

Effluent Quality Assessment

Sea World – Discovery Cove

Orange County

NPDES #FL0622648

Sampled August 12, 2013

November 2013

Biology Section
Bureau of Laboratories
Division of Environmental Assessment and Restoration
2013 FDEP Bureau of Labs Quality Manual
NELAC Certification No. E31780

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Sea World – Discovery Cove, 7007 Sea World Drive, Orlando, Orange County, Florida, NPDES #FL0622648.

Facility Overview

Sea World – Discovery Cove is a theme park which combines several waste streams into a holding pond for aeration treatment prior to discharge. See Appendix A for a description of the facility, summary of permit limits and Discharge Monitoring Report (DMR) information.

Methods

Effluent grab samples for toxicity testing and biological and chemical analyses for this facility were collected on August 12, 2013. All samples were collected from the EFF-02 NPDES sampling point for Outfall D-002 by Phil Kane and Jason Seyfert (FDEP Central District), and Evan Melear (volunteer from Winter Park High School under Phil Kane) following DEP-SOP-001/01 FS 2400 Wastewater Sampling (see Appendix C)

The 96-hour acute definitive toxicity tests and algal growth potential test were performed following internal DEP SOPs TA07_01, TA07_02, and TA08_01 through TA08_09 (see Appendix C).

Results

Chemistry Results (See Table 1 and Appendix D)

- Total residual chlorine and total ammonia were not detected in the bioassay sample in the laboratory. The total ammonia concentration in the grab sample collected and preserved for chemical analysis was 0.005 I mg N/L. Based on the pH, salinity, and temperature of the effluent as collected, the calculated unionized ammonia concentration was < 0.02 mg/L.
- Copper, iron, carbonaceous biochemical oxygen demand (CBOD), chloride, fluoride, mercury, sulfate, and effluent turbidity were detected in the effluent at levels that comply with Class III Freshwater Quality Criteria (62-302.530, F.A.C.) and/or permitted limits. Arsenic, cadmium, chromium, nickel, and selenium were detected between the laboratory method detection limits (MDL) and practical quantitation limits (PQL). The chlorophyll concentration was high, suggesting nutrient enrichment may be an issue.

Algal Growth Potential (See Table 2 Appendix D)

- The effluent Algal Growth Potential (AGP) was 1.13 A mg dry wt/L of the unicellular green alga, *Pseudokirchneriella subcapitata*, formerly known as *Selenastrum capricornutum*. Raschke and Schultz (1987) determined that AGP values above 5.0 mg dry weight/L represent a "problem" threshold for fresh receiving waters, implying nutrient enrichment. The analytical chemistry suggests that the effluent is co-limited by both nitrogen and phosphorus (Miller et al. 1978). Differences greater than an order of magnitude between actual and predicted AGP values warrant follow up testing with the algal growth inhibition bioassay. True algal growth inhibition can only be determined by performing this test which should be requested by the district as a follow-up to the inspection.

  The high chlorophyll result and the low AGP result present conflicting evidence for interpreting the potential for nutrient enrichment and algal growth inhibition. As noted above, an algal growth inhibition bioassay would need to be performed to determine if the low AGP result was due to an "inhibiting" substance or was in fact due to the non-bioavailability of the organic nitrogen to the test species.

  The evidence presented by the high chlorophyll result more strongly suggests the potential for nutrient enrichment than does the low AGP result suggest the absence of a potential for nutrient enrichment.

Toxicity Test Results (See Appendices D- G)

- Tests were performed August 13 - 17, 2013

Ceriodaphnia dubia 96-hour acute definitive bioassay –	LC_{50} > 100%, 5%* mortality in 100% sample at 96 hours
Pimephales promelas 96-hour acute definitive bioassay –	LC_{50} > 100%, 5%* mortality in 100% sample at 96 hours

*NOTE: In a 96-hour acute definitive test of 100% effluent, mortality of <20% provides confidence that the effluent meets the acute toxicity criterion of Florida's Surface Water Quality Standards (Rule 62-302.500 (1) (a) 4, F.A.C.). Mortality between 20-50% indicates low to moderate levels of toxicity, and further action may be required. Mortality of >50% indicates that the effluent fails to meet the minimum requirement to discharge to waters of the state (Rule 62-4.244(3) (a), F.A.C.).

- The bioassay samples were not acutely toxic to the test organisms.

Conclusion

The effluent sample collected from the EFF-02 NPDES sampling point for this facility on August 12, 2013, was not acutely toxic to either test species during the 96-hour acute definitive bioassays. The AGP result is more than an order of magnitude less than the predicted AGP values based on the effluent nutrient concentrations, suggesting that algal growth inhibition may be an issue. Effluent water quality samples collected on August 12, 2013, did not exceed any applicable water quality standards or violate any permit conditions.

Literature Cited

Miller, W. E., T. E. Maloney, and J. C. Greene. 1978. The *Selenastrum capricornutum* Printz algal assay bottle test. EPA-600/9-78-018. U. S. EPA, Cincinnati, Ohio. 126 p.

Raschke, R. L. and D. A. Schultz. 1987. The use of the algal growth potential test for data assessment. J. Wat. Poll. Cont. Fed. 59(4): 222-227.

Table 1. Effluent limits, Class III Freshwater Criteria, chemical data, and qualifiers.

Sea World - Discovery Cove	Class III Criteria	Effluent Limits	Effluent	
Metals (µg/L unless otherwise noted)				
Aluminum	-	-	164	
Arsenic	≤ 50	-	0.44	I
Cadmium	≤ 0.394 b	≤ 0.394 b	0.089	I
Calcium (mg/L)	-	-	46.6	
Chromium-III	≤ 130.5 b	-	0.37	I
Chromium-VI		≤ 11.0	2.4	U
Copper	≤ 14.37 b	≤ 14.37 b	1.17	
Iron	≤ 1,000	-	350	
Lead	≤ 6.055 b	≤ 6.055 b	0.20	U
Magnesium (mg/L)	-	-	12.0	
Mercury	≤ 0.012	≤ 0.012	0.0014	
Nickel	≤ 80.0 b	-	0.41	I
Potassium (mg/L)			6.8	
Selenium	≤ 5.0	-	0.47	I
Silver	≤ 0.07	-	0.025	U
Sodium (mg/L)	-	-	116	
Zinc	≤ 183.9 b	≤ 183.9 b	5.0	U
Nutrients (mg/L)				
Ortho-phosphate	-	-	0.004	U
Total Phosphorus	-	Report	0.057	
Total Ammonia	-	Report	0.005	I
Un-ionized Ammonia	≤ 0.02 s	≤ 0.02	< 0.02	c
Nitrate and Nitrite	-	Report	0.004	U
Total Kjeldahl Nitrogen	-	Report	1.1	
Organic Nitrogen	-	-	1.095	c
Total Nitrogen	-	Report	1.102	c
Total Organic Carbon	-	-	8.6	A
General Physical and Chemical Parameters				
Dissolved Oxygen (mg/L)	≥ 5.0	≥ 5.0	11.0	
pH (SU)	6.0 - 8.5	6.0 - 8.5 p	7.7	
Specific Conductance (µmhos/cm)	≤ 1,275	-	952	
Temperature (°C)	-	Report	30.8	
Salinity	-	-	≤ 0.42	c
Total Residual Chlorine (mg/L)	≤ 0.01	≤ 0.01	≤ 0.03	QU£
Chlorophyll *a* (µg/L) - Corrected	-	-	51	
Phaeophytin (µg/L)	-	-	3.7	
Turbidity (NTU)	< 29 t	-	6.0	
Color (true, PCU)	-	-	19	
Alkalinity (mg CaCO3/L)	-	-	66	A
CBOD, 5 day (mg/L), N - inhibited	-	Report	6.6	AJ
Chloride (mg/L)	-	Report	230	A
Fluoride (mg/L)	≤ 10.0	-	0.14	
Sulfate (mg/L)	-	Report	24	A
Flow (MGD) (8/1/12 - 8/31/13)	-	Report	0.504	m
Hardness (mg $CaCO_3$)	-	Report	165.78	c

A dash (-) indicates sample/measurement was not collected or criterion/limit does not exist.

Value exceeds the Class III Water Quality Criteria or permit limits

a - Annual average

b - Value is calculated based on hardness

c - Value is calculated

m - monthly average

p - metered in situ

t - Shall not exceed 29 NTUs above background

A - Value reported is the mean of two or more determinations

I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit

J - Estimated value

Q - Sample held beyond normal holding time

U - Material analyzed for but not detected; value reported is the method detection limit

£ - measurement taken in the FDEP laboratory

Table 2. Measured and predicted algal growth potential (AGP; mg dry weight/L) for total soluble inorganic nitrogen (TSIN), total nitrogen (TN) and total phosphorus (TP) limitation of the freshwater species *Pseudokirchneriella subcapitata* and ratios of nitrogen to phosphorus.

Sea World - Discovery Cove					
Location	AGP (measured)	*Predicted AGP (TSIN) ± 20%	Predicted AGP (TN) ± 20%	Predicted AGP (TP) ± 20%	Total N:P ratio
Effluent	1.13 A	0.2 ± 0.1	42.0 ± 8.4	24.5 ± 4.9	19.4

A - Value reported is the mean of two or more determinations.

*Since ortho-phosphate was not detected, an inorganic nitrogen to ortho-phosphate ratio was not calculated.

Appendix A
Facility Summary

State of Florida
Department of Environmental Protection
Facility Introduction & Summary

PART I: Information gathered prior to sampling event		
Prepared By: William Hesser		Contact Number: 407-897-4170
Facility Name (as it appears on permit): Sea World - Discovery Cove Minor NPDES Discharge		Former Names: FPL Cape Canaveral
NPDES Permit Number: 48-FL0622648	Permit Expiration Date: October 17, 2015	
Physical Address: 7007 Sea World Drive, Orlando, Orange County, Florida		
District: Central District	County: Orange	
Function of Facility: Theme Park		
Facility Type: Theme Park	Permitted Capacity (MGD): 0.861 MGD	
Mean Flow for previous 12 months for all EXTERNAL outfalls listed in permit (list date range including months): D-002 0.485 MGD		
If applicable, Mean Flow for previous 12 months for REUSE outfall(s) (list date range including months): N/A		
Description of type of Discharge: ☒ Continuous ☐ Intermittent ☐ Seasonal ☐ Rainfall Dependent ☐ Other, please specify		

Description of Sampling Location(s) - actual permit designation of permitted sampling point(s):

1. Effluent samples shall be taken at the monitoring site locations listed in Permit Condition I.A.1. and as described below:

Monitoring Site Number	Description of Monitoring Site
EFF-02	Sampling location at Outfall D-002.
FLW-02	Flow meter at Outfall D-002 in Pond 13.
INT-04	Sampling location for Fecal Coliform as the wastewater enters Pond 13. (Designated G-11 by the permittee.)
INT-05	Sampling location for Fecal Coliform as the wastewater enters Pond 13. (Designated G-12 by the permittee.)
INT-06	Sampling location for Fecal Coliform as the wastewater enters Pond 13. (Designated G-13 by the permittee.)
SWA-01	Ambient sampling location in the C-5 Canal as noted in Condition I.C.8.

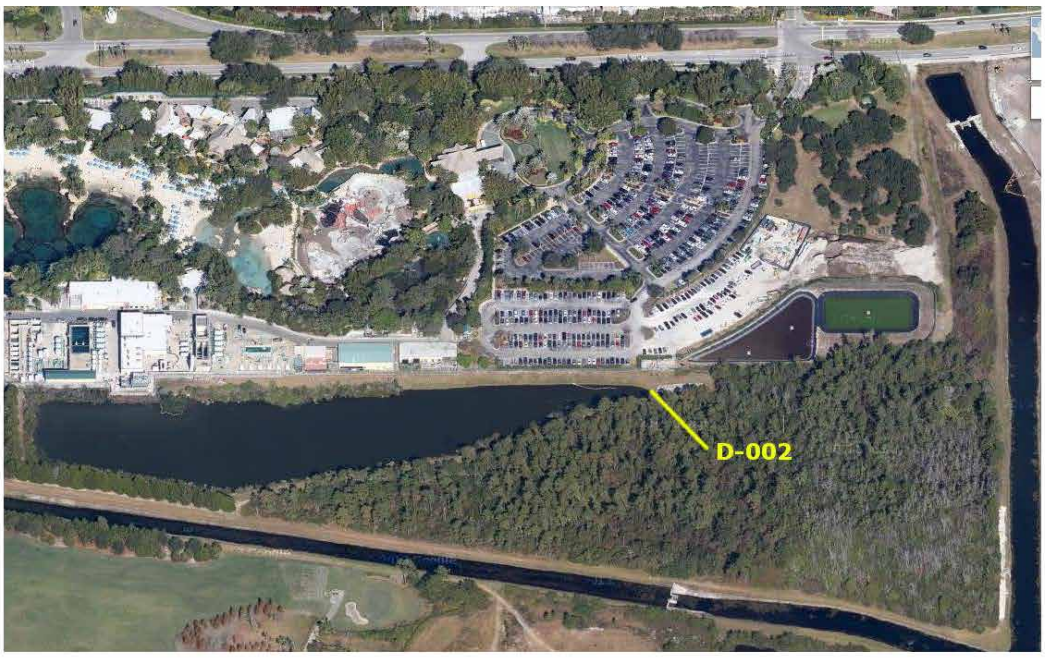
Description of Permitted Outfall(s):

Surface Water Discharge D-002: A 0.861 MGD Daily Maximum Wastewater Flow plus storm water runoff discharge from Pond 13, flows across a wooded wetland area, to the Valencia Water Control District C-5 Canal and then to the C-1 Canal (See DEP Exhibits #4 & 5), thence to the Shingle Creek (WBID# 3169A). Each of these water bodies are Class III Fresh Waters and none are listed as Outstanding Florida Waters. The point of discharge from Pond 13 is a concrete weir located approximately at latitude 28°24' 14" N, longitude 81°27' 38" W.

Description of Treatment Process (if multiple discharge points, include a detailed map or diagram of facility):

The wastestreams that are a part of this permit are: From the Sea World Park on the north side of Central Florida Parkway there is 0.075 MGD of discharge from foundation drains; 2,400 gpd of Park Wash Down; stormwater runoff from several pavilions, a restaurant and the Wild Arctic area. From the Discovery Cove Park south of Central Florida Parkway there are produced ground water discharges from construction activity dewatering with flows up to 0.60 MGD; 0.050 MGD from the added fresh water used for salinity control (see restriction in Part VI.1.4) in Pond 13 at G-14; and 0.050 MGD of product water from a Reverse Osmosis (RO) ground water treatment system at G-14 (See DEP Exhibit # 5). The discharges of demineralization concentrate from the RO system is not allowed into Pond 13 or to the surface waters of the State. Also, this permit does not authorize discharges of untreated produced ground water from any area that has soil and or ground water contamination. Smaller waste streams are the 4,000 gpd from the Guest Rinse areas (showers), 2,000 gpd of incidental pool splash and carry out, 1,800 gpd of miscellaneous Park Wash Down; and small amounts of incidental overspray of reclaimed domestic wastewater used for the landscape irrigation system, Compressor Condensate and wash down from a Bird Aviary. The latter three wastestreams are each less than 100 gpd. Net maximum daily flow for the Park is 0.861 MGD in addition to an estimated long term average daily flow of 0.117 MGD from stormwater runoff.

