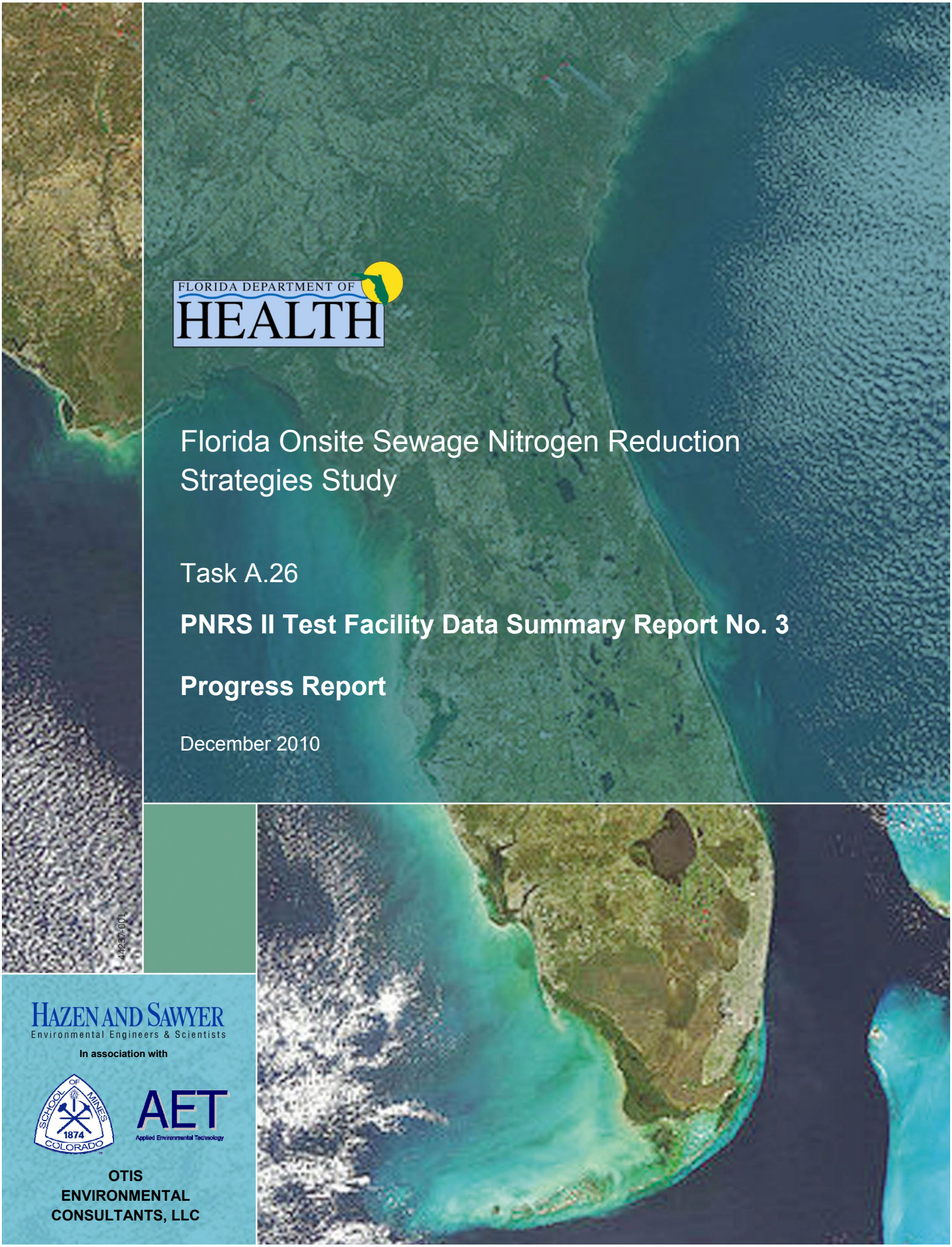

FLORIDA DEPARTMENT OF HEALTH

Florida Onsite Sewage Nitrogen Reduction Strategies Study

Task A.26

PNRS II Test Facility Data Summary Report No. 3

Progress Report

December 2010

4423-001

HAZEN AND SAWYER
Environmental Engineers & Scientists

In association with

SCHOOL OF MINES 1874 COLORADO

AET
Applied Environmental Technology

OTIS ENVIRONMENTAL CONSULTANTS, LLC

Florida Onsite Sewage Nitrogen Reduction Strategies Study

TASK A.26
PROGRESS REPORT

PNRS II Test Facility
Data Summary Report No. 3

Prepared for:

Florida Department of Health
Division of Environmental Health
Bureau of Onsite Sewage Programs
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December 2010

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1.0 Background

Task A of the Florida Onsite Sewage Nitrogen Reduction Strategies Study includes the evaluation of passive treatment systems to remove nitrogen from septic tank effluent. The Passive Nitrogen Removal Study II (PNRS II) is a follow-up to the previous experimental evaluations of passive nitrogen removal technologies conducted in Passive Nitrogen Removal Study I. The objective of the PNRS II study is to extend and expand into field pilot testing the two-stage biofiltration process that was initiated in PNRS I. A unique test facility was constructed for the purpose of this evaluation. The Task A.15 PNRS II 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 November 10, 2010. The corresponding sample event report was submitted as Sample Event Report No. 3, November 2010, 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, 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 and 2 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 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 treatment systems.

3.2.1 Septic Tank Effluent (STE) Quality

In PNRS II biofilter performance evaluation, the two highly important input factors are the composition of Septic Tank Effluent (STE) and the system flowrates. It has been verified in Sample Events 1, 2 and 3 that target flow rates have in general been successfully achieved. Composition of STE at the GCREC site is continuing to provide a challenge. Sample Event No. 1 revealed that GCREC Septic Tank Effluent exhibited low concentrations of key parameters when compared to typical residential STE. Examination of GCREC records indicated unexpectedly high wastewater flowrates. Upon further investigation, it was found that condensate from the facility air conditioning (A/C) system was draining into the wastewater collection system and diluting the GCREC wastewater. The A/C condensate from GCREC air conditioning units was rerouted in mid July and no longer discharges to the wastewater collection system. Following removal of condensate, the influent feed to the PNRS II systems (GCREC STE) was more characteristic of typical STE from single family residences. The nitrogen concentrations in the STE feed was as high or higher than typical STE. However, some STE parameters continued to show relatively low values. TSS, $CBOD_5$, and COD were on the lower end of the range for typical STE.

Multiple approaches were pursued to address STE quality issues. The following modifications were implemented in mid-October to address STE quality issues as depicted in Figure 1:

a. A hydraulic modification was made to the two-chamber PNRS II dosing tank (Tank 1). Prior to the modification, STE from the GCREC tank entered the first chamber of the PNRS II dosing tank and then flowed to the second chamber that contained the PNRS II dosing pumps. To decrease the residence time of STE in the PNRS II dosing tank, a new pipe was installed to direct STE from the GCREC tank directly to the second chamber in the PNRS II dosing tank.
b. Additionally, Pump 1, which withdraws STE from the GCREC wastewater system, was relocated from its previous withdrawal location to an upstream withdrawal tank.

These modifications were intended to provide influent STE to the PNRS II systems that more closely approximates the characteristics of STE typical of single family residences in Florida.

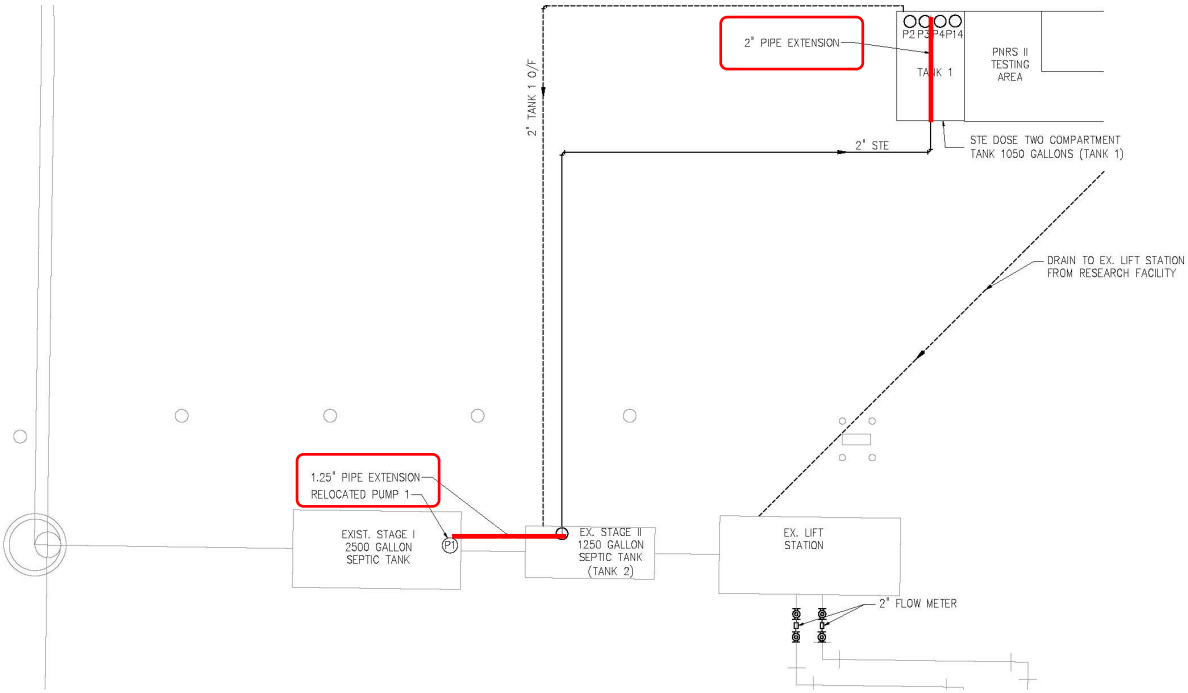

Figure 1
STE Modifications

3.2.2 Polystyrene Biofilter (UNSAT-PS1)

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

Upon further evaluation and analyses, however, it was concluded that the properties of polystyrene media would not be compatible with a practical single pass unsaturated biofilter, and that polystyrene media could more be feasibly deployed in a recirculation biofilter configuration.

The following modifications were implemented to the polystyrene biofilter system in mid-October as depicted in Figure 2:

a. Addition of recirculation pump
b. ½" piping from pump to recirculation tank with flowmeter
c. Addition of recirculation tank
d. Addition of pump tank

Effluent from the re-configured polystyrene biofilter will continue to be directed to the coupled Stage 2 biofilter DENIT-LS4. The outcome of these efforts will be to provide evaluation of total nitrogen reduction using a recirculating Stage 1 biofilter with polystyrene media that is directly coupled to a Stage 2 denitrification biofilter.

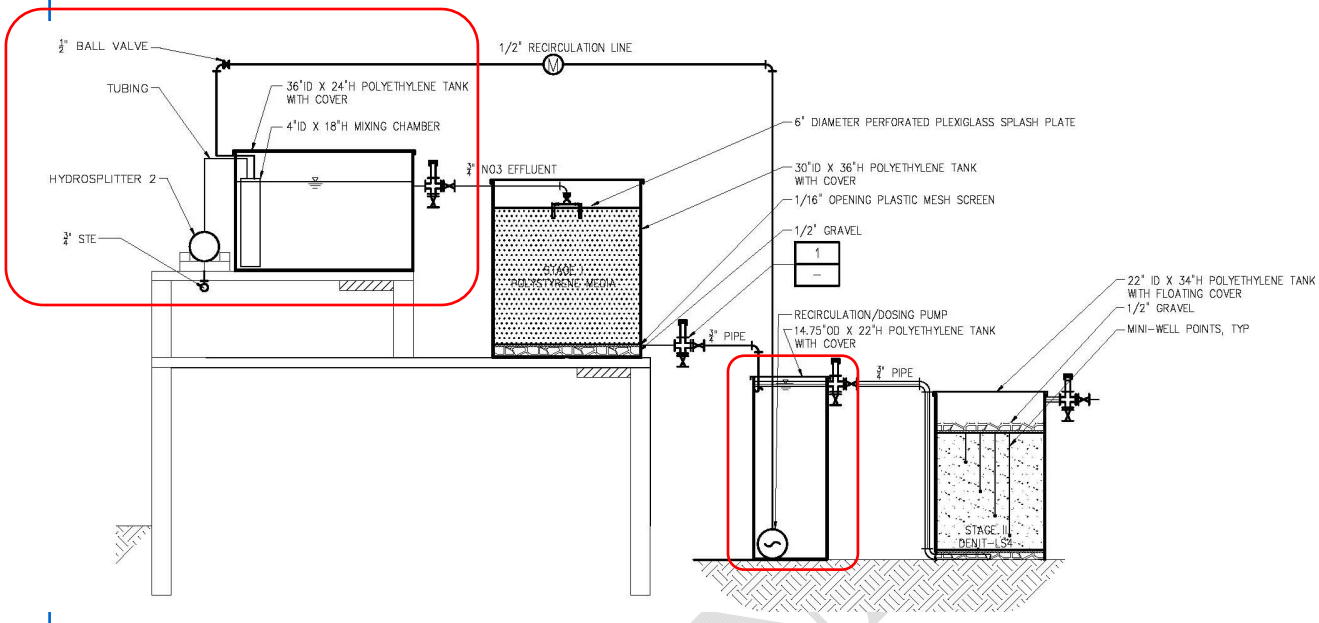

Figure 2
UNSAT-PS1 Modifications

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

Two upflow denitrification biofilters with lignocellulosic media showed limited NO_x reduction in Sample Event 2. Possible explanations are inadequate flow distribution across the biofilter area, lack of adequate electron donor release from media, and inhibition due to release of chemical constituents from the media. The project team initially employed dye tests to visually determine if there is a tendency for effluent to exit the biofilter media in a concentrated form at specific locations. An example is preferential flow along the biofilter walls, which would lead to low water residence times and limited contact with media. A dye test was employed October 19th through October 25th (see Figures 3 through 13) for both DENIT-LS2 and LS3 biofilters. Fluorescent red dye (rhodamine WT) was used at a concentration of 1 mL per gallon (see Figure 3) to visually determine if there is a tendency for effluent to exit the biofilter in specific locations. At 8:00 am on October 19th, a solution of 30 mL red dye in 1 liter of distilled water was added in the sample port upstream of the two biofilters. During monitoring of the biofilters, DENIT-LS-2 exhibited short-circuiting along the walls at 3:30 pm on October 19th (see Figure 5). DE-

NIT-LS3 did not exhibit short-circuiting and began showing dye in the effluent fairly uniformly at approximately 10:00 pm on October 19th.

Figure 3
Rhodamine WT Dye at 1 mL per Gallon Concentration

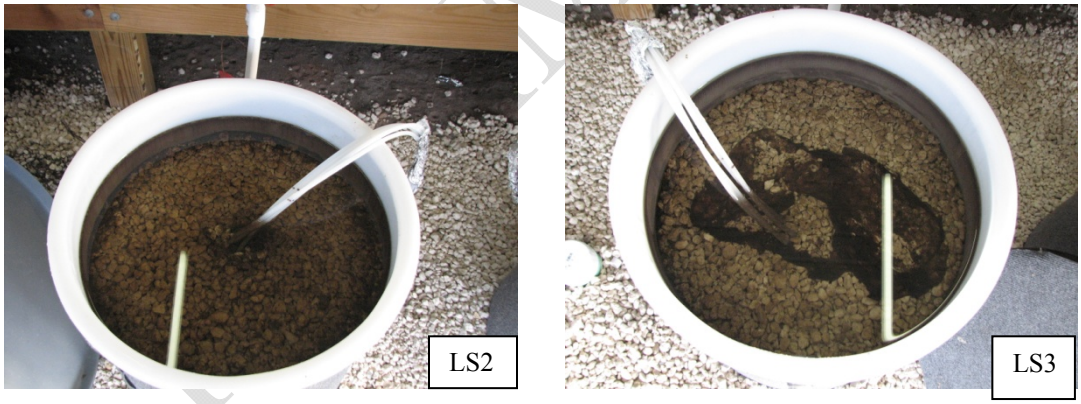

Figure 4
LS2 and LS3 at 8:22 am, October 19th

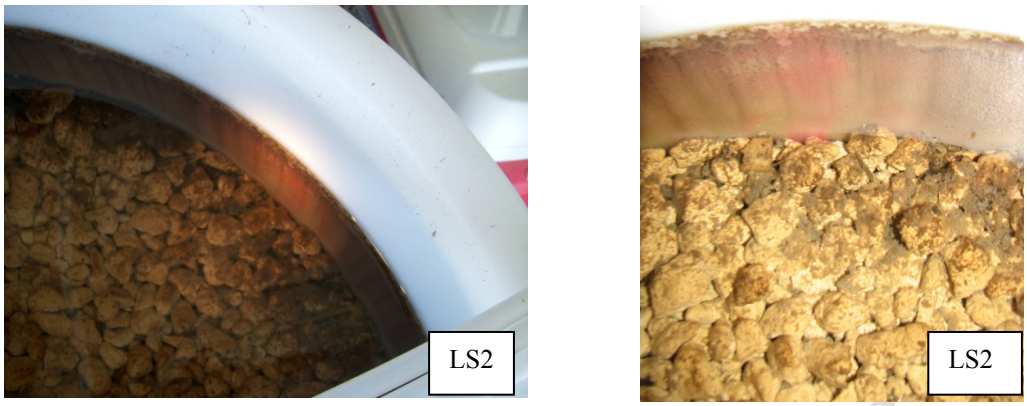

Figure 5
LS2 at 3:56 pm, October 19th

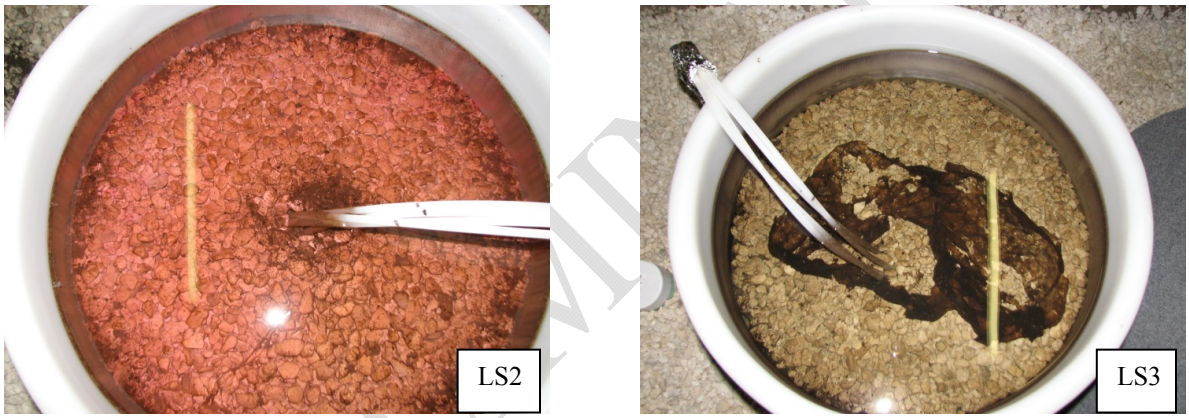

Figure 6
LS2 and LS3 at 7:26 pm, October 19th

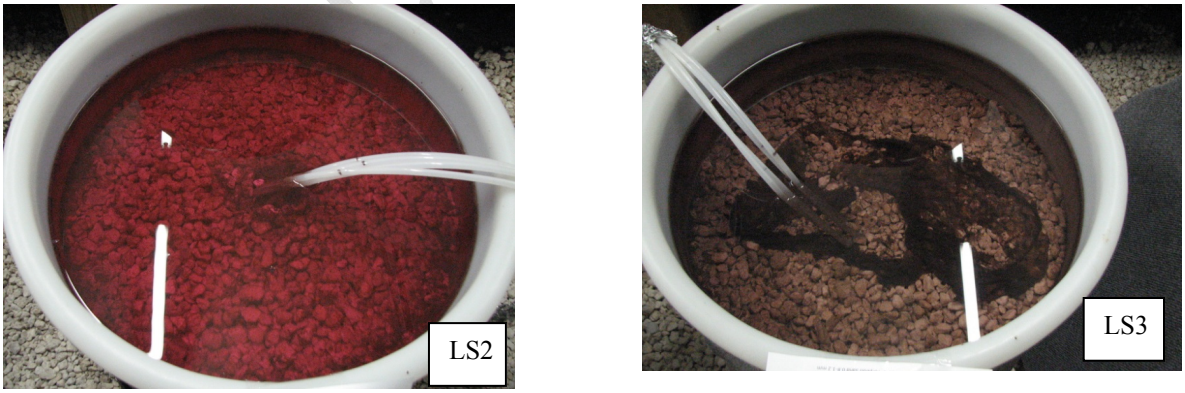

Figure 7
LS2 and LS3 at 12:00 am, October 20th

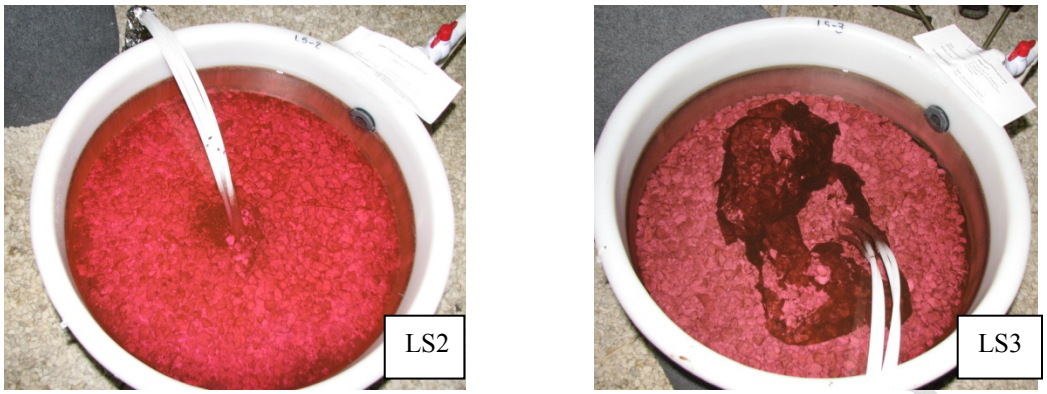

Figure 8
LS2 and LS3 at 7:00 am, October 20th

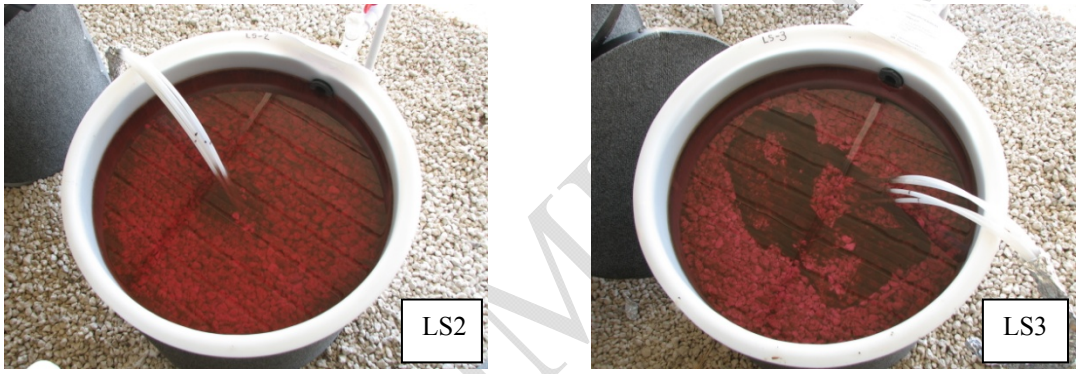

Figure 9
LS2 and LS3 at 12:00 pm, October 20th

Figure 10
LS2 and LS3 effluent at 12:00 pm, October 20th, relative to influent dye solution on right

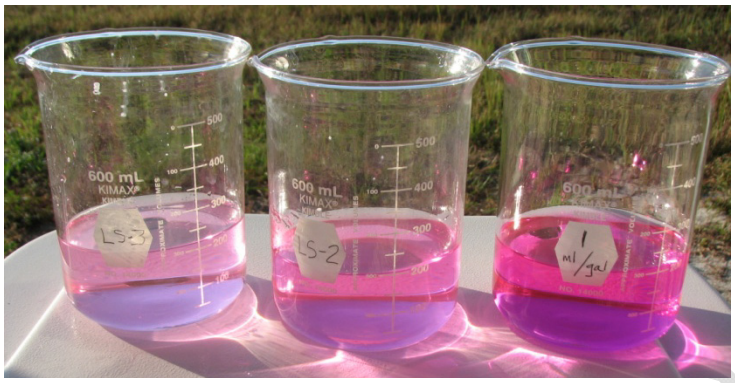

Figure 11
LS2 and LS3 effluent at 9:00 am, October 21st

Figure 12
LS2 and LS3 effluent at 9:27 am, October 22nd

Figure 13
LS2 and LS3 effluent at 8:39 am, October 25th

The results indicated that flow distribution is a concern in DENIT-LS2. The following modifications were implemented as depicted in Figure 14:

a. Replaced media within DENIT-LS2 biofilter
    i. Media mix = 25% Lignocellulosic, 75% Expanded Clay >1.13 mm
b. Glued expanded clay fines to sides of walls to prevent short circuiting
c. Added perforated discharge pipe to bottom inlet along entire length of bottom of tank

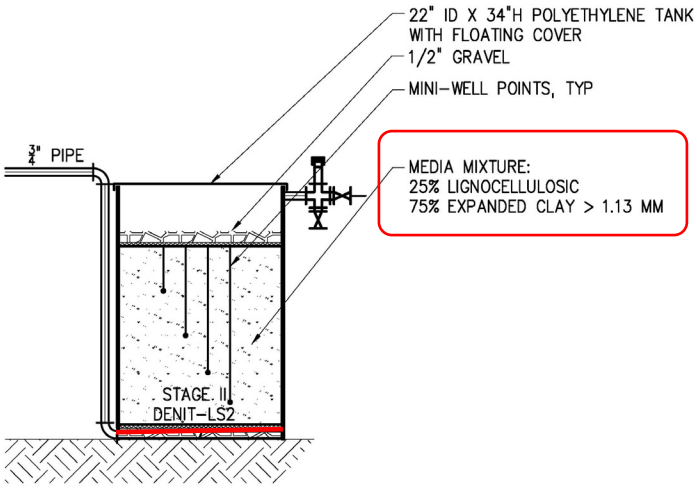

Figure 14
DENIT-LS2 Biofilter Modifications

3.2.4 Glycerol Fed Horizontal Denitrification Biofilter (DENIT-GL1)

In Sample Event 2, the effluent NO_x-N was less than 0.1 mg/L from the glycerol supplied saturated horizontal denitrification biofilter. However, the effluent COD and $CBOD_5$ were quite high (1,100 mg/L and 810, respectively), and other water quality parameters exhibited puzzling results. A possible explanation for the high levels of bulk organic parameters was determined to be glycerol dosing. The strategy for DENIT-GL1 was to supply glycerol in excess and to reduce the dosing level once denitrification was established. It therefore appeared likely that glycerol dosing could account for at least a portion of the elevated COD and $CBOD_5$ in the effluent. The project team performed a complete review of glycerol dosing including a) evaluation of stoichiometric glycerol requirement for influent oxygen, nitrate and other electron acceptors, b) dosing rates and glycerol stock solution concentrations, and c) measured glycerol stock reservoir depletion rates. Upon the review, the glycerol dosing solution concentration was lowered to 13.5 mL of 99% glyce-

rol per liter of dosing solution at the end of October. In Sample Event 3, the effluent NO_x-N was still less than 0.1 mg/L and COD and $CBOD_5$ were significantly lowered to 22 mg/L and 3 mg/L respectively.

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

Sodium sesquicarbonate was supplied as alkalinity supplement in one upflow denitrification biofilter (DENIT-SU4) and one horizontal denitrification biofilter (DENIT-SU2). Sodium sesquicarbonate had exhibited a relatively rapid dissolution rate and possibly re-precipitation in preliminary testing. Sodium sesquicarbonate dissolution rates were too rapid to enable this media to be applied in passive PNRS II systems that are intended for long term deployment. Therefore, limestone will be tested as a replacement for sodium sesquicarbonate in DENIT-SU4 and DENIT-SU2. Additionally, the sulfur content in the biofilters will be reduced to 30%.

The following modifications were implemented as depicted in Figures 15 and 16:

a. Replaced media within DENIT-SU4 upflow biofilter (see Figure 15)
    i. Media mix: 10% limestone, 30% elemental sulfur, 60% Expanded Clay >1.13 mm
b. Replaced media within DENIT-SU2 horizontal biofilter (see Figure 16)
    i. Media mix: 10% limestone, 30% elemental sulfur, 60% Expanded Clay >1.13 mm

The outcome of these modifications will be evaluation of DENIT-SU4 and DENIT-SU-2 denitrification biofilters that are suitable for long term on-site deployment.

