FACT SHEET
AND
PERMIT RATIONALE

DRAFT

Dominion Energy South Carolina - Wateree Station
NPDES Permit No. SC0002038

Permitting Engineer: Randy Thompson June 14, 2021

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: 142 Wateree Station Road, Eastover, SC 29044
County: Richland
Watershed: Basin 03 (Catawba-Santee River Basin)

Facility Description (include SIC code): This facility is a coal-fired steam electric generating plant. SIC Code is 4911.

Receiving Waters and Classification by outfall: 03A - Wateree River (FW) 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: C-007k, Mercury in fish tissue; CW-206, PCBs in fish tissue; ST-034 in Lake Marion for phosphorus

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: N/A

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: Shortnose Sturgeon - Santee River

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: N/A
- ☒ 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

Dominion's Wateree Station is a coal-fired steam electric power generating facility. The facility includes two identical coal-fired generating units, Units 1 and 2, which began operation in 1970 and 1971, respectively. Each unit has a gross generating capacity of 372 megawatts (MW). Both generating units are categorized as base load units.

The facility currently discharges or proposes to discharge effluent through the following outfalls and corresponding locations. Further discussion of the discharges through each outfall is provided later in this rationale.
01A internal outfall (existing discharge of cooling tower blowdown) to 03A
01B internal outfall (existing discharge of combustion residual leachate) to 03A
01C internal outfall (existing discharge of flue gas desulfurization wastewater) to 03A
01D internal outfall (existing discharge of bottom ash transport water and future discharge of bottom ash purge water) to 03A
01E internal outfall (proposed discharge of Unit 1 internal boiler tube rinse wastewater) to 03A
01F internal outfall (proposed discharge of Unit 2 internal boiler tube rinse wastewater) to 03A
03A Wateree River (existing discharge) Latitude 33^{o} 48' 50'' N, Longitude 80^{o} 36' 58" W

Information for external outfall 03A is based on NPDES Form 2C dated 10/15/2020, and internal outfall 01A is based on NPDES form 2E dated 10/15/2020.

Data from Discharge Monitoring Reports (DMRs) and NPDES permit application (including all subsequent data presented) from 07/1/2015 - 6/30/2020 has been used to evaluate permit limitations.

This outfall is outside a state-approved source water protection area (SWPA) for a surface water drinking water intake, but has the potential to affect the intake. The affected intake (Intake #S38102) is owned by Lake Marion 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 October 1, 2009 and subsequent modification effective date of May 23, 2019.

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. This permit uses "modified" 7Q10 and average annual flows to represent the critical flow conditions required by Regulation 61-68.C.4 for developing permit limits. The facility has an intake that draws 17.82 cubic feet per second (cfs) from the Wateree River. This removal is subtracted from the actual calculated 7Q10 of 1201 cfs (FERC flow of 800 cfs plus the incremental inflow between USGS stations #02148000 (574 cfs) and #02148315 (975 cfs)) and the Average Annual Flow of 5997 cfs (from USGS station #02148000) to derive the critical flows for limit derivation. These critical values are those shown in the spreadsheet (Attachment 2) as 7Q10 and AAF. Attachment 2 contains the calculations for the water quality-based permit limitations and reasonable potential determinations for Outfall 03A.

Since the issuance of the last permit in 2008, the plant has added a wet scrubber Flue Gas Desulfurization (FGD) system to comply with air emissions requirements. The system is designed to reduce sulfur dioxide, but also reduces the emission to the air of trace heavy metals. The FGD system consists of scrubbers which remove these pollutants from the air. The system is designed to introduce an alkaline sorbent consisting of lime or limestone (primarily limestone) in a spray form into the exhaust gas system from the coal-fired boilers. FGD scrubber "sludge," once it has been dewatered, is the by-product gypsum. While collected dry and trucked to the landfill, fly ash may also be incorporated into the FGD sludge prior to disposal in the landfill. The plant uses intake water from the Wateree River for FGD reagent preparation water, absorber make-up water, and mist eliminator wash water.

An onsite industrial solid waste landfill accepts the resulting gypsum, fly ash and bottom ash waste, and a sedimentation basin is utilized to settle solids from the landfill runoff and leachate. Gypsum may be sold to companies that beneficially reuse the product (such as for drywall), though the landfill will be a primary disposal alternative. Additionally, the FGD scrubbers have a blowdown wastestream that is currently treated with a physical/chemical solids reduction system that was installed in 2011 and

FGD settling basins prior to combining with other wastewater streams in the 03A Polishing Pond (former Ash Pond #2).

Closure of Ash Pond 1 involved the removal of the coal ash and at least two feet of additional soil. The Department approved the final closure of Ash Pond 1 in November 2019. Ash Pond 1 has been replaced by the new wastewater treatment pond (Pond A) which received the final approval to operate in December 2016. This new pond also superseded the old Coal Pile Runoff Pond and the general yard stormwater runoff pond which have now been closed. Effluent from the new wastewater pond goes directly to the 03A Polishing Pond (Former Ash Pond 2).

The facility initiated a retrofit of the wet sluicing bottom ash handling system on both units in 2011. Prior to the conversion, the facility wet sluiced bottom ash to the ash ponds. The bottom ash handling was converted from using the wet sluicing system to using two remote submerged flight conveyors (SFCs) that dewater the bottom ash sluice and recycle the overflow back to the boiler to be reused as quench water (in the bottom of the boiler) and sluice water. The facility completed the retrofit on both units in October 2012. The facility does not generate fly ash transport water.

Chemical metal cleaning wastes from this facility, other than internal boiler tube rinsewater discharged through Outfalls 01E or 01F, shall be disposed off-site, or disposed by another treatment/disposal method approved by the Department.

Non-chemical metal cleaning wastes discharged through Outfall 03A are considered to be low volume waste in accordance with the EPA June 17, 1975, "Jordan Memorandum". Compliance with the oil and grease and total suspended solids limitations will be monitored at Outfall 03A pursuant to the monitoring frequency in Parts III.A.7 and III.A.8 of the permit.

<u>New Steam and Electric - Effluent Limit Guidelines (ELG)</u>

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 is 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 Wateree Station, bottom ash transport water and 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 will be regulated as low volume wastes.

<u>Outfall 01A</u> (Internal to 03A)
Cooling Tower Blowdown

Outfall 01A was established through an NPDES permit modification that became effective May 1, 2005 in conjunction with the addition of the cooling towers at the facility. Per DMR data, Outfall 01A began discharging in December 2006. The purpose of Outfall 01A is to provide a sampling point to determine compliance with categorical limitations for cooling tower blowdown prior to the cooling tower blowdown mixing with other wastestreams. The cooling tower blowdown is sampled at the cooling tower discharge line prior to discharge to the sump.

In addition to the cooling tower blowdown, the sump also receives smaller volumes of strainer and filter backwash as well as cooling tower mist, and some storm water, from the apron discharge system. However, as mentioned in the preceding paragraph, Outfall 01A is sampled for compliance with the categorical limitations for cooling tower blowdown prior to the cooling tower blowdown mixing with these other wastestreams.

The wastewater sump is pumped to the 03A Polishing Pond (Former Ash Pond #2) and discharged through Outfall 03A.

The cooling towers for Units 1 and 2 are two (2) 10-cell counter-flow-design cooling towers that could be expanded to fourteen (14) cells in the future. Cooling water in a closed cycle mechanical draft system cools the condensers to condense turbine exhaust-gas steam. The blowdown flow rates of 612 gpm average and 805 gpm maximum are designed based on 5 cycles of concentration. Additives to the cooling towers are included with the permit application in Attachment 1.

This discharge is subject to regulation under 40 CFR 423-Steam Electric Power Generating Point Source Category. This discharge, when originally permitted, represented 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.

This internal outfall is included in this permit in accordance with R.61-9.122.45(h) because the mixing with subsequent waste streams would cause the wastes to be diluted such that monitoring to meet guidelines limitations would be impracticable.

Flow

1. Previous permit limits:
   Monthly average: Monitor and Report (MR), MGD
   Daily Maximum: Monitor and Report (MR), MGD
   Sampling Frequency: 1/week
   Sample Type: Estimate
2. NPDES Application: (# of analyses: 52)
   Maximum Daily Value: 1.70 MGD
3. DMR Data: The highest flow was reported in July 2017 as 3.44 MGD.
4. Actual long term average flow (from DMR and/or application): 1.17 MGD
5. Conclusion: Monitor and report requirements for flow shall continue.
   Monthly average: Monitor and Report (MR), MGD
   Daily Maximum: Monitor and Report (MR), MGD
   Sampling Frequency: 1/week
   Sample Type: Estimate

Free Available Chlorine (FAC)

1. Previous permit limits:
   Monthly average: 0.2 mg/l
   Daily Maximum: 0.5 mg/l
   Sampling Frequency: 1/week
   Sample Type: Multiple Grabs
2. NPDES Application: (# of analyses: 0) Not a Form 2C parameter. See Total Residual Chlorine (TRC).
3. DMR Data: The highest reported monthly average concentration was 0.145 mg/l, and the highest reported daily maximum concentration was 0.4 mg/l, both reported on May 31, 2017.
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Other Information: No violations.
6. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: Water quality is addressed at the final outfall 03A.
7. Effluent limitations guidelines (ELGs) and professional judgment-based limits:
   Based on BPT 40 CFR 423.12(b)(7), BAT 40 CFR 423.13(d)(1) and NSPS 40 CFR 423.15(10)(i) for cooling tower blowdown
   Maximum: 0.5 mg/l
   Average: 0.2 mg/l

   Based on BPT 40 CFR 423.12(b)(8), BAT 40 CFR 423.13(d)(2), and NSPS 40 CFR 423.15(a)(10)(ii)
   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 unless the utility can demonstrate to the Regional Administrator or State, if the State has NPDES permit issuing authority, that the units in a particular location cannot operate at or below this level or chlorination.

The facility has requested that TRC limits be established in lieu of FAC limits. Because FAC is a component of TRC, basing the limitations on TRC instead of FAC and applying the FAC concentration numbers from the ELG to TRC is more stringent than simply using the FAC concentrations in the guideline. Therefore, limits for FAC are not necessary, because FAC is effectively addressed under TRC as described below.

8. Conclusion: Limits for FAC are not necessary because the limits for TRC are protective for FAC.

Total Residual Chlorine (TRC)

1. Previous permit limits: N/A
2. NPDES Application: (# of analyses: 4)
   Maximum Daily Value: < 0.05 mg/l
   Long Term Avg Value: < 0.05 mg/l
3. DMR Data: N/A (See FAC.)
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Other Information:
6. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: Water quality is addressed at the final outfall 03A.
7. Effluent limitations guidelines (ELGs) and professional judgment-based limits:
   Based on BPT 40 CFR 423.12(b)(8), BAT 40 CFR 423.13(d)(2), and NSPS 40 CFR 423.15(a)(10)(ii)
   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 unless the utility can demonstrate to the Regional Administrator or state, if the state has NPDES permit issuing authority, that the units in a particular location cannot operate at or below this level of chlorination.
8. PQL: 50 ug/l
9. Conclusion: Because of the effluent limitations guideline, permit limits for TRC are necessary. (See FAC discussion above.) Based on the ELG, TRC shall be limited as follows:
   Monthly average: 0.2 mg/l
   Instantaneous Maximum: 0.5 mg/l
   Sampling Frequency: 1/week
   Sample type: Multiple Grab

   Total residual chlorine may not 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 unless the utility can demonstrate to the Department that the units cannot operate at or below this level of chlorination.

