Attachment 1

NPDES Permit Application

Amick, Byron

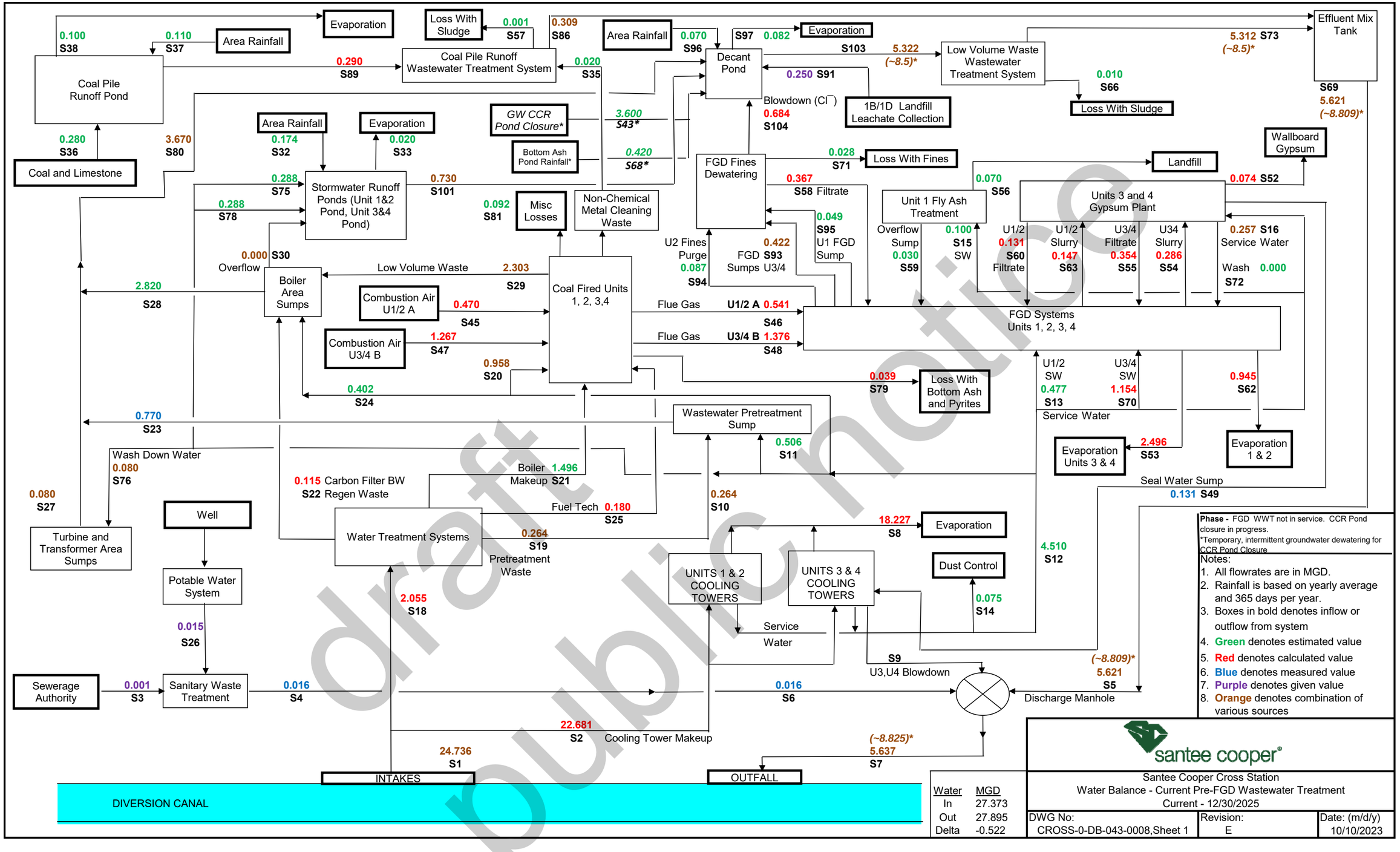
From: Lauren Fennell <lauren.fennell@santeecooper.com>
Sent: Tuesday, October 10, 2023 2:55 PM
To: Amick, Byron
Cc: Jesse Cannon; Connor Smalling
Subject: Cross Water Balance - Revised
Attachments: 2023-10-10 CGS Water Balance Current.pdf; 2023-10-10 CGS Water Balance Future Post-FGD Treatment.pdf

Byron,

Please see the attached updated Water Balance Diagrams for Cross showing the groundwater underdrain and Bottom Ash Pond rain accumulation as intermittent temporary streams for CCR Pond closure on both a current water balance and a future water balance showing FGD Wastewater treatment with Landfill Leachate.

Please let me know if you have any additional questions.

Lauren B. Fennell, P.E.
Senior Engineer · Water & CCR Environmental Services
One Riverwood Drive · Post Office Box 2946101, Mail Code A203
Moncks Corner, South Carolina 29461
843-761-8000, extension 4158



Phase - FGD WWT not in service. CCR Pond closure in progress.
*Temporary, intermittent groundwater dewatering for CCR Pond Closure

Notes:
1. All flowrates are in MGD.
2. Rainfall is based on yearly average and 365 days per year.
3. Boxes in bold denotes inflow or outflow from system
4. **Green** denotes estimated value
5. **Red** denotes calculated value
6. **Blue** denotes measured value
7. **Purple** denotes given value
8. **Orange** denotes combination of various sources

Water	MGD
In	27.373
Out	27.895
Delta	-0.522

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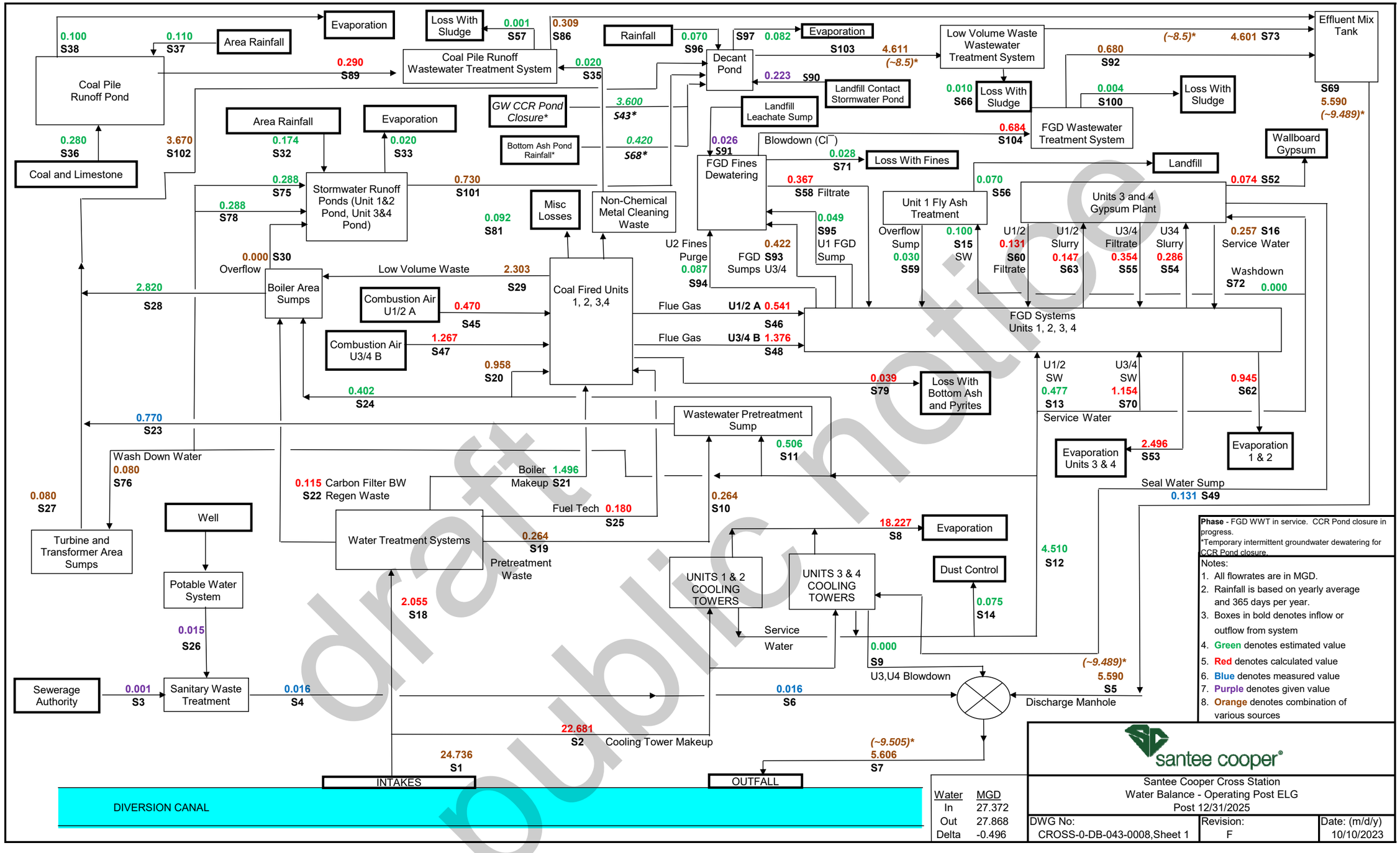
Santee Cooper Cross Station
Water Balance - Current Pre-FGD Wastewater Treatment
Current - 12/30/2025

DWG No:	Revision:	Date: (m/d/y)
CROSS-0-DB-043-0008,Sheet 1	E	10/10/2023



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Hand Delivered

October 13, 2021

Byron Amick
SCDHEC – Water Facility Permitting Division
2600 Bull Street
Columbia, SC 29201

Subject: Cross Generating Station – NPDES Permit # SC0037401
Submission of Notice of Planned Participation (NOPP) Under 2020 Steam Electric Power Generating Effluent Guidelines – Contingent Voluntary Incentive Program

Dear Mr. Amick:

Pursuant to 40 C.F.R. § 423.19(h), Santee Cooper is submitting to the South Carolina Department of Health and the Environmental Control (Department) the attached information for making an election through a Notice of Planned Participation (NOPP) for Cross Generating Stations, Units 1-4. This NOPP is being submitted for establishing, on a contingent basis, the effluent discharge limitations set by the Voluntary Incentives Program (VIP) under 40 C.F.R. § 423.13(g)(3)(i) and will apply only under the conditions described below.

Cross Units 1-4 discharge under NPDES Permit No. SC0037401, which is currently in the process of renewal. In its initial NPDES permit renewal application, Santee Cooper has requested that the next version of the NPDES permit include generally applicable effluent limitations for flue gas desulfurization wastewater (FGDW) based on the effluent limitation guidelines set in 40 C.F.R. § 423.13(g)(1)(i). Santee Cooper hereby notifies the Department of its contingent election for the four Cross units to comply with the VIP requirements for FGDW under 40 C.F.R. § 423.13(g)(3)(i) on a contingent basis, which would apply only if Santee Cooper were to make the election described below.

Santee Cooper is currently conducting a pilot study of a biological treatment system, which EPA has identified as the reference control technology in setting the generally applicable effluent limitations for the FGDW. The trial is ongoing, but should it ultimately turn out to be unsuccessful – or if other new information gathered by Santee Cooper indicates that the VIP approach is preferable – Santee Cooper will elect to modify the NPDES permit for the four Cross units, as currently allowed under condition V.A.7. of the draft NPDES permit. In such a case and only after this election has been made, the VIP requirements for FGDW under 40 C.F.R. § 423.13(g)(3)(i) will apply to Cross Units 1-4, in lieu of the generally applicable requirements for FGDW under 40 C.F.R. § 423.13(g)(1)(i).

The attached document contains the contents that 40 CFR 423.19(h) requires for making the NOPP election on a contingent basis for the four Cross units. The submission of this information documents

and confirms Santee Cooper's intent in meeting the VIP effluent discharge limitations (if determined to be appropriate and so elected) in lieu of the generally applicable requirements based on new information gathered for evaluating performance of, and other relevant information on the effectiveness of, the control technologies for meeting the effluent discharge requirements. At a later date, after Santee Cooper has completed its technical review of the available control technologies, Santee Cooper will submit a report to the Department, which could include a request to modify the permit. Should such review take longer than a year, annual progress reports would be provided describing the progress of our evaluation.

If you have any questions or concerns, please contact Jesse Cannon of my office at (843)761–8000, extension 4377 or jesse.cannon@santeecooper.com.

Sincerely,

Pamela J. Williams
Chief Public Affairs Officer and General Counsel

PJW:JHC:JWC:

Attachment: Cross NOPP for Contingent VIP

Santee Cooper – Cross Generating Station
Notice of Planned Participation – Voluntary Incentive Plan for Flue Gas Desulfurization Discharges

Santee Cooper's Cross Generating Station (CGS) is a four unit, coal-fired electric generating station located in Pineville, South Carolina. CGS was first placed in service in 1983 with the construction of a coal-fired electrical generating unit, Unit 2. Units 1, 3 and 4 followed in 1995, 2007, and 2008, respectively. The station discharges to the Diversion Canal to Lake Moultrie in accordance with South Carolina's Department of Health and Environmental Control (DHEC) National Pollutant Discharge Elimination System (NPDES) permit SC0037401. CGS is subject to EPA's Effluent Limit Guidelines (ELGs) under 40 CFR 423: Steam Electric Power Generating Point Source. Revised ELGs under the Steam Electric Reconsideration Rule were published on October 13, 2020, and include new requirements for flue gas desulfurization (FGD) wastewater (WW) discharges.

The purpose of this document is to provide information to DHEC about CGS's contingent election to comply with the voluntary incentive plan (VIP) requirements for FGD wastewater treatment as outlined in the 2020 revision of the ELGs, which would apply only if Santee Cooper makes the election described in the accompanying cover letter. CGS has been piloting treatment with biological treatment vendors in an effort to establish that the best available technology economically achievable (BAT) treatment option as established by EPA is viable at this site. The pilot is not complete so Santee Cooper does not want to rule out the VIP alternative while the pilot continues.

This Notice of Planned Participation (NOPP) includes descriptions of the likely methodologies available to be used that would qualify for the VIP option and limits, should that prove to be the preferred option for ELG compliance. An engineering dependency chart for attaining compliance with 40 CFR 423.13(g)(3)(i) by the required date of December 31, 2028, is included as Attachment 1.

FGD Wastewater Treatment Approach and Brine Disposal

The 2020 FGD wastewater VIP ELG discharge limitations are shown in Table 1.

Parameter	Daily Max	Monthly Average
Arsenic, total (µg/L)	5	N/A
Mercury, total (ng/L)	23	10
Selenium, total (µg/L)	10	N/A
Nitrate-nitrite, as N (mg/L)	2.0	1.2
Bromide (mg/L)	0.2	N/A
Total Dissolved Solids (TDS) (mg/L)	306	149

Table 1. 2020 FGD Wastewater ELGs for VIP Option

Candidate technologies have been identified for further consideration to comply with these VIP limits. These include thermal evaporation with no resultant wastewater discharge, traditional reverse osmosis (RO) with brine encapsulation, and multi-pass, high-shear membranes with brine encapsulation. High

quality permeate from these processes (if present) may be used as makeup water for the FGD scrubber or other uses. Depending upon the treatment approach, the required limits for the permeate in the VIP option will be met or a no-discharge use for this water will be established.

Encapsulation of the brine is intended to solidify the RO reject solution to allow for disposal in a landfill. Various constituents are mixed with the RO reject solution to form a flowable fill that rapidly solidifies. For FGD wastewater encapsulation, typical constituents mixed with the RO reject are fly ash, bottom ash, gypsum, lime, and/or Portland cement in varying ratios. Encapsulation will require a site-specific brine solidification formula as FGD wastewater is highly variable. Due to this variability, it is expected that significant research and development will be required. CGS would work with industry groups and academia, along with consulting engineers, to determine the brine solidification formula that chemically and physically stabilizes the material and minimizes the operating costs of encapsulation.

Significant experimentation and testing with varying formulations for encapsulation may be necessary. One objective of this process is to have a flowable fill that does not set up in pipes going to the landfill, while still achieving the necessary strength, low permeability, and solidification after placement. Thermal evaporation would generate a dry solid which would be co-managed with fly ash in the landfill. For both encapsulation and thermal evaporation options it will be necessary to work with DHEC permitting authorities to obtain appropriate permits.

Engineering Dependency Schedule for VIP Option

A detailed Engineering Dependency Chart as required by the ELGs is described below and shown in Attachment 1. This proposed schedule may change slightly because a number of utilities will be competing for the same resources. Schedules providing additional detail will be developed as the technology evaluation proceeds and will be provided with annual reports.

FGD WW Characterization / Scrubber Water Balance

Characterization of CGS's FGD wastewater has been conducted in addition to ongoing biological piloting, which is not yet complete. CGS will determine compatibility with the available membrane technology providers that have had experience in treating FGD wastewater, at least on a pilot scale. This previous FGD wastewater characterization would also assist with the identification of additional pre-treatment that may be required to protect the membranes. In addition to the chemical analyses of the wastewater, a detailed water balance of FGD scrubber operations will be used to evaluate opportunities to reduce the volume of wastewater generated that requires treatment. These activities have been in progress since the beginning of 2021 and are expected to be complete soon.

Develop Specifications, Bench & Pilot Testing

As evaluation of the VIP option proceeds, specifications will be developed, and vendors approached. Data will be shared with technology providers and bulk samples shipped for testing of prospective system(s). On-site piloting of membrane treatment technologies may be undertaken. Pilot operations should be over several months to allow for variability in FGD scrubber chemistry or other site operations (generating load, startup, shutdown, weather, etc.). Should piloting be pursued, simultaneous testing with multiple vendors is preferable to minimize variability, so scheduling should accommodate multiple

vendors' equipment availability. This actual piloting is expected to take approximately seven months once the piloting equipment is on site. Pilot testing will not commence prior to DHEC approval to proceed.

Complete Detailed Design

Once a technology is selected, the process of bid award and detailed design is expected to last approximately seventteen months.

Permitting / DHEC Approval to Construct

CGS will request an NPDES permit modification to accommodate the VIP limits and construction approval from DHEC for the selected system. This effort is expected to take eight months and can proceed once the detailed design is sufficiently developed to allow permit applications to be completed.

Construction

Once the contracting and detailed design step is complete, construction of the membrane equipment and system tie-ins can begin. Construction of pre-treatment to prevent fouling of the membranes, installation of membrane technology with built-in clean in place systems, and necessary tie-ins is expected to take approximately eighteen months.

System Startup

Startup of the selected system will commence immediately upon completion of construction and is expected to take three months.

Develop Brine Solidification Formula (If Selected)

If evaporative technology is not selected, development of the site-specific brine management approach is expected to require expertise from industry and/or academia using brine encapsulation models as appropriate. Research in encapsulation should test out various mixtures of fly ash, brine, Portland cement, etc. Various tests of the resulting product (sometimes referred to as paste) would be conducted to determine its flowability, time to solidify, chemical stability, strength, and other properties. Equipment will be designed and installed for brine management. The brine management process has been allowed significant time to ensure VIP implementation can be achieved by the December 31, 2028 date established by the 2020 ELG rule.

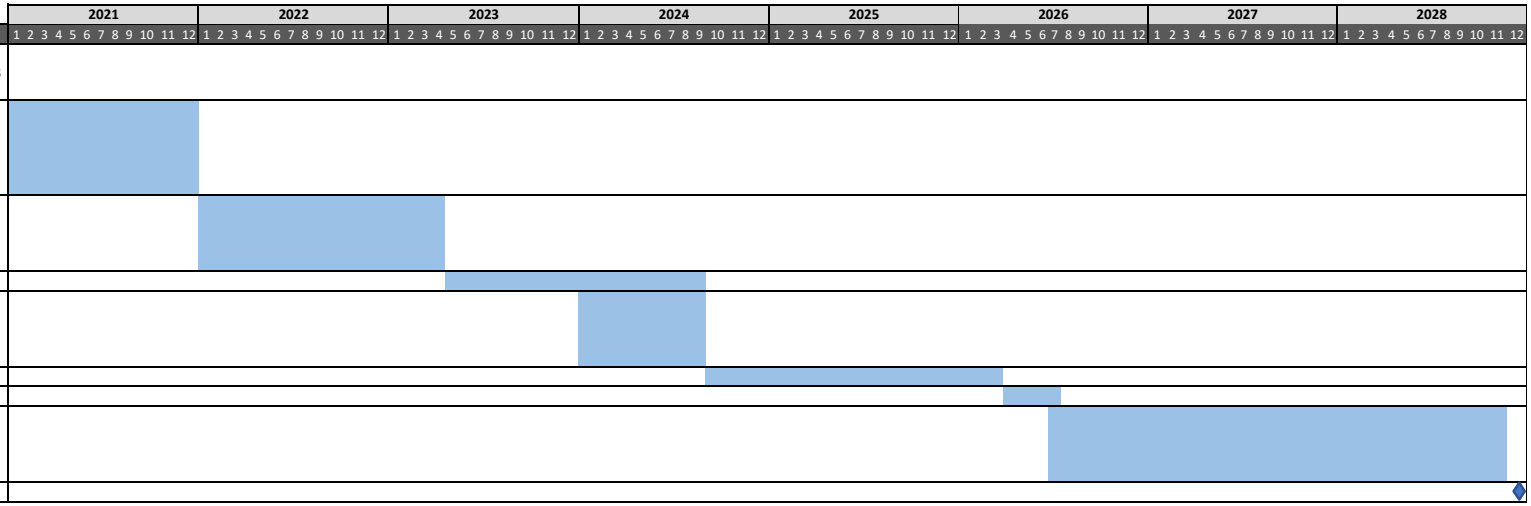
If evaporative technology is selected, a similar period to install tie-ins is anticipated.

Attachment 1 – Engineering Dependency Chart

Attachment 1

Santee Cooper Cross Flue Gas Desulfurization - Voluntary Incentive Plan Engineering Dependency Chart

Task Name	Start	End
Santee Cooper Cross Station FGD VIP Engineering Dependency Chart		**12/31/2028**
Ongoing activities (Engineering contractor selected, project kickoff, compliance strategy, FGD characterization, develop FGD water balance)	1/1/2021	12/30/2021
Provide FGD characterization data, develop specifications, provide bulk volumes for bench testing w/vendors, obtain pilot approval, conduct pilots	1/1/2022	4/30/2023
Complete detailed design	5/1/2023	9/30/2024
Submit Request/Obtain Approval to Construct from DHEC (some parallel activities with detailed design); obtain permits	1/1/2024	9/30/2024
Construction	10/1/2024	3/31/2026
Membrane system commissioning	4/1/2026	6/30/2026
Develop brine solidification formula (if selected), finalize thermal evaporative system tie ins, overall system commissioning	6/1/2026	11/30/2028
ELG Applicability date		12/31/2028



NPDES Form 2C Update

Cross Generating Station
SC0037401

santee cooper

January 26, 2021

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INTRODUCTION

Cross Generating Station was first placed in service in 1983 with the construction of Unit 2, a 540-MW coal-fired electrical generating unit. Units 1 (620 MW), 3 (580 MW) and 4 (580 MW) followed in 1995, 2007, and 2008, respectively. The facility discharges treated wastewater associated with these units and is therefore required to apply for a renewed NPDES permit every five years. Santee Cooper provided a complete NPDES Reapplication package in 2010, with addendums provided in 2015, 2016 and 2019.

Since finalization of Steam Effluent Limitation Guidelines and completion of two new physical chemical wastewater treatment facilities, Santee Cooper has prepared the attached updated 2C form and all required attachments in consultation with the Bureau of Water.

SAMPLE REQUIREMENTS AND LOCATION

As requested by the Bureau of Water, an updated Form 2C including outfall sampling was completed for Outfall 002 (wastewater from the Effluent Mix Tank which has replaced the pH Trim. Santee Cooper hired GEL Laboratories LLC to conduct 2C sampling and analysis to SCDHEC-mandated PQLs at Cross. Sampling involved both grab samples and 24-hour composite samples, conducted using ISCO compositors. Sampling took place December 22, 2020 at the Effluent Mix Tank for Outfall 002. Resulting chemical concentration data are presented in Form 2C for each outfall.

Acetone, cyclohexane, and xylene originally showed up in ash pond process samples in 2019. These results were provided in April 2019 to the Bureau of Water. These three chemicals were also analyzed for in the Effluent Mix Wastewater during the December 2020 sampling event. Neither acetone, cyclohexane, nor xylene were detected in the December 2020 samples. Cyclohexane and xylene are noted as such in the 2C form, however acetone is not on the 2C list.

TOXICITY

The current permit requires monthly chronic toxicity sampling and analysis at 6% concentration. However, in recent years Cross Station has made upgrades to the wastewater treatment processes and installed a discharge diffuser in 2018. As such, Santee Cooper hired Water Environment Consultants (WEC) to conduct a CORMIX modeling study. The enclosed report in attachment E, from WEC, presents the CORMIX modeling conditions, inputs and conclusions and recommends a chronic test concentration of 1.2%.

APPLICATION FORM 2C

EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004
SCD017273533	SC0037401	Cross Generating Station	

Form 2C NPDES

U.S. Environmental Protection Agency
Application for NPDES Permit to Discharge Wastewater

EXISTING MANUFACTURING, COMMERCIAL, MINING, AND SILVICULTURE OPERATIONS

SECTION 1. OUTFALL LOCATION (40 CFR 122.21(g)(1))

Outfall Location

1.1 Provide information on each of the facility's outfalls in the table below.

Outfall Number	Receiving Water Name	Latitude	Longitude
001*	Diversion Canal	33° 22′ 0″ N	80° 6′ 42″ W
002	Diversion Canal	33° 22′ 2″ N	80° 6′ 35″ W
002A	Diversion Canal	TBD° ′ ″	° ′ ″

SECTION 2. LINE DRAWING (40 CFR 122.21(g)(2))

Line Drawing

2.1 Have you attached a line drawing to this application that shows the water flow through your facility with a water balance? (See instructions for drawing requirements. See Exhibit 2C–1 at end of instructions for example.)

☑ Yes ☐ No

SECTION 3. AVERAGE FLOWS AND TREATMENT (40 CFR 122.21(g)(3))

Average Flows and Treatment

3.1 For each outfall identified under Item 1.1, provide average flow and treatment information. Add additional sheets if necessary.

Outfall Number 001*

Operations Contributing to Flow

Operation	Average Flow
Units 1 & 2 Cooling Tower Blowdown	0 mgd
*Note Outfall 001 closing under Closure Plan (LOA-005552)	mgd
	mgd
	mgd

Treatment Units

Description (include size, flow rate through each treatment unit, retention time, etc.)	Code from Table 2C-1	Final Disposal of Solid or Liquid Wastes Other Than by Discharge
n/a		

Average Flows and Treatment Continued

3.1 cont.

Outfall Number 002

Operations Contributing to Flow

Operation	Average Flow
Effluent Mix Tank (TOTAL)	5.065 mgd
Coal Pile Runoff (CPRO) Treatment	0.309 mgd
Low Volume Waste (LVW) Treatment*	4.756 mgd
	mgd

Treatment Units

Description (include size, flow rate through each treatment unit, retention time, etc.)	Code from Table 2C-1	Final Disposal of Solid or Liquid Wastes Other Than by Discharge
CPRO Treatment (600 gpm max flow rate)	1-U, 2-C, 2-K, 4-A, 5-R	5-Q (Landfill)
LVW Treatment (3,300 gpm max flow rate)	1-U, 2-C, 2-K, 4-A, 5-R	5-Q (Landfill)

Outfall Number 002A

Operations Contributing to Flow

Operation	Average Flow
Flue Gas Desulfurization (FGD) Wastewater*	0.163 mgd
	mgd
FGD WW currently included in LVW WW	mgd
	mgd

Treatment Units

Description (include size, flow rate through each treatment unit, retention time, etc.)	Code from Table 2C-1	Final Disposal of Solid or Liquid Wastes Other Than by Discharge
Future FGD Wastewater Treatment TBD	TBD	TBD

System Users

3.2 Are you applying for an NPDES permit to operate a privately owned treatment works?

☐ Yes ☑ No ➔ SKIP to Section 4.

3.3 Have you attached a list that identifies each user of the treatment works?

☐ Yes ☑ No

EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004
SCD017273533	SC0037401	Cross Generating Station	

Form 2C NPDES

U.S. Environmental Protection Agency
Application for NPDES Permit to Discharge Wastewater

EXISTING MANUFACTURING, COMMERCIAL, MINING, AND SILVICULTURE OPERATIONS

SECTION 1. OUTFALL LOCATION (40 CFR 122.21(g)(1))

Outfall Location

1.1 Provide information on each of the facility's outfalls in the table below.

Outfall Number	Receiving Water Name	Latitude	Longitude
003	Diversion Canal	33° 22′ 13″ N	80° 7′ 3″ W
004	Diversion Canal	33° 22′ 17″ N	80° 7′ 1″ W
005	Diversion Canal	33° 21′ 54″ N	80° 7′ 0″ W

SECTION 2. LINE DRAWING (40 CFR 122.21(g)(2))

Line Drawing

2.1 Have you attached a line drawing to this application that shows the water flow through your facility with a water balance? (See instructions for drawing requirements. See Exhibit 2C–1 at end of instructions for example.)

☑ Yes ☐ No

SECTION 3. AVERAGE FLOWS AND TREATMENT (40 CFR 122.21(g)(3))

Average Flows and Treatment

3.1 For each outfall identified under Item 1.1, provide average flow and treatment information. Add additional sheets if necessary.

Outfall Number 003

Operations Contributing to Flow

Operation	Average Flow
Cooling Tower Blowdown	0.223 mgd
	mgd
	mgd
	mgd

Treatment Units

Description (include size, flow rate through each treatment unit, retention time, etc.)	Code from Table 2C-1	Final Disposal of Solid or Liquid Wastes Other Than by Discharge
Blowdown from Unit 3 Cooling Tower	4-A	4-C

Average Flows and Treatment Continued

3.1 cont.

Outfall Number 004

Operations Contributing to Flow

Operation	Average Flow
Cooling Tower Blowdown	0.223 mgd
	mgd
	mgd
	mgd

Treatment Units

Description (include size, flow rate through each treatment unit, retention time, etc.)	Code from Table 2C-1	Final Disposal of Solid or Liquid Wastes Other Than by Discharge
Blowdown from Unit 4 Cooling Tower	4-A	4-C

Outfall Number 005

Operations Contributing to Flow

Operation	Average Flow
Sanitary Wastewater	0.016 mgd
	mgd
	mgd
	mgd

Treatment Units

Description (include size, flow rate through each treatment unit, retention time, etc.)	Code from Table 2C-1	Final Disposal of Solid or Liquid Wastes Other Than by Discharge
Package Sanitary Treatment Plant	1-L, 1-O, 2-H*, 3-A, 4-A	5A
(30,000 gpd capacity, UV Disinfection)	*also 2-F, 2-G	

System Users

3.2 Are you applying for an NPDES permit to operate a privately owned treatment works?

☐ Yes ☑ No ➔ SKIP to Section 4.

3.3 Have you attached a list that identifies each user of the treatment works?

☐ Yes ☑ No

EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004
SCD017273533	SC0037401	Cross Generating Station	

SECTION 4. INTERMITTENT FLOWS (40 CFR 122.21(g)(4))

Intermittent Flows

4.1 Except for storm runoff, leaks, or spills, are any discharges described in Sections 1 and 3 intermittent or seasonal?

☑ Yes ☐ No ➔ SKIP to Section 5.

4.2 Provide information on intermittent or seasonal flows for each applicable outfall. Attach additional pages, if necessary.

Outfall Number	Operation (list)	Frequency		Flow Rate		Duration
		Average Days/Week	Average Months/Year	Long-Term Average	Maximum Daily	
002	CPRO WWT	* days/week	* months/year	0.309 mgd	0.7 mgd	* days
	LVW WWT	* days/week	* months/year	4.756 mgd	8.6 mgd	* days
		days/week	months/year	mgd	mgd	days
002A	FGD WWT (TBD)	* days/week	* months/year	0.163 mgd	TBD mgd	* days
		days/week	months/year	mgd	mgd	days
		days/week	months/year	mgd	mgd	days
003,004	CT Unit 3	* days/week	* months/year	* mgd	* mgd	* days
		days/week	months/year	mgd	mgd	days
	CT Unit 4	* days/week	* months/year	* mgd	* mgd	* days

SECTION 5. PRODUCTION (40 CFR 122.21(g)(5))

Applicable ELGs

5.1 Do any effluent limitation guidelines (ELGs) promulgated by EPA under Section 304 of the CWA apply to your facility?

☑ Yes ☐ No ➔ SKIP to Section 6.

5.2 Provide the following information on applicable ELGs.

ELG Category	ELG Subcategory	Regulatory Citation
Steam Electric Power Generating	Low Volume Waste, Coal Pile Run-off, Non-Chem Mtl Cln	40 CFR Part 423.15
Steam Electric Power Generating	FGD Wastewater, Landfill Leachate, CT Blowdown	40 CFR Part 423.13

Production-Based Limitations

5.3 Are any of the applicable ELGs expressed in terms of production (or other measure of operation)?

☐ Yes ☑ No ➔ SKIP to Section 6.

5.4 Provide an actual measure of daily production expressed in terms and units of applicable ELGs.

Outfall Number	Operation, Product, or Material	Quantity per Day	Unit of Measure

SECTION 6. IMPROVEMENTS (40 CFR 122.21(g)(6))

Upgrades and Improvements

6.1 Are you presently required by any federal, state, or local authority to meet an implementation schedule for constructing, upgrading, or operating wastewater treatment equipment or practices or any other environmental programs that could affect the discharges described in this application?

☑ Yes ☐ No ➔ SKIP to Item 6.3.

6.2 Briefly identify each applicable project in the table below.

Brief Identification and Description of Project	Affected Outfalls (list outfall number)	Source(s) of Discharge	Final Compliance Dates	
			Required	Projected
FGD Wastewater Treatment Construction	New 002A	FGD Systems	TBD*	TBD*
*FGD WW is due to new 2020 Rule and construction schedules are currently being developed.				

6.3 Have you attached sheets describing any additional water pollution control programs (or other environmental projects that may affect your discharges) that you now have underway or planned? *(optional item)*

☐ Yes ☑ No ☐ Not applicable

SECTION 7. EFFLUENT AND INTAKE CHARACTERISTICS (40 CFR 122.21(g)(7))

Effluent and Intake Characteristics

See the instructions to determine the pollutants and parameters you are required to monitor and, in turn, the tables you must complete. Not all applicants need to complete each table.

Table A. Conventional and Non-Conventional Pollutants

7.1 Are you requesting a waiver from your NPDES permitting authority for one or more of the Table A pollutants for any of your outfalls?

☐ Yes ☑ No ➔ SKIP to Item 7.3.

7.2 If yes, indicate the applicable outfalls below. Attach waiver request and other required information to the application.

Outfall Number _____ Outfall Number _____ Outfall Number _____

7.3 Have you completed monitoring for all Table A pollutants at each of your outfalls for which a waiver has not been requested and attached the results to this application package?

☑ Yes ☐ No; a waiver has been requested from my NPDES permitting authority for all pollutants at all outfalls.

Table B. Toxic Metals, Cyanide, Total Phenols, and Organic Toxic Pollutants

7.4 Do any of the facility's processes that contribute wastewater fall into one or more of the primary industry categories listed in Exhibit 2C-3? (See end of instructions for exhibit.)

☑ Yes ☐ No ➔ SKIP to Item 7.8.

7.5 Have you checked "Testing Required" for all toxic metals, cyanide, and total phenols in Section 1 of Table B?

☑ Yes ☐ No

7.6 List the applicable primary industry categories and check the boxes indicating the required GC/MS fraction(s) identified in Exhibit 2C-3.

Primary Industry Category	Required GC/MS Fraction(s) (Check applicable boxes.)
Steam Electric Power Plants	☑ Volatile ☑ Acid ☐ Base/Neutral ☐ Pesticide
	☐ Volatile ☐ Acid ☐ Base/Neutral ☐ Pesticide
	☐ Volatile ☐ Acid ☐ Base/Neutral ☐ Pesticide

Effluent and Intake Characteristics Continued

7.7	Have you checked "Testing Required" for all required pollutants in Sections 2 through 5 of Table B for each of the GC/MS fractions checked in Item 7.6? ☑ Yes ☐ No
7.8	Have you checked "Believed Present" or "Believed Absent" for all pollutants listed in Sections 1 through 5 of Table B where testing is not required? ☑ Yes ☐ No
7.9	Have you provided (1) quantitative data for those Section 1, Table B, pollutants for which you have indicated testing is required or (2) quantitative data or other required information for those Section 1, Table B, pollutants that you have indicated are "Believed Present" in your discharge? ☑ Yes ☐ No
7.10	Does the applicant qualify for a small business exemption under the criteria specified in the instructions? ☐ Yes ➔ Note that you qualify at the top of Table B, then SKIP to Item 7.12. ☑ No
7.11	Have you provided (1) quantitative data for those Sections 2 through 5, Table B, pollutants for which you have determined testing is required or (2) quantitative data or an explanation for those Sections 2 through 5, Table B, pollutants you have indicated are "Believed Present" in your discharge? ☑ Yes ☐ No
Table C. Certain Conventional and Non-Conventional Pollutants	
7.12	Have you indicated whether pollutants are "Believed Present" or "Believed Absent" for all pollutants listed on Table C for all outfalls? ☑ Yes ☐ No
7.13	Have you completed Table C by providing (1) quantitative data for those pollutants that are limited either directly or indirectly in an ELG and/or (2) quantitative data or an explanation for those pollutants for which you have indicated "Believed Present"? ☑ Yes ☐ No
Table D. Certain Hazardous Substances and Asbestos	
7.14	Have you indicated whether pollutants are "Believed Present" or "Believed Absent" for all pollutants listed in Table D for all outfalls? ☑ Yes ☐ No
7.15	Have you completed Table D by (1) describing the reasons the applicable pollutants are expected to be discharged and (2) by providing quantitative data, if available? ☑ Yes ☐ No
Table E. 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (2,3,7,8-TCDD)	
7.16	Does the facility use or manufacture one or more of the 2,3,7,8-TCDD congeners listed in the instructions, or do you know or have reason to believe that TCDD is or may be present in the effluent? ☐ Yes ➔ Complete Table E. ☑ No ➔ SKIP to Section 8.
7.17	Have you completed Table E by reporting *qualitative* data for TCDD? ☐ Yes ☐ No

SECTION 8. USED OR MANUFACTURED TOXICS (40 CFR 122.21(g)(9))

Used or Manufactured Toxics

8.1	Is any pollutant listed in Table B a substance or a component of a substance used or manufactured at your facility as an intermediate or final product or byproduct? ☑ Yes ☐ No ➔ SKIP to Section 9.
8.2	List the pollutants below.

1. *See Table B	4.	7.
2.	5.	8.
3.	6.	9.

SECTION 9. BIOLOGICAL TOXICITY TESTS (40 CFR 122.21(g)(11))

Biological Toxicity Tests

9.1 Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made within the last three years on (1) any of your discharges or (2) on a receiving water in relation to your discharge?

☑ Yes ☐ No ➔ SKIP to Section 10.

9.2 Identify the tests and their purposes below.

Test(s)	Purpose of Test(s)	Submitted to NPDES Permitting Authority?	Date Submitted
Chronic Whole Effluent Toxicity	Effluent Monitoring (Monthly)	☑ Yes ☐ No	Monthly
		☐ Yes ☐ No	
		☐ Yes ☐ No	

SECTION 10. CONTRACT ANALYSES (40 CFR 122.21(g)(12))

Contract Analyses

10.1 Were any of the analyses reported in Section 7 performed by a contract laboratory or consulting firm?

☑ Yes ☐ No ➔ SKIP to Section 11.

10.2 Provide information for each contract laboratory or consulting firm below.

	Laboratory Number 1	Laboratory Number 2	Laboratory Number 3
Name of laboratory/firm	General Engineering Laboratories, LLC	PACE Analytical Services, LLC	Water Systems Inc.
Laboratory address	2040 Savage Road Charleston, SC 29417	106 Vantage Point Drive West Columbia, SC 29172	311 Dooly Road Lexington, SC 29073
Phone number	(843) 556-8817	(803) 791-9700	(803) 755-0090
Pollutant(s) analyzed	Form 2C Permit Renewal Analyses, Quarterly Low Level Mercury	Oil and Grease, BOD	Chronic Toxicity

SECTION 11. ADDITIONAL INFORMATION (40 CFR 122.21(g)(13))

Additional Information

11.1 Has the NPDES permitting authority requested additional information?

☑ Yes ☐ No ➔ SKIP to Section 12.

11.2 List the information requested and attach it to this application.

1. Flow Codes/Categories	4.
2. CORMIX	5.
3.	6.

EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004
SCD017273533		Cross Generating Station	

SECTION 12. CHECKLIST AND CERTIFICATION STATEMENT (40 CFR 122.22(a) and (d))

Checklist and Certification Statement

12.1 In Column 1 below, mark the sections of Form 2C that you have completed and are submitting with your application. For each section, specify in Column 2 any attachments that you are enclosing to alert the permitting authority. Note that not all applicants are required to complete all sections or provide attachments.

Column 1	Column 2
☑ Section 1: Outfall Location	☑ w/ attachments
☑ Section 2: Line Drawing	☑ w/ line drawing ☑ w/ additional attachments
☑ Section 3: Average Flows and Treatment	☑ w/ attachments ☐ w/ list of each user of privately owned treatment works
☑ Section 4: Intermittent Flows	☑ w/ attachments
☑ Section 5: Production	☐ w/ attachments
☑ Section 6: Improvements	☐ w/ attachments ☐ w/ optional additional sheets describing any additional pollution control plans
☑ Section 7: Effluent and Intake Characteristics	☐ w/ request for a waiver and supporting information ☐ w/ explanation for identical outfalls ☐ w/ small business exemption request ☐ w/ other attachments ☑ w/ Table A ☑ w/ Table B ☑ w/ Table C ☑ w/ Table D ☐ w/ Table E ☑ w/ analytical results as an attachment
☑ Section 8: Used or Manufactured Toxics	☐ w/ attachments
☑ Section 9: Biological Toxicity Tests	☐ w/ attachments
☑ Section 10: Contract Analyses	☑ w/ attachments
☑ Section 11: Additional Information	☑ w/ attachments
☑ Section 12: Checklist and Certification Statement	☑ w/ attachments

12.2 **Certification Statement**

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.

Name (print or type first and last name)	Official title
Jane H. Hood	Sr Director Env & Water Systems
Signature: Jane H Hood	Date signed: 1/27/21

APPLICATION FORM 2C – SAMPLING TABLES A – E

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number	Form Approved 03/05/19 OMB No. 2040-0004
SCD017273533	SC0037401	SCPSA Cross Generating Station	Outfall 002	

TABLE A. CONVENTIONAL AND NON CONVENTIONAL POLLUTANTS (40 CFR 122.21(g)(7)(iii)) [1]

	Pollutant	Waiver Requested (if applicable)	Units (specify)		Effluent				Intake (Optional)	
					Maximum Daily Discharge (required)	Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
☐	Check here if you have applied to your NPDES permitting authority for a waiver for *all* of the pollutants listed on this table for the noted outfall.									
1.	Biochemical oxygen demand (BOD_5)	☐	Concentration	mg/L	< 24.0	NA	NA	1	NA	NA
			Mass	lbs/day	< 1,482.2	NA	NA	1	NA	NA
2.	Chemical oxygen demand (COD)	☐	Concentration	mg/L	66.4	NA	NA	1	NA	NA
			Mass	lbs/day	4,100.9	NA	NA	1	NA	NA
3.	Total organic carbon (TOC)	☐	Concentration	mg/L	7.69	NA	NA	1	NA	NA
			Mass	lbs/day	474.9	NA	NA	1	NA	NA
4.	Total suspended solids (TSS)	☐	Concentration	mg/L	24	24	12.05	14	NA	NA
			Mass	lbs/day	1,210.5	NA	NA	1	NA	NA
5.	Ammonia (as N)	☐	Concentration	mg/L	0.442	NA	NA	1	NA	NA
			Mass	lbs/day	27.298	NA	NA	1	NA	NA
6.	Flow	☐	Rate	MGD	9.30	4.24	2.82	CONT	NA	NA
7.	Temperature (winter)	☐	°C	°C	17.3	NA	NA	1	NA	NA
	Temperature (summer)	☐	°C	°C	NA	NA	NA	NA	NA	NA
8.	pH (minimum)	☐	Standard units	s.u.	6.3	NA	NA	CONT	NA	NA
	pH (maximum)	☐	Standard units	s.u.	8.7	NA	NA	CONT	NA	NA

[1] Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter I, subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number	Form Approved 03/05/19 OMB No. 2040-0004
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TABLE B. TOXIC METALS, CYANIDE, TOTAL PHENOLS, AND ORGANIC TOXIC POLLUTANTS (40 CFR 122.21(g)(7)(v))[1]

	Pollutant/Parameter (and CAS Number, if available)	Testing Required	Presence or Absence (check one)		Units (specify)		Effluent				Intake (optional)	
			Believed Present	Believed Absent			Maximum Daily Discharge (required)	Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
☐	Check here if you qualify as a small business per the instructions to Form 2C and, therefore, do not need to submit quantitative data for any of the organic toxic pollutants in Sections 2 through 5 of this table. Note, however, that you must still indicate in the appropriate column of this table if you believe any of the pollutants listed are present in your discharge.											
Section 1. Toxic Metals, Cyanide, and Total Phenols												
1.1	Antimony, total (7440-36-0)	☐	☐	☑	Concentration	µg/L	< 5.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.309	NA	NA	1	NA	NA
1.2	Arsenic, total (7440-38-2)	☐	☐	☑	Concentration	µg/L	< 5.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.309	NA	NA	1	NA	NA
1.3	Beryllium, total (7440-41-7)	☐	☐	☑	Concentration	µg/L	< 1.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.062	NA	NA	1	NA	NA
1.4	Cadmium, total (7440-43-9)	☐	☑	☐	Concentration	µg/L	3.43	NA	NA	1	NA	NA
					Mass	lbs/day	0.212	NA	NA	1	NA	NA
1.5	Chromium, total (7440-47-3)	☐	☐	☑	Concentration	µg/L	< 5.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.309	NA	NA	1	NA	NA
1.6	Copper, total (7440-50-8)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
1.7	Lead, total (7439-92-1)	☐	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
1.8	Mercury, total (7439-97-6)	☐	☑	☐	Concentration	µg/L	0.0821	0.0821	0.0338	4	NA	NA
					Mass	lbs/day	0.003496	0.0035	0.001321	4	NA	NA
1.9	Nickel, total (7440-02-0)	☐	☑	☐	Concentration	µg/L	30.8	NA	NA	1	NA	NA
					Mass	lbs/day	1.902	NA	NA	1	NA	NA
1.10	Selenium, total (7782-49-2)	☐	☑	☐	Concentration	µg/L	17.7	NA	NA	1	NA	NA
					Mass	lbs/day	1.093	NA	NA	1	NA	NA
1.11	Silver, total (7440-22-4)	☐	☐	☑	Concentration	µg/L	< 5.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.309	NA	NA	1	NA	NA

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TABLE B. TOXIC METALS, CYANIDE, TOTAL PHENOLS, AND ORGANIC TOXIC POLLUTANTS (40 CFR 122.21(g)(7)(v))[1]

	Pollutant/Parameter (and CAS Number, if available)	Testing Required	Presence or Absence (check one)		Units (specify)		Effluent				Intake (optional)	
			Believed Present	Believed Absent			Maximum Daily Discharge (required)	Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
1.12	Thallium, total (7440-28-0)	☐	☑	☐	Concentration	µg/L	0.508	NA	NA	1	NA	NA
					Mass	lbs/day	0.031	NA	NA	1	NA	NA
1.13	Zinc, total (7440-66-6)	☐	☑	☐	Concentration	µg/L	22.8	NA	NA	1	NA	NA
					Mass	lbs/day	1.408	NA	NA	1	NA	NA
1.14	Cyanide, total (57-12-5)	☐	☑	☐	Concentration	µg/L	18.9	NA	NA	1	NA	NA
					Mass	lbs/day	1.167	NA	NA	1	NA	NA
1.15	Phenols, total	☐	☐	☑	Concentration	µg/L	< 5.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.309	NA	NA	1	NA	NA
Section 2. Organic Toxic Pollutants (GC/MS Fraction—Volatile Compounds)												
2.1	Acrolein (107-02-8)	☑	☐	☑	Concentration	µg/L	< 5.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.309	NA	NA	1	NA	NA
2.2	Acrylonitrile (107-13-1)	☑	☐	☑	Concentration	µg/L	< 5.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.309	NA	NA	1	NA	NA
2.3	Benzene (71-43-2)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
2.4	Bromoform (75-25-2)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
2.5	Carbon tetrachloride (56-23-5)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
2.6	Chlorobenzene (108-90-7)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
2.7	Chlorodibromomethane (124-48-1)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
2.8	Chloroethane (75-00-3)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA

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TABLE B. TOXIC METALS, CYANIDE, TOTAL PHENOLS, AND ORGANIC TOXIC POLLUTANTS (40 CFR 122.21(g)(7)(v))[1]

	Pollutant/Parameter (and CAS Number, if available)	Testing Required	Presence or Absence (check one)		Units (specify)		Effluent				Intake (optional)	
			Believed Present	Believed Absent			Maximum Daily Discharge (required)	Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
2.9	2-chloroethylvinyl ether (110-75-8)	☑	☐	☑	Concentration	µg/L	< 5.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.309	NA	NA	1	NA	NA
2.10	Chloroform (67-66-3)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
2.11	Dichlorobromomethane (75-27-4)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
2.12	1,1-dichloroethane (75-34-3)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
2.13	1,2-dichloroethane (107-06-2)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
2.14	1,1-dichloroethylene (75-35-4)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
2.15	1,2-dichloropropane (78-87-5)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
2.16	1,3-dichloropropylene (542-75-6)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
2.17	Ethylbenzene (100-41-4)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
2.18	Methyl bromide (74-83-9)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
2.19	Methyl chloride (74-87-3)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
2.20	Methylene chloride (75-09-2)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
2.21	1,1,2,2- tetrachloroethane (79-34-5)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA

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TABLE B. TOXIC METALS, CYANIDE, TOTAL PHENOLS, AND ORGANIC TOXIC POLLUTANTS (40 CFR 122.21(g)(7)(v))[1]

	Pollutant/Parameter (and CAS Number, if available)	Testing Required	Presence or Absence (check one)		Units (specify)		Effluent				Intake (optional)	
			Believed Present	Believed Absent			Maximum Daily Discharge (required)	Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
2.22	Tetrachloroethylene (127-18-4)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
2.23	Toluene (108-88-3)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
2.24	1,2-trans-dichloroethylene (156-60-5)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
2.25	1,1,1-trichloroethane (71-55-6)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
2.26	1,1,2-trichloroethane (79-00-5)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
2.27	Trichloroethylene (79-01-6)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
2.28	Vinyl chloride (75-01-4)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
Section 3. Organic Toxic Pollutants (GC/MS Fraction—Acid Compounds)												
3.1	2-chlorophenol (95-57-8)	☑	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
3.2	2,4-dichlorophenol (120-83-2)	☑	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
3.3	2,4-dimethylphenol (105-67-9)	☑	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
3.4	4,6-dinitro-o-cresol (534-52-1)	☑	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
3.5	2,4-dinitrophenol (51-28-5)	☑	☐	☑	Concentration	µg/L	< 50.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 3.088	NA	NA	1	NA	NA

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TABLE B. TOXIC METALS, CYANIDE, TOTAL PHENOLS, AND ORGANIC TOXIC POLLUTANTS (40 CFR 122.21(g)(7)(v))[1]

	Pollutant/Parameter (and CAS Number, if available)	Testing Required	Presence or Absence (check one)		Units (specify)		Effluent				Intake (optional)	
			Believed Present	Believed Absent			Maximum Daily Discharge (required)	Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
3.6	2-nitrophenol (88-75-5)	☑	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
3.7	4-nitrophenol (100-02-7)	☑	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
3.8	p-chloro-m-cresol (59-50-7)	☑	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
3.9	Pentachlorophenol (87-86-5)	☑	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
3.10	Phenol (108-95-2)	☑	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
3.11	2,4,6-trichlorophenol (88-05-2)	☑	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
Section 4. Organic Toxic Pollutants (GC/MS Fraction—Base /Neutral Compounds)												
4.1	Acenaphthene (83-32-9)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.2	Acenaphthylene (208-96-8)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.3	Anthracene (120-12-7)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.4	Benzidine (92-87-5)	☐	☐	☑	Concentration	µg/L	< 100	NA	NA	1	NA	NA
					Mass	lbs/day	< 6.18	NA	NA	1	NA	NA
4.5	Benzo (a) anthracene (56-55-3)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.6	Benzo (a) pyrene (50-32-8)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA

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TABLE B. TOXIC METALS, CYANIDE, TOTAL PHENOLS, AND ORGANIC TOXIC POLLUTANTS (40 CFR 122.21(g)(7)(v))[1]

	Pollutant/Parameter (and CAS Number, if available)	Testing Required	Presence or Absence (check one)		Units (specify)		Effluent				Intake (optional)	
			Believed Present	Believed Absent			Maximum Daily Discharge (required)	Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
4.7	3,4-benzofluoranthene (205-99-2)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.8	Benzo (ghi) perylene (191-24-2)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.9	Benzo (k) fluoranthene (207-08-9)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.10	Bis (2-chloroethoxy) methane	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.11	Bis (2-chloroethyl) ether (111-44-4)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.12	Bis (2-chloroisopropyl) ether (102-80-1)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.13	Bis (2-ethylhexyl) phthalate (117-81-7)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.14	4-bromophenyl phenyl ether (101-55-3)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.15	Butyl benzyl phthalate (85-68-7)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.16	2-chloronaphthalene (91-58-7)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.17	4-chlorophenyl phenyl ether (7005-72-3)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.18	Chrysene (218-01-9)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.19	Dibenzo (a,h) anthracene (53-70-3)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA

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	Pollutant/Parameter (and CAS Number, if available)	Testing Required	Presence or Absence (check one)		Units (specify)		Effluent				Intake (optional)	
			Believed Present	Believed Absent			Maximum Daily Discharge (required)	Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
4.20	1,2-dichlorobenzene (95-50-1)	☐	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
4.21	1,3-dichlorobenzene (541-73-1)	☐	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
4.22	1,4-dichlorobenzene (106-46-7)	☐	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
4.23	3,3-dichlorobenzidine (91-94-1)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.24	Diethyl phthalate (84-66-2)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.25	Dimethyl phthalate (131-11-3)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.26	Di-n-butyl phthalate (84-74-2)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.27	2,4-dinitrotoluene (121-14-2)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.28	2,6-dinitrotoluene (606-20-2)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.29	Di-n-octyl phthalate (117-84-0)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.30	1,2-Diphenylhydrazine(as azobenzene) (122-66-7)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.31	Fluoranthene (206-44-0)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.32	Fluorene (86-73-7)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA

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	Pollutant/Parameter (and CAS Number, if available)	Testing Required	Presence or Absence (check one)		Units (specify)		Effluent				Intake (optional)	
			Believed Present	Believed Absent			Maximum Daily Discharge (required)	Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
4.33	Hexachlorobenzene (118-74-1)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.34	Hexachlorobutadiene (87-68-3)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.35	Hexachlorocyclopentadiene (77-47-4)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.36	Hexachloroethane (67-72-1)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.37	Indeno (1,2,3-cd) pyrene (193-39-5)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.38	Isophorone (78-59-1)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.39	Naphthalene (91-20-3)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.40	Nitrobenzene (98-95-3)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.41	N-nitrosodimethylamine (62-75-9)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.42	N-nitrosodi-n-propylamine (621-64-7)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.43	N-nitrosodiphenylamine (86-30-6)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.44	Phenanthrene (85-01-8)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA
4.45	Pyrene 129-00-0)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.618	NA	NA	1	NA	NA

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TABLE B. TOXIC METALS, CYANIDE, TOTAL PHENOLS, AND ORGANIC TOXIC POLLUTANTS (40 CFR 122.21(g)(7)(v))[1]

	Pollutant/Parameter (and CAS Number, if available)	Testing Required	Presence or Absence (check one)		Units (specify)		Effluent				Intake (optional)	
			Believed Present	Believed Absent			Maximum Daily Discharge (required)	Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
4.46	1,2,4-trichlorobenzene (120-82-1)	☐	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.124	NA	NA	1	NA	NA
Section 5. Organic Toxic Pollutants (GC/MS Fraction—Pesticides)												
5.1	Aldrin (309-00-2)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.2	α-BHC (319-84-6)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.3	β-BHC (319-85-7)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.4	γ-BHC (58-89-9)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.5	δ-BHC (319-86-8)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.6	Chlordane (57-74-9)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.7	4,4'-DDT (50-29-3)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.8	4,4'-DDE (72-55-9)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.9	4,4'-DDD (72-54-8)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.10	Dieldrin (60-57-1)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.11	α-endosulfan (115-29-7)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA

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	Pollutant/Parameter (and CAS Number, if available)	Testing Required	Presence or Absence (check one)		Units (specify)		Effluent				Intake (optional)	
			Believed Present	Believed Absent			Maximum Daily Discharge (required)	Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
5.12	β-endosulfan (115-29-7)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.13	Endosulfan sulfate (1031-07-8)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.14	Endrin (72-20-8)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.15	Endrin aldehyde (7421-93-4)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.16	Heptachlor (76-44-8)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.17	Heptachlor epoxide (1024-57-3)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.18	PCB-1242 (53469-21-9)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.19	PCB-1254 (11097-69-1)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.20	PCB-1221 (11104-28-2)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.21	PCB-1232 (11141-16-5)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.22	PCB-1248 (12672-29-6)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.23	PCB-1260 (11096-82-5)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.24	PCB-1016 (12674-11-2)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA

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TABLE B. TOXIC METALS, CYANIDE, TOTAL PHENOLS, AND ORGANIC TOXIC POLLUTANTS (40 CFR 122.21(g)(7)(v))[1]

	Pollutant/Parameter (and CAS Number, if available)	Testing Required	Presence or Absence (check one)		Units (specify)		Effluent				Intake (optional)	
			Believed Present	Believed Absent			Maximum Daily Discharge (required)	Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
5.25	Toxaphene (8001-35-2)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA

[1] Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter I, subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

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TABLE C. CERTAIN CONVENTIONAL AND NON CONVENTIONAL POLLUTANTS (40 CFR 122.21(g)(7)(vi))[1]

	Pollutant	Presence or Absence (check one)		Units (specify)		Effluent				Intake (Optional)	
		Believed Present	Believed Absent			Maximum Daily Discharge (required)	Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
☐	Check here if you believe all pollutants on Table C to be ***present*** in your discharge from the noted outfall. You need *not* complete the "Presence or Absence" column of Table C for *each* pollutant.										
☐	Check here if you believe all pollutants on Table C to be ***absent*** in your discharge from the noted outfall. You need *not* complete the "Presence or Absence" column of Table C for *each* pollutant.										
1.	Bromide (24959-67-9)	☑	☐	Concentration	mg/L	3.79	NA	NA	1	NA	NA
				Mass	lbs/day	234.07	NA	NA	1	NA	NA
2.	Chlorine, total residual	☑	☐	Concentration	mg/L	0.11	NA	NA	1	NA	NA
				Mass	lbs/day	6.79	NA	NA	1	NA	NA
3.	Color	☑	☐	Concentration	PCU	60.0	NA	NA	1	NA	NA
				Mass	NA	NA	NA	NA	NA	NA	NA
4.	Fecal coliform	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
				Mass	NA	NA	NA	NA	NA	NA	NA
5.	Fluoride (16984-48-8)	☑	☐	Concentration	mg/L	0.997	NA	NA	1	NA	NA
				Mass	lbs/day	61.57	NA	NA	1	NA	NA
6	Nitrate-nitrite	☑	☐	Concentration	mg/L	0.745	NA	NA	1	NA	NA
				Mass	lbs/day	46.01	NA	NA	1	NA	NA
7.	Nitrogen, total organic (as N)	☑	☐	Concentration	mg/L	1.360	NA	NA	1	NA	NA
				Mass	lbs/day	83.99	NA	NA	1	NA	NA
8.	Oil and grease	☑	☐	Concentration	mg/L	7	7	< 5.00	13	NA	NA
				Mass	lbs/day	< 308.80	NA	NA	1	NA	NA
9.	Phosphorus (as P), total (7723-14-0)	☐	☑	Concentration	mg/L	< 0.050	NA	NA	1	NA	NA
				Mass	lbs/day	< 3.09	NA	NA	1	NA	NA
10.	Sulfate (as SO4) (14808-79-8)	☑	☐	Concentration	mg/L	472	NA	NA	1	NA	NA
				Mass	lbs/day	29,151	NA	NA	1	NA	NA
11.	Sulfide (as S)	☐	☑	Concentration	mg/L	< 0.100	NA	NA	1	NA	NA
				Mass	lbs/day	< 6.176	NA	NA	1	NA	NA

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TABLE C. CERTAIN CONVENTIONAL AND NON CONVENTIONAL POLLUTANTS (40 CFR 122.21(g)(7)(vi))[1]

	Pollutant	Presence or Absence (check one)		Units (specify)		Effluent				Intake (Optional)	
		Believed Present	Believed Absent			Maximum Daily Discharge (required)	Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
12.	Sulfite (as SO_3) (14265-45-3)	☐	☑	Concentration	mg/L	< 2.00	NA	NA	1	NA	NA
				Mass	lbs/day	< 123.52	NA	NA	1	NA	NA
13.	Surfactants	☐	☑	Concentration	mg/L	< 0.050	NA	NA	1	NA	NA
				Mass	lbs/day	< 3.09	NA	NA	1	NA	NA
14.	Aluminum, total (7429-90-5)	☑	☐	Concentration	µg/L	396	NA	NA	1	NA	NA
				Mass	lbs/day	24.46	NA	NA	1	NA	NA
15.	Barium, total (7440-39-3)	☑	☐	Concentration	µg/L	66.4	NA	NA	1	NA	NA
				Mass	lbs/day	4.10	NA	NA	1	NA	NA
16.	Boron, total (7440-42-8)	☑	☐	Concentration	µg/L	11,600	NA	NA	1	NA	NA
				Mass	lbs/day	716.41	NA	NA	1	NA	NA
17.	Cobalt, total (7440-48-4)	☐	☑	Concentration	µg/L	< 20.0	NA	NA	1	NA	NA
				Mass	lbs/day	< 1.24	NA	NA	1	NA	NA
18.	Iron, total (7439-89-6)	☑	☐	Concentration	µg/L	2,890	NA	NA	1	NA	NA
				Mass	lbs/day	178.49	NA	NA	1	NA	NA
19.	Magnesium, total (7439-95-4)	☑	☐	Concentration	µg/L	119,000	NA	NA	1	NA	NA
				Mass	lbs/day	7,349	NA	NA	1	NA	NA
20.	Molybdenum, total (7439-98-7)	☐	☑	Concentration	µg/L	< 20.0	NA	NA	1	NA	NA
				Mass	lbs/day	< 1.24	NA	NA	1	NA	NA
21.	Manganese, total (7439-96-5)	☑	☐	Concentration	µg/L	2,810	NA	NA	1	NA	NA
				Mass	lbs/day	173.55	NA	NA	1	NA	NA
22.	Tin, total (7440-31-5)	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
				Mass	lbs/day	< 0.62	NA	NA	1	NA	NA
23.	Titanium, total (7440-32-6)	☐	☑	Concentration	µg/L	< 50.0	NA	NA	1	NA	NA
				Mass	lbs/day	< 3.09	NA	NA	1	NA	NA

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number
SCD017273533	SC0037401	SCPSA Cross Generating Station	Outfall 002

Form Approved 03/05/19
OMB No. 2040-0004

TABLE C. CERTAIN CONVENTIONAL AND NON CONVENTIONAL POLLUTANTS (40 CFR 122.21(g)(7)(vi))[1]

	Pollutant	Presence or Absence (check one)		Units (specify)		Effluent				Intake (Optional)	
		Believed Present	Believed Absent			Maximum Daily Discharge (required)	Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
24.	**Radioactivity**										
	Alpha, total	☐	☑	Concentration	pCi/L	< 5.00	NA	NA	1	NA	NA
				Mass	NA	NA	NA	NA	NA	NA	NA
	Beta, total	☑	☐	Concentration	pCi/L	7.37	NA	NA	1	NA	NA
				Mass	NA	NA	NA	NA	NA	NA	NA
	Radium, total	☐	☑	Concentration	pCi/L	< 10.0	NA	NA	1	NA	NA
				Mass	NA	NA	NA	NA	NA	NA	NA
	Radium 226, total	☐	☑	Concentration	pCi/L	< 10.0	NA	NA	1	NA	NA
				Mass	NA	NA	NA	NA	NA	NA	NA

[1] Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter I, subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number	Form Approved 03/05/19 OMB No. 2040-0004
SCD017273533	SC0037401	SCPSA Cross Generating Station	Outfall 002	

TABLE D. CERTAIN HAZARDOUS SUBSTANCES AND ASBESTOS (40 CFR 122.21(g)(7)(vii))[1]

	Pollutant	Presence or Absence (check one)		Reason Pollutant Believed Present in Discharge	Available Quantitative Data (specify units)
		Believed Present	Believed Absent		
1.	Asbestos	☐	☑	NA	NA
2.	Acetaldehyde	☐	☑	NA	NA
3.	Allyl alcohol	☐	☑	NA	NA
4.	Allyl chloride	☐	☑	NA	NA
5.	Amyl acetate	☐	☑	NA	NA
6.	Aniline	☐	☑	NA	NA
7.	Benzonitrile	☐	☑	NA	NA
8.	Benzyl chloride	☐	☑	NA	NA
9.	Butyl acetate	☐	☑	NA	NA
10.	Butylamine	☐	☑	NA	NA
11.	Captan	☐	☑	NA	NA
12.	Carbaryl	☐	☑	NA	NA
13.	Carbofuran	☐	☑	NA	NA
14.	Carbon disulfide	☐	☑	NA	NA
15.	Chlorpyrifos	☐	☑	NA	NA
16.	Coumaphos	☐	☑	NA	NA
17.	Cresol	☐	☑	NA	NA
18.	Crotonaldehyde	☐	☑	NA	NA
19.	Cyclohexane	☐	☑	NA	< 1.00 µg/L

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number	Form Approved 03/05/19 OMB No. 2040-0004
SCD017273533	SC0037401	SCPSA Cross Generating Station	Outfall 002	

TABLE D. CERTAIN HAZARDOUS SUBSTANCES AND ASBESTOS (40 CFR 122.21(g)(7)(vii))[1]

	Pollutant	Presence or Absence (check one)		Reason Pollutant Believed Present in Discharge	Available Quantitative Data (specify units)
		Believed Present	Believed Absent		
20.	2,4-D (2,4-dichlorophenoxyacetic acid)	☐	☑	NA	NA
21.	Diazinon	☐	☑	NA	NA
22.	Dicamba	☐	☑	NA	NA
23.	Dichlobenil	☐	☑	NA	NA
24.	Dichlone	☐	☑	NA	NA
25.	2,2-dichloropropionic acid	☐	☑	NA	NA
26.	Dichlorvos	☐	☑	NA	NA
27.	Diethyl amine	☐	☑	NA	NA
28.	Dimethyl amine	☐	☑	NA	NA
29.	Dintrobenzene	☐	☑	NA	NA
30.	Diquat	☐	☑	NA	NA
31.	Disulfoton	☐	☑	NA	NA
32.	Diuron	☐	☑	NA	NA
33.	Epichlorohydrin	☐	☑	NA	NA
34.	Ethion	☐	☑	NA	NA
35.	Ethylene diamine	☐	☑	NA	NA
36.	Ethylene dibromide	☐	☑	NA	NA
37.	Formaldehyde	☐	☑	NA	NA
38.	Furfural	☐	☑	NA	NA

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number	Form Approved 03/05/19 OMB No. 2040-0004
SCD017273533	SC0037401	SCPSA Cross Generating Station	Outfall 002	

