date/Time Collected	08/31/10 12:00						
Date/Time Received	08/31/10 14:50						

Field Parameter

Specific Conductance	umhos/cm	1,388	DEP FT1200	0.1	08/31/10 12:00		TDD
Temperature	C	28.7	DEP FT1400	0.1	08/31/10 12:00		TDD
pH	SU	7.8	DEP FT1100	0.1	08/31/10 12:00		TDD
Dissolved Oxygen	mg/l	7.1	DEP FT1500	0.01	08/31/10 12:00		TDD

Inorganics

Total Alkalinity as CaCO3	mg/l	340	SM 2320B	2	08/31/10 16:00		KTC
Ammonia Nitrogen	mg/l N	0.01 U	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	2 U	SM 5210 B	2	09/07/10 08:47	09/02/10 10:45	MEJ
Chemical Oxygen Demand	mg/l	20 I	EPA 410.4	10	09/01/10 09:00	09/01/10 09:00	ARM
Nitrate-Nitrite (as N)	mg/l	36	EPA 353.2	0.01	09/01/10 11:00		SMB
Total Dissolved Solids	mg/l	850	SM 2540C	10	09/02/10 14:30	09/01/10 11:30	MJV
Total Kjeldahl Nitrogen	mg/l N	4.0	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	6.8	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	1 U	SM 2540D	1	09/02/10 13:00	09/01/10 13:00	MJV

Microbiology

Fecal Coliform	Ct/100 ml	3	SM 9222 D	1	09/01/10 14:00	08/31/10 15:45	MEJ
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Sample Description	UNSAT-CL4						
Matrix	Wastewater						
SAL Sample Number	104686.15						
Date/Time Collected	08/31/10 10:55						
Date/Time Received	08/31/10 14:50						

Field Parameter

Specific Conductance	umhos/cm	1,174	DEP FT1200	0.1	08/31/10 10:55		TDD
Temperature	C	29.3	DEP FT1400	0.1	08/31/10 10:55		TDD
pH	SU	7.8	DEP FT1100	0.1	08/31/10 10:55		TDD
Dissolved Oxygen	mg/l	7.1	DEP FT1500	0.01	08/31/10 10:55		TDD

Inorganics

Total Alkalinity as CaCO3	mg/l	170	SM 2320B	2	08/31/10 16:00		KTC
Ammonia Nitrogen	mg/l N	0.01 U	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	2 U	SM 5210 B	2	09/07/10 08:47	09/02/10 10:45	MEJ
Chemical Oxygen Demand	mg/l	13 I	EPA 410.4	10	09/01/10 09:00	09/01/10 09:00	ARM
Nitrate-Nitrite (as N)	mg/l	43	EPA 353.2	0.01	09/01/10 11:00		SMB

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Sample Description	UNSAT-CL4						
Matrix	Wastewater						
SAL Sample Number	104686.15						
Date/Time Collected	08/31/10 10:55						
Date/Time Received	08/31/10 14:50						

Inorganics

Total Dissolved Solids	mg/l	680	SM 2540C	10	09/02/10 14:30	09/01/10 11:30	MJV
Total Kjeldahl Nitrogen	mg/l N	2.1	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	7.6	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	1 U	SM 2540D	1	09/02/10 13:00	09/01/10 13:00	MJV

Microbiology

Fecal Coliform	Ct/100 ml	1	SM 9222 D	1	09/01/10 14:00	08/31/10 15:45	MEJ
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Sample Description	UNSAT-PS1						
Matrix	Wastewater						
SAL Sample Number	104686.16						
Date/Time Collected	08/31/10 11:40						
Date/Time Received	08/31/10 14:50						

Field Parameter

Specific Conductance	umhos/cm	1,010	DEP FT1200	0.1	08/31/10 11:40		TDD
Temperature	C	28.6	DEP FT1400	0.1	08/31/10 11:40		TDD
pH	SU	7.6	DEP FT1100	0.1	08/31/10 11:40		TDD
Dissolved Oxygen	mg/l	2.5	DEP FT1500	0.01	08/31/10 11:40		TDD

Inorganics

Total Alkalinity as CaCO3	mg/l	280	SM 2320B	2	08/31/10 16:00		KTC
Ammonia Nitrogen	mg/l N	46	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	5.7	SM 5210 B	2	09/07/10 08:47	09/02/10 10:45	MEJ
Chemical Oxygen Demand	mg/l	48	EPA 410.4	10	09/01/10 09:00	09/01/10 09:00	ARM
Nitrate-Nitrite (as N)	mg/l	8.2	EPA 353.2	0.01	09/01/10 11:00		SMB
Total Dissolved Solids	mg/l	420	SM 2540C	10	09/03/10 14:30	09/01/10 12:00	MJV
Total Kjeldahl Nitrogen	mg/l N	53	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	5.9	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	2	SM 2540D	1	09/02/10 13:00	09/01/10 13:00	MJV

Microbiology

Fecal Coliform	Ct/100 ml	930 B	SM 9222 D	1	09/01/10 14:00	08/31/10 15:45	MEJ
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Sample Description	DENIT-SU1
Matrix	Wastewater
SAL Sample Number	104686.17
Date/Time Collected	08/31/10 08:55
Date/Time Received	08/31/10 14:50

Field Parameter

Specific Conductance	umhos/cm	1,473	DEP FT1200	0.1	08/31/10 08:55		TDD
Temperature	C	25.1	DEP FT1400	0.1	08/31/10 08:55		TDD
pH	SU	7.0	DEP FT1100	0.1	08/31/10 08:55		TDD
Dissolved Oxygen	mg/l	0.1	DEP FT1500	0.01	08/31/10 08:55		TDD

Inorganics

Total Alkalinity as CaCO ₃	mg/l	240	SM 2320B	2	08/31/10 16:00		KTC
Ammonia Nitrogen	mg/l N	2.4	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	24	SM 5210 B	2	09/06/10 09:31	09/01/10 11:00	MEJ
Chemical Oxygen Demand	mg/l	63	EPA 410.4	10	09/03/10 09:00	09/03/10 09:00	ARM
Hydrogen Sulfide (Unionized)	mg/l	12	SM 4500S F	0.01	09/01/10 14:00		KTC
Sulfide	mg/l	25	SM 4500S F	0.1	09/01/10 14:00		KTC
Nitrate-Nitrite (as N)	mg/l	0.040	EPA 353.2	0.01	09/01/10 11:00		SMB
Sulfate	mg/l	450	EPA 300.0	0.2	09/03/10 23:15		MEJ
Total Dissolved Solids	mg/l	1,000	SM 2540C	10	09/03/10 14:30	09/01/10 12:00	MJV
Total Kjeldahl Nitrogen	mg/l N	2.7	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	5.0	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	1 U	SM 2540D	1	09/03/10 13:00	09/02/10 15:00	MJV

Microbiology

Fecal Coliform	Ct/100 ml	3	SM 9222 D	1	09/01/10 14:00	08/31/10 15:45	MEJ
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Sample Description	DENIT-SU2
Matrix	Wastewater
SAL Sample Number	104686.18
Date/Time Collected	08/31/10 09:05
Date/Time Received	08/31/10 14:50

Field Parameter

Specific Conductance	umhos/cm	1,402	DEP FT1200	0.1	08/31/10 09:05		TDD
Temperature	C	24.8	DEP FT1400	0.1	08/31/10 09:05		TDD
pH	SU	7.0	DEP FT1100	0.1	08/31/10 09:05		TDD
Dissolved Oxygen	mg/l	0.5	DEP FT1500	0.01	08/31/10 09:05		TDD

Inorganics

Total Alkalinity as CaCO ₃	mg/l	210	SM 2320B	2	08/31/10 16:00		KTC
Ammonia Nitrogen	mg/l N	0.92	EPA 350.1	0.01	09/02/10 09:41		SMB

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Sample Description	DENIT-SU2
Matrix	Wastewater
SAL Sample Number	104686.18
Date/Time Collected	08/31/10 09:05
Date/Time Received	08/31/10 14:50

Inorganics

Carbonaceous BOD	mg/l	20	SM 5210 B	2	09/06/10 09:31	09/01/10 11:00	MEJ
Chemical Oxygen Demand	mg/l	50	EPA 410.4	10	09/03/10 09:00	09/03/10 09:00	ARM
Hydrogen Sulfide (Unionized)	mg/l	6.7	SM 4500S F	0.01	09/01/10 14:00		KTC
Sulfide	mg/l	14	SM 4500S F	0.1	09/01/10 14:00		KTC
Nitrate-Nitrite (as N)	mg/l	0.025 I	EPA 353.2	0.01	09/01/10 11:00		SMB
Sulfate	mg/l	470	EPA 300.0	0.2	09/03/10 23:32		MEJ
Total Dissolved Solids	mg/l	930	SM 2540C	10	09/03/10 14:30	09/01/10 12:00	MJV
Total Kjeldahl Nitrogen	mg/l N	1.8	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	4.8	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	2	SM 2540D	1	09/03/10 13:00	09/02/10 15:00	MJV

Microbiology

Fecal Coliform	Ct/100 ml	1 U	SM 9222 D	1	09/01/10 14:00	08/31/10 15:45	MEJ
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Sample Description	DENIT-SU3
Matrix	Wastewater
SAL Sample Number	104686.19
Date/Time Collected	08/31/10 10:00
Date/Time Received	08/31/10 14:50

Field Parameter

Specific Conductance	umhos/cm	1,655	DEP FT1200	0.1	08/31/10 10:00		TDD
Temperature	C	28.4	DEP FT1400	0.1	08/31/10 10:00		TDD
pH	SU	6.7	DEP FT1100	0.1	08/31/10 10:00		TDD
Dissolved Oxygen	mg/l	0.1	DEP FT1500	0.01	08/31/10 10:00		TDD

Inorganics

Total Alkalinity as CaCO3	mg/l	270	SM 2320B	2	08/31/10 16:00		KTC
Ammonia Nitrogen	mg/l N	0.80	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	2 U	SM 5210 B	2	09/06/10 09:31	09/01/10 11:00	MEJ
Chemical Oxygen Demand	mg/l	39 I	EPA 410.4	10	09/03/10 09:00	09/03/10 09:00	ARM
Hydrogen Sulfide (Unionized)	mg/l	4.5	SM 4500S F	0.01	09/01/10 14:00		KTC
Sulfide	mg/l	7.0	SM 4500S F	0.1	09/01/10 14:00		KTC
Nitrate-Nitrite (as N)	mg/l	0.039 I	EPA 353.2	0.01	09/01/10 11:00		SMB
Sulfate	mg/l	550	EPA 300.0	0.2	09/03/10 23:49		MEJ
Total Dissolved Solids	mg/l	1,100	SM 2540C	10	09/03/10 14:30	09/01/10 12:00	MJV
Total Kjeldahl Nitrogen	mg/l N	2.0	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB

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Sample Description	DENIT-SU3						
Matrix	Wastewater						
SAL Sample Number	104686.19						
Date/Time Collected	08/31/10 10:00						
Date/Time Received	08/31/10 14:50						

Inorganics

Total Phosphorus	mg/l P	6.2	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	1 U	SM 2540D	1	09/03/10 13:00	09/02/10 15:00	MJV

Microbiology

Fecal Coliform	Ct/100 ml	1	SM 9222 D	1	09/01/10 14:00	08/31/10 15:45	MEJ
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Sample Description	DENIT-SU4						
Matrix	Wastewater						
SAL Sample Number	104686.20						
Date/Time Collected	08/31/10 10:25						
Date/Time Received	08/31/10 14:50						

