

Florida Onsite Sewage Nitrogen Reduction Strategies Study

Task A.26
PNRS II Test Facility Data Summary Report No. 3

Progress Report

December 2010



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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:

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FDOH Contract CORCL

December 2010

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In Association With:





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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.

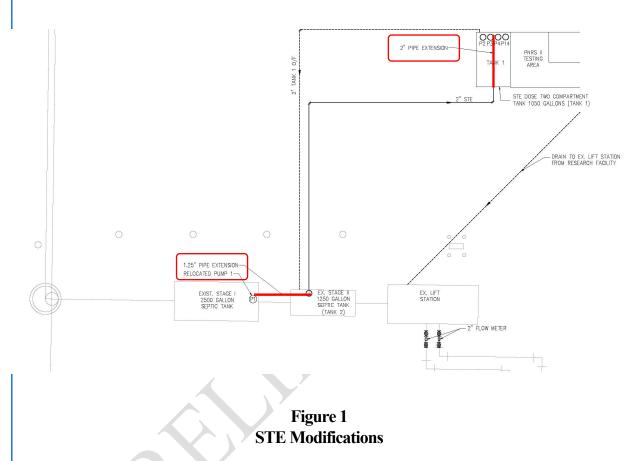
3.2.1 Septic Tank Effluent (STE) Quality

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, CBOD₅, 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.



3.2.2 Polystyrene Biofilter (UNSAT-PS1)

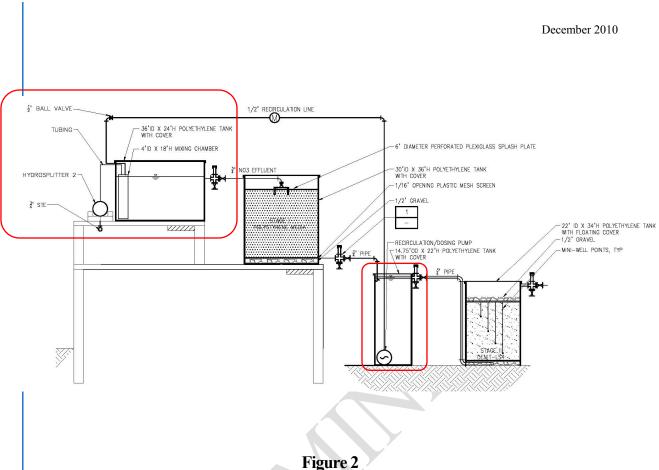
In Sample Event 1, the unsaturated single pass biofilter with polystyrene media (UNSAT-PS1) exhibited limited reduction of organic nitrogen and ammonia as well as a lower effluent dissolved oxygen than the other single pass Stage 1 unsaturated biofilters. Visual observations of the media surface suggested 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 bio-filter, and that polystyrene media could more be feasibly deployed in a recirculation bio-filter 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. 1/2" 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 polysty-rene media that is directly coupled to a Stage 2 denitrification biofilter.



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

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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

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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

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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

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PAGE 1-9 HAZEN AND SAWYER, P.C. 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

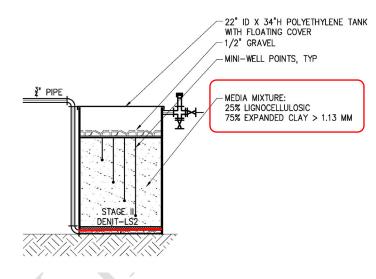


Figure 14 DENIT-LS2 Biofilter Modifications

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 CBOD₅ 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 CBOD₅ 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.

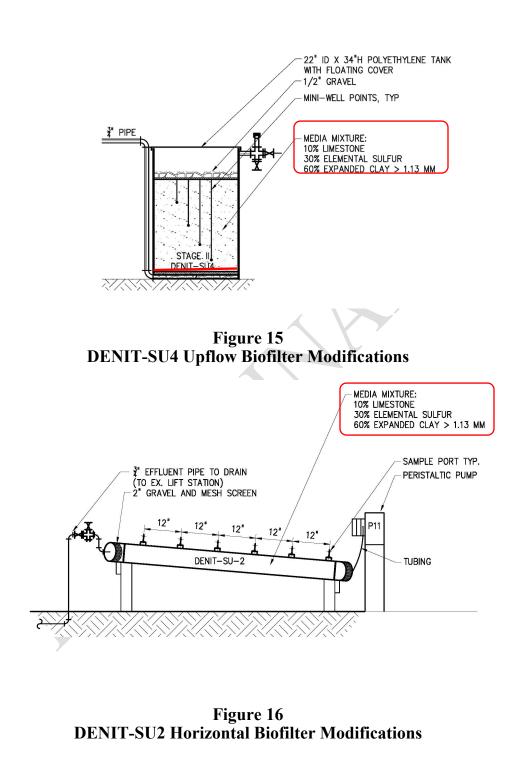
3.2.5 Replace Alkalinity Supplement (DENIT-SU4, DENIT-SU2)

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 reprecipitation 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.



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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 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.

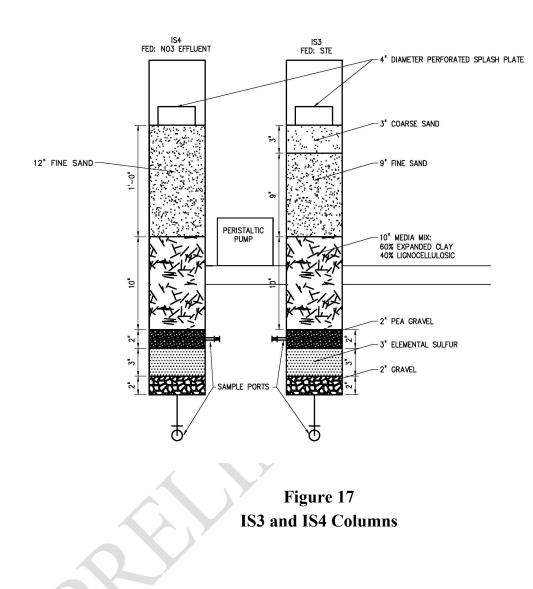
The overall PNRS II objective is to incorporate PNRS II results into the design of full scale testing at homeowner sites in FOSNRS Task B, and the In-situ simulator results are critical for Task B activities. Due to the need to develop functional specifications for vertically stacked single pass biofiltration 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/ft²-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.



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.

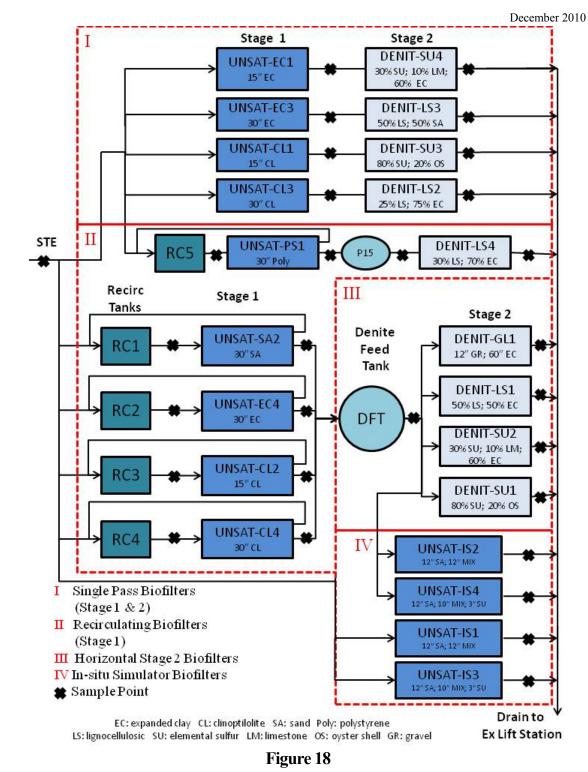
Modifications to test systems that were implemented before this sample event include:

- 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.

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| | Table 1 PNRS II Sample Identification | |
|-------------------|---|-----------------------|
| Group (Figure 18) | Sample Location | Sample Identification |
| • • • • | STE PNRS II Storage Tank 1 | PNRS II-STE-T1 |
| | | UNSAT-EC1 |
| | Stars 1 Single Dees Disfilters | UNSAT-EC3 |
| | Stage 1 Single Pass Biofilters | UNSAT-CL1 |
| | | UNSAT-CL3 |
| l | | DENIT-SU4 |
| | | DENIT-LS3 |
| | Stage 2 Single Pass Upflow Biofilters | DENIT-SU3 |
| | | DENIT-LS2 |
| | | DENIT-LS4 |
| | | RC1 |
| | | RC2 |
| | Recirculation Tanks | RC3 |
| | | RC4 |
| | | RC5 |
| II | | UNSAT-SA2 |
| | | UNSAT-EC4 |
| | Stage 1 Recirculating Biofilters | UNSAT-CL2 |
| | | UNSAT-CL4 |
| | | UNSAT-PS1 |
| | Pump 15 Tank | P15 |
| | Denite Feed Collection Tank | DFT |
| | | UNSAT-SU1 |
| 111 | Stage 2 Horizontal Biofilters | UNSAT-SU2 |
| | Stage 2 Holizontal Bioliters | UNSAT-LS1 |
| | | UNSAT-GL1 |
| | | UNSAT-IS1 |
| IV | In-Situ In-Tank Simulator Single Pass Biofilter | UNSAT-IS2 |
| IV | | UNSAT-IS3 |
| | | UNSAT-IS4 |

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PNRS II Test Facility System Schematic

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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 specific conductance. Temperature (Temp), dissolved oxygen (DO), and oxidation-reduction potential (ORP) were measured with probe tips placed in flow through samplers located directly in the outlet pipe at each sample location. Specific conductance and pH were measured using external sample collection reservoirs. The influent and effluent samples were analyzed by the laboratory for: total alkalinity, total Kjeldahl nitrogen (TKN-N), ammonia nitrogen (NH₃-N), nitrate/nitrite nitrogen (NO_X-N), carbonaceous biochemical oxygen demand (CBOD₅), 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 (SO₄) and hydrogen sulfide (H₂S). Table 2 lists the analytical parameters, analytical methods, and detection limits for these analyses.

| Analytical Parameters, | Method of Analysis, and | d Detection Limits |
|---|-------------------------|--------------------------------------|
| Analytical Parameter | Method of Analysis | Laboratory Detection Limit (mg/L) |
| Total Alkalinity as CaCO ₃ | SM 2320B | 2 mg/L |
| Total Kjeldahl Nitrogen (TKN-N) | EPA351.2 | 0.05 mg/L |
| Ammonia Nitrogen (NH ₃ -N) | EPA350.1 | 0.01 mg/L |
| Nitrate/Nitrite Nitrogen (NO _x -N) | EPA353.2 | 0.01 mg/L |
| Carbonaceous BOD (CBOD ₅) | SM 5210B | 2 mg/L |
| Total Dissolved Solids (TDS) | SM 2540C | 10 mg/L |
| Total Suspended Solids (TSS) | SM 2540D | 1 mg/L |
| Chemical Oxygen Demand (COD) | EPA 410.4 | 10 mg/L |
| Total Phosphorus (TP) | SM 4500PE | 0.01 mg/L |
| Fecal Coliform (fecal) | SM9222D | 1 ct/100mL |
| Sulfate (SO ₄) | EPA300.0 | 0.2 mg/L |
| Hydrogen Sulfide Unionized (H ₂ S) | SM4500S F | 0.01 mg/L |
| Sulfide | SM4500S F | 0.1 mg/L |

| Table 2 | |
|--|----------------------|
| Analytical Parameters, Method of Analysis, a | and Detection Limits |

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.

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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 CBOD₅ 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, NH₃-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).

FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY PNRS II TEST FACILITY DATA SUMMARY REPORT NO. 2

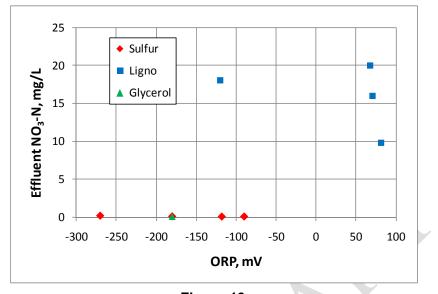


Figure 19 Denitrification Biofilters ORP versus Effluent NO_x-N

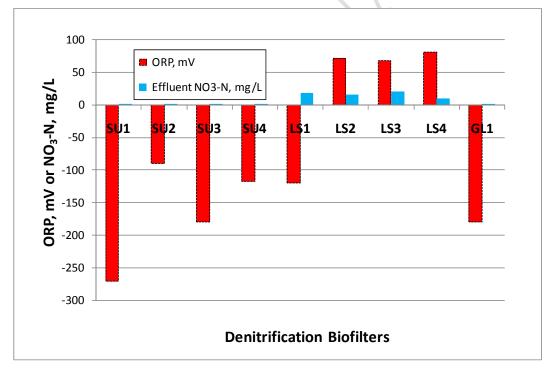


Figure 20 Denitrification Biofilters ORP versus Effluent NO_x-N

FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY PNRS II TEST FACILITY DATA SUJMMARY REPORT NO. 3

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 NH₃-N and 21 mg/L NO_x-N. While somewhat successfully denitrifying the relatively low influent NO_x-N, DE-NIT-LS4 effluent contained 15 mg/L NH₃-N. This result again confirms that NH₃-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 SO₄ concentrations were 79 and 380 mg/L, for IS1 and IS2 respectively.

The new vertically stacked 6" diameter column media biofilters (UNSAT-IS3 and UN-SAT-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) | pН | Total Alkalinity (mg/L) | DO (mg/L) | ORP (mV) | Specific Conductance (µS) | TDS (mg/L) | TSS (mg/L) | CBOD ₅ (mg/L) | COD (mg/L) | TN (mg/L N) ¹ | TKN (mg/L N) | Organic N (mg/L N) ² | NH3-N (mg/L N) | NOx (mg/L N) | TIN (mg/L N) ³ | TP (mg/L) | Sulfide (mg/L) | H ₂ S (mg/L) | SO₄ (mg/L) | Fecal (Ct/100 ml |
|--------------------|--|---|---------------------|----------------|--------------|------|-------------------------------|--------------|-------------|---------------------------------|---------------|---------------|-----------------------------|---------------|-----------------------------|-----------------|------------------------------------|-------------------|-----------------|------------------------------|--------------|-------------------|----------------------------|---------------|---------------------|
| | STE Sample | | | | | | | | | | | | | | | | | | | | | | | <u> </u> | |
| | 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 | 1 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 | 5 1,130 | 800 | 1 | 2 | 10 | 46.6 | 2.6 | 2.6 | 0.005 | 44 | 44.0 | | 1.0 | 0.01 | L 62 | |
| | UNSAT-CL3 | 30" Clinoptilolite | 11/10/10 15:50 | G | 22.0 | 7.4 | 290 | 7.6 | 100.5 | 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 | | | | | | | | | | 1 | | | | | | | | | | | | | | |
| | 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 | 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 | I |
| | 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 | | | 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 | | | | 580 | | 2 | 29 | 41.0 | 17 | 5.0 | 12 | 24 | 36.0 | | | | | |
| | RC2 | | 11/10/10 13:00 | G | 19.5 | 7.2 | 210 | | | | 590 | | 8 | 35 | 43.0 | 19 | 6.0 | 13 | 24 | 37.0 | | | | | |
| | RC3 | | 11/10/10 13:10 | G | 19.2 | 7.2 | 260 | | | | 550 | | 9 | 39 | 36.0 | 19 | 7.0 | | | 29.0 | | | | | |
| | RC4 | | 11/10/10 13:20 | G | 19.7 | 7.4 | 260 | 1.9 | | | 590 | 2 | 4 | 26 | 35.0 | 17 | 5.0 | | 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 | | | | | | h | | | | | | | | | | | | | | | | | | |
| | UNSAT-CL4 | 30" Clinoptilolite | 11/10/10 11:40 | G | 23.5 | 7.2 | 270 | | | | 660 | | 2 | 11 | 42.6 | 2.6 | 2.6 | | 40 | 40.0 | | | | 63 | |
| | UNSAT-CL2 | 15" Clinoptilolite | 11/10/10 11:30 | G | 23.1 | 7.0 | 200 | | | | 630 | | 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 | | | | 660 | _ | 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 | | | | 610 | 13 | 2 | 22 | 41.5 | 3.5 | 2.8 | | 38 | 38.7 | | | | | |
| | UNSAT-PS1 | 30" Polystyrene | 11/10/10 13:50 | G | 23.8 | 7.2 | 200 | | | | 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 | 3 970 | 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 | 2 980 | 630 | 1 | 2 | 22 | 19.5 | 3.5 | 3.3 | 0.17 | 16 | 16.2 | | 1.0 | 0.1 | L 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 | | | 1,250 | | - | 18 | | 2.0 | 1.9 | 1.1 | 0.76 | 0.14 | 0.9 | | 17 | | | |
| | DENIT-SU2 | 10% Limestone; 30% Sulfur; 60% Expanded Clay | 11/10/10 10:25 | G | 25.5 | 7.0 | 210 | - | | | 1,000 | 8 | 2 | 18 | 0.8 | 0.74 | 0.7 | | 0.03 | 0.1 | | 1.0 | 0.01 | 490 L | |
| | DENIT-LS1 | 50% Lignocellulosic; 50% Expanded Clay | 11/10/10 10:40 | G | 21.4 | 7.4 | 210 | | | 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 | | | | 1 | | I | | L | | | | | | | | I | | | | | I | <u> </u> | ⊢ | |
| | UNSAT-IS1 (STE) | 12" Sand; 12" Mix (45% EC, 35% Ligno, 20% Sulfur) | | G | 20.5 | 6.8 | 390 | | | 1,120 | 540 | | 2 | 76 | 53.2 | 53 | 3.0 | | 0.18 | 50.2 | | 4.7 | | | , |
| | UNSAT-IS1 (STE) | 12" Sand; 12" Mix (45% EC, 35% Ligno, 20% Sulfur) | | G | 17.0 | 7.1 | 370 | | - | | 530 | | 2 | 76 | 75.0 | 75 | | | 0.04 | 69.0 | | 4.3 | | | |
| | UNSAT-IS2 (NO ₃) | 12" Sand; 12" Mix (45% EC, 35% Ligno, 20% Sulfur) | | G | 19.2 | 6.8 | 180 | | | | 820 | 19 | 2 | 20 | 1.3 | 1.2 | 0.4 | | 0.05 | 0.9 | | 1.0 | 0.01 | | |
| 4 | UNSAT-IS2 (NO ₃) | 12" Sand; 12" Mix (45% EC, 35% Ligno, 20% Sulfur) | | G | 17.1 | 6.5 | 170 | 0.8 | -213.6 | | 890 | 10 | 2 | 13 | 1.2 | 1.2 | 0.5 | | 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 (NO3) | 12" Sand; 10" Mix (60% EC, 40% Ligno); 3" Sulfur) | 11/10/10 15:15 | G | ΙT | | | | | | | | | ΙT | 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 | 3 0.01 | | 1 | | 35 | 12.8 | 1.8 | 1.7 | 0.086 | 11 | 11.1 | | 1 | | 440 | |
| | Field Blank | Reagent Water | 11/10/10 15:00 | | 24.5 | 6.5 | 200 | 8.0 | | | 10 | 1 | 2 | 10 | 0.1 | 0.07 | 0.1 | 0.000 | 0.01 | 0.02 | | | | 1 | |
| | Equipment Blank | Reagent Water - Cleaned STE Bottle #2 | 11/10/10 14:10 | | 23.0 | 6.7 | 2 | 8.5 | | | | 1 | 2 | 10 | 0.1 | 0.06 | 0.1 | | 0.01 | 0.02 | | 1 | | 1 | 1 |
| | | | | | | | | 0.0 | | | | | _ | | | 0.00 | | | | | | | | | |

Notes: "Total Nitroen (TNI is a calculated value equal to the sum of TKN and NO-"Oraanic Nitroeen (ONI is a calculated value equal to the difference of TKN and NH-"Total Informanic Nitroeen (TNI) is a calculated value equal to the sum of NH- and NO. EC: expanded day, CL: dinoptiloite, PS: polystyrene, SU: elemental sulfur, IS: 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 4Statistical Summary of Water Quality Data

