Covanta Fairfax, Inc.
A Covanta Energy Company
9898 Furnace Road
Lorton, VA 22079
Tel 703 690 6860
Fax 703 690 4223

COVANTA ENERGY

VA DEPARTMENT OF ENVIRONMENTAL QUALITY
NORTHERN
MAY 16 2011
REGIONAL OFFICE
WOODBRIDGE, VA

May 13, 2011

Susan D. Mackert
Environmental Specialist Senior II
Virginia Department of Environmental Quality
Northern Virginia Regional Office
13901 Crown Court
Woodbridge, VA 22193

Reference: Covanta Fairfax, Inc (CFI) VPDES Permit No. VA0090638
Permit Renewal Application

Dear Ms. Mackert,

Please find enclosed the permit application package consisting of the following:

- Public Notice Billing Information.
- VPDES Permit Application Addendum.
- EPA NPDES Application Form 1 General Information.
- EPA NPDES Application Form 2E Facilities Which Do Not Discharge Process Wastewater.
- Fairfax County DSW Acute & Chronic Effluent Toxicity Tests.

The construction of the direct discharge system has not begun and CFI neither discharges nor has the capability for such a discharge at this time. Based on this fact, CFI is requesting consideration for the following waivers until the system is operational:

1. Requirement for monthly submittals of the Discharge Monitoring Report,
2. Requirement for semi-annual chronic toxicity testing/reporting, and
3. Requirement for the Operation and Maintenance Manual.

Please contact me if you have any questions or comments.

Sincerely,

Scott Drew
Facility Manager

Cc J. Doughty (Fairfax County Solid Waste)
J. Herrmann (CFI)

Covanta Fairfax, Inc.
9898 Furnace Road
Lorton, VA 22079

VPDES PERMIT APPLICATION
FOR
NON-CONTACT COOLING TOWER WATER

PUBLIC NOTICE BILLING INFORMATION

I hereby authorize the Department of Environmental Quality to have the cost of publishing a public notice billed to the Agent/Department shown below. The public notice will be published once a week for two consecutive weeks in accordance with 9 VAC 25-31-290.C.2.

Agent/Department to be billed: Mr. Scott Drew / Facility Manager

Owner: Covanta Fairfax

Applicant's Address: 9898 Furnace Road

Lorton, VA 22079

Agent's Telephone Number: (703) 690-6860

Authorizing Agent: _____
Signature

VPDES Permit Number: VA0090638
Facility Name: Covanta Fairfax

Please return to:

Susan Mackert
VA-DEQ, NRO
13901 Crown Court
Woodbridge, VA 22193-1453
Fax: (703) 583-3821

Covanta Fairfax, Inc.
9898 Furnace Road
Lorton, VA 22079

VPDES PERMIT APPLICATION ADDENDUM

VPDES Permit Application Addendum

1. **Entity to whom the permit is to be issued:** COVANTA FAIRFAX, INC.
   Who will be legally responsible for the wastewater treatment facilities and compliance with the permit? This may or may not be the facility or property owner.

2. **Is this facility located within city or town boundaries?** Y / (N)

3. **Provide the tax map parcel number for the land where the discharge is located.**
   MAP REFERENCE # 1073 01 0020

4. **For the facility to be covered by this permit, how many acres will be disturbed during the next five years due to new construction activities?** 1 ACRE

5. **What is the design average effluent flow of this facility?** 662,445 ~~MGD~~ GPD
   For industrial facilities, provide the max. 30-day average production level, include units:

   In addition to the design flow or production level, should the permit be written with limits for any other discharge flow tiers or production levels? Y / (N)
   If "Yes", please identify the other flow tiers (in MGD) or production levels: _____
   Please consider the following questions for both the flow tiers and the production levels (if applicable): Do you plan to expand operations during the next five years? Is your facility's design flow considerably greater than your current flow?

6. **Nature of operations generating wastewater:**
   NON-CONTACT COOLING WATER DISCHARGE

   0 % of flow from domestic connections/sources
   Number of private residences to be served by the treatment works:

   100 % of flow from non-domestic connections/sources

7. **Mode of discharge:** X Continuous ____ Intermittent ____ Seasonal
   Describe frequency and duration of intermittent or seasonal discharges:
   _____

8. **Identify the characteristics of the receiving stream at the point just above the facility's discharge point:**
   X Permanent stream, never dry
   __ Intermittent stream, usually flowing, sometimes dry
   __ Ephemeral stream, wet-weather flow, often dry
   __ Effluent-dependent stream, usually or always dry without effluent flow
   __ Lake or pond at or below the discharge point
   __ Other: _____

9. **Approval Date(s):**
   O & M Manual 1988 **Sludge/Solids Management Plan** 1988

   Have there been any changes in your operations or procedures since the above approval dates? Y / N

Covanta Fairfax, Inc.
9898 Furnace Road
Lorton, VA 22079

EPA NPDES APPLICATION FORM 1 GENERAL INFORMATION

Please print or type in the unshaded areas only.

Form Approved. OMB No. 2040-0086.

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

S		T/A	C
F			D
1	2 13	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 in the appropriate fill-in area below. Also, if any of the preprinted data is absent *(the area to the left of the label space lists 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		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	
	16	17	18		19	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		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)	X		X
	22	23	24		25	26	27
E. Does or will this facility treat, store, or dispose of **hazardous wastes**? (FORM 3)		X		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)		X	
	28	29	30		31	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)		X		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)		X	
	34	35	36		37	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)		X		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)		X	
	40	41	42		43	44	45

III. NAME OF FACILITY

C 1 SKIP Covanta Fairfax, Inc.

15 16 – 29 30 69

IV. FACILITY CONTACT

A. NAME & TITLE *(last, first, & title)*: C 2 Drew, Scott P. Facility Manager (15 16 45)

B. PHONE *(area code & no.)*: (703) 690-6860 (46 48 49 51 52- 55)

V. FACILTY MAILING ADDRESS

A. STREET OR P.O. BOX: C 3 9898 Furnace Road (15 16 45)

B. CITY OR TOWN: C 4 Lorton (15 16 40)

C. STATE: VA (41 42)

D. ZIP CODE: 22079 (47 51)

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER: C 5 9898 Furnace Road (15 16 45)

B. COUNTY NAME: Fairfax (46 70)

C. CITY OR TOWN: C 6 Lorton (15 16 40)

D. STATE: VA (41 42)

E. ZIP CODE: 22079 (47 51)

F. COUNTY CODE *(if known)* (52 -54)

CONTINUED FROM THE FRONT

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

A. FIRST	B. SECOND
7 4953 (specify) Refuse Systems (solid waste combustors and incinerators)	7 (specify)
C. THIRD	**D. FOURTH**
7 (specify)	7 (specify)

VIII. OPERATOR INFORMATION

A. NAME: 8 Covanta Fairfax, Inc

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
S = STATE
P = PRIVATE
M = PUBLIC *(other than federal or state)*
O = OTHER *(specify)*

M (specify)

D. PHONE *(area code & no.)*: A (703) 690-6860

E. STREET OR P.O. BOX: 9898 Furnace Road

F. CITY OR TOWN: B Lorton

G. STATE: VA

H. ZIP CODE: 22079

IX. INDIAN LAND

Is the facility located on Indian lands? ☐ YES ☑ NO

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES *(Discharges to Surface Water)*	9 N	VAR051071	
D. PSD *(Air Emissions from Proposed Sources)*	9 P	71920	
B. UIC *(Underground Injection of Fluids)*	9 U		
E. OTHER *(specify)*	9	Title V NVRO71920	(specify) SIU Wastewater #A511
C. RCRA *(Hazardous Wastes)*	9 R		
E. OTHER *(specify)*	9	Solid Waste PBR #545	(specify)

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. 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)*

Covanta Fairfax, Inc. is an Energy from Waste (EfW) facility which began commercial operations in June 1990. It is Covanta Energy's largest facility, processing a nominal 3,000 tons per day of municipal solid waste. The facility sells up to 79 megawatts of renewable energy to Dominion Virginia Power Company -- enough energy to meet the needs of 75,000 homes and is the first Covanta Energy facility to have a non-ferrous metal recovery system. Energy-from-Waste (EfW) or waste-to-energy (WTE) is a process that takes municipal solid waste - including plain old household trash - and transfers it into combustion chambers where it is reduced to 10% of its original volume in the process. The heat generated from the combustion chambers heats up water in steel tubes that form the walls of the combustion chambers. The water is turned to steam and sent through two turbines that continuously generates electricity. From the boiler, the cooled gases enter the advanced air pollution control system. Using lime slurry, the dry scrubber neutralizes any acid-forming gases, such as sulfur oxides and hydrogen chloride. Ammonia and carbon injection are used for the control of nitrogen oxides and mercury emissions. Particulates are captured by a high-efficiency baghouse. Captured fly ash particles fall into hoppers and are transported by an enclosed conveyor system to the MARTIN Ash Discharger where they are wetted to prevent dust, and mixed with the bottom ash from the grate. Ferrous and non-ferrous metal are recovered for recycling from the ash residue. The ash residue is then conveyed to an enclosed building where it is loaded into covered, leak-proof trucks and taken to a monofil designed to protect against groundwater contamination.

A Flow Diagram is included in Attachment 2.

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
Scott P. Drew, Facility Manager		5/13/2011

COMMENTS FOR OFFICIAL USE ONLY

C

Covanta Fairfax, Inc.
9898 Furnace Road
Lorton, VA 22079

EPA NPDES Application Form 2E
Facilities Which Do Not Discharge Process Wastewater

Please print or type in the unshaded areas only.	EPA ID Number (copy from Item 1 of Form 1)	Form Approved. OMB No. 2040-0086. Approval expires 5-31-92.

FORM 2E NPDES

EPA Facilities Which Do Not Discharge Process Wastewater

I. RECEIVING WATERS

For this outfall, list the latitude and longitude, and name of the receiving water(s).

Outfall Number *(list)*	Latitude			Longitude			Receiving Water *(name)*
	Deg	Min	Sec	Deg	Min	Sec	Mills Branch
001	38	41	51	-77	14	27	

II. DISCHARGE DATE *(If a new discharger, the date you expect to begin discharging)*

11/16/2011

III. TYPE OF WASTE

A. Check the box(es) indicating the general type(s) of wastes discharged.

☐ Sanitary Wastes ☐ Restaurant or Cafeteria Wastes ☑ Noncontact Cooling Water ☐ Other Nonprocess Wastewater *(Identify)*

B. If any cooling water additives are used, list them here. Briefly describe their composition if this information is available.

See Attachment A.

IV. EFFLUENT CHARACTERISTICS

A. Existing Sources — Provide measurements for the parameters listed in the left-hand column below, unless waived by the permitting authority *(see instructions)*.

B. New Dischargers — Provide estimates for the parameters listed in the left-hand column below, unless waived by the permitting authority. Instead of the number of measurements taken, provide the source of estimated values *(see instructions)*.

Pollutant or Parameter	(1) Maximum Daily Value *(include units)*		(2) Average Daily Value *(last year)* *(include units)*		(3) Number of Measurements Taken *(last year)*	(or) (4) Source of Estimate *(if new discharger)*
	Mass	Concentration	Mass	Concentration		
Biochemical Oxygen Demand (BOD)	3.02 kg	2 mg/l	1.32 kg	2 mg/l	1	Analysis of
Total Suspended Solids (TSS)	36.3 kg	24 mg/l	15.8 kg	24 mg/l	1	cooling
Fecal Coliform *(if believed present or if sanitary waste is discharged)*	N/A		N/A			tower blow
Total Residual Chlorine *(if chlorine is used)*	1.36 kg	0.9 mg/l	0.09 kg	0.14 mg/l	Weekly	down
Oil and Grease	3.02 kg	2 mg/l	1.32 kg	2 mg/l	1	discharge
*Chemical oxygen demand (COD)	143.6 kg	95 mg/l	62.5 kg	95 mg/l	1	expected to
*Total organic carbon (TOC)	13.6 kg	9 mg/l	5.91 kg	9 mg/l	1	sanitary
Ammonia *(as N)*	0.30 kg	0.2 mg/l	0.14 kg	0.2 mg/l	1	sewer.
Discharge Flow	Value 1,514,153 gpd		662,445 gpd			
pH *(give range)*	Value 6.2-8.9					
Temperature *(Winter)*	34.4 °C		27.1 °C			
Temperature *(Summer)*	36.5 °C		33.1 °C			

*If noncontact cooling water is discharged

V. **Except for leaks or spills, will the discharge described in this form be intermittent or seasonal?** If yes, briefly describe the frequency of flow and duration.	☐ Yes ☑ No

VI. TREATMENT SYSTEM *(Describe briefly any treatment system(s) used or to be used)*

See Attachment A for a description of additives used for treatment of cooling tower water.

VII. OTHER INFORMATION *(Optional)*

Use the space below to expand upon any of the above questions or to bring to the attention of the reviewer any other information you feel should be considered in establishing permit limitations. Attach additional sheets, if necessary.

A flow diagram illustrating water use within the facility for the proposed non-contact cooling tower water discharge is included as Attachment B.

Toxicity testing of the proposed non-contact cooling tower water discharge was performed on a composite sample obtained during the week of May 8, 2000. Survival rates for both acute and chronic toxicity tests were determined to be 95 percent or greater for all dilutions tested. The toxicity test report is included as Attachment C.

