Biological Assessment of

Arvah B. Hopkins Generating Station

Leon County

NPDES # FL0025518

Sampled October 21, 2013

March 2014

Biology Section

Bureau of Laboratories

Division of Environmental Assessment and Restoration

2014 FDEP Bureau of Laboratories Quality Manual

NELAC Certification No. E31780

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Facility Overview

The Arvah B. Hopkins Generating Station is a steam electric power generation plant. The effluent is discharged into Beaver Creek, a Class III Fresh Water (see map Appendix A). The discharge from this facility forms the head waters of Beaver Creek, which then flows through the Talquin Wildlife Management Area and is a tributary of the Ochlockonee River, an Outstanding Florida Water (OFW). The permitted design flow of the wastewater system is 2.7 million gallons per day (MGD). The annual average flow for October 2012 to September 2013 was 1.3 MGD. The average flow measured during this survey was 1.3 MGD (NW District – Pensacola sampling staff).

Biological assessments are prepared by FDEP staff to provide information for review of NPDES permit renewal applications. Biological assessments, in conjunction with other information concerning the subject facility and its receiving-water body, are used to determine appropriate permit conditions.

See the Facility Summary (Appendix B) for a description of the facility, summary of permit limits, and Discharge Monitoring Report (DMR) information.

Methods

The purpose of this investigation was to determine the discharge's effects on the biota of the receiving waters. Chemical and biological comparisons were made between a Control Site (located in Three Pole Creek, an adjacent tributary to the Ochlockonee River, beginning approximately 124 m and ending approximately 24 m downstream of Geddie Road) and a Test Site (located in Beaver Creek, beginning approximately 415 m and ending approximately 315 m downstream of the point of discharge). Samples were also collected in Beaver Creek downstream of Beaver Dam Road bridge (Beaver Dam Road Site, approximately 960 m downstream of the point of discharge) near the facility's permitted copper monitoring point (D1 from the 2011 copper translator study conducted by the facility) and further downstream (Downstream Site, beginning approximately 1,600 m and ending approximately 1,500 downstream of the point of discharge). Effluent samples were taken as grab and composite samples from monitoring location EFF-1.

For this Fifth Year Inspection, the Test Site was moved approximately 200 m further downstream than in previous inspections to avoid a highly channelized area after the discharge point and to maximize habitat availability. The Control Site was placed back in Three Pole Creek for this Fifth Year Inspection because the hydrology met sampling requirements and it represents a stream of similar location, size and habitats compared to the Test Site in addition to not being under the influence of the effluent. The Three Pole Creek Control Site was used in older Fifth Year Inspections but was dry or had low water during the 2002 and 2008 Fifth Year Inspections. With lack of a better option during these inspection years, the Control Site was moved as far downstream of the point of discharge as appropriate stream conditions allowed. The Downstream Site location, intended to collocate with the Control Site used in the 2002 and 2008 inspections, had to be moved approximately 200 m upstream because of changes from stream to wetland conditions near the Turkey Flat Road bridge. The Downstream Site is not a part of the permit for this facility—rather, it was used to collect data for upcoming criteria and sampling design changes not applicable to this inspection. Still, the Downstream Site, because of its historical association with Arvah B Hopkins Generating Station inspections and studies, may be useful to consider as an additional comparison site. Hester-Dendy multi-plate samplers were initially deployed at both the Control and Test Sites, but when the sites were visited two days later, the Test Site Hester-Dendy was not fully submerged. Although the facility continuously discharges and is the headwaters, the water level was observed to fluctuate at least 6-8 inches in the shallow stream. The Hester-Dendy incubation was terminated and dipnet samples for the Stream Condition Index (SCI) were collected instead.

All field and laboratory biological methods followed Bureau of Laboratories and Biology Section Standard Operating Procedures (see http://www.dep.state.fl.us/labs/library/lab_sops.htm and http://www.dep.state.fl.us/water/sas/sop/sops.htm for details) and met DEP quality assurance/quality control standards (see http://www.dep.state.fl.us/water/sas/qa/index.htm). Explanations of specific methods and measurements can be found in Appendix C.

The following were involved in this investigation: Cheryl Swanson and Harris Walters (FDEP Central, Tallahassee), and FDEP Central Laboratory in Tallahassee. The report was reviewed by District representatives and the Point Source Studies Review Committee (Mike Tanski, Andrew Tintle, and Jennifer Weger).

Results

Organic Constituents (See Table 1 and Appendix F)

- No organic constituents were detected in the effluent grab or composite samples.
- No organic constituents were detected in the Control or Test Site grab samples.
- No organic constituents were detected in the field blank or downstream field blank.

Nutrients (See Table 1 and Appendix F)

- Ortho-phosphate values were similar in the effluent, Control Site, and Test Site grab samples. Total phosphorus values were similar in the effluent composite and Test Site grab samples and higher than in the Control Site grab sample indicating that the effluent may be contributing to nutrient enrichment at the Test Site. Total phosphorus however, was undetected in the Downstream Site sample.
- Total ammonia, nitrate and nitrite, total Kjeldahl nitrogen, total nitrogen, and total organic carbon values were similar in the effluent grab/composite and Test Site grab samples and were all lower than the Control Site grab sample levels.
- Total ammonia was detected between the method detection limit (MDL) and the practical quantitation limit (PQL) in the field blank (I-qualified).
- No nutrients were detected in the downstream field blank.

Physical and Chemical Parameters (See Table 1 and Appendices D, E and F)

- The Habitat Assessment score was lower at the Control Site (104) than at the Test Site (129). This places the Control Site in the Suboptimal category and the Test Site in the Optimal category. The Test Site had better substrate diversity, a much higher water velocity, and was not affected as much by habitat smothering as the Control Site.
- Dissolved oxygen (mg/L and % saturation), pH (Standard Units), and specific conductance (µmhos/cm) of the effluent, Control Site, and Test Site complied with Class III Freshwater Quality Criteria (62-302.530, F.A.C.) and effluent permit limits. The dissolved oxygen measurements are considered to be estimated due to the meter failing the post-sampling calibration check (J-qualified).
- Chlorophyll *a* (corrected) was undetected in the effluent and Control Site grab samples and was detected between the MDL and PQL in the Test Site grab sample (I-qualified).
- Total residual chlorine (TRC) of the effluent complied with Class III Freshwater Quality Criteria (62-302.530, F.A.C.) and permit limits.

Toxicity Whole Effluent Test (See Table 1 and Appendices F, G, and H)

- Tests were performed October 22 through October 29, 2013.
- The effluent composite sample IC25 for the water flea, *Ceriodaphnia dubia,* during the chronic definitive bioassay was greater than 100%, and therefore, complied with effluent permit limits.
- The effluent composite sample IC25 for the fish, *Pimephales promelas,* during the chronic definitive bioassay was less than 100%, which exceeds the effluent permit limits.
- For more information or to obtain copies of the toxicity bench sheets, please contact the Biology Laboratory at 850-245-8177.

Metals (See Table 2 and Appendix F)

- All metals detected in the effluent grab sample were present at levels that complied with effluent permit limits and Class III Freshwater Quality Criteria (62-302.530, F. A. C.).
- All metals in Control and Test Site grab samples were either undetected or detected at levels that complied with Class III Freshwater Quality Criteria (62-302.530, F. A. C.).
- Total recoverable copper was detected at both the Beaver Dam Road Site (18.9 µg/L) and the Downstream Site (15.3 µg/L).
- No metals were detected in the downstream blank.

Algal Growth Potential (See Table 3 and Appendix F)

- Raschke and Shultz (1987) determined that AGP values above 5.0 mg dry weight/L, which represents a "problem" threshold for fresh receiving waters, imply nutrient enrichment. The AGP value in the effluent sample using the freshwater species, *Pseudokirchneriella subcapitata,* was slightly higher than the problem threshold value. The analytical chemistry suggests that the effluent is nitrogen-limited.

- The AGP values in the Control and Test Site samples using the freshwater species, *Pseudokirchneriella subcapitata,* were slightly higher than the problem threshold value. The analytical chemistry suggests that the Control and Test Sites are nitrogen-limited.
- There was no detectable nutrient enrichment from the effluent at the Test Site.

Bioassessment

Macroinvertebrates (See Table 4)

- Qualitative macroinvertebrate data from dipnet samples indicated that the macroinvertebrate communities at the Control and Test Sites were different, but resulted in similar Stream Condition Index (SCI) scores. The Control Site scored 41 A on the SCI placing it in Category 2, and the Test Site scored 40 A, also placing it in Category 2 (see Appendix C for an explanation of SCI Categories). Both sites had similar numbers of Ephemeroptera and clinger taxa. Only one Trichoptera taxa was collected from the Control Site and three Trichoptera taxa were collected from the Test Site. No long-lived taxa were collected from the Control Site and four long-lived taxa were collected from the Test Site. The Control Site had more sensitive taxa than the Test Site. The Test Site had a higher percentage of dominant taxon, but also had a higher percentage of suspension feeders and filterers. The Control Site had a higher percentage of very tolerant individuals than the Test Site, but also had some tanytarsini individuals (which tend to decline with human disturbance) while the Test Site had none. The Control Site was dominated by dipterans while the Test Site was dominated by ephemeropterans. See Appendix C for an explanation of how these SCI metrics typically respond to human disturbance. Overall, there were no negative effects on macroinvertebrates at the Test Site that were attributable to the effluent.
- For more information or to obtain a copy of the taxa lists, please contact the Biology Laboratory at 850-245-8177.

Conclusion

The effluent composite sample IC25 for the fish, *Pimephales promelas*, during the chronic definitive bioassay was less than 100%, which exceeds the effluent permit limits. The total phosphorus level detected in the effluent composite sample and in the Test Site grab sample was higher than in the Control Site grab sample and indicates that the effluent may be contributing to nutrient enrichment at the Test Site. The AGP data did not indicate nutrient enrichment due to the effluent. There were no negative effects on the macroinvertebrates at the Test Site that were attributable to the effluent.

Literature Cited

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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.

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

Arvah B. Hopkins Generating Station	Class III Criteria	Effluent Limits	Effluent (Grab)	Effluent (24-hour composite)	Control Site	Test Site	Downstream Site	Field Blank
Organic Constituents (µg/L)								
None Detected	-	-	None Detected					
Nutrients (mg/L)								
Ortho-phosphate	-	-	0.068	-	0.074	0.071	-	0.004 U
Total Phosphorus	-	-	-	0.52	0.20	0.52	0.002 U	-
Total Ammonia	-	-	0.004 I	-	0.044	0.005 I	-	0.003 I
Un-ionized Ammonia	≤ 0.02 s	-	< 0.02 c	-	< 0.02 c	< 0.02 c	-	-
Nitrate and Nitrite	-	-	-	0.053	0.072	0.049	0.004 U	-
Total Kjeldahl Nitrogen	-	-	-	0.21	0.50	0.22	0.080 U	-
Organic Nitrogen	-	-	-	-	0.46 c	0.2 c	-	-
Total Nitrogen	-	-	-	0.26 c	0.57 c	0.27 c	-	-
Total Organic Carbon	-	-	1.5 A	-	5.5	1.8	-	0.50 U
General Physical and Chemical Parameters								
Habitat Assessment	-	-	-	-	104	129	-	-
Dissolved Oxygen (% saturation)	≥ 67	-	104.7 J	-	73.7 J	106.4 J	103.8 J	-
Dissolved Oxygen (mg/L)	≥ 5.0	-	9.0 J	-	6.6 J	9.2 J	9.3 J	-
pH (SU)	6.0 - 8.5	6.0 - 8.5	7.3	-	7.2	7.8	8.0	-
Specific Conductance (µmhos/cm)	≤ 1,275	-	752	-	313	735	685	-
Temperature (°C)	-	≤ 27	22.5	-	21.2	22.2	21.0	-
Salinity (ppt)	-	-	< 0.39 c	-	< 0.16 c	< 0.38 c	< 0.36 c	-
Sample Depth (m)	-	-	-	-	0.1	-	-	-
Total Residual Chlorine (mg/L)	≤ 0.01	≤ 0.01	0.01	-	-	-	-	-
Chlorophyll *a* (µg/L) - Corrected	-	-	0.55 U	-	0.55 U	0.60 I	0.56 I	-
Phaeophytin (µg/L)	-	-	0.40 U	-	0.40 U	0.40 U	0.40 U	-
Total Suspended Solids (mg/L)	-	-	-	3 I	4 I	4 I	-	-
Turbidity (NTU)	< 29 t	-	0.55	-	3.2	0.90	-	0.10 U
Color (true, PCU)	-	-	4.9 I	-	30	6.0 I	-	2.5 U
Alkalinity (mg CaCO3/L)	-	-	147 A	-	151	147	-	0.65 U
CBOD, 5 day (mg/L), N - inhibited	-	-	-	1.7 I	1.3 I	1.1 I	-	-
Oils and Greases (mg/L)	≤ 5.0	≤ 5.0	0.71 U	-	0.71 U	0.69 U	-	0.70 U
Chloride (mg/L)	-	-	53	-	8.9	53	-	0.20 U
Fluoride (mg/L)	≤ 10.0	-	0.51	-	0.20	0.48	-	0.035 U
Sulfate (mg/L)	-	-	160	-	1.7	150	-	0.20 U
Flow (MGD)	-	Report	1.3 λ	-	-	-	-	-
Hardness (mg $CaCO_3$)	-	Report Φ	-	320 c	162 c	309 c	-	-
Toxicity (Chronic Definitive, IC25, % effluent)								
Bioassay - Water flea *(Ceriodaphnia dubia)*	-	≥ 100 p	-	> 100	-	-	-	-
Bioassay - Fish *(Pimephales promelas)*	-	≥ 100 p	-	15.3	-	-	-	-

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
c - Value is calculated
p - 24 hour flow proportioned composite
s - Single sample
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
L - Actual value is known to be greater than value given (appears in Appendix F)
U - Material analyzed for but not detected; value reported is the method detection limit
IC25 - 25 percent inhibition concentration
Φ - 8 hour flow proportioned composite
λ - Average flow at point of discharge on October 21, 2013

Table 2. Effluent limits, Class III Freshwater Criteria and metals data - Class III Criteria based on hardness are presented individually for each site based on hardness at that site

Arvah B. Hopkins Generating Station	Effluent Class III Criteria	Effluent Limits	Effluent (composite)	Control Site Class III Criteria	Control Site	Test Site Class III Criteria	Test Site
Metals (µg/L unless otherwise noted)							
Aluminum	-	-	9.6 I	-	107	-	62
Arsenic	≤ 50	-	3.31	≤ 50	0.99 I	≤ 50	3.12
Cadmium	≤ 0.641 b	-	0.050 U	≤ 0.387 b	0.050 U	≤ 0.624 b	0.050 U
Calcium (mg/L)	-	-	84.5	-	50.9	-	81.7
Chromium, total	≤ 223 b	≤ 223 ψΦb	0.31 I	≤ 128 b	0.39 I	≤ 217 b	0.31 I
Copper	≤ 25.2 b	≤ 50.0 Φ	13.9	≤ 14.1 b	0.50 U	≤ 24.5 b	14.9
Iron	≤ 1,000	≤ 1,000 Φ	30 U	≤ 1,000	550	≤ 1,000	55 I
Lead	≤ 14.0 b	Report Φ	0.20 U	≤ 5.89 b	0.20 U	≤ 13.4 b	0.20 U
Magnesium (mg/L)	-	-	26.5	-	8.54	-	25.6
Nickel	≤ 140 b	-	2.20	≤ 78.6 b	0.41 I	≤ 136 b	2.41
Potassium (mg/L)	-	-	2.4	-	0.65 I	-	2.2
Selenium	≤ 5.0	-	0.20 U	≤ 5.0	0.20 U	≤ 5.0	0.20 U
Silver	≤ 0.07	-	0.025 U	≤ 0.07	0.025 U	≤ 0.07	0.025 U
Sodium (mg/L)	-	-	36.9	-	4.6	-	35.5
Zinc	≤ 321 b	≤ 321 Φb	5.0 U	≤ 181 b	5.0 U	≤ 312 b	5.0 U

See Table 1 for calculated hardness.

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

b - Value is calculated based on hardness

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

ψ - Class III Freshwater Quality Criterion (62-302.530(19)(a), F.A.C.) for chromium-III

Φ - 8 hour flow proportioned composite

 – Copper result was 18.9 µg/L at Beaver Dam Road Site and 15.3 µg/L at Downstream Site

Table 3. Measured and predicted algal growth potential (AGP; mg dry weight/L) for total soluble inorganic nitrogen (TSIN) and total nitrogen (TN) limitation of the freshwater species *Pseudokirchneriella subcapitata* and ratios of nitrogen to phosphorus

Arvah B. Hopkins Generating Station					
Location	**AGP (measured)**	**Predicted AGP (TSIN) ± 20%**	**Predicted AGP (TN) ± 20%**	**Inorganic N:P ratio**	**Total N:P ratio**
Effluent	5.16	2.2 ± 0.4 ‡	10.0 ± 2.0 ‡	0.8 ‡	0.5 ‡
Control Site	6.60	4.4 ± 0.9	21.7 ± 4.3	1.6	2.9
Test Site	5.48	2.1 ± 0.4	10.2 ± 2.0	0.8	0.5

‡ - Based on nitrate and nitrite, total Kjeldahl nitrogen, and/or total phosphorus from the effluent 24 hour flow proportioned composite sample

Table 4. Macroinvertebrate Dipnet Samples - qualitative

Arvah B. Hopkins Generating Station	Control Site		Test Site	
Summary Statistics				
Stream Condition Index 2007 (value)	41 A		40 A	
Stream Condition Index 2007 (category) *	Category 2		Category 2	
Stream Condition Index Metrics	Rep 1	Rep 2	Rep 1	Rep 2
Number of Total Taxa	32	28	28	28
Number of Ephemeroptera Taxa	3	2	2	2
Number of Trichoptera Taxa	1	0	3	3
Number of Clinger Taxa	4	1	3	2
Number of Long-lived Taxa	0	0	3	4
Number of Sensitive Taxa	6	6	2	2
Percent of Dominant Taxon	19.9	21.3	37.4	32.5
Percent Suspension Feeders and Filterers	11.5	10.3	14.8	17.2
Percent of Tanytarsini Individuals	12.2	14.4	0.0	0.0
Percent of Very Tolerant Individuals	5.1	1.9	1.3	0.0
Total Number of Individuals	156	160	155	157
Community Composition: Percent of total				
Dominant Taxon Name	*Microtendipes pedellus* grp. (Diptera)	*Microtendipes pedellus* grp. (Diptera)	*Baetis intercalaris* (Ephemeroptera)	*Baetis intercalaris* (Ephemeroptera)
Acariformes	1.3	0.0	0.0	0.0
Amphipoda	9.0	13.8	3.2	2.6
Bivalvia	1.9	3.1	0.0	0.0
Coleoptera	2.6	0.6	4.5	3.8
Decapoda	0.0	0.0	3.2	8.9
Diptera	46.8	45.0	21.3	21.7
Ephemeroptera	7.1	4.4	40.7	38.2
Gastropoda	12.2	11.3	0.0	0.6
Heteroptera	0.0	0.6	2.6	0.6
Isopoda	13.5	12.5	0.0	0.0
Odonata	4.5	8.1	8.4	3.8
Oligochaeta	0.0	0.6	0.7	0.6
Trichoptera	0.6	0.0	14.8	18.5
Other	0.7	0.0	0.6	0.6
Functional Feeding Groups: Percent of total				
Browser-Grazers	0.0	0.0	0.3	0.6
Burrowing Deposit Feeders	0.0	0.6	0.7	0.6
Predators	16.0	15.0	21.6	17.5
Scavengers	6.7	6.3	1.6	4.5
Scrapers	16.4	13.8	23.6	22.9
Shredders	4.5	6.6	7.1	7.0
Surface Deposit Feeders	24.4	25.6	27.1	27.7
Suspension Feeders	11.5	10.3	14.8	17.2
Unknown	19.9	21.9	3.2	1.9

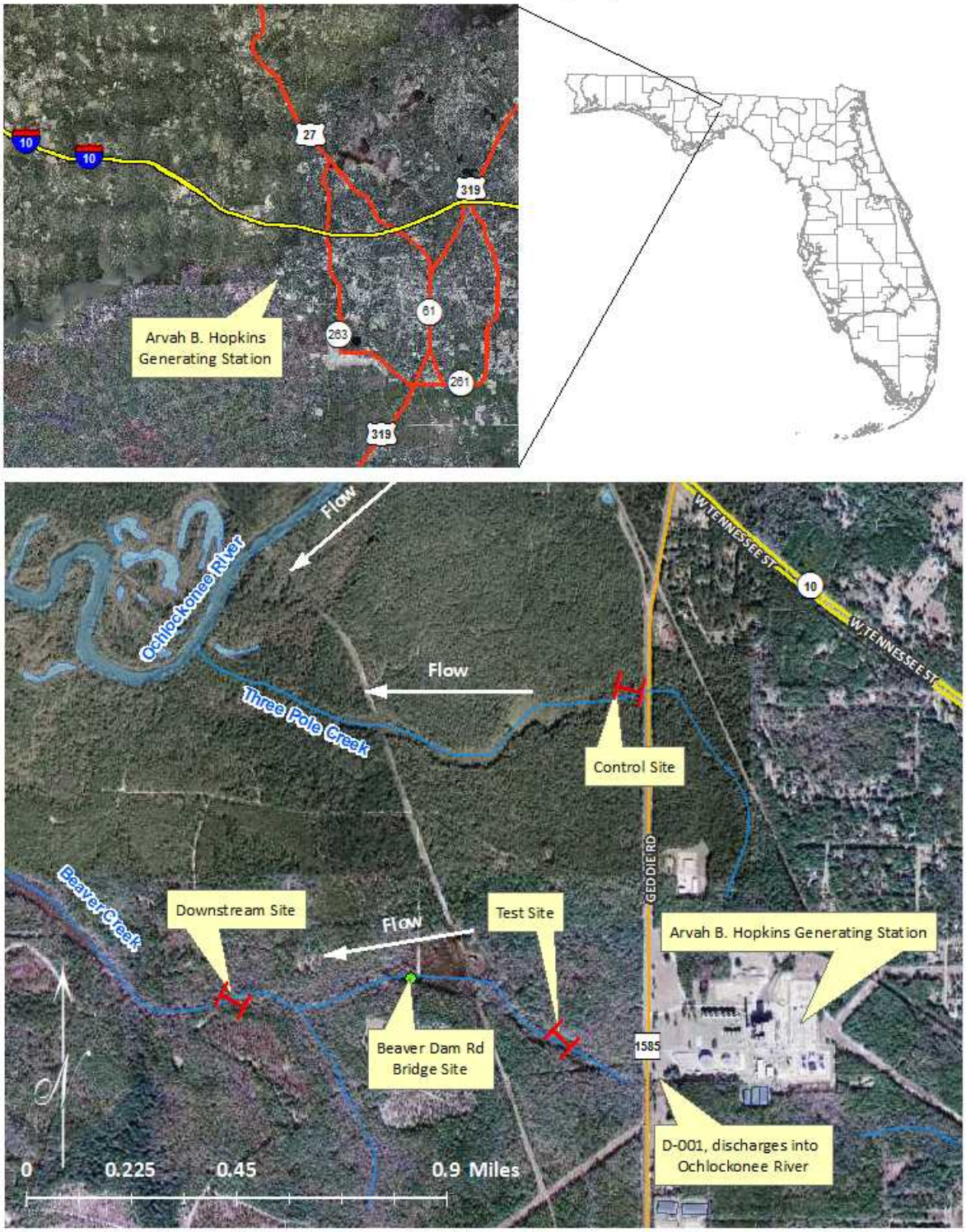
A - Value reported is the mean of two determinations

