



# Florida Onsite Sewage Nitrogen Reduction Strategies Study

Task A.26

**PNRS II Test Facility Data Summary Report No. 4**

**Progress Report**

February 2011

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In association with



**AET**  
Applied Environmental Technology

**OTIS  
ENVIRONMENTAL  
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# **Florida Onsite Sewage Nitrogen Reduction Strategies Study**

## **TASK A.26 PROGRESS REPORT**

### **PNRS II Test Facility Data Summary Report No. 4**

#### **Prepared for:**

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FDOH Contract CORCL

**February 2011**

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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 the two-stage biofiltration process into pilot testing to develop design criteria for subsequent full-scale field testing. A unique test facility was constructed for the purpose of the pilot evaluations. The Task A.15 PNRS II Quality Assurance Project Plan (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 January 13, 2011. The corresponding sample event report was submitted as Sample Event Report No. 4, January 2011, as a deliverable under Task A.25. The monitoring event consisted of an assessment and evaluation of PNRS II operation, measurement of flowrates for all systems and flowrate adjustment if warranted, measurement of field parameters, 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 Modifications of PNRS II Systems

The results of Sample Event No. 1, 2 and 3 and careful observation of PNRS II systems were used to formulate recommendations for modifications to the test systems at the GCREC pilot facility. The modifications that were made following Sample Event No. 3 are presented in this section. All recommendations were based on the overall goal of PNRS II: to provide functional specifications for modular biofiltration components for passive onsite nitrogen reducing wastewater treatment systems.

#### 3.2.1 Polystyrene Biofilter (UNSAT-PS1) Recycle Rate

In Sample Event 3, the unsaturated single pass biofilter with polystyrene media (UNSAT-PS1) exhibited better nitrogen performance as a recirculating system as compared to the single pass configuration during Sample Event 1 and 2. However, significant effluent  $\text{NH}_3\text{-N}$  remained, so the potential utility of polystyrene media in enhanced nitrogen reduction systems depends on further improving ammonia conversion to nitrate. The characteristics of the polystyrene media and the polystyrene based treatment process appear to function better with high recycle rates. Therefore, the Pump 15 runtime was increased so that the recycle ratio was increased to 6:1 from the previous 3:1 ratio.

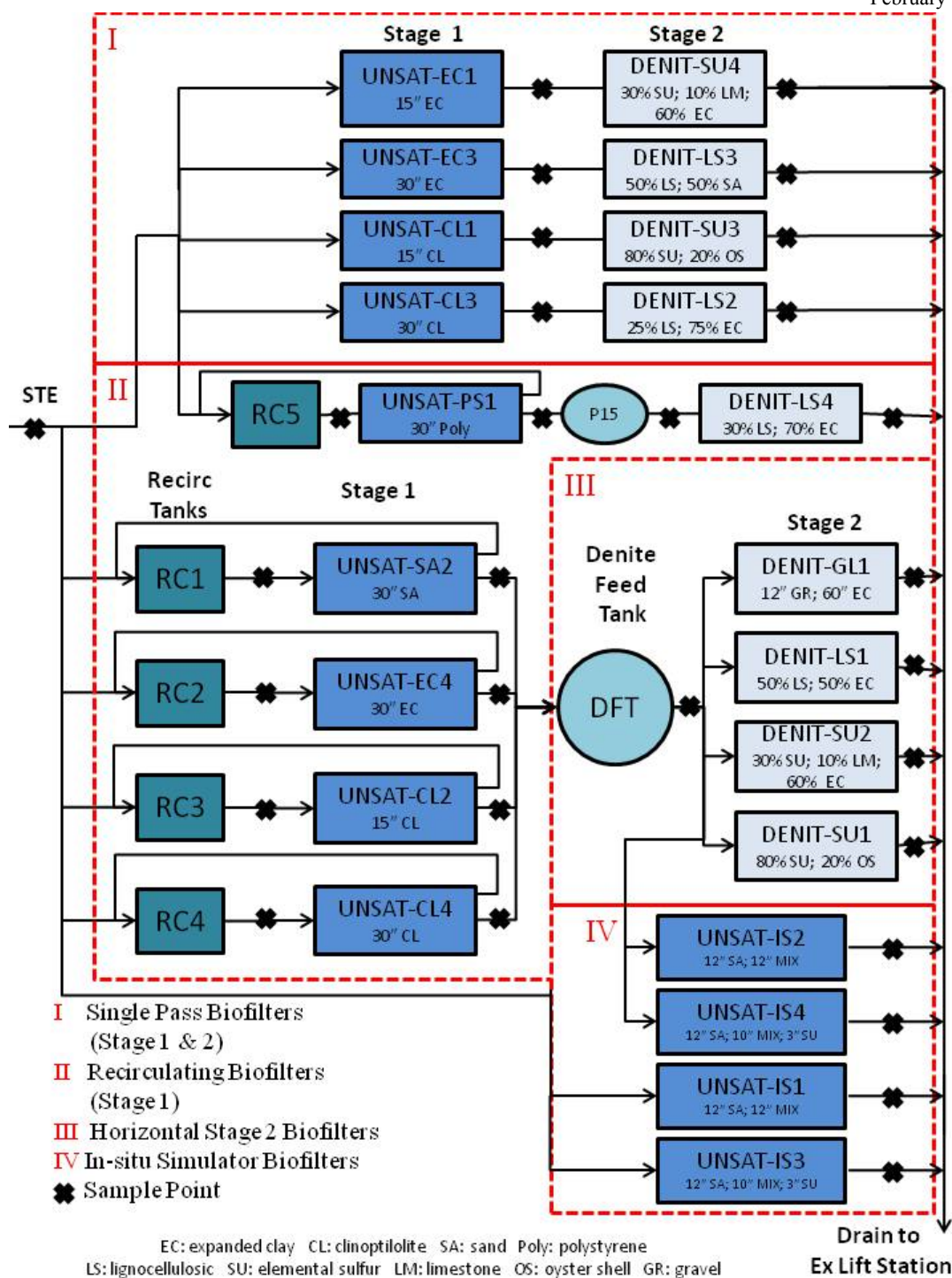
### 3.3 Monitoring and Sampling Locations and Identification

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 four points of entry: Hydro-1, Hydro-2, UNSAT-IS1, and UNSAT-IS3. 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**

<b>Group (Figure 1)</b>	<b>Sample Location</b>	<b>Sample Identification</b>
	STE PNRS II Storage Tank 1	PNRS II-STE-T1
I	Stage 1 Single Pass Biofilters	UNSAT-EC1
		UNSAT-EC3
		UNSAT-CL1
		UNSAT-CL3
	Stage 2 Single Pass Upflow Biofilters	DENIT-SU4
		DENIT-LS3
		DENIT-SU3
		DENIT-LS2
		DENIT-LS4
II	Recirculation Tanks	RC1
		RC2
		RC3
		RC4
		RC5
	Stage 1 Recirculating Biofilters	UNSAT-SA2
		UNSAT-EC4
		UNSAT-CL2
		UNSAT-CL4
		UNSAT-PS1
III	Pump 15 Tank	P15
	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
		UNSAT-IS3
		UNSAT-IS4
	In-Situ In-Tank Simulator Single Pass Biofilter Sample Port (below EC & LS mixture and above SU layer)	UNSAT-IS3-SP
		UNSAT-IS4-SP

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**Figure 1**  
**PNRS II Test Facility System Schematic**

### 3.4 Operational Monitoring

Start-up of the PNRS II test facility occurred on May 17, 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.

### 3.5 Water Quality Sample Collection and Analyses

Influent and effluent water quality samples from the PNRS II test systems for Sample Event 4 were collected January 13, 2011. 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 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. 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 containers. The field sample duplicates were collected immediately subsequent to the regular samples. The duplicate sample containers were filled with PNRS II T1-STE effluent, UNSAT-CL3 effluent, UNSAT-EC1 effluent, and UNSAT-CL1 effluent. Additionally, la-

laboratory split duplicate samples were collected immediately subsequent to the regular samples. The laboratory split sample containers were filled with PNRS II T1-STE effluent, UNSAT-EC3 effluent, DENIT-LS1 effluent, UNSAT-IS3 effluent, and UNSAT-IS4 effluent.

Field parameters were measured using portable electronic probes and included temperature (Temp), dissolved oxygen (DO), oxidation-reduction potential (ORP), pH, and specific conductance. Temperature (Temp), dissolved oxygen (DO), and oxidation-reduction potential (ORP) were measured with probe tips placed in flow through samplers located directly in the outlet pipe at each sample location. Specific conductance and pH were measured using external sample collection reservoirs. The influent and effluent samples were analyzed by the laboratory for: total alkalinity, total Kjeldahl nitrogen (TKN-N), ammonia nitrogen ( $\text{NH}_3\text{-N}$ ), nitrate nitrogen, ( $\text{NO}_3\text{-N}$ ), nitrite nitrogen ( $\text{NO}_2\text{-N}$ ), carbonaceous biochemical oxygen demand ( $\text{CBOD}_5$ ), total dissolved solids (TDS), total suspended solids (TSS), chemical oxygen demand (COD), total phosphorus (TP), and fecal coliform (fecal). For some of the denitrification biofilters containing elemental sulfur media, influent and effluent sample analyses were also conducted for sulfate ( $\text{SO}_4$ ) and hydrogen sulfide ( $\text{H}_2\text{S}$ ). 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 $\text{CaCO}_3$	SM 2320B	2 mg/L
Total Kjeldahl Nitrogen (TKN-N)	EPA351.2	0.05 mg/L
Ammonia Nitrogen ( $\text{NH}_3\text{-N}$ )	EPA350.1	0.01 mg/L
Nitrate/Nitrite Nitrogen ( $\text{NO}_x\text{-N}$ )	EPA353.2	0.01 mg/L
Carbonaceous BOD ( $\text{CBOD}_5$ )	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 ( $\text{SO}_4$ )	EPA300.0	0.2 mg/L
Hydrogen Sulfide Unionized ( $\text{H}_2\text{S}$ )	SM4500S F	0.01 mg/L
Sulfide	SM4500S F	0.1 mg/L

### 3.6 Flow Monitoring

Flow rates for all PNRS II systems were calibrated at initial start-up. The 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 flow volumes were measured on January 17, 2011 and reported in the Sampling Event No. 4 Report. Flow monitoring results are presented in Appendix C.

## 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 17<sup>th</sup> start up, with the exception of occasional power interruptions or outages (see operation and maintenance log). The power interruptions were of relatively short duration. For the most part, operation of the pilot biofilters was fully and automatically resumed when power was restored. The only exceptions are the three peristaltic pumps: Pump 5 which supplies the two In-Situ simulators UNSAT-IS1 and IS2, Pump 10 which supplies the two column In-Situ simulators UNSAT-IS3 and IS4, and Pump 11 which supplies the four horizontal flow denitrification biofilters. Initially, the peristaltic pumps displayed an error message and required manual restarting upon disruption of the power supply; their off times were somewhat longer than the other system pumps. The peristaltic pump settings were saved through the power outage, and the same pump operation was resumed 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 November 11<sup>th</sup> and January 12<sup>th</sup> (Day 178 through Day 240 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, 8, and 15 flows. The data shows that the recycle flows are very close to the initially set 44 gpd rate for Pumps 5, 6, 7, and 8, indicating that the desired recycle ratio of approximately 3:1 is being met. As discussed in Section 3.2.1, the Pump 15 flow rate was increased to 88 gpd rate so that the recycle ratio was increased to 6:1 from the previous 3:1 ratio

## 4.2 Water Quality Analyses

Water quality analytical results for Sample Event No. 4 are listed in Table 3. Quality Control samples, including field blanks, equipment blanks, and external duplicate and lab split samples are also included in this table. Results for the blanks were examined for obvious problems with sample contamination or improper decontamination of sampling equipment. Duplicate and split samples were examined for reproducibility, and where the differences were significant relative to the sample value, the laboratory was notified and requested to verify accuracy in reporting and reanalysis of the sample was requested if warranted. Significant difference determinations for the various lab analyses were based upon a review of reproducibility data in Standard Methods and EPA guidelines as well as on experience of the project team and data accuracy requirements for this project.

Table 4 shows the results of the QC sampling for this sample event, and a calculation of the percent difference between the sample value and the duplicate/split samples. The sample results that are highlighted in this table were forwarded back to the laboratories for verification and potential reanalysis. Any changes to these data from this verification will be reflected in the next data summary report.

A statistical summary of the water quality data collected to date for the PNRS II systems is presented in Table 5. 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 4 remained closer to typical STE composition than were STE samples collected earlier in the PNRS II study. Sample Event 4 STE parameters for TSS, COD, and CBOD<sub>5</sub> were still somewhat low, but within the range expected for domestic STE. The measured STE total nitrogen (TN) concentration was 66 mg/L, which is in the range that has been typically reported for Florida single family residence STE. The performance of the various biofilter systems was compared by considering the changes through treatment of nitrogen species (TKN-N, NH<sub>3</sub>-N, and NO<sub>x</sub>-N), as well as supporting water quality parameters.

**Group 1 Single Pass Biofilters** Effluent NH<sub>3</sub>-N levels were below 2 mg/L for the four Stage 1 single pass biofilters and DO levels were greater than 7.9 mg/L (Table 3). Organic N ranged from 2.3 to 3.5 mg/L in these same four systems. NO<sub>x</sub> was significantly increased in all Stage 1 biofilter effluents corresponding to the decrease in TKN.

Effluent  $\text{NO}_x\text{-N}$  was less than 0.13 mg/L in the two Stage 2 single pass denitrification biofilters with sulfur media. The three lignocellulosic biofilters (DENIT-LS2, DENIT-LS3, and DENIT-LS4) exhibited incomplete denitrification with effluent  $\text{NO}_x\text{-N}$  of 41, 43 and 3.4 mg/L, respectively. Although the denitrification performance of the denitrification biofilters was expected to be more or less equivalent to biofilters with sulfur and glycerol electron donor, lignocellulosic biofilter performance continued to be inferior. Possible reasons are lack of reactivity of lignocellulosic material, toxicity (release of toxic material from lignocellulosic material itself), or short circuiting within the biofilters.

The influent to the DENIT-LS4 biofilter was effluent from the recirculation pump tank for the polystyrene biofilter (UNSAT-PS1) which contained 17 mg/L  $\text{NH}_3\text{-N}$  and 12 mg/L  $\text{NO}_x\text{-N}$ . While somewhat successfully denitrifying the relatively low influent  $\text{NO}_x\text{-N}$ , DENIT-LS4 effluent contained 9.5 mg/L  $\text{NH}_3\text{-N}$ . This result again confirms that  $\text{NH}_3\text{-N}$  will be readily transported through anoxic denitrification biofilters which are at the same time capable of achieving significant  $\text{NO}_x$  reduction.

**Group 2 Stage 1 Recirculating Biofilters**  $\text{NH}_3\text{-N}$  levels were at or below 0.7 mg/L for the four recirculating Stage 1 biofilters containing clinoptilolite, expanded clay, and sand media, and effluent DO was 7.9 to 11.0 mg/L. Effluent  $\text{NO}_x\text{-N}$  ranged from 25 to 36 mg/L and organic N from 2.0 to 2.4 mg/L for these four recirculating Stage 1 biofilters. The nitrification performance of these biofilters was quite acceptable and TN reduction averaged 51%. The ammonia and DO concentrations in UNSAT-PS1 effluent were 16 mg/L and 5.2 mg/L, respectively, indicating incomplete nitrification. UNSAT-PS-1 also had significantly higher effluent TKN of 17 mg/L.

**Group 3 Stage 2 Horizontal Biofilters** Influent  $\text{NO}_x\text{-N}$  to these biofilters was 29 mg/L. Effluent  $\text{NO}_x\text{-N}$  was 0.35 mg/L and less in three of four Stage 2 horizontal biofilters. The low  $\text{NO}_x\text{-N}$  were accompanied by depressed DO and ORP of -173 to -231 mV. Thus, three of the horizontal biofilters were effective in producing a reducing environment and achieving their  $\text{NO}_x\text{-N}$  reduction goal. DENIT-LS1 exhibited incomplete denitrification, with effluent  $\text{NO}_x\text{-N}$  of 22 mg/L.

**Group 4 In-Situ Simulator Systems** UNSAT-IS1, UNSAT-IS2 and UNSAT-IS4 exhibited low effluent  $\text{NO}_x\text{-N}$  of less than 0.4 mg/L. UNSAT-IS2 and UNSAT-IS4 exhibited a TN concentration less than 1.3 mg/L. For UNSAT-IS1, the effluent  $\text{NO}_x\text{-N}$  was low but effluent  $\text{NH}_3\text{-N}$  was 58 mg/L indicating incomplete nitrification as seen in Sample Event 2 and 3. UNSAT-IS3 exhibited effluent  $\text{NO}_x\text{-N}$  of 32.3 mg/L indicating incomplete denitrifi-

cation. In-situ simulator effluent  $\text{SO}_4$  concentrations were 7, 250, 120 and 110 mg/L, for IS1, IS2, IS3 and IS4 respectively.

PRELIMINARY



Table 3  
Water Quality Analytical Results

Group (Figure 1)	Sample ID	Media Composition	Analytical Laboratory	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 <sub>5</sub> (mg/L)	COD (mg/L)	TN (mg/L N)	TKN (mg/L N)	Organic N (mg/L N)	NH <sub>3</sub> -N (mg/L N)	NO <sub>2</sub> -N (mg/L N)	NO <sub>3</sub> -N (mg/L N)	NOx (mg/L N)	TIN (mg/L N) <sup>1</sup>	TP (mg/L)	Sulfide (mg/L)	H <sub>2</sub> S (mg/L)	SO <sub>4</sub> (mg/L)	Fecal Coli/100 mL			
1	STE Sample																														
	PNRS II STE-Tank 1		Southern	1/13/11 13:15	G	13.7	7.1	380	2.7	-236.5	1,220	470	83	78	230	66.0	66	9.0	57	0.02	0.01	0.03	57.03	16	6.9	13	8,900				
	PNRS II STE-Tank 1-D		Southern	1/13/11 13:15	G	13.7	7.1	340	2.7	-236.5	1,220	470	64	85	280	62.1	62	4.0	58	0.05	0.01	0.06	58.06				11,100				
	PNRS II STE-Tank 1-O <sub>2</sub>		Pace	1/13/11 13:15	G	13.7	7.1	351	2.7	-236.5	1,220	570	15.5	87.9	290	61.3	61.1	9.8	51.3	0.12	0.12	0.24	51.54	14.1		17.6	100				
	Stage 1 Single Pass Biofilters Effluent																														
	UNSAT-EC1	15" Expanded Clay	Southern	1/13/11 12:05	G	7.8	6.7	160	7.9	36.5	1,110	730	1	2	16	49.1	4.0	2.3	1.7	45	0.11	45.11	46.81				61	3,900			
	UNSAT-EC1-D	15" Expanded Clay	Southern	1/13/11 12:05	G	7.8	6.7	180	7.9	36.5	1,110	720	1	2	24	48.2	4.1	2.5	1.6	44	0.11	44.11	45.71					3,000			
	UNSAT-EC3	30" Expanded Clay	Southern	1/13/11 12:05	G	6.3	6.8	210	7.9	38.7	1,150	740	1	2	11	47.5	3.5	3.5	0.005	44	0.01	44.01	44.02					4			
	UNSAT-EC3-D	30" Expanded Clay	Pace	1/13/11 12:05	G	6.3	6.8	222	7.9	38.7	1,150	914	5	3	16.2	35.8	0.42	0.4	0.020	35.1	0.25	35.35	35.37	5.6			64.4	12			
	UNSAT-CL1	15" Clinoptilolite	Southern	1/13/11 11:45	G	8.2	7.2	180	8.8	32.3	1,200	710	1	2	16	33.9	2.7	2.7	0.020	31	0.16	31.16	31.18				59	100			
	UNSAT-CL1-D	15" Clinoptilolite	Southern	1/13/11 11:45	G	8.2	7.2	280	8.8	32.3	1,200	700	3	2	20	24.1	2.9	2.9	0.020	21	0.18	21.18	21.20					40			
	UNSAT-CL3	30" Clinoptilolite	Southern	1/13/11 12:05	G	8.3	7.3	300	9.9	20.2	1,300	810	1	2	13	43.8	2.7	2.7	0.016	41	0.07	41.07	41.09					110			
	UNSAT-CL3-D	30" Clinoptilolite	Southern	1/13/11 12:05	G	8.3	7.3	280	9.9	20.2	1,300	840	2	2	16	42.9	2.8	2.8	0.018	40	0.06	40.06	40.08					25			
	Stage 2 Single Pass Upflow Biofilters Effluent																														
	DENIT-SU4	10% Limestone; 30% Sulfur; 60% Expanded Clay	Southern	1/13/11 9:00	G	7.0	6.8	240	4.2	-99.6	1,350	1,000	2	2	20	1.3	1.2	1.0	0.22	0.10	0.03	0.13	0.35	0.14	0.08	420	3				
	DENIT-L33	50% Lignocellulosic; 50% Sand	Southern	1/13/11 9:00	G	6.6	6.7	240	5.4	-79	1,150	790	1	2	16	45.4	2.3	2.3	0.012	43	0.05	43.05	43.06					1			
	DENIT-SU3	80% Sulfur; 20% Oyster Shell	Southern	1/13/11 9:00	G	6.9	6.9	280	2.8	-208.7	1,420	1,000	11	9	50	3.0	2.9	2.1	0.80	0.01	0.04	0.05	0.85			380	6				
	DENIT-L52	25% Lignocellulosic; 75% Expanded Clay	Southern	1/13/11 9:00	G	6.8	7.3	340	5.0	-135	1,300	860	1	2	16	43.8	2.7	2.6	0.085	41	0.07	41.07	41.16					1			
	DENIT-L54	30% Lignocellulosic; 70% Expanded Clay	Southern	1/13/11 9:00	G	7.4	7.3	230	5.2	-98.6	810	460	118	4	22	15.4	12	2.5	9.5	3.1	0.29	3.39	12.89					1			
2	Recirculation Tanks Effluent																														
	RC1		Southern	1/13/11 11:45	G	7.2	7.2	190	1.6	-0.9	950	520	7	11	37	26.5	12	1.0	11	14	0.53	14.53	25.53					8,200			
	RC2		Southern	1/13/11 11:40	G	7.4	7.1	200	2.5	-5	1,000	570	4	9	41	29.2	13	0.0	13	16	0.22	16.22	29.22					9,100			
	RC3		Southern	1/13/11 11:40	G	7.4	6.9	220	2.0	-21.7	990	560	13	12	46	28.4	12	1.0	11	14	2.4	16.40	27.40					13,000			
	RC4		Southern	1/13/11 12:30	G	8.3	7.3	280	0.4	-121.9	1,050	600	12	9	57	31.5	18	2.0	16	10	3.5	13.50	29.50					8,700			
	RC5		Southern	1/13/11 11:10	G	7.0	7.1	220	1.5	-120.7	930	500	17	16	57	36.9	29	6.0	23	6.3	1.6	7.90	30.90					12,700			
	Stage 1 Recirculating Biofilters Effluent																														
	UNSAT-CL4	30" Clinoptilolite	Southern	1/13/11 11:15	G	7.9	7.3	170	11.0	55.5	970	660	1	2	13	38.4	2.2	2.2	0.011	36	0.15	36.15	36.16					1			
	UNSAT-CL2	15" Clinoptilolite	Southern	1/13/11 9:50	G	6.0	7.0	180	7.9	-88.9	990	600	1	3	16	29.2	2.0	2.0	0.019	27	0.23	27.23	27.25					730			
	UNSAT-EC4	30" Expanded Clay	Southern	1/13/11 10:10	G	7.0	6.9	150	10.8	-88.8	960	600	1	2	16	32.9	2.4	2.4	0.038	30	0.50	30.50	30.54					21			
	UNSAT-SA2	30" Sand	Southern	1/13/11 10:10	G	6.3	6.8	190	9.6	-70.8	900	550	1	3	16	28.7	3.0	2.3	0.06	25	0.71	25.71	26.37					41			
	UNSAT-PS1	30" Polystyrene	Southern	1/13/11 10:15	G	5.8	7.3	200	5.2	-28.5	930	490	9	12	52	28.3	17	1.0	16	10	1.3	11.30	27.30					9,500			
	Pump 15 Tank (DENIT-L54 Influent)		Southern	1/13/11 9:20	G	5.0	7.0	200	6.4	-26.9	900	510	4	10	41	33.2	21	4.0	17	11	1.2	12.20	29.20					3,900			
3	Denite Feed Tank (Tank 3)																														
	DFT		Southern	1/13/11 10:35	G	6.4	7.0	160	9.8	-40.9	950	590	1	2	46	31.5	2.4	2.3	0.054	29	0.06	29.06	29.11					67	22		
	Stage 2 Horizontal Biofilters Effluent																														
	DENIT-SU1	80% Sulfur; 20% Oyster Shell	Southern	1/13/11 8:00	G	0.2	6.8	220	1.2	-231.2	1,060	760	1	8	22	3.0	2.6	2.1	0.46	0.11	0.24	0.35	0.81				270	5			
	DENIT-SU2	10% Limestone; 30% Sulfur; 60% Expanded Clay	Southern	1/13/11 8:00	G	0.3	6.8	200	1.6	-212.2	1,130	740	1	6	24	1.2	1.1	0.8	0.30	0.08	0.05	0.06	0.36	4.3	2.6	300	3				
	DENIT-L51	50% Lignocellulosic; 50% Expanded Clay	Southern	1/13/11 8:00	G	0.3	7.0	190	0.6	-173.1	910	590	1	2	16	23.9	1.8	1.8	0.007	22	0.1	22.10	22.11					1			
	DENIT-L51-D	50% Lignocellulosic; 50% Expanded Clay	Pace	1/13/11 8:00	G	0.3	7.0	219	0.6	-173.1	910	640	5	3	20.5	22.3	0.63	0.6	0.020	21.5	0.12	21.62	21.64	5.2			55.5	1			
	DENIT-GL1	12" Gravel; 60" Expanded Clay	Southern	1/13/11 8:00	G	0.3	6.6	400	0.9	-208.7	1,000	540	3	17	48	6.5	6.3	0.5	5.8	0.11	0.04	0.15	5.95					1			
	In-situ Simulator Biofilters Effluent																														
	UNSAT-IS1 (receives STE)	15" Sand; 12" Mix (45% EC, 35% Ligno, 20% Sulfur)	Southern	1/13/11 10:00	G	1.2	6.7	430	0.4	-141.2	1,200	480	7	65	120	64.4	64	6.0	58	0.08	0.29	0.37	58.37				7	10			
4	UNSAT-IS2 (receives NO <sub>2</sub> )	12" Sand; 12" Mix (45% EC, 35% Ligno, 20% Sulfur)	Southern	1/13/11 8:15	G	6.2	6.8	200	3.9	-234.5	680	710	1	6	18	1.3	1.1	0.6	0.53	0.01	0.21	0.22	0.75				250	1			
	UNSAT-IS3-SP (receives STE)	12" Sand; 10" Mix (60% EC, 40% Ligno)	Southern	1/13/11 14:10	G	4.0	7.5	210	12	39.2	980	600	3	2	26	7.7	1.8	1.8	0.036	3.70	2.20	5.90	5.94				130				
	UNSAT-IS3 (receives STE)	12" Sand; 10" Mix (60% EC, 40% Ligno); 3" Sulfur	Southern	1/11/11 8:20	G	11.6	6.97	300	0.4	136.5	1,331	850	10	2	31	36.4	4.1	2.9	1.2	24.0	8.3	32.30	33.50					120			
	UNSAT-IS3 (receives STE)	12" Sand; 10" Mix (60% EC, 40% Ligno); 3" Sulfur	Pace	1/11/11 8:20	G	11.6	6.97	280	0.4	136.5	1,331	868	10		24.2	41.8	1.9	0.8	1.1	31.3	8.6	39.90	41.03	0.50			116	1			
	UNSAT-IS4-SP (receives NO <sub>2</sub> )	12" Sand; 10" Mix (60% EC, 40% Ligno)	Southern	1/13/11 14:00	G	5.1	6.40	100	12.0	35.1	1,050	710	1	2	22	52.4	3.5	3.4	0.1	46.0	2.9	48.90	49.00					90	1		
	UNSAT-IS4 (receives NO <sub>2</sub> )	12" Sand; 10" Mix (60% EC, 40% Ligno); 3" Sulfur	Southern	1/11/11 8:30	G	11.6	7.08	260	1.0	150.4	993	620	7	2	29	1.0	0.87	0.8	0.092	0.11	0.01	0.12	0.21				110				
5	UNSAT-IS4 (receives NO <sub>2</sub> )	12" Sand; 10" Mix (60% EC, 40% Ligno); 3" Sulfur	Pace	1/11/11 8:30	G	11.6	7.08	264	1.0	150.4	993	637	5.0	29	5.5	1.1	1.0	0.9	0.052	0.050	0.050	0.10	0.15	3.9			119	1			
	Field Blank	Reagent Water	Southern	1/13/11 8:45	S	5.0	7.0	2	9.8	-54.6	40	1	1	2	10	0.1	0.05	0.05	0.005	0.01	0.01	0.02	0.03					1			
	Equipment Blank	Reagent Water - Cleaned STE Bottle #2	Southern	1/13/11 11:30	S	5.3	7.0	2	9.8	-54.6	40	1	1	2	10	0.1	0.05	0.04	0.008	0.01	0.01	0.02	0.03					1			

**Table 4**  
**Sample Event No. 4 External QC Sample Results**

Sample ID	Total Alkalinity (mg/L)		TDS (mg/L)		TSS (mg/L)		CBOD <sub>5</sub> (mg/L)		COD (mg/L)		TKN (mg/L N)		NH <sub>3</sub> -N (mg/L N)		NO <sub>3</sub> -N (mg/L N)		NO <sub>2</sub> -N (mg/L N)		SO <sub>4</sub> (mg/L)		Fecal (Ct/100 mL)	
	Value	% diff	Value	% diff	Value	% diff	Value	% diff	Value	% diff	Value	% diff	Value	% diff	Value	% diff	Value	% diff	Value	% diff	Value	% diff
STE Lab	380		470		83		78		230		66		57		0.02		0.01		13		8,900	
STE Dup	340	-10.5%	470	0.0%	64	-22.9%	85	9.0%	280	21.7%	62	-6.1%	58	1.8%	0.05		0.01	0.0%			11,100	
STE Split	351	-7.6%	570	21.3%	15.5	-81.3%	87.9	12.7%	290	26.1%	61.1	-7.4%	51.3	-10.0%	0.12	MDL	0.12	MDL	17.6	35.4%	100	
EC1 Lab	160		730		1		2		16		4.0		1.7		45		0.11		61		3,900	
EC1 Dup	180	12.5%	720	-1.4%	1	0.0%	2	0.0%	24	50.0%	4.1	2.5%	1.6	-5.9%	44	-2.2%	0.11	0.0%			3,000	
EC3 Lab	210		740		1		2		11		3.5		0.005		44		0.01				4	
EC3 Split	222	5.7%	914	23.5%	5	MDL	3	MDL	16.2	47.3%	0.42	-88.0%	0.020	MDL	35.1	-20.2%	0.25	MDL	64.4		12	
CL1 Lab	180		710		1		2		16		2.7		0.020		31		0.16		59		100	
CL1 Dup	280	55.6%	700	-1.4%	3	N/A	2	0.0%	20	25.0%	2.9	7.4%	0.020	0.0%	21	-32.3%	0.18	12.5%			40	
CL3 Lab	300		810		1		2		13		2.7		0.016		41		0.07				110	
CL3 Dup	280	-6.7%	840	3.7%	2	N/A	2	0.0%	16	23.1%	2.8	3.7%	0.018	12.5%	40	-2.4%	0.06	-14.3%			25	
IS1 Lab	190		590		1		2		16		1.8		0.007		22		0.1				1	
IS1 Split	219	15.3%	640	8.5%	5	MDL	3	MDL	20.5	28.1%	0.63	-65.0%	0.020	MDL	21.5	-2.3%	0.12	MDL	55.5			
IS3 Lab	300		850		10		2		31		4.1		1.2		24.0		8.3		120			
IS3 Split	280	-6.7%	868	2.1%	10	0.0%			24.2	-21.9%	1.9	-53.7%	1.1	-8.3%	31.3	30.4%	8.6	3.6%	116	-3.3%	1	
IS4 Lab	260		620		7		2		29		0.87		0.092		0.11		0.01		110			
IS4 Split	264	1.5%	637	2.7%	5.0	MDL			29.5	1.7%	1.0	14.9%	0.052	-43.5%	0.050	-54.5%	0.050	MDL	119	8.2%	1	
Field Blank	2		10		1		2		10		0.05		0.005		0.01		0.01				1	
Equipment Blank	2		10		1		2		10		0.05		0.008		0.01		0.01				1	

