**Jeffrey T. Gasser**
Vice President

**Southern Nuclear Operating Company, Inc.**
40 Inverness Center Parkway
Post Office Box 1295
Birmingham, Alabama 35201

Tel 205.992.7721
Fax 205.992.0403

SOUTHERN COMPANY
*Energy to Serve Your World*℠

December 15, 2003

NL-03-2523

Docket Nos.: 50-424
50-425

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555-0001

Vogtle Electric Generating Plant
NPDES Permit Renewal Application

Ladies and Gentlemen:

In accordance with Section 3.2 of the Vogtle Electric Generating Plant Environmental Protection Plan (Units 1 and 2), Appendix B to Facility Operating License Nos. NPF-68 and NPF 81, enclosed is a copy of the permit renewal application package for National Pollutant Discharge Elimination System (NPDES) Permit No. GA0026786 submitted to the Georgia Environmental Protection Division.

This letter contains no NRC commitments. If you have any questions, please advise.

Sincerely,

Jeffrey T. Gasser

JTG/KWK/daj

Enclosure

cc: Southern Nuclear Operating Company
Mr. J. D. Woodard, Executive Vice President
Mr. W. F. Kitchens, General Manager – Plant Vogtle
Mr. M. Sheibani, Engineering Supervisor – Plant Vogtle
Mr. G. D. Elmore, Environmental Services
Mr. W. C. Carr, Environmental Services (w/o attachments)
Document Services RTYPE: CVC7000

Georgia Power Company
Mr. M. E. Wilder, Environmental Affairs (w/o attachments)

C001

U. S. Nuclear Regulatory Commission
Mr. L. A. Reyes, Regional Administrator
Mr. S. D. Bloom, NRR Project Manager – Vogtle
Mr. J. Zeiler, Senior Resident Inspector – Vogtle

State of Georgia
Mr. L. C. Barrett, Commissioner – Department of Natural Resources

Southern Nuclear
Operating Company, Inc.
Post Office Box 1295
Birmingham, Alabama 35201-1295

Tel 205.992.5000

SOUTHERN COMPANY
*Energy to Serve Your World*™

File: E.03.07
Log: EV-03-2479

December 4, 2003

FEDERAL EXPRESS

Vogtle Electric Generating Plant (NPDES Permit No. GA0026786)
Permit Renewal Application Package

Mr. Michael S. Creason
Unit Coordinator
Water Protection Branch
Environmental Protection Division
4220 International Parkway, Suite 101
Atlanta, Georgia 30354

Dear Mr. Creason:

Attached is the NPDES permit renewal application package for the Vogtle Electric Generating Plant (NPDES Permit No. GA0026786) located near Waynesboro, Georgia. The renewal package contains completed EPA Forms 3510-1 and 3510-2C. Also included are the results from whole effluent toxicity (WET) chronic testing, as required by the State of Georgia.

If you have any questions or need additional information, please contact Greg Elmore at (205) 992-5264.

Sincerely,

F. D. Hundley for

Wayne C. Carr, Manager
Environmental Services

WCC/GDE:ahl

Enclosure

bcc: w/o Enclosure
J. T. Gasser
P. D. Rushton
N. J. Stringfellow
I. A. Kochery
B. D. Carter
M. E. Wilder
B. R. Evans
A. Harris

w/ Enclosure
W. F. Kitchens
C. M. Burke
SNC Document Management – Vogtle (Return Receipt)

# Application for Permit Renewal

## NPDES Permit No. GA0026786

### Vogtle Electric Generating Plant

Submitted by Southern Nuclear Operating Company
December 2003

SOUTHERN COMPANY

# EPA FORM 1 GENERAL

## General Information
## Consolidated Permits Program

**Vogtle Electric Generating Plant**
**NPDES No. GA0026786**

*Fill-in areas are spaced for elite type, i.e. 12 characters/inch.* Form Approved. OMB No. 2040-0086. Approval expires 5-31-92

| FORM 1 GENERAL | EPA | U. S. ENVIRONMENTAL PROTECTION AGENCY **GENERAL INFORMATION** *Consolidated Permits Program* *(Read the "General Instructions" before starting.)* | I. EPA I.D. NUMBER F G A 0 0 2 6 7 8 6 (1–13) | T/A | C D (14–15) |
|---|---|---|---|---|---|

| LABEL ITEMS | | |
|---|---|---|
| I. | EPA I.D. NUMBER | PLEASE PLACE LABEL IN THIS SPACE |
| III. | FACILITY NAME | |
| V. | FACILITY MAILING ADDRESS | |
| VI. | FACILITY LOCATION | |

**GENERAL INSTRUCTIONS**

If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data is absent (the area to the left of the label space list the information that should appear), please provide it in the proper fill-in area(s) below. If the label is complete and correct, you need not complete Items I, III, V, and VI (except VI-B which must be completed regardless). Complete all Items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

## II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of **bold-faced terms**.

| SPECIFIC QUESTIONS | MARK "X" YES | NO | FORM ATTACHED | SPECIFIC QUESTIONS | MARK "X" YES | NO | FORM ATTACHED |
|---|---|---|---|---|---|---|---|
| A. Is this facility a **publicly owned treatment works** which results in a **discharge** to **waters of the U.S.**? (FORM 2A) | | X (17) | (18) | B. Does or will this facility *(either existing or proposed)* include a **concentrated animal feeding operation** or **aquatic animal production facility** which results in a **discharge** to **waters of the U.S.**? (FORM 2B) | | X (20) | (21) |
| C. Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C) | X (22) | (23) | X (24) | D. Is this a proposed facility (other than those described in A or B above) which will result in a **discharge** to waters of the U.S.? (FORM 2D) | (25) | X (26) | (27) |
| E. Does or will this facility treat, store, or dispose of **hazardous wastes**? (FORM 3) | (28) | X (29) | (30) | F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4) | (31) | X (32) | (33) |
| G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4) | (34) | X (35) | (36) | H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4) | (37) | X (38) | (39) |
| I. Is this facility a proposed **stationary source** which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an **attainment area**? (FORM 5) | (40) | X (41) | (42) | J. Is this facility a proposed **stationary source** which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an **attainment area**? (FORM 5) | (43) | X (44) | (45) |

## III. NAME OF FACILITY

C 1 SKIP VOGTLE ELECTRIC GENERATING PLANT (15–69)

## IV. FACILITY CONTACT

| A. NAME & TITLE (*last, first, & title*) | B. PHONE (*area code & no.*) |
|---|---|
| C 2 CARR, WAYNE, MANAGER ENV SERVICES (15–45) | 205 (46–48) 992 (49–51) 6387 (52–55) |

## V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX: C 3 P.O. BOX 1295 (15–45)

| B. CITY OR TOWN | C. STATE | D. ZIP CODE |
|---|---|---|
| C 4 BIRMINGHAM (15–40) | AL (41–42) | 35201 (47–51) |

## VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER: C 5 7821 RIVER ROAD (15–45)

B. COUNTY NAME: BURKE (46–70)

| C. CITY OR TOWN | D. STATE | E. ZIP CODE | F. COUNTY CODE |
|---|---|---|---|
| C 6 WAYNESBORO (15–40) | GA (41–42) | 30830 (47–51) | N/A (52–54) |

**VII. SIC CODES** *(4-digit, in order of priority)*

| A. FIRST | | B. SECOND | |
|---|---|---|---|
| 4911 | (specify) Generation of Electricity | | (specify) N/A |
| **C. THIRD** | | **D. FOURTH** | |
| | (specify) N/A | | (specify) N/A |

**VIII. OPERATOR INFORMATION**

A. NAME: SOUTHERN NUCLEAR OPERATING COMPANY

B. Is the name listed in Item VIII-A also the owner? YES ☒ NO

C. STATUS OF OPERATOR *(Enter the appropriate letter into the answer box; if "Other", specify.)*
F = FEDERAL M = PUBLIC *(other than federal or state)* S = STATE O = OTHER *(specify)* P = PRIVATE
P (specify)

D. PHONE *(area code & no.)*: 205 992 5000

E. STREET OR P.O. BOX: P.O. BOX 1295

F. CITY OR TOWN: BIRMINGHAM

G. STATE: AL

H. ZIP CODE: 35201

IX. INDIAN LAND: Is the facility located on Indian lands? YES ☒ NO

**X. EXISTING ENVIRONMENTAL PERMITS**

| | |
|---|---|
| A. NPDES *(Discharges to Surface Water)* | GA0026786 |
| D. PSD *(Air Emissions from Proposed Sources)* | N/A |
| B. UIC *(Underground Injection of Fluids)* | N/A |
| E. OTHER *(specify)* | SEE ATTACHED |
| C. RCRA *(Hazardous Wastes)* | N/A |
| E. OTHER *(specify)* | N/A |

**XI. MAP**

Attach to this application a topgraphic map of the area extending to at least one mile beyond property bounderies. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

**XII. NATURE OF BUSINESS** *(provide a brief description)*

Generation of electricity through the use of nuclear fuel.

Vogtle Electric Generating Plant is jointly owned by Georgia Power Company, Oglethorpe Power Corporation, Municipal Electric Authority of Georgia, and the City of Dalton, Georgia.

**XIII. CERTIFICATION** *(see instructions)*

*I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.*

| A. NAME & OFFICIAL TITLE *(type or print)* | B. SIGNATURE | C. DATE SIGNED |
|---|---|---|
| J. T. Gasser, Vice President | JT Gasser | 1 Dec 03 |

**COMMENTS FOR OFFICIAL USE ONLY**

**Attachment to EPA Form 1, Section X.E**
**Existing Environmental Permits**
**Vogtle Electric Generating Plant**

| Permit Name | Permit Number | Held By |
|---|---|---|
| NPDES Permit | GA0026786 | Southern Nuclear Operating Co |
| NPDES General Stormwater Permit | GAR000000 | Southern Nuclear Operating Co |
| NPDES General Construction Stormwater Permit | GAR100001 | Southern Nuclear Operating Co |
| Public Non-Transient Non-Community Water System | PG0330017 | Georgia Power Company |
| Public Transient Non-Community Water System | NG0330036 | Georgia Power Company |
| Public Non-Transient Non-Community Water System | PG0330035 | Georgia Power Company |
| Haz. Materials Certificate of Registration (Issued by U.S. Dept. of Transportation) | 061603 001 014L | Southern Nuclear Operating Co |
| Dredging Permit (Issued by U.S. Army Corps of Engineers) | 950004490 | Southern Nuclear Operating Co |
| Surface Water Withdrawal | 017-0191-05 | Southern Nuclear Operating Co |
| Ground Water Use | 017-0003 | Southern Nuclear Operating Co |
| Solid Waste Handling Permit | 017-006D(L)(I) No. 2 | Georgia Power Company |
| Solid Waste Handling Permit | 017-007D(L)(I) | Georgia Power Company |
| Solid Waste Collection Permit By Rule | PBR-017-07COL | Southern Nuclear Operating Co |
| Part 70 Operating Permit | 4911-033-0030-V-01-0 | Georgia Power Company/Southern Company |

# EPA FORM 2C NPDES

## Application for Permit to Discharge Wastewater
## Consolidated Permits Program

**Vogtle Electric Generating Plant**
**NPDES No. GA0026786**

Submitted by Southern Nuclear Operating Company
December 2003

SOUTHERN COMPANY

Please print or type in the unshaded areas only.

EPA I.D. (*copy from Item 1 of Form 1*)
GA0026786

Form Approved.
OMB No. 2040-0086
Approval expires 7-31-88

**FORM 2C NPDES** | **EPA**

**U.S. ENVIRONMENTAL PROTECTION AGENCY**
**APPLICATION FOR PERMIT TO DISCHARGE WASTEWATER**
**EXISTING MANUFACTURING, COMMERCIAL, MINING AND SILVICULTURAL OPERATIONS**
*Consolidated Permits Program*

**I. OUTFALL LOCATION**

For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

| A. OUTFALL NO. (*list*) | B. LATITUDE | | | C. LONGITUDE | | | D. RECEIVING WATER (*name*) |
|---|---|---|---|---|---|---|---|
| | 1. DEG. | 2. MIN. | 3. SEC. | 1. DEG. | 2. MIN. | 3. SEC. | |
| 01-13 | 33 | 08 | 53 | 81 | 45 | 09 | SAVANNAH RIVER |
| 14-15 | 33 | 08 | 30 | 81 | 45 | 44 | BEAVER DAM CREEK |
| | | | | | | | |
| | | | | | | | |

**II. FLOWS, SOURCES OF POLLUTION, AND TREATMENT TECHNOLOGIES**

A. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item B. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

B. For each outfall, provide a description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

| 1. OUTFALL NO (*list*) | 2. OPERATION (S) CONTRIBUTING FLOW | | 3. TREATMENT | | |
|---|---|---|---|---|---|
| | a. OPERATION (*list*) | b. AVERAGE FLOW (*include units*) | a. DESCRIPTION | b. LIST CODES FROM TABLE 2C-1 | |
| 001 | FINAL PLANT DISCHARGE (COMBINED PLANT WASTE STREAMS UNITS 1 & 2) | 5,000 GPM | 59,028 GPM (MAXIMUM) | 2E | 4A |
| 002 | UNIT 1 COOLING TOWER BLOWDOWN | ** | 10,000 GPM (MAXIMUM) | 2F | 4A |
| 002A | UNIT 1 EMERGENCY OVERFLOW TO STORM DRAINS | ** | | 2F | 4A |
| 003 | UNIT 2 COOLING TOWER BLOWDOWN | ** | 10,00 GPM (MAXIMUM) | 2F | 4A |
| 003A | UNIT 2 EMERGENCY OVERFLOW TO STORM DRAINS | ** | | 2F | 4A |
| 004 | UNIT 1 WASTE WATER RETENTION BASIN | ** | 1,300 GPM (MAXIMUM) | 4A | |
| 005 | UNIT 2 WASTE WATER RETENTION BASIN | ** | 1,300 GPM (MAXIMUM) | 4A | |
| 006 | SEWAGE TREATMENT PLANT EMERGENCY OVERFLOW | ** | | 2F, 3A | 4A |
| 007 | LIQUID RADWASTE SYSTEMS DISCHARGE (UNIT 1) | ** | 100 GPM (MAXIMUM) | 2J | 4A |
| 008 | LIQUID RADWASTE SYSTEMS DISCHARGE (UNIT 2) | ** | 100 GPM (MAXIMUM) | 2J | 4A |
| 009 | NUCLEAR SERVICE COOLING TOWER BLOWDOWN (UNITS 1 & 2) | ** | 500 GPM (MAXIMUM) | 2F | 4A |
| 010 | RADWASTE DILUTION FLOW TO OUTFALL 001 | ** | | 4A | |
| 011 | INTAKE SCREEN BACKWASH | ** | | 4A | |
| 012 | POWER BLOCK STORM WATER DISCHARGE TO SAVANNAH RIVER | ** | DISCHARGE FROM THIS OUTFALL IS GOVERNED BY GENERAL PERMIT NO. GAR000000 | 4A | |
| | | | | | |
| | ** INTERMITTENT FLOW (SEE ATTACHED TABLE) | | | | |

**OFFICIAL USE ONLY** (effluent guidelines sub-categories)

 CONTINUE ON PAGE 2

Please print or type in the unshaded areas only.

EPA I.D. (*copy from Item 1 of Form 1*)
GA0026786

Form Approved.
OMB No. 2040-0086
Approval expires 7-31-88

FORM 2C NPDES

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR PERMIT TO DISCHARGE WASTEWATER
EXISTING MANUFACTURING, COMMERCIAL, MINING AND SILVICULTURAL OPERATIONS
*Consolidated Permits Program*

**I. OUTFALL LOCATION**

For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

| A. OUTFALL NO. (*list*) | B. LATITUDE | | | C. LONGITUDE | | | D. RECEIVING WATER (*name*) |
|---|---|---|---|---|---|---|---|
| | 1. DEG. | 2. MIN. | 3. SEC. | 1. DEG. | 2. MIN. | 3. SEC. | |
| 01-13 | 33 | 08 | 53 | 81 | 45 | 09 | SAVANNAH RIVER |
| 14-15 | 33 | 08 | 30 | 81 | 45 | 44 | BEAVER DAM CREEK |
| | | | | | | | |
| | | | | | | | |

**II. FLOWS, SOURCES OF POLLUTION, AND TREATMENT TECHNOLOGIES**

A. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item B. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

B. For each outfall, provide a description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

| 1. OUTFALL NO. (*list*) | 2. OPERATION (S) CONTRIBUTING FLOW | | 3. TREATMENT | | |
|---|---|---|---|---|---|
| | a. OPERATION (*list*) | b. AVERAGE FLOW (*include units*) | a. DESCRIPTION | b. LIST CODES FROM TABLE 2C-1 | |
| 013 | INTAKE STRUCTURE STORM WATER DISCHARGE TO SAVANNAH RIVER | ** | DISCHARGE FROM THIS OUTFALL IS GOVERNED BY GENERAL PERMIT NO. GAR000000 | 4A | |
| 014 | EAST STORM WATER DISCHARGE TO BEAVER DAM CREEK (RETENTION POND 1) | ** | DISCHARGE FROM THIS OUTFALL IS GOVERNED BY GENERAL PERMIT NO. GAR000000 | 4A | |
| 015 | WEST STORM WATER DISCHARGE TO BEAVER DAM CREEK (RETENTION POND 2) | ** | DISCHARGE FROM THIS OUTFALL IS GOVERNED BY GENERAL PERMIT NO. GAR000000 | 4A | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | ** INTERMITTENT FLOW (SEE ATTACHED TABLE) | | | | |

**OFFICIAL USE ONLY** (effluent guidelines sub-categories)

 CONTINUE ON PAGE 2

CONTINUED FROM THE FRONT

C. Except for storm runoff, leaks, or spills, are any of the discharges described in Items II-A or B intermittent or seasonal?

☒ YES (complete the following table) ☐ NO (go to Section III)

| 1. OUTFALL NUMBER (list) | 2. OPERATION(s) CONTRIBUTING FLOW (list) | 3. FREQUENCY a. DAYS PER WEEK (specify average) | b. MONTHS PER YEAR (specify average) | 4. FLOW a. FLOW RATE (in mgd) 1. LONG TERM AVERAGE | 2. MAXIMUM DAILY | b. TOTAL VOLUME (specify with units) 1. LONG TERM AVERAGE | 2. MAXIMUM DAILY | c. DURATION (in days) |
|---|---|---|---|---|---|---|---|---|
| | See attachment for Intermittent Discharges | | | | | | | |

III. PRODUCTION

A. Does an effluent guideline limitation promulgated by EPA under Section 304 of the Clean Water Act apply to your facility?

☒ YES (complete Item III-B) ☐ NO (go to Section IV)

B. Are the limitations in the applicable effluent guideline expressed in terms of production (or other measure of operation)?

☐ YES (complete Item III-C) ☒ NO (go to Section IV)

C. If you answered "yes" to Item III-B, list the quantity which represents an actual measurement of your level of production, expressed in the terms and units used in the applicable effluent guideline, and indicate the affected outfalls.

| 1. AVERAGE DAILY PRODUCTION a. QUANTITY PER DAY | b. UNITS OF MEASURE | c. OPERATION, PRODUCT, MATERIAL, ETC. (specify) | 2. AFFECTED OUTFALLS (list outfall numbers) |
|---|---|---|---|
| N/A | | | |

IV. IMPROVEMENTS

A. Are you now required by any Federal, state or local authority to meet any implementation schedule for the construction, upgrading or operation of wastewater treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.

☐ YES (complete the following table) ☒ NO (go to Item IV-B)

| 1. IDENTIFICATION OF CONDITION, AGREEMENT, ETC. | 2. AFFECTED OUTFALLS a. NO. | B. SOURCE OF DISCHARGE | 3. BRIEF DESCRIPTION OF PROJECT | 4. FINAL COMPLIANCE DATE a. REQUIRED | b. PROJECTED |
|---|---|---|---|---|---|
| N/A | | | | | |

B. OPTIONAL: You may attach additional sheets describing any additional water pollution control programs (or other environmental projects which may affect your discharges) you now have underway or which you plan. Indicate whether each program is now underway or planned, and indicate your actual or planned schedules for construction.

☐ MARK "X" IF DESCRIPTION OF ADDITIONAL CONTROL PROGRAM IS ATTACHED

 CONTINUE ON PAGE 3

CONTINUED FROM PAGE 2

EPA I.D. NUMBER *(copy from Item 1 of Form 1)*

GA0026786

Form Approved.
OMB No. 2040-0086
Approval expires 7-31-88

**V. INTAKE AND EFFLUENT CHARACTERISTICS**

A, B, & C: See instructions before proceeding - Complete one set of tables for each outfall - Annotate the outfall number in the space provided. NOTE: Tables V-A, V-B, and V-C are included on separate sheets numbered V-1 through V-9.

D. Use the space below to list any of the pollutants listed in Table 2c-3 of the instructions, which you know or have reason to believe is discharged or may be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it to be present and report any analytical data in your possession.

| 1. POLLUTANT | 2. SOURCE | 1. POLLUTANT | 2. SOURCE |
|---|---|---|---|
| None | | | |

**VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS**

Is any pollutant listed in Item V-C a substance or a component of a substance which you currently use or manufacture as an intermediate or final product or byproduct?

☐ YES (list all such pollutants below) ☒ NO (go to Item VI-B)

N/A

 CONTINUE ON PAGE 4

CONTINUED FROM THE FRONT

**VII. BIOLOGICAL TOXICITY TESTING DATA**

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

☒ YES (identify the test(s) and describe their purposes below) ☐ NO (go to Section VIII)

WHOLE EFFLUENT TOXICITY (WET) CHRONIC TESTING PERFORMED IN NOVEMBER 2003 AS REQUIRED BY GEORGIA EPD TO SUPPORT NPDES PERMIT RENEWAL. TESTING RESULTS ARE INCLUDED WITH THIS RENEWAL APPLICATION.

**VIII CONTRACT ANALYSIS INFORMATION**

Were any of the analyses reported in Item V performed by a contact laboratory or consulting firm?

