

Bioassays of

JEA Royal Lakes Wastwater Treatment Facility

Nassau County

NPDES #FL0026751

Sampled April 19, 2004

June 2004

Biology Section
Bureau of Laboratories
Division of Resource Assessment and Management

Quality Manual No. 870346G
NELAC Certification No. E31780

JEA Royal Lakes WWTP, 5509 Western Way, Jacksonville, Nassau County, Florida, NPDES #FL0026751. Effluent samples for this facility were collected on April 19, 2004.

Introduction

The facility is permitted as a 3.25 million gallons per day (MGD) annual average daily flow wastewater treatment facility consisting of a conventional activated-sludge wastewater plant. The effluent is disinfected using an ultraviolet treatment system. The outfall pipe is submerged and extends approximately 880 feet into the St. Johns River (Class III fresh receiving water) and discharges at a depth of approximately 15 feet. The point of discharge is located approximately at latitude 30° 13' 38" N, longitude 81° 37' 28" W.

A mixing zone has been established for the discharge of total recoverable silver (maximum 0.14μg/L) and unionized ammonia (maximum 0.04 mg/L as NH_3). The mixing zone for each parameter consists of an area with a circular shape centered at the point of discharge. The size of the mixing zones are the same for both pollutants, both having a radius of 2.03 meters and an area of 12.9 square meters (information prepared by Gloria Berges, FDEP-Northeast District).

Methods

Samples were collected from the NPDES sampling point by Patrick O'Connor (FDEP Northeast District) following DEP-SOP-001/01 FS 2400 Wastewater Sampling. All DEP SOP's are available on the web at: http://www.floridadep.org/labs/qa/sops.htm.

The toxicity and algal growth potential tests discussed in this report were performed following internal DEP SOP's TA07_01,TA07_02, and TA08_01 through TA08_06. All internal DEP SOP's are available on the web at: http://www.floridadep.org/labs/cgi-bin/sop/biosop.asp.

Toxicity Test Results

Tests were performed April 20-22, 2004.

Ceriodaphnia dubia 48-hr acute screening bioassay – Not Toxic; LC_{50} >100%, 0% mortality in 100% sample at 48 hours

Cyprinella leedsi 48-hr acute screening bioassay – Not Toxic; LC_{50} >100%, 0% mortality in 100% sample at 48 hours

The effluent samples from JEA Royal Lakes WWTF collected April 19, 2004, did not exhibit acute toxicity in the 48-hour bioassays.

See Appendix 1 for bioassay bench sheets.

Algal Growth Potential

The effluent Algal Growth Potential (AGP) was 9.65 mg dry wt/L of the unicellular green alga, *Pseudokirchneriella subcapitata*, formerly known as *Selenastrum capricornutum*. Raschke and Shultz (1987) found that AGP values above 5.0 mg dry weight/L represent a "problem" threshold for fresh receiving waters, implying nutrient enrichment. The predicted AGP based on nitrogen and phosphorous concentrations was 208.4 (±20%) mg dry wt/L (Table 2). The nutrient data suggests that the effluent is nitrogen-limited, and the algal growth was potentially inhibited; however, additional testing using the algal growth inhibition test would be necessary to make this determination.

See Table 1 for AGP results.

Chemistry Results

Total residual chlorine was not detected in the bioassay sample in the laboratory.

The ammonia concentration in the unpreserved bioassay sample was 0.216 mg/L in the laboratory, and 0.083 mg/L in the preserved chemistry sample.

The organic pollutant atrazine (4.8 μg/L) was detected in the effluent at a level above the practical quantitation limit (PQL). Aluminum, iron, lead and zinc were detected in the effluent above the PQL. Copper and nickel were detected in the effluent above the minimum detection limit and below the PQL. Metals content of the effluent complied with Class III Fresh Water Quality Criteria (62-302.530 F.A.C.).

See Table 2 for results of analytes detected in the effluent.

See Appendix 2 for a complete list of chemical analyses performed.

Conclusion

The effluent samples collected from JEA Royal Lakes WWTF collected April 19, 2004 did not show acute toxicity to either test species during the 48-hour bioassay tests. The effluent AGP result exceeded the "problem" threshold for fresh receiving waters. The algal growth potential test, while demonstrating growth above the problem threshold, suggests that the algal growth may have been inhibited. The measured AGP value was more than an order of magnitude below the predicted value based upon nutrient concentrations. An algal inhibition test would need to be performed to determine if algal inhibition is occurring.