| Sample ID | Media Composition | Statistical Parameter | Temp (°C) | рН | Total Alkalinity (mg/L) | DO (mg/L) | ORP (mV) | Specific Conductance (µS) | TDS (mg/L) | TSS (mg/L) | CBOD _s (mg/L) | COD (mg/L) | TN (mg/L N) ¹ | TKN (mg/L N) | Organic N (mg/L N) ² | NH3-N (mg/L N) | NOx (mg/L N) | TIN (mg/L N) ³ | TP (mg/L) | Sulfide (mg/L) | H ₂ S (mg/L) | SO ₄ (mg/L) | Fecal (Ct/100 n |
|---|---|---|---|---|--|---|---|---|---|--|--|--|---|--|--|--|--|--|---|--|---|--|--------------------|
| STE Sample | T | | 0 | | - | 6 | | | - | | 0 | - | - | 0 | | | - | | | | 1 | | |
| | | n MEAN | 26.4 | 9 | 323.4 | 0.8 | | 1029.8 | 381.0 | 34.5 | 67.0 | 236.2 | 55.7 | 57.7 | 8.2 | 47.5 | 0.04 | 43.1 | 7.0 | | | | |
| STE-Tank 1 | | STD. DEV. | 1.4 | | 92.2 | 1.2 | | 227.2 | 76.0 | 25.4 | 33.6 | 250.2 | 24.8 | 22.0 | | 23.0 | | 21.7 | | | | | |
| | | MIN | 24.9 | 6.4 | 210.0 | 0.0 | | 649.0 | 240.0 | 12.8 | 22.0 | 210.0 | 25.9 | 25.9 | | | 0.01 | 20.0 | | | | | |
| | I | 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 | | | | 7 |
| Stage 1 Singl | e Pass Biofilters Effl | uent | | | | | | | | | | | | | | | | | | | | | |
| | | n | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 3 | 3 | 3 | 3 | 1 | 1 | 3 3 | 3 | |
| UNSAT-EC1 | ACII Comendad Class | MEAN STD. DEV. | 25.5 4.3 | | 140.0 36.1 | 7.0 | | 940.7 284.3 | 596.7 219.4 | 1.0 | 2.0 | 11.5 | 44.8 22.8 | 3.8 | | 0.4 | | 41.4 | | 0.4 | | 52.7 7.6 | |
| UNSAT-ECT | 15" Expanded Clay | MIN | 4.3 | 6.9 | 36.1 | 6.8 | | 284.3 | 350.0 | 1.0 | 2.0 | 10.0 | 22.8 | 2.2 | | - | 21.5 | 19.0 | | 0.5 | | 46.0 | |
| | | MAX | 28.6 | 7.3 | 110.0 | 7.1 | | 1150.0 | | 1.0 | 2.0 | 13.0 | 66.8 | 4.8 | | | | 63.3 | | 1.0 | | 61.0 | |
| | | n | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | | | 3 | 3 | 1 | | 0.1 | 01.0 | |
| | | MEAN | 26.1 | | 151.3 | 6.8 | 111.0 | 1031.7 | | 1.3 | 2.0 | 13.0 | | 3.5 | | | 47.3 | 48.1 | | | | | |
| UNSAT-EC3 | 30" Expanded Clay | STD. DEV. | 4.1 | | 68.0 | 0.1 | | 283.0 | | 0.6 | | | 32.7 | 1.4 | | | 31.3 | 32.6 | | | | | |
| | | MIN | 21.5 | 6.8 | 84.0 | 6.7 | | 712.0 | | 1.0 | 2.0 | 10.0 | 21.2 | 2.2 | | | 19.0 | 19.0 | | | | | |
| | | 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 | | 2 2 | 2 | |
| | | n MEAN | 26.2 | 3 | 236.7 | 5.4 | 110.9 | 3 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 | |
| UNSAT-CL1 | 15" Clinoptilolite | STD. DEV. | 3.8 | | 11.5 | 1.9 | | 210.5 | 177.9 | 3.5 | 0.0 | 13.0 | 13.6 | 0.1 | | | 13.6 | 13.6 | | 0.5 | | 49.0 | |
| | | MIN | 22.0 | 7.1 | 230.0 | 3.5 | | 857.0 | 470.0 | 1.0 | 2.0 | 10.0 | 20.7 | 2.6 | | | 18.0 | 18.0 | | 0.1 | | 37.0 | |
| | | MAX | 29.5 | 8.3 | 250.0 | 7.3 | | 1271.0 | 800.0 | 7.0 | 2.0 | 20.0 | 46.6 | 2.8 | | | 44.0 | 44.0 | | 1.0 | | 62.0 | |
| | | n | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | | - | 3 | 3 | - | | | | |
| UNICAT CLO | 201 611 | MEAN | 25.8 | | 300.0 | 7.2 | | 1214.0 | | 1.3 | 2.0 | 24.5 | 48.5 | 3.2 | | | 45.3 | 45.3 | | | | | |
| UNSAT-CL3 | 30" Clinoptilolite | STD. DEV. MIN | 3.4 22.0 | 7.4 | 36.1 270.0 | 0.4 | | 214.7 974.0 | 165.2 550.0 | 0.6 | 0.0 | 20.0 | 30.8 22.8 | 0.7 | | | 31.1 20.0 | 31.1 20.0 | | | | | |
| | | MAX | 22.0 | 7.4 | 340.0 | 7.6 | | 1388.0 | | 2.0 | 2.0 | 20.0 | 82.7 | 4.0 | | | 80.0 | 80.0 | | | | | |
| | | n | 20.7 | 2 | 2 | 2 | 100.5 | 2 | 2 | 2.0 | 2.0 | 1 | 2 | 2 | | 2 | 2 | 2 | 1 | | | | |
| UNSAT-PS1 | | 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 | | | | |
| (old) | 30" Polystyrene | STD. DEV. | 1.1 | | 84.9 | 0.1 | | 290.6 | 106.1 | 1.4 | 1.9 | | 25.4 | 26.2 | | | 0.8 | 27.2 | | | | | |
| () | | MIN | 27.0 | 7.3 | 160.0 | 2.5 | | 599.0 | | 2.0 | 3.0 | 48.0 | 25.3 | 16.0 | | | | 15.7 | | | | | |
| | I | 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 | | | | |
| Stage 2 Single | e Pass Upflow Biofil | ters Effluent | 2 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 2 | 2 | 2 | 2 | 1 | | | 2 | |
| | | 11 | 2 | 2 | 2 | 2 | 1 | | | 2 | | 1 | - | | 2 Z | | 2 | 2 | 1 | 4 | <u> </u> 2 | 2 | |
| | | MEAN | 27.6 | | 145.0 | 0.2 | -106.6 | 1162.0 | 755.0 | 10 | 3.0 | 22.0 | 11 | 1.0 | 0.8 | 0.2 | 0.1 | 03 | 3.2 | 10 | 03 | 405.0 | |
| | 80% Sulfur; 20% | MEAN STD. DEV. | 27.6 | | 145.0 7.1 | 0.2 | | 1162.0 329.5 | | 1.0 | 3.0 | | | | | | | 0.3 | | 1.0 | | 405.0 | |
| DENIT-SU4 (old) | 80% Sulfur; 20% Sodium Sesqui. | MEAN STD. DEV. MIN | 27.6 - 27.1 | 6.6 | 7.1 | 0.2 | | 1162.0 329.5 929.0 | 275.8 | 1.0 0.0 1.0 | 1.3 | | 0.4 | 0.4 | 0.2 | 0.1 | 0.1 | | | 1.2 | 0.4 | 405.0 205.1 260.0 | |
| | | STD. DEV. | - 27.1 28.1 | 6.6 | 7.1 | 0.1 0.1 0.2 | -106.6 | 329.5 | 275.8 560.0 | 0.0 | 1.3 2.0 3.9 | 22.0 22.0 | 0.4 | 0.4 0.8 1.3 | 0.2 0.7 1.0 | 0.1 0.1 0.3 | 0.1 0.01 0.1 | 0.2 0.1 0.4 | 3.2 | 1.2 | 2 0.4 1 0.01 | 205.1 | |
| DENIT-SU4 (old) | Sodium Sesqui. | STD. DEV. MIN MAX n | - 27.1 28.1 1 | | 7.1 140.0 150.0 | 0.1 0.1 0.2 1 | -106.6 -106.6 1 | 329.5 929.0 1395.0 1 | 275.8 560.0 950.0 1 | 0.0 | 1.3 2.0 3.9 1 | 22.0 22.0 1 | 0.4 0.8 1.4 1 | 0.4 0.8 1.3 | 0.2 0.7 1.0 | 0.1 0.1 0.3 | 0.1 0.01 0.1 | 0.2 0.1 0.4 1 | 3.2 | 1.2 | 2 0.4 0.01 3 0.6 1 1 | 205.1 260.0 550.0 1 | |
| (old) | Sodium Sesqui. 10% Limestone; | STD. DEV. MIN MAX n MEAN | - 27.1 28.1 | | 7.1 140.0 | 0.1 0.1 0.2 | -106.6 -106.6 1 | 329.5 929.0 | 275.8 560.0 950.0 1 | 0.0 | 1.3 2.0 3.9 | 22.0 22.0 1 | 0.4 0.8 1.4 1 | 0.4 0.8 1.3 | 0.2 0.7 1.0 | 0.1 0.1 0.3 | 0.1 0.01 0.1 | 0.2 0.1 0.4 | 3.2 | 1.2 | 2 0.4 1 0.01 | 205.1 260.0 | |
| | Sodium Sesqui. 10% Limestone; 30% Sulfur; 60% | STD. DEV. MIN MAX n MEAN STD. DEV. | - 27.1 28.1 1 21 | | 7.1 140.0 150.0 1 210 | 0.1 0.1 0.2 1 7.8 | -106.6 -106.6 1 -118 | 329.5 929.0 1395.0 1 1510 | 275.8 560.0 950.0 1 1100 | 0.0 | 1.3 2.0 3.9 1 | 22.0 22.0 1 13 | 0.4 0.8 1.4 1 0.9 | 0.4 0.8 1.3 1 0.9 | 0.2 0.7 1.0 0.8 | 0.1 0.1 0.3 1 0.1 | 0.1 0.01 0.1 1 0.02 | 0.2 0.1 0.4 1 0.12 | 3.2 | 1.2 | 2 0.4 1 0.01 3 0.6 1 1 1 0.09 | 205.1 260.0 550.0 1 560 | |
| (old) DENIT-SU4 | Sodium Sesqui. 10% Limestone; | STD. DEV. MIN MAX n MEAN STD. DEV. MIN | - 27.1 28.1 1 | | 7.1 140.0 150.0 | 0.1 0.1 0.2 1 | -106.6 -106.6 1 -118 -118 | 329.5 929.0 1395.0 1 1510 1510 | 275.8 560.0 950.0 1 1100 1100 | 0.0 1.0 1.0 6 6 | 1.3 2.0 3.9 1 | 22.0 22.0 1 | 0.4 0.8 1.4 1 0.9 0.9 | 0.4 0.8 1.3 1 0.9 0.9 | 4 0.2 8 0.7 8 1.0 1 1 9 0.8 9 0.8 | 0.1 0.1 0.3 1 0.1 0.1 | 0.1 0.01 0.1 0.02 0.02 | 0.2 0.1 0.4 1 0.12 0.12 | 3.2 | 1.2 | 2 0.4 0.01 3 0.6 1 1 | 205.1 260.0 550.0 1 | |
| (old) DENIT-SU4 | Sodium Sesqui. 10% Limestone; 30% Sulfur; 60% | STD. DEV. MIN MAX n MEAN STD. DEV. | - 27.1 28.1 1 21 21 21 21 3 | | 7.1 140.0 150.0 1 210 210 | 0.1 0.1 0.2 1 7.8 7.8 | -106.6 -106.6 1 -118 -118 | 329.5 929.0 1395.0 1 1510 1510 | 275.8 560.0 950.0 1 1100 1100 | 0.0 1.0 1.0 6 6 | 1.3 2.0 3.9 1 2 2 | 22.0 22.0 1 13 13 | 0.4 0.8 1.4 1 0.9 0.9 | 0.4 0.8 1.3 1 0.9 0.9 | 0.2 0.7 0.7 0.7 0.7 0.7 0.8 0.8 0.8 0.8 0.8 0.8 0.8 | 0.1 0.1 0.3 1 0.1 0.1 | 0.1 0.01 0.1 1 0.02 0.02 0.02 | 0.2 0.1 0.4 1 0.12 0.12 | 3.2 | 1.2 | 2 0.4 0.01 3 0.6 1 1 1 0.09 1 0.09 | 205.1 260.0 550.0 1 560 560 | |
| (old) DENIT-SU4 (new) | Sodium Sesqui. 10% Limestone; 30% Sulfur; 60% Expanded Clay 50% | STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN | - 27.1 28.1 1 21 21 21 21 3 25.3 | | 7.1 140.0 150.0 1 210 210 210 210 213.3 | 0.1 0.1 1 7.8 7.8 7.8 7.8 7.8 3 2.0 | -106.6 -106.6 1 -118 -118 -118 2 23.3 | 329.5 929.0 1395.0 1 1510 1510 1510 3 1003.0 | 275.8 560.0 950.0 1 1100 1100 1100 3 630.0 | 0.0 1.0 1.0 6 6 6 3 1.3 | 1.3 2.0 3.9 1 2 2 2 2 3 5.3 | 22.0 22.0 1 13 13 13 13 2 | 0.4 0.8 1.4 1 0.9 0.9 0.9 0.9 3 20.2 | 0.4 0.8 1.3 1 0.9 0.9 0.9 0.9 0.9 3 3.2 | 0.2 0.7 0.7 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 | 0.1 0.1 0.3 1 0.1 0.1 0.1 0.1 0.1 0.5 | 0.1 0.01 1 0.02 0.02 0.02 3 17.0 | 0.2 0.1 0.4 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 | 3.2 3.2 1 1 3.3 | 1.2 | 2 0.4 0.01 3 0.6 1 1 1 0.09 1 0.09 | 205.1 260.0 550.0 1 560 560 | |
| (old) DENIT-SU4 (new) | Sodium Sesqui. 10% Limestone; 30% Sulfur; 60% Expanded Clay 50% Lignocellulosic; | STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. | - 27.1 28.1 1 21 21 21 3 25.3 4.6 | 7.3 1 7 7 7 3 | 7.1 140.0 150.0 1 210 210 210 210 213.3 11.5 | 0.1 0.1 0.2 1 7.8 7.8 7.8 7.8 3 2.0 2.4 | -106.6 -106.6 1 -118 -118 -118 2 23.3 | 329.5 929.0 1395.0 1 1510 1510 1510 3 1003.0 270.2 | 275.8 560.0 950.0 1 1100 1100 1100 3 630.0 239.0 | 0.0 1.0 1.0 6 6 6 6 3 1.3 0.6 | 1.3 2.0 3.9 1 2 2 2 2 3 5.3 5.8 | 22.0 22.0 1 13 13 13 13 2 20.0 | 0.4 0.8 1.4 1 0.9 0.9 0.9 0.9 3 20.2 16.5 | 0.4 0.8 1.3 1 0.9 0.9 0.9 0.9 0.9 3 3.2 1.2 | 0.2 0.7 0.7 0.7 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 | 0.1 0.1 0.3 1 0.1 0.1 0.1 0.1 0.1 0.5 0.5 | 0.1 0.01 1 0.02 0.02 0.02 3 17.0 15.7 | 0.2 0.1 0.4 1 0.12 0.12 0.12 0.12 0.12 0.12 0.12 17.5 | 3.2 3.2 1 3.3 | 1.2 | 2 0.4 0.01 3 0.6 1 1 1 0.09 1 0.09 | 205.1 260.0 550.0 1 560 560 | |
| (old) DENIT-SU4 (new) | Sodium Sesqui. 10% Limestone; 30% Sulfur; 60% Expanded Clay 50% | STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n STD. DEV. MIN MAX n MEAN STD. DEV. MIN MEAN STD. DEV. MIN | - 27.1 28.1 1 21 21 21 3 25.3 4.6 20.0 | 7.3 1 7 7 7 3 6.9 | 7.1 140.0 150.0 1 210 210 210 3 213.3 11.5 200.0 | 0.1 0.1 0.2 1 7.8 7.8 7.8 7.8 7.8 3 2.0 2.4 0.1 | -106.6 -106.6 -118 -118 -118 -118 2 23.3 -21.0 | 329.5 929.0 1395.0 1 1510 1510 1510 3 1003.0 270.2 695.0 | 275.8 560.0 950.0 1100 1100 1100 3 630.0 239.0 370.0 | 0.0 1.0 1 6 6 6 3 1.3 0.6 1.0 | 1.3 2.0 3.9 1 2 2 2 2 2 3 5.3 5.8 5.8 2.0 | 22.0 22.0 1 13 13 13 13 2 20.0 11.0 | 0.4 0.8 1.4 1 0.9 0.9 0.9 3 20.2 16.5 2.0 | 0.4 0.8 1.3 1 0.9 0.9 0.9 0.9 3 3.2 1.2 2.0 | 0.2 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 | 0.1 0.1 0.3 1 0.1 0.1 0.1 0.1 0.5 0.5 0.4 0.2 | 0.1 0.01 1 0.02 0.02 0.02 3 17.0 15.7 0.01 | 0.2 0.1 0.4 1 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0. | 3.2 3.2 1 3.3 3.3 3.3 | 1.2 | 2 0.4 0.01 3 0.6 1 1 1 0.09 1 0.09 | 205.1 260.0 550.0 1 560 560 | |
| (old) DENIT-SU4 | Sodium Sesqui. 10% Limestone; 30% Sulfur; 60% Expanded Clay 50% Lignocellulosic; | STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. | - 27.1 28.1 1 21 21 21 3 25.3 4.6 | 7.3 1 7 7 7 3 | 7.1 140.0 150.0 1 210 210 210 3 213.3 11.5 200.0 | 0.1 0.1 0.2 1 7.8 7.8 7.8 7.8 3 2.0 2.4 | -106.6 -106.6 -118 -118 -118 -118 2 23.3 -21.0 | 329.5 929.0 1395.0 1 1510 1510 1510 3 1003.0 270.2 | 275.8 560.0 950.0 1100 1100 1100 3 630.0 239.0 370.0 | 0.0 1.0 1.0 6 6 6 6 3 1.3 0.6 | 1.3 2.0 3.9 1 2 2 2 2 2 2 2 2 3 3 5.3 5.8 5.8 2.0 12.0 | 22.0 22.0 1 13 13 13 2 20.0 20.0 11.0 29.0 | 0.4 0.8 1.4 1 0.9 0.9 0.9 0.9 3 20.2 16.5 | 0.4 0.8 1.3 1 0.9 0.9 0.9 0.9 3 3.2 1.2 2.0 | 0.2 0.7 0.7 0.7 0.7 0.7 0.7 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 | 0.1 0.1 0.3 1 0.1 0.1 0.1 0.1 0.5 0.5 0.4 0.4 0.2 1.0 | 0.1 0.01 0.1 0.02 0.02 3 3 17.0 15.7 0.01 31.0 | 0.2 0.1 0.4 1 0.12 0.12 0.12 0.12 0.12 0.12 0.12 17.5 | 3.2 3.2 1 3.3 3.3 3.3 3.3 | 1.2 | 2 0.4 0.01 3 0.6 1 1 1 0.09 1 0.09 | 205.1 260.0 550.0 1 560 560 | |
| (old) DENIT-SU4 (new) | Sodium Sesqui. 10% Limestone; 30% Sulfur; 60% Expanded Clay 50% Lignocellulosic; 50% Sand | STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n STD. DEV. MIN MAX n MEAN STD. DEV. MIN MEAN STD. DEV. MIN | - 27.1 28.1 1 21 21 21 3 25.3 4.6 20.0 | 7.3 1 7 7 7 3 6.9 | 7.1 140.0 150.0 1 210 210 210 3 213.3 11.5 200.0 | 0.1 0.1 0.2 1 7.8 7.8 7.8 7.8 7.8 3 2.0 2.4 0.1 | -106.6 -106.6 1 -118 -118 -118 -118 -118 -23.3 -21.0 67.5 2 | 329.5 929.0 1395.0 1 1 510 1 510 3 1003.0 270.2 695.0 1200.0 | 275.8 560.0 950.0 1 1100 1100 3 630.0 239.0 370.0 840.0 3 | 0.0 1.0 1 6 6 6 3 1.3 0.6 1.0 | 1.3 2.0 3.9 1 2 2 2 2 2 3 5.3 5.8 5.8 2.0 | 22.0 22.0 1 1 3 3 1 3 2 2 0.0 2 0.0 2 0 0 2 9.0 2 0 2 0 2 2 2 0 2 2 0 2 2 2 2 2 2 2 2 2 0 2 2 2 2 2 0 2 2 0 2 | 0.4 0.8 1.4 1 0.9 0.9 0.9 3 20.2 16.5 2.0 34.2 | 0.4 0.8 1.3 1 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 | 0.2 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 | 0.1 0.1 0.3 1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0 | 0.1 0.01 0.1 0.02 0.02 3 3 17.0 15.7 0.01 31.0 3 | 0.2 0.1 0.4 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 | 3.2 3.2 1 3.3 3.3 3.3 3.3 1 | 1.2 | 2 0.4 0.01 0.03 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.01 | 205.1 260.0 550.0 1 560 560 | |
| (old) DENIT-SU4 (new) DENIT-LS3 | Sodium Sesqui. 10% Limestone; 30% Sulfur; 60% Expanded Clay 50% Lignocellulosic; 50% Sand 80% Sulfur; 20% | STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n | - 27.1 28.1 1 21 21 21 21 3 25.3 4.6 20.0 28.1 3 | 7.3 1 7 7 7 3 6.9 | 7.1 140.0 150.0 210 210 213 3 213.3 11.5 200.0 220.0 3 | 0.1 0.2 1 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 2.0 2.4 0.1 4.7 3 | -106.6 -106.6 1 -118 -118 -118 -118 -118 -23.3 -21.0 67.5 -219.8 | 329.5 929.0 1395.0 1 1 1 1 510 3 1003.0 270.2 695.0 1200.0 3 | 275.8 560.0 950.0 1 1100 1100 3 630.0 239.0 370.0 840.0 3 3936.7 | 0.0 1.0 1.0 6 6 6 3 3 1.3 0.6 1.0 2.0 3 | 1.3 2.0 3.9 1 2 2 2 2 2 3 3 5.3 3 5.8 8 2.0 12.0 3 | 22.0 22.0 1 1 3 3 1 3 2 2 0.0 2 0.0 2 0 0 2 9.0 2 0 2 0 2 2 2 0 2 2 0 2 2 2 2 2 2 2 2 2 0 2 2 2 2 2 0 2 2 0 2 | 0.4 0.8 1.4 1 0.9 0.9 0.9 20.2 16.5 2.0 34.2 3 | 0.4 0.8 1.3 1 0.9 0.9 0.9 0.9 3 3 3.2 2 1.2 2.0 4.3 3 | 0.2 0.2 0.7 0.7 0.10 1 0.8 0.8 0.0.8 3 2.66 1.4 0.1.11 3.8 3.3 2.66 1.4 3.8 3.3 3.3 | 0.1 0.1 0.3 1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0 | 0.1 0.01 1 0.02 0.02 0.02 0.02 0.02 0.02 | 0.2 0.1 0.12 0.12 0.12 0.12 3 3 17.5 15.3 10.0 3 1.2 3 3 | 3.2 3.2 1 1 3.3 3 3 3 3 3 3 1 1 6.2 | | 2 0.4 0.01 8 0.6 1 1 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.01 | 205.1 260.0 550.0 5600 5600 5600 | |
| (old) DENIT-SU4 (new) DENIT-LS3 | Sodium Sesqui. 10% Limestone; 30% Sulfur; 60% Expanded Clay 50% Lignocellulosic; 50% Sand | STD. DEV. MIN MAX n MEAN STD. DEV. MIN MIN | 27.1 28.1 1 21 21 21 21 25.3 4.6 20.0 28.1 3 3 25.8 2.5.8 - 21.4 | 7.3 1 7 7 7 3 6.9 | 7.1 140.0 150.0 210 210 210 210 210 220.0 220.0 220.0 220.0 3 233.3 55.1 170.0 | 0.1 0.1 0.2 1 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 | -106.6 -106.6 1 -118 -118 -118 -118 -118 -2 23.3 -21.0 67.5 2 -229.8 | 329.5 929.0 1395.0 1 1510 1510 1510 3 1003.0 270.2 695.0 1200.0 3 3 1464.0 | 275.8 560.0 950.0 1 1100 1100 3 630.0 239.0 370.0 840.0 370.0 840.0 329.2 202.6 | 0.0 1.0 1.0 1.0 6 6 6 6 3.3 0.6 1.0 2.0 3.3 6.3 8.44 1.0 | 1.3 2.0 3.9 1 2 2 2 2 2 3 3 5.3 5.8 5.8 2.0 12.0 3 6.0 | 22.0 22.0 1 1 3 3 1 3 2 2 0.0 2 0.0 2 0 0 2 9.0 2 0 2 0 2 2 2 0 2 2 0 2 2 2 2 2 2 2 2 2 0 2 2 2 2 2 0 2 2 0 2 | 0.4 0.8 1.4 1 0.9 0.9 3 20.2 16.5 2.0 34.2 3 2.2 | 0.4 0.8 1.3 1 0.9 0.9 0.9 0.9 3 3 3.2 2 1.2 2.0 4.3 3 2.2 | 0.2 0.7 0.7 0.7 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 | 0.1 0.1 0.3 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.2 0.4 0.2 1.0 0 3 3 0.6 0.2 | 0.1 0.01 1 0.02 0.02 0.02 0.02 0.02 0.02 | 0.2 0.1 0.4 1 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0. | 3.2 3.2 1 3.3 3.3 3.3 1 6.2 | | 2 0.4 0.01 0.09 | 205.1 260.0 550.0 560 560 560 560 3 446.7 | |
| (old) DENIT-SU4 (new) DENIT-LS3 | Sodium Sesqui. 10% Limestone; 30% Sulfur; 60% Expanded Clay 50% Lignocellulosic; 50% Sand 80% Sulfur; 20% | STD. DEV. MIN MAX n MEAN STD. DEV. | | 7.3 1 7 7 7 7 7 7 7 3 3 6.9 7.7 7 3 3 | 7.1 140.0 150.0 210 210 210 210 210 3 3 213.3 11.5 200.0 220.0 3 3 233.3 55.1 170.0 | 0.1 0.2 1. 7.8 7.8 3 2.0 2.4 0.1 4.7 3 2.6 4.4 | -106.6 -106.6 1 -118 -118 -118 -118 -118 -23.3 -23.3 -21.0 67.5 2 -229.8 -229.8 | 329.5 929.0 1395.0 1 1510 1510 1510 3 1003.0 270.2 695.0 1200.0 3 3 1464.0 | 275.8 560.0 950.0 1100 1100 3 630.0 239.0 370.0 840.0 3 0 936.7 202.6 710.0 | 0.0 1.0 1.0 1.0 6 6 6 6 1.0 2.0 3 6.3 6.3 8.4 | 1.3 2.0 3.9 1 2 2 2 2 2 2 2 3 3 5.3 5.3 5.8 8 2.0 12.0 3 3 6.0 6.1 | 22.0 22.0 1 13 13 13 2 2 0.0 20.0 11.0 29.0 2 32.5 | 0.4 0.8 1.4 1 0.9 0.9 0.9 3 20.2 16.5 2.0 34.2 3 2 2.2 0.5 | 0.4 0.8 1.3 1.0 0.9 0.9 0.9 3.3 2.2 2.0 4.3 3 3.22 2.0 5.5 1.8 8 2.7 | 0.2 0.7 0.7 0.7 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 | 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 | 0.1 0.01 1 0.02 0.02 3 3 17.0 15.7 0.01 31.0 3 3.0 0.0 0 0.00 | 0.2 0.1 0.4 1 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0. | 3.2 3.2 1 1 3.3 3.3 3.3 3.3 2 1 1 6.2 6.2 6.2 | 1.2 0.1 1.8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 2 0.4 0.01 0.01 0.09 | 205.1 260.0 550.0 1 560 560 560 560 3 446.7 105.0 | |
| (old) DENIT-SU4 (new) DENIT-LS3 | Sodium Sesqui. 10% Limestone; 30% Sulfur; 60% Expanded Clay S0% Lignocellulosic; S0% Sand 80% Sulfur; 20% Oyster Shell | STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MEAN STD. DEV. MIN MAX n MAX n | 27.1 28.1 21 21 21 25.3 4.66 20.0 28.1 3 25.8 25.8 - - - 21.4 22.4 28.4 28.4 28.4 2 | 7.3 1 7 7 7 7 3 3 6.9 7.7 3 3 6.9 6.9 7.7 3 3 | 7.1 140.0 150.0 210 210 210 210 210 220.0 220.0 220.0 220.0 3 3 233.3 55.1 170.0 270.0 270.0 | 0.1 0.2 1 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 | -106.6 -106.6 1 -118 -118 -118 -118 -23.3 -21.0 67.5 2 -229.8 -229.6 -180.0 1 | 329.5 929.0 1395.0 1 1 510 1 510 3 1003.0 270.2 695.0 1200.0 1200.0 1200.0 1200.0 1205.0 1265.0 1257.0 1655.0 2 | 275.8 560.0 950.0 1100 1100 3 630.0 239.0 370.0 840.0 370.0 840.0 370.0 840.0 370.0 100.0 2 | 0.0 1.0 1.0 1.0 6 6 3 3 1.3 0.6 1.0 2.00 3 8.4 1.0 1.0 2.0 0 3 0.2 0 3 0.2 0 0 2.0 0 3 0 0 0 0 0 0 0 0 0 0 0 0 0 | 1.3 2.0 3.9 1 2 2 2 2 3 3 5.3 5.8 5.8 2.0 12.0 3 3 6.0 6.1 12.0 3 2.0 13.0 0 2.0 2 2 0 2.0 2 2 2 2 2 2 2 3 3 5.3 5.5 3 5.5 5.5 5.5 5.5 5.5 5.5 5 | 22.0 22.0 1 1 3 3 2 2 0.0 2 2 0.0 2 2 0.0 2 2 0.0 2 2 0.0 2 2 0.0 2 2 0.0 2 2 0.0 2 2 0.0 2 2 0.0 0 1 1 3 2.0 2.0 0 1 3 2.0 0 2.0 0 1 1 3 3 2 0 0 0 1 1 3 3 2 0 0 1 1 3 2 0 0 1 1 3 2 0 0 1 1 3 2 0 0 1 1 3 2 0 0 1 1 3 2 0 0 0 1 1 3 2 0 0 0 1 1 3 2 0 0 0 1 1 3 2 0 0 0 1 1 3 2 0 0 0 1 1 3 2 0 0 0 1 1 3 2 0 0 0 1 1 3 2 0 0 0 1 1 0 2 0 0 0 1 1 1 0 2 0 0 0 1 1 0 2 0 0 1 1 1 0 2 0 0 0 1 1 1 0 2 0 0 0 1 1 1 1 | 0.4 0.8 1.4 1 9 0.9 0.9 0.9 0.9 0.9 2.02 16:5 2.0 34:2 33 2.2 0.5 1.9 2.7 7 2.7 | 0.4 0.8 1.3 1.2 0.9 0.9 0.9 0.9 0.9 0.9 3.2 2.0 2.0 4.3 3.2 2.2 0.5 5.1.8 2.7 7 2 | 0.2 0.7.3 0.7.4 0.7.4 0.7.5 0.7.4 0.7.6 0.7.4 0.7.7 0.7.4 0.7.7 0.7.4 0.7.7 0.7.4 0.7.7 0.7.4 0.7.7 0.7.4 0.7.7 0.7.4 0.7.7 0.7.4 0.7.7 0.7.4 0.7.7 0.7.4 0.7.7 0.7.4 0.7.7 0.7.4 0.7.7 0.7.4 | 0.1 0.3 1 0.1 0.1 0.1 0.5 0.5 0.6 0.2 0.5 0.8 8 2 2 | 0.1 0.01 1 0.02 0.02 3 17.0 15.7 0.01 31.0 0 .0 0 0.0 0.01 0.01 0.1 2 | 0.2 0.1 0.4 1 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0. | 3.2 3.2 1 3.3 3.3 3.3 3.3 1 1 6.2 6.2 6.2 1 | 1.2 0.1 1.8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 2 0.4 0.01 0.01 0.09 | 205.1 260.0 550.0 5600 5600 5600 3600 3000 3000 340.0 | |
| (old) DENIT-SU4 (new) DENIT-LS3 DENIT-LS3 DENIT-LS2 | Sodium Sesqui. 10% Limestone; 30% Sulfur; 60% Expanded Clay 50% Sand 80% Sulfur; 20% Oyster Shell 50% | STD. DEV. MIN MAX n MEAN MIN MAX n MEAN | 27.1 28.1 1 21 21 21 3 3 25.3 4.6 20.0 28.1 3 3 25.8 - 21.4 28.4 22.7.3 | 7.3 1 7 7 7 7 3 3 6.9 7.7 3 3 6.9 6.9 7.7 3 3 | 7.1 140.0 150.0 210 210 210 210 210 210 213.3 11.5 200.0 220.0 220.0 220.0 220.0 220.0 220.0 220.0 220.0 223.3 55.1 | 0.1 0.1 0.2 1 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 | -106.6 -106.6 -11 -118 -118 -118 -2 23.3 -21.0 67.5 2 -229.8 -229.8 -229.6 -180.0 1 1 -11.5 | 329.5 929.0 1395.0 1 1 1 510 3 3 1003.0 270.2 695.0 1200.0 1200.0 1200.0 1295.5 1257.0 1655.0 2 2 1223.0 | 275.8 560.0 950.0 1100 1100 3 630.0 239.0 840.0 370.0 840.0 370.0 840.0 370.0 840.0 370.0 840.0 239.0 840.0 239.0 840.0 239.0 840.0 239.0 840.0 239.0 840.0 239.0 840.0 239.0 840.0 239.0 840.0 239.0 840.0 239.0 840.0 239.0 840.0 239.0 840.0 239.0 840.0 239.0 840.0 239.0 840.0 239.0 200.00 | 0.0 1.0 1.0 1.0 6 6 3 1.3 0.6 1.0 2.0 3.0 6.3 8.4 1.0 16.0 2.0 3.0 5.0 | 1.3 2.0 3.9 1 2 2 2 3 3 5.3 5.8 5.8 2.0 12.0 3 0 6.0 6.1 2.0 13.0 2 2 3.8 | 22.0 22.0 1 13 13 2 20.0 11.0 29.0 20.0 232.5 32.5 26.0 | 0.4 0.8 1.4 1 0.9 0.9 0.9 3 20.2 16.5 2.0 3 4.2 2 0.5 1.9 2.7 2 2 17.5 | 0.4 0.8 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 | 0.2 0.7 0.7 0.7 0.7 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 1.4 0.111 3.8 1.6 0.6 0.6 1.2 2.2 2.2 2.0 2.0 | 0.1 0.3 0.1 0.1 0.1 0.1 0.1 0.5 0.5 0.5 0.6 0.2 0.5 0.8 0.8 2 0.3 | 0.1 0.01 1 0.02 0.02 0.02 3 17.0 15.7 0.01 31.0 0.00 0.00 0.01 0.1 2 2 15.2 | 0.2 0.1 0.4 1 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0. | 3.2 3.2 1 3.3 3.3 3.3 3.3 1 6.2 6.2 6.2 6.2 1 1 5.7 | 1.2 0.1 1.8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 2 0.4 0.01 0.01 0.09 | 205.1 260.0 550.0 5600 5600 5600 3600 3000 3000 340.0 | |
| DENIT-SU4 (new) DENIT-LS3 DENIT-SU3 DENIT-LS2 | Sodium Sesqui. 10% Limestone; 30% Sulfur; 60% Expanded Clay S0% Lignocellulosic; S0% Sand 80% Sulfur; 20% Oyster Shell | STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MEAN STD. DEV. MIN MAX n MAX n | 27.1 28.1 21 21 21 25.3 4.66 20.0 28.1 3 25.8 25.8 - - - 21.4 22.4 28.4 28.4 28.4 2 | 7.3 1 7 7 7 7 3 3 6.9 7.7 3 3 6.9 6.9 7.7 3 3 | 7.1 140.0 150.0 210 210 210 210 213 3 11.5 200.0 220.0 3 3 55.1 170.0 270.0 270.0 2375.0 7.1.1 | 0.1 0.2 1 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 | -106.6 -106.6 -118 -118 -118 2 2 23.3 -21.0 67.5 2 2 -229.8 -229.8 -229.6 -180.0 1 1 -11.5 | 329.5 929.0 1395.0 1 1 510 1 510 3 1003.0 270.2 695.0 1200.0 1200.0 1200.0 1200.0 1205.0 1265.0 1257.0 1655.0 2 | 275.8 560.0 950.0 11000 11000 33 630.0 239.0 370.0 840.0 370 | 0.0 1.0 1.0 1.0 6 6 3 3 1.3 0.6 1.0 2.00 3 8.4 1.0 1.0 2.0 0 3 0.2 0 3 0.2 0 0 2.0 0 3 0 0 0 0 0 0 0 0 0 0 0 0 0 | 1.3 2.0 3.9 1 2 2 2 2 3 3 5.3 5.8 5.8 2.0 12.0 3 3 6.0 6.1 12.0 3 2.0 13.0 0 2.0 2 2 0 2.0 2 2 2 2 2 2 3 3 5.3 5.5 3 5.5 5.5 5.5 5.5 5.5 5.5 5 | 22.0 22.0 1 1 3 3 2 2 0.0 2 2 0.0 2 2 0.0 2 2 0.0 2 2 0.0 2 2 0.0 2 2 0.0 2 2 0.0 2 2 0.0 2 2 0.0 0 1 1 3 2.0 2.0 0 1 3 2.0 0 2.0 0 1 1 3 3 2 0 0 0 1 1 3 3 2 0 0 1 1 3 2 0 0 1 1 3 2 0 0 1 1 3 2 0 0 1 1 3 2 0 0 1 1 3 2 0 0 0 1 1 3 2 0 0 0 1 1 3 2 0 0 0 1 1 3 2 0 0 0 1 1 3 2 0 0 0 1 1 3 2 0 0 0 1 1 3 2 0 0 0 1 1 3 2 0 0 0 1 1 0 2 0 0 0 1 1 1 0 2 0 0 0 1 1 0 2 0 0 1 1 1 0 2 0 0 0 1 1 1 0 2 0 0 0 1 1 1 1 | 0.4 0.8 1.4 1 9 0.9 0.9 0.9 0.9 0.9 2.02 16:5 2.0 34:2 33 2.2 0.5 1.9 2.7 7 2.7 | 0.4 0.8 1.3 1 0.9 0.9 0.9 3 3 3.2 2.0 2.0 0 4.3 3 3 2.2 2.0 5.5 1.8 2.7 2 3 1.2 2.3 | 0.2 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.8 0.8 0.8 0.8 0.8 2.6 1.14 1.13 3.8 3.8 3.8 3.8 1.6 0.6.8 1.2.2 2.2.2 2.2 2.2 2.2.0 1.2.2 | 0.1 0.3 1 0.1 0.1 0.1 0.1 0.5 0.4 0.2 1.0 0.3 0.6 0.2 0.5 0.8 0.8 0.3 0.0 0.0 | 0.1 0.01 1 0.02 0.02 0.02 0.02 3 17.0 15.7 0.01 31.0 3 0.00 0.00 0.00 0.001 0.1 2 15.2 15.2 | 0.2 0.1 0.4 1 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0. | 3.2 3.2 1 1 3.3 3.3 3.3 1 1 6.2 6.2 6.2 6.2 5.7 | 1.2 0.1 1.8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 2 0.4 0.01 0.01 0.09 | 205.1 260.0 550.0 5600 5600 5600 3600 3000 3000 340.0 | |
| (old) DENIT-SU4 (new) DENIT-LS3 DENIT-SU3 DENIT-LS2 | Sodium Sesqui. 10% Limestone; 30% Sulfur; 60% Expanded Clay 50% Lignocellulosic; 50% Sand 80% Sulfur; 20% Oyster Shell 50% Lignocellulosic; | STD. DEV. MIN MAX n MEAN STD. DEV. | 27.1 28.1 21 21 21 3 3 25.3 4.6 20.0 28.1 3 3 25.8 2.5.8 2.1.4 22.4 21.4 22.4 22.7.3 0.1 | 7.3 1 7 7 7 7 3 3 6.9 7.7 7 3 3 6.9 7.7 7 2 2 | 7.1 140.0 150.0 210 210 210 210 213.3 11.5 200.0 220.0 3 3 55.1 170.0 270.0 270.0 270.0 270.0 270.0 270.0 275.0 375.0 375.0 | 0.1 0.1 0.2 1 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 | -106.6 -106.6 -118 -118 -118 -118 -118 -2 2 3.3 -21.0 67.5 2 -229.8 -229.8 -229.8 -229.6 -180.0 1 -11.5 -11.5 | 329.5 929.0 1395.0 1510 1510 3 1003.0 270.2 695.0 1200.0 3 1464.0 1299.5 1257.0 1655.0 1257.0 1655.0 1223.0 3 382.2 | 275.8 560.0 950.0 1100 1100 3 630.0 239.0 370.0 840.0 370.0 840.0 370.0 840.0 1100.0 1100.0 202.6 710.0 1100.0 2 680.0 240.4 510.0 | 0.0 1.0 1.0 1.0 6 6 3 3 0.6 1.0 2.0 3 6.3 8.44 1.0 16.0 2 5.0 5.7 | 1.3 2.0 3.9 1 2 2 2 2 2 2 2 2 2 3 3 5.3 3 5.8 2.0 12.0 3 0 6.0 6.1 2.0 3 3 6.0 6.1 2.0 2 2 5.3 3 5.3 5.3 5.8 5.8 5.8 5.9 5.9 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 22.0 22.0 1 1 3 3 1 3 2 2 0.0 2 20.0 1 1.0 2 20.0 2 20.0 2 20.0 2 20.0 2 20.0 2 20.0 1 1.0 2 20.0 1 3 20.0 2 2.0 0 1 3 2.0 0 2.0 0 1 3 3 2 2.0 0 1 3 3 3 3 2 2 0 0 2 2.0 0 1 3 3 3 3 3 2 2 0 0 2 2.0 0 1 3 3 3 3 3 2 2 0 0 2 2.0 0 1 3 3 3 2 2 0 0 2 2.5 2 2.5 2 2.5 2 2.5 2 2.5 2 2.5 2 2.5 2 2.5 2 2.5 2 2.5 2 2.5 2 2.5 2 2.5 2 2.5 2 2.5 2.5 | 0.4 0.8 1.4 1 1 0.9 0.9 0.9 3 20.2 20.2 16.5 2.0 34.2 3 3 2.2 2.0 5 1.9 9 2.7 2 2.7 2 17.5 20.7 | 0.4 0.8 1.3 1.3 0.9 0.9 0.9 3 3.2 2.0 0.5 1.2 2.0 0.5 1.8 8 2.7 2.3 1.2 1.2 1.4 | 0.2 0.7 0.7 1.0 1.1 0.8 0.8 0.8 0.8 0.8 0.8 0.8 1.1 1.1 1.1 1.1 1.1 3.3 2.6 1.1.1 3.8 3.3 1.1 3.8 3.3 1.1.1 3.8 3.3 1.1.1 3.8 3.3 1.1.1 3.8 3.3 1.1.1 3.8 3.1.2 1.2.2 2.2.2 2.2.2 2.2.2 2.2.2 2.2.2 2.2.2 2.2.2 2.2.2 2.2.2 2.2.2 3.3.3 3.3.4 <t< td=""><td>0.1 0.3 1 0.1 0.1 0.1 0.1 0.5 0.4 0.5 0.6 0.2 0.5 0.6 0.2 0.5 0.8 8 2 0.0 3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0</td><td>0.1 0.01 0.1 1 0.02 0.02 0.02 3 17.0 15.7 0.01 31.0 31.0 0.0 0.01 0.01 0.01 2 15.2 19.5 1.4</td><td>0.2 0.1 0.4 1 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.</td><td>3.2 3.2 1 1 3.3 3.3 3.3 3.3 1 6.2 6.2 6.2 1 1 5.7,</td><td>1.2 0.1 1.8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1</td><td>2 0.4 0.01 0.01 0.09</td><td>205.1 260.0 550.0 5600 5600 5600 3600 3000 3000 340.0</td><td></td></t<> | 0.1 0.3 1 0.1 0.1 0.1 0.1 0.5 0.4 0.5 0.6 0.2 0.5 0.6 0.2 0.5 0.8 8 2 0.0 3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0 | 0.1 0.01 0.1 1 0.02 0.02 0.02 3 17.0 15.7 0.01 31.0 31.0 0.0 0.01 0.01 0.01 2 15.2 19.5 1.4 | 0.2 0.1 0.4 1 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0. | 3.2 3.2 1 1 3.3 3.3 3.3 3.3 1 6.2 6.2 6.2 1 1 5.7, | 1.2 0.1 1.8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 2 0.4 0.01 0.01 0.09 | 205.1 260.0 550.0 5600 5600 5600 3600 3000 3000 340.0 | |
| (old) DENIT-SU4 (new) DENIT-LS3 DENIT-SU3 DENIT-LS2 | Sodium Sesqui. 10% Limestone; 30% Sulfur; 60% Expanded Clay 50% Lignocellulosic; 50% Sand 80% Sulfur; 20% Oyster Shell 50% Lignocellulosic; | STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MAX n MAX N MAX N MAX N MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN | 27.1 28.1 1 21 21 21 3 25.3 4.6 6 20.0 28.1 3 25.8 25.8 25.8 21.4 28.4 28.4 21.4 28.4 27.3 0.1 27.2 27.3 1 | 7.3 1 7 7 7 7 7 7 7 7 7 7 7 3 3 6.9 7.7 7 7.7 2 2 2 2 2 7.8 | 7.1 140.0 150.0 210 210 213.3 213.3 11.5 200.0 220.0 233 55.1 170.0 220.0 2375.0 7.1 170.0 220.0 2375.0 7.1 370.0 380.0 1 | 0.1 0.1 0.2 1 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 | -106.6 -106.6 -118 -118 -118 -118 -118 -118 -118 -223.3 -21.0 67.5 2 -229.8 -229.8 -229.6 -180.0 1 1 -11.5 -11.5 -11.5 1 | 329.5 929.0 1395.0 1510 1510 3 1003.0 270.2 695.0 1200.0 3 1464.0 1299.5 1257.0 1655.0 1257.0 1655.0 1223.0 3 1424.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 1223.0 3 1223.0 1223.0 1223.0 1223.0 1235.0 | 275.8 560.0 950.0 1100 1100 3 630.0 239.0 370.0 840.0 370.0 840.0 370.0 840.0 239.0 240.4 510.0 850.0 240.4 510.0 850.0 1 1 1 1 1 1 1 1 1 1 1 1 1 | 0.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 | 1.3 2.0 3.9 1 2 2 2 2 3 3 5.3 3 5.8 2.0 12.00 13.0 6.1 12.00 13.0 2 2 3.8 8 2.5 5.5 5.5 5.5 5.5 5.5 | 22.0 22.0 1 1 3 3 3 2 2 0.0 0 2 2 0.0 0 2 2 0.0 0 2 2 0.0 0 2 2 0.0 0 2 2 0.0 0 2 2 0.0 0 2 2 0.0 2 2 0.0 2 2.0 0 2 2.0 0 2 2.0 0 1 1 3 3 2 2 2 0 0 2 2.0 0 1 1 3 3 2 2 2 0 0 0 2 2.0 0 2 2.0 0 1 1 3 3 2 2 2 0 0 0 0 2 2 0 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 2 2 0 2 2 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 0 2 2 0 0 2 2 0 0 0 0 2 2 0 0 0 0 2 2 0 0 0 2 2 0 0 2 2 0 0 2 2 0 0 0 2 2 0 0 2 2 0 0 2 2 0 0 0 2 2 0 0 0 2 2 0 0 0 2 2 0 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 2 2 0 2 2 0 2 2 0 2 2 0 2 2 0 2 2 0 2 2 5 2 2 2 2 | 0.4 0.8 1.4 1 0.9 0.9 0.9 0.9 3 202 202 16.5 2.0 0 3 4.2 3 3 2.2 2 0.5 1.9 2.7 7 2.2 7.2 2.2 7.2 2.2 7.2 2.2 8 3.2,1 1.9 2.2 7 2.2 7 2.2 7 2.2 7 2.2 7 2.2 7 2.2 7 2.2 7 2.2 7 2.2 7 2.2 7 2.2 7 7 7 7 | 0.4 0.8 1.3 1 0.9 0.9 0.9 0.9 3 3.22 2.0 0.5 0.5 1.8 8 2.7 2.7 2.2 3.3 1.2 2.3 3.1 2.7 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 | 0.2 0.7 0.7 0.7 1.0 0.8 0.8 0.8 0.8 0.8 0.8 3.3 2.6.6 0.6.8 3.3 2.6.6 0.6.7 1.1 3.3 2.6.7 0.6.8 3.3 2.6.6 0.6.6 0.6.7 1.2 2.2.2 2.0 1.2 2.8 1.1 | 0.1 0.3 0.3 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.2 0.5 0.8 0.8 0.2 0.5 0.8 0.2 0.5 0.8 0.3 0.0.0 0.0 0.0 0.3 0.0 0.3 0.0 0.3 0.0 0.3 0.0 0.3 0.0 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 | 0.1 0.01 0.1 1 0.02 0.02 0.02 0.02 0.02 | 0.2 0.1 0.4.4 1 1 0.12 0.12 0.12 0.12 0.12 0.12 0.12 | 3.2 3.2 1 1 3.3 3.3 3.3 1 6.2 6.2 6.2 6.2 2 6.2 5.7 5.7 | 1.2 0.1 1.8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 2 0.4 0.01 0.01 0.09 | 205.1 260.0 550.0 5600 5600 5600 3600 3000 3000 340.0 | |
| (old) DENIT-SU4 (new) DENIT-LS3 DENIT-SU3 DENIT-LS2 (old) | Sodium Sesqui. 10% Limestone; 30% Sulfur; 60% Expanded Clay 50% Sand 80% Sulfur; 20% Oyster Shell 50% Lignocellulosic; 50% Expanded Clay 25% | STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MEAN STD. DEV. MIN MAX n MAX n MAX n MIN MAX n MEAN | 27.1 28.1 1 21 21 21 21 21 21 25.3 4.6 20.0 28.1 3 3 25.8 21.4 21.4 22.7.3 0.1 27.2 27.3 | 7.3 1 7 7 7 7 7 7 7 7 7 7 7 3 3 6.9 7.7 7 7.7 2 2 2 2 2 7.8 | 7.1 140.0 150.0 210 210 210 210 210 3 3 213.3 11.5 200.0 220.0 3 3 55.1 170.0 270.0 270.0 273.5 375.0 375.0 375.0 | 0.1 0.1 0.2 1 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 | -106.6 -106.6 -118 -118 -118 -118 -118 -118 -118 -223.3 -21.0 67.5 2 -229.8 -229.8 -229.6 -180.0 1 1 -11.5 -11.5 -11.5 1 | 329.5 929.0 1395.0 1510 1510 3 1003.0 270.2 695.0 1200.0 3 1464.0 1299.5 1257.0 1655.0 1257.0 1655.0 1223.0 3 1424.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 3 1223.0 1223.0 3 1223.0 1223.0 1223.0 1223.0 1235.0 | 275.8 560.0 950.0 1100 1100 3 630.0 239.0 370.0 840.0 370.0 840.0 370.0 840.0 239.0 240.4 510.0 850.0 240.4 510.0 850.0 1 1 1 1 1 1 1 1 1 1 1 1 1 | 0.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 | 1.3 2.0 3.9 1 2 2 2 2 2 2 2 2 2 2 3 5.8 5.8 5.8 5.8 5.8 2.0 12.0 6.1 13.0 2.0 13.0 2.0 5.5 5.5 | 22.0 22.0 1 1 3 3 3 2 2 0.0 0 2 2 0.0 0 2 2 0.0 0 2 2 0.0 0 2 2 0.0 0 2 2 0.0 0 2 2 0.0 0 2 2 0.0 2 2 0.0 2 2.0 0 2 2.0 0 2 2.0 0 1 1 3 3 2 2 2 0 0 2 2.0 0 1 1 3 3 2 2 2 0 0 0 2 2.0 0 2 2.0 0 1 1 3 3 2 2 2 0 0 0 0 2 2 0 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 2 2 0 2 2 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 0 0 2 2 0 0 2 2 0 0 0 0 2 2 0 0 0 0 2 2 0 0 0 2 2 0 0 2 2 0 0 2 2 0 0 0 2 2 0 0 2 2 0 0 2 2 0 0 0 2 2 0 0 0 2 2 0 0 0 2 2 0 0 0 2 2 0 0 2 2 0 0 2 2 0 0 2 2 0 2 2 0 2 2 0 2 2 0 2 2 0 2 2 0 2 2 0 2 2 5 2 2 2 2 | 0.4 0.8 1.4 1 0.9 0.9 0.9 0.9 3 202 202 16.5 2.0 0 3 4.2 3 3 2.2 2 0.5 1.9 2.7 7 2.2 7.2 2.2 7.2 2.2 7.2 2.2 8 3.2,1 1.9 2.2 7 2.2 7 2.2 7 2.2 7 2.2 7 2.2 7 2.2 7 2.2 7 2.2 7 2.2 7 2.2 7 2.2 7 7 7 7 | 0.4 0.8 1.3 1 0.9 0.9 0.9 0.9 3 3.22 2.0 0.5 0.5 1.8 8 2.7 2.7 2.2 3.3 1.2 2.3 3.1 2.7 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 | 0.2 0.7 0.7 0.7 1.0 0.8 0.8 0.8 0.8 0.8 0.8 3.3 2.6.6 0.6.8 3.3 2.6.6 0.6.7 1.1 3.3 2.6.6 0.6.6 0.6.7 1.2 2.2 2.0 1.2 2.8 1.1 | 0.1 0.1 0.3 1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.2 0.2 0.2 0.2 0.2 0.3 0.3 0.0 0.2 0.3 0.3 0.0 0.2 0.3 0.3 0.0 0.2 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 | 0.1 0.01 0.1 1 0.02 0.02 0.02 0.02 0.02 | 0.2 0.1 0.4.4 1 1 0.12 0.12 0.12 0.12 0.12 0.12 0.12 | 3.2 3.2 1 1 3.3 3.3 3.3 1 6.2 6.2 6.2 6.2 2 6.2 5.7 5.7 | 1.2 0.1 1.8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 2 0.4 0.01 0.01 0.09 | 205.1 260.0 550.0 5600 5600 5600 3600 3000 3000 340.0 | |
| (old) DENIT-SU4 (new) DENIT-LS3 DENIT-LS3 DENIT-LS2 DENIT-LS2 | Sodium Sesqui. 10% Limestone; 30% Sulfur; 60% Expanded Clay 50% Sand 80% Sulfur; 20% Oyster Shell 50% Lignocellulosic; 50% Expanded Clay 25% Lignocellulosic; | STD. DEV. MIN MAX n MEAN STD. DEV. MAX n MEAN STD. DEV. MAX n MEAN STD. DEV. | 27.1 28.1 1 21 21 21 3 3 25.3 4.6 20.0 28.1 3 25.8 21.4 28.4 21.4 28.4 22.7.3 0.1 27.2 27.3 1 1 27.2 27.3 1 27.2 27.3 | 7.3 1 7 7 7 7 7 7 7 7 7 7 7 3 3 6.9 7.7 7 7.7 2 2 2 2 2 7.8 | 7.1 140.0 150.0 210 210 3 3 213.3 11.5 200.0 220.0 3 3 233.3 55.1 170.0 270.0 | 0.1 0.1 0.2 1 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 | -106.6 -106.6 1 -118 -118 -118 -118 -233 -210 -279.6 -180.0 -115 -115 -115 -115 -115 -115 -115 -11 | 329.5 929.0 1395.0 1 1 1 1510 3 1003.0 270.2 695.0 1200.0 3 1464.0 1395.5 1257.0 1655.0 2 1223.0 1655.0 3 18.2 998.0 3 18.2 998.0 1448.0 | 275.8.8 560.00 11 1100 1100 1100 1100 330.0 3370.0 3370.0 3370.0 3370.0 239.0 3370.0 202.6 630.0 3370.0 202.6 680.0 202.6 680.0 1100 202.6 680.0 1100 202.6 850.0 1100 202.6 850.0 1100 202.6 850.0 1100 202.6 850.0 1100 202.6 850.0 1100 202.6 850.0 1100 202.6 100 100 100 100 100 100 100 10 | 0.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 | 1.3 2.0 3.9 1 2 2 2 2 3 3 5.3 3 5.8 2.0 12.00 13.0 6.1 12.00 13.0 2 2 3.8 8 2.5 5.5 5.5 5.5 5.5 5.5 | 22.0 22.0 22.0 1 1 3 3 2 2 2 0.0 2 9.0 2 9.0 2 9.0 2 9.0 2 9.0 2 9.0 2 9.0 2 9.0 2 9.0 2 9.0 2 9.0 2 9.0 2 9.0 2 9.0 2 9.0 2 0.0 2 0.0 2 0 0 2 2 5 5 2 5 5 5 2 5 5 5 2 5 5 5 5 | 0.4 0.8 0.9 0.9 0.9 0.9 3 3 20.2 2.0 3 4.2 3 3 2.2 0.5 2.0 5 2.0 5 2.0 7 2.7 2 2.7 2.2 7.7 5 2.0.7 2.2 8 32.1 1 1 2.0 2.0 7 2.0 2.0 7 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 | 0.4 0.8 1.3 1 0.9 0.9 0.9 3 3 3.2 2.0 5 5 1.8 2.7 2 2.3 1.2 1.4 4 3.1 1.2 1.4 4 3.1 1.2 1.4 4 3.1 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1 | 0.2 0.7 10.0 11 0.8 0.8 0.8 0.8 3.3 2.6 1.11 3.8 1.6 0.6.8 1.11 3.8 1.6 0.6.8 1.2 2.2 2.2 2.2 2.2.2 2.2.2 2.2.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 | 0.1 0.1 0.3 1 0.1 0.1 0.1 0.1 0.1 0.1 0.2 0.5 0.5 0.8 0.0 0.2 0.5 0.3 0.0 0.2 0.3 0.3 0.0 0.2 0.3 0.3 0.0 0.3 0.0 0.3 0.0 0.3 0.0 0.3 0.0 0.3 0.0 0.3 0.0 0.3 0.0 0.3 0.0 0.3 0.0 0.3 0.0 0.3 0.0 0.5 0.0 0.5 0.5 0.5 0.5 0.5 0.5 0.5 | 0.1 0.01 0.1 1 0.02 0.02 0.02 3 3 17.0 0.1 5.7 0.01 31.0 3.0 0.0 0.01 0.1 0.1 2 19.5 1.4 29.0 0 1 16 | 0.2 0.1 0.4 1 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0. | 3.2 3.2 1 1 3.3 3.3 3.3 1 1 6.2 6.2 6.2 6.2 5.7 5.7 5.7 | 1.2 0.1 1.8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 2 0.4 0.01 0.01 0.09 | 205.1 260.0 550.0 5600 5600 5600 3600 3000 3000 340.0 | |
| (old) DENIT-SU4 (new) DENIT-LS3 DENIT-LS3 DENIT-LS2 DENIT-LS2 | Sodium Sesqui. 10% Limestone; 30% Sulfur; 60% Expanded Clay 50% Sand 80% Sulfur; 20% Oyster Shell 50% Lignocellulosic; 50% Expanded Clay 25% | STD. DEV. MIN MAX n MEAN STD. DEV. MIN | 27.1 28.1 28.1 21 21 3 3 25.3 4.6 20.0 28.1 3 3 25.8 4.6 20.0 28.1 3 3 25.8 4.6 20.0 28.1 3 3 25.3 4.6 20.0 28.1 3 3 25.3 4.6 20.0 28.1 21 21 21 21 21 21 21 21 21 21 21 21 21 | 7.3 1 7 7 7 7 7 7 7 7 7 7 7 3 3 6.9 7.7 7 7.7 2 2 2 2 2 7.8 | 7.1 140.0 150.0 210 210 3 3 213.3 11.5 200.0 220.0 233 55.1 170.0 220.0 2335.0 2333 55.1 170.0 220.0 2335.0 7.1 1 375.0 380.0 1 320 320 320 320 320 | 0.1 0.1 0.2 1 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 | -106.6 -106.6 -106.6 -106.6 -106.6 -106.6 -106.6 -118 -118 -118 -118 -118 -115 -115 -115 | 329.5 929.0 1395.0 1510 1510 3 1003.0 270.2 695.0 1200.0 3 1464.0 1200.0 3 1202.0 1655.0 1257.0 3 1455.0 1257.0 3 1223.0 3 1428.0 1223.0 3 1428.0 1448.0 1448.0 1200 | 275.8 560.0.9 950.0.9 11 1100 11000 3 3 630.0 239.0 239.0 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 | 0.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 | 1.3 2.0 3.99 2 2 2 3 3 5.8 2.0 12.0 12.0 6.0 6.1 2.0 3.3 8 2.0 5.5 2.0 5.5 5 2.0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 3 3 8 8 2.0 5.3 3 5.8 8 2.0 6 2 9 2 3 3 5.8 8 2.0 6 2 9 2 2 3 3 5.8 8 2.0 6 2 9 2 2 2 3 3 5.8 8 5.8 5.8 5.8 5.8 5.8 5.8 5.8 5.8 5 | 22.0 22.0 22.0 22.0 20.0 11.0 29.0 29.0 29.0 29.0 29.0 29.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 25.0 26.0 | 0.4 0.8 1.4 1 0.9 0.9 0.9 3 20.2 16.5 2.0 3 2.2 0.5 1.9 2.7 2.2 1.7 2.8 3.221 1.1 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 | 0.4 0.8 1.3 0.9 0.9 0.9 3.2 2.0 0.5 1.8 2.7 7 2.3 1.2 2.3 1.2 2.3 1.2 2.3 1.2 2.3 1.2 2.3 1.2 2.3 1.2 2.3 1.2 2.3 1.2 2.3 1.3 2.2 2.3 1.3 2.2 2.3 1.3 2.2 2.3 1.3 2.2 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2 | 0.2 0.7 0.7 0.7 1.0 0.8 0.8 0.8 0.8 3.3 2.66 1.1 1.1 1.1 1.1 3.3 2.66 0.68 1.2 2.3 1.2 1.2 1.2 < | 0.1 0.1 0.3 0.1 0.1 0.1 0.1 0.5 0.4 0.2 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 | 0.1 0.01 0.1 1 0.02 0.02 0.02 3 3 17.0 15.7 0.01 31.0 0.0 0 0.01 0.01 0.01 0.01 2 15.2 19.5 2 1.5.2 1.4 29.0 1 1 6 16 | 0.2 0.1 0.4.4 1 1 0.12 0.12 0.12 0.12 0.12 0.12 0.12 | 3.2 3.2 1 3.3 3.3 3.3 1 6.2 6.2 6.2 6.2 1 5.7 5.7 | 1.2 0.1 1.8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 2 0.4 0.01 0.01 0.09 | 205.1 260.0 550.0 5600 5600 5600 3600 3000 3000 340.0 | |
| (old) DENIT-SU4 (new) DENIT-LS3 DENIT-LS3 DENIT-LS2 OENIT-LS2 | Sodium Sesqui. 10% Limestone; 30% Sulfur; 60% Expanded Clay 50% Sand 80% Sulfur; 20% Oyster Shell 50% Lignocellulosic; 50% Expanded Clay 25% Lignocellulosic; | STD. DEV. MIN MAX n MEAN STD. DEV. MAX n MEAN STD. DEV. MAX n MEAN STD. DEV. | 27.1 28.1 1 21 21 21 3 3 25.3 4.6 20.0 28.1 3 25.8 21.4 28.4 21.4 28.4 22.7.3 0.1 27.2 27.3 1 1 27.2 27.3 1 27.2 27.3 | 7.3 1 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 | 7.1 140.0 150.0 210 210 3 3 213.3 11.5 200.0 220.0 3 3 233.3 55.1 170.0 270.0 | 0.1 0.1 0.2 1 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 | -106.6 -106.6 -106.6 -106.6 -106.6 -106.6 -1108 -118 -118 -118 -118 -118 -2129.8 -229.8 -229.8 -229.8 -229.8 -115.5 -115.5 -115.5 -115.5 -115.5 -115.5 -115.6 -116.6 -118.6 -118.6 -118.6 -118.6 -118.7 -118.7 -118.7 -219.6 -115.7 -115. | 329.5 929.0 1395.0 1510 1510 3 1003.0 270.2 695.0 1200.0 3 1464.0 199.5 1257.0 2 1223.0 3 3 1464.0 1655.0 2 2 1223.0 3 3 8.8.2 998.0 1428.0 1428.0 1428.0 1200 | 275.8 560.0.9 950.0.9 11 1100 11000 3 3 3 3 3 3 3 3 3 3 3 3 3 | 0.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 | 1.3 2.0 3.9 1 2 2 2 2 3 3 5.3 3 5.8 2.0 12.00 13.0 6.1 12.00 13.0 2 2 3.8 8 2.5 5.5 5.5 5.5 5.5 5.5 | 22.0 22.0 22.0 1 1 3 3 2 2 2 0.0 2 9.0 2 9.0 2 9.0 2 9.0 2 9.0 2 9.0 2 9.0 2 9.0 2 9.0 2 9.0 2 9.0 2 9.0 2 9.0 2 9.0 2 9.0 2 0.0 2 0.0 2 0 0 2 2 5 5 5 2 5 5 5 2 5 5 5 5 | 0.4 0.8 1.4 1 0.9 0.9 0.9 3 20.2 16.5 2.0 3 2.2 0.5 1.9 2.7 2.2 1.7 2.8 3.221 1.1 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 | 0.44 0.88 0.99 0.99 0.99 0.99 0.99 0.99 0.99 | 0.2 0.7 0.10.0 1.10 0.8 0.10.1 1.1 0.8 0.8 0.8 0.8 0.8 1.1 1.2 2.2 2.2 2.2 2.2 2.2 1.2 1.2 1.2 1.2 1.2 1.2 <td>0.1 0.1 0.3 0.1 0.1 0.1 0.1 0.5 0.4 0.2 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5</td> <td>0.1 0.01 0.1 1 0.02 0.02 3 3 17.0 15.7 0.01 31.0 3 3.0 0.0 0 0.00 0.01 0.1 2 15.2 19.5 1.4 4 29.0 1 1 16 6</td> <td>0.2 0.1 0.4.4 1 1 0.12 0.12 0.12 0.12 0.12 0.12 0.12</td> <td>3.2 3.2 1 1 3.3 3.3 3.3 3.3 3.3 1 6.2 6.2 6.2 1 1 5.7 5.7</td> <td>1.2 0.1 1.8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1</td> <td>2 0.4 0.01 0.01 0.09</td> <td>205.1 260.0 550.0 5600 5600 5600 3600 3000 3000 340.0</td> <td></td> | 0.1 0.1 0.3 0.1 0.1 0.1 0.1 0.5 0.4 0.2 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 | 0.1 0.01 0.1 1 0.02 0.02 3 3 17.0 15.7 0.01 31.0 3 3.0 0.0 0 0.00 0.01 0.1 2 15.2 19.5 1.4 4 29.0 1 1 16 6 | 0.2 0.1 0.4.4 1 1 0.12 0.12 0.12 0.12 0.12 0.12 0.12 | 3.2 3.2 1 1 3.3 3.3 3.3 3.3 3.3 1 6.2 6.2 6.2 1 1 5.7 5.7 | 1.2 0.1 1.8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 2 0.4 0.01 0.01 0.09 | 205.1 260.0 550.0 5600 5600 5600 3600 3000 3000 340.0 | |
| (old) DENIT-SU4 (new) DENIT-LS3 DENIT-LS3 DENIT-LS2 OENIT-LS2 | Sodium Sesqui. 10% Limestone; 30% Sulfur; 60% Expanded Clay 50% Sand 80% Sulfur; 20% Oyster Shell 50% Lignocellulosic; 50% Expanded Clay 25% Lignocellulosic; | STD. DEV. MIN MAX n MEAN STD. DEV. MIN | 27.1 28.1 28.1 21 21 21 21 21 21 23 3 3 5.3 3 25.8 3 25.8 2 4.6 20.0 28.1 3 3 25.8 2.1 4 2.2 2.7 3 1 1 2.2 2.2 2.2 2.2 2.2 2.2 2.2 3 3 | 7.3 1 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 | 7.1 140.0 150.0 210 210 3 3 213.3 11.5 200.0 220.0 233 55.1 170.0 220.0 2335.0 2333 55.1 170.0 220.0 2335.0 7.1 1 375.0 380.0 1 320 320 320 320 320 | 0.1 0.1 0.2 1 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 | -106.6 -106.6 -106.6 -11 -118 -118 -118 -118 -118 -223.3 -22.0 -229.8 -229.8 -229.8 -229.8 -229.8 -229.8 -229.6 -180.0 1 1 -11.5 -11 | 329.5 929.0 1395.0 1510 1510 3 1003.0 270.2 695.0 1200.0 3 1464.0 1299.5 1257.0 1257.0 1257.0 1257.0 1253.0 2 1223.0 318.2 998.0 1448.0 112000 12000 12000 | 275.8 560.0.04 11 1100 3 3 630.0 230.0 3 3 630.0 230.0 3 3 0.0 3 3 0.0 0 3 3 0.0 0 3 3 0.0 0 3 3 0.0 0 3 0.0 0 2 3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0 | 0.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 | 1.3 2.0 3.9 2 2 2 2 3 3 5.3 5.8 2.0 0 12.0 3 3 6.0 0 2.0 5.5 5.5 1 1 2 2 0 2.2 5.5 5.2 1 2 2 2 2 2 2 2 2 2 2 3 3 5.3 5. | 2200 2200 11 13 13 2 2 2000 2900 2900 2900 2900 2900 2900 | 0.4 0.8 0.9 0.9 0.9 3 20.2 165 2.0 34.2 3 2.2 2 0.5 1.9 2.7 2 17.5 20.7 2 17.5 20.7 2 17.5 20.7 2 2.8 32.1 1 200 2 0.7 2 2.8 2 2.0 2 10 5 2.0 2 0 9 2.0 2 0 9 3 3 2.0 2 0 9 3 3 2.0 2 0 9 3 3 2.0 2 1.0 5 5 2.0 0 9 3 3 2.0 2 1.0 5 5 2.0 0 3 3 2.0 2 1.0 5 5 2.0 0 3 3 2.0 2 1.0 5 5 2.0 0 3 3 2.0 2 1.0 5 5 2.0 0 3 3 2.0 2 1.0 5 5 2.0 0 3 3 2.0 2 1.0 5 5 2.0 0 3 3 2.0 2 1.5 5 2.0 0 3 3 2.0 2 1.5 5 2.0 0 3 3 2.0 2 0 2 0 5 5 1.0 5 1.0 5 1.0 5 1.0 5 1.0 5 1.0 5 1.0 5 1.0 5 1.0 5 1.0 5 1.0 5 1.0 5 1.0 5 1.0 5 1.0 5 1.0 5 1.0 5 1.0 5 2.0 0 3 3 2.0 2 0.5 5 2.0 0 3 3 2.0 2 0 2 0 5 2.0 5 2 0.0 3 3 2.0 2 0 2.0 5 2 0.0 5 2.0 5 2.0 7 2 0.7 2 0.7 2 0.7 2 0.7 2 0.7 2 0.7 2 0.7 2 0.7 2 0.7 2 0.7 2 0.7 2 0.7 2 0.7 2 0.7 2 0.7 2 0.7 2 2.0 2 2 2.0 2 2.0 2 2.0 2.0 2.0 2.0 2 | 0.44 0.88 0.99 0.99 0.99 0.99 0.99 0.99 0.99 | 0.2 0.7 10.0 110 0.8 0.8 0.8 2.6 1.11 3.3 2.6 1.11 3.8 1.14 3.8 1.6 0.6.8 1.14 3.8 1.6 0.6.8 1.2 2.2 3.3 3.3 | 0.1 0.1 0.3 0.1 0.1 0.1 0.1 0.1 0.5 0.5 0.5 0.5 0.6 0.2 0.5 0.5 0.6 0.2 0.5 0.5 0.0 8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0 | 0.1 0.01 0.1 1 0.02 0.02 0.02 3 3 1.7.0 0.1 5.7 0.01 3.1.0 3.1.0 3.0 0.00 0.01 0.01 0.0 | 0.2 0.1 0.4 1 1 0.12 0.12 0.12 0.12 0.12 0.12 0.12 | 3.2 3.2 1 1 3.3 3.3 3.3 3.3 1 1 6.2 6.2 6.2 6.2 5.7 5.7 5.7 5.7 | 1.2 0.1 1.8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 2 0.4 0.01 0.01 0.09 | 205.1 260.0 550.0 5600 5600 5600 3600 3000 3000 340.0 | |
| (old) DENIT-SU4 (new) | Sodium Sesqui. 10% Limestone; 30% Sulfur; 60% Expanded Clay 50% Sand 80% Sulfur; 20% Oyster Shell 50% Lignocellulosic; 50% Expanded Clay 25% Lignocellulosic; 75% Expanded Clay | STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MAX n | 27.1 28.1 28.1 21 21 3 3 25.3 4.6 20.0 28.1 3 3 25.8 4.6 20.0 28.1 3 3 25.8 4.6 20.0 28.1 3 3 25.3 4.6 20.0 28.1 3 3 25.3 4.6 20.0 28.1 21 21 21 21 21 21 21 21 21 21 21 21 21 | 7.3 1 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 | 7.1 140.0 150.0 210 210 3 3 213.3 213.3 213.3 213.3 220.0 220.0 3 3 223.3 55.1 170.0 270.0 | 0.1 0.1 0.2 1 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.8 | -106.6 -106.6 -106.6 -11 -118 -118 -118 -118 -118 -223.3 -22.0 -229.8 -229.8 -229.8 -229.8 -229.8 -229.8 -229.6 -180.0 1 1 -11.5 -11 | 329.5 929.0 1395.0 1 1 1 5100 3 1 1003.0 270.2 695.0 1200.0 3 3 1464.0 1295.0 1655.0 2 1227.0 1655.0 2 1223.0 318.2 998.0 1448.0 12000 12000 2 2002 3 3 3 3 3 3 3 3 3 3 3 3 3 3 | 275.8 560.0.04 11 1100 3 3 630.0 230.0 3 3 630.0 230.0 3 3 0.0 3 3 0.0 0 3 3 0.0 0 3 3 0.0 0 3 3 0.0 0 3 0.0 0 2 3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0 | 0.0 1.0 1.0 1.0 1.0 1.0 1.0 1.3 0.6 1.3 0.6 1.0 2.0 3.0 6.3 8.4 1.0 1.6 0.2 5.0 0.5 7.7 1.0 1.2 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2 | 1.3 2.0 3.99 2 2 2 2 3 3 5.8 2.0 12.0 13.0 6.0 6.1 1 2.0 0 13.0 2 2.5 5.5 5 2.0 13.0 2.0 13.0 2.0 13.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2 | 22.0 22.0 22.0 1 1 1 1 2 2 20.0 11.0 29.0 20.0 | 0.4 0.8 0.9 0.9 0.9 3 20.2 20 34.2 33 2.2 0.5 2.0 34.2 33 2.2 2.0 5 2.0 7 2.7 2.7 2.7 2.7 2.7 2.7 2.7 2.7 2.7 2 | 0.44 0.80 0.90 0.90 0.90 3.3 2.20 0.55 2.77 2.77 2.77 2.77 2.77 2.77 2.77 2.77 2.77 2.77 2.77 2.77 2.77 2.77 2.77 2.77 2.77 2.77 2.72 2.83 3.33 3.32 2.22 2.23 3.32 2.24 2.45 2 | 0.2 0.7 0.7 0.7 1.0 0.8 0.8 0.8 0.8 3.3 2.66 1.1 1.1 1.1 1.1 3.3 2.66 0.0.8 3.3 2.66 0.1.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.4 1.2 2.4 1.2 2.4 1.2 2.4 1.2 2.4 1.2 2.4 1.2 2.4 <td>0.1 0.1 0.3 0.1 0.1 0.1 0.1 0.1 0.5 0.5 0.5 0.5 0.6 0.2 0.5 0.5 0.6 0.2 0.5 0.5 0.0 8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0</td> <td>0.1 0.01 0.1 1 0.02 0.02 3 3 17.0 15.7 0.01 3 10.0 0 0.0 0 0.01 0.01 0.01 0.01</td> <td>0.2 0.1 0.4 1 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.</td> <td>3.2 3.2 1 1 3.3 3.3 3.3 1 6.2 6.2 6.2 6.2 2 1 1 5.7 5.7 5.7 5.7</td> <td>1.2 0.1 1.8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1</td> <td>2 0.4 0.01 0.01 0.09</td> <td>205.1 260.0 550.0 5600 5600 5600 3600 3000 3000 340.0</td> <td></td> | 0.1 0.1 0.3 0.1 0.1 0.1 0.1 0.1 0.5 0.5 0.5 0.5 0.6 0.2 0.5 0.5 0.6 0.2 0.5 0.5 0.0 8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0 | 0.1 0.01 0.1 1 0.02 0.02 3 3 17.0 15.7 0.01 3 10.0 0 0.0 0 0.01 0.01 0.01 0.01 | 0.2 0.1 0.4 1 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0. | 3.2 3.2 1 1 3.3 3.3 3.3 1 6.2 6.2 6.2 6.2 2 1 1 5.7 5.7 5.7 5.7 | 1.2 0.1 1.8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 2 0.4 0.01 0.01 0.09 | 205.1 260.0 550.0 5600 5600 5600 3600 3000 3000 340.0 | |