Table 5  
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 <sub>5</sub> (mg/L)	COD (mg/L)	TN (mg/L N) <sup>1</sup>	TKN (mg/L N)	Organic N (mg/L N) <sup>2</sup>	NH <sub>3</sub> -N (mg/L N)	NO <sub>3</sub> -N (mg/L N)	NO <sub>2</sub> -N (mg/L N)	NO <sub>x</sub> (mg/L N)	TIN (mg/L N) <sup>3</sup>	TP (mg/L)	Sulfide (mg/L)	H <sub>2</sub> S (mg/L)	SO <sub>4</sub> (mg/L)	Fecal (Ct/100 mL)	
STE Sample																										
STE-Tank 1		n	12	12	10	9	8		12	10	12	12	8	10	12	10	10	3	3	10	9	4	3	4	5	7
		MEAN	23.2		333.5	1.4	-252.8	1077.3	417.7	39.4	71.2	247.6	58.0	59.0	8.0	49.9	0.06	0.05	0.06	47.3	8.8	15.7	8.4	13.9		
		STD. DEV.	5.9		77.6			212.0	89.9	27.7	29.7		20.6	18.9	4.6	19.2	0.05	0.06	0.07	18.3	3.6	0.6	2.9	12.5		
		MIN	13.7	6.4	210.0	0.0	-308.9	649.0	240.0	12.8	22.0	210.0	25.9	25.9	-0.7	20.0	0.02	0.01	0.01	20.0	6.6	15.0	5.4	2.8	80	
		MAX	28.3	7.3	430.0	2.7	-230.0	1250.0	570.0	83.0	100.0	290.0	85.1	85.0	15.0	74.0	0.12	0.12	0.24	67.0	14.1	16.0	12.0	33.0	77000	
Stage 1 Single Pass Biofilters Effluent																										
UNSAT-EC1	15" Expanded Clay	n	5	5	5	5	4		5	5	5	5	4	5	5	5	5	2	2	5	5	1	3	3	4	3
		MEAN	18.4		152.0	7.4	79.6	1008.4	648.0	1.0	2.0	15.8	46.3	3.9	3.0	0.9	44.5	0.1	42.4	43.4	3.9	0.4	0.0	54.8		
		STD. DEV.	10.1		31.1			221.4	170.4	0.0	0.0		16.3	1.0	0.9	0.8	0.7	0.0	15.3	15.9		0.5	0.03	7.5		
		MIN	7.8	6.7	110.0	6.8	36.5	617.0	350.0	1.0	2.0	10.0	21.2	2.2	2.2	0.01	44.0	0.11	19.0	19.0	3.9	0.1	0.01	46.0	1.0	
		MAX	28.6	7.3	180.0	7.9	137.5	1150.0	770.0	1.0	2.0	24.0	66.8	4.8	4.3	1.7	45.0	0.1	62.0	63.3	3.9	1.0	0.1	61.0	3900.0	
UNSAT-EC3	30" Expanded Clay	n	5	5	5	5	4		5	5	5	5	4	5	5	5	5	2	2	5	5	2				3
		MEAN	18.2		177.2	7.2	74.9	1079.0	730.8	2.0	2.2	13.3	47.1	2.9	2.4	0.5	39.6	0.1	44.3	44.8	4.8					
		STD. DEV.	11.2		59.9			210.3	194.2	1.7	0.4		24.0	1.7	1.2	1.1	6.3	0.2	22.8	23.7						
		MIN	6.3	6.8	84.0	6.7	38.7	712.0	410.0	1.0	2.0	10.0	21.2	2.4	0.4	0.005	35.1	0.01	19.0	19.0	3.9				1.0	
		MAX	29.2	7.3	222.0	7.9	117.0	1250.0	914.0	5.0	3.0	16.2	85.9	4.9	3.5	2.4	44.0	0.3	81.0	83.4	5.6				12.0	
UNSAT-CL1	15" Clinoptilolite	n	5	5	5	5	4		5	5	5	5	4	5	5	5	5	2	2	5	5	1	3	3	4	4
		MEAN	19.0		234.0	6.8	71.6	1131.6	686.0	2.6	2.0	16.5	33.2	2.7	2.7	0.013	26.000	0.170	30.5	30.5	8.0	0.5	0.03	51.5		
		STD. DEV.	10.2		36.5			161.4	127.0	2.6	0.0		10.9	0.1	0.1	0.007	7.071	0.014	11.0	11.0		0.5	0.04	11.4		
		MIN	8.2	7.1	180.0	3.5	32.3	857.0	470.0	1.0	2.0	10.0	20.7	2.6	2.6	0.005	21.000	0.160	18.0	18.0	8.0	0.1	0.01	37.0	10	
		MAX	29.5	8.3	280.0	8.8	116.2	1271.0	800.0	7.0	2.0	20.0	46.6	2.9	2.9	0.020	31.000	0.180	44.0	44.0	8.0	1.0	0.08	62.0	100	
UNSAT-CL3	30" Clinoptilolite	n	5	5	5	5	4		5	5	5	5	4	5	5	5	5	2	2	5	5	1				3
		MEAN	18.8		296.0	8.3	56.2	1248.4	774.0	1.4	2.0	19.5	46.4	3.0	3.0	0.012	40.500	0.065	43.4	43.4	6.8					
		STD. DEV.	9.9		27.0			159.0	126.2	0.5	0.0		22.0	0.6	0.6	0.005	0.707	0.007	22.1	22.1						
		MIN	8.3	7.3	270.0	6.9	20.2	974.0	550.0	1.0	2.0	13.0	22.8	2.7	2.7	0.005	40.000	0.060	20.0	20.0	6.8				3.0	
		MAX	28.7	8.6	340.0	9.9	100.5	1388.0	850.0	2.0	2.0	29.0	82.7	4.0	4.0	0.018	41.000	0.070	80.0	80.0	6.8				110.0	
UNSAT-PS1 (old)	30" Polystyrene	n	2	2	2	2	1		2	2	2	2	1	2	2	2	2	0	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	0.0	0.0	8.8	35.0	5.9					
		STD. DEV.	1.1		84.9			290.6	106.1	1.4	1.9		25.4	26.2	1.8	28.0	0.0	0.0	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	0.0	0.0	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	0.0	0.0	9.3	54.2	5.9				930	
Stage 2 Single Pass Upflow Biofilters Effluent																										
DENIT-SU4 (old)	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			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			0.01	0.1	3.2	0.1	0.01	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-SU4 (new)	10% Limestone; 30% Sulfur; 60% Expanded Clay	n	3	3	2	3	3		3	2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	
		MEAN	16		225	4.5	-27	1506	1050	4	2	17	1.1	1.0	0.9	0.2	0.1	0.03	0.08	0.24		1	0.09	490		
		STD. DEV.	-		21			155	71	3	0		0.3	0.2	0.1	0.1			0.08	0.16		0.61	0.01	98.99		
		MIN	7	7	210	1.6	-118	1350	1000	2	2	13	0.9	0.9	0.8	0.1	0.1	0.03	0.02	0.12		0.14	0.08	420		
		MAX	21	7	240	7.8	138	1659	1100	6	2	20	1.3	1.2	1.0	0.2	0.1	0.03	0.13	0.35		1.00	0.09	560		
DENIT-LS3	50% Lignocellulosic; 50% Sand	n	5	5	4	5	4		5	4	4	4	3	4	4	4	4	1	1	4	4	1				2
		MEAN	19.9		220.0	2.8	56.7	1118.2	670.0	1.3	4.5	18.7	26.5	3.0	2.5	0.4	43.0	0.1	23.5	23.9	3.3					
		STD. DEV.	8.9		16.3			267.1	210.9	0.5	5.0		18.4	1.0	1.2	0.4			18.3	17.9						
		MIN	6.6	6.7	200.0	0.1	-79.0	695.0	370.0	1.0	2.0	11.0	2.0	2.0	1.1	0.0	43.0	0.1	0.01	1.0	3.3				1.0	
		MAX	28.1	7.7	240.0	5.4	259.3	1432.0	840.0	2.0	12.0	29.0	45.4	4.3	3.8	1.0	43.0	0.1	43.1	43.1	3.3				1.0	
DENIT-SU3	80% Sulfur; 20% Oyster Shell	n	5	5	4	5	4		5	4	4	4	3	4	4	4	4	1	1	4	4	1	3	3	4	2
		MEAN	20.8		245.0	2.2	-220.0	1472.2	952.5	7.5	6.8	38.3	2.4	2.4	1.7	0.7	0.01	0.04	0.04	0.7	6.2	4.7	2.4	430.0		
		STD. DEV.	8.6		50.7			148.7	168.4	7.2	5.2		0.5	0.5	0.5	0.2			0.02	0.2		2.3	1.9	92.0		
		MIN	6.9	6.7	170.0	0.1	-279.6	1257.0	710.0	1.0	2.0	26.0	1.9	1.8	1.2	0.5	0.01	0.04	0.01	0.5	6.2	2.4	0.9	340.0	1.0	
		MAX	28.4	7.2	280.0	7.7	-180.0	1655.0	1100.0	16.0	13.0	50.0	3.0	2.9	2.2	0.8	0.01	0.04	0.1	0.9	6.2	7.0	4.5	550.0	6.0	
DENIT-LS2 (old)	50% Lignocellulosic; 50% Expanded Clay	n	2	2	2	2	1		2	2	2	1	2	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			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-LS2 (new)	25% Lignocellulosic; 75% Expanded Clay	n	3	3	2	3	3		3	2	2	2	2	2	2	2	2	1	1	2	2					1
		MEAN	15.4		330.0	4.5	66.4	1315.7	820.0	1.5	2.0	21.0	31.8	3.3	3.2	0.1	41.0	0.1	28.5	28.6					0.0	
		STD. DEV.	7.7		14.1			124.2	56.6	0.7	0.0		16.9	0.8	0.8	0.0			17.7	17.7					0.0	
		MIN	6.8	7.3	320.0	4.1	-135.0	1200.0	780.0	1.0	2.0	16.0	19.8	2.7	2.6	0.1	41.0	0.1	16.0	16.1					1.0	
		MAX	21.5	7.6	340.0	5.0	263.1	1447.0	860.0	2.0	2.0	26.0	43.8	3.8	3.7	0.1	41.0	0.1	41.1	41.2					1.0	
DENIT-LS4	30% Lignocellulosic; 70% Expanded Clay	n	55																							

**Table 5 (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 <sub>5</sub> (mg/L)	COD (mg/L)	TN (mg/L N) <sup>1</sup>	TKN (mg/L N)	Organic N (mg/L N) <sup>2</sup>	NH <sub>3</sub> -N (mg/L N)	NO <sub>2</sub> -N (mg/L N)	NO <sub>3</sub> -N (mg/L N)	NOx (mg/L N)	TIN (mg/L N) <sup>3</sup>	TP (mg/L)	Sulfide (mg/L)	H <sub>2</sub> S (mg/L)	SO <sub>4</sub> (mg/L)	Fecal (Ct/100 mL)
Recirculation Tanks Effluent																									
RC1		n	4	4	4	3	3	4	4	4	4	3	4	4	4	4	1	1	4	4	1				2
		MEAN	22.2		185.0	1.2	-24.1	899.5	495.0	4.0	5.5	29.3	36.9	15.3	4.8	10.4	14.0	0.5	21.6	32.1	5.8				
		STD. DEV.	11.0		20.8			177.0	112.7	2.6	4.1		12.7	2.4	3.4	3.3			10.9	13.6					
		MIN	7.2	7.2	160.0	0.03	-128.3	637.0	330.0	1.0	2.0	22.0	26.5	12.0	1.0	5.7	14.0	0.5	12.0	17.7	5.8				114.0
		MAX	30.8	7.3	210.0	2.1	57.0	1011.0	580.0	7.0	11.0	37.0	53.0	17.0	9.3	13.0	14.0	0.5	36.0	49.0	5.8				8200.0
RC2		n	4	4	4	3	3	4	4	4	4	3	4	4	4	4	1	1	4	4	1				
		MEAN	21.9		182.5	1.4	-18.2	932.5	515.0	2.5	5.3	33.3	34.8	16.0	4.4	11.6	16.0	0.2	18.8	30.4	4.2				
		STD. DEV.	10.9		31.0			169.5	117.3	1.3	3.8		7.9	2.6	4.3	4.3			5.7	9.6					
		MIN	7.4	7.1	140.0	0.1	-108.2	679.0	340.0	1.0	2.0	24.0	27.0	13.0	0.0	5.3	16.0	0.2	12.0	17.3	4.2				99.0
		MAX	30.5	7.3	210.0	2.5	58.5	1031.0	590.0	4.0	9.0	41.0	43.0	19.0	9.7	15.0	16.0	0.2	24.0	38.0	4.2				9100.0
RC3		n	4	4	4	3	3	4	4	4	4	3	4	4	4	4	1	1	4	4	1				
		MEAN	21.5		210.0	1.5	41.6	979.5	515.0	6.5	6.6	48.7	34.1	14.8	5.5	9.3	14.0	2.4	19.4	28.7	6.4				
		STD. DEV.	10.6		41.6			157.1	104.7	4.9	4.7		8.3	3.4	4.2	2.9			9.5	10.3					
		MIN	7.4	6.9	160.0	0.1	-21.7	760.0	360.0	1.0	2.0	39.0	27.0	12.0	1.0	5.5	14.0	2.4	11.0	16.5	6.4				109.0
		MAX	30.2	7.6	260.0	2.3	89.0	1128.0	590.0	13.0	12.0	61.0	45.0	19.0	10.5	12.0	14.0	2.4	33.0	41.7	6.4				13000.0
RC4		n	4	4	4	3	3	4	4	4	4	3	4	4	4	4	1	1	4	4	1				2
		MEAN	21.8		235.0	0.8	0.1	1015.8	552.5	11.8	4.7	37.3	32.9	15.5	5.0	10.5	10.0	3.5	17.4	27.9	6.7				
		STD. DEV.	10.2		44.3			138.9	102.4	7.8	2.9		4.7	3.1	3.9	4.5			7.0	8.0					
		MIN	8.3	7.3	180.0	0.0	-121.9	811.0	400.0	2.0	2.7	26.0	27.0	11.0	2.0	5.5	10.0	3.5	11.0	16.5	6.7				112.0
		MAX	30.4	7.8	280.0	1.9	73.0	1112.0	620.0	21.0	9.0	57.0	38.0	18.0	10.5	16.0	10.0	3.5	27.0	35.4	6.7				8700.0
RC5		n	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2				
		MEAN	15.0		240.0	2.4	-12.4	990.0	490.0	12.5	12.0	59.0	41.0	30.0	4.5	25.5	6.3	1.6	11.0	36.5					
		STD. DEV.																							
		MIN	7.9	7.1	220.0	1.5	-120.7	930.0	480.0	8.0	8.0	57.0	36.9	29.0	3.0	23.0	6.3	1.6	7.9	30.9					
		MAX	22.0	7.3	260.0	3.3	96.0	1050.0	500.0	17.0	16.0	61.0	45.0	31.0	6.0	28.0	6.3	1.6	14.0	42.0					
Stage 1 Recirculating Biofilters Effluent																									
UNSAT-CL4	30" Clinoptilolite	n	4	4	4	4	3	4	4	4	4	3	4	4	4	4	1	1	4	4	1				2
		MEAN	22.1		207.5	8.3	47.9	1011.0	620.0	2.8	2.0	12.3	34.1	2.3	2.3	0.01	36.00	0.15	31.8	31.8	7.6				
		STD. DEV.	9.8		47.9			131.5	93.8	3.5	0.0		16.1	0.2	0.2	0.01			16.2	16.1					
		MIN	7.9	6.7	170.0	7.1	35.5	860.0	480.0	1.0	2.0	11.0	10.3	2.1	2.1	0.005	36.000	0.150	7.9	7.9	7.6				1.0
		MAX	29.3	7.8	270.0	11.0	55.5	1174.0	680.0	8.0	2.0	13.0	45.1	2.6	2.6	0.02	36.00	0.15	43.0	43.0	7.6				1.0
UNSAT-CL2	15" Clinoptilolite	n	4	4	4	4	3	4	4	4	4	3	4	4	4	4	1	1	4	4	1				2
		MEAN	20.8		175.0	6.6	-2.8	955.3	580.0	1.8	2.3	20.7	36.9	2.4	2.4	0.011	27.000	0.230	34.6	34.6	7.1				
		STD. DEV.	10.0		37.9			119.1	95.6	1.0	0.5		17.3	0.5	0.5	0.006			17.0	17.0					
		MIN	6.0	7.0	120.0	5.4	-88.9	781.0	440.0	1.0	2.0	16.0	17.1	2.0	2.0	0.005	27.000	0.230	15.0	15.0	7.1				4.0
		MAX	27.1	7.9	200.0	7.9	50.2	1050.0	650.0	3.0	3.0	24.0	56.3	3.1	3.1	0.019	27.000	0.230	54.0	54.0	7.1				730.0
UNSAT-EC4	30" Expanded Clay	n	4	4	4	4	3	4	4	4	4	3	4	4	4	4	1	1	4	4	1				2
		MEAN	21.3		145.0	7.9	12.2	900.3	562.5	1.3	2.0	13.0	36.3	2.4	2.4	0.02	30.00	0.50	33.9	33.9	3.8				
		STD. DEV.	9.9		12.9			160.3	143.8	0.5	0.0		14.0	0.4	0.4	0.02			13.8	13.8					
		MIN	7.0	6.9	130.0	6.9	-88.8	661.0	350.0	1.0	2.0	10.0	18.9	1.9	1.9	0.005	30.00	0.50	17.0	17.0	3.8				1.0
		MAX	28.5	7.3	160.0	10.0	78.8	1000.0	660.0	2.0	2.0	16.0	52.3	2.9	2.9	0.04	30.00	0.50	50.0	50.0	3.8				21.0
UNSAT-SA2	30" Sand	n	4	4	4	4	3	4	4	4	4	3	4	4	4	4	1	1	4	4	1				2
		MEAN	20.9		122.5	7.6	22.0	846.8	532.0	4.0	2.3	17.0	32.2	3.0	2.6	0.4	25.0	0.7	29.2	29.5	6.3				
		STD. DEV.	10.1		18.9			163.3	139.6	6.0	0.5		10.3	0.6	0.5	0.4			9.7	9.9					
		MIN	6.2	6.0	110.0	6.3	-70.8	604.0	330.0	1.0	2.0	13.0	19.2	2.2	2.2	0.01	25.0	0.7	17.0	17.0	6.3				1.0
		MAX	28.2	6.9	150.0	9.6	89.2	953.0	638.0	13.0	3.0	22.0	41.5	3.5	3.3	0.7	25.0	0.7	38.0	38.7	6.3				41.0
UNSAT-PS1 (new recirc)	30" Polystyrene	n	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2					1
		MEAN	14.8		200.0	6.5	30.8	940.0	520.0	7.0	8.0	45.5	63.2	22.5	4.0	18.5	10.0	1.3	40.7	59.2					
		STD. DEV.	12.7		0.0			14.1	42.4	2.8	5.7		49.3	7.8	4.2	3.5			41.5	45.0					
		MIN	5.8	7.2	200.0	5.2	-28.5	930.0	490.0	5.0	4.0	39.0	28.3	17.0	1.0	16.0	10.0	1.3	11.3	27.3					9500.0
		MAX	23.8	7.3	200.0	7.8	90.0	950.0	550.0	9.0	12.0	52.0	98.0	28.0	7.0	21.0	10.0	1.3	70.0	91.0					9500.0
Pump 15 Tank (DENIT-LS4 Influent)		n	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2					1
		MEAN	12.9		200.0	6.8	-4.1	935.0	530.0	5.0	6.5	37.0	37.6	21.0	4.0	17.0	11.0	1.2	16.6	33.6					
		STD. DEV.	11.1		0.0			49.5	28.3	1.4	4.9		6.2	0.0	0.0	0.0			6.2	6.2					
		MIN	5.0	7.0	200.0	6.4	-26.9	900.0	510.0	4.0	3.0	33.0	33.2	21.0	4.0	17.0	11.0	1.2	12.2	29.2					3900.0
		MAX	20.7	7.4	200.0	7.1	18.8	970.0	550.0	6.0	10.0	41.0	42.0	21.0	4.0	17.0	11.0	1.2	21.0	38.0					3900.0



**Table 5 (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 <sub>5</sub> (mg/L)	COD (mg/L)	TN (mg/L N) <sup>1</sup>	TKN (mg/L N)	Organic N (mg/L N) <sup>2</sup>	NH <sub>3</sub> -N (mg/L N)	NO <sub>3</sub> -N (mg/L N)	NO <sub>2</sub> -N (mg/L N)	NOx (mg/L N)	TIN (mg/L N) <sup>3</sup>	TP (mg/L)	Sulfide (mg/L)	H <sub>2</sub> S (mg/L)	SO <sub>4</sub> (mg/L)	Fecal (Ct/100 mL)	
Denite Feed Tank (Tank 3)																										
DFT		n	4	4	4	4	3	4	4	4	4	3	4	4	4	4	1	1	4	4	1	3	3	4	2	
		MEAN	20.0		162.5	8.2	15.6	923.5	567.5	1.0	2.0	28.7	28.7	3.0	2.9	0.1	29.0	0.1	25.8	25.8	6.5	0.4	0.0	57.3		
		STD. DEV.	10.0		28.7			123.1	121.8	0.0	0.0		10.8	0.5	0.4	0.1			11.1	11.1		0.5	0.1	9.9		
		MIN	6.4	7.0	130.0	7.3	-40.9	744.0	390.0	1.0	2.0	18.0	19.5	2.4	2.3	0.01	29.0	0.06	16.0	16.2	6.5	0.1	0.01	46.0	1.0	
		MAX	28.1	8.1	200.0	9.8	62.2	1020.0	660.0	1.0	2.0	46.0	42.8	3.5	3.3	0.2	29.0	0.1	40.0	40.0	6.5	1.0	0.1	67.0	22.0	
Stage 2 Horizontal Biofilters Effluent																										
DENIT-SU1	80% Sulfur; 20% Oyster Shell	n	4	4	4	4	3	4	4	4	4	3	4	4	4	4	1	1	4	4	1	3	3	4	2	
		MEAN	20.2		222.5	0.9	-272.8	1248.8	830.0	1.0	19.0	45.0	2.5	2.4	1.1	1.3	0.1	0.2	0.1	1.4	5.0	23.7	10.7	325.0		
		STD. DEV.	13.4		17.1	0.7		165.3	150.1	0.0	8.1		0.4	0.4	0.8	0.9			0.2	0.8		6.1	1.4	97.1		
		MIN	0.2	6.8	200.0	0.1	-317.2	1080.0	660.0	1.0	8.0	22.0	2.0	1.9	0.3	0.5	0.1	0.2	0.01	0.8	5.0	17.0	9.2	230.0	3.0	
		MAX	28.0	7.2	240.0	1.6	-231.2	1473.0	1000.0	1.0	26.0	63.0	3.0	2.7	2.1	2.4	0.1	0.2	0.4	2.4	5.0	29.0	12.0	450.0	5.0	
DENIT-SU2 (old)	80% Sulfur; 20% Sodium Sesqui.	n	2	2	2	2	1	2	2	2	2	1	2	2	2	2	1	1	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			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	0.01			0.025	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-SU2 (new)	10% Limestone; 30% Sulfur; 60% Expanded Clay	n	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	1	
		MEAN	12.9		205.0	0.9	-151.1	1240.0	870.0	4.5	4.0	21.0	1.0	0.9	0.8	0.2	0.01	0.1	0.05	0.2		2.7	1.3	395.0		
		STD. DEV.	17.8		7.1			155.6	183.8	4.9	2.8		0.3	0.3	0.1	0.2			0.02	0.2		2.3	1.8	134.4		
		MIN	0.3	6.8	200.0	0.2	-212.2	1130.0	740.0	1.0	2.0	18.0	0.8	0.7	0.7	0.03	0.01	0.1	0.03	0.1		1.0	0.01	300.0	3.0	
		MAX	25.5	7.0	210.0	1.6	-90.0	1350.0	1000.0	8.0	6.0	24.0	1.2	1.1	0.8	0.3	0.01	0.1	0.1	0.4		4.3	2.6	490.0	3.0	
DENIT-LS1	50% Lignocellulosic; 50% Expanded Clay	n	6	6	6	6	5	6	5	6	6	4	6	6	6	6	2	2	6	6	2				2	
		MEAN	14.7		224.8	0.5	-136.3	927.7	534.0	1.7	11.5	24.6	17.3	1.9	1.6	0.3	21.8	0.1	15.5	15.7	2.8					
		STD. DEV.	12.1		23.5			111.0	101.6	1.6	21.8		12.9	0.8	0.9	0.4	0.4	0.0	12.7	12.4						
		MIN	0.3	6.9	190.0	0.1	-199.7	738.0	370.0	1.0	2.0	16.0	1.5	0.6	0.6	0.005	21.5	0.100	0.01	0.7	0.5				1.0	
		MAX	27.3	7.7	250.0	1.1	-15.4	1076.0	640.0	5.0	56.0	44.0	33.7	2.7	2.7	0.8	22.0	0.1	31.0	31.0	5.2				1.0	
DENIT-GL1	12" Gravel; 60" Expanded Clay	n	4	4	4	4	3	4	4	4	4	4	4	4	4	4	1	1	5	4	1				2	
		MEAN	18.6		417.5	0.8	-187.9	1095.0	665.0	27.0	217.3	312.0	20.3	19.0	9.9	9.2	0.1	0.04	1.0	10.4	2.9					
		STD. DEV.	12.5		181.5			402.9	364.6	48.7	395.4		30.6	31.4	18.1	13.4			2.1	12.7						
		MIN	0.3	6.4	220.0	0.0	-208.7	794.0	380.0	1.0	3.0	22.0	2.0	1.9	0.5	0.9	0.1	0.04	0.04	1.0	2.9				1.0	
		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	0.1	0.04	4.7	29.1	2.9				800.0	
In-situ Simulator Biofilters Effluent																										
UNSAT-IS1 (receives STE)	15" Sand; 12" Mix (45% EC, 35% Ligno, 20% Sulfur)	n	6	6	6	6	5	6	6	6	6	4	6	6	6	6	1	1	6	6	2	5	5	6	3	
		MEAN	20.8		306.7	0.8	-73.9	1391.8	783.3	23.8	16.4	82.3	37.2	37.1	2.7	34.3	0.08	0.29	0.1	34.4	1.5	2.1	1.2	304.8		
		STD. DEV.	10.8		111.3			513.7	420.1	43.8	24.2		31.0	30.9	2.7	28.4			0.1	28.5	0.4	2.2	1.1	405.8		
		MIN	1.2	6.4	130.0	0.1	-246.2	1120.0	480.0	2.0	2.0	57.0	0.4	0.4	0.0	0.045	0.08	0.29	0.022	0.1	1.2	0.1	0.01	7.0	1.0	
		MAX	29.7	7.1	430.0	2.0	221.6	2438.0	1600.0	113.0	65.0	120.0	75.0	75.0	6.0	69.0	0.08	0.29	0.4	69.0	1.7	4.7	2.8	1100.0	10.0	
UNSAT-IS2 (receives NO <sub>3</sub> )	12" Sand; 12" Mix (45% EC, 35% Ligno, 20% Sulfur)	n	6	6	6	6	5	6	6	6	6	4	6	6	6	6	1	1	6	6	2	5	5	6	3	
		MEAN	21.4		176.7	1.0	-192.8	1474.8	1178.3	48.3	5.5	25.3	1.1	1.0	0.6	0.4	0.01	0.2	0.06	0.5	4.3	0.6	0.1	608.3		
		STD. DEV.	9.1		40.3			1097.7	897.8	45.1	4.5		0.4	0.3	0.3	0.3			0.08	0.3	3.9	0.5	0.3	588.2		
		MIN	6.2	6.1	100.0	0.1	-234.5	365.0	700.0	1.0	2.0	13.0	0.6	0.6	0.4	0.1	0.01	0.2	0.01	0.1	1.5	0.1	0.01	250.0	1.0	
		MAX	30.0	6.8	210.0	3.9	-130.0	3506.0	3000.0	108.0	13.0	50.0	1.5	1.5	1.2	0.8	0.01	0.2	0.22	0.9	7.0	1.0	0.6	1800.0	1.0	
UNSAT-IS3-SP (receives STE)	Sample Port below 10" Mix (60% EC, 40% Ligno), above 3" Sulfur layer	n	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10				10	
		MEAN	4.0		210.0	12.0	39.2	980.0	600.0	3.0	2.0	26.0	7.7	1.8	1.8	0.04	3.7	2.2	5.9	5.9					130.0	
		STD. DEV.																								
		MIN	4.0	7.5	210.0	12.0	39.2	980.0	600.0	3.0	2.0	26.0	7.7	1.8	1.8	0.04	3.7	2.2	5.9	5.9					130.0	
		MAX	4.0	7.5	210.0	12.0	39.2	980.0	600.0	3.0	2.0	26.0	7.7	1.8	1.8	0.04	3.7	2.2	5.9	5.9					130.0	
UNSAT-IS3 (receives STE)	12" Sand; 10" Mix (60% EC, 40% Ligno); 3" Sulfur	n	4	4	4	4	4	4	3	3	3	3	4	4	4	4	2	2	4	4	1	1	1	4	1	
		MEAN	12.7		282.5	0.5	150.6	1390.3	1339.3	8.0	3.0	33.7	38.2	4.2	1.0	3.1	27.7	8.5	34.1	37.2	0.5	1.0	0.01	166.5		
		STD. DEV.	4.3		12.6			82.1	832.0	3.5	1.0		3.4	1.8	1.3	2.5	5.2	0.2	5.1	3.9				83.0		
		MIN	8.7	6.7	270.0	0.4	136.5	1331.0	850.0	4.0	2.0	24.2	34.4	1.9	0.2	1.1	24.0	8.3	28.0	33.5	0.5	1.0	0.01	116.0	1.0	
		MAX	18.7	7.0	300.0	0.5	171.2	1505.0	2300.0	10.0	4.0	46.0	41.8	6.4	2.9	6.2	31.3	8.6	39.9	41.0	0.5	1.0	0.01	290.0	1.0	
UNSAT-IS4-SP (receives NO <sub>3</sub> )	Sample Port below 10" Mix (60% EC, 40% Ligno), above 3" Sulfur layer	n	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				1		
		MEAN	5.1		100.0	12.0	35.1	1050.0	710.0	1.0	2.0	22.0	52.4	3.5	3.4	0.1	46.0	2.9	48.9	49.0					92.0	
		STD. DEV.																								
		MIN	5.1	6.6	100.0	12.0	35.1	1050.0	710.0	1.0	2.0	22.0	52.4	3.5	3.4	0.1	46.0	2.9	48.9	49.0					92.0	
		MAX	5.1	6.6	100.0	12.0	35.1	1050.0	710.0	1.0	2.0	22.0	52.4	3.5	3.4	0.1	46.0	2.9	48.9	49.0					92.0	
UNSAT-IS4 (receives NO <sub>3</sub> )	12" Sand; 10" Mix (60% EC, 40% Ligno); 3" Sulfur	n	4	4	4	4	4	4	4	2	2	2	3	5	5	5	5	2	2	5	5	1			5	1
		MEAN	12.5	0.0	251.0	2.9	158.3	778.8	628.5	6.0	2.0	31.2	13.2	1.4	1.3	0.07	0.08	0.03	11.8	11.8	3.9				269.8	
		STD. DEV.	4.2	0.0	35.1			523.1	12.0	1.4	0.0		17.5	0.5	0.5	0.02	0.04	0.03	17.0	17.0					181.7	
		MIN	8.4	7.1	200.0	0.8	150.4	0.0	620.0	5.0	2.0	29.0	1.0	0.9	0.8	0.04	0.05	0.01	0.1	0.2	3.9				110.0	

### 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 following collection of liquid samples and field parameter analyses.

A flow test was conducted January 17, 2011. These flow measurements are considered to represent those in effect leading up to and during the Sample Event 4. The measured volumes and relative errors between measured and target flow rates are presented in Appendix C, Table 1. For the Group 1 systems, measured STE inputs to four of the five Stage 1 biofilters were within the 15% operational target that is considered acceptable for PNRS II flow rates. The measured influent volume of UNSAT-PS1 was - 24.3% of the target volume. Measured effluent volumes for Stage 1 single pass biofilters (Stage 2 influent) were within 14% of the target volume for four of the five systems (Appendix C, Table 1). The DENIT-LS4 influent pipe was substantially clogged which led to UNSAT-PS1 effluent backing up within the Pump 15 holding tank. Therefore a measurement of influent volume to DENIT-LS4 was unable to be taken.

For the Group 2 systems, all measured STE volumes to the Stage 1 recirculation tanks were within 14% of target volumes. All recycle flow volumes as recorded by the PLC were within 5% of target volumes based on the experimental design recycle ratio of 3.0. The calculated recycle ratios (i.e. recycle flow volume divided by the STE flow volume) for four of the five recirculation systems were within 12% of the target recycle ratio of 3.0. Although the recycle rate to the UNSAT-PS1 was close to target, the recycle ratio was high due to the low influent STE flow that was previously discussed.

For Group 3 systems, the measured influent volumes to the Stage 2 horizontal denitrification biofilters were all within 4% of target.

For Group 4 biofilters, the UNSAT-IS1 and UNSAT-IS2 measured influent volumes were within 15% of target volumes. The UNSAT-IS3 and UNSAT-IS4 measured influent volumes were within 3% of target volumes.

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

- Hydrosplitter 1 petcock valves were adjusted January 18<sup>th</sup> to provide equal distribution of flow to each of the five Stage 1 biofilters with input volumes as close to the target volume as possible.
- Influent pipe to DENIT-LS4 was unclogged January 18<sup>th</sup>

The flows were rechecked after modifications to the systems were made and are provided in Appendix C, Table 2. The UNSAT-PS1 measured influent volume is closer to the target as measured on January 18<sup>th</sup> which will continue to be monitored.

## **5.0 PNRS II Sample Event No. 4: Summary and Recommendations**

### **5.1 Summary**

The results of the fourth 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. 4 results indicate that:

- Delivered flowrates to all biofilters continued to be generally within 15% of target;
- Septic tank effluent (STE) quality supplied to PNRS II systems is reasonably characteristic of typical household STE quality due to system modifications;
- Nine out of ten Stage 1 unsaturated biofilters produced effluent  $\text{NH}_3\text{-N}$  of 1.7 mg/L or less;
- Five out of nine Stage 2 saturated biofilters produced effluent  $\text{NO}_x\text{-N}$  of 0.35 mg/L or less;

These results provide continuing support of the nitrogen reduction potential 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 can be addressed, as discussed in the following sections.

## 5.2 Recommendations

Careful observation of PNRS II systems and the results of Sample Events No. 1 to 4 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 been 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 Polystyrene Biofilter (UNSAT-PS1)

In Sample Event 4, the unsaturated recirculating biofilter with polystyrene media (UNSAT-PS1) exhibited better nitrogen performance as compared to Sample Event 1, 2 and 3. However, the polystyrene media is not performing as well as the other stage one media and does not appear likely to satisfy the objectives of the project. Therefore, it is recommended to discontinue this system.

### 5.2.2 Lignocellulosic Containing Biofilters (DENIT-LS1, DENIT-LS2, DENIT-LS3, DENIT-LS4, UNSAT-IS1, UNSAT-IS2, UNSAT-IS3 and UNSAT-IS4)

The three upflow and one horizontal denitrification biofilters with lignocellulosic media continued to show limited  $\text{NO}_x$  reduction in Sample Event 4. Possible reasons are lack of reactivity of lignocellulosic material, toxicity (release of toxic material from lignocellulosic material itself), or short circuiting as witnessed in the dye test. It is recommended to replace the lignocellulosic material in all the biofilters containing lignocellulosic media with new lignocellulosic material from a different source, and to rebuild these biofilters with special attention to minimizing the potential for hydraulic short circuiting.

### 5.2.3 UNSAT-IS1 and UNSAT-IS2 Ponding

The UNSAT-IS1 and UNSAT-IS2 biofilters exhibited ponding at the surface during this sample event. Following the sampling event, a clog in the discharge line was detected. It is recommended to replace the discharge PVC piping with clear tubing during the tank cleaning and media replacement to allow better visual inspection for clogs.

### 5.2.5 Continue to Monitor Quality of STE Supplied to PNRS II Systems

The characteristics of GCREC septic tank effluent in Sample Event 4 continued to be more typical of Florida single family residences than in previous sample events. It



seems likely that this was at least partially due to the system modifications that were implemented after Sample Event 2 but prior to Sample Event 3. Continued diligence will be maintained to insure that the PNRS II systems are supplied STE of acceptable characteristics.