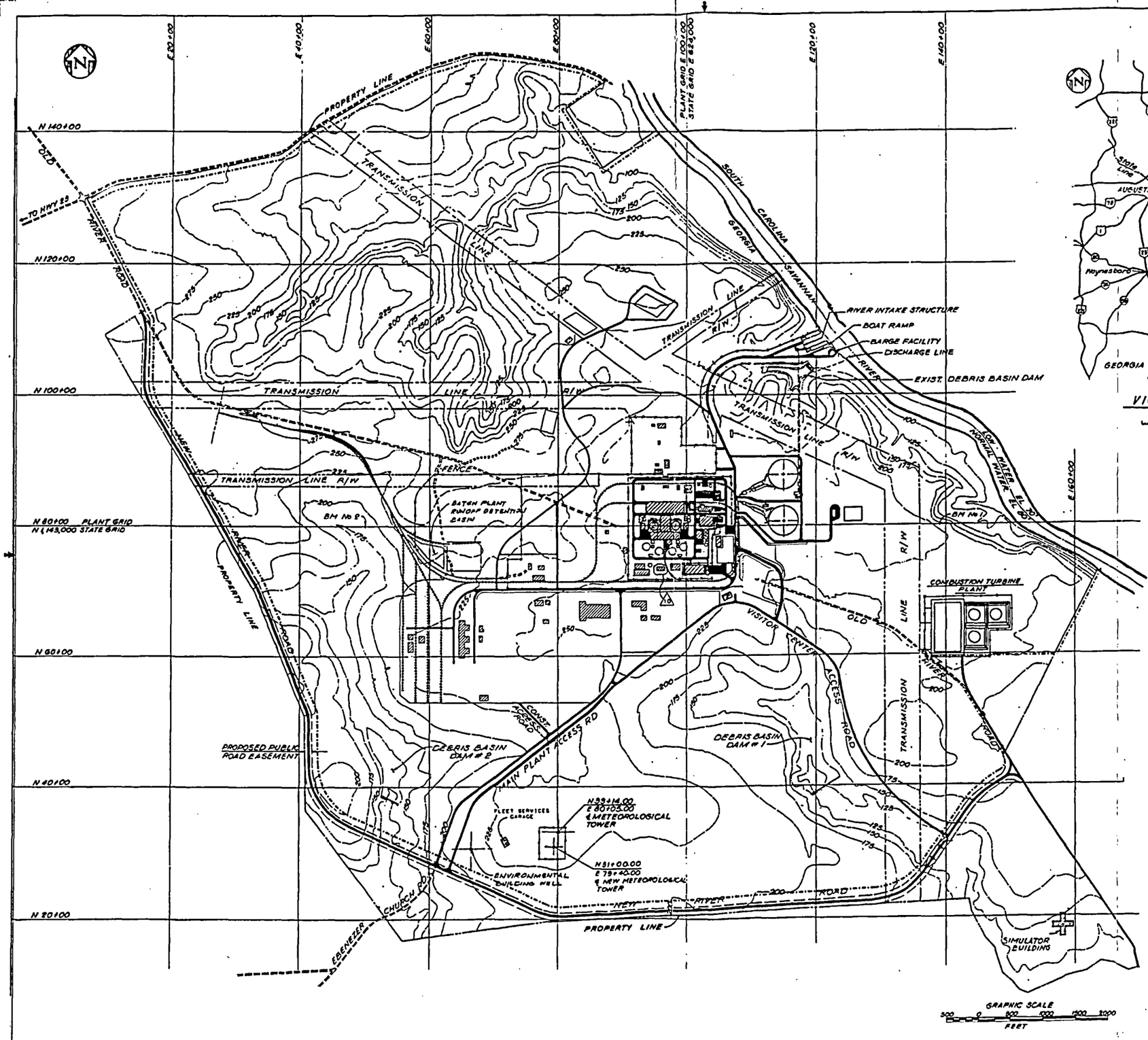
☒ YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below) ☐ NO (go to Section IX)

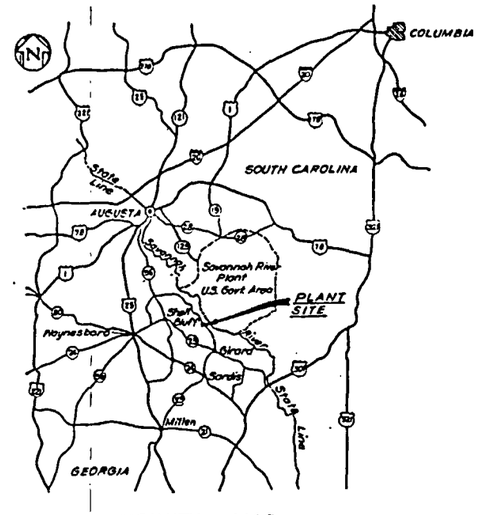
| A. NAME | B. ADDRESS | C. TELEPHONE *(area code & no.)* | D. POLLUTANTS ANALYZED *(list)* |
|---|---|---|---|
| Alabama Power Company General Test Laboratory | P.O. Box 2641 Birmingham, AL 35291 | (205) 664-6182 | All except pH, temperature, Total Residual Chlorine, and Radiological |
| Florida Radiochemistry Services, Inc. | 5456 Hoffner Ave. Suite 201 Orlando, FL 32812 | (407) 382-7733 | Radiological |
| BioTox Laboratory MACTEC Eng. & Consulting | 3200 Town Point Dr., NW Suite 100 Kennesaw, GA 30144 | (770) 421-7027 | Whole Effluent Toxicity Testing |

**IX. CERTIFICATION**

*I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designated to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*

| A. NAME & OFFICIAL TITLE (type or print) | B. PHONE NO. (Area code & no.) |
|---|---|
| J. T. GASSER, VICE PRESIDENT | (205) 992 -5000 |
| C. SIGNATURE J T Gasser | D. DATE SIGNED 1 Dec 03 |




VICINITY MAP

SCALE: 1" = 10 mi.

## LEGEND

- NEW ASPHALT CONCRETE ROAD
- NEW CHAIN LINK FENCE
- EXISTING FENCE
- PROPERTY LINE OR MATCHLINE
- ROUGH GRADE CONTOUR — 215
- EXISTING GROUND CONTOUR — 215
- DITCH FLOWLINE
- SPOT GRADE — 125
- BUILDING OR MAIN STRUCTURES
- RAILROAD
- EXCLUSION BOUNDARY LINE

## GENERAL NOTES

1. EXISTING TOPOGRAPHY REPRODUCED FROM ORIGINAL TOPOGRAPHIC DRAWINGS PROVIDED BY THE ENGINEERING DEPARTMENT OF GEORGIA POWER CO., ATLANTA, GEORGIA.
2. THE GRID SYSTEM SHOWN IS DESIGNATED "PLANT GRID SYSTEM". THE FOLLOWING FACTORS MAY BE APPLIED TO CONVERT TO THE STATE GRID SYSTEM.

PLANT NORTH + 2,125,000 = STATE NORTH
PLANT EAST + 614,000 = STATE EAST

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| NO. | REVISIONS | DATE | DR | CHK | APPV | DTL |
|---|---|---|---|---|---|---|
| 10 | INCORP. PER DCP 88-V-40055 | 03MAR88 | JGH | RHB | WHJ | |

SOUTHERN COMPANY SERVICES, INC.
BIRMINGHAM, ALABAMA

GEORGIA POWER COMPANY
ALVIN W. VOGTLE NUCLEAR PLANT

LOCATION AND VICINITY MAP

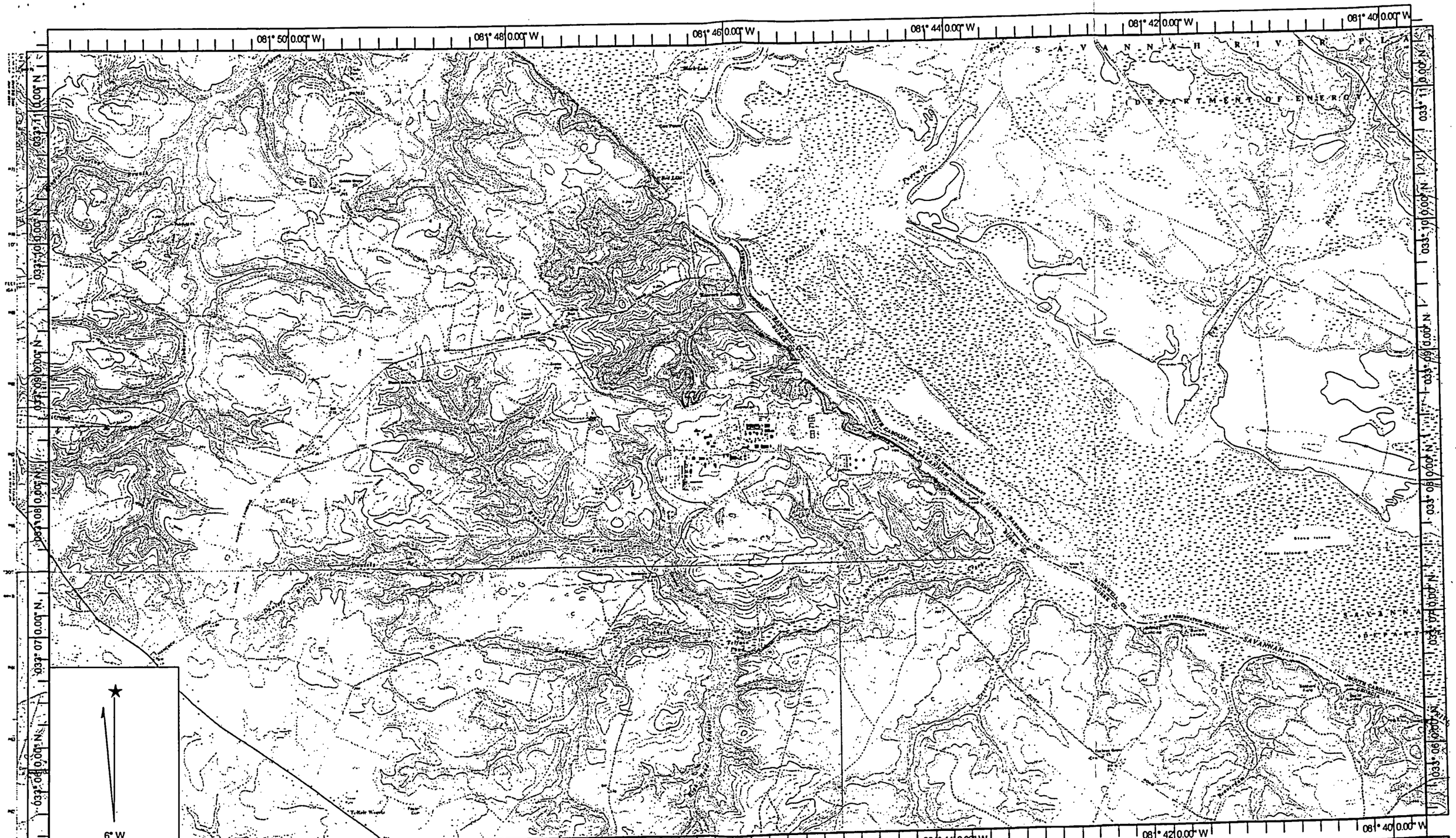
SCALE: 1" = 500'-0"

JOB NO. 10604

DRAWING NO. CX2045Y002

REV. 10

SIZE E 34344




Name: SHELL BLUFF LANDING
Date: 11/24/2003
Scale: 1 inch equals 4000 feet

Location: 033° 08' 27.1" N 081° 45' 57.1" W
Caption: VEGP NPDES Permit Renewal

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# EPA FORM 2C SECTION V

## Intake and Effluent Characteristics
## Consolidated Permits Program

**Vogtle Electric Generating Plant**
**NPDES No. GA0026786**

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets *(use the same format)* instead of completing these pages.
SEE INSTRUCTIONS.

EPA I.D. NUMBER *(copy from Item 1 of Form 1)*
GA0026786

*Form Approved.*
*OMB No. 2040-0086*
*Approval expires 7-31-88*

## V. INTAKE AND EFFLUENT CHARACTERISTICS (continued from page 3 of Form 2-C)

OUTFALL NO. 001

PART A - You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

| 1. POLLUTANT | 2. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCEN-TRATION | 2. EFFLUENT a. MAXIMUM DAILY VALUE (2) MASS | 2. EFFLUENT b. MAXIMUM 30 DAY VALUE *(if available)* (1) CONCEN-TRATION | 2. EFFLUENT b. MAXIMUM 30 DAY VALUE *(if available)* (2) MASS | 2. EFFLUENT c. LONG TERM AVRG. VALUE *(if available)* (1) CONCEN-TRATION | 2. EFFLUENT c. LONG TERM AVRG. VALUE *(if available)* (2) MASS | 2. EFFLUENT d. NO. OF ANALYSES | 3. UNITS *(specify if blank)* a. CONCEN-TRATION | 3. UNITS *(specify if blank)* b. MASS | 4. INTAKE *(optional)* a. LONG TERM AVERAGE VALUE (1) CONCEN-TRATION | 4. INTAKE *(optional)* a. LONG TERM AVERAGE VALUE (2) MASS | 4. INTAKE *(optional)* b. NO. OF ANALYSES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a. Biochemical Oxygen Demand (BOD) | 1 | | | | | | 1 | mg/l | lb/day | 1 | | 1 |
| b. Chemical Oxygen Demand (COD) | 35 | | | | | | 1 | mg/l | lb/day | 14 | | 1 |
| c. Total Organic Carbon (TOC) | 15.0 | | | | | | 1 | mg/l | lb/day | 3.88 | | 1 |
| d. Total Suspended Solids (TSS) | 42 | | | | | | 1 | mg/l | lb/day | 6 | | 1 |
| e. Ammonia *(as N)* | 0.16 | | | | | | 1 | mg/l | lb/day | 0.11 | | 1 |
| f. Flow | VALUE 6,627 | | VALUE | | VALUE | | 2 | gpm | | VALUE 44,315 | | 1,095 |
| g. Temperature *(winter)* | VALUE N/A | | VALUE | | VALUE | | N/A | °C | | VALUE N/A | | N/A |
| h. Temperature *(summer)* | VALUE 24.0 | | VALUE | | VALUE | | 1 | °C | | VALUE 23.0 | | 1 |
| i. pH | MINIMUM 7.2 | MAXIMUM 8.8 | MINIMUM | MAXIMUM | | | 82 | STANDARD UNITS | | | | |

PART B - Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2a for any pollutant which is limited either directly, or indirectly but expressly, in an effluent limitations guideline, you must provide the results of at least one analysis for that pollutant. For other pollutants for which you mark column 2a, you must provide quantitative data for an explanation of their presence in your discharge. Complete one table for each outfall. See the instructions for additional details and requirements.

| 1. POLLUTANT AND CAS NO. (if available) | 2. MARK "X" a. Believed Present | 2. MARK "X" b. Believed Absent | 3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCEN-TRATION | 3. EFFLUENT a. MAXIMUM DAILY VALUE (2) MASS | 3. EFFLUENT b. MAXIMUM 30 DAY VALUE *(if available)* (1) CONCEN-TRATION | 3. EFFLUENT b. MAXIMUM 30 DAY VALUE *(if available)* (2) MASS | 3. EFFLUENT c. LONG TERM AVRG. VALUE *(if available)* (1) CONCEN-TRATION | 3. EFFLUENT c. LONG TERM AVRG. VALUE *(if available)* (2) MASS | 3. EFFLUENT d. NO. OF ANAL-YSES | 4. UNITS a. CONCEN-TRATION | 4. UNITS b. MASS | 5. INTAKE *(optional)* a. LONG TERM AVERAGE VALUE (1) CONCEN-TRATION | 5. INTAKE *(optional)* a. LONG TERM AVERAGE VALUE (2) MASS | 5. INTAKE *(optional)* b. NO. OF ANAL-YSES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a. Bromide (24959-67-9) | X | | <0.02 | | | | | | 1 | mg/l | lb/day | <0.02 | | 1 |
| b. Chlorine, Total Residual | X | | <0.01 | | | | | | 1 | mg/l | | <0.1 | | 1 |
| c. Color | X | | 138 | | | | | | 1 | PCU | | 40 | | 1 |
| d. Fecal Coliform | X | | 4.0 | | | | | | 1 | col/100 ml | | 10 | | 1 |
| e. Fluoride (16984-48-8) | X | | 0.34 | | | | | | 1 | mg/l | lb/day | 0.10 | | 1 |
| f. Nitrate-Nitrite *(as N)* | X | | 2.28 | | | | | | 1 | mg/l | lb/day | 0.60 | | 1 |


CONTINUE ON REVERSE

ITEM V-B CONTINUED FROM FRONT

| 1. POLLUTANT AND CAS NO. (if available) | 2. MARK 'X' a. Believed Present | b. Believed Absent | 3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION | (2) MASS | b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION | (2) MASS | c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION | (2) MASS | d. NO. OF ANALYSES | 4. UNITS a. CONCENTRATION | b. MASS | 5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION | (2) MASS | b. NO. OF ANALYSES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| g. Nitrogen, Total Organic (as N) | X | | 0.820 | | | | | | 1 | mg/l | lb/day | 0.840 | | 1 |
| h. Oil and Grease | X | | 1.5 | | | | | | 1 | mg/l | lb/day | <1.4 | | 1 |
| I. Phosphorus (as P) Total (7723-14-0) | X | | 0.63 | | | | | | 1 | mg/l | lb/day | 0.10 | | 1 |
| J. Radioactivity | | | | | | | | | | | | | | |
| (1) Alpha, Total | X | | 0.3 | | | | | | 1 | pCi/L | | <0.9 | | 1 |
| (2) Beta, Total | X | | 14.8 | | | | | | 1 | pCi/L | | 2.2 | | 1 |
| (3) Radium, Total | X | | <0.9 | | | | | | 1 | pCi/L | | 0.9 | | 1 |
| (4) Radium 226, Total | X | | <0.2 | | | | | | 1 | pCi/L | | <0.2 | | 1 |
| k. Sulfate (as $SO_4$) (14808-79-8) | X | | 70.4 | | | | | | 1 | mg/l | lb/day | 31.9 | | 1 |
| l. Sulfide (as $SO_3$) (14265-45-3) | X | | 0.28 | | | | | | 1 | mg/l | lb/day | 0.06 | | 1 |
| m. Sulfite (as $SO_3$) (14265-45-3) | X | | 0.15 | | | | | | 1 | mg/l | lb/day | 0.05 | | 1 |
| n. Surfactants | X | | 0.05 | | | | | | 1 | mg/l | lb/day | 0.03 | | 1 |
| o. Aluminum, Total (7440-39-3) | X | | 0.612 | | | | | | 1 | mg/l | lb/day | 0.248 | | 1 |
| p. Barium, Total (7440-39-3) | X | | 0.085 | | | | | | 1 | mg/l | lb/day | 0.019 | | 1 |
| q. Boron, Total (7440-42-8) | X | | 0.667 | | | | | | 1 | mg/l | lb/day | 0.020 | | 1 |
| r. Cobalt, Total (7440-48-4) | | X | <0.004 | | | | | | 1 | mg/l | lb/day | <0.004 | | 1 |
| s. Iron, Total (7439-89-6) | X | | 2.19 | | | | | | 1 | mg/l | lb/day | 0.476 | | 1 |
| t. Magnesium, Total (7439-95-4) | X | | 6.16 | | | | | | 1 | mg/l | lb/day | 1.42 | | 1 |
| u. Molybdenum, Total (7439-98-7) | | X | <0.01 | | | | | | 1 | mg/l | lb/day | <0.01 | | 1 |
| v. Manganese, Total (7439-96-5) | X | | 0.298 | | | | | | 1 | mg/l | lb/day | 0.090 | | 1 |
| w. Tin, Total (7440-31-5) | | X | <0.002 | | | | | | 1 | mg/l | lb/day | <0.002 | | 1 |
| x. Titanium, Total (7440-32-6) | | X | 0.018 | | | | | | 1 | mg/l | lb/day | 0.005 | | 1 |



CONTINUE ON PAGE V-3

CONTINUED FROM PAGE 3 OF FORM 2-C

| EPA I.D. NUMBER *(copy from Item 1 of Form 1)* | OUTFALL NUMBER |
|---|---|
| GA0026786 | 001 |

*Form Approved.*
*OMB No. 2040-0086*
*Approval expires 7-31-88*

PART C - If you are a primary industry and this outfall contains process wastewater, refer to Table 2c-2 in the instructions to determine which of the GC/MS fractions you must test for. Mark "X" in column 2-a for all such GC/MS fractions that apply to your industry and for ALL toxic metals, cyanides, and total phenols. If you are not required to mark column 2-a (secondary industries, nonprocess wastewater outfalls, and nonrequired GC/MS fractions), mark "X" in column 2-b for each pollutant you know or have reason to believe is present. Mark "X" in column 2-c for each pollutant you believe is absent. If you mark column 2a for any pollutant, you must provide the results of at least one analysis for that pollutant. If you mark column 2b for any pollutant, you must provide the results of at least one analysis for the pollutant if you know or have reason to believe it will be discharged in concentrations of 10 ppb or greater. If you mark column 2b for acrolein, acrylonitrile, 2,4 dinitrophenol, or 2-methyl-4, 6 dinitrophenol, you must provide the results of at least one analysis for each of these pollutants which you know or have reason to believe that you discharge in concentrations of 100 ppb or greater. Otherwise, for pollutants for which you mark column 2b, you must either submit at least one analysis or briefly describe the reasons the pollutant is expected to be discharged. Note that there are 7 pages to this part; please review each carefully. Complete one table (all 7 pages) for each outfall. See instructions for additional details and requirements.

| 1. POLLUTANT AND CAS NUMBER *(if available)* | 2. MARK 'X' | | | 3. EFFLUENT | | | | | | | 4. UNITS | | 5. INTAKE *(optional)* | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | a. Testing Required | b. Believed Present | b. Believed Absent | a. MAXIMUM DAILY VALUE (1) CONCENTRATION | a. MAXIMUM DAILY VALUE (2) MASS | b. MAXIMUM 30 DAY VALUE *(if available)* (1) CONCENTRATION | b. MAXIMUM 30 DAY VALUE *(if available)* (2) MASS | c. LONG TERM AVRG. VALUE *(if available)* (1) CONCENTRATION | c. LONG TERM AVRG. VALUE *(if available)* (2) MASS | d. NO. OF ANALYSES | a. CONCENTRATION | b. MASS | a. LONG TERM AVERAGE VALUE (1) CONCENTRATION | a. LONG TERM AVERAGE VALUE (2) MASS | b. NO. OF ANALYSES |
| METALS, CYANIDE, AND TOTAL PHENOLS | | | | | | | | | | | | | | | |
| 1M. Antimony, Total (7440-36-0) | X | | X | <0.012 | | | | | | 1 | mg/l | lb/day | <0.012 | | 1 |
| 2M. Arsenic, Total (7440-38-2) | X | | X | <0.005 | | | | | | 1 | mg/l | lb/day | <0.005 | | 1 |
| 3M. Beryllium, Total, 7440-41-7 | X | | X | <0.001 | | | | | | 1 | mg/l | lb/day | <0.001 | | 1 |
| 4M. Cadmium, Total (7440-43-9) | X | | X | <0.002 | | | | | | 1 | mg/l | lb/day | <0.002 | | 1 |
| 5M. Chromium Total (7440-47-3) | X | | X | 0.001 | | | | | | 1 | mg/l | lb/day | <0.001 | | 1 |
| 6M. Copper, Total (7440-50-8) | X | | X | 0.006 | | | | | | 1 | mg/l | lb/day | <0.005 | | 1 |
| 7M. Lead, Total (7439-92-1) | X | | X | <0.004 | | | | | | 1 | mg/l | lb/day | <0.004 | | 1 |
| 8M. Mercury, Total (7439-97-6) | X | | X | <0.0002 | | | | | | 1 | mg/l | lb/day | <0.0002 | | 1 |
| 9M. Nickel, Total (7440-02-0) | X | | X | <0.004 | | | | | | 1 | mg/l | lb/day | <0.004 | | 1 |
| 10M. Selenium, Total (7782-49-2) | X | | X | <0.005 | | | | | | 1 | mg/l | lb/day | <0.005 | | 1 |
| 11M. Silver, Total (7440-22-4) | X | | X | <0.006 | | | | | | 1 | mg/l | lb/day | <0.006 | | 1 |
| 12M. Thallium, Total (7440-28-0) | X | X | | <0.007 | | | | | | 1 | mg/l | lb/day | <0.007 | | 1 |
| 13M. Zinc, Total (7440-66-6) | X | X | | 0.393 | | | | | | 1 | mg/l | lb/day | 0.011 | | 1 |
| 14M. Cyanide, Total (57-12-5) | X | | X | <0.005 | | | | | | 1 | mg/l | lb/day | <0.005 | | 1 |
| 15M. Phenols, Total | X | | X | <0.01 | | | | | | 1 | mg/l | lb/day | <0.01 | | 1 |
| DIOXIN | | | | | | | | | | | | | | | |
| 2,3,7,8-Tetrachlorodibenzo-P-Dioxin (1764-01-6) | | | X | DESCRIBE RESULTS | | | | | | | | | | | |