Literature Cited

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

Table 1. *Measured and predicted algal growth potential (AGP) for total soluble inorganic nitrogen (TSIN) limitation*

Location	AGP (measured)	Predicted AGP (TSIN) ± 20%	Inorganic N:P ratio	Total N:P ratio
Effluent (mg dry wt/L)	9.65	208.4 ± 41.7	1.9	2.3

Table 2. *Effluent limits, Class III Criteria and chemical data for the JEA Royal Lakes effluent sample collected on April 19, 2004.*

JEA Royal Lakes WWTF	Class III Freshwater Stds	Effluent Limits	Effluent Samples
Organic Constituents (µg/L)			
Atrazine	-	-	4.8
Metals (µg/L unless otherwise noted)			
Aluminum	-	-	31
Arsenic	≤ 50	-	14 U
Cadmium	≤ 3.4 b	-	0.025 U
Calcium (mg/L)	-	-	90.7
Chromium-III	≤ 268.2 b	-	2 U
Copper	≤ 30.5 b	-	2.9 I
Iron	≤ 1000	-	64
Lead	≤ 18.6 b	-	0.49
Magnesium (mg/L)	-	-	45.3
Nickel	≤ 168.5 b	-	2.9 I
Selenium	≤ 5	-	5 U
Silver	≤ 0.07	0.14	0.02 U
Zinc	≤ 387.8 b	-	38.3
Nutrients (mg/L)			
Ortho-phosphate	-	Report	2.9
Total Phosphorus	-	Report	3.2
Ammonia	-	Report	0.083 A
Unionized Ammonia	≤ 0.02	0.04	<0.02 c
Nitrate+Nitrite	-	Report	5.4
Total Kjeldahl Nitrogen	-	Report	1.9
Organic Nitrogen	-	Report	1.82 c
Total Nitrogen	-	Report	7.3 c
General Physical and Chemical Parameters			
TSS (mg/L)	-	20.0 s	4 U
Dissolved Oxygen (mg/L)	≥ 5	-	6.8
pH (S.U.)	6.0-8.5	6.0-8.5	7.1
Conductivity (umhos/cm)	≤ 1275	-	1156
Temperature (C)	-	-	25.9
Flow (MGD)	-	2.25 a	-
Total Residual Chlorine (bioassay)(mg/L)	≤ 0.01	-	< 0.03
Hardness (mg/L)	-	-	413 c

a - Annual average
b - Value is calculated based on hardness
c - Value is calculated.
A - Value reported is the mean of two or more determinations
I - Value reported is < the minimum quantitation limit, and ≥ the minimum detection limit
U - Material analyzed for but not detected; value reported is the minimum detection limit
s - Single sample

FDEP Biology Section - Acute Screening Bioassay Bench Sheets

Facility: Royal Palm WWTF — Sample Collection: Date: 4-19-04 Time: 10:15

Address: 5509 Western Way

City: Jacksonville County: Duval

Contact/District: Patrick O'Connor / NE

NPDES Permit #: FL 0026751

LIMS Job #: TLH-2004-04-20-22 LIMS Sample #: 749760

Lims Data Entry: MF 4/23/04 Data Entry Verification: 4/23/04 CAP

Instructions (for below): Circle appropriate wording. If yes is circled complete blanks.

Comments:

Test Type: Screening

(Static) / Static Renewal / Flow-through

Test Duration: (48) 96 Hours.

Light Intensity : 50 - 100 ft. candles.

Photoperiod : 16 hours light 8 hours dark.

Test 1 validation:
Control survival ≥90%: (Yes) No
Temperature Range ≤3°C: (Yes) No

Test 2 validation:
Control survival ≥90%: (Yes) No
Temperature Range ≤3°C: (Yes) No

Initial sample handling:

PH adjustment : yes (no) Initial pH NaOH N HCl N Drops mL Final pH

Aeration : (yes) no Initial DO: 5.4 mg/L Final DO: 6.4 mg/L Duration: 5 minutes Rate: ~ 100 bubbles/min

Salinity adjusted (Test 1): yes (no) Initial Salinity: Final Salinity: Salts Hypersaline brine

Salinity adjusted (Test 2): yes (no) Initial Salinity: Final Salinity: Salts Hypersaline brine

Dechlorination: (yes) (no) mL of 0.025N Sodium Thiosulfate per liter of sample. Final TRC

