Effluent Quality Assessment of

# Duke Energy Florida – Crystal River 4 & 5

Citrus County

NPDES # FL0036366

Sampled October 19, 2015

March 2016

**Biology Program**

**FDEP Laboratory**

**Division of Environmental Assessment and Restoration**

FDEP Laboratory Quality Manual

NELAC Certification No. E31780

**CONTENTS**

**Facility Overview**

**Methods**

**Results**

**Conclusion**

**Literature Cited**

**Tables**

Table 1. Effluent limits, Class III Marine Criteria and field parameters

Table 2. Effluent limits, Class III Marine Criteria and analytical water chemistry data

Table 3. Effluent limits, Class III Marine Criteria and analytical metals data

Table 4. Measured algal growth potential (AGP; mg dry weight/L) and ratios of nitrogen to phosphorus.

**Appendices**

Appendix A. Facility Summary

Appendix B. Explanation of measurements

Appendix C. Chemical Analyses of Effluent

**EPA End Sheet**

Duke Energy Florida – Crystal River 4 & 5, 15760 Powerline Street, Crystal River, Citrus County, Florida, 34428. NPDES #FL0036366.

## Facility Overview

Duke Energy Florida - Crystal River 4 & 5 is an electric power generating plant. See Appendix A for a description of the facility, summary of permit limits, Administrative Order (AO) and Discharge Monitoring Report (DMR) information.

## Methods

Effluent grab samples for toxicity testing, biological and chemical analyses were collected on October 19, 2015. All samples were collected from the EFF-1 NPDES sampling point for Outfall D-001 by Peter Wenner and Lance Kautz (FDEP Southwest District) following DEP-SOP-001/01 FS 2400 Wastewater Sampling (see Appendix B).

The 96-hour acute definitive toxicity tests and algal growth potential test were performed following internal DEP SOPs TA07_03, TA07_04, and TA08_01 through TA08_09 (see Appendix B).

## Results

### Chemistry Results (See Table 1, Table 2, Table 3 and Appendix C)

- The total ammonia concentration in the grab sample collected and preserved for chemical analysis was 0.015 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. Total ammonia was also detected in the equipment blank between the laboratory method detection limit (MDL) and practical quantitation limit (PQL).
- Aluminum, dissolved oxygen, fluoride, mercury and turbidity were detected in the effluent at levels that comply with Class III Marine Water Quality Criteria (62-302.530, F.A.C.) and/or permitted limits. Arsenic, carbonaceous biochemical oxygen demand (CBOD), chromium, copper, iron and nickel were detected between the laboratory MDL and PQL.

### Algal Growth Potential (See Table 4 and Appendix C)

- The effluent Algal Growth Potential (AGP) was 3.64 A mg dry wt/L of the saltwater species *Dunaliella tertiolecta.* Raschke and Schultz determined that AGP values above 10.0 mg dry weight/L, which represents a "problem" threshold for marine receiving waters, imply nutrient enrichment (personal communication, Marshall Faircloth, et. al. FDEP, with Ron Raschke USEPA Region 4 1987). The ratio of inorganic nitrogen to ortho-phosphate suggests that the effluent is nitrogen limited; whereas, the ratio of total nitrogen to total phosphorus suggests the effluent is co-limited by both nitrogen and phosphorus (Maloney et al. 1974).

### Toxicity Test Results (See Appendix C)

- Tests were performed October 20 - 24, 2015.

  *Americamysis bahia* 96-hour acute definitive bioassay – $LC_{50}$ > 100%, 0%* mortality in 100% sample at 96 hours

  *Menidia beryllina* 96-hour acute definitive bioassay – Invalidated due to excess control mortality 72 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 *Americamysis bahia* test organisms. Although the *Menidia beryllina* bioassay was invalidated at 72 hours due to excess control mortality, the test was monitored through 96 hours. There was 5% mortality in the 100% sample at 96 hours. The cause of the control mortality was not determined.

## Conclusion

The effluent sample collected from the EFF-1 NPDES sampling point for Outfall D-001 for this facility on October 19, 2015, was not acutely toxic to the *Americamysis bahia* test species during the 96-hour acute definitive bioassay. The *Menidia beryllina* bioassay was invalidated due to excess control mortality. The effluent AGP result was less than the "problem" threshold for marine receiving waters suggesting that nutrient enrichment is not an issue. Effluent water quality samples collected on October 19, 2015, did not exceed any applicable water quality standards or any permit conditions.

For additional information concerning this sampling event, including bioassay bench sheets and SRT data, please contact Diane.Power@dep.state.fl.us and/or Joseph.Faircloth@dep.state.fl.us.

## Literature Cited.

Maloney, T. E., W. E. Miller, and D. T. Specht. 1974. The Marine Algal Assay Procedure: Bottle Test. National Environmental Research Center Office of Research and Development. U. S. EPA, Corvallis, Oregon. 43 p.

Stevenson, R. J. and L. L. Bahls. 1999. Periphyton protocols. Pp. 6.1-6.22 in: Rapid bioassessment protocols for use in wadeable streams and rivers. 2nd edition. By: M. T. Barbour, J. Gerritsen, B. D. Snyder and J. B. Stribling. EPA 841-B-99-002. U. S. Environmental Protection Agency, Office of Water, Washington, D. C.

USEPA. 2002. Methods for measuring the acute toxicity of effluents to freshwater and marine organisms. 5th edition. EPA-821-R-02-012.

**Table 1. Effluent limits, Class III Marine Criteria and field parameters.**

| Duke Energy Florida - Crystal River 4 & 5 | Units | Class III Criteria | Effluent Permit Limits | D-001 |
|---|---|---|---|---|
| Sample Depth | m | - | - | 0.1 |
| Temperature | C | - | Report | 28.8 |
| pH | SU | 6.5 - 8.5 | 6.5 - 8.5 | 8.2 |
| Salinity | PPTh | - | - | 25.5 |
| Dissolved Oxygen | % saturation | ≥ 42 | - | 127 |
| Dissolved Oxygen | mg/L | - | - | 8.6 |
| Flow | MGD | - | Report | 75.7 |
| Total Residual Oxidants* | mg/L | ≤ 0.01 | ≤ 0.01 | ≤ 0.054 UQd |

A dash (-) indicates sample/measurement was not collected or criterion/limit does not exist.
Q - Sample held beyond normal holding time
U - Material analyzed for but not detected; value reported is the method detection limit

d - measurement taken in the FDEP laboratory
* - measured as total residual chlorine

**Table 2. Effluent limits, Class III Marine Criteria and analytical water chemistry data.**

| Duke Energy Florida - Crystal River 4 & 5 | Units | Class III Criteria | Effluent Permit Limits | D-001 |
|---|---|---|---|---|
| Ortho-phosphate | mg P/L | - | - | 0.015 |
| Total Phosphorus | mg P/L | - | - | 0.039 |
| Total Ammonia | mg N/L | - | - | 0.015 F |
| Un-ionized Ammonia | mg/L | - | - | < 0.02 c |
| Nitrate and Nitrite | mg N/L | - | - | 0.060 |
| Total Kjeldahl Nitrogen | mg N/L | - | - | 0.45 |
| Organic Nitrogen | mg N/L | - | - | 0.44 c |
| Total Nitrogen | mg N/L | - | - | 0.51 c |
| Total Organic Carbon | mg C/L | - | - | 5.2 F |
| Chlorophyll *a* - Corrected | ug/L | - | - | 3.0 |
| Phaeophytin | ug/L | - | - | 1.9 |
| CBOD, 5 day, N - inhibited | mg/L | - | - | 1.3 IJ |
| Total Suspended Solids | mg/L | - | Report | 10 A |
| Turbidity | NTU | < 29 t | < 29 t | 7.0 |
| Color (true) | PCU | - | - | 8.7 |
| Total Alkalinity | mg CaCo3/L | - | - | 127 |
| Oils and greases | mg/L | ≤ 5.0 | - | 2.6 U |
| Chloride | mg Cl/L | - | - | 16000 |
| Fluoride | mg F/L | ≤ 5.0 | - | 1.0 |
| Sulfate | mg SO4/L | - | - | 2200 |
| **Toxicity (Acute Definitive Percent LC50)** | | | | |
| Bioassay - mysid shrimp *(Americamysis bahia)* | % | ≥ 100 | ≥ 100 | > 100 |
| Bioassay - Fish *(Menidia beryllina)* | % | ≥ 100 | ≥ 100 | - |