These wastestreams are all directed to unlined Pond 13. Detention in Pond 13 provides aeration treatment by contact time with the atmosphere and settling. Pond 13 discharges via an Outfall structure at the eastern end. This structure is Outfall D-002. See DEP Exhibits #4 & 5.



PART I: Continued
List current Effluent Limits of Outfall(s) to be Sampled: This should include any AO or CO limits the facility may be under (Leave cell blank if not applicable)

Surface Water Discharges

2. During the period beginning on the issuance date and lasting through the expiration date of this permit, the permittee is authorized to discharge non-process wastewater and stormwater from Outfall D-002 to Shingle Creek and Valencia Water District Canal C-5. Such discharge shall be limited and monitored by the permittee as specified below and reported in accordance with Permit Condition I.C.3:

			Effluent Limitations		Monitoring Requirements			
Parameter	Units	Max/Min	Limit	Statistical Basis	Frequency of Analysis	Sample Type	Monitoring Site Number	Notes
Flow	MGD	Max Max	0.861 Report	Daily Maximum Monthly Average	Daily, when discharging	Calculated Metered	FLW-02	See I.C.9
pH	s.u.	Min Max	6.0 8.5	Monthly Minimum Monthly Maximum	Weekly	Metered in situ	EFF-02	
Temperature, Water	Deg C	Max Max	Report Report	Daily Maximum Monthly Average	Monthly	Metered in situ	EFF-02	
Specific Conductance	umhos/cm	Max Max	See (vi)	Daily Maximum Monthly Average	Weekly	Metered in situ	EFF-02	See I.A.7
Specific Conductance	umhos/cm	Max Max	See (vi)	Daily Maximum Monthly Average	Weekly	Metered in situ	SWA-01	See I.A.7
Phosphorus, Total (as P)	mg/L	Max Max	Report Report	Daily Maximum Monthly Average	Monthly	Grab	EFF-02	
Nitrogen, Total (as N)	mg/L	Max Max	Report Report	Daily Maximum Monthly Average	Monthly	Grab	EFF-02	
Nitrogen, Nitrate, Total (as N)	mg/L	Max Ave	Report Report	Daily Maximum Monthly Average	Monthly	Grab	EFF-02	

			Effluent Limitations		Monitoring Requirements			
Parameter	Units	Max/Min	Limit	Statistical Basis	Frequency of Analysis	Sample Type	Monitoring Site Number	Notes
Nitrogen, Kjeldahl, Total (as N)	mg/L	Max Max	Report Report	Daily Maximum Monthly Average	Monthly	Grab	EFF-02	
Nitrogen, Ammonia, Total (as N)	mg/L	Max Max	Report Report	Daily Maximum Monthly Average	Monthly	Grab	EFF-02	
Nitrogen, Unionized Ammonia, Total (as N)	mg/L	Max Max	0.02 Report	Daily Maximum Monthly Average	Monthly	Grab	EFF-02	
Chlorine, Total Residual	mg/L	Max Ave	0.010 Report	Daily Maximum Monthly Average	Monthly	Grab	EFF-02	
BOD, Carbonaceous 5 day, 20C	mg/L	Max Max	Report Report	Daily Maximum Monthly Average	Monthly	Grab	EFF-02	
Algal Growth Potential	#/mL	Max Max	Report Report	Daily Maximum Monthly Average	Quarterly	Grab	EFF-02	
Oxygen, Dissolved (DO)	mg/L	Min	5.0	Daily Minimum	Weekly	Meter	EFF-02	
Sodium, Total (as Na)	mg/L	Max Max	Report Report	Daily Maximum Monthly Average	Monthly	Grab	EFF-02	
Chloride (as Cl)	mg/L	Max Max	Report Report	Daily Maximum Monthly Average	Monthly	Grab	EFF-02	
Sulfate, Total	mg/L	Max Max	Report Report	Daily Maximum Monthly Average	Monthly	Grab	EFF-02	
Copper, Total Recoverable(ii)	ug/L	Max Max	Calculate (ii)	Daily Maximum Monthly Average	Monthly	Grab	EFF-02	See I.A.4
Mercury Total Recoverable	ug/L	Max	0.012	Single Sample	Quarterly(v)	Grab	EFF-02	
Cadmium Total Recoverable(ii)	ug/L	Max	Calculate (ii)	Single Sample	Quarterly(v)	Grab	EFF-02	See I.A.4

			Effluent Limitations		Monitoring Requirements			
Parameter	Units	Max/Min	Limit	Statistical Basis	Frequency of Analysis	Sample Type	Monitoring Site Number	Notes
Lead Total Recoverable(ii)	ug/L	Max	Calculate (ii)	Single Sample	Quarterly(v)	Grab	EFF-02	See I.A.4
Zinc Total Recoverable(ii)	ug/L	Max	Calculate (ii)	Single Sample	Quarterly(v)	Grab	EFF-02	See I.A.4
Chromium Hex Total Recoverable	ug/L	Max	$\leq$ 11	Single Sample	Quarterly(v)	Grab	EFF-02	
Total Organic Carbon	mg/L	Max	10	Single Sample	Quarterly(v)	Grab	EFF-02	
Benzene	ug/L	Max	1.0	Single Sample	Quarterly(v)	Grab	EFF-02	
Naphthalene	ug/L	Max	100	Single Sample	Quarterly(v)	Grab	EFF-02	
Hardness, Total (as CaCO3)(iv)	mg/L	Max	Report	Single Sample	Monthly	Grab	EFF-02	See I.A.4
Coliform, Fecal(iii)	#/100mL	Max Max	800 200	Daily Maximum Monthly Average	Monthly	Grab	INT-04	aka G-11
Coliform, Fecal(iii)	#/100mL	Max Max	800 200	Daily Maximum Monthly Average	Monthly	Grab	INT-05	aka G-12
Coliform, Fecal(iii)	#/100mL	Max Max	800 200	Daily Maximum Monthly Average	Monthly	Grab	INT-06	aka G-13
Chronic Whole Effluent Toxicity, 7-Day IC25 (Ceriodaphnia dubia)	percent	Min	100	Single Sample	Quarterly		EFF-02	See I.A.5
Chronic Whole Effluent Toxicity, 7-Day IC25 (Pimephales promelas)	percent	Min	100	Single Sample	Quarterly		EFF-02	See I.A.5

(i) Total Flow from all non-stormwater sources is limited to 0.861 MGD. This includes a 10% margin. See Permit Condition Number I.C.9.

(ii). The limit for "Hardness based metals shall be calculated using the following equation(s): $Cu \leq e^{(0.8545[\ln H]-1.702)}$; $Cd \leq e^{(0.7409[\ln H]-}$

$^{4.719)}$;Pb $\leq$ $e^{(1.273\ [\ln H]-4.705)}$; Zn $\leq$ $e^{(0.8473[\ln H]+0.884)}$

(iii). INT-04, INT-05 and INT-06 are shown on DEP Exhibit Number 4. These sampling locations are the point of compliance with the Rule 62-302.530(6) FAC for Fecal Coliform. MPN (Most Probable Number) or MF (Membrane Filter) counts shall not exceed a monthly average of 200, nor exceed 400 in 10% of the samples, nor exceed 800 on any one day. Monthly averages shall be expressed as geometric means based on a minimum of 10 samples taken over a 30 day period. The permittee has separate designations (G-11, G-12, and G-13) for these locations as shown in DEP Exhibit number 5.

(iv).Total hardness shall be measured at the time of the effluent sample. The "ln H" means the natural logarithm of total hardness expressed as mg/L of $CaCO_3$. For calculated metals criteria using equations with hardness, the hardness shall be set at 25 mg/L if actual hardness is <25 mg/L and set at 400 mg/L if actual hardness is >400 mg/L.

(v). The sampling of these parameters is associated with the produced ground water discharges. The facility should analyze these parameters one time before proceeding with any construction dewatering activity. This preliminary sampling shall be from a properly representative recovery or dewatering well and not at D-002. The first time sampling analysis report shall be kept on site and submitted on request. Subsequent sampling frequency and DMR submittal shall be as defined in the above table.

(vi) Shall not be increased more than 50% above background or to 1275.

Daily Discharge - The "discharge of a pollutant" measured during a calendar day or any 24 hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutants discharged over the day. For pollutants expressed in other units of measurements; e.g., concentration, "daily discharge" is calculated as the average measurement of the pollutant over the day.

Average Monthly Discharge Limitation - The highest allowable average of "daily discharges" over a calendar month, calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month. Definition does not apply to Fecal Coliform.

Maximum Daily Discharge Limitation - The highest allowable daily discharge.

3. Effluent samples shall be taken at the monitoring site locations listed in Permit Condition I.A.1. and as described below:

Monitoring Site Number	Description of Monitoring Site
EFF-02	Sampling location at Outfall D-002.
FLW-02	Flow meter at Outfall D-002 in Pond 13.
INT-04	Sampling location for Fecal Coliform as the wastewater enters Pond 13. (Designated G-11 by the permittee.)
INT-05	Sampling location for Fecal Coliform as the wastewater enters Pond 13. (Designated G-12 by the permittee.)
INT-06	Sampling location for Fecal Coliform as the wastewater enters Pond 13. (Designated G-13 by the permittee.)
SWA-01	Ambient sampling location in the C-5 Canal as noted in Condition I.C.8.

4. The discharge shall not contain components that settle to form putrescent deposits or float as debris, scum, oil, or other matter. [62-302.500(1)(a)]

5. The limit for "Metals (copper lead etc.), Total Recoverable" shall be calculated using the equation(s):

$Cu \leq e^{(0.8545[\ln H]-1.702)}$; $Cd \leq e^{(0.7409[\ln H]-4.719)}$; $Pb \leq e^{(1.273[\ln H]-4.705)}$; $Zn \leq e^{(0.8473[\ln H]+0.884)}$

Total hardness shall be measured at the time of the effluent sample. The "ln H" means the natural logarithm of total hardness expressed as mg/L of $CaCO_3$. For metals criteria involving equations with hardness, the hardness shall be set at 25 mg/L if actual hardness is <25 mg/L and set at 400 mg/L if actual hardness is >400 mg/L.

The measured effluent value shall be recorded on the DMR in the parameter row for "Metal Total Recoverable (effluent)." The calculated effluent limit shall be recorded on the DMR in the parameter row for "Metal, Total Recoverable (calculated limit)." Compliance with the effluent limitation is determined by calculating the difference between the measured effluent value and the calculated. The compliance value shall be recorded on the DMR in the parameter row for "Copper, Total Recoverable (effluent minus calculated limit)." The compliance value shall not exceed 0.00. [62-302.530(23)]

6. The permittee shall comply with the following requirements to evaluate Chronic Whole Effluent Toxicity of the discharge from Outfall D-002.

   a. Effluent Limitation
      (1) In any routine or additional follow-up test the Chronic whole effluent Toxicity the 25 percent inhibition concentration (IC25) shall not be less than 100% effluent. [Rules 62-302.530(61) and 62-4.241(1)(b), F.A.C.]
      (2) Whole effluent Acute Toxicity the 96-hour LC50 shall not be less than 100% effluent in any test. [Rule 62-302.500(1)(a)4. and 62-4.241(1)(a), F.A.C.]

   b. Monitoring Frequency
      (1) Routine toxicity tests shall be conducted once every three months, the first starting within 60 days of the issuance date of this permit and lasting for the duration of this permit.
      (2) Upon completion of four consecutive, valid routine tests that demonstrate compliance with the effluent limitation in 5.a.(1) above, the permittee may submit a written request to the Department for a reduction in monitoring frequency to once every six months. The request shall include a summary of the data and the complete bioassay laboratory reports for each test used to demonstrate compliance. The Department shall act on the request within 45 days of receipt. Reductions in monitoring shall only become effective upon the Department's written confirmation that the facility has completed four consecutive valid routine tests that demonstrate compliance with the effluent limitation in 5.a.(1) above.
      (3) If a test within the sequence of the four is deemed invalid based on the acceptance criteria in EPA-821-R-02-013, but is replaced by a repeat valid test initiated within 21 days after the last day of the invalid test, the invalid test will not be counted against the requirement for four consecutive valid tests for the purpose of evaluating the reduction of monitoring frequency.

   c. Sampling Requirements
      (1) For each routine test or additional follow-up test conducted, a total of three 24-hour flow proportional composite samples of final effluent shall be collected and used in accordance with the sampling protocol discussed in EPA-821-R-02-013, Section 8.
      (2) The first sample shall be used to initiate the test. The remaining two samples shall be collected according to the protocol and used as renewal solutions on Day 3 (48 hours) and Day 5 (96 hours) of the test.
      (3) Samples for routine and additional follow-up tests shall not be collected on the same day.

   d. Test Requirements
      (1) Routine Tests: All routine tests shall be conducted using a control (0% effluent) and a minimum of five test dilutions: 100%, 50%, 25%, 12.5%, and 6.25% final effluent.

