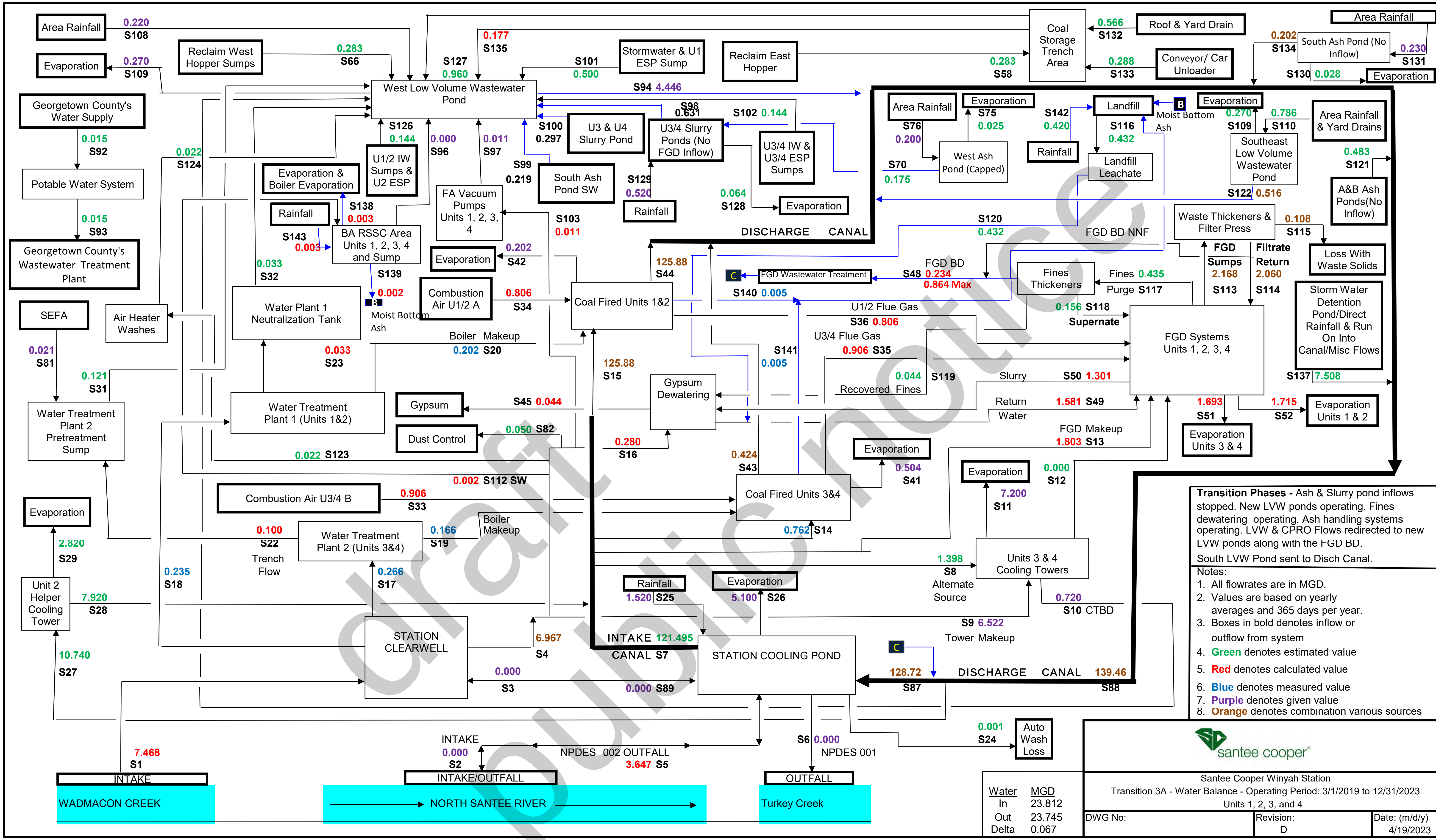
Attachment 1

NPDES Permit Application


Area Rainfall 0.220 S108
Evaporation 0.270 S109
Reclaim West Hopper Sumps 0.283 S66
S127 0.960
0.177 S135
Stormwater & U1 ESP Sump
S101 0.500
Reclaim East Hopper
0.283 S58
Coal Storage Trench Area
0.566 S132
Roof & Yard Drain
0.288 S133
Conveyor/ Car Unloader
Area Rainfall
0.202 S134
South Ash Pond (No Inflow)
0.230 S131
S130 0.028
Evaporation
West Low Volume Wastewater Pond
S94 4.446
Georgetown County's Water Supply
0.015 S92
Potable Water System
0.015 S93
Georgetown County's Wastewater Treatment Plant
0.022 S124
S126 0.144
U1/2 IW Sumps & U2 ESP
0.000 S96
0.011 S97
S100 0.297
U3 & U4 Slurry Pond
S98 0.631
U3/4 Slurry Ponds (No FGD Inflow)
S102 0.144
U3/4 IW & U3/4 ESP Sumps
Area Rainfall
S76 0.200
Evaporation
S75 0.025
West Ash Pond (Capped)
S70 0.175
S142 0.420
Landfill
Moist Bottom Ash
S116 0.432
Rainfall
Landfill Leachate
Evaporation
0.270 S109
0.786 S110
Area Rainfall & Yard Drains
Southeast Low Volume Wastewater Pond
0.483 S121
A&B Ash Ponds(No Inflow)
S122 0.516
Evaporation & Boiler Evaporation
Rainfall
S138 0.003
S143 0.003
BA RSSC Area Units 1, 2, 3, 4 and Sump
FA Vacuum Pumps Units 1, 2, 3, 4
S99 0.219
South Ash Pond SW
S129 0.520
Rainfall
0.064 S128
Evaporation
DISCHARGE CANAL
S103 0.011
0.033 S32
S139
0.002
Moist Bottom Ash
Evaporation
0.202 S42
Combustion Air U1/2 A
0.806 S34
Coal Fired Units 1&2
125.88 S44
FGD Wastewater Treatment
S140 0.005
FGD BD S48 0.234
0.864 Max
S120 0.432
FGD BD NNF
Fines Thickeners
Fines 0.435
Purge S117
Waste Thickeners & Filter Press
0.108 S115
Loss With Waste Solids
FGD Sumps 2.168 S113
Filtrate Return 2.060 S114
Storm Water Detention Pond/Direct Rainfall & Run On Into Canal/Misc Flows
SEFA
Air Heater Washes
Water Plant 1 Neutralization Tank
0.021 S81
0.033 S23
Boiler Makeup 0.202 S20
0.156 S118 Supernate
U1/2 Flue Gas
S36 0.806
U3/4 Flue Gas
S141 0.005
0.906 S35
FGD Systems Units 1, 2, 3, 4
125.88 S15
Gypsum Dewatering
0.044 S119
Recovered Fines
Slurry S50 1.301
S137 7.508
0.121 S31
Water Treatment Plant 2 Pretreatment Sump
Water Treatment Plant 1 (Units 1&2)
Gypsum
S45 0.044
Dust Control
0.050 S82
0.022 S123
0.280 S16
0.424 S43
Return Water 1.581 S49
FGD Makeup 1.803 S13
1.693 S51
1.715 S52
Evaporation Units 1 & 2
Evaporation Units 3 & 4
Evaporation
0.504 S41
Evaporation
7.200 S11
0.000 S12
0.002 S112 SW
Combustion Air U3/4 B
0.906 S33
Coal Fired Units 3&4
0.762 S14
Evaporation
2.820 S29
0.100 S22
Trench Flow
Water Treatment Plant 2 (Units 3&4)
0.166 S19
Boiler Makeup
0.235 S18
0.266 S17
Unit 2 Helper Cooling Tower
7.920 S28
10.740 S27
Rainfall 1.520 S25
Evaporation 5.100 S26
1.398 S8 Alternate Source
Units 3 & 4 Cooling Towers
0.720 S10 CTBD
S9 6.522 Tower Makeup
STATION CLEARWELL
6.967 S4
INTAKE 121.495
CANAL S7
STATION COOLING POND
0.000 S3
0.000 S89
128.72 S87
DISCHARGE CANAL 139.46 S88
0.001 S24
Auto Wash Loss
7.468 S1
INTAKE 0.000 S2
NPDES 002 OUTFALL 3.647 S5
S6 0.000 NPDES 001
INTAKE
WADMACON CREEK
INTAKE/OUTFALL
NORTH SANTEE RIVER
OUTFALL
Turkey Creek
Transition Phases - Ash & Slurry pond inflows stopped. New LVW ponds operating. Fines dewatering operating. Ash handling systems operating. LVW & CPRO Flows redirected to new LVW ponds along with the FGD BD.
South LVW Pond sent to Disch Canal.
Notes:
1. All flowrates are in MGD.
2. Values are based on yearly averages and 365 days per year.
3. Boxes in bold denotes inflow or outflow from system
4. Green denotes estimated value
5. Red denotes calculated value
6. Blue denotes measured value
7. Purple denotes given value
8. Orange denotes combination various sources
santee cooper
Water MGD
In 23.812
Out 23.745
Delta 0.067
Santee Cooper Winyah Station
Transition 3A - Water Balance - Operating Period: 3/1/2019 to 12/31/2023
Units 1, 2, 3, and 4
DWG No:
Revision: D
Date: (m/d/y) 4/19/2023

santee cooper

Hand Delivered

October 8, 2021

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

Subject: Winyah Generating Station – NPDES Permit # SC0022471
Submission of Notice of Planned Participation (NOPP) Under 2020 Steam Electric Power Generating Effluent Guidelines – Permanent Cessation of Coal Combustion

Dear Mr. Amick:

Santee Cooper is submitting the attached NOPP to document our participation in the Permanent Cessation of Coal Combustion subcategory for compliance with the 2020 Steam Electric Power Generating Effluent Guidelines and to certify that all four units at the Winyah facility will cease combustion of coal no later than December 31, 2028 per the requirements of 40 CFR 423.19(f). As required, the NOPP includes the most recent integrated resource plan and a timeline with interim milestones for achieving permanent cessation of coal combustion, based on the best information available today. We are also attaching minutes and a press release concerning the Santee Cooper Board's resolution to retire Winyah, approved March 22, 2021. Taken together, this submittal fulfills our obligations for opting into this subcategory under 40 CFR 423.19.

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

Sincerely,

Pamela J. Williams

Pamela J. Williams
Chief Public Affairs Officer and General Counsel

PJW:JHC:JWC:pjc

Attachment: Winyah NOPP for Permanent Cessation of Coal Combustion

Winyah Generating Station Notice of Planned Participation in 2020 Effluent Limitation Guidelines Retirement Subcategory

PREPARED BY SOUTH CAROLINA PUBLIC SERVICE AUTHORITY (SANTEE COOPER)

October 8, 2021

Winyah Generating Station
Notice of Planned Participation in 2020 Effluent Limitation Guidelines Retirement Subcategory

Water & CCR Environmental Services

Table of Contents

I. **Attachments**

A: NEW GENERATION PERMITTING SCHEDULE

B: NEW GENERATION CONSULTING SCHEDULE

C: INTEGRATED RESOURCE PLAN

D: SANTEE COOPER BOARD MINUTES AND PRESS RELEASE ON WINYAH RETIREMENT

1 Introduction

Santee Cooper plans to retire the Winyah facility by the end of 2028. The utility idled unit 4 at the close of 2020. It could be un-idled to serve load if needed. Originally the utility planned to idle unit 3 following the 2021/2022 winter peak but it is now projected to remain available to meet higher demand than was previously projected. According to the integrated resource plan (IRP, Attachment C), units 1 and 2 are to be idled in or about 2027, depending on how quickly a large new generating resource can be brought on board. In order to maintain system reliability, units 1, 2, and 3 will be needed until that new generating resource is available. Santee Cooper's current IRP shows this new resource as a natural gas combined cycle facility, coming online concurrent with Winyah station retirement (Table 7-2).

These retirement plans allow for submittal of a Notice of Planned Participation (NOPP). This NOPP includes all the information required under 40 CFR 423.19(f) and is an update to a schedule submitted in March to support DHEC's efforts to write a new NPDES permit. It includes some updates reflecting current system needs, which requires Unit 3 to remain available; updated status of Santee Cooper with respect to the General Assembly; and less detail as to plans for replacement power, as Santee Cooper evaluates all possible options.

2 Hurdles to Station Retirement

A number of hurdles stand in the way of developing the type of large generating resource that will be necessary to complete Winyah station retirement. These add uncertainty – and likely additional time – to the schedule provided in the IRP.

1. Under Act 135, passed on May 18, 2020, in Section 11 subsection E, Santee Cooper was prohibited from moving forward with construction of a large new generating resource without obtaining approval from the Santee Cooper Oversight Committee – a group comprised of the Governor, the Speaker of the House, the President of the Senate, the Chair of the House Ways and Means Committee, and the Chair of the Senate Finance Committee. The Office of Regulatory Staff (ORS) raised questions about what activities, including schedule development, would be allowed by Act 135. ORS stated, "In light of Santee Cooper's actions to discuss siting and permitting processes to support new generation planning efforts, it is unclear if the activities undertaken by Santee Cooper related to planning and permitting for a natural gas combined cycle or other major generation resource are allowed under Act 135. ORS recommends the Santee Cooper Oversight Committee review and provide further instruction to ORS and Santee Cooper related to planning efforts that include natural gas combined

cycle or other major generation resources are allowable under Act 135." This slowed progress in 2021.

2. Santee Cooper and Central Electric Cooperative are currently pursuing joint studies to confirm and identify the replacement resource(s) following Winyah's planned retirement. Following this diligence phase, Central will have 120 days to opt in or out of the proposed resource, as required by the Coordination Agreement between Central and Santee Cooper.

3. The recently enacted Act 90 Santee Cooper reform legislation will require the Public Service Commission's review and approval prior to construction or acquisition of a Major Utility Facility or Power Purchase Agreements greater than 10 years. While Santee Cooper is excluded from PSC approval for items related to the WGS retirement, the utility is not necessarily exempt from PSC approval in the event of a new generation resource.

4. Availability of natural gas is a further concern. The existing natural gas infrastructure in South Carolina is fully subscribed and utilized. This lack of natural gas infrastructure could create challenges with site selection. It will also require work and analysis with a natural gas supply company.

5. We anticipate a lengthy permitting period which will include the station proper, intake and discharge structures, and a natural gas supply line.

    a. Because federal permits for intake and discharge structures will be required in the event a new generation resource is constructed or for wetlands impacts in the event of a new transmission resource, it is likely that the NEPA process will be triggered, probably involving an Environmental Assessment and possibly an Environmental Impact Statement, which will have to be written, commented upon, and ultimately approved before federal permits can be granted. The NEPA process itself is quite lengthy. The utility had developed an internal schedule in 2020 that anticipated a 48-month interval for the NEPA-related federal permits.

    b. Other permits will also be required. Some can be applied for concurrently, but Santee Cooper's internal schedules estimated at least an additional three months following completion of the NEPA process for other permits for a generation asset, including air quality, NPDES construction and discharge permits, drinking water supply, septic systems, zoning, and construction stormwater permits. This is an aggressive but reasonable schedule for these other permits, demonstrating the reasonableness of Santee Cooper's internal schedule. Schedules and assumptions for these permits are included in Attachment A.

c. While some permit application development can begin after site selection, technology selection and initial design must take place before applications for federal permits can be submitted. We estimate that it will take three months to procure an engineering consultant and an additional three months following to select the technology and initiate federal permitting.

6. As the federal permitting process nears its conclusion, we hope to begin procurement of materials. This will include final engineering design, procurement and initiation of turbine manufacture for a generating asset or transmission towers and wire for a transmission asset.

7. Once all permits are received, construction can begin. We had previously estimated this will take an additional 28 months to complete construction and commission a new generation asset. An internal construction schedule is included in Attachment B.

8. It is likely that challenges posed by the COVID-19 global pandemic will induce further delays that may be difficult to anticipate, including supply chain disruption for new generating resources.

9. Given our location on the coast, contingencies associated with weather-related delays due to tropical cyclones should also be considered.

10. EPA's recent announcement of the agency's intent to rewrite the 2020 Steam Electric Effluent Limitation Guidelines adds additional uncertainty to station retirement.

3 Projected Availability of Replacement Power

Santee Cooper's schedule for development of a new generation asset demonstrates that it would likely take 7 years from project initiation to bring replacement power for Winyah online (Attachment B). Given the other delays and potential delays noted, it is reasonable and prudent to expect this new resource to be unavailable before December 31, 2028.

4 Timeline for Winyah Retirement and New Asset Availability

We suggest the Department develop simple milestones for the construction of new power capacity. We further suggest the timeline consider the likelihood that the project will not be initiated until early 2022. Broken down, here are the intervals and major milestones that will need to be achieved. We recommend submittal of progress reports every six months until the new asset is available and all Winyah units are idled.

Table 1. Timeline.

Milestone	Interval Necessary	Estimated Completion Date
Select site, initiate project	2 months	12/31/2021
Procure consultants, select technology	6 months	6/30/2022
Develop applications, apply for and receive federal and state permits, initiate construction upon receipt, commission new asset.	84 months	12/31/2028
Permanently idle all Winyah units	84 months	12/31/2028

5 Additional Contents for Notice of Planned Participation

Under the 2020 effluent limitation guidelines, facilities which produce FGD wastewater and which plan to retire or repower by December 31, 2028 can "opt in" to the category for permanent cessation of coal combustion. In order to do so, the utility must submit a notice of planned participation (NOPP) by October 13, 2021.

The regulation defines required contents of the NOPP in 40 CFR 423.19(f). Besides the timeline (part 4 and Table 1, above), the requirements include identification of units intending to join the subcategory and whether they are retiring or repowering, whether or not this has been approved by a relevant regulatory body which must be identified, a copy of the most recent integrated resource plan (IRP, Attachment C), and documentation supporting plans to cease coal combustion.

As discussed briefly in the introduction, plans for closure are defined in the IRP, filed with the South Carolina Energy Office on December 23, 2020. Additional information to meet the requirements for a NOPP is included below in Table 2.

As noted in part 2, Santee Cooper is not currently regulated by the Public Service Commission as it relates to Winyah retirement. At this time, the only body whose approval is required to retire the four units is the Santee Cooper board. That body approved closure of these units in a board meeting held on March 22, 2021. Meeting minutes and a press release are attached in Attachment D.

Table 2. Unit Closure Plans.

	Idle Date	Retire/Repower?
Unit 1	By December 31, 2028	Retire
Unit 2	By December 31, 2028	Retire
Unit 3	By December 31, 2028	Retire
Unit 4	December 31, 2020 By December 31, 2028	Idled Retire

Attachment A: New Generation Permitting Schedule

Two 550-MW Natural Gas Combined-Cycle Turbines (GE H-Class)

Located at Pee Dee or a generic site

Required Environmental Reviews, Permits, and Approvals	Estimated Permitting Timeframe (months)		
	Generation	**NG Pipeline**	**Transmission**
Environmental Impact Statement(s) and Other Major Environmental Reviews (including FERC pipeline certificates; CWA Section 404, navigable waters, and surface water withdrawal permits; and studies of generation/pipeline/transmission alternatives, species of concern, cultural resources, viewsheds, economic justice, and noise)	48	36	48
Air construction permitting for power block and compressor stations for natural gas pipeline[1]	3	N/A	N/A
Section 401 Water Quality Certification[2]	3	3	3
Wastewater Treatment Construction[3]	3	N/A	N/A
Stormwater Construction[3]	3	3	3
Drinking Water Supply Construction[3]	3	N/A	N/A
Septic System Construction[3]	3	N/A	N/A
Local/Zoning (noise, buildings, etc)[3]	3	3	3

Reasonable Total Permitting Timeframe **51 months**

Notes:

[1] The majority of the permitting work will be done simultaneously with the EIS, but the final air permit for the power block will be issued by DHEC after the EIS process is complete (i.e., within 3 months after the 48-month EIS process). The air permit for the compressor stations could be issued on a separate track prior to the issuance of the final EIS.

[2] Application will be reviewed and certification issued after the Section 404 permit is received (within 3 months after the 48-month EIS process).

[3] Application will be reviewed while EIS and 401 processes are ongoing.

Permitting timeframes include consultant procurement, application preparation (including the development of any supporting documentation), and regulatory reviews/approvals.

It is likely that FERC and the Army Corps will conduct separate, but concurrent, environmental reviews for the pipeline and power plant, respectively.

The timeline for completing the environmental reviews of the power block and ancillary facilities will require an EIS from the Army Corps to secure the permits necessary for the water intake structure and wetlands.

Other requirements, including a Spill Prevention Countermeasures & Control (SPCC) Plan, Stormwater Pollution Prevention Plan, Potable Water O&M Manual, and operating permits, will be prepared and submitted prior to the regulatory deadlines. These requirements should not impact the COD.

Assumptions:

At Pee Dee adequate transmission lines are in place for Unit 1 but additional lines will need to be built for Unit 2 and included in the EIS; assume the new lines will utilize the existing rights-of-way.

At a generic site, the power block will be at a location that will allow for the use of existing transmission lines and not require Santee Cooper to construct significant amounts of new transmission. If the project requires the construction of a lengthy new transmission line, this could require additional time and resources to secure the necessary rights of way and permitting approvals.

The generation portion of the project will impact approximately 200 acres and avoid any significant impacts to wetlands.

Any consultation with the Federal Land Manager will be of limited duration because air quality in the Cape Romain Class I area will not be impacted.

No city water or sewer hookup is available.

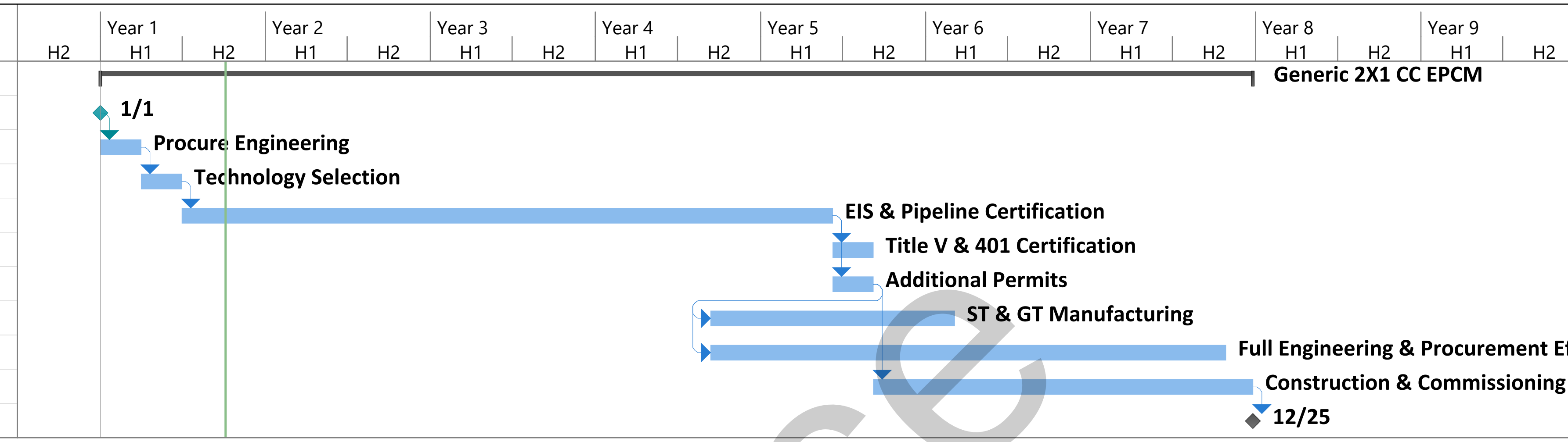
No consultation will be required for threatened or endangered species under the Endangered Species Act.

No significant public opposition occurs during the permitting process.

Attachment B: New Generation Consulting and Construction Schedule

Generic 2X1 CC
EPCM Schedule

ID		Task Mode	Task Name	Duration	Resource Names
1			**Generic 2X1 CC EPCM**	**2550 days**	
2			Central & SC Agree on Shared Resource	0 days	
3			Procure Engineering	90 days	
4			Technology Selection	90 days	
5			EIS & Pipeline Certification	1440 days	
6			Title V & 401 Certification	90 days	
7			Additional Permits	90 days	
8			ST & GT Manufacturing	540 days	
9			Full Engineering & Procurement Effort	1140 days	
10			Construction & Commissioning	840 days	
11			Start Up	0 days	



Project: 2X1 CC Generic EPCM

Task	Project Summary	Manual Task	Start-only	Deadline	
Split	Inactive Task	Duration-only	Finish-only	Progress	
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress	
Summary	Inactive Summary	Manual Summary	External Milestone		

12/23/2020

Santee Cooper
2020 Integrated Resource Plan

December 23, 2020

VIA ELECTRONIC FILING

Ms. Dawn Hipp
Chief Operating Officer
Office of Regulatory Staff
1401 Main Street, Suite 900
Columbia, SC 29201

RE: Integrated Resource Plan (2020) of the South Carolina Public Service Authority

Dear Ms. Hipp,

Santee Cooper is pleased to submit the attached 2020 Integrated Resource Plan Report of the South Carolina Public Service Authority (Santee Cooper). At the direction of the Executive Director of the Office of Regulatory Staff, Santee Cooper is submitting through you the attached report for consideration by the State Energy Office of South Carolina. This 2020 IRP Report documents analyses prepared by and plans developed by Santee Cooper in accordance with Section 58-37-40 of the South Carolina Code to develop a long-term plan of loads, resources, needs, and costs for the Santee Cooper system. Through its 2020 IRP, Santee Cooper has identified a twenty-year plan for a diverse and reliable portfolio of resources that incorporates innovative technologies, improves operating efficiency, and reduces environmental impacts for the benefit of Santee Cooper's retail and wholesale customers.

In developing its 2020 IRP, Santee Cooper recognizes that Section 11 of Act 135 of the General Assembly prohibits Santee Cooper from certain activities with respect to constructing new facilities, among other things. In light of such prohibition, Section 8 of this report, Short-Term Action Plan, identifies a list of activities in which Santee Cooper is currently engaged to advance its 2020 IRP, to the extent permitted by Act 135, and a list of future activities, some of which may require that Santee Cooper seek review and approval under Act 135. Santee Cooper has developed an IRP that both respects the limitations put in place by Act 135 and uses industry-accepted practices to describe a long-term resource plan that can reliably and economically serve the customers of Santee Cooper through the implementation of a diverse, flexible, innovative, and environmentally responsible portfolio of resources.

It should also be noted that Santee Cooper prepared its 2020 IRP subsequent to the execution of Act 135 on May 18, 2020, resulting in a compressed schedule for IRP development. While Santee Cooper engaged with Central Electric Power Cooperative throughout the development of its 2020 IRP, time did not permit engagement of other Santee Cooper customers or community stakeholders. Santee Cooper intends to develop and execute a stakeholder engagement process as part of its next IRP filing. As Santee Cooper continues to develop its IRP process, we look forward to working with the Energy Office to obtain its advice and consultation.

If you have any questions, please do not hesitate to contact me.

Sincerely,

Charlie B. Duckworth

Charlie Duckworth
Deputy CEO & Chief Planning & Innovation Officer

cc: Nanette S. Edwards, Executive Director, Office of Regulatory Staff

2020 Integrated Resource Plan
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Section 1
Executive Summary

Santee Cooper is South Carolina's state-owned electric and water utility, created in 1934 as a rural electrification and public works project. Santee Cooper's primary business is the production, transmission, and distribution of electrical energy, both at wholesale and retail, to serve approximately two million South Carolinians in all 46 counties of the State. Territorial load requirements for 2019 totaled 23,644 gigawatt-hours, with a winter peak demand of 4,583 megawatts. Santee Cooper currently meets its typical winter peak load requirements with firm power supply from its own generating resources totaling 5,338 megawatts and firm power contracts totaling 471 megawatts. Santee Cooper's current mix of resources is depicted in Table 1-1.

Table 1-1
Current Santee Cooper Power Supply Resources

	Winter Capability (MW)	Percent of Total
Coal	3,530	60.8
Natural Gas and Oil	1,315	22.6
Nuclear	322	5.5
Owned Hydro Generation	142	2.5
Landfill Methane Gas	29	0.5
Solar[1]	0	0.0
Total Owned Resources	5,338	91.9
Purchases[1]	471	8.1
Total Resources	5,809	100.0

(1) Santee Cooper currently owns or purchases approximately eight megawatts of solar resources (nameplate capacity) that do not contribute firm capacity at the time of the winter peak.

Beginning with its Reform Plan submitted to the Department of Administration in November 2019 pursuant to Act 95 of the General Assembly and continuing through this 2020 Integrated Resource Plan (2020 IRP), Santee Cooper is committed to implementing a power supply roadmap to achieve a more diversified and environmentally sustainable power supply portfolio. To reach its goals, Santee Cooper has adopted the following resource planning principles.

- **Reliability:** Operate and plan the Santee Cooper system to ensure that all retail and wholesale customers are provided reliable electric power — reliability is the number one product of any electric utility
- **Customer Focus:** Provide safe, reliable, and affordable power, and provide customers with new opportunities as markets change
- **Cost Management:** Develop resource plans that provide effective cost management over the long-term

- **Environmental Stewardship:** Responsibly manage the environmental impact of Santee Cooper operations
- **Long-Term View:** Develop a long-term resource strategy to ensure flexibility and optionality over a wide range of possible future conditions
- **Reduce Financial and Planning Risk:** Develop resource plans that readily adapt as future conditions change and, when possible, add resources in increments that closely match resources to needs
- **Embrace Innovation:** Identify potential developing technologies and incorporate in resource plans when reasonable and cost-effective
- **Transparency:** Engage customers, stakeholders, Board Members, and elected officials in a transparent resource planning process that is responsive to questions and input

Overall, Santee Cooper's goal is to create a diverse and reliable portfolio of resources that incorporates innovative technologies, improves operating efficiency, reduces environmental impacts, and results in lower overall cost. Santee Cooper's roadmap to transform its power supply portfolio represents a dramatic evolution from a coal-heavy generating portfolio to one more dependent on sustainable and lower-emitting resources. Additionally, the power supply roadmap incorporates significant flexibility to address changing future market conditions and to minimize Santee Cooper's capital spending.

Initially, Santee Cooper is focused on the following strategic directions for its future power supply plans.

- Retire coal resources to the extent cost-effective
- Increase utilization of resources that reduce environmental impacts
- Plan for a diversified, low-cost resource portfolio
- Increase solar resource implementation
- Incorporate advanced technologies like battery energy storage
- Encourage demand-side management and demand response implementation
- Ensure system reliability

Through this 2020 IRP, Santee Cooper has identified a power supply roadmap that will transform its power supply portfolio to achieve these strategic initiatives. This plan, the Preferred Resource Plan, as summarized below and described more fully in Section 7 of this report, was developed based on the assumptions, results, and conclusions of the analyses conducted for this 2020 IRP and is intended to depict a reasonable representation of future resource development for Santee Cooper. However, other than the initiatives outlined in Section 8, Short-Term Action Plan, Santee Cooper has not made any final decisions with respect to specific resources or development of specific generation sites.

Central Electric Power Cooperative (Central) participated throughout the development of Santee Cooper's 2020 IRP. Central's staff and its experts participated in numerous meetings to develop key assumptions, identify relevant scenarios, and review preliminary and final results.

The Preferred Resource Plan includes the following.

- Retire 1,150 megawatts of coal resources at the Winyah Generating Station through a phased approach (idling Unit 4 by the winter of 2020/2021, idling Unit 3 by the winter of 2021/2022, and fully retiring all four Winyah coal units by 2027)
- Add 500 megawatts of new solar resources by 2023 through a request for proposals process (amount permitted by Act 135), and plan for an additional 1000 megawatts of solar resources by 2032
- Add 200 megawatts of utility-scale battery storage to the Santee Cooper system in phases (50 megawatts by 2026, 100 megawatts by 2033, and 200 megawatts by 2036)
- Incorporate new natural gas resources into the portfolio, including: adding 552 megawatts of capacity from a combined cycle resource targeted for 2027, identifying opportunities for long-term purchases to flexibly meet future load growth and resource need, and engaging in market energy purchases, when economic, to further diversify power supply
- Implement demand response programs, consisting of direct load control, voltage control, and other measures, to avoid approximately 85 megawatts of winter peak load by 2027, increasing to 106 megawatts by 2034
- Ensure system reliability by upgrading the transmission system to accommodate resource additions and adding quick-start peaking generating resources near the Santee Cooper retail load centers

With these changes, the Preferred Resource Plan would change Santee Cooper's power supply mix, as depicted by the following figures. Figure 1-1 illustrates the projected supply and demand balance for the Preferred Resource Plan, demonstrating increased diversity of resource types and close alignment of future resource additions to projected load requirements.

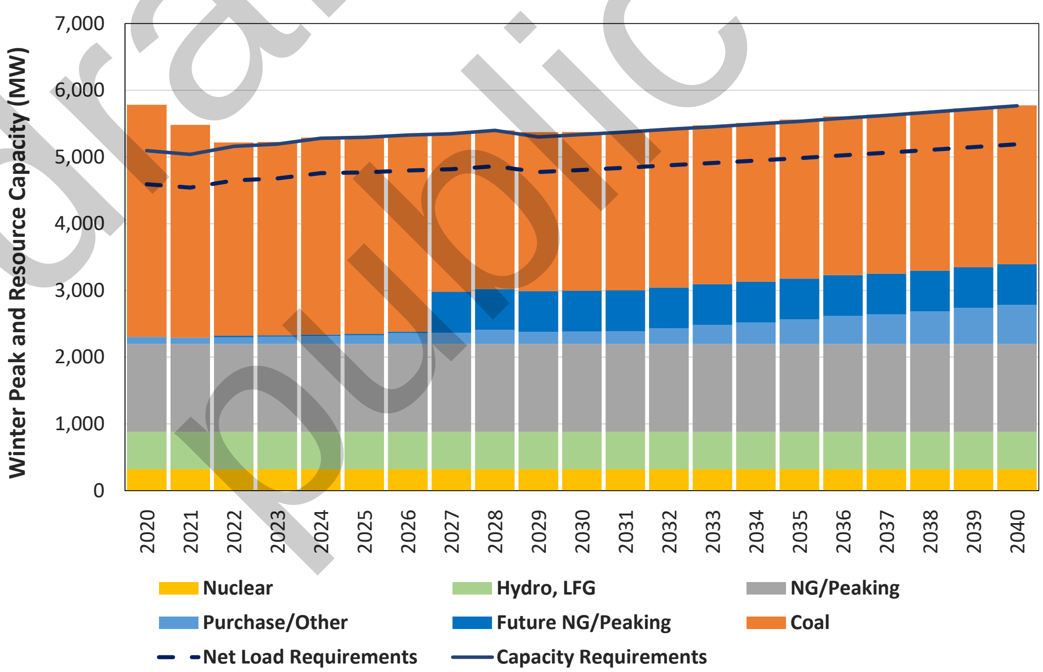

Figure 1-1: Supply and Demand Balance of Preferred Resource Plan

Figure 1-2 illustrates the changes in Santee Cooper's projected energy generation mix for the year 2033 resulting from its Reform Plan and projected for the Preferred Resource Plan, indicating significant improvement in the diversity of energy sources used to meet Santee Cooper's retail and wholesale energy requirements.

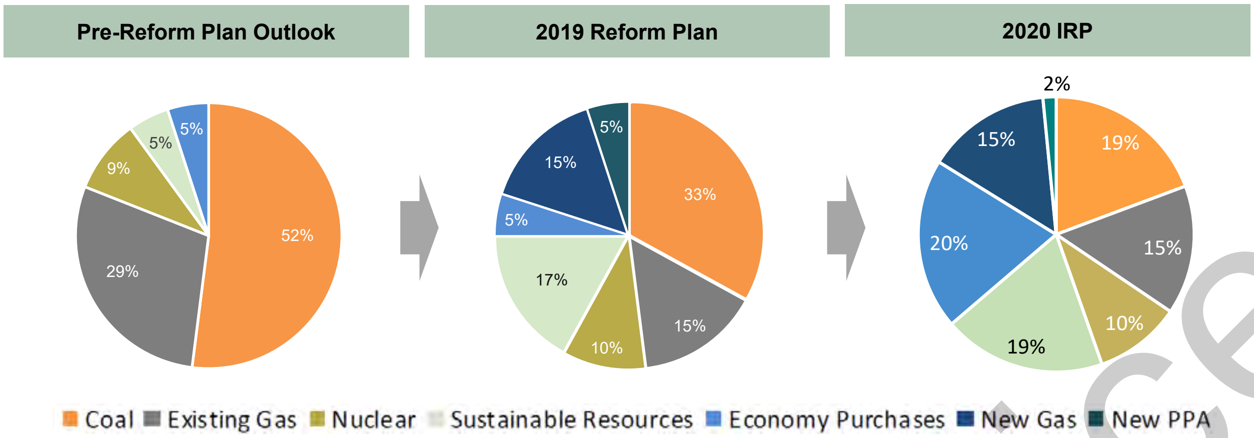

Figure 1-2: Evolution of Projected Santee Cooper Generation Mix for 2033

Figure 1-3 illustrates the improvement in Santee Cooper's carbon dioxide (CO_2) emissions profile projected for its Reform Plan and projected additional improvements under the Preferred Resource Plan, indicating an over 50 percent improvement since 2005.

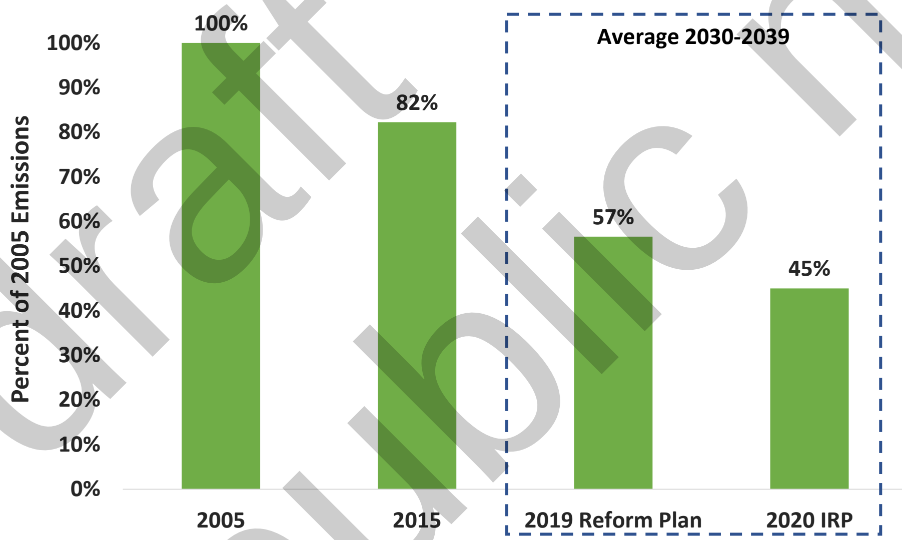

Figure 1-3: Projected CO_2 Emissions of the Santee Cooper System

The IRP Report provides additional context and detail regarding assumptions, processes, and the results of Santee Cooper's 2020 IRP. The following major topics are summarized in the report, by report section title.

- **Overview of Santee Cooper** — Overview of the Santee Cooper system, including a summary of Santee Cooper and its customers, resources, transmission interconnections, and service area.

- **Santee Cooper IRP Process** — Discussion of the process utilized by Santee Cooper in developing its 2020 IRP, including foundational principles, legislative requirements and considerations, and an overview of the functional process Santee Cooper used to prepare the 2020 IRP.
- **Santee Cooper Load Forecast** — Review of the process and projections developed for the load forecast utilized for the 2020 IRP, including forecasts of customers and sales for Santee Cooper's retail customers, load forecasts developed by Central for its member cooperatives, projected energy requirements and peak demand for Santee Cooper's other wholesale sales, and aggregate system requirements over 2020-2039.
- **Demand-Side Resource Plans** — Description of Santee Cooper's existing residential, commercial, load management, and informational demand-side management programs, including summaries of program expenditures and estimate of load reductions, and Santee Cooper plans for future development of demand response, electric vehicle, and commercial and residential energy efficiency programs.
- **Santee Cooper 2020 IRP Development** — Detailed discussion of the methodology and assumptions utilized for the development 2020 IRP, including a discussion of the process, models, portfolio evaluation approach, and sensitivity analyses utilized for the IRP, plus documentation of assumptions for cost escalation, financial assumptions, system load forecast, fuel price forecasts, power market price forecast, Santee Cooper existing generating and purchase power resources, existing Santee Cooper supply-demand balance, generating resource expansion options, and transmission system considerations.
- **IRP Results & Conclusions** — Summary of the results and conclusions of the 2020 IRP, including discussions of the resource expansion analysis process; presentation of the results of the resource expansion analysis, including projected costs and resource expansion portfolios under base case and sensitivity assumptions; and conclusions and development of a Santee Cooper preferred resource plan derived from the results of the IRP analysis.
- **Short-Term Action Plan** — Summary of activities to be undertaken by Santee Cooper over the next five years to develop the Preferred Resource Plan, and a discussion of additional future activities that Santee Cooper intends to undertake to further study and develop its resource plans and future IRP filings.
- **Transmission System Planning (Appendix A)** — Summary of Santee Cooper transmission system planning process and schedule of transmission capital projects.
- **Environmental Compliance Planning (Appendix B)** — Summary of environmental regulations and permitting requirements affecting Santee Cooper's facilities and discussion of actions and compliance of Santee Cooper, including regulations and requirements relating to airborne pollution, discharge of pollutants into waters, and disposal of solid and hazardous wastes.

Section 2
Overview of Santee Cooper

Santee Cooper is South Carolina's state-owned electric and water utility. Known formally as the South Carolina Public Service Authority (Santee Cooper or the Authority), Santee Cooper was created in 1934 as a rural electrification and public works project. Santee Cooper generated its first electricity in February 1942. Santee Cooper's primary business operation is the production, transmission, and distribution of electrical energy, both at wholesale and retail, to citizens of the State, which is the focus of this IRP Report. Santee Cooper is one of the nation's largest municipal wholesale utilities, serving directly or indirectly approximately two million South Carolinians in all 46 counties of the State.

Santee Cooper owns and operates 2,994 miles of distribution lines and associated facilities through which it serves approximately 189,000 residential, commercial, and small industrial retail customers in its assigned retail service territory, which consists of two non-contiguous areas covering portions of Berkeley, Georgetown, and Horry counties. Additionally, Santee Cooper serves 27 large industrial retail customers, several Central member cooperatives, and two municipal electric systems located in South Carolina, the Town of Bamberg and the City of Georgetown, all of which are directly interconnected to the Santee Cooper transmission system.

Central is an association of 20 electric distribution cooperatives, including the five electric distribution cooperatives that were formerly members of Saluda River Electric Cooperative, Inc. Central serves primarily residential, small commercial, and industrial customers in all 46 counties of the State. Santee Cooper supplies the total power and energy requirements of Central, less amounts which Central purchases directly from the Southeastern Power Administration (SEPA), amounts provided by Duke Energy Carolinas, LLC (Duke Energy Carolinas), a subsidiary of Duke Energy Corporation (DEC), as described below, and small amounts purchased from others.

In addition, Santee Cooper provides off-system wholesale sales to the City of Seneca, South Carolina, Piedmont Municipal Power Agency, Alabama Municipal Electric Authority, the Town of Waynesville, North Carolina, and the Charleston Navy Base.

Santee Cooper plans for firm power supply from its own generating capacity and firm power contracts to equal its firm load, including a 15 percent summer peak reserve margin and a 12 percent winter peak reserve margin. Santee Cooper owns generation facilities with current total maximum continuous ratings of 5,110 megawatts during the summer and 5,338 megawatts during the winter. In addition, Santee Cooper has entered into various power purchase arrangements through which Santee Cooper purchases 471 megawatts of firm capacity and associated energy. The territorial peak demand for 2019 was 4,583 megawatts, which occurred January 22, 2019. Santee Cooper typically peaks during the winter season.

Table 2-1, below, details the winter capability of Santee Cooper's resources by primary energy source.

Table 2-1
Current Santee Cooper Power Supply Resources

	Winter Capability (MW)	Percent of Total
Coal	3,530	60.8
Natural Gas and Oil	1,315	22.6
Nuclear	322	5.5
Owned Hydro Generation	142	2.5
Landfill Methane Gas	29	0.5
Solar[1]	0	0.0
Total Owned Resources	5,338	91.9
Purchases[1]	471	8.1
Total Resources	5,809	100.0

(1) Santee Cooper currently owns or purchases approximately eight megawatts of solar resources (nameplate capacity) that do not contribute firm capacity at the time of the winter peak.

Figure 2-1 illustrates the retail service areas of Santee Cooper and Santee Cooper's major generation resources.

Figure 2-1: Santee Cooper Retail Service Area and Major Generation Resources

Figure 2-2 illustrates the service area of Central, which includes areas throughout the state and adjacent to Duke Energy Carolinas, Dominion Energy South Carolina, Santee Cooper, and numerous municipal utilities, including those served by Santee Cooper.

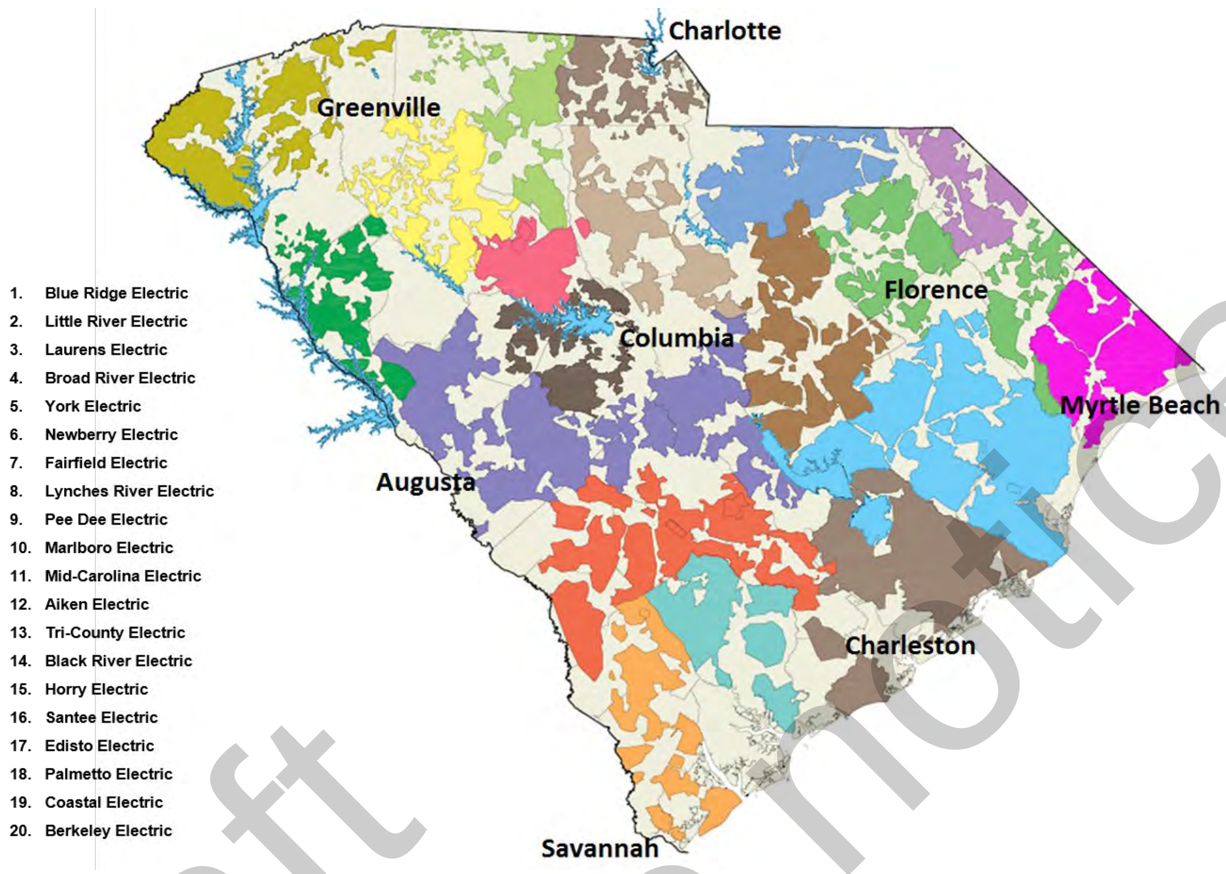

Figure 2-2: Central Service Area

Santee Cooper operates an integrated transmission system which includes lines owned by Santee Cooper as well as those owned by Central and maintained by Santee Cooper. The transmission system includes approximately 1,384 miles of facilities rates at 230 kilovolts, 1,933 miles rated at 115 kilovolts, 1,730 miles rated at 69 kilovolts, and 95 miles of overhead and underground transmission lines rated at 34 kilovolts and below. Santee Cooper operates 91 transmission substations and switching stations serving 87 distribution substations and 411 Central delivery points. Santee Cooper plans the transmission system to operate during normal and contingency conditions that are outlined in electric system reliability standards adopted by the North American Electric Reliability Corporation.

Santee Cooper's transmission system is interconnected with other major electric utilities in the region. It is directly interconnected with Dominion at eight locations (with four additional interconnections currently planned and under contract); with Duke Energy Progress, a subsidiary of DEC, at eight locations; with Southern Company Services, Inc. (Southern Company) at one location; and with Duke Energy Carolinas at two locations. Santee Cooper is also interconnected with Dominion, Duke Energy Carolinas, Southern Company, and SEPA through a five-way interconnection at the SEPA J. Strom Thurmond Hydroelectric Project, and with Southern Company and SEPA through a three-way interconnection at the SEPA R. B. Russell Hydroelectric Project. Through these interconnections, the Santee Cooper transmission system is integrated into the regional transmission system serving the Southeastern region of the United States and the Eastern Interconnection (one of the three major alternating-current electrical grids in the continental U.S. power transmission grid, the others being the Western Interconnection and the Electric Reliability Council of Texas). Santee Cooper has separate interchange agreements with each of the companies with which it is interconnected which provide for mutual exchanges of power.

The electric generation, transmission, and distribution facilities owned by Santee Cooper, as well as certain transmission facilities owned by Central, are operated and maintained by Santee Cooper as a fully integrated electric system.

Section 3
Santee Cooper IRP Process

Santee Cooper is committed to planning its generation and transmission systems in a manner that will result in affordable and competitively priced electricity service to the wholesale and retail customers of Santee Cooper while maintaining the very high level of system reliability that customers have come to appreciate. Moreover, Santee Cooper is focused on developing plans that will significantly reduce the carbon footprint of its generation fleet and enhance the diversity of its resource portfolio to allow Santee Cooper to adapt to changing market and economic conditions.

Resource Planning Principles

A sound integrated resource plan is built on three foundational characteristics: a broad view about future market conditions, such as fuel prices and customer loads; consideration of cost-effective options for both new and existing resources; and evaluation of resource portfolios against a sound set of resource planning principles. For Santee Cooper, core resource planning principles include the following.

- **Reliability:** Operate and plan the Santee Cooper system to ensure that all retail and wholesale customers are provided reliable electric power — reliability is the number one product of any electric utility
- **Customer Focus:** Provide safe, reliable, and affordable power, and provide customers with new opportunities as markets change
- **Cost Management:** Develop resource plans that provide effective cost management over the long-term
- **Environmental Stewardship:** Responsibly manage the environmental impact of Santee Cooper operations
- **Long-Term View:** Develop a long-term resource strategy to ensure flexibility and optionality over a wide range of possible future conditions
- **Reduce Financial and Planning Risk:** Develop resource plans that can readily adapt as future conditions change and, when possible, add resources in increments that closely match resources to needs
- **Embrace Innovation:** Identify potential developing technologies and incorporate in resource plans when reasonable and cost-effective
- **Transparency:** Engage customers, stakeholders, Board Members, and elected officials in a transparent resource planning process that is responsive to questions and input

Overall, the goal of Santee Cooper is to create a diverse and reliable portfolio of resources that incorporate innovative technologies, improve operating efficiency, reduce environmental impacts, and result in lower overall cost.

Legislative Considerations

Act 95

On May 21, 2019, the State's General Assembly passed, and on May 22, 2019, the Governor signed into law Act 95 of 2019 (Act 95), a Joint Resolution of the General Assembly requiring, among other things, the State's Department of Administration to establish a process: (a) to conduct a competitive bidding solicitation for the sale of some or all of the Authority; (b) to receive management proposals that do not involve a sale of the Authority, but are designed to improve the efficiency and cost-effectiveness of the Authority's electric operations; and (c) for the Authority to submit a proposal to the Department of Administration for reform, restructuring, and changes in its operation as an alternative to a sale or management proposal.

On August 16, 2019, the Department of Administration issued an invitation to interested parties to participate in the process by submitting bids for the sale of some or all of the Authority or management proposals. On November 25, 2019, the Authority submitted its original plan for reform, restructuring, and changes in operation to the Department of Administration, which plan was subsequently modified on January 24, 2020 by the Authority following discussions with the Department of Administration and Central (the Reform Plan). The Authority's Reform Plan identified a series of changes to the Authority's generation and transmission systems as well as expense management and other initiatives intended to achieve cost savings and optimize efficient operations. In addition, the Authority's Reform Plan provided for price stability for the Authority's customers, including Central.

During the week of March 2, 2020, the respective House and Senate committees of jurisdiction made recommendations to their respective legislative bodies to reject all of the bids provided in response to Act 95. Further hearings were held related to reforming Santee Cooper and to continue further bidder negotiations outside the scope of Act 95. Due to the COVID-19 public health emergency and disruption at that time of the legislative session, further consideration of Santee Cooper was suspended as part of the passage of Act 135 of 2020.

Act 135

Section 11 of Act 135 of 2020, a budget continuing resolution that was signed by the Governor on May 18, 2020 (Act 135), establishes certain operational guidelines for the Authority and prohibits the Authority from taking any action which would impair, hinder, or otherwise undermine from an economic, operational, feasibility, or any other perspective the ability of the General Assembly to complete its consideration regarding the Authority's status under Act 95. The provisions of Act 135 not only continue certain of the oversight and operational parameters that limited certain actions that could be taken by the Authority during the Act 95 process but also expressly permit and authorize the Authority to advance some of the key principles set forth in the Authority's Reform Plan. The provisions of Act 135 are to remain in effect through the earlier of May 31, 2021 or until an act of the General Assembly expressly supersedes the provisions of Act 135 applicable to the Authority.

Act 135 authorizes the Authority to continue to operate in the ordinary course of business and nothing in the Act prohibits the Authority from engaging in the following activities related to resource planning and operation.

(1) Doing those things necessary for closing and decommissioning the Winyah Generating Station including, but not limited to, planning, permitting, and securing by purchase or lease one hundred megawatts of combustion turbines and minor transmission upgrades, subject to the consent of Central pursuant to the Power System Coordination and Integration Agreement between Santee Cooper and Central, as amended (the Coordination Agreement).
(2) Doing all those things necessary for deploying up to 500 megawatts of new solar generation, within the structure described in the Authority's Reform Plan, subject to the consent of Central pursuant to the Coordination Agreement.
(3) Entering into operational efficiency and joint dispatch agreements with neighboring utilities for a period of up to one year, with annual renewals and reciprocal cancellation clauses thereafter.
(4) Renegotiating existing and entering into new coal supply, transportation, and related agreements that produce savings and for terms not to exceed five years or such longer period of time as may be approved by a Santee Cooper Oversight Committee (as established by Act 135).
(5) Entering into natural gas hedging arrangements for terms not to exceed five years, or such longer period of time as may be approved by the Santee Cooper Oversight Committee
(6) Conducting the planning, permitting, engineering and feasibility studies to develop natural gas transportation and power transmission to ensure a reliable power supply.
(7) Entering into purchase power arrangements needed for, but not in excess of, anticipated load for a term not to exceed the Settlement Rate Period of the Cook Settlement Agreement, and supportive thereof.

Though the Santee Cooper Reform Plan was ultimately rejected by the legislative committees (along with all other bids), Santee Cooper continues to pursue certain key principles of the Reform Plan while operating under the parameters of Act 135. The Reform Plan contemplated a future power supply plan that is adaptable, allowing the Authority to respond to changing business and regulatory conditions, including (i) improving resource diversity; (ii) reducing carbon emissions; (iii) reducing reliance on coal-fired generating resources; (iv) increasing use of renewable resources; (v) maximizing purchases of low-cost energy from surrounding transmission systems (when available and cost-effective); (vi) developing plans for new generation resources that more closely align resource implementation with projected future loads; (vii) reflecting the need for transmission upgrades; and (viii) continuing efforts to reduce the Authority's indebtedness.

The 2020 IRP has been developed taking into consideration the Reform Plan and within the limitations and allowances of Act 135, including requesting proposals for solar generation within the limits provided for under Act 135, and planning and implementing retirement of the Winyah Generating Station. Santee Cooper has also taken initial planning steps to evaluate options for future natural gas fired generating facilities but understands the Office of Regulatory Staff has noted the need for clarification on the compliance with Act 135 of this activity. Additionally, while the Act 95 process precluded Santee Cooper from coordinating or discussing its Reform Plan development with process participants, thus precluding coordination with Central, with the passage of Act 135 in May 2020, Santee Cooper began developing its 2020 IRP with participation and input from Central throughout the process. Additionally, while stakeholder outreach has been curtailed due to the limited time available since the passage of Act 135 and the onset of COVID-19, Santee Cooper is committed to expanding its stakeholder engagement process as part of continuing resource planning activities.

Act 62

The South Carolina Energy Freedom Act (H. 3659, R. 82) was passed by the General Assembly and signed into law by Governor McMaster on May 16, 2019 as Act 62. The Act, in part, amended the Code of Laws of South Carolina by adding Section 58-37-40, relating to Integrated Resource Plans to establish mandatory contents of IRPs and provide for certain reporting requirements. Section 58-37-40 requires Santee Cooper to submit an Integrated Resource Plan to the State Energy Office at least every three years. These IRP's are required to be published on Santee Cooper's website and on the website of the State Energy Office. Santee Cooper has developed this 2020 IRP to comply with the requirements of Act 62 and Section 58-37-40, but within the constraints of Act 95 and Act 135, as described above.

The following Table 3-1 outlines specific filing requirements identified by Act 62 and Section 58-37-40 of the South Carolina Code of Law pertaining to Santee Cooper's filing of its IRP.

Table 3-1
Act 62 and Section 5-37-40 IRP Filing Requirements

Act 62 and SC Code of Law	IRP Filing Requirement	Santee Cooper 2020 IRP Report
58-37-40 (A)(3)	The Integrated Resource Plan must be developed in consultation with the electric cooperatives and municipally owned electric utilities purchasing power and energy from the Public Service Authority and consider any feedback provided by retail customers	Sections 3, 4, 5, 6, 7, and 8
	and shall include the effect of demand side management activities of the electric cooperatives and municipally owned electric utilities that directly purchase power and energy from the Public Service Authority or sell power and energy generated by the Public Service Authority.	Sections 4 and 5
58-37-40 (B)(1)	An integrated resource plan shall include all of the following:	
(a)	A long-term forecast of the utility's sales and peak demand under various reasonable scenarios;	Section 4
(b)	The type of generation technology proposed for a generation facility contained in the plan and the proposed capacity of the generation facility, including fuel cost sensitivities under various reasonable scenarios;	Section 6
(c)	Projected energy purchased or produced by the utility from a renewable energy resource;	Sections 6 and 7

Act 62 and SC Code of Law	IRP Filing Requirement	Santee Cooper 2020 IRP Report
(d)	A summary of the electrical transmission investments planned by the utility;	Section 6 and Appendix A
(e)	Several resource portfolios developed with the purpose of fairly evaluating the range of demand-side, supply-side, storage, and other technologies and services available to meet the utility's service obligations. Such portfolios must include an evaluation of low, medium, and high cases for the adoption of renewable energy and cogeneration, energy efficiency, and demand response measures, including consideration of the following: i. Customer energy efficiency and demand response programs, ii. Facility retirement assumptions, iii. Sensitivity analyses related to fuel costs, environmental regulations, and other uncertainties or risks;	Sections 6, 7 and 8
(f)	Data regarding the utility's current generation portfolio, including the age, licensing status, and remaining estimated life of operation for each facility in the portfolio;	Sections 2 and 6 and Appendix B
(g)	Plans for meeting current and future capacity needs with the cost estimates for all proposed resource portfolios in the plan;	Sections 6 and 7
(h)	An analysis of the cost and reliability impacts of all reasonable options available to meet projected energy and capacity needs; and	Sections 6 and 7
(i)	A forecast of the utility's peak demand, details regarding the amount of peak demand reduction the utility expects to achieve, and the actions the utility proposes to take in order to achieve that peak demand reduction.	Sections 4 and 5

IRP Process

Santee Cooper prepared its 2020 IRP utilizing generally accepted utility practices, including the use of overarching principles and objectives, realistic projections of economic and market conditions, historical operating characteristics for existing resources, industry-based assumptions for future resource alternatives, load forecasts developed using industry-standard techniques, integration of cost-effective demand-side management programs, evaluation of renewable and energy storage resources, screening of potential resource sites, simulation of resource dispatch, optimization of resource expansion plans, evaluation of coal resource retirements, and evaluation of resource plan sensitivities to changes in load, market, and regulatory conditions. Figure 3-1, below, provides a depiction of the overall process utilized by Santee Cooper when developing its 2020 IRP, the components of which are described in more detail in the following sections of this IRP Report.

The 2020 IRP was directed and conducted by a team of Santee Cooper staff, assisted throughout the process by nFront Consulting, LLC, an energy industry consulting firm based in Orlando, Florida. Santee Cooper and nFront Consulting worked together to determine the approach, develop assumptions, model generation dispatch and generation expansion, and review and summarize results of the 2020 IRP. Additionally, the 2020 IRP was prepared in conjunction with Central, including participation by Central's staff and its experts in numerous meetings to develop key assumptions, identify relevant scenarios, and review preliminary and final results. The 2020 IRP was largely prepared during May 2020 through mid-October 2020.

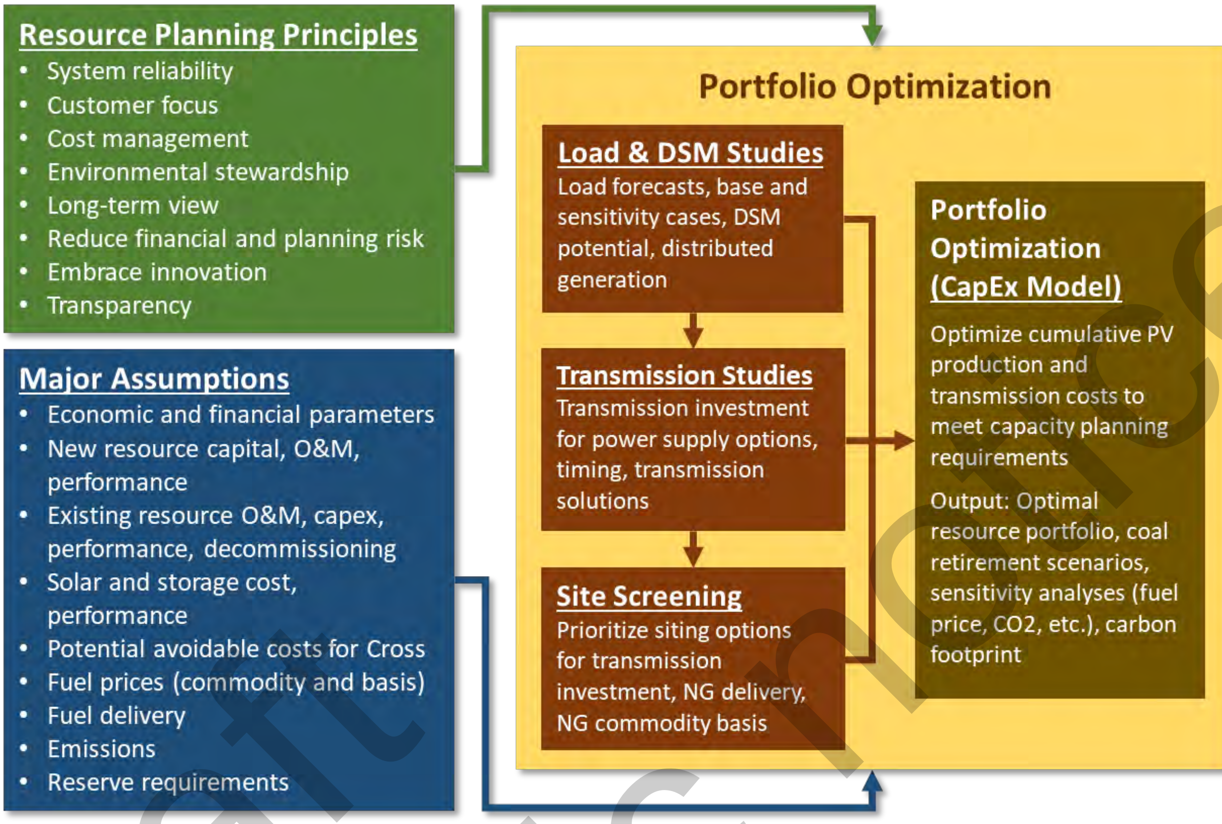

Figure 3-1: Santee Cooper IRP Process

Section 4
Santee Cooper Load Forecast

The territorial load served by Santee Cooper includes retail sales to the residential, commercial, and industrial customers of Santee Cooper and wholesale sales to Central and two interconnected municipal electric utility systems in South Carolina, the Town of Bamberg and the City of Georgetown. Additionally, Santee Cooper provides off-system wholesale sales to Alabama Municipal Electric Authority (AMEA), Piedmont Municipal Power Agency (PMPA), the City of Seneca, South Carolina, the Town of Waynesville, North Carolina, and the Charleston Navy Base.

The load forecast adopted for use in the 2020 IRP (Load Forecast) was prepared by Santee Cooper in June 2020 and provides projections of customer counts, energy sales, and peak demand for Santee Cooper's retail customers; projections of energy requirements and peak demand for wholesale sales to Central and two interconnected municipal electric utility systems; projections of monthly sales to off-system wholesale customers; and projections of aggregate system level energy requirements and peak demand for 2020 through 2039. As described in more detail in Section 6 of this report, the Load Forecast includes a base case and sensitivity cases reflecting higher and lower territorial load levels based on a wide range of uncertainty in future economic conditions. These sensitivities imply variations in load levels and the number of both existing and new customers served by Santee Cooper over the forecast horizon. Importantly, the range of uncertainty in the load forecasts is of a reasonable magnitude to reflect continued service to existing retail and municipal customers of Santee Cooper and Central throughout the study period for the 2020 IRP.

As described more fully below, forecasts for Santee Cooper's residential and commercial retail loads, the Town of Bamberg, and the City of Georgetown were prepared by GDS Associates, a consulting firm based in Marietta, Georgia. Forecasts for Santee Cooper's industrial retail loads were prepared by Santee Cooper. Separately, Central prepared load forecasts of its members' systems and provided the results to Santee Cooper for inclusion in the aggregate Load Forecast, with adjustments made by Santee Cooper to include certain load that it expects to serve through 2024. Santee Cooper worked with its off-system wholesale customers to establish forecasts of energy requirements and peak demand.

Santee Cooper Residential and Commercial Retail Classes

The forecast of Santee Cooper's residential and commercial retail rate classes is developed based on a system of econometric and hybrid econometric/end-use forecast equations that include key driving variables, such as income, employment, gross product, electricity prices, end use appliance saturation and efficiency, and weather conditions. Economic data are obtained from Moody's Analytics, a widely recognized provider of such data to the utility industry. Electricity price assumptions are based on Santee Cooper projections and reflect the historical and projected trend in average bills by class in real terms. For purposes of the load forecast, the projected trend in real electricity prices is assumed to decline slightly over the forecast period, reflecting that electricity prices are expected to escalate at a rate slightly below the rate of inflation. Historical and projected appliance saturation and efficiency data are generally based on data developed by Santee Cooper through its periodic residential consumer surveys and data published by the Energy Information Administration in its periodic Residential Energy Consumption Survey (RECS), Commercial Building Energy Consumption Survey (CBECS), and in the Annual Energy Outlook (AEO). Weather data is obtained from the federal government, and weather conditions over the forecast horizon are assumed to be equal to the most recent 20-year average.

The residential class sales forecast is based on forecasts of residential customer counts and average usage. Residential customer counts are forecasted econometrically, as a function of Horry County households, with an adjustment to capture the gradual decline in the percentage of county households actually served by Santee Cooper (i.e., a larger portion of growth occurs in areas served by cooperatives). Residential average use is forecasted using a hybrid econometric/end-use model commonly referred to as a statistically-adjusted end use (SAE) model, which captures several driving variables within three key categories—cooling, heating, and other consumption. These variables capture trends in average income, home size, people per household, average real electricity cost, saturation and efficiency by end use type, and heating/cooling degree days.

For the commercial class, customer counts are forecasted econometrically as a function of total non-farm employment in the region. Commercial sales are forecast in an SAE model framework, similar to residential average use, but capturing trends in non-farm employment, gross product, saturation and efficiency of commercial end uses, and weather conditions.

Importantly, the historical study period that underpins the forecast ended in December 2019, and the economic data from Moody's Analytics was obtained in February 2020, prior to the onset of the COVID-19 pandemic. Santee Cooper monitored the load impacts of the pandemic utilizing weather-normalized analyses of daily metered system loads and monthly metered loads by class and for major customers and developed adjustments to the forecast to capture the extent of estimated impacts and a reasonable recovery pattern over the 2020-2021 period. This results in reduced load levels in those years and higher growth rates over the first few years of the forecast horizon.

Table 4-1 and Table 4-2, below, provide recent historical and projected numbers of customer counts and sales at the retail meter for the major retail classes.