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

c - Value is calculated

t - Shall not exceed 29 NTUs above background

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

F - Analyte was detected in both sample and field blank

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

J - Estimated value

**Table 3. Effluent limits, Class III Marine Criteria and analytical metals data**

| Duke Energy Florida - Crystal River 4 & 5 | Units | Class III Criteria | Effluent Permit Limits | D-001 |
|---|---|---|---|---|
| Hardness | mg CaCO3/L | - | - | 5130 c |
| Aluminum | ug/L | ≤ 1500 | ≤ 1500 | 165 |
| Arsenic | ug/L | ≤ 50 | ≤ 36 s | 2.6 I |
| Cadmium | ug/L | ≤ 8.8 | ≤ 8.8 | 0.10 U |
| Calcium | mg/L | - | - | 340 |
| Chromium, (hexavalent) | ug/L | ≤ 50 | ≤ 50 | 15 U |
| Copper | ug/L | ≤ 3.7 | ≤ 3.7 | 0.76 I |
| Iron | ug/L | ≤ 300 | ≤ 300 | 170 I |
| Lead | ug/L | ≤ 8.5 | - | 0.25 U |
| Magnesium | mg/L | - | - | 1040 |
| Mercury | µg/L | ≤ 0.025 | ≤ 0.025 | 0.0016 |
| Nickel | ug/L | ≤ 8.3 | ≤ 8.3 | 0.74 I |
| Potassium | mg/L | - | - | 306 |
| Selenium | ug/L | ≤ 71 | ≤ 71 | 1.0 U |
| Silver | ug/L | ≤ 2.3 | - | 0.025 U |
| Sodium | mg/L | - | - | 8320 |
| Zinc | ug/L | ≤ 86 | - | 20 U |

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

c - Value is calculated

s - Single sample

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

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

**Table 4. Measured algal growth potential (AGP; mg dry weight/L) and ratios of nitrogen to phosphorus**

| Duke Energy Florida - Crystal River 4 & 5 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Location** | **Test Species** | **AGP (measured)** | **Predicted AGP (TSIN) ± 20%** | **Predicted AGP (OP) ± 20%** | **Predicted AGP (TN) ± 20%** | **Predicted AGP (TP) ± 20%** | **Inorganic N:P ratio** | **Total N:P ratio** |
| D-001 | *Dunaliella tertiolecta* | 3.64 A | not applicable [2] | not applicable [2] | not applicable [2] | not applicable [2] | 5 | 13.1 |

2 - predictions not applicable to marine matrix

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

**Appendix A**

**Facility Summary**

State of Florida

# Department of Environmental Protection

Facility Introduction & Summary

| PART I: Information gathered prior to sampling event | |
|---|---|
| Prepared By:<br>Lance Kautz | Contact Number:<br>(813) 470-5903 |
| Facility Name (as it appears on permit):<br>Duke Energy Florida- Crystal River 4 & 5 | Former Names:<br>N/A |
| NPDES Permit Number:<br>FL0036366 | Permit Expiration Date:<br>July 17, 2016 |
| Physical Address:<br>15760 Powerline Street Crystal River, FL 34428 | |
| District:<br>Southwest | County:<br>Citrus |
| Function of Facility: Electric Generating Plant | |
| Facility Type:<br>Industrial Wastewater | Permitted Capacity (MGD):<br>N/A |
| Mean Flow for previous 12 months for all EXTERNAL outfalls listed in permit (list date range including months):<br>81.52 MGD (7/31/2015 -8 /31/2015) | |
| If applicable, Mean Flow for previous 12 months for REUSE outfall(s) (list date range including months):<br>N/A | |
| Description of type of Discharge:<br>☒ Continuous ☐ Intermittent ☐ Seasonal ☐ Rainfall Dependent ☐ Other, please specify | |

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

| Monitoring Site Number | Description of Monitoring Site |
|---|---|
| FLW-1 | Flow calculated from flow meter readings at each individual cooling tower discharge point and weir at Outfall I-0CO. Calculated flow is total flow from Unit 4 and 5 discharge canal into the site discharge canal serving Units 1-5. |
| EFF-1 | Point of discharge from Unit 4 and 5 discharge canal into the main discharge canal serving Units 1-5. |
| EFF-2 | Point of continuous chlorine monitor located approximately 950 ft upstream (where the bridge crosses Unit 4 and 5 discharge canal) from the point where the Unit 4 and 5 discharge canal discharges into the main discharge canal serving Units 1-5. |
| FLW-3 | Flow calculated from continuous flow monitoring devices located at each cooling tower basin discharge point. |
| FLW-4 | Calculation of aggregate cooling tower make-up water flow at Units 4 and 5 cooling tower intakes. |
| EFF-3 | Combined blowdown discharges from Units 4 and 5 cooling towers after Outfalls I-074 and I-075 but prior to bypass canal for Units 4 and 5 intake canal. |
| EFF-3A | Unit 4 cooling tower blowdown (CTBD) discharge from Outfall I-074 prior to comingling with discharge from Outfall I-075. |
| EFF-3B | Unit 5 CTBD discharge from Outfall I-075 prior to comingling with discharge from Outfall I-074. |
| INT-1 | At the intake to Units 4 and 5 cooling towers serving both units. |
| FLW-5 | Calculation of storm water flow at Outfall I-CHO. |
| OUI-1 | Coal Storage Area overflow weir prior to discharge into the Runoff Collection System Coal Storage Area overflow weir prior to discharge into the Runoff Collection System |
| FLW-3 | Calculation of storm water flow at Outfall I-C40. |
| OUI-2 | Coal Storage Area overflow weir prior to discharge into the Runoff Collection System Coal Storage Area overflow weir prior to discharge into the Runoff Collection System |
| FLW-6 | Calculation of flow at Outfall I-0CO. |
| OUI-3 | At the discharge from the overflow weir from the detention canal prior to entry into Outfall I-0C0. |

Description of Permitted Outfall(s):

**Surface Water Discharge D-001:** An existing permitted discharge to the Crystal River Energy Complex main discharge canal (WBID 1339) and thence to the Gulf of Mexico (WBID 8039), both are Class II Marine Waters. The point of discharge is located approximately at latitude 28° 58' 00" N, longitude 82° 41' 40" W.

**Internal Outfall I-0CO:** An existing permitted discharge to the Crystal River Unit 4 and 5 blowdown canal.

**Internal Outfall I-CHO:** An existing permitted discharge to site runoff collection system thence to the Crystal River 4&5 blowdown canal.

**Internal Outfall I-C40:** An existing permitted discharge to the site runoff collection system thence to Crystal River 4&5 blowdown canal.

**Internal Outfalls I-074 and I-075:** Two existing 44 MGD permitted discharges to the Crystal River 4&5 blowdown canal.

Description of Treatment Process (if multiple discharge points, include a detailed map or diagram of facility):
Wastewater from the facility consists of non-contact recirculating cooling tower blowdown (CTBD) from the Units 4 and 5 cooling towers and runoff from coal and ash storage and handling areas. Cooling water is treated with a mixture of chlorine and bromine during circulation in the cooling towers and is dechlorinated prior to discharge. CTBD discharges via the Units 4 and 5 blowdown canal to the site discharge canal. Runoff from the coal storage/equipment handling area, ash landfill/equipment handling area runoff, ash sluice and dewatering system, and fly/bottom ash transport truck wash water is treated by sedimentation in the collection areas. Overflow from the coal and ash runoff areas discharges infrequently into the runoff collection system, which in turn discharges infrequently via the Units 4 and 5 blowdown canal to the site discharge canal. The site discharge canal serves Units 4 and 5 and Units 1, 2, and 3, which discharge under a separate permit (FL0000159). The site discharge canal discharges to Crystal Bay, which is part of the Gulf of Mexico, and is a Class III marine surface water. Makeup water for the Units 4 and 5 cooling towers is also obtained from the site discharge canal.