Chromium, total

1. Previous permit limits:
   Monthly average: 0.2 mg/l
   Daily maximum: 0.2 mg/l
   Sampling frequency: 1/month
   Sample type: Grab
   Required to be monitored only when chromium-containing cooling tower chemicals are used.
2. NPDES Application: (# of analyses: Not reported on 2E)
3. DMR Data: Not monitored.
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Other Information:
6. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: Water quality is addressed at the final outfall 03A.
7. Effluent limitations guidelines (ELGs) and professional judgment-based limits:
   Based on BAT 40 CFR 423.13(d) (1) and NSPS 40 CFR 423.15(10)(i)
   Daily Maximum: 0.2 mg/l
   Monthly Average: 0.2 mg/l

Limitations apply only if chromium is present in cooling tower chemicals.

8. PQL: 5.0 ug/l
9. Conclusion: Based on the ELG, the chromium limitations shall remain as follows:
   Monthly average: 0.2 mg/l
   Daily maximum: 0.2 mg/l
   Sampling frequency: 1/month
   Sample type: Grab
   Required to be monitored only when chromium-containing cooling tower chemicals are used.

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
   Required to be monitored only when zinc-containing cooling tower chemicals are used.
2. NPDES Application: (# of analyses: Not reported on 2E)
3. DMR Data: Not monitored.
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Other Information:
6. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: Water quality is addressed at the final outfall 03A.
7. Effluent limitations guidelines (ELGs) and professional judgment-based limits:
   Based on BAT 40 CFR 423.13(d) (1) and NSPS 40 CFR 423.15(10)(i)
   Daily Maximum: 1.0 mg/l
   Monthly Average: 1.0 mg/l
   Limitations apply only if zinc is present in cooling tower chemicals.
8. PQL: 10.0 ug/l
9. Conclusion: Based on the ELG, the zinc limitations shall remain as follows:
   Monthly average: 1.0 mg/l
   Daily maximum: 1.0 mg/l
   Sampling frequency: 1/month
   Sample type: Grab

Required to be monitored only when zinc-containing cooling tower chemicals are used.

126 Priority Pollutants, except chromium and zinc

1. Previous permit limits: The discharge of one hundred twenty-six (126) toxic pollutants, except chromium and zinc, is prohibited in detectable amounts in chemicals added for cooling tower maintenance. The permittee may demonstrate compliance with such limitations by either routinely sampling and analyzing for the pollutants in the discharge or providing engineering calculations which demonstrate that the regulated pollutants are not detectable in the discharge. Results of sampling or calculations to meet this requirement shall be submitted as an attachment to the DMRs on an annual basis. See Attachment 4 of the Fact Sheet for this permit for a list of PQLs and methods for these pollutants to be used to determine detectable amounts.
2. NPDES Application: not applicable
3. DMR Data: not applicable
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Effluent Limitations Guidelines:
   Based on BAT 40 CFR 423.13(d)(1) and NSPS 40 CFR Part 423.15(a)(10)(i)
   No detectable amount of the 126 priority pollutants (except chromium and zinc) contained in chemicals added for cooling tower maintenance.
   Based on BAT 40 CFR 423.13(d)(3) and NSPS 40 CFR Part 423.15(a)(10)(ii)
   At the permitting authority's discretion, instead of monitoring, compliance with the limitations for the 126 priority pollutants (except chromium and zinc) 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.

6. Other Information:
7. PQL: N/A
8. Conclusion: The limit will be based on the ELG. Additionally, the requirement to submit analyses or calculations to demonstrate compliance is retained.

   The discharge of one hundred twenty-six (126) toxic pollutants listed in 40 CFR Part 423 Appendix A, except chromium and zinc, is prohibited in detectable amounts in chemicals added for cooling tower maintenance. The permittee may demonstrate compliance with such limitations by either routinely sampling and analyzing for the pollutants in the discharge or providing engineering calculations which demonstrate that the regulated pollutants are not detectable in the discharge. Results of sampling or calculations to meet this requirement shall be submitted as an attachment to the DMRs on an annual basis. See Attachment 2 of the Fact Sheet for this permit for a list of PQLs to be used to determine detectable amounts.

pH

1. Previous Permit Limits: N/A
2. NPDES Application: (# of analyses: 1)
   Minimum: 8.2 s.u.
   Maximum: 8.2 s.u.
3. DMR Data: N/A
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Effluent limitation guidelines:
   Based on BPT 40 CFR 423.12(b)(1) and NSPS 40 CFR 423.15(a)(1)
   The pH of all discharges, except once through cooling water, shall be within the range of 6.0-9.0.
   Because the pH guideline is for all discharges, compliance with the pH guideline will be evaluated at the final outfall 03A.
6. Other information: pH will be addressed at the final outfall 03A.
7. PQL: Not applicable
8. Conclusion: pH limitations are not necessary at outfall 01A because pH is addressed at the final outfall 03A.

Outfall 01B (Internal to 03A)

Stormwater runoff and combustion residual leachate from the onsite landfill

In conjunction with the installation of the FGD scrubbers after the issuance of the last permit in 2008, the facility constructed an onsite industrial solid waste landfill to accept the FGD sludge, fly ash, and bottom ash waste. The landfill leachate and stormwater runoff from the landfill flow to a sedimentation basin in order to settle solids prior to discharge to the 03A Polishing Pond (Former Ash Pond 2).

As described above, the portions of the ELG regulating combustion residual leachate were vacated by the 5th Circuit in April 2019. Accordingly, combustion residual leachate meets the definition of low volume waste in 40 CFR 423.11(b) since Part 423 no longer establishes specific limitations or standards for combustion residual leachate. Therefore, combustion residual leachate will be limited in this permit as low volume waste. 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.

Flow

1. Previous permit limits: N/A
2. NPDES Application: N/A
3. DMR Data: N/A
4. Actual long term average flow (from DMR and/or application): The information supplement to the application and the line drawing flow chart submitted by the permittee estimate the long term average flow to be 74,000 gallons per day.
5. Conclusion: Flow shall be monitored and reported as follows:
   Monthly average: MR, MGD
   Daily Maximum: MR, MGD
   Sampling Frequency: 1/week

Sample Type: Estimate

Total Suspended Solids (TSS)

1. Previous permit limits: N/A
2. NPDES Application: N/A
3. DMR Data: N/A
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Effluent Limitation Guidelines:
   Based on NSPS 40 CFR 423.15(a)(3)
   Daily Maximum: 100 mg/l
   Monthly Average: 30 mg/l
6. Other information:
7. PQL: 1000 µg/l
8. Conclusion: Technology-based TSS limits for this internal outfall and other wastewaters are being addressed at the final outfall 03A using the flow-weighted approach of the combined waste formula.

Oil and Grease

1. Previous Permit Limits: N/A
2. NPDES Application: N/A
3. DMR Data: N/A
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Effluent limitation guidelines:
   Based on NSPS 40 CFR 423.15(a)(3)
   Daily Maximum: 20 mg/l
   Monthly Average: 15 mg/l
6. Other information:
7. PQL: 5 mg/l
8. Conclusion: Technology-based oil and grease limits for this internal outfall and other wastewaters are being addressed at the final outfall 03A using the flow-weighted approach of the combined waste formula.

pH

1. Previous Permit Limits: N/A
2. NPDES Application: N/A
3. DMR Data: N/A
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Effluent limitation guidelines:
   Based on NSPS 40 CFR 423.15(a)(1)
   The pH of all discharges, except once through cooling water, shall be within the range of 6.0-9.0.
   Because the pH guideline is for all discharges, compliance with the pH guideline will be evaluated at the final outfall 03A.
6. Other information: pH will be addressed at the final outfall 03A.
7. PQL: Not applicable
8. Conclusion: pH limitations are not necessary at outfall 01B because pH is addressed at the final outfall 03A.

Outfall 01C (Internal to 03A)

FGD wastewater

The facility installed FGD scrubbers after the issuance of the last permit in 2008. The FGD scrubbers have a blowdown wastestream that is treated with a physical/chemical solids reduction system that was installed in 2011 and
FGD settling basins prior to combining with other wastewater streams in the 03A Polishing Pond (Former Ash Pond #2). The basins consist of two concrete forebays (1.6 and 1.7 million gallons) operated in parallel but not concurrently, a 1.6 million gallon primary sedimentation pond, and a 0.68 million gallon secondary settling pond. Based on an estimated FGD wastewater flow of 80,000 gallons per day, the detention time in the system is several days, even considering stormwater contributions. Therefore, grab samples will be required in lieu of 24-hour composite samples.

The FGD wastewater discharge is 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)). The facility has chosen to comply with the voluntary incentive program provisions of 423.13(g)(3)(i). Under the voluntary incentive program, the permittee agrees to accept more stringent effluent limitations for mercury, arsenic, selenium, nitrate/nitrite, bromide, and total dissolved solids in exchange for the certainty of a later compliance date of December 31, 2028 for these parameters, instead of an "as soon as possible" compliance date that is determined by the Department and is somewhere between October 13, 2021 and December 31, 2025.

The South Carolina Public Service Commission (SC PSC) has requested Dominion Energy South Carolina to conduct retirement studies of its existing coal burning generating facilities as part of its Integrated Resource Planning process. These retirement studies will include evaluating the impacts of compliance with the final ELG rule at each impacted facility and the result of the studies may result in Dominion Energy committing to future retirement of these facilities. Therefore, the permit includes provisions to allow for the transition from the limits under the voluntary incentive program to the limits applicable to facilities that plan to permanently cease combusting coal. According to 40 CFR 423.13(o)(1)(ii)(A) and 423.13(g)(2)(I) the limits for facilities that plan to transition from the voluntary incentive program to permanently ceasing coal combustion are the TSS limits of 30 mg/l monthly average and 100 mg/l daily maximum prescribed by 423.12(b)(11). These TSS limitations are already applied on a flow-weighted basis at Outfall 03A through use of the combined waste formula. Therefore, an additional limits table in Part III of the permit is not required.

A compliance schedule in Part IV.A.1 of the permit requires the permittee to meet certain interim milestones to achieve compliance with the voluntary incentives program limits by December 31, 2028.

