FLORIDA DEPARTMENT OF HEALTH

Florida Onsite Sewage Nitrogen Reduction Strategies Study

Task A.25

PNRS II Test Facility Sample Event Report No. 2

Progress Report

September 2010

4423-001

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Environmental Engineers & Scientists

In association with

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AET
Applied Environmental Technology

OTIS ENVIRONMENTAL CONSULTANTS, LLC

Florida Onsite Sewage Nitrogen Reduction Strategies Study

TASK A.25
PROGRESS REPORT

PNRS II Test Facility
Sample Event Report No. 2

Prepared for:

Florida Department of Health
Division of Environmental Health
Bureau of Onsite Sewage Programs
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FDOH Contract CORCL

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Prepared by:

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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 sample event report documents data collected from the second PNRS II monitoring and sampling event which was conducted August 31 - September 1, 2010. This monitoring event consisted of an assessment and evaluation of PNRS II operation, measurement of flowrates for all systems, measurement of field parameters, and collection of biofilter influent and effluent samples and their analyses in a NELAC 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 sample 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

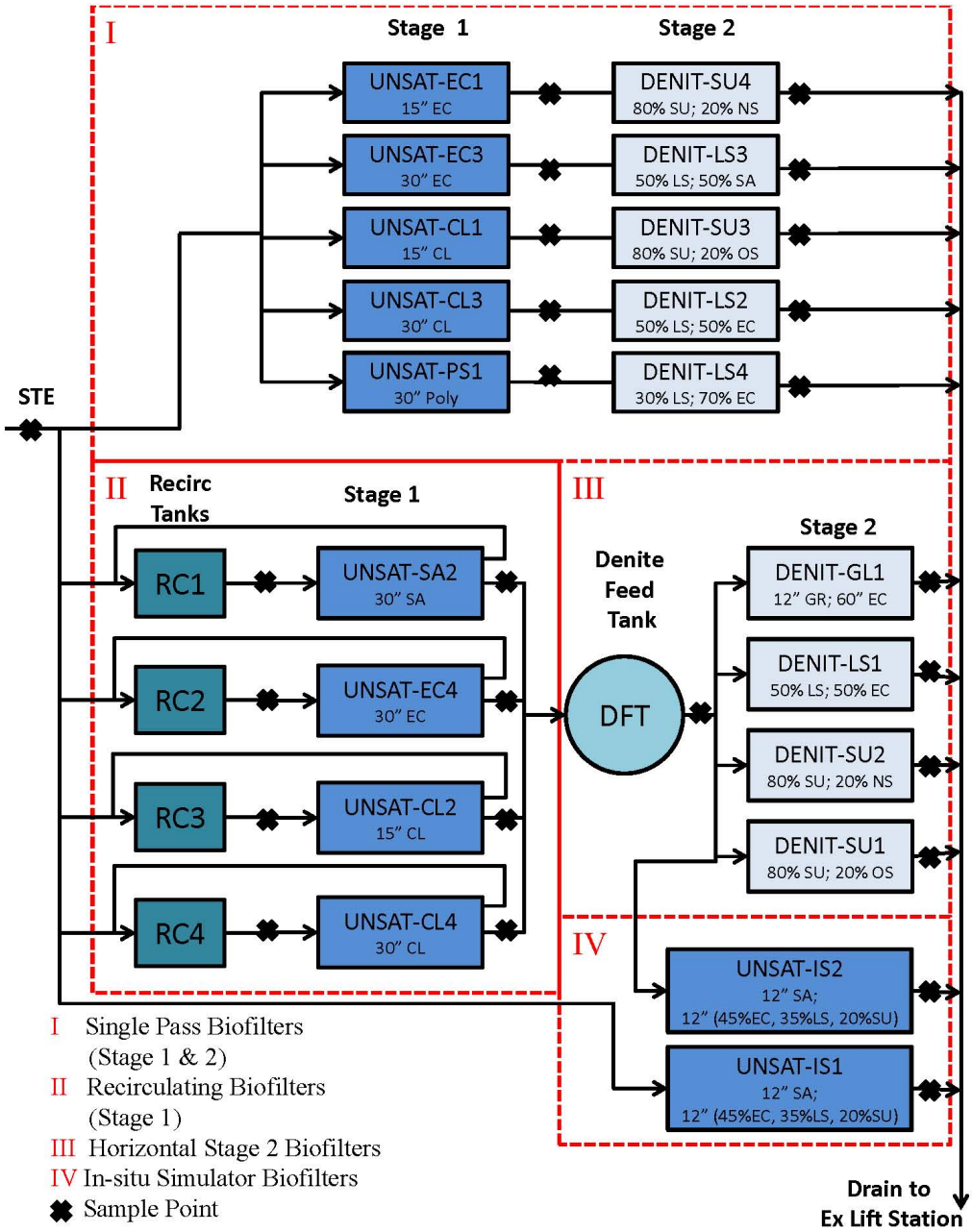

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Figure 1
PNRS II Test Facility System Schematic

3.3 Operational Monitoring

Start-up of the PNRS II test facility 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. In addition, 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 into facility operations. Appendix A 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.