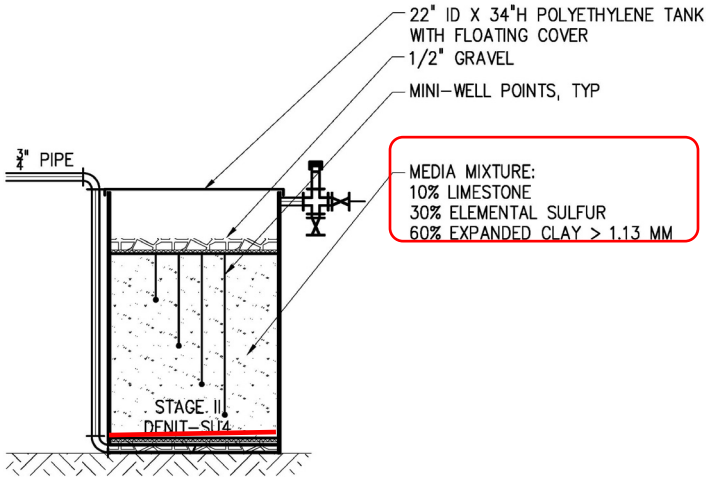

Figure 15
DENIT-SU4 Upflow Biofilter Modifications

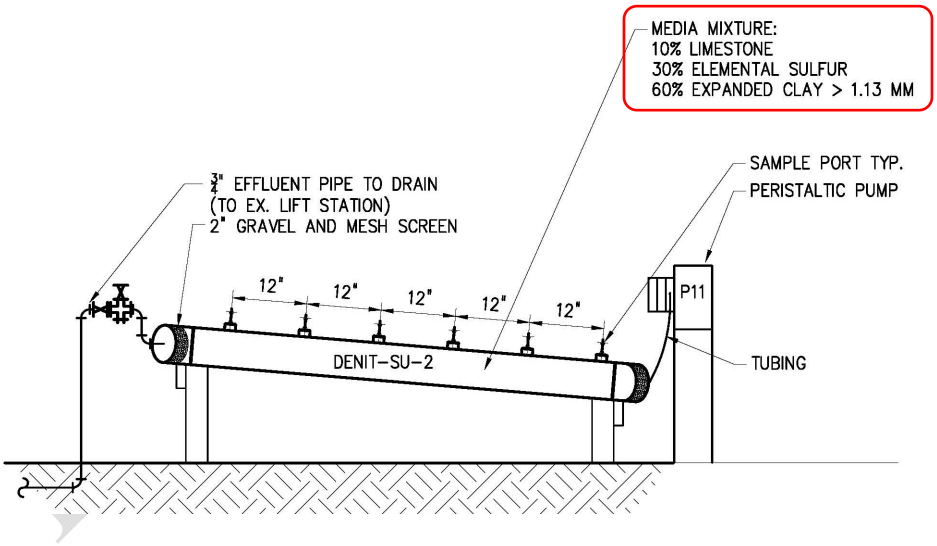

Figure 16
DENIT-SU2 Horizontal Biofilter Modifications

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

In-Situ Simulators contain vertically stacked media layers intended to affect enhanced simultaneous nitrification and denitrification in a single pass vertical downflow system. The concept of employing a vertically stacked media configuration is to accomplish nitrification and organics oxidation in an upper unsaturated media layer, which then supplies nitrified water to one or more underlying layers containing denitrification media. The enhancement of nitrification/denitrification is due to the inclusion of electron donor (i.e. lignocellulosic material and/or elemental sulfur) in the unsaturated media in the lower layer. The In-Situ Simulators deployed a mixed media of expanded clay, lignocellulosic material and elemental sulfur in an unsaturated condition in the lower layer. It was anticipated that placement of sulfur in an unsaturated location would enable oxygen ingress and greater sulfur oxidation than if sulfur were maintained in a saturated condition. High effluent SO_4 levels were anticipated but the extent to which this would occur was not known.

In Sample Event 1, UNSAT-IS1 and UNSAT-IS2 both produced very low NH_3-N, NO_x-N and organic nitrogen concentrations, but sulfate levels were high. In an attempt to decrease sulfur oxidation in the lower layer, the discharge pipe of both In-Situ Simulators was modified on July 20th to saturate the lower 12" of the media bed. The denitrification media was fully encompassed within the saturated layer. The results of Sample Event 2 showed that effluent sulfate levels decreased. The modification resulted in increase of ammonia to 20 mg/L in UNSAT-IS1 that receives STE.

The overall PNRS II objective is to incorporate PNRS II results into the design of full scale testing at homeowner sites in FOSNRS Task B, and the In-situ simulator results are critical for Task B activities. Due to the need to develop functional specifications for vertically stacked single pass biofiltration systems, two additional vertically stacked biofilter systems were constructed to evaluate alternative media designs. The revised media designs were intended to provide enhanced simultaneous nitrification/denitrification in unsaturated media while minimizing effluent sulfate levels. Two six-inch diameter biofilters were constructed and are being dosed at the same frequency (once per 4 hours) and average hydraulic loading rate (0.8 gal/ft^2-day) as UNSAT-IS1 and UNSAT-IS2. UNSAT-IS3 receives STE and UNSAT-IS4 receives nitrified STE. The media configuration of UNSAT-IS3 from top to bottom is: 3 in. coarse sand, 9 in. filter sand, 10 in. mixed lignocellulosic media and expanded clay, 2 in. pea gravel, 3 in. elemental sulfur, and 2 in. gravel as underdrain. The media configuration of UNSAT-IS4 from top to bottom is: 12 in. filter sand, 12 in. mixed lignocellulosic media and expanded clay, 2 in. pea gravel, 3 in. elemental sulfur, and 2 in. gravel as underdrain. STE is applied by peristaltic pump to a drip plate at the biofilter center point. Effluent exits the underdrain from a bottom port located at centerline. STE and nitrified STE supplied to UNSAT-IS3 and UNSAT-IS4 is the

same as that supplied to UNSAT-IS1 and UNSAT-IS2. Effluent exits the underdrain from a bottom port located at centerline. The effluent line is directed in an upward direction external to the biofilter column and is used to control the saturation level within the biofilter media. The saturation levels in UNSAT-IS3 and UNSAT-IS4 is maintained within and slightly below the gravel layer that underlies the lignocellulosic/expanded clay mixture to maintain sulfur in a completely saturated condition. A shutoff valve was placed just below the effluent port to enable maintenance of effluent tubing while not draining the biofilter. The effluent line contains a sampling port for measurement of final effluent. Another sampling location in the gravel layer is located below the lignocellulosic/expanded clay media and above the sulfur media. This port passes through the column sidewall and extends radially several inches into the media. Monitoring will be conducted of system effluent as well as intermediate nitrogen species within the biofilter below the unsaturated expanded clay and lignocellulosic layer and above the saturated sulfur layer. The effectiveness of the unsaturated system with only lignocellulosic electron donor and the added effect of underlying sulfur will be delineated.

The following modifications were implemented as depicted in Figure 17:

a. Construct 6” Diameter IS3 biofilter
    i. Media used = coarse sand, fine sand, expanded clay, lignocellulosic, elemental sulfur, pea gravel and gravel
b. Construct 6” Diameter IS4 biofilter
    i. Media used = fine sand, expanded clay, lignocellulosic, elemental sulfur, pea gravel and gravel
c. Addition of peristaltic pump

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

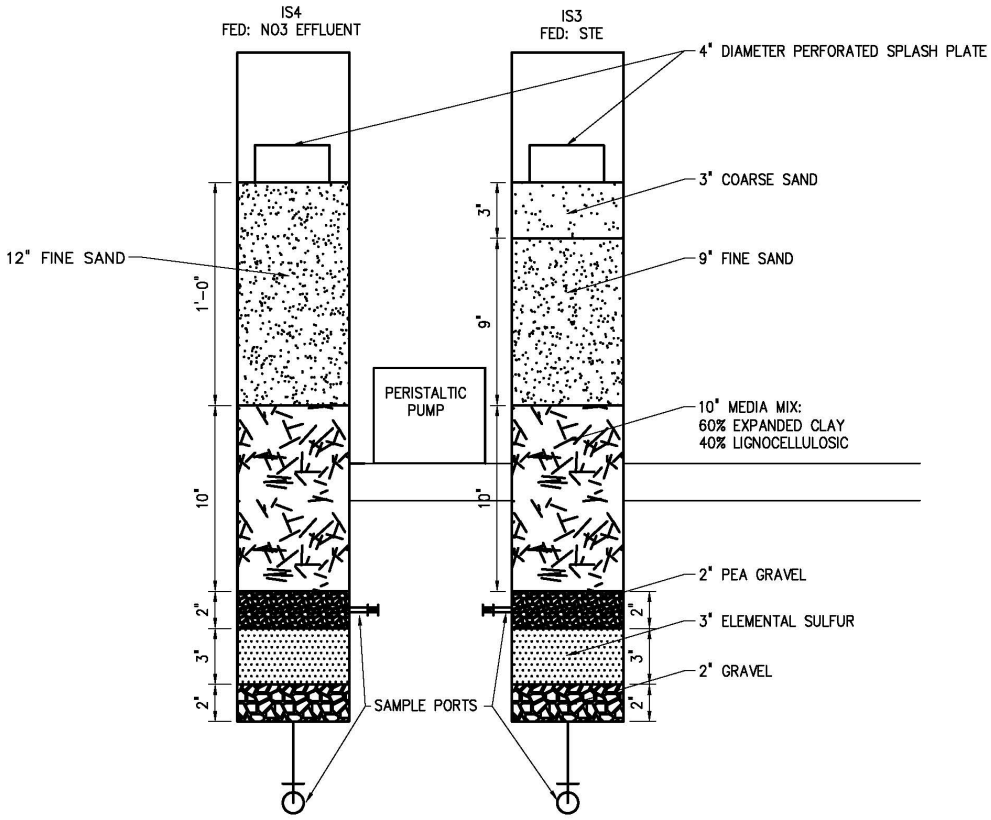

Figure 17
IS3 and IS4 Columns

3.3 Monitoring and Sampling Locations and Identification

A schematic of the PNRS II test facility is shown in Figure 18. 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 18. 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.

Modifications to test systems that were implemented before this sample event include:

- The unsaturated single pass biofilter with polystyrene media (UNSAT-PS1) was re-configured to a recirculation biofilter.
- A fifth recirculation tank (RC5) was installed upstream of UNSAT-PS1.
- A pump tank (P15) was installed downstream of UNSAT-PS1 to feed UNSAT-LS4.
- The media within upflow denitrification biofilter (DENIT-LS2) was revised to be a mixture of 25% lignocellulosic and 75% expanded clay media.
- The sodium sesquicarbonate supplied as an alkalinity supplement in one upflow denitrification biofilter (DENIT-SU4) and one horizontal denitrification biofilter (DENIT-SU2) was replaced with limestone. The media composition in both biofilters was modified to 30% elemental sulfur, 10% limestone, and 60% expanded clay.
- Two additional in-situ simulators containing vertically stacked media layers were constructed to evaluate alternative media designs. UNSAT-IS3 will receive STE and UNSAT-IS4 will receive nitrified STE. The media configuration of UNSAT-IS3 from top to bottom is: 3 in. coarse sand, 9 in. filter sand, 10 in. mixed lignocellulosic media and expanded clay, 2 in. pea gravel, 3 in. elemental sulfur, and 2 in. gravel as underdrain. The media configuration of UNSAT-IS4 from top to bottom is: 12 in. filter sand, 10 in. mixed lignocellulosic media and expanded clay, 2 in. pea gravel, 3 in. elemental sulfur, and 2 in. gravel as underdrain.
- Additional and revised sample locations are included in Table 1 and Figure 18.

Table 1
PNRS II Sample Identification

Group (Figure 18)	Sample Location	Sample Identification
	STE PNRS II Storage Tank 1	PNRS II-STE-T1
I	Stage 1 Single Pass Biofilters	UNSAT-EC1
		UNSAT-EC3
		UNSAT-CL1
		UNSAT-CL3
	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
	Pump 15 Tank	P15
III	Denite Feed Collection Tank	DFT
	Stage 2 Horizontal Biofilters	UNSAT-SU1
		UNSAT-SU2
		UNSAT-LS1
		UNSAT-GL1
IV	In-Situ In-Tank Simulator Single Pass Biofilter	UNSAT-IS1
		UNSAT-IS2
		UNSAT-IS3
		UNSAT-IS4

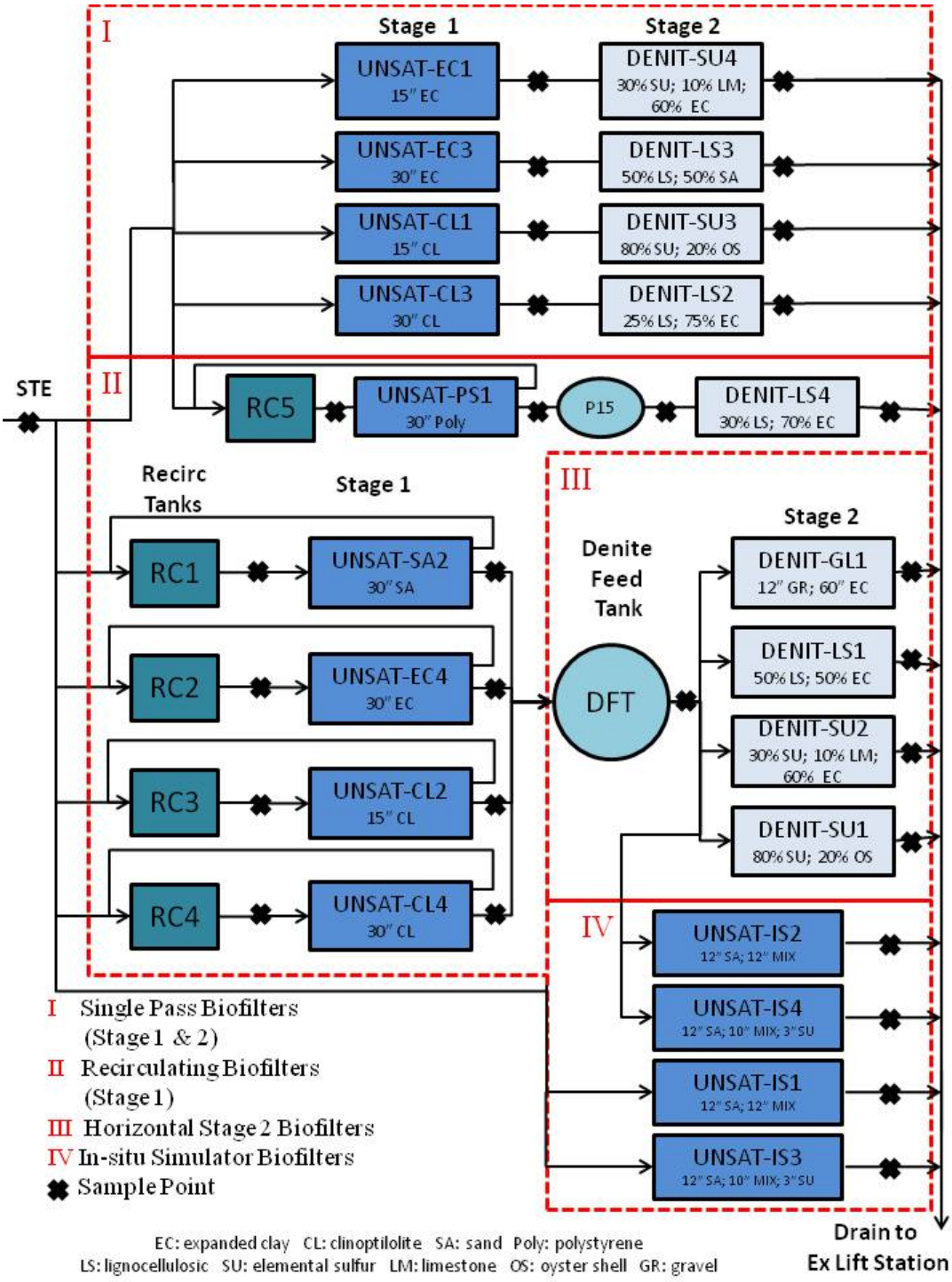

Figure 18
PNRS II Test Facility System Schematic

3.4 Operational Monitoring

Start-up of the PNRS II test facility start-up 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 3 were collected November 10, 2010. A sample of STE was collected from the feed line connecting STE Storage Tank 1 (PNRS II-STE-T1) to Hydrosplitter 1 which supplies STE to the single pass Stage 1 biofilters (Figure 18). A manual dose event was initiated on the control panel until sufficient STE sample volume was collected in a clean sample container. Stage 1, 2, and in-situ simulator biofilter and recirculation tank effluents were each sampled by directing the entire flow from the biofilter into a large, clean sample container over a period of time sufficient to obtain the desired sample volume (approximately 3.5 liters). Sample containers were immediately placed in coolers on ice prior to subdivision of the composited sample.

The composite samples in the 3.5 liter sample containers were then subdivided into analysis-specific sample containers. The analysis-specific containers were supplied by the analytical laboratory and contained the appropriate preservatives. The analysis-specific containers were labeled, placed in coolers and transported on ice to the analytical laboratory. Each sample container was secured in packing material as appropriate to prevent damage and spills, and was recorded on chain-of-custody forms supplied by the laboratory.

Equipment blank, field blank, and field sample duplicates were taken. The equipment blank was collected using a previously cleaned STE sample collection bottle. The bottle was filled with distilled water provided by the laboratory and allowed to sit for eight minutes. The sample containers were then analyzed for the same parameters as the samples. The field blank was collected by filling sample containers with distilled water that had been transported from the laboratory into the field along with other sample containers. The field sample duplicate was collected immediately subsequent to the regular STE sample. The duplicate sample containers were filled with PNRS II T1-STE effluent.

Field parameters were measured using portable electronic probes and included temperature (Temp), dissolved oxygen (DO), oxidation-reduction potential (ORP), pH, and spe-

cific 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 (NH_3-N), nitrate/nitrite nitrogen (NO_X-N), carbonaceous biochemical oxygen demand ($CBOD_5$), total dissolved solids (TDS), total suspended solids (TSS), and chemical oxygen demand (COD). For the denitrification biofilters containing elemental sulfur media, influent and effluent sample analyses were also conducted for sulfate (SO_4) and hydrogen sulfide (H_2S). Table 2 lists the analytical parameters, analytical methods, and detection limits for these analyses.

Table 2
Analytical Parameters, Method of Analysis, and Detection Limits

Analytical Parameter	Method of Analysis	Laboratory Detection Limit (mg/L)
Total Alkalinity as $CaCO_3$	SM 2320B	2 mg/L
Total Kjeldahl Nitrogen (TKN-N)	EPA351.2	0.05 mg/L
Ammonia Nitrogen (NH_3-N)	EPA350.1	0.01 mg/L
Nitrate/Nitrite Nitrogen (NO_X-N)	EPA353.2	0.01 mg/L
Carbonaceous BOD ($CBOD_5$)	SM 5210B	2 mg/L
Total Dissolved Solids (TDS)	SM 2540C	10 mg/L
Total Suspended Solids (TSS)	SM 2540D	1 mg/L
Chemical Oxygen Demand (COD)	EPA 410.4	10 mg/L
Total Phosphorus (TP)	SM 4500PE	0.01 mg/L
Fecal Coliform (fecal)	SM9222D	1 ct/100mL
Sulfate (SO_4)	EPA300.0	0.2 mg/L
Hydrogen Sulfide Unionized (H_2S)	SM4500S F	0.01 mg/L
Sulfide	SM4500S F	0.1 mg/L

3.6 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 November 19th and December 3rd and reported in the Sampling Event No. 3 Report.

4.0 Results and Discussion

4.1 Operational Monitoring

Start up of the PNRS II test facility occurred on May 17, 2010. The test systems have been operated continuously since the May 17th start up, with the exception of power interruptions or outages that have occurred from time to time (see operation and maintenance log). The power interruptions were of relatively short duration. For the most part, the pilot biofilters automatically resumed operation when power was restored. The only exceptions were the two peristaltic pumps: Pump 5 which supplies the two In-Situ simulators and Pump 11 which supplies the four horizontal flow denitrification biofilters. The peristaltic pumps displayed an error message, required manual restarting, and their off times were somewhat longer than the other system pumps. The peristaltic pump settings were saved through the power outage, and the pumps resumed operation once the error code was acknowledged. The peristaltic pumps have since been reprogrammed to start automatically in the event of temporary discontinuance of the power supply. Appendix A provides the operation and maintenance log which includes actions taken since start-up. Appendix B provides summary tables of the PLC recorded data of daily runtimes and flows for the test facility between September 1st and November 9th (Day 107 through Day 176 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 these four systems, indicating that the desired recycle ratio of approximately 3:1 is being met.

4.2 Water Quality Analyses

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

Influent Water Quality Water quality characteristics of STE collected in Sample Event 3 were closer to typical STE composition than were previous STE samples from GCREC. The modifications described in Section 3.2.1, appear to have alleviated the low measured STE strength previously witnessed. Sample Event 3 STE parameters for TSS, COD, and $CBOD_5$ were still somewhat low, but within the range expected for domestic STE. The measured STE total nitrogen (TN) concentration was 80 mg/L, which is at the high end of the expected range. The performance of the various biofilter systems was compared by considering the changes through treatment of nitrogen species (TKN-N, NH_3-N, and NO_X-N), as well as supporting chemistry parameters.

Group 1 Single Pass Biofilters Effluent NH_3-N levels were at or below 3 mg/L for the four Stage 1 single pass biofilters and DO were greater than 6.8 mg/L (Table 3). Organic N ranged from 2.5 to 3.5 mg/L in these same four systems. NO_x was significantly increased in all Stage 1 biofilter effluents corresponding to the decrease in TKN.

Effluent NO_X-N was less than 0.05 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 NO_x-N of 16, 20 and 9.8 mg/L, respectively. These three biofilters did not drive effluent ORP to the low levels that are found in the successfully denitrifying biofilters in this study and in the previous PNRS 1. The lignocellulosic biofilters NO_X-N reducing performance is inferior to sulfur and glycerol but should be doing more or less as well. ORP measurements indicate that the lignocellulosic systems are not driving the ORP into the reducing realms in which denitrification is fostered as depicted in Figures 19 and 20. Possible reasons are lack of reactivity of lignocellulosic material, short circuiting within the biofilters, or toxicity (release of toxic material from lignocellulosic material itself).

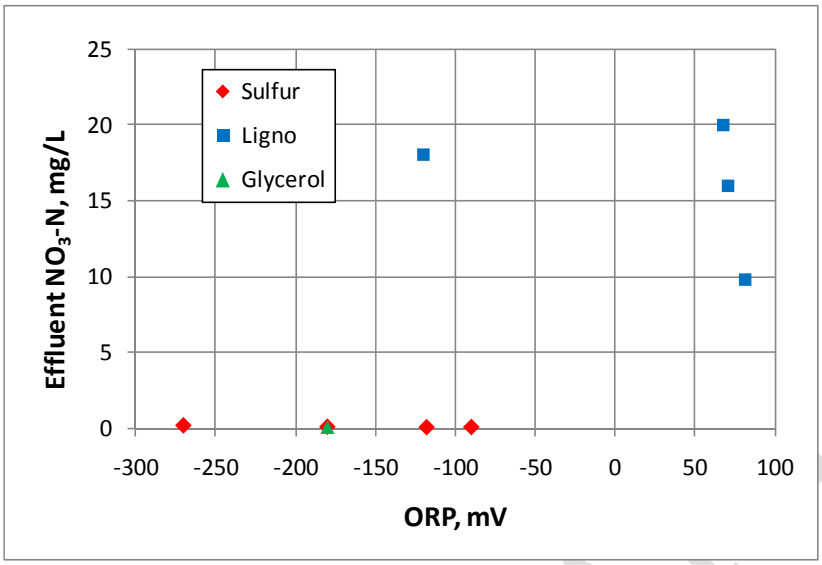

Figure 19
Denitrification Biofilters ORP versus Effluent NO_x-N

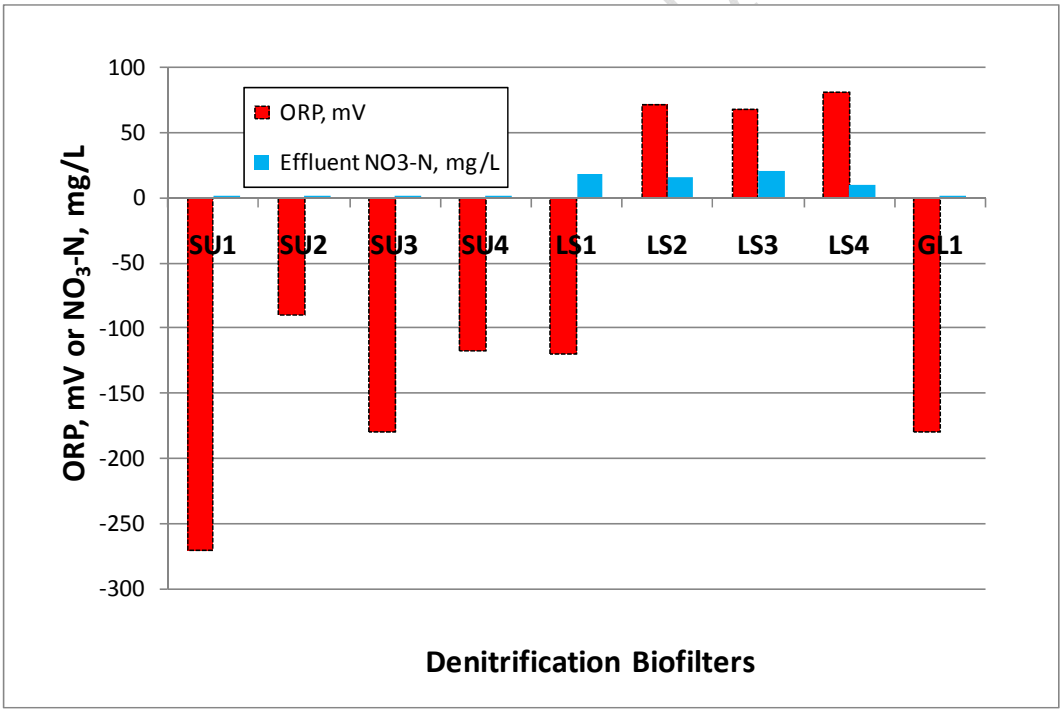

Figure 20
Denitrification Biofilters ORP versus Effluent NO_x-N

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 NH_3-N and 21 mg/L NO_x-N. While somewhat successfully denitrifying the relatively low influent NO_x-N, DENIT-LS4 effluent contained 15 mg/L NH_3-N. This result again confirms that NH_3-N will be readily transported through anoxic denitrification biofilters which at the same time achieve NO_x reduction and reaffirms the importance of efficiently nitrifying prior to denitrification.

Group 2 Stage 1 Recirculating Biofilters NH_3-N levels were at or below 0.7 mg/L for the four recirculating Stage 1 biofilters with clinoptilolite, expanded clay, and sand media, and effluent DO was 5.4 to 8.0 mg/L. Effluent NO_x-N ranged from 38 to 54 mg/L and organic N from 2.3 to 2.8 mg/L for these four recirculating Stage 1 biofilters. The nitrification performance of these biofilters was quite acceptable and TN reduction averaged 40%. The ammonia and DO concentrations in UNSAT-PS1 effluent were 21 mg/L and 7.8 mg/L, respectively, indicating incomplete nitrification. UNSAT-PS-1 also had significantly higher effluent NO_x and TKN of 70 mg/L and 28 mg/L respectively.

Group 3 Stage 2 Horizontal Biofilters Effluent NO_x-N was 0.14 mg/L and less in three of four Stage 2 horizontal biofilters. The low NO_x-N were accompanied by depressed DO and ORP of -90 to –180 mV. Thus, three of the horizontal biofilters were effective in producing a reducing environment and achieving their NO_x-N reduction goal. DENIT-SU2 exhibited the lowest effluent Total Nitrogen of all the PNRS II systems, with TN concentration less than 1 mg/L. DENIT-LS1 exhibited incomplete denitrification, with effluent NO_x-N of 18 mg/L.

Group 4 In-Situ Simulator Systems UNSAT-IS1 and UNSAT-IS2 exhibited low effluent NO_x-N of less than 0.2 mg/L. UNSAT-IS2 exhibited a TN concentration less than 1.3 mg/L. For UNSAT-IS1, the effluent NO_x-N was low but effluent NH_3-N was 50 mg/L indicating incomplete nitrification as seen in Sample Event 2. Since Sample Event 2, three inches of coarse sand was added to the top layer of sand within the biofilter to improve nitrification. In-situ simulator effluent SO_4 concentrations were 79 and 380 mg/L, for IS1 and IS2 respectively.

The new vertically stacked 6” diameter column media biofilters (UNSAT-IS3 and UNSAT-IS4) exhibited very low effluent volumes following Sample Event 3 flow measurements. Upon examination, leaks were witnessed from the sample petcock valves located above the bottom denitrification sulfur layer on both biofilters. The performance of these systems will be assessed after the next sampling event.