Flow

1. Previous permit limits: N/A
2. NPDES Application: N/A
3. DMR Data: N/A
4. Actual long term average flow (from DMR and/or application): The information supplement to the application and the line drawing flow chart submitted by the permittee estimate the long term average flow to be approximately 80,000 gallons per day.
5. Conclusion: Flow shall be monitored and reported as follows:
   Monthly average: MR, MGD
   Daily Maximum: MR, MGD
   Sampling Frequency: 1/month
   Sample Type: Estimate

Total Suspended Solids (TSS)

1. Previous permit limits: N/A
2. NPDES Application: N/A
3. DMR Data: N/A
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Effluent Limitation Guidelines:
   Based on BPT 40 CFR 423.12(b)(11), and NSPS 40 CFR 423.15(a)(3)
   Daily Maximum: 100 mg/l
   Monthly Average: 30 mg/l
6. Other information:
7. PQL: 1000 µg/l
8. Conclusion: Technology-based TSS limits for this internal outfall and other wastewaters are being addressed at the final outfall 03A using the flow-weighted approach of the combined waste formula.

Oil and Grease

1. Previous Permit Limits: N/A
2. NPDES Application: N/A
3. DMR Data: N/A

4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Effluent limitation guidelines:
   Based on BPT 40 CFR 423.12(b)(11) and NSPS 40 CFR 423.15(a)(3)
   Daily Maximum: 20 mg/l
   Monthly Average: 15 mg/l
6. Other information:
7. PQL: 5 mg/l
8. Conclusion: Technology-based oil and grease limits for this internal outfall and other wastewaters are being addressed at the final outfall 03A using the flow-weighted approach of the combined waste formula.

Arsenic, total

1. Previous permit limits: N/A
2. NPDES Application: N/A
3. DMR Data: N/A
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Effluent limitations guidelines:
   Based on the BAT of the voluntary incentives program of 40 CFR 423.13(g)(3)(i) and NSPS 40 CFR 423.15(a)
   Daily Maximum: 5 µg/l
   Monthly Average: N/A
   Based on 40 CFR 423.13(g)(3)(i), dischargers must meet these limitations by December 31, 2028.
6. Other Information:
7. PQL: 5.0 µg/l
8. Conclusion: Based on the ELG, arsenic shall be limited as follows:
   Monthly average: MR, ug/l
   Daily Maximum: 5 µg/l
   Sampling Frequency: 1/month
   Sample type: Grab

   In accordance with 423.13(g)(3)(i), these limits shall become effective on December 31, 2028.

Mercury, total

1. Previous permit limits: N/A
2. NPDES Application: N/A
3. DMR Data: N/A
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Effluent limitations guidelines:
   Based on the BAT of the voluntary incentives program of 40 CFR 423.13(g)(3)(i) and NSPS 40 CFR 423.15(a)
   Daily Maximum: 23 ng/l
   Monthly Average: 10 ng/l
   Based on 40 CFR 423.13(g)(3)(i), dischargers must meet these limitations by December 31, 2028.
6. Other Information:
7. PQL: 0.0005 µg/l
8. Conclusion: Based on the ELG, mercury shall be limited as follows:
   Monthly average: 10 ng/l
   Daily Maximum: 23 ng/l
   Sampling Frequency: 1/month
   Sample type: Grab

   In accordance with 423.13(g)(3)(i), these limits shall become effective on December 31, 2028.

Selenium, total

1. Previous permit limits: N/A
2. NPDES Application: N/A

3. DMR Data: N/A
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Effluent limitations guidelines:
   Based on BAT 40 CFR 423.13(g)(3)(i) and NSPS 40 CFR 423.15(a)
   Daily Maximum: 10 µg/l
   Monthly Average: N/A
   Based on 40 CFR 423.13(g)(3)(i), dischargers must meet these limitations by December 31, 2028.
6. Other Information:
7. PQL: 5.0 µg/l
8. Conclusion: Based on the ELG, selenium shall be limited as follows:
   Monthly average: MR, µg/l
   Daily Maximum: 10 µg/l
   Sampling Frequency: 1/month
   Sample type: Grab

   In accordance with 423.13(g)(3)(i), these limits shall become effective on December 31, 2028.

Nitrate/Nitrite

1. Previous permit limits: N/A
2. NPDES Application: N/A
3. DMR Data: N/A
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Effluent limitations guidelines:
   Based on BAT 40 CFR 423.13(g)(3)(i) and NSPS 40 CFR 423.15(a)
   Daily Maximum: 2.0 mg/l
   Monthly Average: 1.2 mg/l
   Based on 40 CFR 423.13(g)(3)(i), dischargers must meet these limitations by December 31, 2028.
6. Other Information:
7. PQL: 20 µg/l
8. Conclusion: Based on the ELG, nitrate/nitrite shall be limited as follows:
   Monthly average: 1.2 mg/l
   Daily Maximum: 2.0 mg/l
   Sampling Frequency: 1/month
   Sample type: Grab

   In accordance with 423.13(g)(3)(i), these limits shall become effective on December 31, 2028.

Bromide

1. Previous permit limits: N/A
2. NPDES Application: N/A
3. DMR Data: N/A
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Effluent limitations guidelines:
   Based on BAT 40 CFR 423.13(g)(3)(i) and NSPS 40 CFR 423.15(a)
   Daily Maximum: 0.2 mg/l
   Monthly Average: N/A
   Based on 40 CFR 423.13(g)(3)(i), dischargers must meet these limitations by December 31, 2028.
6. Other Information:
7. PQL: 2.0 mg/l
8. Conclusion: Based on the ELG, bromide shall be limited as follows:
   Monthly average: MR, mg/l
   Daily Maximum: 0.2 mg/l
   Sampling Frequency: 1/month
   Sample type: Grab

In accordance with 423.13(g)(3)(i), these limits shall become effective on December 31, 2028.

Total Dissolved Solids (TDS)

1. Previous permit limits: N/A
2. NPDES Application: N/A
3. DMR Data: N/A
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Effluent limitations guidelines:
   Based on BAT 40 CFR 423.13(g)(3)(i) and NSPS 40 CFR 423.15(a)
   Daily Maximum: 306 mg/l
   Monthly Average: 149 mg/l
   Based on 40 CFR 423.13(g)(3)(i), dischargers must meet these limitations by December 31, 2028.
6. Other Information:
7. PQL: N/A
8. Conclusion: Based on the ELG, TDS shall be limited as follows:
   Monthly average: 149 mg/l
   Daily Maximum: 306 mg/l
   Sampling Frequency: 1/month
   Sample type: Grab

   In accordance with 423.13(g)(3)(i), these limits shall become effective on December 31, 2028.

pH

1. Previous Permit Limits: N/A
2. NPDES Application: N/A
3. DMR Data: N/A
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Effluent limitation guidelines:
   Based on BPT 40 CFR 423.12(b)(1) and NSPS 40 CFR 423.15(a)(1)
   The pH of all discharges, except once through cooling water, shall be within the range of 6.0-9.0.
   Because the pH guideline is for all discharges, compliance with the pH guideline will be evaluated at the final outfall 03A.
6. Other information: pH will be addressed at the final outfall 03A.
7. PQL: Not applicable
8. Conclusion: pH limitations are not necessary at outfall 01C because pH is addressed at the final outfall 03A.

Outfall 01D (Internal to 03A)

Bottom Ash Transport Water and Bottom Ash Purge Water

As mentioned above, the facility initiated a retrofit of the wet sluicing bottom ash handling system on both units in 2011. Prior to the conversion, the facility wet sluiced bottom ash to the ash ponds. The bottom ash handling was converted from using the wet sluicing system to using two remote submerged flight conveyors (SFCs) that dewater the bottom ash sluice and recycle the overflow back to the boiler to be reused as quench water (in the bottom of the boiler) and sluice water. The facility completed the retrofit on both units in October 2012.

The bottom ash transport water and bottom ash purge water discharges are subject to regulation under 40 CFR 423-Steam Electric Power Generating Point Source Category. The references and limitations in this permit reflect Best Available Technology (BAT) under 423.13(k) and best professional judgment. The discharge of pollutants in bottom ash transport water is prohibited under 423.13(k)(1)(i), except for those discharges that meet the requirements of one of the options under 423.13(k)(2). The permittee has chosen to comply with the high recycle rate system option under 423.13(k)(2)(i). Discharges under 423.13(k)(2)(i) are defined as "bottom ash purge water" (423.11(cc)). In accordance with 423.11(p), bottom ash transport water does not include bottom ash purge water.

In accordance with 423.13(k)(1)(i), the compliance date by which the facility must comply with the 423.13(k)(1)(i) requirements must be as soon as possible and is determined by the Department based on information provided by the permittee and must fall within the range of October 13, 2021 to December 31, 2025 in accordance with 423.13(k)(1)(i). 40 CFR 423.11(t) specifies the factors that the Department may consider in establishing the compliance date. Based on the Department's review of the schedule included in information Dominion Energy provided to the Department on September 30, 2020, the Department has determined that the compliance date for the bottom ash transport water requirements of 423.13(k)(1) and the related bottom ash purge water requirements of 423.13(k)(2) is December 31, 2024. This compliance date is warranted due to the time required to plan, design, procure, fabricate and install the necessary equipment to comply with the limitations.

The permit includes a compliance schedule in Part IV.A.3 that requires the permittee to achieve certain milestones to meet the compliance date of December 31, 2024. The permit also includes Part V.A.4 that requires by December 31, 2024 the discharge of bottom ash transport water to cease in accordance with 423.13(k)(1)(i) and by January 1, 2025 the volume of discharge of bottom ash purge water, based on the 30-day rolling average, to not exceed 10% of the primary active wetted bottom ash system volume, or a lower amount as determined by the Department, as required by 423.13(k)(2)i). The Department may determine the lower amount (less than 10%) after review of information in the Initial Certification Statement required by Part IV.A.3 to be submitted no later than March 31, 2021.

In addition to the effluent limitation guideline requirements of 423.13(k), the permit also applies case-by-case numeric effluent discharge limitations for total suspended solids and oil and grease to the bottom ash transport water and bottom ash purge water discharges. These limitations are based on best professional judgment. This is consistent with the October 13, 2020 Federal Register which states, "...EPA concluded that BAT limitations for any wastewater that is purged from a high recycle rate system and then discharged, should be established by the NPDES permitting authority on a case-by-case basis using BPJ." (p. 64672) The case-by-case numeric effluent discharge limitations for total suspended solids and oil and grease are being addressed at the final outfall 03A using the flow-weighted approach of the combined waste formula

Flow

1. Previous permit limits: N/A
2. NPDES Application: N/A
3. DMR Data: N/A
4. Actual long term average flow (from DMR and/or application): N/A
5. Conclusion: Flow shall be monitored and reported as follows:
    Monthly average: MR, MGD
    Daily Maximum: MR, MGD
    Sampling Frequency: Daily
    Sample Type: Calculation

Flow is calculated as the sum of the flows measured by flow monitors at each of the purge locations. Beginning January 1, 2025, the permit also requires the calculation and reporting of the daily maximum 30-day rolling average of the daily volume of bottom ash purge water discharge. As discussed above, the 30-day rolling average is limited by Part V.A.4 to 10% of the primary active wetted bottom ash system volume, or a lower amount as determined by the Department.