### 5.2.6 Modify Operation

A track record of acceptable performance has been established for many PNRS II systems and increased flowrates are recommended. These are:

#### Stage 1 Biofilters

- Expanded clay and clinoptilolite media
  - increase loading rates:
    - Single pass: 3 gal/ft<sup>2</sup>-day to 5 gal/ft<sup>2</sup>-day STE
    - Recycle: 3 gal/ft<sup>2</sup>-day to 6 gal/ft<sup>2</sup>-day STE

#### Stage 2 Biofilters

- Sulfur
  - increase loading rates:
    - Single pass coupled: single pass Stage 1 effluent  
5.6 to 9.3 gal/ft<sup>2</sup>-day; 25.7 to 15.4 hour mean pore water residence time (MPWRT)
    - Horizontal: Stage 1 w/recycle combined effluent  
10 to 20 gal/ft<sup>2</sup>-day; 43 to 21.5 hour MPWRT
- Glycerol
  - increase loading rate: 10 to 20 gal/ft<sup>2</sup>-day; 43 to 21.5 hour MPWRT

## 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 All Systems Flow Check
7/1/2010	Sample Event #1
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

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Date	Description
7/16/2010	Capillary mat added to PS-1
7/19/2010	IS 1 changed discharge (rotated 180°) now 15 inches of saturation from bottom of tank
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
8/31/2010	Sample Event #2
9/1/2010	Replaced elbow for Recirc Tank #2 (STE tubing) to fix leak All Systems Flow Check
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
9/21/2010	Reconnected the glycerol tubing between bottle and pump head which had separated Added sample ports to recirculation pump tank discharge lines for flow measurement
9/28/2010	Glycerol batch #11 (70 mL glycerol; 1930 DI water), feed rate ~ 10 mL/dose New clear glycerol bottle with graduated sides, replaced tubing
10/5/2010	Pump 5 and 11 Error Code 18, cleared alarm and restarted pumps
10/6/2010	Glycerol batch #12 (30 mL glycerol; 1970 DI water), feed rate ~ 10 mL/dose

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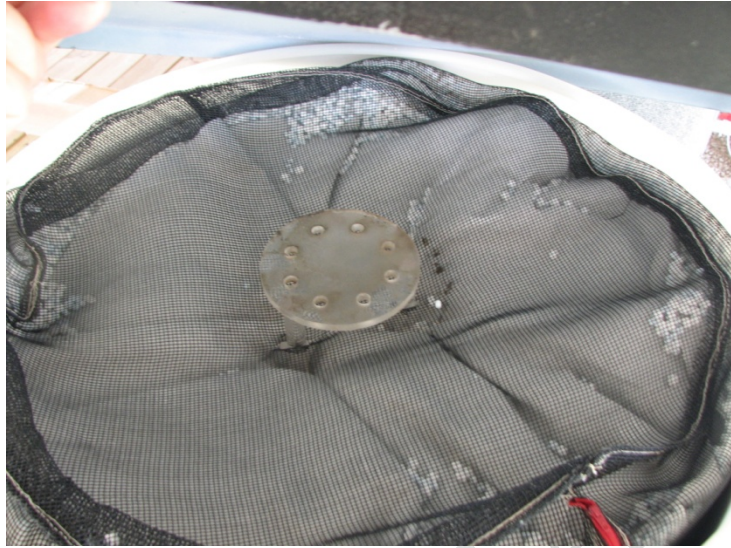
Date	Description
10/7/2010	Pump 5 and 11 Error Code 18, cleared alarm and restarted pumps
10/8/2010	Modified Pump 1 discharge pipe to extend through Tank 1 hole in baffle wall
10/11/2010	DENIT-GL-1 nitrified STE influent tubing had disconnected, reattached Calibrated IS1 and IS2 tubing Calibrated Stage 2 horizontal tubing
10/14/2010	Glycerol batch #13 (30 mL glycerol; 1970 DI water), feed rate ~ 10 mL/dose Built new in-situ columns IS3 and IS4
10/15/2010	Unclogged PS1 discharge pipe Cleaned Pump 1 intake screen Lowered Pump 1 Low Float 1 wrap to decrease volume in tank
10/18/2010	Completed IS3 and IS4 piping, started dosing @ 9:30 am Added 3" coarse sand to UNSAT-IS1 for complete nitrification
10/19/2010	Started dye test DENIT-LS2 and DENIT-LS3 Lowered Pump 1 Low Float 1 wrap to decrease volume in tank
10/20/2010	Calibrated IS3 and IS4 tubing Glycerol batch #14 (15 mL glycerol; 985 DI water), feed rate ~ 10 mL/dose
10/22/2010	Moved Pump 1 to effluent baffle tee of existing GCREC Tank 1 Converted UNSAT-PS1 to recirculating biofilter
10/25/2010	Glycerol batch #15 (15 mL glycerol; 985 DI water), feed rate ~ 10 mL/dose DENIT-SU4 media ~5.5" below initial level Removed DENIT-SU4, DENIT-SU2 and DENIT-LS2 media Cleaned tanks Replaced DENIT-SU2 media (30% sulfur, 10% limestone, 60% expanded clay mixture) Replaced DENIT-SU4 media (30% sulfur, 10% limestone, 60% expanded clay mixture) Replaced DENIT-LS2 media (25% lignocellulosic, 75% expanded clay mixture)
10/27/2010	Glycerol batch #16 (13.5 mL glycerol; 1973 DI water), feed rate ~ 10 mL/dose
11/1/2010	Glycerol batch #17 (13.5 mL glycerol; 1973 DI water), feed rate ~ 10 mL/dose
11/5/2010	Glycerol batch #18 (13.5 mL glycerol; 986.5 DI water), feed rate ~ 10 mL/dose
11/10/2010	Sample Event #3
11/11/2010	Glycerol batch #19 (13.5 mL glycerol; 1973 DI water), feed rate ~ 10 mL/dose
11/18/2010	Glued UNSAT-IS3 and UNSAT-IS4 discharge piping to stop potential leaks Glycerol batch #20 (13.5 mL glycerol; 1973 DI water), feed rate ~ 10 mL/dose Calibrated UNSAT-IS3 and IS4 tubing
11/19/2010	All Systems Flow Check
11/24/2010	Glycerol batch #21 (13.5 mL glycerol; 1973 DI water), feed rate ~ 10 mL/dose
11/29/2010	Glycerol batch #22 (13.5 mL glycerol; 1973 DI water), feed rate ~ 10 mL/dose

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Date	Description
11/29/2010	Threaded and glued UNSAT-IS3 and UNSAT-IS4 petcock valves
12/1/2010	Tank 1 low-low float alarm activated, high float had activated in Tank 1 preventing Pump 1 to run. Cleared both alarms
12/3/2010	Cleared plug in DENIT-LS4 influent piping Replaced Hydrosplitter 1 & 2 tubing Replaced Pump 11 pump and system tubing Replaced Pump 5 pump and system tubing Glycerol batch #23 (13.5 mL glycerol; 1973 DI water), feed rate ~ 10 mL/dose
12/7/2010	Hydrosplitter 1 Flow Check Calibrated UNSAT-IS3 and IS4 tubing
12/10/2010	Glycerol batch #24 (13.5 mL glycerol; 1973 DI water), feed rate ~ 10 mL/dose
12/13/2010	Pump 5 and 11 Error Code 18, cleared alarm and restarted pumps
12/14/2010	Increased Pump 15 runtime to 6:1 recycle rate
12/17/2010	Glycerol batch #25 (13.5 mL glycerol; 1973 DI water), feed rate ~ 10 mL/dose
12/22/2010	UNSAT-IS3 and IS4 effluent samples sent to Southern
12/23/2010	DENIT-LS4, LS2, SU3, LS3, and SU4 effluent sample to Southern Glycerol batch #26 (13.5 mL glycerol; 1973 DI water), feed rate ~ 10 mL/dose
12/27/2010	Pump 5 and 11 Error Code 18, cleared alarm and restarted pumps
12/30/2010	Hydrosplitter 1 Flow Check Glycerol batch #27 (13.5 mL glycerol; 1973 DI water), feed rate ~ 10 mL/dose All Systems Flow Check
1/6/2011	Glycerol batch #28 (13.5 mL glycerol; 1973 DI water), feed rate ~ 10 mL/dose
1/11/2011	UNSAT-IS3 and IS4 effluent Sample Event #4 samples sent to Southern Ponding at surface of UNSAT-IS1 and IS2 Cleared line blockage at outlet from IS1 and IS2
1/13/2011	Sample Event #4 Glycerol batch #29 (13.5 mL glycerol; 1973 DI water), feed rate ~ 10 mL/dose
1/14/2011	Stage 2 Profile Samples sent to Southern
1/17/2011	Pump 5 and 11 Error Code 18, cleared alarm and restarted pumps All Systems Flow Check Cleaned all recirculation system Stage 1 distribution pipes with tap water Pump 7 was air locked - restarted
1/18/2011	Hydrosplitter 1 Flow Check - calibration

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**Figure A.1**  
**Capillary Mat Installed above Polystyrene Media 7/16/10**

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**Figure A.2**  
**Revised In-situ Simulators Discharge Piping 7/20/10**



**Figure A.3**  
**RC1 Outlet Tee 8/4/10**

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**Figure A.4**  
**UNSAT-CL4 before Cleaning 8/4/10**

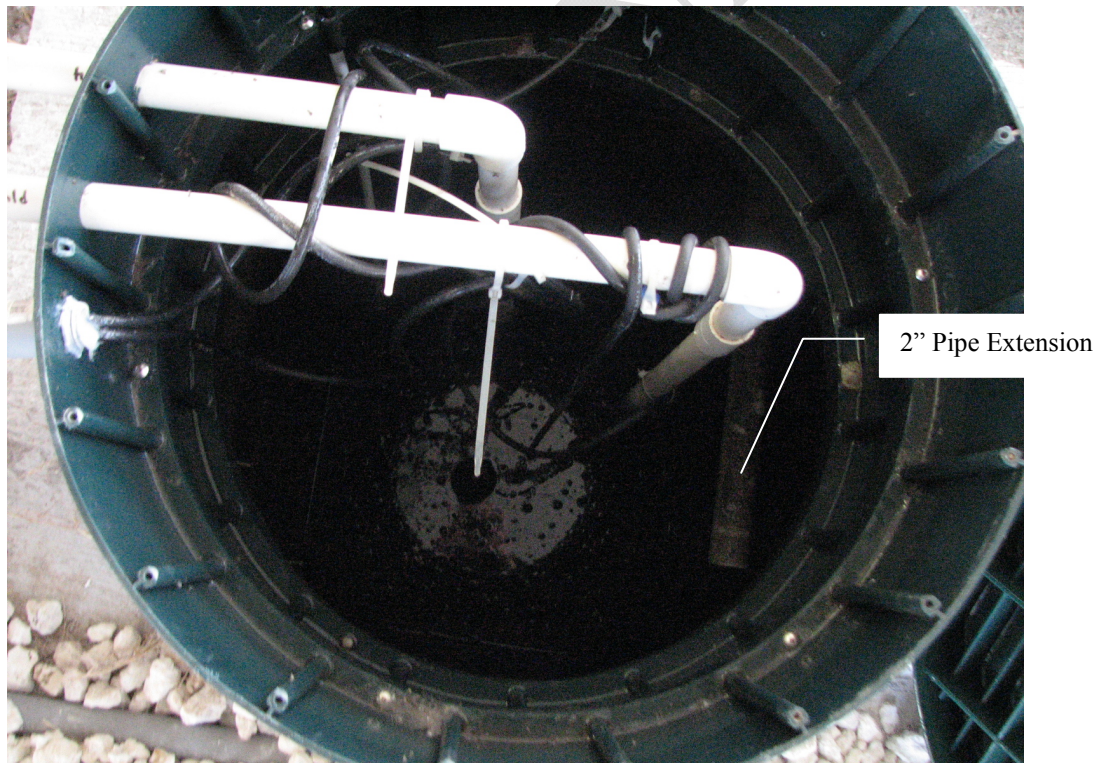


**Figure A.5**  
**UNSAT-CL4 after Cleaning 8/4/10**

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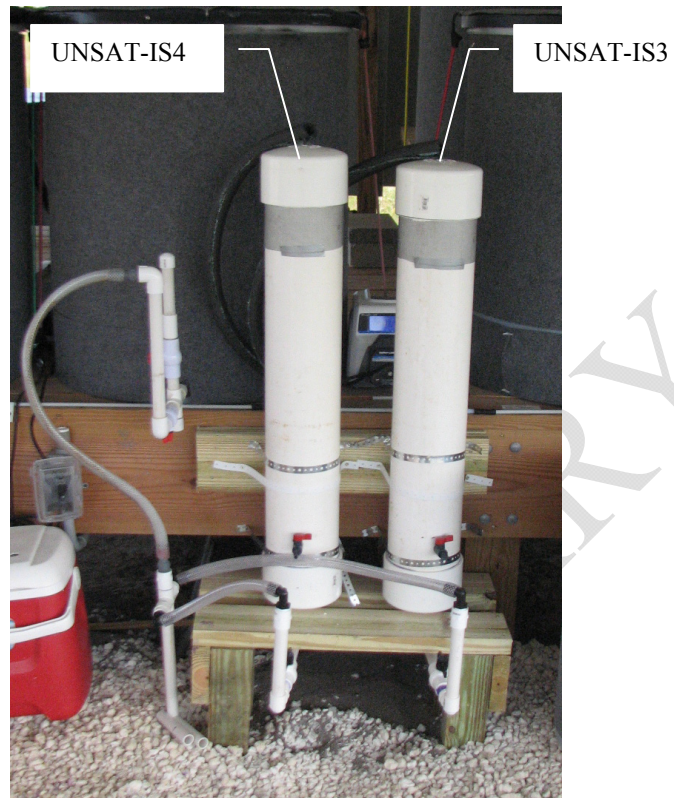
**Figure A.6**  
**Unclogging UNSAT-LS4 Influent Pipe 9/10/10**



**Figure A.7**  
**2\" Pipe Extension into PNRS II Tank 1 Pump Chamber 10/8/10**

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**Figure A.8**  
**UNSAT-IS3 and UNSAT-IS4 Columns 10/14/10**

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## Appendix B: PLC Data Tables

**Table B.1**  
**Summary of PLC Recorded Daily Flows**  
**(11/11/10 – 1/12/11)**

Date Range		Average Recorded Flow (gpd)	Std. Dev.	MIN (gpd)	MAX (gpd)	Target Flow (gpd)	Relative Error <sup>1</sup> (%)
11/11/10- 1/12/11	Pump 4 to Hydro 1	70	16.84	0	118	73.7	-5.0%
	Pump 14 to Hydro 2	57	11.40	0	62	58.9	-2.6%
	Pump 6 to Re-circ. System 1	41	8.01	0	44	44.2	-7.4%
	Pump 7 to Re-circ. System 2	42	8.20	0	45	44.2	-5.3%
	Pump 8 to Re-circ. System 3	41	8.05	0	44	44.2	-7.0%
	Pump 9 to Re-circ. System 4	41	8.42	0	44	44.2	-8.3%
UNSAT-PS1 Target 3:1 Recycle Ratio							
11/11/10- 12/13/10	Pump 15 to Re-circ. System 5	40	11.71	0	64	44.2	-10.6%
UNSAT-PS1 Target 6:1 Recycle Ratio							
12/15/10- 1/12/11	Pump 15 to Re-circ. System 5	91	5.43	89	119	88.4	2.8%

<sup>1</sup>Relative Error = (Recorded Flow – Target Flow)/ Target Flow \*100

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**Table B.2**  
**Summary of PLC Recorded Daily Runtimes**  
**(1/11/10 – 1/12/11)**

Date Range		Average Recorded Daily Runtime (minutes/day)	Std. Dev.	MIN (minutes)	MAX (minutes)	Target Daily Runtime (minutes)	Relative Error <sup>1</sup> (%)
P4 Runtime Target = 31 seconds/dose							
11/11/10- 12/6/10	Pump 4 to Hydro 1	11.4	3.6	0.0	13.0	12.4	-7.9%
P4 Runtime Target = 44 <sup>2</sup> seconds/dose							
12/8/10- 1/12/11	Pump 4 to Hydro 1	18.2	1.1	17.0	24.0	17.6	3.5%
11/11/10- 1/12/11	Pump 14 to Hydro 2	10.3	2.0	0.0	11.0	10.4	-1.1%
	Pump 6 to Recirc. System 1	6.1	1.3	0.0	7.0	6.0	1.6%
	Pump 7 to Recirc. System 2	6.1	1.3	0.0	7.0	6.0	1.6%
	Pump 8 to Recirc. System 3	6.1	1.3	0.0	7.0	6.0	1.6%
	Pump 9 to Recirc. System 4	6.1	1.3	0.0	7.0	6.0	1.6%
UNSAT-PS1 Target 3:1 Recycle Ratio							
11/11/10- 12/13/10	Pump 15 to Recirc. System 5	6.1	1.9	0.0	10.0	6.0	2.0%
UNSAT-PS1 Target 6:1 Recycle Ratio							
12/15/10- 1/12/11	Pump 15 to Recirc. System 5	14.2	0.9	14.0	19.0	14.0	1.2%

<sup>1</sup>Relative Error = (Recorded Runtime – Target Runtime)/ Target Runtime \*100

<sup>2</sup>Pump 4 Runtime was increased to increase UNSAT-PS1 STE influent volume to target level

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## **Appendix C: Flow Test Results**

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PRELIMINARY

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**Table C.1**  
**Flow Test Results (before flow recalibration)**

Group (Figure 1)	Biofilter/Flow	Target Input			Measured Input		Recycle Ratio		
		Target Input Volume	Dose/day	Target Input Volume	Measured Input Volume	Relative Error (%)	Target Recycle Ratio (RR)	Calculated Recycle Ratio (RR)	Relative Error (%)
		(mL/day)	(Dose/day)	(mL/dose)	(mL/dose)	(Measured Input - Target Input) / Target Input * 100	Volume Recycle / Volume STE	Volume Recycle / Volume STE	Measured RR - Target RR / Measured RR * 100
1	Stage 1 Single Pass Biofilters (Hydrosplitter 1)								
	Date				1/17/2011 Dose @ 9:00 am				
	UNSAT-PS1	55,656	24	2,319	1,755	-24.3%			
	UNSAT-CL3				2,650	14.3%			
	UNSAT-CL1				2,520	8.7%			
	UNSAT-EC3				2,620	13.0%			
	UNSAT-EC1				2,580	11.3%			
	Mean				2,425	4.6%			
	Stage 2 Single Pass Upflow Biofilters								
	Date				1/17/2011 8:00- 9:00 am				
	DENIT-LS4	55,656	24	2,319	Plugged				
	DENIT-LS2				2,580	11.3%			
	DENIT-SU3				2,165	-6.6%			
	DENIT-LS3				2,640	13.8%			
	DENIT-SU4				2,245	-3.2%			
	Mean				2,408	3.8%			
2	Stage 1 Recirculating Biofilters (Hydrosplitter 2)								
	Date				{1/17/2011} dose @ 10:30 am				
	RC1 : UNSAT-SA2	55,656	24	2,319	2,000	-13.8%			
	RC2 : UNSAT-EC4				2,080	-10.3%			
	RC3 : UNSAT-CL2				2,290	-1.3%			
	RC4 : UNSAT-CL4				2,260	-2.5%			
	Mean				2,158	-7.0%			
	Stage 1 Recirculating Biofilters (Recycle)				Flowmeter 1/17/2011				
	RC1 : UNSAT-SA2	166,968	24	6,957	6,781	-2.5%	3:1	3.39	11.5%
	RC2 : UNSAT-EC4				6,939	-0.3%		3.34	10.1%
	RC3 : UNSAT-CL2				6,781	-2.5%		2.96	-1.3%
	RC4 : UNSAT-CL4				6,624	-4.8%		2.93	-2.4%
	Mean				6,781	-2.5%		3.15	4.5%
	RC5 : UNSAT-PS1	333,936	24	13,914	14,036	0.9%	6:1	8.00	25.0%
	Stage 1 Recirculating Biofilters (Hydrosplitter + Recycle)								
	RC1 : UNSAT-SA2	222,624	24	9,276	8,781				
	RC2 : UNSAT-EC4				9,019				
	RC3 : UNSAT-CL2				9,071				
	RC4 : UNSAT-CL4				8,884				
	Mean				8,939				
	RC5 : UNSAT-PS1	389,592	24	16,233	15,791				
3	Horizontal Denitrification Biofilters								
	Date				1/17/2011 dose @ 10:40 am				
	DENIT-SU1	7,409	24	308.7	311	0.7%			
	DENIT-SU2				311	0.7%			
	DENIT-GL1				298	-3.5%			
	DENIT-LS1				300	-2.8%			
	Mean				305	-1.2%			
4	In-Situ Simulators								
	Date				1/17/2011 manual dose				
	UNSAT-IS1 (STE)	14,814	6	2,469	2,590	4.9%			
	UNSAT-IS2 (Nitrified STE)				2,830	14.6%			
	UNSAT-IS3 (STE)				96	-3.0%			
	UNSAT-IS4 (Nitrified STE)	594	6	99	101	2.0%			

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

**Table C.2**  
**Flow Test Results (after flow recalibration)**

Group (Figure 1)	Biofilter/Flow	Target Input			Measured Input		Recycle Ratio		
		Target Input Volume	Dose/day	Target Input Volume	Measured Input Volume	Relative Error (%)	Target Recycle Ratio (RR)	Calculated Recycle Ratio (RR)	Relative Error (%)
		(mL/day)	(Dose/day)	(mL/dose)	(mL/dose)	(Measured Input - Target Input) / Target Input * 100	Volume Recycle / Volume STE	Volume Recycle / Volume STE	Measured RR - Target RR / Measured RR * 100
1	Stage 1 Single Pass Biofilters (Hydrosplitter 1)								
	Date				(1/18/11) manual dose @ 9:55 am				
	UNSAT-PS1	55,656	24	2,319	2,645	14.1%			
	UNSAT-CL3				2,420	4.4%			
	UNSAT-CL1				2,410	3.9%			
	UNSAT-EC3				2,310	-0.4%			
	UNSAT-EC1				2,250	-3.0%			
	Mean				2,407	3.8%			
	Stage 2 Single Pass Upflow Biofilters								
	Date				1/17/2011 8:00- 9:00 am				
	DENIT-LS4	55,656	24	2,319	Plugged				
	DENIT-LS2				2,580	11.3%			
	DENIT-SU3				2,165	-6.6%			
	DENIT-LS3				2,640	13.8%			
	DENIT-SU4				2,245	-3.2%			
	Mean				2,408	3.8%			
2	Stage 1 Recirculating Biofilters (Hydrosplitter 2)								
	Date				(1/17/2011) dose @ 10:30 am				
	RC1 : UNSAT-SA2	55,656	24	2,319	2,000	-13.8%			
	RC2 : UNSAT-EC4				2,080	-10.3%			
	RC3 : UNSAT-CL2				2,290	-1.3%			
	RC4 : UNSAT-CL4				2,260	-2.5%			
	Mean				2,158	-7.0%			
	Stage 1 Recirculating Biofilters (Recycle)				Flowmeter 1/17/2011				
	RC1 : UNSAT-SA2	166,968	24	6,957	6,781	-2.5%	3:1	3.39	11.5%
	RC2 : UNSAT-EC4				6,939	-0.3%		3.34	10.1%
	RC3 : UNSAT-CL2				6,781	-2.5%		2.96	-1.3%
	RC4 : UNSAT-CL4				6,624	-4.8%		2.93	-2.4%
	Mean				6,781	-2.5%		3.15	4.5%
	RC5 : UNSAT-PS1	333,936	24	13,914	14,036	0.9%	6:1	5.31	-13.1%
	Stage 1 Recirculating Biofilters (Hydrosplitter + Recycle)								
	RC1 : UNSAT-SA2	222,624	24	9,276	8,781				
	RC2 : UNSAT-EC4				9,019				
	RC3 : UNSAT-CL2				9,071				
	RC4 : UNSAT-CL4				8,884				
	Mean				8,939				
	RC5 : UNSAT-PS1	389,592	24	16,233	16,681				
3	Horizontal Denitrification Biofilters								
	Date				1/17/2011 dose @ 10:40 am				
	DENIT-SU1	7,409	24	308.7	311	0.7%			
	DENIT-SU2				311	0.7%			
	DENIT-GL1				298	-3.5%			
	DENIT-LS1				300	-2.8%			
	Mean				305	-1.2%			
4	In-Situ Simulators								
	Date				1/17/2011 manual dose				
	UNSAT-IS1 (STE)	14,814	6	2,469	2,590	4.9%			
	UNSAT-IS2 (Nitrified STE)				2,830	14.6%			
	UNSAT-IS3 (STE)	594	6	99	96	-3.0%			
	UNSAT-IS4 (Nitrified STE)				101	2.0%			

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



## **Appendix D: Laboratory Report**

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PRELIMINARY



**Hazen and Sawyer**  
**10002 Princess Palm Avenue Suite 200**  
**Tampa, FLORIDA 33619**

**January 26, 2011**  
**Work Order: 1100234**

## Laboratory Report

Project Name		PNRS II						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		PNRS II STE-TI						
Matrix		Wastewater						
SAL Sample Number		1100234-01						
Date/Time Collected		01/13/11 13:15						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b>Field Parameters</b>								
pH	SU	7.1	DEP FT1100	0.1	0.1		01/13/11 13:15	TDD
Water Temperature	°C	13.7	DEP FT1400	0.1	0.1		01/13/11 13:15	TDD
Specific conductance	umhos/cm	1,220	DEP FT1200	0.1	0.1		01/13/11 13:15	TDD
Dissolved Oxygen	mg/L	2.7	DEP FT1500	0.1	0.1		01/13/11 13:15	TDD
<b>Inorganics</b>								
Hydrogen Sulfide (Unionized)	mg/L	6.9	SM 4550SF	0.04	0.01		01/18/11 11:00	KTC
Ammonia as N	mg/L	57	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	78	SM 5210B	2	2	01/14/11 13:51	01/19/11 11:27	KTC
Chemical Oxygen Demand	mg/L	230	EPA 410.4	25	10		01/17/11 09:00	ARM
Nitrate (as N)	mg/L	0.02 I	EPA 300.0	0.04	0.01		01/14/11 12:19	MEJ
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		01/14/11 12:19	MEJ
Sulfate	mg/L	13	EPA 300.0	0.60	0.20		01/14/11 12:19	MEJ
Sulfide	mg/L	16	SM 4500SF	0.40	0.10		01/18/11 11:00	KTC
Total Alkalinity	mg/L	380	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	470	SM 2540C	10	10	01/14/11 14:00	01/17/11 16:30	MJV
Total Kjeldahl Nitrogen	mg/L	66	EPA 351.2	0.20	0.05	01/18/11 07:30	01/21/11 10:18	SMB
Total Suspended Solids	mg/L	83	SM 2540D	1	1	01/14/11 16:35	01/15/11 10:43	KTC
<b>Microbiology</b>								
Fecal Coliforms	CFU/100 ml	8,900	SM 9222D	1	1	01/13/11 16:16	01/14/11 16:00	MEJ
Sample Description		RC1						
Matrix		Wastewater						
SAL Sample Number		1100234-02						
Date/Time Collected		01/13/11 11:45						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b>Field Parameters</b>								
pH	SU	7.2	DEP FT1100	0.1	0.1		01/13/11 11:45	TDD
Water Temperature	°C	7.2	DEP FT1400	0.1	0.1		01/13/11 11:45	TDD
Specific conductance	umhos/cm	950	DEP FT1200	0.1	0.1		01/13/11 11:45	TDD
Dissolved Oxygen	mg/L	1.6	DEP FT1500	0.1	0.1		01/13/11 11:45	TDD
<b>Inorganics</b>								
Ammonia as N	mg/L	11	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	11	SM 5210B	2	2	01/13/11 15:00	01/18/11 13:48	KTC
Chemical Oxygen Demand	mg/L	37	EPA 410.4	25	10		01/17/11 09:00	ARM
Nitrate (as N)	mg/L	14	EPA 300.0	0.04	0.01		01/13/11 18:08	MEJ
Nitrite (as N)	mg/L	0.53	EPA 300.0	0.04	0.01		01/13/11 18:08	MEJ

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**January 26, 2011**

**Work Order: 1100234**

## Laboratory Report

Project Name		PNRS II						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		RC1						
Matrix		Wastewater						
SAL Sample Number		1100234-02						
Date/Time Collected		01/13/11 11:45						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
Total Alkalinity	mg/L	190	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	520	SM 2540C	10	10	01/14/11 14:00	01/17/11 16:30	MJV
Total Kjeldahl Nitrogen	mg/L	12	EPA 351.2	0.20	0.05	01/14/11 08:31	01/17/11 14:48	SMD
Total Suspended Solids	mg/L	7	SM 2540D	1	1	01/14/11 16:35	01/15/11 10:43	KTC
<b>Microbiology</b>								
Fecal Coliforms	CFU/100 ml	8,200	SM 9222D	1	1	01/13/11 14:00	01/14/11 15:30	JAA
Sample Description		RC2						
Matrix		Wastewater						
SAL Sample Number		1100234-03						
Date/Time Collected		01/13/11 11:40						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b>Field Parameters</b>								
pH	SU	7.1	DEP FT1100	0.1	0.1		01/13/11 11:40	TDD
Water Temperature	°C	7.4	DEP FT1400	0.1	0.1		01/13/11 11:40	TDD
Specific conductance	umhos/cm	1,000	DEP FT1200	0.1	0.1		01/13/11 11:40	TDD
Dissolved Oxygen	mg/L	2.5	DEP FT1500	0.1	0.1		01/13/11 11:40	TDD
<b>Inorganics</b>								
Ammonia as N	mg/L	13	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	9	SM 5210B	2	2	01/13/11 15:00	01/18/11 13:48	KTC
Chemical Oxygen Demand	mg/L	41	EPA 410.4	25	10		01/17/11 09:00	ARM
Nitrate (as N)	mg/L	16	EPA 300.0	0.04	0.01		01/13/11 18:08	MEJ
Nitrite (as N)	mg/L	0.22	EPA 300.0	0.04	0.01		01/13/11 18:08	MEJ
Total Alkalinity	mg/L	200	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	570	SM 2540C	10	10	01/14/11 14:00	01/17/11 16:30	MJV
Total Kjeldahl Nitrogen	mg/L	13	EPA 351.2	0.20	0.05	01/14/11 08:31	01/17/11 14:48	SMD
Total Suspended Solids	mg/L	4	SM 2540D	1	1	01/14/11 16:35	01/15/11 10:43	KTC
<b>Microbiology</b>								
Fecal Coliforms	CFU/100 ml	9,100	SM 9222D	1	1	01/13/11 14:00	01/14/11 15:30	JAA
Sample Description		RC3						
Matrix		Wastewater						
SAL Sample Number		1100234-04						
Date/Time Collected		01/13/11 11:40						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						

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January 26, 2011

Work Order: 1100234

## Laboratory Report

Project Name		PNRS II						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		RC3						
Matrix		Wastewater						
SAL Sample Number		1100234-04						
Date/Time Collected		01/13/11 11:40						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b><u>Field Parameters</u></b>								
pH	SU	6.9	DEP FT1100	0.1	0.1		01/13/11 11:40	TDD
Water Temperature	°C	7.4	DEP FT1400	0.1	0.1		01/13/11 11:40	TDD
Specific conductance	umhos/cm	990	DEP FT1200	0.1	0.1		01/13/11 11:40	TDD
Dissolved Oxygen	mg/L	2.0	DEP FT1500	0.1	0.1		01/13/11 11:40	TDD
<b><u>Inorganics</u></b>								
Ammonia as N	mg/L	11	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	12	SM 5210B	2	2	01/13/11 15:00	01/18/11 13:48	KTC
Chemical Oxygen Demand	mg/L	46	EPA 410.4	25	10		01/17/11 09:00	ARM
Nitrate (as N)	mg/L	14	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Nitrite (as N)	mg/L	2.4	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Total Alkalinity	mg/L	220	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	560	SM 2540C	10	10	01/14/11 14:00	01/17/11 16:30	MJV
Total Kjeldahl Nitrogen	mg/L	12	EPA 351.2	0.20	0.05	01/14/11 08:31	01/17/11 14:48	SMD
Total Suspended Solids	mg/L	13	SM 2540D	1	1	01/14/11 16:35	01/15/11 10:43	KTC
<b><u>Microbiology</u></b>								
Fecal Coliforms	CFU/100 ml	13,000	SM 9222D	1	1	01/13/11 14:00	01/14/11 15:30	JAA
Sample Description		RC4						
Matrix		Wastewater						
SAL Sample Number		1100234-05						
Date/Time Collected		01/13/11 12:30						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b><u>Field Parameters</u></b>								
pH	SU	7.3	DEP FT1100	0.1	0.1		01/13/11 12:30	TDD
Water Temperature	°C	8.3	DEP FT1400	0.1	0.1		01/13/11 12:30	TDD
Specific conductance	umhos/cm	1,050	DEP FT1200	0.1	0.1		01/13/11 12:30	TDD
Dissolved Oxygen	mg/L	0.4	DEP FT1500	0.1	0.1		01/13/11 12:30	TDD
<b><u>Inorganics</u></b>								
Ammonia as N	mg/L	16	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	9	SM 5210B	2	2	01/14/11 13:51	01/19/11 11:27	KTC
Chemical Oxygen Demand	mg/L	57	EPA 410.4	25	10		01/17/11 09:00	ARM
Nitrate (as N)	mg/L	10	EPA 300.0	0.04	0.01		01/14/11 12:19	MEJ
Nitrite (as N)	mg/L	3.5	EPA 300.0	0.04	0.01		01/14/11 12:19	MEJ
Total Alkalinity	mg/L	280	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	600	SM 2540C	10	10	01/14/11 14:00	01/17/11 16:30	MJV
Total Kjeldahl Nitrogen	mg/L	18	EPA 351.2	0.20	0.05	01/18/11 07:30	01/21/11 10:18	SMB

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January 26, 2011

Work Order: 1100234

## Laboratory Report

Project Name		PNRS II						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		RC4						
Matrix		Wastewater						
SAL Sample Number		1100234-05						
Date/Time Collected		01/13/11 12:30						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
Total Suspended Solids	mg/L	12	SM 2540D	1	1	01/14/11 16:35	01/15/11 10:43	KTC
<b>Microbiology</b>								
Fecal Coliforms	CFU/100 ml	8,700	SM 9222D	1	1	01/13/11 16:16	01/14/11 16:00	MEJ
Sample Description		RC5						
Matrix		Wastewater						
SAL Sample Number		1100234-06						
Date/Time Collected		01/13/11 11:10						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b>Field Parameters</b>								
pH	SU	7.1	DEP FT1100	0.1	0.1		01/13/11 11:10	TDD
Water Temperature	°C	7.9	DEP FT1400	0.1	0.1		01/13/11 11:10	TDD
Specific conductance	umhos/cm	930	DEP FT1200	0.1	0.1		01/13/11 11:10	TDD
Dissolved Oxygen	mg/L	1.5	DEP FT1500	0.1	0.1		01/13/11 11:10	TDD
<b>Inorganics</b>								
Ammonia as N	mg/L	23	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	16	SM 5210B	2	2	01/13/11 15:00	01/18/11 13:48	KTC
Chemical Oxygen Demand	mg/L	57	EPA 410.4	25	10		01/17/11 09:00	ARM
Nitrate (as N)	mg/L	6.3	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Nitrite (as N)	mg/L	1.6	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Total Alkalinity	mg/L	220	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	500	SM 2540C	10	10	01/14/11 14:00	01/17/11 16:30	MJV
Total Kjeldahl Nitrogen	mg/L	29	EPA 351.2	0.20	0.05	01/14/11 08:31	01/17/11 14:48	SMD
Total Suspended Solids	mg/L	17	SM 2540D	1	1	01/14/11 16:35	01/15/11 10:43	KTC
<b>Microbiology</b>								
Fecal Coliforms	CFU/100 ml	12,700	SM 9222D	1	1	01/13/11 14:00	01/14/11 15:30	JAA
Sample Description		P15-T						
Matrix		Wastewater						
SAL Sample Number		1100234-07						
Date/Time Collected		01/13/11 09:20						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b>Field Parameters</b>								
pH	SU	7.0	DEP FT1100	0.1	0.1		01/13/11 09:20	TDD
Water Temperature	°C	5.0	DEP FT1400	0.1	0.1		01/13/11 09:20	TDD

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**January 26, 2011**  
**Work Order: 1100234**

## Laboratory Report

Project Name		PNRS II						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		P15-T						
Matrix		Wastewater						
SAL Sample Number		1100234-07						
Date/Time Collected		01/13/11 09:20						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
Specific conductance	umhos/cm	900	DEP FT1200	0.1	0.1		01/13/11 09:20	TDD
Dissolved Oxygen	mg/L	6.4	DEP FT1500	0.1	0.1		01/13/11 09:20	TDD
<u>Inorganics</u>								
Ammonia as N	mg/L	17	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	10	SM 5210B	2	2	01/13/11 15:00	01/18/11 13:48	KTC
Chemical Oxygen Demand	mg/L	41	EPA 410.4	25	10		01/17/11 09:00	ARM
Nitrate (as N)	mg/L	11	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Nitrite (as N)	mg/L	1.2	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Total Alkalinity	mg/L	200	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	510	SM 2540C	10	10	01/14/11 14:00	01/17/11 16:30	MJV
Total Kjeldahl Nitrogen	mg/L	21	EPA 351.2	0.20	0.05	01/14/11 08:31	01/17/11 14:48	SMD
Total Suspended Solids	mg/L	4	SM 2540D	1	1	01/14/11 16:35	01/15/11 10:43	KTC
<u>Microbiology</u>								
Fecal Coliforms	CFU/100 ml	3,900	SM 9222D	1	1	01/13/11 14:00	01/14/11 15:30	JAA
Sample Description		UNSAT-IS1						
Matrix		Wastewater						
SAL Sample Number		1100234-08						
Date/Time Collected		01/13/11 10:00						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<u>Field Parameters</u>								
pH	SU	6.7	DEP FT1100	0.1	0.1		01/13/11 10:00	TDD
Water Temperature	°C	1.2	DEP FT1400	0.1	0.1		01/13/11 10:00	TDD
Specific conductance	umhos/cm	1,200	DEP FT1200	0.1	0.1		01/13/11 10:00	TDD
Dissolved Oxygen	mg/L	0.4	DEP FT1500	0.1	0.1		01/13/11 10:00	TDD
<u>Inorganics</u>								
Ammonia as N	mg/L	58	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	65	SM 5210B	2	2	01/13/11 15:00	01/18/11 13:48	KTC
Chemical Oxygen Demand	mg/L	120	EPA 410.4	25	10		01/17/11 09:00	ARM
Nitrate (as N)	mg/L	0.08	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Nitrite (as N)	mg/L	0.29	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Sulfate	mg/L	7.0	EPA 300.0	0.60	0.20		01/13/11 17:24	MEJ
Total Alkalinity	mg/L	430	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	480	SM 2540C	10	10	01/14/11 14:00	01/17/11 16:30	MJV
Total Kjeldahl Nitrogen	mg/L	64	EPA 351.2	0.20	0.05	01/14/11 08:31	01/17/11 14:48	SMD
Total Suspended Solids	mg/L	7	SM 2540D	1	1	01/14/11 16:35	01/15/11 10:43	KTC
<u>Microbiology</u>								