Sample Validation: CAP

Temperature: Shipped ≤6°C (Yes) No Hand Delivered: Cooling (received °C < collected °C) Yes No

Holding Time: ≤36 Hours (Yes) No (Composite-end of collection; grab-when collected; 4 in 24 - time last sample collected)

Temperature Range °C

Incubator # 3 Range 23.5-25.0°C

Room B246: 25.0-26.0°C

Waterbath: N/A

Investigators' Signatures

Christa Devine

Jason Davis

Dianna Nicholson

Sarah Pritchard

Marshall Faircloth

Julie Espy

REVIEWER

Water Quality Parameters	20% DMW	Well Water	Salt Water ASW NSW Test 1	Salt Water ASW NSW Test 2	Moderately Hard Water	Original Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):	N/A	N/A	N/A	N/A	N/A	not measured	—	—	CAP
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03				0.03	HACH	DN	CAP
Alkalinity (mg/L as $CaCO_3$):	81	131				151	HACH	JD	CAP
Hardness (mg/L as $CaCO_3$):	94	127				397	HACH	JD	CAP
Total Ammonia (mg/L as N):	<0.017	<0.017				0.216	DENVER	MF / CAP	DN
Salinity (ppt):	<1	<1				<1	YSI	CAP	MF

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FDEP Biology Section - - Bioassay Bench Sheet
Survival

LIMS Sample #: 749760 Test #: 1 Test Started: Date 4/20/04 Time: 1240
Organism: C. dubia Test Ended: Date 4/22/04 Time: 1320
Organism Batch: #13 Diluent/ Batch: DMW, 12
Organism Age: <24 hrs Food: (YCT) (P. subcapitata) Artemia
Chamber Size 30 mL Batch: 2 24
Test Volume 20 mL Feeding: (Prior to test) - Prior to renewal - Daily

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
CTRL	A		5	5	5			
	B		5	5	5			
	C		5	5	5			
	D		5	5	5			
100%	A		5	5	5			
	B		5	5	5			
	C		5	5	5			
	D		5	5	5			
Organisms loaded by: JD		Checked by: (initials)	CTP	CTP	CTP			
Loading Verified by: CTP			Comments:					

m = missing d = dead BR = before renewal AR = after renewal

Test Results:
% mortality in 100% sample 0%
LC_{50}: >100 If Calculated: 95% CI ______ Method: ______

Screening Tests: Report LC50 as >100%, =100%, or <100%.
Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

FDEP Biology Section - - Bioassay Bench Sheet
Survival

LIMS Sample #: 749760 **Test #:** 2 **Test Started: Date** 4/20/04 **Time:** 1250
Organism: C. leedsi **Test Ended: Date** 4/22/04 **Time:** 1315
Organism Batch: #8 **Diluent/ Batch:** Well , N/A
Organism Age: 11 days **Food:** YCT *P. subcapitata* *Artemia*
Chamber Size 30 **mL** **Batch:** ___ ___ 0194025G
Test Volume 20 **mL** **Feeding:** Prior to test - Prior to renewal - Daily

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
CTRL	A	E13	5	5	5			
	B	E14	5	5	5			
	C	E15	5	5	5			
	D	E16	5	5	5			
100%	A	E17	5	5	5			
	B	E18	5	5	5			
	C	E19	5	5	5			
	D	E20	5	5	5			

Organisms loaded by: DD
Loading Verified by: CAP
Checked by: (initials) CAP CAP CAP
Comments:

m = missing d = dead BR = before renewal AR = after renewal

Test Results:

% mortality in 100% sample 0%

LC_{50}: >100 If Calculated: 95% CI ________ Method: ________

Screening Tests: Report LC50 as >100%, =100%, or <100%.
Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

Bioassay Parameters

LIMS Sample # : 749760 Test # : 1 of 2

TEST SOP: TA07_ ~~02~~ 01 Test Species: (Ceriodaphnia dubia) Cyprinella leedsi Pimephales promelas Americamysis bahia Menidia beryllina Other:

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Concentration CTRL	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A		C			
pH (S.U.)	7.5		7.7			
Temperature °C	25.3		24.9			
Dissolved Oxygen mg/L	7.6		7.3			
Conductivity (µmhos) mmhos	180		205			
(initials) Measured by:	CR		CR			
(initials) Recorded by:	CR		CR			

