FACT SHEET
AND
PERMIT RATIONALE

South Carolina Public Service Authority (Santee Cooper)
Cross Generating Station
NPDES Permit No. SC0037401

Permitting Engineer: Byron M Amick October 4, 2023

Facility Rating: ☒ Major ☐ Minor

☐ Issuance (New) ☒ Reissuance ☐ Modification ☐ Minor Modification

If any part of this application is for a new facility or expansion of an existing facility or increase in permitted limits, an antidegradation review may be required per the requirements of R.61-68.D. If required, the antidegradation review will be included as part of the permit application.

Site Address: 553 Cross Station Road, Pineville, SC 29468
Mailing Address: PO Box 2946101, Mail Code A203, Moncks Corner, SC 29461
County: Berkeley
Watershed: Basin 03 (Catawba-Santee River Basin)

Facility Description (include SIC code): This facility combusts coal to produce steam and generate electricity in four generating units and has four (4) discharge points.
SIC Code: 4911: Electric Services
NAICS Code: 221112; Fossil Fuel Electric Power Generation

Receiving Waters and Classification by outfall: All external outfalls (002, 003, 004 and 005) - Diversion Canal (FW-freshwaters) to Lake Moultrie

Is any discharge to Impaired Waters? Yes (see State 303(d) list for impaired waters)
If Yes, list the monitoring station number(s) and parameter(s) causing impairment: CSTL-079 on the Diversion Canal at SC-45 12.6 miles west of St. Stephens for mercury (fish consumption) and Zinc; The Diversion Canal (as part of the Santee Cooper Lakes (Entire Canal)) in Berkeley County is listed as impaired for Mercury in the 2020 South Carolina Fish Consumption Advisory. SC-043 was removed from the 303(d) in 2012 for copper and fecal coliform due to attainment of the standard and in 2014 for dissolved oxygen due the listing in 2012 being an error.

Information for this permit is based primarily on NPDES Permit Application: 2C dated 1/27/2021, other application submittal includes 2C dated March 2, 2010, supplemental data submitted February 20, 2012, August 22, 2012, October 22, 2012, February 1, 2013, 2C dated July 7, 2013.

Is any discharge to a waterbody or for a parameter listed in an approved TMDL? No
If Yes, list the parameter(s) for which the TMDL is written and the waterbody segments impacted:

Does any discharge have the potential to affect a threatened or endangered species? Yes
If Yes, list the species and the waterbody in which the species resides: Atlantic and Shortnose Sturgeon, Diversion Canal.

New Steam and Electric - Effluent Limit Guidelines (ELG)

On September 30, 2015 EPA issued a final rule (published in the Federal Register on November 3, 2015) amending the ELG for the steam electric power generating industrial category. The new ELG Rule became effective on January 4, 2016 and addressed limitations for FGD wastewater, fly ash transport water, bottom ash transport water, gasification wastewater, flue gas mercury control wastewater, and combustion residual leachate. The ELG is implemented by NPDES permits. On April 12, 2017, the EPA Administrator announced his decision to reconsider the ELG rule. On April 25, 2017, EPA postponed certain compliance dates in the ELG. The postponement was for an indefinite period of time - until the legal challenges to the rule are resolved. In September 2017, EPA finalized a rule that postponed from November 1, 2018 to November 1, 2020 the Best Available Technology (BAT) earliest compliance date for FGD wastewater as well as bottom ash transport water. On April 12, 2019, the U.S. Court of Appeals for the Fifth Circuit vacated the portions of the ELG regulating combustion residual leachate and legacy wastewater. EPA has stated they plan "to address this vacatur in a subsequent action," (November 22, 2019 Federal Register, p. 64625) but have not yet done so. In addition, on August 31, 2020 EPA finalized revised ELG limitations for FGD wastewater and bottom ash transport water, and these revisions were published in the October 13, 2020 Federal Register.

Therefore, the end result of these actions is that the ELG is no longer effective in the manner in which it was issued in 2015. With regard to the Cross Generating Station, FGD wastewater will be regulated in accordance with the 2020 revisions to the ELG. However, as mentioned above, the ELG standards for combustion residual leachate, legacy bottom ash transport water, and legacy FGD wastewater are vacated. Therefore, these wastewaters may be regulated as equivalent to low volume wastes.

In accordance with (40 CFR 423.13(g)(1)(i), the permittee has submitted a schedule which demonstrates December 31, 2025 is the earliest date by which the station could be compliant with the generally applicable limits given installation of new treatment technologies for FGD Wastewaters. The facility does not discharge BATW.

After Santee Cooper submitted its initial schedule, EPA announced the federal government's intention to rewrite the rule by release of a signed prepublication Federal Register notice on July 26, 2021. No specific indication of the government's direction was given.

Outfalls are discussed in Section I of this rationale with a general description of the discharge, treatment system, stream flows and other pertinent information about each outfall.

EPA review of the draft permit is required if any box below is checked (Mark all that apply)

☐ Permits with discharges which may affect the waters of another State (Coordination with the other State is also required)

List State and name of waterbody(ies) that reach affected state: none

☒ Major permits
☒ Permits with any discharge subject to any of the primary industrial categories (see R.61-9.122, Appendix A)
☒ Permits with any discharge of process wastewater with an average flow exceeding 0.5 MGD
☐ Permits which incorporate pollutant trading
☐ Priority permits
☐ Modification(s) to any permit listed above or a mod that changes a permit to put it into one of the above categories (where it previously was not)

List of Attachments to this Rationale:

Attachment 1	Permit Application
Attachment 2	Water Quality Spreadsheets
Attachment 3	Map of Drinking Water Intake/Source Water Protection Area Relative to Discharge
Attachment 4	Effluent Guidelines
Attachment 5	Wasteload Allocation

I. PERMIT LIMITATIONS AND MONITORING REQUIREMENTS

Facility Description

South Carolina Public Service Authority (Santee Cooper)/Cross Generating Station is a coal-fired steam electric generating facility, which is located at 553 Cross Station Road, Pineville, South Carolina. The facility has four (4) generating units. Unit 2 has a design capacity of 540 megawatts and began operation in 1983. Unit 1 has a design capacity of 620 megawatts and began operation in 1995, Units 3 and 4 each have a design capacity of 580 megawatts and began operations in 2007 and 2008 respectively.

All wastewater effluent flows into a common discharge manhole prior to discharge to the Diversion Canal. Any wastestream that enters the manhole has the potential to discharge directly without commingling with other wastewaters. The five external outfalls from the previous permit have been updated and summarized below:

001 - the option to discharge directly to the Diversion Canal has been removed, now internal outfall to 002 (renamed Outfall 02C)
002 - primary discharge to the Diversion Canal
003 - primarily an internal outfall to 002 (02D), with option to discharge directly to the Diversion Canal
004 - primarily an internal outfall to 002 (02E), with option to discharge directly to the Diversion Canal
005 - discharge directly to the Diversion Canal
(See each outfalls discussion for more details)

The sanitary wastewater is segregated from the process wastewater and only commingles with process wastewater in the discharge manhole prior to discharge to the Diversion Canal. There is the potential that the sanitary system could discharge while no process wastewater is entering the manhole. Permit #19971-IW was issued Jan. 20, 2016 to replace and upgrade the sanitary system at the plant.

In 2017 the facility received construction permits 20134-IW and 20152-IW to construct overall CCR/ELG wastewater treatment system changes at the site. As of this writing the construction is complete and approved for operation. Therefore, all wastewater flows to the bottom ash pond have stopped, piping to reroute wastewater from the bottom ash pond to the decant pond was installed, construction of a new low volume wastewater and a new coal pile runoff treatment system was completed.

This facility is covered by 40 CFR Part 423 - Steam Electric Power Generating Point Source Category. Since all four units were built and operational after 1982 but prior to 2015, 1982 New Source Performance Standards (NSPS) §423.15 will apply where appropriate. Internal outfalls will be utilized to ensure guidelines are met for some specific wastewater sources.

Outfall 001

Description of outfall, receiving water and wastewater treatment system: This outfall is for the discharge of Cooling Tower Blowdown from Units 1 and 2. A manually operated valve was used to divert the discharge to either the Diversion Canal or to the Bottom Ash Pond where it would commingle with other waste streams prior to discharge through outfall 002. In August 2020 the U1&2 cooling tower blowdown flow was redirected away from the Bottom Ash Pond where it now passes through the wastewater pretreatment sump and boiler area sumps as the only flow path to the decant pond and then Low Volume Waste system for treatment. The piping that allowed direct discharge to the Diversion Canal has been removed. Therefore, the potential for this as an external outfall has been eliminated.

Outfall 002

Description of outfall, receiving water and wastewater treatment system: This outfall is the primary final discharge point for the plant effluent and is continuous. The flow exits the Effluent Mix Tank and goes to the discharge manhole prior to discharge to the Diversion Canal. The contributing sources to the Effluent Mix tank are the Coal Pile Runoff wastewater, which may include Non-Chemical Metal Cleaning Wastes (NCMCW), and the Low Volume Wastewater (LVW). The Decant Pond is the central collection point for all of the facilities Low Volume Wastewater prior to treatment in the Low Volume Wastewater (LVW) Treatment System. Cross Generating Station's LVW will include, but may not be limited to, various plant sumps (wastewater pretreat, boiler, turbine and transformer areas), wash down water, legacy ash pond water, groundwater from CCR pond closure, bottom ash pond rainfall, vehicle wash rack water, the stormwater runoff ponds (Units 1&2 pond, Units 3&4 pond), FGD Wastewater*, combustion residual leachate*, and contact stormwater runoff from the landfill.

*Once internal Outfall 02F is in place, FGD Wastewater will be treated by the FGD Wastewater Treatment prior to discharge to the common Effluent Mix Tank (002) instead of the Decant Pond. (See Outfall 02F description)

All parameters required by 40 CFR Part 423 - Steam Electric Power Generating Point Source Category will be applied at internal outfalls from the treatment system for the specific wastewater source, except for pH, TSS and O&G. EPA memos from 1985 and 1986 state that these three parameter limitations, in co-treatment facilities, may be applied at the final outfall.

Operator requirements: Based on the permitted LVW and CPRO treatment system and the Pollution Control Act (PCA), the treatment system is classified as Group III-Physical/Chemical. The Environmental Certification Board Rules require that a Grade B-Physical/Chemical operator be assigned to operate this facility. Inspections of the facility will be required on a daily basis per Regulation 61-9.122.41(e).

Operator requirements: Based on the proposed FGD treatment system and the Pollution Control Act (PCA), this separate treatment system is classified as Group IV-Physical/Chemical. The Environmental Certification Board Rules require that a Grade A-Physical/Chemical operator be assigned to operate this facility. Inspections of the facility will be required on a daily basis per Regulation 61-9.122.41(e).

Information for this outfall is primarily based on NPDES Permit Application: 2C dated 1/27/2021.

Data from Discharge Monitoring Reports (DMRs) and NPDES permit application (including all subsequent data presented) from 1/1/2015 - 7/31/2021 has been used to evaluate permit limitations.

Previous permit limits are based on the permit (or modification) effective date of January 1, 2007.

This outfall is within a state-approved source water protection area (SWPA) for a surface water drinking water intake and has the potential to affect the intake. The affected intake(s) (Intake #S*08104*) is owned by Santee Cooper Regional Water System. The 7Q10 and AAF to be used for permitting MCL and water/organism criteria are given on the spreadsheet. Additional information on source water protection is provided in sections III.B and G of this rationale.

All waterbody data is provided on the attached Water Quality Spreadsheets. This data includes 7Q10, annual average flow, dilution factors, hardness, TSS and other information as explained in this rationale. Additional information as necessary to explain the values used will be provided below.

A. Flow

1. Previous permit limits:
   Monthly Average: MR, MGD
   Daily Maximum: MR, MGD
   Sampling Frequency: daily
   Sample Type: continuous
2. NPDES Application: (No. of analyses: continuous) (EPA Form 2C update January 2021)
   Long-Term Average Daily Discharge: 2.82 MGD
   Maximum Monthly Discharge: 4.24 MGD
   Maximum Daily Discharge: 9.30 MGD
3. DMR Data: The highest flow was reported in 11/2020 as 9.3 MGD
4. Actual long term average flow (from DMR: Jan. 2015 to July 2021): 3.10 MGD
5. Conclusion: Effluent flow monitoring will continue as previously permitted.
   Monthly Average: MR, MGD
   Daily Maximum: MR, MGD
   Sampling Frequency: daily
   Sample Type: continuous

B. Temperature

1. Previous permit limits: not limited
2. NPDES Application:
   Summer (No. of analyses: N/A):
   Maximum Daily Discharge: N/A
   Maximum Monthly Discharge: N/A
   Long-Term Average Daily Discharge: N/A
   Winter (No. of analyses: 1):
   Maximum Daily Discharge: 17.3ºC (63.14ºF)
   Maximum Monthly Discharge: N/A
   Long-Term Average Daily Discharge: N/A
3. DMR Data: No Data
4. *S.C. Water Classifications and Standards (S.C. Reg. 61-68)*: Section E.12.a states, "The water temperature of all Freshwaters which are free flowing shall not be increased more than 5ºF (2.8°C) above natural temperature conditions and shall not exceed a maximum of 90°F (32.2°C) as a result of the discharge of heated liquids unless a different site-specific temperature standard as provided for in C.12. has been established, a mixing zone as provided in C.10. has been established, or a Section 316(a) determination under the Federal Clean Water Act has been completed."

5. Other Information: At 7Q10 conditions with an ambient water temperature of 82.9ºF (critical temperature from the WLA) and a 0.446 MGD (based on capacity of each cooling tower) assuming outfalls 003 and 004 discharge at 109ºF simultaneously. The heated water from the cooling tower is reused in the Units 3&4 Gypsum Plant and/or the FGD System prior to entering the 14 acre Decant Pond. Effluent from the Decant Pond is mixed with the Coal Pile Runoff, after each are independently treated in newly installed physical-chemical treatment systems, in the effluent mix tank before entering the discharge manhole for discharge to the Diversion Canal. A heat balance around the outfall gives:

$$Q_1 + Q_2 = Q_3$$

where Q_1 = upstream thermal load
Q_2 = discharge thermal load = $Q_{002} + Q_{003} + Q_{004}$
Q_3 = downstream thermal load

The heat transfer can be estimated from the following equation:

$$Q = mC_pT$$

where Q = heat (Btu/hr)
m = flowrate
C_p = specific heat [Btu/(lb *R)]
T = temperature (R)
m_1 = 7Q10 = 2360 cfs = 1525.3 MGD

Combining and re-arranging the two equations gives:

$$T_3 = \frac{m_1(T_1 + 460^oF) + m_2(T_2 + 460^oF)}{m_3} - 460^oF$$

$$T_3 = \frac{m_1(T_1 + 460^oF) + m_{002}(T_{002} + 460^oF) + m_{003}(T_{003} + 460^oF) + m_{004}(T_{004} + 460^oF)}{m_3} - 460^oF$$

As worse case effluent the Department will assume the maximum discharge and temperature from the two cooling towers (003 and 004) are flowing directly to the discharge manhole and the effluent mix tank (002) is also releasing flow to the discharge manhole.

Instream (Diversion Canal) Heat Balance

$$T_3 = \frac{(1525.3\ MGD)(82.9^oF + 460^oF) + (0.223\ MGD)(109^oF + 460^oF) + (0.223\ MGD)(109^oF + 460^oF) + (5.586\ MGD)(63.14^oF + 460\ F)}{1531.332\ MGD} - 460^oF$$

$$T_3 = \frac{828085.37\ MGD\ ^oF + 126.887\ MGD\ ^oF + 126.887\ MGD\ ^oF + 2927.846\ MGD\ ^oF}{1531.332\ MGD} - 460^oF$$

$T_3 = 82.78^oF$

This indicates that the potential temperature change is the Diversion Canal due to the discharge is approximately 0.1ºF

The conditions for each outfall were included in the equation. In comparison to the instream value, there is minimal delta and there is no potential to exceed the standard. All of the outfalls combine in the common discharge manhole prior to the final discharge point in the Diversion Canal. Therefore, the actual temperature at the discharge into the Diversion Canal will be lower than the temperature

reading at Outfall 002, although no credit is given for this additional dilution prior to the discharge into the Diversion Canal.

6. Conclusion: As with previous permit evaluations there is no indication this discharge has a reasonable potential to cause or contribute to an instream temperature violation, no limit will be established. The Department believes additional temperature sampling will be needed to determine a representative temperature for this discharge that accounts for seasonal variations. Therefore, a requirement to monitor and report temperature will be added as follows:
   Monthly Average: --
   Daily Maximum: MR°F
   Sampling Frequency: 1/month
   Sample Type: grab

C. <u>Dissolved Oxygen (DO)</u>

1. Previous permit limits: not limited
2. NPDES Application: (reporting not required)
3. DMR Data: No Data
4. Water Quality Modeling Recommendation (Wasteload Allocation): recommended limits only on Outfall 005, because there are no parameters of concern for DO from other outfalls.
5. *S.C. Water Classifications and Standards (S.C. Reg. 61-68)*: This discharge is to the Diversion Canal, which is a listed Class **FW (freshwater)** stream. Therefore, the instream standard for DO in this stream is "Daily average not less than 5.0 mg/l with a low of 4.0 mg/1".
6. Conclusion: No limit will be established for this outfall.

D. <u>pH</u>

1. Previous permit limits: Minimum-6.0 standard units; Maximum-9.0 standard units.
   Sampling Frequency: daily
   Sample Type: continuous
2. NPDES Application: (No. of analyses: continuous)
   minimum: 6.3 standard units
   maximum: 8.7 standard units
3. DMR Data: The highest value was reported in 11/19 and 12/19 as 8.7 standard units. The lowest value was reported in 7/20 as 6.25 standard units.
4. *S.C. Water Classifications and Standards (S.C. Reg. 61-68)*: This discharge is to the Diversion Canal in Berkeley County, which is a listed Class **FW (freshwaters)** stream in R.61-69. Therefore, the instream standard for pH for this stream is "Between 6.0 and 8.5".
5. Effluent Limitations Guidelines:
   40 CFR 423-Steam Electric Power Generating Point-Source Category
   § 423.12 Best Practicable Control Technology Currently Available (BPT)
   (b)(1) "The pH of all discharges, except once through cooling water, shall be within the range of 6.0 – 9.0."
6. 40 CFR Part 401-General Provisions
   § 401.17 pH Effluent limitations under continuous monitoring.
   (a) Where a permittee continuously measures the pH of wastewater pursuant to a requirement or option in a National Pollutant Discharge Elimination System (NPDES) permit issued pursuant to section 402 of the Act, the permittee shall maintain the pH of such wastewater within the range set

forth in the applicable effluent limitations guidelines, except excursions from the range are permitted subject to the following limitations:

(1) The total time during which the pH values are outside the required range of pH values shall not exceed 7 hours and 26 minutes in any calendar month; and

(2) No individual excursion from the range of pH values shall exceed 60 minutes.

(b) The Director, as defined in § 122.3 of this chapter, may adjust the requirements set forth in paragraph (a) of this section with respect to the length of individual excursions from the range of pH values, if a different period of time is appropriate based upon the treatment system, plant configuration or other technical factors.

(c) For purposes of this section, an excursion is an unintentional and temporary incident in which the pH value of discharge wastewater exceeds the range set forth in the applicable effluent limitations guidelines. (Secs. 301, 304, 306 and 501 of the Clean Water Act (the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1251 et. seq., as amended by the Clean Water Act of 1977, Pub. L. 95-217))

7. PQL: N/A (SM4500H B)
8. Conclusion: The Effluent Categorical Guidelines (40 CFR 423) require that the pH be within the range of 6.0 to 9.0. The State instream standard is more stringent than the industry effluent guideline and must be maintained at all times regardless of the discharge to that stream. Variations of pH in the discharge outside of the instream water quality standard can only be considered if there is sufficient critical flow in the receiving stream to maintain the water quality standard. The critical flow is identified as 1,800 cfs or 1163.4 MGD, using the discharge flow from the flow diagram, the ratio of the receiving stream flow to the discharge is 208:1. As a result of this large dilution ratio (greater than 10), the stream's ambient pH is not expected to be altered by 0.5 su. Based on these conclusions the pH limits shall be between 6.0 and 9.0 standard units with the following additional limitations:
   Sampling Frequency: daily
   Sample Type: continuous
   Length of longest excursion not to exceed 60 minutes
   Percent of total time exceeding pH limit: 1%

E. <u>Total Suspended Solids (TSS)</u>

1. Previous permit limits:
   Monthly Average: 30 mg/l
   Daily Maximum: 95 mg/l
   Sampling Frequency: 1/month
   Sample Type: grab
2. NPDES Application: (No. of analyses: 14)
   Long-Term Average Daily Discharge: 12.05 mg/l
   Maximum Monthly Discharge: 24 mg/l
   Maximum Daily Discharge: 24 mg/l
3. DMR Data: The highest value was reported in 7/21 as 25.77 mg/l.
4. Effluent Limitations Guidelines:
   40 CFR 423-Steam Electric Power Generating Point-Source Category
   § 423.12 (BPT), 423.13 (BAT) and 423.15 (NSPS)
   Quantity of pollutants discharged from low volume waste sources, metal cleaning waste (non-chemical) FGD wastewater, and combustion residual leachate:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Total Suspended Solids (TSS)	30	100

Coal Pile Runoff

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Total Suspended Solids (TSS)	--	50

At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of any mass-based limitations specified … Concentration limitations shall be those concentrations specified in this section.

5. Additional Information:
   The total flow through the Effluent Mix Tank to the Discharge Manhole is 5.586 MGD. Of this flow 0.309 MGD is from coal pile runoff and 5.277 MGD is from the Low Volume Wastewater (LVW) Treatment System. The LVW Treatment Sources are described in the Outfall 002 description paragraph. Because the two wastestreams commingle prior to discharge the mass balance would be:
   Monthly Average: 0.309 (--) + 5.277 (30) /5.586 = 30 mg/l
   Daily Maximum: 0.309 (50) + 5.277 (100) /5.586 = 97.23 mg/l
6. PQL: 1.0 mg/l (Method SM2540D)
7. Conclusion: In accordance with the EPA Memorandum dated August 22, 1985, total suspended solids (TSS) and oil and grease (O&G) limits may have flow weighted concentration limitations applied after co-treatment at the final Outfall. The current permit limits have proven to be effective and achievable, therefore based on anti-backsliding the current limits will remain.
   Monthly Average: 30 mg/l
   Daily Maximum: 95 mg/l
   Sampling Frequency: 1/month
   Sample Type: grab

F. <u>Oil and Grease</u>

1. Current permit limits:
   Monthly Average: 14 mg/l
   Daily Maximum: 19 mg/l
   Sampling Frequency: 1/month
   Sample Type: grab
2. NPDES Application: (No. of analyses: 13)
   Long-Term Average Daily Discharge: <5.00 mg/l
   Maximum Monthly Discharge: 7 mg/l
   Maximum Daily Discharge: 7 mg/l
3. DMR Data: The highest value was reported in 7/19 as 12 mg/l.
4. 40 CFR Part 423-Steam Electric Power Generating Point-Source Category
   § 423.12 Best Practicable Control Technology Currently Available (BPT)
   Quantity of pollutants discharged from low volume waste sources, metal cleaning waste (non-chemical) FGD wastewater, and combustion residual leachate:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Oil and Grease	15	20

At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of any mass-based limitations specified … Concentration limitations shall be those concentrations specified in this section.

5. Additional Information:
   The total flow through the Effluent Mix Tank to the Discharge Manhole is 5.586 MGD. Of this flow 0.309 MGD is from coal pile runoff and 5.277 MGD is from the Low Volume Wastewater (LVW) Treatment System. The LVW Treatment Sources are described in the Outfall 002 description paragraph. Because the two wastestreams commingle prior to discharge the mass balance would be:
   Monthly Average: 0.309 (0) + 5.277 (15) /5.586 = 14.17 mg/l
   Daily Maximum: 0.309 (0) + 5.277 (20) /5.586 = 18.89 mg/l
6. PQL: 5 mg/l (Method 1664A)
7. Conclusion: In accordance with the EPA Memorandum dated August 22, 1985, total suspended solids (TSS) and oil and grease (O&G) limits may have flow weighted concentration limitations applied after co-treatment at the final Outfall. The newly calculated mass balance is essentially the same as the current permit limits, which have proven to be effective and achievable, therefore the current limits will remain.
   Monthly Average: 14 mg/l
   Daily Maximum: 19 mg/l
   Sampling Frequency: 1/month
   Sample Type: grab

G. <u>Chromium, total</u>

1. Current permit limits:
   Monthly Average: 0.2 mg/l
   Daily Maximum: 0.2 mg/l
   Sampling Frequency: 1/month
   Sample Type: grab
   * Monitoring is only required when chromium-based and/or zinc-based cooling tower maintenance chemicals are used.
2. NPDES Application: (No. of analyses: 1)
   Long-Term Average Daily Discharge: <5.00 mg/l
   Maximum Monthly Discharge: NA
   Maximum Daily Discharge: NA
3. DMR Data: no data (chromium-based cooling tower maintenance chemicals were not used)
4. 40 CFR Part 423-The Steam Electric Power Generating Point-Source Category
   a. Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(1):
      cooling tower blowdown shall not exceed the following:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Chromium, total	0.2	0.2

5. Water Quality Criteria: See Spreadsheet in Appendix 1. (human health: MCL)
   Monthly Average: 49.22 mg/l
   Daily Maximum: 71.85 mg/l
6. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: No
7. Conclusion: In a letter dated October 9, 2012, the facility stated, "… Cross Generating Station does not use cooling tower maintenance chemicals containing chromium or zinc and will not utilize such chemicals in the foreseeable future." Also based on Water Quality standards there is no reasonable potential; therefore in lieu of a limit a condition prohibiting the use of these chemicals will be placed in the permit.