TABLE D. CERTAIN HAZARDOUS SUBSTANCES AND ASBESTOS (40 CFR 122.21(g)(7)(vii))[1]

	Pollutant	Presence or Absence (check one)		Reason Pollutant Believed Present in Discharge	Available Quantitative Data (specify units)
		Believed Present	Believed Absent		
39.	Guthion	☐	☑	NA	NA
40.	Isoprene	☐	☑	NA	NA
41.	Isopropanolamine	☐	☑	NA	NA
42.	Kelthane	☐	☑	NA	NA
43.	Kepone	☐	☑	NA	NA
44.	Malathion	☐	☑	NA	NA
45.	Mercaptodimethur	☐	☑	NA	NA
46.	Methoxychlor	☐	☑	NA	NA
47.	Methyl mercaptan	☐	☑	NA	NA
48.	Methyl methacrylate	☐	☑	NA	NA
49.	Methyl parathion	☐	☑	NA	NA
50.	Mevinphos	☐	☑	NA	NA
51.	Mexacarbate	☐	☑	NA	NA
52.	Monoethyl amine	☐	☑	NA	NA
53.	Monomethyl amine	☐	☑	NA	NA
54.	Naled	☐	☑	NA	NA
55.	Naphthenic acid	☐	☑	NA	NA
56.	Nitrotoluene	☐	☑	NA	NA
57.	Parathion	☐	☑	NA	NA

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number	Form Approved 03/05/19 OMB No. 2040-0004
SCD017273533	SC0037401	SCPSA Cross Generating Station	Outfall 002	

TABLE D. CERTAIN HAZARDOUS SUBSTANCES AND ASBESTOS (40 CFR 122.21(g)(7)(vii))[1]

	Pollutant	Presence or Absence (check one)		Reason Pollutant Believed Present in Discharge	Available Quantitative Data (specify units)
		Believed Present	Believed Absent		
58.	Phenolsulfonate	☐	☑	NA	NA
59.	Phosgene	☐	☑	NA	NA
60.	Propargite	☐	☑	NA	NA
61.	Propylene oxide	☐	☑	NA	NA
62.	Pyrethrins	☐	☑	NA	NA
63.	Quinoline	☐	☑	NA	NA
64.	Resorcinol	☐	☑	NA	NA
65.	Strontium	☑	☐	Analysis of permit renewal samples	1,320 µg/L
66.	Strychnine	☐	☑	NA	NA
67.	Styrene	☐	☑	NA	NA
68.	2,4,5-T (2,4,5-trichlorophenoxyacetic	☐	☑	NA	NA
69.	TDE (tetrachlorodiphenyl ethane)	☐	☑	NA	NA
70.	2,4,5-TP [2-(2,4,5-trichlorophenoxy)	☐	☑	NA	NA
71.	Trichlorofon	☐	☑	NA	NA
72.	Triethanolamine	☐	☑	NA	NA
73.	Triethylamine	☐	☑	NA	NA
74.	Trimethylamine	☐	☑	NA	NA
75.	Uranium	☑	☐	Analysis of permit renewal samples	1.53 µg/L
76.	Vanadium	☐	☑	NA	< 10.0 µg/L

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number	Form Approved 03/05/19 OMB No. 2040-0004
SCD017273533	SC0037401	SCPSA Cross Generating Station	Outfall 002	

TABLE D. CERTAIN HAZARDOUS SUBSTANCES AND ASBESTOS (40 CFR 122.21(g)(7)(vii))[1]

	Pollutant	Presence or Absence (check one)		Reason Pollutant Believed Present in Discharge	Available Quantitative Data (specify units)
		Believed Present	Believed Absent		
77.	Vinyl acetate	☐	☑	NA	NA
78.	Xylene	☐	☑	NA	< 3.00 µg/L
79.	Xylenol	☐	☑	NA	NA
80.	Zirconium	☐	☑	NA	NA

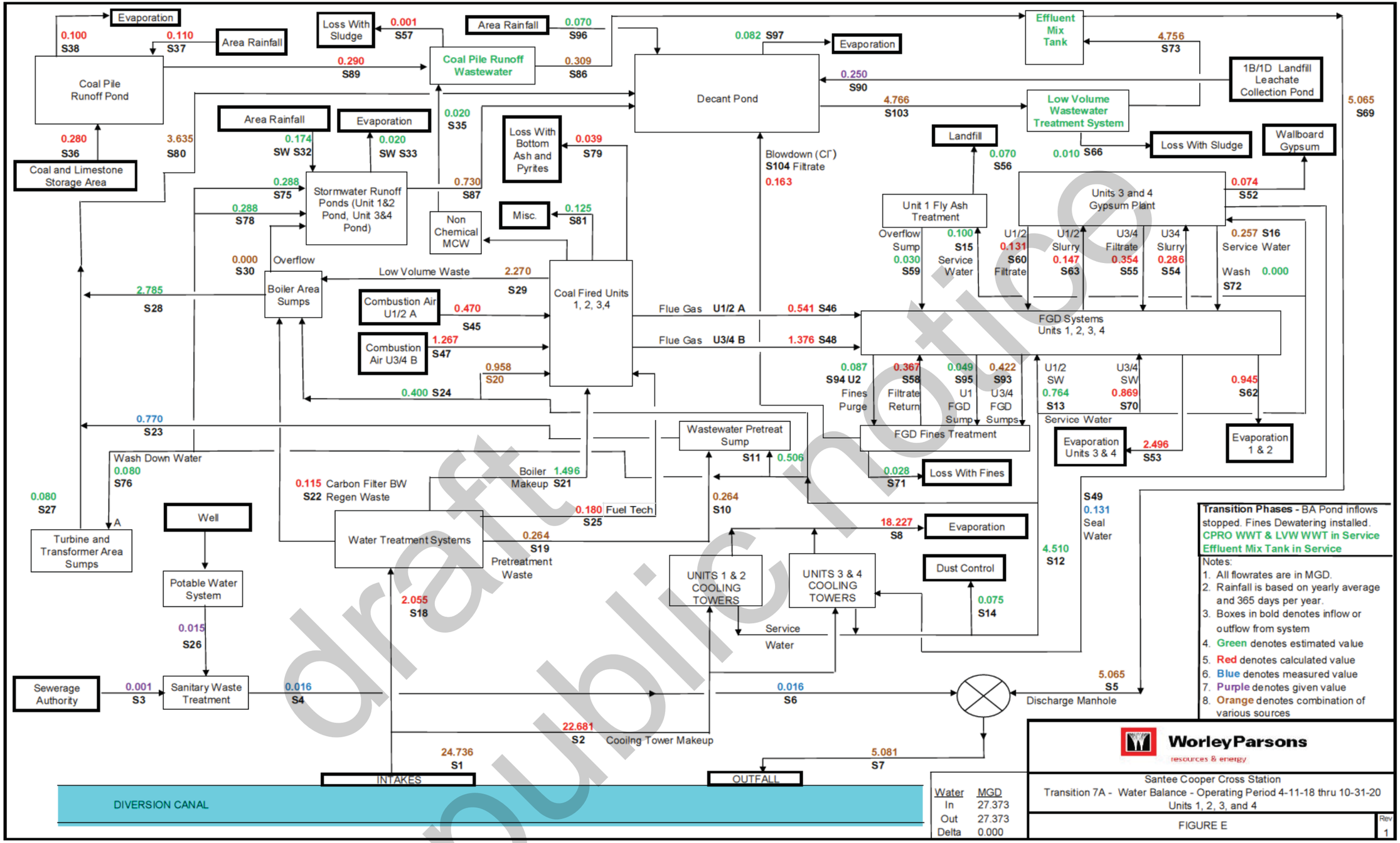
[1] Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter I, subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

TABLE E. 2,3,7,8 TETRACHLORODIBENZO P DIOXIN (2,3,7,8 TCDD) (40 CFR 122.21(g)(7)(viii))

Pollutant	TCDD Congeners Used or Manufactured	Presence or Absence (check one)		Results of Screening Procedure
		Believed Present	Believed Absent	
2,3,7,8-TCDD	☐	☐	☑	< 10 pg/L

ATTACHMENTS

A. WATER BALANCE DIAGRAM



B. WASTEWATER CODES AND ELG CATEGORIES

Cross Generating Station Water Balance - Wastewater Categories

Code	Water Balance Description (Transition 7A Figure E)	40 CFR 423 Def	Comments	Outfall Notes
S1	Diversion Canal Intake	-	Water Supply	
S2	Cooling Tower Makeup	-	Water Supply	
S3	Sewage Authority	n/a	Untreated Sanitary Wastewater	
S4	Sanitary Waste	n/a	Treated Sanitary Wastewater	
S5	Effluent Mix Wastewater Discharge to Common Manhole	Low Volume Waste, Stormwater, Coal Pile Runoff, Non Chemical Metal Cleaning Wastewater, Cooling Tower Blowdown, FGD Blowdown, Legacy Wastewater	Treated combined wastewater	Outfall 002
S6	Sanitary Waste	n/a	Treated Sanitary Wastewater	Outfall 005
S7	Common Manhold Discharge to Diversion Canal	Combined Sanitary and Industrial Wastewater (Low Volume Waste, Stormwater, Coal Pile Runoff, Non Chemical Metal Cleaning Wastewater, Cooling Tower Blowdown, FGD Blowdown, Legacy Wastewater)	Combined Sanitary and Industrial Wastewater	
S8	Cooling Tower Evaporation		Loss	
S9	**U2/3 Cooling Tower Discharge NPDES 003,004 - (U1/2 NPDES 001 Discontinued)**	**Cooling Tower Blowdown**	**Cooling Tower Blowdown**	**Outfall 001, 003, 004**
S10	Water Treatment Systems Pretreatment Wastewater to Wastewater Sump	Low Volume Waste	Pretreatement Wastewater	
S11	Cooling Tower Out to Wastewater Pretreatment Sump (to Decant Pond)	Low Volume Waste	Wastewater	
S12	U1/2 and U3/4 Cooling Tower Out for Service Water		Reuse	
S13	U1/2 Cooling Tower Out Service Water for FGD Systems		Reuse	
S14	Cooling Tower Out Services Water for Dust Control		Reuse - water trucks	
S15	Cooling Tower Out Service Water for Unit 1 Fly Ash Treatement (fixation of Fly Ash if being landfilled)		Reuse	
S16	Cooling Tower Out Service Water for Units 3 and 4 Gypsump Plant		Reuse	
S17	DISCONTINUED - pH Trim Facility Wastewater to Wastewater Pretreatment Sump		DISCONTINUED	
S18	Intake to Water Treatment		Water Supply	
S19	Water Treatment Systems Pretreatment Wastewater to Wastewater Sump	Low Volume Waste	Pretreatement Wastewater	
S20	Cooling Tower Out Service Water to Coal Fired Units	Low Volume Waste	Reuse, Cooling Tower Blowdown	
S21	Boiler Makeup Water	-	Water Supply	
S22	Carbon Filter Boiler Makeup Water Regen Waste from Water Treatment Systems to Boiler Area Sumps	Low Volume Waste	Low Volume Waste	
S23	Wastewater Pretreatment Sump to Decant Pond	Low Volume Waste	Wastewater	
S24	Cooling Tower Out Service Water to Boiler Area Sumps	Low Volume Waste	Reuse, Cooling Tower Blowdown	
S25	Water Treatment System Supply Water to Fuel Tech for Coal Fired Units (infrequent)		Water Supply	
S26	Potable Water System (Well)		Water Supply	
S27	Turbine and Transformer Area Sumps to Decant Pond	Low Volume Wastewater	Wastewater	
S28	Boiler Area Sumps to Decant Pond	Low Volume Waste	Wastewater	
S29	Coal Fired Units Boiler Blowdown	Low Volume Waste	Boiler Blowdown	
S30	Boiler Area Sump Overflow to Stormwater Ponds	Low Volume Waste	Wastewater	
S31	DISCONTINUED - Turbine and Transformer Area Sumps to Bottom Ash Pond		DISCONTINUED	
S32	Rainfall into Stormwater Ponds U1/2 and U3/4		Rainfall to Pond	
S33	Evaporation out of Stormwater Ponds U1/2 and U3/4		Evaporation	
S34	DISCONTINUED - Stormwater Runoff Ponds to Bottom Ash Pond		DISCONTINUED	

Code	Water Balance Description (Transition 7A Figure E)	40 CFR 423 Def	Comments	Outfall Notes
S35	NonChemical Metal Cleaning Waste from Coal Fired Units to Coal Pile Runoff Wastewater Treatment System	Non Chemical Metal Cleaning Waste	Non Chemical Metal Cleaning Waste	
S36	Coal and Limestone Storage Area	Coal Pile Runoff	Untreated Coal Pile Runoff Wastewater and Vehicle Wash Rack	
S37	Rainfall into Coal Pile Runoff Pond	Becomes Coal Pile Runoff	Rainfall to Pond	
S38	Evaporation out of Coal Pile Runoff Pond		Evaporation	
S39	DISCONTINUED - Coal Pile Runoff Pond to Bottom Ash Pond		DISCONTINUED	
S40	DISCONTINUED - Landfill Leachate Collection Pond to Bottom Ash Pond		DISCONTINUED	
S41	DISCONTINUED - Decant Pond Ash Out to Makeup and Treatment Discharge		DISCONTINUED	
S42	DISCONTINUED - Decant Pond to pH Trim System		DISCONTINUED	
S43	DISCONTINUED - Decant Pond Ash Sluce and Seal Water Makeup to Coal Fired Units		DISCONTINUED	
S44	DISCONTINUED - Coal Fired Units Ash Sluice and seal Water Return to Bottom Ash Pond		DISCONTINUED	
S45	Coal Fired Units U1/2 Combustion Air into Boiler	-	Water in ambient air	
S46	U1/2 Flue Gas to Flue Gas Desulfurization (FGD) System	-	Water in Flue Gas	
S47	Coal Fired Units U3/4 Combustion Air into Boiler	-	Water in ambient air	
S48	U3/4 Flue Gas to Flue Gas Desulfurization (FGD) System	-	Water in Flue Gas	
S49	DISCONTINUED - U3/4 Gypsum Plant Seal Water Sump to U3/4 Cooling Towers		DISCONTINUED	
S50	DISCONTINUED - U3/4 Gypsum Plant Filtrate to Bottom Ash Pond		DISCONTINUED	
S51	DISCONTINUED - U3/4 FGD Sumps to Bottom Ash Pond		DISCONTINUED	
S52	Loss to Wallboard Gypsum		Water contained in gypsum	
S53	FGD Systems Unit 3/4 Loss to Evaporation		Water Loss to Evaporation	
S54	U3/4 FGD Slurry to Gypsum Plant	(Low Volume Waste)	Internal Process Stream	
S55	U3/4 Gypsum Plant Filtrate Service Water to FGD System	(Low Volume Waste)	Internal Process Stream	
S56	U1 Fly Ash Treatment to Landfill	n/a	Water Contained in Landfilled Solid Residuals	
S57	Coal Pile Runoff Wastewater Treatment Sludge	n/a	Water Contained in Landfilled Solid Residuals	
S58	FGD Fines Treatment Filtrate Return to FGD System	(Low Volume Waste)	Internal Process Stream	
S59	U1 Fly Ash Treatment Overflow to Sump to FGD System (see S15)	(Low Volume Waste)	Internal Process Stream, S15 overflow or local rainfall	
S60	U1/2 Gypsum Plant Filtrate to FGD System	(Low Volume Waste)	Internal Process Stream	
S61	DISCONTINUED - FGD U1 Sump to Bottom Ash Pond		DISCONTINUED	
S62	FGD Systems Unit 1/2 Loss to Evaporation		Water Loss to Evaporation	
S63	U1/2 FGD Slurry to Gypsum Plant	(Low Volume Waste)	Internal Process	
S64	REPLACED - Decant Pond Rainfall (see S96)		REPLACED	
S65	REPLACED - Decant Pond Evaporation (see S97)		REPLACED	
S66	Loss to Low Volume Wastewater Treatement System Sludge	n/a	Water Contained in Landfilled Sludge	
S67	**NOT SHOWN - Bottom Ash Pond Evaporation**		**Bottom Ash Pond Closed to New Inflows However continues to be a source of legacy wastewater**	
S68	**NOT SHOWN - Bottom Ash Pond Rainfall**		**Bottom Ash Pond Closed to New Inflows However continues to be a source of legacy wastewater**	
S69	Effluent Mix Wastewater Discharge to Common Manhole (same as S5)	Low Volume Waste, Stormwater, Coal Pile Runoff, Non Chemical Metal Cleaning Wastewater, Cooling Tower Blowdown, FGD Blowdown, Legacy Wastewater	Combined Industrial Wastewater	Outfall 002
S70	U3/4 Cooling Tower Out Service Water for FGD Systems		Reuse	
S71	FGD Fines Solids Loss	n/a	Water Contained in Landfilled Solid Residuals	
S72	Gypsum Plant Wash Water to FGD Systems		Internal Process Stream	
S73	Low Volume Wastewater Treatement System	Low Volume Waste	Treated Low Volume Wastewater	Outfall 002

Code	Water Balance Description (Transition 7A Figure E)	40 CFR 423 Def	Comments	Outfall Notes
S74	REPLACED - Cooling Tower Service Water Wash Down Water to U1/2 Stormwater Pond (See S78)		REPLACED	
S75	Cooling Tower Service Water Wash Down Water to U3/4 Stormwater Pond	(Low Volume Waste)	Reuse	
S76	Cooling Tower Out Service Water for Wash Down Water to Turbine and Transformer Area Sumps	(Low Volume Waste)	Reuse	
S77	DISCONTINUED - U3/4 Gypsum Plant Blowdown (Cl-)Filtrate to Bottom Ash Pond		DISCONTINUED	
S78	Cooling Tower Service Water Wash Down Water to U1/2 Stormwater Pond	(Low Volume Waste)	Reuse	
S79	Bottom Ash and Pyrites Loss	-	Water contained in Bottom Ash and Pyrites (Loss)	
S80	Boiler Area and Turbine/Transformer Area Sumps to Decant Pond	Low Volume Waste	Low Volume Waste	
S81	Coal Fired Units Miscellaneous Losses	-	Loss	
S82	DISCONTINUED - Temporary		DISCONTINUED	
S83	DISCONTINUED - Temporary		DISCONTINUED	
S84	DISCONTINUED - Temporary		DISCONTINUED	
S85	DISCONTINUED - Temporary		DISCONTINUED	
S86	Coal Pile Runoff Wastewater	Coal Pile Runoff	Treated Coal Pile Runoff Wastewater	Outfall 002
S87	Stormwater Runoff Ponds to Decant Pond	Low Volume Waste/Stormwater	Wastewater and Stormwater	
S88	NONE			
S89	Coal Pile Runoff Pond	Coal Pile Runoff	Untreated Coal Pile Runoff Wastewater	
S90	Landfill Leachate to Decant Pond	Landfill Leachate	Landfill Leachate	
S91	HOLD - Future Possible Transition for Landfill Leachate		HOLD	
S92	HOLD - Future Possible Transition for FGD Wastewater Treatment		HOLD	
S93	U3/4 FGD Sump to FGD Fines Treatment	(Becomes FGD Wastewater)	Internal Process Stream	
S94	FGD Systems Fines Purge to FGD Fines Treatment	(Becomes FGD Wastewater)	Internal Process Stream	
S95	U1 FGD Sump to FGD Fines Treatment	(Becomes FGD Wastewater)	Internal Process Stream	
S96	Rainfall Into Decant Pond	-	Rainfall to Pond	
S97	Decant Pond Evaporation		Loss to Evaporation	
S98	DISCONTINUED - Temporary		DISCONTINUED	
S99	HOLD - Future Possible Transition for Gypsm Plant Filtrate to FGD Wastewater Treatment System		HOLD	
S100	HOLD - Future Transition for FGD Wastewater Treament Loss with Sludge		HOLD	
S101	HOLD		HOLD	
S102	HOLD		HOLD	
S103	Decant Pond	Low Volume Waste	Combined Untreated Low Volume Waste	
S104	FGD Fines Treatment Blowdown to Decant Pond	FGD Wastewater	FGD Fines Treatment Wastewater (new internal outfall)	Outfall 002A (new FGD ELGs)

Last Revised 1/25/2021

C. INTERMITTENT FLOW DESCRIPTION

Discharge durations and flows from Outfall 002, 003, 004 are depending on system load and meteorological conditions. Included in section 4.2 are the estimated average long-term flows for CPRO, LVW, and FGD wastewater streams. The maximum flow capacity for the CPRO Wastewater Treatment System is 500 gpm (0.7 MGD) and LVW Wastewater Treatment System is 6,000 gpm (8.6 MGD). In addition, Outfall 003 and 004 are permitted outfalls with the ability to directly discharge to the Diversion Canal, this is highly unusual, and they generally blow down to the Decant Pond when needed.

D. MIXING ZONE REQUEST

D H E C

PROMOTE PROTECT PROSPER

South Carolina Department of Health and Environmental Control

NPDES APPLICATION SUPPLEMENT

Mixing Zone Request for Surface Water Discharges

NPDES #: SC0037401

Facility Name: SCPSA - Cross Generating Station (Outfall 002)

County: Berkeley

Are you requesting a mixing zone for whole effluent toxicity (WET) in accordance with the back of this form?

☐ **No**. No further information is needed. Submit this form. If WET testing is required, a chronic test at 100% will be required, unless the IWC is at least 80%. Proposed IWC _____ %

☐ **Yes**. Check one of the boxes below and submit this form with the appropriate information.

☐ Check this block if you are proposing to perform or have performed a mixing zone demonstration to determine the appropriate zone of initial dilution (ZID) and/or mixing zone size. Complete the remainder of this form and submit a mixing zone demonstration plan as described on the back of this form. The Department recommends the demonstration plan be approved prior to implementation of any demonstration work.

☒ Check this block if you are requesting a mixing zone by providing limited information such as a mixing model like CORMIX to determine mixing in accordance with suggested zone of initial dilution (ZID) and/or mixing zone sizes. Complete the remainder of this form, as applicable, and submit the CORMIX Supplement and modeling results (or other model assumptions, inputs and results).

What is the proposed ZID size (in meters)? Length: NA m Width: NA m

What is the proposed acute WET test concentration? NA %

What is the proposed mixing zone size (in meters)? Length: 61 m Width: 112 m

What is the proposed chronic WET test concentration? 1.2 %

Printed Name: John K. Durkee, P.E. **Firm:** Water Environment Consultants, LLC

Signature: _____ **Date:** January 12, 2021

E. CORMIX MIXING ZONE ANALYSIS

CORMIX Mixing Zone Analysis

Cross Generating Station, Berkeley County, South Carolina

Prepared for:

Santee Cooper
NPDES Permit # SC0037401
Berkeley County, South Carolina

January 8, 2021

Prepared by:

Water Environment Consultants
Mount Pleasant, South Carolina

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Executive Summary

Water Environment Consultants (WEC) prepared this report for Santee Cooper and the South Carolina Department of Health and Environmental Control (SCDHEC) to support future NPDES permit (#SC0037401) limitations for the Cross Generating Station (Cross Station) located in Berkeley County, South Carolina. In 2018, Santee Cooper installed a submerged, multiport diffuser; however, the whole effluent toxicity (WET) test limits in the NPDES permit are based on a model analysis of the old outfall structure.

This report summarizes a mixing zone analysis using the CORMIX (Version 11.0) model software to simulate the effluent's mixing with the ambient flow of the Diversion Canal where it is discharged. Based on construction of the new diffuser, the results of this analysis support inclusion of new WET test concentrations in the upcoming reissued NPDES permit.

To analyze the effluent plume, WEC set up the CORMIX model using the best available cross-sectional surveys and diffuser drawings to represent the existing outfall configuration under the most conservative conditions. These conservative conditions include use of the worst-case, 7Q10 ambient flow, a maximum (four-unit operation) long-term daily average discharge flow, and a predicted maximum temperature difference (delta) between effluent and ambient. With all model inputs the same, a sensitivity analysis on the effluent temperature variable was conducted to test effects on plume size and diluted concentration. The sensitivity analysis included temperature differences between effluent and ambient ranging from zero to 10 degrees Celsius, and the difference in chronic WET concentration was only 0.12%. This analysis used the maximum temperature delta as the final model input.

SCDHEC provides guidance on the recommended boundaries for acute and chronic mixing zones as follows:

Acute Dimensions	Chronic Dimensions
Width: 1/10 of river width	Width: 1/2 of river width
Length: 1/3 of river width	Length: Twice river width

SCDHEC also does not require an acute WET limitation if the effluent diffuser is designed to provide an exit velocity of 10 feet per second (ft/s), as is the case at the Cross Station. Therefore, the chronic WET test concentration is based on the modeled instream waste concentration of the plume centerline at the more restrictive of the associated boundary listed above.

Results from this analysis indicate the chronic test concentration is 1.2%, determined by the width dimension of the mixing zone. The plume size at this boundary limit is 112 meters long by 61 meters wide.

1 Introduction

Water Environment Consultants (WEC) prepared this report for Santee Cooper and the South Carolina Department of Health and Environmental Control (SCDHEC) to support future NPDES permit (SC0037401) limitations for the Cross Generating Station (Cross Station).

Santee Cooper operates the Cross Station, a steam-electric generating facility located between Lake Marion and Lake Moultrie in Berkeley County, South Carolina, and under the aforementioned NPDES permit, discharges wastewater into the Diversion Canal between the two lakes (Figure 1-1).

Over the past several years, Cross Station has undergone upgrades to the plant operations including modifications to the wastewater treatment processes, changes of the effluent characteristics, and installation of a discharge diffuser. Previously, the majority of the plant wastewater, which includes coal pile runoff, cooling tower blowdown and plant wastewater, was sent to a bottom ash pond for clarification and equalization prior to recycle and/or discharge. During the previous NPDES permit renewal, the combined wastewater was discharged collectively through a single discharge pipe to the Diversion Canal.

More recently, Cross Station has phased out use of their bottom ash pond in accordance with federal regulations. Coal pile runoff and the remaining wastewater will be routed to separate treatment systems then combined in an effluent mix tank prior to discharge through a new, (installed in 2018) multiport, effluent diffuser.

This report deals exclusively with the whole effluent toxicity (WET) of the wastewater discharge and its mixing within the Diversion Canal. WEC completed this CORMIX modeling study to simulate the mixing of the Cross Station effluent through the multiport diffuser in the receiving stream to determine the downstream dilution under conservation conditions. Where the WET test limits in Cross Station's existing NPDES permit are based on the previous, submerged pipe outfall, the modeled instream dilution presented in this report support a request for SCDHEC's inclusion of improved WET limits in the upcoming reissued NPDES permit.

The report is divided into the following subsections:

- Section 2, Ambient and Outfall Conditions – discusses the basis for the model inputs including channel geometry, outfall configuration, and the ambient flow and temperature
- Section 3, CORMIX Modeling – details the regulatory mixing zone boundaries, summarizes the CORMIX model inputs and explains the results of the mixing zone analysis
- Section 4, Conclusions – presents the study conclusions of the CORMIX modeling and the recommended WET permit limits

Figure 1-1. Site Location Map

2 Ambient and Outfall Conditions

The following sections describe the methodology and rationale for determining the CORMIX input variables. Included below are discussions of developing the modeled channel geometry, outfall configuration, ambient flow rate, and ambient water temperature.

2.1 Channel Geometry

Cross Station discharges into a man-made diversion canal connecting Lake Marion and Lake Moultrie (refer to Figure 1-1). Santee Cooper maintains the canal as a navigation channel and provided WEC with the last bathymetric surveys, completed by Parker Land Surveying, LLC, on October 3, 2016. Evident in the survey profiles, the diversion canal is a fairly uniform, trapezoidal channel. The surveys included eight transects near and downstream of the discharge as shown in Figure 2-1. Figure 2-2 plots the channel profiles including a representative profile which WEC developed by averaging the eight survey transects. Note that the previous outfall pipe is also shown on Figure 2-2. Elevation in these figures are relative to the North American Vertical Datum of 1988 (NAVD88).

A water level of 74 feet NAVD88 was determined to be a conservative benchmark based on historical water elevation ranges in the lake and canal. Based on the average profile, the bottom elevation is 43.5 feet NAVD88. The maximum depth under these conditions is 30.5 feet, and the average width of the canal is 400 feet.

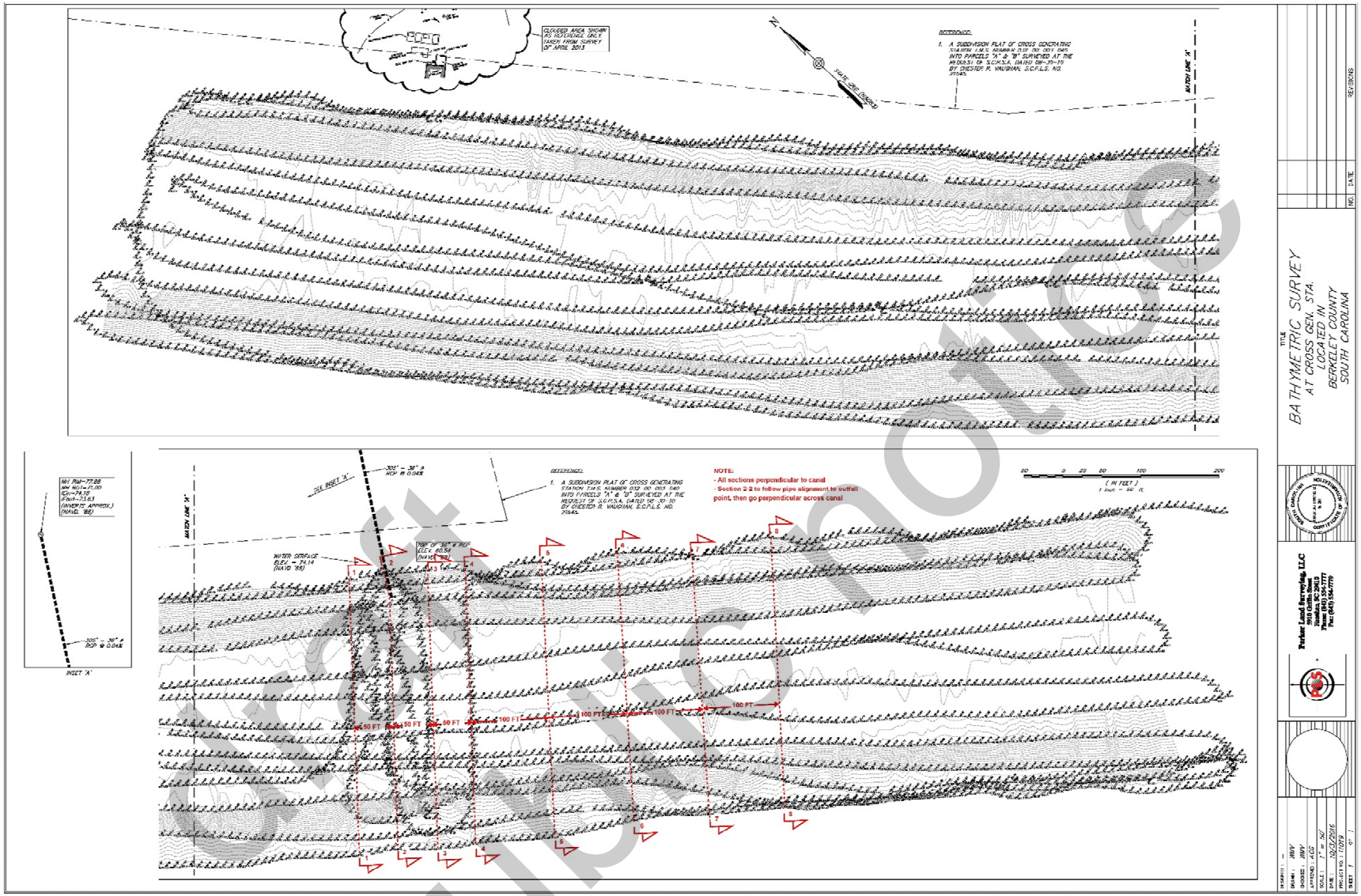

Figure 2-1. Location of bathymetric survey transects

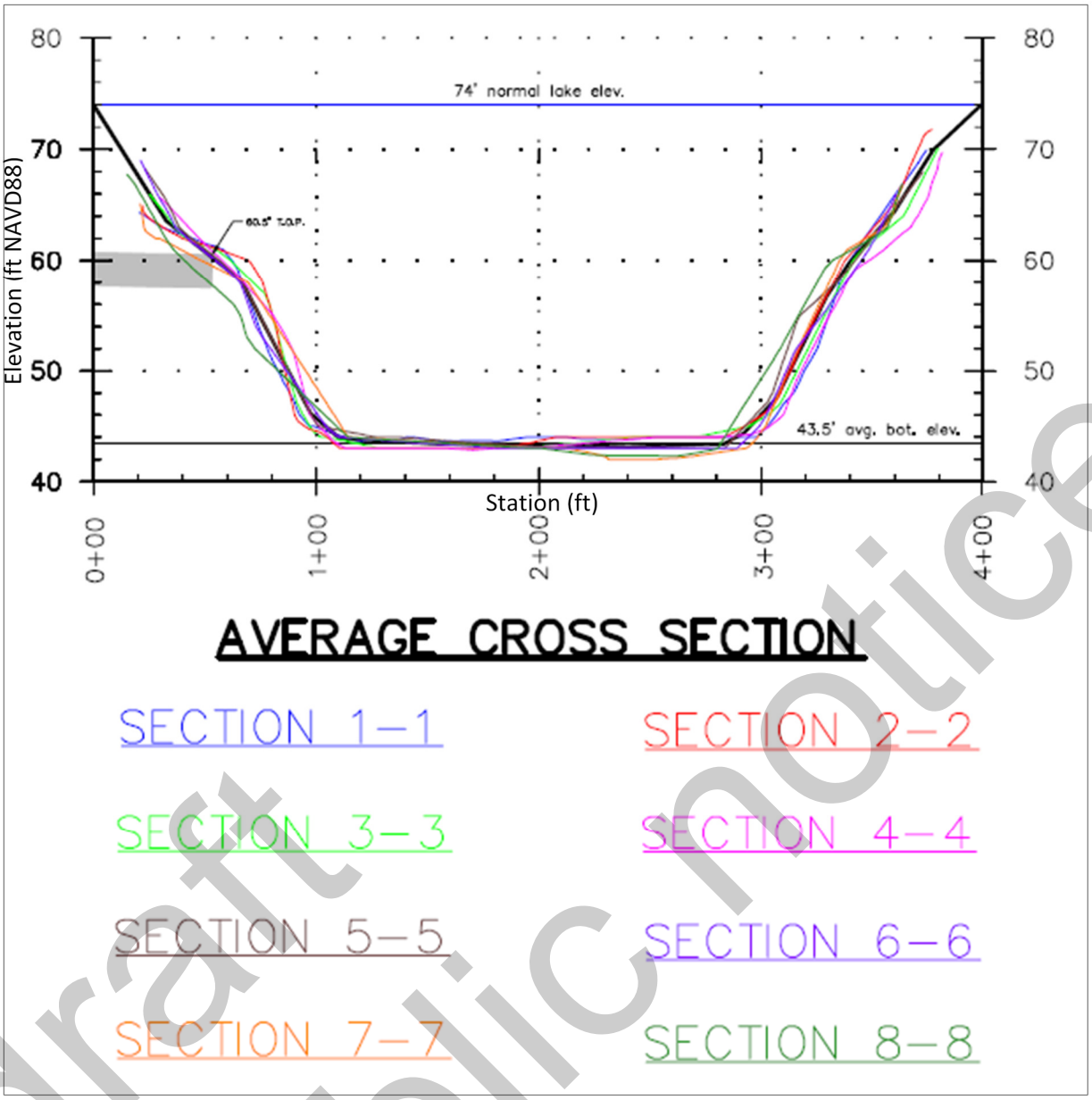

Figure 2-2. Survey and average profile of Diversion Canal (looking downstream)

2.2 Outfall Configuration

The Cross Station effluent discharged through a submerged pipe until 2018, when Santee Cooper installed a submerged, multi-port diffuser that was attached to the end of the old outfall structure. Figures 2-3 through 2-4 include permit drawings of the diffuser structure.

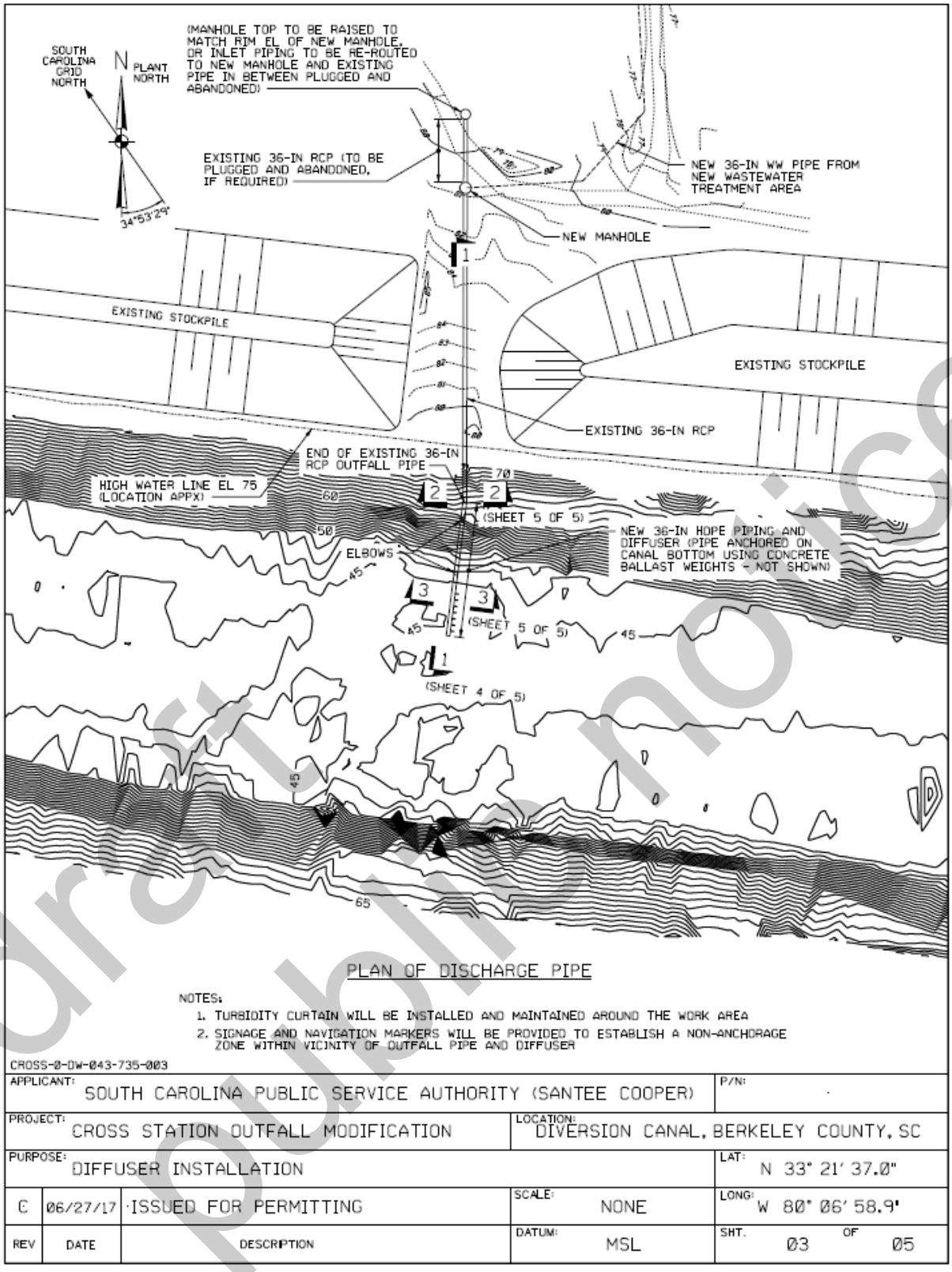

Figure 2-3. Plan view of new outfall diffuser

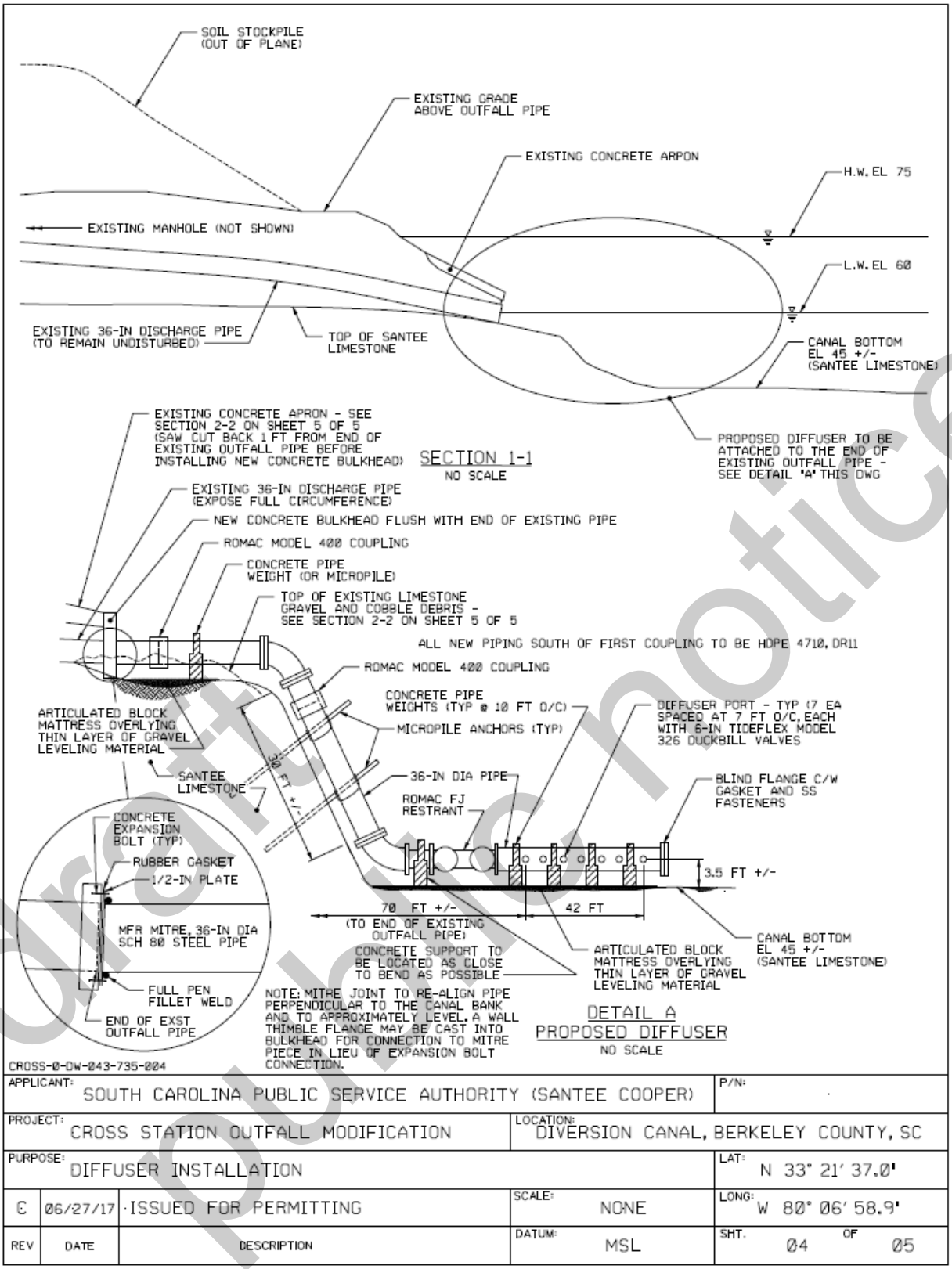

Figure 2-4. Profile view of new outfall diffuser (looking downstream)

The new outfall structure consists of seven diffuser ports each spaced seven feet apart, on center. Each diffuser port is fitted with a 6-inch Tideflex duckbill valve, Model 326. The outfall pipe is oriented perpendicular to the diversion channel. The pipe is anchored to the bottom by concrete supports, so that the diffusers are approximately 3.5 feet above the channel bottom. The ports are positioned perpendicular from the pipe, parallel and co-flowing with the ambient current.

2.3 Ambient Flow Rate

This CORMIX mixing zone analysis uses the statistical 7Q10 (the lowest seven-day average flow expected with a 10-year frequency) flow rate to define the ambient flow conditions. In a report submitted to SCDHEC dated February 28, 2017, WEC reviewed historical USGS gage data and proposed a 7Q10 flow rate for the diversion canal (WEC 2017). Following review and discussion with SCDHEC, the 7Q10 value was calculated to be 2,360 cubic feet per second (cfs) (Matsuzuru 2017).

2.4 Ambient Temperature

For this WET modeling application, the ambient river temperature is less important than the ambient and discharge flows. More impactful to the mixing results is the temperature difference (delta) between the effluent and ambient temperatures than the specific values themselves. For freshwaters, CORMIX calculates the ambient and effluent densities based on their temperature, and this difference in densities drives plume buoyancy and mixing of the plume with the ambient flow. Highly buoyant plumes, especially those with limited initial/jet mixing, "float" to the water surface allowing less opportunity to mix within the water column.

Nonetheless, as a starting point, WEC selected an ambient temperature of 8.4°C. This value represents the lowest, measured temperature collected by GEL Engineering during the winter months of 2010. Santee Cooper provided WEC with measured water temperature data at the intake structure between 2008 and 2020. The 8.4°C matches closely with the 95th-percentile coldest value (8.0°C)

3 CORMIX Modeling

The following sections discuss an application of the CORMIX (Version 11.0) software system, the model inputs, and the results of this analysis. CORMIX is used for the analysis, prediction, and design of aqueous toxic or conventional pollutant discharges into diverse water bodies. The major emphasis of the model is on the geometry and dilution characteristics of the initial mixing zone, but the system also predicts the behavior of the discharge plume at distances further downstream. The purpose of this model study is to simulate the mixing of the Cross Station effluent through the recently constructed multiport diffuser into the Diversion Canal. From the model predictions, the downstream dilution is determined under conservation conditions. This instream dilution is used to determine the NPDES permit limitations for WET. The model results and this report support requesting that the reissued NPDES permit replace the current limits based on the previous single-port outfall with the new WET test limits.

3.1 SCDHEC Recommend Mixing Zone Boundaries

State regulation specifies that the size of instream mixing zones must be "minimized" in order to obtain Department approval. SCDHEC provides guidance on the recommended boundaries for acute (or criterion maximum concertation [CMC] or zone of initial dilution [ZID]) and chronic (or criterion continuous concentration [CCC]) mixing zone boundaries as follows:

Acute Dimensions	Chronic Dimensions
Width: 1/10 of river width	Width: 1/2 of river width
Length: 1/3 of river width	Length: Twice river width

SCDHEC also does not require acute WET limitations if the effluent diffuser is designed to provide an exit velocity of 10 ft/s, as the case at the Cross Station. Therefore, the WET chronic test concentration is based on the modeled instream waste concentration of the plume centerline at the more restrictive of the associated chronic width or length boundary listed above.

The river width used to determine the mixing zone boundaries is 400 feet (refer to Figure 3-1). Table 3-1 summarizes the mixing zone dimensions for determining the WET test concentrations.

Table 3-1. Applicable WET test mixing zone dimensions

WET Test Mixing Zone Dimensions		
	Acute	Chronic
Width	N/A[1]	200 ft (61 m)
Length	N/A[1]	800 ft (244 m)

[1] *exit velocity exceeds 10 ft/s*

3.2 Model Inputs

The CORMIX model uses a rectangular, cross-sectional profile or model "box" to represent the actual channel geometry. Using the average profile derived from the bathymetry data in the Diversion Canal (as described above), WEC determined the cross-sectional area of the channel then "best-fit" the model

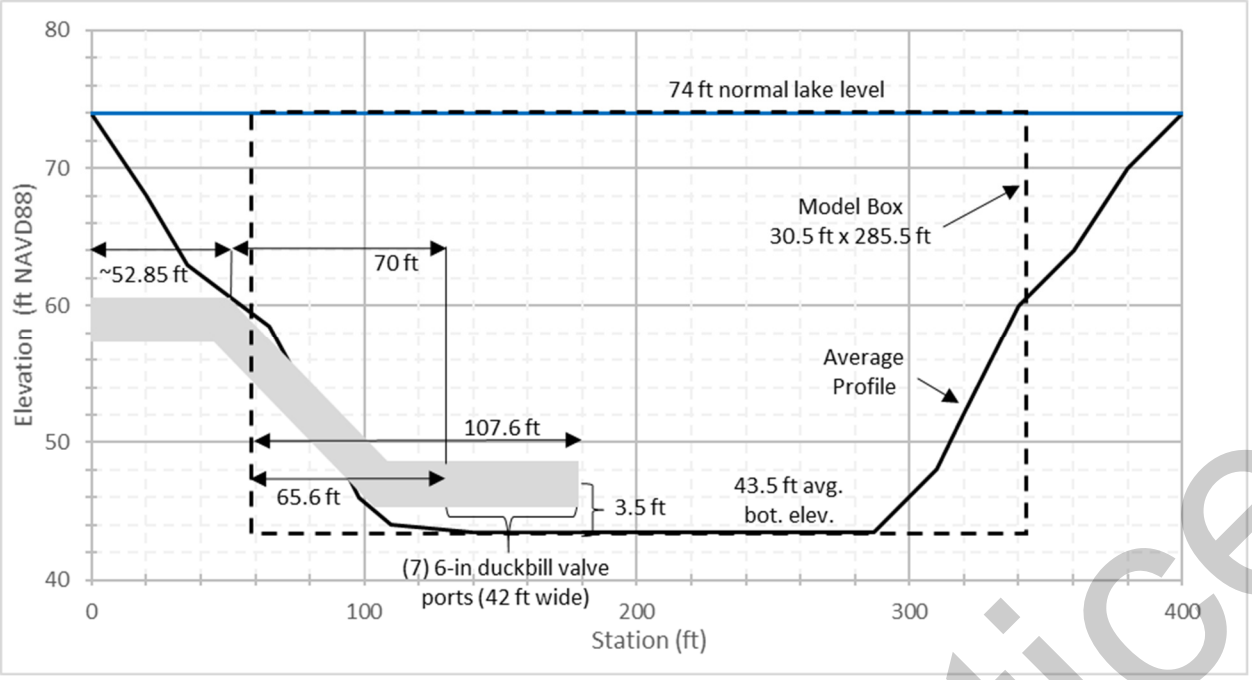

Figure 3-1. Representative average profile and CORMIX model box – looking downstream

box within the average profile. Figure 3-1 illustrates the average profile and the location of the model box utilized by CORMIX. The representative model box channel geometry width was 285.5 feet, and the average depth was 30.5 feet, equating to a cross-sectional area of 8,710 ft^2.

Also included in Figure 3-1 are the dimensions of the diffuser location in relation to the channel profile and model box. WEC used the permitted drawings of the diffuser (Figures 2-3 and 2-4) and the bathymetric surveys (Figures 2-1 and 2-2) to position the diffuser within the model channel cross section. The surveyed top-of-pipe elevation of the previous outfall was 60.5 ft NAVD, which is station 52.85 on the average cross section. The first and last ports are 70 ft and 112 ft from the end of the existing pipe, or 65.6 ft and 107.6 ft from the left edge of the model box, respectively.

Each of the seven diffuser ports are fitted with 6-inch Tideflex, Model 326, duckbill valves manufactured by Red Valve. The outfall pipe is oriented perpendicular to the channel, and each diffuser faces downstream, parallel to the channel bottom. Based on Tideflex's analysis of flow rate versus the valve opening (Figure 3-2), the nominal diameter used in this CORMIX model is 4.5 inches.

Typically, the long-term daily average discharge flow rate is used to model instream mixing zones for NPDES permit limitations. Worley Parsons calculated the long term daily average flow rate at the Cross Station to be 5.08 million gallons per day (MGD) and provided this data to WEC (Weist 2017). Santee Cooper has also confirmed that this value is a reasonable estimate of the average discharge flow during the next five-year permit term.

As mentioned above, more important than effluent temperature value is the temperature difference (delta) between the effluent and ambient. Since completing the most recent modifications to the plant

WIDE BILL TIDEFLEX DIFFUSER (TFW) SYSTEM DATA ANALYSIS

MEDIA:		Effluent	
	Density or Spec. Gravity		lb/ft^3
		1	

DATE:	03-Mar-2017		
CLIENT:	Santee Cooper		
CONTACT:			
ENGINEER:	Water Environment Conultants		
CONTACT:	John K. Durkee, P.E.		
PROJECT:	Cross Station Outfall Diffuser		
REP:			
CONTACT:			

FLOW RANGE:

4.2	MGD =	2916.6	gpm
5.1	MGD =	3541.6	gpm
7	MGD =	4861.1	gpm
8	MGD =	5555.5	gpm
10	MGD =	6944.4	gpm

AVAILABLE HEADLOSS@ DIFFUSER:	Minimum		feet
	Design		feet
	Maximum		feet
MAX. BACKPRESSURE:			feet

THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION OF TIDEFLEX TECHNOLOGIES. IT IS LOANED BY TIDEFLEX TECHNOLOGIES, SUBJECT TO THE CONDITIONS THAT IT AND THE INFORMATION EMBODIED THEREIN SHALL BE USED ONLY FOR RECORD AND REFERENCE PURPOSES. IT SHALL NOT BE USED OR CAUSED TO BE USED IN ANY WAY PREJUDICIAL TO THE INTERESTS OF TIDEFLEX TECHNOLOGIES, IT SHALL NOT BE REPRODUCED OR COPIED IN WHOLE OR IN PART, OR DISCLOSED TO ANYONE WITHOUT THE DIRECT WRITTEN PERMISSION OF TIDEFLEX TECHNOLOGIES, AND SHALL BE RETURNED UPON REQUEST.

* TFW SIZE (IN)	* HYDRAULIC CODE
6	326

* Wide Bill Tideflex Diffuser

PER WIDE BILL TIDEFLEX DIFFUSER

* TOTAL QUANTITY	TOTAL FLOW (gpm)	FLOW (gpm)	JET VELOCITY (fps)	HEADLOSS (feet)	EFFECTIVE DIAMETER (in)
	2916.6	416.7	9.1	1.3	4.3
	3541.6	505.9	10.1	1.6	4.5
7	4861.1	694.4	11.9	2.2	4.9
	5555.5	793.6	12.7	2.5	5.0
	6944.4	992.1	14.3	3.2	5.3

Figure 3-2. Effective port diameter of each 6-inch Tideflex Model 326 duckbill valve

operations and treatment processes (July 2020), measured effluent temperature data is scarce and does not exist for winter months, when the temperature delta is expected greatest. In the new treatment process, heated wastewater can remain in the Detention Pond for as much as five days, though the residence time is closer to one half to two days during typical to high flow days.

Santee Cooper collected ambient (at the intake) and Detention Pond effluent temperatures between October 21, 2020, and November 2, 2020, and found the maximum temperature difference to be 1°C. However, the ambient temperatures were comparatively warm and only one of the four operating units was running. These conditions were not ideal as they do not represent a conservative assessment of the plant operations, where residence time is low and plant production (i.e., heated wastewater generation) is high. Instead, WEC ran a series of model sensitivity tests by incrementally increasing the modeled temperature delta, using the 8.4°C ambient as a base. The results of the sensitivity analysis are discussed in the following report section.

The final mixing zone analysis used an effluent temperature of 18.4°C (a 10°C delta), which is considerably higher than the 1°C measured temperature difference, acknowledging the limited data samples and plant production. Note, this effluent temperature value is higher than the maximum measured (by GEL 2010) temperature (15.6°C) during the 2010 winter months.

The delta-10°C case is slightly larger than the 7.2°C temperature delta that corresponds to the winter-2010 sampled ambient and effluent water temperatures (8.4°C and 15.6°C, respectively). It is also more than the 7.6°C delta between the aforementioned effluent temperature and the 95th-percentile coldest ambient temperature, 8.0°C. The coldest recorded ambient temperature between 2008 and 2020 was 4.6°C, resulting in an 11°C temperature delta (using a 15.6°C effluent). However, the delta-10°C case is still expected to be a conservative value given retention time in the Detention Pond and real time heat loss to the atmosphere are not accounted for in this CORMIX study.

Table 3-2 summarizes the complete list of CORMIX model inputs.

Table 3-2. CORMIX model inputs

Input	Units	Input	Reference/Notes
Effluent			
Concentration	%	100	Starting concentration for toxicity models
Effluent Flow Rate	MGD	5.08	5.08 MGD average flow estimate from WorleyParsons; similar to 75th percentile of discharge flow data from 1/1/2019 – 8/31/2020; also a reasonable estimate of next five years
Effluent Temperature	°C	18.4	Conservative estimate resulting in a delta-T of 10°C; most conservative case based on weather temps and available effluent data of 15.6°C collected 1-20-10
Ambient			
Average Depth	ft	30.5	Based on 74' normal lake elevation and 43.5' average channel depth along plume length; previously 30'; Fig. 3-1
Depth at Discharge	ft	30.5	Roughly flat bottom; same as above
Wind Speed	m/s	2	Default value
Bounded Width	ft	285.5	Model box width; resulting area of model box, W*D, is same as cross-section profile area; Fig. 3-1
Appearance	-	uniform	Per previous models; man-made trapezoidal channel
Ambient Flow Rate	cfs	2,360	WEC report dated Feb 28, 2017, and following negotiations with SCDHEC via email (dated 1/19/2018)
Friction Factor	n-value	0.025	From previous models (Manning's n-value)
Ambient Temperature	°C	8.4	1-20-10 sampling (conservative based on winter weather temps)
Discharge – CORMIX 2 (multiport diffuser)			
Nearest Bank	-	left	As seen looking downstream
Diffuser Length	ft	42	Per Santee Cooper Final COE Drawing Cross-0-DW-043-735-004-RC.pdf (06/27/17); Fig. 2-4
Distance to First Port	ft	65.6	First port from model box edge (centered on channel centerline); Fig. 3-1

Input	Units	Input	Reference/Notes
Distance to Last Port	ft	107.6	First port station + diffuser length; Fig. 3-1
Port Height	ft	3.5	Per Santee Cooper Final COE Drawing Cross-0-DW-043-735-004-RC.pdf (06/27/17); Fig. 2-4
Port Diameter	ft	0.375	6-inch, 326-code duckbill (4.5" at 5.1 MGD); per Tideflex Technologies data analysis 3/3/17; Fig. 3-2
Contraction Ratio	-	1	Default value
Total No. of Openings	-	7	Per Santee Cooper Final COE Drawing Cross-0-DW-043-735-004-RC.pdf (06/27/17); Fig. 2-4
Gamma	degrees	90	Diffuser line to ambient direction (perpendicular); Per Santee Cooper Final COE Drawing Cross-0-DW-043-735-003-RC.pdf (06/27/17); Fig. 2-3
Theta	degrees	0	Port centerline above horizon. plane (horizontal); Per Santee Cooper Final COE Drawing Cross-0-DW-043-735-004-RC.pdf (06/27/17); Fig. 2-4
Sigma	degrees	0	Ambient direction to port centerline (co-flowing); Per Santee Cooper Final COE Drawing Cross-0-DW-043-735-003-RC.pdf (06/27/17); Fig. 2-3
Beta	degrees	90	Port centerline to diffuser line (unidirectional); Per Santee Cooper Final COE Drawing Cross-0-DW-043-735-003-RC.pdf (06/27/17); Fig. 2-3
Nozzle Direction	-	Same	Same direction; Per Santee Cooper Final COE Drawing Cross-0-DW-043-735-003-RC.pdf (06/27/17); Fig. 2-3
Mixing Zone			
Acute/ZID Length	ft	N/A	> 10 fps
Acute/ZID Width	ft	N/A	> 10 fps
Chronic MZ Length	ft	800	Twice the actual 400 ft river (not model) width; 244 m
Chronic MZ Width	ft	200	1/2 of the actual 400 ft river (not model) width; 61 m
Region of Interest	ft	4000	Must be >10 times the modeled channel width

3.3 CORMIX Results

Results from the sensitivity analysis on the discharge and ambient temperature difference are outlined in Table 3-3. The "concentration %" represents the plume centerline concentration at the more restrictive mixing zone boundary, either width or length. The results indicate that the temperature difference has a very minor effect on instream mixing because the diffuser ports quickly mix the effluent with the water column.

Below a temperature delta of 3°C, the more restrictive mixing zone boundary is the length dimension. The plume reaches 244 meters downstream before spreading to 61 meters wide. At and beyond the 3°C delta, the limiting dimension changes. The effluent plume "floats" and spreads to the width dimension (61 meters) more quickly and before reaching the length boundary. Evident in the table below, only 0.12% separate the chronic WET concentrations in the 0°C and 10°C sensitivity cases.

The delta-10°C case above represents the CORMIX mixing zone analysis for revised WET limits. The chronic test concentration is 1.23% at the more restrictive of the plume boundaries, i.e. the width. At this width, the plume is 111.9 meters in length. Because the effluent velocity is greater than 10 ft/s, an acute test concentration is not required. Appendix A includes the session and prediction files as well as graphical representations of the model results.

Table 3-3. CORMIX delta-T sensitivity analysis results

Delta (°C) (effluent – ambient)	Chronic Concentration %	Chronic mixing zone restrictive dimension	
		Width (m)	Length (m)
0	1.11	-	244
1	1.08	-	244
2	1.12	-	244
3	1.13	61	-
4	1.18	61	-
5	1.20	61	-
6	1.21	61	-
7	1.22	61	-
8	1.23	61	-
9	1.23	61	-
10	1.23	61	-

4 Conclusions

Santee Cooper recently modified the outfall structure at the Cross Generating Station by installing a submerged, multi-port diffuser in the Diversion Canal. This report summarizes a CORMIX mixing zone analysis to revise the NPDES permit limits for WET testing, which are currently based on the old, submerged pipe outfall. In addition, over the years, Santee Cooper has made significant modifications to the treatment processes, such as removing the bottom ash ponds and re-routing the coal pile runoff to a separate treatment facility.

Based on these changes to the Cross Station operations, facilities and discharge structure, WEC completed a mixing zone analysis using the CORMIX (Version 11.0) model to simulate mixing of the Cross Station effluent with the ambient flow in the Diversion Canal. Model inputs were based on channel cross-section surveys, 7Q10 flow rate, long term daily average discharge flow, and conservative assumptions for ambient and effluent temperature. The plume centerline concentration was checked against SCDHEC recommended mixing zone boundaries.

Results from the CORMIX model indicate the chronic WET test limits with the multiport diffuser should be 1.2%. For the chronic test scenario, the width boundary is the more restrictive dimension with a plume length of 112 m and a plume width of 61 m. Because the effluent velocity through the ports is greater than 10 ft/s acute WET limits are not required. This report and the results within support a request to update the chronic WET limits in the reissued NPDES permit.

5 References

Matsuzuru, Yoichi. "RE: The water mass balance analysis at Lake Moultrie." Message to Matt Goodrich, John Durkee, Wade Cantrell, and Michael Harrelson. September 14, 2017. Email.

Parker Land Surveying, LLC, 2016. "Bathymetric Survey at Cross Generating Station Located in Berkeley County, South Carolina. Oct. 3, 2016.

Santee Cooper, 2017. "Cross Station Outfall Modification – Diffuser Installation." Sheets 3-5, June 27, 2017

WEC, Feb 28, 2017. *Low Flow and Average Annual Flow Analyses*. *Santee Cooper Cross and Winyah Stations.* Prepared for: Santee Cooper, Monks Corner, SC

Weist, Jay. "RE: FW: Cross/Diffuser / Canal Flows." Message to Mike Harrelson, Fletcher Wood, John Durkee, Gary Maurer, Joseph Takats. January 16, 2017. Email

Appendix A. CORMIX Files

CORMIX Model for WET – Session and Prediction Files

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
CORMIX MIXING ZONE EXPERT SYSTEM
CORMIX Version 11.0GT
HYDRO2:Version-11.0.1.0  August,2019
SITE NAME/LABEL:                SCPSA - Cross Generating Station
DESIGN CASE:                  Cross Station WET
FILE NAME:                    C:\Egnyte\Shared\1 Projects\Santee Cooper (SANT)\Cross
(SANT0001)\CORMIX\2020 Revised Mixing Zone Analysis\cross station WET 2020.prd
Using subsystem CORMIX2:     Multiport Diffuser Discharges
Start of session:             11/12/2020--16:08:51
**************************************************************************
SUMMARY OF INPUT DATA:
--------------------------------------------------------------------------
AMBIENT PARAMETERS:
Cross-section                          = bounded
Width                          BS      = 87.02 m
Channel regularity             ICHREG = 1
Ambient flowrate               QA      = 66.83 m^3/s
Average depth                  HA      = 9.30 m
Depth at discharge             HD      = 9.30 m
Ambient velocity               UA      = 0.0826 m/s
Darcy-Weisbach friction factor F       = 0.0233
Calculated from Manning's n          = 0.025
Wind velocity                  UW      = 2 m/s
Stratification Type            STRCND = U
Surface temperature                    = 8.4 degC
Bottom temperature                     = 8.4 degC
Calculated FRESH-WATER DENSITY values:
Surface density                RHOAS   = 999.8255 kg/m^3
Bottom density                 RHOAB   = 999.8255 kg/m^3
--------------------------------------------------------------------------
DISCHARGE PARAMETERS:           Submerged Multiport Diffuser Discharge
Diffuser type                  DITYPE = unidirectional perpendicular
Diffuser length                LD      = 12.80 m
Nearest bank                           = left
Diffuser endpoints             YB1     = 19.99 m;    YB2 = 32.80 m
Number of openings             NOPEN   = 7
Number of Risers               NRISER  = 7
Ports/Nozzles per Riser        NPPERR  = 1
Spacing between risers/openings SPAC   = 2.13 m
Port/Nozzle diameter           D0      = 0.1143 m
with contraction ratio               = 1
Equivalent slot width          B0      = 0.004809 m
Total area of openings         TA0     = 0.0718 m^2
Discharge velocity             U0      = 3.10 m/s
Total discharge flowrate       Q0      = 0.222568 m^3/s
Discharge port height          H0      = 1.07 m
Nozzle arrangement             BETYPE = unidirectional without fanning
Diffuser alignment angle       GAMMA   = 90 deg
Vertical discharge angle       THETA   = 0 deg
Actual Vertical discharge angle THEAC  = 0 deg
Horizontal discharge angle     SIGMA   = 0 deg
Relative orientation angle     BETA    = 90 deg
```

```
Discharge temperature (freshwater)     = 18.40 degC
Corresponding density          RHO0    = 998.5218 kg/m^3
Density difference             DRHO    = 1.3037 kg/m^3
Buoyant acceleration           GP0     = 0.0128 m/s^2
Discharge concentration        C0      = 100 %
Surface heat exchange coeff.   KS      = 0 m/s
Coefficient of decay           KD      = 0 /s
------------------------------------------------------------------------------
FLUX VARIABLES PER UNIT DIFFUSER LENGTH:
Discharge (volume flux)        q0      = 0.017386 m^2/s
Momentum flux
(based on slot width B0)    m0 =U0^2*B0   = 0.046178 m^3/s^2
(based on volume flux q0)   m0 =U0*q0     = 0.053874 m^3/s^2
Buoyancy flux
(based on slot width B0)    j0 =U0*GP0*B0 = 0.000191 m^3/s^3
(based on volume flux q0)   j0 =q0*GP0    = 0.000222 m^3/s^3
------------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
LQ  = 0.01 m         Lm  = 7.89 m         LM  = 13.91 m
lm' = 99999 m         Lb' = 99999 m         La  = 99999 m
(These refer to the actual discharge/environment length scales.)
------------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
Slot Froude number             FR0     = 395.15
Port/nozzle Froude number      FRD0    = 81.05
Velocity ratio                 R       = 37.51
------------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
Toxic discharge                        = no
Water quality standard specified       = no
Regulatory mixing zone                 = yes
Regulatory mixing zone specification   = width
Regulatory mixing zone value           = 43.51 m (m^2 if area)(WEC Note: Per model box, not MZ,
dimensions)
Region of interest                     = 1219.2 m
******************************************************************************
HYDRODYNAMIC CLASSIFICATION:
*-------------------------*
| FLOW CLASS   = MU2 |
*-------------------------*
This flow configuration applies to a layer corresponding to the full water
depth at the discharge site.
Applicable layer depth = water depth = 9.30 m

Limiting Dilution S = (QA/Q0)+ 1.0 = 301.3

******************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

------------------------------------------------------------------------------
X-Y-Z Coordinate system:
Origin is located at the BOTTOM below the port/diffuser center:
26.40 m from the left bank/shore.
Number of display steps NSTEP = 100 per module.
------------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
implication.  However, this information may be useful for the discharge
designer because the mixing in the NFR is usually sensitive to the
discharge design conditions.
Pollutant concentration at NFR edge  c = 1.7133 %
Dilution at edge of NFR              s = 58.4
```

```
NFR Location:                          x = 6.40 m
(centerline coordinates)             y = 0 m
z = 9.30 m
NFR plume dimensions:  half-width (bh) = 5.15 m
thickness (bv) = 9.30 m
Cumulative travel time:       47.1690 sec.
-------------------------------------------------------------------------------
Buoyancy assessment:
The effluent density is less than the surrounding ambient water
density at the discharge level.
Therefore, the effluent is POSITIVELY BUOYANT and will tend to rise towards
the surface.
-------------------------------------------------------------------------------
Near-field instability behavior:
The diffuser flow will experience instabilities with full vertical mixing
in the near-field.
There may be benthic impact of high pollutant concentrations.
-------------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
Plume becomes vertically fully mixed WITHIN NEAR-FIELD at 0 m
downstream, but RE-STRATIFIES LATER and is not mixed in the far-field.
Plume becomes laterally fully mixed at 254.87 m
downstream.
-------------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
Plume in bounded section contacts nearest bank at 72.79 m downstream.
Plume contacts second bank at 254.87 m downstream.
************************ TOXIC DILUTION ZONE SUMMARY ************************
No TDZ was specified for this simulation.
********************** REGULATORY MIXING ZONE SUMMARY ***********************
The plume conditions at the boundary of the specified RMZ are as follows:
Pollutant concentration              c = 1.348836  %  (WEC Note: Per model box, not MZ, dimensions)
Corresponding dilution               s = 74.1
Plume location:                      x = 52.36 m
(centerline coordinates)           y = 0 m
z = 9.30 m
Plume dimensions:      half-width (bh) = 21.76 m
thickness (bv) = 4.58 m
Cumulative travel time:      601.7078 sec.