CONTINUE ON REVERSE

CONTINUED FROM FRONT

| 1. POLLUTANT AND CAS NUMBER (If available) | 2. MARK 'X' a. Testing Required | b. Believed Present | c. Believed Absent | 3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION | (2) MASS | b. MAXIMUM 30 DAY VALUE (If available) (1) CONCENTRATION | (2) MASS | c. LONG TERM AVRG. VALUE (If available) (1) CONCENTRATION | (2) MASS | d. NO. OF ANALYSES | 4. UNITS a. CONCENTRATION | b. MASS | 5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION | (2) MASS | b. NO. OF ANALYSES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METALS, CYANIDE, AND TOTAL PHENOLS | | | | | | | | | | | | | | | |
| 1V. Acrolein (107-02-8) | X | | X | <0.002 | | | | | | 1 | mg/l | lb/day | <0.002 | | 1 |
| 2V. Acrylonitrile (107-13-1) | X | | X | <0.001 | | | | | | 1 | mg/l | lb/day | <0.001 | | 1 |
| 3V. Benzene (71-43-2) | X | | X | <0.0020 | | | | | | 1 | mg/l | lb/day | <0.0020 | | 1 |
| 4V. Bis(Chloromethyl) Ether (542-88-1) | | | X | | | | | | | 0 | mg/l | lb/day | | | 0 |
| 5V. Bromoform (75-25-2) | X | | X | <0.0030 | | | | | | 1 | mg/l | lb/day | <0.0030 | | 1 |
| 6V. Carbon Tetrachloride (56-23-5) | X | | X | <0.0020 | | | | | | 1 | mg/l | lb/day | <0.0020 | | 1 |
| 7V. Chlorobenzene (108-90-7) | X | | X | <0.0010 | | | | | | 1 | mg/l | lb/day | <0.0010 | | 1 |
| 8V. Chlorodibromomethane (124-48-1) | X | | X | <0.0010 | | | | | | 1 | mg/l | lb/day | <0.0010 | | 1 |
| 9V. Chloroethane (75-00-3) | X | | X | <0.0020 | | | | | | 1 | mg/l | lb/day | <0.0020 | | 1 |
| 10V. 2-Chloro-ethylvinyl Ether (110-75-8) | X | | X | <0.0010 | | | | | | 1 | mg/l | lb/day | <0.0010 | | 1 |
| 11V. Chloroform (67-66-3) | X | | X | <0.0020 | | | | | | 1 | mg/l | lb/day | <0.0020 | | 1 |
| 12V. Dichlorobromomethane (75-71-8) | X | | X | <0.0010 | | | | | | 1 | mg/l | lb/day | <0.0010 | | 1 |
| 13V. Dichlorodifluoromethane (75-71-8) | | | X | | | | | | | 0 | mg/l | lb/day | | | 0 |
| 14V. 1,1-Dichloroethane (75-34-3) | X | | X | <0.0020 | | | | | | 1 | mg/l | lb/day | <0.0020 | | 1 |
| 15V. 1,2-Dichloroethane (107-06-2) | X | | X | <0.0020 | | | | | | 1 | mg/l | lb/day | <0.0020 | | 1 |
| 16V. 1,1-Dichloroethylene (75-35-4) | X | | X | <0.0010 | | | | | | 1 | mg/l | lb/day | <0.0010 | | 1 |
| 17V. 1,2-Dichloropropane (78-87-5) | X | | X | <0.0020 | | | | | | 1 | mg/l | lb/day | <0.0020 | | 1 |
| 18V. 1,3-Dichloropropylene (542-75-6) | X | | X | <0.0020 | | | | | | 1 | mg/l | lb/day | <0.0020 | | 1 |
| 19V. Ethylbenzene (100-41-4) | X | | X | <0.0020 | | | | | | 1 | mg/l | lb/day | <0.0020 | | 1 |
| 20V. Methyl Bromide (74-83-9) | X | | X | <0.0020 | | | | | | 1 | mg/l | lb/day | <0.0020 | | 1 |
| 21V. Methyl Chloride (74-87-3) | X | | X | <0.0020 | | | | | | 1 | mg/l | lb/day | <0.0020 | | 1 |



CONTINUE ON PAGE V-5

CONTINUED FROM PAGE V-4

| EPA I.D. NUMBER (copy from Item I of Form I) | OUTFALL NUMBER |
|---|---|
| GA0026786 | 001 |

Form Approved.
OMB No. 2040-0086
Approval expires 7-31-88

| 1. POLLUTANT AND CAS NUMBER (If available) | 2. MARK "X" a. Testing Required | b. Believed Present | b. Believed Absent | 3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION | (2) MASS | b. MAXIMUM 30 DAY VALUE (If available) (1) CONCENTRATION | (2) MASS | c. LONG TERM AVRG. VALUE (If available) (1) CONCENTRATION | (2) MASS | d. NO. OF ANALYSES | 4. UNITS a. CONCENTRATION | b. MASS | 5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION | (2) MASS | b. NO. OF ANALYSES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GC/MS FRACTION — VOLATILE COMPOUNDS (continued) | | | | | | | | | | | | | | | |
| 22V. Methylene Chloride (75-09-2) | X | | X | <0.0020 | | | | | | 1 | mg/l | lb/day | <0.0020 | | 1 |
| 23V. 1,1,2,2Tetra-chloroethane (79-34-5) | X | | X | <0.0020 | | | | | | 1 | mg/l | lb/day | <0.0020 | | 1 |
| 24V. Tetrachloroethylene (127-18-4) | X | | X | <0.0020 | | | | | | 1 | mg/l | lb/day | <0.0020 | | 1 |
| 25V. Toluene (108-88-3) | X | | X | <0.0020 | | | | | | 1 | mg/l | lb/day | <0.0020 | | 1 |
| 26V. 1,2-Trans-Dichloro-ethylene (156-60-5) | X | | X | <0.0010 | | | | | | 1 | mg/l | lb/day | <0.0010 | | 1 |
| 27V. 1,1,1-Trichloroethane (71-56-6) | X | | X | <0.0010 | | | | | | 1 | mg/l | lb/day | <0.0010 | | 1 |
| 28V. 1,1,2-Trichloroethane (79-00-5) | X | | X | <0.0020 | | | | | | 1 | mg/l | lb/day | <0.0020 | | 1 |
| 29V. Trichloroethylene (79-01-6) | X | | X | <0.0020 | | | | | | 1 | mg/l | lb/day | <0.0020 | | 1 |
| 30V. Trichlorofluoro-methane (75-69-4) | | | X | | | | | | | 0 | mg/l | lb/day | | | 0 |
| 31V. Vinyl Chloride (75-01-4) | X | | X | <0.0010 | | | | | | 1 | mg/l | lb/day | <0.0010 | | 1 |
| GC/MS FRACTION — ACID COMPOUNDS | | | | | | | | | | | | | | | |
| 1A. 2-Chlorophenol (95-57-8) | X | | X | <0.0033 | | | | | | 1 | mg/l | lb/day | <0.0033 | | 1 |
| 2A. 2,4-Dichlorophenol (120-83-2) | X | | X | <0.0027 | | | | | | 1 | mg/l | lb/day | <0.0027 | | 1 |
| 3A. 2,4-Dimethylphenol (105-67-9) | X | | X | <0.0027 | | | | | | 1 | mg/l | lb/day | <0.0027 | | 1 |
| 4A. 4,6-Dinitro-O-Cresol (534-52-1) | X | | X | <0.024 | | | | | | 1 | mg/l | lb/day | <0.024 | | 1 |
| 5A. 2,4-Dinitrophenol (51-28-5) | X | | X | <0.042 | | | | | | 1 | mg/l | lb/day | <0.042 | | 1 |
| 6A. 2-Nitrophenol (88-75-5) | X | | X | <0.0036 | | | | | | 1 | mg/l | lb/day | <0.0036 | | 1 |
| 7A. 4-Nitrophenol (100-02-7) | X | | X | <0.0024 | | | | | | 1 | mg/l | lb/day | <0.0024 | | 1 |
| 8A. P-Chloro-M-Cresol (59-50-7) | X | | X | <0.0030 | | | | | | 1 | mg/l | lb/day | <0.0030 | | 1 |
| 9A. Pentachlorophenol (87-86-5) | X | | X | <0.0036 | | | | | | 1 | mg/l | lb/day | <0.0036 | | 1 |
| 10A. Phenol (108-95-2) | X | | X | <0.0015 | | | | | | 1 | mg/l | lb/day | <0.0015 | | 1 |
| 11A. 2,4,6-Trichloro-phenol (88-06-2) | X | | X | <0.0027 | | | | | | 1 | mg/l | lb/day | <0.0027 | | 1 |



CONTINUE ON REVERSE

CONTINUED FROM FRONT

| 1. POLLUTANT AND CAS NUMBER (if available) | 2. MARK "X" a. Testing Required | b. Believed Present | b. Believed Absent | 3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION | (2) MASS | b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION | (2) MASS | c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION | (2) MASS | d. NO. OF ANALYSES | 4. UNITS a. CONCENTRATION | b. MASS | 5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION | (2) MASS | b. NO. OF ANALYSES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GC/MS FRACTION — BASE/NEUTRAL COMPOUNDS | | | | | | | | | | | | | | | |
| 1B. Acenaphthene (83-32-9) | X | | X | <0.0019 | | | | | | 1 | mg/l | lb/day | <0.0019 | | 1 |
| 2B. Acenaphtylene (208-96-8) | X | | X | <0.0035 | | | | | | 1 | mg/l | lb/day | <0.0035 | | 1 |
| 3B. Anthracene (120-12-7) | X | | X | <0.0019 | | | | | | 1 | mg/l | lb/day | <0.0019 | | 1 |
| 4B. Benzidine (92-87-5) | X | | X | <0.044 | | | | | | 1 | mg/l | lb/day | <0.044 | | 1 |
| 5B. Benzo *(a)* Anthracene (56-55-3) | X | | X | <0.0078 | | | | | | 1 | mg/l | lb/day | <0.0078 | | 1 |
| 6B. Benzo *(a)* Pyrene (50-32-8) | X | | X | <0.0025 | | | | | | 1 | mg/l | lb/day | <0.0025 | | 1 |
| 7B. 3,4-Benzo-fluoranthene (205-99-2) | X | | X | <0.0048 | | | | | | 1 | mg/l | lb/day | <0.0048 | | 1 |
| 8B. Benzo *(ghi)* Perylene (191-24-2) | X | | X | <0.0041 | | | | | | 1 | mg/l | lb/day | <0.0041 | | 1 |
| 9B. Benzo *(k)*Fluoranthene (207-08-9) | X | | X | <0.0025 | | | | | | 1 | mg/l | lb/day | <0.0025 | | 1 |
| 10B. Bis *(2-Chloroethoxy)* Methane (111-91-1) | X | | X | <0.0053 | | | | | | 1 | mg/l | lb/day | <0.0053 | | 1 |
| 11B. Bis *(2-Chloroethyl)* Ether (111-44-4) | X | | X | <0.0057 | | | | | | 1 | mg/l | lb/day | <0.0057 | | 1 |
| 12B. Bis *(2-Chloro-isopropyl)* Ether (102-60-1) | X | | X | <0.0057 | | | | | | 1 | mg/l | lb/day | <0.0057 | | 1 |
| 13B. Bis *(2-Ethylhexyl)* Phthalate (117-81-7) | X | | X | <0.0025 | | | | | | 1 | mg/l | lb/day | <0.0025 | | 1 |
| 14B. 4-Bromophenyl Phenyl Ether (101-55-3) | X | | X | <0.0019 | | | | | | 1 | mg/l | lb/day | <0.0019 | | 1 |
| 15B. Butyl Benzyl Phthalate (85-68-7) | X | | X | <0.0025 | | | | | | 1 | mg/l | lb/day | <0.0025 | | 1 |
| 16B. 2-Chloronaphthalene (91-58-7) | X | | X | <0.0019 | | | | | | 1 | mg/l | lb/day | <0.0019 | | 1 |
| 17B. 4-Chlorophenyl Phenyl Ether (7005-72-3) | X | | X | <0.0042 | | | | | | 1 | mg/l | lb/day | <0.0042 | | 1 |
| 18B. Chrysene (218-01-9) | X | | X | <0.0025 | | | | | | 1 | mg/l | lb/day | <0.0025 | | 1 |
| 19B. Dibenzo *(a,h)* Anthracene (53-70-3) | X | | X | <0.0025 | | | | | | 1 | mg/l | lb/day | <0.0025 | | 1 |
| 20B. 1,2-Dichloro-benzene (95-50-1) | X | | X | <0.0019 | | | | | | 1 | mg/l | lb/day | <0.0019 | | 1 |
| 21B. 1,3-Dichloro-benzene (541-73-1) | X | | X | <0.0019 | | | | | | 1 | mg/l | lb/day | <0.0019 | | 1 |



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| EPA I.D. NUMBER (copy from Item 1 of Form 1) | OUTFALL NUMBER |
|---|---|
| GA0026786 | 001 |

Form Approved.
OMB No. 2040-0086
Approval expires 7-31-88

| 1. POLLUTANT AND CAS NUMBER (if available) | 2. MARK 'X' a. Testing Required | b. Believed Present | c. Believed Absent | 3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION | (2) MASS | b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION | (2) MASS | c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION | (2) MASS | d. NO. OF ANALYSES | 4. UNITS a. CONCENTRATION | b. MASS | 5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION | (2) MASS | b. NO. OF ANALYSES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GC/MS FRACTION — BASE/NEUTRAL COMPOUNDS (continued) | | | | | | | | | | | | | | | |
| 22B. 1,4-Dichlorobenzene (106-46-7) | X | | X | <0.0044 | | | | | | 1 | mg/l | lb/day | <0.0044 | | 1 |
| 23B. 3,3-Dichlorobenzidine (91-94-1) | X | | X | <0.0165 | | | | | | 1 | mg/l | lb/day | <0.0165 | | 1 |
| 24B. Diethyl Phthalate (84-66-2) | X | | X | <0.0019 | | | | | | 1 | mg/l | lb/day | <0.0019 | | 1 |
| 25B. Dimethyl Phthalate (131-11-3) | X | | X | <0.0016 | | | | | | 1 | mg/l | lb/day | <0.0016 | | 1 |
| 26B. Di-N-Butyl Phthalate (84-74-2) | X | | X | <0.0025 | | | | | | 1 | mg/l | lb/day | <0.0025 | | 1 |
| 27B. 2,4-Dinitrotoluene (121-14-2) | X | | X | <0.0057 | | | | | | 1 | mg/l | lb/day | <0.0057 | | 1 |
| 28B. 2,6-Dinitrotoluene (606-20-2) | X | | X | <0.0019 | | | | | | 1 | mg/l | lb/day | <0.0019 | | 1 |
| 29B. Di-N-OctylPhthalate (117-84-0) | X | | X | <0.0025 | | | | | | 1 | mg/l | lb/day | <0.0025 | | 1 |
| 30B. 1,2-Diphenyl-hydrazine (as Azobenzene) (122-66-7) | X | | X | <0.003 | | | | | | 1 | mg/l | lb/day | <0.003 | | 1 |
| 31B. Fluoranthene (206-44-0) | X | | X | <0.0022 | | | | | | 1 | mg/l | lb/day | <0.0022 | | 1 |
| 32B. Fluorene (86-73-7) | X | | X | <0.0019 | | | | | | 1 | mg/l | lb/day | <0.0019 | | 1 |
| 33B. Hexachlorobenzene (118-74-1) | X | | X | <0.0019 | | | | | | 1 | mg/l | lb/day | <0.0019 | | 1 |
| 34B. Hexachlorobutadiene (87-68-3) | X | | X | <0.0009 | | | | | | 1 | mg/l | lb/day | <0.0009 | | 1 |
| 35B. Hexachlorocyclo-pentadiene (77-47-4) | X | | X | <0.001 | | | | | | 1 | mg/l | lb/day | <0.001 | | 1 |
| 36B. Hexachloroethane (67-72-1) | X | | X | <0.0016 | | | | | | 1 | mg/l | lb/day | <0.0016 | | 1 |
| 37B. Indeno (1,2,3-cd) Pyrene (193-39-5) | X | | X | <0.0037 | | | | | | 1 | mg/l | lb/day | <0.0037 | | 1 |
| 38B. Isophorone (78-59-1) | X | | X | <0.0022 | | | | | | 1 | mg/l | lb/day | <0.0022 | | 1 |
| 39B. Naphthalene (91-20-3) | X | | X | <0.0016 | | | | | | 1 | mg/l | lb/day | <0.0016 | | 1 |
| 40B. Nitrobenzene (98-95-3) | X | | X | <0.002 | | | | | | 1 | mg/l | lb/day | <0.002 | | 1 |
| 41B. N-Nitrosodimethylamine (62-75-9) | X | | X | <0.003 | | | | | | 1 | mg/l | lb/day | <0.003 | | 1 |
| 42B. N-Nitrosodi-N-Propylamine (621-64-7) | X | | X | <0.002 | | | | | | 1 | mg/l | lb/day | <0.002 | | 1 |


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| 1. POLLUTANT AND CAS NUMBER (if available) | 2. MARK 'X' a. Testing Required | b. Believed Present | c. Believed Absent | 3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION | (2) MASS | b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION | (2) MASS | c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION | (2) MASS | d. NO. OF ANALYSES | 4. UNITS a. CONCENTRATION | b. MASS | 5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION | (2) MASS | b. NO. OF ANALYSES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GC/MS FRACTION — BASE/NEUTRAL COMPOUNDS *(continued)* | | | | | | | | | | | | | | | |
| 43B. N-Nitrosodiphenylamine (86-30-6) | X | | X | <0.0019 | | | | | | 1 | mg/l | lb/day | <0.0019 | | 1 |
| 44B. Phenanthrene (85-01-8) | X | | X | <0.0054 | | | | | | 1 | mg/l | lb/day | <0.0054 | | 1 |
| 45B. Pyrene (129-00-0) | X | | X | <0.0019 | | | | | | 1 | mg/l | lb/day | <0.0019 | | 1 |
| 46B. 1,2,4-Trichlorobenzene (120-82-1) | X | | X | <0.0019 | | | | | | 1 | mg/l | lb/day | <0.0019 | | 1 |
| GC/MS FRACTION — PESTICIDES | | | | | | | | | | | | | | | |
| 1P. Aldrin (309-00-2) | | | X | <0.003 | | | | | | 1 | mg/l | lb/day | <0.003 | | 1 |
| 2P. α-BHC (319-84-6) | | | X | <0.003 | | | | | | 1 | mg/l | lb/day | <0.003 | | 1 |
| 3P. β-BHC (319-85-7) | | | X | <0.003 | | | | | | 1 | mg/l | lb/day | <0.003 | | 1 |
| 4P. γ-BHC (58-89-9) | | | X | <0.003 | | | | | | 1 | mg/l | lb/day | <0.003 | | 1 |
| 5P. δ-BHC (319-86-8) | | | X | <0.003 | | | | | | 1 | mg/l | lb/day | <0.003 | | 1 |
| 6P. Chlordane (57-74-9) | | | X | <0.003 | | | | | | 1 | mg/l | lb/day | <0.003 | | 1 |
| 7P. 4,4'-DDT (50-29-3) | | | X | <0.003 | | | | | | 1 | mg/l | lb/day | <0.003 | | 1 |
| 8P. 4,4'-DDE (72-55-9) | | | X | <0.003 | | | | | | 1 | mg/l | lb/day | <0.003 | | 1 |
| 9P. 4,4'-DDD (72-54-8) | | | X | <0.003 | | | | | | 1 | mg/l | lb/day | <0.003 | | 1 |
| 10P. Dieldrin (60-57-1) | | | X | <0.003 | | | | | | 1 | mg/l | lb/day | <0.003 | | 1 |
| 11P. α-Endosulfan (115-29-7) | | | X | <0.003 | | | | | | 1 | mg/l | lb/day | <0.003 | | 1 |
| 12P. β-Endosulfan (115-29-7) | | | X | <0.003 | | | | | | 1 | mg/l | lb/day | <0.003 | | 1 |
| 13P. Endosulfan Sulfate (1031-07-8) | | | X | <0.003 | | | | | | 1 | mg/l | lb/day | <0.003 | | 1 |
| 14P. Endrin (72-20-8) | | | X | <0.001 | | | | | | 1 | mg/l | lb/day | <0.001 | | 1 |
| 15P. Endrin Aldehyde (7421-93-4) | | | X | <0.003 | | | | | | 1 | mg/l | lb/day | <0.003 | | 1 |
| 16P. Heptachlor (76-44-8) | | | X | <0.003 | | | | | | 1 | mg/l | lb/day | <0.003 | | 1 |



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| EPA I.D. NUMBER (copy from Item 1 of Form 1) | OUTFALL NUMBER |
|---|---|
| GA0026786 | 001 |

*Form Approved.*
*OMB No. 2040-0086*
*Approval expires 7-31-88*

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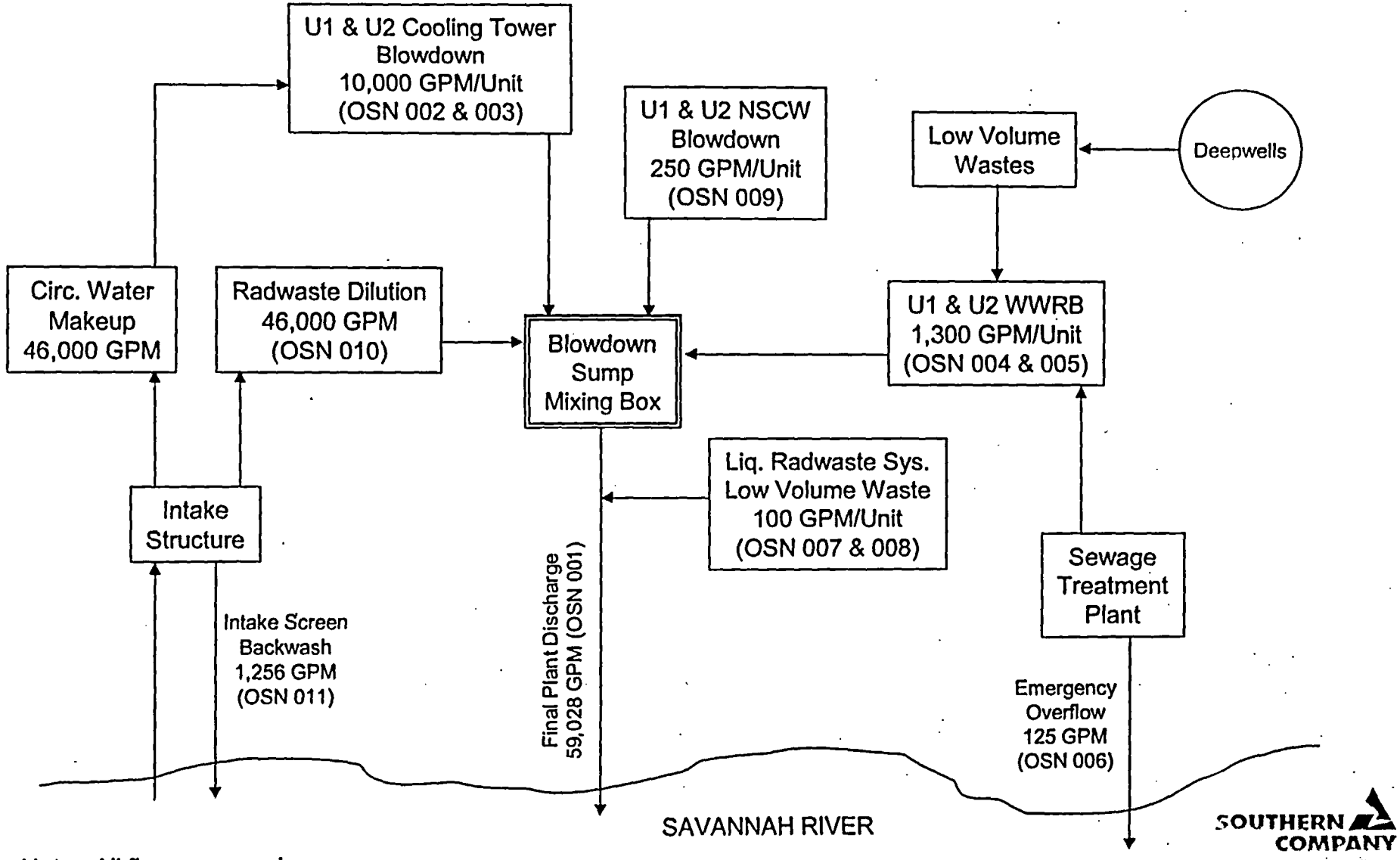
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GC/MS FRACTION — PESTICIDES (continued) | | | | | | | | | | | | | | | |
| 17P. Heptachlor Epoxide (1024-57-3) | | | X | <0.003 | | | | | | 1 | mg/l | lb/day | <0.003 | | 1 |
| 18P. PCB-1242 (53469-21-9) | | | X | <0.005 | | | | | | 1 | mg/l | lb/day | <0.005 | | 1 |
| 19P. PCB-1254 (11097-69-1) | | | X | <0.005 | | | | | | 1 | mg/l | lb/day | <0.005 | | 1 |
| 20P. PCB-1221 (11104-28-2) | | | X | <0.005 | | | | | | 1 | mg/l | lb/day | <0.005 | | 1 |
| 21P. PCB-1232 (11141-16-5) | | | X | <0.005 | | | | | | 1 | mg/l | lb/day | <0.005 | | 1 |
| 22P. PCB-1248 (12672-29-6) | | | X | <0.005 | | | | | | 1 | mg/l | lb/day | <0.005 | | 1 |
| 23P. PCB-1260 (11096-82-5) | | | X | <0.005 | | | | | | 1 | mg/l | lb/day | <0.005 | | 1 |
| 24P. PCB-1016 (12674-11-2) | | | X | <0.005 | | | | | | 1 | mg/l | lb/day | <0.005 | | 1 |
| 25P. Toxaphene (8001-35-2) | | | X | <0.003 | | | | | | 1 | mg/l | lb/day | <0.003 | | 1 |

# Vogtle Electric Generating Plant Flow Diagram

**Attachment to EPA Form 2C, Section II.A**
**NPDES Permit No. GA0026786**




Note: All flows are maximum.