Total Suspended Solids (TSS)

1. Previous permit limits: N/A
2. NPDES Application: N/A
3. DMR Data: N/A
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Effluent Limitation Guidelines or Best Professional Judgment (BPJ) limitations:
    Based on best professional judgment, the Department believes that the BPT requirements of 40 CFR 423.12(b)(4) for bottom ash transport water and 423.12(b)(11) for bottom ash purge water are appropriate BAT limitations in this case, considering the temporary nature of the bottom ash transport water discharge and the limited volume of the bottom ash purge water discharge. These limitations are as follows:
    Daily Maximum: 100 mg/l
    Monthly Average: 30 mg/l
6. Other information:
7. PQL: 1000 µg/l
8. Conclusion: Technology-based TSS limits for this internal outfall and other wastewaters are being addressed at the final

outfall 03A using the flow-weighted approach of the combined waste formula.

Oil and Grease

1. Previous Permit Limits: N/A
2. NPDES Application: N/A
3. DMR Data: N/A
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Effluent limitation guidelines or Best Professional Judgment limitations::
   Based on best professional judgment, the Department believes that the BPT requirements of 40 CFR 423.12(b)(4) for bottom ash transport water and 423.12(b)(11) for bottom ash purge water are appropriate BAT limitations in this case, considering the temporary nature of the bottom ash transport water discharge and the limited volume of the bottom ash purge water discharge. These limitations are as follows:
   Daily Maximum: 20 mg/l
   Monthly Average: 15 mg/l
6. Other information:
7. PQL: 5 mg/l
8. Conclusion: Technology-based oil and grease limits for this internal outfall and other wastewaters are being addressed at the final outfall 03A using the flow-weighted approach of the combined waste formula.

pH

1. Previous Permit Limits: N/A
2. NPDES Application: N/A
3. DMR Data: N/A
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Effluent limitation guidelines or Best Professional Judgment limitations::
   Based on BPT 40 CFR 423.12(b)(1):
   The pH of all discharges, except once through cooling water, shall be within the range of 6.0-9.0.
   Because the pH guideline is for all discharges, compliance with the pH guideline will be evaluated at the final outfall 03A.
6. Other information:
7. PQL: Not applicable
8. Conclusion: pH limitations are not necessary at outfall 01D because pH is addressed at the final outfall 03A.

Outfall 01E (Unit 1) and Outfall 01F (Unit 2)

Internal Boiler Tube Rinse Wastewater (Chemical Metal Cleaning Waste)

The previous permit prohibited the discharge of chemical metal cleaning waste, but the permittee has requested to discharge chemical metal cleaning waste consisting of the wastewater from rinsing the inside of the boiler tubes after chemical cleaning. This rinsewater meets the definition of chemical metal cleaning waste at 40 CFR 423.11(c) and is subject to the New Source Performance Standards (NSPS) of 40 CFR 423.15(b)(1) and (4). The internal cleaning of the boiler tubes occurs about once every five years. The rinsewater will be collected in frac tanks or a tanker and tested to ensure that it meets the limitations below prior to discharge. The discharge of rinsewater that does not meet these limitations is prohibited. The limitations for outfalls 01E and 01F are identical. Outfall 01E is for the discharge of rinsewater from Unit 1, and outfall 01F is for the discharge of rinsewater from Unit 2.

The antidegradation requirements of R.61-68.D.2 must be considered for the possible discharge of the boiler tube rinsewater because the discharge of chemical metal cleaning waste was prohibited by the previous permit. However, the antidegradation requirements apply only in situations where the proposed expanded activity will result in the lowering of water quality to a measurable effect. Based on the following calculations, the Department has determined that the discharge of internal boiler tube rinsewater will not result in the lowering of water quality in the Wateree River to a measurable effect.

The limitations for outfalls 01E and 01F below would allow the discharge of copper at a concentration up to 1.0 mg/l and iron also at a concentration up to 1.0 mg/l. The permittee estimates that approximately 200,000 gallons of rinsewater is generated from the internal cleaning of the boiler tubes of one unit. These calculations consider both unit's boiler tubes to be cleaned at the same time as a possible worst case scenario, though the cleanings for each unit are not necessarily conducted at the same time. The five-year average flow of outfall 03A is 2.54 MGD, and the volume of the polishing pond in which the rinsewater would be mixed with these other wastewaters prior to discharge through outfall 03A is 340 million gallons.

Therefore, 400,000 gallons of rinsewater containing 1.0 mg/l of copper or iron would add the following amount of copper or iron.

(400,000 gallons) x (1.0 mg/l) x (3.785 liters/gallon) = 1,514,000 mg

Assuming total mixing within the polishing pond, the 1,514,000 mg of copper or iron would increase the copper or iron concentration of the polishing pond discharge from outfall 03A by the following;

(1,514,000 mg) / ((340,000,000 gallons) x (3.785 liters/gallon)) = 0.00118 mg/l

The 7Q10 of the Wateree River is 1184 cfs which is equivalent to the following in million gallons per day.

(1184 cubic feet/sec) x (7.48 gallons/cubic feet) x (3600 sec/hour) x (24 hours/day) x (1 MGD/1,000,000 gpd) = 765.2 MGD

Assuming total mixing within the Wateree River, the increase in the Wateree River concentration of copper or iron caused by the 0.00118 mg/l increase of iron or copper in the outfall 03A discharge can be conservatively calculated as follows:

(2.54 MGD) x (0.00118 mg/l) / (765.2 MGD) = 0.000006 mg/l or 0.006 µg/l

The copper results from the Department's ambient monitoring program at monitoring station CW-206 in the Wateree River upstream of Wateree Station show that copper is typically below the practical quantitation limit, or PQL, of 10 µg/l. Therefore, an increase of 0.006 µg/l would not lower water quality to a measurable effect. Ambient data for iron at monitoring station CW-206 shows that the 90th percentile level for iron is 1.13 mg/l. An increase of 0.000006 mg/l of iron would not lower water quality to a measurable effect. Therefore, the Department has determined that because the possible lowering of water quality by the increased concentration of copper or iron due to the discharge of internal boiler tube rinsewater is not to a measurable effect the antidegradation requirements for this new discharge do not apply.

Flow

1. Previous permit limits: N/A
2. NPDES Application: N/A
3. DMR Data: N/A
4. Actual long term average flow (from DMR and/or application): The permittee estimates approximately 200,000 gallons of rinsewater resulting from the internal boiler tube cleaning of one unit.
5. Conclusion: Flow shall be monitored and reported as follows:
   Monthly average: MR, MGD
   Daily Maximum: MR, MGD
   Sampling Frequency: 1/month
   Sample Type: Estimate

Total Suspended Solids (TSS)

1. Previous permit limits: N/A
2. NPDES Application: N/A
3. DMR Data: N/A
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Effluent Limitation Guidelines:
   Based on NSPS of 40 CFR 423.15(b)(4) for chemical metal cleaning wastes

Daily Maximum: 100 mg/l
Monthly Average: 30 mg/l

6. Other information: TSS technology-based limits are applied at the external outfall 03A based on a flow-weighted calculation of the different wastewaters which flow through the outfall. The internal tube rinsewater is not included in those calculations due to the intermittent nature of the tube cleaning operation (approximately once every five years).
7. PQL: 1000 µg/l
8. Conclusion: Technology-based TSS limits are being addressed at the final outfall 03A using the flow-weighted approach of the combined waste formula.

Oil and Grease

1. Previous Permit Limits: N/A
2. NPDES Application: N/A
3. DMR Data: N/A
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Effluent limitation guidelines:
   Based on NSPS of 40 CFR 423.15(b)(4) for chemical metal cleaning wastes
   Daily Maximum: 20 mg/l
   Monthly Average: 15 mg/l
6. Other information: Oil and grease technology-based limits are applied at the external outfall 03A based on a flow-weighted calculation of the different wastewaters which flow through the outfall. The internal tube rinsewater is not included in those calculations due to the intermittent nature of the tube cleaning operation (approximately once every five years).
7. PQL: 5 mg/l
8. Conclusion: Technology-based oil and grease limits are being addressed at the final outfall 03A using the flow-weighted approach of the combined waste formula.

Copper, total

1. Previous permit limits: N/A
2. NPDES Application: N/A
3. DMR Data: N/A
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Effluent limitation guidelines:
   Based on NSPS of 40 CFR 423.15(b)(4) for chemical metal cleaning wastes
   Daily Maximum: 1.0 mg/l
   Monthly Average: 1.0 mg/l
6. Other Information: Sample type shall be grab rather than 24-hour composite because the rinsewater will be held in frac tanks or a tanker and sampled for compliance with the limitations prior to discharge.
7. PQL: 10 µg/l
8. Conclusion: Based on the ELG, copper shall be limited as follows:
   Monthly average: 1.0 mg/l l
   Daily Maximum: 1.0 mg/l
   Sampling Frequency: 1/month
   Sample type: Grab

Iron, total

1. Previous permit limits: N/A
2. NPDES Application: N/A
3. DMR Data: N/A
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Effluent limitation guidelines:
   Based on NSPS of 40 CFR 423.15(b)(4) for chemical metal cleaning wastes
   Daily Maximum: 1.0 mg/l
   Monthly Average: 1.0 mg/l
6. Other Information: Sample type shall be grab rather than 24-hour composite because the rinsewater will be held in frac tanks or a tanker and sampled for compliance with the limitations prior to discharge.

7. PQL: 20 µg/l
8. Conclusion: Based on the ELG, iron shall be limited as follows:
   Monthly average: 1.0 mg/l
   Daily Maximum: 1.0 mg/l
   Sampling Frequency: 1/month
   Sample type: Grab

pH

1. Previous Permit Limits: N/A
2. NPDES Application: N/A
3. DMR Data: N/A
4. Water Quality Data: Water quality is addressed at the final outfall 03A.
5. Effluent limitation guidelines:
   Based on NSPS of 40 CFR 423.15(b)(1):
   The pH of all discharges, except once through cooling water, shall be within the range of 6.0-9.0.
   Because the pH guideline is for all discharges, compliance with the pH guideline will be evaluated at the final outfall 03A.
6. Other information:
7. PQL: Not applicable
8. Conclusion: pH limitations are not necessary at outfalls 01E or 01F because pH is addressed at the final outfall 03A.

Outfall 03A

Outfall 03A historically represents the discharge from each of 2 settling basins (most commonly known as Ash Ponds 1 and 2). However, as mentioned above, Ash Pond 1 has been replaced by the new wastewater treatment pond. Therefore, some discharges through Outfall 03A flow through the new wastewater treatment pond and then to the 03A Polishing Pond (Former Ash Pond 2) prior to discharge to the Wateree River. Cooling tower blowdown, combustion residual leachate, stormwater runoff from the landfill, FGD wastewater, and discharges from the Yard Sump do not go to the new wastewater treatment pond prior to entering the 03A Polishing Pond (Former Ash Pond 2).