Note:
Plume concentration c and dilution s values are reported based on prediction
file values - assuming linear interpolation between predicted points just
before and just after the RMZ boundary has been detected.

Please ensure a small step size is used in the prediction file to account
for this linear interpolation. Step size can be controlled by increasing
(reduces the prediction step size) or decreasing (increases the prediction
step size) the - Output Steps per Module - in CORMIX input.

********************** FINAL DESIGN ADVICE AND COMMENTS **********************
CORMIX2 uses the TWO-DIMENSIONAL SLOT DIFFUSER CONCEPT to represent
the actual three-dimensional diffuser geometry.  Thus, it approximates
the details of the merging process of the individual jets from each
port/nozzle.
In the present design, the spacing between adjacent ports/nozzles
(or riser assemblies) is of the order of, or less than, the local
water depth so that the slot diffuser approximation holds well.

Nevertheless, if this is a final design, the user is advised to use a
final CORMIX1 (single port discharge) analysis, with discharge data
for an individual diffuser jet/plume, in order to compare to
```

```
the present near-field prediction.
-------------------------------------------------------------------------------
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
CORMIX predictions on dilutions and concentrations (with associated
plume geometries) are reliable for the majority of cases and are accurate
to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
the design configuration as highly complex and uncertain for prediction.
```

```
CORMIX2 PREDICTION FILE:
2222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
CORMIX MIXING ZONE EXPERT SYSTEM
Subsystem CORMIX2: Multiport Diffuser Discharges
CORMIX Version 11.0GT
HYDRO2 Version 11.0.1.0 August 2019
------------------------------------------------------------------------------------------------------
------------------------------------------------------------------------------------------------------
CASE DESCRIPTION
Site name/label:   SCPSA - Cross Generating Station
Design case:       Cross Station WET
FILE NAME:         C:\...d Mixing Zone Analysis\cross station WET 2020.prd
Time stamp:        11/12/2020--16:08:51

ENVIRONMENT PARAMETERS (metric units)
Bounded section
BS    =     87.02  AS    =    808.98  QA    =     66.83  ICHREG= 1
HA    =      9.30  HD    =      9.30
UA    =     0.083  F     =     0.023 USTAR =0.4462E-02
UW    =     2.000 UWSTAR=0.2198E-02
Uniform density environment
STRCND=  U         RHOAM =  999.8255

DIFFUSER DISCHARGE PARAMETERS (metric units)
Diffuser type:     DITYPE= unidirectional_perpendicular
BANK  =  LEFT      DISTB =     26.40  YB1   =     19.99  YB2   =     32.80
LD    =     12.80  NOPEN =    7       NRISER=    7       SPAC  =      2.13   NPPERR =    1
D0    =     0.114  A0    =     0.010  H0    =      1.07  SUB0  =      8.23
D0INP =     0.114  CR0   =     1.000  B0    =0.4809E-02
Nozzle/port arrangement:   unidirectional_without_fanning
GAMMA =     90.00  THETA =      0.00  SIGMA =      0.00  BETA  =     90.00
U0    =     3.099  Q0    =     0.223  Q0A   =0.2226E+00
RHO0  =  998.5219  DRHO0 =0.1304E+01  GP0   =0.1279E-01
C0    =0.1000E+03  CUNITS=  %
IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
q0    =0.1739E-01          SIGNJ0=      1.0
m0 =U0^2*B0 =0.4618E-01   j0 =U0*GP0*B0 =0.1906E-03   (based on slot width B0)
m0 =U0*q0   =0.5387E-01   j0 =q0*GP0    =0.2223E-03   (based on volume flux q0)
Associated 2-d length scales (meters)
lQ=B  =       0.006 lM    =      13.91  lm    =      7.89
lmp   =   99999.00  lbp   =   99999.00  la    =   99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
Q0    =0.2226E+00  M0    =0.5912E+00  J0    =0.2439E-02
Associated 3-d length scales (meters)
LQ    =      0.10  LM    =     13.65  Lm    =     10.05  Lb    =      5.05
Lmp   =   99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
FR0   =    395.15  FRD0  =     81.05  R     =     37.51  PL    =   10.60
(slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
Properties of riser group with  1 ports/nozzles each:
U0    =      3.099 D0    =     0.114 A0    =      0.010 THETA =      0.00
FR0   =    395.15  FRD0  =     81.05  R     =     37.51
(slot)             (riser group)

FLOW CLASSIFICATION
22222222222222222222222222222222222222222222222
```

```
2  Flow class (CORMIX2)      =    MU2          2
2  Applicable layer depth HS =     9.30        2
2  Limiting Dilution S =QA/Q0=   301.26        2
22222222222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
C0    =0.1000E+03  CUNITS=  %
NTOX  =  0
NSTD  =  0
REGMZ =  1
REGSPC=  2         XREG  =      0.00  WREG  =     43.51  AREG  =      0.00
XINT  =   1219.20  XMAX  =   1219.20

X-Y-Z COORDINATE SYSTEM:
ORIGIN is located at the bottom and the diffuser mid-point:
26.40 m  from the LEFT  bank/shore.
X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP = 100 display intervals per module
-------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

Profile definitions:
BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
BH = top-hat half-width, in horizontal plane normal to trajectory
S  = hydrodynamic centerline dilution
C  = centerline concentration (includes reaction effects, if any)
Uc = Local centerline excess velocity (above ambient)
TT = Cumulative travel time

X        Y       Z        S        C       BV       BH       Uc       TT
0.00     0.00    1.07     1.0 0.100E+03   0.00     6.40     3.016   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
MIXED over the entire layer depth (HS =   9.30m).
Full mixing is achieved after a plume distance of about five
layer depths from the diffuser.

Profile definitions:
BV = layer depth (vertically mixed)
BH = top-hat half-width, in horizontal plane normal to trajectory
S  = hydrodynamic average (bulk) dilution
C  = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

X        Y       Z        S        C       BV       BH        TT
0.00     0.00    1.07     1.0 0.100E+03   0.00     6.40 .00000E+00
0.06     0.00    1.07     6.7 0.148E+02   0.09     6.36 .11797E+00
0.13     0.00    1.08     9.1 0.110E+02   0.19     6.33 .30289E+00
0.19     0.00    1.08    10.9 0.914E+01   0.28     6.29 .52471E+00
0.26     0.00    1.09    12.5 0.802E+01   0.37     6.26 .77342E+00
0.32     0.00    1.09    13.8 0.723E+01   0.46     6.23 .10435E+01
0.38     0.00    1.10    15.1 0.664E+01   0.56     6.19 .13313E+01
0.45     0.00    1.10    16.2 0.618E+01   0.65     6.16 .16343E+01
0.51     0.00    1.11    17.2 0.581E+01   0.74     6.13 .19507E+01
```

0.58	0.00	1.11	18.2	0.549E+01	0.84	6.10	.22790E+01
0.64	0.00	1.12	19.1	0.522E+01	0.93	6.08	.26179E+01
0.70	0.00	1.12	20.0	0.499E+01	1.02	6.05	.29665E+01
0.77	0.00	1.13	20.9	0.479E+01	1.12	6.02	.33241E+01
0.83	0.00	1.13	21.7	0.461E+01	1.21	6.00	.36898E+01
0.90	0.00	1.14	22.5	0.445E+01	1.30	5.97	.40631E+01
0.96	0.00	1.14	23.2	0.431E+01	1.39	5.95	.44435E+01
1.02	0.00	1.15	23.9	0.418E+01	1.49	5.92	.48305E+01
1.09	0.00	1.15	24.7	0.406E+01	1.58	5.90	.52238E+01
1.15	0.00	1.16	25.3	0.395E+01	1.67	5.88	.56229E+01
1.22	0.00	1.16	26.0	0.385E+01	1.77	5.85	.60275E+01
1.28	0.00	1.17	26.7	0.375E+01	1.86	5.83	.64374E+01
1.34	0.00	1.17	27.3	0.366E+01	1.95	5.81	.68523E+01
1.41	0.00	1.18	27.9	0.358E+01	2.05	5.79	.72719E+01
1.47	0.00	1.18	28.5	0.351E+01	2.14	5.77	.76960E+01
1.54	0.00	1.19	29.1	0.344E+01	2.23	5.75	.81245E+01
1.60	0.00	1.19	29.7	0.337E+01	2.32	5.73	.85571E+01
1.66	0.00	1.20	30.3	0.331E+01	2.42	5.71	.89937E+01
1.73	0.00	1.20	30.8	0.325E+01	2.51	5.70	.94340E+01
1.79	0.00	1.20	31.4	0.319E+01	2.60	5.68	.98780E+01
1.86	0.00	1.21	31.9	0.314E+01	2.70	5.66	.10326E+02
1.92	0.00	1.21	32.4	0.308E+01	2.79	5.65	.10777E+02
1.98	0.00	1.22	32.9	0.304E+01	2.88	5.63	.11231E+02
2.05	0.00	1.22	33.5	0.299E+01	2.97	5.61	.11688E+02
2.11	0.00	1.23	34.0	0.295E+01	3.07	5.60	.12148E+02
2.18	0.00	1.23	34.4	0.290E+01	3.16	5.58	.12612E+02
2.24	0.00	1.24	34.9	0.286E+01	3.25	5.57	.13078E+02
2.30	0.00	1.24	35.4	0.282E+01	3.35	5.55	.13547E+02
2.37	0.00	1.25	35.9	0.279E+01	3.44	5.54	.14019E+02
2.43	0.00	1.25	36.4	0.275E+01	3.53	5.52	.14493E+02
2.50	0.00	1.26	36.8	0.272E+01	3.63	5.51	.14970E+02
2.56	0.00	1.26	37.3	0.268E+01	3.72	5.50	.15449E+02
2.62	0.00	1.27	37.7	0.265E+01	3.81	5.48	.15931E+02
2.69	0.00	1.27	38.2	0.262E+01	3.90	5.47	.16415E+02
2.75	0.00	1.28	38.6	0.259E+01	4.00	5.46	.16901E+02
2.82	0.00	1.28	39.1	0.256E+01	4.09	5.45	.17390E+02
2.88	0.00	1.29	39.5	0.253E+01	4.18	5.44	.17880E+02
2.94	0.00	1.29	39.9	0.251E+01	4.28	5.42	.18373E+02
3.01	0.00	1.30	40.3	0.248E+01	4.37	5.41	.18868E+02
3.07	0.00	1.30	40.7	0.245E+01	4.46	5.40	.19364E+02
3.14	0.00	1.31	41.2	0.243E+01	4.56	5.39	.19863E+02
3.20	0.00	1.31	41.6	0.241E+01	4.65	5.38	.20364E+02
3.26	0.00	1.32	42.0	0.238E+01	4.74	5.37	.20866E+02
3.33	0.00	1.32	42.4	0.236E+01	4.83	5.36	.21370E+02
3.39	0.00	1.33	42.8	0.234E+01	4.93	5.35	.21877E+02
3.46	0.00	1.33	43.2	0.232E+01	5.02	5.34	.22384E+02
3.52	0.00	1.34	43.5	0.230E+01	5.11	5.33	.22894E+02
3.58	0.00	1.34	43.9	0.228E+01	5.21	5.32	.23405E+02
3.65	0.00	1.35	44.3	0.226E+01	5.30	5.31	.23918E+02
3.71	0.00	1.35	44.7	0.224E+01	5.39	5.31	.24432E+02
3.78	0.00	1.36	45.1	0.222E+01	5.48	5.30	.24948E+02
3.84	0.00	1.36	45.4	0.220E+01	5.58	5.29	.25466E+02
3.90	0.00	1.37	45.8	0.218E+01	5.67	5.28	.25985E+02
3.97	0.00	1.37	46.2	0.217E+01	5.76	5.27	.26505E+02
4.03	0.00	1.38	46.5	0.215E+01	5.86	5.27	.27027E+02
4.10	0.00	1.38	46.9	0.213E+01	5.95	5.26	.27551E+02
4.16	0.00	1.39	47.2	0.212E+01	6.04	5.25	.28076E+02
4.22	0.00	1.39	47.6	0.210E+01	6.14	5.25	.28602E+02
4.29	0.00	1.40	48.0	0.209E+01	6.23	5.24	.29129E+02
4.35	0.00	1.40	48.3	0.207E+01	6.32	5.23	.29658E+02
4.42	0.00	1.41	48.7	0.206E+01	6.41	5.23	.30188E+02
4.48	0.00	1.41	49.0	0.204E+01	6.51	5.22	.30720E+02

```
4.54      0.00    1.42    49.3 0.203E+01   6.60     5.22 .31252E+02
4.61      0.00    1.42    49.7 0.201E+01   6.69     5.21 .31786E+02
4.67      0.00    1.43    50.0 0.200E+01   6.79     5.21 .32321E+02
4.74      0.00    1.43    50.3 0.199E+01   6.88     5.20 .32858E+02
4.80      0.00    1.44    50.7 0.197E+01   6.97     5.20 .33395E+02
4.86      0.00    1.44    51.0 0.196E+01   7.07     5.20 .33934E+02
4.93      0.00    1.45    51.3 0.195E+01   7.16     5.19 .34474E+02
4.99      0.00    1.45    51.7 0.194E+01   7.25     5.19 .35015E+02
5.06      0.00    1.46    52.0 0.192E+01   7.34     5.19 .35557E+02
5.12      0.00    1.46    52.3 0.191E+01   7.44     5.18 .36100E+02
5.18      0.00    1.47    52.6 0.190E+01   7.53     5.18 .36644E+02
5.25      0.00    1.47    52.9 0.189E+01   7.62     5.18 .37189E+02
5.31      0.00    1.48    53.3 0.188E+01   7.72     5.17 .37736E+02
5.38      0.00    1.48    53.6 0.187E+01   7.81     5.17 .38283E+02
5.44      0.00    1.49    53.9 0.186E+01   7.90     5.17 .38831E+02
5.50      0.00    1.49    54.2 0.185E+01   7.99     5.17 .39381E+02
5.57      0.00    1.50    54.5 0.183E+01   8.09     5.17 .39931E+02
5.63      0.00    1.50    54.8 0.182E+01   8.18     5.16 .40482E+02
5.70      0.00    1.51    55.1 0.181E+01   8.27     5.16 .41035E+02
5.76      0.00    1.51    55.4 0.180E+01   8.37     5.16 .41588E+02
5.82      0.00    1.52    55.7 0.179E+01   8.46     5.16 .42142E+02
5.89      0.00    1.52    56.0 0.178E+01   8.55     5.16 .42697E+02
5.95      0.00    1.53    56.3 0.178E+01   8.65     5.16 .43253E+02
6.02      0.00    1.53    56.6 0.177E+01   8.74     5.16 .43810E+02
6.08      0.00    1.54    56.9 0.176E+01   8.83     5.15 .44367E+02
6.14      0.00    1.54    57.2 0.175E+01   8.92     5.15 .44926E+02
6.21      0.00    1.55    57.5 0.174E+01   9.02     5.15 .45486E+02
6.27      0.00    1.55    57.8 0.173E+01   9.11     5.15 .46046E+02
6.34      0.00    1.56    58.1 0.172E+01   9.20     5.15 .46607E+02
6.40      0.00    1.56    58.4 0.171E+01   9.30     5.15 .47169E+02
Cumulative travel time =          47.1689 sec  (    0.01 hrs)
Plume centerline may exhibit slight discontinuities in transition
to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER
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------------------------------------------------------------------------------------------
BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

Phase 1: Vertically mixed, Phase 2: Re-stratified

------------------------------------------------------------------------------------------
Phase 2: The flow has RESTRATIFIED at the beginning of this zone.

This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

The initial plume WIDTH values in the next far-field module will be
CORRECTED by a factor  1.64 to conserve the mass flux in the far-field!
The correction factor is quite large because of the small ambient velocity
relative to the strong mixing characteristics of the discharge!
This indicates localized RECIRCULATION REGIONS and INTERNAL HYDRAULIC JUMPS.
Width predictions show discontinuities. Dilution values should be acceptable.
------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

Profile definitions:
BV = top-hat thickness, measured vertically
BH = top-hat half-width, measured horizontally in y-direction
```

```
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S  = hydrodynamic average (bulk) dilution
C  = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

Plume Stage 1 (not bank attached):
```

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
6.40	0.00	9.30	58.4	0.171E+01	9.30	8.43	9.30	0.00	.47169E+02
7.06	0.00	9.30	58.8	0.170E+01	9.09	8.68	9.30	0.20	.55179E+02
7.73	0.00	9.30	59.2	0.169E+01	8.90	8.93	9.30	0.40	.63190E+02
8.39	0.00	9.30	59.6	0.168E+01	8.72	9.18	9.30	0.58	.71200E+02
9.06	0.00	9.30	60.0	0.167E+01	8.55	9.42	9.30	0.74	.79210E+02
9.72	0.00	9.30	60.4	0.166E+01	8.39	9.66	9.30	0.90	.87221E+02
10.38	0.00	9.30	60.8	0.165E+01	8.24	9.90	9.30	1.06	.95231E+02
11.05	0.00	9.30	61.1	0.164E+01	8.10	10.13	9.30	1.20	.10324E+03
11.71	0.00	9.30	61.5	0.163E+01	7.96	10.37	9.30	1.33	.11125E+03
12.38	0.00	9.30	61.8	0.162E+01	7.83	10.60	9.30	1.46	.11926E+03
13.04	0.00	9.30	62.1	0.161E+01	7.71	10.82	9.30	1.59	.12727E+03
13.70	0.00	9.30	62.5	0.160E+01	7.59	11.05	9.30	1.71	.13528E+03
14.37	0.00	9.30	62.8	0.159E+01	7.48	11.27	9.30	1.82	.14329E+03
15.03	0.00	9.30	63.1	0.159E+01	7.37	11.49	9.30	1.92	.15130E+03
15.70	0.00	9.30	63.4	0.158E+01	7.27	11.71	9.30	2.03	.15931E+03
16.36	0.00	9.30	63.7	0.157E+01	7.17	11.92	9.30	2.13	.16732E+03
17.02	0.00	9.30	63.9	0.156E+01	7.07	12.14	9.30	2.22	.17533E+03
17.69	0.00	9.30	64.2	0.156E+01	6.98	12.35	9.30	2.31	.18334E+03
18.35	0.00	9.30	64.5	0.155E+01	6.90	12.56	9.30	2.40	.19135E+03
19.02	0.00	9.30	64.8	0.154E+01	6.81	12.77	9.30	2.48	.19936E+03
19.68	0.00	9.30	65.0	0.154E+01	6.73	12.97	9.30	2.57	.20738E+03
20.34	0.00	9.30	65.3	0.153E+01	6.65	13.18	9.30	2.64	.21539E+03
21.01	0.00	9.30	65.5	0.153E+01	6.58	13.38	9.30	2.72	.22340E+03
21.67	0.00	9.30	65.8	0.152E+01	6.50	13.58	9.30	2.79	.23141E+03
22.33	0.00	9.30	66.0	0.151E+01	6.43	13.78	9.30	2.86	.23942E+03
23.00	0.00	9.30	66.3	0.151E+01	6.36	13.98	9.30	2.93	.24743E+03
23.66	0.00	9.30	66.5	0.150E+01	6.30	14.18	9.30	3.00	.25544E+03
24.33	0.00	9.30	66.7	0.150E+01	6.23	14.38	9.30	3.06	.26345E+03
24.99	0.00	9.30	67.0	0.149E+01	6.17	14.57	9.30	3.13	.27146E+03
25.65	0.00	9.30	67.2	0.149E+01	6.11	14.77	9.30	3.19	.27947E+03
26.32	0.00	9.30	67.4	0.148E+01	6.05	14.96	9.30	3.25	.28748E+03
26.98	0.00	9.30	67.6	0.148E+01	5.99	15.15	9.30	3.30	.29549E+03
27.65	0.00	9.30	67.8	0.147E+01	5.94	15.34	9.30	3.36	.30350E+03
28.31	0.00	9.30	68.0	0.147E+01	5.88	15.53	9.30	3.41	.31151E+03
28.97	0.00	9.30	68.2	0.147E+01	5.83	15.72	9.30	3.47	.31952E+03
29.64	0.00	9.30	68.5	0.146E+01	5.78	15.90	9.30	3.52	.32753E+03
30.30	0.00	9.30	68.7	0.146E+01	5.73	16.09	9.30	3.57	.33554E+03
30.97	0.00	9.30	68.9	0.145E+01	5.68	16.27	9.30	3.62	.34355E+03
31.63	0.00	9.30	69.0	0.145E+01	5.63	16.46	9.30	3.66	.35156E+03
32.29	0.00	9.30	69.2	0.144E+01	5.59	16.64	9.30	3.71	.35957E+03
32.96	0.00	9.30	69.4	0.144E+01	5.54	16.82	9.30	3.75	.36758E+03
33.62	0.00	9.30	69.6	0.144E+01	5.50	17.00	9.30	3.80	.37559E+03
34.29	0.00	9.30	69.8	0.143E+01	5.46	17.18	9.30	3.84	.38360E+03
34.95	0.00	9.30	70.0	0.143E+01	5.41	17.36	9.30	3.88	.39161E+03
35.61	0.00	9.30	70.2	0.143E+01	5.37	17.53	9.30	3.92	.39962E+03
36.28	0.00	9.30	70.3	0.142E+01	5.33	17.71	9.30	3.96	.40763E+03
36.94	0.00	9.30	70.5	0.142E+01	5.29	17.89	9.30	4.00	.41564E+03
37.60	0.00	9.30	70.7	0.141E+01	5.26	18.06	9.30	4.04	.42365E+03
38.27	0.00	9.30	70.9	0.141E+01	5.22	18.24	9.30	4.08	.43166E+03
38.93	0.00	9.30	71.0	0.141E+01	5.18	18.41	9.30	4.12	.43967E+03
39.60	0.00	9.30	71.2	0.140E+01	5.15	18.58	9.30	4.15	.44768E+03
40.26	0.00	9.30	71.4	0.140E+01	5.11	18.75	9.30	4.19	.45570E+03
40.92	0.00	9.30	71.5	0.140E+01	5.08	18.92	9.30	4.22	.46371E+03
41.59	0.00	9.30	71.7	0.139E+01	5.04	19.09	9.30	4.25	.47172E+03

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42.25     0.00     9.30     71.9 0.139E+01   5.01     19.26     9.30     4.29    .47973E+03
42.92     0.00     9.30     72.0 0.139E+01   4.98     19.43     9.30     4.32    .48774E+03
43.58     0.00     9.30     72.2 0.139E+01   4.94     19.60     9.30     4.35    .49575E+03
44.24     0.00     9.30     72.3 0.138E+01   4.91     19.77     9.30     4.38    .50376E+03
44.91     0.00     9.30     72.5 0.138E+01   4.88     19.93     9.30     4.41    .51177E+03
45.57     0.00     9.30     72.6 0.138E+01   4.85     20.10     9.30     4.44    .51978E+03
46.24     0.00     9.30     72.8 0.137E+01   4.82     20.26     9.30     4.47    .52779E+03
46.90     0.00     9.30     72.9 0.137E+01   4.79     20.43     9.30     4.50    .53580E+03
47.56     0.00     9.30     73.1 0.137E+01   4.77     20.59     9.30     4.53    .54381E+03
48.23     0.00     9.30     73.2 0.137E+01   4.74     20.75     9.30     4.56    .55182E+03
48.89     0.00     9.30     73.4 0.136E+01   4.71     20.92     9.30     4.59    .55983E+03
49.56     0.00     9.30     73.5 0.136E+01   4.68     21.08     9.30     4.61    .56784E+03
50.22     0.00     9.30     73.7 0.136E+01   4.66     21.24     9.30     4.64    .57585E+03
50.88     0.00     9.30     73.8 0.135E+01   4.63     21.40     9.30     4.66    .58386E+03
51.55     0.00     9.30     74.0 0.135E+01   4.61     21.56     9.30     4.69    .59187E+03
52.21     0.00     9.30     74.1 0.135E+01   4.58     21.72     9.30     4.72    .59988E+03
** REGULATORY MIXING ZONE BOUNDARY **
In this prediction interval the TOTAL plume width meets or exceeds
the regulatory value =    43.51 m.
This is the extent of the REGULATORY MIXING ZONE.
52.88     0.00     9.30     74.2 0.135E+01   4.56     21.88     9.30     4.74    .60789E+03
53.54     0.00     9.30     74.4 0.134E+01   4.53     22.04     9.30     4.76    .61590E+03
54.20     0.00     9.30     74.5 0.134E+01   4.51     22.19     9.30     4.79    .62391E+03
54.87     0.00     9.30     74.7 0.134E+01   4.48     22.35     9.30     4.81    .63192E+03
55.53     0.00     9.30     74.8 0.134E+01   4.46     22.51     9.30     4.83    .63993E+03
56.19     0.00     9.30     74.9 0.133E+01   4.44     22.66     9.30     4.86    .64794E+03
56.86     0.00     9.30     75.1 0.133E+01   4.42     22.82     9.30     4.88    .65595E+03
57.52     0.00     9.30     75.2 0.133E+01   4.39     22.97     9.30     4.90    .66396E+03
58.19     0.00     9.30     75.3 0.133E+01   4.37     23.13     9.30     4.92    .67197E+03
58.85     0.00     9.30     75.4 0.133E+01   4.35     23.28     9.30     4.95    .67998E+03
59.51     0.00     9.30     75.6 0.132E+01   4.33     23.43     9.30     4.97    .68799E+03
60.18     0.00     9.30     75.7 0.132E+01   4.31     23.59     9.30     4.99    .69600E+03
60.84     0.00     9.30     75.8 0.132E+01   4.29     23.74     9.30     5.01    .70401E+03
61.51     0.00     9.30     76.0 0.132E+01   4.27     23.89     9.30     5.03    .71202E+03
62.17     0.00     9.30     76.1 0.131E+01   4.25     24.04     9.30     5.05    .72003E+03
62.83     0.00     9.30     76.2 0.131E+01   4.23     24.19     9.30     5.07    .72805E+03
63.50     0.00     9.30     76.3 0.131E+01   4.21     24.34     9.30     5.09    .73606E+03
64.16     0.00     9.30     76.4 0.131E+01   4.19     24.49     9.30     5.11    .74407E+03
64.83     0.00     9.30     76.6 0.131E+01   4.17     24.64     9.30     5.12    .75208E+03
65.49     0.00     9.30     76.7 0.130E+01   4.15     24.79     9.30     5.14    .76009E+03
66.15     0.00     9.30     76.8 0.130E+01   4.14     24.94     9.30     5.16    .76810E+03
66.82     0.00     9.30     76.9 0.130E+01   4.12     25.09     9.30     5.18    .77611E+03
67.48     0.00     9.30     77.0 0.130E+01   4.10     25.24     9.30     5.20    .78412E+03
68.15     0.00     9.30     77.2 0.130E+01   4.08     25.38     9.30     5.21    .79213E+03
68.81     0.00     9.30     77.3 0.129E+01   4.06     25.53     9.30     5.23    .80014E+03
69.47     0.00     9.30     77.4 0.129E+01   4.05     25.68     9.30     5.25    .80815E+03
70.14     0.00     9.30     77.5 0.129E+01   4.03     25.82     9.30     5.27    .81616E+03
70.80     0.00     9.30     77.6 0.129E+01   4.01     25.97     9.30     5.28    .82417E+03
71.46     0.00     9.30     77.7 0.129E+01   4.00     26.11     9.30     5.30    .83218E+03
72.13     0.00     9.30     77.9 0.128E+01   3.98     26.26     9.30     5.32    .84019E+03
72.79     0.00     9.30     78.0 0.128E+01   3.96     26.40     9.30     5.33    .84820E+03
Cumulative travel time =        848.2003 sec  (    0.24 hrs)

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Plume is ATTACHED to LEFT  bank/shore.
Plume width is now determined from LEFT  bank/shore.

Plume Stage 2 (bank attached):
X         Y        Z         S         C        BV        BH       ZU       ZL        TT
72.79    26.40     9.30     78.0 0.128E+01   3.96     52.80     9.30     5.33    .84820E+03
74.61    26.40     9.30     78.1 0.128E+01   3.94     53.20     9.30     5.35    .87017E+03
76.43    26.40     9.30     78.3 0.128E+01   3.92     53.59     9.30     5.37    .89214E+03
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78.25	26.40	9.30	78.4	0.127E+01	3.90	53.98	9.30	5.39	.91410E+03
80.08	26.40	9.30	78.6	0.127E+01	3.88	54.37	9.30	5.41	.93607E+03
81.90	26.40	9.30	78.8	0.127E+01	3.86	54.76	9.30	5.43	.95804E+03
83.72	26.40	9.30	78.9	0.127E+01	3.84	55.14	9.30	5.45	.98001E+03
85.54	26.40	9.30	79.1	0.126E+01	3.82	55.53	9.30	5.47	.10020E+04
87.36	26.40	9.30	79.2	0.126E+01	3.80	55.91	9.30	5.49	.10239E+04
89.18	26.40	9.30	79.4	0.126E+01	3.79	56.30	9.30	5.51	.10459E+04
91.00	26.40	9.30	79.5	0.126E+01	3.77	56.68	9.30	5.53	.10679E+04
92.82	26.40	9.30	79.7	0.126E+01	3.75	57.06	9.30	5.55	.10898E+04
94.64	26.40	9.30	79.8	0.125E+01	3.73	57.44	9.30	5.56	.11118E+04
96.46	26.40	9.30	80.0	0.125E+01	3.71	57.81	9.30	5.58	.11338E+04
98.28	26.40	9.30	80.1	0.125E+01	3.70	58.19	9.30	5.60	.11558E+04
100.10	26.40	9.30	80.3	0.125E+01	3.68	58.56	9.30	5.62	.11777E+04
101.92	26.40	9.30	80.4	0.124E+01	3.66	58.94	9.30	5.63	.11997E+04
103.75	26.40	9.30	80.6	0.124E+01	3.65	59.31	9.30	5.65	.12217E+04
105.57	26.40	9.30	80.7	0.124E+01	3.63	59.68	9.30	5.66	.12436E+04
107.39	26.40	9.30	80.9	0.124E+01	3.62	60.05	9.30	5.68	.12656E+04
109.21	26.40	9.30	81.0	0.123E+01	3.60	60.42	9.30	5.70	.12876E+04
111.03	26.40	9.30	81.1	0.123E+01	3.58	60.79	9.30	5.71	.13095E+04
112.85	26.40	9.30	81.3	0.123E+01	3.57	61.15	9.30	5.73	.13315E+04
114.67	26.40	9.30	81.4	0.123E+01	3.55	61.52	9.30	5.74	.13535E+04
116.49	26.40	9.30	81.6	0.123E+01	3.54	61.88	9.30	5.76	.13754E+04
118.31	26.40	9.30	81.7	0.122E+01	3.53	62.25	9.30	5.77	.13974E+04
120.13	26.40	9.30	81.9	0.122E+01	3.51	62.61	9.30	5.79	.14194E+04
121.95	26.40	9.30	82.0	0.122E+01	3.50	62.97	9.30	5.80	.14413E+04
123.77	26.40	9.30	82.1	0.122E+01	3.48	63.33	9.30	5.81	.14633E+04
125.59	26.40	9.30	82.3	0.122E+01	3.47	63.69	9.30	5.83	.14853E+04
127.42	26.40	9.30	82.4	0.121E+01	3.46	64.05	9.30	5.84	.15072E+04
129.24	26.40	9.30	82.5	0.121E+01	3.44	64.40	9.30	5.85	.15292E+04
131.06	26.40	9.30	82.7	0.121E+01	3.43	64.76	9.30	5.87	.15512E+04
132.88	26.40	9.30	82.8	0.121E+01	3.42	65.11	9.30	5.88	.15731E+04
134.70	26.40	9.30	83.0	0.121E+01	3.40	65.47	9.30	5.89	.15951E+04
136.52	26.40	9.30	83.1	0.120E+01	3.39	65.82	9.30	5.91	.16171E+04
138.34	26.40	9.30	83.2	0.120E+01	3.38	66.17	9.30	5.92	.16390E+04
140.16	26.40	9.30	83.4	0.120E+01	3.37	66.52	9.30	5.93	.16610E+04
141.98	26.40	9.30	83.5	0.120E+01	3.35	66.87	9.30	5.94	.16830E+04
143.80	26.40	9.30	83.6	0.120E+01	3.34	67.22	9.30	5.96	.17050E+04
145.62	26.40	9.30	83.8	0.119E+01	3.33	67.57	9.30	5.97	.17269E+04
147.44	26.40	9.30	83.9	0.119E+01	3.32	67.92	9.30	5.98	.17489E+04
149.26	26.40	9.30	84.0	0.119E+01	3.31	68.27	9.30	5.99	.17709E+04
151.09	26.40	9.30	84.2	0.119E+01	3.29	68.61	9.30	6.00	.17928E+04
152.91	26.40	9.30	84.3	0.119E+01	3.28	68.96	9.30	6.01	.18148E+04
154.73	26.40	9.30	84.4	0.118E+01	3.27	69.30	9.30	6.02	.18368E+04
156.55	26.40	9.30	84.6	0.118E+01	3.26	69.64	9.30	6.04	.18587E+04
158.37	26.40	9.30	84.7	0.118E+01	3.25	69.98	9.30	6.05	.18807E+04
160.19	26.40	9.30	84.8	0.118E+01	3.24	70.33	9.30	6.06	.19027E+04
162.01	26.40	9.30	84.9	0.118E+01	3.23	70.67	9.30	6.07	.19246E+04
163.83	26.40	9.30	85.1	0.118E+01	3.22	71.01	9.30	6.08	.19466E+04
165.65	26.40	9.30	85.2	0.117E+01	3.21	71.34	9.30	6.09	.19686E+04
167.47	26.40	9.30	85.3	0.117E+01	3.20	71.68	9.30	6.10	.19905E+04
169.29	26.40	9.30	85.5	0.117E+01	3.19	72.02	9.30	6.11	.20125E+04
171.11	26.40	9.30	85.6	0.117E+01	3.18	72.36	9.30	6.12	.20345E+04
172.93	26.40	9.30	85.7	0.117E+01	3.17	72.69	9.30	6.13	.20564E+04
174.76	26.40	9.30	85.9	0.116E+01	3.16	73.03	9.30	6.14	.20784E+04
176.58	26.40	9.30	86.0	0.116E+01	3.15	73.36	9.30	6.15	.21004E+04
178.40	26.40	9.30	86.1	0.116E+01	3.14	73.69	9.30	6.16	.21223E+04
180.22	26.40	9.30	86.2	0.116E+01	3.13	74.03	9.30	6.17	.21443E+04
182.04	26.40	9.30	86.4	0.116E+01	3.12	74.36	9.30	6.18	.21663E+04
183.86	26.40	9.30	86.5	0.116E+01	3.11	74.69	9.30	6.19	.21882E+04
185.68	26.40	9.30	86.6	0.115E+01	3.10	75.02	9.30	6.20	.22102E+04
187.50	26.40	9.30	86.7	0.115E+01	3.09	75.35	9.30	6.21	.22322E+04
189.32	26.40	9.30	86.9	0.115E+01	3.08	75.68	9.30	6.21	.22541E+04

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191.14    26.40    9.30    87.0 0.115E+01   3.07    76.00    9.30    6.22   .22761E+04
192.96    26.40    9.30    87.1 0.115E+01   3.06    76.33    9.30    6.23   .22981E+04
194.78    26.40    9.30    87.2 0.115E+01   3.06    76.66    9.30    6.24   .23201E+04
196.61    26.40    9.30    87.4 0.114E+01   3.05    76.98    9.30    6.25   .23420E+04
198.43    26.40    9.30    87.5 0.114E+01   3.04    77.31    9.30    6.26   .23640E+04
200.25    26.40    9.30    87.6 0.114E+01   3.03    77.63    9.30    6.27   .23860E+04
202.07    26.40    9.30    87.7 0.114E+01   3.02    77.96    9.30    6.27   .24079E+04
203.89    26.40    9.30    87.9 0.114E+01   3.01    78.28    9.30    6.28   .24299E+04
205.71    26.40    9.30    88.0 0.114E+01   3.01    78.60    9.30    6.29   .24519E+04
207.53    26.40    9.30    88.1 0.113E+01   3.00    78.92    9.30    6.30   .24738E+04
209.35    26.40    9.30    88.2 0.113E+01   2.99    79.24    9.30    6.31   .24958E+04
211.17    26.40    9.30    88.4 0.113E+01   2.98    79.56    9.30    6.31   .25178E+04
212.99    26.40    9.30    88.5 0.113E+01   2.97    79.88    9.30    6.32   .25397E+04
214.81    26.40    9.30    88.6 0.113E+01   2.97    80.20    9.30    6.33   .25617E+04
216.63    26.40    9.30    88.7 0.113E+01   2.96    80.52    9.30    6.34   .25837E+04
218.45    26.40    9.30    88.9 0.113E+01   2.95    80.84    9.30    6.34   .26056E+04
220.28    26.40    9.30    89.0 0.112E+01   2.94    81.15    9.30    6.35   .26276E+04
222.10    26.40    9.30    89.1 0.112E+01   2.94    81.47    9.30    6.36   .26496E+04
223.92    26.40    9.30    89.2 0.112E+01   2.93    81.79    9.30    6.37   .26715E+04
225.74    26.40    9.30    89.4 0.112E+01   2.92    82.10    9.30    6.37   .26935E+04
227.56    26.40    9.30    89.5 0.112E+01   2.92    82.42    9.30    6.38   .27155E+04
229.38    26.40    9.30    89.6 0.112E+01   2.91    82.73    9.30    6.39   .27374E+04
231.20    26.40    9.30    89.7 0.111E+01   2.90    83.04    9.30    6.40   .27594E+04
233.02    26.40    9.30    89.8 0.111E+01   2.89    83.36    9.30    6.40   .27814E+04
234.84    26.40    9.30    90.0 0.111E+01   2.89    83.67    9.30    6.41   .28033E+04
236.66    26.40    9.30    90.1 0.111E+01   2.88    83.98    9.30    6.42   .28253E+04
238.48    26.40    9.30    90.2 0.111E+01   2.87    84.29    9.30    6.42   .28473E+04
240.30    26.40    9.30    90.3 0.111E+01   2.87    84.60    9.30    6.43   .28693E+04
242.12    26.40    9.30    90.5 0.111E+01   2.86    84.91    9.30    6.44   .28912E+04
243.95    26.40    9.30    90.6 0.110E+01   2.85    85.22    9.30    6.44   .29132E+04
245.77    26.40    9.30    90.7 0.110E+01   2.85    85.53    9.30    6.45   .29352E+04
247.59    26.40    9.30    90.8 0.110E+01   2.84    85.83    9.30    6.46   .29571E+04
249.41    26.40    9.30    90.9 0.110E+01   2.84    86.14    9.30    6.46   .29791E+04
251.23    26.40    9.30    91.1 0.110E+01   2.83    86.45    9.30    6.47   .30011E+04
253.05    26.40    9.30    91.2 0.110E+01   2.82    86.76    9.30    6.47   .30230E+04
254.87    26.40    9.30    91.3 0.110E+01   2.82    87.02    9.30    6.48   .30450E+04
Cumulative travel time =      3044.9976 sec  (    0.85 hrs)
Plume is LATERALLY FULLY MIXED at the end of the buoyant spreading regime.

END OF MOD241: BUOYANT AMBIENT SPREADING
------------------------------------------------------------------------------------------
------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value)   = 0.862E-02 m^2/s
Horizontal diffusivity (initial value) = 0.108E-01 m^2/s

Profile definitions:
BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed
BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S  = hydrodynamic centerline dilution
C  = centerline concentration (includes reaction effects, if any)
TT = Cumulative travel time

Plume Stage 2 (bank attached):
X         Y        Z         S         C        BV        BH       ZU       ZL        TT
254.87    26.40    9.30    91.3 0.110E+01   2.82    87.02    9.30    6.48   .30450E+04
264.51    26.40    9.30    91.3 0.109E+01   2.82    87.02    9.30    6.48   .31613E+04
```

274.16	26.40	9.30	91.3	0.109E+01	2.82	87.02	9.30	6.48	.32777E+04
283.80	26.40	9.30	91.4	0.109E+01	2.82	87.02	9.30	6.48	.33940E+04
293.44	26.40	9.30	91.4	0.109E+01	2.82	87.02	9.30	6.48	.35104E+04
303.09	26.40	9.30	91.4	0.109E+01	2.82	87.02	9.30	6.48	.36267E+04
312.73	26.40	9.30	91.4	0.109E+01	2.82	87.02	9.30	6.48	.37431E+04
322.37	26.40	9.30	91.4	0.109E+01	2.82	87.02	9.30	6.48	.38594E+04
332.02	26.40	9.30	91.4	0.109E+01	2.82	87.02	9.30	6.48	.39758E+04
341.66	26.40	9.30	91.5	0.109E+01	2.82	87.02	9.30	6.48	.40921E+04
351.30	26.40	9.30	91.5	0.109E+01	2.82	87.02	9.30	6.47	.42085E+04
360.95	26.40	9.30	91.5	0.109E+01	2.82	87.02	9.30	6.47	.43248E+04
370.59	26.40	9.30	91.5	0.109E+01	2.82	87.02	9.30	6.47	.44412E+04
380.23	26.40	9.30	91.5	0.109E+01	2.82	87.02	9.30	6.47	.45575E+04
389.88	26.40	9.30	91.5	0.109E+01	2.82	87.02	9.30	6.47	.46739E+04
399.52	26.40	9.30	91.6	0.109E+01	2.82	87.02	9.30	6.47	.47902E+04
409.16	26.40	9.30	91.6	0.109E+01	2.82	87.02	9.30	6.47	.49066E+04
418.81	26.40	9.30	91.6	0.109E+01	2.82	87.02	9.30	6.47	.50229E+04
428.45	26.40	9.30	91.6	0.109E+01	2.83	87.02	9.30	6.47	.51393E+04
438.09	26.40	9.30	91.6	0.109E+01	2.83	87.02	9.30	6.47	.52556E+04
447.74	26.40	9.30	91.6	0.109E+01	2.83	87.02	9.30	6.47	.53720E+04
457.38	26.40	9.30	91.7	0.109E+01	2.83	87.02	9.30	6.47	.54883E+04
467.02	26.40	9.30	91.7	0.109E+01	2.83	87.02	9.30	6.47	.56047E+04
476.67	26.40	9.30	91.7	0.109E+01	2.83	87.02	9.30	6.47	.57210E+04
486.31	26.40	9.30	91.7	0.109E+01	2.83	87.02	9.30	6.47	.58374E+04
495.95	26.40	9.30	91.7	0.109E+01	2.83	87.02	9.30	6.47	.59537E+04
505.60	26.40	9.30	91.7	0.109E+01	2.83	87.02	9.30	6.47	.60701E+04
515.24	26.40	9.30	91.8	0.109E+01	2.83	87.02	9.30	6.47	.61864E+04
524.88	26.40	9.30	91.8	0.109E+01	2.83	87.02	9.30	6.47	.63028E+04
534.53	26.40	9.30	91.8	0.109E+01	2.83	87.02	9.30	6.47	.64191E+04
544.17	26.40	9.30	91.8	0.109E+01	2.83	87.02	9.30	6.46	.65355E+04
553.81	26.40	9.30	91.8	0.109E+01	2.83	87.02	9.30	6.46	.66518E+04
563.46	26.40	9.30	91.8	0.109E+01	2.83	87.02	9.30	6.46	.67681E+04
573.10	26.40	9.30	91.9	0.109E+01	2.83	87.02	9.30	6.46	.68845E+04
582.74	26.40	9.30	91.9	0.109E+01	2.83	87.02	9.30	6.46	.70008E+04
592.39	26.40	9.30	91.9	0.109E+01	2.83	87.02	9.30	6.46	.71172E+04
602.03	26.40	9.30	91.9	0.109E+01	2.83	87.02	9.30	6.46	.72335E+04
611.67	26.40	9.30	91.9	0.109E+01	2.84	87.02	9.30	6.46	.73499E+04
621.32	26.40	9.30	91.9	0.109E+01	2.84	87.02	9.30	6.46	.74662E+04
630.96	26.40	9.30	91.9	0.109E+01	2.84	87.02	9.30	6.46	.75826E+04
640.60	26.40	9.30	92.0	0.109E+01	2.84	87.02	9.30	6.46	.76989E+04
650.25	26.40	9.30	92.0	0.109E+01	2.84	87.02	9.30	6.46	.78153E+04
659.89	26.40	9.30	92.0	0.109E+01	2.84	87.02	9.30	6.46	.79316E+04
669.53	26.40	9.30	92.0	0.109E+01	2.84	87.02	9.30	6.46	.80480E+04
679.18	26.40	9.30	92.0	0.109E+01	2.84	87.02	9.30	6.46	.81643E+04
688.82	26.40	9.30	92.0	0.109E+01	2.84	87.02	9.30	6.46	.82807E+04
698.46	26.40	9.30	92.1	0.109E+01	2.84	87.02	9.30	6.46	.83970E+04
708.11	26.40	9.30	92.1	0.109E+01	2.84	87.02	9.30	6.46	.85134E+04
717.75	26.40	9.30	92.1	0.109E+01	2.84	87.02	9.30	6.46	.86297E+04
727.39	26.40	9.30	92.1	0.109E+01	2.84	87.02	9.30	6.46	.87461E+04
737.04	26.40	9.30	92.1	0.109E+01	2.84	87.02	9.30	6.45	.88624E+04
746.68	26.40	9.30	92.1	0.109E+01	2.84	87.02	9.30	6.45	.89788E+04
756.32	26.40	9.30	92.2	0.109E+01	2.84	87.02	9.30	6.45	.90951E+04
765.97	26.40	9.30	92.2	0.108E+01	2.84	87.02	9.30	6.45	.92115E+04
775.61	26.40	9.30	92.2	0.108E+01	2.84	87.02	9.30	6.45	.93278E+04
785.25	26.40	9.30	92.2	0.108E+01	2.84	87.02	9.30	6.45	.94442E+04
794.90	26.40	9.30	92.2	0.108E+01	2.84	87.02	9.30	6.45	.95605E+04
804.54	26.40	9.30	92.2	0.108E+01	2.85	87.02	9.30	6.45	.96769E+04
814.18	26.40	9.30	92.3	0.108E+01	2.85	87.02	9.30	6.45	.97932E+04
823.82	26.40	9.30	92.3	0.108E+01	2.85	87.02	9.30	6.45	.99096E+04
833.47	26.40	9.30	92.3	0.108E+01	2.85	87.02	9.30	6.45	.10026E+05
843.11	26.40	9.30	92.3	0.108E+01	2.85	87.02	9.30	6.45	.10142E+05
852.75	26.40	9.30	92.3	0.108E+01	2.85	87.02	9.30	6.45	.10259E+05
862.40	26.40	9.30	92.3	0.108E+01	2.85	87.02	9.30	6.45	.10375E+05

```
872.04    26.40    9.30    92.4 0.108E+01   2.85    87.02    9.30    6.45   .10491E+05
881.68    26.40    9.30    92.4 0.108E+01   2.85    87.02    9.30    6.45   .10608E+05
891.33    26.40    9.30    92.4 0.108E+01   2.85    87.02    9.30    6.45   .10724E+05
900.97    26.40    9.30    92.4 0.108E+01   2.85    87.02    9.30    6.45   .10840E+05
910.61    26.40    9.30    92.4 0.108E+01   2.85    87.02    9.30    6.45   .10957E+05
920.26    26.40    9.30    92.4 0.108E+01   2.85    87.02    9.30    6.44   .11073E+05
929.90    26.40    9.30    92.5 0.108E+01   2.85    87.02    9.30    6.44   .11189E+05
939.54    26.40    9.30    92.5 0.108E+01   2.85    87.02    9.30    6.44   .11306E+05
949.19    26.40    9.30    92.5 0.108E+01   2.85    87.02    9.30    6.44   .11422E+05
958.83    26.40    9.30    92.5 0.108E+01   2.85    87.02    9.30    6.44   .11538E+05
968.47    26.40    9.30    92.5 0.108E+01   2.85    87.02    9.30    6.44   .11655E+05
978.12    26.40    9.30    92.5 0.108E+01   2.85    87.02    9.30    6.44   .11771E+05
987.76    26.40    9.30    92.6 0.108E+01   2.86    87.02    9.30    6.44   .11887E+05
997.40    26.40    9.30    92.6 0.108E+01   2.86    87.02    9.30    6.44   .12004E+05
1007.05    26.40    9.30    92.6 0.108E+01   2.86    87.02    9.30    6.44   .12120E+05
1016.69    26.40    9.30    92.6 0.108E+01   2.86    87.02    9.30    6.44   .12237E+05
1026.33    26.40    9.30    92.6 0.108E+01   2.86    87.02    9.30    6.44   .12353E+05
1035.98    26.40    9.30    92.6 0.108E+01   2.86    87.02    9.30    6.44   .12469E+05
1045.62    26.40    9.30    92.7 0.108E+01   2.86    87.02    9.30    6.44   .12586E+05
1055.26    26.40    9.30    92.7 0.108E+01   2.86    87.02    9.30    6.44   .12702E+05
1064.91    26.40    9.30    92.7 0.108E+01   2.86    87.02    9.30    6.44   .12818E+05
1074.55    26.40    9.30    92.7 0.108E+01   2.86    87.02    9.30    6.44   .12935E+05
1084.19    26.40    9.30    92.7 0.108E+01   2.86    87.02    9.30    6.44   .13051E+05
1093.84    26.40    9.30    92.7 0.108E+01   2.86    87.02    9.30    6.44   .13167E+05
1103.48    26.40    9.30    92.8 0.108E+01   2.86    87.02    9.30    6.44   .13284E+05
1113.12    26.40    9.30    92.8 0.108E+01   2.86    87.02    9.30    6.43   .13400E+05
1122.77    26.40    9.30    92.8 0.108E+01   2.86    87.02    9.30    6.43   .13516E+05
1132.41    26.40    9.30    92.8 0.108E+01   2.86    87.02    9.30    6.43   .13633E+05
1142.05    26.40    9.30    92.8 0.108E+01   2.86    87.02    9.30    6.43   .13749E+05
1151.70    26.40    9.30    92.8 0.108E+01   2.86    87.02    9.30    6.43   .13865E+05
1161.34    26.40    9.30    92.9 0.108E+01   2.86    87.02    9.30    6.43   .13982E+05
1170.98    26.40    9.30    92.9 0.108E+01   2.86    87.02    9.30    6.43   .14098E+05
1180.63    26.40    9.30    92.9 0.108E+01   2.87    87.02    9.30    6.43   .14214E+05
1190.27    26.40    9.30    92.9 0.108E+01   2.87    87.02    9.30    6.43   .14331E+05
1199.91    26.40    9.30    92.9 0.108E+01   2.87    87.02    9.30    6.43   .14447E+05
1209.56    26.40    9.30    92.9 0.108E+01   2.87    87.02    9.30    6.43   .14564E+05
1219.20    26.40    9.30    93.0 0.108E+01   2.87    87.02    9.30    6.43   .14680E+05
Cumulative travel time =     14679.8398 sec  (    4.08 hrs)

Simulation limit based on maximum specified distance =   1219.20 m.
This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
-------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------
CORMIX2: Multiport Diffuser Discharges        End of Prediction File
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
```

Plume Graphics

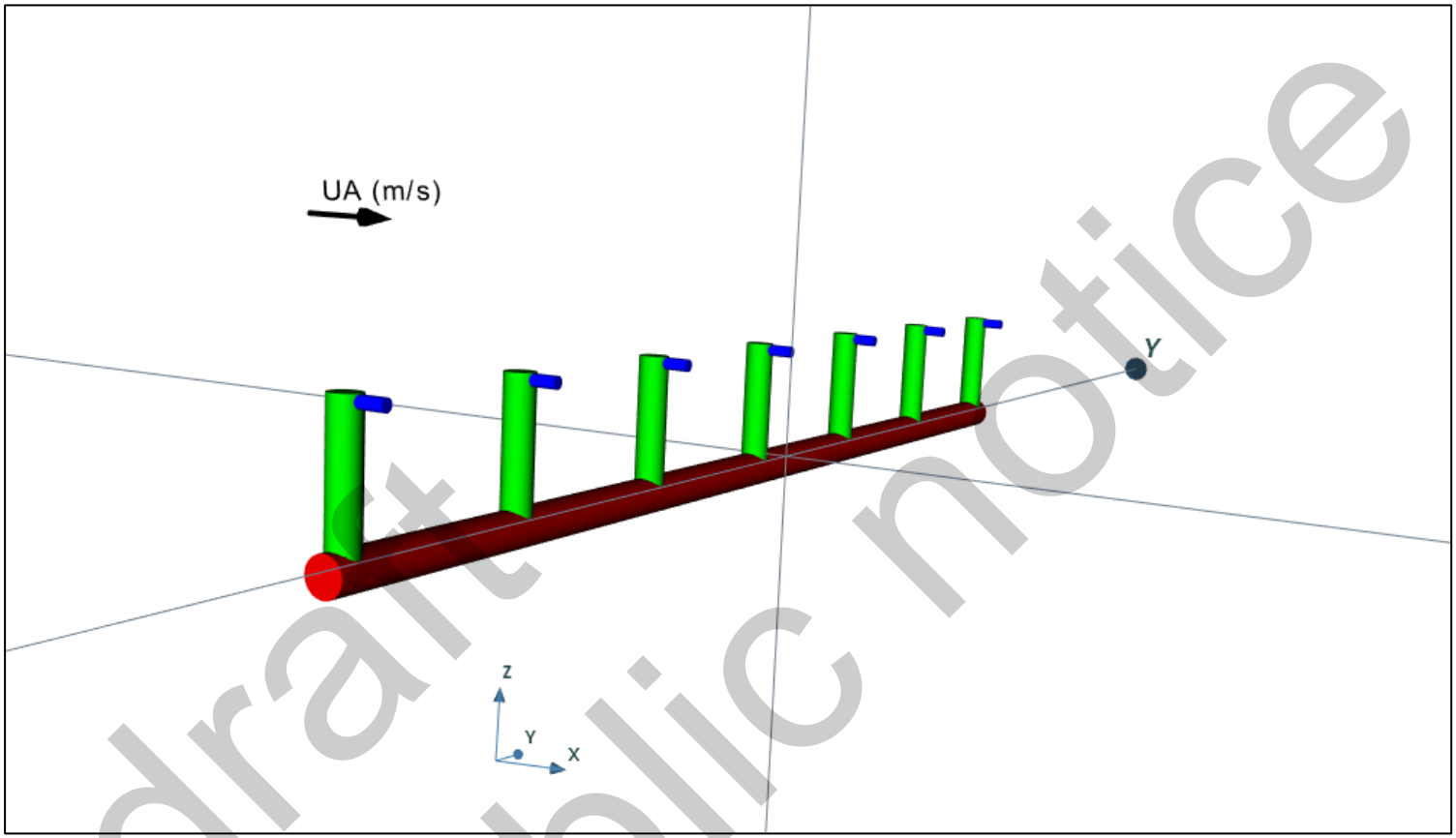

Figure A-1. WET CORMIX Plume – CorSpy Diffuser View

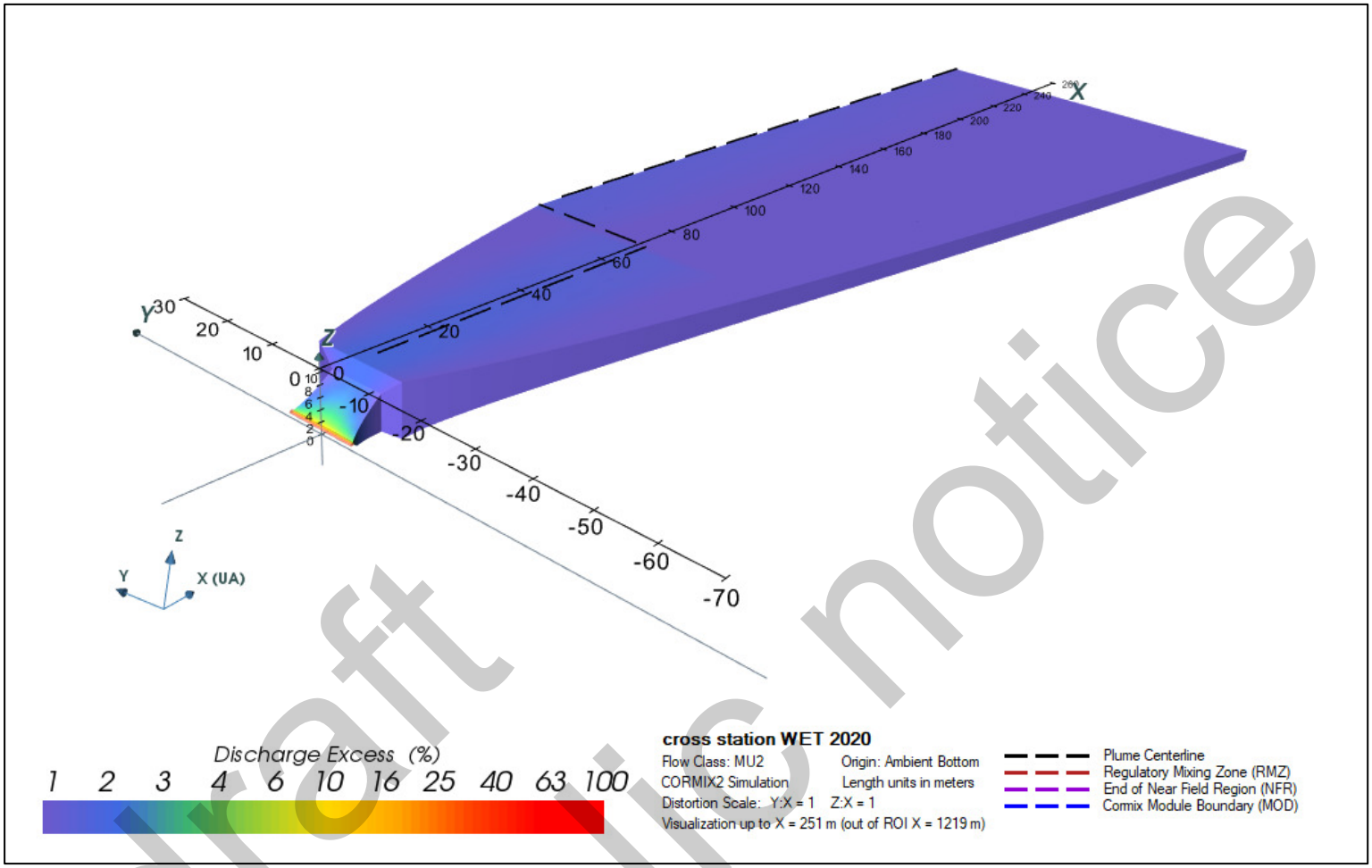

Figure A-2. WET CORMIX Plume – ISO View

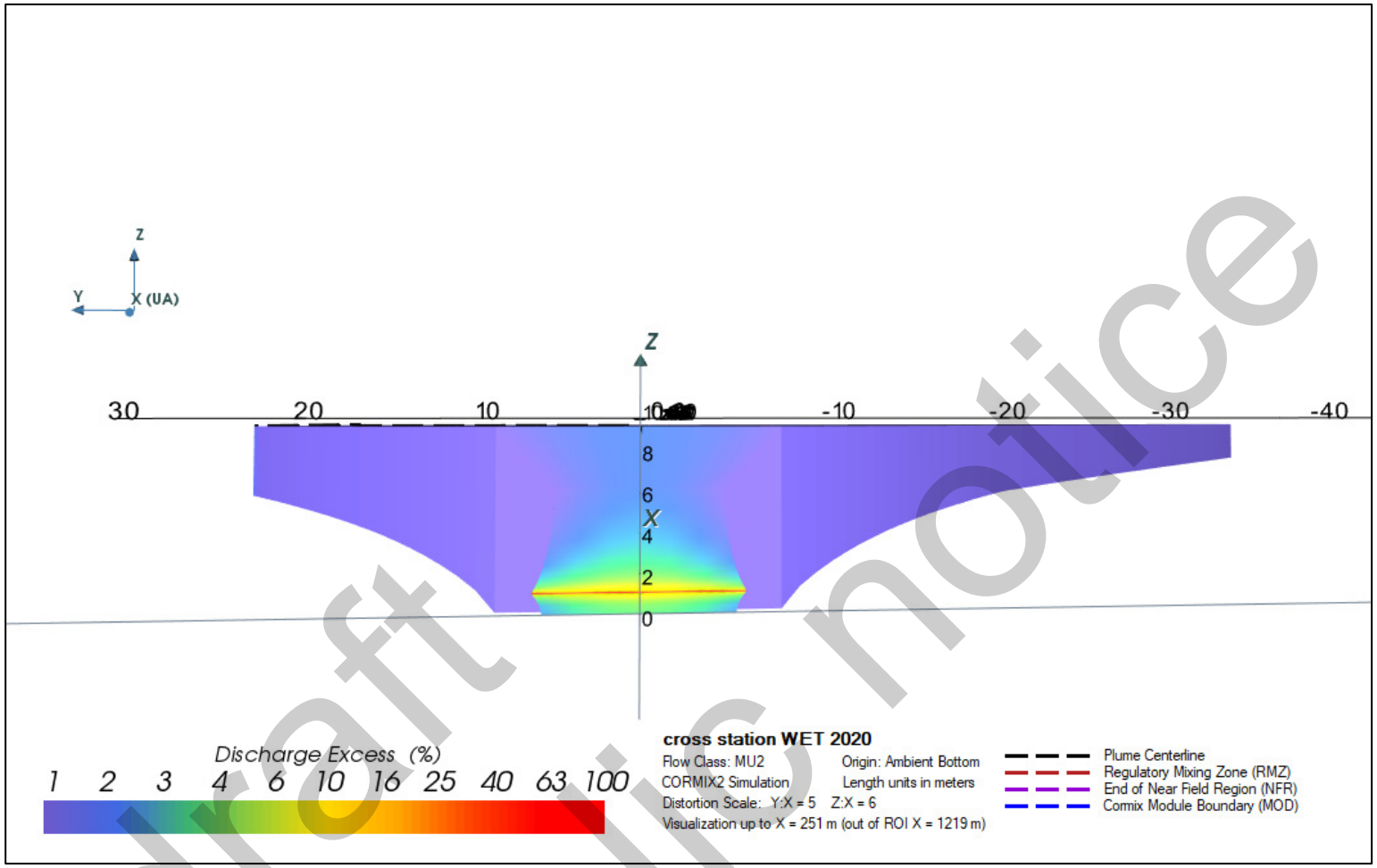

Figure A-3. WET CORMIX Plume – Side View Looking Downstream

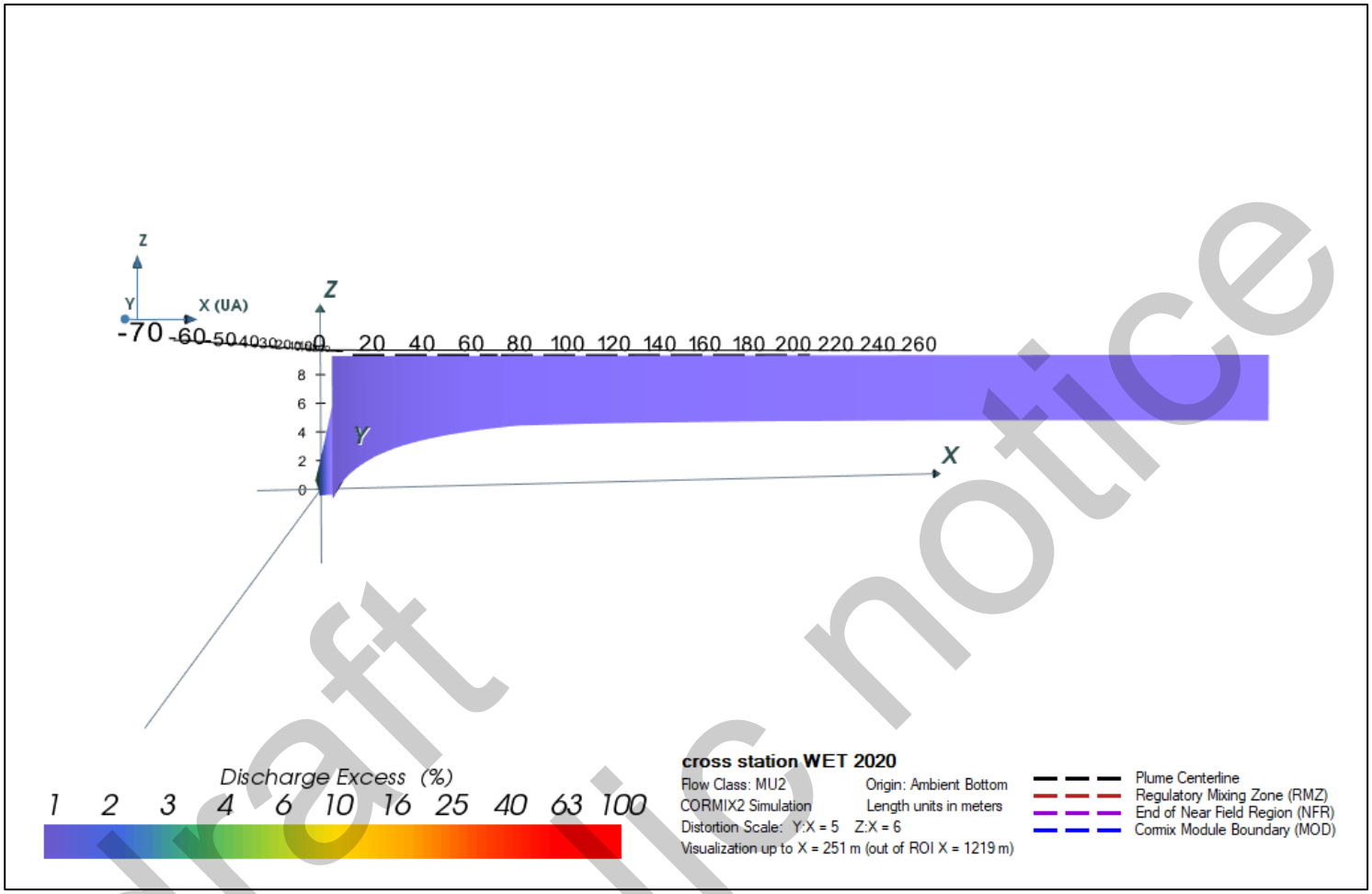

Figure A-4. WET CORMIX Plume – Side View (profile)