* SCI_2007 categories from Table LT 7200-2 of DEP-SOP-002/01 as referenced in Quality Assurance Rule (62-160, F.A.C.), December 3, 2008: Values ≤ 34 are Category 3; Values ≥ 35 and ≤ 67 are Category 2; Values ≥ 68 are Category 1

Appendix A
Map of Facility

Arvah B. Hopkins Generating Station

Fifth Year Bioassessment Sampling Locations



Appendix B
Facility Summary

State of Florida
Department of Environmental Protection
Facility Introduction & Summary

PART I: Information gathered prior to sampling event	
Prepared By: Nathan Mulkey	**Contact Number:** 850 595 0626
Facility Name (as it appears on permit): Arvah B. Hopkins Generating Station	**Former Names:**
NPDES Permit Number: FL0025518	**Permit Expiration Date:** **7/22/2015**
Physical Address: County Road 1585 – Geddie Road, Tallahassee, FL 32304	
District: NWD	**County:** Leon
Function of Facility: treat and dispose of industrial wastewater from a steam electric power generation plant	
Facility Type: IW (power plant)	**Permitted Capacity (MGD):** 2.7 MGD monthly average
Mean Flow for previous 12 months for all EXTERNAL outfalls listed in permit (list date range including months): 1.3 MGD	
If applicable, Mean Flow for previous 12 months for REUSE outfall(s) (list date range including months): None	
Description of type of Discharge: ☒ **Continuous** ☐ **Intermittent** ☐ **Seasonal** ☐ **Rainfall Dependent** ☐ **Other, please specify**	

Actual permit designation of permitted sampling point(s):
D-001:
EFF-1 Onsite man-made ditch, immediately upstream of the overflow weir, which is the point of discharge.

Description of Permitted Outfall(s):

Surface Water Discharge D-001: An existing permitted discharge to Beaver Creek, Class III Fresh Waters, to Talquin Wildlife Management area and is a tributary of the Ochlockonee River. The point of discharge is located approximately at latitude 30o27'4"N, longitude 84o24'13"W.

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

Metal cleaning waste (from air heater cleaning, boiler tube cleaning, boiler fireside cleaning, and metal process equipment cleaning), are collected in a pond, which is designated as pond number 1, and low-volume waste (from floor drains, auxiliary cooling water, boiler blowdown, and demineralizer waste) are collected in two ponds, which are designated as pond number 2 and number 3. The pH of both metal cleaning wastes and low volume wastes is adjusted, and the ponds are used for sedimentation. Blowdown from the cooling towers for Units 1 and 2 is treated with sulfuric acid to adjust pH, and then discharged to the head of the onsite ditch.

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)

I. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

A. Surface Water Discharges

1. During the period beginning on the issuance date and lasting through the expiration date of this permit, the permittee is authorized to discharge all waste streams from the facility from Outfall D-001 to the on-site man-made drainage ditch to Beaver Creek. 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	Report 2.7	Daily Maximum Monthly Average	Continuous	Recording Flow Meter with Totalizer[1]	EFF-1	
Temperature, Water	Deg F	Max Max	80 80	Daily Maximum Monthly Average	Continuous	Meter[1]	EFF-1	Oct.–April
		Max Max	85 85	Daily Maximum Monthly Average				May–Sept.
Chlorine, Total Residual	mg/L	Max Max	0.01 0.01	Daily Maximum Monthly Average	Per discharge	Grab	EFF-1	
Oil and Grease	mg/L	Max Max	5.0 5.0	Daily Maximum Monthly Average	Monthly	Grab	EFF-1	
Chromium, Trivalent Total Recoverable	ug/L	Max Max	Report Report	Daily Maximum Monthly Average	Quarterly	8-hr Composite	EFF-1	See I.A.4
Copper, Total Recoverable	ug/L	Max Max	~~Report~~[2] *50.0* ~~Report~~[2] *50.0*	Daily Maximum Monthly Average	Quarterly	8-hr Composite	EFF-1	~~See I.A.4~~
Iron, Total Recoverable	mg/L	Max Max	1.0 1.0	Daily Average Daily Maximum	Quarterly	8-hr Composite	EFF-1	
Lead, Total Recoverable	ug/L	Max Max	Report Report	Daily Average Daily Maximum	Quarterly	8-hr Composite	EFF-1	
Zinc, Total Recoverable	ug/L	Max	Report Report	Daily Average Daily Maximum	Quarterly	8-hr Composite	EFF-1	See I.A.4
Hardness, Total (as CaCO3)	mg/L	Max	Report	Single Sample	Quarterly	8-hr Composite	EFF-1	
pH	s.u.	Min Max	6.0 8.5	Instantaneous Minimum Instantaneous Maximum	Continuous	Meter[3]	EFF-1	See I.A.5
Duration of pH Excursion	min	Max Max	60 446	Instantaneous Maximum Monthly Total	Continuous	Meter	EFF-1	See I.A.5
Chronic Whole Effluent Toxicity, 7-Day IC25 (Ceriodaphnia dubia)	percent	Min	100	Single Sample	Quarterly	24-hr Composite	EFF-1	See I.A.6
Chronic Whole Effluent Toxicity, 7-Day IC25 (Pimephales promelas)	percent	Min	100	Single Sample	Quarterly	24-hr Composite	EFF-1	See I.A.6

4. The discharge shall comply with the hardness-based limitations for "Chromium, Trivalent Total Recoverable, ~~Copper, Total Recoverable,~~ and Zinc, Total Recoverable." The discharge limitations shall be calculated using the following equation(s):

$Cr \leq e^{(0.819[\ln H]+0.6848)}$
~~$Cu \leq e^{(0.8545[\ln H]-1.702)}$~~
$Zn \leq e^{(0.8473[\ln H]+0.884)}$

Total hardness shall be measured at EFF-1 and 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 "Chromium, Trivalent Total Recoverable~~, Copper, Total Recoverable,~~ and Zinc, Total Recoverable (effluent)." The calculated effluent limit shall be recorded on the DMR in the parameter row for "Chromium, Trivalent Total Recoverable~~, Copper, Total Recoverable,~~ and Zinc, 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 "Chromium, Trivalent Total Recoverable~~, Copper, Total Recoverable,~~ and Zinc, Total Recoverable (effluent minus calculated limit)." The compliance value shall not exceed 0.00. *[62-302.530(19), 62-302.530(23), and 62-302.530(70)]*

5. On outfalls where pH is monitored continuously, the permittee shall maintain the pH of such wastewater within the range specified in this permit. Excursions from the range are permitted subject to the following limitations:
   a. The total time during which pH values are outside the required range of pH values shall not exceed 7 hours and 26 minutes in any calendar month.
   b. No individual excursion from the range of pH values shall exceed 60 minutes.

PART I: Continued

Receiving Waters:	**Classification (indicate whether fresh or marine):**
Beaver Creek. (Beaver Creek flows through the Talquin Wildlife Management Area and is a trib of the Ochlockonee River, an OFW)	**Class III Fresh**

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

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) Samples shall be taken when chlorine or Department-approved biocide is in use
   (3) 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.
   (4) 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.

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

None

Facility Mixing Zone Details (if applicable):

None

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

Date	Parameter and Units	Limit	Result
None found for 6/12 – 7/13.			

Describe previous FYI and WQBEL study: Previous FYI report is dated 7/1/2008.
Describe previous or current Enforcement Actions (including WLs):
Describe any violations or problems noted in previous inspection:
Discuss whether DMR trends within previous five years are improving or declining:
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): **0.01mg/L**	**Total Residual Chlorine - after Disinfection (mg/L):**
Method of Chlorination:	**Method of De-chlorination:**
Flow During Sample Collection for each outfall(MGD): **1.3 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): **1.3 MGD**	

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:

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

(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) Habitat Assessment

Habitat assessment is used to evaluate the physical structure and extent of disturbance in a waterbody. Eight aspects are ranked, with 20 possible points for each aspect (QA Rule SOP FT 3100). The Habitat Assessment score includes types and amounts of benthic substrates, water velocity, amount of sand or silt accumulation, extent of artificial channelization, bank stability, and riparian zone width and vegetation type. All scores are summed to yield an overall Habitat Assessment score. Habitat Assessment score ranges from 11-160 and overall habitat quality is assigned to one of four categories: Optimal (120-160 points), Suboptimal (80-119 points), Marginal (40-79 points), and Poor (11-39 points).

(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.

exceedances of 62-302.530(46), F.A.C., 62-302.530(47)(a), F.A.C., 62-302.530(47)(b), F.A.C. and/or 62-302.530(61), F.A.C.

(6) Benthic Macroinvertebrate Assemblages

Benthic macroinvertebrates qualitative collections are made using 20 dipnet sweeps (QA Rule SOP FS7420). Benthic macroinvertebrates were sorted and identified to the lowest practical taxonomic level, usually species.

Taxa richness: Taxa richness is the number of distinct macroinvertebrate taxa present in a sample. Stress, habitat destruction and pollution tend to reduce the number of different types of organisms present (Karr and Chu 1998). Decreases in taxa richness related to a facility’s effluent may constitute exceedances of 62-302.530(46), F.A.C., 62-302.530(47)(a), F.A.C., 62-302.530(47)(b), F.A.C. and/or 62-302.530(61), F.A.C..

Percent Contribution of Dominant Taxon: Percent contribution of the dominant taxon is calculated by dividing the number of individuals in the most abundant taxa by the total number of individuals counted. Percent contribution of the dominant taxon tends to increase with increasing perturbation (Plafkin *et al*., 1989). Increases in the percent contribution of the dominant taxon related to a facility’s effluent 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..

Community Composition: Shifts in proportions of major groups of organisms downstream of a point source, compared to upstream, control conditions, may indicate negative effects of a discharge (Fore et. al. 2007, Karr and Chu 1998). Shifts in community composition related to a facility's effluent may constitute exceedances of 62-302.530(46), F.A.C., 62-302.530(47)(a), F.A.C., 62-302.530(47)(b), F.A.C. and/or 62-302.530(61), F.A.C.

Functional Feeding Groups: Environmental degradation may differentially affect groups of invertebrates based on how the group feeds (e.g. predators, deposit feeders, etc.). In Florida, pollution may be responsible for reducing the numbers of filter feeders and shredders (Fore et. al. 2007). Changes in the proportions of functional feeding groups related to a facility's effluent may constitute exceedances of 62-302.530(46), F.A.C., 62-302.530(47)(a), F.A.C., 62-302.530(47)(b), F.A.C. and/or 62-302.530(61), F.A.C..

The Stream Condition Index (SCI): The SCI is a composite macroinvertebrate metric developed for Florida (Fore et. al. 2007). This Index was revised in 2007 using data from qualitative dipnet samples. The SCI now assigns points to ten parameters; depending on how closely each parameter approaches an expected value (QA Rule SOP LT 7200). Points are assigned according to in which bioregion (Panhandle, Northeast, or Peninsula) the sampling location exists -and summed to yield a final SCI score (range 0-100). Included in the calculation of SCI are taxa richness, number of Ephemeroptera taxa, number of Trichoptera taxa, percent contribution of the dominant taxon, number of sensitive taxa, number of clinger taxa, number of long-lived taxa, percent contribution of Tanytarsini, percent contribution of very tolerant, and the percent contribution of suspension and filter feeders. As human disturbance increases, it is expected that taxa richness, the number of Ephemeroptera taxa, Trichoptera taxa, sensitive taxa, clinger taxa, long-lived taxa, and the percent contribution of Tanytarsini and suspension and filter feeders will decrease while percent contribution of dominant taxon, and percent contribution of very tolerant taxa will increase.

Scores are broken into three categories (1, 2, and 3). Sites in Category 1 are described as having higher diversity than Category 2 sites, particularly for Ephemeroptera and Trichoptera. A Category 1 site may have several more clinger and sensitive taxa, a higher proportion of Tanytarsini, and a lower percent of a dominant taxon than a site in Category 2. The site will also have a very small percentage of very tolerant individuals, if any.

Sites in Category 2 are described as having an average of 30 species with several different taxa of Ephemeroptera and Trichoptera. A Category 2 site also has several different long-lived taxa and, on average, 5 clinger and 6 sensitive taxa. There is a slight increase in dominance by a single taxon relative to sites in Category 1. Very tolerant taxa represent a small percentage of individuals but are noticeably increased as compared to sites in Category 1.

Sites in Category 3 are described as having a notable loss in taxonomic diversity, and Ephemeroptera, Trichoptera, long-lived, clinger and sensitive taxa are uncommon or rare. Filter feeders are reduced by at least 50%. The site is dominated by a tolerant taxon, and very tolerant individuals represent a large proportion of the individuals collected.

SCI 2007 categories are from Table LT 7200-2 of DEP-SOP-002/01 as referenced in Draft Quality Assurance Rule (62-160, F.A.C.), December 3, 2008. A decrease in ordinal SCI score from the Control to the Test site may be evidence of degradation related to a facility's effluent. An SCI score in Category 3, if it is shown to be related to a facility's effluent, may constitute exceedances of 62-302.530(46), F.A.C., 62-302.530(47)(a), F.A.C., 62-302.530(47)(b), F.A.C., or 62-302.530(61).

(7) 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
Chain of Custody

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *:

Request Number: RQ-2013-10-21-17
FYI5 Arvah B Hopkins Generating Station Sampling

Requester: Jennifer G. Weger
Field Report Prepared By:

Customer: NW-DIST
Project ID: FYI5
PMAS: 1143

Collected By: Harris Walters + Cheryl Swanson
Send Final Report To: Kim Allen

Sampling Agency: FDEP

Lab ID *	Location	Collection (comp begin or grab) Eastern/Central	Composite end Eastern/Central	Bottle Group(s)**
	Arvah Hopkins	☐ Comp ☒ Grab Date 10/21/13 Time 1300	Date Time	
	Field ID: Effluent ~~at Weir~~ (grab)	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L): 9.02 J 104.7%	Storet Station Number
	Matrix (include type e.g. Salt, Fresh, etc): Fresh	Temp (C): 22.5	pH: 7.31	Sample Depth ☐ m ☐ ft; ☐ Salinity (PPTh) ☒ Sp Conductance (umho/cm): 752; NPDES Number
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments: DO "J" qualified	A

Lab ID *	Location	Collection (comp begin or grab) Eastern/Central	Composite end Eastern/Central	Bottle Group(s)**
	Arvah Hopkins	☒ Comp ☐ Grab Date 10/20/13 Time 0805 Central	Date 10/21/13 Time 0805 Central	
	Field ID: Effluent (composite)	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number
	Matrix (include type e.g. Salt, Fresh, etc): Fresh	Temp (C)	pH	Sample Depth ☐ m ☐ ft; ☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm); NPDES Number
	~~Latitude~~ ☐ dd ☐ dms	~~Longitude~~ ☐ dd ☐ dms	~~Comments~~: 2 toxicity bottles; rest of Group B on Tues.	B

Lab ID *	Location	Collection (comp begin or grab) Eastern/Central	Composite end Eastern/Central	Bottle Group(s)**
	Arvah Hopkins	☐ Comp ☒ Grab Date 10/21/13 Time 1300 ~~Central~~	Date Time ~~Central~~	
	Field ID: ~~Eff~~ Field Blank (at D001)	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number
	Matrix (include type e.g. Salt, Fresh, etc): Fresh (DI)	Temp (C)	pH	Sample Depth ☐ m ☐ ft; ☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm); NPDES Number
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments	E

Lab ID *	Location	Collection (comp begin or grab) Eastern/Central	Composite end Eastern/Central	Bottle Group(s)**
	Arvah Hopkins	☐ Comp ☒ Grab Date 10/21/13 Time* 1617 ~~Central~~	Date Time ~~Central~~	
	Field ID: ~~Beaver Creek Dam~~ Rd @ Bridge ~~Dam & Bridge~~	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number
	Matrix (include type e.g. Salt, Fresh, etc): Fresh	Temp (C)	pH	Sample Depth ☐ m ☐ ft; ☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm); NPDES Number
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments: Added this site Copper translator verification site - 1 bottle	G

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
Cheryl Swanson	10/22/13	hand					JC	10-22-13/0858

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

* use times on bottles

Page 1 of 5

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2013-10-21-17
FYI5 Arvah B Hopkins Generating Station Sampling

Requester: Jennifer G. Weger
Field Report Prepared By:

Customer: NW-DIST
Project ID: FYI5
PMAS: 1143

Collected By: Harris Walters + Cheryl Swanson
Send Final Report To: Kim Allen

Sampling Agency: FDEP

Lab ID *	Location	Collection (comp begin or grab) Eastern Central	Composite end Eastern Central	Bottle Group(s)**
	Arvah Hopkins	☐ Comp ☒ Grab Date 10/21/13 Time 1515	Date Time	C D
	Field ID: Control Site	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L): 6.62 J 73.7%	Storet Station Number
	Matrix (include type e.g. Salt, Fresh, etc): Fresh	Temp (C): 21.2	pH: 7.23	Sample Depth: 0.1 ☒ m ☐ ft
			☐ Salinity (PPTh) ☒ Sp Conductance (umho/cm): 313	NPDES Number
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments: Chemistry + SCI ; no HD ; DO "J" qualified	

Lab ID *	Location	Collection (comp begin or grab) Eastern Central	Composite end Eastern Central	Bottle Group(s)**
	Arvah Hopkins	☐ Comp ☒ Grab Date 10/21/13 Time 1210	Date Time	C D
	Field ID: Test Site	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L): 9.24 J 106.4	Storet Station Number
	Matrix (include type e.g. Salt, Fresh, etc): Fresh	Temp (C): 22.2	pH: 7.81	Sample Depth ☐ m ☐ ft
			☐ Salinity (PPTh) ☒ Sp Conductance (umho/cm): 735	NPDES Number
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments: Chemistry + SCI ; no HD ; DO "J" qualified	

Lab ID *	Location	Collection (comp begin or grab) Eastern Central	Composite end Eastern Central	Bottle Group(s)**
	Arvah Hopkins	☐ Comp ☒ Grab Date 10/21/13 Time 0920	Date Time	G
	Field ID: Downstream	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L): 9.27 J 103.8%	Storet Station Number
	Matrix (include type e.g. Salt, Fresh, etc): Fresh	Temp (C): 21.0	pH: 7.97	Sample Depth ☐ m ☐ ft
			☐ Salinity (PPTh) ☒ Sp Conductance (umho/cm): 685	NPDES Number
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments: DO "J" qualified	

Lab ID *	Location	Collection (comp begin or grab) Eastern Central	Composite end Eastern Central	Bottle Group(s)**
	Arvah Hopkins	☐ Comp ☒ Grab Date 10/21/13 Time* 0920	Date Time	F
	Field ID: Downstream Blank	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L): J	Storet Station Number
	Matrix (include type e.g. Salt, Fresh, etc): Fresh (DI)	Temp (C)	pH	Sample Depth ☐ m ☐ ft
			☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments: use time on bottle	

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
Chad Swanson	10/22/13	hand					JLC	10:22-13/855

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

* use times on bottles

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2013-10-21-17
FYI5 Arvah B Hopkins Generating Station Sampling

Requester: Jennifer G. Weger
Field Report Prepared By:
Collected By:
Send Final Report To: Kim Allen
Sampling Agency:

Customer: NW-DIST
Project ID: FYI5
PMAS: 1143

Lab ID *	Location	Comp / Grab	Collection (comp begin or grab) Eastern Central	Composite end Eastern Central	Bottle Group(s)**
	ARVAH HOPKINS	☒ Comp ☐ Grab	Date 10/22 Time 8:00	Date 10/23 Time 8:00	
	Field ID: EFFLUENT (Comp)	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: BSY-CD-FCD, FFS.	