Outfall 03B had been for emergency use only and had not discharged during the past several permit terms. With the removal of Ash Pond 1 from service, Outfall 03B is no longer necessary and has been removed from the permit.
Therefore, Outfall 03A is now the only direct process wastewater discharge to a Water of the State. The sources which contribute to this outfall are listed below.

Wastewater sources discharging to 03A

- Cooling tower blowdown from internal outfall 01A
- Combustion residual leachate from internal outfall 01B
- FGD wastewater from internal outfall 01C
- Bottom ash purge water from outfall 01D and bottom ash transport purge water
- Internal boiler tube rinse wastewater from outfalls 01E and 01F
- Other low volume wastes:
  - Boiler room sumps
  - Floor drains
  - Demineralizer regeneration waste
  - Filter/strainer backwash
  - Bearing/house service cooling water
  - Air heater wastewater
  - Carbon burnout (CBO) truck exterior rinsewater (currently inactive)
  - Storm water and leakage/spillage from various chemical containment & unloading areas:
    - Selective Catalytic Reduction (SCR)
    - Ammonia
    - Caustic
    - Sulfuric acid
    - Cooling tower maintenance chemicals

Coal pile runoff
General plant storm water runoff

Bottom ash is the solid residue collected directly from the boiler. Wateree initiated the retrofit of the wet sluicing bottom ash handling system on both units in 2011. The bottom ash handling retrofit from wet sluicing involved using a remote submerged flight conveyor (SFC). Bottom ash is sluiced from the boilers to a remote mechanical drag (RMD) system which separates the ash from the sluice water. The dewatered ash is deposited in dewatering bays before being moved to the station's permitted landfill or sold for beneficial reuse. The sluice water and any stormwater runoff is recirculated back to the SFC. The overflow from the SFCs is normally recirculated for transport water in the bottom ash collection system. Excess overflow is discharged through the new wastewater treatment pond and the 03A Polishing Pond (Former Ash Pond 2) and when necessary to conduct maintenance on the system or when stormwater threatens to cause the RMD area sump to overfill. The bottom ash handling system does not currently fully comply with the 2020 ELG rule for high-recycle wet handling systems, but the facility intends to make the necessary modifications to meet this compliance option.

Fly ash is the particulate coal residue in the boiler gases. Baghouses remove fly ash and most of the fly ash is recycled for beneficial reuse. Wateree collects fly ash using fabric filter baghouses. Electrostatic precipitators were originally installed on each unit and replaced with reverse gas fabric filters, Unit 1 in 2001, Unit 2 in 2002. No fly ash transport water is generated.

Gypsum is generated as a result of the operation of the FGD scrubbers. The scrubber system uses primary and secondary hydroclones to reduce solids from the scrubber blowdown. The hydroclones are used prior to the blowdown becoming wastewater so they are not considered part of wastewater treatment, but part of the scrubber system. The on-site landfill primarily receives the gypsum solids from the FGD scrubber, though it is approved to accept fly ash and bottom ash as well. Fly/bottom ash, including ash recovered from the ash basins and gypsum may also be sent off-site for recycling or beneficial reuse.

The FGD wastewater can either go through the FGD solids reduction system, which includes flocculation, or directly to the FGD pond. FGD Wastewater is currently treated using flocculation and then settling in the FGD ponds prior to entering the Polishing Pond and/or can be sent directly to the FGD Pond.

The construction and operation of the landfill created the need for a sedimentation basin for leachate and runoff collection. The discharge from the landfill sedimentation basin is pumped into the 03A Polishing Pond (Former Ash Pond 2). The FGD scrubbers generate wastewater from the blowdown of the scrubbers. The blowdown waste stream is treated using flocculation.

Boiler cleaning water will be sent off-site for disposal.

The sanitary wastewater treatment system was approved for closure by the Department in February 2003. Sanitary wastewater goes to an onsite septic tank and tile field.

Treatment Systems

Landfill runoff and leachate is treated in the landfill runoff and leachate pond prior to entering the 03A Polishing Pond (Former Ash Pond 2).

FGD Wastewater is currently treated using flocculation and then settling in the FGD ponds prior to entering the 03A Polishing Pond (Former Ash Pond 2).

Treatment of other wastewaters discharging through outfall 03A consists of sedimentation by the new wastewater pond and the 03A Polishing Pond (Former Ash Pond 2), and pH neutralization. The new wastewater pond and the 03A Polishing Pond (Former Ash Pond 2) operate in series with pH adjustment at the end.

Based on the Pollution Control Act (PCA), the wastewater treatment systems are classified as Group I-P/C. The Environmental Certification Board Rules require that a Grade D-P/C operator be assigned to operate these facilities.

Inspections of each treatment facility will be required on a daily basis per Regulation 61-9.122.41(e).

Flow

1. Previous permit limits:
   Monthly average: MR, MGD
   Daily Maximum: MR, MGD
   Sampling Frequency: 1/month
   Sample Type: Instantaneous
2. NPDES Application: (# of analyses: 52)
   Maximum Daily Value: 8.0 MGD
   Maximum 30 Day Value: 6.2 MGD
   Long Term Avg Value: 2.22 MGD
3. DMR Data: The highest flow was reported on October 31, 2015 as 15.5 MGD
4. Actual long term average flow (from DMR and/or application): 2.54 MGD (past five years)
5. Conclusion: Monitor and Report requirements for flow shall remain as follows:
   Monthly average: MR, MGD
   Daily Maximum: MR, MGD
   Sampling Frequency: 1/month
   Sample Type: Instantaneous

Biochemical Oxygen Demand (BOD_5)

1. Previous permit limits: N/A
2. NPDES Application: (# of analyses: 1)
   Maximum Daily Value: <2.0 mg/l (<133 lb/d)
3. DMR Data: N/A
4. Effluent limitations guidelines: N/A
5. PQL: 2.0 mg/l
6. Waste Load Allocation: N/A
7. Other information:
8. Conclusion: Due to the low concentration of BOD_5 in the discharge, limits are not necessary.

Total Suspended Solids (TSS)

1. Previous permit limits:
   Monthly average: 30 mg/l
   Instantaneous Maximum: 100 mg/l
   Sampling frequency: 1/month
   Sample Type: Grab
2. NPDES Application: (# of analyses: 54)
   Maximum Daily Value: 19.2 mg/l (1280 lb/d)
   Maximum 30 Day Value: 19.2 mg/l (993 lb/d)
   Long Term Avg Value: 8.93 mg/l (165 lb/d)
3. DMR Data: The highest TSS was reported on December 31, 2018 as 19.2 mg/l.
4. Water Quality Data: N/A
5. Effluent Limitation Guidelines and best professional judgment limitations:
   In accordance with the EPA Memorandum dated August 22, 1985 (Hanmer Memo), facilities that commingle dry-weather flows and wet-weather flows should have flow weighted total suspended solids (TSS) and oil and grease (O&G) limitations applied at the final outfall.

   The following effluent limitation guidelines or case-by-case best professional judgment limitations for TSS are applied on a flow-weighted basis at this outfall.
   Based on NSPS 40 CFR 423.15(a)(3) for combustion residual leachate (classified as low volume waste) (from outfall 01B)
      Daily Maximum: 100 mg/l
      Monthly Average: 30 mg/l
   Based on BPT for other Low Volume Wastes (40 CFR 423.12(b)(3)):
      Daily Maximum: 100 mg/l
      Monthly average: 30 mg/l

Based on BPT 40 CFR 423.12(b)(11), and NSPS 40 CFR 423.15(a)(3) for FGD wastewater (from outfall 01C)
Daily Maximum: 100 mg/l
Monthly Average: 30 mg/l
Based on best professional judgment for bottom ash purge water (from outfall 01D) and bottom ash transport water
Daily Maximum: 100 mg/l
Monthly Average: 30 mg/l
Based on BPT for Coal Pile Runoff (40 CFR 423.12(b)(9):
Instantaneous Maximum: 50 mg/l
Based on NSPS of 40 CFR 423.15(b)(4) for chemical metal cleaning wastes (internal boiler tube rinsewater from outfalls 01E and 01F)
Daily Maximum: 100 mg/l
Monthly Average: 30 mg/l

The limitations above for the internal boiler tube rinsewater from outfalls 01E and 01F are intermittent, occurring only about once every 5 years, and the flow volume is expected to be typically no more than about 200,000 gallons for each discharge event. Therefore, the limitations for internal boiler tube rinsewater will not be included in the flow-weighted calculation.

In addition, the limitation for coal pile runoff above is not included in the flow-weighted calculation for the reason described below in item 6, Other information.

Outfall 03A also receives and discharges a significant quantity of cooling tower blowdown from outfall 01A. Therefore, an allowance for TSS in cooling tower blowdown must also be included in the flow-weighted calculations. Based on the permittee's sampling of the cooling tower blowdown from outfall 01A, the Department is using a value of 44.8 mg/l as the monthly average TSS allowance in the cooling tower blowdown. This is the upper 95% confidence limit of the average of the cooling tower blowdown TSS sampling data, which included 15 grab samples that ranged from 5.6 mg/l to 78.7 mg/l. For the TSS cooling tower blowdown daily maximum value, the Department considered 75.3 mg/l, which is the 99th percentile value of the cooling tower blowdown TSS sampling data. However, this value is less than the highest measured value of 78.7 mg/l from the sampling data, so the Department is using the measured value of 78.7 mg/l as the daily maximum value of TSS in the cooling tower blowdown based on the sampling data.

The following flows are assumed for the various wastestreams.

Combustion residual leachate - 0.074 MGD
Other low volume wastes - 0.85 MGD
FGD wastewater - 0.080 MGD
Bottom ash transport water or bottom ash purge water - 0.020 MGD
Cooling tower blowdown - 1.17 MGD

Therefore the flow-weighted monthly average and daily maximum TSS limits can be calculated as follows:

Monthly Average:

$$\frac{(0.074\text{ MGD} \times 30\text{ mg/l}) + (0.85\text{ MGD} \times 30\text{ mg/l}) + (0.080\text{ MGD} \times 30\text{ mg/l}) + (0.020 \times 30\text{ mg/l}) + (1.17 \times 44.8\text{ mg/l})}{0.074\text{ MGD} + 0.85\text{ MGD} + 0.080\text{ MGD} + 0.020\text{ MGD} + 1.17\text{ MGD}} = 37.9\text{ mg/l}$$

Daily Maximum:

$$\frac{(0.074\text{ MGD}\times100\text{ mg/l}) + (0.85\text{ MGD}\times100\text{ mg/l}) + (0.080\text{ MGD}\times100\text{ mg/l}) + (0.020\times100\text{ mg/l}) + (1.17\times78.7\text{ mg/l})}{0.074\text{ MGD} + 0.85\text{ MGD} + 0.080\text{ MGD} + 0.020\text{ MGD} + 1.17\text{ MGD}} = 88.6\text{ mg/l}$$

6. Other information: The facility provided information showing that the new wastewater treatment pond and the 03A Polishing Pond (Former Ash Pond 2) have sufficient capacity to retain for 24 hours all dry weather flows and wet weather flows resulting from the 10-year 24-hour storm event. Therefore, in accordance with the guidance provided in the August 22, 1985 memo from Rebecca Hanmer, Director of the Office of Water Enforcement and Permits at U.S. EPA (Guidance for NPDES Permits Issued to Steam Electric Power Plants), the wet weather limitation for coal pile runoff need not be considered in developing permit limitations.