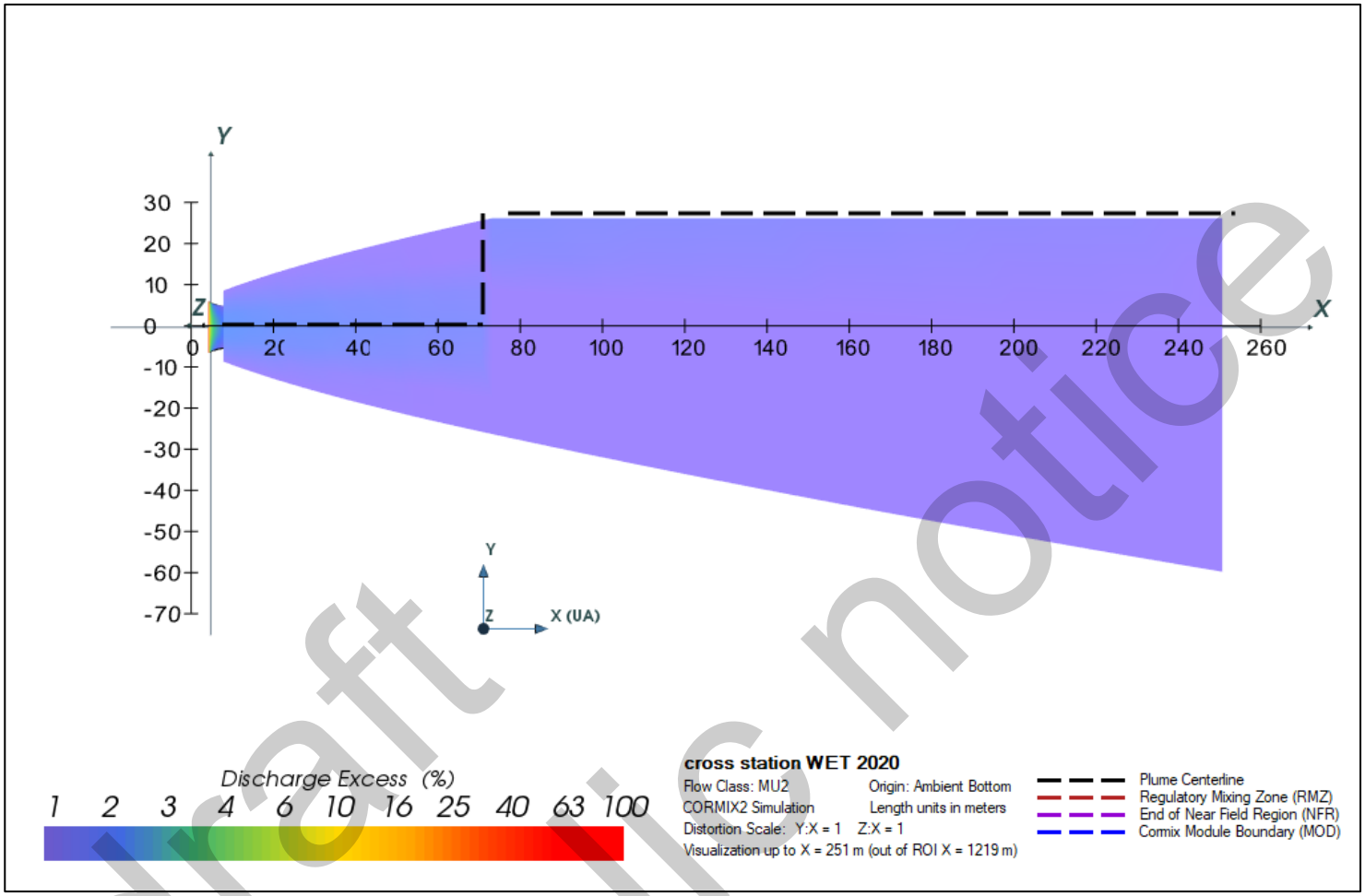

Figure A-5. WET CORMIX Plume – Plan View (full model reach)

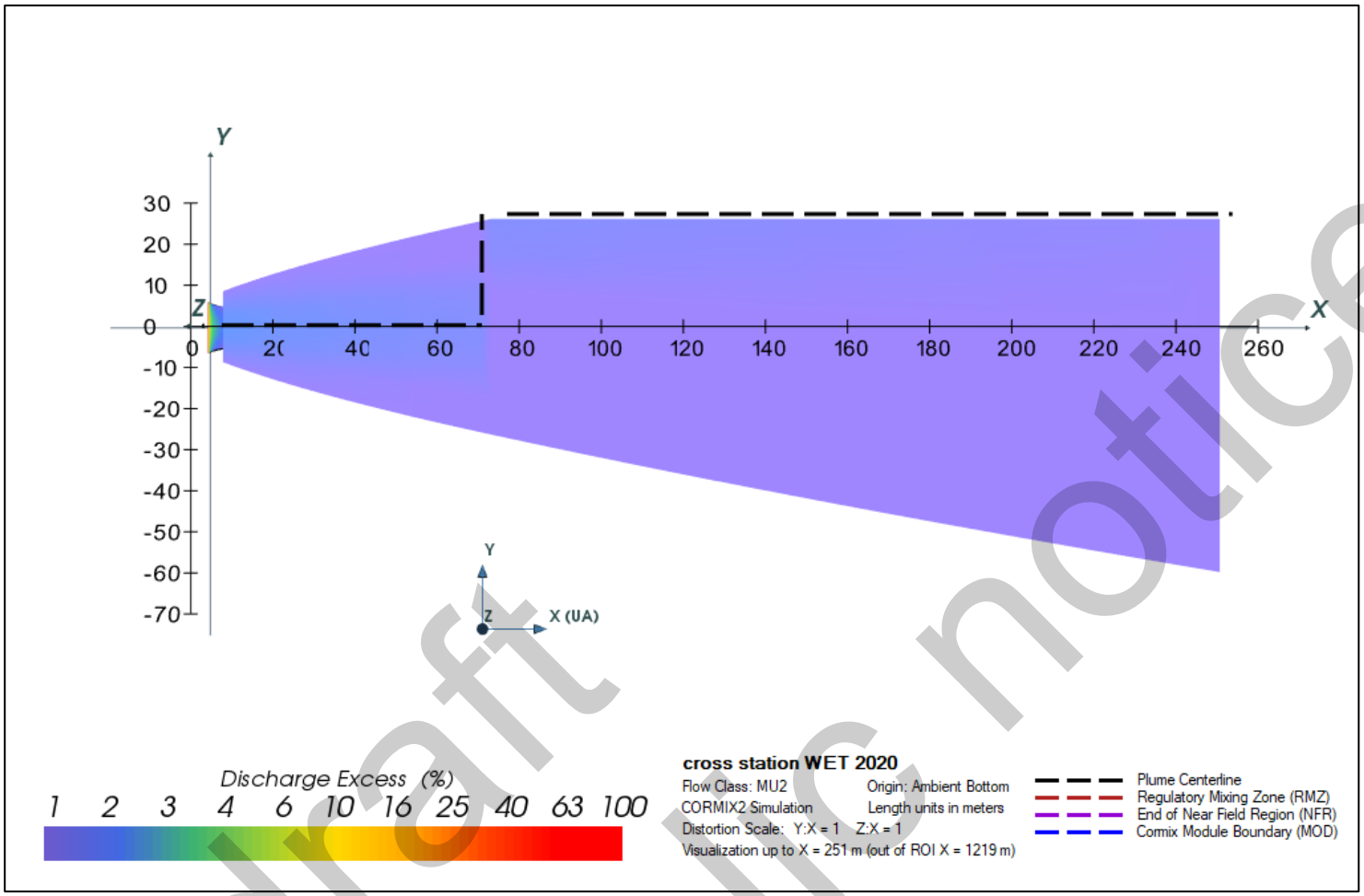

Figure A-6. WET CORMIX Plume – Plan View (reach through regulatory mixing zone)

SC, I think a zoomed in view helps DHEC visually gage the MZ size from the axes

Water Environment Consultants

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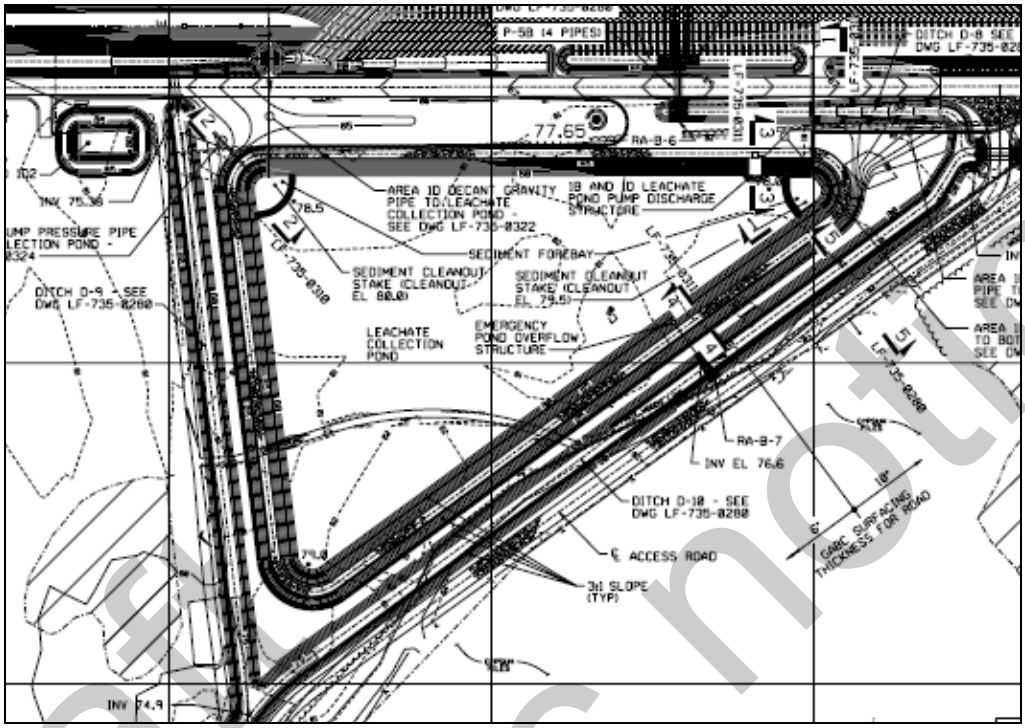
F. LABORATORY ANALYSIS

ADDENDUM

To Engineering Report In Support Of Construction Permit Application



Landfill Leachate Collection Pond
Cross Generating Station (SC0037401)

santee cooper

February 1, 2013

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		2.2.2 Modeling Total Suspended Solids	2
		2.2.3 Modeling Other Parameters	4
3.0	Discussion of Results		4
4.0	Form 2C for Modeled Combined Discharge		5

Appendices: A. Modeled Data Calculations and Worksheets
B. Long-Term Data, Cross Bottom Ash Pond

Certification Statement

I certify under penalty of law that I have personally examined and am familiar with the information submitted in the attached document; and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted 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.

Susan W. Jackson, P.E. 1/3/13
25476

STAMP AND SIGNATURE

1.0 Introduction

Santee Cooper has proposed a new wastewater collection pond to be built as part of a landfill expansion project at Cross Generating Station (NPDES # SC0037401). The station's landfill (083337-1601) provides for management of coal combustion residuals (CCRs) such as bottom ash, fly ash, gypsum/flue gas desulphurization sludge, and pyrites. The expanded landfill will meet the new Class 3 standards requiring a double liner and leachate collection system. It will also include operating procedures to allow for separate collection of stormwater which contacts the operating portions of the landfill (contact stormwater). These wastewaters will be collected in the proposed leachate collection pond (LCP) and be pumped to the station's existing bottom ash pond (BAP) for further treatment. Discharge to the Diversion Canal (FW classification per R.61-69) then takes place after treatment in the station's pH trim system by the station's existing discharge structure at 33° 21′ 36″ N, 80° 07′ 00″ W.

In late August 2012, Santee Cooper submitted a construction permit application for this project, complete with fee, forms, drawings, and an engineering report. In early-mid January 2013, DHEC requested additional water quality modeling after the waste streams combine and are treated in the bottom ash pond. The request included completion of a 2C form for the modeled discharge. This report has been prepared in response to DHEC's request.

2.0 Description of Project and Water Quality Modeling Technique

2.1 Project Description

As described in the original engineering report, he proposed LCP and all associated piping sits well outside the 100-year floodplain on approximately 8 acres of land. It has a design capacity of 2,349,412 cu. ft. The embankment elevation is 88.0 ft., average pond bottom elevation is 78.5 ft, and normal high water level is 81.8 ft. The LCP was sized according to the landfill regulations which require storage of contact stormwater for a 25-yr., 24-hr. storm in addition to one month's worth of leachate and one month's worth of contact stormwater from the active cells at any given time. The pond's design maximum average monthly collection will be 988,710 cu. ft. (0.25 MGD), which will occur during the rainiest months in the third phase of landfill operation, when the pond is receiving leachate from two cells (each on either side of the existing landfill), as the second cell (1D) is opened while the first cell (1B) is closed, and runoff from one open cell (1D). The pond will be allowed to fill, and will then be pumped down monthly or as necessary using two 2000 GPM pumps. If the 25-yr., 24-hr. storm were to occur on the last day of the rainiest month, the pumps would be sufficient to keep the pond from overflowing its emergency discharge structure (elevation 86.0 ft.). Depending on the stage of operation, the pump or pumps would come on at elevations ranging from 81.5-85.0 ft. (81.5 ft. during the critical design case). The proposed outfall and sampling location is the pond's pumping structure.

While the pond is primarily designed as a collection basin, some amount of settling will occur there. With this in mind, the pond may have to be excavated on occasion. Excavated sediment will be placed back in the landfill from which it came. To provide for safe excavation, the pond is equipped with two forebays at the point where the landfill's two drains enter the pond. The bulk of settling is expected to occur within these forebays, which are equipped with a 6-in.

concrete revetment to protect the pond's liner. The pond's liner is described in great detail in the original engineering report.

Representative leachate and contact stormwater water quality of water collected in the proposed LCP was included with the original engineering report, along with an estimate of combined effluent water quality from the proposed pond.

2.2 Modeling Technique and 2C Reporting

Per DHEC request, the water quality model primarily consists of a volumetric average of concentration data submitted in the 2010 NPDES Permit Renewal Application 2C form and data provided in form 2D to support permitting of the LCP.

Two different flow scenarios were modeled: (1) average flows, including projected flow from the LCP and long-term average flows already being processed through the bottom ash pond (BAP); and (2) maximum flows including the LCP maximum pumping capacity and the BAP long-term maximum. For the purposes of completing the 2C form for the modeled flows, the maximum values for concentration and mass from these two scenarios were entered as maximum daily and monthly values. However, it should be noted that it was sometimes the case that the maximum concentration was produced by the average flow scenario, rather than the maximum flow scenario. The modeled figures for the average flow scenario were always entered as the long term average value. All modeled data are included in Appendix A.

2.2.1 Input Data

Data from the 2010 renewal application 2C form were combined with recent long-term average and maximum flow data to represent the existing wastewater flows (Appendix B).

Data from the original LCP engineering report were generally used to represent the proposed new wastewater flows from the landfill. The exception was for total suspended solids (TSS), which would be expected to undergo additional settling in the BAP. Modeling of settling is further described below.

2.2.2 Modeling Total Suspended Solids

The original engineering report assumed that solids directed to the LCP would undergo at least two days of settling, resulting in a final concentration of approximately 238 ppm in the discharge (note that nearly complete settling would occur within about 8 days). Table 1, below, shows that the wastewater ([TSS] = 238 ppm) would likely enjoy a great deal more residence time in the BAP. In fact, for the scenarios described below, complete settling of particles of 0.0014 mm diameter would be expected in an additional 1.5-35 days, depending on the pond's capacity at any given moment in time.

Table 1. Bottom Ash Pond Settling at Various Operating Scenarios.†

Operating Condition	Pond Volume (AC-ft.)	Depth (ft.)	Residence Time (days)	Time to Settle (days)
Minimum Required	59.93	0.63 (Average)	4.89	1.46
2010 Renewal	260	2.73 (Average)	21.28	6.34
Empty	1211.69	15 (Maximum)	98.87	34.83

† Note: This table is largely reproduced from Table 2 of the original LCP engineering report. However, the time to settle has been changed slightly to reflect differences in specific gravity and modeled temperature favored by our consultant, Worley Parsons. The changes include a new settling velocity (v_s=4.9851E-6 fps), new specific gravity (2.4) and new temperature (70°F).

However, average residence time and depth are not necessarily reflective of the pond's treatment capability at a particular time, so additional treatment modeling was conducted using the overflow model described in equation 1. This equation[1] has been found to effectively model trapping efficiency (F) for a reactor operating at steady state with turbulent flow; it was chosen to provide a conservative estimate of effluent quality, as flow through the pond would certainly be laminar or quiescent for the majority of the route. The equation relates the settling velocity (v_s) to the critical velocity or overflow rate of the basin (v_c), where the overflow rate is related to the surface area of the pond (A) and the total flow through the system, as defined by equation 2.

$$F = 1 - exp(-v_s/v_c) \quad (1)$$

$$v_c = Q/A \quad (2)$$

The settling velocity was determined by Worley Parsons according to Stokes' Law for a specific gravity of 2.4 and a temperature of 70°F and a particle with a diameter of 0.0014 mm. Total flow through the system was determined by summing proposed flow from the LCP and existing long-term flows through the BAP. To provide additional conservatism, the pond was modeled at approximately half its surface area (48.5 AC), as the pond does fill prior to ash removal to the landfill.

Modeling was conducted for both the average and maximum flow scenarios. The fraction trapped (F) was deducted from the LCP discharge concentration (238 ppm TSS) to develop a post-treatment concentration. Then the modeled final discharge concentration was calculated as a volumetric average, including the 2010 TSS value[2] shown on the 2C form (8.67 ppm TSS) and the relevant flow condition. TSS modeling calculations are provided in Appendix A.

[1] Haan, C.T., Barfield, B.J., and Hayes, J.C. (1994). *Design Hydrology and Sedimentology for Small Catchments*. Academic Press, San Diego. 332-335. Print.

[2] The 2010 NPDES renewal provided a maximum daily TSS concentration of 8.67 ppm. This value is still reasonable, given long term average data since Cross Unit 4 went into operation in October 2008, provided in Appendix B.

2.2.3 Modeling Other Parameters

Parameters other than TSS were strictly modeled as a volumetric average for the average and maximum flow conditions from the BAP and LCP. Concentration data for the existing station flows through the BAP were taken from the 2010 NPDES Renewal Application 2C form for this outfall (002). Concentration data for the proposed flows from the landfill's LCP were estimated using data from the literature[3], combined with stormwater data collected from Cross for contact stormwater, based on a volumetric average of all relevant flows (leachate, contact stormwater, and direct/non-contact stormwater). This procedure was discussed in great detail in the original engineering report for the LCP.

Modeling was not conducted for GC/MS fraction volatiles, acid compounds, and base/neutral compounds or pesticides. These compounds were not found in the 2010 NPDES Renewal Application 2C form for this outfall, and they were not found in a previous stormwater sample of contact stormwater from the landfill. These compounds are marked "believed absent" on the 2C form.

3.0 Discussion of Results

Generally, constituent concentrations were low and similar to concentrations provided for the BAP in the 2C form included for this outfall in the 2010 NPDES Permit Renewal application.

All concentrations and masses for the average and maximum flow conditions are included in the Modeled Data Worksheet included with Appendix A. As described in section 2.2, maximum data for the day or month was chosen based on the maximum value for both concentration and mass from the two modeled flow conditions. This is because it is conceivable (although highly unlikely) that both the maximum concentration, which sometimes occurs at the average flow condition, and the maximum mass released, which always occurs at the maximum flow condition, could occur within the same day or month. Average data in the 2C form is always from the model for the average flow condition. Daily and monthly maximum values for concentration and mass released for each modeled parameter are included on the 2C form included in section 4.0, along with long-term average modeled values for concentration and mass.

There is no reason to believe GC/MS fraction volatiles, acid compounds, and base/neutral compounds or pesticides are present in either the existing station wastewaters or the proposed wastewaters from the landfill. Therefore, the 2C form shows "believed absent" for these compounds.

[3] EPRI and US DOE, 2006. *Characterization of Field Leachates at Coal Combustion Product Management Sites: Arsenic, Selenium, Chromium, and Mercury Speciation.* Palo Alto, CA and Pittsburg, PA.

5.0 Form 2C for Modeled Combined Discharge

Please print or type in the unshaded areas only.

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)
SC0037401

Form Approved.
OMB No. 2040-0086.
Approval expires 3-31-98.

FORM 2C NPDES

U.S. ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR PERMIT TO DISCHARGE WASTEWATER
EXISTING MANUFACTURING, COMMERCIAL, MINING AND SILVICULTURE 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 NUMBER (*list*)	B. LATITUDE			C. LONGITUDE			D. RECEIVING WATER (*name*)
	1. DEG.	2. MIN.	3. SEC.	1. DEG.	2. MIN.	3. SEC.	
002' modeled	33.00	21.00	58.00	80.00	6.00	45.00	Diversion Canal to Lake Moultrie

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	
002'	pH Trim Facility	2.18 MGD	Flow from Bottom Ash Pond (BAP) Through pH Adjustment System	2-K	
		(Long-term average since Cross	-Cooling Towers usually blow down to the BAP	4-A	
		Unit 4 became operational in	-This form includes a modeled discharge from the proposed landfill wastewater pond to the		
		Oct. 2008	BAP.		

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

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		4. FLOW				
		a. DAYS PER WEEK (*specify average*)	b. MONTHS PER YEAR (*specify average*)	a. FLOW RATE (*in mgd*)		B. TOTAL VOLUME (*specify with units*)		C. DURATION (*in days*)
				1. LONG TERM AVERAGE	2. MAXIMUM DAILY	1. LONG TERM AVERAGE	2. MAXIMUM DAILY	
002 *	pH Trim Facility - Bottom Ash Pond Discharge durations & flows from this outfall is dependent on system load and meteorological conditions. The station cooling towers are equipped with permitted outfalls providing flexibility to discharge to the Diversion Canal, although this seldom happens; generally they blow down through the ash pond. In addition, station stormwater is routed through the ash pond, as is the proposed landfill wastewater pond.	*	*	*	*	*	*	*

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			2. AFFECTED OUTFALLS (*list outfall numbers*)
a. QUANTITY PER DAY	b. UNITS OF MEASURE	c. OPERATION, PRODUCT, MATERIAL, ETC. (*specify*)	
NA	NA	NA	NA

IV. IMPROVEMENTS

A. Are you now required by any Federal, State or local authority to meet any implementation schedule for the construction, upgrading or operations 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		3. BRIEF DESCRIPTION OF PROJECT	4. FINAL COMPLIANCE DATE	
	a. NO.	b. SOURCE OF DISCHARGE		a. REQUIRED	b. PROJECTED
Landfill Consent Agreement	n/a	Leachate Collection Pond	Construct a new landfill, which will require leachate collection and thus treatment. The proposed wastewater pond will discharge through the existing bottom ash pond and NPDES outfall 002. The actions required under the consent agreement must be completed by 6/30/2016.	6/30/2016	6/30/2016

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 PROGRAMS IS ATTACHED

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)
SC0037401

CONTINUED FROM PAGE 2

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
See attached			

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*)

Fly Ash
Gypsum
Bottom Ash
Pyrites

Cross Generating Station – SC0037401
Form 2C Supplemental Information

Item V.D. Effluent Characteristics

The following substances may be released intermittently in trace amounts. We have listed these substances in response to 40 CFR 117.12(a)(2) and (c) to qualify for an exclusion under Section 311(a)(2) of the Clean Water Act.

1. Pollutant	2. Reason for Discharge
Formaldehyde (Table 2C-3)	Flue gas desulfurization (FGD) – scrubber lab analysis
Monomethylamine (Table 2C-3)	Inline sample analyzer reagent
Acetic acid (Table 2C-4)	Various lab analysis
Adipic acid (Table 2C-4)	FGD modules to improve module efficiency (component of Dibasic Acid)
Aluminum Sulfate (Table 2C-4)	Water pretreatment
Ammonia (Table 2C-4)	Various lab analysis and cleaning
Ammonium acetate (Table 2C-4)	Various lab analysis
Ammonium hydroxide (Table 2C-4)	Boiler feedwater treatment (pH control)
Ammonium sulfide (Table 2C-4)	Lab analysis
Calcium arsenite (Table 2C-4)	Lab analysis
Chlorine (Table 2C-4)	Wastewater treatment (disinfection)
Cupric sulfate (Table 2C-4)	Lab analysis
Ethylene diaminetertracetic acid (Table 2C-4)	Lab analysis and boiler chemical cleaning
Formic acid (Table 2C-4)	Lab analysis and inline sampler analyzer reagent
Hydrochloric acid (Table 2C-4)	Lab analysis – FGD/various
Isoprene (Table 2C-4)	Lab analysis
Nitric acid (Table 2C-4)	Lab analysis, FGD modules to improve module efficiency (component of Dibasic Acid)
Phosphoric acid (Table 2C-4)	Lab analysis
Potassium hydroxide (Table 2C-4)	Lab analysis
Potassium permanganate (Table 2C-4)	Drying agent for gas samples
Silver nitrate (Table 2C-4)	Lab analysis
Sodium arsenite (Table 2C-4)	Lab analysis
Sodium hydroxide (Table 2C-4)	Water demineralization and wastewater treatment (pH)
Sodium hypochlorite (Table 2C-4)	Wastewater treatment and cooling tower blowdown
Sulfuric acid (Table 2C-4)	Water demineralization
Vanadium	Component of Dibasic Acid (used in FGD modules) and in selective catalytic reduction catalyst

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*)

As required by the current NPDES permit, the Outfall 002 discharge is tested for toxicity using ceriodaphnia dubia as the test organism. These results are reported to DHEC on the monthly DMR. The toxicity testing is performed by Aquatox Laboratories (Lab ID 10581)

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract 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*)
General Engineering Laboratories, LLC (ID 10120)	PO Box 30712 Charleston, SC 29417	843-556-8171	For 2C Permit Renewal Analyses (from 2010 permit renewal and ditch sample for stormwater), Oil and Grease monthly analysis, Quarterly Low Level Mercury
Santee Cooper Cross Station (ID 08554)	533 Cross Station Road Pineville, SC 29468	843-351-4586	Monthly DMR Data Including TRC, pH, Flow, TSS, DO, BOD, Fecal Coliform, FAC, Outfall 005 2E Fecal (from 2010 permit renewal).
Santee Cooper Central Lab (ID08552)	1 Riverwood Drive Moncks Corner, SC 29461	843-761-8000	Collection of ditch sample and field parameters, also some metals, nutrients, color, fecal coliform, etc.
Aquatox Laboratories (ID 10581)	740 North Gum Street Summerville, SC 29483	843-873-8073	Monthly DMR: Toxicity
Swearingen Ecology Associates (ID 36001)	7126 Broad River Road Columbia, SC 29063	803-749-0056	Monthly DMR: Toxicity

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 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 (*type or print*)	B. PHONE NO. (*area code & no.*)
Jay A. Hudson, P.E.; Manager, Environmental Management	(843) 761-8000
C. SIGNATURE	D. DATE SIGNED
	2/4/2013

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*): SC0037401

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

OUTFALL NO.: 002' (modeled)

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) 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	3. UNITS (*specify if blank*) a. CONCENTRATION	3. UNITS b. MASS	4. INTAKE (*optional*) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	4. INTAKE a. LONG TERM AVERAGE VALUE (2) MASS	4. INTAKE b. NO. OF ANALYSES
a. Biochemical Oxygen Demand (*BOD*)	<3.08	<2.98E2	<3.08	<2.98E2	<2.01	<4.08E1	na	mg/L	lb/day	na	na	na
b. Chemical Oxygen Demand (*COD*)	60.28	5.84E3	60.28	5.84E3	58.16	1.18E3	na	mg/L	lb/day	na	na	na
c. Total Organic Carbon (*TOC*)	6.60	4.99E2	6.60	4.99E2	6.60	1.34E2	na	mg/L	lb/day	na	na	na
d. Total Suspended Solids (*TSS*)	70.04	6.79E3	70.04	6.79E3	9.27	1.88E2	na	mg/L	lb/day	na	na	na
e. Ammonia (*as N*)	0.21	15.0	0.21	15.0	0.21	4.23	na	mg/L	lb/day	na	na	na
f. Flow	VALUE 11.62 MGD (est.)		VALUE 11.62 MGD (est.)		VALUE 2.43 MGD (est.)		na	na	na	VALUE na		na
g. Temperature (*winter*)	VALUE near-ambient		VALUE near-ambient		VALUE near-ambient		na	°C		VALUE na		na
h. Temperature (*summer*)	VALUE near-ambient		VALUE near-ambient		VALUE near-ambient		na	°C		VALUE na		na
i. pH	MINIMUM 7.37	MAXIMUM 7.37	MINIMUM 7.37	MAXIMUM 7.37			na	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 or 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) 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	4. UNITS a. CONCENTRATION	4. UNITS b. MASS	5. INTAKE (*optional*) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	5. INTAKE a. LONG TERM AVERAGE VALUE (2) MASS	5. INTAKE b. NO. OF ANALYSES
a. Bromide (24959-67-9)	X		18.72	1.49E3	18.72	1.49E3	18.72	3.79E2	na	mg/L	lb/d	na	na	na
b. Chlorine, Total Residual	X		<0.07	<7.24	<0.07	<7.24	<0.03	<6.7E-1	na	mg/L	lb/d	na	na	na
c. Color	X		20	-	20	-	20	-	na	pcu	na	na	na	na
d. Fecal Coliform	X		<2	-	<2	-	<2	-	na	cfu/.1L	na	na	na	na
e. Fluoride (16984-48-8)	X		3.32	2.61E2	3.32	2.61E2	3.32	6.72E1	na	mg/L	lb/d	na	na	na
f. Nitrate-Nitrite (*as N*)	X		1.02	60.0	1.02	60.0	1.02	2.06E1	na	mg/L	lb/d	na	na	na

ITEM V-B CONTINUED FROM FRONT

1. POLLUTANT AND CAS NO. (*if available*)	2. MARK "X"		3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
g. Nitrogen, Total Organic (*as N*)	X		1.65	1.09E2	1.65	1.09E2	1.65	3.33E1	na	mg/L	lb/d	na	na	na
h. Oil and Grease	X		<4.81	<4.66E2	<4.81	<4.66E2	<2.58	<5.23E1	na	mg/L	lb/d	na	na	na
i. Phosphorus (as P), Total (7723-14-0)	X		0.07	6.02	0.07	6.02	0.07	1.50	na	mg/L	lb/d	na	na	na
j. Radioactivity														
(1) Alpha, Total	X		171.61	4.35	171.61	4.35	171.61	1.58	na	pCi/L	mCi/d	na	na	na
(2) Beta, Total	X		126.10	5.55	126.10	5.55	75.54	6.95E-1	na	pCi/L	mCi/d	na	na	na
(3) Radium, Total	X		2.58	8.89E-2	2.58	8.89E-2	2.58	2.38E-2	na	pCi/L	mCi/d	na	na	na
(4) Radium 226, Total	X		1.34	5.90E-2	1.34	5.90E-2	<0.62	<5.8E-3	na	pCi/L	mCi/d	na	na	na
k. Sulfate (*as SO_4*) (14808-79-8)	X		1384.27	1.17E5	1384.27	1.17E5	1384.27	2.80E4	na	mg/L	lb/d	na	na	na
l. Sulfide (*as S*)		X	<100	<9.69	<100	<9.69	<50	<1.01	na	ug/L	lb/d	na	na	na
m. Sulfite (*as SO_3*) (14265-45-3)	X		4.97	4.82E2	4.97	4.82E2	1.72	3.48E1	na	mg/L	lb/d	na	na	na
n. Surfactants		X	<50	4.84	<50	4.84	<25	<5.1E-1	na	ug/L	lb/d	na	na	na
o. Aluminum, Total (7429-90-5)	X		227.41	16.3	227.41	16.3	227.41	4.61	na	ug/L	lb/d	na	na	na
p. Barium, Total (7440-39-3)	X		135.46	9.96	135.46	9.96	135.46	2.74	na	ug/L	lb/d	na	na	na
q. Boron, Total (7440-42-8)	X		24.16	1.40E3	24.16	1.40E3	24.16	4.89E2	na	mg/L	lb/d	na	na	na
r. Cobalt, Total (7440-48-4)	X		22.59	1.30	22.59	1.30	22.59	4.58E-1	na	ug/L	lb/d	na	na	na
s. Iron, Total (7439-89-6)	X		3.00	1.66E2	3.00	1.66E2	3.00	6.08E1	na	mg/L	lb/d	na	na	na
t. Magnesium, Total (7439-95-4)	X		243.15	1.44E4	243.15	1.44E4	243.15	4.93E3	na	mg/L	lb/d	na	na	na
u. Molybdenum, Total (7439-98-7)	X		280.36	27.2	280.36	27.2	80.69	1.63	na	ug/L	lb/d	na	na	na
v. Manganese, Total (7439-96-5)	X		4.79	2.66E2	4.79	2.66E2	4.79	9.71E1	na	mg/L	lb/d	na	na	na
w. Tin, Total (7440-31-5)		X	<7.52	<7.3E-1	<7.52	<7.3E-1	<4.74	<9.7E-2	na	ug/L	lb/d	na	na	na
x. Titanium, Total (7440-32-6)		X	<50	<4.84	<50	<4.84	<25	<5.1E-1	na	ug/L	lb/d	na	na	na

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)	OUTFALL NUMBER
SC0037401	002' (modeled)

CONTINUED FROM PAGE 3 OF FORM 2-C

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 that 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	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
METALS, CYANIDE, AND TOTAL PHENOLS															
1M. Antimony, Total (7440-36-0)	X	X		3.91	3.8E-1	3.91	3.8E-1	2.53	<6E-2	na	ug/L	lb/d	na	na	na
2M. Arsenic, Total (7440-38-2)	X	X		42.73	3.08	42.73	3.08	42.73	<0.87	na	ug/L	lb/d	na	na	na
3M. Beryllium, Total (7440-41-7)	X	X		<0.60	<6E-2	<0.60	<6E-2	<0.47	<0.01	na	ug/L	lb/d	na	na	na
4M. Cadmium, Total (7440-43-9)	X	X		4.13	2.5E-1	4.13	2.5E-1	4.13	0.084	na	ug/L	lb/d	na	na	na
5M. Chromium, Total (7440-47-3)	X	X		<4.16	<0.403	<4.16	<0.403	<2.58	<0.06	na	ug/L	lb/d	na	na	na
6M. Copper, Total (7440-50-8)	X	X		<6.73	<0.652	<6.73	<0.652	<4.84	<0.10	na	ug/L	lb/d	na	na	na
7M. Lead, Total (7439-92-1)	X	X		<1.36	<0.131	<1.36	<0.131	<0.97	<0.02	na	ug/L	lb/d	na	na	na
8M. Mercury, Total (7439-97-6)	X	X		63.72	4.4E-3	63.72	4.4E-3	63.72	<2E-3	na	ng/L	lb/d	na	na	na
9M. Nickel, Total (7440-02-0)	X	X		126.01	7.77	126.01	7.77	126.01	2.55	na	ug/L	lb/d	na	na	na
10M. Selenium, Total (7782-49-2)	X	X		265.21	16.5	265.21	16.5	265.21	5.37	na	ug/L	lb/d	na	na	na
11M. Silver, Total (7440-22-4)	X	X		<2.67	<0.259	<2.67	<0.259	<2.27	<5E-2	na	ug/L	lb/d	na	na	na
12M. Thallium, Total (7440-28-0)	X	X		1.81	1.8E-1	1.81	1.8E-1	0.87	<2E-2	na	ug/L	lb/d	na	na	na
13M. Zinc, Total (7440-66-6)	X	X		48.91	2.89	48.91	2.89	48.91	0.991	na	ug/L	lb/d	na	na	na
14M. Cyanide, Total (57-12-5)	X	X		14.79	1.03	14.79	1.03	14.79	0.300	na	ug/L	lb/d	na	na	na
15M. Phenols, Total	X		X	<5	<0.484	<5	<0.484	<2.5	<6E-2	na	ug/L	lb/d	na	na	na
DIOXIN															
2,3,7,8-Tetra-chlorodibenzo-P-Dioxin (1764-01-6)			X	DESCRIBE RESULTS na											

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – VOLATILE COMPOUNDS															
1V. Accrolein (107-02-8)			X	na	na	na	na	na	na	na	na	na	na	na	na
2V. Acrylonitrile (107-13-1)			X	na	na	na	na	na	na	na	na	na	na	na	na
3V. Benzene (71-43-2)			X	na	na	na	na	na	na	na	na	na	na	na	na
4V. Bis (*Chloromethyl*) Ether (542-88-1)			X	na	na	na	na	na	na	na	na	na	na	na	na
5V. Bromoform (75-25-2)			X	na	na	na	na	na	na	na	na	na	na	na	na
6V. Carbon Tetrachloride (56-23-5)			X	na	na	na	na	na	na	na	na	na	na	na	na
7V. Chlorobenzene (108-90-7)			X	na	na	na	na	na	na	na	na	na	na	na	na
8V. Chlorodibromomethane (124-48-1)			X	na	na	na	na	na	na	na	na	na	na	na	na
9V. Chloroethane (75-00-3)			X	na	na	na	na	na	na	na	na	na	na	na	na
10V. 2-Chloroethylvinyl Ether (110-75-8)			X	na	na	na	na	na	na	na	na	na	na	na	na
11V. Chloroform (67-66-3)			X	na	na	na	na	na	na	na	na	na	na	na	na
12V. Dichlorobromomethane (75-27-4)			X	na	na	na	na	na	na	na	na	na	na	na	na
13V. Dichlorodifluoromethane (75-71-8)			X	na	na	na	na	na	na	na	na	na	na	na	na
14V. 1,1-Dichloroethane (75-34-3)			X	na	na	na	na	na	na	na	na	na	na	na	na
15V. 1,2-Dichloroethane (107-06-2)			X	na	na	na	na	na	na	na	na	na	na	na	na
16V. 1,1-Dichloroethylene (75-35-4)			X	na	na	na	na	na	na	na	na	na	na	na	na
17V. 1,2-Dichloropropane (78-87-5)			X	na	na	na	na	na	na	na	na	na	na	na	na
18V. 1,3-Dichloropropylene (542-75-6)			X	na	na	na	na	na	na	na	na	na	na	na	na
19V. Ethylbenzene (100-41-4)			X	na	na	na	na	na	na	na	na	na	na	na	na
20V. Methyl Bromide (74-83-9)			X	na	na	na	na	na	na	na	na	na	na	na	na
21V. Methyl Chloride (74-87-3)			X	na	na	na	na	na	na	na	na	na	na	na	na

CONTINUED FROM PAGE V-4

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – VOLATILE COMPOUNDS (*continued*)															
22V. Methylene Chloride (75-09-2)			X	na	na	na	na	na	na	na	na	na	na	na	na
23V. 1,1,2,2-Tetrachloroethane (79-34-5)			X	na	na	na	na	na	na	na	na	na	na	na	na
24V. Tetrachloro-ethylene (127-18-4)			X	na	na	na	na	na	na	na	na	na	na	na	na
25V. Toluene (108-88-3)			X	na	na	na	na	na	na	na	na	na	na	na	na
26V. 1,2-Trans-Dichloroethylene (156-60-5)			X	na	na	na	na	na	na	na	na	na	na	na	na
27V. 1,1,1-Trichloro-ethane (71-55-6)			X	na	na	na	na	na	na	na	na	na	na	na	na
28V. 1,1,2-Trichloro-ethane (79-00-5)			X	na	na	na	na	na	na	na	na	na	na	na	na
29V Trichloro-ethylene (79-01-6)			X	na	na	na	na	na	na	na	na	na	na	na	na
30V. Trichloro-fluoromethane (75-69-4)			X	na	na	na	na	na	na	na	na	na	na	na	na
31V. Vinyl Chloride (75-01-4)			X	na	na	na	na	na	na	na	na	na	na	na	na
GC/MS FRACTION – ACID COMPOUNDS															
1A. 2-Chlorophenol (95-57-8)			X	na	na	na	na	na	na	na	na	na	na	na	na
2A. 2,4-Dichloro-phenol (120-83-2)			X	na	na	na	na	na	na	na	na	na	na	na	na
3A. 2,4-Dimethyl-phenol (105-67-9)			X	na	na	na	na	na	na	na	na	na	na	na	na
4A. 4,6-Dinitro-O-Cresol (534-52-1)			X	na	na	na	na	na	na	na	na	na	na	na	na
5A. 2,4-Dinitro-phenol (51-28-5)			X	na	na	na	na	na	na	na	na	na	na	na	na
6A. 2-Nitrophenol (88-75-5)			X	na	na	na	na	na	na	na	na	na	na	na	na
7A. 4-Nitrophenol (100-02-7)			X	na	na	na	na	na	na	na	na	na	na	na	na
8A. P-Chloro-M-Cresol (59-50-7)			X	na	na	na	na	na	na	na	na	na	na	na	na
9A. Pentachloro-phenol (87-86-5)			X	na	na	na	na	na	na	na	na	na	na	na	na
10A. Phenol (108-95-2)			X	na	na	na	na	na	na	na	na	na	na	na	na
11A. 2,4,6-Trichloro-phenol (88-05-2)			X	na	na	na	na	na	na	na	na	na	na	na	na

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCEN-TRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – BASE/NEUTRAL COMPOUNDS															
1B. Acenaphthene (83-32-9)			X	na	na	na	na	na	na	na	na	na	na	na	na
2B. Acenaphtylene (208-96-8)			X	na	na	na	na	na	na	na	na	na	na	na	na
3B. Anthracene (120-12-7)			X	na	na	na	na	na	na	na	na	na	na	na	na
4B. Benzidine (92-87-5)			X	na	na	na	na	na	na	na	na	na	na	na	na
5B. Benzo (*a*) Anthracene (56-55-3)			X	na	na	na	na	na	na	na	na	na	na	na	na
6B. Benzo (*a*) Pyrene (50-32-8)			X	na	na	na	na	na	na	na	na	na	na	na	na
7B. 3,4-Benzo-fluoranthene (205-99-2)			X	na	na	na	na	na	na	na	na	na	na	na	na
8B. Benzo (*ghi*) Perylene (191-24-2)			X	na	na	na	na	na	na	na	na	na	na	na	na
9B. Benzo (*k*) Fluoranthene (207-08-9)			X	na	na	na	na	na	na	na	na	na	na	na	na
10B. Bis (*2-Chloro-ethoxy*) Methane (111-91-1)			X	na	na	na	na	na	na	na	na	na	na	na	na
11B. Bis (*2-Chloro-ethyl*) Ether (111-44-4)			X	na	na	na	na	na	na	na	na	na	na	na	na
12B. Bis (*2-Chloroisopropyl*) Ether (102-80-1)			X	na	na	na	na	na	na	na	na	na	na	na	na
13B. Bis (*2-Ethyl-hexyl*) Phthalate (117-81-7)			X	na	na	na	na	na	na	na	na	na	na	na	na
14B. 4-Bromophenyl Phenyl Ether (101-55-3)			X	na	na	na	na	na	na	na	na	na	na	na	na
15B. Butyl Benzyl Phthalate (85-68-7)			X	na	na	na	na	na	na	na	na	na	na	na	na
16B. 2-Chloro-naphthalene (91-58-7)			X	na	na	na	na	na	na	na	na	na	na	na	na
17B. 4-Chloro-phenyl Phenyl Ether (7005-72-3)			X	na	na	na	na	na	na	na	na	na	na	na	na
18B. Chrysene (218-01-9)			X	na	na	na	na	na	na	na	na	na	na	na	na
19B. Dibenzo (*a,h*) Anthracene (53-70-3)			X	na	na	na	na	na	na	na	na	na	na	na	na
20B. 1,2-Dichloro-benzene (95-50-1)			X	na	na	na	na	na	na	na	na	na	na	na	na
21B. 1,3-Di-chloro-benzene (541-73-1)			X	na	na	na	na	na	na	na	na	na	na	na	na

CONTINUED FROM PAGE V-6

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – BASE/NEUTRAL COMPOUNDS (*continued*)															
22B. 1,4-Dichlorobenzene (106-46-7)			X	na	na	na	na	na	na	na	na	na	na	na	na
23B. 3,3-Dichlorobenzidine (91-94-1)			X	na	na	na	na	na	na	na	na	na	na	na	na
24B. Diethyl Phthalate (84-66-2)			X	na	na	na	na	na	na	na	na	na	na	na	na
25B. Dimethyl Phthalate (131 -11-3)			X	na	na	na	na	na	na	na	na	na	na	na	na
26B. Di-N-Butyl Phthalate (84-74-2)			X	na	na	na		na	na	na	na	na	na	na	na
27B. 2,4-Dinitrotoluene (121-14-2)			X	na	na	na	na	na	na	na	na	na	na	na	na
28B. 2,6-Dinitrotoluene (606-20-2)			X	na	na	na	na	na	na	na	na	na	na	na	na
29B. Di-N-Octyl Phthalate (117-84-0)			X	na	na	na	na	na	na	na	na	na	na	na	na
30B. 1,2-Diphenylhydrazine (*as Azobenzene*) (122-66-7)			X	na	na	na	na	na	na	na	na	na	na	na	na
31B. Fluoranthene (206-44-0)			X	na	na	na	na	na	na	na	na	na	na	na	na
32B. Fluorene (86-73-7)			X	na	na	na	na	na	na	na	na	na	na	na	na
33B. Hexachlorobenzene (118-74-1)			X	na	na	na	na	na	na	na	na	na	na	na	na
34B. Hexachlorobutadiene (87-68-3)			X	na	na	na	na	na	na	na	na	na	na	na	na
35B. Hexachlorocyclopentadiene (77-47-4)			X	na	na	na	na	na	na	na	na	na	na	na	na
36B Hexachloroethane (67-72-1)			X	na	na	na	na	na	na	na	na	na	na	na	na
37B. Indeno (*1,2,3-cd*) Pyrene (193-39-5)			X	na	na	na	na	na	na	na	na	na	na	na	na
38B. Isophorone (78-59-1)			X	na	na	na	na	na	na	na	na	na	na	na	na
39B. Naphthalene (91-20-3)			X	na	na	na	na	na	na	na	na	na	na	na	na
40B. Nitrobenzene (98-95-3)			X	na	na	na	na	na	na	na	na	na	na	na	na
41B. N-Nitrosodimethylamine (62-75-9)			X	na	na	na	na	na	na	na	na	na	na	na	na
42B. N-Nitrosodi-N-Propylamine (621-64-7)			X	na	na	na	na	na	na	na	na	na	na	na	na

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCEN-TRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – BASE/NEUTRAL COMPOUNDS (*continued*)															
43B. N-Nitro-sodiphenylamine (86-30-6)			X	na	na	na	na	na	na	na	na	na	na	na	na
44B. Phenanthrene (85-01-8)			X	na	na	na	na	na	na	na	na	na	na	na	na
45B. Pyrene (129-00-0)			X	na	na	na	na	na	na	na	na	na	na	na	na
46B. 1,2,4-Tri-chlorobenzene (120-82-1)			X	na	na	na	na	na	na	na	na	na	na	na	na
GC/MS FRACTION – PESTICIDES															
1P. Aldrin (309-00-2)			X	na	na	na	na	na	na	na	na	na	na	na	na
2P. α-BHC (319-84-6)			X	na	na	na	na	na	na	na	na	na	na	na	na
3P. β-BHC (319-85-7)			X	na	na	na	na	na	na	na	na	na	na	na	na
4P. γ-BHC (58-89-9)			X	na	na	na	na	na	na	na	na	na	na	na	na
5P. δ-BHC (319-86-8)			X	na	na	na	na	na	na	na	na	na	na	na	na
6P. Chlordane (57-74-9)			X	na	na	na	na	na	na	na	na	na	na	na	na
7P. 4,4'-DDT (50-29-3)			X	na	na	na	na	na	na	na	na	na	na	na	na
8P. 4,4'-DDE (72-55-9)			X	na	na	na	na	na	na	na	na	na	na	na	na
9P. 4,4'-DDD (72-54-8)			X	na	na	na	na	na	na	na	na	na	na	na	na
10P. Dieldrin (60-57-1)			X	na	na	na	na	na	na	na	na	na	na	na	na
11P. α-Enosulfan (115-29-7)			X	na	na	na	na	na	na	na	na	na	na	na	na
12P. β-Endosulfan (115-29-7)			X	na	na	na	na	na	na	na	na	na	na	na	na
13P. Endosulfan Sulfate (1031-07-8)			X	na	na	na	na	na	na	na	na	na	na	na	na
14P. Endrin (72-20-8)			X	na	na	na	na	na	na	na	na	na	na	na	na
15P. Endrin Aldehyde (7421-93-4)			X	na	na	na	na	na	na	na	na	na	na	na	na
16P. Heptachlor (76-44-8)			X	na	na	na	na	na	na	na	na	na	na	na	na

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)	OUTFALL NUMBER
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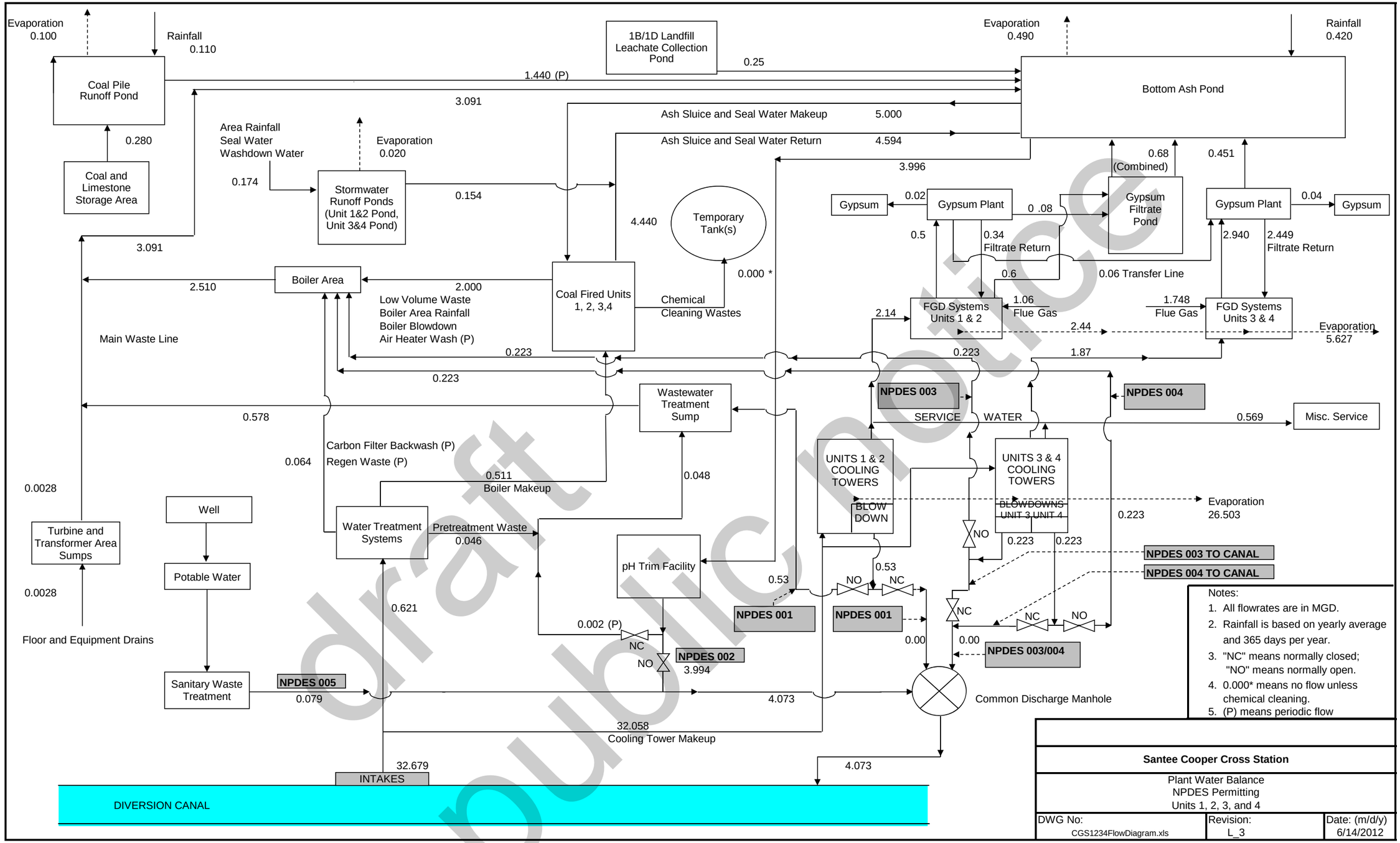
1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCEN-TRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – PESTICIDES (*continued*)															
17P. Heptachlor Epoxide (1024-57-3)			X	na	na	na	na	na	na	na	na	na	na	na	na
18P. PCB-1242 (53469-21-9)			X	na	na	na	na	na	na	na	na	na	na	na	na
19P. PCB-1254 (11097-69-1)			X	na	na	na	na	na	na	na	na	na	na	na	na
20P. PCB-1221 (11104-28-2)			X	na	na	na	na	na	na	na	na	na	na	na	na
21P. PCB-1232 (11141-16-5)			X	na	na	na	na	na	na	na	na	na	na	na	na
22P. PCB-1248 (12672-29-6)			X	na	na	na	na	na	na	na	na	na	na	na	na
23P. PCB-1260 (11096-82-5)			X	na	na	na	na	na	na	na	na	na	na	na	na
24P. PCB-1016 (12674-11-2)			X	na	na	na	na	na	na	na	na	na	na	na	na
25P. Toxaphene (8001-35-2)			X	na	na	na	na	na	na	na	na	na	na	na	na



Appendix A: Modeled Data Calculations and Worksheet

- **TSS Modeling Calculations**
- **Modeled Data Worksheet**

A-1. TSS Calculations 1/2

Settling Velocity Estimate

*Produced using Worley Parsons figures for SG and viscosity at 70F

Diam	0.0014 mm	g	32.2 ft/sec2
SG	2.4	ν_{70F}	0.0000106 ft2/sec

Stokes Law: $v_s = [(SG_{particle}-1)D_{ft}^2 g]/18\nu$

v_s = 4.98E-06 fps

(had previously estimated 0.38 ft day^{-1} or 4.40E-6 fps, so a ~12% change here)

Apply Updated Settling Velocity to Bottom Ash Pond Settling Estimates

*Update Engineering Report Table 2 (New Table 1 in Addendum)

Operating Condition	Pond Volume (AC-ft)	Depth (ft)	Residence Time (Days)	Time to Settle (Days)	% Change
Minimum Required	59.93	0.63	4.89	1.46	12.79
2010 Renewal	260	2.73	21.28	6.34	13.25
Empty	1211.69	15	98.87	34.83	13.32

*Depths are average depths for the 97-AC pond for the Minimum Case and the 2010 Renewal Case.
Depth is maximum depth for the pond operating at an empty condition

A-2. TSS Calculations 2/2

Model TSS Trapping In Bottom Ash Pond

LCP TSS Concentration 238 ppm (Estimate developed in LCP Engineering Report)
Assume BAP 50% Full 48.5 AC
Calculated v_s 4.98E-06 fps

	Flow Conditions	
	Avg (MGD)	Max (MGD)
LCP Q	0.25	5.76
BAP Q	2.18	5.86
Total Q	2.43	11.62

Chen (1975) **Overflow Rate Equation** $F = 1-\exp(-v_s/v_c)$
to estimate trapping efficency (F) of
a reactor at steady state and with $v_c = Q_{total}/A$
turbulent flow (from Haan et al., 1994)

Estimate Trapping Efficiency

Flow Condition	v_c	F	F (%)
Average Flow	1.78E-06	0.9393	93.93
Maximum Flow	8.51E-06	0.4434	44.34

Apply Trapping Efficiency to TSS from LCP

Average Flow Case 14.45 ppm
Maximum Flow Case 132.48 ppm

* This just estimates the results of settling from the LCP inflow to the BAP. There is also the plant's existing discharges into the BAP whose inflow TSS concentrations we do not know. However, we can complete the model for TSS concentration in proposed combined flows through the BAP using the discharge figure from the 2010 NPDES Permit Renewal Application 2C form for Outfall 002

Estimate Final BAP Proposed Discharge Concentration by Mass/Flow Balance

Volumetric Average TSS = $(Q_{BAP}*C_{BAP}+Q_{LCP}*C_{LCP})/Q_{Total}$

Existing Flow BAP Discharge Concentration: 8.67 ppm TSS

Flow Condition	TSS_{Avg}
Average Flow	9.27
Maximum Flow	70.04

A-2. Modeled Data Worksheet

	LCP 2D Concentration Est.			Existing Outfall 002 Recent Flow Data		
	Min	Avg	Max	Min	Avg	Max
Updated Flows (MGD):	0	0.25	5.76	-	2.18	5.86

	LCP 2D Concentration Est.			Existing Outfall 002 Most-Recent 2C Est.			Projected New Outfall 002[1] 2C Concentration Est. - Average Flow Conditions				Projected New Outfall 002[1] 2C Concentration Est. - Max Flow Conditions			
	Units	Modif.	Value	Units	Modif.	Value	Units	Modif	Value	Load - Avg (lbs/d)	Units	Modif	Value	Load - Max Load (lbs/d)
BOD	ppm		2.14	ppm	<	4	ppm	<	2.01	4.08E+01	ppm	<	3.08	2.98E+02
COD	ppm		63	ppm		57.6	ppm		58.16	1.18E+03	ppm		60.28	5.84E+03
TOC	ppm		3.3	ppm		6.98	ppm		6.60	1.34E+02	ppm		5.16	4.99E+02
TSS[2]	ppm		238	ppm		8.67	ppm		9.27	1.88E+02	ppm		70.04	6.79E+03
Flow	MGD		-	MGD		-	MGD		-	-	MGD		-	-
Ammonia	ppm		0.085	ppm		0.223	ppm		0.21	4.23E+00	ppm		0.15	1.50E+01
Temp (w)			-			-			-	-			-	-
Temp (s)			-			-			-	-			-	-
pH	S.U.		7.1	S.U.		7.4	S.U.		7.37	-	S.U.		7.25	-
Bromide	ppm		11	ppm		19.6	ppm		18.72	3.79E+02	ppm		15.34	1.49E+03
TRC[3]	ppm	<	0.10	ppm	<	0.05	ppm	<	0.03	6.63E-01	ppm	<	0.07	7.24E+00
Color	pcu		-	pcu		20	pcu		-	-	pcu		-	-
Fecal Coliform	cfu/100 mL		-	cfu/100 mL	<	2	cfu/100 mL		2	-	cfu/100 mL		2	-
Fluoride	ppm		1.9	ppm		3.48	ppm		3.32	6.72E+01	ppm		2.70	2.61E+02
Nitrate-Nitrite	ppm	<	0.1	ppm		1.13	ppm		1.02	2.06E+01	ppm		0.62	6.00E+01
Total Org. N	ppb		430	ppb		1810	ppb		1645.91	3.33E+01	ppb		1125.94	1.09E+02
Oil and Grease	ppm	<	4.35	ppm	<	5.26	ppm	<	4.94	1.00E+02	ppm	<	4.81	4.66E+02
P-Total	ppm		0.047	ppm		0.077	ppm		0.07	1.50E+00	ppm		0.06	6.02E+00
Alpha	pCi/L	<	5	pCi/L		191	pCi/L - mCi/d		171.61	1.58E+00	pCi/L - mCi/d		98.80	4.35E+00
Beta	pCi/L		191	pCi/L		62.3	pCi/L - mCi/d		75.54	6.95E-01	pCi/L - mCi/d		126.10	5.55E+00
Rad	pCi/L		1.3	pCi/L		2.73	pCi/L - mCi/d		2.58	2.38E-02	pCi/L - mCi/d		2.02	8.89E-02
Rad 226	pCi/L		1.69	pCi/L	<	1	pCi/L - mCi/d	<	0.62	5.72E-03	pCi/L - mCi/d		1.34	5.90E-02
Sulfate	ppm		985.5	ppm		1430	ppm		1384.27	2.80E+04	ppm		1209.66	1.17E+05
Sulfide	ppb	<	100	ppb	<	100	ppb	<	50	1.01E+00	ppb	<	100	9.69E+00
Sulfite	ppm		8	ppm	<	2	ppm		1.72	3.48E+01	ppm		4.97	4.82E+02
MBAS	ppb	<	50	ppb	<	50	ppb	<	25	5.06E-01	ppb	<	50	4.84E+00
Al	ppb		91.5	ppb		243	ppb		227.41	4.61E+00	ppb		167.90	1.63E+01
Ba	ppb		61	ppb		144	ppb		135.46	2.74E+00	ppb		102.86	9.96E+00
B	ppb		2028	ppb		26700	ppb		24161.73	4.89E+02	ppb		14470.16	1.40E+03
Co	ppb		1.6	ppb		25	ppb		22.59	4.58E-01	ppb		13.40	1.30E+00
Fe	ppb		64.7	ppb		3340	ppb		3003.03	6.08E+01	ppb		1716.44	1.66E+02
Mg	ppm		26.5	ppm		268	ppm		243.15	4.93E+03	ppm		148.29	1.44E+04
Mo	ppb		536.7	ppb		28.4	ppb		80.69	1.63E+00	ppb		280.36	2.72E+01
Mn	ppb		110.9	ppb		5330	ppb		4793.06	9.71E+01	ppb		2742.91	2.66E+02
Sn	ppb	<	5	ppb	<	10	ppb	<	4.74	9.61E-02	ppb	<	7.52	7.29E-01
Ti	ppb	<	50	ppb	<	50	ppb	<	25	5.06E-01	ppb	<	50	4.84E+00
Sb	ppb		2.8	ppb	<	5	ppb		2.53	5.13E-02	ppb	<	3.91	3.79E-01
As	ppb		17.7	ppb		45.6	ppb		42.73	8.66E-01	ppb		31.77	3.08E+00
Be	ppb		0.2	ppb	<	1	ppb	<	0.47	9.50E-03	ppb	<	0.60	5.85E-02
Cd	ppb		0.6	ppb		4.53	ppb		4.13	8.36E-02	ppb		2.58	2.50E-01
Cr	ppb		3.3	ppb	<	5	ppb	<	2.58	5.23E-02	ppb	<	4.16	4.03E-01
Cu	ppb		3.4	ppb	<	10	ppb	<	4.84	9.80E-02	ppb	<	6.73	6.52E-01
Pb	ppb		0.7	ppb	<	2	ppb	<	0.97	1.96E-02	ppb	<	1.36	1.31E-01
Hg	ppt		22.5	ppt		68.45	ppt		63.72	1.29E-03	ppt		45.67	4.42E-03
Ni	ppb		21.5	ppb		138	ppb		126.01	2.55E+00	ppb		80.25	7.77E+00
Se	ppb		49	ppb		290	ppb		265.21	5.37E+00	ppb		170.54	1.65E+01
Ag	ppb		0.3	ppb	<	5	ppb	<	2.27	4.61E-02	ppb	<	2.67	2.59E-01
Tl	ppb		3	ppb		0.631	ppb		0.87	1.77E-02	ppb		1.81	1.75E-01
Zn	ppb		5.4	ppb		53.9	ppb		48.91	9.91E-01	ppb		29.86	2.89E+00
Cyanide	ppb	<	5	ppb		16.2	ppb		14.79	3.00E-01	ppb		10.65	1.03E+00
Phenols	ppb	<	5	ppb	<	5	ppb	<	2.5	5.06E-02	ppb	<	5	4.84E-01

	Maximum				
	Modifier	Concentration	Units	Load	Units
BOD	<	3.08	ppm	2.98E+02	lbs/d
COD		60.28	ppm	5.84E+03	lbs/d
TOC		6.60	ppm	4.99E+02	lbs/d
TSS[2]		70.04	ppm	6.79E+03	lbs/d
Flow		0.00	MGD	0.00E+00	lbs/d
Ammonia		0.21	ppm	1.50E+01	lbs/d
Temp (w)		-	-	-	-
Temp (s)		-	-	-	-
pH		7.37	S.U.	-	-
Bromide		18.72	ppm	1.49E+03	lbs/d
TRC	<	0.07	ppm	7.24E+00	lbs/d
Color		20	pcu	-	-
Fecal Coliform	<	2	cfu/100 mL	-	-
Fluoride		3.32	ppm	2.61E+02	lbs/d
Nitrate-Nitrite		1.02	ppm	6.00E+01	lbs/d
Total Org. N		1645.91	ppb	1.09E+02	lbs/d
Oil and Grease	<	4.94	ppm	4.66E+02	lbs/d
P-Total		0.07	ppm	6.02E+00	lbs/d
Alpha		171.61	pCi/L	4.35E+00	mCi/d
Beta		126.10	pCi/L	5.55E+00	mCi/d
Rad		2.58	pCi/L	8.89E-02	mCi/d
Rad 226		1.34	pCi/L	5.90E-02	mCi/d
Sulfate		1384.27	ppm	1.17E+05	lbs/d
Sulfide	<	100	ppb	9.69E+00	lbs/d
Sulfite		4.97	ppm	4.82E+02	lbs/d
MBAS	<	50	ppb	4.84E+00	lbs/d
Al		227.41	ppb	1.63E+01	lbs/d
Ba		135.46	ppb	9.96E+00	lbs/d
B		24161.73	ppb	1.40E+03	lbs/d
Co		22.59	ppb	1.30E+00	lbs/d
Fe		3003.03	ppb	1.66E+02	lbs/d
Mg		243.15	ppm	1.44E+04	lbs/d
Mo		280.36	ppb	2.72E+01	lbs/d
Mn		4793.06	ppb	2.66E+02	lbs/d
Sn	<	7.52	ppb	7.29E-01	lbs/d
Ti	<	50	ppb	4.84E+00	lbs/d
Sb		3.91	ppb	3.79E-01	lbs/d
As		42.73	ppb	3.08E+00	lbs/d
Be	<	0.60	ppb	5.85E-02	lbs/d
Cd		4.13	ppb	2.50E-01	lbs/d
Cr	<	4.16	ppb	4.03E-01	lbs/d
Cu	<	6.73	ppb	6.52E-01	lbs/d
Pb	<	1.36	ppb	1.31E-01	lbs/d
Hg		63.72	ppt	4.42E-03	lbs/d
Ni		126.01	ppb	7.77E+00	lbs/d
Se		265.21	ppb	1.65E+01	lbs/d
Ag	<	2.67	ppb	2.59E-01	lbs/d
Tl		1.81	ppb	1.75E-01	lbs/d
Zn		48.91	ppb	2.89E+00	lbs/d
Cyanide		14.79	ppb	1.03E+00	lbs/d
Phenols	<	5	ppb	4.84E-01	lbs/d

[1] Besides TSS, concentrations estimated by flow balance from initial inputs, previously provided to DHEC in initial construction permit application for the LCP and the 2C form for the existing outfall from the 2010 renewal application. Where one or both waste streams was found below detection limits, half of the detection limit was used for the given input, and the modifier maintained.

[2] TSS concentrations are modeled, as additional settling will take place in the bottom ash pond.