Lab ID *	Location	Comp / Grab	Collection (comp begin or grab) Eastern Central	Composite end Eastern Central	Bottle Group(s)**
	ARVAH HOPKINS	☒ Comp ☐ Grab	Date 10/21 Time 8:00	Date 10/21 Time 16:00	
	Field ID: EFFLUENT	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	Composite end Eastern Central	Bottle Group(s)**
		☐ Comp ☐ Grab	Date Time	Date Time	
	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	Composite end Eastern Central	Bottle Group(s)**
		☐ Comp ☐ Grab	Date Time	Date Time	
	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
			AP	10-23-13 12:00				

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

10-23-13 @ 12:16
2 bioassays AP

Florida Department of Environmental Protection

Event ID*

Central Laboratory Sample Submittal Form

Request Number: RQ-2013-10-21-17
FYI5 Arvah B Hopkins Generating Station Sampling Inspection

Requester: Jennifer G. Weger
Field Report Prepared By:

Customer: NW-DIST
Project ID: FYI5
PMAS: 1143

Collected By: Arvah Hopkins Lab Staff
Send Final Report To: Kim Allen

Sampling Agency: for FDEP

Lab ID*	Location	Comp / Grab	Collection (comp begin or grab) Eastern Central	Composite end Eastern Central	Bottle Group(s)**
	Arvah Hopkins	☒ Comp ☐ Grab	Date 10/24/13 Time 0800	Date 10/25/13 Time 0800	B
	Field ID: Effluent (composite)	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: toxicity renewal – 2 bottles		

Lab ID*	Location	Comp / Grab	Collection (comp begin or grab) Eastern Central	Composite end Eastern Central	Bottle Group(s)**
		☐ Comp ☐ Grab	Date Time	Date Time	
	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	Composite end Eastern Central	Bottle Group(s)**
		☐ Comp ☐ Grab	Date Time	Date Time	
	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	Composite end Eastern Central	Bottle Group(s)**
		☐ Comp ☐ Grab	Date Time	Date Time	
	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
[signature]	10/25/13 1537	hand.					[signature]	10-25-13/1537

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Appendix E
Physical/Chemical and Habitat Assessment field sheets

DEP-SOP-001/01: Form FD 9000-3 (9/19/12)

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SAMPLE ID _____ ORG ID _____ LATITUDE _____

COUNTY Leon STORET # _____ LONGITUDE _____

DATE 10/21/13 TIME 1515 SAMPLING AGENCY FDEP

SITE NAME Arvah Hopkins

FIELD ID/NAME Control Site RECEIVING BODY OF WATER Three Pole Creek

RIPARIAN ZONE / STREAM FEATURES

PREDOMINANT LAND-USE IN WATERSHED (specify relative percent in each category):

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industry	Other (Specify)

Landscape Development Intensity Index (LDI): _____

Local Watershed Erosion (select one): ☐ None ☒ Slight ☐ Moderate ☐ Heavy

Local Watershed NPS Pollution: ☐ No evidence ☐ Slight ☐ Moderate ☐ Heavy

Width of Riparian Vegetation (m) on Each Buffer Side
Left Bank: >18 Right Bank: >18

Hydrologic Modification Score (per FT 3101): _____

High Water Mark: 1 (m) + 0.1 (above present water level) = 1.1 (present depth) (above bed)

Artificially Impounded ☐ Yes ☐ No

Typical Width (m) Depth (m)/Velocity (m/sec) Transect

1 m wide

_____ m/s	0.027 m/s (3G)	_____ m/s
_____ m deep	0.1 m deep	_____ m deep

Artificially Channelized: ☒ No ☐ Some recovery ☐ Mostly recovered, more sinuous ☐ Recent, severe

Canopy Cover % ☐ Open ☐ Lightly Shaded (11-45%) ☒ Heavily Shaded ☐ Moderate Shaded (46-80%)

SEDIMENT / SUBSTRATE

Sediment Oils ☒ Absent ☐ Slight ☐ Moderate ☐ Profuse

Sediment Odors ☒ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ Other (Specify):

Smothering of Substrates
Sand Smothering: None ☐ Slight ☒ Moderate ☐ Severe ☐
Silt Smothering: None ☐ Slight ☐ Moderate ☐ Severe ☒
Algae Smothering: None ☒ Slight ☐ Moderate ☐ Severe ☐

SUBSTRATE TYPE

Assessment Tool: ☒ SCI ☒ RPS ☒ LVS ☐ LCI ☐ BioRecon

	% Coverage	INVERT # Times Sampled	PERI # Times Sampled
Woody Debris (Snags)	<1	1	
Undercut Banks / Roots	3	10	
Leaf Packs or Mat	—		
Aquatic Vegetation	—		
Rock or Shell Rubble..			
Sand.....		9	
Mud / Muck / Silt			
Other			
Other			

ABUNDANCE

	Absent	Rare	Common	Abundant
Periphyton:	☐	☒	☐	☐
Fish:	☐	☒	☐	☐
Aquatic Plants:	☒	☐	☐	☐
Iron/Sulfur Bacteria:	☒	☐	☐	☐

WATER QUALITY

	Depth (M)	Temp. (°C)	pH (SU)	D.O. (MG/L)	D.O. (%)	Cond. (UMHO/CM)	Salinity (PPT)	SECCHI (M)
Top:	0.1	21.2	7.23	6.62	73.7	313.3		
Mid:								☑ VOB
Bottom								SITE DEPTH

Meter ID: #8 — SITE DEPTH: 0.1

Water Odors Normal ☒ Petroleum ☐ Sewage ☐ Chemical ☐ Other ☐

Water Surface Oils Normal ☒ Sheen ☐ Globs ☐ Slick ☐ Other ☐

Water Sample Taken? ☒ Yes ☐ No
Sample Preserved? ☒ Yes ☐ No
Lot Number: _____ Exp: _____

Color Tannic ☐ Green (Algae) ☐ Clear ☒ Other (Specify) ☐

Algae Sample Taken? ☐ Yes ☒ No
Sample Preserved? ☐ Yes ☐ No
Lot Number: _____ Exp: _____

Clarity Clear ☒ Slightly Turbid ☐ Turbid ☐ Opaque ☐

System Type: Stream ☒ Lake ☐ Wetland ☐ Estuary ☐ Other(Specify) ☐ _____

WEATHER CONDITIONS / NOTES:

H_2SO_4 #126185 12-21-13
HNO_3 # 1113020 3-1-15

☒ The antecedent hydrologic conditions have been met to my best knowledge.

SAMPLING TEAM Harris Walters + Chryl Swanson

SIGNATURE: Chryl Swanson

DATE: 10/21/13

DEP-SOP-001/01: Form FD 9000-5

STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL PROTECTION

STREAM/RIVER HABITAT ASSESSMENT FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (MM/DD/YY):	RECEIVING BODY OF WATER:
		10/21/13	Three Pole Creek

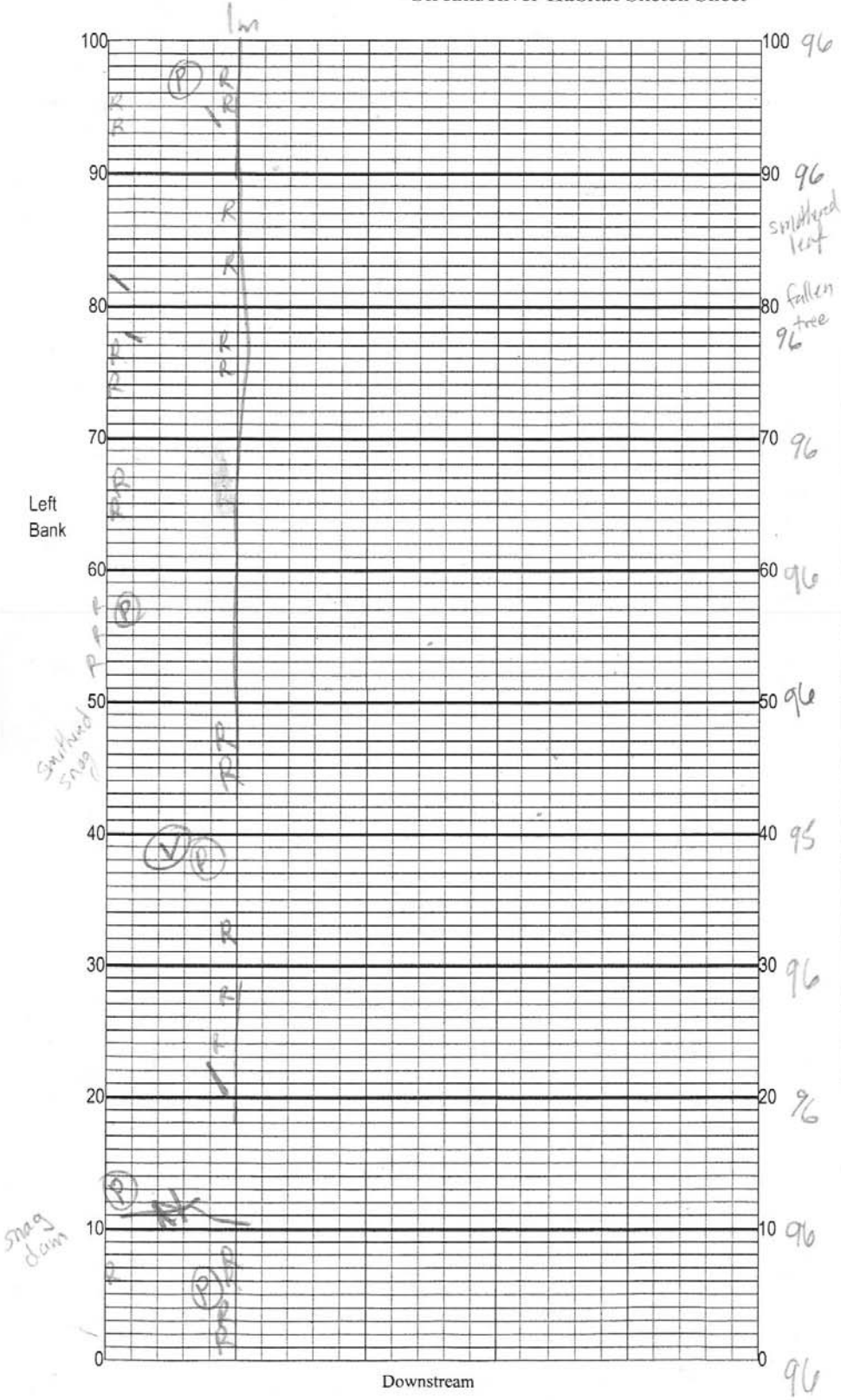
REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Leon	Arvah Hopkins	Control Site

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** 5	Four or more major productive habitats present [snags, tree roots, aquatic vegetation, leaf packs (partially decayed), rock] 20 19 18 17 16	Three major productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags) 15 14 13 12 11	Two major productive habitats present. Less than desirable habitat, frequently disturbed or removed 10 9 8 7 6	One or less major productive habitat. Lack of habitat is obvious, substrates unstable or smothered (5) 4 3 2 1
Substrate Availability 8	Greater than 30% major productive habitat present at site 20 19 18 17 16	16% to 30% major productive habitat, by aerial extent 15 14 13 12 11	6% to 15% major productive habitat 10 9 (8) 7 6	Less than 5% major productive habitat 5 4 3 2 1
Water Velocity 3	Max. observed at typical transect: > 0.25 m/sec. But < 1 m/sec ≥0.33 0.31 0.29 0.27 >0.25 20 19 18 17 16	Max. observed at typical transect: >0.1 to 0.25 m/sec 0.25 0.21 0.17 0.13 >0.1 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 0.1 0.09 0.07 0.06 0.05 10 9 8 7 6	Max. observed at typical transect: <0.05 m/sec; or spate occurring: > 1 m/sec <0.05 0.04 0.03 0.01 <0.01 5 4 (3) 2 1
Habitat Smothering 8 Primary Score 24	Adequate number of stable pools (1-2 per 12 times width) and <25% of habitats affected by sand, silt, or algae. 20 19 18 17 16	Adequate number of stable pools (1-2 per 12 times width) and >25% of habitats affected by sand, silt, or algae. 15 14 13 12 11	Does not have required number of stable pools (1-2 per 12 x width) and/or has shallow pools (<2 x prevailing depth). 10 9 (8) 7 6	Stable pools are absent. Most habitats affected by sand, silt, or algae accumulation. 5 4 3 2 1
Secondary Habitat Components **Artificial Channelization** 20	Expected sinuosity given the stream width. No evidence of dredging or artificial straightening. No spoil banks. (20) 19 18 17 16	Good sinuosity within old channelized area. Evidence of dredging in the past (>25 yrs) but mostly recovered. 15 14 13 12 11	Straightened with trapezoidal cross section, but has a small degree of sinuosity developed within channelized area. 10 9 8 7 6	Straightened or engineered by dredging, has trapezoidal or box cut cross section, lacks required pools. May have spoil banks. 5 4 3 2 1
Bank Stability Right Bank 10 Left Bank 10	Bankfull > 60% of bank height. Slope of bank ≤ 60° from bankful to top of bank. Bankfull is within or above the root zone with few raw, eroded areas. (10) 9	Only meets 2 of the 3 requirements for optimal bank stability. 8 7 6	Only meets 1 of the 3 requirements for optimal bank stability. 5 4	Bankfull < 60% of bank height. Slope of bank > 60°. Bankfull is below the root zone with raw, eroded areas. 3 2 1
Riparian Buffer Zone Width Right Bank 10 Left Bank 10	Width of vegetation greater than 18 m (10) 9	Width of vegetation >12 to 18m 8 7 6	Width of vegetation 6 to 12 m. human activities close to system 5 4	Less than 6 m of buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank 10 Left Bank 10 Secondary Score 80	Over 80% of riparian surfaces consist of normal, expected plant community for given sunlight & habitat conditions (e.g., native plants; tree, shrub, and forbs represented, if appropriate). Minimal disturbance. (10) 9	>50% to 80% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Some disruption in community observed. 8 7 6	25% to 50% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Disruption obvious. 5 4	Less than 25% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). 3 2 1

104 **TOTAL SCORE**

Date:	Analyst:	Signature:
10/21/13	Cheryl Swanson	Cheryl Swanson

DEP-SOP-001/01 Form FD 9000-4
Stream/River Habitat Sketch Sheet



Location: Three Pole Creek Arvah Control

Date: 10/21/13

Sampler: Cheryl Swanson

100 m: Lattitude	
Longitude	
0 m: Lattitude	30 27.793
Longitude	84 24.295

Substrates: Code key, draw proportionate habitat abundance. %

I	Snags	<1
R	Roots/undercut banks	10
L	Leaf Packs (or mats)	smothered or new
	Aquatic Macrophytes	
4	Pools	total # observed = 4; # range expected = 8-16

Average width 1 m

Average depth 0.1 m

Velocity measured at 40 meter mark. 36 s.

WQ & chemistry taken at 100 meter mark.

Habitat Smothering:
Note areas (on map) where sand or silt is smothering substrates, limiting habitability.

Bank Stability:
Note areas (on map) with unstable, eroding banks.

Riparian Buffer Width:
Note areas (on map) where natural vegetation is altered or eliminated.

Plants observed / other notes: 100m²

leaf mat all smothered
1" pack new

sand ~~IIII~~ IIII
snag I

Length of grid represents 100 m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately)

Revision Date: June 2, 2011

DEP-SOP-001/01: Form FD 9000-3 (9/19/12)

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SAMPLE ID _____ ORG ID _____ LATITUDE _____

COUNTY Leon STORET # _____ LONGITUDE _____

DATE 10/21/13 TIME 1210 SAMPLING AGENCY FDEP

SITE NAME Arvah Hopkins

FIELD ID/NAME Test Site RECEIVING BODY OF WATER Beaver Creek

RIPARIAN ZONE / STREAM FEATURES

PREDOMINANT LAND-USE IN WATERSHED (specify relative percent in each category) :

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industry	Other (Specify)

Landscape Development Intensity Index (LDI): _____

Local Watershed Erosion (select one) : ☐ None ☐ Slight ☐ Moderate ☐ Heavy

Local Watershed NPS Pollution : ☐ No evidence ☐ Slight ☐ Moderate ☐ Heavy

Width of Riparian Vegetation (m) on Each Buffer Side
Left Bank : 7 16 Right Bank : 7 18

Hydrologic Modification Score (per FT 3101): _____

High Water Mark: 0.75 (m) + 0.1 (above present water level) = 0.85 (present depth) (above bed)

Artificially Impounded ☐ Yes ☒ No

Typical Width (m) Depth (m)/Velocity (m/sec) Transect

2 m wide

_____ m/s	0.5 m/s (2)	_____ m/s
_____ m deep	0.1 m deep	_____ m deep

Artificially Channelized : ☒ No ☐ Some recovery ☐ Mostly recovered, more sinuous ☐ Recent, severe

Canopy Cover % ☐ Open ☐ Lightly Shaded (11-45%) ☒ Heavily Shaded ☐ Moderate Shaded (46-80%)

SEDIMENT / SUBSTRATE

Sediment Oils ☒ Absent ☐ Slight ☐ Moderate ☐ Profuse

Sediment Odors ☒ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ Other (Specify) :

Smothering of Substrates

Sand Smothering:	None ☐	Slight ☒	Moderate ☐	Severe ☐
Silt Smothering:	None ☐	Slight ☒	Moderate ☐	Severe ☐
Algae Smothering:	None ☒	Slight ☐	Moderate ☐	Severe ☐

SUBSTRATE TYPE

Assessment Tool: ☒ SCI ☒ RPS ☒ LVS ☐ LCI ☐ BioRecon

	% Coverage	INVERT # Times Sampled	PERI # Times Sampled
Woody Debris (Snags)	2.5	7	
Undercut Banks / Roots	2.5	7	
Leaf Packs or Mat	0.75	3	
Aquatic Vegetation			
Rock or Shell Rubble..			
Sand.....	94	3	
Mud / Muck / Silt			
Other			
Other			

WATER QUALITY

	Depth (M)	Temp. (°C)	pH (SU)	D.O. (MG/L) (5)	D.O. (%) (6)	Cond. (UMHO/CM)	Salinity (PPT)	SECCHI (M)
Top :	0.1	22.2	7.81	9.24	106.4	735		
Mid:								☑ VOB
Bottom								SITE DEPTH

Meter ID: #8 — SITE DEPTH: 0.1

Water Odors Normal ☒ Petroleum ☐ Sewage ☐ Chemical ☐ Other ☐

Water Surface Oils Normal ☒ Sheen ☐ Globs ☐ Slick ☐ Other ☐

Water Sample Taken? ☒ Yes ☐ No
Sample Preserved? ☒ Yes ☐ No
Lot Number:_____ Exp:_____

Color Tannic ☐ Green (Algae) ☐ Clear ☐ Other (Specify) ☒ _____

Algae Sample Taken? ☐ Yes ☒ No
Sample Preserved? ☐ Yes ☐ No
Lot Number:_____ Exp:_____

Clarity Clear ☒ Slightly Turbid ☐ Turbid ☐ Opaque ☐

ABUNDANCE

	Absent	Rare	Common	Abundant
Periphyton:	☐	☒	☐	☐
Fish:	☐	☐	☒	☐
Aquatic Plants:	☐	☒	☐	☐
Iron/Sulfur Bacteria:	☒	☐	☐	☐

System Type: Stream ☒ Lake ☐ Wetland ☐ Estuary ☐ Other(Specify) ☐ _____

WEATHER CONDITIONS / NOTES:

H_2SO_4 – # 126185 12-21-13

HNO_3 – # 1113020 3-1-15

☒ The antecedent hydrologic conditions have been met to my best knowledge.