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

<u>D-001:</u>

| Parameter | | Quantity or Loading | | Units | Quality or Concentration | | | Units | No. Ex. | Frequency of Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow | Sample Measurement | | | | | | | | | | |
| PARM Code 50050 1<br>Mon. Site No. FLW-1 | Permit Requirement | Report (Mo.Avg.) | Report (Day.Max.) | MGD | | | | | | Continuous | Recorder |
| Temperature (F), Water | Sample Measurement | | | | | | | | | | |
| PARM Code 00011 1<br>Mon. Site No. EFF-1 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | Deg.F | | Continuous | Recorder |
| Oxidants, Total Residual | Sample Measurement | | | | | | | | | | |
| PARM Code 34044 1<br>Mon. Site No. EFF-2 | Permit Requirement | | | | | 0.01 (Mo.Avg.) | 0.01 (Day.Max.) | mg/L | | Continuous | Recorder |
| Solids, Total Suspended | Sample Measurement | | | | | | | | | | |
| PARM Code 00530 1<br>Mon. Site No. EFF-1 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | mg/L | | Per Discharge | Grab |
| Aluminum, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 01104 1<br>Mon. Site No. EFF-1 | Permit Requirement | | | | | 1500 (Mo.Avg.) | 1500 (Day.Max.) | ug/L | | Per Discharge | Grab |
| Arsenic, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 00978 1<br>Mon. Site No. EFF-1 | Permit Requirement | | | | | 36 (Mo.Avg.) | 36 (Day.Max.) | ug/L | | Per Discharge | Grab |
| Cadmium, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 01113 1<br>Mon. Site No. EFF-1 | Permit Requirement | | | | | 8.8 (Mo.Avg.) | 8.8 (Day.Max.) | ug/L | | Per Discharge | Grab |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Chromium, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 01118 1<br>Mon. Site No. EFF-1 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | Per Discharge | Grab |
| Chromium, Hexavalent Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 78247 1<br>Mon. Site No. EFF-1 | Permit Requirement | | | | | 50 (Mo.Avg.) | 50 (Day.Max.) | ug/L | | Per Discharge | Grab |
| Copper, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 01119 1<br>Mon. Site No. EFF-1 | Permit Requirement | | | | | 3.7 (Mo.Avg.) | 3.7 (Day.Max.) | ug/L | | Per Discharge | Grab |
| Iron, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 00980 1<br>Mon. Site No. EFF-1 | Permit Requirement | | | | | 0.3 (Mo.Avg.) | 0.3 (Day.Max.) | mg/L | | Per Discharge | Grab |
| Mercury, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 71901 1<br>Mon. Site No. EFF-1 | Permit Requirement | | | | | 0.025 (Mo.Avg.) | 0.025 (Day.Max.) | ug/L | | Per Discharge | Grab |
| Nickel, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 01074 1<br>Mon. Site No. EFF-1 | Permit Requirement | | | | | 8.3 (Mo.Avg.) | 8.3 (Day.Max.) | ug/L | | Per Discharge | Grab |
| Selenium, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 00981 1<br>Mon. Site No. EFF-1 | Permit Requirement | | | | | 71 (Mo.Avg.) | 71 (Day.Max.) | ug/L | | Per Discharge | Grab |
| Thallium, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 00982 1<br>Mon. Site No. EFF-1 | Permit Requirement | | | | | 6.3 (Mo.Avg.) | 6.3 (Day.Max.) | ug/L | | Per Discharge | Grab |
| pH | Sample Measurement | | | | | | | | | | |
| PARM Code 00400 1<br>Mon. Site No. EFF-1 | Permit Requirement | | | | 6.5 (Day.Min.) | | 8.5 (Day.Max.) | s.u. | | Monthly | In-Situ |
| Oil and Grease | Sample Measurement | | | | | | | | | | |
| PARM Code 00556 1<br>Mon. Site No. EFF-1 | Permit Requirement | | | | | 5.0 (Mo.Avg.) | 5.0 (Day.Max.) | mg/L | | Per Discharge | Grab |
| 7-DAY CHRONIC STATRE Mysidopsis bahia (Routine)<br>PARM Code TRP3E P<br>Mon. Site No. EFF-1 | Sample Measurement | | | | | | | | | | |
| | Permit Requirement | | | | 100 (Min.) | | | percent | | Semi-annually | 24-hr Composite |
| 7-DAY CHRONIC STATRE Mysidopsis bahia (Additional)<br>PARM Code TRP3E Q<br>Mon. Site No. EFF-1 | Sample Measurement | | | | | | | | | | |
| | Permit Requirement | | | | 100 (Min.) | | | percent | | As needed | As required by the permit |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7-DAY CHRONIC STATRE<br>Mysidopsis bahia (Additional) | Sample<br>Measurement | | | | | | | | | | |
| PARM Code TRP3E R<br>Mon. Site No. EFF-1 | Permit<br>Requirement | | | | 100<br>(Min.) | | | percent | | As needed | As required by the permit |
| 7-DAY CHRONIC STATRE<br>Menidia beryllina (Routine) | Sample<br>Measurement | | | | | | | | | | |
| PARM Code TRP6B P<br>Mon. Site No. EFF-1 | Permit<br>Requirement | | | | 100<br>(Min.) | | | percent | | Semi-annually | 24-hr Composite |
| 7-DAY CHRONIC STATRE<br>Menidia beryllina (Additional) | Sample<br>Measurement | | | | | | | | | | |
| PARM Code TRP6B Q<br>Mon. Site No. EFF-1 | Permit<br>Requirement | | | | 100<br>(Min.) | | | percent | | As needed | As required by the permit |
| 7-DAY CHRONIC STATRE<br>Menidia beryllina (Additional) | Sample<br>Measurement | | | | | | | | | | |
| PARM Code TRP6B R<br>Mon. Site No. EFF-1 | Permit<br>Requirement | | | | 100<br>(Min.) | | | percent | | As needed | As required by the permit |

I-074:

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow | Sample Measurement | | | | | | | | | | |
| PARM Code 50050 1<br>Mon. Site No. FLW-3 | Permit Requirement | Report (Mo.Avg.) | Report (Day.Max.) | MGD | | | | | | Continuous | Recorder |
| Flow (Intake) | Sample Measurement | | | | | | | | | | |
| PARM Code 50050 7<br>Mon. Site No. FLW-4 | Permit Requirement | Report (Mo.Avg.) | Report (Day.Max.) | MGD | | | | | | Continuous | Pump Logs |
| Temperature (F), Water | Sample Measurement | | | | | | | | | | |
| PARM Code 00011 1<br>Mon. Site No. EFF-3 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | Deg F | | Continuous | Recorder |
| Specific Conductance | Sample Measurement | | | | | | | | | | |
| PARM Code 00095 7<br>Mon. Site No. INT-1 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | umhos/cm | | Weekly | Grab |
| Specific Conductance | Sample Measurement | | | | | | | | | | |
| PARM Code 00095 Q<br>Mon. Site No. EFF-3A | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | umhos/cm | | Continuous | Recorder |
| Cycles of Concentration | Sample Measurement | | | | | | | | | | |
| PARM Code 51463 1<br>Mon. Site No. EFF-3A | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | cycles | | Weekly | Calculated |
| pH | Sample Measurement | | | | | | | | | | |
| PARM Code 00400 1<br>Mon. Site No. EFF-3 | Permit Requirement | | | | 6.0 (Day.Min.) | | 9.0 (Day.Max.) | s.u. | | Daily; 24 hours | In-Situ |

I-075:

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Specific Conductivity | Sample Measurement | | | | | | | | | | |
| PARM Code 00095 1<br>Mon. Site No. EFF-3B | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | umhos/cm | | Continuous | Recorder |
| Cycles of Concentration | Sample Measurement | | | | | | | | | | |
| PARM Code 51463 1<br>Mon. Site No. EFF-3B | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | cycles | | Weekly | Calculated |
| Copper, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 01119 1<br>Mon. Site No. EFF-3B | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | Weekly | Grab |
| Nickel, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 01074 1<br>Mon. Site No. EFF-3B | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | Weekly | Grab |
| TRO-Discharge Time (Biocide Application Time) | Sample Measurement | | | | | | | | | | |
| PARM Code 04223 1<br>Mon. Site No. EFF-3B | Permit Requirement | | | | | | 120 (Day.Max.) | min/day | | Daily; 24 hours | Logs |
| Water Treatment Additives (non-biocides) | Sample Measurement | | | | | | | | | | |
| PARM Code 82391 1<br>Mon. Site No. EFF-3B | Permit Requirement | | | | | | Report (Day.Max.) | ug/L | | Per application | Grab |