SOUTHERN COMPANY
Energy to Serve Your World

**Form 2C, Attachment 1**
**Item II.C. Intermittent and Miscellaneous Flows**

| Outfall | Description of Flow |
|---|---|
| 002/003 – Units 1 and 2 Cooling Tower Blowdown | These points represent the blowdown from the Unit 1 and Unit 2 Turbine Plant Cooling Towers. Each tower recirculates river water used to cool turbine condensate via a heat exchanger. Periodic blowdown or discharge from the system is necessary to maintain the cycles of concentration in the circulating water system to prevent the build-up of solids. The estimated flow rate during a blowdown event is approximately 4,000 gpm for an approximate duration of 3-4 hours. The discharge is routed to the Blowdown Sump Mixing Box which is a final mixing chamber. |
| 002A/003A – Units 1 and 2 Cooling Tower Overflow to Storm Drains | These points are utilized for cooling tower basin overflow to storm drains. Overflow events occur infrequently and are generally the result of an operational problem with the system. The estimated flow rate in the event of an overflow of the basins is 2,000 gpm for an approximate duration of 1-2 hours. |
| 004/005 – Units 1 and 2 Waste Water Retention Basins | These points represent the permanent collection basins (420,000 gallon capacity each) for plant low volume waste streams. The basins provide aeration and retention time for the wastes. Each basin has two transfer pumps which discharge the effluent to the Blowdown Sump Mixing Box. The pumping capacity will all four pumps running is rated at 2,600 gpm. |
| 006 – Sewage Treatment Plant Emergency Overflow | This point represents the collection point for discharge from the plant sewage treatment plant in the event of an emergency. During normal operation, discharge from the sewage treatment plant is routed to the Waste Water Retention Basins. The discharge during emergency overflow is approximately 125 gpm, and emergency overflow events occur infrequently. |
| 007/008 – Units 1 and 2 Liquid Radwaste Systems Discharge | These points represent wastewater generated in the Reactor Building and Auxiliary Building which may be slightly radioactive. Radiologically contaminated fluids are treated and monitored for radioactivity levels in accordance with Nuclear Regulatory Commission (NRC) regulations prior to release. The maximum flow is approximately 200 gpm (combined for both units). |

**Form 2C, Attachment 1 (Continued)**
**Item II.C. Intermittent and Miscellaneous Flows**

| Outfall | Description of Flow |
|---|---|
| 009 – Nuclear Service Cooling Towers (Units 1 and 2) | This point represents the system which supplies cooling water for safety related equipment. Each unit has its own separate NSCW system which consists of two cooling towers. The discharge of each tower is routed to the Blowdown Sump Mixing Box. The maximum combined flow for both units is approximately 500 gpm. |
| 010 – Radwaste Dilution Flow | This point represents an internal stream consisting of river water with no additives. The discharge is routed to the Blowdown Sump Mixing Box to provide dilution water for radwaste discharges. The maximum flow for this discharge point is approximately 46,000 gpm. |
| 011 – Intake Screen Backwash | This point represents a discharge consisting only of river water with no additives. The flow is used to backwash the intake screens, and is returned directly to the Intake Canal. Maximum flow for this discharge point is approximately 1,256 gpm. |

# Requested Permit Revisions

**Vogtle Electric Generating Plant**
**NPDES No. GA0026786**

Submitted by Southern Nuclear Operating Company
December 2003

SOUTHERN COMPANY

**Vogtle Electric Generating Plant NPDES Permit Renewal**
**Proposed Changes**

---

The following is a list of the proposed changes to the Vogtle Electric Generating Plant NPDES permit:

1. Change the sampling frequency for outfalls 007 and 008 (Liquid Radwaste System Unit 1 and Unit 2) from once per quarter to once per six months. Past data indicates that these discharges are consistently meeting limitations and that more frequent sampling is not warranted.

2. Southern Nuclear requests the addition of the following item to the Special Requirements section of the permit.

   *"In accordance with 40 CFR 122.41(m)(2), the permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs (m)(3) and (m)(4) of 40 CFR 122.41 or section II.A.5 of this permit. Sampling results from a bypass of this nature shall be reported in a suitably concise format on the quarterly Operation Monitoring Report (OMR) for the period in which the bypass occurred."*

3. For outfalls 002, 003, 002A, and 003A, change footnote 8 to apply to both Chromium and Zinc. This change would be consistent with other Southern Nuclear NPDES permits issued by EPD.

# Whole Effluent Toxicity Chronic Testing
# Summary Report

## Vogtle Electric Generating Plant
## NPDES No. GA0026786

Submitted by Southern Nuclear Operating Company
December 2003

SOUTHERN COMPANY

# CHRONIC TOXICITY TESTING REPORT

## SOUTHERN NUCLEAR
## PLANT VOGTLE EFFLUENT

**WAYNESBORO, GEORGIA**

**Test Period: November 18-25, 2003**

**Prepared for:**

## Southern Nuclear

**Birmingham, Alabama**

**December 2003**

MACTEC

December 3, 2003

Mr. Greg Elmore
Southern Nuclear
40 Inverness Center Parkway
Birmingham, AL 35242
Fax: 205-992-6108

Subject: **Chronic Toxicity Testing of Southern Nuclear Plant Vogtle Effluent, Waynesboro, Georgia, November 18-25, 2003**
**MACTEC Project 6308-03-0045**

Dear Mr. Elmore:

MACTEC Engineering and Consulting, Inc. (MACTEC) BioTox Laboratory has completed multi-concentration chronic toxicity testing using the water flea, *Ceriodaphnia dubia*, and fathead minnow, *Pimephales promelas*, on Southern Nuclear's Plant Vogtle effluent samples collected by Southern Nuclear personnel November 16-21, 2003.

Plant Vogtle's Instream Waste Concentration (IWC, or the estimated concentration of effluent in the receiving stream during low flow conditions, 7Q10) designated for the permitted discharge of effluent into the receiving stream is 3.18% effluent. Chronic toxicity was not exhibited to water flea survival or reproduction at the IWC when statistically compared to the control treatment. The No Observable Effect Concentration (NOEC), or the highest concentration tested that did not exhibit chronic toxicity, was 25.4% effluent for water flea survival and reproduction. When the NOEC is less than the IWC, chronic toxicity is indicated in the effluent samples submitted. In this case, the water flea NOECs are not less than the IWC; therefore, chronic toxicity was not indicated to the water flea in Plant Vogtle's effluent.

Chronic toxicity was not exhibited to fathead minnow survival or growth at the IWC when statistically compared to the control treatment. The NOEC, therefore, was 100% effluent for fathead minnow survival and growth. The NOECs for fathead minnow survival and growth are not less than the IWC; therefore, chronic toxicity was not indicated to the fathead minnow in Plant Vogtle effluent.

Results are summarized in the accompanying report (55 total pages). All test results contained herein comply with the requirements of the National Environmental Laboratory Accreditation Conference (NELAC). A summary of test conditions, as well as chemical and physical data, are located in Appendix A (10 total pages). Sample collection locations, dates, times, and temperatures. are located in the attached chain of custody documents in Appendix B (4 total pages). Test organism source data are located in Appendix C (4 total pages). Raw laboratory data and statistical analyses results are located in Appendix D (24 total pages).



MACTEC Engineering and Consulting
3200 Town Point Drive NW, Suite 100 • Kennesaw, GA 30144
770-421-3400 • Fax: 770-421-3486

If there are any questions, please do not hesitate to contact Andrew S. Peiken at (770) 421-7027.

Sincerely,

MACTEC ENGINEERING AND CONSULTING, INC.

Andrew S. Peiken

Andrew S. Peiken, C.E.
BioTox Laboratory Manager

Margaret E. Tanner

Margaret E. Tanner
Senior Environmental Engineer

Attachment: Data Report

# TEST SUMMARY

## I. Client

| | |
|---|---|
| Facility Tested: | Southern Nuclear<br>Plant Vogtle<br>River Road<br>Waynesboro, Georgia 30830 |
| NPDES Number: | GA0026786 |
| Samples Tested: | Plant Vogtle Effluent (MACTEC LAB ID # 03-0160-01, 03-0162-01, 09-0164-01) |

## II. Laboratory Accreditation

| | |
|---|---|
| Laboratory: | BioTox Laboratory<br>Mactec Engineering and Consulting, Inc.<br>3200 Town Point Drive N.W., Suite 100<br>Kennesaw, Georgia 30144 |
| Accreditor: | State of Florida, Deptartment. of Health<br>Bureau of Laboratories |
| Accreditation ID: | Lab ID. E87477 |
| Category: | Non-Potable Water – Whole Effluent Toxicity |
| Effective: | July 1, 2003 through June 30, 2004 |

## III. Tests Conducted

| | |
|---|---|
| Test: | Water Flea, *Ceriodaphnia dubia*<br>Chronic Definitive Survival and Reproduction Test<br>EPA-821-R-02-013, 2002<br><br>Fathead minnow, *Pimephales promelas*<br>Chronic Definitive Larval Survival and Growth Test<br>EPA-821-R-02-013, 2002 |
| Test Dates(Times): | Water Flea: November 18 (1440) – 24 (1245), 2003<br>Fathead Minnow: November 18 (1500) – 25 (1645), 2003 |
| Source/Age of Organisms: | Water Flea: In-house cultures, ID# CERB01110703 /< 24 hours<br>Fathead minnow: C-K, ID# CS906111803 / < 48 hours |
| Test Concentrations: | Control, 1.59%, 3.18%, 6.36%, 12.72%, and 25.4% effluent |

Control Water: Water Flea: DMW, Diluted Mineral Water, 20-percent Perrier.
Fathead minnow: LWC, moderately hard reconstituted fresh water.

Deviation From Test None

Statistical Analyses: Toxstat 3.5 (Gulley, 1996)

## IV. Results

**Survival and Reproduction Data for Water Fleas Exposed for Six Days[d] to Plant Vogtle Effluent, November 18-24, 2003.**

| % Total Effluent | Survival (%) | Reproduction[a] |
|---|---|---|
| Laboratory Control[b] | 100 | 18.2 |
| 1.59 | 90 | 19.2 |
| 3.18 | 100 | 19.4 |
| 6.36 | 100 | 20.3 |
| 12.72 | 100 | 22.9 |
| 25.44 | 100 | 21.4 |
| **NOEC[c] (% Effluent)** | **25.44** | **25.44** |

Prepared by: ASP 12/3/03
Checked by: SEC 12/3/03

[a] Mean number of young (neonates) per original number of female water fleas, excluding those accidentally killed.
[b] DMW = Diluted Mineral Water, Moderately Hard Synthetic Freshwater
[c] NOEC = No Observable Effect Concentration See Section V. Summary for explanation.
[d] Test ends when 60% of the surviving controls have had third brood.

**Survival and Growth Data for Fathead Minnows Exposed for Seven Days to Plant Vogtle Effluent, November 18-25, 2003.**

| % Total Effluent | Survival (%) | Growth[a] (mg) |
|---|---|---|
| Laboratory Control[b] | 100 | 0.462 |
| 1.59 | 100 | 0.509 |
| 3.18 | 100 | 0.502 |
| 6.36 | 100 | 0.446 |
| 12.72 | 100 | 0.415 |
| 25.44 | 90 | 0.442 |
| **NOEC[c] (% Effluent)** | **25.44** | **25.44** |

Prepared by: ASP 12/3/03
Checked by: SEC 12/3/03

[a] Mean dry weight per original number of fish used at test start, excluding those that were accidentally killed or missing.
[b] LWC = Laboratory Water Control, Moderately Hard Synthetic Freshwater
[c] NOEC = No Observable Effect Concentration. See Section V. Summary for explanation.

## V. Summary

Plant Vogtle's Instream Waste Concentration (IWC, or the estimated concentration of effluent in the receiving stream during low flow conditions, 7Q10) designated for the permitted discharge of effluent into the receiving stream is 3.18% effluent. Chronic toxicity was not exhibited to water flea survival or reproduction at the IWC when statistically compared to the control treatment (see Figure 1). The No Observable Effect Concentration (NOEC), or the highest concentration tested that did not exhibit chronic toxicity, was 25.4% effluent for water flea survival and reproduction. When the NOEC is less than the IWC, chronic toxicity is indicated in the effluent samples submitted. In this case, the water flea NOECs are not less than the IWC; therefore, chronic toxicity was not indicated to the water flea in Plant Vogtle's effluent.

Chronic toxicity was not exhibited to fathead minnow survival or growth at the IWC when statistically compared to the control treatment (see Figure 2). The NOEC, therefore, was 100% effluent for fathead minnow survival and growth. The NOECs for fathead minnow survival and growth are not less than the IWC; therefore, chronic toxicity was not indicated to the fathead minnow in Plant Vogtle effluent.

## VI. Quality Assurance

*Ceriodaphnia dubia*, NaCl Reference Toxicant, RT#122CCD, 10/21/03
Survival: $IC_{25}$ = 2,333 mg/L NaCl **(ACCEPTABLE)**
$IC_{25}$ Range of Acceptability = 900 to 3,460 mg/L NaCl
Reproduction: $IC_{25}$ = 823 mg/L NaCl **(ACCEPTABLE)**
$IC_{25}$ Range of Acceptability = 440 to 1,560 mg/L NaCl

*Pimephales promelas*, NaCl Reference Toxicant, RT#147CPP, 10/21/03
Survival: $IC_{25}$ = 3,182 mg/L NaCl **(ACCEPTABLE)**
$IC_{25}$ Range of Acceptability = 1,400 to 5,800 mg/L NaCl
Growth: $IC_{25}$ = 2,135 mg/L NaCl **(ACCEPTABLE)**
$IC_{25}$ Range of Acceptability = 1,270 to 4,150 mg/L NaCl

## GLOSSARY AND ABBREVIATIONS

| | |
|---|---|
| Acute | Involving a stimulus severe enough to rapidly induce a response; in toxicity tests, a response observed in 96 hours or less typically is considered acute. |
| Chronic | Involving a stimulus that lingers or continues for a relatively long period of time, often one-tenth of the life span or more. A chronic effect can be lethality, growth, reduced reproduction, etc. |
| Chronic | A numeric value representing the geometric mean of the NOEC (No Observed Effect Concentration) and the LOEC (Lowest Observed Effect Concentration) by chronic toxicity testing. The chronic value is an estimate of the toxicant concentration that will be the actual no effect concentration based on the chronic effect tested. |
| Critical Value | Minimum numeric value for a toxicity test endpoint (i.e., survival, growth, or reproduction) below which a given test result will be statistically significantly different from the control value. |
| DMW | Diluted Mineral Water |
| EC | Effective Concentration, a point estimate of the toxicant concentration that would cause an adverse response such as death, immobilization, or serious incapacitation. |
| Ft-c | Foot candles - a measure of light intensity |
| Graphical Method | Log concentration versus percent mortality method. Toxicity test data are plotted on 2-cycle semi-log graph paper. The logarithmic axis (y axis) is used for percent effluent concentration, and the linear axis (x axis) is used for percent mortality. The graph provides a reasonably accurate estimate of the $LC_{50}$, but does not provide a confidence interval. |
| IC | Inhibition Concentration, a point estimate of the toxicant concentration that would cause a given percent reduction in a biological measurement such as fecundity or growth. |
| LC | Lethal Concentration, identical to EC when the observed response is death. |
| $LC_{50}$ | The toxicant concentration that is lethal to 50 percent of exposed organisms at a specific time of observation. |
| LCL | Lower 95-percent Confidence Limit |
| LOEC | Lowest-Observed-Effect-Concentration, the lowest concentration of toxicant to which organisms are exposed that causes adverse effects. |
| LWC | Lab Water Control, moderately hard synthetic freshwater prepared from MILLIPORE MILLI-Q$^R$ water and reagent grade chemicals. |

| | |
|---|---|
| NOEC | No-Observed-Effect-Concentration, the highest concentration of toxicant to which organisms are exposed that causes no observable adverse effects. |
| Probit Analyses | Probit Analysis consists of a group of statistical methods used to analyze data from concentration-response experiments, and provides an estimate of the $LC_{50}$ and the precision of this estimate. In Probit Analysis, the percentages of affected organisms are converted to Probits (probability units), and the effluent concentrations are converted to logarithms. The relationship between the Probits and the logarithmic values of the concentrations is approximately linear. A Probit regression line drawn through the data points is used to estimate the $LC_{50}$ and its precision estimate. To use Probit Analysis, at least two partial mortalities must be obtained in the toxicity test. |
| RWC | Receiving Water Control |
| UCL | Upper 95-percent Confidence Limit |
| $\mu E/m^2/s$ | Micro-ergs per square meter per second - a measure of light intensity |

## REFERENCES

Gulley, D.D., and WEST, Inc. 1996. TOXSTAT version 3.5. Fish Physiology and Toxicology Laboratory. Department of Zoology and Physiology. University of Wyoming. Laramie, Wyoming.

U.S. Environmental Protection Agency. 1979. Methods for Chemical Analysis of Water and Wastes. Environmental Monitoring Laboratory, U.S. Environmental Protection Agency, Cincinnati, OH. EPA 600/4-79-020.

U.S. Environmental Protection Agency. 1999. Errata for Effluent and Receiving Water Toxicity Testing Manuals: Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms; Short-Term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Waters to Freshwater Organisms; and Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms. U.S. Environmental Protection Agency, Office of Research and Development, Duluth, MN. EPA/600/R-98/182.

U.S. Environmental Protection Agency. 2002. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms. Fourth Edition. Office of Water (4303T), U.S. Environmental Protection Agency, Washington, DC. EPA-821-R-02-013.

# FIGURES

## Figure 1. Southern Nuclear Plant Vogtle Effluent Water Flea Chronic Toxicity Test 11/18-24/03

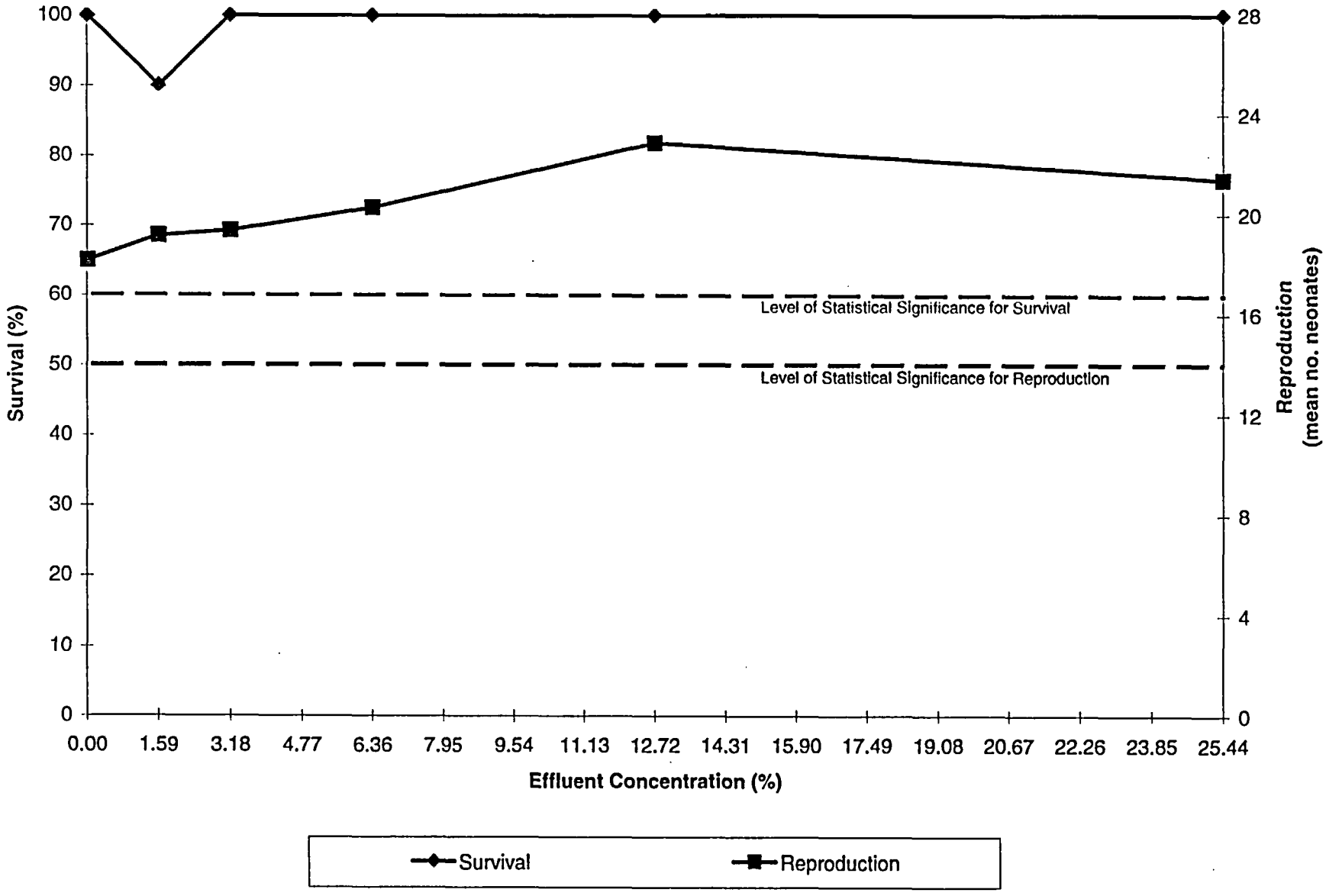
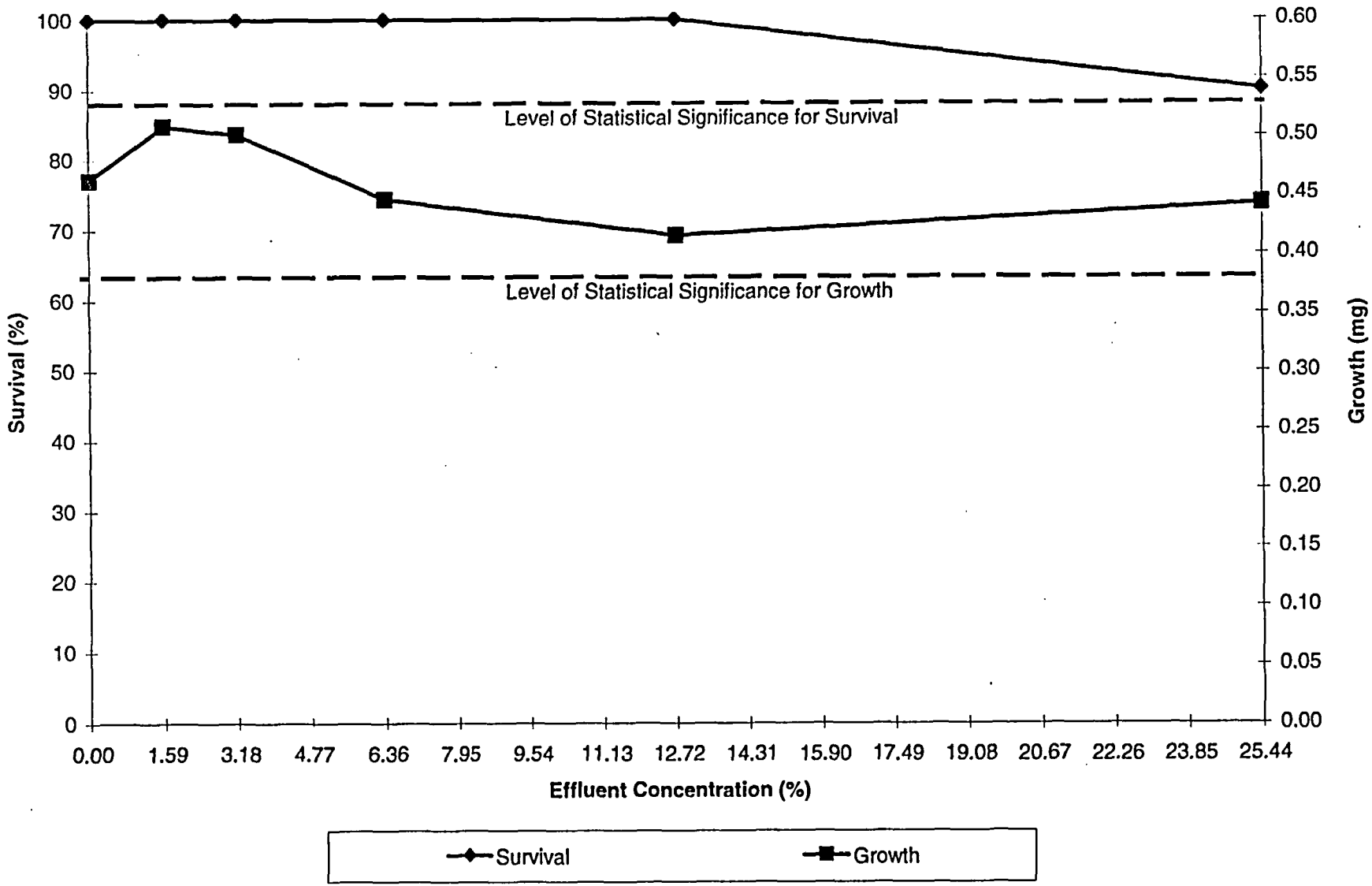