Field Parameter

Specific Conductance	umhos/cm	1,395	DEP FT1200	0.1	08/31/10 10:25		TDD
Temperature	C	28.1	DEP FT1400	0.1	08/31/10 10:25		TDD
pH	SU	6.6	DEP FT1100	0.1	08/31/10 10:25		TDD
Dissolved Oxygen	mg/l	0.2	DEP FT1500	0.01	08/31/10 10:25		TDD

Inorganics

Total Alkalinity as CaCO3	mg/l	150	SM 2320B	2	08/31/10 16:00		KTC
Ammonia Nitrogen	mg/l N	0.31	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	2 U	SM 5210 B	2	09/06/10 09:31	09/01/10 12:15	MEJ
Chemical Oxygen Demand	mg/l	22 I	EPA 410.4	10	09/03/10 09:00	09/03/10 09:00	ARM
Hydrogen Sulfide (Unionized)	mg/l	0.01 U	SM 4500S F	0.01	09/01/10 14:00		KTC
Sulfide	mg/l	0.1 U	SM 4500S F	0.1	09/01/10 14:00		KTC
Nitrate-Nitrite (as N)	mg/l	0.091	EPA 353.2	0.01	09/01/10 11:00		SMB
Sulfate	mg/l	550	EPA 300.0	0.2	09/04/10 00:06		MEJ
Total Dissolved Solids	mg/l	950	SM 2540C	10	09/03/10 14:30	09/01/10 12:00	MJV
Total Kjeldahl Nitrogen	mg/l N	1.3	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	3.2	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	1 U	SM 2540D	1	09/03/10 13:00	09/02/10 15:00	MJV

Microbiology

Fecal Coliform	Ct/100 ml	1 U	SM 9222 D	1	09/01/10 14:00	08/31/10 15:45	MEJ
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Sample Description	DENIT-LS1						
Matrix	Wastewater						
SAL Sample Number	104686.21						
Date/Time Collected	08/31/10 09:20						
Date/Time Received	08/31/10 14:50						

Field Parameter

Specific Conductance	umhos/cm	962	DEP FT1200	0.1	08/31/10 09:20		TDD
Temperature	C	25.2	DEP FT1400	0.1	08/31/10 09:20		TDD
pH	SU	7.7	DEP FT1100	0.1	08/31/10 09:20		TDD
Dissolved Oxygen	mg/l	0.2	DEP FT1500	0.01	08/31/10 09:20		TDD

Inorganics

Total Alkalinity as CaCO3	mg/l	250	SM 2320B	2	08/31/10 16:00		KTC
Ammonia Nitrogen	mg/l N	0.70	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	3.9	SM 5210 B	2	09/06/10 09:31	09/01/10 12:15	MEJ
Chemical Oxygen Demand	mg/l	44	EPA 410.4	10	09/03/10 09:00	09/03/10 09:00	ARM
Nitrate-Nitrite (as N)	mg/l	0.01 U	EPA 353.2	0.01	09/01/10 11:00		SMB
Total Dissolved Solids	mg/l	530	SM 2540C	10	09/02/10 14:30	09/01/10 11:30	MJV
Total Kjeldahl Nitrogen	mg/l N	1.8	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	0.46	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	1 U	SM 2540D	1	09/03/10 13:00	09/02/10 15:00	MJV

Microbiology

Fecal Coliform	Ct/100 ml	1 U	SM 9222 D	1	09/01/10 14:00	08/31/10 15:45	MEJ
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Sample Description	DENIT-LS2						
Matrix	Wastewater						
SAL Sample Number	104686.22						
Date/Time Collected	08/31/10 09:50						
Date/Time Received	08/31/10 14:50						

Field Parameter

Specific Conductance	umhos/cm	1,448	DEP FT1200	0.1	08/31/10 09:50		TDD
Temperature	C	27.3	DEP FT1400	0.1	08/31/10 09:50		TDD
pH	SU	7.8	DEP FT1100	0.1	08/31/10 09:50		TDD
Dissolved Oxygen	mg/l	4.1	DEP FT1500	0.01	08/31/10 09:50		TDD

Inorganics

Total Alkalinity as CaCO3	mg/l	380	SM 2320B	2	08/31/10 16:00		KTC
Ammonia Nitrogen	mg/l N	0.30	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	2 U	SM 5210 B	2	09/06/10 09:31	09/01/10 12:15	MEJ
Chemical Oxygen Demand	mg/l	24 I	EPA 410.4	10	09/03/10 09:00	09/03/10 09:00	ARM
Nitrate-Nitrite (as N)	mg/l	29	EPA 353.2	0.01	09/01/10 11:00		SMB

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Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Sample Description	DENIT-LS2						
Matrix	Wastewater						
SAL Sample Number	104686.22						
Date/Time Collected	08/31/10 09:50						
Date/Time Received	08/31/10 14:50						

Inorganics

Total Dissolved Solids	mg/l	850	SM 2540C	10	09/03/10 14:30	09/02/10 09:30	MJV
Total Kjeldahl Nitrogen	mg/l N	3.1	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	5.7	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	1 U	SM 2540D	1	09/03/10 13:00	09/02/10 15:00	MJV

Microbiology

Fecal Coliform	Ct/100 ml	1 U	SM 9222 D	1	09/01/10 14:00	08/31/10 15:45	MEJ
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Sample Description	DENIT-LS3						
Matrix	Wastewater						
SAL Sample Number	104686.23						
Date/Time Collected	08/31/10 10:15						
Date/Time Received	08/31/10 14:50						

Field Parameter

Specific Conductance	umhos/cm	1,114	DEP FT1200	0.1	08/31/10 10:15		TDD
Temperature	C	27.8	DEP FT1400	0.1	08/31/10 10:15		TDD
pH	SU	7.3	DEP FT1100	0.1	08/31/10 10:15		TDD
Dissolved Oxygen	mg/l	1.3	DEP FT1500	0.01	08/31/10 10:15		TDD

Inorganics

Total Alkalinity as CaCO3	mg/l	220	SM 2320B	2	08/31/10 16:00		KTC
Ammonia Nitrogen	mg/l N	0.15	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	2 U	SM 5210 B	2	09/06/10 09:31	09/01/10 12:15	MEJ
Chemical Oxygen Demand	mg/l	29 I	EPA 410.4	10	09/03/10 09:00	09/03/10 09:00	ARM
Nitrate-Nitrite (as N)	mg/l	31	EPA 353.2	0.01	09/01/10 11:00		SMB
Total Dissolved Solids	mg/l	680	SM 2540C	10	09/03/10 14:30	09/02/10 09:30	MJV
Total Kjeldahl Nitrogen	mg/l N	3.2	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	3.3	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	1 U	SM 2540D	1	09/03/10 13:00	09/02/10 15:00	MJV

Microbiology

Fecal Coliform	Ct/100 ml	1 U	SM 9222 D	1	09/01/10 14:00	08/31/10 15:45	MEJ
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Sample Description	DENIT-LS4						
Matrix	Wastewater						
SAL Sample Number	104686.24						
Date/Time Collected	08/31/10 09:40						
Date/Time Received	08/31/10 14:50						

Field Parameter

Specific Conductance	umhos/cm	1,120	DEP FT1200	0.1	08/31/10 09:40		TDD
Temperature	C	27.1	DEP FT1400	0.1	08/31/10 09:40		TDD
pH	SU	7.6	DEP FT1100	0.1	08/31/10 09:40		TDD
Dissolved Oxygen	mg/l	0.4	DEP FT1500	0.01	08/31/10 09:40		TDD

Inorganics

Total Alkalinity as CaCO ₃	mg/l	360	SM 2320B	2	08/31/10 16:00		KTC
Ammonia Nitrogen	mg/l N	33	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	2 U	SM 5210 B	2	09/06/10 09:31	09/01/10 12:15	MEJ
Chemical Oxygen Demand	mg/l	35 I	EPA 410.4	10	09/03/10 09:00	09/03/10 09:00	ARM
Nitrate-Nitrite (as N)	mg/l	0.17	EPA 353.2	0.01	09/01/10 11:00		SMB
Total Dissolved Solids	mg/l	430	SM 2540C	10	09/03/10 14:30	09/02/10 09:30	MJV
Total Kjeldahl Nitrogen	mg/l N	67	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	6.9	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	1 U	SM 2540D	1	09/03/10 13:00	09/02/10 15:00	MJV

Microbiology

Fecal Coliform	Ct/100 ml	12	SM 9222 D	1	09/01/10 14:00	08/31/10 15:45	MEJ
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Sample Description	DENIT-GL1						
Matrix	Wastewater						
SAL Sample Number	104686.25						
Date/Time Collected	08/31/10 09:30						
Date/Time Received	08/31/10 16:25						

Field Parameter

Specific Conductance	umhos/cm	1,686	DEP FT1200	0.1	08/31/10 09:30		TDD
Temperature	C	25.2	DEP FT1400	0.1	08/31/10 09:30		TDD
pH	SU	6.4	DEP FT1100	0.1	08/31/10 09:30		TDD
Dissolved Oxygen	mg/l	0.0	DEP FT1500	0.01	08/31/10 09:30		TDD

Inorganics

Total Alkalinity as CaCO ₃	mg/l	660	SM 2320B	2	09/04/10 08:30		KTC
Ammonia Nitrogen	mg/l N	29	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	810	SM 5210 B	2	09/06/10 09:31	09/01/10 12:15	MEJ
Chemical Oxygen Demand	mg/l	1100	EPA 410.4	10	09/03/10 09:00	09/03/10 09:00	ARM
Nitrate-Nitrite (as N)	mg/l	0.076	EPA 353.2	0.01	09/01/10 11:00		SMB

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Sample Description	DENIT-GL1						
Matrix	Wastewater						
SAL Sample Number	104686.25						
Date/Time Collected	08/31/10 09:30						
Date/Time Received	08/31/10 16:25						

Inorganics

Total Dissolved Solids	mg/l	1,200	SM 2540C	10	09/03/10 14:30	09/02/10 09:30	MJV
Total Kjeldahl Nitrogen	mg/l N	66	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	2.9	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	100	SM 2540D	1	09/03/10 13:00	09/02/10 15:00	MJV

Microbiology

Fecal Coliform	Ct/100 ml	800 Z	SM 9222 D	1	09/01/10 14:00	08/31/10 15:45	MEJ
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Sample Description	DFT						
Matrix	Wastewater						
SAL Sample Number	104686.26						
Date/Time Collected	08/31/10 14:30						
Date/Time Received	08/31/10 16:25						

Field Parameter

Specific Conductance	umhos/cm	1,020	DEP FT1200	0.1	08/31/10 14:30			TDD
Temperature	C	28.1	DEP FT1400	0.1	08/31/10 14:30			TDD
pH	SU	7.6	DEP FT1100	0.1	08/31/10 14:30			TDD
Dissolved Oxygen	mg/l	7.4	DEP FT1500	0.01	08/31/10 14:30			TDD

Inorganics

Total Alkalinity as CaCO3	mg/l	130	SM 2320B	2	09/04/10 08:30			KTC
Ammonia Nitrogen	mg/l N	0.01 U	EPA 350.1	0.01	09/02/10 09:41			SMB
Carbonaceous BOD	mg/l	2 U	SM 5210 B	2	09/06/10 09:31	09/01/10 13:30		MEJ
Chemical Oxygen Demand	mg/l	18 I	EPA 410.4	10	09/03/10 09:00	09/03/10 09:00		ARM
Hydrogen Sulfide (Unionized)	mg/l	0.01 U	SM 4500S F	0.01	09/01/10 14:00			KTC
Sulfide	mg/l	0.1 U	SM 4500S F	0.1	09/01/10 14:00			KTC
Nitrate-Nitrite (as N)	mg/l	40	EPA 353.2	0.01	09/01/10 11:00			SMB
Sulfate	mg/l	52	EPA 300.0	0.2	09/03/10 03:03			MEJ
Total Dissolved Solids	mg/l	660	SM 2540C	10	09/03/10 14:30	09/02/10 09:30		MJV
Total Kjeldahl Nitrogen	mg/l N	2.8	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35		SMB
Total Phosphorus	mg/l P	6.5	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00		SMB
Total Suspended Solids	mg/l	1 U	SM 2540D	1	09/03/10 13:00	09/02/10 15:00		MJV