Table 3
Water Quality Analytical Results

Group (Figure 1)	Sample ID	Media Composition	Sample Date/Time	Sample Type	Temp (°C)	pH	Total Alkalinity (mg/L)	DO (mg/L)	ORP (mV)	Specific Conductance (µS)	TDS (mg/L)	TSS (mg/L)	$CBOD_5$ (mg/L)	COD (mg/L)	TN (mg/L N)[1]	TKN (mg/L N)	Organic N (mg/L N)[2]	NH_3-N (mg/L N)	NOx (mg/L N)	TIN (mg/L N)[3]	TP (mg/L)	Sulfide (mg/L)	H_2S (mg/L)	SO_4 (mg/L)	Fecal (Ct/100 mL)
	STE Sample																								
	PNRS II STE-Tank 1		11/10/10 13:50	G	25.1	7.2	430	2.4	-235.0	1,250	450	70	91	240	80.0	80	13.0	67	0.01	67.0		15	5.4	33	
	PNRS II STE-Tank 1-D		11/10/10 14:00	G	25.3	7.3	410	2.2	-230.0	1,250	470	64	100	240	85.1	85	11.0	74	0.11	74.1					
	Stage 1 Single Pass Biofilters Effluent																								
	UNSAT-EC1	15" Expanded Clay	11/10/10 16:00	G	20.6	6.9	180	7.1	108.0	1,150	770	1	2	10	66.8	4.8	3.5	1.3	62	63.3		1.0	0.01	61	
	UNSAT-EC3	30" Expanded Clay	11/10/10 15:30	G	21.5	6.8	220	6.8	105.0	1,250	850	1	2	10	85.9	4.9	2.5	2.4	81	83.4					
	UNSAT-CL1	15" Clinoptilolite	11/10/10 15:40	G	22.0	7.1	230	7.3	105.5	1,130	800	1	2	10	46.6	2.6	2.6	0.005	44	44.0		1.0	0.01	62	
	UNSAT-CL3	30" Clinoptilolite	11/10/10 15:50	G	22.0	7.4	290	7.6	100.5	1,280	820	2	2	29	82.7	2.7	2.7	0.005	80	80.0					
1	**Stage 2 Single Pass Upflow Biofilters Effluent**																								
	DENIT-SU4	10% Limestone; 30% Sulfur; 60% Expanded Clay	11/10/10 13:40	G	21.0	7.3	210	7.8	-118.0	1,510	1,100	6	2	13	0.9	0.89	0.8	0.10	0.02	0.1		1.0	0.09	560	
	DENIT-LS3	50% Lignocellulosic; 50% Sand	11/10/10 12:30	G	20.0	6.9	220	4.7	67.5	1,200	840	1	2	11	24.3	4.3	3.8	0.52	20	20.5					
	DENIT-SU3	80% Sulfur; 20% Oyster Shell	11/10/10 13:30	G	21.4	7.2	260	7.7	-180.0	1,480	1,000	2	3	26	1.9	1.8	1.3	0.55	0.05	0.6		2.4	0.85	450	
	DENIT-LS2	25% Lignocellulosic; 75% Expanded Clay	11/10/10 12:15	G	21.5	7.4	320	4.1	71.0	1,200	780	2	2	26	19.8	3.8	3.7	0.10	16	16.1					
	DENIT-LS4	30% Lignocellulosic; 70% Expanded Clay	11/10/10 12:05	G	20.0	7.3	200	3.8	81.0	900	480	2	2	20	30.8	21	6.0	15	9.8	24.8					
	Recirculation Tanks Effluent																								
	RC1		11/10/10 12:50	G	20.6	7.3	180	2.1	57.0	1,000	580	3	2	29	41.0	17	5.0	12	24	36.0					
	RC2		11/10/10 13:00	G	19.5	7.2	210	1.6	58.5	1,020	590	2	8	35	43.0	19	6.0	13	24	37.0					
	RC3		11/10/10 13:10	G	19.2	7.2	260	2.3	57.5	1,040	550	6	9	39	36.0	19	7.0	12	17	29.0					
	RC4		11/10/10 13:20	G	19.7	7.4	260	1.9	49.3	1,090	590	2	4	26	35.0	17	5.0	12	18	30.0					
	RC5		11/10/10 16:10	G	22.0	7.3	260	3.3	96.0	1,050	480	8	8	61	45.0	31	3.0	28	14	42.0					
2	**Stage 1 Recirculating Biofilters Effluent**																								
	UNSAT-CL4	30" Clinoptilolite	11/10/10 11:40	G	23.5	7.2	270	8.0	52.8	1,040	660	1	2	11	42.6	2.6	2.6	0.005	40	40.0				63	
	UNSAT-CL2	15" Clinoptilolite	11/10/10 11:30	G	23.1	7.0	200	5.4	50.2	1,000	630	2	2	24	56.3	2.3	2.3	0.005	54	54.0					
	UNSAT-EC4	30" Expanded Clay	11/10/10 11:20	G	22.2	6.9	140	7.3	46.5	980	660	2	2	10	52.3	2.3	2.3	0.005	50	50.0					
	UNSAT-SA2	30" Sand	11/10/10 11:10	G	22.5	6.9	120	7.7	47.5	930	610	13	2	22	41.5	3.5	2.8	0.74	38	38.7					
	UNSAT-PS1	30" Polystyrene	11/10/10 13:50	G	23.8	7.2	200	7.8	90.0	950	550	5	4	39	98.0	28	7.0	21	70	91.0					
	Pump 15 Tank (DENIT-LS4 Influent)		11/10/10 13:45	G	20.7	7.4	200	7.1	18.8	970	550	6	3	33	42.0	21	4.0	17	21	38.0					
	Denite Feed Tank (Tank 3)																								
	DFT		11/10/10 11:50	G	18.5	7.2	200	8.3	62.2	980	630	1	2	22	19.5	3.5	3.3	0.17	16	16.2		1.0	0.1	64	
	Stage 2 Horizontal Biofilters Effluent																								
3	DENIT-SU1	80% Sulfur; 20% Oyster Shell	11/10/10 10:15	G	28.0	6.9	230	1.6	-270.0	1,250	900	1	18	50	2.0	1.9	1.1	0.76	0.14	0.9		17	9.2	350	
	DENIT-SU2	10% Limestone; 30% Sulfur; 60% Expanded Clay	11/10/10 10:25	G	25.5	7.0	210	0.2	-90.0	1,350	1,000	8	2	18	0.8	0.74	0.7	0.033	0.03	0.1		1.0	0.01	490	
	DENIT-LS1	50% Lignocellulosic; 50% Expanded Clay	11/10/10 10:40	G	21.4	7.4	210	1.1	-120.0	970	540	1	2	18	20.7	2.7	2.7	0.005	18	18.0					
	DENIT-GL1	12" Gravel; 60" Expanded Clay	11/10/10 10:55	G	21.0	6.9	390	0.8	-180.0	900	540	4	3	22	2.0	1.9	1.0	0.88	0.07	1.0					
	In-situ Simulator Biofilters Effluent																								
	UNSAT-IS1 (STE)	12" Sand; 12" Mix (45% EC, 35% Ligno, 20% Sulfur)	11/10/10 10:00	G	20.5	6.8	390	1.9	-161.0	1,120	540	6	2	76	53.2	53	3.0	50	0.18	50.2		4.7	2.8	79	
	UNSAT-IS1 (STE)	12" Sand; 12" Mix (45% EC, 35% Ligno, 20% Sulfur)	11/12/10 6:45	G	17.0	7.1	370	2.0	221.6	1,168	530	2	2	76	75.0	75	6.0	69	0.04	69.0		4.3	1.8	83	
	UNSAT-IS2 (NO_3)	12" Sand; 12" Mix (45% EC, 35% Ligno, 20% Sulfur)	11/10/10 9:45	G	19.2	6.8	180	0.8	-130.0	1,300	820	19	2	20	1.3	1.2	0.4	0.80	0.05	0.9		1.0	0.01	380	
4	UNSAT-IS2 (NO_3)	12" Sand; 12" Mix (45% EC, 35% Ligno, 20% Sulfur)	11/12/10 6:45	G	17.1	6.5	170	0.8	-213.6	365	890	10	2	13	1.2	1.2	0.5	0.71	0.04	0.8		1.0	0.01	400	
	UNSAT-IS3 (STE)	12" Sand; 10" Mix (60% EC, 40% Ligno); 3" Sulfur)	11/15/10 8:30	G	18.7	6.7	280	0.4	158.3	1,505	2,300	4	3	46	34.4	6.4	0.2	6.2	28	34.2		1.0	0.01	290	
	UNSAT-IS4 (NO_3)	12" Sand; 10" Mix (60% EC, 40% Ligno); 3" Sulfur)	11/10/10 15:15	G											43.1	2.1	2.1	0.036	41	41.0				490	
	UNSAT-IS4 (NO_3)	12" Sand; 10" Mix (60% EC, 40% Ligno); 3" Sulfur)	11/15/10 8:45	G	18.3	7.48	280	9.0	152.8	0.01				35	12.8	1.8	1.7	0.086	11	11.1				440	
	Field Blank	Reagent Water	11/10/10 15:00		24.5	6.5	2	8.0	12.5	25	10	1	2	10	0.1	0.07	0.1	0.005	0.01	0.02					
	Equipment Blank	Reagent Water - Cleaned STE Bottle #2	11/10/10 14:10		23.0	6.7	2	8.5	-80.0	28	10	1	2	10	0.1	0.06	0.1	0.005	0.01	0.02					

Notes:

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

[2]Oreanic Nitrogen (ON) is a calculated value equal to the difference of TKN and NH_3

[3]Total Inorganic Nitrogen (TIN) is a calculated value equal to the sum of NH_3 and NO_x

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

D.O. - Dissolved oxygen

G - Grab sample

Gray-shaded data points indicate values below method detection level (mdl), mdl value used for statistical analyses.

Yellow-shaded data points indicate the reported value is between the laboratory method detection limit and the laboratory practical quantitation limit, value used for statistical analysis.

Orange - shaded data points indicate too many colonies were present. The numberic value represents the dilution factor times the maximum reportable number of colonies.

Purple-shaded data points indicate results based upon colony counts outside the method indicated ideal range.

Blue-shaded data points indicate matrix spike was outside typical range. All other QC criteria were acceptable.

Green-shaded data points indicate that sample was re-run by Southern Analytical Laboratories, Inc. The sample was held beyond the accepted holding time.

Table 4
Statistical Summary of Water Quality Data

Sample ID	Media Composition	Statistical Parameter	Temp (°C)	pH	Total Alkalinity (mg/L)	DO (mg/L)	ORP (mV)	Specific Conductance (µS)	TDS (mg/L)	TSS (mg/L)	$CBOD_5$ (mg/L)	COD (mg/L)	TN (mg/L N)[1]	TKN (mg/L N)	Organic N (mg/L N)[2]	NH3-N (mg/L N)	NOx (mg/L N)	TIN (mg/L N)[3]	TP (mg/L)	Sulfide (mg/L)	H_2S (mg/L)	SO_4 (mg/L)	Fecal (Ct/100 mL)
STE Sample																							
STE-Tank 1		n	9	9	7	6	5	9	7	9	9	5	7	9	7	7	7	6	3				4
		MEAN	26.4		323.4	0.8	-262.6	1029.8	381.0	34.5	67.0	236.2	55.7	57.7	8.2	47.5	0.04	43.1	7.0				
		STD. DEV.	1.4		92.2	1.2		227.2	76.0	25.4	33.6		24.8	22.0	5.3	23.0	0.03	21.7					
		MIN	24.9	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	0.01	20.0	6.6				80
		MAX	28.3	7.3	430.0	2.4	-230.0	1250.0	470.0	70.0	100.0	270.0	85.1	85.0	15.0	74.0	0.11	67.0	7.4				77000
Stage 1 Single Pass Biofilters Effluent																							
UNSAT-EC1	15" Expanded Clay	n	3	3	3	3	2	3	3	3	3	2	3	3	3	3	3	3	1	3	3	3	1
		MEAN	25.5		140.0	7.0	122.8	940.7	596.7	1.0	2.0	11.5	44.8	3.8	3.3	0.4	41.0	41.4	3.9	0.4	0.0	52.7	
		STD. DEV.	4.3		36.1	0.2		284.3	219.4	0.0	0.0		22.8	1.4	1.1	0.7	21.5	22.2		0.5	0.03	7.6	
		MIN	20.6	6.9	110.0	6.8	108.0	617.0	350.0	1.0	2.0	10.0	21.2	2.2	2.2	0.01	19.0	19.0	3.9	0.1	0.01	46.0	1.0
		MAX	28.6	7.3	180.0	7.1	137.5	1150.0	770.0	1.0	2.0	13.0	66.8	4.8	4.3	1.3	62.0	63.3	3.9	1.0	0.1	61.0	1.0
UNSAT-EC3	30" Expanded Clay	n	3	3	3	3	2	3	3	3	3	2	3	3	3	3	3	3	1				1
		MEAN	26.1		151.3	6.8	111.0	1031.7	666.7	1.3	2.0	13.0	50.8	3.5	2.7	0.8	47.3	48.1	3.9				
		STD. DEV.	4.1		68.0	0.1		283.0	229.0	0.6	0.0		32.7	1.4	0.6	1.4	31.3	32.6					
		MIN	21.5	6.8	84.0	6.7	105.0	712.0	410.0	1.0	2.0	10.0	21.2	2.2	2.2	0.01	19.0	19.0	3.9				1.0
		MAX	29.2	7.3	220.0	6.9	117.0	1250.0	850.0	2.0	2.0	16.0	85.9	4.9	3.3	2.4	81.0	83.4	3.9				1.0
UNSAT-CL1	15" Clinoptilolite	n	3	3	3	3	2	3	3	3	3	2	3	3	3	3	3	3	1	3	3	3	2
		MEAN	26.2		236.7	5.4	110.9	1086.0	673.3	3.0	2.0	15.0	36.0	2.7	2.7	0.008	33.3	33.3	8.0	0.5	0.03	49.0	
		STD. DEV.	3.8		11.5	1.9		210.5	177.9	3.5	0.0		13.6	0.1	0.1	0.003	13.6	13.6		0.5	0.04	12.5	
		MIN	22.0	7.1	230.0	3.5	105.5	857.0	470.0	1.0	2.0	10.0	20.7	2.6	2.6	0.005	18.0	18.0	8.0	0.1	0.01	37.0	10
		MAX	29.5	8.3	250.0	7.3	116.2	1271.0	800.0	7.0	2.0	20.0	46.6	2.8	2.8	0.010	44.0	44.0	8.0	1.0	0.08	62.0	12
UNSAT-CL3	30" Clinoptilolite	n	3	3	3	3	2	3	3	3	3	2	3	3	3	3	3	3	1				1
		MEAN	25.8		300.0	7.2	92.2	1214.0	740.0	1.3	2.0	24.5	48.5	3.2	3.2	0.008	45.3	45.3	6.8				
		STD. DEV.	3.4		36.1	0.4		214.7	165.2	0.6	0.0		30.8	0.7	0.7	0.003	31.1	31.1					
		MIN	22.0	7.4	270.0	6.9	83.8	974.0	550.0	1.0	2.0	20.0	22.8	2.7	2.7	0.005	20.0	20.0	6.8				3.0
		MAX	28.7	8.6	340.0	7.6	100.5	1388.0	850.0	2.0	2.0	29.0	82.7	4.0	4.0	0.010	80.0	80.0	6.8				3.0
UNSAT-PS1 (old)	30" Polystyrene	n	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	1				1
		MEAN	27.8		220.0	2.6	60.0	804.5	345.0	3.0	4.4	48.0	43.3	34.5	8.3	26.2	8.8	35.0	5.9				
		STD. DEV.	1.1		84.9	0.1		290.6	106.1	1.4	1.9		25.4	26.2	1.8	28.0	0.8	27.2					
		MIN	27.0	7.3	160.0	2.5	60.0	599.0	270.0	2.0	3.0	48.0	25.3	16.0	7.0	6.4	8.2	15.7	5.9				930
		MAX	28.6	7.6	280.0	2.7	60.0	1010.0	420.0	4.0	5.7	48.0	61.2	53.0	9.6	46.0	9.3	54.2	5.9				930
Stage 2 Single Pass Upflow Biofilters Effluent																							
DENIT-SU4 (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	1
		MEAN	27.6		145.0	0.2	-106.6	1162.0	755.0	1.0	3.0	22.0	1.1	1.0	0.8	0.2	0.1	0.3	3.2	1.0	0.3	405.0	
		STD. DEV.	-		7.1	0.1		329.5	275.8	0.0	1.3		0.4	0.4	0.2	0.1	0.1	0.2		1.2	0.4	205.1	
		MIN	27.1	6.6	140.0	0.1	-106.6	929.0	560.0	1.0	2.0	22.0	0.8	0.8	0.7	0.1	0.01	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	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	
		MEAN	21		210	7.8	-118	1510	1100	6	2	13	0.9	0.9	0.8	0.1	0.02	0.12		1	0.09	560	
		STD. DEV.																					
		MIN	21	7	210	7.8	-118	1510	1100	6	2	13	0.9	0.9	0.8	0.1	0.02	0.12		1	0.09	560	
		MAX	21	7	210	7.8	-118	1510	1100	6	2	13	0.9	0.9	0.8	0.1	0.02	0.12		1	0.09	560	
DENIT-LS3	50% Lignocellulosic; 50% Sand	n	3	3	3	3	2	3	3	3	3	2	3	3	3	3	3	3	1				1
		MEAN	25.3		213.3	2.0	23.3	1003.0	630.0	1.3	5.3	20.0	20.2	3.2	2.6	0.5	17.0	17.5	3.3				
		STD. DEV.	4.6		11.5	2.4		270.2	239.0	0.6	5.8		16.5	1.2	1.4	0.4	15.7	15.3					
		MIN	20.0	6.9	200.0	0.1	-21.0	695.0	370.0	1.0	2.0	11.0	2.0	2.0	1.1	0.2	0.01	1.0	3.3				1.0
		MAX	28.1	7.7	220.0	4.7	67.5	1200.0	840.0	2.0	12.0	29.0	34.2	4.3	3.8	1.0	31.0	31.2	3.3				1.0
DENIT-SU3	80% Sulfur; 20% Oyster Shell	n	3	3	3	3	2	3	3	3	3	2	3	3	3	3	3	3	1	3	3	3	1
		MEAN	25.8		233.3	2.6	-229.8	1464.0	936.7	6.3	6.0	32.5	2.2	2.2	1.6	0.6	0.0	0.6	6.2	4.7	2.4	446.7	
		STD. DEV.	-		55.1	4.4		199.5	202.6	8.4	6.1		0.5	0.5	0.6	0.2	0.0	0.2		2.3	1.9	105.0	
		MIN	21.4	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	0.5	6.2	2.4	0.9	340.0	1.0
		MAX	28.4	7.2	270.0	7.7	-180.0	1655.0	1100.0	16.0	13.0	39.0	2.7	2.7	2.2	0.8	0.1	0.8	6.2	7.0	4.5	550.0	1.0
DENIT-LS2 (old)	50% Lignocellulosic; 50% Expanded Clay	n	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	1				1
		MEAN	27.3		375.0	2.1	-11.5	1223.0	680.0	5.0	3.8	24.0	17.5	2.3	2.0	0.3	15.2	15.5	5.7				
		STD. DEV.	0.1		7.1	2.8		318.2	240.4	5.7	2.5		20.7	1.2	1.2	0.0	19.5	19.6					
		MIN	27.2	7.8	370.0	0.1	-11.5	998.0	510.0	1.0	2.0	24.0	2.8	1.4	1.2	0.2	1.4	1.6	5.7				1.0
		MAX	27.3	8.1	380.0	4.1	-11.5	1448.0	850.0	9.0	5.5	24.0	32.1	3.1	2.8	0.3	29.0	29.3	5.7				1.0
DENIT-LS2 (new)	25% Lignocellulosic; 75% Expanded Clay	n	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
		MEAN	22		320	4.1	71	1200	780	2	2	26	20	4	4	0.1	16	16					
		STD. DEV.																					
		MIN	22	7	320	4.1	71	1200	780	2	2	26	20	4	4	0.1	16	16					
		MAX	22	7	320	4.1	71	1200	780	2	2	26	20	4	4	0.1	16	16					
DENIT-LS4	30% Lignocellulosic; 70% Expanded Clay	n	3	3	4	3	2	3	4	4	4	2	3	3	3	3	3	3	1				1
		MEAN	25.1		272.5	1.6	18.7	879.3	400.0	1.3	3.8	27.5	37.3	34.0	16.1	17.9	3.3	21.3	6.9				
		STD. DEV.	4.4		95.7	1.9		251.6	90.6	0.5	3.6		27.2	28.8	15.6	13.8	5.6	14.0					
		MIN	20.0	7.3	180.0	0.4	-43.7	618.0	270.0	1.0	2.0	20.0	14.0	14.0	6.0	5.8	0.01	5.8	6.9				12.0
		MAX	28.1	7.6	360.0	3.8	81.0	1120.0	480.0	2.0	9.1	35.0	67.2	67.0	34.0	33.0	9.8	33.2	6.9				12.0

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

Sample ID	Media Composition	Statistical Parameter	Temp (°C)	pH	Total Alkalinity (mg/L)	DO (mg/L)	ORP (mV)	Specific Conductance (µS)	TDS (mg/L)	TSS (mg/L)	$CBOD_5$ (mg/L)	COD (mg/L)	TN (mg/L N)[1]	TKN (mg/L N)	Organic N (mg/L N)[2]	NH3-N (mg/L N)	NOx (mg/L N)	TIN (mg/L N)[3]	TP (mg/L)	Sulfide (mg/L)	H_2S (mg/L)	SO_4 (mg/L)	Fecal (Ct/100 mL)
Recirculation Tanks Effluent																							
RC1		n	3	3	3	2	2	3	3	3	3	2	3	3	3	3	3	3	1				1
		MEAN	27.1		183.3	1.1	-35.7	882.7	486.7	3.0	3.6	25.5	40.3	16.3	6.1	10.2	24.0	34.2	5.8				
		STD. DEV.	5.7		25.2			212.8	136.5	2.0	2.1		13.0	1.2	2.8	4.0	12.0	15.7					
		MIN	20.6	7.3	160.0	0.03	-128.3	637.0	330.0	1.0	2.0	22.0	27.0	15.0	4.0	5.7	12.0	17.7	5.8				114.0
		MAX	30.8	7.3	210.0	2.1	57.0	1011.0	580.0	5.0	6.0	29.0	53.0	17.0	9.3	13.0	36.0	49.0	5.8				114.0
RC2		n	3	3	3	2	2	3	3	3	3	2	3	3	3	3	3	3	1				1
		MEAN	26.7		176.7	0.9	-24.9	910.0	496.7	2.0	4.0	29.5	36.7	17.0	5.9	11.1	19.7	30.8	4.2				
		STD. DEV.	6.3		35.1			200.1	136.5	1.0	3.5		8.5	2.0	3.9	5.1	6.7	11.7					
		MIN	19.5	7.2	140.0	0.1	-108.2	679.0	340.0	1.0	2.0	24.0	27.0	15.0	2.0	5.3	12.0	17.3	4.2				99.0
		MAX	30.5	7.3	210.0	1.6	58.5	1031.0	590.0	3.0	8.0	35.0	43.0	19.0	9.7	15.0	24.0	38.0	4.2				99.0
RC3		n	3	3	3	2	2	3	3	3	3	2	3	3	3	3	3	3	1				1
		MEAN	26.2		206.7	1.2	73.3	976.0	500.0	4.3	4.8	50.0	36.0	15.7	6.9	8.7	20.3	29.1	6.4				
		STD. DEV.	6.1		50.3			192.2	122.9	2.9	3.7		9.0	3.5	3.6	3.3	11.4	12.6					
		MIN	19.2	7.2	160.0	0.1	57.5	760.0	360.0	1.0	2.0	39.0	27.0	12.0	3.3	5.5	11.0	16.5	6.4				109.0
		MAX	30.2	7.6	260.0	2.3	89.0	1128.0	590.0	6.0	9.0	61.0	45.0	19.0	10.5	12.0	33.0	41.7	6.4				109.0
RC4		n	3	3	3	2	2	3	3	3	3	2	3	3	3	3	3	3	1				1
		MEAN	26.3		220.0	1.0	61.2	1004.3	536.7	11.7	3.2	27.5	33.3	14.7	6.0	8.6	18.7	27.3	6.7				
		STD. DEV.	5.8		40.0			167.8	119.3	9.5	0.7		5.7	3.2	4.1	3.3	8.0	9.7					
		MIN	19.7	7.4	180.0	0.0	49.3	811.0	400.0	2.0	2.7	26.0	27.0	11.0	2.6	5.5	11.0	16.5	6.7				112.0
		MAX	30.4	7.8	260.0	1.9	73.0	1112.0	620.0	21.0	4.0	29.0	38.0	17.0	10.5	12.0	27.0	35.4	6.7				112.0
RC5		n	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
		MEAN	22.0		260.0	3.3	96.0	1050.0	480.0	8.0	8.0	61.0	45.0	31.0	3.0	28.0	14.0	42.0					
		STD. DEV.																					
		MIN	22.0	7.3	260.0	3.3	96.0	1050.0	480.0	8.0	8.0	61.0	45.0	31.0	3.0	28.0	14.0	42.0					
		MAX	22.0	7.3	260.0	3.3	96.0	1050.0	480.0	8.0	8.0	61.0	45.0	31.0	3.0	28.0	14.0	42.0					
Stage 1 Recirculating Biofilters Effluent																							
UNSAT-CL4	30" Clinoptilolite	n	3	3	3	3	2	3	3	3	3	2	3	3	3	3	3	3	1				1
		MEAN	26.8		220.0	7.5	44.2	1024.7	606.7	3.3	2.0	12.0	32.7	2.4	2.4	0.01	30.3	30.3	7.6				
		STD. DEV.	3.0		50.0	0.5		157.6	110.2	4.0	0.0		19.4	0.3	0.3	0.01	19.5	19.4					
		MIN	23.5	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	7.9	7.9	7.6				1.0
		MAX	29.3	7.8	270.0	8.0	52.8	1174.0	680.0	8.0	2.0	13.0	45.1	2.6	2.6	0.02	43.0	43.0	7.6				1.0
UNSAT-CL2	15" Clinoptilolite	n	3	3	3	3	2	3	3	3	3	2	3	3	3	3	3	3	1				1
		MEAN	25.7		173.3	6.2	40.2	943.7	573.3	2.0	2.0	23.0	39.5	2.5	2.5	0.008	37.0	37.0	7.1				
		STD. DEV.	2.2		46.2	0.7		143.1	115.9	1.0	0.0		20.2	0.5	0.5	0.003	20.0	20.0					
		MIN	23.1	7.0	120.0	5.4	30.2	781.0	440.0	1.0	2.0	22.0	17.1	2.1	2.1	0.005	15.0	15.0	7.1				4.0
		MAX	27.1	7.9	200.0	6.7	50.2	1050.0	650.0	3.0	2.0	24.0	56.3	3.1	3.1	0.010	54.0	54.0	7.1				4.0
UNSAT-EC4	30" Expanded Clay	n	3	3	3	3	2	3	3	3	3	2	3	3	3	3	3	3	1				1
		MEAN	26.0		143.3	7.1	62.7	880.3	550.0	1.3	2.0	11.5	37.4	2.4	2.4	0.01	35.0	35.0	3.8				
		STD. DEV.	3.4		15.3	0.2		190.2	173.5	0.6	0.0		17.0	0.5	0.5	0.00	16.7	16.7					
		MIN	22.2	6.9	130.0	6.9	46.5	661.0	350.0	1.0	2.0	10.0	18.9	1.9	1.9	0.01	17.0	17.0	3.8				1.0
		MAX	28.5	7.3	160.0	7.3	78.8	1000.0	660.0	2.0	2.0	13.0	52.3	2.9	2.9	0.01	50.0	50.0	3.8				1.0
UNSAT-SA2	30" Sand	n	3	3	3	3	2	3	3	3	3	2	3	3	3	3	3	3	1				1
		MEAN	25.8		113.3	7.0	68.4	829.0	526.0	5.0	2.0	17.5	33.3	3.0	2.7	0.3	30.3	30.6	6.3				
		STD. DEV.	3.0		5.8	0.7		195.2	170.3	6.9	0.0		12.3	0.7	0.6	0.4	11.6	11.8					
		MIN	22.5	6.0	110.0	6.3	47.5	604.0	330.0	1.0	2.0	13.0	19.2	2.2	2.2	0.01	17.0	17.0	6.3				1.0
		MAX	28.2	6.9	120.0	7.7	89.2	953.0	638.0	13.0	2.0	22.0	41.5	3.5	3.3	0.7	38.0	38.7	6.3				1.0
UNSAT-PS1 (new recirc)	30" Polystyrene	n	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
		MEAN	24		200	7.8	90	950	550	5	4	39	98	28	7	21	70	91					
		STD. DEV.																					
		MIN	24	7	200	7.8	90	950	550	5	4	39	98	28	7	21	70	91					
		MAX	24	7	200	7.8	90	950	550	5	4	39	98	28	7	21	70	91					
Pump 15 Tank (DENIT-LS4 Influent)		n	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
		MEAN	21		200	7.1	19	970	550	6	3	33	42	21	4	17	21	38					
		STD. DEV.																					
		MIN	21	7	200	7.1	19	970	550	6	3	33	42	21	4	17	21	38					
		MAX	21	7	200	7.1	19	970	550	6	3	33	42	21	4	17	21	38					