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Project Name		PNRS II						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		UNSAT-IS1						
Matrix		Wastewater						
SAL Sample Number		1100234-08						
Date/Time Collected		01/13/11 10:00						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
Fecal Coliforms	CFU/100 ml	10	SM 9222D	1	1	01/13/11 14:00	01/14/11 15:30	JAA
Sample Description		UNSAT-IS2						
Matrix		Wastewater						
SAL Sample Number		1100234-09						
Date/Time Collected		01/13/11 08:15						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b>Field Parameters</b>								
pH	SU	6.8	DEP FT1100	0.1	0.1		01/13/11 08:15	TDD
Water Temperature	°C	6.2	DEP FT1400	0.1	0.1		01/13/11 08:15	TDD
Specific conductance	umhos/cm	680	DEP FT1200	0.1	0.1		01/13/11 08:15	TDD
Dissolved Oxygen	mg/L	3.9	DEP FT1500	0.1	0.1		01/13/11 08:15	TDD
<b>Inorganics</b>								
Ammonia as N	mg/L	0.53	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	6	SM 5210B	2	2	01/13/11 15:00	01/18/11 13:48	KTC
Chemical Oxygen Demand	mg/L	18 I	EPA 410.4	25	10		01/17/11 09:00	ARM
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Nitrite (as N)	mg/L	0.21	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Sulfate	mg/L	250	EPA 300.0	0.60	0.20		01/19/11 09:57	MEJ
Total Alkalinity	mg/L	200	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	710	SM 2540C	10	10	01/14/11 14:00	01/17/11 16:30	MJV
Total Kjeldahl Nitrogen	mg/L	1.1	EPA 351.2	0.20	0.05	01/14/11 08:31	01/17/11 14:48	SMD
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	01/14/11 16:35	01/15/11 10:43	KTC
<b>Microbiology</b>								
Fecal Coliforms	CFU/100 ml	1 U	SM 9222D	1	1	01/13/11 14:00	01/14/11 15:30	JAA
Sample Description		UNSAT-IS3-SP						
Matrix		Wastewater						
SAL Sample Number		1100234-10						
Date/Time Collected		01/13/11 14:10						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 15:40						
<b>Field Parameters</b>								
pH	SU	7.5	DEP FT1100	0.1	0.1		01/13/11 14:10	TDD
Water Temperature	°C	4.0	DEP FT1400	0.1	0.1		01/13/11 14:10	TDD
Specific conductance	umhos/cm	980	DEP FT1200	0.1	0.1		01/13/11 14:10	TDD



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Project Name		PNRS II						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		UNSAT-IS3-SP						
Matrix		Wastewater						
SAL Sample Number		1100234-10						
Date/Time Collected		01/13/11 14:10						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 15:40						
Dissolved Oxygen	mg/L	12	DEP FT1500	0.1	0.1		01/13/11 14:10	TDD
<b>Inorganics</b>								
Ammonia as N	mg/L	0.036	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	01/14/11 13:51	01/19/11 11:27	KTC
Chemical Oxygen Demand	mg/L	26	EPA 410.4	25	10		01/17/11 09:00	ARM
Nitrate (as N)	mg/L	3.7	EPA 300.0	0.04	0.01		01/14/11 12:19	MEJ
Nitrite (as N)	mg/L	2.2	EPA 300.0	0.04	0.01		01/14/11 12:19	MEJ
Sulfate	mg/L	130	EPA 300.0	0.60	0.20		01/19/11 09:57	MEJ
Total Alkalinity	mg/L	210	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	600	SM 2540C	10	10	01/14/11 14:00	01/17/11 16:30	MJV
Total Kjeldahl Nitrogen	mg/L	1.8	EPA 351.2	0.20	0.05	01/18/11 07:30	01/21/11 10:18	SMB
Total Suspended Solids	mg/L	3	SM 2540D	1	1	01/14/11 16:35	01/15/11 10:43	KTC
Sample Description		UNSAT-IS4-SP						
Matrix		Wastewater						
SAL Sample Number		1100234-11						
Date/Time Collected		01/13/11 14:00						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 15:40						
<b>Field Parameters</b>								
pH	SU	6.6	DEP FT1100	0.1	0.1		01/13/11 14:00	TDD
Water Temperature	°C	5.1	DEP FT1400	0.1	0.1		01/13/11 14:00	TDD
Specific conductance	umhos/cm	1,050	DEP FT1200	0.1	0.1		01/13/11 14:00	TDD
Dissolved Oxygen	mg/L	12	DEP FT1500	0.1	0.1		01/13/11 14:00	TDD
<b>Inorganics</b>								
Ammonia as N	mg/L	0.10	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	01/14/11 13:51	01/19/11 11:27	KTC
Chemical Oxygen Demand	mg/L	22 I	EPA 410.4	25	10		01/17/11 09:00	ARM
Nitrate (as N)	mg/L	46	EPA 300.0	0.04	0.01		01/14/11 15:44	MEJ
Nitrite (as N)	mg/L	2.9	EPA 300.0	0.04	0.01		01/14/11 12:19	MEJ
Sulfate	mg/L	92	EPA 300.0	0.60	0.20		01/14/11 15:44	MEJ
Total Alkalinity	mg/L	100	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	710	SM 2540C	10	10	01/14/11 14:00	01/17/11 16:30	MJV
Total Kjeldahl Nitrogen	mg/L	3.5	EPA 351.2	0.20	0.05	01/18/11 07:30	01/21/11 10:18	SMB
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	01/14/11 16:35	01/15/11 10:43	KTC
<b>Microbiology</b>								
Fecal Coliforms	CFU/100 ml	1	SM 9222D	1	1	01/13/11 16:16	01/14/11 16:00	MEJ

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Sample Description		UNSAT-EC1						
Matrix		Wastewater						
SAL Sample Number		1100234-12						
Date/Time Collected		01/13/11 12:05						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 15:40						
<b>Field Parameters</b>								
pH	SU	6.7	DEP FT1100	0.1	0.1		01/13/11 12:05	TDD
Water Temperature	°C	7.8	DEP FT1400	0.1	0.1		01/13/11 12:05	TDD
Specific conductance	umhos/cm	1,110	DEP FT1200	0.1	0.1		01/13/11 12:05	TDD
Dissolved Oxygen	mg/L	7.9	DEP FT1500	0.1	0.1		01/13/11 12:05	TDD
<b>Inorganics</b>								
Ammonia as N	mg/L	1.7	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	01/14/11 13:51	01/19/11 11:27	KTC
Chemical Oxygen Demand	mg/L	16 I	EPA 410.4	25	10		01/17/11 09:00	ARM
Nitrate (as N)	mg/L	45	EPA 300.0	0.04	0.01		01/14/11 15:44	MEJ
Nitrite (as N)	mg/L	0.11	EPA 300.0	0.04	0.01		01/14/11 12:19	MEJ
Sulfate	mg/L	61	EPA 300.0	0.60	0.20		01/14/11 12:19	MEJ
Total Alkalinity	mg/L	160	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	730	SM 2540C	10	10	01/14/11 14:00	01/17/11 16:30	MJV
Total Kjeldahl Nitrogen	mg/L	4.0	EPA 351.2	0.20	0.05	01/21/11 12:39	01/25/11 09:24	SMD
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	01/14/11 16:35	01/15/11 10:43	KTC
<b>Microbiology</b>								
Fecal Coliforms	CFU/100 ml	3,900	SM 9222D	1	1	01/13/11 16:16	01/14/11 16:00	MEJ
Sample Description		UNSAT-SA2						
Matrix		Wastewater						
SAL Sample Number		1100234-13						
Date/Time Collected		01/13/11 10:10						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b>Field Parameters</b>								
pH	SU	6.8	DEP FT1100	0.1	0.1		01/13/11 10:10	TDD
Water Temperature	°C	6.2	DEP FT1400	0.1	0.1		01/13/11 10:10	TDD
Specific conductance	umhos/cm	900	DEP FT1200	0.1	0.1		01/13/11 10:10	TDD
Dissolved Oxygen	mg/L	9.6	DEP FT1500	0.1	0.1		01/13/11 10:10	TDD
<b>Inorganics</b>								
Ammonia as N	mg/L	0.66	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	3	SM 5210B	2	2	01/13/11 15:00	01/18/11 13:48	KTC
Chemical Oxygen Demand	mg/L	16 I	EPA 410.4	25	10		01/17/11 09:00	ARM
Nitrate (as N)	mg/L	25	EPA 300.0	0.04	0.01		01/14/11 15:44	MEJ
Nitrite (as N)	mg/L	0.71	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Total Alkalinity	mg/L	150	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	550	SM 2540C	10	10	01/14/11 14:00	01/17/11 16:30	MJV

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Project Name		PNRS II						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		UNSAT-SA2						
Matrix		Wastewater						
SAL Sample Number		1100234-13						
Date/Time Collected		01/13/11 10:10						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
Total Kjeldahl Nitrogen	mg/L	3.0	EPA 351.2	0.20	0.05	01/14/11 08:31	01/17/11 14:48	SMD
Total Suspended Solids	mg/L	1	SM 2540D	1	1	01/14/11 16:35	01/15/11 10:43	KTC
<b>Microbiology</b>								
Fecal Coliforms	CFU/100 ml	41	SM 9222D	1	1	01/13/11 14:00	01/14/11 15:30	JAA
Sample Description		UNSAT-EC3						
Matrix		Wastewater						
SAL Sample Number		1100234-14						
Date/Time Collected		01/13/11 12:05						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b>Field Parameters</b>								
pH	SU	6.8	DEP FT1100	0.1	0.1		01/13/11 12:05	TDD
Water Temperature	°C	6.3	DEP FT1400	0.1	0.1		01/13/11 12:05	TDD
Specific conductance	umhos/cm	1,150	DEP FT1200	0.1	0.1		01/13/11 12:05	TDD
Dissolved Oxygen	mg/L	7.9	DEP FT1500	0.1	0.1		01/13/11 12:05	TDD
<b>Inorganics</b>								
Ammonia as N	mg/L	0.005 I	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	01/14/11 13:51	01/19/11 11:27	KTC
Chemical Oxygen Demand	mg/L	11 I	EPA 410.4	25	10		01/17/11 09:00	ARM
Nitrate (as N)	mg/L	44	EPA 300.0	0.04	0.01		01/14/11 15:44	MEJ
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		01/14/11 12:19	MEJ
Total Alkalinity	mg/L	210	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	740	SM 2540C	10	10	01/14/11 14:00	01/17/11 16:30	MJV
Total Kjeldahl Nitrogen	mg/L	3.5	EPA 351.2	0.20	0.05	01/18/11 07:30	01/21/11 10:18	SMB
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	01/14/11 16:35	01/15/11 10:43	KTC
<b>Microbiology</b>								
Fecal Coliforms	CFU/100 ml	4	SM 9222D	1	1	01/13/11 16:16	01/14/11 16:00	MEJ
Sample Description		UNSAT-EC4						
Matrix		Wastewater						
SAL Sample Number		1100234-15						
Date/Time Collected		01/13/11 10:10						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b>Field Parameters</b>								
pH	SU	6.9	DEP FT1100	0.1	0.1		01/13/11 10:10	TDD

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Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		UNSAT-EC4						
Matrix		Wastewater						
SAL Sample Number		1100234-15						
Date/Time Collected		01/13/11 10:10						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
Water Temperature	°C	7.0	DEP FT1400	0.1	0.1		01/13/11 10:10	TDD
Specific conductance	umhos/cm	960	DEP FT1200	0.1	0.1		01/13/11 10:10	TDD
Dissolved Oxygen	mg/L	10	DEP FT1500	0.1	0.1		01/13/11 10:10	TDD
Inorganics								
Ammonia as N	mg/L	0.038	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	01/13/11 15:00	01/18/11 13:48	KTC
Chemical Oxygen Demand	mg/L	16 I	EPA 410.4	25	10		01/17/11 09:00	ARM
Nitrate (as N)	mg/L	30	EPA 300.0	0.04	0.01		01/14/11 15:44	MEJ
Nitrite (as N)	mg/L	0.50	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Total Alkalinity	mg/L	150	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	600	SM 2540C	10	10	01/14/11 14:00	01/17/11 16:30	MJV
Total Kjeldahl Nitrogen	mg/L	2.4	EPA 351.2	0.20	0.05	01/14/11 08:31	01/17/11 14:48	SMD
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	01/14/11 16:35	01/15/11 10:43	KTC
Microbiology								
Fecal Coliforms	CFU/100 ml	21	SM 9222D	1	1	01/13/11 14:00	01/14/11 15:30	JAA
Sample Description		UNSAT-CL1						
Matrix		Wastewater						
SAL Sample Number		1100234-16						
Date/Time Collected		01/13/11 11:45						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
Field Parameters								
pH	SU	7.2	DEP FT1100	0.1	0.1		01/13/11 11:45	TDD
Water Temperature	°C	8.2	DEP FT1400	0.1	0.1		01/13/11 11:45	TDD
Specific conductance	umhos/cm	1,200	DEP FT1200	0.1	0.1		01/13/11 11:45	TDD
Dissolved Oxygen	mg/L	8.8	DEP FT1500	0.1	0.1		01/13/11 11:45	TDD
Inorganics								
Ammonia as N	mg/L	0.020	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	01/14/11 13:51	01/19/11 11:27	KTC
Chemical Oxygen Demand	mg/L	16 I	EPA 410.4	25	10		01/17/11 09:00	ARM
Nitrate (as N)	mg/L	31	EPA 300.0	0.04	0.01		01/14/11 15:44	MEJ
Nitrite (as N)	mg/L	0.16	EPA 300.0	0.04	0.01		01/14/11 12:19	MEJ
Sulfate	mg/L	59	EPA 300.0	0.60	0.20		01/14/11 12:19	MEJ
Total Alkalinity	mg/L	180	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	710	SM 2540C	10	10	01/14/11 14:00	01/17/11 16:30	MJV
Total Kjeldahl Nitrogen	mg/L	2.7	EPA 351.2	0.20	0.05	01/21/11 12:39	01/25/11 09:24	SMD
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	01/14/11 16:35	01/15/11 10:43	KTC

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Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		UNSAT-CL1						
Matrix		Wastewater						
SAL Sample Number		1100234-16						
Date/Time Collected		01/13/11 11:45						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b>Microbiology</b>								
Fecal Coliforms	CFU/100 ml	100	SM 9222D	1	1	01/13/11 16:16	01/14/11 16:00	MEJ
Sample Description		UNSAT-CL2						
Matrix		Wastewater						
SAL Sample Number		1100234-17						
Date/Time Collected		01/13/11 09:50						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b>Field Parameters</b>								
pH	SU	7.0	DEP FT1100	0.1	0.1		01/13/11 09:50	TDD
Water Temperature	°C	6.0	DEP FT1400	0.1	0.1		01/13/11 09:50	TDD
Specific conductance	umhos/cm	990	DEP FT1200	0.1	0.1		01/13/11 09:50	TDD
Dissolved Oxygen	mg/L	7.9	DEP FT1500	0.1	0.1		01/13/11 09:50	TDD
<b>Inorganics</b>								
Ammonia as N	mg/L	0.019	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	3	SM 5210B	2	2	01/13/11 15:00	01/18/11 13:48	KTC
Chemical Oxygen Demand	mg/L	16 I	EPA 410.4	25	10		01/17/11 09:00	ARM
Nitrate (as N)	mg/L	27	EPA 300.0	0.04	0.01		01/14/11 15:44	MEJ
Nitrite (as N)	mg/L	0.23	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Total Alkalinity	mg/L	180	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	600	SM 2540C	10	10	01/14/11 14:00	01/17/11 16:30	MJV
Total Kjeldahl Nitrogen	mg/L	2.0	EPA 351.2	0.20	0.05	01/14/11 08:31	01/17/11 14:48	SMD
Total Suspended Solids	mg/L	1	SM 2540D	1	1	01/14/11 16:35	01/15/11 10:43	KTC
<b>Microbiology</b>								
Fecal Coliforms	CFU/100 ml	730	SM 9222D	1	1	01/13/11 14:00	01/14/11 15:30	JAA
Sample Description		UNSAT-CL3						
Matrix		Wastewater						
SAL Sample Number		1100234-18						
Date/Time Collected		01/13/11 12:05						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b>Field Parameters</b>								
pH	SU	7.3	DEP FT1100	0.1	0.1		01/13/11 12:05	TDD
Water Temperature	°C	8.3	DEP FT1400	0.1	0.1		01/13/11 12:05	TDD
Specific conductance	umhos/cm	1,300	DEP FT1200	0.1	0.1		01/13/11 12:05	TDD

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Project Name		PNRS II						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		UNSAT-CL3						
Matrix		Wastewater						
SAL Sample Number		1100234-18						
Date/Time Collected		01/13/11 12:05						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
Dissolved Oxygen	mg/L	9.9	DEP FT1500	0.1	0.1		01/13/11 12:05	TDD
<u>Inorganics</u>								
Ammonia as N	mg/L	0.016	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	01/14/11 13:51	01/19/11 11:27	KTC
Chemical Oxygen Demand	mg/L	13 I	EPA 410.4	25	10		01/18/11 09:00	ARM
Nitrate (as N)	mg/L	41	EPA 300.0	0.04	0.01		01/14/11 15:44	MEJ
Nitrite (as N)	mg/L	0.07	EPA 300.0	0.04	0.01		01/14/11 12:19	MEJ
Total Alkalinity	mg/L	300	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	810	SM 2540C	10	10	01/18/11 15:00	01/19/11 15:45	MJV
Total Kjeldahl Nitrogen	mg/L	2.7	EPA 351.2	0.20	0.05	01/18/11 07:30	01/21/11 10:18	SMB
Total Suspended Solids	mg/L	1	SM 2540D	1	1	01/14/11 16:35	01/15/11 10:43	KTC
<u>Microbiology</u>								
Fecal Coliforms	CFU/100 ml	110	SM 9222D	1	1	01/13/11 16:16	01/14/11 16:00	MEJ
Sample Description		UNSAT-CL4						
Matrix		Wastewater						
SAL Sample Number		1100234-19						
Date/Time Collected		01/13/11 11:15						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<u>Field Parameters</u>								
pH	SU	7.3	DEP FT1100	0.1	0.1		01/13/11 11:15	TDD
Water Temperature	°C	7.9	DEP FT1400	0.1	0.1		01/13/11 11:15	TDD
Specific conductance	umhos/cm	970	DEP FT1200	0.1	0.1		01/13/11 11:15	TDD
Dissolved Oxygen	mg/L	11	DEP FT1500	0.1	0.1		01/13/11 11:15	TDD
<u>Inorganics</u>								
Ammonia as N	mg/L	0.011	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	01/13/11 15:00	01/18/11 13:48	KTC
Chemical Oxygen Demand	mg/L	13 I	EPA 410.4	25	10		01/18/11 09:00	ARM
Nitrate (as N)	mg/L	36	EPA 300.0	0.04	0.01		01/14/11 15:44	MEJ
Nitrite (as N)	mg/L	0.15	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Total Alkalinity	mg/L	170	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	660	SM 2540C	10	10	01/18/11 15:00	01/19/11 15:45	MJV
Total Kjeldahl Nitrogen	mg/L	2.2	EPA 351.2	0.20	0.05	01/14/11 08:31	01/17/11 14:48	SMD
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	01/14/11 16:35	01/15/11 10:43	KTC
<u>Microbiology</u>								
Fecal Coliforms	CFU/100 ml	1 U	SM 9222D	1	1	01/13/11 14:00	01/14/11 15:30	JAA



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Project Name		PNRS II						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		UNSAT-PS1						
Matrix		Wastewater						
SAL Sample Number		1100234-20						
Date/Time Collected		01/13/11 10:15						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b>Field Parameters</b>								
pH	SU	7.3	DEP FT1100	0.1	0.1		01/13/11 10:15	TDD
Water Temperature	°C	5.8	DEP FT1400	0.1	0.1		01/13/11 10:15	TDD
Specific conductance	umhos/cm	930	DEP FT1200	0.1	0.1		01/13/11 10:15	TDD
Dissolved Oxygen	mg/L	5.2	DEP FT1500	0.1	0.1		01/13/11 10:15	TDD
<b>Inorganics</b>								
Ammonia as N	mg/L	16	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	12	SM 5210B	2	2	01/13/11 15:00	01/18/11 13:48	KTC
Chemical Oxygen Demand	mg/L	52	EPA 410.4	25	10		01/18/11 09:00	ARM
Nitrate (as N)	mg/L	10	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Nitrite (as N)	mg/L	1.3	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Total Alkalinity	mg/L	200	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	490	SM 2540C	10	10	01/18/11 15:00	01/19/11 15:45	MJV
Total Kjeldahl Nitrogen	mg/L	17	EPA 351.2	0.20	0.05	01/14/11 08:31	01/17/11 14:48	SMD
Total Suspended Solids	mg/L	9	SM 2540D	1	1	01/14/11 16:35	01/15/11 10:43	KTC
<b>Microbiology</b>								
Fecal Coliforms	CFU/100 ml	9,500	SM 9222D	1	1	01/13/11 14:00	01/14/11 15:30	JAA
Sample Description		DENIT-SU1						
Matrix		Wastewater						
SAL Sample Number		1100234-21						
Date/Time Collected		01/13/11 08:00						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b>Field Parameters</b>								
pH	SU	6.8	DEP FT1100	0.1	0.1		01/13/11 08:00	TDD
Water Temperature	°C	0.2	DEP FT1400	0.1	0.1		01/13/11 08:00	TDD
Specific conductance	umhos/cm	1,080	DEP FT1200	0.1	0.1		01/13/11 08:00	TDD
Dissolved Oxygen	mg/L	1.2	DEP FT1500	0.1	0.1		01/13/11 08:00	TDD
<b>Inorganics</b>								
Ammonia as N	mg/L	0.46	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	8	SM 5210B	2	2	01/13/11 15:00	01/18/11 13:48	KTC
Chemical Oxygen Demand	mg/L	22 I	EPA 410.4	25	10		01/18/11 09:00	ARM
Nitrate (as N)	mg/L	0.11	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Nitrite (as N)	mg/L	0.24	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Sulfate	mg/L	270	EPA 300.0	0.60	0.20		01/19/11 18:44	MEJ
Total Alkalinity	mg/L	220	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	760	SM 2540C	10	10	01/18/11 15:00	01/19/11 15:45	MJV

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Sample Description		DENIT-SU1						
Matrix		Wastewater						
SAL Sample Number		1100234-21						
Date/Time Collected		01/13/11 08:00						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
Total Kjeldahl Nitrogen	mg/L	2.6	EPA 351.2	0.20	0.05	01/14/11 08:31	01/17/11 14:48	SMD
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	01/15/11 10:00	01/17/11 15:25	MJV
<b><u>Microbiology</u></b>								
Fecal Coliforms	CFU/100 ml	5	SM 9222D	1	1	01/13/11 14:00	01/14/11 15:30	JAA
Sample Description		DENIT-SU2						
Matrix		Wastewater						
SAL Sample Number		1100234-22						
Date/Time Collected		01/13/11 08:00						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b><u>Field Parameters</u></b>								
pH	SU	6.8	DEP FT1100	0.1	0.1		01/13/11 08:00	TDD
Water Temperature	°C	0.3	DEP FT1400	0.1	0.1		01/13/11 08:00	TDD
Specific conductance	umhos/cm	1,130	DEP FT1200	0.1	0.1		01/13/11 08:00	TDD
Dissolved Oxygen	mg/L	1.6	DEP FT1500	0.1	0.1		01/13/11 08:00	TDD
<b><u>Inorganics</u></b>								
Hydrogen Sulfide (Unionized)	mg/L	2.6	SM 4550SF	0.04	0.01		01/18/11 11:00	KTC
Ammonia as N	mg/L	0.30	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	6	SM 5210B	2	2	01/13/11 15:00	01/18/11 13:48	KTC
Chemical Oxygen Demand	mg/L	24 I	EPA 410.4	25	10		01/18/11 09:00	ARM
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Nitrite (as N)	mg/L	0.05	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Sulfate	mg/L	300	EPA 300.0	0.60	0.20		01/19/11 18:44	MEJ
Sulfide	mg/L	4.3	SM 4500SF	0.40	0.10		01/18/11 11:00	KTC
Total Alkalinity	mg/L	200	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	740	SM 2540C	10	10	01/18/11 15:00	01/19/11 15:45	MJV
Total Kjeldahl Nitrogen	mg/L	1.1	EPA 351.2	0.20	0.05	01/14/11 08:31	01/17/11 14:48	SMD
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	01/15/11 10:00	01/17/11 15:25	MJV
<b><u>Microbiology</u></b>								
Fecal Coliforms	CFU/100 ml	3	SM 9222D	1	1	01/13/11 14:00	01/14/11 15:30	JAA

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Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		DENIT-SU3						
Matrix		Wastewater						
SAL Sample Number		1100234-23						
Date/Time Collected		01/13/11 09:00						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b>Field Parameters</b>								
pH	SU	6.9	DEP FT1100	0.1	0.1		01/13/11 09:00	TDD
Water Temperature	°C	6.9	DEP FT1400	0.1	0.1		01/13/11 09:00	TDD
Specific conductance	umhos/cm	1,420	DEP FT1200	0.1	0.1		01/13/11 09:00	TDD
Dissolved Oxygen	mg/L	2.8	DEP FT1500	0.1	0.1		01/13/11 09:00	TDD
<b>Inorganics</b>								
Ammonia as N	mg/L	0.80	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	9	SM 5210B	2	2	01/13/11 15:00	01/18/11 13:48	KTC
Chemical Oxygen Demand	mg/L	50	EPA 410.4	25	10		01/18/11 09:00	ARM
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Nitrite (as N)	mg/L	0.04	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Sulfate	mg/L	380	EPA 300.0	0.60	0.20		01/19/11 18:44	MEJ
Total Alkalinity	mg/L	280	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	1,000	SM 2540C	10	10	01/18/11 15:00	01/19/11 15:45	MJV
Total Kjeldahl Nitrogen	mg/L	2.9	EPA 351.2	0.20	0.05	01/14/11 08:31	01/17/11 14:48	SMD
Total Suspended Solids	mg/L	11	SM 2540D	1	1	01/15/11 10:00	01/17/11 15:25	MJV
<b>Microbiology</b>								
Fecal Coliforms	CFU/100 ml	6	SM 9222D	1	1	01/13/11 14:00	01/14/11 15:30	JAA
Sample Description		DENIT-SU4						
Matrix		Wastewater						
SAL Sample Number		1100234-24						
Date/Time Collected		01/13/11 09:00						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b>Field Parameters</b>								
pH	SU	6.8	DEP FT1100	0.1	0.1		01/13/11 09:00	TDD
Water Temperature	°C	7.0	DEP FT1400	0.1	0.1		01/13/11 09:00	TDD
Specific conductance	umhos/cm	1,350	DEP FT1200	0.1	0.1		01/13/11 09:00	TDD
Dissolved Oxygen	mg/L	4.2	DEP FT1500	0.1	0.1		01/13/11 09:00	TDD
<b>Inorganics</b>								
Hydrogen Sulfide (Unionized)	mg/L	0.08	SM 4550SF	0.04	0.01		01/18/11 11:00	KTC
Ammonia as N	mg/L	0.22	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	01/13/11 15:00	01/18/11 13:48	KTC
Chemical Oxygen Demand	mg/L	20 I	EPA 410.4	25	10		01/18/11 09:00	ARM
Nitrate (as N)	mg/L	0.10	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Nitrite (as N)	mg/L	0.03 I	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Sulfate	mg/L	420	EPA 300.0	0.60	0.20		01/20/11 21:45	MEJ

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Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		DENIT-SU4						
Matrix		Wastewater						
SAL Sample Number		1100234-24						
Date/Time Collected		01/13/11 09:00						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
Sulfide	mg/L	0.14 I	SM 4500SF	0.40	0.10		01/18/11 11:00	KTC
Total Alkalinity	mg/L	240	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	1,000	SM 2540C	10	10	01/18/11 15:00	01/19/11 15:45	MJV
Total Kjeldahl Nitrogen	mg/L	1.2	EPA 351.2	0.20	0.05	01/14/11 08:31	01/17/11 14:48	SMD
Total Suspended Solids	mg/L	2	SM 2540D	1	1	01/15/11 10:00	01/17/11 15:25	MJV
<b><u>Microbiology</u></b>								
Fecal Coliforms	CFU/100 ml	3	SM 9222D	1	1	01/13/11 14:00	01/14/11 15:30	JAA
Sample Description		DENIT-LS1						
Matrix		Wastewater						
SAL Sample Number		1100234-25						
Date/Time Collected		01/13/11 08:00						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b><u>Field Parameters</u></b>								
pH	SU	7.0	DEP FT1100	0.1	0.1		01/13/11 08:00	TDD
Water Temperature	°C	0.3	DEP FT1400	0.1	0.1		01/13/11 08:00	TDD
Specific conductance	umhos/cm	910	DEP FT1200	0.1	0.1		01/13/11 08:00	TDD
Dissolved Oxygen	mg/L	0.6	DEP FT1500	0.1	0.1		01/13/11 08:00	TDD
<b><u>Inorganics</u></b>								
Ammonia as N	mg/L	0.007 I	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	01/13/11 15:00	01/18/11 13:48	KTC
Chemical Oxygen Demand	mg/L	16 I	EPA 410.4	25	10		01/18/11 09:00	ARM
Nitrate (as N)	mg/L	22	EPA 300.0	0.04	0.01		01/14/11 15:44	MEJ
Nitrite (as N)	mg/L	0.10	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Total Alkalinity	mg/L	190	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	590	SM 2540C	10	10	01/18/11 15:00	01/19/11 15:45	MJV
Total Kjeldahl Nitrogen	mg/L	1.8	EPA 351.2	0.20	0.05	01/14/11 08:31	01/17/11 14:48	SMD
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	01/15/11 10:00	01/17/11 15:25	MJV
<b><u>Microbiology</u></b>								
Fecal Coliforms	CFU/100 ml	1 U	SM 9222D	1	1	01/13/11 14:00	01/14/11 15:30	JAA

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Project Name		PNRS II						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		DENIT-LS2						
Matrix		Wastewater						
SAL Sample Number		1100234-26						
Date/Time Collected		01/13/11 09:00						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b>Field Parameters</b>								
pH	SU	7.3	DEP FT1100	0.1	0.1		01/13/11 09:00	TDD
Water Temperature	°C	6.8	DEP FT1400	0.1	0.1		01/13/11 09:00	TDD
Specific conductance	umhos/cm	1,300	DEP FT1200	0.1	0.1		01/13/11 09:00	TDD
Dissolved Oxygen	mg/L	5.0	DEP FT1500	0.1	0.1		01/13/11 09:00	TDD
<b>Inorganics</b>								
Ammonia as N	mg/L	0.085	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	01/13/11 15:00	01/18/11 13:48	KTC
Chemical Oxygen Demand	mg/L	16 I	EPA 410.4	25	10		01/18/11 09:00	ARM
Nitrate (as N)	mg/L	41	EPA 300.0	0.04	0.01		01/14/11 15:44	MEJ
Nitrite (as N)	mg/L	0.07	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Total Alkalinity	mg/L	340	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	860	SM 2540C	10	10	01/18/11 15:00	01/19/11 15:45	MJV
Total Kjeldahl Nitrogen	mg/L	2.7	EPA 351.2	0.20	0.05	01/14/11 08:31	01/17/11 14:48	SMD
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	01/15/11 10:00	01/17/11 15:25	MJV
<b>Microbiology</b>								
Fecal Coliforms	CFU/100 ml	1 U	SM 9222D	1	1	01/13/11 14:00	01/14/11 15:30	JAA
Sample Description		DENIT-LS3						
Matrix		Wastewater						
SAL Sample Number		1100234-27						
Date/Time Collected		01/13/11 09:00						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b>Field Parameters</b>								
pH	SU	6.7	DEP FT1100	0.1	0.1		01/13/11 09:00	TDD
Water Temperature	°C	6.6	DEP FT1400	0.1	0.1		01/13/11 09:00	TDD
Specific conductance	umhos/cm	1,150	DEP FT1200	0.1	0.1		01/13/11 09:00	TDD
Dissolved Oxygen	mg/L	5.4	DEP FT1500	0.1	0.1		01/13/11 09:00	TDD
<b>Inorganics</b>								
Ammonia as N	mg/L	0.012	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	01/13/11 15:00	01/18/11 13:48	KTC
Chemical Oxygen Demand	mg/L	16 I	EPA 410.4	25	10		01/18/11 09:00	ARM
Nitrate (as N)	mg/L	43	EPA 300.0	0.04	0.01		01/14/11 15:44	MEJ
Nitrite (as N)	mg/L	0.05	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Total Alkalinity	mg/L	240	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	790	SM 2540C	10	10	01/18/11 15:00	01/19/11 15:45	MJV
Total Kjeldahl Nitrogen	mg/L	2.3	EPA 351.2	0.20	0.05	01/14/11 08:31	01/17/11 14:48	SMD

**Hazen and Sawyer**

**10002 Princess Palm Avenue Suite 200**

**Tampa, FLORIDA 33619**

**January 26, 2011**

**Work Order: 1100234**

## Laboratory Report

Project Name		PNRS II						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		DENIT-LS3						
Matrix		Wastewater						
SAL Sample Number		1100234-27						
Date/Time Collected		01/13/11 09:00						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	01/15/11 10:00	01/17/11 15:25	MJV
<b><u>Microbiology</u></b>								
Fecal Coliforms	CFU/100 ml	1	SM 9222D	1	1	01/13/11 14:00	01/14/11 15:30	JAA
Sample Description		DENIT-LS4						
Matrix		Wastewater						
SAL Sample Number		1100234-28						
Date/Time Collected		01/13/11 09:00						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b><u>Field Parameters</u></b>								
pH	SU	7.3	DEP FT1100	0.1	0.1		01/13/11 09:00	TDD
Water Temperature	°C	7.4	DEP FT1400	0.1	0.1		01/13/11 09:00	TDD
Specific conductance	umhos/cm	810	DEP FT1200	0.1	0.1		01/13/11 09:00	TDD
Dissolved Oxygen	mg/L	5.2	DEP FT1500	0.1	0.1		01/13/11 09:00	TDD
<b><u>Inorganics</u></b>								
Ammonia as N	mg/L	9.5	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	4	SM 5210B	2	2	01/13/11 15:00	01/18/11 13:48	KTC
Chemical Oxygen Demand	mg/L	22 I	EPA 410.4	25	10		01/18/11 09:00	ARM
Nitrate (as N)	mg/L	3.1	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Nitrite (as N)	mg/L	0.29	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Total Alkalinity	mg/L	230	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	460	SM 2540C	10	10	01/18/11 15:00	01/19/11 15:45	MJV
Total Kjeldahl Nitrogen	mg/L	12	EPA 351.2	0.20	0.05	01/14/11 08:31	01/17/11 14:48	SMD
Total Suspended Solids	mg/L	118	SM 2540D	1	1	01/15/11 10:00	01/17/11 15:25	MJV
<b><u>Microbiology</u></b>								
Fecal Coliforms	CFU/100 ml	1	SM 9222D	1	1	01/13/11 14:00	01/14/11 15:30	JAA
Sample Description		DENIT-GL1						
Matrix		Wastewater						
SAL Sample Number		1100234-29						
Date/Time Collected		01/13/11 08:00						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b><u>Field Parameters</u></b>								
pH	SU	6.6	DEP FT1100	0.1	0.1		01/13/11 08:00	TDD
Water Temperature	°C	0.3	DEP FT1400	0.1	0.1		01/13/11 08:00	TDD