Microbiology

Fecal Coliform	Ct/100 ml	1 U	SM 9222 D	1	09/01/10 17:00	08/31/10 18:15	MEJ
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Sample Description	DENIT LS4 Duplicate						
Matrix	Wastewater						
SAL Sample Number	104686.27						
Date/Time Collected	08/31/10 09:40						
Date/Time Received	08/31/10 16:25						

Inorganics

Total Alkalinity as CaCO ₃	mg/l	350	SM 2320B	2	09/04/10 08:30		KTC
Carbonaceous BOD	mg/l	2 U	SM 5210 B	2	09/06/10 09:31	09/01/10 13:30	MEJ
Total Dissolved Solids	mg/l	420	SM 2540C	10	09/03/10 14:30	09/02/10 09:30	MJV
Total Suspended Solids	mg/l	1 U	SM 2540D	1	09/03/10 13:00	09/02/10 15:00	MJV

Sample Description	Field Blank						
Matrix	Reagent Water						
SAL Sample Number	104686.28						
Date/Time Collected	08/31/10 08:30						
Date/Time Received	08/31/10 16:25						

Inorganics

Total Alkalinity as CaCO ₃	mg/l	2 U	SM 2320B	2	09/04/10 08:30		KTC
Ammonia Nitrogen	mg/l N	0.01 U	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	2 U	SM 5210 B	2	09/06/10 09:31	09/01/10 13:30	MEJ
Chemical Oxygen Demand	mg/l	10 U	EPA 410.4	10	09/03/10 09:00	09/03/10 09:00	ARM
Nitrate-Nitrite (as N)	mg/l	0.01 U	EPA 353.2	0.01	09/01/10 11:00		SMB
Sulfate	mg/l	0.2 U	EPA 300.0	0.2	09/03/10 03:20		MEJ
Sulfide, Total	mg/l	0.1 U	SM 4500S F	0.1	09/01/10 14:00		KTC
Total Dissolved Solids	mg/l	10 U	SM 2540C	10	09/03/10 14:30	09/02/10 09:30	MJV
Total Kjeldahl Nitrogen	mg/l N	0.05 U	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	0.01 U	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	1 U	SM 2540D	1	09/03/10 13:00	09/02/10 15:00	MJV

Hazen and Sawyer, PC
10002 Princess Palm Avenue
Suite 200
Tampa, FL 33619-

September 22, 2010
Project No: 104686

Laboratory Report

Project Name **PNRS II Wastewater System Analyses**

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
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Sample Description	Equipment Blank
Matrix	Reagent Water
SAL Sample Number	104686.29
Date/Time Collected	08/31/10 08:40
Date/Time Received	08/31/10 16:25

Inorganics

Total Alkalinity as CaCO ₃	mg/l	2 U	SM 2320B	2	09/03/10 13:30		KTC
Ammonia Nitrogen	mg/l N	0.01 U	EPA 350.1	0.01	09/02/10 09:41		SMB
Carbonaceous BOD	mg/l	2 U	SM 5210 B	2	09/06/10 09:31	09/01/10 13:30	MEJ
Chemical Oxygen Demand	mg/l	10 U	EPA 410.4	10	09/03/10 09:00	09/03/10 09:00	ARM
Nitrate-Nitrite (as N)	mg/l	0.01 U	EPA 353.2	0.01	09/01/10 11:00		SMB
Sulfate	mg/l	0.2 U	EPA 300.0	0.2	09/03/10 03:37		MEJ
Sulfide, Total	mg/l	0.1 U	SM 4500S F	0.1	09/01/10 14:00		KTC
Total Dissolved Solids	mg/l	10 U	SM 2540C	10	09/03/10 14:30	09/02/10 09:30	MJV
Total Kjeldahl Nitrogen	mg/l N	0.05 U	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	0.01 U	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB
Total Suspended Solids	mg/l	1 U	SM 2540D	1	09/03/10 13:00	09/02/10 15:00	MJV

Sample Description	UNSAT CL4 Duplicate
Matrix	Wastewater
SAL Sample Number	104686.30
Date/Time Collected	08/31/10 10:55
Date/Time Received	08/31/10 16:25

Inorganics

Ammonia Nitrogen	mg/l N	0.01 U	EPA 350.1	0.01	09/02/10 09:41		SMB
Chemical Oxygen Demand	mg/l	18 I	EPA 410.4	10	09/03/10 09:00	09/03/10 09:00	ARM
Nitrate-Nitrite (as N)	mg/l	43	EPA 353.2	0.01	09/01/10 11:00		SMB
Total Kjeldahl Nitrogen	mg/l N	2.2	EPA 351.2	0.05	09/03/10 08:43	09/01/10 08:35	SMB
Total Phosphorus	mg/l P	7.4	SM 4500P E	0.01	09/04/10 10:19	09/02/10 08:00	SMB

Sample Description	UNSAT EC1 Duplicate
Matrix	Wastewater
SAL Sample Number	104686.31
Date/Time Collected	08/31/10 12:40
Date/Time Received	08/31/10 16:25

Microbiology

Fecal Coliform	Ct/100 ml	1	SM 9222 D	1	09/01/10 17:00	08/31/10 18:15	MEJ
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SOUTHERN ANALYTICAL LABORATORIES, INC.

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



Hazen and Sawyer, PC
10002 Princess Palm Avenue
Suite 200
Tampa, FL 33619-

September 22, 2010
Project No: 104686

Laboratory Report

Project Name PNRS II Wastewater System Analyses

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
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Sample Description	UNSAT CL1 Duplicate
Matrix	Wastewater
SAL Sample Number	104686.32
Date/Time Collected	08/31/10 12:30
Date/Time Received	08/31/10 16:25

Microbiology

Fecal Coliform	Ct/100 ml	10	SM 9222 D	1	09/01/10 17:00	08/31/10 18:15	MEJ
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Hazen and Sawyer, PC
10002 Princess Palm Avenue
Suite 200
Tampa, FL 33619-

September 22, 2010
Project No: 104686

Laboratory Report

Project Name

PNRS II Wastewater System Analyses

Footnotes

- # Questions regarding this report should be directed to Client Services at 813-855-1844.
- * Test results presented in this report meet all the requirements of the NELAC standards. Test results within this report relate only to these samples.
- ** A statement of estimated uncertainty of test results is available upon request.
- *** For methods marked with ***, all QC criteria have been met for this method which is equivalent to a SAL certified method.
- B Results based upon colony counts outside the method indicated ideal range.
- D1 Measurement was made in the field. Data supplied by client.
- I The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
- U Analyte was undetected. Indicated concentration is method detection limit.
- Z Too many colonies were present. The numeric value represents the dilution factor times the maximum reportable number of colonies.



SOUTHERN ANALYTICAL LABORATORIES, INC.

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

SAL Project No. 104186

Client Name		Hazen and Sawyer		Contact / Phone:		Josephin Edeback-Hirst 813-630-4498										
Project Name / Location		PNRS II Wastewater System Analyses		Edeback@hazanandsawyer.com												
Samplers: (Signature)				PNRS II Wastewater System Analyses												
SAL Use Only	Sample No.	Sample Description	Date	Time	Matrix	Composite	Grab	1LP, Cool Alkalinity, CBOD, TSS	1LP, Cool SO4	1LP, Zn Acetate/NaOH	250ml P, H2SO4 TKN, NH3, NOX, COD	125ml P, Sterile Fecal Coliforms	Field pH	Field Temp	Field Cond	Field DO
	01	PNRS II STE-T1	8/31/10	1335	WW		X	1			1	2				
	02	RC1		1300	WW		X	1			1	2				
	03	RC2		1310	WW		X	1			1	2				
	04	RC3		1320	WW		X	1			1	2				
	05	RC4		1330	WW		X	1			1	2				
	06	UNSAT-IS1		1345	WW		X	1	1		1	2				
	07	UNSAT-IS2	9/1/10	1020	WW		X	1	1	1	1	2	6.29	29.0	1543	6.09
	08	UNSAT-EC1	8/31/10	1240	WW		X	1	1	1	1	2				
	09	UNSAT-SA2		1130	WW		X	1			1	2				
	10	UNSAT-EC3		1250	WW		X	1			1	2				
	11	UNSAT-EC4		1120	WW		X	1			1	2				
	12	UNSAT-CL1		1230	WW		X	1	1	1	1	2				
Containers Prepared/Relinquished:		Date/Time: 100	Received:				Date/Time: 600	Seal intact?	Y N	Y N	Y N	Y N	Instructions / Remarks			
Relinquished:		08-28-10	Received:				8/30/10	Samples intact upon arrival?	Y N	Y N	Y N	Y N				
Relinquished:		8/31/10	Received:					Received on ice? Temp	Y N	Y N	Y N	Y N				
Relinquished:		1443	Received:					Proper preservatives indicated?	Y N	Y N	Y N	Y N				
Relinquished:		9/1/10	Received:					Rec'd w/in holding time?	Y N	Y N	Y N	Y N				
Relinquished:			Received:					Volatiles rec'd w/out headspace	Y N	Y N	Y N	Y N				
Relinquished:			Received:					Proper containers used?	Y N	Y N	Y N	Y N				

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

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

SAL Project No. 104686

Client Name		Hazen and Sawyer										Contact / Phone:		Josephin Edeback-Hirst 813-630-4498							
Project Name / Location		PNRS II Wastewater System Analyses										jedeback@hazanandsawyer.com									
Samplers: (Signature)																					
Matrix Codes:																					
DW-Drinking Water WW-Wastewater																					
SW-Surface Water SL-Sludge SO-Soil																					
GW-Groundwater SA-Saline Water O-Other																					
R-Reagent Water																					
SAL Use Only	Sample No.	Sample Description	Date	Time	Matrix	Composite	Grab	1LP, Cool	Alkalinity, CBOD, TSS	1LP, Cool	SO4	1LP, Zn Acetate/NaOH	250ml P, H2SO4	TKN, NH3, NOX, COD	Total P	125ml P, Sterile	Fecal Coliforms	Field pH	Field Temp	Field Cond	Field DO
	25	DENIT-GL1	8/31/10	0930	WW	X	X	1	1	1	1	1	1	1	1	2	2				
	26	DFT		1430	WW	X	X	1	1	1	1	1	1	1	2	2					
	27	Duplicate		0940	WW	X	X	1	1	1	1	1	1	1	2	2					
	28	Field Blank		0830	R WW	X	X	1	1	1	1	1	1	1	1	1					
	29	Equipment Blank		0840	R WW	X	X	1	1	1	1	1	1	1	1	1					
	30	UNSAT CL4 Duplicate		1055	WW	X	X	1	1	1	1	1	1	1	1	1					
	31	UNSAT EC1 Duplicate		1240	WW	X	X	1	1	1	1	1	1	1	1	1					
	32	UNSAT CL1 Duplicate		1230	WW	X	X	1	1	1	1	1	1	1	1	1					
Containers Prepared/Relinquished:		Date/Time: 8-30-10 1600	Received:	Date/Time: 8/30/10 1600																	
Relinquished:		Date/Time: 8/31/10 1625	Received:	Date/Time: 8/31/10 1625																	
Relinquished:		Date/Time:	Received:	Date/Time:																	
Relinquished:		Date/Time:	Received:	Date/Time:																	
Relinquished:		Date/Time:	Received:	Date/Time:																	
Instructions / Remarks		<p>Seal intact? <input checked="" type="checkbox"/> Y <input checked="" type="checkbox"/> N</p> <p>Samples intact upon arrival? <input checked="" type="checkbox"/> Y <input checked="" type="checkbox"/> N</p> <p>Received on ice? Temp _____ <input checked="" type="checkbox"/> Y <input checked="" type="checkbox"/> N</p> <p>Proper preservatives indicated? <input checked="" type="checkbox"/> Y <input checked="" type="checkbox"/> N</p> <p>Rec'd w/ in holding time? <input checked="" type="checkbox"/> Y <input checked="" type="checkbox"/> N</p> <p>Volatiles rec'd w/ out headspace <input checked="" type="checkbox"/> Y <input checked="" type="checkbox"/> N</p> <p>Proper containers used? <input checked="" type="checkbox"/> Y <input checked="" type="checkbox"/> N</p> <p>DUPLICATE 6</p> <p>DENIT-CL4 ALK, DOB, TSS, TDS</p> <p>UNSAT-CL4 NUTRIENTS</p> <p>UNSAT-EC1 Fecal</p> <p>UNSAT-CL1 Fecal</p> <p>DENIT-CL1 Fecal</p> <p>DENIT-SAX1 H2S</p>																			