H. Zinc, total

1. Current permit limits:
   Monthly Average: 0.1 mg/l
   Daily Maximum: 0.1 mg/l
   Sampling Frequency: 1/month
   Sample Type: grab
   * Monitoring is only required when chromium-based and/or zinc-based cooling tower maintenance chemicals are used.
2. NPDES Application: (No. of analyses: 1)
   Long-Term Average Daily Discharge: 0.0228 mg/l
   Maximum Monthly Discharge: NA
   Maximum Daily Discharge: NA
3. DMR Data: no data (zinc-based cooling tower maintenance chemicals were not used)
4. 40 CFR Part 423-The Steam Electric Power Generating Point-Source Category
   a. Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(1):
      cooling tower blowdown shall not exceed the following:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Zinc, total	1.0	1.0

5. Water Quality Criteria: See Spreadsheet in Appendix 1.
   Monthly Average: 3642 mg/l (human health - water/organism)
   Daily Maximum: 30.96 mg/l (aquatic life - freshwater)
6. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: No
7. Conclusion: In a letter dated October 9, 2012, the facility stated, "… Cross Generating Station does not use cooling tower maintenance chemicals containing chromium or zinc and will not utilize such chemicals in the foreseeable future." Also based on Water Quality standards there is no reasonable potential; therefore in lieu of a limit a condition prohibiting the use of these chemicals will be placed in the permit.

I. Free Available Chlorine (FAC)

1. Previous permit limits:
   Monthly average: 0.2 mg/l
   Daily Maximum: 0.5 mg/l
   Sampling Frequency: 1/month
   Sample Type: multiple grabs
2. NPDES Application: (No. of analyses: 1)
   Maximum Daily Value: 0.11 mg/l (TRC)
3. DMR Data: The highest value was reported in 10/19 as 0.2 mg/l monthly ave and 0.4 daily max.
4. 40 CFR Part 423-The Steam Electric Power Generating Point-Source Category
   a. Best Practicable Control Technology Currently Available (BPT) Standards 423.12(b)(7) &
   Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(1):
      cooling tower blowdown shall not exceed the following:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Free Available Chlorine (FAC)	0.2	0.5

b. Best Practicable Control Technology Currently Available (BPT) Standards 423.12(b)(8) & Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(2):
Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit in any plant may discharge free available or total residual chlorine at any one time...

c. Best Practicable Control Technology Currently Available (BPT) Standards 423.12(b)(12) & Best Available Technology Economically Achievable (BAT) Standards 423.13(m):
At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of the mass-based limitations specified .... Concentration limitations shall be those concentrations specified.

5. Conclusion: The guidelines established by 40 CFR Part 423 are technology-based guidelines therefore the limitations established by the guideline are to be met after leaving the cooling towers, but prior to mixing with any other waters. All cooling tower blowdown in this outfall first passes through the wastewater pretreatment sump and boiler area sumps as the flow path to the decant pond and then goes to the Low Volume Waste system for treatment before mixing with coal pile runoff in the effluent mix tank. These limits will be applied at internal outfalls prior to mixing with other wastestreams.

J. Mercury, total

1. Previous permit limits:
   Monthly average: MR, µg/l (effluent, intake)
   Monthly average: MR, lbs/day (effluent, intake, difference)
   Daily Maximum: MR, µg/l & lbs/day (effluent, intake)
   Sampling Frequency: 1/quarter
   Sample Type: grab
2. NPDES Application: (No. of analyses: 4):
   Maximum Daily Discharge: 0.0821 µg/l
   Maximum Monthly Discharge: 0.0821 µg/l
   Long-Term Average Daily Discharge: 0.0338 µg/l
3. DMR Data: The highest effluent value was reported in the 2nd quarter of 2016 as 0.010443 lbs/day or 0.3862 µg/l. The highest intake value was reported in the 4th quarter of 2015 as 0.01034 lbs/day or 0.0051 µg/l. The largest difference of the effluent over the intake was reported in the 2nd quarter of 2016 as 0.010138 lbs/day.
4. Water Quality Criteria: See Spreadsheet in Appendix 1. (human health - water/organism)
   Monthly Average: 0.00005 mg/l (50 ng/l)
   Daily Maximum: 0.000073 mg/l (73 ng/l)
5. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: Yes
6. PQL: 0.0005 µg/l (0.5 ng/l)
7. Conclusion: Per SC Regulation 61-68.E.18. the receiving stream is listed as impaired for mercury and there is a quantifiable level of mercury in the discharge, therefore mercury monitoring, assessment and minimization is required. Using procedures established to determine limits for impaired waters, the data indicates that there is a reasonable potential to cause or contribute to the instream violation of the standard. With concentrations in the effluent reported above the standard as 82.7 ng/l as recently as 2nd quarter 2021, while the concentration in the intake water from the same time was 3.1 ng/l, the standard for impaired waters may not always be met. Therefore, a requirement to develop and implement a mercury minimization plan and an effluent monitoring limit will be established. A compliance schedule will also be established to design and construct mercury treatment for FGD

wastewater. The final limit will be as follows:
Monthly Average: 50 ng/l
Daily Maximum: 73 ng/l
Sampling Frequency: 1/month
Sample Type: grab

K. 126 Priority Pollutants

1. Previous permit limits:
   Part III.A.2
   Monthly average: ND (No Detectable Amount)
   Daily Maximum: ND (No Detectable Amount)
   Sampling Frequency: 1/year
   Sample Type: grab
   Part V.A.7
   The discharge of one hundred twenty-six toxic pollutants (excluding chromium and zinc) is prohibited in detectable amounts from cooling tower discharge if the pollutants come from cooling tower maintenance chemicals. The permittee may demonstrate compliance with such limitations to the SCDHEC by either routinely sampling and analyzing for the pollutants in the discharge or providing mass balance calculations to demonstrate that use of particular maintenance chemicals will not result in detectable amounts of the toxic pollutants in the discharge.
2. NPDES Application: not reported
3. DMR Data: no data (monitoring not required)
4. 40 CFR Part 423-The Steam Electric Power Generating Point-Source Category
   a. Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(1):
   cooling tower blowdown shall not exceed the following:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
The 126 priority pollutants (Appendix A) contained in chemicals added for cooling tower maintenance, except: Chromium and Zinc	([1])	([1])

([1]) No detectable amount

   b. Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(3):
   At the permitting authority's discretion, instead of the monitoring specified in 40 CFR 122.11(b) compliance with the limitations for the 126 priority pollutants in paragraph (d)(1) of this section may be determined by engineering calculations which demonstrate that the regulated pollutants are not detectable in the final discharge by the analytical methods in 40 CFR part 136.
5. Conclusion: For the cooling tower blowdown the 126 priority pollutants, the permittee shall demonstrate that the pollutants are not present in detectable amounts annually. To demonstrate compliance the permittee will either take grab samples of each pollutant or provide an engineering calculation to demonstrate that the regulated pollutants are not detectable in the final discharge by the analytical methods in 40 CFR Part 136.

L. Other Parameters

All other parameters reported on the 2C show no reasonable potential to cause or contribute to a water quality violation. Therefore, no additional limits will be placed on this outfall.

M. Whole Effluent Toxicity (WET)

1. Previous permit limits:
   Chronic whole effluent toxicity testing using *Ceriodaphnia dubia* at a CTC = 6% using the dilution series 0% (control), 1.5%, 3%, 53%, and 100%
   Quarterly Average: 25% effect (total, reproduction, & mortality)
   Maximum: 40% effect (total, reproduction, & mortality)
   Sampling Frequency: 1/month
   Sample Type: 24-hour composite
2. DMR Data: All chronic tests at CTC = 6% have passed. The largest percent effects that were observed are 2/2019 as 31% maximum and in 3/2019 as 22% average. The most restrictive IC25 is reported in 8/2020 as 9.9%.
3. Other Information: In 2018 the Department issued a construction permit to upgrade the stations treatment system design. Included in the upgrade was the installation of effluent diffuser in the Diversion Canal to promote mixing instream. The discharge pipe has been extended into the Diversion Canal with a 42 ft diffuser at the end. The diffuser has seven 6-in ports equipped with duckbill valves which terminate at approximately 180 ft from the bank.
4. Mixing Zone Information:
   The average width of the stream at the point of discharge is 400 ft (122 m) (w in the equation below). The maximum allowed mixing zone dimensions are determined as follows using stream width:
   Chronic mixing zone
   Width: ½ w = 200 ft (61 m)
   Length: 2w = 800 ft (244 m)

   The following dilutions can be determined at the boundary conditions given above.
   Chronic concentrations
   Width: 1.23% (Summer)
   Length: approx. 1.10%
5. Reasonable potential evaluation: Using the IC25's reported with the DMR, a reasonable potential (RP) evaluation was run using the mixing zone concentration of 6.0%. The reasonable potential was calculated with a RWC of 0.72. Since RWC is less than 1, there is no reasonable potential. See Attachment (with spreadsheets).
6. Conclusion: Based on the DMR results, the Department concludes that there is no reasonable potential for the discharge to cause or contribute to a violation of the water quality standards. For Major facilities with complex waste streams, it is believed that toxicity testing should continue in order to collect data in order to properly evaluate toxicity at each permit cycle. Due to separate treatment chemical addition approvals (LOA-006020, etc.) the sampling frequency will remain 1/month.

   The installation of a diffuser, which is designed to promote mixing, completely changes the mixing zone from the previous permit. The permittee has recommended changing the CTC to 1.2% from the current 6.0%. Based on the CORMIX model of the discharge plume using the newly installed diffuser, the Department agrees that a new CTC of 1.2% is appropriate for this discharge.

   A geometric series is used to determine the dilution series. A low value of 0.5% and a high value of 100% are being used as bounds for the dilution testing series. The CTC for this test will be 1.2% and will replace the concentration closest to it from the geometric series. Therefore, the limitations are:

Monthly Average = 25%
Daily Maximum = 40%
Chronic whole effluent toxicity testing shall be performed at a CTC = 1.2% using the dilution series 0%, 0.5%, 1.2% (CTC), 7%, 32%, 100%
Sampling Frequency: 1/month
Sample Type: 24-hr composite

N. Whole Effluent Toxicity (WET) Requirements - Acute

1. Previous permit requirements: Acute toxicity was not monitored independent of the chronic test.
2. DMR Data: All chronic tests at CTC = 6% have passed. The most restrictive LC50 is reported in 10/2020 as 17.8%.
3. Mixing Zone and Zone of Initial Dilution (ZID) Information:
   The stream at the point of discharge is 400 ft (122 m) wide (w in the equation below). The mixing zone and ZID dimensions are determined as follows using stream width:
   Acute ZID
   Width: 1/10 w = 40 ft (12 m)
   Length: 1/3 w = 133 ft (41 m)
   The following dilutions can be determined at the boundary conditions given above.
   Acute concentrations
   Width: NA (diffuser is 42 ft, exit velocity greater than 10 ft/s)
   Length: NA (exit velocity greater than 10 ft/s)
4. Conclusion: Using the LC50 data for reasonable potential it was determined that there is no reasonable potential for the discharge to cause or contribute to an acute toxicity violation. The multi-concentration test used for chronic toxicity will capture any acute toxicity of the discharge and can be used to continue to collect LC50 data. The LC50 data can be used to evaluate acute toxicity in the future for permit renewals or modifications. Since LC50 data will continue to be reported as part of the chronic toxicity limitation, acute toxicity requirements will not be added to this permit.

Outfall 003

Description of outfall, receiving water and wastewater treatment system: This outfall discharges Cooling Tower Blowdown from Unit 3. A manually operated valve was used to divert the discharge to either the Diversion Canal through the Discharge Manhole for a direct final discharge or the internal flow, as stated in the previous permit, to the Bottom Ash Pond where it would commingle with other waste streams prior to discharge through outfall 002. In August 2020 the internal flow was redirected away from the Bottom Ash Pond through the wastewater pretreatment sump and boiler area sumps before entering the decant pond. This outfall is to be monitored when the valve has been manually turned to divert the discharge to the Diversion Canal.

Information for this outfall is based on NPDES Permit Application: 2C dated March 2, 2010. Unit 3 is identical to Unit 4, therefore 2C sampling for Outfall 004 is considered representative of Outfall 003, and the data will be used to evaluate permit limitation for Outfall 003.

Data from Discharge Monitoring Reports (DMRs) and NPDES permit application (including all subsequent data presented) from 01/1/2019 - 7/31/2021 has been used to evaluate permit limitations.

This outfall is within a state-approved source water protection area (SWPA) for a surface water drinking water intake and has the potential to affect the intake. The affected intake (Intake #S08104) is owned by Santee Cooper Regional Water System. The 7Q10 and AAF to be used for permitting MCL and water/organism criteria are given on the spreadsheet. Additional information on source water protection is provided in sections III.B and G of this rationale.

Previous permit limits are based on the permit (or modification) effective date of January 1, 2007.

All waterbody data is provided on the attached Water Quality Spreadsheets. This data includes 7Q10, annual average flow, dilution factors, hardness, TSS and other information as explained in this rationale. Additional information as necessary to explain the values used will be provided below.

A. Flow, effluent

1. Previous permit limits: only for discharge to the Diversion Canal
   Monthly Average: MR, MGD
   Daily Maximum: MR, MGD
   Sampling Frequency: daily
   Sample Type: continuous
2. NPDES Application: (No. of flow analyses: no discharge)
   Average Flow: 0.223 MGD (capacity)
3. DMR Data: no discharge to the Diversion Canal since January 1, 2007
4. Actual long-term average flow (from DMR): 0.0 MGD
5. Conclusion: The flow of the external discharge will continue to be monitored as in the previous permit.
   Monthly Average: MR, MGD
   Daily Maximum: MR, MGD
   Sampling Frequency: daily
   Sampling Type: continuous

B. Temperature

1. Previous Permit Limits:
   Daily Maximum: 109°F
   Sampling Frequency: daily
   Sample Type: continuous
2. NPDES Application: (No. of analyses: 1)
   Maximum: 28.3°C
3. DMR Data: no discharge to the Diversion Canal since January 1, 2007
4. *S.C. Water Classifications and Standards (S.C. Reg. 61-68)*: Per Reg. 61-68.E.12.a, The water temperature of all Freshwaters which are free flowing shall not be increased more than 5°F (2.8°C) above natural temperature conditions and shall not exceed a maximum of 90°F (32.2°C) as a result of the discharge of heated liquids unless a different temperature standard as provided for in C.12 has been established, a mixing zone as provided in C.10 has been established, or a Section 316(a) determination under the Federal Clean Water Act has been completed.
5. Effluent limitation guidelines: not applicable

6. Other information:
At 7Q10 conditions with an ambient water temperature of 84.4°F (critical temperature from the WLA) and a 0.9760 MGD (based on capacity of each cooling tower) assuming outfall 001*, 003 and 004 discharge at 109°F simultaneously, a heat balance around the outfall gives: (*note: 001 can no longer discharge directly to the discharge manhole, but the assumed flow and temperature is used as an additional safety factor)

$$Q_1 + Q_2 = Q_3$$

where Q_1 = upstream thermal load
Q_2 = discharge thermal load
Q_3 = downstream thermal load

The heat transfer can be estimated from the following equation:

$$Q = mC_pT$$

where Q = heat (BTU/hr)
m = flow rate (lb/hr)
C_p = specific heat [BTU/(lb*R)]
T = temperature (R)
m_1 = 7Q10 = 2360 cfs = 1525.3 MGD

Combining and re-arranging the two equations gives:

$$T_3 = \frac{m_1(T_1 + 460^oF) + m_2(T_2 + 460^oF)}{m_3} - 460^oF$$

$$T_3 = \frac{(1525.3\ MGD)(84.4^oF + 460^oF) + (0.9760\ MGD)(109^oF + 460^oF)}{1526.276\ MGD} - 460^oF$$

$T_3 = 84.416^oF$

The instream temperature change is far less than 5°F and the instream temperature should not go above 90 °F.

A mixing zone study was submitted and approved by this office on April 18, 1996. This study was conducted during the months of July, August, and September in order to verify the thermal mixing zone and also the temperature limit of 109° F. The size of the mixing zone has not been increased and an increased temperature limit is not being proposed. A portion of the cooling tower blowdown is sent to the decant pond, with the remainder being discharged thru this outfall. All of the outfalls combine in the common discharge manhole prior to the final discharge point in the Diversion Canal. The cooling tower blowdown combines with Outfalls 002, 003 and 004 (no discharge to date). Therefore, the actual temperature at the discharge into the Diversion Canal will be lower than the temperature reading at Outfall 001, although no credit is given for this additional dilution prior to the discharge into the Diversion Canal.

To re-certify the mixing zone a CORMIX mixing zone computer simulation was received on October 29, 2012 using a "worst-case" scenario in which the station cooling towers were blowing down directly to the Diversion Canal with no other station discharges taking place. Modeling this unlikely "worst-case" scenario, under critical stream flow conditions, shows that both standards are met within 1 meter of the discharge point.

7. PQL: Not applicable (Method SM 2550 B)
8. Conclusion: The existing thermal mixing zone has been re-evaluated and it has been demonstrated that natural conditions should not be adversely impacted.
   Daily Maximum: 109°F
   Sampling Frequency: daily
   Sample Type: continuous

C. pH

1. Previous permit limits: 6.0 – 9.0 standard units.
   Sampling Frequency: daily
   Sample Type: continuous
   Length of longest excursion not to exceed 60 minutes
   Percent of total time exceeding pH limit: 1%
2. NPDES Application: (No. of pH analyses: 1 representative sample)
   minimum: 7.7 standard unit
   maximum: 7.7 standard units
3. DMR Data: no discharge to the Diversion Canal since January 1, 2007
4. 40 CFR Part 423-Steam Electric Power Generating Point-Source Category
   § 423.15 New Source Performance Standards (NSPS)
   (a) "The pH of all discharges, except once through cooling water, shall be within the range of 6.0 – 9.0."
5. *S.C. Water Classifications and Standards (S.C. Reg. 61-68)*: Section G.10.f. states that the Class **FW** standards for pH shall be "between 6.0 and 8.5".
6. Conclusion: The dilution factor provided by the receiving stream is greater than 10, which is large enough that a variance on the upper pH limit of half a standard unit will not cause the instream pH to be greater than the state standard of 8.5 or an adverse impact to the stream. Therefore, the pH limits shall remain between 6.0 and 9.0.
   Sampling Frequency: daily
   Sample Type: continuous
   Length of longest excursion not to exceed 60 minutes
   Percent of total time exceeding pH limit: 1%

D. Cadmium, total

1. Previous permit limits: not limited
2. NPDES Application: (No. of analyses: 1)
   Long Term Average Value: --
   Maximum 30-day Value: --
   Maximum Daily Value: <0.0001 mg/l
3. Background Data from Station SC-043 from January 2005 to December 2008:
   (30 samples taken; all reported "present <QL")
   Median: 0.0000 mg/l
   90th percentile: 0.0000 mg/l
4. Background Data from Station CSTL-079 from January 2005 to December 2008:
   (8 samples taken; all reported "present <QL")
   Median: 0.0000 mg/l
   90th percentile: 0.0000 mg/l

5. DMR Data: no discharge to the Diversion Canal since January 1, 2007
6. Water Quality Criteria: See Spreadsheet in Appendix 1.
7. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: No
8. PQL: 0.1 µg/l (Method 200.8, 200.9 or SM3113B)
9. Conclusion: No limit will be established for this parameter.

E. <u>Chromium, total</u>

1. Previous permit limits:
   Monthly Average: 0.2 mg/l
   Daily Maximum: 0.2 mg/l
   Sampling Frequency: 1/month
   Sample Type: grab
   Monitoring is only required when chromium-based and/or zinc-based cooling tower maintenance chemicals are used
2. NPDES Application: (No. of analyses: 1)
   Long Term Average Value: --
   Maximum 30-day Value: --
   Maximum Daily Value: <0.005 mg/l
3. Background Data from Station SC-043 from January 2005 to December 2008:
   (31 samples taken; one was reported above the PQL, it is: 12/10/08 – 0.021 mg/l)
   Median: 0.0000 mg/l 90th percentile: 0.0000 mg/l
4. Background Data from Station CSTL-079 from January 2005 to December 2008:
   (8 samples taken; one was reported above the PQL, it is: 4/8/08 – 0.018 mg/l)
   Median: 0.0000 mg/l 90th percentile: 0.0054 mg/l
5. DMR Data: no discharge to the Diversion Canal since January 1, 2007
6. 40 CFR Part 423-Steam Electric Power Generating Point-Source Category
   § 423.15 New Source Performance Standards (NSPS)
   (j) Quantity of pollutants discharged in cooling tower blowdown

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Chromium, total	0.2	0.2

7. Water Quality Criteria: See Spreadsheet in Appendix 1.
8. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: No
9. PQL: 5.0 µg/l (Method 200.7, 200.8, 200.9 or SM3113B)
10. Conclusion: In a letter dated October 9, 2012, the facility stated, "… Cross Generating Station does not use cooling tower maintenance chemicals containing chromium or zinc, and will not utilize such chemicals in the foreseeable future." Therefore in lieu of a limit a condition prohibiting the use of these chemicals will be placed in the permit.

F. <u>Copper, total</u>

1. Previous permit limits: not limited
2. NPDES Application: (No. of analyses: 1)
   Long Term Average Value: --
   Maximum 30-day Value: --
   Maximum Daily Value: 0.0271 mg/l

3. Background Data from Station SC-043 from January 2005 to December 2008:
   (31 samples taken; two were reported above the PQL, they are: 5/15/06 – 0.019 mg/l and 7/7/08 – 0.012 mg/l)
   Median: 0.0000 mg/l 90th percentile: 0.0000 mg/l
4. Background Data from Station CSTL-079 from January 2005 to December 2008:
   (8 samples taken; all reported "present <QL")
   Median: 0.0000 mg/l 90th percentile: 0.0000 mg/l
5. DMR Data: not limited
6. Water Quality Criteria: See Spreadsheet in Appendix 1.
7. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: No
8. Other information: As noted on page one of this rationale the monitoring station (SC-043) is listed in the 2010 303(d) list as impaired for copper. On August 12, 2010 a letter was issued stating that the listing of this station as impaired for copper was an error, and the listing was subsequently removed.
9. PQL: 10 µg/l (Method 200.7, 200.8, 200.9 or SM3113B)
10. Conclusion: Based on the data provided in the 2C application and the fact that the stream is not impaired for copper as originally listed, no limit for copper will be established.

G. <u>Lead, total</u>

1. Previous permit limits: not limited
2. NPDES Application: (No. of analyses: 1)
   Long Term Average Value: --
   Maximum 30-day Value: --
   Maximum Daily Value: 0.00279 mg/l
3. Background Data from Station SC-043 from January 2005 to December 2008:
   (31 samples taken; all reported "present <QL")
   Median: 0.0000 mg/l 90th percentile: 0.0000 mg/l
4. Background Data from Station CSTL-079 from January 2005 to December 2008:
   (8 samples taken; all reported "present <QL")
   Median: 0.0000 mg/l 90th percentile: 0.0000 mg/l
5. DMR Data: not limited
6. Water Quality Criteria: See Spreadsheet in Appendix 1.
7. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: No
8. PQL: 2.0 µg/l (Method 200.8, 200.9 or SM3113B)
9. Conclusion: No limit will be established for this parameter.