SAMPLING TEAM Harris Walters + Cheryl Swanson

SIGNATURE: Cheryl Swanson

DATE: 10/21/13

DEP-SOP-001/01: Form FD 9000-5

STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL PROTECTION

STREAM/RIVER HABITAT ASSESSMENT FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (MM/DD/YY):	RECEIVING BODY OF WATER:
		10/21/13	Beaver Creek

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Leon	Arvah Hopkins	Test Site

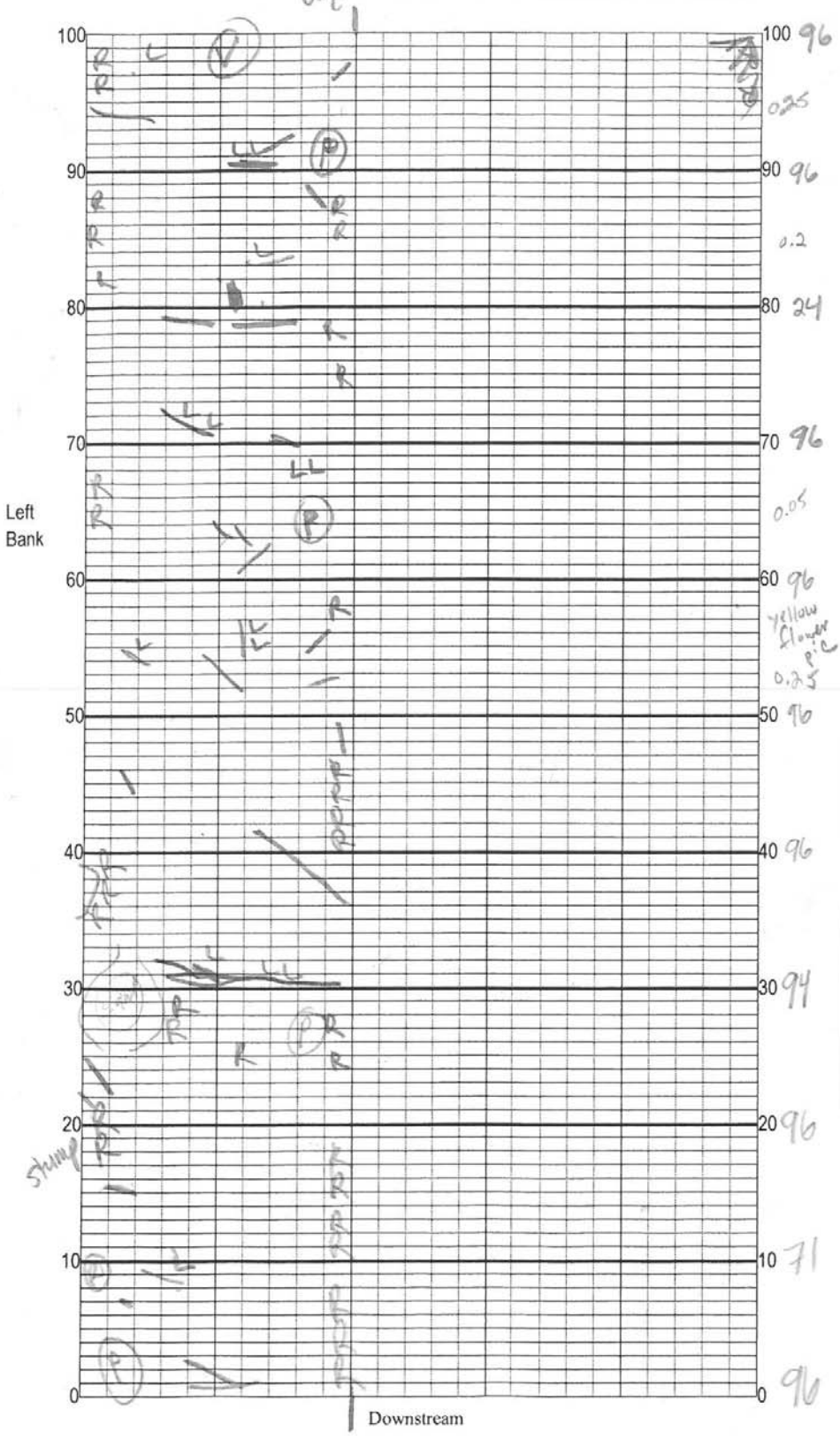
Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** 10	Four or more major productive habitats present [snags, tree roots, aquatic vegetation, leaf packs (partially decayed), rock] 20 19 18 17 16	Three major productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags) 15 14 13 12 11	Two major productive habitats present. Less than desirable habitat, frequently disturbed or removed (10) 9 8 7 6	One or less major productive habitat. Lack of habitat is obvious, substrates unstable or smothered 5 4 3 2 1
Substrate Availability 6	Greater than 30% major productive habitat present at site 20 19 18 17 16	16% to 30% major productive habitat, by aerial extent 15 14 13 12 11	6% to 15% major productive habitat 10 9 8 7 (6)	Less than 5% major productive habitat 5 4 3 2 1
Water Velocity 20	Max. observed at typical transect: > 0.25 m/sec. But < 1 m/sec ≥0.33 0.31 0.29 0.27 >0.25 (20) 19 18 17 16	Max. observed at typical transect: >0.1 to 0.25 m/sec 0.25 0.21 0.17 0.13 >0.1 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 0.1 0.09 0.07 0.06 0.05 10 9 8 7 6	Max. observed at typical transect: <0.05 m/sec; or spate occurring: > 1 m/sec <0.05 0.04 0.03 0.01 <0.01 5 4 3 2 1
Habitat Smothering 13 Primary Score 49	Adequate number of stable pools (1-2 per 12 times width) and <25% of habitats affected by sand, silt, or algae. 20 19 18 17 16	Adequate number of stable pools (1-2 per 12 times width) and >25% of habitats affected by sand, silt, or algae. 15 14 (13) 12 11	Does not have required number of stable pools (1-2 per 12 x width) and/or has shallow pools (<2 x prevailing depth). 10 9 8 7 6	Stable pools are absent. Most habitats affected by sand, silt, or algae accumulation. 5 4 3 2 1
Secondary Habitat Components **Artificial Channelization** 20	Expected sinuosity given the stream width. No evidence of dredging or artificial straightening. No spoil banks. (20) 19 18 17 16	Good sinuosity within old channelized area. Evidence of dredging in the past (>25 yrs) but mostly recovered. 15 14 13 12 11	Straightened with trapezoidal cross section, but has a small degree of sinuosity developed within channelized area. 10 9 8 7 6	Straightened or engineered by dredging, has trapezoidal or box cut cross section, lacks required pools. May have spoil banks. 5 4 3 2 1
Bank Stability Right Bank 10 Left Bank 10	Bankfull > 60% of bank height. Slope of bank ≤ 60° from bankful to top of bank. Bankfull is within or above the root zone with few raw, eroded areas. 10 9	Only meets 2 of the 3 requirements for optimal bank stability. 8 7 6	Only meets 1 of the 3 requirements for optimal bank stability. 5 4	Bankfull < 60% of bank height. Slope of bank > 60°. Bankfull is below the root zone with raw, eroded areas. 3 2 1
Riparian Buffer Zone Width Right Bank 10 Left Bank 10	Width of vegetation greater than 18 m 10 9	Width of vegetation >12 to 18m 8 7 6	Width of vegetation 6 to 12 m. human activities close to system 5 4	Less than 6 m of buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank 10 Left Bank 10 Secondary Score 80	Over 80% of riparian surfaces consist of normal, expected plant community for given sunlight & habitat conditions (e.g., native plants; tree, shrub, and forbs represented, if appropriate). Minimal disturbance. 10 9	>50% to 80% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Some disruption in community observed. 8 7 6	25% to 50% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Disruption obvious. 5 4	Less than 25% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). 3 2 1

129 **TOTAL SCORE**

Date:	Analyst:	Signature:
10/21/13	Cheryl Swanson	Cheryl Swanson

Form FD 9000-5 Revision Date: December 19, 2011

Stream/River Habitat Sketch Sheet



Location: Beaver Creek Arvah Test

Date: 10/21/13

Sampler: Cheryl Swanson

100 m:	Lattitude	30° 27.117'
	Longitude	84° 24.388'
0 m:	Lattitude	30° 27.153'
	Longitude	84° 24.433'

Substrates: Code key, draw proportionate habitat abundance. %

/	Snags	2.5
R	Roots/undercut banks	2.5
L	Leaf Packs (or mats)	~0.75
	Aquatic Macrophytes	
P	Pools	total # observed = 4 # range expected = 4-8

Average width 2 m

Average depth 0.1 m

Velocity measured at 100 meter mark.

WQ & chemistry taken at 100 meter mark.

Habitat Smothering:
Note areas (on map) where sand or silt is smothering substrates, limiting habitability.

Bank Stability:
Note areas (on map) with unstable, eroding banks.

Riparian Buffer Width:
Note areas (on map) where natural vegetation is altered or eliminated.

Plants observed / other notes:

200 m²

Length of grid represents 100 m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately).

Revision Date: June 2, 2011

DEP-SOP-001/01: Form FD 9000-3 (9/19/12)

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SAMPLE ID _____ ORG ID _____ LATITUDE _____

COUNTY Leon STORET # _____ LONGITUDE _____

DATE 10/21/13 TIME 0920 SAMPLING AGENCY FDEP

SITE NAME Arvah Hopkins

FIELD ID/NAME Downstream RECEIVING BODY OF WATER Beaver Creek

RIPARIAN ZONE / STREAM FEATURES

PREDOMINANT LAND-USE IN WATERSHED (specify relative percent in each category) :

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industry	Other (Specify)

Landscape Development Intensity Index (LDI): _____

Local Watershed Erosion (select one) : ☐ None ☐ Slight ☐ Moderate ☐ Heavy

Local Watershed NPS Pollution : ☐ No evidence ☐ Slight ☐ Moderate ☐ Heavy

Width of Riparian Vegetation (m) on Each Buffer Side
Left Bank : >18 Right Bank : >18

Hydrologic Modification Score (per FT 3101): _____

High Water Mark: 1 (m) + 0.1 (above present water level) = 1.1 (present depth) (above bed)

Artificially Impounded ☐ Yes ☒ No

Typical Width (m) Depth (m)/Velocity (m/sec) Transect
2 m wide

m/s	0.4 m/s	m/s
	2.5	
m deep	0.1 m deep	m deep

Artificially Channelized : ☒ No ☐ Some recovery ☐ Mostly recovered, more sinuous ☐ Recent, severe

Canopy Cover % ☐ Open ☐ Lightly Shaded (11-45%) ☐ Heavily Shaded ☒ Moderate Shaded (46-80%)

SEDIMENT / SUBSTRATE

Sediment Oils ☒ Absent ☐ Slight ☐ Moderate ☐ Profuse

Sediment Odors ☒ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ Other (Specify) :

Smothering of Substrates
Sand Smothering: None ☐ Slight ☒ Moderate ☐ Severe ☐
Silt Smothering: None ☐ Slight ☒ Moderate ☐ Severe ☐
Algae Smothering: None ☒ Slight ☐ Moderate ☐ Severe ☐

SUBSTRATE TYPE
Assessment Tool: ☐ SCI ☒ RPS ☒ LVS ☐ LCI ☐ BioRecon

	% Coverage	INVERT # Times Sampled	PERI # Times Sampled
Woody Debris (Snags)			
Undercut Banks / Roots			
Leaf Packs or Mat			
Aquatic Vegetation			
Rock or Shell Rubble..			
Sand.....			
Mud / Muck / Silt			
Other			
Other			

WATER QUALITY

	Depth (M)	Temp. (°C)	pH (SU)	D.O. (MG/L)	D.O. (%)	Cond. (UMHO/CM)	Salinity (PPT)
Top :	0.1	21.0	7.97	9.27	103.8	685	
Mid:							
Bottom							

Secchi (M): ☒ VOB

Site Depth: 0.1

Meter ID: #8

Water Odors Normal ☒ Petroleum ☐ Sewage ☐ Chemical ☐ Other ☐

Water Surface Oils Normal ☒ Sheen ☐ Globs ☐ Slick ☐ Other ☐

Water Sample Taken? ☒ Yes ☐ No
Sample Preserved? ☒ Yes ☐ No
Lot Number:_____ Exp:_____

Color Tannic ☐ Green (Algae) ☐ Clear ☒ Other (Specify) ☐

Algae Sample Taken? ☐ Yes ☒ No
Sample Preserved? ☐ Yes ☐ No
Lot Number:_____ Exp:_____

Clarity Clear ☒ Slightly Turbid ☐ Turbid ☐ Opaque ☐

ABUNDANCE

	Absent	Rare	Common	Abundant
Periphyton:	☐	☒	☐	☐
Fish:	☐	☐	☒	☐
Aquatic Plants:	☐	☒	☐	☐
Iron/Sulfur Bacteria:	☒	☐	☐	☐

System Type: Stream ☒ Lake ☐ Wetland ☐ Estuary ☐ Other(Specify) ☐ _____

WEATHER CONDITIONS / NOTES:
HNO_3 - # 1113020 3-1-15
H_2SO_4 - # 124185 12-21-13

☒ The antecedent hydrologic conditions have been met to my best knowledge.

SAMPLING TEAM Harris Watkis Cheryl Swanson

SIGNATURE: Cheryl Swanson DATE : 10/21/13

DEP-SOP-001/01: Form FD 9000-5

STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL PROTECTION

STREAM/RIVER HABITAT ASSESSMENT FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (MM/DD/YY):	RECEIVING BODY OF WATER:
		10/21/13	Beaver Creek

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Leon	Arvah Hopkins	Downstream

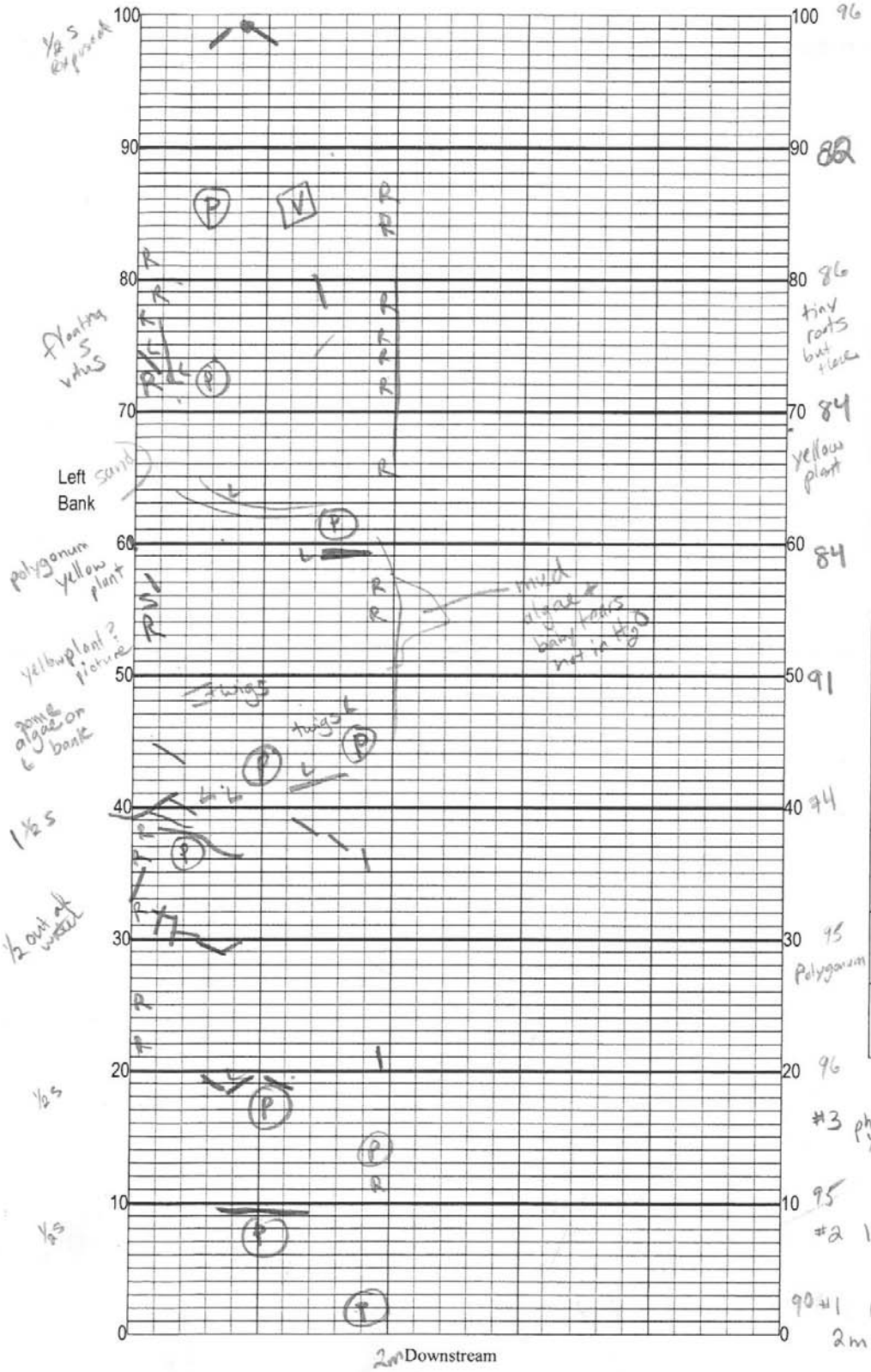
Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** 7	Four or more major productive habitats present [snags, tree roots, aquatic vegetation, leaf packs (partially decayed), rock] 20 19 18 17 16	Three major productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags) 15 14 13 12 11	Two major productive habitats present. Less than desirable habitat, frequently disturbed or removed 10 9 8 (7) 6	One or less major productive habitat. Lack of habitat is obvious, substrates unstable or smothered 5 4 3 2 1
Substrate Availability 5	Greater than 30% major productive habitat present at site 20 19 18 17 16	16% to 30% major productive habitat, by aerial extent 15 14 13 12 11	6% to 15% major productive habitat 10 9 8 7 6	Less than 5% major productive habitat (5) 4 3 2 1
Water Velocity 20	Max. observed at typical transect: > 0.25 m/sec. But < 1 m/sec ≥0.33 0.31 0.29 0.27 >0.25 (20) 19 18 17 16	Max. observed at typical transect: >0.1 to 0.25 m/sec 0.25 0.21 0.17 0.13 >0.1 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 0.1 0.09 0.07 0.06 0.05 10 9 8 7 6	Max. observed at typical transect: <0.05 m/sec; or spate occurring: > 1 m/sec <0.05 0.04 0.03 0.01 <0.01 5 4 3 2 1
Habitat Smothering 17 Primary Score 49	Adequate number of stable pools (1-2 per 12 times width) and <25% of habitats affected by sand, silt, or algae. 20 19 18 (17) 16	Adequate number of stable pools (1-2 per 12 times width) and >25% of habitats affected by sand, silt, or algae. 15 14 13 12 11	Does not have required number of stable pools (1-2 per 12 x width) and/or has shallow pools (<2 x prevailing depth). 10 9 8 7 6	Stable pools are absent. Most habitats affected by sand, silt, or algae accumulation. 5 4 3 2 1
Secondary Habitat Components **Artificial Channelization** 20	Expected sinuosity given the stream width. No evidence of dredging or artificial straight-ening. No spoil banks. (20) 19 18 17 16	Good sinuosity within old chan-nelized area. Evidence of dredging in the past (>25 yrs) but mostly recovered. 15 14 13 12 11	Straightened with trapezoidal cross section, but has a small degree of sinuosity developed within channelized area. 10 9 8 7 6	Straightened or engineered by dredging, has trapezoidal or box cut cross section, lacks required pools. May have spoil banks. 5 4 3 2 1
Bank Stability Right Bank 10 Left Bank 10	Bankfull > 60% of bank height. Slope of bank ≤ 60° from bankful to top of bank. Bankfull is within or above the root zone with few raw, eroded areas. (10) 9	Only meets 2 of the 3 requirements for optimal bank stability. 8 7 6	Only meets 1 of the 3 requirements for optimal bank stability. 5 4	Bankfull < 60% of bank height. Slope of bank > 60°. Bankfull is below the root zone with raw, eroded areas. 3 2 1
Riparian Buffer Zone Width Right Bank 10 Left Bank 10	Width of vegetation greater than 18 m (10) 9	Width of vegetation >12 to 18m 8 7 6	Width of vegetation 6 to 12 m. human activities close to system 5 4	Less than 6 m of buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank 10 Left Bank 10 Secondary Score 80	Over 80% of riparian surfaces consist of normal, expected plant community for given sunlight & habitat conditions (e.g., native plants; tree, shrub, and forbs represented, if appropriate). Minimal disturbance. (10) 9	>50% to 80% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Some disruption in community observed. 8 7 6	25% to 50% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Disruption obvious. 5 4	Less than 25% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). 3 2 1

129 **TOTAL SCORE**

Date:	Analyst:	Signature:
10/21/13	Cheryl Swanson	Cheryl Swanson

Form FD 9000-5 Revision Date: December 19, 2011

Stream/River Habitat Sketch Sheet



Location: Beaver Creek Arvah Downstream

Date: 10/21/13

Sampler: Cheryl Swanson

100 m: Lattitude 30 27.191 N
Longitude -84 25.090 W

0 m: Lattitude 30° 27.215' N
Longitude -84° 25.144' W

Substrates: Code key, draw proportionate habitat abundance. %

/	Snags	2
R	Roots/undercut banks	2
L	Leaf Packs (or mats)	<1
	Aquatic Macrophytes	
P	Pools	total # observed = 10 # range expected = 4-8

Average width 2 m
Average depth 0.1 m

Velocity measured at 88 meter mark.

WQ & chemistry taken at 35 meter mark.

Habitat Smothering:
Note areas (on map) where sand or silt is smothering substrates, limiting habitability.

Bank Stability:
Note areas (on map) with unstable, eroding banks.

Riparian Buffer Width:
Note areas (on map) where natural vegetation is altered or eliminated.

Plants observed / other notes:

200m²

Length of grid represents 100 m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately).