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

WASTEWATER SAMPLING LOG

Client Name:	Hazan and Sawyer		Location:	STE - T1		Contact:		
Date of Sample:	8/31/10		SAL Project #	104686.01		Phone:		
SAL Audit Performed:	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Auditor Name:			Client Representative on Site?	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Rep. Name:	
		Signature:					Signature:	

SAMPLE DATA							
Sampled By:	SAL Client		Compositor Belongs To:	SAL Client N/A		COMP Bottle Belongs To:	SAL Client N/A
Compositor ID:				Bottle ID:			
Intake Tubing Type:	PP PE NP TL TT SI	Intake Tubing Lot:			Pump Tubing Lot:		

COMPOSITE DATA							
Composite ID Number:							
START	Date:		Time:		Compositor Set-up By:		
STOP	Date:		Time:		Compositor Picked-up By:		
Composite Type:	Time	Flow	Continuous	Collect Sample Every:		Minutes	Gallons
Calibrated Sample Volume:			mLs				
Programmed Number of Samples:			Actual Number of Samples Collected:				
Final Compositor Temperature:			°C	Ice Present in Compositor at Pick-up?		Yes	No

GRAB SAMPLE DATA			
Grab ID Number: 01			
Date Collected:	8/31/10	Time Collected:	1335
Collected By:	TM		

FIELD PARAMETERS				
PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.24	SU		SAL-SAM-63-
Temperature	27.9	°C		SAL-SAM-63-
Temperature Verification with Secondary Source		°C		SAL-SAM-006-
Specific Conductance	1,092	µmhos/cm		SAL-SAM-63-
Dissolved Oxygen	0.00	mg/L		SAL-SAM-55-
Turbidity	—	NTU	TM 8/31/10	SAL-SAM-005-
ORP	-263.9			
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:			Date:	8/31/10
			Date:	
Reviewed By:			Date:	

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

WASTEWATER SAMPLING LOG

Client Name:	Hazan and Sawyer		Location:	RC-1		Contact:		
Date of Sample:	8/31/10		SAL Project #	104686.02		Phone:		
SAL Audit Performed:	Y <input checked="" type="radio"/> N <input type="radio"/>	Auditor Name:				Client Representative on Site?	Y <input checked="" type="radio"/> N <input type="radio"/>	Rep. Name:
		Signature:						Signature:

SAMPLE DATA					
Sampled By:	SAL Client	Compositor Belongs To:	SAL Client N/A	COMP Bottle Belongs To:	SAL Client N/A
Compositor ID:			Bottle ID:		
Intake Tubing Type:	PP PE NP TL TT SI	Intake Tubing Lot:			Pump Tubing Lot:

COMPOSITE DATA					
Composite ID Number:					
START	Date:	Time:	Compositor Set-up By:		
STOP	Date:	Time:	Compositor Picked-up By:		
Composite Type:	Time Flow Continuous	Collect Sample Every:	Minutes	Gallons	
Calibrated Sample Volume:	mLs				
Programmed Number of Samples:	Actual Number of Samples Collected:				
Final Compositor Temperature:	°C	Ice Present in Compositor at Pick-up?	Yes	No	

GRAB SAMPLE DATA			
Grab ID Number: 02			
Date Collected:	8/31/10	Time Collected:	13200
Collected By:	TM		

FIELD PARAMETERS				
PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.25	SU		SAL-SAM-63-
Temperature	30.0	°C		SAL-SAM-63-
Temperature Verification with Secondary Source		°C		SAL-SAM-006-
Specific Conductance	1,011	µmhos/cm		SAL-SAM-63-
Dissolved Oxygen	0.03	mg/L		SAL-SAM-55-
Turbidity		NTU	TD 8/31/10	SAL-SAM-005-
ORP	-128.3			
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:			Date:	8/31/10
			Date:	
Reviewed By:			Date:	

SOUTHERN ANALYTICAL LABORATORIES, INC.

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WASTEWATER SAMPLING LOG

Client Name:	Hazan and Sawyer		Location:	RC-2		Contact:		
Date of Sample:	8/31/10		SAL Project #	104686.03		Phone:		
SAL Audit Performed:	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Auditor Name:			Client Representative on Site?	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Rep. Name:	
		Signature:					Signature:	

SAMPLE DATA							
Sampled By:	SAL Client	Compositor Belongs To:	SAL Client N/A	COMP Bottle Belongs To:	SAL Client N/A		
Compositor ID:			Bottle ID:				
Intake Tubing Type:	PP PE NP TL TT SI	Intake Tubing Lot:			Pump Tubing Lot:		

COMPOSITE DATA							
Composite ID Number:							
START	Date:		Time:		Compositor Set-up By:		
STOP	Date:		Time:		Compositor Picked-up By:		
Composite Type:	Time Flow Continuous	Collect Sample Every:		Minutes	Gallons		
Calibrated Sample Volume:		mLs					
Programmed Number of Samples:		Actual Number of Samples Collected:					
Final Compositor Temperature:		°C	Ice Present in Compositor at Pick-up?	Yes	No		

GRAB SAMPLE DATA			
Grab ID Number: 03			
Date Collected:	8/31/10	Time Collected:	1330
Collected By:	TM		

FIELD PARAMETERS				
PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.33	SU		SAL-SAM-63-
Temperature	30.2	°C		SAL-SAM-63-
Temperature Verification with Secondary Source		°C		SAL-SAM-006-
Specific Conductance	1,031	µmhos/cm		SAL-SAM-63-
Dissolved Oxygen	0.09	mg/L		SAL-SAM-55-
Turbidity	-	NTU	8/31/10	SAL-SAM-005-
ORP	-108.2			
Preservation Checked in Field?	Y <input type="checkbox"/> N <input type="checkbox"/>	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:			Date:	8/31/10
			Date:	
Reviewed By:			Date:	

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

WASTEWATER SAMPLING LOG

Client Name:	Hazan and Sawyer		Location:	RC-3		Contact:		
Date of Sample:	8/31/10		SAL Project #	104686.04		Phone:		
SAL Audit Performed:	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Auditor Name:			Client Representative on Site?	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Rep. Name:	
		Signature:					Signature:	

SAMPLE DATA							
Sampled By:	SAL Client		Compositor Belongs To:	SAL Client N/A		COMP Bottle Belongs To:	SAL Client N/A
Compositor ID:			Bottle ID:				
Intake Tubing Type:	PP PE NP TL TT SI	Intake Tubing Lot:			Pump Tubing Lot:		

COMPOSITE DATA							
Composite ID Number:							
START	Date:		Time:		Compositor Set-up By:		
STOP	Date:		Time:		Compositor Picked-up By:		
Composite Type:	Time	Flow	Continuous	Collect Sample Every:		Minutes	Gallons
Calibrated Sample Volume:			mLs				
Programmed Number of Samples:			Actual Number of Samples Collected:				
Final Compositor Temperature:			°C	Ice Present in Compositor at Pick-up?		Yes	No

GRAB SAMPLE DATA			
Grab ID Number: 04			
Date Collected:	8/31/10	Time Collected:	1330
Collected By:	TM		

FIELD PARAMETERS				
PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.60	SU		SAL-SAM-63-
Temperature	30.2	°C		SAL-SAM-63-
Temperature Verification with Secondary Source		°C		SAL-SAM-006-
Specific Conductance	1,128	µmhos/cm		SAL-SAM-63-
Dissolved Oxygen	0.10	mg/L		SAL-SAM-55-
Turbidity		NTU		SAL-SAM-005-
ORP	89.0			
Preservation Checked in Field?	Y <input type="checkbox"/> N <input type="checkbox"/>	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:			Date:	8/31/10
			Date:	
Reviewed By:			Date:	

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

WASTEWATER SAMPLING LOG

Client Name:	Hazan and Sawyer		Location:	RC-4		Contact:		
Date of Sample:	8/31/10		SAL Project #	104686.05		Phone:		
SAL Audit Performed:	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Auditor Name:			Client Representative on Site?	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Rep. Name:	
		Signature:					Signature:	
SAMPLE DATA								
Sampled By:	SAL Client	Compositor Belongs To:	SAL Client N/A		COMP Bottle Belongs To:	SAL Client N/A		
Compositor ID:			Bottle ID					
Intake Tubing Type:	PP PE NP TL TT SI	Intake Tubing Lot:			Pump Tubing Lot:			
COMPOSITE DATA								
Composite ID Number:								
START	Date:			Time:			Compositor Set-up By:	
STOP	Date:			Time:			Compositor Picked-up By:	
Composite Type:	Time Flow Continuous	Collect Sample Every:			Minutes	Gallons		
Calibrated Sample Volume:			mLs					
Programmed Number of Samples:			Actual Number of Samples Collected:					
Final Compositor Temperature:			°C	Ice Present in Compositor at Pick-up?		Yes No		
GRAB SAMPLE DATA								
Grab ID Number: 05								
Date Collected:	8/31/10		Time Collected:	1330		Collected By:	TM	
FIELD PARAMETERS								
PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID				
pH	7.81	SU		SAL-SAM-63-				
Temperature	30.4	°C		SAL-SAM-63-				
Temperature Verification with Secondary Source		°C		SAL-SAM-006-				
Specific Conductance	1,112	µmhos/cm		SAL-SAM-63-				
Dissolved Oxygen	0.00	mg/L		SAL-SAM-55-				
Turbidity	—	NTU	TM 8/31/10	SAL-SAM-005-				
ORP	73.0							
Preservation Checked in Field?	Y N	Checked By:						
List any Preservatives Added in Field:								
Comments:								
Sampler(s) Signature:				Date	8/31/10			
				Date				
Reviewed By:				Date:				

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

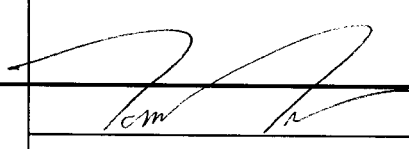
WASTEWATER SAMPLING LOG

Client Name:	Hazan and Sawyer		Location:	IS-1		Contact:		
Date of Sample:	8/31/10		SAL Project #	104686.06		Phone:		
SAL Audit Performed:	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Auditor Name:			Client Representative on Site?	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Rep. Name:	
		Signature:					Signature:	

SAMPLE DATA							
Sampled By:	SAL <input checked="" type="checkbox"/> Client	Compositor Belongs To:	SAL	Client	N/A	COMP Bottle Belongs To:	SAL Client N/A
Compositor ID:			Bottle ID				
Intake Tubing Type:	PP PE NP TL TT SI	Intake Tubing Lot:			Pump Tubing Lot:		