Table 4-1
Historical Customer Counts and Sales to the Residential and Commercial Classes

Year	Customer Counts			Electricity Sales (GWh)		
	Residential	Commercial	Total	Residential	Commercial	Total
2010	134,704	27,780	162,484	1,859	2,132	3,991
2011	136,047	27,434	163,481	1,761	2,076	3,837
2012	138,353	27,267	165,620	1,623	2,013	3,635
2013	140,126	27,517	167,643	1,679	2,011	3,690
2014	142,663	27,690	170,353	1,801	2,050	3,851
2015	145,208	27,564	172,772	1,785	2,059	3,844
2016	147,447	28,019	175,466	1,807	2,059	3,866
2017	151,044	28,294	179,338	1,746	2,013	3,760
2018	154,586	29,202	183,788	1,939	2,045	3,984
2019	158,032	29,787	187,819	1,879	2,004	3,883
Compound Avg. Growth Rates:						
2010-2019	1.8%	0.8%	1.6%	0.1%	-0.7%	-0.3%

Table 4-2
Projected Customer Counts and Sales to the Residential and Commercial Classes

Year	Customer Counts			Electricity Sales (GWh)		
	Residential	Commercial	Total	Residential	Commercial	Total
2020	159,128	31,172	190,300	1,953	1,968	3,921
2021	162,638	31,435	194,073	1,940	2,075	4,015
2022	166,555	32,056	198,611	1,982	2,184	4,166
2023	169,741	32,598	202,339	1,994	2,191	4,185
2024	172,880	33,120	206,000	2,015	2,203	4,218
2025	176,013	33,633	209,646	2,042	2,204	4,246
2026	179,151	34,149	213,300	2,066	2,201	4,267
2027	182,249	34,681	216,930	2,087	2,202	4,289
2028	185,280	35,198	220,478	2,111	2,204	4,315
2029	188,334	35,672	224,006	2,136	2,192	4,328
2030	191,394	36,141	227,535	2,159	2,181	4,340
2031	194,464	36,614	231,078	2,181	2,186	4,367
2032	197,479	37,085	234,564	2,205	2,197	4,402
2033	200,324	37,554	237,878	2,232	2,213	4,445
2034	202,934	38,019	240,953	2,258	2,236	4,494
2035	205,329	38,484	243,813	2,283	2,258	4,541
2036	207,647	38,953	246,600	2,308	2,286	4,594
2037	209,874	39,418	249,292	2,333	2,306	4,639
2038	212,044	39,879	251,923	2,351	2,330	4,681
2039	214,180	40,348	254,528	2,375	2,356	4,731
Compound Avg. Growth Rates:						
2020-2039	1.6%	1.4%	1.5%	1.0%	1.0%	1.0%

Santee Cooper's monthly peak demand associated with the residential and commercial retail classes is forecast econometrically, based on the aggregate sales forecast described above and peak day temperature. Peak day temperatures over the forecast horizon are assumed to be similar to long-term average historical values. Table 4-3 provides projected winter and summer peak demands associated with the residential and commercial retail classes, as delivered to the Santee Cooper distribution system.

Table 4-3
Projected Peak Demand of the Residential and Commercial Classes

Year	Winter Peak (MW)	Summer Peak (MW)
2020	879	815
2021	842	857
2022	895	883
2023	903	892
2024	913	901
2025	922	910
2026	932	920
2027	941	929
2028	951	939
2029	961	949
2030	971	959
2031	981	969
2032	991	979
2033	1,003	991
2034	1,014	1,003
2035	1,025	1,013
2036	1,036	1,024
2037	1,047	1,035
2038	1,058	1,046
2039	1,070	1,058
Compound Avg. Growth Rates:		
2020-2039	1.0%	1.4%

The forecasts of retail sales by class and seasonal peak demand have been reduced for the projected impacts of demand-side management (DSM) programs. Table 4-4, below, provides the projected impacts of both historical DSM activity and expected future activity, excluding demand response programs associated with Santee Cooper's retail load that are currently under development. Projected impacts of historical DSM decline through time based on the gradual aging and replacement of affected end uses. See Section 5, Demand-side Resource Plans, for more information.

Table 4-4
Projected Demand-side Management Program Impacts

Year	Pre-2020 DSM Activity			Future DSM Activity		
	Energy (GWh)	Peak Demand (MW)		Energy (GWh)	Peak Demand (MW)	
		Winter	Summer		Winter	Summer
2020	(279)	(71)	(59)	(12)	(3)	(3)
2021	(256)	(71)	(59)	(29)	(6)	(6)
2022	(244)	(70)	(58)	(44)	(8)	(8)
2023	(211)	(69)	(57)	(55)	(10)	(10)
2024	(194)	(48)	(44)	(64)	(12)	(12)
2025	(180)	(44)	(41)	(70)	(13)	(13)
2026	(155)	(39)	(36)	(75)	(14)	(14)
2027	(131)	(34)	(31)	(78)	(14)	(14)
2028	(104)	(27)	(25)	(81)	(15)	(15)
2029	(73)	(20)	(19)	(84)	(16)	(16)
2030	(38)	(11)	(10)	(87)	(16)	(16)
2031	(18)	(6)	(5)	(90)	(17)	(17)
2032	(4)	(2)	(1)	(93)	(18)	(18)
2033	(4)	(1)	(1)	(86)	(16)	(16)
2034	(4)	(1)	(1)	(80)	(15)	(15)
2035	(4)	(1)	(1)	(75)	(15)	(15)
2036	(4)	(1)	(1)	(73)	(15)	(15)
2037	(4)	(1)	(1)	(70)	(14)	(14)
2038	0	0	0	(64)	(13)	(13)
2039	0	0	0	(58)	(13)	(13)

Santee Cooper has engaged in such DSM programs for many years. As this period of activity far exceeds the study period utilized in the econometric equations that underpin the forecast, it was not deemed necessary to adjust the historical data that formed the basis of the forecast equations for the impacts of DSM.

Santee Cooper Industrial Retail Class

Santee Cooper serves 27 industrial retail customers directly interconnected to its transmission system. The forecast of demand and energy requirements for Santee Cooper's industrial retail class is based on recent actual loads, contracted quantities, expected changes in operations, and input from account representatives. Santee Cooper typically contracts with industrial customers for service under the Santee Cooper Large Light and Power Schedule, which includes an initial term of not less than five years, with automatic two-year rollover terms thereafter. The Load Forecast utilized for the 2020 IRP assumes a range of future load growth projections that is of reasonable magnitude to reflect continued service of the existing Santee Cooper industrial customers throughout the IRP study period.

The largest customers in the Santee Cooper industrial retail class include Nucor Steel (Nucor) and Century Aluminum of South Carolina, Inc. (Century). Nucor has been a customer since 1996, currently receiving approximately 300 megawatts of power, the majority of which is provided as non-firm power. Century has been a customer of Santee Cooper since 1977, currently receiving approximately 200 megawatts of power, with 25 percent of the load served under Santee Cooper's firm industrial rate schedule and the remainder served under Santee Cooper's customer-supplied power rate schedule pursuant to which Century provides an off-system resource for the power and Santee Cooper transmits the provided power.

Table 4-5 provides projected customer counts, energy sales, and seasonal peak demands and of the industrial load directly served by Santee Cooper, on a delivered basis.

Table 4-5
Projected Industrial Class Sales and Peak Demand

Year	Energy Sales (GWh)	Peak Demand (MW)	
		Winter	Summer
2020	3,762	474	498
2021	4,342	524	619
2022	4,549	562	626
2023	4,159	519	576
2024	4,159	519	576
2025	4,159	519	576
2026	4,159	519	576
2027	4,159	519	576
2028	4,159	519	576
2029	4,159	519	576
2030	4,159	519	576
2031	4,159	519	576
2032	4,159	519	576
2033	4,159	519	576
2034	4,159	519	576
2035	4,159	519	576
2036	4,159	519	576
2037	4,159	519	576
2038	4,159	519	576
2039	4,159	519	576
Compound Avg. Growth Rates:			
2020-2039	0.5%	0.5%	0.8%

Central Load Forecast

Central's forecast is prepared by Central staff and is based on SAE and econometric models similar to those discussed above regarding Santee Cooper's retail load forecast. Central's forecast represents the aggregate forecast for the Central member cooperative loads served by Santee Cooper, with adjustments made by Santee Cooper to include certain load that it expects to serve through 2024. Central's forecasted aggregate requirements include the load of some Central customers billed to Central under Santee Cooper's L-Rate. Table 4-6, below, provides projected aggregate peak demand and energy requirements of Central's load served by Santee Cooper, on a delivered basis.

Table 4-6
Projected Central Energy Requirements and Peak Demand

Year	Energy Requirements (GWh)	Peak Demand (MW)	
		Winter	Summer
2020	14,017	3,295	2,756
2021	14,452	3,283	2,800
2022	14,850	3,321	2,834
2023	15,200	3,378	2,901
2024	15,528	3,437	2,971
2025	15,495	3,434	2,981
2026	15,601	3,470	3,025
2027	15,693	3,495	3,049
2028	15,834	3,524	3,072
2029	15,898	3,548	3,102
2030	15,989	3,570	3,126
2031	16,084	3,593	3,151
2032	16,225	3,619	3,176
2033	16,285	3,641	3,206
2034	16,385	3,664	3,233
2035	16,491	3,689	3,263
2036	16,650	3,720	3,292
2037	16,731	3,747	3,328
2038	16,856	3,777	3,362
2039	16,984	3,809	3,397
Compound Avg. Growth Rates:			
2020-2039	1.0%	0.8%	1.1%

Municipal Customers on the Santee Cooper System

Santee Cooper serves two municipal electric utilities that are connected to the Santee Cooper transmission system, the Town of Bamberg, South Carolina, and the City of Georgetown, South Carolina. Santee Cooper, with the assistance of GDS Associates, prepares a forecast of the municipal systems energy requirements and contribution to the Santee Cooper system peak demand based on an econometric approach. Table 4-7, below, provides projected energy requirements and coincident peak demands for these municipal customers, on a delivered basis.

Table 4-7
Projected Municipal Energy Requirements and Peak Demand

Year	Energy Requirements (GWh)	Peak Demand (MW)	
		Winter	Summer
2020	178	33	36
2021	182	31	37
2022	186	33	38
2023	186	33	38
2024	186	33	38
2025	186	33	38
2026	185	33	38
2027	185	33	38
2028	185	33	38
2029	185	32	38
2030	184	32	38
2031	184	32	38
2032	184	32	38
2033	184	32	38
2034	184	32	38
2035	184	32	38
2036	183	32	38
2037	183	32	38
2038	183	32	37
2039	183	32	37
Compound Avg. Growth Rates:			
2020-2039	0.1%	-0.1%	0.2%

Other Wholesale Sales

Forecasts of wholesale sales to AMEA, PMPA, the City of Seneca, South Carolina, the Town of Waynesville, North Carolina, and the Charleston Navy Base are based either on forecasts provided by the wholesale customers or, in cases where customers do not provide a forecast, Santee Cooper uses historical and market data to develop forecasts for these customers' requirements, which have been included in the aggregate Load Forecast for the duration of each contract term.[1] Table 4-8, below, provides projected energy requirements and peak demand contributions of these customers, on a delivered basis, over the forecast horizon.

[1] Wholesale sales are included in the Load Forecast through the following terms: Charleston Navy Base through May 5, 2020, AMEA through December 2023, Seneca through June 2025, Waynesville through December 2026, and PMPA through December 2029.

Table 4-8
Projected Energy Requirements and Peak Demand of Off-system Sales

Year	Energy Requirements (GWh)	Peak Demand (MW)	
		Winter	Summer
2020	715	192	263
2021	719	173	268
2022	736	179	273
2023	753	186	278
2024	546	143	234
2025	448	150	240
2026	356	132	210
2027	260	116	199
2028	277	122	203
2029	19	0	30
2030+	0	0	0

Aggregate System Requirements

The total system load requirements are derived from a summation of the forecasts above and applicable losses over Santee Cooper's transmission system. Table 4-9, below, provides historical and projected energy requirements and seasonal peak demand for the aggregate Santee Cooper system, including transmission losses, over the forecast horizon.

As discussed above, the Load Forecast includes an expected reduction in 2020 sales of approximately eight percent compared to projections developed in 2019, primarily to account for the projected impacts of COVID-19. This reduction includes a downward adjustment in Central's load for 2020 of five percent. The Load Forecast reflects a reasonable recovery pattern for COVID-19 load reductions over 2020 and2021. In the initial five months following the development of the COVID-19-reduced load forecast (April 2020 through August 2020), weather-adjusted loads appear to be approximately three percent higher than projected.

Table 4-9
Projected Santee Cooper System Energy Requirements and Peak Demand

Year	Energy Requirements (GWh)	Peak Demand (MW)	
		Winter	Summer
2020	22,753	4,951	4,438
2021	23,897	4,932	4,656
2022	24,689	5,071	4,729
2023	24,705	5,101	4,760
2024	24,871	5,127	4,796
2025	24,776	5,140	4,821
2026	24,834	5,168	4,846
2027	24,873	5,187	4,869
2028	25,086	5,233	4,907
2029	24,936	5,145	4,773
2030	25,055	5,177	4,777
2031	25,196	5,210	4,812
2032	25,387	5,247	4,847
2033	25,500	5,281	4,890
2034	25,661	5,316	4,930
2035	25,822	5,353	4,971
2036	26,042	5,395	5,011
2037	26,173	5,433	5,059
2038	26,354	5,476	5,105
2039	26,543	5,520	5,152
Compound Avg. Growth Rates:			
2020-2039	0.8%	0.6%	0.8%

Section 5
Demand-Side Resource Plans

Title 58, Chapter 37 of the S.C. Code of Laws requires Santee Cooper to invest in demand-side management (DSM) and other energy efficiency and renewable energy programs. These are utility-led programs that promote the reduction or more efficient use of energy by utilities, their energy suppliers, and their retail and wholesale customers. These programs include conservation, energy efficiency, load management, and renewable energy technologies. The projected impact in terms of load reductions from these programs are factored into the 2020 IRP, either through reductions in forecast of Santee Cooper's retail loads or as *below-the-line* resources that otherwise reduce the need for supply-side resources.

This section describes and quantifies the Santee Cooper DSM programs and future plans to enhance and expand the programs to continue improving the efficiency of our customers' consumption and reducing the overall cost of power on our system. Importantly, these programs are associated with Santee Cooper's retail customers only. Central and Santee Cooper's other wholesale customers administer similar programs and engage with their retail customers to economically reduce consumption. Hence, the scope of programs discussed herein is limited to the Santee Cooper retail customers, and the estimated DSM savings are associated with that portion of the Santee Cooper system only. The projected savings from the DSM programs being administered by Santee Cooper's wholesale customers are embedded in the load forecasts these customers share with Santee Cooper for use in the aggregate system Load Forecast.[2]

Santee Cooper DSM Overview and Goals

Santee Cooper serves eight wholesale customers, 27 military and large industrial customers, and more than 189,000 residential and commercial customers directly in Berkeley, Georgetown, and Horry counties. The relative proportions of sales to these customers during 2019 are shown in Figure 5-1, below.[3]

Santee Cooper mainly focuses on developing and offering DSM programs to its residential and commercial customers. Santee Cooper's largest wholesale customer, Central Electric Cooperative, Inc., develops, implements, and administers its own DSM programs. Santee Cooper's military and industrial customers independently make energy efficiency improvements based on the measures found to be most feasible for the specialized needs their industries.

[2] Central also expects to increase its demand response resources as discussed in Section 6 under Demand-side Resources.

[3] Residential and commercial sales include interdepartmental sales, which comprise electricity sales to Santee Cooper water system facilities.

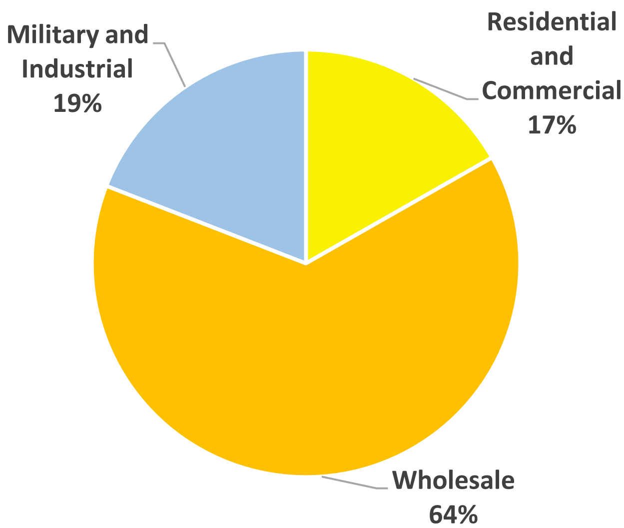

Figure 5-1: Santee Cooper Customer Energy Sales Mix

Santee Cooper has offered DSM programs for decades. Most recently, its retail customer base has benefited from the Santee Cooper DSM plan and portfolio of programs called *Reduce the Use*, which was active through 2020 and included a variety of both commercial and residential programs. In 2008, the Santee Cooper Board of Directors set a goal to reduce energy consumption by 209 gigawatt-hours by 2020, which was the basis for choosing the portfolio of DSM programs to include in the Reduce the Use plan. With the Reduce the Use plan meeting its energy reduction goals by 2018 and coming to a successful conclusion in 2020, Santee Cooper designed and implemented a successor DSM plan that will continue to serve its retail customers by empowering them to take steps to further improve their energy efficiency, establish solutions for peak demand load control, and support electric vehicle adoption through rebate initiatives. This portfolio of DSM programs, called *EmpowerSC*, embraces new technologies and focuses on the needs of our customers.

The EmpowerSC plan is comprised of voluntary load management programs, beneficial electrification, residential and commercial energy efficiency programs, and solar power offers, and provides for inclusion of new technologies, when appropriate. Santee Cooper's goal for the EmpowerSC plan is to save an additional 100 gigawatt-hours by 2030. The EmpowerSC plan is structured to be customer-focused, diversified, continuously improving, and transparent. Additionally, flexibility and responsiveness have been built into the EmpowerSC plan through the expectation of continuous evaluation and adaptation to best meet customer needs, as well as take advantage of market opportunities and technology advances.

Current DSM Offerings

Santee Cooper's Smart Energy portfolio includes all its residential and commercial smart energy programs in one portfolio. Although program qualifications and participants vary by program, all Santee Cooper programs are measured and evaluated at a portfolio level.

Residential Programs

Smart Energy Loans

In addition to loans for renewable energy resources, Santee Cooper offers on-bill financing for energy efficient upgrades. A qualifying customer can secure an outstanding loan of up to $20,000 for energy-efficiency and $40,000 for renewable energy resources. The combined maximum outstanding loans per customer cannot exceed $40,000. Customers receiving Smart Energy Loans can also receive rebates on qualifying equipment through the Reduce the Use residential programs. To prevent double counting, the savings from the installations are tracked as part of the rebate program, although many of the equipment upgrades would not be possible without the assistance of the Smart Energy Loan.

Smart Energy Existing Homes Program

The Smart Energy Existing Homes Program offers home energy evaluations, incentive rebates and financial assistance through low cost loans for residential energy efficiency improvements to improve the energy efficiency of customers' homes year-round. Santee Cooper provided rebates to 1,184 customers in 2019, totaling $337,211, with estimated savings of 1,577 megawatt-hours. Table 5-1 provides the numbers of rebates and rebate levels for the rebate measures in this program for 2019. The rebate level for the heat pump measure depends on a variety of factors, including efficiency level and application (single- versus multi-family).

Table 5-1
Smart Energy Existing Homes Rebate Activity During 2019

Measure	Quantity	Incentive
Duct Replacement	148	$500
Heat Pump Water Heater	20	$400
Smart Thermostat	744	$50
High efficiency heat pump	849	$80 - $700

Equipment and Lighting Incentives: Residential LEDs

As prices continue to drop, LEDs have become a cost-effective lighting solution. LEDs last 20 times longer than incandescent bulbs, produce over 75 percent less heat, use over 75 percent less energy, and are available in different sizes and shapes to fit in almost any fixture. Santee Cooper energy advisors gave away 11,142 LED bulbs to 2,500 residential customers, yielding annual energy savings of 846 megawatt-hours.

Santee Cooper Residential Energy Advisors conduct site visits to perform *Home Energy House Calls*. During a House Call, the Energy Advisor evaluates the efficiency of the home and makes recommendations on opportunities to make the home more energy efficient and comfortable. During these site visits, 706 customers received a *Home Energy House Call Kit* that included LED bulbs, faucet aerators, an LED night light, and, where needed, pipe wrap for water heaters. The estimated annual energy savings total 105 megawatt-hours.

Smart Energy New Homes Program

The Smart Energy New Homes Program offers rebates to builders who construct homes that meet Santee Cooper's eligibility requirements and either meet Smart Energy New Homes performance path criteria or include qualifying equipment. There are three tiers of energy efficiency standards for the single-family performance pathway and two tiers for multi-family.

- **Tier 1**: Achieve a Home Energy Rating System (HERS) Index of 65 or below, which requires homes to be 35 percent more energy efficient than a standard new home. The rebate for this tier is $3,000 for single-family homes and $1,400 per unit for multi-family homes.
- **Tier 2**: Achieve a HERS Index of 75 or below, which requires homes to be 25 percent more energy efficient than a standard new home. The rebate for this tier is $1,600 for single-family homes and $400 per unit for multi-family homes.
- **Tier 3**: Achieve a HERS Index of 85 or below, which requires homes to be 15 percent more energy efficient than a standard new home. The rebate for this tier is $800 for single-family homes only.

Under Tier 1, 94 new single-family homes and 186 multi-family homes were built during 2019 for annual savings of 979 megawatt-hours. Under Tier 2, 125 new single-family homes and 5 new multi-family homes were built for annual savings of 356 megawatt-hours. Under Tier 3, 1 new single-family home was built for annual savings of 2 megawatt-hours.

There were 9 single-family homes that Energy Star qualified, which resulted in a higher HERS Index rating overall. There were 220 new single-family homes that received an LED Bonus for installing more than 50 percent of household lighting with new LED Energy Star bulbs. The total combined incentive cost was $764,860.

On-site Energy Assessments

Santee Cooper offers free energy assessments to residential customers, upon request. In 2019, 260 residential energy assessments were completed.

Commercial Programs

Commercial Prescriptive Program

The Commercial Prescriptive program is a predefined rebate program with established qualifications and associated rebates. This comprehensive platform includes specific cost-effective energy-efficiency measures and associated rebates for commercial improvements. Projects with qualified improvements are eligible for rebates under the Commercial Prescriptive Program. In 2019, 167 projects were funded, saving an estimated total of 9,548 megawatt-hours annually, at a total combined incentive cost of $425,940.

Commercial Small Business Energy Saver Program

Santee Cooper determined that small business customers have limitations that make it hard to participate in traditional energy efficiency programs. These customers typically have little to no time to research options, have little upfront capital, are not equipped to perform economic evaluations of energy efficiency measures, and have no resources to manage a project. As part of the EmpowerSC plan, Santee Cooper wanted to create a program offer that would be more inclusive and targeted to this segment of customers to help address these issues. Santee Cooper implemented a Small Business Direct Install program, in which an implementation contractor, Lime Energy™, sells projects to our small business customers. After selling the project, Lime Energy then procures the materials and equipment and has the measures installed by licensed contractors, creating a seamless experience for the customer. In 2019, 455 customers participated in this program for a combined savings of 4,140 megawatt-hours and a combined incentive cost of $434,009.

On-site Energy Assessments

Santee Cooper offers free energy assessments to commercial customers, upon request. In 2019, 485 energy assessments were completed.

Load Management

Direct Load Control

Santee Cooper has not had an active direct load control program for many years. However, as discussed further below, Santee Cooper is working to implement a demand response program involving residential and commercial heat pumps and water heating end uses that is expected to function in a similar way to legacy direct load control programs but with two-way communication, more complex control options, greater participant engagement and available options, and end use data collection.

Time-of-Use or Seasonal Rates

Santee Cooper offers time-of-use rates for residential and commercial customers, with the rate for the latter being seasonal. These options have been offered for many years, currently with three residential and 25 commercial customers.

Standby Generation Incentives

Santee Cooper has historically offered a generator lease program. The decision was made to close this program to new participants in 2014. Santee Cooper continues to actively service the generators remaining in the lease program until the term of those leases expire. The program has 57 participants leasing a total of approximately 11 megawatts.

Voltage Reduction

Santee Cooper has installed a Conservation Voltage Reduction (CVR) application which allows for the reduction of distribution system peak demand. The CVR application and the associated supervisory control and data acquisition (SCADA), regulator controls, and metering upgrades have been completed in the Horry, Georgetown, and Berkeley areas. By the end of 2019, a total of 253 feeders were complete and ready for CVR. When CVR is enabled, SCADA will direct the station regulators to lower the feeder voltage until the end-of-line meters reach the lower end of the American National Standard Institute (ANSI) required range. If voltage starts to drift too close to the lower limit, SCADA directs the regulators to increase the voltage. Voltage delivered to service points must fall within an acceptable ANSI range, and the application configures the system to deliver the lowest possible voltage while staying within that range. This operational efficiency results in an overall reduction of electric demand. Results from our CVR pilot study support an expected demand reduction on the order of two percent of our distribution system's peak load. Although it will vary by month, Santee Cooper is currently able to achieve between 17 megawatts and 21 megawatts on a typical summer or winter peak. These anticipated reductions are not reflected in the forecast of Santee Cooper's retail loads being utilized for the 2020 IRP and are instead reflected within the demand response capability shown as supply-side resources.

Public Information

Web-Based Customer Tips & Tools

Santee Cooper offers online energy saving tips for residential and commercial customers. We have a partnership with EnergyEarth to offer residential customers a free, online home energy audit. The online, personalized home energy checkup helps customers identify opportunities to be more energy efficient in their homes, which can reduce energy consumption and lower utility bills. The process is easy, progress and results can be saved, and when the audit is finished, suggested products that can help lower energy use are made available for customers to purchase. There is no purchase required to complete the home energy checkup and get personalized energy-saving tips.

Direct-to-Customer Communications

Santee Cooper communicates directly to customers to support all of our energy efficiency, conservation and DSM activities and programs. Our monthly bill inserts highlight new programs and include clear, measurable calls to action. We also use direct mail promotions and education collateral. For customers that have opted-in to e-mail notifications, we send monthly information and links to sign up for programs and submit program and participation questions that are answered by our Energy Advisors and engineers. At the end of 2019, the opt-in email program included 88,457 residential and commercial customers, and our direct mail numbers vary according to the target audience for each specific program.

Public Campaigns

Santee Cooper continues to use advertising and communications vehicles that target specific customers and customer groups. We advertise and promote our programs primarily through digital advertising on the web and through social media, which is highly measurable and lets us know who we are reaching and how they are responding. We analyze and measure performance of communications, allowing us to quickly adjust promotions to achieve better results with our customers and other public stakeholders. We also promote programs through traditional advertising such as outdoor, radio and print ads, as well as press releases and press conferences. In addition, we are partnering with customers who can help spread the word, such as large property managers who help us promote energy efficiency to their property owners.

School Programs & Resources

Through educational initiatives, Santee Cooper has established a strong, collaborative network with school districts in the state to provide educators and students with a real-world understanding of the sources and uses of electricity as well as the importance of conserving and using energy efficiently. Through our business and education partnerships, Santee Cooper is continually supporting the needs of students, teachers, and parents. The following describes the programs in place for ongoing community education and involvement in the energy efficiency and conservation aspects of Santee Cooper's operations.

- **Energy Educators Institute.** Each summer, Santee Cooper sponsors the Energy Educators Institute, a graduate level course for certified South Carolina K-12 teachers and administrators. Ninety educators explore the scientific concepts of energy, its sources, use and impact on the environment, economy and society. Since 1988, over 2,130 South Carolina educators have attended the Institute and have received relevant curriculum-based materials to enhance their teaching in areas such as energy efficiency and conservation.
- **Educational Publications.** Approximately 25,000 curriculum-based environmental/energy conservation publications (K-12) are sent to teachers in the state each year. These publications educate teachers and students about environmental issues such as the importance of *Reduce, Reuse, and Recycle,*—how renewable resources can play a part in the generation of electricity, and the need to develop life-long practices to conserve energy wisely.
- **Solar Schools' Project/Conservation of Energy Curriculum.** Santee Cooper's Solar Schools Initiative in 2007 led to the development of the Conservation of Energy science curriculum kit now being taught to all sixth-grade students in 32 middle schools in South Carolina. Teachers are trained each summer (over 150 to date) on the Conservation of Energy curriculum, equipping them with the scientific knowledge needed to understand the opportunities and limitations associated with renewable power sources, as well as the need for societies to develop lifestyles that embrace the efficient use of energy.
- **E-SMART Kids.** This interactive website is a tool to inspire teachers, students, and parents to be *green*. The intent of the website is to bring awareness and understanding about the need to be energy efficient and the steps each individual can take to prevent energy waste. Also available on this site is a link for teachers and parents to learn how Santee Cooper's green initiatives can help make homes, schools and businesses operate in a more energy efficient manner.

- **Environmental Bookmarks.** Santee Cooper's energy conservation message is also delivered through the distribution of bookmarks, Live the Good Life and Make an Impact, (over 76,000 through 2019) at educational and community venues, such as career day events, classroom presentations and environmental fairs. The green tips shared on the bookmarks are a daily reminder to students, parents, and community members on the actions they can take every day to use energy more wisely.

Future DSM Programs and Program Updates

Demand Response

Santee Cooper is currently developing a demand response program for its commercial and residential customers. The program will initially be utilized to reduce demand during reliability events but will eventually be used for peak shaving. The program will begin as a residential pilot program, which, upon successful completion, will roll into a full-scale program. A commercial pilot and, ultimately, full-scale program will follow. The program initially is planned to control customers' electric heating systems and water heaters during electric system reliability events. This program will emphasize the customer experience, including efforts to manage customer convenience as well as high-quality marketing and communication to inform our customers about the reason for needing a demand response program and how Santee Cooper is striving to ensure that our customer's inconvenience during a called event is minimized. The program will provide customers with information about why an event was called and pay them incentives for their participation. The goal for this program is to have 35 megawatts of demand response by 2027.

This customer-focused program will work in tandem with conservation voltage reduction and Volt-VAR optimization capability that Santee Cooper has been developing, which is currently estimated to be capable of reducing the system peak by 18 megawatts. Santee Cooper expects to be able to increase the capability of the voltage reduction and Volt-VAR optimization program to 26 megawatts by 2027. The impacts of these demand response programs are not reflected in the forecast of Santee Cooper's retail load that has been utilized for the 2020 IRP.

Electric Vehicles

Santee Cooper is developing and implementing an electric vehicle (EV) program. The program has two focuses—internal advocacy of EVs and customer programs. Santee Cooper believes that internal advocacy of EVs will be a driving factor in the success of the EV programs. Therefore, Santee Cooper wants to understand EVs from users' perspectives to better serve customers. Santee Cooper's approach to internal advocacy will include:

- **Replacing Santee Cooper Fleets:** Fifty FleetCarma telematics devices are being rotated throughout Santee Cooper's light duty fleet vehicles. These devices capture real-time driving patterns, such as the number of trips, trip length, and miles driven. FleetCarma analyses the data from these vehicles and determines whether the driving patterns associated with each vehicle conform with those of plug-in hybrid electric vehicles (PHEV) or battery-powered electric vehicles

(BEV). Results of the analyses are summarized in a report that provides recommendations on the type of EV that is most appropriate for each fleet vehicle's given driving pattern. In 2020, Santee Cooper has purchased four BEVs and envisions replacing at least 60 fleet vehicles over the next ten years with BEVs and PHEVs.

- **Santee Cooper's Level 2 Charging Infrastructure:** Santee Cooper is installing level 2 charging infrastructure for its EV fleet vehicles, employees that purchase EVs, and customers with EVs. By December 2020, two level 2 charging heads for fleet vehicles and two for employees and customers will be installed at Santee Cooper's main office complex in Moncks Corner. There will also be two level 2 charging heads for fleet vehicles and two for employees and customers installed at Santee Cooper's Horry-Georgetown Division headquarters by December 2020. The North Myrtle Beach Service Center will have one level 2 charging head for fleet vehicles and one for employees and customers. Santee Cooper will continue to build out this infrastructure to aid EV owners.
- **Residential Level 2 EV Charging Incentive:** Santee Cooper's EV residential customer program will begin on December 1, 2020, incentivizing the installation of level 2 charging stations at customers' homes. The incentive is designed to offset a portion of the cost of the EV charging infrastructure sufficient to encourage customers to purchase EVs. The first fifty customers who install qualified, networked, level 2 charging stations will receive a rebate of $500. Any projects submitted after the first 50 rebates have been or will be eligible to receive a $250 rebate.
- **Commercial Level 2 EV Charging Incentive:** Santee Cooper's commercial customer program for level 2 fleet charging station incentives is planned to begin in late 2021.
- **Commercial customer EV Fleet Replacement Incentive:** Santee Cooper plans to initiate a program to incentive commercial customers to replace gas-powered fleet vehicles with EVs that will begin in 2022.

Commercial and Residential Energy Efficiency

Using the results of a DSM Market Potential Study conducted for Santee Cooper by Nexant, Inc., in August 2019, Santee Cooper has implemented additional measures as part of its commercial and residential energy efficiency programs. The Potential Study produced both a low and high estimate of potential for these programs. After consideration of the specific measure parameters and analysis of potential adoption rates, Santee Cooper decided to adopt the high case estimate to inform its DSM implementation goal. The resulting DSM program updates include a significant expansion to the residential multi-family measure offerings and additional residential single family and commercial measures to better meet customer needs and match offerings of comparable utilities. New and modified DSM measures for residential include air source and geothermal heat pump systems, household appliances, pool pump motors, thermal envelope measures (e.g., insulation and air sealing), and smart thermostats. Expanding and adapting these incentives to multi-family homes expands our programs' reach into a large segment of our residential customer base. New and modified DSM measures for commercial customers include lighting, refrigeration, water pump motors, and variable frequency drives.

DSM Program Savings for Retail Customers

Table 5-2 provides the cumulative participants and current level of estimated savings, including transmission and distribution losses, from customers that have participated in Smart Energy Portfolio DSM measures, excluding the Good Cents program.

Table 5-2
Smart Energy Portfolio Savings (Excluding Good Cents)[4]

Class	Cumulative Participants (2009-2019)	DSM Savings (at Generation)		
		Annual Energy (MWh)	Winter Demand (kW)	Summer Demand (kW)
Residential	73,028	66,802	8,215	8,215
Commercial	6,822	201,224	36,290	36,290
Total	79,850	268,026	44,505	44,505

Table 5-3 provides the current level of estimated savings, including transmission and distribution losses, from customers that have participated in the Good Cents program.

Table 5-3
Current Level of Estimated Savings from the Good Cents Program[5]

Class	DSM Savings (at Generation)		
	Annual Energy (MWh)	Winter Demand (kW)	Summer Demand (kW)
Residential	25,173	17,660	29,938

Table 5-4 provides the estimated incremental savings, including transmission and distribution losses, from DSM activity projected for 2020.

Table 5-4
Projected Incremental DSM Savings for 2020

Class	DSM Savings (at Generation)		
	Annual Energy (MWh)	Winter Demand (kW)	Summer Demand (kW)
Residential	2,632	2,724	2,724
Commercial	9,474	676	676
Total	12,106	3,400	3,400

[4] Incentive measure lives have been accounted for.
[5] Good Cents is a discontinued program from which continued load reduction benefits are expected until the end of 2022, when the useful lives of the affected end uses of this program expire.

Table 5-5 provides historical and projected incremental savings, including transmission and distribution losses, from DSM activity over the forecast horizon, excluding demand response programs associated with Santee Cooper's retail load that are currently under development. As a large portion of the DSM activity corresponds to lighting measures, which tend to be largely or wholly off-peak, the implied load factor of the estimated DSM savings can be higher than 100 percent and varies considerably over this period depending on the relative extent of lighting measures.

Table 5-5
Historical and Projected Incremental DSM Savings

Year	Annual Energy (MWh)	Peak Demand (MW)
2011	17,872	1.6
2012	13,965	2.8
2013	24,721	4.2
2014	24,284	4.6
2015	27,915	5.7
2016	31,776	5.9
2017	35,836	8.1
2018	20,221	4.9
2019	18,517	4.7
2020	12,133	3.4
2021	17,959	2.8
2022	15,824	2.5
2023	12,563	2.0
2024	9,145	1.6
2025	6,496	1.2
2026	4,716	0.9
2027	3,746	0.8
2028	3,220	0.7
2029 and beyond	2,968	0.7

The decline in incremental energy savings is generally a function of market saturation of economically feasible energy efficiency measures given current technologies and the impact of evolving building codes and appliance standards, which themselves are designed to drive implementation of economic energy efficiency improvements. Santee Cooper periodically performs DSM potential studies, like the study completed in 2019, and will revise future plans and projections as appropriate.

Section 6
Santee Cooper 2020 IRP Development

Santee Cooper developed its 2020 IRP with consideration of future loads, existing resources, resource needs, future resource options, and projected costs for the Santee Cooper system. Through this process, Santee Cooper evaluated potential long-term resource plans to identify plans that reliably and economically meet future loads while providing for flexibility, resource diversity, technological innovation, improved efficiency, and reduced environmental impacts. The following section provides a detailed discussion of the methodology and assumptions utilized for the Santee Cooper 2020 IRP.

Methodology

Santee Cooper has prepared its 2020 IRP utilizing generally accepted utility practices, including the use of overarching principles and objectives, realistic projections of economic and market conditions, historical operating characteristics for existing resources, industry-based assumptions for future resource alternatives, load forecasts developed using industry-standard techniques, identification of future power supply needs, integration of cost-effective DSM programs, evaluation of renewable and energy storage resources, screening of potential resource sites, simulation of resource dispatch, optimization of resource expansion plans, evaluation of coal resource retirements, and evaluation of resource plan sensitivities to changes in load, market, and regulatory conditions.

Santee Cooper has utilized an industry-accepted generation simulation and optimization software model to perform its resource expansion evaluations to identify a least-cost portfolio of future resources under a set of Base Case assumptions and under multiple sensitivity case assumptions reflecting changes in forecast load growth and fuel and power prices. To assure that resource plans are sufficiently flexible to address potential carbon regulations, a sensitivity case depicting a CO_2 tax and multiple portfolios for varying assumptions regarding retirement of Santee Cooper coal resources were investigated. Additionally, sensitivity cases were prepared to analyze the impact of lower levels of solar resource implementation.

Figure 6-1, below, provides a depiction of the overall process utilized by Santee Cooper when developing its 2020 IRP.

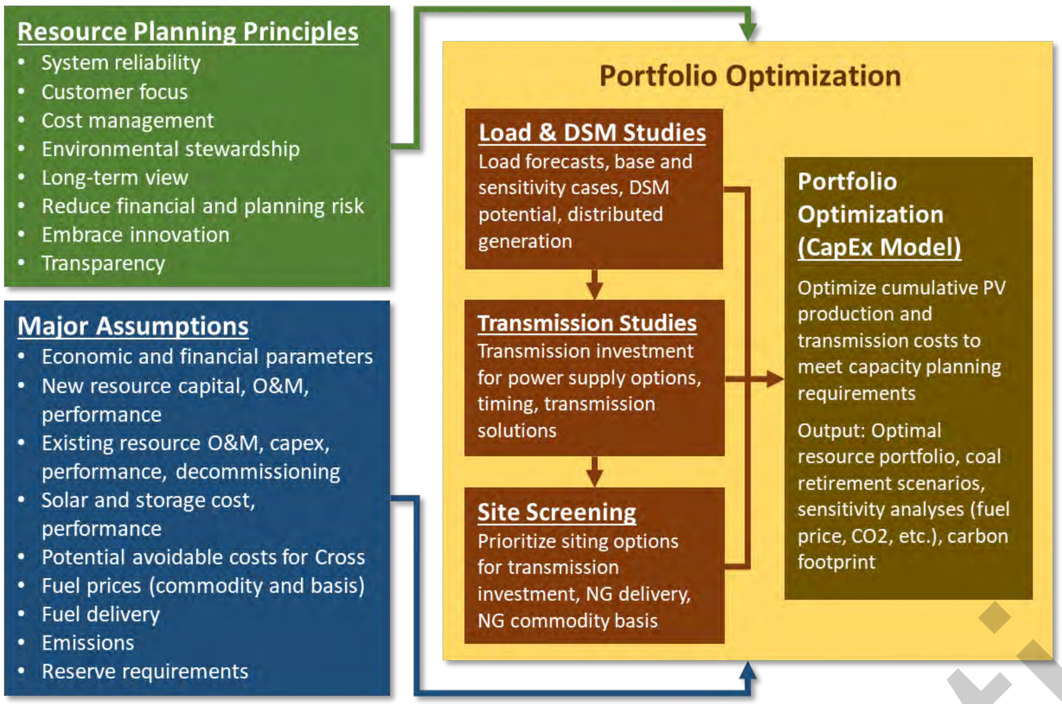

Figure 6-1: Santee Cooper IRP Process

Capacity Expansion Model

The IRP dispatch and capacity expansion analysis was performed by Santee Cooper using the Capacity Expansion (CapEx) resource expansion optimization software model licensed by Hitachi ABB Power Grids, a leading vendor of power system simulation software applications that are widely used across the electric utility industry. CapEx is a PC-based software model capable of simulating hourly generating resource dispatch and evaluating future resource expansion plans using a mixed integer linear programing technique to identify a least-cost portfolio of resources, including future resource options identified by the user. CapEx simulates resource dispatch utilizing representative typical days and user-defined time periods.

For the 2020 IRP, the Santee Cooper electric system was modeled as a stand-alone system, with Santee Cooper generating resources and firm purchase power arrangements dispatched to meet the Santee Cooper load and wholesale sales obligations. Santee Cooper's projected loads and wholesale obligations modeled for the 2020 IRP include Santee Cooper retail loads; sales to Central; partial requirements sales to the municipalities of Seneca, South Carolina, Waynesville, North Carolina, and Piedmont Municipal Power Agency; and other firm wholesales sales contracts, each with specific terms. Additional information on retail load and wholesale sales obligations are provided in Section 4.

Non-firm wholesale economy market purchases were simulated concurrently with the dispatch of other Santee Cooper resources, with price and import characteristics as described below. Non-firm wholesale economy market sales were not simulated as part of the IRP evaluation to eliminate the chance that the CapEx model might identify future expansion resources that rely on benefits of speculative market sales.

Portfolio Evaluation

Santee Cooper performed resource portfolio simulations in CapEx under multiple assumptions for coal resource retirements and generation expansion options (as described in more detail below). Common to each of the portfolios evaluated is the adoption of resource retirements and resource additions targeted to achieve broader planning objectives of Santee Cooper to diversify its resource portfolio, reduce reliance on coal generation, reduce greenhouse gas emissions, and increase use of renewable and storage technologies.

Santee Cooper Power Supply Roadmap

The Santee Cooper 2020 IRP assumes certain fixed resource retirement and resource expansion assumptions as part of all resource plans evaluated. For each of the expansion plans evaluated in CapEx, the 2020 IRP reflects the following resource additions and retirements.

- Retire the Winyah coal plant through a phased approach, idling Unit 4 by the winter of 2020/2021, idling Unit 3 by the Winter of 2021/2022, and fully retiring all four Winyah coal units by 2027.
- Add quick-start resources to ensure system reliability by installing 20 megawatts of diesel-fired reciprocating internal combustion engine (RICE) generating units in 2022 prior to idling Winyah Unit 3. The RICE units, already owned by Santee Cooper at the V. C. Summer site, will be installed at a new site near the Santee Cooper Conway substation.
- Add 500 megawatts of new solar resources by 2023 through an ongoing request for proposals (RFP) process jointly undertaken with Central, and plan for an additional 1000 megawatts of solar resources by 2032.[6]
- Add 200 megawatts of utility-scale battery storage to the Santee Cooper system in phases (50 megawatts by 2026, 100 megawatts by 2033, and 200 megawatts by 2036).[7]
- Implementation of demand response programs, consisting of direct load control, voltage control, and other measures, to avoid approximately 85 megawatts of winter peak load by 2027, increasing to 106 megawatts by 2034 (representing the total combined impacts for Santee Cooper and Central).

Some of these resource retirement and addition assumptions reflect resource decisions and plans that are already being implemented by Santee Cooper, such as the retirement of the Winyah Generating Station, installation of quick-start resources at a site near the Conway substation, and the

[6] Solar resources have the potential to provide a low-cost, low environmental impact resource option for the Santee Cooper system and, as such, have been included in the long-term Santee Cooper resource plans. However, Santee Cooper intends to conduct additional analyses to evaluate the cost and reliability of integrating and operating solar resources before formal decisions regarding solar implementation beyond 500 megawatts are made.

[7] Phased implementation of battery storage will allow Santee Cooper to take advantage of market trends toward lower costs and to gain industry insights and experience on utility-scale battery operation.

ongoing RFP solicitation for 500 megawatts of solar resources. Other resource addition assumptions, including energy storage, additional solar, and demand response, reflect strategic choices in Santee Cooper's long-term resource roadmap. The timing for implementing these resources takes into consideration anticipated improvements in cost and technology and the need for additional studies.

Alternative Retirement Portfolios

The IRP analysis was performed in a manner that provided for the identification of potential least-cost resource portfolios under representative scenarios for coal resource retirements. Under each coal retirement portfolio, a resource expansion optimization analysis was performed under the Base Case assumptions and under various sensitivity case assumptions (see below).

- **Retire Winyah Portfolios** – As discussed previously, Winyah is modeled to be retired in phases, with two of the four generation units being idled by the winter of 2021/2022 and all four units retired by 2027.
- **Retire All Coal Portfolios** – Under this retirement scenario, the Winyah Plant is retired as described above, and the Cross Plant is also retired, with Units 1 and 2 retired in 2030 and Units 3 and 4 retired in 2032.

Sensitivity Analysis

For the 2020 IRP, Santee Cooper prepared resource expansion analyses examining various resources options under a Base Case set of assumptions that depicts expected market and planning conditions. In addition, Santee Cooper evaluated how resource expansion plans might change with changes in market, regulatory, load, and renewable resource planning, as follows.

- **Higher/Lower Load Growth** – Higher and lower retail and wholesale loads by one standard deviation of expected load forecast error due to economic uncertainty
- **High Natural Gas and Economy Energy Prices** – 50 percent increase in natural gas prices and an associated increase in economy power prices for market purchases in all years
- **CO2 Tax** – $15 per ton price beginning in 2027, increasing annually by $5 per ton until a cap of $80 per ton is reached in 2040
- **Lower Level of Solar Resources** – Reduction in planned solar implementation by 500 megawatts

Specific assumptions utilized for the Base Case and each sensitivity case are discussed in more detail below and in the following section of the IRP Report.

For each sensitivity case, the CapEx model was allowed to optimize generation expansion portfolios specific to the assumptions for the case. Utilizing this approach, Santee Cooper was able to understand the variability of future power supply costs, recognize how resources expansion portfolios change for specific sensitivity assumptions, and identify whether specific resource expansion decisions were robust and would not change materially for changes in major assumptions.

Major Assumptions

The following section summarizes major assumptions for cost escalation, financial assumptions, fuel prices, and economy power prices. Assumptions are provided for Base Case and sensitivity cases and were developed in consultation with Central.

Cost Escalation

The IRP was prepared utilizing the assumptions for future annual cost escalation depicted in Table 6-1. Assumptions are based on recent long-term projections of general inflation and facility cost escalation derived from a variety of sources.

Table 6-1
Escalation Assumptions

Cost Category	Annual Escalation Rate
Fixed and Variable Operating Cost	2.0%
Capital Cost for New Generating Resources	2.5%
Capital Costs for New Electric Transmission Facilities	2.0%
Capital Costs for Natural Gas Pipeline Facilities	2.0%

The IRP utilizes a constant two percent annual cost escalation assumption across a broad range of operating costs, such as fixed and variable operation and maintenance costs and administrative costs. Cost escalation for generation equipment is generally based on trends in historical cost escalation published in the Handy-Whitman Index of Public Utility Construction Costs (HWI). Cost escalation for transmission equipment and natural gas pipeline equipment was tied to assumptions for general inflation.

Financial Assumptions

Financial cost assumptions utilized for the IRP, including the Santee Cooper cost of long-term and short-term debt and the discount rate utilized for purposes of presenting present value system power costs are provided in Table 6-2. These assumptions are based on information provided by Santee Cooper's financial advisors, PFM Financial Advisors, LLC.

Table 6-2
Study Financial Assumptions

Financial Assumption	Interest Rate
Long-term Debt Interest Rate	3.76%
Interest During Construction (utilizing Commercial Paper)	2.63%
Discount Rate for Present Value Calculations	3.76%

Load Forecast

The Load Forecast modeled for the 2020 IRP includes the Base Case assumptions described above in Section 4, as well as sensitivity case assumptions for higher and lower load growth that reflect uncertainty in future economic conditions. Central and Santee Cooper independently produced sensitivity case forecasts for the Central and Santee Cooper loads, respectively, reflecting one standard deviation of potential variation in load growth attributable to economic uncertainty. Table 6-3 provides the resulting aggregate system annual energy requirements and firm winter peak demand for the Base Case and the Low and High Load Cases.

Table 6-3
Load Forecast Scenarios

	Base Case		Low Load Case		High Load Case	
Year	Energy Require-ments	Winter Peak Demand	Energy Require-ments	Winter Peak Demand	Energy Require-ments	Winter Peak Demand
2021	23,897	4,933	23,308	4,820	24,930	5,057
2022	24,689	5,072	23,951	4,946	25,733	5,233
2023	24,706	5,101	23,722	4,927	25,786	5,278
2024	24,872	5,127	23,702	4,910	26,079	5,328
2025	24,776	5,140	23,611	4,931	26,306	5,419
2026	24,833	5,168	23,511	4,917	26,536	5,475
2027	24,874	5,187	23,411	4,906	26,770	5,534
2028	25,087	5,233	23,488	4,922	27,176	5,622
2029	24,936	5,145	23,195	4,803	27,224	5,575
2030	25,055	5,177	23,177	4,807	27,541	5,650
2031	25,196	5,210	23,178	4,810	27,879	5,725
2032	25,387	5,247	23,232	4,819	28,268	5,805
2033	25,500	5,281	23,205	4,825	28,589	5,885
2034	25,661	5,316	23,228	4,833	28,959	5,966
2035	25,822	5,353	23,250	4,841	29,332	6,049
2036	26,042	5,395	23,329	4,856	29,764	6,139
2037	26,173	5,433	23,319	4,865	30,117	6,226
2038	26,354	5,476	23,357	4,879	30,526	6,319
2039	26,543	5,520	23,402	4,894	30,968	6,418
Compound Avg. Growth Rates:						
2021-2039	0.6%	0.6%	0.0%	0.1%	1.2%	1.3%

Fuel Price Forecasts

Coal Price

Long-term forecasts for the delivered price of coal to the Cross and Winyah units were developed by Santee Cooper based on long-term basin price forecasts obtained from Energy Ventures Analysis (EVA) and S&P Global and rail transportation costs developed by Santee Cooper. Additionally, market pricing from ICAP is used for the estimation of coal pricing through 2023. Forecast rail transport costs were developed from recent experience of Santee Cooper and reflect near-term contract prices and long-term assumptions with annual cost escalation of 1.5 percent.

Sources of supply to Santee Cooper's coal units were assumed to include the Central Appalachian, Northern Appalachian, and Illinois Basins, with coal blends specific to each coal-fired generating resource. Figure 6-2 and Figure 6-3 depict the resulting projections of the delivered price of coal burned by unit at Cross and Winyah Station, respectively.

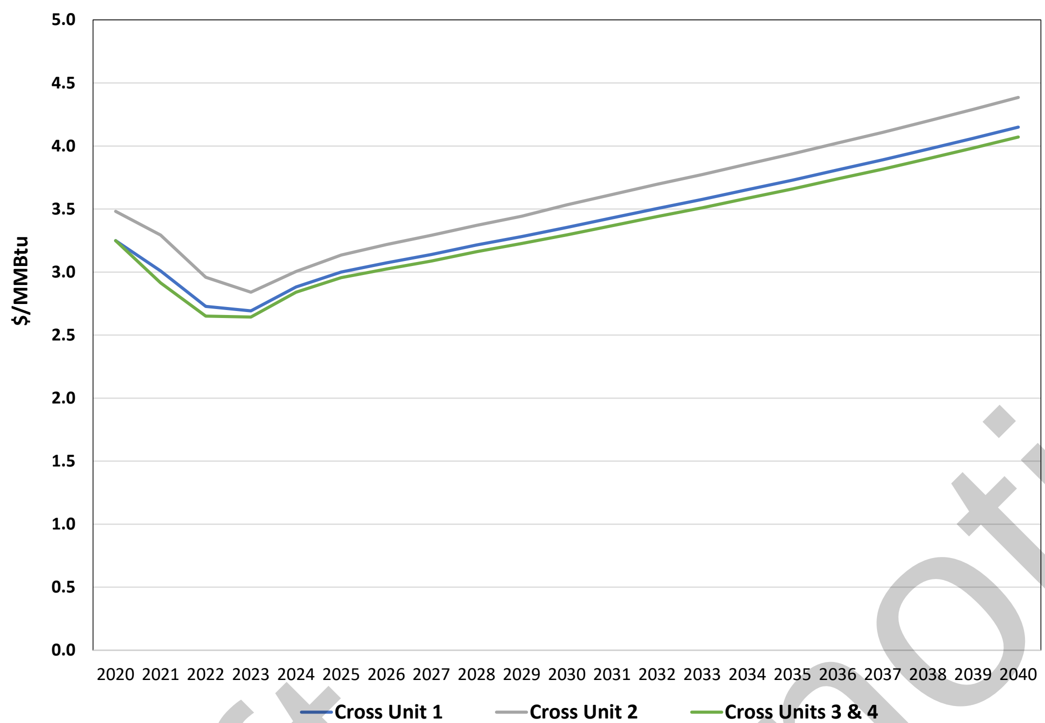

Figure 6-2: Projected Price of Coal Delivered to Cross Station

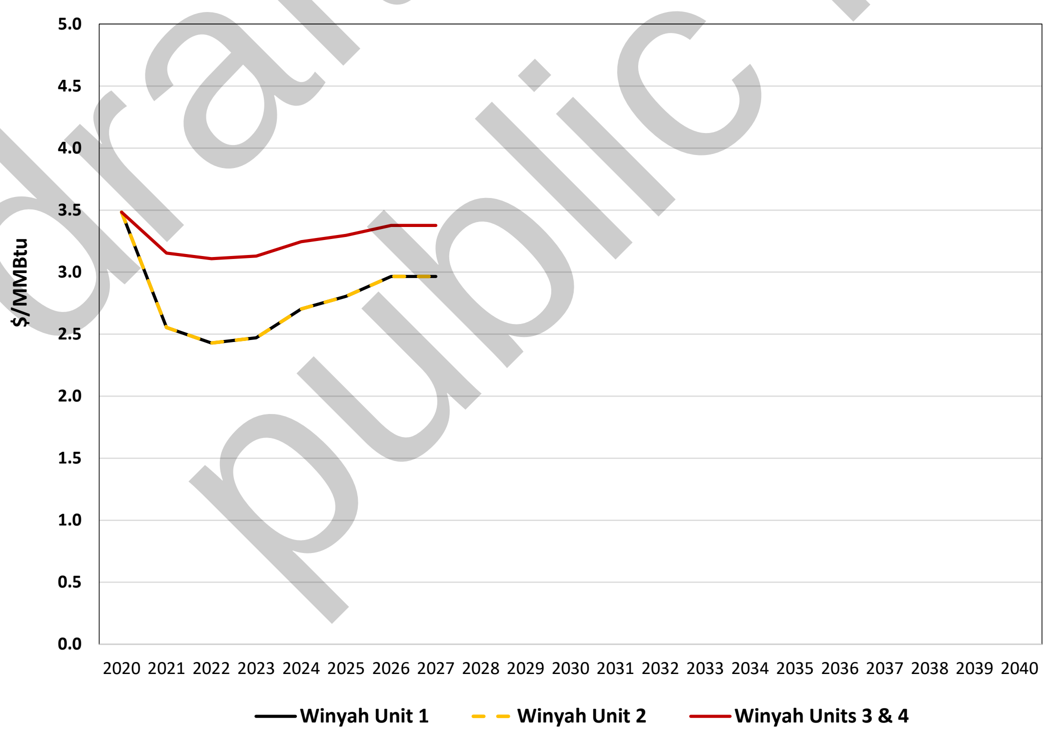

Figure 6-3: Projected Cost of Coal Delivered to Winyah Station

Natural Gas Commodity Price

Natural gas prices were developed based on an average of forecast and forward natural gas price curves for Henry Hub obtained from multiple sources. Santee Cooper utilized an average of forward NYMEX Henry Hub prices settled during the month of May 2020 published by S&P Global to provide a forecast through 2032. Beyond 2032, Santee Cooper utilized a fundamental forecast of Henry Hub prices through 2039 prepared by SNL and published S&P Global. Prices were modeled to transition uniformly from forward to forecast prices over a seven-year period through 2039. Prices beyond 2039 were escalated at the compound annual growth rate observed for the final three years of the forecast period. Figure 6-4 depicts the projected monthly nominal prices for Henry Hub assumed in the 2020 IRP for the Base Case.

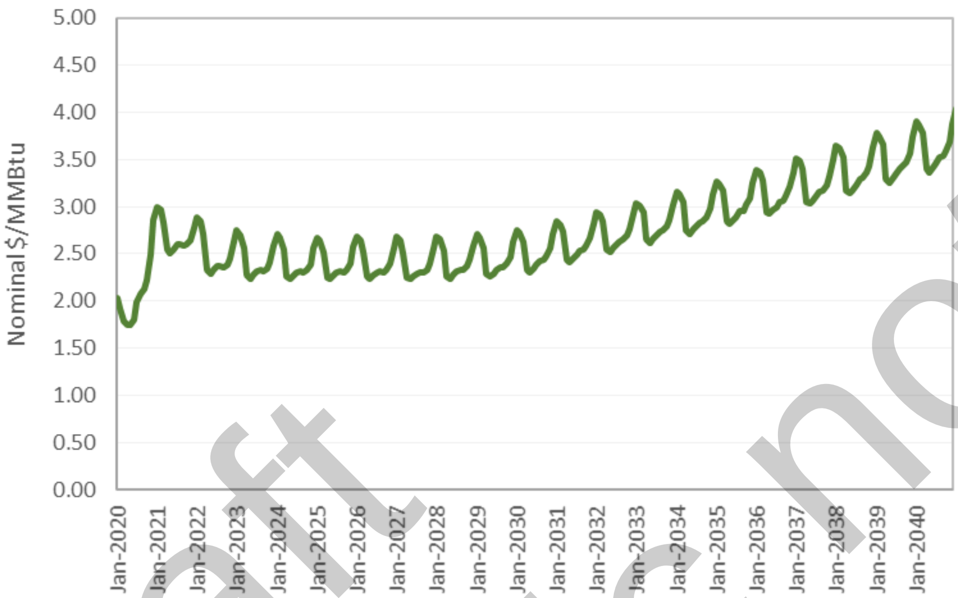

Figure 6-4: Projected Henry Hub Natural Gas Prices

In addition, a high natural gas price case (High NG Case) was developed to test the sensitivity of resource decisions and future power costs to higher gas prices. This High NG Case assumes Henry Hub prices are 50 percent higher than the Base Case forecast. Because natural gas price are near historically low levels, Santee Cooper did not model a low natural gas price scenario for the 2020 IRP. Figure 6-5, below, depicts the projected annual nominal prices for Henry Hub assumed in the 2020 IRP for the Base Case and the High NG Case.

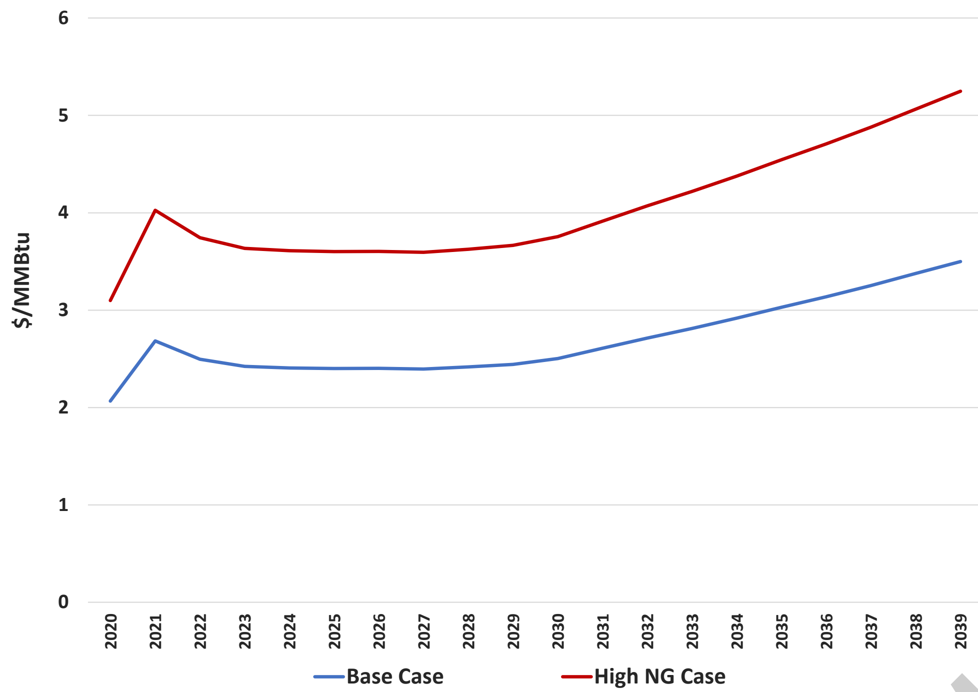

Figure 6-5: Projected Henry Hub High Natural Gas Price Sensitivity

Natural gas price basis differentials for natural gas hubs to which Santee Cooper has access (i.e., Transco Zone 4 and Transco Zone 5) were developed from the average of forecast hub prices prepared by OTC Global Holdings through 2029 and published by S&P Global during May 2020. The forecast monthly basis differentials were added to or subtracted from the forecast Henry Hub price utilized for the 2020 IRP, with basis pricing beyond 2029 held constant. Natural gas hub basis differentials were assumed to remain unchanged for the High NG Price sensitivity. Figure 6-6 depicts the forecast monthly natural gas hub basis assumed for the 2020 IRP. As depicted below, Transco Zone 5 is subject to the influence of much higher demand for natural gas as a heating fuel, primarily in the Northeast, during winter months.

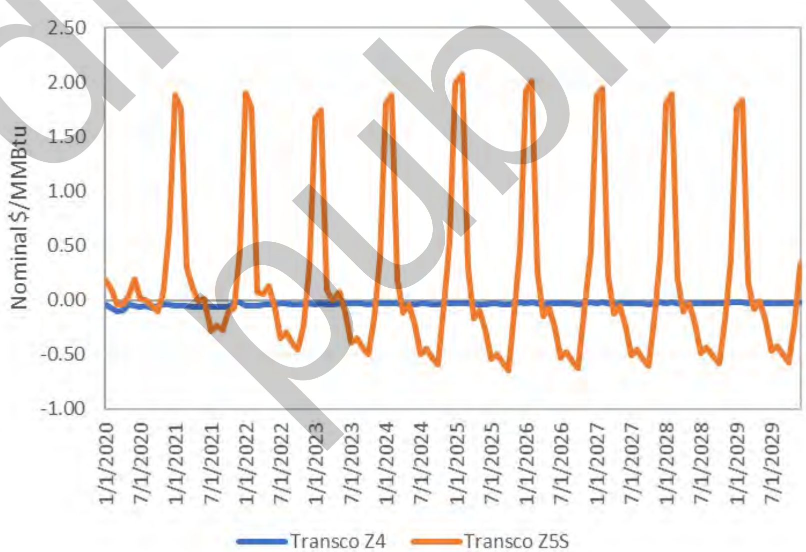

Figure 6-6: Projected Natural Gas Price Basis

Natural Gas Transportation

Costs for natural gas transportation were added to the forecast natural gas commodity and hub basis prices to develop delivered prices of natural gas modeled for existing and future natural gas-fired resources. Variable transportation charges (i.e., fuel use charges and variable transportation service rates and fees) were added to the delivered cost for all natural gas-fired resources. Natural gas-fired combined cycle (NGCC) resources were modeled with firm natural gas transportation service (FT service), while natural gas-fired combined cycle (NGCT) peaking resources were generally modeled using interruptible natural gas transportation service (IT service).

Use of FT service for base-loaded NGCC resources is important to assure resource capacity can be counted as firm. NGCT resources, which typically operate at low capacity factors, were modeled as having diesel fuel backup and assumed to not require FT service to assure firm capacity and instead were modeled to use IT service. Additionally, in certain instances when a portfolio might consider only new NGCT resources for expansion at a site without preexisting natural gas service, firm NG transportation service was modeled to reflect the cost of securing new pipeline facilities to the site. Where appropriate, existing Santee Cooper natural gas-fired resources were modeled assuming existing fuel supply contracts, converting to more general market assumptions following existing contract terms.

The projected price of transportation service was developed for each potential NGCC site and delivery configuration based on rate information obtained from natural gas pipeline companies and from existing pipeline tariffs. Charges for FT service were assumed to vary for the evaluated NGCC generation sites based on the proximity of each site to interstate pipelines in the region. For instance, charges for FT service at the Winyah Generating Station were assumed to be approximately twice that assumed for a site near the V. C. Summer Generating Station. Additionally, charges for FT service were assumed to decline with increasing volumes to reflect improved economy of scale associated with larger pipeline lateral installations. FT service was modeled as a fixed cost for each NGCC resource within the CapEx model by multiplying the max hourly natural gas requirement by the firm reservation charge. IT service was assumed to be equal to the firm reservation charge but was assigned as a variable cost adder to the delivered price of natural gas. Natural gas transportation charges were assumed to remain constant over the IRP study period.

Nuclear Fuel

The projected cost of nuclear fuel at the V. C. Summer Generating Station was provided by Dominion through 2029 and escalated thereafter at the average rate computed over 2022-2029. Figure 6-7, below, depicts the projected cost of nuclear fuel at Summer over the study period.

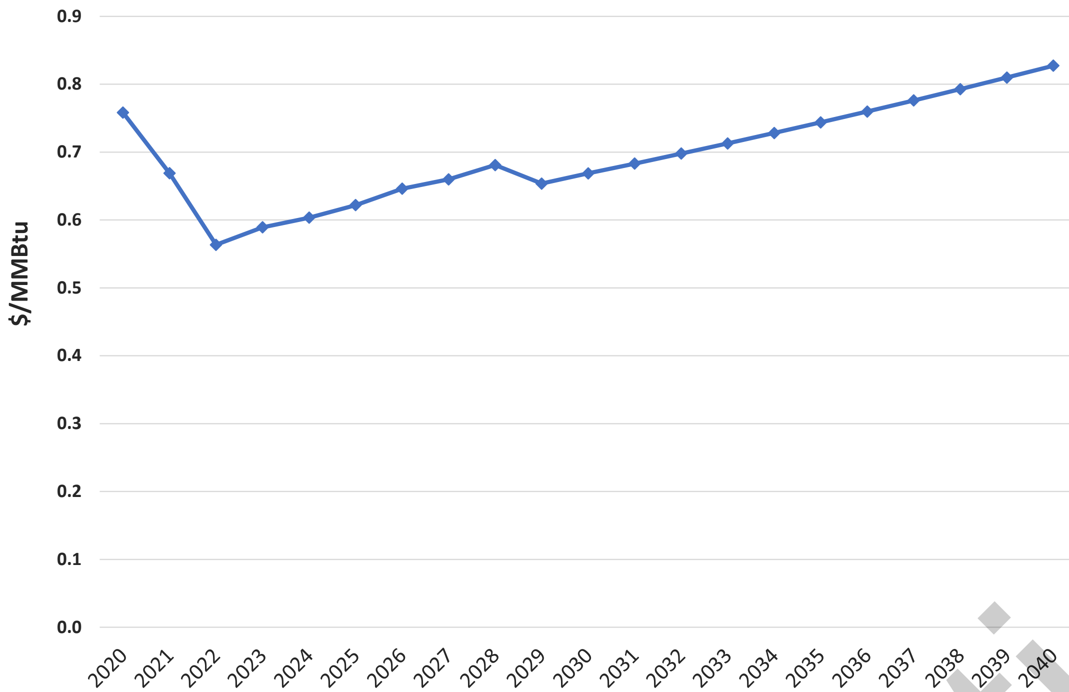

Figure 6-7: Projected Nuclear Fuel Cost at V.C. Summer

Power Market Prices

The IRP assumes that Santee Cooper has access to economy energy purchases from the market as an additional resource to economically meet load requirements. Economy energy reflects daily and short-term purchases, with prices varying monthly with natural gas prices and daily based on assumed market conditions. Pricing includes two tiers: Tier 1 for economy purchases that are generally available year-round across all hours, and Tier 2 depicting additional amounts assumed available at a price premium, and with the modeled quantity of either tier being dependent on the economic dispatch simulated in the CapEx model. See the section entitled Transmission System Considerations, below, for additional information on modeled economy import limits.

The projected price of Tier 1 economy energy purchases is based on projections of monthly energy market prices developed by The Energy Authority (TEA) for the Southern Company market area, adjusted to be consistent with the Henry Hub prices modeled for the 2020 IRP, utilizing an implied monthly heat rate from TEA projections. TEA projections were based on market indicators, including market offers, forward prices for power and natural gas, and fundamental forecasts of power prices and natural gas prices. Projected economy energy prices are further adjusted for assumed wheeling charges to reach the Santee Cooper interface, and to reflect typical daily price volatility relative to variations in load. Tier 2 economy energy prices assume a 15 percent price premium relative to Tier 1.

Figure 6-8, below, depicts the economy energy prices modeled for the 2020 IRP under the Base Case. Economy energy prices were also modeled for the High NG Price sensitivity case utilizing the implied heat rate and other adjustments described above for the Base Case forecast. Figure 6-9, below, depicts the projections of the economy energy prices under the Base Case and High NG Price sensitivity case.