**Figure 2. Southern Nuclear Plant Vogtle Effluent**
**Fathead Minnow Chronic Toxicity Test**
**11/18-25/03**



# APPENDICES

# APPENDIX A

## Chemical and Physical Data

**Initial Chemical Characterization of Plant Vogtle Effluent, LWC, and DMW Used in Short-term Chronic Toxicity Tests, November 18-25, 2003.**

| Parameter | 100% Effluent | | | Lab Water Control[a] | Diluted Mineral Water[b] |
|---|---|---|---|---|---|
| Sample date | 11/16-17/03 | 11/18-19/03 | 11/20-21/03 | 11/18/03 | 11/18/03 |
| Date received | 11/18/03 | 11/20/03 | 11/22/03 | 11/18/03 | 11/18/03 |
| Temperature upon receipt (°C) | 1.5 | 2.0 | 1.0 | 25.0 | 25.0 |
| Dissolved Oxygen (mg/L) | 8.94 | 8.92 | 8.48 | 7.40 | 7.74 |
| pH | 7.09 | 8.79 | 7.31 | 6.95 | 6.96 |
| Total Alkalinity as $CaCO_3$ (mg/L) | 97.5 | 167.5 | 182.5 | 75.0 | 77.5 |
| Total Hardness as $CaCO_3$ (mg/L) | 56.0 | 96.0 | 98.0 | 92.0 | 82.0 |
| Conductivity @25°C (µmhos/cm) | 358 | 646 | 577 | 327 | 163 |
| Residual chlorine (mg/L)[c] | 0.07 | 0.09 | 0.07 | <0.01 | <0.01 |
| Ammonia-nitrogen $NH_3$-N (mg/L)[c] | 0.18 | 0.20 | 0.41 | <0.01 | <0.01 |

Unless otherwise noted, all chemical analyses determined according to EPA 600/4-79-020.
[a] LWC, moderately hard reconstituted fresh water
[b] DMW, diluted mineral water, moderately hard fresh water
[c] Determined by Hach Spectrophotometric Test Kit

Prepared by: ASP 12/3/03
Checked by: SEC 12/13/03

**Summary of Toxicity Test Conditions for the Water Flea, *Ceriodaphnia dubia*, Survival and Reproduction Test.**

| | | |
|---|---|---|
| 1. | Test type: | Static renewal definitive |
| 2. | Temperature (°C): | 23.5-26.0 °C |
| 3. | Light quality: | Ambient laboratory illumination |
| 4. | Light intensity: | 10-20 $\mu E/m^2/s$, or 50-100 ft-c |
| 5. | Photoperiod: | 16-hr. light, 8-hr. darkness |
| 6. | Test chamber size: | 30 mL |
| 7. | Test solution volume: | 15 mL/replicate |
| 8. | Renewal of test concentrations: | Daily |
| 9. | Age of test organisms: | Newly hatched neonates < 24-hr. old |
| 10. | No. neonates per test chamber: | 1 |
| 11. | No. replicate chambers per concentration: | 10 |
| 12. | No. neonates per concentration: | 10 |
| 13. | Feeding regime: | Fed 0.1 mL each of YCT and algae suspension per test chamber daily |
| 14. | Aeration: | None |
| 15. | Dilution water: | Moderately hard synthetic water is prepared using MILLIPORE MILLI-Q[R] and Perrier. |
| 16. | Effluent concentrations: | Control, 1.59%, 3.18%, 6.36%, 12.72%, and 25.4% effluent |
| 17. | Dilution factor: | 0.5 |
| 18. | Test duration: | 6 days, 60% of control females had 3 broods |
| 19. | End points: | Survival and reproduction |
| 20. | Test acceptability: | 80% or greater survival in controls; Average of 15 or more young/surviving female in the control solutions. At least 60% of surviving females in controls should have produced their third brood. |
| 21. | Sampling requirement: | Samples are collected daily, and used within 36-hr. of the time they are removed from the sampling device |
| 22. | Sample volume required: | 1.0 L per day |

**Summary of Toxicity Test Conditions for the Fathead Minnow, *Pimephales promelas*, Larval Survival and Growth Test.**

| | | |
|---|---|---|
| 1. | Test type: | Static renewal definitive |
| 2. | Temperature (°C): | 24.0-26.0°C |
| 3. | Light quality: | Ambient laboratory illumination |
| 4. | Light intensity: | 10-20 $\mu E/m^2/s$, or 50-100 ft-c |
| 5. | Photoperiod: | 16 hrs. light, 8 hrs. darkness |
| 6. | Test chamber size: | 400 mL |
| 7. | Test solution volume: | 250 mL/replicate |
| 8. | Renewal of test concentrations: | Daily |
| 9. | Age of test organisms: | Newly hatched larvae < 24-hr. old |
| 10. | No. larvae per test chamber: | 10 |
| 11. | No. replicate chambers per concentration: | 4 |
| 12. | No. larvae per concentration: | 40 |
| 13. | Feeding regime: | Fed approximately 0.1 to 0.3 mL newly hatched (less than 24-hr. old) brine shrimp nauplii three times daily. Larvae are not fed during the final 12-hr. of the test. |
| 14. | Cleaning: | Siphoned daily, immediately before test solution renewal |
| 15. | Aeration: | None |
| 16. | Dilution water: | Moderately hard synthetic water prepared using MILLIPORE MILLI-Q[R] and reagent grade chemicals |
| 17. | Effluent concentrations: | Control, 1.59%, 3.18%, 6.36%, 12.72%, and 25.4% effluent |
| 18. | Dilution factor: | 0.5 |
| 19. | Test duration: | 7 days |
| 20. | End points: | Survival and growth (dry weight) |
| 21. | Test acceptability: | 80% or greater survival in controls; Average dry weight of surviving controls equals or exceeds 0.25 mg. |
| 22. | Sampling requirement: | A minimum of three samples are collected during testing |
| 23. | Sample volume required: | 4.0 L per day |

# MACTEC ENGINEERING AND CONSULTING, INC.
## BIOTOX LABORATORY
## DAILY WATER QUALITY DATA
(STANDARD EPA CHRONIC TOXICITY TEST)

CLIENT: Southern Nuclear
SAMPLE: Plant Vogtle Effluent
LOCATION: Waynesboro, GA
NPDES NO.: GA 26786

TEST TYPE: Cerio Definitive
AERATION REQUIRED: N
TEST CHAMBER SIZE: 30 ml
TEST SOLUTION VOL.: 15 ml

DILUTION/CONTROL ID: DMW01111703
ORGANISM ID: CERB01110703
FOOD TYPE: YCS/Selenastrum
DATE/TIME ORGANISMS FED: 1 X Daily

| DATE/ANALYST | | 11/18/03 GW | | | | | 11/23/03 GW | | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|
| CONTROL: | | DMW | | | | | | | |
| D.O. | INITIAL | 7.74 | 8.04 | 7.44 | 7.88 | 7.56 | 7.32 | | |
| | FINAL | 7.35 | 7.60 | 8.20 | 8.10 | AM ~~6.15~~ 7.95 | 7.66 | | |
| pH | INITIAL | 6.96 | 7.86 | 7.63 | 7.87 | 7.77 | 7.54 | | |
| | FINAL | 7.78 | 7.83 | 8.56 | 7.84 | 7.99 | 6.78 | | |
| ALKALINITY | | 77.5 | | | | | | | |
| HARDNESS | | 82 | | | | | | | |
| CONDUCTIVITY | | 163 | | | | | | | |
| TRC mg/l | | <0.01 | | | | | | | |
| NH3 mg/l | | <0.01 | | | | | | | |

| CONCENTRATION: | | 1.59% | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| D.O. | INITIAL | 7.75 | 7.92 | 8.03 | 7.85 | 7.50 | 7.35 | | |
| | FINAL | 7.35 | 7.77 | 8.18 | 8.08 | 7.80 | 7.67 | | |
| pH | INITIAL | 7.0 | 7.81 | 7.68 | 7.94 | 7.74 | 7.60 | | |
| | FINAL | 7.74 | 7.84 | 9.57 | 7.77 | 8.01 | 6.49 | | |
| ALKALINITY | | | | | | | | | |
| HARDNESS | | | | | | | | | |
| CONDUCTIVITY | | | | | | | | | |
| TRC mg/l | | | | | | | | | |
| NH3 mg/l | | | | | | | | | |

| CONCENTRATION: | | 3.18% | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| D.O. | INITIAL | 7.74 | 7.68 | 8.10 | 7.80 | 7.52 | 7.38 | | |
| | FINAL | 7.74 | 7.78 | 8.04 | 8.07 | 7.62 | 7.74 | | |
| pH | INITIAL | 7.02 | 7.85 | 7.70 | 8.16 | 7.84 | 7.77 | | |
| | FINAL | 7.75 | 7.80 | 8.55 | 7.62 | 8.06 | 7.05 | | |
| ALKALINITY | | | | | | | | | |
| HARDNESS | | | | | | | | | |
| CONDUCTIVITY | | | | | | | | | |
| TRC mg/l | | | | | | | | | |
| NH3 mg/l | | | | | | | | | |

| CONCENTRATION: | | 6.36% | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| D.O. | INITIAL | 7.82 | 7.53 | 8.09 | 7.85 | 7.48 | 7.32 | | |
| | FINAL | 7.40 | 7.58 | 8.00 | 8.05 | 7.58 | 7.06 | | |
| pH | INITIAL | 7.06 | 7.84 | 7.71 | 8.34 | 7.90 | 7.75 | | |
| | FINAL | 7.74 | 7.79 | 8.51 | 7.58 | 8.18 | 7.01 | | |
| ALKALINITY | | | | | | | | | |
| HARDNESS | | | | | | | | | |
| CONDUCTIVITY | | | | | | | | | |
| TRC mg/l | | | | | | | | | |
| NH3 mg/l | | | | | | | | | |

| CONCENTRATION: | | 12.72% | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| D.O. | INITIAL | 7.69 | 7.30 | 8.20 | 7.82 | 7.47 | 7.34 | | |
| | FINAL | 7.38 | 7.50 | 7.99 | 8.10 | 7.50 | 7.56 | | |
| pH | INITIAL | 7.09 | 7.86 | 7.74 | 8.50 | 7.45 | 7.80 | | |
| | FINAL | 7.78 | 7.81 | 8.56 | 7.48 | 8.20 | 7.06 | | |
| ALKALINITY | | | | | | | | | |
| HARDNESS | | | | | | | | | |
| CONDUCTIVITY | | | | | | | | | |
| TRC mg/l | | | | | | | | | |
| NH3 mg/l | | | | | | | | | |

| CONCENTRATION: | | 25.44% | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| D.O. | INITIAL | 8.0 | 7.23 | 8.22 | 7.81 | AM ~~7.53~~ 7.48 | 7.32 | | |
| | FINAL | 7.35 | 7.54 | 7.92 | 8.08 | 7.53 | ~~7.68~~ 7.99 | | |
| pH | INITIAL | 7.10 | 7.83 | 7.75 | 8.58 | 7.79 | 7.86 | | |
| | FINAL | 7.78 | 7.84 | 8.53 | 7.26 | 8.22 | 6.48 | | |
| ALKALINITY | 100% | 97.5 | | 167.5 | | 182.5 | | | |
| HARDNESS | 100% | 56 | | 96 | | 98 | | | |
| CONDUCTIVITY | 100% | 358 uS/cm | | 641 uS/cm | | 577 uS/cm | | | |
| TRC mg/l | 100% | 0.07 | | 0.09 | | 0.07 | | | |
| NH3 mg/l | 100% | 0.18 | | 0.2 | | 0.41 | | | |

100% pH 7.07 100% pH 8.24 100% pH 7.31
100% DO 8.94 100% DO 8.92 100% DO 8.48

# MACTEC ENGINEERING AND CONSULTING, INC.
## BIOTOX LABORATORY
## DAILY WATER QUALITY DATA
(STANDARD EPA CHRONIC TOXICITY TEST)

CLIENT: Southern Nuclear
SAMPLE: Plant Vogtle Effluent
LOCATION: Waynesboro, GA
NPDES NO.: GA 26786

TEST TYPE: FHM Definitive
AERATION REQUIRED: N
TEST CHAMBER SIZE: 400 ml
TEST SOLUTION VOL.: 250 ml

DILUTION/CONTROL ID: LWC04111703
ORGANISM ID: CS906111803
FOOD TYPE: artemia
DATE/TIME ORGANISMS FED: 2 X Daily

| DATE/ANALYST | | 11/18/03 AIO | 11/19 AIO | 11/20 AIO | 11/21 AIO | 11/22 AIO | 11/23 AIO | 11/24 AIO | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|
| CONTROL: | | LWC | | | | | | | |
| D.O. | INITIAL | 7.40 | 7.20 | 7.70 | 7.31 | 7.25 | 7.00 | 7.06 | |
| | FINAL | 6.75 | 7.28 | 6.72 | 7.00 | 6.15 | 6.32 | 6.20 | |
| pH | INITIAL | 6.95 | 7.84 | 7.41 | 7.13 | 7.26 | 7.70 | 6.91 | |
| | FINAL | 7.72 | 7.68 | 7.75 | 7.26 | 7.91 | 6.73 | 6.95 | |
| ALKALINITY | | 75 | | | | | | | |
| HARDNESS | | 42 | | | | | | | |
| CONDUCTIVITY | | 327 | | | | | | | |
| TRC mg/l | | <0.01 | | | | | | | |
| NH3 mg/l | | <0.01 | | | | | | | |
| CONCENTRATION: | | 1.59% | | | | | | | |
| D.O. | INITIAL | 7.45 | 7.28 | 7.69 | 7.44 | 7.21 | 7.08 | 7.26 | |
| | FINAL | 6.41 | 7.12 | 6.78 | 7.03 | 6.20 | 6.36 | 6.22 | |
| pH | INITIAL | 6.90 | 7.85 | 7.44 | 7.28 | 7.34 | 7.70 | 6.90 | |
| | FINAL | 7.79 | 7.69 | 7.79 | 7.38 | 7.90 | 6.74 | 7.26 | |
| ALKALINITY | | | | | | | | | |
| HARDNESS | | | | | | | | | |
| CONDUCTIVITY | | | | | | | | | |
| TRC mg/l | | | | | | | | | |
| NH3 mg/l | | | | | | | | | |
| CONCENTRATION: | | 3.18% | | | | | | | |
| D.O. | INITIAL | 7.42 | 7.31 | 7.55 | 7.49 | 7.28 | 7.16 | 7.15 | |
| | FINAL | 6.45 | 7.18 | 7.06 | 7.05 | 6.15 | 6.78 | 6.79 | |
| pH | INITIAL | 6.80 | 7.80 | 7.52 | 7.56 | 7.58 | 7.72 | 6.94 | |
| | FINAL | 7.75 | 7.65 | 7.94 | 7.56 | 7.92 | 6.80 | 7.15 | |
| ALKALINITY | | | | | | | | | |
| HARDNESS | | | | | | | | | |
| CONDUCTIVITY | | | | | | | | | |
| TRC mg/l | | | | | | | | | |
| NH3 mg/l | | | | | | | | | |
| CONCENTRATION: | | 6.36% | | | | | | | |
| D.O. | INITIAL | 7.41 | 7.79 | 7.52 | 7.58 | 7.36 | 7.22 | 7.29 | |
| | FINAL | 6.53 | 7.07 | 6.95 | 7.02 | 6.18 | 6.39 | 6.35 | |
| pH | INITIAL | 6.86 | 7.79 | 7.68 | 7.49 | 7.77 | 7.78 | 6.83 | |
| | FINAL | 7.80 | 7.70 | 8.26 | 7.55 | 7.90 | 6.75 | 7.28 | |
| ALKALINITY | | | | | | | | | |
| HARDNESS | | | | | | | | | |
| CONDUCTIVITY | | | | | | | | | |
| TRC mg/l | | | | | | | | | |
| NH3 mg/l | | | | | | | | | |
| CONCENTRATION: | | 12.72% | | | | | | | |
| D.O. | INITIAL | 7.42 | 7.50 | 7.55 | 7.62 | 7.32 | 7.29 | 7.36 | |
| | FINAL | 6.59 | 7.10 | 6.84 | 7.10 | 7.22 | 6.35 | 6.41 | |
| pH | INITIAL | 6.89 | 7.81 | 7.72 | 8.36 | 7.90 | 7.83 | 6.83 | |
| | FINAL | 7.52 | 7.69 | 8.38 | 7.68 | 7.91 | 6.88 | 7.20 | |
| ALKALINITY | | | | | | | | | |
| HARDNESS | | | | | | | | | |
| CONDUCTIVITY | | | | | | | | | |
| TRC mg/l | | | | | | | | | |
| NH3 mg/l | | | | | | | | | |
| CONCENTRATION: | | 25.4% | | | | | | | |
| D.O. | INITIAL | 7.43 | 7.53 | 7.59 | 7.69 | 7.30 | 7.33 | 7.48 | |
| | FINAL | 6.65 | 7.05 | 6.87 | 7.0 | 6.19 | 6.30 | 6.38 | |
| pH | INITIAL | 6.85 | 7.82 | 7.71 | 8.57 | 7.97 | 7.86 | 6.76 | |
| | FINAL | 7.61 | 7.67 | 8.50 | 7.74 | 7.93 | 6.89 | 7.26 | |
| ALKALINITY | 100% | 177.5 | | 167.5 | | 182.5 | | | |
| HARDNESS | 100% | 56 | | 96 | | 98 | | | |
| CONDUCTIVITY | 100% | 355 µS/cm | | 646 µS/cm | | 577 µS/cm | | | |
| TRC mg/l | 100% | 0.07 | | 0.07 | | 0.07 | | | |
| NH3 mg/l | 100% | 0.18 | | 0.06 | | 0.01 | | | |

100% pH 7.09 100% pH 8.79 100% pH 7.31
100% DO 8.94 100% DO 8.92 100% DO 8.48

# MACTEC ENGINEERING AND CONSULTING
## BIOTOX LABORATORY
### TITRIMETRIC BENCH SHEET

| | |
|---|---|
| PARAMETER: HARDNESS | METHOD REFERENCE: EPA 130.2 |
| REAGENT REFERENCES: | ANALYST: SEC |
| 1) BUFFER: 429 | STANDARD REFERENCE: BKII p. 142 |
| 2) CALMAGITE: 228 | CURVE REFERENCE: HRD061603 |
| 3) 0.020 N DISODIUM EDTA: 478 | CLIENT: Southern Nuclear |

| SAMPLE | LAB SAMPLE ID NO. | DATE | SAMPLE VOLUME | $V_{INIT}$ (mL) | $V_{FINAL}$ (mL) | $V_{TOTAL}$ (mL) | STD CORR +/- mg/l | BLK CORR +/-mg/l | CONC (mg/L) |
|---|---|---|---|---|---|---|---|---|---|
| DMW | - | 11/18/03 | 25/50 | 0 | 2.10 | 2.10 | 0 | -2 | 82 |
| LWC | - | 11/18/03 | 25/50 | 0 | 2.35 | 2.35 | 0 | | 92 |
| DI Blank | - | 11/18/03 | 25/50 | 0 | 0 | 0 | 0 | | <0.01 |
| 50 mg/L Std. | - | 11/18/03 | 25/50 | 0 | 1.35 | 1.35 | 0 | | 52 |
| 100% Vogtle Eff. | 03-0160-01 | 11/18/03 | 25/50 | 0 | 1.45 | 1.45 | 0 | | 56 |
| 100% Vogtle Eff. | 03-0162-01 | 11/20/03 | 25/50 | 0 | 2.45 | 2.45 | 0 | | 96 |
| 100% Vogtle Eff. | 03-0164-01 | 11/22/03 | 25/50 | 0 | 2.50 | 2.50 | 0 | | 98 |

$$\text{Mg/L HARDNESS} = \frac{[V_{total} + (\text{BLANK CORR} + \text{STD CORR})] \times 50{,}000 \times N_{titrant}}{\text{SAMPLE VOLUME}}$$