COMPOSITE DATA							
							Composite ID Number:
START	Date:		Time:		Compositor Set-up By:		
STOP	Date:		Time:		Compositor Picked-up By:		
Composite Type:	Time	Flow	Continuous	Collect Sample Every:		Minutes	Gallons
Calibrated Sample Volume:			mLs				
Programmed Number of Samples:			Actual Number of Samples Collected:				
Final Compositor Temperature:			°C	Ice Present in Compositor at Pick-up?		Yes	No

GRAB SAMPLE DATA			
Date Collected:		Grab ID Number: 06	
8/31/10		Time Collected:	1345
		Collected By:	Tim

FIELD PARAMETERS				
PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	6.48	SU		SAL-SAM-63-
Temperature	29.5	°C		SAL-SAM-63-
Temperature Verification with Secondary Source		°C		SAL-SAM-006-
Specific Conductance	1,206	µmhos/cm		SAL-SAM-63-
Dissolved Oxygen	0.08	mg/L		SAL-SAM-55-
Turbidity		NTU	Tim 8/31/10	SAL-SAM-005-
ORP	-42.5			
Preservation Checked in Field?	Y <input type="checkbox"/> N <input type="checkbox"/>	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:			Date:	8/31/10
			Date:	
Reviewed By:			Date:	

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

WASTEWATER SAMPLING LOG

Client Name:		Hazan and Sawyer		Location:		IS-2		Contact:			
Date of Sample:				SAL Project #		104686.07		Phone:			
SAL Audit Performed:		Y <input checked="" type="radio"/> N <input type="radio"/>		Auditor Name:				Client Representative on Site?		Y <input checked="" type="radio"/> N <input type="radio"/>	
		Signature:						Rep. Name:			
								Signature:			
SAMPLE DATA											
Sampled By:		SAL <input checked="" type="radio"/> Client <input type="radio"/>		Compositor Belongs To:		SAL Client N/A		COMP Bottle Belongs To:		SAL Client N/A	
Compositor ID:				Bottle ID:							
Intake Tubing Type:		PP PE NP TL TT SI		Intake Tubing Lot:				Pump Tubing Lot:			
COMPOSITE DATA Composite ID Number:											
START		Date:		Time:				Compositor Set-up By:			
STOP		Date:		Time:				Compositor Picked-up By:			
Composite Type:		Time Flow Continuous		Collect Sample Every:				Minutes Gallons			
Calibrated Sample Volume:				mLs							
Programmed Number of Samples:				Actual Number of Samples Collected:							
Final Compositor Temperature:				°C		Ice Present in Compositor at Pick-up?		Yes No			
GRAB SAMPLE DATA Grab ID Number: 07											
Date Collected:				Time Collected:				Collected By:			
FIELD PARAMETERS											
PARAMETER		READING		UNITS		PERMIT LIMIT		INSTRUMENT ID			
pH				SU				SAL-SAM-63-			
Temperature				°C				SAL-SAM-63-			
Temperature Verification with Secondary Source				°C				SAL-SAM-006-			
Specific Conductance				µmhos/cm				SAL-SAM-63-			
Dissolved Oxygen				mg/L				SAL-SAM-55-			
Turbidity		—		NTU		Tm 8/31/0		SAL-SAM-005-			
ORP											
Preservation Checked in Field?		Y N		Checked By:							
List any Preservatives Added in Field:											
Comments:											
Sampler(s) Signature:				Date:							
				Date:							
Reviewed By:				Date:							

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

WASTEWATER SAMPLING LOG

Client Name:	Hazan and Sawyer		Location:	EC-1		Contact:		
Date of Sample:	8/31/10		SAL Project #	104686.08		Phone:		
SAL Audit Performed:	Y (N)	Auditor Name:			Client Representative on Site?	Y (N)	Rep. Name:	
		Signature:					Signature:	

SAMPLE DATA							
Sampled By:	SAL Client	Compositor Belongs To:	SAL Client	N/A	COMP Bottle Belongs To:	SAL Client	N/A
Compositor ID:			Bottle ID:				
Intake Tubing Type:	PP PE NP TL TT SI	Intake Tubing Lot:			Pump Tubing Lot:		

COMPOSITE DATA							
Composite ID Number:							
START	Date:		Time:		Compositor Set-up By:		
STOP	Date:		Time:		Compositor Picked-up By:		
Composite Type:	Time	Flow	Continuous	Collect Sample Every:		Minutes	Gallons
Calibrated Sample Volume:		mLs					
Programmed Number of Samples:		Actual Number of Samples Collected:					
Final Compositor Temperature:		°C	Ice Present in Compositor at Pick-up?		Yes	No	

GRAB SAMPLE DATA				Grab ID Number:	
Date Collected:	8/31/10	Time Collected:	1240	Collected By:	Tm

FIELD PARAMETERS				
PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.02	SU		SAL-SAM-63-
Temperature	28.6	°C		SAL-SAM-63-
Temperature Verification with Secondary Source		°C		SAL-SAM-006-
Specific Conductance	1,055	µmhos/cm		SAL-SAM-63-
Dissolved Oxygen	6.83	mg/L		SAL-SAM-55-
Turbidity	—	NTU	Tm 8/31/10	SAL-SAM-005-
ORP	137.5			
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:	[Signature]		Date:	8/31/10
			Date:	
Reviewed By:			Date:	

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

WASTEWATER SAMPLING LOG

Client Name:		Hazen and Sawyer		Location:		SA-2		Contact:			
Date of Sample:		8/31/10		SAL Project #		104686.09		Phone:			
SAL Audit Performed:		Y <input checked="" type="checkbox"/> N <input type="checkbox"/>		Auditor Name:				Client Representative on Site?		Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	
		Signature:						Rep. Name:			
								Signature:			

SAMPLE DATA											
Sampled By:		SAL Client		Compositor Belongs To:		SAL Client N/A		COMP Bottle Belongs To:		SAL Client N/A	
Compositor ID:				Bottle ID							
Intake Tubing Type:		PP PE NP TL TT SI		Intake Tubing Lot:				Pump Tubing Lot:			

COMPOSITE DATA											
Composite ID Number:											
START	Date:		Time:		Compositor Set-up By:						
STOP	Date:		Time:		Compositor Picked-up By:						
Composite Type:		Time Flow Continuous		Collect Sample Every:		Minutes Gallons					
Calibrated Sample Volume:				mLs							
Programmed Number of Samples:				Actual Number of Samples Collected:							
Final Compositor Temperature:				°C		Ice Present in Compositor at Pick-up?		Yes No			

GRAB SAMPLE DATA											
Grab ID Number: 09											
Date Collected:		8/31/10		Time Collected:		1130		Collected By:			

FIELD PARAMETERS												
PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID								
pH	6.87	SU		SAL-SAM-63-								
Temperature	28.2	°C		SAL-SAM-63-								
Temperature Verification with Secondary Source		°C		SAL-SAM-006-								
Specific Conductance	953	µmhos/cm		SAL-SAM-63-								
Dissolved Oxygen	6.32	mg/L		SAL-SAM-55-								
Turbidity		NTU		SAL-SAM-005-								
ORP	89.2											
Preservation Checked in Field?	Y N	Checked By:										
List any Preservatives Added in Field:												
Comments:												
Sampler(s) Signature:				Date	8/31/10							
				Date								
Reviewed By:				Date:								

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

WASTEWATER SAMPLING LOG

Client Name:	Hazan and Sawyer		Location:	EC-3		Contact:		
Date of Sample:	8/31/10		SAL Project #	104686.10		Phone:		
SAL Audit Performed:	Y <input checked="" type="checkbox"/> N	Auditor Name:			Client Representative on Site?	Y <input checked="" type="checkbox"/> N	Rep. Name:	
		Signature:					Signature:	

SAMPLE DATA							
Sampled By:	SAL Client	Compositor Belongs To:	SAL Client	N/A	COMP Bottle Belongs To:	SAL Client	N/A
Compositor ID:			Bottle ID				
Intake Tubing Type:	PP PE NP TL TT SI	Intake Tubing Lot:			Pump Tubing Lot:		

COMPOSITE DATA							
Composite ID Number:							
START	Date:			Time:			Compositor Set-up By:
STOP	Date:			Time:			Compositor Picked-up By:
Composite Type:	Time	Flow	Continuous	Collect Sample Every:	Minutes Gallons		
Calibrated Sample Volume:			mLs				
Programmed Number of Samples:			Actual Number of Samples Collected:				
Final Compositor Temperature:			°C	Ice Present in Compositor at Pick-up?	Yes No		

GRAB SAMPLE DATA			
Grab ID Number: 10			
Date Collected:	Time Collected:	Collected By:	
8/31/10	1250	8/31/10	

FIELD PARAMETERS				
PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.00	SU		SAL-SAM-63-
Temperature	29.2	°C		SAL-SAM-63-
Temperature Verification with Secondary Source		°C		SAL-SAM-006-
Specific Conductance	1,133	µmhos/cm		SAL-SAM-63-
Dissolved Oxygen	6.67	mg/L		SAL-SAM-55-
Turbidity	—	NTU	TP	SAL-SAM-005-
ORP	117.0			
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:			Date:	8/31/10
			Date:	
Reviewed By:			Date:	

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

WASTEWATER SAMPLING LOG

Client Name:	Hazan and Sawyer		Location:	EC-4		Contact:		
Date of Sample:	8/31/10		SAL Project #	104686.11		Phone:		
SAL Audit Performed:	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Auditor Name:			Client Representative on Site?	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Rep. Name:	
		Signature:					Signature:	
SAMPLE DATA								
Sampled By:	SAL <input checked="" type="checkbox"/>	Client	Compositor Belongs To:	SAL	Client	N/A	COMP Bottle Belongs To:	SAL Client N/A
Compositor ID:			Bottle ID:					
Intake Tubing Type:	PP	PE	NP	TL	TT	SI	Intake Tubing Lot:	
							Pump Tubing Lot:	
COMPOSITE DATA								
Composite ID Number:								
START	Date:		Time:		Compositor Set-up By:			
STOP	Date:		Time:		Compositor Picked-up By:			
Composite Type:	Time	Flow	Continuous	Collect Sample Every:		Minutes	Gallons	
Calibrated Sample Volume:		mLs						
Programmed Number of Samples:		Actual Number of Samples Collected:						
Final Compositor Temperature:		°C	Ice Present in Compositor at Pick-up?		Yes	No		
GRAB SAMPLE DATA								
Grab ID Number: 11								
Date Collected:	8/31/10	Time Collected:	1120	Collected By:				
FIELD PARAMETERS								
PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID				
pH	6.95	SU		SAL-SAM-63-				
Temperature	28.5	°C		SAL-SAM-63-				
Temperature Verification with Secondary Source		°C		SAL-SAM-006-				
Specific Conductance	1,000	µmhos/cm		SAL-SAM-63-				
Dissolved Oxygen	6.94	mg/L		SAL-SAM-55-				
Turbidity	—	NTU	tm 8/31/10	SAL-SAM-005-				
ORP	78.8							
Preservation Checked in Field?	Y	N	Checked By:					
List any Preservatives Added in Field:								
Comments:								
Sampler(s) Signature:				Date:	8/31/10			
				Date:				
Reviewed By:				Date:				

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

WASTEWATER SAMPLING LOG

Client Name:		Hazan and Sawyer		Location:		CL-1		Contact:			
Date of Sample:		8/31/00		SAL Project #		104686.12		Phone:			
SAL Audit Performed:		Y <input checked="" type="checkbox"/> N <input type="checkbox"/>		Auditor Name:				Client Representative on Site?		Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	
		Signature:						Rep. Name:			
								Signature:			