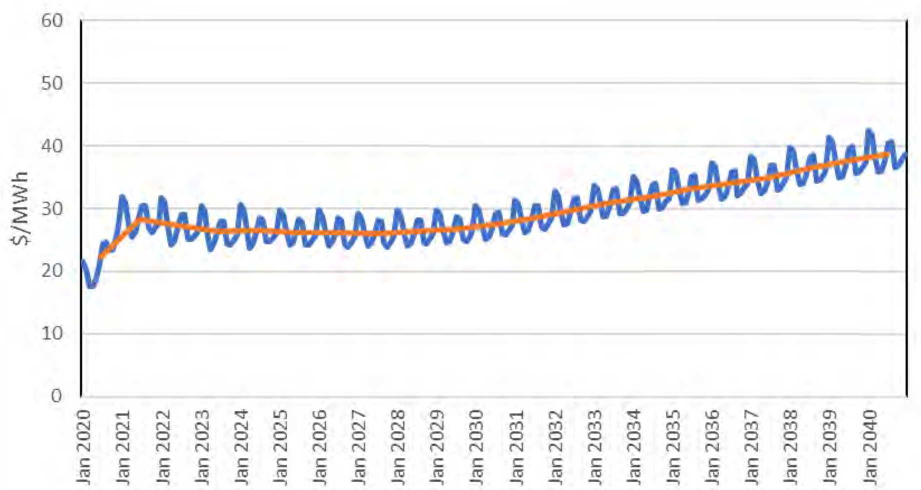

Figure 6-8: Projected Base Case Tier 1 Monthly Economy Energy Price

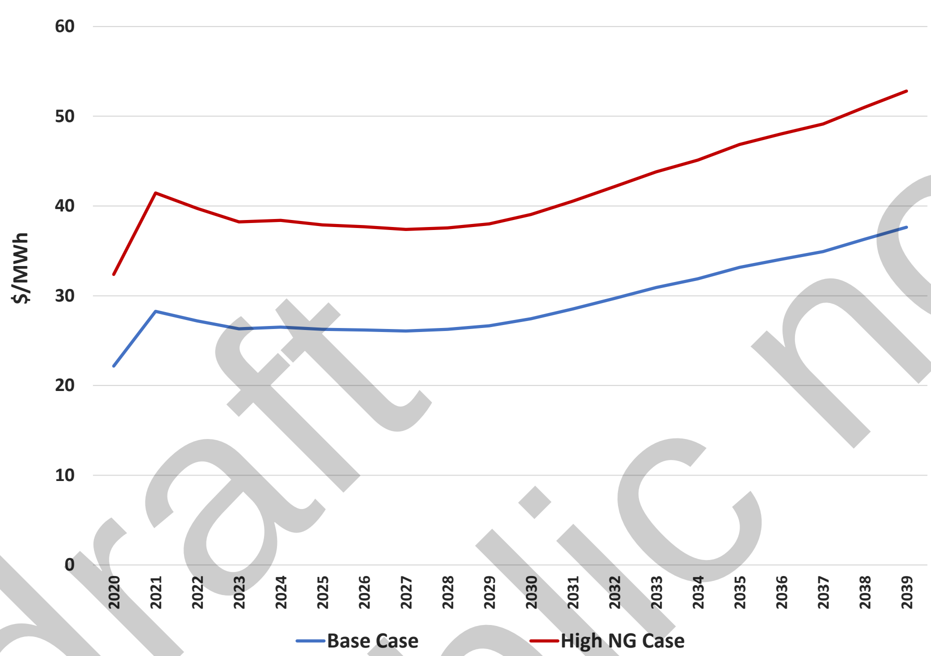

Figure 6-9: Projected Annual Base Case and High Prices for Economy Energy

Existing Santee Cooper Resources

Santee Cooper currently owns and operates approximately 5,338 megawatts (winter rating) of generating resources and purchases approximately 471 megawatts from other parties. Table 6-4, below, lists existing generation resources owned by Santee Cooper, including information on resource location, in-service date, winter and summer capacity ratings, and the fuel or energy source. Table 6-5, below, lists existing and planned wholesale purchases made by Santee Cooper, including information on the type of resource, purchase term, nameplate capacity rating, and winter and summer firm capacity ratings.

Table 6-4
Existing Santee Cooper Generation Resources

Generating Facilities	Location	In Service Date	Winter MCR[1] (MW)	Summer MCR[1] (MW)	Energy Source
Jefferies Hydroelectric Generating Station[2]	Moncks Corner	1942	140	140	Hydro
Wilson Dam Generating Station	Lake Marion	1950	2	2	Hydro
Myrtle Beach CT1-CT5	Myrtle Beach	1962-1976	65	56	Oil/NG
Hilton Head CT1-CT3	Hilton Head	1973-1979	100	88	Oil
Winyah Generating Station	Georgetown				
No. 1		1975	280	275	Coal
No. 2		1977	290	285	Coal
No. 3		1980	290	285	Coal
No. 4		1981	290	285	Coal
Summer Nuclear Unit 1	Jenkinsville	1983	322	322	Nuclear
Cross Generating Station	Cross				
Unit 1		1995	585	580	Coal
Unit 2		1983	570	565	Coal
Unit 3		2007	610	610	Coal
Unit 4		2008	615	615	Coal
Landfill Gas Resources					
Horry Landfill Gas Station	Conway	2001	3	3	LFG
Lee County Landfill Gas Station	Bishopville	2005	11	11	LFG
Richland County Landfill Gas Station	Elgin	2006	8	8	LFG
Anderson County Landfill Gas Station	Belton	2008	3	3	LFG
Georgetown County Landfill Gas Station	Georgetown	2010	1	1	LFG
Berkeley County Landfill Gas Station	Moncks Corner	2011	3	3	LFG
Rainey Generating Station	Starr				
Unit 1		2002	520	460	NG
Unit 2A		2002	180	146	NG
Unit 2B		2002	180	146	NG
Unit 3		2004	90	75	NG
Unit 4		2004	90	75	NG
Unit 5		2004	90	75	NG
Total Capability [3]			5,338	5,110	

(1) Maximum Continuous Ratings (MCR).
(2) MCR updated after Hydro rebuilds.
(3) Santee Cooper currently owns 5.1 megawatts of solar resources that do not contribute to the total capability.

While Santee Cooper has announced its intent to retire the Winyah Generating Station, as discussed below, Santee Cooper has not otherwise assigned useful life estimates to other generating resources. For purposes of the 2020 IRP, Santee Cooper has assumed that standard maintenance on the existing generating assets will permit the continued operation of the resources through the IRP study period. Santee Cooper intends to periodically study the economics of retirement of its generating assets, including the Cross retirement portfolios detailed herein. See Appendix B for additional information related to environmental compliance planning for existing resources.

Table 6-5
Existing Santee Cooper Purchases

Generating Facilities	Term	Nameplate Capacity (MW)	MCR (MW)	Energy Source
Buzzards Roost	March 2020	15	8	Hydro
Domtar	2025	38	38	Biomass
EDF Renewables	2043	36	36	Biomass
Southeastern Power Administration	Indefinite	305	305	Hydro
St. Stephens Hydro(1)	2035	84	84	Hydro
TIG Solar(2)	2033	3	0	Solar
Total		481	471	

(1) Santee Cooper anticipates taking ownership of St. Stephens by 2035.
(2) The MCR for TIG Solar is 0 because the Santee Cooper winter peak typically occurs early in the morning before PV production would occur.

Winyah Generating Station Retirement

Santee Cooper has announced its intent to retire Winyah Generating Station in a phased manner over 2021-2027. Current plans call for Winyah Unit 4 to be idled in the winter of 2020/2021, followed by Winyah Unit 3 in the winter of 2021/2022, with the entire generating station being retired by 2027. Santee Cooper continues to evaluate the appropriate timing for the idling of Winyah Units 3 and 4 with consideration of uncertain territorial loads, economies of operation and idling, and technical requirements to idle the generating facilities. Santee Cooper has developed a staffing plan for the Winyah Generating Station and has begun staff reduction efforts. Additionally, future maintenance outage plans and schedules are being modified to accommodate the planned retirement.

Gypsum Delivery Contracts

Santee Cooper has contracted with American Gypsum (AG) to deliver quantities of gypsum, produced as a byproduct of emissions control processes at Santee Cooper's coal plants. Gypsum is a byproduct of the flue gas desulfurization process utilized at Santee Cooper's coal plants to reduce sulfur content in air emissions from these plants and is utilized by AG to produce gypsum wallboard at an AG manufacturing facility located adjacent to the Winyah site. To the extent the coal plants do not produce enough wallboard quality gypsum to meet minimum required deliveries under the AG contract, Santee Cooper fulfills any shortfalls by purchasing gypsum in the open market for delivery to the AG site. Gypsum produced at the Cross plant is shipped by Santee Cooper to the AG site through 2028. Beginning in 2029, AG takes ownership of Cross-produced gypsum at the Cross site.

The IRP reflects gypsum production from the coal units based on historical production rates. Remaining gypsum requirements to satisfy the AG contract are assumed in this IRP to be fulfilled via market purchases at an assumed cost rate of $46 per ton, escalated at the general inflation rate.

Summer Nuclear Station Licensing

In 2004, the Nuclear Reliability Commission (NRC) extended the operating license for Summer Nuclear Unit 1 to August 6, 2042, an additional twenty years beyond the then-current operating license period.

FERC Hydro Licensing

Santee Cooper operates its Jefferies Hydro Station and certain other property, including the Pinopolis Dam on the Cooper River and the Santee Dam on the Santee River, which are major parts of Santee Cooper's integrated hydroelectric complex, under a license issued by the Federal Energy Regulatory Commission (FERC) pursuant to the Federal Power Act (FPA). The FERC license includes oversight of project activities such as Dams and Dikes Maintenance, Shoreline Management, Forestry Management, Mosquito Control, Water Quality Monitoring, and Aquatic Plant Management, conducted in cooperation and partnership with DHEC, the South Carolina Department of National Resources (the DNR), the U.S. Fish and Wildlife Service (USFWS), and the National Marine Fishery Service (NMFS). The project is currently undergoing relicensing and a Notice of Intent (NOI) to relicense was filed with the FERC on November 13, 2000. The final license application was submitted March 12, 2004. Due to a number of Additional Information Requests, the relicensing process has extended beyond the license expiration date. The FERC has issued a standing annual license renewal until a final license is issued.

The FERC issued its Final Environmental Impact Statement (EIS) in October 2007. The DNR, the USFWS and Santee Cooper jointly signed and filed a settlement agreement in May 2007 with the FERC that among other things, identifies fish passage and outflow guidelines during the term of the next license. The NMFS chose not to join in the settlement agreement and in January 2020 submitted final documents for mandatory fishway conditions under Section §18 of the FPA, flow recommendations under Section §10 of that Act, and a biological opinion for endangered Shortnose and Atlantic sturgeon under Section 7 of the Endangered Species Act (ESA). Santee Cooper is finalizing an engineering assessment of the impacts higher outflows prescribed by NMFS will have to the Santee Dam system. Santee Cooper cannot predict the final scope, timing, or general outcome of the FERC relicensing process.

Supply-Demand Balance

Combining projections for the Load Forecast, existing resource capabilities, and planned phased retirement of the Winyah Generating Station yields projections of the future Santee Cooper supply-demand balance as depicted in the following Figure 6-10 and Table 6-6, below. Supply resources reflected below include only existing owned and purchased resources. Some small amounts of capacity are needed over 2022 through 2026, but the first major capacity need is triggered by the full retirement of Winyah in 2027, at which time the Santee Cooper system will be short approximately 700 megawatts. As described more fully below, Santee Cooper is planning to meet capacity needs in the near-term with new quick-start peaking resources, battery storage resources, demand response programs, and short-term capacity purchases. Longer-term capacity requirements have been identified through the 2020 IRP by determining the most economic combination of resources to meet Santee Cooper's load obligations over this 20-year planning horizon while balancing the objectives of the Santee Cooper planning process.

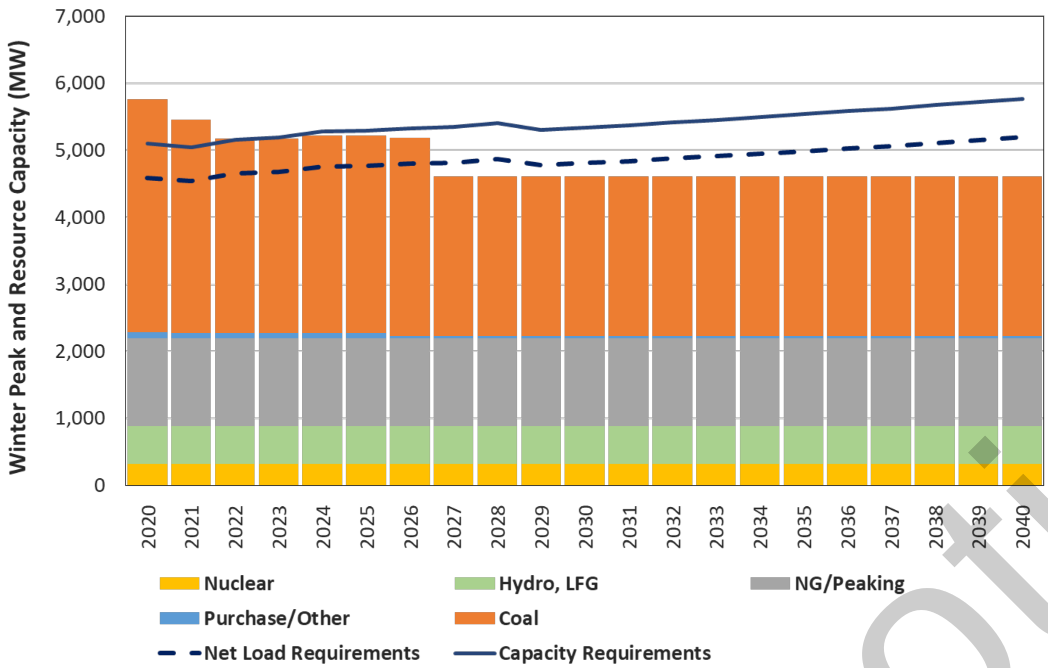

Figure 6-10: Santee Cooper System Supply and Demand Balance

Table 6-6
Santee Cooper System Supply and Demand Balance

Load & Resources	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
System Demand																					
Winter Peak Demand	4,951	4,932	5,071	5,101	5,127	5,140	5,168	5,187	5,233	5,145	5,177	5,210	5,247	5,281	5,316	5,353	5,395	5,433	5,476	5,520	5,561
Less: Non-firm/Interruptible Loads	(308)	(339)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)
Less: Non-system Wholesale Sales	(52)	(52)	(52)	(52)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Less: Firm Hydro Resources	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)
Net Peak Demand	4,202	4,152	4,260	4,290	4,368	4,381	4,409	4,428	4,474	4,386	4,418	4,451	4,488	4,522	4,557	4,594	4,636	4,674	4,717	4,761	4,802
Resource Capacity																					
Existing Resources																					
Coal Steam	3,530	3,240	2,950	2,950	2,950	2,950	2,950	2,380	2,380	2,380	2,380	2,380	2,380	2,380	2,380	2,380	2,380	2,380	2,380	2,380	2,380
Nuclear	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322
NGCC/NGCT	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150
Peaking	165	165	165	165	165	165	165	165	165	165	165	165	165	165	165	165	165	165	165	165	165
Landfill Gas	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Hydro	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142
Purchases	89	74	74	74	74	74	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Total	5,427	5,122	4,832	4,832	4,832	4,832	4,794	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224
Less: Unit-contingent Sales	(52)	(52)	(52)	(52)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Net Capacity	5,375	5,070	4,780	4,780	4,832	4,832	4,794	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224
Capacity Reserves																					
Net Peak Demand	4,202	4,152	4,260	4,290	4,368	4,381	4,409	4,428	4,474	4,386	4,418	4,451	4,488	4,522	4,557	4,594	4,636	4,674	4,717	4,761	4,802
Planning Reserves (12%)	504	498	511	515	524	526	529	531	537	526	530	534	539	543	547	551	556	561	566	571	576
Total Capacity Requirements	4,707	4,650	4,771	4,805	4,892	4,907	4,938	4,959	5,011	4,912	4,948	4,985	5,026	5,065	5,104	5,145	5,192	5,235	5,283	5,332	5,378
Total Net Capacity	5,375	5,070	4,780	4,780	4,832	4,832	4,794	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224
Capacity Surplus/(Deficiency)	668	419	9	(25)	(60)	(75)	(145)	(736)	(787)	(688)	(725)	(761)	(803)	(841)	(881)	(921)	(969)	(1,011)	(1,059)	(1,108)	(1,154)

Supply-side Options

Conventional Thermal Resource Options

Cost and operating characteristics of potential NGCC, NGCT, and aero-derivative gas turbine resource options were developed jointly by Santee Cooper and Central. Sources of these estimates included a variety of publicly available reports, original equipment manufacturer estimates, and proprietary databases and estimates developed by consultants for Central and Santee Cooper. Capital costs, operating costs, and operating characteristics were developed for two-on-one (2x1) H-class NGCC resources, both with and without duct-firing (DF), and for single H-class NGCT resources. Table 6-7 provides the capital costs, average ambient capacity rating, fixed and variable operating and maintenance (O&M) costs, and heat rate characteristics that were assumed for conventional, fossil-fueled resource options.

Table 6-7
Operating Costs and Characteristics of Conventional Resource Options

	2x1 NGCC (no DF)	2x1 NGCC (with DF)	NGCT	LM2500
Total Project Cost ($M)	665.9	697.8	196.0	31.3
Max Rating (MW, ambient)	1,104.6	1,315.2	347.9	32.3
Per Unit Cost ($/kW)	602.82	530.59	563.39	970.33
Operating Cost				
Fixed O&M ($/kW-yr)	5.07	4.26	5.46	26.00
Variable O&M ($/MWh)	3.34	3.16	8.73	12.68
Full Load Heat Rate (Btu/kWh)	6,110	6,383	9,200	9,680

For purposes of the 2020 IRP, Santee Cooper evaluated options to build 2x1 NGCC resources, as depicted in Table 6-7, as well as options that assume NGCC additions could be developed jointly with other parties, with Santee Cooper retaining an entitlement to one-half of the unit, thereby permitting Santee Cooper to take advantage of improved economies of scale of the larger NGCC while attaining a resource that fits into Santee Cooper's resource portfolio and resource planning more effectively. For these jointly developed units, it was assumed that Santee Cooper would be entitled to one-half of the unit's capacity and energy output and be responsible for one-half of the development, construction, and operating cost of the unit, including the cost of transmission upgrades and firm natural gas service.

Solar Resources

The IRP assumes that Santee Cooper would contract for solar power from utility-scale solar facilities developed, owned, and operated by private developers through purchase power agreements (PPA). Under such PPAs, the Seller would be responsible over the life of the project for operating, maintaining, and decommissioning its project. This approach would enable Santee Cooper to reduce energy costs and financial risk by avoiding on-balance sheet debt. It is expected that owners of these projects will monetize the tax incentives available to solar projects and pass on the benefit to Santee Cooper through lower PPA pricing given the competitive nature of the procurement.

Under the Base Case, energy delivered under such solar PPAs are assumed at a long-term, fixed rate of $25 per megawatt-hour, inclusive of transmission interconnection costs. This assumption is based on Santee Cooper experience and market knowledge gained primarily through recent competitive procurement processes. On October 15, 2019, Santee Cooper issued a Request for Information (RFI) from potential solar resource developers, and on June 5, 2020, Santee Cooper issued a Request for Proposals for Solar Power, to which responses are currently under evaluation. Responses to both the RFI and the RFP indicate that a price of $25 per megawatt-hour is indicative of current market prices for solar energy. The 2020 IRP assumes that continued downward cost pressure for PV modules and balance of plant equipment will be sufficient to offset the effects of declining investment tax credits over the next several years. The IRP assumes further that such contracts could be renewed or replaced at the end of their terms, which typically span 15-25 years, and facility refurbishments made to extend the lives of the solar facilities for approximately the same pricing in nominal terms throughout the study period.

Solar facilities would be located near Santee Cooper's primary load centers near the coast but would be geographically dispersed to achieve production diversity while maintaining significant economies of scale. As Santee Cooper is winter peaking, with the peak typically occurring during the hour ending 8 AM, solar capacity would not contribute to meeting peak demand requirements. While some capacity value could be achieved toward meeting the summer peak, which typically occurs in the late afternoon, this IRP does not reflect any capacity value for solar resources.

Santee Cooper expects to execute multiple PPAs for solar resources to provide for an initial tranche of 500 megawatts of nameplate capacity though solar PPAs. The 2020 IRP reflects that an additional 1000 megawatts of solar resources will be secured over 2023-2032 period. The capacity factor of the solar resources is assumed to be approximately 28 percent, based on the estimated typical output of single-axis tracking solar resources in or near the Santee Cooper system. Table 6-8, below, provides the cumulative solar resources procured in addition to Santee Cooper's existing solar resources discussed earlier in this section under the heading, Existing Santee Cooper Resources.

Table 6-8
Solar Implementation Schedule Assumed for the IRP

Year	Nameplate Capacity (MW)
2020	0
2021	75
2022	150
2023	500
2024	555
2025	800
2026	1,000
2027	1,000
2028	1,000
2029	1,250
2030	1,350
2031	1,425
2032+	1,500

Storage Resources

The 2020 IRP assumes that Santee Cooper will add battery energy storage systems (BESS) with a total capacity of 200 megawatts in 50 megawatt increments over the 2026-2036 timeframe. These BESS systems are assumed to have two-hour storage capability, primarily targeting the Santee Cooper winter peak demand and transmission reliability requirements. Utilization of BESS with low frequency of charge/discharge cycles allows for the useful life of the units to extend through the 2020 IRP study period and is consistent with relatively low operation and maintenance costs. Table 6-9 provides the cumulative BESS capacity assumed to be implemented in all resource portfolio analyses discussed herein.

Table 6-9
BESS Implementation Schedule Assumed for the IRP

Year	Nameplate Capacity (MW)
2020-2025	0
2026	50
2027	50
2028	50
2029	50
2030	50
2031	50
2032	50
2033	100
2034	100
2035	150
2036+	200

Capital and O&M costs for BESS were jointly developed by Santee Cooper and Central based on information obtained from battery system vendors, public reports by other industry organizations, and indications from renewable resource procurement process. Cost and operating characteristics were developed for both two- and four-hour BESS for evaluation in the 2020 IRP. Initial results indicated that a BESS system with two-hours of storage would be more cost effective than a four-hour system. However, Santee Cooper recognizes the limitations of modeling BESS in the CapEx model and intends to further study BESS economics, including the operation of longer duration BESS to manage seasonal peak demand periods, intermittent resource operation, and energy arbitrage.

Figure 6-11 depicts the assumed capital cost on a unit energy capacity basis of two-hour and four-hour BESS over the study period. Fixed O&M is assumed at $3 per kilowatt-year in 2020 dollars, with escalation at 2.0 percent per year.

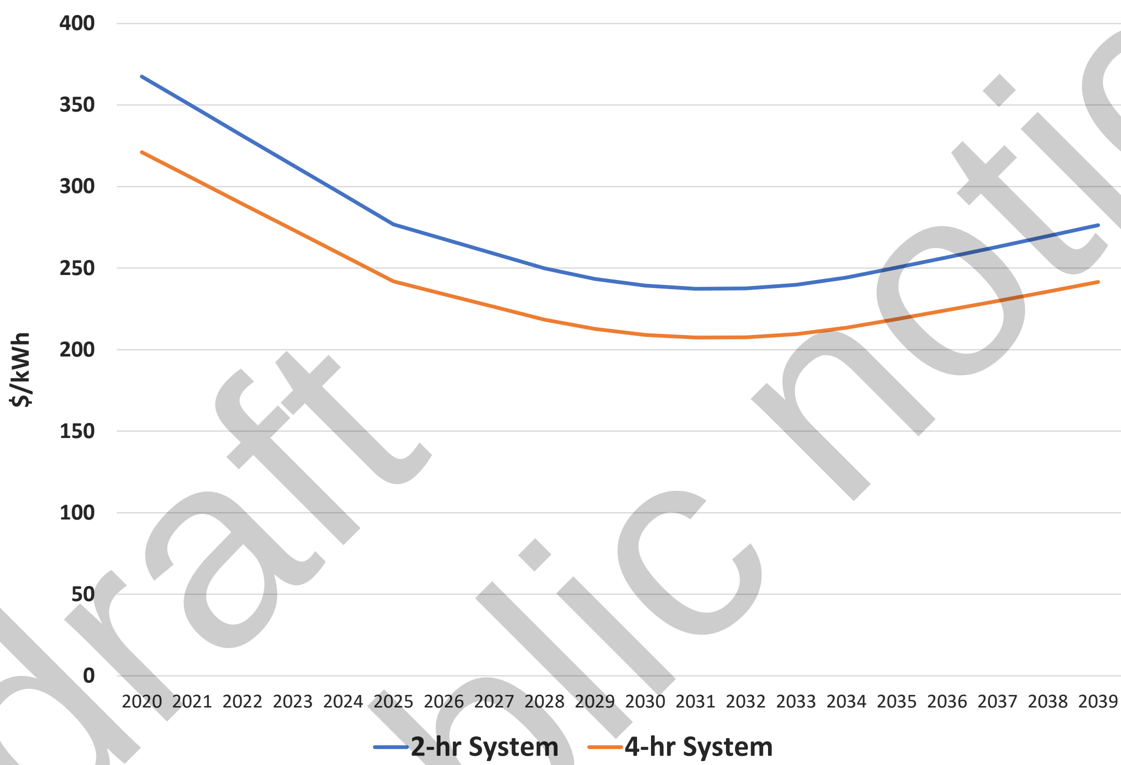

Figure 6-11: Projected Trend of Two-Hour Battery System Capital Costs

Demand-side Resources

Santee Cooper and Central have conducted DSM programs aimed at improving the efficiency of residential and commercial end uses for many years, as discussed in Section 4 above. Central also has a variety of load management measures in place across its member cooperatives. The Load Forecast utilized for this IRP reflects the latest projections of the level of activity and impacts of these programs through reductions in future peak demand and energy requirements.

In addition, the IRP assumes the implementation of demand response programs by Santee Cooper and Central targeting peak demands and offsetting demand requirements that must otherwise be met by supply-side resources. This includes the development of a program to control air conditioning units and water heaters at residential and commercial customers on the Santee Cooper distribution system to reduce demand for electricity. Santee Cooper is currently undertaking a process to obtain interest and information from vendors regarding potential program costs, technologies, and logistics. Santee Cooper's projected DR capability also includes both conservation voltage reduction and Volt-VAR optimization across the Santee Cooper system, programs which have recently been under development. This measure is intended to reduce system losses and peak demand through improving voltage stability across the system and reducing voltage slightly during peak periods. The IRP also reflects the implementation and expansion of similar measures by Central. The projected incremental DR program capability is provided in Table 6-10.

Table 6-10
Projected Demand Response Program Capability
Megawatts

	Santee Cooper System				
Year	Direct Load Control	Conservation Voltage Reduction and Other	Total	Central System	Total Capability
2020	0.0	18.0	18.0	0.0	18.0
2021	3.0	18.0	21.0	3.0	24.0
2022	7.2	18.0	25.2	5.0	30.2
2023	12.8	18.0	30.8	7.0	37.8
2024	18.5	18.0	36.5	12.0	48.5
2025	24.1	18.0	42.1	16.0	58.1
2026	29.7	20.2	49.9	20.0	69.9
2027	35.3	25.6	60.9	24.0	84.9
2028	39.2	25.6	64.8	27.0	91.8
2029	41.0	25.6	66.6	30.0	96.6
2030	42.3	25.6	67.9	33.0	100.9
2031	42.9	25.6	68.5	34.0	102.5
2032	43.4	25.6	69.0	35.0	104.0
2033	43.9	25.6	69.5	36.0	105.5
2034	44.3	25.6	69.9	36.0	105.9

Santee Cooper has developed projections regarding the capital and operating costs of implementing and sustaining the program, including equipment costs, initial and continuing participant incentives, and on-going costs related to marketing, call center operations, system licensing, communication fees, and administrative costs. These costs are included in the power costs reflected in the results presented herein. These DR program impacts are not reflected in the Load Forecast but are instead modeled as supply-side resource in the 2020 IRP.

Purchase Power Options

The 2020 IRP includes simulation of two Purchase Power Agreements (PPA) available to Santee Cooper as resource options to meet power supply needs during 2031 to 2040. One is a unit-continent tolling agreement based on the operating and cost parameters of an NGCC resource. The other available PPA is not tied to a particular resource, but instead reflects a tolling agreement backed by multiple resources and energy prices indexed to NG hub prices and a fixed heat rate. The PPA resources were assumed to be available any year during 2031 to 2040 in five megawatt increments up to the maximum available capacity. The PPA resources were modeled as options in CapEx in the same manner as generating resource options to allow the CapEx model to optimize resource plans that included small PPA increments each year or larger, more efficient NGCC resources, or both, depending on least-cost planning decisions. Table 6-11 provides the cost and operating parameters of both PPAs that were used for the 2020 IRP.

Table 6-11
PPA Cost Assumptions 2031-2040

	System Purchase	NGCC Purchase	Annual Escalation
Capacity (MW)	Up to 300 MW	Up to 200 MW	
PPA Price (2031 $)			
Capacity Price ($/kW-mo)	6.00	6.25	2.0%
NG FT Charge ($/kW-mo)	1.33	2.48	0.0%
Variable O&M ($/MWh)	3.34	3.75	2.0%
Start-up Cost ($/start/MW)	0.00	21.50	2.0%
Heat Rate (Btu/kWh)	7,000	7,000	
Transmission Losses	2.2%	2.2%	

During the near-term period 2020 through 2030, the 2020 IRP assumes that any capacity needed to maintain the Santee Cooper planning reserve margin could be served through short-term annual capacity purchases. Pricing for these short-term purchases is based on market price information provided by TEA as depicted in Table 6-12.

Table 6-12
Short-term Capacity Purchase Price

Year	Capacity Price ($/kW-mo)
2020	3.50
2021	4.25
2022	4.79
2023	4.88
2024	4.97
2025	5.00
2026	5.08
2027	5.16
2028	5.25
2029	5.34
2030	5.43

Transmission System Considerations

Import Limitations

Quantities of economy energy purchases that could be imported into the Santee Cooper system were limited to hourly maximum import and export limits based on typical market trading practices of Santee Cooper. Import limits are assumed to vary by season and across the Tier 1 and Tier 2 economy purchases. Additionally, transmission studies performed by Santee Cooper have indicated that import limits are likely to vary depending on where Santee Cooper decides to add new resources to the system following the retirement of Winyah Generating Station. If new generating resources are added at the Winyah site (essentially replacing the retired Winyah resources), then import limitations are unaffected. However, if new resources are built at alternative sites, further from the Santee Cooper load centers, import limits are likely to be reduced, thus limiting access to economy purchases. By modeling varying limits for transmission imports, potential resource plans evaluated for the 2020 IRP considered the tradeoff between varying costs of developing different sites against the value of access to economy power transactions. Import limits modeled for the IRP for both economy energy purchase tiers are depicted in Table 6-13.

Table 6-13
Estimated Import Limits Across Potential Major System Resource Builds

NGCC Development Site	Import Limits (MW)		
	Jan-Feb, Dec	May-Sep	Mar-Apr, Oct-Nov
Winyah Site			
Tier 1	650	650	650
Tier 2	150	550	350
Total	800	1,200	1,000
Near-Summer Site			
Tier 1	490	650	610
Tier 2	0	80	0
Total	490	730	610
Pee Dee Site			
Tier 1	650	650	650
Tier 2	0	320	160
Total	650	970	810

Transmission Upgrades

As previously mentioned, the 2020 IRP considered generating resource additions at multiple sites throughout the Santee Cooper system. Resource additions were considered at the existing Winyah Generating Station and Cross Generating Station sites (when portfolios considered the retirement of the Cross coal resources). Other sites evaluated include the Pee Dee site (land currently owned by Santee Cooper) and a new site near the V. C. Summer Generating Station. When considering development at the existing Winyah or Cross sites (following retirement of the existing generating resources at these sites), only limited transmission investment would be required to reconfigure substation interconnections since the surrounding transmission grid is already developed to accommodate significant generating capacity at these sites. However, for the Pee Dee site and the site near V. C. Summer, transmission system upgrades would be required to allow development of these sites.

To estimate transmission system upgrade costs for each site, Santee Cooper performed transmission load flow studies to identify necessary system upgrades and prepared preliminary cost estimates. These estimates include costs to reconfigure the existing substations at Winyah and Cross Generating Stations and for new bulk transmission system facilities to accommodate new generating resources at the Pee Dee site and the site near V. C. Summer. These costs were added to other capital and operating costs when evaluating least-cost resource portfolios for the 2020 IRP. Table 6-14 summarizes the incremental transmission system upgrade costs modeled for the 2020 IRP for each evaluated site. See Appendix A for additional information on planned transmission system upgrades.

Table 6-14
Estimated Incremental Costs for Transmission System Upgrades

Generating Site	Cost of Upgrade (2020 $Millions)
Winyah Generating Station	$10
Cross Generating Station	$10
New Pee Dee Site	$84
New Site Near V. C. Summer	$308

In addition to the transmission system upgrades described above, the transmission evaluations determined that additional quick-start generating capability would be needed near the Conway substation if new NGCC/NGCT resources are not installed at the Winyah Generating Station to replace the retiring coal units. Modeled quick-start generating resource additions included multiple RICE units totaling 20 megawatts, as discussed in more detail above, plus a new LM2500 generating unit, using assumptions summarized above, when new NGCC/NGCT resources were modeled to be developed at sites other than Winyah.[8]

[8] As discussed in more detail in Section 8 of this report, Santee Cooper is continuing to investigate multiple options for new quick-start resources to address transmission system support requirements for the retirement of the Winyah Generating Station.

Section 7
IRP Results & Conclusions

Resource Portfolio Evaluation

Resource Expansion Analysis

Santee Cooper has prepared its 2020 IRP utilizing electric system simulations to identify potential resource expansion plans. These evaluations were performed utilizing the assumptions described previously in this IRP Report with respect to forecast system loads, fuel prices, natural gas transportation, economy energy purchases, existing generating resources and purchase power arrangements, options for future generating and purchase power resources, renewable and storage resources, demand-side resources, and transmission system impacts. Resource portfolios with varying assumptions for coal retirement were analyzed under the Base Case assumptions and under multiple sensitivity assumptions.

It should be noted that the resource plans represented in this 2020 IRP, including generating and purchase power resource options and development of potential generating resource sites, are intended to depict reasonable representations of future resource development that Santee Cooper could undertake in the future. However, other than the initiatives outlined herein with respect to the Santee Cooper Short-term Action Plan, Santee Cooper has not made any final decisions with respect to specific resources or development of specific generation sites.

Resource Expansion Analysis Process

As previously discussed, Santee Cooper utilized the CapEx software to estimate hourly resource dispatch of the Santee Cooper system and to evaluate future resource expansion plans. The CapEx model uses a mixed integer linear programing technique to identify least-cost portfolios of future resource additions derived from representative options under consideration by Santee Cooper (as described above). Additionally, Santee Cooper evaluated options to develop future resources at multiple sites throughout its electric system, including developing new generating facilities at the existing Winyah Generating Station (Winyah Site), developing a new generating station at the Pee Dee site currently owned by Santee Cooper (Pee Dee Site), developing a new generating station near or adjacent to the existing V. C. Summer generating station (Summer Site), and developing new generating facilities at the existing Cross Generating Station (Cross Site) when evaluating retirement of the existing Cross generating units. By evaluating options for multiple resource types and multiple resource development sites, Santee Cooper was able to evaluate numerous potential resource configurations, for which only the most cost-effective have been reported in this 2020 IRP.

Resource expansion plans were evaluated in CapEx over a twenty-one-year Planning Period, 2020 through 2040, over which decisions on resource additions were modeled to identify least-cost plans. Additionally, total costs were modeled through a forty-one-year Study Period, through 2060, which includes an addition twenty-years beyond the Planning Period to ensure that capital costs of major resource additions and end effects of production operating costs are captured when considering the optimum least-cost plans. Over this additional twenty-year period of the Study Period, loads and resources were held constant but fuel prices, economy energy prices, and O&M costs continued to escalate.[9] Potential resource plans were compared on a present value basis for costs projected over the Study Period using the Santee Cooper discount rate depicted previously in Table 6-2.

Costs modeled and reported in the 2020 IRP include the following.

- Fuel costs of existing and new resources
- Fixed and variable O&M costs of existing and new resources
- Demand and energy charges for purchase power resources
- Debt service on new resources
- Transmission upgrades (including capital and maintenance costs)
- Reduced capital additions related to the Cross Generating Station in portfolios that reflect retirement of Cross
- Decommissioning costs when retiring existing coal resources

Costs reported in the 2020 IRP do not include costs for existing debt service, operating costs for transmission and distributions systems, and customer service and administrative and general costs, nor do they reflect revenue for wholesale sales (which are consistent across all simulated cases). In this way, costs reported in the 2020 IRP that are used to compare and identify least-cost resource portfolios include all of the costs that are subject to change between potential portfolios, but do not reflect the full cost of Santee Cooper.

Retirement and Sensitivity Analyses

The 2020 IRP considered two alternative retirement portfolios for the Santee Cooper coal resources. Under each coal retirement portfolio, resource expansion optimization analyses were performed under the Base Case assumptions and under sensitivity case assumptions. The coal resource retirement scenarios include the following.

- **Retire Winyah Portfolios** – Winyah is modeled to be retired in phases, with two of the four generation units being idled by the winter of 2021/2022 and fully retiring all four generating units by 2027.

- **Retire All Coal Portfolios** –The Winyah Plant is retired as described above, and the Cross Plant is retired in phases beginning with Units 1 and 2 retired in 2030 and Units 3 and 4 retired in 2032.

As previously discussed, the 2020 IRP was prepared under a Base Case set of assumptions and under multiple sensitivity case assumptions for variations in pricing for fuel and economy energy markets, implementation of a CO_2 tax, high and low load levels, and variations in the amount of solar resources.

[9] Additionally, an NGCT was allowed to be installed in 2041 if needed to replace long-term PPA purchases that were modeled for the 2031 through 2040 period.

As discussed in more detail in the prior Section 6 of the IRP Report, the evaluated sensitivity cases include the following.

- **Higher/Lower Load** – Higher and lower retail and wholesale loads by one standard deviation of expected load forecast error due to economic uncertainty
- **High Natural Gas and Economy Energy Prices** – 50 percent increase in natural gas prices and an associated increase in economy power prices for market purchases in all years
- **CO_2 Tax** – \$15 per ton price beginning in 2027, increasing annually by \$5 per ton until a cap of \$80 per ton is reached in 2040
- **Lower Level of Solar Resources** – Reduction in planned solar implementation by 500 megawatts

Table 7-1 summarizes the sensitivity cases modeled for the two retirement portfolios.

Table 7-1
Sensitivity Cases by Retirement Portfolio

Sensitivity Case	Retire Winyah	Retire All Coal
High Load Case	✓	–
Low Load Case	✓	✓
High NG Case	✓	✓
CO_2 Tax Case	✓	✓
Lower Solar Case	✓	–

Other Considerations

Over the course of developing its 2020 IRP, Santee Cooper reviewed costs to secure natural gas service through multiple pipeline sources, including over the Dominion pipeline system and through new pipeline laterals tied to the Transco pipeline that could be built either by Transco/Williams, Santee Cooper, or others. Through these analyses, Santee Cooper has identified natural gas supply as a significant resource planning consideration that could affect its decision to develop one potential generation site over another. While the assumptions presented in the IRP Report reflect current reasonable assumptions for the cost of natural gas supply, Santee Cooper is still investigating fuel supply and other considerations that could ultimately affect resource and site selections.

Additionally, Santee Cooper performed analyses to screen and identify preferred generation development sites, including relative costs for transmission upgrades and costs for natural gas supply. Through these analyses, Santee Cooper identified three preferred sites for evaluation within the 2020 IRP—the Winyah Site, the Pee Dee Site, and the Summer Site (see additional site descriptions in the section Resource Expansion Analysis Process, above). Each of these sites were analyzed with unique assumptions for the cost of transmission upgrades, economy energy import limits, and the cost of securing natural gas service. While Santee Cooper considers the modeling of these sites to be reasonable for use in the 2020 IRP, Santee Cooper has not made any final decisions with respect to the development of specific generation sites.

Results of the Resource Expansion Analysis

The following tables summarize results of the Base Case and sensitivity case analyses performed for the 2020 IRP. Table 7-2, below, provides results assuming retirement of the Winyah Generating Station. Table 7-3, below, provides results assuming retirement of all Santee Cooper coal resources (retirement of both Winyah and Cross Generating Stations). The tables depict the resources projected to be built under each retirement portfolio and each Base Case and sensitivity case and the projected present value costs for each case. As discussed above, present value costs depict certain power supply costs that can vary across different resource plans, but do not reflect certain Santee Cooper costs for existing debt and other operating and administrative and general costs that are the same across the resource plans.

By way of example, the results in Table 7-2 can be read as follows. The present value cost of the Base Case is projected to be $24.1 billion over the 2020 to 2060 Study Period. As depicted in the right-most columns of the table, common resources assumed to be built and retired under the Base Case and all sensitivity cases include the idling and retirement of the Winyah coal resources and the installation of RICE, BESS, and DR resources over the Planning Period. Resources listed under the remaining columns for the Base Case and the sensitivity cases depict the resource additions identified through the resource optimization analyses performed for each case.

For each set of assumptions for coal resource retirements and the Base Case and sensitivity case assumptions, the resource expansion analysis performed in the CapEx model was allowed to optimize resource plans specific to the conditions associated with each case. Utilizing this approach, Santee Cooper was able to understand the variability of future power supply costs, recognize how resource expansion portfolios change for specific sensitivity assumptions, and examine whether specific resource expansion decisions were robust and would not change materially with changes in major assumptions. Results and conclusions presented herein were reviewed with Central during the development of the 2020 IRP.

Table 7-2
NPV Power Supply Costs and Resource Expansion Plan - Winyah Retired

	Base Case	Low Load	High Load	High NG Price	CO2 Tax	Lower Solar	Fixed Resource Retirements & Additions		Legend
NPV (2020$)	$24.1 B	$21.9 B	$29.2 B	$25.9 B	$31.9 B	$24.4 B			
	Resource Additions						Resources	Demand Response	
2020								DR 18MW	Retirements
2021							Winyah Coal (290MW)	DR 6MW	NGCC
2022	Solar 75MW	Solar 75MW	Solar 75MW	Solar 75MW	Solar 75MW	Solar 75MW	Winyah Coal (290MW)	DR 6MW	NGCT
			ST Purchase Annual 125MW				Diesel RICE 20MW		SPC LT PPA
2023	Solar 350MW	Solar 350MW	Solar 350MW	Solar 350MW	Solar 350MW	Solar 350MW		DR 8MW	ST Capacity Purchase
			ST Purchase Annual 170MW						Diesel RICE
2024			ST Purchase Annual 220MW					DR 11MW	LM2500
2025	Solar 245MW	Solar 245MW	Solar 245MW	Solar 245MW	Solar 245MW	Solar 245MW		DR 9MW	Solar
			ST Purchase Annual 315MW						BESS
2026	Solar 275MW	Solar 275MW	Solar 275MW	Solar 275MW	Solar 275MW	Solar 275MW	BESS 50MW	DR 12MW	Demand Response
	ST Purchase Annual 10MW		ST Purchase Annual 355MW	ST Purchase Annual 10MW	ST Purchase Annual 10MW	ST Purchase Annual 10MW			
2027	NGCC Summer 552MW	NGCC Summer 552MW	NGCC Summer 552MW	NGCC Summer 552MW	NGCC Summer 552MW	NGCC Summer 552MW	Winyah Coal (570MW)	DR 15MW	
			2xNGCT Summer 696MW						
	LM2500 32MW	LM2500 32MW	LM2500 32MW	LM2500 32MW	LM2500 32MW	LM2500 32MW			
2028	ST Purchase Annual 35MW			ST Purchase Annual 35MW	ST Purchase Annual 35MW	ST Purchase Annual 35MW		DR 7MW	
2029	Solar 305MW	Solar 305MW	Solar 305MW	Solar 305MW	Solar 305MW	Solar 55MW		DR 5MW	
2030	Solar 100MW	Solar 100MW	Solar 100MW	Solar 100MW	Solar 100MW			DR 4MW	
					2xNGCC Summer 1105MW				
2031	Solar 75MW	Solar 75MW	Solar 75MW	Solar 75MW	Solar 75MW			DR 1MW	
	PPA 5MW			PPA 5MW		PPA 5MW			
2032	Solar 75MW	Solar 75MW	Solar 75MW	Solar 75MW	Solar 75MW			DR 2MW	
	PPA 40MW			PPA 40MW		PPA 40MW			
2033			PPA 15MW				BESS 50MW	DR 1MW	
2034	PPA 35MW		Summer NGCT 348MW	PPA 25MW		PPA 25MW		DR 1MW	
2035							BESS 50MW		
2036							BESS 50MW		
2037	PPA 25MW			PPA 30MW		PPA 30MW			
2038	PPA 45MW		PPA 35MW	PPA 50MW		PPA 55MW			
2039	PPA 50MW		PPA 110MW	PPA 50MW		PPA 45MW			
2040	PPA 45MW		PPA 110MW	PPA 45MW		PPA 45MW			

Table 7-3
NPV Power Supply Costs and Resource Expansion Plan - All Coal Retired

	Base Case	Low Load	High NG Price	CO2 Tax	Fixed Resource Retirements & Additions		Legend
NPV (2020$)	$24.7 B	$22.3 B	$28.3 B	$31.3 B	Resources	Demand Response	
	Resource Additions						
2020						DR 18MW	Retirements
2021					Winyah Coal (290MW)	DR 6MW	NGCC
2022	Solar 75MW	Solar 75MW	Solar 75MW	Solar 75MW	Winyah Coal (290MW)	DR 6MW	NGCT
					Diesel RICE 20MW		SPC LT PPA
2023	Solar 350MW	Solar 350MW	Solar 350MW	Solar 350MW		DR 8MW	ST Capacity Purchase
2024						DR 11MW	Diesel RICE
2025	Solar 245MW	Solar 245MW	Solar 245MW	Solar 245MW		DR 9MW	LM2500
2026	Solar 275MW	Solar 275MW	Solar 275MW	Solar 275MW	BESS 50MW	DR 12MW	Solar
	ST Purchase Annual 10MW		ST Purchase Annual 10MW	ST Purchase Annual 10MW			BESS
2027	NGCC Summer 552MW	NGCC Summer 552MW	NGCC Summer 552MW	NGCC Summer 552MW	Winyah Coal (570MW)	DR 15MW	Demand Response
	LM2500 32MW	LM2500 32MW	LM2500 32MW	LM2500 32MW			
2028	ST Purchase Annual 35MW		ST Purchase Annual 35MW	ST Purchase Annual 35MW		DR 7MW	
2029	Solar 305MW	Solar 305MW	Solar 305MW	Solar 305MW		DR 5MW	
2030	Solar 100MW	Solar 100MW	Solar 100MW	Solar 100MW	Cross Coal (1155MW)	DR 4MW	
	2xNGCC Summer 1105MW	NGCC Summer 552MW	2xNGCC Summer 1105MW	2xNGCC Summer 1105MW			
		NGCT Summer 348MW					
2031	Solar 75MW	Solar 75MW	Solar 75MW	Solar 75MW		DR 1MW	
	PPA 55MW		PPA 55MW	PPA 55MW			
2032	Solar 75MW	Solar 75MW	Solar 75MW	Solar 75MW	Coal Cross (1225MW)	DR 2MW	
	NGCC Cross 552MW	NGCC Cross 552MW	NGCC Cross 552MW	NGCC Cross 552MW			
	2xNGCT Cross 696MW	NGCT Cross 348MW	2xNGCT Cross 696MW	2xNGCT Cross 696MW			
	PPA 15MW	PPA 145MW	PPA 15MW	PPA 15MW			
2033					BESS 50MW	DR 1MW	
2034	PPA 25MW		PPA 25MW	PPA 25MW		DR 1MW	
2035					BESS 50MW		
2036					BESS 50MW		
2037	PPA 35MW		PPA 35MW	PPA 35MW			
2038	PPA 45MW		PPA 50MW	PPA 45MW			
2039	PPA 55MW		PPA 55MW	PPA 55MW			
2040	PPA 50MW		PPA 50MW	PPA 50MW			

Conclusions

The following observations and conclusions were drawn from the 2020 IRP study results depicted in Table 7-2 and Table 7-3, above.

1. Across all sensitivity cases and under both of the coal retirement portfolios, the optimized resource portfolio includes an initial NGCC build at the Summer Site (which reflects an assumed joint build of a 2x1 NGCC). This result indicates that a decision to build an initial NGCC in 2027 reflects a robust resource planning decision.
2. Under the low load scenario, resource portfolios depicting a retirement of the Winyah Generating Station are lower cost than resource portfolios that include the retirement of both the Winyah and Cross Generating Stations.
3. Identified resource portfolios are sufficiently flexible to readily accommodate both high and low load scenarios by adapting future resource additions to meet changes in loads. Importantly, all the optimum resource portfolios identified for the high and low load scenarios include an initial NGCC build at the Summer Site in 2027.
4. Under the High NG Price scenario, a resource portfolio that includes the retirement of both the Winyah and Cross Generating Stations results in higher cost than the portfolio with Winyah retirement only, indicating that the Cross resources provide fuel diversity and a hedge against high natural gas prices.
5. Under the CO_2 Tax scenario, a resource portfolio that includes the retirement of both the Winyah and Cross Generating Stations is considerably lower in cost than a portfolio that includes only the retirement of the Winyah Generating Station. Santee Cooper will continue to investigate retiring the Cross Generating Station as an option to mitigate potential future carbon regulation.
6. Under all scenarios other than the CO_2 Tax scenario, resource portfolios depicting a retirement of the Winyah Generating Station are lower in cost than resource portfolios that include the retirement of both the Winyah and Cross Generating Stations.
7. Reducing solar implementation, as assumed in the Lower Solar implementation scenario, results in higher cost.
8. The Summer Site is the preferred site for generation development (under the natural gas transportation assumptions assumed for the 2020 IRP).

Preferred Resource Plan

Based on the results of its 2020 IRP analysis, Santee Cooper's Preferred Resource Plan includes the key elements listed below. The Preferred Resource Plan provides a power supply roadmap that provides reliable service to customers, is based on realistic resource assumptions, can adapt as future conditions change, is not dependent on a single set of assumptions for future conditions, provides more affordable and competitive service to customers relative to other alternatives studied, and improves environmental performance under a wide range of market conditions. This plan assumes retirement of the Winyah Generating Station by 2027 and includes expansion resources depicted above in Table 7-2 for the Base Case set of assumptions. However, other than the initiatives outlined in Section 8, Short-Term Action Plan, Santee Cooper has not made any final decisions with respect to specific resources or development of specific generation sites.

- **Retire Coal Resources**
  - Idle Winyah Units 4 and 3 by the winter 2020/21 and 2021/22, respectively
  - Retire the Winyah Generating Station by 2027
  - Continue operating Cross coal units, but evaluate retirement in the event of additional carbon regulation
- **Increase Natural Gas Resources**
  - Add a new jointly-developed NGCC resource targeted for 2027 and sited near the V. C. Summer Generating Station[10]
  - Continue to engage in market energy purchases (when economic) to further diversify power supply
  - Investigate opportunities for long-term PPA purchases to provide flexibility to meet future load growth and resource need
- **Ensure System Reliability**
  - Add quick-start peaking generating resources near the Conway substation coincident with the retirement of the Winyah generating units (potentially adding 20 megawatts of diesel-fired RICE generating units by 2022, already owned by Santee Cooper, and one LM2500 or similar technology by 2027)
  - Upgrade transmission facilities as needed to support the retirement of the Winyah coal resources and the addition of new natural gas-fired generating resources
- **Increase Solar Resource Implementation**
  - Plan for phased implementation of solar, beginning with 500 megawatts by 2023 through the current solar RFP process
  - Continue phased implementation of solar up to 1000 megawatts by 2026 and 1,500 megawatts by 2032
- **Incorporate Advanced Technologies**
  - Add battery storage technologies in phases to take advantage of technological advancements and expected cost decline
  - Add 50 megawatts of battery storage by 2026, 100 megawatts by 2033, and 200 megawatts by 2036
- **Encourage DSM and DR**
  - Execute Santee Cooper and Central DSM/conservation plans and DR program implementations and consider additional opportunities

[10] Santee Cooper intends to conduct future planning and engineering studies and negotiate supplier arrangements before finalizing any resources or sites to be developed.

Figure 7-1 and Table 7-4, below, depict the supply and demand balance for the Preferred Resource Plan. The Preferred Resource Plan provides for increased diversity of resource types and is designed to closely align future resource additions to future load requirements to minimize Santee Cooper's future capital investments and to provide flexibility in meeting future needs and market conditions.

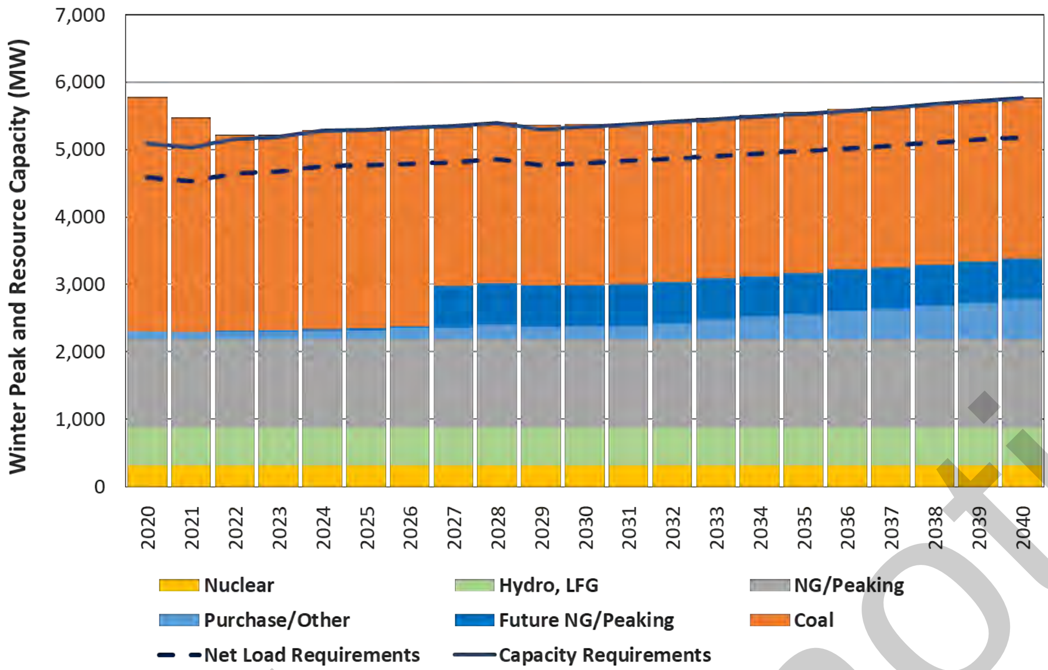

Figure 7-1: Supply and Demand Balance of Preferred Resource Plan

Table 7-4
Supply and Demand Balance - Preferred Resource Plan

Load & Resources	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
System Demand																					
Winter Peak Demand	4,951	4,932	5,071	5,101	5,127	5,140	5,168	5,187	5,233	5,145	5,177	5,210	5,247	5,281	5,316	5,353	5,395	5,433	5,476	5,520	5,561
Less: Non-firm/Interruptible Loads	(308)	(339)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)	(370)
Less: Non-system Wholesale Sales	(52)	(52)	(52)	(52)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Less: Firm Hydro Resources	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)	(389)
Net Peak Demand	4,202	4,152	4,260	4,290	4,368	4,381	4,409	4,428	4,474	4,386	4,418	4,451	4,488	4,522	4,557	4,594	4,636	4,674	4,717	4,761	4,802
Resource Capacity																					
Existing Resources																					
Coal Steam	3,530	3,240	2,950	2,950	2,950	2,950	2,950	2,380	2,380	2,380	2,380	2,380	2,380	2,380	2,380	2,380	2,380	2,380	2,380	2,380	2,380
Nuclear	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322
NGCC/NGCT	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150
Peaking	165	165	165	165	165	165	165	165	165	165	165	165	165	165	165	165	165	165	165	165	165
Landfill Gas	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Hydro	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142
Purchases	89	74	74	74	74	74	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Total	5,427	5,122	4,832	4,832	4,832	4,832	4,794	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224	4,224
Future Resources																					
NGCC	0	0	0	0	0	0	0	560	560	560	560	560	560	560	560	560	560	560	560	560	560
NGCT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peaking	0	0	20	20	20	20	20	52	52	52	52	52	52	52	52	52	52	52	52	52	52
Demand Response	18	24	30	38	49	58	70	84	92	97	101	102	104	105	106	105	105	104	104	104	104
Energy Storage	0	0	0	0	0	0	50	50	50	50	50	50	50	100	100	150	200	200	200	200	200
Purchases	0	0	0	0	0	0	10	0	35	0	0	5	45	45	80	80	80	105	150	200	245
Total	18	24	50	58	69	78	150	746	789	759	763	769	811	862	898	947	997	1,021	1,066	1,116	1,161
Less: Unit-contingent Sales	(52)	(52)	(52)	(52)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Net Capacity	5,393	5,094	4,830	4,838	4,901	4,910	4,944	4,970	5,013	4,983	4,987	4,993	5,035	5,086	5,122	5,171	5,221	5,245	5,290	5,340	5,385
Capacity Reserves																					
Net Peak Demand	4,202	4,152	4,260	4,290	4,368	4,381	4,409	4,428	4,474	4,386	4,418	4,451	4,488	4,522	4,557	4,594	4,636	4,674	4,717	4,761	4,802
Planning Reserves (12%)	504	498	511	515	524	526	529	531	537	526	530	534	539	543	547	551	556	561	566	571	576
Total Capacity Requirements	4,707	4,650	4,771	4,805	4,892	4,907	4,938	4,959	5,011	4,912	4,948	4,985	5,026	5,065	5,104	5,145	5,192	5,235	5,283	5,332	5,378
Total Net Capacity	5,393	5,094	4,830	4,838	4,901	4,910	4,944	4,970	5,013	4,983	4,987	4,993	5,035	5,086	5,122	5,171	5,221	5,245	5,290	5,340	5,385
Capacity Surplus/(Deficiency)	686	443	59	33	9	3	5	10	2	71	38	8	8	21	17	25	28	9	7	8	7
Reserve Margin	28%	23%	13%	13%	12%	12%	12%	12%	12%	14%	13%	12%	12%	12%	12%	13%	13%	12%	12%	12%	12%

This Preferred Resource Plan builds on the beneficial changes to Santee Cooper's projected resource mix established for its Reform Plan completed in 2019. Figure 7-2 illustrates the changes in Santee Cooper's projected energy generation mix for the year 2033 resulting from its Reform Plan and currently projected under the 2020 IRP. The projected change in the generation mix for the Preferred Resource Plan also takes into consideration reductions in the projected cost of coal and natural gas, as well as economy energy available from surrounding utilities.

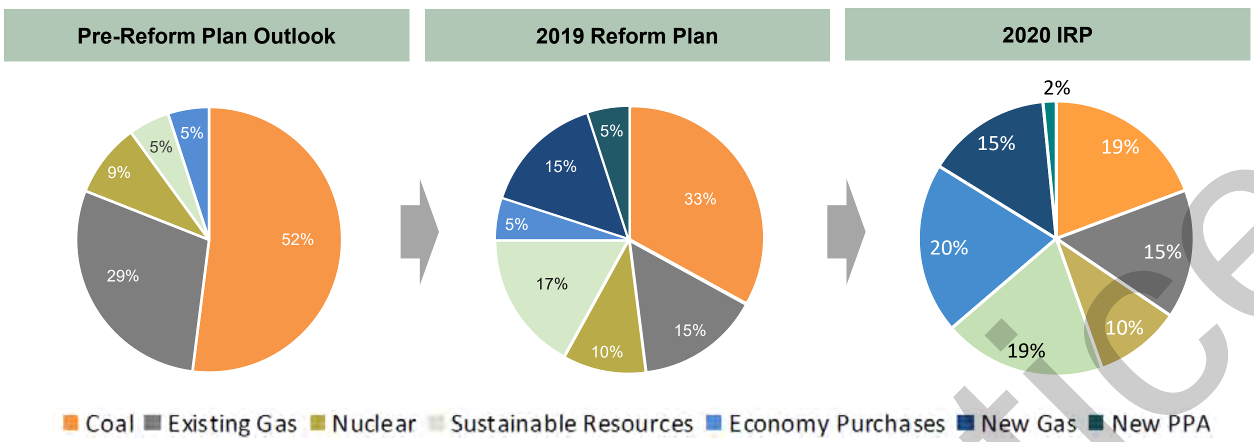

Figure 7-2: Evolution of Projected Santee Cooper Generation Mix for 2033

This evolution in projected generation mix is also accompanied by a considerable improvement in Santee Cooper's CO_2 emissions profile. Figure 7-3 illustrates that improvement by comparing average emissions over 2030-2039 to actual emissions in 2005 and 2015, all as a percentage of the 2005 emissions, which is a common comparative year in the industry for this purpose. The figure reflects a 43 percent reduction in projected emissions relative to 2005 levels for the 2019 Reform Plan and a further 12 percent reduction relative to 2005 for the 2020 IRP, which represents a 20 percent reduction versus the 2019 Reform Plan.

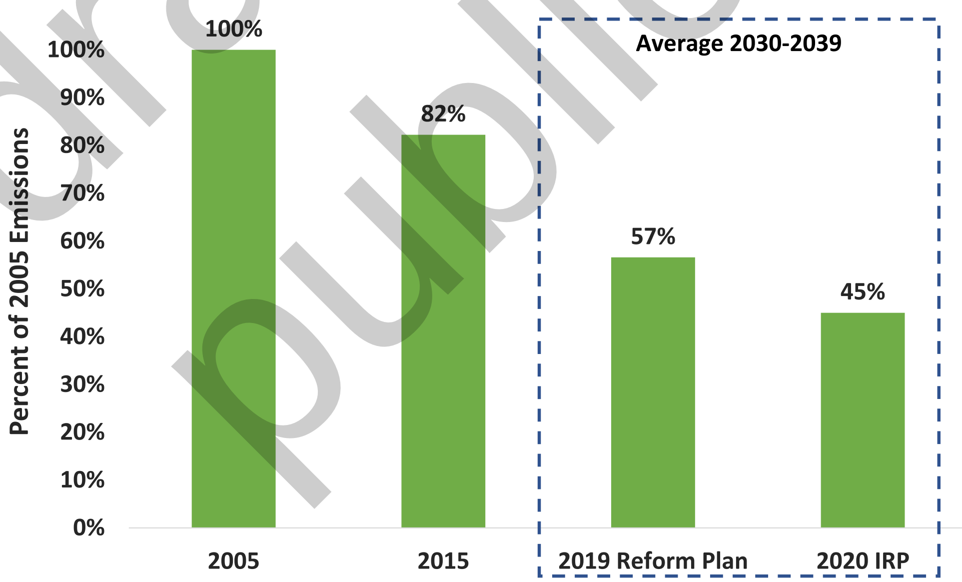

Figure 7-3: Projected CO_2 Emissions of the Santee Cooper System

Section 8
Short-Term Action Plan

The following Short-term Action Plan identifies the activities to be undertaken by Santee Cooper over the next five years to begin implementation of the Preferred Resource Plan documented in Section 7 of this IRP Report, IRP Results & Conclusions.

Current Activities

The following summarizes activities in which Santee Cooper is currently engaged to develop its future resource plans. As previously discussed in Section 3, Santee Cooper IRP Process, Santee Cooper interprets Act 135 to permit the following activities.

- On June 5, 2020, in coordination with Central, Santee Cooper issued a Request for Proposals for Solar Power to secure up to 500 megawatts of utility-scale, low-cost, low environmental impact power through long-term PPA arrangements with solar developers. Evaluation of submitted proposals, initial award, and negotiations are on-going. Santee Cooper intends to secure up to 500 megawatts of solar power through PPAs for installation by 2023.
- Santee Cooper is engaged in activities necessary for the closing and decommissioning of the Winyah Generating Station. Santee Cooper plans to idle Winyah Unit 4 by the winter of 2020/2021 and Unit 3 by the winter of 2021/2022. Santee Cooper continues to evaluate the appropriate timing for the idling of Winyah Units 3 and 4 with consideration of uncertain territorial loads, economies of operation and idling, and technical requirements to idle the generating facilities. Santee Cooper is planning for the retirement of the entire Winyah Generating Station by 2027. To advance these plans, Santee Cooper has developed a staffing plan for the Winyah Generating Station and has begun staff reassignment and reduction efforts. Additionally, future maintenance outage plans and schedules are being modified to accommodate the planned retirement of the station by 2027.
- Santee Cooper is investigating the installation of approximately 20 megawatts of diesel-fired RICE generating resources at a site near the Conway substation by 2022. Current plans call for relocating four RICE units from the V. C. Summer Generating Station to the site near the Conway substation to help support transmission system reliability upon the idling of Winyah Units 3 and 4. The RICE units at the V. C. Summer Generating Station are owned by Santee Cooper but are not currently in service. Santee Cooper is actively performing engineering studies regarding cost, feasibility, and permitting that may be required to relocate the RICE generating units.
- Santee Cooper has begun planning for a demand response program involving the control of residential and commercial retail customers' heat pumps and electric water heaters. Toward that end, Santee Cooper is conducting a procurement process to engage an experienced utility demand response program developer to work with Santee Cooper during initial

planning efforts. The demand response program is anticipated to work in tandem with Santee Cooper's existing conservation voltage reduction system and with similar programs administered by Central.

- Santee Cooper has begun preliminary studies of transmission system upgrades that would be required to support the Preferred Resource Plan documented in Section 7. These analyses have included transmission load flow studies to identify system upgrades required for the development of a new NGCC generating site, potentially near the existing V. C. Summer Generating Station, and preparation of preliminary cost estimates.
- Santee Cooper has begun preliminary discussions with potential teaming partners for the joint development of new generating facilities and fuel supply.

Future Activities and Studies

The following reflect future activities in which Santee Cooper intends to engage to further the development of the Preferred Resource Plan documented in Section 7, IRP Results & Conclusions. Depending on the results of these studies, Santee Cooper may modify its Preferred Resource Plan as part of future IRP filings if more cost-effective resource alternatives and plans are identified. Additionally, Santee Cooper recognizes that certain future activities may be limited by Act 135; Santee Cooper will comply with its obligations established by Act 135 prior to initiating activities that may be impacted by Act 135.

- Prepare engineering studies for the retirement of the coal units at the Winyah Generating Station, including detailed plans and studies for decommissioning, engineering, and permitting.
- Conduct additional studies regarding the integration of solar, up to 1,500 megawatts, and battery storage resources within the Santee Cooper system to better quantify the costs and benefits of operating these resources.
- Continue discussions with potential partners for the joint development of new generating facilities and fuel supply.
- Prepare feasibility studies and evaluations of potential generating sites, including studies of generating resource development and costs, natural gas fuel supply development and arrangements, and electric transmission system upgrade requirements.
- Investigate the feasibility of installing quick-start peaking generating resources at a site near the Conway substation to help support transmission system reliability upon the full retirement of the Winyah Generating Station. An LM2500 aeroderivative combustion turbine was assumed for purposes of the 2020 IRP; however, Santee Cooper has not made any final decisions with respect to specific resources that may be developed for this purpose.

- Investigate the conversion of the existing electric generators at the Winyah Generating Station to operate as synchronous condensers to aid with addressing system reliability upon the full retirement of the Winyah Generating Station.
- Begin discussion with potential natural gas fuel suppliers to identify pipeline facilities and associated costs and charges to supply natural gas to a new generating site and, as warranted, conduct planning, feasibility, engineering, and permitting studies to develop natural gas pipeline facilities.
- Expand analysis of required transmission system upgrades, including submission of transmission service requests and preparation of joint planning studies that may be required prior to the development of a new generating site and, as warranted, conduct planning, feasibility, engineering, and permitting studies for new transmission facilities.
- Continue evaluations of potential DSM and DR programs, including leveraging the 2019 DSM Market Potential Study and conducting additional studies, when needed, and identify implementation scenarios for use in future Santee Cooper IRPs.
- Santee Cooper is investigating the development of a demand response program. Plans are anticipated to identify technologies to be deployed at customers' premises, identify a potential distributed energy resource management system (DERMS), define program incentive levels, develop an effective communication and marketing campaign, and develop a customer implementation and management processes. Santee Cooper intends to operate a demand response program in coordination with its existing conservation voltage reduction system and with similar programs administered by Central. Santee Cooper anticipates implementing a total of 61 megawatts of demand response capability by 2027.
- Develop a stakeholder engagement process in compliance with Act 62 and with consideration of Public Participation guidelines outlined in the consensus IRP Best Practices Guidelines produced by the State Energy Plan IRP Study Committee, as appropriate. Santee Cooper plans to begin development of a stakeholder engagement process in early 2021.[11]

[11] With the compressed schedule since the enactment of Act 135 and onset of COVID-19, Santee Cooper was limited in its ability to engage in a robust stakeholder process for the 2020 IRP. While Santee Cooper engaged with Central in the development of the 2020 IRP, time did not permit engagement of other Santee Cooper customers or community stakeholders. Santee Cooper intends to develop and execute a stakeholder engagement process as part of its next IRP filing.