REVIEWED BY: CKP

DATE: 12/1/03

# MACTEC ENGINEERING AND CONSULTING

## BIOTOX LABORATORY

### SPECTROPHOTOMETRIC BENCH SHEET

| | |
|---|---|
| PARAMETER: CHLORINE | WAVELENGTH: 530 NM |
| METHOD: HACH PROCEDURES 8167 | INSTRUMENT ID: HACH DR/2500 |
| ANALYST: Ojp | CURVE REFERENCE: CL2061603 |
| STANDARD REFERENCE: 461 | REAGENT REFERENCES: |
| CLIENT: Southern Nuclear | 1) DPD AccuVac: #474 |
| DATE: 11/18/03 | |

| SAMPLE | LAB SAMPLE ID NO. | DATE | %T | MG/L CURVE | CELL CORR FACTOR | STD/BLK CORR | FINAL CONC (MG/L) |
|---|---|---|---|---|---|---|---|
| DMW | - | 11/18/03 | 97.8 | <0.01 | 0 | 0 | <0.01 |
| LWC | - | 11/18/03 | 97.8 | <0.01 | 0 | | <0.01 |
| DI Blank | - | 11/18/03 | 97.8 | <0.01 | 0 | | <0.01 |
| 0.590 mg/L Std. | - | 11/18/03 | 48.1 | 0.558 | 0 | | 0.56 94.9% |
| 100% Vogtle Eff. | 03-0161-01 | 11/18/03 | 88.9 | 0.07 | 0 | | 0.07 |
| 100% Vogtle Eff. | 03-0162-01 | 11/20/03 | 86.6 | 0.09 | 0 | | 0.09 |
| 100% Vogtle Eff. | 03-0164-01 | 11/22/03 | 88.5 | 0.073 | 0 | | 0.07 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Mg/L CHLORINE = [ (Mg/L CURVE x CELL CORR) + (STANDARD + BLANK CORR) ]

REVEIWED BY: OJP

DATE: 12/1/03

MACTEC ENGINEERING AND CONSULTING

BIOTOX LABORATORY

SPECTROPHOTOMETRIC BENCH SHEET

| | |
|---|---|
| PARAMETER: AMMONIA | WAVELENGTH: 425 NM |
| METHOD: HACH "PROCEDURES 8038 | INSTRUMENT ID:HACH DR/2500 |
| ANALYST: Agp | CURVE REFERENCE: NH3051503 |
| STANDARD REFERENCE: Bk II, pg 148 | REAGENT REFERENCES: |
| CLIENT: Southern Nuclear | 1) NESSLER RGT: #424 |
| | 2) MINERAL STABILIZER: 441 3) PVA: 440 |

| SAMPLE ID | SAMPLE ID NO. | DATE | %T | MG/L CURVE | CELL CORR FACTOR | STD/BLK CORR | FINAL CONC (MG/L) |
|---|---|---|---|---|---|---|---|
| DMW | — | 11/18/03 | 87.1 | <0.01 | 0 | c | <0.01 |
| LWC | — | 11/18/03 | 87.1 | <0.01 | 0 | | <0.01 |
| 1.5 mg/L Std. | — | 11/18/03 | 13.3 | 1.4 | 0 | | 1.4 |
| DI Blank | — | 11/18/03 | 87.1 | <0.01 | 0 | | <0.01 |
| 100% Vogtle | 03-0161-01 | 11/18/03 | 63.6 | 0.182 | 0 | | 0.18 |
| 100% Vogtle | 03-0162-01 | 11/20/03 | 62.0 | 0.203 | 0 | | 0.20 |
| 100% Vogtle | 03-0164-01 | 11/21/03 | 47.6 | 0.412 | 0 | | 0.41 |

93.3%

Mg/L AMMONIA = [ (Mg/L CURVE x CELL CORR) + (STANDARD + BLANK CORR) ]

REVIEWED BY: Agp

DATE: 12/1/03

# MACTEC ENGINEERING AND CONSULTING
## BIOTOX LABORATORY
### TITRIMETRIC BENCH SHEET

| | |
|---|---|
| PARAMETER: ALKALINITY | METHOD REFERENCE: EPA 310.1 |
| REAGENT REFERENCES: | ANALYST: SEL |
| 1) 0.02 N H2SO4: 454 | STANDARD REFERENCE: BKII p. 141 |
| | CURVE REFERENCE: ALK061603 |
| | CLIENT: Southern Nuclear |

| SAMPLE ID | LAB ID No. | DATE | SAMPLE VOLUME | $V_{INIT}$ (mL) | $V_{FINAL}$ (mL) | $V_{TOTAL}$ (mL) | STD CORR (+/-) | BLK CORR (+/-) | CONC (mg/L) |
|---|---|---|---|---|---|---|---|---|---|
| DMW | – | 11/18/03 | 20/40 | 0 | 1.6 | 1.6 | 0 | -2.5 | 77.5 |
| LWC | – | 11/18/03 | 20/40 | 0 | 1.55 | 1.55 | 0 | | 75.0 |
| 125 mg/L Std. | – | 11/18/03 | 20/40 | 0 | 2.65 | 2.65 | 0 | | 130 |
| DI Blank | – | 11/18/03 | 20/40 | 0 | 0.05 | 0.05 | 0 | | <0.01 |
| 100% Vogtle | 03-0160-01 | 11/18/03 | 20/40 | 0 | 2.0 | 2.0 | 0 | | 97.5 |
| 100% Vogtle | 03-0162-01 | 11/20/03 | 20/40 | 0 | 3.4 | 3.4 | 0 | | 167.5 |
| 100% Vogtle | 03-0164-01 | 11/22/03 | 20/40 | 0 | 3.7 | 3.7 | 0 | | 182.5 |

$$\text{Mg/L ALKALINITY} = \frac{[\text{Vtotal} + (\text{BLANK CORR} + \text{STD CORR})] \times 50{,}000 \times \text{Ntitrant}}{\text{SAMPLE VOLUME}}$$

REVIEWED BY: agp

DATE: 12/1/03

# APPENDIX B

## Chain of Custody Records

# MACTEC

## CHAIN OF CUSTODY RECORD

№ 05129

MACTEC ENGINEERING AND CONSULTING
BIOTOX LABORATORY
3200 Town Point Drive NW, Suite 100
Kennesaw, GA 30144
(770) 421-3312 • FAX (770) 421-3314

**CLIENT INFORMATION**

NAME OF FACILITY: SNC - VOGTLE
STREET ADDRESS: P.O. Box 1600 (RIVER ROAD)
CITY/STATE: WAYNESBORO GA ZIP: 30830
NPDES # (NATIONAL OR STATE): GA 26786

**PROJECT NAME**: SNC - VOGTLE NPDES # GA 26786

**MACTEC PROJECT #**:

**SAMPLERS (SIGNATURE)**: [signature]

**SAMPLERS INITIALS (PRINT)**: JH

**SAMPLES SHIPPED VIA:**
FEDEX ✓ UPS ____ HAND ____ OTHER ____

COOLANT USED: ICE SHIP DATE 11-17-03

**SAMPLE INFORMATION**

GRAB SAMPLES: DATE/TIME ____ VOL. ____

TIME COMPOSITE: START DATE 11-16-03 START TIME 0800
END DATE 11-17-03 END TIME 0700
VOLUME OF SUBSAMPLES 100 ml TIME INCREMENT hourly
TOTAL VOL. 2400 ml

FLOW-PROPORTIONED COMPOSITE: INITIATED ____
ENDED ____ TOTAL VOL. ____
SET VOL. OF SUBSAMPLE / VOL. FLOW* ____

**FIELD PARAMETERS**

GRAB SAMPLES: pH ____
DO (mg/l) ____ TEMP (°C) ____
CHLORINE (residual, mg/L) ____

COMPOSITES: pH (last grab) 8.4
CHLORINE (residual, last grab, mg/L) ≤0.01 TR/FRO
TEMP (last grab, °C) 23
pH (composited sample, °C) 8.2
TEMP (composited sample, °C) 3°

| DATE | TIME | GRAB (x) | COMPOSITE (x) | MATRIX** | SAMPLE STATION DESCRIPTION | TOTAL # OF CONTAINERS | CONTAINER TYPE / NUMBER: 1 GALLON | 2 LITER | 1 LITER | OTHER | BIOTOX USE ONLY: TEMP (°C) | LAB # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11-17-03 | 0700 | | X | W | FINAL EFFLUENT | 2 | | | 2 | | 1.5 | 03-0160-01 |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| RELINQUISHED BY: (SIGNATURE) | DATE/TIME | RECEIVED BY: (SIGNATURE) | DATE/TIME | RELINQUISHED BY: (SIGNATURE) | RECEIVED BY LABORATORY: (SIGNATURE) | DATE/TIME |
|---|---|---|---|---|---|---|
| [signature] | 11/17/03 0835 | | | Fedex | Christen Parker | 11/18/03 095. |

*FOR VARIABLE VOLUME SUBSAMPLES BASED ON FLOW OR SET TIME INCREMENTS, ATTACH SAMPLE AND FLOW INFORMATION.

**BIOTOX USE ONLY**
ICE PRESENT? YES / N pH ____ RESIDUAL CL ____ D.O. ____ CONDUCTIVITY ____ VISUAL ____

****MATRIX**
WATER - W SLUDGE - SL
SOIL - SO OTHER - NA
SEDIMENT - SD

*Distribution: Original Copy Accompany Sample To Laboratory. Yellow Copy Retained By Sampler.*

F1008-A 8/03

# MACTEC

## CHAIN OF CUSTODY RECORD

№ 05131

MACTEC ENGINEERING AND CONSULTING
BIOTOX LABORATORY
3200 Town Point Drive NW, Suite 100
Kennesaw, GA 30144
(770) 421-3312 • FAX (770) 421-3314

**CLIENT INFORMATION**

NAME OF FACILITY: SNC - VOGTLE
STREET ADDRESS: PO BOX 1600 (RIVER RD)
CITY/STATE: WAYNESBORO, GA ZIP: 30830
NPDES # (NATIONAL OR STATE): GA ~~GG~~ 26786

**PROJECT NAME**: SNC - VOGTLE

**MACTEC PROJECT #**:

**SAMPLERS (SIGNATURE)**: [signature]

**SAMPLERS INITIALS (PRINT)**: JH

**SAMPLES SHIPPED VIA:** FEDEX ✓ UPS ____ HAND ____ OTHER ____

COOLANT USED: ICE SHIP DATE 11-19-03

**SAMPLE INFORMATION**

GRAB SAMPLES: DATE/TIME ____ VOL. ____

TIME COMPOSITE: START DATE 11-18-03 START TIME 1200
END DATE 11-19-03 END TIME 1100
VOLUME OF SUBSAMPLES 100 ml TIME INCREMENT 24 (hourly)
TOTAL VOL. 2400 ml

FLOW-PROPORTIONED COMPOSITE: INITIATED ____
ENDED ____ TOTAL VOL. ____
SET VOL. OF SUBSAMPLE / VOL. FLOW* ____

**FIELD PARAMETERS**

GRAB SAMPLES: pH ____
DO (mg/l) ____ TEMP (°C) ____
CHLORINE (residual, mg/L) ____

COMPOSITES: pH (last grab) ____
CHLORINE (residual, last grab, mg/L) ____
TEMP (last grab, °C) ____
pH (composited sample, °C) ____
TEMP (composited sample, °C) ____

| DATE | TIME | GRAB (x) | COMPOSITE (x) | MATRIX** | SAMPLE STATION DESCRIPTION | TOTAL # OF CONTAINERS | CONTAINER TYPE / NUMBER: 1 GALLON | 2 LITER | 1 LITER | OTHER | BIOTOX USE ONLY: TEMP (°C) | LAB # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11-19-03 | 1100 | | X | W | FINAL EFFLUENT | 2 | | | 2 | | 2.0 | 03-0162-01 |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| RELINQUISHED BY: (SIGNATURE) | DATE/TIME | RECEIVED BY: (SIGNATURE) | DATE/TIME | RELINQUISHED BY: (SIGNATURE) | RECEIVED BY LABORATORY: (SIGNATURE) | DATE/TIME |
|---|---|---|---|---|---|---|
| [signature] | 11/19/03 1300 | | | | [signature] | 11/20/03 0945 |

*FOR VARIABLE VOLUME SUBSAMPLES BASED ON FLOW OR SET TIME INCREMENTS, ATTACH SAMPLE AND FLOW INFORMATION

**BIOTOX USE ONLY**
ICE PRESENT? YES / N pH ____ RESIDUAL CL ____ D.O. ____ CONDUCTIVITY ____ VISUAL ____

****MATRIX**
WATER - W SLUDGE - SL
SOIL - SO OTHER - NA
SEDIMENT - SD

*Distribution: Original Copy Accompany Sample To Laboratory. Yellow Copy Retained By Sampler.*

F1008-A 8/03

# MACTEC

## CHAIN OF CUSTODY RECORD

№ 05130

MACTEC ENGINEERING AND CONSULTING
BIOTOX LABORATORY
3200 Town Point Drive NW, Suite 100
Kennesaw, GA 30144
(770) 421-3312 • FAX (770) 421-3314

**CLIENT INFORMATION**

NAME OF FACILITY: SNC VOGTLE
STREET ADDRESS: P.O BOX 1600
CITY/STATE: WAYNESBORO GA ZIP: 30830
NPDES # (NATIONAL OR STATE): GA 0026786

**PROJECT NAME**: SNC VOGTLE

**MACTEC PROJECT #**:

**SAMPLERS (SIGNATURE)**: [signature]

**SAMPLERS INITIALS (PRINT)**: JH

**SAMPLES SHIPPED VIA:**
FEDEX ✓ UPS ____ HAND ____ OTHER ____

COOLANT USED: ICE SHIP DATE 11-21-03

**SAMPLE INFORMATION**

GRAB SAMPLES: DATE/TIME ____ VOL. ____

TIME COMPOSITE: START DATE 11-20-03 START TIME 0700
END DATE 11-21-03 END TIME 0800
VOLUME OF SUBSAMPLES 24 200 ml TIME INCREMENT 24 Hourly
TOTAL VOL. 4800 ml

FLOW-PROPORTIONED COMPOSITE: INITIATED ____
ENDED ____ TOTAL VOL. ____
SET VOL. OF SUBSAMPLE / VOL. FLOW* ____

**FIELD PARAMETERS**

GRAB SAMPLES: pH ____
DO (mg/l) ____ TEMP (°C) ____
CHLORINE (residual, mg/L) ____

COMPOSITES: pH (last grab) ____
CHLORINE (residual, last grab, mg/L) ____
TEMP (last grab, °C) ____
pH (composited sample, °C) ____
TEMP (composited sample, °C) ____

| DATE | TIME | GRAB (x) | COMPOSITE (x) | MATRIX** | SAMPLE STATION DESCRIPTION | TOTAL # OF CONTAINERS | CONTAINER TYPE / NUMBER: 1 GALLON | 2 LITER | 1 LITER | OTHER | BIOTOX USE ONLY: TEMP (°C) | LAB # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11-21-03 | 0800 | | X | W | Final Effluent | 1 | 1 | | | | 1.0 | 03-0164-01 |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| RELINQUISHED BY: (SIGNATURE) | DATE/TIME | RECEIVED BY: (SIGNATURE) | DATE/TIME | RELINQUISHED BY: (SIGNATURE) | RECEIVED BY LABORATORY: (SIGNATURE) | DATE/TIME |
|---|---|---|---|---|---|---|
| [signature] | 11-21-03 1030 | | | | Andrew Peitzer | 11/22/03 1045 |

*FOR VARIABLE VOLUME SUBSAMPLES BASED ON FLOW OR SET TIME INCREMENTS, ATTACH SAMPLE AND FLOW INFORMATION

**BIOTOX USE ONLY**
ICE PRESENT? (YES) / N pH ____ RESIDUAL CL ____ D.O. ____ CONDUCTIVITY ____ VISUAL ____

****MATRIX**
WATER - W SLUDGE - SL
SOIL - SO OTHER - NA
SEDIMENT - SD

*Distribution: Original Copy Accompany Sample To Laboratory. Yellow Copy Retained By Sampler.*

F1008-A 8/03

# APPENDIX C

## Test Organism Documents

**MACTEC Engineering and Consulting, Inc.**
**BioTox Laboratory**

***Ceriodaphnia dubia* In-house Culture Source Document**

| Brood Board ID No. | Brood Board Date | Date/Time Cups Marked | Age of Test Organisms | Water Type/Temp. (°C) | Food Type |
|---|---|---|---|---|---|
| CERB01110703 | 11/07/03 | 11/18/03 0900 | <24-hr | DMW / 25.0 | YCT & *Selenastrum* |

**MACTEC Engineering and Consulting, Inc.**
**BioTox Laboratory**

***Pimephales promelas* In-house Culture Source Document**

| Larvae Batch ID No. | Source | Hatch Date | Age of Test Organisms | Water Type/Temp. (°C) | Food Type |
|---|---|---|---|---|---|
| CS906111803 | C-K | 11/17/03 | <48-hr | LWC / 25.0 | *Artemia* |

C-K
• ASSOCIATES •
ENVIRONMENTAL & ENGINEERING CONSULTANTS

17170 PERKINS ROAD
BATON ROUGE, LA 70810
PH (225) 755-1000
FAX (225) 755-2042
http://www.c-ka.com

AQUATIC TOXICOLOGY LABORATORY

# Test Organism Shipment Record

Shipped to: Mactec

Project #: 055-426

Date Shipped: 11-17-03

P.O. #: verbal

Species: P. promelas / Selenastrum

Quantity: 640 / 1 Liter

Price each: 25¢ / 20.00

Age/Lifestage: 24 hours

Batch #: 3341 / 102703

Broodstock Source: C-K Associates, Inc.

Feeding: artemia

## Water Chemistry Record

✓ Freshwater Species

_____ Marine Species

Alkalinity (mg/L): 63

Alkalinity (mg/L): _____

Hardness (mg/L): 94

Salinity (ppt): _____

Comments: Thank you!

## Billing Information

(This is not an invoice. You will be billed separately.)

Organism Price: 180.00

City tax (5%) —

State tax (4%) —

Shipping Charge: —

(if not billed directly to recipient's Fed Ex account)

Shipment Total: 180.00

Effective February 2001, C-K Associates, Inc. will mail you an invoice for the total amount of all purchases made within the month. If you have any questions, please feel free to contact us.

**Thank You**

CS9C111803

18.52

app / Fed Ex

rec'd 11/18/03 0950

test organism shipment record.doc

# APPENDIX D

## Laboratory Test Data Sheets and Statistical Analyses

**Fathead Minnow**

**Effluent Test**

# MACTEC Engineering and Consulting, Inc.
# BioTox Laboratory

### 7-day Fathead Minnow Larval Survival and Growth Test
### (EPA/-821-R-02-013, 1000.0)

Client: Southern Nuclear
Location: Waynesboro, GA
Sample: Plant Vogtle Effluent
Minnow I.D. #: CS906111803

Test Location:
INC # 003
Shelf # 02

| Concentration | Rep. # | Surviving Organisms (alive/dead) Day 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | % Survival |
|---|---|---|---|---|---|---|---|---|---|---|
| | | date: 11/18/03 time: 1500 init: aa | date: 11/19/03 time: 1555 init: aa | date: 11/20/03 time: 1255 init: aa | date: 11/21/03 time: 1525 init: aa | date: 11/22 time: 1045 init: aa | date: 11/23 time: 1620 init: aa | date: 11/24 time: 1540 init: aa | date: 11/25 time: 1645 init: aa | |
| LWC | 1 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 100 |
| | 2 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 3 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 4 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | Temp (°C) | 25 | 26 | 26 | 24 | 25 | 25 | 25 | 25.5 | |
| 1.59% | 1 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 100 |
| | 2 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 3 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 4 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | Temp (°C) | 25 | 26 | 26 | 24 | 25 | 25 | 25 | 25.5 | |
| 3.18% (IWC) | 1 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 100 |
| | 2 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 3 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 4 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | Temp (°C) | 25 | 26 | 25.5 | 24 | 25 | 25 | 25 | 25.5 | |
| 6.36% | 1 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 100 |
| | 2 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 3 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 4 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | Temp (°C) | 25 | 26 | 25.5 | 25 | 25 | 25 | 25.5 | 25.5 | |
| 12.72% | 1 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 100 |
| | 2 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 3 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 4 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | Temp (°C) | 25 | 26 | 26 | 26 | 25 | 26 | 26 | 25 | |
| 25.4% | 1 | 10 | 10 | 10 | 8/2 | 8 | 8 | 8 | 7/1 | 90 |
| | 2 | 10 | 10 | 10 | 9/1 | 9 | 9 | 9 | 9 | |
| | 3 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 4 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | Temp (°C) | 25 | 26 | 26 | 26 | 25 | 26 | 26 | 25 | |

Sample ID: 03-0161-01 03-0162-01 03-0164-01
Comments:

# MACTEC ENGINEERING AND CONSULTING, INC.
# BIOTOX LABORATORY

## Laboratory weight data for larval survival and growth test

Client: Southern Nuclear
Discharge: Vogtle Effluent 03-0161-01, 03-0162-01, 03-0164-01
Location: Waynesboro, GA
Test Dates: 11/18-25/03
Organism: P. promelas, CS906111803
Drying Temp.: 59 °C
Drying Time: 24 hr.
Analyst(s): AG

| Conc.: | Replicate No. | Weight of boat (gms) | Dry weight: boat and larvae (gms) | Total dry weight of larvae (gms) | Original Number of larvae [day 0] | Mean dry weight per rep. original number of larvae (mg) | Mean dry weight per conc., original number larvae (mg) | Oven Times In Date: 11/25 | Oven Times Out Date: 11/26 |
|---|---|---|---|---|---|---|---|---|---|
| Conc.: | 1 | 0.97592 | 0.98046 | | 10 | | | 1645 | 1700 |
| | 2 | 0.97254 | 0.97583 | | | | | | |
| LWC | 3 | 0.97468 | 0.98008 | | | | | | |
| | 4 | 0.97850 | 0.98374 | | | | | | |
| Conc.: | 1 | 0.97609 | 0.98104 | | | | | | |
| | 2 | 0.97705 | 0.98154 | | | | | | |
| 1.59% | 3 | 0.96851 | 0.97427 | | | | | | |
| | 4 | 0.97844 | 0.98358 | | | | | | |
| Conc.: | 1 | 0.96737 | 0.97208 | | | | | | |
| | 2 | 0.97263 | 0.97741 | | | | | | |
| 3.18% | 3 | 0.96489 | 0.96963 | | | | | | |
| | 4 | 0.97193 | 0.97726 | | | | | | |
| Conc.: | 1 | 0.97096 | 0.97559 | | | | | | |
| | 2 | 0.97162 | 0.97590 | | | | | | |
| 6.36% | 3 | 0.96710 | 0.97162 | | | | | | |
| | 4 | 0.98225 | 0.98667 | | | | | | |
| Conc.: | 1 | 0.96633 | 0.97036 | | | | | | |
| | 2 | 0.96231 | 0.96676 | | | | | | |
| 12.72% | 3 | 0.97832 | 0.98239 | | | | | | |
| | 4 | 0.97729 | 0.98135 | | | | | | |
| Conc.: | 1 | 0.98575 | 0.98967 | | | | | | |
| | 2 | 0.97576 | 0.97999 | | | | | | |
| 25.44% | 3 | 0.97043 | 0.97505 | | | | | | |
| | 4 | 0.96766 | 0.97251 | | | | | | |

# MACTEC ENGINEERING AND CONSULTING, INC.
# BIOTOX LABORATORY

## Laboratory weight data for larval survival and growth test

Client: Southern Nuclear
Discharge: Vogtle Effluent
Location: Waynesboro, Ga

Test Dates: 11/18-25/03
Organism: P. promelas, CS906111803
Sample ID: 03-0161-01, 03-0162-01, 03-0164-01