H. <u>Nickel, total</u>

1. Previous permit limits: not limited
2. NPDES Application: (No. of analyses: 1)
   Long Term Average Value: --
   Maximum 30-day Value: --
   Maximum Daily Value: <0.010 mg/l
3. Background Data from Station SC-043 from January 2005 to December 2008:
   (30 samples taken; three samples reported values of 0.010 mg/l, 0.005 mg/l and 0.024 mg/l)
   Median: 0.0000 mg/l 90th percentile: 0.0005 mg/l

4. Background Data from Station CSTL-079 from January 2005 to December 2008:
   (8 samples taken; all reported "present <QL")
   Median: 0.0000 mg/l 90th percentile: 0.0000 mg/l
5. DMR Data: not limited
6. Water Quality Criteria: See Spreadsheet in Appendix 1.
7. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: No
8. PQL: 10 µg/l (Method 200.8, 200.9 or SM3113B)
9. Conclusion: No limit will be established for this parameter.

I. <u>Zinc, total</u>

1. Previous permit limits:
   Monthly Average: 1.0 mg/l
   Daily Maximum: 1.0 mg/l
   Sampling Frequency: 1/month
   Sample Type: grab
   Monitoring is only required when chromium-based and/or zinc-based cooling tower maintenance chemicals are used
2. NPDES Application: (No. of analyses: 1)
   Long Term Average Value: --
   Maximum 30-day Value: --
   Maximum Daily Value: 0.0162 mg/l
3. Background Data from Station SC-043 from January 2005 to December 2008:
   (27 samples taken; many samples were above the PQL)
   Median: 0.0000 mg/l 90th percentile: 0.0336 mg/l
4. Background Data from Station CSTL-079 from January 2005 to December 2008:
   (8 samples taken; many samples were above the PQL)
   Median: 0.0120 mg/l 90th percentile: 0.0229 mg/l
5. DMR Data: no discharge to the Diversion Canal since January 1, 2007
6. 40 CFR Part 423-Steam Electric Power Generating Point-Source Category
   § 423.15 New Source Performance Standards (NSPS)
   (j) Quantity of pollutants discharged in cooling tower blowdown

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Zinc, total	1.0	1.0

7. Water Quality Criteria: See Spreadsheet in Appendix 1.
8. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: No
9. PQL: 10 µg/l (Method 200.7, 200.8 or SM3113B)
10. Conclusion: In a letter dated October 9, 2012, the facility stated, "… Cross Generating Station does not use cooling tower maintenance chemicals containing chromium or zinc, and will not utilize such chemicals in the foreseeable future." Therefore in lieu of a limit a condition prohibiting the use of these chemicals will be placed in the permit.

J. Free Available Chlorine (FAC)

1. Previous permit limits:
   Monthly average: 0.2 mg/l
   Daily Maximum: 0.5 mg/l
   Sampling Frequency: 1/month
   Sample Type: multiple grab
2. NPDES Application: (No. of FAC analyses: none)
3. DMR Data: no discharge to the Diversion Canal since January 1, 2007
4. 40 CFR Part 423-The Steam Electric Power Generating Point-Source Category
   § 423.15 New Source Performance Standards (NSPS)
   (j) Quantity of pollutants discharged in cooling tower blowdown

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Free Available Chlorine (FAC)	0.2	0.5

5. Conclusion: The guideline established by 40 CFR Part 423 is a technology based guideline therefore the limitations established by the guideline are to be met after leaving the cooling towers, but prior to mixing with any other waters. The limitations will be as follows:
   Monthly Average: 0.2 mg/l
   Daily Maximum: 0.5 mg/l
   Sampling Frequency: 1/month
   Sample Type: multiple grab

K. Mercury, total

1. Previous permit limits:
   Monthly Average: --
   Daily Maximum: MR lbs/day; MR µg/l
   Sampling Frequency: 1/quarter
   Sample Type: grab
2. NPDES Application: (No. of analyses: 1)
   Long Term Average Value: --
   Maximum 30-day Value: --
   Maximum Daily Value: 6.08 ng/l (6.08×10^{-6} mg/l)
3. Background Data from Station SC-043 from January 2005 to December 2008: no data available
4. Background Data from Station CSTL-079 from January 2005 to December 2008:
   (8 samples taken; all reported "present <QL")
   Median: 0.0000 mg/l 90^{th} percentile: 0.0000 mg/l
5. DMR Data: no discharge to the Diversion Canal since January 1, 2007
6. Water Quality Criteria: See Spreadsheet in Appendix 1.
7. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: No
8. Other information: As noted on page one of this rationale the upstream monitoring station (CSTL--079) is listed in the 2010 303(d) list as impaired for mercury, due to the fish consumption advisory on the Diversion canal.
9. PQL: 0.0005 µg/l (Methods 1669(sampling)/1631E (analysis))
10. Conclusion: The water used in the cooling tower does not come into contact with any potential sources of mercury. Therefore, the only mercury in the blowdown is from the intake on the Diversion Canal. Since there is no additional mercury discharged to the Diversion Canal as a result of this activity the requirement to monitor and report will be removed.

K. 126 Priority Pollutants

1. Previous permit limits:
   Part III.A.2
   Monthly average: ND (No Detectable Amount)
   Daily Maximum: ND (No Detectable Amount)
   Sampling Frequency: 1/year
   Sample Type: grab
   Part V.A.7
   The discharge of one hundred twenty-six toxic pollutants (excluding chromium and zinc) is prohibited in detectable amounts from cooling tower discharge if the pollutants come from cooling tower maintenance chemicals. The permittee may demonstrate compliance with such limitations to the SCDHEC by either routinely sampling and analyzing for the pollutants in the discharge or providing mass balance calculations to demonstrate that use of particular maintenance chemicals will not result in detectable amounts of the toxic pollutants in the discharge.
2. NPDES Application: not reported
3. DMR Data: no data (monitoring not required)
4. 40 CFR Part 423-The Steam Electric Power Generating Point-Source Category
   a. Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(1):
   cooling tower blowdown shall not exceed the following:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
The 126 priority pollutants (Appendix A) contained in chemicals added for cooling tower maintenance, except: Chromium and Zinc	([1])	([1])

([1]) No detectable amount

   b. Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(3):
   At the permitting authority's discretion, instead of the monitoring specified in 40 CFR 122.11(b) compliance with the limitations for the 126 priority pollutants in paragraph (d)(1) of this section may be determined by engineering calculations which demonstrate that the regulated pollutants are not detectable in the final discharge by the analytical methods in 40 CFR part 136.
5. Conclusion: For the 126 priority pollutants, the permittee shall demonstrate that the pollutants are not present in detectable amounts annually. To demonstrate compliance the permittee will either take grab samples of each pollutant or provide an engineering calculation to demonstrate that the regulated pollutants are not detectable in the final discharge by the analytical methods in 40 CFR Part 136.

L. Other Parameters

All other parameters reported on the 2C show no reasonable potential to cause or contribute to a water quality violation. Therefore, no additional limits will be placed on this outfall.

Outfall 004

Description of outfall, receiving water and wastewater treatment system: This outfall discharges Cooling Tower Blowdown from Unit 4. A manually operated valve was used to divert the discharge to either the Diversion Canal through the Discharge Manhole for a direct final discharge or the internal flow, as stated in the previous permit, to the Bottom Ash Pond where it would commingle with other waste streams prior to discharge through outfall 002. In August 2020 the internal flow was redirected away from the Bottom Ash Pond through

the wastewater pretreatment sump and boiler area sumps before entering the decant pond. This outfall is to be monitored when the valve has been manually turned to divert the discharge to the Diversion Canal.

Information for this outfall is based on NPDES Permit Application: 2C dated March 2, 2010.

Data from Discharge Monitoring Reports (DMRs) and NPDES permit application (including all subsequent data presented) from 01/1/2019 - 7/31/2021 has been used to evaluate permit limitations.

This outfall is within a state-approved source water protection area (SWPA) for a surface water drinking water intake and has the potential to affect the intake. The affected intake (Intake #S08104) is owned by Santee Cooper Regional Water System. The 7Q10 and AAF to be used for permitting MCL and water/organism criteria are given on the spreadsheet. Additional information on source water protection is provided in sections III.B and G of this rationale.

Previous permit limits are based on the permit (or modification) effective date of January 1, 2007.

All waterbody data is provided on the attached Water Quality Spreadsheets. This data includes 7Q10, annual average flow, dilution factors, hardness, TSS and other information as explained in this rationale. Additional information as necessary to explain the values used will be provided below.

A. Flow, effluent

1. Previous permit limits: only for discharge to the Diversion Canal
   Monthly Average: MR, MGD
   Daily Maximum: MR, MGD
   Sampling Frequency: daily
   Sample Type: continuous
2. NPDES Application: (No. of flow analyses: no discharge)
   Average Flow: 0.223 MGD (capacity)
3. DMR Data: no discharge to the Diversion Canal since January 1, 2007
4. Actual long-term average flow (from DMR): 0.0 MGD
5. Conclusion: The flow of the external discharge will continue to be monitored as in the previous permit.
   Monthly Average: MR, MGD
   Daily Maximum: MR, MGD
   Sampling Frequency: daily
   Sampling Type: continuous

B. Temperature

1. Previous Permit Limits:
   Daily Maximum: 109°F
   Sampling Frequency: daily
   Sample Type: continuous
2. NPDES Application: (No. of analyses: 1)
   Maximum: 28.3°C
3. DMR Data: no discharge to the Diversion Canal since January 1, 2007
4. *S.C. Water Classifications and Standards (S.C. Reg. 61-68)*: Per Reg. 61-68.E.12.a, The water temperature of all Freshwaters which are free flowing shall not be increased more than 5°F (2.8°C) above natural

temperature conditions and shall not exceed a maximum of 90°F (32.2°C) as a result of the discharge of heated liquids unless a different temperature standard as provided for in C.12 has been established, a mixing zone as provided in C.10 has been established, or a Section 316(a) determination under the Federal Clean Water Act has been completed.

5. Effluent limitation guidelines: not applicable
6. Other information:
   At 7Q10 conditions with an ambient water temperature of 84.4°F (critical temperature from the WLA) and a 0.9760 MGD (based on capacity of each cooling tower) assuming outfall 001*, 003 and 004 discharge at 109°F simultaneously, a heat balance around the outfall gives: (*note: 001 can no longer discharge directly to the discharge manhole, but the assumed flow and temperature is used as an additional safety factor)

$$Q_1 + Q_2 = Q_3$$

where Q_1 = upstream thermal load
Q_2 = discharge thermal load
Q_3 = downstream thermal load

The heat transfer can be estimated from the following equation:

$$Q = mC_pT$$

where Q = heat (BTU/hr)
m = flow rate (lb/hr)
C_p = specific heat [BTU/(lb*R)]
T = temperature (R)
m_1 = 7Q10 = 2360 cfs = 1525.3 MGD

Combining and re-arranging the two equations gives:

$$T_3 = \frac{m_1(T_1 + 460^oF) + m_2(T_2 + 460^oF)}{m_3} - 460^oF$$

$$T_3 = \frac{(1525.3\ MGD)(84.4^oF + 460^oF) + (0.9760\ MGD)(109^oF + 460^oF)}{1526.276\ MGD} - 460^oF$$

$T_3 = 84.416^oF$

The instream temperature change is far less than 5°F and the instream temperature should not go above 90 °F.

A mixing zone study was submitted and approved by this office on April 18, 1996. This study was conducted during the months of July, August, and September in order to verify the thermal mixing zone and also the temperature limit of 109° F. The size of the mixing zone has not been increased and an increased temperature limit is not being proposed. A portion of the cooling tower blowdown is sent to the decant pond, with the remainder being discharged thru this outfall. All of the outfalls combine in the common discharge manhole prior to the final discharge point in the Diversion Canal. The cooling tower blowdown combines with Outfalls 002, 003 and 004 (no discharge to date). Therefore, the actual temperature at the discharge into the Diversion Canal will be lower than the temperature reading at Outfall 001, although no credit is given for this additional dilution prior to the discharge into the Diversion Canal.

To re-certify the mixing zone a CORMIX mixing zone computer simulation was received on October 29, 2012 using a "worst-case" scenario in which the station cooling towers were blowing down directly to the Diversion Canal with no other station discharges taking place. Modeling this unlikely "worst-case" scenario, under critical stream flow conditions, shows that both standards are met within 1 meter of the discharge point.

7. PQL: Not applicable (Method SM 2550 B)
8. Conclusion: The existing thermal mixing zone has been re-evaluated and it has been demonstrated that natural conditions should not be adversely impacted.
   Daily Maximum: 109°F
   Sampling Frequency: daily
   Sample Type: continuous

C. <u>pH</u>

1. Previous permit limits: 6.0 – 9.0 standard units.
   Sampling Frequency: daily
   Sample Type: continuous
   Length of longest excursion not to exceed 60 minutes
   Percent of total time exceeding pH limit: 1%
2. NPDES Application: (No. of pH analyses: 1 representative sample)
   minimum: 7.7 standard unit
   maximum: 7.7 standard units
3. DMR Data: no discharge to the Diversion Canal since January 1, 2007
4. 40 CFR Part 423-Steam Electric Power Generating Point-Source Category
   § 423.15 New Source Performance Standards (NSPS)
   (a) "The pH of all discharges, except once through cooling water, shall be within the range of 6.0 – 9.0."
5. *S.C. Water Classifications and Standards (S.C. Reg. 61-68)*: Section G.10.f. states that the Class **FW** standards for pH shall be "between 6.0 and 8.5".
6. Conclusion: The dilution factor provided by the receiving stream is greater than 10, which is large enough that a variance on the upper pH limit of half a standard unit will not cause the instream pH to be greater than the state standard of 8.5 or an adverse impact to the stream. Therefore, the pH limits shall remain between 6.0 and 9.0.
   Sampling Frequency: daily
   Sample Type: continuous
   Length of longest excursion not to exceed 60 minutes
   Percent of total time exceeding pH limit: 1%

D. <u>Cadmium, total</u>

1. Previous permit limits: not limited
2. NPDES Application: (No. of analyses: 1)
   Long Term Average Value: --
   Maximum 30-day Value: --
   Maximum Daily Value: <0.0001 mg/l
3. Background Data from Station SC-043 from January 2005 to December 2008:
   (30 samples taken; all reported "present <QL")
   Median: 0.0000 mg/l 90th percentile: 0.0000 mg/l

4. Background Data from Station CSTL-079 from January 2005 to December 2008:
   (8 samples taken; all reported "present <QL")
   Median: 0.0000 mg/l 90th percentile: 0.0000 mg/l
5. DMR Data: no discharge to the Diversion Canal since January 1, 2007
6. Water Quality Criteria: See Spreadsheet in Appendix 1.
7. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: No
8. PQL: 0.1 µg/l (Method 200.8, 200.9 or SM3113B)
9. Conclusion: No limit will be established for this parameter.

E. <u>Chromium, total</u>

1. Previous permit limits:
   Monthly Average: 0.2 mg/l
   Daily Maximum: 0.2 mg/l
   Sampling Frequency: 1/month
   Sample Type: grab
   Monitoring is only required when chromium-based and/or zinc-based cooling tower maintenance chemicals are used
2. NPDES Application: (No. of analyses: 1)
   Long Term Average Value: --
   Maximum 30-day Value: --
   Maximum Daily Value: <0.005 mg/l
3. Background Data from Station SC-043 from January 2005 to December 2008:
   (31 samples taken; one was reported above the PQL, it is: 12/10/08 – 0.021 mg/l)
   Median: 0.0000 mg/l 90th percentile: 0.0000 mg/l
4. Background Data from Station CSTL-079 from January 2005 to December 2008:
   (8 samples taken; one was reported above the PQL, it is: 4/8/08 – 0.018 mg/l)
   Median: 0.0000 mg/l 90th percentile: 0.0054 mg/l
5. DMR Data: no discharge to the Diversion Canal since January 1, 2007
6. 40 CFR Part 423-Steam Electric Power Generating Point-Source Category
   § 423.15 New Source Performance Standards (NSPS)
   (j) Quantity of pollutants discharged in cooling tower blowdown

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Chromium, total	0.2	0.2

7. Water Quality Criteria: See Spreadsheet in Appendix 1.
8. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: No
9. PQL: 5.0 µg/l (Method 200.7, 200.8, 200.9 or SM3113B)
10. Conclusion: In a letter dated October 9, 2012, the facility stated, "… Cross Generating Station does not use cooling tower maintenance chemicals containing chromium or zinc, and will not utilize such chemicals in the foreseeable future." Therefore in lieu of a limit a condition prohibiting the use of these chemicals will be placed in the permit.

F. Copper, total

1. Previous permit limits: not limited
2. NPDES Application: (No. of analyses: 1)
   Long Term Average Value: --
   Maximum 30-day Value: --
   Maximum Daily Value: 0.0271 mg/l
3. Background Data from Station SC-043 from January 2005 to December 2008:
   (31 samples taken; two were reported above the PQL, they are: 5/15/06 – 0.019 mg/l and 7/7/08 – 0.012 mg/l)
   Median: 0.0000 mg/l 90th percentile: 0.0000 mg/l
4. Background Data from Station CSTL-079 from January 2005 to December 2008:
   (8 samples taken; all reported "present <QL")
   Median: 0.0000 mg/l 90th percentile: 0.0000 mg/l
5. DMR Data: not limited
6. Water Quality Criteria: See Spreadsheet in Appendix 1.
7. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: No
8. Other information: As noted on page one of this rationale the monitoring station (SC-043) is listed in the 2010 303(d) list as impaired for copper. On August 12, 2010 a letter was issued stating that the listing of this station as impaired for copper was an error, and the listing was subsequently removed.
9. PQL: 10 µg/l (Method 200.7, 200.8, 200.9 or SM3113B)
10. Conclusion: Based on the data provided in the 2C application and the fact that the stream is not impaired for copper as originally listed, no limit for copper will be established.

G. Lead, total

1. Previous permit limits: not limited
2. NPDES Application: (No. of analyses: 1)
   Long Term Average Value: --
   Maximum 30-day Value: --
   Maximum Daily Value: 0.00279 mg/l
3. Background Data from Station SC-043 from January 2005 to December 2008:
   (31 samples taken; all reported "present <QL")
   Median: 0.0000 mg/l 90th percentile: 0.0000 mg/l
4. Background Data from Station CSTL-079 from January 2005 to December 2008:
   (8 samples taken; all reported "present <QL")
   Median: 0.0000 mg/l 90th percentile: 0.0000 mg/l
5. DMR Data: not limited
6. Water Quality Criteria: See Spreadsheet in Appendix 1.
7. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: No
8. PQL: 2.0 µg/l (Method 200.8, 200.9 or SM3113B)
9. Conclusion: No limit will be established for this parameter.

H. Nickel, total

1. Previous permit limits: not limited
2. NPDES Application: (No. of analyses: 1)
   Long Term Average Value: --
   Maximum 30-day Value: --
   Maximum Daily Value: <0.010 mg/l
3. Background Data from Station SC-043 from January 2005 to December 2008:
   (30 samples taken; three samples reported values of 0.010 mg/l, 0.005 mg/l and 0.024 mg/l)
   Median: 0.0000 mg/l 90th percentile: 0.0005 mg/l
4. Background Data from Station CSTL-079 from January 2005 to December 2008:
   (8 samples taken; all reported "present <QL")
   Median: 0.0000 mg/l 90th percentile: 0.0000 mg/l
5. DMR Data: not limited
6. Water Quality Criteria: See Spreadsheet in Appendix 1.
7. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: No
8. PQL: 10 µg/l (Method 200.8, 200.9 or SM3113B)
9. Conclusion: No limit will be established for this parameter.

I. Zinc, total

1. Previous permit limits:
   Monthly Average: 1.0 mg/l
   Daily Maximum: 1.0 mg/l
   Sampling Frequency: 1/month
   Sample Type: grab
   Monitoring is only required when chromium-based and/or zinc-based cooling tower maintenance chemicals are used
2. NPDES Application: (No. of analyses: 1)
   Long Term Average Value: --
   Maximum 30-day Value: --
   Maximum Daily Value: 0.0162 mg/l
3. Background Data from Station SC-043 from January 2005 to December 2008:
   (27 samples taken; many samples were above the PQL)
   Median: 0.0000 mg/l 90th percentile: 0.0336 mg/l
4. Background Data from Station CSTL-079 from January 2005 to December 2008:
   (8 samples taken; many samples were above the PQL)
   Median: 0.0120 mg/l 90th percentile: 0.0229 mg/l
5. DMR Data: no discharge to the Diversion Canal since January 1, 2007
6. 40 CFR Part 423-Steam Electric Power Generating Point-Source Category
   § 423.15 New Source Performance Standards (NSPS)
   (j) Quantity of pollutants discharged in cooling tower blowdown

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Zinc, total	1.0	1.0

7. Water Quality Criteria: See Spreadsheet in Appendix 1.
8. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: No
9. PQL: 10 µg/l (Method 200.7, 200.8 or SM3113B)

10. Conclusion: In a letter dated October 9, 2012, the facility stated, "… Cross Generating Station does not use cooling tower maintenance chemicals containing chromium or zinc, and will not utilize such chemicals in the foreseeable future." Therefore in lieu of a limit a condition prohibiting the use of these chemicals will be placed in the permit.

J. Free Available Chlorine (FAC)

1. Previous permit limits:
   Monthly average: 0.2 mg/l
   Daily Maximum: 0.5 mg/l
   Sampling Frequency: 1/month
   Sample Type: multiple grab
2. NPDES Application: (No. of FAC analyses: none)
3. DMR Data: no discharge to the Diversion Canal since January 1, 2007
4. 40 CFR Part 423-The Steam Electric Power Generating Point-Source Category
   § 423.15 New Source Performance Standards (NSPS)
   (j) Quantity of pollutants discharged in cooling tower blowdown

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Free Available Chlorine (FAC)	0.2	0.5

5. Conclusion: The guideline established by 40 CFR Part 423 is a technology based guideline therefore the limitations established by the guideline are to be met after leaving the cooling towers, but prior to mixing with any other waters. The limitations will be as follows:
   Monthly Average: 0.2 mg/l
   Daily Maximum: 0.5 mg/l
   Sampling Frequency: 1/month
   Sample Type: multiple grab

K. Mercury, total

1. Previous permit limits:
   Monthly Average: --
   Daily Maximum: MR lbs/day; MR µg/l
   Sampling Frequency: 1/quarter
   Sample Type: grab
2. NPDES Application: (No. of analyses: 1)
   Long Term Average Value: --
   Maximum 30-day Value: --
   Maximum Daily Value: 6.08 ng/l (6.08×10^{-6} mg/l)
3. Background Data from Station SC-043 from January 2005 to December 2008: no data available
4. Background Data from Station CSTL-079 from January 2005 to December 2008:
   (8 samples taken; all reported "present <QL")
   Median: 0.0000 mg/l
   90^{th} percentile: 0.0000 mg/l
5. DMR Data: no discharge to the Diversion Canal since January 1, 2007
6. Water Quality Criteria: See Spreadsheet in Appendix 1.
7. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: No

8. Other information: As noted on page one of this rationale the upstream monitoring station (CSTL--079) is listed in the 2010 303(d) list as impaired for mercury, due to the fish consumption advisory on the Diversion canal.
9. PQL: 0.0005 µg/l (Methods 1669(sampling)/1631E (analysis))
10. Conclusion: The water used in the cooling tower does not come into contact with any potential sources of mercury. Therefore the only mercury in the blowdown is from the intake on the Diversion Canal. Since there is no additional mercury discharged to the Diversion Canal as a result of this activity the requirement to monitor and report will be removed.

K. 126 Priority Pollutants

1. Previous permit limits:
   Part III.A.2
   Monthly average: ND (No Detectable Amount)
   Daily Maximum: ND (No Detectable Amount)
   Sampling Frequency: 1/year
   Sample Type: grab
   Part V.A.7
   The discharge of one hundred twenty-six toxic pollutants (excluding chromium and zinc) is prohibited in detectable amounts from cooling tower discharge if the pollutants come from cooling tower maintenance chemicals. The permittee may demonstrate compliance with such limitations to the SCDHEC by either routinely sampling and analyzing for the pollutants in the discharge or providing mass balance calculations to demonstrate that use of particular maintenance chemicals will not result in detectable amounts of the toxic pollutants in the discharge.
2. NPDES Application: not reported
3. DMR Data: no data (monitoring not require)
4. 40 CFR Part 423-The Steam Electric Power Generating Point-Source Category
   a. Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(1):
   cooling tower blowdown shall not exceed the following:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
The 126 priority pollutants (Appendix A) contained in chemicals added for cooling tower maintenance, except: Chromium and Zinc	([1])	([1])

([1]) No detectable amount

   b. Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(3):
   At the permitting authority's discretion, instead of the monitoring specified in 40 CFR 122.11(b) compliance with the limitations for the 126 priority pollutants in paragraph (d)(1) of this section may be determined by engineering calculations which demonstrate that the regulated pollutants are not detectable in the final discharge by the analytical methods in 40 CFR part 136.
5. Conclusion: For the 126 priority pollutants, the permittee shall demonstrate that the pollutants are not present in detectable amounts annually. To demonstrate compliance the permittee will either take grab samples of each pollutant or provide an engineering calculation to demonstrate that the regulated pollutants are not detectable in the final discharge by the analytical methods in 40 CFR Part 136.