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

Sample ID	Media Composition	Statistical Parameter	Temp (°C)	pH	Total Alkalinity (mg/L)	DO (mg/L)	ORP (mV)	Specific Conductance (µS)	TDS (mg/L)	TSS (mg/L)	$CBOD_5$ (mg/L)	COD (mg/L)	TN (mg/L N)[1]	TKN (mg/L N)	Organic N (mg/L N)[2]	NH3-N (mg/L N)	NOx (mg/L N)	TIN (mg/L N)[3]	TP (mg/L)	Sulfide (mg/L)	H_2S (mg/L)	SO_4 (mg/L)	Fecal (Ct/100 mL)
Denite Feed Tank (Tank 3)																							
DFT		n	3	3	3	3	2	3	3	3	3	2	3	3	3	3	3	3	1	3	3	3	1
		MEAN	24.5		163.3	7.7	43.9	914.7	560.0	1.0	2.0	20.0	27.8	3.2	3.1	0.1	24.7	24.7	6.5	0.4	0.0	54.0	
		STD. DEV.	5.2		35.1	0.5		149.1	148.0	0.0	0.0		13.0	0.4	0.3	0.1	13.3	13.3		0.5	0.1	9.2	
		MIN	18.5	7.2	130.0	7.3	25.5	744.0	390.0	1.0	2.0	18.0	19.5	2.8	2.8	0.01	16.0	16.2	6.5	0.1	0.01	46.0	1.0
		MAX	28.1	8.1	200.0	8.3	62.2	1020.0	660.0	1.0	2.0	22.0	42.8	3.5	3.3	0.2	40.0	40.0	6.5	1.0	0.1	64.0	1.0
Stage 2 Horizontal Biofilters Effluent																							
DENIT-SU1	80% Sulfur; 20% Oyster Shell	n	3	3	3	3	2	3	3	3	3	2	3	3	3	3	3	3	1	3	3	3	1
		MEAN	26.9		223.3	0.7	-293.6	1305.0	853.3	1.0	22.7	56.5	2.4	2.3	0.8	1.6	0.1	1.6	5.0	23.7	10.7	343.3	
		STD. DEV.	1.6		20.8	0.8		148.4	174.7	0.0	4.2		0.4	0.4	0.4	0.8	0.1	0.8		6.1	1.4	110.2	
		MIN	25.1	6.9	200.0	0.1	-317.2	1192.0	660.0	1.0	18.0	50.0	2.0	1.9	0.3	0.8	0.01	0.9	5.0	17.0	9.2	230.0	3.0
		MAX	28.0	7.2	240.0	1.6	-270.0	1473.0	1000.0	1.0	26.0	63.0	2.7	2.7	1.1	2.4	0.1	2.4	5.0	29.0	12.0	450.0	3.0
DENIT-SU2 (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	1
		MEAN	26.4		235.0	0.9	-279.0	1400.0	810.0	1.5	12.5	50.0	4.1	1.5	1.0	0.5	2.6	3.1	4.8	7.1	3.4	305.0	
		STD. DEV.	2.2		35.4	0.5		2.8	169.7	0.7	10.7		3.2	0.4	0.2	0.6	3.7	3.0		9.8	4.7	233.3	
		MIN	24.8	7.0	210.0	0.5	-279.0	1398.0	690.0	1.0	4.9	50.0	1.8	1.2	0.9	0.01	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	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	
		MEAN	26		210	0.2	-90	1350	1000	8	2	18	1	1	1	0.03	0.03	0.06		1	0.01	490	
		STD. DEV.																					
		MIN	26	7	210	0.2	-90	1350	1000	8	2.0	18	1	1	1	0.03	0.03	0.06		1	0.01	490	
		MAX	26	7	210	0.2	-90	1350	1000	8	2.0	18	1	1	1	0.03	0.03	0.06		1	0.01	490	
DENIT-LS1	50% Lignocellulosic; 50% Expanded Clay	n	3	3	3	3	2	3	3	3	3	2	3	3	3	3	3	3	1				1
		MEAN	24.6		236.7	0.6	-159.9	890.0	480.0	1.0	20.6	31.0	8.0	2.0	1.5	0.5	6.0	6.5	0.5				
		STD. DEV.	3.0		23.1	0.5		131.7	95.4	0.0	30.6		11.0	0.6	1.0	0.4	10.4	10.0					
		MIN	21.4	7.4	210.0	0.2	-199.7	738.0	370.0	1.0	2.0	18.0	1.5	1.5	0.7	0.005	0.01	0.7	0.5				1.0
		MAX	27.3	7.7	250.0	1.1	-120.0	970.0	540.0	1.0	56.0	44.0	20.7	2.7	2.7	0.8	18.0	18.0	0.5				1.0
DENIT-GL1	12" Gravel; 60" Expanded Clay	n	3	3	3	3	2	3	3	3	3	3	3	3	3	3	4	3	1				1
		MEAN	24.7		423.3	0.8	-177.5	1126.7	706.7	35.0	284.0	400.0	24.9	23.3	13.0	10.3	1.2	11.9	2.9				
		STD. DEV.	3.4		221.9	0.8		487.3	434.7	56.3	455.9		35.8	37.0	20.8	16.2	2.3	15.1					
		MIN	21.0	6.4	220.0	0.0	-180.0	794.0	380.0	1.0	3.0	22.0	2.0	1.9	0.9	0.9	0.0	1.0	2.9				800.0
		MAX	27.8	8.0	660.0	1.5	-174.9	1686.0	1200.0	100.0	810.0	1100.0	66.1	66.0	37.0	29.0	4.7	29.1	2.9				800.0
In-situ Simulator Biofilters Effluent																							
UNSAT-IS1 (STE)	12" Sand; 12" Mix (45% EC, 35% Ligno, 20% Sulfur)	n	5	5	5	5	4	5	5	5	5	3	5	5	5	5	5	5	2	5	5	5	2
		MEAN	24.7		282.0	0.9	-57.0	1430.2	844.0	27.2	6.6	69.7	31.8	31.7	2.1	29.6	0.1	29.7	1.5	2.1	1.2	364.4	
		STD. DEV.	-		104.5	1.0	203.7	564.7	439.4	48.1	4.7		31.3	31.3	2.5	29.0	0.1	29.0	0.4	2.2	1.1	423.3	
		MIN	17.0	6.4	130.0	0.1	-246.2	1120.0	530.0	2.0	2.0	57.0	0.4	0.4	0.0	0.045	0.022	0.1	1.2	0.1	0.01	79.0	1.0
		MAX	29.7	7.1	390.0	2.0	221.6	2438.0	1600.0	113.0	13.0	76.0	75.0	75.0	6.0	69.0	0.2	69.0	1.7	4.7	2.8	1100.0	1.0
UNSAT-IS2 (NO_3)	12" Sand; 12" Mix (45% EC, 35% Ligno, 20% Sulfur)	n	5	5	5	5	4	5	5	5	5	3	5	5	5	5	5	5	2	5	5	5	2
		MEAN	24.4		172.0	0.5	-182.4	1633.8	1272.0	57.8	5.4	27.7	1.1	1.0	0.6	0.4	0.03	0.4	4.3	0.6	0.1	680.0	
		STD. DEV.	5.9		43.2	0.3	39.3	1147.5	970.4	43.3	5.0		0.4	0.4	0.4	0.3	0.02	0.3	3.9	0.5	0.3	627.7	
		MIN	17.1	6.1	100.0	0.1	-213.6	365.0	700.0	10.0	2.0	13.0	0.6	0.6	0.4	0.1	0.01	0.1	1.5	0.1	0.01	350.0	1.0
		MAX	30.0	6.8	210.0	0.8	-130.0	3506.0	3000.0	108.0	13.0	50.0	1.5	1.5	1.2	0.8	0.05	0.9	7.0	1.0	0.6	1800.0	1.0
UNSAT-IS3 (STE)	12" Sand; 10" Mix (60% EC, 40% Ligno); 3" Sulfur)	n	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	
		MEAN	19		280	0.4	158	1505	2300	4	3	46	34	6	0	6	28	34		1	0.01	290	
		STD. DEV.																					
		MIN	19	7	280	0.4	158	1505	2300	4	3	46	34	6	0	6	28	34		1	0.01	290	
		MAX	19	7	280	0.4	158	1505	2300	4	3	46	34	6	0	6	28	34		1	0.01	290	
UNSAT-IS4 (NO_3)	12" Sand; 10" Mix (60% EC, 40% Ligno); 3" Sulfur)	n	1	1	1	1	1	1				1	2	2	2	2	2	2				2	
		MEAN	18		280	9	153	0.01				35	28	2	2	0.06	26	26				465	
		STD. DEV.											21				21	21				35	
		MIN	18	7	280	9	153	0.01				35	13	2	2	0.04	11	11				440	
		MAX	18	7	280	9	153	0.01				35	43	2	2	0.09	41	41				490	

Notes:

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

[2]Organic Nitrogen (ON) is a calculated value equal to the difference of TKN and NH_3

[3]Total Inorganic Nitrogen (TIN) is a calculated value equal to the sum of NH_3 and NO_x

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

DO - Dissolved oxygen

Gray-shaded data points indicate values below method detection level (mdl), mdl value used for statistical analyses.

Yellow-shaded data points indicate the reported value is between the laboratory method detection limit and the laboratory practical quantitation limit, value used for statistical analysis.

Orange - shaded data points indic

Blue-shaded data points indicate the number is greater than reported value.

Purple-shaded data points indicate results based on colony counts outside the method indicated ideal range.

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 November 19, 2010. These flow measurements are considered to represent those in effect leading up to and during the Sample Event 3. 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 -36.2% of the target volume. Measured effluent volumes for Stage 1 single pass biofilters (Stage 2 influent) were within 13% of the target volume for four of the five systems (Appendix C, Table 1). The DENIT-LS4 measured influent volume was substantially less than the target volume. The low measured flow to the DENIT-LS4 (RE = -27.1%) is associated with the low influent volume of the directly connected UNSAT-PS1 biofilter.

For the Group 2 systems, all measured STE volumes to the Stage 1 recirculation tanks were within 9% of target volumes. All recycle flow volumes as recorded by the PLC were within 6% 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 5% 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 5% of target.

For Group 4 biofilters, the measured influent volumes were within 10% of target volumes for three of the four in-situ simulators. The measured influent volume of UNSAT-IS 1 was -26.9% of the target volume. The system tubing was replaced and recalibrated December 3rd; the influent volume to UNSAT-IS1 and UNSAT-IS2 was then measured to be within 8% of target.

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

- Peristaltic Pump 10 pump tubing was calibrated November 19th
- Peristaltic Pump 5 pump and system tubing was replaced and calibrated December 3rd

- Pump 4 (which feeds Hydrosplitter 1) runtime was modified December 8th from 31 seconds to 44 seconds
- Hydrosplitter 1 petcock valves were adjusted December 8th 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

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 December 8th which will continue to be monitored. After replacing and calibrating the Pump 5 pump and system tubing on December 3rd, the influent doses to UNSAT-IS1 and UNSAT-IS2 were closer to the target volume. After calibrating the Pump 10 pump tubing on November 19th, the influent doses to UNSAT-IS3 and UNSAT-IS4 were equal to the target volume.

5.0 PNRS II Sample Event No. 3: Summary and Recommendations

5.1 Summary

The results of the third 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. 3 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 NH_3-N of 2.4 mg/L or less;
- Five out of nine Stage 2 saturated biofilters produced effluent NO_x-N of 0.14 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 3 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) 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. Visual observations of the media surface during the single pass system configuration suggested that the STE application system resulted in somewhat better distribution than previously due to the higher application rates with recycle. However, there is still room for improvement in this regard.

Therefore, it is recommended to increase the recycle rate due to the characteristics of the polystyrene media and the polystyrene based treatment process which appears to function better with high recycle rates. The results of Sample Event 3 indicate that the polystyrene media performance is greatly improved as a recycle versus single pass system, however significant effluent NH_3-N remained, so its potential utility in enhanced nitrogen reduction systems depends on further improving ammonia removal. Therefore it is recommended that the Pump 15 runtime is increased so that the recycle ratio is increased to 6:1 from the current 3:1 ratio.

5.2.2 Additional Monitoring UNSAT-IS3 and UNSAT-IS4

Visual observation of both UNSAT-IS3 and UNSAT-IS4 indicated that the sampling valve in the gravel layer located below the lignocellulosic/expanded clay media and above the sulfur media was leaking immediately prior to Sample Event 3. The IS3 and IS4 results indicate that the system may have been compromised by the leak. Additionally, Sample Event 3 was conducted only three weeks after start-up of these columns, and biological activity may not have been fully mature at the time of sampling. It is recommended that

an intermediate monitoring of IS3 and IS4 nitrogen species to delineate inorganic N performance is conducted as this is a critical path for in-situ mound construction.

5.2.3 Profiling of Denitrification Biofilters

As discussed within Section 4.2, the denitrification biofilters (Stage 2) effluent water quality provided puzzling results. It is recommended to gain additional insight into the operation of the denitrification biofilters by taking profile samples for NO_x-N, DO, ORP, COD and for the biofilters containing sulfur media, SO_4 and H_2S as well.

5.2.4 Lignocellulosic Denitrification Biofilters (DENIT-LS1, DENIT-LS2, DENIT-LS3, and DENIT-LS4)

The three upflow and one horizontal denitrification biofilters with lignocellulosic media showed limited NO_x reduction in Sample Event 3. As previously discussed in Section 4.2, ORP measurements indicate that the lignocellulosic systems are not driving the ORP into the reducing realms in which denitrification is fostered. Possible reasons are lack of reactivity of lignocellulosic material, short circuiting as witnessed in the dye test, or toxicity (release of toxic material from lignocellulosic material itself). A few possible options are recommended to be considered. To evaluate alternative lignocellulosic media material, small diameter columns can be constructed incorporating an alternative lignocellulosic media. In addition, the lignocellulosic biofilter effluent can be tested for toxicity screening using Microtox to evaluate the condition of the currently used lignocellulosic media.

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

The characteristics of GCREC septic tank effluent in Sample Event 3 were 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.

Appendix A: Operation & Maintenance Log

Table A.1
Operation and Maintenance Log

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

Date	Description
7/20/2010	IS 2 changed discharge (rotated 180°) now 15 inches of saturation from bottom of tank
7/26/2010	Removed PS1 capillary mat from inside mesh bag, replaced with new mat on top of bag
	Glycerol batch #4 (70 mL glycerol; 1930 mL DI water), feed rate ~ 10 mL/dose
8/3/2010	Glycerol batch #5 (70 mL glycerol; 1930 mL DI water), feed rate ~ 10 mL/dose
8/4/2010	Cleaned crosses in Stage 1 Recirculating Biofilters
	Added tees to outlet of RC1 and RC4 tanks to alleviate blockage build-up
	Replaced Hydrosplitter 1 & 2 tubing
	Replaced Stage 2 horizontal tubing from Pump 11
	Cleaned Stage 2 horizontal sample ports
	Lowered Pump 1 Low Float 2 wraps to decrease volume in tank(decrease residence time)
8/10/2010	Glycerol batch #6 (70 mL glycerol; 1930 mL DI water), feed rate ~ 10 mL/dose
	Raised Pump 1 Low Float 1 wrap because float down was below the hole
8/12/2010	Revised tubing connection at top of In-Situ simulator tanks to elbow
8/17/2010	Glycerol batch #7 (70 mL glycerol; 1930 mL DI water), feed rate ~ 10 mL/dose
	Added tees to outlet in RC2 and RC3 tanks as well
	Revised RC tanks discharge piping to flexible hose
8/19/2010	Pump 5 and 11 Error Code 18, cleared alarm and restarted pumps
8/23/2010	Possible leak detected at Recirc Tank #2 for P7
8/27/2010	Glycerol batch #8 (70 mL glycerol; 1930 mL DI water), feed rate ~ 10 mL/dose
9/1/2010	Replaced elbow for Recirc Tank #2 (STE tubing) to fix leak
9/7/2010	Glycerol batch #9 (70 mL glycerol; 1930 DI water), feed rate ~ 10 mL/dose
	Removed PS1 capillary mat
9/9/2010	Replaced Pump 5 pump tubing
9/10/2010	Cut the LS4 inlet pipe and used a drain snake to unclog both elbows
9/13/2010	Glycerol batch #10 (70 mL glycerol; 1980 DI water), feed rate ~ 10 mL/dose
9/17/2010	Modified Pump 7 runtime to 15 seconds per dose
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 capability
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
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

Date	Description
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(to decrease residence time)
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(to decrease residence time)
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
11/11/2010	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
11/24/2010	Glycerol batch #21 (13.5 mL glycerol; 1973 DI water), feed rate ~ 10 mL/dose
11/29/2010	Glycerol batch #21 (13.5 mL glycerol; 1973 DI water), feed rate ~ 10 mL/dose
	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

Date	Description
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

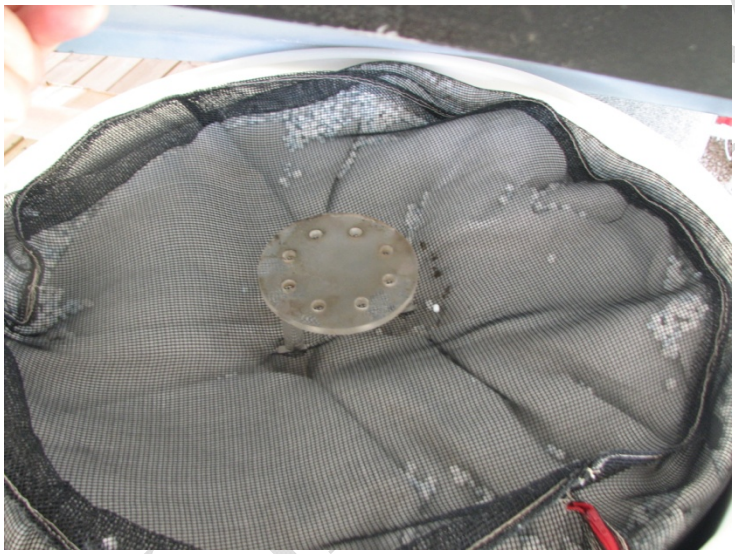

Figure A.1
Capillary Mat Installed above Polystyrene Media

Figure A.2
Revised In-situ Simulators Discharge Piping

Figure A.3
RC1 Outlet Tee

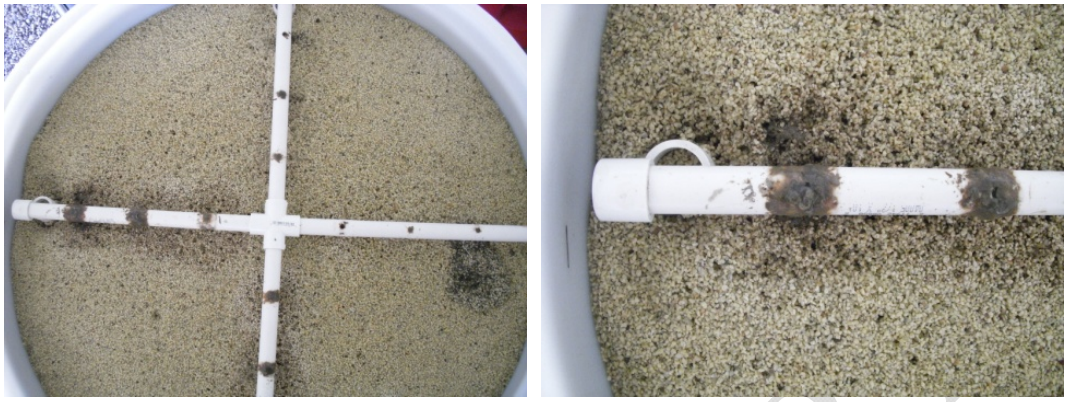

Figure A.4
UNSAT-CL4 before Cleaning

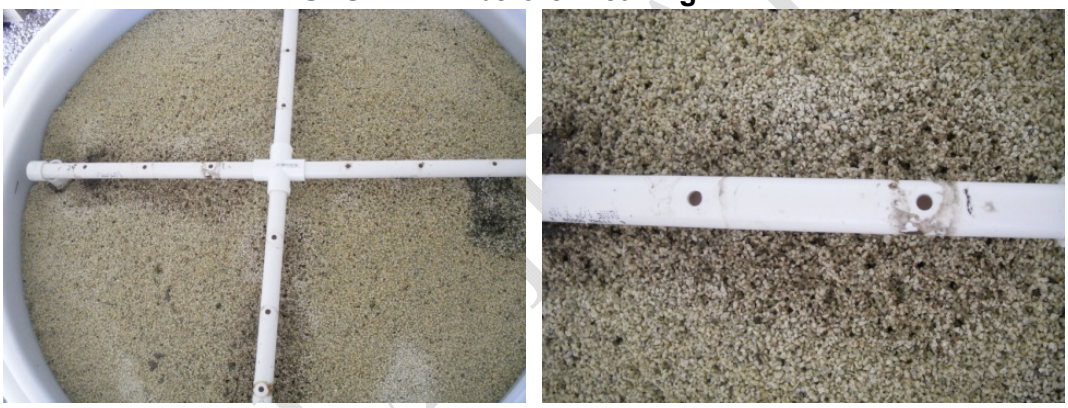

Figure A.5
UNSAT-CL4 after Cleaning

Figure A.6
Outlet Tee in Recirculation Tank

Figure A.7
Unclogging UNSAT-LS4 Influent Pipe

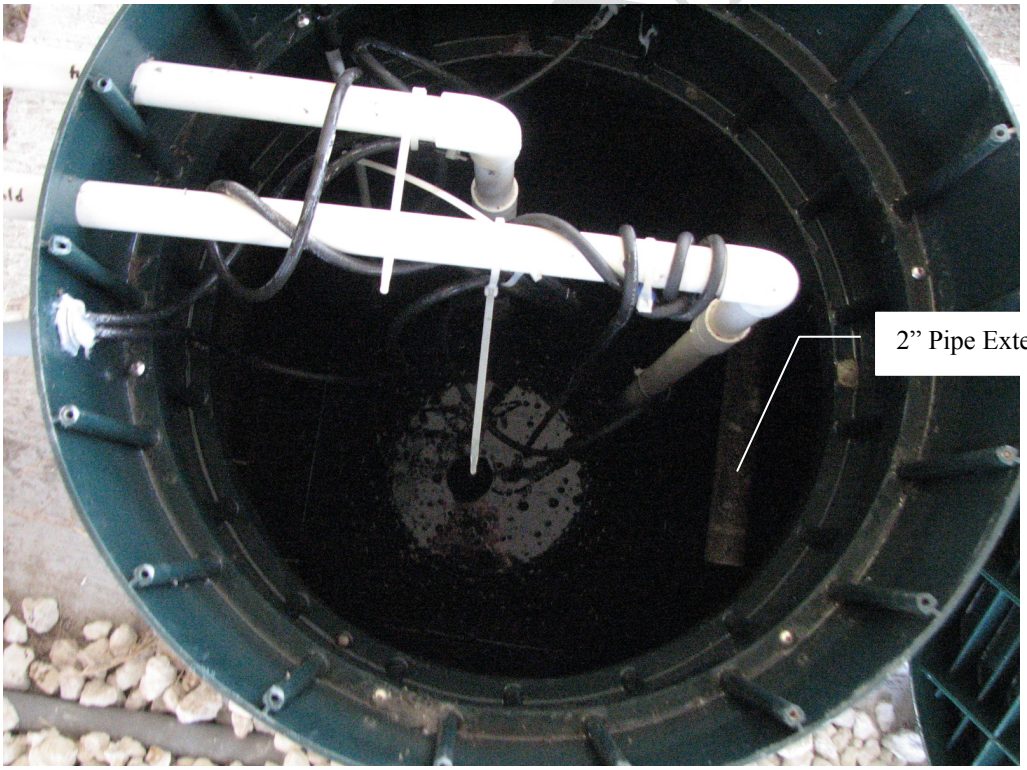

Figure A.8
2” Pipe Extension into PNRS II Tank 1 Pump Chamber

Figure A.9
UNSAT-IS3 and UNSAT-IS4 Columns

Appendix B: PLC Data Tables

Table B.1
Summary of PLC Recorded Daily Flows
(9/1/10 – 11/9/10)

	Average Recorded Flow (gpd)	Std. Dev.	MIN (gpd)	MAX (gpd)	Target Flow (gpd)	Relative Error[1] (%)
Pump 4 to Hydro 1	70	2.52	65	76	73.7	-4.8%
Pump 14 to Hydro 2	62	1.38	59	68	58.9	4.6%
Pump 6 to Recirc. System 1	44	0.97	43	51	44.2	0.2%
Pump 7 to Recirc. System 2	45	1.65	43	52	44.2	2.5%
Pump 8 to Recirc. System 3	44	0.46	43	45	44.2	-0.4%
Pump 9 to Recirc. System 4	44	0.64	42	45	44.2	-0.5%
Pump 15 to Recirc. System 5	42	0.60	41	43	44.2	-5.4%

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

Table B.2
Summary of PLC Recorded Daily Runtimes
(9/1/10 – 11/9/10)

	Average Recorded Daily Runtime (minutes/day)	Std. Dev.	MIN (minutes)	MAX (minutes)	Target Daily Runtime (minutes)	Relative Error[1] (%)
Pump 4 to Hydro 1	12.8	0.4	12.0	13.0	12.4	3.0%
Pump 14 to Hydro 2	10.8	0.4	10.0	11.0	10.4	3.7%
Pump 6 to Recirc. System 1	6.4	0.5	6.0	7.0	6.0	6.4%
Pump 7 to Recirc. System 2	6.5	0.5	6.0	7.0	6.0	8.1%
Pump 8 to Recirc. System 3	6.4	0.5	6.0	7.0	6.0	6.4%
Pump 9 to Recirc. System 4	6.4	0.5	6.0	7.0	6.0	6.4%
Pump 15 to Recirc. System 5	6.4	0.5	6.0	7.0	6.0	6.5%

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

Appendix C: Flow Test Results

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

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

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

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 (%)	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	Measured RR - Target RR / Measured RR * 100
1	**Stage 1 Single Pass Biofilters (Hydrosplitter 1)**							
	Date				(12/8/10) manual dose @ 8:45 am			
	UNSAT-PS1	55,656	24	2,319	2,320	0.0%		
	UNSAT-CL3				2,395	3.3%		
	UNSAT-CL1				2,340	0.9%		
	UNSAT-EC3				2,300	-0.8%		
	UNSAT-EC1				2,340	0.9%		
	Mean				2,339	0.9%		
	Stage 2 Single Pass Upflow Biofilters							
	Date				11/19/2010 8:00-9:00 am			
	DENIT-LS4	55,656	24	2,319	1,690			
	DENIT-LS2				2,090			
	DENIT-SU3				2,425			
	DENIT-LS3				2,025			
	DENIT-SU4				2,120			
	Mean							
2	**Stage 1 Recirculating Biofilters (Hydrosplitter 2)**							
	Date				(11/19/10) dose @ 9:30 am			
	RC1 : UNSAT-SA2	55,656	24	2,319	2,105	-9.2%		
	RC2 : UNSAT-EC4				2,270	-2.1%		
	RC3 : UNSAT-CL2				2,345	1.1%		
	RC4 : UNSAT-CL4				2,220	-4.3%		
	Mean				2,235	-3.6%		
	Stage 1 Recirculating Biofilters (Recycle)				Flowmeter 11/19/10 8:30			
	RC1 : UNSAT-SA2	166,968	24	6,957	6,586	-5.3%	3.13	4.1%
	RC2 : UNSAT-EC4				7,116	2.3%	3.13	4.3%
	RC3 : UNSAT-CL2				7,002	0.7%	2.99	-0.5%
	RC4 : UNSAT-CL4				6,586	-5.3%	2.97	-1.1%
	RC5 : UNSAT-PS1				6,662	-4.2%	2.98	-0.7%
	Mean				6,822	-1.9%	3.05	1.8%
	Stage 1 Recirculating Biofilters (Hydrosplitter + Recycle)							
	RC1 : UNSAT-SA2	222,624	24	9,276	8,691			
	RC2 : UNSAT-EC4				9,386			
	RC3 : UNSAT-CL2				9,347			
	RC4 : UNSAT-CL4				8,806			
	RC5 : UNSAT-PS1				8,982			
	Mean				9,042			
3	**Horizontal Denitrification Biofilters**							
	Date				11/19/10 dose @ 8:25 am			
	DENIT-SU1	7,409	24	308.7	302	-2.2%		
	DENIT-SU2				295	-4.4%		
	DENIT-GL1				295	-4.4%		
	DENIT-LS1				300	-2.8%		
	Mean				298	-3.5%		
4	**In-Situ Simulators**							
	Date				12/3/2010 manual dose			
	UNSAT-IS1 (STE)	14,814	6	2,469	2,600	5.3%		
	UNSAT-IS2 (Nitrified STE)				2,660	7.7%		
	Date				11/19/2010 manual dose			
	UNSAT-IS3 (STE)	594	6	99	99	0.0%		
	UNSAT-IS4 (Nitrified STE)				99	0.0%		

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

Appendix D: Laboratory Report

SOUTHERN ANALYTICAL LABORATORIES, INC.
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January 7, 2011
Work Order: 1001627
Revised Report

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		**1001627-01**						
Date/Time Collected		**11/10/10 13:50**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	7.2	DEP FT1100	0.1	0.1		11/10/10 13:50	TDD
Water Temperature	°C	25.1	DEP FT1400	0.1	0.1		11/10/10 13:50	TDD
Specific conductance	umhos/cm	1,250	DEP FT1200	0.1	0.1		11/10/10 13:50	TDD
Dissolved Oxygen	mg/L	2.4	DEP FT1500	0.1	0.1		11/10/10 13:50	TDD
Inorganics								
Hydrogen Sulfide (Unionized)	mg/L	5.4	SM 4550SF	0.04	0.01		11/12/10 16:00	KTC
Ammonia as N	mg/L	67	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	91	SM 5210B	2	2	11/12/10 10:00	11/17/10 13:07	KTC
Chemical Oxygen Demand	mg/L	240	EPA 410.4	25	10		11/16/10 08:45	ARM
Sulfate	mg/L	33	EPA 300.0	0.60	0.20	11/15/10 09:53	11/15/10 23:40	MEJ
Sulfide	mg/L	15	SM 4500SF	4.0	1.0		11/12/10 16:00	KTC
Total Alkalinity	mg/L	430	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	450	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:00	MJV
Total Kjeldahl Nitrogen	mg/L	80	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	70 Q	SM 2540D	1	1	12/15/10 15:30	12/16/10 14:58	MJV
Nitrate+Nitrite (as N)	mg/L	0.01 I	EPA 353.2	0.04	0.01		11/17/10 15:50	SMB
Sample Description		**RC1**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-02**						
Date/Time Collected		**11/10/10 12:00-11/10/10 12:50**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	7.3	DEP FT1100	0.1	0.1		11/10/10 12:50	TDD
Water Temperature	°C	20.6	DEP FT1400	0.1	0.1		11/10/10 12:50	TDD
Specific conductance	umhos/cm	1,000	DEP FT1200	0.1	0.1		11/10/10 12:50	TDD
Dissolved Oxygen	mg/L	2.1	DEP FT1500	0.1	0.1		11/10/10 12:50	TDD
Inorganics								
Ammonia as N	mg/L	12	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	11/12/10 10:00	11/17/10 13:07	KTC
Chemical Oxygen Demand	mg/L	29	EPA 410.4	25	10		11/16/10 08:45	ARM
Total Alkalinity	mg/L	180	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	580	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:00	MJV
Total Kjeldahl Nitrogen	mg/L	17	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	3	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	24	EPA 353.2	0.04	0.01		11/17/10 15:50	SMB

