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50-389 St. Lucie Plant, Unit 2, Florida Power & Light Co. 05000389
AUTH.NAME AUTHOR AFFILIATION
SAGER,D.A. Florida Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
Document Control Branch (Document Control Desk)

SUBJECT: Forwards MA Smith 900601 ltr to WR Cunningham of EPA requesting mod to plant NPDES permit.

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| | RGN2 DRSS/RPB | 1 | 1 | | | |
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R I D S / A D D S

R I D S / A D D S

FPL

P.O. Box 14000, Juno Beach, FL 33408-0420

JUN 18 1990
L-90-213
10 CFR 50.36b

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Gentlemen:

Re: St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389
NPDES Permit Modification

In accordance with Section 3.2.4 of the St. Lucie Units 1 and 2 Environmental Protection Plans, attached for your information is a copy of a letter to the U. S. Environmental Protection Agency requesting a modification to the St. Lucie Plant NPDES permit. The specific modification is discussed in the attached document.

Very truly yours,

D A Sager

D. A. Sager
Vice President
St. Lucie Plant

DAS/DMB/gp

Attachment

cc: Stewart D. Ebneter, Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, St. Lucie Plant





A001
1/1

FPL

P. O. Box 078768, West Palm Beach, FL 33407-0768
6001 Village Blvd.

CERTIFIED MAIL
RETURN-RECEIPT-REQUESTED

June 1, 1990

Mr. W. Ray Cunningham, Director
Water Management Division
Region IV
U.S. Environmental Protection Agency
345 Courtland Street, NE
Atlanta, GA 30365

RE: Request for Permit Modification
NPDES Permit No. FL0002208
St. Lucie Power Plant

Dear Mr. Cunningham:

Florida Power & Light Company (FPL) hereby requests a modification to the above referenced NPDES permit. FPL is requesting a modification to the NPDES permit to enable us to perform steam generator chemical cleaning at the St. Lucie Plant. Specifically, FPL is seeking the Agency's approval for the following:

- The establishment of discharge limits for the chemical cleaning wastes.
- The designation of a new (temporary) point of discharge for metal cleaning wastes.
- The designation of serial 005, steam generator blowdown, as a source of metal cleaning wastes during the chemical cleaning.

The number of St. Lucie Unit No. 1 steam generator tubes that have had to be plugged due to corrosion has increased significantly since 1984. The corrosion process is related to contaminants which have become entrapped within metallic oxide (iron and copper) deposits in isolated areas of the steam generators. FPL has determined that the best way to reduce the corrosion is to remove the contaminants along with the metallic oxides using a chemical cleaning process. This has prompted FPL to plan for a chemical cleaning of the St. Lucie Unit No. 1 steam generators at the next scheduled refueling outage in the fall of 1991.

The process FPL plans to apply is one that the Electric Power Research Institute-Steam Generator Owners Group (EPRI-SGOG) developed which will be adapted for application at the St. Lucie Plant. The EPRI-SGOG chemical cleaning process is shown in attachment 1. This process has been successfully used by other utilities to clean

their steam generators.

The chemical cleaning process involves separate cleaning steps to remove the copper and iron oxides. Rinses are also performed between the iron and copper steps. At St. Lucie Unit No. 1 two steam generators (approximate volume of 3340 cu-ft each) would be cleaned. It should be noted that FPL will be cleaning the secondary side of the steam generators not the primary (reactor water) side. However, there is a potential for a small amount of radioactive material to be present in the cleaning wastes. All treatment and or disposal of any radioactive material associated with the chemical cleaning will be performed in accordance with all applicable federal and state regulations and with the plant's technical specifications issued by the Nuclear Regulatory Commission (NRC).

Since this chemical cleaning was not anticipated during the renewal of the St. Lucie NPDES permit, appropriate limits for effluent waste streams associated with the chemical cleaning process have not yet been established. However, in order to perform the chemical cleaning, FPL is requesting that discharge limits be established. To assist the EPA establish effluent limits for the chemical cleaning process, FPL has undertaken toxicity studies for EDTA (the primary constituent of the chemical cleaning solvents) and for the spent iron and copper solutions. A report summarizing the EDTA study results, along with our interpretation of these results and suggested limits is included herein for the Agency's review.

The initial test results obtained with the spent iron and copper solutions were not definitive. Therefore, FPL is conducting further testing for use as a basis for establishing discharge limits for EDTA complexes including iron and copper. The EDTA complexes should not be biologically available to aquatic organisms. The FPL tests will verify that there will be no significant toxicity in the receiving waters. This information will be provided to the Agency upon completion of the tests. The discharge for uncomplexed iron and copper would remain the same (1 mg/L) as in the current NPDES permit. In addition, the discharge of hydrazine (a constituent in the iron solvent) would be limited to an average resulting concentration of 0.6 mg/L at the headwall consistent with our correspondence of December 2, 1988. This will be the first steam generator cleaning to be performed at the St. Lucie Power Plant. We anticipate that these cleanings would occur very infrequently, and would be performed only during scheduled outages.

FPL is seeking final agency action on this request by September 1990. The need for this information is to support the process application selection. FPL will need to have this approval in order to provide specifications for the chemical cleaning process and vendors bidding on the process will need to know this information in order to design and engineer their systems.

Please feel free to contact Winifred Perkins of my staff at (407) 640-2023 if you have any questions or comments concerning this request.

Sincerely,

Martin A. Smith, Ph.D.
Manager
Environmental Permitting & Programs
Florida Power & Light Company

MAS/WGP/jlf

Enclosure

cc: Charles Kaplan - EPA
William Peltier - EPA - Athens
Vik Kamath - DER - WPB

Attachment I

## EPRI SGOG CLEANING PROCESS

SGOG Iron Solvent -

| | |
|---|---|
| EDTA | = 10% by weight |
| Hydrazine | = 1% by volume |
| CCI-801 (base metal inhibitor) | = .75% by volume |
| pH | = 7.0 with ammonia |

SGOG Copper Solvent -

| | |
|---|---|
| EDTA | = 5% by weight |
| pH | = 7.0 with ammonia |
| pH | = 9.5 with EDA |
| Hydrogen Peroxide | = 3% by volume |

# PSL STEAM GENERATOR
# CHEMICAL CLEANING WASTES:
# RECOMMENDED DISCHARGE LIMITS

Environmental Affairs Department
May 1990

TABLE OF CONTENTS

I. Background

The Environmental Affairs Department was asked to evaluate wastes that would be generated from the proposed chemical cleaning protocol for the PSL Steam Generators from the standpoint of defining allowable discharge limits where NPDES steam electric guidelines have not been established. To this end, toxicity tests were conducted by Hunter/ESE of Gainesville, Florida on a 10% EDTA solution prepared by Combustion Engineering, Inc. of Windsor Connecticut. Summary data from the Hunter/ESE report are appended to this report.

This report develops recommendations to establish effluent limits at the point of discharge for concentrations of free EDTA from the steam generator chemical cleaning process, under different flow conditions of both the point discharge and the total throughput of the plant in the discharge canal.

The toxicity tests were conducted using two salt water species, the mysid shrimp (Mysidopsis bahia) and the sheepshead minnow (Cyprinodon variegatus). The tests followed standard EPA protocols (Peltier and Weber, 1985) for developing 96-hour $LC_{50}$s, or the percent effluent concentration that is lethal to 50% of the organisms within a 96-hour exposure period. Using this toxicological endpoint for the most sensitive of the two species, toxicity-based discharge limits were developed for EDTA from the procedure given in Section 12 of the EPA guidance document (Peltier and Weber, 1985).

Control survival and water quality parameters were all within acceptable limits for concentration ranges from which the $LC_{50}$s were calculated except for unexplained pH shifts in certain test concentrations. Although the lowered pH may have contributed to observed toxicity, the data are acceptable for development of allowable discharge limits since any effect the pH shifts may have had would only contribute to the conservatism of the recommended limits.

The recommended concentration limits for EDTA in the St. Lucie steam generator chemical cleaning discharge are developed below.