SAMPLE DATA											
Sampled By:		SAL Client		Compositor Belongs To:		SAL Client N/A		COMP Bottle Belongs To:		SAL Client N/A	
Compositor ID:				Bottle ID:							
Intake Tubing Type:		PP PE NP TL TT SI		Intake Tubing Lot:				Pump Tubing Lot:			

COMPOSITE DATA											
											Composite ID Number:
START	Date:		Time:		Compositor Set-up By:						
STOP	Date:		Time:		Compositor Picked-up By:						
Composite Type:		Time Flow Continuous		Collect Sample Every:				Minutes		Gallons	
Calibrated Sample Volume:				mLs							
Programmed Number of Samples:				Actual Number of Samples Collected:							
Final Compositor Temperature:		2		°C		Ice Present in Compositor at Pick-up?		Yes		No	

GRAB SAMPLE DATA											
											Grab ID Number:
Date Collected:		8/31/00		Time Collected:		1230		Collected By:		TM	

FIELD PARAMETERS												
PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID								
pH	7.44	SU		SAL-SAM-63-								
Temperature	29.5	°C		SAL-SAM-63-								
Temperature Verification with Secondary Source		°C		SAL-SAM-006-								
Specific Conductance	1,271	µmhos/cm		SAL-SAM-63-								
Dissolved Oxygen	5.54	mg/L		SAL-SAM-55-								
Turbidity		NTU	Too 8/31/00	SAL-SAM-005-								
ORP	116.2											
Preservation Checked in Field?	Y	N	Checked By:									
List any Preservatives Added in Field:												
Comments:												
Sampler(s) Signature:						Date:	8/31/00					
						Date:						
Reviewed By:						Date:						

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

WASTEWATER SAMPLING LOG

Client Name:		Hazen and Sawyer		Location:		CL-2		Contact:			
Date of Sample:		8/31/10		SAL Project #		104686.13		Phone:			
SAL Audit Performed:		Y <input checked="" type="checkbox"/> N <input type="checkbox"/>		Auditor Name:				Client Representative on Site?		Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	
		Signature:						Rep. Name:			
								Signature:			

SAMPLE DATA											
Sampled By:		SAL Client		Compositor Belongs To:		SAL Client N/A		COMP Bottle Belongs To:		SAL Client N/A	
Compositor ID:				Bottle ID:							
Intake Tubing Type:		PP PE NP TL TT SI		Intake Tubing Lot:				Pump Tubing Lot:			

COMPOSITE DATA											
Composite ID Number:											
START		Date:				Time:				Compositor Set-up By:	
STOP		Date:				Time:				Compositor Picked-up By:	
Composite Type:		Time		Flow		Continuous		Collect Sample Every:		Minutes Gallons	
Calibrated Sample Volume:				mLs							
Programmed Number of Samples:				Actual Number of Samples Collected:							
Final Compositor Temperature:				°C		Ice Present in Compositor at Pick-up?				Yes No	

GRAB SAMPLE DATA											
Grab ID Number: 13											
Date Collected:		8/31/10		Time Collected:		1105		Collected By:		TM	

FIELD PARAMETERS											
PARAMETER		READING		UNITS		PERMIT LIMIT		INSTRUMENT ID			
pH		7.39		SU				SAL-SAM-63-			
Temperature		26.8		°C				SAL-SAM-63-			
Temperature Verification with Secondary Source				°C				SAL-SAM-006-			
Specific Conductance		1,050		µmhos/cm				SAL-SAM-63-			
Dissolved Oxygen		6.37		mg/L				SAL-SAM-55-			
Turbidity				NTU				SAL-SAM-005-			
ORP		30.2									
Preservation Checked in Field?		Y N		Checked By:							
List any Preservatives Added in Field:											
Comments:											
Sampler(s) Signature:						Date:		8/31/10			
						Date:					
Reviewed By:						Date:					

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

WASTEWATER SAMPLING LOG

Client Name:	Hazan and Sawyer		Location:	CC-3		Contact:		
Date of Sample:	8/31/10		SAL Project #	104686.14		Phone:		
SAL Audit Performed:	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Auditor Name:			Client Representative on Site?	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Rep. Name:	
		Signature:					Signature:	

SAMPLE DATA							
Sampled By:	SAL <input checked="" type="checkbox"/> Client <input type="checkbox"/>	Compositor Belongs To:	SAL <input type="checkbox"/> Client <input type="checkbox"/> N/A <input type="checkbox"/>	COMP Bottle Belongs To:	SAL <input type="checkbox"/> Client <input type="checkbox"/> N/A <input type="checkbox"/>		
Compositor ID:			Bottle ID:				
Intake Tubing Type:	PP PE NP TL TT SI	Intake Tubing Lot:			Pump Tubing Lot:		

COMPOSITE DATA							
Composite ID Number:							
START	Date:		Time:		Compositor Set-up By:		
STOP	Date:		Time:		Compositor Picked-up By:		
Composite Type:	Time	Flow	Continuous	Collect Sample Every:		Minutes	Gallons
Calibrated Sample Volume:			mLs				
Programmed Number of Samples:			Actual Number of Samples Collected:				
Final Compositor Temperature:			°C	Ice Present in Compositor at Pick-up?	Yes	No	

GRAB SAMPLE DATA			
Grab ID Number: 14			
Date Collected:	8/31/10	Time Collected:	1200
Collected By:	TM		

FIELD PARAMETERS				
PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.82	SU		SAL-SAM-63-
Temperature	28.7	°C		SAL-SAM-63-
Temperature Verification with Secondary Source		°C		SAL-SAM-006-
Specific Conductance	1,388	µmhos/cm		SAL-SAM-63-
Dissolved Oxygen	7.06	mg/L		SAL-SAM-55-
Turbidity	TM 8/31/10	NTU	TM 8/31/10	SAL-SAM-005-
ORP	83.8			
Preservation Checked in Field?	Y <input type="checkbox"/> N <input type="checkbox"/>	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:			Date:	8/31/10
			Date:	
Reviewed By:			Date:	

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

WASTEWATER SAMPLING LOG

Client Name:		Hazan and Sawyer		Location:		CL-4		Contact:			
Date of Sample:		8/31/10		SAL Project #		104686.15		Phone:			
SAL Audit Performed:		Y <input checked="" type="checkbox"/> N		Auditor Name:				Client Representative on Site?		Y <input checked="" type="checkbox"/> N	
		Signature:						Rep. Name:			
								Signature:			

SAMPLE DATA											
Sampled By:		SAL Client		Compositor Belongs To:		SAL Client N/A		COMP Bottle Belongs To:		SAL Client N/A	
Compositor ID:				Bottle ID:							
Intake Tubing Type:				PP PE NP TL TT SI				Intake Tubing Lot:		Pump Tubing Lot:	

COMPOSITE DATA									
Composite ID Number:									
START		Date:		Time:		Compositor Set-up By:			
STOP		Date:		Time:		Compositor Picked-up By:			
Composite Type:		Time Flow Continuous		Collect Sample Every:		Minutes Gallons			
Calibrated Sample Volume:		mLs							
Programmed Number of Samples:		Actual Number of Samples Collected:							
Final Compositor Temperature:		°C		Ice Present in Compositor at Pick-up?		Yes No			

GRAB SAMPLE DATA											
Grab ID Number: 15											
Date Collected:		8/31/10		Time Collected:		1055		Collected By:		TM	

FIELD PARAMETERS									
PARAMETER		READING		UNITS		PERMIT LIMIT		INSTRUMENT ID	
pH		7.79		SU				SAL-SAM-63-	
Temperature		29.3		°C				SAL-SAM-63-	
Temperature Verification with Secondary Source				°C				SAL-SAM-006-	
Specific Conductance		1,174		µmhos/cm				SAL-SAM-63-	
Dissolved Oxygen		7.806		mg/L				SAL-SAM-55-	
Turbidity				NTU		TM 8/31/10		SAL-SAM-005-	
ORP		35.5							
Preservation Checked in Field?		Y N		Checked By:					
List any Preservatives Added in Field:									
Comments:									
Sampler(s) Signature:				Date:		8/31/10			
				Date:					
Reviewed By:				Date:					

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

WASTEWATER SAMPLING LOG

Client Name:	Hazan and Sawyer		Location:	PS-1		Contact:		
Date of Sample:	8/31/10		SAL Project #	104686.16		Phone:		
SAL Audit Performed:	Y <input checked="" type="radio"/> N <input type="radio"/>	Auditor Name:			Client Representative on Site?	Y <input checked="" type="radio"/> N <input type="radio"/>	Rep. Name:	
		Signature:					Signature:	

SAMPLE DATA							
Sampled By:	SAL <input checked="" type="radio"/> Client	Compositor Belongs To:	SAL	Client	N/A	COMP Bottle Belongs To:	SAL Client N/A
Compositor ID:			Bottle ID:				
Intake Tubing Type:	PP PE NP TL TT SI	Intake Tubing Lot:			Pump Tubing Lot:		

COMPOSITE DATA							
Composite ID Number:							
START	Date:		Time:		Compositor Set-up By:		
STOP	Date:		Time:		Compositor Picked-up By:		
Composite Type:	Time	Flow	Continuous	Collect Sample Every:		Minutes	Gallons
Calibrated Sample Volume:			mLs				
Programmed Number of Samples:			Actual Number of Samples Collected:				
Final Compositor Temperature:			°C	Ice Present in Compositor at Pick-up?		Yes	No

GRAB SAMPLE DATA			
Grab ID Number: 16			
Date Collected:	8/31/10	Time Collected:	1140
Collected By:	TM		

FIELD PARAMETERS				
PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.62	SU		SAL-SAM-63-
Temperature	28.6	°C		SAL-SAM-63-
Temperature Verification with Secondary Source		°C		SAL-SAM-006-
Specific Conductance	1,010	µmhos/cm		SAL-SAM-63-
Dissolved Oxygen	2.50	mg/L		SAL-SAM-55-
Turbidity		NTU	TD 8/31/10	SAL-SAM-005-
ORP	60.0	mV		
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:	[Signature]		Date:	8/31/10
			Date:	
Reviewed By:			Date:	

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

WASTEWATER SAMPLING LOG

Client Name:	Hazan and Sawyer		Location:	SV-1		Contact:		
Date of Sample:	8/31/10		SAL Project #	104686.17		Phone:		
SAL Audit Performed:	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Auditor Name:			Client Representative on Site?	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Rep. Name:	
		Signature:					Signature:	
SAMPLE DATA								
Sampled By:	SAL Client	Compositor Belongs To:	SAL Client N/A		COMP Bottle Belongs To:	SAL Client N/A		
Compositor ID:			Bottle ID:					
Intake Tubing Type:	PP PE NP TL TT SI	Intake Tubing Lot:			Pump Tubing Lot:			
COMPOSITE DATA Composite ID Number:								
START	Date:		Time:		Compositor Set-up By:			
STOP	Date:		Time:		Compositor Picked-up By:			
Composite Type:	Time Flow Continuous	Collect Sample Every:		Minutes	Gallons			
Calibrated Sample Volume:		mLs						
Programmed Number of Samples:		Actual Number of Samples Collected:						
Final Compositor Temperature:		°C	Ice Present in Compositor at Pick-up?		Yes	No		
GRAB SAMPLE DATA Grab ID Number: 17								
Date Collected:	8/31/10	Time Collected:	0855	Collected By:	TM			
FIELD PARAMETERS								
PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID				
pH	7.02	SU		SAL-SAM-63-				
Temperature	25.1	°C		SAL-SAM-63-				
Temperature Verification with Secondary Source		°C		SAL-SAM-006-				
Specific Conductance	1473	µmhos/cm		SAL-SAM-63-				
Dissolved Oxygen	0.11	mg/L		SAL-SAM-55-				
Turbidity		NTU	TM 8/31/10	SAL-SAM-005-				
ORP	-317.2	mV						
Preservation Checked in Field?	Y <input type="checkbox"/> N <input type="checkbox"/>	Checked By:						
List any Preservatives Added in Field:								
Comments:								
Sampler(s) Signature:			Date:	8/31/10				
			Date:					
Reviewed By:			Date:					