Because the monthly average TSS limit is increasing from 30 mg/l in the previous permit to 37.9 mg/l in this permit, antibacksliding and antidegredation requirements must be considered. Antibacksliding is addressed in R.61-9.122.44(l) which requires that limits in a reissued permit be at least as stringent as the limits in the previous permit "unless the circumstances on which the previous permit was based have materially and substantially changed since the time the permit was issued and would constitute cause for permit modification or revocation and reissuance under section 122.62." The outfall 03A TSS limits were last considered at the time of the last permit reissuance in August 2008. Since that time, material and substantial changes have been made that would constitute cause for permit modification under 122.62. These changes include the construction of an onsite landfill (with the associated discharge of combustion residual leachate), the elimination of ash sluicing, and the conversion of the bottom ash handling system to dry handling with the installation of submerged flight conveyors. Therefore, antibacksliding does not apply, other than to ensure that antidegradation requirements are met. Antidegradation requirements are addressed at R.61-68.D. R.61-68.D.2 requires the Department to consider antidegredation requirements when water quality would be lowered to a measurable effect. However, the outfall 03A limits in the previous permit were based on a flow of 6.87 MGD compared to 2.54 MGD for this permit. Therefore, though the TSS monthly average concentration is increasing by 26.3% [(37.9-30)/30], the outfall 03A flow for this permit is decreasing by 63% [(6.87-2.54)/6.87]. Therefore, the increase of the TSS limit from 30 mg/l to 37.9 mg/l will not result in the lowering of quality compared to the previous permit due to the lower flow upon which this permit is based.

7. PQL: 1000 µg/l
8. Conclusion: The TSS limits shall be in accordance with the flow-weighted calculations above. Because the retention time of the polishing pond is greater than 24 hours, a grab sample is acceptable in lieu of a 24-hour composite sample.
   Monthly average: 37.9 mg/l
   Daily Maximum: 88.6 mg/l
   Sampling Frequency: 1/month
   Sample type: Grab

pH

1. Previous Permit Limits: 6.0 to 8.5 standard units.
   Sampling Frequency: 1/month
   Sample type: Grab
2. NPDES Application: (# of analyses: 1024)
   Maximum Daily Value: Min: 6.1 su, Max: 8.4 su
   Maximum 30 Day Value: Min: 6.1 su, Max: 8.4 su
3. DMR Data: The highest pH was reported as 8.4 su in August 2016, August 2018, September 2018, and July 2019. The lowest pH was reported as 6.1 su in August 2016.
4. Water Quality Data: Water quality standards for pH are established in Reg. 61-68.G. For Class FW waters, pH shall be between 6.0 and 8.5 su.
5. Effluent limitation guidelines:
   Based on BPT 40 CFR 423.12(b)(1) and NSPS 40 CFR 423.15(a)(1)
   The pH of all discharges, except once through cooling water, shall be within the range of 6.0-9.0 su.
6. Other information:
7. PQL: Not applicable
8. Conclusion: Due to the water quality standards, pH limitations shall remain as follows: 6.0 to 8.5 su.
   Sampling Frequency: 1/month
   Sample type: Grab

Temperature

1. Previous permit limits:
   Daily maximum: MR, ^{o}F
   Sampling frequency: 1/quarter
   Sample type: Grab
2. Winter
   NPDES Application: (# of analyses: 6)
   Maximum Daily Value: 13.3 ^{o}C
   Maximum 30 Day Value: 13.3 ^{o}C

Long Term Avg Value: 12.0 ^oC
Summer
NPDES Application: (# of analyses: 7)
Maximum Daily Value: 31.1 ^oC
Maximum 30 Day Value: 31.1 ^oC
Long Term Avg Value: 30.7 ^oC

3. DMR Data: The highest value was reported in September 2018 as 88 ^oF.
4. Water Quality Data: (Reg. 61-68.E.12) Maximum temperature of 90 ^oF (32.2^oC) and the temperature of free flowing freshwaters shall not be increased more than 5 ^oF (2.8 ^oC) above natural temperature conditions as a result of the discharge of heated liquids unless a different site specific temperature standard has been established, a mixing zone has been established, or a 316(a) determination under the Clean Water Act has been completed.
5. Other Information: Instream temperature data is available from DHEC monitoring station CW-206. However, this station is located more than nine miles upstream of the Wateree Station discharge location.
6. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: No. The maximum discharge temperature of 88 ^oF (September 2018) does not exceed the water quality criterion of 90 ^oF. However, according to Dominion Energy, the September DMR monitoring is typically based on sampling conducted early in the quarter (i.e. early July). Therefore, the month of August, often the month with the highest temperatures, is not represented in the DMR data. In addition, a comparison of the discharge temperature data reported in the month of March (presumably sampled in early January) to upstream January temperature data from monitoring station CW-206 indicates that it may be possible for the discharge to result in an exceedance of the temperature-rise criterion of 5 ^oF. However, this is not a definitive reasonable potential determination due to the distance of station CW-206 from the Wateree Station discharge and differences between instream and discharge sample days.

   It should also be noted that in a hypothetical situation of a discharge temperature of 94 ^oF at the long term average flow of 2.54 MGD and a river temperature of 83 ^oF at the critical 7Q10 flow of 1183 cubic feet per second (764.59 MGD), the resulting river temperature would be ((94 x 2.54) + (83 x 764.59)) / (764.59+2.54) = 83.04 ^oF after complete mixing.
7. Effluent limitations guidelines (ELGs) and professional judgment-based limits: N/A
8. Conclusion: Based on the above discussion, the temperature monitoring frequency should be increased to determine if a mixing zone is necessary for the water quality criterion of 90 ^oF, and intake monitoring should be required to determine if a mixing zone is necessary for the temperature-rise criterion of 5 ^oF. Therefore, the following monitor and report requirements will apply.

   Discharge Temperature:
   Daily maximum: MR, ^oF
   Sampling Frequency: 1/month
   Sample type: Grab

   Intake Temperature:
   Daily minimum: MR, ^oF
   Sampling Frequency: 1/month, within the same hour as discharge temperature monitoring
   Sample type: Grab

   Temperature Rise:
   Daily maximum: MR, ^oF
   Sampling Frequency: 1/month
   Sample type: Calculation (Temperature Rise = Discharge Temperature - Intake Temperature)

Oil and Grease (O&G)

1. Previous Permit Limits:
   Monthly average: 15 mg/l
   Daily maximum: 20 mg/l
   Sampling Frequency: 1/month
   Sample type: Grab
2. NPDES Application: (# of analyses: 54)

Maximum Daily Value: < 5.0 mg/l (< 330 lb/d)
Maximum 30 Day Value: < 5.0 mg/l (< 260 lb/d)
Long Term Avg Value: < 2.6 mg/l (< 48 lb/d)

3. DMR Data: All results are non-detect.
4. Water Quality Data: Narrative water quality criteria for oil and grease is covered by Reg.61-68.E.5.
5. Effluent limitation guidelines and best professional judgment limitations:
   In accordance with the EPA Memorandum dated August 22, 1985 (Hanmer Memo), facilities that commingle dry-weather flows and wet-weather flows should have flow-weighted total suspended solids (TSS) and oil and grease (O&G) limitations applied at the final outfall.

   The following effluent limitation guidelines or case-by-case best professional judgment limitations for oil and grease are applied on a flow-weighted basis at this outfall.

Based on NSPS 40 CFR 423.15(a)(3) for combustion residual leachate (classified as low volume waste) (from outfall 01B)
Daily Maximum: 20 mg/l
Monthly Average: 15 mg/l

Based on BPT for other Low Volume Wastes (40 CFR 423.12(b)(3)):
Daily Maximum: 20 mg/l
Monthly average: 15 mg/l

Based on BPT 40 CFR 423.12(b)(11), and NSPS 40 CFR 423.15(a)(3) for FGD wastewater (from outfall 01C)
Daily Maximum: 20 mg/l
Monthly Average: 15 mg/l

Based on best professional judgment for bottom ash purge water (from outfall 01D) and bottom ash transport water
Daily Maximum: 20 mg/l
Monthly Average: 15 mg/l

Based on NSPS of 40 CFR 423.15(b)(4) for chemical metal cleaning wastes (internal boiler tube rinsewater from outfalls 01E and 01F)
Daily Maximum: 20 mg/l
Monthly Average: 15 mg/l

The limitations above for the internal boiler tube rinsewater from outfalls 01E and 01F are intermittent, occurring only about once every 5 years, and the flow volume is expected to be typically no more than about 200,000 gallons for each discharge event. Therefore, the limitations for internal boiler tube rinsewater will not be included in the flow-weighted calculation.

Outfall 03A also receives and discharges a significant quantity of cooling tower blowdown from outfall 01A. Therefore, an allowance for oil and grease in cooling tower blowdown must also be included in the flow-weighted calculations. The only recent oil and grease sampling data for the cooling tower blowdown from outfall 01A available to the Department is one sample reported with a result of < 5.0 mg/l (reported on the permit application - Form 2E, dated October 15, 2020). Therefore, an oil and grease allowance is given for cooling tower blowdown in the amount of 5 mg/l for monthly average and 10 mg/l for daily maximum, based on past Department practice.

The following flows are assumed for the various wastestreams.

Combustion residual leachate - 0.074 MGD
Other low volume wastes - 0.85 MGD
FGD wastewater - 0.080 MGD
Bottom ash transport water or bottom ash purge water - 0.020 MGD
Cooling tower blowdown - 1.17 MGD

Therefore the flow-weighted monthly average and daily maximum oil and grease limits can be calculated as follows:

Monthly Average:

$$\frac{(0.074\text{ MGD} \times 15\text{ mg/l}) + (0.85\text{ MGD} \times 15\text{ mg/l}) + (0.080\text{ MGD} \times 15\text{ mg/l}) + (0.020 \times 15\text{ mg/l}) + (1.17 \times 5\text{ mg/l})}{0.074\text{ MGD} + 0.85\text{ MGD} + 0.080\text{ MGD} + 0.020\text{ MGD} + 1.17\text{ MGD}} = 9.7\text{ mg/l}$$

Daily Maximum:

$$\frac{(0.074\text{ MGD}\times 20\text{ mg/l}) + (0.85\text{ MGD}\times 20\text{ mg/l}) + (0.080\text{ MGD}\times 20\text{ mg/l}) + (0.020\times 20\text{ mg/l}) + (1.17\times 10\text{ mg/l})}{0.074\text{ MGD} + 0.85\text{ MGD} + 0.080\text{ MGD} + 0.020\text{ MGD} + 1.17\text{ MGD}} = 14.7\text{ mg/l}$$

6. Other information: none
7. PQL: 5 mg/l
8. Conclusion: The oil and grease limits shall be based on the flow-weighted calculations above.
   Monthly average: 9.7 mg/l
   Daily maximum: 14.7 mg/l
   Sampling Frequency: 1/month
   Sample type: Grab

Fecal Coliform

1. Previous permit limits: N/A
2. NPDES Application: (# of analyses: 1)
   Maximum Daily Value: 1 col/100 ml
   Maximum 30 Day Value: 1 col/100 ml
   Long Term Avg Value: 1 col/100 ml
3. DMR Data: N/A
4. Water Quality Data: See E. coli rationale.
5. Other Information: Sanitary wastewater is not a component of the discharge.
6. Effluent limitations guidelines (ELGs): N/A
7. PQL: 1/100 ml
8. Conclusion: The Water Quality Standards have been changed such that the new bacteriological standard for freshwaters is E. coli.