Revision Date: June 2, 2011

Appendix F
Chemical analysis of effluent and receiving water

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units	MDL	PQL
10/21/2013 16:00	Effluent	Chlorophyll/Grain Size/BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	1.7	I	mg/L	0.2	2
10/21/2013 16:00	Effluent	Metals	Chromium	0.31	I	ug/L	0.3	1.2
10/21/2013 16:00	Effluent	Metals	Lead	0.20	U	ug/L	0.2	0.8
10/21/2013 16:00	Effluent	Metals	Cadmium	0.050	U	ug/L	0.05	0.2
10/21/2013 16:00	Effluent	Metals	Potassium	2.4		mg/L	0.3	1.2
10/21/2013 16:00	Effluent	Metals	Iron	30	U	ug/L	30	120
10/21/2013 16:00	Effluent	Metals	Silver	0.025	U	ug/L	0.025	0.1
10/21/2013 16:00	Effluent	Metals	Zinc	5.0	U	ug/L	5	20
10/21/2013 16:00	Effluent	Metals	Magnesium	26.5		mg/L	0.04	0.16
10/21/2013 16:00	Effluent	Metals	Calcium	84.5		mg/L	0.075	0.3
10/21/2013 16:00	Effluent	Metals	Nickel	2.20		ug/L	0.25	1
10/21/2013 16:00	Effluent	Metals	Arsenic	3.31		ug/L	0.25	1
10/21/2013 16:00	Effluent	Metals	Selenium	0.20	U	ug/L	0.2	0.8
10/21/2013 16:00	Effluent	Metals	Copper	13.9		ug/L	0.5	1
10/21/2013 16:00	Effluent	Metals	Hardness	320		mg/L	0.4	1.6
10/21/2013 16:00	Effluent	Metals	Sodium	36.9		mg/L	0.5	2
10/21/2013 16:00	Effluent	Metals	Aluminum	9.6	I	ug/L	5	20
10/21/2013 16:00	Effluent	Nutrients	Kjeldahl Nitrogen	0.21		mg N/L	0.08	0.2
10/21/2013 16:00	Effluent	Nutrients	Total-P	0.52		mg P/L	0.005	0.05
10/21/2013 16:00	Effluent	Nutrients	NO2NO3-N	0.053		mg N/L	0.004	0.01
10/21/2013 16:00	Effluent	Nutrients	TSS	3	I	mg/L	2	10
10/21/2013 8:05	Effluent	Toxicology	Bioassay-Chron-Def-FW-Fish, IC25	15.3		IC25		
10/21/2013 8:05	Effluent	Toxicology	Bioassay-Chron-Def-FW-Fish, NOEC	12.5		NOEC		
10/21/2013 8:05	Effluent	Toxicology	Bioassay-Chron-Def-FW-C.dubia, IC25	100	L	IC25		
10/21/2013 8:05	Effluent	Toxicology	Bioassay-Chron-Def-FW-C.dubia, NOEC	100		NOEC		
10/21/2013 13:00	Effluent	AGP/LN	Algal Growth Potential	5.16		mg DryWt/L	0.3	0.9
10/21/2013 13:00	Effluent	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	0.55	U	ug/L	0.55	1.7
10/21/2013 13:00	Effluent	Chlorophyll/Grain Size/BOD	Phaeophytin-a	0.40	U	ug/L	0.4	1.2
10/21/2013 13:00	Effluent	Nutrients	Ammonia-N	0.004	I	mg N/L	0.002	0.005
10/21/2013 13:00	Effluent	Nutrients	Alkalinity	147	A	mg CaCO3/L	0.65	2.5
10/21/2013 13:00	Effluent	Nutrients	Sulfate	160		mg SO4/L	2	5
10/21/2013 13:00	Effluent	Nutrients	Fluoride	0.51		mg F/L	0.035	0.1
10/21/2013 13:00	Effluent	Nutrients	Color (true)	4.9	I	PCU	2.5	6
10/21/2013 13:00	Effluent	Nutrients	Chloride	53		mg Cl/L	2	5
10/21/2013 13:00	Effluent	Nutrients	Turbidity	0.55		NTU	0.1	0.1
10/21/2013 13:00	Effluent	Nutrients	Organic Carbon	1.5	A	mg C/L	0.5	1
10/21/2013 13:00	Effluent	Nutrients	O-Phosphate-P	0.068		mg P/L	0.004	0.01
10/21/2013 13:00	Effluent	Overflow	Oil and Grease	0.71	U	mg/L	0.71	2.5
10/21/2013 13:00	Effluent	Pesticides	Ethion	0.011	U	ug/L	0.011	0.043

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units	MDL	PQL
10/21/2013 13:00	Effluent	Pesticides	Ethoprop	0.0054	U	ug/L	0.0054	0.022
10/21/2013 13:00	Effluent	Pesticides	Alachlor	0.065	U	ug/L	0.065	0.26
10/21/2013 13:00	Effluent	Pesticides	Chlorpyrifos Ethyl	0.011	U	ug/L	0.011	0.043
10/21/2013 13:00	Effluent	Pesticides	Chlorpyrifos Methyl	0.011	U	ug/L	0.011	0.043
10/21/2013 13:00	Effluent	Pesticides	Hexazinone	0.032	U	ug/L	0.032	0.13
10/21/2013 13:00	Effluent	Pesticides	Atrazine	0.011	U	ug/L	0.011	0.043
10/21/2013 13:00	Effluent	Pesticides	Butylate	0.022	U	ug/L	0.022	0.086
10/21/2013 13:00	Effluent	Pesticides	Malathion	0.011	U	ug/L	0.011	0.043
10/21/2013 13:00	Effluent	Pesticides	Mevinphos	0.011	U	ug/L	0.011	0.043
10/21/2013 13:00	Effluent	Pesticides	Naled	0.043	U	ug/L	0.043	0.17
10/21/2013 13:00	Effluent	Pesticides	Phorate	0.0054	U	ug/L	0.0054	0.022
10/21/2013 13:00	Effluent	Pesticides	Diazinon	0.011	U	ug/L	0.011	0.043
10/21/2013 13:00	Effluent	Pesticides	Azinphos Methyl	0.022	U	ug/L	0.022	0.086
10/21/2013 13:00	Effluent	Pesticides	Metribuzin	0.022	U	ug/L	0.022	0.086
10/21/2013 13:00	Effluent	Pesticides	Metolachlor	0.065	U	ug/L	0.065	0.26
10/21/2013 13:00	Effluent	Pesticides	Fenamiphos	0.032	UJ	ug/L	0.032	0.13
10/21/2013 13:00	Effluent	Pesticides	Parathion Methyl	0.011	U	ug/L	0.011	0.043
10/21/2013 13:00	Effluent	Pesticides	Simazine	0.011	U	ug/L	0.011	0.043
10/21/2013 13:00	Effluent	Pesticides	Prometryn	0.022	U	ug/L	0.022	0.086
10/21/2013 13:00	Effluent	Pesticides	Parathion Ethyl	0.022	U	ug/L	0.022	0.086
10/21/2013 13:00	Effluent	Pesticides	Norflurazon	0.032	U	ug/L	0.032	0.13
10/21/2013 13:00	Effluent	Pesticides	Metalaxyl	0.043	U	ug/L	0.043	0.17
10/21/2013 13:00	Effluent	Pesticides	Fonofos	0.011	U	ug/L	0.011	0.043
10/21/2013 13:00	Effluent	Pesticides	Bromacil	0.043	UJ	ug/L	0.043	0.17
10/21/2013 13:00	Effluent	Pesticides	Ametryn	0.011	U	ug/L	0.011	0.043
10/21/2013 13:00	Effluent	Priority Organic Pollutants	2,4-Dichlorophenol	0.99	U	ug/L	0.99	4
10/21/2013 13:00	Effluent	Priority Organic Pollutants	2,4-Dinitrophenol	15	UJ	ug/L	15	59
10/21/2013 13:00	Effluent	Priority Organic Pollutants	4-Nitrophenol	15	U	ug/L	15	59
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Acenaphthylene	0.20	U	ug/L	0.2	0.79
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Benzo(g,h,i)perylene	0.20	U	ug/L	0.2	0.79
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Hexachlorobenzene	0.99	U	ug/L	0.99	4
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Phenanthrene	0.20	U	ug/L	0.2	0.79
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Phenol	0.99	U	ug/L	0.99	4
10/21/2013 13:00	Effluent	Priority Organic Pollutants	4-Bromophenyl phenyl ether	0.99	U	ug/L	0.99	4
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Bis(2-chloroethyl)ether	0.99	U	ug/L	0.99	4
10/21/2013 13:00	Effluent	Priority Organic Pollutants	N-Nitrosodimethylamine	2.0	U	ug/L	2	7.9
10/21/2013 13:00	Effluent	Priority Organic Pollutants	1,2,4-Trichlorobenzene	0.99	U	ug/L	0.99	4
10/21/2013 13:00	Effluent	Priority Organic Pollutants	2,4-Dinitrotoluene	0.99	U	ug/L	0.99	4
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	3.0	U	ug/L	3	12
10/21/2013 13:00	Effluent	Priority Organic Pollutants	2,4,6-Trichlorophenol	0.99	U	ug/L	0.99	4
10/21/2013 13:00	Effluent	Priority Organic Pollutants	4-Chloro-3-methylphenol	0.99	U	ug/L	0.99	4
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Acenaphthene	0.20	U	ug/L	0.2	0.79

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units	MDL	PQL
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	0.99	U	ug/L	0.99	4
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Chrysene	0.20	U	ug/L	0.2	0.79
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Diethyl phthalate	0.99	U	ug/L	0.99	4
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Nitrobenzene	2.0	U	ug/L	2	7.9
10/21/2013 13:00	Effluent	Priority Organic Pollutants	2,4-Dimethylphenol	9.9	U	ug/L	9.9	40
10/21/2013 13:00	Effluent	Priority Organic Pollutants	2-Chloronaphthalene	0.99	U	ug/L	0.99	4
10/21/2013 13:00	Effluent	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	3.0	U	ug/L	3	12
10/21/2013 13:00	Effluent	Priority Organic Pollutants	3,3'-Dichlorobenzidine	40	U	ug/L	40	160
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Anthracene	0.20	U	ug/L	0.2	0.79
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Benzidine	99	U	ug/L	99	400
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Benzo(a)pyrene	0.20	U	ug/L	0.2	0.79
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Di-n-butyl phthalate	0.99	U	ug/L	0.99	4
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Hexachlorobutadiene	3.0	U	ug/L	3	12
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Hexachlorocyclopentadiene	3.0	U	ug/L	3	12
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	0.20	U	ug/L	0.2	0.79
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Isophorone	0.99	U	ug/L	0.99	4
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Naphthalene	0.20	U	ug/L	0.2	0.79
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Pentachlorophenol	3.0	U	ug/L	3	12
10/21/2013 13:00	Effluent	Priority Organic Pollutants	1,4-Dioxane	0.020	U	ug/L	0.02	0.1
10/21/2013 13:00	Effluent	Priority Organic Pollutants	2,6-Dinitrotoluene	0.99	U	ug/L	0.99	4
10/21/2013 13:00	Effluent	Priority Organic Pollutants	2-Chlorophenol	0.99	U	ug/L	0.99	4
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	2.0	U	ug/L	2	7.9
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Dibenzo(a,h)anthracene	0.20	U	ug/L	0.2	0.79
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Fluorene	0.20	U	ug/L	0.2	0.79
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Pyrene	0.20	U	ug/L	0.2	0.79
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Butyl benzyl phthalate	0.99	U	ug/L	0.99	4
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Di-n-octyl phthalate	0.99	U	ug/L	0.99	4
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Hexachloroethane	3.0	U	ug/L	3	12
10/21/2013 13:00	Effluent	Priority Organic Pollutants	2-Nitrophenol	0.99	U	ug/L	0.99	4
10/21/2013 13:00	Effluent	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	2.0	U	ug/L	2	7.9
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Benzo(a)anthracene	0.20	U	ug/L	0.2	0.79
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Benzo(b)fluoranthene	0.20	U	ug/L	0.2	0.79
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Benzo(k)fluoranthene	0.20	U	ug/L	0.2	0.79
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Dimethyl phthalate	0.99	U	ug/L	0.99	4
10/21/2013 13:00	Effluent	Priority Organic Pollutants	Fluoranthene	0.20	U	ug/L	0.2	0.79
10/21/2013 13:00	Effluent	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	2.0	U	ug/L	2	7.9
10/21/2013 13:00	Effluent	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	3.0	U	ug/L	3	12
10/21/2013 13:00	Effluent	Field Parameter	Temperature	22.5		C		
10/21/2013 13:00	Effluent	Field Parameter	pH	7.31				
10/21/2013 13:00	Effluent	Field Parameter	Specific Conductance	752		umhos/cm		
10/21/2013 13:00	Effluent	Field Parameter	Dissolved Oxygen	9.02		mg/L		
10/21/2013 16:17	Control Site	Metals	Copper	18.9		ug/L	0.5	1

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units	MDL	PQL
10/21/2013 16:17	Control Site	Nutrients	Kjeldahl Nitrogen	0.25		mg N/L	0.08	0.2
10/21/2013 16:17	Control Site	Nutrients	Total-P	0.51		mg P/L	0.005	0.05
10/21/2013 16:17	Control Site	Nutrients	NO2NO3-N	0.048		mg N/L	0.004	0.01
10/21/2013 15:15	Control Site	AGP/LN	Algal Growth Potential	6.60		mg DryWt/L	0.3	0.9
10/21/2013 15:15	Control Site	Chlorophyll/Grain Size/BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	1.3	I	mg/L	0.2	2
10/21/2013 15:15	Control Site	Chlorophyll/Grain Size/BOD	Phaeophytin-a	0.40	U	ug/L	0.4	1.2
10/21/2013 15:15	Control Site	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	0.55	U	ug/L	0.55	1.7
10/21/2013 15:15	Control Site	Metals	Copper	0.50	U	ug/L	0.5	1
10/21/2013 15:15	Control Site	Metals	Aluminum	107		ug/L	5	20
10/21/2013 15:15	Control Site	Metals	Magnesium	8.54		mg/L	0.04	0.16
10/21/2013 15:15	Control Site	Metals	Chromium	0.39	I	ug/L	0.3	1.2
10/21/2013 15:15	Control Site	Metals	Silver	0.025	U	ug/L	0.025	0.1
10/21/2013 15:15	Control Site	Metals	Calcium	50.9		mg/L	0.075	0.3
10/21/2013 15:15	Control Site	Metals	Selenium	0.20	U	ug/L	0.2	0.8
10/21/2013 15:15	Control Site	Metals	Sodium	4.6		mg/L	0.5	2
10/21/2013 15:15	Control Site	Metals	Iron	550		ug/L	30	120
10/21/2013 15:15	Control Site	Metals	Zinc	5.0	U	ug/L	5	20
10/21/2013 15:15	Control Site	Metals	Lead	0.20	U	ug/L	0.2	0.8
10/21/2013 15:15	Control Site	Metals	Cadmium	0.050	U	ug/L	0.05	0.2
10/21/2013 15:15	Control Site	Metals	Potassium	0.65	I	mg/L	0.3	1.2
10/21/2013 15:15	Control Site	Metals	Arsenic	0.99	I	ug/L	0.25	1
10/21/2013 15:15	Control Site	Metals	Nickel	0.41	I	ug/L	0.25	1
10/21/2013 15:15	Control Site	Nutrients	Organic Carbon	5.5		mg C/L	0.5	1
10/21/2013 15:15	Control Site	Nutrients	NO2NO3-N	0.072		mg N/L	0.004	0.01
10/21/2013 15:15	Control Site	Nutrients	Color (true)	30		PCU	2.5	6
10/21/2013 15:15	Control Site	Nutrients	Alkalinity	151		mg CaCO3/L	0.65	2.5
10/21/2013 15:15	Control Site	Nutrients	TSS	4	I	mg/L	2	10
10/21/2013 15:15	Control Site	Nutrients	Kjeldahl Nitrogen	0.50		mg N/L	0.08	0.2
10/21/2013 15:15	Control Site	Nutrients	Turbidity	3.2		NTU	0.1	0.1
10/21/2013 15:15	Control Site	Nutrients	Chloride	8.9		mg Cl/L	0.2	0.5
10/21/2013 15:15	Control Site	Nutrients	Sulfate	1.7		mg SO4/L	0.2	0.5
10/21/2013 15:15	Control Site	Nutrients	Ammonia-N	0.044		mg N/L	0.002	0.005
10/21/2013 15:15	Control Site	Nutrients	Total-P	0.20		mg P/L	0.005	0.05
10/21/2013 15:15	Control Site	Nutrients	O-Phosphate-P	0.074		mg P/L	0.004	0.01
10/21/2013 15:15	Control Site	Nutrients	Fluoride	0.20		mg F/L	0.035	0.1
10/21/2013 15:15	Control Site	Overflow	Oil and Grease	0.71	U	mg/L	0.71	2.6
10/21/2013 15:15	Control Site	Pesticides	Ametryn	0.0096	U	ug/L	0.0096	0.038
10/21/2013 15:15	Control Site	Pesticides	Alachlor	0.057	U	ug/L	0.057	0.23
10/21/2013 15:15	Control Site	Pesticides	Prometryn	0.019	U	ug/L	0.019	0.077
10/21/2013 15:15	Control Site	Pesticides	Parathion Ethyl	0.019	U	ug/L	0.019	0.077
10/21/2013 15:15	Control Site	Pesticides	Ethoprop	0.0048	U	ug/L	0.0048	0.019
10/21/2013 15:15	Control Site	Pesticides	Chlorpyrifos Ethyl	0.0096	U	ug/L	0.0096	0.038

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units	MDL	PQL
10/21/2013 15:15	Control Site	Pesticides	Phorate	0.0048	U	ug/L	0.0048	0.019
10/21/2013 15:15	Control Site	Pesticides	Norflurazon	0.029	U	ug/L	0.029	0.11
10/21/2013 15:15	Control Site	Pesticides	Metribuzin	0.019	U	ug/L	0.019	0.077
10/21/2013 15:15	Control Site	Pesticides	Metolachlor	0.057	U	ug/L	0.057	0.23
10/21/2013 15:15	Control Site	Pesticides	Metalaxyl	0.038	U	ug/L	0.038	0.15
10/21/2013 15:15	Control Site	Pesticides	Hexazinone	0.029	U	ug/L	0.029	0.11
10/21/2013 15:15	Control Site	Pesticides	Atrazine	0.0096	U	ug/L	0.0096	0.038
10/21/2013 15:15	Control Site	Pesticides	Simazine	0.0096	U	ug/L	0.0096	0.038
10/21/2013 15:15	Control Site	Pesticides	Ethion	0.0096	U	ug/L	0.0096	0.038
10/21/2013 15:15	Control Site	Pesticides	Diazinon	0.0096	U	ug/L	0.0096	0.038
10/21/2013 15:15	Control Site	Pesticides	Azinphos Methyl	0.019	U	ug/L	0.019	0.077
10/21/2013 15:15	Control Site	Pesticides	Mevinphos	0.0096	U	ug/L	0.0096	0.038
10/21/2013 15:15	Control Site	Pesticides	Parathion Methyl	0.0096	U	ug/L	0.0096	0.038
10/21/2013 15:15	Control Site	Pesticides	Fonofos	0.0096	U	ug/L	0.0096	0.038
10/21/2013 15:15	Control Site	Pesticides	Chlorpyrifos Methyl	0.0096	U	ug/L	0.0096	0.038
10/21/2013 15:15	Control Site	Pesticides	Malathion	0.0096	U	ug/L	0.0096	0.038
10/21/2013 15:15	Control Site	Pesticides	Fenamiphos	0.029	UJ	ug/L	0.029	0.11
10/21/2013 15:15	Control Site	Pesticides	Naled	0.038	U	ug/L	0.038	0.15
10/21/2013 15:15	Control Site	Pesticides	Bromacil	0.038	UJ	ug/L	0.038	0.15
10/21/2013 15:15	Control Site	Pesticides	Butylate	0.019	U	ug/L	0.019	0.077
10/21/2013 15:15	Control Site	Priority Organic Pollutants	3,3'-Dichlorobenzidine	38	U	ug/L	38	150
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Acenaphthylene	0.19	U	ug/L	0.19	0.77
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Benzo(b)fluoranthene	0.19	U	ug/L	0.19	0.77
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	0.96	U	ug/L	0.96	3.8
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Hexachlorobenzene	0.96	U	ug/L	0.96	3.8
10/21/2013 15:15	Control Site	Priority Organic Pollutants	N-Nitrosodimethylamine	1.9	U	ug/L	1.9	7.7
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Nitrobenzene	1.9	U	ug/L	1.9	7.7
10/21/2013 15:15	Control Site	Priority Organic Pollutants	2,4,6-Trichlorophenol	0.96	U	ug/L	0.96	3.8
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Acenaphthene	0.19	U	ug/L	0.19	0.77
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Benzidine	96	U	ug/L	96	380
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Bis(2-chloroethyl)ether	0.96	U	ug/L	0.96	3.8
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	2.9	U	ug/L	2.9	12
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Di-n-octyl phthalate	0.96	U	ug/L	0.96	3.8
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	0.19	U	ug/L	0.19	0.77
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Naphthalene	0.19	U	ug/L	0.19	0.77
10/21/2013 15:15	Control Site	Priority Organic Pollutants	2,6-Dinitrotoluene	0.96	U	ug/L	0.96	3.8
10/21/2013 15:15	Control Site	Priority Organic Pollutants	4-Bromophenyl phenyl ether	0.96	U	ug/L	0.96	3.8
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Diethyl phthalate	0.96	U	ug/L	0.96	3.8
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Pyrene	0.19	U	ug/L	0.19	0.77
10/21/2013 15:15	Control Site	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	1.9	U	ug/L	1.9	7.7
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Benzo(a)anthracene	0.19	U	ug/L	0.19	0.77
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Benzo(k)fluoranthene	0.19	U	ug/L	0.19	0.77

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units	MDL	PQL
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Butyl benzyl phthalate	0.96	U	ug/L	0.96	3.8
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Dibenzo(a,h)anthracene	0.19	U	ug/L	0.19	0.77
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Hexachlorobutadiene	2.9	U	ug/L	2.9	12
10/21/2013 15:15	Control Site	Priority Organic Pollutants	1,4-Dioxane	0.020	U	ug/L	0.02	0.1
10/21/2013 15:15	Control Site	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	2.9	U	ug/L	2.9	12
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Benzo(a)pyrene	0.19	U	ug/L	0.19	0.77
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Benzo(g,h,i)perylene	0.19	U	ug/L	0.19	0.77
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Chrysene	0.19	U	ug/L	0.19	0.77
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Hexachlorocyclopentadiene	2.9	U	ug/L	2.9	12
10/21/2013 15:15	Control Site	Priority Organic Pollutants	2,4-Dimethylphenol	9.6	U	ug/L	9.6	38
10/21/2013 15:15	Control Site	Priority Organic Pollutants	2,4-Dinitrotoluene	0.96	U	ug/L	0.96	3.8
10/21/2013 15:15	Control Site	Priority Organic Pollutants	2-Nitrophenol	0.96	U	ug/L	0.96	3.8
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Fluorene	0.19	U	ug/L	0.19	0.77
10/21/2013 15:15	Control Site	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	2.9	U	ug/L	2.9	12
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Pentachlorophenol	2.9	U	ug/L	2.9	12
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Phenanthrene	0.19	U	ug/L	0.19	0.77
10/21/2013 15:15	Control Site	Priority Organic Pollutants	2,4-Dinitrophenol	14	UJ	ug/L	14	58
10/21/2013 15:15	Control Site	Priority Organic Pollutants	2-Chlorophenol	0.96	U	ug/L	0.96	3.8
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Anthracene	0.19	U	ug/L	0.19	0.77
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Dimethyl phthalate	0.96	U	ug/L	0.96	3.8
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Hexachloroethane	2.9	U	ug/L	2.9	12
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Isophorone	0.96	U	ug/L	0.96	3.8
10/21/2013 15:15	Control Site	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	1.9	U	ug/L	1.9	7.7
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Phenol	0.96	U	ug/L	0.96	3.8
10/21/2013 15:15	Control Site	Priority Organic Pollutants	1,2,4-Trichlorobenzene	0.96	U	ug/L	0.96	3.8
10/21/2013 15:15	Control Site	Priority Organic Pollutants	2,4-Dichlorophenol	0.96	U	ug/L	0.96	3.8
10/21/2013 15:15	Control Site	Priority Organic Pollutants	2-Chloronaphthalene	0.96	U	ug/L	0.96	3.8
10/21/2013 15:15	Control Site	Priority Organic Pollutants	4-Chloro-3-methylphenol	0.96	U	ug/L	0.96	3.8
10/21/2013 15:15	Control Site	Priority Organic Pollutants	4-Nitrophenol	14	U	ug/L	14	58
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	1.9	U	ug/L	1.9	7.7
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Di-n-butyl phthalate	0.96	U	ug/L	0.96	3.8
10/21/2013 15:15	Control Site	Priority Organic Pollutants	Fluoranthene	0.19	U	ug/L	0.19	0.77
10/21/2013 15:15	Control Site	Field Parameter	Specific Conductance	313		umhos/cm		
10/21/2013 15:15	Control Site	Field Parameter	Sample Depth	0.1		m		
10/21/2013 15:15	Control Site	Field Parameter	Dissolved Oxygen	6.62		mg/L		
10/21/2013 15:15	Control Site	Field Parameter	pH	7.23				
10/21/2013 15:15	Control Site	Field Parameter	Sample Depth	0.1		m		
10/21/2013 15:15	Control Site	Field Parameter	Temperature	21.2		C		
10/21/2013 15:15	Control Site	Field Parameter	pH	7.23				
10/21/2013 15:15	Control Site	Field Parameter	Dissolved Oxygen	6.62		mg/L		
10/21/2013 15:15	Control Site	Field Parameter	Temperature	21.2		C		
10/21/2013 15:15	Control Site	Field Parameter	Specific Conductance	313		umhos/cm		