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Project Name **PNRS II**

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		**RC2**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-03**						
Date/Time Collected		**11/10/10 13:00**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	7.2	DEP FT1100	0.1	0.1		11/10/10 13:00	TDD
Water Temperature	°C	19.5	DEP FT1400	0.1	0.1		11/10/10 13:00	TDD
Specific conductance	umhos/cm	1,020	DEP FT1200	0.1	0.1		11/10/10 13:00	TDD
Dissolved Oxygen	mg/L	1.6	DEP FT1500	0.1	0.1		11/10/10 13:00	TDD
Inorganics								
Ammonia as N	mg/L	13	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	8	SM 5210B	2	2	11/12/10 10:00	11/17/10 13:07	KTC
Chemical Oxygen Demand	mg/L	35	EPA 410.4	25	10		11/16/10 08:45	ARM
Total Alkalinity	mg/L	210	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	590	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:00	MJV
Total Kjeldahl Nitrogen	mg/L	19	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	2	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	24 J5	EPA 353.2	0.04	0.01		11/17/10 15:50	SMB
Sample Description		**RC3**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-04**						
Date/Time Collected		**11/10/10 13:10**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	7.2	DEP FT1100	0.1	0.1		11/10/10 13:10	TDD
Water Temperature	°C	19.2	DEP FT1400	0.1	0.1		11/10/10 13:10	TDD
Specific conductance	umhos/cm	1,040	DEP FT1200	0.1	0.1		11/10/10 13:10	TDD
Dissolved Oxygen	mg/L	2.3	DEP FT1500	0.1	0.1		11/10/10 13:10	TDD
Inorganics								
Ammonia as N	mg/L	12	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	9	SM 5210B	2	2	11/12/10 10:00	11/17/10 13:07	KTC
Chemical Oxygen Demand	mg/L	39	EPA 410.4	25	10		11/16/10 08:45	ARM
Total Alkalinity	mg/L	260	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	550	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:00	MJV
Total Kjeldahl Nitrogen	mg/L	19	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	6	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	17	EPA 353.2	0.04	0.01		11/17/10 15:50	SMB

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Project Name **PNRS II**

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		**RC4**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-05**						
Date/Time Collected		**11/10/10 13:20**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	7.4	DEP FT1100	0.1	0.1		11/10/10 13:20	TDD
Water Temperature	°C	19.7	DEP FT1400	0.1	0.1		11/10/10 13:20	TDD
Specific conductance	umhos/cm	1,090	DEP FT1200	0.1	0.1		11/10/10 13:20	TDD
Dissolved Oxygen	mg/L	1.9	DEP FT1500	0.1	0.1		11/10/10 13:20	TDD
Inorganics								
Ammonia as N	mg/L	12	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	4	SM 5210B	2	2	11/12/10 10:00	11/17/10 13:07	KTC
Chemical Oxygen Demand	mg/L	26	EPA 410.4	25	10		11/16/10 08:45	ARM
Total Alkalinity	mg/L	260	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	590	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:00	MJV
Total Kjeldahl Nitrogen	mg/L	17	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	2	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	18	EPA 353.2	0.04	0.01		11/17/10 15:50	SMB
Sample Description		**RC5**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-06**						
Date/Time Collected		**11/10/10 16:10**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	7.3	DEP FT1100	0.1	0.1		11/10/10 16:10	TDD
Water Temperature	°C	22.0	DEP FT1400	0.1	0.1		11/10/10 16:10	TDD
Specific conductance	umhos/cm	1,050	DEP FT1200	0.1	0.1		11/10/10 16:10	TDD
Dissolved Oxygen	mg/L	3.3	DEP FT1500	0.1	0.1		11/10/10 16:10	TDD
Inorganics								
Ammonia as N	mg/L	28	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	8	SM 5210B	2	2	11/12/10 11:05	11/17/10 13:07	KTC
Chemical Oxygen Demand	mg/L	61	EPA 410.4	25	10		11/16/10 08:45	ARM
Total Alkalinity	mg/L	260	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	480	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:00	MJV
Total Kjeldahl Nitrogen	mg/L	31	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	8	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	14	EPA 353.2	0.04	0.01		11/17/10 15:50	SMB

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Project Name **PNRS II**

Parameters	Units	Results *		Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		**P15-T**							
Matrix		**Wastewater**							
SAL Sample Number		**1001627-07**							
Date/Time Collected		**11/10/10 13:45**							
Collected by		**Thomas Drunasky**							
Date/Time Received		**11/10/10 17:50**							
Field Parameters									
pH	SU	7.4		DEP FT1100	0.1	0.1		11/10/10 13:45	TDD
Water Temperature	°C	20.7		DEP FT1400	0.1	0.1		11/10/10 13:45	TDD
Specific conductance	umhos/cm	970		DEP FT1200	0.1	0.1		11/10/10 13:45	TDD
Dissolved Oxygen	mg/L	7.1		DEP FT1500	0.1	0.1		11/10/10 13:45	TDD
Inorganics									
Ammonia as N	mg/L	17		EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	3		SM 5210B	2	2	11/12/10 10:00	11/17/10 13:07	KTC
Chemical Oxygen Demand	mg/L	33		EPA 410.4	25	10		11/16/10 08:45	ARM
Total Alkalinity	mg/L	200		SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	550		SM 2540C	10	10	11/15/10 11:00	11/16/10 14:00	MJV
Total Kjeldahl Nitrogen	mg/L	21		EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	6		SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	21		EPA 353.2	0.04	0.01		11/17/10 15:50	SMB
Sample Description		**UNSAT-IS1**							
Matrix		**Wastewater**							
SAL Sample Number		**1001627-08**							
Date/Time Collected		**11/10/10 10:00**							
Collected by		**Thomas Drunasky**							
Date/Time Received		**11/10/10 17:50**							
Field Parameters									
pH	SU	6.8		DEP FT1100	0.1	0.1		11/10/10 10:00	TDD
Water Temperature	°C	20.5		DEP FT1400	0.1	0.1		11/10/10 10:00	TDD
Specific conductance	umhos/cm	1,120		DEP FT1200	0.1	0.1		11/10/10 10:00	TDD
Dissolved Oxygen	mg/L	1.9		DEP FT1500	0.1	0.1		11/10/10 10:00	TDD
Inorganics									
Hydrogen Sulfide (Unionized)	mg/L	2.8		SM 4550SF	0.04	0.01		11/12/10 16:00	KTC
Ammonia as N	mg/L	50	J5	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	2	U	SM 5210B	2	2	11/11/10 15:00	11/16/10 12:10	KTC
Chemical Oxygen Demand	mg/L	76		EPA 410.4	25	10		11/16/10 08:45	ARM
Sulfate	mg/L	79		EPA 300.0	0.60	0.20	11/15/10 09:53	11/15/10 23:40	MEJ
Sulfide	mg/L	4.7		SM 4500SF	4.0	1.0		11/12/10 16:00	KTC
Total Alkalinity	mg/L	390		SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	540		SM 2540C	10	10	11/15/10 11:00	11/16/10 14:00	MJV
Total Kjeldahl Nitrogen	mg/L	53		EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	6		SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	0.18		EPA 353.2	0.04	0.01		11/17/10 15:50	SMB

FDOH Laboratory No.E84129
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Project Name **PNRS II**

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		**UNSAT-IS2**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-09**						
Date/Time Collected		**11/10/10 09:45**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	6.8	DEP FT1100	0.1	0.1		11/10/10 09:45	TDD
Water Temperature	°C	19.2	DEP FT1400	0.1	0.1		11/10/10 09:45	TDD
Specific conductance	umhos/cm	1,300	DEP FT1200	0.1	0.1		11/10/10 09:45	TDD
Dissolved Oxygen	mg/L	0.8	DEP FT1500	0.1	0.1		11/10/10 09:45	TDD
Inorganics								
Hydrogen Sulfide (Unionized)	mg/L	0.01 U	SM 4550SF	0.04	0.01		11/12/10 16:00	KTC
Ammonia as N	mg/L	0.80	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	11/11/10 15:00	11/16/10 12:10	KTC
Chemical Oxygen Demand	mg/L	20 I	EPA 410.4	25	10		11/16/10 08:45	ARM
Sulfate	mg/L	380	EPA 300.0	0.60	0.20	11/15/10 09:53	11/15/10 23:40	MEJ
Sulfide	mg/L	1.0 U	SM 4500SF	4.0	1.0		11/12/10 16:00	KTC
Total Alkalinity	mg/L	180	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	820	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:00	MJV
Total Kjeldahl Nitrogen	mg/L	1.2	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	19	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	0.05	EPA 353.2	0.04	0.01		11/17/10 15:50	SMB
Sample Description		**UNSAT-IS4**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-11**						
Date/Time Collected		**11/10/10 15:15**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Inorganics								
Ammonia as N	mg/L	0.036	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Sulfate	mg/L	490	EPA 300.0	0.60	0.20	11/15/10 09:53	11/15/10 23:40	MEJ
Total Kjeldahl Nitrogen	mg/L	2.1	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Nitrate+Nitrite (as N)	mg/L	41	EPA 353.2	0.04	0.01		11/18/10 14:49	SMB
Sample Description		**UNSAT-EC1**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-12**						
Date/Time Collected		**11/10/10 16:00**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								

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Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		**UNSAT-EC1**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-12**						
Date/Time Collected		**11/10/10 16:00**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
pH	SU	6.9	DEP FT1100	0.1	0.1		11/10/10 16:00	TDD
Water Temperature	°C	20.6	DEP FT1400	0.1	0.1		11/10/10 16:00	TDD
Specific conductance	umhos/cm	1,150	DEP FT1200	0.1	0.1		11/10/10 16:00	TDD
Dissolved Oxygen	mg/L	7.1	DEP FT1500	0.1	0.1		11/10/10 16:00	TDD
Inorganics								
Hydrogen Sulfide (Unionized)	mg/L	0.01 U	SM 4550SF	0.04	0.01		11/12/10 16:00	KTC
Ammonia as N	mg/L	1.3	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	11/12/10 11:05	11/17/10 13:07	KTC
Chemical Oxygen Demand	mg/L	10 U	EPA 410.4	25	10		11/16/10 08:45	ARM
Sulfate	mg/L	61	EPA 300.0	0.60	0.20	11/16/10 11:22	11/16/10 16:02	MEJ
Sulfide	mg/L	1.0 U	SM 4500SF	4.0	1.0		11/12/10 16:00	KTC
Total Alkalinity	mg/L	180	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	770	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:00	MJV
Total Kjeldahl Nitrogen	mg/L	4.8	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	62 Q	EPA 353.2	0.04	0.01		01/06/11 15:32	SMB
Sample Description		**UNSAT-SA2**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-13**						
Date/Time Collected		**11/10/10 11:10**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	6.9	DEP FT1100	0.1	0.1		11/10/10 11:10	TDD
Water Temperature	°C	22.5	DEP FT1400	0.1	0.1		11/10/10 11:10	TDD
Specific conductance	umhos/cm	930	DEP FT1200	0.1	0.1		11/10/10 11:10	TDD
Dissolved Oxygen	mg/L	7.7	DEP FT1500	0.1	0.1		11/10/10 11:10	TDD
Inorganics								
Ammonia as N	mg/L	0.74	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	11/11/10 15:00	11/16/10 12:10	KTC
Chemical Oxygen Demand	mg/L	22 I	EPA 410.4	25	10		11/16/10 08:45	ARM
Total Alkalinity	mg/L	120	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	610	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:00	MJV
Total Kjeldahl Nitrogen	mg/L	3.5	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	13	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	38	EPA 353.2	0.04	0.01		11/18/10 14:49	SMB

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Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		**UNSAT-EC3**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-14**						
Date/Time Collected		**11/10/10 15:30**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	6.8	DEP FT1100	0.1	0.1		11/10/10 15:30	TDD
Water Temperature	°C	21.5	DEP FT1400	0.1	0.1		11/10/10 15:30	TDD
Specific conductance	umhos/cm	1,250	DEP FT1200	0.1	0.1		11/10/10 15:30	TDD
Dissolved Oxygen	mg/L	6.8	DEP FT1500	0.1	0.1		11/10/10 15:30	TDD
Inorganics								
Ammonia as N	mg/L	2.4	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	11/12/10 11:05	11/17/10 13:07	KTC
Chemical Oxygen Demand	mg/L	10 U	EPA 410.4	25	10		11/16/10 08:45	ARM
Total Alkalinity	mg/L	220	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	850	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:00	MJV
Total Kjeldahl Nitrogen	mg/L	4.9	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	81	EPA 353.2	0.04	0.01		11/18/10 14:49	SMB
Sample Description		**UNSAT-EC4**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-15**						
Date/Time Collected		**11/10/10 11:20**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	6.9	DEP FT1100	0.1	0.1		11/10/10 11:20	TDD
Water Temperature	°C	22.2	DEP FT1400	0.1	0.1		11/10/10 11:20	TDD
Specific conductance	umhos/cm	980	DEP FT1200	0.1	0.1		11/10/10 11:20	TDD
Dissolved Oxygen	mg/L	7.3	DEP FT1500	0.1	0.1		11/10/10 11:20	TDD
Inorganics								
Ammonia as N	mg/L	0.005 U	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	11/11/10 15:00	11/16/10 12:10	KTC
Chemical Oxygen Demand	mg/L	10 U	EPA 410.4	25	10		11/16/10 08:45	ARM
Total Alkalinity	mg/L	140	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	660	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:00	MJV
Total Kjeldahl Nitrogen	mg/L	2.3	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	2	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	50	EPA 353.2	0.04	0.01		11/18/10 14:49	SMB

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Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		**UNSAT-CL1**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-16**						
Date/Time Collected		**11/10/10 15:40**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	7.1	DEP FT1100	0.1	0.1		11/10/10 15:40	TDD
Water Temperature	°C	22.0	DEP FT1400	0.1	0.1		11/10/10 15:40	TDD
Specific conductance	umhos/cm	1,130	DEP FT1200	0.1	0.1		11/10/10 15:40	TDD
Dissolved Oxygen	mg/L	7.3	DEP FT1500	0.1	0.1		11/10/10 15:40	TDD
Inorganics								
Hydrogen Sulfide (Unionized)	mg/L	0.01 U	SM 4550SF	0.04	0.01		11/12/10 16:00	KTC
Ammonia as N	mg/L	0.005 U	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	11/12/10 11:05	11/17/10 13:07	KTC
Chemical Oxygen Demand	mg/L	10 U	EPA 410.4	25	10		11/16/10 08:45	ARM
Sulfate	mg/L	62	EPA 300.0	0.60	0.20	11/16/10 11:22	11/16/10 16:02	MEJ
Sulfide	mg/L	1.0 U	SM 4500SF	4.0	1.0		11/12/10 16:00	KTC
Total Alkalinity	mg/L	230	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	800	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:00	MJV
Total Kjeldahl Nitrogen	mg/L	2.6	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	44	EPA 353.2	0.04	0.01		11/18/10 14:49	SMB
Sample Description		**UNSAT-CL2**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-17**						
Date/Time Collected		**11/10/10 11:30**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	7.0	DEP FT1100	0.1	0.1		11/10/10 11:30	TDD
Water Temperature	°C	23.1	DEP FT1400	0.1	0.1		11/10/10 11:30	TDD
Specific conductance	umhos/cm	1,000	DEP FT1200	0.1	0.1		11/10/10 11:30	TDD
Dissolved Oxygen	mg/L	5.4	DEP FT1500	0.1	0.1		11/10/10 11:30	TDD
Inorganics								
Ammonia as N	mg/L	0.005 U	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	11/11/10 15:00	11/16/10 12:10	KTC
Chemical Oxygen Demand	mg/L	24 I	EPA 410.4	25	10		11/16/10 08:45	ARM
Total Alkalinity	mg/L	200	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	630	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:00	MJV
Total Kjeldahl Nitrogen	mg/L	2.3	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	2	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	54	EPA 353.2	0.04	0.01		11/18/10 14:49	SMB

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Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		**UNSAT-CL3**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-18**						
Date/Time Collected		**11/10/10 15:50**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	7.4	DEP FT1100	0.1	0.1		11/10/10 15:50	TDD
Water Temperature	°C	22.0	DEP FT1400	0.1	0.1		11/10/10 15:50	TDD
Specific conductance	umhos/cm	1,280	DEP FT1200	0.1	0.1		11/10/10 15:50	TDD
Dissolved Oxygen	mg/L	7.6	DEP FT1500	0.1	0.1		11/10/10 15:50	TDD
Inorganics								
Ammonia as N	mg/L	0.005 U	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	11/12/10 11:05	11/17/10 13:07	KTC
Chemical Oxygen Demand	mg/L	29	EPA 410.4	25	10		11/16/10 08:45	ARM
Total Alkalinity	mg/L	290	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	820	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:00	MJV
Total Kjeldahl Nitrogen	mg/L	2.7	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	2	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	80	EPA 353.2	0.04	0.01		11/18/10 14:49	SMB
Sample Description		**UNSAT-CL4**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-19**						
Date/Time Collected		**11/10/10 11:40**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	7.2	DEP FT1100	0.1	0.1		11/10/10 11:40	TDD
Water Temperature	°C	23.5	DEP FT1400	0.1	0.1		11/10/10 11:40	TDD
Specific conductance	umhos/cm	1,040	DEP FT1200	0.1	0.1		11/10/10 11:40	TDD
Dissolved Oxygen	mg/L	8.0	DEP FT1500	0.1	0.1		11/10/10 11:40	TDD
Inorganics								
Ammonia as N	mg/L	0.005 U	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	11/11/10 15:00	11/16/10 12:10	KTC
Chemical Oxygen Demand	mg/L	11 I	EPA 410.4	25	10		11/16/10 08:45	ARM
Sulfate	mg/L	63	EPA 300.0	0.60	0.20	11/16/10 11:22	11/16/10 16:02	MEJ
Total Alkalinity	mg/L	270	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	660	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:00	MJV
Total Kjeldahl Nitrogen	mg/L	2.6	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	40	EPA 353.2	0.04	0.01		11/18/10 14:49	SMB

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Parameters	**Units**	**Results ***	**Method**	**PQL**	**MDL**	**Prepared**	**Analyzed**	**By**
Sample Description		**UNSAT-PS1**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-20**						
Date/Time Collected		**11/10/10 13:50**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	7.2	DEP FT1100	0.1	0.1		11/10/10 13:50	TDD
Water Temperature	°C	23.8	DEP FT1400	0.1	0.1		11/10/10 13:50	TDD
Specific conductance	umhos/cm	950	DEP FT1200	0.1	0.1		11/10/10 13:50	TDD
Dissolved Oxygen	mg/L	7.8	DEP FT1500	0.1	0.1		11/10/10 13:50	TDD
Inorganics								
Ammonia as N	mg/L	21	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	4	SM 5210B	2	2	11/12/10 10:00	11/17/10 13:07	KTC
Chemical Oxygen Demand	mg/L	39	EPA 410.4	25	10		11/17/10 07:30	ARM
Total Alkalinity	mg/L	200	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	550	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:00	MJV
Total Kjeldahl Nitrogen	mg/L	28	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	5	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	70	EPA 353.2	0.04	0.01		11/18/10 14:49	SMB
Sample Description		**DENIT-SU1**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-21**						
Date/Time Collected		**11/10/10 10:15**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	6.9	DEP FT1100	0.1	0.1		11/10/10 10:15	TDD
Water Temperature	°C	28.0	DEP FT1400	0.1	0.1		11/10/10 10:15	TDD
Specific conductance	umhos/cm	1,250	DEP FT1200	0.1	0.1		11/10/10 10:15	TDD
Dissolved Oxygen	mg/L	1.6	DEP FT1500	0.1	0.1		11/10/10 10:15	TDD
Inorganics								
Hydrogen Sulfide (Unionized)	mg/L	9.2	SM 4550SF	0.04	0.01		11/12/10 16:00	KTC
Ammonia as N	mg/L	0.76	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	18	SM 5210B	2	2	11/11/10 15:00	11/16/10 12:10	KTC
Chemical Oxygen Demand	mg/L	50	EPA 410.4	25	10		11/17/10 07:30	ARM
Sulfate	mg/L	350	EPA 300.0	0.60	0.20	11/16/10 11:22	11/16/10 16:02	MEJ
Sulfide	mg/L	17	SM 4500SF	4.0	1.0		11/12/10 16:00	KTC
Total Alkalinity	mg/L	230	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	900	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:30	MJV
Total Kjeldahl Nitrogen	mg/L	1.9	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	0.14	EPA 353.2	0.04	0.01		11/18/10 14:49	SMB

FDOH Laboratory No.E84129
NELAP Accredited

Francis I. Daniels, Laboratory Director
Leslie C. Boardman, Q.A. Manager

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Project Name **PNRS II**

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		**DENIT-SU2**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-22**						
Date/Time Collected		**11/10/10 10:25**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	7.0	DEP FT1100	0.1	0.1		11/10/10 10:25	TDD
Water Temperature	°C	25.5	DEP FT1400	0.1	0.1		11/10/10 10:25	TDD
Specific conductance	umhos/cm	1,350	DEP FT1200	0.1	0.1		11/10/10 10:25	TDD
Dissolved Oxygen	mg/L	0.2	DEP FT1500	0.1	0.1		11/10/10 10:25	TDD
Inorganics								
Hydrogen Sulfide (Unionized)	mg/L	0.01 U	SM 4550SF	0.04	0.01		11/12/10 16:00	KTC
Ammonia as N	mg/L	0.033	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	11/11/10 15:00	11/16/10 12:10	KTC
Chemical Oxygen Demand	mg/L	18 I	EPA 410.4	25	10		11/17/10 07:30	ARM
Sulfate	mg/L	490	EPA 300.0	0.60	0.20	11/16/10 11:22	11/16/10 16:02	MEJ
Sulfide	mg/L	1.0 U	SM 4500SF	4.0	1.0		11/12/10 16:00	KTC
Total Alkalinity	mg/L	210	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	1,000	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:30	MJV
Total Kjeldahl Nitrogen	mg/L	0.74	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	8	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	0.03 I	EPA 353.2	0.04	0.01		11/18/10 14:49	SMB
Sample Description		**DENIT-SU3**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-23**						
Date/Time Collected		**11/10/10 13:30**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	7.2	DEP FT1100	0.1	0.1		11/10/10 13:30	TDD
Water Temperature	°C	21.4	DEP FT1400	0.1	0.1		11/10/10 13:30	TDD
Specific conductance	umhos/cm	1,480	DEP FT1200	0.1	0.1		11/10/10 13:30	TDD
Dissolved Oxygen	mg/L	7.7	DEP FT1500	0.1	0.1		11/10/10 13:30	TDD
Inorganics								
Hydrogen Sulfide (Unionized)	mg/L	0.85	SM 4550SF	0.04	0.01		11/12/10 16:00	KTC
Ammonia as N	mg/L	0.55	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	3	SM 5210B	2	2	11/12/10 10:00	11/17/10 13:07	KTC
Chemical Oxygen Demand	mg/L	26	EPA 410.4	25	10		11/17/10 07:30	ARM
Sulfate	mg/L	450	EPA 300.0	0.60	0.20	11/16/10 11:22	11/16/10 16:02	MEJ
Sulfide	mg/L	2.4 I	SM 4500SF	4.0	1.0		11/12/10 16:00	KTC
Total Alkalinity	mg/L	260	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	1,000	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:30	MJV

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Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		**DENIT-SU3**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-23**						
Date/Time Collected		**11/10/10 13:30**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Total Kjeldahl Nitrogen	mg/L	1.8	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	2	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	0.05	EPA 353.2	0.04	0.01		11/18/10 14:49	SMB
Sample Description		**DENIT-SU4**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-24**						
Date/Time Collected		**11/10/10 13:40**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	7.3	DEP FT1100	0.1	0.1		11/10/10 13:40	TDD
Water Temperature	°C	21.0	DEP FT1400	0.1	0.1		11/10/10 13:40	TDD
Specific conductance	umhos/cm	1,510	DEP FT1200	0.1	0.1		11/10/10 13:40	TDD
Dissolved Oxygen	mg/L	7.8	DEP FT1500	0.1	0.1		11/10/10 13:40	TDD
Inorganics								
Hydrogen Sulfide (Unionized)	mg/L	0.09	SM 4550SF	0.04	0.01		11/12/10 16:00	KTC
Ammonia as N	mg/L	0.10	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	11/12/10 10:00	11/17/10 13:07	KTC
Chemical Oxygen Demand	mg/L	13 I	EPA 410.4	25	10		11/17/10 07:30	ARM
Sulfate	mg/L	560	EPA 300.0	0.60	0.20	11/16/10 11:22	11/16/10 16:02	MEJ
Sulfide	mg/L	1.0 U	SM 4500SF	4.0	1.0		11/12/10 16:00	KTC
Total Alkalinity	mg/L	210	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	1,100	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:30	MJV
Total Kjeldahl Nitrogen	mg/L	0.89	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	6	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	0.02 I	EPA 353.2	0.04	0.01		11/18/10 14:49	SMB
Sample Description		**DENIT-LS1**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-25**						
Date/Time Collected		**11/10/10 10:40**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	7.4	DEP FT1100	0.1	0.1		11/10/10 10:40	TDD
Water Temperature	°C	21.4	DEP FT1400	0.1	0.1		11/10/10 10:40	TDD

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Parameters	**Units**	**Results ***	**Method**	**PQL**	**MDL**	**Prepared**	**Analyzed**	**By**
Sample Description		**DENIT-LS1**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-25**						
Date/Time Collected		**11/10/10 10:40**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Specific conductance	umhos/cm	970	DEP FT1200	0.1	0.1		11/10/10 10:40	TDD
Dissolved Oxygen	mg/L	1.1	DEP FT1500	0.1	0.1		11/10/10 10:40	TDD
Inorganics								
Ammonia as N	mg/L	0.005 U	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	11/11/10 15:00	11/16/10 12:10	KTC
Chemical Oxygen Demand	mg/L	18 I	EPA 410.4	25	10		11/17/10 07:30	ARM
Total Alkalinity	mg/L	210	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	540	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:30	MJV
Total Kjeldahl Nitrogen	mg/L	2.7	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	18 Q	EPA 353.2	0.04	0.01		12/20/10 13:40	SMB
Sample Description		**DENIT-LS2**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-26**						
Date/Time Collected		**11/10/10 12:15**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	7.4	DEP FT1100	0.1	0.1		11/10/10 12:15	TDD
Water Temperature	°C	21.5	DEP FT1400	0.1	0.1		11/10/10 12:15	TDD
Specific conductance	umhos/cm	1,200	DEP FT1200	0.1	0.1		11/10/10 12:15	TDD
Dissolved Oxygen	mg/L	4.1	DEP FT1500	0.1	0.1		11/10/10 12:15	TDD
Inorganics								
Ammonia as N	mg/L	0.10	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	11/12/10 10:00	11/17/10 13:07	KTC
Chemical Oxygen Demand	mg/L	26	EPA 410.4	25	10		11/17/10 07:30	ARM
Total Alkalinity	mg/L	320	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	780	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:30	MJV
Total Kjeldahl Nitrogen	mg/L	3.8	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	2	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	16 Q	EPA 353.2	0.04	0.01		12/20/10 13:40	SMB

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Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		**DENIT-LS3**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-27**						
Date/Time Collected		**11/10/10 12:30**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	6.9	DEP FT1100	0.1	0.1		11/10/10 12:30	TDD
Water Temperature	°C	20.0	DEP FT1400	0.1	0.1		11/10/10 12:30	TDD
Specific conductance	umhos/cm	1,200	DEP FT1200	0.1	0.1		11/10/10 12:30	TDD
Dissolved Oxygen	mg/L	4.7	DEP FT1500	0.1	0.1		11/10/10 12:30	TDD
Inorganics								
Ammonia as N	mg/L	0.52	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	11/12/10 10:00	11/17/10 13:07	KTC
Chemical Oxygen Demand	mg/L	11 I	EPA 410.4	25	10		11/17/10 07:30	ARM
Total Alkalinity	mg/L	220	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	840	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:30	MJV
Total Kjeldahl Nitrogen	mg/L	4.3	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	20 Q	EPA 353.2	0.04	0.01		12/20/10 13:40	SMB
Sample Description		**DENIT-LS4**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-28**						
Date/Time Collected		**11/10/10 12:05**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	7.3	DEP FT1100	0.1	0.1		11/10/10 12:05	TDD
Water Temperature	°C	20.0	DEP FT1400	0.1	0.1		11/10/10 12:05	TDD
Specific conductance	umhos/cm	900	DEP FT1200	0.1	0.1		11/10/10 12:05	TDD
Dissolved Oxygen	mg/L	3.8	DEP FT1500	0.1	0.1		11/10/10 12:05	TDD
Inorganics								
Ammonia as N	mg/L	15	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	11/11/10 15:00	11/16/10 12:10	KTC
Chemical Oxygen Demand	mg/L	20 I	EPA 410.4	25	10		11/17/10 07:30	ARM
Total Alkalinity	mg/L	200	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	480	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:30	MJV
Total Kjeldahl Nitrogen	mg/L	21	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	2	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	9.8 Q	EPA 353.2	0.04	0.01		12/20/10 13:40	SMB