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

WASTEWATER SAMPLING LOG

Client Name:	Hazan and Sawyer		Location:	SU-2		Contact:		
Date of Sample:	8/31/10		SAL Project #	104686.18		Phone:		
SAL Audit Performed:	Y <input checked="" type="radio"/> N <input type="radio"/>	Auditor Name:			Client Representative on Site?	Y <input checked="" type="radio"/> N <input type="radio"/>	Rep. Name:	
		Signature:					Signature:	

SAMPLE DATA							
Sampled By:	SAL Client		Compositor Belongs To:	SAL Client N/A		COMP Bottle Belongs To:	SAL Client N/A
Compositor ID:			Bottle ID:				
Intake Tubing Type:	PP PE NP TL TT SI	Intake Tubing Lot:			Pump Tubing Lot:		

COMPOSITE DATA							
Composite ID Number:							
START	Date:		Time:		Compositor Set-up By:		
STOP	Date:		Time:		Compositor Picked-up By:		
Composite Type:	Time	Flow	Continuous	Collect Sample Every:		Minutes	Gallons
Calibrated Sample Volume:			mLs				
Programmed Number of Samples:			Actual Number of Samples Collected:				
Final Compositor Temperature:			°C	Ice Present in Compositor at Pick-up?		Yes	No

GRAB SAMPLE DATA			
Grab ID Number: 18			
Date Collected:	8/31/10	Time Collected:	0905
Collected By:	Tm		

FIELD PARAMETERS				
PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.00	SU		SAL-SAM-63-
Temperature	24.8	°C		SAL-SAM-63-
Temperature Verification with Secondary Source		°C		SAL-SAM-006-
Specific Conductance	1,402	µmhos/cm		SAL-SAM-63-
Dissolved Oxygen	0.50	mg/L		SAL-SAM-55-
Turbidity	—	NTU	Tm 8/31/10	SAL-SAM-005-
ORP	-279.0	mV		
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:	[Signature]		Date:	8/31/10
			Date:	
Reviewed By:			Date:	

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

WASTEWATER SAMPLING LOG

Client Name:	Hazan and Sawyer		Location:	SU-3		Contact:		
Date of Sample:	8/31/10		SAL Project #	104686.19		Phone:		
SAL Audit Performed:	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Auditor Name:			Client Representative on Site?	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Rep. Name:	
		Signature:					Signature:	
SAMPLE DATA								
Sampled By:	SAL Client		Compositor Belongs To:	SAL Client N/A		COMP Bottle Belongs To:	SAL Client N/A	
Compositor ID:			Bottle ID:					
Intake Tubing Type:	PP PE NP TL TT SI		Intake Tubing Lot:			Pump Tubing Lot:		
COMPOSITE DATA Composite ID Number:								
START	Date:		Time:		Compositor Set-up By:			
STOP	Date:		Time:		Compositor Picked-up By:			
Composite Type:	Time Flow Continuous		Collect Sample Every:			Minutes	Gallons	
Calibrated Sample Volume:			mLs					
Programmed Number of Samples:			Actual Number of Samples Collected:					
Final Compositor Temperature:			°C	Ice Present in Compositor at Pick-up?		Yes No		
GRAB SAMPLE DATA Grab ID Number: 19								
Date Collected:	8/31/10		Time Collected:	1000		Collected By:	TM	
FIELD PARAMETERS								
PARAMETER	READING		UNITS		PERMIT LIMIT		INSTRUMENT ID	
pH	6.65		SU				SAL-SAM-63-	
Temperature	28.4		°C				SAL-SAM-63-	
Temperature Verification with Secondary Source			°C				SAL-SAM-006-	
Specific Conductance	1,655		µmhos/cm				SAL-SAM-63-	
Dissolved Oxygen	6.18		0.05 mg/L				SAL-SAM-55-	
Turbidity			NTU		TM 8/31/10		SAL-SAM-005-	
ORP	-279.6							
Preservation Checked in Field?	Y N		Checked By:					
List any Preservatives Added in Field:								
Comments:								
Sampler(s) Signature:					Date:	8/31/10		
					Date:			
Reviewed By:					Date:			

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

WASTEWATER SAMPLING LOG

Client Name:	Hazan and Sawyer		Location:	50-4		Contact:		
Date of Sample:	8/31/10		SAL Project #	104686.20		Phone:		
SAL Audit Performed:	Y <input checked="" type="checkbox"/> N	Auditor Name:			Client Representative on Site?	Y <input checked="" type="checkbox"/> N	Rep. Name:	
		Signature:					Signature:	

SAMPLE DATA							
Sampled By:	SAL Client	Compositor Belongs To:	SAL Client	N/A	COMP Bottle Belongs To:	SAL Client	N/A
Compositor ID:			Bottle ID:				
Intake Tubing Type:	PP PE NP TL TT SI	Intake Tubing Lot:			Pump Tubing Lot:		

COMPOSITE DATA							
Composite ID Number:							
START	Date:		Time:		Compositor Set-up By:		
STOP	Date:		Time:		Compositor Picked-up By:		
Composite Type:	Time	Flow	Continuous	Collect Sample Every:		Minutes	Gallons
Calibrated Sample Volume:			mLs				
Programmed Number of Samples:			Actual Number of Samples Collected:				
Final Compositor Temperature:			°C	Ice Present in Compositor at Pick-up?		Yes	No

GRAB SAMPLE DATA			
Grab ID Number: 20			
Date Collected:	8/31/10	Time Collected:	1025
		Collected By:	TM

FIELD PARAMETERS				
PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	6.63	SU		SAL-SAM-63-
Temperature	28.1	°C		SAL-SAM-63-
Temperature Verification with Secondary Source		°C		SAL-SAM-006-
Specific Conductance	1,395	µmhos/cm		SAL-SAM-63-
Dissolved Oxygen	6.18	mg/L		SAL-SAM-55-
Turbidity		NTU	TM 8/31/10	SAL-SAM-005-
ORP	-106.6			
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:			Date:	8/31/10
			Date:	
Reviewed By:			Date:	

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

WASTEWATER SAMPLING LOG

Client Name:	Hazan and Sawyer		Location:	8/31/10 80-5LS-1		Contact:		
Date of Sample:	8/31/10		SAL Project #	104686.21		Phone:		
SAL Audit Performed:	Y <input checked="" type="radio"/> N <input type="radio"/>	Auditor Name:			Client Representative on Site?	Y <input checked="" type="radio"/> N <input type="radio"/>	Rep. Name:	
		Signature:					Signature:	

SAMPLE DATA							
Sampled By:	SAL Client	Compositor Belongs To:	SAL Client N/A	COMP Bottle Belongs To:	SAL Client N/A		
Compositor ID:			Bottle ID				
Intake Tubing Type:	PP PE NP TL TT SI	Intake Tubing Lot:		Pump Tubing Lot:			

COMPOSITE DATA							
Composite ID Number:							
START	Date:		Time:		Compositor Set-up By:		
STOP	Date:		Time:		Compositor Picked-up By:		
Composite Type:	Time	Flow	Continuous	Collect Sample Every:		Minutes	Gallons
Calibrated Sample Volume:		mLs					
Programmed Number of Samples:		Actual Number of Samples Collected:					
Final Compositor Temperature:		°C	Ice Present in Compositor at Pick-up?		Yes	No	

GRAB SAMPLE DATA			
Grab ID Number: 21			
Date Collected:	8/31/10	Time Collected:	1920
Collected By:	TM		

FIELD PARAMETERS				
PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.69	SU		SAL-SAM-63-
Temperature	25.2	°C		SAL-SAM-63-
Temperature Verification with Secondary Source		°C		SAL-SAM-006-
Specific Conductance	962	µmhos/cm		SAL-SAM-63-
Dissolved Oxygen	2.24	mg/L		SAL-SAM-55-
Turbidity		NTU	TM 8/31/10	SAL-SAM-005-
ORP	-199.7	mV		
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:			Date:	8/31/10
			Date:	
Reviewed By:			Date:	

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

WASTEWATER SAMPLING LOG

Client Name:	Hazan and Sawyer		Location:	LS-2		Contact:		
Date of Sample:	8/31/10		SAL Project #	104686.22		Phone:		
SAL Audit Performed:	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Auditor Name:			Client Representative on Site?	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Rep. Name:	
		Signature:					Signature:	

SAMPLE DATA							
Sampled By:	SAL <input checked="" type="checkbox"/> Client <input type="checkbox"/>	Compositor Belongs To:	SAL <input type="checkbox"/> Client <input type="checkbox"/> N/A <input type="checkbox"/>	COMP Bottle Belongs To:	SAL <input type="checkbox"/> Client <input type="checkbox"/> N/A <input type="checkbox"/>		
Compositor ID:			Bottle ID:				
Intake Tubing Type:	PP PE NP TL TT SI	Intake Tubing Lot:			Pump Tubing Lot:		

COMPOSITE DATA							
							Composite ID Number:
START	Date:		Time:		Compositor Set-up By:		
STOP	Date:		Time:		Compositor Picked-up By:		
Composite Type:	Time	Flow	Continuous	Collect Sample Every:		Minutes	Gallons
Calibrated Sample Volume:			mLs				
Programmed Number of Samples:			Actual Number of Samples Collected:				
Final Compositor Temperature:			°C	Ice Present in Compositor at Pick-up?		Yes	No

GRAB SAMPLE DATA				Grab ID Number:	
Date Collected:	8/31/10	Time Collected:	0950	Collected By:	TM

FIELD PARAMETERS				
PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.84	SU		SAL-SAM-63-
Temperature	27.3	°C		SAL-SAM-63-
Temperature Verification with Secondary Source		°C		SAL-SAM-006-
Specific Conductance	1,448	µmhos/cm		SAL-SAM-63-
Dissolved Oxygen	4.10	mg/L		SAL-SAM-55-
Turbidity		NTU	TM 8/31/10	SAL-SAM-005-
ORP	-11.5	mV		
Preservation Checked in Field?	Y <input type="checkbox"/> N <input type="checkbox"/>	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:			Date:	8/31/10
			Date:	
Reviewed By:			Date:	

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

WASTEWATER SAMPLING LOG

Client Name:		Hazan and Sawyer		Location:		CS-3		Contact:			
Date of Sample:		8/31/10		SAL Project #		104686.23		Phone:			
SAL Audit Performed:		Y <input checked="" type="checkbox"/> N		Auditor Name:				Client Representative on Site?		Y <input checked="" type="checkbox"/> N	
		Signature:						Rep. Name:			
								Signature:			

SAMPLE DATA											
Sampled By:		SAL Client		Compositor Belongs To:		SAL Client N/A		COMP Bottle Belongs To:		SAL Client N/A	
Compositor ID:				Bottle ID:							
Intake Tubing Type:		PP PE NP TL TT SI		Intake Tubing Lot:				Pump Tubing Lot:			

COMPOSITE DATA											
Composite ID Number:											
START	Date:		Time:		Compositor Set-up By:						
STOP	Date:		Time:		Compositor Picked-up By:						
Composite Type:		Time Flow Continuous		Collect Sample Every:				Minutes		Gallons	
Calibrated Sample Volume:				mLs							
Programmed Number of Samples:		1		Actual Number of Samples Collected:		1					
Final Compositor Temperature:		✓		°C				Ice Present in Compositor at Pick-up?		Yes No	