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

| Sample ID | Media Composition | Statistical Parameter | Temp (°C) | рН | Total Alkalinity (mg/L) | DO (mg/L) | ORP (mV) | Specific Conductance (µS) | TDS (mg/L) | TSS (mg/L) | CBOD _s (mg/L) | COD (mg/L) | TN (mg/L N) ¹ | TKN (mg/L N) | Organic N (mg/L N) ² | NH3-N (mg/L N) | NOx (mg/L N) | TIN (mg/L N) ³ | TP (mg/L) | Sulfide (mg/L) | H ₂ S (mg/L) | SO₄ (mg/L) | Fecal (Ct/100 mL |
|--|---|---|---|--|--|--|--|---|---|--|--|---|--|--|--|--|--|--|---|-------------------|----------------------------|---------------|---------------------|
| Recirculatio | n Tanks Effluent | | | | | | | | | | | | | , | | | | | | | | | |
| | | n | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | | 3 | | | 1 | | | | |
| | | MEAN | 27.1 | | 183.3 | 1.1 | -35.7 | 882.7 | 486.7 | 3.0 | 3.6 | 25.5 | 40.3 | 16.3 | | 10.2 | | | 5.8 | | | | |
| RC1 | | STD. DEV. | 5.7 | | 25.2 | | | 212.8 | 136.5 | 2.0 | 2.1 | | 13.0 | 1.2 | | 4.0 | | | | | | | |
| | | MIN | 20.6 | | | 0.03 | | 637.0 | 330.0 | 1.0 | 2.0 | 22.0 | 27.0 | 15.0 | 10000 | 5.7 | | | 5.8 | | | | 11 |
| | | 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 | | | | 11 |
| | | n | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 4.0 | 20.5 | 3 | 3 | 5.9 | | 3 | 3 | 1 | | | | |
| RC2 | | MEAN STD. DEV. | 26.7 | | 176.7 35.1 | 0.9 | -24.9 | 910.0 200.1 | 496.7 136.5 | 2.0 | 4.0 | 29.5 | 36.7 8.5 | 17.0 | | 11.1 5.1 | | 30.8 11.7 | 4.2 | | | | |
| 1102 | | MIN | 19.5 | | | 0.1 | -108.2 | 679.0 | 340.0 | 1.0 | 2.0 | 24.0 | 27.0 | 15.0 | | 5.3 | | | 4.2 | | | | 9 |
| | | MAX | 30.5 | | | 1.6 | | 1031.0 | 590.0 | 3.0 | 8.0 | 35.0 | 43.0 | 19.0 | | 15.0 | | | 4.2 | | | | 9 |
| | | n | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 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 | | | | |
| RC3 | | STD. DEV. | 6.1 | | 50.3 | | | 192.2 | 122.9 | 2.9 | 3.7 | | 9.0 | 3.5 | | 3.3 | | | | | | | |
| | | MIN | 19.2 | 7.2 | | 0.1 | 57.5 | 760.0 | 360.0 | 1.0 | 2.0 | 39.0 | 27.0 | 12.0 | | 5.5 | | | 6.4 | | | | 10 |
| | | MAX | 30.2 | | | 2.3 | | 1128.0 | 590.0 | 6.0 | | 61.0 | 45.0 | 19.0 | | 12.0 | | | 6.4 | | | | 10 |
| | | n | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 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 | | | | |
| RC4 | | STD. DEV. | 5.8 | | 40.0 | | | 167.8 | 119.3 | 9.5 | 0.7 | | 5.7 | 3.2 | | 3.3 | | | | | | | |
| | | MIN | 19.7 | 7.4 | | 0.0 | 49.3 | 811.0 | 400.0 | 2.0 | 2.7 | 26.0 | 27.0 | 11.0 | | 5.5 | | 16.5 | 6.7 | | | | 11 |
| | | 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 | | | | 11 |
| | | 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 | | | | | |
| RC5 | | STD. DEV. | | | | | | | | 1 | | | | | | | | | | | | | |
| | | MIN MAX | 22.0 | | 260.0 260.0 | 3.3 | 96.0 96.0 | 1050.0 1050.0 | 480.0 480.0 | <u>8.0</u> 8.0 | 8.0 8.0 | 61.0 61.0 | 45.0 45.0 | 31.0 31.0 | | 28.0 | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| Change 1 Davis | I Invitation Riafiltana Fé | | 22.0 | 7.5 | 200.0 | 5.5 | | | | | 0.0 | 01.0 | 45.0 | 51.0 | | 20.0 | 1110 | 42.0 | | | | | |
| Stage 1 Reci | culating Biofilters Ef | | 3 | 3 | 3 | 3.5 | 2 | 3 | 3 | | 3 | 2 | 43.0 | 3 | | 3 | | | 1 | | | | |
| Stage 1 Reci | culating Biofilters Ef | | | 3 | 3 | | 2 44.2 | 3 1024.7 | | | | 2 | | | 3 | | 3 | 3 | 1 | | | | |
| Stage 1 Recin | culating Biofilters Ef | fluent n MEAN STD. DEV. | 3 26.8 3.0 | 3 | 3 220.0 50.0 | 3 7.5 0.5 | 2 44.2 | 3 1024.7 157.6 | 3 606.7 110.2 | 3 3.3 4.0 | 3 2.0 0.0 | 2 | 3 32.7 19.4 | 3 2.4 0.3 | 3 2.4 0.3 | 3 0.01 0.01 | 3 30.3 19.5 | 3 30.3 19.4 | | | | | |
| | | fluent n MEAN STD. DEV. MIN | 3 26.8 3.0 23.5 | 6.7 | 3 220.0 50.0 170.0 | 3 7.5 0.5 7.1 | 2 44.2 35.5 | 3 1024.7 157.6 860.0 | 3 606.7 110.2 480.0 | 3 3.3 4.0 1.0 | 3 2.0 0.0 2.0 | 2 12.0 11.0 | 3 32.7 19.4 10.3 | 3 2.4 0.3 2.1 | 3 2.4 0.3 2.1 | 3 0.01 0.01 0.005 | 3 30.3 19.5 7.9 | 3 30.3 19.4 7.9 | 7.6 | | | | |
| | | fluent n MEAN STD. DEV. | 3 26.8 3.0 | 3 | 3 220.0 50.0 170.0 | 3 7.5 0.5 | 2 44.2 35.5 | 3 1024.7 157.6 | 3 606.7 110.2 480.0 680.0 | 3 3.3 4.0 1.0 8.0 | 3 2.0 0.0 2.0 2.0 | 2 | 3 32.7 19.4 10.3 45.1 | 3 2.4 0.3 2.1 2.6 | 3 2.4 0.3 2.1 2.6 | 3 0.01 0.01 | 3 30.3 19.5 7.9 43.0 | 3 30.3 19.4 7.9 43.0 | | | | | |
| | | fluent n MEAN STD. DEV. MIN MAX n | 3 26.8 3.0 23.5 29.3 3 | 6.7 | 3 220.0 50.0 170.0 270.0 3 | 3 7.5 0.5 7.1 8.0 3 | 2 44.2 35.5 52.8 2 | 3 1024.7 157.6 860.0 1174.0 3 | 3 606.7 110.2 480.0 680.0 3 | 3 3.3 4.0 1.0 8.0 3 | 3 2.0 0.0 2.0 2.0 3 | 2 12.0 11.0 13.0 2 | 3 32.7 19.4 10.3 45.1 3 | 3 2.4 0.3 2.1 2.6 3 | 3 2.4 0.3 2.1 2.6 3 | 3 0.01 0.01 0.005 0.02 3 | 3 30.3 19.5 7.9 43.0 3 | 3 30.3 19.4 7.9 43.0 3 | 7.6 7.6 1 | | | | |
| UNSAT-CL4 | 30" Clinoptilolite | fluent n MEAN STD. DEV. MIN MAX n MEAN | 3 26.8 3.0 23.5 29.3 3 25.7 | 6.7 | 3 220.0 50.0 170.0 270.0 3 173.3 | 3 7.5 0.5 7.1 8.0 3 6.2 | 2 44.2 35.5 | 3 1024.7 157.6 860.0 1174.0 3 943.7 | 3 606.7 110.2 480.0 680.0 3 573.3 | 3 3.3 4.0 1.0 8.0 3 2.0 | 3 2.0 0.0 2.0 2.0 3 2.0 | 2 12.0 11.0 | 3 32.7 19.4 10.3 45.1 3 39.5 | 3 2.4 0.3 2.1 2.6 3 2.5 | 3 2.4 0.3 2.1 2.6 3 2.5 | 3 0.01 0.01 0.005 0.02 3 0.008 | 3 30.3 19.5 7.9 43.0 3 37.0 | 3 30.3 19.4 7.9 43.0 3 37.0 | 7.6 | | | | |
| | | fluent n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. | 3 26.8 3.0 23.5 29.3 3 25.7 2.2 | 6.7 7.8 3 | 3 220.0 50.0 170.0 270.0 3 173.3 46.2 | 3 7.5 0.5 7.1 8.0 3 6.2 0.7 | 2 44.2 35.5 52.8 2 40.2 | 3 1024.7 157.6 860.0 1174.0 3 943.7 143.1 | 3 606.7 110.2 480.0 680.0 3 573.3 115.9 | 3 3.3 4.0 1.0 8.0 3 2.0 1.0 | 3 2.0 0.0 2.0 3 2.0 0.0 | 2 12.0 11.0 13.0 2 23.0 | 3 32.7 19.4 10.3 45.1 3 39.5 20.2 | 3 2.4 0.3 2.1 2.6 3 2.5 0.5 | 3 2.4 0.3 2.1 2.6 3 2.5 0.5 | 3 0.01 0.005 0.02 3 0.008 0.008 | 3 30.3 19.5 7.9 43.0 3 37.0 20.0 | 3 30.3 19.4 7.9 43.0 3 37.0 20.0 | 7.6 7.6 1 7.1 | | | | |
| UNSAT-CL4 | 30" Clinoptilolite | n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN | 3 26.8 3.0 23.5 29.3 3 25.7 2.2 23.1 | 3 6.7 7.8 3 7.0 | 3 220.0 50.0 170.0 270.0 3 173.3 46.2 120.0 | 3 7.5 0.5 7.1 8.0 3 6.2 0.7 5.4 | 2 44.2 35.5 52.8 2 40.2 30.2 | 3 1024.7 157.6 860.0 1174.0 3 943.7 143.1 781.0 | 3 606.7 110.2 480.0 680.0 3 573.3 115.9 440.0 | 3 3.3 4.0 1.0 8.0 3 2.0 1.0 1.0 | 3 2.0 0.0 2.0 2.0 3 2.0 0.0 0.0 2.0 | 2 12.0 11.0 13.0 2 23.0 22.0 | 3 32.7 19.4 10.3 45.1 3 39.5 20.2 17.1 | 3 2.4 0.3 2.1 2.6 3 2.5 0.5 2.1 | 3 2.4 0.3 2.1 2.6 3 2.5 0.5 2.1 | 3 0.01 0.005 0.02 3 0.008 0.003 0.003 | 3 30.3 19.5 7.9 43.0 3 37.0 20.0 15.0 | 3 30.3 19.4 7.9 43.0 3 37.0 20.0 15.0 | 7.6 7.6 1 7.1 7.1 | | | | |
| UNSAT-CL4 | 30" Clinoptilolite | fluent n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. | 3 26.8 3.0 23.5 29.3 3 25.7 2.2 | 3 6.7 7.8 3 7.0 | 3 220.0 50.0 170.0 270.0 3 173.3 46.2 120.0 | 3 7.5 0.5 7.1 8.0 3 6.2 0.7 | 2 44.2 35.5 52.8 2 40.2 | 3 1024.7 157.6 860.0 1174.0 3 943.7 143.1 | 3 606.7 110.2 480.0 680.0 3 573.3 115.9 | 3 3.3 4.0 1.0 8.0 3 2.0 1.0 | 3 2.0 0.0 2.0 3 2.0 0.0 0.0 2.0 2.0 | 2 12.0 11.0 13.0 2 23.0 | 3 32.7 19.4 10.3 45.1 3 39.5 20.2 | 3 2.4 0.3 2.1 2.6 3 2.5 0.5 2.1 3.1 | 3 2.4 0.3 2.1 2.6 3 2.5 0.5 2.1 | 3 0.01 0.005 0.02 3 0.008 0.008 | 3 30.3 19.5 7.9 43.0 3 37.0 20.0 | 3 30.3 19.4 7.9 43.0 3 37.0 20.0 15.0 | 7.6 7.6 1 7.1 | | | | |
| UNSAT-CL4 | 30" Clinoptilolite | fluent n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MAX n | 3 26.8 3.0 23.5 29.3 3 3 25.7 2.2 23.1 27.1 3 | 3 6.7 7.8 3 7.0 7.0 7.9 3 | 3 220.0 50.0 170.0 270.0 3 173.3 46.2 120.0 200.0 3 | 3 7.5 0.5 7.1 8.0 3 6.2 0.7 5.4 6.7 5.4 6.7 3 | 2 44.2 35.5 52.8 40.2 30.2 50.2 2 | 3 1024.7 157.6 860.0 1174.0 3 943.7 143.1 781.0 1050.0 3 | 3 606.7 110.2 480.0 680.0 3 573.3 115.9 440.0 650.0 3 | 3 3.3 4.0 1.0 8.0 3 2.0 1.0 1.0 3.0 3.0 3 | 3 2.0 0.0 2.0 3 2.0 0.0 0.0 2.0 2.0 3 | 2 12.0 11.0 13.0 2 23.0 22.0 24.0 24.0 2 | 3 32.7 19.4 10.3 45.1 3 39.5 20.2 17.1 56.3 3 | 3 2.4 0.3 2.1 2.6 3 2.5 0.5 2.1 3.1 3.1 3 | 3 2.4 0.3 2.1 2.6 3 2.5 0.5 2.1 3.1 3.1 3 | 3 0.01 0.005 0.02 3 0.008 0.003 0.005 0.010 3 | 3 30.3 19.5 7.9 43.0 3 37.0 20.0 15.0 54.0 3 | 3 30.3 19.4 7.9 43.0 3 37.0 20.0 15.0 54.0 3 | 7.6 7.6 1 7.1 7.1 7.1 7.1 1 | | | | |
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| UNSAT-CL4 | 30" Clinoptilolite | n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n STD. DEV. | 3 26.8 3.0 23.5 29.3 3 3 25.7 2.2 23.1 27.1 27.1 3 3 26.0 3.4 | 6.7 7.8 3 7.0 7.9 3 | 3 220.0 50.0 270.0 3 173.3 46.2 120.0 200.0 200.0 3 143.3 15.3 | 3 7.5 0.5 7.1 8.0 3 6.2 0.7 5.4 6.7 3 3 7.1 0.2 | 2 44.2 35.5 52.8 2 40.2 30.2 50.2 2 62.7 | 3 1024.7 157.6 860.0 1174.0 3 943.7 143.1 781.0 1050.0 3 880.3 190.2 | 3 606.7 110.2 480.0 680.0 3 573.3 115.9 440.0 650.0 3 550.0 173.5 | 3 3.3 4.0 1.0 8.0 3 2.0 1.0 1.0 3.0 3.0 3.0 3.0 6 | 3 2.0 0.0 2.0 3 2.0 0.0 2.0 2.0 3 2.0 3 0.0 0.0 | 2 12.0 13.0 23.0 22.0 24.0 24.0 2 11.5 | 3 32.7 19.4 10.3 45.1 3 39.5 20.2 17.1 56.3 3 3 37.4 17.0 | 3 2.4 0.3 2.1 2.6 3 3 2.5 0.5 2.1 3.1 3.1 3.1 3 2.4 0.5 | 3 2.4 0.3 2.1 2.6 3 2.5 0.5 2.1 3.1 3.1 3 3 2.4 0.5 | 3 0.01 0.005 0.002 3 0.008 0.003 0.005 0.010 3 0.011 0.00 | 3 30.3 19.5 7.9 43.0 3 37.0 20.0 15.0 54.0 3 35.0 35.0 16.7 | 3 30.3 19.4 7.9 43.0 3 37.0 20.0 15.0 15.0 54.0 3 3 55.0 16.7 | 7.6 7.6 1 7.1 7.1 7.1 3.8 | | | | |
| UNSAT-CL4 UNSAT-CL2 | 30" Clinoptilolite | n MEAN STD. DEV. MIN MAX n STD. DEV. MIN MAX n MAX MAX MEAN STD. DEV. MIN MAX MIN MEAN STD. DEV. MIN | 3 26.8 3.0 23.5 29.3 3 25.7 2.2 23.1 27.1 3 26.0 3.4 22.2 | 3 6.7 7.8 3 7.0 7.0 7.9 3 3 6.9 | 3 220.0 50.0 170.0 270.0 3 46.2 120.0 200.0 3 143.3 15.3 130.0 | 3 7.5 0.5 7.1 8.0 3 6.2 0.7 5.4 6.7 3 7.1 0.2 2 6.9 | 2 44.2 35.5 52.8 2 40.2 30.2 50.2 2 62.7 46.5 | 3 1024.7 157.6 860.0 1174.0 3 943.7 143.1 781.0 1050.0 1050.0 3 880.3 190.2 661.0 | 3 606.7 110.2 480.0 680.0 3 573.3 115.9 440.0 650.0 3 550.0 173.5 350.0 | 3 3.33 4.00 1.00 3.00 1.00 3.00 3.00 3.00 3.00 6 1.0 | 3 2.0 2.0 3 2.0 0.0 2.0 2.0 3 3 2.0 0.0 2.0 0.0 2.0 | 2 12.0 13.0 2 3.0 22.0 24.0 2 4.0 2 2 11.5 10.0 | 3 32.7 19.4 10.3 45.1 3.9 5 20.2 17.1 56.3 3 37.4 17.0 18.9 | 3 2.4 0.3 2.1 2.6 3 2.5 0.5 2.1 3.1 3 3 2.4 0.5 1.9 | 3 2.4 0.3 2.1 2.6 3 2.5 0.5 2.1 3.1 3.1 3.1 3 2.4 0.5 1.9 | 3 0.01 0.005 0.02 3 0.008 0.003 0.005 0.010 3 0.001 0.000 0.011 | 3 30.3 19.5 7.9 43.0 3 37.0 20.0 15.0 54.0 3 3 55.0 16.7 17.0 | 3 30.3 19.4 7.9 43.0 37.00 20.0 15.0 54.0 335.0 35.0 16.7 17.0 | 7.6 7.6 1 7.1 7.1 7.1 1 3.8 3.8 | | | | |
| UNSAT-CL4 UNSAT-CL2 | 30" Clinoptilolite | n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n STD. DEV. | 3 26.8 3.0 23.5 29.3 3 3 25.7 2.2 23.1 27.1 27.1 3 3 26.0 3.4 | 3 6.7 7.8 3 7.0 7.0 7.9 3 3 6.9 | 3 220.0 50.0 270.0 3 173.3 46.2 120.0 200.0 200.0 3 143.3 15.3 | 3 7.5 0.5 7.1 8.0 3 6.2 0.7 5.4 6.7 3 3 7.1 0.2 | 2 44.2 35.5 52.8 2 40.2 30.2 50.2 2 62.7 | 3 1024.7 157.6 860.0 1174.0 3 943.7 143.1 781.0 1050.0 3 880.3 190.2 | 3 606.7 110.2 480.0 680.0 3 573.3 115.9 440.0 650.0 3 550.0 173.5 350.0 660.0 | 3 3.3 4.0 1.0 8.0 3 2.00 1.0 1.0 3.0 3.0 3 1.3 0.0 6 1.0 2.0 | 3 2.0 0.0 2.0 3 2.0 0.0 2.0 3 2.0 0.0 0.0 0.0 0.0 0.0 0.2.0 | 2 12.0 13.0 23.0 22.0 24.0 24.0 2 11.5 | 3 32.7 19.4 10.3 45.1 3 39.5 20.2 17.1 56.3 3 3 37.4 17.0 | 3 2.4 0.3 2.1 2.6 3 2.5 0.5 2.1 3.1 3 3 2.4 4 0.5 1.9 2.9 | 3 2.4 0.3 2.1 2.6 3 3 2.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0 | 3 0.01 0.005 0.023 3 0.008 0.003 0.0005 0.0010 0.010 0.001 0.001 | 3 30.3 19.5 7.9 43.0 3 37.0 20.0 15.0 54.0 3 3 35.0 3 35.0 16.7 17.0 50.0 | 3 30.3 19.4 7.9 43.00 3 3 7.0 20.0 15.0 54.0 3 3 5.0 16.7 17.0 50.0 | 7.6 7.6 1 7.1 7.1 7.1 3.8 | | | | |
| UNSAT-CL4 UNSAT-CL2 | 30" Clinoptilolite | n MEAN STD. DEV. MIN MAX n STD. DEV. MIN MAX n MAX MAX MEAN STD. DEV. MIN MAX MIN MEAN STD. DEV. MIN | 3 268 3.0 23.5 29.3 3 25.7 2.2 2 3.1 27.1 3 26.0 3.4 22.2 28.5 3 3 | 3 6.7 7.8 3 7.0 7.9 3 6.9 7.3 3 3 3 | 3 220.0 50.0 170.0 270.0 3 173.3 46.2 120.0 200.0 3 143.3 15.3 130.0 160.0 3 3 | 3 7.5 0.5 7.1 8.00 3 3 6.2 0.7 5.4 6.7 3 3 7.1 0.2 6.9 7.3 3 3 3 3 | 2 44.2 35.5 52.8 2 40.2 30.2 50.2 50.2 62.7 62.7 46.5 78.8 2 | 3 1024.7 157.6 860.0 1174.0 943.7 143.1 781.0 1050.0 3 3 880.3 190.2 661.0 1000.0 3 3 | 3 606.7 110.2 480.0 680.0 3 573.3 115.9 440.0 650.0 3 550.0 173.5 550.0 173.5 350.0 660.0 3 | 3 3.3 4.0 1.0 8.0 3.0 1.0 3.0 3.0 3.0 3.0 3.0 6.6 1.0 0 2.0 3 3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3 | 3 2.0 0.0 2.0 3 2.0 0.0 2.0 3 2.0 0.0 2.0 0.0 2.0 3 3 2.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 | 2 12.0 11.0 2 23.0 22.0 24.0 2 21.15 11.5 10.0 13.0 2 2 2 11.5 2 2 10.0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 3 32.7 19.4 10.3 3 39.5 20.2 17.1 56.3 3 3 3.7.4 17.0 18.9 52.3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 | 3 2.4 0.3 2.1 2.6 3 2.5 2.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 9.2,9 9.2,9 9.3 3 | 3 2.4 0.3 2.1 2.6 3 2.5 0.5 2.1 3.1 3.1 3.1 3.1 3.2 4 0.5 1.9 2.9 3.3 | 3 0.01 0.005 0.02 3 0.008 0.003 0.005 0.010 3 0.01 0.001 0.001 0.001 3 3 0.01 | 3 30.3 19.5 7.9 43.0 37.0 20.0 15.0 54.0 35.0 35.0 16.7 17.0 50.0 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 | 3 30.3 19.4 7.9 43.0 37.0 20.0 15.0 54.0 3 3 55.0 16.7 17.0 50.0 3 3 0 0 0 3 3 3 3 3 3 3 3 3 3 3 3 3 | 7.6 7.6 1 7.1 7.1 7.1 7.1 7.1 3.8 3.8 3.8 3.8 3.8 3.8 1 | | | | |
| UNSAT-CL4 UNSAT-CL2 | 30" Clinoptilolite | fluent n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MEAN STD. DEV. MIN MAX n MAX n | 3 26.8 3.0 23.5 29.3 3 25.7 2.2 23.1 27.1 3 3 26.0 3.4 22.2 28.5 | 3 6.7 7.8 3 7.0 7.9 3 6.9 7.3 3 3 | 3 220.0 50.0 170.0 270.0 3 46.2 120.0 200.0 3 143.3 15.3 130.0 | 3 7.5 0.5 7.1 8.0 3 6.2 0.7 5.4 6.7 3 7.1 0.2 2 6.9 | 2 44.2 35.5 52.8 2 40.2 30.2 50.2 50.2 62.7 62.7 46.5 78.8 2 | 3 1024.7 157.6 860.0 1174.0 3 943.7 143.1 781.0 1050.0 3 880.3 880.3 190.2 661.0 1000.0 | 3 606.7 110.2 480.0 680.0 3 573.3 115.9 440.0 650.0 3 550.0 173.5 350.0 660.0 | 3 3.3 4.0 1.0 8.0 3 2.00 1.0 1.0 3.0 3.0 3 1.3 0.0 6 1.0 2.0 | 3 2.0 0.0 2.0 3 2.0 0.0 2.0 2.0 3 2.0 0.0 0.0 0.0 3 2.0 0.0 3 3 2.0 0.0 3 3 2.0 0.0 3 3 2.0 0.0 3 3 3 2.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 | 2 12.0 11.0 2 3.0 22.0 24.0 24.0 2 11.5 11.5 10.0 13.0 | 3 32.7 19.4 10.3 345.1 339.5 20.2 17.1 56.3 3 37.4 17.0 18.9 52.3 3 3.3 3.3 3.3 3.3 | 3 2.4 0.3 2.1 2.6 3 2.5 0.5 2.1 3.1 3 3 2.4 4 0.5 1.9 2.9 | 3 2.4 0.3 2.1 2.6 3 3 2.5 5 2.1 3.1 3.1 3.3 3 2.4 0.5 5 2.1 9 3.3 1.9 2.9 3 3 2.7 7 7 | 3 0.01 0.005 0.023 3 0.008 0.003 0.0005 0.0010 0.010 0.001 0.001 | 3 30.3 19.5 7.9 43.0 337.0 20.0 15.0 54.0 335.0 16.7 17.0 50.0 33.0.3 30.3 | 3 30.3 19.4 7.9 43.0 33 7.0 20.0 20.0 54.0 33 50.0 16.7 17.0 50.0 33 50.0 30.6 | 7.6 7.6 1 7.1 7.1 7.1 1 3.8 3.8 | | | | |
| UNSAT-CL4 UNSAT-CL2 UNSAT-EC4 | 30" Clinoptilolite 15" Clinoptilolite 30" Expanded Clay | fluent n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN MEAN MIN MAX MEAN MEAN | 3 26.8 3.0 23.5 29.3 3 25.7 2.2 2 23.1 27.1 27.1 27.1 3 3 26.0 3.4 22.2 28.5 3 3 25.8 | 3 6.7 7.8 3 7.0 7.9 3 6.9 7.3 3 3 | 3 220.0 50.0 170.0 270.0 3 173.3 46.2 120.0 200.0 200.0 200.0 3 3 143.3 15.3 130.0 160.0 3 3 13.3 13.3 13.3 5.5.8 | 3 7.5 0.5 7.1 800 3 6.2 0.7 5.4 6.7 7.1 0.2 6.9 7.3 3 3 7.0 0.7 | 2 44.2 35.5 52.8 2 40.2 30.2 50.2 50.2 62.7 62.7 46.5 78.8 2 | 3 1024.7 157.6 860.0 1174.0 3 943.7 143.1 781.0 1050.0 1050.0 3 880.3 190.2 661.0 1000.0 3 880.3 190.2 661.0 1000.0 3 8829.0 | 3 606.7 110.2 480.0 680.0 3 573.3 115.9 440.0 650.0 3 550.0 173.5 350.0 660.0 3 0 526.0 | 3 3.3 4.0 1.0 8.0 3.0 1.0 1.0 3.0 0 3.0 0 3.0 0 3.0 0.0 3.0 5.0 | 3 2.0 0.0 2.0 3 2.0 0.0 2.0 3 2.0 0.0 2.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 | 2 12.0 11.0 2 2.0 22.0 24.0 2 11.5 10.0 13.0 2 17.5 | 3 32.7 19.4 10.3 3 39.5 20.2 17.1 56.3 3 3 3.7.4 17.0 18.9 52.3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 | 3 2.4 0.3 2.1 2.6 3 3 2.5 0.5 2.1 3.1 3.1 3.2 4 0.5 1.9 2.9 3.3 0.0 7 | 3 2.4 0.3 2.1 2.5 0.5 2.1 3.1 3.1 3.3 2.5 5 0.5 2.1 3.1 3.1 3.3 3 2.4 0.5 1.9 9 2.9 2.7 0.6 6 | 3 0.01 0.005 0.002 3 0.008 0.003 0.0005 0.010 3 0.001 0.001 0.001 3 3 0.01 0.01 | 3 30.3 19.5 7.9 43.0 337.0 20.0 15.0 15.0 54.0 3 3 35.0 16.7 17.0 50.0 3 3 0.3 3 0.3 11.6 | 3 30.3 19.4 7.9 43.0 37.0 20.0 15.0 15.0 33.0 55.0 33.0 55.0 16.7 17.0 50.0 30.6 11.18 | 7.6 7.6 1 7.1 7.1 7.1 7.1 7.1 3.8 3.8 3.8 3.8 3.8 3.8 1 | | | | |
| UNSAT-CL4 UNSAT-CL2 UNSAT-EC4 | 30" Clinoptilolite 15" Clinoptilolite 30" Expanded Clay | Fluent n n MEAN STD. DEV. MIN MAX n n MEAN STD. DEV. MIN MAX n STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX MEAN STD. DEV. STD. DEV. STD. DEV. | 3 26.8 3.0 23.5 29.3 3 3 25.7 2.2 23.1 27.1 3 3 26.0 3 4 22.2 28.5 3 3 26.8 3 3.0 | 3 6.7 7.8 3 7.0 7.9 3 3 6.9 7.3 3 3 6.0 | 3 220.0 50.0 170.0 270.0 3 173.3 46.2 120.0 200.0 3 143.3 15.3 130.0 160.0 3 3 113.3 5.8 110.0 | 3 7.5 0.5 7.1 8.0 3 6.2 0.7 5.4 6.7 5.4 6.7 5.4 6.7 5.4 6.7 5.4 7.1 1 0.2 6.9 7.3 3 3 7.0 | 2 44.2 35.5 52.8 2 40.2 50.2 50.2 2 62.7 46.5 78.8 2 68.4 | 3 1024.7 157.6 860.0 1174.0 3 943.7 143.1 781.0 1050.0 3 880.3 190.2 661.0 1000.0 3 829.0 1052.2 | 3 606.7 110.2 480.0 680.0 3 573.3 115.9 440.0 650.0 3 550.0 173.5 350.0 660.0 3 3550.0 660.0 170.3 | 3 3.3 4.0 1.0 8.0 3 2.0 1.0 1.0 3.0 3 1.3 1.3 0.6 1.0 2.0 3 3 5.00 6.9 | 3 2.0 2.0 3 2.0 0.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 3 2.0 2.0 3 2.0 0.0 0 0.0 0 0.0 0 0.0 0.0 0.0 0.0 0 | 2 12.0 11.0 2 23.0 22.0 24.0 2 21.15 11.5 10.0 13.0 2 2 2 11.5 2 10.0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 3 32.7 19.4 10.3 39.5 20.2 17.1 56.3 3 37.4 17.0 18.9 52.3 3 33.3 3 33.3 3 3.3 3.3 2.3 | 3 2.4 0.3 2.1 2.6 3 2.5 0.5 2.1 3.1 3.1 3.1 3.1 2.4 0.5 1.9 2.9 3.3 0 | 3 2.4 0.3 2.1 2.1 2.5 0.5 2.1 3.1 3.1 3.1 3.1 3.1 3.2 4 4 0.5 1.9 2.9 3.3 2.7 0.6 6 2.2 2 | 3 0.01 0.005 0.02 3 0.008 0.003 0.005 0.010 3 0.01 0.01 0.01 0.01 3 3 0.3 | 3 30.3 19.5 7.9 43.00 15.00 54.0 3 35.0 15.0 54.0 3 30.3 30.3 30.3 30.3 11.6 6 17.0 | 3 30.3 19.4 7.9 43.0 37.0 20.0 15.0 15.0 33 35.0 16.7 17.0 50.0 3 3 30.6 11.8 17.0 | 7.6 7.6 1 7.1 7.1 1 3.8 3.8 3.8 3.8 3.8 6.3 | | | | |
| UNSAT-CL4 UNSAT-CL2 UNSAT-EC4 | 30" Clinoptilolite 15" Clinoptilolite 30" Expanded Clay | Fluent n n MEAN STD. DEV. MIN MAX n n MEAN STD. DEV. MIN MAX n STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MAX n MAX n MAX | 3 26.8 3.0 23.5 29.3 3 25.7 2.2 23.1 27.1 27.1 3 26.0 3.4 22.2 28.5 3 3.0 2.5.8 3.0 2.5.7 3 2.5.8 3.0 3.0 2.5.7 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 | 3 6.7 7.8 3 7.0 7.9 3 6.9 7.3 3 3 6.0 6.0 6.9 6.9 1 | 3 220.0 50.0 270.0 3 173.3 46.2 120.0 200.0 200.0 200.0 200.0 200.0 3 143.3 15.3 13.0 113.3 113.3 5.8 110.0 120.0 133.1 15.3 113.3 113.3 113.3 110.0 120.0 | 3 7.5 0.5 7.1 8.0 3 6.2 0.7 5.4 6.7 3 7.1 0.2 6.9 7.3 3 7.0 0.7 7.3 3 7.0 0.7 7.5 4 6.7 7.1 7.1 8.0 9.0 7.1 9.0 7.1 9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0 | 2 44.2 35.5 52.8 40.2 2 50.2 2 2 62.7 46.5 78.8 2.8 68.4 47.5 89.2 1 | 3 1024.7 1157.6 860.0 1174.0 943.7 143.1 781.0 1050.0 3 880.3 880.3 190.2 661.0 1000.0 1000.0 195.2 664.0 953.0 953.0 1 | 3 606.7 110.2 480.0 680.0 3 573.3 115.9 440.0 650.0 550.0 550.0 550.0 550.0 550.0 660.0 3 350.0 660.0 173.5 350.0 663.0 170.3 330.0 638.0 170.3 | 3 3.3 4.0 1.00 8.0 3.0 1.00 1.00 3.0 3.0 3.0 5.0 6.9 1.0 1.3.0 1.3.0 1.3.0 1.3.0 1.3.0 1.3.0 1.3.0 1.3.0 1.3.0 1.0.00 1.0.00 1.0.00 1.0.00 1.0.00 1.0.00 1.0.000 1.0.000 1.0.00000 1.0.00000000 | 3 2.0 0.0 2.0 2.0 0.0 2.0 2.0 3 2.0 0.0 2.0 2.0 2.0 2.0 2.0 2.0 1 1 | 2 12.0 13.0 23.0 24.0 24.0 24.0 24.0 24.0 13.0 13.0 13.0 17.5 17.5 13.0 22.0 1 | 3 32.7 19.4 10.3 345.1 33.95 20.2 17.1 156.3 3 3.7 4 17.0 18.9 52.3 3 3.3 3.3 12.3 3 19.2 4.15 11 | 3 2.4 0.3 2.1 2.6 3 3 2.5 2.1 3.1 3.1 3.1 3.2 4 4 0.5 3 3.0 0 0.7 2.2 3.5 3.5 1 | 3 2.4 0.3 2.1 2.1 2.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0 | 3 0.01 0.005 0.022 3 0.008 0.003 0.005 0.010 0.010 0.01 0.001 0.01 3 3 0.03 0.0 | 3 30.3 19.5 7.9 43.00 20.00 15.0 54.0 3 35.0 16.7 17.0 50.0 3 3 30.3 3 11.6 17.0 3 0.3 11.6 17.0 3 11.6 17.0 11.6 17.0 11.6 17.0 11.6 17.9 17.9 17.9 17.9 17.9 17.9 17.9 17.9 | 3 30.3 19.4 7.9 43.0 37.0 20.0 54.0 55.0 15.0 33.5 0.0 54.0 33.5 0.0 16.7 17.0 30.6 11.18 17.0 38.7 17.9 11.0 38.7 11.0 38.7 11.0 | 7.6 7.6 1 7.1 7.1 7.1 1 3.8 3.8 3.8 3.8 3.8 3.8 6.3 6.3 6.3 6.3 | | | | |
| UNSAT-CL2 UNSAT-CL2 UNSAT-EC4 UNSAT-SA2 | 30° Clinoptilolite 15° Clinoptilolite 30° Expanded Clay 30° Sand | n MEAN STD. DEV. MIN MAX n MIN MAX n MEAN | 3 26.8 3.0 23.5 29.3 3 3 25.7 2.2 23.1 27.1 27.1 27.1 3 3 26.0 3.4 22.2 28.5 3 3 22.5.8 3.0 0 22.5 | 3 6.7 7.8 3 7.0 7.9 3 6.9 7.3 3 3 6.0 6.0 6.9 6.9 1 | 3 220.0 50.0 170.0 270.0 3 173.3 46.2 120.0 200.0 3 143.3 15.3 130.0 160.0 3 3 113.3 5.8 110.0 | 3 7.5 0.5 7.1 8.0 3 6.2 0.7 5.4 6.7 3 7.1 0.2 6.9 7.3 3 7.0 0.7,7 6.3 | 2 44.2 35.5 52.8 40.2 2 50.2 2 2 62.7 46.5 78.8 2.8 68.4 47.5 89.2 1 | 3 1024.7 157.6 860.0 1174.0 3 943.7 143.1 781.0 1050.0 1050.0 3 880.3 190.2 661.0 1000.0 3 829.0 1952.2 604.0 953.0 | 3 606.7 110.2 480.0 680.0 3 573.3 115.9 440.0 650.0 173.5 550.0 660.0 173.5 550.0 660.0 170.3 350.0 660.0 170.3 330.0 633.0 0 170.3 330.0 633.0 170.3 | 3 3.3 4.0 1.00 8.0 3.0 1.00 1.00 3.0 3.0 3.0 5.0 6.9 1.0 1.3.0 1.3.0 1.3.0 1.3.0 1.3.0 1.3.0 1.3.0 1.3.0 1.3.0 1.0.00 1.0.00 1.0.00 1.0.00 1.0.00 1.0.00 1.0.000 1.0.000 1.0.00000 1.0.00000000 | 3 2.0 0.0 2.0 2.0 0.0 2.0 2.0 3 2.0 0.0 2.0 2.0 2.0 2.0 2.0 2.0 1 1 | 2 12.0 13.0 2 23.0 22.0 24.0 2 11.5 11.5 13.0 2 2 17.5 13.0 22.0 | 3 32.7 19.4 10.3 345.1 33.95 20.2 17.1 156.3 3 3.7 4 17.0 18.9 52.3 3 3.3 3.3 12.3 3 19.2 4.15 11 | 3 2.4 0.3 2.1 2.6 3 3 2.5 0.5 2.1 3.1 3 3 2.4 0.5 1.9 2.9 3 3 0.0 7 2.2 2 3.5 | 3 2.4 0.3 2.1 2.1 2.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0 | 3 0.01 0.005 0.022 3 0.008 0.0005 0.010 0.01 0.001 0.01 3 0.01 3 0.01 0.01 | 3 30.3 19.5 7.9 43.0 20.0 20.0 15.0 54.0 3 3 5.0 0 16.7 17.0 3 3 5.0 0 11.6 7 17.0 3 3 0.3 3 0.3 2 0.0 11.5 5 0.0 11.5 5 4.0 5 4.0 5 5 4.0 5 5 4.0 5 5 4.0 5 5 4.0 5 5 5 4.0 5 5 5 7.9 5 5 7.9 5 5 7.9 5 5 7.9 5 7.9 5 7.9 5 7.9 5 7.9 5 7.9 5 7.9 5 7.0 5 7.0 5 7.0 5 7.0 5 7.0 5 7.0 5 7.0 5 7.0 5 7.0 5 7.0 5 7.0 5 7.0 5 7.0 5 5 7.0 5 5 7.0 5 5 7.0 5 5 7.0 5 5 7.0 5 5 7.0 5 5 7.0 5 5 7.0 5 5 7.0 5 5 7.0 5 5 7.0 5 5 7.0 5 5 7.0 5 7.0 5 5 7.0 5 7 5 7.0 5 7 5 7.0 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 | 3 30.3 19.4 7.9 43.0 37.0 20.0 54.0 55.0 15.0 33.5 0.0 54.0 33.5 0.0 16.7 17.0 30.6 11.18 17.0 38.7 17.9 11.0 38.7 11.0 38.7 11.0 | 7.6 7.6 1 7.1 7.1 7.1 1 3.8 3.8 3.8 3.8 3.8 3.8 6.3 6.3 6.3 6.3 | | | | |
| UNSAT-CL2 UNSAT-CL2 UNSAT-EC4 UNSAT-SA2 | 30" Clinoptilolite 15" Clinoptilolite 30" Expanded Clay | Fileent n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MAX n MEAN STD. DEV. | 3 26.8 3.0 23.5 29.3 3 3 25.7 2.2 2 3.1 27.1 27.1 27.1 27.1 27.1 3 3 26.0 3.4 2.2 5 3 3 2.5.8 3.0 2.25.5 2.8.2 2.8.2 2.8.2 2.8.2 2.8.2 2.8.2 2.8.2 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.5.7 2.2.7 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.5.7 3.0 2.2.5 3.0 2.5.7 2.2.7 3.0 2.5.7 3.0 2.5.7 3.0 2.5.7 2.2.7 2.2.7 2.2.7 3.0 2.5.7 2.2.7 2.7 | 6.7 7.8 3 7.0 7.9 7.0 7.9 3 3 6.9 7.3 3 6.9 7.3 3 6.9 7.3 1 6.9 7.3 1 6.9 7.4 6.9 7.3 1 6.9 7.4 6.9 7.8 6.9 7.8 7.8 7.8 7.8 7.8 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9 | 3 220.0 50.0 270.0 3 173.3 46.2 120.0 200.0 3 143.3 15.3 15.3 130.0 160.0 3 5.8 110.0 120.0 100.0 120.0 1000 | 3 3 7.5 0.5 7.1 8.0 3 6.2 0.7 5.4 6.7 3 7.1 0.2 6.9 9 7.3 3 7.0 0.7 7.7 1 1 7.8 | 2 2 44.22 35.55 52.8.8 2 2 40.2.2 50.2 2 2 62.7, 78.8 2 46.55 78.8 2 46.55 78.8 2 45.55 78.8 2 47.55 89.2 1 1 90 | 3 1024.7 157.6 860.0 1174.0 3 943.7 143.1 781.0 1050.0 3 880.3 190.2 661.0 1000.0 3 889.0 195.2 664.0 195.2 664.0 195.2 664.0 195.2 664.0 195.2 664.0 195.2 664.0 195.2 664.0 195.2 664.0 195.2 664.0 195.2 664.0 195.2 665.0 195.2 665.0 195.2 665.0 195.2 | 3 606.7 110.2 480.0 680.0 3 573.3 115.9 440.0 650.0 3 550.0 173.5 350.0 660.0 3 3526.0 170.3 3526.0 170.3 3526.0 170.3 350.0 6638.0 1 550.0 1 550.0 1 1 550.0 1 1 550.0 1 1 550.0 1 1 550.0 1 1 550.0 1 1 550.0 1 1 550.0 1 1 550.0 1 1 550.0 1 1 550.0 1 1 550.0 1 1 550.0 1 1 550.0 1 1 5 5 2 5 1 5 5 5 5 5 5 5 5 5 5 5 5 5 | 3 3.3 4.00 1.0 8.0 3.0 1.0 1.0 3.0 0.6 6 1.0 2.0 3.0 5.0 6.9 1.0 1.0 1.5 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5 | 3 2.0 0.0 2.0 3 2.0 0.0 2.0 2.0 3 2.0 0.0 0 2.0 2.0 3 2.0 0.0 0 2.0 1 4 4 | 2 11.0 13.0 2.30 2.4.0 2.4.0 2.4.0 2.4.0 2.1.5 10.0 13.0 2.1.7,5 13.0 2.2.0 1 3.9 | 3 32.7 19.4 10.3 45.1 39.5 20.2 17.1 15.6.3 3 37.4 17.0 18.9 9 52.3 3 33.3 12.3 19.2 19.2 11.1 98 | 3 2.4 0.3 2.1 2.5 0.5 2.1 3.1 3.1 3.2 4 0.5 1.9 2.9 3.3 0.7 2.2 2 3.5 1 1 2.8 | 3 2.4 0.3 2.1 2.1 2.5 0.5 2.1 3.1 3.1 3.1 3.2 4 0.5 0.5 2.1 3.3 2.7 7 0.6 6 2.2 3.3 3 1.7 7 | 3 0.01 0.005 0.002 3 0.008 0.003 0.005 0.010 3 0.01 0.01 0.01 0.01 0.03 0.03 0 | 3 30.3 19.5 7.9 43.0 37.0 20.0 50.0 55.0 33 35.0 16.7 17.0 50.0 3 30.3 30.3 11.6 17.0 50.0 3 30.3 11.6 70 70 | 3 30.3 19.4 7.9 43.0 3 37.0 54.0 54.0 3 35.0 16.7 17.0 50.0 30.6 11.8 17.0 30.3 30.6 11.8 17.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1 | 7.6 7.6 1 7.1 7.1 7.1 1 3.8 3.8 3.8 3.8 3.8 3.8 6.3 6.3 6.3 6.3 | | | | |
| UNSAT-CL2 UNSAT-CL2 UNSAT-EC4 UNSAT-SA2 | 30° Clinoptilolite 15° Clinoptilolite 30° Expanded Clay 30° Sand | Fluent n n MEAN STD. DEV. MIN MAX n n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n n DEV. MIN MAX n MEAN STD. DEV. MIN | 3 26.8 3.0.0 23.5 29.3 3 25.7 2.2 23.1 27.1 3 3 26.0 3.4 22.2 28.5 3.0 22.5 25.8 3.0 22.5 28.2 2 1 1 24 24 | 3 6.7 7.8 3 7.0 7.9 3 3 6.9 7.3 3 3 6.0 6.9 1 1 7 7 | 3 220.0 50.0 270.0 310 270.0 3173.3 46.2 120.0 200.0 33 15.3 15.3 130.0 30 110.0 30 110.0 120.0 1 200 200 200 200 200 200 200 200 200 | 3 3 7.5 0.5 7.1 8.0 3.0 6.2 0.7 5.4 6.7 3.7 7.1 6.7 3.7 7.1 6.7 3.7 7.1 6.7 6.7 6.7 6.7 6.7 6.7 6.7 6.7 | 2 44.2 35.5 52.8 2 40.2 50.2 50.2 50.2 50.2 50.2 50.2 50.2 5 | 3 1024.7 157.6 860.0 1174.0 943.7 143.1 781.0 1050.0 3 880.3 880.3 190.2 661.0 1000.0 195.2 664.0 953.0 1 950.2 1 957.2 1024.7 1025.7 1024.7 1025.7 1005.7 1005.7 10 | 3 606.7 110.2 480.0 680.0 3 573.3 115.9 440.0 650.0 3 3 550.0 173.5 350.0 173.5 350.0 170.3 350.0 170.3 330.0 660.0 170.3 330.0 638.0 0 170.5 550 | 3 3.3 4.0 1.0 3.0 1.0 1.0 3.0 3.0 3.0 3.0 6.6 3.0 6.9 1.0 1.0 1.0 5.0 0 6.9 1.0 1.0 5.5 5 5 5 5 | 3 2.0 0.0 2.0 2.0 0.0 2.0 2.0 3 2.0 0.0 2.0 2.0 2.0 2.0 2.0 2.0 1 1 | 2 11.0 13.0 23.0 22.0 24.0 24.0 2 11.5 10.0 13.0 22.0 13.0 22.0 13.9 39 | 3 32.7 19.4 10.3 345.1 33.95 20.2 17.1 15.63 3 3.7.4 17.0 18.9 52.3 3 3.3 3.3 12.3 19.2 4.15 1 1 98 98 | 3 2.4 0.3 2.5 0.5 2.1 3.1 3 3 2.4 0.5 3.3 2.9 3.0 0.7 2.2 3.5 1 1 2.8 3.0 0 2.7 2.2 2.8 3.0 0 2.7 2.2 2.8 3.0 5 5 2.5 2.5 3.5 5 2.5 5 2.5 5 5 5 5 5 5 5 5 5 5 5 5 5 | 3 2.4 0.3 2.1 2.1 2.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0 | 3 0.01 0.01 0.005 0.002 3 0.003 0.000 0.010 0.010 0.01 0.01 0.0 | 3 30.3 19.5 7.9 43.0 20.0 15.0 15.0 33.5 0.0 33.5 0.0 33.5 0.0 30.3 311.6 17.0 30.3 30.1 11.6 17.0 70 70 70 | 3 30.3 19.4 7.9 43.0 37.0 20.0 15.0 54.0 33 35.0 16.7 17.0 30.6 11.18 17.0 38.7 17.9 91 91 | 7.6 7.6 1 7.1 7.1 7.1 1 3.8 3.8 3.8 3.8 3.8 3.8 6.3 6.3 6.3 6.3 | | | | |
| UNSAT-CL4 UNSAT-CL2 UNSAT-EC4 | 30° Clinoptilolite 15° Clinoptilolite 30° Expanded Clay 30° Sand | Fileent n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MAX n MEAN STD. DEV. | 3 26.8 3.0 23.5 29.3 3 3 25.7 2.2 2 3.1 27.1 27.1 27.1 27.1 27.1 3 3 26.0 3.4 2.2 5 3 3 2.5.8 3.0 2.25.5 2.8.2 2.8.2 2.8.2 2.8.2 2.8.2 2.8.2 2.8.2 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.5.7 2.2.7 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.2.5 3.0 2.5.7 3.0 2.2.5 3.0 2.5.7 2.2.7 3.0 2.5.7 3.0 2.5.7 3.0 2.5.7 2.2.7 2.2.7 2.2.7 3.0 2.5.7 2.2.7 2.7 | 3 6.7 7.8 3 7.0 7.9 3 3 6.9 7.3 3 3 6.0 6.9 1 1 7 7 | 3 220.0 50.0 270.0 3 173.3 46.2 120.0 200.0 3 143.3 15.3 15.3 130.0 160.0 3 5.8 110.0 120.0 100.0 120.0 1000 | 3 3 7.5 0.5 7.1 8.0 3 3 6.2 0.7 5.4 6.7 3 7.1 0.2 6.9 9 7.3 3 7.0 0.7 7.7 1 1 7.8 | 2 2 44.22 35.55 52.8.8 2 2 40.2.2 50.2 2 2 62.7, 78.8 2 46.55 78.8 2 46.55 78.8 2 45.55 78.8 2 47.55 89.2 1 1 90 | 3 1024.7 157.6 860.0 1174.0 3 943.7 143.1 781.0 1050.0 3 880.3 190.2 661.0 1000.0 3 889.0 195.2 664.0 195.2 664.0 195.2 664.0 195.2 664.0 195.2 664.0 195.2 664.0 195.2 664.0 195.2 664.0 195.2 664.0 195.2 664.0 195.2 665.2 195.2 105.2 | 3 606.7.7 1480.0 680.0.0 3 3 115.9 440.0 650.0 650.0 660.0 170.5 3 350.0 660.0 170.3 330.0 10 330.0 10 330.0 10 550 550 550 550 550 550 550 | 3 3.3 4.00 1.0 8.0 3.0 1.0 1.0 3.0 0.6 6 1.0 2.0 3.0 5.0 6.9 1.0 1.0 1.5 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5 | 3 2.0 0.0 2.0 3 2.0 0.0 2.0 2.0 3 2.0 0.0 0 2.0 2.0 3 2.0 0.0 0 2.0 1 4 4 | 2 11.0 13.0 2.30 2.4.0 2.4.0 2.4.0 2.4.0 2.1.5 10.0 13.0 2.1.7,5 13.0 2.2.0 1 3.9 | 3 32.7 19.4 10.3 45.1 39.5 20.2 17.1 56.3 3 37.4 17.0 18.9 52.3 37.4 17.0 18.9 52.3 33.3 12.3 19.2 41.5 1 1 9.98 9.98 | 3 2.4 0.3 2.5 0.5 2.1 3.1 3.1 3.1 3.1 3.2 4.4 0.5 1.9 2.9 3.3 0.0,7,7 2.2 2 3.5 1.1 2.8 2.4 2.8 2.8 2.8 2.8 2.8 2.8 2.8 2.8 2.8 2.8 | 3 2.4 0.3 2.1 2.1 2.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0 | 3 0.01 0.01 0.005 0.002 3 0.008 0.003 0.001 0.010 0.010 0.01 0.01 0.01 | 3 30.3 19.5.5 7.9 43.0 37.0 20.0 54.0 33 50.0 54.0 33 50.0 50.0 50.0 11.6 7 0 30.3 311.6 17.0 38.0 17.0 70 70 70 70 | 3 30.3 19.4 4 7.9 43.0 37.0 20.0 54.0 3 35.0 56.0 3 35.0 56.0 3 35.0 56.0 3 3 30.6 11.8 17.0 38.7 17.0 91 91 91 | 7.6 7.6 1 7.1 7.1 7.1 1 3.8 3.8 3.8 3.8 3.8 3.8 6.3 6.3 6.3 6.3 | | | | |
| UNSAT-CL2 UNSAT-EC4 UNSAT-SA2 UNSAT-PS1 (new recirc) | 30° Clinoptilolite 15° Clinoptilolite 30° Expanded Clay 30° Sand | Fluent n MEAN STD. DEV. MIN MAX n MEAN | 3 3 26.8.6 3.0.0 3.3.0 23.5 23.3 3 25.7.7 22.2 22.2 22.2 23.1 23.1 23.3 3 25.7.7 3.3 24.2 24.2 24.2 24.4 24.4 1 | 6.7 7.8 3 7.0 7.9 7.3 3 6.9 7.3 3 6.9 7.3 3 3 6.9 7.3 7 7 7 7 7 | 3 220.0 50.0 270.0 3 173.3 46.2 120.0 200.0 3 3 143.3 15.3 130.0 160.0 3 3 143.3 130.0 160.0 3 3 131.3 3 5.8 111.0 200 120.0 0 200 1 200 1 200 1 200 120.0 13.3 143.3 13.0 10.0 160.0 160.0 160.0 160.0 160.0 160.0 160.0 160.0 1000 | 3 3 7.5 0.5 7.1 8.0 3 6.2 0.7 5.4 6.7 3 7.1 0.2 6.9 7.3 3 7.0 0.7 7.7 1 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9 | 2 44.2 35.5 52.8 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 3 1024.7 157.6 860.0 1174.0 3 943.7 143.1 781.0 1050.0 3 880.3 190.2 661.0 1000.0 1000.0 1052.2 664.0 953.0 953.0 9550 9550 1 | 3 606.7.1 480.0 680.0 3 3 5 5 5 5 5 5 5 5 5 5 5 5 5 | 3 3.3 4.00 8.0 3.0 1.0 1.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 6.9 1.0 1.0 1.0 5.0 0 6.9 1.0 1.3 0 0 5.5 5 5 5 5 5 5 5 | 3 2.0 0.0 2.0 2.0 3 2.0 2.0 3 2.0 0.0 2.0 2.0 2.0 2.0 0.0 2.0 0.0 1 1 4 4 4 4 4 4 1 | 2 12.0 11.0 2 2.0 24.0 24.0 2.1 1.5 10.0 13.0 2.0 17.5 13.0 2.0 13.0 2.0 11 3.9 39 39 39 39 | 3 32.7 19.4 10.3 345.1 33.95 20.2 17.1 156.3 33.3 37.4 17.0 18.99 52.3 33.3 3.37.4 18.7 9 18.9 19.2 19.2 11.2 11.9 98 98 98 98 98 98 98 | 3 3 2.4.4.1 2.6 3 3 2.5: 2.5: 2.1: 3 3 3 3 3 3.0: 0.5: 3.1: 3.3: 3.0: 0.7: 3.3: 3.3: | 3 2.4 0.3 2.1 2.1 2.5 0.5 2.1 3.1 3.1 3.2 4 4 0.5 2.7 1.9 2.9 2.7 7 0.6 6 2.2 2.3 3.3 1 1 7 7 7 7 7 7 | 3 0.01 0.001 3 3 0.003 0.003 0.003 0.003 0.003 0.001 0.001 0.001 0.001 0.001 0.011 1 1 1 | 33 30.3.3.7 7.9.9 3.3.3 3.7.0 20.0.0 20.0.0 3.3 3.7.0 5.0.0 3.3 3.5.0.0 5.0.0 3.3 3.5.0.0 5.0.0 17.0.0 5.0.0 17.0.0 5.0.0 17.0.0 5.0.0 10 5.0.0 7.0.0 5.0.00 5.0.00 5.0.00 5.0.00 5.0.00 5.0.00 5.0.00 5.000 5.000 5.000 5.000 5.0000 5.0000 5.0000 5.0000 5.0000 5.00000 5.00000 5.00000 5.00000000 | 3 30.3 19.4 7.9 43.0 3.7 0.20.0 54.0 50.0 15.0 3.3 3.5 0.0 16.7 17.0 50.0 3.3 50.0 11.8 17.0 50.0 11.8 17.9 91 91 91 11.9 11.9 11.9 11.8 1 | 7.6 7.6 1 7.1 7.1 7.1 1 3.8 3.8 3.8 3.8 3.8 3.8 6.3 6.3 6.3 6.3 | | | | |
| UNSAT-CL2 UNSAT-CL2 UNSAT-EC4 UNSAT-SA2 UNSAT-PS1 (new recirc) Pump 15 | 30° Clinoptilolite 15° Clinoptilolite 30° Expanded Clay 30° Sand | Fluent n n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. MIN MAX n n MEAN STD. DEV. MIN MAX n MEAN STD. DEV. | 3 26.8 3.0.0 23.5 29.3 3 25.7 2.2 23.1 27.1 3 3 26.0 3.4 22.2 28.5 3.0 22.5 25.8 3.0 22.5 28.2 2 1 1 24 24 | 6.7 7.8 3 7.0 7.9 7.3 3 6.9 7.3 3 6.9 7.3 3 3 6.9 7.3 7 7 7 7 7 | 3 220.0 50.0 270.0 310 270.0 3173.3 46.2 120.0 200.0 33 15.3 15.3 130.0 30 110.0 30 110.0 120.0 1 200 200 200 200 200 200 200 200 200 | 3 3 7.5 0.5 7.1 8.0 3.0 6.2 0.7 5.4 6.7 3.7 7.1 6.7 3.7 7.1 6.7 6.7 6.7 6.7 6.7 6.7 6.7 6.7 | 2 44.2 35.5 52.8 2 40.2 50.2 50.2 50.2 50.2 50.2 50.2 50.2 5 | 3 1024.7 157.6 860.0 1174.0 943.7 143.1 781.0 1050.0 3 880.3 880.3 190.2 661.0 1000.0 195.2 664.0 953.0 1 950.2 1 957.2 1024.7 1025.7 1024.7 1025.7 1005.7 1005.7 10 | 3 606.7.7 1480.0 680.0.0 3 3 115.9 440.0 650.0 650.0 660.0 170.5 3 350.0 660.0 170.3 330.0 10 330.0 10 330.0 10 550 550 550 550 550 550 550 | 3 3.3 4.00 8.0 3.0 1.0 1.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 6.9 1.0 1.0 1.0 5.0 0 6.9 1.0 1.3 0 0 5.5 5 5 5 5 5 5 5 | 3 2.0 0.0 2.0 3 2.0 0.0 2.0 2.0 3 2.0 0.0 0 2.0 2.0 3 2.0 0.0 0 2.0 1 4 4 | 2 11.0 13.0 23.0 22.0 24.0 24.0 2 11.5 10.0 13.0 22.0 13.0 22.0 13.9 39 | 3 32.7 19.4 10.3 345.1 33.95 20.2 17.1 156.3 3 3.37.4 17.0 18.9 9 52.3 3.37.4 18.2 3 3.33.3 10.2 19.2 19.2 11 9.8 98 98 98 98 98 98 98 | 3 2.4 0.3 2.5 0.5 2.1 3.1 3.1 3.1 3.1 3.2 4.4 0.5 1.9 2.9 3.3 0.0,7,7 2.2 2 3.5 1.1 2.8 2.4 2.8 2.8 2.8 2.8 2.8 2.8 2.8 2.8 2.8 2.8 | 3 2.4 0.3 2.1 2.1 2.5 0.5 2.1 3.1 3.1 3.2 4 4 0.5 2.7 1.9 2.9 2.7 7 0.6 6 2.2 2.3 3.3 1 1 7 7 7 7 7 7 | 3 0.01 0.01 0.005 0.002 3 0.008 0.003 0.001 0.010 0.010 0.01 0.01 0.01 | 33 30.3.3.7 7.9.9 3.3.3 3.7.0 20.0.0 20.0.0 3.3 3.7.0 5.0.0 3.3 3.5.0.0 5.0.0 3.3 3.5.0.0 5.0.0 17.0.0 5.0.0 17.0.0 5.0.0 17.0.0 5.0.0 10 5.0.0 7.0.0 5.0.00 5.0.00 5.0.00 5.0.00 5.0.00 5.0.00 5.0.00 5.000 5.000 5.000 5.000 5.0000 5.0000 5.0000 5.0000 5.0000 5.00000 5.00000 5.00000 5.00000000 | 3 30.3 19.4 7.9 43.0 3.7 0.20.0 54.0 50.0 15.0 3.3 3.5 0.0 16.7 17.0 50.0 3.3 50.0 11.8 17.0 50.0 11.8 17.9 91 91 91 11.9 11.9 11.9 11.8 1 | 7.6 7.6 1 7.1 7.1 7.1 1 3.8 3.8 3.8 3.8 3.8 3.8 6.3 6.3 6.3 6.3 | | | | |
| UNSAT-CL2 UNSAT-CL2 UNSAT-EC4 UNSAT-SA2 UNSAT-PS1 (new recirc) | 30° Clinoptilolite 15° Clinoptilolite 30° Expanded Clay 30° Sand | Fluent n MEAN STD. DEV. MIN MAX n MEAN | 3 3 26.8.6 3.0.0 3.3.0 23.5 23.3 3 25.7.7 22.2 22.2 22.2 23.1 23.1 23.3 3 25.7.7 3.3 24.2 24.2 24.2 24.4 24.4 1 | 3 6.7 7.8 3 7.0 7.9 3 3 6.9 7.3 3 3 3 6.0 6.9 1 1 7 7 7 1 | 3 220.0 50.0 270.0 3 173.3 46.2 120.0 200.0 3 3 143.3 15.3 130.0 160.0 3 3 143.3 130.0 160.0 3 3 131.3 3 5.8 111.0 200 120.0 0 200 1 200 1 200 1 200 120.0 13.3 143.3 13.0 10.0 160.0 160.0 160.0 160.0 160.0 160.0 160.0 160.0 1000 | 3 3 7.5 0.5 7.1 8.0 3 6.2 0.7 5.4 6.7 3 7.1 0.2 6.9 7.3 3 7.0 0.7 7.7 1 7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9 | 2 44.2 35.5 52.8 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 3 1024.7 157.6 860.0 1174.0 3 943.7 143.1 781.0 1050.0 3 880.3 190.2 661.0 1000.0 1000.0 1052.2 664.0 953.0 953.0 9550 9550 1 | 3 606.7.1 480.0 680.0 3 3 5 5 5 5 5 5 5 5 5 5 5 5 5 | 3 3.3 4.00 8.0 3.0 1.0 1.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 6.9 1.0 1.0 1.0 5.0 0 6.9 1.0 1.3 0 0 5.5 5 5 5 5 5 5 5 | 3 2.0 0.0 2.0 2.0 3 2.0 2.0 3 2.0 0.0 2.0 2.0 2.0 2.0 0.0 2.0 0.0 1 1 4 4 4 4 4 4 1 | 2 12.0 11.0 2 2.0 24.0 24.0 2.1 1.5 10.0 13.0 2.0 17.5 13.0 2.0 13.0 2.0 11 3.9 39 39 39 39 | 3 32.7 19.4 10.3 345.1 33.95 20.2 17.1 156.3 33.3 37.4 17.0 18.99 52.3 33.3 3.37.4 18.7 9 18.9 19.2 19.2 11.2 11.9 98 98 98 98 98 98 98 | 3 3 2.4.4.1 2.6 3 3 2.5: 2.5: 2.1: 3 3 3 3 3 3.0: 0.5: 3.1: 3.3: 3.0: 0.7: 3.3: 3.3: | 3 2.4 0.3 2.1 2.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.2 4 4 0.5 1.9 2.9 2.9 3.3 2.7 0.6 6 2.2 2 3.3 3.1 1 7 7 7 7 7 7 7 7 1 1 4 4 | 3 0.01 0.001 3 3 0.003 0.003 0.003 0.003 0.003 0.001 0.001 0.001 0.001 0.001 0.011 1 1 1 | 3 3 3 3 3 7 9 4 3 0 3 3 7 0 2 0 0 0 3 3 3 7 0 2 0 0 0 3 3 3 5 4 0 0 3 3 5 4 0 0 3 3 5 4 0 0 3 3 5 4 0 0 5 4 0 0 5 5 4 0 0 5 5 5 4 0 0 5 5 5 5 | 3 30.3 19.4 7.9 43.0 37.0 20.0 15.0 54.0 3 35.0 16.7 17.0 50.0 33.50.0 33.50.0 33.50.0 33.50.0 33.50.0 33.0 6 11.8 17.0 30.0 31.8 17.0 30.0 38.7 10.0 38.7 10.0 38.7 10.0 33.7 10.0 33.50.0 33.7 | 7.6 7.6 1 7.1 7.1 7.1 1 3.8 3.8 3.8 3.8 3.8 3.8 6.3 6.3 6.3 6.3 | | | | |