[3] In the course of preparing this estimate, an error was found in the 2D estimate for TRC from landfill wastewater. The EPRI and DOE (2006) report referenced in the 2D submittal did not include TRC for leachate, but only chloride data. The data presented here are TRC data from the March 2011 landfill stormwater sampling event (to represent both stormwater and leachate) and the 2010 2C data from the bottom ash pond.

Appendix B: Long-Term Data, Cross Bottom Ash Pond

- **Long Term Flow Data**
- **Long Term TSS Data**

Table B-1. Long-Term Average Flow Data, Cross Bottom Ash Pond.[†]

Year	Month	Flow (MGD)	
		AVG	MAX
2008	October	0.31	3.01
2008	November	0.02	4.32
2008	December	0.01	0.02
2009	January	0.31	4.32
2009	February	0.05	4.32
2009	March	0.32	4.32
2009	April	0.26	3.20
2009	May	0.32	4.32
2009	June	0.28	3.31
2009	July	2.63	3.84
2009	August	2.07	2.16
2009	September	0.16	2.06
2009	October	0.26	1.88
2009	November	3.17	4.32
2009	December	0.30	2.63
2010	January	0.01	0.45
2010	February	0.38	2.57
2010	March	0.32	3.82
2010	April	0.27	0.51
2010	May	0.18	0.41
2010	June	1.39	2.25
2010	July	1.81	3.06
2010	August	2.28	3.51
2010	September	1.29	2.04
2010	October	2.19	4.15
2010	November	1.56	2.83
2010	December	1.81	4.32
2011	January	2.97	4.32
2011	February	2.87	3.26
2011	March	2.24	4.32
2011	April	3.02	4.32
2011	May	3.13	4.32
2011	June	4.03	4.07
2011	July	2.86	4.02
2011	August	4.08	4.32
2011	September	4.07	4.32
2011	October	2.31	4.32
2011	November	4.22	5.86
2011	December	4.21	4.51
2012	January	4.38	4.53
2012	February	4.24	4.64

Table B-1 (cont'd.). Long-Term Average Flow Data, Cross Bottom Ash Pond. †

Year	Month	Flow (MGD)	
		AVG	MAX
2012	March	4.41	4.85
2012	April	4.51	4.97
2012	May	3.38	4.20
2012	June	3.72	4.30
2012	July	3.54	4.72
2012	August	4.38	4.71
2012	September	4.01	4.77
2012	October	4.23	4.70
2012	November	4.18	4.43
	AVG	2.18	3.61
	MIN	0.01	0.02
	MAX	4.51	5.86

† From monthly DMR data for outfall 002.

Table B-2. Long-Term Average TSS Data, Cross Bottom Ash Pond.[†]

Year	Month	TSS (mg/l)	
		avg	max
2008	October	8	8
2008	November	6	6
2008	December	6	6
2009	January	3	3
2009	February	5	5
2009	March	5	5
2009	April	2	2
2009	May	2	2
2009	June	11	11
2009	July	16	16
2009	August	10	10
2009	September	4	4
2009	October	15	15
2009	November	8	8
2009	December	16	16
2010	January	6	9
2010	February	8	8
2010	March	8	8
2010	April	8	8
2010	May	4	4
2010	June	11	11
2010	July	8	8
2010	August	8	8
2010	September	6	6
2010	October	3	3
2010	November	19	19
2010	December	9	9
2011	January	5	5
2011	February	3	3
2011	March	11	11
2011	April	3	3
2011	May	12	12
2011	June	7	7
2011	July	6	6
2011	August	10	10
2011	September	11	11
2011	October	12	12
2011	November	7	7
2011	December	16	16
2012	January	11	11
2012	February	18	18

Table B-2 (cont'd.). Long-Term Average TSS Data, Cross Bottom Ash Pond. †

Year	Month	TSS (mg/l)	
		avg	max
2012	March	12	12
2012	April	10	10
2012	May	11	11
2012	June	10	10
2012	July	7	7
2012	August	11	11
2012	September	11	11
2012	October	4	4
2012	November	6	6
	AVG	9	9
	MIN	2	2
	MAX	19	19

† From monthly DMR data for outfall 002.

NPDES Permit Renewal

Cross Generating Station (SC0037401)

santee cooper

March 2, 2010

Santee Cooper

One Riverwood Drive
Moncks Corner, SC 29461-2901
(843) 761-8000
P.O. Box 2946101
Moncks Corner, SC 29461-6101

March 2, 2010

South Carolina Department of Health
and Environmental Control
Attn: Ms. Patty G. Barnes
NPDES/ND Permit Administration Section
Bureau of Water
2600 Bull Street
Columbia, South Carolina 29201

Dear Ms. Barnes:

Re: SC PUBLIC SERVICE AUTHORITY/CROSS GENERATING STATION
NPDES Number SC0037401
Berkeley County

Enclosed please find the original and one (1) copy of our NPDES permit renewal application for the reference facility. We believe the application is administratively complete and in accordance with the guidance provided in Forms 1, 2C, and 2E. Besides the forms, the location supplement, sludge supplement, Cormix 5.0 modeling results, ash pond volume study, and an updated NPDES diagram are being provided per the department's instructions. In addition, Santee Cooper is requesting, based on modeling and sampling results, that the toxicity limit be removed and replaced with an annual monitor and report requirement and that the quarterly mercury monitor and report requirement be dropped altogether. A brief report providing a rationale for these requests is included.

Since the previous renewal, Cross has begun operating Units 3 and 4, but there have been no changes to industrial wastewater treatment. There has been a slight change to the sanitary wastewater package plant, in which chlorination/dechlorination have been supplanted by ozonation as the primary disinfection system. These changes are reflected appropriately in Forms 1, 2C, and 2E.

The "Sludge Disposal Supplement for NPDES and ND Permit Applications" form for sludge disposals from the sanitary sewage treatment facility is included with this package. Sludge is collected upstream of the new ozonation system, and operation of the sewage treatment facility has not otherwise changed. Therefore, it is believed the sludge characteristics have not changed, and no TCLP analysis is being submitted.

We look forward to receiving the draft permit. Should you have any questions or need additional information, please call Jesse Cannon at (843) 761-8000, extension 4377.

Sincerely,

Jay Hudson, P.E.
Manager
Environmental Management

Attachments

JAH:SWW:JWC:dks

File: A12 51100
I:\92200\CGS\NPDES\2010 Renewal\cover_letter.doc

cc: w/o attachments
Crystal Rippy
Manager,
Bureau of Water, SCDHEC
2600 Bull Street
Columbia, South Carolina 29201

w/attachments
Byron Amick
Bureau of Water, SCDHEC
2600 Bull Street
Columbia, South Carolina 29201

bcc: Phil Pierce (A205) Attn: Mike Davis w/attachments
Levon Strickland (CGS) Attn: Tim Swicord w/attachments

INTRODUCTION

Cross Generating Station was first placed in service in 1983 with the construction of Unit 2, a 540-MW coal-fired electrical generating unit. Units 1 (620 MW), 3 (580 MW) and 4 (580 MW) followed in 1995, 2007, and 2008, respectively. The facility discharges treated wastewater associated with these units and is therefore required to apply for a renewed NPDES permit every five years. Santee Cooper prepared the attached forms 1, 2C, and 2E and all required attachments in consultation with the Bureau of Water. This brief report is meant to describe the methods by which these reports were generated and to explain Santee Cooper's contention that there is no reasonable potential for toxicity or mercury at Cross, and that therefore these limits should be eliminated with the renewed permit. In addition, Santee Cooper will describe the results of studies required under the current permit and request that these studies not be required under the new permit.

SAMPLE REQUIREMENTS AND LOCATIONS

A complete renewal application requires outfall sampling. Cross Station outfalls 001 (Units 1 and 2 Cooling Tower Blowdown), 002 (pH Trim from the Bottom Ash Pond), 003 (Unit 3 Cooling Tower Blowdown) and 004 (Unit 4 Cooling Tower Blowdown) require completion of Form 2C, while outfall 005 (treated sanitary wastewater) requires the completion of Form 2E. This was confirmed with Bureau of Water personnel, who also confirmed that only one of outfalls 003 and 004 required sampling, as the two cooling towers are identical and are thus representative of one another.

Santee Cooper hired GEL Laboratories LLC to conduct 2C and 2E sampling and analysis to SCDHEC-mandated PQLs at Cross. Therefore, 2C sampling was conducted at outfalls 001, 002, and 004, and 2E sampling was conducted at outfall 005. Sampling involved both grab samples and 24-hour composite samples, conducted using ISCO compositors. Sampling took place January 20-22, 2010 in the Unit 1 cooling tower basin for 001, from the pH trim tank for 002, the Unit 4 cooling tower basin for 004/003, and from the dechlorination chamber for outfall 005. Resulting chemical concentration data are presented in Form 2C for each outfall.

FLOW DATA

Flow data for outfalls 002 and 005 are recorded at Cross for completion of their monthly DMRs. Because Unit 4 has only been running since October 2008, only data generated since that time were used to calculate long term average flows for these two outfalls (Table 1). This information is presented on the front of form 2C for these two outfalls; however, form 2E specifies average flow data from the last year, so only data from 2009 were used to calculate the average flow provided in form 2E.

Outfalls 001, 003, and 004 have the ability to blow down to the Diversion Canal, but in reality this is a rare occurrence. More often, they blow down to the Bottom Ash

Pond. In addition, flow data for blow down to the bottom ash pond is not recorded on monthly DMRs, so it was not possible to calculate a long term average. Therefore the flow numbers presented on the front of form 2C for these outfalls is taken from the NPDES flow diagram.

The station was asked to record flows for all outfalls on the days of sampling. Those data are reported within form 2C as maximum daily values for flow in Part V. For outfalls 002 and 005, maximum 30 day values and long term average data is also reported in Part V.

Table 1. Outfalls 002 and 005 Flow Data.

	002 Flow (MGD)		005 Flow (MGD)	
Date	**Average**	**Max**	**Average**	**Max**
Oct-08	0.31	3.01	0.0377	0.0507
Nov-08	0.02	4.32	0.0198	0.0378
Dec-08	0.01	0.02	0.0173	0.0212
Jan-09	0.31	4.32	0.0189	0.0208
Feb-09	0.05	4.32	0.018	0.0248
Mar-09	0.32	4.32	0.019	0.0232
Apr-09	0.26	3.2	0.0219	0.0348
May-09	0.32	4.32	0.0198	0.219
Jun-09	0.28	3.31	0.018	0.0413
Jul-09	2.63	3.84	0.026	0.086
Aug-09	2.07	2.16	0.46	0.88
Sep-09	0.16	2.06	0.012	0.045
Oct-09	0.26	1.88	0.0136	0.0148
Nov-09	3.17	4.32	0.0337	0.0439
Dec-09	0.3	2.63	0.0346	0.0476
Mean	0.698	3.202	0.051353	0.10606
*Unit 4 Entered Commercial Operation Oct 1 2008.				
*No other outfalls discharged over this time period.				

AVERAGING DATA

Most of the 2C and 2E parameters are not regularly sampled at Cross. However, where data was available from DMR reporting it was averaged over the period since Unit 4 entered commercial operation. This information is reported with the appropriate number of analyses.

MASS DATA

Mass data was created by multiplying appropriate flow data by the maximum daily, maximum 30-day, and long term average concentration data.

TOXICITY

The current permit requires monthly chronic toxicity sampling and analysis at 6% concentration. However, discharge flows have dropped since the current permit was developed, so the new Cormix modeling showed a more-dilute chronic toxicity concentration at the mixing zone boundary (1.4%). In addition, data collected since October 2008 (Table 2) shows that toxicity of the monitored outfall (002) effluent is quite low. With this in mind, Santee Cooper is requesting that chronic toxicity limits be removed and replaced by an annual monitor-and-report requirement.

Table 2. IC25 and LC50 Data.

	IC25 (%)	LC50 (%)	IC25 (%)	LC50 (%)
Oct-08	21.3	>99.8	30	>199
Nov-08	23.4	>100	31.7	>100
Dec-08	22.4	>100	43.6	78
Jan-09	16.05	100	53.7	100
Feb-09	14.9	100	56.5	100
Mar-09	17.8	100	53.8	>100
Apr-09	24.1	100	41.1	>100
May-09	20.3	99.9	50.7	79
June-09	17.75	>100	26.7	>100
Jul-09	20.7	>100	21.6	>100
Aug-09	15.85	>100	18.1	100
Sept-09	15.5	95.3	18.6	>100
Oct-09	27.8	78.4	18.3	>76
Nov-09	23.6	>100	16.3	73
Dec-09	22.4	88.3	16.6	>100

These data indicate that the worst-case sample was collected in February 2009 with an IC25 of 14.9%. This translates to a maxTUc = 6.71. Using SCDHEC's approach for calculating reasonable potential found in the current permit rational, reasonable potential exists when the receiving water concentration (RWC) is greater than 1 TUc, where

$$RWC = 1.5 * \max TUc * [CTC/100]$$

Using these parameters, the resulting RWC = 0.14, much less than 1, indicating that reasonable potential does not exist.

MERCURY

Santee Cooper is required to collect low-level mercury samples at Cross on a quarterly basis under the current permit. These data are included with the data from the January 2010 sampling in the 2C form. The data presented on the 2C form are averages since October 2008 along with January 2C sampling numbers, but the full set of DMR data is also presented here (Table 3).

Table 3. Cross Generating Station Mercury Data

Date	Intake [Hg]	Outfall [Hg]	Intake (load)	Outfall (load)	Delta (released load)
	ug/L	ug/L	lbs/day	lbs/day	lbs/day
Mar-07	0.0051	0.0445	0.0006	0.000279	-0.000321
Jun-07	0.0015	0.0374	0.000209	0.000131	-0.000078
Sep-07	0.0009	0.0312	0.000144	0.000078	-0.000066
Dec-07	0.0009	0.1351	0.000082	0.002762	0.00268
Mar-08	0.0017	0.0915	0.00011	0.000534	0.000422
Jun-08	0.001	0.0679	0.000086	0.000045	-0.000044
Sep-08	0.0023	0.1501	0.0002	0.000501	0.000305
Dec-08	0.0011	0.0584	0.000114	0.000215	0.000103
Mar-09	0.005	0.0815	0.00017	0.000238	0.000066
Jun-09	0.0894	0.0011	0.002784	0.000003	-0.002781
Sep-09	0.0009	0.0338	0.000026	0.000392	0.000366
Dec-09	0.0185	0.0986	0.001373	0.000206	-0.001163
AVG:	0.01069167	0.06925833	0.0004915	0.000448667	0.000432167
MAX:	0.0894	0.1501	0.002784	0.002762	0.00268
MIN:	0.0009	0.0011	0.000026	0.000003	-0.002781
COUNT:	12	12	12	12	12
STDEV:	0.02527836	0.04418448	0.00081297	0.000747801	0.001235189

The current permit does not include a dilution factor, which, in the case of mercury, would be based on the Diversion Canal's 7Q10. In working through the reasonable potential calculations, Santee Cooper has found that the mercury concentration of effluent discharged through 002 is less than limitations suggested by the department's calculations, which generally include dilution factors. Thus reasonable potential does not exist and mercury limits should be dropped with the new permit.

SUMMARY OF REPORTS REQUIRED UNDER CURRENT PERMIT

The current permit required a Mercury Minimization Study and a demonstration that intake flows had been reduced commensurate with an closed-cycle cooling system. Santee Cooper met these requirements to the department's satisfaction and believes that both objectives have been achieved. Therefore we request that these reports not be required with the renewed permit.

Please print or type in the unshaded areas only.

Form Approved. OMB No. 2040-0086.

FORM 1 GENERAL

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	SC0037401		D
1	2 — 13	14	15

LABEL ITEMS

- I. EPA I.D. NUMBER
- III. FACILITY NAME
- V. FACILITY MAILING ADDRESS
- VI. FACILITY LOCATION

PLEASE PLACE LABEL IN THIS SPACE

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)	16	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)	19	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 | Cross Generating Station

15 | 16 – 29 | 30 — 69

IV. FACILITY CONTACT

A. NAME & TITLE *(last, first, & title)*	B. PHONE *(area code & no.)*
C 2 Jackson, Susan; Supervisor, Environmental Services	(843) 761-8000
15 — 16 — 45	46 — 48 | 49 — 51 | 52- — 55

V. FACILTY MAILING ADDRESS

A. STREET OR P.O. BOX

C 3 PO Box 2946101

15 — 16 — 45

B. CITY OR TOWN	C. STATE	D. ZIP CODE
C 4 Moncks Corner	SC	29461
15 — 16 — 40	41 — 42	47 — 51

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER

C 5 533 Cross Station Road

15 — 16 — 45

B. COUNTY NAME

Berkeley

46 — 70

C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE *(if known)*
C 6 Pineville	SC	29468	008
15 — 16 — 40	41 — 42	47 — 51	52 — 54

CONTINUED FROM THE FRONT

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

A. FIRST	B. SECOND
7 4911 (specify) Electric Services	7 NA (specify) NA
C. THIRD	**D. FOURTH**
7 NA (specify) NA	7 NA (specify) NA

VIII. OPERATOR INFORMATION

A. NAME: 8 South Carolina Public Service Authority

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)*

S (specify)

D. PHONE *(area code & no.)*: A (843) 761-8000

E. STREET OR P.O. BOX: PO Box 2946101

F. CITY OR TOWN: B Moncks Corner

G. STATE: SC

H. ZIP CODE: 29461

IX. INDIAN LAND

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

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES *(Discharges to Surface Water)*: 9 N SC0037401	D. PSD *(Air Emissions from Proposed Sources)*: 9 P Var. Air Constr. Permits
B. UIC *(Underground Injection of Fluids)*: 9 U NA	E. OTHER *(specify)*: 9 TV-0420-0030 (specify) Title V Operating Permit
C. RCRA *(Hazardous Wastes)*: 9 R	E. OTHER *(specify)*: 9 (specify) See Attached Sheet

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)*

The facility generates electricity.

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
Jay A. Hudson, P.E.; Manager, Environmental Management		3/2/10

COMMENTS FOR OFFICIAL USE ONLY

C

Cross Generating Station, SC0037401
Form 1 Supplemental Information
February 2010

Item X. Existing Environmental Permits (Continued)

EXISTING ENVIRONMENTAL PERMITS
FOR CROSS GENERATING STATION

DESCRIPTION	PERMIT ISSUED BY	PERMIT No.
1) Potable Water System Operating Permit	SCDHEC	00830019
2) Intake/Discharge Permits		
Federal Constr. Permit	USACE	78-5G-350
Federal Constr. Permit	FERC	Project #199
State Constr. Permit and 401 Water Quality Certif.	State Budget & Control Board and SCDHEC	78-5G-350
3) Wastewater Treatment System Operating/Construction Permits		
Sanitary Waste Treatment Plant New Ozonation System (Constr.)	SCDHEC SCDHEC	7169, 17369, 18181-IW, 18641 19172-IW
Railcar Maintenance Facility Septic Permit	SCDHEC	2004050045
Gypsum Pond, Bottom Ash Pond, pH Adjustment Facility, Oil Interceptor Pit, Lift Station & Force Main	SCDHEC	8603, 9683
Cooling Tower & Bottom Ash Pond; Cooling Tower Blowdown Pipeline and Boiler Sump to Ash Pond Pipeline, Units 3 and 4	SCDHEC	17377 18861-IW 19091-IW
Pump and Haul Septic System, Gate (Constr.)	SCDHEC	19248-IW
4) Industrial Solid Waste Permits		
Industrial Solid Waste Landfill	SCDHEC	083337-1601
Closed C&D Landfills	SCDHEC	CWP-034, IWP-185
5) Air Permits		
Title V Operating Permit	SCDHEC	TV-0420-0030
Unit 1 FGD Upgrade Construction Permit	SCDHEC	0420-0030-CM
Unit 2 FGD Upgrade Construction Permit	SCDHEC	0420-0030-CK

Synfuel Construction Permit	SCDHEC	0420-0030-CN
7) Viper Road Overpass Construction Permit	USACE	2006-1846-2IG
7) Rail Spur Construction Permit	USACE	2006-1782-2IG
7) UST Permit	SCDHEC	01132
8) EPA Small Quantity Hazardous Waste Generator	US EPA	SCD017273533
8) Stormwater Permits		
Industrial General Permit	SCDHEC	SCR000000
Construction General Permit	SCDHEC	SCR100000

Please print or type in the unshaded areas only.

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)
SC0037401

Form Approved.
OMB No. 2040-0086.
Approval expires 3-31-98.

FORM 2C NPDES

U.S. ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR PERMIT TO DISCHARGE WASTEWATER
EXISTING MANUFACTURING, COMMERCIAL, MINING AND SILVICULTURE 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 NUMBER (*list*)	B. LATITUDE			C. LONGITUDE			D. RECEIVING WATER (*name*)
	1. DEG.	2. MIN.	3. SEC.	1. DEG.	2. MIN.	3. SEC.	
001	33.00	22.00	0.00	80.00	6.00	42.00	Diversion Canal to Lake Moultrie
002	33.00	21.00	58.00	80.00	6.00	45.00	Diversion Canal to Lake Moultrie
003	33.00	22.00	13.00	80.00	7.00	3.00	Diversion Canal to Lake Moultrie
004	33.00	22.00	17.00	80.00	7.00	1.00	Diversion Canal to Lake Moultrie
005	33.00	21.00	54.00	80.00	7.00	0.00	Diversion Canal to Lake Moultrie

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	Cooling Tower Blowdown	0.53 MGD	Blowdown from Units 1 & 2 Cooling Towers	4-A	
		*Capacity from NPDES diagram.	*Seldom discharges to Diversion Canal, almost always discharges to Bottom Ash Pond.	4-C	
002	pH Trim Facility	0.698 MGD	Flow from Bottom Ash Pond Through pH Adjustment System	2-K	
		*Long-Term Average since Cross		4-A	
		Unit 4 became operational in			
		Oct. 2008.			
003	Cooling Tower Blowdown	0.223 MGD	Blowdown from Unit 3 Cooling Tower	4-A	
		*Capacity from NPDES diagram.	*Seldom discharges to Diversion Canal, almost always discharges to Bottom Ash Pond.	4-C	
004	Cooling Tower Blowdown	0.223 MGD	Blowdown from Unit 4 Cooling Tower	4-A	
		*Capacity from NPDES diagram.	*Seldom discharges to Diversion Canal, almost always discharges to Bottom Ash Pond.	4-C	
005	Sanitary Wastewater	0.0514 MGD	Package Sanitary Treatment Plant, See Form 2E	1-L	1-O
		*Long-Term Average since Cross	*Chlorinate (2-F) and Dechlorinate (2E) as backup to ozonation.	1-U	2-G
		Unit 4 became operational in		3-A	4-A
		Oct. 2008.		5-A	

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

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		4. FLOW				
		a. DAYS PER WEEK (*specify average*)	b. MONTHS PER YEAR (*specify average*)	a. FLOW RATE (*in mgd*)		B. TOTAL VOLUME (*specify with units*)		C. DURATION (*in days*)
				1. LONG TERM AVERAGE	2. MAXIMUM DAILY	1. LONG TERM AVERAGE	2. MAXIMUM DAILY	
001	Cooling Tower Blowdown Units 1 and 2	*	*	*	*	*	*	*
002	pH Trim Facility - Bottom Ash Pond	*	*	*	*	*	*	*
003	Cooling Tower Blowdown Unit 3	*	*	*	*	*	*	*
004	Cooling Tower Blowdown Unit 4	*	*	*	*	*	*	*
*	Discharge durations and flows from these outfalls is dependent on system load and meteorolgoical conditions. In addition, while 001, 003 and 004 are permitted outfalls with the ability to discharge to the Diversion Canal, this is highly unusual and they generally blow down to the Bottom Ash Pond							

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			2. AFFECTED OUTFALLS (*list outfall numbers*)
a. QUANTITY PER DAY	b. UNITS OF MEASURE	c. OPERATION, PRODUCT, MATERIAL, ETC. (*specify*)	
NA	NA	NA	NA

IV. IMPROVEMENTS

A. Are you now required by any Federal, State or local authority to meet any implementation schedule for the construction, upgrading or operations 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		3. BRIEF DESCRIPTION OF PROJECT	4. FINAL COMPLIANCE DATE	
	a. NO.	b. SOURCE OF DISCHARGE		a. REQUIRED	b. PROJECTED
NA	NA	NA	NA	NA	NA

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 PROGRAMS IS ATTACHED

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)
SC0037401

CONTINUED FROM PAGE 2

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
See attached.			

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*)

Cross Generating Station – SC0037401
Form 2C Supplemental Information

Item V.D. Effluent Characteristics

The following substances may be released intermittently in trace amounts. We have listed these substances in response to 40CFR117.12(a)(2) and (c) to qualify for an exlusion under Section 311(a)(2) of the Clean Water Act.

1. Pollutant	**2. Reason for Discharge**
Formaldehyde (Table 2C-3)	Flue gas desulfurization (FGD) – scrubber lab analysis
Monomethylamine (Table 2C-3)	Inline sample analyzer reagent
Acetic acid (Table 2C-4)	Various lab analysis
Adipic acid (Table 2C-4)	FGD modules to improve module efficiency
Aluminum Sulfate (Table 2C-4)	Water pretreatment
Ammonia (Table 2C-4)	Various lab analysis and cleaning
Ammonium acetate (Table 2C-4)	Various lab analysis
Ammonium hydroxide (Table 2C-4)	Boiler feedwater treatment (pH control)
Ammonium sulfide (Table 2C-4)	Lab analysis
Calcium arsenite (Table 2C-4)	Lab analysis
Chlorine (Table 2C-4)	Wastewater treatment (disinfection)
Cupric sulfate (Table 2C-4)	Lab analysis
Ethylene diaminetertracetic acid (Table 2C-4)	Lab analysis and boiler chemical cleaning
Formic acid (Table 2C-4)	Lab analysis and inline sampler analyzer reagent
Hydrochloric acid (Table 2C-4)	Lab analysis – FGD/various
Isoprene (Table 2C-4)	Lab analysis
Nitric acid (Table 2C-4)	Lab analysis
Phosphoric acid (Table 2C-4)	Lab analysis
Potassium hydroxide (Table 2C-4)	Lab analysis
Potassium permanganate (Table 2C-4)	Drying agent for gas samples
Silver nitrate (Table 2C-4)	Lab analysis
Sodium arsenite (Table 2C-4)	Lab analysis
Sodium bisulfite (Table 2C-4)	Sanitary wastewater treatment
Sodium hydroxide (Table 2C-4)	Water demineralization and wastewater treatment (pH)
Sodium hypochlorite (Table 2C-4)	Wastewater treatment and cooling tower blowdown
Sulfuric acid (Table 2C-4)	Water demineralization

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*)

As required by the current NPDES permit, the Outfall 002 discharge is tested for toxicity using ceriodaphnia dubia as the test organism. These results are reported to DHEC on the monthly DMR. The toxicity testing is performed by Aquatox Laboratories (Lab ID 10581).

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract 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*)
General Engineering Laboratories, LLC (ID 10120)	PO Box 30712 Charleston, SC 29417	843-556-8171	Form 2C Permit Renewal Analyses, Oil and Grease monthly analysis, Quarterly Low Level Mercury
Santee Cooper Cross Station (ID 08554)	533 Cross Station Road Pineville, SC 29468	843-351-4586	Monthly DMR Data Including TRC, pH, Flow, TSS, DO, BOD, Fecal, FAC, Outfall 005 2E Fecal
Santee Cooper Central Lab (ID 08552)	1 Riverwood Drive Moncks Corner, SC 29461	843-761-8000	Monthly Chromium and Zinc if used in Cooling Tower Cleaning Chemicals (rare)
Aquatox Laboratories (ID 10581)	740 North Gum Street Summerville, SC 29483	843-873-8073	Monthly DMR: Toxicity
Swearingen Ecology Associates (ID 36001)	7126 Broad River Road Columbia, SC 29063	803-749-0056	Monthly DMR: Toxicity

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 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 (*type or print*)	B. PHONE NO. (*area code & no.*)
Jay A. Hudson, P.E; Manager, Environmental Management	(843) 761-8000
C. SIGNATURE	D. DATE SIGNED
	3/2/10

Cross Generating Station
Outfall 001

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*): SC0037401

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) 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	3. UNITS (*specify if blank*) a. CONCEN-TRATION	3. UNITS b. MASS	4. INTAKE (*optional*) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	4. INTAKE a. LONG TERM AVERAGE VALUE (2) MASS	4. INTAKE b. NO. OF ANALYSES
a. Biochemical Oxygen Demand (*BOD*)	<4	<0.0523	na	na	na	na	1	mg/L	lb/day	na	na	na
b. Chemical Oxygen Demand (*COD*)	51.5	0.6732	na	na	na	na	1	mg/L	lb/day	na	na	na
c. Total Organic Carbon (*TOC*)	24.8	0.3242	na	na	na	na	1	mg/L	lb/day	na	na	na
d. Total Suspended Solids (*TSS*)	11.2	0.1464	na	na	na	na	1	mg/L	lb/day	na	na	na
e. Ammonia (*as N*)	<0.100	<0.0013	na	na	na	na	1	mg/L	lb/day	na	na	na
f. Flow	VALUE 1568 GPD		VALUE na		VALUE na		1	NA	NA	VALUE na		na
g. Temperature (*winter*)	VALUE 25.5		VALUE na		VALUE na		1	°C		VALUE na		na
h. Temperature (*summer*)	VALUE na		VALUE na		VALUE na		na	°C		VALUE na		na
i. pH	MINIMUM 7.7	MAXIMUM 7.7	MINIMUM na	MAXIMUM na			1	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 or 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) 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	4. UNITS a. CONCEN-TRATION	4. UNITS b. MASS	5. INTAKE (*optional*) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	5. INTAKE a. LONG TERM AVERAGE VALUE (2) MASS	5. INTAKE b. NO. OF ANALYSES
a. Bromide (24959-67-9)		X	<2.00	<0.0261	na	na	na	na	1	mg/L	lb/d	na	na	na
b. Chlorine, Total Residual	X		0.16	0.00209	na	na	na	na	1	mg/L	lb/d	na	na	na
c. Color	X		180	na	na	na	na	na	1	pcu	na	na	na	na
d. Fecal Coliform	X		10	na	na	na	na	na	1	cfu/.1L	na	na	na	na
e. Fluoride (16984-48-8)	X		0.314	4.1E-3	na	na	na	na	1	mg/L	lb/d	na	na	na
f. Nitrate-Nitrite (*as N*)	X		1.27	0.01660	na	na	na	na	1	mg/L	lb/d	na	na	na

ITEM V-B CONTINUED FROM FRONT

1. POLLUTANT AND CAS NO. (*if available*)	2. MARK "X"		3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
g. Nitrogen, Total Organic (*as N*)	X		956	0.01249	na	na	na	na	1	ug/L	lb/d	na	na	na
h. Oil and Grease	X		<5.38	<0.0703	na	na	na	na	1	mg/L	lb/d	na	na	na
i. Phosphorus (as P), Total (7723-14-0)	X		0.209	2.73E-3	na	na	na	na	1	mg/L	lb/d	na	na	na
j. Radioactivity														
(1) Alpha, Total	X		4.49	na	na	na	na	na	1	pCi/L	na	na	na	na
(2) Beta, Total	X		20	na	na	na	na	na	1	pCi/L	na	na	na	na
(3) Radium, Total		X	<1.00	na	na	na	na	na	1	pCi/L	na	na	na	na
(4) Radium 226, Total		X	<1.00	na	na	na	na	na	1	pCi/L	na	na	na	na
k. Sulfate (*as SO_4*) (14808-79-8)	X		31.3	0.4092	na	na	na	na	1	mg/L	lb/d	na	na	na
l. Sulfide (*as S*)		X	<0.100	<1.3E-3	na	na	na	na	1	mg/L	lb/d	na	na	na
m. Sulfite (*as SO_3*) (14265-45-3)		X	<2.00	<0.0261	na	na	na	na	1	mg/L	lb/d	na	na	na
n. Surfactants	X		0.0908	1.19E-3	na	na	na	na	1	mg/L	lb/d	na	na	na
o. Aluminum, Total (7429-90-5)	X		3490	0.0456	na	na	na	na	1	ug/L	lb/d	na	na	na
p. Barium, Total (7440-39-3)	X		93.1	1.22E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
q. Boron, Total (7440-42-8)	X		102	1.33E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
r. Cobalt, Total (7440-48-4)		X	<20.0	<2.6E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
s. Iron, Total (7439-89-6)	X		4040	0.0528	na	na	na	na	1	ug/L	lb/d	na	na	na
t. Magnesium, Total (7439-95-4)	X		7790	0.1018	na	na	na	na	1	ug/L	lb/d	na	na	na
u. Molybdenum, Total (7439-98-7)		X	<20.0	<2.6E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
v. Manganese, Total (7439-96-5)	X		91.2	1.19E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
w. Tin, Total (7440-31-5)		X	<10	<1.3E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
x. Titanium, Total (7440-32-6)		X	<50.0	<6.5E-4	na	na	na	na	1	ug/L	lb/d	na	na	na

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)	OUTFALL NUMBER
SC0037401	001

CONTINUED FROM PAGE 3 OF FORM 2-C

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 that 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	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCEN-TRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
METALS, CYANIDE, AND TOTAL PHENOLS															
1M. Antimony, Total (7440-36-0)	X			<5.00	<7E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
2M. Arsenic, Total (7440-38-2)	X			<5.00	<7E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
3M. Beryllium, Total (7440-41-7)	X			<1.00	<2E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
4M. Cadmium, Total (7440-43-9)	X			<0.100	<2E-6	na	na	na	na	1	ug/L	lb/d	na	na	na
5M. Chromium, Total (7440-47-3)	X			<5.00	<7E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
6M. Copper, Total (7440-50-8)	X			27.1	3.5E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
7M. Lead, Total (7439-92-1)	X			2.79	3.7E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
8M. Mercury, Total (7439-97-6)	X			6.08	8.0E-8	na	na	na	na	1	ng/L	lb/d	na	na	na
9M. Nickel, Total (7440-02-0)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
10M. Selenium, Total (7782-49-2)	X			<5.00	<7E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
11M. Silver, Total (7440-22-4)	X			<5.00	<7E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
12M. Thallium, Total (7440-28-0)	X			<0.500	<7E-6	na	na	na	na	1	ug/L	lb/d	na	na	na
13M. Zinc, Total (7440-66-6)	X			16.2	2.1E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
14M. Cyanide, Total (57-12-5)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
15M. Phenols, Total	X			<5.00	<7E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
DIOXIN															
2,3,7,8-Tetra-chlorodibenzo-P-Dioxin (1764-01-6)			X	DESCRIBE RESULTS Not Detected in EPA 625 Form 2C Dioxin Screen											

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – VOLATILE COMPOUNDS															
1V. Accrolein (107-02-8)	X			<5.00	<7E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
2V. Acrylonitrile (107-13-1)	X			<5.00	<7E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
3V. Benzene (71-43-2)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
4V. Bis (*Chloromethyl*) Ether (542-88-1)	Testing is Not Required			na	na	na	na	na	na	na	na	na	na	na	na
5V. Bromoform (75-25-2)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
6V. Carbon Tetrachloride (56-23-5)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
7V. Chlorobenzene (108-90-7)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
8V. Chlorodibromomethane (124-48-1)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
9V. Chloroethane (75-00-3)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
10V. 2-Chloroethylvinyl Ether (110-75-8)	X			<5.00	<7E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
11V. Chloroform (67-66-3)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
12V. Dichlorobromomethane (75-27-4)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
13V. Dichlorodifluoromethane (75-71-8)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
14V. 1,1-Dichloroethane (75-34-3)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
15V. 1,2-Dichloroethane (107-06-2)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
16V. 1,1-Dichloroethylene (75-35-4)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
17V. 1,2-Dichloropropane (78-87-5)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
18V. 1,3-Dichloropropylene (542-75-6)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
19V. Ethylbenzene (100-41-4)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
20V. Methyl Bromide (74-83-9)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
21V. Methyl Chloride (74-87-3)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na

CONTINUED FROM PAGE V-4

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – VOLATILE COMPOUNDS (*continued*)															
22V. Methylene Chloride (75-09-2)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
23V. 1,1,2,2-Tetrachloroethane (79-34-5)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
24V. Tetrachloro-ethylene (127-18-4)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
25V. Toluene (108-88-3)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
26V. 1,2-Trans-Dichloroethylene (156-60-5)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
27V. 1,1,1-Trichloro-ethane (71-55-6)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
28V. 1,1,2-Trichloro-ethane (79-00-5)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
29V Trichloro-ethylene (79-01-6)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
30V. Trichloro-fluoromethane (75-69-4)				<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
31V. Vinyl Chloride (75-01-4)	X			<2.00	<3E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
GC/MS FRACTION – ACID COMPOUNDS															
1A. 2-Chlorophenol (95-57-8)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
2A. 2,4-Dichloro-phenol (120-83-2)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
3A. 2,4-Dimethyl-phenol (105-67-9)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
4A. 4,6-Dinitro-O-Cresol (534-52-1)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
5A. 2,4-Dinitro-phenol (51-28-5)	X			<50.0	<7E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
6A. 2-Nitrophenol (88-75-5)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
7A. 4-Nitrophenol (100-02-7)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
8A. P-Chloro-M-Cresol (59-50-7)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
9A. Pentachloro-phenol (87-86-5)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
10A. Phenol (108-95-2)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
11A. 2,4,6-Trichloro-phenol (88-05-2)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCEN-TRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – BASE/NEUTRAL COMPOUNDS															
1B. Acenaphthene (83-32-9)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
2B. Acenaphtylene (208-96-8)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
3B. Anthracene (120-12-7)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
4B. Benzidine (92-87-5)	X			<100	<2E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
5B. Benzo (*a*) Anthracene (56-55-3)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
6B. Benzo (*a*) Pyrene (50-32-8)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
7B. 3,4-Benzo-fluoranthene (205-99-2)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
8B. Benzo (*ghi*) Perylene (191-24-2)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
9B. Benzo (*k*) Fluoranthene (207-08-9)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
10B. Bis (*2-Chloro-ethoxy*) Methane (111-91-1)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
11B. Bis (*2-Chloro-ethyl*) Ether (111-44-4)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
12B. Bis (*2-Chloroisopropyl*) Ether (102-80-1)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
13B. Bis (*2-Ethyl-hexyl*) Phthalate (117-81-7)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
14B. 4-Bromophenyl Phenyl Ether (101-55-3)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
15B. Butyl Benzyl Phthalate (85-68-7)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
16B. 2-Chloro-naphthalene (91-58-7)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
17B. 4-Chloro-phenyl Phenyl Ether (7005-72-3)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
18B. Chrysene (218-01-9)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
19B. Dibenzo (*a,h*) Anthracene (53-70-3)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
20B. 1,2-Dichloro-benzene (95-50-1)	X			<1.00	<2E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
21B. 1,3-Di-chloro-benzene (541-73-1)	X			<1.00	<2E-5	na	na	na	na	1	ug/L	lb/d	na	na	na

CONTINUED FROM PAGE V-6

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCEN-TRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – BASE/NEUTRAL COMPOUNDS (*continued*)															
22B. 1,4-Dichloro-benzene (106-46-7)	X			<1.00	<2E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
23B. 3,3-Dichloro-benzidine (91-94-1)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
24B. Diethyl Phthalate (84-66-2)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
25B. Dimethyl Phthalate (131 -11-3)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
26B. Di-N-Butyl Phthalate (84-74-2)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
27B. 2,4-Dinitro-toluene (121-14-2)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
28B. 2,6-Dinitro-toluene (606-20-2)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
29B. Di-N-Octyl Phthalate (117-84-0)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
30B. 1,2-Diphenyl-hydrazine (*as Azo-benzene*) (122-66-7)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
31B. Fluoranthene (206-44-0)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
32B. Fluorene (86-73-7)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
33B. Hexachloro-benzene (118-74-1)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
34B. Hexachloro-butadiene (87-68-3)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
35B. Hexachloro-cyclopentadiene (77-47-4)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
36B Hexachloro-ethane (67-72-1)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
37B. Indeno (*1,2,3-cd*) Pyrene (193-39-5)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
38B. Isophorone (78-59-1)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
39B. Naphthalene (91-20-3)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
40B. Nitrobenzene (98-95-3)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
41B. N-Nitro-sodimethylamine (62-75-9)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
42B. N-Nitrosodi-N-Propylamine (621-64-7)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – BASE/NEUTRAL COMPOUNDS (*continued*)															
43B. N-Nitrosodiphenylamine (86-30-6)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
44B. Phenanthrene (85-01-8)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
45B. Pyrene (129-00-0)	X			<10.0	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
46B. 1,2,4-Trichlorobenzene (120-82-1)	X			<9.43	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
GC/MS FRACTION – PESTICIDES															
1P. Aldrin (309-00-2)				na	na	na	na	na	na	na	na	na	na	na	na
2P. α-BHC (319-84-6)				na	na	na	na	na	na	na	na	na	na	na	na
3P. β-BHC (319-85-7)				na	na	na	na	na	na	na	na	na	na	na	na
4P. γ-BHC (58-89-9)				na	na	na	na	na	na	na	na	na	na	na	na
5P. δ-BHC (319-86-8)				na	na	na	na	na	na	na	na	na	na	na	na
6P. Chlordane (57-74-9)				na	na	na	na	na	na	na	na	na	na	na	na
7P. 4,4'-DDT (50-29-3)				na	na	na	na	na	na	na	na	na	na	na	na
8P. 4,4'-DDE (72-55-9)				na	na	na	na	na	na	na	na	na	na	na	na
9P. 4,4'-DDD (72-54-8)				na	na	na	na	na	na	na	na	na	na	na	na
10P. Dieldrin (60-57-1)				na	na	na	na	na	na	na	na	na	na	na	na
11P. α-Enosulfan (115-29-7)				na	na	na	na	na	na	na	na	na	na	na	na
12P. β-Endosulfan (115-29-7)				na	na	na	na	na	na	na	na	na	na	na	na
13P. Endosulfan Sulfate (1031-07-8)				na	na	na	na	na	na	na	na	na	na	na	na
14P. Endrin (72-20-8)				na	na	na	na	na	na	na	na	na	na	na	na
15P. Endrin Aldehyde (7421-93-4)				na	na	na	na	na	na	na	na	na	na	na	na
16P. Heptachlor (76-44-8)				na	na	na	na	na	na	na	na	na	na	na	na

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)	OUTFALL NUMBER
SC0037401	001

CONTINUED FROM PAGE V-8

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCEN-TRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – PESTICIDES (*continued*)															
17P. Heptachlor Epoxide (1024-57-3)				na	na	na	na	na	na	na	na	na	na	na	na
18P. PCB-1242 (53469-21-9)				na	na	na	na	na	na	na	na	na	na	na	na
19P. PCB-1254 (11097-69-1)				na	na	na	na	na	na	na	na	na	na	na	na
20P. PCB-1221 (11104-28-2)				na	na	na	na	na	na	na	na	na	na	na	na
21P. PCB-1232 (11141-16-5)				na	na	na	na	na	na	na	na	na	na	na	na
22P. PCB-1248 (12672-29-6)				na	na	na	na	na	na	na	na	na	na	na	na
23P. PCB-1260 (11096-82-5)				na	na	na	na	na	na	na	na	na	na	na	na
24P. PCB-1016 (12674-11-2)				na	na	na	na	na	na	na	na	na	na	na	na
25P. Toxaphene (8001-35-2)				na	na	na	na	na	na	na	na	na	na	na	na

Cross Generating Station
Outfall 002

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*): SC0037401

V. INTAKE AND EFFLUENT CHARACTERISTICS *(continued from page 3 of Form 2-C)* — OUTFALL NO. 002

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. MAX DAILY VALUE (1) CONCENTRATION	a. MAX DAILY VALUE (2) MASS	b. MAX 30 DAY VALUE (*if available*) (1) CONCENTRATION	b. MAX 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	3. UNITS (*specify if blank*) a. CONCENTRATION	3. UNITS b. MASS	4. INTAKE (*optional*) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	4. INTAKE a. LONG TERM AVERAGE VALUE (2) MASS	4. INTAKE b. NO. OF ANALYSES
a. Biochemical Oxygen Demand (*BOD*)	<4.00	14.6465	na	na	na	na	1	mg/L	lb/day	na	na	na
b. Chemical Oxygen Demand (*COD*)	57.6	210.908	na	na	na	na	1	mg/L	lb/day	na	na	na
c. Total Organic Carbon (*TOC*)	6.98	25.5581	na	na	na	na	1	mg/L	lb/day	na	na	na
d. Total Suspended Solids (*TSS*)	8.67	31.7462	9	33.9900	7.5882	41.4451	17	mg/L	lb/day	na	na	na
e. Ammonia (*as N*)	0.223	0.8165	na	na	na	na	1	mg/L	lb/day	na	na	na
f. Flow	VALUE 439,200 GPD		VALUE 453,000 GPD		VALUE 655,125 GPD		488	NA	NA	VALUE na		na
g. Temperature (*winter*)	VALUE 15.6		VALUE na		VALUE na		1	°C		VALUE na		na
h. Temperature (*summer*)	VALUE na		VALUE na		VALUE na		na	°C		VALUE na		na
i. pH	MINIMUM 7.4	MAXIMUM 7.4	MINIMUM 7.6	MAXIMUM 7.1			31 (cn)	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 or 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. MAX DAILY VALUE (1) CONCENTRATION	a. MAX DAILY VALUE (2) MASS	b. MAX 30 DAY VALUE (*if available*) (1) CONCENTRATION	b. MAX 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	4. UNITS a. CONCENTRATION	4. UNITS b. MASS	5. INTAKE (*optional*) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	5. INTAKE a. LONG TERM AVERAGE VALUE (2) MASS	5. INTAKE b. NO. OF ANALYSES
a. Bromide (24959-67-9)	X		19.6	71.7676	na	na	na	na	1	mg/L	lb/d	na	na	na
b. Chlorine, Total Residual	X		<0.05	<0.1831	na	na	na	na	1	mg/L	lb/d	na	na	na
c. Color	X		20	na	na	na	na	na	1	pcu	na	na	na	na
d. Fecal Coliform	X		<2.00	na	na	na	na	na	1	cfu/.1L	na	na	na	na
e. Fluoride (16984-48-8)	X		3.48	12.7424	na	na	na	na	1	mg/L	lb/d	na	na	na
f. Nitrate-Nitrite (*as N*)	X		1.13	4.1376	na	na	na	na	1	mg/L	lb/d	na	na	na

ITEM V-B CONTINUED FROM FRONT

1. POLLUTANT AND CAS NO. (*if available*)	2. MARK "X"		3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
g. Nitrogen, Total Organic (*as N*)	X		1810	6.6275	na	na	na	na	1	ug/L	lb/d	na	na	na
h. Oil and Grease	X		<5.26	<19.26	6	22.66	1.69	9.23	32	mg/L	lb/d	na	na	na
i. Phosphorus (as P), Total (7723-14-0)	X		0.077	0.2819	na	na	na	na	1	mg/L	lb/d	na	na	na
j. Radioactivity														
(1) Alpha, Total	X		191	na	na	na	na	na	1	pCi/L	na	na	na	na
(2) Beta, Total	X		62.3	na	na	na	na	na	1	pCi/L	na	na	na	na
(3) Radium, Total		X	2.73	na	na	na	na	na	1	pCi/L	na	na	na	na
(4) Radium 226, Total		X	<1.00	na	na	na	na	na	1	pCi/L	na	na	na	na
k. Sulfate (*as SO_4*) (14808-79-8)	X		1430	5236.10	na	na	na	na	1	mg/L	lb/d	na	na	na
l. Sulfide (*as S*)		X	<0.100	<0.3662	na	na	na	na	1	mg/L	lb/d	na	na	na
m. Sulfite (*as SO_3*) (14265-45-3)		X	<2.00	<7.3232	na	na	na	na	1	mg/L	lb/d	na	na	na
n. Surfactants	X		<0.05	<0.1831	na	na	na	na	1	mg/L	lb/d	na	na	na
o. Aluminum, Total (7429-90-5)	X		243	0.8898	na	na	na	na	1	ug/L	lb/d	na	na	na
p. Barium, Total (7440-39-3)	X		144	0.5273	na	na	na	na	1	ug/L	lb/d	na	na	na
q. Boron, Total (7440-42-8)	X		26700	97.7651	na	na	na	na	1	ug/L	lb/d	na	na	na
r. Cobalt, Total (7440-48-4)		X	25	0.0915	na	na	na	na	1	ug/L	lb/d	na	na	na
s. Iron, Total (7439-89-6)	X		3340	12.2298	na	na	na	na	1	ug/L	lb/d	na	na	na
t. Magnesium, Total (7439-95-4)	X		268000	981.312	na	na	na	na	1	ug/L	lb/d	na	na	na
u. Molybdenum, Total (7439-98-7)		X	28.4	0.1040	na	na	na	na	1	ug/L	lb/d	na	na	na
v. Manganese, Total (7439-96-5)	X		5330	19.5164	na	na	na	na	1	ug/L	lb/d	na	na	na
w. Tin, Total (7440-31-5)		X	<10	<0.0366	na	na	na	na	1	ug/L	lb/d	na	na	na
x. Titanium, Total (7440-32-6)		X	<50.0	<0.1831	na	na	na	na	1	ug/L	lb/d	na	na	na

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)	OUTFALL NUMBER
SC0037401	002

CONTINUED FROM PAGE 3 OF FORM 2-C

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 that 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	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCEN-TRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
METALS, CYANIDE, AND TOTAL PHENOLS															
1M. Antimony, Total (7440-36-0)	X			<5.00	<0.018	na	na	na	na	1	ug/L	lb/d	na	na	na
2M. Arsenic, Total (7440-38-2)	X			45.6	0.1670	na	na	na	na	1	ug/L	lb/d	na	na	na
3M. Beryllium, Total (7440-41-7)	X			<1.00	<0.004	na	na	na	na	1	ug/L	lb/d	na	na	na
4M. Cadmium, Total (7440-43-9)	X			4.53	0.0169	na	na	na	na	1	ug/L	lb/d	na	na	na
5M. Chromium, Total (7440-47-3)	X			<5.00	<0.018	na	na	na	na	1	ug/L	lb/d	na	na	na
6M. Copper, Total (7440-50-8)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
7M. Lead, Total (7439-92-1)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
8M. Mercury, Total (7439-97-6)	X			68.45	2.5E-4	na	na	0.0586	2E-4	7	ng/L	lb/d	0.0198	7.5E-4	6
9M. Nickel, Total (7440-02-0)	X			138	0.5053	na	na	na	na	1	ug/L	lb/d	na	na	na
10M. Selenium, Total (7782-49-2)	X			290	1.0619	na	na	na	na	1	ug/L	lb/d	na	na	na
11M. Silver, Total (7440-22-4)	X			<5.00	<0.018	na	na	na	na	1	ug/L	lb/d	na	na	na
12M. Thallium, Total (7440-28-0)	X			0.631	0.0023	na	na	na	na	1	ug/L	lb/d	na	na	na
13M. Zinc, Total (7440-66-6)	X			53.9	0.1974	na	na	na	na	1	ug/L	lb/d	na	na	na
14M. Cyanide, Total (57-12-5)	X			16.2	0.0593	na	na	na	na	1	ug/L	lb/d	na	na	na
15M. Phenols, Total	X			<5.00	<0.018	na	na	na	na	1	ug/L	lb/d	na	na	na
DIOXIN															
2,3,7,8-Tetra-chlorodibenzo-P-Dioxin (1764-01-6)			X	DESCRIBE RESULTS		Not Detected in EPA 625 Form 2C Dioxin Screen									

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCEN-TRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – VOLATILE COMPOUNDS															
1V. Accrolein (107-02-8)	X			<5.00	<0.018	na	na	na	na	1	ug/L	lb/d	na	na	na
2V. Acrylonitrile (107-13-1)	X			<5.00	<0.018	na	na	na	na	1	ug/L	lb/d	na	na	na
3V. Benzene (71-43-2)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
4V. Bis (*Chloro-methyl*) Ether (542-88-1)	Testing is Not Required			na	na	na	na	na	na	na	na	na	na	na	na
5V. Bromoform (75-25-2)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
6V. Carbon Tetrachloride (56-23-5)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
7V. Chlorobenzene (108-90-7)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
8V. Chlorodi-bromomethane (124-48-1)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
9V. Chloroethane (75-00-3)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
10V. 2-Chloro-ethylvinyl Ether (110-75-8)	X			<5.00	<0.018	na	na	na	na	1	ug/L	lb/d	na	na	na
11V. Chloroform (67-66-3)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
12V. Dichloro-bromomethane (75-27-4)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
13V. Dichloro-difluoromethane (75-71-8)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
14V. 1,1-Dichloro-ethane (75-34-3)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
15V. 1,2-Dichloro-ethane (107-06-2)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
16V. 1,1-Dichloro-ethylene (75-35-4)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
17V. 1,2-Dichloro-propane (78-87-5)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
18V. 1,3-Dichloro-propylene (542-75-6)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
19V. Ethylbenzene (100-41-4)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
20V. Methyl Bromide (74-83-9)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
21V. Methyl Chloride (74-87-3)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na

CONTINUED FROM PAGE V-4

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – VOLATILE COMPOUNDS (*continued*)															
22V. Methylene Chloride (75-09-2)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
23V. 1,1,2,2-Tetrachloroethane (79-34-5)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
24V. Tetrachloro-ethylene (127-18-4)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
25V. Toluene (108-88-3)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
26V. 1,2-Trans-Dichloroethylene (156-60-5)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
27V. 1,1,1-Trichloro-ethane (71-55-6)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
28V. 1,1,2-Trichloro-ethane (79-00-5)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
29V Trichloro-ethylene (79-01-6)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
30V. Trichloro-fluoromethane (75-69-4)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
31V. Vinyl Chloride (75-01-4)	X			<2.00	<0.007	na	na	na	na	1	ug/L	lb/d	na	na	na
GC/MS FRACTION – ACID COMPOUNDS															
1A. 2-Chlorophenol (95-57-8)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
2A. 2,4-Dichloro-phenol (120-83-2)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
3A. 2,4-Dimethyl-phenol (105-67-9)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
4A. 4,6-Dinitro-O-Cresol (534-52-1)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
5A. 2,4-Dinitro-phenol (51-28-5)	X			<50.0	<0.183	na	na	na	na	1	ug/L	lb/d	na	na	na
6A. 2-Nitrophenol (88-75-5)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
7A. 4-Nitrophenol (100-02-7)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
8A. P-Chloro-M-Cresol (59-50-7)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
9A. Pentachloro-phenol (87-86-5)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
10A. Phenol (108-95-2)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
11A. 2,4,6-Trichloro-phenol (88-05-2)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – BASE/NEUTRAL COMPOUNDS															
1B. Acenaphthene (83-32-9)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
2B. Acenaphtylene (208-96-8)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
3B. Anthracene (120-12-7)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
4B. Benzidine (92-87-5)	X			<100	<0.366	na	na	na	na	1	ug/L	lb/d	na	na	na
5B. Benzo (*a*) Anthracene (56-55-3)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
6B. Benzo (*a*) Pyrene (50-32-8)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
7B. 3,4-Benzo-fluoranthene (205-99-2)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
8B. Benzo (*ghi*) Perylene (191-24-2)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
9B. Benzo (*k*) Fluoranthene (207-08-9)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
10B. Bis (*2-Chloro-ethoxy*) Methane (111-91-1)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
11B. Bis (*2-Chloro-ethyl*) Ether (111-44-4)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
12B. Bis (*2-Chloroisopropyl*) Ether (102-80-1)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
13B. Bis (*2-Ethyl-hexyl*) Phthalate (117-81-7)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
14B. 4-Bromophenyl Phenyl Ether (101-55-3)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
15B. Butyl Benzyl Phthalate (85-68-7)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
16B. 2-Chloro-naphthalene (91-58-7)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
17B. 4-Chloro-phenyl Phenyl Ether (7005-72-3)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
18B. Chrysene (218-01-9)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
19B. Dibenzo (*a,h*) Anthracene (53-70-3)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
20B. 1,2-Dichloro-benzene (95-50-1)	X			<1.00	<0.004	na	na	na	na	1	ug/L	lb/d	na	na	na
21B. 1,3-Di-chloro-benzene (541-73-1)	X			<1.00	<0.004	na	na	na	na	1	ug/L	lb/d	na	na	na

CONTINUED FROM PAGE V-6

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – BASE/NEUTRAL COMPOUNDS (*continued*)															
22B. 1,4-Dichlorobenzene (106-46-7)	X			<1.00	<0.004	na	na	na	na	1	ug/L	lb/d	na	na	na
23B. 3,3-Dichlorobenzidine (91-94-1)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
24B. Diethyl Phthalate (84-66-2)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
25B. Dimethyl Phthalate (131 -11-3)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
26B. Di-N-Butyl Phthalate (84-74-2)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
27B. 2,4-Dinitrotoluene (121-14-2)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
28B. 2,6-Dinitrotoluene (606-20-2)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
29B. Di-N-Octyl Phthalate (117-84-0)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
30B. 1,2-Diphenylhydrazine (*as Azobenzene*) (122-66-7)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
31B. Fluoranthene (206-44-0)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
32B. Fluorene (86-73-7)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
33B. Hexachlorobenzene (118-74-1)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
34B. Hexachlorobutadiene (87-68-3)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
35B. Hexachlorocyclopentadiene (77-47-4)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
36B Hexachloroethane (67-72-1)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
37B. Indeno (*1,2,3-cd*) Pyrene (193-39-5)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
38B. Isophorone (78-59-1)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
39B. Naphthalene (91-20-3)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
40B. Nitrobenzene (98-95-3)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
41B. N-Nitrosodimethylamine (62-75-9)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
42B. N-Nitrosodi-N-Propylamine (621-64-7)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – BASE/NEUTRAL COMPOUNDS (*continued*)															
43B. N-Nitrosodiphenylamine (86-30-6)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
44B. Phenanthrene (85-01-8)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
45B. Pyrene (129-00-0)	X			<10.0	<0.037	na	na	na	na	1	ug/L	lb/d	na	na	na
46B. 1,2,4-Trichlorobenzene (120-82-1)	X			<9.43	<0.034	na	na	na	na	1	ug/L	lb/d	na	na	na
GC/MS FRACTION – PESTICIDES															
1P. Aldrin (309-00-2)				na	na	na	na	na	na	na	na	na	na	na	na
2P. α-BHC (319-84-6)				na	na	na	na	na	na	na	na	na	na	na	na
3P. β-BHC (319-85-7)				na	na	na	na	na	na	na	na	na	na	na	na
4P. γ-BHC (58-89-9)				na	na	na	na	na	na	na	na	na	na	na	na
5P. δ-BHC (319-86-8)				na	na	na	na	na	na	na	na	na	na	na	na
6P. Chlordane (57-74-9)				na	na	na	na	na	na	na	na	na	na	na	na
7P. 4,4'-DDT (50-29-3)				na	na	na	na	na	na	na	na	na	na	na	na
8P. 4,4'-DDE (72-55-9)				na	na	na	na	na	na	na	na	na	na	na	na
9P. 4,4'-DDD (72-54-8)				na	na	na	na	na	na	na	na	na	na	na	na
10P. Dieldrin (60-57-1)				na	na	na	na	na	na	na	na	na	na	na	na
11P. α-Enosulfan (115-29-7)				na	na	na	na	na	na	na	na	na	na	na	na
12P. β-Endosulfan (115-29-7)				na	na	na	na	na	na	na	na	na	na	na	na
13P. Endosulfan Sulfate (1031-07-8)				na	na	na	na	na	na	na	na	na	na	na	na
14P. Endrin (72-20-8)				na	na	na	na	na	na	na	na	na	na	na	na
15P. Endrin Aldehyde (7421-93-4)				na	na	na	na	na	na	na	na	na	na	na	na
16P. Heptachlor (76-44-8)				na	na	na	na	na	na	na	na	na	na	na	na

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)	OUTFALL NUMBER
SC0037401	002

CONTINUED FROM PAGE V-8

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCEN-TRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – PESTICIDES (*continued*)															
17P. Heptachlor Epoxide (1024-57-3)				na	na	na	na	na	na	na	na	na	na	na	na
18P. PCB-1242 (53469-21-9)				na	na	na	na	na	na	na	na	na	na	na	na
19P. PCB-1254 (11097-69-1)				na	na	na	na	na	na	na	na	na	na	na	na
20P. PCB-1221 (11104-28-2)				na	na	na	na	na	na	na	na	na	na	na	na
21P. PCB-1232 (11141-16-5)				na	na	na	na	na	na	na	na	na	na	na	na
22P. PCB-1248 (12672-29-6)				na	na	na	na	na	na	na	na	na	na	na	na
23P. PCB-1260 (11096-82-5)				na	na	na	na	na	na	na	na	na	na	na	na
24P. PCB-1016 (12674-11-2)				na	na	na	na	na	na	na	na	na	na	na	na
25P. Toxaphene (8001-35-2)				na	na	na	na	na	na	na	na	na	na	na	na

Cross Generating Station
Outfall 004

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*): SC0037401

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

OUTFALL NO.: 004

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) 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	3. UNITS (*specify if blank*) a. CONCEN-TRATION	3. UNITS b. MASS	4. INTAKE (*optional*) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	4. INTAKE a. LONG TERM AVERAGE VALUE (2) MASS	4. INTAKE b. NO. OF ANALYSES
a. Biochemical Oxygen Demand (*BOD*)	<4	<0.4100	na	na	na	na	1	mg/L	lb/day	na	na	na
b. Chemical Oxygen Demand (*COD*)	48.9	5.0124	na	na	na	na	1	mg/L	lb/day	na	na	na
c. Total Organic Carbon (*TOC*)	10.4	1.0660	na	na	na	na	1	mg/L	lb/day	na	na	na
d. Total Suspended Solids (*TSS*)	13.6	1.3941	na	na	na	na	1	mg/L	lb/day	na	na	na
e. Ammonia (*as N*)	0.112	0.0115	na	na	na	na	1	mg/L	lb/day	na	na	na
f. Flow	VALUE 12295 GPD		VALUE na		VALUE na		1	NA	NA	VALUE na		na
g. Temperature (*winter*)	VALUE 28.3		VALUE na		VALUE na		1	°C		VALUE na		na
h. Temperature (*summer*)	VALUE na		VALUE na		VALUE na		na	°C		VALUE na		na
i. pH	MINIMUM 8.1	MAXIMUM 8.1	MINIMUM na	MAXIMUM na			1	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 or 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) 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	4. UNITS a. CONCEN-TRATION	4. UNITS b. MASS	5. INTAKE (*optional*) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	5. INTAKE a. LONG TERM AVERAGE VALUE (2) MASS	5. INTAKE b. NO. OF ANALYSES
a. Bromide (24959-67-9)		X	<2.00	<0.2050	na	na	na	na	1	mg/L	lb/d	na	na	na
b. Chlorine, Total Residual	X		1.17	0.1199	na	na	na	na	1	mg/L	lb/d	na	na	na
c. Color	X		100	na	na	na	na	na	1	pcu	na	na	na	na
d. Fecal Coliform		X	<2	na	na	na	na	na	1	cfu/.1L	na	na	na	na
e. Fluoride (16984-48-8)	X		0.268	0.0275	na	na	na	na	1	mg/L	lb/d	na	na	na
f. Nitrate-Nitrite (*as N*)	X		1.05	0.1076	na	na	na	na	1	mg/L	lb/d	na	na	na

ITEM V-B CONTINUED FROM FRONT

1. POLLUTANT AND CAS NO. (*if available*)	2. MARK "X"		3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
g. Nitrogen, Total Organic (*as N*)	X		287	0.0294	na	na	na	na	1	ug/L	lb/d	na	na	na
h. Oil and Grease		X	<5.24	<0.5371	na	na	na	na	1	mg/L	lb/d	na	na	na
i. Phosphorus (as P), Total (7723-14-0)	X		0.15	0.0154	na	na	na	na	1	mg/L	lb/d	na	na	na
j. Radioactivity														
(1) Alpha, Total		X	<5.00	na	na	na	na	na	1	pCi/L	na	na	na	na
(2) Beta, Total	X		7.26	na	na	na	na	na	1	pCi/L	na	na	na	na
(3) Radium, Total		X	<1.00	na	na	na	na	na	1	pCi/L	na	na	na	na
(4) Radium 226, Total		X	<1.00	na	na	na	na	na	1	pCi/L	na	na	na	na
k. Sulfate (*as SO_4*) (14808-79-8)	X		27.6	2.8291	na	na	na	na	1	mg/L	lb/d	na	na	na
l. Sulfide (*as S*)		X	<0.1	<0.0103	na	na	na	na	1	mg/L	lb/d	na	na	na
m. Sulfite (*as SO_3*) (14265-45-3)		X	<2	<0.2050	na	na	na	na	1	mg/L	lb/d	na	na	na
n. Surfactants	X		0.0632	0.0065	na	na	na	na	1	mg/L	lb/d	na	na	na
o. Aluminum, Total (7429-90-5)	X		2390	0.2450	na	na	na	na	1	ug/L	lb/d	na	na	na
p. Barium, Total (7440-39-3)	X		82.3	0.0084	na	na	na	na	1	ug/L	lb/d	na	na	na
q. Boron, Total (7440-42-8)	X		87.8	0.0090	na	na	na	na	1	ug/L	lb/d	na	na	na
r. Cobalt, Total (7440-48-4)		X	<20.0	<0.0021	na	na	na	na	1	ug/L	lb/d	na	na	na
s. Iron, Total (7439-89-6)	X		3580	0.3670	na	na	na	na	1	ug/L	lb/d	na	na	na
t. Magnesium, Total (7439-95-4)	X		6730	0.6898	na	na	na	na	1	ug/L	lb/d	na	na	na
u. Molybdenum, Total (7439-98-7)		X	<20	<0.0021	na	na	na	na	1	ug/L	lb/d	na	na	na
v. Manganese, Total (7439-96-5)	X		109	0.0112	na	na	na	na	1	ug/L	lb/d	na	na	na
w. Tin, Total (7440-31-5)		X	<10	<0.0010	na	na	na	na	1	ug/L	lb/d	na	na	na
x. Titanium, Total (7440-32-6)		X	<50.0	<0.0051	na	na	na	na	1	ug/L	lb/d	na	na	na

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)	OUTFALL NUMBER
SC0037401	004

CONTINUED FROM PAGE 3 OF FORM 2-C

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 that 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	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCEN-TRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
METALS, CYANIDE, AND TOTAL PHENOLS															
1M. Antimony, Total (7440-36-0)	X			<5.00	<5E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
2M. Arsenic, Total (7440-38-2)	X			<5.00	<5E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
3M. Beryllium, Total (7440-41-7)	X			<1.00	<1E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
4M. Cadmium, Total (7440-43-9)	X			<0.100	<1E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
5M. Chromium, Total (7440-47-3)	X			<5.00	<5E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
6M. Copper, Total (7440-50-8)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
7M. Lead, Total (7439-92-1)	X			2.22	0.0023	na	na	na	na	1	ug/L	lb/d	na	na	na
8M. Mercury, Total (7439-97-6)	X			6.51	6.7E-7	na	na	na	na	1	ng/L	lb/d	na	na	na
9M. Nickel, Total (7440-02-0)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
10M. Selenium, Total (7782-49-2)	X			<5.00	<5E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
11M. Silver, Total (7440-22-4)	X			<5.00	<5E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
12M. Thallium, Total (7440-28-0)	X			<0.500	<5E-5	na	na	na	na	1	ug/L	lb/d	na	na	na
13M. Zinc, Total (7440-66-6)	X			26.5	2.7E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
14M. Cyanide, Total (57-12-5)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
15M. Phenols, Total	X			<5.00	<5E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
DIOXIN															
2,3,7,8-Tetra-chlorodibenzo-P-Dioxin (1764-01-6)			X	DESCRIBE RESULTS		Not Detected in EPA 625 Form 2C Dioxin Screen.									