L. Other Parameters

All other parameters reported on the 2C show no reasonable potential to cause or contribute to a water quality violation. Therefore no additional limits will be placed on this outfall.

Outfall 005

Description of outfall, receiving water and wastewater treatment system: The facility's sanitary wastewater is segregated from other wastewaters for treatment. This system discharges through the common discharge manhole; therefore it is treated as a direct discharge to the Diversion Canal. The current system was placed into operation in June 2017, replacing the legacy system originally installed in 1981. The sanitary treatment is accomplished with a single rectangular tank divided into seven sections. The complete system consists of equalization, aeration, clarification and ultraviolet (UV) disinfection with ozone and chlorination (tablets) available for use as needed.

Operator requirements: Based on the treatment system described above and the Pollution Control Act (PCA), the treatment system is classified as **Group III-Biological**. The Environmental Certification Board Rules require that a **Grade B-Biological** operator be assigned to operate this system. Inspections of the facility will be required on a daily basis per Regulation 61-9.122.41(e).

Information for this outfall is based on NPDES Permit Application: 2C dated March 2, 2010.

Data from Discharge Monitoring Reports (DMRs) and NPDES permit application (including all subsequent data presented) from 1/1/2015 - 7/31/2021 has been used to evaluate permit limitations.

This outfall is within a state-approved source water protection area (SWPA) for a surface water drinking water intake and has the potential to affect the intake. The affected intake (Intake #S08104) is owned by Santee Cooper Regional Water System. The 7Q10 and AAF to be used for permitting MCL and water/organism criteria are given on the spreadsheet. Additional information on source water protection is provided in sections III.B and G of this rationale.

Previous permit limits are based on the permit (or modification) effective date of 2E dated March 02, 2010.

All waterbody data is provided on the attached Water Quality Spreadsheets. This data includes 7Q10, annual average flow, dilution factors, hardness, TSS and other information as explained in this rationale. Additional information as necessary to explain the values used will be provided below.

A. Flow

1. Previous permit limits:
   Monthly Average: MR, MGD
   Daily Maximum: MR, MGD
   Sampling Frequency: 1/month
   Sample Type: instantaneous
2. NPDES Application: (No. of flow analyses: 365)
   Average Daily Value: 0.058 MGD
   Maximum Daily Value: 0.054 MGD

3. DMR Data: The highest flow was reported in 10/15 as 0.466 MGD, in October 2015 the region experienced the 1000-year storm event
4. Actual long-term average flow (from DMR): 0.0176 MGD
5. Conclusion: The monitoring requirement will remain, in comments received Feb, 27, 2015 it is stated that "the station has the ability to perform continuous flow monitoring of this outfall." The sample type and monitoring frequency will be changed to utilize this ability.
   Monthly Average: MR, MGD
   Daily Maximum: MR, MGD
   Sampling Frequency: 1/month
   Sample Type: continuous

B. Dissolved Oxygen (DO)

1. Previous permit limits:
   Daily Minimum: 1.0 mg/l
   Sampling Frequency: 1/month
   Sample Type: grab
2. NPDES Application: reporting not required
3. DMR Data: The lowest DO was reported in 4/17 as 3.3 mg/l
4. Water Quality Modeling Recommendation (Wasteload Allocation): 1.0 mg/l
5. *S.C. Water Classifications and Standards (S.C. Reg. 61-68)*: This discharge is to the Diversion Canal upstream of Lake Moultrie. The Diversion Canal is a listed Class **Freshwaters (FW)** stream with an instream standard for DO of "daily average not less than 5.0 mg/l with a low of 4.0 mg/l".
6. Conclusion: The Wasteload Allocation has determined that a minimum DO of 1.0 mg/l in the discharge from this facility is needed to ensure that the instream standard is maintained. The limit for DO will remain as previously permitted.
   Daily Minimum: 1.0 mg/l
   Sampling Frequency: 1/month
   Sample Type: grab

C. Biochemical Oxygen Demand (BOD_5)

1. Previous permit limits:
   Monthly Average: 30 mg/l
   Daily Maximum: 60 mg/l
   Sampling Frequency: 1/month
   Sample Type: 24 hr composite
2. NPDES Application: (No. of BOD analyses: 15)
   Average Daily Value: 5.73 mg/l
   Maximum Daily Value: 14.867 mg/l
3. DMR Data: The highest BOD was reported in 7/16 as 114 mg/l. Note: The sanitary plant was replace in 2017, therefore the data shown is not reflective of the new treatment system.
4. Water Quality Modeling Recommendation (Wasteload Allocation): 30.0 mg/l
5. Secondary Treatment (Reg 61-9§133.102): "30-day average shall not exceed 30 mg/l"
6. PQL: 2.0 mg/l (Method SM5210B)

7. Conclusion: The BOD limitations will remain as previously permitted.
   Monthly Average: 30 mg/l
   Daily Maximum: 60 mg/l
   Sampling Frequency: 1/month
   Sample Type: 24 hr composite

D. pH

1. Previous permit limits: Minimum-6.0 standard units; Maximum-9.0 standard units.
   Sampling Frequency: 1/month
   Sample Type: grab
2. NPDES Application: (No. of pH analyses: 12)
   minimum: 7.3 standard unit
   maximum: 8.0 standard units
3. DMR Data: The lowest and highest values were reported as 6.7 SU in 6/16 and 7/19 and 8.0 SU in 6/17, respectively.
4. *S.C. Water Classifications and Standards (S.C. Reg. 61-68)*: Section G.10.f. states that the Class **FW** standards for pH shall be "Between 6.0 and 8.5"
5. Conclusion: The previous permit granted a pH variance to allow discharges outside of the State Standards. Because the 7Q10 of the Diversion Canal is greater than 10 times the facility's discharge flow, there is sufficient proof that the current permit limitations will maintain the pH standards in the receiving water body. Based on this information the pH limits shall remain between 6.0 and 9.0.
   Sampling Frequency: 1/month
   Sample Type: grab

E. Total Suspended Solids (TSS)

1. Previous permit limits:
   Monthly Average: 30 mg/l
   Daily Maximum: 60 mg/l
   Sampling Frequency: 1/month
   Sample Type: 24 hr composite
2. NPDES Application: (No. of analyses: 12)
   Average Daily Value: 9.8 mg/l
   Maximum Daily Value: 62.3 mg/l
3. DMR Data: The highest TSS was reported in 2/15 as 35 mg/l. Note: The sanitary plant was replace in 2017, therefore the data shown is not reflective of the new treatment system.
4. Secondary Treatment (Reg 61-9§133.102): "30-day average shall not exceed 30 mg/l"
5. Conclusion: The TSS limitations will remain as previously permitted.
   Monthly Average: 30 mg/l
   Daily Maximum: 60 mg/l
   Sampling Frequency: 1/month
   Sample Type: 24 hr composite

F. Total Residual Chlorine (TRC)

1. Previous permit limits:
   Monthly Average: 0.5 mg/l
   Daily Maximum: 1.0 mg/l
   Sampling Frequency: 1/month
   Sample Type: grab
2. NPDES Application: (No. of TRC analyses: 12)
   Average Daily Value: <0.05 mg/l
   Maximum Daily Value: 0.2917 mg/l
3. DMR Data: The highest value was reported in 5/15 as 0.9 mg/l.
4. Water Quality Criteria for Protection of freshwater Aquatic Life
   - from SC Reg. 61-68, Appendix 1(2008):
   CCC = 11 µg/l; monthly average = 11 µg/l
   CMC = 19 µg/l; daily maximum = 19 µg/l
5. Water Quality Criteria for Protection of Human Health:
   - from SC Reg. 61-68, Appendix 1(2008): none
6. Water Quality Criteria based on Organoleptic Data from Reg. 61-68, Appendix: None
7. PQL: 0.05 mg/l (Method SM4500Cl B, C, D, E, F or G)
8. Conclusion: In 2008 this facility received a permit to replace the chlorine disinfection with an ozone system. The ozone system was approved for operation on January 29, 2009. The chlorine addition system, while not used on a regular basis is maintained for back-up disinfection. Because the back-up chlorination system may be used the TRC limit needs to remain in the permit, but monitoring for compliance will only be required when chlorination is used. This discharge to the Diversion Canal has a dilution factor of greater than 250. As with the previous permit the limit will be set at the maximum allowable TRC concentration.
   Monthly Average: 0.5 mg/l
   Daily Maximum: 1.0 mg/l
   Sampling Frequency: 1/month
   Sample Type: grab

G. Fecal Coliform/E. Coli

1. Previous permit limits:
   Monthly Average: 200/100 ml
   Daily Maximum: 400/100 ml
   Sampling Frequency: 1/month
   Sample Type: grab
2. NPDES Application: (No. of analyses: 12)
   Average Daily Value: 0 col/100
   Maximum Daily Value: 26.25 col.
3. DMR Data: The highest fecal coliform was reported in 1/12 as 766/100 ml
4. *S.C. Water Classifications and Standards (S.C. Reg. 61-68):* In 2012 the bacteriological standard was changed to E. Coli for a Class **FW**. The E. Coli standard is monthly average 126/100 ml and daily maximum 349/100 ml.

5. Conclusion: The limit has been changed to E. Coli and will be as follows:
   Monthly Average: 126 MPN/100 ml
   Daily Maximum: 349 MPN/100 ml
   Sampling Frequency: 1/month
   Sample Type: grab

Outfall 01A, 021, 02A, and 02B

These Outfall serial numbers were previously used in this permit and all have been previously eliminated from the permit. These outfall designations will not be used for new internal outfalls.

Outfall 02C

Description of outfall, receiving water and wastewater treatment system: This outfall is for the discharge of Cooling Tower Blowdown from Units 1 and 2 (U1&2). A manually operated valve was used to divert the discharge to either the Diversion Canal through the Discharge Manhole for a direct final discharge or as stated in the previous permit to the Bottom Ash Pond where it would commingle with other waste streams prior to discharge through outfall 002. In August 2020 the U1&2 cooling tower blowdown flow was redirected away from the Bottom Ash Pond where it now passes through the wastewater pretreatment sump and boiler area sumps as the only flow path to the decant pond and then Low Volume Waste system for treatment. Cooling Water may also be drawn off of the U1&2 cooling towers for Service Water re-use in the FGD Systems, Gypsum Plant, or Fly Ash Treatment. The service water becomes part of the FGD Wastewater discharge and is monitored at internal outfall 02F. The piping that allowed direct discharge to the Diversion Canal has been removed. Therefore, the potential for this as an external outfall has been eliminated. This internal outfall will be established for the U1&2 cooling tower blowdown to be monitored prior to discharge to the Decant Pond.

A. Flow

1. Previous permit limits: not included
2. NPDES Application: (January 2021 - Water Balance Flow diagram)
   Maximum Daily Value: 0.764 MGD
3. DMR Data: no data
4. Conclusion: The contributing flow from each of the effluent guideline sources needs to be identified, therefore flow will be monitored as follows:
   Monthly Average: MR, MGD
   Daily Maximum: MR, MGD
   Sampling Frequency: 1/month
   Sample Type: estimate

B. pH

1. Previous permit limits: not included
2. NPDES Application:
   Maximum Daily Value: not reported
3. DMR Data: no data (monitoring not require)
4. *S.C. Water Classifications and Standards (S.C. Reg. 61-68)*: Standard applied at the final outfall.

5. Effluent Limitations Guidelines:
   40 CFR 423-Steam Electric Power Generating Point-Source Category
   § 423.12 Best Practicable Control Technology Currently Available (BPT)
   (b)(1) "The pH of all discharges, except once through cooling water, shall be within the range of 6.0 – 9.0."
6. PQL: N/A (SM4500H B)
7. Conclusion: In accordance with the EPA Memorandum dated March 21, 1986, pH limits may be applied after co-treatment at the final Outfall. Therefore, no pH limit will be applied at this internal monitoring location.

C. <u>Free Available Chlorine (FAC)</u>

1. Previous permit limits: not included
2. NPDES Application:
   Maximum Daily Value: not reported
3. DMR Data: no data (monitoring not required)
4. 40 CFR Part 423-The Steam Electric Power Generating Point-Source Category
   a. Best Practicable Control Technology Currently Available (BPT) Standards 423.12(b)(7) & Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(1):
      cooling tower blowdown shall not exceed the following:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Free Available Chlorine (FAC)	0.2	0.5

   b. Best Practicable Control Technology Currently Available (BPT) Standards 423.12(b)(8) & Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(2):
      Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit in any plant may discharge free available or total residual chlorine at any one time…
   c. Best Practicable Control Technology Currently Available (BPT) Standards 423.12(b)(12) & Best Available Technology Economically Achievable (BAT) Standards 423.13(m):
      At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of the mass-based limitations specified …. Concentration limitations shall be those concentrations specified.
5. Conclusion: The guidelines established by 40 CFR Part 423 are technology based guidelines therefore the limitations established by the guideline are to be met after leaving the cooling towers, but prior to mixing with any other waters. The limitations will be as follows:
   Monthly Average: 0.2 mg/l
   Daily Maximum: 0.5 mg/l
   Sampling Frequency: 1/month
   Sample Type: grab

D. <u>126 Priority Pollutants</u>

1. Previous permit limits:
   Part III.A.2
   Monthly average: ND (No Detectable Amount)
   Daily Maximum: ND (No Detectable Amount)
   Sampling Frequency: 1/year
   Sample Type: grab

Part V.A.7

The discharge of one hundred twenty-six toxic pollutants (excluding chromium and zinc) is prohibited in detectable amounts from cooling tower discharge if the pollutants come from cooling tower maintenance chemicals. The permittee may demonstrate compliance with such limitations to the SCDHEC by either routinely sampling and analyzing for the pollutants in the discharge or providing mass balance calculations to demonstrate that use of particular maintenance chemicals will not result in detectable amounts of the toxic pollutants in the discharge.

2. NPDES Application: : not reported
3. DMR Data: no data (monitoring not require)
4. 40 CFR Part 423-The Steam Electric Power Generating Point-Source Category
   a. Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(1):
      cooling tower blowdown shall not exceed the following:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
The 126 priority pollutants (Appendix A) contained in chemicals added for cooling tower maintenance, except: Chromium and Zinc	([1])	([1])

([1]) No detectable amount

   b. Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(3):
      At the permitting authority's discretion, instead of the monitoring specified in 40 CFR 122.11(b) compliance with the limitations for the 126 priority pollutants in paragraph (d)(1) of this section may be determined by engineering calculations which demonstrate that the regulated pollutants are not detectable in the final discharge by the analytical methods in 40 CFR part 136.
5. Conclusion: For the 126 priority pollutants, the permittee shall demonstrate that the pollutants are not present in detectable amounts annually. To demonstrate compliance the permittee will either take grab samples of each pollutant or provide a mass balance calculations to demonstrate that the regulated pollutants are not detectable in the final discharge by the analytical methods in 40 CFR Part 136.

E. <u>Chromium, total</u>

1. Previous permit limits: not included
2. NPDES Application: not reported
3. DMR Data: no data (monitoring not require)
4. 40 CFR Part 423-The Steam Electric Power Generating Point-Source Category
   a. Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(1):
      cooling tower blowdown shall not exceed the following:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Chromium, total	0.2	0.2

5. Conclusion: In a letter dated October 9, 2012, the facility stated, "… Cross Generating Station does not use cooling tower maintenance chemicals containing chromium or zinc, and will not utilize such chemicals in the foreseeable future." Therefore in lieu of a limit a condition prohibiting the use of these chemicals will be placed in the permit.

F. Zinc, total

1. Previous permit limits: not included
2. NPDES Application: not reported
3. DMR Data: no data (monitoring not required)
4. 40 CFR Part 423-The Steam Electric Power Generating Point-Source Category
   a. Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(1): cooling tower blowdown shall not exceed the following:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Zinc, total	1.0	1.0

5. Conclusion: In a letter dated October 9, 2012, the facility stated, "… Cross Generating Station does not use cooling tower maintenance chemicals containing chromium or zinc and will not utilize such chemicals in the foreseeable future." Therefore in lieu of a limit a condition prohibiting the use of these chemicals will be placed in the permit.

Outfall 02D

Description of outfall, receiving water and wastewater treatment system: This outfall is for the discharge of Cooling Tower Blowdown from Unit 3 (U3). A manually operated valve was used to divert the discharge to either the Diversion Canal through the Discharge Manhole for a direct final discharge or, as stated in the previous permit, to the Bottom Ash Pond where it would commingle with other waste streams prior to discharge through outfall 002. In August 2020 the U3 cooling tower blowdown flow was redirected away from the Bottom Ash Pond, where it now passes through the wastewater pretreatment sump and boiler area sumps as the primary flow path to the decant pond and then Low Volume Waste system for treatment. Cooling Water may also be drawn off of the U3 cooling towers for Service Water re-use in the FGD Systems, Gypsum Plant, or Fly Ash Treatment. The service water becomes part of the FGD Wastewater discharge and is monitored at internal outfall 02F. This internal outfall will be established for the U3 cooling tower blowdown to be monitored prior to discharge to the Decant Pond.

A. Flow

1. Previous permit limits: not included
2. NPDES Application: (January 2021 - Water Balance Flow diagram)
   Maximum Daily Value: 0.869 MGD
3. DMR Data: no data
4. Conclusion: The contributing flow from each of the effluent guideline sources needs to be identified, therefore flow will be monitored as follows:
   Monthly Average: MR, MGD
   Daily Maximum: MR, MGD
   Sampling Frequency: 1/month
   Sample Type: estimate

B. pH

1. Previous permit limits: not included
2. NPDES Application:
   Maximum Daily Value: not reported

3. DMR Data: no data (monitoring not required)
4. *S.C. Water Classifications and Standards (S.C. Reg. 61-68)*: Standard applied at the final outfall.
5. Effluent Limitations Guidelines:
   40 CFR 423-Steam Electric Power Generating Point-Source Category
   § 423.12 Best Practicable Control Technology Currently Available (BPT)
   (b)(1) "The pH of all discharges, except once through cooling water, shall be within the range of 6.0 – 9.0."
6. PQL: N/A (SM4500H B)
7. Conclusion: In accordance with the EPA Memorandum dated March 21, 1986, pH limits may be applied after co-treatment at the final Outfall. Therefore, no pH limit will be applied at this internal monitoring location.

C. <u>Free Available Chlorine (FAC)</u>

1. Previous permit limits: not included
2. NPDES Application:
   Maximum Daily Value: not reported
3. DMR Data: no data (monitoring not required)
4. 40 CFR Part 423-The Steam Electric Power Generating Point-Source Category
   a. Best Practicable Control Technology Currently Available (BPT) Standards 423.12(b)(7) &
   Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(1):
   cooling tower blowdown shall not exceed the following:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Free Available Chlorine (FAC)	0.2	0.5

   b. Best Practicable Control Technology Currently Available (BPT) Standards 423.12(b)(8) &
   Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(2):
   Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit in any plant may discharge free available or total residual chlorine at any one time…
   c. Best Practicable Control Technology Currently Available (BPT) Standards 423.12(b)(12) &
   Best Available Technology Economically Achievable (BAT) Standards 423.13(m):
   At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of the mass-based limitations specified …. Concentration limitations shall be those concentrations specified.
5. Conclusion: The guidelines established by 40 CFR Part 423 are technology based guidelines therefore the limitations established by the guideline are to be met after leaving the cooling towers, but prior to mixing with any other waters. The limitations will be as follows:
   Monthly Average: 0.2 mg/l
   Daily Maximum: 0.5 mg/l
   Sampling Frequency: 1/month
   Sample Type: grab

D. 126 Priority Pollutants

1. Previous permit limits:
   Part III.A.2
   Monthly average: ND (No Detectable Amount)
   Daily Maximum: ND (No Detectable Amount)
   Sampling Frequency: 1/year
   Sample Type: grab
   Part V.A.7
   The discharge of one hundred twenty-six toxic pollutants (excluding chromium and zinc) is prohibited in detectable amounts from cooling tower discharge if the pollutants come from cooling tower maintenance chemicals. The permittee may demonstrate compliance with such limitations to the SCDHEC by either routinely sampling and analyzing for the pollutants in the discharge or providing mass balance calculations to demonstrate that use of particular maintenance chemicals will not result in detectable amounts of the toxic pollutants in the discharge.
2. NPDES Application: : not reported
3. DMR Data: no data (monitoring not require)
4. 40 CFR Part 423-The Steam Electric Power Generating Point-Source Category
   a. Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(1):
   cooling tower blowdown shall not exceed the following:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
The 126 priority pollutants (Appendix A) contained in chemicals added for cooling tower maintenance, except: Chromium and Zinc	([1])	([1])

([1]) No detectable amount

   b. Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(3):
   At the permitting authority's discretion, instead of the monitoring specified in 40 CFR 122.11(b) compliance with the limitations for the 126 priority pollutants in paragraph (d)(1) of this section may be determined by engineering calculations which demonstrate that the regulated pollutants are not detectable in the final discharge by the analytical methods in 40 CFR part 136.
5. Conclusion: For the 126 priority pollutants, the permittee shall demonstrate that the pollutants are not present in detectable amounts annually. To demonstrate compliance the permittee will either take grab samples of each pollutant or provide a mass balance calculations to demonstrate that the regulated pollutants are not detectable in the final discharge by the analytical methods in 40 CFR Part 136.

E. Chromium, total

1. Previous permit limits: not included
2. NPDES Application: not reported
3. DMR Data: no data (monitoring not require)
4. 40 CFR Part 423-The Steam Electric Power Generating Point-Source Category
   a. Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(1):
   cooling tower blowdown shall not exceed the following:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Chromium, total	0.2	0.2

5. Conclusion: In a letter dated October 9, 2012, the facility stated, "… Cross Generating Station does not use cooling tower maintenance chemicals containing chromium or zinc and will not utilize such chemicals in the foreseeable future." Therefore in lieu of a limit a condition prohibiting the use of these chemicals will be placed in the permit.

F. Zinc, total

1. Previous permit limits: not included
2. NPDES Application: not reported
3. DMR Data: no data (monitoring not required)
4. 40 CFR Part 423-The Steam Electric Power Generating Point-Source Category
   a. Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(1):
      cooling tower blowdown shall not exceed the following:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Zinc, total	1.0	1.0

5. Conclusion: In a letter dated October 9, 2012, the facility stated, "… Cross Generating Station does not use cooling tower maintenance chemicals containing chromium or zinc and will not utilize such chemicals in the foreseeable future." Therefore in lieu of a limit a condition prohibiting the use of these chemicals will be placed in the permit.

Outfall 02E

Description of outfall, receiving water and wastewater treatment system: This outfall is for the discharge of Cooling Tower Blowdown from Unit 4 (U4). A manually operated valve was used to divert the discharge to either the Diversion Canal through the Discharge Manhole for a direct final discharge or, as stated in the previous permit, to the Bottom Ash Pond where it would commingle with other waste streams prior to discharge through outfall 002. In August 2020 the U4 cooling tower blowdown flow was redirected away from the Bottom Ash Pond, where it now passes through the wastewater pretreatment sump and boiler area sumps as the primary flow path to the decant pond and then Low Volume Waste system for treatment. Cooling Water may also be drawn off of the U4 cooling towers for Service Water re-use in the FGD Systems, Gypsum Plant, or Fly Ash Treatment. The service water becomes part of the FGD Wastewater discharge and is monitored at internal outfall 02F. This internal outfall will be established for the U4 cooling tower blowdown to be monitored prior to discharge to the Decant Pond.

A. Flow

1. Previous permit limits: not included
2. NPDES Application: (January 2021 - Water Balance Flow diagram)
   Maximum Daily Value: 0.869 MGD
3. DMR Data: no data
4. Conclusion: The contributing flow from each of the effluent guideline sources needs to be identified, therefore flow will be monitored as follows:
   Monthly Average: MR, MGD
   Daily Maximum: MR, MGD
   Sampling Frequency: 1/month
   Sample Type: estimate

B. pH

1. Previous permit limits: not included
2. NPDES Application:
   Maximum Daily Value: not reported
3. DMR Data: no data (monitoring not require)
4. *S.C. Water Classifications and Standards (S.C. Reg. 61-68)*: Standard applied at the final outfall.
5. Effluent Limitations Guidelines:
   40 CFR 423-Steam Electric Power Generating Point-Source Category
   § 423.12 Best Practicable Control Technology Currently Available (BPT)
   (b)(1) "The pH of all discharges, except once through cooling water, shall be within the range of 6.0 – 9.0."
6. PQL: N/A (SM4500H B)
7. Conclusion: In accordance with the EPA Memorandum dated March 21, 1986, pH limits may be applied after co-treatment at the final Outfall. Therefore no pH limit will be applied at this internal monitoring location.