Appendix A
Transmission System Planning

Transmission Planning Assessments

Santee Cooper performs various transmission system assessments annually in order to determine whether current transmission plans are valid and to provide possible solutions to identified areas of concern on the transmission system. These assessments are conducted by performing a thorough analysis of steady state power flows, facility interrupting capabilities, and total system dynamic performance on the Santee Cooper transmission system. Study efforts test the operation of existing facilities, re-evaluate the current completion dates of existing capital construction projects, and identify additional facilities needed to maintain adequate electric service throughout the system. By annually evaluating future system operation using up-to-date load projections and resource planning assumptions, the installation of new facilities may be effectively scheduled and their need verified in order to make efficient use of Santee Cooper resources in a continuing effort to provide safe, reliable, and economical electrical energy to both wholesale and retail customers.

As outlined in the Power System Coordination and Integration Agreement between Santee Cooper and Central, the transmission assessments performed by Santee Cooper outline transmission expansion and improvement plans for the combined Santee Cooper-Central transmission system, which includes Central-owned facilities within the Santee Cooper Planning Coordinator area, for a forward-looking 10-year planning horizon. The final plan is the result of studies evaluating requirements of the combined Santee Cooper-Central system for adequately supplying the total present and anticipated future transmission system requirements of both parties and for maintaining the integrity of the combined transmission system.

Santee Cooper endeavors to maintain a degree of reliability in electric service that will satisfy customer requirements at a reasonable cost. As a member of SERC, Santee Cooper adheres to regional reliability standards and to the Reliability Standards developed by the North American Electric Reliability Corporation. In order to meet these objectives, Transmission Reliability Criteria have been developed for the Santee Cooper System that are based on North American Electric Reliability Corporation Reliability Standard TPL-001. The primary concerns on the transmission system are that (i) all facilities remain within their continuous ratings, as outlined in Santee Cooper's Transmission Facility Ratings Methodology Document during normal operating conditions, (ii) all facilities remain within their emergency ratings during selected contingency conditions, (iii) the voltage on the transmission system remains within the ratings of the facilities on the system, and (iv) the voltage at the delivery point connection to each customer is within the operating range of standard equipment for the voltage class of the delivery point connection.

The planned retirement of Winyah is expected to require significant investment in the Santee Cooper transmission system. Upgrades to existing facilities and new facility construction are planned to facilitate the retirement of these resources. In addition, network upgrades will be required to provide further transmission system support depending on the type and location of replacement generation being added to the Santee Cooper and adjacent systems.

Santee Cooper has established numerous interconnections with neighboring utilities to enhance reliability and permit economic power transactions. Interconnections are maintained with Duke Energy Progress, Duke Energy Carolinas, Dominion Energy South Carolina, Southern Company, and the Southeastern Power Administration. The interconnected nature of the transmission system also leads to situations where conditions on neighboring systems can impact the reliability of the Santee Cooper transmission system, as well as situations where conditions on the Santee Cooper transmission system can impact the reliability of neighboring systems. Santee Cooper actively coordinates with other utilities in the region to share modeling information to assure that coordinated models reflect expected conditions as accurately as possible to facilitate the most robust assessments possible. Study results are shared between utilities where potential issues are identified and corrective actions coordinated to mitigate the concern where necessary.

Table A-1 provides a list of projects associated with Santee Cooper's current transmission plan. The recommended completion dates reported for each project are based on information available as of the date of this report. Changes in anticipated transmission system operating conditions may result in modifications to these recommendations or to the scope of work outlined for each project.

Table A-1
Current Schedule of Transmission Capital Projects

Project Title	Recommended Completion Date
Bluffton 230-115 kV Substation: Add 115 kV Interconnection Metering Point	5/1/2021
Carnes Crossroads-Harleys Bridge 115 kV Line via McQueen Phase 2	6/1/2021
Carnes Crossroads 230-115 kV Transformer #3	6/1/2021
Series Bus Tie Breakers Hemingway 230 kV	11/1/2021
Purrysburg 230 kV Add Redundant Bus Differential Relays and Series Bus Tie Breakers	12/1/2021
115 kV Quickstart Generator Interconnections	12/1/2021
Rebuild Chiquola Spinners 115 kV Tap Line	12/1/2021
SCE&G-SCPSA Johns Island - Queensboro 115 kV Interconnection	12/31/2021
Replace Capacitor Bank ACI at Carnes Crossroads 230-115 kV Substation	12/31/2021
Charity - Industrial Customer 230 kV #2 Line	12/31/2021
Aiken 230 kV Tie Line with Dominion	12/31/2021
Reconductor North Charleston-Goose Creek 115 kV Line Section	3/31/2022
Aiken 230-115 kV Transformer #2	11/1/2022
Replace Switches at Yemassee 230 kV Switching Station	12/1/2022
Conway 230 kV Switching Station	9/1/2024
Marion-Conway 230 kV Line	9/1/2024
Chime Bell 115 kV Switching Station	12/1/2024
Replace Limiting Elements on Perry Rd - Carolina Forest 115 kV Line	12/1/2024
Kingstree 230 kV Series Bus Tie Breaker	12/1/2024

Project Title	Recommended Completion Date
Conway - Perry Road 230 kV Line	12/1/2025
Carolina Forest 230-115 kV Transformer #2	12/1/2026
Cross - Kingstree #1 and #2 230 kV Breaker and Switch Replacements	12/1/2026
Marion 230 kV Series Bus Tie Breaker	12/1/2026
Replace Limiting Elements on Jefferies-Georgetown #2 115 kV line	12/1/2026
Kingstree - Hemingway 230 kV #2 Line	12/1/2026
Dalzell - Lake City 230 kV Line	12/1/2026
Charity 115 kV Capacitor Banks	12/1/2026
Replace limiting elements on St. George-Orangeburg #1 115 kV line	12/1/2026
Replace limiting elements on Columbia-Lyles 115 kV line section	12/1/2026
Lugoff 230-69 kV Transformer #2	12/1/2027
Rebuild Blythewood-Lugoff 69 kV #1 Line	12/1/2027
Replace relaying on Lugoff - Blythewood #1 69 kV Line	12/1/2027
Bucksville - Conway 230 kV Line	12/1/2028
Varnville to Robertville 69 kV Rebuild to 115 kV	12/1/2028
Wassamassaw 230-115 kV Substation	12/1/2028
Wassamassaw-Pringletown #1 115 kV Line	12/1/2028
Rebuild Perry Road - Myrtle Beach #2 115 kV Line	6/1/2029
Nixons Crossroads - Red Bluff #1 115 kV Line	6/1/2030

Joint Planning Activities

Santee Cooper also participates in joint planning activities with other utilities in the region and the broader Eastern Interconnection to assure reliable operation of the wide-area bulk transmission system. The following is a list of joint study activities Santee Cooper has participated in recently:

- SERC Near-Term Working Group Summer and Winter Reliability Studies
- SERC Near-Term Working Group OASIS Studies
- SERC Long-Term Working Group Reliability Study
- Carolina Transmission Collaboration Agreement Reliability Studies
- South Carolina Regional Transmission Planning Transfer Studies
- Eastern Interconnection Planning Collaborative Low Inertia Model Development

Appendix B
Environmental Compliance Planning

Both the Environmental Protection Agency (EPA) and the Department of Health and Environmental Control (DHEC) have imposed various environmental regulations and permitting requirements affecting Santee Cooper's facilities. These regulations and requirements relate primarily to airborne pollution, the discharge of pollutants into waters, and the disposal of solid and hazardous wastes. Santee Cooper endeavors to ensure its facilities comply with applicable environmental regulations and standards. Federal and state standards and procedures that govern control of the environment and systems operations can change. These changes may arise from legislation, regulatory action, and judicial interpretations regarding the standards, procedures, and requirements for compliance and issuance of permits. Therefore, there is no assurance that units in operation, under construction, or contemplated will remain subject to the regulations that are currently in effect. Furthermore, changes in environmental laws and standards may result in increased capital and operating costs.

Air Quality

General Regulatory Requirements

Santee Cooper is subject to a number of federal and state laws and regulations addressing air quality. The Clean Air Act (CAA) regulates certain air pollutants, including particulate matter, ozone, sulfur dioxide (SO2) and nitrogen oxides (NOx), at Santee Cooper's fossil fuel generating facilities. Mercury is also regulated through the Mercury and Air Toxics Standard (MATS). Emissions of SO2 and NOx are also managed in accordance with the Acid Rain program and the Cross State Air Pollution Rule (CSAPR) through emissions allowance inventories and trading. Santee Cooper is in compliance with these regulatory requirements.

Evolving Regulatory Requirements

Greenhouse Gases

The Clean Power Plan, which established state limits on greenhouse gas emissions, was repealed in 2017. To replace it, the EPA issued the Affordable Clean Energy (ACE) Rule, in June 2019, establishing heat rate improvement (HRI) measures as the best system of emissions reduction (BSER) for CO_2 emissions from existing coal-fired generating units. ACE requires that states establish unit-specific "standards of performance" that reflect the emission limitations achievable through application of the BSER technologies as part of a State plan and requires State plans to be submitted within three years of the date of the final rule. EPA will then have one year to approve a State plan once submitted.

Santee Cooper is currently providing information to the DHEC as it develops unit-specific standards for the State plan. Santee Cooper has already adopted most of the proposed HRI measures at the Cross and Winyah Generating Stations and does not anticipate any significant investment or expenditures to comply with the State plan.

Santee Cooper continues to monitor possible regulatory developments with respect to greenhouse gases.

Water Quality

General Regulatory Requirements

Santee Cooper is subject to a number of federal and state laws and regulations which address water quality. The Clean Water Act (CWA) prohibits the discharge of pollutants, including heat, from point sources into waters of the United States, except as authorized in the National Pollutant Discharge Elimination System (NPDES) permit program. The DHEC has been delegated NPDES permitting authority by the EPA and administers the program for the State. Industrial wastewater discharges from all stations and the regional water plants are governed by NPDES permits. The DHEC also has permitting authority for stormwater discharges and Santee Cooper manages stormwater pursuant to the DHEC issued Industrial General Permits and Construction General Permits.

Evolving Regulatory Requirements

316(b) Fish Protection Regulations

Section 316(b) of the CWA, which became effective on October 15, 2014, requires that NPDES permits for facilities with cooling water intake structures ensure that the structures reflect the Best Technology Available (BTA) to minimize adverse environmental impacts from impingement and entrainment of fish and egg larvae. No significant impacts are expected at the existing Santee Cooper coal and natural gas fired generating stations; therefore, this regulation does not impact the 2020 IRP.

Effluent Limitation Guidelines

An NPDES Steam Electric Effluent Limitation Guidelines (ELG) rule was finalized late in 2020, after numerous revisions and postponements from the original rule issued in 2015. The rule requires stricter performance standards on discharges from coal-fired generating stations, requiring upgrades and installation of additional wastewater treatment systems. The new rule contained a subcategory for facilities facing retirement prior to year-end 2028. Santee Cooper is evaluating this retirement exemption for Winyah, and current financial forecasts assume that the exemption will be taken at Winyah, while the complete suite of flue gas desulfurization (FGD) wastewater treatment equipment will be installed at Cross.

PFAS

While not currently regulated, Santee Cooper is closely following potential regulation of Per- and Polyfluoroalkyl substances (PFAS), which are being extensively studied because of their widespread use and the potential for adverse health outcomes in humans. PFAS are typically found in consumer products such as cookware, cleaning products, and water-repellent fabrics, but can also be found in industrial products such as fire-fighting foams and in the Teflon film that coats many solar panels.

PFAS can contaminate drinking water, ground water and soil. Santee Cooper is assessing its existing facilities to determine if any PFAS exist.

Solid and Hazardous Waste and Hazardous Substances

General Regulatory Requirements

Santee Cooper is subject to federal and state laws and regulations, which address solid, universal, and hazardous wastes and substances. The Resource Conservation and Recovery Act (RCRA), under Subtitle C, is the overarching regulation providing the framework for proper management of hazardous waste, while others include the Clean Water Act (CWA), which imposes penalties for spills of oil or federally-listed hazardous substances into water and for failure to report such spills; the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), which provides for the reporting requirements to cover the release of hazardous substances into the environment and imposes liability upon generators of hazardous substances; and the Superfund Amendments and Reauthorization Act (SARA), which requires compliance with programs for emergency planning and public information. Santee Cooper has comprehensive programs, policies and procedures for on-going compliance in response to these regulations.

Evolving Regulatory Requirements

Coal Combustion Residuals Rule

Santee Cooper generates coal combustion residuals (CCR), including fly ash, bottom ash, scrubber sludge, and gypsum, when coal is combusted to produce electricity. CCR are regulated as a RCRA Subtitle D, nonhazardous waste. The federal CCR Rule establishes compliance standards, such as specific location standards, which has triggered closure of the Santee Cooper surface impoundments that are regulated by the CCR Rule. Santee Cooper has ash and gypsum slurry ponds at the Winyah, Cross, and Jefferies Generating Stations, all of which are regulated by the DHEC and which are closed or undergoing closure. A portion of these ponds are also subject to the CCR Rule, as noted above. Santee Cooper complies with the requirements of the CCR Rule, even as the CCR Rule continues to evolve as new regulations are promulgated.

CCR that can be beneficially reused are considered Coal Combustion Products (CCP), and include fly ash, bottom ash, and FGD products such as gypsum. In order to minimize the CCR that are landfilled, Santee Cooper has entered into contracts for the beneficial use of CCP and continually looks for new markets for excess quantities. As noted previously, Santee Cooper provides gypsum to American Gypsum for their wallboard production requirements. Gypsum and ponded gypsum that do not meet wallboard quality standards are provided to cement companies and the agriculture industry. Additionally, dry fly ash from the operating units and ash reclaimed from the Santee Cooper ash ponds are provided to the cement industry and bottom ash is provided to concrete block manufacturers.

At Cross and Winyah Generating Stations, dry CCR that cannot be beneficially used are disposed of in on-site industrial Class 3 solid waste landfills. These landfills are permitted by the DHEC to receive the Santee Cooper CCR waste from any of Santee Cooper coal-fired generating units and CCR ponds. As noted above, these landfills are also federally regulated under the CCR Rule. Additional landfill cells for the Cross and Winyah Class 3 landfills are already fully permitted and will be constructed as the existing cells are filled and closed in order to provide ongoing landfill capacity.

MEETING OF THE BOARD OF DIRECTORS
WAMPEE CONFERENCE CENTER
PINOPOLIS, SOUTH CAROLINA
MONDAY, March 22, 2021 – 12:45 P.M.

Regular Session

Directors Present: Acting Chairman Dan J. Ray, Directors Kristofer Clark, J. Calhoun Land IV, Stephen H. Mudge, Peggy H. Pinnell, and David F. Singleton

Directors Present by WebEx/Telephone: Directors William A. Finn, Merrell W. Floyd, Charles H. Leaird, and Barry D. Wynn

Staff Members Present: Mark B. Bonsall, President and Chief Executive Officer; Charlie B. Duckworth, Deputy CEO & Chief Planning & Innovation Officer; Pamela J. Williams, Chief Public Affairs Officer & General Counsel; Kenneth W. Lott, Chief Financial & Administration Officer; Mike Poston, Chief Customer Service; Thomas B. Curtis, Chief Generation Officer; Monique Washington, Chief Audit Executive; B. Shawan Gillians, Director Legal Services & Corporate Secretary; Mollie R. Gore, Director Corporate Communications; Suzanne H. Ritter, Treasurer; Marty Watson, Director Supply & Trading; Mike Smith, Director Budget & Pricing; Dan Manes, Controller; Chad Hutson, Manager Industrial & Municipal Services; Carlita Goff, Sr. Manager Distribution Design; Wayne Grace, Desktop Analyst III; Paul Zoeller, Creative Specialist III; John Pearson, Engineering Tech B; Sandra R. Starks, Assistant Corporate Secretary and Crystal Botelho, Executive Assistant to CEO.

Staff Members Present by WebEx/Telephone: Rahul Dembla, Sr. Director Financial & Resource Planning; Dom Maddalone, Sr. Director Innovation & Chief Information Officer; Chris Wagner, Director Transmission Planning; Geoff Penland, Director State & Federal Government Relations; Yvette Rowland, Sr. State & Federal Government Relations Liaison; Steve Pelcher, Deputy General Counsel-Nuclear & Regulatory Compliance; Rebecca A. Roser, Associate General Counsel; Vicky N. Budreau, Sr. Director Customer Service; Michael C. Brown, Director Research & Development; Greg McCormack, Sr. Manager Financial Forecast; Jennifer Wadford, Manager Central Contract Administration.

Also in attendance by WebEx were John T. Lay of Gallivan White & Boyd, Carmen Thomas, Rush Smith, and Matt Bogan of Nelson Mullins, John Painter of nFront and Jon Schneider of Stinson.

An agenda, including the time, date and location of the meeting, was posted on Santee Cooper's website and in the Santee Cooper lobby on Friday, March 19, 2021. The agenda was emailed to all outlets on the media list and to those who requested notice of the meeting on Friday, March 19, 2021. The meeting was live-streamed and archived at https://vimeo.com/527256740.

Acting Chairman Ray presided, and Ms. Starks kept the minutes. Mr. Pearson delivered the invocation, and Ms. Goff led the group in reciting the Pledge of Allegiance.

Upon motion made by Director Singleton, and seconded by Director Finn, the Board voted unanimously to waive reading of the minutes of the January 25, 2021, annual meeting, January 25, 2021 regular board meeting, February 24, 2021 special meeting and adopted the minutes as submitted.

Upon recommendation of the Property Committee, the Board voted unanimously to approve the resolution entitled "Grainger Out Parcels Surplus Property Approval" (Exhibit MB 3-1-21).

Upon recommendation of the Executive-Corporate Planning Committee, the Board voted unanimously to approve the resolution entitled "Retirement of Winyah Units 1, 2, 3 and 4" (Exhibit MB 3-2-21).

Upon recommendation of the Executive-Corporate Planning Committee, the Board voted unanimously to approve the resolution entitled "Authorization to Retain Black and Veatch" (Exhibit MB 3-3-21).

Upon recommendation of the Executive-Corporate Planning Committee, the Board voted unanimously to approve the resolution entitled "Century Aluminum Service Agreement Authorization" (Exhibit MB 3-4-21).

Upon recommendation of the Legal Affairs Committee, the Board voted unanimously to approve the resolution entitled "Authorizing Settlement of Lawsuits: Hearn v. Santee Cooper and Santee Cooper v. National Union Fire Insurance Co." (Exhibit MB 3-5-21).

Upon recommendation of the Legal Affairs Committee, the Board voted unanimously to approve the resolution entitled "Authorizing Settlement Agreement for Century Aluminum and City of Goose Creek" (Exhibit MB 3-6-21).

Upon recommendation of the Finance Committee, the Board voted unanimously to approve the resolution entitled "Withdrawal of Use and Delivery of Customer-Supplied Power Experimental Rate Schedule CSP-16" (Exhibit MB 3-7-21).

Mr. Bonsall presented his President's Report (Exhibit MB 3-8-21). His report included introduction of the IDEA Council team members and community recognition to Ms. Washington and Ms. Stinson ushering in a new era of intentional inclusion, diversity, and equity awareness at the utility. He also gave update on the Winter Storm Uri (assessment for Santee Cooper/South Carolina) - the impacts. Solar PPA status and next steps and SEEM update summary from Mr. Duckworth, ORS submissions from Ms. Williams, broadband update, Berkeley Delivery Points update, audit status, continuing impacts of COVID-19 from Mr. Poston, and Mr. Bonsall gave other updates that included February 2021 Financials, one-year free of preventable motor vehicle accidents (PMVAs), recap of March 17 meeting, 2020AB Refunding highlights, and debt service de-risked and levelized.

There being no further business and upon motion made and seconded, the meeting was adjourned.

Respectfully submitted,

Sandra R. Starks

Sandra R. Starks
Assistant Corporate Secretary

APPROVED:

Dan J. Ray
Acting Chairman

Executive-Corporate Planning Committee*

March 22, 2021

RETIREMENT OF WINYAH UNITS 1, 2, 3 AND 4

Adopted ✓

Rejected ____

Postponed ____

<u>R E S O L U T I O N</u>

WHEREAS, On November 21, 2019, the Board of Directors of the South Carolina Public Service Authority (the "Authority") approved and adopted the Proposal for Reform developed pursuant to the South Carolina General Assembly's Act 95 of 2019 (the "Reform Plan"), which included, among other things, the Authority's plans for generation over the next twenty years and specifically contemplated the retirement of the Winyah Generating Station; and

WHEREAS, The South Carolina General Assembly's Act 135 of 2020 permits the Authority to do certain things necessary for closing and decommissioning the Winyah Generating Station; and

WHEREAS, On December 7, 2020, the Board of Directors authorized construction of a 20MW generating resource in Horry County in furtherance of its plans to retire the Winyah Generating Station; and

WHEREAS, The Authority's management has evaluated the costs of compliance necessary to obtain a new National Pollutant Discharge Elimination System (NPDES) permit for operation of the Winyah Generating Station and the projected generation resource needs for the Authority's system and, based on this assessment, has determined that it is not cost effective to implement the new environmental regulatory measures that may be necessary for the future permitting of the Winyah Generating Station; and

WHEREAS, The Authority's management recommends a retirement plan reflecting closure of Winyah Units 3 and 4 in December 2023 and closure of Winyah Units 1 and 2 in December 2027; and

WHEREAS, The Authority management's evaluation confirms the orderly retirement of the Winyah Generating Station is in the best interests of the Authority and it recommends that the Board of Directors affirmatively authorize the President and CEO to take all actions necessary to effect such retirement; and

WHEREAS, The Board of Directors has considered and appropriately balanced the factors set forth in South Carolina Code Section 58-31-55(A)(3) and has determined that the orderly retirement of the Winyah Generating Station as set forth above is in the best interests of the Authority; now, therefore, be it

RESOLVED, The Board of Directors authorizes and directs the President and CEO to take such actions as he deems necessary or appropriate, subject to the limitations of Act 135, regarding the Winyah Generating Station, including the execution or modification of all agreements, permits and other necessary documents, to effect the orderly retirement of the Winyah Generating Station in accordance with the timeline set forth above, but in any event no later than December 31, 2028 in compliance with the applicable federal regulatory deadlines.

**If approved by the Committee, this resolution will be referred to the full Board for approval.*
This resolution was referred to and approved by the full Board.

Santee Cooper approves new contract with Century Aluminum, sets Winyah retirement deadline

Board also approves preliminary Hearn settlement

Posted March 22, 2021 | Media Contact

MONCKS CORNER, S.C. – The Santee Cooper Board of Directors approved today a new contract with Century Aluminum, providing all electric needs to its Mount Holly plant in Berkeley County through Dec. 31, 2023.

Santee Cooper will serve Century under an experimental rate that takes advantage of incremental power – excess capacity available until Winyah Units 3 and 4 are retired at the end of 2023 (Winyah 4 was idled Dec. 31, 2020.) Because all of Century's load will be served from Santee Cooper resources, the deal also frees up 150 megawatts (MW) of transmission capacity, used by Century under its existing contract, which Santee Cooper can now use for economic wholesale market sales and purchases that will benefit all customers.

The new power agreement allows Century to continue operations at its Mount Holly plant, which employs about 300 people currently and is expected to increase operations and jobs under the new contract.

"Throughout these negotiations, Century's team has worked elbow to elbow with Santee Cooper in developing a unique service agreement that truly benefits all parties," said Mark Bonsall, Santee Cooper president and CEO. "The South Carolina Department of Commerce also played a pivotal role in facilitating this deal, and I thank Secretary Bobby Hitt for supporting the process. The Mount Holly plant is a model of efficiency in its industry, an important employer in this area and a good corporate citizen, and Santee Cooper is pleased to continue to power its success."

The service agreement drew positive reaction from others as well.

South Carolina Commerce Secretary Bobby Hitt said, "Today's announcement is another illustration of the strength of Team SC. Working creatively and collaboratively, Santee Cooper and Century Aluminum were able to come to a balanced, mutually beneficial agreement that is positive for both the long-term prospect of Mount Holly operations and future economic opportunities."

Sen. Brian Adams, R-Berkeley County, said, "The 300 dedicated employees at Mt. Holly are the big winners today. I thank the Commerce Department, Century and Santee Cooper for working together and finding an innovative deal that keeps those jobs and offers the promise of more to come."

Rep. Joe Daning, R-Berkeley, said, "Century and Santee Cooper are both vital members of this community and critical to our economy. I commend them for working hard to accomplish this deal and congratulate the employees at Mount Holly for their outstanding performance that made it possible."

Berkeley County Supervisor Johnny Cribb said, "We are proud that for decades both Santee Cooper and Century Aluminum have called Berkeley County home. These two companies work hand-in-hand to support each other's operations in order to deliver high-quality services to citizens and area industries. Because of their continued partnership under this new contract, quality of life will remain a top priority in our community as job opportunities expand and new investment boosts the County's already-thriving economy."

In conjunction with the new power agreement, Santee Cooper has resolved related litigation through settlement agreements with Century and the City of Goose Creek.

In other matters, the Board approved today a retirement deadline for all Winyah Generating Station units that aligns with new regulatory requirements. Santee Cooper anticipates retiring the four Winyah units by the end of 2027. The Board action requires retiring the station no later than Dec. 31, 2028, which complies with new environmental regulations.

The Board also approved preliminary settlement of a class-action suit related to its canceled plans to build a coal-fired generating station in Florence County (the Pee Dee station). Hearn v. Santee Cooper was filed in 2015, and Santee Cooper agreed to pay the plaintiffs $12.5 million to settle the suit. The settlement terms must still be approved by the Circuit Court in Horry County. In a related action, Santee Cooper filed suit against its then insurer, AIG, which sought to characterize Hearn as a "related wrongful act" to the now-settled Cook litigation, and restrict its coverage. AIG has agreed to pay Santee Cooper $9.7 million to settle that matter.

Santee Cooper

Santee Cooper is South Carolina's largest power provider and the ultimate source of electricity for 2 million people across the state. Through its low-cost, reliable and environmentally responsible electricity and water services, and through innovative partnerships and initiatives that attract and retain industry and jobs, Santee Cooper helps power South Carolina. To learn more, visit **www.santeecooper.com** and follow #PoweringSC on social media.

NPDES Form 2C Update

WINYAH GENERATING STATION

Georgetown County

NPDES Permit # SC0022471

santee cooper

January 28, 2021

TABLE OF CONTENTS

Introduction – General Information

Winyah Generating Station is a coal fired electric generating facility located approximately four miles south of Georgetown, South Carolina. The site is approximately 50 miles northeast of Charleston. Highway access to the site is furnished by S.C. State Route 17 east of the site and Pennyroyal Road (County Rd S-22-42) to the site.

The Winyah Generating Station currently consists of four coal-fired steam electric generating units. Winyah Unit 1 began commercial operation in 1977 producing 290 MW. Winyah Unit 2 began commercial operation in 1975 producing 290 MW. Winyah Unit 3 began commercial operation in 1980 producing 290 MW. Winyah Unit 4 began commercial operation in 1981 producing 290 MW. All the units are equipped with flue gas emission control facilities (selective catalytic reduction (SCR) systems, electrostatic precipitators (ESPs), and wet flue gas desulfurization (WFGD) systems).

Due to United States Environmental Protection Agency (EPA) amendments to the Steam Electric Power Generating Point Source Category Effluent Limitations Guidelines (ELGs), 40 CFR Part 423 and new Coal Combustion Residual (CCR) regulations, 40 CFR Part 257, Subpart D existing inflows into the surface impoundments are being terminated and Wastewater Treatment (WWT) Systems to meet the new EPA regulations will be installed to treat those streams that cannot be eliminated. Additionally, Santee Cooper has constructed one new landfill and is currently working to construct a new landfill within existing Ash Pond A and B once they are closed. Landfill construction will be in accordance with South Carolina (SC) landfill requirements Regulation 61-107.19.

The facility discharges treated wastewater associated with these units and is therefore required to apply for a renewed NPDES permit every five years. Santee Cooper provided a complete NPDES Reapplication package in 2011.

As requested by the Bureau of Water, an updated Form 2C including outfall sampling was completed for Outfall 002 (Cooling Pond Discharge). Santee Cooper hired GEL Laboratories LLC to conduct 2C sampling and analysis to SCDHEC-mandated PQLs at Winyah. Sampling involved only grab samples and took place December 8, 2020 at the cooling pond discharge Outfall 002 sampling point. Resulting chemical concentration data are presented in Form 2C for Outfall 002. Since both Outfalls 001 and 002 are from the same source (cooling pond), for the 2C form, only one grab sample was taken from Outfall 002 which will also serve as representative of Outfall 001.

Acetone, cyclohexane, and xylene has showed up in ash pond process samples at our Cross facility, therefore these three chemicals were also analyzed for in the Effluent Mix Wastewater during the December 2020 sampling event. Neither acetone, cyclohexane, nor xylene were detected in the December 2020 samples. Cyclohexane and xylene are noted as such in the 2C form, however acetone is not on the 2C list.

EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004
	SC0022471	Winyah Generating Station	

Form 2C NPDES

U.S. Environmental Protection Agency
Application for NPDES Permit to Discharge Wastewater
EXISTING MANUFACTURING, COMMERCIAL, MINING, AND SILVICULTURE OPERATIONS

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

Outfall Location

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

Outfall Number	Receiving Water Name	Latitude	Longitude
001	Turkey Creek	33° 19′ 48″	79° 20′ 26″
002	North Santee River	33° 12′ 32″	78° 22′ 58″
		° ′ ″	° ′ ″

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

Line Drawing

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

☑ Yes ☐ No

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

Average Flows and Treatment

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

Outfall Number 001

Operations Contributing to Flow

Operation	Average Flow
Cooling Pond Blowdown to Turkey Creek	0 mgd
Note: Contributing Flows are same as Outfall 002	mgd
See Attachment	mgd
	mgd

Treatment Units

Description (include size, flow rate through each treatment unit, retention time, etc.)	Code from Table 2C-1	Final Disposal of Solid or Liquid Wastes Other Than by Discharge
Heat is removed by evaporation	1-F	NA
Solids are removed by sedimentation	1-U	cooling pond
Oil & Grease is removed by flotation	1-H	cooling pond
pH control	1-K	cooling pond

EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004
	SC0022471	Winyah Generating Station	

Average Flows and Treatment Continued

3.1 cont.

****Outfall Number**** 002

Operations Contributing to Flow

Operation	Average Flow
See Attachment	mgd
	mgd
	mgd
	mgd

Treatment Units

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

****Outfall Number**** __________

Operations Contributing to Flow

Operation	Average Flow
	mgd
	mgd
	mgd
	mgd

Treatment Units

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

System Users

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

☐ Yes ☑ No → SKIP to Section 4.

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

☐ Yes ☐ No

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

Intermittent Flows

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

☑ Yes ☐ No ➔ SKIP to Section 5.

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

Outfall Number	Operation (list)	Frequency		Flow Rate		Duration
		Average Days/Week	Average Months/Year	Long-Term Average	Maximum Daily	
001	See attachment	days/week	months/year	mgd	mgd	days
		days/week	months/year	mgd	mgd	days
		days/week	months/year	mgd	mgd	days
002	see attachment	days/week	months/year	mgd	mgd	days
		days/week	months/year	mgd	mgd	days
		days/week	months/year	mgd	mgd	days
		days/week	months/year	mgd	mgd	days
		days/week	months/year	mgd	mgd	days
		days/week	months/year	mgd	mgd	days

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

Applicable ELGs

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

☑ Yes ☐ No ➔ SKIP to Section 6.

5.2 Provide the following information on applicable ELGs.

ELG Category	ELG Subcategory	Regulatory Citation
Steam Electric	Cooling Tower Blowdown, Landfill Leachate	40 CFR 423.13
Steam Electric	Non-chemical Metal Cleaning, Low volume wastewater	40 CFR 423.13
Steam Electric	FGD Wastewater, Coal Pile Runoff	40 CFR 423.13

Production-Based Limitations

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

☐ Yes ☑ No ➔ SKIP to Section 6.

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

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

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

Upgrades and Improvements

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

☑ Yes ☐ No → SKIP to Item 6.3.

6.2 Briefly identify each applicable project in the table below.

Brief Identification and Description of Project	Affected Outfalls (list outfall number)	Source(s) of Discharge	Final Compliance Dates	
			Required	Projected
FGD Wastewater Compliance	001,002	FGD System	TBD*	TBD*
*FGD WW is due to new 2020 Rule and construction schedules are currently being developed.				

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

☐ Yes ☑ No ☐ Not applicable

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

Effluent and Intake Characteristics

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

Table A. Conventional and Non-Conventional Pollutants

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

☐ Yes ☑ No → SKIP to Item 7.3.

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

Outfall Number _____ Outfall Number _____ Outfall Number _____

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

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

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

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

☑ Yes ☐ No → SKIP to Item 7.8.

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

☑ Yes ☐ No

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

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

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

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

Used or Manufactured Toxics	8.1	Is any pollutant listed in Table B a substance or a component of a substance used or manufactured at your facility as an intermediate or final product or byproduct? ☑ Yes ☐ No ➔ SKIP to Section 9.		
	8.2	List the pollutants below.		
		1. gypsum (trace metals)	4.	7.
		2. flyash (trace metals)	5.	8.
		3. bottom ash (trace metals)	6.	9.

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

Biological Toxicity Tests

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

☑ Yes ☐ No → SKIP to Section 10.

9.2 Identify the tests and their purposes below.

Test(s)	Purpose of Test(s)	Submitted to NPDES Permitting Authority?	Date Submitted
WET	Chronic Toxicity	☑ Yes ☐ No	12/23/2020
		☐ Yes ☐ No	
		☐ Yes ☐ No	

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

Contract Analyses

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

☑ Yes ☐ No → SKIP to Section 11.

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

	Laboratory Number 1	Laboratory Number 2	Laboratory Number 3
Name of laboratory/firm	GEL Laboratories Cert #: 10120001	Pace Analytical Columbia (formerly Shealy Environmental)	Water Systems Inc (843)755-0090 Cert#: 32576
Laboratory address	2040 Savage Rd Charleston, SC 29407	106 Vantage Point Drive W. Columbia, SC 29172	311 Dooley Road Lexington, SC 29073
Phone number	(843) 556-8171	(803) 791-9700	(843) 755-0090
Pollutant(s) analyzed	2C parameters listed on 2C form Oil & Grease Low Level Mercury	Oil & Grease	Toxicity

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

Additional Information

11.1 Has the NPDES permitting authority requested additional information?

☐ Yes ☑ No → SKIP to Section 12.

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

1.	4.
2.	5.
3.	6.

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

Checklist and Certification Statement

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

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

12.2 **Certification Statement**

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

Name (print or type first and last name)	Official title
Jane H. Hood	Sr. Director, Env and Water Systems
Signature	**Date signed**
Jane H Hood	1/29/21

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EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number	Form Approved 03/05/19 OMB No. 2040-0004
SCD097630537	SC0022471	SCPSA Winyah Steam Station	Outfall 002	

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

	Pollutant	Waiver Requested (if applicable)	Units (specify)		Effluent				Intake (Optional)	
					Maximum Daily Discharge (required)	Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
☐	Check here if you have applied to your NPDES permitting authority for a waiver for *all* of the pollutants listed on this table for the noted outfall.									
1.	Biochemical oxygen demand (BOD_5)	☐	Concentration	mg/L	< 60.0	NA	NA	1	NA	NA
			Mass	lbs/day	< 1,887.8	NA	NA	1	NA	NA
2.	Chemical oxygen demand (COD)	☐	Concentration	mg/L	43.9	NA	NA	1	NA	NA
			Mass	lbs/day	1,381.3	NA	NA	1	NA	NA
3.	Total organic carbon (TOC)	☐	Concentration	mg/L	8.45	NA	NA	1	NA	NA
			Mass	lbs/day	265.9	NA	NA	1	NA	NA
4.	Total suspended solids (TSS)	☐	Concentration	mg/L	17.3	12.95	7.03	46	NA	NA
			Mass	lbs/day	151.34	NA	NA	1	NA	NA
5.	Ammonia (as N)	☐	Concentration	mg/L	0.239	NA	NA	1	NA	NA
			Mass	lbs/day	7.520	NA	NA	1	NA	NA
6.	Flow	☐	Rate	MGD	3.99	3.98	3.02	CONT	NA	NA
7.	Temperature (winter)	☐	°C	°C	25.5	19.4	18.6	CONT	NA	NA
	Temperature (summer)	☐	°C	°C	36.1	36.1	34.1	CONT	NA	NA
8.	pH (minimum)	☐	Standard units	s.u.	7.2	NA	NA	24	NA	NA
	pH (maximum)	☐	Standard units	s.u.	8.2	NA	NA	23	NA	NA

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

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EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number	
SCD097630537	SC0022471	SCPSA Winyah Steam Station	Outfall 002	Form Approved 03/05/19 OMB No. 2040-0004

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

	Pollutant/Parameter (and CAS Number, if available)	Testing Required	Presence or Absence (check one)		Units (specify)		Effluent					Intake (optional)	
			Believed Present	Believed Absent			Maximum Daily Discharge (required)		Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
☐	Check here if you qualify as a small business per the instructions to Form 2C and, therefore, do not need to submit quantitative data for any of the organic toxic pollutants in Sections 2 through 5 of this table. Note, however, that you must still indicate in the appropriate column of this table if you believe any of the pollutants listed are present in your discharge.												
Section 1. Toxic Metals, Cyanide, and Total Phenols													
1.1	Antimony, total (7440-36-0)	☐	☐	☑	Concentration	µg/L	<	5.00	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.157	NA	NA	1	NA	NA
1.2	Arsenic, total (7440-38-2)	☐	☑	☐	Concentration	µg/L		26	24	10.5	25	NA	NA
					Mass	lbs/day		0.475	NA	NA	1	NA	NA
1.3	Beryllium, total (7440-41-7)	☐	☐	☑	Concentration	µg/L	<	1.00	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.031	NA	NA	1	NA	NA
1.4	Cadmium, total (7440-43-9)	☐	☐	☑	Concentration	µg/L	<	0.100	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.003	NA	NA	1	NA	NA
1.5	Chromium, total (7440-47-3)	☐	☐	☑	Concentration	µg/L	<	5.00	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.157	NA	NA	1	NA	NA
1.6	Copper, total (7440-50-8)	☐	☐	☑	Concentration	µg/L	<	10.0	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.315	NA	NA	1	NA	NA
1.7	Lead, total (7439-92-1)	☐	☐	☑	Concentration	µg/L	<	2.00	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.063	NA	NA	1	NA	NA
1.8	Mercury, total (7439-97-6)	☐	☑	☐	Concentration	µg/L		0.02220	0.02220	0.01084	4	NA	NA
					Mass	lbs/day		3.03E-04	NA	NA	1	NA	NA
1.9	Nickel, total (7440-02-0)	☐	☐	☑	Concentration	µg/L	<	10.0	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.315	NA	NA	1	NA	NA
1.10	Selenium, total (7782-49-2)	☐	☑	☐	Concentration	µg/L		9.58	NA	NA	1	NA	NA
					Mass	lbs/day		0.301	NA	NA	1	NA	NA
1.11	Silver, total (7440-22-4)	☐	☐	☑	Concentration	µg/L	<	5.00	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.157	NA	NA	1	NA	NA

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number	Form Approved 03/05/19 OMB No. 2040-0004
SCD097630537	SC0022471	SCPSA Winyah Steam Station	Outfall 002	

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

	Pollutant/Parameter (and CAS Number, if available)	Testing Required	Presence or Absence (check one)		Units (specify)		Effluent				Intake (optional)	
			Believed Present	Believed Absent			Maximum Daily Discharge (required)	Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
1.12	Thallium, total (7440-28-0)	☐	☐	☑	Concentration	µg/L	< 0.500	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.016	NA	NA	1	NA	NA
1.13	Zinc, total (7440-66-6)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
1.14	Cyanide, total (57-12-5)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
1.15	Phenols, total	☐	☐	☑	Concentration	µg/L	< 5.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.157	NA	NA	1	NA	NA
Section 2. Organic Toxic Pollutants (GC/MS Fraction—Volatile Compounds)												
2.1	Acrolein (107-02-8)	☑	☐	☑	Concentration	µg/L	< 5.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.157	NA	NA	1	NA	NA
2.2	Acrylonitrile (107-13-1)	☑	☐	☑	Concentration	µg/L	< 5.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.157	NA	NA	1	NA	NA
2.3	Benzene (71-43-2)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.063	NA	NA	1	NA	NA
2.4	Bromoform (75-25-2)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.063	NA	NA	1	NA	NA
2.5	Carbon tetrachloride (56-23-5)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.063	NA	NA	1	NA	NA
2.6	Chlorobenzene (108-90-7)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.063	NA	NA	1	NA	NA
2.7	Chlorodibromomethane (124-48-1)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.063	NA	NA	1	NA	NA
2.8	Chloroethane (75-00-3)	☑	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.063	NA	NA	1	NA	NA

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number	
SCD097630537	SC0022471	SCPSA Winyah Steam Station	Outfall 002	Form Approved 03/05/19 OMB No. 2040-0004

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

	Pollutant/Parameter (and CAS Number, if available)	Testing Required	Presence or Absence (check one)		Units (specify)		Effluent					Intake (optional)	
			Believed Present	Believed Absent			Maximum Daily Discharge (required)		Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
2.9	2-chloroethylvinyl ether (110-75-8)	☑	☐	☑	Concentration	µg/L	<	5.00	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.157	NA	NA	1	NA	NA
2.10	Chloroform (67-66-3)	☑	☐	☑	Concentration	µg/L	<	2.00	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.063	NA	NA	1	NA	NA
2.11	Dichlorobromomethane (75-27-4)	☑	☐	☑	Concentration	µg/L	<	2.00	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.063	NA	NA	1	NA	NA
2.12	1,1-dichloroethane (75-34-3)	☑	☐	☑	Concentration	µg/L	<	2.00	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.063	NA	NA	1	NA	NA
2.13	1,2-dichloroethane (107-06-2)	☑	☐	☑	Concentration	µg/L	<	2.00	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.063	NA	NA	1	NA	NA
2.14	1,1-dichloroethylene (75-35-4)	☑	☐	☑	Concentration	µg/L	<	2.00	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.063	NA	NA	1	NA	NA
2.15	1,2-dichloropropane (78-87-5)	☑	☐	☑	Concentration	µg/L	<	2.00	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.063	NA	NA	1	NA	NA
2.16	1,3-dichloropropylene (542-75-6)	☑	☐	☑	Concentration	µg/L	<	2.00	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.063	NA	NA	1	NA	NA
2.17	Ethylbenzene (100-41-4)	☑	☐	☑	Concentration	µg/L	<	2.00	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.063	NA	NA	1	NA	NA
2.18	Methyl bromide (74-83-9)	☑	☐	☑	Concentration	µg/L	<	2.00	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.063	NA	NA	1	NA	NA
2.19	Methyl chloride (74-87-3)	☑	☐	☑	Concentration	µg/L	<	2.00	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.063	NA	NA	1	NA	NA
2.20	Methylene chloride (75-09-2)	☑	☐	☑	Concentration	µg/L	<	2.00	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.063	NA	NA	1	NA	NA
2.21	1,1,2,2- tetrachloroethane (79-34-5)	☑	☐	☑	Concentration	µg/L	<	2.00	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.063	NA	NA	1	NA	NA

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number	Form Approved 03/05/19 OMB No. 2040-0004
SCD097630537	SC0022471	SCPSA Winyah Steam Station	Outfall 002	

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

	Pollutant/Parameter (and CAS Number, if available)	Testing Required	Presence or Absence (check one)		Units (specify)		Effluent				Intake (optional)	
			Believed Present	Believed Absent			Maximum Daily Discharge (required)	Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
2.22	Tetrachloroethylene (127-18-4)	☑	☐	☑	Concentration	μg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.063	NA	NA	1	NA	NA
2.23	Toluene (108-88-3)	☑	☐	☑	Concentration	μg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.063	NA	NA	1	NA	NA
2.24	1,2-trans-dichloroethylene (156-60-5)	☑	☐	☑	Concentration	μg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.063	NA	NA	1	NA	NA
2.25	1,1,1-trichloroethane (71-55-6)	☑	☐	☑	Concentration	μg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.063	NA	NA	1	NA	NA
2.26	1,1,2-trichloroethane (79-00-5)	☑	☐	☑	Concentration	μg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.063	NA	NA	1	NA	NA
2.27	Trichloroethylene (79-01-6)	☑	☐	☑	Concentration	μg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.063	NA	NA	1	NA	NA
2.28	Vinyl chloride (75-01-4)	☑	☐	☑	Concentration	μg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.063	NA	NA	1	NA	NA
Section 3. Organic Toxic Pollutants (GC/MS Fraction—Acid Compounds)												
3.1	2-chlorophenol (95-57-8)	☑	☐	☑	Concentration	μg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
3.2	2,4-dichlorophenol (120-83-2)	☑	☐	☑	Concentration	μg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
3.3	2,4-dimethylphenol (105-67-9)	☑	☐	☑	Concentration	μg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
3.4	4,6-dinitro-o-cresol (534-52-1)	☑	☐	☑	Concentration	μg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
3.5	2,4-dinitrophenol (51-28-5)	☑	☐	☑	Concentration	μg/L	< 50.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 1.573	NA	NA	1	NA	NA

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

	Pollutant/Parameter (and CAS Number, if available)	Testing Required	Presence or Absence (check one)		Units (specify)		Effluent				Intake (optional)	
			Believed Present	Believed Absent			Maximum Daily Discharge (required)	Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
3.6	2-nitrophenol (88-75-5)	☑	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
3.7	4-nitrophenol (100-02-7)	☑	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
3.8	p-chloro-m-cresol (59-50-7)	☑	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
3.9	Pentachlorophenol (87-86-5)	☑	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
3.10	Phenol (108-95-2)	☑	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
3.11	2,4,6-trichlorophenol (88-05-2)	☑	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
Section 4. Organic Toxic Pollutants (GC/MS Fraction—Base /Neutral Compounds)												
4.1	Acenaphthene (83-32-9)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.2	Acenaphthylene (208-96-8)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.3	Anthracene (120-12-7)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.4	Benzidine (92-87-5)	☐	☐	☑	Concentration	µg/L	< 100	NA	NA	1	NA	NA
					Mass	lbs/day	< 3.15	NA	NA	1	NA	NA
4.5	Benzo (a) anthracene (56-55-3)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.6	Benzo (a) pyrene (50-32-8)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA

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

	Pollutant/Parameter (and CAS Number, if available)	Testing Required	Presence or Absence (check one)		Units (specify)		Effluent				Intake (optional)	
			Believed Present	Believed Absent			Maximum Daily Discharge (required)	Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
4.7	3,4-benzofluoranthene (205-99-2)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.8	Benzo (ghi) perylene (191-24-2)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.9	Benzo (k) fluoranthene (207-08-9)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.10	Bis (2-chloroethoxy) methane	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.11	Bis (2-chloroethyl) ether (111-44-4)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.12	Bis (2-chloroisopropyl) ether (102-80-1)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.13	Bis (2-ethylhexyl) phthalate (117-81-7)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.14	4-bromophenyl phenyl ether (101-55-3)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.15	Butyl benzyl phthalate (85-68-7)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.16	2-chloronaphthalene (91-58-7)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.17	4-chlorophenyl phenyl ether (7005-72-3)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.18	Chrysene (218-01-9)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.19	Dibenzo (a,h) anthracene (53-70-3)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA

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

	Pollutant/Parameter (and CAS Number, if available)	Testing Required	Presence or Absence (check one)		Units (specify)		Effluent				Intake (optional)	
			Believed Present	Believed Absent			Maximum Daily Discharge (required)	Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
4.20	1,2-dichlorobenzene (95-50-1)	☐	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.063	NA	NA	1	NA	NA
4.21	1,3-dichlorobenzene (541-73-1)	☐	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.063	NA	NA	1	NA	NA
4.22	1,4-dichlorobenzene (106-46-7)	☐	☐	☑	Concentration	µg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.063	NA	NA	1	NA	NA
4.23	3,3-dichlorobenzidine (91-94-1)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.24	Diethyl phthalate (84-66-2)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.25	Dimethyl phthalate (131-11-3)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.26	Di-n-butyl phthalate (84-74-2)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.27	2,4-dinitrotoluene (121-14-2)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.28	2,6-dinitrotoluene (606-20-2)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.29	Di-n-octyl phthalate (117-84-0)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.30	1,2-Diphenylhydrazine(as azobenzene) (122-66-7)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.31	Fluoranthene (206-44-0)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA
4.32	Fluorene (86-73-7)	☐	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.315	NA	NA	1	NA	NA

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	Pollutant/Parameter (and CAS Number, if available)	Testing Required	Presence or Absence (check one)		Units (specify)		Effluent					Intake (optional)	
			Believed Present	Believed Absent			Maximum Daily Discharge (required)		Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
4.33	Hexachlorobenzene (118-74-1)	☐	☐	☑	Concentration	µg/L	<	10.0	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.315	NA	NA	1	NA	NA
4.34	Hexachlorobutadiene (87-68-3)	☐	☐	☑	Concentration	µg/L	<	10.0	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.315	NA	NA	1	NA	NA
4.35	Hexachlorocyclopentadiene (77-47-4)	☐	☐	☑	Concentration	µg/L	<	10.0	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.315	NA	NA	1	NA	NA
4.36	Hexachloroethane (67-72-1)	☐	☐	☑	Concentration	µg/L	<	10.0	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.315	NA	NA	1	NA	NA
4.37	Indeno (1,2,3-cd) pyrene (193-39-5)	☐	☐	☑	Concentration	µg/L	<	10.0	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.315	NA	NA	1	NA	NA
4.38	Isophorone (78-59-1)	☐	☐	☑	Concentration	µg/L	<	10.0	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.315	NA	NA	1	NA	NA
4.39	Naphthalene (91-20-3)	☐	☐	☑	Concentration	µg/L	<	10.0	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.315	NA	NA	1	NA	NA
4.40	Nitrobenzene (98-95-3)	☐	☐	☑	Concentration	µg/L	<	10.0	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.315	NA	NA	1	NA	NA
4.41	N-nitrosodimethylamine (62-75-9)	☐	☐	☑	Concentration	µg/L	<	10.0	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.315	NA	NA	1	NA	NA
4.42	N-nitrosodi-n-propylamine (621-64-7)	☐	☐	☑	Concentration	µg/L	<	10.0	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.315	NA	NA	1	NA	NA
4.43	N-nitrosodiphenylamine (86-30-6)	☐	☐	☑	Concentration	µg/L	<	10.0	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.315	NA	NA	1	NA	NA
4.44	Phenanthrene (85-01-8)	☐	☐	☑	Concentration	µg/L	<	10.0	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.315	NA	NA	1	NA	NA
4.45	Pyrene 129-00-0)	☐	☐	☑	Concentration	µg/L	<	10.0	NA	NA	1	NA	NA
					Mass	lbs/day	<	0.315	NA	NA	1	NA	NA

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

	Pollutant/Parameter (and CAS Number, if available)	Testing Required	Presence or Absence (check one)		Units (specify)		Effluent				Intake (optional)	
			Believed Present	Believed Absent			Maximum Daily Discharge (required)	Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
4.46	1,2,4-trichlorobenzene (120-82-1)	☐	☐	☑	Concentration	μg/L	< 2.00	NA	NA	1	NA	NA
					Mass	lbs/day	< 0.063	NA	NA	1	NA	NA
Section 5. Organic Toxic Pollutants (GC/MS Fraction—Pesticides)												
5.1	Aldrin (309-00-2)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.2	α-BHC (319-84-6)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.3	β-BHC (319-85-7)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.4	γ-BHC (58-89-9)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.5	δ-BHC (319-86-8)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.6	Chlordane (57-74-9)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.7	4,4'-DDT (50-29-3)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.8	4,4'-DDE (72-55-9)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.9	4,4'-DDD (72-54-8)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.10	Dieldrin (60-57-1)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA
5.11	α-endosulfan (115-29-7)	☐	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
					Mass	NA	NA	NA	NA	NA	NA	NA

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

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

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

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

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

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SCD097630537	SC0022471	SCPSA Winyah Steam Station	Outfall 002	Form Approved 03/05/19 OMB No. 2040-0004

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

	Pollutant	Presence or Absence (check one)		Units (specify)		Effluent				Intake (Optional)	
		Believed Present	**Believed Absent**			**Maximum Daily Discharge** (required)	**Maximum Monthly Discharge** (if available)	**Long-Term Average Daily Discharge** (if available)	**Number of Analyses**	**Long-Term Average Value**	**Number of Analyses**
☐	Check here if you believe all pollutants on Table C to be ***present*** in your discharge from the noted outfall. You need *not* complete the "Presence or Absence" column of Table C for *each* pollutant.										
☐	Check here if you believe all pollutants on Table C to be ***absent*** in your discharge from the noted outfall. You need *not* complete the "Presence or Absence" column of Table C for *each* pollutant.										
1.	Bromide (24959-67-9)	☑	☐	Concentration	mg/L	8.90	NA	NA	1	NA	NA
				Mass	lbs/day	280.03	NA	NA	1	NA	NA
2.	Chlorine, total residual	☑	☐	Concentration	mg/L	0.09	NA	NA	1	NA	NA
				Mass	lbs/day	2.83	NA	NA	1	NA	NA
3.	Color	☑	☐	Concentration	PCU	25.0	NA	NA	1	NA	NA
				Mass	NA	NA	NA	NA	NA	NA	NA
4.	Fecal coliform	☐	☑	Concentration	NA	NA	NA	NA	NA	NA	NA
				Mass	NA	NA	NA	NA	NA	NA	NA
5.	Fluoride (16984-48-8)	☑	☐	Concentration	mg/L	2.58	NA	NA	1	NA	NA
				Mass	lbs/day	81.18	NA	NA	1	NA	NA
6	Nitrate-nitrite	☑	☐	Concentration	mg/L	0.0414	NA	NA	1	NA	NA
				Mass	lbs/day	1.30	NA	NA	1	NA	NA
7.	Nitrogen, total organic (as N)	☑	☐	Concentration	mg/L	0.901	NA	NA	1	NA	NA
				Mass	lbs/day	28.35	NA	NA	1	NA	NA
8.	Oil and grease	☐	☑	Concentration	mg/L	< 5.00	< 5.00	< 5.00	26	NA	NA
				Mass	lbs/day	< 157.32	NA	NA	1	NA	NA
9.	Phosphorus (as P), total (7723-14-0)	☐	☑	Concentration	mg/L	< 0.050	NA	NA	1	NA	NA
				Mass	lbs/day	< 1.57	NA	NA	1	NA	NA
10.	Sulfate (as SO4) (14808-79-8)	☑	☐	Concentration	mg/L	796	NA	NA	1	NA	NA
				Mass	lbs/day	25,045	NA	NA	1	NA	NA
11.	Sulfide (as S)	☐	☑	Concentration	mg/L	< 0.100	NA	NA	1	NA	NA
				Mass	lbs/day	< 3.146	NA	NA	1	NA	NA

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number
SCD097630537	SC0022471	SCPSA Winyah Steam Station	Outfall 002

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

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

	Pollutant	Presence or Absence (check one)		Units (specify)		Effluent				Intake (Optional)	
		Believed Present	Believed Absent			Maximum Daily Discharge (required)	Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
12.	Sulfite (as SO_3) (14265-45-3)	☐	☑	Concentration	mg/L	< 2.00	NA	NA	1	NA	NA
				Mass	lbs/day	< 62.93	NA	NA	1	NA	NA
13.	Surfactants	☐	☑	Concentration	mg/L	< 0.050	NA	NA	1	NA	NA
				Mass	lbs/day	< 1.57	NA	NA	1	NA	NA
14.	Aluminum, total (7429-90-5)	☐	☑	Concentration	µg/L	< 50.0	NA	NA	1	NA	NA
				Mass	lbs/day	< 1.57	NA	NA	1	NA	NA
15.	Barium, total (7440-39-3)	☑	☐	Concentration	µg/L	78.5	NA	NA	1	NA	NA
				Mass	lbs/day	2.47	NA	NA	1	NA	NA
16.	Boron, total (7440-42-8)	☑	☐	Concentration	µg/L	9,990	NA	NA	1	NA	NA
				Mass	lbs/day	314.33	NA	NA	1	NA	NA
17.	Cobalt, total (7440-48-4)	☐	☑	Concentration	µg/L	< 20.0	NA	NA	1	NA	NA
				Mass	lbs/day	< 0.63	NA	NA	1	NA	NA
18.	Iron, total (7439-89-6)	☑	☐	Concentration	µg/L	315	NA	NA	1	NA	NA
				Mass	lbs/day	9.91	NA	NA	1	NA	NA
19.	Magnesium, total (7439-95-4)	☑	☐	Concentration	µg/L	73,000	NA	NA	1	NA	NA
				Mass	lbs/day	2,297	NA	NA	1	NA	NA
20.	Molybdenum, total (7439-98-7)	☑	☐	Concentration	µg/L	40.7	NA	NA	1	NA	NA
				Mass	lbs/day	1.28	NA	NA	1	NA	NA
21.	Manganese, total (7439-96-5)	☑	☐	Concentration	µg/L	406	NA	NA	1	NA	NA
				Mass	lbs/day	12.77	NA	NA	1	NA	NA
22.	Tin, total (7440-31-5)	☐	☑	Concentration	µg/L	< 10.0	NA	NA	1	NA	NA
				Mass	lbs/day	< 0.31	NA	NA	1	NA	NA
23.	Titanium, total (7440-32-6)	☐	☑	Concentration	µg/L	< 50.0	NA	NA	1	NA	NA
				Mass	lbs/day	< 1.57	NA	NA	1	NA	NA

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number
SCD097630537	SC0022471	SCPSA Winyah Steam Station	Outfall 002

Form Approved 03/05/19
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TABLE C. CERTAIN CONVENTIONAL AND NON CONVENTIONAL POLLUTANTS (40 CFR 122.21(g)(7)(vi))[1]

	Pollutant	Presence or Absence (check one)		Units (specify)		Effluent				Intake (Optional)	
		Believed Present	Believed Absent			Maximum Daily Discharge (required)	Maximum Monthly Discharge (if available)	Long-Term Average Daily Discharge (if available)	Number of Analyses	Long-Term Average Value	Number of Analyses
24.	**Radioactivity**										
	Alpha, total	☑	☐	Concentration	pCi/L	7.48	NA	NA	1	NA	NA
				Mass	NA	NA	NA	NA	NA	NA	NA
	Beta, total	☑	☐	Concentration	pCi/L	10.0	NA	NA	1	NA	NA
				Mass	NA	NA	NA	NA	NA	NA	NA
	Radium, total	☐	☑	Concentration	pCi/L	< 10.0	NA	NA	1	NA	NA
				Mass	NA	NA	NA	NA	NA	NA	NA
	Radium 226, total	☐	☑	Concentration	pCi/L	< 10.0	NA	NA	1	NA	NA
				Mass	NA	NA	NA	NA	NA	NA	NA

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

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EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number	Form Approved 03/05/19 OMB No. 2040-0004
SCD097630537	SC0022471	SCPSA Winyah Steam Station	Outfall 002	

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

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

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number	
SCD097630537	SC0022471	SCPSA Winyah Steam Station	Outfall 002	Form Approved 03/05/19 OMB No. 2040-0004

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

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

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number	Form Approved 03/05/19 OMB No. 2040-0004
SCD097630537	SC0022471	SCPSA Winyah Steam Station	Outfall 002	

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

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

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number	Form Approved 03/05/19 OMB No. 2040-0004
SCD097630537	SC0022471	SCPSA Winyah Steam Station	Outfall 002	

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

	Pollutant	Presence or Absence (check one)		Reason Pollutant Believed Present in Discharge	Available Quantitative Data (specify units)
		Believed Present	Believed Absent		
58.	Phenolsulfonate	☐	☑	NA	NA
59.	Phosgene	☐	☑	NA	NA
60.	Propargite	☐	☑	NA	NA
61.	Propylene oxide	☐	☑	NA	NA
62.	Pyrethrins	☐	☑	NA	NA
63.	Quinoline	☐	☑	NA	NA
64.	Resorcinol	☐	☑	NA	NA
65.	Strontium	☑	☐	Analysis of permit renewal samples	1,860 µg/L
66.	Strychnine	☐	☑	NA	NA
67.	Styrene	☐	☑	NA	NA
68.	2,4,5-T (2,4,5-trichlorophenoxyacetic	☐	☑	NA	NA
69.	TDE (tetrachlorodiphenyl ethane)	☐	☑	NA	NA
70.	2,4,5-TP [2-(2,4,5-trichlorophenoxy)	☐	☑	NA	NA
71.	Trichlorofon	☐	☑	NA	NA
72.	Triethanolamine	☐	☑	NA	NA
73.	Triethylamine	☐	☑	NA	NA
74.	Trimethylamine	☐	☑	NA	NA
75.	Uranium	☑	☐	Analysis of permit renewal samples	1.72 µg/L
76.	Vanadium	☐	☑	NA	< 10.0 µg/L

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number	Form Approved 03/05/19 OMB No. 2040-0004
SCD097630537	SC0022471	SCPSA Winyah Steam Station	Outfall 002	

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

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

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

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EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number
SCD097630537	SC0022471	SCPSA Winyah Steam Station	002

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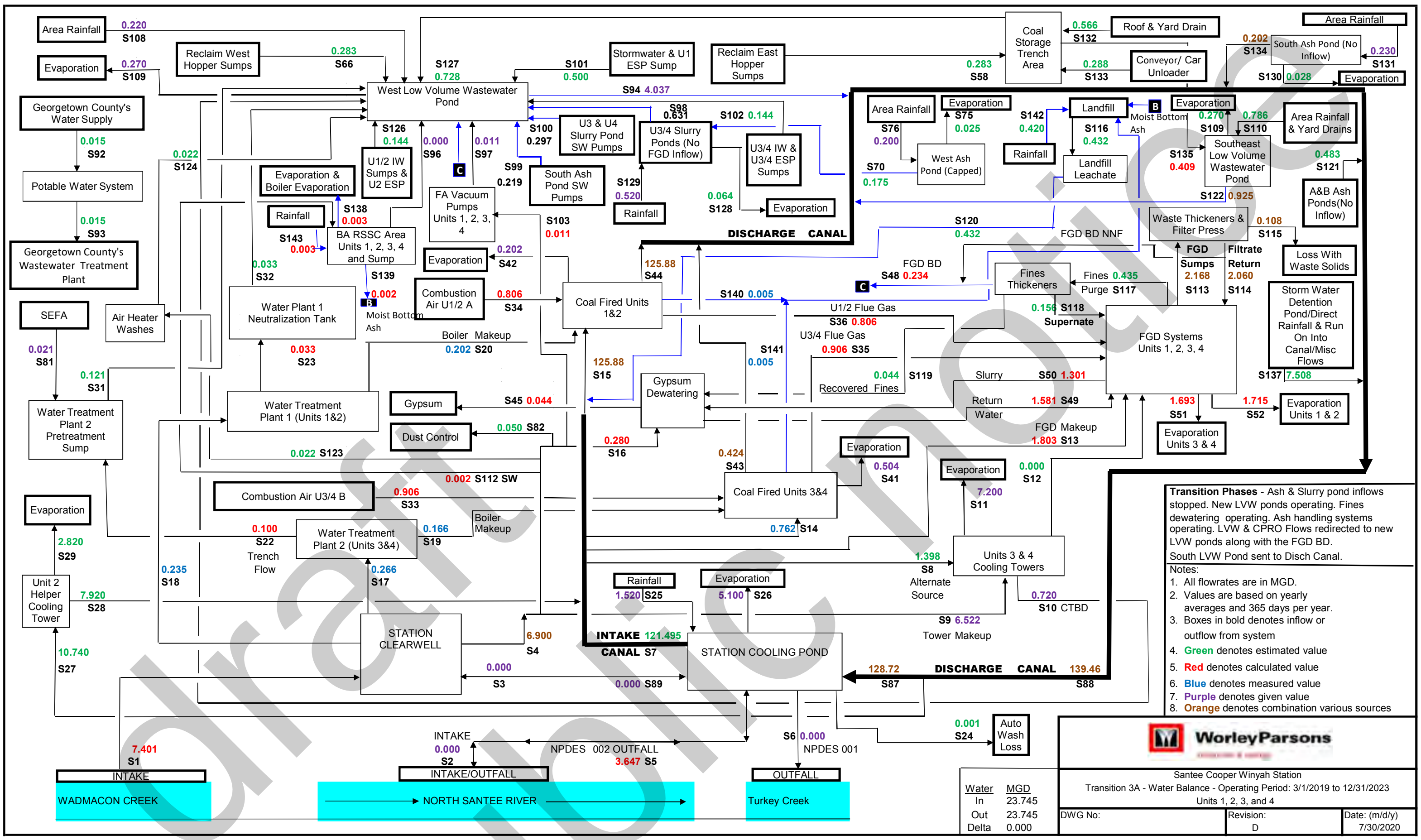
TABLE E. 2,3,7,8 TETRACHLORODIBENZO P DIOXIN (2,3,7,8 TCDD) (40 CFR 122.21(g)(7)(viii))

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

2C Form Attachments



Area Rainfall
0.220
S108
Evaporation
0.270
S109
Reclaim West Hopper Sumps
0.283
S66
Georgetown County's Water Supply
0.015
S92
Potable Water System
0.015
S93
Georgetown County's Wastewater Treatment Plant
SEFA
Air Heater Washes
0.021
S81
0.121
S31
Water Treatment Plant 2 Pretreatment Sump
Evaporation
2.820
S29
Unit 2 Helper Cooling Tower
7.920
S28
10.740
S27
7.401
S1
INTAKE
WADMACON CREEK
West Low Volume Wastewater Pond
S127
0.728
S101
0.500
Stormwater & U1 ESP Sump
Reclaim East Hopper Sumps
S94 4.037
0.022
S124
Evaporation & Boiler Evaporation
U1/2 IW Sumps & U2 ESP
S126
0.144
0.000
S96
0.011
S97
S100
0.297
U3 & U4 Slurry Pond SW Pumps
S98
0.631
U3/4 Slurry Ponds (No FGD Inflow)
S102 0.144
U3/4 IW & U3/4 ESP Sumps
S99
0.219
South Ash Pond SW Pumps
S129
0.520
Rainfall
0.064
S128
Evaporation
FA Vacuum Pumps Units 1, 2, 3, 4
S103
0.011
Rainfall
S138
0.003
S143
0.003
BA RSSC Area Units 1, 2, 3, 4 Sumps and Sump
Evaporation
0.202
S42
0.033
S32
S139
0.002
B
Moist Bottom Ash
Combustion Air U1/2 A
0.806
S34
Water Plant 1 Neutralization Tank
0.033
S23
Boiler Makeup
0.202 S20
Coal Fired Units 1&2
125.88
S44
125.88
S15
Water Treatment Plant 1 (Units 1&2)
Gypsum
S45 0.044
Dust Control
0.050 S82
0.022 S123
Gypsum Dewatering
0.280
S16
0.002 S112 SW
Combustion Air U3/4 B
0.906
S33
0.100
S22
Trench Flow
Water Treatment Plant 2 (Units 3&4)
Boiler Makeup
0.166
S19
0.235
S18
0.266
S17
STATION CLEARWELL
6.900
S4
0.000
S3
INTAKE 121.495
CANAL S7
0.000 S89
INTAKE
0.000
S2
INTAKE/OUTFALL
NORTH SANTEE RIVER
NPDES 002 OUTFALL
3.647 S5
DISCHARGE CANAL
Coal Storage Trench Area
0.566
S132
Roof & Yard Drain
0.283
S58
0.288
S133
Conveyor/ Car Unloader
Area Rainfall
0.202
S134
South Ash Pond (No Inflow)
0.230
S131
S130 0.028
Evaporation
Area Rainfall
Evaporation
S75
0.025
S76
0.200
West Ash Pond (Capped)
S70
0.175
S142
0.420
Rainfall
Landfill
S116
0.432
Landfill Leachate
Moist Bottom Ash
Evaporation
0.270
0.786
S109
S110
Area Rainfall & Yard Drains
S135
0.409
Southeast Low Volume Wastewater Pond
0.483
S121
S122 0.925
A&B Ash Ponds(No Inflow)
S120
0.432
FGD BD NNF
Waste Thickeners & Filter Press
0.108
S115
Loss With Waste Solids
FGD BD
S48 0.234
C
Fines Thickeners
Fines 0.435
Purge S117
FGD Sumps
2.168
S113
Filtrate Return
2.060
S114
Storm Water Detention Pond/Direct Rainfall & Run On Into Canal/Misc Flows
S137 7.508
S140 0.005
U1/2 Flue Gas
S36 0.806
U3/4 Flue Gas
S141
0.005
0.906 S35
0.156 S118
Supernate
FGD Systems Units 1, 2, 3, 4
0.044
Recovered Fines
S119
Slurry
S50 1.301
Return Water
1.581 S49
FGD Makeup
1.803 S13
1.693
S51
1.715
S52
Evaporation Units 1 & 2
Evaporation Units 3 & 4
0.424
S43
Evaporation
0.504
S41
Coal Fired Units 3&4
0.762 S14
Evaporation
7.200
S11
0.000
S12
1.398
S8
Alternate Source
Units 3 & 4 Cooling Towers
Rainfall
1.520 S25
Evaporation
5.100 S26
0.720
S10 CTBD
S9 6.522
Tower Makeup
STATION COOLING POND
128.72
S87
DISCHARGE CANAL
139.46
S88
S6 0.000
NPDES 001
OUTFALL
Turkey Creek
0.001
S24
Auto Wash Loss
Transition Phases - Ash & Slurry pond inflows stopped. New LVW ponds operating. Fines dewatering operating. LVW & CPRO Flows redirected to new operating. Ash handling systems LVW ponds along with the FGD BD.
South LVW Pond sent to Disch Canal.
Notes:
1. All flowrates are in MGD.
2. Values are based on yearly averages and 365 days per year.
3. Boxes in bold denotes inflow or outflow from system
4. Green denotes estimated value
5. Red denotes calculated value
6. Blue denotes measured value
7. Purple denotes given value
8. Orange denotes combination various sources
WorleyParsons
Water MGD
In 23.745
Out 23.745
Delta 0.000
Santee Cooper Winyah Station
Transition 3A - Water Balance - Operating Period: 3/1/2019 to 12/31/2023
Units 1, 2, 3, and 4
DWG No:
Revision: D
Date: (m/d/y) 7/30/2020

Winyah Generating Station operation consists of several process flows that contribute wastewater to the NPDES outfalls 001 and 002 that discharge into Turkey Creek and the North Santee River. The total discharge flowrate in Section 3.1 for outfall 001 is based on reported DMR average flows from December 2019 through November 2020. The total discharge flowrate in Section 3.1 for outfall 002 is based on yearly average and 365 days per year. The process names and treatment codes relative to the types of treatment and flowrate are provided in the attached table.

