

Dominion Energy South Carolina, Inc.

400 Otarre Parkway, Cayce, SC 29033

Mailing Address:

220 Operation Way, MC-C221, Cayce SC 29033



October 11, 2021

Ms. Melanie Hindman
Water Pollution Enforcement
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

RE: Notice of Planned Participation in EPA Flue Gas Desulfurization Wastewater Voluntary Incentive Program at the Dominion Energy South Carolina Wateree Station, NPDES Permit No. SC0002038.

Dear Ms. Hindman,

On behalf of the Wateree Station, Dominion Energy South Carolina (DESC) submits the attached "Notice of Planned Participation in the Voluntary Incentive Program for Flue Gas Desulfurization Wastewater Discharges". This submittal complies with the requirements of the EPA 2020 Steam Electric Reconsideration Rule (40 CFR 423.19(h)(1)(2)).

Background:

On October 13, 2020, EPA published the Steam Electric Reconsideration Rule which changed the Flue Gas Desulfurization (FGD) wastewater discharge requirements and applicability dates. The 2020 rule includes a Voluntary Incentive Program (VIP) that provides the certainty of more time (until December 31, 2028) for plants to implement new BAT limitations if they adopt additional process changes and controls that achieve limitations on mercury, arsenic, selenium, nitrate-nitrite, bromide, and TDS in FGD wastewater, outlined in 40 CFR 423.13(g)(3)(i).

The DESC Wateree Station submits this Notice of Planned Participation in the VIP. The attached notice includes a description of technologies that are projected to be used, an engineering dependency chart and accompanying narrative discussion demonstrating when and how the system(s) and any accompanying disposal requirements will be achieved at the Wateree Station by December 31, 2028.

The Wateree Station NPDES permit (SC0002038) is being renewed at this time. The renewed permit will include the 2020 VIP limits and requirements for FGD wastewater discharges. This Notice of Planned Participation satisfies one of the requirements outlined in Part IV.A.1 of the draft NPDES permit.

If you have any questions, please contact Mark Ferguson at 803-217-8103 or by email at mark.ferguson@dominionenergy.com or Mike Mosley at 803-217-7345 or by email at michael.mosley@dominionenergy.com

Sincerely,

A handwritten signature in black ink that reads "T. A. Effinger". The signature is written in a cursive style with a prominent initial "T" and "A".

Thomas Effinger
Director, Environmental Services

CC: Randy Thompson (SCDHEC)
Richard Salley/Reggie Butler
J. Robinson
M. Quattlebaum/C. Pearson
K. Roller
M. Mosley/M. Ferguson/file



Dominion Energy South Carolina – Wateree Station Notice of Planned Participation – Voluntary Incentive Plan for Flue Gas Desulfurization Wastewater Discharges

Dominion Energy South Carolina (DESC) Wateree Station is a two unit, coal-fired electric generating station located in Eastover, South Carolina. The station discharges to the Wateree River in accordance with South Carolina’s Department of Health and Environmental Control (DHEC) National Pollutant Discharge Elimination System (NPDES) permit SC0002038. Wateree Station is subject to EPA’s Effluent Limit Guidelines (ELGs) under 40 CFR 423: Steam Electric Power Generating Point Source. Revised ELGs under the Steam Electric Reconsideration Rule were published on October 13, 2020, and include new requirements for flue gas desulfurization (FGD) wastewater (WW) discharges.

The purpose of this document is to provide information to DHEC about DESC Wateree’s plan to select the voluntary incentive plan (VIP) option for FGD wastewater treatment as outlined in the 2020 revision of the ELGs. This Notice of Planned Participation (NOPP) includes descriptions of the likely methodologies available to be used for compliance. An engineering dependency chart for attaining compliance with 40 CFR 423.13(g)(3)(i) by the required date of December 31, 2028, is included as Attachment 1.

FGD Wastewater Treatment Approach and Brine Disposal

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

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

Table 1. 2020 FGD Wastewater ELGs for VIP Option

Candidate technologies have been identified for further consideration to comply with these limits. These include thermal evaporation with no resultant discharge, traditional reverse osmosis (RO) with brine encapsulation, and multi-pass, high-shear membranes with brine encapsulation. High quality permeate from these processes (if present) may be used as makeup water for the FGD scrubber or other uses. Depending upon the treatment approach, the required limits for the permeate in the VIP option will be met or a no-discharge use for this water will be established.