VIII. CERTIFICATION

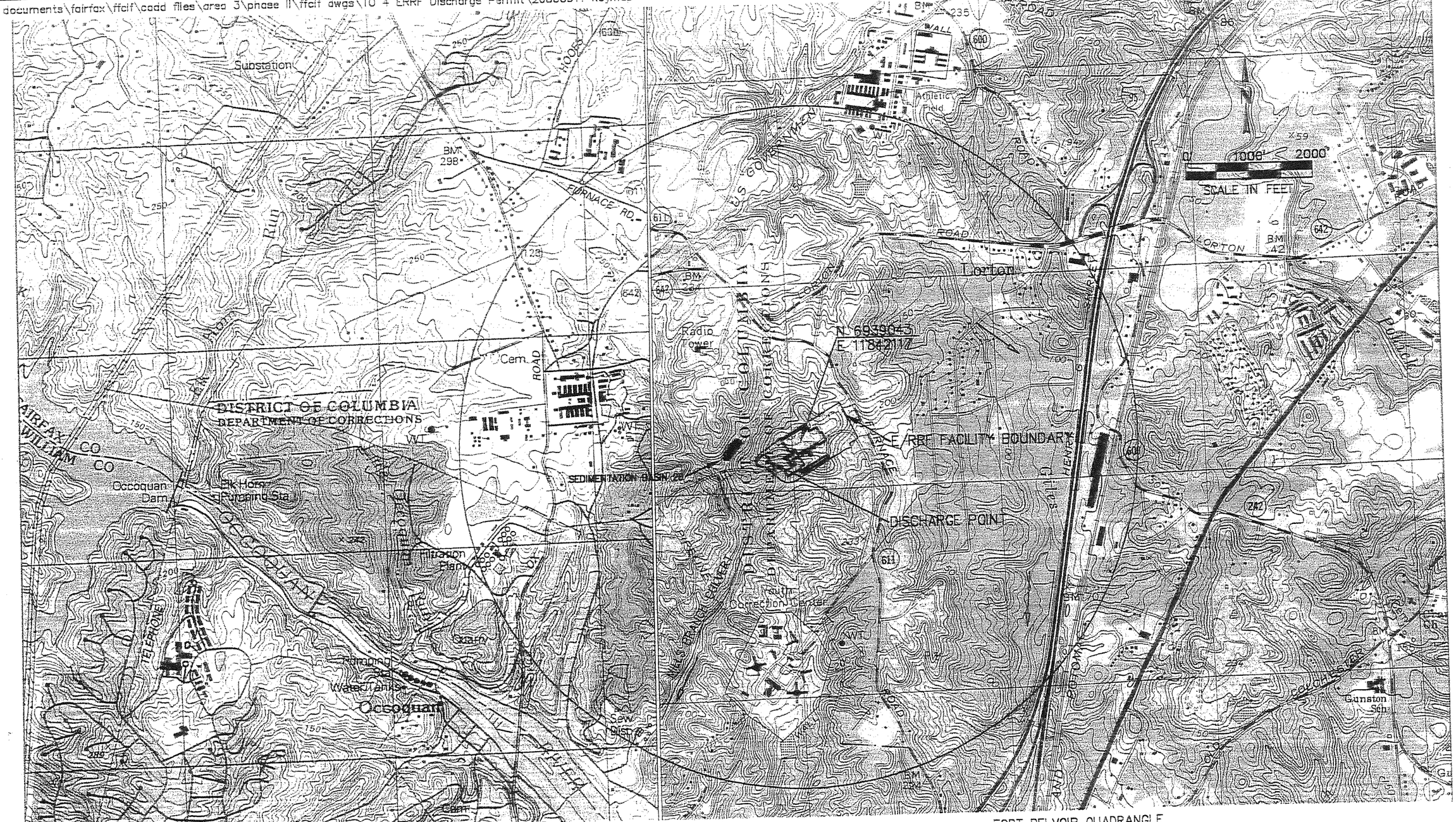
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage 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	B. Phone No. *(area code & no.)*
Scott P. Drew, Facility Manager	(703) 690-6860
C. Signature	D. Date Signed
[signature]	5/13/2011

Covanta Fairfax, Inc.
9898 Furnace Road
Lorton, VA 22079

ATTACHMENT 1
SITE MAP

\my documents\fairfax\ffclf\cadd files\area 3\phase II\ffclf dwgs\TO 4 ERRF Discharge Permit\20000911 keymap



OCCOQUAN QUADRANGLE
VIRGINIA
7.5-MINUTE SERIES(TOPOGRAPHIC)
UPDATED 1994

FORT BELVOIR QUADRANGLE
VIRGINIA-MARYLAND
7.5-MINUTE SERIES(TOPOGRAPHIC-BATHYMETRIC)
UPDATED 1965

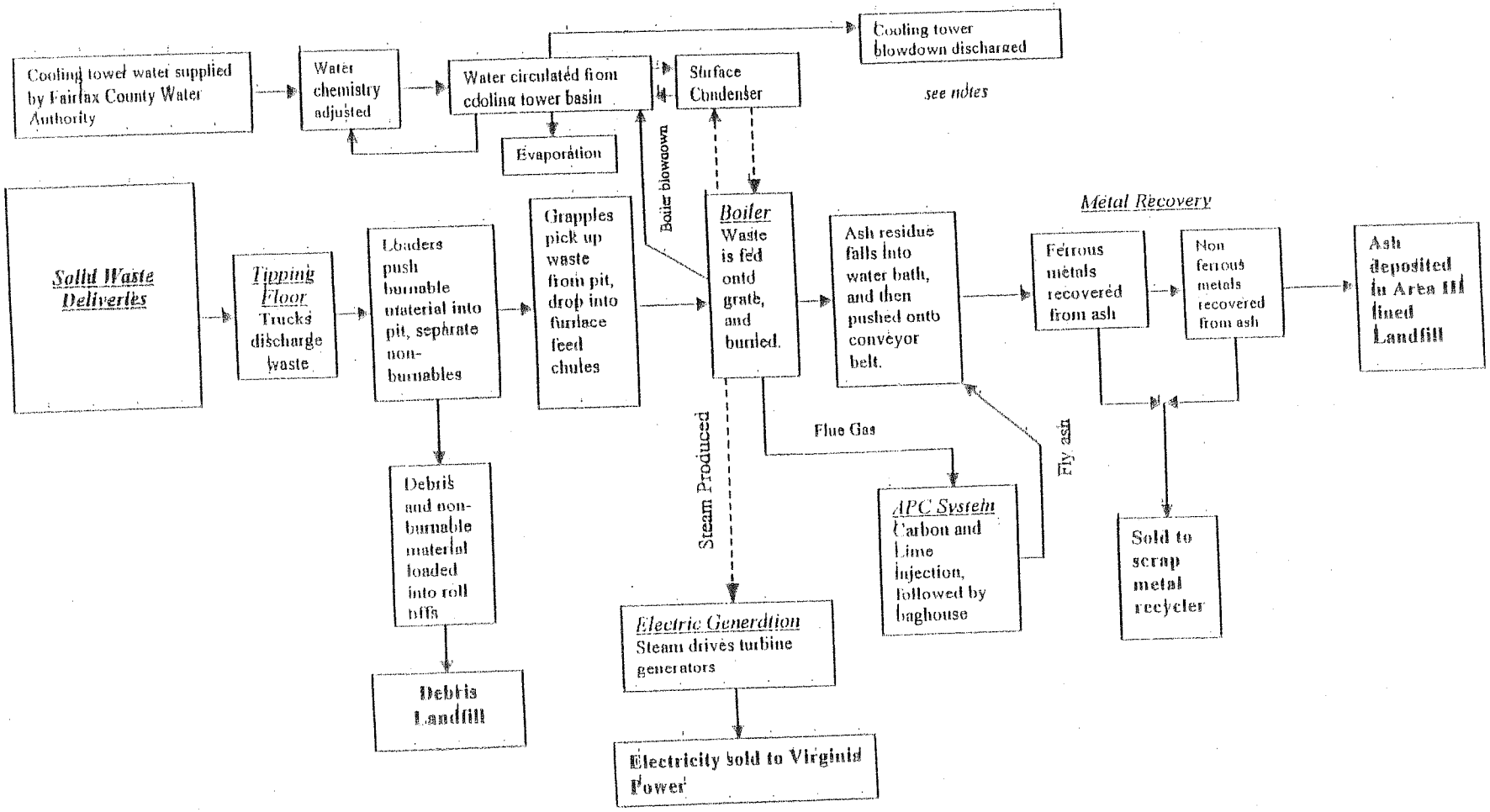
SWS
Solid Waste Services, LLC

VIRGINIA POLLUTION DISCHARGE ELIMINATION SYSTEM PERMIT
ENERGY / RECOURCE RECOVERY FACILITY KEYMAP

FAIRFAX COUNTY - PERMIT NO. 103

Covanta Fairfax, Inc.
9898 Furnace Road
Lorton, VA 22079

ATTACHMENT 2
FLOW DIAGRAM



Process Flow Chart
Ogden Martin Systems of Fairfax
Waste-to-Energy Facility

Notes:
Dashed lines indicate boiler water flow which is separate from the cooling water.
See Attachment B of the Form 2E VPDES Permit Application for additional water usage information

Covanta Fairfax, Inc.
9898 Furnace Road
Lorton, VA 22079

ATTACHMENT A
COOLING TOWER WATER ADDITIVES

ATTACHMENT A: FAIRFAX COUNTY E/RRF COOLING WATER ADDITIVES

Trade Name	Av. Usage Amount	Chemical Name	Weight Percent	LC-50	Est. Residual Conc. (ppm)	Comments
Chemtreat CL-2150	300 gal/treatm.	5-chloro-2-methyl-4-isothiazolin-3-one 2-methyl-4-isothiazolin-3-one Magnesium nitrate, dodecahydrate Cupric nitrate	1.15 0.35 < 1.0 0.025	13.7 mg/l (4hr rat inhal.)	None	Non-oxidizing biocide used as a shock treatment for the cooling tower 2 to 3 times per year. Half-life = 12 hours. If shock treatment is necessary, cooling tower blowdown will be diverted to the sanitary sewer for 3 days after treatment. Sodium bisulfite is used to detoxify any residual concentrations.
Chlorine bleach	300,000 lb/mo.	Sodium hypochlorite	6.67	5.9 mg/l (96 hr p.promelas)	0.4 to 1.0 Free Cl: .15 to .25	1 percent active. Continuous feed biocide.
Chemtreat CL-4891	6,000 lb/mo.	Potassium hydroxide Tolyltriazole, sodium salt Molybdic acid, disodium salt 5-Hydroxyethylidene-1,1-diphosphonic acid, tetrapotassium salt	<10 <10 <10 <10	676 mg/l (96 hr p.promelas) >1000 mg/l (96 hr c.dubia)	< 0.5 < 1.5	Continuous feed dispersant for control of deposits and corrosion.
Sulfuric Acid	100 gal/day	Sulfuric acid	98	100-330 mg/l (48 hr flounder) 80-90 mg/l (48 hr shrimp)	125 (SO4)	Continuous feed pH contol for scaling
Chemtreat B-143	10 lb/mo. (max)	Sodium phosphate, tribasic	>1.0	120 mg/l (96 hr trout) 220 mg/l 96 hr bluegill)	< 1	Rarely used; used to adjust boiler feed water pH, if necessary.
Chemtreat B-144	10 lb/mo. (max)	Sodium phosphate, monobasic	>1.0	3200 mg/l (96 hr trout) 6400 mg/l (96 hour bluegill)	< 1	Rarely used; used to adjust boiler feed water pH, if necessary.
Chemtreat BL-1283	200 lb/mo	Diethylhydroxylamine	>1.0		None	Continuous feed volatile oxygen scavenger; prevents pitting of steam distribution system. Travels with vapor, undetectable in cooling water blowdown.
Chemtreat BL-1551	200 lb/mo	Morpholine	>1.0	180 mg/l (trout 96 hr) 350 mg/l (bluegill (96 hr)	None	Continuous feed boiler water treatment to eliminate CO2 concentrations. Travels with vapor, undetectable in cooling water blowdown.
Chemtreat BL-1754	608 lb/mo	Sodium hydroxide, Sodium tripolyphosphate	<2.0 >1.0		< 1 (P04)	Continuous feed to adjust boiler feed water pH.

Note: Chemical additives with trade names beginning with a B are boiler water additives. Boiler blowdown comprises less than 1 percent of the cooling water makeup.