SECTION 3.1: Average Flows and Treatment (40 CFR 122.21(g)(3)) Attachment						
Flow Diagram Code	Operation	Flow (MGD)	Final Discharge/Receiving Stream	Treatment Codes Table 2C-2	40 CFR 423 Def	Other comments
S5	WASTEWATER TREATMENT DISCHARGE TO OUTFALL NPDES 002 TO SANTEE RIVER	3.647	North Santee	1-F, 1-U, 1-H, 4-A, 2-K	-	Combined discharge (normal conditions)
S6	WASTEWATER TREATMENT DISCHARGE TO OUTFALL NPDES 001 TO TURKEY CREEK	0.000	Turkey Creek	1-F, 1-U, 1-H, 4-A, 2-K	-	Combined discharge (emergency conditions)
S10	BLOWDOWN LOSS COOLING TOWER	0.720	WLVW Pond	1-U,1-F	Cooling Tower Blowdown	Wastewater
S22	U3/4 REGENERATION WASTE (Water Treatment Plant 3/4)	0.100	Pretreatment Sump	1-U	Low Volume Waste	Wastewater
S23	U1/2 REGENERATION WASTE (Water Treatment Plant 1/2)	0.033	Neutralization Tank 1	1-U	Low Volume Waste	Wastewater source - discharges to neutralization tank from which it flows to West Low Volume Waste Pond as S32
S25	COOLING POND RAINFALL IN	1.520	Cooling Pond	1-U, 1-F	-	Rainfall
S31	U3/4 REGENERATION WASTE	0.121	WLVW Pond	1-U	Low Volume Waste	Wastewater
S32	U1/2 REGENERATION WASTE	0.033	WLVW Pond	1-U	Low Volume Waste	Wastewater
S43	U3/4 POWER ISLAND WATER TO DISCHARGE CANAL	0.424	Discharge Canal	1-F, 1-U	Low Volume Waste	Wastewater: Condenser cooling, additional Low Volume Waste
S44	U1/2 POWER ISLAND WATER TO DISCHARGE CANAL	125.880	Discharge Canal	1-F, 1-U, 4-C	Low Volume Waste	Wastewater: Low Volume Waste drains
S48	FGD BLOWDOWN FROM FINES THICKENERS TO DISCHARGE CANAL	0.234	WLVW Pond	5-L, 1-U, 1-F	FGD Wastewater	Wastewater
S58	RECLAIM EAST HOPPER SUMPS	0.283	WLVW Pond	1-U, 1-F	Low Volume Waste	Wastewater
S66	RECLAIM WEST HOPPER SUMPS	0.283	WLVW Pond	1-U, 1-F	Low Volume Waste	Wastewater
S70	WEST ASH POND RUNOFF TO U3/4 SLURRY PONDS	0.175	WLVW Pond	1-U, 1-F	-	Noncontact runoff given cover
S76	RAINFALL INTO WEST ASH POND	0.200	West Ash Pond	1-U, 1-F	-	Rainfall to covered pond
S81	SEFA WASTEWATER	0.021	Water Treatment Plan 2 Sump	1-U	Low Volume Waste/Stormwater	Wastewater/Stormwater
S94	WEST LOW VOLUME WASTEWATER POND TO DISCHARGE CANAL	4.037	Discharge Canal	1-U	Low Volume Waste/Stormwater	Wastewater
S96	BA RSSC AREA TO WEST LOW VOLUME WASTEWATER POND	0.000	WLVW Pond	1-U, 1-F	Low Volume Waste/Stormwater	Wastewater & stormwater from RSSC area and sump
S97	FA VACUUM PUMPS TO WEST LOW VOLUME WASTEWATER POND U1/2/3/4	0.011	WLVW Pond	1-U, 1-F	Low Volume Waste	Wastewater: seal water
S98	UNIT 3/4 SLURRY PONDS TO West LVW Pond	0.631	WLVW Pond	1-U, 1-F	Legacy WW	Wastewater
S99	SOUTH ASH POND SW PUMPS	0.219	WLVW Pond	1-U, 1-F	Legacy WW	Wastewater
S100	U3 & U4 SLURRY POND SW PUMPS	0.297	WLVW Pond	1-U, 1-F	Legacy WW	Wastewater
S101	STORMWATER TO WEST LOW VOLUME WASTEWATER POND	0.500	WLVW Pond	1-U, 1-F	Stormwater	Stormwater
S102	U3/4 IW SUMPS TO WEST LOW VOLUME WASTEWATER POND	0.144	WLVW Pond	1-U, 1-F	Stormwater	Stormwater
S108	RAINFALL INTO WEST LOW VOLUME WASTEWATER POND	0.220	WLVW Pond	1-U, 1-F	-	Rainfall to Pond
S110	RAINFALL AND YARD DRAINS INTO SOUTHEAST LOW VOLUME WASTEWATER POND	0.786	SELVW Pond	1-U, 1-F	Stormwater	Stormwater

S113	FGD SUMPS TO WASTE THICKENERS	2.168	Waste Thickener & Press		-	Internal process stream
S114	FILTRATE RETURN FROM WASTE THICKENERS	2.060	FGD System		-	Internal process stream
S115	LOSS WITH FGD WASTE SOLIDS	0.108	Solid Removal	5-Q	-	Minor loss associated with solids disposal
S116	LANDFILL LEACHATE	0.432	Intake Canal	1-U	Combustion Residual Leachate	Wastewater generated in landfill; discharged S120 below
S117	FINES PURGE	0.435	Fines Thickeners		-	Internal process stream
S118	FINES THICKENERS SUPERNATE TO FGD SYSTEM	0.156	FGD System		-	Internal process stream
S119	RECOVERED FINES - FINES THICKENERS TO GYPSUM DEWATERING	0.044	Gypsum Dewatering		-	Internal process stream
S120	LANDFILL LEACHATE TO INTAKE CANAL	0.432	Intake Canal	1-U	Combustion Residual Leachate	Wastewater collected and discharged to intake canal
S121	ASH PONDS "A" & "B" FLOW TO DISCHARGE CANAL	0.483	Discharge Canal	1-U	Legacy WW	Wastewater
S122	SOUTHEAST LOW VOLUME WASTERWATER POND TO DISCHARGE CANAL	0.925	Discharge Canal	1-U	Low Volume Wastewater & Stormwater	Wastewater and stormwater
S124	AIR HEATER WASH TO WEST LOW VOLUME WASTEWATER POND	0.022	WLVW Pond	1-U, 1-F	Non Chemical Metal Cleaning Waste	Wastewater
S126	U1/2 IW SUMPS & U2 ESP SUMP TO WEST LOW VOLUME WASTEWATER POND	0.144	WLVW Pond	1-U, 1-F	Low Volume Waste/Stormwater	Wastewater and stormwater
S127	COAL PILE DITCH TO WEST LOW VOLUME WASTEWATER POND	0.728	WLVW Pond	1-U, 1-F	Coal Pile Runoff	Wastewater
S129	RAINFALL INTO U3/4 SLURRY POND	0.520	WLVW Pond	1-U, 1-F	-	Direct rainfall to pond
S131	RAINFALL INTO U3/4 SOUTH ASH POND	0.230	Discharge Canal	1-U	-	Direct rainfall to pond
S132	ROOF AND YARD DRAINS TO COAL STORAGE AREA	0.566	WLVW Pond	1-U, 1-F	-	Rainfall
S133	CAR UNLOADER CONVEYOR SUMPS TO COAL STORAGE AREA	0.288	WLVW Pond	1-U, 1-F	-	Stormwater
S134	SOUTH ASH POND TO DISCHARGE CANAL	0.202	Discharge Canal	1-U, 1-F	Legacy WW	Wastewater
S135	COAL STORAGE AREA TO SOUTHEAST LOW VOLUME WASTEWATER POND	0.409	SELVW Pond	1-U, 1-F	Coal Pile Runoff	Wastewater
S137	STORM WATER DETENTION POND/DIRECT RAINFALL & RUN ON INTO CANAL / MISC FLOWS INTO CANAL	7.508	Discharge Canal	1-U, 1-F	Stormwater	Stormwater
S139	BA RSSC AREA U1/2/3/4 SUMP TO LANDFILL	0.002	Moisture Bottom Ash Solids	5-Q	-	Water contained in bottom ash
S140	COAL FIRED U1/2 TO LANDFILL	0.005	Landfill Solids	5-Q	-	Water contained in landfilled solid residuals
S141	COAL FIRED U3/4 TO LANDFILL	0.005	Landfill Solids	5-Q	-	Water contained in landfilled solid residuals
S142	RAINFALL INTO LANDFILL	0.420	Intake Canal	1-U	-	Rainfall
S143	RAINFALL INTO BA RSSC AREA U1/2/3/4	0.003	Evaporation/intake canal	1-U	-	Rainfall

Intermittent flows associated with the discharge through outfall 001 may occur during extreme weather conditions such as 100-yr floods and are basically stormwater inflows into the cooling pond during such events.

Intermittent flows associated with the discharge through outfall 002 occur when seasonal ambient air temperatures create internal cooling pond temperatures above the permitted limit necessary for continuous discharge.

Intermittent flows associated with the vehicle wash rack is 0.0003 MGD into intake canal.

Section 2.1 Line Drawing provides flowrates based upon yearly average that are typical of a continuous plant operation.

Oil & Grease

Pace Analytical Services Charlotte
9800 Kincey Ave Ste 100
Hutersville, NC 28078
(704)875-9092
Cert #:99006001

Test America Laboratories
5102 LaRoche Ave
Savannah, GA 31404
912-250-0281
Cert #: 98001001

TSS and Arsenic

Santee Cooper Central Lab
1 Riverwood Drive
Moncks Corner, SC 29461
(843) 761-8000
Cert#: 08552001

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 − (843) 556−8171 − www.gel.com

Certificate of Analysis Report
for

GEEL001 GEL Engineering, LLC

Client SDG: 529489 GEL Work Order: 529489

The Qualifiers in this report are defined as follows:

*	A quality control analyte recovery is outside of specified acceptance criteria
**	Analyte is a Tracer compound
**	Analyte is a surrogate compound
H	Analytical holding time was exceeded
J	See case narrative for an explanation
J	Value is estimated
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
d	5−day BOD−−The 2:1 depletion requirement was not met for this sample

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Jake Crook.

Reviewed by ______________________________

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: January 26, 2021

Company :	GEL Engineering, LLC
Address :	2040 Savage Road
	Charleston, South Carolina 29417
Contact:	Mr. John McLure
Project:	NPDES Renewal Assistance

Client Sample ID:	Outfall 002	Project:	SOOP01120C
Sample ID:	529489001	Client ID:	GEEL001
Matrix:	Waste Water		
Collect Date:	08-DEC-20 12:45		
Receive Date:	08-DEC-20		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis												
SM 5310 B Total Organic Carbon "As Received"												
Total Organic Carbon Average		8450	330	1000	ug/L		1	TSM	12/11/20	1502	2070832	1
Field Data												
GEL Field Crew pH (SCID 10585) "As Received"												
Field Temperature		25.5			Celsius			AXM8	12/08/20	1245	2071500	2
Field pH		7.50			SU							
GEL Field Residual Chlorine Method "As Received"												
Field Residual Chlorine		0.09			mg/L			AXM8	12/08/20	1245	2071500	3
Flow Injection Analysis												
EPA 335.4 Cyanide, Total "As Received"												
Cyanide, Total	U	ND	1.67	10.0	ug/L	1.00	1	AXH3	12/09/20	1018	2070270	4
EPA 420.4 Total Phenols "As Received"												
Total Phenol	U	ND	1.67	5.00	ug/L	1.00	1	AXH3	12/16/20	1039	2070826	5
Ion Chromatography												
EPA300.0 Bromide Liquid "As Received"												
Fluoride		2580	33.0	100	ug/L		1	LXA2	12/09/20	1854	2070769	6
Sulfate		796000	13300	40000	ug/L		100	LXA2	12/10/20	1440	2070769	7
Bromide		8900	335	2000	ug/L		5	LXA2	12/10/20	1511	2070769	8
Metals Analysis-ICP-MS												
200.8/200.2 NPDES Metals "As Received"												
Antimony	J	1.86	0.600	5.00	ug/L	1.00	1	BAJ	12/15/20	2346	2071312	9
Arsenic		15.1	1.66	5.00	ug/L	1.00	1					
Barium		78.5	0.500	50.0	ug/L	1.00	1					
Cadmium	J	0.0890	0.0300	0.100	ug/L	1.00	1					
Lead	U	ND	0.500	2.00	ug/L	1.00	1					
Molybdenum		40.7	0.167	20.0	ug/L	1.00	1					
Selenium		9.58	1.50	5.00	ug/L	1.00	1					
Silver	U	ND	0.200	5.00	ug/L	1.00	1					
Thallium	J	0.129	0.125	0.500	ug/L	1.00	1					
Tin	U	ND	1.00	10.0	ug/L	1.00	1					
Zinc	J	4.42	3.00	10.0	ug/L	1.00	1					
Uranium		1.72	0.0670	0.200	ug/L	1.00	1	BAJ	12/16/20	0607	2071312	10
Aluminum	J	43.7	15.0	50.0	ug/L	1.00	1	BAJ	12/16/20	1127	2071312	11
Beryllium	U	ND	0.200	1.00	ug/L	1.00	1					
Chromium	U	ND	1.00	5.00	ug/L	1.00	1					

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Charleston, South Carolina 29417
Contact: Mr. John McLure
Project: NPDES Renewal Assistance

Client Sample ID:	Outfall 002	Project:	SOOP01120C
Sample ID:	529489001	Client ID:	GEEL001

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS												
200.8/200.2 NPDES Metals "As Received"												
Copper	J	3.09	0.350	10.0	ug/L	1.00	1					
Iron		315	10.0	20.0	ug/L	1.00	1					
Manganese		406	1.00	10.0	ug/L	1.00	1					
Nickel	J	9.39	0.500	10.0	ug/L	1.00	1					
Titanium	U	ND	2.00	50.0	ug/L	1.00	1					
Vanadium	J	2.21	2.00	10.0	ug/L	1.00	1					
Cobalt	J	0.646	0.100	20.0	ug/L	1.00	1	BAJ	12/16/20	1337	2071312	12
Magnesium		73000	100	150	ug/L	1.00	10	BAJ	12/16/20	1206	2071312	13
Strontium		1860	20.0	100	ug/L	1.00	10					
Boron		9990	400	1500	ug/L	1.00	100	BAJ	12/16/20	1328	2071312	14
Micro-biology												
SM 5210B BOD, 5DAY "As Received"												
BOD, 5 DAY	Ud	ND	30000	60000	ug/L			HXC1	12/09/20	1318	2070479	15
Nutrient Analysis												
EPA 350.1 Nitrogen, Ammonia L "As Received"												
Nitrogen, Ammonia		239	17.0	100	ug/L	1.00	1	KLP1	12/15/20	1135	2072723	16
EPA 351.2/350.1 Total Organic Nitrogen "See Parent Products"												
Total Organic Nitrogen		901	33.0	100	ug/L		1	KLP1	12/15/20	1252	2072789	17
EPA 353.2 Nitrogen, Nitrate/Nitrite "As Received"												
Nitrogen, Nitrate/Nitrite		41.4	7.00	20.0	ug/L		1	AXH3	12/11/20	0713	2071414	18
EPA 365.4 Phosphorus, Total in "As Received"												
Phosphorus, Total as P	U	ND	20.0	50.0	ug/L	1.00	1	KLP1	12/15/20	1324	2072771	19
Nitrogen, Total Kjeldahl (TKN) "As Received"												
Nitrogen, Total Kjeldahl		1140	33.0	100	ug/L	1.00	1	KLP1	12/15/20	1142	2072752	20
Oil & Grease Analysis												
EPA 1664A n-Hexane Extractable Material (Oil and Grease) "As Received"												
Oil and Grease	U	ND	1.14	5.00	mg/L			DXB7	12/14/20	0527	2072124	21
Semi-Volatile-GC/MS												
EPA 625.1 SVOA, Liquid "As Received"												
1,2,4-Trichlorobenzene	U	ND	2.86	9.53	ug/L	0.000953	1	JMB3	12/10/20	1735	2071115	22
1,2-Dichlorobenzene	U	ND	2.86	9.53	ug/L	0.000953	1					
1,2-Diphenylhydrazine	U	ND	2.86	9.53	ug/L	0.000953	1					
1,3-Dichlorobenzene	U	ND	2.86	9.53	ug/L	0.000953	1					

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Project: NPDES Renewal Assistance

Client Sample ID: Outfall 002 — Project: SOOP01120C
Sample ID: 529489001 — Client ID: GEEL001

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Semi-Volatile-GC/MS												
EPA 625.1 SVOA, Liquid "As Received"												
1,4-Dichlorobenzene	U	ND	2.86	9.53	ug/L	0.000953	1					
2,4,6-Trichlorophenol	U	ND	2.86	9.53	ug/L	0.000953	1					
2,4-Dichlorophenol	U	ND	2.86	9.53	ug/L	0.000953	1					
2,4-Dimethylphenol	U	ND	2.86	9.53	ug/L	0.000953	1					
2,4-Dinitrophenol	U	ND	4.76	19.1	ug/L	0.000953	1					
2,4-Dinitrotoluene	U	ND	2.86	9.53	ug/L	0.000953	1					
2,6-Dinitrotoluene	U	ND	2.86	9.53	ug/L	0.000953	1					
2-Chloronaphthalene	U	ND	0.391	0.953	ug/L	0.000953	1					
2-Chlorophenol	U	ND	2.86	9.53	ug/L	0.000953	1					
2-Methyl-4,6-dinitrophenol	U	ND	2.86	9.53	ug/L	0.000953	1					
2-Nitrophenol	U	ND	2.86	9.53	ug/L	0.000953	1					
3,3'-Dichlorobenzidine	U	ND	2.86	9.53	ug/L	0.000953	1					
4-Bromophenylphenylether	U	ND	2.86	9.53	ug/L	0.000953	1					
4-Chloro-3-methylphenol	U	ND	2.86	9.53	ug/L	0.000953	1					
4-Chlorophenylphenylether	U	ND	2.86	9.53	ug/L	0.000953	1					
4-Nitrophenol	U	ND	2.86	9.53	ug/L	0.000953	1					
Acenaphthene	U	ND	0.286	0.953	ug/L	0.000953	1					
Acenaphthylene	U	ND	0.286	0.953	ug/L	0.000953	1					
Anthracene	U	ND	0.286	0.953	ug/L	0.000953	1					
Benzidine	U	ND	3.72	9.53	ug/L	0.000953	1					
Benzo(a)anthracene	U	ND	0.286	0.953	ug/L	0.000953	1					
Benzo(a)pyrene	U	ND	0.286	0.953	ug/L	0.000953	1					
Benzo(b)fluoranthene	U	ND	0.286	0.953	ug/L	0.000953	1					
Benzo(ghi)perylene	U	ND	0.286	0.953	ug/L	0.000953	1					
Benzo(k)fluoranthene	U	ND	0.286	0.953	ug/L	0.000953	1					
Butylbenzylphthalate	U	ND	0.286	9.53	ug/L	0.000953	1					
Chrysene	U	ND	0.286	0.953	ug/L	0.000953	1					
Di-n-butylphthalate	U	ND	0.286	9.53	ug/L	0.000953	1					
Di-n-octylphthalate	U	ND	0.286	9.53	ug/L	0.000953	1					
Dibenzo(a,h)anthracene	U	ND	0.286	0.953	ug/L	0.000953	1					
Diethylphthalate	U	ND	0.286	9.53	ug/L	0.000953	1					
Dimethylphthalate	U	ND	0.286	9.53	ug/L	0.000953	1					
Diphenylamine	U	ND	2.86	9.53	ug/L	0.000953	1					
Fluoranthene	U	ND	0.286	0.953	ug/L	0.000953	1					
Fluorene	U	ND	0.286	0.953	ug/L	0.000953	1					
Hexachlorobenzene	U	ND	2.86	9.53	ug/L	0.000953	1					

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Charleston, South Carolina 29417
Contact: Mr. John McLure
Project: NPDES Renewal Assistance

Client Sample ID: Outfall 002 — Project: SOOP01120C
Sample ID: 529489001 — Client ID: GEEL001

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Semi-Volatile-GC/MS												
EPA 625.1 SVOA, Liquid "As Received"												
Hexachlorobutadiene	U	ND	2.86	9.53	ug/L	0.000953	1					
Hexachlorocyclopentadiene	U	ND	2.86	9.53	ug/L	0.000953	1					
Hexachloroethane	U	ND	2.86	9.53	ug/L	0.000953	1					
Indeno(1,2,3-cd)pyrene	U	ND	0.286	0.953	ug/L	0.000953	1					
Isophorone	U	ND	3.34	9.53	ug/L	0.000953	1					
N-Methyl-N-nitrosomethylamine	U	ND	2.86	9.53	ug/L	0.000953	1					
N-Nitrosodipropylamine	U	ND	2.86	9.53	ug/L	0.000953	1					
Naphthalene	U	ND	0.286	0.953	ug/L	0.000953	1					
Nitrobenzene	U	ND	2.86	9.53	ug/L	0.000953	1					
Pentachlorophenol	U	ND	2.86	9.53	ug/L	0.000953	1					
Phenanthrene	U	ND	0.286	0.953	ug/L	0.000953	1					
Phenol	U	ND	2.86	9.53	ug/L	0.000953	1					
Pyrene	U	ND	0.286	0.953	ug/L	0.000953	1					
bis(2-Chloro-1-methylethyl)ether	U	ND	2.86	9.53	ug/L	0.000953	1					
bis(2-Chloroethoxy)methane	U	ND	2.86	9.53	ug/L	0.000953	1					
bis(2-Chloroethyl) ether	U	ND	2.86	9.53	ug/L	0.000953	1					
bis(2-Ethylhexyl)phthalate	U	ND	0.286	0.953	ug/L	0.000953	1					
Solids Analysis												
SM 2540D Total Suspended Liq "As Received"												
Total Suspended Solids		4810	1060	4630	ug/L			KLP1	12/10/20	0954	2070723	23
Spectrometric Analysis												
HACH Chemical Oxygen Demand "As Received"												
COD		43900	8950	20000	ug/L		1	VH1	12/15/20	1112	2071495	24
SM 4500-S(2-) D Sulfide "As Received"												
Total Sulfide	U	ND	33.0	100	ug/L		1	VH1	12/14/20	1155	2071026	25
SM 5540 C Surfactants (MBAS) "As Received"												
MBAS	U	ND	17.0	50.0	ug/L		1	RXB5	12/09/20	1758	2070734	26
Titration and Ion Analysis												
SM4500 Sulfite Liquid "As Received"												
Sulfite	HU	ND	500	2000	ug/L			RXB5	12/09/20	1228	2070733	27
Volatile Organics												
EPA 624.1 Volatiles Method List "As Received"												
1,1,1-Trichloroethane	U	ND	0.333	1.00	ug/L		1	PXY1	12/09/20	1748	2071167	28
1,1,2,2-Tetrachloroethane	U	ND	0.333	1.00	ug/L		1					

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Contact:	Mr. John McLure
Project:	NPDES Renewal Assistance

Client Sample ID:	Outfall 002	Project:	SOOP01120C
Sample ID:	529489001	Client ID:	GEEL001

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Volatile Organics												
EPA 624.1 Volatiles Method List "As Received"												
1,1,2-Trichloroethane	U	ND	0.333	1.00	ug/L		1					
1,1-Dichloroethane	U	ND	0.333	1.00	ug/L		1					
1,1-Dichloroethylene	U	ND	0.333	1.00	ug/L		1					
1,2,4-Trichlorobenzene	U	ND	0.333	1.00	ug/L		1					
1,2-Dichlorobenzene	U	ND	0.333	1.00	ug/L		1					
1,2-Dichloroethane	U	ND	0.333	1.00	ug/L		1					
1,2-Dichloropropane	U	ND	0.333	1.00	ug/L		1					
1,3-Dichlorobenzene	U	ND	0.333	1.00	ug/L		1					
1,3-Dichloropropylene(total)	U	ND	0.333	2.00	ug/L		1					
1,4-Dichlorobenzene	U	ND	0.333	1.00	ug/L		1					
2-Chloroethylvinyl ether	U	ND	1.67	5.00	ug/L		1					
Acetone	J	2.35	1.74	5.00	ug/L		1					
Acrolein	U	ND	1.67	5.00	ug/L		1					
Acrylonitrile	U	ND	1.67	5.00	ug/L		1					
Benzene	U	ND	0.333	1.00	ug/L		1					
Bromodichloromethane	U	ND	0.333	1.00	ug/L		1					
Bromoform	U	ND	0.333	1.00	ug/L		1					
Bromomethane	U	ND	0.337	1.00	ug/L		1					
Carbon tetrachloride	U	ND	0.333	1.00	ug/L		1					
Chlorobenzene	U	ND	0.333	1.00	ug/L		1					
Chloroethane	U	ND	0.333	1.00	ug/L		1					
Chloroform	U	ND	0.333	1.00	ug/L		1					
Chloromethane	U	ND	0.333	1.00	ug/L		1					
Cyclohexane	U	ND	0.333	1.00	ug/L		1					
Dibromochloromethane	U	ND	0.333	1.00	ug/L		1					
Dichlorodifluoromethane	U	ND	0.355	1.00	ug/L		1					
Ethylbenzene	U	ND	0.333	1.00	ug/L		1					
Methylene chloride	U	ND	1.67	2.00	ug/L		1					
Tetrachloroethylene	U	ND	0.333	1.00	ug/L		1					
Toluene	U	ND	0.333	1.00	ug/L		1					
Trichloroethylene	U	ND	0.333	1.00	ug/L		1					
Trichlorofluoromethane	U	ND	0.333	1.00	ug/L		1					
Vinyl chloride	U	ND	0.333	1.00	ug/L		1					
Xylenes (total)	U	ND	1.00	3.00	ug/L		1					
trans-1,2-Dichloroethylene	U	ND	0.333	1.00	ug/L		1					
Wet Chemistry General												

Certificate of Analysis

Report Date: January 26, 2021

Company : GEL Engineering, LLC
Address : 2040 Savage Road

Charleston, South Carolina 29417
Contact: Mr. John McLure
Project: NPDES Renewal Assistance

Client Sample ID: Outfall 002 — Project: SOOP01120C
Sample ID: 529489001 — Client ID: GEEL001

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Wet Chemistry General												
SM 2120 B Color "As Received"												
Color at pH 7.6		25.0	5.00	5.00	PCU		1	VH1	12/10/20	1044	2070882	29

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 200.2	ICP-MS 200.2 PREP	HH1	12/11/20	1744	2071311
EPA 335.4	EPA 335.4 Total Cyanide	AXH3	12/09/20	0902	2070269
EPA 350.1 Prep	EPA 350.1 Ammonia Nitrogen Prep	KLP1	12/14/20	1320	2072722
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	KLP1	12/14/20	1700	2072748
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	KLP1	12/14/20	1700	2072761
EPA 420.4	EPA 420.4 Phenols, Total in liquid PREP	AXH3	12/16/20	1020	2070825
EPA 625.1	BNA Liq. Prep-EPA 625 Analysis	DXF4	12/10/20	0432	2071114

Certificate of Analysis

Report Date: January 26, 2021

Company :	GEL Engineering, LLC
Address :	2040 Savage Road
	Charleston, South Carolina 29417
Contact:	Mr. John McLure
Project:	NPDES Renewal Assistance

Client Sample ID:	Outfall 002	Project:	SOOP01120C
Sample ID:	529489001	Client ID:	GEEL001

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SM 5310 B	
2	SM 4500-H B/SW846 9040C, SM 2550B	
3	SM 4500-Cl G	
4	EPA 335.4 SC	
5	EPA 420.4 SC	
6	EPA 300.0	
7	EPA 300.0	
8	EPA 300.0	
9	EPA 200.8 SC_NPDES	
10	EPA 200.8 SC_NPDES	
11	EPA 200.8 SC_NPDES	
12	EPA 200.8 SC_NPDES	
13	EPA 200.8 SC_NPDES	
14	EPA 200.8 SC_NPDES	
15	SM 5210B	
16	EPA 350.1 SC	
17	EPA 351.2/350.1	
18	EPA 353.2 Low Level	
19	EPA 365.4	
20	EPA 351.2 SC	
21	EPA 1664A/1664B	
22	EPA 625.1	
23	SM 2540D	
24	HACH 8000	
25	SM 4500-S (2-) D	
26	EPA 425.1 SC_NPDES	
27	SM 4500-SO3 (2-) B	
28	EPA 624.1	
29	SM 2120 B	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
2-Fluorobiphenyl	EPA 625.1 SVOA, Liquid "As Received"	40.7 ug/L	47.6	85	(31%-107%)
Nitrobenzene-d5	EPA 625.1 SVOA, Liquid "As Received"	40.0 ug/L	47.6	84	(35%-113%)
p-Terphenyl-d14	EPA 625.1 SVOA, Liquid "As Received"	18.5 ug/L	47.6	39	(35%-134%)

Certificate of Analysis

Report Date: January 26, 2021

Company :	GEL Engineering, LLC
Address :	2040 Savage Road
	Charleston, South Carolina 29417
Contact:	Mr. John McLure
Project:	NPDES Renewal Assistance

Client Sample ID:	Outfall 002	Project:	SOOP01120C
Sample ID:	529489001	Client ID:	GEEL001

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
2,4,6-Tribromophenol		EPA 625.1 SVOA, Liquid "As Received"			79.1 ug/L		95.3		83		(32%-122%)	
2-Fluorophenol		EPA 625.1 SVOA, Liquid "As Received"			36.4 ug/L		95.3		38		(15%-88%)	
Phenol-d5		EPA 625.1 SVOA, Liquid "As Received"			28.0 ug/L		95.3		29		(15%-91%)	
1,2-Dichloroethane-d4		EPA 624.1 Volatiles Method List "As Received"			56.6 ug/L		50.0		113		(71%-134%)	
Bromofluorobenzene		EPA 624.1 Volatiles Method List "As Received"			51.8 ug/L		50.0		104		(70%-131%)	
Toluene-d8		EPA 624.1 Volatiles Method List "As Received"			51.5 ug/L		50.0		103		(74%-124%)	

Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

GEL LABORATORIES LLC

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Certificate of Analysis

Company :	GEL Engineering, LLC			
Address :	2040 Savage Road			
	Charleston, South Carolina 29417		Report Date:	January 26, 2021
Contact:	Mr. John McLure			
Project:	NPDES Renewal Assistance			

Client Sample ID:	Outfall 002	Project:	SOOP01120C
Sample ID:	529489001	Client ID:	GEEL001
Matrix:	Waste Water		
Collect Date:	08-DEC-20		
Receive Date:	08-DEC-20		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gas Flow Proportional Counting														
GFPC, Gross A/B, liquid "As Received"														
Alpha		7.48	+/-3.72	4.95	+/-3.91	5.00	pCi/L			JXK3	12/11/20	0803	2071441	1
Beta		10.0	+/-2.50	3.53	+/-3.02	5.00	pCi/L							
GFPC, Total Alpha Radium, Liquid "As Received"														
Total Alpha Radium	U	3.39	+/-3.26	4.98	+/-3.32	10.0	pCi/L			LXB3	12/11/20	1159	2071442	2
Rad Radium-226														
Lucas Cell, Ra226, liquid "As Received"														
Radium-226		0.581	+/-0.321	0.378	+/-0.333	10.0	pCi/L			MXH8	12/14/20	0827	2071434	3

The following Analytical Methods were performed

Method	Description
1	EPA 900.0/SW846 9310
2	EPA 900.1 Mod/ EPA 903.0 Mod
3	EPA 903.1 Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium Carrier	GFPC, Total Alpha Radium, Liquid "As Received"	2071442	101	(25%-125%)

Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

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QC Summary

Report Date: January 26, 2021

GEL Engineering, LLC
2040 Savage Road
Charleston, South Carolina

Contact: **Mr. John McLure**

Workorder: **529489**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Carbon Analysis											
Batch 2070832											
QC1204712425 529407001 DUP											
Total Organic Carbon Average		9080		9320	ug/L	2.62		(0%-20%)	TSM	12/11/20	13:20
QC1204712422 LCS											
Total Organic Carbon Average	10000			9410	ug/L		94.1	(80%-120%)		12/11/20	11:09
QC1204712421 MB											
Total Organic Carbon Average			U	330	ug/L					12/11/20	10:59
QC1204712428 529407001 PS											
Total Organic Carbon Average	10.0	9.08		19.4	mg/L		103	(65%-120%)		12/11/20	14:02
Flow Injection Analysis											
Batch 2070270											
QC1204711425 529444002 DUP											
Cyanide, Total		U 5.00	U	5.00	ug/L	N/A			AXH3	12/09/20	10:40
QC1204710180 LCS											
Cyanide, Total	50.0			49.1	ug/L		98.2	(90%-110%)		12/09/20	10:14
QC1204710179 MB											
Cyanide, Total			U	5.00	ug/L					12/09/20	10:14
QC1204711427 529444002 MS											
Cyanide, Total	100	U 5.00		99.4	ug/L		99.2	(90%-110%)		12/09/20	10:41
Batch 2070826											
QC1204711435 LCS											
Total Phenol	50.0			51.2	ug/L		102	(90%-110%)	AXH3	12/16/20	10:45

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QC Summary

Workorder: 529489

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Flow Injection Analysis											
Batch 2070826											
QC1204711434 MB											
Total Phenol				U	ND	ug/L				AXH3	12/16/20 10:38
QC1204711436 529489001 MS											
Total Phenol	50.0	U	ND		45.6	ug/L		91.2	(90%-110%)		12/16/20 10:40
QC1204711437 529489001 MSD											
Total Phenol	50.0	U	ND		48.2	ug/L	5.54	96.4	(0%-20%)		12/16/20 10:41
Ion Chromatography											
Batch 2070769											
QC1204711284 529485001 DUP											
Bromide		U	ND	U	ND	ug/L	N/A			LXA2	12/10/20 13:39
Fluoride		U	ND	U	ND	ug/L	N/A				
Sulfate		J	213	J	212	ug/L	0.283 ^		(+/-400)		
QC1204711283 LCS											
Bromide	1250				1250	ug/L		99.9	(90%-110%)		12/09/20 15:49
Fluoride	2500				2400	ug/L		95.9	(90%-110%)		
Sulfate	10000				9440	ug/L		94.4	(90%-110%)		
QC1204711282 MB											
Bromide				U	ND	ug/L					12/09/20 15:18
Fluoride				U	ND	ug/L					
Sulfate				U	ND	ug/L					

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Ion Chromatography										
Batch 2070769										
QC1204711285 529485001 PS										
Bromide	1.25	U	ND	1.24	mg/L		99.2	(90%-110%)	LXA2	12/10/20 14:09
Fluoride	2.50	U	ND	2.42	mg/L		97	(90%-110%)		
Sulfate	10.0	J	0.213	9.70	mg/L		94.9	(90%-110%)		
Metals Analysis - ICPMS										
Batch 2071312										
QC1204712218 LCS										
Aluminum	2000			2100	ug/L		105	(85%-115%)	BAJ	12/16/20 11:25
Antimony	50.0			49.0	ug/L		98	(85%-115%)		12/15/20 23:43
Arsenic	50.0			48.7	ug/L		97.5	(85%-115%)		
Barium	50.0			49.3	ug/L		98.5	(85%-115%)		
Beryllium	50.0			52.9	ug/L		106	(85%-115%)		12/16/20 11:25
Boron	100			102	ug/L		102	(85%-115%)		12/16/20 13:26
Cadmium	50.0			50.7	ug/L		101	(85%-115%)		12/15/20 23:43
Chromium	50.0			47.3	ug/L		94.6	(85%-115%)		12/16/20 11:25
Cobalt	50.0			53.6	ug/L		107	(85%-115%)		12/16/20 13:26
Copper	50.0			48.4	ug/L		96.8	(85%-115%)		12/16/20 11:25
Iron	2000			1910	ug/L		95.4	(85%-115%)		

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS										
Batch 2071312										
Lead	50.0			50.1	ug/L		100	(85%-115%)	BAJ	12/15/20 23:43
Magnesium	2000			2080	ug/L		104	(85%-115%)		12/16/20 11:25
Manganese	50.0			48.6	ug/L		97.2	(85%-115%)		
Molybdenum	50.0			50.9	ug/L		102	(85%-115%)		12/15/20 23:43
Nickel	50.0			47.9	ug/L		95.9	(85%-115%)		12/16/20 11:25
Selenium	50.0			50.8	ug/L		102	(85%-115%)		12/15/20 23:43
Silver	50.0			50.9	ug/L		102	(85%-115%)		
Strontium	50.0			52.1	ug/L		104	(80%-120%)		12/16/20 11:25
Thallium	50.0			49.8	ug/L		99.6	(85%-115%)		12/15/20 23:43
Tin	50.0			49.3	ug/L		98.6	(85%-115%)		
Titanium	50.0			46.8	ug/L		93.6	(85%-115%)		12/16/20 11:25
Uranium	50.0			50.5	ug/L		101	(80%-120%)		12/16/20 06:04
Vanadium	50.0			50.0	ug/L		100	(85%-115%)		12/16/20 11:25
Zinc	50.0			52.7	ug/L		105	(85%-115%)		12/15/20 23:43
QC1204712217 MB										
Aluminum			U	ND	ug/L					12/16/20 11:22

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS										
Batch 2071312										
Antimony			U	ND	ug/L				BAJ	12/15/20 23:39
Arsenic			U	ND	ug/L					
Barium			U	ND	ug/L					
Beryllium			U	ND	ug/L					12/16/20 11:22
Boron			U	ND	ug/L					12/16/20 13:25
Cadmium			U	ND	ug/L					12/15/20 23:39
Chromium			U	ND	ug/L					12/16/20 11:22
Cobalt			U	ND	ug/L					12/16/20 13:25
Copper			U	ND	ug/L					12/16/20 11:22
Iron			U	ND	ug/L					
Lead			U	ND	ug/L					12/15/20 23:39
Magnesium			J	22.8	ug/L					12/16/20 11:22
Manganese			U	ND	ug/L					
Molybdenum			U	ND	ug/L					12/15/20 23:39
Nickel			U	ND	ug/L					12/16/20 11:22

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS										
Batch 2071312										
Selenium			U	ND	ug/L				BAJ	12/15/20 23:39
Silver			U	ND	ug/L					
Strontium			U	ND	ug/L					12/16/20 11:22
Thallium			U	ND	ug/L					12/15/20 23:39
Tin			U	ND	ug/L					
Titanium			U	ND	ug/L					12/16/20 11:22
Uranium			U	ND	ug/L					12/16/20 06:00
Vanadium			U	ND	ug/L					12/16/20 11:22
Zinc			U	ND	ug/L					12/15/20 23:39
QC1204712219 529489001 MS										
Aluminum	2000	J 43.7		1990	ug/L		97.5	(75%-125%)		12/16/20 11:30
Antimony	50.0	J 1.86		51.2	ug/L		98.8	(75%-125%)		12/15/20 23:49
Arsenic	50.0	15.1		66.7	ug/L		103	(75%-125%)		
Barium	50.0	78.5		127	ug/L		96.2	(75%-125%)		
Beryllium	50.0	U ND		46.1	ug/L		92	(75%-125%)		12/16/20 11:30
Boron	100	9990		10300	ug/L		N/A	(75%-125%)		12/16/20 13:29

QC Summary

Workorder: 529489

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 2071312											
Cadmium	50.0	J	0.0890		46.2	ug/L		92.2	(75%-125%)	BAJ	12/15/20 23:49
Chromium	50.0	U	ND		46.4	ug/L		92.4	(75%-125%)		12/16/20 11:30
Cobalt	50.0	J	0.646		49.0	ug/L		96.8	(75%-125%)		12/16/20 13:39
Copper	50.0	J	3.09		43.6	ug/L		81.1	(75%-125%)		12/16/20 11:30
Iron	2000		315		2090	ug/L		88.9	(75%-125%)		
Lead	50.0	U	ND		45.0	ug/L		90	(75%-125%)		12/15/20 23:49
Magnesium	2000		73000		74000	ug/L		N/A	(75%-125%)		12/16/20 12:08
Manganese	50.0		406		449	ug/L		N/A	(75%-125%)		12/16/20 11:30
Molybdenum	50.0		40.7		96.7	ug/L		112	(75%-125%)		12/15/20 23:49
Nickel	50.0	J	9.39		51.5	ug/L		84.1	(75%-125%)		12/16/20 11:30
Selenium	50.0		9.58		60.1	ug/L		101	(75%-125%)		12/15/20 23:49
Silver	50.0	U	ND		46.0	ug/L		92	(75%-125%)		
Strontium	50.0		1860		1910	ug/L		N/A	(75%-125%)		12/16/20 12:08
Thallium	50.0	J	0.129		46.2	ug/L		92.1	(75%-125%)		12/15/20 23:49
Tin	50.0	U	ND		51.2	ug/L		102	(75%-125%)		

QC Summary

Workorder: 529489

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 2071312											
Titanium	50.0	U	ND		47.7	ug/L		93.7	(75%-125%)	BAJ	12/16/20 11:30
Uranium	50.0		1.72		52.7	ug/L		102	(75%-125%)		12/16/20 06:10
Vanadium	50.0	J	2.21		51.5	ug/L		98.5	(75%-125%)		12/16/20 11:30
Zinc	50.0	J	4.42		48.7	ug/L		88.5	(75%-125%)		12/15/20 23:49
QC1204712220 529489001 MSD											
Aluminum	2000	J	43.7		1990	ug/L	0.125	97.4	(0%-20%)		12/16/20 11:32
Antimony	50.0	J	1.86		50.6	ug/L	1.26	97.5	(0%-20%)		12/15/20 23:53
Arsenic	50.0		15.1		67.8	ug/L	1.59	105	(0%-20%)		
Barium	50.0		78.5		127	ug/L	0.24	96.8	(0%-20%)		
Beryllium	50.0	U	ND		46.7	ug/L	1.4	93.3	(0%-20%)		12/16/20 11:32
Boron	100		9990		9880	ug/L	4.1	N/A	(0%-20%)		12/16/20 13:31
Cadmium	50.0	J	0.0890		47.1	ug/L	2.03	94.1	(0%-20%)		12/15/20 23:53
Chromium	50.0	U	ND		46.6	ug/L	0.436	92.8	(0%-20%)		12/16/20 11:32
Cobalt	50.0	J	0.646		48.2	ug/L	1.84	95	(0%-20%)		12/16/20 13:40
Copper	50.0	J	3.09		43.9	ug/L	0.681	81.7	(0%-20%)		12/16/20 11:32
Iron	2000		315		2060	ug/L	1.47	87.3	(0%-20%)		

QC Summary

Workorder: 529489

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 2071312											
Lead	50.0	U	ND		45.3	ug/L	0.788	90.7	(0%-20%)	BAJ	12/15/20 23:53
Magnesium	2000		73000		72600	ug/L	1.92	N/A	(0%-20%)		12/16/20 12:11
Manganese	50.0		406		449	ug/L	0.147	N/A	(0%-20%)		12/16/20 11:32
Molybdenum	50.0		40.7		95.6	ug/L	1.14	110	(0%-20%)		12/15/20 23:53
Nickel	50.0	J	9.39		50.4	ug/L	2.15	82	(0%-20%)		12/16/20 11:32
Selenium	50.0		9.58		61.5	ug/L	2.37	104	(0%-20%)		12/15/20 23:53
Silver	50.0	U	ND		45.7	ug/L	0.746	91.3	(0%-20%)		
Strontium	50.0		1860		1910	ug/L	0.159	N/A	(0%-20%)		12/16/20 12:11
Thallium	50.0	J	0.129		46.4	ug/L	0.527	92.6	(0%-20%)		12/15/20 23:53
Tin	50.0	U	ND		51.2	ug/L	0.0567	102	(0%-20%)		
Titanium	50.0	U	ND		48.2	ug/L	0.976	94.6	(0%-20%)		12/16/20 11:32
Uranium	50.0		1.72		53.4	ug/L	1.42	103	(0%-20%)		12/16/20 06:14
Vanadium	50.0	J	2.21		51.4	ug/L	0.189	98.3	(0%-20%)		12/16/20 11:32
Zinc	50.0	J	4.42		49.1	ug/L	0.872	89.3	(0%-20%)		12/15/20 23:53
QC1204712221 529489001 SDILT											
Aluminum		J	43.7	U	ND	ug/L	N/A		(0%-10%)		12/16/20 11:35

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2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: **529489**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS										
Batch 2071312										
Antimony	J	1.86	U	ND	ug/L	N/A		(0%-10%)	BAJ	12/15/20 23:56
Arsenic		15.1	J	3.23	ug/L	6.64		(0%-10%)		
Barium		78.5		15.2	ug/L	3.3		(0%-10%)		
Beryllium	U	ND	U	ND	ug/L	N/A		(0%-10%)		12/16/20 11:35
Boron		99.9		18.0	ug/L	9.75		(0%-10%)		12/16/20 13:33
Cadmium	J	0.0890	U	ND	ug/L	N/A		(0%-10%)		12/15/20 23:56
Chromium	U	ND	U	ND	ug/L	N/A		(0%-10%)		12/16/20 11:35
Cobalt	J	0.646	J	0.136	ug/L	5.26		(0%-10%)		12/16/20 13:42
Copper	J	3.09	J	0.731	ug/L	18.3		(0%-10%)		12/16/20 11:35
Iron		315		66.5	ug/L	5.56		(0%-10%)		
Lead	U	ND	U	ND	ug/L	N/A		(0%-10%)		12/15/20 23:56
Magnesium		7300		1320	ug/L	9.38		(0%-10%)		12/16/20 12:13
Manganese		406		83.3	ug/L	2.72		(0%-10%)		12/16/20 11:35
Molybdenum		40.7		7.77	ug/L	4.5		(0%-10%)		12/15/20 23:56
Nickel	J	9.39	J	1.97	ug/L	5.08		(0%-10%)		12/16/20 11:35

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS										
Batch 2071312										
Selenium		9.58	J	1.96	ug/L	2.34		(0%-10%)	BAJ	12/15/20 23:56
Silver	U	ND	U	ND	ug/L	N/A		(0%-10%)		
Strontium		186		35.3	ug/L	5.24		(0%-10%)		12/16/20 12:13
Thallium	J	0.129	U	ND	ug/L	N/A		(0%-10%)		12/15/20 23:56
Tin	U	ND	U	ND	ug/L	N/A		(0%-10%)		
Titanium	U	ND	U	ND	ug/L	N/A		(0%-10%)		12/16/20 11:35
Uranium		1.72		0.370	ug/L	7.56		(0%-10%)		12/16/20 06:17
Vanadium	J	2.21	J	2.41	ug/L	446		(0%-10%)		12/16/20 11:35
Zinc	J	4.42	U	ND	ug/L	N/A		(0%-10%)		12/15/20 23:56
Micro-biology										
Batch 2070479										
QC1204710687 529442002 DUP										
BOD, 5 DAY		5610		5260	ug/L	6.44 ^		(+/-2000)	HXC1	12/09/20 09:09
QC1204710685 LCS										
BOD, 5 DAY	198000			212000	ug/L		107	(85%-115%)		12/09/20 09:42
QC1204710684 MB										
BOD, 5 DAY				160	ug/L					12/09/20 09:36
QC1204710686 SEED										
BOD, 5 DAY				638	ug/L					12/09/20 09:43

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Nutrient Analysis										
Batch 2071414										
QC1204712450 529505004 DUP										
Nitrogen, Nitrate/Nitrite		530		531	ug/L	0.189		(0%-20%)	AXH3	12/11/20 07:27
QC1204712449 LCS										
Nitrogen, Nitrate/Nitrite	1000			1040	ug/L		104	(90%-110%)		12/11/20 07:10
QC1204712448 MB										
Nitrogen, Nitrate/Nitrite			U	ND	ug/L					12/11/20 07:02
QC1204712452 529505004 PS										
Nitrogen, Nitrate/Nitrite	1.00	0.530		1.50	mg/L		97	(90%-110%)		12/11/20 07:28
Batch 2072723										
QC1204715019 529322002 DUP										
Nitrogen, Ammonia		55.5	J	21.7	ug/L	87.6 ^		(+/-50.0)	KLP1	12/15/20 11:30
QC1204715018 LCS										
Nitrogen, Ammonia	1000			996	ug/L		99.6	(90%-110%)		12/15/20 11:28
QC1204715017 MB										
Nitrogen, Ammonia			U	ND	ug/L					12/15/20 11:27
QC1204715020 529322002 MS										
Nitrogen, Ammonia	1000	55.5		1010	ug/L		95.5	(90%-110%)		12/15/20 11:31
Batch 2072752										
QC1204715132 529407001 DUP										
Nitrogen, Total Kjeldahl		15900		14700	ug/L	7.84		(0%-20%)	KLP1	12/15/20 11:40
QC1204715131 LCS										
Nitrogen, Total Kjeldahl	1000			983	ug/L		98.3	(90%-110%)		12/15/20 11:35
QC1204715130 MB										
Nitrogen, Total Kjeldahl			U	ND	ug/L					12/15/20 11:34

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Nutrient Analysis										
Batch 2072752										
QC1204715133 529407001 MS										
Nitrogen, Total Kjeldahl	1000	15900		16400	ug/L		N/A	(90%-110%)	KLP1	12/15/20 11:40
Batch 2072771										
QC1204715184 529407001 DUP										
Phosphorus, Total as P		1160		1130	ug/L	2.62		(0%-41%)	KLP1	12/15/20 13:14
QC1204715183 LCS										
Phosphorus, Total as P	1000			978	ug/L		97.8	(80%-124%)		12/15/20 13:12
QC1204715182 MB										
Phosphorus, Total as P			J	23.9	ug/L					12/15/20 13:11
QC1204715185 529407001 MS										
Phosphorus, Total as P	1000	1160		2070	ug/L		91	(70%-136%)		12/15/20 13:15
Oil & Grease Analysis										
Batch 2072124										
QC1204713785 LCS										
Oil and Grease	40.0			35.6	mg/L		89	(78%-114%)	DXB7	12/14/20 05:27
QC1204713786 LCSD										
Oil and Grease	40.0			37.3	mg/L	4.66	93.3	(0%-18%)		12/14/20 05:27
QC1204713784 MB										
Oil and Grease			U	1.40	mg/L					12/14/20 05:27
Semi-Volatile-GC/MS										
Batch 2071115										
QC1204711878 LCS										
1,2,4-Trichlorobenzene	50.0			41.0	ug/L		82	(39%-94%)	JMB3	12/10/20 15:12
1,2-Dichlorobenzene	50.0			39.0	ug/L		78	(37%-94%)		

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 2071115										
1,2-Diphenylhydrazine	50.0			46.5	ug/L		93	(51%-108%)	JMB3	12/10/20 15:12
1,3-Dichlorobenzene	50.0			36.9	ug/L		74	(35%-90%)		
1,4-Dichlorobenzene	50.0			37.9	ug/L		76	(35%-91%)		
2,4,6-Trichlorophenol	50.0			46.0	ug/L		92	(53%-111%)		
2,4-Dichlorophenol	50.0			43.7	ug/L		87	(56%-112%)		
2,4-Dimethylphenol	50.0			34.4	ug/L		69	(44%-99%)		
2,4-Dinitrophenol	50.0			41.7	ug/L		83	(30%-126%)		
2,4-Dinitrotoluene	50.0			48.4	ug/L		97	(54%-119%)		
2,6-Dinitrotoluene	50.0			48.0	ug/L		96	(55%-118%)		
2-Chloronaphthalene	50.0			44.4	ug/L		89	(43%-103%)		
2-Chlorophenol	50.0			37.5	ug/L		75	(51%-101%)		
2-Methyl-4,6-dinitrophenol	50.0			48.9	ug/L		98	(43%-127%)		
2-Nitrophenol	50.0			43.8	ug/L		88	(54%-105%)		
3,3'-Dichlorobenzidine	50.0			42.7	ug/L		85	(45%-125%)		
4-Bromophenylphenylether	50.0			47.4	ug/L		95	(52%-106%)		

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 2071115										
4-Chloro-3-methylphenol	50.0			41.8	ug/L		84	(55%-107%)	JMB3	12/10/20 15:12
4-Chlorophenylphenylether	50.0			46.6	ug/L		93	(56%-115%)		
4-Nitrophenol	50.0			14.1	ug/L		28	(21%-110%)		
Acenaphthene	50.0			44.0	ug/L		88	(52%-103%)		
Acenaphthylene	50.0			43.3	ug/L		87	(51%-101%)		
Anthracene	50.0			44.5	ug/L		89	(54%-107%)		
Benzidine	100			34.1	ug/L		34	(16%-139%)		
Benzo(a)anthracene	50.0			47.2	ug/L		94	(56%-107%)		
Benzo(a)pyrene	50.0			42.4	ug/L		85	(47%-110%)		
Benzo(b)fluoranthene	50.0			48.1	ug/L		96	(52%-106%)		
Benzo(ghi)perylene	50.0			39.4	ug/L		79	(38%-126%)		
Benzo(k)fluoranthene	50.0			48.8	ug/L		98	(48%-115%)		
Butylbenzylphthalate	50.0			49.8	ug/L		100	(50%-118%)		
Chrysene	50.0			46.3	ug/L		93	(57%-112%)		
Di-n-butylphthalate	50.0			47.2	ug/L		94	(56%-120%)		

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 2071115										
Di-n-octylphthalate	50.0			50.6	ug/L		101	(44%-124%)	JMB3	12/10/20 15:12
Dibenzo(a,h)anthracene	50.0			39.5	ug/L		79	(47%-119%)		
Diethylphthalate	50.0			47.4	ug/L		95	(59%-113%)		
Dimethylphthalate	50.0			46.7	ug/L		93	(61%-118%)		
Diphenylamine	50.0			47.8	ug/L		96	(51%-107%)		
Fluoranthene	50.0			49.7	ug/L		99	(52%-112%)		
Fluorene	50.0			46.6	ug/L		93	(54%-101%)		
Hexachlorobenzene	50.0			46.5	ug/L		93	(52%-108%)		
Hexachlorobutadiene	50.0			38.8	ug/L		78	(33%-91%)		
Hexachlorocyclopentadiene	50.0			27.5	ug/L		55	(22%-85%)		
Hexachloroethane	50.0			34.4	ug/L		69	(33%-91%)		
Indeno(1,2,3-cd)pyrene	50.0			39.1	ug/L		78	(40%-117%)		
Isophorone	50.0			45.4	ug/L		91	(50%-110%)		
N-Methyl-N-nitrosomethylamine	50.0			28.4	ug/L		57	(28%-78%)		
N-Nitrosodipropylamine	50.0			47.1	ug/L		94	(54%-110%)		

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 2071115										
Naphthalene	50.0			43.0	ug/L		86	(44%-98%)	JMB3	12/10/20 15:12
Nitrobenzene	50.0			42.7	ug/L		85	(51%-110%)		
Pentachlorophenol	50.0			37.5	ug/L		75	(48%-121%)		
Phenanthrene	50.0			46.9	ug/L		94	(55%-102%)		
Phenol	50.0			17.6	ug/L		35	(12%-90%)		
Pyrene	50.0			47.6	ug/L		95	(45%-126%)		
bis(2-Chloro-1-methylethyl)ether	50.0			42.6	ug/L		85	(45%-113%)		
bis(2-Chloroethoxy)methane	50.0			46.3	ug/L		93	(50%-110%)		
bis(2-Chloroethyl) ether	50.0			40.6	ug/L		81	(52%-109%)		
bis(2-Ethylhexyl)phthalate	50.0			47.9	ug/L		96	(46%-121%)		
**2,4,6-Tribromophenol	100			94.4	ug/L		94	(32%-122%)		
**2-Fluorobiphenyl	50.0			43.5	ug/L		87	(31%-107%)		
**2-Fluorophenol	100			42.5	ug/L		43	(15%-88%)		
**Nitrobenzene-d5	50.0			40.0	ug/L		80	(35%-113%)		
**Phenol-d5	100			33.4	ug/L		33	(15%-91%)		

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 2071115										
**p-Terphenyl-d14	50.0			35.7	ug/L		71	(35%-134%)	JMB3	12/10/20 15:12
QC1204711877 MB										
1,2,4-Trichlorobenzene			U	ND	ug/L					12/10/20 15:40
1,2-Dichlorobenzene			U	ND	ug/L					
1,2-Diphenylhydrazine			U	ND	ug/L					
1,3-Dichlorobenzene			U	ND	ug/L					
1,4-Dichlorobenzene			U	ND	ug/L					
2,4,6-Trichlorophenol			U	ND	ug/L					
2,4-Dichlorophenol			U	ND	ug/L					
2,4-Dimethylphenol			U	ND	ug/L					
2,4-Dinitrophenol			U	ND	ug/L					
2,4-Dinitrotoluene			U	ND	ug/L					
2,6-Dinitrotoluene			U	ND	ug/L					
2-Chloronaphthalene			U	ND	ug/L					
2-Chlorophenol			U	ND	ug/L					
2-Methyl-4,6-dinitrophenol			U	ND	ug/L					

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 2071115										
2-Nitrophenol			U	ND	ug/L				JMB3	12/10/20 15:40
3,3'-Dichlorobenzidine			U	ND	ug/L					
4-Bromophenylphenylether			U	ND	ug/L					
4-Chloro-3-methylphenol			U	ND	ug/L					
4-Chlorophenylphenylether			U	ND	ug/L					
4-Nitrophenol			U	ND	ug/L					
Acenaphthene			U	ND	ug/L					
Acenaphthylene			U	ND	ug/L					
Anthracene			U	ND	ug/L					
Benzidine			U	ND	ug/L					
Benzo(a)anthracene			U	ND	ug/L					
Benzo(a)pyrene			U	ND	ug/L					
Benzo(b)fluoranthene			U	ND	ug/L					
Benzo(ghi)perylene			U	ND	ug/L					
Benzo(k)fluoranthene			U	ND	ug/L					

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 2071115										
Butylbenzylphthalate			U	ND	ug/L				JMB3	12/10/20 15:40
Chrysene			U	ND	ug/L					
Di-n-butylphthalate			U	ND	ug/L					
Di-n-octylphthalate			U	ND	ug/L					
Dibenzo(a,h)anthracene			U	ND	ug/L					
Diethylphthalate			U	ND	ug/L					
Dimethylphthalate			U	ND	ug/L					
Diphenylamine			U	ND	ug/L					
Fluoranthene			U	ND	ug/L					
Fluorene			U	ND	ug/L					
Hexachlorobenzene			U	ND	ug/L					
Hexachlorobutadiene			U	ND	ug/L					
Hexachlorocyclopentadiene			U	ND	ug/L					
Hexachloroethane			U	ND	ug/L					
Indeno(1,2,3-cd)pyrene			U	ND	ug/L					

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 2071115										
Isophorone			U	ND	ug/L				JMB3	12/10/20 15:40
N-Methyl-N-nitrosomethylamine			U	ND	ug/L					
N-Nitrosodipropylamine			U	ND	ug/L					
Naphthalene			U	ND	ug/L					
Nitrobenzene			U	ND	ug/L					
Pentachlorophenol			U	ND	ug/L					
Phenanthrene			U	ND	ug/L					
Phenol			U	ND	ug/L					
Pyrene			U	ND	ug/L					
bis(2-Chloro-1-methylethyl)ether			U	ND	ug/L					
bis(2-Chloroethoxy)methane			U	ND	ug/L					
bis(2-Chloroethyl) ether			U	ND	ug/L					
bis(2-Ethylhexyl)phthalate			U	ND	ug/L					
**2,4,6-Tribromophenol	100			86.6	ug/L		87	(32%-122%)		
**2-Fluorobiphenyl	50.0			40.4	ug/L		81	(31%-107%)		

QC Summary

Workorder: 529489

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 2071115											
**2-Fluorophenol	100				39.6	ug/L		40	(15%-88%)	JMB3	12/10/20 15:40
**Nitrobenzene-d5	50.0				39.3	ug/L		79	(35%-113%)		
**Phenol-d5	100				30.1	ug/L		30	(15%-91%)		
**p-Terphenyl-d14	50.0				34.9	ug/L		70	(35%-134%)		
QC1204711879 529493001 MS											
1,2,4-Trichlorobenzene	100	U	ND		65.3	ug/L		65	(32%-87%)		12/10/20 16:38
1,2-Dichlorobenzene	100	U	ND		57.0	ug/L		57	(29%-90%)		
1,2-Diphenylhydrazine	100	U	ND		73.7	ug/L		74	(38%-113%)		
1,3-Dichlorobenzene	100	U	ND		51.4	ug/L		51	(31%-82%)		
1,4-Dichlorobenzene	100	U	ND		53.0	ug/L		53	(31%-84%)		
2,4,6-Trichlorophenol	100	U	ND		85.0	ug/L		85	(38%-113%)		
2,4-Dichlorophenol	100	U	ND	U	ND	ug/L		0*	(40%-109%)		
2,4-Dimethylphenol	100	U	ND	U	ND	ug/L		0*	(35%-100%)		
2,4-Dinitrophenol	100	U	ND		64.0	ug/L		64	(20%-131%)		
2,4-Dinitrotoluene	100	U	ND		82.9	ug/L		83	(43%-116%)		
2,6-Dinitrotoluene	100	U	ND		83.0	ug/L		83	(43%-112%)		

QC Summary

Workorder: 529489

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 2071115											
2-Chloronaphthalene	100	U	ND		71.5	ug/L		71	(34%-105%)	JMB3	12/10/20 16:38
2-Chlorophenol	100	U	ND		56.2	ug/L		56	(37%-104%)		
2-Methyl-4,6-dinitrophenol	100	U	ND		70.4	ug/L		70	(30%-128%)		
2-Nitrophenol	100	U	ND		77.0	ug/L		77	(38%-113%)		
3,3'-Dichlorobenzidine	100	U	ND	U	ND	ug/L		0*	(31%-122%)		
4-Bromophenylphenylether	100	U	ND		62.9	ug/L		63	(39%-116%)		
4-Chloro-3-methylphenol	100	U	ND		63.0	ug/L		63	(38%-115%)		
4-Chlorophenylphenylether	100	U	ND		64.2	ug/L		64	(41%-116%)		
4-Nitrophenol	100	U	ND		39.1	ug/L		39	(16%-83%)		
Acenaphthene	100	U	ND		72.2	ug/L		72	(39%-112%)		
Acenaphthylene	100	U	ND		70.7	ug/L		71	(37%-111%)		
Anthracene	100	U	ND		61.2	ug/L		61	(39%-112%)		
Benzidine	200	U	ND	U	ND	ug/L		0*	(10%-134%)		
Benzo(a)anthracene	100	U	ND		46.0	ug/L		46	(42%-114%)		
Benzo(a)pyrene	100	U	ND		37.8	ug/L		38*	(41%-109%)		

QC Summary

Workorder: 529489

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 2071115											
Benzo(b)fluoranthene	100	U	ND		42.8	ug/L		43	(41%-109%)	JMB3	12/10/20 16:38
Benzo(ghi)perylene	100	U	ND		40.1	ug/L		40	(31%-118%)		
Benzo(k)fluoranthene	100	U	ND		42.6	ug/L		43	(41%-113%)		
Butylbenzylphthalate	100	J	3.57		62.4	ug/L		59	(40%-121%)		
Chrysene	100	U	ND		44.7	ug/L		45	(42%-118%)		
Di-n-butylphthalate	100	J	0.900		60.2	ug/L		59	(44%-119%)		
Di-n-octylphthalate	100	U	ND		41.5	ug/L		41	(31%-129%)		
Dibenzo(a,h)anthracene	100	U	ND		39.9	ug/L		40	(33%-122%)		
Diethylphthalate	100	J	1.86		86.9	ug/L		85	(46%-117%)		
Dimethylphthalate	100	U	ND		82.6	ug/L		83	(45%-123%)		
Diphenylamine	100	U	ND		66.2	ug/L		66	(37%-109%)		
Fluoranthene	100	U	ND		60.0	ug/L		60	(42%-113%)		
Fluorene	100	U	ND		71.3	ug/L		71	(39%-108%)		
Hexachlorobenzene	100	U	ND		54.8	ug/L		55	(40%-111%)		
Hexachlorobutadiene	100	U	ND		50.2	ug/L		50	(24%-92%)		

QC Summary

Workorder: 529489

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 2071115											
Hexachlorocyclopentadiene	100	U	ND		29.3	ug/L		29	(19%-77%)	JMB3	12/10/20 16:38
Hexachloroethane	100	U	ND		46.9	ug/L		47	(29%-88%)		
Indeno(1,2,3-cd)pyrene	100	U	ND		38.9	ug/L		39	(34%-121%)		
Isophorone	100	U	ND		72.9	ug/L		73	(38%-110%)		
N-Methyl-N-nitrosomethylamine	100	U	ND		49.3	ug/L		49	(24%-96%)		
N-Nitrosodipropylamine	100	U	ND		74.4	ug/L		74	(38%-119%)		
Naphthalene	100	U	ND		68.8	ug/L		69	(32%-98%)		
Nitrobenzene	100	U	ND		67.6	ug/L		68	(37%-115%)		
Pentachlorophenol	100	U	ND		82.7	ug/L		83	(33%-130%)		
Phenanthrene	100	U	ND		68.3	ug/L		68	(41%-108%)		
Phenol	100	U	ND	J	11.0	ug/L		11*	(19%-78%)		
Pyrene	100	U	ND		56.7	ug/L		57	(33%-121%)		
bis(2-Chloro-1-methylethyl)ether	100	U	ND		65.8	ug/L		66	(35%-121%)		
bis(2-Chloroethoxy)methane	100	U	ND		75.4	ug/L		75	(41%-110%)		
bis(2-Chloroethyl) ether	100	U	ND		65.2	ug/L		65	(41%-112%)		

QC Summary

Workorder: 529489

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 2071115											
bis(2-Ethylhexyl)phthalate	100		1.18		51.8	ug/L		51	(33%-126%)	JMB3	12/10/20 16:38
**2,4,6-Tribromophenol	200		81.6		177	ug/L		89	(32%-122%)		
**2-Fluorobiphenyl	100		41.3		66.3	ug/L		66	(31%-107%)		
**2-Fluorophenol	200		36.6		74.8	ug/L		37	(15%-88%)		
**Nitrobenzene-d5	100		39.3		64.7	ug/L		65	(35%-113%)		
**Phenol-d5	200		15.6		35.9	ug/L		18	(15%-91%)		
**p-Terphenyl-d14	100		19.8		24.6	ug/L		25*	(35%-134%)		
QC1204711880 529493001 MSD											
1,2,4-Trichlorobenzene	100	U	ND		75.2	ug/L	14	75	(0%-30%)		12/10/20 17:07
1,2-Dichlorobenzene	100	U	ND		65.0	ug/L	13	65	(0%-30%)		
1,2-Diphenylhydrazine	100	U	ND		80.9	ug/L	9	81	(0%-30%)		
1,3-Dichlorobenzene	100	U	ND		60.1	ug/L	16	60	(0%-30%)		
1,4-Dichlorobenzene	100	U	ND		61.1	ug/L	14	61	(0%-30%)		
2,4,6-Trichlorophenol	100	U	ND		93.9	ug/L	10	94	(0%-30%)		
2,4-Dichlorophenol	100	U	ND	U	ND	ug/L	N/A	0*	(0%-30%)		
2,4-Dimethylphenol	100	U	ND	U	ND	ug/L	N/A	0*	(0%-30%)		

QC Summary

Workorder: 529489

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 2071115											
2,4-Dinitrophenol	100	U	ND		76.1	ug/L	17	76	(0%-30%)	JMB3	12/10/20 17:07
2,4-Dinitrotoluene	100	U	ND		90.7	ug/L	9	91	(0%-30%)		
2,6-Dinitrotoluene	100	U	ND		89.6	ug/L	8	90	(0%-30%)		
2-Chloronaphthalene	100	U	ND		80.5	ug/L	12	80	(0%-30%)		
2-Chlorophenol	100	U	ND		62.9	ug/L	11	63	(0%-30%)		
2-Methyl-4,6-dinitrophenol	100	U	ND		84.2	ug/L	18	84	(0%-30%)		
2-Nitrophenol	100	U	ND		86.4	ug/L	12	86	(0%-30%)		
3,3'-Dichlorobenzidine	100	U	ND	J	8.92	ug/L	200*	9*	(0%-30%)		
4-Bromophenylphenylether	100	U	ND		65.8	ug/L	5	66	(0%-30%)		
4-Chloro-3-methylphenol	100	U	ND	U	ND	ug/L	200*	0*	(0%-30%)		
4-Chlorophenylphenylether	100	U	ND		69.5	ug/L	8	70	(0%-30%)		
4-Nitrophenol	100	U	ND		58.1	ug/L	39*	58	(0%-30%)		
Acenaphthene	100	U	ND		80.6	ug/L	11	81	(0%-30%)		
Acenaphthylene	100	U	ND		78.7	ug/L	11	79	(0%-30%)		
Anthracene	100	U	ND		65.5	ug/L	7	66	(0%-30%)		