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Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		**DENIT-GL1**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-29**						
Date/Time Collected		**11/10/10 10:55**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	6.9	DEP FT1100	0.1	0.1		11/10/10 10:55	TDD
Water Temperature	°C	21.0	DEP FT1400	0.1	0.1		11/10/10 10:55	TDD
Specific conductance	umhos/cm	900	DEP FT1200	0.1	0.1		11/10/10 10:55	TDD
Dissolved Oxygen	mg/L	0.8	DEP FT1500	0.1	0.1		11/10/10 10:55	TDD
Inorganics								
Ammonia as N	mg/L	0.88	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	3	SM 5210B	2	2	11/11/10 15:00	11/16/10 12:10	KTC
Chemical Oxygen Demand	mg/L	22 I	EPA 410.4	25	10		11/17/10 07:30	ARM
Total Alkalinity	mg/L	390	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	540	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:30	MJV
Total Kjeldahl Nitrogen	mg/L	1.9	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	4	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	0.07	EPA 353.2	0.04	0.01		11/18/10 14:49	SMB
Sample Description		**DFT**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-30**						
Date/Time Collected		**11/10/10 11:50**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	7.2	DEP FT1100	0.1	0.1		11/10/10 11:50	TDD
Water Temperature	°C	18.5	DEP FT1400	0.1	0.1		11/10/10 11:50	TDD
Specific conductance	umhos/cm	980	DEP FT1200	0.1	0.1		11/10/10 11:50	TDD
Dissolved Oxygen	mg/L	8.3	DEP FT1500	0.1	0.1		11/10/10 11:50	TDD
Inorganics								
Hydrogen Sulfide (Unionized)	mg/L	0.10	SM 4550SF	0.04	0.01		11/12/10 16:00	KTC
Ammonia as N	mg/L	0.17	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	11/11/10 15:00	11/16/10 12:10	KTC
Chemical Oxygen Demand	mg/L	22 I	EPA 410.4	25	10		11/17/10 07:30	ARM
Sulfate	mg/L	64	EPA 300.0	0.60	0.20	11/16/10 11:22	11/16/10 16:02	MEJ
Sulfide	mg/L	1.0 U	SM 4500SF	4.0	1.0		11/12/10 16:00	KTC
Total Alkalinity	mg/L	200	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	630	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:30	MJV
Total Kjeldahl Nitrogen	mg/L	3.5	EPA 351.2	0.20	0.05	11/19/10 07:30	11/19/10 15:47	SMB
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	11/17/10 14:17	11/17/10 14:19	MJV
Nitrate+Nitrite (as N)	mg/L	16 Q	EPA 353.2	0.04	0.01		01/06/11 15:31	SMB

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Sample Description		**T1-D**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-31**						
Date/Time Collected		**11/10/10 14:00**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	7.3	DEP FT1100	0.1	0.1		11/10/10 14:00	TDD
Water Temperature	°C	25.3	DEP FT1400	0.1	0.1		11/10/10 14:00	TDD
Specific conductance	umhos/cm	1,250	DEP FT1200	0.1	0.1		11/10/10 14:00	TDD
Dissolved Oxygen	mg/L	2.2	DEP FT1500	0.1	0.1		11/10/10 14:00	TDD
Inorganics								
Ammonia as N	mg/L	74	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	100	SM 5210B	2	2	11/12/10 11:00	11/17/10 13:07	KTC
Chemical Oxygen Demand	mg/L	240	EPA 410.4	25	10		11/17/10 07:30	ARM
Total Alkalinity	mg/L	410	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	470	SM 2540C	10	10	11/15/10 11:00	11/16/10 14:30	MJV
Total Kjeldahl Nitrogen	mg/L	85 Q	EPA 351.2	0.20	0.05	11/19/10 07:30	12/27/10 10:00	SMB
Total Suspended Solids	mg/L	64 Q	SM 2540D	1	1	12/15/10 15:30	12/16/10 14:58	MJV
Nitrate+Nitrite (as N)	mg/L	0.11	EPA 353.2	0.04	0.01		11/18/10 14:49	SMB
Sample Description		**FB**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-32**						
Date/Time Collected		**11/10/10 15:00**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	6.5	DEP FT1100	0.1	0.1		11/10/10 15:00	TDD
Water Temperature	°C	24.5	DEP FT1400	0.1	0.1		11/10/10 15:00	TDD
Specific conductance	umhos/cm	25	DEP FT1200	0.1	0.1		11/10/10 15:00	TDD
Dissolved Oxygen	mg/L	8.0	DEP FT1500	0.1	0.1		11/10/10 15:00	TDD
Inorganics								
Ammonia as N	mg/L	0.005 U	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	11/12/10 11:00	11/17/10 13:07	KTC
Chemical Oxygen Demand	mg/L	10 U	EPA 410.4	25	10		11/17/10 07:30	ARM
Total Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	10 U	SM 2540C	10	10	11/16/10 16:15	11/17/10 15:30	MJV
Total Kjeldahl Nitrogen	mg/L	0.07 I	EPA 351.2	0.20	0.05	11/24/10 11:22	11/29/10 16:50	SMD
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	11/17/10 14:27	11/17/10 14:32	MJV
Nitrate+Nitrite (as N)	mg/L	0.01 U	EPA 353.2	0.04	0.01		11/18/10 14:49	SMB

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Project Name **PNRS II**

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		**EB**						
Matrix		**Wastewater**						
SAL Sample Number		**1001627-33**						
Date/Time Collected		**11/10/10 14:10**						
Collected by		**Thomas Drunasky**						
Date/Time Received		**11/10/10 17:50**						
Field Parameters								
pH	SU	6.7	DEP FT1100	0.1	0.1		11/10/10 14:10	TDD
Water Temperature	°C	23.0	DEP FT1400	0.1	0.1		11/10/10 14:10	TDD
Specific conductance	umhos/cm	28	DEP FT1200	0.1	0.1		11/10/10 14:10	TDD
Dissolved Oxygen	mg/L	8.5	DEP FT1500	0.1	0.1		11/10/10 14:10	TDD
Inorganics								
Ammonia as N	mg/L	0.005 U	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	11/12/10 11:00	11/17/10 13:07	KTC
Chemical Oxygen Demand	mg/L	10 U	EPA 410.4	25	10		11/17/10 07:30	ARM
Total Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		11/16/10 12:30	KTC
Total Dissolved Solids	mg/L	10 U	SM 2540C	10	10	11/16/10 16:15	11/17/10 15:30	MJV
Total Kjeldahl Nitrogen	mg/L	0.06 I	EPA 351.2	0.20	0.05	11/24/10 11:22	11/29/10 16:50	SMD
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	11/17/10 14:27	11/17/10 14:32	MJV
Nitrate+Nitrite (as N)	mg/L	0.01 U	EPA 353.2	0.04	0.01		11/18/10 14:49	SMB

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Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BK01140 - BOD										
Blank (BK01140-BLK1)					Prepared: 11/11/10 Analyzed: 11/16/10					
Carbonaceous BOD	2 U	2	2	mg/L						
Blank (BK01140-BLK2)					Prepared: 11/11/10 Analyzed: 11/16/10					
Carbonaceous BOD	2 U	2	2	mg/L						
LCS (BK01140-BS1)					Prepared: 11/11/10 Analyzed: 11/16/10					
Carbonaceous BOD	179	2	2	mg/L	200		90	85-115		
LCS (BK01140-BS2)					Prepared: 11/11/10 Analyzed: 11/16/10					
Carbonaceous BOD	179	2	2	mg/L	200		90	85-115		
LCS Dup (BK01140-BSD1)					Prepared: 11/11/10 Analyzed: 11/16/10					
Carbonaceous BOD	179	2	2	mg/L	200		90	85-115	0	10
LCS Dup (BK01140-BSD2)					Prepared: 11/11/10 Analyzed: 11/16/10					
Carbonaceous BOD	179	2	2	mg/L	200		90	85-115	0	10
Batch BK01205 - BOD										
Blank (BK01205-BLK1)					Prepared: 11/12/10 Analyzed: 11/17/10					
Carbonaceous BOD	2 U	2	2	mg/L						
Blank (BK01205-BLK2)					Prepared: 11/12/10 Analyzed: 11/17/10					
Carbonaceous BOD	2 U	2	2	mg/L						
LCS (BK01205-BS1)					Prepared: 11/12/10 Analyzed: 11/17/10					
Carbonaceous BOD	190	2	2	mg/L	200		95	85-115		

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Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BK01205 - BOD										
LCS (BK01205-BS2)					Prepared: 11/12/10 Analyzed: 11/17/10					
Carbonaceous BOD	190	2	2	mg/L	200		95	85-115		
LCS Dup (BK01205-BSD1)					Prepared: 11/12/10 Analyzed: 11/17/10					
Carbonaceous BOD	191	2	2	mg/L	200		96	85-115	0.5	10
LCS Dup (BK01205-BSD2)					Prepared: 11/12/10 Analyzed: 11/17/10					
Carbonaceous BOD	191	2	2	mg/L	200		96	85-115	0.5	10
Batch BK01304 - Sulfide prep										
Blank (BK01304-BLK1)					Prepared & Analyzed: 11/12/10					
Sulfide	1.0 U	4.0	1.0	mg/L						
LCS (BK01304-BS1)					Prepared & Analyzed: 11/12/10					
Sulfide	5.11	4.0	1.0	mg/L	5.0		102	85-115		
Batch BK01514 - Ion Chromatography 300.0 Prep										
Blank (BK01514-BLK1)					Prepared & Analyzed: 11/15/10					
Sulfate	0.20 U	0.60	0.20	mg/L						
LCS (BK01514-BS1)					Prepared & Analyzed: 11/15/10					
Sulfate	9.04	0.60	0.20	mg/L	9.0		100	85-115		
LCS Dup (BK01514-BSD1)					Prepared & Analyzed: 11/15/10					
Sulfate	9.03	0.60	0.20	mg/L	9.0		100	85-115	0.1	10

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Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BK01611 - Ion Chromatography 300.0 Prep										
Blank (BK01611-BLK1)					Prepared & Analyzed: 11/16/10					
Sulfate	0.20 U	0.60	0.20	mg/L						
LCS (BK01611-BS1)					Prepared & Analyzed: 11/16/10					
Sulfate	8.81	0.60	0.20	mg/L	9.0		98	85-115		
LCS Dup (BK01611-BSD1)					Prepared & Analyzed: 11/16/10					
Sulfate	8.73	0.60	0.20	mg/L	9.0		97	85-115	0.9	10
Batch BK01621 - COD prep										
Blank (BK01621-BLK1)					Prepared & Analyzed: 11/16/10					
Chemical Oxygen Demand	10 U	25	10	mg/L						
LCS (BK01621-BS1)					Prepared & Analyzed: 11/16/10					
Chemical Oxygen Demand	50	25	10	mg/L	50		100	90-110		
Matrix Spike (BK01621-MS1)		**Source: 1001627-02**			Prepared & Analyzed: 11/16/10					
Chemical Oxygen Demand	74	25	10	mg/L	50	29	90	85-115		
Matrix Spike Dup (BK01621-MSD1)		**Source: 1001627-02**			Prepared & Analyzed: 11/16/10					
Chemical Oxygen Demand	74	25	10	mg/L	50	29	90	85-115	0	32
Batch BK01627 - alkalinity										
Blank (BK01627-BLK1)					Prepared & Analyzed: 11/16/10					
Total Alkalinity	2.0 U	8.0	2.0	mg/L						

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Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BK01627 - alkalinity										
Blank (BK01627-BLK2)					Prepared & Analyzed: 11/16/10					
Total Alkalinity	2.0 U	8.0	2.0	mg/L						
LCS (BK01627-BS1)					Prepared & Analyzed: 11/16/10					
Total Alkalinity	120	8.0	2.0	mg/L	120		95	90-110		20
LCS (BK01627-BS2)					Prepared & Analyzed: 11/16/10					
Total Alkalinity	120	8.0	2.0	mg/L	120		95	90-110		20
Matrix Spike (BK01627-MS2)		**Source: 1001627-18**			Prepared & Analyzed: 11/16/10					
Total Alkalinity	410	8.0	2.0	mg/L	120	290	95	80-120		26
Matrix Spike Dup (BK01627-MSD2)		**Source: 1001627-18**			Prepared & Analyzed: 11/16/10					
Total Alkalinity	410	8.0	2.0	mg/L	120	290	95	80-120	0	26
Batch BK01735 - COD prep										
Blank (BK01735-BLK1)					Prepared & Analyzed: 11/17/10					
Chemical Oxygen Demand	10 U	25	10	mg/L						
LCS (BK01735-BS1)					Prepared & Analyzed: 11/17/10					
Chemical Oxygen Demand	52	25	10	mg/L	50		104	90-110		
Matrix Spike (BK01735-MS1)		**Source: 1001627-20**			Prepared & Analyzed: 11/17/10					
Chemical Oxygen Demand	85	25	10	mg/L	50	39	92	85-115		
Matrix Spike Dup (BK01735-MSD1)		**Source: 1001627-20**			Prepared & Analyzed: 11/17/10					
Chemical Oxygen Demand	87	25	10	mg/L	50	39	96	85-115	2	32

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Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BK01739 - TSS prep										
Blank (BK01739-BLK1)					Prepared & Analyzed: 11/17/10					
Total Suspended Solids	1 U	1	1	mg/L						
LCS (BK01739-BS1)					Prepared & Analyzed: 11/17/10					
Total Suspended Solids	50.0	1	1	mg/L	50		100	85-115		
LCS Dup (BK01739-BSD1)					Prepared & Analyzed: 11/17/10					
Total Suspended Solids	45.0	1	1	mg/L	50		90	85-115	11	30
Duplicate (BK01739-DUP1)		**Source: 1001627-20**			Prepared & Analyzed: 11/17/10					
Total Suspended Solids	5.00	1	1	mg/L		5.00			0	30
Batch BK01740 - TSS prep										
Blank (BK01740-BLK1)					Prepared & Analyzed: 11/17/10					
Total Suspended Solids	1 U	1	1	mg/L						
LCS (BK01740-BS1)					Prepared & Analyzed: 11/17/10					
Total Suspended Solids	52.5	1	1	mg/L	50		105	85-115		
LCS Dup (BK01740-BSD1)					Prepared & Analyzed: 11/17/10					
Total Suspended Solids	45.5	1	1	mg/L	50		91	85-115	14	30
Batch BK01803 - Ammonia by SEAL										
Blank (BK01803-BLK1)					Prepared & Analyzed: 11/17/10					
Ammonia as N	0.005 U	0.010	0.005	mg/L						

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Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BK01803 - Ammonia by SEAL										
Blank (BK01803-BLK2)					Prepared & Analyzed: 11/17/10					
Ammonia as N	0.005 U	0.010	0.005	mg/L						
Blank (BK01803-BLK3)					Prepared & Analyzed: 11/17/10					
Ammonia as N	0.005 U	0.010	0.005	mg/L						
Blank (BK01803-BLK4)					Prepared & Analyzed: 11/17/10					
Ammonia as N	0.005 U	0.010	0.005	mg/L						
LCS (BK01803-BS1)					Prepared & Analyzed: 11/17/10					
Ammonia as N	0.49	0.010	0.005	mg/L	0.50		98	90-110		
LCS (BK01803-BS2)					Prepared & Analyzed: 11/17/10					
Ammonia as N	0.52	0.010	0.005	mg/L	0.50		104	90-110		
LCS (BK01803-BS3)					Prepared & Analyzed: 11/17/10					
Ammonia as N	0.52	0.010	0.005	mg/L	0.50		105	90-110		
LCS (BK01803-BS4)					Prepared & Analyzed: 11/17/10					
Ammonia as N	0.53	0.010	0.005	mg/L	0.50		106	90-110		
Matrix Spike (BK01803-MS2)		**Source: 1001627-08**			Prepared & Analyzed: 11/17/10					
Ammonia as N	72 J5	0.010	0.005	mg/L	50	50	44	90-110		
Matrix Spike Dup (BK01803-MSD2)		**Source: 1001627-08**			Prepared & Analyzed: 11/17/10					
Ammonia as N	75 J5	0.010	0.005	mg/L	50	50	50	90-110	4	10
Batch BK01804 - Nitrate 353.2 by seal										
Blank (BK01804-BLK1)					Prepared & Analyzed: 11/17/10					
Nitrate+Nitrite (as N)	0.01 U	0.04	0.01	mg/L						

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Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BK01804 - Nitrate 353.2 by seal										
Blank (BK01804-BLK2)					Prepared & Analyzed: 11/17/10					
Nitrate+Nitrite (as N)	0.01 U	0.04	0.01	mg/L						
LCS (BK01804-BS1)					Prepared & Analyzed: 11/17/10					
Nitrate+Nitrite (as N)	0.749	0.04	0.01	mg/L	0.80		94	90-110		
LCS (BK01804-BS2)					Prepared & Analyzed: 11/17/10					
Nitrate+Nitrite (as N)	0.912	0.04	0.01	mg/L	1.0		91	90-110		
Matrix Spike (BK01804-MS2)		**Source: 1001627-03**			Prepared & Analyzed: 11/17/10					
Nitrate+Nitrite (as N)	61.1 J5	0.04	0.01	mg/L	50	23.8	75	77-119		
Matrix Spike Dup (BK01804-MSD2)		**Source: 1001627-03**			Prepared & Analyzed: 11/17/10					
Nitrate+Nitrite (as N)	58.0 J5	0.04	0.01	mg/L	50	23.8	68	77-119	5	20
Batch BK01811 - TDS Prep										
Blank (BK01811-BLK1)					Prepared: 11/15/10 Analyzed: 11/16/10					
Total Dissolved Solids	10 U	10	10	mg/L						
LCS (BK01811-BS1)					Prepared: 11/15/10 Analyzed: 11/16/10					
Total Dissolved Solids	982	10	10	mg/L	1000		98	90-110		
Duplicate (BK01811-DUP1)		**Source: 1001627-08**			Prepared: 11/15/10 Analyzed: 11/16/10					
Total Dissolved Solids	534	10	10	mg/L		538			0.7	24
Batch BK01814 - TDS Prep										
Blank (BK01814-BLK1)					Prepared: 11/15/10 Analyzed: 11/16/10					
Total Dissolved Solids	10 U	10	10	mg/L						

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Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BK01814 - TDS Prep										
LCS (BK01814-BS1)					Prepared: 11/15/10 Analyzed: 11/16/10					
Total Dissolved Solids	974	10	10	mg/L	1000		97	90-110		
Duplicate (BK01814-DUP1)		**Source: 1001627-25**			Prepared: 11/15/10 Analyzed: 11/16/10					
Total Dissolved Solids	552	10	10	mg/L		540			2	24
Batch BK01836 - TDS Prep										
Blank (BK01836-BLK1)					Prepared & Analyzed: 11/18/10					
Total Dissolved Solids	10 U	10	10	mg/L						
LCS (BK01836-BS1)					Prepared & Analyzed: 11/18/10					
Total Dissolved Solids	968	10	10	mg/L	1000		97	90-110		
Batch BK01919 - Nitrate 353.2 by seal										
Blank (BK01919-BLK1)					Prepared & Analyzed: 11/18/10					
Nitrate+Nitrite (as N)	0.01 U	0.04	0.01	mg/L						
Blank (BK01919-BLK2)					Prepared & Analyzed: 11/18/10					
Nitrate+Nitrite (as N)	0.0100 I	0.04	0.01	mg/L						
LCS (BK01919-BS1)					Prepared & Analyzed: 11/18/10					
Nitrate+Nitrite (as N)	0.929	0.04	0.01	mg/L	1.0		93	90-110		
LCS (BK01919-BS2)					Prepared & Analyzed: 11/18/10					
Nitrate+Nitrite (as N)	0.953	0.04	0.01	mg/L	1.0		95	90-110		

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Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BK02002 - Digestion for TKN by EPA 351.2										
Blank (BK02002-BLK1)					Prepared & Analyzed: 11/19/10					
Total Kjeldahl Nitrogen	0.05 U	0.20	0.05	mg/L						
Blank (BK02002-BLK2)					Prepared & Analyzed: 11/19/10					
Total Kjeldahl Nitrogen	0.05 U	0.20	0.05	mg/L						
LCS (BK02002-BS1)					Prepared & Analyzed: 11/19/10					
Total Kjeldahl Nitrogen	2.28	0.20	0.05	mg/L	2.5		91	90-110		
LCS (BK02002-BS2)					Prepared & Analyzed: 11/19/10					
Total Kjeldahl Nitrogen	2.52	0.20	0.05	mg/L	2.5		101	90-110		
Matrix Spike (BK02002-MS2)		**Source: 1001627-09**			Prepared & Analyzed: 11/19/10					
Total Kjeldahl Nitrogen	3.63	0.20	0.05	mg/L	2.5	1.24	95	80-120		
Matrix Spike Dup (BK02002-MSD2)		**Source: 1001627-09**			Prepared & Analyzed: 11/19/10					
Total Kjeldahl Nitrogen	3.72	0.20	0.05	mg/L	2.5	1.24	99	80-120	3	20
Batch BK02410 - Digestion for TKN by EPA 351.2										
Blank (BK02410-BLK1)					Prepared: 11/24/10 Analyzed: 11/29/10					
Total Kjeldahl Nitrogen	0.05 U	0.20	0.05	mg/L						
Blank (BK02410-BLK2)					Prepared: 11/24/10 Analyzed: 11/29/10					
Total Kjeldahl Nitrogen	0.05 U	0.20	0.05	mg/L						
LCS (BK02410-BS1)					Prepared: 11/24/10 Analyzed: 11/29/10					
Total Kjeldahl Nitrogen	2.54	0.20	0.05	mg/L	2.5		102	90-110		

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Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BK02410 - Digestion for TKN by EPA 351.2										
LCS (BK02410-BS2)					Prepared: 11/24/10 Analyzed: 11/29/10					
Total Kjeldahl Nitrogen	2.70	0.20	0.05	mg/L	2.5		108	90-110		
Batch BL01630 - TSS prep										
Blank (BL01630-BLK1)					Prepared: 12/15/10 Analyzed: 12/16/10					
Total Suspended Solids	1 U	1	1	mg/L						
LCS (BL01630-BS1)					Prepared & Analyzed: 12/16/10					
Total Suspended Solids	48.5	1	1	mg/L	50		97	85-115		
Batch BL02015 - Nitrate 353.2 by seal										
Blank (BL02015-BLK1)					Prepared & Analyzed: 12/20/10					
Nitrate+Nitrite (as N)	0.01 U	0.04	0.01	mg/L						
Blank (BL02015-BLK2)					Prepared & Analyzed: 12/20/10					
Nitrate+Nitrite (as N)	0.01 U	0.04	0.01	mg/L						
LCS (BL02015-BS1)					Prepared & Analyzed: 12/20/10					
Nitrate+Nitrite (as N)	0.784	0.04	0.01	mg/L				90-110		
LCS (BL02015-BS2)					Prepared & Analyzed: 12/20/10					
Nitrate+Nitrite (as N)	0.784	0.04	0.01	mg/L				90-110		
Batch BL02401 - Digestion for TKN by EPA 351.2										
Blank (BL02401-BLK1)					Prepared: 12/23/10 Analyzed: 12/24/10					
Total Kjeldahl Nitrogen	0.05 U	0.20	0.05	mg/L						

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Batch BL02401 - Digestion for TKN by EPA 351.2										
Blank (BL02401-BLK2)					Prepared: 12/23/10 Analyzed: 12/24/10					
Total Kjeldahl Nitrogen	0.05 U	0.20	0.05	mg/L						
LCS (BL02401-BS1)					Prepared: 12/23/10 Analyzed: 12/24/10					
Total Kjeldahl Nitrogen	2.52	0.20	0.05	mg/L	2.5		101	90-110		
LCS (BL02401-BS2)					Prepared: 12/23/10 Analyzed: 12/24/10					
Total Kjeldahl Nitrogen	2.51	0.20	0.05	mg/L	2.5		101	90-110		
Batch BL02713 - Nitrate 353.2 by seal										
Blank (BL02713-BLK1)					Prepared & Analyzed: 12/28/10					
Nitrate+Nitrite (as N)	0.01 U	0.04	0.01	mg/L						
LCS (BL02713-BS1)					Prepared & Analyzed: 12/28/10					
Nitrate+Nitrite (as N)	0.814	0.04	0.01	mg/L	0.80		102	90-110		

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Revised Report

* Qualifiers, Notes and Definitions

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 limts 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.

Q	Sample held beyond the accepted holding time.
J5	Matrix spike of this sample was outside typical range. All other QC criteria were acceptable.

Results with a "Q" qualifier were originally analyzed within holding time. They were re-run out of holding time to verify or correct original results.

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

SAL Project No. 1001627

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

Matrix Codes: DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water

SAL Use Only Sample No.	Sample Description	Date	Time	Matrix	Composite	Grab	PARAMETER / CONTAINER DESCRIPTION: 1LP, Cool Alkalinity, CBOD, TSS, TDS	1LP, Cool SO4	1LP, Zn Acetate/NaOH Hydrogen Sulfide No Headspace	250ml P H2SO4 (TKN/NH3/NOx)	ORP (Client meter)	Field pH	Field Temp	Field Cond	Field DO
01	PNRS II STE-T1	11/10/10	1350	WW		X	1	1	1	1					
02	RC31		1250	WW		X	1			1					
03	RC2		1300	WW		X	1			1					
04	RC3		1310	WW		X	1			1					
05	RC4		1320	WW		X	1			1					
06	RC5		1610	WW		X	1			1					
07	P15-T		1345	WW		X	1			1					
08	UNSAT-IS1		1003	WW		X	1	1	1	1					
09	UNSAT-IS2		0945	WW		X	1	1	1	1					
10	UNSAT-IS3		—	WW		X	~~1~~	~~1~~	~~1~~	~~1~~					
11	UNSAT-IS4		1515	WW		X	~~1~~	(1)	~~1~~	(1)					
12	UNSAT-EC1		1600	WW		X	1	1	1	1					

Containers Prepared/ Relinquished:	Date/Time: 1130 11-08-10	Received:	Date/Time: 11/9/10 1430
Relinquished:	Date/Time: 11/10/10 1750	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:

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

Instructions / Remarks

#11 (IS-4) NOx (1) SO4 (2) NH3 (3) TKN (4)
(LIMITED VOLUME SAMPLE)

#10 (IS-3) No Sample

1001627

Chain of Custody

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

SAL Project No. 1001627

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

Matrix Codes: DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water

SAL Use Only Sample No.	Sample Description	Date	Time	Matrix	Composite	Grab	PARAMETER / CONTAINER DESCRIPTION: 1LP, Cool Alkalinity, CBOD, TSS, TDS	1LP, Cool SO4	1LP, Zn Acetate/NaOH Hydrogen Sulfide **No Headspace**	250ml P, H2SO4 TKN, NH3, NoX, COD	**ORP (Client meter)**	**Field pH**	**Field Temp**	**Field Cond**	**Field DO**
13	UNSAT-SA2	11/10/10	1110	WW		X	1			1					
14	UNSAT-EC3		1530	WW		X	1			1					
15	UNSAT-EC4		1120	WW		X	1			1					
16	UNSAT-CL1		1540	WW		X	1	1	1	1					
17	UNSAT-CL2		1130	WW		X	1			1					
18	UNSAT-CL3		1550	WW		X	1			1					
19	UNSAT-CL4		1140	WW		X	1			1					
20	UNSAT-PS1		1350	WW		X	1			1					
21	DENIT-SU1		1015	WW		X	1	1	1	1					
22	DENIT-SU2		1025	WW		X	1	1	1	1					
23	DENIT-SU3		1330	WW		X	1	1	1	1					
24	DENIT-SU4		1340	WW		X	1	1	1	1					

Containers Prepared/ Relinquished:	Date/Time: 1130 11-08-10	Received:	Date/Time: 1430 11/09/10
Relinquished:	Date/Time: 1750 11/14/10	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:

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

Instructions / Remarks

1001627

Chain of Custody

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

SAL Project No. 1001627

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

Matrix Codes:
DW-Drinking Water WW-Wastewater
SW-SurfaceWater SL-Sludge SO-Soil
GW-Groundwater SA-Saline Water O-Other
R-Reagent Water

SAL Use Only Sample No.	Sample Description	Date	Time	Matrix	Composite	Grab	PARAMETER / CONTAINER DESCRIPTION: 1LP, Cool Alkalinity, CBOD, TSS, TDS	1LP, Cool SO4	1LP, Zn Acetate/NaOH Hydrogen Sulfide No Headspace	250ml P, H2SO4 TKN, NH3, NoX, COD	ORP (Client meter)	Field pH	Field Temp	Field Cond	Field DO
25	DENIT-LS1	11/10/10	1040	WW		X	1			1					
26	DENIT-LS2		1215	WW		X	1			1					
27	DENIT-LS3		1230	WW		X	1			1					
28	DENIT-LS4		1205	WW		X	1			1					
29	DENIT-GL1		1055	WW		X	1			1					
30	DFT		1150	WW		X	1	1	1	1					
31	T1-D		1400	WW		X	1			1					
32	FB		1500	WW		X	1			1					
33	EB		1410	WW		X	1			1					