Drying Temp.: 59 C
Drying Time: 24 hours
Analyst(s): ASP/MRF

| Conc.: | Replicate No. | Weight of boat (gms) | Dry weight: boat and larvae (gms) | Total dry weight of larvae (gms) | Original Number of larvae [day 0] | Mean dry weight per rep. original number of larvae (mg) | Mean dry weight per conc., original number larvae (mg) | Oven Times In Date: 11/25/2003 | Oven Times Out Date: 11/26/2003 |
|---|---|---|---|---|---|---|---|---|---|
| Conc.: | 1 | 0.97592 | 0.98046 | 0.00454 | 10 | 0.454 | | 1645 | 1700 |
| | 2 | 0.97254 | 0.97583 | 0.00329 | 10 | 0.329 | | 1645 | 1700 |
| LWC | 3 | 0.97468 | 0.98008 | 0.00540 | 10 | 0.540 | 0.462 | 1645 | 1700 |
| | 4 | 0.97850 | 0.98374 | 0.00524 | 10 | 0.524 | | 1645 | 1700 |
| Conc.: | 1 | 0.97609 | 0.98104 | 0.00495 | 10 | 0.495 | | 1645 | 1700 |
| | 2 | 0.97705 | 0.98154 | 0.00449 | 10 | 0.449 | | 1645 | 1700 |
| 1.59% | 3 | 0.96851 | 0.97427 | 0.00576 | 10 | 0.576 | 0.509 | 1645 | 1700 |
| | 4 | 0.97844 | 0.98358 | 0.00514 | 10 | 0.514 | | 1645 | 1700 |
| Conc.: | 1 | 0.96737 | 0.97208 | 0.00471 | 10 | 0.471 | | 1645 | 1700 |
| | 2 | 0.97263 | 0.97791 | 0.00528 | 10 | 0.528 | | 1645 | 1700 |
| 3.18% | 3 | 0.96489 | 0.96963 | 0.00474 | 10 | 0.474 | 0.502 | 1645 | 1700 |
| | 4 | 0.97193 | 0.97726 | 0.00533 | 10 | 0.533 | | 1645 | 1700 |
| Conc.: | 1 | 0.97096 | 0.97559 | 0.00463 | 10 | 0.463 | | 1645 | 1700 |
| | 2 | 0.97162 | 0.97590 | 0.00428 | 10 | 0.428 | | 1645 | 1700 |
| 6.36% | 3 | 0.96710 | 0.97162 | 0.00452 | 10 | 0.452 | 0.446 | 1645 | 1700 |
| | 4 | 0.98225 | 0.98667 | 0.00442 | 10 | 0.442 | | 1645 | 1700 |
| Conc.: | 1 | 0.96633 | 0.97036 | 0.00403 | 10 | 0.403 | | 1645 | 1700 |
| | 2 | 0.96231 | 0.96676 | 0.00445 | 10 | 0.445 | | 1645 | 1700 |
| 12.72% | 3 | 0.97832 | 0.98239 | 0.00407 | 10 | 0.407 | 0.415 | 1645 | 1700 |
| | 4 | 0.97729 | 0.98135 | 0.00406 | 10 | 0.406 | | 1645 | 1700 |
| Conc.: | 1 | 0.98575 | 0.98967 | 0.00392 | 10 | 0.392 | | 1645 | 1700 |
| | 2 | 0.97570 | 0.97999 | 0.00429 | 10 | 0.429 | | 1645 | 1700 |
| 25.44% | 3 | 0.97043 | 0.97505 | 0.00462 | 10 | 0.462 | 0.442 | 1645 | 1700 |
| | 4 | 0.96766 | 0.97251 | 0.00485 | 10 | 0.485 | | 1645 | 1700 |

Prepaired by ASP 12/3/03
Reviewed by SLL 12/3/03

Title: Southern Nuclear Plant Vogtle Eff. 11/18/03 FHM Survive
File: 111803 .PPS Transform: ARC SINE(SQUARE ROOT(Y))
Number of Groups: 6

| GRP | IDENTIFICATION | REP | VALUE | TRANS VALUE |
|---|---|---|---|---|
| 1 | 0 LWC | 1 | 1.0000 | 1.4120 |
| 1 | 0 LWC | 2 | 1.0000 | 1.4120 |
| 1 | 0 LWC | 3 | 1.0000 | 1.4120 |
| 1 | 0 LWC | 4 | 1.0000 | 1.4120 |
| 2 | 1.59 % | 1 | 1.0000 | 1.4120 |
| 2 | 1.59 % | 2 | 1.0000 | 1.4120 |
| 2 | 1.59 % | 3 | 1.0000 | 1.4120 |
| 2 | 1.59 % | 4 | 1.0000 | 1.4120 |
| 3 | 3.18 % | 1 | 1.0000 | 1.4120 |
| 3 | 3.18 % | 2 | 1.0000 | 1.4120 |
| 3 | 3.18 % | 3 | 1.0000 | 1.4120 |
| 3 | 3.18 % | 4 | 1.0000 | 1.4120 |
| 4 | 6.36 % | 1 | 1.0000 | 1.4120 |
| 4 | 6.36 % | 2 | 1.0000 | 1.4120 |
| 4 | 6.36 % | 3 | 1.0000 | 1.4120 |
| 4 | 6.36 % | 4 | 1.0000 | 1.4120 |
| 5 | 12.72 % | 1 | 1.0000 | 1.4120 |
| 5 | 12.72 % | 2 | 1.0000 | 1.4120 |
| 5 | 12.72 % | 3 | 1.0000 | 1.4120 |
| 5 | 12.72 % | 4 | 1.0000 | 1.4120 |
| 6 | 25.4 % | 1 | 0.7000 | 0.9912 |
| 6 | 25.4 % | 2 | 0.9000 | 1.2490 |
| 6 | 25.4 % | 3 | 1.0000 | 1.4120 |
| 6 | 25.4 % | 4 | 1.0000 | 1.4120 |

Entered by azp 12/3/03
Checked by SCC 12/3/03

Title: Southern Nuclear Plant Vogtle Eff. 11/18/03 FHM Survive
File: 111803 .PPS Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 1 of 2

| GRP | IDENTIFICATION | N | MIN | MAX | MEAN |
|---|---|---|---|---|---|
| 1 | 0 LWC | 4 | 1.4120 | 1.4120 | 1.4120 |
| 2 | 1.59 % | 4 | 1.4120 | 1.4120 | 1.4120 |
| 3 | 3.18 % | 4 | 1.4120 | 1.4120 | 1.4120 |
| 4 | 6.36 % | 4 | 1.4120 | 1.4120 | 1.4120 |
| 5 | 12.72 % | 4 | 1.4120 | 1.4120 | 1.4120 |
| 6 | 25.4 % | 4 | 0.9912 | 1.4120 | 1.2661 |

Title: Southern Nuclear Plant Vogtle Eff. 11/18/03 FHM Survive
File: 111803 .PPS Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 2 of 2

| GRP | IDENTIFICATION | VARIANCE | SD | SEM | C.V. % |
|---|---|---|---|---|---|
| 1 | 0 LWC | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2 | 1.59 % | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 3 | 3.18 % | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 4 | 6.36 % | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 5 | 12.72 % | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 6 | 25.4 % | 0.0395 | 0.1987 | 0.0994 | 15.6960 |

Title: Southern Nuclear Plant Vogtle Eff. 11/18/03 FHM Survive
File: 111803 .PPS Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's Test for Normality

---

D = 0.1185
W = 0.4845

Critical W = 0.8840 (alpha = 0.01 , N = 24)
W = 0.9160 (alpha = 0.05 , N = 24)

---

Data FAIL normality test (alpha = 0.01). Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normality and should not be performed with this data as is.

Title: Southern Nuclear Plant Vogtle Eff. 11/18/03 FHM Survive
File: 111803 .PPS Transform: ARC SINE(SQUARE ROOT(Y))

Hartley's Test for Homogeneity of Variance
Bartlett's Test for Homogeneity of Variance

---

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

---

Title: Southern Nuclear Plant Vogtle Eff. 11/18/03 FHM Survive
File: 111803 .PPS Transform: ARC SINE(SQUARE ROOT(Y))

Steel's Many-One Rank Test - Ho: Control<Treatment

| GROUP | IDENTIFICATION | TRANSFORMED MEAN | RANK SUM | CRIT. VALUE | DF | SIG 0.05 |
|---|---|---|---|---|---|---|
| 1 | 0 LWC | 1.4120 | | | | |
| 2 | 1.59 % | 1.4120 | 18.00 | 10.00 | 4.00 | |
| 3 | 3.18 % | 1.4120 | 18.00 | 10.00 | 4.00 | |
| 4 | 6.36 % | 1.4120 | 18.00 | 10.00 | 4.00 | |
| 5 | 12.72 % | 1.4120 | 18.00 | 10.00 | 4.00 | |
| 6 | 25.4 % | 1.2661 | 14.00 | 10.00 | 4.00 | |

Critical values are 1 tailed ( k = 5 )

NOEC = 100%

Title: Southern Nuclear Plant Vogtle Eff. 11/18/03 FHM Growth
File: 111803 .PPG Transform: NO TRANSFORMATION
Number of Groups: 6

| GRP | IDENTIFICATION | REP | VALUE | TRANS VALUE |
|---|---|---|---|---|
| 1 | 0 LWC | 1 | 0.4540 | 0.4540 |
| 1 | 0 LWC | 2 | 0.3290 | 0.3290 |
| 1 | 0 LWC | 3 | 0.5400 | 0.5400 |
| 1 | 0 LWC | 4 | 0.5240 | 0.5240 |
| 2 | 1.59 % | 1 | 0.4950 | 0.4950 |
| 2 | 1.59 % | 2 | 0.4490 | 0.4490 |
| 2 | 1.59 % | 3 | 0.5760 | 0.5760 |
| 2 | 1.59 % | 4 | 0.5140 | 0.5140 |
| 3 | 3.18 % | 1 | 0.4710 | 0.4710 |
| 3 | 3.18 % | 2 | 0.5280 | 0.5280 |
| 3 | 3.18 % | 3 | 0.4740 | 0.4740 |
| 3 | 3.18 % | 4 | 0.5330 | 0.5330 |
| 4 | 6.36 % | 1 | 0.4630 | 0.4630 |
| 4 | 6.36 % | 2 | 0.4280 | 0.4280 |
| 4 | 6.36 % | 3 | 0.4520 | 0.4520 |
| 4 | 6.36 % | 4 | 0.4420 | 0.4420 |
| 5 | 12.72 % | 1 | 0.4030 | 0.4030 |
| 5 | 12.72 % | 2 | 0.4450 | 0.4450 |
| 5 | 12.72 % | 3 | 0.4070 | 0.4070 |
| 5 | 12.72 % | 4 | 0.4060 | 0.4060 |
| 6 | 25.4 % | 1 | 0.3920 | 0.3920 |
| 6 | 25.4 % | 2 | 0.4290 | 0.4290 |
| 6 | 25.4 % | 3 | 0.4620 | 0.4620 |
| 6 | 25.4 % | 4 | 0.4850 | 0.4850 |

Entered by arp 12/3/03
Checked by sec 12/5/03

Title: Southern Nuclear Plant Vogtle Eff. 11/18/03 FHM Growth
File: 111803 .PPG Transform: NO TRANSFORMATION

Summary Statistics on Data TABLE 1 of 2

| GRP | IDENTIFICATION | N | MIN | MAX | MEAN |
|---|---|---|---|---|---|
| 1 | 0 LWC | 4 | 0.3290 | 0.5400 | 0.4618 |
| 2 | 1.59 % | 4 | 0.4490 | 0.5760 | 0.5085 |
| 3 | 3.18 % | 4 | 0.4710 | 0.5330 | 0.5015 |
| 4 | 6.36 % | 4 | 0.4280 | 0.4630 | 0.4463 |
| 5 | 12.72 % | 4 | 0.4030 | 0.4450 | 0.4153 |
| 6 | 25.4 % | 4 | 0.3920 | 0.4850 | 0.4420 |

Title: Southern Nuclear Plant Vogtle Eff. 11/18/03 FHM Growth
File: 111803 .PPG Transform: NO TRANSFORMATION

Summary Statistics on Data TABLE 2 of 2

| GRP | IDENTIFICATION | VARIANCE | SD | SEM | C.V. % |
|---|---|---|---|---|---|
| 1 | 0 LWC | 0.0092 | 0.0961 | 0.0480 | 20.8028 |
| 2 | 1.59 % | 0.0028 | 0.0526 | 0.0263 | 10.3496 |
| 3 | 3.18 % | 0.0011 | 0.0336 | 0.0168 | 6.6941 |
| 4 | 6.36 % | 0.0002 | 0.0149 | 0.0074 | 3.3357 |
| 5 | 12.72 % | 0.0004 | 0.0199 | 0.0100 | 4.7937 |
| 6 | 25.4 % | 0.0016 | 0.0405 | 0.0202 | 9.1603 |

Title: Southern Nuclear Plant Vogtle Eff. 11/18/03 FHM Growth
File: 111803 .PPG Transform: NO TRANSFORMATION

ANOVA Table

| SOURCE | DF | SS | MS | F |
|---|---|---|---|---|
| Between | 5 | 0.0262 | 0.0052 | 2.0455 |
| Within (Error) | 18 | 0.0461 | 0.0026 | |
| Total | 23 | 0.0724 | | |

(p-value = 0.1204)

Critical F = 4.2479 (alpha = 0.01, df = 5,18)
= 2.7729 (alpha = 0.05, df = 5,18)

Since F < Critical F FAIL TO REJECT Ho: All equal (alpha = 0.05)

Title: Southern Nuclear Plant Vogtle Eff. 11/18/03 FHM Growth
File: 111803 .PPG Transform: NO TRANSFORMATION

Shapiro - Wilk's Test for Normality

---

D = 0.0461
W = 0.9401

Critical W = 0.8840 (alpha = 0.01 , N = 24)
W = 0.9160 (alpha = 0.05 , N = 24)

---

Data PASS normality test (alpha = 0.01). Continue analysis.

Title: Southern Nuclear Plant Vogtle Eff. 11/18/03 FHM Growth
File: 111803 .PPG Transform: NO TRANSFORMATION

Bartlett's Test for Homogeneity of Variance

---

Calculated B1 statistic = 11.2234 (p-value = 0.0471)

Data PASS B1 homogeneity test at 0.01 level. Continue analysis.

---

Critical B = 15.0863 (alpha = 0.01, df = 5)
= 11.0705 (alpha = 0.05, df = 5)

Title: Southern Nuclear Plant Vogtle Eff. 11/18/03 FHM Growth
File: 111803 .PPG Transform: NO TRANSFORMATION

Dunnett's Test - TABLE 1 OF 2 Ho:Control<Treatment

| GROUP | IDENTIFICATION | TRANSFORMED MEAN | MEAN CALCULATED IN ORIGINAL UNITS | T STAT | SIG 0.05 |
|---|---|---|---|---|---|
| 1 | 0 LWC | 0.4618 | 0.4618 | | |
| 2 | 1.59 % | 0.5085 | 0.5085 | -1.3058 | |
| 3 | 3.18 % | 0.5015 | 0.5015 | -1.1103 | |
| 4 | 6.36 % | 0.4463 | 0.4463 | 0.4329 | |
| 5 | 12.72 % | 0.4153 | 0.4153 | 1.2988 | |
| 6 | 25.4 % | 0.4420 | 0.4420 | 0.5517 | |

Dunnett critical value = 2.4100 (1 Tailed, alpha = 0.05, df = 5,18)

NOEC = 100%

Title: Southern Nuclear Plant Vogtle Eff. 11/18/03 FHM Growth
File: 111803 .PPG Transform: NO TRANSFORMATION

Dunnett's Test - TABLE 2 OF 2 Ho:Control<Treatment

| GROUP | IDENTIFICATION | NUM OF REPS | MIN SIG DIFF (IN ORIG. UNITS) | % OF CONTROL | DIFFERENCE FROM CONTROL |
|---|---|---|---|---|---|
| 1 | 0 LWC | 4 | | | |
| 2 | 1.59 % | 4 | 0.0863 | 18.7 | -0.0467 |
| 3 | 3.18 % | 4 | 0.0863 | 18.7 | -0.0397 |
| 4 | 6.36 % | 4 | 0.0863 | 18.7 | 0.0155 |
| 5 | 12.72 % | 4 | 0.0863 | 18.7 | 0.0465 |
| 6 | 25.4 % | 4 | 0.0863 | 18.7 | 0.0198 |

9
<0.376 mg
is toxic

Water Flea

Effluent Test

# MACTEC ENGINEERING AND CONSULTING, INC.
## BIOTOX LABORATORY
### Daily survival and reproduction data for Ceriodaphnia dubia chronic test

Client: Southern Nuclear
Discharge: Plant Vogtle Effluent
Location: Waynesboro, GA

Dilution Water ID: DMW01111703
C. dubia Source ID: CERB01110703
Template ID:

Test Set-up Date (day 0): 11/18/03
Test Set-up Time: 1446
Test Set-up Analyst: aye

Cup #1 DMW | Cup #2 = 1.59% | Cup #3 = 3.18% | Cup #4 = 6.36% | Cup#5 = 12.72% | Cup #6 = 25.44%

**DAILY RENEWAL DATES, TIMES, TEMPS, AND ANALYST'S INITIALS**

| Day 1: 11/19/03 | Day 2: 11/20/03 | Day 3: 11/21/03 | Day 4: 11/22 | Day 5: 11/23/03 | Day 6: 11/24 | Day 7: |
|---|---|---|---|---|---|---|
| Time: 1420 | Time: 1350 | Time: 1400 | Time: 1320 | Time: 1540 | Time: 1245 | Time: |
| Inits: aye | Inits: aye | Inits: aye | Inits: aye | Inits: aye | Inits: aye | Inits: |

**BEHAVIOR KEY**

MF = molten embryo; MC = molten carapace; J = alive adult; X = dead adult; # = no. live neonates; -# = no. dead neonates; MA = missing adult; Y = male adult; GA = gravid adult; EA = ephippial adult; SA = small adult; NB = neonates on bottom

| Day | Cup 6 | Cup 15 | Cup 25 | Cup 35 | Cup 45 | Cup 55 |
|---|---|---|---|---|---|---|
| 0 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 1 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 4 | 4 ✓ | 2 ✓ | 1 ✓ | 3 ✓ | ✓ 3 | ✓ 4 |
| 5 | ✓ 8 | ✓ 7 | ✓ 8 | ✓ 4 | ✓ 4 | ✓ 5 |
| 6 | ✓ 5 | ✓ 5 | ✓ 6 | ✓ 10 | ✓ 6 | ✓ 15 |
| 7 | | | | | | |

| Day | Cup 10 | Cup 20 | Cup 30 | Cup 40 | Cup 50 | Cup 60 |
|---|---|---|---|---|---|---|
| 0 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 1 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 4 | ✓ 4 | ✓ 4 | ✓ 4 | 5 ✓ | ✗ 2 | ✓ 4 |
| 5 | ✓ 9 | ✓ 8 | ✓ 11 | ✓ 8 | | ✓ 9 |
| 6 | ✓ 5 | ✓ 4 | ✓ 10 | ✓ 9 | | ✓ 6 |
| 7 | | | | | | |

| Day | Cup 4 | Cup 14 | Cup 24 | Cup 34 | Cup 44 | Cup 54 |
|---|---|---|---|---|---|---|
| 0 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 1 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 4 | 4 ✓ | 4 ✓ | 2 ✓ | ✓ 4 | 3 ✓ | 4 ✓ |
| 5 | ✓ 8 | ✓ 8 | ✓ 7 | ✓ 10 | ✓ 5 | ✓ 9 |
| 6 | ✓ 11 | ✓ 12 | ✓ 11 | ✓ 15 | ✓ 8 | ✓ 8 |
| 7 | | | | | | |

| Day | Cup 9 | Cup 19 | Cup 29 | Cup 39 | Cup 49 | Cup 59 |
|---|---|---|---|---|---|---|
| 0 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 1 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 4 | ✓ 4 | ✓ 3 | ✓ 2 | ✓ 3 | ✓ 3 | ✓ 2 |
| 5 | ✓ 12 | ✓ 9 | ✓ 9 | ✓ 5 | ✓ 8 | ✓ 9 |
| 6 | ✓ 11 | ✓ 11 | ✓ 12 | ✓ 11 | ✓ 12 | ✓ 14 |
| 7 | | | | | | |

| Day | Cup 3 | Cup 13 | Cup 23 | Cup 33 | Cup 43 | Cup 53 |
|---|---|---|---|---|---|---|
| 0 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 1 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 4 | 4 ✓ | 2 ✓ | 2 ✓ | 3 ✓ | 3 ✓ | 3 ✓ |
| 5 | ✓ 9 | ✓ 8 | ✓ 5 | ✓ 8 | ✓ 11 | ✓ 8 |
| 6 | ✓ 12 | ✓ 11 | ✓ 13 | ✓ 11 | ✓ 12 | ✓ 13 |
| 7 | | | | | | |

| Day | Cup 8 | Cup 18 | Cup 28 | Cup 38 | Cup 48 | Cup 58 |
|---|---|---|---|---|---|---|
| 0 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 1 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 4 | 3 ✓ | 5 ✓ | ✓ 3 | ✓ 1 | ✓ 5 | ✓ 4 |
| 5 | ✓ 9 | ✓ 4 | ✓ 5 | ✓ 4 | ✓ 11 | ✓ 8 |
| 6 | ✓ 11 | ✓ 6 | ✓ | ✓ 11 | ✓ 13 | ✓ 6 |
| 7 | | | | | | |

| Day | Cup 2 | Cup 12 | Cup 22 | Cup 32 | Cup 42 | Cup 52 |
|---|---|---|---|---|---|---|
| 0 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 1 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 4 | ✓ 3 | 4 ✓ | ✓ 3 | ✓ 3 | ✓ 4 | ✓ 3 |
| 5 | ✓ 8 | ✓ 7 | 9 ✓ | ✓ 8 | ✓ 10 | 9 ✓ |
| 6 | ✓ 7 | ✓ 12 | ✓ 12 | ✓ 12 | ✓ 14 | ✓ 11 |
| 7 | | | | | | |

| Day | Cup 7 | Cup 17 | Cup 27 | Cup 37 | Cup 47 | Cup 57 |
|---|---|---|---|---|---|---|
| 0 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 1 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 4 | ✓ 6 | ✓ 4 | ✓ 3 | 4 ✓ | ✓ 4 | ✓ 2 |
| 5 | ✓ 9 | ✓ 9 | ✓ 7 | ✓ 7 | ✓ 10 | ✓ 8 |
| 6 | ✓ 6 | ✓ 10 | ✓ 9 | ✓ 6 | ✓ 13 | ✓ 7 |
| 7 | | | | | | |

| Day | Cup 1 | Cup 11 | Cup 21 | Cup 31 | Cup 41 | Cup 51 |
|---|---|---|---|---|---|---|
| 0 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 1 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 4 | ✓ 3 | ✓ 3 | ✓ 4 | ✓ 3 | ✓ 2 | ✓ 3 |
| 5 | ✓ 4 | ✓ 9 | ✓ 11 | ✓ 11 | ✓ 7 | ✓ 9 |
| 6 | ✓ 1 | ✓ 11 | ✓ 8 | ✓ 8 | ✓ 12 | ✓ 8 |
| 7 | | | | | | |

| Day | Cup 6 | Cup 16 | Cup 26 | Cup 36 | Cup 46 | Cup 56 |
|---|---|---|---|---|---|---|
| 0 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 1 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 4 | ✓ 3 | 5 ✓ | ✓ 7 | ✓ 3 | ✓ 3 | ✓ 3 |
| 5 | ✓ 7 | ✓ 5 | ✓ 6 | ✓ 7 | ✓ 6 | ✓ 6 |
| 6 | ✓ 12 | ✓ 13 | ✓ 7 | ✓ 6 | ✓ 11 | ✓ 7 |
| 7 | | | | | | |