I-0C0:

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow | Sample Measurement | | | | | | | | | | |
| PARM Code 50050 1<br>Mon. Site No. FLW-7 | Permit Requirement | Report (Mo.Avg.) | Report (Day.Max.) | MGD | | | | | | Per discharge | Weir Reading |
| Duration of Discharge | Sample Measurement | | | | | | | | | | |
| PARM Code 81381 P<br>Mon. Site No. OUI-3 | Permit Requirement | Report (Mo.Avg.) | Report (Day.Max.) | min/day | | | | | | Per discharge | Log |
| Solids, Total Suspended | Sample Measurement | | | | | | | | | | |
| PARM Code 00530 P<br>Mon. Site No. OUI-3 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | mg/L | | Per discharge | Grab |
| Iron, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 00980 P<br>Mon. Site No. OUI-3 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | mg/L | | Per discharge | Grab |
| pH | Sample Measurement | | | | | | | | | | |
| PARM Code 00400 P<br>Mon. Site No. OUI-3 | Permit Requirement | | | | Report (Day Min.) | | Report (Day.Max.) | s.u. | | Per discharge | In-situ |
| Oil and Grease | Sample Measurement | | | | | | | | | | |
| PARM Code 00556 P<br>Mon. Site No. OUI-3 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | mg/L | | Per discharge | Grab |

IC40:

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow | Sample Measurement | | | | | | | | | | |
| PARM Code 50050 1<br>Mon. Site No. FLW-6 | Permit Requirement | Report (Mo.Avg.) | Report (Day.Max.) | MGD | | | | | | Per discharge | Weir Reading |
| Duration of Discharge | Sample Measurement | | | | | | | | | | |
| PARM Code 81381 P<br>Mon. Site No. OUI-2 | Permit Requirement | Report (Mo.Avg.) | Report (Day.Max.) | mm/day | | | | | | Per discharge | Log |
| Solids, Total Suspended | Sample Measurement | | | | | | | | | | |
| PARM Code 00530 P<br>Mon. Site No. OUI-2 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | mg/L | | Per discharge | Grab |
| Aluminum, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 01104 P<br>Mon. Site No. OUI-2 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | Per discharge | Grab |
| Arsenic, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 00978 P<br>Mon. Site No. OUI-2 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | Per discharge | Grab |
| Cadmium, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 01113 P<br>Mon. Site No. OUI-2 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | Per discharge | Grab |

| | | | | | | | | | Ex. | Analysis | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Chromium, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 01118 P<br>Mon. Site No. OUI-2 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | Per discharge | Grab |
| Copper, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 01119 P<br>Mon. Site No. OUI-2 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | Per discharge | Grab |
| Iron, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 00980 P<br>Mon. Site No. OUI-2 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | mg/L | | Per discharge | Grab |
| Lead, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 01114 P<br>Mon. Site No. OUI-2 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | Per discharge | Grab |
| Nickel, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 01074 P<br>Mon. Site No. OUI-2 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | Per discharge | Grab |
| Selenium, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 00981 P<br>Mon. Site No. OUI-2 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | Per discharge | Grab |
| Mercury, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 71901 P<br>Mon. Site No. OUI-2 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | Per discharge | Grab |
| Thallium, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 00982 P<br>Mon. Site No. OUI-2 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | Per discharge | Grab |
| Vanadium, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 01128 P<br>Mon. Site No. OUI-2 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | Per discharge | Grab |

I-CH0:

| | | | | | | | | | | Ex. | Analysis | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow | Sample Measurement | | | | | | | | | | | |
| PARM Code 50050 1 Mon. Site No. FLW-5 | Permit Requirement | Report (Mo.Avg.) | Report (Day.Max.) | MGD | | | | | | | Per discharge | Weir Reading |
| Solids, Total Suspended | Sample Measurement | | | | | | | | | | | |
| PARM Code 00530 P Mon. Site No. OUI-1 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | mg/L | | | Per discharge | Grab |
| Duration of Discharge | Sample Measurement | | | | | | | | | | | |
| PARM Code 81381 P Mon. Site No. OUI-1 | Permit Requirement | Report (Mo.Avg.) | Report (Day.Max.) | min/day | | | | | | | Per discharge | Log |
| Aluminum, Total Recoverable | Sample Measurement | | | | | | | | | | | |
| PARM Code 01104 P Mon. Site No. OUI-1 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | | Per discharge | Grab |
| Arsenic, Total Recoverable | Sample Measurement | | | | | | | | | | | |
| PARM Code 00978 P Mon. Site No. OUI-1 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | | Per discharge | Grab |
| Cadmium, Total Recoverable | Sample Measurement | | | | | | | | | | | |
| PARM Code 01113 P Mon. Site No. OUI-1 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | | Per discharge | Grab |

| | | | | | | | | | Ex. | Analysis | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Chromium, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 01118 P<br>Mon. Site No. OUI-1 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | Per discharge | Grab |
| Copper, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 01119 P<br>Mon. Site No. OUI-1 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | Per discharge | Grab |
| Iron, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 00980 P<br>Mon. Site No. OUI-1 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | mg/L | | Per discharge | Grab |
| Lead, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 01114 P<br>Mon. Site No. OUI-1 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | Per discharge | Grab |
| Mercury, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 71901 P<br>Mon. Site No. OUI-1 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | Per discharge | Grab |
| Nickel, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 01074 P<br>Mon. Site No. OUI-1 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | Per discharge | Grab |
| Selenium, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 00981 P<br>Mon. Site No. OUI-1 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | Per discharge | Grab |
| Thallium, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 00982 P<br>Mon. Site No. OUI-1 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | Per discharge | Grab |
| Vanadium, Total Recoverable | Sample Measurement | | | | | | | | | | |
| PARM Code 01128 P<br>Mon. Site No. OUI-1 | Permit Requirement | | | | | Report (Mo.Avg.) | Report (Day.Max.) | ug/L | | Per discharge | Grab |

| PART I: Continued | |
|---|---|
| Receiving Waters:<br>Gulf of Mexico | Classification (indicate whether fresh or marine):<br>Class II Marine Waters |

Toxicity Test Requirements (routine and/or additional test language, test species, salinity adjustment, etc.):

3. The permittee shall comply with the following requirements to evaluate chronic whole effluent toxicity of the discharge from outfall D-001.

   a. Effluent Limitation
      (1) In any routine or additional follow-up test for 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) For acute whole effluent 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 six months, starting the second month after the issuance date of this permit and lasting for the duration of this permit.
      (2) 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 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 7-day survival and growth chronic toxicity tests with the mysid shrimp, *Americamysis (Mysidopsis) bahia*, Method 1007.0, and the inland silverside, *Menidia beryllina*, Method 1006.0, 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 Marine and**

**Estaurine Organisms**, 3rd ed., EPA-821-R-02-014. 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 artificial sea salts as described in EPA-821-R-02-014, Section 7.2. The test salinity shall be determined as follows:

(a) For the *Americamysis (Mysidopsis) bahia* bioassays, the effluent shall be adjusted to a salinity of 20 parts per thousand (ppt) with artificial sea salts. The salinity of the control/dilution water (0% effluent) shall be 20 ppt. If the salinity of the effluent is greater than 20 ppt, no salinity adjustment shall be made to the effluent and the test shall be run at the effluent salinity. The salinity of the control/dilution water shall match the salinity of the effluent.

(b) For the *Menidia beryllina* bioassays, if the effluent salinity is less than 5 ppt, the salinity shall be adjusted to 5 ppt with artificial sea salts. The salinity of the control/dilution water (0% effluent) shall be 5 ppt. If the salinity of the effluent is greater than 5 ppt, no salinity adjustment shall be made to the effluent and the test shall be run at the effluent salinity. The salinity of the control/dilution water shall match the salinity of the effluent.

(c) If the salinity of the effluent requires adjustment, a salinity adjustment control should be prepared and included with each bioassay. The salinity adjustment control is intended to identify toxicity resulting from adjusting the effluent salinity with artificial sea salts. To prepare the salinity adjustment control, dilite the control/dilution water to the salinity of the effluent and adjust the salinity of the salinity adjustment control at the same time and to the same salinity that the salinity of the effluent is adjusted using the same artificial sea salts.