Containers Prepared/ Relinquished:	Date/Time: 1130 11-08-10	Received:	Date/Time: 1430 11/09/10
Relinquished:	Date/Time: 1750 11/10/10	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:

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

Instructions / Remarks

1001627

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

Chain of Custody

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

WASTEWATER SAMPLING LOG

Client Name:		Location:	PNRS II STE-71	Contact:			
				Phone:			
Date of Sample:	11/16/10	SAL Project #	1001627	Project Name:			
SAL Audit Performed:	Y (N)	Auditor Name:		Client Representative on Site?	(Y) N	Rep. Name:	
		Signature:				Signature:	

SAMPLE DATA

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

COMPOSITE DATA Composite ID Number:

START	Date:		Time:	Compositor Set-up By:	
STOP	Date:		Time:	Compositor Picked-up By:	

Composite Type:	Time Flow Continuous	Collect Sample Every:		Minutes Gallons
Calibrated Sample Volume:		mLs		
Programmed Number of Samples:		Actual Number of Samples Collected:		
Final Compositor Temperature:		°C	Ice Present in Compositor at Pick-up?	Yes No

GRAB SAMPLE DATA Grab ID Number: .01

Date Collected:	11/16/10	Time Collected:	1350	Collected By:	

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.2	SU		SAL-SAM-63-03
Temperature	25.1	°C		SAL-SAM-63-Calib-03
CRP Temperature Verification with Secondary Source	-235.0	°C MV		SAL-SAM-006-Calib-02
Specific Conductance	1,25[illegible]	µmhos/cm		SAL-SAM-63-03
Dissolved Oxygen	2.46	mg/L		SAL-SAM-55-Calib-02
~~Turbidity~~	—	~~NTU~~	—	~~SAL-SAM-005-~~
~~Residual Chlorine~~	—	—	—	~~SAL-SAM-006-~~
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:		Date	11/16/10	
		Date		
Reviewed By:		Date:		

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

WASTEWATER SAMPLING LOG

Client Name:		Location:	RC 1	Contact:			
				Phone:			
Date of Sample:	11/10/10	SAL Project #	1001627	Project Name:			
SAL Audit Performed:	Y (N)	Auditor Name:		Client Representative on Site?	(Y) N	Rep. Name:	
		Signature:				Signature:	

SAMPLE DATA

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

COMPOSITE DATA Composite ID Number:

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

GRAB SAMPLE DATA Grab ID Number: 02

Date Collected:	11/10/10	Time Collected:	1250	Collected By:	TM

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.3	SU		SAL-SAM-63-03
Temperature	20.6	°C		SAL-SAM-63-Client
Temperature Verification with Secondary Source	57.0	°C		SAL-SAM-006-Client
Specific Conductance	1,000	µmhos/cm		SAL-SAM-63-03
Dissolved Oxygen	2.10	mg/L		SAL-SAM-55-Client
~~Turbidity~~	—	~~NTU~~	—	~~SAL-SAM-005-~~
Residual Chlorine	—	—	—	~~SAL-SAM-006-~~
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:	TM	Date	11/10/10	
		Date		
Reviewed By:		Date:		

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

WASTEWATER SAMPLING LOG

Client Name:		Location:	RC2	Contact:			
				Phone:			
Date of Sample:	11/10/10	SAL Project #	1001627	Project Name:			
SAL Audit Performed:	Y (N)	Auditor Name:		Client Representative on Site?	(Y) N	Rep. Name:	
		Signature:				Signature:	

SAMPLE DATA

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

COMPOSITE DATA

Composite ID Number:

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

GRAB SAMPLE DATA

Grab ID Number: 03

Date Collected:	11/10/10	Time Collected:	1300	Collected By:	TM

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.2	SU		SAL-SAM-63- 03
Temperature	19.5	°C		~~SAL-SAM-63-~~ Combined
ORP Temperature Verification with ~~Secondary~~ Source	58.5	~~°C~~ mV		~~SAL-SAM-~~006- Combined
Specific Conductance	1,020	µmhos/cm		SAL-SAM-63- 03
Dissolved Oxygen	1.60	mg/L		~~SAL-SAM-55-~~ Combined
Turbidity		NTU		SAL-SAM-005-
Residual Chlorine				SAL-SAM-006-
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:		Date	11/10/10	
		Date		
Reviewed By:		Date:		

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

WASTEWATER SAMPLING LOG

Client Name:		Location:	RC 3	Contact:			
Date of Sample:	11/10/10	SAL Project #	1001627	Phone:		Project Name:	
SAL Audit Performed:	Y N	Auditor Name:		Client Representative on Site?	Y N	Rep. Name:	
		Signature:				Signature:	

SAMPLE DATA

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

COMPOSITE DATA Composite ID Number:

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

GRAB SAMPLE DATA Grab ID Number: .04

Date Collected:	11/10/10	Time Collected:	1310	Collected By:	Tim

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.2	SU		SAL-SAM-63- 03
Temperature	19.2	°C		SAL-SAM-63- [illegible]
Temperature Verification with ~~Secondary Source~~	57.5	°C mV		SAL-SAM-006- [illegible]
Specific Conductance	1,040	µmhos/cm		SAL-SAM-63-03
Dissolved Oxygen	2.30	mg/L		SAL-SAM-55- [illegible]
~~Turbidity~~	—	~~NTU~~	—	~~SAL-SAM-005-~~
~~Residual Chlorine~~	—	—	—	~~SAL-SAM-006-~~
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:		Date	11/10/10	
		Date		
Reviewed By:		Date:		

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

WASTEWATER SAMPLING LOG

Client Name:		Location:	RC 4	Contact:			
Date of Sample:	11/10/10	SAL Project #	1001627	Phone:			
SAL Audit Performed:	Y (N)	Auditor Name:		Project Name:			
		Signature:		Client Representative on Site?	(Y) N	Rep. Name:	
						Signature:	

SAMPLE DATA

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

COMPOSITE DATA Composite ID Number:

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

GRAB SAMPLE DATA Grab ID Number: 05

Date Collected:	11/10/10	Time Collected:	1320	Collected By:	TM

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.4	SU		SAL-SAM-63-
Temperature	19.7	°C		SAL-SAM-63-
Temperature Verification with ~~Secondary Source~~	459.3 TM	~~°C~~ mV		SAL-SAM-006-
Specific Conductance	1,090	µmhos/cm		SAL-SAM-63-
Dissolved Oxygen	1.90	mg/L		SAL-SAM-55-
~~Turbidity~~	~~5~~	~~NTU~~	~~—~~	~~SAL-SAM-005-~~
~~Residual Chlorine~~	~~—~~	~~—~~	~~—~~	~~SAL-SAM-006-~~
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:		Date	11/10/10	
		Date		
Reviewed By:		Date:		

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

WASTEWATER SAMPLING LOG

Client Name:		Location:	RC 5	Contact:	
Date of Sample:	11/16/11	SAL Project #	1001627	Phone:	
SAL Audit Performed: Y (N)	Auditor Name:		Client Representative on Site? (Y) N	Project Name:	
	Signature:			Rep. Name:	
				Signature:	

SAMPLE DATA

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

COMPOSITE DATA

Composite ID Number:

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

GRAB SAMPLE DATA

Grab ID Number: .06

Date Collected:	11/16/11	Time Collected:	1610	Collected By:	TM

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.3	SU		SAL-SAM-63-
Temperature	22.0	°C		SAL-SAM-63-
~~Temperature~~ Verification with Secondary Source	96.0	°C		SAL-SAM-006-
Specific Conductance	1,050	µmhos/cm		SAL-SAM-63-
Dissolved Oxygen	3.30	mg/L		SAL-SAM-55-
~~Turbidity~~	—	~~NTU~~	—	~~SAL-SAM-005-~~
Residual Chlorine	—	—	—	SAL-~~SAM-006-~~
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:		Date	11/16/11	
		Date		
Reviewed By:		Date:		

CRP

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

WASTEWATER SAMPLING LOG

Client Name:		Location:	P15 - T	Contact:			
Date of Sample:	11/10/15	SAL Project #	1001627	Phone:		Project Name:	
SAL Audit Performed:	Y N	Auditor Name:		Client Representative on Site?	Y N	Rep. Name:	
		Signature:				Signature:	

SAMPLE DATA

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

COMPOSITE DATA Composite ID Number:

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

GRAB SAMPLE DATA Grab ID Number: 07

Date Collected:	11/10/15	Time Collected:	1345	Collected By:	TM

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.4	SU		SAL-SAM-63-03
Temperature	20.7	°C		~~SAL-SAM-63-~~ Circle F
Temperature Verification with ~~Secondary~~ Source	18.8	°C		~~SAL-SAM-006-~~ Circle F
Specific Conductance	970	µmhos/cm		SAL-SAM-63- 03
Dissolved Oxygen	7.1	mg/L		~~SAL-SAM-55-~~ Circle F
~~Turbidity~~	—	~~NTU~~	—	~~SAL-SAM-005-~~
~~Residual Chlorine~~	—	—	—	~~SAL-SAM-006-~~
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:		Date	11/10/15	
		Date		
Reviewed By:		Date:		

ORP

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

WASTEWATER SAMPLING LOG

Client Name:		Location:	UNSAT-IS 1	Contact:			
Date of Sample:	11/10/10	SAL Project #	1001627	Phone:		Project Name:	
SAL Audit Performed:	Y (N)	Auditor Name:		Client Representative on Site?	(Y) N	Rep. Name:	
		Signature:				Signature:	

SAMPLE DATA

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

COMPOSITE DATA Composite ID Number:

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

GRAB SAMPLE DATA Grab ID Number: 08

Date Collected:	11/10/10	Time Collected:	1000	Collected By:	TM

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	6.8	SU		SAL-SAM-63- 03
Temperature	20.5	°C		SAL-SAM-63- Correct →
ORP Temperature Verification with ~~Secondary Source~~	-161.0	~~°C~~ mV		SAL-SAM-006- Correct →
Specific Conductance	1,120	µmhos/cm		SAL-SAM-63- 03
Dissolved Oxygen	1.90	mg/L		SAL-SAM-55- Correct →
~~Turbidity~~	—	~~NTU~~	—	~~SAL-SAM-005-~~
~~Residual~~ Chlorine	—	—	—	SAL-SAM-006-
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:	TM	Date	11/10/10	
		Date		
Reviewed By:		Date:		

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

WASTEWATER SAMPLING LOG

Client Name:		Location:	UNSAT-152	Contact:			
				Phone:			
Date of Sample:	11/10/10	SAL Project #	1001627	Project Name:			
SAL Audit Performed:	Y / N	Auditor Name:		Client Representative on Site?	Y / N	Rep. Name:	
		Signature:				Signature:	

SAMPLE DATA

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

COMPOSITE DATA Composite ID Number:

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

GRAB SAMPLE DATA Grab ID Number: .09

Date Collected:	11/10/10	Time Collected:	0945	Collected By:	TM

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	6.8	SU		SAL-SAM-63-03
Temperature	19.2	°C		SAL-SAM-63- CLIENT
ORP Temperature ~~Verification~~ with Secondary Source	-130.0	~~°C~~ mV		~~SAL-SAM-006~~ CLIENT
Specific Conductance	1,300	µmhos/cm		SAL-SAM-63- 03
Dissolved Oxygen	0.80	mg/L		SAL-SAM-55- CLIENT
~~Turbidity~~	—	~~NTU~~	—	~~SAL-SAM-005~~
~~Residual~~ Chlorine	—	—	—	~~SAL-SAM-006~~
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:		Date	11/10/10	
		Date		
Reviewed By:		Date:		

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WASTEWATER SAMPLING LOG

Client Name:		Location:	UNSAT #3	Contact:			
Date of Sample:	11/10/16	SAL Project #	1001627	Phone:		Project Name:	
SAL Audit Performed:	Y (N)	Auditor Name:		Client Representative on Site?	(Y) N	Rep. Name:	
		Signature:				Signature:	

SAMPLE DATA

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

COMPOSITE DATA

Composite ID Number:

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

GRAB SAMPLE DATA

Grab ID Number: 10

Date Collected:	11/10/16	Time Collected:	~~1305~~	Collected By:	TM

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH		SU		SAL-SAM-63-
Temperature		°C		SAL-SAM-63-
Temperature Verification with Secondary Source		°C		SAL-SAM-006-
Specific Conductance		µmhos/cm		SAL-SAM-63-
Dissolved Oxygen		mg/L		SAL-SAM-55-
Turbidity		NTU		SAL-SAM-005-
Residual Chlorine				SAL-SAM-006-
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:	Low Volume - No Sample			
Sampler(s) Signature:		Date	11/10/16	
		Date		
Reviewed By:		Date:		

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WASTEWATER SAMPLING LOG

Client Name:		Location:	UNSAT-154	Contact:			
				Phone:			
Date of Sample:	11/10/10	SAL Project #	100627	Project Name:			
SAL Audit Performed:	Y N	Auditor Name:		Client Representative on Site?	Y N	Rep. Name:	
		Signature:				Signature:	

SAMPLE DATA

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

COMPOSITE DATA Composite ID Number:

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

GRAB SAMPLE DATA Grab ID Number: 11

Date Collected:	11/10/10	Time Collected:	1515	Collected By:	TM

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH		SU		SAL-SAM-63-
Temperature		°C		SAL-SAM-63-
Temperature Verification with Secondary Source		°C		SAL-SAM-006-
Specific Conductance		µmhos/cm		SAL-SAM-63-
Dissolved Oxygen		mg/L		SAL-SAM-55-
Turbidity		NTU		SAL-SAM-005-
Residual Chlorine				SAL-SAM-006-
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:	- Low Volume - No Rinsate			
Sampler(s) Signature:	TM	Date	11/10/10	
		Date		
Reviewed By:		Date:		

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WASTEWATER SAMPLING LOG

Client Name:		Location:	UNSAT-EC1	Contact:	
				Phone:	
Date of Sample:	11/10/10	SAL Project #	1001627	Project Name:	
SAL Audit Performed: Y (N)	Auditor Name:		Client Representative on Site? (Y) N	Rep. Name:	
	Signature:			Signature:	

SAMPLE DATA

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

COMPOSITE DATA

Composite ID Number:

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

GRAB SAMPLE DATA

Grab ID Number: ,12

Date Collected:	11/10/10	Time Collected:	1600	Collected By:	Tm

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	6.9	SU		SAL-SAM-63-
Temperature	20.6	°C		SAL-SAM-63-
Temperature Verification with ~~Secondary Source~~	108.0	°C		SAL-SAM-006-
Specific Conductance	1,150	µmhos/cm		SAL-SAM-63-
Dissolved Oxygen	7.10	mg/L		SAL-SAM-55-
~~Turbidity~~		~~NTU~~		SAL-SAM-005-
Residual Chlorine				SAL-SAM-006-
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:		Date	11/10/10	
		Date		
Reviewed By:		Date:		

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SOUTHERN ANALYTICAL LABORATORIES, INC.
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WASTEWATER SAMPLING LOG

Client Name:		Location:	UNsat - SA2	Contact:			
				Phone:			
Date of Sample:	11/10/10	SAL Project #:	1001627	Project Name:			
SAL Audit Performed:	Y (N)	Auditor Name:		Client Representative on Site?	(Y) N	Rep. Name:	
		Signature:				Signature:	

SAMPLE DATA

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

COMPOSITE DATA

Composite ID Number:

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

GRAB SAMPLE DATA

Grab ID Number: 13

Date Collected:	11/10/10	Time Collected:	1110	Collected By:	

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	6.9	SU		SAL-SAM-63- 03
Temperature	22.5	°C		~~SAL-SAM-63-~~ Calibrated
~~Temperature Verification~~ with Secondary Source (ORP)	47.5	~~°C~~ mV		~~SAL-SAM-006-~~ Calibrated
Specific Conductance	930	µmhos/cm		SAL-SAM-63- 03
Dissolved Oxygen	7.70	mg/L		~~SAL-SAM-55-~~ Calibrated
~~Turbidity~~	—	~~NTU~~	—	~~SAL-SAM-005-~~
~~Residual Chlorine~~	—	—	—	~~SAL-SAM-006-~~
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				

Sampler(s) Signature:		Date	
		Date	
Reviewed By:		Date:	

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WASTEWATER SAMPLING LOG

Client Name:		Location:	UNSAT-EC3	Contact:			
Date of Sample:	11/10/16	SAL Project #	1001627	Phone:		Project Name:	
SAL Audit Performed:	Y N	Auditor Name:		Client Representative on Site?	Y N	Rep. Name:	
		Signature:				Signature:	

SAMPLE DATA

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

COMPOSITE DATA Composite ID Number:

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

GRAB SAMPLE DATA Grab ID Number: .14

Date Collected:	11/10/16	Time Collected:	1530	Collected By:	

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	6.8	SU		SAL-SAM-63-
Temperature	21.5	°C		SAL-SAM-63-
Temperature Verification with Secondary Source	105.0	~~°C~~ mV		SAL-SAM-006-
Specific Conductance	1,250	µmhos/cm		SAL-SAM-63-
Dissolved Oxygen	6.80	mg/L		SAL-SAM-55-
Turbidity	—	NTU	—	SAL-SAM-005-
Residual Chlorine	—	—	—	SAL-~~SAM~~-006-
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:		Date	11/10/16	
		Date		
Reviewed By:		Date:		

CRP

SOUTHERN ANALYTICAL LABORATORIES, INC.
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WASTEWATER SAMPLING LOG

Client Name:		Location:	UNSAT-EC4	Contact:			
Date of Sample:	11/10/11	SAL Project #:	100627	Phone:			
SAL Audit Performed: Y (N)	Auditor Name:		Client Representative on Site?	(Y) N	Project Name:		
	Signature:				Rep. Name:		
					Signature:		

SAMPLE DATA

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

COMPOSITE DATA

Composite ID Number:

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

GRAB SAMPLE DATA

Grab ID Number: 15

Date Collected:	11/10/11	Time Collected:	1120	Collected By:	TM

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	6.5	SU		SAL-SAM-63-23
Temperature	22.2	°C		~~SAL-SAM-63-~~ Cell
ORP: ~~Temperature Verification with Secondary Source~~	46.5	~~°C~~ mV		~~SAL-SAM-006-~~ Cell
Specific Conductance	980	µmhos/cm		SAL-SAM-63-23
Dissolved Oxygen	7.3	~~mg/L~~	—	~~SAL-SAM-55-~~ Cell
Turbidity	—	~~NTU~~	—	~~SAL-SAM-005-~~
Residual Chlorine	—	—	—	SAL-~~SAM-006-~~
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				

Sampler(s) Signature:		Date	
		Date	
Reviewed By:		Date:	

SOUTHERN ANALYTICAL LABORATORIES, INC.
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WASTEWATER SAMPLING LOG

Client Name:		Location:	USAT- CL1	Contact:			
Date of Sample:	11/10/10	SAL Project #	1001627	Phone:		Project Name:	
SAL Audit Performed:	Y N	Auditor Name:		Client Representative on Site?	Y N	Rep. Name:	
		Signature:				Signature:	

SAMPLE DATA

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

COMPOSITE DATA

Composite ID Number:

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

GRAB SAMPLE DATA

Grab ID Number: 16

Date Collected:	11/10/10	Time Collected:	1340	Collected By:	TM

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.1	SU		SAL-SAM-63-
Temperature	22.0	°C		SAL-SAM-63-
~~Temperature Verification with Secondary Source~~ (CAP)	105.5	°C M		SAL-SAM-006-
Specific Conductance	1,130	µmhos/cm		SAL-SAM-63-
Dissolved Oxygen	7.30	mg/L		SAL-SAM-55-
~~Turbidity~~	—	~~NTU~~	—	~~SAL-SAM-~~005-
~~Residual Chlorine~~	—	—	—	SAL-~~SAM-~~006-
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:		Date	11/10/10	
		Date		
Reviewed By:		Date:		

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

WASTEWATER SAMPLING LOG

Client Name:		Location:	UNSAT CL2	Contact:			
Date of Sample:	11/10/20	SAL Project #	1001627	Phone:			
				Project Name:			
SAL Audit Performed:	Y / N	Auditor Name:		Client Representative on Site?	Y / N	Rep. Name:	
		Signature:				Signature:	

SAMPLE DATA

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

COMPOSITE DATA — Composite ID Number:

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

GRAB SAMPLE DATA — Grab ID Number: .17

Date Collected:	11/10/20	Time Collected:	1130	Collected By:	TM

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.0	SU		SAL-SAM-63- 03
Temperature	23.1	°C		~~SAL-SAM-63-~~ Comp
ORP Temperature Verification with Secondary Source	50.2	~~°C~~ mV		~~SAL-SAM-006-~~ Comp
Specific Conductance	1,000	µmhos/cm		SAL-SAM-63- 03
Dissolved Oxygen	58.4	mg/L		~~SAL-SAM-55-~~ Comp
~~Turbidity~~	TM	~~NTU~~		SAL-SAM-005-
~~Residual~~ Chlorine				~~SAL-SAM-006-~~
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:		Date	11/10/20	
		Date		
Reviewed By:		Date:		

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SOUTHERN ANALYTICAL LABORATORIES, INC.
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WASTEWATER SAMPLING LOG

Client Name:		Location:	UNSAT - CL3	Contact:	
				Phone:	
Date of Sample:	11/6/20	SAL Project #:	100167	Project Name:	
SAL Audit Performed: Y N	Auditor Name:		Client Representative on Site? Y N	Rep. Name:	
	Signature:			Signature:	

SAMPLE DATA

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

COMPOSITE DATA

Composite ID Number:

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

GRAB SAMPLE DATA

Grab ID Number: 18

Date Collected:	11/6/20	Time Collected:	1550	Collected By:	

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.4	SU		SAL-SAM-63-
Temperature	22.0	°C		SAL-SAM-63-
ORP Temperature Verification with Secondary Source	100.5	~~°C~~ mV		SAL-SAM-006-
Specific Conductance	1,250	µmhos/cm		SAL-SAM-63-
Dissolved Oxygen	7.60	mg/L		SAL-SAM-55-
~~Turbidity~~	—	~~NTU~~	—	~~SAL-SAM-005-~~
~~Residual~~ Chlorine	✓	✓	—	SAL-~~SAM-006-~~
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:		Date	11/6/20	
		Date		
Reviewed By:		Date:		

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WASTEWATER SAMPLING LOG

Client Name:		Location:	UNSAT CL4	Contact:			
Date of Sample:	11/10/10	SAL Project #:	1001627	Phone:			
SAL Audit Performed:	Y (N)	Auditor Name:		Project Name:			
		Signature:		Client Representative on Site?	Y N	Rep. Name:	
						Signature:	

SAMPLE DATA

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

COMPOSITE DATA

Composite ID Number:

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

GRAB SAMPLE DATA

Grab ID Number: 19

Date Collected:	11/10/10	Time Collected:	1140	Collected By:	TM

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.2	SU		SAL-SAM-63- C3
Temperature	23.5	°C		SAL-SAM-63- Calibrated
Temperature Verification with ~~Secondary~~ Source (CRC)	52.8	~~°C~~ mV		SAL-SAM-006- Calibrated
Specific Conductance	1,040	µmhos/cm		SAL-SAM-63- C3
Dissolved Oxygen	8.0	mg/L		SAL-SAM-55- Calibrated
~~Turbidity~~	—	~~NTU~~	—	~~SAL-SAM-005-~~
Residual Chlorine	—	—	—	SAL-SAM-006-
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:		Date	11/10/10	
		Date		
Reviewed By:		Date:		

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WASTEWATER SAMPLING LOG

Client Name:		Location:	UNSAT-PSI	Contact:			
				Phone:			
Date of Sample:	11/10/10	SAL Project #	1001627	Project Name:			
SAL Audit Performed:	Y N	Auditor Name:		Client Representative on Site?	Y N	Rep. Name:	
		Signature:				Signature:	

SAMPLE DATA

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

COMPOSITE DATA

Composite ID Number:

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

GRAB SAMPLE DATA

Grab ID Number: 120

Date Collected:	11/10/10	Time Collected:	1350	Collected By:	TM

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.2	SU		SAL-SAM-63-63
Temperature	23.8	°C		SAL-SAM-63-Calibrated
Temperature Verification with ~~Secondary Source~~	90.0	°C mV		SAL-SAM-006-Calibrated
Specific Conductance	950	µmhos/cm		SAL-SAM-63-63
Dissolved Oxygen	7.80	mg/L		SAL-SAM-55-Calibrated
~~Turbidity~~	—	~~NTU~~		~~SAL-SAM-005-~~
Residual Chlorine	✓	✓	✓	~~SAL-SAM-006-~~
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:		Date	11/10/10	
		Date		
Reviewed By:		Date:		

CRP

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WASTEWATER SAMPLING LOG

Client Name:		Location:	DENIT-SU2	Contact:			
				Phone:			
Date of Sample:	11/10/11	SAL Project #	100627	Project Name:			
SAL Audit Performed:	Y (N)	Auditor Name:		Client Representative on Site?	(Y) N	Rep. Name:	
		Signature:				Signature:	

SAMPLE DATA

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

COMPOSITE DATA

Composite ID Number:

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

GRAB SAMPLE DATA

Grab ID Number: 21

Date Collected:	11/10/11	Time Collected:	1015	Collected By:	TM

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	6.9	SU		SAL-SAM-63- 07
Temperature	28.0	°C		SAL-SAM-63- Cccc
ORP Temperature Verification with Secondary Source	-270.0	~~°C~~ mV		~~SAL-SAM-006-~~ Cccc
Specific Conductance	1,250	µmhos/cm		SAL-SAM-63- 03
Dissolved Oxygen	1.60	mg/L		~~SAL-SAM-55-~~ Cccc
~~Turbidity~~	—	~~NTU~~	—	~~SAL-SAM-005-~~
Residual Chlorine	—		—	SAL-~~SAM-006-~~
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				

Sampler(s) Signature:		Date	
		Date	
Reviewed By:		Date:	

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WASTEWATER SAMPLING LOG

Client Name:		Location:	DENIT-SU2	Contact:			
Date of Sample:	11/10/10	SAL Project #	1001627	Phone:			
SAL Audit Performed:	Y (N)	Auditor Name:		Project Name:			
		Signature:		Client Representative on Site?	(Y) N	Rep. Name:	
						Signature:	

SAMPLE DATA

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

COMPOSITE DATA

Composite ID Number:

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

GRAB SAMPLE DATA

Grab ID Number: i22

Date Collected:	11/10/10	Time Collected:	1025	Collected By:	TM

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.0	SU		SAL-SAM-63-03
Temperature	25.5	°C		SAL-SAM-63- Current
ORP Temperature Verification with Secondary Source	-90.0	~~°C~~ mV		~~SAL-SAM-006-~~ Current
Specific Conductance	1,350	µmhos/cm		SAL-SAM-63-03
Dissolved Oxygen	0.20	mg/L		~~SAL-SAM-55-~~ Current
~~Turbidity~~	—	~~NTU~~	—	SAL-SAM-005-
Residual Chlorine	—	—	—	SAL-SAM-006-
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:		Date		
		Date		
Reviewed By:		Date:		

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WASTEWATER SAMPLING LOG

Client Name:		Location:	DENIT-SU3	Contact:			
Date of Sample:	11/10/10	SAL Project #	1001627	Phone:			
SAL Audit Performed:	Y (N)	Auditor Name:		Client Representative on Site?	(Y) N	Project Name:	
		Signature:				Rep. Name:	
						Signature:	

SAMPLE DATA

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

COMPOSITE DATA Composite ID Number:

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

GRAB SAMPLE DATA Grab ID Number: 23

Date Collected:	11/10/10	Time Collected:	~~1040~~ 1330 TM	Collected By:	TM

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.2	SU		SAL-SAM-63-C3
Temperature	21.4	°C		~~SAL-SAM-63-~~ Calibrated
CRP Temperature Verification with Secondary Source	-138, 0.0 TM	°C mV		~~SAL-SAM-006-~~ Calibrated
Specific Conductance	1,480	µmhos/cm		SAL-SAM-63-C3
Dissolved Oxygen	7.0, 8.8 TM	mg/L		~~SAL-SAM-55-~~ Calibrated
~~Turbidity~~	—	~~NTU~~	—	~~SAL-SAM-005-~~
~~Residual Chlorine~~	—	✓	—	SAL-~~SAM-006-~~
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:	TM	Date	11/10/10	
		Date		
Reviewed By:		Date:		

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WASTEWATER SAMPLING LOG

Client Name:		Location:	DENIT 504	Contact:			
Date of Sample:	11/10/11	SAL Project #	100627	Phone:			
SAL Audit Performed:	Y N	Auditor Name:		Client Representative on Site?	Y N	Project Name:	
		Signature:				Rep. Name:	
						Signature:	

SAMPLE DATA

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

COMPOSITE DATA Composite ID Number:

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

GRAB SAMPLE DATA Grab ID Number: 24

Date Collected:	11/10/11	Time Collected:	~~405~~ 1340 TM	Collected By:	TM

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.3	SU		SAL-SAM-63-
Temperature	21.0	°C		~~SAL-SAM-63-~~ Client
Temperature Verification with Secondary Source (CRP)	-1184.0 TM	~~°C~~ mV		~~SAL-SAM-006-~~ Client
Specific Conductance	1,510	µmhos/cm		SAL-SAM-63-
Dissolved Oxygen TM	~~7.80~~	mg/L		~~SAL-SAM-55-~~ Client
~~Turbidity~~	—	~~NTU~~	—	~~SAL-SAM-005-~~
~~Residual Chlorine~~	—	—	—	~~SAL-SAM-006-~~
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:	TM	Date	11/10/11	
		Date		
Reviewed By:		Date:		