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

| Sample ID | Media Composition | Statistical Parameter | Temp (°C) | рН | Total Alkalinity (mg/L) | DO (mg/L) | ORP (mV) | Specific Conductance (µS) | TDS (mg/L) | TSS (mg/L) | CBOD₅ (mg/L) | COD (mg/L) | TN (mg/L N) ¹ (I | TKN ng/LN) | 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) | H2S (mg/L) | SO₄ (mg/L) | Fecal (Ct/100 m |
|---------------------------------------|---------------------------------------|--|--------------|---------------|-------------------------------|--------------|----------------|---------------------------------|-----------------|---------------|-----------------|---------------|--------------------------------|---------------|------------------------------------|-------------------|-----------------|------------------------------|--------------|-------------------|---------------|----------------|--------------------|
| Denite Feed | Tank (Tank 3) | | | | • | - | | | | | | | | | | | | | • | | | | • |
| | | n | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 1 | 3 | 3 | 3 | |
| | | MEAN | 24.5 | | 163.3 | 7.7 | 43.9 | 914.7 | 560.0 | 1.0 | 2.0 | 20.0 | 27.8 | 3.2 | | 0.1 | 24.7 | | 6.5 | | 0.0 | 54.0 | |
| DFT | | STD. DEV. | 5.2 18.5 | | 35.1 | 0.5 | 25.5 | 149.1 | 148.0 | 0.0 | 0.0 | 40.0 | 13.0 19.5 | 0.4 | | | 13.3 | | 6.5 | 0.5 | 0.1 | 9.2 46.0 | |
| | | MIN MAX | 28.1 | | 130.0 | 7.3 | | 744.0 | 390.0 | | | 18.0 | 42.8 | 2.8 | | 0.01 | 16.0 40.0 | | 6.5 | 0.1 | 0.01 | 46.0 | |
| Stage 2 Horiz | ontal Biofilters Efflu | | 20.1 | 0.1 | 200.0 | 0.5 | 02.2 | 1020.0 | 000.0 | 1.0 | 2.0 | 22.0 | 12.0 | 5.5 | | 0.2 | 10.0 | 10.0 | 0.5 | 1.0 | 0.1 | 01.0 | |
| | | n | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 1 | 3 | 3 | 3 | |
| | 000/ 001500 200/ | 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 | j. |
| DENIT-SU1 | 80% Sulfur; 20% Oyster Shell | STD. DEV. | 1.6 | | 20.8 | 0.8 | | 148.4 | 174.7 | 0.0 | 4.2 | | 0.4 | 0.4 | | 0.8 | 0.1 | | | 6.1 | 1.4 | 110.2 | |
| | oyster shen | MIN | 25.1 | 6.9 | | 0.1 | | 1192.0 | 660.0 | 1.0 | 18.0 | 50.0 | 2.0 | 1.9 | | | 0.01 | | 5.0 | 17.0 | 9.2 | 230.0 | |
| | | 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 | |
| | | n MEAN | 26.4 | 2 | 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 | <u> </u> |
| DENIT-SU2 | 80% Sulfur; 20% | STD. DEV. | 20.4 | | 35.4 | 0.5 | -275.0 | 2.8 | 169.7 | 0.7 | 12.3 | 30.0 | 3.2 | 0.4 | | | 3.7 | | 4.0 | 9.8 | 4.7 | 233.3 | |
| (old) | Sodium Sesqui. | MIN | 24.8 | 7.0 | | 0.5 | -279.0 | 1398.0 | | 1.0 | 4.9 | 50.0 | 1.8 | 1.2 | | | 0.025 | | 4.8 | | 0.0 | 140.0 | |
| | | 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 | |
| | | n | 1 | 1 | . 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | |
| DENIT-SU2 | 10% Limestone; 30% Sulfur; 60% | MEAN STD. DEV. | 26 | | 210 | 0.2 | -90 | 1350 | 1000 | 8 | 2 | 18 | 1 | 1 | 1 | 0.03 | 0.03 | 0.06 | | 1 | 0.01 | 490 | <u> </u> |
| new) | Expanded Clay | 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 | |
| | Expanded elay | MAX | 26 | 7 | 210 | 0.2 | | | | 8 | 2.0 | 18 | 1 | 1 | 1 | 0.03 | 0.03 | | | 1 | 0.01 | 490 | |
| | | n | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 1 | | | | |
| | 50% | 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 | | | | |
| DENIT-LS1 | Lignocellulosic; 50% Expanded Clay | STD. DEV. | 3.0 | | 23.1 | 0.5 | | 131.7 | 95.4 | 0.0 | 30.6 | | 11.0 | 0.6 | | | 10.4 | | | | | | |
| | | MIN | 21.4 | | | 0.2 | | 738.0 | | 1.0 | 2.0 | 18.0 | 1.5 | 1.5 | | 0.005 | 0.01 | | 0.5 | | | | |
| | | 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 | | | | |
| | | n MEAN | 24.7 | 3 | 423.3 | 3 | -177.5 | 3 1126.7 | 3 706.7 | 35.0 | 3 284.0 | 400.0 | 24.9 | 23.3 | 13.0 | 3 10.3 | 4 | 11.9 | 2.9 | | | | |
| DENIT-GL1 | 12" Gravel; 60" | STD. DEV. | 3.4 | | 423.3 | 0.8 | | 487.3 | 434.7 | | 455.9 | 400.0 | 35.8 | 37.0 | | | 2.3 | | 2.9 | | | | |
| | Expanded Clay | MIN | 21.0 | | 220.0 | 0.0 | | 794.0 | 380.0 | 1.0 | 3.0 | 22.0 | 2.0 | 1.9 | | 0.9 | 0.0 | | 2.9 | | | | 8 |
| | | 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 | | | | 8 |
| In citu Cimul | ator Biofilters Efflue | n † | | | | | | | | | | | | | | | | | | | | | |
| n-sita sinia | | n | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 2 | 5 | 5 | 5 | |
| | 12" Sand; 12" Mix | 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 | |
| JNSAT-IS1 STE) | (45% EC, 35% | 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 | |
| 311) | Ligno, 20% Sulfur) | 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 | | | 0.022 | | 1.2 | | 0.01 | 79.0 | í. |
| | | 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 | | 69.0 | 0.2 | | 1.7 | 4.7 | 2.8 | 1100.0 | |
| | 4211 Courd 4211 Mar | n | 5 | 2 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 3 | 5 | 5 | | 5 | 5 | | 2 | 5 | 5 | 5 | |
| UNSAT-IS2 | 12" Sand; 12" Mix (45% EC, 35% | MEAN STD. DEV. | 24.4 | | 172.0 43.2 | 0.5 | -182.4 39.3 | 1633.8 1147.5 | 1272.0 970.4 | 57.8 43.3 | 5.4 5.0 | 27.7 | 1.1 | 1.0 | | | 0.03 | | 4.3 | 0.6 | 0.1 | 680.0 627.7 | |
| NO ₃) | Ligno, 20% Sulfur) | MIN | 17.1 | 6.1 | 100.0 | 0.1 | -213.6 | 365.0 | 700.0 | 10.0 | 2.0 | 13.0 | 0.4 | 0.6 | | 0.1 | 0.02 | 0.1 | 1.5 | 0.1 | 0.01 | 350.0 | |
| | 5 ., , | MAX | 30.0 | | 210.0 | 0.8 | | 3506.0 | 3000.0 | 108.0 | 13.0 | 50.0 | 1.5 | 1.5 | | 0.8 | 0.05 | | 7.0 | 1.0 | 0.6 | 1800.0 | |
| | | n | 1 | 1 | . 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | . 1 | 1 | 1 | 1 | | 1 | 1 | 1 | |
| JNSAT-IS3 | 12" Sand; 10" Mix | MEAN | 19 | | 280 | 0.4 | 158 | 1505 | 2300 | 4 | 3 | 46 | 34 | 6 | 0 | 6 | 28 | 34 | | 1 | 0.01 | 290 | |
| STE) | (60% EC, 40% | STD. DEV. | 19 | _ | 200 | | 450 | 4505 | 2200 | | 2 | 46 | 34 | | | - | 20 | 34 | | 1 | 0.01 | 200 | |
| | Ligno); 3" Sulfur) | MIN MAX | 19 | | 280 | 0.4 | 158 158 | 1505 1505 | 2300 2300 | 4 | 3 | 46 | 34 | 6 | 0 | 6 | 28 28 | | | 1 | 0.01 | 290 290 | |
| | | n | 15 | , 1 | 200 | 0.4 | 150 | 1505 | 2300 | | | 40 | 2 | 2 | 2 | 2 | 20 | 2 | | | 0.01 | 2,0 | |
| JNSAT-IS4 | 12" Sand; 10" Mix | MEAN | 18 | | 280 | 9 | 153 | 0.01 | | | | 35 | 28 | 2 | 2 | 0.06 | 26 | 26 | | | | 465 | j. |
| | (60% EC, 40% | STD. DEV. | | | | | | | | | | | 21 | | | | 21 | | | | | 35 | |
| NO ₂) | Ligno); 3" Sulfur) | MIN | 18 | 7 | 280 | 9 | 153 | 0.01 | | | | 35 | 13 | 2 | 2 | 0.04 | 11 | | | | | 440 | |
| NO3) | | MAX | 18 | 7 | 280 | 9 | 153 | 0.01 | | | | 35 | 43 | 2 | 2 | 0.09 | 41 | 41 | | | | 490 | 1 |
| | | | | | | | | | | | | | | | | | | | | | | | |
| NO3) lotes: | en (TN) is a calculate | | sum of T | N and NO | | | | | | | | | | | | | | | | | | | |
| lotes: Total Nitrog | | ed value equal to the | | | and NH ₂ | | | | | | | | | | | | | | | | | | |
| otes: Fotal Nitrog Drganic Nitr | ogen (ON) is a calcu | ed value equal to the lated value equal to f a calculated value eq | the differe | ence of TKN a | | | | | | | | | | | | | | | | | | | |

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

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- 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 NH₃-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 NH₃-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, SO₄ and H₂S 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.1Operation and Maintenance Log

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

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| 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 $^{\sim}$ 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 |
| 0/20/2010 | 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 |
| 10/20/2010 | time) |
| 10/20/2010 | Calibrated IS3 and IS4 tubing |
| 10/22/2010 | 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 |
| 10/25/2010 | 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) |
| 10/27/2010 | Replaced DENIT-LS2 media (25% lignocellulosic, 75% expanded clay mixture) |
| | 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 |
| 44/24/2010 | 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 |
| 10/1/00/- | 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 |

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Appendix A

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

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Figure A.2 Revised In-situ Simulators Discharge Piping





Figure A.3 RC1 Outlet Tee

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Figure A.4 UNSAT-CL4 before Cleaning



Figure A.5 UNSAT-CL4 after Cleaning





Figure A.6 Outlet Tee in Recirculation Tank

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Figure A.7 Unclogging UNSAT-LS4 Influent Pipe

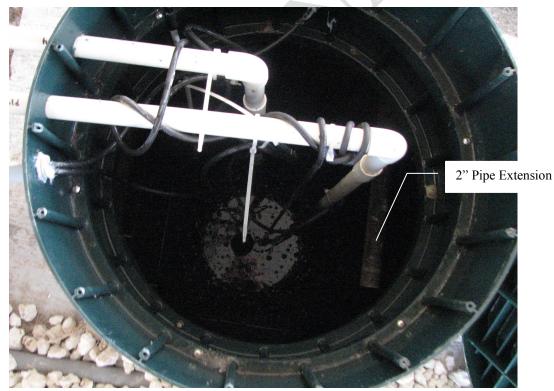


Figure A.8 2" Pipe Extension into PNRS II Tank 1 Pump Chamber

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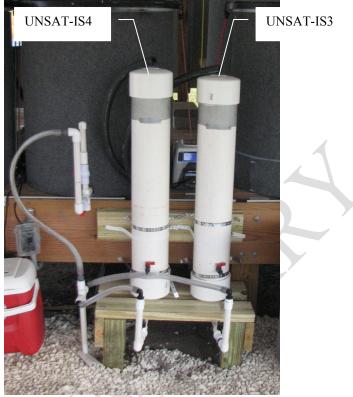


Figure A.9 UNSAT-IS3 and UNSAT-IS4 Columns

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Appendix B: PLC Data Tables

| | Summary | | Record | ed Daily | y 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% | | | | |

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

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

| | | | | 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% |

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

FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY PNRS II TEST FACILITY DATA SUMMARY REPORT NO. 3

PAGE B-1 HAZEN AND SAWYER, P.C.



Appendix C: Flow Test Results

FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY PNRS II TEST FACILITY DATA SUMMARY REPORT NO. 3

PAGE C-1 HAZEN AND SAWYER, P.C.

| | | | Target Input | : | Measur | ed Input | Measure | d Output | Recycl | e Ratio |
|---------------------|---|------------------------|--------------|------------------------|------------------------------|--|------------------------------|---|-------------------------------------|--|
| Group (Figure 1) | Biofilter/Flow | Target Input Volume | Dose/day | Target Input Volume | Measured Input Volume | Relative Error (%) | Measured Output Volume | Relative Error (%) | Calculated Recycle Ratio (RR) | Relative Erro (%) |
| | | (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 |
| | Stage 1 Single Pass Biofilters | | | | | | | | | |
| | (Hydrosplitter 1) | | | | 9/10/2010 Dose | | 9/1/10 | | | |
| | Date | | | | @ 10:00 am | | 12:53 - 1:53 pm | | | |
| | UNSAT-PS1 | | | | 2,175 | -6.2% | 3,575 | 54.2% | | |
| | UNSAT-CL3 | | | | 2,295 | -1.0% | 2,405 | 3.7% | à | |
| | UNSAT-CL1 UNSAT-EC3 | 55,656 | 24 | 2,319 | 2,330 2,245 | -3.2% | 2,303 | -0.7% | | |
| | UNSAT-EC3 UNSAT-EC1 | | | | 2,245 | -3.2% | 2,368 2,405 | 3.7% | | |
| | Mean | | | | 2,330 | -1.9% | 2,403 | 12.6% | | |
| 1 | | | | | 2,273 | -1.5% | 2,011 | 12.0/6 | - | |
| | Stage 2 Single Pass Upflow Biofilters | | | | | | | | | |
| | Date | | | | | | 9/1/10 8:42 - 9:42 am | | | |
| | DENIT-LS4 | | | | | | 1,779 | -23.3% | | |
| | DENIT-LS2 | | | | | | 3,437 | 48.2% | | |
| | DENIT-SU3 | 55,656 | 24 | 2,319 | | | 2,857 | 23.2% | | |
| | DENIT-LS3 | | | | | | 2,770 | 19.4% | | |
| | DENIT-SU4 | | | | | | 2,407 | 3.8% | | |
| | Mean | | | | | | 2,650 | 14.3% | | |
| | Stage 1 Recirculating Biofilters (Hydrosplitter 2) | | | | | | | | | |
| | Date | | | | (9/10/10) dose @ 10:30 am | | | | | |
| | RC1 : UNSAT-SA2 | | | | 2,300 | -0.8% | | | | |
| | RC2 : UNSAT-EC4 | 55,656 | 24 | 2,319 | 2,520 | 8.7% | | | | |
| | RC3 : UNSAT-CL2 | 33,030 | 24 | 2,315 | 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) | | | | | |
| 2 | RC1 : UNSAT-SA2 | | | | 6,939 | -0.3% | | | 3.02 | 0.6% |
| | RC2 : UNSAT-EC4 | 166,968 | 24 | 6,957 | 7,570 | 8.8% | | | 3.00 | 0.1% |
| | RC3 : UNSAT-CL2 RC4 : UNSAT-CL4 | | | | 6,939 6,939 | -0.3% | | | 2.88 | -4.2% -2.9% |
| | Mean | | | | 7,097 | 2.0% | | | 2.95 | -2.5% |
| | Stage 1 Recirculating Biofilters (Hydrosplitter 2 + Recycle) | | | | 1,001 | 2.070 | 9/1/2010 10:10 - 11:10 am | | 2.55 | 1070 |
| | RC1 : UNSAT-SA2 | | | | | | 9,290 | 0.2% | | |
| | RC2 : UNSAT-EC4 | 222,624 | 24 | 9,276 | | | 10,170 | 9.6% | | |
| | RC3 : UNSAT-CL2 | | | ., . | | | 9,325 | 0.5% | | |
| | RC4 : UNSAT-CL4 | | | | | | 9,184 | -1.0% | | - |
| | Mean Horizontal Denitrification Biofilters | | | | | | 9,492 | 2.3% | | |
| | Date | | | | 9/10/10 dose @ 12:06 pm | | 9/1/2010 12:58 - 1:58 pm | | | |
| 2 | DENIT-SU1 | | | | 298 | -3.5% | 239 | -22.6% | | |
| 3 | DENIT-SU2 | | | | 296 | -4.1% | 275 | -10.9% | | |
| | DENIT-GL1 | 7,409 | 24 | 308.7 | 295 | -4.4% | 272 | -11.9% | | |
| | DENIT-LS1 | | | | 282 | -8.6% | 248 | -19.7% | | |
| | Mean | | | | 293 | -5.2% | 259 | -16.3% | | |
| | In-Situ Simulators | | | | | | | | | |
| 4 | 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% | | |

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

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

FLORIDA DEPARTMENT OF HEALTH PNRS II TEST FACILITY DATA SUMMARY REPORT NO. 3

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| | | estr | esuits | (anter | now re | camprat | lion) | |
|---------------------|---|------------------------|--------------|------------------------|------------------------------------|--|-------------------------------------|--|
| | | | Target Input | : | Measur | ed Input | Recycl | e Ratio |
| Group (Figure 1) | Biofilter/Flow | 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 |
| | Stage 1 Single Pass Biofilters (Hydrosplitter 1) | | | | | | | |
| | Date | | | | (12/8/10) manual dose @ 8:45 am | | | |
| | UNSAT-PS1 | | | | 2,320 | 0.0% | | |
| | UNSAT-CL3 | | | | 2,395 | 3.3% | | |
| | UNSAT-CL1 | 55,656 | 24 | 2,319 | 2,340 | 0.9% | | |
| | UNSAT-EC3 UNSAT-EC1 | | | | 2,300 2,340 | -0.8% | | |
| 1 | Mean | | | | 2,340 | 0.9% | | |
| - | Stage 2 Single Pass Upflow Biofilters | | | | 2,555 | 0.570 | | |
| | Stage 2 Single Pass opnow Biointers | | | | 11/10/2010 8:00 | | | |
| | Date | | | | 11/19/2010 8:00- 9:00 am | | | |
| | DENIT-LS4 | | | | 1,690 | | | |
| | DENIT-LS2 | | | | 2,090 | | | |
| | DENIT-SU3 | 55,656 | 24 | 2,319 | 2,425 | | | |
| | DENIT-LS3 | | | | 2,025 | | | |
| | DENIT-SU4 | | | | 2,120 | | | |
| | Mean Stage 1 Recirculating Biofilters | | | | | | | |
| | (Hydrosplitter 2) | | | | (11/19/10) dose | | 1 | |
| | Date | | | | @ 9:30 am | | | |
| | RC1 : UNSAT-SA2 | | | | 2,105 | -9.2% | | |
| | RC2 : UNSAT-EC4 | 55,656 | 24 | 2,319 | 2,270 | -2.1% | | |
| | RC3 : UNSAT-CL2 RC4 : UNSAT-CL4 | | | | 2,345 2,220 | -4.3% | | |
| | Mean | | | | 2,235 | -3.6% | | |
| | Stage 1 Recirculating Biofilters (Recycle) | | | | Flowmeter 11/19/10 8:30 | | | |
| | RC1 : UNSAT-SA2 | | | | 6,586 | -5.3% | 3.13 | 4.1% |
| 2 | RC2 : UNSAT-EC4 | | | | 7,116 | 2.3% | 3.13 | 4.3% |
| | RC3 : UNSAT-CL2 | 166,968 | 24 | 6,957 | 7,002 | 0.7% | 2.99 | -0.5% |
| | RC4 : UNSAT-CL4 | | | | 6,586 | -5.3% | 2.97 | -1.1% |
| | RC5 : UNSAT-PS1 Mean | | | | 6,662 | -4.2% | 2.98 3.05 | -0.7% 1.8% |
| | Stage 1 Recirculating Biofilters (Hydrosplitter + Recycle) | | | | 6,822 | -1.5% | 5.05 | 1.8% |
| | RC1 : UNSAT-SA2 | | | | 8,691 | | | |
| | RC2 : UNSAT-EC4 | | | | 9,386 | | | |
| | RC3 : UNSAT-CL2 | 222,624 | 24 | 9,276 | 9,347 | | | |
| | RC4 : UNSAT-CL4 | | | | 8,806 | | | |
| | RC5 : UNSAT-PS1 | | | | 8,982 | | | |
| | Mean Horizontal Denitrification Biofilters | | | | 9,042 | | | |
| | Date | <u> </u> | | | 11/19/10 dose @ | | | |
| 2 | DENIT-SU1 | - | | | 8:25 am 302 | -2.2% | | |
| 3 | DENIT-SU2 | | | 202 - | 295 | -4.4% | | |
| | DENIT-GL1 | 7,409 | 24 | 308.7 | 295 | -4.4% | | |
| | DENIT-LS1 | | | | 300 | -2.8% | | |
| | Mean | | | | 298 | -3.5% | ļ | |
| | In-Situ Simulators | | | | 12/3/2010 | | | |
| | Date | | | | 12/3/2010 manual dose | | | |
| 4 | UNSAT-IS1 (STE) UNSAT-IS2 (Nitrified STE) | 14,814 | 6 | 2,469 | 2,600 2,660 | 5.3% 7.7% | | |
| | Date | | | | 11/19/2010 manual dose | | | |
| | LINGAT IC2 (CTC) | | | 1 | 99 | 0.0% | | |
| | UNSAT-IS3 (STE) | 594 | 6 | 99 | | | | |

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



Appendix D: Laboratory Report

FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY PNRS II TEST FACILITY DATA SUMMARY REPORT NO. 3

PAGE D-1 HAZEN AND SAWYER, P.C.