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units	MDL	PQL
10/21/2013 12:10	Test Site	AGP/LN	Algal Growth Potential	5.48		mg DryWt/L	0.3	0.9
10/21/2013 12:10	Test Site	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	0.60	I	ug/L	0.55	1.7
10/21/2013 12:10	Test Site	Chlorophyll/Grain Size/BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	1.1	I	mg/L	0.2	2
10/21/2013 12:10	Test Site	Chlorophyll/Grain Size/BOD	Phaeophytin-a	0.40	U	ug/L	0.4	1.2
10/21/2013 12:10	Test Site	Metals	Selenium	0.20	U	ug/L	0.2	0.8
10/21/2013 12:10	Test Site	Metals	Nickel	2.41		ug/L	0.25	1
10/21/2013 12:10	Test Site	Metals	Arsenic	3.12		ug/L	0.25	1
10/21/2013 12:10	Test Site	Metals	Silver	0.025	U	ug/L	0.025	0.1
10/21/2013 12:10	Test Site	Metals	Chromium	0.31	I	ug/L	0.3	1.2
10/21/2013 12:10	Test Site	Metals	Iron	55	I	ug/L	30	120
10/21/2013 12:10	Test Site	Metals	Aluminum	62		ug/L	5	20
10/21/2013 12:10	Test Site	Metals	Sodium	35.5		mg/L	0.5	2
10/21/2013 12:10	Test Site	Metals	Cadmium	0.050	U	ug/L	0.05	0.2
10/21/2013 12:10	Test Site	Metals	Zinc	5.0	U	ug/L	5	20
10/21/2013 12:10	Test Site	Metals	Magnesium	25.6		mg/L	0.04	0.16
10/21/2013 12:10	Test Site	Metals	Lead	0.20	U	ug/L	0.2	0.8
10/21/2013 12:10	Test Site	Metals	Copper	14.9		ug/L	0.5	1
10/21/2013 12:10	Test Site	Metals	Potassium	2.2		mg/L	0.3	1.2
10/21/2013 12:10	Test Site	Metals	Calcium	81.7		mg/L	0.075	0.3
10/21/2013 12:10	Test Site	Nutrients	O-Phosphate-P	0.071		mg P/L	0.004	0.01
10/21/2013 12:10	Test Site	Nutrients	Chloride	53		mg Cl/L	0.4	1
10/21/2013 12:10	Test Site	Nutrients	Fluoride	0.48		mg F/L	0.035	0.1
10/21/2013 12:10	Test Site	Nutrients	Turbidity	0.90		NTU	0.1	0.1
10/21/2013 12:10	Test Site	Nutrients	Organic Carbon	1.8		mg C/L	0.5	1
10/21/2013 12:10	Test Site	Nutrients	Kjeldahl Nitrogen	0.22		mg N/L	0.08	0.2
10/21/2013 12:10	Test Site	Nutrients	Color (true)	6.0	I	PCU	2.5	6
10/21/2013 12:10	Test Site	Nutrients	Total-P	0.52		mg P/L	0.005	0.05
10/21/2013 12:10	Test Site	Nutrients	Sulfate	150		mg SO4/L	0.4	1
10/21/2013 12:10	Test Site	Nutrients	Ammonia-N	0.005	I	mg N/L	0.002	0.005
10/21/2013 12:10	Test Site	Nutrients	NO2NO3-N	0.049		mg N/L	0.004	0.01
10/21/2013 12:10	Test Site	Nutrients	Alkalinity	147		mg CaCO3/L	0.65	2.5
10/21/2013 12:10	Test Site	Nutrients	TSS	4	I	mg/L	2	10
10/21/2013 12:10	Test Site	Overflow	Oil and Grease	0.69	U	mg/L	0.69	2.5
10/21/2013 12:10	Test Site	Pesticides	Metribuzin	0.020	U	ug/L	0.02	0.078
10/21/2013 12:10	Test Site	Pesticides	Bromacil	0.039	UJ	ug/L	0.039	0.16
10/21/2013 12:10	Test Site	Pesticides	Metalaxyl	0.039	U	ug/L	0.039	0.16
10/21/2013 12:10	Test Site	Pesticides	Metolachlor	0.059	U	ug/L	0.059	0.24
10/21/2013 12:10	Test Site	Pesticides	Prometryn	0.020	U	ug/L	0.02	0.078
10/21/2013 12:10	Test Site	Pesticides	Chlorpyrifos Ethyl	0.0098	U	ug/L	0.0098	0.039
10/21/2013 12:10	Test Site	Pesticides	Parathion Ethyl	0.020	U	ug/L	0.02	0.078
10/21/2013 12:10	Test Site	Pesticides	Fonofos	0.0098	U	ug/L	0.0098	0.039
10/21/2013 12:10	Test Site	Pesticides	Simazine	0.0098	U	ug/L	0.0098	0.039

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units	MDL	PQL
10/21/2013 12:10	Test Site	Pesticides	Fenamiphos	0.029	UJ	ug/L	0.029	0.12
10/21/2013 12:10	Test Site	Pesticides	Chlorpyrifos Methyl	0.0098	U	ug/L	0.0098	0.039
10/21/2013 12:10	Test Site	Pesticides	Parathion Methyl	0.0098	U	ug/L	0.0098	0.039
10/21/2013 12:10	Test Site	Pesticides	Malathion	0.0098	U	ug/L	0.0098	0.039
10/21/2013 12:10	Test Site	Pesticides	Atrazine	0.0098	U	ug/L	0.0098	0.039
10/21/2013 12:10	Test Site	Pesticides	Alachlor	0.059	U	ug/L	0.059	0.24
10/21/2013 12:10	Test Site	Pesticides	Hexazinone	0.029	U	ug/L	0.029	0.12
10/21/2013 12:10	Test Site	Pesticides	Azinphos Methyl	0.020	U	ug/L	0.02	0.078
10/21/2013 12:10	Test Site	Pesticides	Ametryn	0.0098	U	ug/L	0.0098	0.039
10/21/2013 12:10	Test Site	Pesticides	Butylate	0.020	U	ug/L	0.02	0.078
10/21/2013 12:10	Test Site	Pesticides	Phorate	0.0049	U	ug/L	0.0049	0.02
10/21/2013 12:10	Test Site	Pesticides	Naled	0.039	U	ug/L	0.039	0.16
10/21/2013 12:10	Test Site	Pesticides	Ethoprop	0.0049	U	ug/L	0.0049	0.02
10/21/2013 12:10	Test Site	Pesticides	Ethion	0.0098	U	ug/L	0.0098	0.039
10/21/2013 12:10	Test Site	Pesticides	Diazinon	0.0098	U	ug/L	0.0098	0.039
10/21/2013 12:10	Test Site	Pesticides	Norflurazon	0.029	U	ug/L	0.029	0.12
10/21/2013 12:10	Test Site	Pesticides	Mevinphos	0.0098	U	ug/L	0.0098	0.039
10/21/2013 12:10	Test Site	Priority Organic Pollutants	1,4-Dioxane	0.020	U	ug/L	0.02	0.1
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Benzo(a)anthracene	0.21	U	ug/L	0.21	0.83
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Bis(2-chloroethyl)ether	1.0	U	ug/L	1	4.2
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	2.1	U	ug/L	2.1	8.3
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Di-n-octyl phthalate	1.0	U	ug/L	1	4.2
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Hexachloroethane	3.1	U	ug/L	3.1	12
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Isophorone	1.0	U	ug/L	1	4.2
10/21/2013 12:10	Test Site	Priority Organic Pollutants	N-Nitrosodimethylamine	2.1	U	ug/L	2.1	8.3
10/21/2013 12:10	Test Site	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	3.1	U	ug/L	3.1	12
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Naphthalene	0.21	U	ug/L	0.21	0.83
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Nitrobenzene	2.1	U	ug/L	2.1	8.3
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Phenol	1.0	U	ug/L	1	4.2
10/21/2013 12:10	Test Site	Priority Organic Pollutants	2,4-Dinitrophenol	16	UJ	ug/L	16	62
10/21/2013 12:10	Test Site	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	3.1	U	ug/L	3.1	12
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Acenaphthene	0.21	U	ug/L	0.21	0.83
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Benzo(a)pyrene	0.21	U	ug/L	0.21	0.83
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	1.0	U	ug/L	1	4.2
10/21/2013 12:10	Test Site	Priority Organic Pollutants	3,3'-Dichlorobenzidine	42	U	ug/L	42	170
10/21/2013 12:10	Test Site	Priority Organic Pollutants	4-Bromophenyl phenyl ether	1.0	U	ug/L	1	4.2
10/21/2013 12:10	Test Site	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	2.1	U	ug/L	2.1	8.3
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Benzo(b)fluoranthene	0.21	U	ug/L	0.21	0.83
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Butyl benzyl phthalate	1.0	U	ug/L	1	4.2
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Di-n-butyl phthalate	1.0	U	ug/L	1	4.2
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Hexachlorobutadiene	3.1	U	ug/L	3.1	12
10/21/2013 12:10	Test Site	Priority Organic Pollutants	2,4-Dimethylphenol	10	U	ug/L	10	42

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units	MDL	PQL
10/21/2013 12:10	Test Site	Priority Organic Pollutants	2,4-Dinitrotoluene	1.0	U	ug/L	1	4.2
10/21/2013 12:10	Test Site	Priority Organic Pollutants	4-Chloro-3-methylphenol	1.0	U	ug/L	1	4.2
10/21/2013 12:10	Test Site	Priority Organic Pollutants	4-Nitrophenol	16	U	ug/L	16	62
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Benzo(g,h,i)perylene	0.21	U	ug/L	0.21	0.83
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Benzo(k)fluoranthene	0.21	U	ug/L	0.21	0.83
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Dimethyl phthalate	1.0	U	ug/L	1	4.2
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Fluoranthene	0.21	U	ug/L	0.21	0.83
10/21/2013 12:10	Test Site	Priority Organic Pollutants	2-Chloronaphthalene	1.0	U	ug/L	1	4.2
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Diethyl phthalate	1.0	U	ug/L	1	4.2
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Hexachlorobenzene	1.0	U	ug/L	1	4.2
10/21/2013 12:10	Test Site	Priority Organic Pollutants	2,6-Dinitrotoluene	1.0	U	ug/L	1	4.2
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Acenaphthylene	0.21	U	ug/L	0.21	0.83
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Benzidine	100	U	ug/L	100	420
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	3.1	U	ug/L	3.1	12
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Chrysene	0.21	U	ug/L	0.21	0.83
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Dibenzo(a,h)anthracene	0.21	U	ug/L	0.21	0.83
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Fluorene	0.21	U	ug/L	0.21	0.83
10/21/2013 12:10	Test Site	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	2.1	U	ug/L	2.1	8.3
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Pentachlorophenol	3.1	U	ug/L	3.1	12
10/21/2013 12:10	Test Site	Priority Organic Pollutants	1,2,4-Trichlorobenzene	1.0	U	ug/L	1	4.2
10/21/2013 12:10	Test Site	Priority Organic Pollutants	2,4,6-Trichlorophenol	1.0	U	ug/L	1	4.2
10/21/2013 12:10	Test Site	Priority Organic Pollutants	2,4-Dichlorophenol	1.0	U	ug/L	1	4.2
10/21/2013 12:10	Test Site	Priority Organic Pollutants	2-Nitrophenol	1.0	U	ug/L	1	4.2
10/21/2013 12:10	Test Site	Priority Organic Pollutants	2-Chlorophenol	1.0	U	ug/L	1	4.2
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Anthracene	0.21	U	ug/L	0.21	0.83
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Hexachlorocyclopentadiene	3.1	U	ug/L	3.1	12
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	0.21	U	ug/L	0.21	0.83
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Phenanthrene	0.21	U	ug/L	0.21	0.83
10/21/2013 12:10	Test Site	Priority Organic Pollutants	Pyrene	0.21	U	ug/L	0.21	0.83
10/21/2013 12:10	Test Site	Field Parameter	Dissolved Oxygen	9.24		mg/L		
10/21/2013 12:10	Test Site	Field Parameter	pH	7.81				
10/21/2013 12:10	Test Site	Field Parameter	Dissolved Oxygen	9.24		mg/L		
10/21/2013 12:10	Test Site	Field Parameter	Temperature	22.2		C		
10/21/2013 12:10	Test Site	Field Parameter	Specific Conductance	735		umhos/cm		
10/21/2013 12:10	Test Site	Field Parameter	pH	7.81				
10/21/2013 12:10	Test Site	Field Parameter	Specific Conductance	735		umhos/cm		
10/21/2013 12:10	Test Site	Field Parameter	Temperature	22.2		C		
10/21/2013 13:00	Field Blank	Nutrients	Alkalinity	0.65	U	mg CaCO3/L	0.65	2.5
10/21/2013 13:00	Field Blank	Nutrients	Turbidity	0.10	U	NTU	0.1	0.1
10/21/2013 13:00	Field Blank	Nutrients	Chloride	0.20	U	mg Cl/L	0.2	0.5
10/21/2013 13:00	Field Blank	Nutrients	O-Phosphate-P	0.004	U	mg P/L	0.004	0.01
10/21/2013 13:00	Field Blank	Nutrients	Color (true)	2.5	U	PCU	2.5	6

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units	MDL	PQL
10/21/2013 13:00	Field Blank	Nutrients	Organic Carbon	0.50	U	mg C/L	0.5	1
10/21/2013 13:00	Field Blank	Nutrients	Ammonia-N	0.003	I	mg N/L	0.002	0.005
10/21/2013 13:00	Field Blank	Nutrients	Sulfate	0.20	U	mg SO4/L	0.2	0.5
10/21/2013 13:00	Field Blank	Nutrients	Fluoride	0.035	U	mg F/L	0.035	0.1
10/21/2013 13:00	Field Blank	Overflow	Oil and Grease	0.70	U	mg/L	0.7	2.5
10/21/2013 13:00	Field Blank	Pesticides	Metribuzin	0.020	U	ug/L	0.02	0.079
10/21/2013 13:00	Field Blank	Pesticides	Naled	0.040	U	ug/L	0.04	0.16
10/21/2013 13:00	Field Blank	Pesticides	Norflurazon	0.030	U	ug/L	0.03	0.12
10/21/2013 13:00	Field Blank	Pesticides	Azinphos Methyl	0.020	U	ug/L	0.02	0.079
10/21/2013 13:00	Field Blank	Pesticides	Ethion	0.0099	U	ug/L	0.0099	0.04
10/21/2013 13:00	Field Blank	Pesticides	Parathion Ethyl	0.020	U	ug/L	0.02	0.079
10/21/2013 13:00	Field Blank	Pesticides	Butylate	0.020	U	ug/L	0.02	0.079
10/21/2013 13:00	Field Blank	Pesticides	Fonofos	0.0099	U	ug/L	0.0099	0.04
10/21/2013 13:00	Field Blank	Pesticides	Phorate	0.0050	U	ug/L	0.005	0.02
10/21/2013 13:00	Field Blank	Pesticides	Prometryn	0.020	U	ug/L	0.02	0.079
10/21/2013 13:00	Field Blank	Pesticides	Alachlor	0.059	U	ug/L	0.059	0.24
10/21/2013 13:00	Field Blank	Pesticides	Ametryn	0.0099	U	ug/L	0.0099	0.04
10/21/2013 13:00	Field Blank	Pesticides	Chlorpyrifos Methyl	0.0099	U	ug/L	0.0099	0.04
10/21/2013 13:00	Field Blank	Pesticides	Hexazinone	0.030	U	ug/L	0.03	0.12
10/21/2013 13:00	Field Blank	Pesticides	Metalaxyl	0.040	U	ug/L	0.04	0.16
10/21/2013 13:00	Field Blank	Pesticides	Chlorpyrifos Ethyl	0.0099	U	ug/L	0.0099	0.04
10/21/2013 13:00	Field Blank	Pesticides	Simazine	0.0099	U	ug/L	0.0099	0.04
10/21/2013 13:00	Field Blank	Pesticides	Atrazine	0.0099	U	ug/L	0.0099	0.04
10/21/2013 13:00	Field Blank	Pesticides	Parathion Methyl	0.0099	U	ug/L	0.0099	0.04
10/21/2013 13:00	Field Blank	Pesticides	Metolachlor	0.059	U	ug/L	0.059	0.24
10/21/2013 13:00	Field Blank	Pesticides	Malathion	0.0099	U	ug/L	0.0099	0.04
10/21/2013 13:00	Field Blank	Pesticides	Bromacil	0.040	UJ	ug/L	0.04	0.16
10/21/2013 13:00	Field Blank	Pesticides	Fenamiphos	0.030	UJ	ug/L	0.03	0.12
10/21/2013 13:00	Field Blank	Pesticides	Ethoprop	0.0050	U	ug/L	0.005	0.02
10/21/2013 13:00	Field Blank	Pesticides	Diazinon	0.0099	U	ug/L	0.0099	0.04
10/21/2013 13:00	Field Blank	Pesticides	Mevinphos	0.0099	U	ug/L	0.0099	0.04
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Acenaphthylene	0.19	U	ug/L	0.19	0.78
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Fluorene	0.19	U	ug/L	0.19	0.78
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Hexachlorobenzene	0.97	U	ug/L	0.97	3.9
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Naphthalene	0.19	U	ug/L	0.19	0.78
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Pyrene	0.19	U	ug/L	0.19	0.78
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	2,4-Dichlorophenol	0.97	U	ug/L	0.97	3.9
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	2,4-Dinitrotoluene	0.97	U	ug/L	0.97	3.9
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Benzo(k)fluoranthene	0.19	U	ug/L	0.19	0.78
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Fluoranthene	0.19	U	ug/L	0.19	0.78
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	2-Chlorophenol	0.97	U	ug/L	0.97	3.9
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	2.9	U	ug/L	2.9	12

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units	MDL	PQL
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	2-Nitrophenol	0.97	U	ug/L	0.97	3.9
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	4-Bromophenyl phenyl ether	0.97	U	ug/L	0.97	3.9
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Anthracene	0.19	U	ug/L	0.19	0.78
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Benzo(b)fluoranthene	0.19	U	ug/L	0.19	0.78
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	2.9	U	ug/L	2.9	12
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	1.9	U	ug/L	1.9	7.8
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Diethyl phthalate	0.97	U	ug/L	0.97	3.9
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	2.9	U	ug/L	2.9	12
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	2,4,6-Trichlorophenol	0.97	U	ug/L	0.97	3.9
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	3,3'-Dichlorobenzidine	39	U	ug/L	39	160
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	1.9	U	ug/L	1.9	7.8
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Benzo(a)anthracene	0.19	U	ug/L	0.19	0.78
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Benzo(g,h,i)perylene	0.19	U	ug/L	0.19	0.78
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Dimethyl phthalate	0.97	U	ug/L	0.97	3.9
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	0.19	U	ug/L	0.19	0.78
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Isophorone	0.97	U	ug/L	0.97	3.9
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	N-Nitrosodimethylamine	1.9	U	ug/L	1.9	7.8
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Nitrobenzene	1.9	U	ug/L	1.9	7.8
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Pentachlorophenol	2.9	U	ug/L	2.9	12
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	2,4-Dinitrophenol	15	UJ	ug/L	15	58
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	2,6-Dinitrotoluene	0.97	U	ug/L	0.97	3.9
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	2-Chloronaphthalene	0.97	U	ug/L	0.97	3.9
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	4-Chloro-3-methylphenol	0.97	U	ug/L	0.97	3.9
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Benzo(a)pyrene	0.19	U	ug/L	0.19	0.78
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Hexachlorobutadiene	2.9	U	ug/L	2.9	12
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Hexachlorocyclopentadiene	2.9	U	ug/L	2.9	12
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	1.9	U	ug/L	1.9	7.8
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	1,4-Dioxane	0.020	U	ug/L	0.02	0.1
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	1,2,4-Trichlorobenzene	0.97	U	ug/L	0.97	3.9
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Benzidine	97	U	ug/L	97	390
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Di-n-butyl phthalate	0.97	U	ug/L	0.97	3.9
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Di-n-octyl phthalate	0.97	U	ug/L	0.97	3.9
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Hexachloroethane	2.9	U	ug/L	2.9	12
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Phenanthrene	0.19	U	ug/L	0.19	0.78
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Acenaphthene	0.19	U	ug/L	0.19	0.78
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Chrysene	0.19	U	ug/L	0.19	0.78
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Dibenzo(a,h)anthracene	0.19	U	ug/L	0.19	0.78
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	2,4-Dimethylphenol	9.7	U	ug/L	9.7	39
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	4-Nitrophenol	15	U	ug/L	15	58
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	0.97	U	ug/L	0.97	3.9
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Bis(2-chloroethyl)ether	0.97	U	ug/L	0.97	3.9
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Butyl benzyl phthalate	0.97	U	ug/L	0.97	3.9

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units	MDL	PQL
10/21/2013 13:00	Field Blank	Priority Organic Pollutants	Phenol	0.97	U	ug/L	0.97	3.9
10/21/2013 9:20	Downstream Blank	Metals	Copper	0.50	U	ug/L	0.5	1
10/21/2013 9:20	Downstream Blank	Metals	Lead	0.20	U	ug/L	0.2	0.8
10/21/2013 9:20	Downstream Blank	Metals	Hardness	0.40	U	mg/L	0.4	1.6
10/21/2013 9:20	Downstream Blank	Metals	Selenium	0.20	U	ug/L	0.2	0.8
10/21/2013 9:20	Downstream Blank	Metals	Potassium	0.30	U	mg/L	0.3	1.2
10/21/2013 9:20	Downstream Blank	Metals	Calcium	0.075	U	mg/L	0.075	0.3
10/21/2013 9:20	Downstream Blank	Metals	Nickel	0.25	U	ug/L	0.25	1
10/21/2013 9:20	Downstream Blank	Metals	Chromium	0.30	U	ug/L	0.3	1.2
10/21/2013 9:20	Downstream Blank	Metals	Zinc	5.0	U	ug/L	5	20
10/21/2013 9:20	Downstream Blank	Metals	Iron	30	U	ug/L	30	120
10/21/2013 9:20	Downstream Blank	Metals	Silver	0.025	U	ug/L	0.025	0.1
10/21/2013 9:20	Downstream Blank	Metals	Aluminum	5.0	U	ug/L	5	20
10/21/2013 9:20	Downstream Blank	Metals	Cadmium	0.050	U	ug/L	0.05	0.2
10/21/2013 9:20	Downstream Blank	Metals	Magnesium	0.040	U	mg/L	0.04	0.16
10/21/2013 9:20	Downstream Blank	Metals	Sodium	0.50	U	mg/L	0.5	2
10/21/2013 9:20	Downstream Blank	Metals	Arsenic	0.25	U	ug/L	0.25	1
10/21/2013 9:20	Downstream Blank	Nutrients	NO2NO3-N	0.004	U	mg N/L	0.004	0.01
10/21/2013 9:20	Downstream Blank	Nutrients	Kjeldahl Nitrogen	0.080	U	mg N/L	0.08	0.2
10/21/2013 9:20	Downstream Blank	Nutrients	Total-P	0.002	U	mg P/L	0.002	0.005
10/21/2013 9:20	Downstream Site	Chlorophyll/Grain Size/BOD	Phaeophytin-a	0.40	U	ug/L	0.4	1.2
10/21/2013 9:20	Downstream Site	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	0.56	I	ug/L	0.55	1.7
10/21/2013 9:20	Downstream Site	Metals	Copper	15.3		ug/L	0.5	1
10/21/2013 9:20	Downstream Site	Nutrients	NO2NO3-N	0.004	U	mg N/L	0.004	0.01
10/21/2013 9:20	Downstream Site	Nutrients	Kjeldahl Nitrogen	0.080	U	mg N/L	0.08	0.2
10/21/2013 9:20	Downstream Site	Nutrients	Total-P	0.002	U	mg P/L	0.002	0.005
10/21/2013 9:20	Downstream Site	Field Parameter	pH	7.97				
10/21/2013 9:20	Downstream Site	Field Parameter	Temperature	21.0		C		
10/21/2013 9:20	Downstream Site	Field Parameter	Dissolved Oxygen	9.27		mg/L		
10/21/2013 9:20	Downstream Site	Field Parameter	Specific Conductance	685		umhos/cm		

Appendix G
Toxicological results

FDEP Biology Laboratory - Chronic Bioassay Bench Sheet

Pimphales promelas or Menidia beryllina

Arvan B.