II. Ethylenediamine Tetraacetic Acid (EDTA)

The 96-hr. $LC_{50}$ for a 10% solution of EDTA (hypothetical effluent) for the most sensitive species (Mysidopsis bahia) of the two species tested is 0.2% effluent.

Converting to amount EDTA per liter of effluent:

0.2% of 10% EDTA solution

$= 0.002 \times 100$ g EDTA/l $= 0.2$ g/l.

To protect receiving waters where a mixing zone is specified, it is necessary to assure that there will be no acutely lethal condition within the boundary of the mixing zone. In the case of the PSL effluent, the discharge canal is analogous to a mixing zone prior to the final ocean discharge.

In accordance with EPA guidance (Peltier and Weber, 1985), a factor of three is applied to the acute $LC_{50}$ to define the instream waste concentration (IWC) protective against acutely toxic concentrations of an effluent constituent.

Thus:

$$IWC \leq \frac{LC_{50}}{3}$$

or, for EDTA,

$$IWC \leq \frac{0.2 \text{ g/l}}{3}$$

$$\leq 0.067 \text{ g/l.}$$

This calculated IWC agrees very well with the no-observed-adverse-effect-concentration (NOAEC) determined in the Mysidopsis toxicity test (0.056 g/l).

At the St. Lucie plant site, the point at which the IWC must not exceed 0.067 g EDTA/l is in the discharge canal after convergence at the NPDES compliance point east of A1A. It is also required that the waste should not exhibit acute or chronic toxicity outside of the discharge canal. It is clear that the recommended IWC will be adequate to protect against acute and chronic toxicity beyond the ocean discharge because of (1) the very high dilution factor, and (2), although relatively persistent in surface waters, EDTA is not expected to bioaccumulate in aquatic organisms (NLM, 1990).

The allowable concentration of EDTA in the discharge from the St. Lucie steam generator chemical cleaning process is calculated by:

$$C_d = \frac{R_c \times C_c}{R_d}$$

where,

$C_d$ = maximum allowable concentration of EDTA in the steam generator chemical cleaning discharge,

$R_d$ = discharge rate of release,

$C_c$ = maximum allowable concentration of EDTA in the canal (0.067 g/l),

$R_c$ = rate of flow in the canal.

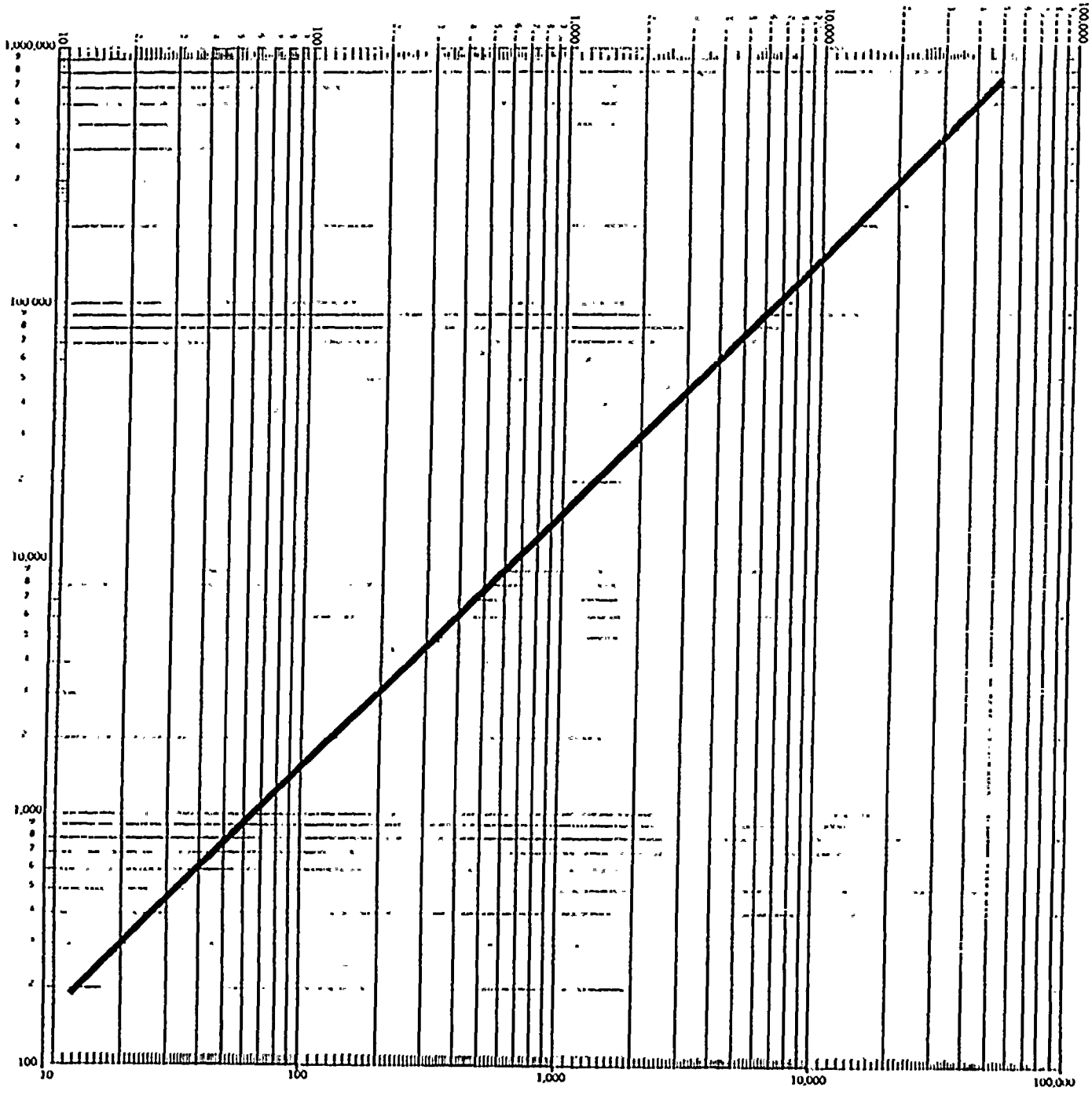
This equation has numerous solutions, however, since the discharge flow from the steam generator chemical cleaning process can vary from one to 100 gallons per minute (GPM), and the total system flow can vary from 29,000 GPM to 1,026,000 GPM (although actual flows rarely would exceed 50 GPM for the discharge and 500,000 GPM for the total system). For easy reference, a graph has been generated in Figure 1 that relates the ratio of the rate of flow in the canal, or total system flow, to the rate of discharge from the steam generator chemical cleaning process ($R_c/R_d$, presented on the ordinate) to the calculated allowable EDTA concentration in the steam generator chemical cleaning process discharge ($C_d$, presented on the abscissa).

Thus, one needs only to determine the ratio of current total system to discharge flows, locate this value on the ordinate, come horizontally to the point of intersection with the graph and then vertically to the abscissa to read the corresponding value for the allowable EDTA discharge concentration. Potential vendors should be apprised that the total unreacted EDTA in the treated discharge should not exceed the amount indicated for any given set of flow conditions.

It should be noted that complexing reduces the toxicity of EDTA. Because EDTA will complex with calcium and magnesium (relatively non-toxic metals that contribute to hardness and salinity of receiving waters), the concentration of EDTA tolerated by organisms increases directly with both water hardness and salinity (Mount and Anderson-Carnahan, 1988). The receiving water at the St. Lucie Plant has an average salinity of 35.4 ppt., with annual and monthly means varying less than 1 ppt.

FIGURE 1

EDTA DISCHARGE LIMITS DURING CHEMICAL
CLEANING OF THE ST. LUCIE STEAM GENERATORS



III. References

Mount, D. I. and L. Anderson-Carnahan. 1988. Methods for Aquatic Toxicity Identification Evaluations, Phase I Toxicity Characterization Procedures. EPA/600/3-88/034. Environmental Research Laboratory, USEPA, Duluth, Minnesota.