(2) The permittee shall conduct a daphnid, Ceriodaphnia dubia, Survival and Reproduction Test and a fathead minnow, Pimephales promelas, Larval Survival and Growth Test, concurrently.
(3) All test species, procedures and quality assurance criteria used shall be in accordance with Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, 4th ed., EPA-821-R-02-013. Any deviation of the bioassay procedures outlined herein shall be submitted in writing to the Department for review and approval prior to use. In the event the above method is revised, the permittee shall conduct chronic toxicity testing in accordance with the revised method.
(4) The control water and dilution water shall be moderately hard water as described in EPA-821-R-02-013, Section 7.

e. Quality Assurance Requirements
(1) A standard reference toxicant (SRT) quality assurance (QA) chronic toxicity test shall be conducted with each species used in the required toxicity tests either concurrently or initiated no more than 30 days before the date of each routine or additional follow-up test conducted. Additionally, the SRT test must be conducted concurrently if the test organisms are obtained from outside the test laboratory unless the test organism supplier provides control chart data from at least the last five monthly chronic toxicity tests using the same reference toxicant and test conditions. If the organism supplier provides the required SRT data, the organism supplier's SRT data and the test laboratory's monthly SRT-QA data shall be included in the reports for each companion routine or additional follow-up test required.
(2) If the mortality in the control (0% effluent) exceeds 20% for either species in any test or does not meet "test acceptability criteria", the test for that species (including the control) shall be invalidated and the test repeated. Test acceptability criteria for each species are defined in EPA-821-R-02-013, Section 13.12 (Ceriodaphnia dubia) and Section 11.11 (Pimephales promelas). The repeat test shall begin within 21 days after the last day of the invalid test.
(3) If 100% mortality occurs in all effluent concentrations prior to the end of any test and the control mortality is less than 20% at that time, the test (including the control) shall be terminated with the conclusion that the test fails and constitutes non-compliance.
(4) Routine and additional follow-up tests shall be evaluated for acceptability based on the observed dose-response relationship as required by EPA-821-R-02-013, Section 10.2.6., and the evaluation shall be included with the bioassay laboratory reports.

f. Reporting Requirements
(1) Results from all required tests shall be reported on the Discharge Monitoring Report (DMR) as follows:
(a) Routine and Additional Follow-up Test Results: The calculated IC25 for each test species shall be entered on the DMR.
(2) A bioassay laboratory report for each routine test shall be prepared according to EPA-821-R-02-013, Section 10, Report Preparation and Test Review, and mailed to the Department at the address below within 30 days after the last day of the test.
(3) For additional follow-up tests, a single bioassay laboratory report shall be prepared according to EPA-821-R-02-013, Section 10, and mailed within 30 days after the last day of the second valid additional follow-up test.
(4) Data for invalid tests shall be included in the bioassay laboratory report for the repeat test.
(5) The same bioassay data shall not be reported as the results of more than one test.
(6) All bioassay laboratory reports shall be sent to:
Florida Department of Environmental Protection
Central District Office

3319 Maguire Blvd, Suite 232
Orlando, Florida 32803-3767

g. Test Failures
(1) A test fails when the test results do not meet the limits in 5.a.(1).
(2) Additional Follow-up Tests:
(a) If a routine test does not meet the chronic toxicity limitation in 5.a.(1) above, the permittee shall notify the Department at the address above within 21 days after the last day of the failed routine test and conduct two additional follow-up tests on each species that failed the test in accordance with 5.d.
(b) The first test shall be initiated within 28 days after the last day of the failed routine test. The remaining additional follow-up tests shall be conducted weekly thereafter until a total of two valid additional follow-up tests are completed.
(c) The first additional follow-up test shall be conducted using a control (0% effluent) and a minimum of five dilutions: 100%, 50%, 25%, 12.5%, and 6.25% effluent. The permittee may modify the dilution series in the second additional follow-up test to more accurately bracket the toxicity such that at least two dilutions above and two dilutions below the target concentration and a control (0% effluent) are run. All test results shall be statistically analyzed according to the Appendices in EPA-821-R-02-013.
(3) In the event of three valid test failures (whether routine or additional follow-up tests) within a 12-month period, the permittee shall notify the Department within 21 days after the last day of the third test failure.
(a) The permittee shall submit a plan for correction of the effluent toxicity within 60 days after the last day of the third test failure.
(b) The Department shall review and approve the plan before initiation.
(c) The plan shall be initiated within 30 days following the Department's written approval of the plan.
(d) Progress reports shall be submitted quarterly to the Department at the address above.
(e) During the implementation of the plan, the permittee shall conduct quarterly routine whole effluent toxicity tests in accordance with 5.d. Additional follow-up tests are not required while the plan is in progress. Following completion or termination of the plan, the frequency of monitoring for routine and additional follow-up tests shall return to the schedule established in 5.b.(1). If a routine test is invalid according to the acceptance criteria in EPA-821-R-02-013, a repeat test shall be initiated within 21 days after the last day of the invalid routine test.
(f) Upon completion of four consecutive, valid routine tests that demonstrate compliance with the effluent limitation in 5.a.(1) above, the permittee may submit a written request to the Department to terminate the plan. The plan shall be terminated upon written verification by the Department that the facility has passed at least four consecutive valid routine whole effluent toxicity tests.
If a test within the sequence of the four is deemed invalid, but is replaced by a repeat valid test initiated within 21 days after the last day of the invalid test, the invalid test will not be counted against the requirement for four consecutive valid tests for the purpose of terminating the plan.
(4) If chronic toxicity test results indicate greater than 50% mortality within 96 hours in an effluent concentration equal to or less than the effluent concentration specified as the acute toxicity limit in 5.a(2), the Department may revise this permit to require acute

definitive whole effluent toxicity testing.

(5) The additional follow-up testing and the plan do not preclude the Department taking enforcement action for acute or chronic whole effluent toxicity permit limit violations.
[62-4.241, 62-620.620(3)]

7. The discharges at D-002 are expected to be above the applicable standards for Fecal Coliform based on the presence of wildlife in the pond area. The Department has agreed to move the point of compliance for this parameter back to internal locations selected by the permittee and designated in this permit as INT-04, INT-05 and INT-06 respectively. These locations are the points where the waste streams enter Pond 13.

8. The limit for "Specific Conductance" shall be 1.5 times the background value or 1275 umhos/cm, whichever is greater.

   The measured effluent value shall be recorded on the DMR in the parameter row for "Specific Conductance (effluent)." The measured background value (at SWA-01) shall be recorded on the DMR in the parameter row for "Specific Conductance (background)." The calculated effluent limit shall be recorded on the DMR in the parameter row for "Specific Conductance (calculated limit)." Compliance with the effluent limitation is determined by calculating the difference between the measured effluent value and the calculated. The compliance value shall be recorded on the DMR in the parameter row for "Specific Conductance (effluent minus calculated limit)." The compliance value shall not exceed 0.00. [62-302.530(22)]

PART I: Continued

Receiving Waters:	Classification (indicate whether fresh or marine):
Valencia Water Control District C-5 Canal (D-002)	Class III Fresh Waters

Toxicity Test Requirements (routine and/or additional test language, test species, salinity adjustment, etc.):
Toxicity testing is required. Please see description above.

Administrative or Consent Orders (date executed, specific requirements, interim limit dates-if applicable, etc.):

The facility has no Administrative Orders (AO) or Consent Orders (CO). The facility has historical and continuing noncompliance issues with salt contamination in the groundwater.

Facility Mixing Zone Details (if applicable):
N/A

List Permit Violations (DMR data) and plant upsets that occurred at the plant within the last year:

Date	Parameter and Units	Limit	Result
10/31/12	Specific Conductance (umho/cm)	0	98
11/30/12	Specific Conductance (umho/cm)	0	438
12/31/12	Specific Conductance (umho/cm)	0	446
01/31/13	Specific Conductance (umho/cm)	0	502
01/31/13	Unionized Ammonia (mg/L)	0.02	0.099
02/28/13	Specific Conductance (umho/cm)	0	619
03/31/13	Specific Conductance (umho/cm)	0	633
04/30/13	Unionized Ammonia (mg/L)	0.02	0.11
04/30/13	Flow (MGD)	0.861	0.894
05/31/13	pH (SU)	8.5	8.8

Describe previous FYI and WQBEL study:

None

Describe previous or current Enforcement Actions (including WLs):

None

Describe any violations or problems noted in previous inspection:

The following statement was included as part of the Compliance Evaluation Inspection (CEI) conducted on September 20, 2012 by William Hesser:

DMRs were reviewed from December, 2011 through August, 2012 with effluent quality deficiencies summarized in the following tables:

Outfall D-002

Reporting period

Parameter	Limit	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12
Dissolved Oxygen Daily Minimum (mg/L)	5.0							3.8		
Specific Conductance (effluent - calculated limit) Daily Maximum (umhos/cm)	0	102				14	121			
Unionized Ammonia Daily Maximum (mg/L)	0.02					0.037	0.051	0.34		

Discuss whether DMR trends within previous five years are improving or declining:

N/A

Additional Comments (this should include a trend of the Effluent, i.e. if the facility is now Reuse):

PART II: Sampling Event Information

Date(s) sample collected:	**Sampler(s):**
Temperature (Deg C):	**pH (SU):**
Dissolved Oxygen (mg/L):	**Conductivity (umhos/cm):**

Total Residual Chlorine (mg/L):	**Total Residual Chlorine - after Disinfection (mg/L):**
Method of Chlorination:	**Method of De-chlorination:**
Flow During Sample Collection for each outfall(MGD):	
Mean Flow for each outfall for previous 12 months based on sampling date (If samples are taken on more than one day, indicate Mean Flow for each day):	
Describe Discharge during Sampling Event: ☐ **Continuous** ☐ **Intermittent** ☐ **Seasonal** ☐ **Rainfall Dependent** ☐ **Other, please specify**	
Describe any conditions, difficulties or abnormal events that occurred during the sample collection and any other additional comments here:	

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2013-08-12-20
FYI3 Discovery Cove Sampling Inspection

Customer: CEN-DIST
Project ID: FYI3
PMAS: 1143

Requester: Jennifer G. Weger
Collected By: KANE, SEYFERT, MELEAR
Sampling Agency: FDEP CENTRAL DISTRICT

Field Report Prepared By: Kane
Send Final Report To: David Smicherko, Phil Kane

Lab ID *	Location: DISCOVERY COVE 6000 DISCOVERY COVE WAY ORLANDO, FLORIDA			☐ Comp ☑ Grab	Collection (comp begin or grab) Eastern Central Date Time (PK)	Composite end Eastern Central Date 8/12/2013 Time 9:41		Bottle Group(s)**	
	Field ID: FISH				Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L): 10.99	Storet Station Number		A
	Matrix (include type e.g. Salt, Fresh, etc): EFFLUENT	Temp (C): 30.76	pH: 7.65	Sample Depth ☐ m ☐ ft: SURFACE	952	☐ Salinity (PPTh) ☑ Sp Conductance (umho/cm)	NPDES Number: FL0622648		
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms		Comments: Checked pH on nutrients & metals					
Lab ID *	Location: DISCOVERY COVE 6000 DISCOVERY COVE WAY ORLANDO, FL			☐ Comp ☑ Grab	Collection (comp begin or grab) Eastern Central Date Time (PK)	Composite end Eastern Central Date 8/12/13 Time 10:23		Bottle Group(s)**	
	Field ID: FISH				Tot Res Chlorine (mg/L): N/A	Diss Oxygen (mg/L): N/A	Storet Station Number		C
	Matrix (include type e.g. Salt, Fresh, etc): BLANK	Temp (C): N/A	pH: N/A	Sample Depth ☐ m ☐ ft: N/A	N/A	☐ Salinity (PPTh) ☑ Sp Conductance (umho/cm)	NPDES Number: FL0622648		
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms		Comments: BLANK					
Lab ID *	Location			☐ Comp ☐ Grab	Collection (comp begin or grab) Eastern Central Date Time	Composite end Eastern Central Date Time		Bottle Group(s)**	
	Field ID				Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number		
	Matrix (include type e.g. Salt, Fresh, etc)	Temp (C)	pH	Sample Depth ☐ m ☐ ft		☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number		
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms		Comments					
Lab ID *	Location			☐ Comp ☐ Grab	Collection (comp begin or grab) Eastern Central Date Time	Composite end Eastern Central Date Time		Bottle Group(s)**	
	Field ID				Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number		
	Matrix (include type e.g. Salt, Fresh, etc)	Temp (C)	pH	Sample Depth ☐ m ☐ ft		☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number		
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms		Comments					

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
KANE	8/12/13	FEDEX	[illegible]	8-13-13 09-15				

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

8-13-13 @ 10:13
4 bioassays AP

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Appendix B
Chain of Custody

Florida Department of Environmental Protection

Request Number: RQ-2013-08-12-20
FYI3 Discovery Cove Sampling Inspection

Event ID *

(IS) ~~Central Laboratory~~ Test America Sample Submittal Form

Customer: FDEP CEN-DIST
Project ID: FYI3
PMAS: 1143

Requester: Jennifer G. Weger
Collected By: KANE, SEYFERT, MELEAR
Sampling Agency: FDEP Central District
Field Report Prepared By: Kane PK
Send Final Report To: ~~David Smitherko~~, Phil Kane ORLANDO OFFICE

Lab ID *
Location: DISCOVERY COVE 6000 DISCOVERY COVE WAY Orlando, FL
Field ID: FISH
Matrix (include type e.g. Salt, Fresh, etc): EFFLUENT
Temp (C): 30.76
pH: 7.65
Latitude ☐ dd ☐ dms
Longitude ☐ dd ☐ dms

☐ Comp ☑ Grab
Collection (comp begin or grab) Eastern/Central Date 8/12/13 Time 10:35
Composite end Eastern/Central Date 8/12/13 Time 10:35
Tot Res Chlorine (mg/L)
Diss Oxygen (mg/L): 10.99
Storet Station Number
Sample Depth ☐ m ☐ ft: Surface
952
☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)
NPDES Number: FL0677648
Bottle Group(s)**: A (one bottle)
Comments: ANALYZE CHROMIUM VI DR. PHIL KANE 407-897-4156 METER READING 10.99 AT 10:15 AM

Lab ID *
Location: DISCOVERY COVE 6000 DISCOVERY COVE WAY Orlando, FL
Field ID: FISH
Matrix (include type e.g. Salt, Fresh, etc): BLANK
Temp (C): N/A
pH: N/A
Latitude ☐ dd ☐ dms
Longitude ☐ dd ☐ dms

☐ Comp ☑ Grab
Collection (comp begin or grab) Eastern/Central Date 8/12/13 Time 10:37
Composite end Eastern/Central Date 8/12/13 Time 10:37
Tot Res Chlorine (mg/L): N/A
Diss Oxygen (mg/L): N/A
Storet Station Number
Sample Depth ☐ m ☐ ft: N/A
N/A
☐ Salinity (PPTh) ☑ Sp Conductance (umho/cm)
NPDES Number: FL0677648
Bottle Group(s)**: C (one bottle)
Comments: BLANK BLANK FOR CHROMIUM VI

Lab ID *
Location
Field ID
Matrix (include type e.g. Salt, Fresh, etc)
Temp (C)
pH
Latitude ☐ dd ☐ dms
Longitude ☐ dd ☐ dms

☐ Comp ☐ Grab
Collection (comp begin or grab) Eastern/Central Date Time
Composite end Eastern/Central Date Time
Tot Res Chlorine (mg/L)
Diss Oxygen (mg/L)
Storet Station Number
Sample Depth ☐ m ☐ ft
☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)
NPDES Number
Bottle Group(s)**
Comments

Lab ID *
Location
Field ID
Matrix (include type e.g. Salt, Fresh, etc)
Temp (C)
pH
Latitude ☐ dd ☐ dms
Longitude ☐ dd ☐ dms

☐ Comp ☐ Grab
Collection (comp begin or grab) Eastern/Central Date Time
Composite end Eastern/Central Date Time
Tot Res Chlorine (mg/L)
Diss Oxygen (mg/L)
Storet Station Number
Sample Depth ☐ m ☐ ft
☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)
NPDES Number
Bottle Group(s)**
Comments

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
KANE	8/12/13	FED EX						

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Appendix C
Explanation of measurements

(1) Quality Assurance and Quality Control

FDEP's quality assurance requirements for analytical laboratories and field activities are codified in Chapter 62-160, F.A.C., Quality Assurance (QA Rule) and in internal Standard Operating Procedures (FDEP SOPs). Methods for all analyses are on file at the FDEP Central Laboratory in Tallahassee and may be viewed on the web at http://www.floridadep.org/labs/sop/index.htm and/or http://www.floridadep.org/labs/qa/index.htm .