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-02-014, Section 14.12 (*Americamysis bahia* ) and Section 13.12 (*Menidia beryllina*). 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 for either test species prior to the end of any test and the control mortality is less than 20% at that time, the test (including the control) for that species 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-02-014, 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-02-014, 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-02-014, 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
Southwest District
13051 N. Telecom Parkway
Temple Terrace, Florida 33637

g. Test Failures

(1) A test fails when the test results do not meet the limits in 3.a.(1).

(2) Additional Follow-up Tests:

(a) If a routine test does not meet the chronic toxicity limitation in 3.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 3.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 analyzed according to the procedures 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 3.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 3.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 3.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 3.(1)(b), 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)]*

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

N/A

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 |
|---|---|---|---|
| | | | |

Describe previous FYI and WQBEL study:

N/A

Describe previous or current Enforcement Actions (including WLs):

N/A

Describe any violations or problems noted in previous inspection:

N/A

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

DMR trends appear to be remaining fairly consistent over the past five years. A review of DMRs from 09/30/2010 to 09/30/2015 revealed a general consistency of effluent quality with two exceedances of the permitted thallium limits in 6/2012 .

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

N/A

| PART II: Sampling Event Information | |
|---|---|
| Date(s) sample collected:<br>**10/19/2015** | Sampler(s):<br>**Lance Kautz, Peter Wenner** |
| Temperature (Deg C):<br>**28.75** | pH (SU):<br>**8.19** |
| Dissolved Oxygen (mg/L):<br>**7.67** | Conductivity (umhos/cm):<br>**40,000** |
| Total Residual Chlorine (mg/L):<br>**N/A** | Total Residual Chlorine - after Disinfection (mg/L):<br>**N/A** |
| Method of Chlorination:<br>**N/A** | Method of De-chlorination:<br>**N/A** |
| Flow During Sample Collection for each outfall(MGD):<br><br>**D-001: 75.7** | |
| 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):<br>**D-001: 81.52 MGD; (07/31/2014 - 08/31/2015)** | |
| Describe Discharge during Sampling Event:<br>☒ 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:<br><br>**Sampling instrument broke during sampling process, grab sampling methods used for remaining samples. Compliance sampling point was extremely turbulent.** | |

## Appendix B

## 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.dep.state.fl.us/labs/library/lab_sops.htm and/or http://www.dep.state.fl.us/water/sas/sop/sops.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.

**(3) Toxicity Bioassays**

Greater than 50% mortality in an acute toxicity test may constitute an exceedance of 62-302.500(1)a and/or facility permit limits. A 25% inhibition concentration (IC25) is the effluent concentration causing a 25% reduction in a biological response such as biomass or reproduction when compared to a control population. An IC25 of less than 100% in a chronic test may constitute exceedances of 62-302.530(20), 62-302.530(61) and/or 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 facility permit limits. Standard reference toxicant (SRT) tests are conducted monthly to ensure quality in toxicity testing.

**(4) Chlorophyll *a* Content**

Chlorophyll *a* content is an estimate algal biomass. High algal biomass implies nutrient stress (Stevenson and Bahls 1999) and 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..

**(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 10.0 mg dry weight/L represents a “problem” threshold for marine 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 in a low salinity sample 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 (EPA-822-B-00-002). 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. Expected AGP is not calculated for marine samples incubated with *Dunaliella*.

**(6) 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 C

## Chemical analysis of effluent

| Date | Field ID | Analysis | Component | Result | Units | MDL | PQL |
|---|---|---|---|---|---|---|---|
| 10/19/2015 13:45 | D-001 | AGP/LN | Algal Growth Potential-Salinity Adjusted | 3.64 A | mg DryWt/L | 3.00 | 3.00 |
| 10/19/2015 13:45 | D-001 | Chlorophyll/Grain Size/BOD | Biochemical Oxygen Demand-5 Day,N-Inhib | 1.3 IJ | mg/L | 0.20 | 2.0 |
| 10/19/2015 13:45 | D-001 | Chlorophyll/Grain Size/BOD | Chlorophyll-a, Corrected | 3.0 | ug/L | 0.55 | 1.7 |
| 10/19/2015 13:45 | D-001 | Chlorophyll/Grain Size/BOD | Phaeophytin-a | 1.9 | ug/L | 0.40 | 1.2 |
| 10/19/2015 13:45 | D-001 | Toxicology | Bioassay-Acute-Def-SW-Mysid, LC50 | 100 L | LC50 | | |
| 10/19/2015 13:45 | D-001 | Toxicology | Bioassay-Acute-Def-SW-Fish, LC50 | No Result | LC50 | | |
| 10/19/2015 13:45 | D-001 | Metals | Mercury | 1.6 | ng/L | 0.10 | 0.40 |
| 10/19/2015 13:45 | D-001 | Metals | Zinc | 20 U | ug/L | 20 | 80 |
| 10/19/2015 13:45 | D-001 | Metals | Thallium | 0.50 U | ug/L | 0.50 | 2.0 |
| 10/19/2015 13:45 | D-001 | Metals | Selenium | 1.0 U | ug/L | 1.0 | 4.0 |
| 10/19/2015 13:45 | D-001 | Metals | Chromium | 0.66 I | ug/L | 0.25 | 1.0 |
| 10/19/2015 13:45 | D-001 | Metals | Sodium | 8.32E+03 | mg/L | 25 | 100 |
| 10/19/2015 13:45 | D-001 | Metals | Iron | 170 I | ug/L | 120 | 480 |
| 10/19/2015 13:45 | D-001 | Metals | Calcium | 340 | mg/L | 0.30 | 1.2 |
| 10/19/2015 13:45 | D-001 | Metals | Lead | 0.25 U | ug/L | 0.25 | 1.0 |
| 10/19/2015 13:45 | D-001 | Metals | Potassium | 306 | mg/L | 15 | 60 |
| 10/19/2015 13:45 | D-001 | Metals | Silver | 0.025 U | ug/L | 0.025 | 0.10 |
| 10/19/2015 13:45 | D-001 | Metals | Nickel | 0.74 I | ug/L | 0.25 | 1.0 |
| 10/19/2015 13:45 | D-001 | Metals | Arsenic | 2.6 I | ug/L | 0.75 | 3.0 |
| 10/19/2015 13:45 | D-001 | Metals | Vanadium | 8.0 U | ug/L | 8.0 | 32 |
| 10/19/2015 13:45 | D-001 | Metals | Cadmium | 0.10 U | ug/L | 0.10 | 0.40 |
| 10/19/2015 13:45 | D-001 | Metals | Magnesium | 1.04E+03 | mg/L | 2.0 | 8.0 |
| 10/19/2015 13:45 | D-001 | Metals | Copper | 0.76 I | ug/L | 0.50 | 2.0 |
| 10/19/2015 13:45 | D-001 | Metals | Aluminum | 165 | ug/L | 10 | 40 |
| 10/19/2015 13:45 | D-001 | Nutrients | Sulfate | 2.2E+03 | mg SO4/L | 40 | 100 |
| 10/19/2015 13:45 | D-001 | Nutrients | Total Alkalinity | 127 | mg CaCO3/L | 0.65 | 2.5 |
| 10/19/2015 13:45 | D-001 | Nutrients | TSS | 10 A | mg/L | 3.0 | 10 |
| 10/19/2015 13:45 | D-001 | Nutrients | Organic Carbon | 5.2 | mg C/L | 1.0 | 2.0 |
| 10/19/2015 13:45 | D-001 | Nutrients | Turbidity | 7.0 | NTU | 0.10 | 0.10 |
| 10/19/2015 13:45 | D-001 | Nutrients | Chloride | 1.6E+04 | mg Cl/L | 40 | 100 |
| 10/19/2015 13:45 | D-001 | Nutrients | Ammonia-N | 0.015 | mg N/L | 0.0020 | 0.0050 |
| 10/19/2015 13:45 | D-001 | Nutrients | O-Phosphate-P | 0.015 | mg P/L | 0.0040 | 0.010 |
| 10/19/2015 13:45 | D-001 | Nutrients | Kjeldahl Nitrogen | 0.45 | mg N/L | 0.16 | 0.40 |