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## Laboratory Report

Project Name		PNRS II						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		DENIT-GL1						
Matrix		Wastewater						
SAL Sample Number		1100234-29						
Date/Time Collected		01/13/11 08:00						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
Specific conductance	umhos/cm	1,000	DEP FT1200	0.1	0.1		01/13/11 08:00	TDD
Dissolved Oxygen	mg/L	0.9	DEP FT1500	0.1	0.1		01/13/11 08:00	TDD
<b><u>Inorganics</u></b>								
Ammonia as N	mg/L	5.8	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	17	SM 5210B	2	2	01/13/11 15:00	01/18/11 13:48	KTC
Chemical Oxygen Demand	mg/L	48	EPA 410.4	25	10		01/18/11 09:00	ARM
Nitrate (as N)	mg/L	0.11	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Nitrite (as N)	mg/L	0.04	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Total Alkalinity	mg/L	400	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	540	SM 2540C	10	10	01/18/11 15:00	01/19/11 15:45	MJV
Total Kjeldahl Nitrogen	mg/L	6.3	EPA 351.2	0.20	0.05	01/14/11 08:31	01/17/11 14:48	SMD
Total Suspended Solids	mg/L	3	SM 2540D	1	1	01/15/11 10:00	01/17/11 15:25	MJV
<b><u>Microbiology</u></b>								
Fecal Coliforms	CFU/100 ml	1 U	SM 9222D	1	1	01/13/11 14:00	01/14/11 15:30	JAA
Sample Description		DFT						
Matrix		Wastewater						
SAL Sample Number		1100234-30						
Date/Time Collected		01/13/11 10:35						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b><u>Field Parameters</u></b>								
pH	SU	7.0	DEP FT1100	0.1	0.1		01/13/11 10:35	TDD
Water Temperature	°C	6.4	DEP FT1400	0.1	0.1		01/13/11 10:35	TDD
Specific conductance	umhos/cm	950	DEP FT1200	0.1	0.1		01/13/11 10:35	TDD
Dissolved Oxygen	mg/L	9.8	DEP FT1500	0.1	0.1		01/13/11 10:35	TDD
<b><u>Inorganics</u></b>								
Ammonia as N	mg/L	0.054	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	01/13/11 15:00	01/18/11 13:48	KTC
Chemical Oxygen Demand	mg/L	46	EPA 410.4	25	10		01/18/11 09:00	ARM
Nitrate (as N)	mg/L	29	EPA 300.0	0.04	0.01		01/14/11 15:44	MEJ
Nitrite (as N)	mg/L	0.06	EPA 300.0	0.04	0.01		01/13/11 17:24	MEJ
Sulfate	mg/L	67	EPA 300.0	0.60	0.20		01/13/11 17:24	MEJ
Total Alkalinity	mg/L	160	SM 2320B	8.0	2.0	01/20/11 09:28	01/20/11 09:30	KTC
Total Dissolved Solids	mg/L	590	SM 2540C	10	10	01/18/11 15:00	01/19/11 15:45	MJV
Total Kjeldahl Nitrogen	mg/L	2.4	EPA 351.2	0.20	0.05	01/14/11 08:31	01/17/11 14:48	SMD
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	01/15/11 10:00	01/17/11 15:25	MJV
<b><u>Microbiology</u></b>								



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## Laboratory Report

Project Name		PNRS II						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		DFT						
Matrix		Wastewater						
SAL Sample Number		1100234-30						
Date/Time Collected		01/13/11 10:35						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
Fecal Coliforms	CFU/100 ml	22	SM 9222D	1	1	01/13/11 14:00	01/14/11 15:30	JAA
Sample Description		T1-D						
Matrix		Wastewater						
SAL Sample Number		1100234-31						
Date/Time Collected		01/13/11 10:15						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 15:40						
<b>Field Parameters</b>								
pH	SU	7.1	DEP FT1100	0.1	0.1		01/13/11 10:15	TDD
Water Temperature	°C	13.7	DEP FT1400	0.1	0.1		01/13/11 10:15	TDD
Specific conductance	umhos/cm	1,220	DEP FT1200	0.1	0.1		01/13/11 10:15	TDD
Dissolved Oxygen	mg/L	2.7	DEP FT1500	0.1	0.1		01/13/11 10:15	TDD
<b>Inorganics</b>								
Ammonia as N	mg/L	58	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	85	SM 5210B	2	2	01/14/11 13:51	01/19/11 11:27	KTC
Chemical Oxygen Demand	mg/L	280	EPA 410.4	25	10		01/18/11 09:00	ARM
Nitrate (as N)	mg/L	0.05	EPA 300.0	0.04	0.01		01/14/11 12:19	MEJ
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		01/14/11 12:19	MEJ
Total Alkalinity	mg/L	340	SM 2320B	8.0	2.0	01/20/11 09:28	01/20/11 09:30	KTC
Total Dissolved Solids	mg/L	470	SM 2540C	10	10	01/18/11 15:00	01/19/11 15:45	MJV
Total Kjeldahl Nitrogen	mg/L	62	EPA 351.2	0.20	0.05	01/18/11 07:30	01/21/11 10:18	SMB
Total Suspended Solids	mg/L	64	SM 2540D	1	1	01/15/11 10:00	01/17/11 15:25	MJV
<b>Microbiology</b>								
Fecal Coliforms	CFU/100 ml	11,100	SM 9222D	1	1	01/13/11 16:16	01/14/11 16:00	MEJ
Sample Description		CL3-D						
Matrix		Wastewater						
SAL Sample Number		1100234-32						
Date/Time Collected		01/13/11 12:05						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 15:40						
<b>Field Parameters</b>								
pH	SU	7.3	DEP FT1100	0.1	0.1		01/13/11 12:05	TDD
Water Temperature	°C	8.3	DEP FT1400	0.1	0.1		01/13/11 12:05	TDD
Specific conductance	umhos/cm	1,300	DEP FT1200	0.1	0.1		01/13/11 12:05	TDD
Dissolved Oxygen	mg/L	9.9	DEP FT1500	0.1	0.1		01/13/11 12:05	TDD

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## Laboratory Report

Project Name		PNRS II						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		CL3-D						
Matrix		Wastewater						
SAL Sample Number		1100234-32						
Date/Time Collected		01/13/11 12:05						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 15:40						
<b><u>Inorganics</u></b>								
Ammonia as N	mg/L	0.018	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	01/14/11 13:51	01/19/11 11:27	KTC
Chemical Oxygen Demand	mg/L	16 I	EPA 410.4	25	10		01/18/11 09:00	ARM
Nitrate (as N)	mg/L	40	EPA 300.0	0.04	0.01		01/14/11 15:44	MEJ
Nitrite (as N)	mg/L	0.06	EPA 300.0	0.04	0.01		01/14/11 12:19	MEJ
Total Alkalinity	mg/L	280	SM 2320B	8.0	2.0	01/20/11 09:28	01/20/11 09:30	KTC
Total Dissolved Solids	mg/L	840	SM 2540C	10	10	01/18/11 15:00	01/19/11 15:45	MJV
Total Kjeldahl Nitrogen	mg/L	2.8	EPA 351.2	0.20	0.05	01/18/11 07:30	01/21/11 10:18	SMB
Total Suspended Solids	mg/L	2	SM 2540D	1	1	01/15/11 10:00	01/17/11 15:25	MJV
<b><u>Microbiology</u></b>								
Fecal Coliforms	CFU/100 ml	25	SM 9222D	1	1	01/13/11 16:16	01/14/11 16:00	MEJ
Sample Description		EC1-D						
Matrix		Wastewater						
SAL Sample Number		1100234-33						
Date/Time Collected		01/13/11 12:05						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 15:40						
<b><u>Field Parameters</u></b>								
pH	SU	6.7	DEP FT1100	0.1	0.1		01/13/11 12:05	TDD
Water Temperature	°C	7.8	DEP FT1400	0.1	0.1		01/13/11 12:05	TDD
Specific conductance	umhos/cm	1,110	DEP FT1200	0.1	0.1		01/13/11 12:05	TDD
Dissolved Oxygen	mg/L	7.9	DEP FT1500	0.1	0.1		01/13/11 12:05	TDD
<b><u>Inorganics</u></b>								
Ammonia as N	mg/L	1.6	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	01/14/11 13:51	01/19/11 11:27	KTC
Chemical Oxygen Demand	mg/L	24 I	EPA 410.4	25	10		01/18/11 09:00	ARM
Nitrate (as N)	mg/L	44	EPA 300.0	0.04	0.01		01/14/11 15:44	MEJ
Nitrite (as N)	mg/L	0.11	EPA 300.0	0.04	0.01		01/14/11 12:19	MEJ
Total Alkalinity	mg/L	180	SM 2320B	8.0	2.0	01/20/11 09:28	01/20/11 09:30	KTC
Total Dissolved Solids	mg/L	720	SM 2540C	10	10	01/18/11 15:00	01/19/11 15:45	MJV
Total Kjeldahl Nitrogen	mg/L	4.1	EPA 351.2	0.20	0.05	01/21/11 12:39	01/25/11 09:24	SMD
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	01/15/11 10:00	01/17/11 15:25	MJV
<b><u>Microbiology</u></b>								
Fecal Coliforms	CFU/100 ml	3,000	SM 9222D	1	1	01/13/11 16:16	01/14/11 16:00	MEJ

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**January 26, 2011**

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## Laboratory Report

Project Name		PNRS II						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		CL1-D						
Matrix		Wastewater						
SAL Sample Number		1100234-34						
Date/Time Collected		01/13/11 11:45						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b>Field Parameters</b>								
pH	SU	7.2	DEP FT1100	0.1	0.1		01/13/11 11:45	TDD
Water Temperature	°C	8.2	DEP FT1400	0.1	0.1		01/13/11 11:45	TDD
Specific conductance	umhos/cm	1,200	DEP FT1200	0.1	0.1		01/13/11 11:45	TDD
Dissolved Oxygen	mg/L	8.8	DEP FT1500	0.1	0.1		01/13/11 11:45	TDD
<b>Inorganics</b>								
Ammonia as N	mg/L	0.020	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	01/14/11 13:51	01/19/11 11:27	KTC
Chemical Oxygen Demand	mg/L	20 I	EPA 410.4	25	10		01/18/11 09:00	ARM
Nitrate (as N)	mg/L	21	EPA 300.0	0.04	0.01		01/14/11 21:06	MEJ
Nitrite (as N)	mg/L	0.18	EPA 300.0	0.04	0.01		01/14/11 21:06	MEJ
Total Alkalinity	mg/L	280	SM 2320B	8.0	2.0	01/20/11 09:28	01/20/11 09:30	KTC
Total Dissolved Solids	mg/L	700	SM 2540C	10	10	01/18/11 15:00	01/19/11 15:45	MJV
Total Kjeldahl Nitrogen	mg/L	2.9	EPA 351.2	0.20	0.05	01/21/11 12:39	01/25/11 09:24	SMD
Total Suspended Solids	mg/L	3	SM 2540D	1	1	01/15/11 10:00	01/17/11 15:25	MJV
<b>Microbiology</b>								
Fecal Coliforms	CFU/100 ml	40	SM 9222D	1	1	01/13/11 16:16	01/14/11 16:00	MEJ
Sample Description		FB						
Matrix		Wastewater						
SAL Sample Number		1100234-35						
Date/Time Collected		01/13/11 08:45						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b>Field Parameters</b>								
pH	SU	7.0	DEP FT1100	0.1	0.1		01/13/11 08:45	TDD
Water Temperature	°C	5.0	DEP FT1400	0.1	0.1		01/13/11 08:45	TDD
Specific conductance	umhos/cm	40	DEP FT1200	0.1	0.1		01/13/11 08:45	TDD
Dissolved Oxygen	mg/L	9.8	DEP FT1500	0.1	0.1		01/13/11 08:45	TDD
<b>Inorganics</b>								
Ammonia as N	mg/L	0.005 U	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	01/13/11 15:00	01/18/11 13:48	KTC
Chemical Oxygen Demand	mg/L	10 U	EPA 410.4	25	10		01/19/11 09:45	ARM
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		01/14/11 21:06	MEJ
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		01/14/11 21:06	MEJ
Total Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0	01/20/11 09:28	01/20/11 09:30	KTC
Total Dissolved Solids	mg/L	10 U	SM 2540C	10	10	01/18/11 15:00	01/19/11 15:45	MJV
Total Kjeldahl Nitrogen	mg/L	0.05 U	EPA 351.2	0.20	0.05	01/18/11 07:30	01/21/11 10:18	SMB

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## Laboratory Report

Project Name		PNRS II						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		FB						
Matrix		Wastewater						
SAL Sample Number		1100234-35						
Date/Time Collected		01/13/11 08:45						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	01/15/11 10:00	01/17/11 15:25	MJV
<b>Microbiology</b>								
Fecal Coliforms	CFU/100 ml	1 U	SM 9222D	1	1	01/13/11 14:00	01/14/11 15:30	JAA
Sample Description		EB						
Matrix		Wastewater						
SAL Sample Number		1100234-36						
Date/Time Collected		01/13/11 11:30						
Collected by		Thomas Drunasky						
Date/Time Received		01/13/11 13:20						
<b>Field Parameters</b>								
pH	SU	7.0	DEP FT1100	0.1	0.1		01/13/11 11:30	TDD
Water Temperature	°C	5.3	DEP FT1400	0.1	0.1		01/13/11 11:30	TDD
Specific conductance	umhos/cm	40	DEP FT1200	0.1	0.1		01/13/11 11:30	TDD
Dissolved Oxygen	mg/L	9.8	DEP FT1500	0.1	0.1		01/13/11 11:30	TDD
<b>Inorganics</b>								
Ammonia as N	mg/L	0.008 I	EPA 350.1	0.010	0.005		01/14/11 09:39	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	01/13/11 15:00	01/18/11 13:48	KTC
Chemical Oxygen Demand	mg/L	10 U	EPA 410.4	25	10		01/19/11 09:45	ARM
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		01/14/11 21:06	MEJ
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		01/14/11 21:06	MEJ
Total Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0	01/20/11 09:28	01/20/11 09:30	KTC
Total Dissolved Solids	mg/L	10 U	SM 2540C	10	10	01/18/11 15:00	01/19/11 15:45	MJV
Total Kjeldahl Nitrogen	mg/L	0.05 U	EPA 351.2	0.20	0.05	01/18/11 07:30	01/21/11 10:18	SMB
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	01/15/11 10:00	01/17/11 15:25	MJV
<b>Microbiology</b>								
Fecal Coliforms	CFU/100 ml	1 U	SM 9222D	1	1	01/13/11 14:00	01/14/11 15:30	JAA

# SOUTHERN ANALYTICAL LABORATORIES, INC.

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



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January 26, 2011

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## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA11306 - Ion Chromatography 300.0 Prep</b>										
<b>Blank (BA11306-BLK1)</b>					Prepared & Analyzed: 01/13/11					
Nitrite (as N)	0.01 U	0.04	0.01	mg/L						
Nitrate (as N)	0.01 U	0.04	0.01	mg/L						
<b>LCS (BA11306-BS1)</b>					Prepared & Analyzed: 01/13/11					
Nitrite (as N)	1.36	0.04	0.01	mg/L	1.4		97	85-115		
Nitrate (as N)	1.63	0.04	0.01	mg/L	1.7		96	85-115		
<b>LCS Dup (BA11306-BSD1)</b>					Prepared & Analyzed: 01/13/11					
Nitrite (as N)	1.33	0.04	0.01	mg/L	1.4		95	85-115	2	200
Nitrate (as N)	1.63	0.04	0.01	mg/L	1.7		96	85-115	0	200
<b>Matrix Spike (BA11306-MS1)</b>					<b>Source: 1100219-10</b>		Prepared & Analyzed: 01/13/11			
Nitrite (as N)	1.37	0.04	0.01	mg/L	1.4	ND	98	85-115		
Nitrate (as N)	1.61	0.04	0.01	mg/L	1.7	ND	95	85-115		
<b>Matrix Spike (BA11306-MS2)</b>					<b>Source: 1100376-03</b>		Prepared & Analyzed: 01/13/11			
Nitrite (as N)	1.44	0.04	0.01	mg/L	1.4	ND	103	85-115		
Nitrate (as N)	1.59	0.04	0.01	mg/L	1.7	0.0156	93	85-115		
<b>Batch BA11322 - BOD</b>										
<b>Blank (BA11322-BLK1)</b>					Prepared: 01/13/11 Analyzed: 01/18/11					
Carbonaceous BOD	2 U	2	2	mg/L						
<b>Blank (BA11322-BLK2)</b>					Prepared: 01/13/11 Analyzed: 01/18/11					
Carbonaceous BOD	2 U	2	2	mg/L						

# SOUTHERN ANALYTICAL LABORATORIES, INC.

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Tampa, FLORIDA 33619

January 26, 2011  
Work Order: 1100234

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA11322 - BOD</b>										
<b>LCS (BA11322-BS1)</b>					Prepared: 01/13/11 Analyzed: 01/18/11					
Carbonaceous BOD	191	2	2	mg/L	200		96	85-115		
<b>LCS (BA11322-BS2)</b>					Prepared: 01/13/11 Analyzed: 01/18/11					
Carbonaceous BOD	191	2	2	mg/L	200		96	85-115		
<b>LCS Dup (BA11322-BSD1)</b>					Prepared: 01/13/11 Analyzed: 01/18/11					
Carbonaceous BOD	176	2	2	mg/L	200		88	85-115	8	10
<b>LCS Dup (BA11322-BSD2)</b>					Prepared: 01/13/11 Analyzed: 01/18/11					
Carbonaceous BOD	176	2	2	mg/L	200		88	85-115	8	10
<b>Duplicate (BA11322-DUP1)</b>					Source: 1100362-03 Prepared: 01/13/11 Analyzed: 01/18/11					
Carbonaceous BOD	240	2	2	mg/L		240			2	25
<b>Duplicate (BA11322-DUP2)</b>					Source: 1100407-01 Prepared: 01/13/11 Analyzed: 01/18/11					
Carbonaceous BOD	520	2	2	mg/L		470			9	25
<b>Batch BA11334 - Ammonia by SEAL</b>										
<b>Blank (BA11334-BLK1)</b>					Prepared & Analyzed: 01/14/11					
Ammonia as N	0.005 U	0.010	0.005	mg/L						
<b>Blank (BA11334-BLK2)</b>					Prepared & Analyzed: 01/14/11					
Ammonia as N	0.005 I	0.010	0.005	mg/L						
<b>Blank (BA11334-BLK3)</b>					Prepared & Analyzed: 01/14/11					
Ammonia as N	0.005 U	0.010	0.005	mg/L						



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## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA11334 - Ammonia by SEAL</b>										
<b>LCS (BA11334-BS1)</b>					Prepared & Analyzed: 01/14/11					
Ammonia as N	0.51	0.010	0.005	mg/L	0.50		101	90-110		
<b>LCS (BA11334-BS2)</b>					Prepared & Analyzed: 01/14/11					
Ammonia as N	0.54	0.010	0.005	mg/L	0.50		107	90-110		
<b>LCS (BA11334-BS3)</b>					Prepared & Analyzed: 01/14/11					
Ammonia as N	0.53	0.010	0.005	mg/L	0.50		107	90-110		
<b>Matrix Spike (BA11334-MS1)</b>					<b>Source: 1100340-01</b>		Prepared & Analyzed: 01/14/11			
Ammonia as N	0.56	0.010	0.005	mg/L	0.50	0.072	97	90-110		
<b>Matrix Spike (BA11334-MS2)</b>					<b>Source: 1100234-35</b>		Prepared & Analyzed: 01/14/11			
Ammonia as N	0.52	0.010	0.005	mg/L	0.50	ND	104	90-110		
<b>Matrix Spike (BA11334-MS3)</b>					<b>Source: 1100234-36</b>		Prepared & Analyzed: 01/14/11			
Ammonia as N	0.52	0.010	0.005	mg/L	0.50	0.008	101	90-110		
<b>Matrix Spike Dup (BA11334-MSD1)</b>					<b>Source: 1100340-01</b>		Prepared & Analyzed: 01/14/11			
Ammonia as N	0.57	0.010	0.005	mg/L	0.50	0.072	100	90-110	3	10
<b>Matrix Spike Dup (BA11334-MSD2)</b>					<b>Source: 1100234-35</b>		Prepared & Analyzed: 01/14/11			
Ammonia as N	0.52	0.010	0.005	mg/L	0.50	ND	104	90-110	0.5	10
<b>Matrix Spike Dup (BA11334-MSD3)</b>					<b>Source: 1100234-36</b>		Prepared & Analyzed: 01/14/11			
Ammonia as N	0.53	0.010	0.005	mg/L	0.50	0.008	104	90-110	2	10

## Batch BA11336 - Ion Chromatography 300.0 Prep

<b>Blank (BA11336-BLK1)</b>					Prepared & Analyzed: 01/13/11					
Nitrate (as N)	0.01 U	0.04	0.01	mg/L						
Nitrite (as N)	0.01 U	0.04	0.01	mg/L						
Sulfate	0.20 U	0.60	0.20	mg/L						

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Work Order: 1100234

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA11336 - Ion Chromatography 300.0 Prep</b>										
<b>LCS (BA11336-BS1)</b>					Prepared & Analyzed: 01/13/11					
Sulfate	9.83	0.60	0.20	mg/L	9.0		109	85-115		
Nitrite (as N)	1.49	0.04	0.01	mg/L	1.4		106	85-115		
Nitrate (as N)	1.78	0.04	0.01	mg/L	1.7		105	85-115		
<b>LCS Dup (BA11336-BSD1)</b>					Prepared & Analyzed: 01/13/11					
Nitrite (as N)	1.54	0.04	0.01	mg/L	1.4		110	85-115	3	200
Nitrate (as N)	1.83	0.04	0.01	mg/L	1.7		108	85-115	3	200
Sulfate	9.86	0.60	0.20	mg/L	9.0		110	85-115	0.3	200
<b>Matrix Spike (BA11336-MS1)</b>					<b>Source: 1100234-20</b>		Prepared & Analyzed: 01/13/11			
Nitrate (as N)	12.2	0.04	0.01	mg/L	1.7	10.4	106	85-115		
Nitrite (as N)	2.80	0.04	0.01	mg/L	1.4	1.31	106	85-115		
Sulfate	71.9	0.60	0.20	mg/L	9.0	63.7	91	85-115		
<b>Matrix Spike (BA11336-MS2)</b>					<b>Source: 1100234-30</b>		Prepared & Analyzed: 01/13/11			
Nitrate (as N)	23.1 +O	0.04	0.01	mg/L	1.7	29.0	NR	85-115		
Nitrite (as N)	1.29	0.04	0.01	mg/L	1.4	0.0625	88	85-115		
Sulfate	69.2 +O	0.60	0.20	mg/L	9.0	67.3	21	85-115		
<b>Batch BA11403 - Digestion for TKN by EPA 351.2</b>										
<b>Blank (BA11403-BLK1)</b>					Prepared: 01/14/11 Analyzed: 01/17/11					
Total Kjeldahl Nitrogen	0.05 U	0.20	0.05	mg/L						
<b>Blank (BA11403-BLK2)</b>					Prepared: 01/14/11 Analyzed: 01/17/11					
Total Kjeldahl Nitrogen	0.05 U	0.20	0.05	mg/L						

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January 26, 2011

Work Order: 1100234

**Inorganics - Quality Control**

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
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**Batch BA11403 - Digestion for TKN by EPA 351.2****LCS (BA11403-BS1)**

Prepared: 01/14/11 Analyzed: 01/17/11

Total Kjeldahl Nitrogen	2.25	0.20	0.05	mg/L	2.5		90	90-110		
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**LCS (BA11403-BS2)**

Prepared: 01/14/11 Analyzed: 01/17/11

Total Kjeldahl Nitrogen	2.41	0.20	0.05	mg/L	2.5		96	90-110		
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**Matrix Spike (BA11403-MS1)**

Source: 1100340-05

Prepared: 01/14/11 Analyzed: 01/17/11

Total Kjeldahl Nitrogen	3.09	0.20	0.05	mg/L	2.5	0.770	93	80-120		
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**Matrix Spike (BA11403-MS2)**

Source: 1100234-27

Prepared: 01/14/11 Analyzed: 01/17/11

Total Kjeldahl Nitrogen	4.95	0.20	0.05	mg/L	2.5	2.31	106	80-120		
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**Matrix Spike Dup (BA11403-MSD1)**

Source: 1100340-05

Prepared: 01/14/11 Analyzed: 01/17/11

Total Kjeldahl Nitrogen	3.06	0.20	0.05	mg/L	2.5	0.770	92	80-120	0.8	20
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**Matrix Spike Dup (BA11403-MSD2)**

Source: 1100234-27

Prepared: 01/14/11 Analyzed: 01/17/11

Total Kjeldahl Nitrogen	5.02	0.20	0.05	mg/L	2.5	2.31	108	80-120	1	20
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**Batch BA11407 - Ion Chromatography 300.0 Prep****Blank (BA11407-BLK1)**

Prepared &amp; Analyzed: 01/14/11

Sulfate	0.20 U	0.60	0.20	mg/L						
Nitrite (as N)	0.01 U	0.04	0.01	mg/L						
Nitrate (as N)	0.01 U	0.04	0.01	mg/L						

**LCS (BA11407-BS1)**

Prepared &amp; Analyzed: 01/14/11

Nitrite (as N)	1.37	0.04	0.01	mg/L	1.4		98	85-115		
Sulfate	8.94	0.60	0.20	mg/L	9.0		99	85-115		
Nitrate (as N)	1.69	0.04	0.01	mg/L	1.7		99	85-115		

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January 26, 2011

Work Order: 1100234

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
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### Batch BA11407 - Ion Chromatography 300.0 Prep

#### LCS Dup (BA11407-BSD1)

Prepared & Analyzed: 01/14/11

Sulfate	8.46	0.60	0.20	mg/L	9.0		94	85-115	6	200
Nitrite (as N)	1.37	0.04	0.01	mg/L	1.4		98	85-115	0	200
Nitrate (as N)	1.62	0.04	0.01	mg/L	1.7		95	85-115	4	200

#### Matrix Spike (BA11407-MS1)

Source: 1100234-01

Prepared & Analyzed: 01/14/11

Nitrite (as N)	1.43	0.04	0.01	mg/L	1.4	ND	102	85-115		
Nitrate (as N)	1.70	0.04	0.01	mg/L	1.7	0.0217	99	85-115		
Sulfate	22.1	0.60	0.20	mg/L	9.0	13.0	101	85-115		

#### Matrix Spike (BA11407-MS2)

Source: 1100234-33

Prepared & Analyzed: 01/14/11

Nitrate (as N)	22.4 +O	0.04	0.01	mg/L	1.7	44.0	NR	85-115		
Nitrite (as N)	1.47	0.04	0.01	mg/L	1.4	0.108	97	85-115		
Sulfate	71.1	0.60	0.20	mg/L	9.0	63.0	90	85-115		

### Batch BA11410 - Ion Chromatography 300.0 Prep

#### Blank (BA11410-BLK1)

Prepared & Analyzed: 01/14/11

Nitrite (as N)	0.01 U	0.04	0.01	mg/L						
Nitrate (as N)	0.01 U	0.04	0.01	mg/L						

#### LCS (BA11410-BS1)

Prepared & Analyzed: 01/14/11

Nitrate (as N)	1.72	0.04	0.01	mg/L	1.7		101	85-115		
Nitrite (as N)	1.50	0.04	0.01	mg/L	1.4		107	85-115		

#### LCS Dup (BA11410-BSD1)

Prepared & Analyzed: 01/14/11

Nitrite (as N)	0.440 +O	0.04	0.01	mg/L	1.4		31	85-115	109	200
Nitrate (as N)	1.75	0.04	0.01	mg/L	1.7		103	85-115	2	200

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**January 26, 2011**  
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**Inorganics - Quality Control**

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BA11410 - Ion Chromatography 300.0 Prep										
Matrix Spike (BA11410-MS1)		Source: 1100408-07			Prepared & Analyzed: 01/14/11					
Nitrate (as N)	1.83	0.04	0.01	mg/L	1.7	0.0676	104	85-115		
Nitrite (as N)	1.45	0.04	0.01	mg/L	1.4	ND	104	85-115		
Matrix Spike (BA11410-MS2)		Source: 1100220-05			Prepared & Analyzed: 01/14/11					
Nitrate (as N)	18.0	0.04	0.01	mg/L	17	0.0333	106	85-115		
Nitrite (as N)	14.8	0.04	0.01	mg/L	14		106	85-115		
Batch BA11412 - alkalinity										
Blank (BA11412-BLK1)					Prepared & Analyzed: 01/14/11					
Total Alkalinity	2.0 U	8.0	2.0	mg/L						
Blank (BA11412-BLK2)					Prepared & Analyzed: 01/14/11					
Total Alkalinity	2.0 U	8.0	2.0	mg/L						
LCS (BA11412-BS1)					Prepared & Analyzed: 01/14/11					
Total Alkalinity	120	8.0	2.0	mg/L	120		98	90-110		
LCS (BA11412-BS2)					Prepared & Analyzed: 01/14/11					
Total Alkalinity	120	8.0	2.0	mg/L	120		98	90-110		
Matrix Spike (BA11412-MS1)		Source: 1100408-01			Prepared & Analyzed: 01/14/11					
Total Alkalinity	280	8.0	2.0	mg/L	120	150	98	80-120		
Matrix Spike (BA11412-MS2)		Source: 1100234-07			Prepared & Analyzed: 01/14/11					
Total Alkalinity	320	8.0	2.0	mg/L	120	200	98	80-120		

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## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BA11412 - alkalinity										
Matrix Spike Dup (BA11412-MSD1)		Source: 1100408-01			Prepared & Analyzed: 01/14/11					
Total Alkalinity	280	8.0	2.0	mg/L	120	150	98	80-120	0	26
Matrix Spike Dup (BA11412-MSD2)		Source: 1100234-07			Prepared & Analyzed: 01/14/11					
Total Alkalinity	320	8.0	2.0	mg/L	120	200	98	80-120	0	26
Batch BA11430 - BOD										
Blank (BA11430-BLK1)					Prepared: 01/14/11 Analyzed: 01/19/11					
Carbonaceous BOD	2 U	2	2	mg/L						
Blank (BA11430-BLK2)					Prepared: 01/14/11 Analyzed: 01/19/11					
Carbonaceous BOD	2 U	2	2	mg/L						
LCS (BA11430-BS1)					Prepared: 01/14/11 Analyzed: 01/19/11					
Carbonaceous BOD	178	2	2	mg/L	200		89	85-115		
LCS (BA11430-BS2)					Prepared: 01/14/11 Analyzed: 01/19/11					
Carbonaceous BOD	178	2	2	mg/L	200		89	85-115		
LCS Dup (BA11430-BSD1)					Prepared: 01/14/11 Analyzed: 01/19/11					
Carbonaceous BOD	178	2	2	mg/L	200		89	85-115	0	10
LCS Dup (BA11430-BSD2)					Prepared: 01/14/11 Analyzed: 01/19/11					
Carbonaceous BOD	178	2	2	mg/L	200		89	85-115	0	10
Duplicate (BA11430-DUP1)		Source: 1100294-01			Prepared: 01/14/11 Analyzed: 01/19/11					
Carbonaceous BOD	200	2	2	mg/L		220			13	25



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## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA11430 - BOD</b>										
<b>Duplicate (BA11430-DUP2)</b>		<b>Source: 1100455-01</b>			Prepared: 01/14/11 Analyzed: 01/19/11					
Carbonaceous BOD	560	2	2	mg/L		520			8	25
<b>Batch BA11445 - TSS prep</b>										
<b>Blank (BA11445-BLK1)</b>		Prepared: 01/14/11 Analyzed: 01/15/11								
Total Suspended Solids	1 U	1	1	mg/L						
<b>LCS (BA11445-BS1)</b>		Prepared: 01/14/11 Analyzed: 01/15/11								
Total Suspended Solids	47.5	1	1	mg/L	50		95	85-115		
<b>Duplicate (BA11445-DUP1)</b>		<b>Source: 1100455-07</b>			Prepared: 01/14/11 Analyzed: 01/15/11					
Total Suspended Solids	1 U	1	1	mg/L		ND				30
<b>Batch BA11504 - TSS prep</b>										
<b>Blank (BA11504-BLK1)</b>		Prepared: 01/15/11 Analyzed: 01/17/11								
Total Suspended Solids	1 U	1	1	mg/L						
<b>LCS (BA11504-BS1)</b>		Prepared: 01/15/11 Analyzed: 01/17/11								
Total Suspended Solids	47.5	1	1	mg/L	50		95	85-115		
<b>Duplicate (BA11504-DUP1)</b>		<b>Source: 1100258-01</b>			Prepared: 01/15/11 Analyzed: 01/17/11					
Total Suspended Solids	18.0	1	1	mg/L		18.0			0	30
<b>Duplicate (BA11504-DUP2)</b>		<b>Source: 1100283-03</b>			Prepared: 01/15/11 Analyzed: 01/17/11					
Total Suspended Solids	1 U	1	1	mg/L		ND				30

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## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA11701 - COD prep</b>										
<b>Blank (BA11701-BLK1)</b>					Prepared & Analyzed: 01/17/11					
Chemical Oxygen Demand	10 U	25	10	mg/L						
<b>LCS (BA11701-BS1)</b>					Prepared & Analyzed: 01/17/11					
Chemical Oxygen Demand	52	25	10	mg/L	50		104	90-110		
<b>Matrix Spike (BA11701-MS1)</b>					<b>Source: 1100234-02</b>		Prepared & Analyzed: 01/17/11			
Chemical Oxygen Demand	82	25	10	mg/L	50	37	90	85-115		
<b>Matrix Spike Dup (BA11701-MSD1)</b>					<b>Source: 1100234-02</b>		Prepared & Analyzed: 01/17/11			
Chemical Oxygen Demand	82	25	10	mg/L	50	37	90	85-115	0	32
<b>Batch BA11731 - TDS Prep</b>										
<b>Blank (BA11731-BLK1)</b>					Prepared: 01/14/11 Analyzed: 01/17/11					
Total Dissolved Solids	10 U	10	10	mg/L						
<b>LCS (BA11731-BS1)</b>					Prepared: 01/14/11 Analyzed: 01/17/11					
Total Dissolved Solids	1,020	10	10	mg/L	1000		102	90-110		
<b>Duplicate (BA11731-DUP1)</b>					<b>Source: 1100234-11</b>		Prepared: 01/14/11 Analyzed: 01/17/11			
Total Dissolved Solids	716	10	10	mg/L		706			1	24
<b>Batch BA11801 - Digestion for TKN by EPA 351.2</b>										
<b>Blank (BA11801-BLK1)</b>					Prepared: 01/18/11 Analyzed: 01/21/11					
Total Kjeldahl Nitrogen	0.05 U	0.20	0.05	mg/L						