Comments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A		C			
pH (S.U.)	7.5		7.9			
Temperature °C	25.3		24.7			
Dissolved Oxygen mg/L	7.0		7.4			
Conductivity (µmhos) mmhos	1040		1195			
(initials) Measured by:	CR		CR			
(initials) Recorded by:	CR		CR			

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

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Bioassay Parameters

LIMS Sample # : 749760 **Test # :** 2 **of** 2

TEST SOP: TA-07- 02 **Test Species:** *Ceriodaphnia dubia* (*Cyprinella leedsi*) *Pimephales promelas* *Americamysis bahia* *Menidia beryllina* Other:_____

V.1 2/24/04

Concentration CTRL	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C			
pH (S.U.)	7.5	8.0	8.0			
Temperature °C	25.2	24.6	24.7			
Dissolved Oxygen mg/L	7.4	7.8	7.3			
Conductivity (µmhos) mmhos	250	290	270			
(initials) Measured by:	MP	DN	CR			
(initials) Recorded by:	CP	CAP	CR			

Comments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C			
pH (S.U.)	7.4	8.1	8.1			
Temperature °C	25.3	24.2	25.2			
Dissolved Oxygen mg/L	7.0	7.6	7.4			
Conductivity (µmhos) mmhos	1070	1110	1235			
(initials) Measured by:	CP	DN	CR			
(initials) Recorded by:	CP	CAP	CR			

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

Appendix 2. Chemical analyte list for JEA Royal Lakes WWTF effluent sampled on April 19, 2004

Date Sampled	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	1,2,4-Trichlorobenzene	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	1,2-Dichlorobenzene	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	1,3-Dichlorobenzene	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	1,4-Dichlorobenzene	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	2,4,6-Trichlorophenol	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	2,4-Dichlorophenol	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	2,4-Dimethylphenol	48	ug/L	U	48	190
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	2,4-Dinitrophenol	14	ug/L	UJ	14	57
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	2,4-Dinitrotoluene	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	2,6-Dinitrotoluene	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	2-Chloronaphthalene	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	2-Chlorophenol	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	2-Methyl-4,6-dinitrophenol	2.9	ug/L	U	2.9	11
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	2-Nitrophenol	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	3,3'-Dichlorobenzidine	38	ug/L	U	38	150
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	4,4'-DDD	1.4	ug/L	U	1.4	5.7
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	4,4'-DDE	1.4	ug/L	U	1.4	5.7
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	4,4'-DDT	1.4	ug/L	U	1.4	5.7
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	4-Bromophenyl phenyl ether	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	4-Chloro-3-methylphenol	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	4-Chlorophenyl phenyl ether	1.9	ug/L	U	1.9	7.6
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	4-Nitrophenol	14	ug/L	U	14	57
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Acenaphthene	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Acenaphthylene	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Aldrin	1.4	ug/L	U	1.4	5.7
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Anthracene	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Benzidine	95	ug/L	U	95	380
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Benzo(a)anthracene	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Benzo(a)pyrene	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Benzo(b)fluoranthene	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Benzo(g,h,i)perylene	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Benzo(k)fluoranthene	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Bis(2-chloroethoxy)methane	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Bis(2-chloroethyl)ether	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Bis(2-chloroisopropyl)ether	2.9	ug/L	U	2.9	11
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Bis(2-ethylhexyl)phthalate	14	ug/L	U	14	57
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Butyl benzyl phthalate	4.8	ug/L	U	4.8	19
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Chrysene	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Di-n-butyl phthalate	4.8	ug/L	U	4.8	19
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Di-n-octyl phthalate	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Dibenzo(a,h)anthracene	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Dieldrin	1.4	ug/L	U	1.4	5.7
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Diethyl phthalate	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Dimethyl phthalate	48	ug/L	U	48	190
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Endosulfan I	3.8	ug/L	U	3.8	15
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Endosulfan II	3.8	ug/L	U	3.8	15
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Endosulfan sulfate	1.4	ug/L	U	1.4	5.7
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Endrin	1.4	ug/L	U	1.4	5.7
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Endrin aldehyde	3.8	ug/L	UJ	3.8	15
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Fluoranthene	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Fluorene	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Heptachlor	1.4	ug/L	U	1.4	5.7
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Heptachlor epoxide	1.4	ug/L	U	1.4	5.7
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Hexachlorobenzene	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Hexachlorobutadiene	2.9	ug/L	U	2.9	11
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Hexachlorocyclopentadiene	2.9	ug/L	UJ	2.9	11
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Hexachloroethane	2.9	ug/L	U	2.9	11