Covanta Fairfax, Inc.
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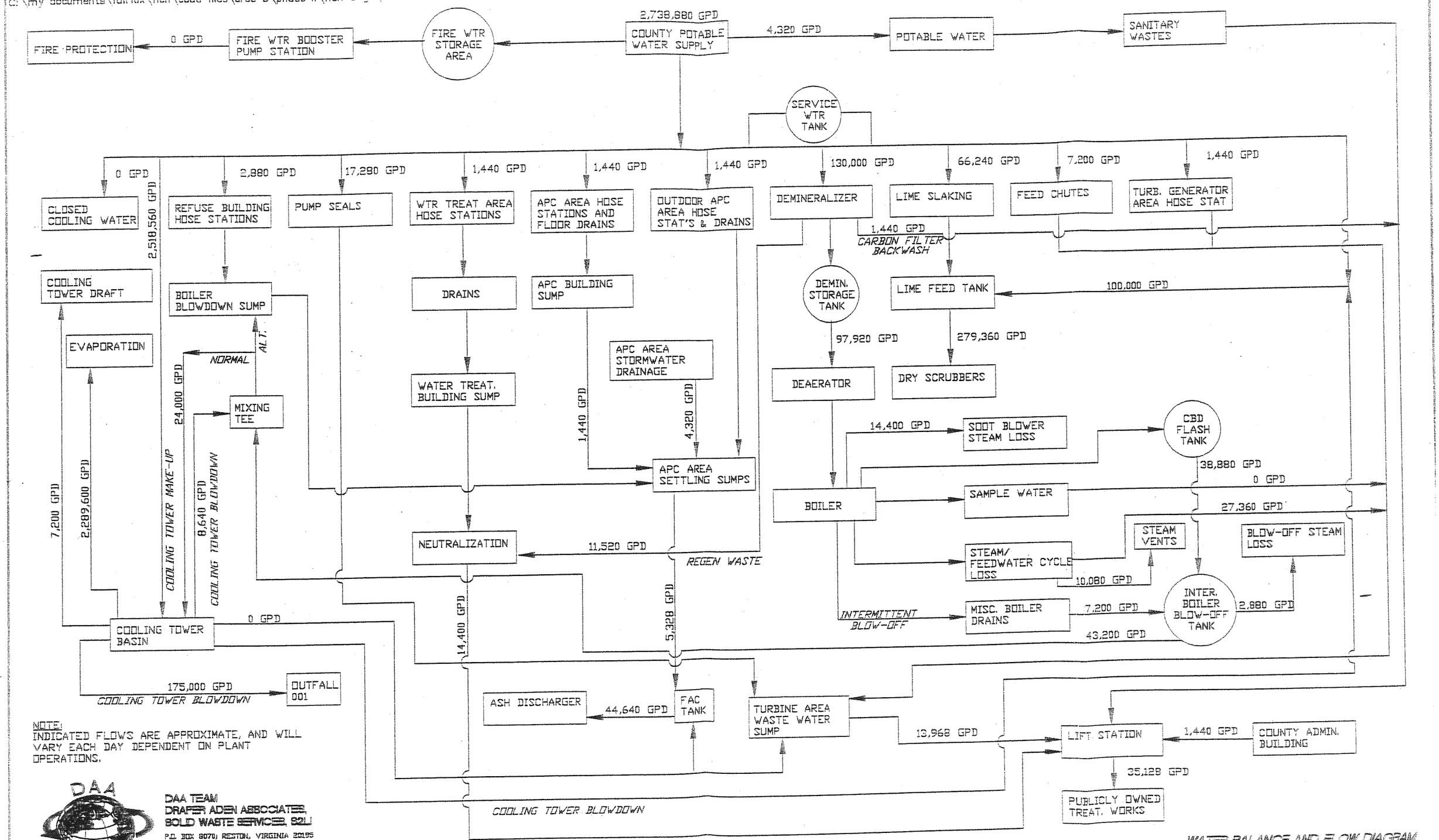
Lorton, VA 22079

ATTACHMENT B
WATER FLOW DIAGRAM

C:\my documents\fairfax\ffclf\cadd files\area 3\phase II\ffclf dwgs\20001024FLOWCHART

11/6/2000



NOTE:
INDICATED FLOWS ARE APPROXIMATE, AND WILL VARY EACH DAY DEPENDENT ON PLANT OPERATIONS.

DAA TEAM
DRAPER ADEN ASSOCIATES, SOLID WASTE SERVICES, SZL
P.O. BOX 8070, RESTON, VIRGINIA 20195
PHONE: (703) 834-0711
FAX: (703) 834-6181
EMAIL: SWS@DAA.COM

WATER BALANCE AND FLOW DIAGRAM
VPDES PERMIT APPLICATION

Covanta Fairfax, Inc.
9898 Furnace Road
Lorton, VA 22079

ATTACHMENT C
COOLING TOWER WATER BLOWDOWN
TOXICITY TEST REPORT

Fairfax County DSW
Acute & Chronic Effluent Toxicity Tests
Ceriodaphnia dubia Pimephales promelas
5/8/00 to 5/12/00 Sampling Period

Submitted to:

Mr. Mike Schmitt
Martel Laboratory Services, Inc
1025 Cromwell Bridge Road
Baltimore, MD 21204

By

Coastal Bioanalysts, Inc
6400 Enterprise Court
Gloucester, VA 23061
(804) 694-8285

Sample Collection Date/Time	Sample Use Dates/Times	Aeration[2] Rate/Time	Pretreatment/ Adjustment
5/10/00 1417	5/11/00 1540/1550[3]	mod/1.5 min	n/a

[2]Aeration often necessary to reduce sample oxygen concentration to 100% saturation after warming.
[3]*C. dubia P. promelas* test time.

Table 2. Acute Test Effluent and Dilution Water [4] Chemical & Physical Characteristics (Mean Value (Standard Deviation))

Parameter	Initial Effluent	Adjusted Effluent	Dilution Water
Temperature (^{0}C)	4.1 (---)	20.2 (---)	20.3 (---)
Conductivity (uMHOS/cm)	2360 (---)	N.D.	267 (---)
pH	8.60 (---)	8.41 (---)	8.03 (---)
Dissolved Oxygen (mg/l)	11.8 (---)	8.9 (---)	8.9 (---)
Total Hardness (mg/l as $CaCO_3$)	1192 (---)	N.D.	90 (---)
Alkalinity (mg/l as $CaCO_3$)	114 (---)	N.D.	58 (---)
Total Chlorine (mg/l)	0.2 (---)	0.2 (---)	N.D.
NH_3-N (mg/l)	0.66 (---)	N.D.	N.D.

[4]Effluent parameters measured upon receipt of sample in lab and after adjustment on day of use. Dilution water (Synthetic using ASTM Type 1 deionized water) values measured after preparation of diluent on day of use.

Coastal Bioanalysis, Inc.

II. RESULTS - CHRONIC TOXICITY TESTS

Table 3. Summary Chronic Test Results

% Effluent Concentration	*C. dubia* Survival (%)	*C. dubia* Mean # Offspring	*C. dubia* # Males	*P. promelas* Survival (%)	*P. promelas* Growth (mg)
0	100	22.2	0	93	0.58
6.3	100	20.6	0	100	0.52
12.5	100	20.7	0	100	0.51
25	100	20.7	0	98	0.61
50	100	21.7	0	98	0.62
100	100	21.0	0	95	0.57
NOEC (%):	100	100		100	100
T.U./Chr	≤1.00	≤1.00		≤1.00	≤1.00
Hypothesis Test (p=0.05):	n/a	Dunnett's		Steel's	Dunnett's
Normality Test (p=0.01):	n/a	Pass		Fail	Pass
Homogeneity Test (p=0.01)	n/a	Pass		n/a	Pass

Note: Tests for normality and homogeneous variance performed to determine the appropriate hypothesis test to be used for identifying the NOEC for each end point. Analyses for end points other than survival performed only on concentrations ≥survival NOEC.

Coastal Bioanalysis, Inc

Chronic Test Information:

	C. dubia Test	*P. promelas* Test
Test Type	3 Brood Static Renewal	7-day Static Renewal
End Point	Survival, Reproduction	Survival, Growth
Test Start:	5/9/00 1435	5/9/00 1500
Test End:	5/15/00 1500	5/16/00 1525
Organism Source:	CBI stock cultures	CBI stock cultures
Hatch/harvest Date:	5/8/00 1725-2030	5/9/00 0800-1230
Acclimation Temperature:	25.4°C	25.4°C
Test Aerated?[5]	N/A	No
Aeration Initiation Date/Time:	N/A	N/A

[5]Aeration necessary when effluent oxygen demand results in dissolved oxygen concentration ≤ 4.0 mg/l.

Sample Collection Date/Time	Sample Use Dates/Times			Aeration[6] Rate/Time	Pretreatment/ Adjustment
5/8/00 1407	5/9/00 1435/1500[7]	5/10/00 1235/1420		mod/1.5 min	n/a
5/10/00 1417	5/11/00 1240/1400	5/12/00 1255/1400		mod/1.5-2 min	n/a
5/12/00 1242	5/13/00 1830/1815	5/14/00 1240/1300	5/15/00 ----/1200	mod/2 min	n/a

[6]Aeration often necessary to reduce sample oxygen concentration to 100% saturation after warming.
[7]*C. dubia/P. promelas* test times.

Table 4 Chronic Test Effluent and Dilution Water [8] Chemical & Physical Characteristics (Mean Value (Standard Deviation))

Parameter	Initial Effluent	Adjusted Effluent	Dilution Water
Temperature (°C)	4.3 (1.7)	25.5 (0.4)	24.5 (0.3)
Conductivity (uMHOS/cm)	2337 (146)	N.D.	272 (11)
pH	8.60 (0.12)	8.40 (0.6)	8.06 (0.05)
Dissolved Oxygen (mg/l)	11.8 (0.4)	8.2 (0.1)	8.2 (0.1)
Total Hardness (mg/l as $CaCO_3$)	1079 (179)	N.D.	93 (8)
Alkalinity (mg/l as $CaCO_3$)	125 (27)	N.D.	58 (0)
Total Chlorine (mg/l)	0.2 (0.1)	0.2 (0.1)	N.D.
NH_3-N (mg/l)	0.44 (0.26)	N.D.	N.D.

[8]Effluent parameters measured upon receipt of sample in lab and after adjustment on day of use. Dilution water (Synthetic using ASTM Type 1 deionized water) values measured after preparation of diluent on day of use.

III. WATER QUALITY

Table 5. Water Quality Summary - Acute Tests

C. dubia Test

Parameter	Control	6.3%	12.5%	25%	50%	100%
Temperature (°C)	20.2 (0.2)	20.1 (0.3)	20.0 (0.4)	19.9 (0.3)	20.0 (0.4)	20.1 (0.4)
D.O (mg/l)	8.9 (0.1)	8.8 (0.1)	8.9 (0.1)	8.8 (0.1)	8.8 (0.2)	8.7 (0.3)
pH	8.02 (0.02)	8.03 (0.09)	8.08 (0.14)	8.17 (0.19)	8.28 (0.16)	8.33 (0.12)
Conductivity (uMHOS/CM)	264 (5)	387 (5)	511 (15)	762 (18)	1217 (165)	2275 (148)

P. promelas

Parameter	Control	6.3%	12.5%	25%	50%	100%
Temperature (°C)	20.3 (0.1)	20.1 (0.3)	20.0 (0.2)	19.9 (0.3)	19.9 (0.3)	20.0 (0.3)
D.O (mg/l)	8.8 (0.1)	8.8 (0.1)	8.7 (0.2)	8.7 (0.2)	8.7 (0.2)	8.7 (0.2)
pH	7.98 (0.05)	7.93 (0.15)	7.98 (0.21)	8.03 (0.28)	8.14 (0.25)	8.26 (0.14)
Conductivity (uMHOS/cm))	269 (2)	388 (3)	527 (8)	780 (7)	1411 (33)	2310 (99)

Coastal Bioanalysts, Inc.

Table 6. Water Quality Summary - Chronic Tests[9]

C. dubia Test

Parameter	Control	6.3%	12.5%	25%	50%	100%
Temperature (°C)	24.7 (0.2)	24.7 (0.2)	24.7 (0.2)	24.8 (0.2)	24.9 (0.2)	25.0 (0.2)
D.O. (mg/l)	8.1 (0.1)	8.1 (0.1)	8.1 (0.1)	8.1 (0.1)	8.1 (0.1)	8.1 (0.1)
pH	7.99 (0.12)	8.06 (0.18)	8.10 (0.15)	8.18 (0.17)	8.27 (0.15)	8.34 (0.09)
Conductivity (uMHOS/cm)	269 (6)	402 (21)	545 (26)	801 (28)	1267 (98)	2294 (101)

P. promelas Test

Parameter	Control	6.3%	12.5%	25%	50%	100%
Temperature (°C)	24.6 (0.3)	24.6 (0.3)	24.7 (0.3)	24.7 (0.3)	24.7 (0.3)	24.8 (0.4)
D.O. (mg/l)	8.1 (0.1)	8.1 (0.1)	8.1 (0.1)	8.0 (0.2)	8.0 (0.2)	8.0 (0.2)
pH	7.79 (0.14)	7.86 (0.17)	7.96 (0.17)	8.07 (0.16)	8.20 (0.13)	8.31 (0.09)
Conductivity (uMHOS/cm)	273 (8)	415 (17)	553 (29)	842 (35)	1356 (67)	2340 (100)

[9]Means and standard deviations of measurements both before and after renewal.

Coastal Bioanalysis, Inc

IV. OUTFALL DATA SUMMARY

Table 7 Cumulative Data Summary - Acute & Chronic Tests
(Tests conducted on this outfall by CBI)

	Invertebrate				Vertebrate			
	Acute Tests		Chronic Tests		Acute Tests		Chronic Tests	
Test Date	LC50	T.U.	NOEC	T.U.	LC50	T.U.	NOEC	T.U.
5/00*	>100%	<1.00	100%	≤1.00	>100%	<1.00	100%	≤1.00

*Results submitted with this report

V. QUALITY ASSURANCE

C. dubia - Acute	CBI Stock Cultures
Reference Test Dates:	4/24/00-4/26/00
Reference Toxicant:	KCl (Sigma "Ultra" Lot#29H00321)
Test Concentrations:	274, 392, 560, 800, 1143 mg/l
Control Survival:	100%
LC50 Reference test (95% C.L.):	530.8 mg/l (491.9-572.8)
Control Chart LC50 (95% C.L.):	559.9 mg/l (498.3-621.4)

P. promelas - Acute	CBI Stock Cultures
Reference Test Dates:	5/6/00-5/8/00
Reference Toxicant:	KCl (Sigma "Ultra" Lot#29H00321)
Test Concentrations:	515, 735, 1050, 1500, 2143 mg/l
Control Survival:	100%
LC50 Reference test (95% C.L.):	847.8 mg/l (793.1-906.2)
Control Chart LC50 (95% C.L.):	832.3 mg/l (649.5-1015.2)

C. dubia - Chronic	CBI Stock Cultures	
Reference Test Dates:	5/2/00-5/8/00	
Reference Toxicant:	KCl (Sigma "Ultra" Lot#29H00321)	
Test Concentrations:	2000, 1000, 500, 250, 125 mg/l	
Control Survival/Mean Offspring:	90%	21.0
NOEC Survival/Reproduction:	500 mg/l	250 mg/l
Median NOEC Control Chart:	250 mg/l	

P. promelas - Chronic	CBI Stock Cultures	
Reference Test Dates:	4/6/00-4/13/00	
Reference Toxicant:	KCl (Sigma "Ultra" Lot#29H00321)	
Test Concentrations:	4000, 2000, 1000, 500, 250 mg/l	
Control Survival/Growth:	98%	0.62 mg
NOEC Survival/Growth:	500 mg/l	500 mg/l
Median NOEC Control Chart:	500 mg/l	