| Date | Field ID | Analysis | Component | Result | Units | MDL | PQL |
|---|---|---|---|---|---|---|---|
| 10/19/2015 13:45 | D-001 | Nutrients | Total-P | 0.039 | mg P/L | 0.0040 | 0.010 |
| 10/19/2015 13:45 | D-001 | Nutrients | NO2NO3-N | 0.060 | mg N/L | 0.0040 | 0.010 |
| 10/19/2015 13:45 | D-001 | Nutrients | Fluoride | 1.0 | mg F/L | 0.18 | 0.50 |
| 10/19/2015 13:45 | D-001 | Nutrients | Color (true) | 8.7 | PCU | 2.5 | 6.0 |
| 10/19/2015 13:45 | D-001 | Overflow | Hexavalent Chromium | 15 U | ug/L | 15 | 50 |
| 10/19/2015 13:45 | D-001 | Overflow | HEM | 2.6 U | mg/L | 2.6 | 9.1 |
| 10/19/2015 13:45 | D-001 | Pesticides | Bromacil | 0.047 U | ug/L | 0.047 | 0.19 |
| 10/19/2015 13:45 | D-001 | Pesticides | Demeton | 0.028 U | ug/L | 0.028 | 0.11 |
| 10/19/2015 13:45 | D-001 | Pesticides | Disulfoton | 0.0059 U | ug/L | 0.0059 | 0.023 |
| 10/19/2015 13:45 | D-001 | Pesticides | Ethion | 0.012 U | ug/L | 0.012 | 0.047 |
| 10/19/2015 13:45 | D-001 | Pesticides | Metribuzin | 0.023 U | ug/L | 0.023 | 0.094 |
| 10/19/2015 13:45 | D-001 | Pesticides | Parathion Methyl | 0.012 U | ug/L | 0.012 | 0.047 |
| 10/19/2015 13:45 | D-001 | Pesticides | Simazine | 0.012 U | ug/L | 0.012 | 0.047 |
| 10/19/2015 13:45 | D-001 | Pesticides | Diazinon | 0.012 U | ug/L | 0.012 | 0.047 |
| 10/19/2015 13:45 | D-001 | Pesticides | Butylate | 0.023 U | ug/L | 0.023 | 0.094 |
| 10/19/2015 13:45 | D-001 | Pesticides | Atrazine Desisopropyl | 0.012 U | ug/L | 0.012 | 0.047 |
| 10/19/2015 13:45 | D-001 | Pesticides | Ametryn | 0.012 U | ug/L | 0.012 | 0.047 |
| 10/19/2015 13:45 | D-001 | Pesticides | Hexazinone | 0.035 UJ | ug/L | 0.035 | 0.14 |
| 10/19/2015 13:45 | D-001 | Pesticides | Prometryn | 0.023 U | ug/L | 0.023 | 0.094 |
| 10/19/2015 13:45 | D-001 | Pesticides | Chlorpyrifos Ethyl | 0.012 U | ug/L | 0.012 | 0.047 |
| 10/19/2015 13:45 | D-001 | Pesticides | Metalaxyl | 0.047 U | ug/L | 0.047 | 0.19 |
| 10/19/2015 13:45 | D-001 | Pesticides | Metolachlor | 0.070 U | ug/L | 0.070 | 0.28 |
| 10/19/2015 13:45 | D-001 | Pesticides | Parathion Ethyl | 0.023 U | ug/L | 0.023 | 0.094 |
| 10/19/2015 13:45 | D-001 | Pesticides | Norflurazon | 0.035 U | ug/L | 0.035 | 0.14 |
| 10/19/2015 13:45 | D-001 | Pesticides | Atrazine | 0.012 U | ug/L | 0.012 | 0.047 |
| 10/19/2015 13:45 | D-001 | Pesticides | Naled | 0.047 U | ug/L | 0.047 | 0.19 |
| 10/19/2015 13:45 | D-001 | Pesticides | Fenamiphos | 0.035 U | ug/L | 0.035 | 0.14 |
| 10/19/2015 13:45 | D-001 | Pesticides | Mevinphos | 0.012 U | ug/L | 0.012 | 0.047 |
| 10/19/2015 13:45 | D-001 | Pesticides | Ethoprop | 0.0059 U | ug/L | 0.0059 | 0.023 |
| 10/19/2015 13:45 | D-001 | Pesticides | Azinphos Methyl | 0.023 U | ug/L | 0.023 | 0.094 |
| 10/19/2015 13:45 | D-001 | Pesticides | Malathion | 0.012 UJ | ug/L | 0.012 | 0.047 |
| 10/19/2015 13:45 | D-001 | Pesticides | Phorate | 0.0059 U | ug/L | 0.0059 | 0.023 |
| 10/19/2015 13:45 | D-001 | Pesticides | Fonofos | 0.012 U | ug/L | 0.012 | 0.047 |
| 10/19/2015 13:45 | D-001 | Pesticides | Chlorpyrifos Methyl | 0.012 U | ug/L | 0.012 | 0.047 |
| 10/19/2015 13:45 | D-001 | Pesticides | Atrazine Desethyl | 0.012 U | ug/L | 0.012 | 0.047 |
| 10/19/2015 13:45 | D-001 | Pesticides | Prometon | 0.023 U | ug/L | 0.023 | 0.094 |

| Date | Field ID | Analysis | Component | Result | Units | MDL | PQL |
|---|---|---|---|---|---|---|---|
| 10/19/2015 13:45 | D-001 | Pesticides | Alachlor | 0.070 U | ug/L | 0.070 | 0.28 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | 2,4-Dimethylphenol | 11 U | ug/L | 11 | 42 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | 2,4-Dinitrophenol | 16 U | ug/L | 16 | 63 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | 2,6-Dinitrotoluene | 1.1 U | ug/L | 1.1 | 4.2 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | 2-Chloronaphthalene | 1.1 U | ug/L | 1.1 | 4.2 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | 2-Nitrophenol | 1.1 U | ug/L | 1.1 | 4.2 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Butyl benzyl phthalate | 1.1 U | ug/L | 1.1 | 4.2 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Chrysene | 0.21 U | ug/L | 0.21 | 0.84 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Pentachlorophenol | 1.1 U | ug/L | 1.1 | 4.2 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | 2-Chlorophenol | 1.1 U | ug/L | 1.1 | 4.2 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | 2-Methyl-4,6-dinitrophenol | 3.2 U | ug/L | 3.2 | 13 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | 4-Chloro-3-methylphenol | 1.1 U | ug/L | 1.1 | 4.2 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Benzo(k)fluoranthene | 0.21 U | ug/L | 0.21 | 0.84 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Di-n-octyl phthalate | 1.1 U | ug/L | 1.1 | 4.2 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Diethyl phthalate | 1.8 I | ug/L | 1.1 | 4.2 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Indeno(1,2,3-cd)pyrene | 0.21 U | ug/L | 0.21 | 0.84 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Naphthalene | 0.21 U | ug/L | 0.21 | 0.84 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | 4-Bromophenyl phenyl ether | 1.1 U | ug/L | 1.1 | 4.2 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | 4-Nitrophenol | 16 U | ug/L | 16 | 63 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Acenaphthylene | 0.21 U | ug/L | 0.21 | 0.84 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Bis(2-chloroethoxy)methane | 1.1 U | ug/L | 1.1 | 4.2 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Bis(2-chloroethyl)ether | 1.1 U | ug/L | 1.1 | 4.2 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Isophorone | 1.1 U | ug/L | 1.1 | 4.2 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | 2,4,6-Trichlorophenol | 1.1 U | ug/L | 1.1 | 4.2 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | 2,4-Dichlorophenol | 1.1 U | ug/L | 1.1 | 4.2 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | N-Nitrosodimethylamine | 2.1 U | ug/L | 2.1 | 8.4 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | 3,3'-Dichlorobenzidine | 42 U | ug/L | 42 | 170 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Benzo(a)anthracene | 0.21 U | ug/L | 0.21 | 0.84 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Benzo(a)pyrene | 0.21 U | ug/L | 0.21 | 0.84 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Benzo(g,h,i)perylene | 0.21 U | ug/L | 0.21 | 0.84 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Hexachlorobenzene | 1.1 U | ug/L | 1.1 | 4.2 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | N-Nitrosodi-n-propylamine | 2.1 U | ug/L | 2.1 | 8.4 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Phenanthrene | 0.21 U | ug/L | 0.21 | 0.84 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Pyrene | 0.21 U | ug/L | 0.21 | 0.84 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | 1,2,4-Trichlorobenzene | 1.1 U | ug/L | 1.1 | 4.2 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | 4-Chlorophenyl phenyl ether | 2.1 U | ug/L | 2.1 | 8.4 |