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 laboratory 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. Chain of custody forms, provided in Appendix D, were used to document the transfer of samples from field personnel to the analytical laboratory. One chain of custody form was filled out for each set of samples and placed inside the cooler.

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 contain-

ers. The four field sample duplicate sample containers were collected with the regular samples. The total alkalinity, $CBOD_5$, 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 H_2S 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 parameters included pH, specific conductance, temperature (Temp), dissolved oxygen (DO), and oxidation-reduction potential (ORP). Field parameter results are listed in Appendix B. The influent and effluent samples were analyzed by the laboratory for: total alkalinity, total Kjeldahl nitrogen (TKN-N), ammonia nitrogen (NH_3-N), nitrate/nitrite nitrogen (NO_X-N), carbonaceous biochemical oxygen demand ($CBOD_5$), total dissolved solids (TDS), total suspended solids (TSS), chemical oxygen demand (COD), total phosphorus (TP), and fecal coliform (fecal). For the denitrification biofilters containing elemental sulfur media, influent and effluent sample analyses were also conducted for sulfate (SO_4) and hydrogen sulfide (H_2S). 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_2S)	SM4500S F	0.01 mg/L
Sulfide	SM4500S F	0.1 mg/L

3.5 Flow Monitoring

The PNRS II test system dose rates were calibrated at initial start-up. The flow rates are measured at each sampling event and adjusted as necessary to maintain flow rates consistent with the experimental design. 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 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.

Appendix A: PLC Data

Table A.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%

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

Table A.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%

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

Appendix B: Field Parameter Analyses

Table B.1
Field Parameter Results
(8/31/10)

Sample Identification	pH	Temperature (°C)	Specific Conductance (µS)	Dissolved Oxygen (mg/L)	ORP (mV)
STE					
STE-Tank 1	7.24	27.9	1,092	<0.1	-263.9
Stage 1 Single Pass Biofilter Effluent					
UNSAT-EC1	7.02	28.6	1,055	6.83	137.5
UNSAT-EC3	7.00	29.2	1,133	6.67	117.0
UNSAT-CL1	7.44	29.5	1,271	5.54	116.2
UNSAT-CL3	7.82	28.7	1,388	7.06	83.8
UNSAT-PS1	7.62	28.6	1,010	2.50	60.0
Stage 2 Single Pass Upflow Biofilter Effluent					
DENIT-SU4	6.63	28.1	1,395	0.18	-106.6
DENIT-LS3	7.25	27.8	1,114	1.32	-21.0
DENIT-SU3	6.65	28.4	1,655	<0.1	-279.6
DENIT-LS2	7.84	27.3	1,448	4.10	-11.5
DENIT-LS4	7.59	27.1	1,120	0.42	-43.7
Recirculation Tank Effluent					
RC1	7.25	30.0	1,011	<0.1	-128.3
RC2	7.33	30.2	1,031	<0.1	-108.2
RC3	7.60	30.2	1,128	<0.1	89.0
RC4	7.81	30.4	1,112	<0.1	73.0
Stage 1 Recirculating Biofilter Effluent					
UNSAT-CL4	7.79	29.3	1,174	7.06	35.5
UNSAT-CL2	7.39	26.8	1,050	6.37	30.2
UNSAT-EC4	6.95	28.5	1,000	6.94	78.8
UNSAT-SA2	6.87	28.2	953	6.32	89.2
Denite Feed Tank (Tank 3)					
DFT	7.57	28.1	1,020	7.44	25.5

Sample Identification	pH	Temperature (°C)	Specific Conductance (µS)	Dissolved Oxygen (mg/L)	ORP (mV)
Stage 2 Horizontal Biofilters Effluent					
DENIT-SU1	7.02	25.1	1,473	0.11	-317.2
DENIT-SU2	7.00	24.8	1,402	0.50	-279.0
DENIT-LS1	7.69	25.2	962	0.24	-199.7
DENIT-GL1	6.38	25.2	1,686	<0.1	-174.9
In-situ Simulator Biofilter Effluent					
UNSAT-IS1 (STE)	6.48	29.5	1,206	<0.1	-42.5
UNSAT-IS2 (Nitrified STE)	6.29	29.0	1,543	<0.1	-174.5

Appendix C: Flow Test Results

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

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Appendix D: Chain of Custody Forms

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

SAL Project No. 104686

Client Name	Contact / Phone:
Hazan and Sawyer	Josephin Edeback-Hirst 813-630-4498
Project Name / Location	jedeback@hazanandsawyer.com
PNRS II Wastewater System Analyses	
Samplers: (Signature)	