(2) Chemical Analyses of the Effluent

The effluent was analyzed for nutrients, metals, organic constituents (base, neutral, and acid extractables) and pesticides following FDEP SOPs. The results from these analyses were compared with Water Quality Criteria (62-302, F.A.C.) and facility permit limits. Exceedances of Water Quality Criteria may constitute violations of specific provisions of Chapter 62-302 (F.A.C.) and/ or facility permit limits.

(3) Toxicity Bioassays

Greater than 50% mortality in an acute toxicity test may constitute an exceedance of 62-302.500(1)a and/or a violation of facility permit limits. An inhibition concentration greater than 25% in a chronic test may constitute exceedances of 62-302.530(20), 62-302.530(61) and/or a violation of facility permit limits. A no observed effect concentration (NOEC) less than 100% effluent in a chronic test may constitute an exceedance of 62-302.530(61) and/or a violation of facility permit limits. Standard reference toxicant (SRT) tests are conducted monthly to ensure quality in toxicity testing.

(4) Bacteriological Testing

High levels of fecal coliform bacteria may constitute an exceedance of 62-302.530(6) and/or a violation of facility permit limits. Fecal coliform and enterococci results often are based on colony counts outside the acceptable range (B-qualifier). The dilutions performed on the sample did not yield results within the method acceptable range of 20-60 colony forming units per plate. The B-qualifier does not affect data quality.

(5) Algal Growth Potential (AGP)

The algal growth potential (AGP) value is the peak growth of the alga within that 14-day period, recorded as mg dry weight/L. Raschke and Shultz (1987) found that an AGP above 5.0 mg dry weight/L represents a “problem” threshold for fresh receiving waters, implying nutrient enrichment. High AGP values may constitute exceedances of 62-302.530(46), F.A.C., 62-302.530(47)(a), F.A.C. and/or 62-302.530(47)(b), F.A.C..

The concentration of nutrients in a water sample may be used to calculate the expected yield of AGP under the assumption that other required nutrients (e.g. silicon, micronutrients) are present in excess (Miller *et al*. 1978). The expected amount of production is calculated as 38 times the total soluble inorganic nitrogen (nitrate and nitrite plus ammonia) under nitrogen limitation or 430 times the ortho-phosphate (OP) concentration under phosphorus limitation with an error of $\pm$ 20%. When the ratio of nitrogen to phosphorus (N: P) is less than 10:1, nitrogen limitation of algal production is likely. When the N: P ratio is 20:1 or greater, phosphorus limitation is likely (USEPA 2000). For ratios in-between, co-limitation may occur. Production of lower biomass than expected may be evidence of growth inhibition related to toxic compounds present in the water sample tested and may constitute an exceedance of 62-302.530(61), F.A.C.

(7) Chlorophyll *a* Content

Chlorophyll *a* content is an estimate of algal biomass . High algal biomass implies nutrient stress (Stevenson and Bahls 1999) and may be constitute exceedances of 62-302.530(46) F.A.C., 62-302.530(47)(a) F.A.C. and/or 62-302.530(47)(b) F.A.C..

(8) Definition of Qualifiers

A - Value reported is the mean of two or more determinations
B - Results based on colony counts outside the acceptable range.
I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Presumptive evidence of presence of material.
O - Sampled, but analysis lost or not performed.
Q - Sample held beyond normal holding time.
T - Value reported is less than the criterion of detection.
U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.
V - Analyte was detected in both sample and method blank.
X - Too few individuals to calculate SCI value.
Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate
Z - Colonies were too numerous to count (TNTC)

Appendix D
Chemical Analyses of Effluent

Date Sampled	Field ID	Analysis Group	Components	Result	Remark	Units	MDL	PQL
8/12/2013 9:41	FISH	AGP/LN	Algal Growth Potential	1.13	A	mg DryWt/L	0.3	0.9
8/12/2013 9:41	FISH	Chlorophyll/Grain Size/BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	6.6	AJ	mg/L	0.2	2
8/12/2013 9:41	FISH	Chlorophyll/Grain Size/BOD	Phaeophytin-a	3.7		ug/L	0.8	2.4
8/12/2013 9:41	FISH	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	51		ug/L	1.1	3.4
8/12/2013 9:41	FISH	Toxicology	Bioassay-Acute-Def-FW-C.dubia, LC50	100	L	LC50		
8/12/2013 9:41	FISH	Toxicology	Bioassay-Acute-Def-FW-Fish, LC50	100	L	LC50		
8/12/2013 9:41	FISH	Metals	Arsenic	0.44	I	ug/L	0.25	1
8/12/2013 9:41	FISH	Metals	Nickel	0.41	I	ug/L	0.25	1
8/12/2013 9:41	FISH	Metals	Aluminum	164		ug/L	5	20
8/12/2013 9:41	FISH	Metals	Lead	0.20	U	ug/L	0.2	0.8
8/12/2013 9:41	FISH	Metals	Cadmium	0.089	I	ug/L	0.05	0.2
8/12/2013 9:41	FISH	Metals	Potassium	6.8		mg/L	0.3	1.2
8/12/2013 9:41	FISH	Metals	Sodium	116		mg/L	0.5	2
8/12/2013 9:41	FISH	Metals	Copper	1.17		ug/L	0.5	1
8/12/2013 9:41	FISH	Metals	Selenium	0.47	I	ug/L	0.2	0.8
8/12/2013 9:41	FISH	Metals	Mercury	1.4		ng/L	0.1	0.4
8/12/2013 9:41	FISH	Metals	Silver	0.025	U	ug/L	0.025	0.1
8/12/2013 9:41	FISH	Metals	Iron	350		ug/L	30	120
8/12/2013 9:41	FISH	Metals	Chromium	0.37	I	ug/L	0.3	1.2
8/12/2013 9:41	FISH	Metals	Magnesium	12.0		mg/L	0.04	0.16
8/12/2013 9:41	FISH	Metals	Calcium	46.6		mg/L	0.075	0.3
8/12/2013 9:41	FISH	Metals	Hardness	166		mg/L	0.4	1.6
8/12/2013 9:41	FISH	Metals	Zinc	5.0	U	ug/L	5	20
8/12/2013 9:41	FISH	Nutrients	NO2NO3-N	0.004	U	mg N/L	0.004	0.01
8/12/2013 9:41	FISH	Nutrients	O-Phosphate-P	0.004	U	mg P/L	0.004	0.01
8/12/2013 9:41	FISH	Nutrients	Color (true)	19		PCU	2.5	6
8/12/2013 9:41	FISH	Nutrients	Turbidity	6.0		NTU	0.1	0.1
8/12/2013 9:41	FISH	Nutrients	Kjeldahl Nitrogen	1.1		mg N/L	0.08	0.2
8/12/2013 9:41	FISH	Nutrients	Total-P	0.057		mg P/L	0.005	0.05
8/12/2013 9:41	FISH	Nutrients	Fluoride	0.14		mg F/L	0.035	0.1
8/12/2013 9:41	FISH	Nutrients	Chloride	230	A	mg Cl/L	2	5
8/12/2013 9:41	FISH	Nutrients	Organic Carbon	8.6	A	mg C/L	0.5	1
8/12/2013 9:41	FISH	Nutrients	Alkalinity	66	A	mg CaCO3/L	0.65	2.5
8/12/2013 9:41	FISH	Nutrients	Sulfate	24	A	mg SO4/L	2	5
8/12/2013 9:41	FISH	Nutrients	Nitrite-N	0.007		mg N/L	0.002	0.005
8/12/2013 9:41	FISH	Nutrients	Ammonia-N	0.005	I	mg N/L	0.002	0.005
8/12/2013 9:41	FISH	Pesticides	Parathion Methyl	0.0095	UJ	ug/L	0.0095	0.038

Date Sampled	Field ID	Analysis Group	Components	Result	Remark	Units	MDL	PQL
8/12/2013 9:41	FISH	Pesticides	Fenamiphos	0.029	U	ug/L	0.029	0.11
8/12/2013 9:41	FISH	Pesticides	Hexazinone	0.029	U	ug/L	0.029	0.11
8/12/2013 9:41	FISH	Pesticides	Bromacil	0.038	U	ug/L	0.038	0.15
8/12/2013 9:41	FISH	Pesticides	Chlorpyrifos Ethyl	0.0095	U	ug/L	0.0095	0.038
8/12/2013 9:41	FISH	Pesticides	Chlorpyrifos Methyl	0.0095	U	ug/L	0.0095	0.038
8/12/2013 9:41	FISH	Pesticides	Phorate	0.0048	U	ug/L	0.0048	0.019
8/12/2013 9:41	FISH	Pesticides	Naled	0.038	U	ug/L	0.038	0.15
8/12/2013 9:41	FISH	Pesticides	Atrazine	0.0095	U	ug/L	0.0095	0.038
8/12/2013 9:41	FISH	Pesticides	Butylate	0.019	U	ug/L	0.019	0.076
8/12/2013 9:41	FISH	Pesticides	Mevinphos	0.0095	U	ug/L	0.0095	0.038
8/12/2013 9:41	FISH	Pesticides	Metalaxyl	0.038	U	ug/L	0.038	0.15
8/12/2013 9:41	FISH	Pesticides	Azinphos Methyl	0.019	UJ	ug/L	0.019	0.076
8/12/2013 9:41	FISH	Pesticides	Ametryn	0.0095	U	ug/L	0.0095	0.038
8/12/2013 9:41	FISH	Pesticides	Diazinon	0.0095	U	ug/L	0.0095	0.038
8/12/2013 9:41	FISH	Pesticides	Prometryn	0.019	U	ug/L	0.019	0.076
8/12/2013 9:41	FISH	Pesticides	Ethoprop	0.0048	U	ug/L	0.0048	0.019
8/12/2013 9:41	FISH	Pesticides	Fonofos	0.0095	U	ug/L	0.0095	0.038
8/12/2013 9:41	FISH	Pesticides	Malathion	0.0095	U	ug/L	0.0095	0.038
8/12/2013 9:41	FISH	Pesticides	Parathion Ethyl	0.019	U	ug/L	0.019	0.076
8/12/2013 9:41	FISH	Pesticides	Alachlor	0.057	U	ug/L	0.057	0.23
8/12/2013 9:41	FISH	Pesticides	Metribuzin	0.019	U	ug/L	0.019	0.076
8/12/2013 9:41	FISH	Pesticides	Ethion	0.0095	U	ug/L	0.0095	0.038
8/12/2013 9:41	FISH	Pesticides	Simazine	0.0095	U	ug/L	0.0095	0.038
8/12/2013 9:41	FISH	Pesticides	Metolachlor	0.057	U	ug/L	0.057	0.23
8/12/2013 9:41	FISH	Pesticides	Norflurazon	0.029	U	ug/L	0.029	0.11
8/12/2013 9:41	FISH	Priority Organic Pollutants	2,4-Dimethylphenol	9.4	U	ug/L	9.4	38
8/12/2013 9:41	FISH	Priority Organic Pollutants	4-Nitrophenol	14	U	ug/L	14	57
8/12/2013 9:41	FISH	Priority Organic Pollutants	Benzo(g,h,i)perylene	0.19	U	ug/L	0.19	0.75
8/12/2013 9:41	FISH	Priority Organic Pollutants	Benzo(k)fluoranthene	0.19	U	ug/L	0.19	0.75
8/12/2013 9:41	FISH	Priority Organic Pollutants	Hexachloroethane	2.8	U	ug/L	2.8	11
8/12/2013 9:41	FISH	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	1.9	U	ug/L	1.9	7.5
8/12/2013 9:41	FISH	Priority Organic Pollutants	Pentachlorophenol	2.8	U	ug/L	2.8	11
8/12/2013 9:41	FISH	Priority Organic Pollutants	Phenanthrene	0.19	U	ug/L	0.19	0.75
8/12/2013 9:41	FISH	Priority Organic Pollutants	Chrysene	0.19	U	ug/L	0.19	0.75
8/12/2013 9:41	FISH	Priority Organic Pollutants	Hexachlorobenzene	0.94	U	ug/L	0.94	3.8
8/12/2013 9:41	FISH	Priority Organic Pollutants	Nitrobenzene	1.9	U	ug/L	1.9	7.5
8/12/2013 9:41	FISH	Priority Organic Pollutants	4-Bromophenyl phenyl ether	0.94	U	ug/L	0.94	3.8
8/12/2013 9:41	FISH	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	1.9	U	ug/L	1.9	7.5
8/12/2013 9:41	FISH	Priority Organic Pollutants	Benzo(a)anthracene	0.19	U	ug/L	0.19	0.75
8/12/2013 9:41	FISH	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	0.94	U	ug/L	0.94	3.8
8/12/2013 9:41	FISH	Priority Organic Pollutants	Bis(2-chloroethyl)ether	0.94	U	ug/L	0.94	3.8
8/12/2013 9:41	FISH	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	1.9	U	ug/L	1.9	7.5
8/12/2013 9:41	FISH	Priority Organic Pollutants	Fluoranthene	0.19	U	ug/L	0.19	0.75