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCEN-TRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – VOLATILE COMPOUNDS															
1V. Accrolein (107-02-8)	X			<5.00	<5E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
2V. Acrylonitrile (107-13-1)	X			<5.00	<5E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
3V. Benzene (71-43-2)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
4V. Bis (*Chloro-methyl*) Ether (542-88-1)	Testing is Not Required			na	na	na	na	na	na	na	na	na	na	na	na
5V. Bromoform (75-25-2)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
6V. Carbon Tetrachloride (56-23-5)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
7V. Chlorobenzene (108-90-7)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
8V. Chlorodi-bromomethane (124-48-1)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
9V. Chloroethane (75-00-3)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
10V. 2-Chloro-ethylvinyl Ether (110-75-8)	X			<5.00	<5E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
11V. Chloroform (67-66-3)	X			14.1	1.5E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
12V. Dichloro-bromomethane (75-27-4)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
13V. Dichloro-difluoromethane (75-71-8)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
14V. 1,1-Dichloro-ethane (75-34-3)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
15V. 1,2-Dichloro-ethane (107-06-2)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
16V. 1,1-Dichloro-ethylene (75-35-4)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
17V. 1,2-Dichloro-propane (78-87-5)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
18V. 1,3-Dichloro-propylene (542-75-6)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
19V. Ethylbenzene (100-41-4)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
20V. Methyl Bromide (74-83-9)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
21V. Methyl Chloride (74-87-3)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na

CONTINUED FROM PAGE V-4

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCEN-TRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – VOLATILE COMPOUNDS (*continued*)															
22V. Methylene Chloride (75-09-2)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
23V. 1,1,2,2-Tetrachloroethane (79-34-5)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
24V. Tetrachloro-ethylene (127-18-4)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
25V. Toluene (108-88-3)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
26V. 1,2-Trans-Dichloroethylene (156-60-5)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
27V. 1,1,1-Trichloro-ethane (71-55-6)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
28V. 1,1,2-Trichloro-ethane (79-00-5)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
29V Trichloro-ethylene (79-01-6)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
30V. Trichloro-fluoromethane (75-69-4)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
31V. Vinyl Chloride (75-01-4)	X			<2.00	<2E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
GC/MS FRACTION – ACID COMPOUNDS															
1A. 2-Chlorophenol (95-57-8)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
2A. 2,4-Dichloro-phenol (120-83-2)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
3A. 2,4-Dimethyl-phenol (105-67-9)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
4A. 4,6-Dinitro-O-Cresol (534-52-1)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
5A. 2,4-Dinitro-phenol (51-28-5)	X			<50.0	<5E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
6A. 2-Nitrophenol (88-75-5)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
7A. 4-Nitrophenol (100-02-7)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
8A. P-Chloro-M-Cresol (59-50-7)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
9A. Pentachloro-phenol (87-86-5)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
10A. Phenol (108-95-2)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
11A. 2,4,6-Trichloro-phenol (88-05-2)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCEN-TRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – BASE/NEUTRAL COMPOUNDS															
1B. Acenaphthene (83-32-9)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
2B. Acenaphtylene (208-96-8)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
3B. Anthracene (120-12-7)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
4B. Benzidine (92-87-5)	X			<100	<1E-2	na	na	na	na	1	ug/L	lb/d	na	na	na
5B. Benzo (*a*) Anthracene (56-55-3)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
6B. Benzo (*a*) Pyrene (50-32-8)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
7B. 3,4-Benzo-fluoranthene (205-99-2)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
8B. Benzo (*ghi*) Perylene (191-24-2)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
9B. Benzo (*k*) Fluoranthene (207-08-9)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
10B. Bis (*2-Chloro-ethoxy*) Methane (111-91-1)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
11B. Bis (*2-Chloro-ethyl*) Ether (111-44-4)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
12B. Bis (*2-Chloroisopropyl*) Ether (102-80-1)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
13B. Bis (*2-Ethyl-hexyl*) Phthalate (117-81-7)	X			11.1	1.1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
14B. 4-Bromophenyl Phenyl Ether (101-55-3)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
15B. Butyl Benzyl Phthalate (85-68-7)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
16B. 2-Chloro-naphthalene (91-58-7)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
17B. 4-Chloro-phenyl Phenyl Ether (7005-72-3)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
18B. Chrysene (218-01-9)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
19B. Dibenzo (*a,h*) Anthracene (53-70-3)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
20B. 1,2-Dichloro-benzene (95-50-1)	X			<1.00	<1E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
21B. 1,3-Di-chloro-benzene (541-73-1)	X			<1.00	<1E-4	na	na	na	na	1	ug/L	lb/d	na	na	na

CONTINUED FROM PAGE V-6

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCEN-TRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – BASE/NEUTRAL COMPOUNDS (*continued*)															
22B. 1,4-Dichloro-benzene (106-46-7)	X			<1.00	<1E-4	na	na	na	na	1	ug/L	lb/d	na	na	na
23B. 3,3-Dichloro-benzidine (91-94-1)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
24B. Diethyl Phthalate (84-66-2)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
25B. Dimethyl Phthalate (131 -11-3)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
26B. Di-N-Butyl Phthalate (84-74-2)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
27B. 2,4-Dinitro-toluene (121-14-2)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
28B. 2,6-Dinitro-toluene (606-20-2)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
29B. Di-N-Octyl Phthalate (117-84-0)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
30B. 1,2-Diphenyl-hydrazine (*as Azo-benzene*) (122-66-7)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
31B. Fluoranthene (206-44-0)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
32B. Fluorene (86-73-7)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
33B. Hexachloro-benzene (118-74-1)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
34B. Hexachloro-butadiene (87-68-3)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
35B. Hexachloro-cyclopentadiene (77-47-4)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
36B Hexachloro-ethane (67-72-1)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
37B. Indeno (*1,2,3-cd*) Pyrene (193-39-5)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
38B. Isophorone (78-59-1)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
39B. Naphthalene (91-20-3)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
40B. Nitrobenzene (98-95-3)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
41B. N-Nitro-sodimethylamine (62-75-9)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
42B. N-Nitrosodi-N-Propylamine (621-64-7)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – BASE/NEUTRAL COMPOUNDS (*continued*)															
43B. N-Nitrosodiphenylamine (86-30-6)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
44B. Phenanthrene (85-01-8)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
45B. Pyrene (129-00-0)	X			<10.0	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
46B. 1,2,4-Trichlorobenzene (120-82-1)	X			<9.43	<1E-3	na	na	na	na	1	ug/L	lb/d	na	na	na
GC/MS FRACTION – PESTICIDES															
1P. Aldrin (309-00-2)				na	na	na	na	na	na	na	na	na	na	na	na
2P. α-BHC (319-84-6)				na	na	na	na	na	na	na	na	na	na	na	na
3P. β-BHC (319-85-7)				na	na	na	na	na	na	na	na	na	na	na	na
4P. γ-BHC (58-89-9)				na	na	na	na	na	na	na	na	na	na	na	na
5P. δ-BHC (319-86-8)				na	na	na	na	na	na	na	na	na	na	na	na
6P. Chlordane (57-74-9)				na	na	na	na	na	na	na	na	na	na	na	na
7P. 4,4'-DDT (50-29-3)				na	na	na	na	na	na	na	na	na	na	na	na
8P. 4,4'-DDE (72-55-9)				na	na	na	na	na	na	na	na	na	na	na	na
9P. 4,4'-DDD (72-54-8)				na	na	na	na	na	na	na	na	na	na	na	na
10P. Dieldrin (60-57-1)				na	na	na	na	na	na	na	na	na	na	na	na
11P. α-Enosulfan (115-29-7)				na	na	na	na	na	na	na	na	na	na	na	na
12P. β-Endosulfan (115-29-7)				na	na	na	na	na	na	na	na	na	na	na	na
13P. Endosulfan Sulfate (1031-07-8)				na	na	na	na	na	na	na	na	na	na	na	na
14P. Endrin (72-20-8)				na	na	na	na	na	na	na	na	na	na	na	na
15P. Endrin Aldehyde (7421-93-4)				na	na	na	na	na	na	na	na	na	na	na	na
16P. Heptachlor (76-44-8)				na	na	na	na	na	na	na	na	na	na	na	na

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)	OUTFALL NUMBER
SC0037401	004

CONTINUED FROM PAGE V-8

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCEN-TRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – PESTICIDES (*continued*)															
17P. Heptachlor Epoxide (1024-57-3)				na	na	na	na	na	na	na	na	na	na	na	na
18P. PCB-1242 (53469-21-9)				na	na	na	na	na	na	na	na	na	na	na	na
19P. PCB-1254 (11097-69-1)				na	na	na	na	na	na	na	na	na	na	na	na
20P. PCB-1221 (11104-28-2)				na	na	na	na	na	na	na	na	na	na	na	na
21P. PCB-1232 (11141-16-5)				na	na	na	na	na	na	na	na	na	na	na	na
22P. PCB-1248 (12672-29-6)				na	na	na	na	na	na	na	na	na	na	na	na
23P. PCB-1260 (11096-82-5)				na	na	na	na	na	na	na	na	na	na	na	na
24P. PCB-1016 (12674-11-2)				na	na	na	na	na	na	na	na	na	na	na	na
25P. Toxaphene (8001-35-2)				na	na	na	na	na	na	na	na	na	na	na	na

Cross Generating Station
Outfall 005

Please print or type in the unshaded areas only.	EPA ID Number (copy from Item 1 of Form 1) SC0037401	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	
005	33.0(	13.0(	35.0(	79.0(	58.0(	40.0(	Diversion Canal to Lake Moultrie

II. DISCHARGE DATE *(If a new discharger, the date you expect to begin discharging)*
06/03/1981

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.

N/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)	2.60 lbs/day	5.73 mg/L	7.1837 lbs/d	14.8670 mg/L	15.00	NA
Total Suspended Solids (TSS)	28.3 lbs/day	62.3 mg/L	4.7514 lbs/d	9.8333 mg/L	12.00	NA
Fecal Coliform *(if believed present or if sanitary waste is discharged)*	NA	0 col/100 mL	NA	26.25 col.	12.00	NA
Total Residual Chlorine *(if chlorine is used)*	<0.023 lbs/d	<0.05 mg/L	0.1409 lbs/d	0.2917 mg/L	12.00	NA
Oil and Grease	10.35 lbs/d	22.8 mg/L	NA	NA	1.00	NA
*Chemical oxygen demand (COD)	NA	NA	NA	NA	1.00	NA
*Total organic carbon (TOC)	NA	NA	NA	NA	1.00	NA
Ammonia *(as N)*	3.18 lbs/d	7.01 mg/L	NA	NA	1.00	NA
Discharge Flow	Value 54457 GPD		57958 GPD *2009 AVG		365.00	NA
pH *(give range)*	Value 7.7 S.U.		7.3 - 8, AVG 7.6 S.U.		12.00	NA
Temperature *(Winter)*	18.00 °C		NA °C		1.00	NA
Temperature *(Summer)*	NA °C		NA °C		0.00	NA

*If noncontact cooling water is discharged

V. Except for leaks or spills, will the discharge described in this form be intermittent or seasonal? ☐ Yes ☐ No

If yes, briefly describe the frequency of flow and duration.

No

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

Sanitary wastes from Cross Station are treated by a package plant. Treated effluent from the package plant is discharged through Internal Outfall 005 to the common discharge manhole where it joins with other wastewater discharges from the facility. The combined wastewater stream is discharged to the Diversion Canal to Lake Moultrie.

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.

Average daily values calculated from monthly DMRs over the past year. While Cross is not required to monitor or report COD or TOC, because noncontact cooling water is not discharged through this outfall, one measurement of these two parameters was taken in Jan. 2010 as noted on the form. Results were 35.8 mg-COD/L and 12.4 mg-TOC/L.

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.)*
Jay A. Hudson, P.E., Manager, Environmental Management	(843) 761-8000
C. Signature	D. Date Signed
	3/2/10

D H E C

PROMOTE PROTECT PROSPER

South Carolina Department of Health and Environmental Control

BUREAU OF WATER

(803) 898-4300

Location Supplement for ND and NPDES Permit Applications

I. Date: February 19, 2010

II. Name of Facility: Cross Generating Station

III. NPDES or ND Number: SC0037401 (proposed dischargers leave blank)

IV. If the facility is not owned by a city or town, please answer the following question. Is the plant or discharge point/application site(s) located within the corporate limits of a city or town?

_____ Yes, Name of city or town: _____

__X__ No.

V. If the address on the application is not a specific location, please give a short description of the plant location. Example: Plant is located at the interchange of Interstate I-26 and U.S. Highway #1.

The facility is located between Cross and Pineville, SC in Berkeley County, but is not within the city/town limits of either municipality. It is located adjacent to the Diversion Canal between Lakes Marion and Moultrie.

The address is 553 Cross Station Road, Pineville, SC 29468. Cross Station Road intersects with Viper Road (S-8-708) which intersects with state highway SC45 about one mile north of the Diversion Canal bridge.

Lat.: 33.3694 N, Long.: 80.1119 W

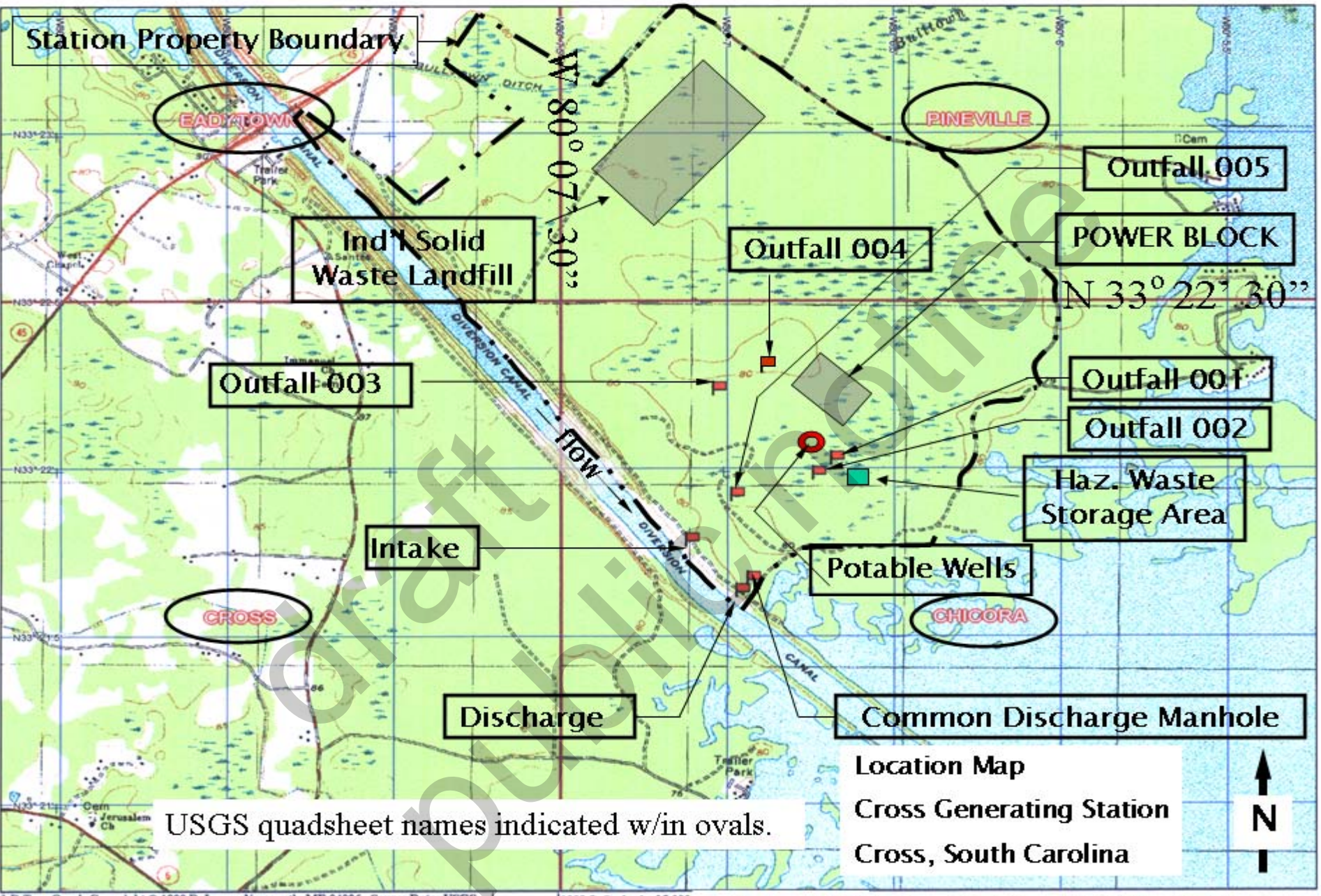
VI. **For NPDES permits**, please give a description of the location of each discharge point into the receiving stream using some landmark as a reference point, i.e., bridge, stream, road junction, the plant itself, etc. Example: Discharge #001 is into Johnny Creek approximately 300 feet directly behind the plant. Discharge #002 is into Doris Creek 150 feet downstream from U.S. Highway #30 bridge. **For ND permits**, describe the location of each application site. Use additional sheets, as necessary.

Outfalls 001, 002, 003, 004, and 005 discharge into the Diversion Canal via a pipeline which extends from a common discharge manhole at which point the outfalls are interconnected. The final discharge point is approximately 200 ft. southwest of the common discharge manhole and approximately 1,200 feet south east of the plant intake. The discharge pipe projects 117.8 ft. into the Diversion Canal and discharges perpendicular to the direction of flow, and is located approximately 7.97 ft. off the channel bottom.

VII. Please submit a copy of a U.S. Geological Survey 7½ minute quad sheet (or a 15 minute quad if a 7½ quad is not available for the area) with the discharge point(s) identified. The entire quad sheet need not be submitted. An 8½ by 11 photocopy of the applicable portion of the map is sufficient. The quad sheet name must be provided on the copy submitted to the Department. USGS are available at the SC Department of Natural Resources/Map and Information Center, 2221 Devine Street, Suite 222, Columbia, SC 29205. Telephone #: (803) 734-9108.

Please see attached location maps.

Location Map: Cross Generating Station. Plant located near intersection of Pineville, Chicora, Cross, and Eadytown 7.5 Min. Quads.



Filename: C:\Data\PowerPoint\Cross3\OutfallsonUSGSMapRev1

CROSS SLUDGE SUPPLEMENT

Per the instructions for completing DHEC's sludge supplement and our consultation with the Bureau of Water, Santee Cooper is submitting the attached Sludge Supplement for NPDES and ND Permit Applications form. Sludge from the sanitary wastewater treatment package plant will be hauled to Berkeley County Water and Sanitation's Lower Berkeley WWTP in accordance with the attached letter. Please note that BCW&S requires 24-hours notice and a sludge analysis.

The Cross package plant's sludge compartment does not require regular emptying. However, Santee Cooper certifies that there have been no modifications to the plant or reason to believe sludge characteristics have changed since the last NPDES permit application was submitted in 2005.

Certification

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 this study, 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.

Name and Official Title	**Registration Number**	**Date**
Susan W. Jackson, P.E. Supervisor, Environmental Services	25476 State of SC	3/2/10

SEAL

D H E C

PROMOTE PROTECT PROSPER

South Carolina Department of Health and Environmental Control

BUREAU OF WATER
SLUDGE DISPOSAL SUPPLEMENT FOR NPDES AND ND PERMIT APPLICATIONS

Facility Name: SCPSA/CROSS GENERATING STATION

Permit Number: SC00 37401 (leave blank for a new facility)

or ND00 _____

Please check your proposed or current sludge disposal procedure:

I. Existing Facilities:

___ Lagoon or other facility with no routine sludge disposal. Please attach a letter that addresses the approximate schedule for sludge removal and address the anticipated disposal method (note that the proposed sludge disposal method must be approved by the Department prior to initiation).

_X_ Sludge disposal at another wastewater treatment facility. Attached is a recent letter of acceptance dated 16 Feb. 2010. This letter must include the NPDES or ND number of the treatment facility accepting the sludge for disposal. If no previous SCDHEC approval has been granted on the disposal method, then please include a detailed report on the existing sludge disposal method. See the attached requirements for Sludge Disposal Report A. If a previous SCDHEC approval has been granted, then include a recent analysis that shows the non-hazardous nature of the sludge or a signed statement that the sludge characteristics have not changes since the last analysis.

___ Sludge disposal at a landfill. If the landfill is SWAIP (special waste) approved, an recent acceptance letter from the landfill is acceptable. If the landfill is not SWAIP approved, attached is SCDHEC Solid and Hazardous Waste approval dated _____, or other SCDHEC approval dated _____. If no previous approval has been granted on the disposal method, then please include a detailed report on the existing sludge disposal method. See the attached requirements for Sludge Disposal Report B.

___ Sludge disposal by Beneficial Use of Sludge. Attached is SCDHEC approval letter or program approval dated _____. If no previous approval has been granted on the disposal method, then please include a detailed report on the existing sludge disposal method. See the attached requirements for Sludge Disposal Report C.

II. Proposed Facilities:

___ Lagoon or other facility with no routine sludge disposal. Please attach a letter that addresses the approximate schedule for sludge removal and address the anticipated disposal method (note that the proposed sludge disposal method must be approved by the Department prior to initiation).

___ Sludge disposal at another wastewater treatment facility. Please include a detailed report on the proposed sludge disposal method. See the attached requirements for Sludge Disposal Report A.

___ Sludge disposal at a landfill. Please include a detailed report on the proposed sludge disposal method. See the attached requirements for Sludge Disposal Report B.

___ Sludge disposal by Beneficial Use. Please include a detailed report on the proposed sludge disposal method. See the attached requirements for Sludge Disposal Report C.

Send this form and the appropriate disposal report (if applicable) with your NPDES or ND permit application.

ALSO SEE ATTACHED INSTRUCTIONS

February 16, 2010

Mr. Jesse Cannon, Associate Engineer
Santee Cooper
One River Drive
P.O. Box 2946101
Moncks Corner, SC 29461-2901

Dear Mr. Cannon:

The Berkeley County Water and Sanitation approves the disposal of sanitary sewer sludge generated from the Cross Generating Station at the Lower Berkeley WWTP NPDES# SC0046060 under the following criteria:

1) At least twenty four hours notice is requested before sludge is accepted.

2) Copies of any sludge analysis performed will be provided to BCWS.

3) Only sludge generated from the generating station's sewage facility will be accepted. No industrial process sludges are to be included in this disposal agreement.

4) Billing will be sent to the private hauler utilized by Santee Cooper.

5) Only those haulers approved by BCWS are authorized to discharge at the Lower Berkeley WWTP.

Respectfully,

Carlton D. Ouzts
Operations Superintendent

212 Oakley Plantation Drive • PO Box 1529 • Moncks Corner, SC 29461• Telephone (843) 572-4400 • 761-8817 • 567-2061• Fax (843) 569-5309

TOXICITY MIXING ZONE SUPPLEMENT

Santee Cooper had previously provided CORMIX modeling data for a mixing zone request in 2000. With this renewal, SC DHEC has requested updated modeling using the newest CORMIX model. Santee Cooper commissioned Environmental Engineering Sciences, LLC (E2S) of Charleston, SC to conduct the required modeling and complete the mixing zone forms. The results of this modeling, along with the mxing zone request supplement and CORMIX checklist are attached.

Model Set-Up

Santee Cooper provided E2S with the 2000 mixing zone request report and our current NPDES permit and rationale. With this information, E2S proceeded to re-modeling the worst case chronic toxicity scenario from the 2000 report with CORMIX 5.0 and updated long-term flow data from discharge monitoring reports. This flow data has been provided and discussed in the report section of this application. Modeled data were from NPDES outfall 002, the bottom ash pond, which is the only outfall at Cross with a toxicity limit.

Description of Waste Stream

Cross NPDES outfall 002 is the bottom ash pond, following pH adjustment at the Station's pH-trim facility. The bottom ash pond collects cooling tower blowdown, stormwater, bottom ash sluice water, boiler blowdown, low volume wastes, non-chemical metal cleaning waste, seal water, air heater wash water, coal pile runoff, and vehicle rinse rack water. After treatment in the pond and pH-trim system, wastewaters are discharged into the Diversion Canal at an average rate of 0.698 MGD. Discharge occurs through a 36-in. pipe which projects 117.8 ft. into the Diversion Canal and is situated 7.97 ft. above the channel bottom. Treated wastewaters discharge perpendicular to the direction of the channel's flow. Attached drawings show the plant's discharge structure.

Description of Receiving Water

The Diversion Canal consists of a man-made trapezoidal channel which connects Lakes Marion and Moultrie. The canal was constructed as part of the original Santee-Cooper project which culminated in the construction of Lakes Marion and Moultrie, Jefferies Hydropower Station, the Pinopolis Lock and Dam, the Santee Spillway, and all associated dikes and dams. This project became operational in 1942. Attached are results of a channel survey conducted by Santee Cooper in 2000.

According to the current NPDES permit, the 7Q10 for the canal is 1800 cfs. The channel is 396 ft. wide and has an average depth of 30 feet. Using the average depth, the stream width is 236.1 ft.; this is the width used in the model.

Worst-Case Modeling

Due to buoyancy's effects on plume dispersion, the worst-case model from the 2000 study was the winter scenario, which had the highest difference between plume temperature and ambient temperature. Cross does not routinely model discharge temperature, so the same temperature was used as in 2000. Thus, the only change between this model and the 2000 model was the long-term average discharge rate. Ambient temperature (11.1°C), channel geometry, and ambient flow were unchanged.

Results and Discussion

Model results are attached. Chronic toxicity mixing zones, as defined by SC DHEC, are of width equal to half of channel width and length equal to twice the channel width. The model shows release of the plume at the discharge point and rapidly rising to the Diversion Canal's surface. The plume's centerline gradually shifts toward the Canal's southern bank, opposite the station. Eventually the plume becomes bank-attached.

Chronic toxicity mixing zones, as defined by SC DHEC, are of width equal to half of channel width and length equal to twice the channel width. The chronic toxicity concentration (CTC) was found to be 1.4% at the width boundary (36.0 m), yielding a necessary mixing zone length of only 83.5 m, (out of a possible length of 144 m). This is less than the 4% and 6% concentrations (chronic and acute, respectively) established by the 2000 model and described in the current permit rationale.

Because the current permit only requires chronic toxicity modeling, given results are for the DHEC-mandated dimensions of the chronic mixing zone. If desired, acute toxicity modeling results can easily be interpolated from the model results by evaluating the modeled concentrations against the dimensions of the DHEC-mandated acute mixing zone (one-tenth of stream width in width, and one-third of stream width in length downstream).

D H E C

PROMOTE PROTECT PROSPER

South Carolina Department of Health and Environmental Control

NPDES APPLICATION SUPPLEMENT

Mixing Zone Request for Surface Water Discharges

NPDES #: SC0037401

Facility Name: SCPSA - Cross Generating Station (Outfall 002 - Chronic WET)

County: Berkeley

Are you requesting a mixing zone for whole effluent toxicity (WET) in accordance with the back of this form?

☐ **No**. No further information is needed. Submit this form. If WET testing is required, a chronic test at 100% will be required, unless the IWC is at least 80%. Proposed IWC _____ %

☒ **Yes**. Check one of the boxes below and submit this form with the appropriate information.

☐ Check this block if you are proposing to perform or have performed a mixing zone demonstration to determine the appropriate zone of initial dilution (ZID) and/or mixing zone size. Complete the remainder of this form and submit a mixing zone demonstration plan as described on the back of this form. The Department recommends the demonstration plan be approved prior to implementation of any demonstration work.

☒ Check this block if you are requesting a mixing zone by providing limited information such as a mixing model like CORMIX to determine mixing in accordance with suggested zone of initial dilution (ZID) and/or mixing zone sizes. Complete the remainder of this form, as applicable, and submit the CORMIX Supplement and modeling results (or other model assumptions, inputs and results).

What is the proposed ZID size (in meters)? Length: NA m Width: NA m

What is the proposed acute WET test concentration? NA %

What is the proposed mixing zone size (in meters)? Length: 83.5 m Width: 36.0 m

What is the proposed chronic WET test concentration? 1.4 %

Printed Name: John Durkee, P.E. **Firm:** Environmental Engineering Sciences, LLC

Signature: _____ **Date:** February 3, 2010

CORMIX Checklist for Data Preparation – Version v5.0

PROJECT LEGEND

Project File Name: 2010 Chronic (Winter) Model @ 0.7 MGD.cmx **Design Case**: 2010 Chronic (Winter) Model @ 0.7 MGD
Site Name: SCPSA - Cross Generating Station **Prepared By**: John Durkee, P.E. **Date**: Februai

EFFLUENT DATA

☐ **Non-Fresh Water Effluent Density**
Density ρ_0: .....kg/m^3

☒ **Fresh Water Effluent Density**
☒ Temperature T_0: 25.2 °C ☐ Density ρ_0: ..... kg/m^3
Discharge Excess Concentration: 100% ☒ Effluent Flowrate Q_0: 0.0307 m^3/s ☐ Effluent Velocity U_0: .....m/s

Pollutant Types
☒ Conservative ☐ Non Conservative: ...../day ☐ Heated – Heat Loss Coefficient: .....W/m^2/°C

☐ **Brine** ☐ **Sediment:** Chunks: ..... % Sand: ..... % Coarse Silt: ..... % Fine Silt: .....% Clay: ..... %
Total Sediment Concentration: ..... kg/m^3

AMBIENT GEOMETRY / FLOW FIELD DATA

Average Depth H_a: 9.14 m ☐ **Unbounded** ☒ **Bounded**: Width BS: 72 m
Depth at Discharge H_d: 9.14 m Appearance: ☒ Uniform ☐ Slight Meander ☐ Highly Irregular

☒ **Steady**
☒ Ambient Flowrate Q_a 51 m^3/s
☐ Ambient Velocity U_a ..... m/s

☐ **Unsteady**
Period .....hr Max Velocity U_m ..... m/s Tidal Velocity at this Time U_a: ..... m/s
☐ At Time: ....hr Before Slack ☐ At Slack – Δ Time: .....hr ☐ At Time: ....hr After Slack

☐ **Single Slope**
Slope S: ..... %
Near Shore Velocity: ..... m/s
Near Shore Darcy-Weisbach f: .....

☐ **Near & Far Slope**
☐ Near Shore Slope S_1 .....% ☐ Far Slope S_2: ..... %
☐ Near Shore Velocity U_{a1}.....m/s ☐ Far Shore Velocity U_{a2}: ..... m/s
☐ Near Shore Darcy-Weisbach f_1: ..... ☐ Far Shore Darcy-Weisbach f_2: .....
☐ Breakpoint: ..... m

☒ Manning's n: 0.025 Wind Speed: 2 m/s

AMBIENT DENSITY DATA

Water Body: ☒ **Fresh Water** ☐ **Non-Fresh Water**

☒ **Uniform** **Fresh**: ☒ Temperature: 11.1 °C ☐ Density ρ_a: ..... kg/ m^3 **Non-Fresh**: Density ρ_a: ..... kg/ m^3

☐ **Stratified** ☐ **Type A** ☐ **Type B**: Pycnocline Height: .....m ☐ **Type C**: Pycnocline Height: .....m Jump: .....kg/ m^3 / °C
Density ρ: At Surface ρ_{as}..... kg/m^3/ °C At Bottom ρ_{ab}:..... kg/ m^3 / °C

☐ **Brine & Sediment Only** Level 1 Density ρ_1: .. kg/ m^3 Sub 1:.....m; Level 2 Density ρ_2:.....kg/ m^3 Sub 2:..... m

DISCHARGE GEOMETRY DATA

CORMIX 1 – Single Port

Nearest Bank: ☒ Left ☐ Right
Dist. to Nearest Bank: 35.9 m
Vert. Angle θ_0: 0 °; Horiz. Angle σ_0: 270°
☒ Port Diameter D_0: 0.9 m
☐ Port Area A_0: .....m^2

Submerged
Port Height above Bottom h_0: 2.43 m

Above Surface
Port Height above Surface..... m
☐ Jet-like ☐ Spray ☐ Area
Deflector Plate: . ☐ With or ☐ Without

CORMIX 2 – Multiport

Nearest Bank: ☐ Left ☐ Right
☐ Unidirectional ☐ Staged ☐ Altern./ Vert.
N° of openings: .....; Diffuser Length: ..... m
Dist. to 1nd end-point YB_1: .....m
Dist. to 2st far end-point YB_2: .....m
Port Height h_0: .....m; Port Diameter D_0: .... m
Contraction Ratio: .....

Angles (degrees)
Vert. Angle θ: ..... °; Horiz. Angle σ: ..... °
Align. Angle γ: ..... °; Relat.Orient. Angle β: ..... °
Nozzle Direction: ☐ Same or ☐ Fanned Out

CORMIX 3 – Surface Discharge

Discharge Located: ☐ Left ☐ Right
Horiz. Angle σ: ..... °
Local Depth at Discharge Outlet: ..... m
☐ **Flush** ☐ **Co-flowing**
☐ **Protruding:** Distance from Bank: ..... m

Discharge Outlet
☐ **Channel:** Width: .....m; Depth b_0: ..... m
☐ **Pipe:** Diameter D_0: ..... m
Bottom Invert Depth: ..... m
Local Bottom Slope at Chanel Entry: ..... °

MIXING ZONE DATA

☒ **Non-Toxic Effluent** ☐ **Toxic Effluent**
☐ WQ Standard: ..... ☒ No WQ Standard CMC : ..... CCC : .....

☒ **Mixing Zone Specified** **Chronic Sizes Per SCDHEC** ☐ **No Mixing Zone Specified**
☐ Trajectory: .....m ☒ Downstream Distance: 144 m ☒ Width: 36 % /ⓜ ☐ Area: ..... %
Region of Interest: 8000 m Grid Intervals for Display: 50

```
CORMIX1 PREDICTION FILE:
1111111111111111111111111111111111111111111111111111111111111111111111111111111
                      CORMIX MIXING ZONE EXPERT SYSTEM
            Subsystem CORMIX1:  Single Port Discharges
                        CORMIX Version 5.0GT
                     HYDRO1 Version 5.0.2.0 October 2008
------------------------------------------------------------------------------
------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Cross Station
 Design case:       2010 Chronic (Winter) Model @ 0.7 MGD
 FILE NAME:         C:\...\Cross\2010 Chronic (Winter) Model at 0.7 MGD.prd
 Time stamp:        Tue Feb  2 10:07:38 2010

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =     72.00  AS    =    658.08  QA    =     51.00  ICHREG= 1
 HA    =      9.14  HD    =      9.14
 UA    =     0.077  F     =     0.023 USTAR =0.4198E-02
 UW    =     2.000 UWSTAR=0.2198E-02
 Uniform density environment
 STRCND=  U         RHOAM =  999.5970

DISCHARGE PARAMETERS (metric units)
 BANK  =  LEFT      DISTB =     35.90
 D0    =     0.900 A0    =     0.636 H0    =      2.43  SUB0  =      6.71
 THETA =      0.00  SIGMA =    270.00
 U0    =     0.048 Q0    =     0.031       =0.3070E-01
 RHO0  =  996.9941  DRHO0 =0.2603E+01  GP0   =0.2554E-01
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES (metric units)
 Q0    =0.3070E-01  M0    =0.1482E-02  J0    =0.7840E-03  SIGNJ0=      1.0
 Associated length scales (meters)
 LQ    =     0.80  LM    =     0.27  Lm    =     0.50  Lb    =     1.68
                                     Lmp   =  99999.00  Lbp   =  99999.00


NON-DIMENSIONAL PARAMETERS
 FR0   =     0.32  R     =     0.62

FLOW CLASSIFICATION
 1111111111111111111111111111111111111111
 1  Flow class (CORMIX1)     =    H1    1
 1  Applicable layer depth HS =    9.14  1
 1111111111111111111111111111111111111111

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =   8000.00  XMAX  =   8000.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and below the center of the port:
        35.90 m  from the LEFT  bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
BEGIN MOD101: DISCHARGE MODULE

       X        Y       Z        S       C       B
      0.00     0.00    2.43     1.0 0.100E+03   0.45

END OF MOD101: DISCHARGE MODULE
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
BEGIN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

 Jet/plume transition motion in strong crossflow.

 Zone of flow establishment:            THETAE=     -0.00  SIGMAE=    303.63
  LE    =      0.00  XE    =      0.00  YE    =     -0.00  ZE    =      2.43

 Profile definitions:
   B = Gaussian 1/e (37%) half-width, normal to trajectory
   S = hydrodynamic centerline dilution
   C = centerline concentration (includes reaction effects, if any)

       X        Y       Z        S       C       B
      0.00    -0.00    2.43     1.1 0.902E+02   0.44
  Minimum jet height has been reached.
      0.09    -0.08    2.52     1.2 0.867E+02   0.35
      0.20    -0.13    2.67     1.3 0.759E+02   0.33
      0.30    -0.16    2.83     1.5 0.659E+02   0.33
      0.40    -0.18    2.96     1.7 0.585E+02   0.34
      0.51    -0.19    3.11     2.0 0.512E+02   0.36
      0.63    -0.21    3.25     2.2 0.451E+02   0.38
      0.74    -0.22    3.38     2.5 0.406E+02   0.40
      0.86    -0.23    3.52     2.8 0.362E+02   0.42
      0.99    -0.24    3.65     3.1 0.325E+02   0.44
      1.12    -0.25    3.79     3.4 0.293E+02   0.46
      1.24    -0.25    3.90     3.7 0.269E+02   0.48
      1.37    -0.26    4.03     4.1 0.245E+02   0.51
      1.51    -0.26    4.16     4.5 0.224E+02   0.53
      1.63    -0.27    4.27     4.8 0.208E+02   0.55
      1.77    -0.27    4.39     5.2 0.192E+02   0.58
      1.92    -0.28    4.51     5.6 0.177E+02   0.60
      2.04    -0.28    4.62     6.0 0.166E+02   0.62
      2.19    -0.28    4.73     6.5 0.155E+02   0.65
      2.34    -0.29    4.85     6.9 0.144E+02   0.67
      2.49    -0.29    4.97     7.4 0.135E+02   0.70
      2.62    -0.29    5.06     7.8 0.128E+02   0.72
      2.77    -0.30    5.17     8.3 0.120E+02   0.74
      2.92    -0.30    5.28     8.8 0.113E+02   0.77
      3.06    -0.30    5.38     9.3 0.108E+02   0.79
      3.21    -0.30    5.49     9.8 0.102E+02   0.81
      3.37    -0.30    5.59    10.4 0.966E+01   0.84
      3.52    -0.31    5.70    10.9 0.916E+01   0.86
      3.66    -0.31    5.79    11.4 0.877E+01   0.88
      3.82    -0.31    5.89    12.0 0.835E+01   0.90
      3.98    -0.31    5.99    12.6 0.796E+01   0.93
      4.11    -0.31    6.08    13.1 0.765E+01   0.95
      4.27    -0.31    6.18    13.7 0.731E+01   0.97
      4.43    -0.32    6.28    14.3 0.699E+01   0.99
      4.57    -0.32    6.36    14.8 0.674E+01   1.01
      4.73    -0.32    6.46    15.5 0.646E+01   1.04
      4.90    -0.32    6.56    16.1 0.620E+01   1.06
```

```
      5.06    -0.32    6.65    16.8 0.596E+01   1.08
      5.20    -0.32    6.73    17.3 0.577E+01   1.10
      5.36    -0.32    6.83    18.0 0.555E+01   1.13
      5.53    -0.32    6.92    18.7 0.535E+01   1.15
      5.67    -0.33    7.00    19.3 0.519E+01   1.17
      5.83    -0.33    7.09    20.0 0.501E+01   1.19
      6.00    -0.33    7.18    20.7 0.484E+01   1.21
      6.14    -0.33    7.26    21.3 0.470E+01   1.23
      6.30    -0.33    7.35    22.0 0.454E+01   1.25
      6.47    -0.33    7.44    22.7 0.440E+01   1.28
      6.64    -0.33    7.53    23.5 0.426E+01   1.30
      6.78    -0.33    7.61    24.1 0.415E+01   1.32
      6.95    -0.33    7.69    24.9 0.402E+01   1.34
      7.12    -0.33    7.78    25.5 0.392E+01   1.36
 Cumulative travel time =          61.6154 sec

END OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION
------------------------------------------------------------------------------
------------------------------------------------------------------------------
BEGIN MOD131: LAYER BOUNDARY/TERMINAL LAYER APPROACH

  Control volume inflow:
       X        Y       Z        S       C       B
      7.12    -0.33    7.78    25.5 0.392E+01   1.36

 Profile definitions:
   BV = top-hat thickness, measured vertically
   BH = top-hat half-width, measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)

        X        Y       Z        S       C       BV       BH       ZU       ZL
      5.76    -0.33    9.14    25.5 0.392E+01   0.00     0.00     9.14     9.14
      6.17    -0.33    9.14    25.5 0.392E+01   1.84     0.93     9.14     7.30
      6.57    -0.33    9.14    25.5 0.392E+01   2.19     1.31     9.14     6.95
      6.98    -0.33    9.14    25.5 0.392E+01   2.41     1.61     9.14     6.73
      7.39    -0.33    9.14    26.2 0.381E+01   2.57     1.85     9.14     6.57
      7.79    -0.33    9.14    29.5 0.339E+01   2.69     2.07     9.14     6.45
      8.20    -0.33    9.14    34.0 0.294E+01   2.78     2.27     9.14     6.36
      8.61    -0.34    9.14    38.1 0.263E+01   2.85     2.45     9.14     6.29
      9.02    -0.34    9.14    40.9 0.244E+01   2.90     2.62     9.14     6.24
      9.42    -0.34    9.14    42.4 0.236E+01   2.92     2.78     9.14     6.22
      9.83    -0.34    9.14    43.4 0.230E+01   2.93     2.93     9.14     6.21
 Cumulative travel time =          96.6578 sec

END OF MOD131: LAYER BOUNDARY/TERMINAL LAYER APPROACH
------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 Bank nearest to plume centerline has changed.
   Nearest bank is now on RIGHT.
------------------------------------------------------------------------------
BEGIN MOD141: BUOYANT AMBIENT SPREADING

 Profile definitions:
   BV = top-hat thickness, measured vertically
   BH = top-hat half-width, measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
```

ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)

Plume Stage 1 (not bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL
9.83	-0.34	9.14	43.4	0.230E+01	2.93	2.93	9.14	6.21
14.17	-0.34	9.14	48.1	0.208E+01	2.16	4.40	9.14	6.98
18.51	-0.34	9.14	51.2	0.195E+01	1.79	5.66	9.14	7.35
22.85	-0.34	9.14	53.7	0.186E+01	1.57	6.79	9.14	7.57
27.19	-0.34	9.14	55.7	0.180E+01	1.41	7.83	9.14	7.73
31.53	-0.34	9.14	57.4	0.174E+01	1.29	8.80	9.14	7.85
35.87	-0.34	9.14	58.9	0.170E+01	1.20	9.72	9.14	7.94
40.21	-0.34	9.14	60.3	0.166E+01	1.13	10.60	9.14	8.01
44.55	-0.34	9.14	61.7	0.162E+01	1.07	11.45	9.14	8.07
48.89	-0.34	9.14	62.9	0.159E+01	1.02	12.26	9.14	8.12
53.23	-0.34	9.14	64.0	0.156E+01	0.97	13.05	9.14	8.17
57.57	-0.34	9.14	65.2	0.153E+01	0.93	13.81	9.14	8.21
61.91	-0.34	9.14	66.2	0.151E+01	0.90	14.56	9.14	8.24
66.25	-0.34	9.14	67.3	0.149E+01	0.87	15.28	9.14	8.27
70.59	-0.34	9.14	68.3	0.146E+01	0.85	15.99	9.14	8.29
74.93	-0.34	9.14	69.4	0.144E+01	0.82	16.68	9.14	8.32
79.27	-0.34	9.14	70.4	0.142E+01	0.80	17.36	9.14	8.34
83.61	-0.34	9.14	71.4	0.140E+01	0.78	18.02	9.14	8.36
87.95	-0.34	9.14	72.4	0.138E+01	0.77	18.68	9.14	8.37
92.29	-0.34	9.14	73.4	0.136E+01	0.75	19.32	9.14	8.39
96.63	-0.34	9.14	74.4	0.134E+01	0.74	19.95	9.14	8.40
100.97	-0.34	9.14	75.4	0.133E+01	0.73	20.57	9.14	8.41
105.31	-0.34	9.14	76.5	0.131E+01	0.72	21.18	9.14	8.42
109.65	-0.34	9.14	77.5	0.129E+01	0.71	21.78	9.14	8.43
113.99	-0.34	9.14	78.6	0.127E+01	0.70	22.37	9.14	8.44
118.33	-0.34	9.14	79.7	0.126E+01	0.69	22.95	9.14	8.45
122.67	-0.34	9.14	80.7	0.124E+01	0.68	23.53	9.14	8.46
127.01	-0.34	9.14	81.9	0.122E+01	0.67	24.10	9.14	8.47
131.35	-0.34	9.14	83.0	0.121E+01	0.67	24.67	9.14	8.47
135.69	-0.34	9.14	84.1	0.119E+01	0.66	25.22	9.14	8.48
140.03	-0.34	9.14	85.3	0.117E+01	0.66	25.77	9.14	8.48
144.37	-0.34	9.14	86.5	0.116E+01	0.65	26.32	9.14	8.49
148.71	-0.34	9.14	87.7	0.114E+01	0.65	26.85	9.14	8.49
153.05	-0.34	9.14	88.9	0.112E+01	0.64	27.39	9.14	8.50
157.39	-0.34	9.14	90.2	0.111E+01	0.64	27.92	9.14	8.50
161.73	-0.34	9.14	91.5	0.109E+01	0.64	28.44	9.14	8.50
166.07	-0.34	9.14	92.8	0.108E+01	0.63	28.96	9.14	8.51
170.41	-0.34	9.14	94.2	0.106E+01	0.63	29.47	9.14	8.51
174.75	-0.34	9.14	95.5	0.105E+01	0.63	29.98	9.14	8.51
179.09	-0.34	9.14	96.9	0.103E+01	0.63	30.48	9.14	8.51
183.43	-0.34	9.14	98.4	0.102E+01	0.63	30.98	9.14	8.51
187.77	-0.34	9.14	99.8	0.100E+01	0.63	31.48	9.14	8.51
192.11	-0.34	9.14	101.3	0.987E+00	0.63	31.97	9.14	8.51
196.45	-0.34	9.14	102.8	0.973E+00	0.63	32.46	9.14	8.51
200.79	-0.34	9.14	104.4	0.958E+00	0.63	32.94	9.14	8.51
205.13	-0.34	9.14	106.0	0.944E+00	0.63	33.42	9.14	8.51
209.47	-0.34	9.14	107.6	0.930E+00	0.63	33.90	9.14	8.51
213.81	-0.34	9.14	109.2	0.916E+00	0.63	34.37	9.14	8.51
218.15	-0.34	9.14	110.9	0.902E+00	0.63	34.84	9.14	8.51
222.49	-0.34	9.14	112.6	0.888E+00	0.63	35.31	9.14	8.51
226.83	-0.34	9.14	114.4	0.874E+00	0.63	35.77	9.14	8.51

Cumulative travel time = 2895.0151 sec

Interpolated CTC @ width boundary (36.0 m) = 1.40%

Interpolated MZ length = 83.5 m

Mixing zone length boundary is further downstream (144 m)

Plume is ATTACHED to RIGHT bank/shore.
Plume width is now determined from RIGHT bank/shore.

Plume Stage 2 (bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL
226.83	-36.10	9.14	114.4	0.874E+00	0.63	71.54	9.14	8.51
226.92	-36.10	9.14	114.4	0.874E+00	0.63	71.55	9.14	8.51
227.01	-36.10	9.14	114.4	0.874E+00	0.63	71.56	9.14	8.51
227.09	-36.10	9.14	114.5	0.874E+00	0.63	71.57	9.14	8.51
227.18	-36.10	9.14	114.5	0.873E+00	0.63	71.58	9.14	8.51
227.27	-36.10	9.14	114.5	0.873E+00	0.63	71.59	9.14	8.51
227.36	-36.10	9.14	114.6	0.873E+00	0.63	71.59	9.14	8.51
227.45	-36.10	9.14	114.6	0.873E+00	0.63	71.60	9.14	8.51
227.54	-36.10	9.14	114.6	0.872E+00	0.63	71.61	9.14	8.51
227.62	-36.10	9.14	114.7	0.872E+00	0.63	71.62	9.14	8.51
227.71	-36.10	9.14	114.7	0.872E+00	0.63	71.63	9.14	8.51
227.80	-36.10	9.14	114.7	0.872E+00	0.63	71.64	9.14	8.51
227.89	-36.10	9.14	114.8	0.871E+00	0.63	71.65	9.14	8.51
227.98	-36.10	9.14	114.8	0.871E+00	0.63	71.66	9.14	8.51
228.07	-36.10	9.14	114.8	0.871E+00	0.63	71.67	9.14	8.51
228.15	-36.10	9.14	114.9	0.871E+00	0.63	71.68	9.14	8.51
228.24	-36.10	9.14	114.9	0.870E+00	0.63	71.69	9.14	8.51
228.33	-36.10	9.14	114.9	0.870E+00	0.63	71.70	9.14	8.51
228.42	-36.10	9.14	115.0	0.870E+00	0.64	71.71	9.14	8.50
228.51	-36.10	9.14	115.0	0.870E+00	0.64	71.71	9.14	8.50
228.60	-36.10	9.14	115.0	0.869E+00	0.64	71.72	9.14	8.50
228.68	-36.10	9.14	115.1	0.869E+00	0.64	71.73	9.14	8.50
228.77	-36.10	9.14	115.1	0.869E+00	0.64	71.74	9.14	8.50
228.86	-36.10	9.14	115.1	0.869E+00	0.64	71.75	9.14	8.50
228.95	-36.10	9.14	115.1	0.868E+00	0.64	71.76	9.14	8.50
229.04	-36.10	9.14	115.2	0.868E+00	0.64	71.77	9.14	8.50
229.13	-36.10	9.14	115.2	0.868E+00	0.64	71.78	9.14	8.50
229.21	-36.10	9.14	115.2	0.868E+00	0.64	71.79	9.14	8.50
229.30	-36.10	9.14	115.3	0.867E+00	0.64	71.80	9.14	8.50
229.39	-36.10	9.14	115.3	0.867E+00	0.64	71.81	9.14	8.50
229.48	-36.10	9.14	115.3	0.867E+00	0.64	71.82	9.14	8.50
229.57	-36.10	9.14	115.4	0.867E+00	0.64	71.83	9.14	8.50
229.66	-36.10	9.14	115.4	0.867E+00	0.64	71.83	9.14	8.50
229.74	-36.10	9.14	115.4	0.866E+00	0.64	71.84	9.14	8.50
229.83	-36.10	9.14	115.5	0.866E+00	0.64	71.85	9.14	8.50
229.92	-36.10	9.14	115.5	0.866E+00	0.64	71.86	9.14	8.50
230.01	-36.10	9.14	115.5	0.866E+00	0.64	71.87	9.14	8.50
230.10	-36.10	9.14	115.6	0.865E+00	0.64	71.88	9.14	8.50
230.19	-36.10	9.14	115.6	0.865E+00	0.64	71.89	9.14	8.50
230.27	-36.10	9.14	115.6	0.865E+00	0.64	71.90	9.14	8.50
230.36	-36.10	9.14	115.7	0.865E+00	0.64	71.91	9.14	8.50
230.45	-36.10	9.14	115.7	0.864E+00	0.64	71.92	9.14	8.50
230.54	-36.10	9.14	115.7	0.864E+00	0.64	71.93	9.14	8.50
230.63	-36.10	9.14	115.8	0.864E+00	0.64	71.94	9.14	8.50
230.72	-36.10	9.14	115.8	0.864E+00	0.64	71.95	9.14	8.50
230.80	-36.10	9.14	115.8	0.863E+00	0.64	71.95	9.14	8.50
230.89	-36.10	9.14	115.9	0.863E+00	0.64	71.96	9.14	8.50
230.98	-36.10	9.14	115.9	0.863E+00	0.64	71.97	9.14	8.50
231.07	-36.10	9.14	115.9	0.863E+00	0.64	71.98	9.14	8.50
231.16	-36.10	9.14	116.0	0.862E+00	0.64	71.99	9.14	8.50
231.25	-36.10	9.14	116.0	0.862E+00	0.64	72.00	9.14	8.50

Cumulative travel time = 2951.9673 sec
Plume is LATERALLY FULLY MIXED at the end of the buoyant spreading regime.

END OF MOD141: BUOYANT AMBIENT SPREADING

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BEGIN MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.803E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.100E-01 m^2/s

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)

 Plume Stage 2 (bank attached):
       X        Y       Z        S        C        BV       BH      ZU      ZL
    231.25   -36.10    9.14   116.0 0.862E+00   0.64    72.00    9.14    8.50
    386.62   -36.10    9.14   116.3 0.860E+00   0.64    72.00    9.14    8.50
    542.00   -36.10    9.14   116.6 0.857E+00   0.64    72.00    9.14    8.50
    697.37   -36.10    9.14   117.0 0.855E+00   0.64    72.00    9.14    8.50
    852.75   -36.10    9.14   117.3 0.853E+00   0.65    72.00    9.14    8.49
   1008.12   -36.10    9.14   117.6 0.850E+00   0.65    72.00    9.14    8.49
   1163.50   -36.10    9.14   117.9 0.848E+00   0.65    72.00    9.14    8.49
   1318.87   -36.10    9.14   118.3 0.846E+00   0.65    72.00    9.14    8.49
   1474.25   -36.10    9.14   118.6 0.843E+00   0.65    72.00    9.14    8.49
   1629.62   -36.10    9.14   118.9 0.841E+00   0.65    72.00    9.14    8.49
   1785.00   -36.10    9.14   119.3 0.838E+00   0.66    72.00    9.14    8.48
   1940.37   -36.10    9.14   119.6 0.836E+00   0.66    72.00    9.14    8.48
   2095.75   -36.10    9.14   120.0 0.834E+00   0.66    72.00    9.14    8.48
   2251.12   -36.10    9.14   120.3 0.831E+00   0.66    72.00    9.14    8.48
   2406.50   -36.10    9.14   120.6 0.829E+00   0.66    72.00    9.14    8.48
   2561.87   -36.10    9.14   121.0 0.826E+00   0.67    72.00    9.14    8.47
   2717.25   -36.10    9.14   121.3 0.824E+00   0.67    72.00    9.14    8.47
   2872.62   -36.10    9.14   121.7 0.822E+00   0.67    72.00    9.14    8.47
   3028.00   -36.10    9.14   122.0 0.819E+00   0.67    72.00    9.14    8.47
   3183.37   -36.10    9.14   122.4 0.817E+00   0.67    72.00    9.14    8.47
   3338.75   -36.10    9.14   122.8 0.815E+00   0.68    72.00    9.14    8.46
   3494.12   -36.10    9.14   123.1 0.812E+00   0.68    72.00    9.14    8.46
   3649.50   -36.10    9.14   123.5 0.810E+00   0.68    72.00    9.14    8.46
   3804.87   -36.10    9.14   123.8 0.807E+00   0.68    72.00    9.14    8.46
   3960.25   -36.10    9.14   124.2 0.805E+00   0.68    72.00    9.14    8.46
   4115.62   -36.10    9.14   124.6 0.803E+00   0.69    72.00    9.14    8.45
   4271.00   -36.10    9.14   124.9 0.800E+00   0.69    72.00    9.14    8.45
   4426.37   -36.10    9.14   125.3 0.798E+00   0.69    72.00    9.14    8.45
   4581.75   -36.10    9.14   125.7 0.796E+00   0.69    72.00    9.14    8.45
   4737.12   -36.10    9.14   126.1 0.793E+00   0.69    72.00    9.14    8.45
   4892.50   -36.10    9.14   126.4 0.791E+00   0.70    72.00    9.14    8.44
   5047.87   -36.10    9.14   126.8 0.788E+00   0.70    72.00    9.14    8.44
   5203.25   -36.10    9.14   127.2 0.786E+00   0.70    72.00    9.14    8.44
   5358.62   -36.10    9.14   127.6 0.784E+00   0.70    72.00    9.14    8.44
   5514.00   -36.10    9.14   128.0 0.781E+00   0.70    72.00    9.14    8.44
   5669.37   -36.10    9.14   128.4 0.779E+00   0.71    72.00    9.14    8.43
   5824.75   -36.10    9.14   128.8 0.777E+00   0.71    72.00    9.14    8.43
   5980.12   -36.10    9.14   129.2 0.774E+00   0.71    72.00    9.14    8.43
   6135.50   -36.10    9.14   129.6 0.772E+00   0.71    72.00    9.14    8.43
   6290.87   -36.10    9.14   130.0 0.769E+00   0.72    72.00    9.14    8.42
   6446.25   -36.10    9.14   130.4 0.767E+00   0.72    72.00    9.14    8.42
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   6601.62   -36.10    9.14   130.8 0.765E+00   0.72    72.00    9.14    8.42
   6757.00   -36.10    9.14   131.2 0.762E+00   0.72    72.00    9.14    8.42
   6912.37   -36.10    9.14   131.6 0.760E+00   0.72    72.00    9.14    8.42
   7067.75   -36.10    9.14   132.0 0.758E+00   0.73    72.00    9.14    8.41
   7223.12   -36.10    9.14   132.4 0.755E+00   0.73    72.00    9.14    8.41
   7378.50   -36.10    9.14   132.8 0.753E+00   0.73    72.00    9.14    8.41
   7533.87   -36.10    9.14   133.3 0.750E+00   0.73    72.00    9.14    8.41
   7689.25   -36.10    9.14   133.7 0.748E+00   0.74    72.00    9.14    8.40
   7844.62   -36.10    9.14   134.1 0.746E+00   0.74    72.00    9.14    8.40
   8000.00   -36.10    9.14   134.5 0.743E+00   0.74    72.00    9.14    8.40
 Cumulative travel time =      103136.0156 sec

 Simulation limit based on maximum specified distance =   8000.00 m.
   This is the REGION OF INTEREST limitation.

END OF MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
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-------------------------------------------------------------------------------
CORMIX1: Single Port Discharges              End of Prediction File
11111111111111111111111111111111111111111111111111111111111111111111111111111
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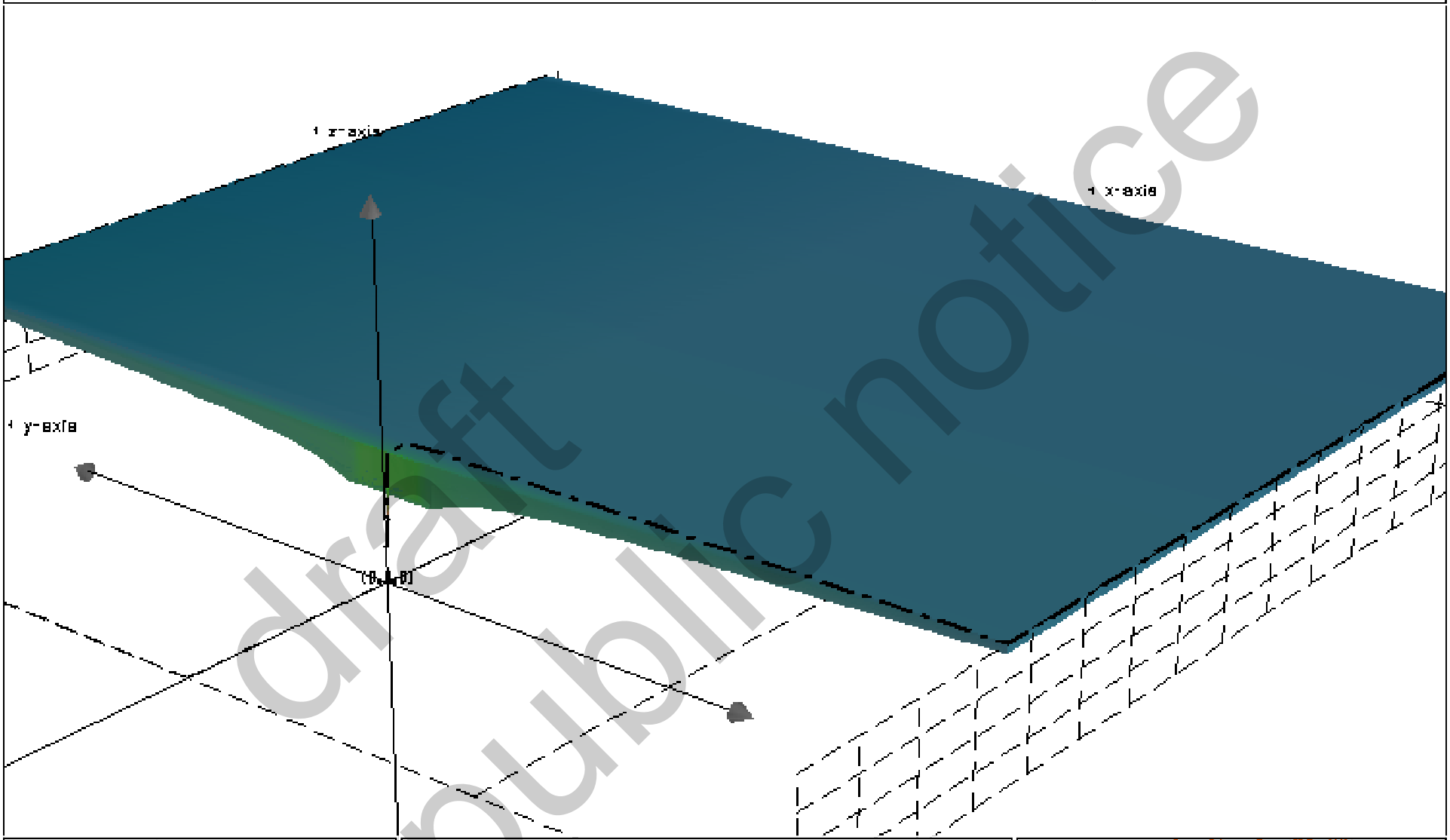
Cross
2010 Chronic (Winter) Model @ 0.7 MGD
Time of Run: Tue Feb 2 10:07:38 2010

Cormix1 Simulation
Users\John\E2S\Client Files\Santee Cooper\Cro
Flow Class: H1



Concentration
100 % 0

Distortion Scale:
Y:X = 148.17 Z:X = 116.72 ROV = 8000.00 m

Toxic Dilution Zone (TDZ - CMC)
Regulatory Mixing Zone (RMZ)
Water Quality Standard (WQS - CCC)
Module boundary (MOD)
Plume Centerline
Lateral Boundary Interaction

Cross

2010 Chronic (Winter) Model @ 0.7 MGD

Time of Run: Tue Feb 2 10:07:38 2010

Cormix1 Simulation

Users\John\E2S\Client Files\Santee Cooper\Cro

Flow Class: H1

Concentration

100 % 0

Distortion Scale:

Y:X = 148.17 Z:X = 116.72 ROV = 8000.00 m

Toxic Dilution Zone (TDZ - CMC)
Regulatory Mixing Zone (RMZ)
Water Quality Standard (WQS - CCC)
Module boundary (MOD)
Plume Centerline
Lateral Boundary Interaction

Cross

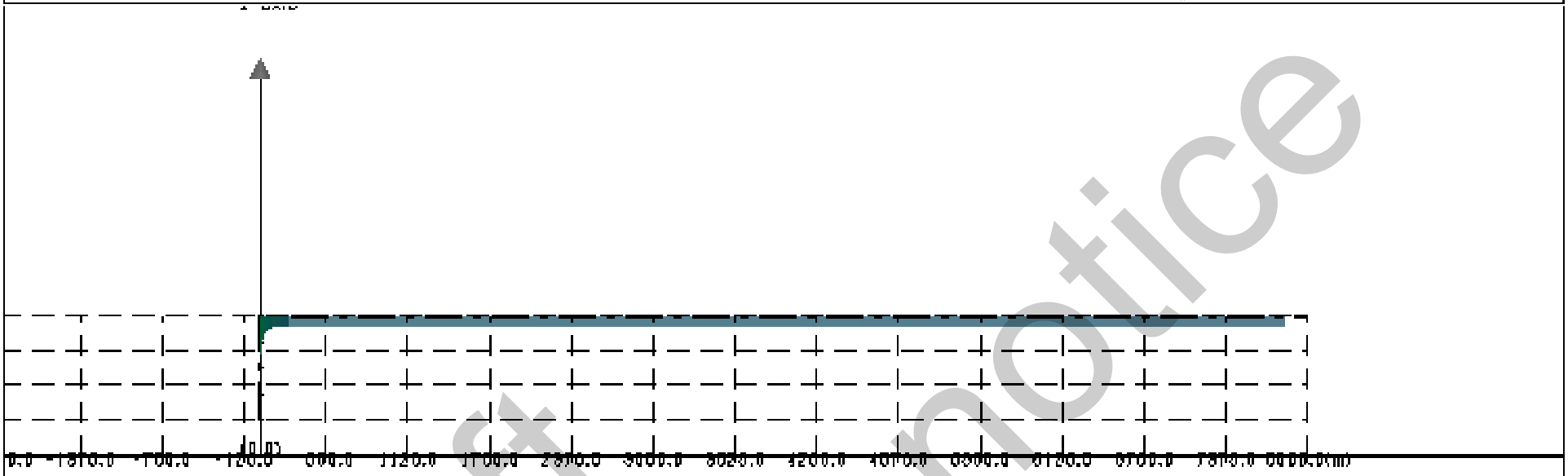
2010 Chronic (Winter) Model @ 0.7 MGD

Time of Run: Tue Feb 2 10:07:38 2010

Cormix1 Simulation

Users\John\E2S\Client Files\Santee Cooper\Cro

Flow Class: H1



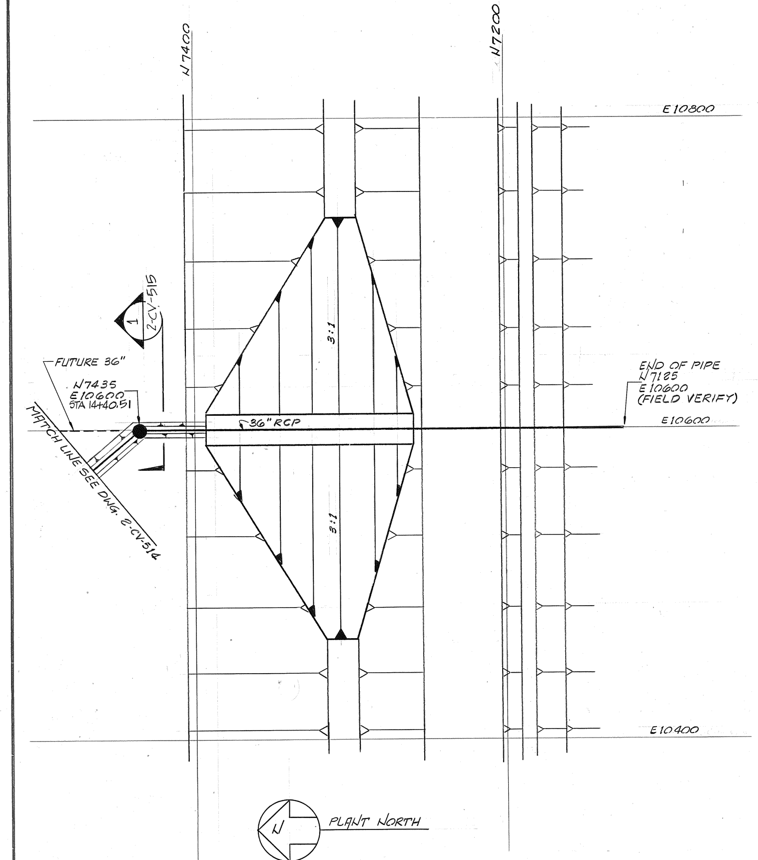
Concentration

100 % 0

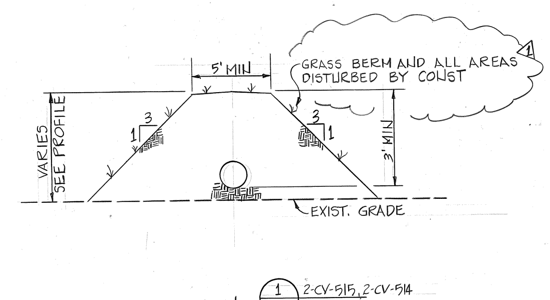
Distortion Scale:

Y:X = 148.17 Z:X = 116.72 ROV = 8000.00 m

Toxic Dilution Zone (TDZ - CMC)
Regulatory Mixing Zone (RMZ)
Water Quality Standard (WQS - CCC)
Module boundary (MOD)
Plume Centerline
Lateral Boundary Interaction



PLAN
SCALE 1" = 40'



SECTION 1/2-CV-515 (2-CV-515, 2-CV-514)
NO—SCALE

GRASSING NOTES

1. AREAS TO BE GRASSED SHALL BE SEEDED IN ACCORDANCE WITH THE SOUTH CAROLINA STATE HIGHWAY SPEC'S., SECT. 810.
2. SEED TYPE SHALL BE SCHEDULE NO. 4 (LOWER STATE).
3. FERTILIZER SHALL BE 10-10-10, SPREAD AT A RATE OF 1000 LBS PER ACRE.
4. LIME SHALL BE APPLIED AT A RATE OF 500 LBS PER ACRE.
5. MULCH SHALL BE PLACED PER METHOD "A".