National Library of Medicine. 1990. MEDLARS on-line network, Hazardous Substances Data Bank (HSDB). NLM, U.S. Dept. Health and Human Services, Bethesda, Maryland.

Peltier, W. H. and C. I. Weber, eds. 1985. Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms, Third Edition. EPA/600/4-85/013. Environmental Monitoring and Support Laboratory, USEPA, Cincinnati, Ohio.

## IV. APPENDIX

Summary data from 96-hour acute toxicity tests of a hypothetical EDTA effluent on the mysid shrimp, Mysidopsis bahia, and the sheepshead minnow, Cyprinodon variegatus.

# 3.0 RESULTS AND DISCUSSION

## 3.1 EDTA SOLUTION

After 96 hours of exposure, mysid survivial ranged from 0 to 100 percent in all low concentration range treatments. Mysid survival in all high concentration range treatments was 0 percent in less than 24 hours. Control survival for exposed mysids was 95 percent for both concentration ranges (Table 3-1). The 96-hour LC50 for the EDTA Solution effluent sample to mysids was 0.20 percent effluent with 95 percent confidence limits of 0.18 and 0.32 percent effluent. With the exception of extremely high salinities in the high concentration range exposures, water quality parameters remained within acceptable limits throughout the tests. Mysid survival and water quality data are provided in Appendix C.

After 96 hours of exposure, sheepshead minnow survival ranged from 90 to 100 percent in all low concentration range treatments. Sheepshead minnow survival in all high concentration range treatments was 0 percent in less than 24 hours. Control survival for exposed sheepshead minnows was 100 percent for both concentration ranges (Table 3-1). The 96-hour LC50 for the EDTA Solution effluent sample to sheepshead minnows was 1.96 percent effluent with 95 percent confidence limits of 1.0 and 5.6 percent effluent.

With the exception of low pH in the 1.0 percent concentration of the low concentration range test, and the extremely high salinities in the high concentration range exposures, water quality parameters remained within

acceptable limits throughout the tests. Sheepshead minnow survival and water quality data are provided in Appendix D.

Table 3-1. Survival of Mysids (Mysidopsis bahia) and Sheepshead Minnows (Cyprenodon variegatus) During 96-Hour Exposures to Two Concentration Ranges of EDTA Solution Effluent

| | Percent Survival | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Low Concentration Range | | | | | | | | | | High Concentration Range |
| Percent Minnows | Mysids | | | | Sheepshead Minnows | | | | | Percent | Sheepshead Mysids |
| Mixture | 24 Hour | 48 Hours | 72 Hours | 96 Hours | 24 Hour | 48 Hours | 72 Hours | 96 Hours | Mixture | 24 Hours | 24 Hours |
| Control | 100 | 100 | 95 | 95 | 100 | 100 | 100 | 100 | Control | 95 | 100 |
| 0.056 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 5.6 | 0 | 0 |
| 0.1 | 100 | 100 | 95 | 90 | 100 | 100 | 100 | 100 | 10 | 0 | 0 |
| 0.18 | 100 | 95 | 60 | 55 | 100 | 100 | 100 | 100 | 18 | 0 | 0 |
| 0.32 | 90 | 70 | 60 | 25 | 100 | 100 | 100 | 100 | 32 | 0 | 0 |
| 0.56 | 10 | 10 | 0 | 0 | 100 | 100 | 100 | 100 | 56 | 0 | 0 |
| 1.0 | 0 | 0 | 0 | 0 | 95 | 90 | 90 | 90 | 100 | 0 | 0 |

# APPENDIX C

## EDTA/MYSID TEST DATA

ESE AQUATIC TOXICOLOGY DEPARTMENT
GAINESVILLE, FLORIDA

PAGE:
ESE QA FORM: 015
EFFECTIVE: March, 1986

SUBJECT: ACUTE TOXICITY DATA SHEET—BIOLOGICAL DATA

SPONSOR: FP&L PROJECT NUMBER: 393048-0100-3140

TEST SUBSTANCE: EDTA (12) TEST SPECIES: Mysidopsis

ANIMAL HISTORY

SAMPLE INFORMATION AND DESCRIPTION FOUND ON PAGE 658 OF THE TEST SUBSTANCE USAGE LOG. Effluents

DATE MAINTENANCE/ACCLIMATION BEGAN: 12-14-89

LOT NO./BATCH NO.: (CIRCLE ONE) 89-76

CONDITION OF ANIMALS: good

LIFE STAGE/AGE: DOH 12-16-89

SEE PAGE NO.: 36 OF ANIMAL COLLECTION/RECEIPT LOG FOR RAW DATA

MORTALITY (%) IN TANK 48 HOURS PRIOR TO TESTING: NOB %

SEE PAGE NO. 183 OF Invert Holding FOR RAW DATA ON ANIMAL HOLDING

TEST CONDITIONS

| ___ RANGE-FINDING<br>✓ DEFINITIVE | ✓ STATIC<br>___ FLOW-THROUGH | TIME ADDED SUBSTANCE/ANIMALS<br>1600 / | TEST LOCATION<br>Main Lab | TEST SYSTEM<br>✓ OPEN ___ CLOSED |
|---|---|---|---|---|

| TEST CONTAINER DIMENSIONS | TEST SOLUTION HEIGHT | TEST CHAMBER VOLUME (L)<br>0.2, ~~1~~, ~~3~~, 8, 38 - | TEST SOLUTION VOLUME (L)<br>0.1, (1.0), 3, 30 - | TEST CONTAINER COMPOSITION |
|---|---|---|---|---|
| Caroline | Water | (1.6) | | glass |

PROTOCOL: EPA/600/4-85/013

DILUTION WATER: ~~Reconstituted~~ Filtered SW TYPE LIGHTING: Fluorescent PHOTOPERIOD: 16L:8D

| CIRCLE ONE: TEST SUBSTANCE AS ACTIVE INGREDIENT/WHOLE MATERIAL | | | | | | | | | | | SOLVENT/CARRIER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TEST CONCENTRATION % mg/L µg/L µg/L | CONTROL | SOLV CONT | Salt Ctl | 1056 0.56 EE OC | 0.10 | 0.18 | 0.32 | 0.56 | 1.0 | | |
| AMOUNT OF SUBSTANCE/ STOCK ADDED ( ml ) | N.A. | N.A. | 0 | 0.56 | 1.0 | 1.8 | 3.2 | 5.6 | 10 | | SOLVENT/CARRIER CONCENTRATION |
| ~~STOCK SOLUTION~~ Dilution water USED (e.g., 1°,2°,3°) | N.A. | N.A. | 100 C | 1000 | 999 | 998 | 997 | 994 | 990 | | |
| AMOUNT OF SOLVENT ADDED ( ) | N.A. | | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | |

ADDITIONAL COMMENTS: (DOCUMENT ANY DEVIATIONS FROM PROTOCOL: e.g., AERATION)