| Date | Field ID | Analysis | Component | Result | Units | MDL | PQL |
|---|---|---|---|---|---|---|---|
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Anthracene | 0.21 U | ug/L | 0.21 | 0.84 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Benzo(b)fluoranthene | 0.21 U | ug/L | 0.21 | 0.84 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Di-n-butyl phthalate | 1.9 IV | ug/L | 1.1 | 4.2 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Dibenzo(a,h)anthracene | 0.21 U | ug/L | 0.21 | 0.84 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Dimethyl phthalate | 1.1 U | ug/L | 1.1 | 4.2 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Fluorene | 0.21 U | ug/L | 0.21 | 0.84 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Hexachloroethane | 3.2 U | ug/L | 3.2 | 13 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | N-Nitrosodiphenylamine/ Diphenylamine | 3.2 U | ug/L | 3.2 | 13 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Nitrobenzene | 2.1 U | ug/L | 2.1 | 8.4 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Phenol | 1.1 U | ug/L | 1.1 | 4.2 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | 2,4-Dinitrotoluene | 1.1 U | ug/L | 1.1 | 4.2 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Acenaphthene | 0.21 U | ug/L | 0.21 | 0.84 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Benzidine | 110 U | ug/L | 110 | 420 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Bis(2-chloroisopropyl)ether | 3.2 U | ug/L | 3.2 | 13 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Bis(2-ethylhexyl)phthalate | 2.1 U | ug/L | 2.1 | 8.4 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Fluoranthene | 0.21 U | ug/L | 0.21 | 0.84 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Hexachlorobutadiene | 3.2 U | ug/L | 3.2 | 13 |
| 10/19/2015 13:45 | D-001 | Priority Organic Pollutants | Hexachlorocyclopentadiene | 3.2 U | ug/L | 3.2 | 13 |
| 10/19/2015 13:45 | D-001 | Nutrients | Sample Depth | 0.1 | m | | |
| 10/19/2015 13:45 | D-001 | Nutrients | Dissolved Oxygen | 8.56 | mg/L | | |
| 10/19/2015 13:45 | D-001 | Nutrients | Temperature | 28.75 | C | | |
| 10/19/2015 13:45 | D-001 | Nutrients | Salinity | 25.5 | PPTh | | |
| 10/19/2015 13:45 | D-001 | Nutrients | pH | 8.19 | | | |
| 10/19/2015 8:30 | Equipment Blank | Metals | Thallium | 0.10 U | ug/L | 0.10 | 0.40 |
| 10/19/2015 8:30 | Equipment Blank | Metals | Sodium | 0.50 U | mg/L | 0.50 | 2.0 |
| 10/19/2015 8:30 | Equipment Blank | Metals | Arsenic | 0.050 U | ug/L | 0.050 | 0.20 |
| 10/19/2015 8:30 | Equipment Blank | Metals | Vanadium | 2.0 U | ug/L | 2.0 | 8.0 |
| 10/19/2015 8:30 | Equipment Blank | Metals | Iron | 30 U | ug/L | 30 | 120 |
| 10/19/2015 8:30 | Equipment Blank | Metals | Silver | 0.0050 U | ug/L | 0.0050 | 0.020 |
| 10/19/2015 8:30 | Equipment Blank | Metals | Copper | 0.35 I | ug/L | 0.10 | 0.40 |
| 10/19/2015 8:30 | Equipment Blank | Metals | Magnesium | 0.040 U | mg/L | 0.040 | 0.16 |
| 10/19/2015 8:30 | Equipment Blank | Metals | Potassium | 0.30 U | mg/L | 0.30 | 1.2 |
| 10/19/2015 8:30 | Equipment Blank | Metals | Cadmium | 0.020 U | ug/L | 0.020 | 0.080 |
| 10/19/2015 8:30 | Equipment Blank | Metals | Lead | 0.050 U | ug/L | 0.050 | 0.20 |
| 10/19/2015 8:30 | Equipment Blank | Metals | Nickel | 0.050 U | ug/L | 0.050 | 0.20 |
| 10/19/2015 8:30 | Equipment Blank | Metals | Selenium | 0.20 U | ug/L | 0.20 | 0.80 |

| Date | Field ID | Analysis | Component | Result | Units | MDL | PQL |
|---|---|---|---|---|---|---|---|
| 10/19/2015 8:30 | Equipment Blank | Metals | Mercury | 0.10 U | ng/L | 0.10 | 0.40 |
| 10/19/2015 8:30 | Equipment Blank | Metals | Zinc | 5.0 U | ug/L | 5.0 | 20 |
| 10/19/2015 8:30 | Equipment Blank | Metals | Aluminum | 2.0 U | ug/L | 2.0 | 8.0 |
| 10/19/2015 8:30 | Equipment Blank | Metals | Chromium | 0.050 U | ug/L | 0.050 | 0.20 |
| 10/19/2015 8:30 | Equipment Blank | Metals | Calcium | 0.075 U | mg/L | 0.075 | 0.30 |
| 10/19/2015 8:30 | Equipment Blank | Nutrients | Sulfate | 0.20 U | mg SO4/L | 0.20 | 0.50 |
| 10/19/2015 8:30 | Equipment Blank | Nutrients | Color (true) | 2.5 U | PCU | 2.5 | 6.0 |
| 10/19/2015 8:30 | Equipment Blank | Nutrients | NO2NO3-N | 0.004 U | mg N/L | 0.0040 | 0.010 |
| 10/19/2015 8:30 | Equipment Blank | Nutrients | Kjeldahl Nitrogen | 0.080 U | mg N/L | 0.080 | 0.20 |
| 10/19/2015 8:30 | Equipment Blank | Nutrients | Total-P | 0.002 U | mg P/L | 0.0020 | 0.0050 |
| 10/19/2015 8:30 | Equipment Blank | Nutrients | Organic Carbon | 1.5 | mg C/L | 0.50 | 1.0 |
| 10/19/2015 8:30 | Equipment Blank | Nutrients | Ammonia-N | 0.003 I | mg N/L | 0.0020 | 0.0050 |
| 10/19/2015 8:30 | Equipment Blank | Nutrients | Total Alkalinity | 0.65 U | mg CaCO3/L | 0.65 | 2.5 |
| 10/19/2015 8:30 | Equipment Blank | Nutrients | Turbidity | 0.10 U | NTU | 0.10 | 0.10 |
| 10/19/2015 8:30 | Equipment Blank | Nutrients | O-Phosphate-P | 0.004 U | mg P/L | 0.0040 | 0.010 |
| 10/19/2015 8:30 | Equipment Blank | Nutrients | Chloride | 0.20 U | mg Cl/L | 0.20 | 0.50 |
| 10/19/2015 8:30 | Equipment Blank | Nutrients | Fluoride | 0.035 U | mg F/L | 0.035 | 0.10 |
| 10/19/2015 8:30 | Equipment Blank | Overflow | HEM | 2.2 U | mg/L | 2.2 | 7.7 |
| 10/19/2015 8:30 | Equipment Blank | Overflow | Hexavalent Chromium | 3.0 UQ | ug/L | 3.0 | 10 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Ethion | 0.0097 U | ug/L | 0.0097 | 0.039 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Diazinon | 0.0097 U | ug/L | 0.0097 | 0.039 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Butylate | 0.019 U | ug/L | 0.019 | 0.077 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Azinphos Methyl | 0.019 U | ug/L | 0.019 | 0.077 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Ametryn | 0.0097 U | ug/L | 0.0097 | 0.039 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Naled | 0.039 U | ug/L | 0.039 | 0.15 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Simazine | 0.0097 U | ug/L | 0.0097 | 0.039 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Prometon | 0.019 U | ug/L | 0.019 | 0.077 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Hexazinone | 0.029 UJ | ug/L | 0.029 | 0.12 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Ethoprop | 0.0048 U | ug/L | 0.0048 | 0.019 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Atrazine Desisopropyl | 0.0097 U | ug/L | 0.0097 | 0.039 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Phorate | 0.0048 U | ug/L | 0.0048 | 0.019 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Norflurazon | 0.029 U | ug/L | 0.029 | 0.12 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Mevinphos | 0.0097 U | ug/L | 0.0097 | 0.039 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Metolachlor | 0.058 U | ug/L | 0.058 | 0.23 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Metalaxyl | 0.039 U | ug/L | 0.039 | 0.15 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Chlorpyrifos Methyl | 0.0097 U | ug/L | 0.0097 | 0.039 |