Facility: Hopkin's Generating Station
Address: County Road 158S - Geddie Road, Tallahassee, FL, 32304
County: Leon
NPDES Permit #: FL 0025518
Contact/District: Nathan Mulkey / NWD

Test Species (circle one)
P. promelas SOP#: TA07_09 EPA-821-R-02-013 Method 1000.0
M. beryllina SOP#: TA07_14 EPA-821-R-02-014 Method 1006.0

Start Date: 10.22.13 Time: 1415
End Date: 10.29.13 Time: 0930

Diluent/ Batch:
MHW / 10.4.13 Test Days Used: 0-
MHW / 10.10.13 Test Days Used: 1-6
ASW / _____ Test Days Used: _____
ASW / _____ Test Days Used: _____

Organism age : 24 ~~days~~ hours CR
Feeding Prior to Test and Daily
Artemia Lot # : 23013
Chamber size : 1000 ml
Test volume : 500 ml

Organism Batch #: 10.22.13	
Artemia Batch #	Day 3 207.13
Day 0 204.13	Day 4 208.13
Day 1 205.13	Day 5 209.13
Day 2 206.13	Day 6 210.13

LIMS entry: 11-1-13 MF Entry verification: 11.4.13 BA

Sample Received	Lab Sample #	LIMS Job #	LIMS Sample #	Collection Date/Time	Received Date/Time
Test Day 0	1	TLH-2013-10-22-21	1545998	10-21-13/0805	10-22-13/0715
Test Day 2	2	TLH-2013-10-23-74	1546707	10-23-13/0800	10-23-13/1216
Test Day 4	3	TLH-2013-10-25-81	1547625	10-25-13/0800	10-26-13/0800

Water Quality Parameters	Batch #	10.4.13 (MHW) ASW (circle one)	10.10.13 (MHW) ASW (circle one)	NA Sample 1	NA Sample 2	NA Sample 3	Other:	Measured By:	Verified by:
Field Total Residual Cl_2 (mg/L):		NA	NA	*NM	NM	NM		~~HW~~	CR
Lab Total Residual Cl_2 (mg/L):		<0.03	<0.03	<0.03	<0.03	<0.03		AP/CR	CR/AP
Alkalinity (mg/L as $CaCO_3$):		63	68	160	158	159		CR/HW	AP
Hardness (mg/L as $CaCO_3$):		78	81	306	316	291		CR/HW	AP
Total Ammonia (mg/L as N):		<0.017	<0.017	<0.017	<0.017	<0.017		MF	CR
Conductivity: ~~µmhos~~ mmhos:		287	295	760	752	728		CR/AP	AP/CR
Salinity (ppth):									

*NM = not measured

Light Intensity : 50 - 100 ft. candles
Photoperiod : 16 light 8 dark
Temperature Range °C:
Incubator # 2 min 24.2 max 27.1
Test min 24.0 max 26.0
Room B246 min 24.3 max 25.3

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)

Statistics	
Growth NOEC:	12.5%
Growth LOEC:	25%
Growth IC_{20}:	12.8%
Growth IC_{25}:	15.3%
Ctrl % CV:	14.1%
Dunnetts PMSD:	32%
Survival NOEC:	25%
Survival LOEC:	50%

Investigators' signatures

	Initials:
Adrienne Permenter	AP
Cassidy Reichert	CR
Marshall Faircloth	MF
Diane Powell	DP
Bruce Auer	BA
Hans Webb	HW

REVIEWER Liz Miller

Comments:

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revised 07/23/13 AP

Chronic Bioassay Survival Benchsheet

Facility: Arvah B. Hoplin's Generating Station

LIMS Sample Number: 1545998
(for Lab Sample # 1)

Department of Environmental Protection
Biology Laboratory Chronic Screening Bioassay
***P. promelas* SOP TA07_09 *M. beryllina* SOP TA07_14**

Organism: (*P. promelas*) *M.beryllina* (circle one)

		TEST DAY							
Concentration	Replicate	0	1	2	3	4	5	6	7
Control	A	10	10	10	10	10	10	10	10
	B	10	9 1D	9 ~~10 AP~~	9	9	9	9	9
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
Sample 6.25 %	A	10	10	10	10	10	9 1D	9	9
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
Sample 12.5 %	A	10	10	10	10	10	10	~~7 3D 2D~~ 8	8
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	9 1D	7 2D	7
	D	10	10	10	10	10	10	10	10
Sample 25 %	A	10	10	10	10	10	6 4D	5 1D	5
	B	10	10	10	10	10	9 1D	6 3D	5 1D
	C	10	10	10	10	10	10	10	10
	D	10	10	8 3D	8	6 3D	3 3D	1 2D	1
Sample 50 %	A	10	10	10	10	10	7 3D	7	7
	B	10	10	10	10	10	8 2D	8	8
	C	10	10	10	10	9 1D	7 2D	6 1D	6
	D	10	10	10	10	10	10	8 2D	8
Sample 100%	A	10	10	10	10	10	9 1D	7 2D	7
	B	10	10	10	10	9 1D	8 1D	7 1D	7
	C	10	9 1D	9	8 1D	8	8	8	8
	D	10	10	10	10	9 1D	8 1D	8	8
Sample %	A	10							
	B	10							
	C	10							
	D	10							
Loaded by: AP	Checked by:		CR	CR	AP	CR	DP	AP	BA
Verified by: CR									

Comments:

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Arvan B.

Chronic Bioassay Parameters Benchsheet

P. promelas and M. beryllina SOP TA07_09 and TA-07_14 parameter pg. 1

Sample Source: Hopkin's Generating Station
Start Date: 10.22.13 End Date: 10.29.13
LIMS Sample #: 1545998 (for Lab sample #1)
Start Time: 1415 End Time: 0930

conc = concentration rep = replicate circle umhos or mmhos

Test Day		Conc.	Before Renewal: Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Conductivity (umhos) mmhos	Salinity ppth	After Renewal: Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Conductivity (umhos) mmhos	Salinity ppth
Day 0	sample:	Control	A	8.0	24.4	7.8	287							
	1	6.25%	A	8.0	24.6	7.8	322							
	1	12.5%	A	8.0	24.8	8.1	356							
	1	25%	A	8.1	25.1	8.2	414							
	1	50%	A	8.1	25.9	8.4	546							
	1	100%	A	8.1	25.1	8.6	760							
	1		A											
	Measured by:			CR	CR	CR	CR							
	Recorded by:			CR	CR	CR	CR							
			Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 1	sample:	Control	B	8.0	25.3	7.7	303		B	8.0	24.3	7.6	295	
	1	6.25%	B	8.0	25.1	7.8	337		B	8.0	24.3	7.6	328	
	1	12.5%	B	8.0	25.1	7.8	368		B	8.0	24.2	7.5	355	
	1	25%	B	8.0	25.1	8.0	426		B	8.0	24.3	8.1	417	
	1	50%	B	8.0	25.2	7.8	547		B	8.1	24.3	7.7	531	
	1	100%	B	8.1	24.9	7.9	769		B	8.2	24.6	8.3	754	
	1		B						B					
	Measured by:			CR	AP	CR	CR			CR	CR	CR	CR	
	Recorded by:			CR	CR	CR	CR			CR	AP	CR	CR	
			Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 2	sample:	Control	C	7.8	24.9	6.9	302		C	7.9	24.2	7.8	297	
	2	6.25%	C	7.7	24.6	6.9	332		C	7.9	24.1	7.6	330	
	2	12.5%	C	7.7	24.9	6.8	364		C	7.9	24.1	7.4	360	
	2	25%	C	7.7	24.6	6.7	423		C	7.9	24.1	7.4	421	
	2	50%	C	7.8	24.7	6.7	541		C	7.9	24.0	7.4	537	
	2	100%	C	8.0	24.7	6.7	771		C	8.0	24.1	7.4	767	
	2		C						C					
	Measured by:			AP	CR	AP	AP			AP	AP	AP	AP	
	Recorded by:			AP	AP	AP	AP			AP	AP	AP	AP	
			Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 3	sample:	Control	D	7.9	25.8	7.1	305		D	7.8	24.4	7.4	290	
	2	6.25%	D	7.9	25.5	7.0	336		D	7.8	24.3	7.3	322	
	2	12.5%	D	~~7.8~~ 8.0	25.1	6.6	364		D	7.8	24.2	7.3	354	
	2	25%	D	~~7.8~~ 8.1	24.9	7.2	436		D	7.8	24.1	7.4	419	
	2	50%	D	~~7.8~~ 8.1	24.9	7.0	541		D	8.0	24.1	7.7	532	
	2	100%	D	8.1	25.6	7.2	773		D	8.1	24.2	7.9	752	
	2		D						D					
	Measured by:			CR	CR	CR	CR			CR	AP	CR	CR	
	Recorded by:			~~DP~~	DP	DP	DP			CR	CR	CR	CR	

Comments:

For salinity <1 ppth insert <1. For salinity > 1 ppth, conductivity measurement is not required if salinity probe is functional.

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Arvah B.

Chronic Bioassay Parameters Benchsheet

P. promelas and M. beryllina SOP TA07_09 and TA-07_14 parameter pg. 2

Sample Source: Hopkins Generating Station
LIMS Sample #: 1545998 (for Lab sample #1)

Start Date: 10.22.13 End Date: 10.29.13
Start Time: 1415 End Time: 0930

conc = concentration rep = replicate

Test Day			Before Renewal						After Renewal					
	Conc.	Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Conductivity umhos mmhos	Salinity ppth	Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Conductivity umhos mmhos	Salinity ppth
Day 4 sample:	Control	A	7.8	24.8	8.0	302		A	7.8	24.0	7.7	288	
3	6.25%	A	7.7	25.0	7.2	336		A	7.8	24.0	7.9	317	
3	12.5%	A	7.7	24.8	7.0	369		A	7.8	24.0	7.7	351	
3	25%	A	7.7	24.9	6.7	430		A	7.8	24.0	8.0	408	
3	50%	A	7.7	25.0	6.9	553		A	7.9	24.1	7.9	519	
3	100%	A	7.9	25.0 ~~24.8~~	7.8	772		A	8.1	24.4	7.8	728	
3		A						A					
Measured by:			CR	MF	CR	CR			CR	CR	CR	CR	
Recorded by:			CR	MF	CR	CR			CR	CR	CR	CR	
		Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 5 sample:	Control	B	8.0	~~24.5~~	6.6	297		B	8.1	24.0	7.8	285	
3	6.25%	B	7.9	24.8	6.7	327		B	8.1	24.0	7.7	314	
3	12.5%	B	7.9	25.4	6.6	359		B	8.0	24.0	7.7	343	
3	25%	B	7.8	25.6	6.6	415		B	7.9	24.0	7.7	402	
3	50%	B	7.8	25.6	6.7	527		B	8.0	24.0	7.6	512	
3	100%	B	7.9	25.8	6.7	743		B	7.9	24.1	7.7	722	
3		B						B					
Measured by:			AP	MF	AP	AP			AP	AP	AP	AP	
Recorded by:			AP	MF	AP	AP			DP	DP	DP	DP	
		Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 6 sample:	Control	C	7.8	25.8	6.9	312		C	7.9	24.0	7.4	290	
3	6.25%	C	7.7	25.6	6.9	345		C	7.8	24.0	7.4	317	
3	12.5%	C	7.7	26.0	6.3	380		C	7.8	24.0	7.4	346	
3	25%	C	7.7	25.8	6.4	434		C	7.8	24.0	7.3	399	
3	50%	C	7.6	26.0	6.4	555		C	7.8	24.0	7.3	510	
3	100%	C	7.8	25.2	6.2	766		C	8.0	24.0	7.3	725	
3		C						C					
Measured by:			AP	AP	AP	AP			AP	AP	AP	AP	
Recorded by:			AP	AP	AP	AP			AP	AP	AP	AP	
		Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 7 sample:	Control	D	7.8	24.4	7.3	304		D					
3	6.25%	D	7.7	24.6	6.6	331		D					
3	12.5%	D	7.6	24.5	6.6	363		D					
3	25%	D	7.6	25.0	7.2	417		D					
3	50%	D	7.6	25.3	6.8	532		D					
3	100%	D	7.7	25.2	6.8	746		D					
3								D					
Measured by:			AP	AP	AP	AP							
Recorded by:			AP	AP	AP	AP							

Comments:

For salinity <1 ppth insert <1. For salinity > 1 ppth, conductivity measurement is not required if salinity probe is functional.

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Chronic Bioassay Weighing Benchsheet

Facility: Arvah B. Hopkins Generating Station

LIMS Sample Number: 1545998

(for Lab Sample # 1)

***P. promelas* and *M. beryllina* Bench Sheet**

SOP TA06_21

			mean wt = fish wt divided by 10 convert g to mg: move decimal 3 places to right					
Concentration	Replicate	Pan #	Pan wt. g	Pan + Fish g	Fish wt. g	Original # Fish	Mean wt. mg	Avg.
Control	A	1	0.02195	0.02875	0.00680	10	0.680	
	B	2	0.02123	0.02925	0.00802	10	0.802	0.828
	C	3	0.02344	0.03300	0.00956	10	0.956	
	D	4	0.02134	0.03009	0.00875	10	0.875	
sample 6.25 %	A	5	0.02183	0.02771	0.00588	10	0.588	
	B	6	0.02148	0.02916	0.00768	10	0.768	0.663
	C	7	0.02191	0.02822	0.00631	10	0.631	
	D	8	0.02251	0.02915	0.00664	10	0.664	
sample 12.5 %	A	9	0.02173	0.02716	0.00543	10	0.543	
	B	10	0.02142	0.02966	0.00824	10	0.824	0.673
	C	11	0.02132 (2 mf)	0.02686	0.00554	10	0.554	
	D	12	0.02151	0.02923	0.00772	10	0.772	
sample 25 %	A	13	0.02134	0.02499	0.00365	10	0.365	
	B	14	0.02182	0.02531	0.00349	10	0.349	0.380
	C	15	0.02022	0.02775	0.00753	10	0.753	
	D	16	0.02150	0.02202	0.00052	10	0.052	
sample 50 %	A	17	0.02095	0.02563	0.00468	10	0.468	
	B	18	0.02136	0.02803	0.006667	10	0.667	0.536
	C	19	0.01852	0.02275	0.00423	10	0.423	
	D	20	0.02211	0.02795	0.00584	10	0.584	
sample 100%	A	21	0.02201	0.02524	0.00323	10	0.323	
	B	22	0.02211	0.02701	0.00490	10	0.490	0.460
	C	23	0.02190	0.02706	0.00516	10	0.516	
	D	24	0.02193	0.02740	0.00547	10	0.547	
sample %	A					10		
	B					10		
	C					10		
	D					10		
	Weighed by initials:		AP	CR	revised 7/16/08 mf			

Comments:

Balance: Ohaus 250D Ser# 1125481084
S-Weights: BIO-S-Weights-01

Note: Pan number (#) refers to actual Pan number.

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Chronic Bioassay Weighing Benchsheet

Arvah B.

Quality Control

Facility: Hopkin's Generating Station

LIMS Sample Number: 1545998
(for Lab Sample # 1)

***P. promelas and M. beryllina* Bench sheet**
SOPs TA07_09, TA07_14 and TA06_21

Drying Oven ID:	ER034000
Temperature °C:	100
Hours:	8

Tare weighed by: AP
Final weighed by: CR

Tare Weighing Date: 10.28.13 Final Weighing Date: 10.31.13

			Measured Value (g)		S-weight Value (g)
Tare Pan 1 after Pan 5 (g)	0.02194	@0.02195	S-weights	@	
Tare Pan 1 after Pan 10 (g)	0.02196	@0.02195	at tare	0.03001	@ 0.03
Tare Pan 1 after Pan 15 (g)	0.02196	@0.02195	S-weights	0.01000	@ 0.01
Tare Pan 1 after Pan 20 (g)	0.02196	@0.02195	at final	0.05003	@ 0.05
Tare Pan 1 after Pan 25 (g)	0.02196	@0.02195			
Tare Pan 1 after Pan 30 (g)		@			
Tare Pan 1 after Pan 35 (g)		@			
Tare Pan 1 after Pan 40 (g)		@			
Tare Pan 1 after Pan 45 (g)		@			
Tare Pan 1 after Pan 48 (g)		@			
Final Pan 1 after Pan 5 (g)	0.02875	@0.02875			
Final Pan 1 after Pan 10 (g)	0.02876	@0.02875			
Final Pan 1 after Pan 15 (g)	0.02874	@0.02875			
Final Pan 1 after Pan 20 (g)	0.02875	@0.02875			
Final Pan 1 after Pan 25 (g)	0.02874	@0.02875			
Final Pan 1 after Pan 30 (g)		@			
Final Pan 1 after Pan 35 (g)		@			
Final Pan 1 after Pan 40 (g)		@			
Final Pan 1 after Pan 45 (g)		@			
Final Pan 1 after Pan 48 (g)		@			

Balance: Ohaus 250D Ser# 1125481084
S-Weights: BIO-S-Weights-01

Note: Pan numbers (5, 10, etc.) for Tare and Final refers to sequence of weighing as actual Pan #s may differ.