# SOUTHERN ANALYTICAL LABORATORIES, INC.

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



Hazen and Sawyer

10002 Princess Palm Avenue Suite 200

Tampa, FLORIDA 33619

January 26, 2011

Work Order: 1100234

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA11801 - Digestion for TKN by EPA 351.2</b>										
<b>Blank (BA11801-BLK2)</b>					Prepared: 01/18/11 Analyzed: 01/21/11					
Total Kjeldahl Nitrogen	0.05 U	0.20	0.05	mg/L						
<b>LCS (BA11801-BS1)</b>					Prepared: 01/18/11 Analyzed: 01/21/11					
Total Kjeldahl Nitrogen	2.47	0.20	0.05	mg/L	2.5		99	90-110		
<b>LCS (BA11801-BS2)</b>					Prepared: 01/18/11 Analyzed: 01/21/11					
Total Kjeldahl Nitrogen	2.49	0.20	0.05	mg/L	2.5		99	90-110		
<b>Matrix Spike (BA11801-MS1)</b>					<b>Source: 1100396-01</b>		Prepared: 01/18/11 Analyzed: 01/21/11			
Total Kjeldahl Nitrogen	3.89	0.20	0.05	mg/L	2.5	1.33	103	80-120		
<b>Matrix Spike (BA11801-MS2)</b>					<b>Source: 1100407-09</b>		Prepared: 01/18/11 Analyzed: 01/21/11			
Total Kjeldahl Nitrogen	3.46	0.20	0.05	mg/L	2.5	0.778	107	80-120		
<b>Matrix Spike Dup (BA11801-MSD1)</b>					<b>Source: 1100396-01</b>		Prepared: 01/18/11 Analyzed: 01/21/11			
Total Kjeldahl Nitrogen	4.05	0.20	0.05	mg/L	2.5	1.33	109	80-120	4	20
<b>Matrix Spike Dup (BA11801-MSD2)</b>					<b>Source: 1100407-09</b>		Prepared: 01/18/11 Analyzed: 01/21/11			
Total Kjeldahl Nitrogen	3.52	0.20	0.05	mg/L	2.5	0.778	110	80-120	2	20
<b>Batch BA11809 - COD prep</b>										
<b>Blank (BA11809-BLK1)</b>					Prepared & Analyzed: 01/18/11					
Chemical Oxygen Demand	10 U	25	10	mg/L						
<b>LCS (BA11809-BS1)</b>					Prepared & Analyzed: 01/18/11					
Chemical Oxygen Demand	46	25	10	mg/L	50		92	90-110		

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## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	Limits	RPD	RPD Limit
Batch BA11809 - COD prep										
Matrix Spike (BA11809-MS1)		Source: 1100234-18			Prepared & Analyzed: 01/18/11					
Chemical Oxygen Demand	59	25	10	mg/L	50	13	92	85-115		
Matrix Spike Dup (BA11809-MSD1)		Source: 1100234-18			Prepared & Analyzed: 01/18/11					
Chemical Oxygen Demand	59	25	10	mg/L	50	13	92	85-115	0	32
Batch BA11816 - Sulfide prep										
Blank (BA11816-BLK1)					Prepared & Analyzed: 01/18/11					
Sulfide	0.10 U	0.40	0.10	mg/L						
LCS (BA11816-BS1)					Prepared & Analyzed: 01/18/11					
Sulfide	4.95	0.40	0.10	mg/L	5.0		99	85-115		
Duplicate (BA11816-DUP1)		Source: 1100234-24			Prepared & Analyzed: 01/18/11					
Sulfide	0.140 I	0.40	0.10	mg/L		0.140			0	14
Batch BA11822 - Ion Chromatography 300.0 Prep										
Blank (BA11822-BLK1)					Prepared & Analyzed: 01/14/11					
Sulfate	0.20 U	0.60	0.20	mg/L						
Nitrate (as N)	0.01 U	0.04	0.01	mg/L						
LCS (BA11822-BS1)					Prepared & Analyzed: 01/14/11					
Nitrate (as N)	1.69	0.04	0.01	mg/L	1.7		99	85-115		
Sulfate	8.83	0.60	0.20	mg/L	9.0		98	85-115		

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## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA11822 - Ion Chromatography 300.0 Prep</b>										
<b>LCS Dup (BA11822-BSD1)</b>					Prepared & Analyzed: 01/14/11					
Nitrate (as N)	1.68	0.04	0.01	mg/L	1.7		99	85-115	0.6	200
Sulfate	8.86	0.60	0.20	mg/L	9.0		98	85-115	0.3	200
<b>Matrix Spike (BA11822-MS1)</b>					<b>Source: 1100234-25</b>		Prepared & Analyzed: 01/14/11			
Nitrate (as N)	36.4	0.04	0.01	mg/L	17	21.7	86	85-115		
Sulfate	148	0.60	0.20	mg/L	90	65.4	92	85-115		
<b>Matrix Spike (BA11822-MS2)</b>					<b>Source: 1100384-15</b>		Prepared & Analyzed: 01/14/11			
Nitrate (as N)	44.9	0.04	0.01	mg/L	17	29.3	92	85-115		
Sulfate	883 +O	0.60	0.20	mg/L	90	873	11	85-115		
<b>Batch BA11833 - Ion Chromatography 300.0 Prep</b>										
<b>Blank (BA11833-BLK1)</b>					Prepared & Analyzed: 01/19/11					
Sulfate	0.20 U	0.60	0.20	mg/L						
<b>LCS (BA11833-BS1)</b>					Prepared & Analyzed: 01/19/11					
Sulfate	8.68	0.60	0.20	mg/L	9.0		96	85-115		
<b>LCS Dup (BA11833-BSD1)</b>					Prepared & Analyzed: 01/19/11					
Sulfate	8.69	0.60	0.20	mg/L	9.0		97	85-115	0.1	200
<b>Matrix Spike (BA11833-MS1)</b>					<b>Source: 1100515-01</b>		Prepared & Analyzed: 01/19/11			
Sulfate	10.7	0.60	0.20	mg/L	9.0	2.10	96	85-115		
<b>Matrix Spike (BA11833-MS2)</b>					<b>Source: 1100516-01</b>		Prepared & Analyzed: 01/19/11			
Sulfate	14.3	0.60	0.20	mg/L	9.0	5.82	94	85-115		

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## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA11902 - COD prep</b>										
<b>Blank (BA11902-BLK1)</b>					Prepared & Analyzed: 01/19/11					
Chemical Oxygen Demand	10 U	25	10	mg/L						
<b>LCS (BA11902-BS1)</b>					Prepared & Analyzed: 01/19/11					
Chemical Oxygen Demand	46	25	10	mg/L	50		92	90-110		
<b>Matrix Spike (BA11902-MS1)</b>					<b>Source: 1100384-01</b>		Prepared & Analyzed: 01/19/11			
Chemical Oxygen Demand	61	25	10	mg/L	50	11	100	85-115		
<b>Matrix Spike Dup (BA11902-MSD1)</b>					<b>Source: 1100384-01</b>		Prepared & Analyzed: 01/19/11			
Chemical Oxygen Demand	61	25	10	mg/L	50	11	100	85-115	0	32
<b>Batch BA11928 - Ion Chromatography 300.0 Prep</b>										
<b>Blank (BA11928-BLK1)</b>					Prepared & Analyzed: 01/19/11					
Sulfate	0.20 U	0.60	0.20	mg/L						
<b>LCS (BA11928-BS1)</b>					Prepared & Analyzed: 01/19/11					
Sulfate	9.90	0.60	0.20	mg/L	9.0		110	85-115		
<b>LCS Dup (BA11928-BSD1)</b>					Prepared & Analyzed: 01/19/11					
Sulfate	9.90	0.60	0.20	mg/L	9.0		110	85-115	0	200
<b>Matrix Spike (BA11928-MS1)</b>					<b>Source: 1100472-08</b>		Prepared & Analyzed: 01/19/11			
Sulfate	107 +O	0.60	0.20	mg/L	9.0	107	0	85-115		
<b>Matrix Spike (BA11928-MS2)</b>					<b>Source: 1100576-05</b>		Prepared & Analyzed: 01/19/11			
Sulfate	10.9 +O	0.60	0.20	mg/L	9.0	3.26	85	85-115		



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## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA11930 - TDS Prep</b>										
<b>Blank (BA11930-BLK1)</b>					Prepared: 01/18/11 Analyzed: 01/19/11					
Total Dissolved Solids	10 U	10	10	mg/L						
<b>Blank (BA11930-BLK2)</b>					Prepared: 01/18/11 Analyzed: 01/19/11					
Total Dissolved Solids	10 U	10	10	mg/L						
<b>LCS (BA11930-BS1)</b>					Prepared: 01/18/11 Analyzed: 01/19/11					
Total Dissolved Solids	990	10	10	mg/L	1000		99	90-110		
<b>Duplicate (BA11930-DUP1)</b>					<b>Source: 1100234-32</b>		Prepared: 01/18/11 Analyzed: 01/19/11			
Total Dissolved Solids	854	10	10	mg/L		844			1	24
<b>Duplicate (BA11930-DUP2)</b>					<b>Source: 1100215-09</b>		Prepared: 01/18/11 Analyzed: 01/19/11			
Total Dissolved Solids	2,700	10	10	mg/L		2720			0.8	24
<b>Batch BA12007 - Ion Chromatography 300.0 Prep</b>										
<b>Blank (BA12007-BLK1)</b>					Prepared & Analyzed: 01/20/11					
Sulfate	0.20 U	0.60	0.20	mg/L						
<b>LCS (BA12007-BS1)</b>					Prepared & Analyzed: 01/20/11					
Sulfate	9.53	0.60	0.20	mg/L	9.0		106	85-115		
<b>LCS Dup (BA12007-BSD1)</b>					Prepared & Analyzed: 01/20/11					
Sulfate	9.39	0.60	0.20	mg/L	9.0		104	85-115	1	200
<b>Matrix Spike (BA12007-MS1)</b>					<b>Source: 1100384-10</b>		Prepared & Analyzed: 01/20/11			
Sulfate	369	0.60	0.20	mg/L	90	286	92	85-115		

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**Inorganics - Quality Control**

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA12007 - Ion Chromatography 300.0 Prep</b>										
<b>Matrix Spike (BA12007-MS2)</b>		<b>Source: 1100422-03</b>			Prepared & Analyzed: 01/20/11					
Sulfate	341	0.60	0.20	mg/L	90	242	110	85-115		
<b>Batch BA12008 - alkalinity</b>										
<b>Blank (BA12008-BLK1)</b>		Prepared & Analyzed: 01/20/11								
Total Alkalinity	2.0 U	8.0	2.0	mg/L						
<b>LCS (BA12008-BS1)</b>		Prepared & Analyzed: 01/20/11								
Total Alkalinity	120	8.0	2.0	mg/L	120		98	90-110		
<b>Matrix Spike (BA12008-MS1)</b>		<b>Source: 1100563-01</b>			Prepared & Analyzed: 01/20/11					
Total Alkalinity	430	8.0	2.0	mg/L	120	300	98	80-120		
<b>Matrix Spike Dup (BA12008-MSD1)</b>		<b>Source: 1100563-01</b>			Prepared & Analyzed: 01/20/11					
Total Alkalinity	430	8.0	2.0	mg/L	120	300	98	80-120	0	26
<b>Batch BA12118 - Digestion for TKN by EPA 351.2</b>										
<b>Blank (BA12118-BLK1)</b>		Prepared: 01/21/11 Analyzed: 01/25/11								
Total Kjeldahl Nitrogen	0.05 U	0.20	0.05	mg/L						
<b>Blank (BA12118-BLK2)</b>		Prepared: 01/21/11 Analyzed: 01/25/11								
Total Kjeldahl Nitrogen	0.05 U	0.20	0.05	mg/L						
<b>LCS (BA12118-BS1)</b>		Prepared: 01/21/11 Analyzed: 01/25/11								
Total Kjeldahl Nitrogen	2.61	0.20	0.05	mg/L	2.5		104	90-110		

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## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA12118 - Digestion for TKN by EPA 351.2</b>										
<b>LCS (BA12118-BS2)</b>					Prepared: 01/21/11 Analyzed: 01/25/11					
Total Kjeldahl Nitrogen	2.33	0.20	0.05	mg/L	2.5		93	90-110		
<b>Matrix Spike (BA12118-MS1)</b>					<b>Source: 1100002-03</b> Prepared: 01/21/11 Analyzed: 01/25/11					
Total Kjeldahl Nitrogen	3.03	0.20	0.05	mg/L	2.5	0.668	95	80-120		
<b>Matrix Spike (BA12118-MS2)</b>					<b>Source: 1100602-09</b> Prepared: 01/21/11 Analyzed: 01/25/11					
Total Kjeldahl Nitrogen	2.85	0.20	0.05	mg/L	2.5	0.414	97	80-120		
<b>Matrix Spike Dup (BA12118-MSD1)</b>					<b>Source: 1100002-03</b> Prepared: 01/21/11 Analyzed: 01/25/11					
Total Kjeldahl Nitrogen	2.94	0.20	0.05	mg/L	2.5	0.668	91	80-120	3	20
<b>Matrix Spike Dup (BA12118-MSD2)</b>					<b>Source: 1100602-09</b> Prepared: 01/21/11 Analyzed: 01/25/11					
Total Kjeldahl Nitrogen	2.84	0.20	0.05	mg/L	2.5	0.414	97	80-120	0.2	20

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## Microbiology - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA11713 - FC-MF</b>										
<b>Blank (BA11713-BLK1)</b>					Prepared: 01/13/11 Analyzed: 01/14/11					
Fecal Coliforms	1 U	1	1	CFU/100 ml						
<b>Batch BA11716 - FC-MF</b>										
<b>Blank (BA11716-BLK1)</b>					Prepared: 01/13/11 Analyzed: 01/14/11					
Fecal Coliforms	1 U	1	1	CFU/100 ml						
<b>Duplicate (BA11716-DUP1)</b>					<b>Source: 1100296-04</b>		Prepared: 01/13/11 Analyzed: 01/14/11			
Fecal Coliforms	1 U	1	1	CFU/100 ml		ND				200
Non-Coliform	1 U	1	1	CFU/100 ml		ND				200

**Hazen and Sawyer****10002 Princess Palm Avenue Suite 200****Tampa, FLORIDA 33619****January 26, 2011****Work Order: 1100234**

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**\* Qualifiers, Notes and Definitions**

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Results followed by a "U" indicate that the sample was analyzed but the compound was not detected. Results followed by "I" indicate that the reported value is between the laboratory method detection limits and the laboratory practical quantitation limit.

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.

Test results in this report meet all the requirements of the NELAC standards. Any applicable qualifiers are shown below. Questions regarding this report should be directed to Client Services at 813-855-1844.

+O Matrix spike source sample was over the recommended range for the method.

Due to the large amount of sampling locations, sampling efforts were completed by both Southern Analytical Laboratories and Hazen and Sawyer staff. In addition, some sampling locations produced very minimal sample volume making it very difficult to use SAL's field meters. A combination of both companies meters was used to complete all field readings.





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SAL Project No. 1100234

Client Name		Hazan and Sawyer		Contact / Phone: Josephin Edeback-Hirst 813-630-4498 jedeback@hazanandsawyer.com																	
Project Name / Location		PNRS H Wastewater System Analyses																			
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		PARAMETER / CONTAINER DESCRIPTION																			
SAL Use Only	Sample No.	Sample Description	Date	Time	Matrix	Composite	Grab	500mL P. Cool Alkalinity, CBOD, TSS	125mL P. Cool SO4	500mL P. Zn Acetate/NaOH Hydrogen Sulfide	No Headspace	TKN, NH3, NO3, COD, TP	125mL P. Sterile, Cool Fecal Coliforms	ORP (Client meter)	Field pH	Field Temp	Field Cond	Field DO			
	13	UNSAT-SA2	11/13/11	1610	WW		X	1				1	1								
	14	UNSAT-EC3			WW		X	1				1	1								
	15	UNSAT-EC4		1610	WW		X	1				1	1								
	16	UNSAT-CL1			WW		X	1	1			1	1								
	17	UNSAT-CL2		0850	WW		X	1				1	1								
	18	UNSAT-CL3			WW		X	1				1	1								
	19	UNSAT-CL4		1115	WW		X	1				1	1								
	20	UNSAT-PS1		1015	WW		X	1				1	1								
	21	DENIT-SU1		0800	WW		X	1	1			1	1								
	22	DENIT-SU2		0800	WW		X	1	1	1		1	1								
	23	DENIT-SU3		0900	WW		X	1	1			1	1								
	24	DENIT-SU4		0900	WW		X	1	1	1		1	1								
Containers Prepared/Relinquished:		Date/Time: 1200	Received: 1200	Date/Time: 11/13/11		Date/Time: 11/13/11		Seal intact? Y N NA		Samples intact upon arrival? Y N NA		Received on ice? Temp. Y N NA		Proper preservatives indicated? Y N NA		Rec'd within holding time? Y N NA		Volatiles rec'd w/out headspace Y N NA		Proper containers used? Y N NA	
Relinquished:		Date/Time: 1300	Received: 1300	Date/Time: 11/13/11		Date/Time: 11/13/11															
Relinquished:		Date/Time: 11/13/11	Received: 11/13/11	Date/Time: 11/13/11		Date/Time: 11/13/11															
Relinquished:		Date/Time: 11/13/11	Received: 11/13/11	Date/Time: 11/13/11		Date/Time: 11/13/11															
Relinquished:		Date/Time: 11/13/11	Received: 11/13/11	Date/Time: 11/13/11		Date/Time: 11/13/11															
Relinquished:		Date/Time: 11/13/11	Received: 11/13/11	Date/Time: 11/13/11		Date/Time: 11/13/11															

1100234



## SAL Project No.

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110234

## Chain of Custody

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**10002 Princess Palm Avenue Suite 200**

**Tampa FLORIDA, 33619**

**January 20, 2011**

**Work Order: 1100335**

## Laboratory Report

Project Name		PNRS II						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		UNSAT-IS3						
Matrix		Wastewater						
SAL Sample Number		1100335-01						
Date/Time Collected		01/11/11 08:20						
Collected by		Client						
Date/Time Received		01/11/11 13:50						
<b><u>Inorganics</u></b>								
Ammonia as N	mg/L	1.2	EPA 350.1	0.010	0.005		01/12/11 08:41	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	01/12/11 17:05	01/17/11 13:47	KTC
Chemical Oxygen Demand	mg/L	31	EPA 410.4	25	10		01/12/11 09:15	ARM
Nitrate (as N)	mg/L	24	EPA 300.0	0.04	0.01		01/12/11 13:55	MEJ
Nitrite (as N)	mg/L	8.3	EPA 300.0	0.04	0.01		01/11/11 17:00	MEJ
Sulfate	mg/L	120	EPA 300.0	0.60	0.20		01/15/11 00:31	MEJ
Total Alkalinity	mg/L	300	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	850	SM 2540C	10	10	01/14/11 13:30	01/17/11 16:30	MJV
Total Kjeldahl Nitrogen	mg/L	4.1	EPA 351.2	0.20	0.05	01/13/11 07:45	01/14/11 11:34	SMB
Total Suspended Solids	mg/L	10	SM 2540D	1	1	01/18/11 15:54	01/18/11 16:00	KTC
Sample Description		UNSAT-IS4						
Matrix		Wastewater						
SAL Sample Number		1100335-02						
Date/Time Collected		01/11/11 08:30						
Collected by		Client						
Date/Time Received		01/11/11 13:50						
<b><u>Inorganics</u></b>								
Ammonia as N	mg/L	0.092	EPA 350.1	0.010	0.005		01/12/11 08:41	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	01/12/11 17:05	01/17/11 13:47	KTC
Chemical Oxygen Demand	mg/L	29	EPA 410.4	25	10		01/12/11 09:15	ARM
Nitrate (as N)	mg/L	0.11	EPA 300.0	0.04	0.01		01/11/11 17:00	MEJ
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		01/11/11 17:00	MEJ
Sulfate	mg/L	110	EPA 300.0	0.60	0.20		01/15/11 00:31	MEJ
Total Alkalinity	mg/L	260	SM 2320B	8.0	2.0	01/14/11 11:03	01/14/11 11:06	KTC
Total Dissolved Solids	mg/L	620	SM 2540C	10	10	01/14/11 13:30	01/17/11 16:30	MJV
Total Kjeldahl Nitrogen	mg/L	0.87	EPA 351.2	0.20	0.05	01/13/11 07:45	01/14/11 11:34	SMB
Total Suspended Solids	mg/L	7	SM 2540D	1	1	01/18/11 15:54	01/18/11 16:00	KTC

# SOUTHERN ANALYTICAL LABORATORIES, INC.

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



Hazen and Sawyer

10002 Princess Palm Avenue Suite 200

Tampa FLORIDA, 33619

January 20, 2011

Work Order: 1100335

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
---------	--------	-----	-----	-------	-------------	---------------	------	-------------	-----	-----------

### Batch BA11118 - Ion Chromatography 300.0 Prep

<b>Blank (BA11118-BLK1)</b>					Prepared & Analyzed: 01/11/11					
Nitrite (as N)	0.01 U	0.04	0.01	mg/L						
Nitrate (as N)	0.01 U	0.04	0.01	mg/L						
<b>LCS (BA11118-BS1)</b>					Prepared & Analyzed: 01/11/11					
Nitrite (as N)	1.43	0.04	0.01	mg/L	1.4		102	85-115		
Nitrate (as N)	1.70	0.04	0.01	mg/L	1.7		100	85-115		
<b>LCS Dup (BA11118-BSD1)</b>					Prepared & Analyzed: 01/11/11					
Nitrate (as N)	1.69	0.04	0.01	mg/L	1.7		99	85-115	0.6	200
Nitrite (as N)	1.42	0.04	0.01	mg/L	1.4		101	85-115	0.7	200
<b>Matrix Spike (BA11118-MS1)</b>					<b>Source: 1100315-02</b>		Prepared & Analyzed: 01/11/11			
Nitrate (as N)	1.56	0.04	0.01	mg/L	1.7	0.0267	90	85-115		
Nitrite (as N)	1.32	0.04	0.01	mg/L	1.4	ND	94	85-115		
<b>Matrix Spike (BA11118-MS2)</b>					<b>Source: 1100335-02</b>		Prepared & Analyzed: 01/11/11			
Sulfate	102 +O	0.60	0.20	mg/L	9.0	114	NR	85-115		
Nitrite (as N)	1.33	0.04	0.01	mg/L	1.4	ND	95	85-115		
Nitrate (as N)	1.68	0.04	0.01	mg/L	1.7	0.107	93	85-115		

### Batch BA11121 - Ammonia by SEAL

<b>Blank (BA11121-BLK1)</b>					Prepared & Analyzed: 01/12/11					
Ammonia as N	0.005 U	0.010	0.005	mg/L						
<b>Blank (BA11121-BLK2)</b>					Prepared & Analyzed: 01/12/11					
Ammonia as N	0.005 U	0.010	0.005	mg/L						

**Hazen and Sawyer**  
**10002 Princess Palm Avenue Suite 200**  
**Tampa FLORIDA, 33619**

**January 20, 2011**  
**Work Order: 1100335**

**Inorganics - Quality Control**

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA11121 - Ammonia by SEAL</b>										
<b>Blank (BA11121-BLK3)</b>					Prepared & Analyzed: 01/12/11					
Ammonia as N	0.005	0.010	0.005	mg/L						
<b>LCS (BA11121-BS1)</b>					Prepared & Analyzed: 01/12/11					
Ammonia as N	0.49	0.010	0.005	mg/L	0.50		99	90-110		
<b>LCS (BA11121-BS2)</b>					Prepared & Analyzed: 01/12/11					
Ammonia as N	0.51	0.010	0.005	mg/L	0.50		102	90-110		
<b>LCS (BA11121-BS3)</b>					Prepared & Analyzed: 01/12/11					
Ammonia as N	0.48	0.010	0.005	mg/L	0.50		96	90-110		
<b>Matrix Spike (BA11121-MS1)</b>					Source: 1100250-01 Prepared & Analyzed: 01/12/11					
Ammonia as N	0.51	0.010	0.005	mg/L	0.50	ND	103	90-110		
<b>Matrix Spike (BA11121-MS2)</b>					Source: 1100195-11 Prepared & Analyzed: 01/12/11					
Ammonia as N	0.49	0.010	0.005	mg/L	0.50	ND	97	90-110		
<b>Matrix Spike (BA11121-MS3)</b>					Source: 1100330-09 Prepared & Analyzed: 01/12/11					
Ammonia as N	0.50	0.010	0.005	mg/L	0.50	0.031	93	90-110		
<b>Matrix Spike Dup (BA11121-MSD1)</b>					Source: 1100250-01 Prepared & Analyzed: 01/12/11					
Ammonia as N	0.50	0.010	0.005	mg/L	0.50	ND	101	90-110	2	10
<b>Matrix Spike Dup (BA11121-MSD2)</b>					Source: 1100195-11 Prepared & Analyzed: 01/12/11					
Ammonia as N	0.51	0.010	0.005	mg/L	0.50	ND	101	90-110	4	10
<b>Matrix Spike Dup (BA11121-MSD3)</b>					Source: 1100330-09 Prepared & Analyzed: 01/12/11					
Ammonia as N	0.50	0.010	0.005	mg/L	0.50	0.031	94	90-110	0.6	10

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Tampa FLORIDA, 33619

January 20, 2011

Work Order: 1100335

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA11205 - COD prep</b>										
<b>Blank (BA11205-BLK1)</b>					Prepared & Analyzed: 01/12/11					
Chemical Oxygen Demand	10 U	25	10	mg/L						
<b>LCS (BA11205-BS1)</b>					Prepared & Analyzed: 01/12/11					
Chemical Oxygen Demand	46	25	10	mg/L	50		92	90-110		
<b>Matrix Spike (BA11205-MS1)</b>					<b>Source: 1100152-01</b>		Prepared & Analyzed: 01/12/11			
Chemical Oxygen Demand	2,200	25	10	mg/L	1000	1100	108	85-115		
<b>Matrix Spike Dup (BA11205-MSD1)</b>					<b>Source: 1100152-01</b>		Prepared & Analyzed: 01/12/11			
Chemical Oxygen Demand	2,200	25	10	mg/L	1000	1100	108	85-115	0	32
<b>Batch BA11218 - Ion Chromatography 300.0 Prep</b>										
<b>Blank (BA11218-BLK1)</b>					Prepared & Analyzed: 01/12/11					
Nitrate (as N)	0.01 U	0.04	0.01	mg/L						
<b>LCS (BA11218-BS1)</b>					Prepared & Analyzed: 01/12/11					
Nitrate (as N)	1.65	0.04	0.01	mg/L	1.7		97	85-115		
<b>LCS Dup (BA11218-BSD1)</b>					Prepared & Analyzed: 01/12/11					
Nitrate (as N)	1.71	0.04	0.01	mg/L	1.7		101	85-115	4	200
<b>Matrix Spike (BA11218-MS1)</b>					<b>Source: 1100361-01</b>		Prepared & Analyzed: 01/12/11			
Nitrate (as N)	1.73	0.04	0.01	mg/L	1.7	0.0250	100	85-115		
<b>Matrix Spike (BA11218-MS2)</b>					<b>Source: 1100365-06</b>		Prepared & Analyzed: 01/12/11			
Nitrate (as N)	1.85	0.04	0.01	mg/L	1.7	0.319	90	85-115		

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Hazen and Sawyer  
10002 Princess Palm Avenue Suite 200  
Tampa FLORIDA, 33619

January 20, 2011  
Work Order: 1100335

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA11225 - BOD</b>										
<b>Blank (BA11225-BLK1)</b>					Prepared: 01/12/11 Analyzed: 01/17/11					
Carbonaceous BOD	2 U	2	2	mg/L						
<b>LCS (BA11225-BS1)</b>					Prepared: 01/12/11 Analyzed: 01/17/11					
Carbonaceous BOD	181	2	2	mg/L	200		90	85-115		
<b>LCS Dup (BA11225-BSD1)</b>					Prepared: 01/12/11 Analyzed: 01/17/11					
Carbonaceous BOD	177	2	2	mg/L	200		88	85-115	2	10
<b>Duplicate (BA11225-DUP1)</b>					Source: 1100330-01 Prepared: 01/12/11 Analyzed: 01/17/11					
Carbonaceous BOD	430	2	2	mg/L		430			0.7	25
<b>Batch BA11301 - Digestion for TKN by EPA 351.2</b>										
<b>Blank (BA11301-BLK1)</b>					Prepared: 01/13/11 Analyzed: 01/14/11					
Total Kjeldahl Nitrogen	0.05 U	0.20	0.05	mg/L						
<b>Blank (BA11301-BLK2)</b>					Prepared: 01/13/11 Analyzed: 01/14/11					
Total Kjeldahl Nitrogen	0.05 U	0.20	0.05	mg/L						
<b>LCS (BA11301-BS1)</b>					Prepared: 01/13/11 Analyzed: 01/14/11					
Total Kjeldahl Nitrogen	2.40	0.20	0.05	mg/L	2.5		96	90-110		
<b>LCS (BA11301-BS2)</b>					Prepared: 01/13/11 Analyzed: 01/14/11					
Total Kjeldahl Nitrogen	2.43	0.20	0.05	mg/L	2.5		97	90-110		
<b>Matrix Spike (BA11301-MS1)</b>					Source: 1100195-11 Prepared: 01/13/11 Analyzed: 01/14/11					
Total Kjeldahl Nitrogen	2.36	0.20	0.05	mg/L	2.5	ND	94	80-120		

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Work Order: 1100335

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA11301 - Digestion for TKN by EPA 351.2</b>										
<b>Matrix Spike (BA11301-MS2)</b>		<b>Source: 1100284-01</b>			Prepared: 01/13/11 Analyzed: 01/14/11					
Total Kjeldahl Nitrogen	2.39	0.20	0.05	mg/L	2.5	ND	96	80-120		
<b>Matrix Spike Dup (BA11301-MSD1)</b>		<b>Source: 1100195-11</b>			Prepared: 01/13/11 Analyzed: 01/14/11					
Total Kjeldahl Nitrogen	2.36	0.20	0.05	mg/L	2.5	ND	95	80-120	0.2	20
<b>Matrix Spike Dup (BA11301-MSD2)</b>		<b>Source: 1100284-01</b>			Prepared: 01/13/11 Analyzed: 01/14/11					
Total Kjeldahl Nitrogen	2.51	0.20	0.05	mg/L	2.5	ND	100	80-120	5	20
<b>Batch BA11412 - alkalinity</b>										
<b>Blank (BA11412-BLK1)</b>		Prepared & Analyzed: 01/14/11								
Total Alkalinity	2.0 U	8.0	2.0	mg/L						
<b>Blank (BA11412-BLK2)</b>		Prepared & Analyzed: 01/14/11								
Total Alkalinity	2.0 U	8.0	2.0	mg/L						
<b>LCS (BA11412-BS1)</b>		Prepared & Analyzed: 01/14/11								
Total Alkalinity	120	8.0	2.0	mg/L	120		98	90-110		
<b>LCS (BA11412-BS2)</b>		Prepared & Analyzed: 01/14/11								
Total Alkalinity	120	8.0	2.0	mg/L	120		98	90-110		
<b>Matrix Spike (BA11412-MS1)</b>		<b>Source: 1100408-01</b>			Prepared & Analyzed: 01/14/11					
Total Alkalinity	280	8.0	2.0	mg/L	120	150	98	80-120		
<b>Matrix Spike (BA11412-MS2)</b>		<b>Source: 1100234-07</b>			Prepared & Analyzed: 01/14/11					
Total Alkalinity	320	8.0	2.0	mg/L	120	200	98	80-120		



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January 20, 2011

Work Order: 1100335

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BA11412 - alkalinity										
Matrix Spike Dup (BA11412-MSD1)		Source: 1100408-01			Prepared & Analyzed: 01/14/11					
Total Alkalinity	280	8.0	2.0	mg/L	120	150	98	80-120	0	26
Matrix Spike Dup (BA11412-MSD2)		Source: 1100234-07			Prepared & Analyzed: 01/14/11					
Total Alkalinity	320	8.0	2.0	mg/L	120	200	98	80-120	0	26
Batch BA11729 - TDS Prep										
Blank (BA11729-BLK1)					Prepared: 01/14/11 Analyzed: 01/17/11					
Total Dissolved Solids	10 U	10	10	mg/L						
LCS (BA11729-BS1)					Prepared: 01/14/11 Analyzed: 01/17/11					
Total Dissolved Solids	996	10	10	mg/L	1000		100	90-110		
Duplicate (BA11729-DUP1)		Source: 1100219-04			Prepared: 01/14/11 Analyzed: 01/17/11					
Total Dissolved Solids	276	10	10	mg/L		272			1	24
Duplicate (BA11729-DUP2)		Source: 1100315-01			Prepared: 01/14/11 Analyzed: 01/17/11					
Total Dissolved Solids	10 U	10	10	mg/L		ND				24
Batch BA11821 - Ion Chromatography 300.0 Prep										
Blank (BA11821-BLK1)					Prepared & Analyzed: 01/15/11					
Sulfate	0.20 U	0.60	0.20	mg/L						
LCS (BA11821-BS1)					Prepared & Analyzed: 01/15/11					
Sulfate	8.90	0.60	0.20	mg/L	9.0		99	85-115		

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Tampa FLORIDA, 33619

January 20, 2011

Work Order: 1100335

## Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch BA11821 - Ion Chromatography 300.0 Prep</b>										
<b>LCS Dup (BA11821-BSD1)</b>					Prepared & Analyzed: 01/15/11					
Sulfate	8.99	0.60	0.20	mg/L	9.0		100	85-115	1	200
<b>Matrix Spike (BA11821-MS1)</b>					<b>Source: 1100384-25</b>		Prepared & Analyzed: 01/15/11			
Sulfate	158	0.60	0.20	mg/L	90		176	85-115		
<b>Matrix Spike (BA11821-MS2)</b>					<b>Source: 1100367-03</b>		Prepared & Analyzed: 01/15/11			
Sulfate	NO2 or SO4	0.60	0.20	mg/L	90		148	85-115		
<b>Batch BA11835 - TSS prep</b>										
<b>Blank (BA11835-BLK1)</b>					Prepared & Analyzed: 01/18/11					
Total Suspended Solids	1 U	1	1	mg/L						
<b>Blank (BA11835-BLK2)</b>					Prepared & Analyzed: 01/18/11					
Total Suspended Solids	1 U	1	1	mg/L						
<b>LCS (BA11835-BS1)</b>					Prepared & Analyzed: 01/18/11					
Total Suspended Solids	45.5	1	1	mg/L	50		91	85-115		
<b>LCS (BA11835-BS2)</b>					Prepared & Analyzed: 01/18/11					
Total Suspended Solids	45.5	1	1	mg/L	50		91	85-115		
<b>Duplicate (BA11835-DUP1)</b>					<b>Source: 1100455-06</b>		Prepared & Analyzed: 01/18/11			
Total Suspended Solids	1 U	1	1	mg/L		ND				30
<b>Duplicate (BA11835-DUP2)</b>					<b>Source: 1100374-07</b>		Prepared & Analyzed: 01/18/11			
Total Suspended Solids	1 U	1	1	mg/L		ND				30

Hazen and Sawyer

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Tampa FLORIDA, 33619

January 20, 2011

Work Order: 1100335

## \* Qualifiers, Notes and Definitions

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Results followed by a "U" indicate that the sample was analyzed but the compound was not detected. Results followed by "I" indicate that the reported value is between the laboratory method detection limits and the laboratory practical quantitation limit.

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.

Test results in this report meet all the requirements of the NELAC standards. Any applicable qualifiers are shown below. Questions regarding this report should be directed to Client Services at 813-855-1844.

+O Matrix spike source sample was over the recommended range for the method.