ABOVE DATA RECORDED BY: ___ SF DATE: 12-21-89

| Mbahia | | 0-HOUR | | 24-HOUR | | 48-HOUR | | 72-HOUR | | 96-HOUR | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | | 12-21-89 | | 12/22/89 | | 12/23/89 | | 12/24/89 | | 12/25/89 | |
| ANIMALS FED | | BS | | BS | | BS | | BS | | No | |
| TIME | | 1600 | | 1400 | | 1420 | | 1405 | | 1420 | |
| DATA BY | | SH | | PAN | | ARB | | ARB | | ARB. | |
| NOMINAL CONCENTRATION mg/L µg/L (ppb) µg/L | REP | OBS | NO. ALIVE | OBS | NO. ALIVE | OBS | NO. ALIVE | OBS | NO. ALIVE | OBS | NO. ALIVE |
| CONTROL | A | How | 10 | Norm | 10 | Norm | 10 | Norm | 10 | Norm | 10 |
| | B | ↓ | 10 | ↓ | 10 | ↓ | 10 | 2 INF | 8 | 10 | 9 |
| ~~Salt Control~~ | A | | ~~10~~ | | ~~10~~ | | | | | | |
| | B | | ~~10~~ | | ~~10~~ | | | | | | |
| 0.056 | A | | 10 | Norm | 10 | Norm | 10 | Norm | 10 | Norm | 10 |
| | B | | 10 | ↓ | 10 | ↓ | 10 | ↓ | 10 | ↓ | 10 |
| 0.10 | A | | 10 | ↓ | 10 | ↓ | 10 | 10 | 9 | ↓ | 9 |
| | B | | 10 | ↓ | 10 | ↓ | 10 | Norm | 10 | 10 | 9 |
| 0.18 | A | | 10 | ↓ | 10 | ~~Norm~~ ↓ | 10 | 20 | 8 | 10 | 7 |
| | B | | 10 | ↓ | 10 | INF | 9 | 20 2 INF | 4 | Norm | 4 |
| 0.32 | A | | 10 | 10 | 9 | LETH | 9 | 20 LETH | 7 | 20 | 2 |
| | B | | 10 | 1 UC 1 LETH | 9 | 4 INF | 5 | 20 | 5 | 20 | 3 |
| 0.56 | A | | 10 | 80 | 2 | 2 PLE | 2 | 20 | 0 | — | — |
| | B | | 10 | 100 | 0 | — | — | — | — | — | — |
| 1.0 | A | | 10 | 100 | 0 | — | — | — | — | — | — |
| | B | ↓ | 10 | 100 | 0 | — | — | — | — | — | — |
| | A | | | | | | | | | | |
| | B | | | | | | | | | | |
| | A | | | | | | | | | | |
| | B | | | | | | | | | | |

OBSERVATION KEY

NONE - OBSERVATION WAS MADE AND NOTHING OUT OF THE ORDINARY WAS OBSERVED

| | | |
|---|---|---|
| AS - AT THE SURFACE | GY - GYRATING | PRE - PRECIPITATE |
| MSP - MUSCLE SPASM | DRK - DARK PIGMENTATION | FOS - FILM ON SURFACE |
| CLE - COMPLETE LOSS OF EQUILIBRIUM | HEM - HEMORRHAGIC | UC - UNDISSOLVED CHEMICAL |
| PLE - PARTIAL LOSS OF EQUILIBRIUM | RAR - RAPID RESPIRATION | NF - NOT FOUND |
| LETH - LETHARGIC | G - GULPING | LT - LIGHT PIGMENTATION |
| HYP - HYPERACTIVE | CLDY - CLOUDY SOLUTION | BS - BRINE SHRIMP |
| ERR - ERRATIC | OBS - OBSERVATION | |

ESE AQUATIC TOXICOLOGY DEPARTMENT
GAINESVILLE, FLORIDA

PAGE: ____
ESE DA FORM: 115
EFFECTIVE: MARCH 1988

SUBJECT: ACUTE TOXICITY DATA SHEET—CHEMICAL AND PHYSICAL DATA

SPONSOR: EPA/EAD PROJECT NO. ____ TEST SUBSTANCE: Diazinon
TEST SPECIES: Mysidopsis bahia

| NOMINAL CONCENTRATION ppt | REP | 12-21-89 Temp °C | SAL ppt | DO mg/L | pH | ALK | COND | 12/22/89 Temp °C | SAL ppt | DO mg/L | pH | 12/23/89 Temp °C | SAL ppt | DO mg/L | pH | 12/24/89 Temp °C | SAL ppt | DO mg/L | pH | 12/25/89 Temp °C | SAL ppt | DO mg/L | pH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1600 | | | | | | 1400 | | | | 1400 | | | | 1315 | | | | 1340 | | | |
| DATA BY | | SAE/PAE | | | | | | DE/AER | | | | AER | | | | AER | | | | AER | | | |
| CONTROL | A | 22 | 21 | 8.2 | 8.1 | | | 22 | 22/30 | 8.2 | 7.7 | 20 | 22 | 8.2 | 6.9 | 21 | 22 | 8.2 | 7.3 | 21 | 22 | 8.3 | 7.2 |
| | B | 22 | - | 8.0 | 8.0 | | | 22 | - | 8.2 | 6.4 | 20 | - | 8.1 | 6.6 | 21 | - | 8.2 | 7.4 | 21 | - | 8.3 | 7.2 |
| 0.056 | A | 22 | 22 | 8.0 | 8.1 | | | 22 | 22 | 8.1 | 7.0 | 20 | 22 | 8.2 | 6.9 | 21 | 24 | 8.2 | 7.4 | 21 | 24 | 8.2 | 7.2 |
| | B | 22 | - | 8.0 | 7.9 | | | 22 | - | 8.1 | 7.2 | 20 | - | 8.2 | 7.2 | 21 | - | 8.2 | 7.5 | 21 | - | 8.2 | 7.2 |
| 0.10 | A | 22 | 22 | 7.7 | 8.1 | | | 22 | 22 | 8.0 | 7.1 | 20 | 22 | 8.1 | 7.3 | 21 | 24 | 8.1 | 7.6 | 21 | 24 | 8.2 | 7.2 |
| | B | 22 | - | 7.3 | 7.9 | | | 22 | - | 8.0 | 7.1 | 20 | - | 8.0 | 7.4 | 21 | - | 8.2 | 7.7 | 21 | - | 8.2 | 7.2 |
| 0.18 | A | 22 | 22 | 6.9 | 7.9 | | | 22 | 23 | 7.9 | 7.1 | 20 | 22 | 8.1 | 7.4 | 21 | 24 | 8.0 | 6.9 | 21 | 24 | 8.2 | 7.2 |
| | B | 22 | - | 7.1 | 7.9 | | | 22 | - | 7.9 | 7.1 | 20 | - | 8.1 | 7.4 | 21 | - | 8.1 | 7.5 | 21 | - | 8.2 | 7.3 |
| 0.32 | A | 22 | 22 | 6.6 | 8.0 | | | 22 | 22 | 7.8 | 7.1 | 20 | 22 | 7.9 | 7.2 | 21 | 24 | 8.0 | 7.3 | 21 | 24 | 8.2 | 7.2 |
| | B | 22 | - | 5.8 | 8.0 | | | 22 | - | 7.8 | 7.2 | 20 | - | 7.9 | 7.2 | 21 | - | 8.0 | 7.4 | 21 | - | 8.2 | 7.1 |
| 0.56 | A | 22 | 22 | 6.1 | 7.7 | | | 22 | 23 | 7.5 | 7.2 | 20 | 22 | 7.7 | 7.4 | 21 | 25 | 7.7 | 7.6 | — | — | — | — |
| | B | 22 | - | 6.1 | 7.8 | | | 22 | - | 7.4 | 7.2 | 20 | b | | | | | | | | | | |
| 1.0 | A | 22 | 22 | 4.8 | 7.8 | | | 23 | 23 | 4.9 | 8.4 | 20 | 22 | | | | | | | | | | |
| | B | 22 | - | 4.6 | 7.9 | | | 22 | - | 4.8 | 7.6 | 20 | - | | | | | | | | | | |

| | | | | |
|---|---|---|---|---|
| TEMP. DEVICE | Room #3 | → | → | → |
| SAL/HARD MEASUREMENT | Cond #3 | → | → | → |
| DO METER | YSI 57 #2 | → | → | → |
| pH METER | Fisher #1 | → | → | → |
| ALKALINITY METHOD | — | — | — | — |
| CHLORINITY METHOD | — | — | — | — |

TEMPERATURE WAS CONTINUOUSLY RECORDED ON CHANNEL ___ OF THE ESE TEMPERATURE MONITOR.

SAL/HARD = ppt/ppm
DO = ppm
ALK = ppm
COND = umhos/cm

* 22 AER 12/23/89
b exhausted AER 12/23/89

ESE AQUATIC TOXICOLOGY DEPARTMENT
GAINESVILLE, FLORIDA

PAGE:
ESE QA FORM: 015
EFFECTIVE: March, 1986

SUBJECT: ACUTE TOXICITY DATA SHEET—BIOLOGICAL DATA

SPONSOR: FP&L PROJECT NUMBER: 390304S-0100-314C

TEST SUBSTANCE: EDTA Solution TEST SPECIES: Mysidopsis bahia

ANIMAL HISTORY

SAMPLE INFORMATION AND DESCRIPTION FOUND ON PAGE 658 OF THE ~~TEST SUBSTANCE USAGE~~ Effluent LOG.