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



Hazen and Sawyer 10002 Princess Palm Avenue Suite 200 Tampa FLORIDA, 33619 January 7, 2011 Work Order: 1001627 Revised Report

Laboratory Report

| Project Name | | PN | RS II | | | | | |
|--|--------------|-------------------------------------|-----------------------|------------|-----------|-----------------|----------------------------------|------------|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Ву |
| 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 | | | | | | | | |
| рН | 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 | ma/l | E / | SM AFFORT | 0.04 | 0.01 | | 11/12/10 16:00 | KT0 |
| 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 SM 5210B | 0.010 | 0.005 | 11/10/10 10:00 | 11/17/10 17:04 | SMB |
| Carbonaceous BOD | mg/L | 91 240 | EPA 410.4 | 2 25 | 2 10 | 11/12/10 10:00 | 11/17/10 13:07 | KTC ARM |
| Chemical Oxygen Demand Sulfate | mg/L | 240 33 | EPA 300.0 | 25 0.60 | 0.20 | 11/15/10 09:53 | 11/16/10 08:45 11/15/10 23:40 | MEJ |
| Sulfide | mg/L | 15 | SM 4500SF | 4.0 | 1.0 | 11/15/10 09.55 | 11/12/10 16:00 | KTC |
| Total Alkalinity | mg/L mg/L | 430 | SM 430031 SM 2320B | 4.0 8.0 | 2.0 | | 11/16/10 12:30 | KTC |
| Total Dissolved Solids | mg/L | 450 | SM 2520D | 0.0 10 | 2.0 10 | 11/15/10 11:00 | 11/16/10 12:30 | 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 | 12,10,10,10,000 | 11/17/10 15:50 | SMB |
| | | | | | | | | |
| Sample Description | | RC1 | | | | | | |
| Matrix | | Wastewater | | | | | | |
| SAL Sample Number | | 1001627-02 11/10/10 12:00-11/10/ | 40 40-50 | | | | | |
| Date/Time Collected Collected by | | Thomas Drunasky | 10 12:50 | | | | | |
| Date/Time Received | | 11/10/10 17:50 | | | | | | |
| | | 11/10/10 17.50 | | | | | | |
| Field Parameters | | | | | | | | |
| рН | 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 | | 10 | | 0.040 | 0.005 | | 444740 47.04 | |
| Ammonia as N | mg/L | 12 | EPA 350.1 | 0.010 | 0.005 | 11/10/10 10:00 | 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 | 11/15/10 11:00 | 11/16/10 12:30 | KTC |
| Total Dissolved Solids | mg/L | 580 | SM 2540C EPA 351.2 | 10 | 10 | 11/15/10 11:00 | 11/16/10 14:00 | MJV |
| Total Kjeldahl Nitrogen | mg/L | 17 | SM 2540D | 0.20 | 0.05 1 | 11/19/10 07:30 | 11/19/10 15:47 | SMB |
| Total Suspended Solids Nitrate+Nitrite (as N) | mg/L | 3 24 | EPA 353.2 | 1 0.04 | 1 0.01 | 11/17/10 14:17 | 11/17/10 14:19 11/17/10 15:50 | MJV SMB |
| | mg/L | ۲4 | LI / 000.2 | 0.04 | 0.01 | | 11/17/10 15:50 | SIVID |

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Sone Caro

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January 7, 2011 Work Order: 1001627 Revised Report

| Project Name | | PN | RS II | | | | | |
|-------------------------|----------|-----------------|------------|-------|-------|----------------|----------------|-----|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Ву |
| 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 | | | | | | | | |
| pН | 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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Hazen and Sawyer 10002 Princess Palm Avenue Suite 200 Tampa FLORIDA, 33619 January 7, 2011 Work Order: 1001627 Revised Report

| Project Name | | PN | RS II | | | | | |
|-----------------------------|----------|--------------------------|------------|-------|-------|----------------|----------------|-----|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Ву |
| 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 | | | | | | | | |
| рН | 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 | ктс |
| 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 |
| Comple Description | | RC5 | | | | | | |
| Sample Description | | | | | | | | |
| Matrix SAL Sample Number | | Wastewater 1001627-06 | | | | | | |
| Date/Time Collected | | 11/10/10 16:10 | | | | | | |
| Collected by | | Thomas Drunasky | | | | | | |
| Date/Time Received | | 11/10/10 17:50 | | | | | | |
| | | 11/10/10 17.50 | | | | | | |
| Field Parameters | | | | | | | | |
| рН | 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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Hazen and Sawyer 10002 Princess Palm Avenue Suite 200 Tampa FLORIDA, 33619 January 7, 2011 Work Order: 1001627 Revised Report

Laboratory Report

| Project Name | | PN | RS II | | | | | |
|------------------------------|----------|-----------------|-------------------|------------|-----------|----------------|----------------|-----|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Ву |
| 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 | | | | | | | | |
| рН | 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 | 4.0 8.0 | 2.0 | | 11/16/10 12:30 | KTC |
| Total Dissolved Solids | mg/L | 540 | SM 2540C | 10 | 2.0 10 | 11/15/10 11:00 | 11/16/10 14:00 | MJV |
| Total Kjeldahl Nitrogen | mg/L | 540 | 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 | 0.20 | 0.05 | 11/17/10 14:17 | 11/17/10 14:19 | MJV |
| Nitrate+Nitrite (as N) | • | 0.18 | EPA 353.2 | 0.04 | ا 0.01 | 11/17/10 14.17 | 11/17/10 14:19 | SMB |
| | mg/L | 0.10 | LI / 000.2 | 0.04 | 0.01 | | 111110 15.50 | |

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Hazen and Sawyer 10002 Princess Palm Avenue Suite 200 Tampa FLORIDA, 33619 January 7, 2011 Work Order: 1001627 Revised Report

| Project Name | | PN | RS II | | | | | |
|------------------------------|----------|-----------------|------------|-------|-------|----------------|----------------|-----|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Ву |
| 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 | | | | | | | | |
| pН | SU | 6.8 | DEP FT1100 | 0.1 | 0.1 | | 11/10/10 09:45 | TDE |
| 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 | SME |
| 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 | 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 | ME |
| 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 | ктс |
| Total Dissolved Solids | mg/L | 820 | SM 2540C | 10 | 10 | 11/15/10 11:00 | 11/16/10 14:00 | MJ∖ |
| Total Kjeldahl Nitrogen | mg/L | 1.2 | EPA 351.2 | 0.20 | 0.05 | 11/19/10 07:30 | 11/19/10 15:47 | SME |
| Total Suspended Solids | mg/L | 19 | SM 2540D | 1 | 1 | 11/17/10 14:17 | 11/17/10 14:19 | MJ∖ |
| Nitrate+Nitrite (as N) | mg/L | 0.05 | EPA 353.2 | 0.04 | 0.01 | | 11/17/10 15:50 | SME |
| 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 | SME |
| Sulfate | mg/L | 490 | EPA 300.0 | 0.60 | 0.20 | 11/15/10 09:53 | 11/15/10 23:40 | ME |
| Total Kjeldahl Nitrogen | mg/L | 2.1 | EPA 351.2 | 0.20 | 0.05 | 11/19/10 07:30 | 11/19/10 15:47 | SME |
| Nitrate+Nitrite (as N) | mg/L | 41 | EPA 353.2 | 0.04 | 0.01 | | 11/18/10 14:49 | SME |
| 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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Hazen and Sawyer 10002 Princess Palm Avenue Suite 200 Tampa FLORIDA, 33619 January 7, 2011 Work Order: 1001627 Revised Report

Laboratory Report

| Project Name | | PN | RS II | | | | | |
|-------------------------------------|----------|-----------------------------------|-----------------------|-------|-------|----------------|----------------|------|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Ву |
| 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 | | | | | | |
| рН | 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 | | | 014 455005 | | 0.04 | | | 1/70 |
| 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 | 444040 44 05 | 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 EPA 353.2 | 1 | 1 | 11/17/10 14:17 | 11/17/10 14:19 | MJV |
| Nitrate+Nitrite (as N) | mg/L | 62 Q | EFA 355.2 | 0.04 | 0.01 | | 01/06/11 15:32 | SMB |
| Sample Description | | UNSAT-SA2 | | | | | | |
| Matrix | | Wastewater | | | | | | |
| SAL Sample Number | | 1001627-13 | | | | | | |
| Date/Time Collected Collected by | | 11/10/10 11:10 Thomas Drunasky | | | | | | |
| Date/Time Received | | Thomas Drunasky 11/10/10 17:50 | | | | | | |
| | | 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 | | a - 4 | | | | | | |
| 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 | 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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Hazen and Sawyer 10002 Princess Palm Avenue Suite 200 Tampa FLORIDA, 33619

January 7, 2011 Work Order: 1001627 Revised Report

| Project Name | | PN | RS II | | | | | |
|-------------------------|----------|-----------------|-------------------|-------|-------|----------------|----------------|-----|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Ву |
| 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 | | | | | | | | |
| рН | 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 | 0.1 | 0.0 | | 0.4 | | | | TDD |
| 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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Hazen and Sawyer 10002 Princess Palm Avenue Suite 200 Tampa FLORIDA, 33619 January 7, 2011 Work Order: 1001627 Revised Report

Laboratory Report

| Project Name | | PN | RS II | | | | | |
|------------------------------|----------|-----------------|------------|-------|-------|----------------|----------------|-----|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Ву |
| 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 | | | | | | | | |
| рН | 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 | | | | | | | | |
| рН | 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 |

FDOH Laboratory No.E84129 NELAP Accredited

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



Hazen and Sawyer 10002 Princess Palm Avenue Suite 200 Tampa FLORIDA, 33619 January 7, 2011 Work Order: 1001627 Revised Report

Laboratory Report

| Project Name | | PN | RS II | | | | | |
|------------------------------|----------|-------------------------|-------------------|-------|-------|----------------|----------------|--------|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Ву |
| 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 | | | | | | | | |
| рН | 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 Matrix | | UNSAT-CL4 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 | 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 |
| | mg/L | 1 U | SM 2540D | 1 | 1 | 11/17/10 14:17 | 11/17/10 14:19 | MJV |
| Total Suspended Solids | mg/∟ | 10 | CINI LO TOD | | 1 | 11/1//10 14.1/ | 11/1/10 14.19 | 1010 0 |

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Hazen and Sawyer 10002 Princess Palm Avenue Suite 200 Tampa FLORIDA, 33619 January 7, 2011 Work Order: 1001627 Revised Report

Laboratory Report

| Project Name | | PN | RS II | | | | | |
|--|--------------|-----------------|------------|-----------|-----------|----------------|----------------------------------|-----|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Ву |
| 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 | | | | | | | | |
| рН | 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 |
| <u>Inorganics</u> 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 |
| | | 39 | EPA 410.4 | 25 | 2 10 | 11/12/10 10:00 | 11/17/10 07:30 | ARM |
| Chemical Oxygen Demand Total Alkalinity | mg/L | 200 | SM 2320B | 25 8.0 | 2.0 | | 11/16/10 12:30 | KTC |
| Total Dissolved Solids | mg/L | 550 | SM 2520B | 8.0 10 | 2.0 10 | 11/15/10 11:00 | 11/16/10 12:30 | MJV |
| | mg/L | 28 | EPA 351.2 | | 0.05 | 11/19/10 07:30 | | SMB |
| Total Kjeldahl Nitrogen | mg/L | 20 5 | SM 2540D | 0.20 | | | 11/19/10 15:47 | MJV |
| Total Suspended Solids Nitrate+Nitrite (as N) | mg/L mg/L | | EPA 353.2 | 1 0.04 | 1 0.01 | 11/17/10 14:17 | 11/17/10 14:19 11/18/10 14:49 | SMB |
| | | | | | 0.01 | | | 0 |
| Sample Description | | DENIT-SU1 | | | | | | |
| Matrix | | Wastewater | | | | | | |
| SAL Sample Number | | 1001627-21 | | | | | | |
| Date/Time Collected Collected by | | 11/10/10 10:15 | | | | | | |
| Date/Time Received | | 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 |
| | | | | | | | | |

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Laboratory Report

| Project Name | | PN | RS II | | | | | |
|--|----------|-----------------|------------|------------|-------------|----------------|----------------------------------|------------|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Ву |
| 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 | | | | | | | | |
| рН | 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 | ma/l | 0.01 U | SM 4550SF | 0.04 | 0.01 | | 11/12/10 16:00 | ктс |
| Hydrogen Sulfide (Unionized) Ammonia as N | mg/L | 0.01 0 | EPA 350.1 | 0.04 | | | 11/17/10 17:04 | SME |
| | mg/L | | SM 5210B | 0.010 | 0.005 | 11/11/10 15:00 | | - |
| Carbonaceous BOD | mg/L | 2 U 18 I | EPA 410.4 | 2 25 | 2 10 | 11/11/10 15:00 | 11/16/10 12:10 | KTC |
| Chemical Oxygen Demand Sulfate | mg/L | 490 | EPA 300.0 | 25 0.60 | 0.20 | 11/16/10 11:22 | 11/17/10 07:30 11/16/10 16:02 | ARN MEJ |
| Sulfide | mg/L | 490 1.0 U | SM 4500SF | | 0.20 1.0 | 11/10/10 11.22 | | KTC |
| | mg/L | 210 | SM 43003F | 4.0 8.0 | 2.0 | | 11/12/10 16:00 11/16/10 12:30 | KTC |
| Total Alkalinity | mg/L | | SM 2540C | | | 44/45/40 44:00 | | |
| Total Dissolved Solids | mg/L | 1,000 | EPA 351.2 | 10 | 10 | 11/15/10 11:00 | 11/16/10 14:30 | MJ∖ |
| Total Kjeldahl Nitrogen | mg/L | 0.74 | | 0.20 | 0.05 | 11/19/10 07:30 | 11/19/10 15:47 | SME |
| Total Suspended Solids | mg/L | 8 | SM 2540D | 1 | 1 | 11/17/10 14:17 | 11/17/10 14:19 | MJ∖ |
| Nitrate+Nitrite (as N) | mg/L | 0.03 | EPA 353.2 | 0.04 | 0.01 | | 11/18/10 14:49 | SME |
| 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 | | | | | | | | |
| рН | 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 | SME |
| 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 | AR№ |
| Sulfate | mg/L | 450 | EPA 300.0 | 0.60 | 0.20 | 11/16/10 11:22 | 11/16/10 16:02 | ME |
| Sulfide | mg/L | 2.4 I | SM 4500SF | 4.0 | 1.0 | | 11/12/10 16:00 | KTC |
| | ····· // | 200 | SM 2320B | 8.0 | 2.0 | | 11/16/10 12:30 | KTC |
| Total Alkalinity | mg/L | 260 | 3WI 2320B | 0.0 | 2.0 | | 11/10/10 12.30 | NIC. |

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Laboratory Report

| Project Name | | PN | RS II | | | | | |
|------------------------------|----------|-----------------|------------|-------|-------|----------------|----------------|-----|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Ву |
| 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 | | | | | | | | |
| рН | 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 1 | 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 | | | | | | | | |
| рН | 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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January 7, 2011 Work Order: 1001627 Revised Report

| Project Name | | PN | RS II | | | | | |
|-------------------------|----------|-----------------|-------------------|-------|-------|----------------|----------------|-----|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Ву |
| 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 | | | | | | | | |
| рН | 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 | ктс |
| 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 | ктс |
| 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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| Project Name | | PN | RS II | | | | | |
|-------------------------|----------|-----------------|------------|-------|-------|----------------|----------------|-----|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Ву |
| 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 | | | | | | | | |
| рН | 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 | ктс |
| 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 | | | | | | |
| | | 11/10/10 17.50 | | | | | | |
| Field Parameters | | | | | | | | |
| рН | 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 1 | 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 |

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



Hazen and Sawyer 10002 Princess Palm Avenue Suite 200 Tampa FLORIDA, 33619 January 7, 2011 Work Order: 1001627 Revised Report

Laboratory Report

| Project Name | | PN | RS II | | | | | |
|---|---|---|---|--|---|----------------------------------|--|---|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Ву |
| 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 | | | | | | | | |
| pН | 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 |
| <u>Inorganics</u> Ammonia as N | ~~// | 0.88 | EPA 350.1 | 0.010 | 0.005 | | 11/17/10 17:04 | SMB |
| | mg/L | 0.00 | SM 5210B | 0.010 2 | 0.005 2 | 11/11/10 15:00 | 11/17/10 17:04 11/16/10 12:10 | KTC |
| Carbonaceous BOD | mg/L | 22 | EPA 410.4 | 2 25 | 2 10 | 11/11/10 15.00 | | ARM |
| Chemical Oxygen Demand | mg/L | | SM 2320B | | | | 11/17/10 07:30 | |
| Total Alkalinity | mg/L | 390 | SM 2540C | 8.0 | 2.0 | 44/45/40 44.00 | 11/16/10 12:30 | KTC |
| Total Dissolved Solids | mg/L | 540 | | 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 | | - | | | | | | |
| <u>Field Parameters</u> pH | SU | - | DEP FT1100 | 0.1 | 0.1 | | 11/10/10 11:50 | TDD |
| | SU °C | 11/10/10 17:50 | DEP FT1100 DEP FT1400 | 0.1 0.1 | 0.1 0.1 | | 11/10/10 11:50 11/10/10 11:50 | TDD TDD |
| рН | | 11/10/10 17:50 | | | | | | |
| pH Water Temperature | °C | 11/10/10 17:50 7.2 18.5 | DEP FT1400 | 0.1 | 0.1 | | 11/10/10 11:50 | TDD |
| pH Water Temperature Specific conductance | °C umhos/cm | 11/10/10 17:50 7.2 18.5 980 | DEP FT1400 DEP FT1200 | 0.1 0.1 | 0.1 0.1 | | 11/10/10 11:50 11/10/10 11:50 | TDD TDD |
| pH Water Temperature Specific conductance Dissolved Oxygen | °C umhos/cm | 11/10/10 17:50 7.2 18.5 980 | DEP FT1400 DEP FT1200 | 0.1 0.1 | 0.1 0.1 | | 11/10/10 11:50 11/10/10 11:50 | TDD TDD |
| pH Water Temperature Specific conductance Dissolved Oxygen Inorganics | °C umhos/cm mg/L | 7.2 18.5 980 8.3 | DEP FT1400 DEP FT1200 DEP FT1500 | 0.1 0.1 0.1 | 0.1 0.1 0.1 | | 11/10/10 11:50 11/10/10 11:50 11/10/10 11:50 | TDD TDD TDD |
| pH Water Temperature Specific conductance Dissolved Oxygen <u>Inorganics</u> Hydrogen Sulfide (Unionized) | °C umhos/cm mg/L mg/L | 7.2 18.5 980 8.3 0.10 | DEP FT1400 DEP FT1200 DEP FT1500 SM 4550SF | 0.1 0.1 0.1 | 0.1 0.1 0.1 0.01 | 11/11/10 15:00 | 11/10/10 11:50 11/10/10 11:50 11/10/10 11:50 11/12/10 16:00 | TDD TDD TDD KTC |
| pH Water Temperature Specific conductance Dissolved Oxygen Inorganics Hydrogen Sulfide (Unionized) Ammonia as N | °C umhos/cm mg/L mg/L mg/L | 11/10/10 17:50 7.2 18.5 980 8.3 0.10 0.17 | DEP FT1400 DEP FT1200 DEP FT1500 SM 4550SF EPA 350.1 | 0.1 0.1 0.1 0.04 0.010 | 0.1 0.1 0.1 0.01 0.005 | 11/11/10 15:00 | 11/10/10 11:50 11/10/10 11:50 11/10/10 11:50 11/12/10 16:00 11/17/10 17:04 | TDD TDD TDD KTC SMB |
| pH Water Temperature Specific conductance Dissolved Oxygen Inorganics Hydrogen Sulfide (Unionized) Ammonia as N Carbonaceous BOD | °C umhos/cm mg/L mg/L mg/L mg/L | 11/10/10 17:50 7.2 18.5 980 8.3 0.10 0.17 2 U | DEP FT1400 DEP FT1200 DEP FT1500 SM 4550SF EPA 350.1 SM 5210B | 0.1 0.1 0.1 0.04 0.010 2 | 0.1 0.1 0.1 0.01 0.005 2 | 11/11/10 15:00 11/16/10 11:22 | 11/10/10 11:50 11/10/10 11:50 11/10/10 11:50 11/12/10 16:00 11/17/10 17:04 11/16/10 12:10 | TDD TDD TDD KTC SMB KTC |
| pH Water Temperature Specific conductance Dissolved Oxygen Inorganics Hydrogen Sulfide (Unionized) Ammonia as N Carbonaceous BOD Chemical Oxygen Demand | °C umhos/cm mg/L mg/L mg/L mg/L mg/L | 11/10/10 17:50 7.2 18.5 980 8.3 0.10 0.17 2 U 22 I | DEP FT1400 DEP FT1200 DEP FT1500 SM 4550SF EPA 350.1 SM 5210B EPA 410.4 | 0.1 0.1 0.04 0.010 2 25 | 0.1 0.1 0.01 0.005 2 10 | | 11/10/10 11:50 11/10/10 11:50 11/10/10 11:50 11/12/10 16:00 11/17/10 17:04 11/16/10 12:10 11/17/10 07:30 | TDD TDD TDD KTC SMB KTC ARM |
| pH Water Temperature Specific conductance Dissolved Oxygen Inorganics Hydrogen Sulfide (Unionized) Ammonia as N Carbonaceous BOD Chemical Oxygen Demand Sulfate | °C umhos/cm mg/L mg/L mg/L mg/L mg/L mg/L | 11/10/10 17:50 7.2 18.5 980 8.3 0.10 0.17 2 U 22 I 64 | DEP FT1400 DEP FT1200 DEP FT1500 SM 4550SF EPA 350.1 SM 5210B EPA 410.4 EPA 300.0 | 0.1 0.1 0.04 0.010 2 25 0.60 | 0.1 0.1 0.01 0.005 2 10 0.20 | | 11/10/10 11:50 11/10/10 11:50 11/10/10 11:50 11/12/10 16:00 11/17/10 17:04 11/16/10 12:10 11/17/10 07:30 11/16/10 16:02 | TDD TDD TDD KTC SMB KTC ARM MEJ |
| pH Water Temperature Specific conductance Dissolved Oxygen Inorganics Hydrogen Sulfide (Unionized) Ammonia as N Carbonaceous BOD Chemical Oxygen Demand Sulfate Sulfide | °C umhos/cm mg/L mg/L mg/L mg/L mg/L mg/L mg/L | 11/10/10 17:50 7.2 18.5 980 8.3 0.10 0.17 2 U 22 I 64 1.0 U 200 | DEP FT1400 DEP FT1200 DEP FT1500 SM 4550SF EPA 350.1 SM 5210B EPA 410.4 EPA 300.0 SM 4500SF | 0.1 0.1 0.04 0.010 2 25 0.60 4.0 8.0 | 0.1 0.1 0.1 0.01 0.005 2 10 0.20 1.0 2.0 | | 11/10/10 11:50 11/10/10 11:50 11/10/10 11:50 11/12/10 16:00 11/17/10 17:04 11/16/10 12:10 11/17/10 07:30 11/16/10 16:02 11/12/10 16:00 | TDD TDD TDD KTC SMB KTC ARM MEJ KTC KTC |
| pH Water Temperature Specific conductance Dissolved Oxygen Inorganics Hydrogen Sulfide (Unionized) Ammonia as N Carbonaceous BOD Chemical Oxygen Demand Sulfate Sulfide Total Alkalinity Total Dissolved Solids | °C umhos/cm mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/ | 11/10/10 17:50 7.2 18.5 980 8.3 0.10 0.17 2 U 22 I 64 1.0 U 200 630 | DEP FT1400 DEP FT1200 DEP FT1500 SM 4550SF EPA 350.1 SM 5210B EPA 410.4 EPA 300.0 SM 4500SF SM 2320B | 0.1 0.1 0.04 0.010 2 25 0.60 4.0 8.0 10 | 0.1 0.1 0.1 0.01 0.005 2 10 0.20 1.0 | 11/16/10 11:22 | 11/10/10 11:50 11/10/10 11:50 11/10/10 11:50 11/12/10 16:00 11/17/10 17:04 11/16/10 12:10 11/17/10 07:30 11/16/10 16:02 11/12/10 16:00 11/16/10 12:30 | TDD TDD TDD KTC SMB KTC ARM MEJ KTC KTC MJV |
| pH Water Temperature Specific conductance Dissolved Oxygen Inorganics Hydrogen Sulfide (Unionized) Ammonia as N Carbonaceous BOD Chemical Oxygen Demand Sulfate Sulfide Total Alkalinity | °C umhos/cm mg/L mg/L mg/L mg/L mg/L mg/L mg/L | 11/10/10 17:50 7.2 18.5 980 8.3 0.10 0.17 2 U 22 I 64 1.0 U 200 | DEP FT1400 DEP FT1200 DEP FT1500 SM 4550SF EPA 350.1 SM 5210B EPA 410.4 EPA 300.0 SM 4500SF SM 2320B SM 2540C | 0.1 0.1 0.04 0.010 2 25 0.60 4.0 8.0 | 0.1 0.1 0.1 0.01 0.005 2 10 0.20 1.0 2.0 10 | 11/16/10 11:22 11/15/10 11:00 | 11/10/10 11:50 11/10/10 11:50 11/10/10 11:50 11/12/10 16:00 11/17/10 17:04 11/16/10 12:10 11/17/10 07:30 11/16/10 16:02 11/12/10 16:00 11/16/10 12:30 11/16/10 14:30 | TDD TDD TDD KTC SMB KTC ARM MEJ KTC KTC |

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Hazen and Sawyer 10002 Princess Palm Avenue Suite 200 Tampa FLORIDA, 33619 January 7, 2011 Work Order: 1001627 Revised Report

| Project Name | | PN | RS II | | | | | |
|---|----------|-----------------|------------|-------|-------|----------------|----------------|-----|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Ву |
| 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 | | | | | | | | |
| рН | 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 | 0 | | | | | | | |
| 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 |
| | mg/L | 0.07 I | EPA 351.2 | 0.20 | 0.05 | 11/24/10 11:22 | 11/29/10 16:50 | SMD |
| | | | | | | | | |
| Total Kjeldahl Nitrogen Total Suspended Solids | mg/L | 1 U | SM 2540D | 1 | 1 | 11/17/10 14:27 | 11/17/10 14:32 | MJV |

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Sone C

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

January 7, 2011 Work Order: 1001627 Revised Report

| Project Name | | PN | RS II | | | | | |
|---|----------|---|------------|-------|-------|----------------|----------------|-----|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Ву |
| Sample Description Matrix SAL Sample Number | | EB Wastewater 1001627-33 | | | | | | |
| Date/Time Collected Collected by Date/Time Received | | 11/10/10 14:10 Thomas Drunasky 11/10/10 17:50 | | | | | | |
| Field Parameters | | | | | | | | |
| рН | 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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January 7, 2011

Revised Report

Work Order: 1001627

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

| 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 Ar | nalyzed: 11 | /16/10 | | |
| Carbonaceous BOD | 2 U | 2 | 2 | mg/L | | | | | | |
| Blank (BK01140-BLK2) | | | | | Prepared: | 11/11/10 Ar | nalyzed: 11 | /16/10 | | |
| Carbonaceous BOD | 2 U | 2 | 2 | mg/L | | | | | | |
| LCS (BK01140-BS1) | | | | | Prepared: | 11/11/10 Ar | nalyzed: 11 | /16/10 | | |
| Carbonaceous BOD | 179 | 2 | 2 | mg/L | 200 | | 90 | 85-115 | | |
| LCS (BK01140-BS2) | | | | | Prepared: | 11/11/10 Ar | nalyzed: 11 | /16/10 | | |
| Carbonaceous BOD | 179 | 2 | 2 | mg/L | 200 | | 90 | 85-115 | | |
| LCS Dup (BK01140-BSD1) | | | | | Prepared: | 11/11/10 Ar | nalyzed: 11 | /16/10 | | |
| Carbonaceous BOD | 179 | 2 | 2 | mg/L | 200 | | 90 | 85-115 | 0 | 10 |
| LCS Dup (BK01140-BSD2) | | | | | Prepared: | 11/11/10 Ar | nalyzed: 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 Ar | nalyzed: 11 | /17/10 | | |
| Carbonaceous BOD | 2 U | 2 | 2 | mg/L | | | | | | |
| Blank (BK01205-BLK2) | | | | | Prepared: | 11/12/10 Ar | nalyzed: 11 | /17/10 | | |
| Carbonaceous BOD | 2 U | 2 | 2 | mg/L | | | | | | |
| LCS (BK01205-BS1) | | | | | Prepared: | 11/12/10 Ar | nalyzed: 11 | /17/10 | | |
| Carbonaceous BOD | 190 | 2 | 2 | mg/L | 200 | | 95 | 85-115 | | |

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January 7, 2011

Revised Report

Work Order: 1001627

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

| 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 Ai | nalyzed: 11 | /17/10 | | |
| Carbonaceous BOD | 190 | 2 | 2 | mg/L | 200 | | 95 | 85-115 | | |
| LCS Dup (BK01205-BSD1) | | | | | Prepared: | 11/12/10 Ar | nalyzed: 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 Ar | nalyzed: 11 | /17/10 | | |
| Carbonaceous BOD | 191 | 2 | 2 | mg/L | 200 | | 96 | 85-115 | 0.5 | 10 |
| Batch BK01304 - Sulfide pre | р | | | | | | | | | |
| Blank (BK01304-BLK1) | | | | | Prepared 8 | & 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 Chroma | atography 300.0 I | Prep | | | | | | | | |
| Blank (BK01514-BLK1) | | | | | Prepared 8 | & 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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Work Order: 1001627

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

| | | | | | Spike | Source | | %REC | | RPD | | |
|---------------------------------|--------------|-----------|-----------|-------|-------------------------------|-------------|---|--------|-----|-------|--|--|
| Analyte | Result | PQL | MDL | Units | Level | Result | %REC | Limits | RPD | Limit | | |
| Batch BK01611 - Ion Chromatog | graphy 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: 1 | 001627-02 | | Prepared & | & Analyzed: | 11/16/10 98 85-115 11/16/10 97 85-115 0.9 11/16/10 11/16/10 11/16/10 90 85-115 11/16/10 90 85-115 11/16/10 90 85-115 11/16/10 90 85-115 | | | | | |
| Chemical Oxygen Demand | 74 | 25 | 10 | mg/L | 50 | 29 | 90 | 85-115 | | | | |
| Matrix Spike Dup (BK01621-MSD1) | | Source: 1 | 001627-02 | | 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 8 | & 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 |
|---------------------------------|--------|-----------|-----------|-------|----------------|------------------|----------|----------------|------|--------------|
| Analyte | Result | FQL | MDL | Units | Levei | Result | /0RLC | LIIIIIIS | NF D | LIIIII |
| 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: 1 | 001627-18 | | 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: 1 | 001627-18 | | Prepared & | Analyzed: | | | | |
| 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: 1 | 001627-20 | | Prepared & | Analyzed: | 11/17/10 | | | |
| Chemical Oxygen Demand | 85 | 25 | 10 | mg/L | 50 | 39 | 92 | 85-115 | | |
| Matrix Spike Dup (BK01735-MSD1) | | Source: 1 | 001627-20 | | Prepared & | Analyzed: | 11/17/10 | | | |
| Chemical Oxygen Demand | 87 | 25 | 10 | mg/L | 50 | 39 | 96 | 85-115 | 2 | 32 |

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| | _ | | | | Spike | Source | | %REC | | RPD | |
|---------------------------|---------|-----------|-----------|-------|-------------------------------|-------------|----------|--------|-----|-------|--|
| Analyte | Result | PQL | MDL | Units | Level | Result | %REC | Limits | 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: 1 | 001627-20 | | 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 b | y SEAL | | | | | | | | | | |
| Blank (BK01803-BLK1) | | | | | Prepared 8 | 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 8 | Analyzed: | 11/17/10 | | | |
| Ammonia as N | 0.005 U | 0.010 | 0.005 | mg/L | | | | | | |
| Blank (BK01803-BLK3) | | | | | Prepared 8 | Analyzed: | 11/17/10 | | | |
| Ammonia as N | 0.005 U | 0.010 | 0.005 | mg/L | | | | | | |
| Blank (BK01803-BLK4) | | | | | Prepared 8 | Analyzed: | 11/17/10 | | | |
| Ammonia as N | 0.005 U | 0.010 | 0.005 | mg/L | | | | | | |
| LCS (BK01803-BS1) | | | | | Prepared 8 | Analyzed: | 11/17/10 | | | |
| Ammonia as N | 0.49 | 0.010 | 0.005 | mg/L | 0.50 | | 98 | 90-110 | | |
| LCS (BK01803-BS2) | | | | | Prepared 8 | Analyzed: | 11/17/10 | | | |
| Ammonia as N | 0.52 | 0.010 | 0.005 | mg/L | 0.50 | | 104 | 90-110 | | |
| LCS (BK01803-BS3) | | | | | Prepared 8 | 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: 1 | 001627-08 | | Prepared 8 | 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 | 2) | Source: 1 | 001627-08 | | Prepared 8 | | | | | |
| 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: 1 | 001627-03 | | Prepared & | | | | | |
| Nitrate+Nitrite (as N) | 61.1 J5 | 0.04 | 0.01 | mg/L | 50 | 23.8 | 75 | 77-119 | | |
| Matrix Spike Dup (BK01804-MSD2 | 2) | Source: 1 | 001627-03 | | 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 Ai | nalyzed: 11 | /16/10 | | |
| Total Dissolved Solids | 10 U | 10 | 10 | mg/L | | | | | | |
| LCS (BK01811-BS1) | | | | | Prepared: | 11/15/10 Ar | nalyzed: 11 | /16/10 | | |
| Total Dissolved Solids | 982 | 10 | 10 | mg/L | 1000 | | 98 | 90-110 | | |
| Duplicate (BK01811-DUP1) | | Source: 1 | 001627-08 | | Prepared: | 11/15/10 Ar | nalyzed: 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 Ai | nalyzed: 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: 1 | 001627-25 | | Prepared: | 11/15/10 Ar | nalyzed: 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 8 | & Analyzed: | 11/18/10 | | | | |
| Nitrate+Nitrite (as N) | 0.0100 l | 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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Inorganics - Quality Control

| Analyte | Result | PQL | MDL | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|--|-------------|----------------------|-----------|--------------|----------------|---------------------|------------------------------|----------------|-----|--------------|
| Batch BK02002 - Digestion for T | KN by EPA | 351.2 | | | | | | | | |
| Blank (BK02002-BLK1) | | | | | Prepared 8 | Analyzed: | 11/19/10 | | | |
| Total Kjeldahl Nitrogen | 0.05 U | 0.20 | 0.05 | mg/L | | | | | | |
| Blank (BK02002-BLK2) | | | | | Prepared 8 | Analyzed: | 11/19/10 | | | |
| Total Kjeldahl Nitrogen | 0.05 U | 0.20 | 0.05 | mg/L | | | | | | |
| LCS (BK02002-BS1) | | | | | Prepared 8 | Analyzed: | 11/19/10 | | | |
| Total Kjeldahl Nitrogen | 2.28 | 0.20 | 0.05 | mg/L | 2.5 | | 91 | 90-110 | | |
| LCS (BK02002-BS2) | | | | | Prepared 8 | 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: 1 | 001627-09 | | Prepared 8 | 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: 1 | 001627-09 | | Prepared 8 | Analyzed: | 11/19/10 | | | |
| Total Kieldehl Nitregen | | | | | | | | | • | 00 |
| Total Kjeldahl Nitrogen | 3.72 | 0.20 | 0.05 | mg/L | 2.5 | 1.24 | 99 | 80-120 | 3 | 20 |
| Batch BK02410 - Digestion for T | | | 0.05 | mg/L | 2.5 | 1.24 | 99 | 80-120 | 3 | 20 |
| , 0 | | | 0.05 | mg/L | | 1.24 11/24/10 Ar | | | 3 | 20 |
| Batch BK02410 - Digestion for T | | | 0.05 | mg/L mg/L | | | | | 3 | 20 |
| Batch BK02410 - Digestion for T Blank (BK02410-BLK1) | KN by EPA | 351.2 | | | Prepared: | | nalyzed: 11 | /29/10 | 3 | 20 |
| Batch BK02410 - Digestion for T Blank (BK02410-BLK1) Total Kjeldahl Nitrogen | KN by EPA | 351.2 | | | Prepared: | 11/24/10 Ar | nalyzed: 11 | /29/10 | 3 | 20 |
| Batch BK02410 - Digestion for T Blank (BK02410-BLK1) Total Kjeldahl Nitrogen Blank (BK02410-BLK2) | KN by EPA : | 351.2 0.20 | 0.05 | mg/L | Prepared: 7 | 11/24/10 Ar | nalyzed: 11, nalyzed: 11, | /29/10 | 3 | 20 |

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Inorganics - Quality Control

| Analyte | Result | PQL | MDL | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|-------------------------------|----------------|------|------|-------|----------------|------------------|-------------|----------------|-----|--------------|
| Batch BK02410 - Digestion for | r TKN by EPA 3 | 51.2 | | | | | | | | |
| LCS (BK02410-BS2) | | | | | Prepared: | 11/24/10 Ar | nalyzed: 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 Ar | nalyzed: 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 3 | 51.2 | | | | | | | | |
| Blank (BL02401-BLK1) | | | | | Prepared: | 12/23/10 Ar | nalyzed: 12 | /24/10 | | |
| Total Kjeldahl Nitrogen | 0.05 U | 0.20 | 0.05 | 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 BL02401 - Digestion | for TKN by EPA 3 | 51.2 | | | | | | | | |
| Blank (BL02401-BLK2) | | | | | Prepared: | 12/23/10 Ar | nalyzed: 12 | /24/10 | | |
| Total Kjeldahl Nitrogen | 0.05 U | 0.20 | 0.05 | mg/L | | | | | | |
| LCS (BL02401-BS1) | | | | | Prepared: | 12/23/10 Ar | nalyzed: 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 Ar | nalyzed: 12 | /24/10 | | |
| Total Kjeldahl Nitrogen | 2.51 | 0.20 | 0.05 | mg/L | 2.5 | | 101 | 90-110 | | |
| Batch BL02713 - Nitrate 35 | 3.2 by seal | | | | | | | | | |
| Blank (BL02713-BLK1) | | | | | Prepared 8 | 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 | | |

AND THE IN ACCORDANCE

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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.

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.



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SAL Project No. 1001627

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

| Client Name | Hazan | Hazan and Sawver | | | | | | | Contact / Phone: Josephin Edeba | hone: deback-Hir | Contact / Phone: Josephin Edeback-Hirst 813-630-4498 | -4498 | | |
|---|---|------------------|------------------------------------|--------|-------------------|------------------------------------|---------------------------|--|------------------------------------|---------------------|---|-------------------------|---------------------|----------|
| Project Name / Location | | | | | | | | | edeback@ | hazanands | jedeback@hazanandsawyer.com | | | |
| | PNRSI | I Wastewate | PMRS II Wastewater System Analyses | lyses | | | | | | | | | | |
| Samplers: (Signature) | | (| | | | | PARA | METER / 0 | PARAMETER / CONTAINER DESCRIPTION | R DESCRI | PTION | | | |
| Matrix Codes: DW-Drinking Water WW-Wastewater SW-Surface/Water SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water | astewater le SO-Soil ater O-Other | | | | | ,287 ,00 | | ate/NaOH Ifide ce | X0 X0 X0 | meter) | | | | |
| SAL Use Only Sample Description No. | otion | Date | ∋miT | xittsM | Composite Grab | 1LP, Cool Alkalinity, CB TDS | 204) 11 b Cool | teoA nZ ,911 Hydrogen Su No Headspa | TKA NH30 TKA NH30 S2001 B H5 | ORP (Client | Hq blsif | qməT blai7 | bno D bl əiŦ | OG bl∌i∃ |
| PNRS II STE-1 | | 10/10 | 1350 | MM | × | - |) - | - | 1 | | | _ | | |
| | | | 1250 | MM | × | 1 | | | - | | | | | |
| 03 RC2 | | | 1300 | ŴŴ | × | | | | | | | | | |
| 04 RC3 | | | 1310 | WM | × | - | | | - | | | _ | | |
| | | | 1320 | MM | × | ٢ | | | - | | | | | |
| 06 RC5 | | | 1610 | MM | × | 1 | | | - | _ | | | | |
| | | | 5451 | MM | × | 1 | | | - | | | | | |
| 08 UNSAT-IS1 | | | 1000 | WM | × | - | | - | - | | | | | |
| 09 UNSAT-IS2 | | | 5760 | ŴŴ | × | - | - | - | - | | | | | |
| | | | 1 | MM | × | + | 4 | t | f | | | | | |
| | | | 1515 | MM | × | ł | Θ |) t | E | | | | | |
| 12 UNSAT-EC1 | | 3 | 1600 | MM | × | + | | ۲ |) - | | | | | |
| Containers Prepared/ Relinquisted: | Date/Time: 1130 | Received | | (| Date/Time: | a 2 p 1 1 | Seal intact? | 6. | | N N | Instructions / Remarks | is / Remar i | Ś | |
| | 01-80-11 | (cm | 1/10/ | | 11 /0 91 | : | Samples ii | Samples intact upon arrival? | | × N NA | _ = t | (+5-5) | NoX W | |
| Relinguener | Date/Time: 150 | Kecewed: | | | uate/ Ime. | | Received | Received on ice? Temp | | Y N NA | 24 | s becord | SC, O NHAO | |
| Relinquished: | Date/Time: | Received: | | | Date/Time: | | Proper pre Rec'd w ith | Proper preservatives indicated? Rec'd w ithin holding time? | | X N NA X N NA | | 1 | TKNO | Ì |
| Relinquished: | Date/Time: | Received: | | | Date/Time: | | Volatiles r | Volatiles rec'd w /out headspace | eadspace Υ | N N | ⊈ © (' | w (<-15) | 100000 | |
| Relinquished: | Date/Time: | Received: | | | Date/Time: | | | | | Y N NA | | 1001627 | 627 | |
| Chain of Custody vis Rev Date 11/19/01 | | | | | | | | | | Cha | Chain of Custody | dy | | |

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| ABOF |
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| NA N |
| NRAN |
| BOUT |

SAL Project No. 1001627

| SOUTHERN ANALYTICAL Lu 110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 | AR, FL 34677 | BORATC 813-855-1844 | n | FALES, INC. fax 813-855-2218 | | | | | | SAL P | SAL Project No. | | |
|--|--------------------------------|-------------------------------|----------------------------------|--|--------------------------------|-------------------------------------|--|-------------------------------------|---|------------------|------------------------|---------------------|----------|
| Client Name | Hazan | Hazan and Sawver | | | | | | Contact / Phone: Josephin Edebae | Contact / Phone: Josephin Edeback-Hirst 813-630-4498 | rst 813-63(| 0-4498 | | |
| Project Name / Location | | (Wolford | DNDPT With the Contract Contract | | | | | jedeback(| iedeback@hazanandsawyer.com | sawyer.con | | | |
| Samplers: (Signature) | | I Maylewale | | cacki | | | | | | | | | |
| 10m | | | | | | d - | PARAMETER / CONTAINER DESCRIPTION | | | PIION | | | T |
| Matrix Codés: DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water | ewater SO-Soil r O-Other | | | | | | əbill | \$0s | meter) | | | | |
| SAL Use Only Sample Ne. Sample Description | c | Date | 9mi⊺ | xinteM | Composite Grab 1LP, Cool | SO4 TDS TDS SO4 | ובף, Zn Ace Hydrogen <i>Su</i> No Headspa | 750ml P, H2 250ml P, H2 | леіlЭ) ЯЯО | Hq blei7 | qməT blai1 | bno D bl əiF | Field DO |
| UNSAT-SA2 | Y, | 1.010- | 0/11 | MM | × | | | - | | | | | |
| | | | 1530 | ŴŴ | × | | | - | | | | | |
| 15 UNSAT-EC4 | | | 1120 | ŴŴ | × | | | - | | | | | |
| 16 UNSAT-CL1 | | | 1540 | ŴŴ | × | - | | - | | | - | | |
| 17 UNSAT-CL2 | | | 0511 | WM | X 1 | | | - | | | | | _ |
| 18 UNSAT-CL3 | | | 1550 | MM | × | | | - | | | | | |
| 19 UNSAT-CL4 | | | 1140 | ŴŴ | × | | | - | | | | | |
| 20 UNSAT-PS1 | | | 1350 | Ŵ | × | | | | | | | | |
| 21 DENIT-SU1 | | | 1015 | ŴŴ | × | | - | + | | | | | |
| 22 DENIT-SU2 | | | 1025 | Ŵ | × | | | | | | | | |
| 23 DENIT-SU3 | | | 1330 | MM | × | | - | | | | | | |
| DENIT-SU4 | | $\overline{}$ | 0761 | ŴŴ | × | | - | - | | | | | |
| | Date/Time: //\$0 | Received: | Ú | | Date/Time: 1 | 143_{0} Seal intact? Seal intact? | Seal intact? Samples intact upon arrival? | arrival? | X N NA X N NA N NA | Instructior | Instructions / Remarks | S | |
| | | Received: | | | Date/Time: | Recei | Received on ice? Temp. | due | Y N NA | | | | |
| Relinduished: | Date/Time: | Received: | | | Date/Time: | Prope Rec'd | Proper preservatives indicated? Rec'd w ithin holding time? | s indicated? time? | Y N NVA Y N NVA | | | | |
| Relinquished: Dat | Date/Time: | Received: | | | Date/Time: | Volati | Volatiles rec'd w/out headspace Proper containers used? | headspace | Y N N'A | | | | |
| Relinquished: | Date/Time: | Received: | | | Date/Time: | <u> </u> | | | Y N N/A | | 1001627 | $t \chi_{o}$ | |
| Chain of Custody xls Rev Date 11/19/01 | | | | | | | | | Cha | Chain of Custody | dy | |] |