QC Summary

Workorder: 529489

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 2071115											
Benzidine	200	U	ND	U	ND	ug/L	N/A	0*	(0%-30%)	JMB3	12/10/20 17:07
Benzo(a)anthracene	100	U	ND		46.6	ug/L	1	47	(0%-30%)		
Benzo(a)pyrene	100	U	ND		38.2	ug/L	1	38*	(0%-30%)		
Benzo(b)fluoranthene	100	U	ND		42.9	ug/L	0	43	(0%-30%)		
Benzo(ghi)perylene	100	U	ND		39.6	ug/L	1	40	(0%-30%)		
Benzo(k)fluoranthene	100	U	ND		43.4	ug/L	2	43	(0%-30%)		
Butylbenzylphthalate	100	J	3.57		59.0	ug/L	6	55	(0%-30%)		
Chrysene	100	U	ND		45.1	ug/L	1	45	(0%-30%)		
Di-n-butylphthalate	100	J	0.900		61.3	ug/L	2	60	(0%-30%)		
Di-n-octylphthalate	100	U	ND		43.7	ug/L	5	44	(0%-30%)		
Dibenzo(a,h)anthracene	100	U	ND		41.6	ug/L	4	42	(0%-30%)		
Diethylphthalate	100	J	1.86		93.0	ug/L	7	91	(0%-30%)		
Dimethylphthalate	100	U	ND		90.4	ug/L	9	90	(0%-30%)		
Diphenylamine	100	U	ND		82.0	ug/L	21	82	(0%-30%)		
Fluoranthene	100	U	ND		59.8	ug/L	0	60	(0%-30%)		

QC Summary

Workorder: 529489

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 2071115											
Fluorene	100	U	ND		79.3	ug/L	11	79	(0%-30%)	JMB3	12/10/20 17:07
Hexachlorobenzene	100	U	ND		55.5	ug/L	1	56	(0%-30%)		
Hexachlorobutadiene	100	U	ND		57.2	ug/L	13	57	(0%-30%)		
Hexachlorocyclopentadiene	100	U	ND		39.1	ug/L	29	39	(0%-30%)		
Hexachloroethane	100	U	ND		55.2	ug/L	16	55	(0%-30%)		
Indeno(1,2,3-cd)pyrene	100	U	ND		39.8	ug/L	2	40	(0%-30%)		
Isophorone	100	U	ND		82.3	ug/L	12	82	(0%-30%)		
N-Methyl-N-nitrosomethylamine	100	U	ND		58.2	ug/L	17	58	(0%-30%)		
N-Nitrosodipropylamine	100	U	ND		87.8	ug/L	17	88	(0%-30%)		
Naphthalene	100	U	ND		79.3	ug/L	14	79	(0%-30%)		
Nitrobenzene	100	U	ND		79.2	ug/L	16	79	(0%-30%)		
Pentachlorophenol	100	U	ND		90.0	ug/L	8	90	(0%-30%)		
Phenanthrene	100	U	ND		72.7	ug/L	6	73	(0%-30%)		
Phenol	100	U	ND	J	8.86	ug/L	21	9*	(0%-30%)		
Pyrene	100	U	ND		56.0	ug/L	1	56	(0%-30%)		

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QC Summary

Workorder: 529489

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS											
Batch 2071115											
bis(2-Chloro-1-methylethyl)ether	100	U	ND		74.8	ug/L	13	75	(0%-30%)	JMB3	12/10/20 17:07
bis(2-Chloroethoxy)methane	100	U	ND		85.0	ug/L	12	85	(0%-30%)		
bis(2-Chloroethyl) ether	100	U	ND		73.2	ug/L	12	73	(0%-30%)		
bis(2-Ethylhexyl)phthalate	100		1.18		46.6	ug/L	11	45	(0%-30%)		
**2,4,6-Tribromophenol	200		81.6		194	ug/L		97	(32%-122%)		
**2-Fluorobiphenyl	100		41.3		75.0	ug/L		75	(31%-107%)		
**2-Fluorophenol	200		36.6		81.7	ug/L		41	(15%-88%)		
**Nitrobenzene-d5	100		39.3		73.9	ug/L		74	(35%-113%)		
**Phenol-d5	200		15.6		35.2	ug/L		18	(15%-91%)		
**p-Terphenyl-d14	100		19.8		24.1	ug/L		24*	(35%-134%)		
Solids Analysis											
Batch 2070723											
QC1204711183 529435003 DUP											
Total Suspended Solids		U	1270	U	1270	ug/L	N/A			KLP1	12/10/20 09:54
QC1204711182 LCS											
Total Suspended Solids	500000				492000	ug/L		98.4	(95%-105%)		12/10/20 09:54
QC1204711181 MB											
Total Suspended Solids				U	1140	ug/L					12/10/20 09:54

QC Summary

Workorder: 529489

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Spectrometric Analysis											
Batch 2070734											
QC1204711208 529489001 DUP											
MBAS		U	ND	U	ND	ug/L	N/A			RXB5	12/09/20 17:58
QC1204711207 LCS											
MBAS	500				527	ug/L		105	(90%-110%)		12/09/20 17:57
QC1204711206 MB											
MBAS				U	ND	ug/L					12/09/20 17:57
QC1204711209 529489001 PS											
MBAS	0.500	U	ND		0.399	mg/L		79.1	(47%-141%)		12/09/20 17:58
Batch 2071026											
QC1204711714 LCS											
Total Sulfide	400				381	ug/L		95.1	(85%-115%)	VH1	12/14/20 11:55
QC1204711713 MB											
Total Sulfide				U	33.0	ug/L					12/14/20 11:55
QC1204711716 529471003 PS											
Total Sulfide	0.400	U	0.00495		0.381	mg/L		93.9	(75%-125%)		12/14/20 11:55
QC1204711718 529471003 PSD											
Total Sulfide	0.400	U	0.00495		0.381	mg/L	0	93.9	(0%-15%)		12/14/20 11:55
Batch 2071495											
QC1204713612 529489001 DUP											
COD			43900		46600	ug/L	5.82 ^		(+/-20000)	VH1	12/15/20 11:12
QC1204712613 LCS											
COD	500000				478000	ug/L		95.6	(90%-110%)		12/15/20 11:12
QC1204712612 MB											
COD				U	ND	ug/L					12/15/20 11:12

QC Summary

Workorder: 529489

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Spectrometric Analysis											
Batch 2071495											
QC1204713613 529489001 MS											
COD	500000		43900		510000	ug/L		93.2	(90%-110%)	VH1	12/15/20 11:12
Titration and Ion Analysis											
Batch 2070733											
QC1204711203 LCS											
Sulfite	100000				95500	ug/L		95.5	(90%-110%)	RXB5	12/09/20 12:26
QC1204711202 MB											
Sulfite				U	ND	ug/L					12/09/20 12:24
QC1204711204 529489001 MS											
Sulfite	100000	HU	ND	H	98500	ug/L		98.5	(80%-120%)		12/09/20 12:30
QC1204711205 529489001 MSD											
Sulfite	100000	HU	ND	H	98500	ug/L	0	98.5	(0%-20%)		12/09/20 12:32
Volatile-GC/MS											
Batch 2071167											
QC1204711957 LCS											
1,1,1-Trichloroethane	50.0				56.7	ug/L		113	(70%-130%)	PXY1	12/09/20 09:03
1,1,2,2-Tetrachloroethane	50.0				46.7	ug/L		93	(70%-130%)		
1,1,2-Trichloroethane	50.0				46.9	ug/L		94	(70%-130%)		
1,1-Dichloroethane	50.0				55.9	ug/L		112	(70%-130%)		
1,1-Dichloroethylene	50.0				59.6	ug/L		119	(70%-130%)		
1,2,4-Trichlorobenzene	50.0				50.7	ug/L		101	(70%-130%)		
1,2-Dichlorobenzene	50.0				48.7	ug/L		97	(70%-130%)		

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 2071167										
1,2-Dichloroethane	50.0			48.3	ug/L		97	(70%-130%)	PXY1	12/09/20 09:03
1,2-Dichloropropane	50.0			50.1	ug/L		100	(70%-130%)		
1,3-Dichlorobenzene	50.0			48.3	ug/L		97	(70%-130%)		
1,4-Dichlorobenzene	50.0			47.3	ug/L		95	(70%-130%)		
2-Chloroethylvinyl ether	250			222	ug/L		89	(70%-130%)		
Acetone	250			225	ug/L		90	(70%-130%)		
Benzene	50.0			51.4	ug/L		103	(70%-130%)		
Bromodichloromethane	50.0			52.0	ug/L		104	(70%-130%)		
Bromoform	50.0			50.3	ug/L		101	(70%-130%)		
Bromomethane	50.0			53.3	ug/L		107	(70%-130%)		
Carbon tetrachloride	50.0			56.1	ug/L		112	(70%-130%)		
Chlorobenzene	50.0			48.4	ug/L		97	(70%-130%)		
Chloroethane	50.0			55.5	ug/L		111	(70%-130%)		
Chloroform	50.0			54.2	ug/L		108	(70%-130%)		
Chloromethane	50.0			57.5	ug/L		115	(70%-130%)		

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 2071167										
Cyclohexane	50.0			55.4	ug/L		111	(70%-130%)	PXY1	12/09/20 09:03
Dibromochloromethane	50.0			51.3	ug/L		103	(70%-130%)		
Dichlorodifluoromethane	50.0			72.4	ug/L		145*	(70%-130%)		
Ethylbenzene	50.0			48.6	ug/L		97	(70%-130%)		
Methylene chloride	50.0			45.3	ug/L		91	(70%-130%)		
Tetrachloroethylene	50.0			50.1	ug/L		100	(70%-130%)		
Toluene	50.0			49.5	ug/L		99	(70%-130%)		
Trichloroethylene	50.0			51.8	ug/L		104	(70%-130%)		
Trichlorofluoromethane	50.0			57.8	ug/L		116	(70%-130%)		
Vinyl chloride	50.0			56.2	ug/L		112	(70%-130%)		
Xylenes (total)	150			145	ug/L		97	(70%-130%)		
trans-1,2-Dichloroethylene	50.0			57.7	ug/L		115	(70%-130%)		
**1,2-Dichloroethane-d4	50.0			52.2	ug/L		104	(71%-134%)		
**Bromofluorobenzene	50.0			50.1	ug/L		100	(70%-131%)		
**Toluene-d8	50.0			50.6	ug/L		101	(74%-124%)		

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 2071167										
QC1204711958 LCS										
Acrolein	250			284	ug/L		114	(70%-130%)	PXY1	12/09/20 10:29
Acrylonitrile	250			257	ug/L		103	(70%-130%)		
**1,2-Dichloroethane-d4	50.0			51.9	ug/L		104	(71%-134%)		
**Bromofluorobenzene	50.0			50.5	ug/L		101	(70%-131%)		
**Toluene-d8	50.0			51.6	ug/L		103	(74%-124%)		
QC1204712833 LCS										
1,1,1-Trichloroethane	50.0			54.8	ug/L		110	(70%-130%)		12/10/20 09:22
1,1,2,2-Tetrachloroethane	50.0			47.3	ug/L		95	(70%-130%)		
1,1,2-Trichloroethane	50.0			47.3	ug/L		95	(70%-130%)		
1,1-Dichloroethane	50.0			53.5	ug/L		107	(70%-130%)		
1,1-Dichloroethylene	50.0			56.8	ug/L		114	(70%-130%)		
1,2,4-Trichlorobenzene	50.0			52.1	ug/L		104	(70%-130%)		
1,2-Dichlorobenzene	50.0			47.2	ug/L		94	(70%-130%)		
1,2-Dichloroethane	50.0			48.6	ug/L		97	(70%-130%)		
1,2-Dichloropropane	50.0			48.3	ug/L		97	(70%-130%)		
1,3-Dichlorobenzene	50.0			47.3	ug/L		95	(70%-130%)		

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 2071167										
1,4-Dichlorobenzene	50.0			46.4	ug/L		93	(70%-130%)	PXY1	12/10/20 09:22
2-Chloroethylvinyl ether	250			229	ug/L		92	(70%-130%)		
Acetone	250			233	ug/L		93	(70%-130%)		
Benzene	50.0			49.0	ug/L		98	(70%-130%)		
Bromodichloromethane	50.0			51.4	ug/L		103	(70%-130%)		
Bromoform	50.0			51.1	ug/L		102	(70%-130%)		
Bromomethane	50.0			50.3	ug/L		101	(70%-130%)		
Carbon tetrachloride	50.0			54.7	ug/L		109	(70%-130%)		
Chlorobenzene	50.0			46.5	ug/L		93	(70%-130%)		
Chloroethane	50.0			51.8	ug/L		104	(70%-130%)		
Chloroform	50.0			52.5	ug/L		105	(70%-130%)		
Chloromethane	50.0			49.9	ug/L		100	(70%-130%)		
Cyclohexane	50.0			52.0	ug/L		104	(70%-130%)		
Dibromochloromethane	50.0			51.2	ug/L		102	(70%-130%)		
Dichlorodifluoromethane	50.0			67.0	ug/L		134*	(70%-130%)		

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 2071167										
Ethylbenzene	50.0			46.8	ug/L		94	(70%-130%)	PXY1	12/10/20 09:22
Methylene chloride	50.0			42.3	ug/L		85	(70%-130%)		
Tetrachloroethylene	50.0			48.9	ug/L		98	(70%-130%)		
Toluene	50.0			47.9	ug/L		96	(70%-130%)		
Trichloroethylene	50.0			49.7	ug/L		99	(70%-130%)		
Trichlorofluoromethane	50.0			56.7	ug/L		113	(70%-130%)		
Vinyl chloride	50.0			50.6	ug/L		101	(70%-130%)		
Xylenes (total)	150			138	ug/L		92	(70%-130%)		
trans-1,2-Dichloroethylene	50.0			54.6	ug/L		109	(70%-130%)		
**1,2-Dichloroethane-d4	50.0			53.3	ug/L		107	(71%-134%)		
**Bromofluorobenzene	50.0			51.2	ug/L		102	(70%-131%)		
**Toluene-d8	50.0			50.4	ug/L		101	(74%-124%)		
QC1204712834 LCS										
Acrolein	250			286	ug/L		115	(70%-130%)		12/10/20 10:20
Acrylonitrile	250			257	ug/L		103	(70%-130%)		
**1,2-Dichloroethane-d4	50.0			53.6	ug/L		107	(71%-134%)		

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 2071167										
**Bromofluorobenzene	50.0			50.1	ug/L		100	(70%-131%)	PXY1	12/10/20 10:20
**Toluene-d8	50.0			51.6	ug/L		103	(74%-124%)		
QC1204711956 MB										
1,1,1-Trichloroethane			U	ND	ug/L					12/09/20 11:27
1,1,2,2-Tetrachloroethane			U	ND	ug/L					
1,1,2-Trichloroethane			U	ND	ug/L					
1,1-Dichloroethane			U	ND	ug/L					
1,1-Dichloroethylene			U	ND	ug/L					
1,2,4-Trichlorobenzene			U	ND	ug/L					
1,2-Dichlorobenzene			U	ND	ug/L					
1,2-Dichloroethane			U	ND	ug/L					
1,2-Dichloropropane			U	ND	ug/L					
1,3-Dichlorobenzene			U	ND	ug/L					
1,3-Dichloropropylene(total)			U	ND	ug/L					
1,4-Dichlorobenzene			U	ND	ug/L					
2-Chloroethylvinyl ether			U	ND	ug/L					

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 2071167										
Acetone			U	ND	ug/L				PXY1	12/09/20 11:27
Acrolein			U	ND	ug/L					
Acrylonitrile			U	ND	ug/L					
Benzene			U	ND	ug/L					
Bromodichloromethane			U	ND	ug/L					
Bromoform			U	ND	ug/L					
Bromomethane			U	ND	ug/L					
Carbon tetrachloride			U	ND	ug/L					
Chlorobenzene			U	ND	ug/L					
Chloroethane			U	ND	ug/L					
Chloroform			U	ND	ug/L					
Chloromethane			U	ND	ug/L					
Cyclohexane			U	ND	ug/L					
Dibromochloromethane			U	ND	ug/L					
Dichlorodifluoromethane			U	ND	ug/L					

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 2071167										
Ethylbenzene			U	ND	ug/L				PXY1	12/09/20 11:27
Methylene chloride			U	ND	ug/L					
Tetrachloroethylene			U	ND	ug/L					
Toluene			U	ND	ug/L					
Trichloroethylene			U	ND	ug/L					
Trichlorofluoromethane			U	ND	ug/L					
Vinyl chloride			U	ND	ug/L					
Xylenes (total)			U	ND	ug/L					
trans-1,2-Dichloroethylene			U	ND	ug/L					
**1,2-Dichloroethane-d4	50.0			53.0	ug/L		106	(71%-134%)		
**Bromofluorobenzene	50.0			49.9	ug/L		100	(70%-131%)		
**Toluene-d8	50.0			51.7	ug/L		103	(74%-124%)		
QC1204712832 MB										
1,1,1-Trichloroethane			U	ND	ug/L					12/10/20 11:18
1,1,2,2-Tetrachloroethane			U	ND	ug/L					
1,1,2-Trichloroethane			U	ND	ug/L					

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 2071167										
1,1-Dichloroethane			U	ND	ug/L				PXY1	12/10/20 11:18
1,1-Dichloroethylene			U	ND	ug/L					
1,2,4-Trichlorobenzene			U	ND	ug/L					
1,2-Dichlorobenzene			U	ND	ug/L					
1,2-Dichloroethane			U	ND	ug/L					
1,2-Dichloropropane			U	ND	ug/L					
1,3-Dichlorobenzene			U	ND	ug/L					
1,3-Dichloropropylene(total)			U	ND	ug/L					
1,4-Dichlorobenzene			U	ND	ug/L					
2-Chloroethylvinyl ether			U	ND	ug/L					
Acetone			U	ND	ug/L					
Acrolein			U	ND	ug/L					
Acrylonitrile			U	ND	ug/L					
Benzene			U	ND	ug/L					
Bromodichloromethane			U	ND	ug/L					

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 2071167										
Bromoform			U	ND	ug/L				PXY1	12/10/20 11:18
Bromomethane			U	ND	ug/L					
Carbon tetrachloride			U	ND	ug/L					
Chlorobenzene			U	ND	ug/L					
Chloroethane			U	ND	ug/L					
Chloroform			U	ND	ug/L					
Chloromethane			U	ND	ug/L					
Cyclohexane			U	ND	ug/L					
Dibromochloromethane			U	ND	ug/L					
Dichlorodifluoromethane			U	ND	ug/L					
Ethylbenzene			U	ND	ug/L					
Methylene chloride			U	ND	ug/L					
Tetrachloroethylene			U	ND	ug/L					
Toluene			U	ND	ug/L					
Trichloroethylene			U	ND	ug/L					

QC Summary

Workorder: 529489

Parmname	NOM	Sample Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Volatile-GC/MS									
Batch 2071167									
Trichlorofluoromethane		U	ND	ug/L				PXY1	12/10/20 11:18
Vinyl chloride		U	ND	ug/L					
Xylenes (total)		U	ND	ug/L					
trans-1,2-Dichloroethylene		U	ND	ug/L					
**1,2-Dichloroethane-d4	50.0		53.2	ug/L		106	(71%-134%)		
**Bromofluorobenzene	50.0		49.9	ug/L		100	(70%-131%)		
**Toluene-d8	50.0		51.1	ug/L		102	(74%-124%)		
QC1204711959 529489001 PS									
1,1,1-Trichloroethane	50.0	U ND	55.5	ug/L		111	(66%-138%)		12/10/20 17:11
1,1,2,2-Tetrachloroethane	50.0	U ND	49.7	ug/L		99	(52%-142%)		
1,1,2-Trichloroethane	50.0	U ND	49.7	ug/L		99	(68%-126%)		
1,1-Dichloroethane	50.0	U ND	54.5	ug/L		109	(67%-129%)		
1,1-Dichloroethylene	50.0	U ND	57.3	ug/L		115	(62%-134%)		
1,2,4-Trichlorobenzene	50.0	U ND	47.0	ug/L		94	(43%-136%)		
1,2-Dichlorobenzene	50.0	U ND	45.3	ug/L		91	(52%-128%)		
1,2-Dichloroethane	50.0	U ND	54.1	ug/L		108	(69%-132%)		

QC Summary

Workorder: 529489

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 2071167											
1,2-Dichloropropane	50.0	U	ND		49.5	ug/L		99	(66%-129%)	PXY1	12/10/20 17:11
1,3-Dichlorobenzene	50.0	U	ND		45.7	ug/L		91	(50%-125%)		
1,4-Dichlorobenzene	50.0	U	ND		44.5	ug/L		89	(49%-125%)		
2-Chloroethylvinyl ether	250	U	ND		242	ug/L		97	(60%-118%)		
Acetone	250	J	2.35		275	ug/L		109	(35%-148%)		
Benzene	50.0	U	ND		49.5	ug/L		99	(63%-124%)		
Bromodichloromethane	50.0	U	ND		54.9	ug/L		110	(72%-140%)		
Bromoform	50.0	U	ND		53.1	ug/L		106	(61%-136%)		
Bromomethane	50.0	U	ND		56.5	ug/L		113	(64%-137%)		
Carbon tetrachloride	50.0	U	ND		55.5	ug/L		111	(63%-146%)		
Chlorobenzene	50.0	U	ND		46.9	ug/L		94	(60%-122%)		
Chloroethane	50.0	U	ND		48.4	ug/L		97	(65%-127%)		
Chloroform	50.0	U	ND		54.0	ug/L		108	(66%-133%)		
Chloromethane	50.0	U	ND		46.8	ug/L		94	(50%-138%)		
Cyclohexane	50.0	U	ND		51.0	ug/L		102	(55%-131%)		

QC Summary

Workorder: 529489

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 2071167											
Dibromochloromethane	50.0	U	ND		53.6	ug/L		107	(69%-137%)	PXY1	12/10/20 17:11
Dichlorodifluoromethane	50.0	U	ND		63.3	ug/L		127	(39%-149%)		
Ethylbenzene	50.0	U	ND		46.1	ug/L		92	(57%-126%)		
Methylene chloride	50.0	U	ND		43.6	ug/L		87	(62%-129%)		
Tetrachloroethylene	50.0	U	ND		48.0	ug/L		96	(57%-132%)		
Toluene	50.0	U	ND		47.3	ug/L		95	(60%-122%)		
Trichloroethylene	50.0	U	ND		50.3	ug/L		101	(66%-128%)		
Trichlorofluoromethane	50.0	U	ND		56.3	ug/L		113	(66%-135%)		
Vinyl chloride	50.0	U	ND		48.4	ug/L		97	(58%-134%)		
Xylenes (total)	150	U	ND		138	ug/L		92	(48%-137%)		
trans-1,2-Dichloroethylene	50.0	U	ND		55.0	ug/L		110	(65%-130%)		
**1,2-Dichloroethane-d4	50.0		56.6		56.6	ug/L		113	(71%-134%)		
**Bromofluorobenzene	50.0		51.8		50.6	ug/L		101	(70%-131%)		
**Toluene-d8	50.0		51.5		50.1	ug/L		100	(74%-124%)		
QC1204711960 529489001 PS											
Acrolein	250	U	ND		248	ug/L		99	(55%-137%)		12/09/20 20:04

QC Summary

Workorder: 529489

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 2071167											
Acrylonitrile	250	U	ND		257	ug/L		103	(55%-139%)	PXY1	12/09/20 20:04
**1,2-Dichloroethane-d4	50.0		56.6		53.5	ug/L		107	(71%-134%)		
**Bromofluorobenzene	50.0		51.8		49.1	ug/L		98	(70%-131%)		
**Toluene-d8	50.0		51.5		50.0	ug/L		100	(74%-124%)		
QC1204711961 529489001 PSD											
1,1,1-Trichloroethane	50.0	U	ND		54.8	ug/L	1	110	(0%-20%)		12/10/20 17:40
1,1,2,2-Tetrachloroethane	50.0	U	ND		50.5	ug/L	2	101	(0%-20%)		
1,1,2-Trichloroethane	50.0	U	ND		52.1	ug/L	5	104	(0%-20%)		
1,1-Dichloroethane	50.0	U	ND		53.9	ug/L	1	108	(0%-20%)		
1,1-Dichloroethylene	50.0	U	ND		56.9	ug/L	1	114	(0%-20%)		
1,2,4-Trichlorobenzene	50.0	U	ND		47.3	ug/L	1	95	(0%-20%)		
1,2-Dichlorobenzene	50.0	U	ND		47.7	ug/L	5	95	(0%-20%)		
1,2-Dichloroethane	50.0	U	ND		54.8	ug/L	1	110	(0%-20%)		
1,2-Dichloropropane	50.0	U	ND		50.6	ug/L	2	101	(0%-20%)		
1,3-Dichlorobenzene	50.0	U	ND		46.8	ug/L	2	94	(0%-20%)		
1,4-Dichlorobenzene	50.0	U	ND		46.2	ug/L	4	92	(0%-20%)		

QC Summary

Workorder: 529489

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 2071167											
2-Chloroethylvinyl ether	250	U	ND		241	ug/L	0	96	(0%-20%)	PXY1	12/10/20 17:40
Acetone	250	J	2.35		270	ug/L	2	107	(0%-20%)		
Benzene	50.0	U	ND		50.0	ug/L	1	100	(0%-20%)		
Bromodichloromethane	50.0	U	ND		55.7	ug/L	2	111	(0%-20%)		
Bromoform	50.0	U	ND		54.9	ug/L	3	110	(0%-20%)		
Bromomethane	50.0	U	ND		55.4	ug/L	2	111	(0%-20%)		
Carbon tetrachloride	50.0	U	ND		55.1	ug/L	1	110	(0%-20%)		
Chlorobenzene	50.0	U	ND		48.3	ug/L	3	97	(0%-20%)		
Chloroethane	50.0	U	ND		47.6	ug/L	2	95	(0%-20%)		
Chloroform	50.0	U	ND		54.1	ug/L	0	108	(0%-20%)		
Chloromethane	50.0	U	ND		45.5	ug/L	3	91	(0%-20%)		
Cyclohexane	50.0	U	ND		51.2	ug/L	0	102	(0%-20%)		
Dibromochloromethane	50.0	U	ND		56.0	ug/L	4	112	(0%-20%)		
Dichlorodifluoromethane	50.0	U	ND		60.5	ug/L	5	121	(0%-20%)		
Ethylbenzene	50.0	U	ND		48.0	ug/L	4	96	(0%-20%)		

QC Summary

Workorder: 529489

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 2071167											
Methylene chloride	50.0	U	ND		43.4	ug/L	1	87	(0%-20%)	PXY1	12/10/20 17:40
Tetrachloroethylene	50.0	U	ND		49.0	ug/L	2	98	(0%-20%)		
Toluene	50.0	U	ND		49.0	ug/L	4	98	(0%-20%)		
Trichloroethylene	50.0	U	ND		50.9	ug/L	1	102	(0%-20%)		
Trichlorofluoromethane	50.0	U	ND		54.4	ug/L	3	109	(0%-20%)		
Vinyl chloride	50.0	U	ND		46.9	ug/L	3	94	(0%-20%)		
Xylenes (total)	150	U	ND		141	ug/L	2	94	(0%-20%)		
trans-1,2-Dichloroethylene	50.0	U	ND		55.1	ug/L	0	110	(0%-20%)		
**1,2-Dichloroethane-d4	50.0		56.6		57.0	ug/L		114	(71%-134%)		
**Bromofluorobenzene	50.0		51.8		52.8	ug/L		106	(70%-131%)		
**Toluene-d8	50.0		51.5		52.1	ug/L		104	(74%-124%)		
QC1204711962 529489001 PSD											
Acrolein	250	U	ND		237	ug/L	5	95	(0%-20%)		12/09/20 20:33
Acrylonitrile	250	U	ND		256	ug/L	1	102	(0%-20%)		
**1,2-Dichloroethane-d4	50.0		56.6		53.6	ug/L		107	(71%-134%)		
**Bromofluorobenzene	50.0		51.8		51.3	ug/L		103	(70%-131%)		

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QC Summary

Workorder: **529489**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 2071167										
**Toluene-d8	50.0	51.5		50.1	ug/L		100	(74%-124%)	PXY1	12/09/20 20:33
Wet Chemistry General										
Batch 2070882										
QC1204711518 529489001 DUP										
Color		25.0		25.0	PCU	0		(+/-5.00)	VH1	12/10/20 10:44
QC1204711517 LCS										
Color	35.0			35.0	PCU		100	(100%-100%)		12/10/20 10:35
QC1204711516 MB										
Color			U	ND	PCU					12/10/20 10:35

Notes:

The Qualifiers in this report are defined as follows:

**	Analyte is a surrogate compound
<	Result is less than value reported
>	Result is greater than value reported
A	The TIC is a suspected aldol-condensation product
B	The target analyte was detected in the associated blank.
C	Analyte has been confirmed by GC/MS analysis
D	Results are reported from a diluted aliquot of the sample
E	%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
E	Concentration of the target analyte exceeds the instrument calibration range
E	General Chemistry--Concentration of the target analyte exceeds the instrument calibration range
FB	Mercury was found present at quantifiable concentrations in field blanks received with these samples. Data associated with the blank are deemed invalid for reporting to regulatory agencies
H	Analytical holding time was exceeded
J	See case narrative for an explanation
J	Value is estimated
JNX	Non Calibrated Compound
N	Metals--The Matrix spike sample recovery is not within specified control limits
N	Organics--Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time

N	Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
N/A	RPD or %Recovery limits do not apply.
N1	See case narrative
ND	Analyte concentration is not detected above the detection limit
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
P	Organics--The concentrations between the primary and confirmation columns/detectors is >40% different. For HPLC, the difference is >70%.
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
R	Per section 9.3.4.1 of Method 1664 Revision B, due to matrix spike recovery issues, this result may not be reported or used for regulatory compliance purposes.
R	Sample results are rejected
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
UJ	Compound cannot be extracted
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.
Y	QC Samples were not spiked with this compound
Z	Paint Filter Test--Particulates passed through the filter, however no free liquids were observed.
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
d	5-day BOD--The 2:1 depletion requirement was not met for this sample
e	5-day BOD--Test replicates show more than 30% difference between high and low values. The data is qualified per the method and can be used for reporting purposes
h	Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

QC Summary

Report Date: January 26, 2021

Client : **GEL Engineering, LLC**
2040 Savage Road

Charleston, South Carolina

Contact: **Mr. John McLure**

Workorder: **529489**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gas Flow										
Batch 2071441										
QC1204712513 529489001 DUP										
Alpha		7.48		15.6	pCi/L	70.6		(0% - 100%)	JXK3	12/11/20 08:07
	Uncert:	+/-3.72		+/-4.76						
	TPU:	+/-3.91		+/-5.40						
Beta		10.0		14.7	pCi/L	37.6		(0% - 100%)		
	Uncert:	+/-2.50		+/-2.68						
	TPU:	+/-3.02		+/-3.63						
QC1204712516 LCS										
Alpha	281			251	pCi/L		89.3	(75%-125%)	JXK3	12/11/20 08:07
	Uncert:			+/-24.7						
	TPU:			+/-50.1						
Beta	966			973	pCi/L		101	(75%-125%)		
	Uncert:			+/-35.6						
	TPU:			+/-166						
QC1204712512 MB										
Alpha			U	-0.0419	pCi/L				JXK3	12/14/20 12:31
	Uncert:			+/-1.42						
	TPU:			+/-1.42						
Beta			U	0.592	pCi/L					
	Uncert:			+/-2.58						
	TPU:			+/-2.58						
QC1204712514 529489001 MS										
Alpha	505	7.48		344	pCi/L		66.6*	(75%-125%)	JXK3	12/11/20 08:02
	Uncert:	+/-3.72		+/-58.0						
	TPU:	+/-3.91		+/-95.5						
Beta	1740	10.0		1580	pCi/L		90.6	(75%-125%)		
	Uncert:	+/-2.50		+/-63.4						
	TPU:	+/-3.02		+/-265						
QC1204712515 529489001 MSD										
Alpha	505	7.48		281	pCi/L	20.2*	54.1*	(0%-20%)	JXK3	12/11/20 08:06
	Uncert:	+/-3.72		+/-48.3						
	TPU:	+/-3.91		+/-67.5						
Beta	1740	10.0		1730	pCi/L	8.79	98.9	(0%-20%)		
	Uncert:	+/-2.50		+/-64.5						
	TPU:	+/-3.02		+/-296						
Batch 2071442										
QC1204712518 529489001 DUP										
Total Alpha Radium	U	3.39	U	2.20	pCi/L	0		N/A	LXB3	12/11/20 11:59
	Uncert:	+/-3.26		+/-2.19						
	TPU:	+/-3.32		+/-2.23						
QC1204712519 LCS										

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QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Gas Flow										
Batch 2071442										
Total Alpha Radium	2280			2340	pCi/L		103	(75%-125%)	LXB3	12/11/20 12:00
	Uncert:			+/-60.0						
	TPU:			+/-404						
QC1204712517 MB										
Total Alpha Radium			U	-0.431	pCi/L				LXB3	12/11/20 11:59
	Uncert:			+/-1.39						
	TPU:			+/-1.39						
Rad Ra-226										
Batch 2071434										
QC1204712492 529489001 DUP										
Radium-226		0.581		0.678	pCi/L	15.4		(0% - 100%)	MXH8	12/14/20 08:27
	Uncert:	+/-0.321		+/-0.423						
	TPU:	+/-0.333		+/-0.442						
QC1204712494 LCS										
Radium-226	27.0			31.0	pCi/L		115	(75%-125%)	MXH8	12/14/20 08:59
	Uncert:			+/-2.03						
	TPU:			+/-5.54						
QC1204712491 MB										
Radium-226			U	0.298	pCi/L				MXH8	12/14/20 08:27
	Uncert:			+/-0.310						
	TPU:			+/-0.313						
QC1204712493 529489001 MS										
Radium-226	27.0	0.581		25.7	pCi/L		92.9	(75%-125%)	MXH8	12/14/20 08:59
	Uncert:	+/-0.321		+/-1.78						
	TPU:	+/-0.333		+/-4.81						

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

**	Analyte is a Tracer compound
<	Result is less than value reported
>	Result is greater than value reported
BD	Results are either below the MDC or tracer recovery is low
FA	Failed analysis.
H	Analytical holding time was exceeded
J	See case narrative for an explanation
J	Value is estimated
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
M	M if above MDC and less than LLD
M	REMP Result > MDC/CL and < RDL
N/A	RPD or %Recovery limits do not apply.
N1	See case narrative

QC Summary

Workorder: 529489

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time

ND	Analyte concentration is not detected above the detection limit
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
R	Sample results are rejected
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
UI	Gamma Spectroscopy--Uncertain identification
UJ	Gamma Spectroscopy--Uncertain identification
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h	Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
** Indicates analyte is a surrogate/tracer compound.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Page: 1 of 2
Project # S00P01120
GEL Quote #:
COC Number (1):
PO Number:

529489

GEL Laboratories LLC
gel.com
Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

Chain of Custody and Analytical Request

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

GEL Work Order Number: GEL Project Manager:

Client Name: GEL(S00P01120) Phone #
Project/Site Name: NPDES Renewal - Winyah Station Fax #
Address: Georgetown, SC
Collected By: Client(TDW, WSR) Send Results To: J. McLure

Sample Analysis Requested (5) (Fill in the number of containers for each test)

Sample ID * For composites - indicate start and stop date/time	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Radioactive Please supply isotopic info.	(7) Known or possible hazards	Total number of containers	TSS	TOC	COD, NH3, NO2/3, TKN, TON, TP	200.8 Metals	CN	Total Phenols	O&G	2C VOC 624.1	BOD	2C BNA	Comments Note: extra sample is required for sample specific QC
<- Preservative Type (6)										SA	SA	NI	SH	SA	HA				
Outfall 002	12/8/20	1245	G	N	WW			14	1	1	1	1	1	1	2	3	1	2	*SCDHEC Wastewater PQL's must be met * Field pH: 7.5 Field pH Dup: 7.5 Field Temp: 25.4 Field Cl2: 0.08 DPD Lot#: A9003 Field Cl2 Dup: 0.0

Chain of Custody Signatures

	Relinquished By (Signed)	Date	Time		Received by (signed)	Date	Time
1	[signature]	12/8/20	1510	1	A. Olsen	12/8/20	15:10
2				2			
3				3			

TAT Requested: Normal: ✓ Rush: ____ Specify: ____ (Subject to Surcharge)

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4

Additional Remarks:

For Lab Receiving Use Only: Custody Seal Intact? [ ] Yes [ ] No **Cooler Temp:** 1 °C

> For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)

Sample Collection Time Zone: [ ] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other:

1.) Chain of Custody Number = Client Determined

2.) QC Codes: **N** = Normal Sample, **TB** = Trip Blank, **FD** = Field Duplicate, **EB** = Equipment Blank, **MS** = Matrix Spike Sample, **MSD** = Matrix Spike Duplicate Sample, **G** = Grab, **C** = Composite

3.) Field Filtered: For liquid matrices, indicate with a **- Y -** for yes the sample was field filtered or **- N -** for sample was not field filtered.

4.) Matrix Codes: **DW**=Drinking Water, **GW**=Groundwater, **SW**=Surface Water, **WW**=Waste Water, **W**=Water, **ML**=Misc Liquid, **SO**=Soil, **SD**=Sediment, **SL**=Sludge, **SS**=Solid Waste, **O**=Oil, **F**=Filter, **P**=Wipe, **U**=Urine, **F**=Fecal, **N**=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. **8260B, 6010B/7470A**) and number of containers provided for each (i.e. *8260B* - 3, *6010B/7470A* - 1).

6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank

7.) *Are there any known or possible hazards associated with these samples?*

RCRA Metals
As = Arsenic, Hg= Mercury
Ba = Barium, Se= Selenium
Cd = Cadmium, Ag= Silver
Cr = Chromium, MR= Miscellaneous RCRA metals
Pb = Lead

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

TSCA Regulated
PCB = Polychlorinated biphenyls

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

***Please provide any additional details below regarding handling and/or disposal concerns.** (i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)*

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

GEL Laboratories LLC
gel.com
Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

Chain of Custody and Analytical Request

Page: 2 of 2
Project # S00P01120
GEL Quote #:
COC Number [1]:
PO Number:

GEL Work Order Number:
GEL Project Manager:

Client Name: GEL (S00P01120)
Phone #
Project/Site Name: NPDES Renewal - Winyah Station
Fax #
Address: Georgetown, SC
Collected By: Client (TDN, WSR)
Send Results To: J. McLure

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Sample ID * For composites - indicate start and stop date/time	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Should this sample be considered: Radioactive (If yes, please supply isotopic info.)	(7) Known or possible Hazards	Total number of containers	Br-, F-, SO4, MBAS, Color	Sulfide	Sulfite	Gross A/B, Tot Alpha Rad, Ra226							Comments Note: extra sample is required for sample specific QC
<-- Preservative Type (6)										Zn Ac	EDTA	N							
Outfall 002	12/8/20	1245	G	N	WW			4	1	1	1	1							

Chain of Custody Signatures

	Relinquished By (Signed)	Date	Time		Received by (signed)	Date	Time
1	[signature]	12/8/20	1510	1	[signature]	12/8/20	15:10
2				2			
3				3			

TAT Requested: Normal: ✓ Rush: ____ Specify: ______ (Subject to Surcharge)

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4

Additional Remarks:

For Lab Receiving Use Only: *Custody Seal Intact?* [ ] Yes [ ] No *Cooler Temp:* 1 °C

> For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)

Sample Collection Time Zone: [ ] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other:

1.) Chain of Custody Number = Client Determined

2.) QC Codes: **N** = Normal Sample, **TB** = Trip Blank, **FD** = Field Duplicate, **EB** = Equipment Blank, **MS** = Matrix Spike Sample, **MSD** = Matrix Spike Duplicate Sample, **G** = Grab, **C** = Composite

3.) Field Filtered: For liquid matrices, indicate with a **- Y -** for yes the sample was field filtered or **- N -** for sample was not field filtered.

4.) Matrix Codes: **DW**=Drinking Water, **GW**=Groundwater, **SW**=Surface Water, **WW**=Waste Water, **W**=Water, **ML**=Misc Liquid, **SO**=Soil, **SD**=Sediment, **SL**=Sludge, **SS**=Solid Waste, **O**=Oil, **F**=Filter, **P**=Wipe, **U**=Urine, **F**=Fecal, **N**=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. **8260B, 6010B/7470A**) and number of containers provided for each (i.e. *8260B* - **3**, *6010B/7470A* - **1**).

6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank

7.) **KNOWN OR POSSIBLE HAZARDS**

RCRA Metals
As = Arsenic, **Hg**= Mercury
Ba = Barium, **Se**= Selenium
Cd = Cadmium, **Ag**= Silver
Cr = Chromium, **MR**= Misc. RCRA metals
Pb = Lead

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

TSCA Regulated
PCB = Polychlorinated biphenyls

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. (i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)

GEL Laboratories LLC

JR **SAMPLE RECEIPT & REVIEW FORM**

Client: SOOP		**SDG/AR/COC/Work Order:** 529489	
Received By: AJA		**Date Received:** 12/8/20	
Carrier and Tracking Number		Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other	

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#: If UN2910, Is the Radioactive Shipment Survey Compliant? Yes___ No___
B) Did the client designate the samples are to be received as radioactive?		✓	COC notation or radioactive stickers on containers equal client designation.
C) Did the RSO classify the samples as radioactive?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): Ø CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3
D) Did the client designate samples are hazardous?		✓	COC notation or hazard labels on containers equal client designation.
E) Did the RSO identify possible hazards?		✓	If D or E is yes, select Hazards below. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	✓			Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	✓			Preservation Method: Wet Ice Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius TEMP: 1°
4	Daily check performed and passed on IR temperature gun?	✓			**Temperature Device Serial #:** IR4-16 Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?		✓		Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?	✓			If Yes, are Encores or Soil Kits present for solids? Yes___ No ✓ NA___(If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes___ No ✓ NA___(If unknown, select No) Are liquid VOA vials free of headspace? Yes ✓ No___ NA___ Sample ID's and containers affected:
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	✓			Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided by use of GEL labels?			✓	
13	COC form is properly signed in relinquished/received sections?	✓			Circle Applicable: Not relinquished Other (describe)

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials AM Date 12/9/20 Page 1 of 1

GL-CHL-SR-001 Rev 7

List of current GEL Certifications as of 26 January 2021

State	Certification
Alabama	42200
Alaska	17−018
Alaska Drinking Water	SC00012
Arkansas	88−0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH−0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330−15−00283, P330−15−00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C−SC−01
Kansas NELAP	E−10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2019020
Maryland	270
Massachusetts	M−SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE−OS−26−13
Nevada	SC000122021−1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R−158
Oklahoma	2019−165
Pennsylvania NELAP	68−00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235−20−17
Utah NELAP	SC000122020−33
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

Technical Case Narrative
GEL Engineering, LLC
SDG #: 529489

GC/MS Volatile

Product: **Volatile Organic Compounds (VOC) by Gas Chromatograph/Mass Spectrometer**
Analytical Method: EPA 624.1
Analytical Procedure: GL-OA-E-026 REV# 29
Analytical Batch: 2071167

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
529489001	Outfall 002
1204711956	Method Blank (MB)
1204711957	Laboratory Control Sample (LCS)
1204711958	Laboratory Control Sample (LCS)
1204711959	529489001(Outfall 002) Post Spike (PS)
1204711960	529489001(Outfall 002) Post Spike (PS)
1204711961	529489001(Outfall 002) Post Spike Duplicate (PSD)
1204711962	529489001(Outfall 002) Post Spike Duplicate (PSD)
1204712832	Method Blank (MB)
1204712833	Laboratory Control Sample (LCS)
1204712834	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Calibration Information

Continuing Calibration Verification Requirements
All Calibration Verification Standards (CCV) did not meet the acceptance criteria as outlined in Method 8260D for samples and the associated QC . However, the method allows for a designated number of outliers dependent on the requested analyte list. This SDG satisfied the 8260D outlier acceptance criteria. The results are reported.

Quality Control (QC) Information

Blank (MB) Statement
Target analytes were detected in the blank 1204711956 (MB) below the reporting limit.

Laboratory Control Sample (LCS) Recovery
The LCS/and or LCSD (See Below) recoveries were not within the acceptance limits for all analytes. The unacceptable analytes were not detected in the samples associated with the laboratory control samples. Therefore, the data were reported.

Sample	Analyte	Value
1204711957 (LCS)	Dichlorodifluoromethane	145* (70%-130%)
1204712833 (LCS)	Dichlorodifluoromethane	134* (70%-130%)

Technical Information

Sample Re-extraction/Re-analysis
Samples 1204711959 (Outfall 002PS) and 1204711961 (Outfall 002PSD) were re-analyzed due to unacceptable surrogate or internal standard recoveries in the initial analysis. The re-analyses confirmed/and or passed and were reported.

GC/MS Semivolatile

Product: **Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry**
Analytical Method: EPA 625.1
Analytical Procedure: GL-OA-E-009 REV# 45
Analytical Batch: 2071115

Preparation Method: EPA 625.1
Preparation Procedure: GL-OA-E-013 REV# 34
Preparation Batch: 2071114

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
529489001	Outfall 002
1204711877	Method Blank (MB)
1204711878	Laboratory Control Sample (LCS)
1204711879	529493001(NonSDG) Matrix Spike (MS)
1204711880	529493001(NonSDG) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

Surrogate Recoveries
Samples (See Below) did not meet surrogate recovery acceptance criteria. Since the parent sample and associated MS/MSD pair displayed similar recoveries, the failures were attributed to matrix interference and the data results are reported.

Sample	Analyte	Value
1204711879 (Non SDG 529493001MS)	p-Terphenyl-d14	25* (35%-134%)
1204711880 (Non SDG 529493001MSD)	p-Terphenyl-d14	24* (35%-134%)

Spike Recovery Statement
The MS or MSD (See Below) recovered spiked analytes outside of the established acceptance limits. As similar recoveries were displayed in the MS and MSD, the failures were attributed to sample matrix interference and the data were reported.

Sample	Analyte	Value
1204711879 (Non SDG 529493001MS)	2, 4-Dichlorophenol	0* (40%-109%)
	2, 4-Dimethylphenol	0* (35%-100%)
	3, 3'-Dichlorobenzidine	0* (31%-122%)
	Benzidine	0* (10%-134%)
	Benzo(a)pyrene	38* (41%-109%)
	Phenol	11* (19%-78%)
1204711880 (Non SDG 529493001MSD)	2, 4-Dichlorophenol	0* (40%-109%)
	2, 4-Dimethylphenol	0* (35%-100%)
	3, 3'-Dichlorobenzidine	9* (31%-122%)
	4-Chloro-3-methylphenol	0* (38%-115%)
	Benzidine	0* (10%-134%)
	Benzo(a)pyrene	38* (41%-109%)
	Phenol	9* (19%-78%)

MS/MSD Relative Percent Difference (RPD) Statement
The relative percent differences (RPD) for the MS and MSD, (See Below), were not within the acceptance limits. The failures were attributed to matrix interference. The data were reported.

Sample	Analyte	Value
1204711879MS and 1204711880MSD (Non SDG 529493001)	3, 3'-Dichlorobenzidine, 4-Chloro-3-methylphenol	RPD 200* (0%-30%)
	4-Nitrophenol	RPD 39* (0%-30%)

<u>**Miscellaneous Information**</u>

Manual Integrations
Samples (See Below) required manual integration in order to properly identify one or more peaks and/or to correctly position the baseline as set in the calibration standard injections.

Sample	Analyte	Value
1204711879 (Non SDG 529493001MS)	Phenol-d5	Result 35.9ug/L
1204711880 (Non SDG 529493001MSD)	Phenol-d5	Result 35.2ug/L

Metals

Product: Determination of Metals by ICP-MS
Analytical Method: EPA 200.8 SC_NPDES
Analytical Procedure: GL-MA-E-014 REV# 34
Analytical Batch: 2071312

Preparation Method: EPA 200.2
Preparation Procedure: GL-MA-E-016 REV# 18
Preparation Batch: 2071311

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
529489001	Outfall 002
1204712217	Method Blank (MB)**ICP-MS**
1204712218	Laboratory Control Sample (LCS)
1204712221	529489001(Outfall 002L) Serial Dilution (SD)
1204712219	529489001(Outfall 002S) Matrix Spike (MS)
1204712220	529489001(Outfall 002SD) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Calibration Information

ICSA/ICSAB Statement
For the ICP-MS analysis, the ICSA solution contains analyte concentrations which are verified trace impurities indigenous to the purchased standard.

Technical Information

Sample Dilutions
Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range. Sample 529489001 (Outfall 002) was diluted to ensure that the analyte concentration was within the linear calibration range of the instrument.

Analyte	529489 001
Boron	100X
Magnesium	10X 1X
Strontium	10X 1X

General Chemistry

Product: **Carbon, Total Organic**
Analytical Method: SM 5310 B
Analytical Procedure: GL-GC-E-093 REV# 16
Analytical Batch: 2070832

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
529489001	Outfall 002
1204712421	Method Blank (MB)
1204712422	Laboratory Control Sample (LCS)
1204712425	529407001(NonSDG) Sample Duplicate (DUP)
1204712428	529407001(NonSDG) Post Spike (PS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: **Cyanide, Total**
Analytical Method: EPA 335.4 SC
Analytical Procedure: GL-GC-E-095 REV# 22
Analytical Batch: 2070270

Preparation Method: EPA 335.4
Preparation Procedure: GL-GC-E-067 REV# 23
Preparation Batch: 2070269

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
529489001	Outfall 002
1204710179	Method Blank (MB)
1204710180	Laboratory Control Sample (LCS)
1204711425	529444002(NonSDG) Sample Duplicate (DUP)
1204711427	529444002(NonSDG) Matrix Spike (MS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: **Total Phenols**

Analytical Method: EPA 420.4 SC
Analytical Procedure: GL-GC-E-102 REV# 10
Analytical Batch: 2070826

Preparation Method: EPA 420.4
Preparation Procedure: GL-GC-E-102 REV# 10
Preparation Batch: 2070825

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
529489001	Outfall 002
1204711434	Method Blank (MB)
1204711435	Laboratory Control Sample (LCS)
1204711436	529489001(Outfall 002) Matrix Spike (MS)
1204711437	529489001(Outfall 002) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Sample Re-analysis
Sample 1204711435 (LCS) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

Product: Ion Chromatography
Analytical Method: EPA 300.0
Analytical Procedure: GL-GC-E-086 REV# 28
Analytical Batch: 2070769

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
529489001	Outfall 002
1204711282	Method Blank (MB)
1204711283	Laboratory Control Sample (LCS)
1204711284	529485001(NonSDG) Sample Duplicate (DUP)
1204711285	529485001(NonSDG) Post Spike (PS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Sample Dilutions

The following sample 529489001 (Outfall 002) was diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Analyte	529489 001
Bromide	5X
Sulfate	100X

Sample Re-analysis

Samples 1204711284 (Non SDG 529485001DUP) and 1204711285 (Non SDG 529485001PS) were re-analyzed to verify the results.

Miscellaneous Information

Manual Integrations

Samples 1204711282 (MB) and 1204711284 (Non SDG 529485001DUP) were manually integrated to correctly position the baseline as set in the calibration standards.

Product: **Biochemical Oxygen Demand**
Analytical Method: SM 5210B
Analytical Procedure: GL-GC-E-045 REV# 27
Analytical Batch: 2070479

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
529489001	Outfall 002
1204710684	Method Blank (MB)
1204710685	Laboratory Control Sample (LCS)
1204710686	BOD Seed (SEED)
1204710687	529442002(NonSDG) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

2:1 Depletion Requirement

The following samples in this batch did not meet the 2:1 depletion requirement. 529489001 (Outfall 002).

Product: **Nitrate/Nitrite Cad Redux Low Level**

Analytical Method: EPA 353.2 Low Level
Analytical Procedure: GL-GC-E-128 REV# 10
Analytical Batch: 2071414

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
529489001	Outfall 002
1204712448	Method Blank (MB)
1204712449	Laboratory Control Sample (LCS)
1204712450	529505004(NonSDG) Sample Duplicate (DUP)
1204712452	529505004(NonSDG) Post Spike (PS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: **Ammonia Nitrogen**
Analytical Method: EPA 350.1 SC
Analytical Procedure: GL-GC-E-106 REV# 10
Analytical Batch: 2072723

Preparation Method: EPA 350.1 Prep
Preparation Procedure: GL-GC-E-072 REV# 18
Preparation Batch: 2072722

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
529489001	Outfall 002
1204715017	Method Blank (MB)
1204715018	Laboratory Control Sample (LCS)
1204715019	529322002(NonSDG) Sample Duplicate (DUP)
1204715020	529322002(NonSDG) Matrix Spike (MS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: **Total Kjeldahl Nitrogen**
Analytical Method: EPA 351.2 SC
Analytical Procedure: GL-GC-E-104 REV# 15

Analytical Batch: 2072752

Preparation Method: EPA 351.2 Prep
Preparation Procedure: GL-GC-E-071 REV# 17
Preparation Batch: 2072748

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
529489001	Outfall 002
1204715130	Method Blank (MB)
1204715131	Laboratory Control Sample (LCS)
1204715132	529407001(NonSDG) Sample Duplicate (DUP)
1204715133	529407001(NonSDG) Matrix Spike (MS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Sample Dilutions
The following samples 1204715132 (Non SDG 529407001DUP) and 1204715133 (Non SDG 529407001MS) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

Sample Re-analysis
Samples 1204715130 (MB), 1204715131 (LCS), 1204715132 (Non SDG 529407001DUP), 1204715133 (Non SDG 529407001MS) and 529489001 (Outfall 002) were re-analyzed due to CCV failure. The reanalysis data with passing instrument QC was reported.

Product: Total Phosphorus
Analytical Method: EPA 365.4
Analytical Procedure: GL-GC-E-103 REV# 11
Analytical Batch: 2072771

Preparation Method: EPA 365.4 Prep
Preparation Procedure: GL-GC-E-071 REV# 17
Preparation Batch: 2072761

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
529489001	Outfall 002
1204715182	Method Blank (MB)
1204715183	Laboratory Control Sample (LCS)
1204715184	529407001(NonSDG) Sample Duplicate (DUP)

1204715185 529407001(NonSDG) Matrix Spike (MS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: **Total Organic Nitrogen**
Analytical Method: EPA 351.2/350.1
Analytical Procedure: GL-GC-E-107 REV# 10
Analytical Batch: 2072789

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
529489001	Outfall 002

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Miscellaneous Information

Additional Comments
Total Organic Nitrogen (TON) is determined by subtracting the result of Ammonia (NH3) determination from the result for Total Kjeldahl Nitrogen (TKN) determination for a sample.
TON = TKN - NH3
Please refer to the TKN and NH3 data to validate results appearing on the Total Organic Nitrogen Summary sheet. Both fractions are in the General Chemistry portion of the package.
There is no Batch QC for calculated results, and thus no QC Summary for the Total OrganicNitrogen Batch.

Product: **n-Hexane Extractable Material**
Analytical Method: EPA 1664A/1664B
Analytical Procedure: GL-GC-E-094 REV# 18
Analytical Batch: 2072124

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
529489001	Outfall 002
1204713784	Method Blank (MB)
1204713785	Laboratory Control Sample (LCS)
1204713786	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: Solids, Total Suspended
Analytical Method: SM 2540D
Analytical Procedure: GL-GC-E-012 REV# 16
Analytical Batch: 2070723

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
529489001	Outfall 002
1204711181	Method Blank (MB)
1204711182	Laboratory Control Sample (LCS)
1204711183	529435003(NonSDG) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Miscellaneous Information

Additional Comments
Sample filtration took > 10 minutes; therefore as prescribed in the method, a reduced aliquot was used. 529489001 (Outfall 002). A reduced aliquot was used due to limited volume. The client did not provide an entire 1 liter aliquot. 1204711183 (Non SDG 529435003DUP).

Product: Surfactants (MBAS)
Analytical Method: EPA 425.1 SC_NPDES
Analytical Procedure: GL-GC-E-047 REV# 22
Analytical Batch: 2070734

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
529489001	Outfall 002
1204711206	Method Blank (MB)
1204711207	Laboratory Control Sample (LCS)
1204711208	529489001(Outfall 002) Sample Duplicate (DUP)
1204711209	529489001(Outfall 002) Post Spike (PS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: **Sulfide, Total**
Analytical Method: SM 4500-S (2-) D
Analytical Procedure: GL-GC-E-052 REV# 11
Analytical Batch: 2071026

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
529489001	Outfall 002
1204711713	Method Blank (MB)
1204711714	Laboratory Control Sample (LCS)
1204711716	529471003(NonSDG) Post Spike (PS)
1204711718	529471003(NonSDG) Post Spike Duplicate (PSD)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: **COD**
Analytical Method: HACH 8000
Analytical Procedure: GL-GC-E-061 REV# 21
Analytical Batch: 2071495

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
529489001	Outfall 002
1204712612	Method Blank (MB)
1204712613	Laboratory Control Sample (LCS)
1204713612	529489001(Outfall 002) Sample Duplicate (DUP)
1204713613	529489001(Outfall 002) Matrix Spike (MS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: **Sulfite**
Analytical Method: SM 4500-SO3 (2-) B
Analytical Procedure: GL-GC-E-056 REV# 10
Analytical Batch: 2070733

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	**Client Sample Identification**
529489001	Outfall 002
1204711202	Method Blank (MB)
1204711203	Laboratory Control Sample (LCS)
1204711204	529489001(Outfall 002) Matrix Spike (MS)
1204711205	529489001(Outfall 002) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Holding Times
Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified.

Sample	Analyte	Value
1204711204 (Outfall 002MS)		Received 08-DEC-20, out of holding 08-DEC-20
1204711205 (Outfall 002MSD)		Received 08-DEC-20, out of holding 08-DEC-20
529489001 (Outfall 002)		Received 08-DEC-20, out of holding 08-DEC-20

Product: **Color**
Analytical Method: SM 2120 B
Analytical Procedure: GL-GC-E-036 REV# 11
Analytical Batch: 2070882

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	**Client Sample Identification**
529489001	Outfall 002
1204711516	Method Blank (MB)
1204711517	Laboratory Control Sample (LCS)
1204711518	529489001(Outfall 002) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Radiochemistry

Product: GFPC, Gross A/B, liquid
Analytical Method: EPA 900.0/SW846 9310
Analytical Procedure: GL-RAD-A-001 REV# 20
Analytical Batch: 2071441

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
529489001	Outfall 002
1204712512	Method Blank (MB)
1204712513	529489001(Outfall 002) Sample Duplicate (DUP)
1204712514	529489001(Outfall 002) Matrix Spike (MS)
1204712515	529489001(Outfall 002) Matrix Spike Duplicate (MSD)
1204712516	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Preparation Information

Aliquot Reduced
1204712513 (Outfall 002DUP) and 529489001 (Outfall 002) aliquot volumes were reduced due to the sample matrix.

Quality Control (QC) Information

Matrix Spike (MS) Recovery
Matrix Spike and Matrix Spike Duplicate, , do not meet the alpha recovery requirement due to the matrix of the sample. The samples are similar in results.

Sample	Analyte	Value
1204712514 (Outfall 002MS)	Alpha	66.6* (75%-125%)
1204712515 (Outfall 002MSD)	Alpha	54.1* (75%-125%)

Duplication Criteria between MS and MSD
The Matrix Spike and Matrix Spike Duplicate, (See Below), did not meet the relative percent difference requirement; however, they do meet the relative error ratio requirement with the value listed below and they both meet the spiked recovery requirement.

Sample	Analyte	Value
1204712514MS and 1204712515MSD (Outfall 002)	Alpha	RPD 20.2* (0%-20%) RER 1.06 (0-3)

Technical Information

Gross Alpha/Beta Preparation Information
High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating.

Recounts
Sample 1204712512 (MB) was recounted due to high MDC. The recount is reported.

Miscellaneous Information

Additional Comments
The matrix spike and matrix spike duplicate, 1204712514 (Outfall 002MS) and 1204712515 (Outfall 002MSD), aliquots were reduced to conserve sample volume.

Product: GFPC, Total Alpha Radium, Liquid
Analytical Method: EPA 900.1 Mod/ EPA 903.0 Mod
Analytical Procedure: GL-RAD-A-010 REV# 20
Analytical Batch: 2071442

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
529489001	Outfall 002
1204712517	Method Blank (MB)
1204712518	529489001(Outfall 002) Sample Duplicate (DUP)
1204712519	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: Lucas Cell, Ra226, liquid
Analytical Method: EPA 903.1 Modified

Analytical Procedure: GL-RAD-A-008 REV# 15
Analytical Batch: 2071434

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
529489001	Outfall 002
1204712491	Method Blank (MB)
1204712492	529489001(Outfall 002) Sample Duplicate (DUP)
1204712493	529489001(Outfall 002) Matrix Spike (MS)
1204712494	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 − (843) 556−8171 − www.gel.com

Certificate of Analysis Report
for

GEEL001 GEL Engineering, LLC

Client SDG: 529516 GEL Work Order: 529516

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a Tracer compound
- ** Analyte is a surrogate compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Jake Crook.

Reviewed by A. M______________________

Certificate of Analysis

Report Date: December 16, 2020

Company :	GEL Engineering, LLC
Address :	2040 Savage Road
	Charleston, South Carolina 29417
Contact:	Mr. John McLure
Project:	NPDES Renewal Assistance

Client Sample ID:	Field Blank	Project:	SOOP01120C
Sample ID:	529516001	Client ID:	GEEL001
Matrix:	Waste Water		
Collect Date:	08-DEC-20 12:30		
Receive Date:	09-DEC-20		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA												
EPA 1631 Low Level Mercury Analysis "As Received"												
Mercury	U	<0.000500	0.000200	0.000500	ug/L		1	BCD1	12/15/20	1010	2072021	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 1631E	

Notes:

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Lc/LC: Critical Level
PF: Prep Factor
RL: Reporting Limit
SQL: Sample Quantitation Limit

Certificate of Analysis

Report Date: December 16, 2020

Company : GEL Engineering, LLC
Address : 2040 Savage Road

Charleston, South Carolina 29417
Contact: Mr. John McLure
Project: NPDES Renewal Assistance

Client Sample ID:	Outfall 002	Project:	SOOP01120C
Sample ID:	529516002	Client ID:	GEEL001
Matrix:	Waste Water		
Collect Date:	08-DEC-20 12:35		
Receive Date:	09-DEC-20		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA												
EPA 1631 Low Level Mercury Analysis "As Received"												
Mercury		0.00955	0.000200	0.000500	ug/L		1	BCD1	12/15/20	1020	2072021	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 1631E	

Notes:

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Lc/LC: Critical Level
PF: Prep Factor
RL: Reporting Limit
SQL: Sample Quantitation Limit

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: December 16, 2020

Company :	GEL Engineering, LLC
Address :	2040 Savage Road
	Charleston, South Carolina 29417
Contact:	Mr. John McLure
Project:	NPDES Renewal Assistance

Client Sample ID:	Outfall 002 Dup	Project:	SOOP01120C
Sample ID:	529516003	Client ID:	GEEL001
Matrix:	Waste Water		
Collect Date:	08-DEC-20 12:37		
Receive Date:	09-DEC-20		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA												
EPA 1631 Low Level Mercury Analysis "As Received"												
Mercury		0.00962	0.000200	0.000500	ug/L		1	BCD1	12/15/20	1024	2072021	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 1631E	

Notes:

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Lc/LC: Critical Level
PF: Prep Factor
RL: Reporting Limit
SQL: Sample Quantitation Limit

Certificate of Analysis

Report Date: December 16, 2020

Company : GEL Engineering, LLC
Address : 2040 Savage Road

Charleston, South Carolina 29417
Contact: Mr. John McLure
Project: NPDES Renewal Assistance

Client Sample ID: Trip Blank
Sample ID: 529516004
Matrix: Waste Water
Collect Date: 08-DEC-20 12:40
Receive Date: 09-DEC-20
Collector: Client

Project: SOOP01120C
Client ID: GEEL001

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA												
EPA 1631 Low Level Mercury Analysis "As Received"												
Mercury	U	<0.000500	0.000200	0.000500	ug/L		1	BCD1	12/15/20	1015	2072021	1

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 1631E	

Notes:

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Lc/LC: Critical Level
PF: Prep Factor
RL: Reporting Limit
SQL: Sample Quantitation Limit

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 16, 2020

GEL Engineering, LLC
2040 Savage Road
Charleston, South Carolina

Contact: **Mr. John McLure**

Workorder: **529516**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-Mercury										
Batch 2072021										
QC1204713597 LCS										
Mercury	0.00500			0.00529	ug/L		106	(77%-123%)	BCD1	12/15/20 10:01
QC1204713596 MB										
Mercury			U	<0.0002	ug/L					12/15/20 09:57
QC1204713598 529516002 MS										
Mercury	0.0100	0.00955		0.0177	ug/L		81.7	(71%-125%)		12/15/20 10:29
QC1204713599 529516002 MSD										
Mercury	0.0100	0.00955		0.0177	ug/L	0.0565	81.6	(0%-24%)		12/15/20 10:34

Notes:

The Qualifiers in this report are defined as follows:

- < Result is less than value reported
- > Result is greater than value reported
- E %difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- FB Mercury was found present at quantifiable concentrations in field blanks received with these samples. Data associated with the blank are deemed invalid for reporting to regulatory agencies
- H Analytical holding time was exceeded
- J See case narrative for an explanation
- J Value is estimated
- N Metals--The Matrix spike sample recovery is not within specified control limits
- N/A RPD or %Recovery limits do not apply.
- N1 See case narrative
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
- R Sample results are rejected
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Other specific qualifiers were required to properly define the results. Consult case narrative.

QC Summary

Workorder: **529516**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time

^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.

h Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Page: ______ of ______
Project # S00P01120
GEL Quote #:
COC Number (1):
PO Number:

529516

GEL Laboratories LLC
gel.com
Chemistry | Radiochemistry | Radiobioassay | Specialty Analytics

Chain of Custody and Analytical Request

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

GEL Work Order Number: GEL Project Manager:

Client Name: GEL (S00P01120) Phone #
Project/Site Name: LLHg - Winyah Station Fax #
Address: Georgetown, SC
Collected By: Client (TDN, WSR) Send Results To: J. Mcluore

Sample Analysis Requested (5) (Fill in the number of containers for each test)

Sample ID *For composites - indicate start and stop date/time	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Should this sample be considered: Radioactive Please supply isotopic info.	(7) Known or possible hazards	Total number of containers	LLHg										Comments Note: extra sample is required for sample specific QC Bottle ID
Field Blank	12/8/20	1230	FB	N	WW			1	1										200567
Outfall 002	(	1235	G	(	(			1	1										203388
Outfall 002 Dup	)	1237	G	)	)			1	1										203392
Trip Blank	–	1240	TB	–	–			1											200862

PRESERVED
Date: 12/9/20
Time: 0720
Analyst: CW
BrCl: 201120
Volume: 5mL

Chain of Custody Signatures

	Relinquished By (Signed)	Date	Time		Received by (signed)	Date	Time
1	T —	12/8/2020	1510	1	[signature]	12/9/20	0708
2				2			
3				3			

TAT Requested: Normal: ✓ Rush: ____ Specify: ________ **(Subject to Surcharge)**

Fax Results: [ ] Yes [ ] No

Select Deliverable: [ ] C of A [ ] QC Summary [ ] level 1 [ ] Level 2 [ ] Level 3 [ ] Level 4

Additional Remarks:

For Lab Receiving Use Only: *Custody Seal Intact?* [ ] *Yes* [ ] *No* ***Cooler Temp:*** 20 °C

> For sample shipping and delivery details, see Sample Receipt & Review form (SRR.)

Sample Collection Time Zone: [ ] Eastern [ ] Pacific [ ] Central [ ] Mountain [ ] Other: ______

1.) Chain of Custody Number = Client Determined

2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.

4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, ML=Misc Liquid, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. **8260B, 6010B/7470A**) and number of containers provided for each (i.e. *8260B - 3, 6010B/7470A* - 1).