DATE MAINTENANCE/ACCLIMATION BEGAN: 12-19-89

LOT NO./BATCH NO.: (CIRCLE ONE) 89-76

CONDITION OF ANIMALS: good

LIFE STAGE/AGE: VOM 12-16-89

SEE PAGE NO.: 36 OF ANIMAL COLLECTION/RECEIPT LOG FOR RAW DATA

MORTALITY (%) IN TANK 48 HOURS PRIOR TO TESTING: NOB %

SEE PAGE NO. 183 OF Invert Holding FOR RAW DATA ON ANIMAL HOLDING

TEST CONDITIONS

| | | | | |
|---|---|---|---|---|
| ___ RANGE-FINDING<br>✓ DEFINITIVE | ✓ STATIC<br>___ FLOW-THROUGH | TIME ADDED SUBSTANCE/ANIMALS<br>1600 / 1615 | TEST LOCATION<br>water bath main lab | TEST SYSTEM<br>✓ OPEN ___ CLOSED |

| TEST CONTAINER DIMENSIONS | TEST SOLUTION HEIGHT | TEST CHAMBER VOLUME (L) 0.2, 1, 3.8, 38 - | TEST SOLUTION VOLUME (L) 0.1, (1.0), 3, 30 - | TEST CONTAINER COMPOSITION |
|---|---|---|---|---|
| carolina dish | ~4 cm | (1.6) | | glass |

PROTOCOL: EPA/600/4-85/013

DILUTION WATER: ~~Reconstituted~~ Seawater Filtered SW TYPE LIGHTING: Fluorescent PHOTOPERIOD: 16L:8D

| CIRCLE ONE: TEST SUBSTANCE AS ACTIVE INGREDIENT/WHOLE MATERIAL | | | | | | | | | | | SOLVENT/CARRIER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TEST CONCENTRATION % mg/L µg/L µg/L | CONTROL | SOLV CONT | Salt control | 5.6 | 10 | 18 | 32 | 56 | 100 | | |
| AMOUNT OF ~~SUBSTANCE~~ Effluent STOCK ADDED ( ) | N.A. | N.A. | 0 | 56 | 100 | 180 | 320 | 560 | 1000 | | SOLVENT/CARRIER CONCENTRATION |
| ~~STOCK SOLUTION~~ Dilution water USED (e.g., 1°,2°,3°) | N.A. | N.A. | 1000 | 944 | 900 | 820 | 680 | 440 | 0 | | |
| AMOUNT OF SOLVENT ADDED ( NA ) | N.A. | | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | |

ADDITIONAL COMMENTS: (DOCUMENT ANY DEVIATIONS FROM PROTOCOL: e.g., AERATION)

ABOVE DATA RECORDED BY: SF DATE: 12-21-89

| Mbahia. | | 0-HOUR | | 24-HOUR | | 48-HOUR | | 72-HOUR | | 96-HOUR | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | | 12-21-89 | | 12/22/89 | | | | | | | |
| ANIMALS FED | | BS | | AS | | | | | | | |
| TIME | | 1600 | | 1350 | | | | | | | |
| DATA BY | | STF | | PAR | | | | | | | |
| NOMINAL CONCENTRATION mg/L µg/L µg/L (?) | REP | OBS | NO. ALIVE | OBS | NO. ALIVE | OBS | NO. ALIVE | OBS | NO. ALIVE | OBS | NO. ALIVE |
| CONTROL | A | None | 10 | NVF | 9 | | | | | | |
| | B | | 10 | None | 10 | | | | | | |
| ~~Salt~~ PAR | A | | 10 PAR | | | | | | | | |
| Control PAR | B | | 10 PAR | | | | | | | | |
| 5.6 | A | | 10 | 100 dpt | 0 | | | | | | |
| | B | | 10 | 100 dpt | 0 | | | | | | |
| 10 | A | | 10 | 100 dpt | 0 | | | | | | |
| | B | | 10 | | 0 | | | | | | |
| 18 | A | | 10 | | 0 | | | | | | |
| | B | | 10 | | 0 | | | | | | |
| 32 | A | | 10 | | 0 | | | | | | |
| | B | | 10 | | 0 | | | | | | |
| 56 | A | | 10 | | 0 | | | | | | |
| | B | | 10 | | 0 | | | | | | |
| 100 | A | | 10 | | 0 | | | | | | |
| | B | | 10 | | 0 | | | | | | |
| | A | | | | | | | | | | |
| | B | | | | | | | | | | |
| | A | | | | | | | | | | |
| | B | | | | | | | | | | |

OBSERVATION KEY

NONE - OBSERVATION WAS MADE AND NOTHING OUT OF THE ORDINARY WAS OBSERVED

| | | |
|---|---|---|
| AS - AT THE SURFACE | GY - GYRATING | PRE - PRECIPITATE |
| MSP - MUSCLE SPASM | DRK - DARK PIGMENTATION | FOS - FILM ON SURFACE |
| CLE - COMPLETE LOSS OF EQUILIBRIUM | HEM - HEMORRHAGIC | UC - UNDISSOLVED CHEMICAL |
| PLE - PARTIAL LOSS OF EQUILIBRIUM | RAR - RAPID RESPIRATION | NF - NOT FOUND |
| LETH - LETHARGIC | G - GULPING | LT - LIGHT PIGMENTATION |
| HYP - HYPERACTIVE | CLDY - CLOUDY SOLUTION | BS - BRINE SHRIMP |
| ERR - ERRATIC | OBS - OBSERVATION | |

PAGE: ____
ESE QA FORM: 016
EFFECTIVE: MARCH 1988

ESE AQUATIC TOXICOLOGY DEPARTMENT
GAINESVILLE, FLORIDA

SUBJECT: ACUTE TOXICITY DATA SHEET—CHEMICAL AND PHYSICAL DATA

SPONSOR: EPEL PROJECT NO. ____ TEST SUBSTANCE: EDTA
TEST SPECIES: Mysidopsis

| NOMINAL CONCENTRATION ppt (mg/L) | REP | Day 0 Time | Day 0 Temp °C | Day 0 SAL/HARD | Day 0 pH | Day 0 DO | Day 0 ALK | Day 0 COND | Day 1 Time | Day 1 Temp °C | Day 1 SAL/HARD | Day 1 pH | Day 1 DO | Day 2 Time | Day 2 Temp °C | Day 2 SAL/HARD | Day 2 pH | Day 2 DO | Day 3 Time | Day 3 Temp °C | Day 3 SAL/HARD | Day 3 pH | Day 3 DO | Day 4 Time | Day 4 Temp °C | Day 4 SAL/HARD | Day 4 pH | Day 4 DO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CONTROL | A | 1136 | 21 | 22 | 8.3 | 8.0 | | | 1600 | 22 | 21 | 8.2 | 6.9 | | | | | | | | | | | | | | | |
| | B | | 21 | - | 8.3 | 8.1 | | | | 22 | - | 8.2 | 7.0 | | | | | | | | | | | | | | | |
| Salt | A | | 21 | | | | | | | 22 | | | | | | | | | | | | | | | | | | |
| | B | | 21 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.6 | A | | 21 | 26 | 8.3 | 8.2 | | | | 22 | 27 | 8.2 | 6.7 | | | | | | | | | | | | | | | |
| | B | | 21 | - | 8.3 | 8.4 | | | | 22 | - | 8.2 | 6.8 | | | | | | | | | | | | | | | |
| 10 | A | | 21 | 28 | 8.3 | 7.5 | | | | 22 | 31 | 8.2 | 6.9 | | | | | | | | | | | | | | | |
| | B | | 21 | - | 8.3 | 7.5 | | | | 22 | - | 8.2 | 7.3 | | | | | | | | | | | | | | | |
| 18 | A | | 21 | 36 | 8.3 | 7.1 | | | | 22 | 37 | 8.3 | 6.9 | | ** | | | 7.0 | | | | | | | | | | |
| | B | | 21 | - | 8.3 | 7.1 | | | | 22 | - | 8.3 | 7.2 | | ** | | | 6.8 | | | | | | | | | | |
| 32 | A | | 21 | 54 | 8.3 | 6.6 | | | | 22 | 51 | 8.2 | 7.3 | | ** | | | 6.5 | | | | | | | | | | |
| | B | | 21 | - | 8.3 | 6.5 | | | | 22 | - | 8.3 | 7.1 | | ** | | | 6.6 | | | | | | | | | | |
| 56 | A | | 21 | 75 | 8.3 | 6.7 | | | | 22 | 78 | 8.2 | 7.1 | | ** | | | 6.5 | | | | | | | | | | |
| | B | | 21 | - | 8.3 | 6.6 | | | | 22 | - | 8.2 | 7.2 | | ** | | | 6.5 | | | | | | | | | | |
| 100 * | A | | 21 | 05 | 8.1 | 6.2 | | | | 22 | 100 | 8.1 | 7.2 | | ** | | | 6.6 | | | | | | | | | | |
| | B | | 21 | | 8.1 | 6.4 | | | | 22 | - | 8.1 | 8.4 | | ** | | | 6.4 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