Comments:

revised 7/16/08 MF

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Test ID: Arvah B. Hopkins Generating station Dates: 10.22.13 - 10.29.13

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 10.31.13

V 1.3 2/15/13 MF

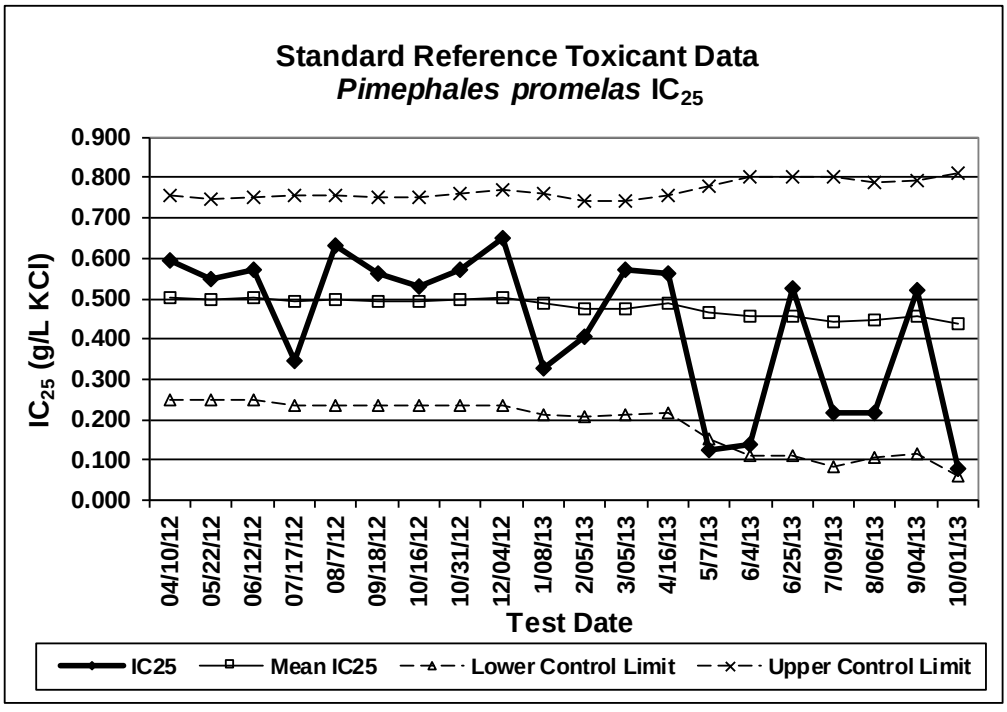
PAGE

Appendix H
Standard Reference Toxicant Data

Florida Department of Environmental Protection
Bureau of Laboratories
Standard Reference Toxicant (SRT) Test Data - 7-Day Chronic Toxicity
Pimephales promelas (fathead minnow) - Potassium Chloride (KCl)

Date	IC25	Mean IC25	Std Dev	Lower Control Limit	Upper Control Limit	Date
04/10/12	0.596	0.503	0.13	0.248	0.758	04/10/12
05/22/12	0.548	0.499	0.12	0.250	0.748	05/22/12
06/12/12	0.570	0.501	0.12	0.250	0.751	06/12/12
07/17/12	0.345	0.494	0.13	0.234	0.754	07/17/12
08/7/12	0.631	0.496	0.13	0.236	0.756	08/07/12
09/18/12	0.564	0.493	0.13	0.234	0.753	09/18/12
10/16/12	0.529	0.493	0.13	0.234	0.752	10/16/12
10/31/12	0.571	0.498	0.13	0.237	0.759	10/31/12
12/04/12	0.648	0.501	0.13	0.234	0.768	12/04/12
1/08/13	0.329	0.488	0.14	0.214	0.761	01/08/13
2/05/13	0.408	0.477	0.13	0.209	0.744	02/05/13
3/05/13	0.574	0.477	0.13	0.213	0.741	03/05/13
4/16/13	0.561	0.486	0.13	0.217	0.756	04/16/13
5/7/13	0.124	0.467	0.16	0.153	0.781	5/72013
6/4/13	0.140	0.456	0.17	0.111	0.800	06/04/13
6/25/13	0.525	0.457	0.17	0.112	0.804	06/25/13
7/09/13	0.219	0.442	0.18	0.082	0.802	07/09/13
8/06/13	0.219	0.448	0.17	0.107	0.789	08/06/13
9/04/13	0.521	0.458	0.17	0.115	0.792	09/04/13
10/01/13	0.078	0.437	0.19	0.062	0.811	10/01/13

Means are from the last 20 SRTs.
Lower Confidence Limit = mean - 2 * Std Dev
Upper Confidence Limit = mean + 2 * Std Dev
EPA 75th %CV: 38%
lab % CV: 42.9%



FDEP Biology Laboratory - Chronic SRT Benchsheet

Pimephales promelas or *Menidia beryllina*

Test Species (circle one)

(*P. promelas*)	SOP#: TA07_09	EPA-821-R-02-013	Method 1000.0
M. beryllina	SOP#: TA07_14	EPA-821-R-02-014	Method 1006.0

Diluent/ Batch: MHW/ 9.24.13 Test Days Used: 0-2

Diluent/ Batch: 10.2.13 Test Days Used: 3-6

Toxicant/ Batch # : KCl / 9.30.13

Artemia Lot # : 23013

Start Date: 10.1.13 Time: 1530

End Date: 10.8.13 Time: 1030

Organism Batch #/ Age: 10.1.13 / 24 hrs.

Artemia Batch #	Day 2 192.13	Day 5 195.13
Day 0 190.13	Day 3 193.13	Day 6 196.13
Day1 191.13	Day 4 194.13	

Chamber size : 1000 ml

Test volume : 500 ml

Feeding: *P. promelas* 0.15 g wet wt. 2X day 6 hour interval

M. beryllina 0.10 g wet wt days 0-2 0.15g wet wt. days 3-7

Water Quality Parameters	MHW Diluent 9.24.13	Diluent 10.2.13 (or other)	Method	Measured by	Verified by
Total Residual Cl_2 (mg/L):	<0.03	<0.03	HACH	AP	CR
Alkalinity (mg/L as $CaCO_3$):	65	68	HACH	CR	AP
Hardness (mg/L as $CaCO_3$):	78	85	HACH	CR	AP
Total Ammonia (mg/L as N):	<0.017	<0.017	DENVER	MF	CR
Conductivity (umhos-cm) mmhos-cm:	295	293	METTLER	CR	AP

Statistics	
Growth NOEC:	<0.125 g/L
Growth LOEC:	0.125 g/L
Growth IC_{20}:	0.0625 g/L
Growth IC_{25}:	0.078 g/L
Ctrl % CV:	29.4%
Dunnetts PMSD:	25.01%
Survival NOEC:	0.5 g/L
Survival LOEC:	1.0 g/L

Light Intensity : 50 - 100 ft. candles

Photoperiod : 16 light 8 dark

Test incubated in : Temperature Range °C:

Incubator # 3 min. 25.2 max. 27.2

Water bath # ____ min. ____ max. ____

Room B246 min. 24.8 max. 25.5

P. promelas PMSD Bounds for Growth: Lower 12 Upper 30

M. beryllina PMSD Bounds for Growth: Lower 11 Upper 28

Investigators' signatures

Adrienne Pennington

Cassidy Reichert

Jackie Savage

Marshall Faircloth

Bruce Alder

REVIEWER Liz Miller

Comments:

FDEP Biology Laboratory - Chronic SRT Benchsheet

Pimephales promelas or Menidia beryllina Survival

Organism: *P. promelas* *M.beryllina* (circle one) D = dead M = missing

Concentration: µg/L g/L (circle one)

			TEST DAY							
Concentration	Replicate	Chamber	0	1	2	3	4	5	6	7
Control	A	B1	10	10	10	10	10	10	10	10
	B	B2	10	10	10	10	9^{1D}	9	9	9
	C	B3	10	10	10	10	10	10	10	10
	D	B4	10	10	10	10	10	10	10	10
0.125	A	B5	10	10	10	10	10	10	10	10
	B	B6	10	10	10	10	10	10	9^{1D}	9
	C	B7	10	8^{2D}	8	8	8	8	5^{3D}	5
	D	B8	10	10	10	10	10	10	10	10
0.25	A	B9	10	10	10	10	10	9^{1D}	8^{1D}	8
	B	B10	10	10	10	10	10	9^{1D}	9	9
	C	B11	10	10	10	10	9^{1D}	9	9	9
	D	B12	10	10	10	10	10	9^{1D}	9	8^{1D}
0.5	A	B13	10	9^{1D}	9	9	9	9	8^{1D}	8
	B	B14	10	10	10	10	10	10	10	10
	C	B15	10	10	10	10	9^{1D}	9	8^{1D}	8
	D	B16	10	9^{1D}	9	9	9	9	9	9
1.0	A	B17	10	4^{6D}	3^{1D}	3	3	3	3	3
	B	B18	10	1^{9D}	1	0^{1D}	AP +0	—	—	—
	C	B19	10	3^{7D}	1^{2D}	1	1	1	1	1
	D	B20	10	3^{8D}	2	2	2	2	0^{2D}	—
2.0	A	B21	10	0^{10D}						
	B	B22	10	0^{10D}						
	C	B23	10	0^{10D}						
	D	B24	10	0^{10D}						
	A		10							
	B		10							
	C		10							
	D		10							
Loaded by (0 hr): AP		Checked by:		CR	AP	CR	AP	[illegible]	CR	CR
Verified by (0 hr): CR										
Concentrations prepared by:				AP	CR	AP	AP	AP	AP	AP

Comments:

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revised 7/16/08 MF

Chronic SRT Parameters Benchsheet

P. promelas and M. beryllina SOP TA07_09 and TA-07_15 parameter pg. 1

Start Date: 10.1.13 End Date: ~~CR 1530~~ 10.8.13

Start Time: 1530 End Time: 1030

conc = concentration rep = replicate circle umhos or mmhos

Test Day	Conc.	Before Renewal: Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Conductivity umhos mmhos	Salinity ppth	After Renewal: Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Conductivity umhos mmhos	Salinity ppth
Day 0 ←	Control	A	7.8	24.3	7.9	295							
	0.125	A	7.8	24.5	8.0	542							
	0.25	A	7.9	24.6	8.2	783							
	0.5	A	7.9	25.3	8.4	1230							
	1.0	A	8.0	25.6	8.4	2210							
	2.0	A	8.1	24.7	8.1	3930							
		A											
	Measured by		CR	CR	CR	CR							
	Recorded by		CR	CR	CR	CR							
		Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 1	Control	B	7.8	25.8	8.4	302		B	8.0	24.5	8.1	297	
	0.125	B	7.8	26.0	8.3	553		B	8.0	24.3	7.9	545	
	0.25	B	7.9	25.6	8.4	792		B	8.0	24.3	7.8	775	
	0.5	B	7.9	25.7	8.2	1208		B	8.0	24.3	7.8	1213	
	1.0	B	8.0	25.7	8.2	2170		B	8.1	24.3	7.8	2130	
	2.0	B	8.0	25.7	8.2	3870		B					
		B						B					
	Measured by		CR	AP	CR	CR			AP	AP	AP	AP	
	Recorded by		CR	CR	CR	CR			AP	AP	AP	AP	
		Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 2	Control	C	7.8	25.2	7.5	301		C	8.1	24.0	7.6	296	
	0.125	C	7.8	25.3	7.5	546		C	8.1	24.0	7.5	537	
	0.25	C	7.8	25.8	7.4	784		C	8.1	24.0	7.6	779	
	0.5	C	7.9	25.8	7.6	1238		C	8.1	24.1	7.5	1215	
	1.0	C	7.9	25.8	7.5	2130		C	8.1	24.3	7.5	2140	
		C						C					
		C						C					
	Measured by		CR	AP	CR	CR			AP	CR	AP	AP	
	Recorded by		CR	CR	CR	CR			AP	AP	AP	AP	
		Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 3	Control	D	7.8	25.7	7.1	314		D	7.9	24.4	8.0	293	
	0.125	D	7.8	25.8	7.1	563		D	7.9	24.4	8.0	523	
	0.25	D	7.8	25.2	7.1	806		D	7.9	24.4	8.0	761	
	0.5	D	7.8	25.5	7.2	1265		D	7.9	24.3	8.0	1218	
	1.0	D	7.9	25.6	7.2	2170		D	8.0	24.5	8.4	2110	
		D						D					
		D						D					
	Measured by		AP	AP	AP	AP			CR	CR	CR	CR	
	Recorded by		AP	CR	AP	AP			CR	AP	CR	CR	

Comments:

For salinity <1 ppth insert <1. For salinity > 1 ppth, conductivity measurement is not required if salinity probe is functional

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Chronic SRT Parameters Benchsheet

P. promelas and M. beryllina SOP TA07_09 and TA-07_15

parameter pg. 2

Start Date: 10.1.13 End Date: 10.8.13

Start Time: 1530 End Time: 1030

conc = concentration rep = replicate

Test Day ↓	Conc.	Before Renewal: Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Conductivity umhos/mmhos	Salinity ppth	After Renewal: Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Conductivity umhos/mmhos	Salinity ppth
Day 4	Control	A	7.8	25.4	6.7	319		A	8.0	24.3	7.5	300	
	0.125	A	7.8	25.9	6.8	570		A	8.0	24.3	7.4	554	
	0.25	A	7.9	24.6	6.9	811		A	8.0	24.2	7.4	805	
	0.5	A	7.9	25.7	7.0	1286		A	8.0	24.1	7.4	1265	
	1.0	A	7.9	25.8	7.4	2170		A	8.0	24.2	7.4	2170	
		A						A					
		A						A					
	Measured by		AP	AP	AP	AP			AP	AP	AP	AP	
	Recorded by		AP	AP	AP	AP			AP	AP	AP	AP	
		Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 5	Control	B	7.2	24.8	6.2	308		B	7.2	24.6	6.1	291	
	0.125	B	7.2	25.2	6.3	568		B	7.3	24.7	6.5	553	
	0.25	B	7.3	25.1	6.5	811		B	7.4	24.7	6.8	784	
	0.5	B	7.3	24.9	6.7	1280		B	7.5	24.7	6.9	1258	
	1.0	A, B AP	7.3	25.2	6.6	2210		A, B AP	7.5	24.7	6.9	2160	
		B						B					
		B						B					
	Measured by		gs	AP	gs	gs			gs	gs	gs	gs	
	Recorded by		gs	AP	gs	gs			gs	gs	gs	gs	
		Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 6	Control	C	7.8	25.1	6.7	313		C	8.0	24.0	7.1	298	
	0.125	C	7.7	25.2	6.4	579		C	8.0	24.0	7.0	548	
	0.25	C	7.8	24.6	6.8	816		C	8.0	24.0	7.2	790	
	0.5	C	7.8	25.2	7.0	1281		C	8.0	24.0	7.4	1254	
	1.0	C	7.9	24.9	7.4	2200		C	8.1	24.1	7.5	2110	
		C						C					
		C						C					
	Measured by		AP	AP	AP	AP			CR	AP	CR	CR	
	Recorded by		AP	AP	AP	AP			CR	CR	CR	CR	
		Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 7	Control	D	7.9	25.2	7.2	311		D					
	0.125	D	7.8	25.7	7.1	574		D					
	0.25	D	7.9	25.4	7.0	834		D					
	0.5	D	7.9	25.4	7.0	1321		D					
	1.0	C, D SR	7.9	25.7	6.9	2240		D					
		D						D					
		D						D					
	Measured by		AP	AP	AP	AP							
	Recorded by		AP	CR	AP	AP							

For salinity <1 ppth insert <1. For salinity > 1 ppth, conductivity measurement is not required if salinity probe is functional.

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FDEP Biology Laboratory - Chronic SRT Benchsheet

Pimephales promelas or *Menidia beryllina* Weights

SOP TA06_21

Organism: (*P. promelas*) *M.beryllina* (circle one)

Concentration: µg/L (g/L) (circle one)

mean wt = fish wt divided by 10

convert g to mg: move decimal 3 places to right

Concentration	Replicate	Pan #	Pan wt. (g)	Pan + Fish (g)	Fish wt. (g)	Original # of fish	Mean wt. (mg)	Avg.
Control	A	25	0.02215	0.02814	0.00599	10	0.599	
	B	26	0.02208	0.02709	0.00501	10	0.501	
	C	27	0.02266	0.03032	0.00766	10	0.766	0.685
	D	28	0.02228	0.03102	0.00874	10	0.874	
0.125	A	29	0.02126	0.02603	0.00477	10	0.477	
	B	30	0.02113	0.02567	0.00454	10	0.454	
	C	31	0.02196	0.02456	0.00260	10	0.260	0.411
	D	32	0.02195	0.02648	0.00453	10	0.453	
0.25	A	33	0.02160	0.02506	0.00346	10	0.346	
	B	34	0.02225	0.02714	0.00489	10	0.489	
	C	35	0.02183	0.02637	0.00454	10	0.454	0.392
	D	36	0.02044	0.02321	0.00277	10	0.277	
0.5	A	37	0.02033	0.02320	0.00287	10	0.287	
	B	38	0.02234	0.02559	0.00325	10	0.325	
	C	39	0.02122	0.02446	0.00324	10	0.324	0.316
	D	40	0.02221	0.02549	0.00328	10	0.328	
1.0	A	41	0.02266	0.02411	0.00145	10	0.145	(÷4) 0.046
	B					10		
	C	42	0.02245	0.02285	0.00040	10	0.040	(÷2) 0.093
	D					10		
	A					10		
	B					10		
	C					10		
	D					10		
	A					10		
	B					10		
	C					10		
	D					10		
		Weighed by:	CR	AP				

Comments:

Note: Pan number (#) refers to actual Pan number.

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revised 8/24/06 MF/SP

FDEP Biology Laboratory - Chronic SRT Benchsheet

Pimephales promelas or *Menidia beryllina* QC

SOPs TA07_09, TA07_14 and TA06_21

all weights in grams

Empty Pan Weights Date: 10.7.13 Weighed by: CR

	Pan 1 wt.	Pan 1 initial wt.
after Pan 5	0.02214	@0.02215
after Pan 10	0.02214	@0.02215
after Pan 15	0.02214	@0.02215
after Pan 20	0.02213	@0.02215
after Pan 25		@
after Pan 30		@
after Pan 35		@
after Pan 40		@
after Pan 45		@
after Pan 48		@

	Measured Value	S-weight Value
S-weights	0.00999	@ 0.01
	0.03002	@ 0.03

Balance: Ohaus 250D Ser# 1125481084

S-Weights: BIO-S-Weights-01

Fish + Pan Weights Date: 10.9.13 Weighed by: AP

	Pan 1 wt.	Pan 1 initial wt.
after Pan 5	0.02812	@ 0.02814
after Pan 10	0.02814	@ 0.02814
after Pan 15	0.02814	@ 0.02814
after Pan 20	0.02814	@ 0.02814
after Pan 25		@
after Pan 30		@
after Pan 35		@
after Pan 40		@
after Pan 45		@
after Pan 48		@

	Measured Value	S-weight Value
S-weights	0.00999	@ 0.01
	0.05003	@ 0.05

Drying Oven ID: ER034000

Temperature °C: 100

Drying Hours: 8

Note: Pan number (5, 10, etc.) refers to sequence of weighing as actual Pan #s may differ.

Comments:

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revised 7/16/08 MF

Test ID: P. promelas Chronic SRT Dates: 10.1.13 - 10.8.13

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: 10-8-13 AP

V 1.3 2/15/13 MF

PAGE

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	10/22/2013 14:15	Test ID:	hopppoct13	Sample ID:	Hopkins Generating Station
End Date:	10/29/2013 09:30	Lab ID:	DEP TOXLAB-FDEP Biology T	Sample Type:	EFF2-Industrial
Sample Date:		Protocol:	EPAF 94-EPA/600/4-91/002	Test Species:	PP-Pimephales promelas
Comments:	Pimephales promelas chronic bioassay for Hopkins Generating Station Oc				

Conc-%	1	2	3	4
D-Control	1.0000	0.9000	1.0000	1.0000
6.25	0.9000	1.0000	1.0000	1.0000
12.5	0.8000	1.0000	0.7000	1.0000
25	0.5000	0.5000	1.0000	0.1000
50	0.7000	0.8000	0.6000	0.8000
100	0.7000	0.7000	0.8000	0.8000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
D-Control	0.9750	1.0000	1.3713	1.2490	1.4120	5.942	4		
6.25	0.9750	1.0000	1.3713	1.2490	1.4120	5.942	4	18.00	10.00
12.5	0.8750	0.8974	1.2306	0.9912	1.4120	17.454	4	15.00	10.00
25	0.5250	0.5385	0.8261	0.3218	1.4120	54.177	4	12.50	10.00
*50	0.7250	0.7436	1.0229	0.8861	1.1071	10.396	4	10.00	10.00
*100	0.7500	0.7692	1.0492	0.9912	1.1071	6.383	4	10.00	10.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.86968	0.884	0.44792	4.83607
Bartlett's Test indicates unequal variances (p = 6.17E-03)	16.2473	15.0863		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	25	50	35.3553	4
Treatments vs D-Control				

Larval Fish Growth and Survival Test-7 Day Biomass

Start Date:	10/22/2013 14:15	Test ID:	hopppoct13	Sample ID:	Hopkins Generating Station
End Date:	10/29/2013 09:30	Lab ID:	DEP TOXLAB-FDEP Biology T	Sample Type:	EFF2-Industrial
Sample Date:		Protocol:	EPAF 94-EPA/600/4-91/002	Test Species:	PP-Pimephales promelas
Comments:	Pimephales promelas chronic bioassay for Hopkins Generating Station Oc				

Conc-%	1	2	3	4
D-Control	0.6800	0.8020	0.9560	0.8750
6.25	0.5880	0.7680	0.6310	0.6640
12.5	0.5430	0.8240	0.5540	0.7720
25	0.3650	0.3490	0.7530	0.0520
50	0.4680	0.6670	0.4230	0.5840
100	0.3230	0.4900	0.5160	0.5470

			Transform: Untransformed					Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	0.8283	1.0000	0.8283	0.6800	0.9560	14.144	4	0.8283	1.0000
6.25	0.6628	0.8002	0.6628	0.5880	0.7680	11.582	4	0.6680	0.8065
12.5	0.6733	0.8129	0.6733	0.5430	0.8240	21.637	4	0.6680	0.8065
25	0.3798	0.4585	0.3798	0.0520	0.7530	75.697	4	0.4614	0.5571
50	0.5355	0.6465	0.5355	0.4230	0.6670	20.699	4	0.4614	0.5571
100	0.4690	0.5663	0.4690	0.3230	0.5470	21.340	4	0.4614	0.5571

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.96249	0.884	0.27141	1.86625
Bartlett's Test indicates equal variances (p = 0.26)	6.55154	15.0863		

			Linear Interpolation (200 Resamples)		
Point	%	SD	95% CL(Exp)		Skew
IC05*	1.615	1.858	0.900	9.229	4.4069
IC10*	3.230	3.226	1.800	21.681	2.3873
IC15*	4.845	5.177	2.701	24.876	2.7137
IC20	12.827	7.308	0.000	38.864	3.0366
IC25	15.333	9.322	0.147	51.672	4.2163
IC40	22.850				
IC50	>100				

* indicates IC estimate less than the lowest concentration

The Bioassay of the Arvah B. Hopkins Generating Station effluent sampled on October 21, 2013 NPDES #FL0025518

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 2 5 5 1 8 11	12 1 3 1 0 2 1	# B	# S	# 2

Remarks

#

The Priority Pollutants Analysis of the Arvah B. Hopkins Generating Station effluent sampled on October 21, 2013 NPDES #FL0025518

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 2 5 5 1 8 11	12 1 3 1 0 2 1	# X	# S	# 2

Remarks

#

Biological Analyses of the Arvah B. Hopkins Generating Station effluent sampled on October 21, 2013, NPDES #FL0025518

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 2 5 5 1 8 11	12 1 3 1 0 2 1	# S	# S	# 2

Remarks

#