C. Free Available Chlorine (FAC)

1. Previous permit limits: not included
2. NPDES Application:
   Maximum Daily Value: not reported
3. DMR Data: no data (monitoring not require)
4. 40 CFR Part 423-The Steam Electric Power Generating Point-Source Category
   a. Best Practicable Control Technology Currently Available (BPT) Standards 423.12(b)(7) &
   Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(1):
   cooling tower blowdown shall not exceed the following:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Free Available Chlorine (FAC)	0.2	0.5

   b. Best Practicable Control Technology Currently Available (BPT) Standards 423.12(b)(8) &
   Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(2):
   Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit in any plant may discharge free available or total residual chlorine at any one time…
   c. Best Practicable Control Technology Currently Available (BPT) Standards 423.12(b)(12) &
   Best Available Technology Economically Achievable (BAT) Standards 423.13(m):
   At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of the mass-based limitations specified …. Concentration limitations shall be those concentrations specified.
5. Conclusion: The guidelines established by 40 CFR Part 423 are technology based guidelines therefore the limitations established by the guideline are to be met after leaving the cooling towers, but prior to mixing with any other waters. The limitations will be as follows:
   Monthly Average: 0.2 mg/l
   Daily Maximum: 0.5 mg/l
   Sampling Frequency: 1/month
   Sample Type: grab

D. 126 Priority Pollutants

1. Previous permit limits:
   Part III.A.2
   Monthly average: ND (No Detectable Amount)
   Daily Maximum: ND (No Detectable Amount)
   Sampling Frequency: 1/year
   Sample Type: grab
   Part V.A.7
   The discharge of one hundred twenty-six toxic pollutants (excluding chromium and zinc) is prohibited in detectable amounts from cooling tower discharge if the pollutants come from cooling tower maintenance chemicals. The permittee may demonstrate compliance with such limitations to the SCDHEC by either routinely sampling and analyzing for the pollutants in the discharge or providing mass balance calculations to demonstrate that use of particular maintenance chemicals will not result in detectable amounts of the toxic pollutants in the discharge.
2. NPDES Application: not reported
3. DMR Data: no data (monitoring not required)
4. 40 CFR Part 423-The Steam Electric Power Generating Point-Source Category
   a. Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(1):
   cooling tower blowdown shall not exceed the following:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
The 126 priority pollutants (Appendix A) contained in chemicals added for cooling tower maintenance, except: Chromium and Zinc	([1])	([1])

([1]) No detectable amount

   b. Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(3):
   At the permitting authority's discretion, instead of the monitoring specified in 40 CFR 122.11(b) compliance with the limitations for the 126 priority pollutants in paragraph (d)(1) of this section may be determined by engineering calculations which demonstrate that the regulated pollutants are not detectable in the final discharge by the analytical methods in 40 CFR part 136.
5. Conclusion: For the 126 priority pollutants, the permittee shall demonstrate that the pollutants are not present in detectable amounts annually. To demonstrate compliance the permittee will either take grab samples of each pollutant or provide a mass balance calculations to demonstrate that the regulated pollutants are not detectable in the final discharge by the analytical methods in 40 CFR Part 136.

E. Chromium, total

1. Previous permit limits: not included
2. NPDES Application: not reported
3. DMR Data: no data (monitoring not required)
4. 40 CFR Part 423-The Steam Electric Power Generating Point-Source Category
   a. Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(1):
   cooling tower blowdown shall not exceed the following:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Chromium, total	0.2	0.2

5. Conclusion: In a letter dated October 9, 2012, the facility stated, "… Cross Generating Station does not use cooling tower maintenance chemicals containing chromium or zinc and will not utilize such chemicals in the foreseeable future." Therefore in lieu of a limit a condition prohibiting the use of these chemicals will be placed in the permit.

F. <u>Zinc, total</u>

1. Previous permit limits: not included
2. NPDES Application: not reported
3. DMR Data: no data (monitoring not required)
4. 40 CFR Part 423-The Steam Electric Power Generating Point-Source Category
   a. Best Available Technology Economically Achievable (BAT) Standards 423.13(d)(1):
      cooling tower blowdown shall not exceed the following:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Zinc, total	1.0	1.0

5. Conclusion: In a letter dated October 9, 2012, the facility stated, "… Cross Generating Station does not use cooling tower maintenance chemicals containing chromium or zinc and will not utilize such chemicals in the foreseeable future." Therefore in lieu of a limit a condition prohibiting the use of these chemicals will be placed in the permit.

<u>Outfall 02F</u>

Description of outfall, receiving water and wastewater treatment system: This is an internal outfall which consists of FGD Wastewater from the FGD Systems for Units 1, 2, 3 and 4. The FGD System receives water from the cooling tower blowdown (U1&2, U3 and U4), the Unit 3 & 4 Gypsum Plant and the Unit 1 Fly Ash Treatment overflow sump for use in the system. The Unit 1 Fly Ash Treatment Overflow sump is an area sump that collects stormwater or any overflows from a system which fixates fly ash prior to landfilling. Combustion Residual Leachate (CRL), which comes from the 1B/1D Landfill Leachate Collection system, enters the FGD Fines Dewatering where the filtrate is sent back to the FGD for use in the system. All water sent to the FGD System will be regulated as FGD wastewater upon discharge. The wastewater generated by the FGD Systems is sent to the FGD Fines Dewatering where the blowdown is sent to the FGD Wastewater Treatment System for treatment. Outfall 02F will be monitored for compliance following the FGD Wastewater Treatment System but prior to mixing in the Effluent Mix Tank which will discharge through outfall 002.

New FGD systems were installed, or existing ones were upgraded as follows: Unit 1 in 2010 (1995 install), Unit 2 in 2007 (1984 install), Unit 3 in 2006, and Unit 4 in 2008, which makes the FGD wastewater discharge subject to regulation under 40 CFR 423-Steam Electric Power Generating Point Source Category. This discharge represents a new source as defined by R.61-9.122.2. Therefore, the references and limitations reflect New Source Performance Standards (NSPS) as required by 40 CFR 423.15(a)(3) and Best Available Technology (BAT) 423.13(g) (as referenced by 423.15(a)).

<u>Outfall 02F - biological treatment option</u>

The facility has provided a schedule to comply with the requirements of the 2020 ELG rule by December 31, 2025.

A. Flow

1. Previous permit limits: NA
2. NPDES Application: (March 2023 - Water Balance Flow diagram)
   Maximum Daily Value: 0.680 MGD
3. DMR Data: NA
4. Conclusion: Flow monitoring and reporting will be required.
   Monthly Average: MR, MGD
   Daily Maximum: MR, MGD
   Sampling Frequency: 1/month
   Sample Type: estimate

B. pH

1. Previous permit limits: NA
2. NPDES Application: NA
3. DMR Data: NA
4. *S.C. Water Classifications and Standards (S.C. Reg. 61-68)*: Standard applied at the final outfall.
5. Effluent Limitations Guidelines:
   40 CFR 423-Steam Electric Power Generating Point-Source Category
   § 423.12 Best Practicable Control Technology Currently Available (BPT)
   (b)(1) "The pH of all discharges, except once through cooling water, shall be within the range of 6.0 – 9.0."
6. PQL: N/A (SM4500H B)
7. Conclusion: In accordance with the EPA Memorandum dated March 21, 1986, pH limits may be applied after co-treatment at the final Outfall. Therefore no pH limit will be applied at this internal monitoring location.

C. Total Suspended Solids (TSS)

1. Previous permit limits: NA
2. NPDES Application: NA
3. DMR Data: NA
4. Effluent Limitations Guidelines:
   40 CFR 423-Steam Electric Power Generating Point-Source Category
   § 423.15(a) (NSPS)
   Any new source as of November 19, 1982, subject to paragraph (a) of this section, must achieve the following new source performance standards, in addition to the limitations in §423.13 of this part, established on November 3, 2015. In the case of conflict, the more stringent requirements apply:
   (The 2020 ELG Rule modified the BAT requirements established by the 2015 Rule for FGD wastewater and bottom ash transport water on October 13, 2020)
   § 423.12(b)(11) (BPT), and 423.15(a)(3) (NSPS)
   Quantity of pollutants discharged in FGD wastewater

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Total Suspended Solids (TSS)	30	100

§ 423.12(b)(12) (BPT), and 423.15(a)(13) (NSPS)

At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of any mass-based limitations specified … Concentration limitations shall be those concentrations specified in this section.

§ 423.13(g)(1)(ii) (BAT)

For FGD wastewater generated before the date determined by the permitting authority, as specified in paragraph (g)(1)(i), the quantity of pollutants discharged in FGD wastewater shall not exceed the … concentration listed for TSS in §423.12(b)(11).

5. PQL: 1.0 mg/l (Method SM2540D)
6. Conclusion: In accordance with the EPA Memorandum dated August 22, 1985, total suspended solids (TSS) and oil and grease (O&G) limits may have flow weighted concentration limitations applied after co-treatment at the final Outfall. This limit is equivalent to the low volume waste limitations and is included as one of the sources in the flow-weighted calculation for the TSS limits on the final outfall 002. Since the limit is applied at the final outfall no limit will be established on this internal outfall.

D. <u>Oil and Grease</u>

1. Previous permit limits: NA
2. NPDES Application: NA
3. DMR Data: NA
4. Effluent Limitations Guidelines:
   40 CFR 423-Steam Electric Power Generating Point-Source Category
   § 423.15(a) (NSPS)

   Any new source as of November 19, 1982, subject to paragraph (a) of this section, must achieve the following new source performance standards, in addition to the limitations in §423.13 of this part, established on November 3, 2015. In the case of conflict, the more stringent requirements apply:

   (The 2020 ELG Rule modified the BAT requirements established by the 2015 Rule for FGD wastewater and bottom ash transport water on October 13, 2020)

   § 423.12(b)(11) (BPT), and 423.15(a)(3) (NSPS)

   Quantity of pollutants discharged in FGD wastewater:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Oil and Grease	15	20

   § 423.12(b)(12) (BPT), and 423.15(a)(13) (NSPS)

   At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of any mass-based limitations specified … Concentration limitations shall be those concentrations specified in this section.

   § 423.13(g)(1)(ii) (BAT)

   For FGD wastewater generated before the date determined by the permitting authority, as specified in paragraph (g)(1)(i), the quantity of pollutants discharged in FGD wastewater shall not exceed the … concentration listed for TSS in §423.12(b)(11).
5. PQL: 5 mg/l (Method 1664A)
6. Conclusion: Therefore, in accordance with the EPA Memorandum dated August 22, 1985, total suspended solids (TSS) and oil and grease (O&G) limits may have flow weighted concentration limitations applied after co-treatment at the final Outfall. Since the limit is applied at the final outfall no limit will be established on this internal outfall.

E. Nitrite and Nitrate, Total as N

1. Previous permit limits: NA
2. NPDES Application: NA
3. DMR Data: NA
4. Effluent Limitations Guidelines:
   40 CFR 423-Steam Electric Power Generating Point-Source Category
   § 423.15(a) (NSPS)
   Any new source as of November 19, 1982, subject to paragraph (a) of this section, must achieve the following new source performance standards, in addition to the limitations in §423.13 of this part, established on November 3, 2015. In the case of conflict, the more stringent requirements apply:
   (The 2020 ELG Rule modified the BAT requirements established by the 2015 Rule for FGD wastewater and bottom ash transport water on October 13, 2020)
   § 423.12(b)(11) (BPT), and 423.15(a)(3) (NSPS)
   Quantity of pollutants discharged in FGD wastewater: Parameter not listed
   § 423.13(g)(1)(i) (BAT)
   Quantity of pollutants discharged in FGD wastewater:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Nitrate/Nitrite as N	3	4

   § 423.13(m)
   At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of any mass-based limitations specified in paragraphs (b) through (l) of this section. Concentration limitations shall be those concentrations specified in this section.
5. PQL: 20 µg/l
6. Conclusion: Beginning December 31, 2025 the internal discharge for the FGD wastewater will be limited in accordance §423.13(g)(1)(i). Therefore, the limit will be as follows:
   Monthly Average: 3 mg/l
   Daily Maximum: 4 mg/l
   Sampling Frequency: 1/month
   Sample Type: grab

F. Arsenic, total

1. Previous permit limits: NA
2. NPDES Application: NA
3. DMR Data: NA
4. Effluent Limitations Guidelines:
   40 CFR 423-Steam Electric Power Generating Point-Source Category
   § 423.15(a) (NSPS)
   Any new source as of November 19, 1982, subject to paragraph (a) of this section, must achieve the following new source performance standards, in addition to the limitations in §423.13 of this part, established on November 3, 2015. In the case of conflict, the more stringent requirements apply:
   (The 2020 ELG Rule modified the BAT requirements established by the 2015 Rule for FGD wastewater and bottom ash transport water on October 13, 2020)
   § 423.12(b)(11) (BPT), and 423.15(a)(3) (NSPS)
   Quantity of pollutants discharged in FGD wastewater: Parameter not listed

§ 423.13(g)(1)(i) (BAT)

Quantity of pollutants discharged in FGD wastewater:

Parameter	Monthly Average (µg/l)	Daily Maximum (µg/l)
Arsenic, total	8	18

§ 423.13(m)

At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of any mass-based limitations specified in paragraphs (b) through (l) of this section. Concentration limitations shall be those concentrations specified in this section.

5. PQL: 5.0 µg/l
6. Conclusion: Beginning December 31, 2025 the internal discharge for the FGD wastewater will be limited in accordance §423.13(g)(1)(i). Therefore, the limit will be as follows:
   Monthly Average: 8 µg/l
   Daily Maximum: 18 µg/l
   Sampling Frequency: 1/month
   Sample Type: grab

G. <u>Selenium, total</u>

1. Previous permit limits: NA
2. NPDES Application: NA
3. DMR Data: NA
4. Effluent Limitations Guidelines:
   40 CFR 423-Steam Electric Power Generating Point-Source Category
   § 423.15(a) (NSPS)
   Any new source as of November 19, 1982, subject to paragraph (a) of this section, must achieve the following new source performance standards, in addition to the limitations in §423.13 of this part, established on November 3, 2015. In the case of conflict, the more stringent requirements apply:
   (The 2020 ELG Rule modified the BAT requirements established by the 2015 Rule for FGD wastewater and bottom ash transport water on October 13, 2020)
   § 423.12(b)(11) (BPT), and 423.15(a)(3) (NSPS)
   Quantity of pollutants discharged in FGD wastewater: Parameter not listed
   § 423.13(g)(1)(i) (BAT)
   Quantity of pollutants discharged in FGD wastewater:

Parameter	Monthly Average (µg/l)	Daily Maximum (µg/l)
Selenium, total	29	70

§ 423.13(m)

At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of any mass-based limitations specified in paragraphs (b) through (l) of this section. Concentration limitations shall be those concentrations specified in this section.

5. PQL: 5.0 µg/l
6. Conclusion: Beginning December 31, 2025 the internal discharge for the FGD wastewater will be limited in accordance §423.13(g)(1)(i). Therefore, the limit will be as follows:
   Monthly Average: 29 µg/l
   Daily Maximum: 70 µg/l
   Sampling Frequency: 1/month
   Sample Type: grab

H. Mercury, total

1. Previous permit limits: NA
2. NPDES Application: NA
3. DMR Data: NA
4. Effluent Limitations Guidelines:
   40 CFR 423-Steam Electric Power Generating Point-Source Category
   § 423.15(a) (NSPS)
   Any new source as of November 19, 1982, subject to paragraph (a) of this section, must achieve the following new source performance standards, in addition to the limitations in §423.13 of this part, established on November 3, 2015. In the case of conflict, the more stringent requirements apply:
   (The 2020 ELG Rule modified the BAT requirements established by the 2015 Rule for FGD wastewater and bottom ash transport water on October 13, 2020)
   § 423.12(b)(11) (BPT), and 423.15(a)(3) (NSPS)
   Quantity of pollutants discharged in FGD wastewater: Parameter not listed
   § 423.13(g)(1)(i) (BAT)
   Quantity of pollutants discharged in FGD wastewater:

Parameter	Monthly Average (ng/l)	Daily Maximum (ng/l)
Mercury, total	34	103

   § 423.13(m)
   At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of any mass-based limitations specified in paragraphs (b) through (l) of this section. Concentration limitations shall be those concentrations specified in this section.
5. PQL: 0.0005 µg/l (0.5 ng/l)
6. Conclusion: Beginning December 31, 2025 the internal discharge for the FGD wastewater will be limited in accordance §423.13(g)(1)(i). Therefore, the limit will be as follows:
   Monthly Average: 34 ng/l
   Daily Maximum: 103 ng/l
   Sampling Frequency: 1/month
   Sample Type: grab

Outfall 02F - Voluntary Incentive Program (VIP) option

The facility has requested the option to comply with the VIP limits in 423.13(g)(3)(i). The Notice of Planned Participation (NOPP) for the option to transfer from the generally applicable limitations to the VIP limitations was submitted to the Department on October 13, 2021, as required by the 2020 ELG rule. Therefore, should the facility choose to use this option the more stringent VIP limitations will become effective in accordance with the 2020 ELG rule by December 31, 2028.

A. Flow

1. Previous permit limits: NA
2. NPDES Application: (March 2023 - Water Balance Flow diagram)
   Maximum Daily Value: 0.680 MGD
3. DMR Data: NA

4. Conclusion: Flow monitoring and reporting will be required.
   Monthly Average: MR, MGD
   Daily Maximum: MR, MGD
   Sampling Frequency: 1/month
   Sample Type: estimate

B. pH

1. Previous permit limits: NA
2. NPDES Application: NA
3. DMR Data: NA
4. *S.C. Water Classifications and Standards (S.C. Reg. 61-68)*: Standard applied at the final outfall.
5. Effluent Limitations Guidelines:
   40 CFR 423-Steam Electric Power Generating Point-Source Category
   § 423.12 Best Practicable Control Technology Currently Available (BPT)
   (b)(1) "The pH of all discharges, except once through cooling water, shall be within the range of 6.0 – 9.0."
6. PQL: N/A (SM4500H B)
7. Conclusion: In accordance with the EPA Memorandum dated March 21, 1986, pH limits may be applied after co-treatment at the final Outfall. Therefore, no pH limit will be applied at this internal monitoring location.

C. Total Suspended Solids (TSS)

1. Previous permit limits: NA
2. NPDES Application: NA
3. DMR Data: NA
4. Effluent Limitations Guidelines:
   40 CFR 423-Steam Electric Power Generating Point-Source Category
   § 423.15(a) (NSPS)
   Any new source as of November 19, 1982, subject to paragraph (a) of this section, must achieve the following new source performance standards, in addition to the limitations in §423.13 of this part, established on November 3, 2015. In the case of conflict, the more stringent requirements apply:
   (The 2020 ELG Rule modified the BAT requirements established by the 2015 Rule for FGD wastewater and bottom ash transport water on October 13, 2020)
   § 423.12(b)(11) (BPT), and 423.15(a)(3) (NSPS)
   Quantity of pollutants discharged in FGD wastewater

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Total Suspended Solids (TSS)	30	100

   § 423.12(b)(12) (BPT), and 423.15(a)(13) (NSPS)
   At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of any mass-based limitations specified … Concentration limitations shall be those concentrations specified in this section.
   § 423.13(g)(1)(ii) (BAT)
   For FGD wastewater generated before the date determined by the permitting authority, as specified in paragraph (g)(1)(i), the quantity of pollutants discharged in FGD wastewater shall not exceed the … concentration listed for TSS in §423.12(b)(11).

5. PQL: 1.0 mg/l (Method SM2540D)
6. Conclusion: In accordance with the EPA Memorandum dated August 22, 1985, total suspended solids (TSS) and oil and grease (O&G) limits may have flow weighted concentration limitations applied after co-treatment at the final Outfall. This limit is equivalent to the low volume waste limitations and is included as one of the sources in the flow-weighted calculation for the TSS limits on the final outfall 002. Since the limit is applied at the final outfall no limit will be established on this internal outfall.

D. <u>Oil and Grease</u>

1. Previous permit limits: NA
2. NPDES Application: NA
3. DMR Data: NA
4. Effluent Limitations Guidelines:
   40 CFR 423-Steam Electric Power Generating Point-Source Category
   § 423.15(a) (NSPS)
   Any new source as of November 19, 1982, subject to paragraph (a) of this section, must achieve the following new source performance standards, in addition to the limitations in §423.13 of this part, established on November 3, 2015. In the case of conflict, the more stringent requirements apply:
   (The 2020 ELG Rule modified the BAT requirements established by the 2015 Rule for FGD wastewater and bottom ash transport water on October 13, 2020)
   § 423.12(b)(11) (BPT), and 423.15(a)(3) (NSPS)
   Quantity of pollutants discharged in FGD wastewater:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Oil and Grease	15	20

   § 423.12(b)(12) (BPT), and 423.15(a)(13) (NSPS)
   At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of any mass-based limitations specified … Concentration limitations shall be those concentrations specified in this section.
   § 423.13(g)(1)(ii) (BAT)
   For FGD wastewater generated before the date determined by the permitting authority, as specified in paragraph (g)(1)(i), the quantity of pollutants discharged in FGD wastewater shall not exceed the … concentration listed for TSS in §423.12(b)(11).
5. PQL: 5 mg/l (Method 1664A)
6. Conclusion: Therefore, in accordance with the EPA Memorandum dated August 22, 1985, total suspended solids (TSS) and oil and grease (O&G) limits may have flow weighted concentration limitations applied after co-treatment at the final Outfall. Since the limit is applied at the final outfall no limit will be established on this internal outfall.

E. <u>Nitrite and Nitrate, Total as N</u>

1. Previous permit limits: NA
2. NPDES Application: NA
3. DMR Data: NA
4. Effluent Limitations Guidelines:
   40 CFR 423-Steam Electric Power Generating Point-Source Category
   § 423.15(a) (NSPS)

Any new source as of November 19, 1982, subject to paragraph (a) of this section, must achieve the following new source performance standards, in addition to the limitations in §423.13 of this part, established on November 3, 2015. In the case of conflict, the more stringent requirements apply:

(The 2020 ELG Rule modified the BAT requirements established by the 2015 Rule for FGD wastewater and bottom ash transport water on October 13, 2020)

§ 423.12(b)(11) (BPT), and 423.15(a)(3) (NSPS)

Quantity of pollutants discharged in FGD wastewater: Parameter not listed

§ 423.13(g)(3)(i) (VIP - BAT)

Quantity of pollutants discharged in FGD wastewater:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Nitrate/Nitrite as N	1.2	2.0

§ 423.13(m)

At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of any mass-based limitations specified in paragraphs (b) through (l) of this section. Concentration limitations shall be those concentrations specified in this section.

5. PQL: 20 µg/l
6. Conclusion: Beginning December 31, 2028, the internal discharge for the FGD wastewater will be limited in accordance §423.13(g)(3)(i). Therefore, the limit will be as follows:

   Monthly Average: 1.2 mg/l
   Daily Maximum: 2.0 mg/l
   Sampling Frequency: 1/month
   Sample Type: grab

F. <u>Arsenic, total</u>

1. Previous permit limits: NA
2. NPDES Application: NA
3. DMR Data: NA
4. Effluent Limitations Guidelines:

   40 CFR 423-Steam Electric Power Generating Point-Source Category

   § 423.15(a) (NSPS)

   Any new source as of November 19, 1982, subject to paragraph (a) of this section, must achieve the following new source performance standards, in addition to the limitations in §423.13 of this part, established on November 3, 2015. In the case of conflict, the more stringent requirements apply:

   (The 2020 ELG Rule modified the BAT requirements established by the 2015 Rule for FGD wastewater and bottom ash transport water on October 13, 2020)

   § 423.12(b)(11) (BPT), and 423.15(a)(3) (NSPS)

   Quantity of pollutants discharged in FGD wastewater: Parameter not listed

   § 423.13(g)(3)(i) (VIP - BAT)

   Quantity of pollutants discharged in FGD wastewater:

Parameter	Monthly Average (µg/l)	Daily Maximum (µg/l)
Arsenic, total	NA	5

   § 423.13(m)

   At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of any mass-based limitations

specified in paragraphs (b) through (l) of this section. Concentration limitations shall be those concentrations specified in this section.