# SOUTHERN ANALYTICAL LABORATORIES, INC.

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

SAL Project No. 1100335

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 Description	Date	Time	Matrix	Composite	Grab	1LP, Cool Alkalinity, CBOD, SO4
01	UNSAT-IS3	1/11/11	8:30	WW		X	250ml P, H2SO4 TKN, NH3, NO3
02	UNSAT-IS4	1/11/11	8:30	WW		X	1LP, Zn Acetate/NaOH No Headspace
							Hydrogen Sulfide, Sulfide
							ORP (Client meter)
							Field pH
							Field Temp
							Field Cond
							Field DO
Containers Prepared:	Date/Time: 1580	Received:	Date/Time: 12/15 2:30pm	Seal intact?	Y N	NA	Instructions / Remarks
Relinquished:	12-11-10	Received:	12/11/11	Samples intact upon arrival?	Y N	NA	
Relinquished:	1-11-11	Received:	1/11/11	Received on ice? Temp	Y N	NA	
Relinquished:	1300	Received:		Proper preservatives indicated?	Y N	NA	
Relinquished:		Received:		Rec'd within holding time?	Y N	NA	
Relinquished:		Received:		Volatiles rec'd w/out headspace	Y N	NA	
Relinquished:		Received:		Proper containers used?	Y N	NA	

Chain of Custody

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

January 28, 2011

Ms. Josefin Edebeck-Hirst  
Hazen and Sawyer, P.C  
10002 Princess Palm Avenue  
Suite 200  
Tampa, FL 33619

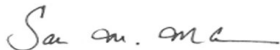
RE: Project: FDOH  
Pace Project No.: 3524876

Dear Ms. Edebeck-Hirst:

Enclosed are the analytical results for sample(s) received by the laboratory on January 14, 2011.  
The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Sakina Mckenzie

sakina.mckenzie@pacelabs.com  
Project Manager

Enclosures

## REPORT OF LABORATORY ANALYSIS

Page 1 of 37

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## CERTIFICATIONS

Project: FDOH  
Pace Project No.: 3524876

### Ormond Beach Certification IDs

8 East Tower Circle, Ormond Beach, FL 32174  
Alabama Certification #: 41320  
Arizona Certification #: AZ0735  
Colorado Certification: FL NELAC Reciprocity  
Connecticut Certification #: PH 0216  
Florida Certification #: E83079  
Georgia Certification #: 955  
Guam Certification: FL NELAC Reciprocity  
Hawaii Certification: FL NELAC Reciprocity  
Kansas Certification #: E-10383  
Kentucky Certification #: 90050  
Louisiana Certification #: LA090012  
Louisiana Environmental Certificate #: 05007  
Maine Certification #: FL1264  
Massachusetts Certification #: M-FL1264

Michigan Certification #: 9911  
Mississippi Certification: FL NELAC Reciprocity  
Montana Certification #: Cert 0074  
Nevada Certification: FL NELAC Reciprocity  
New Hampshire Certification #: 2958  
New Jersey Certification #: FL765  
New York Certification #: 11608  
North Carolina Environmental Certificate #: 667  
North Carolina Certification #: 12710  
Pennsylvania Certification #: 68-547  
Puerto Rico Certification #: FL01264  
Tennessee Certification #: TN02974  
Texas Certification: FL NELAC Reciprocity  
Virginia Certification #: 00432  
Wyoming Certification: FL NELAC Reciprocity

### Tampa Certification IDs

1209 Tech Boulevard, Ste 207, Tampa FL 33619

Florida Certification #: E84973

## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: FDOH  
Pace Project No.: 3524876

Lab ID	Sample ID	Matrix	Date Collected	Date Received
3524876001	DENIT-LS1	Water	01/13/11 08:00	01/14/11 07:00
3524876002	UNSAT-EC3	Water	01/13/11 12:05	01/14/11 07:00
3524876003	PNRSII STE-T1	Water	01/13/11 13:30	01/14/11 07:00

## REPORT OF LABORATORY ANALYSIS

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## SAMPLE ANALYTE COUNT

Project: FDOH  
Pace Project No.: 3524876

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
3524876001	DENIT-LS1	SM 2320B	HEM	1	PASI-O
		SM 2540C	AIS	1	PASI-O
		SM 2540D	AIS	1	PASI-O
		SM 5210B	KHC	1	PASI-O
		EPA 300.0	KDM	3	PASI-O
		EPA 300.0	KDM	1	PASI-O
		EPA 350.1	AMD	1	PASI-O
		EPA 351.2	AMD	1	PASI-O
		EPA 365.4	AMD	1	PASI-O
		EPA 410.4	MMD	1	PASI-O
3524876002	UNSAT-EC3	SM 9222D	KMC	1	PASI-T
		SM 2320B	HEM	1	PASI-O
		SM 2540C	AIS	1	PASI-O
		SM 2540D	AIS	1	PASI-O
		SM 5210B	KHC	1	PASI-O
		EPA 300.0	KDM	3	PASI-O
		EPA 300.0	KDM	1	PASI-O
		EPA 350.1	AMD	1	PASI-O
		EPA 351.2	AMD	1	PASI-O
		EPA 365.4	AMD	1	PASI-O
		EPA 410.4	MMD	1	PASI-O
3524876003	PNRSII STE-T1	SM 9222D	KMC	1	PASI-T
		SM 2320B	HEM	1	PASI-O
		SM 2540C	AIS	1	PASI-O
		SM 2540D	AIS	1	PASI-O
		SM 5210B	KHC	1	PASI-O
		EPA 300.0	KDM	3	PASI-O
		EPA 300.0	KDM	1	PASI-O
		EPA 350.1	AMD	1	PASI-O
		EPA 351.2	AMD	1	PASI-O
		EPA 365.4	AMD	1	PASI-O
		EPA 410.4	MMD	1	PASI-O

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## PROJECT NARRATIVE

Project: FDOH  
Pace Project No.: 3524876

---

**Method:** SM 9222D  
**Description:** 9222D Fecal Coliform Tampa  
**Client:** Hazen and Sawyer, P.C  
**Date:** January 28, 2011

**General Information:**

2 samples were analyzed for SM 9222D. All samples were received in acceptable condition with any exceptions noted below.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Sample Preparation:**

The samples were prepared in accordance with SM 9222D with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Internal Standards:**

All internal standards were within QC limits with any exceptions noted below.

**Surrogates:**

All surrogates were within QC limits with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: FDOH  
Pace Project No.: 3524876

---

**Method:** SM 2320B  
**Description:** 2320B Alkalinity  
**Client:** Hazen and Sawyer, P.C  
**Date:** January 28, 2011

**General Information:**

3 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WET/6874

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 3524769003,3524811002

J(M1): Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 160912)
  - Alkalinity, Total as CaCO<sub>3</sub>
- MS (Lab ID: 160914)
  - Alkalinity, Total as CaCO<sub>3</sub>

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: FDOH  
Pace Project No.: 3524876

---

**Method:** SM 2540C  
**Description:** 2540C Total Dissolved Solids  
**Client:** Hazen and Sawyer, P.C  
**Date:** January 28, 2011

**General Information:**

3 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: FDOH  
Pace Project No.: 3524876

---

**Method:** SM 2540D  
**Description:** 2540D Total Suspended Solids  
**Client:** Hazen and Sawyer, P.C  
**Date:** January 28, 2011

**General Information:**

3 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: FDOH  
Pace Project No.: 3524876

---

**Method:** SM 5210B  
**Description:** 5210B cBOD, 5 day  
**Client:** Hazen and Sawyer, P.C  
**Date:** January 28, 2011

**General Information:**

3 samples were analyzed for SM 5210B. All samples were received in acceptable condition with any exceptions noted below.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Sample Preparation:**

The samples were prepared in accordance with SM 5210B with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

Analyte Comments:

QC Batch: WET/6832

J(B2): Estimated Value. Oxygen usage is less than 2.0 for all dilutions set. The reported value is an estimated less than value and is calculated for the dilution using the most amount of sample.

- DENIT-LS1 (Lab ID: 3524876001)
  - Carbonaceous BOD, 5 day
- UNSAT-EC3 (Lab ID: 3524876002)
  - Carbonaceous BOD, 5 day

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: FDOH  
Pace Project No.: 3524876

---

**Method:** EPA 300.0  
**Description:** 300.0 IC Anions  
**Client:** Hazen and Sawyer, P.C  
**Date:** January 28, 2011

**General Information:**

3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

Analyte Comments:

QC Batch: WETA/8171

1p: The recovery of the analyte in the CRDL standard (also known as the reporting limit verification) did not meet the acceptance criteria.

- BLANK (Lab ID: 160412)
  - Nitrite as N
  - Nitrate as N
  - Orthophosphate as P

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: FDOH  
Pace Project No.: 3524876

---

**Method:** EPA 300.0  
**Description:** 300.0 IC Anions 28 Days  
**Client:** Hazen and Sawyer, P.C  
**Date:** January 28, 2011

**General Information:**

3 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

Analyte Comments:

QC Batch: WETA/8172

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- PNRSII STE-T1 (Lab ID: 3524876003)
  - Sulfate

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## PROJECT NARRATIVE

Project: FDOH  
Pace Project No.: 3524876

---

**Method:** EPA 350.1  
**Description:** 350.1 Ammonia  
**Client:** Hazen and Sawyer, P.C  
**Date:** January 28, 2011

**General Information:**

3 samples were analyzed for EPA 350.1. All samples were received in acceptable condition with any exceptions noted below.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/8258

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 3524811002

J(M1): Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 162542)
- Nitrogen, Ammonia

QC Batch: WETA/8259

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 3524876003

J(M1): Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 162546)
- Nitrogen, Ammonia

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

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## PROJECT NARRATIVE

Project: FDOH  
Pace Project No.: 3524876

---

**Method:** EPA 351.2  
**Description:** 351.2 Total Kjeldahl Nitrogen  
**Client:** Hazen and Sawyer, P.C  
**Date:** January 28, 2011

### General Information:

3 samples were analyzed for EPA 351.2. All samples were received in acceptable condition with any exceptions noted below.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Sample Preparation:

The samples were prepared in accordance with EPA 351.2 with any exceptions noted below.

### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

### Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/8206

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 3524858002

J(M1): Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 161199)
- Nitrogen, Kjeldahl, Total

QC Batch: WETA/8208

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 3524876003,3524989002

J(M1): Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 161209)
- Nitrogen, Kjeldahl, Total
- MS (Lab ID: 161380)
- Nitrogen, Kjeldahl, Total

### Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

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## PROJECT NARRATIVE

Project: FDOH  
Pace Project No.: 3524876

---

**Method:** EPA 351.2  
**Description:** 351.2 Total Kjeldahl Nitrogen  
**Client:** Hazen and Sawyer, P.C  
**Date:** January 28, 2011

QC Batch: WETA/8208

J(D6): Estimated Value. The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.

- DUP (Lab ID: 161379)
- Nitrogen, Kjeldahl, Total

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: FDOH  
Pace Project No.: 3524876

---

**Method:** EPA 365.4  
**Description:** 365.4 Phosphorus, Total  
**Client:** Hazen and Sawyer, P.C  
**Date:** January 28, 2011

**General Information:**

3 samples were analyzed for EPA 365.4. All samples were received in acceptable condition with any exceptions noted below.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Sample Preparation:**

The samples were prepared in accordance with EPA 365.4 with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: FDOH  
Pace Project No.: 3524876

---

**Method:** EPA 410.4  
**Description:** 410.4 COD  
**Client:** Hazen and Sawyer, P.C  
**Date:** January 28, 2011

**General Information:**

3 samples were analyzed for EPA 410.4. All samples were received in acceptable condition with any exceptions noted below.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/8276

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 3524641001

J(M1): Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 163023)
- Chemical Oxygen Demand

QC Batch: WETA/8365

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 3524910001

J(M1): Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 164825)
- Chemical Oxygen Demand

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: FDOH  
Pace Project No.: 3524876

Sample: DENIT-LS1      Lab ID: 3524876001      Collected: 01/13/11 08:00      Received: 01/14/11 07:00      Matrix: Water									
Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>2320B Alkalinity</b> Analytical Method: SM 2320B									
Alkalinity, Total as CaCO <sub>3</sub>	219	mg/L	5.0	5.0	1		01/18/11 20:18		
<b>2540C Total Dissolved Solids</b> Analytical Method: SM 2540C									
Total Dissolved Solids	640	mg/L	5.0	5.0	1		01/18/11 08:52		
<b>2540D Total Suspended Solids</b> Analytical Method: SM 2540D									
Total Suspended Solids	5.0U	mg/L	5.0	5.0	1		01/17/11 09:16		
<b>5210B cBOD, 5 day</b> Analytical Method: SM 5210B      Preparation Method: SM 5210B									
Carbonaceous BOD, 5 day	3.0U	mg/L	3.0	3.0	1.5	01/14/11 08:02	01/19/11 11:00		J(B2)
<b>300.0 IC Anions</b> Analytical Method: EPA 300.0									
Nitrate as N	21.5	mg/L	0.25	0.12	5		01/14/11 22:36	14797-55-8	
Nitrite as N	0.12U	mg/L	0.25	0.12	5		01/14/11 22:36	14797-65-0	
Nitrogen, NO <sub>2</sub> plus NO <sub>3</sub>	21.5	mg/L	0.25	0.12	5		01/14/11 22:36		
<b>300.0 IC Anions 28 Days</b> Analytical Method: EPA 300.0									
Sulfate	55.5	mg/L	10.0	5.0	2		01/14/11 15:07	14808-79-8	
<b>350.1 Ammonia</b> Analytical Method: EPA 350.1									
Nitrogen, Ammonia	0.020U	mg/L	0.050	0.020	1		01/24/11 10:21	7664-41-7	
<b>351.2 Total Kjeldahl Nitrogen</b> Analytical Method: EPA 351.2      Preparation Method: EPA 351.2									
Nitrogen, Kjeldahl, Total	0.63	mg/L	0.50	0.25	1	01/19/11 12:00	01/20/11 12:30	7727-37-9	
<b>365.4 Phosphorus, Total</b> Analytical Method: EPA 365.4      Preparation Method: EPA 365.4									
Phosphorus, Total (as P)	5.2	mg/L	0.10	0.050	1	01/19/11 12:00	01/20/11 12:30	7723-14-0	
<b>410.4 COD</b> Analytical Method: EPA 410.4									
Chemical Oxygen Demand	20.5 I	mg/L	25.0	12.5	1		01/25/11 09:56		

## ANALYTICAL RESULTS

Project: FDOH  
Pace Project No.: 3524876

Sample: UNSAT-EC3      Lab ID: 3524876002      Collected: 01/13/11 12:05      Received: 01/14/11 07:00      Matrix: Water									
Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9222D Fecal Coliform Tampa</b> Analytical Method: SM 9222D      Preparation Method: SM 9222D									
Fecal Coliforms	12.0	CFU/100 mL	1.0	1.0	1	01/13/11 15:40	01/14/11 13:55		
<b>2320B Alkalinity</b> Analytical Method: SM 2320B									
Alkalinity, Total as CaCO <sub>3</sub>	222	mg/L	5.0	5.0	1		01/20/11 12:17		
<b>2540C Total Dissolved Solids</b> Analytical Method: SM 2540C									
Total Dissolved Solids	914	mg/L	10.0	10.0	1		01/18/11 08:52		
<b>2540D Total Suspended Solids</b> Analytical Method: SM 2540D									
Total Suspended Solids	5.0U	mg/L	5.0	5.0	1		01/17/11 09:16		
<b>5210B cBOD, 5 day</b> Analytical Method: SM 5210B      Preparation Method: SM 5210B									
Carbonaceous BOD, 5 day	3.0U	mg/L	3.0	3.0	1.5	01/14/11 08:02	01/19/11 11:00		J(B2)
<b>300.0 IC Anions</b> Analytical Method: EPA 300.0									
Nitrate as N	35.1	mg/L	0.50	0.25	10		01/14/11 22:49	14797-55-8	
Nitrite as N	0.25U	mg/L	0.50	0.25	10		01/14/11 22:49	14797-65-0	
Nitrogen, NO <sub>2</sub> plus NO <sub>3</sub>	35.1	mg/L	0.50	0.25	10		01/14/11 22:49		
<b>300.0 IC Anions 28 Days</b> Analytical Method: EPA 300.0									
Sulfate	64.4	mg/L	10.0	5.0	2		01/14/11 15:44	14808-79-8	
<b>350.1 Ammonia</b> Analytical Method: EPA 350.1									
Nitrogen, Ammonia	0.020U	mg/L	0.050	0.020	1		01/24/11 10:23	7664-41-7	
<b>351.2 Total Kjeldahl Nitrogen</b> Analytical Method: EPA 351.2      Preparation Method: EPA 351.2									
Nitrogen, Kjeldahl, Total	0.42 I	mg/L	0.50	0.25	1	01/19/11 12:00	01/20/11 12:32	7727-37-9	
<b>365.4 Phosphorus, Total</b> Analytical Method: EPA 365.4      Preparation Method: EPA 365.4									
Phosphorus, Total (as P)	5.6	mg/L	0.10	0.050	1	01/19/11 12:00	01/20/11 12:32	7723-14-0	
<b>410.4 COD</b> Analytical Method: EPA 410.4									
Chemical Oxygen Demand	16.2 I	mg/L	25.0	12.5	1		01/25/11 09:56		



## ANALYTICAL RESULTS

Project: FDOH  
Pace Project No.: 3524876

Sample: PNRSII STE-T1      Lab ID: 3524876003      Collected: 01/13/11 13:30      Received: 01/14/11 07:00      Matrix: Water									
Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9222D Fecal Coliform Tampa</b> Analytical Method: SM 9222D      Preparation Method: SM 9222D									
Fecal Coliforms	<b>100</b>	CFU/100 mL	100	100	100	01/13/11 15:40	01/14/11 13:55		
<b>2320B Alkalinity</b> Analytical Method: SM 2320B									
Alkalinity, Total as CaCO <sub>3</sub>	<b>351</b>	mg/L	5.0	5.0	1		01/20/11 12:41		
<b>2540C Total Dissolved Solids</b> Analytical Method: SM 2540C									
Total Dissolved Solids	<b>570</b>	mg/L	10.0	10.0	1		01/18/11 08:52		
<b>2540D Total Suspended Solids</b> Analytical Method: SM 2540D									
Total Suspended Solids	<b>15.5</b>	mg/L	5.0	5.0	1		01/17/11 09:16		
<b>5210B cBOD, 5 day</b> Analytical Method: SM 5210B      Preparation Method: SM 5210B									
Carbonaceous BOD, 5 day	<b>87.9</b>	mg/L	2.0	2.0	1	01/14/11 08:02	01/19/11 11:00		
<b>300.0 IC Anions</b> Analytical Method: EPA 300.0									
Nitrate as N	<b>0.12U</b>	mg/L	0.25	0.12	5		01/14/11 15:56	14797-55-8	
Nitrite as N	<b>0.12U</b>	mg/L	0.25	0.12	5		01/14/11 15:56	14797-65-0	
Nitrogen, NO <sub>2</sub> plus NO <sub>3</sub>	<b>0.12U</b>	mg/L	0.25	0.12	5		01/14/11 15:56		
<b>300.0 IC Anions 28 Days</b> Analytical Method: EPA 300.0									
Sulfate	<b>17.6 I</b>	mg/L	25.0	12.5	5		01/14/11 15:56	14808-79-8	D3
<b>350.1 Ammonia</b> Analytical Method: EPA 350.1									
Nitrogen, Ammonia	<b>51.3</b>	mg/L	0.25	0.10	5		01/24/11 10:27	7664-41-7	J(M1)
<b>351.2 Total Kjeldahl Nitrogen</b> Analytical Method: EPA 351.2      Preparation Method: EPA 351.2									
Nitrogen, Kjeldahl, Total	<b>61.1</b>	mg/L	2.0	1.0	1	01/19/11 12:00	01/20/11 12:55	7727-37-9	J(M1)
<b>365.4 Phosphorus, Total</b> Analytical Method: EPA 365.4      Preparation Method: EPA 365.4									
Phosphorus, Total (as P)	<b>14.1</b>	mg/L	0.40	0.20	1	01/19/11 12:00	01/20/11 12:55	7723-14-0	
<b>410.4 COD</b> Analytical Method: EPA 410.4									
Chemical Oxygen Demand	<b>290</b>	mg/L	50.0	25.0	2		01/27/11 19:27		

## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524876

QC Batch:	TAMP/2094	Analysis Method:	SM 9222D
QC Batch Method:	SM 9222D	Analysis Description:	9222D MBIO Fecal Coliform Tampa
Associated Lab Samples:	3524876002, 3524876003		

METHOD BLANK:	160318	Matrix:	Water
Associated Lab Samples:	3524876002, 3524876003		

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Fecal Coliforms	CFU/100 mL	1.0U	1.0	01/14/11 13:55	

SAMPLE DUPLICATE: 160319

Parameter	Units	3524876003 Result	Dup Result	RPD	Max RPD	Qualifiers
Fecal Coliforms	CFU/100 mL	100	100	0		

## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524876

QC Batch: WET/6874 Analysis Method: SM 2320B  
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity  
Associated Lab Samples: 3524876001

METHOD BLANK: 160909 Matrix: Water  
Associated Lab Samples: 3524876001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	5.0U	5.0	01/18/11 18:07	

LABORATORY CONTROL SAMPLE: 160910

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	250	250	100	90-110	

MATRIX SPIKE SAMPLE: 160912

Parameter	Units	3524769003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	234	250	407	69	90-110	J(M1)

MATRIX SPIKE SAMPLE: 160914

Parameter	Units	3524811002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	75.7	250	262	74	90-110	J(M1)

SAMPLE DUPLICATE: 160911

Parameter	Units	3524769003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	234	239	2	20	

SAMPLE DUPLICATE: 160913

Parameter	Units	3524811002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	75.7	73.4	3	20	

## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524876

QC Batch: WET/6901 Analysis Method: SM 2320B  
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity  
Associated Lab Samples: 3524876002, 3524876003

METHOD BLANK: 161584 Matrix: Water  
Associated Lab Samples: 3524876002, 3524876003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	5.0U	5.0	01/20/11 12:04	

LABORATORY CONTROL SAMPLE: 161585

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	250	241	96	90-110	

MATRIX SPIKE SAMPLE: 161587

Parameter	Units	3524876002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	222	250	479	103	90-110	

MATRIX SPIKE SAMPLE: 161589

Parameter	Units	3524948001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	8.7	250	258	100	90-110	

SAMPLE DUPLICATE: 161586

Parameter	Units	3524876002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	222	228	3	20	

SAMPLE DUPLICATE: 161588

Parameter	Units	3524948001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	8.7	8.7	.5	20	

## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524876

QC Batch: WET/6855 Analysis Method: SM 2540C  
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids  
Associated Lab Samples: 3524876001, 3524876002, 3524876003

METHOD BLANK: 160650 Matrix: Water  
Associated Lab Samples: 3524876001, 3524876002, 3524876003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	5.0U	5.0	01/18/11 08:49	

LABORATORY CONTROL SAMPLE: 160651

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	300	287	96	90-110	

SAMPLE DUPLICATE: 160652

Parameter	Units	3524866002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	280	258	8	20	

SAMPLE DUPLICATE: 160653

Parameter	Units	3039900001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	99.0	93.0	6	20	

## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524876

QC Batch: WET/6841 Analysis Method: SM 2540D  
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids  
Associated Lab Samples: 3524876001, 3524876002, 3524876003

METHOD BLANK: 160506 Matrix: Water  
Associated Lab Samples: 3524876001, 3524876002, 3524876003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	5.0U	5.0	01/17/11 09:16	

LABORATORY CONTROL SAMPLE: 160507

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	80	83.0	104	90-110	

SAMPLE DUPLICATE: 160508

Parameter	Units	3524809004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	5.0U	5.0U		20	

SAMPLE DUPLICATE: 160509

Parameter	Units	3524853001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	5.0U	5.0U		20	

## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524876

QC Batch: WET/6832 Analysis Method: SM 5210B  
QC Batch Method: SM 5210B Analysis Description: 5210B cBOD, 5 day  
Associated Lab Samples: 3524876001, 3524876002, 3524876003

METHOD BLANK: 160371 Matrix: Water  
Associated Lab Samples: 3524876001, 3524876002, 3524876003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Carbonaceous BOD, 5 day	mg/L	2.0U	2.0	01/19/11 11:00	

LABORATORY CONTROL SAMPLE: 160372

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Carbonaceous BOD, 5 day	mg/L	198	183	92	85-115	

SAMPLE DUPLICATE: 160373

Parameter	Units	3524790001 Result	Dup Result	RPD	Max RPD	Qualifiers
Carbonaceous BOD, 5 day	mg/L	2.1	2.1	0	20	

## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524876

QC Batch: WETA/8171 Analysis Method: EPA 300.0  
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions  
Associated Lab Samples: 3524876001, 3524876002, 3524876003

METHOD BLANK: 160412 Matrix: Water  
Associated Lab Samples: 3524876001, 3524876002, 3524876003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrate as N	mg/L	0.025U	0.050	01/14/11 14:43	1p
Nitrite as N	mg/L	0.025U	0.050	01/14/11 14:43	1p
Nitrogen, NO2 plus NO3	mg/L	0.025U	0.050	01/14/11 14:43	

LABORATORY CONTROL SAMPLE: 160413

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrate as N	mg/L	5	4.5	90	90-110	
Nitrite as N	mg/L	5	5.0	101	90-110	
Nitrogen, NO2 plus NO3	mg/L	10	9.5	95	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 160414 160415

Parameter	Units	3524876001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrate as N	mg/L	21.5	10	10	32.1	32.0	106	106	90-110	.05	20	
Nitrite as N	mg/L	0.12U	10	10	10.3	10.3	103	103	90-110	.05	20	
Nitrogen, NO2 plus NO3	mg/L	21.5	20	20	42.4	42.3	105	104	90-110	.05	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 160416 160417

Parameter	Units	3039900003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrate as N	mg/L	0.27	5	5	5.0	5.0	95	95	90-110	.3	20	
Nitrite as N	mg/L	ND	5	5	5.4	5.4	107	107	90-110	.006	20	
Nitrogen, NO2 plus NO3	mg/L	0.27	10	10	10.4	10.4	101	101	90-110	.1	20	



## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524876

QC Batch: WETA/8172 Analysis Method: EPA 300.0  
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions  
Associated Lab Samples: 3524876001, 3524876002, 3524876003

METHOD BLANK: 160418 Matrix: Water  
Associated Lab Samples: 3524876001, 3524876002, 3524876003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	2.5U	5.0	01/14/11 14:43	

LABORATORY CONTROL SAMPLE: 160419

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	50	45.9	92	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 160420 160421

Parameter	Units	3524876001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	55.5	100	100	165	165	109	109	90-110	.03	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 160422 160423

Parameter	Units	3039900003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	ND	50	50	55.8	55.9	102	102	90-110	.2	20	

## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524876

QC Batch: WETA/8258 Analysis Method: EPA 350.1  
QC Batch Method: EPA 350.1 Analysis Description: 350.1 Ammonia  
Associated Lab Samples: 3524876001, 3524876002

METHOD BLANK: 162539 Matrix: Water  
Associated Lab Samples: 3524876001, 3524876002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, Ammonia	mg/L	0.020U	0.050	01/24/11 09:37	

LABORATORY CONTROL SAMPLE: 162540

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	1	1.1	105	90-110	

MATRIX SPIKE SAMPLE: 162542

Parameter	Units	3524811002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	0.020U	1	1.1	112	90-110	J(M1)

SAMPLE DUPLICATE: 162541

Parameter	Units	3524811002 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, Ammonia	mg/L	0.020U	0.020U		20	

## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524876

QC Batch:	WETA/8259	Analysis Method:	EPA 350.1
QC Batch Method:	EPA 350.1	Analysis Description:	350.1 Ammonia
Associated Lab Samples:	3524876003		

METHOD BLANK: 162543      Matrix: Water  
Associated Lab Samples: 3524876003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, Ammonia	mg/L	0.020U	0.050	01/24/11 10:24	

LABORATORY CONTROL SAMPLE: 162544

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	1	1.1	106	90-110	

MATRIX SPIKE SAMPLE: 162546

Parameter	Units	3524876003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	51.3	5	57.3	119	90-110	J(M1)

SAMPLE DUPLICATE: 162545

Parameter	Units	3524876003 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, Ammonia	mg/L	51.3	50.6	1	20	

## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524876

QC Batch: WETA/8206 Analysis Method: EPA 351.2  
QC Batch Method: EPA 351.2 Analysis Description: 351.2 TKN  
Associated Lab Samples: 3524876001, 3524876002

METHOD BLANK: 161196 Matrix: Water  
Associated Lab Samples: 3524876001, 3524876002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	0.25U	0.50	01/20/11 12:06	

LABORATORY CONTROL SAMPLE: 161197

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	20	21.2	106	90-110	

MATRIX SPIKE SAMPLE: 161199

Parameter	Units	3524858002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	5.4	20	28.3	115	90-110	J(M1)

SAMPLE DUPLICATE: 161198

Parameter	Units	3524858002 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	5.4	5.4	1	20	

## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524876

QC Batch: WETA/8208 Analysis Method: EPA 351.2  
QC Batch Method: EPA 351.2 Analysis Description: 351.2 TKN  
Associated Lab Samples: 3524876003

METHOD BLANK: 161206 Matrix: Water  
Associated Lab Samples: 3524876003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	0.25U	0.50	01/20/11 12:49	

LABORATORY CONTROL SAMPLE: 161207

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	20	19.9	100	90-110	

MATRIX SPIKE SAMPLE: 161209

Parameter	Units	3524876003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	61.1	80	156	118	90-110	J(M1)

MATRIX SPIKE SAMPLE: 161380

Parameter	Units	3524989002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	0.56	20	23.4	114	90-110	J(M1)

SAMPLE DUPLICATE: 161208

Parameter	Units	3524876003 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	61.1	61.2	.2	20	

SAMPLE DUPLICATE: 161379

Parameter	Units	3524989002 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	0.56	0.70	22	20	J(D6)

## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524876

QC Batch: WETA/8207 Analysis Method: EPA 365.4  
QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus  
Associated Lab Samples: 3524876001, 3524876002

METHOD BLANK: 161200 Matrix: Water  
Associated Lab Samples: 3524876001, 3524876002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Phosphorus, Total (as P)	mg/L	0.050U	0.10	01/20/11 12:33	

LABORATORY CONTROL SAMPLE: 161201

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus, Total (as P)	mg/L	4	4.1	102	90-110	

MATRIX SPIKE SAMPLE: 161203

Parameter	Units	3524858002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus, Total (as P)	mg/L	0.050U	4	4.2	106	80-120	

SAMPLE DUPLICATE: 161202

Parameter	Units	3524858002 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus, Total (as P)	mg/L	0.050U	0.050U		20	

## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524876

QC Batch:	WETA/8209	Analysis Method:	EPA 365.4
QC Batch Method:	EPA 365.4	Analysis Description:	365.4 Phosphorus
Associated Lab Samples:	3524876003		

METHOD BLANK: 161211 Matrix: Water  
Associated Lab Samples: 3524876003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Phosphorus, Total (as P)	mg/L	0.050U	0.10	01/20/11 13:33	

LABORATORY CONTROL SAMPLE: 161212

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus, Total (as P)	mg/L	4	4.0	100	90-110	

MATRIX SPIKE SAMPLE: 161214

Parameter	Units	3524876003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus, Total (as P)	mg/L	14.1	16	31.3	108	80-120	

SAMPLE DUPLICATE: 161213

Parameter	Units	3524876003 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus, Total (as P)	mg/L	14.1	13.8	2	20	

## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524876

QC Batch: WETA/8276 Analysis Method: EPA 410.4  
QC Batch Method: EPA 410.4 Analysis Description: 410.4 COD  
Associated Lab Samples: 3524876001, 3524876002

METHOD BLANK: 163020 Matrix: Water  
Associated Lab Samples: 3524876001, 3524876002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chemical Oxygen Demand	mg/L	12.5U	25.0	01/25/11 09:56	

LABORATORY CONTROL SAMPLE: 163021

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	500	498	100	90-110	

MATRIX SPIKE SAMPLE: 163023

Parameter	Units	3524641001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	24.2 I	500	400	75	90-110	J(M1)

SAMPLE DUPLICATE: 163022

Parameter	Units	3524641001 Result	Dup Result	RPD	Max RPD	Qualifiers
Chemical Oxygen Demand	mg/L	24.2 I	29.4		20	



## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524876

QC Batch:	WETA/8365	Analysis Method:	EPA 410.4
QC Batch Method:	EPA 410.4	Analysis Description:	410.4 COD
Associated Lab Samples:	3524876003		

METHOD BLANK: 164822 Matrix: Water  
Associated Lab Samples: 3524876003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chemical Oxygen Demand	mg/L	12.5U	25.0	01/27/11 19:27	

LABORATORY CONTROL SAMPLE: 164823

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	500	504	101	90-110	

MATRIX SPIKE SAMPLE: 164825

Parameter	Units	3524910001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	273	500	701	86	90-110	J(M1)

SAMPLE DUPLICATE: 164824

Parameter	Units	3524910001 Result	Dup Result	RPD	Max RPD	Qualifiers
Chemical Oxygen Demand	mg/L	273	275	.9	20	

## QUALIFIERS

Project: FDOH  
Pace Project No.: 3524876

### DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is NELAP accredited. Contact your Pace PM for the current list of accredited analytes.

### LABORATORIES

PASI-O Pace Analytical Services - Ormond Beach

PASI-T Pace Analytical Services - Tampa

### ANALYTE QUALIFIERS

I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
1p	The recovery of the analyte in the CRDL standard (also known as the reporting limit verification) did not meet the acceptance criteria.
D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
J(B2)	Estimated Value. Oxygen usage is less than 2.0 for all dilutions set. The reported value is an estimated less than value and is calculated for the dilution using the most amount of sample.
J(D6)	Estimated Value. The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.
J(M1)	Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: FDOH  
Pace Project No.: 3524876

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
3524876002	UNSAT-EC3	SM 9222D	TAMP/2093	SM 9222D	TAMP/2094
3524876003	PNRSII STE-T1	SM 9222D	TAMP/2093	SM 9222D	TAMP/2094
3524876001	DENIT-LS1	SM 2320B	WET/6874		
3524876002	UNSAT-EC3	SM 2320B	WET/6901		
3524876003	PNRSII STE-T1	SM 2320B	WET/6901		
3524876001	DENIT-LS1	SM 2540C	WET/6855		
3524876002	UNSAT-EC3	SM 2540C	WET/6855		
3524876003	PNRSII STE-T1	SM 2540C	WET/6855		
3524876001	DENIT-LS1	SM 2540D	WET/6841		
3524876002	UNSAT-EC3	SM 2540D	WET/6841		
3524876003	PNRSII STE-T1	SM 2540D	WET/6841		
3524876001	DENIT-LS1	SM 5210B	WET/6832	SM 5210B	WET/6896
3524876002	UNSAT-EC3	SM 5210B	WET/6832	SM 5210B	WET/6896
3524876003	PNRSII STE-T1	SM 5210B	WET/6832	SM 5210B	WET/6896
3524876001	DENIT-LS1	EPA 300.0	WETA/8171		
3524876002	UNSAT-EC3	EPA 300.0	WETA/8171		
3524876003	PNRSII STE-T1	EPA 300.0	WETA/8171		
3524876001	DENIT-LS1	EPA 300.0	WETA/8172		
3524876002	UNSAT-EC3	EPA 300.0	WETA/8172		
3524876003	PNRSII STE-T1	EPA 300.0	WETA/8172		
3524876001	DENIT-LS1	EPA 350.1	WETA/8258		
3524876002	UNSAT-EC3	EPA 350.1	WETA/8258		
3524876003	PNRSII STE-T1	EPA 350.1	WETA/8259		
3524876001	DENIT-LS1	EPA 351.2	WETA/8206	EPA 351.2	WETA/8216
3524876002	UNSAT-EC3	EPA 351.2	WETA/8206	EPA 351.2	WETA/8216
3524876003	PNRSII STE-T1	EPA 351.2	WETA/8208	EPA 351.2	WETA/8218
3524876001	DENIT-LS1	EPA 365.4	WETA/8207	EPA 365.4	WETA/8217
3524876002	UNSAT-EC3	EPA 365.4	WETA/8207	EPA 365.4	WETA/8217
3524876003	PNRSII STE-T1	EPA 365.4	WETA/8209	EPA 365.4	WETA/8219
3524876001	DENIT-LS1	EPA 410.4	WETA/8276		
3524876002	UNSAT-EC3	EPA 410.4	WETA/8276		
3524876003	PNRSII STE-T1	EPA 410.4	WETA/8365		

[illegible]



## Sample Condition Upon Receipt Form

TAMPA

Page 1 of 1Client Name: Hazen and Sawyer Project #Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☒ Client ☐ Commercial ☐ Pace ☐ B&B

Project Name: \_\_\_\_\_

Tracking # \_\_\_\_\_ ☐ Other \_\_\_\_\_Custody Seal on Cooler/Box Present: ☒ yes ☐ no Seals intact: ☐ yes ☒ noPacking Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other \_\_\_\_\_Thermometer Used T-11Type of Ice: Wet ☒ Blue ☐ None ☐ROI ☐ Cooling process has begun

VRW

2.5

Received Date: 01/13/10

Temp should be above freezing to 6°C

Comments:

Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name & Signature on COC:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72hr):	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	6. FECAL MF DONE IN TAMPA
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.
-Pace Containers Used:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.
Sample Labels match COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes date/time/ID/Analysis Matrix:		
All containers needing preservation have been checked.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	<input type="checkbox"/> Yes <input type="checkbox"/> No	Initial when completed
Samples checked for dechlorination:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	14.
Headspace in VOA Vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	16.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased):	N/A	

Reviewed by : \_\_\_\_\_ VRW

Client Notification/ Resolution client did not filled out coc

Field Data Required? Y / N / N/A

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments/ Resolution: date and time on MF containers

LS1: 01-13-11 8: 00 A.M

EC3: 01/13-11 12:05 P.M

STE-T1: 01/13/11 13:30 P.M

Project Manager Review: \_\_\_\_\_

Date: \_\_\_\_\_

Sample Bottle Codes		12 g Liters	500 mL	250 mL	125 mL	40 mL	Other
	T=Tedlar Bag						
	TPBU=Bac-T						
	WG43						
	WG90						
	DG9E						
	DG9U						
	VG9M						
	VG9H						
	VG9U						
	BP4S						
	BP4H						
	BP4C						
	TP4U	3					
	AG34						
	AG3E						
	AG3S						
	AG3U						
	BP3N						
	BP3H						
	BP3S						
	BP3C						
	TP3U						
	AG24						
	AG2S						
	AG2U						
	BP2N						
	BP2S						
	TP2U						
	AG1H						
	AG1S						
	AG1U						
	AP1S						
	AP1U						
	BP1N						
	BP1Z						
	BP1S						
	TP1U						
	12GU						
Item#	1-3						

Client's Sample ID(s)	Sample Discrepancy

WG43 = 4oz Jar + 3 Soil Vials  
WG90 = 9oz Soil Jar  
TP5U = 100mL Coliform Cup  
T = Tedlar Air Bag

# BOTTLE ORDER # 7005

Pace Analytical Services, Inc.  
8 East Tower Circle

Ormond Beach, FL 32174  
(386) 672-5668

1/6/2011 4:46:21 PM

Contact: Edeback-Hirst, P.E., Josefin

Ship To:

Return To:

Company: Hazen and Sawyer, P.C.