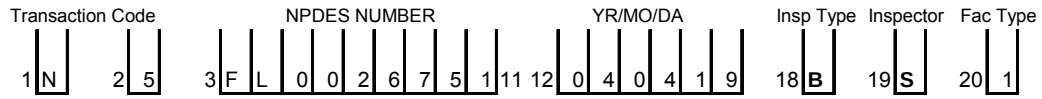
Date Sampled	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Indeno(1,2,3-cd)pyrene	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Isophorone	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	N-Nitrosodi-n-propylamine	1.9	ug/L	U	1.9	7.6
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	N-Nitrosodimethylamine	1.9	ug/L	U	1.9	7.6
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	N-Nitrosodiphenylamine	2.9	ug/L	UJ	2.9	11
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Naphthalene	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Nitrobenzene	1.9	ug/L	U	1.9	7.6
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Pentachlorophenol	2.9	ug/L	U	2.9	11
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Phenanthrene	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Phenol	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	Pyrene	0.95	ug/L	U	0.95	3.8
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	alpha-BHC	1.4	ug/L	U	1.4	5.7
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	beta-BHC	1.4	ug/L	U	1.4	5.7
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	delta-BHC	1.4	ug/L	U	1.4	5.7
4/19/2004 14:00	EQUIPMENT BLK	BNA-Water	gamma-BHC	1.4	ug/L	U	1.4	5.7
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Alachlor	0.57	ug/L	U	0.57	2.28
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Ametryn	0.048	ug/L	U	0.048	0.192
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Atrazine	0.048	ug/L	U	0.048	0.192
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Azinphos Methyl	0.048	ug/L	U	0.048	0.192
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Bromacil	0.19	ug/L	U	0.19	0.76
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Butylate	0.19	ug/L	U	0.19	0.76
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Chlorpyrifos Ethyl	0.048	ug/L	U	0.048	0.192
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Chlorpyrifos Methyl	0.095	ug/L	U	0.095	0.38
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Diazinon	0.048	ug/L	U	0.048	0.192
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Ethion	0.048	ug/L	U	0.048	0.192
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Ethoprop	0.095	ug/L	U	0.095	0.38
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Fenamiphos	0.19	ug/L	U	0.19	0.76
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Fonofos	0.095	ug/L	U	0.095	0.38
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Hexazinone	0.095	ug/L	U	0.095	0.38
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Malathion	0.14	ug/L	U	0.14	0.56
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Metalaxyl	0.24	ug/L	U	0.24	0.96
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Metolachlor	0.48	ug/L	U	0.48	1.92
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Metribuzin	0.095	ug/L	U	0.095	0.38
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Mevinphos	0.19	ug/L	U	0.19	0.76
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Naled	0.76	ug/L	U	0.76	3.04
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Norflurazon	0.095	ug/L	U	0.095	0.38
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Parathion Ethyl	0.14	ug/L	UJ	0.14	0.56
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Parathion Methyl	0.095	ug/L	U	0.095	0.38
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Phorate	0.048	ug/L	U	0.048	0.192
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Prometryn	0.14	ug/L	U	0.14	0.56
4/19/2004 14:00	EQUIPMENT BLK	GC-Water	Simazine	0.048	ug/L	U	0.048	0.192
4/19/2004 14:00	EQUIPMENT BLK	Nutrients-Liquid	Ammonia-N	0.01	mg N/L	U	0.01	0.02
4/19/2004 14:00	EQUIPMENT BLK	Nutrients-Liquid	NO2NO3-N	0.004	mg N/L	U	0.004	0.01
4/19/2004 14:00	EQUIPMENT BLK	Nutrients-Liquid	N_KJEL_TOT	0.06	mg N/L	U	0.06	0.2
4/19/2004 14:00	EQUIPMENT BLK	Nutrients-Liquid	O-Phosphate-P	0.004	mg P/L	U	0.004	0.01
4/19/2004 14:00	EQUIPMENT BLK	Nutrients-Liquid	TSS		mg/L			
4/19/2004 14:00	EQUIPMENT BLK	Nutrients-Liquid	Total-P	0.024	mg P/L	I	0.02	0.06
4/19/2004 10:15	FINAL EFFLUENT	Bio-Chl-a	Chlorophyll-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
4/19/2004 10:15	FINAL EFFLUENT	Bio-Chl-a	Phaeophytin-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
4/19/2004 10:15	FINAL EFFLUENT	Bio-Toxicology	Bioassay-Acute-Screen-FW-C.dubia, LC50	100	LC50	L		
4/19/2004 10:15	FINAL EFFLUENT	Bio-Toxicology	Bioassay-Acute-Screen-FW-Fish, LC50	100	LC50	L		
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	1,2,4-Trichlorobenzene	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	1,2-Dichlorobenzene	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	1,3-Dichlorobenzene	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	1,4-Dichlorobenzene	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	2,4,6-Trichlorophenol	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	2,4-Dichlorophenol	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	2,4-Dimethylphenol	48	ug/L	U	48	190
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	2,4-Dinitrophenol	14	ug/L	UJ	14	57
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	2,4-Dinitrotoluene	0.95	ug/L	U	0.95	3.8