MLSI0001 C DUBIA REPRODUCTION
File: MLSI0001.CDR Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	5	11	25	18	1

Calculated Chi-Square goodness of fit test statistic = 4.3838
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

MLSI0001 C DUBIA REPRODUCTION
File: MLSI0001.CDR Transform: NO TRANSFORMATION

Bartlett's test for homogeneity of variance
Calculated B1 statistic = 7.19

Table Chi-square value = 15.09 (alpha = 0.01, df = 5)
Table Chi-square value = 11.07 (alpha = 0.05, df = 5)

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

TITLE: MLSI0001 C DUBIA REPRODUCTION
FILE: MLSI0001.CDR
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	21.0000	21.0000
1	CONTROL	2	20.0000	20.0000
1	CONTROL	3	27.0000	27.0000
1	CONTROL	4	27.0000	27.0000
1	CONTROL	5	13.0000	13.0000
1	CONTROL	6	25.0000	25.0000
1	CONTROL	7	26.0000	26.0000
1	CONTROL	8	23.0000	23.0000
1	CONTROL	9	24.0000	24.0000
1	CONTROL	10	16.0000	16.0000
2	6.25	1	20.0000	20.0000
2	6.25	2	20.0000	20.0000
2	6.25	3	21.0000	21.0000
2	6.25	4	21.0000	21.0000

	6.25	5	16.0000	16.0000
	6.25	6	22.0000	22.0000
	6.25	7	20.0000	20.0000
	6.25	8	25.0000	25.0000
	6.25	9	19.0000	19.0000
	6.25	10	22.0000	22.0000
	12.5	1	25.0000	25.0000
	12.5	2	21.0000	21.0000
	12.5	3	23.0000	23.0000
	12.5	4	22.0000	22.0000
	12.5	5	9.0000	9.0000
	12.5	6	26.0000	26.0000
	12.5	7	16.0000	16.0000
	12.5	8	18.0000	18.0000
	12.5	9	23.0000	23.0000
	12.5	10	24.0000	24.0000
	25	1	22.0000	22.0000
	25	2	9.0000	9.0000
	25	3	22.0000	22.0000
	25	4	23.0000	23.0000
	25	5	14.0000	14.0000
	25	6	26.0000	26.0000
	25	7	21.0000	21.0000
	25	8	23.0000	23.0000
	25	9	23.0000	23.0000
	25	10	24.0000	24.0000
	50	1	23.0000	23.0000
	50	2	24.0000	24.0000
	50	3	22.0000	22.0000
	50	4	23.0000	23.0000
	50	5	17.0000	17.0000
	50	6	19.0000	19.0000
	50	7	26.0000	26.0000
	50	8	18.0000	18.0000
	50	9	26.0000	26.0000
	50	10	19.0000	19.0000
	100	1	23.0000	23.0000
	100	2	25.0000	25.0000
	100	3	25.0000	25.0000
	100	4	24.0000	24.0000
	100	5	14.0000	14.0000
	100	6	19.0000	19.0000
	100	7	13.0000	13.0000
	100	8	23.0000	23.0000
	100	9	26.0000	26.0000
	100	10	18.0000	18.0000

MLSI0001 C DUBIA REPRODUCTION
File: MLSI0001.CDR Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

.P	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	10	13.000	27.000	22.200
2	6.25	10	16.000	25.000	20.600
3	12.5	10	9.000	26.000	20.300

4	25	10	9.000	26.000	30.700
5	50	10	17.000	26.000	21.700
6	100	10	13.000	26.000	21.000

MLSI0001 C DUBIA REPRODUCTION
File: MLSI0001.CDR Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	CONTROL	22.400	4.733	1.497	21.32
2	6.25	5.378	2.319	0.733	11.26
3	12.5	26.233	5.122	1.620	24.74
4	25	26.678	5.165	1.633	24.95
5	50	10.678	3.268	1.033	15.06
6	100	22.222	4.714	1.491	22.45

MLSI0001 C DUBIA REPRODUCTION
File: MLSI0001.CDR Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	21.350	4.270	0.226
Within (Error)	54	1022.300	18.931	
Total	59	1043.650		

Critical F value = 2.45 (0.05,5,40)
Since F < Critical F FAIL TO REJECT Ho: All equal

MLSI0001 C DUBIA REPRODUCTION
File: MLSI0001.CDR 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
1	CONTROL	22.200	22.200		
2	6.25	20.600	20.600	0.822	
3	12.5	20.700	20.700	0.771	
4	25	20.700	20.700	0.771	
5	50	21.700	21.700	0.257	
6	100	21.000	21.000	0.617	

Dunnett Table Value = 2.21 - Tailed Value P=0.05, df=40,5

S10001 C DUBIA REPRODUCTION
File: MLSI0001.CDR Transform: NO TRANSFORMATION

Ho:Control<Treatment

DUNNETT'S TEST - TABLE 2 OF 2

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	CONTROL	10			
2	6.25	10	4.495	20.2	1.600
3	12.5	10	4.495	20.2	1.500
4	25	10	4.495	20.2	1.500
5	50	10	4.495	20.2	0.500
6	100	10	4.495	20.2	1.200

MLSI0001 FATHEAD SURVIVAL
File: MLSI0001.PPS Transform: ARC SINE(SQUARE ROOT(Y))

apiro - Wilk's test for normality

---

2 = 0.174

W = 0.859

Critical W (P = 0.05) (n = 24) = 0.916
Critical W (P = 0.01) (n = 24) = 0.884

Data FAIL normality test. Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normal data and should not be performed.

MLSI0001 FATHEAD SURVIVAL
File: MLSI0001.PPS Transform: ARC SINE(SQUARE ROOT(Y))

Hartley's test for homogeneity of variance
Bartlett's test for homogeneity of variance

---

hese two tests can not be performed because at least one group has
ero variance.

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

MLSI0001 FATHEAD SURVIVAL
File: MLSI0001.PPS Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	4	1.107	1.412	1.295
2	6.25	4	1.412	1.412	1.412
3	12.5	4	1.412	1.412	1.412
4	25	4	1.249	1.412	1.371
5	50	4	1.249	1.412	1.371
6	100	4	1.107	1.412	1.336

MLSI0001 FATHEAD SURVIVAL

File: MLSI0001.PPS Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	CONTROL	0.022	0.147	0.073	11.35
2	6.25	0.000	0.000	0.000	0.00
3	12.5	0.000	0.000	0.000	0.00
4	25	0.007	0.081	0.041	5.94
5	50	0.007	0.081	0.041	5.94
6	100	0.023	0.152	0.076	11.41

MLSI0001 FATHEAD SURVIVAL
File: MLSI0001.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
1	CONTROL	1.295				
2	6.25	1.412	22.00	10.00	4.00	
3	12.5	1.412	22.00	10.00	4.00	
4	25	1.371	20.50	10.00	4.00	
5	50	1.371	20.50	10.00	4.00	
6	100	1.336	19.50	10.00	4.00	

Critical values use k = 5, are 1 tailed, and alpha = 0.05

MLSI0001 FATHEAD GROWTH
File: MLSI0001.PPG Transform: NO TRANSFORMATION

Shapiro - Wilk's test for normality

D = 0.086

W = 0.952

Critical W (P = 0.05) (n = 24) = 0.916
Critical W (P = 0.01) (n = 24) = 0.884

Data PASS normality test at P=0.01 level. Continue analysis.

MLSI0001 FATHEAD GROWTH
File: MLSI0001.PPG Transform: NO TRANSFORMATION

Bartlett's test for homogeneity of variance

Calculated B1 statistic = 5.48

ble Chi-square value = 15.09 (alpha = 0.01, df = 5)
ble Chi-square value = 11.07 (alpha = 0.05, df = 5)

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

MLSI0001 FATHEAD GROWTH
File: MLSI0001.PPG Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	4	0.460	0.670	0.578
2	6.25	4	0.490	0.540	0.515
3	12.5	4	0.440	0.590	0.510
4	25	4	0.570	0.670	0.608
5	50	4	0.540	0.700	0.620
6	100	4	0.450	0.660	0.570

SI0001 FATHEAD GROWTH
le: MLSI0001.PPG Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	CONTROL	0.009	0.093	0.046	16.08
2	6.25	0.001	0.024	0.012	4.62
3	12.5	0.004	0.062	0.031	12.09
4	25	0.002	0.043	0.022	7.16
5	50	0.005	0.070	0.035	11.25
6	100	0.009	0.095	0.047	16.64

MLSI0001 FATHEAD GROWTH
File: MLSI0001.PPG Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
tween	5	0.042	0.008	1.767
Within (Error)	18	0.086	0.005	
Total	23	0.128		

Critical F value = 2.77 (0.05,5,18)
Since F < Critical F FAIL TO REJECT Ho: All equal

MLSI0001 FATHEAD GROWTH
File: MLSI0001.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
1	CONTROL	0.578	0.578		
2	6.25	0.515	0.515	1.277	
3	12.5	0.510	0.510	1.379	
4	25	0.608	0.608	-0.613	
5	50	0.620	0.620	-0.868	
6	100	0.570	0.570	0.153	

Dunnett table value = 2.41 (1 Tailed Value, P=0.05, df=18,5)

MLSI0001 FATHEAD GROWTH
File: MLSI0001.PPG Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	CONTROL	4			
2	6.25	4	0.118	20.4	0.063
3	12.5	4	0.118	20.4	0.068
4	25	4	0.118	20.4	-0.030
5	50	4	0.118	20.4	-0.042
6	100	4	0.118	20.4	0.007

% Effluent	I.D.	Day 1 # Live	Day 2 # Live	Final % Survival	% Effluent	I.D.	Day 1 # Live	Day 2 # Live	Final % Survival
Control	C-1	5	5	100	25	3-1	5	5	95
	C-2	5	5			3-2	5	5	
	C-3	5	5			3-3	5	5	
	C-4	5	5			3-4	5	4	
6.25	1-1	5	5	100	50	4-1	5	5	100
	1-2	5	5			4-2	5	5	
	1-3	5	5			4-3	5	5	
	1-4	5	5			4-4	5	5	
12.5	2-1	5	5	100	100	5-1	5	5	100
	2-2	5	5			5-2	5	5	
	2-3	5	5			5-3	5	5	
	2-4	5	5			5-4	5	5	
Observer		GM	GD						
Time		1440	1450						

		Day 0	Day 1	Day 2
TEMP	C	20.3	20.3	19.9
	1	20.1	20.4	19.8
	2	20.0	20.4	19.2
	3	19.8	20.3	19.2
	4	19.9	20.4	19.6
	5	20.0	20.4	19.7
pH	C	8.03		8.00
	1	8.04		7.96
	2	8.18		7.98
	3	8.20		8.03
	4	8.39		8.16
	5	8.41		8.24
D.O. (mg/l)	C	8.9		8.8
	1	8.9		8.2
	2	8.9		8.8
	3	8.9		8.2
	4	8.9		8.6
	5	8.9		8.5
CONDUCTIVITY (uS)	C	267		260
	1	390		383
	2	521		500
	3	775		749
	4	1434		1200
	5	2380		2170
Replicate # above meas.		1	2	3
Initials:		GM	GM	GM

Species: Ceriodaphnia dubia Source: CBI

Harvest date/time: 5/10/00 1214 to 5/11/00 1000

Acclimation water: SFW Acclimation water hardness (mg/l CaCO3): 99

Acclimation temp. (range): 19.1 to 20.6

Feeding prior to test: YCT/Selenastrum 1x /d Other: _____

Feeding during test: Not fed ☐ YCT/Selenastrum 2 hr. prior

Chamber size: 30 ml ☒ 100 ml ☐ Other: _____ ml

Test volume: 15 ml ☒ 25 ml ☐ Other: _____ ml

Initial no. organisms per replicate: 5 No. replicates: 4

Photoperiod: 16L:8D ☒ Other: _____ Randomization template no. 16

SET UP: Date 5/11/00 Time Water Added 1500

Time Animals Added 1540 Set Up By GM

INSTRUMENTATION USED.

Stem thermometer Number: 41

- ☐ YSI D.O. Meter # 1 (SN E8014475)
- ☒ CP Diosense pH Meter (D95C0563)
- ☐ Sartorius R160P Balance (40020093)
- ☐ YSI SCT 33 Meter (H8016792)
- ☒ YSI D.O. Meter # 2 (SN9) A0253329)
- ☐ Corning 240 pH Meter (SN5268)
- ☐ SP Portach/2 Meter (852360)
- ☒ Hanna Conductivity Meter (511001)

Other: _____

NOTES: _____

Quality Assurance:

As Quality Assurance officer for this test I certify that no significant deviations from accepted protocol occurred during routine inspections (unless otherwise noted below) and that the data accurately reflect the test as it was performed by CBI.