6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank

7.) *Are there any known or possible hazards associated with these samples?*

RCRA Metals
As = Arsenic, Hg= Mercury
Ba = Barium, Se= Selenium
Cd = Cadmium, Ag= Silver
Cr = Chromium, MR= Miscellaneous RCRA metals
Pb = Lead

Characteristic Hazards
FL = Flammable/Ignitable
CO = Corrosive
RE = Reactive

TSCA Regulated
PCB = Polychlorinated biphenyls

Listed Waste
LW= Listed Waste
(F,K,P and U-listed wastes.)
Waste code(s):

Other
OT= Other / Unknown
(i.e.: High/low pH, asbestos, beryllium, irritants, other misc. health hazards, etc.)
Description:

Please provide any additional details below regarding handling and/or disposal concerns. *(i.e.: Origin of sample(s), type of site collected from, odd matrices, etc.)*

GEL ENGINEERING, LLC
LOW-LEVEL MERCURY FIELD DATA SHEET

Project No.:	GLAB00412
Project Description:	Collection and analysis of low level mercury sample by USEPA Method 1669
GEL Project Manager:	Hope Taylor (GEL Laboratories)
GEL Project Manager Phone No.:	843-556-8171

Permit Holder:	Santee Cooper - Winyah Station
Permit No.:	SC0022471
Facility Name:	Santee Cooper - Winyah Station
Sample Location/Outfall No.:	Outfall 002
Regulatory/Non-Regulatory Sampling:	Regulatory
Environmental Program Area:	Clean Water Act

Cooler ID No.:						
Preservation Method (check one):		Blue Ice		Bagged Ice		Not Applicable
Sampling Technique (check one):		Manual Grab		Peristaltic Pump		
Sampling Protocol:	SOP for Low-Level Mercury Sampling by USEPA Method 1669, Rev. 2					

Equipment	Vendor	Name	Lot/Item No.
Ziplock Bags	Associated Bag Company	1-quart bags	CHINAP58019-04N
		1-gallon bags	CHINAP58019-14N
Shoulder Length Gloves	Associated Bag Company	Disposable Shoulder Length Gloves	66-3-301
Hand Gloves	Associated Bag Company	Powder Free Vinyl Gloves	CHINAP59254-02S
Plastic Sheeting	Lowes (Sunbelt Plastics)	2-mil Plastic Sheeting	NA
Peristaltic Pump	Geotech	Series I Geopump	NA
Teflon Tubing	ECT Manufacturing, Inc.	Teflon-lined 1/4-in ID x 3/8-in OD	NA
Wind Suits	REI	Unisex Windpak Suite	672887/680249

Notes:	

Sampling Date:	12/8/22	Sampling Time:	1235

Sampling Personnel:

Tracy Noel (Clean Hands-Print)	T (Signature)
Steve Ruck (Dirty Hands-Print)	SR (Signature)

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: SOOP	SDG/AR/COC/Work Order: 529516
Received By: C.Dhillington	Date Received: 12/9/20
Carrier and Tracking Number	Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#: If UN2910, Is the Radioactive Shipment Survey Compliant? Yes___ No___
B) Did the client designate the samples are to be received as radioactive?		✓	COC notation or radioactive stickers on containers equal client designation.
C) Did the RSO classify the samples as radioactive?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3
D) Did the client designate samples are hazardous?		✓	COC notation or hazard labels on containers equal client designation.
E) Did the RSO identify possible hazards?		✓	If D or E is yes, select Hazards below. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	✓			Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*		✓		Preservation Method: Wet Ice Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius TEMP: 20.7°C
4	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: [illegible] Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?		✓		Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?			✓	If Yes, are Encores or Soil Kits present for solids? Yes___ No___ NA___(If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes___ No___ NA___(If unknown, select No) Are liquid VOA vials free of headspace? Yes___ No___ NA___ Sample ID's and containers affected:
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	✓			Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided by use of GEL labels?	✓			
13	COC form is properly signed in relinquished/received sections?	✓			Circle Applicable: Not relinquished Other (describe)

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials AM Date 12/9/20 Page 1 of 1

GL-CHL-SR-001 Rev 7

List of current GEL Certifications as of 16 December 2020

State	Certification
Alabama	42200
Alaska	17−018
Alaska Drinking Water	SC00012
Arkansas	88−0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH−0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330−15−00283, P330−15−00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C−SC−01
Kansas NELAP	E−10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2019020
Maryland	270
Massachusetts	M−SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE−OS−26−13
Nevada	SC000122021−1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R−158
Oklahoma	2019−165
Pennsylvania NELAP	68−00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235−20−17
Utah NELAP	SC000122020−33
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

Metals
Technical Case Narrative
GEL Engineering, LLC
SDG #: 529516

Product: **Mercury Analysis Using the PS Analytical Millennium Automated Mercury Analyzer**
Analytical Method: EPA 1631E
Analytical Procedure: GL-MA-E-018 REV# 19
Analytical Batch: 2072021

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
529516001	Field Blank
529516002	Outfall 002
529516003	Outfall 002 Dup
529516004	Trip Blank
1204713596	Method Blank (MB)**CVAF**
1204713597	Laboratory Control Sample (LCS)
1204713598	529516002(Outfall 002S) Matrix Spike (MS)
1204713599	529516002(Outfall 002SD) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

NPDES PERMIT
Renewal

WINYAH GENERATING STATION

Georgetown County

NPDES Permit # SC0022471

santee cooper

January, 2011

Introduction

Winyah Generating Station's present NPDES Permit was issued January 7, 2008 with an effective date of March 1, 2008 and an expiration date of July 31, 2011. A modification concerning the pH limitation was issued March 4, 2009 with an effective date of April 1, 2009.

A requirement of this permit is that an application for a new permit be submitted one hundred eighty (180) days prior to its expiration date. Therefore, a new permit must be applied for by February 1, 2011. This submittal includes all the required forms and attachments to constitute a complete application in accordance with the Department's procedures and letter dated November 1, 2011.

Contents

- Application Form 1 – General Information
- Location Supplement
- USGS Location Maps
- Aerial Map
- Application Form 2C – General Data
- Flow Diagram
- Application Form 2C – Outfall 001 Data
- Application Form 2C – Outfall 002 Data
- Application Form 2E – Outfall 02A Data
- Sludge Disposal Supplement
- Mixing Zone Request Forms and Modeling Results
- Laboratory Reports

Procedures

The present NPDES Permit designates three outfalls:

- 001, cooling pond blowdown to Turkey Creek
- 002, cooling pond blowdown to the North Santee River, and
- 02A, cooling tower blowdown from Units 3 & 4 (internal to outfalls 001 and 002)

In discussions with Department personnel, the following was agreed upon:

1. Since both Outfalls 001 and 002 are from the same source (cooling pond), for the 2C form, one grab sample will be taken from Outfall 002 which will also serve as representative of Outfall 001.

2. The sample need not be analyzed for Dioxin or Radioactivity (j, 1-4).

3. Under Volatile Compounds, testing is not required for No. 4V (Bis Chloromethyl) Either, No. 13V (Dichlorodifluoromethane), nor No. 30V (Trichlorofluoromethane).

4. Per Table 1 in Appendix D to 40 CFR Part 122.21 as amended, testing is not required for the Base/Neutrals or the Pesticides GC/MS Fractions.

For internal Outfall 02A (cooling tower blowdown):

1. Form 2E would be used instead of Form 2C.

2. The sample will be a 24 hour composite which will be analyzed for BOD, TSS, COD, TOC, and ammonia (as N). A grab sample will be taken and analyzed for pH, total residual chlorine, temperature, and oil and grease.

GEL Laboratories LLC was contracted to take and analyze the samples. The grab sample from Outfall 002 was taken on December 14, 2010 and the composite sample from Outfall 02A was taken December 14-15, 2010. Although 2C forms only required data from one year, since the cooling pond discharge is intermittent, DMR data from January 2009 through December 2010 was used along with the results of the December 14, 2010 grab sample to complete the forms. Discharge occurred during only eleven (11) months of the twenty-four (24) months in this time period.

For internal Outfall 02A, the only DMR data required is Free Available Chlorine. Therefore, only the data from the December 14-15, 2010 sampling is presented. Since internal flow rates are not measured, the flow value shown and used to calculate mass is an estimate.

APPLICATION FORM 1

GENERAL INFORMATION

Please print or type in the unshaded areas only.

Form Approved. OMB No. 2040-0086.

FORM 1 GENERAL

U.S. ENVIRONMENTAL PROTECTION AGENCY

GENERAL INFORMATION

Consolidated Permits Program

(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER

S		T/A	C
F	SC0022471		D
1	2 13	14	15

LABEL ITEMS	
I. EPA I.D. NUMBER	PLEASE PLACE LABEL IN THIS SPACE
III. FACILITY NAME	
V. FACILITY MAILING ADDRESS	
VI. FACILITY LOCATION	

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent *(the area to the left of the label space lists the information that should appear)*, please provide it in the proper fill-in area(s) below. If the label is complete and correct, you need not complete Items I, III, V, and VI *(except VI-B which must be completed regardless)*. Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements: see Section C of the instructions. See also, Section D of the instructions for definitions of **bold-faced terms**.

SPECIFIC QUESTIONS	YES	NO	FORM ATTACHED
A. Is this facility a **publicly owned treatment works** which results in a **discharge** to **waters of the U.S.**? (FORM 2A)	16	X 17	18
B. Does or will this facility *(either existing or proposed)* include a **concentrated animal feeding operation** or **aquatic animal production facility** which results in a **discharge** to **waters of the U.S.**? (FORM 2B)	19	X 20	21
C. Is this a facility which currently results in **discharges** to **waters of the U.S.** other than those described in A or B above? (FORM 2C)	X 22	23	X 24
D. Is this a proposed facility *(other than those described in A or B above)* which will result in a **discharge** to **waters of the U.S.**? (FORM 2D)	25	X 26	27
E. Does or will this facility treat, store, or dispose of **hazardous wastes**? (FORM 3)	28	X 29	30
F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)	31	X 32	33
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)	34	X 35	36
H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)	37	38	39
I. Is this facility a proposed **stationary source** which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)	40	X 41	42
J. Is this facility a proposed **stationary source** which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an **attainment area**? (FORM 5)	43	X 44	45

III. NAME OF FACILITY

C	SKIP	
1		South Carolina Public Service Authority - Winyah Generating Station
15	16 - 29	30 69

IV. FACILITY CONTACT

C	A. NAME & TITLE *(last, first, & title)*	B. PHONE *(area code & no.)*
2	Harrelson, Michael, Principal Engineer	(843) 761-8000
15	16 45	46 48 49 51 52- 55

V. FACILTY MAILING ADDRESS

C	A. STREET OR P.O. BOX
3	PO Box 2946101
15	16 45

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

VI. FACILITY LOCATION

C	A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER
5	661 Steam Plant Road
15	16 45

B. COUNTY NAME
Georgetown County
46 70

C	C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE *(if known)*
6	Georgetown County	SC	29440	022
15	16 40	41 42	47 51	52

EPA Form 3510-1 (8-90)

CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

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

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

VIII. OPERATOR INFORMATION

A. NAME
8 South Carolina Public Service Authority (Santee Cooper)

B. Is the name listed in Item VIII-A also the owner?
☑ YES ☐ NO

C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box: if "Other," specify.)
F = FEDERAL
S = STATE
P = PRIVATE
M = PUBLIC (other than federal or state)
O = OTHER (specify)

S (specify)

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

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

F. CITY OR TOWN	G. STATE	H. ZIP CODE
B Moncks Corner	SC	29461

IX. INDIAN LAND

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

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water): 9 N SC0022471	D. PSD (Air Emissions from Proposed Sources): 9 P See Attached List
B. UIC (Underground Injection of Fluids): 9 U NA	E. OTHER (specify): 9 See Attached List (specify)
C. RCRA (Hazardous Wastes): 9 R NA	E. OTHER (specify): 9 See Attached List (specify)

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers, and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS (provide a brief description)

Generation of Electricity

XIII. CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)	B. SIGNATURE	C. DATE SIGNED
Jay A Hudson, P.E., Manager, Environmental Management		1/28/11

COMMENTS FOR OFFICIAL USE ONLY

C

Winyah Generating Station - SC0022471
Georgetown County

NPDES Permit Renewal Application – January 2011

Form 1 – Supplemental Information

Item X. Existing Environmental Permits (continued)

DESCRIPTION	ISSUED BY	PERMIT NO.
1) Intake/Discharge Permits		
North Santee Intake Construction	USACE	73-12-160
Wadmacon Intake Construction	USACE	70-5R-335
Maintenance Dredging and installation of a discharge pipe in the North Santee River	USACE[1]	99-1D-337
Critical Area/Water Quality Certification	SCDHEC	99-1D-337-P (Revised)
2) Wastewater Treatment System Construction/Operation Permits		
Construction/Operating Permit for Cooling Impoundment	SCDHEC	2596
Construction/Operating Permit for Settling Basins and Cooling Towers	SCDHEC	6078
Construction/Operating Permit to Raise Ash Pond B Dikes	SCDHEC	17,692-IW
Operating Permit for Force Main/Diffuser	SCDHEC	18,546-IW
Operating Permit for Sanitary Wastewater Pump Station/Force Main	SCDHEC	20,604 - DW
3) Stormwater NPDES Industrial General Permit	SCDHEC	SCR000000
IGP Facility Coverage Number	SCDHEC	SCR003832
4) Air Permits		
Title V Operating Permit	SCDHEC	TV-1140-0005
Construction Permit for Duel Flue Gas Conditioning System	SCDHEC	1140-0005-CO
Construction Permit for ESP Upgrade	SCDHEC	1140-0005-CP
Construction Permit for Chem Mod	SCDHEC	1140-0005-CQ
5) Small Quantity Hazardous Waste Generator ID	USEPA	SCD097630537
6) Groundwater Withdrawal Permit	SCDHEC	22IN002

[1] Listed as 99-ID-327 in some documents and correspondence.

LOCATION SUPPLEMENT

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
BUREAU OF WATER

LOCATION SUPPLEMENT FOR ND AND NPDES PERMIT APPLICATIONS

FACILITY: SCPSA/WINYAH GENERATING STATION DATE: 01/21/2011

ITEM 1: Please give a short description of the plant location, if the address is not a specific location. Example: Plant is located at the interchange of Interstate 26 and U.S. Highway #1.

The Station is located at 661 Steam Plant Drive off County Road S-22-42 (Pennyroyal Rd) approximately four miles south of the City of Georgetown. County Road S-22-42 runs east/west between US HY 17 and US HW 17A. The entrance road to the Station (Steam Plant Rd) is located approximately 1.5 miles west of US HW 17 at a Lat/Long of aproximately 33.3393 N and -79.3357 W.

ITEM 2: Please give a description of the location of the discharge point into the receiving stream using some landmark as a reference point, i.e., bridge, stream, road junction, the plant itself, etc. Give the direction and the distance in feet from the reference point. Example: Discharge #001 is into Johnny Creek approximately 300 feet directly behind the plant. Discharge #002 is into Doris Creek 150 feet downstream from U.S. Highway #30 bridge.

Discharge Point 001: Cooling Pond Discharge enters Turkey Creek approximately 0.2 miles south of County Road S -22-42.

Discharge Point 002: Cooling Pond Discharge enters the North Santee River directly downstream of US HW 17's bridge crossing of the North Santee River, which is approximately 13 miles south of the City of Georgetown.

Discharge Point 02A is an internal discharge point adjacent to the cooling towers for Units 3 and 4.

ITEM 3: Please locate the discharge on a U.S. Geological Survey 7 1/2 minute quad sheet (or a 15 minute quad if a 7 1/2 quad is not available for the area). The entire quad sheet need not be submitted. An 8 1/2 by 11 inch photocopy of the applicable portion of the map is sufficient. The quad sheet name must be provided on the copy submitted to the Department. USGS Maps are available at the SC Dept. Of Natural Resources/Map Division, 2221 Devine Street, Suite 222, Columbia, SC 29205. Phone number is 734-9108.

RETURN TO: SCDHEC
Bureau of Water
NPDES Administration
2600 Bull Street
Columbia, SC 29201

USGS LOCATION MAPS

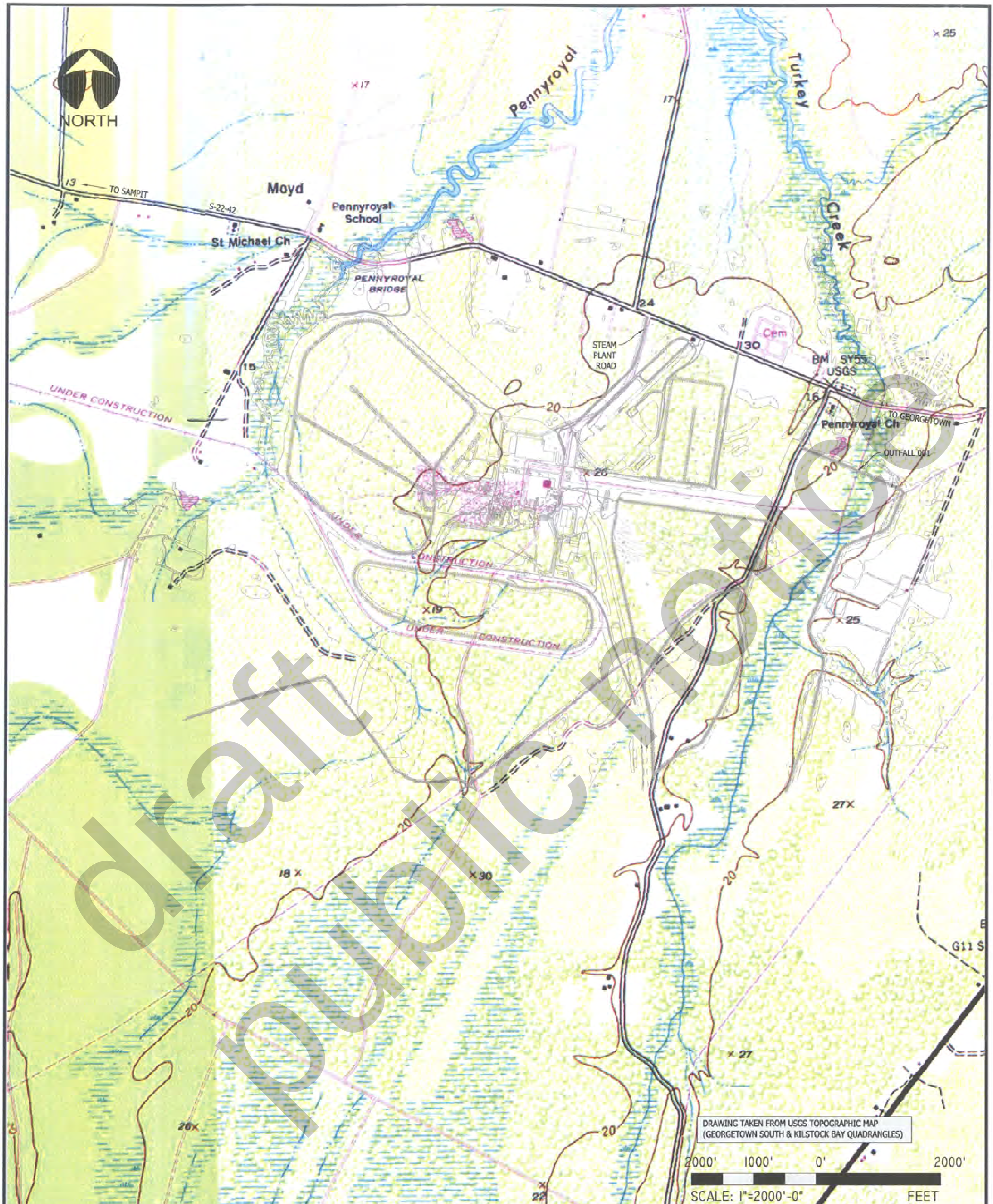
REV.	DATE	DESCRIPTION	DTLR	ENGR.	SUPV.
0	1/18/11	OUTFALL LOCATION UPDATES	WFH	MEH	SWJ

A

Santee Cooper
SOUTH CAROLINA PUBLIC SERVICE AUTHORITY

WINYAH GENERATING STATION
DISCHARGE LOCATION
MAP

ENVIRONMENTAL SERVICES — PROJ. NO.
DES. ENGR.: M.E.HARRELSON — DETAILER: W.F.HUBER — SCALE: 1"=6000'
DATE: 1/18/11 — DRAWING NO.: WO-000-10-C0002 — SHEET 1 OF 2



REV.	DATE	DESCRIPTION	DTLR	ENGR.	SUPV.
0	1/18/11	DISHCHARGE LOCATION UPDATE	WFH	MEH	SWJ

A

Santee Cooper
SOUTH CAROLINA PUBLIC SERVICE AUTHORITY

WINYAH GENERATING STATION
SITE LOCATION MAP

ENVIRONMENTAL SERVICES — PROJ. NO:
DES. ENGR.: M.E.HARRELSON — DETAILER: W.F.HUBER — SCALE: 1"=2000'
DATE: 1/18/11 — DRAWING NO.: W0-000-10-C0002 — SHEET 2 OF 2

AERIAL MAP


Winyah Generating Station
Georgetown County
NPDES Permit No. SC0022471
Pennyroyal Rd
Slurry Pond Units 3 & 4
Outfall 02A
Slurry Pond Unit 2
Outfall 001
West Ash Pond
Intake Canal
Ash Pond A
South Ash Pond
Ash Pond B
Discharge Canal
Cooling Pond
Station Clearwell
Cooling Pond Dike
US Hwy 17
Plant Area

APPLICATION FORM 2C

GENERAL DATA

Please print or type in the unshaded areas only.

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)
SC0022471

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

FORM 2C NPDES

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR PERMIT TO DISCHARGE WASTEWATER
EXISTING MANUFACTURING, COMMERCIAL, MINING AND SILVICULTURE OPERATIONS
Consolidated Permits Program

I. OUTFALL LOCATION

For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

A. OUTFALL NUMBER (*list*)	B. LATITUDE			C. LONGITUDE			D. RECEIVING WATER (*name*)
	1. DEG.	2. MIN.	3. SEC.	1. DEG.	2. MIN.	3. SEC.	
001	33.00	19.00	48.00	79.00	20.00	26.00	Turkey Creek
002	33.00	12.00	32.00	78.00	22.00	58.00	North Santee River

II. FLOWS, SOURCES OF POLLUTION, AND TREATMENT TECHNOLOGIES

A. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item B. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (*e.g., for certain mining activities*), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

B. For each outfall, provide a description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

1. OUT-FALL NO. (*list*)	2. OPERATION(S) CONTRIBUTING FLOW		3. TREATMENT		
	a. OPERATION (*list*)	b. AVERAGE FLOW (*include units*)	a. DESCRIPTION	b. LIST CODES FROM TABLE 2C-1	
001	Cooling Pond Blowdown to Turkey Creek	0.00 MGD	heat is removed by evaporation	1-F	4-A
			solids are removed by sedimentation	1-U	4-C
			oil & grease is removed by flotation	1-H	
			sodium hypochlorite is used to control fouling	2-F	
002	Cooling Pond Blowdown to North Santee River	2.18 MGD	heat is removed by evaporation	1-F	4-A
			solids are removed by sedimentation	1-U	4-C
			oil & grease is removed by flotation	1-H	
			sodium hypochlorite is used to control fouling	2-F	
	Note: See attached flow diagram for more details on operations, flow, and treatment processes.		Note: Reuse is the principal mode of operation for this facility.		4-C

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

CONTINUED FROM THE FRONT

C. Except for storm runoff, leaks, or spills, are any of the discharges described in Items II-A or B intermittent or seasonal?

☑ YES (*complete the following table*) ☐ NO (*go to Section III*)

1. OUTFALL NUMBER (*list*)	2. OPERATION(s) CONTRIBUTING FLOW (*list*)	3. FREQUENCY		4. FLOW				
		a. DAYS PER WEEK (*specify average*)	b. MONTHS PER YEAR (*specify average*)	a. FLOW RATE (*in mgd*)		B. TOTAL VOLUME (*specify with units*)		C. DURATION (*in days*)
				1. LONG TERM AVERAGE	2. MAXIMUM DAILY	1. LONG TERM AVERAGE	2. MAXIMUM DAILY	
001	Cooling Pond Emergency Overflow due to flooding conditions	0	0	0	0	0	0	0
002	Cooling Pond Blowdown (based on 2009 and 2010 DMR data).* *Discharge flow varies dependent on many factors including meterological conditions, energy demand, etc.	3.17	5.5	2.18	4.03	2.18 MG	4.03 MG	165 avg days per year

III. PRODUCTION

A. Does an effluent guideline limitation promulgated by EPA under Section 304 of the Clean Water Act apply to your facility?

☑ YES (*complete Item III-B*) ☐ NO (*go to Section IV*)

B. Are the limitations in the applicable effluent guideline expressed in terms of production (*or other measure of operation*)?

☐ YES (*complete Item III-C*) ☑ NO (*go to Section IV*)

C. If you answered "yes" to Item III-B, list the quantity which represents an actual measurement of your level of production, expressed in the terms and units used in the applicable effluent guideline, and indicate the affected outfalls.

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

IV. IMPROVEMENTS

A. Are you now required by any Federal, State or local authority to meet any implementation schedule for the construction, upgrading or operations of wastewater treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.

☐ YES (*complete the following table*) ☑ NO (*go to Item IV-B*)

1. IDENTIFICATION OF CONDITION, AGREEMENT, ETC.	2. AFFECTED OUTFALLS		3. BRIEF DESCRIPTION OF PROJECT	4. FINAL COMPLIANCE DATE	
	a. NO.	b. SOURCE OF DISCHARGE		a. REQUIRED	b. PROJECTED
NA	NA	NA	NA	NA	NA

B. OPTIONAL: You may attach additional sheets describing any additional water pollution control programs (*or other environmental projects which may affect your discharges*) you now have underway or which you plan. Indicate whether each program is now underway or planned, and indicate your actual or planned schedules for construction.

☐ MARK "X" IF DESCRIPTION OF ADDITIONAL CONTROL PROGRAMS IS ATTACHED

CONTINUE ON PAGE 3

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

SC0022471

CONTINUED FROM PAGE 2

V. INTAKE AND EFFLUENT CHARACTERISTICS

A, B, & C: See instructions before proceeding – Complete one set of tables for each outfall – Annotate the outfall number in the space provided.
NOTE: Tables V-A, V-B, and V-C are included on separate sheets numbered V-1 through V-9.

D. Use the space below to list any of the pollutants listed in Table 2c-3 of the instructions, which you know or have reason to believe is discharged or may be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it to be present and report any analytical data in your possession.

1. POLLUTANT	2. SOURCE	1. POLLUTANT	2. SOURCE
Dilute or trace amounts of some of these substances may be present in the intake water, or in some maintenance or water treatment chemicals, or in various fuels, oils, lubricants or materials, or used in or contained in various laboratory procedures and/or reagents. Information on maintenance chemicals and priority pollutants is routinely reported. Inventory and releasded amounts of hazardous materials are accounted for and reported under SARA regulations. Inventories of substances maintained on site are kept and MSDSs with composite information are available. (continued)	See attached.	See attached.	See attached.

VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS

Is any pollutant listed in Item V-C a substance or a component of a substance which you currently use or manufacture as an intermediate or final product or byproduct?

☐ YES (*list all such pollutants below*) ☑ NO (*go to Item VI-B*)

None known, but trace amounts could be present in byproducts as discussed under V.D.

CONTINUED FROM THE FRONT

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

☑ YES (*identify the test(s) and describe their purposes below*) ☐ NO (*go to Section VIII*)

The current NPDES permit contains a requirement for toxicity testing using ceriodaphnia dubia as the test organism. These results are reported to DHEC on the monthly DMRs. The toxicity testing is performed by Swearingen Ecology Associates (Lab ID 36001).

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

☑ YES (*list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below*) ☐ NO (*go to Section IX*)

A. NAME	B. ADDRESS	C. TELEPHONE (*area code & no.*)	D. POLLUTANTS ANALYZED (*list*)
General Engineering Laboratortories, LLC (IDs 10120001/10120002)	P.O. Box 30712 Charleston, SC 29417	843-556-8171	O&G analyses and all other Form 2C parameters except Color and Fecal Coliform
Shealy Environmental Services, Inc. (ID 32010)	106 Vantage Point Drive West Columbia, SC 29172	803-791-9700	Color
Trident Lab Services, Inc. (ID10122)	9104 Canvas Lane Ladson, SC 29456	843-871-4999	Fecal Coliform
Test America Analytical testing Corp. (ID 98001)	2969 Foster Crighton Drive Nashville, TN 37204	800-765-0980	Arsenic
Santee Cooper Winyah Station (ID 22551)	661 Steam Plant Drive Georgetown, SC 29440	843-546-4171	Temperature, pH, TSS, FAC, and flow

IX. CERTIFICATION

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

A. NAME & OFFICIAL TITLE (*type or print*)	B. PHONE NO. (*area code & no.*)
Jay A. Hudson, P.E., Manager, Environmental Management	(843) 761-8000
C. SIGNATURE	D. DATE SIGNED 1-28-11

Winyah Generating Station – SC0022471
Form 2C Supplemental Information

Item V.D. Effluent Characteristics (continued)

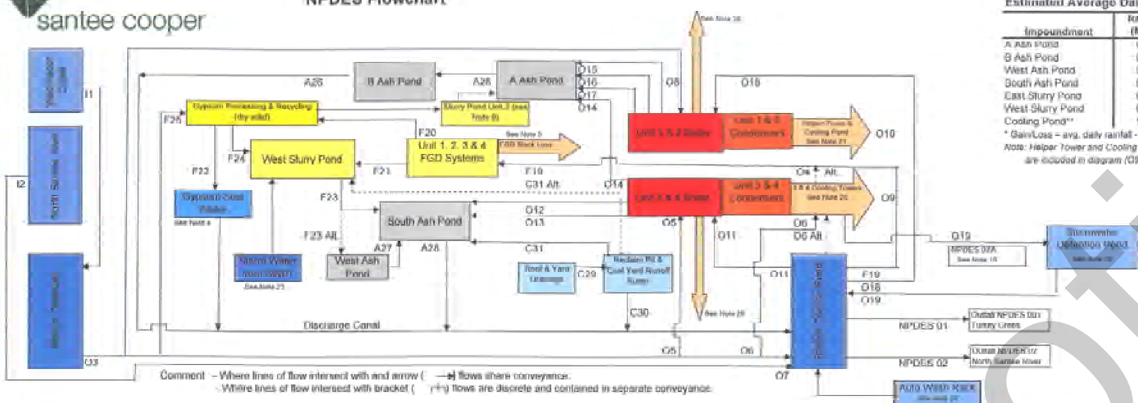
In addition to that described in the form, the following specific substances may be released intermittently in trace amounts. We are providing this information in response to 40CFR117.12(a)(2) and (c) to qualify for an exclusion under Section 311(a)(2) of the Clean Water Act.

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

FLOW DIAGRAM

Winyah Generating Station
NPDES Flowchart

santee cooper



Comment – Where lines of flow intersect with and arrow (→| flows share conveyance.
– Where lines of flow intersect with bracket (┤) flows are discrete and contained in separate conveyance.

Estimated Average Daily Evaporative Loss (MGD)

Impoundment	Rainfall (MGD)	Evaporation (MGD)	* +Gain/-Loss (MGD)
A Ash Pond	0.33	-0.40	-0.07
B Ash Pond	0.22	-0.27	-0.05
West Ash Pond	0.20	-0.26	-0.06
South Ash Pond	0.23	-0.28	-0.05
East Slurry Pond	0.12	-0.15	-0.03
West Slurry Pond	0.40	-0.49	-0.09
Cooling Pond**	1.52	-5.10	-3.58

* Gain/Loss = avg. daily rainfall - avg. daily evaporation

Note: Helper Tower and Cooling pond evaporation are included in diagram (O9 & O10)

Flow ID	Description	Flow Rate GPM	(1 pump)	MGD
I1	Wadmacon Creek Make Up Line	8,000	(6,500)	11.520
I2	N. Santee River Make Up Line	6,500	(5,000)	9.360
O3	Clearwell To Station Line	14,500		20.880
O4	Alternate FGD Make Up Line – as required	400		0.576
O5	Unit 3 & 4 Boiler Make Up Line	50		0.072
O6	Unit 3 & 4 Cooling Tower Make Up Line	6,200		8.928
O7	Residual Flow to Cooling Pond - variable	See Note 16		
O8	Unit 1 & 2 Boiler Make Up	40		0.058
O9	Unit 3 & 4 Cooling Tower Evaporation	-5,000		-7.200
O10	Unit 1 & 2 Helper Tower & Cooling Pond Evaporation	-5,500		-7.920
O11	Unit 3 & 4 Station Service Water (Non-FGD)	4,180		6.019
O12	Unit 3 & 4 Low Volume Waste Sources	540		0.778
O13	Unit 3 & 4 Hydroveyor Water	2,180		3.139
O14	Unit 3 & 4 Bottom Ash Return	1,460		2.102
O15	Unit 1 & 2 Low Volume Waste Sources	550		0.792
O16	Unit 1 & 2 Hydroveyor Water	3,364		4.844
O17	Unit 1 & 2 Bottom Ash Sluice	725		1.044
O18	Unit 1 & 2 Station Service Water (O15, O16, O17)	4,640		6.682
O19	Unit 3 & 4 Cooling Tower Blowdown	500		0.720
F19	FGD Make Up	1,450		2.088
F20	Gypsum Processing (Wallboard Plant)	300		0.432
F21	FGD Blowdown	995		1.433
F22	Gypsum Seal Water	200		0.288
F23	West Slurry Pond Blowdown (See Note 19)	810		1.166
F24	Gypsum Filtrate	160		0.230
F25	Chloride Wash Water to Gyp Process	100		0.144
A25	A Pond Blowdown (A15, A16, A17)	4,640		6.682
A26	B Pond Blowdown	4,640		6.682
A27	West Pond Blowdown	100		0.144
A28	South Ash Pond Blowdown	5,090		7.330
	[illegible]	[illegible]		[illegible]
	[illegible]	[illegible]		[illegible]
	[illegible]	430		[illegible]
C29	Roof and Yard Drainage	160		0.230
C30	Reclaim Pit and Coal Yard RO Sump (Gravity flow)	260		0.374
C31	Reclaim Pit and Coal Yard RO Sump (Pumped flow)	260		0.374
NPDES 01	Industrial Cooling Pond Outfall to Turkey Creek	0		0.000
NPDES 02	Industrial Cooling Pond Outfall to North Santee	-1,000		-1.440

Notes:

1. Typical operations are considered to be dry, warm to hot weather.
2. FGD flows do not account for evaporation from flue gas exposure.
3. This flow chart includes 4 operating FGD systems.
4. Gypsum Seal Water is clean water that may be directed to the Cooling Pond, FGD Make Up, or Cooling Tower Make Up as necessary. Rate = approx. 400 GPM for 12 hours/day.
5. FGD stack loss (evaporation) can be as high as 550 GPM.
6. Ash from any boiler may be directed to the South, West or A Ash ponds as necessary.
7. Under normal conditions, pond evaporation exceeds rainfall accumulation; therefore, stormwater is not considered in the flow analysis.
8. Under normal conditions the FGD blowdown to ponds will be relatively free of solids due to recycling as gypsum.
9. Off-Spec Gypsum to Slurry Pond Unit 2; Decant pumped to Ash Pond A as needed.
10. This flow chart assumes the North Santee (NPDES 002) is the primary discharge for the facility.
11. Water in the North Santee has a normally high conductivity due to tidal effects and limits its use for inflow to the cooling pond.
12. The Cooling Pond has been designed to hold the 10 year, 24 hour storm event without a discharge.
13. Hydroveyor flows are used to carry various ash products to the Ash Ponds and do not include the volume of the solids.
14. Most of the station's fly ash is recycled via Carbon Burn Out and is not stored at the facility.
15. NPDES Internal 02A - Unit 3 & 4 Cooling Tower Blowdown normally routed to the Cooling Pond via the Stormwater Detention Pond - flow is intermittent in hot weather.
16. This variable flow (O7) is the residual from the Clearwell and varies with load, temperature, and other factors.
17. If necessary, all (or any individual) make up flow(s) may come from the Cooling Pond as required for operations.
18. Net flows (+) are added to, or (-) taken from the Cooling Pond.
19. Flow (F23) is reduced as a result of evaporation and loss of solids from make up.
20. Unit 3 & 4 Cooling Towers recirculating flows are not indicated, only make up and blowdown.
21. Unit 1 & 2 Helper Tower is a single pass tower that recirculates with the cooling pond. Recirculating flows not shown.
22. Stormwater detention pond collects stormwater from approximately 26 acres. Typically an incidental flow.
23. Collects storm water from approx. 15 acres of dike bank area. Typically an incidental flow.
24. Auto Wash Rack was added 6/27/08. Use is intermittent and averages 0.2 GPM or 0.0003 MGD.
25. Flow numbers are not necessarily additive due to weather conditions, adsorptive processes, evaporative loss or other conditions.
26. Low Volume Waste Sources include: wet scrubber air pollution control systems, boiler blowdown, floor drains, cooling tower basin cleaning wastes, process water treatment sludges and backwashes, service water systems, non-chemical cleaning waste, etc.
27. Sanitary wastewater is segregated from process water for discharge to Georgetown county's Wastewater Treatment Plant (Permit # 20604-DW, 12/12/08).
28. Evaporative Boiler Feed - up to 175 GPM (0.252 MGD) of wastewater per boiler may be evaporated.

Flow ID Codes:
I# - Intake Flows
O# - Operations (Steam and Power Operations related) flows
F# - FGD Operations Flows
A# - Ash related flows
C# - Coal and associated flows
NPDES ## - Permitted wastewater discharges by outfall #

Flow Balance	GPM	(Major Flows Only)
Intake (Wadmacon)	8,000	(8k w/2 pumps; 6.5k w/1 pump)
Intake (N. Santee)	0	(6.5k w/2pumps; 5k w/1pump)
1 & 2 Tower & Pond	-5,500	
3 & 4 Cooling Tower	-5,000	
FGD Loss	-550	See Note 5
NPDES	-1,000	
Net	-4050	See Note 18

MEH: 01/27/2010

APPLICATION FORM 2C

OUTFALL 001 DATA

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets *(use the same format)* instead of completing these pages.
SEE INSTRUCTIONS

EPA I.D. Number *(copy from Item 1 of Form 1)*
SC0022471

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

OUTFALL NO. 001

PART A - You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

1. POLLUTANT	2. EFFLUENT							3. UNITS (specify if blank)		4. INTAKE (optional)		
	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. Concentration	b. Mass	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass				(1) Concentration	(2) Mass	
a. Biochemical Oxygen Demand (BOD)	2.90	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
b. Chemical Oxygen Demand (COD)	50.0	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
c. Total Organic Carbon (TOC)	6.16	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
d. Total Suspended Solids (TSS)	21.0	NA	16.6	NA	7.6	NA	40	mg/L	NA	NA	NA	NA
e. Ammonia (as N)	0.581	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
f. Flow	VALUE No Flow		VALUE No Flow		VALUE No Flow		No Flow	NA	NA	VALUE NA		NA
g. Temperature *(winter)*	VALUE 90°F		VALUE 84°F		VALUE NA		12	NA °F		VALUE NA		NA
h. Temperature *(summer)*	VALUE 95°F		VALUE 91°F		VALUE NA		12	NA °F		VALUE NA		NA
i. pH	MINIMUM 6.0	MAXIMUM 8.2	MINIMUM NA	MAXIMUM NA			43	STANDARD UNITS				

PART B - Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2-a for any pollutant, which is limited either directly, or indirectly but expressly, in an effluent limitations guideline, you must provide the results of at least one analysis for that pollutant. For other pollutants for which you mark column 2a, you must provide quantitative data or an explanation of their presence in your discharge. Complete one table for each outfall. See the instructions for additional details and requirements.

1. POLLUTANT and CAS NO. (if available)	2. MARK "X"		3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. Concentration	b. Mass	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass				(1) Concentration	(2) Mass	
a. Bromide (24959-67-9)	X		73.5	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
b. Chlorine, Total Residual	X		0.05	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
c. Color		X	<25	NA	NA	NA	NA	NA	1	PCU	NA	NA	NA	NA
d. Fecal Coliform	X		10	NA	NA	NA	NA	NA	1	CFU/100mL	NA	NA	NA	NA
e. Fluoride (16984-48-8)	X		3.20	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
f. Nitrate - Nitrite (as N)	X		0.131	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA

CONTINUE ON PAGE V-2

CONTINUED FROM V-1

EPA I.D. Number *(copy from Item 1 of Form 1)* SC0022471

OUTFALL NUMBER 001

1. POLLUTANT and CAS NO. *(if available)*	2. MARK "X"		3. EFFLUENT							4. UNITS *(specify if blank)*		5. INTAKE *(optional)*		
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVRG. VALUE *(if available)*		d. NO. OF ANALYSES			a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass		a. Concentration	b. Mass	(1) Concentration	(2) Mass	
g. Nitrogen, Total Organic (as N)	X		0.724	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
h. Oil and Grease	X		6	NA	4	NA	1.7	NA	22	mg/L	NA	NA	NA	NA
i. Phosphorus (as P), Total (7723-14-0)	X		0.094	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
j. Radioactivity														
(1) Alpha, Total		X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(2) Beta, Total		X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(3) Radium, Total		X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(4) Radium 226, Total		X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
k. Sulfate (as SO4) (14808-79-8)	X		997	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
l. Sulfide (as S)		X	<0.100	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
m. Sulfite (as SO3) (14265-45-3)		X	<2.00	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
n. Surfactants		X	<0.05	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
o. Aluminum, Total (7429-90-5)	X		0.280	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
p. Barium, Total (7440-39-3)	X		0.158	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
q. Boron, Total (7440-42-8)	X		16.00	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
r. Cobalt, Total (7440-48-4)		X	<0.02	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
s. Iron, Total (7439-89-6)	X		3.03	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
t. Magnesium, Total (7439-95-4)	X		177.00	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
u. Molybdenum, Total (7439-98-7)	X		0.156	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
v. Manganese, Total (7439-96-5)	X		0.776	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
w. Tin, Total (7440-31-5)		X	<0.010	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
x. Titanium, Total (7440-32-6)		X	<0.025	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA

CONTINUE ON PAGE V-3

CONTINUED FROM PAGE 3 of FORM 2-C

EPA I.D. Number *(copy from Item 1 of Form 1)*	OUTFALL NUMBER
SC0022471	001

PART C- If you are a primary industry and this outfall contains process wastewater, refer to Table 2c-2 in the instructions to determine which of the GC/MS fractions you must test for. Mark "X" in column 2-a for all such GC/MS fractions that apply to your industry and for ALL toxic metals, cyanides, and total phenols. If you are not required to mark column 2-a *(secondary industries, non-process wastewater outfalls, and non-required GC/MS fractions)*, mark "X" in column 2-b for each pollutant you know or have reason to believe is present. Mark "X" in column 2-c for each pollutant you believe to be absent. If you mark column 2a for any pollutant, you must provide the results of at least one analysis for that pollutant. If you mark column 2b for acrolein, acrylonitrile, 2,4,dintrophenol, or 2-methyl-4, 6 dinitrophenol, you must provide the results of at least one analysis for each of these polutatns which youknow or have reason to believe that you discharge in concentration of 100 ppb or greater. Otherwise, for pollutants for which you mark column 2b, you must either submit at least one analysis or briefly describe the reasons the pollutant is exprected to be discharged. Note that there are 7 pages to this part; please review each carefully. Complete one table *(all 7 pages)* for each outfall. See instructions for additional details and requirements.

1. POLLUTANT and CASS NO. *(if available)*	2. MARK "X"			3. EFFLUENT							4. UNITS *(specify if blank)*		5. INTAKE *(optional)*		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVGR. VALUE *(if available)*		d. NO. OF ANALYSES			a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass		a. Concentration	b. Mass	(1) Concentration	(2) Mass	
METALS, CYANIDE, AND TOTAL PHENOLS															
1M. Antimony, Total (7440-36-0)	X			0.0105	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
2M. Arsenic, Total (7440-38-2)	X			0.067	NA	0.043	NA	0.025	NA	21	mg/L	NA	NA	NA	NA
3M. Beryllium, Total (7440-41-7)	X			<0.001	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
4M. Cadmium, Total (7440-43-9)	X			<0.0001	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
5M. Chromium, Total (7440-47-3)	X			<0.005	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
6M. Copper, Total (7440-50-8)	X			<0.010	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
7M. Lead, Total (7439-92-1)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
8M. Mercury, Total (7439-97-6)	X			0.00000826	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
9M. Nickel, Total (7440-02-0)	X			0.032	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
10M. Selenium, Total (7782-49-2)	X			0.177	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
11M. Silver, Total (7440-22-4)	X			<0.005	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
12M. Thallium, Total (7440-28-0)	X			0.0014	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
13M. Zinc, Total (7440-66-6)	X			0.019	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
14M. Cyanide, Total (57-12-5)	X			<0.010	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
15M. Phenols, Total	X			<0.005	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
DIOXIN															
2,3,7,8 - Tetrachloride-defense-P-Dioxin (1764-01-6)			X	DESCRIBE RESULTS NA											

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EPA I.D. Number *(copy from Item 1 of Form 1)*: SC0022471

OUTFALL NUMBER: 001

1. POLLUTANT and CAS NO. *(if available)*	2. MARK "X"			3. EFFLUENT							4. UNITS *(specify if blank)*		5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVRG. VALUE *(if available)*		d. NO. OF ANALYSES	a. Concentration	b. Mass	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass				(1) Concentration	(2) Mass	
GC/MS FRACTION - VOLATILE COMPOUNDS															
1V. Acrolein (107-02-8)	X			<0.005	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
2V. Acrylonitrile (107-13-1)	X			<0.005	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
3V. Benzene (71-43-2)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
4V. Bis (Chloromethyl) Ether (542-88-1)	TESTING IS NOT REQUIRED			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5V. Bromoform (75-25-2)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
6V. Carbon Tetra-chloride (56-23-5)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
7V. Chlorobenzene (108-90-7)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
8V. Chlorodibromo-methane (124-48-1)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
9V. Chloroethane (75-00-3)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
10V. 2-Chloroethylvinyl Ether (110-75-8)	X			<0.005	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
11V. Chloroform (67-66-3)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
12V. Dichlorobromo-methane (75-27-4)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
13V. Dichlorodifluoro-methane (75-71-8)	TESTING IS NOT REQUIRED			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
14V. 1,1-Dichloroethane (75-34-3)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
15V. 1,2-Dichloroethane (107-06-2)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
16V. 1,1-Dichloro-ethylene (75-35-4)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
17V. 1,2-Dichloropropane (78-87-5)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
18V. 1,3-Dichloroprop-ylene (542-75-6)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
19V. Ethylbenzene (100-41-4)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
20V. Methyl Bromide (74-83-9)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
21V. Methyl Chloride (74-87-3)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA

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OUTFALL NUMBER 001

1. POLLUTANT and CAS NO. *(if available)*	2. MARK "X"			3. EFFLUENT							4. UNITS *(specify if blank)*		5. INTAKE *(optional)*		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVRG. VALUE *(if available)*		d. NO. OF ANALYSES	a. Concentration	b. Mass	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass				(1) Concentration	(2) Mass	
GC/MS FRACTION - VOLATILE COMPOUNDS (continued)															
22V. Methylene Chloride (75-09-2)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
23V. 1,1,2,2-Tetrachoro-ethane (79-34-5)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
24V. Tetrachloroethy-lene (127-18-4)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
25V. Toluene (108-88-3)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
26V. 1,2-Trans-Dichloro-ethylene (156-60-5)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
27V. 1,1,1-Trichloro-ethane (71-55-6)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
28V. 1,1,2-Trichloro-ethane (79-00-5)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
29V. Trichloroethylene (79-01-6)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
30V. Trichlorofluoro-methane (75-69-4)	TESTING IS NOT REQUIRED			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
31V. Vinyl Chloride (75-01-4)	X			<0.002	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
GC/MS FRACTION - ACID COMPOUNDS															
1A. 2-Chlorophenol (95-57-8)	X			<0.010	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
2A. 2,4-Dichlorophenol (120-83-2)	X			<0.010	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
3A. 2,4-Dimethylphenol (105-67-9)	X			<0.010	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
4A. 4,6-Dinitro-O-Cresol (534-52-1)	X			<0.010	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
5A. 2,4-Dinitrophenol (51-28-5)	X			<0.050	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
6A. 2-Nitrophenol (88-75-5)	X			<0.010	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
7A. 4-Nitrophenol (100-02-7)	X			<0.010	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
8A. P-Chloro-M-Cresol (59-50-7)	X			<0.010	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
9A. Pentachlorophenol (87-86-5)	X			<0.010	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
10A. Phenol (108-95-2)	X			<0.010	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA
11A. 2,4,6-Trichloro-phenol (88-06-2)	X			<0.010	NA	NA	NA	NA	NA	1	mg/L	NA	NA	NA	NA

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OUTFALL NUMBER 001

1. POLLUTANT and CAS NO. *(if available)*	2. MARK "X"			3. EFFLUENT							4. UNITS *(specify if blank)*		5. INTAKE *(optional)*		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVRG. VALUE *(if available)*		d. NO. OF ANALYSES	a. Concentration	b. Mass	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass				(1) Concentration	(2) Mass	
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS															
1B. Acenaphthene (83-32-9)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2B. Acenaphthylene (208-96-8)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3B. Anthracene (120-12-7)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4B. Benzidine (92-87-5)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5B. Benzo (a) Anthracene (56-55-3)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6B. Benzo (a) Pyrene (50-32-8)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7B. 3,4-Benzofluoranthene (205-99-2)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
8B. Benzo *(ghi)* Perylene (191-24-2)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9B. Benzo *(k)* Fluoranthene (207-08-9)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10B. Bis *(2-Chloroethoxy)* Methane (111-91-1)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
11B. Bis *(2-Chloroethyl)* Ether (111-44-4)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12B. Bis- *(2-Chloroisopropyl)* Ether (102-60-1)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13B. Bis *(2-Ethylhexyl)* Phthalate (117-81-7)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
14B. 4-Bromophenyl Phenyl Ether (101-55-3)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
15B. Butyl Benzyl Phthalate (85-68-7)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
16B. 2-Chloronaphthalene (91-58-7)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
17B. 4-Chlorophenyl Phenyl Ether (7005-72-3)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
18B. Chrysene (218-01-9)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
19B. Dibenzo *(a,h)* Anthracene (58-70-3)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
20B. 1,2- Dichlorobenzene (95-50-1)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
21B. 1,3-Dichlorobenzene (541-73-1)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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EPA I.D. Number *(copy from Item 1 of Form 1)*: SC0022471

OUTFALL NUMBER: 001

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

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EPA I.D. Number *(copy from Item 1 of Form 1)* SC0022471

OUTFALL NUMBER 001

1. POLLUTANT and CAS NO. *(if available)*	2. MARK "X"			3. EFFLUENT							4. UNITS *(specify if blank)*		5. INTAKE *(optional)*		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVRG. VALUE *(if available)*		d. NO. OF ANALYSES	a. Concentration	b. Mass	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass				(1) Concentration	(2) Mass	
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS *(continued)*															
43B. N-Nitrosodiphenyl-amine (86-30-6)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
44B. Phenanthrene (85-01-8)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
45B. Pyrene (129-00-0)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
46B. 1,2,4-Trichloro-benzene (120-82-1)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GC/MS FRACTION - PESTICIDES															
1P. Aldrin (309-00-2)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2P. *A*-BHC (319-84-6)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3P. *B*-BHC (319-85-7)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4P. Y-BHC (58-89-9)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5P. O-BHC (319-86-8)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6P. Chlordane (57-74-9)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7P. 4,4'-DDT (50-29-3)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
8P. 4,4'-DDE (72-55-9)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9P. 4,4'-DDD (72-54-8)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10P. Dieldrin (60-57-1)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
11P. A-Endosulfan (115-29-7)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12P. *B*-Endosulfan (115-29-7)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13P. Endosulfan Sulfate (1031-07-8)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
14P. Endrin (72-20-8)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
15P. Endrin Aldehyde (7421-93-4)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
16P. Heptachlor (76-44-8)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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EPA I.D. Number *(copy from Item 1 of Form 1)* SC0022471

OUTFALL NUMBER 001

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

APPLICATION FORM 2C

OUTFALL 002 DATA

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (*use the same format*) instead of completing these pages.
SEE INSTRUCTIONS

EPA I.D. Number (*copy from Item 1 of Form 1*): SC0022471

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

OUTFALL NO. 002

PART A - You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

1. POLLUTANT	2. EFFLUENT							3. UNITS (*specify if blank*)		4. INTAKE (*optional*)		
	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES			a. LONG TERM AVERAGE VALUE		b. NO OF ANALYSES
	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass		a. Concentration	b. Mass	(1) Concentration	(2) Mass	
a. Biochemical Oxygen Demand (BOD)	2.90	19.43	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
b. Chemical Oxygen Demand (COD)	50.0	335	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
c. Total Organic Carbon (TOC)	6.16	41.28	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
d. Total Suspended Solids (TSS)	21.0	79.1	16.6	NA	7.6	NA	40	mg/L	lbs/day	NA	NA	NA
e. Ammonia (as N)	0.581	3.89	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
f. Flow	VALUE 4.03 MGD		VALUE 3.79 MGD		VALUE 2.18 MGD		~730	NA	NA	VALUE NA		NA
g. Temperature (*winter*)	VALUE 90 °F		VALUE 84 °F		VALUE NA		12	NA °F		VALUE NA		NA
h. Temperature (*summer*)	VALUE 95 °F		VALUE 91 °F		VALUE NA		12	NA °F		VALUE NA		NA
i. pH	MINIMUM 6.0	MAXIMUM 8.2	MINIMUM NA	MAXIMUM NA			43	STANDARD UNITS				

PART B - Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2-a for any pollutant, which is limited either directly, or indirectly but expressly, in an effluent limitations guideline, you must provide the results of at least one analysis for that pollutant. For other pollutants for which you mark column 2a, you must provide quantitative data or an explanation of their presence in your discharge. Complete one table for each outfall. See the instructions for additional details and requirements.

1. POLLUTANT and CAS NO. (*if available*)	2. MARK "X"		3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES			a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass		a. Concentration	b. Mass	(1) Concentration	(2) Mass	
a. Bromide (24959-67-9)	X		73.5	492.5	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
b. Chlorine, Total Residual	X		0.05	0.335	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
c. Color		X	<25	NA	NA	NA	NA	NA	1	PCU	NA	NA	NA	NA
d. Fecal Coliform	X		10	NA	NA	NA	NA	NA	1	CFU/100mL	NA	NA	NA	NA
e. Fluoride (16984-48-8)	X		3.20	21.44	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
f. Nitrate - Nitrite (as N)	X		0.131	0.878	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA

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OUTFALL NUMBER 002

1. POLLUTANT and CAS NO. *(if available)*	2. MARK "X"		3. EFFLUENT							4. UNITS *(specify if blank)*		5. INTAKE *(optional)*		
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVRG. VALUE *(if available)*		d. NO. OF ANALYSES			a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass		a. Concentration	b. Mass	(1) Concentration	(2) Mass	
g. Nitrogen, Total Organic (as N)	X		0.724	4.852	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
h. Oil and Grease	X		6	<33.51	4	NA	1.7	NA	22	mg/L	lbs/day	NA	NA	NA
i. Phosphorus (as P), Total (7723-14-0)	X		0.094	0.630	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
j. Radioactivity														
(1) Alpha, Total		X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(2) Beta, Total		X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(3) Radium, Total		X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(4) Radium 226, Total		X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
k. Sulfate (as SO4) (14808-79-8)	X		997	6,681	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
l. Sulfide (as S)		X	<0.100	<0.670	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
m. Sulfite (as SO3) (14265-45-3)		X	<2.00	<13.40	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
n. Surfactants		X	<0.05	<0.34	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
o. Aluminum, Total (7429-90-5)	X		0.280	1.88	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
p. Barium, Total (7440-39-3)	X		0.158	1.06	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
q. Boron, Total (7440-42-8)	X		16.00	107.22	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
r. Cobalt, Total (7440-48-4)		X	<0.02	<0.13	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
s. Iron, Total (7439-89-6)	X		3.03	20.30	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
t. Magnesium, Total (7439-95-4)	X		177.00	1,186	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
u. Molybdenum, Total (7439-98-7)	X		0.156	1.05	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
v. Manganese, Total (7439-96-5)	X		0.776	5.20	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
w. Tin, Total (7440-31-5)		X	<0.010	<0.067	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
x. Titanium, Total (7440-32-6)		X	<0.025	<0.168	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA

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PART C- If you are a primary industry and this outfall contains process wastewater, refer to Table 2c-2 in the instructions to determine which of the GC/MS fractions you must test for. Mark "X" in column 2-a for all such GC/MS fractions that apply to your industry and for ALL toxic metals, cyanides, and total phenols. If you are not required to mark column 2-a *(secondary industries, non-process wastewater outfalls, and non-required GC/MS fractions)*, mark "X" in column 2-b for each pollutant you know or have reason to believe is present. Mark "X" in column 2-c for each pollutant you believe to be absent. If you mark column 2a for any pollutant, you must provide the results of at least one analysis for that pollutant. If you mark column 2b for acrolein, acrylonitrile, 2,4,dintrophenol, or 2-methyl-4, 6 dinitrophenol, you must provide the results of at least one analysis for each of these polutatns which youknow or have reason to believe that you discharge in concentration of 100 ppb or greater. Otherwise, for pollutants for which you mark column 2b, you must either submit at least one analysis or briefly describe the reasons the pollutant is expected to be discharged. Note that there are 7 pages to this part; please review each carefully. Complete one table *(all 7 pages)* for each outfall. See instructions for additional details and requirements.

1. POLLUTANT and CASS NO. *(if available)*	2. MARK "X"			3. EFFLUENT							4. UNITS *(specify if blank)*		5. INTAKE *(optional)*		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVGR. VALUE *(if available)*		d. NO. OF ANALYSES			a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass		a. Concentration	b. Mass	(1) Concentration	(2) Mass	
METALS, CYANIDE, AND TOTAL PHENOLS															
1M. Antimony, Total (7440-36-0)	X			0.0105	0.0703	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
2M. Arsenic, Total (7440-38-2)	X			0.067	0.447	0.043	NA	0.025	NA	21	mg/L	lbs/day	NA	NA	NA
3M. Beryllium, Total (7440-41-7)	X			<0.001	<0.007	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
4M. Cadmium, Total (7440-43-9)	X			<0.0001	<0.0007	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
5M. Chromium, Total (7440-47-3)	X			<0.005	<0.034	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
6M. Copper, Total (7440-50-8)	X			<0.010	<0.067	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
7M. Lead, Total (7439-92-1)	X			<0.002	<0.013	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
8M. Mercury, Total (7439-97-6)	X			0.00000826	0.000055	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
9M. Nickel, Total (7440-02-0)	X			0.032	0.213	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
10M. Selenium, Total (7782-49-2)	X			0.177	1.19	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
11M. Silver, Total (7440-22-4)	X			<0.005	<0.034	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
12M. Thallium, Total (7440-28-0)	X			0.0014	0.0095	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
13M. Zinc, Total (7440-66-6)	X			0.019	0.129	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
14M. Cyanide, Total (57-12-5)	X			<0.010	<0.067	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
15M. Phenols, Total	X			<0.005	<0.034	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
DIOXIN															
2,3,7,8 - Tetrachloride-defense-P-Dioxin (1764-01-6)			X	DESCRIBE RESULTS NA											

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EPA I.D. Number *(copy from Item 1 of Form 1)*: SC0022471

OUTFALL NUMBER: 002

1. POLLUTANT and CAS NO. *(if available)*	2. MARK "X"			3. EFFLUENT							4. UNITS *(specify if blank)*		5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVRG. VALUE *(if available)*		d. NO. OF ANALYSES	a. Concentration	b. Mass	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass				(1) Concentration	(2) Mass	
GC/MS FRACTION - VOLATILE COMPOUNDS															
1V. Acrolein (107-02-8)	X			<0.005	<0.0335	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
2V. Acrylonitrile (107-13-1)	X			<0.005	<0.0335	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
3V. Benzene (71-43-2)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
4V. Bis (Chloromethyl) Ether (542-88-1)	TESTING IS NOT REQUIRED			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5V. Bromoform (75-25-2)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
6V. Carbon Tetra-chloride (56-23-5)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
7V. Chlorobenzene (108-90-7)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
8V. Chlorodibromo-methane (124-48-1)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
9V. Chloroethane (75-00-3)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
10V. 2-Chloroethylvinyl Ether (110-75-8)	X			<0.005	<0.0335	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
11V. Chloroform (67-66-3)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
12V. Dichlorobromo-methane (75-27-4)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
13V. Dichlorodifluoro-methane (75-71-8)	TESTING IS NOT REQUIRED			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
14V. 1,1-Dichloroethane (75-34-3)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
15V. 1,2-Dichloroethane (107-06-2)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
16V. 1,1-Dichloro-ethylene (75-35-4)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
17V. 1,2-Dichloropropane (78-87-5)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
18V. 1,3-Dichloroprop-ylene (542-75-6)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
19V. Ethylbenzene (100-41-4)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
20V. Methyl Bromide (74-83-9)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
21V. Methyl Chloride (74-87-3)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA

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EPA I.D. Number *(copy from Item 1 of Form 1)* SC0022471

OUTFALL NUMBER 002

1. POLLUTANT and CAS NO. *(if available)*	2. MARK "X"			3. EFFLUENT							4. UNITS *(specify if blank)*		5. INTAKE *(optional)*		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVRG. VALUE *(if available)*		d. NO. OF ANALYSES	a. Concentration	b. Mass	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass				(1) Concentration	(2) Mass	
GC/MS FRACTION - VOLATILE COMPOUNDS (continued)															
22V. Methylene Chloride (75-09-2)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
23V. 1,1,2,2-Tetrachloro-ethane (79-34-5)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
24V. Tetrachloroethy-lene (127-18-4)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
25V. Toluene (108-88-3)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
26V. 1,2-Trans-Dichloro-ethylene (156-60-5)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
27V. 1,1,1-Trichloro-ethane (71-55-6)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
28V. 1,1,2-Trichloro-ethane (79-00-5)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
29V. Trichloroethylene (79-01-6)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
30V. Trichlorofluoro-methane (75-69-4)	TESTING IS NOT REQUIRED			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
31V. Vinyl Chloride (75-01-4)	X			<0.002	<0.0134	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
GC/MS FRACTION - ACID COMPOUNDS															
1A. 2-Chlorophenol (95-57-8)	X			<0.010	<0.067	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
2A. 2,4-Dichlorophenol (120-83-2)	X			<0.010	<0.067	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
3A. 2,4-Dimethylphenol (105-67-9)	X			<0.010	<0.067	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
4A. 4,6-Dinitro-O-Cresol (534-52-1)	X			<0.010	<0.067	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
5A. 2,4-Dinitrophenol (51-28-5)	X			<0.050	<0.335	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
6A. 2-Nitrophenol (88-75-5)	X			<0.010	<0.067	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
7A. 4-Nitrophenol (100-02-7)	X			<0.010	<0.067	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
8A. P-Chloro-M-Cresol (59-50-7)	X			<0.010	<0.067	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
9A. Pentachlorophenol (87-86-5)	X			<0.010	<0.067	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
10A. Phenol (108-95-2)	X			<0.010	<0.067	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA
11A. 2,4,6-Trichloro-phenol (88-06-2)	X			<0.010	<0.067	NA	NA	NA	NA	1	mg/L	lbs/day	NA	NA	NA

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EPA I.D. Number *(copy from Item 1 of Form 1)* SC0022471

OUTFALL NUMBER 002

1. POLLUTANT and CAS NO. *(if available)*	2. MARK "X"			3. EFFLUENT							4. UNITS *(specify if blank)*		5. INTAKE *(optional)*		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVRG. VALUE *(if available)*		d. NO. OF ANALYSES			a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass		a. Concentration	b. Mass	(1) Concentration	(2) Mass	
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS															
1B. Acenaphthene (83-32-9)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2B. Acenaphthylene (208-96-8)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3B. Anthracene (120-12-7)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4B. Benzidine (92-87-5)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5B. Benzo (a) Anthracene (56-55-3)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6B. Benzo (a) Pyrene (50-32-8)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7B. 3,4-Benzofluor-anthene (205-99-2)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
8B. Benzo *(ghi)* Perylene (191-24-2)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9B. Benzo *(k)* Fluoranthene (207-08-9)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10B. Bis *(2-Chloroethoxy)* Methane (111-91-1)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
11B. Bis *(2-Chloroethyl)* Ether (111-44-4)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12B. Bis- *(2-Chloroisopropyl)* Ether (102-60-1)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13B. Bis *(2-Ethylhexyl)* Phthalate (117-81-7)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
14B. 4-Bromophenyl Phenyl Ether (101-55-3)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
15B. Butyl Benzyl Phthalate (85-68-7)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
16B. 2-Chloronaphthalene (91-58-7)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
17B. 4-Chlorophenyl Phenyl Ether (7005-72-3)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
18B. Chrysene (218-01-9)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
19B. Dibenzo *(a,h)* Anth-racene (58-70-3)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
20B. 1,2- Dichloro-benzene (95-50-1)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
21B. 1,3-Dichloro-benzene (541-73-1)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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EPA I.D. Number (*copy from Item 1 of Form 1*): SC0022471

OUTFALL NUMBER: 002

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

CONTINUE ON PAGE V-8

CONTINUED FROM PAGE V-7

EPA I.D. Number *(copy from Item 1 of Form 1)*	OUTFALL NUMBER
SC0022471	002

1. POLLUTANT and CAS NO. *(if available)*	2. MARK "X"			3. EFFLUENT							4. UNITS *(specify if blank)*		5. INTAKE *(optional)*		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVRG. VALUE *(if available)*		d. NO. OF ANALYSES	a. Concentration	b. Mass	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass				(1) Concentration	(2) Mass	
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS *(continued)*															
43B. N-Nitrosodiphenyl-amine (86-30-6)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
44B. Phenanthrene (85-01-8)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
45B. Pyrene (129-00-0)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
46B. 1,2,4-Trichloro-benzene (120-82-1)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GC/MS FRACTION - PESTICIDES															
1P. Aldrin (309-00-2)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2P. *A*-BHC (319-84-6)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3P. *B*-BHC (319-85-7)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4P. *Y*-BHC (58-89-9)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5P. O-BHC (319-86-8)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6P. Chlordane (57-74-9)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7P. 4,4'-DDT (50-29-3)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
8P. 4,4'-DDE (72-55-9)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9P. 4,4'-DDD (72-54-8)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10P. Dieldrin (60-57-1)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
11P. A-Endosulfan (115-29-7)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12P. *B*-Endosulfan (115-29-7)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13P. Endosulfan Sulfate (1031-07-8)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
14P. Endrin (72-20-8)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
15P. Endrin Aldehyde (7421-93-4)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
16P. Heptachlor (76-44-8)			X	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

CONTINUE ON PAGE V-9

CONTINUED FROM PAGE V-8

EPA I.D. Number *(copy from Item 1 of Form 1)* SC0022471

OUTFALL NUMBER 002

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

APPLICATION FORM 2E

OUTFALL 02A DATA

Please print or type in the unshaded areas only.

EPA I.D. Number (copy from Item 1 of Form 1): SC0022471

Form Approved OMB No. 2040-0086
Approval expires 5-31-92

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

I. Receiving Waters

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

Outfall Number *(list)*	Latitude Deg	Latitude Min	Latitude Sec	Longitude Deg	Longitude Min	Longitude Sec	Receiving Water *(name)*
02A	33	19	55	79	21	39	Internal Outfall

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

NA

III. Type of Waste

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

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

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

Sodium Hypochlorite - 12-15%
Sulfuric Acid - 93-94%
Silt Dispersant - GE Betz Depositrol BL5323
Corrosion Inhibitor - GE BETZ Inhibitor AZ8104 (Polytriazole)

IV. Effluent Characteristics

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

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

Pollutant or Parameter	(1) Maximum Daily Value *(include units)* Mass	(1) Concentration	(2) Average Daily Value *(last year)* *(include units)* Mass	(2) Concentration	(3) Number of Measurements Taken *(last year)*	or (4) Source of Estimate *(if new discharger)*
Biochemical Oxygen Demand (BOD)	314.88 lbs/day	35.8 mg/L	NA	NA	1	NA
Total Suspended Solids (TSS)	<87.96 lbs/day	<10.0 mg/L	NA	NA	1	NA
Fecal Coliform *(if believed present or if sanitary waste is discharged)*	NA	NA	NA	NA	NA	NA
Total Residual Chlorine *(if chlorine is used)*	2.20 lbs/day	0.25 mg/L	NA	NA	1	NA
Oil and Grease	<43.98 lbs/day	<5.00 mg/L	NA	NA	1	NA
*Chemical Oxygen Demand (COD)	869.9 lbs/day	98.9 mg/L	NA	NA	1	NA
*Total Organic Carbon (TOC)	183.8 lbs/day	20.9 mg/L	NA	NA	1	NA
Ammonia *(as N)*	15.48 lbs/day	1.76 mg/L	NA	NA	1	NA
Discharge Flow	Value 1.054 MGD		NA		1	NA
pH *(give range)*	Value 7.4 SU		NA		1	NA
Temperature *(Winter)*	69.3 °F		NA °F		1	NA
Temperature *(Summer)*	NA °F		NA °F		NA	NA

*If noncontact cooling water is discharged

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

Discharge flow varies and is dependent on many factors including ambient temperatures, precipitation, energy demand, basin water level, unit load, and unit availability. The blowdown flow rate is not measured but is estimated to range from 0 mgd to 1.0 mgd, with an average of 0.7 mgd. In 2009, the Unit 3 Cooling Tower blowdown occurred approximately 200 days and Unit 4 Cooling Tower blowdown occurred approximately 325 days.

VI. Treatment System *(Describe briefly any treatment system(s) used or to be used)*

This discharge is directed to the Station's cooling pond where additional cooling and chlorine dissipation occur prior to reuse or discharge via Outfall 002.

VII. Other Information *(Optional)*

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

VIII. Certification

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

A. Name & Official Title	B. Phone No. (area code & no.)
C. Signature	D. Date Signed 1/28/11

EPA Form 3510-2E (8-90) PAGE 2 of 2

SLUDGE SUPPLEMENT

D H E C

PROMOTE PROTECT PROSPER

South Carolina Department of Health and Environmental Control

BUREAU OF WATER

SLUDGE DISPOSAL SUPPLEMENT FOR NPDES AND ND PERMIT APPLICATIONS

Facility Name: South Carolina Public Service Authority/Winyah Generating Station

Permit Number: SC00 22471 (leave blank for a new facility)

or ND00______________

Please check your proposed or current sludge disposal procedure:

I. Existing Facilities:

Ash is removed for sale for beneficial re-use based on market conditions.