5. PQL: 5.0 µg/l
6. Conclusion: Beginning December 31, 2028, the internal discharge for the FGD wastewater will be limited in accordance §423.13(g)(3)(i). Therefore, the limit will be as follows:
   Monthly Average: MR µg/l
   Daily Maximum: 5 µg/l
   Sampling Frequency: 1/month
   Sample Type: grab

G. <u>Selenium, total</u>

1. Previous permit limits: NA
2. NPDES Application: NA
3. DMR Data: NA
4. Effluent Limitations Guidelines:
   40 CFR 423-Steam Electric Power Generating Point-Source Category
   § 423.15(a) (NSPS)
   Any new source as of November 19, 1982, subject to paragraph (a) of this section, must achieve the following new source performance standards, in addition to the limitations in §423.13 of this part, established on November 3, 2015. In the case of conflict, the more stringent requirements apply:
   (The 2020 ELG Rule modified the BAT requirements established by the 2015 Rule for FGD wastewater and bottom ash transport water on October 13, 2020)
   § 423.12(b)(11) (BPT), and 423.15(a)(3) (NSPS)
   Quantity of pollutants discharged in FGD wastewater: Parameter not listed
   § 423.13(g)(3)(i) (VIP - BAT)
   Quantity of pollutants discharged in FGD wastewater:

Parameter	Monthly Average (µg/l)	Daily Maximum (µg/l)
Selenium, total	NA	10

   § 423.13(m)
   At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of any mass-based limitations specified in paragraphs (b) through (l) of this section. Concentration limitations shall be those concentrations specified in this section.
5. PQL: 5.0 µg/l
6. Conclusion: Beginning December 31, 2028, the internal discharge for the FGD wastewater will be limited in accordance §423.13(g)(1)(i). Therefore, the limit will be as follows:
   Monthly Average: MR µg/l
   Daily Maximum: 10 µg/l
   Sampling Frequency: 1/month
   Sample Type: grab

H. <u>Total Dissolved Solids (TDS)</u>

1. Previous permit limits: NA
2. NPDES Application: NA
3. DMR Data: NA

4. Effluent Limitations Guidelines:
   40 CFR 423-Steam Electric Power Generating Point-Source Category
   § 423.15(a) (NSPS)
   Any new source as of November 19, 1982, subject to paragraph (a) of this section, must achieve the following new source performance standards, in addition to the limitations in §423.13 of this part, established on November 3, 2015. In the case of conflict, the more stringent requirements apply:
   (The 2020 ELG Rule modified the BAT requirements established by the 2015 Rule for FGD wastewater and bottom ash transport water on October 13, 2020)
   § 423.12(b)(11) (BPT), and 423.15(a)(3) (NSPS)
   Quantity of pollutants discharged in FGD wastewater: Parameter not listed
   § 423.13(g)(3)(i) (VIP - BAT)
   Quantity of pollutants discharged in FGD wastewater:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
TDS	149	306

   § 423.13(m)
   At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of any mass-based limitations specified in paragraphs (b) through (l) of this section. Concentration limitations shall be those concentrations specified in this section.
5. Conclusion: Beginning December 31, 2028, the internal discharge for the FGD wastewater will be limited in accordance §423.13(g)(1)(i). Therefore, the limit will be as follows:
   Monthly Average: 149 mg/l
   Daily Maximum: 306 mg/l
   Sampling Frequency: 1/month
   Sample Type: grab

I. Bromide

1. Previous permit limits: NA
2. NPDES Application: NA
3. DMR Data: NA
4. Effluent Limitations Guidelines:
   40 CFR 423-Steam Electric Power Generating Point-Source Category
   § 423.15(a) (NSPS)
   Any new source as of November 19, 1982, subject to paragraph (a) of this section, must achieve the following new source performance standards, in addition to the limitations in §423.13 of this part, established on November 3, 2015. In the case of conflict, the more stringent requirements apply:
   (The 2020 ELG Rule modified the BAT requirements established by the 2015 Rule for FGD wastewater and bottom ash transport water on October 13, 2020)
   § 423.12(b)(11) (BPT), and 423.15(a)(3) (NSPS)
   Quantity of pollutants discharged in FGD wastewater: Parameter not listed
   § 423.13(g)(3)(i) (VIP - BAT)
   Quantity of pollutants discharged in FGD wastewater:

Parameter	Monthly Average (mg/l)	Daily Maximum (mg/l)
Bromide	NA	0.2

§ 423.13(m)

At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of any mass-based limitations specified in paragraphs (b) through (l) of this section. Concentration limitations shall be those concentrations specified in this section.

5. PQL: 2000 µg/l or 2 mg/l
6. Conclusion: Beginning December 31, 2028, the internal discharge for the FGD wastewater will be limited in accordance §423.13(g)(1)(i). Therefore, the limit will be as follows:
   Monthly Average: MR mg/l
   Daily Maximum: 0.2 mg/l
   Sampling Frequency: 1/month
   Sample Type: grab

J. Mercury, total

1. Previous permit limits: NA
2. NPDES Application: NA
3. DMR Data: NA
4. Effluent Limitations Guidelines:
   40 CFR 423-Steam Electric Power Generating Point-Source Category
   § 423.15(a) (NSPS)
   Any new source as of November 19, 1982, subject to paragraph (a) of this section, must achieve the following new source performance standards, in addition to the limitations in §423.13 of this part, established on November 3, 2015. In the case of conflict, the more stringent requirements apply:
   (The 2020 ELG Rule modified the BAT requirements established by the 2015 Rule for FGD wastewater and bottom ash transport water on October 13, 2020)
   § 423.12(b)(11) (BPT), and 423.15(a)(3) (NSPS)
   Quantity of pollutants discharged in FGD wastewater: Parameter not listed
   § 423.13(g)(3)(i) (VIP - BAT)
   Quantity of pollutants discharged in FGD wastewater:

Parameter	Monthly Average (ng/l)	Daily Maximum (ng/l)
Mercury, total	10	23

   § 423.13(m)
   At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of any mass-based limitations specified in paragraphs (b) through (l) of this section. Concentration limitations shall be those concentrations specified in this section.
5. PQL: 0.0005 µg/l (0.5 ng/l)
6. Conclusion: Beginning December 31, 2028, the internal discharge for the FGD wastewater will be limited in accordance §423.13(g)(1)(i). Therefore, the limit will be as follows:
   Monthly Average: 10 ng/l
   Daily Maximum: 23 ng/l
   Sampling Frequency: 1/month
   Sample Type: grab

Outfall 02G

Stormwater runoff and combustion residual leachate from the onsite landfill.

In conjunction with the installation of facility upgrades after the issuance of the last permit, the facility constructed an onsite industrial solid waste landfill to accept the FGD sludge, fly ash, and bottom ash waste. When first drafted it was proposed that the landfill leachate and stormwater runoff from the landfill would combine and flow to the Decant Pond. In this scenario the combined flow to the Decant Pond would have to meet the ELGs regulating combustion residual leachate prior to entering the Decant Pond. The design has been changed to separate the two flows and the stormwater will continue to flow to the Decant Pond which is sent to the Low Volume Wastewater (LVW) Treatment System. The combustion residual leachate from the onsite landfill will be routed to the FGD System and will become part of the FGD wastewater which is regulated at Outfall 02F. Therefore, Outfall 02G is no longer required.

Bottom Ash Transport Water (BATW)

The CGS station does not discharge bottom ash transport water, as it is equipped with submerged flight conveyor systems directly under each boiler. Effectively, the bottom of the boiler is submerged in the submerged flight conveyor system, therefore this water is never transport water. Bottom ash falls into the system and dries as it is retrieved from large bins under the boilers by conveyor systems. The bottom ash is then deposited on concrete decant pads. There is no blowdown. During maintenance events, water is drained to the decant pond as low volume waste and then treated by the new physical-chemical low volume waste system.

Industrial Stormwater Requirements

The permit requires the permittee to maintain good housekeeping procedures to reduce pollutants in stormwater that are discharged through Outfalls 002, 003, 004 or 005. Other industrial stormwater discharges from the site are covered by the NPDES General Permit for Storm Water Discharges Associated with Industrial Activities (SCR003626)

Chemical Metal Cleaning Wastes

During chemical cleaning, the wastes are collected in temporary holding tanks and disposed of as hazardous or non-hazardous waste (RCRA) off-site.

Non-Chemical Metal Cleaning Wastes

The EPA memorandum dated June 17, 1975 concerning the interpretation of the chemical limitation guidelines for the Steam Electric Power Generation Industry, commonly referred to as the Jordan Memo, states that "All water washing operations are "low volume". Historically Non-Chemical Metal Cleaning Wastes (NCMCW) at Cross have been considered Low Volume Waste (LVW). In subsequent reviews and promulgations of new steam electric effluent guidelines EPA concluded that “until the Agency promulgates new limitations and standards, the previous guidance policy [the Jordan memo] may continue to be applied in those cases in which it was applied in the past.”

Cooling Water Additives

The following chemicals (all aqueous products) are added to the cooling water to properly maintain the cooling towers.

Current Preferred:	**Alternatives:**
Bleach (sodium hypochlorite) 12-15%	Inhibitor AZ8104

Inhibitor CL 4132
Dispersant CL 1355
Defoamer FO 180

Gengard GN7004
Depositrol BL5400
Depositrol PY 5203
Inhibitor ECP 8130

316b Cooling Water Intake Requirements

Cross Generating Station (Cross) is located in Pineville, Berkeley County, SC and has four coal-fired units with a combined generating capacity of 2,390 megawatts (MWs). Cross utilizes two Cooling Water Intake Structures (CWISs) located along the left descending bank (i.e., eastern shoreline) of the Diversion Canal, a man-made channel between Lake Marion and Lake Moultrie. The CWISs are located at 80°07'08" W Longitude and 33°21'46" N Latitude. The two CWISs are shore-mounted concrete structures, each equipped, from front to rear, with a trash rack, a fish escape passage, a traveling band screen, a fine mesh screen, guides for stop logs, and a wet well.

The CWISs withdraw cooling water from the Diversion Canal that is used as makeup water for the cooling towers. The station currently employs a closed-cycle recirculating system utilizing mechanical draft cooling towers. CWIS Units 1&2 and 3&4 each have three Siemens circulating water pumps. Each pump is rated for 10,725 gallons per minute (gpm), with an effective capacity rating of 9,750 gpm. At each CWIS, only 2 pumps can be operated at once for a total calculated DIF of 56.2 MGD (Table 1). Cross currently withdraws greater than 2 MGD of water from the Diversion Canal and uses greater than 25% of the water withdrawn for cooling purposes.

Table 1: Cross Intake Pump Capacities

Intake Structure		**Number of Pumps Per Unit**	**Capacity of Each Pump (gpm)**	**Capacity of Each Pump (MGD)**	**Total Pump Capacity (MGD)**
Unit 1 & 2	1984	3-Siemens Vertical Circulating Pumps*	9,750	14.04	28.08
Unit 3 & 4	2008	3-Siemens Vertical Circulating Pumps*	9,750	14.04	28.08
Total Withdrawal Capacity					**56.2**

*Only 2 pumps can physically run at one time. The third pump is to provide redundancy.
** Each intake structure has a diesel-powered fire pump not included in the Design Intake Flow.

Based on the information presented above, the facility is subject to the 316(b) Rule requirements at §122.21(r)(2-8), since the facility maintains a DIF of more than 2.0 MGD and uses more than 25% of its intake water for cooling purposes. In addition, the facility operates a closed-cycle recirculating system as defined in §125.92(c) by use of mechanical draft cooling towers.

Section 316(b) of the CWA requires that the location, design, construction, and capacity of a CWIS reflect the best technology available for minimizing environmental impact. In 1984 and 2008, a determination was made for each intake, in accordance with Section 316(b) of the Clean Water Act, that the location, design,

construction, and capacity of the CWIS reflected the best technology available at that time for minimizing adverse environmental impact. On October 14, 2014, new regulations, called the Existing Facilities Rule, became effective for cooling water intake structures at existing NPDES facilities. The regulations were published in the Federal Register on Aug. 15, 2014 (79 FR 48424). The regulations are listed in 40 CFR 125.90-99 (Subpart J) and 122.21(r).

The CWIS at the Cross Generating Station is subject to these new regulations. For permits that were applied for before the effective date, as in this case, the rule allows at 40 CFR 125.98(b)(6) that the permit may include conditions to ensure the Department will have all of the necessary information under 40 CFR 122.21(r) to establish impingement mortality and entrainment best technology available (BTA) requirements under 40 CFR 125.94(c) and (d) for the subsequent permit. The Department must establish interim BTA requirements in the permit on a site-specific basis using best professional judgment.

Therefore, the permit includes a compliance schedule that requires the permittee to submit the information required by 40 CFR 122.21(r) and 125.95(f). In addition, the compliance schedule requires the permittee to submit for Department approval a plan to conduct a baseline entrainment study. Based on this information, the Department will make a BTA determination in the next permit renewal in accordance with the regulations. Interim BTA requirements included in this permit are to rotate and clean the existing intake screens no less frequently than daily (Monday-Friday) so that collected debris is removed from the screens and through screen velocity is minimized and to continue to perform the manual function check daily.

Intake screen backwash: The intake screens are washed using intake water and the backwash water is recirculated into the intake canal. The debris from the cleaned screens is collected in the trash racks and properly disposed. **Part V.E.10** allows this discharge.

Groundwater Monitoring Requirements

The Department's Groundwater Protection Section reviewed the permit renewal application and recommends that the facility monitor and report each of the fifteen (15) groundwater monitoring wells (PM-1, CAP-1, CAP-2, CAP-3, CAP-4, CAP- 5, CAP-6, CAP-7, CAP-8, CAP-9, CAP –10, CAP-11, CAP-12, CAP-13 and CAP-14) semi-annually for the following parameters:

Water Table Elevation (within 0.01 feet) (relative to mean sea level)
Depth to the Water Table (within 0.01 feet) (relative to land surface)
Field pH (standard units)
Field Specific Conductance (umhos/cm)
Field Turbidity (NTU)
Total Dissolved Solids (TDS) (mg/l)
Arsenic (mg/l)
Cadmium (mg/l)
Chromium (mg/l)
Selenium (mg/l)
Sulfate (mg/l)

The permittee requested to amend the second semi-annual groundwater sampling period from July 1st – September 30th to June 1st – August 31st. The Department's Groundwater Protection section has agreed to this change.

Threatened and Endangered Species Information

There are two species that live in the Santee Cooper Lakes (Marion and Moultrie), including the Diversion Canal, which are listed by both the federal and state authorities as legally Endangered.

The **Shortnose and Atlantic Sturgeon** are known to occupy the same habitat. Atlantic and shortnose sturgeon have conservation status rankings of G3 and S3 (NatureServe 2014), meaning that populations of both species are "vulnerable", both globally and in South Carolina. In general, populations of both species along the entire Atlantic Coast are reduced from historical levels for at least the past half-century (Atlantic States Marine Fisheries Commission (ASMFC) 1990; ASMFC 1998; National Marine Fisheries Service (NMFS) 1998). The Atlantic Sturgeon South Atlantic Distinct Population Segment (DPS) was listed as endangered under the Endangered Species Act (ESA) in 2012. The shortnose sturgeon has been listed as "endangered" under the ESA since 1967 and the American Fisheries Society deemed it "threatened" in 1989.

In previous discussions with the South Carolina Department of Natural Resources (SC-DNR) concerning the shortnose sturgeon, it was noted that shortnose sturgeon, particularly juveniles, are sensitive to low dissolved oxygen levels. Aside from DO, there is no information showing that the shortnose sturgeon is more sensitive than the established criteria used to evaluate the permit limitations. Therefore based on known information this permit is protective of the shortnose sturgeon.

Within a 5-mile radius of final outfall there are additional species, which have both a global/state ranking and a legal status, either Federal or State. These species do not live in the receiving stream. The species are:

Species	Ranking	Legal Status
Red-cockaded Woodpecker	G3, S2	LE - Endangered, Federal SE - Endangered, State
Bald Eagle	G5, S3B, S3N	Bald & Golden Eagle Protection Act, Federal ST - Threatened, State
Southern Hog-nosed Snake	G2 / S1S2	ST - Threatened, State
Canby's Dropwort (AKA Canby's Cowbane)	G2, S2	LT - Threatened, Federal
Spotted Turtle	G5, S3	ARS-At Risk Species, Federal ST - Threatened, State

Global rankings:

Basic Ranks

GX - **Presumed Extinct** (species) - Not located despite intensive searches and virtually no likelihood of rediscovery.
Eliminated (ecological communities) - Eliminated throughout its range, with no restoration potential due to extinction of dominant or characteristic species.

GH - **Possibly Extinct** (species) - Missing; known from only historical occurrences but still some hope of rediscovery.
Presumed Eliminated - (Historic, ecological communities)-Presumed eliminated throughout its range, with no or virtually no likelihood that it will be rediscovered, but with the potential for restoration, for example, American Chestnut (Forest).

G1 - **Critically Imperiled** - At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.

G2 - **Imperiled** - At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.

G3 - **Vulnerable** - At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.

G4 - **Apparently Secure** - Uncommon but not rare; some cause for long-term concern due to declines or other factors.

G5 - **Secure** - Common; widespread and abundant.

G? - Status unknown

Variant Ranks

G#G# - **Range Rank** - A numeric range rank (e.g., G2G3) is used to indicate the range of uncertainty in the status of a species or community. Ranges cannot skip more than one rank (e.g., GU should be used rather than G1G4).

GU - **Unrankable** - Currently unrankable due to lack of information or due to substantially conflicting information about status or trends. Whenever possible, the most likely rank is assigned and the question mark qualifier is added (e.g., G2?) to express uncertainty, or a range rank (e.g., G2G3) is used to delineate the limits (range) of uncertainty.

GNR - **Unranked** - Global rank not yet assessed.

GNA - **Not Applicable** - A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

Rank Qualiifiers

? - **Inexact Numeric Rank -** Denotes inexact numeric rank (e.g., G2?)

Q - **Questionable taxonomy that may reduce conservation priority -** Distinctiveness of this entity as a taxon or ecosystem type at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or inclusion of this taxon or type in another taxon or type, with the resulting taxon having a lower-priority (numerically higher) conservation status rank. The "Q" modifier is only used at a global level and not at a national or subnational level.

C - **Captive or Cultivated Only** - At present extant only in captivity or cultivation, or as a reintroduced population not yet established.

T#- **Infraspecific Taxon** (trinomial)—The status of infraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank. Rules for assigning T-ranks follow the same principles outlined above for global conservation status ranks. For example, the global rank of a critically imperiled subspecies of an otherwise widespread and common species would be G5T1. A T-rank cannot imply the subspecies or variety is more abundant than the species as a whole-for example, a G1T2 cannot occur. A vertebrate animal population, such as those listed as distinct population segments under under the U.S. Endangered Species Act, may be considered an infraspecific taxon and assigned a T-rank; in such cases a Q is used after the T-rank to denote the taxon's informal taxonomic status.

State or Subnational rankings:

Basic Ranks

SX - **Presumed Extirpated**—Species or community is believed to be extirpated from the nation or state/province. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.

SH - **Possibly Extirpated** (Historical)—Species or community occurred historically in the nation or state/province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years. A species or community could become NH or SH without such a 20-40 year delay if the only known occurrences in a nation or state/province were destroyed or if it had been extensively and unsuccessfully looked for. The NH or SH rank is reserved for species or communities for which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurrences.

S1 - **Critically Imperiled** - Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.

S2 - **Imperiled** - Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

S3 - **Vulnerable** - Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

S4 - **Apparently Secure** - Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5 - **Secure** - Common; widespread and abundant in the nation or state/province.

SNR - **Unranked** - Nation or state/province conservation status not yet assessed.

SU - **Unrankable** - Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

SNA - **Not Applicable** - A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

S#S# - **Range Rank** - A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU should be used rather than S1S4).

Not Provided - Species is known to occur in this nation or state/province. Contact the relevant natural heritage program for assigned conservation status.

Breeding Status Qualifiers

B - **Breeding** - Conservation status refers to the breeding population of the species in the nation or state/province.

N - **Nonbreeding** - Conservation status refers to the non-breeding population of the species in the nation or state/province.

M - **Migrant** - Migrant species occurring regularly on migration at particular staging areas or concentration spots where the species might warrant conservation attention. Conservation status refers to the aggregating transient population of the species in the nation or state/province.

Other Qualifiers

? - **Inexact Numeric Rank -** Denotes inexact or uncertain numeric rank. (The ? qualifies the character immediately preceding it in the S-rank.)

There does not appear to be any limitations that could be placed in this permit that would have any impact on any of the species listed above.

II. GENERAL INFORMATION

A. The effluent from this facility may be subject to the requirements of any of the following regulations: R.61-9.125, 129, 133, and 403; 40 CFR Part 136; Subchapter N (40 CFR Parts 400 through 402 and 404 through 471); R.61-9.503, R.61-9.504 and R.61-9.505.

B. Authority: This permit is written in accordance with applicable laws and regulations including, but not limited to, Regulation 61-9, Regulation 61-68, Pollution Control Act and Clean Water Act.

C. Under R.61-9.124.8 (Fact Sheet), a fact sheet shall be prepared for every draft permit for a major NPDES facility or activity, for every Class I sludge management facility, for every NPDES draft permit that incorporates a variance or requires an explanation under section 124.56(b), and for every draft permit which the Department finds is the subject of wide-spread public interest or raises major issues. The Rationale will be included as an attachment to the Fact Sheet prepared under this regulation.

D. The conclusions noted in the Rationale establish proposed effluent limitations and permit requirements addressed in R.61-9.122.43 (Establishing Permit Conditions), R.61-9.122.44 (Establishing Limitations, Standards and other permit conditions) and other appropriate sections of R.61-9.

III. BACKGROUND AND PROCEDURES FOR PERMIT LIMIT DEVELOPMENT

A. The receiving waterbody 7Q10, annual average flow or other critical flow condition at the discharge point, and 7Q10, annual average flow, or other critical flow condition for source water protection are determined by the SCDHEC's Wasteload Allocation Section. The 7Q10, Annual Average Flow or other critical flow conditions are based on information published or verified by the USGS, an estimate extrapolation from published or verified USGS data or from data provided by the permittee. These flows may be adjusted by the Wasteload Allocation Section to account for existing water withdrawals that impact the flow. The 7Q10 (or 30Q5 if provided by the applicant), annual average flow at the discharge point, or other critical flow condition or 7Q10 (or 30Q5 if provided by the applicant), annual average flow or other critical flow condition for source water protection for a proposed or existing surface water drinking water intake will be used to determine dilution factors, as appropriate, in accordance with R.61-68.C.4.a & 4.b for aquatic life, human health, and organoleptic effects respectively.

B. Water and organism consumption and drinking water MCL criteria will be evaluated for protection of human health when calculating dilution factors. "The Department may, after Notice of Intent included in a notice of a proposed NPDES permit in accordance with Regulation 61-9.124.10, determine that drinking water MCLs or W/O shall not apply to discharges to those waterbodies where there is: no potential to affect an existing or proposed drinking water source and no state-approved source water protection area." For permitting purposes, "a proposed drinking water source is one for which a complete permit application, including plans and specifications for the intake, is on file with the Department at the time of consideration of an NPDES permit application for a discharge that will affect or has the potential to affect the drinking water source" (R.61-68.E.14.c(5)).

The Department will implement this protection in NPDES permits using the source water protection program already developed for the drinking water program. A source water protection program was developed originally in 1999 to define the source water protection areas for each drinking water intake. The program was designed to identify source water protection areas (SWPAs) to aid drinking water systems in identifying sources of potential contamination that could affect their intakes. In September 2009, this program was modified to redefine the SWPAs as smaller, more manageable areas. The revised document developed in September 2009 is entitled "South Carolina Drinking Water Source Assessment and Protection Program." For the purposes of NPDES permitting, the SWPA referred to in Regulation 61-68.E.14.c(5) is the Primary Protection Area defined in the revised assessment and protection document. More information regarding the use of these protection areas is provided later in this rationale with the discussion of the procedure for establishing permit limits in Section G.2.

C. Application of numeric criteria to protect human health: If separate numeric criteria are given for organism consumption, water and organism consumption (W/O), and drinking water Maximum Contaminant Levels (MCLs), they shall be applied as appropriate. The most stringent of the criteria shall be applied to protect the existing and classified uses of the waters of the State. See R.61-68.E.14.b(1).

D. Numeric criteria have been established in R.61-68 based on organoleptic data (prevention of undesirable taste and odor). For those substances which have aquatic life and/or human health numeric criteria and organoleptic numeric criteria, the most stringent of the three shall be used for derivation of permit effluent limitations. See R.61-68.E.13.