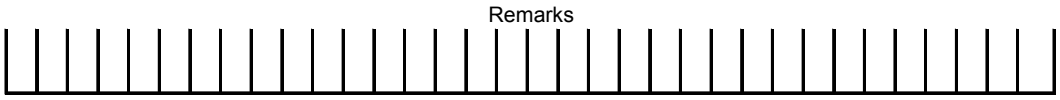
Date Sampled	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	2,6-Dinitrotoluene	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	2-Chloronaphthalene	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	2-Chlorophenol	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	2-Methyl-4,6-dinitrophenol	2.9	ug/L	U	2.9	11
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	2-Nitrophenol	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	3,3'-Dichlorobenzidine	38	ug/L	U	38	150
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	4,4'-DDD	1.4	ug/L	U	1.4	5.7
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	4,4'-DDE	1.4	ug/L	U	1.4	5.7
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	4,4'-DDT	1.4	ug/L	U	1.4	5.7
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	4-Bromophenyl phenyl ether	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	4-Chloro-3-methylphenol	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	4-Chlorophenyl phenyl ether	1.9	ug/L	U	1.9	7.6
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	4-Nitrophenol	14	ug/L	U	14	57
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Acenaphthene	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Acenaphthylene	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Aldrin	1.4	ug/L	U	1.4	5.7
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Anthracene	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Benzidine	95	ug/L	U	95	380
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Benzo(a)anthracene	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Benzo(a)pyrene	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Benzo(b)fluoranthene	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Benzo(g,h,i)perylene	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Benzo(k)fluoranthene	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Bis(2-chloroethoxy)methane	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Bis(2-chloroethyl)ether	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Bis(2-chloroisopropyl)ether	2.9	ug/L	U	2.9	11
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Bis(2-ethylhexyl)phthalate	14	ug/L	U	14	57
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Butyl benzyl phthalate	4.8	ug/L	U	4.8	19
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Chrysene	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Di-n-butyl phthalate	4.8	ug/L	U	4.8	19
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Di-n-octyl phthalate	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Dibenzo(a,h)anthracene	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Dieldrin	1.4	ug/L	U	1.4	5.7
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Diethyl phthalate	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Dimethyl phthalate	48	ug/L	U	48	190
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Endosulfan I	3.8	ug/L	U	3.8	15
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Endosulfan II	3.8	ug/L	U	3.8	15
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Endosulfan sulfate	1.4	ug/L	U	1.4	5.7
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Endrin	1.4	ug/L	U	1.4	5.7
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Endrin aldehyde	3.8	ug/L	UJ	3.8	15
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Fluoranthene	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Fluorene	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Heptachlor	1.4	ug/L	U	1.4	5.7
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Heptachlor epoxide	1.4	ug/L	U	1.4	5.7
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Hexachlorobenzene	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Hexachlorobutadiene	2.9	ug/L	U	2.9	11
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Hexachlorocyclopentadiene	2.9	ug/L	UJ	2.9	11
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Hexachloroethane	2.9	ug/L	U	2.9	11
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Indeno(1,2,3-cd)pyrene	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Isophorone	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	N-Nitrosodi-n-propylamine	1.9	ug/L	U	1.9	7.6
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	N-Nitrosodimethylamine	1.9	ug/L	U	1.9	7.6
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	N-Nitrosodiphenylamine	2.9	ug/L	UJ	2.9	11
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Naphthalene	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Nitrobenzene	1.9	ug/L	U	1.9	7.6
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Pentachlorophenol	2.9	ug/L	U	2.9	11
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Phenanthrene	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Phenol	0.95	ug/L	U	0.95	3.8