**Temperature (°C)**

| Day | Cup # 1 | Cup # 11 | Cup #21 | Cup # 31 | Cup # 41 | Cup # 51 |
|---|---|---|---|---|---|---|
| 0 | 25 | 25 | 25 | 25 | 25 | 25 |
| 1 | 24 | 24 | 24 | 25 | 25.5 | 26 |
| 2 | 24 | 24 | 24 | 24 | 24 | 24.5 |
| 3 | 25 | 25 | 25.5 | 25.5 | 25.5 | 26.6 |
| 4 | 23.5 | 23.5 | 25 | 25 | 25 | 25.5 |
| 5 | 25 | 25 | 25 | 25 | 26 | 26 |
| 6 | 25 | 25 | 24.5 | 24.5 | 24.5 | 24.5 |
| 7 | | | | | | |

**Test Location**

| | |
|---|---|
| INC # | 003 |
| SHELF # | 05 |

Sample ID- Sun-Mon: 03-0160-01
Tue-Wed: 03-0162-01
Thu-Fri: 03-0164-01

# MACTEC ENGINEERING AND CONSULTING, INC.
## BIOTOX LABORATORY
### *Ceriodaphnia dubia* 3-brood chronic test de-randomization sheet

Client: Southern Nuclear
Discharge: Plant Vogtle Effluent
Location: Waynesboro, GA

Dilution Water ID: DMW01111703
C. dubia Source ID: CERB01110703
Template ID:

Test Set-up Date (Time): 11/18/03 (1440)
Test End Date (Time): 11/24/03 (1245)
Test Analyst(s): ASP/MRF

Cup #1 = DMW  Cup #2 = 1.59%  Cup #3 = 3.18%  Cup #4 = 6.36%  Cup #5 = 12.72%  Cup #6 = 25.44%

**Behavior Key**

ME = molten embryo | A = alive adult | # = no. live neonates | MF = missing adult | GA = gravid adult | SA = small adult
MC = molten carapace | X = dead adult | -# = no. dead neonates | Y = male adult | EA = ephippial adult | NB = neonates on bottom

| Conc: DMW | Day 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Total Neonates |
|---|---|---|---|---|---|---|---|---|---|
| Cup # | | | | | | | | | |
| 1 | A | A | A | A | 3 | 4 | 1 | | 8 |
| 12 | A | A | A | A | 4 | 7 | 12 | | 23 |
| 53 | A | A | A | A | 3 | 8 | 13 | | 24 |
| 24 | A | A | A | A | 2 | 7 | 11 | | 20 |
| 45 | A | A | A | A | 3 | 4 | 6 | | 13 |
| 36 | A | A | A | A | 3 | 7 | 6 | | 16 |
| 17 | A | A | A | A | 4 | 9 | 10 | | 23 |
| 58 | A | A | A | A | 4 | 8 | 6 | | 18 |
| 39 | A | A | A | A | 3 | 5 | 11 | | 19 |
| 10 | A | A | A | A | 4 | 9 | 5 | | 18 |
| Original no. of females: | | | 10 | Live neonates per female: | | | | 18.2 | 182 |

| Conc: 1.59% | Day 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Total Neonates |
|---|---|---|---|---|---|---|---|---|---|
| Cup # | | | | | | | | | |
| 11 | A | A | A | A | 3 | 9 | 11 | | 23 |
| 42 | A | A | A | A | 4 | 10 | 14 | | 28 |
| 33 | A | A | A | A | 3 | 8 | 11 | | 22 |
| 4 | A | A | A | A | 4 | 8 | 11 | | 23 |
| 25 | A | A | A | A | 1 | 8 | 6 | | 15 |
| 56 | A | A | A | A | 3 | 6 | 7 | | 16 |
| 37 | A | A | A | A | 4 | 7 | 6 | | 17 |
| 8 | A | A | A | A | 3 | 9 | 11 | | 23 |
| 29 | A | A | A | A | 2 | 9 | 12 | | 23 |
| 50 | A | A | A | A | X 2 | | | | 2 |
| Original no. of females: | | | 10 | Live neonates per female: | | | | 19.2 | 192 |

| Conc: 3.18% | Day 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Total Neonates |
|---|---|---|---|---|---|---|---|---|---|
| Cup # | | | | | | | | | |
| 21 | A | A | A | A | 4 | 11 | 8 | | 23 |
| 32 | A | A | A | A | 3 | 8 | 12 | | 23 |
| 3 | A | A | A | A | 4 | 9 | 12 | | 25 |
| 54 | A | A | A | A | 4 | 9 | 8 | | 21 |
| 15 | A | A | A | A | 2 | 7 | 5 | | 14 |
| 46 | A | A | A | A | 3 | 6 | 11 | | 20 |
| 7 | A | A | A | A | 6 | 9 | 6 | | 21 |
| 28 | A | A | A | A | 3 | 5 | A | | 8 |
| 49 | A | A | A | A | 3 | 8 | 12 | | 23 |
| 20 | A | A | A | A | 4 | 8 | 4 | | 16 |
| Original no. of females: | | | 10 | Live neonates per female: | | | | 19.4 | 194 |

| Conc: 6.36% | Day 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Total Neonates |
|---|---|---|---|---|---|---|---|---|---|
| Cup # | | | | | | | | | |
| 31 | A | A | A | A | 3 | 11 | 8 | | 22 |
| 52 | A | A | A | A | 3 | 8 | 11 | | 22 |
| 13 | A | A | A | A | 2 | 8 | 11 | | 21 |
| 44 | A | A | A | A | 3 | 5 | 8 | | 16 |
| 5 | A | A | A | A | 4 | 8 | 5 | | 17 |
| 26 | A | A | A | A | 3 | 6 | 7 | | 16 |
| 47 | A | A | A | A | 4 | 10 | 13 | | 27 |
| 18 | A | A | A | A | 5 | 4 | 6 | | 15 |
| 59 | A | A | A | A | 2 | 9 | 14 | | 25 |
| 40 | A | A | A | A | 5 | 8 | 9 | | 22 |
| Original no. of females: | | | 10 | Live neonates per female: | | | | 20.3 | 203 |

| Conc: 12.72% | Day 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Total Neonates |
|---|---|---|---|---|---|---|---|---|---|
| Cup # | | | | | | | | | |
| 41 | A | A | A | A | 2 | 7 | 12 | | 21 |
| 2 | A | A | A | A | 3 | 8 | 7 | | 18 |
| 23 | A | A | A | A | 2 | 5 | 13 | | 20 |
| 34 | A | A | A | A | 4 | 10 | 15 | | 29 |
| 55 | A | A | A | A | 4 | 5 | 15 | | 24 |
| 16 | A | A | A | A | 5 | 5 | 13 | | 23 |
| 27 | A | A | A | A | 3 | 7 | 9 | | 19 |
| 48 | A | A | A | A | 5 | 11 | 13 | | 29 |
| 9 | A | A | A | A | 4 | 12 | 11 | | 27 |
| 60 | A | A | A | A | 4 | 9 | 6 | | 19 |
| Original no. of females: | | | 10 | Live neonates per female: | | | | 22.9 | 229 |

| Conc: 25.44% | Day 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Total Neonates |
|---|---|---|---|---|---|---|---|---|---|
| Cup # | | | | | | | | | |
| 51 | A | A | A | A | 3 | 9 | 8 | | 20 |
| 22 | A | A | A | A | 3 | 9 | 12 | | 24 |
| 43 | A | A | A | A | 3 | 11 | 12 | | 26 |
| 14 | A | A | A | A | 4 | 8 | 12 | | 24 |
| 35 | A | A | A | A | 3 | 4 | 10 | | 17 |
| 6 | A | A | A | A | 3 | 7 | 12 | | 22 |
| 57 | A | A | A | A | 2 | 8 | 7 | | 17 |
| 38 | A | A | A | A | 1 | 4 | 11 | | 16 |
| 19 | A | A | A | A | 3 | 9 | 11 | | 23 |
| 30 | A | A | A | A | 4 | 11 | 10 | | 25 |
| Original no. of females: | | | 10 | Live neonates per female: | | | | 21.4 | 214 |

Comments:

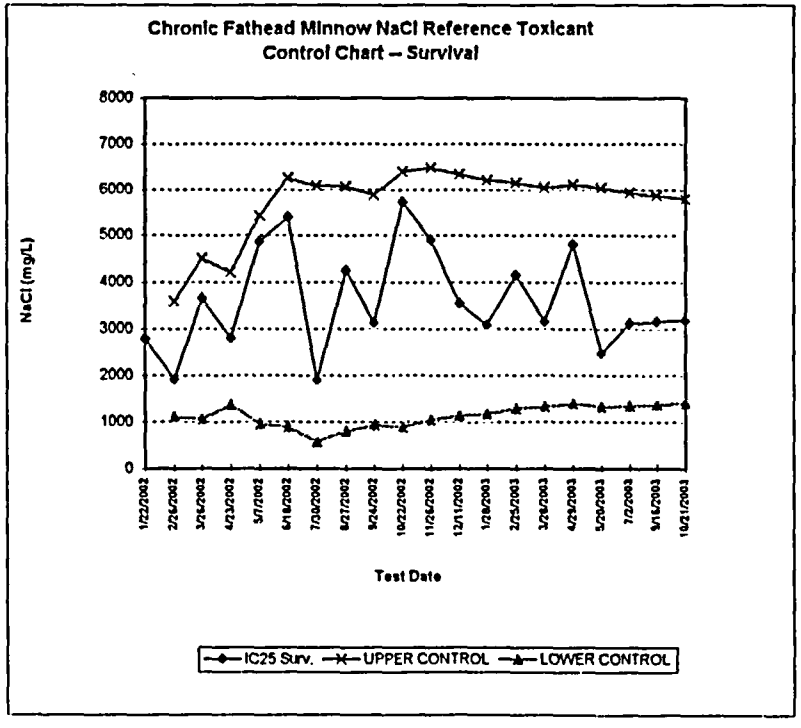
Entered by: ASP 12/3/03
Checked by: SKC 12/3/03

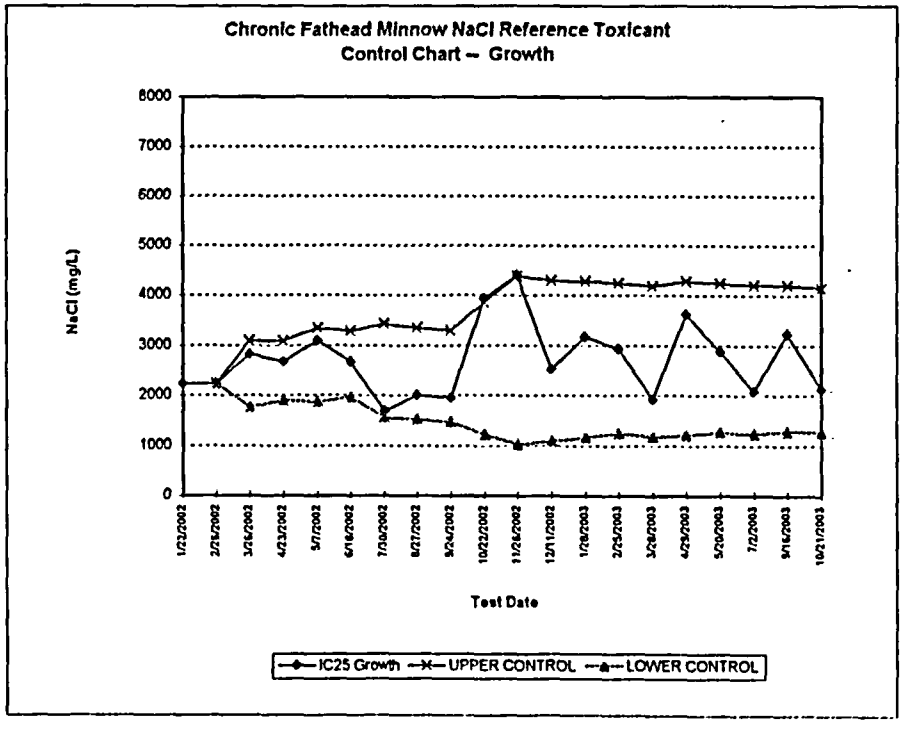
**Fathead Minnow**

**Reference Toxicant Test**

# P. promelas Chronic NaCl Reference Toxicant Data

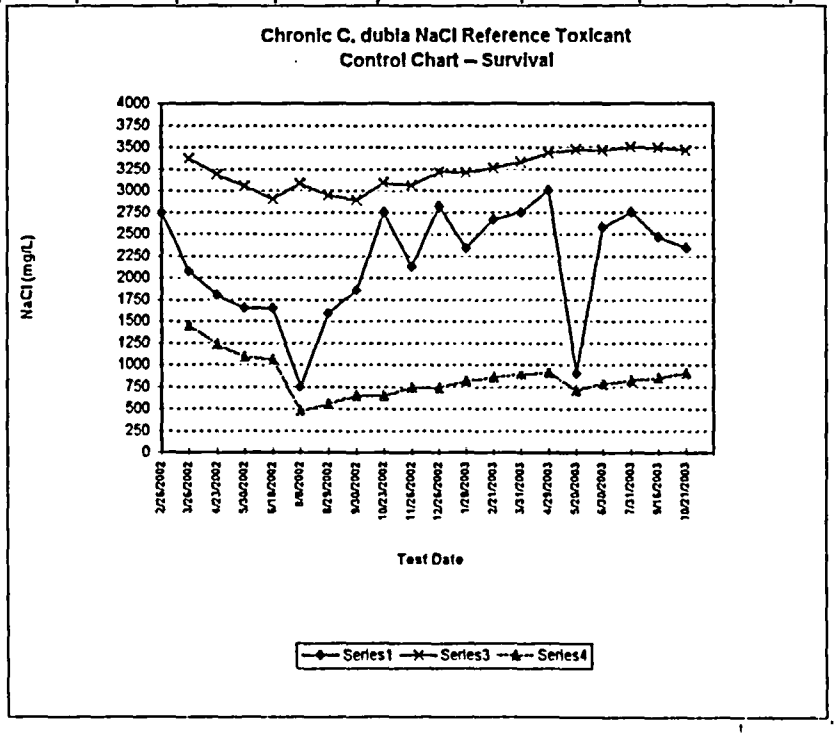
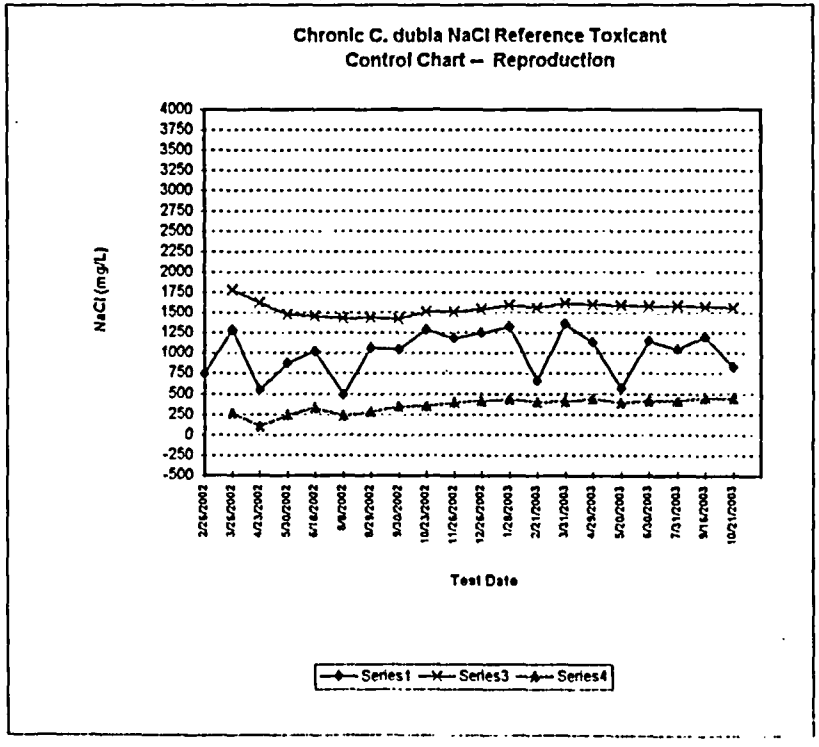
| TEST NO. | INITS | DATE | IC25 Surv (Arc-Sine) | CUM MEAN IC25 | CUM SD | UPPER CONTROL (+ 2x Cum SD) | LOWER CONTROL (-2x CUM SD) | IC25 Growth | CUM MEAN IC25 | CUM SD | UPPER CONTROL (+ 2x Cum SD) | LOWER CONTROL (-2x CUM SD) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 128 | RFP/ASP | 1/22/2002 | 2783 | 2780 | | | | 2241 | 2240 | | | |
| 129 | RFP/ASP | 2/26/2002 | 1908 | 2350 | 620 | 3590 | 1110 | 2241 | 2240 | 0 | 2240 | 2240 |
| 130 | RFP/ASP | 3/26/2002 | 3636 | 2780 | 860 | 4500 | 1060 | 2821 | 2430 | 330 | 3090 | 1770 |
| 131 | RFP/ASP | 4/23/2002 | 2800 | 2780 | 710 | 4200 | 1360 | 2673 | 2490 | 300 | 3090 | 1890 |
| 132 | RFP/ASP | 5/7/2002 | 4868 | 3200 | 1120 | 5440 | 960 | 3095 | 2610 | 370 | 3350 | 1870 |
| 133 | RFP/ASP | 6/18/2002 | 5400 | 3570 | 1340 | 6250 | 890 | 2669 | 2620 | 330 | 3280 | 1960 |
| 134 | RFP/ASP | 7/30/2002 | 1900 | 3330 | 1380 | 6090 | 570 | 1690 | 2490 | 470 | 3430 | 1550 |
| 135 | ASP/RFP | 8/27/2002 | 4250 | 3440 | 1320 | 6080 | 800 | 2003 | 2430 | 460 | 3350 | 1510 |
| 136 | RPP/ASP | 9/24/2002 | 3117 | 3410 | 1240 | 5890 | 930 | 1950 | 2380 | 460 | 3300 | 1460 |
| 137 | RFP/ASP | 10/22/2002 | 5741 | 3640 | 1380 | 6400 | 880 | 3937 | 2530 | 660 | 3850 | 1210 |
| 138 | RFP/ASP | 11/26/2002 | 4904 | 3760 | 1360 | 6480 | 1040 | 4396 | 2700 | 840 | 4380 | 1020 |
| 139 | ASP/RFP | 12/11/2002 | 3544 | 3740 | 1300 | 6340 | 1140 | 2525 | 2690 | 800 | 4290 | 1090 |
| 140 | RFP | 1/28/2003 | 3077 | 3690 | 1260 | 6210 | 1170 | 3167 | 2720 | 780 | 4280 | 1160 |
| 141 | MRF | 2/25/2003 | 4144 | 3720 | 1220 | 6160 | 1280 | 2932 | 2740 | 750 | 4240 | 1240 |
| 142 | ASP/MRF | 3/28/2003 | 3143 | 3680 | 1180 | 6040 | 1320 | 1928 | 2680 | 750 | 4180 | 1180 |
| 143 | MRF/ASP | 4/29/2003 | 4802 | 3750 | 1180 | 6110 | 1390 | 3624 | 2740 | 770 | 4280 | 1200 |
| 144 | MRF/ASP | 5/20/2003 | 2475 | 3680 | 1180 | 6040 | 1320 | 2882 | 2750 | 740 | 4230 | 1270 |
| 145 | ASP/MRF | 7/2/2003 | 3112 | 3640 | 1150 | 5940 | 1340 | 2084 | 2710 | 740 | 4190 | 1230 |
| 146 | ASP/MRF | 9/16/2003 | 3143 | 3620 | 1130 | 5880 | 1360 | 3228 | 2740 | 730 | 4200 | 1280 |
| 147 | ASP/MRF | 10/21/2003 | 3182 | 3600 | 1100 | 5800 | 1400 | 2135 | 2710 | 720 | 4150 | 1270 |



# Water Flea

# Reference Toxicant Test

C. dubia Chronic NaCl Reference Toxicant Data

| Test No. | Inits | Date | C25 Surviva (Arc-Sine) | Cumulative Mean IC25 | Cumulative ST | UPPER CONTRO (+ 2 cum SD) | OWER CONTRO (-2 cum SD) | C25 Reprod | Cumulative Mea IC25 | CUM SD | PPER CONTRO (+ 2 cum SD) | LOWER CONTROL (-2 cum SD) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 103 | RFP/ASP | 2/26/2002 | 2750 | 2750 | | | | 745 | 750 | | | |
| 104 | RFP/ASP | 3/26/2002 | 2071 | 2410 | 480 | 3370 | 1450 | 1287 | 1020 | 380 | 1780 | 260 |
| 105 | RFP/ASP | 4/23/2002 | 1800 | 2210 | 490 | 3190 | 1230 | 543 | 860 | 380 | 1620 | 100 |
| 106 | RFP/ASP | 5/30/2002 | 1650 | 2070 | 490 | 3050 | 1090 | 876 | 860 | 310 | 1480 | 240 |
| 107 | RFP/ASP | 6/18/2002 | 1650 | 1980 | 460 | 2900 | 1060 | 1020 | 890 | 280 | 1450 | 330 |
| 108 | RFP/ASP | 8/8/2002 | 750 | 1780 | 650 | 3080 | 480 | 490 | 830 | 300 | 1430 | 230 |
| 109 | ASP/RFP | 8/29/2002 | 1591 | 1750 | 600 | 2950 | 550 | 1057 | 860 | 290 | 1440 | 280 |
| 110 | RFP/ASP | 9/30/2002 | 1859 | 1770 | 560 | 2890 | 650 | 1043 | 880 | 270 | 1420 | 340 |
| 111 | RFP/ASP | 10/23/2002 | 2750 | 1870 | 610 | 3090 | 650 | 1286 | 930 | 290 | 1510 | 350 |
| 112 | RFP/ASP | 11/26/2002 | 2125 | 1900 | 580 | 3060 | 740 | 1180 | 950 | 280 | 1510 | 390 |
| 113 | RFP/ASP | 12/26/2002 | 2824 | 1980 | 620 | 3220 | 740 | 1247 | 980 | 280 | 1540 | 420 |
| 114 | RFP | 1/28/2003 | 2333 | 2010 | 600 | 3210 | 810 | 1327 | 1010 | 290 | 1590 | 430 |
| 115 | RFP/ASP | 2/21/2003 | 2667 | 2060 | 600 | 3260 | 860 | 656 | 980 | 290 | 1560 | 400 |
| 116 | MRF/ASP | 3/31/2003 | 2750 | 2110 | 610 | 3330 | 890 | 1358 | 1010 | 300 | 1610 | 410 |
| 117 | MRF/ASP | 4/29/2003 | 3000 | 2170 | 630 | 3430 | 910 | 1133 | 1020 | 290 | 1600 | 440 |
| 118 | MRF/ASP | 5/20/2003 | 900 | 2090 | 690 | 3470 | 710 | 571 | 990 | 300 | 1590 | 390 |
| 119 | ASP/MRF | 6/30/2003 | 2571 | 2120 | 670 | 3460 | 780 | 1151 | 1000 | 290 | 1580 | 420 |
| 120 | ASP/MRF | 7/31/2003 | 2750 | 2160 | 670 | 3500 | 820 | 1045 | 1000 | 290 | 1580 | 420 |
| 121 | ASP/MRF | 9/16/2003 | 2461 | 2170 | 660 | 3490 | 850 | 1199 | 1010 | 280 | 1570 | 450 |
| 122 | ASP/MRF | 10/21/2003 | 2333 | 2180 | 640 | 3460 | 900 | 823 | 1000 | 280 | 1560 | 440 |