SAL Project No. 1001627

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 B13-855-1844 fax B13-855-2218

| Client Name | | | | | | | | | ntaot / Dhor | | | | | |
|---|---|------------------------------------|--------------|--------|--------------------------------|-------------------------------|--|---|-------------------------------------|-------------------|----------------------|------------------------|------------|----------|
| | Haza | Hazan and Sawyer | | | | | | <u>ş</u> | Josephin Edeback-Hirst 813-630-4498 | back-Hirst | t 813-630- | -4498 | | |
| Project Name / Location | ANKI | PMRS II Wastewater System Analyses | er System An | alyses | | | | jej | <u>iedeback@hazanandsawyer.com</u> | zanandsa | wyer.com | | | |
| Samplers: (Signature) | en | | (| | | | PARAMI | PARAMETER / CONTAINER DESCRIPTION | UTAINER D | ESCRIP- | LION | | | |
| Matrix Codes: DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water Sampe Only Sampe No. | Matrix Codes: a Water WW-Wastewater Nater SL-Sludge SO-Soil Reagent Water Reagent Water Sample Description | Date | əmi⊺ | Matrix | Composite Grab 1LP, Cool | Alkalinity, CBOD, TSS, TDS | ILP, Zn Acetate/NaOH | 520∭ b' H52O⊄ µo µesqebsce Aqıoğeu Znilide | гки' инз' и•х' со <u>р</u> | אף (Client meter) | Hq bləi ⁼ | qməT bləi ⁻ | bno⊃ blei∓ | Field DO |
| 25 DENIT-LS1 | | 1/10/10 | 1040 | MM |) × | | | 4 4 | |)) | 4 | 1 | I I | |
| 26 DENIT-LS2 | | - | 1245 | ŴŴ | × | | | | - | | | | | |
| 27 DENIT-LS3 | | | 1230 | MM | × | - | | _ | - | | | | | |
| 28 DENIT-LS4 | | | 5021 | MM | × | - | | | | | | | | |
| 29 DENIT-GL1 | | | 1055 | MM | × | | | | - | | | | | |
| 30 DFT | | | 1150 | WW | × | + | | | - | | | | | |
| 31 T1-D | | | 1400 | ww | × | | | | - | | | | | |
| 32 FB | | | 1500 | WW | × | | | | - | | | | | |
| 33 EB | | > | 0141 | WM | × | . - | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Containare Prenarod/ | i i | | -4 | | | | | | | | | | | |
| | 11-1, 8 -1) | Baeetved: | \sum_{i} | (| Date/Time: | د¢، د¢، | Seal intact? Samoles intact upon arrival? | t upon arriva | Z Z → → | N/A N/A | structions | Instructions / Remarks | S | |
| Relinquished: | | Received: | <u>></u> | | Date/Time: | | Received on ice? Temp | ce? Temp | · > | | | | | |
| Relinquished: | Date/Time: | Received: | | | Date/Time: | | Proper preservatives indicated? Rec'd w ithin holding time? | vatives indica olding time? | ated? Y N Y N | A/N A/N | | | | |
| Relinquished: | Date/Time: | Received: | | | Date/Time: | | Volatiles rec'd w /out headspace | w /out heads | ≻ | | | | | |
| Relinquished: | Date/Time: | Received: | | | Date/Time: | т | Proper containers used? | iers used? | z ≻ | N/A | / | 100 | 001627 | |
| Chain of Custody.xls Rev.Date 11/19/01 | | | | | | | | | | | | | | |

Chain of Custody

| | | | W/ | ASTEWA | TER SA | MPLING | LOG | | | |
|-----------------------------------|-----------------|-----------------------------|---------|------------------|---------------|-----------------|----------------|--------------------|--------------------------|------------------|
| Client Name: | | | | Location: | PNRS | IT STE | -71 | Contact: Phone: | | |
| Date of Sample: | 11/1 | 0/14 | | SAL Project # | 1 | nn11. | 2I | Project Name: | | |
| SAL Audit Performed: | YN | Auditor Name: Signature: | | | | Client Repre | | (YN | Rep. Name: Signature: | |
| | | | | | MPLE | ΠΑΤΑ | | L | | L |
| Sampled By: | ,8AL | Client | Compos | itor Belongs To: | SAL | | N/A | СОМР В | ottle Belongs To | SAL Client N/A |
| Compositor ID: | / | | | | Bottle ID | | <u>, , .</u> | I | | |
| Intake Tubing Type: | PP F | PE NP TL | IT SI | int | akeTubing Lot | | | F | ump Tubing Lot | |
| | L | | COMPOS | | A | Composit | e ID Num | nber: | | L |
| START | Date: | | | Time: | | | Comp | ositor Set-up By | | |
| STOP | Date: | | | Time: | | · | Composi | tor Picked-up By | | |
| Co | omposite Type: | Time | Flow Co | ntinuous | Collect | Sample Every: | | Minutes | Gallons | |
| Calibrated S | ample Volume: | | | mLs | | | | · | | |
| Programmed Numb | per of Samples: | | | Actual N | lumber of Sam | ples Collected: | | | | |
| Final Composito | r Temperature: | | | °C | Ice Pres | ent in Composi | tor at Pick-up | 2 | Yes | No |
| | | | GRAE | 3 SAMPLE | DATA | Grab I | D Numbe | er: , 0 | | |
| Date Collected: | 111 | ole. | | Time Collected | 135 | U | | Collected By | 100 | |
| | | | | FIEL | D PARA | METERS | | | | |
| PARAMET | ER | READ | DING | UN | ITS | F | | | INS | |
| pH | | 7- | 2 | s | U | | | | s | AL-SAM-63-¢ 🤔 |
| Temperati | | 25 | ·./ | • | c | | | | s | AL-SAM-63-CCCC |
| Temperature Verifi Secondary S | | | 35-0 | | ThV | | | | S, | AL-SAM-006-CCC |
| Specific Condu | uctance | 1,2 | 56 | μmhos/cm | | | | | l | AL-SAM-63- 03 |
| Dissolved O | xygen | 2. | 46 | mı | g/L | | | SAL-SAM-55 | | AL-SAM-55-CULLAN |
| | у | | | N | r.y. | | | | S | AL-SAM-005- |
| Residual Ch | | | | | | ļ | <u> </u> | | S. | AL-SAM-000- |
| Preservation Ch Field? | | Y | N | (| Checked By | : | | | | |
| List any Preservat in Field | | | | | | | | | | |
| Commen | ts: | | 7, | \frown | , | • | | 1 | 1 | |
| Sampler(e) Siz | | _en | ~ | | \ | Date | | 1/10 | 110 | |
| Sampler(s) Sig | | | | | | Date | | | | |
| R | eviewed By: | | | | | Date: | | | | |

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

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| | | | | ASTEWA | | | 200 | | ····· | |
|----------------------------------|---------------|---------------|---------------------------------------|--------------------|-------------------|----------------------|----------------|--------------------|-------------------|----------------|
| Client Name: | | | | Location: | RC / | | | Contact: Phone: | | |
| Date of Sample: | 101 | 10/01 | | SAL Project # | | 00162 | 27 | Project Name: | | |
| | | Auditor Name: | | _ _ | · | | | | Rep. Name: | |
| SAL Audit Performed: | YN | Signature: | | | | Client Repre Site | | CY N | Signature: | |
| | | | | SA | AMPLE | DATA | | I | | |
| Sampled By: | SAL | Client | Compo | ositor Belongs To: | T | | N/A | COMP B | ottle Belongs To: | SAL Client N/A |
| Compositor ID: | | | | | Bottle ID | | | L | | |
| Intake Tubing Type: | PP F | ENPTL | T SI | Int | takeTubing Lot | 1 | | F | Pump Tubing Lot: | |
| · | | | COMPO | SITE DAT | A | Composit | e ID Nun | nber: | | |
| START | Date: | | | Time | : | | Com | positor Set-up By | | |
| STOP | Date: | | | Time | : | | Composi | itor Picked-up By | | |
| Cor | mposite Type: | Tìme | Flow C | Continuous | Collect | Sample Every: | | Minutes | Gallons | |
| Calibrated Sa | | | | mLs | L | | | - L | | |
| Programmed Number | | | | Actual N | Number of Sam | ples Collected: | | | <u></u> | |
| Final Compositor | | <u> </u> | | ℃ | · | ent in Composi | tor at Pick-up | 3 | Yes | No |
| | | | GRA | B SAMPLE | | Grab I | D Numbe | er: , 0 / | 2 | |
| Date Collected: | 11/10 | 100 | | Time Collected | | | | Collected By | | |
| | | | l | FIEI | LD PARA | | | | | |
| PARAMET | ER | REAL | DING | UN | IITS | F | PERMITLI | міт | INS | TRUMENT ID |
| рН | | 7. | 3 | s | SU | | | | S | AL-SAM-63-63 |
| Temperatu | ire | | 0.6 | 0 | °C | | | | s | AL-SAM-63- CCC |
| Temperature Verific | | 57. | | 0 | °C | | | | S/ | AL-SAM-006-CLI |
| Specific Condu | | 1,00 | υ | μmho | os/cm | | aa. | | s | AL-SAM-63 |
| Dissolved Ox | ygen | 2.1 | · · · · · · · · · · · · · · · · · · · | m | g/L | | | | s | AL-SAM-55-CCCC |
| Turbidity | 4 | ~ | | N | ์ 1 ีป | 1 | ~ | | S | AL-SAM-005- |
| Residual Chl | orine | | - | | | <u> </u> | | ~ | S, | AL-SAM-006- |
| Preservation Che Field? | ecked in | Y | N | | Checked By | : | | | I | |
| List any Preservati in Field: | | | | - I | | | | | | |
| Comment | s: | | 2. | |) | | | | | |
| Complet(a) Cit | noture | 10 | m | | | Date | | 11 leal | 10 | |
| Sampler(s) Sig | nature: | i | | | - x | Date | | | | |
| Re | eviewed By: | | | | | Date | | | | |

WASTEWATER SAMPLING LOG

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

| | | | W. | ASIEWA | IER SA | MPLING | | | | |
|-------------------------------------|----------------|---------------|-----------|-------------------|-------------------|---------------------|---|--------------------|-------------------|------------------|
| Client Name: | | 1 | | Location: | RC | 2 | | Contact: Phone: | | |
| Date of Sample: | 1:1 | 10/00 | | SAL Project # | | <u></u> | 17 | Project Name: | | |
| | | Auditor Name: | | | | 016 | <u>{ 7</u> | | Rep. Name: | |
| SAL Audit Performed: | Y N | | | <u> </u> | | Client Repre Sit | | Q.N | | |
| | | Signature: | | <u> </u> | AMPLE | | | 1 | Signature: | |
| Sampled By: | SAL | Client | Compos | sitor Belongs To: | T | Client | N/A | COMPR | ottle Belongs To: | SAL Client N/A |
| | JAL | | | | L | | | | otte belongs ro. | |
| Compositor ID: | | | | | Bottle ID | | | · | | |
| Intake Tubing Type: | | PENPTLT | | | takeTubing Lot: | | | L | Pump Tubing Lot: | |
| | | | СОМРО | | A | Composit | | | 1 | |
| START | Date: | | ` | Time: | : | | Com | positor Set-up By | | |
| STOP | Date: | | | Time | : | | Compos | itor Picked-up By | | |
| Cor | mposite Type: | Time | Flow Co | ontinuous | Collect | Sample Every: | | Minutes | Gallons | |
| Calibrated Sa | mple Volume: | | | mLs | | | | | | |
| Programmed Numbe | er of Samples: | | | Actual N | Number of Sam | ples Collected | | | | |
| Final Compositor | Temperature: | | | °C | Ice Pres | ent in Compos | itor at Pick-up | 19 | Yes | No |
| | | | GRA | B SAMPLE | DATA | Grab I | D Numbe | er: ,0 | 3 | |
| Date Collected: | 11/1. | : 10 | | Time Collected | 1 13. | | | Collected By | Tim | |
| | | | | FIEI | LD PARA | METERS | | | | |
| PARAMETE | ER | REAL | DING | UN | IITS | F | PERMIT LI | MIT | INS | |
| pН | | 7. | 2 | s | SU | | | | S | AL-SAM-63- 03 |
| Temperatu | re | 19. | 5 | 0 | °C | | | | 8 | AL-SAM-63- Carpo |
| Temperature Verific Secondary Sc | | 58. | | قہ | env | | | | S/ | H-SAM-006- Ceces |
| Specific Condu | | | 20 | 1- | os/cm | | | | | AL-SAM-63- 3 |
| Dissolved Ox | ygen | 1.6 | | m | g/L | | | | S | AL-SAM-55- Coup |
| Turbidity | , | /· | | N | TU | | | · | | AL-SAM-005- |
| Residual Chl | orine | | | | | <u> </u> | | | S/ | AL-SAM-006- |
| Preservation Che | | Y | N | | Checked By | <u> </u> | | | <u> </u> | |
| Field? | | | <u> </u> | | | | <u>, </u> | | | |
| List any Preservati | ves Added | | | | | | | | | |
| in Field: | | | | | | | | | | |
| | | | | <u>.</u> | <u> </u> | | <u> </u> | | | |
| • • • | | | | | | | | | | |
| Comment | S : | | | $\overline{)}$ | | | | | | |
| | | | <u> </u> | | | | 1 | | | |
| Sampler(s) Sig | nature: | | m | 1- | } | Date | 1 | 110/1 | , | |
| | | ļ | <u></u> u | | · · · · · · · · · | Date | <u> </u> | | | |
| Re | eviewed By | : | | | | Date | : | | | |

WASTEWATED SAMPLING LOG

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

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| | | | WASIEWA | IER OP | | | | | |
|-----------------------------------|---------------------------------------|-----------------------------|---------------------|---------------|-----------------|-------------------|--------------------|---------------------------------------|--------------------|
| Client Name: | | i (| Location: | RC | 3 | | Contact: Phone: | | |
| Date of Sample: | Jili | 10/10 | SAL Project # | 10 | - 1 1 0 | 17 | Project Name: | | |
| SAL Audit Performed: | YW | Auditor Name: Signature: | | | | esentative on te? | Q' N | Rep. Name: Signature: | |
| | | | SA | MPLE | | <u> </u> | <u> </u> | | |
| Sampled By: | SAL | Client Corr | positor Belongs To: | | | N/A | COMP B | ottle Belongs To: | SAL Client N/A |
| Compositor ID: | | | | Bottle ID | | | <u> </u> | l | |
| Intake Tubing Type: | PP F | PE NP TL TT SI | Int | akeTubing Lot | | | F | Pump Tubing Lot: | |
| | | COMF | | 4 | Composit | te ID Num | nber: | ł | |
| START | Date: | | Time: | 1 | | Comp | positor Set-up By | | |
| STOP | Date: | | Time: | | | Composi | tor Picked-up By | | |
| Cor | nposite Type: | Time Flow | Continuous | Collect | Sample Every: | | Minutes | Gallons | |
| Calibrated Sa | mple Volume: | | mLs | | | L | ± | <u> </u> | |
| Programmed Numbe | er of Samples: | | Actual N | lumber of Sam | ples Collected: | | | | |
| Final Compositor | Temperature: | | °C | Ice Pres | ent in Composi | itor at Pick-up | 3 | Yes | No |
| | · · · · · · · · · · · · · · · · · · · | GR | AB SAMPLE | DATA | Grab I | D Numbe | er: , 04 | 4 | |
| Date Collected: | t1/1 | 0/10 | Time Collected: | 13 | ن / | | Collected By | Fic | 7 |
| | | | FIEL | D PARA | METERS | | | · · · · · · · · · · · · · · · · · · · | |
| PARAMETE | ER | READING | UN | ITS | F | PERMITLI | иIT | INS | TRUMENT ID |
| pH | | 7.2 | s | U | | | | | AL-SAM-63- ⊂.⊇ |
| Temperatu | | 19.2 | °(| c | | | | | AL-SAM-63-C に E, |
| Temperature Verific | | 57.5 | یژ | Sml | | | | SA | L-SAM-006- CCCCA |
| Specific Condu | ctance | 1,040 | µmhc | s/cm | | | | · · · · · · · · · · · · · · · · · · · | AL-SAM-63-63 |
| Dissolved Ox | ygen | 2.30 | mç | g/L | | | | S/ | AL-SAM-55- Collian |
| | | | FM | fU | | | | SA | L-SAM-005- |
| Residual Chic | | L | | **** | | | · · · | SA | L-SAM-006- |
| Preservation Che Field? | ecked in | Y N | C | hecked By | | | | | |
| List any Preservativ in Field: | ves Added | | | | | | | | |
| Commente | S: | \frown | \sim | | | | 1 9 | <u> </u> | |
| Sampler(s) Sig | nature: | Im | / | | Date | 11 | 176/4 | · · · · · | |
| Sampler(s) Sigi | | | | 7 | Date | | | | |
| Re | viewed By: | | | | Date: | | | | |

WASTEWATER SAMPLING LOG

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| | | | ** | | | | | | | |
|-----------------------------------|-------------------|---------------|----------|-------------------|----------------|---------------|----------------------|--------------------|-------------------|------------------------|
| Client Name: | | 4 (| | Location: | RCL |] | | Contact: Phone: | | |
| Date of Sample: | 17 | tiste. | | SAL Project # | | 2016 | 77 | Project Name: | | |
| | Č – | Auditor Name: | | | <i>(</i> | | | | Rep. Name: | |
| SAL Audit Performed: | Y (N) | Signature: | | | | | esentative on te? | (Y)N | Signature: | |
| | | | | SA | | | | | olghatore. | |
| Sampled By: | SAL | Client | Compos | sitor Belongs To: | | Client | N/A | СОМР В | ottle Belongs To: | SAL Client N/A |
| Compositor ID: | | / | | | Bottle ID | | | l | | |
| Intake Tubing Type: | PP F | PE NP TL | TT SI | Inta | akeTubing Lot: | | | P | ump Tubing Lot: | |
| <u>_</u> l | · · · · · · · · · | · · · · · | COMPO | | | Comnosi | te ID Num | | | |
| START | Date: | | | Time: | | | | ositor Set-up By: | | |
| STOP | Date: | | | Time: | | | · · · · · · | or Picked-up By: | | |
| | mposite Type: | Time | Flow Co | ntinuous | Collect | Sample Every: | Composit | | | |
| | mple Volume: | | | mLs | | Sample Every. | | Minutes (| Gallons | |
| Programmed Number | | | | | | | | | | |
| Final Compositor | | | <u> </u> | | umber of Samp | | | | | |
| | | | | °C | | | tor at Pick-up? | | Yes | No |
| | | 1 | | 3 SAMPLE | | | D Numbei | | 5 | |
| Date Collected: | 11/1 | 0/10 | | Time Collected: | 132 D PARAN | | | Collected By: | Try | |
| PARAMETE | ĒR | READ | ING | | | | ERMIT LIM | и т Т | | |
| pH | | | | SI | | | | | | |
| Temperatu | re | 19 | 7 | °C | | | | | | L-SAM-63- |
| Temperature Verific | ation with | |).3 T | | | ······ | | | | L-SAM-63- |
| Secondary So Specific Conduc | | | | | TMU | | | | | L-SAM-006- |
| Dissolved Oxy | | 1,03 | 7 C 7 | μmhos | | · · · · · · | | | | L-SAM-63- |
| | | <u> </u> | | mg | | | <u>,</u> | | | L-SAM-55- |
| | | G | | JIT. | J | | | | SA | L-SAM-005- |
| Residual Chic Preservation Che | | | | | | | | | SA | - SA M-006- |
| Field? | | Y | N | CI | necked By: | | | | | |
| List any Preservativ in Field: | ves Added | | | | | | | | | |
| Comments | | | | | | | | | | |
| Sampler(s) Sign | ature | low | | 6 | | Date | 111 | 10/10 | | |
| | | | | 1 | | Date | | | | |
| Rev | /iewed By: | | | | | Date: | | | | |

WASTEWATER SAMPLING LOG

(17) p

| | | | | ASTEVVA | TER SP | | JLUG | | | |
|---|----------------|---------------|---------|-------------------|---|----------------|-----------------|-------------------------|---|----------------|
| Client Name: | | , | | Location: | R C | 5 | | Contact: | | |
| Date of Sample: | 11 | 11011. | | SAL Project # | 70 | 5016 | 27 | Phone: Project Name: | <u> </u> | |
| SAL Audit Performed: | YN | Auditor Name: | | | L K | | esentative on | - | Rep. Name: | |
| | 0 | Signature: | | | | | te? | €¶.N | Signature: | |
| | | ~ | | SA | AMPLE | DATA | | · | | I |
| Sampled By: | SAL | Client | Compos | sitor Belongs To: | SAL | Client | N/A | СОМР Во | ottle Belongs To: | SAL Client N/A |
| Compositor ID: | \subseteq | | | | Bottle ID | | | | | |
| Intake Tubing Type: | PP I | PE NP TL T | T SI | Inta | akeTubing Lot: | | | P | ump Tubing Lot: | |
| | | | СОМРО | SITE DAT | <u>ــــــــــــــــــــــــــــــــــــ</u> | Composit | e ID Num | ber: | | |
| START | Date: | | | Time: | | | Comp | ositor Set-up By: | • | |
| STOP | Date: | | | Time: | | | Composit | or Picked-up By: | <u> </u> | |
| Co | mposite Type: | Time | Flow Co | ntinuous | Collect ! | Sample Every: | | Minutes C | Gallons | |
| Calibrated Sa | mple Volume: | | | mLs | | | | | | |
| Programmed Number | er of Samples: | | | Actual N | umber of Samp | les Collected: | | | | |
| Final Compositor | Temperature: | | | °C | Ice Prese | ent in Composi | tor at Pick-up? | | Yes | No |
| | - ć | ; | GRAE | SAMPLE | DATA | Grab I | D Number | r: , 0 | 6 | |
| Date Collected: | <u>n]</u> (. | ele, | | Time Collected: | 461 | 0 | | Collected By: | TM | |
| | | | | FIEL | D PARAN | METERS | | I | | |
| PARAMETE | ER | READ | ING | UNI | TS | F | ERMIT LIM | ПТ | INS | TRUMENT ID |
| рН | | <u> </u> | 3 | รเ | J | | | | SA | AL-SAM-63- |
| Temperatu | | 22.0 | | °C | ; | | | | SA | L-SAM-63- |
| Tem perature Verific Secondary So | ation with | <u>96</u> . | υ | °C | ; | | | | SA | L-SAM-006- |
| Specific Conduc | ctance | 1,0* | | μmhos | s/cm | | | | SA | AL-SAM-63- |
| Dissolved Oxy | /gen | 3.30 | 2 | mg/ | ′L | | | | SA | L-SAM-55- |
| Turbidity | | | | NT | H | | | | SA | L-SAM=005- |
| Residual Chlo | | | | | | | | | SA | L-ŠAM-006- |
| Preservation Che Field? | cked in | Y | N | Cł | necked By: | | | | | |
| List any Preservativ in Field: | es Added | | | | | | | | | |
| Comments | : | | \sum | 7 | | | | / | | |
| Sampler(s) Sign | ature: | - low | | | | Date | 11/1 | 1/12 | | |
| | | | | | | Date | (| | | |
| Rev | viewed By: | | | | | Date: | | | | |

WASTEWATER SAMPLING LOC

CRO

| | | | | W | ASTEWA | TER SA | MPLING | G LOG | | | |
|------|-----------------------------------|-------------------|------------------|----------|-------------------|----------------|---------------------|-----------------|--------------------|-------------------|-----------------|
| | Client Name: | , | | | Location: | PIS | - 7 | v | Contact: Phone: | ·········· | |
| | Date of Sample: | | $\frac{1}{1010}$ | | SAL Project # | 17 | 00/62 | 17 | Project Name: | · · | |
| | | | Auditor Name: | | ۱ <u> </u> | | | <u>~ /</u> | | Rep. Name: | |
| | SAL Audit Performed: | Y N | Signature: | | <u> </u> | | Client Repre Sit | | Y'N | Signature: | |
| | | | | L | S | AMPLE | DATA | | <u> </u> | | |
| | Sampled By: | /SAL | Client / | Compos | sitor Belongs To: | | | N/A | COMP B | ottle Belongs To: | SAL Client N/A |
| | Compositor ID: | | \nearrow | I | [| Bottle ID | | | L | | |
| | Intake Tubing Type: | PP F | PE NP TL | TT SI | Int | akeTubing Lot | | | Р | ump Tubing Lot: | |
| | | | <u></u> | COMPO | | 4 | Composit | e ID Num | 1 iber: | | <u> </u> |
| | START | Date: | | | Time | r | | | ositor Set-up By: | | |
| | STOP | Date: | | | Time | | | Composi | tor Picked-up By: | | |
| | Cc | mposite Type: | Time | Flow Co | ntinuous | Collect | Sample Every: | | Minutes | Gallons | |
| | Calibrated Sa | ample Volume: | | | mLs | <u> </u> | | | I | <u> </u> | |
| | Programmed Numb | er of Samples | | | Actual N | Jumber of Sam | ples Collected: | | | | |
| | Final Composito | r Temperature | | | °C | ice Pres | ent in Composi | tor at Pick-up' | 2 | Yes | No |
| | | | | GRAE | 3 SAMPLE | | Grab I | D Numbe | r: , 0- | 7 | |
| | Date Collected: | 1 | alr. | <u> </u> | Time Collected | | 4, | | Collected By: | 1 | |
| | | | 51 0 | L | FIEL | D PARAI | | | | | |
| | PARAMET | ER | REA | DING | UN | ITS | F | PERMITLIN | ИТ | INS | TRUMENT ID |
| | pН | | 7.4 | / | s | U | | | | SA | AL-SAM-63-23 |
| | Temperatu | ure | 20 | .7 | 0 | с | | | | _S/ | H-SAM-63- Ceres |
| UP . | Temperature Verifi Secondary S | cation with ource | 18. | 3 | 0 | с | | | | SA | L-SAM-006-CCC |
| | Specific Condu | | 9-7 | | μmho | os/cm | | | | SA | AL-SAM-63- 03 |
| | Dissolved Ox | kygen | 7. | 1 | m | g/L | | | | | AL-SAM-55- Curl |
| | Turbidity | 7 | | | -N- | FU | | | | SA | L-SAM-005- |
| | Residual Chi | | | | | | | - | | SA | L₂SAM=006- |
| | Preservation Ch Field? | iecked in | Y | N | | Checked By: | | | | I | |
| | List any Preservat in Field | | | | - - | | L | | | | |
| | Commen | ts: | | 2. | | \geq | | | / 1 | | |
| | Sampler(s) Sig | nature: | Li | m | _/~ | $\dot{\frown}$ | Date | 11 | 110/1 | <u>ه</u> | |
| | | | ļ | | | | Date | | ř | | |
| | R | eviewed By | : | | | | Date: | | | | |

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

| _ | | | | W | ASTEWA | TER SA | MPLING | G LOG | | | | |
|------|---------------------------------|------------------------------|---------------|----------|-------------------|--|-----------------|--------------|--|-------------------|----------------|-----|
| | Client Name: | | | | Location: | UNS | AT-I | 51 | Contact: Phone: | | | |
| | Date of Sample: | 111 | 16/00 | | SAL Project # | | 1001 | 627 | Project Name: | | | |
| | CAL Audit Derformed | | Auditor Name: | | | / | Client Repre | sentative on | 0 | Rep. Name: | | |
| | SAL Audit Performed: | Y (N | Signature: | | | | Sit | | (ĈN | Signature: | | |
| | | | | <u> </u> | SA | AMPLE | DATA | | | | | |
| | Sampled By: | SAL | Client | Compo | sitor Belongs To: | SAL | Client | N/A | COMP B | ottle Belongs To: | SAL Client N/A | |
| | Compositor ID: | | | | | Bottle ID | | | | | | |
| | Intake Tubing Type: | PP F | PE NP TL | TT SI | Int | akeTubing Lot: | | | F | ump Tubing Lot: | | |
| | | | | COMPO | SITE DAT | 4 | Composit | e ID Num | iber: | | | |
| | START | Date: | | | Time: | | | Comp | ositor Set-up By: | | | |
| | STOP | Date: | | | Time: | | | Composi | tor Picked-up By: | | | |
| | Co | mposite Type: | Time | Flow Co | ontinuous | Collect | Sample Every: | | Minutes | Gallons | | |
| | Calibrated Sa | imple Volume: | | | mLs | | | | | | | |
| | Programmed Numbe | er of Samples: | | | Actual N | lumber of Sam | ples Collected: | | T | | | |
| | Final Compositor | Final Compositor Temperature | | | | | ent in Composi | · · · · | | Yes | No | |
| | | /_ | | GRAI | B SAMPLE | | | D Numbe | r: ,0 | 8 | | |
| | Date Collected: | Date Collected: 11/10/12 | | | | 100 | | | Collected By: | Ta | | |
| | PARAMET | FR | REAL | | | D PARAM | | PERMITLIN | | INS | TRUMENT ID | |
| | pH | | | \sim | s | · · · · · · · · · · · · · · · · · · · | | | | | AL-SAM-63- 63 | |
| | Temperatu | ire | 20 | 5 | °(| | | | | | AL-SAM-63- | |
| ORP | Temperature Verific | cation with | -16 | 1.0 | | | | | | | L-SAM-006- C C | 94 |
| 0,,, | Specific Condu | | 10 | 20 | μmhc | | | | | | AL-SAM-63- 63 | * / |
| | Dissolved Ox | ygen | 1.5 | | mg | | | <u> </u> | · · · · · | | AL-SAM-55- CCC | |
| | Jurbidity | , | | | FK, | J | | | ······································ | | L-SAM-005- | |
| | Residual Chlo | orine | | | - | | | <u> </u> | | SA | L-SAM-006- | |
| | Preservation Che Field? | ecked in | Y | N | C | hecked By: | | | | | | |
| | List any Preservation in Field: | | | | J | | | | | | | |
| | Comments: | | | | |) | | | 1 | | | |
| | | | | | In | | Date | | 110/13 | | | |
| | Po | viewed By: | | | | <u>. </u> | Date | | | | | |
| | | менец ву. | L | | | | Date: | | | | | |

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

| | | | W/ | ASTEWA | TER SA | MPLING | LOG | | | | |
|---|----------------|---------------|---------|---------------------------------------|---------------|--|----------------|--------------------|-------------------|--|--------|
| Client Name: | | | | Location: | UNS | A7-15 | 52 | Contact: Phone: | | | |
| Date of Sample: | 11 | 10/10 | | SAL Project # | | 0016 | | Project Name: | | | |
| | | Auditor Name: | | L | · | Client Repre | | 1 | Rep. Name: | | |
| SAL Audit Performed: | Y/N | Signature: | | · · · · · · · · · · · · · · · · · · · | | Sit | | YN | Signature: | ······································ | |
| | | ~ | | SA | AMPLE | DATA | | L | | | |
| Sampled By: | SAL | Client | Compos | itor Belongs To: | SAL | Client | N/A | COMP B | ottle Belongs To: | SAL Client N | I/A |
| Compositor ID: | | | | | Bottle ID | | | • - | | · · · · · · · · · · · · · · · · · · · | |
| Intake Tubing Type | PP F | ENPTL | T SI | Int | akeTubing Lot | | | P | ump Tubing Lot: | | |
| | | | COMPO | SITE DAT | Ą | Composit | e ID Num | nber: | | | |
| START | Date: | | | Time: | | | Comp | oositor Set-up By: | | | |
| STOP | Date: | | | Time: | | | Composi | tor Picked-up By: | | | _ |
| Co | mposite Type: | Time | Flow Co | ntinuous | Collect | Sample Every: | | Minutes | Gallons | | |
| Calibrated Sa | ample Volume: | | | mLs | L | | | <u>,</u> | | | |
| Programmed Numb | er of Samples: | | | Actual N | lumber of Sam | ples Collected | | | | | |
| Final Compositor | r Temperature: | | | °C | Ice Pres | ent in Composi | tor at Pick-up | \$ | Yes | No | |
| | | 1 | GRAE | SAMPLE | DATA | Grab I | D Numbe | er: ,0 | 9 | · | |
| Date Collected: | 11/1. | 11. | | Time Collected | 09. | 15 | | Collected By: | Tim | | |
| | | | | FIEL | D PARA | METERS | | | | | |
| PARAMET | ER | READ | DING | UN | ITS | F | PERMIT LIN | TIN | INS | TRUMENT ID | |
| рН | | 6.9 | 8 | s | U | | | | S | AL-SAM-63-03 | |
| Temperatu | ıre | 19.9 | 2 | 0 | C | | | | S | AL-SAM-63- | Cire |
| Femperature Verifi Secondary Secondary S | | -17 | 30.0 | | e MV | | | | SA | L-SAM-006- < | - CIEN |
| Specific Condu | | 1,30 | νO | μmhc | is/cm | | | | S | دن AL-SAM-63- | |
| Dissolved Ox | ygen | 0.8 | v | mı | g/L | | | | S | AL-SAM-55- | Cure |
| Turbidity | ī | - | | _N | τυ | | | | _SA | L-SAM-005- | |
| Residuat Chl | orine | - | | | | | | | SA | L-SAM-006- | |
| Preservation Ch Field? | ecked in | Y | N | 0 | Checked By | : | | | L | | |
| List any Preservati in Field: | | | | | | • | | | | | |
| Comment | ts: | | 7/ | 7 | | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | | 1. | | | |
| Sampler(s) Sig | inature: | lor | | | | Date Date | 31 | 10/1, | | | |
| Re | eviewed By: | | | | | Date: | | | | | |

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

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

| | | | | | IER SA | | | | |
|-----------------------------------|----------------|---------------|----------|------------------|---------------|-----------------|------------------|--------------------|----------------------------------|
| Client Name: |) | | | Location: | UNSA | 7153 | 3 | Contact: Phone: | |
| Date of Sample: | 11/10 | 100 | | SAL Project # | 10 | 0162 | 7 | Project Name: | |
| | × @ | Auditor Name: | | | | Client Repre | | 101 | Rep. Name: |
| SAL Audit Performed: | Y N' | Signature: | | | | Sit | | YN | Signature: |
| | | | | SA | AMPLE | DATA | | | I |
| Sampled By: | SAL | Client | Compos | itor Belongs To: | SAL | Client | N/A | COMP B | ottle Belongs To: SAL Client N/A |
| Compositor ID: | | | | | Bottle ID | | | | |
| Intake Tubing Type: | PP P | ENP TL 1 | T SI | Int | akeTubing Lot | | | P | ump Tubing Lot: |
| | | | COMPO | SITE DAT | 4 | Composit | e ID Num | iber: | |
| START | Date: | | | Time: | | | Comp | ositor Set-up By: | |
| STOP | Date: | | | Time: | | | Composi | or Picked-up By: | |
| Co | mposite Type: | Time | Flow Co | ntinuous | Collect | Sample Every: | | Minutes | Gallons |
| Calibrated Sa | ample Volume: | | | mLs | | | | | |
| Programmed Numb | er of Samples: | | | Actual N | lumber of Sam | ples Collected: | | | |
| Final Compositor | Temperature: | | | °C | Ice Pres | ent in Composi | itor at Pick-up? | 2 | Yes No |
| | (| | GRAE | SAMPLE | DATA | Grab I | D Numbe | r: , / | 0 |
| Date Collected: | 11/1 | 0/10 | | Time Collected | +32 | 25 | | Collected By: | Tin |
| | | | | FIEL | D PARA | METERS | | | |
| PARAMET | ER | READ | DING | UN | ITS | F | PERMIT LIN | /IT | INSTRUMENT ID |
| рН | | | | s | U | | | | SAL-SAM-63- |
| Temperatu | | | | 0(| С | | | | SAL-SAM-63- |
| Temperature Verifi Secondary S | | | | 01 | с | | | | SAL-SAM-006- |
| Specific Condu | ictance | | | μmho | os/cm | | | | SAL-SAM-63- |
| Dissolved Ox | ygen | | | mç | g/L | | | | SAL-SAM-55- |
| Turbidity | 1 | | | N | ſU | | | | SAL-SAM-005- |
| Residual Chl | | | | | | | | | SAL-SAM-006- |
| Preservation Ch Field? | ecked in | Y | N | C | Checked By: | | | | |
| List any Preservati in Field: | | | | | | | | | |
| Comment | s: | | Lon Z | Vol. | në - | X. S | DAM PO | : e _ | |
| Sampler(s) Sig | nature: | h | . / | 5 | | Date | | allul l | v |
| | | | | | | Date | | | |
| Re | viewed By: | | | | | Date: | | | |

WASTEWATER SAMPLING LOG

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

| | | | | ASIEWA | | | | | | |
|-----------------------------------|----------------|---------------|---------|------------------|---------------|-----------------|-----------------|---|---|--|
| Client Name: | | , | | Location: | UNSA | T-15 | <u>ц</u> | Contact: Phone: | | |
| Date of Sample: | 17 | 10/10 | | SAL Project # | 10 | | 17 | Project Name: | | ······································ |
| | | Auditor Name: | | | <i>i</i> | Client Repre | sentative on | <i>C</i> . | Rep. Name: | |
| SAL Audit Performed: | YŃ | Signature: | | | | Sit | | C'N | Signature: | |
| | | \geq | | SA | MPLE | DATA | | L | | |
| Sampled By: | SAL | Client | Composi | itor Belongs To: | SAL | Client | N/A | COMP B | ottle Belongs To: | SAL Client N/A |
| Compositor ID: | \subseteq | | | | Bottle ID | | | • <u>•</u> •••••••••••••••••••••••••••••••••• | | |
| Intake Tubing Type: | PP P | E NP TL TT | SI | Int | akeTubing Lot | | | F | ump Tubing Lot: | |
| | | (| COMPOS | SITE DAT | 4 | Composit | e ID Num | nber: | | |
| START | Date: | | | Time: | | | Comp | ositor Set-up By: | | |
| STOP | Date: | | | Time: | | | Composi | tor Picked-up By: | | |
| Co | mposite Type: | Time | Flow Co | ntinuous | Collect | Sample Every: | | Minutes | Gallons | |
| Calibrated Sa | ample Volume: | | | mLs | | | | | <u>, , , , , , , , , , , , , , , , , , , </u> | |
| Programmed Numb | er of Samples: | | | Actual N | lumber of Sam | ples Collected: | | | | |
| Final Compositor | r Temperature: | | | °C | Ice Pres | ent in Composi | itor at Pick-up | 3 | Yes | No |
| | 1 | | GRAE | SAMPLE | DATA | Grab I | D Numbe | er: ,/ | | |
| Date Collected: | 11/1 | ors | | Time Collected | 15 | 15 | | Collected By | Th | |
| | | | | FIEL | D PARA | METERS | | | · · · · · · · · · · · · · · · · · · · | ······ |
| PARAMET | ER | READ | NG | UN | ITS | F | | | INS | |
| pH | | | | s | U | | | | S/ | AL-SAM-63- |
| Temperatu | | | | 0 | c | | | | S | AL-SAM-63- |
| Temperature Verifi Secondary S | | | | o | с | | | | SA | L-SAM-006- |
| Specific Condu | uctance | | | μmhc | os/cm | | | | S | AL-SAM-63- |
| Dissolved Ox | kygen | | _ | mg | g/L | | | | S | AL-SAM-55- |
| Turbidity | ý | | | N | τU | | | | SA | L-SAM-005- |
| Residual Ch | | | | | | | | | SA | L-SAM-006- |
| Preservation Ch Field? | ecked in | Y | N | (| Checked By | : | | | | |
| List any Preservati in Field | | | | | , | | | | | |
| Commen | ts: | | -1 | -on | Vour | në - | Xo | READ | by G S | |
| Complete(a) C | | / | om | · · · · | 1 | Date | | 11/101 | 1. | |
| Sampler(s) Sig | jnature: | | | / | <u> </u> | Date | | | | |
| R | eviewed By: | | | <u> </u> | | Date | | | | |

WASTEWATER SAMPLING LOG

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

| | | | ** | ASIEWA | | | | | | · | |
|-----|-------------------------------|----------------|---------------|--------------------|---------------|-----------------|-----------------|--------------------|-------------------|----------------|--|
| ſ | Client Name: | | / | Location: | UNSA | T-EC | / | Contact: Phone: | | | |
| ŀ | Date of Sample: | | 10/10 | SAL Project # | | 0162 | 7 | Project Name: | | | |
| F | | / | Auditor Name: | | | Client Repres | | | Rep. Name: | | |
| 1 | SAL Audit Performed: | Y (N F | Signature: | | | Site | | Ŭ.M. | Signature: | | |
| ŀ | I | | | SA | MPLE | DATA | | | | | |
| ľ | Sampled By: | (SAL) | Client Compo | ositor Belongs To: | SAL | Client | N/A | COMP B | ottle Belongs To: | SAL Client N/A | |
| f | Compositor ID: | | | 1 | Bottle ID | | | | | | |
| Ì | Intake Tubing Type: | PP PE | E NP TL TT SI | Inta | akeTubing Lot | | | P | ump Tubing Lot: | | |
| ł | | | COMPC | SITE DATA | <u> </u> | Composit | e ID Nun | nber: | | | |
| ŀ | START | Date: | | Time: | | | Comp | positor Set-up By | | | |
| ŀ | STOP | Date: | | Time: | | | Composi | itor Picked-up By | _ | | |
| | Co | omposite Type: | Time Flow C | Continuous | Collect | Sample Every: | | Minutes | Gallons | • | |
| | Calibrated Sa | ample Volume: | | mLs | L | | | | | | |
| | Programmed Numb | er of Samples: | | Actual N | lumber of Sam | ples Collected: | | | | | |
| | Final Composito | r Temperature: | | °C | Ice Pres | ent in Composi | itor at Pick-up | 13 | Yes | No | |
| | | / | GRA | B SAMPLE | DATA | Grab I | D Numbe | er: ,/`, | 2 | | |
| | Date Collected | 11/4 | 110 | Time Collected | 16 | 00 | | Collected By | · Tr | 7 | |
| | | <u> </u> | <u> </u> | FIEL | D PARA | | | | | , | |
| | PARAMET | TER | READING | UN | ITS | 6 | | MIT | | | |
| | рН | | 6.9 | s | U | | | | \$\$ | SAL-SAM-63- | |
| | Temperat | | 20.6 | 0 | с | | | | <u>؛</u> | SAL-SAM-63- | |
| RP | Temperature Verif | | 108.0 | | с | | | | s | AL-SAM-006- | |
| X 1 | Specific Cond | | 1,150 | μmh | µmhos/cm | | | | SAL-SAM-63- | | |
| | Dissolved O | xygen | 7.10 | m | g/L | | | | ; | SAL-SAM-55- | |
| | Turbidil | ty | | ~N | τυ | | ••• | | 5 | AL-SAM-005- | |
| | Residual Cr | | | | | | | | 5 | AL-SAM-006- | |
| | Preservation C Field? | | Y N | | Checked By | r: | | | | | |
| | List any Preserva in Field | tives Added | | | | | | | | | |
| | Comme | nts: | \square | 7 | | | <u></u> | / | j | | |
| | Sampler(s) S | ignature: | lind | | / | Date Date | 1 | 1/101 | / c , | | |
| | Reviewed I | | a | | | Date | e: | | | | |

WASTEWATER SAMPLING LOG

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

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

| | | | | ASTEWA | | | | | | |
|-----------------------------------|----------------|---------------|---------|-------------------|------------------|-----------------|----------------|--------------------|-------------------|--------------------|
| Client Name: | | | | Location: | UNSat | t-SAS | 2 | Contact: Phone: | | |
| Date of Sample: | 11/0 | | | SAL Project # | | 016 | 27 | Project Name: | | |
| SAL Audit Performed: | Y Ń | Auditor Name: | | ······ | | Client Repre | | Y N | Rep. Name: | |
| | C | Signature: | | | | Sit | e? | C | Signature: | |
| · | | | | S/ | MPLE | DATA | | | | |
| Sampled By: | SAL | Client | Compos | sitor Belongs To: | SAL | Client | N/A | COMP B | ottle Belongs To: | SAL Client N/A |
| Compositor ID: | \square | | | | Bottle ID | | | | | |
| Intake Tubing Type | PP P | E NP TL | IT SI | Int | akeTubing Lot: | | | F | Pump Tubing Lot: | |
| | | | СОМРО | SITE DAT | 4 | Composit | e ID Num | nber: | | |
| START | Date: | | | Time: | | | Comp | ositor Set-up By: | | |
| STOP | Date: | | | Time: | | | Composi | tor Picked-up By: | | |
| Co | omposite Type: | Time | Flow Co | ontinuous | Collect | Sample Every: | | Minutes | Gallons | |
| Calibrated Sa | ample Volume: | | | mLs | | | | | | |
| Programmed Numb | er of Samples: | | | Actual N | lumber of Sam | ples Collected: | | | | |
| Final Composito | r Temperature: | | | °C | Ice Pres | ent in Composi | tor at Pick-up | 3 | Yes | No |
| | | | GRA | B SAMPLE | DATA | Grab I | D Numbe | er: , /\ | 3 | |
| Date Collected: | Intro | :100 | | Time Collected | - t(). | 0 | | Collected By | Th | |
| | | | | FIEL | D PARA | METERS | | | | |
| PARAMET | ER | REAL | DING | UN | ITS | F | PERMIT LI | TIN | INS | |
| pH | | 6. | 2 | S | U | | | | s | AL-SAM-63- @ 3 |
| Temperati | 1 | 22 | .5 | 0 | c | | | | .8 | AL-SAM-63- Current |
| Temperature Verifi Secondary S | | 47 | 7.5 | | c _m V | | | | S | AL-SAM-006- Carter |
| Specific Condu | uctance | 93 | C) | μmhc | os/cm | | | | s | SAL-SAM-63- СЗ |
| Dissolved Ox | xygen | 7.* | 70 | mı | g/L | | | | £ | AL-SAM-55- CURR |
| Turbidity | y | - | | | гU | | | - | S | AL-SAM-005- |
| Residual-Ch | lorine | | | | | | | | S. | AL-SAM-006- |
| Preservation Ch Field? | | Y | N | (| Checked By: | | | | • | |
| List any Preservat in Field | | | | | | | | | | |
| Commen | ts: | | | | | | | | | |
| Sampler(s) Sig | nature: | | | | | Date | | | | ····· |
| Sampler(s) Sig | | | | | | Date | | | | |
| R | eviewed By: | | | | | Date | | | | |