Comments: _____

Signature: [illegible] Date: 5/12/00

TEST I.D. [illegible]

WATER QUALITY MEASUREMENTS - FRESHWATER CHK JC

CBI TEST ID [illegible]

Parameter	Treatment	Day 0 Initial	Day 1 Final	Day 1 Initial	Day 2 Final	Day 2 Initial	Day 3 Final	Day 3 Initial	Day 4 Final	Day 4 Initial	Day 5 Final	Day 5 Initial	Day 6 Final	Day 6 Initial	Day 7 Final
TEMPERATURE (C)	C	25.0	24.2	24.6	24.7	24.6	24.8	24.7	24.7	24.3	24.9	24.8	25.0		
	1	25.0	24.7	24.2	24.3	24.3	24.6	24.5	24.6	24.5	25.0	24.7	25.0		
	2	25.0	24.8	24.9	24.9	24.5	24.8	24.7	24.6	24.6	24.8	24.7	25.1		
	3	25.0	25.1	25.0	24.5	24.3	24.8	24.7	24.7	24.8	25.0	24.8	25.1		
	4	25.0	25.1	25.2	24.6	24.5	24.8	24.7	24.7	24.8	25.0	24.8	25.0		
	5	25.1	25.3	25.4	24.7	24.7	24.9	25.0	24.9	25.0	25.1	25.0	25.0		
pH	C	7.93	7.97	8.04	7.95	8.11	7.86	7.95	8.25	8.06	7.76	8.01	8.05		
	1	8.08	8.01	8.13	7.98	8.23	7.89	8.01	8.45	8.19	7.72	8.02	8.06		
	2	8.09	8.04	8.21	8.00	8.29	7.91	8.07	8.22	8.26	7.81	8.15	7.92		
	3	8.32	8.05	8.35	8.09	8.34	7.93	8.15	8.26	8.33	7.93	8.25	8.07		
	4	8.42	8.15	8.42	8.24	8.47	8.03	8.25	8.29	8.38	8.12	8.32	8.10		
	5	8.49	8.30	8.43	8.40	8.46	8.16	8.30	8.27	8.37	8.28	8.35	8.29		
DISS OXYGEN (mg/l)	C	8.2	8.1	8.0	8.1	8.2	8.1	8.0	8.1	8.2	8.1	8.1	8.1		
	1	8.1	8.0	8.2	8.1	8.0	8.1	8.2	8.1	8.0	8.0	8.1	8.0		
	2	8.2	8.0	8.2	8.0	8.2	8.0	8.2	8.0	8.2	8.0	8.1	8.1		
	3	8.0	7.9	8.2	8.0	8.2	8.0	8.2	8.0	8.2	8.1	8.1	8.0		
	4	8.0	8.0	8.2	8.1	8.2	8.0	8.2	7.9	8.2	8.1	8.3	8.0		
	5	8.2	7.9	8.2	7.9	8.2	8.0	8.2	8.1	8.0	8.1	8.2	8.0		
CONDUCTIVITY (uS)	C	263	264	266	269	272	278	270	276	272	260	263	275		
	1	386	353	409	403	357	385	432	419	421	407	410	400		
	2	516	481	535	535	554	551	561	559	579	562	558	579		
	3	780	744	806	817	762	798	805	801	835	813	837	822		
	4	1228	1134	1254	1215	1121	1294	1385	1349	1335	1337	1320	1350		
	5	2224	2050	2260	2210	2340	2370	2400	2340	2420	2270	2370	2330		
	Replicate	1	5	5	7	1	8	8	7	7	10	10	4		
	Initials	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB		

COASTAL BIOANALYSTS BASELINE INFO - FRESHWATER 7-DAY CHRONIC TEST

TEST ORGANISMS

Species: C. dubia Source: CBI

Hatch/Release Date(s) & Time(s): 5/8/00 1225 to 2030 Arrival Date (non-CBI source): NA

Acclimation Water Type: SFW Hardness: 30 Temperature (C): 25

Feeding Prior to Test: Artemia _____ /day YCT/Selenastrum 1X/day Other _____

TEST DESIGN

Chamber size: 1000 ml ____ 30 ml ✓ Other _____ Test Volume: 500 ml ____ 15 ml ✓ Other _____

Initial No. Organisms per Replicate: 1 No. Replicates: 10 Photoperiod: 16L:8D Randomization Template No. 11

Feeding During Test: Artemia _____ /day YCT/Selenastrum 1X/day Other _____

TEST SET UP

Set up Date: 5/9/00 Time Water Added: 1415 Time Animals Added: 1435 Set up By (initials): LM

INSTRUMENTATION

Stem Thermometer No. C1

____ YSI 00 Meter # 1 (SNEB014475)

✓ YSI 00 Meter # 2 (SN91A026329)

____ SP PortaoH2 Meter (852360)

____ Corning 240 pH Meter (SN5268)

✓ CP Diatsense pH Meter (D9500563)

____ Sartorius R160P Balance (40020093)

____ YSI SCT 33 Meter (H8016797)

✓ Horiba Conductivity Meter (511001)

NOTES _____

As Quality Assurance Officer for this test I certify that no significant deviations from accepted protocol occurred during routine inspections (unless otherwise noted below) and that the data accurately reflect the test as it was performed by CBI.

Comments _____

[signature] 5/18/00

Signature Date

CBI TEST ID 00L5T040

File: FWC-COVR

Effluent	I.D.	Day 1 # Live	Day 2 # Live	Final % Survival
Control	0-1	10	10	100
	0-2	10	10	
6.25	1-1	10	10	100
	1-2	10	10	
12.5	2-1	10	10	100
	2-2	10	10	
25	3-1	10	10	100
	3-2	10	10	
50	4-1	10	10	100
	4-2	10	10	
100	5-1	10	10	100
	5-2	10	10	
Observer		GD	GB	
Time		1435	1455	

		Day 0	Day 1	Day 2
TEMP	C	20.3	20.3	20.2
	1	20.1	20.4	19.9
	2	20.0	20.2	19.8
	3	19.8	20.2	19.6
	4	19.9	20.2	19.6
	5	20.2	20.2	19.6
pH	C	8.03	7.95	7.95
	1	8.09	7.91	7.79
	2	8.19	7.99	7.77
	3	8.30	8.04	7.75
	4	8.39	8.13	7.89
	5	8.41	8.23	8.14
D.O. (mg/l)	C	8.9	8.8	8.8
	1	8.9	8.7	8.7
	2	8.9	8.6	8.7
	3	8.9	8.7	8.6
	4	8.9	8.7	8.6
	5	8.9	8.6	8.6
CONDUCTIVITY (uS)	C	262	NA	270
	1	390		386
	2	521		532
	3	775		785
	4	1434		1388
	5	2380		2240
Replicate # above meas.		1	1	1
Initials:		GD	GB	GB

Species: Pimephales promelas Source: CBI

Hatch Date/Time: 5/5/00 0900 - 5/6/00 0800

Acclimation water: SFW Acclimation water hardness (mg/l CaCO3): 90

Acclimation Temp (range): 19.1 to 20.6

Feeding prior to test: Artemia 2X /d Other: _____

Feeding during test: Not fed ☒ Other: _____

Chamber size: 500 ml ☒ 1000 ml ☒ 8000 ml ☐ Other: _____ ml

Test Volume: 250 ml ☐ 500 ml ☒ 4000 ml ☐ Other: _____ ml

Initial no. animals per replicate: 10 No. replicates: 2

Photoperiod: 16L:8D ☒ Other: _____ Randomization table no.: 3-23

SET UP Date: 5/11/00 Time Water Added: 1524

Time Animals Added: 1550 Set Up By: GB

INSTRUMENTATION USED:

Stem Thermometer Number: 21

- ☐ YSI D.O. Meter # 1 (SHEB014475)
- ☐ SP Orion/ross pH Meter (D9500563)
- ☐ Sartorius R160P Balance (40010093)
- ☐ YSI SCT 33 Meter (H8018792)
- ☒ YSI D.O. Meter # 2 (SN91A016329)
- ☐ Corning 240 pH Meter (SN5268)
- ☐ SP PortapH2 Meter (852360)
- ☒ Horiba Conductivity Meter (511C01)

Other: _____

NOTES: _____

Quality Assurance:

As Quality Assurance officer for this test I certify that no significant deviations from accepted protocol occurred during routine inspections (unless otherwise noted below) and that the data accurately reflect the test as it was performed by CBI.

Comments: _____

Signature: [signature] Date: 5/16/00

TEST I.D.: mb 5 2000

% Effluent	Rep	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
0	1	0	0	2	5	0	14	
	2	0	0	3	7	0	12	
	3	0	0	4	2	0	16	
0	4	0	0	3	8	0	16	
	5	0	0	0	2	3	8	
	6	0	0	0	11	0	10	
	7	0	0	3	7	0	16	
	8	0	0	0	2	9	12	
	9	0	0	4	8	0	10	
	10	0	0	1	6	0	8	
1	1	0	0	4	8	0	8	
	2	0	0	3	2	0	10	
	3	0	0	2	7	0	12	
6.25	4	0	0	1	8	0	12	
	5	0	0	1	7	0	8	
	6	0	0	3	7	0	12	
	7	0	0	4	2	0	14	
	8	0	0	2	9	0	14	
	9	0	0	3	8	0	8	
	10	0	0	4	8	0	10	
2	1	0	0	3	8	0	14	
	2	0	0	3	6	0	12	
	3	0	0	2	7	0	14	
12.5	4	0	0	3	9	0	10	
	5	0	0	0	3	6	0	
	6	0	0	4	10	0	10	
	7	0	0	2	8	0	6	
	8	0	0	0	8	0	10	
	9	0	0	3	10	6	10	
	10	0	6	4	8	0	12	

% Effluent	Rep	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
3	1	0	0	2	8	0	8	
	2	0	0	1	0	0	0	
	3	0	0	2	9	0	12	
25	4	0	0	2	9	0	12	
	5	0	0	2	2	0	10	
	6	0	0	5	9	0	12	
	7	0	0	2	9	0	10	
	8	0	0	0	4	0	12	
	9	0	0	4	7	0	12	
	10	0	0	4	8	0	12	
4	1	0	0	2	8	0	12	
	2	0	0	3	2	0	14	
	3	0	0	3	7	0	12	
50	4	0	0	2	9	0	12	
	5	0	0	2	3	0	12	
	6	0	0	3	6	0	10	
	7	0	0	3	9	0	14	
	8	0	0	0	8	0	10	
	9	0	0	3	4	0	14	
	10	0	0	3	8	0	8	
5	1	0	0	5	8	0	10	
	2	0	0	3	8	0	14	
	3	0	0	5	6	0	14	
100	4	0	0	3	9	0	10	
	5	0	0	0	4	0	10	
	6	0	0	3	8	0	8	
	7	0	0	0	5	0	8	
	8	0	0	0	11	0	12	
	9	0	0	6	10	0	10	
	10	0	0	X	9	12	8	

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Observation/Renewal Time:	1235	1240	1255	1330	1340	1500	
Initials:	GB	GB	GB	GB	GB	GB	

NOTES Late spawn

NOTE: Values indicate number of offspring observed at each renewal period. "D" indicates death of organism. Checked control replicates are those with three or more broods.

CBI TEST ID

COASTAL BIOANALYSTS BASELINE INFO - FRESHWATER [illegible]

TEST ORGANISMS

Species: P promelas Source: CPAE

Hatch/Release Date(s) & Time(s): 5/8/00 0700 1230 Arrival Date (non-CBI source): n/a

Acclimation Water: Type: SAW Hardness: 90 Temperature (C): 25 4

Feeding Prior to Test: Artemia 2X /day YCT/Selenastrum: Other:

TEST DESIGN

Chamber size: 1000 ml ✓ 30 ml ___ Other: Test Volume: 500 ml ✓ 15 ml ___ Other:

Initial No. Organisms per Replicate: 10 No. Replicates: 4 Photoperiod: 16 h 8 h Randomization Template No. 4

Feeding During Test: Artemia 2X /day YCT/Selenastrum: Other:

TEST SET UP

Set-up Date: 5/9/00 Time Water Added: 1450 Time Animals Added: 1500 Set-up By (Initials): GM

INSTRUMENTATION

Stem Thermometer No. C1

___ YSI DO Meter # 1 (SNEB014475)

✓ YSI DO Meter # 2 (SM91A0263329)

___ SP Portable pH Meter (857360)

___ Corning 240 pH Meter (SM5268)

✓ CP Datasonic pH Meter (D9500563)

___ Sartorius A160P Balance (40020093)

___ YSI SCT 33 Meter (H80167972)

✓ Hanna Conductivity Meter (511001)

NOTES:

As Quality Assurance Officer for this test I certify that no significant deviations from accepted protocol occurred during routine inspections (unless otherwise noted below) and that the data accurately reflect the test as it was performed by CBI.

Comments:

[illegible] 5/18/00

Signature Date

CBI TEST ID mc 97001

File: FWC-COVR

W. R QUALITY MEASUREMENTS - FRESHWATER CHR .C CBI TEST ID 01.51 000 1

Parameter	Treatment	Day 0 Initial	Day 1 Final	Day 1 Initial	Day 2 Final	Day 2 Initial	Day 3 Final	Day 3 Initial	Day 4 Final	Day 4 Initial	Day 5 Final	Day 5 Initial	Day 6 Final	Day 6 Initial	Day 7 Final
TEMPERATURE (C)	C	25.0	24.5	25.1	24.1	24.7	24.5	24.6	24.6	24.7	24.5	24.6	24.1	24.7	24.1
	1	25.1	24.5	25.1	24.1	24.7	24.6	24.6	24.7	24.1	24.6	24.6	24.2	24.7	24.3
	2	25.1	24.5	25.2	24.2	24.7	24.6	24.5	24.8	24.8	24.6	24.8	24.4	24.7	24.5
	3	25.2	24.6	25.1	24.3	24.7	24.6	24.7	24.8	24.9	24.6	24.7	24.3	24.8	24.6
	4	25.2	24.6	25.2	24.3	24.8	24.5	24.7	24.8	25.3	24.6	24.7	24.4	24.7	24.5
	5	25.3	24.6	25.6	24.4	24.8	24.5	24.8	24.8	25.3	24.5	24.7	24.3	24.8	24.5
pH	C	8.00	7.89	7.94	7.74	7.94	7.67	7.73	7.65	7.79	7.65	7.93	7.70	7.90	7.55
	1	8.18	7.96	8.02	7.78	8.02	7.72	7.82	7.69	7.73	7.69	7.95	7.85	8.00	7.56
	2	8.29	8.02	8.17	7.91	8.12	7.78	7.96	7.76	7.89	7.80	8.02	7.84	8.11	7.78
	3	8.41	8.11	8.27	8.06	8.23	7.94	8.04	7.86	8.07	7.96	8.08	7.97	8.17	7.89
	4	8.49	8.23	8.36	8.21	8.35	8.08	8.18	8.01	8.10	8.14	8.16	8.12	8.29	8.09
	5	8.51	8.35	8.42	8.35	8.39	8.22	8.25	8.16	8.21	8.25	8.34	8.30	8.34	8.26
DISS OXYGEN (mg/l)	C	8.2	8.1	8.2	8.1	8.1	8.1	8.2	8.1	8.2	8.1	8.2	8.1	8.2	8.1
	1	8.2	8.0	8.2	8.0	8.1	8.0	8.1	8.0	8.2	8.1	8.2	8.0	8.2	8.0
	2	8.2	7.9	8.2	7.8	8.1	7.9	8.1	8.0	8.2	8.1	8.2	8.1	8.2	7.9
	3	8.2	7.9	8.2	7.7	8.0	8.0	8.1	7.9	8.2	8.0	8.2	8.0	8.2	7.8
	4	8.2	7.7	8.1	7.8	7.9	7.9	8.1	7.9	8.2	7.9	8.2	7.9	8.1	7.8
	5	8.2	7.7	8.1	7.7	7.8	7.9	8.1	8.0	8.2	7.9	8.2	7.9	8.1	7.9
CONDUCTIVITY (uS)	C	261	261	265	276	270	275	291	277	274	270	276	278	270	271
	1	426	411	403	398	423	425	413	391	378	424	433	432	429	425
	2	541	480	511	535	562	554	587	562	541	581	564	565	574	572
	3	810	808	802	831	845	848	854	823	851	855	851	938	861	854
	4	1270	1302	1245	1254	1404	1396	1418	1363	1425	1367	1381	1421	1432	1397
	5	2180	2250	2300	2190	2310	2410	2450	2240	2360	2350	2380	2424	2470	2400
	Replicate	3	3	4	4	2	1	3	2	1	2	2	2	1	1
	Initials	GB	GB	GB	GB	SD	GB	GB	GB	GB	GB	GB	GB	SD	GB