Encapsulation of the brine is intended to solidify the RO reject solution to allow for disposal in a landfill. Various constituents are mixed with the RO reject solution to form a flowable fill that rapidly solidifies. For



FGD wastewater encapsulation, typical constituents mixed with the RO reject are fly ash, bottom ash, gypsum, lime, and/or Portland cement in varying ratios. Encapsulation will require a site-specific brine solidification formula as FGD wastewater is highly variable. Due to this variability, it is expected that significant research and development will be required. DESC Wateree would work with industry groups and academia, along with consulting engineers, to determine the brine solidification formula that chemically and physically stabilizes the material.

Significant experimentation and testing with varying formulations for encapsulation may be necessary. One objective of this process is to have a flowable fill that does not set up in pipes going to the landfill, while still achieving the necessary strength, low permeability, and solidification after placement. It will also be necessary to work with DHEC permitting authorities in both water and waste to obtain appropriate permits.

Engineering Dependency Schedule for VIP Option

Detailed schedules for implementation of the VIP option have not yet been developed. An Engineering Dependency Chart as required by the ELGs is described below and shown in Attachment 1. This proposed schedule may change slightly because a number of utilities will be competing for the same resources.

FGD WW Characterization / Scrubber Water Balance

Characterization of Wateree's FGD wastewater will be conducted to determine compatibility with the available membrane technology providers that have had experience in treating FGD wastewater, at least on a pilot scale. This characterization would also assist with the identification of additional pre-treatment that may be required to protect the membranes. In addition to the chemical analyses of the wastewater, a detailed water balance of FGD scrubber operations will be needed to evaluate opportunities to reduce the volume of wastewater generated and thus requiring treatment. Characterization and development of the water balance, incorporating station and seasonal variability, is expected to require six to nine months.

Develop Specifications, Bench & Pilot Testing

Once characterization is complete, specifications will be developed, and vendors approached. Data will be shared with technology providers and bulk samples shipped for testing of prospective system(s). On-site piloting of membrane treatment technologies may be undertaken. Pilot operations should be conducted over several months to allow for variability in FGD scrubber chemistry and other site operations (generating load, startup, shutdown, weather, etc.). Should piloting be pursued, simultaneous testing with multiple vendors is preferable to minimize variability, so scheduling should accommodate multiple vendors' equipment availability. This process is expected to take approximately twelve months, including time to obtain approval for the pilot(s).



Complete Detailed Design

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

Permitting / DHEC Approval to Construct

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

Construction

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

System Startup

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

Develop Brine Solidification Formula (If Selected)

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



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

Richard Salley 10-8-21

Richard Salley
Plant Manager
Wateree Station



Attachment 1 – Engineering Dependency Chart

**Attachment 1
Wateree Flue Gas Desulfurization - Voluntary Incentive Plan Engineering Dependency Chart**

Task Name	Start	End	2021												2022												2023												2024												2025												2026												2027												2028																																																																																																																																			
			1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12																																																																																																																								
Wateree FGD VIP Engineering Dependency Chart		12/31/2028																																																																																																																																																																																																																								
Ongoing activities (Engineering contractor selected, project kickoff, compliance strategy)	1/1/2021	10/1/2021	█																																																																																																																																																																																																																							
Begin FGD characterization and develop FGD water balance	10/1/2021	4/30/2022													█																																																																																																																																																																																																											
Provide FGD characterization data, develop specifications, provide bulk volumes for bench testing w/vendors, obtain pilot approval, conduct pilots	5/1/2022	4/30/2023													█																																																																																																																																																																																																											
Complete detailed design	5/1/2023	9/30/2024																									█																																																																																																																																																																																															
Submit Request/Obtain Approval to Construct from DHEC (some parallel activities with detailed design); obtain permits	10/1/2023	6/1/2024																									█																																																																																																																																																																																															
Construction	7/1/2024	3/31/2026																																					█																																																																																																																																																																																			
System startup	4/1/2026	6/30/2026																																																	█																																																																																																																																																																							
Develop brine solidification formula (if selected)	6/1/2026	11/30/2028																																																													█																																																																																																																																																											
ELG Applicability date		12/31/2028																																																																																																																																																																																																																								