E. Sampling Frequency: Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. Monitoring results must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in the permit (R.61-9.122.41). Typically requirements to report monitoring results shall be established on a case-by-case basis with a frequency dependent on the nature and effect of the discharge but in no case less than once a year (R.61-9.122.44)

F. Compliance Schedules:

1. A person issued an NPDES permit by the Department who is not in compliance with applicable effluent standards and limitations or other requirements contained therein at the time the permit is issued, shall be required to achieve compliance within a period of time as set forth by the Department, with effluent standards and limitations, with water quality standards, or with specific requirements or conditions set by the Department. The Department shall require compliance with terms and conditions of the permit in the shortest reasonable period of time as determined thereby or within a time schedule for compliance which shall be specified in the issued permit.

2. If a time schedule for compliance specified in an NPDES permit which is established by the Department, exceeds nine (9) months, the time schedule shall provide for interim dates of achievement for compliance with certain applicable terms and conditions of the permit. (R.61-9.122.47)

G. Procedure for establishing effluent limitations:

1. Effluent limits (mass and concentration) for Five-day Biochemical Oxygen Demand (BOD_5), Ultimate Oxygen Demand (UOD), Dissolved Oxygen (DO), Total Ammonia Nitrogen (as N), and Nutrients are established by the Wasteload Allocation (WLA) Section, with consideration given to technology-based limitations.

   a. Five-day Biochemical Oxygen Demand BOD_5, Ultimate Oxygen Demand (UOD), Dissolved Oxygen (DO):

      Effluent limits for conventional oxygen demanding constituents (BOD_5, UOD and DO) are established to protect in-stream water quality and uses, while utilizing a portion of the assimilative capacity of the receiving water. The ability of a water body to assimilate oxygen-demanding substances is a function of its physical and chemical characteristics above and below the discharge point. Various mathematical techniques, called models, have been developed to estimate this capacity. The Department follows the procedures as outlined in the "State/EPA Region IV Agreement on the Development of Wasteload Allocations/Total Maximum Daily Loads and NPDES Permit Limitations" dated October 30, 1991 (as updated) for determining the assimilative capacity of a given water body. Mathematical models such as QUAL2E and QUAL2E-UNCAS are used in accordance with "Enhanced Stream Water Quality Models QUAL2E and QUAL2E-UNCAS: Documentation and Users Manual" (EPA/600/3-87/007; dated May 1987) as updated. BOD_5 and UOD values determined from modeling results will be used in permitting as monthly average derived limits (C_{wla}). Daily maximum derived limits will be determined by multiplying the monthly average value by two.

      For facilities subject to effluent guidelines limitations or other technology-based limitations, BOD_5 will also be evaluated in accordance with the applicable industrial categorical guidelines. These parameters will be identified in Part III of this rationale when they are applicable to the permit.

   b. Total Ammonia Nitrogen (as N):

      Ammonia limitations based on oxygen demand will be determined from modeling information as described above. These values will be used as monthly average derived limits and a daily maximum will be determined by multiplying the monthly average derived limit by two. These values will be compared with the ammonia water quality criteria for protection of aquatic life from Regulation 61-68 and any categorical limitations. The more stringent of the limitations will be imposed. Calculations for aquatic life criteria and other wasteload recommendations will be shown in Part I of this rationale when ammonia is a pollutant of concern.

   c. Discharges of Nutrients:

      In order to protect and maintain lakes and other waters of the State, consideration is given to the control of nutrients reaching the waters of the State. Therefore, in accordance with regulation R.61-68.E.11**,** the Department controls the nutrients as prescribed below. Nutrient limitations will be determined from the best available information and/or modeling performed by the Wasteload Allocation Section to meet these water quality standards.

i. Discharges of nutrients from all sources, including point and nonpoint, to waters of the State shall be prohibited or limited if the discharge would result in or if the waters experience growths of microscopic or macroscopic vegetation such that the water quality standards would be violated or the existing or classified uses of the waters would be impaired. Loading of nutrients shall be addressed on an individual basis as necessary to ensure compliance with the narrative and numeric criteria.

ii. Numeric nutrient criteria for lakes are based on an ecoregional approach which takes into account the geographic location of the lakes within the State and are listed below. These numeric criteria are applicable to lakes of 40 acres or more. Lakes of less than 40 acres will continue to be protected by the narrative criteria.

1. for the Blue Ridge Mountains ecoregion of the State, total phosphorus shall not exceed 0.02 mg/l, chlorophyll *a* shall not exceed 10 ug/l, and total nitrogen shall not exceed 0.35 mg/l

2. for the Piedmont and Southeastern Plains ecoregions of the State, total phosphorus shall not exceed 0.06 mg/l, chlorophyll *a* shall not exceed 40 ug/l, and total nitrogen shall not exceed 1.50 mg/l

3. for the Middle Atlantic Coastal Plains ecoregion of the State, total phosphorus shall not exceed 0.09 mg/l, chlorophyll *a* shall not exceed 40 ug/l, and total nitrogen shall not exceed 1.50 mg/l.

iii. In evaluating the effects of nutrients upon the quality of lakes and other waters of the State, the Department may consider, but not be limited to, such factors as the hydrology and morphometry of the waterbody, the existing and projected trophic state, characteristics of the loadings, and other control mechanisms in order to protect the existing and classified uses of the waters.

iv. The Department shall take appropriate action, to include, but not limited to: establishing numeric effluent limitations in permits, establishing Total Maximum Daily Loads, establishing waste load allocations, and establishing load allocations for nutrients to ensure that the lakes attain and maintain the above narrative and numeric criteria and other applicable water quality standards.

v. The criteria specific to lakes shall be applicable to all portions of the lake. For this purpose, the Department shall define the applicable area to be that area covered when measured at full pool elevation.

2. Effluent concentration limits (C_{efflim}) for parameters other than the parameters listed in G.1.a-c above are established using the following procedures:

Q_{7Q10} 7Q10 or other critical flow condition of the receiving water at the discharge point in mgd. (may require adjustment for withdrawals)

AAF_d Average Annual Flow (AAF) or other critical flow condition of the receiving water at the discharge point in mgd. (may require adjustment for withdrawals)

Q_{7Q10i} 7Q10 or other critical flow condition of the receiving water at the SWP Area boundary in mgd.

AAF_i Average Annual Flow (AAF) or other critical flow condition of the receiving water at the SWP Area boundary in mgd.

Q_d Long term average discharge flow in mgd.

a. Determine dilution factors, where not provided by modeling:
The following information is to be used (where applicable) for establishing effluent concentration limits:

DF_1: This dilution factor is based on 7Q10 or other critical flow condition of the receiving water at the discharge point (Q_{7Q10}). This dilution factor is used to determine the derived limits for protection of the following aquatic life and human health concerns for the reasons indicated:

i. Aquatic Life (see R.61-68.C.4.a(1)). Protection of aquatic life on a short-term basis is needed at the point where aquatic organisms become exposed to the discharge.

ii. Human Health – Organism Consumption for parameters identified as non-carcinogens per R.61-68.C.4.b(1). Protection for human health on a short-term basis for consumption of aquatic organisms is needed at the point the aquatic organisms become exposed to the discharge.

$$DF_1 = \left(\frac{Q_{7Q10} + Q_d}{Q_d} \right)$$

DF_2: This dilution factor is based on the Average Annual Flow of the receiving water at the discharge point (AAF_d). This dilution factor is used to determine the derived limits for protection of the following human health and organoleptic concerns for the reasons indicated:

i. Human Health – Organism Consumption for parameters identified as carcinogens per R.61-68.C.4.b(1). Protection for human health on a long-term basis to prevent cancer due to consumption of aquatic organisms is needed at the point the aquatic organisms become exposed to the discharge.

ii. Organoleptic effects per R.61-68.C.4.b(1). Protection for taste and odor issues related to the discharge is needed at the point where the discharge enters the receiving water.

$$DF_2 = \left(\frac{AAF_d + Q_d}{Q_d} \right)$$

DF_3: This dilution factor is based on the 7Q10 or other critical flow condition (Q_{7Q10i}) for protection of a proposed or existing surface water drinking water intake that the discharge has the potential to affect. This dilution factor is used to determine the derived limits for protection of the following human health concerns for the reasons indicated:

i. Human Health – Water and Organism (W/O) Consumption for parameters identified as non-carcinogens per R.61-68.C.4.b(1) and E.14.c(5) to protect for short-term health effects when the discharge has the potential to affect a surface water drinking water intake. Protection of human health relative to drinking the water from the waterbody and consuming aquatic organisms from the same waterbody is provided by this criterion, but drinking the water withdrawn from the waterbody may require a higher level of protection in terms of applicable dilution than consumption of organisms.

ii. Human Health - Drinking Water Maximum Contaminant Level (MCL) for parameters identified as non-carcinogens per R.61-68.C.4.b(1) and E.14.c(5) to protect for short-term health effects when the discharge has the potential to affect a surface water drinking water intake. Protection of human health relative to drinking the water from the waterbody after conventional treatment per R.61-68.G is provided by this criterion.

$$DF_3 = \left(\frac{Q_{7Q10i} + Q_d}{Q_d} \right)$$

DF4: This dilution factor is based on the Average Annual Flow or other critical flow condition (*AAFi*) for protection of a proposed or existing surface water drinking water intake that the discharge has the potential to affect. This dilution factor is used to determine the derived limits for protection of the following human health concerns for the reasons indicated:

i. Human Health–Water and Organism Consumption for parameters identified as carcinogens per R.61-68.C.4.b(1) and E.14.c(5) to protect for long-term health effects due to cancer when the discharge has the potential to affect a surface water drinking water intake. Protection of human health relative to drinking the water from the waterbody and consuming aquatic organisms from the same waterbody is provided by this criterion, but drinking the water withdrawn from the waterbody may require a higher level of protection in terms of applicable dilution than consumption of organisms.

ii. Human Health - Drinking Water Maximum Contaminant Level (MCL) for parameters identified as carcinogens per R.61-68.C.4.b(1) and E.14.c(5) to protect for long-term health effects due to cancer when the discharge has the potential to affect a surface water drinking water intake. Protection of human health relative to drinking the water from the waterbody after conventional treatment per R.61-68.G is provided by this criterion.

$$DF_4 = \left(\frac{AAF_i + Q_d}{Q_d} \right)$$

For both *DF3* and *DF4*, to satisfy the mixing zone requirements of R.61-68.C.10(a) for both W/O and MCL criteria, the Department will use the following flows to determine dilution:

1. The following applies to discharges and intakes in flowing rivers:

    a. Where the discharge is within the SWPA (15 river miles) of the intake, the flow at the 15-river mile boundary of the tributary with the largest applicable critical flow will be used.

    b. Where the discharge is outside the SWPA (15 river miles) of the intake, the applicable critical flow at the intake will be used.

2. When the discharge is either in the tributary to a lake or in a lake and the intake is in the same lake that does not behave as a run-of- river impoundment*, the flow is determined using the sum of the applicable critical flows of all tributaries entering the lake.

3. The following applies when both the discharge and the intake are in a lake arm that behaves as a run-of-river impoundment*:

    a. Where the discharge is within the SWPA (15-mile buffer which may include both lake and river miles) of the intake, the flow at the 15-mile boundary of the tributary with the largest applicable critical flow will be used.

    b. Where the discharge is outside the SWPA (15-mile buffer which may include both lake and river miles) of the intake, the applicable critical flow at the intake will be used.

4. Where the discharge is in the arm of a lake and the intake is in the upper reach of another arm of the lake, no protection of W/O or MCL criteria is needed because the discharge does not have the potential to affect the intake,

5. If the discharge has the potential to affect multiple intakes, the SWPA of the intake closest to the discharge will be protected. However, the permittee may be required to provide notification to all potentially affected intakes.

6. When the discharge is in a tidally influenced waterbody, the flow may be determined on a case-by-case basis and the 7Q10 and AAF for source water protection will be specified [and may not use the 15 mile buffer listed above]. The determination of the source water protection area will be made using available data and taking into consideration tidal conditions.

    * Run-of-river impoundment is defined as a lake or reservoir (or arm of a lake or reservoir) that is narrow and/or shallow offering little dilution or delay in contaminant flow toward an intake.

b. Determine derived limits using the following procedures:

WQS_{al} Receiving water Standard (based on an established criteria or other published data per R.61-68) for protection of Aquatic Life; may be a CCC or CMC as defined below

WQS_{org} Receiving water Standard (based on an established criteria or other published data per R.61-68) for protection of Human Health – Organism Consumption

WQS_{wo} Receiving water Standard (based on an established criteria or other published data per R.61-68), for protection of Human Health – Water & Organism Consumption. Applicable

only if any portion of the mixing zone for this discharge is in a state-approved source water protection area for a proposed or existing water intake downstream of the discharge point.

WQS_{mcl} Receiving water Standard (based on an established criteria or other published data per R.61-68), for Drinking Water MCL (Maximum Contaminant Level). Applicable only if any portion of the mixing zone for this discharge is in a state-approved source water protection area for a proposed or existing water intake downstream of the discharge point.

WQS_{ol}: Receiving water Standard (based on an established criteria or other published data per R.61-68), based on Organoleptic Data.

C_{aqlife} Concentration limit derived from aquatic life data

C_{HH} Concentration limit derived from human health data as determined from organism (C_{org}), water/organism (C_{wo}) and MCL (C_{mcl}) data

C_{ol} Concentration limit derived from organoleptic data

C_b Background concentration of the concerned parameter in mg/l is typically determined from ambient monitoring data or data provided by applicant. If the waterbody to which the discharge flows is not on the 303(d) list, the 90th percentile of ambient monitoring data for aquatic life protection for the parameters identified in the Appendix (Water Quality Numeric Criteria) to Regulation 61-68 from the last 3 years, or whatever is available if less than 3 years, will typically be used. If the waterbody to which the discharge flows is not on the 303(d) list, the median value of ambient monitoring data for human health protection for the parameters identified in the Appendix (Water Quality Numeric Criteria) to Regulation 61-68 from the last 3 years, or whatever is available if less than 3 years, will typically be used. The background concentration is assumed to be zero (0) in the absence of actual data based on Departmental guidance and EPA recommendation.

i. Determine the derived limits for protection of Aquatic Life (C_{aqlife})

1. The following guidelines apply to determining aquatic life limits using this basic equation:

$$C_{aqlife} = (DF_1 \times WQS_{al}) - \left\{ C_b \times \left(\frac{Q_{7Q10}}{Q_d} \right) \right\}$$

a. Typically, the Criterion Maximum Concentration (CMC) is applied as a daily maximum derived limit and the Criterion Continuous Concentration (CCC) is applied as a monthly average derived limit, after consideration of dilution and background concentrations. The CMC and CCC for specific metals will be adjusted using the procedures in 60 FR 22229, "Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants; States' Compliance-Revision of Metals Criteria," May 4, 1995 and the "Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria," Oct. 1, 1993 and applied as a daily maximum and monthly average, respectively, after consideration of dilution and background concentrations. For specific metals, this calculation is explained in detail later in this rationale.

monthly average = C_{aqlife} using CCC as WQS_{al}
daily maximum = C_{aqlife} using CMC as WQS_{al}

b. If only a CMC exists for a particular parameter, the daily maximum derived permit limit will be set using that value, after consideration of dilution and background concentrations. If no other values (e.g., human health) exist for that parameter on which to base a monthly average limit and the discharge is continuous, the monthly average will be set equal to the daily maximum to satisfy Regulation 61-9.122.45(d). In no case shall the monthly average limit be set higher than the daily maximum limit. If only a CCC is given, it will be used as a monthly average derived limit and the daily maximum derived limit will be two (2) times the value obtained for the monthly average based on a simplified statistical procedure for determining permit limits recommended in Section 5.4.2 of the US EPA's "Technical Support Document for Water Quality-based Toxics Control", EPA/505/2-90-001, March 1991 (hereafter known as the TSD).

If a CCC exists and no CMC exists and no other acute or chronic data exists, the aquatic life limits are

monthly average = C_{aqlife} using CCC as WQS_{al}
daily maximum = 2 x C_{aqlife}

If a CMC and no CCC exists, and no other acute or chronic data exists, the aquatic life limits are

monthly average = C_{aqlife} using CMC as WQS_{al}
daily maximum = C_{aqlife} using CMC as WQS_{al}

c. If only an acute toxicity effect concentration for a number of species for a particular pollutant is given as a LC_{50}, the lowest concentration should be divided by an acute-to-chronic ratio (ACR) of 10 and a sensitivity factor of 3.3, for an acceptable instream concentration in order to protect against chronic toxicity effects (R.61-68.E.16.a(1)). Other acute toxicity data will be handled similarly. The value obtained from this calculation will be used as a monthly average derived limit after consideration of dilution and background concentrations. The daily maximum will be two (2) times the value obtained for the monthly average based on a simplified statistical procedure for determining permit limits recommended in Section 5.4.2 of the TSD.

monthly average = C_{aqlife} using other data as WQS_{al}
daily maximum = 2 x C_{aqlife}

d. If a chronic toxicity effect concentration for a number of species for a particular pollutant is given as a no observed effect concentration (NOEC), the lowest concentration should be divided by a sensitivity factor of 3.3 in order to protect against chronic toxicity to the most sensitive species (R.61-68.E.16.a(2)). Other chronic toxicity data will be handled similarly. The value obtained from this calculation will be used as a monthly average derived limit after consideration of dilution and background concentrations. The daily maximum will be two (2) times

the value obtained for the monthly average based on a simplified statistical procedure for determining permit limits recommended in Section 5.4.2 of the TSD.

monthly average = C_{aqlife} using other data as WQS_{al}
daily maximum = 2 x C_{aqlife}

e. If both acute and chronic data are available for a particular pollutant, monthly average derived limit will be calculated as in c and d above for each acute and chronic, respectively. The more stringent of the monthly average derived limits will be the monthly average derived limit used after consideration of dilution and background concentrations. The daily maximum will be two (2) times the value obtained for the monthly average based on a simplified statistical procedure for determining permit limits recommended in Section 5.4.2 of the TSD.

monthly average = C_{aqlife} using other data as WQS_{al}
daily maximum = 2 x C_{aqlife}

f. Consider the background concentration (C_b) of the parameter of concern. If the background concentration is equal to or greater than the applicable standard (*WQS,* as defined above) for the parameter of concern, then the derived concentration limit (C_{aqlife}) for that parameter is established equal to the standard (*WQS*) so that no additional amount of that pollutant is added to the waterbody. An exception exists where the naturally occurring instream concentration for a substance is higher than the derived permit effluent limitation. In those situations, the Department may establish permit effluent limitations (C_{efflim}) at a level higher than the derived limit, but no higher than the natural background concentration (i.e. a "rise above background" limit). In such cases, the Department may require biological instream monitoring and/or whole effluent toxicity (WET) testing (R.61-68.E.14.c(2)).

If C_b is not based on naturally occurring concentrations and

$$C_b \geq WQS$$

Then, generally,

$$C_{\text{aqlife}} = WQS.$$

If C_b is based on naturally occurring concentrations and

$$C_b \geq WQS$$

Then, generally,

$$C_{\text{aqlife}} < C_{eff\ \text{lim}} \leq C_b.$$

2. Metals: Regulation 61-9.122.45(c) requires that permit limits be expressed in terms of total recoverable metal (with limited exceptions). In order to translate from the water quality criterion to a total recoverable metal, Regulation R.61-68.E.14.c(4) provides for the use of the EPA Office of Water Policy and "Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria", October 1, 1993. A subsequent revision published in the Federal Register (60 FR 22229) on May 4, 1995 updated the data in the original report. See R.61-68 Appendix for CMC and CCC values and equations,

Attachment 1 for "Conversion Factors for Dissolved Metals" and Attachment 2 "Parameters for Calculating Freshwater Dissolved Metals Criteria that are Hardness-Dependent".

Per R.61-68.E.14.a(3), the CMC and CCC are based on a hardness of 25 mg/l if the ambient or mixed stream hardness is equal to or less than 25 mg/l. Concentrations of hardness less than 400 mg/l may be based on the mixed stream hardness if it is greater than 25 mg/l and less than 400 mg/l and 400 mg/l if the ambient stream hardness is greater than 400 mg/l. The ambient stream hardness is assumed to be 25 mg/l in the absence of actual stream data. Mixed stream hardness may be determined using flow-weighted effluent hardness and stream hardness.

The following equations and constants will be used to calculate aquatic life metals limits based on these documents. The values of the terms referenced in this section and determined from the equations below are included in the Metals spreadsheet attached to this rationale.

a. Freshwater: The following metals are subject to this section:

arsenic	lead
cadmium	mercury
chromium (III & VI)	nickel
copper	zinc

The equation for C_d below changes the total metal to dissolved metal. From Technical Guidance Manual for Performing Waste Load Allocations Book II, Rivers and Streams, EPA/440/484/022.

$$S = CCC \; or \; CMC \quad \text{(adjusted for hardness)}$$
$$C_d = S \times CF$$

where C_d = Dissolved metal concentration (µg/l)
S = a constant to represent the CCC or CMC (µg/l)
CF = Conversion factor considered most relevant in fresh water for aquatic life as defined by EPA for each metal

Once the dissolved metal concentration is known, determine C_p using the equation for C_d above and the following equations.

$$C_p = C_d \times \left\{1 + \left(K_{pb} \times TSS_b \times 10^{-6}\right)\right\}$$

$$K_{pb} = K_{po} \times (TSS_b)^a$$

where C_p = Particulate sorbed metal concentration (µg/l). This value represents the revised water quality criterion for the metal to be used for ambient data comparison.

K_{pb} = Linear partition coefficient using the stream TSS (liters/mg)
K_{po} = Metal-specific equilibrium constant (liters/mg)
a = Metal-specific constant
TSS_b = Background or in-stream Total Suspended Solids (TSS) concentration (mg/l). The background TSS is assumed to be 1 mg/l in the absence of actual instream data based on the 5th percentile of ambient TSS data on South Carolina waterbodies from 1993-2000.

To determine the effluent limit (C_{aqlife}), use the following equations to translate the limits into a total recoverable metal concentration.

$$TSS_{avg} = \frac{(Q_d \times TSS_e) + (Q_{7Q10} \times TSS_b)}{Q_d + Q_{7Q10}}$$

where TSS_e = Effluent Total Suspended Solids (TSS) concentration (mg/l) determined from actual long-term average data or proposed permit limits if no data available.
TSS_{avg} = Average in-stream (mixed) TSS concentration (mg/l)

$$C_t = C_d \times \left\{1 + \left(K_p \times TSS_{avg} \times 10^{-6}\right)\right\}$$

$$K_p = K_{po} \times (TSS_{avg})^a$$

where C_t = Total metal concentration (µg/l)
K_p = Linear partition coefficient (liters/mg). This is the distribution of metal at equilibrium between the particulate and dissolved forms.

Once C_t has been calculated, it is multiplied by DF_1 and background concentrations are accounted for to obtain the derived limit (max or avg) (C_{aqlife}):

$$C_{aqlife} = (C_t \times DF_1) - \left\{C_b \times \left(\frac{Q_{7Q10}}{Q_d}\right)\right\}$$

monthly average = C_{aqlife} based on CCC
daily maximum = C_{aqlife} based on CMC

b. Saltwater: So that metals may be expressed in terms of total recoverable metal as required by R.61-9.122.45(c), the saltwater CCC and CMC will be used in the calculation of limits for all other parameters not included in paragraph 2 above. Monthly average derived limits (C_{aqlife}) for aquatic life protection are calculated as follows:

$$C_{aqlife} = (DF_1 \times WQS_{al}) - \left\{ C_b \times \left(\frac{Q_{7Q10}}{Q_d} \right) \right\}$$

c. The more stringent of the freshwater and saltwater values derived above for each pollutant will be used so that all waters are protected.

3. Where a Water Effects Ratio (WER) is used to adjust a criterion, derived limits for the adjusted aquatic life criterion ($C_{aqlife\text{-}adj}$) are calculated as follows. The WER is a type of site-specific permit effluent limit, as allowed by R.61-68.E.14.c(7), derived using a ratio determined from EPA methodology. Both DHEC and EPA must approve the WER prior to implementation. See EPA's 1994 "Interim Guidance on the Determination and Use of Water-Effect Ratios (WERs) for Metals." The approved WER will be shown in the water quality spreadsheets on the Data sheet. The revised aquatic life value will be shown with the WER, hardness and dissolved metals adjustments, as appropriate, in the aquatic life columns on the Pollutant spreadsheet.

   a. For metals identified in #2 above, revise the equation for S as follows:

      S = [CCC or CMC (adjusted for hardness)] x WER

      Follow the remaining calculations in #2 above to get an adjusted C_{aqlife} value that will be used to determine derived limits:

      monthly average = $C_{aqlife\text{-}adj}$ based on CCC
      daily maximum = $C_{aqlife\text{-}adj}$ based on CMC

   b. For other parameters, use the appropriate equation in #1 above to derive an adjusted C_{aqlife} value. The monthly average will be calculated as follows using the appropriate WQS_{al} and the daily maximum calculated using the appropriate equations in #1 above.

$$C_{aqlife-adj} = (DF_1 \times WQS_{al} \times WER) - \left\{ C_b \times \left(\frac{Q_{7Q10}}{Q_d} \right) \right\}$$

4. Where the Recalculation Procedure is used to adjust a criterion, derived limits for the adjusted aquatic life criterion ($C_{aqlife\text{-}adj}$) are calculated as follows. The Recalculation Procedure is intended to cause a site-specific criterion to appropriately differ from the State-adopted national aquatic life criterion if justified by demonstrated pertinent toxicological differences between the aquatic species that occur at the site and those that were used in the derivation of the criterion. It is important to note that the site (the portion of the waterbody or watershed being affected) must be clearly defined. This type of site-specific effluent limit is allowed by R.61-68.E.14.c(7) Both DHEC and EPA must approve the recalculation prior to implementation.