Contact: Edeback-Hirst, P.E., Josefin

Contact:

Address: 10002 Princess Palm Ave., Suite

Company: Hazen and Sawyer, P.C.

Lab Name: PACE - FL

Address: 10002 Princess Palm Ave., Suite

Address: 8 East Tower Circle

City, St, Zip: Tampa, FL 33619

Phone: 813-630-4498

Ext.

City, St, Zip: Tampa, FL 33619

City, St, Zip: Ormond Beach, FL 32174

Initiator: Sakina McKenzie

PM: SMM

Phone: 813-630-4498

Ext.

Phone: (386) 672-5668

Ext.

Proj. Description: FDOH

Quote Number:

Profile Number:

Needs Bottles by: 01/10/2011

Expected Date Ret:

Shipping Method: Other - Tampa

Return Shipping Labels

COC's

Bottle Labels

Bottles

No Shipper

☒ Blank

I

☐ Blank

☐ Boxed Cases

With Shipper #

☐ Preprinted

☒ Pre-Printed - With Sample IDs

☐ Individually Wrapped

☒ Pre-Printed - No Sample IDs

☒ Grouped By Sample ID / Matrix

Misc

Trip Blank

Sampling Instructions

☐ Coolers:

Custody Seal

☐ Extra Bubble Wrap

Short Hold / Rush Stickers

Temp. Blank

☐ 10 mL Cut-Off Syringes

D1 Water 0 Liter(s)

Qty	Total	Matrix	Method	Bottle Type	Lot Number	Note
3	3	Water	Fecal Coliform MF	1-100mL Coliform w/ Sodium Thiosulfate Pellet		
3	9	Water	COD, TDS, TSS, Nitrate, Nitrite, Alk	3-Liter Plastic Unpreserved		
3	3	Water	Ammonia, COD, TKN, TP	1-250mL Plastic w/ H2SO4		
1	1	Water	Sulfate	1-250mL Plastic Unpreserved		
1	1	Water	Sulfide	1-1L Plastic NaOH & Zinc Acetate		Need Ph, Temp, Cond

Notes: SAMPLE IDS PNRS 11 STE-TI, DENIT-SU3, DENIT-LS3 (ONLY DENIT-SU3 NEEDS SULFATE AND HYDROGEN SULFIDE)

Hazard Shipping Placard In Place : NA

\*Sample receiving hours are Monday through Friday 8:00 am to 6:00 pm and Saturday from 9:00 am to 12:00 pm unless special arrangements are made with you project manager.

\*Pace Analytical reserves the right to return hazardous, toxic, or radioactive samples to you.

\*Pace Analytical reserves the right to charge for unused bottles, as well as cost associated with sample storage and disposal.

\*Payment term are net 30 days.

\*Please include the proposal number on the chain of custody to insure proper billing.

Shipped Date: 1/7/2011

Shipped By: Bo Pollard

Verified By:

# Sample Condition Upon Receipt Form (SCUR)

Table Number: \_\_\_\_\_



Client Name: HARZEN & SAWYER Project # 3524876

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☒ Commercial ☐ Pace ☐ B&B ☐ Other \_\_\_\_\_

Tracking # \_\_\_\_\_

Custody Seal on Cooler/Box Present: ☐ yes ☒ no Seals intact: ☐ yes ☐ no

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other \_\_\_\_\_

Thermometer Used L4 ☒ L6 ☐ Type of Ice: Wet ☐ Blue ☐ None

Cooler Temperature 0.0 (Actual) (Temp should be above freezing to 6°C)

Receipt of samples satisfactory: ☐ Yes ☐ No

Date and Initials of person examining contents: R. A. 1/14/11

Secondary Review Initials: \_\_\_\_\_

Rush TAT requested on COC: ☐

If yes, then all conditions below were met:

If no, then mark box & describe issue (use comments area if necessary):

Chain of Custody Present	<input type="checkbox"/>
Chain of Custody Filled Out	<input type="checkbox"/>
Relinquished Signature & Sampler Name COC	<input type="checkbox"/>
Samples Arrived within Hold Time	<input type="checkbox"/>
Sufficient Volume	<input checked="" type="checkbox"/>
Correct Containers Used	<input type="checkbox"/>
Containers Intact	<input type="checkbox"/>
Sample Labels match COC (sample IDs & date/time of collection)	<input type="checkbox"/> <u>NO time or Date or Analysis on COC</u>
	No Labels: <input type="checkbox"/> No Time/Date on Labels: <input type="checkbox"/>
All containers needing preservation are found to be in compliance with EPA recommendation.	<input type="checkbox"/>
No Headspace in VOA Vials (>6mm):	<input type="checkbox"/>

## Client Notification/ Resolution:

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments/ Resolution (use back for additional comments):

SAMPLE #1 - DENIT - LSI 1 OF 3 CBOD HAS INSUFFICIENT VOLUME. (RD)

Did not receive sulfate bottle. SM

Project Manager Review: \_\_\_\_\_

Date: 01/14/2011

## Finished Product Information Only

F.P. Sample ID: \_\_\_\_\_

Production Code: \_\_\_\_\_

Date/Time Opened: \_\_\_\_\_

Number of Unopened Bottles Remaining: \_\_\_\_\_

Extra Sample in Shed: Yes No

## Size & Qty of Bottles Received

\_\_\_\_\_ x 5 Gal  
 \_\_\_\_\_ x 2.5 Gal  
 \_\_\_\_\_ x 1 Gal  
 \_\_\_\_\_ x 1 Liter  
 \_\_\_\_\_ x 500 mL  
 \_\_\_\_\_ x 250 mL  
 \_\_\_\_\_ x Other: \_\_\_\_\_



January 25, 2011

Ms. Josefin Edebeck-Hirst  
Hazen and Sawyer, P.C  
10002 Princess Palm Avenue  
Suite 200  
Tampa, FL 33619

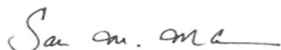
RE: Project: FDOH  
Pace Project No.: 3524641

Dear Ms. Edebeck-Hirst:

Enclosed are the analytical results for sample(s) received by the laboratory on January 11, 2011. The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Sakina Mckenzie

sakina.mckenzie@pacelabs.com  
Project Manager

Enclosures

## REPORT OF LABORATORY ANALYSIS

Page 1 of 29

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## CERTIFICATIONS

Project: FDOH  
Pace Project No.: 3524641

### Ormond Beach Certification IDs

8 East Tower Circle, Ormond Beach, FL 32174  
Alabama Certification #: 41320  
Arizona Certification #: AZ0735  
Colorado Certification: FL NELAC Reciprocity  
Connecticut Certification #: PH 0216  
Florida Certification #: E83079  
Georgia Certification #: 955  
Guam Certification: FL NELAC Reciprocity  
Hawaii Certification: FL NELAC Reciprocity  
Kansas Certification #: E-10383  
Kentucky Certification #: 90050  
Louisiana Certification #: LA090012  
Louisiana Environmental Certificate #: 05007  
Maine Certification #: FL1264  
Massachusetts Certification #: M-FL1264

Michigan Certification #: 9911  
Mississippi Certification: FL NELAC Reciprocity  
Montana Certification #: Cert 0074  
Nevada Certification: FL NELAC Reciprocity  
New Hampshire Certification #: 2958  
New Jersey Certification #: FL765  
New York Certification #: 11608  
North Carolina Environmental Certificate #: 667  
North Carolina Certification #: 12710  
Pennsylvania Certification #: 68-547  
Puerto Rico Certification #: FL01264  
Tennessee Certification #: TN02974  
Texas Certification: FL NELAC Reciprocity  
Virginia Certification #: 00432  
Wyoming Certification: FL NELAC Reciprocity

### Tampa Certification IDs

1209 Tech Boulevard, Ste 207, Tampa FL 33619

Florida Certification #: E84973

## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: FDOH  
Pace Project No.: 3524641

Lab ID	Sample ID	Matrix	Date Collected	Date Received
3524641001	UNSAT-IS3	Water	01/11/11 08:20	01/11/11 11:11
3524641002	UNSAT-IS4	Water	01/11/11 08:30	01/11/11 11:11

## REPORT OF LABORATORY ANALYSIS

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## SAMPLE ANALYTE COUNT

Project: FDOH  
Pace Project No.: 3524641

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
3524641001	UNSAT-IS3	SM 9222D	VRW	1	PASI-T
		SM 2320B	HEM	1	PASI-O
		SM 2540C	AIS	1	PASI-O
		SM 2540D	AIS	1	PASI-O
		EPA 300.0	KDM	3	PASI-O
		EPA 300.0	KDM	1	PASI-O
		EPA 350.1	AMD	1	PASI-O
		EPA 351.2	AMD	1	PASI-O
		EPA 365.4	AMD	1	PASI-O
		EPA 410.4	MMD	1	PASI-O
3524641002	UNSAT-IS4	SM 9222D	VRW	1	PASI-T
		SM 2320B	HEM	1	PASI-O
		SM 2540C	AIS	1	PASI-O
		SM 2540D	AIS	1	PASI-O
		EPA 300.0	KDM	3	PASI-O
		EPA 300.0	KDM	1	PASI-O
		EPA 350.1	AMD	1	PASI-O
		EPA 351.2	AMD	1	PASI-O
		EPA 365.4	AMD	1	PASI-O
		EPA 410.4	MMD	1	PASI-O

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: FDOH  
Pace Project No.: 3524641

---

**Method:** SM 9222D  
**Description:** 9222D Fecal Coliform Tampa  
**Client:** Hazen and Sawyer, P.C  
**Date:** January 25, 2011

**General Information:**

2 samples were analyzed for SM 9222D. All samples were received in acceptable condition with any exceptions noted below.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Sample Preparation:**

The samples were prepared in accordance with SM 9222D with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Internal Standards:**

All internal standards were within QC limits with any exceptions noted below.

**Surrogates:**

All surrogates were within QC limits with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: FDOH  
Pace Project No.: 3524641

---

**Method:** SM 2320B  
**Description:** 2320B Alkalinity  
**Client:** Hazen and Sawyer, P.C  
**Date:** January 25, 2011

**General Information:**

2 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: WET/6798

J(D6): Estimated Value. The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.

- DUP (Lab ID: 159341)
- Alkalinity, Total as CaCO<sub>3</sub>

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: FDOH  
Pace Project No.: 3524641

---

**Method:** SM 2540C  
**Description:** 2540C Total Dissolved Solids  
**Client:** Hazen and Sawyer, P.C  
**Date:** January 25, 2011

**General Information:**

2 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: FDOH  
Pace Project No.: 3524641

---

**Method:** SM 2540D  
**Description:** 2540D Total Suspended Solids  
**Client:** Hazen and Sawyer, P.C  
**Date:** January 25, 2011

**General Information:**

2 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: FDOH  
Pace Project No.: 3524641

---

**Method:** EPA 300.0  
**Description:** 300.0 IC Anions  
**Client:** Hazen and Sawyer, P.C  
**Date:** January 25, 2011

### General Information:

2 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

- Q: Sample held beyond the accepted holding time.
- UNSAT-IS3 (Lab ID: 3524641001)

### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

### Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/8130

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 3524702002,3524728001

J(M1): Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 159473)
  - Orthophosphate as P
- MSD (Lab ID: 159474)
  - Orthophosphate as P

### Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

### Additional Comments:

Analyte Comments:

QC Batch: WETA/8130

1p: The recovery of the analyte in the CRDL standard (also known as the reporting limit verification) did not meet the acceptance criteria.

- BLANK (Lab ID: 159471)
  - Nitrite as N
  - Nitrate as N

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: FDOH  
Pace Project No.: 3524641

---

**Method:** EPA 300.0  
**Description:** 300.0 IC Anions  
**Client:** Hazen and Sawyer, P.C  
**Date:** January 25, 2011

Analyte Comments:

QC Batch: WETA/8130

1p: The recovery of the analyte in the CRDL standard (also known as the reporting limit verification) did not meet the acceptance criteria.

- BLANK (Lab ID: 159471)
- Orthophosphate as P

2p: The sample was analyzed within hold for nitrate, however, the result was above the instrument calibration range and required a dilution. The dilution concentration confirmed the initial analysis, however, the analysis was outside the method hold criteria.

- UNSAT-IS3 (Lab ID: 3524641001)
- Nitrate as N

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: FDOH  
Pace Project No.: 3524641

---

**Method:** EPA 300.0  
**Description:** 300.0 IC Anions 28 Days  
**Client:** Hazen and Sawyer, P.C  
**Date:** January 25, 2011

**General Information:**

2 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: FDOH  
Pace Project No.: 3524641

---

**Method:** EPA 350.1  
**Description:** 350.1 Ammonia  
**Client:** Hazen and Sawyer, P.C  
**Date:** January 25, 2011

**General Information:**

2 samples were analyzed for EPA 350.1. All samples were received in acceptable condition with any exceptions noted below.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: FDOH  
Pace Project No.: 3524641

---

**Method:** EPA 351.2  
**Description:** 351.2 Total Kjeldahl Nitrogen  
**Client:** Hazen and Sawyer, P.C  
**Date:** January 25, 2011

**General Information:**

2 samples were analyzed for EPA 351.2. All samples were received in acceptable condition with any exceptions noted below.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Sample Preparation:**

The samples were prepared in accordance with EPA 351.2 with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/8123

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 3524680001

J(M1): Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 159229)
- Nitrogen, Kjeldahl, Total

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: FDOH  
Pace Project No.: 3524641

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**Method:** EPA 365.4  
**Description:** 365.4 Phosphorus, Total  
**Client:** Hazen and Sawyer, P.C  
**Date:** January 25, 2011

**General Information:**

2 samples were analyzed for EPA 365.4. All samples were received in acceptable condition with any exceptions noted below.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Sample Preparation:**

The samples were prepared in accordance with EPA 365.4 with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: FDOH  
Pace Project No.: 3524641

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**Method:** EPA 410.4  
**Description:** 410.4 COD  
**Client:** Hazen and Sawyer, P.C  
**Date:** January 25, 2011

**General Information:**

2 samples were analyzed for EPA 410.4. All samples were received in acceptable condition with any exceptions noted below.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/8276

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 3524641001

J(M1): Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 163023)
- Chemical Oxygen Demand

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: FDOH  
Pace Project No.: 3524641

Sample: UNSAT-IS3		Lab ID: 3524641001	Collected: 01/11/11 08:20	Received: 01/11/11 11:11	Matrix: Water				
Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9222D Fecal Coliform Tampa</b>		Analytical Method: SM 9222D Preparation Method: SM 9222D							
Fecal Coliforms	1.0U	CFU/100 mL	1.0	1.0	1	01/11/11 11:32	01/12/11 11:35		
<b>2320B Alkalinity</b>		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO <sub>3</sub>	280	mg/L	5.0	5.0	1		01/12/11 17:55		
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C							
Total Dissolved Solids	868	mg/L	10.0	10.0	1		01/13/11 09:32		
<b>2540D Total Suspended Solids</b>		Analytical Method: SM 2540D							
Total Suspended Solids	10.0	mg/L	5.0	5.0	1		01/13/11 09:14		
<b>300.0 IC Anions</b>		Analytical Method: EPA 300.0							
Nitrate as N	31.3	mg/L	0.25	0.12	5		01/14/11 02:22	14797-55-8	2p,Q
Nitrite as N	8.6	mg/L	0.10	0.050	2		01/12/11 12:02	14797-65-0	
Orthophosphate as P	0.10U	mg/L	0.20	0.10	2		01/12/11 12:02		
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0							
Sulfate	116	mg/L	10.0	5.0	2		01/12/11 12:02	14808-79-8	
<b>350.1 Ammonia</b>		Analytical Method: EPA 350.1							
Nitrogen, Ammonia	1.1	mg/L	0.050	0.020	1		01/14/11 12:54	7664-41-7	
<b>351.2 Total Kjeldahl Nitrogen</b>		Analytical Method: EPA 351.2 Preparation Method: EPA 351.2							
Nitrogen, Kjeldahl, Total	1.9	mg/L	0.50	0.25	1	01/12/11 09:30	01/13/11 12:54	7727-37-9	
<b>365.4 Phosphorus, Total</b>		Analytical Method: EPA 365.4 Preparation Method: EPA 365.4							
Phosphorus, Total (as P)	0.050U	mg/L	0.10	0.050	1	01/12/11 09:30	01/13/11 12:54	7723-14-0	
<b>410.4 COD</b>		Analytical Method: EPA 410.4							
Chemical Oxygen Demand	24.2 I	mg/L	25.0	12.5	1		01/25/11 09:56		J(M1)



## ANALYTICAL RESULTS

Project: FDOH  
Pace Project No.: 3524641

Sample: UNSAT-IS4		Lab ID: 3524641002	Collected: 01/11/11 08:30	Received: 01/11/11 11:11	Matrix: Water				
Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>9222D Fecal Coliform Tampa</b>		Analytical Method: SM 9222D Preparation Method: SM 9222D							
Fecal Coliforms	<b>1.0U</b>	CFU/100 mL	1.0	1.0	1	01/11/11 11:32	01/12/11 11:35		
<b>2320B Alkalinity</b>		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO <sub>3</sub>	<b>264</b>	mg/L	5.0	5.0	1		01/12/11 18:02		
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C							
Total Dissolved Solids	<b>637</b>	mg/L	5.0	5.0	1		01/13/11 09:32		
<b>2540D Total Suspended Solids</b>		Analytical Method: SM 2540D							
Total Suspended Solids	<b>5.0U</b>	mg/L	5.0	5.0	1		01/13/11 09:14		
<b>300.0 IC Anions</b>		Analytical Method: EPA 300.0							
Nitrate as N	<b>0.050U</b>	mg/L	0.10	0.050	2		01/12/11 12:14	14797-55-8	
Nitrite as N	<b>0.050U</b>	mg/L	0.10	0.050	2		01/12/11 12:14	14797-65-0	
Orthophosphate as P	<b>3.3</b>	mg/L	0.20	0.10	2		01/12/11 12:14		
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0							
Sulfate	<b>119</b>	mg/L	10.0	5.0	2		01/12/11 12:14	14808-79-8	
<b>350.1 Ammonia</b>		Analytical Method: EPA 350.1							
Nitrogen, Ammonia	<b>0.052</b>	mg/L	0.050	0.020	1		01/14/11 12:58	7664-41-7	
<b>351.2 Total Kjeldahl Nitrogen</b>		Analytical Method: EPA 351.2 Preparation Method: EPA 351.2							
Nitrogen, Kjeldahl, Total	<b>1.0</b>	mg/L	0.50	0.25	1	01/12/11 09:30	01/13/11 12:56	7727-37-9	
<b>365.4 Phosphorus, Total</b>		Analytical Method: EPA 365.4 Preparation Method: EPA 365.4							
Phosphorus, Total (as P)	<b>3.9</b>	mg/L	0.10	0.050	1	01/12/11 09:30	01/13/11 12:56	7723-14-0	
<b>410.4 COD</b>		Analytical Method: EPA 410.4							
Chemical Oxygen Demand	<b>29.5</b>	mg/L	25.0	12.5	1		01/25/11 09:56		

## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524641

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QC Batch:	TAMP/2089	Analysis Method:	SM 9222D
QC Batch Method:	SM 9222D	Analysis Description:	9222D MBIO Fecal Coliform Tampa
Associated Lab Samples:	3524641001, 3524641002		

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METHOD BLANK:	159216	Matrix:	Water
Associated Lab Samples:	3524641001, 3524641002		

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Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Fecal Coliforms	CFU/100 mL	1.0U	1.0	01/12/11 11:35	

## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524641

QC Batch: WET/6798 Analysis Method: SM 2320B  
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity  
Associated Lab Samples: 3524641001, 3524641002

METHOD BLANK: 159337 Matrix: Water  
Associated Lab Samples: 3524641001, 3524641002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	5.0U	5.0	01/12/11 15:31	

LABORATORY CONTROL SAMPLE: 159338

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	250	250	100	90-110	

MATRIX SPIKE SAMPLE: 159340

Parameter	Units	3524583002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	383	250	608	90	90-110	

MATRIX SPIKE SAMPLE: 159342

Parameter	Units	3524595003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	391	250	650	104	90-110	

SAMPLE DUPLICATE: 159339

Parameter	Units	3524583002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	383	377	2	20	

SAMPLE DUPLICATE: 159341

Parameter	Units	3524595003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO <sub>3</sub>	mg/L	391	513	27	20 J(D6)	

## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524641

QC Batch:	WET/6807	Analysis Method:	SM 2540C
QC Batch Method:	SM 2540C	Analysis Description:	2540C Total Dissolved Solids
Associated Lab Samples:	3524641001, 3524641002		

METHOD BLANK:	159657	Matrix:	Water
Associated Lab Samples:	3524641001, 3524641002		

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	5.0U	5.0	01/13/11 09:29	

LABORATORY CONTROL SAMPLE: 159658

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	300	298	99	90-110	

SAMPLE DUPLICATE: 159659

Parameter	Units	3524669001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	338	348	3	20	

SAMPLE DUPLICATE: 159660

Parameter	Units	3524677004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1730	1670	4	20	

## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524641

QC Batch: WET/6808 Analysis Method: SM 2540D  
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids  
Associated Lab Samples: 3524641001, 3524641002

METHOD BLANK: 159663 Matrix: Water  
Associated Lab Samples: 3524641001, 3524641002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	5.0U	5.0	01/13/11 09:14	

LABORATORY CONTROL SAMPLE: 159664

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	80	85.0	106	90-110	

SAMPLE DUPLICATE: 159665

Parameter	Units	3524618002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	5.0U	5.0U		20	

SAMPLE DUPLICATE: 159666

Parameter	Units	3524641001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	10.0	9.0	11	20	

## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524641

QC Batch: WETA/8130 Analysis Method: EPA 300.0  
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions  
Associated Lab Samples: 3524641001, 3524641002

METHOD BLANK: 159471 Matrix: Water  
Associated Lab Samples: 3524641001, 3524641002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrate as N	mg/L	0.025U	0.050	01/12/11 09:37	1p
Nitrite as N	mg/L	0.025U	0.050	01/12/11 09:37	1p
Orthophosphate as P	mg/L	0.050U	0.10	01/12/11 09:37	1p

LABORATORY CONTROL SAMPLE: 159472

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrate as N	mg/L	5	4.8	97	90-110	
Nitrite as N	mg/L	5	4.9	98	90-110	
Orthophosphate as P	mg/L	10	9.8	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 159473 159474

Parameter	Units	3524702002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrate as N	mg/L	0.025U	5	5	4.5	4.6	91	91	90-110	.3	20	
Nitrite as N	mg/L	0.025U	5	5	4.6	4.6	91	91	90-110	.05	20	
Orthophosphate as P	mg/L	0.050U	10	10	8.9	8.9	89	89	90-110	.3	20	J(M1)

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 159475 159476

Parameter	Units	3524728001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrate as N	mg/L	0.025U	5	5	4.7	4.7	94	95	90-110	.08	20	
Nitrite as N	mg/L	0.025U	5	5	4.8	4.8	96	96	90-110	.05	20	
Orthophosphate as P	mg/L	0.58	10	10	10.0	10.0	94	95	90-110	.1	20	

## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524641

QC Batch: WETA/8132 Analysis Method: EPA 300.0  
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions  
Associated Lab Samples: 3524641001, 3524641002

METHOD BLANK: 159484 Matrix: Water  
Associated Lab Samples: 3524641001, 3524641002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	2.5U	5.0	01/12/11 09:37	

LABORATORY CONTROL SAMPLE: 159485

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	50	47.6	95	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 159486 159487

Parameter	Units	3524702002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	3.4 I	50	50	48.7	48.7	91	91	90-110	.03	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 159713 159714

Parameter	Units	3524728001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	2.5U	50	50	46.4	46.4	92	92	90-110	.01	20	

## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524641

QC Batch: WETA/8153 Analysis Method: EPA 350.1  
QC Batch Method: EPA 350.1 Analysis Description: 350.1 Ammonia  
Associated Lab Samples: 3524641001, 3524641002

METHOD BLANK: 160050 Matrix: Water  
Associated Lab Samples: 3524641001, 3524641002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, Ammonia	mg/L	0.020U	0.050	01/14/11 12:48	

LABORATORY CONTROL SAMPLE: 160051

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	1	1.0	104	90-110	

MATRIX SPIKE SAMPLE: 160053

Parameter	Units	3524641001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	1.1	1	2.1	101	90-110	

SAMPLE DUPLICATE: 160052

Parameter	Units	3524641001 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, Ammonia	mg/L	1.1	1.1	1	20	



## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524641

QC Batch: WETA/8123 Analysis Method: EPA 351.2  
QC Batch Method: EPA 351.2 Analysis Description: 351.2 TKN  
Associated Lab Samples: 3524641001, 3524641002

METHOD BLANK: 159226 Matrix: Water  
Associated Lab Samples: 3524641001, 3524641002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	0.25U	0.50	01/13/11 12:31	

LABORATORY CONTROL SAMPLE: 159227

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	20	20.9	104	90-110	

MATRIX SPIKE SAMPLE: 159229

Parameter	Units	3524680001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	3.1	20	25.6	113	90-110	J(M1)

SAMPLE DUPLICATE: 159228

Parameter	Units	3524680001 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	3.1	3.0	2	20	

## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524641

QC Batch: WETA/8124 Analysis Method: EPA 365.4  
QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus  
Associated Lab Samples: 3524641001, 3524641002

METHOD BLANK: 159230 Matrix: Water  
Associated Lab Samples: 3524641001, 3524641002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Phosphorus, Total (as P)	mg/L	0.050U	0.10	01/13/11 13:11	

LABORATORY CONTROL SAMPLE: 159231

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus, Total (as P)	mg/L	4	4.0	100	90-110	

MATRIX SPIKE SAMPLE: 159233

Parameter	Units	3524680001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus, Total (as P)	mg/L	0.50	4	4.8	107	80-120	

SAMPLE DUPLICATE: 159232

Parameter	Units	3524680001 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus, Total (as P)	mg/L	0.50	0.49	3	20	

## QUALITY CONTROL DATA

Project: FDOH  
Pace Project No.: 3524641

QC Batch: WETA/8276 Analysis Method: EPA 410.4  
QC Batch Method: EPA 410.4 Analysis Description: 410.4 COD  
Associated Lab Samples: 3524641001, 3524641002

METHOD BLANK: 163020 Matrix: Water  
Associated Lab Samples: 3524641001, 3524641002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chemical Oxygen Demand	mg/L	12.5U	25.0	01/25/11 09:56	

LABORATORY CONTROL SAMPLE: 163021

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	500	498	100	90-110	

MATRIX SPIKE SAMPLE: 163023

Parameter	Units	3524641001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chemical Oxygen Demand	mg/L	24.2 I	500	400	75	90-110	J(M1)

SAMPLE DUPLICATE: 163022

Parameter	Units	3524641001 Result	Dup Result	RPD	Max RPD	Qualifiers
Chemical Oxygen Demand	mg/L	24.2 I	29.4		20	

## QUALIFIERS

Project: FDOH  
Pace Project No.: 3524641

### DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is NELAP accredited. Contact your Pace PM for the current list of accredited analytes.

### LABORATORIES

PASI-O Pace Analytical Services - Ormond Beach

PASI-T Pace Analytical Services - Tampa

### ANALYTE QUALIFIERS

I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
1p	The recovery of the analyte in the CRDL standard (also known as the reporting limit verification) did not meet the acceptance criteria.
2p	The sample was analyzed within hold for nitrate, however, the result was above the instrument calibration range and required a dilution. The dilution concentration confirmed the initial analysis, however, the analysis was outside the method hold criteria.
J(D6)	Estimated Value. The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.
J(M1)	Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
Q	Sample held beyond the accepted holding time.

## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: FDOH  
Pace Project No.: 3524641

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
3524641001	UNSAT-IS3	SM 9222D	TAMP/2088	SM 9222D	TAMP/2089
3524641002	UNSAT-IS4	SM 9222D	TAMP/2088	SM 9222D	TAMP/2089
3524641001	UNSAT-IS3	SM 2320B	WET/6798		
3524641002	UNSAT-IS4	SM 2320B	WET/6798		
3524641001	UNSAT-IS3	SM 2540C	WET/6807		
3524641002	UNSAT-IS4	SM 2540C	WET/6807		
3524641001	UNSAT-IS3	SM 2540D	WET/6808		
3524641002	UNSAT-IS4	SM 2540D	WET/6808		
3524641001	UNSAT-IS3	EPA 300.0	WETA/8130		
3524641002	UNSAT-IS4	EPA 300.0	WETA/8130		
3524641001	UNSAT-IS3	EPA 300.0	WETA/8132		
3524641002	UNSAT-IS4	EPA 300.0	WETA/8132		
3524641001	UNSAT-IS3	EPA 350.1	WETA/8153		
3524641002	UNSAT-IS4	EPA 350.1	WETA/8153		
3524641001	UNSAT-IS3	EPA 351.2	WETA/8123	EPA 351.2	WETA/8139
3524641002	UNSAT-IS4	EPA 351.2	WETA/8123	EPA 351.2	WETA/8139
3524641001	UNSAT-IS3	EPA 365.4	WETA/8124	EPA 365.4	WETA/8140
3524641002	UNSAT-IS4	EPA 365.4	WETA/8124	EPA 365.4	WETA/8140
3524641001	UNSAT-IS3	EPA 410.4	WETA/8276		
3524641002	UNSAT-IS4	EPA 410.4	WETA/8276		



CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

MO# : 3524641

PM: SMH

CLIENT: HAZSAM

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1455805

<b>Section A</b> Required Client Information:		<b>Section B</b> Required Project Information:		<b>Section C</b> Invoice Information:	
Company:	Hazen and Sawyer	Report To:	Joseph Hitt	Attention:	
Address:	10000 Princeton Parkway	Copy To:		Company Name:	
City:	San Jose, CA 95129	Purchase Order No.:		Address:	
Email To:	jeff@hazenand.com	Project Name:		Reference:	
Phone:	813-630-4444	Project Number:		Pace Project Manager:	
Requested Due Date/AT:				Pace Profile #:	
REGULATORY AGENCY		SITE Location		STATE:	
NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/>		UST <input type="checkbox"/> RORA <input type="checkbox"/> OTHER <input type="checkbox"/>			

Section D Required Client Information		Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		# OF CONTAINERS		Preservatives		Analysis Test ↓		Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
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Matrix Codes MATRIX / CODE		Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		# OF CONTAINERS		Preservatives		Analysis Test ↓		Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		# OF CONTAINERS		Preservatives		Analysis Test ↓		Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		# OF CONTAINERS		Preservatives		Analysis Test ↓		Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		# OF CONTAINERS		Preservatives		Analysis Test ↓		Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		# OF CONTAINERS		Preservatives		Analysis Test ↓		Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		Matrix Codes MATRIX / CODE		COLLECTED													

ADDITIONAL COMMENTS		RELINQUISHED BY / AFFILIATION		DATE		TIME		ACCEPTED BY / AFFILIATION		DATE		TIME		SAMPLE CONDITIONS	
SAMPLER NAME AND SIGNATURE		PRINT Name of SAMPLER:		SIGNATURE of SAMPLER:		DATE Signed (MM/DD/YY):		Temp in °C		Received on Ice (Y/N)		Custody Sealed Cooler (Y/N)		Samples Intact (Y/N)	
ORIGINAL		Joseph Hitt		Joseph Hitt		1-7-11 10:00		Joseph Hitt		1-7-11 2:00pm		80		Y	
		Joseph Hitt		Joseph Hitt		1-11-11 11:11		Joseph Hitt		1-11-11 11:11		80		Y	
		Joseph Hitt		Joseph Hitt		1-11-11 11:11		Joseph Hitt		1-11-11 11:11		80		Y	

\*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-FALL-Q-020rev.07, 15-May-2007

## Sample Condition Upon Receipt Form (SCUR)

Table Number: \_\_\_\_\_

Client Name: HAZ SAWProject # 3524641Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☒ Commercial ☐ Pace ☐ B&B ☐ Other \_\_\_\_\_

Tracking # \_\_\_\_\_

Custody Seal on Cooler/Box Present: ☐ yes ☒ no Seals intact: ☐ yes ☒ noPacking Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other \_\_\_\_\_Thermometer Used L4 T-39 Type of Ice: ☒ Wet ☐ Blue ☐ NoneCooler Temperature 0.0 (Actual) (Temp should be above freezing to 6°C)

Receipt of samples satisfactory:

☒ Yes☐ NoDate and Initials of person examining contents: JP 1/12/11

Secondary Review

Initials: \_\_\_\_\_

Rush TAT requested on COC: ☐

If yes, then all conditions below were met:

If no, then mark box &amp; describe issue (use comments area if necessary):

Chain of Custody Present ☐Chain of Custody Filled Out ☐Relinquished Signature & Sampler Name COC ☐Samples Arrived within Hold Time ☐Sufficient Volume ☐Correct Containers Used ☐Containers Intact ☐Sample Labels match COC (sample IDs & date/time of collection) ☐No Labels: ☐ No Time/Date on Labels: ☐All containers needing preservation are found to be in compliance with EPA recommendation. ☐No Headspace in VOA Vials (>6mm): ☐

Client Notification/ Resolution:

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments/ Resolution (use back for additional comments): \_\_\_\_\_

Project Manager Review: \_\_\_\_\_

Date: 01/12/2011

## Finished Product Information Only

F.P. Sample ID: \_\_\_\_\_

Production Code: \_\_\_\_\_

Date/Time Opened: \_\_\_\_\_

Number of Unopened Bottles Remaining: \_\_\_\_\_

## Size &amp; Qty of Bottles Received

\_\_\_\_\_ x 5 Gal

\_\_\_\_\_ x 2.5 Gal

\_\_\_\_\_ x 1 Gal

\_\_\_\_\_ x 1 Liter

\_\_\_\_\_ x 500 mL

\_\_\_\_\_ x 250 mL

\_\_\_\_\_ x Other: \_\_\_\_\_

Extra Sample In Shed: Yes No