CHRONIC FISH SURVIVAL AND WEIGHT DATA (File FISHSVWT)

CBI TEST ID ML51001

Treatment	Rep	No Live Day 1	No Live Day 2	No Live Day 3	No Live Day 4	No Live Day 5	No Live Day 6	No Live Day 7
C	1	10	10	10	10	10	10	9
	2	10	10	10	10	8	8	8
	3	10	10	10	10	10	10	10
0 % Effluent	4	10	10	10	10	10	10	10
1	1	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10
6.25 % Effluent	4	10	10	10	10	10	10	10
2	1	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10
	3	10	10	10	10	10	10	10
12.5 % Effluent	4	10	10	10	10	10	10	10
3	1	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10
	3	10	10	9	9	9	9	9
25 % Effluent	4	10	10	10	10	10	10	10
4	1	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	10
	3	10	10	9	9	9	9	9
50 % Effluent	4	10	10	10	10	10	10	10
5	1	10	10	10	10	10	10	10
	2	10	10	10	10	10	10	8
	3	10	10	10	10	10	10	10
100 % Effluent	4	10	10	10	10	10	10	10
Time		1430	1400	1400	1630	1500	1200	1525
Initials		CB	SA	DB	CB	CB	SA	CB

If the current flow is less than 90% of the target flow, only record to nearest 0.1 liter.

FISH DRY WEIGHT DATA (mg)

Pan No	Total Weight	Tare Weight	Net Total Wt	Avg Individ Wt
1	9.59	4.61	4.98	0.55
2	10.83	5.44	5.39	0.67
3	9.57	4.96	4.61	0.46
4	12.08	5.75	6.33	0.63
5	9.17	4.18	4.99	0.50
6	10.87	5.56	5.31	0.53
7	9.79	4.92	4.87	0.49
8	10.71	5.35	5.36	0.54
9	9.51	4.49	5.02	0.50
10	10.30	4.40	5.90	0.59
11	11.80	6.66	5.14	0.51
12	11.45	7.08	4.37	0.44
13	12.39	6.66	5.73	0.57
14	12.61	5.93	6.68	0.67
15	11.95	6.65	5.30	0.59
16	12.93	6.96	5.97	0.60
17	12.05	6.14	5.91	0.59
18	10.58	5.20	5.38	0.54
19	11.29	5.40	5.89	0.65
20	13.28	6.32	6.96	0.70
21	12.05	6.61	5.44	0.54
22	10.62	7.06	3.61	0.45
23	12.85	6.54	6.31	0.63
24	12.38	5.76	6.62	0.66

TARE WEIGHT DATE 5/16/00 INITIALS CB CALIB (CLASS S 10 MG) 10.01

TOTAL WEIGHT DATE 5/18/00 INITIALS CB CALIB (CLASS S 10 MG) 10.00

INITIAL (ARRIVAL) EFFLUENT CHARACTERISTICS: (Sample date = last 6 characters of sample I.D.)

Sample Date	050800	051000	051200
Temp. (°C)	2.8	4.1	6.1
Conduct. (uMHOS)	2180	2360	2470
Salinity (g/kg)	NA	NA	NA
pH	8.71	8.60	8.48
Diss. Oxygen (mg/l)	12.1	11.8	11.4
Tot. Chlorine (mg/l)	0.2	0.2	0.1
NH3-N (mg/l)	0.15	0.66	0.20
Hard (mg/l CaCO3)	872	1192	1122
Alkln (mg/l CaCO3)	105	114	155
Color/Appearance[1]	C	C	C
Initials/Date	GB 5/9	GB 5/11	PA

[1] C-Clear O-Opaque Y-Yellow B-Brown Bl-Black G-Green T-Turbid Sl -Solids (S-Slight M-Moderate V-Very Much)

EFFLUENT ADJUSTMENT/POST-ADJUSTMENT MEASUREMENTS: ACUTE

Sample Date	050800	050800	051000	051000	051200	051200	051200	051000
Temp. (°C)	25.3	25.8	25.7	25.6	26.0	25.2	24.2	20.2
Salinity (g/kg)	NA	NA	NA	NA	NA	NA	NA	NA
D.O. (mg/l)	9.9	10.2	9.7	10.4	9.4	9.9	9.9	10.3
Aeration Rate	mod	mod	mod	mod	mod	mod	mod	mod
Aeration Time (min)	1.5	1.5	1.5	2.0	2.0	2.0	2.0	1.5
Adjust. D.O. (mg/l)	8.2	8.2	8.1	8.2	8.2	8.2	8.2	8.9
pH	8.51	8.43	8.41	8.33	8.37	8.32	8.36	8.41
Tot Chlorine (mg/l)	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2
Initials/Date	GB 5/9	GB 5/11	GB 5/11	AB 5/12	PA 5/13	GB 5/14	GB 5/15	GB 5/12

DILUTION WATER CHARACTERISTICS: SFW: ✓ HWM: ACUTE

Temp. (°C)	25.0	24.4	24.1	24.7	24.5	24.2	24.2	20.3
Conduct. (uMHOS)	261	265	283	289	268	267	272	261
Salinity (g/kg)	NA	NA	NA	NA	NA	NA	NA	NA
pH	8.00	8.03	8.12	8.12	8.07	8.05	8.05	8.03
Diss. Oxygen (mg/l)	8.1	8.2	8.2	8.2	8.3	8.2	8.2	8.9
Hard (mg/l CaCO3)	99	90	99	99	95	83	83	90
Alkln (mg/l CaCO3)	58	58	58	58	58	58	58	58
Initials/Date	GB 5/9	GB 5/10	GB 5/11	AB 5/12	PA 5/13	GB 5/14	GB 5/15	GB 5/11

EFFLUENT ID: [illegible] (Facility-Outfall)

TEST ID: MC [illegible] (First 8 characters of sample I.D.)

SAMPLE CHAIN-OF-CUSTODY FORM

SAMPLE ID No 0015 1 0001

Consultant Environmental Inc

NOTE: The following information is REQUIRED by the state in order for testing to be valid and acceptable. Any test rejected because of failure to provide all required information applicable to the outfall is the sole responsibility of the sampler. Maintenance of proper sample temperature (0-4 deg C) during composite and shipping is also the responsibility of the sampler. Questions? Call 804 694 8285

CLIENT NAME: FAIRFAX COUNTY DSC

NPDES PERMIT NO:

OUTFALL NO:

SAMPLING LOCATION: Out-1

TESTS REQUIRED: Acute [ ] SPECIES: C. dubia; Chronic [ ] SPECIES: P. promelas; Acute [ ] Chronic [ ]

INSTREAM WASTE CONCENTRATION (IWC) (Required for chronic toxicity tests only): %

If chlorine is present, does permit specify that the sample is to be dechlorinated prior to use in toxicity testing? YES [ ] NO [ ]

SAMPLING EQUIPMENT/METHOD:

SAMPLE CONTAINER: CUBITAINER [✓] PLASTIC BOTTLE [ ] GLASS BOTTLE [ ]

GRAB SAMPLES ONLY: SAMPLE DATE: 5-8-2000 SAMPLE TIME: 2:07 PM SAMPLE TEMPERATURE (C): 35.1°C

COMPOSITE SAMPLES ONLY: COMPOSITE START DATE: COMPOSITE START TIME:

COMPOSITE TEMPERATURE: COMPOSITE END DATE: COMPOSITE END TIME:

SUBSAMPLE TIME	EFFLUENT FLOW	SUBSAMPLE VOLUME	SUBSAMPLE TIME	EFFLUENT FLOW	SUBSAMPLE VOLUME	SUBSAMPLE TIME	EFFLUENT FLOW	SUBSAMPLE VOLUME	SUBSAMPLE TIME	EFFLUENT FLOW	SUBSAMPLE VOLUME

FIELD MEASUREMENTS (must be taken within 15 minutes of subsample)

Date	Time	pH	Chlorine (TRC mg/l)	Effluent Temp
5-8-2000	2:07 PM	8.31	0.3	36.1°C

NOTES

I certify that the above information is correct. [signature] (Sample signed & printed name) Wayne Blake Hatse

Relinquished By	Date/Time	Received By	Date/Time
[signature]	3 PM 5-8-00	[signature]	3/19/00
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

Shipment Method: UPS [✓] Fedex [ ] Hand Delivery [ ] Arrived on ice? Yes [✓]

Contact Bioanalytic, Inc

NOTE: The following information is REQUIRED by the state in order for testing to be valid and acceptable. Any test rejected because of failure to provide all required information applicable to the outfall is the sole responsibility of the sampler. Maintenance of proper sample temperature (0-4 deg C) during composite and shipping is also the responsibility of the sampler. Questions? Call 804 694-8285

CLIENT NAME: FAIRFAX COUNTY DSW

NPDES PERMIT NO:

OUTFALL NO:

SAMPLING LOCATION:

TESTS REQUIRED: Acute ☐ SPECIES C. dubia Acute ☐ Chronic ☐ SPECIES P. promelas Chronic ☐

INSTREAM WASTE CONCENTRATION (IWC) (Required for chronic toxicity tests only) %

If chlorine is present, does permit specify that the sample is to be dechlorinated prior to use in toxicity testing? YES ☐ NO ☐

SAMPLING EQUIPMENT/METHOD:

SAMPLE CONTAINER: CUBITAINER ☒ PLASTIC BOTTLE ☐ GLASS BOTTLE ☐

GRAB SAMPLES ONLY: SAMPLE DATE 5-8-2000 SAMPLE TIME 10:04 AM SAMPLE TEMPERATURE (C) 35.5 °C

COMPOSITE SAMPLES ONLY: COMPOSITE START DATE: COMPOSITE START TIME:

COMPOSITE TEMPERATURE: COMPOSITE END DATE: COMPOSITE END TIME:

SUBSAMPLE TIME	EFFLUENT FLOW	SUBSAMPLE VOLUME	SUBSAMPLE TIME	EFFLUENT FLOW	SUBSAMPLE VOLUME	SUBSAMPLE TIME	EFFLUENT FLOW	SUBSAMPLE VOLUME	SUBSAMPLE TIME	EFFLUENT FLOW	SUBSAMPLE VOLUME

FIELD MEASUREMENTS (must be taken within 15 minutes of subsample)

Date	Time	pH	Chlorine (TRC mg/l)	Effluent Temp
5-8-2000	10:10 AM	7.76	0.4	35.5 °C

NOTES:

I certify that the above information is correct: [signature] Wayne Blackburn
(Sampler signature & printed name)

Relinquished By	Date/Time	Received By	Date/Time
[signature]	5-8-2000 3pm	[signature]	5/9/00 [illegible]
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

Shipment Method: UPS ☐ FedEx ☐ Hand Delivery ☐ Arrived on ice? Yes ☐ No ☐

SAMPLE CHAIN-OF-CUSTODY FORM

SAMPLE ID No MLSI DAP 1 S 5 DAYS

SAMPLE CHAIN-OF-CUSTODY FORM

SAMPLE ID No. ML51000105 1A5A

Consultant Guarantee, Inc.