E. coli

1. Previous Permit Limits: N/A
2. NPDES Application: N/A
3. DMR Data: N/A
4. Water Quality Data: E. coli standards in Regulation 61-68.E.14.c(8): In order to protect recreational uses in freshwaters (including FW, and all types of Trout Waters) of the State, NPDES permit effluent limitations shall be specified as a monthly average of 126 MPN/100ml and a daily maximum of 349 MPN/100 ml. Provisions for meeting alternate daily maximum bacteria limits shall be in accordance with R.61-68.E.14.c(12).
5. Effluent limitation guidelines: N/A
6. Other information: Sanitary wastewater is not a component of the discharge.
7. PQL: 1/100 ml
8. Conclusion: Due to the low concentration of fecal coliform reported on the permit application and because sanitary wastewater is not a component of the discharge, E. coli limits are not necessary.

Total Residual Chlorine (TRC)

1. Previous Permit Limits: N/A
2. NPDES Application: (No. of analyses: 2)
   Maximum Daily Value: < 0.05 mg/l (< 3.33 lb/d)
   Maximum 30 Day Value: < 0.05 mg/l (< 2.59 lb/d)
   Long Term Avg Value: < 0.05 mg/l (< 0.93 lb/d)
3. DMR Data: N/A
4. Water Quality Criteria: See attached spreadsheet
5. Effluent limitation guidelines: TRC is limited at Outfall 01A for compliance with the effluent limitation guidelines.
6. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: No
7. Other information: Chlorine is used in the cooling towers for disinfection. TRC (in lieu of FAC) is limited at Outfall 01A.
8. PQL: 0.05 mg/l
9. Conclusion: Total Residual Chlorine (TRC) will not be limited since there is not reasonable potential.

Ammonia-Nitrogen, Total As N

1. Previous permit limits:
   Monthly average: MR, mg/l
   Daily maximum: MR, mg/l
   Sampling Frequency: 1/quarter
   Sample Type: Grab
2. NPDES Application: (# of analyses: 19)
   Maximum Daily Value: 1.2 mg/l (80 lb/d)
   Maximum 30 Day Value: 1.2 mg/l (62 lb/d)
   Long Term Avg Value: 0.35 mg/l (6.5 lb/d)
3. DMR Data: The highest value was reported in June 2020 as 1.8 mg/l.
4. Waste Load Allocation: Continue monitoring and reporting requirements.
5. Water Quality Criteria for Protection of Aquatic Life: see Reg. 61-68, Appendix, Attachment 3 for Freshwater using the following calculations (limit not calculated for this permit)

   In situations where salmonids are absent, the CMC may be calculated as:

   $$\text{CMC} = \left\{\frac{0.411}{1+10^{7.204-pH}} + \frac{58.4}{1+10^{pH-7.204}}\right\}$$

   Establish the CCC when fish early life stages (ELS) are present:

   $$\text{CCC} = \left\{\frac{0.0577}{1+10^{7.688-pH}} + \frac{2.487}{1+10^{pH-7.688}}\right\} \times \left\{\min\left(2.85, 1.45 \times 10^{0.028\times(25-T)}\right)\right\}$$

   Note: The Department always considers fish early life stages to be present unless data is presented which demonstrates their absence.
   Where:
   pH given in su = 7.5
   Stream temp (critical) = 29.34 °C
   Stream temp (seasonal) = 14.78 °C
   Headwater concentration of ammonia in mg N/l = 0.19
   Upstream flow: 1213 cfs

   Critical months are March – October and November - February is seasonal.

   CCC (critical) = 1.678 mg/l CCC (seasonal) = 4.291 mg/l
   CMC (critical) = 19.890 mg/l CMC (seasonal) = 19.890 mg/l

   With dilution:
   Monthly average (critical chronic): 171.53 mg/l Monthly average(seasonal chronic): 472.30 mg/l
   Daily maximum (critical acute): 2268.06 mg/l Daily maximum (seasonal acute): 2268.06 mg/l

6. Does the discharge cause, have the Reasonable Potential to Cause or Contribute? No
9. Other information:
10. PQL: 100 µg/l
11. Conclusion: In accordance with the wasteload allocation, monitor and report requirements shall remain as in the previous permit. Because the retention time of the wastewater basins is greater than 24 hours, a grab sample is acceptable in lieu of a 24-hour composite sample.
    Monthly average: MR, mg/l
    Daily maximum: MR, mg/l
    Sampling Frequency: 1/quarter

Sample Type: Grab

Phosphorus

1. Previous Permit Limits:
   Monthly average: MR mg/l, MR lb/d
   Daily maximum: MR mg/l
   Sampling frequency: 1/quarter
   Sample type: Grab
2. NPDES Application: (# of analyses: 19)
   Maximum Daily Value: 1.8 mg/l (120.0 lb/d)
   Maximum 30 Day Value: 1.8 mg/l (93.1 lb/d)
   Long Term Avg Value: 0.29 mg/l (5.39 lb/d)
3. DMR Data: The highest value was reported in March 2020 as 1.2 mg/l.
4. Water Quality Data: See Section III.G.1.c of this rationale.
5. Effluent limitation guidelines: not applicable
6. Wasteload Allocation: Monitor and report.
7. Other information: Lake Marion, downstream of this discharge, is impaired for phosphorus. Station CW-206 in the Wateree River above this discharge shows an average phosphorus concentration of 0.04 mg/l for the period from September 2014 to July 2017.
8. PQL: 50 µg/l
9. Conclusion: Phosphorus monitoring will continue. Data will be useful for future TMDL development. Because the retention time of the wastewater basins is greater than 24 hours, a grab sample is acceptable in lieu of a 24-hour composite sample.
   Monthly average: MR mg/l, MR lb/d
   Daily maximum: MR mg/l
   Sampling frequency: 1/quarter
   Sample type: Grab

Mercury

1. Previous permit limits:
   Monthly average: MR, µg/l
   Daily maximum: MR, µg/l
   Sampling frequency: 1/quarter
   Sample type: Grab
2. NPDES Application: (No. of analyses: 28)
   Maximum Daily Value: 23.5 ng/l (0.0016 lb/d)
   Maximum 30 Day Value: 23.3 ng/l (0.0012 lb/d)
   Long Term Avg Value: 9.2 ng/l (0.0002 lb/d)
3. DMR Data: The highest value was reported in March 2016 as 0.0456 ug/l. See discussion below in 7. Other Information.
4. Water Quality Data: See spreadsheet in Attachment 2 for numeric criteria. In addition, S.C. regulation R.61-68.E.18.a requires mercury monitoring, assessment, and minimization when the receiving stream is impaired for methylmercury in fish tissue, and the discharge has consistently quantifiable levels of mercury.
5. Effluent limitations guidelines (ELGs) and professional judgment-based limits: none
6. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: No
7. Other Information: If the highest mercury concentration of 0.0456 ug/l from March 2016 is used in the reasonable potential analysis, the discharge exhibits reasonable potential. However, the permittee stated that the facility stopped sluicing ash to Ash Pond 1 in January 2016. Therefore, the March 2016 result of 0.0456 ug/l (sample taken on January 7, 2016) was likely affected by conditions prior to this process change. In addition, the permittee provided three additional DMR mercury results (for September 2020, December 2020, and March 2021) that are more recent than the five years of DMR results that the Department originally considered (September 2015 to June 2020) in the reasonable potential analysis. When the three more recent results of September 2020, December 2020, and March 2021 are used to replace the three oldest results of September 2015, December 2015, and March 2016, the reasonable potential analysis indicates no reasonable potential for mercury. The Department believes that this adjustment to the reasonable potential analysis for mercury is reasonable due to the process change that occurred in January 2016 of no longer sluicing ash to Ash Pond 1. In addition, the ash has since been removed from Ash Pond 1, and the pond has been closed.

Mercury is included on the 303(d) list of impaired waters due to a fish consumption advisory on the Wateree River. Since the waterbody is impaired, the assumption is that an addition to the water column levels can affect the methyl mercury accumulation in the fish, which would contribute to a water quality violation. Due to the impairment, no credit for receiving stream dilution may be allowed (i.e. the 7Q10 and annual average flow at the discharge location will be set to zero for calculating limits). Facility water is supplied from the Wateree River.

8. PQL: 0.0005 µg/l (0.5 ng/l)
9. Conclusion: Because there is no reasonable potential, mercury limits are not necessary. However, because the stream is impaired for mercury in fish tissue and the discharge has quantifiable levels of mercury, the permit will require the submittal and implementation of a mercury minimization plan and monitoring of mercury as follows:
   Monthly average: MR, ng/l
   Daily maximum: MR, ng/l
   Sampling frequency: 1/month
   Sample type: Grab

Arsenic

1. Previous permit limits:
   Monthly average: MR mg/l
   Daily maximum: MR mg/l
   Sampling frequency: 1/month
   Sample type: Grab
2. NPDES Application: (No. of analyses: 54) (The application reported arsenic as ug/l, but Dominion Energy has confirmed the values are actually in mg/l.)
   Maximum Daily Value: 0.04 mg/l (2.67 lb/d)
   Maximum 30 Day Value: 0.04 mg/l (2.07 lb/d)
   Long Term Avg Value: 0.017 mg/l (0.305 lb/d)
3. DMR Data: The highest value was reported in September 2016 as 0.04 mg/l.
4. Water Quality Data: see spreadsheets in Attachment 2
5. Effluent limitations guidelines (ELGs) and professional judgment-based limits: none
6. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: No
7. Other Information:
8. PQL: 5.0 µg/l
9. Conclusion: Based on the data collected over the last permit term, and there being no reasonable potential, monitoring for arsenic is no longer necessary.