GRAB SAMPLE DATA											
Grab ID Number: 23											
Date Collected:		8/31/10		Time Collected:		1015		Collected By:		TM	

FIELD PARAMETERS											
PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID							
pH	7.25	SU		SAL-SAM-63-							
Temperature	27.8	°C		SAL-SAM-63-							
Temperature Verification with Secondary Source		°C		SAL-SAM-006-							
Specific Conductance	1,114	µmhos/cm		SAL-SAM-63-							
Dissolved Oxygen	1.32	mg/L		SAL-SAM-55-							
Turbidity		NTU		SAL-SAM-005-							
ORP	-21.0	mV									
Preservation Checked in Field?		Y N		Checked By:							
List any Preservatives Added in Field:											
Comments:											
Sampler(s) Signature:				Date:		8/31/10					
				Date:							
Reviewed By:				Date:							

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

WASTEWATER SAMPLING LOG

Client Name:	Hazan and Sawyer		Location:	LS-4		Contact:		
Date of Sample:	8/31/10		SAL Project #	104686,24		Phone:		
SAL Audit Performed:	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Auditor Name:			Client Representative on Site?	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Rep. Name:	
		Signature:					Signature:	

SAMPLE DATA							
Sampled By:	SAL Client	Compositor Belongs To:	SAL Client	N/A	COMP Bottle Belongs To:	SAL Client	N/A
Compositor ID:			Bottle ID				
Intake Tubing Type:	PP PE NP TL TT SI	Intake Tubing Lot:			Pump Tubing Lot:		

COMPOSITE DATA							
Composite ID Number:							
START	Date:		Time:		Compositor Set-up By:		
STOP	Date:		Time:		Compositor Picked-up By:		
Composite Type:	Time	Flow	Continuous	Collect Sample Every:		Minutes	Gallons
Calibrated Sample Volume:			mLs				
Programmed Number of Samples:			Actual Number of Samples Collected:				
Final Compositor Temperature:			°C	Ice Present in Compositor at Pick-up?		Yes	No

GRAB SAMPLE DATA			
Grab ID Number: 24			
Date Collected:	8/31/10	Time Collected:	0940
Collected By:	TS		

FIELD PARAMETERS				
PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.59	SU		SAL-SAM-63-
Temperature	27.1	°C		SAL-SAM-63-
Temperature Verification with Secondary Source		°C		SAL-SAM-006-
Specific Conductance	1,120	µmhos/cm		SAL-SAM-63-
Dissolved Oxygen	0.42	mg/L		SAL-SAM-55-
Turbidity		NTU	TS 8/31/10	SAL-SAM-005-
ORP	-43.7			
Preservation Checked in Field?	Y <input type="checkbox"/> N <input type="checkbox"/>	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:			Date:	8/31/10
			Date:	
Reviewed By:			Date:	

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

WASTEWATER SAMPLING LOG

Client Name:		Hazan and Sawyer		Location:		GL-1		Contact:			
Date of Sample:		8/31/10		SAL Project #		104686.25		Phone:			
SAL Audit Performed:		Y <input checked="" type="checkbox"/> N		Auditor Name:				Client Representative on Site?		Y <input checked="" type="checkbox"/> N	
		Signature:						Rep. Name:			
								Signature:			

SAMPLE DATA											
Sampled By:		SAL Client		Compositor Belongs To:		SAL Client N/A		COMP Bottle Belongs To:		SAL Client N/A	
Compositor ID:		-		Bottle ID:		-					
Intake Tubing Type:		PP PE NP TL TT SI		Intake Tubing Lot:		-		Pump Tubing Lot:		-	

COMPOSITE DATA											
Composite ID Number:											
START	Date:	-		Time:	-		Compositor Set-up By:		-		
STOP	Date:	-		Time:	-		Compositor Picked-up By:		-		
Composite Type:		Time Flow Continuous		Collect Sample Every:		-		Minutes Gallons			
Calibrated Sample Volume:		-		mLs		-					
Programmed Number of Samples:		-		Actual Number of Samples Collected:		-					
Final Compositor Temperature:		-		°C		Ice Present in Compositor at Pick-up?		-		Yes No	

GRAB SAMPLE DATA											
Grab ID Number: 25											
Date Collected:		8/31/10		Time Collected:		0930		Collected By:		TM	

FIELD PARAMETERS											
PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID							
pH	6.38	SU		SAL-SAM-63-							
Temperature	25.2	°C		SAL-SAM-63-							
Temperature Verification with Secondary Source		°C		SAL-SAM-006-							
Specific Conductance	1,686	µmhos/cm		SAL-SAM-63-							
Dissolved Oxygen	0.03	mg/L		SAL-SAM-55-							
Turbidity	-	NTU	TM 8/31/10	SAL-SAM-005-							
ORP	-174.9	mV									
Preservation Checked in Field?		Y N		Checked By:							
List any Preservatives Added in Field:											
Comments:											
Sampler(s) Signature:		[Signature]		Date:		8/31/10					
				Date:							
Reviewed By:				Date:							

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

WASTEWATER SAMPLING LOG

Client Name:	Hazan and Sawyer		Location:	DFT		Contact:		
Date of Sample:	8/31/10		SAL Project #	104686.26		Phone:		
SAL Audit Performed:	Y <input checked="" type="checkbox"/> N	Auditor Name:			Client Representative on Site?	Y <input checked="" type="checkbox"/> N	Rep. Name:	
		Signature:					Signature:	

SAMPLE DATA							
Sampled By:	SAL Client	Compositor Belongs To:	SAL Client	N/A	COMP Bottle Belongs To:	SAL Client	N/A
Compositor ID:			Bottle ID				
Intake Tubing Type:	PP PE NP TL TT SI	Intake Tubing Lot:			Pump Tubing Lot:		

COMPOSITE DATA							
Composite ID Number:							
START	Date:		Time:		Compositor Set-up By:		
STOP	Date:		Time:		Compositor Picked-up By:		
Composite Type:	Time	Flow	Continuous	Collect Sample Every:		Minutes	Gallons
Calibrated Sample Volume:			mLs				
Programmed Number of Samples:			Actual Number of Samples Collected:				
Final Compositor Temperature:			°C	Ice Present in Compositor at Pick-up?		Yes	No

GRAB SAMPLE DATA			
Grab ID Number: 26			
Date Collected:	8/31/10	Time Collected:	1430
		Collected By:	TM

FIELD PARAMETERS				
PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.57	SU		SAL-SAM-63-
Temperature	28.1	°C		SAL-SAM-63-
Temperature Verification with Secondary Source		°C		SAL-SAM-006-
Specific Conductance	1,020	µmhos/cm		SAL-SAM-63-
Dissolved Oxygen	7.44	mg/L		SAL-SAM-55-
Turbidity		NFU	TM 8/31/10	SAL-SAM-005-
ORP	25.5			
Preservation Checked in Field?	Y	N	Checked By:	
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:			Date:	8/31/10
			Date:	
Reviewed By:			Date:	

SOUTHERN ANALYTICAL LABORATORIES, INC.

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



Hazen and Sawyer, PC
10002 Princess Palm Avenue Suite 200
Tampa, FL, 33619-

September 22, 2010
Project No: 104686

PNRS II Wastewater System Analyses

Laboratory Quality Assurance Report Results and Limits

QC Batch	Date	Project Samples	Method	Parameter	Units	Blank	Matrix Original	Recovery, %				% RPD	Control Limits %	
								LCS	LCSD	MS	MSD		Recovery	RPD
QC77499	09/02/10	104686.07-.16, .26, .28, .29	EPA 300.0	Sulfate	mg/l	0.2 U	104850.04	97	98	107		1	90-110	10
QC77517	09/03/10	104686.06, .17-.20	EPA 300.0	Sulfate	mg/l	0.2 U	104695.04	98	109	102		11	90-110	10
QC77509	09/02/10	104686.01 - .30	EPA 350.1	Ammonia Nitrogen	mg/l N	0.01 U	104686.28	101		104	108	4	90-110	10
QC77509	09/02/10	104686.01 - .30	EPA 350.1	Ammonia Nitrogen	mg/l N	0.01 U	104686.29	101		102	102	0	90-110	10
QC77518	09/03/10	104686.01-.30	EPA 351.2	Total Kjeldahl Nitrogen	mg/l N	0.05 U	104677.01	102		101	98	3	90-110	10
QC77591	09/09/10	104686.07	EPA 351.2	Total Kjeldahl Nitrogen	mg/l N	0.05 U	104681.02	103		107	110	3	90-110	10
QC77501	09/01/10	104686.01-.30	SM 4500-NO2 B	Nitrate-Nitrite (as N)	mg/l	0.01 U	104686.28	96		95	98	3	90-110	10
QC77520	09/03/10	104686.07	SM 4500-NO2 B	Nitrate-Nitrite (as N)	mg/l	0.01 U	104815.01	99		97	93	4	90-110	10
QC77475	09/01/10	104686.02 - .06, .08 - .16	EPA 410.4	Chemical Oxygen Demand	mg/l	10 U	104558.01	100		86	108	23	90-110	32
QC77519	09/03/10	104686.01, .07, .17 - .30	EPA 410.4	Chemical Oxygen Demand	mg/l	10 U	104789.01	100		95	90	5	90-110	32
QC77480	08/31/10	104686.13 - .24	SM 2320B	Total Alkalinity as CaCO3	mg/l	2 U	104686.13	95	102	95	95	7	90-110	26
QC77534	09/03/10	104686.01 - .12, .29	SM 2320B	Total Alkalinity as CaCO3	mg/l	2 U	104686.29	104	100	95	95	4	90-110	26
QC77535	09/04/10	104686.28 - .28	SM 2320B	Total Alkalinity as CaCO3	mg/l	2 U	104686.28	95	96	104	104	1	90-110	26
QC77512	09/02/10	104686.0-104686.2	SM 2540C	Total Dissolved Solids	mg/l	10 U		100					90-110	24
QC77528	09/03/10	104686.1-104686.2	SM 2540C	Total Dissolved Solids	mg/l	10 U		100				200	90-110	24
QC77581	09/08/10	104686.0	SM 2540C	Total Dissolved Solids	mg/l	10 U		101					90-110	24
QC77503	09/02/10	104686.0-104686.1	SM 2540D	Total Suspended Solids	mg/l	1 U		110					85-115	30
QC77530	09/03/10	104686.1-104686.2	SM 2540D	Total Suspended Solids	mg/l	1 U		94					85-115	30
QC77564	09/08/10	104686.0	SM 2540D	Total Suspended Solids	mg/l	1 U		94					85-115	30
QC77569	09/04/10	104686.01-.30	SM 4500P E	Total Phosphorus	mg/l P	0.01 U	104686.20	91		103	101	2	75-125	25
QC77594	09/09/10	104686.07	SM 4500P E	Total Phosphorus	mg/l P	0.01 U	104681.02	99		99	98	1	75-125	25
QC77489	09/01/10	104686.01-.30	SM 4500S F	Sulfide, Total	mg/l	0.1 U	104686.29	103		92	92	0	85-115	14
QC77585	09/08/10	104686.07	SM 4500S F	Sulfide, Total	mg/l	0.1 U	104686.07	94		94	94	0	85-115	14
QC77538	09/06/10	104686.17 - .29	SM 5210 B	Carbonaceous BOD	mg/l	2 U		96	93			3	85-115	25
QC77543	09/07/10	104686.01 - .06, .08 - .16	SM 5210 B	Carbonaceous BOD	mg/l	2 U		88	93			6	85-115	25
QC77572	09/08/10	104686.07	SM 5210 B	Carbonaceous BOD	mg/l	2 U		94	96			2	85-115	25