TEMP. DEVICE: Thermo 3 ⇒
SAL/HARD MEASUREMENT: YSI 3 ⇒
pH METER: 3A250-1 ⇒
DO METER: DO-1 ⇒
ALKALINITY METHOD:
CONDUCTIVITY METER: YSI-2

TEMPERATURE WAS CONTINUOUSLY RECORDED ON CHANNEL __ OF THE SOX TEMPERATURE MONITOR.

SAL/HARD = ppt/ppm
DO = ppm
ALK = ppm
COND = umhos/cm

* STP - 05 = OFF SCALE

** ABB values redone because of Salinity correction

# APPENDIX D

# EDTA/SHEEPSHEAD TEST DATA

SUBJECT: ACUTE TOXICITY DATA SHEET—BIOLOGICAL DATA

SPONSOR: EPA PROJECT NUMBER:

TEST SUBSTANCE: EDTA Soln (13) TEST SPECIES: Cyprinodon variegatus

ANIMAL HISTORY

SAMPLE INFORMATION AND DESCRIPTION FOUND ON PAGE 65 OF THE ~~TEST SUBSTANCE USAGE LOG~~ Effluent

DATE MAINTENANCE/ACCLIMATION BEGAN: 12-19-89

LOT NO./BATCH NO.: (CIRCLE ONE) 89-75

CONDITION OF ANIMALS: good

LIFE STAGE/AGE: ~31 days

SEE PAGE NO.: 36 OF ANIMAL COLLECTION/RECEIPT LOG FOR RAW DATA

MORTALITY (%) IN TANK 48 HOURS PRIOR TO TESTING: 1 %

SEE PAGE NO. 574 OF final MDL.xls FOR RAW DATA ON ANIMAL HOLDING

TEST CONDITIONS

| | | | | |
|---|---|---|---|---|
| ___ RANGE-FINDING<br>✓ DEFINITIVE | ✓ STATIC<br>___ FLOW-THROUGH | TIME ADDED SUBSTANCE/ANIMALS<br>1000 / | TEST LOCATION<br>water bath<br>main lab | TEST SYSTEM<br>✓ OPEN ___ CLOSED |

| TEST CONTAINER DIMENSIONS | TEST SOLUTION HEIGHT | TEST CHAMBER VOLUME (L) 0.2, 1, 3.8, 38 - | TEST SOLUTION VOLUME (L) 0.1, 1.0, 3, 30 - | TEST CONTAINER COMPOSITION |
|---|---|---|---|---|
| | ~4cm | 1.0 | 1.0 | glass |

PROTOCOL: EPA/600/4-85/013

DILUTION WATER: Recon ~~HP~~ Filt SW TYPE LIGHTING: F.L. PHOTOPERIOD: 16L:8D

| CIRCLE ONE: % mg/L µg/L µg/L | TEST SUBSTANCE AS ACTIVE INGREDIENT/WHOLE MATERIAL | | | | | | | | | | SOLVENT/CARRIER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TEST CONCENTRATION | CONTROL | SOLV CONT | Salt Ctl | 50% | 0.10 | 0.18 | 0.32 | 0.56 | 1.0 | | |
| AMOUNT OF SUBSTANCE/ STOCK ADDED ( ml ) | N.A. | N.A. | 0 | 0.50 | 1.0 | 1.8 | 3.2 | 5.6 | 10 | | SOLVENT/CARRIER CONCENTRATION |
| STOCK SOLUTION USED (e.g., 1°,2°,3°) dilution 4.0 | N.A. | N.A. | 1000 | 1000 | 999 | 998 | 997 | 994 | 990 | | |
| AMOUNT OF SOLVENT ADDED ( ) | N.A. | | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | |

ADDITIONAL COMMENTS: (DOCUMENT ANY DEVIATIONS FROM PROTOCOL: e.g., AERATION)



ABOVE DATA RECORDED BY: STF DATE: 12-21-89

| C.var. | | 0-HOUR | | 24-HOUR | | 48-HOUR | | 72-HOUR | | 96-HOUR | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | | 12/21/89 | | 12/22/89 | | 12/23/89 | | 12/24/89 | | 12/25/89 | |
| ANIMALS FED | | NO | | NO | | NO | | NO | | NO | |
| TIME | | 1640 | | 1430 | | 1430 | | 1425 | | 1410 | |
| DATA BY | | PAR | | PAR | | ARB | | HEB | | ARB | |
| NOMINAL CONCENTRATION µg/L µg/L (%) µg/L | REP | OBS | NO. ALIVE | OBS | NO. ALIVE | OBS | NO. ALIVE | OBS | NO. ALIVE | OBS | NO. ALIVE |
| CONTROL | A | | 10 | NONE | 10 | NONE | 10 | NONE | 10 | NONE | 10 |
| | B | | 10 | | 10 | | 10 | | 10 | | 10 |
| ~~Salt~~ | A | | | | | | | | | | |
| | B | | | | | | | | | | |
| 0.056 | A | | 10 | | 10 | | 10 | | 10 | | 10 |
| | B | | 10 | | 10 | | 10 | | 10 | | 10 |
| 0.10 | A | | 10 | | 10 | | 10 | | 10 | | 10 |
| | B | | 10 | | 10 | | 10 | | 10 | | 10 |
| 0.18 | A | | 10 | | 10 | | 10 | | 10 | | 10 |
| | B | | 10 | | 10 | | 10 | | 10 | | 10 |
| 0.32 | A | | 10 | | 10 | | 10 | | 10 | | 10 |
| | B | | 10 | | 10 | | 10 | | 10 | | 10 |
| 0.56 | A | | 10 | | 10 | | 10 | | 10 | | 10 |
| | B | | 10 | | 10 | | 10 | | 10 | | 10 |
| 1.0 | A | | 10 | | 10 | ↓ | 10 | | 10 | | 10 |
| | B | | 10 | 10 | 9 | 10 | 8 | ↓ | 8 | ↓ | 8 |
| | A | | | | | | | | | | |
| | B | | | | | | | | | | |
| | A | | | | | | | | | | |
| | B | | | | | | | | | | |