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WASTEWATER SAMPLING LOG

Client Name:		Location:	DENIT-LS1	Contact:			
Date of Sample:	11/10/10	SAL Project #	100627	Phone:			
SAL Audit Performed:	Y N	Auditor Name:		Project Name:			
		Signature:		Client Representative on Site?	Y N	Rep. Name:	
						Signature:	

SAMPLE DATA

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

COMPOSITE DATA

Composite ID Number:

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

GRAB SAMPLE DATA

Grab ID Number: 125

Date Collected:	11/10/10	Time Collected:	1040	Collected By:	TM

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.4	SU		SAL-SAM-63- 03
Temperature	21.4	°C		~~SAL-SAM-63- 03~~ Client
CRP ~~Temperature Verification~~ with Secondary Source	-120.0	°C		~~SAL-SAM-006-~~ Client
Specific Conductance TM	~~1,400~~ 970	µmhos/cm		SAL-SAM-63- 03
Dissolved Oxygen	1.10	mg/L		SAL-SAM-55- Client
~~Turbidity~~	—	~~NTU~~	—	~~SAL-SAM-005-~~
~~Residual Chlorine~~	—	—	—	~~SAL-SAM-006-~~
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				

Sampler(s) Signature:		Date	11/10/10
		Date	
Reviewed By:		Date:	

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WASTEWATER SAMPLING LOG

Client Name:		Location:	DENIT-L52	Contact:			
Date of Sample:	11/10/10	SAL Project #	1001627	Phone:			
				Project Name:			
SAL Audit Performed:	Y N	Auditor Name:		Client Representative on Site?	Y N	Rep. Name:	
		Signature:				Signature:	

SAMPLE DATA

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

COMPOSITE DATA

Composite ID Number:

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

GRAB SAMPLE DATA

Grab ID Number: 26

Date Collected:	11/10/10	Time Collected:	1215	Collected By:	

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.4	SU		SAL-SAM-63- 05
Temperature	21.5	°C		SAL-SAM-63- Cal Fail
ORP Temperature Verification with Secondary Source	71.0	°C		SAL-SAM-006- Cal Fail
Specific Conductance	1,260	µmhos/cm		SAL-SAM-63- 03
Dissolved Oxygen	4.10	mg/L		SAL-SAM-55- Cal Fail
~~Turbidity~~	—	~~NTU~~	—	~~SAL-SAM-005-~~
~~Residual Chlorine~~	—	—	—	~~SAL-SAM-006-~~
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:		Date	11/10/10	
		Date		
Reviewed By:		Date:		

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WASTEWATER SAMPLING LOG

Client Name:		Location:	DENIT-LS3	Contact:			
Date of Sample:	11/10/10	SAL Project #	001627	Phone:			
SAL Audit Performed:	Y (N)	Auditor Name:		Project Name:			
		Signature:		Client Representative on Site?	Y N	Rep. Name:	
						Signature:	

SAMPLE DATA

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

COMPOSITE DATA Composite ID Number:

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

GRAB SAMPLE DATA Grab ID Number: 27

Date Collected:	11/10/10	Time Collected:	1230	Collected By:	Tm

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	6.9	SU		SAL-SAM-63-03
Temperature	20.0	°C		SAL-SAM-63- Current
ORP Temperature Verification with ~~Secondary Source~~	67.5	~~°C~~ mV		SAL-SAM-006- Current
Specific Conductance	1,200	µmhos/cm		SAL-SAM-63-02
Dissolved Oxygen	4.70	mg/L		SAL-SAM-55- Current
~~Turbidity~~	—	~~NTU~~	—	~~SAL-SAM-005-~~
~~Residual Chlorine~~	—	—	—	~~SAL-SAM-006-~~
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:	Tom	Date	11/10/10	
		Date		
Reviewed By:		Date:		

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WASTEWATER SAMPLING LOG

Client Name:		Location:	DENIT-254	Contact:			
Date of Sample:	11/10/10	SAL Project #	1001627	Phone:			
SAL Audit Performed:	Y (N)	Auditor Name:		Client Representative on Site?	Y N	Project Name:	
		Signature:				Rep. Name:	
						Signature:	

SAMPLE DATA

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

COMPOSITE DATA Composite ID Number:

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

GRAB SAMPLE DATA Grab ID Number: 129

Date Collected:	11/10/10	Time Collected:	1205	Collected By:	TM

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.3	SU		SAL-SAM-63- 073
Temperature	24.0.0	TP °C		~~SAL-SAM-63-~~ Calc'd
~~Temperature Verification with Secondary Source~~ ORP	81.0	~~°C~~ mV		SAL-SAM-006-Calc'd
Specific Conductance	900	µmhos/cm		SAL-SAM-63 3
Dissolved Oxygen	3.80	mg/L		~~SAL-SAM-55-~~ Calc'd
~~Turbidity~~	—	~~NTU~~	—	SAL-~~SAM-005-~~
~~Residual~~ Chlorine	—	—	—	SAL-~~SAM-006-~~
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:		Date	11/10/10	
		Date		
Reviewed By:		Date:		

FS-Industrial WW Monitoring Log.xls
Revision Date 09/25/09

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WASTEWATER SAMPLING LOG

Client Name:		Location:	DENIT-GL1	Contact:			
Date of Sample:	11/10/10	SAL Project #:	001627	Phone:			
SAL Audit Performed:	Y (N)	Auditor Name:		Client Representative on Site?	(Y) N	Project Name:	
		Signature:				Rep. Name:	
						Signature:	

SAMPLE DATA

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

COMPOSITE DATA

Composite ID Number:

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

GRAB SAMPLE DATA

Grab ID Number: 129

Date Collected:	11/10/10	Time Collected:	1055	Collected By:	TM

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	6.9	SU		SAL-SAM-63- 03
Temperature	21.0	°C		~~SAL-SAM-63-~~ Cleaned
Temperature Verification with ~~Secondary Source~~	-18.6	~~°C~~ mV		~~SAL-SAM-006-~~ Cleaned
Specific Conductance	900	µmhos/cm		SAL-SAM-63-03
Dissolved Oxygen	0.80	mg/L		~~SAL-SAM-55-~~ Cleaned
~~Turbidity~~	—	~~NTU~~	—	~~SAL-SAM-005-~~
~~Residual~~ Chlorine	—	✓	—	~~SAL-SAM-006-~~
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:		Date	11/10/10	
		Date		
Reviewed By:		Date:		

ORP

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WASTEWATER SAMPLING LOG

Client Name:		Location:	DFT	Contact:			
Date of Sample:	11/10/10	SAL Project #	001627	Phone:			
SAL Audit Performed:	Y (N)	Auditor Name:		Project Name:			
		Signature:		Client Representative on Site?	(Y) N	Rep. Name:	
						Signature:	

SAMPLE DATA

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

COMPOSITE DATA

Composite ID Number:

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

GRAB SAMPLE DATA

Grab ID Number: 130

Date Collected:	11/10/10	Time Collected:	1150	Collected By:	TM

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.2	SU		SAL-SAM-63-
Temperature	18.5	°C		SAL-SAM-63-
ORP Temperature Verification with ~~Secondary Source~~	62.2	~~°C~~ mV		SAL-SAM-006-
Specific Conductance	9803 TM	µmhos/cm		SAL-SAM-63-
Dissolved Oxygen	8.3	mg/L		SAL-SAM-55-
~~Turbidity~~	—	~~NTU~~	—	~~SAL-SAM-005-~~
~~Residual~~ Chlorine	—	—	—	SAL-SAM-006-
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:		Date	11/10/10	
		Date		
Reviewed By:		Date:		

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WASTEWATER SAMPLING LOG

Client Name:		Location:	TI-D	Contact:			
				Phone:			
Date of Sample:	11/10/10	SAL Project #	100627	Project Name:			
SAL Audit Performed:	Y (N)	Auditor Name:		Client Representative on Site?	(Y) N	Rep. Name:	
		Signature:				Signature:	

SAMPLE DATA

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

COMPOSITE DATA Composite ID Number:

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

GRAB SAMPLE DATA Grab ID Number: 31

Date Collected:	11/10/10	Time Collected:	1400	Collected By:	

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	7.3	SU		SAL-SAM-63-03
Temperature	25.3	°C		~~SAL-SAM-63-~~ Accuracy
ORP Temperature Verification with Secondary Source	-230.0	~~°C~~ mV		SAL-SAM-006- Accuracy
Specific Conductance	1,250	µmhos/cm		SAL-SAM-63-03
Dissolved Oxygen	2.20	mg/L		~~SAL-SAM-55-~~ Accuracy
~~Turbidity~~	—	~~NTU~~	—	~~SAL-SAM-005-~~
~~Residual Chlorine~~	—	—	—	~~SAL-SAM-006-~~
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:		Date	11/10/10	
		Date		
Reviewed By:		Date:		

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WASTEWATER SAMPLING LOG

Client Name:		Location:	FB	Contact:			
Date of Sample:	11/10/10	SAL Project #	001627	Phone:			
SAL Audit Performed:	Y N	Auditor Name:		Project Name:			
		Signature:		Client Representative on Site?	Y N	Rep. Name:	
						Signature:	

SAMPLE DATA

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

COMPOSITE DATA

Composite ID Number:

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

GRAB SAMPLE DATA

Grab ID Number: 32

Date Collected:	11/10/10	Time Collected:	1500	Collected By:	Tm

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	6.5	SU		SAL-SAM-63
Temperature	24.5	°C		~~SAL-SAM-63-~~
~~Temperature Verification with Secondary Source~~ ORP	12.5	~~°C~~ mV		~~SAL-SAM-006-~~
Specific Conductance	25.0	µmhos/cm		SAL-SAM-63-
Dissolved Oxygen	8.0	mg/L		~~SAL-SAM-55-~~
~~Turbidity~~	—	~~NTU~~	—	SAL-SAM-005-
~~Residual Chlorine~~	✓	✓	✓	~~SAL-SAM-006-~~
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:		Date	11/10/10	
		Date		
Reviewed By:		Date:		

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WASTEWATER SAMPLING LOG

Client Name:		Location:	EB	Contact:	
				Phone:	
Date of Sample:	11/10/10	SAL Project #	100627	Project Name:	
SAL Audit Performed: Y N	Auditor Name:		Client Representative on Site? Y N	Rep. Name:	
	Signature:			Signature:	

SAMPLE DATA

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

COMPOSITE DATA

Composite ID Number:

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

GRAB SAMPLE DATA

Grab ID Number: 33

Date Collected:	11/10/10	Time Collected:	1410	Collected By:	TM

FIELD PARAMETERS

PARAMETER	READING	UNITS	PERMIT LIMIT	INSTRUMENT ID
pH	6.70 TM	SU		SAL-SAM-63- C3
Temperature	23.0	°C		SAL-SAM-63- C1 C2 C3
Temperature Verification with Secondary Source (CRP)	80.6	°C		SAL-SAM-006 C1 C2 C3
Specific Conductance	28	µmhos/cm		SAL-SAM-63- C3
Dissolved Oxygen	8.5	mg/L		SAL-SAM-55- C1 C2
~~Turbidity~~	—	~~NTU~~	—	~~SAL-SAM-005-~~
~~Residual Chlorine~~	—	—	—	~~SAL-SAM-006-~~
Preservation Checked in Field?	Y N	Checked By:		
List any Preservatives Added in Field:				
Comments:				
Sampler(s) Signature:		Date	11/10/10	
		Date		
Reviewed By:		Date:		

FS-Industrial WW Monitoring Log.xls
Revision Date 09/25/09

SOUTHERN ANALYTICAL LABORATORIES, INC.
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Hazen and Sawyer
10002 Princess Palm Avenue Suite 200
Tampa FLORIDA, 33619

December 24, 2010
Work Order: 1002218
Revised Report

Laboratory Report

Project Name **PNRS II**

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		**UNSAT-IS1**						
Matrix		**Wastewater**						
SAL Sample Number		**1002218-01**						
Date/Time Collected		**11/12/10 06:45**						
Collected by		**Client**						
Date/Time Received		**11/12/10 10:25**						
Inorganics								
Hydrogen Sulfide (Unionized)	mg/L	1.8	SM 4550SF	0.04	0.01		11/12/10 16:00	KTC
Ammonia as N	mg/L	69	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	11/12/10 16:00	11/17/10 13:07	KTC
Chemical Oxygen Demand	mg/L	76	EPA 410.4	25	10		11/18/10 08:15	ARM
Sulfate	mg/L	83	EPA 300.0	0.60	0.20	11/17/10 13:00	11/18/10 12:24	MEJ
Sulfide	mg/L	4.3	SM 4500SF	4.0	1.0		11/12/10 16:00	KTC
Total Alkalinity	mg/L	370	SM 2320B	8.0	2.0		11/19/10 08:30	KTC
Total Dissolved Solids	mg/L	530	SM 2540C	10	10	11/18/10 15:13	11/18/10 15:17	MJV
Total Kjeldahl Nitrogen	mg/L	75	EPA 351.2	0.20	0.05	11/20/10 09:26	11/23/10 14:11	SMD
Total Suspended Solids	mg/L	2	SM 2540D	1	1	11/16/10 14:00	11/17/10 15:00	MJV
Nitrate+Nitrite (as N)	mg/L	0.04	EPA 353.2	0.04	0.01		11/24/10 15:22	SMB
Sample Description		**UNSAT-IS2**						
Matrix		**Wastewater**						
SAL Sample Number		**1002218-02**						
Date/Time Collected		**11/12/10 06:45**						
Collected by		**Client**						
Date/Time Received		**11/12/10 10:25**						
Inorganics								
Hydrogen Sulfide (Unionized)	mg/L	0.01 U	SM 4550SF	0.04	0.01		11/12/10 16:00	KTC
Ammonia as N	mg/L	0.71	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	11/12/10 16:00	11/17/10 13:07	KTC
Chemical Oxygen Demand	mg/L	13 I	EPA 410.4	25	10		11/18/10 08:15	ARM
Sulfate	mg/L	400	EPA 300.0	0.60	0.20	11/17/10 13:00	11/18/10 12:24	MEJ
Sulfide	mg/L	1.0 U	SM 4500SF	4.0	1.0		11/12/10 16:00	KTC
Total Alkalinity	mg/L	170	SM 2320B	8.0	2.0		11/19/10 08:30	KTC
Total Dissolved Solids	mg/L	890	SM 2540C	10	10	11/18/10 15:13	11/18/10 15:17	MJV
Total Kjeldahl Nitrogen	mg/L	1.2	EPA 351.2	0.20	0.05	11/20/10 09:26	11/23/10 14:11	SMD
Total Suspended Solids	mg/L	10	SM 2540D	1	1	11/16/10 14:00	11/17/10 15:00	MJV
Nitrate+Nitrite (as N)	mg/L	0.04	EPA 353.2	0.04	0.01		11/24/10 15:22	SMB

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

December 24, 2010
Work Order: 1002218
Revised Report

Laboratory Report

Project Name **PNRS II**

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	By
Sample Description		**UNSAT-IS3**						
Matrix		**Wastewater**						
SAL Sample Number		**1002218-03**						
Date/Time Collected		**11/15/10 08:30**						
Collected by		**Client**						
Date/Time Received		**11/15/10 14:50**						
Inorganics								
Hydrogen Sulfide (Unionized)	mg/L	0.01 U	SM 4550SF	0.04	0.01	11/19/10 11:27	11/19/10 11:29	KTC
Ammonia as N	mg/L	6.2	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Carbonaceous BOD	mg/L	3	SM 5210B	2	2	11/17/10 08:30	11/22/10 13:10	MEJ
Chemical Oxygen Demand	mg/L	46	EPA 410.4	25	10		11/18/10 08:15	ARM
Sulfate	mg/L	290	EPA 300.0	0.60	0.20	11/17/10 13:00	11/18/10 12:24	MEJ
Sulfide	mg/L	1.0 U	SM 4500SF	4.0	1.0		11/19/10 11:29	KTC
Total Alkalinity	mg/L	280	SM 2320B	8.0	2.0		11/19/10 08:30	KTC
Total Dissolved Solids	mg/L	2,300	SM 2540C	10	10	11/18/10 15:13	11/18/10 15:17	MJV
Total Kjeldahl Nitrogen	mg/L	6.4	EPA 351.2	0.20	0.05	11/20/10 09:26	11/23/10 14:11	SMD
Total Suspended Solids	mg/L	4	SM 2540D	1	1	11/16/10 14:00	11/17/10 15:00	MJV
Nitrate+Nitrite (as N)	mg/L	28	EPA 353.2	0.04	0.01		11/24/10 15:22	SMB
Sample Description		**UNSAT-IS4**						
Matrix		**Wastewater**						
SAL Sample Number		**1002218-04**						
Date/Time Collected		**11/12/10 00:00**						
Collected by		**Client**						
Date/Time Received		**11/15/10 14:50**						
Inorganics								
Ammonia as N	mg/L	0.086	EPA 350.1	0.010	0.005		11/17/10 17:04	SMB
Chemical Oxygen Demand	mg/L	35	EPA 410.4	25	10		11/18/10 08:15	ARM
Sulfate	mg/L	440	EPA 300.0	0.60	0.20	11/17/10 13:00	11/18/10 12:24	MEJ
Total Alkalinity	mg/L	280	SM 2320B	8.0	2.0		11/19/10 08:30	KTC
Total Kjeldahl Nitrogen	mg/L	1.8	EPA 351.2	0.20	0.05	11/20/10 09:26	11/23/10 14:11	SMD
Nitrate+Nitrite (as N)	mg/L	11	EPA 353.2	0.04	0.01		11/24/10 15:22	SMB

Hazen and Sawyer
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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BK01205 - BOD										
Blank (BK01205-BLK1)					Prepared: 11/12/10 Analyzed: 11/17/10					
Carbonaceous BOD	2 U	2	2	mg/L						
Blank (BK01205-BLK2)					Prepared: 11/12/10 Analyzed: 11/17/10					
Carbonaceous BOD	2 U	2	2	mg/L						
LCS (BK01205-BS1)					Prepared: 11/12/10 Analyzed: 11/17/10					
Carbonaceous BOD	190	2	2	mg/L	200		95	85-115		
LCS (BK01205-BS2)					Prepared: 11/12/10 Analyzed: 11/17/10					
Carbonaceous BOD	190	2	2	mg/L	200		95	85-115		
LCS Dup (BK01205-BSD1)					Prepared: 11/12/10 Analyzed: 11/17/10					
Carbonaceous BOD	191	2	2	mg/L	200		96	85-115	0.5	10
LCS Dup (BK01205-BSD2)					Prepared: 11/12/10 Analyzed: 11/17/10					
Carbonaceous BOD	191	2	2	mg/L	200		96	85-115	0.5	10
Batch BK01304 - Sulfide prep										
Blank (BK01304-BLK1)					Prepared & Analyzed: 11/12/10					
Sulfide	1.0 U	4.0	1.0	mg/L						
LCS (BK01304-BS1)					Prepared & Analyzed: 11/12/10					
Sulfide	5.11	4.0	1.0	mg/L	5.0		102	85-115		
Batch BK01731 - Ion Chromatography 300.0 Prep										
Blank (BK01731-BLK1)					Prepared: 11/17/10 Analyzed: 11/18/10					
Sulfate	0.20 U	0.60	0.20	mg/L						

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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BK01731 - Ion Chromatography 300.0 Prep										
LCS (BK01731-BS1)					Prepared: 11/17/10 Analyzed: 11/18/10					
Sulfate	8.72	0.60	0.20	mg/L	9.0		97	85-115		
LCS Dup (BK01731-BSD1)					Prepared: 11/17/10 Analyzed: 11/18/10					
Sulfate	8.73	0.60	0.20	mg/L	9.0		97	85-115	0.1	10
Matrix Spike (BK01731-MS1)		**Source: 1002218-02**			Prepared: 11/17/10 Analyzed: 11/18/10					
Sulfate	441 +O	0.60	0.20	mg/L	90	397	49	85-115		
Batch BK01747 - BOD										
Blank (BK01747-BLK1)					Prepared: 11/17/10 Analyzed: 11/22/10					
Carbonaceous BOD	2 U	2	2	mg/L						
LCS (BK01747-BS1)					Prepared: 11/17/10 Analyzed: 11/22/10					
Carbonaceous BOD	195	2	2	mg/L	200		98	85-115		
LCS Dup (BK01747-BSD1)					Prepared: 11/17/10 Analyzed: 11/22/10					
Carbonaceous BOD	190	2	2	mg/L	200		95	85-115	3	10
Batch BK01801 - COD prep										
Blank (BK01801-BLK1)					Prepared & Analyzed: 11/18/10					
Chemical Oxygen Demand	10 U	25	10	mg/L						
LCS (BK01801-BS1)					Prepared & Analyzed: 11/18/10					
Chemical Oxygen Demand	48	25	10	mg/L	50		96	90-110		

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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BK01803 - Ammonia by SEAL										
Blank (BK01803-BLK1)					Prepared & Analyzed: 11/17/10					
Ammonia as N	0.005 U	0.010	0.005	mg/L						
Blank (BK01803-BLK2)					Prepared & Analyzed: 11/17/10					
Ammonia as N	0.005 U	0.010	0.005	mg/L						
Blank (BK01803-BLK3)					Prepared & Analyzed: 11/17/10					
Ammonia as N	0.005 U	0.010	0.005	mg/L						
Blank (BK01803-BLK4)					Prepared & Analyzed: 11/17/10					
Ammonia as N	0.005 U	0.010	0.005	mg/L						
LCS (BK01803-BS1)					Prepared & Analyzed: 11/17/10					
Ammonia as N	0.49	0.010	0.005	mg/L	0.50		98	90-110		
LCS (BK01803-BS2)					Prepared & Analyzed: 11/17/10					
Ammonia as N	0.52	0.010	0.005	mg/L	0.50		104	90-110		
LCS (BK01803-BS3)					Prepared & Analyzed: 11/17/10					
Ammonia as N	0.52	0.010	0.005	mg/L	0.50		105	90-110		
LCS (BK01803-BS4)					Prepared & Analyzed: 11/17/10					
Ammonia as N	0.53	0.010	0.005	mg/L	0.50		106	90-110		
Batch BK01836 - TDS Prep										
Blank (BK01836-BLK1)					Prepared & Analyzed: 11/18/10					
Total Dissolved Solids	10 U	10	10	mg/L						

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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BK01836 - TDS Prep										
LCS (BK01836-BS1)					Prepared & Analyzed: 11/18/10					
Total Dissolved Solids	968	10	10	mg/L	1000		97	90-110		
Batch BK01905 - alkalinity										
Blank (BK01905-BLK1)					Prepared & Analyzed: 11/19/10					
Total Alkalinity	2.0 U	8.0	2.0	mg/L						
LCS (BK01905-BS1)					Prepared & Analyzed: 11/19/10					
Total Alkalinity	120	8.0	2.0	mg/L	120		95	90-110		20
Batch BK01920 - Sulfide prep										
Blank (BK01920-BLK1)					Prepared & Analyzed: 11/19/10					
Hydrogen sulfide (Unionized)	0.01 U	0.04	0.01	mg/L						
Sulfide	1.0 U	4.0	1.0	mg/L						
LCS (BK01920-BS1)					Prepared & Analyzed: 11/19/10					
Sulfide	4.70	4.0	1.0	mg/L	5.0		94	85-115		
Matrix Spike (BK01920-MS1)		**Source: 1002218-03**			Prepared & Analyzed: 11/19/10					
Sulfide	4.70	4.0	1.0	mg/L	5.0	ND	94	85-115		
Matrix Spike Dup (BK01920-MSD1)		**Source: 1002218-03**			Prepared & Analyzed: 11/19/10					
Sulfide	4.70	4.0	1.0	mg/L	5.0	ND	94	85-115	0	14

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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BK01927 - TSS prep										
Blank (BK01927-BLK1)					Prepared & Analyzed: 11/19/10					
Total Suspended Solids	1 U	1	1	mg/L						
LCS (BK01927-BS1)					Prepared & Analyzed: 11/19/10					
Total Suspended Solids	45.5	1	1	mg/L	50		91	85-115		
Batch BK02001 - Digestion for TKN by EPA 351.2										
Blank (BK02001-BLK1)					Prepared: 11/20/10 Analyzed: 11/22/10					
Total Kjeldahl Nitrogen	0.05 U	0.20	0.05	mg/L						
Blank (BK02001-BLK2)					Prepared: 11/20/10 Analyzed: 11/23/10					
Total Kjeldahl Nitrogen	0.05 U	0.20	0.05	mg/L						
LCS (BK02001-BS1)					Prepared: 11/20/10 Analyzed: 11/22/10					
Total Kjeldahl Nitrogen	2.69	0.20	0.05	mg/L	2.5		108	90-110		
LCS (BK02001-BS2)					Prepared: 11/20/10 Analyzed: 11/23/10					
Total Kjeldahl Nitrogen	2.62	0.20	0.05	mg/L	2.5		105	90-110		
Batch BK02434 - Nitrate 353.2 by seal										
Blank (BK02434-BLK1)					Prepared & Analyzed: 11/24/10					
Nitrate+Nitrite (as N)	0.0124 I	0.04	0.01	mg/L						
Blank (BK02434-BLK2)					Prepared & Analyzed: 11/24/10					
Nitrate+Nitrite (as N)	0.01 U	0.04	0.01	mg/L						

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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BK02434 - Nitrate 353.2 by seal										
Blank (BK02434-BLK3)					Prepared & Analyzed: 11/24/10					
Nitrate+Nitrite (as N)	0.01 U	0.04	0.01	mg/L						
LCS (BK02434-BS1)					Prepared & Analyzed: 11/24/10					
Nitrate+Nitrite (as N)	0.758	0.04	0.01	mg/L	0.80		95	90-110		
LCS (BK02434-BS2)					Prepared & Analyzed: 11/24/10					
Nitrate+Nitrite (as N)	0.984	0.04	0.01	mg/L	1.0		98	90-110		
LCS (BK02434-BS3)					Prepared & Analyzed: 11/24/10					
Nitrate+Nitrite (as N)	0.968	0.04	0.01	mg/L	1.0		97	90-110		

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* Qualifiers, Notes and Definitions

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 limts 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 reccommended range for the method.

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

SAL Project No. 1002218

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

Samplers: (Signature) Josephin Hirst

Matrix Codes: DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water

SAL Use Only Sample No.	Sample Description	Date	Time	Matrix	Composite	Grab	PARAMETER / CONTAINER DESCRIPTION: 1LP, Cool Alkalinity, CBOD, TSS, TDS	1LP, Cool SO4	1LP, Zn Acetate/NaOH Hydrogen Sulfide No Headspace	250ml P, H2SO4 TKN, NH3, NoX, COD	ORP (Client meter)	Field pH	Field Temp	Field Cond	Field DO
01	UNSAT-IS1	11/12/10	06:45	WW		X	1	1	1	1	221.6	7.07	17.0	1168	1.95
02	UNSAT-IS2	11/12/10	06:45	WW		X	1	1	1	1	-213.6	6.48	17.1	365	0.75
03	~~UNSAT-IS3~~ DID NOT SAMPLE			~~WW~~		X	~~1~~	~~1~~	~~1~~	~~1~~					
04	~~UNSAT-IS4~~ DID NOT SAMPLE			~~WW~~		X	~~1~~	~~1~~	~~1~~	~~1~~					
03	UNSAT-IS3	11/15/10	0830	WW		X	1	1	1	1	158.3	6.67	18.7	1505	0.44

Containers Prepared/ Relinquished:	Date/Time:	Received:	Date/Time:
HH	1640 11-11-10		
Relinquished: Josephin Hirst	11/12/10 08:58	Received: courier	11/12/10 08:58
Relinquished: courier (01-02)	11/12/10 10:25	Received: courier	
Relinquished: courier (03-04)		Received: K Mudmark	1450 11/15/10
Relinquished:		Received:	

Seal intact? Y N N/A

Samples intact upon arrival? Y N N/A

Received on ice? Temp ____ Y N N/A

Proper preservatives indicated? Y N N/A

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

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

Proper containers used? Y N N/A

Instructions / Remarks

Start time: 11/11/10 16:05

Both IS1 & IS2

Chain of Custody

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

SAL Project No. 1002218

Client Name	Contact / Phone:
Hazan and Sawyer	Josephin Edeback-Hirst 813-630-4498
Project Name / Location: MRSII ~~Septic Tank Effluent Analyses~~	jedeback@hazanandsawyer.com
Samplers: (Signature)	

Matrix Codes: DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water

SAL Use Only Sample No	Sample Description	Date	Time	Matrix	Composite	Grab	1LP, Cool Alkalinity, ~~CBOD5~~, TSS SOY	250 ml P, H_2SO_4 TKN, NH_3, NOx, COD		ORP	DO	Field Temp	Field Cond	Field pH	No. of Containers (Total per each location)
03 01	~~UNSAT-153~~	~~11/15/10~~	~~8:30am~~	~~WW~~	X	~~X~~	+	+		158.3	0.44	18.7	1505	6.67	Y
04	UNSAT-154	11/15/10	8:45am	WW	X		1 +	++ 1		152.8	8.96	18.3	0.01	7.48	2
							IW 11/15/10								

Containers Prepared/ Relinquished:	Date/Time:	Received:	Date/Time:
Travis	11/12/10 8-10-10 1400	JCH	~~11/15/10~~
Relinquished: JCH	Date/Time: 11/15/10	Received: Victor Perez	Date/Time: 1115 am
Relinquished: Courier	Date/Time:	Received: K Nudment	Date/Time: 1450 11/15/10
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:

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

Instructions / Remarks: started 11/10 4:45pm collecting

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

Chain of Custody