Date Sampled	Field ID	Analysis Group	Components	Result	Remark	Units	MDL	PQL
8/12/2013 9:41	FISH	Priority Organic Pollutants	2,4-Dinitrophenol	14	UJ	ug/L	14	57
8/12/2013 9:41	FISH	Priority Organic Pollutants	2-Chloronaphthalene	0.94	U	ug/L	0.94	3.8
8/12/2013 9:41	FISH	Priority Organic Pollutants	Anthracene	0.19	U	ug/L	0.19	0.75
8/12/2013 9:41	FISH	Priority Organic Pollutants	Butyl benzyl phthalate	0.94	U	ug/L	0.94	3.8
8/12/2013 9:41	FISH	Priority Organic Pollutants	Di-n-butyl phthalate	0.94	U	ug/L	0.94	3.8
8/12/2013 9:41	FISH	Priority Organic Pollutants	Isophorone	0.94	U	ug/L	0.94	3.8
8/12/2013 9:41	FISH	Priority Organic Pollutants	Phenol	0.94	U	ug/L	0.94	3.8
8/12/2013 9:41	FISH	Priority Organic Pollutants	2,4,6-Trichlorophenol	0.94	U	ug/L	0.94	3.8
8/12/2013 9:41	FISH	Priority Organic Pollutants	2-Chlorophenol	0.94	U	ug/L	0.94	3.8
8/12/2013 9:41	FISH	Priority Organic Pollutants	2-Nitrophenol	0.94	U	ug/L	0.94	3.8
8/12/2013 9:41	FISH	Priority Organic Pollutants	4-Chloro-3-methylphenol	0.94	U	ug/L	0.94	3.8
8/12/2013 9:41	FISH	Priority Organic Pollutants	Benzidine	94	UJ	ug/L	94	380
8/12/2013 9:41	FISH	Priority Organic Pollutants	Benzene	0.20	U	ug/L	0.2	0.8
8/12/2013 9:41	FISH	Priority Organic Pollutants	2,6-Dinitrotoluene	0.94	U	ug/L	0.94	3.8
8/12/2013 9:41	FISH	Priority Organic Pollutants	Dibenzo(a,h)anthracene	0.19	U	ug/L	0.19	0.75
8/12/2013 9:41	FISH	Priority Organic Pollutants	Fluorene	0.19	U	ug/L	0.19	0.75
8/12/2013 9:41	FISH	Priority Organic Pollutants	Hexachlorocyclopentadiene	2.8	UJ	ug/L	2.8	11
8/12/2013 9:41	FISH	Priority Organic Pollutants	N-Nitrosodimethylamine	1.9	U	ug/L	1.9	7.5
8/12/2013 9:41	FISH	Priority Organic Pollutants	Naphthalene	0.19	U	ug/L	0.19	0.75
8/12/2013 9:41	FISH	Priority Organic Pollutants	Pyrene	0.19	U	ug/L	0.19	0.75
8/12/2013 9:41	FISH	Priority Organic Pollutants	2,4-Dichlorophenol	0.94	U	ug/L	0.94	3.8
8/12/2013 9:41	FISH	Priority Organic Pollutants	2,4-Dinitrotoluene	0.94	U	ug/L	0.94	3.8
8/12/2013 9:41	FISH	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	2.8	U	ug/L	2.8	11
8/12/2013 9:41	FISH	Priority Organic Pollutants	Benzo(a)pyrene	0.19	U	ug/L	0.19	0.75
8/12/2013 9:41	FISH	Priority Organic Pollutants	Benzo(b)fluoranthene	0.19	U	ug/L	0.19	0.75
8/12/2013 9:41	FISH	Priority Organic Pollutants	Diethyl phthalate	0.94	U	ug/L	0.94	3.8
8/12/2013 9:41	FISH	Priority Organic Pollutants	Dimethyl phthalate	0.94	U	ug/L	0.94	3.8
8/12/2013 9:41	FISH	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	2.8	U	ug/L	2.8	11
8/12/2013 9:41	FISH	Priority Organic Pollutants	1,2,4-Trichlorobenzene	0.94	U	ug/L	0.94	3.8
8/12/2013 9:41	FISH	Priority Organic Pollutants	3,3'-Dichlorobenzidine	38	U	ug/L	38	150
8/12/2013 9:41	FISH	Priority Organic Pollutants	Acenaphthene	0.19	U	ug/L	0.19	0.75
8/12/2013 9:41	FISH	Priority Organic Pollutants	Acenaphthylene	0.19	U	ug/L	0.19	0.75
8/12/2013 9:41	FISH	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	2.8	U	ug/L	2.8	11
8/12/2013 9:41	FISH	Priority Organic Pollutants	Di-n-octyl phthalate	0.94	U	ug/L	0.94	3.8
8/12/2013 9:41	FISH	Priority Organic Pollutants	Hexachlorobutadiene	2.8	U	ug/L	2.8	11
8/12/2013 9:41	FISH	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	0.19	U	ug/L	0.19	0.75
8/12/2013 9:41	FISH	Field Parameter	Dissolved Oxygen	10.99		mg/L		
8/12/2013 9:41	FISH	Field Parameter	Dissolved Oxygen	10.99		mg/L		
8/12/2013 9:41	FISH	Field Parameter	Temperature	30.76		C		
8/12/2013 9:41	FISH	Field Parameter	Temperature	30.76		C		
8/12/2013 9:41	FISH	Field Parameter	pH	7.65				
8/12/2013 9:41	FISH	Field Parameter	pH	7.65				
8/12/2013 9:41	FISH	Field Parameter	Specific Conductance	952		umhos/cm		

Date Sampled	Field ID	Analysis Group	Components	Result	Remark	Units	MDL	PQL
8/12/2013 9:41	FISH	Field Parameter	Specific Conductance	952		umhos/cm		
8/12/2013 10:23	FISH BLANK	Metals	Zinc	5.0	U	ug/L	5	20
8/12/2013 10:23	FISH BLANK	Metals	Mercury	0.10	U	ng/L	0.1	0.4
8/12/2013 10:23	FISH BLANK	Metals	Arsenic	0.25	U	ug/L	0.25	1
8/12/2013 10:23	FISH BLANK	Metals	Sodium	0.50	U	mg/L	0.5	2
8/12/2013 10:23	FISH BLANK	Metals	Copper	0.50	U	ug/L	0.5	1
8/12/2013 10:23	FISH BLANK	Metals	Cadmium	0.050	U	ug/L	0.05	0.2
8/12/2013 10:23	FISH BLANK	Metals	Hardness	0.40	U	mg/L	0.4	1.6
8/12/2013 10:23	FISH BLANK	Metals	Lead	0.20	U	ug/L	0.2	0.8
8/12/2013 10:23	FISH BLANK	Metals	Aluminum	5.0	U	ug/L	5	20
8/12/2013 10:23	FISH BLANK	Metals	Silver	0.025	U	ug/L	0.025	0.1
8/12/2013 10:23	FISH BLANK	Metals	Selenium	0.20	U	ug/L	0.2	0.8
8/12/2013 10:23	FISH BLANK	Metals	Nickel	0.25	U	ug/L	0.25	1
8/12/2013 10:23	FISH BLANK	Metals	Potassium	0.30	U	mg/L	0.3	1.2
8/12/2013 10:23	FISH BLANK	Metals	Iron	30	U	ug/L	30	120
8/12/2013 10:23	FISH BLANK	Metals	Magnesium	0.040	U	mg/L	0.04	0.16
8/12/2013 10:23	FISH BLANK	Metals	Chromium	0.30	U	ug/L	0.3	1.2
8/12/2013 10:23	FISH BLANK	Metals	Calcium	0.075	U	mg/L	0.075	0.3
8/12/2013 10:23	FISH BLANK	Nutrients	Chloride	0.20	U	mg Cl/L	0.2	0.5
8/12/2013 10:23	FISH BLANK	Nutrients	Turbidity	0.10	U	NTU	0.1	0.1
8/12/2013 10:23	FISH BLANK	Nutrients	Alkalinity	0.65	U	mg CaCO3/L	0.65	2.5
8/12/2013 10:23	FISH BLANK	Nutrients	Nitrite-N	0.002	U	mg N/L	0.002	0.005
8/12/2013 10:23	FISH BLANK	Nutrients	O-Phosphate-P	0.004	U	mg P/L	0.004	0.01
8/12/2013 10:23	FISH BLANK	Nutrients	Fluoride	0.035	U	mg F/L	0.035	0.1
8/12/2013 10:23	FISH BLANK	Nutrients	Organic Carbon	0.50	U	mg C/L	0.5	1
8/12/2013 10:23	FISH BLANK	Nutrients	Color (true)	2.5	U	PCU	2.5	6
8/12/2013 10:23	FISH BLANK	Nutrients	Kjeldahl Nitrogen	0.080	U	mg N/L	0.08	0.2
8/12/2013 10:23	FISH BLANK	Nutrients	Sulfate	0.20	U	mg SO4/L	0.2	0.5
8/12/2013 10:23	FISH BLANK	Nutrients	NO2NO3-N	0.004	U	mg N/L	0.004	0.01
8/12/2013 10:23	FISH BLANK	Nutrients	Total-P	0.002	U	mg P/L	0.002	0.005
8/12/2013 10:23	FISH BLANK	Nutrients	Ammonia-N	0.002	U	mg N/L	0.002	0.005
8/12/2013 10:23	FISH BLANK	Pesticides	Diazinon	0.0095	U	ug/L	0.0095	0.038
8/12/2013 10:23	FISH BLANK	Pesticides	Butylate	0.019	U	ug/L	0.019	0.076
8/12/2013 10:23	FISH BLANK	Pesticides	Azinphos Methyl	0.019	U	ug/L	0.019	0.076
8/12/2013 10:23	FISH BLANK	Pesticides	Ametryn	0.0095	U	ug/L	0.0095	0.038
8/12/2013 10:23	FISH BLANK	Pesticides	Ethoprop	0.0047	U	ug/L	0.0047	0.019
8/12/2013 10:23	FISH BLANK	Pesticides	Fenamiphos	0.028	U	ug/L	0.028	0.11
8/12/2013 10:23	FISH BLANK	Pesticides	Parathion Ethyl	0.019	U	ug/L	0.019	0.076
8/12/2013 10:23	FISH BLANK	Pesticides	Atrazine	0.0095	U	ug/L	0.0095	0.038
8/12/2013 10:23	FISH BLANK	Pesticides	Chlorpyrifos Ethyl	0.0095	U	ug/L	0.0095	0.038
8/12/2013 10:23	FISH BLANK	Pesticides	Mevinphos	0.0095	U	ug/L	0.0095	0.038
8/12/2013 10:23	FISH BLANK	Pesticides	Chlorpyrifos Methyl	0.0095	U	ug/L	0.0095	0.038
8/12/2013 10:23	FISH BLANK	Pesticides	Phorate	0.0047	U	ug/L	0.0047	0.019

Date Sampled	Field ID	Analysis Group	Components	Result	Remark	Units	MDL	PQL
8/12/2013 10:23	FISH BLANK	Pesticides	Norflurazon	0.028	U	ug/L	0.028	0.11
8/12/2013 10:23	FISH BLANK	Pesticides	Parathion Methyl	0.0095	U	ug/L	0.0095	0.038
8/12/2013 10:23	FISH BLANK	Pesticides	Metolachlor	0.057	U	ug/L	0.057	0.23
8/12/2013 10:23	FISH BLANK	Pesticides	Alachlor	0.057	U	ug/L	0.057	0.23
8/12/2013 10:23	FISH BLANK	Pesticides	Malathion	0.0095	U	ug/L	0.0095	0.038
8/12/2013 10:23	FISH BLANK	Pesticides	Metalaxyl	0.038	U	ug/L	0.038	0.15
8/12/2013 10:23	FISH BLANK	Pesticides	Prometryn	0.019	U	ug/L	0.019	0.076
8/12/2013 10:23	FISH BLANK	Pesticides	Naled	0.038	U	ug/L	0.038	0.15
8/12/2013 10:23	FISH BLANK	Pesticides	Metribuzin	0.019	U	ug/L	0.019	0.076
8/12/2013 10:23	FISH BLANK	Pesticides	Fonofos	0.0095	U	ug/L	0.0095	0.038
8/12/2013 10:23	FISH BLANK	Pesticides	Ethion	0.0095	U	ug/L	0.0095	0.038
8/12/2013 10:23	FISH BLANK	Pesticides	Bromacil	0.038	U	ug/L	0.038	0.15
8/12/2013 10:23	FISH BLANK	Pesticides	Simazine	0.0095	U	ug/L	0.0095	0.038
8/12/2013 10:23	FISH BLANK	Pesticides	Hexazinone	0.028	U	ug/L	0.028	0.11
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	2,4,6-Trichlorophenol	0.94	U	ug/L	0.94	3.8
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Benzo(a)anthracene	0.19	U	ug/L	0.19	0.75
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Benzo(b)fluoranthene	0.19	U	ug/L	0.19	0.75
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Benzo(g,h,i)perylene	0.19	U	ug/L	0.19	0.75
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	2.8	U	ug/L	2.8	11
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Butyl benzyl phthalate	0.94	U	ug/L	0.94	3.8
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Fluoranthene	0.19	U	ug/L	0.19	0.75
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	1.9	U	ug/L	1.9	7.5
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Pentachlorophenol	2.8	U	ug/L	2.8	11
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Benzene	0.20	U	ug/L	0.2	0.8
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	2,6-Dinitrotoluene	0.94	U	ug/L	0.94	3.8
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	2-Nitrophenol	0.94	U	ug/L	0.94	3.8
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Acenaphthylene	0.19	U	ug/L	0.19	0.75
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Benzo(k)fluoranthene	0.19	U	ug/L	0.19	0.75
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Chrysene	0.19	U	ug/L	0.19	0.75
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Diethyl phthalate	0.94	U	ug/L	0.94	3.8
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Hexachlorobenzene	0.94	U	ug/L	0.94	3.8
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	N-Nitrosodimethylamine	1.9	U	ug/L	1.9	7.5
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	4-Bromophenyl phenyl ether	0.94	U	ug/L	0.94	3.8
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Anthracene	0.19	U	ug/L	0.19	0.75
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Benzidine	94	U	ug/L	94	380
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Dibenzo(a,h)anthracene	0.19	U	ug/L	0.19	0.75
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Hexachlorobutadiene	2.8	U	ug/L	2.8	11
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Hexachlorocyclopentadiene	2.8	U	ug/L	2.8	11
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	0.19	U	ug/L	0.19	0.75
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Phenol	0.94	U	ug/L	0.94	3.8
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Pyrene	0.19	U	ug/L	0.19	0.75
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	2-Chlorophenol	0.94	U	ug/L	0.94	3.8
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	4-Nitrophenol	14	U	ug/L	14	57

Date Sampled	Field ID	Analysis Group	Components	Result	Remark	Units	MDL	PQL
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	0.94	U	ug/L	0.94	3.8
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Di-n-butyl phthalate	0.94	U	ug/L	0.94	3.8
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Dimethyl phthalate	0.94	U	ug/L	0.94	3.8
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Phenanthrene	0.19	U	ug/L	0.19	0.75
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	1,2,4-Trichlorobenzene	0.94	U	ug/L	0.94	3.8
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	2,4-Dichlorophenol	0.94	U	ug/L	0.94	3.8
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	2,4-Dinitrotoluene	0.94	U	ug/L	0.94	3.8
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	2-Chloronaphthalene	0.94	U	ug/L	0.94	3.8
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	1.9	U	ug/L	1.9	7.5
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Hexachloroethane	2.8	U	ug/L	2.8	11
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	2.8	U	ug/L	2.8	11
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Naphthalene	0.19	U	ug/L	0.19	0.75
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	2,4-Dimethylphenol	9.4	U	ug/L	9.4	38
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	2,4-Dinitrophenol	14	UJ	ug/L	14	57
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	2.8	U	ug/L	2.8	11
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	3,3'-Dichlorobenzidine	38	U	ug/L	38	150
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Bis(2-chloroethyl)ether	0.94	U	ug/L	0.94	3.8
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	1.9	U	ug/L	1.9	7.5
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Isophorone	0.94	U	ug/L	0.94	3.8
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Acenaphthene	0.19	U	ug/L	0.19	0.75
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Di-n-octyl phthalate	0.94	U	ug/L	0.94	3.8
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Fluorene	0.19	U	ug/L	0.19	0.75
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Nitrobenzene	1.9	U	ug/L	1.9	7.5
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	4-Chloro-3-methylphenol	0.94	U	ug/L	0.94	3.8
8/12/2013 10:23	FISH BLANK	Priority Organic Pollutants	Benzo(a)pyrene	0.19	U	ug/L	0.19	0.75
8/12/2013 10:35	FISH-OV-CHRO-VI	Overflow	Hexavalent Chromium	2.4	U	ug/L	2.4	10
8/12/2013 10:35	FISH-OV-CHRO-VI	Field Parameter	Dissolved Oxygen	10.99		mg/L		
8/12/2013 10:35	FISH-OV-CHRO-VI	Field Parameter	pH	7.65				
8/12/2013 10:35	FISH-OV-CHRO-VI	Field Parameter	Specific Conductance	952		umhos/cm		
8/12/2013 10:35	FISH-OV-CHRO-VI	Field Parameter	Temperature	30.76		C		
8/12/2013 10:37	FISH-OV-CHRO-VI BLANK	Overflow	Hexavalent Chromium	2.4	U	ug/L	2.4	10
8/13/2013 13:03	TRIP BLANK	Priority Organic Pollutants	Benzene	0.20	U	ug/L	0.2	0.8