   The approved recalculated aquatic life criteria (*SS*-CCC and *SS*-CMC, as appropriate) will be shown adjusted for hardness on the Data spreadsheet. The additional dissolved

metals adjustments, as appropriate, will be shown in the aquatic life columns on the Pollutant spreadsheet. If the parameter being adjusted is one of the metals in #2 above, SS will include all the appropriate metals adjustments.

$$C_{aqlife-adj} = (DF_1 \times SS - \left\{ C_b \times \left(\frac{Q_{7Q10}}{Q_d} \right) \right\}$$

monthly average = $C_{aqlife-adj}$ based on CCC
daily maximum = $C_{aqlife-adj}$ based on CMC

5. Where a WER and recalculation procedure are combined to adjust a criterion, derived limits ($C_{aqlife-adj}$) for aquatic life protection are calculated by combining the calculations in #3 and #4.

$$C_{aqlife-adj} = (DF_1 \times SS \times WER) - \left\{ C_b \times \left(\frac{Q_{7Q10}}{Q_d} \right) \right\}$$

monthly average = $C_{aqlife-adj}$ based on CCC
daily maximum = $C_{aqlife-adj}$ based on CMC

6. Other scientifically defensible methods for developing site-specific aquatic life effluent limits or site-specific criterion may be used on a case-by-case basis.

ii. Determine derived limits for protection of Human Health

1. The following guidelines apply to determining human health limits:

a. The human health criterion given by Regulation 61-68 will be applied as a monthly average derived limit after consideration of dilution and background concentrations (C_{HH-avg}). Exceptions exist based on EPA criteria and are indicated for specific parameters. No limits on human health based on water and organism consumption or drinking water MCLs will be imposed if there is no potential to affect an existing or proposed surface water drinking water intake and no state-approved source water protection area in accordance with Regulation 61-68.E.14.c(5).

b. The daily maximum permit limit will be determined from the monthly average value from (a) above and a multiplier (*M)* determined using a statistical procedure recommended in Section 5.5 using average = 95th percentile from Table 5-3 in the TSD. The permitted or proposed number of samples per month (n) is used with the coefficient of variation (CV) to determine *M*.

$$M = \frac{e^{(Z_m\sigma - 0.5\sigma^2)}}{e^{(Z_a\sigma_n - 0.5\sigma_n^{\ 2})}}$$

where:

$$\sigma_n^{\,2} = \ln\left(\frac{CV^2}{n} + 1\right)$$

$$\sigma^{\,2} = \ln\left(CV^2 + 1\right)$$

CV = coefficient of variation of the effluent concentration. For a data set where *n*>10, the *CV* is calculated as standard deviation divided by mean for the data set being evaluated. For data set where *n*<10, the *CV* is estimated to equal 0.6. For less than 10 items of data, the uncertainty in the *CV* is too large to calculate a standard deviation or mean with sufficient confidence.

n = the number of effluent samples per month (where frequency is less than 1/month, *n* =1)

z_m = the percentile exceedance probability for the daily maximum permit limit (=2.326 for 99th percentile basis)

z_a = the percentile exceedance probability for the monthly average permit limit (=1.645 for 95th percentile basis)

$C_{HH\text{-}max} = M * C_{HH\text{-}avg}$

c. Consider the background concentration (C_b) of the parameter of concern. If the background concentration is equal to or greater than the applicable standard (*WQS,* as defined above) for the parameter of concern, then the derived concentration limit (C_{HHe}) for that parameter and for the protection of that standard is established equal to the standard (*WQS*). An exception exists where the naturally occurring instream concentration for a substance is higher than the derived permit effluent limitation. In those situations, the Department may establish permit effluent limitations (C_{efflim}) at a level higher than the derived limit, but no higher than the natural background concentration (i.e. a "rise above background" limit). In such cases, the Department may require biological instream monitoring and/or whole effluent toxicity (WET) testing (See R.61-68.E.14.c(3)).

If C_b is not based on naturally occurring concentrations and

$$C_b \geq WQS$$

Then, generally,

$$C_{\mathrm{HH}} = WQS\,.$$

If C_b is based on naturally occurring concentrations and

$$C_b \geq WQS$$

Then, generally,

$$C_{HH} < C_{eff\ \mathrm{lim}} \leq C_b\,.$$

2. Human Health – Organism Consumption (C_{org}).

a. For Carcinogens

The Monthly Average is calculated as follows:

$$C_{org} = (DF_2 \times WQS_{org}) - \left\{ C_b \times \left(\frac{AAF_d}{Q_d} \right) \right\}$$

The Daily Maximum is calculated as

$C_{org\text{-}max} = M * C_{org}$

b. For Non-carcinogens
The Monthly Average is calculated as follows:

$$C_{org} = (DF_1 \times WQS_{org}) - \left\{ C_b \times \left(\frac{Q_{7Q10}}{Q_d} \right) \right\}$$

The Daily Maximum is calculated as

$C_{org\text{-}max} = M * C_{org}$

3. Human Health – Water and Organism Consumption (C_{wo})

a. For Carcinogens
The Monthly Average is calculated as follows:

$$C_{wo} = (DF_4 \times WQS_{wo}) - \left\{ C_b \times \left(\frac{AAF_i}{Q_d} \right) \right\}$$

The Daily Maximum is calculated as

$C_{wo\text{-}max} = M * C_{wo}$

b. For Non-carcinogens
The Monthly Average is calculated as follows:

$$C_{wo} = (DF_3 \times WQS_{wo}) - \left\{ C_b \times \left(\frac{Q_{7Q10i}}{Q_d} \right) \right\}$$

The Daily Maximum is calculated as

$C_{wo\text{-}max} = M * C_{wo}$

4. Human Health – Drinking Water Maximum Contaminant Level (MCL) (C_{mcl}).

a. For Carcinogens

The Monthly Average is calculated as follows:

$$C_{mcl} = (DF_4 \times WQS_{mcl}) - \left\{ C_b \times \left(\frac{AAF_i}{Q_d} \right) \right\}$$

The Daily Maximum is calculated as

$C_{mcl\text{-}max} = M * C_{mcl}$

b. For Non-carcinogens

The Monthly Average is calculated as follows:

$$C_{mcl} = (DF_3 \times WQS_{mcl}) - \left\{ C_b \times \left(\frac{Q_{7Q10i}}{Q_d} \right) \right\}$$

The Daily Maximum is calculated as

$C_{mcl\text{-}max} = M * C_{mcl}$

5. Organoleptic criteria (C_{ol}).

The Monthly Average is calculated as follows:

$$C_{ol} = (DF_2 \times WQS_{ol}) - \left\{ C_b \times \left(\frac{AAF_d}{Q_d} \right) \right\}$$

The Daily Maximum is calculated as

$C_{ol\text{-}max} = M * C_{ol}$

iii. Parameters given in a wasteload allocation for oxygen-demanding pollutants and nutrients will be limited as

monthly average = C_{wla}
daily maximum = 2 x C_{wla}

c. Determine the most stringent of applicable water quality data using the derived limits determined above:

monthly average C_{efflim} = minimum of derived monthly averages (C_{aqlife}, C_{org}, C_{wo}, C_{mcl}, C_{ol} , C_{wla})
daily maximum C_{efflim} = minimum of derived daily maximums (C_{aqlife}, $C_{org\text{-}max}$, $C_{wo\text{-}max}$, $C_{mcl\text{-}max}$, $C_{ol\text{-}max}$, $C_{wla\text{-}max}$)

d. Determine whether the discharge causes, has the reasonable potential to cause or contributes to a water quality violation.

Regulation 61-9.122.44(d)(1)(i) states: "Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Department determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality."

When determining whether a discharge causes, has the reasonable potential to cause or contributes to an instream excursion, the Department will use procedures which account for controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, the sensitivity of the species to toxicity testing (when evaluating whole effluent toxicity), and, where appropriate, the dilution of the effluent in the receiving water (R.61-9.122.44(d)(1)(ii)).

Based on the above statements, there are three scenarios when limitations are required, as follows:

i. When data provided by the permit applicant indicates discharge values greater than the proposed limitation derived above, that discharge may cause an excursion above a narrative or numeric water quality criterion.

ii. A discharge may be determined to contribute to an excursion of a water quality criterion when the waterbody is impaired (e.g., on the 303(d) list) for the parameter of concern and that parameter is also being discharged at levels above the water quality criterion.

iii. Reasonable potential to cause a water quality violation is determined using the following information:

The Department will primarily use EPA's Technical Support Document (TSD) for determining reasonable potential using effluent data. Other methods may be used as well to evaluate data sets. All pollutants given in a wasteload allocation or an effluent limitation guideline will be limited in the permit.

When effluent data consists of non-quantifiable/non-detectable values or when no effluent data is available, other factors and information are considered to determine reasonable potential. In situations where a pollutant is known to be present in the wastestream (due to production data or other information), we know it is being discharged and has the potential to impact even though it may not be quantifiable. The fact that it is present will be enough information to say reasonable potential exists for that pollutant. Therefore, a reasonable potential decision is based on various data and information, and not just non-quantifiable/non-detectable data. Consideration is given to existing data, dilution in the waterbody, type of receiving water, designated use, type of industry/wastestream, ambient data, history of compliance, and history of toxic impact. If any source of information indicates reasonable potential to cause or contribute to an exceedance of the water quality standard, a water quality limit will be established.

Note: The result of the following calculations may indicate that reasonable potential does not exist. However, as stated above, other information may "override" this numerical determination to justify the need for a limit.

1. The procedure for determining reasonable potential from actual effluent data is explained in Box 3-2 on page 53 of the TSD. Multiplying factors are determined from Table 3-2 at a 95% confidence level and 95% probability in Section 3.3.2. The following describes the procedures used for determining reasonable potential for chemical-specific parameters and WET, under certain circumstances. More information on determining reasonable potential for WET is given in Item 2 below.

   Step 1: Data Analysis: The statistical calculations involved in the "Reasonable Potential" analysis require discrete numerical data. The following describes how the effluent data will be used in determining reasonable potential.

   Actual analytical results should be used whenever possible. Results less than detection and quantification should be used as follows:

   a. If the permittee reports results below the practical quantitation limit (PQL) (as defined by the permit), then the reported "less than PQL" value for a given sample is generally assumed to be zero.

   b. If the permittee uses a detection/quantification level that is **greater** than the PQL, then the reported "less than" value for a given sample is generally assumed to be a discrete value equal to the detection/quantification level used by the permittee.

   c. If the reported data consists of both discrete and non-discrete values and/or the data is reported using varying detection/quantification levels, then, generally, a combination of the above two approaches is used, or the data is evaluated in a manner that is most appropriate for that data set.

   Note: For information on the acceptable analytical methods and PQLs please refer to NPDES permit application attachment titled "Practical Quantitation Limits (PQL) and Approved Test Methods."

   Step 2: Using data from the permit application, other data supplied by the applicant and/or Discharge Monitoring Report (DMR) data, determine the total number of observations (n) for a particular set of effluent data and determine the highest value (C_{max}) from that data set. For the monthly average comparison, the data set will include monthly average results and n will be the number of months in which they sampled in the time period being evaluated. For the daily maximum comparison, the data set will include daily maximum results and n will be the total number of samples in the time period being evaluated. Individual results may not necessarily be used in the calculation.

Step 3: Determine the coefficient of variation (*CV*) for the data set. For a data set where *n*>10, the *CV* is calculated as standard deviation divided by mean for the data set being evaluated. For data set where *n*<10, the *CV* is estimated to equal 0.6. For less than 10 items of data, the uncertainty in the *CV* is too large to calculate a standard deviation or mean with sufficient confidence.

$$CV = 0.6 \quad \text{for} \quad n < 10$$

$$CV = \frac{\sigma}{\mu} \quad \text{for} \quad n > 10$$

where: σ = Standard Deviation of the samples
μ = Mean of the samples

Step 4: Determine the appropriate multiplying factor (*MF*) from either Table 3-2 or using the formulae in Section 3.3.2 of the TSD.

a. Determine the percentile represented by the highest concentration in the sample data.

$$p_n = (1 - Confidence\ Level)^{1/n}$$

where: p_n = Percentile represented by the highest concentration in the data
n = number of samples
Confidence Level = 0.95 i.e. 95%

b. Determine the multiplying factor (*MF*), which is the relationship between the percentile described above (C_p) and the selected upper bound of the lognormal effluent distribution, which in this case will be the 95th percentile (C_{95}).

$$MF = \frac{C_{95}}{C_p} = \frac{e^{(Z_{95}\sigma + 0.5\sigma^2)}}{e^{(Z_p\sigma + 0.5\sigma^2)}}$$

where: Z_{95} is the standardized Z-score for the 95th percentile of the standardized normal distribution = 1.645

Z_p is the standardized Z-score for the p^{th} percentile of the standardized normal distribution.(determined in (b) above)

Note: The values of Z-scores are listed in tables for the normal distribution. If using Microsoft® Excel, this can be calculated using the NORMSINV function.

$$\sigma^2 = \ln(CV^2 + 1)$$

$$\sigma = \sqrt{\ln(CV^2 + 1)}$$

Step 5: Multiply the highest value from the data set (C_{max}) by the multiplying factor (*MF*) determined in Step 4 to obtain the maximum receiving water concentration (*RWC*).

$$RWC = C_{\max} \times MF$$

Step 6: *RWC* ≤ Derived limit (C_{efflim}) implies that reasonable potential does not exist.

RWC > Derived limit (C_{efflim}) implies that reasonable potential exists.

2. Reasonable potential for Whole Effluent Toxicity (WET) may be determined from numerical data using the following procedure:

a. When the effluent data is given in terms of percent effluent as an IC_{25}, LC_{50} and/or NOEC values:

Step 1: Convert the given values to toxic units: TU_a for acute data and TU_c for chronic data, respectively, using the following formulae. Please note that an NOEC derived using the IC_{25} is approximately the analogue of an NOEC derived using hypothesis testing. The IC_{25} is the preferred statistical method for determining the NOEC (EPA TSD, March 1991, p.6).

$$TU_a = \frac{100}{LC_{50}}$$

$$TU_c = \frac{100}{NOEC} \quad \text{or} \quad TU_c = \frac{100}{IC_{25}} \text{ if } IC_{25} \text{ available}$$

Step 2: Using DMR data or other data provided by the applicant, determine the total number of observations (*n*) for a particular set of effluent data and determine the highest value ($TU_{a,\,max}$ or $TU_{c,\,max}$) from that data set.

Step 3: Determine the coefficient of variation (*CV*) for the data set. For a data set where *n*>10, the *CV* is calculated as standard deviation divided by mean. For data set where *n*<10, the *CV* is estimated to equal 0.6. For less than 10 items of data, the uncertainty in the *CV* is too large to calculate a standard deviation or mean with sufficient confidence.

Step 4: Determine the appropriate multiplying factor (*MF*) from either Table 3-2 or using the formulae in Section 3.3.2. (see iii.1, Step 4 above).

Step 5: Multiply the highest value of $TU_{a,\,max}$ or $TU_{c,\,max}$ from the data set by the multiplying factor (*MF*) determined in Step 4 and the dilution at the edge of the mixing zone (the test concentration obtained from mixing zone modeling or demonstration) to obtain the maximum receiving water concentration (*RWC*)

RWC for Acute Toxicity = [$TU_{a,\,max}$ * *MF* * *conc. at MZ boundary]*
RWC for Chronic Toxicity = [$TU_{c,\,max}$ * *MF* * *conc. at MZ boundary*]

Step 6: *RWC* for Acute Toxicity ≤ $0.3TU_a$ implies that a reasonable potential does not exist
RWC for Acute Toxicity > $0.3TU_a$ implies that a reasonable potential exists

RWC for Chronic Toxicity ≤ $1.0TU_c$ implies that a reasonable potential does not exist
RWC for Chronic Toxicity >$1.0TU_c$ implies that a reasonable potential exists

b. Other methods for determining reasonable potential may be used if appropriately justified.

e. Consider Effluent Limitations Guidelines (ELG or Categorical guidelines)

The more stringent of the effluent limitations guidelines average and maximum derived limits and water quality-derived average and maximum limits shall be used as permit limits, unless other information indicates more stringent limits are needed (e.g. previous permit limits due to backsliding). Categorical limitations based on mass may be converted to concentration using the long-term average flow of the discharge for comparison to the monthly average and daily maximum derived limits.

1. For effluent guidelines based on production, limits will be calculated as follows:

$$ELG\,\text{lim} = \sum (ELGprod)(ELG) \text{ where}$$

*ELG*lim*:* the mass limit, in lbs/day, for an applicable pollutant based on the production
ELGprod: the production rate, in lbs, for the applicable guideline(s), usually based on long-term average data
ELG: the effluent guideline limitation, given as a measure of production (e.g. lbs/1000 lbs), for an applicable pollutant

2. For effluent guidelines based on flow, limits will typically be calculated as follows:

$$ELG\,\text{lim} = \sum (ELGflow)(ELG)(8.345)$$

*ELG*lim: the mass limit, in lbs/day, for the applicable pollutant based on the applicable flow
ELGflow: the long-term average process flow rate, in MGD, for the applicable guideline(s) (unless otherwise specified in the guideline)
ELG: the concentration limitation, in mg/l, for the applicable pollutant from the applicable guideline(s)

H. Other considerations

1. When the derived permit effluent limitation based on aquatic life numeric criteria is below the practical quantitation limit for a substance, the derived permit effluent limitation shall include an accompanying statement in the permit that the practical quantitation limit using approved analytical methods shall be considered as being in compliance with the limit. Appropriate biological monitoring requirements shall be incorporated into the permit to determine compliance with appropriate water quality standards (R.61-68.E.14.c(2)).

2. When the derived permit effluent limitation based on human health numeric criteria is below the practical quantitation limit for a substance, the derived permit effluent limitation shall include an accompanying statement in the permit that the practical quantitation limit using approved analytical methods shall be considered as being in compliance with the limit (R.61-68.E.14.c(3)).

3. The effluent concentration limits determined above may not necessarily be the NPDES permit limit. NPDES Permit limits are determined after a reasonable potential analysis is conducted using these derived limits and also after evaluating other issues such as anti-backsliding and antidegradation.

4. When mass limits are calculated, the formula to be used is as follows.

*Mass (lb/day) = Flow (mgd) * Concentration (mg/l) * 8.345*

5. Per Regulation 61-9.122.45(d), for continuous discharges all permit effluent limitations, standards, and prohibitions, including those necessary to achieve water quality standards, shall unless impracticable be stated as maximum daily and average monthly discharge limitations for all dischargers other than publicly owned treatment works.

6. Antibacksliding: When a permit is reissued, the terms and conditions of the reissued permit must be at least as stringent as those final limits in the previous permit unless certain exceptions are met (see Regulation 61-9.122.44.l).

IV. PROCEDURES FOR REACHING A FINAL PERMIT DECISION

A. Comment Period (R.61-9.124.10 and 11)

The Department of Health and Environmental Control proposes to issue an NPDES permit to this applicant subject to the effluent limitations and special conditions outlined in this document. These determinations are tentative.

During the public comment period, any interested person may submit written comments on the draft permit to the following address:

SC Dept. of Health and Environmental Control
Water Facilities Permitting Division
Bureau of Water
2600 Bull Street
Columbia, South Carolina 29201

For additional information, interested persons may contact **Byron Amick** at 803-898-4236.

All written comments received during the public comment period shall be considered in making the final decision and shall be responded to as prescribed below.

Per R.61-9.124.17, the Department is only required to issue a response to comments when a final permit is issued. This response shall:

1. Specify which provisions, if any, of the draft permit have been changed in the final permit decision, and the reasons for the change; and

2. Briefly describe and respond to all significant comments on the draft permit raised during the public comment period, or during any hearing.

The response to comments shall be available to the public.

B. Public Hearings (R.61-9.124.11 and 12)

During the public comment period, any interested person may request a public hearing, if no hearing has already been scheduled. A request for a public hearing shall be in writing and shall state the nature of the issues proposed to be raised in the hearing.

Determinations and Scheduling.

1. Within the thirty (30) day comment period or other applicable comment period provided after posting or publishing of a public notice, an applicant, any affected state or interstate agency, the Regional Administrator or any other interested person or agency may file a petition with the Department for a public hearing on an application for a permit. A petition for a public hearing shall indicate the specific reasons why a hearing is requested, the existing or proposed discharge identified therein and specifically indicate which portions of the application or other permit form or information constitutes necessity for a public hearing. If the Department determines that a petition constitutes significant cause or that there is sufficient public interest in an application for a public hearing, it may direct the scheduling of a hearing thereon.

2. A hearing shall be scheduled not less than four (4) nor more than eight (8) weeks after the Department determines the necessity of the hearing in the geographical location of the applicant or, at the discretion of the Department, at another appropriate location, and shall be noticed at least thirty (30) days before the hearing. The notice of public hearing shall be transmitted to the applicant and shall be published in at least one (1) newspaper of general circulation in the geographical area of the existing or proposed discharge identified on the permit application and shall be mailed to any person or group upon request thereof. Notice shall be mailed to all persons and governmental agencies which received a copy of the notice or the fact sheet for the permit application.

3. The Department may hold a single public hearing on related groups of permit applications.

4. The Department may also hold a public hearing at its discretion, whenever, for instance, such a hearing might clarify one or more issues involved in the permit decision;

5. Public notice of the hearing shall be given in accordance with R.61-9.124.10.

Any person may submit oral or written statements and data concerning the draft permit. Reasonable limits may be set upon the time allowed for oral statements, and the submission of statements in writing may be required. The public comment period under R.61-9.124.10 shall automatically be extended to the close of any public hearing under this section. The hearing officer may also extend the comment period by so stating at the hearing.

A tape recording or written transcript of the hearing shall be made available to the public.

C. Obligation to raise issues and provide information during the public comment period. (R.61-9.124.13)

All persons, including applicants, who believe any condition of a draft permit is inappropriate or that the Department's tentative decision to deny an application, terminate a permit, or prepare a draft permit is inappropriate, must raise all reasonably ascertainable issues and submit all reasonably available arguments supporting their position by the close of the public comment period (including any public hearing). No issue shall be raised during an appeal by any party that was not submitted to the administrative record as part of the preparation and comment on a draft permit, unless good cause is shown for the failure to submit it. Any supporting materials which are submitted shall be included in full and may not be incorporated by reference, unless they are already part of the administrative record in the same proceeding, or consist of State or Federal statutes and regulations, Department and EPA documents of general applicability, or other generally available reference materials. Commenters shall make supporting materials not already included in the administrative record available. (A comment period longer than 30 days may be necessary to give commenters a reasonable opportunity to comply with the requirements of this section. Additional time shall be granted under R.61-9.124.10 to the extent that a commenter who requests additional time demonstrates the need for such time).

D. Issuance and Effective Date of the Permit

1. After the close of the public comment period on a draft permit, the Department shall issue a final permit decision. The Department shall notify the applicant and each person who has submitted written comments or requested notice of the final permit decision. This notice shall include reference to the procedures for appealing a decision on a permit. For the purposes of this section, a final permit decision means a final decision to issue, deny, modify, revoke and reissue, or terminate a permit.

2. A final permit decision shall become effective 30 days after the service of notice of the decision unless:

   (a) A later effective date is specified in the decision; or

   (b) No comments requested a change in the draft permit, in which case the permit shall become effective on the effective date shown in the issued permit.

3. Issuance or Denial of Permits. An appeal to a final determination of the Department or to a condition of a permit issued or the denial of a permit pursuant to the State law and Regulation 61-9, shall be in accordance with and subject to 48-1-200 of the SC Code (see E below).

E. Adjudicatory Hearings

Please see the Department's Guide to Board Review:
https://www.scdhec.gov/about-dhec/sc-board-health-and-environmental-control/guide-board-review.