NOTE:
SANITARY WASTE DISCHARGE LINE AND DISCHARGE LINE THRU SPOIL PILE CANNOT BE INSTALLED UNTIL PERMITS ARE APPROVED. CONSTRUCTION TO BEGIN ONLY WHEN DIRECTED BY RESIDENT CONSTRUCTION MANAGER.

PROFILE
SCALE 1" = 40' HORIZ.
1" = 10' VERT.

no	date	REVISION	by	ck.	appr.
1	3-28-80	ISSUED FOR CONST. CONTR 294	CW	TSMc	
0	2-8-80	ISSUED FOR BIDS 294	G	TSMc	

no	date	REVISION	by	ck.	appr.

drawn by CW
dept. ck. McIntyre
dept. appr. PR Duralia
coord. ck.
p.m. appr. Glenn Kurtz
B&R appr. J Ward 9/11/84

BURNS-AND ROE. INC.
ENGINEERS AND CONSTRUCTORS
ORADELL. N. J. WOODBURY. N. Y. LOS ANGELES. CALIF. JACKSONVILLE. FLA.

ATLANTA DALLAS NEW YORK
LOCKWOOD GREENE
ARCHITECTS · ENGINEERS
SPARTANBURG, S.C.

job name: SANTEE COOPER
CROSS GENERATING STATION UNIT 2
CROSS, SOUTH CAROLINA

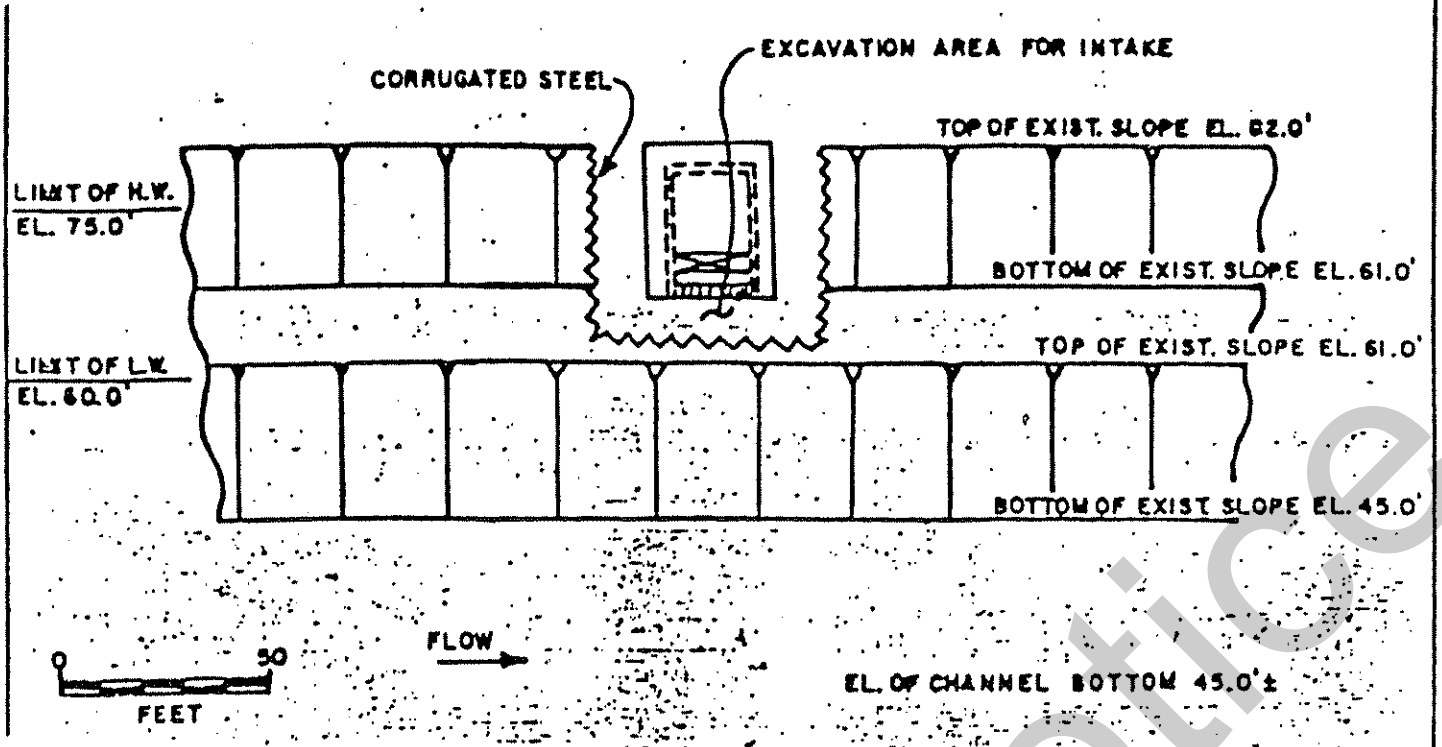
sheet title: PLAN & PROFILE
SANITARY WASTE DISCHARGE LINE

B&R #200-00-0167

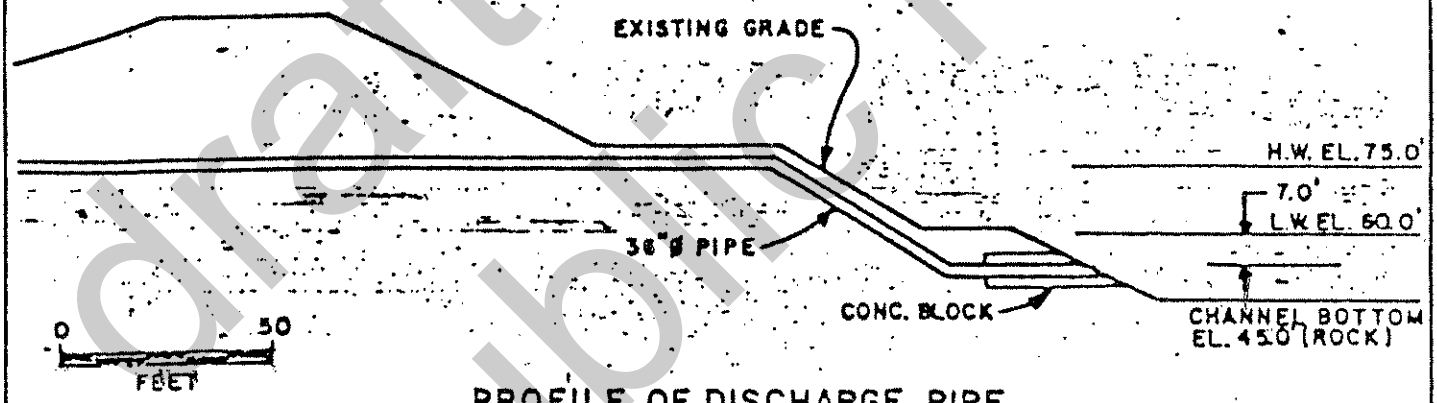
SOUTH CAROLINA REGISTERED ENGINEER 5444 P. R. DURALIA

PKG	ISSUE	DATE	REV.
294	CONST.	3-28-80	1
294	BID	2-8-80	0

scale: AS NOTED
date: 2-8-80
L-G JOB NO. 78271.01
B&R W.O. NO. 3446.02
dwg. no. 2-CV-515
rev. no. 1



TEMP. COFFERDAM FOR CONSTRUCTION OF EACH INTAKE



PROFILE OF DISCHARGE PIPE

PURPOSE: POWER PLANT INTAKE AND DISCHARGE

DATUM: MEAN SEA LEVEL

ADJACENT PROPERTY OWNERS:

NONE

78 5E 350

IN: DIVERSION CANAL

AT: CROSS, S. C.

COUNTY OF BERKELEY STATE OF S. C.

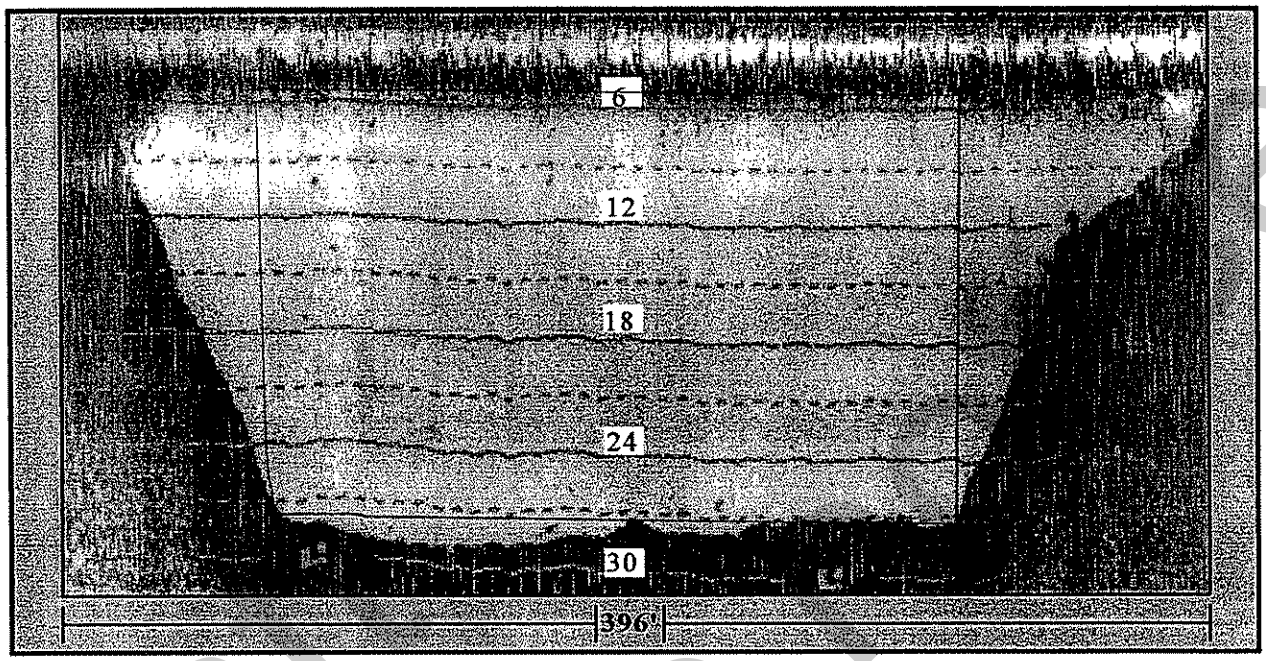
APPLICATION BY SCPSA

SHEET 5 OF 6 DATE 2/13/79

Diversion Canal Bottom Contour
Upstream of Cross Generating Station Discharge Pipe

West Shoreline
Latitude: 33 21' 37 N
Longitude: 080 01' 01 W

East Shoreline
Latitude: 33 21' 38 N
Longitude: 080 07' 00 W

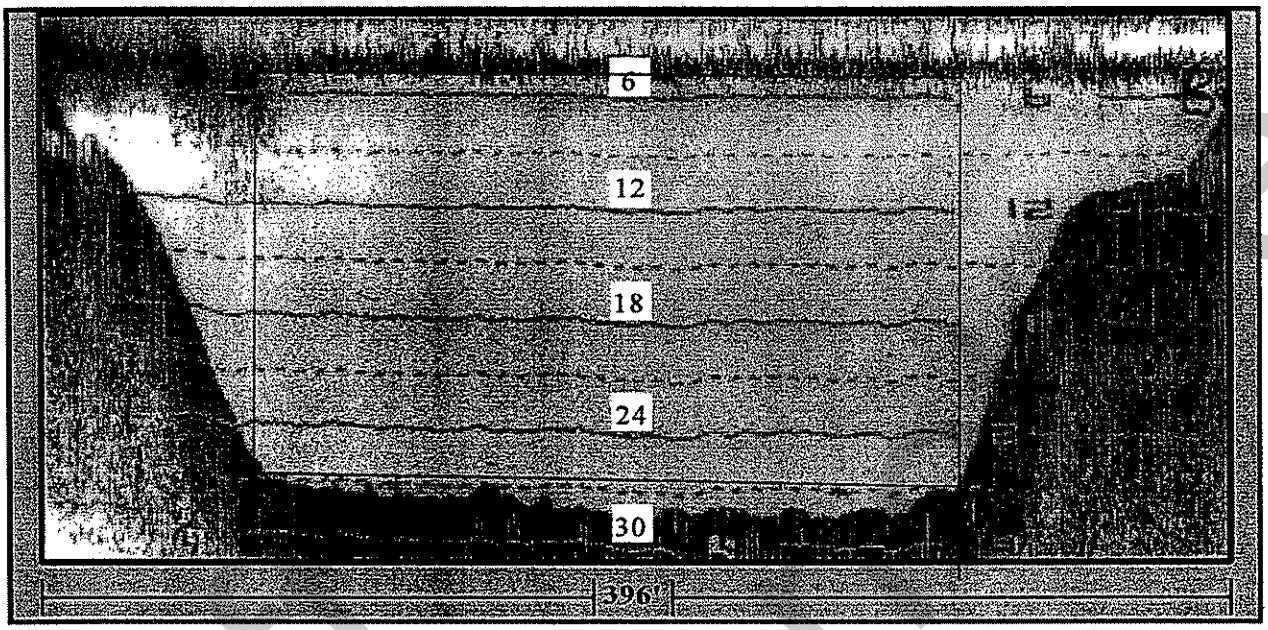


- Recorded @ 1015 on 5/16/2000 with a Lowrance Model X-15 Graph Recorder, starting on the east shoreline and moving to the west shoreline @ 3.0 MPH.
- Speed was measured using a Magellan Map 410 hand held GPS unit.
- Canal width was measured with a Bushnell Yardage PRO 800 Laser Range finder

Diversion Canal Bottom Contour
of Cross Generating Station Discharge Pipe

West Shoreline
Latitude: 33 21' 36 N
Longitude: 080 07' 00 W

East Shoreline
Latitude: 33 21' 37 N
Longitude: 080 06' 59 W

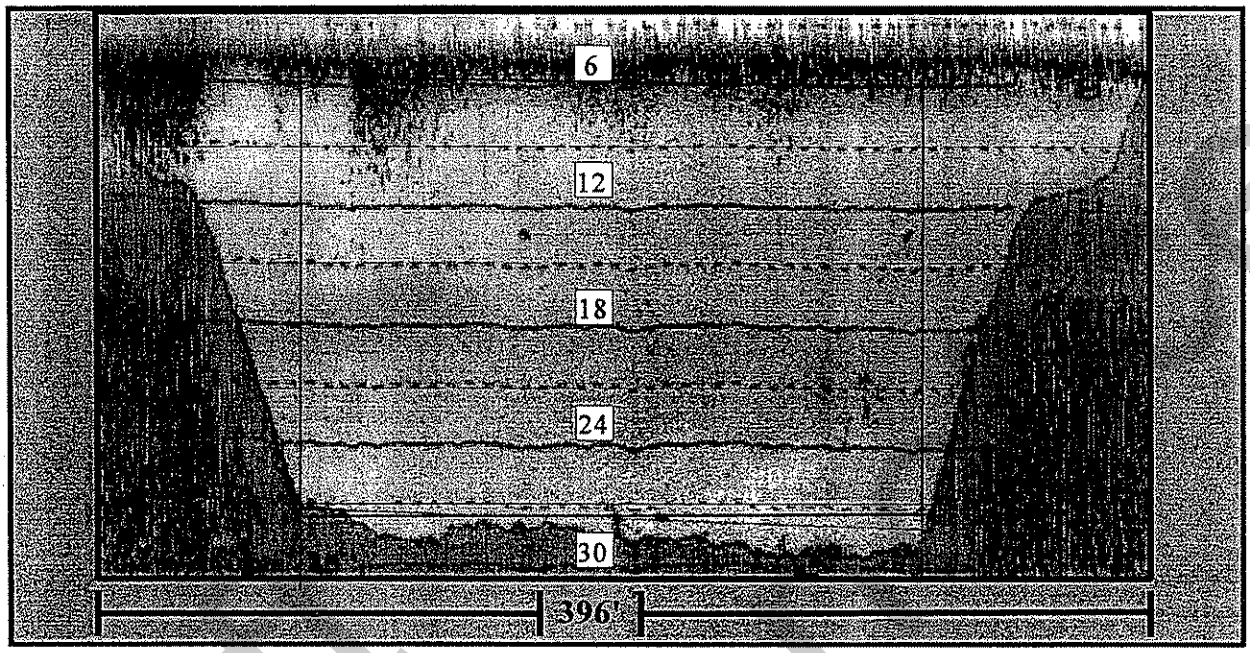


- Recorded @ 1015 on 5/16/2000 with a Lowrance Model X-15 Graph Recorder, starting on the east shoreline and moving to the west shoreline @ 3.0 MPH.
- Speed was measured using a Magellan Map 410 hand held GPS unit.
- Canal width was measured with a Bushnell Yardage PRO 800 Laser Range finder

Diversion Canal Bottom Contour
Downstream of Cross Generating Station Discharge Pipe

West Shoreline
Latitude: 33 21' 35 N
Longitude: 080 06' 59 W

East Shoreline
Latitude: 33 21' 36 N
Longitude: 080 06' 57 W



- Recorded @ 1030 on 5/16/2000 with a Lowrance Model X-15 Graph Recorder, starting on the east shoreline and moving to the west shoreline @ 3.0 MPH.
- Speed was measured using a Magellan Map 410 hand held GPS unit.
- Canal width was measured with a Bushnell Yardage PRO 800 Laser Range finder

CROSS BOTTOM ASH POND CAPACITY STUDY

Per the conditions of Cross Generating Station's NPDES Permit (SC0037401), Santee Cooper is required once per term to submit calculations certifying that ash ponds "provide the necessary minimum wet weather detention volume to contain the combined volume of all direct rainfall, all rainfall runoff to the pond resulting from the 10-year 24-hour rainfall event, and maximum dry weather waste plant flows which could occur during a 24-hr. period." Detention volume is defined as the difference between the top of the sediment level and the minimum overflow discharge elevation. To meet this requirement, Santee Cooper submits the following description of the station Bottom Ash Pond design and operation, calculations and results of a recent pond survey.

Bottom Ash Pond Design and Operation

The Cross Bottom Ash Pond was designed in two stages. The first section was commissioned in 1983. Top of dike elevation for this section is 95.0 ft., although the pond has been operated at an elevation of 88.0 ft. since 1995. Toe of slope elevation is 75.0 ft. This section is equipped with a soil and bentonite clay liner. The second section, commissioned in 1995, was designed with a top of dike elevation of 91.0 ft., with an operating elevation of 88.0 ft. and toe of slope elevation of 76.0 ft. This section is equipped with a geocomposite bentonite liner. Both ponds are protected with a 3-in. concrete revetment for the purposes of erosion control; revetments extend down the dikes' inside slopes to an elevation of 85.0 ft. The two stages are connected by a spillway with a width of 10 ft. and a bottom elevation of 85.0 ft., serving as a weir which decants water from the second, larger stage into the smaller original stage.

The emergency discharge elevation for both ponds is 89.0 ft., with a pump structure in southern dike of the pond's first section. This is the capacity defined by DHEC in the permit. AutoCAD's area and perimeter functions were used with design drawings to determine capacities of both pond sections at various relevant elevations in Table 1.0. Sample calculations are provided in the attachment section, along with design drawings BA-117-S0001 rev. 3, BA-117-S0002 rev. 0, and BA-117-S0003 rev. 1.

Table 1.0. Pond Capacities at Various Elevations

Description	Elevation (ft)	Section 1 Capacity (AC-ft)	Section 2 Capacity (AC-ft)	Total Capacity (AC-ft)
Original Operating Elevation	93	215.06	-	13.71
Section 1 Dike Elevation	95	242.95	-	242.95
Current Operating Elevation	88	148.83	1062.86	1211.69
Current Emergency Discharge Elevation	***89***	***161.68***	***1146.56***	***1308.24***
Section 2 Dike Elevation	91	187.97	1315.52	1503.49

The pond was designed to serve as a settling basin and treatment system for sluiced bottom ash, coal pile runoff, cooling tower blowdown, other station wastewaters, and stormwater. Using the DHEC criteria from the permit and the station's current NPDES flow diagram, the pond must therefore have enough free volume to provide water storage for 19.28 million gallons (Table 2.0) or 59.16 AC-ft.

Wastewaters are discharged into the pond along the second stage's southern dike. Settling and treatment occurs as water moves away from this area into the main body of the pond's second stage, before decanting across the spillway into the pond's first stage. From there water is pumped from the pond through the pH trim treatment system before being discharged to the Diversion Canal. Bottom Ash is routinely mined for sale for beneficial use from the pond's second stage, and we do not intend for ash to be deposited in the first stage at all. In addition, prior to the arrival of large advancing storms, all station ponds are pumped down as much as possible.

Table 2.0. Necessary Storage Volume

Source	**Volumetric Flow (MGD)**
Turbine, Transformer, Boiler Area, & Wastewater Treatment Sumps, Filter Backwash, Regen Waste, Low Volume Waste, Boiler Blow Down, Boiler Area Rainfall, Wash Water , Cooling Tower Blowdown	3.091
Gypsum Pond	0.740
Units 3 & 4 Gypsum Filtrate Plant	0.391
Ash Sluice and Seal Water Return, Station Stormwaters	4.594
Coal Pile Runoff Pond *(Sporadic)*	*1.440*
Ash Sluice and Seal Water Makeup	-5.000
Discharge (NPDES 002)	-3.746
Rainfall Storage[1]	17.77
TOTAL:	19.28

[1] See Calculations Attachment for development of this figure.

Additional Ponds

As indicated by the current NPDES-flow diagrams, there are additional ponds onsite. Non-wallboard-grade gypsum is allowed to settle in the Gypsum Pond before being mined out for later agricultural sale. That pond is approximately 1 AC in surface area with a total storage area of 6 AC-ft. It is constantly dug out to maintain that volume. This pond does not receive ash, and effluent is pumped to the Bottom Ash Pond. Thus the Gypsum Pond is considered a source of wastewater to the Bottom Ash Pond per the station's NPDES permit (SC0037401).

The Coal Pile Runoff Pond is also covered by the station's NPDES permit (SC0037401) as a source of wastewater to the bottom ash pond. This pond has a capacity of 68 AC-ft. and is designed to contain the 10-year 24-hour storm runoff from the coal pile and limestone storage areas at Cross, an area of about 75 AC.

Finally, there are two stormwater ponds and a sediment pond on site. The sediment pond is located east of the plant's substation and was designed to provide retention of stormwater, primarily to aid in settling of total suspended solids. Both stormwater ponds were designed to contain the volume from the 10-year 24-hour storm event over the areas they drain. The Unit 1 & 2 Stormwater pond was constructed with 339,768 cu. ft. of storage, receiving runoff from the generally-paved 19.4 AC area of the power block around Cross Units 1 & 2. The Unit 3 & 4 Stormwater pond was constructed with 450,000 cu. ft. of storage, receiving runoff from the generally paved 20.6 AC area around Cross Units 3 & 4. Although both of these ponds are routinely pumped to the Bottom Ash Pond and are therefore listed as a source of wastewater in the NPDES permit (SC0037401), they are equipped with emergency discharge structures designed for 100-year storm events and are covered under the site SWPPP as required for coverage under the NPDES Industrial General Permit for Storm Water Discharges Associated with Industrial Activity (SCR000000).

Because none of these ponds receive ash Santee Cooper is not required to analyze their detention volumes per the terms of the Cross Station's NPDES permit (SC0037401). In addition, these ponds are regularly dredged to maintain necessary storage volumes. Therefore, these ponds are not further analyzed in this study.

Bottom Ash Pond Capacity Calculations

In 1994 Santee Cooper hired GAI Consultants, Inc. to help evaluate possibilities for beneficial use of combustion byproducts. Using ash analysis data from as-fired coal samples, GAI estimated the amount of ash produced prior to 1994, using the rule-of-thumb that bottom ash constitutes about 20% of total ash. Following GAI's approach and using current analyses of as-fired coal along with known quantities of combusted coal, Santee Cooper has maintained an estimate of combustion byproduct production ever since (Table 3.0). Monthly estimates dating to 2005 of byproduct production are included in the attachment, along with 2009 monthly progress reports which contain coal analysis numbers and coal combustion figures used to generate the monthly estimates. Bottom ash density is assumed to be 50 lbs/cu. ft., so this would indicate that approximately 314.09 AC-ft. or 24.01% of the bottom ash pond volume remains. To handle station stormwater and wastewater, the pond required only 59.16 AC-ft., so sufficient volume remains.

Table 3.0. Cross Bottom Ash Estimated Quantities.

Date	Bottom Ash Produced (T)	Bottom Ash Shipped (T)	Bottom Ash Ponded (T)
Before 1994*	240,000		
1994	28,287	-	28,287
1995	49,542	-	49,542
1996	44,979	-	44,979
1997	43,584	-	43,584
1998	41,578	-	41,578
1999	42,338	-	42,338
2000	51,569	-	51,569

2001	56,111	-	56,111
2002	52,608	-	52,608
2003	34,297	-	34,297
2004	61,097	1,234	59,863
2005	50,131	18,680	31,451
2006	60,677	9,358	51,319
2007	90,834	27,088	63,746
2008	106,810	15,711	91,099
2009	115,242	14,983	100,259
Totals	**1,169,684**	**87,054**	**1,082,630**

Another approach to estimating remaining volume would rely on an engineering rule-of-thumb, that each of Santee Cooper's ~600 MW units at Cross produce about 24 AC-ft of bottom ash per year. Based on the dates of commission in Table 4.0, Santee Cooper could use this rule of thumb to estimate that approximately 1128 AC-ft. of ash had been produced over the years. Deducting the volume of bottom ash mined and shipped for beneficial reuse (Table 3.0, above) would thus yield a remaining volume of about 260.18 AC-ft., more than enough space to handle current station needs.

Table 4.0. Year of Commissioning for Cross Generating Station Units

Unit #	Began Commercial Operation
Cross 1	1995
Cross 2	1983
Cross 3	2007
Cross 4	2008

Bottom Ash Pond Survey

With the addition of Units 3 and 4 in 2007 and 2008, respectively, Santee Cooper recognized the need to thoroughly define the Bottom Ash Pond's remaining volume. To that end, Santee Cooper's Analytical and Biological Services department conducted a depth sounding of the pond's second section using a boat, depth finder, and GPS unit in January of 2009. Waypoints are included as an attachment to this study, along with Figure 1.0, a map showing their locations.

Based on cross sections of the pond bottom created from this information, Santee Cooper estimated that the remaining pond volume was 374 AC-ft. Using the 2009 ponded ash figure (92.07 AC-ft.) from Table 2.0, this would indicate that as of this writing, this section currently has approximately 281.93 AC-ft. of capacity. This, combined with a March 2009 visual survey of the pond's first section which indicated the pond was approximately 90% free of accumulated solids (145.51 AC-ft. of available capacity) indicate approximately 427.44 AC-ft. of remaining storage.

Conclusions

While there is some variability among estimates of remaining pond capacity, it is clear that the pond still has sufficient capacity to function properly. Santee Cooper is pursuing a landfill permit to contain bottom ash in the future.

Certification: Bottom Ash Pond Volume Study

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 this study, 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.

Name and Official Title	**Registration Number**	**Date**
Susan W. Jackson, P.E. Supervisor, Environmental Services	25476 State of SC	3/2/2010

SEAL

ATTACHMENTS

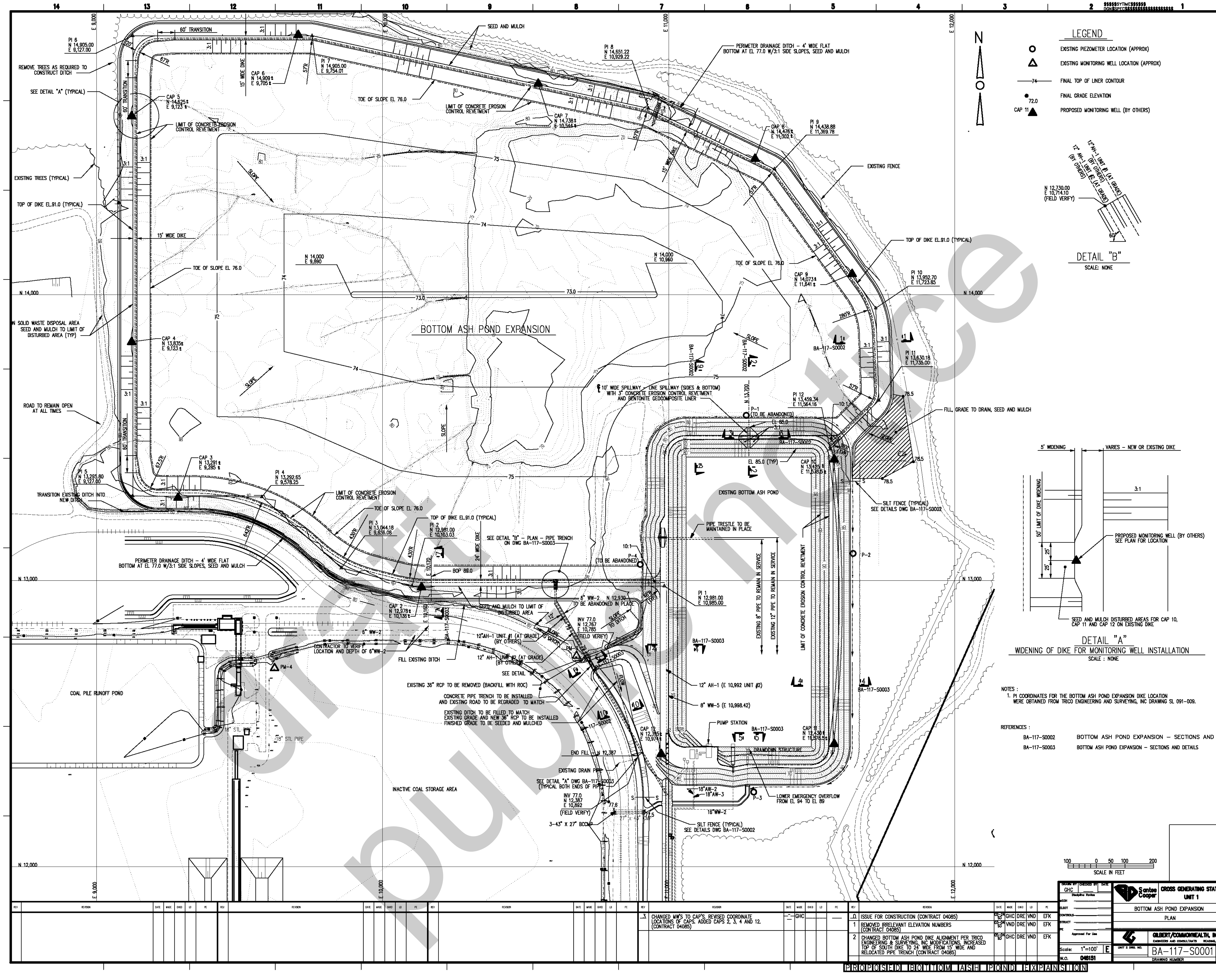
Bottom Ash Pond Drawings

Capacity Calculations

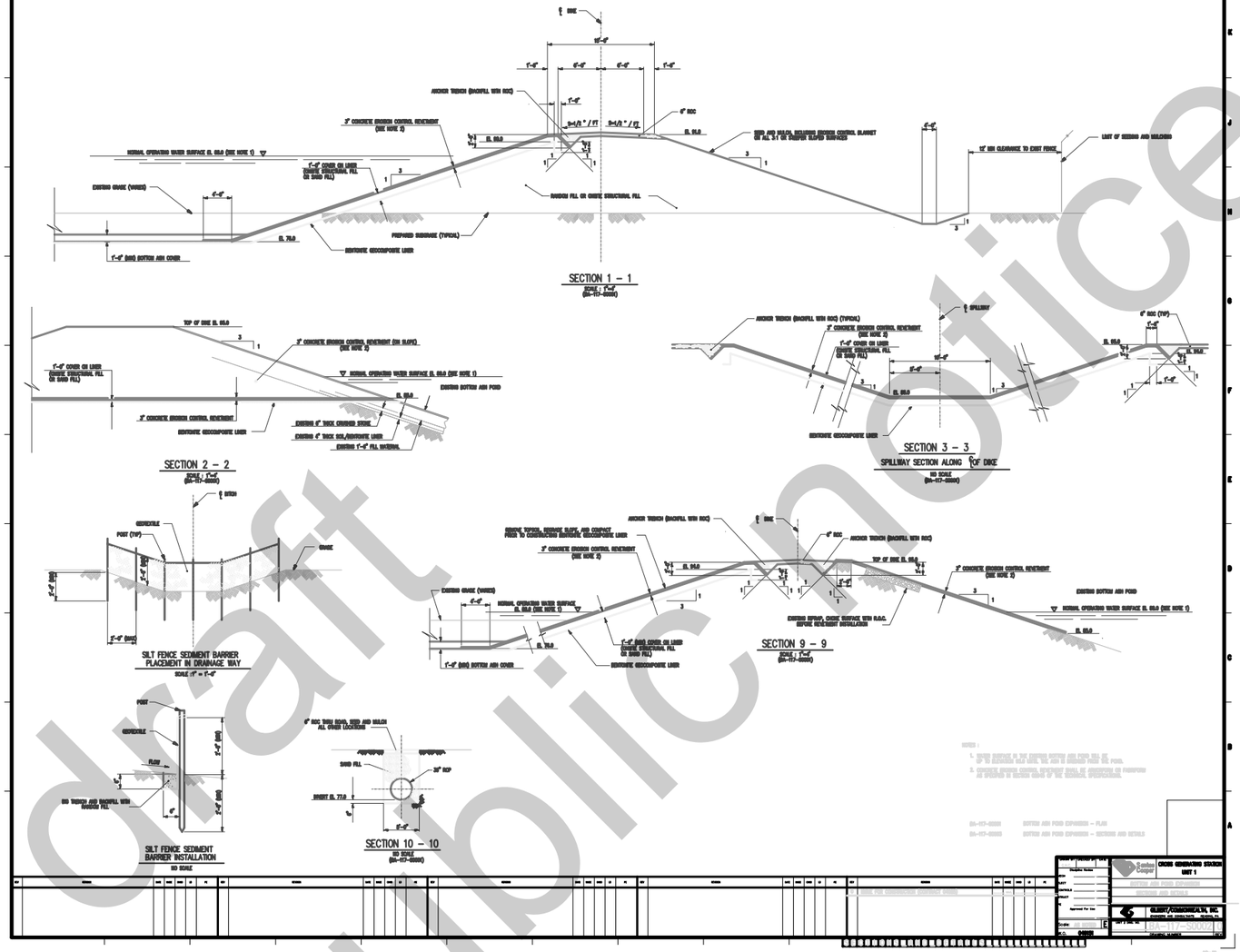
Bottom Ash Production: 2005-2009 Monthly Production Estimates
Bottom Ash Production: 2009 Monthly Progress Reports

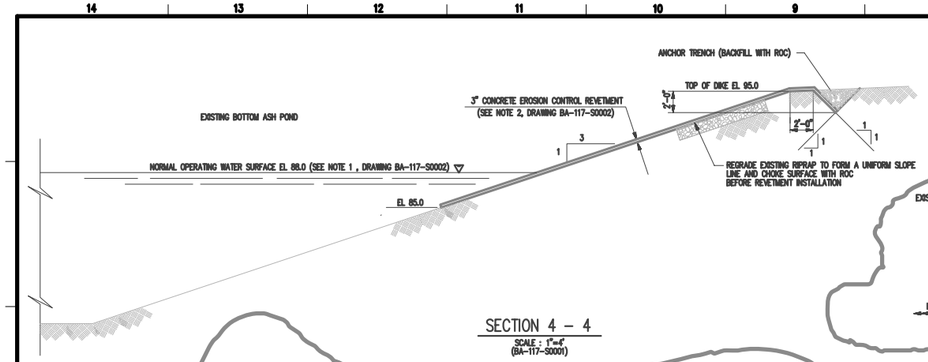
Capacity Remaining Calculations

Bottom Ash Pond Survey: Way Points & Depths
Bottom Ash Pond Survey: Figure 1.0. Survey Points



BOTTOM ASH POND EXPANSION
EXISTING BOTTOM ASH POND
COAL PILE RUNOFF POND
INACTIVE COAL STORAGE AREA
LEGEND
EXISTING PIEZOMETER LOCATION (APPROX)
EXISTING MONITORING WELL LOCATION (APPROX)
FINAL TOP OF LINER CONTOUR
FINAL GRADE ELEVATION
PROPOSED MONITORING WELL (BY OTHERS)
SEED AND MULCH
PERIMETER DRAINAGE DITCH - 4' WIDE FLAT BOTTOM AT EL 77.0 W/3:1 SIDE SLOPES, SEED AND MULCH
REMOVE TREES AS REQUIRED TO CONSTRUCT DITCH
SEE DETAIL "A" (TYPICAL)
LIMIT OF CONCRETE EROSION CONTROL REVETMENT
EXISTING TREES (TYPICAL)
TOP OF DIKE EL.91.0 (TYPICAL)
15' WIDE DIKE
TOE OF SLOPE EL 76.0
SOLID WASTE DISPOSAL AREA SEED AND MULCH TO LIMIT OF DISTURBED AREA (TYP)
ROAD TO REMAIN OPEN AT ALL TIMES
TRANSITION EXISTING DITCH INTO NEW DITCH
EXISTING FENCE
10' WIDE SPILLWAY - LINE SPILLWAY (SIDES & BOTTOM) WITH 3" CONCRETE EROSION CONTROL REVETMENT AND BENTONITE GEOCOMPOSITE LINER
FILL, GRADE TO DRAIN, SEED AND MULCH
SILT FENCE (TYPICAL) SEE DETAILS DWG BA-117-S0002
PIPE TRESTLE TO BE MAINTAINED IN PLACE
EXISTING 8" PIPE TO REMAIN IN SERVICE
EXISTING 12" PIPE TO REMAIN IN SERVICE
LIMIT OF CONCRETE EROSION CONTROL REVETMENT
PUMP STATION
DRAWDOWN STRUCTURE
LOWER EMERGENCY OVERFLOW FROM EL 94 TO EL 89
SEE DETAIL "B" - PLAN - PIPE TRENCH ON DWG BA-117-S0003
FILL EXISTING DITCH
CONTRACTOR TO VERIFY LOCATION AND DEPTH OF 6" WW-2
EXISTING 36" RCP TO BE REMOVED (BACKFILL WITH ROC)
CONCRETE PIPE TRENCH TO BE INSTALLED AND EXISTING ROAD TO BE REGRADED TO MATCH
EXISTING DITCH TO BE FILLED TO MATCH EXISTING GRADE AND NEW 36" RCP TO BE INSTALLED FINISHED GRADE TO BE SEEDED AND MULCHED
EXISTING DRAIN PIPE
SEE DETAIL "A" DWG BA-117-S0003 (TYPICAL BOTH ENDS OF PIPE)
3-43" X 27" BCCMP
12" AH-1 UNIT #1 (AT GRADE) (BY OTHERS)
12" AH-1 UNIT #2 (AT GRADE) (BY OTHERS)
DETAIL "B" SCALE: NONE
5' WIDENING
VARIES - NEW OR EXISTING DIKE
50' LIMIT OF DIKE WIDENING
PROPOSED MONITORING WELL (BY OTHERS) SEE PLAN FOR LOCATION
SEED AND MULCH DISTURBED AREAS FOR CAP 10, CAP 11 AND CAP 12 ON EXISTING DIKE
DETAIL "A" WIDENING OF DIKE FOR MONITORING WELL INSTALLATION SCALE : NONE
NOTES :
1. PI COORDINATES FOR THE BOTTOM ASH POND EXPANSION DIKE LOCATION WERE OBTAINED FROM TRICO ENGINEERING AND SURVEYING, INC DRAWING SL 091-009.
REFERENCES :
BA-117-S0002 BOTTOM ASH POND EXPANSION - SECTIONS AND DETAILS
BA-117-S0003 BOTTOM ASH POND EXPANSION - SECTIONS AND DETAILS
SCALE IN FEET
3 CHANGED MW'S TO CAP'S. REVISED COORDINATE LOCATIONS OF CAPS. ADDED CAPS 2, 3, 4 AND 12. (CONTRACT 04085)
0 ISSUE FOR CONSTRUCTION (CONTRACT 04085)
1 REMOVED IRRELEVANT ELEVATION NUMBERS (CONTRACT 04085)
2 CHANGED BOTTOM ASH POND DIKE ALIGNMENT PER TRICO ENGINEERING & SURVEYING, INC MODIFICATIONS. INCREASED TOP OF SOUTH DIKE TO 24' WIDE FROM 15' WIDE AND RELOCATED PIPE TRENCH (CONTRACT 04085)
Santee Cooper
CROSS GENERATING STATION UNIT 1
BOTTOM ASH POND EXPANSION PLAN
GILBERT/COMMONWEALTH, INC. ENGINEERS AND CONSULTANTS READING, PA
Scale: 1"=100'
BA-117-S0001 3
PROPOSED BOTTOM ASH POND EXPANSION
draft public notice





SECTION 4 – 4
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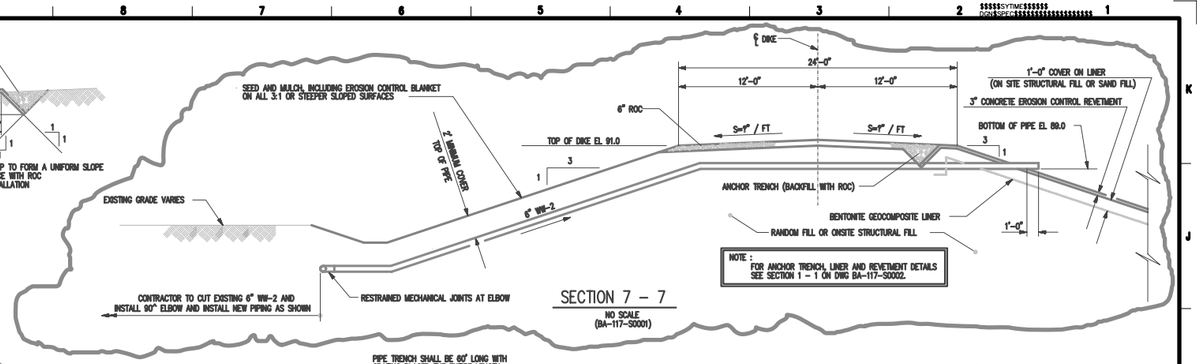
(BA-117-S0001)



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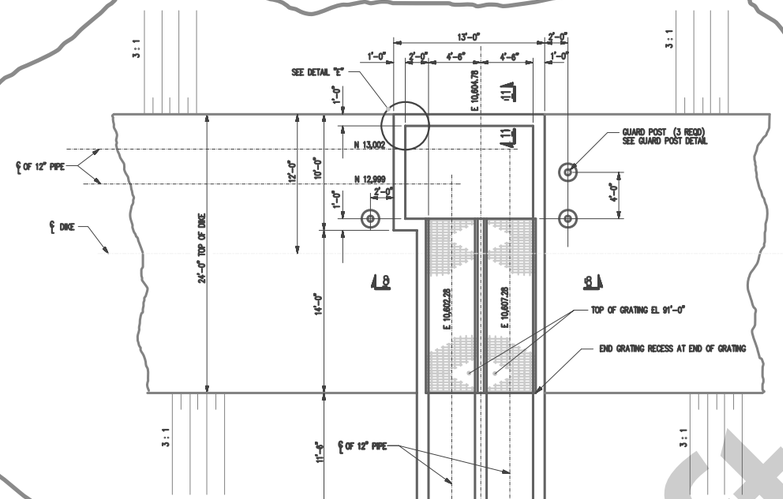

DETAIL "B " – PLAN – PIPE TRENCH
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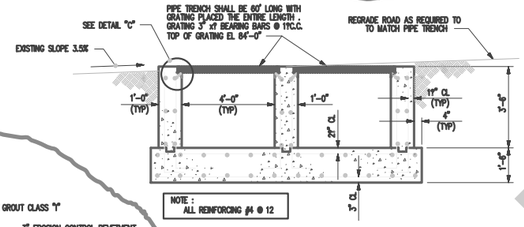

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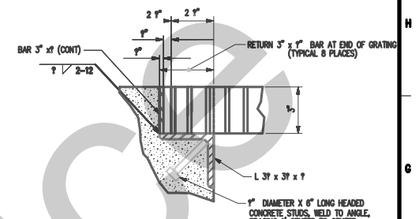

DETAIL "C "
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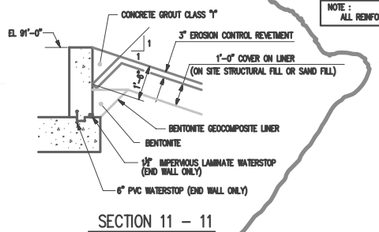

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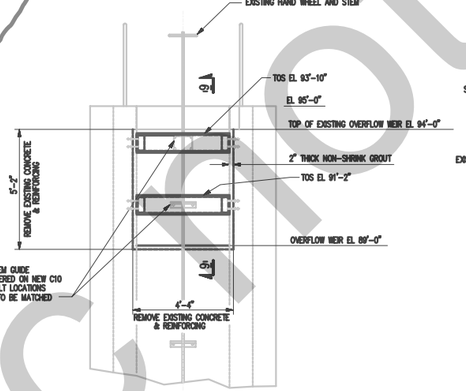

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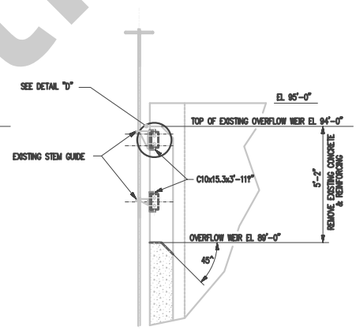

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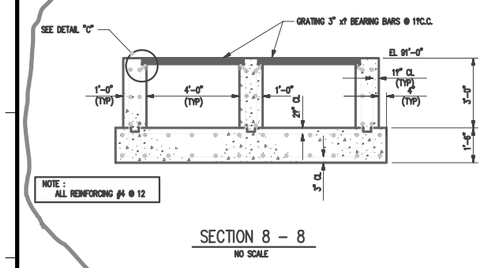

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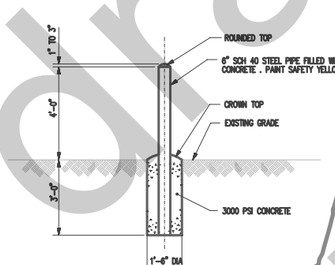
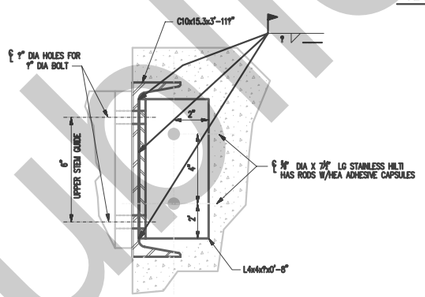


GUARD POST DETAIL
NO SCALE



DETAIL "D "
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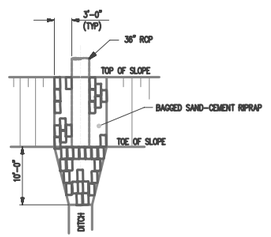


DETAIL "A"
NO SCALE
(BA-117-S0001)

REFERENCES :

BA-117-S0001	BOTTOM ASH POND EXPANSION – PLAN
BA-117-S0002	BOTTOM ASH POND EXPANSION – SECTIONS AND DETAILS

REV	REVISION	DATE	MADE	CHKD	LD	PE
0	ISSUE FOR CONSTRUCTION (CONTRACT 04085)					
1	CHANGED SECTION 7 – 7, INCREASED TOP OF DIKE TO 24' FROM 15', CHANGED DETAIL "B", ALTERED SIZE AND SHAPE OF PIPE TRENCH ADDED GUARD POSTS AND GUARD POST DETAIL, (CONTRACT 04085)					

DRAWN BY | CHECKED BY | DATE

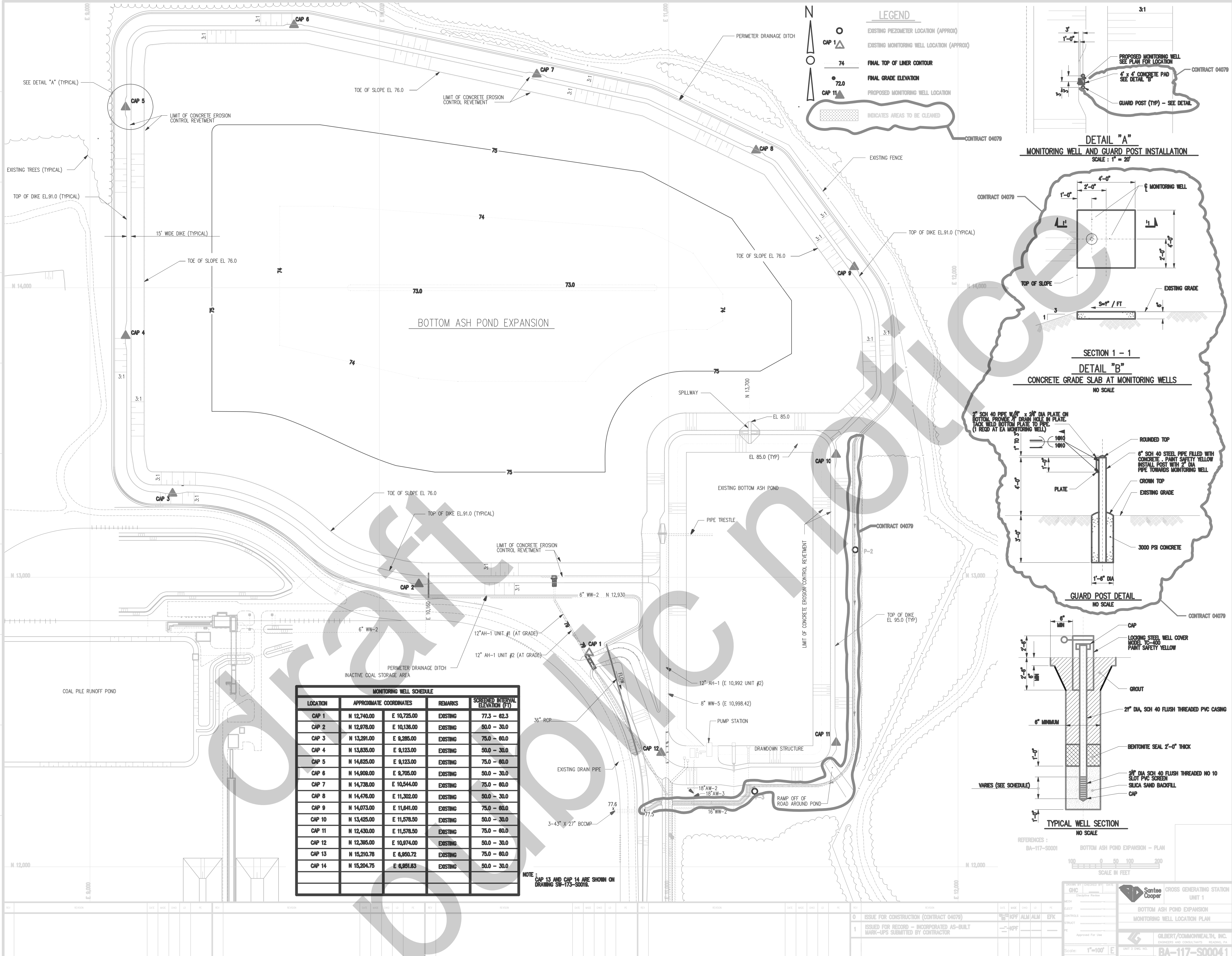
Discipline Review
MECH
ELECT
CONTROLS
STRUCT
PE
Approved For Use

Santee Cooper
CROSS GENERATING STATION
UNIT 1
BOTTOM ASH POND EXPANSION
SECTIONS AND DETAILS

GILBERT/COMMONWEALTH, INC.
ENGINEERS AND CONSULTANTS READING, PA

Scale: AS NOTED
E
W.O. 046151
UNIT 2 DWG NO.
BA-117-S0003
DRAWING NUMBER
REV 1

AS=48



MONITORING WELL SCHEDULE				
LOCATION	APPROXIMATE COORDINATES		REMARKS	SCREENED INTERVAL ELEVATION (FT)
CAP 1	N 12,740.00	E 10,725.00	EXISTING	77.3 – 62.3
CAP 2	N 12,978.00	E 10,136.00	EXISTING	50.0 – 30.0
CAP 3	N 13,291.00	E 9,285.00	EXISTING	75.0 – 60.0
CAP 4	N 13,835.00	E 9,123.00	EXISTING	50.0 – 30.0
CAP 5	N 14,625.00	E 9,123.00	EXISTING	75.0 – 60.0
CAP 6	N 14,909.00	E 9,705.00	EXISTING	50.0 – 30.0
CAP 7	N 14,738.00	E 10,544.00	EXISTING	75.0 – 60.0
CAP 8	N 14,476.00	E 11,302.00	EXISTING	50.0 – 30.0
CAP 9	N 14,073.00	E 11,641.00	EXISTING	75.0 – 60.0
CAP 10	N 13,425.00	E 11,578.50	EXISTING	50.0 – 30.0
CAP 11	N 12,430.00	E 11,578.50	EXISTING	75.0 – 60.0
CAP 12	N 12,395.00	E 10,974.00	EXISTING	50.0 – 30.0
CAP 13	N 15,210.78	E 6,950.72	EXISTING	75.0 – 60.0
CAP 14	N 15,204.75	E 6,951.63	EXISTING	50.0 – 30.0

NOTE : CAP 13 AND CAP 14 ARE SHOWN ON DRAWING SW-173-S0010.

REFERENCES : BA-117-S0001 BOTTOM ASH POND EXPANSION – PLAN

REV	REVISION	DATE	MADE	CHKD	LD	PE
0	ISSUE FOR CONSTRUCTION (CONTRACT 04079)		KPF	ALM	ALM	EFK
1	ISSUED FOR RECORD – INCORPORATED AS-BUILT MARK-UPS SUBMITTED BY CONTRACTOR		KPF			

DRAWN BY GHC

Santee Cooper

CROSS GENERATING STATION UNIT 1

BOTTOM ASH POND EXPANSION

MONITORING WELL LOCATION PLAN

GILBERT/COMMONWEALTH, INC. ENGINEERS AND CONSULTANTS READING, PA

Scale: 1"=100' E

W.O. 046151

DRAWING NUMBER BA-117-S00041 REV 1

MONITORING WELL LOCATION PLAN

AS=1200

PLOTTING SIZE IS X = 44.00 & Y = 34.00

Necessary Pond Volume Calculations

Necessary pond volume is defined by the flows into the pond as expressed in Table 2.0 (taken from station NPDES flow diagram) and the volume of the 10-yr. 24-hr. storm, both directly into the pond and delivered via station runoff. Because Cross Station has stormwater, sediment, and coal pile runoff ponds to contain this volume, the only volume of interest here is that which is deposited directly into the pond.

Stormwater Calculations

Top-of-Dike Areas for Both Sections of Pond

Section 1	14.14	AC
Section 2	85	AC
Total	99.14	AC

10-yr. 24-hr. Storm is 6.6 in. or 0.55 ft.

Direct runoff volume: 99.14 AC * 0.55 ft 54.527 AC-ft

Convert to MGD:

54.527	AC-ft	
2375196	cu.ft	(multiply AC-ft. by 43560 sq.ft./AC)
17768842	gallons	(multiply cu.ft. by 7.481 gal./cu.ft)
17.76884	million gallons	(divide gallons by 1,000,000)

Necessary Pond Volume Calculations

Volume was summed in Table 2.0 to 19.28 MGD. To convert to AC-ft

19.28	million gallons	
19280000	gallons	(multiply gallons by 1,000,000)
2577196	cu.ft	(divide gallons by 7.481 gal./cu.ft)
59.16427	AC-ft	(divide cu.ft. by 43560 sq.ft./AC)

Jesse Cannon 2/11/2010
Ref BA-117-S0004 Using AutoCAD
Ref BA-117-S0001

Section I Capacity Calculations

This pond has a flat bottom, so the volumes are calculated based on the depth over the flat portion and the depth over the sloped dikes.

Specifications

Pond Bottom Area:	442149	sq ft	(AutoCAD Calculation)
Pond Bottom Perim.:	2899.68	ft	(AutoCAD Calculation)

Dikes: 3:1 Slopes

Bottom Elev.:	75	ft
Orig. Oper. Elev.:	93	ft
Dike Elev.:	95	ft
Current Oper. Elev.:	88	ft
Current Emerg. Disch Elev.:	89	ft
Stage 2 Dike Elev.:	91	ft

Calculation Description

Depth = (Elev. Of Interest) - (Pond Bottom Elevation)
Volume = (Volume Over Flat Bottom) + (Volume Over Sloped Sides)
Volume Over Flat Bottom = (Depth)*(Pond Bottom Area)
Slope L = Slope Length, as defined by 3:1 Slopes. Slope L = 3*Depth
Volume Over Sloped Sides = 1/2*(Depth)*(Slope L)*(Pond Bottom Perimeter)
Area = (Pond Bottom Area) + (Area Over Sloped Sides, Expands W/ Incr. Depth)
Area Over Sloped Sides = Slope L * Pond Bottom Perimeter

Sample Calculations

Original Oper. Elevation
Depth = 93' - 75' = 18 ft.
Slope L = 3*18' = 54 ft.
Volume = [442149 sq.ft. * 18 ft.] + 1/2*(18 ft.*54 ft.) *2899.68 ft. = 9367926 cu. ft. = 215.058 AC-ft.
Area = (442149 sq. ft.) + 54 ft.*2899.68 ft. = 5998731.7 sq. ft. = 13.74499 AC.

Calculated Dimensions

Original Oper. Elev.

Depth:	18	ft	
Slope L:	54	ft	(Based on 3:1 Slopes)
Volume:	9367926	cu ft	
	215.058	AC-ft	(Divide cu. ft. by 43,560 sq.ft./AC)
Area:	598731.7	sq ft	
	13.74499	AC	(Divide sq. ft. by 43,560 sq.ft./AC)

Dike Elev.

Depth:	20	ft	
Slope L:	60	ft	(Based on 3:1 Slopes)
Volume:	10582787	cu ft	
	242.9474	AC-ft	(Divide cu. ft. by 43,560 sq.ft./AC)

Area:	616129.8	sq ft	
	14.14439	AC	(Divide sq. ft. by 43,560 sq.ft./AC)

Current Oper. Elev.

Depth:	13	ft	
Slope L:	39	ft	(Based on 3:1 Slopes)
Volume:	6483005	cu ft	
	148.8293	AC-ft	(Divide cu. ft. by 43,560 sq.ft./AC)
Area:	555236.5	sq ft	
	12.74648	AC	(Divide sq. ft. by 43,560 sq.ft./AC)

Current Emerg. Discharge Elev.

Depth:	14	ft	
Slope L:	42	ft	(Based on 3:1 Slopes)
Volume:	7042591	cu ft	
	161.6756	AC-ft	(Divide cu. ft. by 43,560 sq.ft./AC)
Area:	563935.5	sq ft	
	12.94618	AC	(Divide sq. ft. by 43,560 sq.ft./AC)

Section 2 Dike Elev.

Depth:	16	ft	
Slope L:	48	ft	(Based on 3:1 Slopes)
Volume:	8187860	cu ft	
	187.9674	AC-ft	(Divide cu. ft. by 43,560 sq.ft./AC)
Area:	581333.6	sq ft	
	13.34558	AC	(Divide sq. ft. by 43,560 sq.ft./AC)

Jesse Cannon 2/12/2010
Ref BA-117-S0004 Using AutoCAD

Section II Capacity Calculations

This pond has a sloping bottom, so volume of the bottom was calculated in sections. AutoCAD was used to define areas below each 1-ft. elevation contour defined in the design drawings. This area was multiplied by one foot of depth, while the area between upper and lower contours, defined by subtraction, was multiplied by one-half foot of depth, as being an intermediate elevation between the two contours. These two areas are summed for each section of the pond bottom. Once the toe-of-the-slope was reached, the remaining area is defined by the depth of the water, the 3:1 slopes, and the perimeter of the toe-of-the slope. Areas were defined by summing the area at the toe of the slope (elevation = 76 ft.) with the area along the slope, which increases with increasing depth.

AutoCAD-Defined Parameters

73' Area	21200	sq ft
74' Area	752736.2	sq ft
75' Area	1859943	sq ft
76' Area	3364011	sq ft
76' Per.	7521.8	ft

Sectional Volume Calculation Description

The area defined by each contour was calculated using AutoCAD. The volume between two of the 1-ft. countours is defined by the following equation.

Volume Between Two Contours = (Area of Lower Contour, sq.ft.)*1 ft. + 1/2 (Area of Higher Contour-Area of Lower Contour)

Sectional Volume Sample Calculation

73'-74' Volume = 1 ft.*(21200 sq.ft.) + 1/2 ft.*(752736.2 sq.ft. - 21200 sq.ft.) = 386968.1 cu.ft. = 8.88 AC-ft.

Description of Calculation for Volume Above Elev.=76 ft. (Toe-of-Slope)

This volume varies not only with the elevation of the water surface above the 76-ft. contour, but also with the varying slope length along the dikes' 3:1 slopes. Therefor this final sectional volume is defined by the following equation.

Volume Above Toe-of-Slope = Depth*(76 Ft. Contour Area) + 1/2*Depth*Slope L*(76 Ft Contour Perimeter)

Volume Above Toe-of-Slope Sample Calculation

For 89-ft. Water Surface Elevation
Depth = 89' - 76' = 13 ft.
Slope L = 3*13' = 39 ft.
Volume Above Toe-of-Slope = 13 ft.*(3364011 sq.ft.) + 1/2*(13 ft.)*(39 ft.)*(7521.8 ft) = 45638913 cu.ft. = 1047.73 AC-ft.

73-74' Volume
386968.1 cu ft

74-75' Volume
1306340 cu ft

75-76' Volume
2611977 cu ft

76'+ Volume **(Elevation 76-89')**
45638913 cu ft Depth = 13 ft.
Slope L = 39 ft.

76'+ Volume **(Elevation 76-88')**
41992835 cu ft Depth = 12 ft.
Slope L = 36 ft.

76'+ Volume **(Elevation 76-91')**
52998765 cu ft Depth = 15 ft.
Slope L = 45 ft.

Total Volume Description and Sample Calculation
Total Volume is calculated simply by summing all relevant sectional volumes.

Total Volume for 89' Operating Level = 386968.1 cu.ft. + 1306340 cu.ft. + 2611977 cu.ft. + 45638913 cu.ft.
=49944197 cu.ft = 1146.561 AC-ft.

Area Calculation Description and Sample Calculation
Area is defined by the area bounded by the toe-of-slope at elevation = 76 ft. and the varying area across the 3:1 slopes which increase with depth. Thus area is defined by the following equations.