| Date | Field ID | Analysis | Component | Result | Units | MDL | PQL |
|---|---|---|---|---|---|---|---|
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Atrazine Desethyl | 0.0097 U | ug/L | 0.0097 | 0.039 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Alachlor | 0.058 U | ug/L | 0.058 | 0.23 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Disulfoton | 0.0048 U | ug/L | 0.0048 | 0.019 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Chlorpyrifos Ethyl | 0.0097 U | ug/L | 0.0097 | 0.039 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Bromacil | 0.039 U | ug/L | 0.039 | 0.15 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Atrazine | 0.0097 U | ug/L | 0.0097 | 0.039 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Parathion Methyl | 0.0097 U | ug/L | 0.0097 | 0.039 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Demeton | 0.023 U | ug/L | 0.023 | 0.093 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Metribuzin | 0.019 U | ug/L | 0.019 | 0.077 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Fenamiphos | 0.029 U | ug/L | 0.029 | 0.12 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Prometryn | 0.019 U | ug/L | 0.019 | 0.077 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Parathion Ethyl | 0.019 U | ug/L | 0.019 | 0.077 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Fonofos | 0.0097 U | ug/L | 0.0097 | 0.039 |
| 10/19/2015 8:30 | Equipment Blank | Pesticides | Malathion | 0.0097 UJ | ug/L | 0.0097 | 0.039 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | N-Nitrosodi-n-propylamine | 2.0 U | ug/L | 2.0 | 7.9 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | N-Nitrosodimethylamine | 2.0 U | ug/L | 2.0 | 7.9 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | 2-Nitrophenol | 0.99 U | ug/L | 0.99 | 4.0 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Anthracene | 0.20 U | ug/L | 0.20 | 0.79 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Bis(2-chloroisopropyl)ether | 3.0 U | ug/L | 3.0 | 12 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Hexachloroethane | 3.0 U | ug/L | 3.0 | 12 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Pyrene | 0.20 U | ug/L | 0.20 | 0.79 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Benzo(b)fluoranthene | 0.20 U | ug/L | 0.20 | 0.79 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Chrysene | 0.20 U | ug/L | 0.20 | 0.79 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Isophorone | 0.99 U | ug/L | 0.99 | 4.0 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | N-Nitrosodiphenylamine/ Diphenylamine | 3.0 U | ug/L | 3.0 | 12 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | 2,6-Dinitrotoluene | 0.99 U | ug/L | 0.99 | 4.0 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Acenaphthylene | 0.20 U | ug/L | 0.20 | 0.79 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Benzidine | 99 U | ug/L | 99 | 400 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Bis(2-chloroethyl)ether | 0.99 U | ug/L | 0.99 | 4.0 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Hexachlorobenzene | 0.99 U | ug/L | 0.99 | 4.0 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | 2,4-Dichlorophenol | 0.99 U | ug/L | 0.99 | 4.0 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Bis(2-ethylhexyl)phthalate | 2.0 U | ug/L | 2.0 | 7.9 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Hexachlorocyclopentadiene | 3.0 U | ug/L | 3.0 | 12 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Indeno(1,2,3-cd)pyrene | 0.20 U | ug/L | 0.20 | 0.79 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Naphthalene | 0.20 U | ug/L | 0.20 | 0.79 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Nitrobenzene | 2.0 U | ug/L | 2.0 | 7.9 |

| Date | Field ID | Analysis | Component | Result | Units | MDL | PQL |
|---|---|---|---|---|---|---|---|
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Phenanthrene | 0.20 U | ug/L | 0.20 | 0.79 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | 2,4,6-Trichlorophenol | 0.99 U | ug/L | 0.99 | 4.0 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | 2-Chloronaphthalene | 0.99 U | ug/L | 0.99 | 4.0 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | 4-Bromophenyl phenyl ether | 0.99 U | ug/L | 0.99 | 4.0 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | 4-Nitrophenol | 15 U | ug/L | 15 | 59 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Acenaphthene | 0.20 U | ug/L | 0.20 | 0.79 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Benzo(a)pyrene | 0.20 U | ug/L | 0.20 | 0.79 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Benzo(g,h,i)perylene | 0.20 U | ug/L | 0.20 | 0.79 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Butyl benzyl phthalate | 0.99 U | ug/L | 0.99 | 4.0 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Di-n-butyl phthalate | 0.99 U | ug/L | 0.99 | 4.0 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Diethyl phthalate | 0.99 U | ug/L | 0.99 | 4.0 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Hexachlorobutadiene | 3.0 U | ug/L | 3.0 | 12 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | 2,4-Dimethylphenol | 9.9 U | ug/L | 9.9 | 40 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | 2,4-Dinitrophenol | 15 U | ug/L | 15 | 59 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | 2,4-Dinitrotoluene | 0.99 U | ug/L | 0.99 | 4.0 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | 3,3'-Dichlorobenzidine | 40 U | ug/L | 40 | 160 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Benzo(k)fluoranthene | 0.20 U | ug/L | 0.20 | 0.79 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Bis(2-chloroethoxy)methane | 0.99 U | ug/L | 0.99 | 4.0 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Fluorene | 0.20 U | ug/L | 0.20 | 0.79 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Pentachlorophenol | 0.99 U | ug/L | 0.99 | 4.0 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Phenol | 0.99 U | ug/L | 0.99 | 4.0 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | 1,2,4-Trichlorobenzene | 0.99 U | ug/L | 0.99 | 4.0 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | 2-Chlorophenol | 0.99 U | ug/L | 0.99 | 4.0 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | 2-Methyl-4,6-dinitrophenol | 3.0 U | ug/L | 3.0 | 12 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | 4-Chloro-3-methylphenol | 0.99 U | ug/L | 0.99 | 4.0 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | 4-Chlorophenyl phenyl ether | 2.0 U | ug/L | 2.0 | 7.9 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Benzo(a)anthracene | 0.20 U | ug/L | 0.20 | 0.79 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Di-n-octyl phthalate | 0.99 U | ug/L | 0.99 | 4.0 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Dibenzo(a,h)anthracene | 0.20 U | ug/L | 0.20 | 0.79 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Dimethyl phthalate | 0.99 U | ug/L | 0.99 | 4.0 |
| 10/19/2015 8:30 | Equipment Blank | Priority Organic Pollutants | Fluoranthene | 0.20 U | ug/L | 0.20 | 0.79 |

**EPA End Sheet**

## The Bioassay of Duke Energy Florida - Crystal River 4 & 5 effluent sampled on October 19, 2015. NPDES #FL0036366.

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

| Transaction Code | NPDES NUMBER | YR/MO/DA | Insp Type | Inspector | Fac Type |
|---|---|---|---|---|---|
| 1 N 2 5 | 3 F L 0 0 3 6 3 6 6 | 11 12 15 10 19 | 18 **B** | 19 **S** | 20 2 |

Remarks

66

## The Priority Pollutants Analysis of Duke Energy Florida - Crystal River 4 & 5 effluent sampled on October 19, 2015. NPDES #FL0036366.

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

| Transaction Code | NPDES NUMBER | YR/MO/DA | Insp Type | Inspector | Fac Type |
|---|---|---|---|---|---|
| 1 N 2 5 | 3 F L 0 0 3 6 3 6 6 | 11 12 15 10 19 | 18 **X** | 19 **S** | 20 2 |

Remarks

66

## Biological Analyses of Duke Energy Florida - Crystal River 4 & 5 effluent sampled on October 19, 2015. NPDES #FL0036366.

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

| Transaction Code | NPDES NUMBER | YR/MO/DA | Insp Type | Inspector | Fac Type |
|---|---|---|---|---|---|
| 1 N 2 5 | 3 F L 0 0 3 6 3 6 6 | 11 12 15 10 19 | 18 **S** | 19 **S** | 20 2 |

Remarks

66