WASTEWATER SAMPLING LOG

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

| | | | VASIEVVA | | | | | | |
|----------------------------------|----------------|----------------|---------------------|----------------|---------------------|-----------------|--------------------|--------------------------|---------------------------------------|
| Client Name: | | | Location: | UNSA | 7-ECS | 3 | Contact: Phone: | | |
| Date of Sample: | , | , le. | SAL Project # | 1 | 0016 | ,27 | Project Name: | | |
| SAL Audit Performed: | YŃ | Auditor Name: | | | Client Repre Sit | sentative on | YN | Rep, Name: Signature: | |
| | | | S | AMPLE | | | | | |
| Sampled By: | SAL | Client Comp | positor Belongs To: | 1 | | N/A | COMP B | ottle Belongs To: | SAL Client N/A |
| Compositor ID: | 0 | | | Bottle ID | | | | | |
| Intake Tubing Type: | PP F | PE NP TL TT SI | Ini | takeTubing Lot | | | P | ump Tubing Lot: | |
| | | COMP | OSITE DAT | Α | Composit | e ID Num | iber: | | |
| START | Date: | | Time | | | Comp | ositor Set-up By: | | |
| STOP | Date: | | Time | | | Composit | or Picked-up By: | | |
| Co | mposite Type: | Time Flow | Continuous | Collect | Sample Every: | | Minutes | Gallons | |
| Calibrated Sa | ample Volume: | | mLs | | | | | | |
| Programmed Numb | er of Samples: | | Actual N | Number of Sam | ples Collected: | | | | |
| Final Compositor | r Temperature: | | °C | Ice Pres | ent in Composi | tor at Pick-up? | 2 | Yes | No |
| | | GR | AB SAMPLE | DATA | Grab I | D Numbe | r: ,/* | 7 | |
| Date Collected: | 11/0 | der l | Time Collected | 15 | 30 | | Collected By: | Th | · · · · · · · · · · · · · · · · · · · |
| | | | FIEL | D PARA | METERS | | | | |
| PARAMET | ER | READING | UN | ITS | F | | | INS | |
| рН | | 6.8 | s | U | | | | S | AL-SAM-63- |
| Temperatu | | 21.5 | 0 | c | | | | S, | AL-SAM-63- |
| Temperature Verifi | | 105.0 | 0 | s- ul | | | | SA | AL-SAM-006- |
| Specific Condu | ictance | 1,250 | μπλα | os/cm | | | | S | AL-SAM-63- |
| Dissolved Ox | kygen | 6,80 | m | g/L | | | | S | AL-SAM-55- |
| Turbidity | / | | N | TU | | •••• | | SE | L-SAM-005- |
| Residual Chi | | <u> </u> | - | | | | | SA | AL-SAM-006- |
| Preservation Ch Field? | ecked in | Y N | (| Checked By | | | | | |
| List any Preservati in Field: | | | | | | | | | |
| Comment | ts: | $\overline{}$ | | | | | | <u>í</u> | |
| Sampler(s) Sig | inature: | - Au | | 7 | Date | 1 | 1/11 | / | |
| | | | | / | Date | | | | |
| Re | eviewed By: | | | | Date | | | | ······· |

WASTEWATER SAMPLING LOG

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

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| | | | | ASIEWA | IEK SF | | J LUG | | | |
|-------------------------------------|----------------|---------------|---------|-------------------|---------------|-----------------|-------------------|---------------------------------------|-------------------|--------------------|
| Client Name: | | 1 + | | Location: | UNS | 47-E | 24 | Contact: Phone: | | |
| Date of Sample: | 11 | 110/11 | | SAL Project # | | 10016 | ,7I | Project Name: | | |
| SAL Audit Performed: | Y N | Auditor Name: | | | (| Client Repre | esentative on te? | / ¥/ N | Rep. Name: | |
| | | Signature: | | | | | | | Signature: | |
| | | | | | MPLE | | | i | | |
| Sampled By: | | Client | Compo | sitor Belongs To: | | | N/A | COMP B | ottle Belongs To: | SAL Client N/A |
| Compositor ID: | | | | | Bottle ID | | | | | |
| Intake Tubing Type: | PP | PE NP TL | | | akeTubing Lot | | | | Pump Tubing Lot: | |
| | | | COMPO | | 4 | Composi | te ID Num | ber: | | |
| START | Date: | _ | | Time: | | | Comp | ositor Set-up By: | | |
| STOP | Date: | ······· | | Time: | | | Composit | or Picked-up By: | | |
| Co | mposite Type: | Time | Flow Co | ontinuous | Collect | Sample Every: | | Minutes | Gallons | |
| Calibrated Sa | mple Volume: | | | mLs | | | | · · · · · · · · · · · · · · · · · · · | | |
| Programmed Numbe | er of Samples: | | | Actual N | umber of Sam | ples Collected: | | | | |
| Final Compositor | Temperature: | | | °C | Ice Pres | ent in Composi | tor at Pick-up? | | Yes | No |
| | , | | GRA | B SAMPLE | DATA | Grab I | D Numbe | r: 15 | | |
| Date Collected: | 11/c | 0/10 | | Time Collected: | 1120 | 0 | | Collected By: | Tim | |
| | | | | FIEL | D PARA | | | | | |
| PARAMETE | ĒR | READ | ING | UNI | TS | F | PERMIT LIN | 1IT | INS | RUMENT ID |
| pН | | 6. | 5 | รเ | J | | | | SA | L-SAM-63-2-3 |
| Temperatu | | 22. | 2 | °C | ; | | | · · · · · · · · · · · · · · · · · · · | SA | L-SAM-63-C ((Ca. |
| Temperature Verific Secondary So | | 46. | 5 | ير | FMU | | | | SA | L-SAM-006- C. C. |
| Specific Conduc | | 28 | ð | μmhos | | | | | | L-SAM-63- 63 |
| Dissolved Oxy | ygen | 7.3 | | mg | AL-> | | | | | L-SAM-55- C |
| Turbidity | | | | | U U | | | | - | L-SAM-005- |
| Residual Chic | orine | | | | | | | | | L-SAM-006- |
| Preservation Che Field? | cked in | Y | N | CI | necked By: | | | | | |
| List any Preservativ in Field: | ves Added | | | I | | | | | | |
| Comments | :: | | | | | | | | | |
| Sampler(s) Sign | ature: | | | | | Date | | | | |
| | | | | | | Date | | | | |
| Rev | /iewed By: | | | | | Date: | | | | |

WASTEWATER SAMPLING LOC

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

| | | | - | ••• | AULINA | I LI OA | | | | | | | |
|-----|-------------------------------------|--|---------------|------------|------------------|---------------|----------------|--------------|--------------------|------------------|--|--|--|
| | Client Name: | | 1 1 | | Location: | USAT- | CLI | | Contact: Phone: | | | | |
| | Date of Sample: | liti | 10/1. | | SAL Project # | 11 | 016 | 27 | Project Name: | | | | |
| | SAL Audit Performed: | V N | Auditor Name: | | | | Client Repres | sentative on | | Rep. Name: | | | |
| | SAL Addit Performed. | YN | Signature: | | | | Site | | YN | Signature: | | | |
| | | | | | SA | MPLE | DATA | | L,,,,,, | L | | | |
| | Sampled By: | SAL | Client | Compos | itor Belongs To: | SAL | Client | N/A | COMP B | ottle Belongs To | SAL Client N/A | | |
| | Compositor ID: | | | | | Bottle ID | | | | | | | |
| | Intake Tubing Type: | PP F | PE NP TL | TT SI | Inta | akeTubing Lot | | | F | Pump Tubing Lot | | | |
| | | | | COMPO | SITE DATA | N | Composite | e ID Num | ber: | | | | |
| | START | Date: | | | Time: | | | Compo | ositor Set-up By: | | | | |
| | STOP | Date: | | | Time: | | | Composite | or Picked-up By: | 1 | | | |
| | Co | mposite Type: | Time | Flow Co | ntinuous | Collect \$ | Sample Every: | | Minutes | Gallons | | | |
| | Calibrated Sa | imple Volume: | | | mLs | | | | | | ······································ | | |
| | Programmed Numb | er of Samples: | | | Actual N | umber of Samp | les Collected: | | | | | | |
| | Final Compositor | Temperature | | | ະ | Ice Prese | nt in Composit | | Yes No | | | | |
| | | 1 | 1 | GRAE | SAMPLE | DATA | Grab II |) Number | r: ,/ | 6 | | | |
| | Date Collected: | Date Collected: 1/10/10 | | | | 150 | 70 | | Collected By: | Th | 7 | | |
| | | | | | | D PARAN | IETERS | | | | | | |
| | PARAMET | PARAMETER READING | | | | TS | P | ERMIT LIM | ПТ | INS | TRUMENT ID | | |
| | рН | | \frown | / | รเ | J | | | | S | AL-SAM-63- | | |
| - 0 | Temperatu | and the second sec | 22 | 2 - 0 - | °C | ; | | | | S | AL-SAM-63- | | |
| CIP | Temperature Verific Secondary Sc | cation with ource | 10 | <u>5,5</u> | ي ا | "nC | | | | SA | L-SAM-006- | | |
| | Specific Condu | ctance | 1, | 130 | μmho | | | | | S | AL-SAM-63- | | |
| | Dissolved Ox | ygen | 7 | -30 | mg | /L | | | | S | AL-SAM-55- | | |
| | -Turbidity | | | | ,NT | σ | | - | | sį | L-SAM-005- | | |
| | Residual Chie | | | - | - | | | | | S/ | L-SAM-006- | | |
| | Preservation Che Field? | ecked in | Y | N | C | necked By: | | | <u>,</u> | | | | |
| | List any Preservativ in Field: | ves Added | | | | | | | | | | | |
| | Comments | s: | | 7 | 2 | | | | _1 | | | | |
| | Sampler(s) Sigr | nature: | _ Cm | | ~ |) | Date | 4 | T_{2} | 9 | | | |
| | | Sampler(s) Signature: | | | | , | Date | | | | | | |
| | Re | Reviewed By: | | | | | Date: | | | | | | |

WASTEWATER SAMPLING LOG

| | | | | ASILWA | | | | | | |
|-------------------------------------|----------------|---------------------------------------|--------|--------------------|----------------|---------------------------------------|---------------|--------------------|-------------------|--------------------|
| Client Name: | 1 | 1 | | Location: | UNSA | TCL | 2 | Contact: Phone: | | |
| Date of Sample: | 111 | 10/ru | | SAL Project # | 10 | 016 | 17 | Project Name: | ····· | |
| | | Auditor Name: | | <u> </u> | | Client Renge | esentative on | 1. | Rep. Name: | |
| SAL Audit Performed: | YN | Signature: | | | | Sit | | (Y)N | Signature: | |
| | | | | SA | MPLE | DATA | | I | L | |
| Sampled By: | SAL | Client | Compo | ositor Belongs To: | SAL | Client | N/A | COMP B | ottle Belongs To: | SAL Client N/A |
| Compositor ID: | \subset | | | | Bottle ID | | | L | | |
| Intake Tubing Type: | PP | PE NP TL 1 | T SI | Inti | akeTubing Lot: | | | P | ump Tubing Lot: | |
| | | | COMPC | | A / | Composit | e ID Num | ber: | | |
| START | Date | | | Time: | | | Comp | ositor Set-up By: | | |
| STOP | Date | | | Time: | | | Composit | or Picked-up By: | | |
| Co | mposite Type | Time | Flow C | ontinuous | Collect | Sample Every: | | Minutes (| Gallons | |
| Calibrated Sa | mple Volume | · · · · · · · · · · · · · · · · · · · | | mLs | | | | | | |
| Programmed Number | er of Samples: | | | Actual N | umber of Sam | ples Collected: | | | | |
| Final Compositor | Temperature | | | °C | | ent in Composi | | | Yes | No |
| | | i | GRA | B SAMPLE | DATA | Grab II | D Numbe | r 17 | | |
| Date Collected: | $-\frac{1}{1}$ | | | Time Collected: | | 30 | | Collected By: | Ta | |
| <u> </u> | <u> </u> | 010 | | FIEL | D PARA | | | | - lag | |
| PARAMETE | ER | READ | ING | UNI | тs | P | PERMIT LIN | IIT | INS | |
| pН | | 7.0 |) | SI | J | | | | S | AL-SAM-63- 03 |
| Temperatu | re | 23 | 1 | °(| > | | | | S/ | NL-SAM-63- Cc (/2 |
| Temperature Verific Secondary So | | 50 | . 2 | يد | Thu | | | | | E-SAM=006- Cecer |
| Specific Conduc | | 1,0 | 20 | μmho | · | | | | | L-SAM-63- °3 |
| Dissolved Oxy | /gen | 58.4 | l. | mg | /L | | | | | L-SAM-55- Cour |
| Turbidity | . <u> </u> | TIP | - | NT | ₩~ | · · · · · · · · · · · · · · · · · · · | | | | L-SAM-005- |
| Residual Chic | orine | | | | / | | | | | L-SAM-006- |
| Preservation Che Field? | cked in | Y | N | c | hecked By: | · | | | | |
| List any Preservativ in Field: | es Added | | | | | L | | | | |
| Comments | : | | 7 | \bigcirc | | | | 1 | 1 | |
| Sampler(s) Sign | isture: | 62 | ~ | 1~ | | Date | | ellel | () | |
| Sumpler(s) Sign | | | | | 1 | Date | | | | |
| Rev | viewed By: | | | | | Date: | | | | |

WASTEWATER SAMPLING LOG

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| | | | | ASIEWA | IER SA | | LOG | | | |
|------------------------------------|----------------|---------------|---------|--------------------------|----------------|-----------------|-----------------|--------------------|-------------------|-------------------------|
| Client Name: | | 1 | | Location: | UNSAT | 1 - CL | 3 | Contact: Phone: | | |
| Date of Sample: | 111 | coles. | | SAL Project # | | 00/6 | 77 | Project Name: | | |
| SAL Audit Performed: | YŃ | Auditor Name: | | | | | esentative on | Y N | Rep. Name: | |
| | | Signature: | | | | | te? | C | Signature: | |
| | | | | S/ | MPLE [| DATA | | | | |
| Sampled By: | / SAL | Client | Compos | itor Belongs To: | SAL | Client | N/A | COMP B | ottle Belongs To: | SAL Client N/A |
| Compositor ID: | \subseteq | | | | Bottle ID | | | | | |
| Intake Tubing Type: | PP | PE NP TL T | SI | Inta | akeTubing Lot: | | | F | ump Tubing Lot: | |
| | - | | COMPOS | SITE DATA | 4 | Composit | e ID Num | ber: | | |
| START | Date: | | | Time: | | | Comp | ositor Set-up By: | | |
| STOP | Date: | | | Time: | | | Composit | or Picked-up By: | | |
| Co | mposite Type: | Time | Flow Co | ntinuous | Collect | Sample Every: | | Minutes (| Gallons | |
| Calibrated Sa | imple Volume: | | | mLs | | | | | | - <u> </u> |
| Programmed Number | er of Samples: | | | Actual N | umber of Samp | oles Collected: | | | | |
| Final Compositor | Temperature: | | | °C | Ice Prese | ent in Composi | tor at Pick-up? | | Yes | No |
| | (| | GRAB | SAMPLE | DATA | Grab I | D Numbe | r: 1/2 | 3 | |
| Date Collected: | 1110 | Jr. | | Time Collected: | 15 | らい | | Collected By: | | 7 |
| | | | | FIEL | D PARAN | IETERS | | | | |
| PARAMETE | ER | READI | NG | UNI | тѕ | F | PERMIT LIN | IIT | INS | TRUMENT ID |
| рН | | 7.4 | | SU | J | | | | S/ | AL-SAM-63- |
| Temperature Temperature Verific | | 22. | .0 | °C | ; | | | | S/ | AL-SAM-63- |
| Secondary So | | 100 | .5 | ିଂ | The | | | | SA | L-SAM-006- |
| Specific Conduc | ctance | 1,29 | 3 U | μmho | s/cm | | | | S | AL-SAM-63- |
| Dissolved Oxy | ygen | 7.6 | Ú, | mg | /L | | | | S | AL-SAM-55- |
| Turbidity | | | | NT | U | | - | | SA | L-SAM-005- |
| Residual Chic | | | | - | | | | | SA | L- SAM-00 6- |
| Preservation Che Field? | ecked in | Y | N | c | hecked By: | | | | | |
| List any Preservativ in Field: | ves Added | | | | | | | | | |
| Comments | s: | | $\Big)$ | $\overline{\mathcal{T}}$ | | | | _/1 | | |
| Sampler(s) Sign | nature: | | ~ | \square | | Date | 11 | Kik | 3 2 | |
| | | | | | | Date | | | | |
| Rev | viewed By: | | | | | Date: | | | | |

WASTEWATED SAMPLING LOC

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| | Client Name: | , | , | | Location: | UNS | ATC | 14 | Contact Phone | | |
|---|-----------------------------------|----------------|---------------------------------------|--------|--------------------|----------------|----------------|-----------------------|------------------|---------------------------------------|----------------------|
| | Date of Sample: | 11 | 10/10 | | SAL Project # | | 016 | 27 | Project Name: | · · · · · · · · · · · · · · · · · · · | |
| Ì | | | Auditor Name: | | | | | | | Rep. Name: | |
| | SAL Audit Performed: | Y (N) . | Signature: | | | | | esentative on ite? | (Y N | Signature: | |
| | | | · · · · · · · · · · · · · · · · · · · | | SA | MPLE | DATA | <u> </u> | | | |
| | Sampled By: | SAL | lient | Compo | ositor Belongs To: | SAL | Client | N/A | COMP B | ottle Belongs To: | SAL Client N/A |
| | Compositor ID: | | | | | Bottle ID | | | | | |
| | Intake Tubing Type: | PP | PE NP TL | TT SI | Inte | akeTubing Lot: | | | F | Pump Tubing Lot: | |
| | | | · · · · | СОМРО | | \ \ | Composi | te ID Num | ber: | | |
| | START | Date: | | | Time: | | | Compo | ositor Set-up By | | |
| | STOP | Date: | | | Time: | | | Composite | or Picked-up By | | |
| ſ | Co | mposite Type: | Time | Flow C | ontinuous | Collect | Sample Every | | Minutes | Gallons | |
| Į | Calibrated Sa | imple Volume: | | | mLs | | | | <u> </u> | | |
| Ī | Programmed Numbe | er of Samples: | | | Actual Nu | umber of Sam | oles Collected | | | | |
| ľ | Final Compositor | Temperature: | | | °C | Ice Prese | ent in Compos | itor at Pick-up? | | Yes | No |
| ľ | | (, | | GRA | B SAMPLE | DATA | Grab I | D Number | | 7 | |
| ľ | Date Collected: | lilipto | ΰ | | Time Collected: | 1140 | | | Collected By: | | |
| Ľ | | | | | FIEL | | | <u> </u> | | Tim | |
| | PARAMETE | ĒR | READ | ING | UNI | rs | I | PERMITLIM | IT | INST | RUMENT ID |
| | pН | | 2 | 2 | SL | , | | | | SA | L-SAM-63- 4 3 |
| L | Temperatur | | 23 | .5 | °C | | | | | SA | L-SAM-63-Cector |
| Ľ | Temperature Verific | | 52. | 8 | <u>-•e</u> | mV | | | | | -SAM-006- Co com |
| | Specific Conduc | | 1,00 | 10 | μmhos | | | | | | L-SAM-63- €3 |
| | Dissolved Oxy | /gen | 8.0 |) | mg/ | L | | • | | | L-SAM-55- Cc : (1.14 |
| | Turbidity | ~ | · | | NT4 | J | | | | | -SAM-005- |
| ſ | Residual Chlo | | - | | - | - | | | | | -SAM-006- |
| Γ | Preservation Che Field? | cked in | Y | N | Ch | ecked By: | | | | | |
| | List any Preservativ in Field: | es Added | | | • | · | | | | | |
| | Comments | : | | | \bigcirc | | | | 1 | , | |
| l | Sampler(s) Signa | ature: | | | 1 | | Date | . 17 | 1101 | С з | |
| L | | _ | | | | 1 | Date | | | | |
| L | Rev | iewed By: | | | | | Date: | | | | |

WASTEWATER SAMPLING LOG

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| | | | V | VASTEWA | TER SA | MPLIN | G LOG | | | |
|----------------------------------|----------------|--------------|--------|--------------------|----------------|-----------------|---------------------------------------|------------------|-------------------|-------------------|
| Client Name: | | | | Location: | UNSF | 17-P | SI | Contact Phone | | |
| Date of Sample: | | 10/1 | | SAL Project # | | 0016 | | Project Name: | | |
| SAL Audit Performed: | | Auditor Name | : | | L [| | esentative on | | Rep. Name: | |
| SAL Addit Performed: | YN | Signature: | | | | | ite? | CYN | Signature: | |
| | | <u> </u> | | SA | | DATA | · · · · · · · · · · · · · · · · · · · | L | L | ···· ··· ··· ··· |
| Sampled By: | SAL | Client | Comp | ositor Belongs To: | SAL | Client | N/A | COMP B | ottle Belongs To: | SAL Client N/A |
| Compositor ID: | | | | | Bottle ID | | | • | | |
| Intake Tubing Type: | PP I | PE NP TL | TT SI | Inta | akeTubing Lot: | | | F | Pump Tubing Lot: | |
| | | | COMPO | SITE DATA | 4 | Composi | ite ID Nun | nber: | I | |
| START | Date | | | Time: | | | Comp | ositor Set-up By | : | |
| STOP | Date | | | Time: | | | Composit | or Picked-up By | | |
| Co | mposite Type: | Time | Flow C | Continuous | Collect | Sample Every: | | Minutes | Gallons | |
| Calibrated Sa | ample Volume: | | | mLs | | | | · · | | |
| Programmed Numb | er of Samples: | | | Actual N | umber of Samp | oles Collected: | | | | |
| Final Compositor | Temperature: | | | °C | Ice Prese | nt in Composi | tor at Pick-up? | | Yes | No |
| | | | GRA | B SAMPLE | DATA | Grab I | D Numbe | er: | 20 | |
| Date Collected: | 11/1 | 0/10 | | Time Collected: | 135 | J | | Collected By: | | |
| | | | | FIEL | D PARAM | IETERS | · | | <u> </u> | |
| PARAMET | ER | REA | DING | UNI | TS | F | PERMIT LIN | ЛТ | INST | RUMENT ID |
| pН | | 7.4 | 2 | SI | J | | | | | L-SAM-63-63 |
| Temperatu | | 23 | 8 | °(| ` | | | | SA | L-SAM-63- ((E - |
| Temperature Verifi | | 9c | 1. U | يدر | 5 nV | | | | SA | L-SAM-006CCC |
| Specific Condu | ictance | 95 | T0 | μmho | | | | | SA | L-SAM-63-4 3 |
| Dissolved Ox | ygen | 7.8 | 0 | mg | /L | | | | SA | L-SAM-55-Ccc |
| Turbidity | | | | NT | U_ | | | | | -SAM-005- |
| Residual Chl | | · | | | | | $\langle \rangle$ | | SA | |
| Preservation Ch Field? | ecked in | Y | N | C | hecked By: | | | | A | |
| List any Preservati in Field: | | | | | | | | | | |
| Comment | s: | | 7 | $ \land $ | | | | | | |
| Sampler(s) Sig | nature: | | m | 12 | γ | Date | | 11/101 | 1,0 | |
| | | | | / | | Date | | | · # * | |
| Re | viewed By: | | | | | Date: | | | | |

| | | | W | ASTEWA | TER SA | MPLINC | LOG | | <u></u> | |
|-----------------------------------|----------------|---------------|---------|-------------------|----------------|-----------------|-----------------|---------------------------------------|-------------------|-------------------|
| Client Name: | | | | Location: | DENI | T-SU | 2 | Contact: Phone: | | ····· |
| Date of Sample: | ,,], | 0/1- | | SAL Project # | | 016 | 27 | Project Name: | | |
| SAL Audit Performed: | . <i>K</i> i | Auditor Name: | | L | | | esentative on | | Rep. Name: | |
| SAL Abuit Ferionneu. | Y /N | Signature: | | | | Sit | | ΩN | Signature: | |
| *** | | | | SA | MPLE | ΟΑΤΑ | | · · · · · · · · · · · · · · · · · · · | | |
| Sampled By: | SAL | Client | Compos | sitor Belongs To: | SAL | Client | N/A | COMP B | ottle Belongs To: | SAL Client N/A |
| Compositor ID: | \subseteq | | | | Bottle ID | | | | | |
| Intake Tubing Type: | PP F | PE NP TL 1 | ⊤ SI | Int | akeTubing Lot: | | | P | ump Tubing Lot: | |
| | | | СОМРО | SITE DATA | 4 | Composit | e ID Num | ber: | | |
| START | Date: | | | Time: | | | Compo | ositor Set-up By: | | |
| STOP | Date: | | | Time: | | | Composite | or Picked-up By: | | |
| Cor | mposite Type: | Time | Flow Co | ontinuous | Collect | Sample Every: | | Minutes (| Gallons | |
| Calibrated Sa | mple Volume: | | | mLs | | | | | | |
| Programmed Numbe | er of Samples: | | | Actual N | umber of Sam | ples Collected: | | | | |
| Final Compositor | Temperature: | | | °C | Ice Prese | ent in Composi | tor at Pick-up? | | Yes | No |
| | / | -1 | GRA | 3 SAMPLE | DATA | Grab I | D Number | <u> ,2 </u> | | |
| Date Collected: | 11/10 | 1. | | Time Collected: | 1013 | 5 | | Collected By: | Tm | |
| | | | | 1 | D PARAN | | | | | |
| PARAMETE | R | READ | | UNI | TS | F | | IIT | INS | TRUMENT ID |
| рН | | 6. | | SI | | | | | | AL-SAM-63- 67 |
| Temperatur Temperature Verific | | 28.0 | | °(| | | | | | AL-SAM-63- Cccer- |
| Secondary So | urce | -270 | | ~ | FNU | | | | | L-SAM-006 |
| Specific Conduc | | 1,2 | | μmho | s/cm | | | | | AL-SAM-63- ∞3 |
| Dissolved Oxy | | 1.60 | 2 | mg | /L | | | | SA | H-SAM-55- Cace |
| - Turbidi ty | | | | NT | θ | | | | . | L-SAM-005- |
| Residual Chlo Preservation Che | | | | | <u> </u> | | - | | SA | L-SAM-006- |
| Field? | | Y | N | с | hecked By: | | | | | |
| List any Preservativ in Field: | es Added | | | | | | | | | |
| Comments | :: | | | | | | | | | |
| Sampler(e) Si | inturo: | | | | | Date | | | | |
| Sampler(s) Sign | ature: | | | | | Date | | | | |
| Rev | /iewed By: | | | | | Date: | | | | |

ORP

| | | | | | | MPLIN | | | | |
|-------------------------------------|---------------|---------------|---------|-------------------|----------------|---------------------------------------|-------------------|--|-------------------|-----------------|
| Client Name: | | | | Location: | DEA | 117-5 | :02 | Contact: | | |
| Date of Sample: | 1,11 | 0/12 | | SAL Project # | , | 5016 | | Phone: Project Name: | | |
| SAL Audit Performed: | Y (N) | Auditor Name: | | I | | Client Repre | esentative on te? | (Y)N | Rep. Name: | |
| | | Signature: | | | | | | | Signature: | |
| | | | | S/ | AMPLE | DATA | | | | |
| Sampled By: | SAL | Client | Compos | sitor Belongs To: | SAL | Client | N/A | COMP B | ottle Belongs To: | SAL Client N/A |
| Compositor ID: | | | | | Bottle ID | | | | | |
| Intake Tubing Type: | PP F | PE NP TL - | TT SI | Int | akeTubing Lot: | | | P | ump Tubing Lot: | |
| | | | COMPO | SITE DAT | ۹ | Composit | te ID Num | ber: | | |
| START | Date: | | | Time: | | | Сотр | ositor Set-up By: | | |
| STOP | Date: | | | Time: | | | Composit | or Picked-up By: | | |
| Con | nposite Type: | Time | Flow Co | ontinuous | Collect | Sample Every: | | Minutes (| Gallons | |
| Calibrated Sar | mple Volume: | | | mLs | | | | | | |
| Programmed Numbe | r of Samples: | | | Actual N | umber of Sam | ples Collected | - | ······································ | | |
| Final Compositor | Temperature: | | | °C | Ice Prese | ent in Composi | tor at Pick-up? | | Yes | No |
| | 1 | · · · | GRA | 3 SAMPLE | DATA | Grab I | D Numbe | 1,27 | | |
| Date Collected: | 11/1 | 5/15 | | Time Collected: | 102 | 1 | | Collected By: | Ta | |
| | | | | FIEL | | | | | | |
| PARAMETE | R | READ | NG | UNI | тs | F | PERMIT LIN | ΙΙΤ | INST | TRUMENT ID |
| рН | | 7.0 | 0 | SI | J | | | | SA | AL-SAM-63- 2-3 |
| Temperatur | | 25 | .5 | °(| > | | | | SA | AL-SAM-63- CCCC |
| Temperature Verific Secondary So | | -90 | 2.0 | | FMU | | | | | L-SAM-006- CLC |
| Specific Conduc | tance | 1,35 | 0 | μmho | | | | | SA | AL-SAM-63- 03 |
| Dissolved Oxy | gen | 0.5 | | mg | /L | | | | | AL-SAM-55- Call |
| Turbidity | | | | NT | U | | | | | L-SAM-005- |
| Residual Chlo | rine | | | | | | | | SA | L-SAM-006- |
| Preservation Chee Field? | cked in | Y | N | c | hecked By: | · · · · · · · · · · · · · · · · · · · | | I | | |
| List any Preservativ in Field: | es Added | | | 4 | | | . <u></u> | | | |
| Comments: | | | | 7 | | | | | | |
| Somel/-> 0' | | low | / /~ | 7 | | Date | | | | |
| Sampler(s) Signa | ature: | <u>, v ·</u> | | | | Date | | | | |
| Rev | iewed By: | | | ·· | | Date: | | | | · |

FS-Industrial WW Monitoring Log.xls

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| Bottle 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 Composite ID Number: STOP Date Time Flow Continuous Collect Sample Every Minutes Gallons Composite Type: Time Flow Continuous Collect Sample Every Minutes Gallons Composite Type: Time Flow Collect Sample Every Minutes Gallons Composite Type: Time Flow Collected Jet Sample Scolected Final Compositor Temperature Collected Time Collected Fieled PARAMETERS Date Collected J1 // / / / / / / / / / / / / / / / / / | | | | V | ASIEWA | VIER SA | | GLUG | | | | |
|--|---|---------------|-----------------|---------|-----------------|-------------------|-------------------|------------------|---------------------------------------|-----------------|-------------------|----------------|
| Date of Sample 1////// Sal. Protect # //////// Protect Name Sul Austi Partomet v Austite Harree Control Representative on Sample V N Sumpled By Austite Harree Compositer Belongs To SAL Cleart V N Simpled By Austite Harree Compositer Belongs To SAL Cleart NA COMP Balle Belongs To SAL Cleart Simpled By Austite Harree Compositer Borrys To SAL Cleart NA COMP Balle Belongs To SAL Cleart Compositer ID Builts ID Builts ID Entrant Pump Tubilg Lat Compositer Top Date Time Compositer ID Number: STAPT Date Time Compositer ID Number: STAPT Date Time Compositer ID Number: Consciser Type Time Flow Compositer Austice of Samples Consciser Type Time Flow Compositer Austice of Samples Colload Programmet Number of Samples Actual Number of Samples Colload Minutes Calload Programmet Number of Samples Actual Number of Samples Colload Minutes Calload Programmet Number of Samples Actual Number of Samples Colload Minutes Calload Programmet Number of Samples Actual Number | Client Name: | / | 1 | | Location: | DEA | JIT-< | 503 | | | | |
| SAL Audit Performed V (r) Suprature Client Representative on Suprature V (r) Suprature Sampled by AL Gient Compositor ID Sampled by Sale Called and Suprature Sampled by Sale Called and Suprature Sampled by Sale Called and Suprature Sale Ca | Date of Sample: | 17/ | r <u>o (</u> 1. | | SAL Project # | | | 027 | | | | |
| Start Start Site Site Sampled Sy Au Gine Composite Burgs To SAL Clerk NA COMP Botte Burgs To SAL Clerk NA Composite ID Refer to Refer to Refer to Pump Tubing Lop Interview Tubing Type PP PP PR Time Composite ID Number: START Date Time Composite ID Number: STOP Date Time Composite ID Number: Composite Type Time Flow Contractions Collect Surgite Every Minutes Calabraid Sampa Voume mLs Recent to Composite of Sample Every Minutes Satore Databraid Sampa Voume mLs Recent to Composite of Sample Every Minutes Minutes Final Compositor Tengenaum for Present in Compositor at Pol-Lop Yes No GRAB SAMPLE DATA Grab ID Number: Calabraid Sampa Voume Time Field D PARAMETER READING UNITS PERMIT LIMIT INSTRUMENT ID pH 77 Su Sati-SAMA63-C2 Sati-SAMA63-C2 Temperature Z.1.4.4 fc Sati-SAMA63-C2 Septific Conductance 1/.4.5.C Sati-SAMA63-C2 Se | SAL Audit Performed: | Y /N | Auditor Name: | | | | Client Repr | resentative on | 6 | Rep. Name: | | |
| Samuel By SAL Gant Compositor Befores To SAL Client NA COMP Buttle Befores To SAL Client NA Inake Tubing Type PP PP PR TIT SI InakeTubing Log Pump Tubing Log START Date Time Compositor Befores To Compositor Setup By Start START Date Time Compositor Setup By Monites Gantowstr Setup By STOP Date Time Compositor Setup By Monites Gantowstr Setup By Compositor Type Time Compositor Setup By Monites Gantowstr Setup By Compositor Type Time File Compositor Setup By Monites Gantowstr Setup By Compositor Tope Time File Compositor Setup By Monites Gantowstr Setup By Contropation Tope Time File Compositor Setup By Monites Gantowstr Setup By Contropation Tope Time File Contropation Tope Monites Gantowstr Setup By Date I // / / / / Time Contropation Tope Yes No GRAB SAMPLE DATA Grab ID Number: 23 Time Contropation Tope Date I / / / / / / / / / / / / / | | - C/ | Signature: | | | | | | CYN | Signature: | | |
| Composition ID Examination Composition ID Examination Intraster Tubling Type PP PE NP TT START Date Time Composition ID Pump Tubling Log START Date Time Composition ID Pump Tubling Log STOP Date Time Composition ID Pump Tubling Log Composition Tamperature Time Composition ID Number of Semples Collected Control Composition Tamperature Time Control Collected Semples Collected Programmed Number of Semples Actual Number of Semples Collected Yes Programmed Number of Semples Actual Number of Semples Collected Yes Programmed Number of Semples Collected Semple Exercitic Yes Date Contexted Semple Yes No Flet D PARAMETERS PARAMETER READING UNITS PERMIT LIMIT PH 7 2 SU SAL-SAM-63C-C Stational Source 7.1 % % SAL-SAM-63C-C Stational Source 7.1 % % SAL-SAM-63C-C Stational Source 7.1 % % SAL-SAM-63C-C Stational Source 7.1 % SAL-SAM-63C-C | | | 1 | | S/ | AMPLE | DATA | | · · · · · · · · · · · · · · · · · · · | L I. | | |
| Instact Tusing Type PP PE NP T T Instact Juding Log Pump Tubing Log COMPOSITE DATA Composite ID Number: START Date Time Composite ID Number: STOP Date Time Composite Vexture By Composite Type Time Composite Sample Scale UB Samples Composite Type Time For Continuous Collect Sample Scale UB Samples Composite Type Time For Continuous Collect Sample Scale UB Sample Scale UB Samples Ves No Gailbrated Sample Volume Int.s Programmed Number of Samples Actual Number of Samples Collected Field Composite at Poly-up Ves No Grabe SamPle DATA Grab ID Number: .2.3 Date Collected I/ 1///. Time Collected If Time Field ParAmetters ParAMETER READING UNITS PERMIT LIMIT INSTRUMENT ID Date Collected If 1///. Sat-SaM+63.C C <td cols<="" td=""><td>Sampled By:</td><td>SAL</td><td>Glient</td><td>Compos</td><td>sitor Belongs To:</td><td>SAL</td><td>. Client</td><td>N/A</td><td>COMP B</td><td>ottle Belongs To:</td><td>SAL Client N/A</td></td> | <td>Sampled By:</td> <td>SAL</td> <td>Glient</td> <td>Compos</td> <td>sitor Belongs To:</td> <td>SAL</td> <td>. Client</td> <td>N/A</td> <td>COMP B</td> <td>ottle Belongs To:</td> <td>SAL Client N/A</td> | Sampled By: | SAL | Glient | Compos | sitor Belongs To: | SAL | . Client | N/A | COMP B | ottle Belongs To: | SAL Client N/A |
| COMPOSITE DATA Composite ID Number: START Date Time Composite ID Number: STOP Date Time Compositor Setup By Concestor Floaded pBy Concestor Floaded pBy Concestor Floaded pBy Concestor Floaded pBy Concestor Floaded pBy Concestor Floaded pBy Image: Concestor Floaded pBy Programmed Number of Samples Concestor Floaded pBy Image: Concestor Floaded pBy Data Collected 11 /1 /1 /1 /1 /1 /1 /1 /1 /1 /1 /1 /1 / | Compositor ID: | | / | | | Bottle ID | | | · | | | |
| START Date Time Compositor Serve DBy STOP Date Time Compositor Serve DBy Connecele Type Time Flow Controlling Connecele Type Time Flow Controlling Calibrated Sample Volume InLis Minutes Calibrate Programmed Number of Samples Actual Number of Samples Calibrated Minutes Final Compositor Temperature *C ice Present in Compositor at Pickup? Yes No. GRAB SAMPLE DATA Grab ID Number: 23 Date Celected 11 /1 /1 /1 /1 Time Collected #C################################### | Intake Tubing Type: | PP | PE NP TL | TT SI | int | akeTubing Lot | | | F | ump Tubing Lot: | | |
| STOP Date Time Compositor Pickad up By Compositor Type Time Flow Controls Collect Sample Every Minutes Calibrated Sample Volume mt.4 Programmed Number of Samples Actual Number of Samples Collected Final Compositor Temperature c Ice Present in Compositor at Pickup Yes No GRAB SAMPLE DATA Grab ID Number: Z3 Date Collected 11 // / / / / Time Collected #dual Number of Samples Collected PARAMETER READING UNITS PERMIT LIMIT INSTRUMENT ID pH 7 2 SU SAL-SAM-63-C // Secondray Source -1/2 & 2 SU SAL-SAM-63-C // Secondray Source -1/2 & 2 SU SAL-SAM-63-C // Dissolved Oxygen -1/2 & 2 SU SAL-SAM-63-C // Secondray Source -1/2 & 2 SU SAL-SAM-63-C // Preservative Verification with Field? -1/2 & 2 SU SAL-SAM-63-C // Dissolved Oxygen 7 // 2 SU SAL-SAM-63-C // #dfbidity -1/2 & 2 µmhos/cm SAL-SAM-63-C // #dfbidity -1/2 & 2 µmhos/cm SAL-SAM-63-C // Braidened Evertifier -1/2 & 2 | | | | COMPO | SITE DAT | 4 | Composi | te ID Num | ber: | | | |
| Composite Type Time Flow Continuous Collect Sample Every Minutes Calibrated Sample Volume mLs Minutes Calibrated Sample Scalected Programmed Number of Samples Actual Number of Samples Collected Ves No GRAB SAMPLE DATA Grab ID Number: 23 Date Collected 11 // v // Time Collected Ves No Field PARAMETERS PARAMETER READING UNITS PERMIT LIMIT INSTRUMENT ID pH 77 2 SU SAL-SAM-63-C 7 Temperature 7/ °C SAL-SAM-63-C 7 Temperature 1/ U °C SAL-SAM-63-C 7 Specific Conductance 1/ U SO µmhos/cm SAL-SAM-63-C 7 Specific Conductance 1/ U SO µmhos/cm SAL-SAM-65-C Q Specific Conductance 1/ U SO µmhos/cm SAL-SAM-65-C Q Prostoved Oxygen 7/ 7/ 7/ 8/ 7 mg/L SAL-SAM-65-C Q Prestervation Checked In Field? N Checked By SAL-SAM-65-C Q Comments: 2 2 2 SAL-SAM-65-C Q Sampler(s) Signature: 2 2 3 3 | START | Date | | | Time: | | | Comp | ositor Set-up By: | | | |
| Calibrated Sample Volume mLs model Programmed Number of Samples Actual Number of Samples Collected ves No Final Compositor Temperature °C ice Present in Compositor at Pick-up? ves No Date Collected 11 / 1/1 / 1/1 Time Collected +0.47 / 1/3 -70 Collected By PARAMETER READING UNITS PERMIT LIMIT INSTRUMENT ID PH 72 SU SAL-SAM-63-C3 Temperature 21.4/ °C SAL-SAM-63-C3 Temperature 21.4/ °C SAL-SAM-63-C3 Temperature 21.4/ °C SAL-SAM-63-C3 Dissolved Oxygen 7.2/3 × 70 mg/L SAL-SAM-63-C3 Dissolved Oxygen 7.2/3 × 70 mg/L SAL-SAM-63-C3 Preservation Checked In Y N Checked By List any Preservatives Added in Field: Comments: Comments: Date Sampler(s) Signature: Comments: Date 11 / 1/1 / 3 | STOP | Date | | | Time: | | | Composit | or Picked-up By: | | | |
| Programmed Number of Samples Actual Number of Samples Collected Final Compositor Temperature C Ice Present in Compositor at Pickup? Yes No GRAB SAMPLE DATA Grab ID Number: 23 Date Collected //////. Time Collected /////. Time Collected /////. Yes No FIELD PARAMETERS PARAMETER READING UNITS PERMIT LIMIT INSTRUMENT ID pH 7 2 SU SAL-SAM-63.C 3 Temperature Z / 4 °C SAL-SAM-63.C 3 Specific Conductance //, U & U umhos/cm SAL-SAM-63.C 3 Dissolved Oxygen 7.0 & SAL mg/L SAL-SAM-63.C 3 Temperature Z / 4 °C SAL-SAM-63.C 3 Dissolved Oxygen 7.0 & SAL mg/L SAL-SAM-60.C 3 Registrat-Chorine N NFU SAL-SAM-005.C 3 R | Cor | mposite Type | Time | Flow Co | ontinuous | Collect | Sample Every | | Minutes (| Gallons | | |
| Final Compositor Temperature 'C' Ice Present in Compositor at Pickup? Yes No GRAB SAMPLE DATA Grab ID Number: 23 Date Collected 11 /1/r. Time Collected #################################### | Calibrated Sa | mple Volume | | | mLs | | | | | | | |
| GRAB SAMPLE DATA Grab ID Number: 23 Date Collected 11 // / / / / / / / / / / / / / / / / / | Programmed Numbe | er of Samples | | | Actual N | umber of Sam | ples Collected | | | | | |
| Date Collected 11 /1 / / / / / / / / / / / / / / / / / | Final Compositor | Temperature | | | °C | Ice Pres | ent in Compos | itor at Pick-up? | | Yes | No | |
| FIELD PARAMETERS PARAMETER READING UNITS PERMIT LIMIT INSTRUMENT ID pH 7 2 SU SAL-SAM-63-C3 Temperature 2.1.4 °C SAL-SAM-63-C3 Temperature Verification with Secondary Source -1.2.8, c.0.7, °C, V SAL-SAM-63-C3 Specific Conductance 1,4.4.5.0 µmhos/cm SAL-SAM-63-C3 Dissolved Oxygen 7.7, 8.X.7, mg/L SAL-SAM-63-C3 Dissolved Oxygen 7.7, 8.X.7, mg/L SAL-SAM-605-C2 Preservation Checked in Field? NTTU SAL-SAM-005- Residuat-Chlorine | | | | GRAE | SAMPLE | DATA | Grab I | D Number | | 23 | | |
| FIELD PARAMETERS PARAMETER READING UNITS PERMIT LIMIT INSTRUMENT ID pH 7.2 SU SAL-SAM-63-C3 Temperature 2.1.4 °C SAL-SAM-63-C3 Temperature Verification with Secondary Source -13.9 | Date Collected: | 11/10 | 11. | | Time Collected: | +04 | o 1 33 | 0 700 | Collected By: | 15 | | |
| pH 7.2 SU INSTRUMENTIO pH 7.2 SU SAL-SAM-63-C3 Temperature 21.4 °C SAL-SAM-63-C3 [emperature Verification with Secondary Source -13.8, 20.0 76. MV SAL-SAM-63-C3 Specific Conductance 1,48.0 µmhos/cm SAL-SAM-63-C3 Dissolved Oxygen 7.7,8% 70. mg/L SAL-SAM-63-C3 Dissolved Oxygen 7.7,8% 70. mg/L SAL-SAM-63-C3 Preservation 7.7,8% 70. mg/L SAL-SAM-63-C3 Preservation Checked In Field? N Checked By: SAL-SAM-006- Comments: | | | | | FIEL | | | | | | | |
| Temperature Z / 4 °C SAL-SAM-63- C Imperature Verification with Secondary Source - / X & C 76 V SAL-SAM-63- C Specific Conductance / / 4 & C µmhos/cm SAL-SAM-63- C Dissolved Oxygen 7 0 7 x & Tr mg/L 9AL-SAM-63- C Temperature 70 7 x & Tr mg/L 9AL-SAM-63- C Dissolved Oxygen 7 0 7 x & Tr mg/L 9AL-SAM-63- C Temperature NTU SAL-SAM-605- C Residual-Chlorine NTU SAL-SAM-006- C Preservation Checked in Field? Y N Checked By: List any Preservatives Added in Field: Comments: Date 1////// Sampler(s) Signature: Comments: Date 1////// | PARAMETE | R | READ | NG | UNI | TS | F | PERMIT LIM | ΙТ | INST | RUMENT ID | |
| Secondary Source $-1X \mathcal{B}_{x} \mathcal{O}_{x} \mathcal{O}_{x} \mathcal{D}_{x} \mathcal{D}_{$ | рН | | 7. | 2 | รเ | J | | | | SA | -SAM-63- 03 | |
| Secondary Source $-1X \mathcal{B}_{x} \mathcal{O}_{x} \mathcal{O}_{x} \mathcal{D}_{x} \mathcal{D}_{$ | | | | 4 | | ; | | | | SA | | |
| Specific Conductance 1,480 µmhos/cm SAL-SAM-63-C3 Dissolved Oxygen 7,7,82 mg/L 9AL-SAM-55-C3 Forbidity NTU SAL-SAM-005- Residual-Chorine NTU SAL-SAM-006- Preservation Checked in Field? Y N Checked By: List any Preservatives Added in Field: Comments: Date 1//////////////////////////////////// | | | -178 | 9,0,0 | Tes to | : "V | | | | | -SAM-006- Cecce | |
| Forbidity NTU SAL-SAM005- Residual-thiorine NTU SAL-SAM006- Preservation Checked in Field? Y N Checked By: Checked By: Checked By: List any Preservatives Added in Field: Checked By: Checked By: Comments: Comments: Comments: Sampler(s) Signature: Comments: Date Date Date | Specific Conduc | tance | 1,4 | 80 | | s/cm | | | | SAI | SAM-63- C 3 | |
| Forbidity NTU SAL-SAM 005- Residual-Chlorine SAL-SAM 005- SAL-SAM 006- Preservation Checked in Field? Y N Checked By: List any Preservatives Added in Field: V N Checked By: Comments: V V V Sampler(s) Signature: V Date V Date V V V | Dissolved Oxy | gen | 7,7,8 | X TO | , mg/ | /L | | | | SAI | -SAM-55- Cecer | |
| Preservation Checked in Field? Y N Checked By: List any Preservatives Added in Field: | Turbidity | | | · . | NT | ₽ | | | | | | |
| Field? Y N Checked By: List any Preservatives Added in Field: | - | | | | | - | | | | SAL | -SAM-006- | |
| in Field: Comments: Sampler(s) Signature: Date Date Date | | cked in | Y | N | Cł | hecked By: | | | h | | | |
| Sampler(s) Signature: Date 11/10/05 Date Date | | es Added | | | | | | | | | | |
| Sampler(s) Signature: Date | Comments: | | | 2 | \bigcirc | | | | 1 1 | | | |
| Date | Sampler(s) Sign | ature: | 7 01 | w | / | | Date | 11 | 115% | 3 | | |
| Reviewed By: Date: | , | | | | 1 | | Date | | ······ | | | |
| | Rev | iewed By: | | | | | Date: | | | | | |