FDEP Biology Laboratory - Acute Bioassay Bench Sheets

Facility: Discovery Cove
Address: 7007 SeaWorld Dr. Orlando, FL
City: Orlando County: Orange
Contact/District: Phil Kane / Central District
NPDES Permit #: FL 0622648
LIMS Job #: TLH-2013-08-13-28 LIMS Sample #: 1525844
Lims Data Entry: 8-19-13 MF Data Entry Verification: 8-19-13 AP

Sample Collection: Date: 8-12-13 Time: 0941
Hold Time Start: Date: 8-12-13 Time: 0941

Comments:

Initial sample handling:
Instructions: Check yes or no. If yes is checked, complete blanks

PH adjustment: ☐ yes ☑ no Initial pH: ____ NaOH ____N HCl ____N ____Drops mL Final pH: ____
Aeration: ☐ yes ☑ no Initial DO: ____mg/L Final DO: ____mg/L Duration: ____minutes Rate: ~____bubbles/min
Salinity adjusted (Test 1): ☐ yes ☑ no Initial Salinity: ____ Final Salinity: ____ Salts Hypersaline brine
Salinity adjusted (Test 2): ☐ yes ☑ no Initial Salinity: ____ Final Salinity: ____ Salts Hypersaline brine
Dechlorination: ☐ yes ☑ no ____mL of 0.025N Sodium Thiosulfate per liter of sample. Final TRC: ____

Sample Validation:
Instructions: Check yes or no. Fill in temperatures.

Temperature: Shipped ≤ 6°C ☑ Yes ☐ No --- IF Hand Delivered: Cooling ☐ Yes ☐ No (received ____°C collected____°C)
Holding Time: ≤ 36 Hours ☑ Yes ☐ No (Composite-end of collection; grab-when collected; 4 in 24 - time last sample collected)

Investigators' Signatures:	Initials:
Cassidy Reichert	CR
Adrienne Pennington	AP
Marshall Faircloth	MF
Dave Akuszewski	BA
REVIEWER: Liz Miller	

Diluent/Control Batch#:	8.7.13		8.8.13						
Water Quality Parameters	MHWCD ~~20% DMW~~ CR	Well Water	Moderately Hard Water	Salt Water ASW NSW Test 1	Salt Water ASW NSW Test 2	Other:	Original Sample	Measured by	Verified by
Field Total Residual Cl_2 (mg/L):	N/A	N/A	N/A	N/A	N/A	N/A	Not Measured		MF
Lab Total Residual Cl_2 (mg/L):	<0.03		<0.03				<0.03	CR/AP	MF/CR
Alkalinity (mg/L as $CaCO_3$):	68		64				73	CR	MF
Hardness (mg/L as $CaCO_3$):	80		86				156	CR	MF
Total Ammonia (mg/L as N):	<0.017		<0.017				<0.017	MF	CR
Conductivity: ☑ µmhos ☐ mmhos	304		303				950	CR/AP	AP/CR
Salinity (ppth):									

V 1.8 1/13/10

FDEP Biology Laboratory - Acute Bioassay Survival Bench Sheet

LIMS Sample # 1525844 **SOP#: TA 07** 01 **Test #** 1 **of** 2

Test Species:
Batch #: 8.13.13 Age: 24hrs
- [x] *Ceriodaphnia dubia*
- [ ] *Cyprinella leedsi*
- [ ] *Pimephales promelas*
- [ ] *Menidia beryllina*
- [ ] *Americamysis bahia*
- [ ] Other:_____

Test Validation
Control Survival ≥ 90%: [x] Yes [ ] No
Temperature Range ≤ 3° C: [x] Yes [ ] No

Diluent (Batch # 8.7.13)
- [ ] ASW
- [x] MHWCD
- [ ] MHW
- [ ] Well

Test Type: [ ] Screen [x] Definitive
[ ] Static [x] Static Renewal [ ] Flow-Through

Test Duration:
- [ ] 48 hr
- [x] 96 hr
- [ ] ___hr

Test Started: Date 8.13.13 Time 1300

Test Ended: Date 8.17.13 Time 1515

Chamber Size 30 ml
Test Volume: 20 ml

Concentration	Replicate	Chamber #	Test Hour: 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
control	A	1	5	5	5	5	5	5
	B	2	5	5	5	5	5	5
	C	3	5	5	5	5	5	5
	D	4	5	5	5	5	5	5
6.25%	A	5	5	5	5	5	5	5
	B	6	5	5	5	5	5	5
	C	7	5	5	5	5	5	5
	D	8	5	5	5	5	5	5
12.5%	A	9	5	5	5	5	5	4 ID
	B	10	5	5	5	5	5	5
	C	11	5	5	5	5	5	5
	D	12	5	5	5	5	5	5
25%	A	13	5	5	5	5	5	5
	B	14	5	5	5	5	5	5
	C	15	5	5	5	5	5	5
	D	16	5	5	5	5	5	5
50%	A	17	5	5	5	5	5	5
	B	18	5	5	5	5	5	5
	C	19	5	5	5	5	5	5
	D	20	5	5	5	5	5	5
100%	A	21	5	5	5	5	5	5
	B	22	5	5	5	5	5	4 ID
	C	23	5	5	5	5	5	5
	D	24	5	5	5	5	5	5
Checked or Verified by:			CR	AP	AP	AP AP	AP	CR

Food
- [x] YCT Batch# 5.28.13
- [x] P. subcapitata Batch# 7.22.13
- [ ] Artemia Lot#_____

Feeding and Artemia Batch #
- [x] 0 hr____ [x] Prior to Test
- [ ] 24 hr____
- [x] 48 hr____ [x] Prior to Renewal
- [ ] 72 hr____

Temperature Range (°C)
Incubator # 5
min. 24.9 max. 25.8 mean ___
Incubator #___
min.____max.____mean____
Waterbath #___
min.____max.____mean____
Room B246
min: 24.9 max: 25.3 mean ___
Light intensity (ft. candles): 50-100
Photoperiod (hours): 16 light, 8 dark

Loaded/ Verified by: AP / CR
m = missing, d = dead, BR/AR Before/ After Renewal

Test Results:
Screening Tests: Report LC50 as >100%, =100%, or <100%.
% mortality in 100% sample: 5% LC50: >100%
Calculated LC50 (Definitive) 95% CI_____ Method_____

Comments:

V. 2.6 2-15-13

Substitute highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration)

...Biology Laboratory - Acute Bioassay Survival Bench Sheet

LIMS Sample # 1525844 SOP#: TA 07 02 Test # 2 of 2

Test Species:
Batch #: 8.13.13 Age: 8 days
AP ☑ *Ceriodaphnia dubia*
☐ *Cyprinella leedsi*
☑ *Pimephales promelas*
☐ *Menidia beryllina*
☐ *Americamysis bahia*
☐ Other:_____

Test Validation
Control Survival ≥ 90%: ☑ Yes ☐ No
Temperature Range ≤ 3° C: ☑ Yes ☐ No

Diluent (Batch # 8.8.13)
☐ ASW ☐ MHWCD
☑ MHW ☐ Well

Test Type: ☐ Screen ☑ Definitive
☐ Static ☑ Static Renewal ☐ Flow-Through

Test Duration:
☐ 48 hr
☑ 96 hr
☐ ___hr

Test Started: Date 8.13.13 Time 1300

Test Ended: Date 8.17.13 Time 1500

Chamber Size 1000 ml
Test Volume: 500 ml

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Control	A	E1	10	10	10	10	10	10
	B	E2	10	10	10	10	10	10
6.25%	A	E3	10	10	10	10	10	10
	B	E4	10	10	10	10	10	10
12.5%	A	E5	10	10	10	10	10	10
	B	E6	10	10	10	10	10	10
25%	A	E7	10	10	10	10	9 ID	9
	B	E8	10	10	10	10	10	10
50%	A	E9	10	10	9 ID	9	9	9
	B	E10	10	10	10	10	10	9 ID
100%	A	E11	10	10	10	10	10	10
	B	E12	10	9 ID	9	9	9	9
Checked or Verified by:			AP	AP	CR	CR	CR	CR

Loaded/ Verified by: CR / AP
m = missing, d = dead, BR/AR Before/ After Renewal

Test Results:
Screening Tests: Report LC50 as >100%, =100%, or <100%.
% mortality in 100% sample: 5% LC50: >100%
Calculated LC50 (Definitive) 95% CI_____ Method_____

Food
☐ YCT Batch#_____
☐ P. subcapitata Batch#_____
☑ Artemia Lot# 23013

Feeding and Artemia Batch #
☑ 0 hr 8.13 CR 8.16.13 ☑ Prior to Test
☐ 24 hr___
☑ 48 hr 8.17.13 ☑ Prior to Renewal
☐ 72 hr___

Temperature Range (°C)
Incubator # 2
min: 24.2 max: 25.4 mean: —
Incubator #___
min.___ max.___ mean___
Waterbath #___
min.___ max.___ mean___
Room B246
min. 24.9 max: 25.3 mean: —
Light intensity (ft. candles): 50-100
Photoperiod (hours): 16 light, 8 dark

Comments:

V. 2.6 2-15-13

Substitute highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration)

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LIMS Sample # 1525844 Test # 1 of 2

Test Species: AP

☑ *Ceriodaphnia dubia* ☐ *Pimephales promelas* ☐ *Americamysis bahia*
☐ *Cyprinella leedsi* ☐ *Menidia beryllina* ☐ Other:_____

Test aerated: (if DO is < 4.0 mg/L) ☐ Yes ☑ No

Concentration	Replicate	Test Hour	pH (SU)	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity ☑ µmhos ☐ mmhos	Salinity* (ppth)
Control	M	0 hr	8.0	24.6	8.1	340	
		24 hr					
	A	48 hr BR	7.9	24.9	8.1	339	
	M	48 hr AR	8.1	25.1	8.4	332	
		72 hr					
	A	96 hr	8.0	25.1	8.5	330	
6.25%	M	0 hr	8.0	24.8	8.2	417	
		24 hr					
	A	48 hr BR	8.0	24.9	8.2	359	
	M	48 hr AR	8.2	25.0	8.4	382	
		72 hr					
	A	96 hr	8.1	25.0	8.5	378	
12.5%	M	0 hr	8.1	24.7	8.2	403	
		24 hr					
	A	48 hr BR	8.0	24.8	8.2	403	
	M	48 hr AR	8.2	25.0	8.5	429	
		72 hr					
	A	96 hr	8.1	25.0	8.7	407	
25%	M	0 hr	8.1	24.7	8.2	485	
		24 hr					
	A	48 hr BR	8.0	24.7	8.3	487	
	M	48 hr AR	8.2	25.0	8.5	523	
		72 hr					
	A	96 hr	8.1	25.2	8.7	497	
50%	M	0 hr	8.0	24.6	8.2	639	
		24 hr					
	A	48 hr BR	8.0	24.8	8.3	649	
	M	48 hr AR	8.1	24.9	8.6	660	
		72 hr					
	A	96 hr	8.1	25.0	8.8	681	
100%	M	0 hr	8.0	24.3	8.2	950	
		24 hr					
	A	48 hr BR	8.0	24.3	8.2	967	
	M	48 hr AR	8.1	25.0	8.6	1145	
		72 hr					
	A	96 hr	8.1	25.0	8.8	1004	
		0 hr					
		24 hr					
		48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					
		0 hr					
		24 hr					
		48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					

*Measure/ record salinity for marine tests

Comments:

Measured By:
0 hr: AP
24 hr:
48 hr BR: AP
48 hr AR: AP
72 hr:
96 hr: CR

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V. 2.3 1-13-10

FDEP Biology Laboratory - Bioassay Parameter Sheet

LIMS Sample # 1525844 Test # 2 of 2

Test Species:

☐ *Ceriodaphnia dubia* ☑ *Pimephales promelas* ☐ *Americamysis bahia*
☐ *Cyprinella leedsi* ☐ *Menidia beryllina* ☐ Other:_____

Test aerated:
(if DO is < 4.0 mg/L)
☐ Yes ☑ No

Concentration	Replicate	Test Hour	pH (SU)	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity ☑ µmhos ☐ mmhos	Salinity* (ppth)
Control	A	0 hr	7.9	24.8	8.4	293	
	B	24 hr	7.8	24.2	7.9	300	
	A	48 hr BR	7.9	25.0	8.4	307	
	A	48 hr AR	8.0	24.6	8.1	310	
	B	72 hr	7.9	25.4	8.0	295	
	A	96 hr	7.9	25.1	8.1	308	
6.25%	A	0 hr	8.0	24.7	8.5	338	
	B	24 hr	7.8	25.1	7.9	345	
	A	48 hr BR	7.9	25.0	8.1	352	
	A	48 hr AR	8.0	24.6	8.2	332	
	B	72 hr	7.9	25.0	8.0	340	
	A	96 hr	7.9	24.5	8.0	352	
12.5%	A	0 hr	8.0	24.7	8.5	381	
	B	24 hr	7.9	25.5	027.87	390	
	A	48 hr BR	7.9	25.5	8.3	397	
	A	48 hr AR	8.0	24.6	8.2	373	
	B	72 hr	7.8	25.6	7.5	388	
	A	96 hr	7.9	24.8	7.8	400	
25%	A	0 hr	8.0	24.7	8.5	461	
	B	24 hr	7.9	24.6	7.9	466	
	A	48 hr BR	7.9	25.6	8.3	483	
	A	48 hr AR	8.0	24.7	8.2	455	
	B	72 hr	7.8	25.3	7.8	465	
	A	96 hr	7.9	25.2	8.1	490	
50%	A	0 hr	8.0	24.6	8.6	623	
	B	24 hr	7.9	25.5	7.7	638	
	A	48 hr BR	7.9	25.4	8.1	650	
	A	48 hr AR	8.0	24.7	8.2	621	
	B	72 hr	7.8	25.2	7.8	634	
	A	96 hr	7.9	25.3	8.3	666	
100%	A	0 hr	8.0	24.5	8.7	941	
	B	24 hr	7.9	24.2	7.8	951	
	A	48 hr BR	7.9	25.5	7.8	989	
	A	48 hr AR	8.0	25.2	8.3	939	
	B	72 hr	7.8	24.8	7.5	950	
	A	96 hr	7.8	24.6	7.6	977	
_____		0 hr					
		24 hr					
		48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					
_____		0 hr					
		24 hr					
		48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					