Area = (Area at Toe-of-Slope, Elev. = 76 ft.) + (Area Over Slopes)
Area Over Slopes = (Slope L)*(76 ft. Contour Perimeter)

As an example, this is the calculation for pond area when the operating elevation = 91 ft.:
Area = 3364011 sq.ft. + 39 ft. * 7521.8 ft. = 3702492 sq.ft. = 85.00 AC

Operating Elevation = 89' (Emergency Discharge Elevation)

Volume	49944197	cu ft	
	1146.561	AC-ft	(Divide cu. ft. by 43,560 sq.ft./AC)
Area	3461794	sq ft	
	79.47185	AC	(Divide sq. ft. by 43,560 sq.ft./AC)

Operating Elevation = 88' (Current Operating Elevation)

Volume	46298119	cu ft	
	1062.859	AC-ft	(Divide cu. ft. by 43,560 sq.ft./AC)
Area	3454272	sq ft	
	79.29918	AC	(Divide sq. ft. by 43,560 sq.ft./AC)

Operating Elevation = 91' (Top of Dike Elevation)

Volume	57304049	cu ft	
	1315.52	AC-ft	(Divide cu. ft. by 43,560 sq.ft./AC)
Area	3702492	sq ft	
	84.99752	AC	(Divide sq. ft. by 43,560 sq.ft./AC)

Jesse Cannon 2/11/2010
Ref BA-117-S0001 Using AutoCAD

Santee Cooper Generating Station

Ash Produced/Ash Shipped

ESTIMATED STORAGE

		Inventory-Ponded	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Totals
		Before 1994*	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
Cross	Bottom Ash Produced	240,000	28,287	49,542	44,979	43,584	41,578	42,338	51,569	56,111	52,608	34,297	61,097	55,311	60,677	90,834	106,810	115,242	1,174,864
	Bottom Ash Shipped		-			-	-	-		-	-	-	1,234	18,680	9,358	27,088	15,711	14,983	87,054
	Bottom Ash Ponded		28,287	49,542	44,979	43,584	41,578	42,338	51,569	56,111	52,608	34,297	59,863	36,631	51,319	63,746	91,099	100,259	1,087,810
Grainger	Bottom Ash Produced	52,976	4,857	2,460	2,850	3,811	3,212	8,413		76,061	7,978	11,788	10,392	12,117	11,581	9,175	9,138	1,747	228,556
	Bottom Ash Shipped	Co-Mingled	522	170	9,000	-	-	59,319		19	23,076	16,384	-	-	-	-	-	-	108,490
	Bottom Ash Ponded		4,335	2,290	(6,150)	3,811	3,212	(50,906)	-	76,042	(15,098)	(4,596)	10,392	12,117	11,581	9,175	9,138	1,747	120,066
Jefferies	Bottom Ash Produced	345,174	8,704	10,290	7,705	7,471	8,545	11,893	72,583	61,576	15,979	2,979	14,688	16,873	16,242	15,469	12,146	1,943	630,260
	Bottom Ash Shipped	Co-Mingled	-	8,614	2,300	2,614	1,005	537	3,066	2,036	1,734	10,448	-	4,344	3,700	6,225	3,613	-	50,236
	Bottom Ash Ponded		8,704	1,676	5,405	4,857	7,540	11,356	69,517	59,540	14,245	(7,469)	14,688	12,529	12,542	9,244	8,533	1,943	580,024
Winyah	Bottom Ash Produced	746,667	46,654	29,054	42,635	41,640	41,734	45,671	35,873	33,511	54,000	52,083	57,934	67,677	72,543	68,380	65,300	46,195	1,547,551
	Bottom Ash Shipped	Co-Mingled	256	-	30	16,534	36,308	36,663	30,657	35,873	35,307	34,836	36,836	37,419	35,537	25,381	38,203	20,691	420,531
	Bottom Ash Ponded		46,398	29,054	42,605	25,106	5,426	9,008	5,216	(2,362)	18,693	17,247	21,098	30,258	37,006	42,999	27,097	25,504	1,127,020
															Estimated Bottom Ash Storage				2,914,920

*** From GAI Report on Combustion Products Management**

ASH PRODUCED
2005

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Cross	29,241	22,405	21,346	14,347	25,624	22,856	25,876	14,653	26,345	24,967	22,994	25,899	**276,554**
Grainger	4,377	4,484	5,203	4,433	4,976	5,229	6,332	6,600	3,147	5,457	5,117	5,499	**60,854**
Jefferies	7,334	6,489	5,600	3,998	7,995	6,369	8,088	8,283	8,899	8,123	5,477	7,712	**84,367**
Winyah	26,338	23,217	26,414	29,506	23,477	26,405	30,788	32,837	30,682	26,663	27,213	34,844	**338,384**
	67,290	**56,595**	**58,563**	**52,284**	**62,072**	**60,859**	**71,085**	**62,373**	**69,073**	**65,210**	**60,801**	**73,953**	**760,158**
												Fly ash(80%)	**608,127**
												Bott. ash(20%)	**152,032**

STATION ASH SALES (tons)
2005

	January	February	March	April	May	June	July	August	September	October	November	December	Total
													Sales
Cross	33,304	13,472	28,812	12,519	26,229	21,277	19,423	26,747	20,127	24,327	21,219	19,961	**267,417**
Grainger	5,335	3,328	5,555	5,033	5,362	5,528	5,018	6,490	4,345	5,665	5,142	4,785	**61,586**
Jefferies	0	0	0	0	27	4,975	3,525	1,212	16,825	10,759	8,238	1,347	**46,908**
Winyah	23,609	20,808	27,581	36,202	36,690	27,476	31,104	26,986	27,100	22,093	24,244	24,667	**328,560**
TOTAL	**62,248**	**37,608**	**61,948**	**53,754**	**68,308**	**59,256**	**59,070**	**61,435**	**68,397**	**62,844**	**58,843**	**50,760**	**704,471**
												Fly Ash	**592,333**
												Bottom ash	**55,895**
												Pond Ash	**46,139**

ASH PRODUCED
2006

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Cross	23,484	21,820	16,828	18,291	25,546	24,584	28,371	27,722	26,771	26,271	29,018	34,677	**303,383**
Grainger	5,377	5,272	5,914	5,302	5,148	6,136	6,187	5,836	3,936	3,762	3,148	1,888	**57,906**
Jefferies	5,677	7,406	8,022	6,656	7,078	7,322	7,827	7,400	4,771	5,463	6,914	6,673	**81,209**
Winyah	29,568	27,699	29,680	27,691	26,184	30,510	33,790	34,568	29,716	31,069	29,624	32,615	**362,714**
	64,106	**62,197**	**60,444**	**57,940**	**63,956**	**68,552**	**76,175**	**75,526**	**65,194**	**66,565**	**68,704**	**75,853**	**805,211**
												Fly ash(80%)	**644,169**
												Bott. ash(20%)	**161,042**

Station ASH SALES (tons)
2006

	January	February	March	April	May	June	July	August	September	October	November	December	Total Sales
Cross	18,761	14,995	29,895	14,245	18,095	15,945	24,763	26,523	23,828	21,542	21,253	28,380	**258,225**
Grainger	4,290	5,280	5,693	4,263	5,060	5,774	5,088	5,885	4,400	3,850	3,410	2,035	**55,028**
Jefferies	1,886	1,174	1,479	4,288	3,166	1,972	0	1,612	9,247	6,148	2,854	2,239	**36,065**
Winyah	29,337	32,273	38,170	28,693	32,471	30,709	22,850	19,897	20,038	29,837	21,866	22,349	**328,490**
TOTAL	**54,274**	**53,722**	**75,237**	**51,489**	**58,792**	**54,400**	**52,701**	**53,917**	**57,513**	**61,377**	**49,383**	**55,003**	**677,808**
												Fly Ash	**550,692**
												Bottom ash	**49,432**
												Pond Ash	**46,139**

ASH PRODUCED
2007

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Cross	42,663	36,262	39,074	38,035	37,034	37,891	36,310	41,923	36,660	27,851	35,376	45,089	**454,169**
Grainger	2,250	3,686	3,748	4,446	2,717	4,107	4,786	5,163	3,152	4,557	4,244	3,017	**45,873**
Jefferies	4,447	5,990	5,704	6,711	6,165	6,747	8,039	9,275	4,611	6,763	6,870	6,025	**77,346**
Winyah	27,545	27,733	23,432	20,971	21,322	33,957	34,577	32,092	30,021	32,005	27,993	30,251	**341,899**
	76,905	**73,671**	**71,958**	**70,163**	**67,238**	**82,702**	**83,712**	**88,453**	**74,444**	**71,176**	**74,483**	**84,382**	**919,287**
												Fly ash(80%)	**735,430**
												Bott. ash(20%)	**183,857**

Station ASH SALES (tons)
2007

	January	February	March	April	May	June	July	August	September	October	November	December	Total
													Sales
Cross	34,528	49,019	35,356	31,392	33,169	35,870	27,471	23,322	22,719	34,222	28,906	31,411	**387,385**
Grainger	2,311	2,090	3,905	5,033	2,723	4,593	4,950	5,198	2,585	4,400	4,428	2,888	**45,104**
Jefferies	1,245	599	7,220	8,937	5,078	14,428	9,084	5,551	7,024	4,674	7,881	8,212	**79,933**
Winyah	22,848	23,927	30,122	27,808	27,904	23,528	25,319	27,545	23,069	25,206	22,312	17,093	**296,681**
TOTAL	**60,932**	**75,635**	**76,603**	**73,170**	**68,874**	**78,419**	**66,824**	**61,616**	**55,397**	**68,502**	**63,527**	**59,604**	**809,103**
												Fly ash	**694,383**
												Bottom Ash	**52,473**
												Pond Ash	**62,247**

ASH PRODUCED
2008

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Cross	49,248	41,663	35,645	28,573	54,397	54,755	39,803	42,262	50,412	46,450	44,391	46,450	**534,049**
Grainger	5,062	3,594	4,540	4,267	4,756	4,315	6,828	6,371	442	3,154	1,728	635	**45,691**
Jefferies	7,549	5,983	7,681	7,065	7,249	6,927	6,796	7,075	2,179	0	0	1,727	**60,230**
Winyah	30,705	29,285	31,094	29,790	24,230	21,460	33,643	32,139	27,860	20,612	19,914	25,766	**326,498**
	92,563	**80,524**	**78,959**	**69,696**	**90,632**	**87,457**	**87,071**	**87,846**	**80,893**	**69,799**	**65,954**	**74,578**	**965,972**
												Fly ash(80%)	**772,778**
												Bott. ash(20%)	**193,194**

Station ASH SALES (tons)
2008

	January	February	March	April	May	June	July	August	September	October	November	December	Total Sales
Cross	18,778	13,653	23,278	40,717	19,264	20,349	13,840	13,430	8,709	13,209	14,221	10,162	**209,610**
Grainger	4,015	3,850	5,803	4,483	5,637	6,243	5,884	4,758	825	193	2,366	1,183	**45,240**
Jefferies	3,391	6,348	2,133	1,881	1,938	16,653	8,149	3,255	3,069	2,751	0	127	**49,695**
Winyah	18,502	20,186	21,684	20,119	20,219	24,232	22,030	16,860	18,954	16,472	13,719	12,228	**225,205**
TOTAL	**44,686**	**44,037**	**52,898**	**67,200**	**47,058**	**67,477**	**49,903**	**38,303**	**31,557**	**32,625**	**30,306**	**23,700**	**529,750**
												Fly ash	**643,900**
												Bottom Ash	**51,678**
												Pond Ash	**56,047**

ASH PRODUCED
2009

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Cross	41,504	45,815	47,226	46,607	41,222	50,800	54,760	57,394	43,235	47,180	45,175	55,293	**576,212**
Grainger	2,346	1,718	945	0	0	2,128	1,358	165	0	0	0	74	**8,734**
Jefferies	5,351	2,908	479	0	0	0	979	0	0	0	0	0	**9,717**
Winyah	32,182	23,820	17,602	14,235	15,782	26,573	21,537	21,259	14,722	19,676	21,940	1,647	**230,975**
	81,383	**74,261**	**66,252**	**60,842**	**57,004**	**79,500**	**78,635**	**78,819**	**57,958**	**66,856**	**67,115**	**57,014**	**825,638**
												Fly ash(80%)	**660,511**
												Bott. ash(20%)	**165,128**

Station ASH SALES (tons)
2009

	January	February	March	April	May	June	July	August	September	October	November	December	Total
													Sales
Cross	10,989	10,615	17,821	18,906	20,418	13,757	14,365	15,841	21,552	16,017	13,388	9,783	**183,452**
Grainger	770	0	868	0	0	1,458	1,403	908	28	0	0	0	**5,435**
Jefferies	6,876	3,049	349	1,607	1,383	0	3,203	2,711	8,734	4,463	0	0	**32,375**
Winyah	10,466	11,806	14,224	15,411	12,415	13,021	12,793	11,999	13,958	11,778	9,024	7,945	**144,840**
TOTAL	**29,101**	**25,470**	**33,262**	**35,924**	**34,216**	**28,236**	**31,764**	**31,459**	**44,272**	**32,258**	**22,412**	**17,728**	**366,102**
Percent Utilized	36%	34%	50%	59%	60%	36%	40%	40%	76%	48%	33%	31%	**44%**

MONTHLY PROGRESS REPORT

CROSS GENERATING STATION

January-09

	UNITS	UNIT 1	UNIT 2	UNIT 3	UNIT 4	STATION TOTALS Units 1&2	Units 3&4	All units
GROSS GENERATION	MWH	257,866	316,052	278,146	393,603	573,918	671,749	1,245,667
STATION USE	MWH	17,723	18,235	1,099	1,254	35,958	2,353	38,311
NET GENERATION	MWH	240,143	297,817	277,047	392,349	537,960	669,396	1,207,356
MAGNESIUM HYDROXIDE USAGE	GALS	28593	38340	28853	33689	66933	62542	129475
MAX HOURLY GROSS GENERATION	MWH	629	607	609	629			
DATE/TIME MAX HR		01/02/09	01/17/09	01/16/09	01/16/09			
		11:00:00 PM	11:00:00 PM	6:00:00 AM	11:00:00 AM			
MAX GROSS GENERATION	MWH	14,558	14,076	14,221	14,734	28,634	28,955	57,589
DATE MAX GROSS		01/17/09	01/17/09	01/16/09	01/16/09			
MAX DAY NET GENERATION		13,655	13,277	14,209	14,718	26,932	28,927	55,859
DATE MAX DAY NET		01/17/09	01/18/09	01/16/09	01/16/09			
MIN HOURLY GENERATION	MWH	-	-	-	265			
HOURS OPERATED		744.00	744.00	744.00	744.00			
CURRENT RUN LENGTH	DAYS	10	14	1	32			
HISTORIC RUN LENGTH	DAYS	128	235	53	20			
STATION SERVICE	%	6.87	5.77	0.40	0.32	6.27	0.35	3.08
NET OUTPUT FACTOR	%	54.71	68.43	63.11	89.38			
NET CAPACITY FACTOR	%	54.71	68.43	63.11	89.38			
COAL ON HAND START	TONS	764,124.1				764,124.1	-	764,124.1
COAL RECEIVED	TONS	432,182.0				432,182.0	-	432,182.0
COAL BURNED	TONS	98,527.2	120,158.6	104,163.2	142,441.8	218,685.8	246,605.0	465,290.8
COAL PILE ADJUSTMENT	TONS	(11,222.1)		-		(11,222.1)	-	(11,222.1)
COAL ON HAND END	TONS	862,235.0				862,235.0	(246,605.0)	719,793.2
PETCOKE ON HAND START	TONS	96,365.0		-		96,365.0	-	96,365.0
PETCOKE RECEIVED	TONS	-		-		-	-	-
PETCOKE BURNED	TONS	-	-	-	0.00	-	-	-
PET COKE ON HAND END	TONS	96,365.0		-		96,365.0	-	96,365.0
IGNITION OIL ON HAND START	GALS	514,541.0		-		514,541.0	-	514,541.0
IGNITION OIL RECEIVED	GALS	264,294.0		-		264,294.0	-	264,294.0
IGN OIL BURNED	GALS	126,771.4	48,232.0	12,215.0	-	175,003.4	12,215.0	187,218.4
IGN. OIL ADJUSTMENT	GALS	-		-		-	-	-
IGN. OIL BURN., HEAVY EQUIP.	GALS	12,230.6		-		12,230.6	-	12,230.6
IGN. OIL BURN., LEASE EQUIP.	GALS	4,472.7		-		4,472.7	-	4,472.7
IGNITION OIL ON HAND END	GALS	587,128.3		-		587,128.3	-	574,913.3
COAL WT AVG MOIST	%	7.24	6.93	6.65	6.73	7.10	6.68	6.86
COAL WT AVG ASH	%	8.94	8.91	8.83	9.01	8.93	8.91	8.92
COAL WT AVG SULFUR	%	1.57	1.64	2.05	2.20	1.60	2.11	1.89
COAL WT AVG BTU	Btu/lb	12,629	12,686	12,856	12,788	12,655	12,828	12,752
NET HEAT RATE	Btu/KWH	10,437	10,259	9,674	9,285	10,334	9,454	9,850
GROSS HEAT RATE	Btu/KWH	9,720	9,667	9,635	9,256	9,687	9,421	9,547
AVERAGE SO2 EMISSIONS	lb/Mbtu	0.07	0.24	0.10	0.10			
AVERAGE NOX EMISSIONS	lb/Mbtu	0.09	0.09	0.07	0.07			
AVERAGE SO2 REMOVAL	%	97.27	90.77	97.06	97.03			
Ammonia Usage	lbs	247,095.30	336,688.80	114,449.20	178,645.30			
Ammonia Usage	tons	123.55	168.34	57.22	89.32			
Magnesium Hydroxide Usage	GALS	28,593	38,340	28,853	33,689.00	66,933.00	62,542.00	129,475.00
NO OF EMPLOYEES		227						227

MONTHLY PROGRESS REPORT

CROSS GENERATING STATION

February-09

	UNITS	UNIT 1	UNIT 2	UNIT 3	UNIT 4	STATION TOTALS Units 1&2	Units 3&4	All units
GROSS GENERATION	MWH	348,042	267,321	290,591	307,983	615,363	598,574	1,213,937
STATION USE	MWH	22,499	14,992	707	741	37,491	1,448	38,939
NET GENERATION	MWH	325,543	252,329	289,884	307,242	577,872	597,126	1,174,998
MAGNESIUM HYDROXIDE USAGE	GALS	46103	28538	38838	37437	74641	76275	150916
MAX HOURLY GROSS GENERATION	MWH	631	603	621	628			
DATE/TIME MAX HR		02/04/09	02/04/09	02/03/09	02/05/09			
		3:00:00 AM	5:00:00 AM	8:00:00 AM	7:00:00 PM			
MAX GROSS GENERATION	MWH	14,856	13,642	13,828	14,294	28,498	28,122	56,620
DATE MAX GROSS		02/23/09	02/04/09	02/05/09	02/23/09			
MAX DAY NET GENERATION		13,901	12,938	13,817	14,279	26,839	28,096	54,935
DATE MAX DAY NET		02/23/09	02/04/09	02/05/09	02/23/09			
MIN HOURLY GENERATION	MWH	-	-	-	-			
HOURS OPERATED		672.00	566.83	616.02	644.01			
CURRENT RUN LENGTH	DAYS	38	4	-	14			
HISTORIC RUN LENGTH	DAYS	128	235	53	20			
STATION SERVICE	%	6.46	5.61	0.24	0.24	6.09	0.24	3.21
NET OUTPUT FACTOR	%	82.11	76.10	79.76	80.86			
NET CAPACITY FACTOR	%	82.11	64.19	73.11	77.49			
COAL ON HAND START	TONS	719,793.2				719,793.2	-	719,793.2
COAL RECEIVED	TONS	460,603.6				460,603.6	-	460,603.6
COAL BURNED	TONS	130,706.9	101,314.7	109,312.6	113,176.2	232,021.6	222,488.8	454,510.4
COAL PILE ADJUSTMENT	TONS	(25,000.0)		-		(25,000.0)	-	(25,000.0)
COAL ON HAND END	TONS	814,062.6				814,062.6	(222,488.8)	700,886.4
PETCOKE ON HAND START	TONS	96,365.0		-		96,365.0	-	96,365.0
PETCOKE RECEIVED	TONS	-		-		-	-	-
PETCOKE BURNED	TONS	-	-	-	696.00	-	696.0	696.0
PET COKE ON HAND END	TONS	95,669.0		-		96,365.0	-	95,669.0
IGNITION OIL ON HAND START	GALS	574,913.3		-		574,913.3	-	574,913.3
IGNITION OIL RECEIVED	GALS	160,378.0		-		160,378.0	-	160,378.0
IGN OIL BURNED	GALS	30,416.6	51,321.4	45,169.0	31,180.0	81,738.0	76,349.0	158,087.0
IGN. OIL ADJUSTMENT	GALS	-		-		-	-	-
IGN. OIL BURN., HEAVY EQUIP.	GALS	15,481.1		-		15,481.1	-	15,481.1
IGN. OIL BURN., LEASE EQUIP.	GALS	3,424.9		-		3,424.9	-	3,424.9
IGNITION OIL ON HAND END	GALS	634,647.3		-		634,647.3	-	558,298.3
COAL WT AVG MOIST	%	7.29	7.35	7.30	7.50	7.32	7.41	7.36
COAL WT AVG ASH	%	9.81	9.68	10.46	10.49	9.75	10.48	10.08
COAL WT AVG SULFUR	%	1.67	1.65	1.73	1.85	1.67	1.80	1.73
COAL WT AVG BTU	Btu/lb	12,421	12,411	12,259	12,232	12,416	12,244	12,337
NET HEAT RATE	Btu/KWH	9,987	9,995	9,268	9,081	9,990	9,171	9,578
GROSS HEAT RATE	Btu/KWH	9,342	9,434	9,245	9,059	9,382	9,148	9,271
AVERAGE SO2 EMISSIONS	lb/Mbtu	0.06	0.22	0.05	0.08			
AVERAGE NOX EMISSIONS	lb/Mbtu	0.09	0.09	0.07	0.07			
AVERAGE SO2 REMOVAL	%	97.67	91.37	98.20	97.13			
Ammonia Usage	lbs	384,368.10	288,003.30	126,560.50	182,990.70			
Ammonia Usage	tons	192.18	144.00	63.28	91.50			
Magnesium Hydroxide Usage	GALS	46,103	28,538	38,838	37,437.00	74,641.00	76,275.00	150,916.00
NO OF EMPLOYEES		228						228

MONTHLY PROGRESS REPORT

CROSS GENERATING STATION
March-08

						STATION TOTALS		
	UNITS	UNIT 1	UNIT 2	UNIT 3	UNIT 4	Units 1&2	Units 3&4	All units
GROSS GENERATION	MWH	401,333	89,419	389,378	374,716	490,752	764,094	1,254,846
STATION USE	MWH	25,813	6,547	428	360	32,360	788	33,148
NET GENERATION	MWH	375,520	82,872	388,950	374,356	458,392	763,306	1,221,698
MAGNESIUM HYDROXIDE USAGE	GALS	41496	10807	48187	51832	52303	100019	152322
MAX HOURLY GROSS GENERATION	MWH	633	606	610	617			
DATE/TIME MAX HR		03/22/09	03/05/09	03/12/09	03/05/09			
		9:00:00 AM	9:00:00 AM	8:00:00 PM	9:00:00 PM			
MAX GROSS GENERATION	MWH	14,635	13,508	14,427	13,839	28,143	28,266	56,409
DATE MAX GROSS		03/22/09	03/05/09	03/12/09	03/05/09			
MAX DAY NET GENERATION		13,762	12,817	14,416	13,825	26,579	28,241	54,820
DATE MAX DAY NET		03/22/09	03/05/09	03/12/09	03/05/09			
MIN HOURLY GENERATION	MWH	200	-	-	298			
HOURS OPERATED		743.00	167.75	737.95	743.00			
CURRENT RUN LENGTH	DAYS	69	-	31	45			
HISTORIC RUN LENGTH	DAYS	128	235	53	45			
STATION SERVICE	%	6.43	7.32	0.11	0.10	6.59	0.10	2.64
NET OUTPUT FACTOR	%	85.66	84.45	89.33	85.40			
NET CAPACITY FACTOR	%	85.66	19.07	88.73	85.40			
COAL ON HAND START	TONS	700,314.9						700,314.9
COAL RECEIVED	TONS	627,605.5						627,605.5
COAL BURNED	TONS	152,580.7	35,093.4	138,612.5	136,711.3	187,674.1	275,323.8	462,997.9
COAL PILE ADJUSTMENT	TONS	(25,571.5)						(25,571.5)
COAL ON HAND END	TONS	839,351.0						839350.97
PETCOKE ON HAND START	TONS	95,669.0						95,669.0
PETCOKE RECEIVED	TONS	-						-
PETCOKE BURNED	TONS	296.0	-	8,376.4	5,062.7	296.0	13,439.1	13,735.1
PET COKE ON HAND END	TONS	81,933.9						81933.88
IGNITION OIL ON HAND START	GALS	558,298.3		-		558,298.3	-	558,298.3
IGNITION OIL RECEIVED	GALS	15,994.0		15,992.0		15,994.0	15,992.0	31,986.0
IGN OIL BURNED	GALS	8,891.1	1,443.0	18,190.0	-	10,334.1	18,190.0	28,524.1
IGN. OIL ADJUSTMENT	GALS	-		-		-	-	-
IGN. OIL BURN., HEAVY EQUIP.	GALS	4,424.5		-		4,424.5	-	4,424.5
IGN. OIL BURN., LEASE EQUIP.	GALS	23,302.5		-		23,302.5	-	23,302.5
IGNITION OIL ON HAND END	GALS	536,231.2		-		536,231.2	-	534033.20
COAL WT AVG MOIST	%	7.39	6.69	7.09	6.84	7.19	6.96	7.06
COAL WT AVG ASH	%	10.61	9.96	10.12	9.91	10.43	10.02	10.20
COAL WT AVG SULFUR	%	1.65	1.84	1.95	1.94	1.70	1.95	1.84
COAL WT AVG BTU	Btu/lb	12,238	12,473	12,386	12,511	12,304	12,450	12,386
NET HEAT RATE	Btu/KWH	9,968	10,566	9,368	9,477	10094.39423	9423.09348	9669.722215
GROSS HEAT RATE	Btu/KWH	9,327	9,793	9,358	9,467	9428.77372	9413.37557	9414.286925
AVERAGE SO2 EMISSIONS	lb/Mbtu	0.08	0.25	0.07	0.10			
AVERAGE NOX EMISSIONS	lb/Mbtu	0.09	0.08	0.07	0.07			
AVERAGE SO2 REMOVAL	%	96.86	90.64	97.62	96.93			
Ammonia Usage	lbs	408,028.00	113,705.60	200,102.30	218,145.60			
Ammonia Usage	tons	204.01	56.85	100.05	109.07			
Magnesium Hydroxide Usage	GALS	41,496	10,807	48,187	51,832.00	52,303.00	100,019.00	152,322.00
NO OF EMPLOYEES		228						228

MONTHLY PROGRESS REPORT

CROSS GENERATING STATION

April-08

						STATION TOTALS		
	UNITS	UNIT 1	UNIT 2	UNIT 3	UNIT 4	Units 1&2	Units 3&4	All units
GROSS GENERATION	MWH	386,469	-	359,316	356,885	386,469	716,201	1,102,670
STATION USE	MWH	23,429	381	607	469	23,810	1,076	24,886
NET GENERATION	MWH	362,216	(1,675)	358,709	356,416	360,541	715,125	1,075,666
MAGNESIUM HYDROXIDE USAGE	GALS	39315	0	45418	40093	39315	85511	124826
MAX HOURLY GROSS GENERATION	MWH	635	-	609	613			
DATE/TIME MAX HR		04/23/09	01/00/00	04/25/09	04/21/09			
		3:00:00 PM	12:00:00 AM	1:00:00 PM	12:00:00 PM			
MAX GROSS GENERATION	MWH	15,008	-	13,871	14,276	15,008	28,147	43,155
DATE MAX GROSS		04/23/09	01/00/00	04/25/09	04/21/09			
MAX DAY NET GENERATION		14,145	(43)	13,860	14,130	14,102	27,990	42,092
DATE MAX DAY NET		04/26/09	01/00/00	04/25/09	04/21/09			
MIN HOURLY GENERATION	MWH	-	-	-	-			
HOURS OPERATED		717.58	-	686.43	720.00			
CURRENT RUN LENGTH	DAYS	99	-	6	75			
HISTORIC RUN LENGTH	DAYS	128	235	53	75			
STATION SERVICE	%	6.06	#DIV/0!	0.17	0.13	6.16	0.15	2.26
NET OUTPUT FACTOR	%	85.55	#DIV/0!	88.57	83.90			
NET CAPACITY FACTOR	%	85.27	-0.40	84.44	83.90			
COAL ON HAND START	TONS	839,351.0						839,351.0
COAL RECEIVED	TONS	704,159.6						704,159.6
COAL BURNED	TONS	147,261.7	-	130,856.8	140,629.0	147,261.7	271,485.8	418,747.5
COAL PILE ADJUSTMENT	TONS	(25,571.5)						(25,571.5)
COAL ON HAND END	TONS	1,099,191.5						1,099,191.5
PETCOKE ON HAND START	TONS	81,933.9						81,933.9
PETCOKE RECEIVED	TONS	-						-
PETCOKE BURNED	TONS	-	-	11,115.0	-	-	11,115.0	11,115.0
PET COKE ON HAND END	TONS	70,818.9						70,818.9
IGNITION OIL ON HAND START	GALS	533,580.3		-		533,580.3	-	533,580.3
IGNITION OIL RECEIVED	GALS	87,731.0		-		87,731.0	-	87,731.0
IGN OIL BURNED	GALS	17,695.1	-	119,508.0	-	17,695.1	119,508.0	137,203.1
IGN. OIL ADJUSTMENT	GALS	-		-		-	-	-
IGN. OIL BURN., HEAVY EQUIP.	GALS	31,712.1		-		31,712.1	-	31,712.1
IGN. OIL BURN., LEASE EQUIP.	GALS	4,518.2		-		4,518.2	-	4,518.2
IGNITION OIL ON HAND END	GALS	567,385.9		-		567,385.9	-	447,877.9
COAL WT AVG MOIST	%	7.58	#DIV/0!	7.12	7.39	7.58	7.25	7.36
COAL WT AVG ASH	%	11.44	#DIV/0!	10.71	11.24	11.44	10.97	11.13
COAL WT AVG SULFUR	%	1.70	#DIV/0!	1.92	1.76	1.70	1.84	1.79
COAL WT AVG BTU	Btu/lb	12,026	#DIV/0!	12,257	12,123	12,026	12,192	12,135
NET HEAT RATE	Btu/KWH	9,786	#DIV/0!	9,749	9,567	9831.106289	9659.57276	9716.707296
GROSS HEAT RATE	Btu/KWH	9,172	#DIV/0!	9,732	9,554	9171.542588	9645.06049	9478.748556
AVERAGE SO2 EMISSIONS	lb/Mbtu	0.08	-	0.07	0.08			
AVERAGE NOX EMISSIONS	lb/Mbtu	0.09	-	0.07	0.07			
AVERAGE SO2 REMOVAL	%	96.81	-	97.57	97.02			
Ammonia Usage	lbs	413,526.10	-	179,674.10	189,119.40			
Ammonia Usage	tons	206.76	-	89.84	94.56			
Magnesium Hydroxide Usage	GALS	39,315	-	45,418	40,093.00	39,315.00	85,511.00	124,826.00
NO OF EMPLOYEES		225						225

COMMENTS:

DISTRIBUTION:

R. M. Singletary A-205, H.L. Strickland CGS, P. Pierce A-203, P. Runey A-G09, M.Cherry A-205, Tim Swicord CGS

MONTHLY PROGRESS REPORT

CROSS GENERATING STATION

May-09

						STATION TOTALS		
	UNITS	UNIT 1	UNIT 2	UNIT 3	UNIT 4	Units 1&2	Units 3&4	All units
GROSS GENERATION	MWH	392,506	-	398,541	368,017	392,506	766,558	1,159,064
STATION USE	MWH	25,019	1,538	281	203	26,557	484	27,041
NET GENERATION	MWH	367,487	(1,538)	398,260	367,814	365,949	766,074	1,132,023
MAGNESIUM HYDROXIDE USAGE	GALS	48285	0	57217	53678	48285	110895	159180
MAX HOURLY GROSS GENERATION	MWH	630	-	609	612			
DATE/TIME MAX HR		05/16/09		05/02/09	05/01/09			
		12:00:00 PM		1:00:00 PM	3:00:00 PM			
MAX GROSS GENERATION	MWH	14,214		13,821	13,152	14,214	26,973	41,187
DATE MAX GROSS		05/16/09		05/02/09	05/01/09			
MAX DAY NET GENERATION		13,339		13,812	13,146	13,339	26,958	40,297
DATE MAX DAY NET		05/16/09		05/02/09	05/01/09			
MIN HOURLY GENERATION	MWH	-		270	222			
HOURS OPERATED		739.09		744.00	744.00			
CURRENT RUN LENGTH	DAYS	1		37	106			
HISTORIC RUN LENGTH	DAYS	128		53	106			
STATION SERVICE	%	6.37		0.07	0.06	6.77	0.06	2.33
NET OUTPUT FACTOR	%	84.99		90.73	83.79			
NET CAPACITY FACTOR	%	84.43		90.73	83.79			
COAL ON HAND START	TONS	1,099,191.5						1,099,191.5
COAL RECEIVED	TONS	650,638.1						650,638.1
COAL BURNED	TONS	149,684.6		141,063.1	147,315.7	149,684.6	288,378.8	438,063.4
COAL PILE ADJUSTMENT	TONS	(25,571.5)						(25,571.5)
COAL ON HAND END	TONS	1,286,194.8						1,286,194.8
PETCOKE ON HAND START	TONS	70,818.9						70,818.9
PETCOKE RECEIVED	TONS	-		-		-	-	-
PETCOKE BURNED	TONS	-		18,559.0	-	-	18,559.0	18,559.0
PET COKE ON HAND END	TONS	52,259.9						52,259.9
IGNITION OIL ON HAND START	GALS	447,877.9		-		447,877.9	-	447,877.9
IGNITION OIL RECEIVED	GALS	39,253.0		7,965.0		39,253.0	7,965.0	47,218.0
IGN OIL BURNED	GALS	31,357.3		190.0	-	31,357.3	190.0	31,547.3
IGN. OIL ADJUSTMENT	GALS	-		-		-	-	-
IGN. OIL BURN., HEAVY EQUIP.	GALS	32,680.9		-		32,680.9	-	32,680.9
IGN. OIL BURN., LEASE EQUIP.	GALS	1,574.2		-		1,574.2	-	1,574.2
IGNITION OIL ON HAND END	GALS	421,518.5		-		421,518.5	-	429,293.5
COAL WT AVG MOIST	%	6.81		6.90	6.80	6.81	6.85	6.84
COAL WT AVG ASH	%	9.70		8.93	9.61	9.70	9.26	9.41
COAL WT AVG SULFUR	%	1.44		2.15	1.96	1.44	2.06	1.85
COAL WT AVG BTU	Btu/lb	12,486		12,679	12,566	12,486	12,623	12,577
NET HEAT RATE	Btu/KWH	10,184		10,164	10,066	10226.6	10115.3	10150.3
GROSS HEAT RATE	Btu/KWH	9,535		10,157	10,060	9534.7	10109.0	9913.5
AVERAGE SO2 EMISSIONS	lb/Mbtu	0.09		0.09	0.10			
AVERAGE NOX EMISSIONS	lb/Mbtu	0.09		0.07	0.07			
AVERAGE SO2 REMOVAL	%	96.03		97.46	97.07			
Ammonia Usage	lbs	419,590.50		230,535.80	198,817.90			
Ammonia Usage	tons	209.80		115.27	99.41			
Magnesium Hydroxide Usage	GALS	48,285		57,217	53,678	48,285.00	110,895.00	159,180.00
NO OF EMPLOYEES		227						227

MONTHLY PROGRESS REPORT

CROSS GENERATING STATION

June-09

						STATION TOTALS		
	UNITS	UNIT 1	UNIT 2	UNIT 3	UNIT 4	Units 1&2	Units 3&4	All units
GROSS GENERATION	MWH	383,867	168,564	373,854	343,502	552,431	717,356	1,269,787
STATION USE	MWH	25,300	10,467	444	411	35,767	855	36,622
NET GENERATION	MWH	358,567	158,097	373,410	343,091	516,664	716,501	1,233,165
MAGNESIUM HYDROXIDE USAGE	GALS	55527	17163	54046	76024	72690	130070	202760
MAX HOURLY GROSS GENERATION	MWH	629	603	607	611			
DATE/TIME MAX HR		06/25/09	06/26/09	06/06/09	06/11/09			
		11:00:00 PM	10:00:00 PM	10:00:00 AM	10:00:00 PM			
MAX GROSS GENERATION	MWH	14,483	13,398	13,792	13,163	27,881	26,955	54,836
DATE MAX GROSS		06/25/09	06/25/09	06/04/09	06/01/09			
MAX DAY NET GENERATION		13,578	12,692	13,784	13,157	26,270	26,941	53,211
DATE MAX DAY NET		06/25/09	06/25/09	06/04/09	06/01/09			
MIN HOURLY GENERATION	MWH	-	-	-	-			
HOURS OPERATED		718.60	320.69	719.42	702.73			
CURRENT RUN LENGTH	DAYS	31	15	20	-			
HISTORIC RUN LENGTH	DAYS	128	235	53	135			
STATION SERVICE	%	6.59	6.21	0.12	0.12	6.47	0.12	2.88
NET OUTPUT FACTOR	%	84.57	84.27	87.97	82.75			
NET CAPACITY FACTOR	%	84.41	37.53	87.90	80.77			
COAL ON HAND START	TONS	1,286,194.8						1,286,194.8
COAL RECEIVED	TONS	547,034.4						547,034.4
COAL BURNED	TONS	157,753.8	69,963.4	132,882.6	140,883.2	227,717.2	273,765.8	501,483.0
COAL PILE ADJUSTMENT	TONS	(25,571.5)						(25,571.5)
COAL ON HAND END	TONS	1,306,174.7						1,306,174.7
PETCOKE ON HAND START	TONS	52,259.9						52,259.9
PETCOKE RECEIVED	TONS	-		29,536.0				29,536.0
PETCOKE BURNED	TONS	-	-	17,725.0	-	-	17,725.0	17,725.0
PET COKE ON HAND END	TONS	34,534.9						64,070.9
IGNITION OIL ON HAND START	GALS	429,293.5		-		429,293.5	-	429,293.5
IGNITION OIL RECEIVED	GALS	294,386.0		-		294,386.0	-	294,386.0
IGN OIL BURNED	GALS	24,883.1	197,989.0	18,740.0	4,412.0	222,872.1	23,152.0	246,024.1
IGN. OIL ADJUSTMENT	GALS	59,706.0		-		59,706.0	-	59,706.0
IGN. OIL BURN., HEAVY EQUIP.	GALS	27,714.5		-		27,714.5	-	27,714.5
IGN. OIL BURN., LEASE EQUIP.	GALS	3,469.1		-		3,469.1	-	3,469.1
IGNITION OIL ON HAND END	GALS	529,329.8		-		529,329.8	-	506,177.8
COAL WT AVG MOIST	%	6.67	7.60	6.79	6.91	6.78	6.85	6.82
COAL WT AVG ASH	%	10.63	10.53	9.58	10.16	10.61	9.86	10.13
COAL WT AVG SULFUR	%	1.55	1.64	2.17	1.78	1.56	1.98	1.83
COAL WT AVG BTU	Btu/lb	12,436	12,252	12,605	12,431	12,413	12,520	12,482
NET HEAT RATE	Btu/KWH	10,952	11,019	10,175	10,211	11002.42	10191.41	10538.40
GROSS HEAT RATE	Btu/KWH	10,230	10,335	10,163	10,198	10290.07	10179.26	10234.47
AVERAGE SO2 EMISSIONS	lb/Mbtu	0.09	0.22	0.08	0.08			
AVERAGE NOX EMISSIONS	lb/Mbtu	0.09	0.09	0.07	0.07			
AVERAGE SO2 REMOVAL	%	96.50	81.63	97.46	97.26			
Ammonia Usage	lbs	382,429.20	136,564.70	236,581.00	194,223.90			
Ammonia Usage	tons	191.21	68.28	118.29	97.11			
Magnesium Hydroxide Usage	GALS	55,527	17,163	54,046	76,024.00	72,690.00	130,070.00	202,760.00
NO OF EMPLOYEES		227						227

MONTHLY PROGRESS REPORT

CROSS GENERATING STATION

July-09

						STATION TOTALS		
	UNITS	UNIT 1	UNIT 2	UNIT 3	UNIT 4	Units 1&2	Units 3&4	All units
GROSS GENERATION	MWH	353,457	389,848	342,347	332,338	743,305	674,685	1,417,990
STATION USE	MWH	22,996	20,779	801	815	43,775	1,616	45,391
NET GENERATION	MWH	330,461	369,069	341,546	331,523	699,530	673,069	1,372,599
MAGNESIUM HYDROXIDE USAGE	GALS	51504	42204	65440	75918	93708	141358	235066
MAX HOURLY GROSS GENERATION	MWH	630	606	613	612			
DATE/TIME MAX HR		07/28/09	07/29/09	07/28/09	07/31/09			
		3:00:00 PM	2:00:00 PM	12:00:00 PM	9:00:00 PM			
MAX GROSS GENERATION	MWH	13,717	13,633	13,248	13,327	27,350	26,575	53,925
DATE MAX GROSS		07/07/09	07/07/09	07/29/09	07/11/09			
MAX DAY NET GENERATION		12,926	12,928	13,241	13,226	25,854	26,467	52,321
DATE MAX DAY NET		07/07/09	07/07/09	07/29/09	07/11/09			
MIN HOURLY GENERATION	MWH	-	-	-	-			
HOURS OPERATED		680.18	739.71	666.64	674.80			
CURRENT RUN LENGTH	DAYS	14	24	18	21			
HISTORIC RUN LENGTH	DAYS	128	235	53	135			
STATION SERVICE	%	6.51	5.33	0.23	0.25	5.89	0.24	3.20
NET OUTPUT FACTOR	%	82.35	85.29	86.84	83.27			
NET CAPACITY FACTOR	%	75.28	84.80	77.81	75.52			
COAL ON HAND START	TONS	1,306,174.8						1,306,174.8
COAL RECEIVED	TONS	507,586.7						507,586.7
COAL BURNED	TONS	136,797.1	152,321.5	118,812.2	119,118.9	289,118.6	237,931.1	527,049.7
COAL PILE ADJUSTMENT	TONS	(25,571.5)						(25,571.5)
COAL ON HAND END	TONS	1,261,140.3						1,261,140.3
PETCOKE ON HAND START	TONS	64,070.9						64,070.9
PETCOKE RECEIVED	TONS	-						-
PETCOKE BURNED	TONS	-	-	14,069.0	6,990.0	-	21,059.0	21,059.0
PET COKE ON HAND END	TONS	43,011.9						43,011.9
IGNITION OIL ON HAND START	GALS	506,177.8		-		506,177.8	-	506,177.8
IGNITION OIL RECEIVED	GALS	269,671.0		-		269,671.0	-	269,671.0
IGN OIL BURNED	GALS	128,782.0	10,550.0	4,165.0	2,847.0	139,332.0	7,012.0	146,344.0
IGN. OIL ADJUSTMENT	GALS	-		-		-	-	-
IGN. OIL BURN., HEAVY EQUIP.	GALS	44,211.7		-		44,211.7	-	44,211.7
IGN. OIL BURN., LEASE EQUIP.	GALS	7,027.6		-		7,027.6	-	7,027.6
IGNITION OIL ON HAND END	GALS	585,277.5		-		585,277.5	-	578,265.5
COAL WT AVG MOIST	%	7.12	7.28	6.83	7.29	7.20	7.05	7.13
COAL WT AVG ASH	%	11.01	10.52	10.13	9.80	10.75	9.97	10.39
COAL WT AVG SULFUR	%	1.62	1.58	2.07	2.00	1.60	2.03	1.80
COAL WT AVG BTU	Btu/lb	12,349	12,248	12,470	12,457	12,296	12,464	12,374
NET HEAT RATE	Btu/KWH	10,278	10,114	9,705	9,478	10191.98232	9593.37928	9897.388943
GROSS HEAT RATE	Btu/KWH	9,610	9,575	9,682	9,455	9591.752232	9570.40129	9580.565565
AVERAGE SO2 EMISSIONS	lb/Mbtu	0.07	0.25	0.09	0.09			
AVERAGE NOX EMISSIONS	lb/Mbtu	0.09	0.08	0.07	0.07			
AVERAGE SO2 REMOVAL	%	97.39	90.14	97.38	97.50			
Ammonia Usage	lbs	374,440.50	328,877.40	191,084.90	196,215.40			
Ammonia Usage	tons	187.22	164.44	95.54	98.11			
Magnesium Hydroxide Usage	GALS	51,504	42,204	65,440	75,918.00	93,708.00	141,358.00	235,066.00
NO OF EMPLOYEES		229						229

MONTHLY PROGRESS REPORT

CROSS GENERATING STATION
August-08

						STATION TOTALS		
	UNITS	UNIT 1	UNIT 2	UNIT 3	UNIT 4	Units 1&2	Units 3&4	All units
GROSS GENERATION	MWH	400,025	380,622	374,260	365,402	780,647	739,662	1,520,309
STATION USE	MWH	25,612	20,237	5,861	310	45,849	6,171	52,020
NET GENERATION	MWH	374,413	360,385	368,399	365,092	734,798	733,491	1,468,289
MAGNESIUM HYDROXIDE USAGE	GALS	60212	39187	90208	85815	99399	176023	275422
MAX HOURLY GROSS GENERATION	MWH	632	604	617	615			
DATE/TIME MAX HR		08/26/09	08/04/09	08/23/09	08/13/09			
		5:00:00 PM	3:00:00 PM	11:00:00 PM	8:00:00 PM			
MAX GROSS GENERATION	MWH	13,867	13,352	13,264	13,161	27,219	26,425	53,644
DATE MAX GROSS		08/27/09	08/27/09	08/26/09	08/22/09			
MAX DAY NET GENERATION		13,000	12,673	13,036	13,154	25,673	26,190	51,863
DATE MAX DAY NET		08/27/09	08/27/09	08/26/09	08/22/09			
MIN HOURLY GENERATION	MWH	396	3	-	6			
HOURS OPERATED		744.00	740.99	738.25	742.79			
CURRENT RUN LENGTH	DAYS	45	3	28	1			
HISTORIC RUN LENGTH	DAYS	128	235	53	135			
STATION SERVICE	%	6.40	5.32	1.57	0.08	5.87	0.83	3.42
NET OUTPUT FACTOR	%	85.30	83.14	84.58	83.31			
NET CAPACITY FACTOR	%	85.30	82.80	83.93	83.17			
COAL ON HAND START	TONS	1,261,140.3						1,261,140.3
COAL RECEIVED	TONS	627,521.8						627,521.8
COAL BURNED	TONS	157,248.8	150,616.3	128,380.0	129,216.8	307,865.1	257,596.8	565,461.9
COAL PILE ADJUSTMENT	TONS	-						-
COAL ON HAND END	TONS	1,323,200.2						1,323,200.2
PETCOKE ON HAND START	TONS	43,011.9						43,011.9
PETCOKE RECEIVED	TONS	-						-
PETCOKE BURNED	TONS	-	-	14,277.0	12,435.0	-	26,712.0	26,712.0
PET COKE ON HAND END	TONS	16,299.9						16,299.9
IGNITION OIL ON HAND START	GALS	578,265.5		-		578,265.5	-	578,265.5
IGNITION OIL RECEIVED	GALS	31,644.0		-		31,644.0	-	31,644.0
IGN OIL BURNED	GALS	8,829.4	18,321.0	1,533.0	477.0	27,150.4	2,010.0	29,160.4
IGN. OIL ADJUSTMENT	GALS	-		-		-	-	-
IGN. OIL BURN., HEAVY EQUIP.	GALS	587.2		-		587.2	-	587.2
IGN. OIL BURN., LEASE EQUIP.	GALS	-		-		-	-	-
IGNITION OIL ON HAND END	GALS	580,161.9		-		580,161.9	-	580,161.9
COAL WT AVG MOIST	%	6.28	9.52	7.16	6.96	7.88	7.06	7.49
COAL WT AVG ASH	%	11.52	10.66	9.63	8.60	11.09	9.11	10.15
COAL WT AVG SULFUR	%	1.57	1.48	2.17	2.20	1.53	2.18	1.84
COAL WT AVG BTU	Btu/lb	12,210	11,865	12,531	12,763	12,039	12,647	12,329
NET HEAT RATE	Btu/KWH	10,259	9,924	9,706	9,904	10093.45818	9804.83681	9947.303853
GROSS HEAT RATE	Btu/KWH	9,602	9,397	9,554	9,896	9500.648676	9723.03506	9606.93966
AVERAGE SO2 EMISSIONS	lb/Mbtu	0.07	0.23	0.07	0.07			
AVERAGE NOX EMISSIONS	lb/Mbtu	0.09	0.09	0.07	0.07			
AVERAGE SO2 REMOVAL	%	97.38	90.51	97.72	97.71			
Ammonia Usage	lbs	427,612.10	331,229.10	214,321.50	255,450.70			
Ammonia Usage	tons	213.81	165.61	107.16	127.73			
Magnesium Hydroxide Usage	GALS	60,212	39,187	90,208	85,815.00	99,399.00	176,023.00	275,422.00
NO OF EMPLOYEES		229						229

MONTHLY PROGRESS REPORT

CROSS GENERATING STATION
September-09

						STATION TOTALS		
	UNITS	UNIT 1	UNIT 2	UNIT 3	UNIT 4	Units 1&2	Units 3&4	All units
GROSS GENERATION	MWH	400,030	148	390,489	364,252	400,178	754,741	1,154,919
STATION USE	MWH	26,716	1,196	6,595	318	27,912	6,913	34,825
NET GENERATION	MWH	373,314	(1,048)	383,894	363,934	372,266	747,828	1,120,094
MAGNESIUM HYDROXIDE USAGE	GALS	58983	1067	87274	85171	60050	172445	232495
MAX HOURLY GROSS GENERATION	MWH	630	148	615	607			
DATE/TIME MAX HR		09/23/09	09/01/09	09/02/09	09/01/09			
		9:00:00 PM	1:00:00 AM	4:00:00 PM	9:00:00 PM			
MAX GROSS GENERATION	MWH	14,189	148	14,305	13,736	14,337	28,041	42,378
DATE MAX GROSS		09/23/09	09/01/09	09/09/09	09/25/09			
MAX DAY NET GENERATION		13,321	28	14,059	13,730	13,349	27,789	41,138
DATE MAX DAY NET		09/23/09	09/01/09	09/09/09	09/25/09			
MIN HOURLY GENERATION	MWH	-	-	-	-			
HOURS OPERATED		720.00	-	720.00	698.47			
CURRENT RUN LENGTH	DAYS	75	-	58	-			
HISTORIC RUN LENGTH	DAYS	128	235	58	135			
STATION SERVICE	%	6.68	808.11	1.69	0.09	6.97	0.92	3.02
NET OUTPUT FACTOR	%	87.88	0.00	90.37	88.31			
NET CAPACITY FACTOR	%	87.88	-0.25	90.37	85.67			
COAL ON HAND START	TONS	1,323,200.1						1,323,200.1
COAL RECEIVED	TONS	758,405.1						758,405.1
COAL BURNED	TONS	156,416.9	429.9	147,254.6	137,076.1	156,846.8	284,330.7	441,177.5
COAL PILE ADJUSTMENT	TONS	-						-
COAL ON HAND END	TONS	1,640,427.7						1,640,427.7
PETCOKE ON HAND START	TONS	16,299.9						16,299.9
PETCOKE RECEIVED	TONS	-						-
PETCOKE BURNED	TONS	-	-	1,724.0	6,349.0	-	8,073.0	8,073.0
PET COKE ON HAND END	TONS	8,226.9						8,226.9
IGNITION OIL ON HAND START	GALS	580,161.9		-		580,161.9	-	580,161.9
IGNITION OIL RECEIVED	GALS	30,717.0		7,927.0		30,717.0	7,927.0	38,644.0
IGN OIL BURNED	GALS	13,638.0	19,363.0	-	2,563.0	33,001.0	2,563.0	35,564.0
IGN. OIL ADJUSTMENT	GALS	-		-		-	-	-
IGN. OIL BURN., HEAVY EQUIP.	GALS	-		-		-	-	-
IGN. OIL BURN., LEASE EQUIP.	GALS	-		-		-	-	-
IGNITION OIL ON HAND END	GALS	583,241.9		-		583,241.9	-	583,241.9
COAL WT AVG MOIST	%	6.65	-	6.71	6.51	6.65	6.61	6.63
COAL WT AVG ASH	%	10.16	-	9.49	9.72	10.16	9.60	9.80
COAL WT AVG SULFUR	%	1.76	-	1.81	1.62	1.76	1.71	1.73
COAL WT AVG BTU	Btu/lb	12,441	-	12,563	12,525	12,441	12,544	12,508
NET HEAT RATE	Btu/KWH	10,430	-	9,751	9,873	10495.5697	9810.14426	10038.24305
GROSS HEAT RATE	Btu/KWH	9,734	-	9,586	9,865	9763.514608	9720.28889	9735.553589
AVERAGE SO2 EMISSIONS	lb/Mbtu	0.08	-	0.05	0.05			
AVERAGE NOX EMISSIONS	lb/Mbtu	0.09	-	0.07	0.06			
AVERAGE SO2 REMOVAL	%	96.86	-	97.97	97.94			
Ammonia Usage	lbs	433,320.40	-	190,933.00	235,889.70			
Ammonia Usage	tons	216.66	-	95.47	117.94			
Magnesium Hydroxide Usage	GALS	58,983	1,067	87,274	85,171.00	60,050.00	172,445.00	232,495.00
NO OF EMPLOYEES		228						228

15 891.96 Tons Ash

9-12

MONTHLY PROGRESS REPORT

CROSS GENERATING STATION
October-09

						STATION TOTALS		
	UNITS	UNIT 1	UNIT 2	UNIT 3	UNIT 4	Units 1&2	Units 3&4	All units
GROSS GENERATION	MWH	431,820	1,210	412,537	325,798	433,030	738,335	1,171,365
STATION USE	MWH	27,096	2,268	7,550	560	29,364	8,110	37,474
NET GENERATION	MWH	404,724	(1,058)	404,987	325,238	403,666	730,225	1,133,891
MAGNESIUM HYDROXIDE USAGE	GALS	63167	0	83459	61955	63167	145414	208581
MAX HOURLY GROSS GENERATION	MWH	637	287	626	618			
DATE/TIME MAX HR		10/02/08	10/04/09	10/30/09	10/08/09			
		9:00:00 AM	3:00:00 AM	11:00:00 AM	10:00:00 AM			
MAX GROSS GENERATION	MWH	15,042	697	14,592	14,239	15,739	28,831	44,570
DATE MAX GROSS		10/05/09	10/04/09	10/03/09	10/13/09			
MAX DAY NET GENERATION		14,123	509	14,301	14,232	14,632	28,533	43,165
DATE MAX DAY NET		10/05/09	10/04/09	10/03/09	10/13/09			
MIN HOURLY GENERATION	MWH	404	-	278	-			
HOURS OPERATED		744.00	5.27	744.00	626.61			
CURRENT RUN LENGTH	DAYS	106	-	89	25			
HISTORIC RUN LENGTH	DAYS	128	235	89	135			
STATION SERVICE	%	6.27	187.44	1.83	0.17	6.78	1.10	3.20
NET OUTPUT FACTOR	%	92.20	-34.32	92.26	87.97			
NET CAPACITY FACTOR	%	92.20	-0.24	92.26	74.09			
COAL ON HAND START	TONS	1,640,427.7						1,640,427.7
COAL RECEIVED	TONS	780,000.2						780,000.2
COAL BURNED	TONS	166,996.5	-	157,507.1	118,499.1	166,996.5	276,006.2	443,002.7
COAL PILE ADJUSTMENT	TONS	-						-
COAL ON HAND END	TONS	1,977,425.1						1,977,425.1
PETCOKE ON HAND START	TONS	8,226.9						8,226.9
PETCOKE RECEIVED	TONS	-						-
PETCOKE BURNED	TONS	-	-	-	8,221.0	-	8,221.0	8,221.0
PET COKE ON HAND END	TONS	5.9						5.9
IGNITION OIL ON HAND START	GALS	523,535.9		-		523,535.9	-	523,535.9
IGNITION OIL RECEIVED	GALS	63,482.0		63,535.0		63,482.0	63,535.0	127,017.0
IGN OIL BURNED	GALS	7,186.6	57,036.0	-	3,987.0	64,222.6	3,987.0	68,209.6
IGN. OIL ADJUSTMENT	GALS	(3,500.0)		-		(3,500.0)	-	(3,500.0)
IGN. OIL BURN., HEAVY EQUIP.	GALS	-		-		-	-	-
IGN. OIL BURN., LEASE EQUIP.	GALS	-		-		-	-	-
IGNITION OIL ON HAND END	GALS	515,308.3		-		515,308.3	-	578,843.3
COAL WT AVG MOIST	%	6.88		6.77	6.29	6.88	6.56	6.68
COAL WT AVG ASH	%	10.55		10.86	10.52	10.55	10.71	10.65
COAL WT AVG SULFUR	%	1.79		1.63	1.53	1.79	1.58	1.66
COAL WT AVG BTU	Btu/lb	12,309		12,510	12,413	12,309	12,468	12,409
NET HEAT RATE	Btu/KWH	10,161		9,730	9,675	10207.11	9706.41	9884.31
GROSS HEAT RATE	Btu/KWH	9,523		9,552	9,658	9514.96	9599.79	9568.10
AVERAGE SO2 EMISSIONS	lb/Mbtu	0.10		0.07	0.06			
AVERAGE NOX EMISSIONS	lb/Mbtu	0.09	-	0.07	0.07			
AVERAGE SO2 REMOVAL	%	96.29	-	97.61	97.63			
Ammonia Usage	lbs	523,881.60	3.90	211,618.20	149,381.80			
Ammonia Usage	tons	261.94	0.00	105.81	74.69			
Magnesium Hydroxide Usage	GALS	63,167	-	83,459	61,955.00	63,167.00	145,414.00	208,581.00
NO OF EMPLOYEES		227						227

COMMENTS: Fuel Oil adjustment made due to Gopher truck pulling 3500 gallons out of bottom of tank. Per Don Reed

DISTRIBUTION:
P. Pierce A-205, H.L. Strickland CGS, D.Ensor A-205, H. Schweers A-205, Tim Swicord CGS

MONTHLY PROGRESS REPORT

CROSS GENERATING STATION
November-09

						STATION TOTALS		
	UNITS	UNIT 1	UNIT 2	UNIT 3	UNIT 4	Units 1&2	Units 3&4	All units
GROSS GENERATION	MWH	404,625	-	394,449	376,188	404,625	770,637	1,175,262
STATION USE	MWH	25,106	2,531	10,583	96	27,637	10,679	38,316
NET GENERATION	MWH	379,519	(2,531)	383,866	376,092	376,988	759,958	1,136,946
MAGNESIUM HYDROXIDE USAGE	GALS	53927	0	64617	62185	53927	126802	180729
MAX HOURLY GROSS GENERATION	MWH	636	-	623	613			
DATE/TIME MAX HR		11/22/09		11/16/09	11/05/09			
		12:00:00 PM		9:00:00 PM	4:00:00 PM			
MAX GROSS GENERATION	MWH	15,205		14,729	13,942	15,205	28,671	43,876
DATE MAX GROSS		11/22/09		11/16/09	11/05/09			
MAX DAY NET GENERATION		14,264		14,294	13,931	14,264	28,225	42,489
DATE MAX DAY NET		11/22/09		11/16/09	11/05/09			
MIN HOURLY GENERATION	MWH	-	-	-	-			
HOURS OPERATED		713.15	-	720.00	720.00			
CURRENT RUN LENGTH	DAYS	26	-	119	55			
HISTORIC RUN LENGTH	DAYS	128	235	119	135			
STATION SERVICE	%	6.20		2.68	0.03	6.83	1.39	3.26
NET OUTPUT FACTOR	%	90.20		90.36	88.53			
NET CAPACITY FACTOR	%	89.34	-0.60	90.36	88.53			
COAL ON HAND START	TONS	1,977,425.1						1,977,425.1
COAL RECEIVED	TONS	711,164.5						711,164.5
COAL BURNED	TONS	159,239.9	-	149,869.4	147,201.8	159,239.9	297,071.2	456,311.1
COAL PILE ADJUSTMENT	TONS	-						-
COAL ON HAND END	TONS	2,232,278.5						2,232,278.5
PETCOKE ON HAND START	TONS	5.9						5.9
PETCOKE RECEIVED	TONS	-						-
PETCOKE BURNED	TONS	-	-	-	-	-	-	-
PET COKE ON HAND END	TONS	5.9						5.9
IGNITION OIL ON HAND START	GALS	578,843.3		-		578,843.3	-	578,843.3
IGNITION OIL RECEIVED	GALS	39,837.0		-		39,837.0	-	39,837.0
IGN OIL BURNED	GALS	31,297.9	-	-	-	31,297.9	-	31,297.9
IGN. OIL ADJUSTMENT	GALS	(25,903.0)		-		(25,903.0)	-	(25,903.0)
IGN. OIL BURN., HEAVY EQUIP.	GALS	-		-		-	-	-
IGN. OIL BURN., LEASE EQUIP.	GALS	-		-		-	-	-
IGNITION OIL ON HAND END	GALS	561,479.4		-		561,479.4	-	561,479.4
COAL WT AVG MOIST	%	6.46		6.90	7.15	6.46	7.02	6.83
COAL WT AVG ASH	%	10.47		9.52	9.67	10.47	9.60	9.90
COAL WT AVG SULFUR	%	1.60		1.73	1.78	1.60	1.76	1.70
COAL WT AVG BTU	Btu/lb	12,435		12,596	12,495	12,435	12,546	12,507
NET HEAT RATE	Btu/KWH	10,447		9,835	9,781	10517	9808	10043
GROSS HEAT RATE	Btu/KWH	9,798		9,572	9,778	9798	9672	9716
AVERAGE SO2 EMISSIONS	lb/Mbtu	0.09	-	0.05	0.04			
AVERAGE NOX EMISSIONS	lb/Mbtu	0.09	-	0.07	0.07			
AVERAGE SO2 REMOVAL	%	96.44	-	98.14	98.71			
Ammonia Usage	lbs	497656.4	0.0	206116.8	174500.8			
Ammonia Usage	tons	248.8	0.0	103.1	87.3			
Magnesium Hydroxide Usage	GALS	53927.0	0.0	64617.0	62185.0	53927.0	126802.0	180729.0
NO OF EMPLOYEES		228						228

MONTHLY PROGRESS REPORT

CROSS GENERATING STATION

December-09

	UNITS	UNIT 1	UNIT 2	UNIT 3	UNIT 4	STATION TOTALS Units 1&2	Units 3&4	All units
GROSS GENERATION	MWH	395,838	267,121	368,986	353,717	662,959	722,703	1,385,662
STATION USE	MWH	25,699	14,313	2,000	527	40,012	2,527	42,539
NET GENERATION	MWH	370,139	252,808	366,986	353,190	622,947	720,176	1,343,123
MAGNESIUM HYDROXIDE USAGE	GALS	50730	25177	51298	56082	75907	107380	183287
MAX HOURLY GROSS GENERATION	MWH	636	607	613	611			
DATE/TIME MAX HR		12/12/09	12/17/09	12/06/09	12/05/09			
		1:00:00 PM	11:00:00 PM	4:00:00 PM	10:00:00 PM			
MAX GROSS GENERATION	MWH	15,052	14,229	14,585	13,810	29,281	28,395	57,676
DATE MAX GROSS		12/06/09	12/12/09	12/06/09	12/06/09			
MAX DAY NET GENERATION		14,117	13,525	14,331	13,793	27,642	28,124	55,766
DATE MAX DAY NET		12/06/09	12/12/09	12/06/09	12/06/09			
MIN HOURLY GENERATION	MWH	308	-	264	-			
HOURS OPERATED		744.00	522.83	744.00	733.47			
CURRENT RUN LENGTH	DAYS	57	21	150	15			
HISTORIC RUN LENGTH	DAYS	128	235	150	135			
STATION SERVICE	%	6.49	5.36	0.54	0.15	6.04	0.35	3.07
NET OUTPUT FACTOR	%	84.32	82.66	83.60	81.62			
NET CAPACITY FACTOR	%	84.32	58.08	83.60	80.46			
COAL ON HAND START	TONS	2,232,278.5						2,232,278.5
COAL RECEIVED	TONS	572,264.8						572,264.8
COAL BURNED	TONS	153,393.0	106,498.1	145,046.5	137,151.0	259,891.1	282,197.5	542,088.6
COAL PILE ADJUSTMENT	TONS	-						-
COAL ON HAND END	TONS	2,262,454.7						2,262,454.7
PETCOKE ON HAND START	TONS	5.9						5.9
PETCOKE RECEIVED	TONS	-						-
PETCOKE BURNED	TONS	-	-	-	-	-	-	-
PET COKE ON HAND END	TONS	5.9						5.9
IGNITION OIL ON HAND START	GALS	561,479.4		-		561,479.4	-	561,479.4
IGNITION OIL RECEIVED	GALS	40,001.0		7,998.0		40,001.0	7,998.0	47,999.0
IGN OIL BURNED	GALS	6,613.6	45,356.0	-	1,705.0	51,969.6	1,705.0	53,674.6
IGN. OIL ADJUSTMENT	GALS	-		-		-	-	-
IGN. OIL BURN., HEAVY EQUIP.	GALS	-		-		-	-	-
IGN. OIL BURN., LEASE EQUIP.	GALS	-		-		-	-	-
IGNITION OIL ON HAND END	GALS	547,805.8		-		547,805.8	-	555,803.8
COAL WT AVG MOIST	%	6.96	7.69	7.14	6.98	7.16	7.06	7.10
COAL WT AVG ASH	%	10.04	10.70	10.19	10.17	10.23	10.18	10.20
COAL WT AVG SULFUR	%	1.54	1.41	1.53	1.51	1.50	1.52	1.51
COAL WT AVG BTU	Btu/lb	12,427	12,210	12,369	12,423	12,368	12,395	12,383
NET HEAT RATE	Btu/KWH	10,303	10,312	9,777	9,649	10331	9714	10001
GROSS HEAT RATE	Btu/KWH	9,634	9,760	9,724	9,635	9708	9680	9694
AVERAGE SO2 EMISSIONS	lb/Mbtu	0.10	0.23	0.04	0.03			
AVERAGE NOX EMISSIONS	lb/Mbtu	0.09	0.09	0.07	0.07			
AVERAGE SO2 REMOVAL	%	95.97	90.05	98.27	98.81			
Ammonia Usage	lbs	464,768.60	236,068.90	198,766.30	170,628.40			
Ammonia Usage	tons	232.38	118.03	99.38	85.31			
Magnesium Hydroxide Usage	GALS	50,730	25,177	51,298	56,082.00	75,907.00	107,380.00	183,287.00
NO OF EMPLOYEES		228						228

Remaining Capacity Calculations

Table 3.0, 1,082,630 T of Ponded Bottom Ash
Using Bulk Density = 50 lbs/cu.ft.

1082630	T	
2165260000	lbs	(multiply T times 2000 lbs/T)
43305200	cu.ft	(divide lbs by 50 lbs/cu.ft)
994.1505969	AC-ft of Ash	(divide cu.ft. by 43560 sq.ft/AC)

Capacity Remaining Calculated by Difference
Total Volume of the Two Bottom Ash Pond Sections at Elevation = 89 ft.:
1308.24 AC-ft (Table 1.0)

Thus Remaining Volume = 1308.24 AC-ft - 994.15 AC-ft = 314.0894 AC-ft

% Remaining: 24.00859

Table 4.0, Based on Length of Operations

	Unit 1	Unit 2	Unit 3	Unit 4
Years	15	27	3	2
Production (AC/ft)	360	648	72	48
		Total		**1128**

Shipped 87054 T (Total Through 2009, Table 3.0)
79.93939 AC-ft

Space Consumed: 1048.061 AC-ft (Total Produced - Shipped)
Space Open: 260.1794 AC-ft
Original Capacity 1308.24 AC-ft

% Consumed 80.11226
% Open 19.88774

Survey
2009 survey found 374 AC-ft remaining in section 2, and that ~10% of section 1 was filled.

100259	T	Ponded Ash in 2009, Per Table 3.0
92.06519743	AC-ft	Ponded Ash in 2009, Converted to AC-ft

Remaining capacity in section 2:
281.9348026 AC-ft By Difference

Original Capacity, section 1: 161.68 AC-ft
Remaining Capacity, section 1: 145.512 AC-ft

Overall Remaining Capacity: 427.4468 AC-ft (summed sections 1 & 2)

Jesse Cannon 2/11/2010

Survey Data

Way Point	Depth (ft.)
1	1.2
2	1.1
3	3.6
4	5.0
5	5.0
6	4.5
7	1.3
8	3.7
9	4.5
10	1.4
11	1.5
12	1.0
13	1.0
14	1.4
15	1.3
16	4.5
17	2.4
18	1.9
19	1.6
20	4.4
21	7.4
22	7.3
23	6.4
24	4.1
25	4.1
26	6.5
27	7.4
28	6.3
29	1.7
30	4.1
31	4.1
32	1.1
33	1.8
34	1.9
35	1.8
36	4.8
37	2.2
38	1.0
39	8.1
40	7.0
41	6.5
42	4.1
43	2.7
44	3.1
45	2.9
46	2.9

Way Point	Depth (ft.)
47	5.2
48	3.8
49	5.9
50	11.1
51	11.1
52	11.4
53	11.4
54	10.4
55	11.6
56	11.4
57	11.5
58	11.1
59	2.1
60	11.2
61	11.5
62	12.0
63	11.5
64	10.1
65	11.5
66	11.5
67	11.1
68	3.3
69	11.0
70	11.2
71	11.8
72	11.1
73	9.5
74	11.4
75	11.2
76	10.9
77	11.1
78	3.5
79	10.9
80	11.2
81	11.6
82	11.5
83	9.6
84	6.7
85	5.1
86	3.7
87	3.5
88	6.6
89	7.8
90	6.7
91	8.6
92	10.4
93	11.7

Way Point	Depth (ft.)
94	11.7
95	11.3
96	11.1
97	11.0
98	3.6
99	11.2
100	11.4
101	11.6
102	9.8
103	9.0
104	2.9
105	4.4
106	9.9
107	10.5
108	11.9
109	11.3
110	10.8
111	4.3
112	11.2
113	11.9
114	11.6
115	8.3
116	1.7
117	1.5
118	10.9
119	11.6
120	12.0
121	11.3
122	4.7
123	3.6
124	11.1
125	12.4
126	12.7
127	10.4
128	1.8
129	5.2
130	12.7
131	12.5
132	11.1
133	3.9
134	2.8
135	11.0
136	12.6
137	11.8
138	5.2
139	6.4
140	11.2

Way Point	Depth (ft.)
141	11.3
142	3.5
143	3.3
144	10.9
145	11.8
146	2.7
147	4.1
148	11.8
149	11.4
150	2.7
151	2.7
152	11.4
153	11.4
154	11.3
155	4.7
156	6.2
157	5.4
158	10.5
159	11.6
160	11.3
161	11.1
162	4.2
163	2.4
164	11.2
165	11.5
166	11.0
167	10.5
168	3.2
169	10.8
170	11.0
171	10.8
172	4.3
173	1.8
174	9.7
175	10.5
176	3.7
177	3.5
178	3.9
179	4.4

Avg Depth	7.4	ft
Avg Vol.	585.173743	AC-ft
	25490168.25	cu. Ft.
	944080.3054	cu.yds.


Figure 1: Pond Volume Survey Locations, 2009
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