Bromide

1. Previous permit limits: N/A
2. NPDES Application: (# of analyses: 1)
   Maximum Daily Value: <2.0 mg/l (133 lb/d)
3. DMR Data: N/A
4. Water Quality Data: see spreadsheet
5. Other Information: Bromide discharges can contribute to the formation of trihalomethanes which is a concern for downstream drinking water intakes. Bromide is naturally-occurring in coal, and bromide may be present in the discharge of wet FGD scrubbers at coal-fired steam electric plants.
6. Does the discharge cause, have the Reasonable Potential to Cause or Contribute: No
7. Effluent limitations guidelines (ELGs) and professional judgment-based limits: N/A
8. PQL: 2.0 mg/l
9. Conclusion: Due to the presence of a drinking water intake downstream and the operation of the FGD wet scrubber, requirements to monitor and report for bromide shall be added to the permit. Because the retention time of the wastewater basins is greater than 24 hours, a grab sample is acceptable in lieu of a 24-hour composite sample.
   Monthly average: MR, mg/l
   Daily maximum: MR, mg/l
   Sampling Frequency: 1/quarter
   Sample type: Grab

Whole Effluent Toxicity (WET)

1. Previous permit requirements:
   Acute whole effluent toxicity (WET) pass/fail testing at an ATC = 15%
   Sampling Frequency: 1/quarter
   Sample Type: Grab

   Chronic whole effluent toxicity (WET) multi-concentration testing at a CTC= 2.3% using the dilution series 0%, 1.0%, 2.3%, 10%, 32%, 100%.
   Monthly average = MR%
   Daily Maximum = MR%
   Sampling Frequency: 1/month
   Sample Type: Grab

2. DMR Data: Acute - All tests results reported as “pass".
   Chronic - The highest percent effect was reported in March 2016 as 14,2%.
3. Mixing Zone and Zone of Initial Dilution (ZID) Information:
   The stream at the point of discharge is 58.52 m wide (w in the equations below). The maximum allowable mixing zone and ZID dimensions are determined as follows using stream width:

Acute ZID size	Chronic mixing zone size
Width: 1/10 w = 5.85 m	Width: ½ w = 29.3 m
Length: 1/3 w = 19.5 m	Length: 2w = 117.04 m

The CORMIX model used by the permittee estimates the centerline concentration of the wastewater plume. The model input included a critical stream flow of 962 cubic feet per second (cfs) which is less than the 7Q10 of 1183 cfs. Therefore, the model is conservative with regard to critical steam flow. The model uses an effluent flow of 2.22 million gallons per day (MGD) which is slightly less than the long-term average effluent flow of 2.54 MGD based on the last five years but greater than the average effluent flow of 1.80 MGD based on the past three years.

Using the CORMIX model, the following dilutions can be determined at the boundary conditions given above.

Acute concentrations
Width: At the width boundary of 5.85 meters (length approximately 0.5 meters), the centerline plume concentration is 18.9%. This is the point at which the edge of the plume touches the width boundary of 5.85 meters.

Length: At the length boundary of 19.5 meters, the centerline plume concentration is 4.5%.

Chronic concentrations
Width: The plume does not touch the width boundary of 29.3 meters within the 117.04 length of the chronic mixing zone.

Length: At the length boundary of 117.04 meters, the centerline plume concentration is 3.3%.

4. Other information:
5. Reasonable potential evaluation:
   Acute: The permittee has been performing acute WET testing at 15% effluent. All tests have been reported as “pass”. In addition, all "LC50" (the concentration at which 50% of organisms die) values from the chronic multi-concentration testing are greater than 100%. Therefore, there is no reasonable potential for acute toxicity.

   Chronic: Based on the chronic WET results submitted since September 2015, there is no reasonable potential for chronic toxicity. The reasonable potential calculations for chronic WET are shown in Attachment 2.

6. Conclusion: Though there is no reasonable potential for either acute toxicity or chronic toxicity, monitor and report will continue to be required for chronic toxicity so that data will be available for the next permit reissuance. Chronic toxicity

testing includes analysis of acute effects. Sampling shall be required quarterly.

Chronic whole effluent toxicity (WET) testing shall be performed using *Ceriodaphnia dubia* at a CTC = 3.3%. Testing using multiple dilutions will be required. A geometric series is used to determine the dilution series as follows:

To determine a geometric series of effluent concentrations given a low concentration L, a high concentration *H,* and *n* concentrations, the concentration factor is $F = (\frac{H}{L})^{\frac{1}{n-1}}$ and the *i*th concentration is $C_i = L * F^{i-1}$. For this permit, the following values shall be used to estimate the dilution series.

n = 5
L= 1.0%
H= 60%

A geometric series is used to estimate the dilution series as shown in the spreadsheet in Attachment 2. In addition to the control value of 0%, a low value of 1.0%, and a high value of 60% are being used as bounds for the dilution testing series. Therefore, chronic WET testing shall be performed using the dilution series 0%, 1.0%, 3.3%, 8%, 22%, 60%. Because the retention time of the wastewater basins is greater than 24 hours, a grab sample is acceptable in lieu of a 24-hour composite sample.

Monthly average = MR, % effect (total, reproduction, & mortality)
Daily Maximum = MR, % effect (total, reproduction, & mortality)
Sampling Frequency: 1/quarter
Sample Type: Grab

Industrial Stormwater Requirements

The permit requires the permittee to maintain good housekeeping procedures to reduce pollutants in stormwater that is discharged through Outfall 03A. Other industrial stormwater discharges from the site are covered by the NPDES General Permit for Storm Water Discharges Associated with Industrial Activity (SCR005027).

Cooling Water Additives

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

Sodium hypochlorite	~10.5-15% Sodium hypochlorite
Sodium bisulfite	40-60% Sodium bisulfite
Corrosion Inhibitor	60-80% Phosphoric acid
Deposit Control Agent	2.5-10% Phosphonic acid

316b Cooling Water Intake Requirements

Wateree Station currently utilizes two multi-cell recirculating cooling towers providing cooling water for the facility circulating water systems. The station withdraws cooling water from the Wateree River at an average rate of roughly 11 MGD. An intake channel approximately 290 meters in length and 45 meters in width carries surface water from the Wateree River to the Cooling Water Intake Structure (CWIS). The CWIS is located at 33.8276° N, 80.6198° W. The CWIS is equipped with four traveling water screens made by Screening Systems International, Inc. equipped with 14 gauge wire mesh having 3/8" square openings. The traveling water screens are rotated for 30 minutes every 24 hours in addition to a twice-daily manual function check. Behind the screens are two Makeup Water Pumps, two Scrubber Service Water Pumps, two Service Water Pumps, one Diesel Fire Pump, and one Vertical Ash Sluice Pump. Rated capacities for the pumps are listed below.

Make up Water Pumps (2)	11,500 gpm (each) One pump runs, the other is on standby.
Scrubber Service Water Pumps (2)	2125 gpm (each) One pump runs, the other is on standby.
Service Water Pumps (2)	6000 gpm (each) One pump runs, the other is on standby.

Diesel Fire Pump (1)	2500 gpm
Vertical Ash Sluice Pump (1)	2520 gpm

Therefore, the CWIS design intake flow, which does not include the capacities of the standby pumps or the fire pump, is calculated to be 22,145 gpm or 32 MGD.

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 April 1978, a determination was made, 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 Wateree 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 for the period of peak ichthyoplankton abundance from February to July and to report the results. 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.12 allows this discharge.

<u>Groundwater Monitoring Requirements</u>

The permittee shall conduct semi-annual groundwater monitoring at monitoring wells MW-1A, MW-2, MW-3, MW-4, MW-5, MW-6, MW-8, MW-11, and MW-12 for the following parameters.

Arsenic	Lead	Chromium	Cadmium	Sulfate
Copper	Iron	Mercury	Nickel	Selenium
Zinc	Total Organic Carbon	Chloride	Nitrate Nitrogen	
Total Dissolved Solids	Turbidity	pH	Specific Conductivity	
Depth to Water	Water Level Elevation			

<u>Surface Water Sampling Requirements</u>

The permittee shall conduct surface water sampling in the Wateree River for total arsenic and total nickel on a semi-annual basis at three locations consistent with the Groundwater Mixing Zone Agreement (CA#01-053-W) Sampling Plan - adjacent to the former ash ponds, upstream, and downstream.

<u>Threatened and Endangered Species Information</u>

This discharge is not expected to adversely impact any known threatened species or its habitat. The federally endangered short-nose sturgeon has been observed near the confluence of the Congaree River and the Wateree River approximately 13 miles downstream from the discharge.

II. GENERAL INFORMATION

A. The effluent from this facility may be subject to the requirements of any of the following regulations: R.61-68, R.61-69, R.61-9.122, 124, 125, 129, 133, and 403; 40 CFR Part 136; Subchapter N (40 CFR Parts 400 through 402 and 404 through 471); and R.61-9.503, 504 and 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.

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 (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(j)(4)). 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(i)(2)).

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. (R.61-9.122.47(c)(1))

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(c)(2))

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 (e.g., nitrogen and phosphorus) 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, 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 typically 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 guidelines will be identified in Part I 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 typically 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, Attachment 3 and any categorical limitations. The more stringent of the limitations will be imposed. Calculations for aquatic life criteria and other wasteload recommendations are 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 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 (except ammonia toxicity calculations) 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 either the SWP Area 15-river mile boundary or at the intake, as appropriate, in mgd.
AAF_i — Average Annual Flow (AAF) of the receiving water at either the SWP Area 15-river mile

boundary or at the intake, as appropriate, in mgd.

Q_d Long term average discharge flow in mgd.

a. Determine dilution factors:
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 or other critical 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.

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

DF_4: This dilution factor is based on the Average Annual Flow or other critical flow condition (AAF_i) 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 DF_3 and DF_4, 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.

* 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} Freshwater 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} Standard (based on an established criteria or other published data per R.61-68) for protection of Human Health – Organism Consumption
WQS_{wo} Standard (based on an established criteria or other published data per R.61-68) for protection of Human Health – Water & Organism Consumption.
WQS_{mcl} Standard (based on an established criteria or other published data per R.61-68) for Drinking Water MCL (Maximum Contaminant Level).
WQS_{ol}: 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 The 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,

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

If C_b is based on naturally occurring concentrations and

$$C_b \geq WQS$$

Then, generally,

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

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. 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,

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

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.

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

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

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.

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

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

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 procedure is used to develop site-specific criteria in accordance with R.61-68.C.12. Both DHEC and EPA must approve the recalculated criterion prior to implementation. The recalculated criterion will require an update to the Water Classifications and Standards Regulations, R.61-68 and 61-69.

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

5. Where a WER and recalculation procedure are combined to adjust a criterion, derived limits ($C_{aqlife\text{-}adj}$) 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 = $C_{aqlife\text{-}adj}$ based on CCC
daily maximum = $C_{aqlife\text{-}adj}$ 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 ($C_{HH\text{-}avg}$). 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).

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

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

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:

$$ELG\lim = \sum (ELGflow)(ELG)(8.345)$$

*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 Randy Thompson at 803-898-4314.

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.