OBSERVATION KEY

NONE - OBSERVATION WAS MADE AND NOTHING OUT OF THE ORDINARY WAS OBSERVED
AS - AT THE SURFACE
MSP - MUSCLE SPASM
CLE - COMPLETE LOSS OF EQUILIBRIUM
PLE - PARTIAL LOSS OF EQUILIBRIUM
LETH - LETHARGIC
HYP - HYPERACTIVE
ERR - ERRATIC
GY - GYRATING
DRK - DARK PIGMENTATION
HEM - HEMORRHAGIC
RAR - RAPID RESPIRATION
G - GULPING
CLDY - CLOUDY SOLUTION
OBS - OBSERVATION
PRE - PRECIPITATE
FOS - FILM ON SURFACE
UC - UNDISSOLVED CHEMICAL
NF - NOT FOUND
LT - LIGHT PIGMENTATION
BS - BRINE SHRIMP

ESE AQUATIC TOXICOLOGY DEPARTMENT
GAINESVILLE, FLORIDA

PAGE: _____
ESE DA FORM: 115
EFFECTIVE: MARCH 1988

SUBJECT: ACUTE TOXICITY DATA SHEET—CHEMICAL AND PHYSICAL DATA

SPONSOR: FP&L PROJECT NO. _____ TEST SUBSTANCE: EDTA
TEST SPECIES: C. vir

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | | 12/21/89 | | | | | | 12/22/89 | | | | 12/23/89 | | | | 12/24/89 | | | | 12/25/89 | | | | | | | | | |
| TIME | | 1630 | | | | | | 1500 | | | | 1405 | | | | 1320 | | | | 1745 | | | | | | | | | |
| DATA BY | | DC | | | | | | DC | | | | AES | | | | AES | | | | AES | | | | | | | | | |
| NOMINAL CONCENTRATION mg/L ug/L ug/L | REP | Temp °C | SAL/HARD | pH | DO | ALK | COND | Temp °C | SAL/HARD | pH | DO | Temp °C | SAL/HARD | pH | DO | Temp °C | SAL/HARD | pH | DO | Temp °C | SAL/HARD | pH | DO | | | | | | |
| CONTROL | A | 22 | 20 | 8.2 | 7.1 | | | 22 | 20 | 8.1 | 7.3 | 20 | 20 | 8.1 | 6.8 | 21 | 20 | 8.1 | 7.2 | | 20 | 8.4 | 7.4 | | | | | | |
| | B | 22 | — | 8.4 | 6.9 | | | 22 | — | 8.1 | 7.3 | 20 | — | 8.1 | 6.8 | 21 | — | 8.1 | 7.2 | | — | 8.3 | 7.1 | | | | | | |
| Solv | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.88 | 7.1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.056 | | 22 | 21 | 5.9 | 7.9 | | | 22 | 21 | 8.0 | 7.0 | 20 | 21 | 8.1 | 6.9 | 21 | 23 | 8.0 | 6.9 | | 23 | 8.2 | 7.2 | | | | | | |
| | | 22 | | 8.0 | 7.9 | | | 22 | — | 8.0 | 7.1 | 20 | — | 8.1 | 6.9 | 21 | — | 8.1 | 7.0 | | — | 8.3 | 7.2 | | | | | | |
| 0.10 | | 22 | 21 | 6.5 | 7.9 | | | 22 | 21 | 8.0 | 7.1 | 20 | 21 | 8.1 | 7.0 | 21 | 23 | 8.1 | 7.3 | | 23 | 8.4 | 7.4 | | | | | | |
| | | 22 | RED | 6.9 | 7.9 | | | 22 | — | 8.0 | 7.1 | 20 | — | 8.1 | 7.1 | 21 | — | 8.1 | 7.3 | | — | 8.3 | 7.1 | | | | | | |
| 0.18 | | 22 | 21 | 6.5 | 7.9 | | | 22 | 21 | 7.9 | 7.1 | 20 | 21 | 8.0 | 7.2 | 21 | 23 | 8.0 | 7.4 | | 23 | 8.1 | 7.3 | | | | | | |
| | | 22 | | 6.5 | 7.9 | | | 22 | — | 7.9 | 7.1 | 20 | — | 8.0 | 7.2 | 21 | — | 8.0 | 7.4 | | — | 8.1 | 7.3 | | | | | | |
| 0.32 | | 22 | 21 | 6.7 | 8.0 | | | 22 | 21 | 7.8 | 7.1 | 20 | 21 | 7.9 | 7.3 | 21 | 23 | 7.9 | 7.6 | | 23 | 7.9 | 7.3 | | | | | | |
| | | 22 | | 5.9 | 8.1 | | | 22 | — | 7.7 | 7.0 | 20 | — | 7.9 | 7.1 | 21 | — | 7.9 | 7.6 | | — | 7.9 | 7.3 | | | | | | |
| 0.56 | | 22 | 21 | 5.9 | 8.1 | | | 22 | 22 | 7.6 | 7.3 | 20 | 22 | 7.7 | 7.4 | 21 | 24 | 7.6 | 7.6 | | 23 | 7.8 | 7.3 | | | | | | |
| | | 22 | | 5.4 | 8.1 | | | 22 | — | 7.6 | 7.0 | 20 | — | 7.6 | 7.5 | 21 | — | 7.6 | 7.6 | | — | 7.8 | 7.3 | | | | | | |
| 1.0 | | 22 | 21 | 5.6 | 8.1 | | | 22 | 24 | 7.8 | 7.2 | 20 | 24 | 7.9 | 7.4 | 21 | 25 | 7.9 | 7.6 | | 23 | 7.8 | 7.3 | | | | | | |
| | | 22 | | 5.6 | 7.9 | | | 22 | — | 7.8 | 7.4 | 20 | — | 7.9 | 7.4 | 21 | — | 7.9 | 7.6 | | — | 7.8 | 7.3 | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TEMP. DEVICE | | Thrm 3 | | | | | | Thrm 3 → | | | | → | | | | → | | | | → | | | | | | | | | |
| SAL/HARD MEASUREMENT | | Ref 3 | | | | | | Ref 3 → | | | | → | | | | → | | | | → | | | | | | | | | |
| pH METER | | 9250-1 | | | | | | 5250-1 → | | | | → | | | | → | | | | → | | | | | | | | | |
| DO METER | | 50-1 | | | | | | 50-1 → | | | | → | | | | → | | | | → | | | | | | | | | |
| ALKALINITY METHOD | | titr | | | | | | titr → | | | | → | | | | → | | | | → | | | | | | | | | |
| CONDUCTIVITY METER | | SCT-2 | | | | | | — → | | | | → | | | | → | | | | → | | | | | | | | | |

TEMPERATURE WAS CONTINUOUSLY RECORDED ON CHANNEL ___ OF THE ESE TEMPERATURE MONITOR.

SAL/HARD = ppt/ppm
DO = ppm
ALK = ppm
COND = umhos/cm

ESE AQUATIC TOXICOLOGY DEPARTMENT
GAINESVILLE, FLORIDA

PAGE:
ESE QA FORM: 015
EFFECTIVE: March, 1986

SUBJECT: ACUTE TOXICITY DATA SHEET—BIOLOGICAL DATA

SPONSOR: FPL PROJECT NUMBER:

TEST SUBSTANCE: EDTA Solution TEST SPECIES: C. dubia

ANIMAL HISTORY

SAMPLE INFORMATION AND DESCRIPTION FOUND ON PAGE 458 OF THE TEST SUBSTANCE USAGE LOG. Effluent

DATE MAINTENANCE/ACCLIMATION BEGAN: 12-19-89

(LOT NO.)/BATCH NO.: (CIRCLE ONE) 89-75

CONDITION OF ANIMALS: good

LIFE STAGE/AGE: ~31 days

SEE PAGE NO.: 36 OF ANIMAL COLLECTION/RECEIPT LOG FOR RAW DATA

MORTALITY (%) IN TANK 48 HOURS PRIOR TO TESTING: <1 %

SEE PAGE NO. 574 OF fish holding FOR RAW DATA ON ANIMAL HOLDING

TEST CONDITIONS

| ___ RANGE-FINDING | ✓ STATIC | TIME ADDED SUBSTANCE/ANIMALS | TEST LOCATION | TEST SYSTEM |
|---|---|---|---|---|
| ✓ DEFINITIVE | ___ FLOW-THROUGH | 1000 / | Water bath Main Lab | ✓ OPEN ___ CLOSED |

| TEST CONTAINER DIMENSIONS | TEST SOLUTION HEIGHT | TEST CHAMBER VOLUME (L) 0.2, 1, 3.8, 38 - | TEST SOLUTION VOLUME (L) 0.1, (1.0), 3, 30 - | TEST CONTAINER COMPOSITION |
|---|---|---|---|---|
| Carolina | ~4cm | (1.6) | | glass |