WASTEWATER SAMPLING LOC

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

| | | | V | ASTEWA | IER SA | | | | | |
|-------------------------------------|----------------|---------------|----------|-----------------|----------------|-----------------|----------------|--------------------|-------------------|-------------------|
| Client Name: | | | | Location: | NEN | IT 54 | 14 | Contact: Phone: | | |
| Date of Sample: | 11/ | 10/10 | | SAL Project # | | 20112 | 27 | Project Name: | | |
| SAL Audit Performed: | | Auditor Name: | | | | Client Repre | | (Y N | Rep. Name: | |
| | | Signature: | | | | | | | Signature: | |
| ····· | | | | | AMPLE | | | | | |
| Sampled By: | | Client | Composi | itor Belongs To | | | N/A | COMP B | ottle Belongs To: | SAL Client N/A |
| Compositor ID: | | | | | Bottle ID | | | 1 | | |
| Intake Tubing Type | PP P | ENPTL | | | takeTubing Lot | | | | ump Tubing Lot: | |
| | | | COMPOS | SITE DAT | A | Composit | e ID Num | nber: | | |
| START | Date: | | | Time | | | Comp | ositor Set-up By: | | |
| STOP | Date: | | | Time | : | | Composi | tor Picked-up By: | | |
| Cor | mposite Type: | Time | Flow Co | ntinuous | Collect | Sample Every: | | Minutes | Gallons | |
| Calibrated Sa | mple Volume: | | | mLs | | | | | | |
| Programmed Numbe | er of Samples: | | | Actual I | Number of Sam | ples Collected: | | | | |
| Final Compositor | Temperature: | | | °C | Ice Pres | ent in Composi | tor at Pick-up | 2 | Yes | No |
| | 1 | , | GRAE | 3 SAMPLE | DATA | Grab I | D Numbe | er: , 2 | 4 | |
| Date Collected: | 11/1 | 10/1- | | Time Collected | to | 5 1340 | TPS | Collected By | Ta | |
| | | | • | FIEI | LD PARA | METERS | | | | |
| PARAMET | ĒR | REAL | DING | UN | IITS | F | PERMIT LI | ИГ | INS | TRUMENT ID |
| рН | | 7. | 3 | S | U | | | | | AL-SAM-63- |
| Temperatu | | 21 | 0 | c | C | | | | 3 | AL-SAM-63- CLIEN |
| Temperature Verific Secondary Sc | | - 118 | Q.0 17 | 70 S | S V | | | | s/ | N-SAM-006- C14107 |
| Specific Condu | | 1,5 | 10 | μmh | os/cm | | • • • | | S. | AL-SAM-63- |
| Dissolved Ox | ygen | \$7.9 | | m | g/L | | | | 5 | AL-SAM-55- Ccie |
| - Turbidit y | | - | <u>_</u> | N | ŦU | | _ | | | L-SAM-005- |
| Residual Chi | orine | - | | | | | | | Sł | L-SAM-006- |
| Preservation Che Field? | ecked in | Y | N | | Checked By | : | | | 1 | |
| List any Preservati in Field: | | | | | | , | | | | |
| Comment | s: | | \sum | \frown | | | | , | | |
| Sampler(s) Sig | nature: | | m | | | Date | 11 | 11010 | | |
| Gampier(s) Big | | | | / | | Date | | | | |
| Re | eviewed By: | | | | | Date: | | | | · · · · |

WASTEWATER SAMPLING LOG

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

| | | | W | ASTEWA | TER SA | MPLI | NG LOG | | | |
|-------------------------------------|--------------|-----------------------------|---------------------------------------|----------------------|----------------|---------------|--|--------------------|-------------------|--------------------|
| Client Name: | | , | | Location: | DEA | リア- | LST | Contact: Phone: | | |
| Date of Sample: | <u>;</u> ; | 10/10 | | SAL Project # | 10 | 016 | 27 | Project Name: | | |
| SAL Audit Performed: | ΥŃ | Auditor Name: Signature: | | | | Client Re | presentative on Site? | (Y, N | Rep. Name: | |
| | | | | S | AMPLE | | ······································ | | Signature: | |
| Sampled By: | SAL | Client | Compo | sitor Belongs To: | | | N/A | COMPB | ottle Belongs To: | SAL Client N/A |
| Compositor ID: | | | L | 1 | Bottle ID | | | | | |
| Intake Tubing Type: | PP | PE NP TL | TT SI | Inta | akeTubing Lot: | | | F | Pump Tubing Lot: | |
| | | | COMPO | SITE DATA | 4 | Compo | site ID Num | iber: | | L |
| START | Date | | | Time: | | | Comp | ositor Set-up By: | | |
| STOP | Date | | | Time: | | | Composi | tor Picked-up By: | | |
| Con | nposite Type | Time | Flow Co | ontinuous | Collect | Sample Eve | ry: | Minutes (| Gallons | |
| Calibrated Sar | mple Volume | - | | mLs | | | | · | | |
| Programmed Numbe | r of Samples | | | Actual N | umber of Sam | oles Collecte | ed: | | <u></u> | |
| Final Compositor | Temperature | : | | °C | Ice Prese | ent in Comp | ositor at Pick-up? | | Yes | No |
| | /- | | GRA | B SAMPLE | DATA | Grab | ID Numbe | r: ,2 | 5 | |
| Date Collected: | 11/1 | 0/10 | | Time Collected: | 104 | J | | Collected By: | Th | |
| | | / | | FIEL | D PARAN | IETERS | 3 | | | |
| PARAMETE | R | READ | NG | UNI | TS | <u> </u> | PERMIT LIM | 11⊤ | INS | TRUMENT ID |
| pH | | 7.4 | | su | J | | | | SA | AL-SAM-63- c ろ |
| Temperatur Temperature Verific | | 21.4 | · · · · · · · · · · · · · · · · · · · | °C | ; | | | | S4 | L-SAM-63- # Cilcon |
| Secondary Sou | urce | -120 | | °C | ; | | | | SA | L-SAM-006- Care |
| Specific Conduc | _ 70 | | 00-9- | ρ _Ο μmhos | s/cm | | | | SA | AL-SAM-63- レク |
| Dissolved Oxy | gen | 1.10 |) | mg/ | ΊL | | | | SA | AL-SAM-55- CUERT |
| -Furbidity | | | | - NT I | A | | | | ŞA | L-SAM-005- |
| Residual Chlor Preservation Cheo | | | | | | | | | SA | L-SAM-006- |
| Field? | | Υ | N | Cł | necked By: | | | | | |
| List any Preservative in Field: | es Added | | | | | | | | | |
| Comments: | | | 7 - | \frown | | | | | | |
| Sampler(s) Signa | ature: | | w | 4 | | Date Date | 101 | 10/0 | | |
| Revi | ewed By: | | - | | | Date | | | | |
| | | | | | | | 1 | | | |

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

| | | | W | ASTEWA | ATER SA | MPLING | j log | | | |
|---------------------------------------|--------------|---------------|---------|--------------------------|---------------|-----------------|-----------------------|-------------------------|-------------------|---|
| Client Name: | | 1 | | Location: | DEN | 117-2 | 52 | Contact: | | |
| Date of Sample: | 11/ | 10/10 | | SAL Project # | | 6011 | 17 | Phone: Project Name: | | |
| | | Auditor Name: | | 1 | L/ | | ~ | | Rep. Name: | |
| SAL Audit Performed: | Y 💆 . | Signature: | | | | | esentative on te? | (Y N | Signature: | |
| | | | L | SA | | | | | | |
| Sampled By: | SAL | Client | Compo | sitor Belongs To: | SAL | Client | N/A | COMP B | ottle Belongs To: | SAL Client N/A |
| Compositor ID: | Ć | | | | Bottle ID | | | L | | |
| Intake Tubing Type: | PP F | PE NP TL | IT SI | Int | akeTubing Lot | | | Р | ump Tubing Lot: | |
| | | | СОМРО | | 4 | Composit | e ID Num | ber: | | |
| START | Date: | | | Time: | | | Comp | ositor Set-up By: | | |
| STOP | Date: | | | Time: | | | Composit | or Picked-up By: | | |
| Com | posite Type: | Time | Flow Co | ontinuous | Collect | Sample Every: | | Minutes (| Gallons | |
| Calibrated San | ple Volume: | | | mLs | I | | | | | |
| Programmed Number | of Samples: | | | Actual N | lumber of Sam | ples Collected: | | | - 11 | |
| Final Compositor T | emperature: | | | °C | Ice Pres | ent in Composi | tor at Pick-up? | | Yes | No |
| | , | | GRA | B SAMPLE | DATA | Grab I | D Numbe | r: ,2 | 6 | |
| Date Collected: | uli | olco | · | Time Collected: | 121. | 5 | | Collected By: | -74 | |
| · · · · · · · · · · · · · · · · · · · | | | | FIEL | D PARAN | | | | | |
| PARAMETE | R | READ | NG | UNI | ITS | F | PERMITLIN | π | INS | TRUMENT ID |
| рH | | 7. | 4 | SI | U | | | | SA | AL-SAM-63- 03 |
| Temperature | | 27. | 5 | °C | c | | | | SĮ | L-SAM-63- CI C Far- |
| Temperature Verifica Secondary Sou | | 71. | O | °C | ; | | | | SA | AL-SAM-63- С. С. Г L-SAM-006- С. С. Г. |
| Specific Conduct | ance | 1,2. | 50 | μmho | s/cm | | | | SA | L-SAM-63- & 3 |
| Dissolved Oxyg | gen | 4.1 | 0 | mg | /L | | · · · · · · · · · · · | | SA | L-SAM-55- C |
| Turbidity | | | | NT | :ป | | | | | L-SAM=005- |
| Residual Chlor | | | | _ | | | - | | SA | L-SAM-006- |
| Preservation Chec Field? | ked in | Y | N | С | hecked By: | | | | | |
| ist any Preservative. in Field: | s Added | | | | | | | | | |
| Comments: | | |) | $\overline{}$ | | | | | | |
| | | 1cm | / | $\langle \frown \rangle$ | | Date | 11/ | 10/1. | | |
| Sampler(s) Signa | iture: | | | | | Date | | | | |

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

-

OR?

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

| | | | w | ASTEWA | TER SA | | S LOG | | | |
|-------------------------------------|----------------|---------------|---------|-------------------|---|----------------|-----------------|-------------------|-------------------|------------------------------------|
| Client Name: | | , | | Location: | DEA | 11T-L | 53 | Contact: | | |
| Date of Sample: | | -/ /- | | | ULI | | 7 | Phone: | | |
| Date of Sample: | 1/ | 11010 | T | SAL Project # | /(| 0/6 | 17 | Project Name: | | |
| SAL Audit Performed: | YN | Auditor Name: | | | | Client Repre | | Υ N | Rep. Name: | |
| | (| Signature: | | | | Sit | e? | \bigcirc | Signature: | |
| | | | | SA | AMPLE | ΟΑΤΑ | | | | |
| Sampled By: | SAL | Client | Compos | sitor Belongs To: | SAL | Client | N/A | COMP Bo | ottle Belongs To: | SAL Client N/A |
| Compositor ID: | \subseteq | | | | Bottle ID | | | | | |
| Intake Tubing Type: | PP F | PE NP TL | TT SI | Inta | akeTubing Lot: | | | P | ump Tubing Lot: | |
| | | | СОМРО | SITE DATA | <u>ــــــــــــــــــــــــــــــــــــ</u> | Composit | e ID Num | ber: | | |
| START | Date: | | | Time: | | | Comp | ositor Set-up By: | | |
| STOP | Date: | | | Time: | | - | Composit | or Picked-up By: | | |
| Cor | mposite Type: | Time | Flow Co | ontinuous | Collect | Sample Every: | | Minutes (| Gallons | |
| Calibrated Sa | mple Volume: | | | mLs | | | | | | |
| Programmed Numbe | er of Samples: | | | | umber of Sam | ples Collected | | | | |
| Final Compositor | | | | °c | | ent in Composi | tor at Pick-un? | | Yes | No |
| · · · · · | | | GRA | B SAMPLE | | | D Numbe | | 2 | NO |
| Date Collected: | 11/10 | 110 | | Time Collected: | 123 | | | Collected By: | Ta | |
| | 111.0 | / • | 1 | FIEL | DPARA | | | | 12 | |
| PARAMETE | ĒR | REAL | DING | UNI | тs | F | ERMIT LIN | ΙТ | INS | TRUMENT ID |
| pН | | 6. | 9 | SI | J | | | | SA | AL-SAM-63-63 |
| Temperatu | re | 20 | . 0 | °C | ; | | | | SA | AL-SAM-63- (|
| Temperature Verific Secondary So | | 6- | 7.5 | °C. | 2 11 | | | | SA | аl-SAM-63- Ссор L-SAM-006- Сосо |
| Specific Conduc | | 1,20 | | μmho | | | | | | AL-SAM-63- C> |
| Dissolved Oxy | ygen | | 70 | mg | /L | | | | | AL-SAM-55- CCC 12 |
| | | | ~ | NT | и | | | | | E-SAM-005- |
| Residual Chic | prine | | | <u> </u> | | | · | | | L- SAM-006- |
| Preservation Che Field? | cked in | Y | N | с | hecked By: | | | | | |
| Field? | | | | L | | | | | | |
| List any Preservativ | es Added | | | | | | | | | |
| in Field: | | | | | | | | | | |
| | | | | | | | | | | |
| Comments | | | | | | | | | | |
| Comments | | | 7 | \frown | | | | | | |
| | | <u> </u> | | | | | | -/- <i>i</i> - | <u> </u> | |
| Sampler(s) Sign | nature: | 1. | m | In | | Date | 1[| 113/11 | | |
| | | | | | | Date | | | | |
| Rev | viewed By: | | | | | Date: | | | | |

| | | | W | ASTEWA | TER SA | | IG LOG | | | |
|-------------------------------------|--------------|---------------|------------|-------------------|-----------------|--------------|-------------------|--------------------|-------------------|---------------------|
| Client Name: | | | | Location: | DEN | 117- | 2.54 | Contact: Phone: | | |
| Date of Sample: | , , , / | 10/10 | | SAL Project # | | 116 | 27 | Project Name: | | |
| | ~ | Auditor Name: | | 1 | / U | | presentative on | | Rep. Name: | |
| SAL Audit Performed: | Y | Signature: | | | | | Site? | C" N | Signature: | |
| | I | | | S | AMPLE | DATA | | L | | |
| Sampled By: | (SAL) | Client | Compos | sitor Belongs To: | SAL | Client | N/A | COMP B | ottle Belongs To: | SAL Client N/A |
| Compositor ID: | | | | | Bottle ID | | | - I | I | |
| Intake Tubing Type: | PP F | E NP TL | r⊤ si | Int | takeTubing Lot: | | | F | ump Tubing Lot: | |
| | | | СОМРО | SITE DAT | A | Compo | site ID Nun | nber: | | |
| START | Date: | | | Time | | | Com | positor Set-up By: | | |
| STOP | Date: | | | Time | : | | Compos | itor Picked-up By: | | |
| Com | posite Type: | Time | Flow Co | ontinuous | Collect | Sample Eve | ry: | Minutes | Gallons | |
| Calibrated San | nple Volume: | | | mLs | | | | | | |
| Programmed Number | of Samples: | | | Actual N | Number of Sam | ples Collect | ed: | | | |
| Final Compositor T | emperature: | | | °C | Ice Pres | ent in Comp | ositor at Pick-up | | Yes | No |
| | 1 | | GRA | B SAMPLE | DATA | Grat | D Numbe | er: ,2 | g | |
| Date Collected: | 10/1 | 0/10 | | Time Collected | 1200 | 5 | | Collected By | 1. | , |
| | | t | | FIEL | _D PARA | METER | 8 | | r | |
| PARAMETE | R | READ | | UN | ITS | | PERMIT LI | MIT | INS | TRUMENT ID |
| рН | | 7. | <u>'5</u> | | SU | | | | | AL-SAM-63- 🖉 🏷 |
| Temperature Temperature Verifica | | | <u>0.0</u> | | С | | | | _S_ | AL-SAM-63- (c (CA |
| Secondary Sou | | ., , | . 0 | | env | | | | | |
| Specific Conduc | tance | 900 | | μmho | os/cm | | | | | AL-SAM-63 |
| Dissolved Oxy | gen | 3.8 | 50 | mį | g/L | | | | S. | AL-SAM-55- CUICH- |
| Turbidity | | | | -N | FU | | | | S/ | L-SAM-005- |
| Residual Chlor | | | | · | <u> </u> | | | | S/ | AL-SAM-006- |
| Preservation Cher Field? | | Y | N | | Checked By: | | | | | |
| List any Preservative in Field: | es Added | | | | | | | | | |
| Comments | : | | 2 | | | | | 1 1 | n | |
| Sampler(s) Sign | ature: | 10 | 1- | | $\overline{}$ | Date Date | 11 | 11.01% | | |
| Rev | viewed By: | | | | | Dat | e: | | | |

ORP

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

| | | | W | ASTEWA | TER SA | MPLING | i log | | | |
|---|----------------|----------------|--|---------------------------------------|-----------------------|---------------------------------------|-------------------------|--------------------|-------------------|-----------------|
| Client Name: | | | | Location: | DEN | 11T-C | the | Contact: Phone: | | |
| Date of Sample: | 1 | stict | | SAL Project # | | 0076 | 27 | Project Name: | | |
| | | Auditor Name: | · · · · | | / | | ~7 | | Rep. Name: | |
| SAL Audit Performed: | Y (N/ | Y N Signature: | | | | Client Representative on Site? | | (N | Signature: | |
| | | | | S | AMPLE | | · · · · | l | olgrididio. | |
| Sampled By: | /SAL/ | / Client/ | Compos | sitor Belongs To: | Γ | | N/A | COMP B | ottle Belongs To: | SAL Client N/A |
| Compositor ID: | $-\mathcal{H}$ | | · · · · · · · · · · · · · · · · · · · | | Bottle ID | | | I | | |
| Intake Tubing Type: PP | | PE NP TL TT SI | | IntakeTubing Lot | | | | Pump Tubing Lot: | | |
| | | | COMPO | | | L Composit | e ID Num | L | | |
| START | Date: | | | Time: | | | Compositor Set-up By: | | | |
| STOP | Date: | | | Time | | | Compositor Picked-up By | | | |
| Composite Type: | | | | ontinuous | Collect Sample Every: | | 1 | Gallons | | |
| Calibrated Sa | | | mLs | | voiy. | | | | | |
| Programmed Number of Samples: Actual Number of Samples Collected: | | | | | | | | | | |
| Final Compositor | | | °C Ice Present in Compositor at Pick-up? | | | | | Yes | No | |
| · · · · | | | GRAF | I SAMPLE | | | D Numbe | | 16 | |
| Date Collected: | 11/10 | + | | · · · · · · · · · · · · · · · · · · · | | | | Collected By: | pllected By: | |
| | 1. 110 | 10 | | | 10. D PARAN | | | | 11- | |
| PARAMETER | | READING | | UNITS | | PERMIT LIMIT | | /IT | INSTRUMENT ID | |
| рН | | 6.9 | | SU | | · · · · · · · · · · · · · · · · · · · | | | SAL-SAM-63- 0 3 | |
| Temperature | | 21.0 | | °C | | | | SAL-SAM 63- CILITY | | |
| Temperature Verification with | | -180.0 | | 20 mV | | | | | SA | L-SAM-006- Cena |
| Specific Conductance | | 900 | | μmhos/cm | | | | SAL-SAM-63- | | |
| Dissolved Oxygen | | C. SU | | mg/L | | | | -SAL-SAM-55- Cerci | | |
| - Turbidity | | | | | | | | | SAL-SAM-005- | |
| Residu al Ch lorine | | | | | | | | SAL-SAM-006- | | |
| Preservation Checked in | | Y N | | Checked By: | | | | | | |
| Field? List any Preservativ in Field: | ves Added | | | I | | L | | | | |
| Comments | | 7 / | \frown | | <u> </u> | | / | 1 | | |
| Sampler(s) Signature: | | Com la | | | | Date 11/10/13 | | | | |
| | | | | | | Date | | | | |
| Reviewed By: | | | | | | Date: | | | | |

ORP

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

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

| | | | _ | VASIEVVA | | | | | | |
|---|---------------------------------------|----------------|---------------------------------------|---------------------|---------------|-----------------|-----------------|--------------------|-----------------|----------------------|
| | Client Name: | | | Location: | DF | - T | | Contact: Phone: | | |
| | Date of Sample: | 11/ | · c/rs | SAL Project # | Í | 0162 | 7 | Project Name: | | |
| | SAL Audit Performed: | Y E | Auditor Name: Signature: | | | Client Repre | sentative on | (Y N | Rep. Name: | |
| | I | | | S | AMPLE | | | | | |
| | Sampled By: | SAL | Client Comp | ositor Belongs To: | 1 | Client | N/A | COMP B | ottle Belongs T | o: SAL Client N/A |
| | Compositor ID: | | | | Bottle ID | | | | | |
| | Intake Tubing Type: | PP F | PE NP TL TT SI | Int | akeTubing Lot | | | P | ump Tubing Lo | bt: |
| | | | СОМРО | | ۹ | Composit | e ID Num | ber: | | |
| | START | Date: | | Time: | r · · · | | | ositor Set-up By: | | |
| | STOP | Date: | | Time: | | | Composit | or Picked-up By: | | |
| | Co | mposite Type: | Time Flow (| Continuous | Collect | Sample Every: | | Minutes | Gallons | |
| | Calibrated Sa | mple Volume: | | mLs | J | | | | | |
| | Programmed Numbe | er of Samples: | | Actual N | lumber of Sam | oles Collected: | | | | |
| | Final Compositor | Temperature | | °C | Ice Pres | ent in Composi | tor at Pick-up? | | Yes | No |
| | | 1 | , GRA | B SAMPLE | DATA | Grab I | D Numbe | r: ,3 | 0 | |
| | Date Collected: | 11/10 | 100 | Time Collected | 115 | 0 | | Collected By: | TM | |
| | | | | FIEL | D PARA | IETERS | | | | |
| | PARAMETI | ER | READING | UN | ITS | F | PERMIT LIN | 1IT | IN | STRUMENT ID |
| | рН | | 7.2 | s | U | | | | | SAL-SAM-63- |
| _ | Temperatu | | 18.5 | °(| с | | | | | SAL-SAM-63- Ссса |
| P | Temperature Verific | cation with | 62.2 | هم | Chu | | | | , S | SAL-SAM-006-として |
| | Specific Condu | ctance | 9803 TR | _ν , μmho | os/cm | | | | | SAL-SAM-63-23 |
| | Dissolved Ox | ygen | 8.3 | mį | g/L | | | | | SAL-SAM-55- Cc . 124 |
| | | | · · · · · · · · · · · · · · · · · · · | ស | דט־ | | | | 5 | AL-SAM-005- |
| | Residual Chle | | ~ | | | | ••••• | | ç | SAL-SAM-006- |
| | Preservation Che Field? | ecked in | Y N | c | Checked By: | | | | | |
| | List any Preservation in Field: | | | | | | | | | |
| | Comment | s: | | |) | | | | | |
| | Sampler(s) Sig | nature: | lon | | \sim | Date | | 11/10 | 100 | |
| | i i i i i i i i i i i i i i i i i i i | | | | | Date | | - | | |

WASTEWATER SAMPLING LOG

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

| Client Name: Date of Sample: SAL Audit Performed: | 11/1 | 0/1- | Location: SAL Project # | TI | - D | | Contact: Phone: | | |
|---|-----------------|---------------|----------------------------|---------------|-----------------|-----------------|--------------------|-------------------|-------------------------|
| | 11/1 | 0/1- | SAL Project # | | | | | | |
| SAL Audit Performed: | † <u>'</u> | | | / (| 50/63 | 17 | Project Name: | | |
| | YG | Auditor Name: | I I | | Client Repre | | YN | Rep. Name: | |
| | | Signature: | | | | | | Signature: | |
| | \sim | | | MPLE | | | 1 | | |
| Sampled By | SAL | Client C | Compositor Belongs To: | SAL | Client | N/A | COMP B | ottle Belongs To: | SAL Client N/A |
| Compositor ID | | | | Bottle ID | | | . | | |
| Intake Tubing Type | PP F | E NP TL TT SI | Inta | keTubing Lot: | | | F | ump Tubing Lot: | |
| | _ | CON | MPOSITE DATA | ۱ | Composit | e ID Num | nber: | | |
| START | Date: | | Time: | | | Comp | ositor Set-up By: | | |
| STOP | Date: | 44 / / · | Time: | | | Composi | tor Picked-up By: | | |
| C | omposite Type: | Time Flow | Continuous | Collect | Sample Every: | | Minutes | Gallons | |
| Calibrated S | ample Volume: | | mLs | | | | I | | |
| Programmed Numb | per of Samples: | | Actual N | umber of Sam | ples Collected: | | | | |
| Final Composito | or Temperature: | | °C | Ice Pres | ent in Composi | tor at Pick-up? | ? | Yes | No |
| | | G | RAB SAMPLE | DATA | Grab I | D Numbe | r: , 3 | 1 | |
| Date Collected | 11/1 | 0/13 | Time Collected: | 140 | 5.0 | | Collected By: | Tim | - |
| | 1 (777 | | FIEL | | | | | | |
| PARAMET | ER | READING | UNI | тs | F | PERMIT LIN | ЛТ | INS | TRUMENT ID |
| рН | | n.3 | SI | J | | | | S | AL-SAM-63-دع |
| Temperat | ure | 25.3 | °(| > | | | | S. | AL-SAM-63- Exerna |
| Temperature Verif | | - 230. | ں بر | -nV | | | | | L-SAM-006- Cecer |
| Specific Condi | | 1,250 | μmho | | | | | | AL-SAM-632 3 |
| Dissolved O | xygen | 2.20 | mg | /L. | | | | · S/ | AL-SAM-55- Cecier |
| Ţ urbidit | ¥. | • | | U | ~ | | | | t- SAM-00 5- |
| Residual en | Torine | \sim | | <i></i> | | <u> </u> | | | L-SAM -006- |
| Preservation Ch | | Y N | c | hecked By: | | | | | |
| Field? List any Preservat in Field | ives Added | | I | | L | | | | |
| Commen | ts: | | \sum | | | | (| | |
| | | | | | Dette | | | 1 | |
| Sampler(s) Sid | nature: | /cm | 10 | 1 | Date | | 1/1/0 | 100 | |
| Sampler(s) Sig | gnature: | / cm | 100 | <u> </u> | Date | | [/[[0 | 100 | |

WASTEWATER SAMPLING LOG

URP

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

| | | | V | ASTEWA | VIEK SA | | LUG | | | |
|-------------------------------------|----------------|---------------------------------------|---------|------------------|----------------|-----------------|-------------------|--------------------|-------------------|-------------------|
| Client Name: | | 1 | | Location: | FR | | | Contact: Phone: | | |
| Date of Sample: | 17/ | enter . | | SAL Project # | - Y | 0167 | 17 | Project Name: | | |
| | | Auditor Name: | | I | | | · | -5 | Rep. Name: | |
| SAL Audit Performed: | Y N | Signature: | | | | | esentative on te? | YN | Signature: | |
| | | | | S | AMPLE | DATA | | | | |
| Sampled By: | SAL | Client | Compo | sitor Belongs To | | | N/A | COMP B | ottle Belongs To: | SAL Client N/A |
| Compositor ID: | \sim | | | | Bottle ID | | | L | 1 | |
| Intake Tubing Type: | PP F | PE NP TL | IT SI | Ini | akeTubing Lot: | | | F | ump Tubing Lot: | |
| | | · · · · · · · · · · · · · · · · · · · | СОМРО | SITE DAT | A | Composit | te ID Num | ber: | | |
| START | Date: | | | Time | | | | ositor Set-up By: | | |
| STOP | Date: | | | Time | | | Composit | or Picked-up By: | | |
| Co | mposite Type: | Time | Flow Co | | Collect | Sample Every: | | <u> </u> | Gallons | |
| Calibrated Sa | ample Volume: | | | mLs | I | | | · · · · · | | |
| Programmed Numb | er of Samples: | | | Actual N | lumber of Sam | ples Collected: | | | | |
| Final Compositor | r Temperature: | | | °C | Ice Pres | ent in Composi | tor at Pick-up? | | Yes | No |
| | | | GRA | B SAMPLE | | | D Numbe | | 2 | |
| Date Collected: | 11/10 | 10 | | Time Collected | r | | | Collected By: | Ta | |
| | 11 170 | <u> </u> | | | D PARAM | | | | 100 | |
| PARAMET | ER | READ | NG | UN | ITS | F | PERMIT LIN | 11T | INST | FRUMENT ID |
| рH | | 6.4 |) | s | U | | | | SA | L-SAM-63-4-3 |
| Temperatu | ire | 24. | 5 | °(| c | | | | _SA | L-SAM-63- Cecerra |
| Temperature Verifie Secondary So | | 12. | 5 | - | SAU | | | | SA | L-SAM-006- CCC |
| Specific Condu | | 25 | λu | μmho | | | | | SA | L-SAM-63- 23 |
| Dissolved Ox | ygen | 8.0 |) | mç | j/L | | | | SA | L-SAM-55- Ceccie |
| Turbidity | | | | FIA_ | ₩ | | | | | L-SAM-005- |
| Residual Chlo | orine | | / | | | | | | | L-SAM-006- |
| Preservation Che Field? | ecked in | Y | N | c | hecked By: | | <u> </u> | | | |
| List any Preservativ in Field: | | | | L | | L | | | | |
| Comments | s: | | 7 | | 2 | | | , . | | |
| Sampler(s) Sigr | nature: | lei | n | 1 | | Date | i | 15/18 | | |
| | auro. | | / | | | Date | <i>L / 4</i> | | | |
| Re | viewed By: | | | | | Date: | | | | |

WASTEWATER SAMPLING LOG

ORP

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

| | | | | ASIEWA | VIEK 24 | | LOG | | | |
|------------------------------------|---------------|---------------|---------|------------------|---------------------------------------|---------------------|----------------|-------------------------|-------------------|--------------------|
| Client Name: | | | | Location: | E | B | | Contact: | | |
| Date of Sample: | 11 | 10/1. | | SAL Project # | | 5016 | 17 | Phone: Project Name: | | |
| | | Auditor Name: | | <u></u> | / | | | | Rep. Name: | |
| SAL Audit Performed: | Y M | Signature: | | | | Client Repre Sil | | Y N | Signature: | |
| | | | | S | AMPLE | DATA | | L | | |
| Sampled By: | 8AL | Client | Compos | sitor Belongs To | | | N/A | COMP B | ottle Belongs To: | SAL Client N/A |
| Compositor ID: | \leftarrow | | | [| Bottle ID | | | L | | |
| Intake Tubing Type: | PP I | PE NP TL 1 | IT SI | ini | takeTubing Lot | | | F | ump Tubing Lot: | |
| | | | COMPO | | A | Composit | e ID Num | ber: | | |
| START | Date: | | | Time | T | | | ositor Set-up By: | | |
| STOP | Date: | | | Time | : | | Composi | tor Picked-up By: | | |
| (Co | mposite Type: | Time | Flow Co | Intinuous | Collect | Sample Every: | ······ | <u> </u> | Gallons | |
| | mple Volume: | | | mLs | L | | | L | | |
| Programmed Numbe | | | | | Number of Sam | ples Collected: | | | | |
| Final Compositor | | | | °C | <u> </u> | ent in Composi | tor at Pick-up | 2 | Yes | No |
| | | L <u></u> | GRAE | B SAMPLE | <u></u> | | D Numbe | | 2 | |
| Date Collected: | rite | 0/10 | | Time Collected | · · · · · · · · · · · · · · · · · · · | | | Collected By: | | |
| | | 0 [75 | L | FIEL | D PARAI | | | | /.1. | |
| PARAMET | ER | READ | DING | UN | IITS | F | PERMITLI | ИГ | INS | TRUMENT ID |
| рН | | 67.6 | To | s | ευ | | | | S, | AL-SAM-63- 7 3 |
| Temperatu | ire | 23. | 0 | | с | | | | | AL-SAM-63-CCLC- |
| emperature Verifie Secondary So | | - 8 | 0.0 | 0 | с | | | | | L-SAM-006€ ((;) |
| Specific Condu | | 28 | ~ | μmhc | os/cm | | | | | AL-SAM-63-63 |
| Dissolved Ox | ygen | 8.5 | | mı | g/L | | | | S | AL-SAM-55-6(() |
| -Turbidity | | | · | N | ŦU | | | | s | L-SAM-005- |
| Residual Chi | orine | L _ | | | | | <u> </u> | | S/ | NS-SAM-006- |
| Preservation Cho | ecked in | Y | N | | Checked By: | | <u> </u> | | L | |
| Field? | | | | <u> </u> | | J | | | | |
| List any Preservati | | 1 | | | | | | | | |
| in Field: | | | | | | • | | | | |
| | | | | | | | | | | |
| Comment | ·c. |] | _ | | | | | | | |
| Comment | | | 7 | 1 | | | | 1 | | |
| | | F | | | | Date | | Lite | | |
| Sampler(s) Sig | nature: | -10 | n | | | Date | | 10110 | | |
| <u></u> | | <u> </u> | | _ | | | | | <u></u> | |
| Re | eviewed By | - | | | | Date: | | | | |

WASTEWATER SAMPLING LOG

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

CPP

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



Hazen and Sawyer 10002 Princess Palm Avenue Suite 200 Tampa FLORIDA, 33619 December 24, 2010 Work Order: 1002218 Revised Report

Laboratory Report

| Project Name | | PN | IRS II | | | | | |
|------------------------------|-------|----------------|-----------|-------|-------|----------------|----------------|-----|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Ву |
| 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 | 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 |

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



Hazen and Sawyer 10002 Princess Palm Avenue Suite 200 Tampa FLORIDA, 33619 December 24, 2010 Work Order: 1002218 Revised Report

Laboratory Report

| Project Name | | PN | IRS II | | | | | |
|--|-------|---|-----------|-------|-------|----------------|----------------|-----|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Ву |
| Sample Description Matrix SAL Sample Number Date/Time Collected Collected by Date/Time Received | | UNSAT-IS3 Wastewater 1002218-03 11/15/10 08:30 Client 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 | ктс |
| 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 | ктс |
| Total Alkalinity | mg/L | 280 | SM 2320B | 8.0 | 2.0 | | 11/19/10 08:30 | ктс |
| 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 Matrix SAL Sample Number Date/Time Collected Collected by Date/Time Received | | UNSAT-IS4 Wastewater 1002218-04 11/12/10 00:00 Client 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 | ктс |
| 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 |

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



December 24, 2010

Revised Report

Work Order: 1002218

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

| 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 Ar | nalyzed: 11 | /17/10 | | |
| Carbonaceous BOD | 2 U | 2 | 2 | mg/L | | | | | | |
| Blank (BK01205-BLK2) | | | | | Prepared: | 11/12/10 Ar | nalyzed: 11 | /17/10 | | |
| Carbonaceous BOD | 2 U | 2 | 2 | mg/L | | | | | | |
| LCS (BK01205-BS1) | | | | | Prepared: | 11/12/10 Ar | nalyzed: 11 | /17/10 | | |
| Carbonaceous BOD | 190 | 2 | 2 | mg/L | 200 | | 95 | 85-115 | | |
| LCS (BK01205-BS2) | | | | | Prepared: | 11/12/10 Ar | nalyzed: 11 | /17/10 | | |
| Carbonaceous BOD | 190 | 2 | 2 | mg/L | 200 | | 95 | 85-115 | | |
| LCS Dup (BK01205-BSD1) | | | | | Prepared: | 11/12/10 Ar | nalyzed: 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 Ar | nalyzed: 11 | /17/10 | | |
| Carbonaceous BOD | 191 | 2 | 2 | mg/L | 200 | | 96 | 85-115 | 0.5 | 10 |
| Batch BK01304 - Sulfide prep | o | | | | | | | | | |
| 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 Chroma | tography 300.0 F | Prep | | | | | | | | |
| Blank (BK01731-BLK1) | | | | | Prepared: | 11/17/10 Ar | nalyzed: 11 | /18/10 | | |
| Sulfate | 0.20 U | 0.60 | 0.20 | mg/L | | | | | | |

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December 24, 2010

Revised Report

Work Order: 1002218

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

| Analyte | Result | PQL | MDL | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|----------------------------|----------------|-----------|-----------|-------|----------------|------------------|-------------|----------------|-----|--------------|
| Batch BK01731 - Ion Chroma | tography 300 0 | Pren | | | | | | | | |
| LCS (BK01731-BS1) | | | | | Prepared: | 11/17/10 Ar | nalyzed: 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 Ar | nalyzed: 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: 1 | 002218-02 | | Prepared: | 11/17/10 Ar | nalyzed: 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 Ar | nalyzed: 11 | /22/10 | | |
| Carbonaceous BOD | 2 U | 2 | 2 | mg/L | | | | | | |
| LCS (BK01747-BS1) | | | | | Prepared: | 11/17/10 Ar | nalyzed: 11 | /22/10 | | |
| Carbonaceous BOD | 195 | 2 | 2 | mg/L | 200 | | 98 | 85-115 | | |
| LCS Dup (BK01747-BSD1) | | | | | Prepared: | 11/17/10 Ar | nalyzed: 11 | /22/10 | | |
| Carbonaceous BOD | 190 | 2 | 2 | mg/L | 200 | | 95 | 85-115 | 3 | 10 |
| Batch BK01801 - COD prep | | | | | | | | | | |
| Blank (BK01801-BLK1) | | | | | Prepared 8 | & 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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December 24, 2010

Revised Report

Work Order: 1002218

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

| Analyte | Result | PQL | MDL | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|----------------------------|---------|-------|-------|-------|----------------|------------------|----------|----------------|-----|--------------|
| | | | mbe | Onto | Level | rteour | /iiteo | Linito | | Linin |
| Batch BK01803 - Ammonia by | SEAL | | | | | | | | | |
| Blank (BK01803-BLK1) | | | | | Prepared 8 | & 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 8 | & Analyzed: | 11/17/10 | | | |
| Ammonia as N | 0.49 | 0.010 | 0.005 | mg/L | 0.50 | | 98 | 90-110 | | |
| LCS (BK01803-BS2) | | | | | Prepared 8 | & Analyzed: | 11/17/10 | | | |
| Ammonia as N | 0.52 | 0.010 | 0.005 | mg/L | 0.50 | | 104 | 90-110 | | |
| LCS (BK01803-BS3) | | | | | Prepared 8 | & 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 | | | | | | |

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



December 24, 2010

Revised Report

Work Order: 1002218

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

| Analyte | Result | PQL | MDL | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|--------------------------------|--------|-----------|-----------|-------|----------------|------------------|----------|----------------|-----|--------------|
| Batch BK01836 - TDS Prep | | | | | | | | | | |
| LCS (BK01836-BS1) | | | | | Prepared 8 | Analyzed: | 11/18/10 | | | |
| Total Dissolved Solids | 968 | 10 | 10 | mg/L | 1000 | | 97 | 90-110 | | |
| Batch BK01905 - alkalinity | | | | | | | | | | |
| Blank (BK01905-BLK1) | | | | | Prepared 8 | Analyzed: | 11/19/10 | | | |
| Total Alkalinity | 2.0 U | 8.0 | 2.0 | mg/L | | | | | | |
| LCS (BK01905-BS1) | | | | | Prepared 8 | 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 8 | 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 8 | Analyzed: | 11/19/10 | | | |
| Sulfide | 4.70 | 4.0 | 1.0 | mg/L | 5.0 | | 94 | 85-115 | | |
| Matrix Spike (BK01920-MS1) | | Source: 1 | 002218-03 | | Prepared 8 | Analyzed: | 11/19/10 | | | |
| Sulfide | 4.70 | 4.0 | 1.0 | mg/L | 5.0 | ND | 94 | 85-115 | | |
| Matrix Spike Dup (BK01920-MSD1 | I) | Source: 1 | 002218-03 | | Prepared 8 | Analyzed: | 11/19/10 | | | |
| Sulfide | 4.70 | 4.0 | 1.0 | mg/L | 5.0 | ND | 94 | 85-115 | 0 | 14 |

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



December 24, 2010

Revised Report

Work Order: 1002218

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

| 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 3 | 51.2 | | | | | | | | |
| Blank (BK02001-BLK1) | | | | | Prepared: | 11/20/10 Ar | nalyzed: 11 | /22/10 | | |
| Total Kjeldahl Nitrogen | 0.05 U | 0.20 | 0.05 | mg/L | | | | | | |
| Blank (BK02001-BLK2) | | | | | Prepared: | 11/20/10 Ar | nalyzed: 11 | /23/10 | | |
| Total Kjeldahl Nitrogen | 0.05 U | 0.20 | 0.05 | mg/L | | | | | | |
| LCS (BK02001-BS1) | | | | | Prepared: | 11/20/10 Ar | nalyzed: 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 Ar | nalyzed: 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 | 0.04 | 0.01 | mg/L | | | | | | |
| Blank (BK02434-BLK2) | | | | | Prepared 8 | & Analyzed: | 11/24/10 | | | |
| Nitrate+Nitrite (as N) | 0.01 U | 0.04 | 0.01 | mg/L | | | | | | |

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December 24, 2010

Revised Report

Work Order: 1002218

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

| Analyte | Result | PQL | MDL | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---------------------------|--------------|------|------|-------|----------------|------------------|----------|----------------|-----|--------------|
| Batch BK02434 - Nitrate 3 | 53.2 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 | | |

A DIED IN ACCORDANCE

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

* 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.

Finbail

December 24, 2010 Work Order: 1002218

Revised Report

SAL Project No. | CODD-1 X

1 110 11:02 11:11 **OD** bleif 000 144 0.75 1505 3651 1168 Field Cond Instructions / Remarks Ť 18:3 Josephin Edeback-Hirst 813-630-4498 qmeT bleil Chain of Custody Star Star jedeback@hazanandsawyer.com 221.67.07 Ŗ しんそ PARAMETER / CONTAINER DESCRIPTION Hq blai7 ` ر ب -213.6 N NA (Y) NA 158.3 N NA AN NA N N N N NA ٨N **ORP (Client meter)** Contact / Phone: ſŲ≻ ≻ Proper preservatives indicated? Volatiles rec'd w /out headspace TKN, NH3, NoX, COD Ť Samples intact upon arrival? 250ml P, H2SO4 Rec'd within holding time? Proper containers used? Received on ice? Temp_ No Headspace Hydrogen Sulfide T HO6N/sisten nZ, 91 Seal intact? **70**\$ T 1LP, Cool 11/1/10 23 SOT Date/Time; 15110 ALP, Cool ALP, Cool Date/Time: Date/Time: ate/fime: Date/Time Grab × × × × × 1 etisoqmo 5 110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 B13-855-1844 fax B13-855-2218 MAA-Ŵ WM xinteM PNRS II Wastewater System Analyses 8 6 3 4 S 30 06:45 CONTIE emi⊺ 3 0 0 12/20 01/ 115/10 Hazan and Sawyer Received: sceived: feceived Received Date 2 11/12/1000:58 DID NOT SAMPLE TOID NOT SAMPLE Date/Time: 1640 v V V 1-11-10 Date/Time: /10 H. www. DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other Date/Time: Date/Time: Date/Time Sample Description **R-Reagent Water** in the second Matrix Codes: Andre Him WN5AT-153 Project Name / Location Samplers: (Signature) 03 - HNSAT-IS3 UNSAT-IS2 UNSAT-184 UNSAT-IS1 Containers Prepai Chain of Custody.ds Rev.Date 11/19/01 Client Name Relinquished: Relinquished Relinquished M Sample No. 02 SAL Use Only 5 2 20-10 030



| PARAMETER CONTAINER Decleback@Hazanandssille Mainx Mainx Physics OP Physi | Client Name | Hazar | Hazan and Sawver | | | - | | | | Contact / Phone: Josephin Edeback-Hirst | hone: deback-Hir | 1 | 813-630-4498 | | |
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