NOTE: The following information is REQUIRED by the state in order for testing to be valid and acceptable. Any test rejected because of failure to provide all required information applicable to the outfall is the sole responsibility of the sampler. Maintenance of proper sample temperature (0-4 deg C) during composite and shipping is also the responsibility of the sampler. Questions? Call 804 694 8285

CLIENT NAME: FAIRFAX COUNTY DSW	NPDES PERMIT NO	OUTFALL NO
SAMPLING LOCATION: OGDEN COOLING WATER	TESTS REQUIRED: SPECIES C. dubia Acute ☐ Chronic ☐	SPECIES P. promelas Acute ☐ Chronic ☐
INSTREAM WASTE CONCENTRATION (IWC) (Required for chronic toxicity tests only) %	If chlorine is present, does permit specify that the sample is to be dechlorinated prior to use in toxicity testing?	YES ☐ NO ☐
SAMPLING EQUIPMENT/METHOD	SAMPLE CONTAINER	CUBITAINER ☒ PLASTIC BOTTLE ☐ GLASS BOTTLE ☐

GRAB SAMPLES ONLY:	SAMPLE DATE: 5-10-2000	SAMPLE TIME: 2:17 pm	SAMPLE TEMPERATURE (C)

COMPOSITE SAMPLES ONLY	COMPOSITE START DATE	COMPOSITE START TIME
COMPOSITE TEMPERATURE	COMPOSITE END DATE	COMPOSITE END TIME

SUBSAMPLE TIME	EFFLUENT FLOW	SUBSAMPLE VOLUME	SUBSAMPLE TIME	EFFLUENT FLOW	SUBSAMPLE VOLUME	SUBSAMPLE TIME	EFFLUENT FLOW	SUBSAMPLE VOLUME	SUBSAMPLE TIME	EFFLUENT FLOW	SUBSAMPLE VOLUME

FIELD MEASUREMENTS (must be taken within 15 minutes of subsample)

Date: 5-10-2000	Time: 2:17 pm	pH: 7.92	Chlorine (TRC mg/l): 0.5	Bilwet Temp: 33.1

NOTES:

I certify that the above information is correct: [signature] Wayne Blake-Hedges
(Sampler signature & printed name)

Relinquished By: [signature]	Date/Time: 3:30 pm 5-10-2000	Received By: [signature]	Date/Time: 5/11/00
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:

Shipment Method: UPS / FedEx / Hand Delivery / Arrived on ice? Yes / No

SAMPLE CHAIN-OF-CUSTODY FORM

SAMPLE I.D. No. 045-1006

Cascade Bioanalytical, Inc.

NOTE: The following information is REQUIRED by the state in order for testing to be valid and acceptable. Any test rejected because of failure to provide all required information applicable to the outfall is the sole responsibility of the sampler. Maintenance of proper sample temperature (0-4 deg C) during composite and shipping is also the responsibility of the sampler. Questions? Call 804 694 8285

CLIENT NAME: FAIRFAX COUNTY DSW	NPDES PERMIT NO	OUTFALL NO
SAMPLING LOCATION: UPPER CONNAN WATER	TESTS REQUIRED: SPECIES C. dubia Acute ☐ Chronic ☐	SPECIES P. promelas Acute ☐ Chronic ☐
INSTREAM WASTE CONCENTRATION (IWC) (Required for chronic toxicity tests only) %	If chlorine is present, does permit specify that the sample is to be dechlorinated prior to use in toxicity testing?	YES ☐ NO ☐
SAMPLING EQUIPMENT/METHOD	SAMPLE CONTAINER	CUBITAINER ☒ PLASTIC BOTTLE ☐ GLASS BOTTLE ☐

GRAB SAMPLES ONLY:	SAMPLE DATE: 5-10-2000	SAMPLE TIME: 11:17 AM	SAMPLE TEMPERATURE (C): 33.5 °C

COMPOSITE SAMPLES ONLY	COMPOSITE START DATE	COMPOSITE START TIME
COMPOSITE TEMPERATURE	COMPOSITE END DATE	COMPOSITE END TIME

SUBSAMPLE TIME	EFFLUENT FLOW	SUBSAMPLE VOLUME	SUBSAMPLE TIME	EFFLUENT FLOW	SUBSAMPLE VOLUME	SUBSAMPLE TIME	EFFLUENT FLOW	SUBSAMPLE VOLUME	SUBSAMPLE TIME	EFFLUENT FLOW	SUBSAMPLE VOLUME

FIELD MEASUREMENTS (must be taken within 15 minutes of subsample)

Date: 5-10-2000	Time: 11:17 AM	pH: 8.20	Chlorine (TRC mg/l): 0.2	Effluent Temp: 33.5 °C

NOTES:

I certify that the above information is correct: [signature] Wayne Blake Hedges
(Sampler signature & printed name)

Relinquished By: [signature]	Date/Time: 3:31 PM 5-10-2000	Received By: [signature]	Date/Time: 5-11-2000
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:

Shipment Method: UPS Fedex Hand Delivery Arrived on ice? Yes

Coastal Bioanalysts, Inc.

NOTE: The following information is REQUIRED by the state in order for testing to be valid and acceptable. Any test rejected because of failure to provide all required information applicable to the outfall is the sole responsibility of the sampler. Maintenance of proper sample temperature (0-4 deg C) during composite and shipping is also the responsibility of the sampler. Questions? Call 804-694-8285

CLIENT NAME: FAIRFAX COUNTY DSW

NPDES PERMIT NO:

OUTFALL NO:

SAMPLING LOCATION: OGDEN COUNTY WATER

TESTS REQUIRED: SPECIES C. dubia Acute [ ] Chronic [ ] SPECIES P. promelas Acute [ ] Chronic [ ]

INSTREAM WASTE CONCENTRATION (IWC) (Required for chronic toxicity tests only): %

If chlorine is present, does permit specify that the sample is to be dechlorinated prior to use in toxicity testing? YES [ ] NO [ ]

SAMPLING EQUIPMENT/METHOD:

SAMPLE CONTAINER: CUBITAINER [X] PLASTIC BOTTLE [ ] GLASS BOTTLE [ ]

GRAB SAMPLES ONLY: SAMPLE DATE 5-12-2000 SAMPLE TIME 12:42 SAMPLE TEMPERATURE (C) 35.3°C

COMPOSITE SAMPLES ONLY: COMPOSITE START DATE: COMPOSITE START TIME:

COMPOSITE TEMPERATURE: COMPOSITE END DATE: COMPOSITE END TIME:

SUBSAMPLE TIME	EFFLUENT FLOW	SUBSAMPLE VOLUME	SUBSAMPLE TIME	EFFLUENT FLOW	SUBSAMPLE VOLUME	SUBSAMPLE TIME	EFFLUENT FLOW	SUBSAMPLE VOLUME	SUBSAMPLE TIME	EFFLUENT FLOW	SUBSAMPLE VOLUME

FIELD MEASUREMENTS (must be taken within 15 minutes of subsample)

Date	Time	pH	Chlorine (TRC mg/l)	Effluent Temp
5-12-2000	12:47	7.53	0.4	35.3°C

NOTES:

I certify that the above information is correct: [signature] Wayne Blake-Hedges
(Sampler signature & printed name)

Relinquished By	Date/Time	Received By	Date/Time
[signature]	5-12-2000 3 p.m.	[signature]	5/12/00 3:15

Shipment Method: UPS [ ] FedEx [✓] Hand Delivery [ ] Arrived on ice? Yes [✓]

SAMPLE CHAIN-OF-CUSTODY FORM

SAMPLE ID No. 00-51 DAC

Cour Cali Brad navitz Inc

NOTE: The following information is REQUIRED by the state in order for testing to be valid and acceptable. Any test rejected because of failure to provide all required information applicable to the outfall is the sole responsibility of the sampler. Maintenance of proper sample temperature (0-4 deg C) during composite and shipping is also the responsibility of the sampler. Questions? Call 804 694 8785

CLIENT NAME: FAIRFAX COUNTY DSW	NPDES PERMIT NO:	OUTFALL ID:
SAMPLING LOCATION: OGDEN COUNTRY WATER	TESTS REQUIRED: SPECIES C. dubia Acute ☐ Chronic ☐	SPECIES P. promelas Acute ☐ Chronic ☐
INSTREAM WASTE CONCENTRATION (IWC) (Required for chronic toxicity tests only) %	If chlorine is present, does permit specify that the sample is to be dechlorinated prior to use in toxicity testing?	YES ☐ NO ☐
SAMPLING EQUIPMENT/METHOD	SAMPLE CONTAINER	CUBITAINER ☒ PLASTIC BOTTLE ☐ GLASS BOTTLE ☐

GRAB SAMPLES ONLY:	SAMPLE DATE: 5-12-2000	SAMPLE TIME: 8:11 AM	SAMPLE TEMPERATURE (C): 29.6°C

COMPOSITE SAMPLES ONLY	COMPOSITE START DATE	COMPOSITE START TIME
COMPOSITE TEMPERATURE	COMPOSITE END DATE	COMPOSITE END TIME

SUBSAMPLE TIME	EFFLUENT FLOW	SUBSAMPLE VOLUME	SUBSAMPLE TIME	EFFLUENT FLOW	SUBSAMPLE VOLUME	SUBSAMPLE TIME	EFFLUENT FLOW	SUBSAMPLE VOLUME	SUBSAMPLE TIME	EFFLUENT FLOW	SUBSAMPLE VOLUME

FIELD MEASUREMENTS (must be taken within 15 minutes of subsample)

Date: 5-11-2000	Time: 8:17 AM	pH: 7.83	Chlorine (TRC mg/l): 0.5	Effluent Temp: 29.6°C

NOTES:

I certify that the above information is correct: Wayne Blake Hedges (Sampler signature & printed name)

Relinquished By:	Date/Time: 5-12 3:00	Received By:	Date/Time: 5/12/00 5:24
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:

Shipment Method: UPS ___ FedEx ✓ Hand Delivery ___ Arrived on ice? Yes ✓ No ___

SAMPLE CHAIN-OF-CUSTODY FORM

SAMPLE ID No. FC 151 0001

MATERIAL SAFETY DATA SHEET NUMBER 007

Solvay Minerals, Inc., Green River, WY.
Date: May 11, 2000
Supersedes edition: 01-28-98
Purpose of revision: General Format Update
Issued by: P J Luzmoor, Safety/Training Dept.

HAZARDOUS MATERIAL INFORMATION SYSTEM(HMIS®) H = 2 F = 0 R = 1 PERSONAL PROTECTION = H

The following information is based upon our current knowledge and experience of our product and is not exhaustive. It applies to the product as defined by the specifications. In case of combinations of mixtures, one must confirm that no new hazards are likely to exist. In any case, the user is not exempt from observing all legal, administrative and regulatory procedures relating to the product, personal hygiene, and integrity of the work environment. (Unless noted to the contrary, the technical information applies only to pure product).

Telephone #-General 1-800-443-2785 (Solvay Minerals, Inc., PO BOX 27328-Houston, TX. 77227-7328)
Telephone #-Emergencies (USA) 1-307-872-6688 (Solvay Minerals, Green River, WY.)
Visit us on the WEB @ www.solvayminerals.com
Telephone #-Emergencies (USA) 1-800-424-9300 (CHEMTREC)
Telephone #-Emergencies (INTERNATIONAL/MARITIME) 1-703-527-3887 (CHEMTREC)
Telephone #-Emergencies (CANADA) 1-613-966-6666 (CANUTEC)
Telephone #-Emergencies (MEXICO) 91-800-00-214(MEX. REPUBLIC)-0-11-52-5-575-0838(SETIQ)

1. PRODUCT IDENTIFICATION

1.1 **Product Name:** SODIUM BISULFITE SOLUTION
1.2 **Chemical Name:** inorganic sodium compounds.
1.3 **Synonyms:** sodium hydrogen sulfite-sulfurous acid monosodium salt, aqueous solution.
1.4 **Trade Names:** sodium bisulfite solution.
1.5 **Formula:** $NaHSO_3$ H_20
1.6 **Molecular Weight:** 104
1.7 CAS No.: 7631-90-5
1.8 EINECS #: 231-548-0

2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENTS/FORMULA	CAS #	UN#	PERCENT
Sodium Bisulfite-$NaHSO_3$	7631-90-5	2693	38-42%
Sodium Sulfite-Na_2SO_3	7757-83-7	NA	1-3%
Sodium Sulfate-Na_2SO_4	7757-82-6	NA	<1%

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CHLOR-A-VAC™ Sodium Bisulfite Dechlorination Systems

The Capital Controls Group

Worldwide Water Quality Solutions

General

Water and wastewater treatment plants frequently use reducing agents to remove excess chlorine residual after completion of the disinfection process. One such method uses liquid sodium bisulfite or sodium hyposulfite as the reducing agent.

When rapid, efficient mixing and uniform dispersion of the reducing agent are the main concerns, the preferred alternative is the Capital Controls CHLOR-A-VAC chemical induction unit.

The CHLOR-A-VAC chemical induction unit meets or exceeds performance and operating requirements for dechlorinating with liquid sodium bisulfite. Rapid mixing assures complete dechlorination instantaneously. The result is rapid, effective, highly efficient, and uniform chemical dispersion to the process, thereby allowing plants to enjoy reduced chemical consumption. Benefits in addition to mixing include the ability to comply with increasing plant flows, more active regulation, and lower oxidant discharge levels.

In addition, the CHLOR-A-VAC chemical induction unit offers convenient post aeration of the effluent which can raise the dissolved oxygen level to within allowable discharge permit standards without the cost of adding a separate post aerator.

System Components

Figure 1 illustrates a sodium bisulfite system using a CHLOR-A-VAC induction unit.

The following list details the equipment necessary to feed sodium bisulfite using a CHLOR-A-VAC Chemical Induction Unit and provides their respective function:

CAPTROL® Controller

The microprocessor-based controller controls the feed rate of sodium bisulfite via a chemical metering pump.

The CAPTROL controller is capable of single-input flow proportional and dual-input feed forward (flow and residual) control.

Chemical Metering Pump

The chemical metering pump provides measured amounts of chemical to the CHLOR-A-VAC unit. A back pressure valve assures back pressure for proper pump operation.