PROTOCOL: EPA 600/4-85/013

DILUTION WATER: Filt. SW TYPE LIGHTING: Fluor PHOTOPERIOD: 16L 8D

| CIRCLE ONE: % mg/L µg/L µg/L TEST CONCENTRATION | CONTROL | SOLV CONT | Salt CH | 56 | 10 | 18 | 32 | 56 | 100 | | SOLVENT/CARRIER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| AMOUNT OF SUBSTANCE/ STOCK ADDED ( mL ) | N.A. | N.A. | 0 | 56 | 100 | 180 | 320 | 560 | 1000 | | SOLVENT/CARRIER CONCENTRATION |
| STOCK SOLUTION USED (e.g., 1°,2°,3°) (Dilution water) | 100 C N.A. | N.A. | 100 C | 944 | 900 | 820 | 680 | 440 | " | | |
| AMOUNT OF SOLVENT ADDED ( ) | N.A. | | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | |

ADDITIONAL COMMENTS: (DOCUMENT ANY DEVIATIONS FROM PROTOCOL: e.g., AERATION)



ABOVE DATA RECORDED BY: SF DATE: 12-21-89

| C. var. | | 0-HOUR | | 24-HOUR | | 48-HOUR | | 72-HOUR | | 96-HOUR | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | | 12/2/89 | | 12/2-3/89 | | | | | | | |
| ANIMALS FED | | NO | | NO | | | | | | | |
| TIME | | 1645 | | 1440 | | | | | | | |
| DATA BY | | PAR | | PAR | | | | | | | |
| NOMINAL CONCENTRATION mg/L µg/L (%) µg/L | REP | OBS | NO. ALIVE | OBS | NO. ALIVE | OBS | NO. ALIVE | OBS | NO. ALIVE | OBS | NO. ALIVE |
| CONTROL | A | | 10 | NON | 10 | | | | | | |
| | B | | 10 | \| | 10 | | | | | | |
| ~~Salt Pat~~ | A | | | | | | | | | | |
| | B | | | | | | | | | | |
| 5.6 | A | | 10 | 100 | 0 | | | | | | |
| | B | | 10 | \| | 0 | | | | | | |
| 10 | A | | 10 | \| | 0 | | | | | | |
| | B | | 10 | \| | 0 | | | | | | |
| 18 | A | | 10 | \| | 0 | | | | | | |
| | B | | 10 | \| | 0 | | | | | | |
| 32 | A | | 10 | \| | 0 | | | | | | |
| | B | | 10 | \| | 0 | | | | | | |
| 56 | A | | 10 | \| | 0 | | | | | | |
| | B | | 10 | \| | 0 | | | | | | |
| 100 | A | | 10 | \| | 0 | | | | | | |
| | B | | 10 | \| | 0 | | | | | | |
| | A | | | | | | | | | | |
| | B | | | | | | | | | | |
| | A | | | | | | | | | | |
| | B | | | | | | | | | | |

OBSERVATION KEY

NONE - OBSERVATION WAS MADE AND NOTHING OUT OF THE ORDINARY WAS OBSERVED
AS - AT THE SURFACE
MSP - MUSCLE SPASM
CLE - COMPLETE LOSS OF EQUILIBRIUM
PLE - PARTIAL LOSS OF EQUILIBRIUM
LETH - LETHARGIC
HYP - HYPERACTIVE
ERR - ERRATIC
GY - GYRATING
DPK - DARK PIGMENTATION
HEM - HEMORRHAGIC
RAR - RAPID RESPIRATION
G - GULPING
CLDY - CLOUDY SOLUTION
OBS - OBSERVATION
PRE - PRECIPITATE
FOS - FILM ON SURFACE
UC - UNDISSOLVED CHEMICAL
NF - NOT FOUND
LT - LIGHT PIGMENTATION
BS - BRINE SHRIMP

ESE AQUATIC TOXICOLOGY DEPARTMENT
GAINESVILLE, FLORIDA

PAGE: ____
ESE QA FORM: 016
EFFECTIVE: MARCH 1988

SUBJECT: ACUTE TOXICITY DATA SHEET—CHEMICAL AND PHYSICAL DATA

SPONSOR: FP&L PROJECT NO. ____ TEST SUBSTANCE: CPVA
TEST SPECIES: C virg

| NOMINAL CONCENTRATION mg/L (ppt) | REP | Temp °C | SAL/HARD | pH | DO | ALK | COND | Temp °C | SAL/HARD | pH | DO | Temp °C | SAL/HARD | pH | DO | Temp °C | SAL/HARD | pH | DO | Temp °C | SAL/HARD | pH | DO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | | 12/21/89 | | | | | | 12/22/89 | | | | | | | | | | | | | | | |
| TIME | | 1630 | | | | | | 1445 | | | | | | | | | | | | | | | |
| DATA BY | | DC | | | | | | DC | | | | | | | | | | | | | | | |
| CONTROL | A | 22 | 20 | 8.2 | 6.8 | | | 22 | 20 | 8.1 | 6.1 | | | | | | | | | | | | |
| | B | 22 | — | 8.2 | 7.0 | | | 22 | — | 8.1 | 6.3 | | | | | | | | | | | | |
| ~~Salt~~ | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | 28.0‰ | | | | | | | | | | | | | | | | | | |
| 5.6 | | 22 | 19 | 8.7 | 7.8 | | | 22 | 28 | 8.4 | 7.3 | | | | | | | | | | | | |
| | | 22 | — | 8.8 | 7.9 | | | 22 | — | 8.7 | 7.4 | | | | | | | | | | | | |
| 10 | | 22 | 25 | 8.9 | 7.7 | | | 22 | 31 | 8.9 | 7.1 | | | | | | | | | | | | |
| | | 22 | — | 9.2 | 7.7 | | | 22 | — | 9.0 | 7.0 | | | | | | | | | | | | |
| 18 | | 22 | 32 | 9.1 | 7.2 | | | 22 | 40 | 9.3 | 7.0 | | | | | | | | | | | | |
| | | 22 | — | 9.3 | 7.3 | | | 22 | — | 9.3 | 7.0 | | | | | | | | | | | | |
| 32 | | 22 | 39 | 9.4 | 6.8 | | | 22 | 50 | 9.3 | 7.1 | | | | | | | | | | | | |
| | | 22 | — | 9.4 | 6.7 | | | 22 | — | 9.2 | 7.0 | | | | | | | | | | | | |
| 56 | | 22 | 64 | 9.8 | 6.5 | | | 22 | 72 | 9.7 | 6.9 | | | | | | | | | | | | |
| | | 22 | — | 9.8 | 6.6 | | | 22 | — | 9.7 | 6.9 | | | | | | | | | | | | |
| 100 | | 22 | 100 | 9.1 | 6.2 | | | 22 | 105 | 9.1 | 6.9 | | | | | | | | | | | | |
| | | 22 | — | 9.1 | 6.4 | | | 22 | — | 9.1 | 6.9 | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |

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|---|---|
| TEMP. DEVICE | Therm 3 |
| SAL./HARD MEASUREMENT | Kat #3 |
| pH METER | YSI 60-1 |
| DO METER | YSI 50-1 |
| ALKALINITY METHOD | titr |
| CONDUCTIVITY METER | Sct-2 |

TEMPERATURE WAS CONTINUOUSLY RECORDED ON CHANNEL __ OF THE ESE TEMPERATURE MONITOR.

SAL/HARD = ppt/ppm
DO = ppm
ALK = ppm
COND = umhos/cm

*Sal 100% Effluent ‰ scale

DS - DO ℓ scale