Matrix Codes: DW-Drinking Water WW-Wastewater SW-SurfaceWater 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, TDS	1LP, Cool SO4	1LP, Zn Acetate/NaOH Hydrogen Sulfide	250ml P, H2SO4 TKN, NH3, NoX, COD Total P	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	RC31		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	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				

ORP -174.5

Containers Prepared/ Relinquished:	Date/Time: 1100 08-28-10	Received:	Date/Time: 1600 8/30/10
Relinquished:	Date/Time: 1625 8/31/10	Received:	Date/Time:
Relinquished: Courier	Date/Time: 1443 9/1/10	Received: K Redmond	Date/Time: 1443 9/1/10
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:

Seal intact? Y N (N/A)
Samples intact upon arrival? (Y) N N/A
Received on ice? Temp_____ (Y) N N/A
Proper preservatives indicated? (Y) N N/A
Rec'd within holding time? (Y) N N/A
Volatiles rec'd w/out headspace Y N (N/A)
Proper containers used? (Y) N N/A

Instructions / Remarks

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

SAL Project No. 1046860

Client Name	Contact / Phone:
Hazan and Sawyer	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-SurfaceWater 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, TDS	1LP, Cool SO4	1LP, Zn Acetate/NaOH Hydrogen Sulfide	250ml P, H2SO4 TKN, NH3, NoX, COD Total P	125ml P, Sterile Fecal Coliforms	Field pH	Field Temp	Field Cond	Field DO
13	UNSAT-CL2	8/31/10	1105	WW		X	1			1	2				
14	UNSAT-CL3		1200	WW		X	1			1	2				
15	UNSAT-CL4		1055	WW		X	1			1	2				
16	UNSAT-PS1		1140	WW		X	1			1	2				
17	DENIT-SU1		0855	WW		X	1	1	1	1	2				
18	DENIT-SU2		0905	WW		X	1	1	1	1	2				
19	DENIT-SU3		1000	WW		X	1	1	1	1	2				
20	DENIT-SU4		1025	WW		X	1	1	1	1	2				
21	DENIT-LS1		0920	WW		X	1			1	2				
22	DENIT-LS2		0950	WW		X	1			1	2				
23	DENIT-LS3		1015	WW		X	1			1	2				
24	DENIT-LS4		0940	WW		X	1			1	2				

	Date/Time:	Received:	Date/Time:
Containers Prepared/ Relinquished:	1100 08-28-10		8/30/10 1600
Relinquished:	8/31/10 1210	Received:	8/31/10 1200
Relinquished: Dana E. Wolfe	8-31-10 1450	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:

Seal intact? Y N (N/A)

Samples intact upon arrival? (Y) N N/A

Received on ice? Temp_____ (Y) N N/A

Proper preservatives indicated? (Y) N N/A

Rec'd within holding time? (Y) N N/A

Volatiles rec'd w/out headspace Y N (N/A)

Proper containers used? (Y) N N/A

Instructions / Remarks

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

SAL Project No. 104686

Client Name	Contact / Phone:
Hazan and Sawyer	Josephin Edeback-Hirst 813-630-4498
Project Name / Location	jedeback@hazanandsawyer.com
PNRS II Wastewater System Analyses	
Samplers: (Signature)	

Matrix Codes: DW-Drinking Water WW-Wastewater SW-SurfaceWater 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, TDS	1LP, Cool SO4	1LP, Zn Acetate/NaOH Hydrogen Sulfide	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	8/30/10	0930	WW		X	1			1	2				
26	DFT		1430	WW		X	1	1	1	1	2				
27	Duplicate ~~ES4~~ DENIT LS4		0940	WW		X	1	~~1~~	~~1~~ 1	~~1~~	~~2~~				
28	Field Blank		0830	R ~~WW~~		X	1	1	1	1					
29	Equipment Blank		0845	R ~~WW~~		X	1	1	1	1					
30	UNSAT CL4 Duplicate		1055	WW		X				1					
31	UNSAT EC1 Duplicate		1240	WW		X					1				
32	UNSAT CL1 Duplicate		1230	WW		X					1				

Containers Prepared/ Relinquished: HH	Date/Time: 8-30-10 1600	Received:	Date/Time: 8/30/10 1600
Relinquished:	Date/Time: 8/31/10 1625	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:

Seal intact? Y N (N/A)
Samples intact upon arrival? (Y) N N/A
Received on ice? Temp_____ (Y) N N/A
Proper preservatives indicated? (Y) N N/A
Rec'd within holding time? (Y) N N/A
Volatiles rec'd w/out headspace Y N (N/A)
Proper containers used? (Y) N N/A

Instructions / Remarks

DUPLICATE #
DENIT-LS4 ALK, CBOD, TSS, TDS
UNSAT-CL4 NUTRIENTS
UNSAT-EC1 FECAL
UNSAT-CL1 FECAL
~~DENIT-SA#1 SULFATE~~
~~DENIT-SA#1 H_2S~~