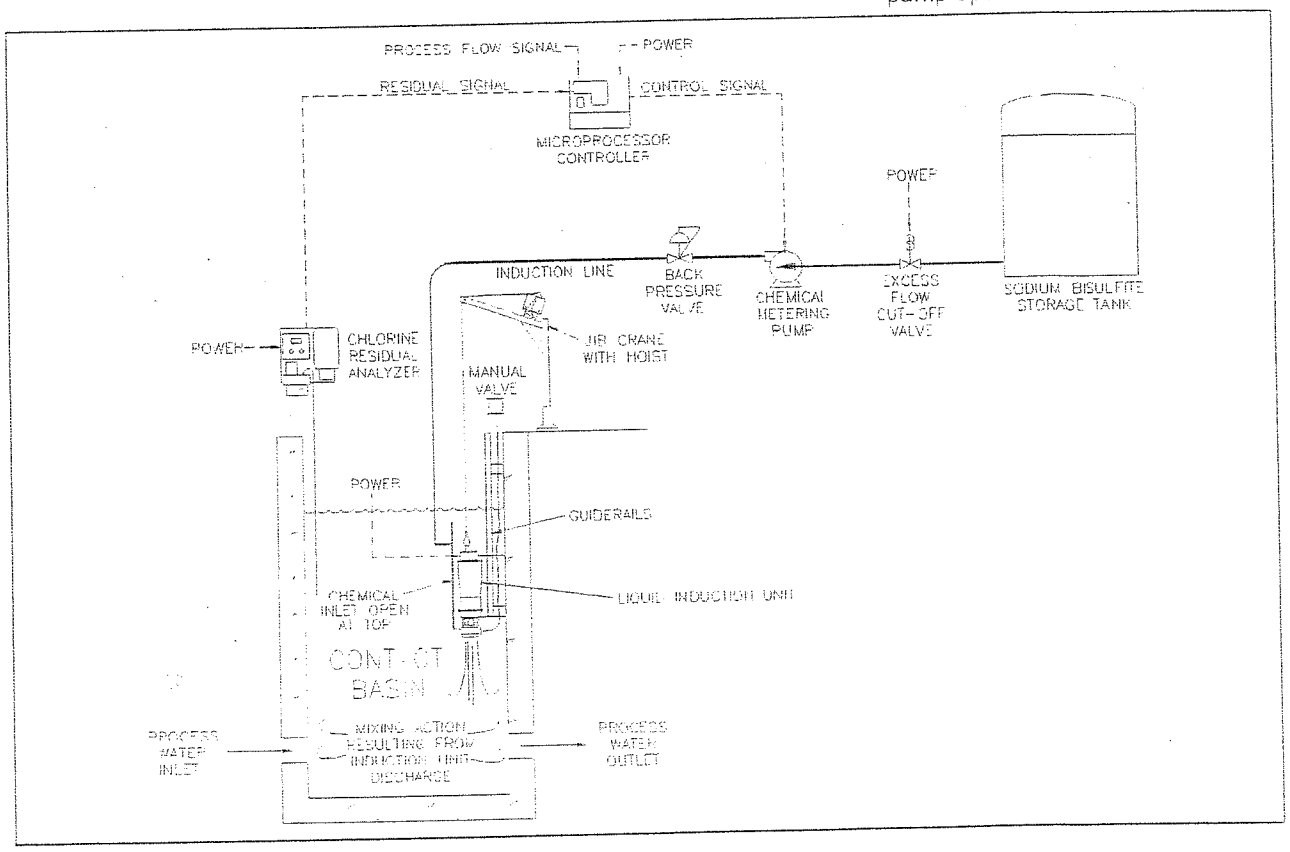

Figure 1 - Sodium Bisulfite Feed System Using A Chlor-A-Vac

Excess Flow Cut-Off Valve

An excess flow cut-off valve, generally a normally-open two-way solenoid valve, will prevent feeding an excess of chemical into the process.

CHLOR-A-VAC Chemical Induction Unit

The chemical induction unit will provide the process with rapid, efficient mixing action and a convenient source of post aeration.

Proper operation requires simultaneous sodium bisulfite feed and inflow of process water into the chemical inlet. The metering pump controls sodium bisulfite feed under pressure into the chemical inlet. Process water is simultaneously drawn into the open end of the chemical inlet under vacuum. Process water and sodium bisulfite form a solution which is then discharged into the contact chamber where mixing occurs.

If post aeration is required, air is drawn into the venturi area through the second inlet and introduced into the process water. Typically, the air hose is secured to the top of the guiderail assembly. A manual valve is used to control air flow to produce the desired dissolved oxygen level of the effluent.

Chlorine Residual Analyzer

A Capital Controls chlorine residual analyzer will provide the residual signal to the controller in feed forward controlled systems.

Guiderails and Lifting Crane Assemblies

Guiderails, typically mounted on the wall of the contact chamber, provide a secure means for installing the CHLOR-A-VAC unit in the chamber. Optimum mixing is assured when the unit is placed vertically in the chamber approximately three feet above the chamber floor. In the event of flows in excess of 10 feet per second, or in a shallow chamber or channel, the unit can also be horizontally positioned with the discharge upstream into the flow. The lifting crane is mounted at the edge of the contact chamber for installation and removal of the unit and for vertical positioning the unit in the chamber.

Represented by:

- UNITED KINGDOM
- HONG KONG
- INDIA
- MALAYSIA

The Capital Controls Group

Worldwide Water Quality Solutions

a part of

Severn Trent Plc

3000 Advance Lane, Colmar, PA 18915
Tel: 215 997-4000, Fax: 215 997-4062
e-mail: marketing@capitalcontrols.com
Web: http://www.capitalcontrols.com

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6/95

Water	$-H_2O$	7732-18-5	NA	54-60%

3. HAZARD IDENTIFICATION

3.1 Sodium Bisulfite Solution is a slightly cloudy, yellowish liquid with a sulfur dioxide odor (pungent smell).

3.2 **Route(s) of Entry:** *Inhalation: Yes Skin: Yes Ingestion: yes*

3.3 **Effects of exposure:** May cause mild irritation.

Inhalation (mists): May cause irritation. Sulfite-sensitive individuals may experience a severe allergic reaction.

Eyes (mists): May cause mild irritation or severe burns with prolonged exposure.

Skin: May cause mild irritation with prolonged exposure.

Ingestion: Oral exposure or swallowing may produce gastrointestinal upset, nausea or vomiting. Ingestion of large doses may be fatal. Sulfite sensitive individuals may experience a severe allergic reaction.

4. FIRST AID MEASURES

4.1 ***Inhalation:*** Remove the patient to fresh air. If breathing has stopped or patient experiences difficulty in breathing, administer artificial respiration.

Eyes: Immediately remove contact lenses and gently flush the eyes and surrounding areas with lukewarm water for 15 minutes. If irritation persists, seek medical attention.

Skin: Remove contaminated clothing. Wipe material from the skin. Rinse the affected area with large amounts of water for 15 minutes. If irritation persists, seek medical attention.

Ingestion: DO NOT ATTEMPT TO GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. Remove any evidence of the substance from the patient's mouth. If the patient is conscious and alert, give 8-12 ounces of water and seek medical attention.

4.2 **Medical Conditions Aggravated by Exposure:** Breathing of mists may aggravate asthma or other pulmonary diseases.

5. FIRE FIGHTING MEASURES

5.1 **Flash Point:** Non combustible. ***Method:*** Not applicable.

5.2 **Auto-ignition Temperature:** Not applicable.

5.3 **Flammability Limits:** ***Lower & Upper Limit:*** Non flammable.

5.4 **Unusual Fire and Explosion Hazards:** Non combustible at normal temperatures. Generates hazardous Sulfur Dioxide gas and excess heat during decomposition (150° C or 302° F).

5.5 **Common Extinguishing Methods:** Not applicable.

5.6 **Fire Fighting Procedures:** Wear NIOSH-approved self-contained breathing apparatus. Use water spray to keep containers cool and to knock down fumes. CAUTION: When subjected to excess heat

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(>150° C), product releases additional sulfur dioxide gas.

6. ACCIDENTAL RELEASE MEASURES

6.1 **Spills:** While wearing proper protective clothing (see section 8), stop or control the leak using an absorbent material. Control the spill and deposit in a suitable dry container. Spills to the environment exceeding RQ (5,000 LBS or 1,265 gallons @ 39% solution) must be reported to the National Response Center. Dispose of waste in accordance with applicable federal, state, and local environmental laws and regulations.

7. HANDLING AND STORAGE

7.1 **Handling:** Avoid prolonged or repeated contact with the skin or eyes. Do not wear contact lenses without proper eye protection when using this product. Wash exposed areas promptly and thoroughly after skin contact from working with this product and before eating, drinking, using tobacco products or using the rest room. Avoid prolonged or repeated breathing of mists.

7.2 **Storage:** Keep in a closed, properly labeled container away from acids, oxidizers and heat sources. Protect from physical damage.

7.3 *For all operations:* DO NOT TAKE INTERNALLY.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 **Exposure Limits:** ACGIH TLV 2000-2001 and OSHA PEL = 5 mg/m^3, for an 8 hour TWA. Exposure limits for sulfur dioxide (SO_2) is TWA = 2 PPM, STEL = 5 PPM.

8.2 **Ventilation:** In places with the possibility for creating mists in excess of exposure limits, ventilation should be provided.

8.3 **Respiratory Protection:** In case of significant or accidental mist emissions, a NIOSH/MSHA approved mask should be worn. If Sulfur Dioxide Gas is present, (see section 10), use an NIOSH-approved respirator or self-contained breathing apparatus.

8.4 **Protective Gloves:** Acid impervious gloves are required for routine handling of hot solution product.

8.5 **Eye Protection: Wear** chemical safety goggles. Do not wear contact lenses without proper eye protection.

8.6 **Other Protective Clothing or Equipment:** Wear boots, apron, long sleeves and other protective clothing suitable for use to prevent contact with the skin. Use good hygiene practices when handling this product including changing work clothes after use. Do not eat, drink or smoke in areas where this material is handled.

8.7 **Other:** Persons with allergic symptoms should seek advice from medical personnel as to whether exposure should be curtailed or eliminated.

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9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 **Melting Point:** NA.

9.2 **Boiling Point:** 104° C (220° F).

9.3 **Specific Gravity (H_2O=1):** 1.33 @ 20°C (68°F).

9.4 **Vapor Density (air=1):** Not applicable.

9.5 **Vapor Pressure:** 1.3mmHg @ 42%, 25 °C

9.6 **Solubility:** 42% $NaHSO_3$ at 6° C (43° F).

9.7 **Decomposition Temperature:** Dry product decomposes at 150°C (302°F).

9.8 **Viscosity:** Not listed.

9.9 **pH:** 4.5

9.10 **Other information: Freezing Point:** 43° F.

10. STABILITY AND REACTIVITY

10.1 **Stability:** At ambient temperatures and atmospheric pressure, product decomposes giving off sulfur dioxide gas.

10.2 **Hazardous Decomposition Products:** Sulfur Dioxide Gas.

10.3 **Conditions to Avoid:** Oxidizing agents, acids and excess heat (>150° C).

10.4 **Materials and Substances to Avoid: Contact** with excess heat (>150° C), oxidizers, acids and water releases sulfur dioxide gas which may be harmful or deadly when inhaled. Contact with strong oxidizers causes a vigorous exothermic reaction.

11. TOXICOLOGICAL INFORMATION

11.1 **Acute toxicity:** LD_{50}-oral 2 gm/kg species: rat

11.2 **Chronic toxicity:** Can cause allergic reactions (including headaches, difficulty in breathing, rapid heart rate, anaphylaxis) to susceptible individuals.

12. ECOLOGICAL INFORMATION

12.1 **Aquatic Toxicity-Sodium Sulfite:** 96 hour LC_{50}, goldfish: 100 mg/l. 24, 48, 96 hour TLm, mosquito fish: 2,600 PPM. BOD (Biological Oxygen Demand)= 0.12 LB/LB instantaneous. Sodium Bisulfite is an oxygen scavenger when introduced to water.

13. DISPOSAL CONSIDERATIONS

13.1 **Waste treatment:** Sodium Bisulfite Solution is not a listed hazardous waste under 40 CFR 261. However, state and local regulations for waste disposal may be more restrictive. It is recommended that Sodium Bisulfite Solution be disposed of in an EPA approved disposal facility in accordance with applicable environmental laws and regulations.

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13.2 RCRA waste #: Not a listed hazardous waste.

14. TRANSPORT INFORMATION

14.1 UN #: 2693.

14.2 **TDG class:** 8. **Label:** UN 2693.

14.3 **DOT guide #:** 154

14.4 **Hazard class:** 8(Corrosive).

14.5 **Proper shipping name:** Bisulfites, aqueous solutions, nos. 8(corrosive)/UN 2693/PG III/ RQ.

14.6 STCC #: 4932376

15. REGULATORY INFORMATION

15.1 **NFPA:** *Health - not listed*
Flammability - not listed
Reactivity - not listed

HMIS: *Health - 2*
Fire - 0
Reactivity - 1
Personal Protection: H

WHMIS: *D-2*

15.2 **Regulatory/Carcinogenicity Status:**
NTP: None (1987) **IARC:** None (1990) **OSHA:** None (1987)

15.3 **CERCLA RQ** (40 CFR 302): **YES** (5,000 LBS. = 1,265 gallons @ 39% solution).

15.4 **SARA TITLE III SECTION 302 & 303**(40 CFR 355) extremely hazardous substance: NA.

15.5 **SARA TITLE III SECTION 311 & 312**(40 CFR 370)
Hazard Categories(product): **Fire:** N **Sudden release of pressure:** N **Reactive:** Y
Acute health: Y **Chronic health:** Y
Planning threshold: 10,000 lbs.

15.6 **SARA TITLE III SECTION 313**(40 CFR 372): Listed toxic chemical: NO Reporting threshold: NA

15.7 **U.S. TSCA STATUS** (40 CFR 710 & 712.30): **Yes.**

16. OTHER INFORMATION:

For manufacturing use only. Not for use as a food or drug additive. The National Sanitation Foundation (NSF) recommends that the maximum usage level is 46 mg/l for potable water.

To our actual knowledge, the information contained herein is accurate as of the date of this document. However, neither Solvay Minerals, Inc. nor any of its affiliates makes any warranty, expressed or implied, or accepts any liability in connection with this information or its use. This information is for use by technically skilled persons at their own discretion and risk and does not relate to the use of this product in combination with any other substance or any other process. This is not a license under any patent. The user alone must finally determine suitability of any information or material for any contemplated use, the manner of use and whether any patents are infringed.

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