Date Sampled	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	Pyrene	0.95	ug/L	U	0.95	3.8
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	alpha-BHC	1.4	ug/L	U	1.4	5.7
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	beta-BHC	1.4	ug/L	U	1.4	5.7
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	delta-BHC	1.4	ug/L	U	1.4	5.7
4/19/2004 10:15	FINAL EFFLUENT	BNA-Water	gamma-BHC	1.4	ug/L	U	1.4	5.7
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Alachlor	0.6	ug/L	U	0.6	2.4
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Ametryn	0.05	ug/L	U	0.05	0.2
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Atrazine	4.8	ug/L		0.05	0.2
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Azinphos Methyl	0.05	ug/L	U	0.05	0.2
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Bromacil	0.2	ug/L	U	0.2	0.8
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Butylate	0.2	ug/L	U	0.2	0.8
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Chlorpyrifos Ethyl	0.05	ug/L	U	0.05	0.2
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Chlorpyrifos Methyl	0.1	ug/L	U	0.1	0.4
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Diazinon	0.05	ug/L	U	0.05	0.2
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Ethion	0.05	ug/L	U	0.05	0.2
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Ethoprop	0.1	ug/L	U	0.1	0.4
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Fenamiphos	0.2	ug/L	U	0.2	0.8
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Fonofos	0.1	ug/L	U	0.1	0.4
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Hexazinone	0.1	ug/L	U	0.1	0.4
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Malathion	0.15	ug/L	U	0.15	0.6
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Metalaxyl	0.25	ug/L	U	0.25	1
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Metolachlor	0.5	ug/L	U	0.5	2
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Metribuzin	0.1	ug/L	U	0.1	0.4
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Mevinphos	0.2	ug/L	U	0.2	0.8
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Naled	0.8	ug/L	U	0.8	3.2
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Norflurazon	0.1	ug/L	U	0.1	0.4
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Parathion Ethyl	0.15	ug/L	UJ	0.15	0.6
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Parathion Methyl	0.1	ug/L	U	0.1	0.4
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Phorate	0.05	ug/L	U	0.05	0.2
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Prometryn	0.15	ug/L	U	0.15	0.6
4/19/2004 10:15	FINAL EFFLUENT	GC-Water	Simazine	0.05	ug/L	U	0.05	0.2
4/19/2004 10:15	FINAL EFFLUENT	Nutrients-Liquid	Ammonia-N	0.083	mg N/L	A	0.01	0.02
4/19/2004 10:15	FINAL EFFLUENT	Nutrients-Liquid	NO2NO3-N	5.4	mg N/L		0.04	0.1
4/19/2004 10:15	FINAL EFFLUENT	Nutrients-Liquid	N_KJEL_TOT	1.9	mg N/L		0.06	0.2
4/19/2004 10:15	FINAL EFFLUENT	Nutrients-Liquid	O-Phosphate-P	2.9	mg P/L		0.16	0.4
4/19/2004 10:15	FINAL EFFLUENT	Nutrients-Liquid	TSS	4	mg/L	U	4	16
4/19/2004 10:15	FINAL EFFLUENT	Nutrients-Liquid	Total-P	3.2	mg P/L		0.2	0.6

The Bioassay of the JEA Royal Lakes WWTF effluent sampled on 19 April 2004, NPDES #FL0026751.

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

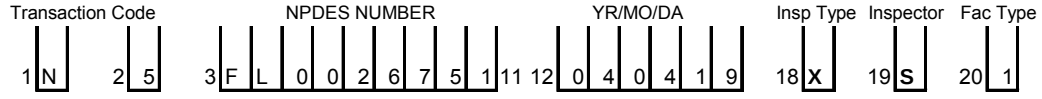


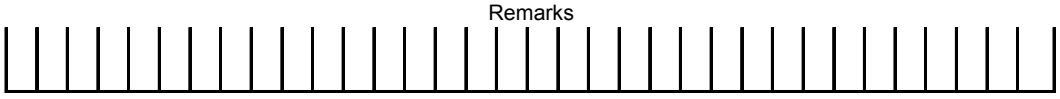


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The Priority Pollutants Analysis for Bioassay of the JEA Royal Lakes WWTF effluent sampled on 19 April 2004, NPDES #FL0026751.

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