*Measure/ record salinity for marine tests

Comments:

Measured By:
0 hr: CR
24 hr: CR
48 hr BR: CR/AP
48 hr AR: CR
72 hr: CR
96 hr: CR

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V. 2.3 1-13-10

Test ID: Discovery Cove Dates: 8.13.13 – 8.17.13

METER / DEVICE	ID	SOP	Parameter	Method	√ used
YSI Model 58 Dissolved Oxygen Meter	90H018262	TA06_04	Dissolved Oxygen	SM 4500 O G	✓
YSI DO Probe	5905	TA06_04	Dissolved Oxygen	SM 4500 O G	✓
Accumet AR-10 pH Meter	93312105	TA06_23	pH	SM 4500 H+	✓
Mettler-Toledo SevenMulti Conductivity Meter	SN 1225117049 Probe H04257	TA06_25	Conductivity Salinity	SM 2510 B SM 2520 B	✓
Denver Model 225 ISE with ammonia probe	SN K01377	TA06_17	Ammonia	SM 4500 NH3 F	✓
Traceable Thermometer	#1-SN101686412 #2-SN221295527 #3-SN240116020 #4-SN80361795 #5-SN61990624	TA06_05	Temperature	SM-2530B modified DEP SOP-001/01 FT1400	✓ #4
Hach Pocket Colorimeter II #1	05110C042029	TA06_22	Total Residual Chlorine	EPA 330.5 SM 4500 CL G	
Hach Pocket Colorimeter II #2	05050C026378	TA06_22	Total Residual Chlorine	EPA 330.5 SM 4500 CL G	✓
Alkalinity (Hach Kit)	No SN	TA06_08	Alkalinity	SM 2320 B	✓
Hardness (Hach Kit)	No SN	TA06_09	Hardness	SM 2340 C	✓
OHAUS Balance 250D	1125481084	TA06_21 TA06_27	Weight	-	✓
S-Weights	BIO-S-WEIGHTS-01	NA	Balance check	-	✓

SM-2530B modified to allow use of electronic and non-mercury filled thermometers.

Insert other device information in blank spaces(if used). Test ID = Facility or SRTs (acute SRT--Chronic SRT)

Entered By: CR 8.19.13

V 1.3 2/15/13 MF

06000

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Appendix F
Standard Reference Toxicant Data

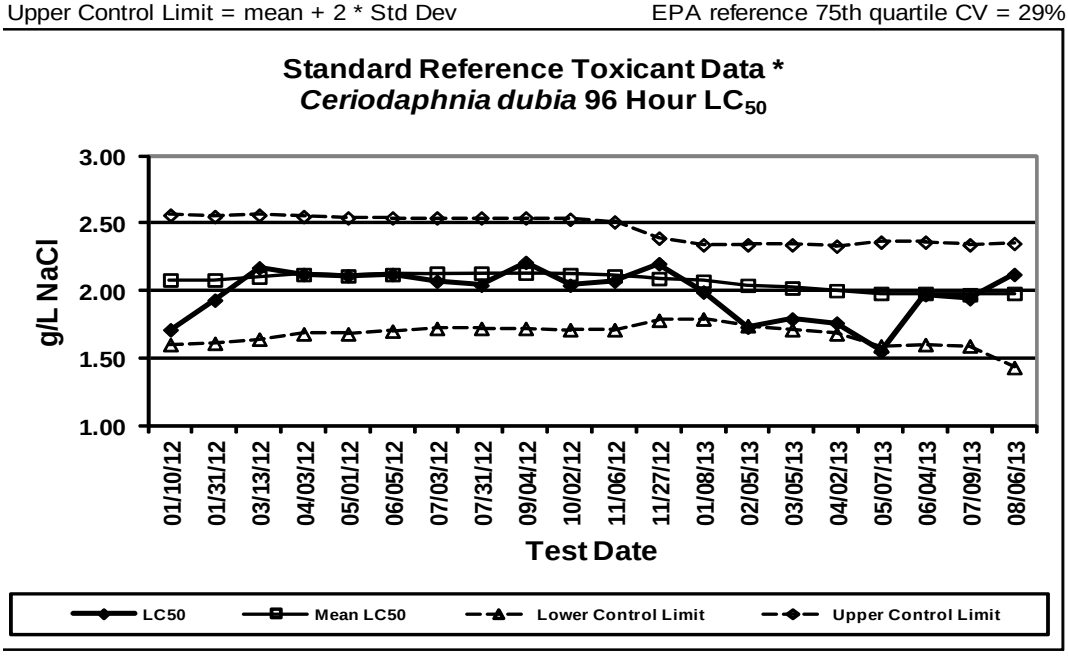
Florida Department of Environmental Protection
Bureau of Laboratories

Standard Reference Toxicant (SRT) Test Data - 96-hour Acute Toxicity
Ceriodaphnia dubia (water flea) - Sodium Chloride (NaCl)

Date	LC50	Mean LC50	Std Dev	Lower Control Limit	Upper Control Limit
01/10/12	1.71	2.08	0.24	1.60	2.56
01/31/12	1.93	2.08	0.24	1.61	2.55
03/13/12	2.17	2.10	0.23	1.64	2.56
04/03/12	2.12	2.12	0.22	1.68	2.55
05/01/12	2.11	2.11	0.22	1.68	2.54
06/05/12	2.12	2.12	0.21	1.70	2.54
07/03/12	2.07	2.13	0.21	1.72	2.54
07/31/12	2.04	2.13	0.20	1.72	2.54
09/04/12	2.21	2.13	0.21	1.72	2.54
10/02/12	2.04	2.12	0.20	1.71	2.53
11/06/12	2.07	2.11	0.20	1.71	2.51
11/27/12	2.20	2.09	0.15	1.78	2.39
01/08/13	1.99	2.07	0.14	1.79	2.34
02/05/13	1.73	2.04	0.15	1.74	2.34
03/05/13	1.79	2.02	0.16	1.71	2.34
04/02/13	1.76	2.00	0.16	1.68	2.33
05/07/13	1.55	1.98	0.19	1.59	2.36
06/04/13	1.97	1.98	0.19	1.60	2.36
07/09/13	1.94	1.97	0.19	1.59	2.34
08/06/13	2.12	1.98	0.18	1.43	2.35

Lower Control Limit = mean - 2 * Std Dev
Upper Control Limit = mean + 2 * Std Dev

CV = 9.30
EPA reference 75th quartile CV = 29%



FDEP Biology Laboratory - Acute SRT Bench Sheet

Method from EPA-821-R-02-012 except *H. azteca*

Test Organism: (check one)
☐ *Americamysis bahia* Method 2007.0 TA07.03 ☐ *Menidia beryllina* Method 2006.0 TA07.04 ☐ *Hyalella azteca* Method 100.1 EPA-600-R-99-064
☑ *Ceriodaphnia dubia* Method 2002.0 TA07.01 ☐ *Cyprinella leedsi* Method 2000.0 TA07.02 ☐ *Pimephales promelas* Method 2000.0 TA07.02

Test Type: ☐ non-renewal ☑ renewal

Test Page 1 of 2

Diluent/ Batch #: MW 20 | 8-1-13
Toxicant/ Batch#: NaCl 45/4 8-6-13

Organism Batch: 8-6-13 Age: < 24 hrs

Test Beginning: Date: 8-12-13 Time: 1100
Test Ending: Date: 8-16-13 Time: 1000

Water Quality Parameters:	Diluent	SOP	Initials
Total Residual Cl_2 (mg/L):	<0.03	TA06_22	AP
Alkalinity (mg/L as $CaCO_3$):	71	TA06_08	AP
Hardness (mg.L as $CaCO_3$):	68	TA06_09	AP
Total Ammonia (mg/L as N):	<0.017	TA06_17	MF
Conductivity: µmhos (mmhos)	0.274	TA06_25	AP
Salinity (ppth):		TA06_25	

Food:	Batch
☑ YCT	5.28.13
☑ *P. subcapitata*	7.22.13
☐ Artemia Lot #	

Artemia Batch:
0 hr:
24 hr:
48 hr:
72 hr:

Chamber size: 30 mL
Test volume: 20 mL per replicate

Concentrations prepared by: MF
Test Incubated in: Incubator # 5
Light Intensity: 50-100 Ft. candles
Photoperiod: 16 hours Light / 8 hours dark

Temperature Range °C:(if used)
Incubator # 5 min 24.8 max 26.1
Test min 24.0 max 25.9
Room B246 min ~~25.1~~ 24.5 max 25.3

Feeding: √ as needed
☑ Before test
☐ 24 hr
☑ 48 hr
☐ 72 hr

all species 2 hrs prior to test
mysids daily
all species except *H. azteca* 2 hr prior to renewal
H. azteca 0 hr and 48 hr

H. azteca		
0 hr	Alk	Hrd
Well		
100%		
96 hr	Alk	Hrd
Well		
100%		

Concentration µg/L	mg/L	g/L	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Control			A	1	5	5	5	5	5	5
			B	2	5	5	5	5	5	5
			C	3	5	5	5	5	5	5
			D	4	5	5	5	5	5	5
1.5			A	5	5	5	5	5	5	5
			B	6	5	5	5	5	5	5
			C	7	5	5	5	5	5	3 2D
			D	8	5	5	5 MF	5	5	4 1D
2.0			A	9	5	5	4 3 2D	4	4	3 1D
			B	10	5	5	4 1D	4	4	4
			C	11	5	5	4 1D	4	4	3 1D
			D	12	5	5	5	5	5	5
2.5			A	13	5	5	0 5D			
			B	14	5	5	0 5D			
			C	15	5	5	0 5D			
			D	16	5	5	0 5D			
3.0			A	17	5	3 2D	0 3D			
			B	18	5	4 1D	0 4D			
			C	19	5	2 3D	0 2D			
			D	20	5	2 3D	0 2D			
4.0			A	21	5	0 5D				
			B	22	5	0 5D				
			C	23	5	0 5D				
			D	24	5	0 5D				
Organisms loaded by: MF			Checked by:		BA	BA	MF	MF	MF	AP

Loading Verified by: BA AR = after renewal
m = missing d = dead BR = before renewal hr = hour

Investigators' Signatures

Marshall Faircloth	MF
Adrienne Pennington	AP
Cassidy Rowland	CR
Bruce Alexander	BA

Reviewer: Liz Miller

Comments:

Method: TSK

Statistics: LC50	95% confidence intervals Lower	Upper
48 hour: –	–	–
96 hour: 2.12	1.96	2.25

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Revised 7/2/13 AP

FDEP Biology Laboratory - Acute SRT Bench Sheet
0-96 hour parameters

Methods from EPA-821-R-02-012 except *H. azteca*

Test Page 2 of 2

Test Organism: (check one)
- ☐ *Americamysis bahia* Method 2007.0 TA07.03
- ☐ *Menidia beryllina* Method 2006.0 TA07.04
- ☐ *Hyalella azteca* Method 100.1 EPA-600-R-99-064
- ☑ *Ceriodaphnia dubia* Method 2002.0 TA07.01
- ☐ *Cyprinella leedsi* Method 2000.0 TA07.02
- ☐ *Pimephales promelas* Method 2000.0 TA07.02

Test Beginning: Date: 8-6-13 AP Time: 1100
Test Ending: Date: 8-10-13 Time: 1000

Test Type: ☐ non-renewal ☑ renewal

hr = hour AR = after renewal BR = before renewal

Concentration µg/L mg/L g/L	Replicate	Test Hour	pH (SU)	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity ☐ µmhos ☑ mmhos	Salinity (ppth)
Control	M	0 hr	8.0	24.5	8.3	0.274	
		24 hr					
	A	48 hr BR	7.9	24.2	8.1	0.364	
	M/A/M	48 hr AR	7.9	25.1	8.2	0.268	
		72 hr					
	A	96 hr	7.8	25.9	7.9	0.363	
1.5	M	0 hr	8.0	24.2	8.2	3.63	
		24 hr					
	A	48 hr BR	7.9	24.2	8.2	4.13	
	M/A/M	48 hr AR	8.0	25.0	8.1	2.85	
		72 hr					
	A	96 hr	7.8	25.5	7.9	3.14	
2.0	M	0 hr	8.0	24.2	8.2	4.25	
		24 hr					
	A	48 hr BR	8.0	24.2	8.3	4.60	
	M	48 hr AR	8.0	25.0	8.1	3.77	
		72 hr					
	A	96 hr	7.9	25.3	8.1	4.53	
2.5	M	0 hr	8.1	24.1	8.1	5.16	
		24 hr					
	A	48 hr BR	8.0	24.1	8.3	5.68	
		48 hr AR					
		72 hr					
		96 hr					
3.0	M	0 hr	8.1	24.2	8.1	5.34	
		24 hr					
	A	48 hr BR	8.0	24.0	8.2	6.50	
		48 hr AR					
		72 hr					
		96 hr					
4.0	M	0 hr	8.1	24.2	8.1	7.21	
	A	24 hr	7.6	24.7	7.1	7.44	
		48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					

Investigators Signatures
Marshal Faircloth
Adrienne Pennington
Cassidy Rachit
Bruce Hinkle

Reviewed By: Liz Miller

Measured by:
0 hr: MF/AP
24 hr: BA
48 hr BR: MF/AP
48 hr AR: MF/AP
72 hr:
96 hr: AP

Measure/record salinity for marine tests

Comments:

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Revised 02/26/2013 MF

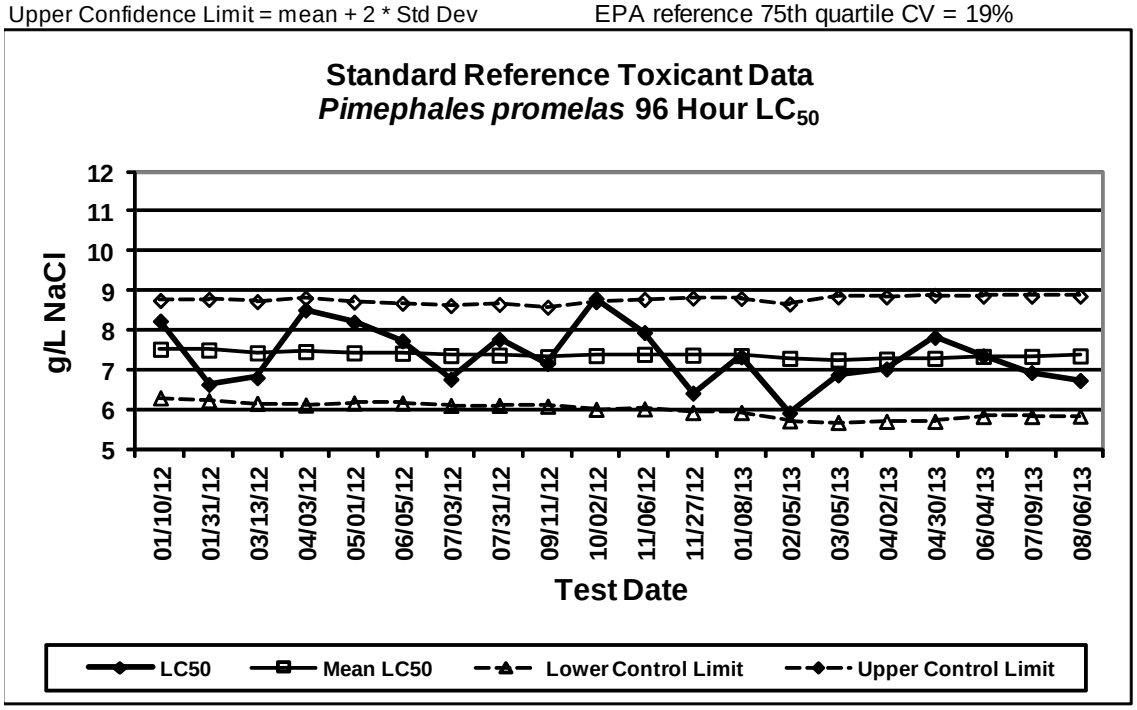
Florida Department of Environmental Protection
Bureau of Laboratories

Standard Reference Toxicant (SRT) Test Data - 96-hour Acute Toxicity
Pimephales promelas (fathead minnow) - Sodium Chloride (NaCl)

Date	LC50	Mean LC50	Std Dev	Lower Control Limit	Upper Control Limit
01/10/12	8.23	7.52	0.61	6.29	8.75
01/31/12	6.63	7.5	0.64	6.22	8.78
03/13/12	6.80	7.43	0.64	6.15	8.72
04/03/12	8.51	7.46	0.68	6.11	8.81
05/01/12	8.20	7.43	0.64	6.16	8.71
06/05/12	7.73	7.42	0.63	6.16	8.68
07/03/12	6.76	7.36	0.63	6.1	8.62
07/31/12	7.77	7.37	0.64	6.1	8.65
09/11/12	7.16	7.33	0.62	6.08	8.58
10/02/12	8.80	7.36	0.68	6	8.72
11/06/12	7.94	7.39	0.69	6.01	8.78
11/27/12	6.41	7.37	0.72	5.92	8.81
01/08/13	7.33	7.36	0.72	5.92	8.8
02/05/13	5.91	7.29	0.79	5.71	8.66
03/05/13	6.87	7.25	0.79	5.67	8.84
04/02/13	7.02	7.27	0.78	5.7	8.84
04/30/13	7.82	7.29	0.79	5.7	8.88
06/04/13	7.35	7.34	0.76	5.82	8.86
07/09/13	6.93	7.34	0.76	5.82	8.86
08/06/13	6.73	7.35	0.76	5.83	8.86

Lower Confidence Limit = mean - 2 * Std Dev
Upper Confidence Limit = mean + 2 * Std Dev

CV = 10.31
EPA reference 75th quartile CV = 19%



FDEP Biology Laboratory - Acute SRT Bench Sheet

Method from EPA-821-R-02-012 except *H. azteca*

Test Organism: (check one)
☐ *Americamysis bahia* Method 2007.0 TA07.03 ☐ *Menidia beryllina* Method 2006.0 TA07.04 ☐ *Hyalella azteca* Method 100.1 EPA-600-R-99-064
☐ *Ceriodaphnia dubia* Method 2002.0 TA07.01 ☐ *Cyprinella leedsi* Method 2000.0 TA07.02 ☑ *Pimephales promelas* Method 2000.0 TA07.02

Test Type: ☐ non-renewal ☑ renewal

AP 8.6.13

Test Page 1 of 2

Diluent/ Batch #: MHW / 8.3.13
Toxicant/ Batch#: NaCl / 8.6.13

Organism Batch: 8.6.13 Age: 7 days

Test Beginning: Date: ~~8.6.13~~ Time: 1310
Test Ending: Date: 8.10.13 Time: 1045

Water Quality Parameters:	Diluent	SOP	Initials
Total Residual Cl_2 (mg/L):	<0.03	TA06_22	CR
Alkalinity (mg/L as $CaCO_3$):	64	TA06_08	CR
Hardness (mg/L as $CaCO_3$):	78	TA06_09	CR
Total Ammonia (mg/L as N):	<0.017	TA06_17	BA
Conductivity: µmhos ~~mmhos~~	0.293	TA06_25	BA
Salinity (ppth):		TA06_25	

Food:	Batch
☐ YCT	
☐ *P. subcapitata*	
☑ Artemia Lot #	23013

Artemia Batch:
0 hr: 149.13
24 hr:
48 hr: 151.13
72 hr:

Chamber size: 1000 mL
Test volume: 500 mL per replicate

Concentrations prepared by: BB
Test Incubated in: Incubator # 2
Light Intensity: 50-100 Ft. candles
Photoperiod: 16 hours Light / 8 hours dark

Temperature Range °C: (if used)
Incubator # 2 min 23.9 max 25.2
Test min 24.0 max 24.8
Room B246 min 24.5 max 25.3

Feeding: √ as needed

☑	Before test
☐	24 hr
☑	48 hr
☐	72 hr

all species 2 hrs prior to test

mysids daily

all species except *H. azteca* 2 hr prior to renewal

H. azteca 0 hr and 48 hr

Concentration µg/L mg/L g/L	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Control	~~AP~~ A	D13	10	10	10	10	10	10
	B	D14	10	10	10	10	10	10
4	A	D15	10	10	10	10	10	10
	B	D16	10	10	10	10	10	10
5	A	D17	10	10	10	10	9 1D	8 1D
	B	D18	10	10	10	10	9 1D	9
6	A	D19	10	10	9 1D	9	8 1D	8
	B	D20	10	10	10	10	8 2D	8
7	A	D21	10	10	4 4D	4	4	4
	B	D22	10	9 1D	5 4D	5	4 1D	4
10	A	D23	10	1 9D	0 1D			
	B	D24	10	0 10D	—			
Organisms loaded by: CR		Checked by:	AP	CR	CR	CR	CR	AP
Loading Verified by: AP			AR = after renewal					

m = missing d = dead BR = before renewal hr = hour

H. azteca		
0 hr	Alk	Hrd
Well		
100%		
96 hr	Alk	Hrd
Well		
100%		

Comments:

Investigators' Signatures
Adrienne Pennington
Sue Ambler
Cassidy Reichert

Reviewer: Liz Mattis

Method: TSK

Statistics: LC50	95% confidence intervals Lower	Upper
48 hour: —	—	—
96 hour: 6.73	6.27	7.23

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Revised 7/2/13 AP

FDEP Biology Laboratory - Acute SRT Bench Sheet
0-96 hour parameters

Methods from EPA-821-R-02-012 except *H. azteca*

Test Page 2 of 2

Test Organism: (check one)
- ☐ *Americamysis bahia* Method 2007.0 TA07.03
- ☐ *Menidia beryllina* Method 2006.0 TA07.04
- ☐ *Hyalella azteca* Method 100.1 EPA-600-R-99-064
- ☐ *Ceriodaphnia dubia* Method 2002.0 TA07.01
- ☐ *Cyprinella leedsi* Method 2000.0 TA07.02
- ☑ *Pimephales promelas* Method 2000.0 TA07.02

Test Beginning: Date: 8.6.13 Time: 1310
Test Ending: Date: 8.10.13 Time: 1045

Test Type: ☐ non-renewal ☑ renewal

hr = hour AR = after renewal BR = before renewal

Concentration µg/L mg/L (g/L)	Replicate	Test Hour	pH (SU)	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity ☐ µmhos ☑ mmhos	Salinity (ppth)
Control	A	0 hr	7.7	24.7	7.7	0.293	
	B	24 hr	7.6	24.4	7.4 CR	0.293	
	A	48 hr BR	7.7	24.4	8.0	0.302	
	A	48 hr AR	7.8	24.5	8.1	0.299	
	B	72 hr	7.8	24.5	7.7	0.300	
	A	96 hr	7.7	24.0	8.0	0.313	
4	A	0 hr	7.6	24.4	7.5	7.87	
	B	24 hr	7.6	24.3	7.6	7.78	
	A	48 hr BR	7.7	24.4	7.9	7.94	
	A	48 hr AR	7.8	24.5	7.9	7.93	
	B	72 hr	7.7	24.2	7.4	7.78	
	A	96 hr	7.6	24.1	7.5	7.62	
5	A	0 hr	7.7	24.3	7.4	9.68	
	B	24 hr	7.7	24.8	7.7	9.72	
	A	48 hr BR	7.8	24.4	7.9	9.70	
	A	48 hr AR	7.8	24.4	7.8	9.84	
	B	72 hr	7.7	24.4	7.0	9.88	
	A	96 hr	7.6	24.6	7.4	9.76	
6	A	0 hr	7.8	24.3	7.2	11.5	
	B	24 hr	7.7	24.4	7.7	11.4	
	A	48 hr BR	7.8	24.8	7.9	11.6	
	A	48 hr AR	7.9	24.5	7.8	11.6	
	B	72 hr	7.7	24.0	7.0	11.6	
	A	96 hr	7.6	24.3	7.3	11.3	
7	A	0 hr	7.8	24.3	7.4	12.9	
	B	24 hr	7.7	24.2	7.6	12.8	
	A	48 hr BR	7.8	24.5	7.9	13.0	
	A	48 hr AR	7.9	24.5	8.3	13.0	
	B	72 hr	7.7	24.3	7.1	13.0	
	A	96 hr	7.6	24.4	7.3	12.8	
10	A	0 hr	7.9	24.3	7.3	18.2	
	B	24 hr	7.7	24.6	7.6	18.1	
	A	48 hr BR	7.8	24.5	8.0	18.3	
		48 hr AR					
		72 hr					
		96 hr					

Investigators Signatures
Adrianna Pennington
Bruce Alexander
Cassidy Reichert

Reviewed By: Lizmarie

Measured by:
0 hr: BA
24 hr: CR
48 hr BR: CR/AP
48 hr AR: AP/CR
72 hr: CR
96 hr: AP

Measure/record salinity for marine tests

Comments:

PAGE 00012

Revised 02/26/2013 MF

Appendix G
Organism Receipts

MARINCO BIOASSAY LABORATORY
The Aquatic Toxicology Specialists

NELAP Certification # E84191

Shipment Record

State of Florida Aquaculture Certificate Number AQ0668007

Shipping Date: 8/5/13

Ship to: FDEP

P.O. No:

Species	Quantity	Age	Brood/Lot Number	Temp. (°C)	pH (S.U.)	Salinity (‰)
Mysidopsis bahia						
Menidia beryllina						
						Hardness mg/L
Cyprinella leedsi	150 ac	12 days	CL130724	25	7.8	80
Pimephales promelas	150 ac	7DAYS	FM130729	25	7.8	80
	300	<24 HRS	FM130804-1600	25	7.8	80
Ceriodaphnia dubia						
Daphnia magna						
YCT						
P. subcapitata						

Packed by: PM

Shipped Via: Fed Ex

Notes:

Thank you for your order.

4569 Samuel Street · Sarasota, FL 34233 · Tel: 941-925-3594 · Fax: 941-922-3874 · Web: www.biologylab.com

MARINCO BIOASSAY LABORATORY
The Aquatic Toxicology Specialists

NELAP Certification # E84191

Shipment Record

State of Florida Aquaculture Certificate Number AQ0668007

Shipping Date: 8/12/13

Ship to: FDEP

P.O. No: _____

Species	Quantity	Age	Brood/Lot Number	Temp. (°C)	pH (S.U.)	Salinity (‰)
Mysidopsis bahia						
Menidia beryllina						
						Hardness mg/L
Cyprinella leedsi						
Pimephales promelas	150 ac	7DAYS	PM 130805	25	7.8	50
Ceriodaphnia dubia						
Daphnia magna						
YCT						
P. subcapitata						

Packed by: PM

Shipped Via: Fed Ex

Notes: _____

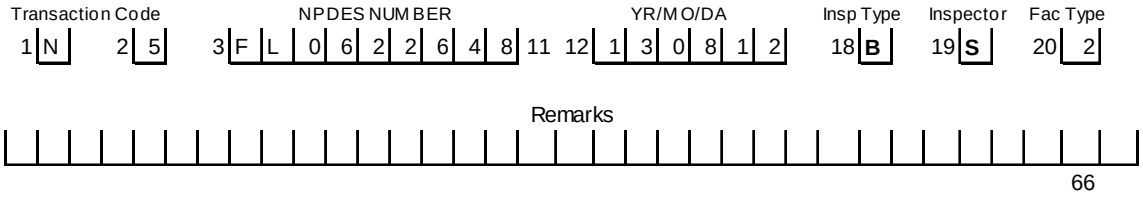
Thank you for your order.

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EPA End Sheet

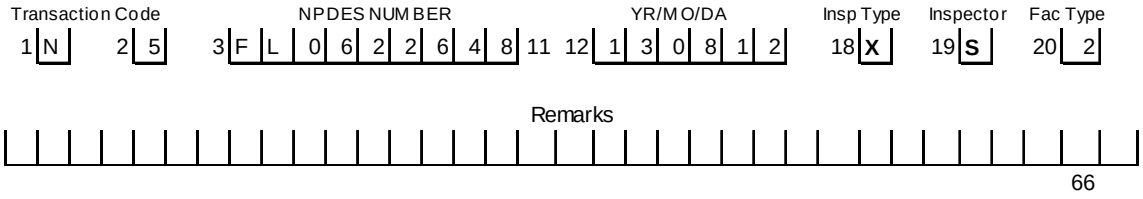
The Bioassay of Sea World - Discovery Cove effluent sampled on August 12, 2013. NPDES #FL0622648.

Fill Out This Section For All Surface Water Discharger Inspections(CEI, CSI, CBI, PAI, XSI-RI Optional)



The Priority Pollutants Analysis of Sea World - Discovery Cove effluent sampled on August 12, 2013. NPDES #FL0622648.

Fill Out This Section For All Surface Water Discharger Inspections(CEI, CSI, CBI, PAI, XSI-RI Optional)



Biological Analyses of Sea World - Discovery Cove effluent sampled on August 12, 2013. NPDES #FL0622648.

Fill Out This Section For All Surface Water Discharger Inspections(CEI, CSI, CBI, PAI, XSI-RI Optional)