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

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

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

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

II. Proposed Facilities:

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

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

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

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

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

ALSO SEE ATTACHED INSTRUCTIONS

July 1, 1998

MIXING ZONE REQUEST FORMS AND

MODELING RESULTS

DHEC

PROMOTE PROTECT PROSPER

South Carolina Department of Health and Environmental Control

NPDES APPLICATION SUPPLEMENT

Mixing Zone Request for Surface Water Discharges

NPDES #: SC0022471

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

County: Georgetown

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

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

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

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

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

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

What is the proposed acute WET test concentration? NA %

What is the proposed mixing zone size (in meters)? Length: 144 m Width: 89.9 m

What is the proposed chronic WET test concentration? 2.6 %

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

Signature: [signature] **Date:** January 20, 2011

CORMIX Checklist for Data Preparation – Version v5.0

PROJECT LEGEND

Project File Name: Spring-Fall Toxicity.cmx **Design Case:** Spring/Fall Toxicity
Site Name: SCPSA - Winyah Generating Station **Prepared By:** John Durkee, P.E. **Date:** January 20, 2011

EFFLUENT DATA

☐ **Non-Fresh Water Effluent Density** ☒ **Fresh Water Effluent Density**

Density ρ_0: ....kg/m³ ☒ Temperature T_0: 32.7 °C ☐ Density ρ_0: ....kg/m³

Discharge Excess Concentration: 100% ☒ Effluent Flowrate Q_0: 0.19 m³/s ☐ Effluent Velocity U_0: ....m/s

Pollutant Types

☒ Conservative ☐ Non Conservative: ..../day ☐ Heated – Heat Loss Coefficient: ....W/m²/°C

☐ **Brine** ☐ **Sediment:** Chunks: ..... % Sand: ..... % Coarse Silt: ..... % Fine Silt: ..... % Clay: ..... %
Total Sediment Concentration: ..... kg/m³

AMBIENT GEOMETRY / FLOW FIELD DATA

Average Depth H_a: 2.8 m ☐ **Unbounded** ☒ **Bounded:** Width BS: 179.8 m
Depth at Discharge H_d: 2.8 m Appearance: ☒ Uniform ☐ Slight Meander ☐ Highly Irregular

☒ **Steady** ☐ **Unsteady**

☒ Ambient Flowrate Q_a 10.65 m³/s Period ......hr Max Velocity U_m ...... m/s Tidal Velocity at this Time U_a: ...... m/s
☐ Ambient Velocity U_a .... m/s ☐ At Time: ....hr Before Slack ☐ At Slack – Δ Time: .....hr ☐ At Time: ....hr After Slack

☐ **Single Slope** ☐ **Near & Far Slope**

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

☒ Manning's n: 0.035 (Darcy) Wind Speed: 2 m/s

AMBIENT DENSITY DATA

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

☒ **Uniform** Fresh: ☒ Temperature: 10.7 °C ☐ Density ρ_a: .... kg/m³ **Non-Fresh:** Density ρ_a: .... kg/m³

☐ **Stratified** ☐ **Type A** ☐ **Type B:** Pycnocline Height: ....m ☐ **Type C:** Pycnocline Height: ....m Jump: ....kg/m³/°C
Density ρ: At Surface ρ_{as} .... kg/m³/°C At Bottom ρ_{ab}: .... kg/m³/°C

☐ **Brine & Sediment Only** Level 1 Density ρ_1: .. kg/m³ Sub 1: ......m; Level 2 Density ρ_2: ....kg/m³ Sub 2: ...... m

DISCHARGE GEOMETRY DATA

CORMIX 1 – Single Port	CORMIX 2 – Multiport	CORMIX 3 – Surface Discharge
Nearest Bank: ☐ Left ☐ Right	Nearest Bank: ☒ Left ☐ Right	Discharge Located: ☐ Left ☐ Right
Dist. to Nearest Bank: .... m	☒ Unidirectional ☐ Staged ☐ Altern./ Vert.	Horiz. Angle σ: .... °
Vert. Angle θ_0: ..... °; Horiz. Angle σ_0: ..... °	N° of openings: 5 ; Diffuser Length: 3 m	Local Depth at Discharge Outlet: .... m
☐ Port Diameter D_0: ......m	Dist. to 1st end-point YB_1: 15.2 m	☐ **Flush** ☐ **Co-flowing**
☐ Port Area A_0: ......m²	Dist. to 2st far end-point YB_2: 18.2 m	☐ **Protruding:** Distance from Bank: ...... m
Submerged	Port Height h_0: 0.9 m; Port Diameter D_0: 0.1 m	**Discharge Outlet**
Port Height above Bottom h_0: ...... m	Contraction Ratio: 1	☐ **Channel:** Width: ......m; Depth b_0: ..... m
Above Surface	**Angles (degrees)**	☐ **Pipe:** Diameter D_0: .... m
Port Height above Surface ...... m	Vert. Angle θ: 45 °; Horiz. Angle σ: 0 °	Bottom Invert Depth: .... m
☐ Jet-like ☐ Spray ☐ Area	Align. Angle γ: 90 °; Relat.Orient. Angle β: 90 °	Local Bottom Slope at Chanel Entry: .... °
Deflector Plate: ☐ With or ☐ Without	Nozzle Direction: ☒ Same or ☐ Fanned Out	

MIXING ZONE DATA

☒ **Non-Toxic Effluent** ☐ **Toxic Effluent**

☐ WQ Standard: .... ☒ No WQ Standard CMC : .... CCC : ....

☒ **Mixing Zone Specified** **Chronic Sizes Per SCDHEC** ☐ **No Mixing Zone Specified**

☐ Trajectory: ......m ☒ Downstream Distance: 359.6 m ☒ Width: 89.9 % / m ☐ Area: .... %

Region of Interest: 1798 m Grid Intervals for Display: 50

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                      CORMIX MIXING ZONE EXPERT SYSTEM
                          CORMIX Version 6.0GT
                       HYDRO2:Version-6.0.0.0  October,2009
SITE NAME/LABEL:                Winyah Station
  DESIGN CASE:                  Spring/Fall Toxicity
  FILE NAME:                    C:\Users\E2Sciences\E2S\Client Files\Santee
Cooper\Winyah\Spring-Fall Toxicity.prd
  Using subsystem CORMIX2:     Multiport Diffuser Discharges
  Start of session:             01/20/2011--14:11:18
******************************************************************************
SUMMARY OF INPUT DATA:
------------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                            = bounded
  Width                           BS       = 179.80 m
  Channel regularity              ICHREG = 1
  Ambient flowrate                QA       = 10.65 m^3/s
  Average depth                   HA       = 2.8 m
  Depth at discharge              HD       = 2.8 m
  Ambient velocity                UA       = 0.0212 m/s
  Darcy-Weisbach friction factor  F        = 0.035
  Wind velocity                   UW       = 2 m/s
  Stratification Type             STRCND = U
  Surface temperature                      = 10.70 degC
  Bottom temperature                       = 10.70 degC
  Calculated FRESH-WATER DENSITY values:
  Surface density                 RHOAS    = 999.6370 kg/m^3
  Bottom density                  RHOAB    = 999.6370 kg/m^3
------------------------------------------------------------------------------
DISCHARGE PARAMETERS:             Submerged Multiport Diffuser Discharge
  Diffuser type                   DITYPE = unidirectional perpendicular
  Diffuser length                 LD       = 3 m
  Nearest bank                             = left
  Diffuser endpoints              YB1      = 15.20 m;    YB2 = 18.20 m
  Number of openings              NOPEN    = 5
  Number of Risers                NRISER = 5
  Ports/Nozzles per Riser         NPPERR   = 1
  Spacing between risers/openings SPAC     = 0.75 m
  Port/Nozzle diameter            D0       = 0.1 m
    with contraction ratio                 = 1
  Equivalent slot width           B0       = 0.0131 m
  Total area of openings          TA0      = 0.0393 m^2
  Discharge velocity              U0       = 4.84 m/s
  Total discharge flowrate        Q0       = 0.19 m^3/s
  Discharge port height           H0       = 0.9 m
  Nozzle arrangement              BETYPE = unidirectional without fanning
  Diffuser alignment angle        GAMMA    = 90 deg
  Vertical discharge angle        THETA    = 45 deg
  Actual Vertical discharge angle THEAC    = 45 deg
  Horizontal discharge angle      SIGMA    = 0 deg
  Relative orientation angle      BETA     = 90 deg
  Discharge temperature (freshwater)       = 32.70 degC
  Corresponding density           RHO0     = 994.7996 kg/m^3
  Density difference              DRHO     = 4.8374 kg/m^3
  Buoyant acceleration            GP0      = 0.0475 m/s^2
```

```
  Discharge concentration         C0      = 100 %
  Surface heat exchange coeff.    KS      = 0 m/s
  Coefficient of decay            KD      = 0 /s
-----------------------------------------------------------------------------
FLUX VARIABLES PER UNIT DIFFUSER LENGTH:
  Discharge (volume flux)         q0      = 0.063333 m^2/s
  Momentum flux                   m0      = 0.306426 m^3/s^2
  Buoyancy flux                   j0      = 0.003006 m^3/s^3
-----------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  = 0.01 m          Lm  = 684.73 m          LM  = 14.67 m
  lm' = 99999 m         Lb' = 99999 m           La  = 99999 m
  (These refer to the actual discharge/environment length scales.)
-----------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
Slot Froude number              FR0     = 194.12
  Port/nozzle Froude number       FRD0    = 70.23
  Velocity ratio                  R       = 228.71
-----------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                         = no
  Water quality standard specified        = no
  Regulatory mixing zone                  = yes
  Regulatory mixing zone specification    = width
  Regulatory mixing zone value            = 89.90 m (m^2 if area)
  Region of interest                      = 1798 m
*****************************************************************************
HYDRODYNAMIC CLASSIFICATION:
  *------------------------*
  | FLOW CLASS   =  MU2 |
  *------------------------*
  This flow configuration applies to a layer corresponding to the full water
  depth at the discharge site.
  Applicable layer depth = water depth = 2.8 m
*****************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-----------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    16.70 m from the left bank/shore.
  Number of display steps NSTEP = 50 per module.
-----------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at NFR edge  c = 1.1077 %
  Dilution at edge of NFR              s = 90.3
  NFR Location:                        x = 817.27 m
    (centerline coordinates)           y = 0 m
                                       z = 2.8 m
  NFR plume dimensions:  half-width (bh) = 287.28 m
                          thickness (bv) = 0.57 m
Cumulative travel time:       49513.5234 sec.
-----------------------------------------------------------------------------
```

```
Buoyancy assessment:
  The effluent density is less than the surrounding ambient water
  density at the discharge level.
  Therefore, the effluent is POSITIVELY BUOYANT and will tend to rise towards
  the surface.
-----------------------------------------------------------------------------
Near-field instability behavior:
  The diffuser flow will experience instabilities with full vertical mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
-----------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume becomes vertically fully mixed WITHIN NEAR-FIELD at 0 m
  downstream, but RE-STRATIFIES LATER and is not mixed in the far-field.
-----------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
  Plume in bounded section contacts nearest bank at 0 m downstream.
  Plume contacts second bank at 0 m downstream.
*********************** TOXIC DILUTION ZONE SUMMARY ***********************
No TDZ was specified for this simulation.
********************* REGULATORY MIXING ZONE SUMMARY **********************
The plume conditions at the boundary of the specified RMZ are as follows:
  Pollutant concentration                c = 2.588003  %
  Corresponding dilution                 s = 38.7
  Plume location:                        x = 144.25 m
    (centerline coordinates)             y = 0 m
                                         z = 2.8 m
  Plume dimensions:      half-width (bh) = 44.95 m
                          thickness (bv) = 0.83 m
Cumulative travel time < 49513.5234 sec. (RMZ is within NFR)
-----------------------------------------------------------------------------
Regulatory Mixing Zone Analysis:
  The RMZ specification occurs before the near-field mixing regime (NFR) has
  been completed.  The specification of the RMZ is highly restrictive.
********************* FINAL DESIGN ADVICE AND COMMENTS **********************
CORMIX2 uses the TWO-DIMENSIONAL SLOT DIFFUSER CONCEPT to represent
  the actual three-dimensional diffuser geometry.  Thus, it approximates
  the details of the merging process of the individual jets from each
  port/nozzle.
In the present design, the spacing between adjacent ports/nozzles
  (or riser assemblies) is of the order of, or less than, the local
  water depth so that the slot diffuser approximation holds well.

Nevertheless, if this is a final design, the user is advised to use a
  final CORMIX1 (single port discharge) analysis, with discharge data
  for an individual diffuser jet/plume, in order to compare to
  the present near-field prediction.
-----------------------------------------------------------------------------
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
  CORMIX predictions on dilutions and concentrations (with associated
  plume geometries) are reliable for the majority of cases and are accurate
  to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
  the design configuration as highly complex and uncertain for prediction.
```

```
CORMIX2 PREDICTION FILE:
2222222222222222222222222222222222222222222222222222222222222222222222222222222
2222222222222222
                        CORMIX MIXING ZONE EXPERT SYSTEM
         Subsystem CORMIX2:  Multiport Diffuser Discharges
                          CORMIX Version 6.0GT
                       HYDRO2 Version 6.0.0.0 October 2009
-------------------------------------------------------------------------------
---------------
-------------------------------------------------------------------------------
---------------
CASE DESCRIPTION
 Site name/label:   Winyah Station
 Design case:       Spring/Fall Toxicity
 FILE NAME:         C:\...les\Santee Cooper\Winyah\Spring-Fall Toxicity.prd
 Time stamp:        Thu Jan 20 14:11:18 2011

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS     =    179.80  AS     =    503.44  QA     =     10.65  ICHREG= 1
 HA     =      2.80  HD     =      2.80
 UA     =     0.021  F      =     0.035  USTAR =0.1399E-02
 UW     =     2.000  UWSTAR=0.2198E-02
 Uniform density environment
 STRCND=  U          RHOAM =  999.6370

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:      DITYPE= unidirectional_perpendicular
 BANK   =  LEFT      DISTB =     16.70  YB1    =     15.20  YB2    =     18.20
 LD     =      3.00  NOPEN =    5        SPAC   =      0.75
 D0     =     0.100  A0     =     0.008  H0     =      0.90  SUB0   =      1.90
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =     90.00  THETA =      45.00  SIGMA =       0.00  BETA   =     90.00
 U0     =     4.838  Q0     =     0.190         =0.1900E+00
 RHO0  =  994.7996  DRHO0 =0.4837E+01  GP0    =0.4746E-01
 C0     =0.1000E+03  CUNITS=  %
 IPOLL =  1          KS     =0.0000E+00  KD     =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0     =0.6333E-01  m0     =0.3064E+00  j0     =0.3006E-02  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =     0.013 lM     =     14.67  lm     =    684.73
 lmp   =  99999.00  lbp    =  99999.00  la     =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0     =0.1900E+00  M0     =0.9193E+00  J0     =0.9017E-02
 Associated 3-d length scales (meters)
 LQ     =      0.09  LM     =      9.89  Lm     =     45.32  Lb     =    952.44
                                        Lmp    =  99999.00  Lbp    =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0    =    194.12  FRD0   =     70.23  R      =    228.71  PL     =     3.76
 (slot)              (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0     =     4.838 D0     =     0.100 A0     =     0.008 THETA =     45.00
```

```
 FR0    =    194.12  FRD0   =      70.23  R       =    228.71
 (slot)              (riser group)

FLOW CLASSIFICATION
 222222222222222222222222222222222222222222
 2  Flow class (CORMIX2)       =    MU2    2
 2  Applicable layer depth HS =     2.80  2
 222222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0     =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  1
 REGSPC=  2          XREG   =       0.00  WREG   =     89.90  AREG   =      0.00
 XINT  =    1798.00  XMAX   =    1798.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
        16.70 m  from the LEFT  bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-------------------------------------------------------------------------------
---------------
-------------------------------------------------------------------------------
---------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

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

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

        X          Y        Z        S        C       BV       BH       Uc        TT
       0.00      0.00     0.90     1.0 0.100E+03   0.01     1.50     4.823
.00000E+00

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

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =     2.80m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
```

S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

X	Y	Z	S	C	BV	BH	TT
0.00	0.00	0.90	1.0	0.100E+03	0.01	1.50	.00000E+00
0.03	0.00	0.90	2.2	0.464E+02	0.06	1.46	.13246E-01
0.06	0.00	0.90	2.6	0.379E+02	0.11	1.42	.32308E-01
0.09	0.00	0.90	3.0	0.333E+02	0.17	1.38	.55133E-01
0.12	0.00	0.90	3.3	0.302E+02	0.22	1.35	.80988E-01
0.15	0.00	0.91	3.6	0.279E+02	0.28	1.31	.10945E+00
0.18	0.00	0.91	3.8	0.261E+02	0.34	1.28	.14023E+00
0.21	0.00	0.91	4.1	0.246E+02	0.39	1.25	.17312E+00
0.24	0.00	0.91	4.3	0.234E+02	0.45	1.22	.20796E+00
0.27	0.00	0.91	4.5	0.224E+02	0.50	1.20	.24461E+00
0.30	0.00	0.91	4.7	0.215E+02	0.56	1.17	.28298E+00
0.33	0.00	0.91	4.8	0.207E+02	0.62	1.15	.32296E+00
0.36	0.00	0.91	5.0	0.200E+02	0.67	1.13	.36448E+00
0.39	0.00	0.91	5.2	0.193E+02	0.73	1.10	.40747E+00
0.42	0.00	0.91	5.3	0.188E+02	0.78	1.08	.45186E+00
0.45	0.00	0.92	5.5	0.183E+02	0.84	1.07	.49762E+00
0.48	0.00	0.92	5.6	0.178E+02	0.90	1.05	.54468E+00
0.51	0.00	0.92	5.8	0.173E+02	0.95	1.03	.59301E+00
0.54	0.00	0.92	5.9	0.169E+02	1.01	1.01	.64256E+00
0.57	0.00	0.92	6.0	0.166E+02	1.06	1.00	.69330E+00
0.60	0.00	0.92	6.2	0.162E+02	1.12	0.98	.74520E+00
0.63	0.00	0.92	6.3	0.159E+02	1.18	0.97	.79821E+00
0.66	0.00	0.92	6.4	0.156E+02	1.23	0.95	.85233E+00
0.69	0.00	0.92	6.5	0.153E+02	1.29	0.94	.90751E+00
0.72	0.00	0.93	6.7	0.150E+02	1.34	0.92	.96373E+00
0.75	0.00	0.93	6.8	0.147E+02	1.40	0.91	.10210E+01
0.78	0.00	0.93	6.9	0.145E+02	1.46	0.90	.10792E+01
0.81	0.00	0.93	7.0	0.143E+02	1.51	0.89	.11384E+01
0.84	0.00	0.93	7.1	0.140E+02	1.57	0.88	.11986E+01
0.87	0.00	0.93	7.2	0.138E+02	1.62	0.87	.12597E+01
0.90	0.00	0.93	7.3	0.136E+02	1.68	0.86	.13218E+01
0.93	0.00	0.93	7.4	0.134E+02	1.74	0.85	.13847E+01
0.96	0.00	0.93	7.5	0.133E+02	1.79	0.84	.14485E+01
0.99	0.00	0.94	7.6	0.131E+02	1.85	0.84	.15132E+01
1.02	0.00	0.94	7.7	0.129E+02	1.90	0.83	.15788E+01
1.05	0.00	0.94	7.8	0.128E+02	1.96	0.82	.16452E+01
1.08	0.00	0.94	7.9	0.126E+02	2.02	0.82	.17125E+01
1.11	0.00	0.94	8.0	0.124E+02	2.07	0.81	.17805E+01
1.14	0.00	0.94	8.1	0.123E+02	2.13	0.81	.18494E+01
1.17	0.00	0.94	8.2	0.122E+02	2.18	0.80	.19191E+01
1.20	0.00	0.94	8.3	0.120E+02	2.24	0.80	.19896E+01
1.23	0.00	0.94	8.4	0.119E+02	2.30	0.79	.20608E+01
1.26	0.00	0.94	8.5	0.118E+02	2.35	0.79	.21328E+01
1.29	0.00	0.95	8.6	0.117E+02	2.41	0.79	.22055E+01
1.32	0.00	0.95	8.7	0.115E+02	2.46	0.79	.22790E+01
1.35	0.00	0.95	8.8	0.114E+02	2.52	0.79	.23533E+01
1.38	0.00	0.95	8.8	0.113E+02	2.58	0.78	.24283E+01
1.41	0.00	0.95	8.9	0.112E+02	2.63	0.78	.25039E+01
1.44	0.00	0.95	9.0	0.111E+02	2.69	0.78	.25803E+01
1.47	0.00	0.95	9.1	0.110E+02	2.74	0.78	.26574E+01
1.50	0.00	0.95	9.2	0.109E+02	2.80	0.78	.27352E+01

Cumulative travel time = 2.7352 sec

```
   Plume centerline may exhibit slight discontinuities in transition
     to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

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

 Phase 1: The diffuser plume is VERTICALLY FULLY MIXED over the
          entire layer depth.
 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.
-----------------------------------------------------------------------------------------------

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

 Profile definitions:
   BV = top-hat thickness, measured vertically
   BH = Gaussian 1/e (37%) half-width in horizontal plane normal to trajectory
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time
```

X	Y	Z	S	C	BV	BH	TT
1.50	0.00	2.80	9.2	0.109E+02	2.80	0.88	.27352E+01
17.82	0.00	2.80	15.7	0.638E+01	1.17	5.92	.20984E+03
34.13	0.00	2.80	20.2	0.496E+01	1.05	10.65	.50347E+03
50.45	0.00	2.80	23.8	0.420E+01	0.99	15.49	.86295E+03
66.76	0.00	2.80	27.0	0.370E+01	0.95	20.43	.12779E+04
83.08	0.00	2.80	29.8	0.335E+01	0.92	25.46	.17416E+04
99.39	0.00	2.80	32.4	0.308E+01	0.89	30.57	.22495E+04
115.71	0.00	2.80	34.8	0.287E+01	0.87	35.75	.27980E+04
132.02	0.00	2.80	37.1	0.270E+01	0.85	40.98	.33843E+04

Interpolated CTC @ width boundary (89.9 m) = 2.6%

```
** REGULATORY MIXING ZONE BOUNDARY is within the Near-Field Region **
In this prediction interval the TOTAL plume width meets or exceeds
the regulatory value =    89.90 m.
This is the extent of the REGULATORY MIXING ZONE.
```

Interpolated MZ length = 144 m

X	Y	Z	S	C	BV	BH	TT
148.34	0.00	2.80	39.2	0.255E+01	0.83	46.28	.40060E+04
164.65	0.00	2.80	41.2	0.243E+01	0.81	51.62	.46614E+04
180.97	0.00	2.80	43.1	0.232E+01	0.80	57.00	.53486E+04
197.29	0.00	2.80	44.9	0.222E+01	0.79	62.43	.60664E+04
213.60	0.00	2.80	46.7	0.214E+01	0.77	67.90	.68134E+04
229.92	0.00	2.80	48.4	0.207E+01	0.76	73.41	.75886E+04
246.23	0.00	2.80	50.0	0.200E+01	0.75	78.95	.83910E+04
262.55	0.00	2.80	51.6	0.194E+01	0.74	84.52	.92196E+04
278.86	0.00	2.80	53.2	0.188E+01	0.73	90.13	.10074E+05
295.18	0.00	2.80	54.7	0.183E+01	0.72	95.77	.10953E+05
311.49	0.00	2.80	56.1	0.178E+01	0.72	101.43	.11855E+05
327.81	0.00	2.80	57.5	0.174E+01	0.71	107.12	.12782E+05
344.12	0.00	2.80	58.9	0.170E+01	0.70	112.84	.13731E+05
360.44	0.00	2.80	60.3	0.166E+01	0.69	118.59	.14703E+05
376.76	0.00	2.80	61.6	0.162E+01	0.69	124.36	.15696E+05

Mixing zone length boundary is further downstream (359.6 m) but is beyond the limiting dilution of (57.1)

393.07	0.00	2.80	62.9	0.159E+01	0.68	130.15	.16711E+05
409.39	0.00	2.80	64.2	0.156E+01	0.67	135.97	.17746E+05
425.70	0.00	2.80	65.4	0.153E+01	0.67	141.81	.18802E+05
442.02	0.00	2.80	66.6	0.150E+01	0.66	147.67	.19878E+05
458.33	0.00	2.80	67.8	0.147E+01	0.66	153.55	.20974E+05
474.65	0.00	2.80	69.0	0.145E+01	0.65	159.45	.22090E+05
490.96	0.00	2.80	70.2	0.143E+01	0.64	165.37	.23224E+05
507.28	0.00	2.80	71.3	0.140E+01	0.64	171.31	.24377E+05
523.59	0.00	2.80	72.4	0.138E+01	0.63	177.27	.25548E+05
539.91	0.00	2.80	73.5	0.136E+01	0.63	183.24	.26738E+05
556.23	0.00	2.80	74.6	0.134E+01	0.63	189.24	.27946E+05
572.54	0.00	2.80	75.7	0.132E+01	0.62	195.25	.29171E+05
588.86	0.00	2.80	76.8	0.130E+01	0.62	201.28	.30413E+05
605.17	0.00	2.80	77.8	0.129E+01	0.61	207.32	.31673E+05
621.49	0.00	2.80	78.8	0.127E+01	0.61	213.38	.32950E+05
637.80	0.00	2.80	79.8	0.125E+01	0.60	219.46	.34243E+05
654.12	0.00	2.80	80.8	0.124E+01	0.60	225.55	.35552E+05
670.43	0.00	2.80	81.8	0.122E+01	0.60	231.66	.36878E+05
686.75	0.00	2.80	82.8	0.121E+01	0.59	237.79	.38220E+05
703.06	0.00	2.80	83.8	0.119E+01	0.59	243.92	.39578E+05
719.38	0.00	2.80	84.7	0.118E+01	0.59	250.08	.40952E+05
735.70	0.00	2.80	85.7	0.117E+01	0.58	256.24	.42341E+05
752.01	0.00	2.80	86.6	0.115E+01	0.58	262.42	.43746E+05
768.33	0.00	2.80	87.6	0.114E+01	0.58	268.62	.45165E+05
784.64	0.00	2.80	88.5	0.113E+01	0.57	274.82	.46600E+05
800.96	0.00	2.80	89.4	0.112E+01	0.57	281.05	.48049E+05
817.27	0.00	2.80	90.3	0.111E+01	0.57	287.28	.49514E+05

Cumulative travel time = 49513.5547 sec

END OF MOD251: DIFFUSER PLUME IN CO-FLOW

** End of NEAR-FIELD REGION (NFR) **

The initial plume WIDTH values in the next far-field module will be CORRECTED by a factor 1.57 to conserve the mass flux in the far-field!
The correction factor is quite large because of the small ambient velocity relative to the strong mixing characteristics of the discharge!
This indicates localized RECIRCULATION REGIONS and internal hydraulic JUMPS.
Width predictions show discontinuities, dilution values should be acceptable.

The LIMITING DILUTION (given by ambient flow/discharge ratio) is: 57.1
This value is below the computed dilution of 90.3 at the end of the NFR.
Mixing for this discharge configuration is constrained by the ambient flow.

The previous module predictions are UNRELIABLE since the limiting dilution cannot be exceeded for this unstable shallow discharge configuration.

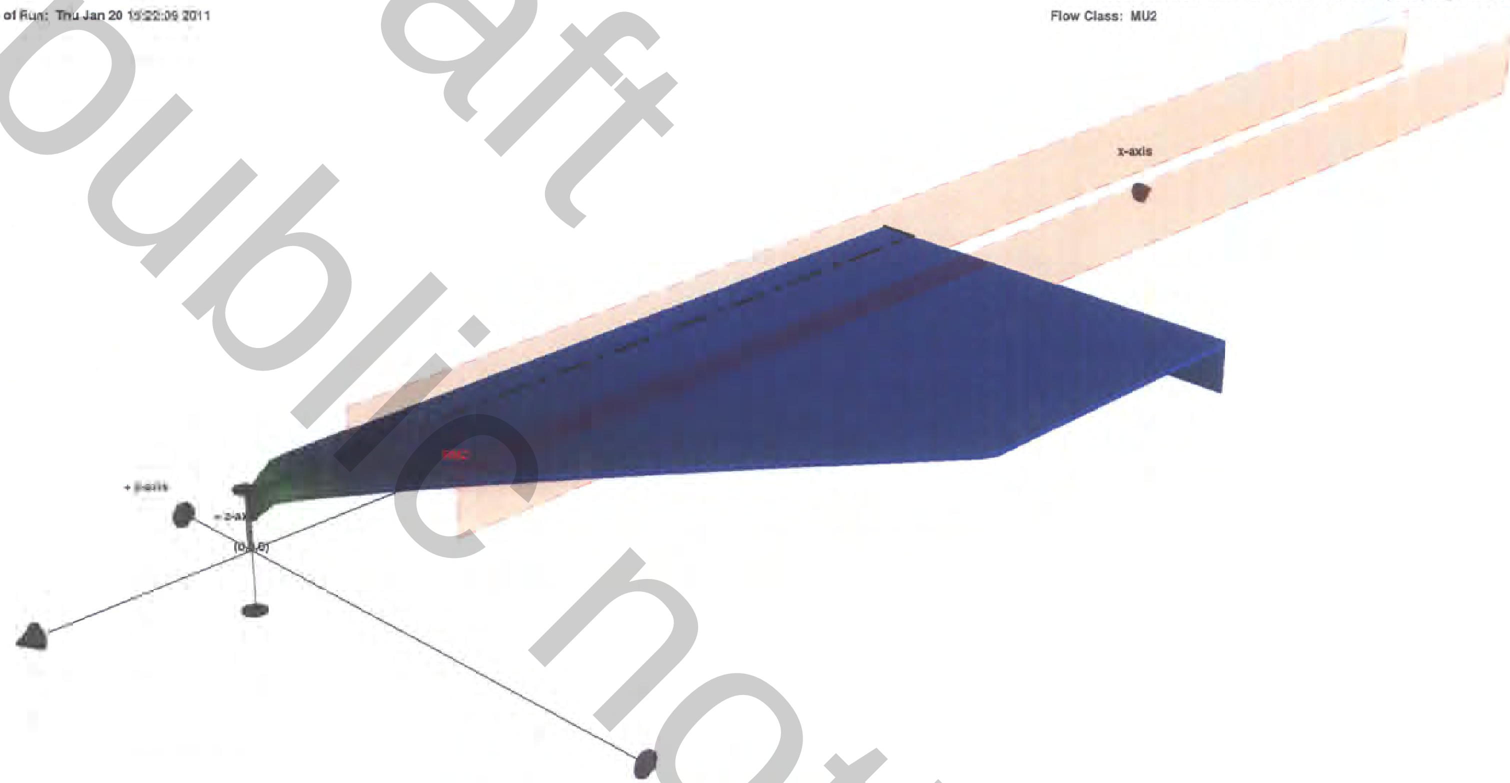
A subsequent module (MOD281) will predict the properties of the cross-sectionally fully mixed plume with limiting dilution and will compute a POSSIBLE UPSTREAM WEDGE INTRUSION.

BEGIN MOD281: MIXED PLUME/BOUNDED CHANNEL/POSSIBLE UPSTREAM WEDGE INTRUSION

```
 The DOWNSTREAM flow field for this unstable shallow water discharge is
     VERTICALLY FULLY MIXED.
 The mixing is controlled by the limiting dilution =      57.1

 Channel DENSIMETRIC FROUDE NUMBER (FCHAN) for this mixed flow =      0.44

 An UPSTREAM INTRUDING WEDGE is formed along the surface/pycnocline.

 UPSTREAM WEDGE INTRUSION PROPERTIES in bounded channel (laterally uniform):
        Wedge length                          =      86.81 m
        X-Position of wedge tip               =     730.46 m
        Thickness at discharge (end of NFR)   =       1.18 m
         (Wedge thickness gradually decreases to zero at wedge tip.)

 In this case, the upstream INTRUSION IS VERY LARGE, exceeding 10 times
   the local water depth.
 This may be caused by a very small ambient velocity, perhaps in combination
   with large discharge buoyancy.
 If the ambient conditions are strongly transient (e.g. tidal), then the
   CORMIX steady-state predictions of upstream intrusion are probably
   unrealistic.
 The plume predictions prior to boundary impingement and wedge formation
  will be acceptable, however.

        X         Y         Z         S        C        BV       BH       ZU       ZL
TT
    817.27    16.70     2.80     57.1 0.175E+01  2.80   179.80    2.80     0.00
.49514E+05
 Cumulative travel time =        49513.5234 sec

 VERTICALLY AND LATERALLY FULLY MIXED over layer depth: END OF SIMULATION!

END OF MOD281: MIXED PLUME/BOUNDED CHANNEL/POSSIBLE UPSTREAM WEDGE INTRUSION
-----------------------------------------------------------------------------
---------------
-----------------------------------------------------------------------------
---------------
CORMIX2: Multiport Diffuser Discharges       End of Prediction File
22222222222222222222222222222222222222222222222222222222222222222222222222222
222222222222222
```

Winyah
Spring/Fall Toxicity
Time of Run: Thu Jan 20 15:22:09 2011

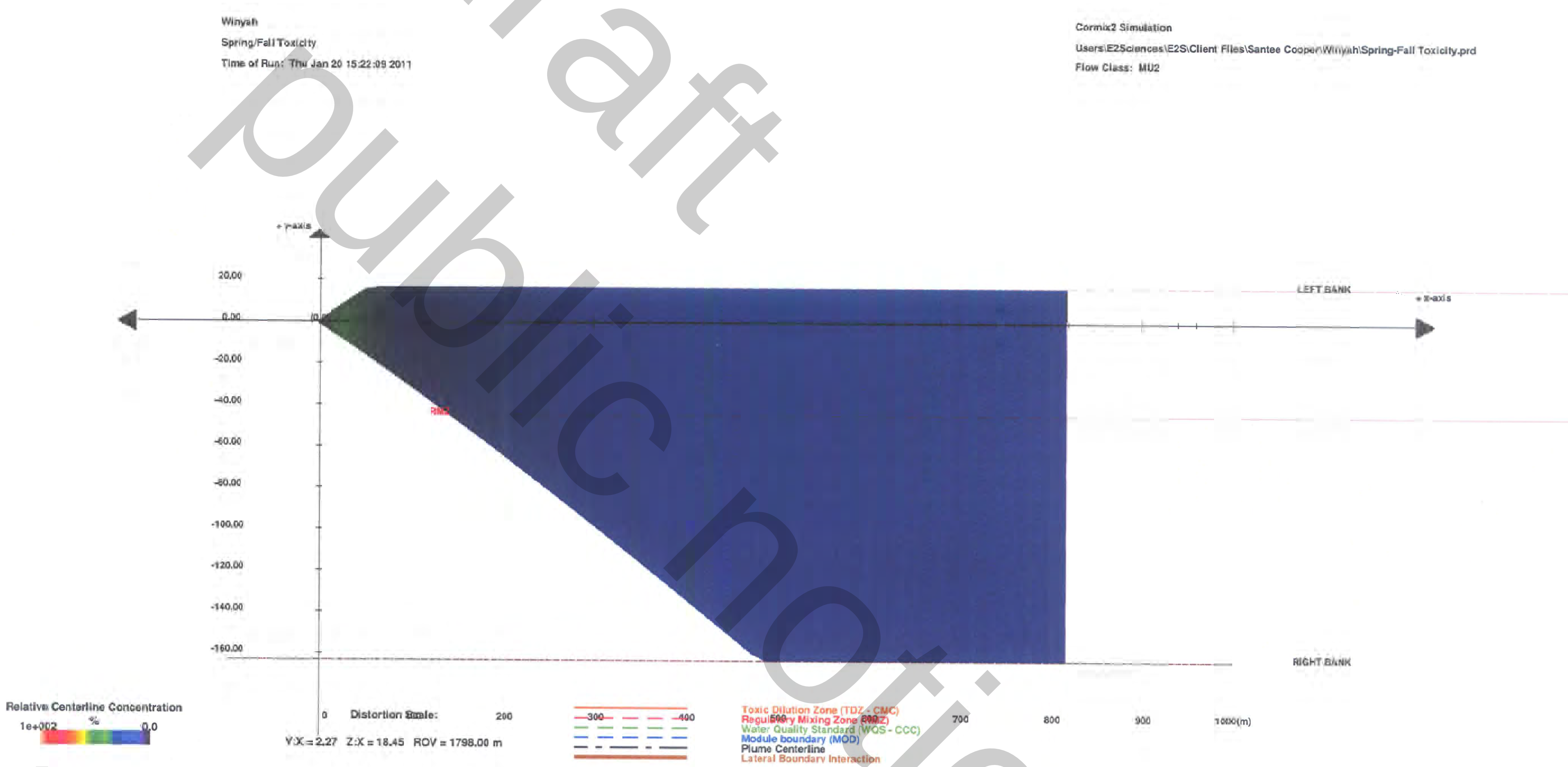
Cormix2 Simulation
Users\E2Sciences\E2S\Client Files\Santee Cooper\Winyah\Spring-Fall Toxicity.prd
Flow Class: MU2



Relative Centerline Concentration
%
1e+002 0.0

Distortion Scale:
Y:X = 2.27 Z:X = 16.46 ROV = 1798.00 m

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


Winyah
Spring/Fall Toxicity
Time of Run: Thu Jan 20 15:22:09 2011
Cormix2 Simulation
Users\E2Sciences\E2S\Client Files\Santee Cooper\Winyah\Spring-Fall Toxicity.prd
Flow Class: MU2
+ y-axis
20.00
0.00
-20.00
-40.00
-60.00
-80.00
-100.00
-120.00
-140.00
-160.00
LEFT BANK
+ x-axis
RIGHT BANK
0
200
300
400
500
600
700
800
900
1000(m)
Distortion Scale:
Y:X = 2.27 Z:X = 18.45 ROV = 1798.00 m
Toxic Dilution Zone (TDZ - CMC)
Regulatory Mixing Zone (RMZ)
Water Quality Standard (WQS - CCC)
Module boundary (MOD)
Plume Centerline
Lateral Boundary Interaction
Relative Centerline Concentration
%
1e+002
0.0

Winyah

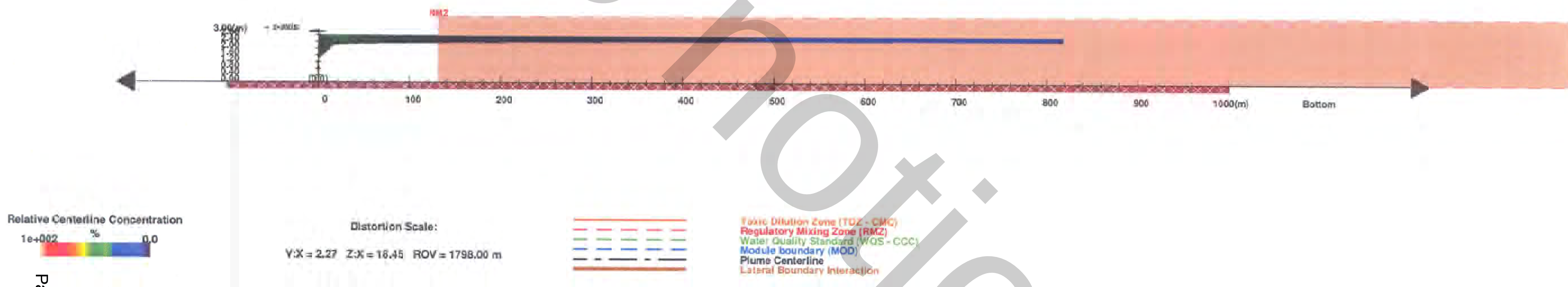
Spring/Fall Toxicity

Time of Run: Thu Jan 20 15:22:09 2011

Cormix2 Simulation

Users\E2Sciences\E2S\Client Files\Santee Cooper\Winyah\Spring-Fall Toxicity.prd

Flow Class: MU2



Thermal Model

98 °F Summer Discharge

CORMIX Checklist for Data Preparation – Version v5.0

PROJECT LEGEND

Project File Name: Summer Thermal.cmx **Design Case:** Summer Thermal
Site Name: SCPSA - Winyah Generating Station **Prepared By:** John Durkee, P.E. **Date:** January 20, 2011

EFFLUENT DATA

☐ **Non-Fresh Water Effluent Density** ☒ **Fresh Water Effluent Density**

Density ρ_0: .... kg/m³ ☒ Temperature T_0: 36.8 °C ☐ Density ρ_0: .... kg/m³

Discharge Excess Concentration: 11.8 C ☒ Effluent Flowrate Q_0: 0.19 m³/s ☐ Effluent Velocity U_0: .... m/s

Pollutant Types

☒ Conservative ☐ Non Conservative: .... /day ☐ Heated – Heat Loss Coefficient: .... W/m²/°C

☐ **Brine** ☐ **Sediment:** Chunks: .... % Sand: .... % Coarse Silt: .... % Fine Silt: .... % Clay: .... %
Total Sediment Concentration: .... kg/m³

AMBIENT GEOMETRY / FLOW FIELD DATA

Average Depth H_a: 2.8 m ☐ **Unbounded** ☒ **Bounded:** Width BS: 179.8 m
Depth at Discharge H_d: 2.8 m Appearance: ☒ Uniform ☐ Slight Meander ☐ Highly Irregular

☒ **Steady** ☐ **Unsteady**

☒ Ambient Flowrate Q_a: 10.65 m³/s Period .... hr Max Velocity U_m .... m/s Tidal Velocity at this Time U_a: .... m/s
☐ Ambient Velocity U_a .... m/s ☐ At Time: .... hr Before Slack ☐ At Slack – Δ Time: .... hr ☐ At Time: .... hr After Slack

☐ **Single Slope** ☐ **Near & Far Slope**

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

☒ Manning's n: 0.035 (Darcy) Wind Speed: 2 m/s

AMBIENT DENSITY DATA

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

☒ **Uniform** Fresh: ☒ Temperature: 25 °C ☐ Density ρ_a: .... kg/m³ Non-Fresh: Density ρ_a: .... kg/m³

☐ **Stratified** ☐ Type A ☐ **Type B:** Pycnocline Height: .... m ☐ **Type C:** Pycnocline Height: .... m Jump: .... kg/m³/°C
Density ρ: At Surface ρ_{as} .... kg/m³/°C At Bottom ρ_{ab}: .... kg/m³/°C

☐ **Brine & Sediment Only** Level 1 Density ρ_1: .. kg/m³ Sub 1: .... m; Level 2 Density ρ_2: .... kg/m³ Sub 2: .... m

DISCHARGE GEOMETRY DATA

CORMIX 1 – Single Port

Nearest Bank: ☐ Left ☐ Right
Dist. to Nearest Bank: .... m
Vert. Angle θ_0: .... °; Horiz. Angle σ_0: .... °
☐ Port Diameter D_0: .... m
☐ Port Area A_0: .... m²

Submerged
Port Height above Bottom h_0: .... m

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

CORMIX 2 – Multiport

Nearest Bank: ☒ Left ☐ Right
☒ Unidirectional ☐ Staged ☐ Altern./ Vert.
N° of openings: 5; Diffuser Length: 3 m
Dist. to 1st end-point YB_1: 15.2 m
Dist. to 2st far end-point YB_2: 18.2 m
Port Height h_0: 0.9 m; Port Diameter D_0: 0.1 m
Contraction Ratio: 1

Angles (degrees)
Vert. Angle θ: 45 °; Horiz. Angle σ: 0 °
Align. Angle γ: 90 °; Relat.Orient. Angle β: 90 °
Nozzle Direction: ☒ Same or ☐ Fanned Out

CORMIX 3 – Surface Discharge

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

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

MIXING ZONE DATA

☒ **Non-Toxic Effluent** ☐ **Toxic Effluent**

☒ WQ Standard: Delta 0.8 C ☐ No WQ Standard CMC: .... CCC: ....

☒ **Mixing Zone Specified** **Chronic Sizes Per SCDHEC** ☐ **No Mixing Zone Specified**

☐ Trajectory: .... m ☒ Downstream Distance: 359.6 m ☒ Width: 89.9 % / m ☐ Area: .... %
Region of Interest: 1798 m Grid Intervals for Display: 50

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                      CORMIX MIXING ZONE EXPERT SYSTEM
                          CORMIX Version 6.0GT
                   HYDRO2:Version-6.0.0.0  October,2009
SITE NAME/LABEL:                Winyah Station
  DESIGN CASE:                  Summer Thermal
  FILE NAME:                    C:\Users\E2Sciences\E2S\Client Files\Santee
Cooper\Winyah\Summer Thermal.prd
  Using subsystem CORMIX2:     Multiport Diffuser Discharges
  Start of session:             01/20/2011--14:17:49
****************************************************************************
SUMMARY OF INPUT DATA:
----------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                            = bounded
  Width                           BS       = 179.80 m
  Channel regularity              ICHREG   = 1
  Ambient flowrate                QA       = 10.65 m^3/s
  Average depth                   HA       = 2.8 m
  Depth at discharge              HD       = 2.8 m
  Ambient velocity                UA       = 0.0212 m/s
  Darcy-Weisbach friction factor  F        = 0.035
  Wind velocity                   UW       = 2 m/s
  Stratification Type             STRCND   = U
  Surface temperature                      = 25 degC
  Bottom temperature                       = 25 degC
  Calculated FRESH-WATER DENSITY values:
  Surface density                 RHOAS    = 997.0456 kg/m^3
  Bottom density                  RHOAB    = 997.0456 kg/m^3
----------------------------------------------------------------------------
DISCHARGE PARAMETERS:             Submerged Multiport Diffuser Discharge
  Diffuser type                   DITYPE = unidirectional perpendicular
  Diffuser length                 LD       = 3 m
  Nearest bank                             = left
  Diffuser endpoints              YB1      = 15.20 m;    YB2 = 18.20 m
  Number of openings              NOPEN    = 5
  Number of Risers                NRISER   = 5
  Ports/Nozzles per Riser         NPPERR   = 1
  Spacing between risers/openings SPAC     = 0.75 m
  Port/Nozzle diameter            D0       = 0.1 m
    with contraction ratio                 = 1
  Equivalent slot width           B0       = 0.0131 m
  Total area of openings          TA0      = 0.0393 m^2
  Discharge velocity              U0       = 4.84 m/s
  Total discharge flowrate        Q0       = 0.19 m^3/s
  Discharge port height           H0       = 0.9 m
  Nozzle arrangement              BETYPE = unidirectional without fanning
  Diffuser alignment angle        GAMMA    = 90 deg
  Vertical discharge angle        THETA    = 45 deg
  Actual Vertical discharge angle THEAC    = 45 deg
  Horizontal discharge angle      SIGMA    = 0 deg
  Relative orientation angle      BETA     = 90 deg
  Discharge temperature (freshwater)       = 36.80 degC
  Corresponding density           RHO0     = 993.3969 kg/m^3
  Density difference              DRHO     = 3.6486 kg/m^3
  Buoyant acceleration            GP0      = 0.0359 m/s^2
```

```
  Discharge concentration          C0      = 11.800000 deg.C
  Surface heat exchange coeff.     KS      = 0 m/s
  Coefficient of decay             KD      = 0 /s
-----------------------------------------------------------------------------
FLUX VARIABLES PER UNIT DIFFUSER LENGTH:
  Discharge (volume flux)          q0      = 0.063333 m^2/s
  Momentum flux                    m0      = 0.306426 m^3/s^2
  Buoyancy flux                    j0      = 0.002273 m^3/s^3
-----------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  = 0.01 m          Lm  = 684.73 m          LM  = 17.68 m
  lm' = 99999 m         Lb' = 99999 m           La  = 99999 m
  (These refer to the actual discharge/environment length scales.)
-----------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
Slot Froude number               FR0     = 223.23
  Port/nozzle Froude number        FRD0    = 80.77
  Velocity ratio                   R       = 228.71
-----------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                          = no
  Water quality standard specified         = yes
  Water quality standard           CSTD    = 0.8 deg.C
  Regulatory mixing zone                   = no
  Region of interest                       = 1798 m downstream
*****************************************************************************
HYDRODYNAMIC CLASSIFICATION:
  *------------------------*
  | FLOW CLASS    = MU2 |
  *------------------------*
  This flow configuration applies to a layer corresponding to the full water
  depth at the discharge site.
  Applicable layer depth = water depth = 2.8 m
*****************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-----------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    16.70 m from the left bank/shore.
  Number of display steps NSTEP = 50 per module.
-----------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at NFR edge  c = 0.1307 deg.C
  Dilution at edge of NFR              s = 90.3
  NFR Location:                        x = 817.27 m
    (centerline coordinates)           y = 0 m
                                       z = 2.8 m
  NFR plume dimensions:  half-width (bh) = 266.88 m
                          thickness (bv) = 0.61 m
Cumulative travel time:       49513.5352 sec.
-----------------------------------------------------------------------------
Buoyancy assessment:
```

```
  The effluent density is less than the surrounding ambient water
  density at the discharge level.
  Therefore, the effluent is POSITIVELY BUOYANT and will tend to rise towards
  the surface.
-----------------------------------------------------------------------------
Near-field instability behavior:
  The diffuser flow will experience instabilities with full vertical mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
-----------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume becomes vertically fully mixed WITHIN NEAR-FIELD at 0 m
  downstream, but RE-STRATIFIES LATER and is not mixed in the far-field.
-----------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
  Plume in bounded section contacts nearest bank at 0 m downstream.
  Plume contacts second bank at 0 m downstream.
************************ TOXIC DILUTION ZONE SUMMARY ************************
No TDZ was specified for this simulation.
********************* REGULATORY MIXING ZONE SUMMARY ***********************
No RMZ has been specified.
However:
The ambient water quality standard was encountered at the following
  plume position:
  Water quality standard                   = 0.8  deg.C
  Corresponding dilution                 s = 14.8
  Plume location:                        x = 16.66 m
    (centerline coordinates)             y = 0 m
                                         z = 2.8 m
  Plume dimensions:       half width (bh) = 5.19 m
                           thickness (bv) = 1.43 m
******************** FINAL DESIGN ADVICE AND COMMENTS *********************
CORMIX2 uses the TWO-DIMENSIONAL SLOT DIFFUSER CONCEPT to represent
  the actual three-dimensional diffuser geometry.  Thus, it approximates
  the details of the merging process of the individual jets from each
  port/nozzle.
In the present design, the spacing between adjacent ports/nozzles
  (or riser assemblies) is of the order of, or less than, the local
  water depth so that the slot diffuser approximation holds well.

Nevertheless, if this is a final design, the user is advised to use a
  final CORMIX1 (single port discharge) analysis, with discharge data
  for an individual diffuser jet/plume, in order to compare to
  the present near-field prediction.
-----------------------------------------------------------------------------
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
  CORMIX predictions on dilutions and concentrations (with associated
  plume geometries) are reliable for the majority of cases and are accurate
  to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
  the design configuration as highly complex and uncertain for prediction.
```

```
CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222
2222222222222222
                       CORMIX MIXING ZONE EXPERT SYSTEM
         Subsystem CORMIX2:  Multiport Diffuser Discharges
                         CORMIX Version 6.0GT
                      HYDRO2 Version 6.0.0.0 October 2009
--------------------------------------------------------------------------------
---------------
--------------------------------------------------------------------------------
---------------
CASE DESCRIPTION
 Site name/label:   Winyah Station
 Design case:       Summer Thermal
 FILE NAME:         C:\...ent Files\Santee Cooper\Winyah\Summer Thermal.prd
 Time stamp:        Thu Jan 20 15:53:47 2011

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =     179.80  AS     =    503.44  QA     =     10.65  ICHREG= 1
 HA    =       2.80  HD     =      2.80
 UA    =      0.021  F      =     0.035  USTAR =0.1399E-02
 UW    =      2.000  UWSTAR=0.2198E-02
 Uniform density environment
 STRCND=  U          RHOAM =  997.0456

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:      DITYPE= unidirectional_perpendicular
 BANK  =  LEFT       DISTB =     16.70  YB1    =     15.20  YB2    =     18.20
 LD    =       3.00  NOPEN =    5        SPAC   =      0.75
 D0    =      0.100  A0     =     0.008  H0     =      0.90  SUB0   =      1.90
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =      90.00  THETA =     45.00  SIGMA  =      0.00  BETA   =     90.00
 U0    =      4.838  Q0     =     0.190         =0.1900E+00
 RHO0  =  993.3970   DRHO0 =0.3649E+01  GP0    =0.3589E-01
 C0    =0.1180E+02   CUNITS=  deg.C
 IPOLL =   1         KS    =0.0000E+00  KD     =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.6333E-01   m0    =0.3064E+00  j0     =0.2273E-02  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.013  lM    =     17.68  lm     =    684.73
 lmp   =  99999.00   lbp   =  99999.00  la     =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.1900E+00   M0    =0.9193E+00  J0     =0.6818E-02
 Associated 3-d length scales (meters)
 LQ    =       0.09  LM    =     11.37  Lm     =     45.32  Lb     =    720.25
                                        Lmp    =  99999.00  Lbp    =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =     223.23  FRD0  =     80.77  R      =    228.71  PL     =     3.43
 (slot)              (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      4.838  D0    =     0.100  A0     =     0.008  THETA =     45.00
```

```
 FR0    =    223.23  FRD0  =     80.77  R      =    228.71
 (slot)              (riser group)

FLOW CLASSIFICATION
 2222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     2.80  2
 2222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0     =0.1180E+02  CUNITS=  deg.C
 NTOX  =  0
 NSTD  =  1          CSTD  =0.8000E+00
 REGMZ =  0
 XINT  =    1798.00  XMAX  =   1798.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
        16.70 m  from the LEFT  bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP =  50 display intervals per module
-----------------------------------------------------------------------------
---------------
-----------------------------------------------------------------------------
---------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

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

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

        X        Y        Z        S      C       BV       BH       Uc        TT
      0.00     0.00     0.90     1.0 0.118E+02  0.01     1.50     4.823
.00000E+00

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

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =     2.80m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
```

C = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

X	Y	Z	S	C	BV	BH	TT
0.00	0.00	0.90	1.0	0.118E+02	0.01	1.50	.00000E+00
0.03	0.00	0.90	2.2	0.547E+01	0.06	1.46	.13246E-01
0.06	0.00	0.90	2.6	0.448E+01	0.11	1.42	.32308E-01
0.09	0.00	0.90	3.0	0.393E+01	0.17	1.38	.55133E-01
0.12	0.00	0.90	3.3	0.356E+01	0.22	1.35	.80988E-01
0.15	0.00	0.91	3.6	0.329E+01	0.28	1.31	.10945E+00
0.18	0.00	0.91	3.8	0.308E+01	0.34	1.28	.14023E+00
0.21	0.00	0.91	4.1	0.291E+01	0.39	1.25	.17312E+00
0.24	0.00	0.91	4.3	0.276E+01	0.45	1.22	.20796E+00
0.27	0.00	0.91	4.5	0.264E+01	0.50	1.20	.24461E+00
0.30	0.00	0.91	4.7	0.253E+01	0.56	1.17	.28298E+00
0.33	0.00	0.91	4.8	0.244E+01	0.62	1.15	.32296E+00
0.36	0.00	0.91	5.0	0.236E+01	0.67	1.13	.36448E+00
0.39	0.00	0.91	5.2	0.228E+01	0.73	1.10	.40747E+00
0.42	0.00	0.91	5.3	0.222E+01	0.78	1.08	.45186E+00
0.45	0.00	0.92	5.5	0.215E+01	0.84	1.07	.49762E+00
0.48	0.00	0.92	5.6	0.210E+01	0.90	1.05	.54468E+00
0.51	0.00	0.92	5.8	0.205E+01	0.95	1.03	.59301E+00
0.54	0.00	0.92	5.9	0.200E+01	1.01	1.01	.64256E+00
0.57	0.00	0.92	6.0	0.195E+01	1.06	1.00	.69330E+00
0.60	0.00	0.92	6.2	0.191E+01	1.12	0.98	.74520E+00
0.63	0.00	0.92	6.3	0.187E+01	1.18	0.97	.79821E+00
0.66	0.00	0.92	6.4	0.184E+01	1.23	0.95	.85233E+00
0.69	0.00	0.92	6.5	0.180E+01	1.29	0.94	.90751E+00
0.72	0.00	0.93	6.7	0.177E+01	1.34	0.92	.96373E+00
0.75	0.00	0.93	6.8	0.174E+01	1.40	0.91	.10210E+01
0.78	0.00	0.93	6.9	0.171E+01	1.46	0.90	.10792E+01
0.81	0.00	0.93	7.0	0.168E+01	1.51	0.89	.11384E+01
0.84	0.00	0.93	7.1	0.166E+01	1.57	0.88	.11986E+01
0.87	0.00	0.93	7.2	0.163E+01	1.62	0.87	.12597E+01
0.90	0.00	0.93	7.3	0.161E+01	1.68	0.86	.13218E+01
0.93	0.00	0.93	7.4	0.159E+01	1.74	0.85	.13847E+01
0.96	0.00	0.93	7.5	0.156E+01	1.79	0.84	.14485E+01
0.99	0.00	0.94	7.6	0.154E+01	1.85	0.84	.15132E+01
1.02	0.00	0.94	7.7	0.152E+01	1.90	0.83	.15788E+01
1.05	0.00	0.94	7.8	0.150E+01	1.96	0.82	.16452E+01
1.08	0.00	0.94	7.9	0.149E+01	2.02	0.82	.17125E+01
1.11	0.00	0.94	8.0	0.147E+01	2.07	0.81	.17805E+01
1.14	0.00	0.94	8.1	0.145E+01	2.13	0.81	.18494E+01
1.17	0.00	0.94	8.2	0.144E+01	2.18	0.80	.19191E+01
1.20	0.00	0.94	8.3	0.142E+01	2.24	0.80	.19896E+01
1.23	0.00	0.94	8.4	0.140E+01	2.30	0.79	.20608E+01
1.26	0.00	0.94	8.5	0.139E+01	2.35	0.79	.21328E+01
1.29	0.00	0.95	8.6	0.137E+01	2.41	0.79	.22055E+01
1.32	0.00	0.95	8.7	0.136E+01	2.46	0.79	.22790E+01
1.35	0.00	0.95	8.8	0.135E+01	2.52	0.79	.23533E+01
1.38	0.00	0.95	8.8	0.133E+01	2.58	0.78	.24283E+01
1.41	0.00	0.95	8.9	0.132E+01	2.63	0.78	.25039E+01
1.44	0.00	0.95	9.0	0.131E+01	2.69	0.78	.25803E+01
1.47	0.00	0.95	9.1	0.130E+01	2.74	0.78	.26574E+01
1.50	0.00	0.95	9.2	0.129E+01	2.80	0.78	.27352E+01

Cumulative travel time = 2.7352 sec
Plume centerline may exhibit slight discontinuities in transition

to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

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

Phase 1: The diffuser plume is VERTICALLY FULLY MIXED over the entire layer depth.

Profile definitions:
BV = layer depth (vertically mixed)
BH = Gaussian 1/e (37%) half-width in horizontal plane normal to trajectory
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
TT = Cumulative travel time

X	Y	Z	S	C	BV	BH	TT
1.50	0.00	2.80	9.2	0.129E+01	2.80	0.88	.27352E+01
1.52	0.00	2.80	9.2	0.128E+01	2.80	0.88	.28886E+01
1.53	0.00	2.80	9.2	0.128E+01	2.80	0.88	.30422E+01
1.55	0.00	2.80	9.2	0.128E+01	2.80	0.89	.31959E+01
1.57	0.00	2.80	9.2	0.128E+01	2.80	0.89	.33498E+01
1.58	0.00	2.80	9.2	0.128E+01	2.80	0.89	.35038E+01
1.60	0.00	2.80	9.2	0.128E+01	2.80	0.89	.36580E+01
1.62	0.00	2.80	9.2	0.128E+01	2.80	0.89	.38123E+01
1.63	0.00	2.80	9.2	0.128E+01	2.80	0.89	.39668E+01
1.65	0.00	2.80	9.3	0.127E+01	2.80	0.90	.41214E+01
1.67	0.00	2.80	9.3	0.127E+01	2.80	0.90	.42762E+01
1.68	0.00	2.80	9.3	0.127E+01	2.80	0.90	.44311E+01
1.70	0.00	2.80	9.3	0.127E+01	2.80	0.90	.45862E+01
1.72	0.00	2.80	9.3	0.127E+01	2.80	0.90	.47414E+01
1.73	0.00	2.80	9.3	0.127E+01	2.80	0.90	.48968E+01
1.75	0.00	2.80	9.3	0.127E+01	2.80	0.91	.50523E+01
1.77	0.00	2.80	9.3	0.127E+01	2.80	0.91	.52080E+01
1.78	0.00	2.80	9.3	0.126E+01	2.80	0.91	.53638E+01
1.80	0.00	2.80	9.3	0.126E+01	2.80	0.91	.55197E+01
1.82	0.00	2.80	9.3	0.126E+01	2.80	0.91	.56758E+01
1.83	0.00	2.80	9.4	0.126E+01	2.80	0.91	.58321E+01
1.85	0.00	2.80	9.4	0.126E+01	2.80	0.92	.59885E+01
1.87	0.00	2.80	9.4	0.126E+01	2.80	0.92	.61451E+01
1.88	0.00	2.80	9.4	0.126E+01	2.80	0.92	.63018E+01
1.90	0.00	2.80	9.4	0.126E+01	2.80	0.92	.64586E+01
1.92	0.00	2.80	9.4	0.126E+01	2.80	0.92	.66156E+01
1.93	0.00	2.80	9.4	0.125E+01	2.80	0.92	.67727E+01
1.95	0.00	2.80	9.4	0.125E+01	2.80	0.93	.69300E+01
1.97	0.00	2.80	9.4	0.125E+01	2.80	0.93	.70875E+01
1.99	0.00	2.80	9.4	0.125E+01	2.80	0.93	.72450E+01
2.00	0.00	2.80	9.4	0.125E+01	2.80	0.93	.74028E+01
2.02	0.00	2.80	9.5	0.125E+01	2.80	0.93	.75606E+01
2.04	0.00	2.80	9.5	0.125E+01	2.80	0.93	.77187E+01
2.05	0.00	2.80	9.5	0.125E+01	2.80	0.94	.78768E+01

2.07	0.00	2.80	9.5	0.124E+01	2.80	0.94	.80351E+01
2.09	0.00	2.80	9.5	0.124E+01	2.80	0.94	.81936E+01
2.10	0.00	2.80	9.5	0.124E+01	2.80	0.94	.83522E+01
2.12	0.00	2.80	9.5	0.124E+01	2.80	0.94	.85109E+01
2.14	0.00	2.80	9.5	0.124E+01	2.80	0.94	.86698E+01
2.15	0.00	2.80	9.5	0.124E+01	2.80	0.95	.88289E+01
2.17	0.00	2.80	9.5	0.124E+01	2.80	0.95	.89881E+01
2.19	0.00	2.80	9.5	0.124E+01	2.80	0.95	.91474E+01
2.20	0.00	2.80	9.5	0.124E+01	2.80	0.95	.93069E+01
2.22	0.00	2.80	9.6	0.123E+01	2.80	0.95	.94665E+01
2.24	0.00	2.80	9.6	0.123E+01	2.80	0.95	.96263E+01
2.25	0.00	2.80	9.6	0.123E+01	2.80	0.96	.97862E+01
2.27	0.00	2.80	9.6	0.123E+01	2.80	0.96	.99462E+01
2.29	0.00	2.80	9.6	0.123E+01	2.80	0.96	.10106E+02
2.30	0.00	2.80	9.6	0.123E+01	2.80	0.96	.10267E+02
2.32	0.00	2.80	9.6	0.123E+01	2.80	0.96	.10427E+02
2.34	0.00	2.80	9.6	0.123E+01	2.80	0.96	.10588E+02

Cumulative travel time = 10.5878 sec

End of Phase 1:

The mixed diffuser flow has RESTRATIFIED and is now detached from the bottom or surface/interface.

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

Profile definitions:

BV = top-hat thickness, measured vertically
BH = Gaussian 1/e (37%) half-width in horizontal plane normal to trajectory
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
TT = Cumulative travel time

X	Y	Z	S	C	BV	BH	TT
2.34	0.00	2.80	9.6	0.123E+01	2.80	0.96	.10588E+02

** WATER QUALITY STANDARD OR CCC HAS BEEN FOUND **

The pollutant concentration in the plume falls below water quality standard or CCC value of 0.800E+00 in the current prediction interval.

This is the spatial extent of concentrations exceeding the water quality standard or CCC value.

At 0.8 C temperature change, interpolated MZ length = 15.0 m and interpolated MZ width = 9.6 m

X	Y	Z	S	C	BV	BH	TT
18.64	0.00	2.80	15.9	0.741E+00	1.24	5.77	.22277E+03
34.93	0.00	2.80	20.4	0.579E+00	1.12	10.23	.51973E+03
51.23	0.00	2.80	24.0	0.492E+00	1.05	14.78	.88173E+03
67.53	0.00	2.80	27.1	0.435E+00	1.01	19.42	.12987E+04
83.83	0.00	2.80	30.0	0.394E+00	0.97	24.13	.17641E+04
100.13	0.00	2.80	32.5	0.363E+00	0.95	28.91	.22734E+04
116.43	0.00	2.80	34.9	0.338E+00	0.92	33.74	.28231E+04
132.73	0.00	2.80	37.2	0.317E+00	0.90	38.63	.34103E+04
149.02	0.00	2.80	39.3	0.300E+00	0.88	43.56	.40329E+04
165.32	0.00	2.80	41.3	0.286E+00	0.87	48.54	.46889E+04
181.62	0.00	2.80	43.2	0.273E+00	0.85	53.56	.53767E+04
197.92	0.00	2.80	45.0	0.262E+00	0.84	58.62	.60950E+04
214.22	0.00	2.80	46.8	0.252E+00	0.83	63.71	.68423E+04
230.52	0.00	2.80	48.5	0.243E+00	0.81	68.83	.76178E+04
246.82	0.00	2.80	50.1	0.236E+00	0.80	73.98	.84203E+04
263.12	0.00	2.80	51.7	0.228E+00	0.79	79.16	.92490E+04

279.41	0.00	2.80	53.2	0.222E+00	0.78	84.37	.10103E+05
295.71	0.00	2.80	54.7	0.216E+00	0.77	89.61	.10982E+05
312.01	0.00	2.80	56.2	0.210E+00	0.77	94.87	.11885E+05
328.31	0.00	2.80	57.6	0.205E+00	0.76	100.15	.12811E+05
344.61	0.00	2.80	59.0	0.200E+00	0.75	105.46	.13760E+05
360.91	0.00	2.80	60.3	0.196E+00	0.74	110.79	.14731E+05
377.21	0.00	2.80	61.6	0.191E+00	0.74	116.14	.15724E+05
393.51	0.00	2.80	62.9	0.188E+00	0.73	121.52	.16738E+05
409.80	0.00	2.80	64.2	0.184E+00	0.72	126.91	.17773E+05
426.10	0.00	2.80	65.4	0.180E+00	0.72	132.32	.18828E+05
442.40	0.00	2.80	66.7	0.177E+00	0.71	137.75	.19904E+05
458.70	0.00	2.80	67.9	0.174E+00	0.70	143.20	.20999E+05
475.00	0.00	2.80	69.0	0.171E+00	0.70	148.66	.22114E+05
491.30	0.00	2.80	70.2	0.168E+00	0.69	154.15	.23247E+05
507.60	0.00	2.80	71.3	0.165E+00	0.69	159.65	.24400E+05
523.90	0.00	2.80	72.5	0.163E+00	0.68	165.17	.25570E+05
540.19	0.00	2.80	73.6	0.160E+00	0.68	170.70	.26759E+05
556.49	0.00	2.80	74.6	0.158E+00	0.67	176.25	.27966E+05
572.79	0.00	2.80	75.7	0.156E+00	0.67	181.81	.29190E+05
589.09	0.00	2.80	76.8	0.154E+00	0.66	187.39	.30431E+05
605.39	0.00	2.80	77.8	0.152E+00	0.66	192.98	.31690E+05
621.69	0.00	2.80	78.8	0.150E+00	0.65	198.59	.32965E+05
637.99	0.00	2.80	79.9	0.148E+00	0.65	204.21	.34257E+05
654.29	0.00	2.80	80.9	0.146E+00	0.65	209.84	.35566E+05
670.58	0.00	2.80	81.9	0.144E+00	0.64	215.49	.36891E+05
686.88	0.00	2.80	82.8	0.142E+00	0.64	221.15	.38232E+05
703.18	0.00	2.80	83.8	0.141E+00	0.63	226.82	.39588E+05
719.48	0.00	2.80	84.8	0.139E+00	0.63	232.51	.40960E+05
735.78	0.00	2.80	85.7	0.138E+00	0.63	238.21	.42348E+05
752.08	0.00	2.80	86.6	0.136E+00	0.62	243.92	.43751E+05
768.38	0.00	2.80	87.6	0.135E+00	0.62	249.64	.45170E+05
784.68	0.00	2.80	88.5	0.133E+00	0.62	255.38	.46603E+05
800.97	0.00	2.80	89.4	0.132E+00	0.61	261.12	.48051E+05
817.27	0.00	2.80	90.3	0.131E+00	0.61	266.88	.49514E+05

Cumulative travel time = 49513.5547 sec

END OF MOD251: DIFFUSER PLUME IN CO-FLOW

** End of NEAR-FIELD REGION (NFR) **

The initial plume WIDTH values in the next far-field module will be
CORRECTED by a factor 1.57 to conserve the mass flux in the far-field!
The correction factor is quite large because of the small ambient velocity
relative to the strong mixing characteristics of the discharge!
This indicates localized RECIRCULATION REGIONS and internal hydraulic JUMPS.
Width predictions show discontinuities, dilution values should be
acceptable.

The LIMITING DILUTION (given by ambient flow/discharge ratio) is: 57.1
This value is below the computed dilution of 90.3 at the end
of the NFR.
Mixing for this discharge configuration is constrained by the ambient flow.

The previous module predictions are UNRELIABLE since the limiting dilution
cannot be exceeded for this unstable shallow discharge configuration.

A subsequent module (MOD281) will predict the properties of the
cross-sectionally fully mixed plume with limiting dilution and will
compute a POSSIBLE UPSTREAM WEDGE INTRUSION.

BEGIN MOD281: MIXED PLUME/BOUNDED CHANNEL/POSSIBLE UPSTREAM WEDGE INTRUSION

The DOWNSTREAM flow field for this unstable shallow water discharge is
VERTICALLY FULLY MIXED.
The mixing is controlled by the limiting dilution = 57.1

Channel DENSIMETRIC FROUDE NUMBER (FCHAN) for this mixed flow = 0.50

An UPSTREAM INTRUDING WEDGE is formed along the surface/pycnocline.

UPSTREAM WEDGE INTRUSION PROPERTIES in bounded channel (laterally uniform):
Wedge length = 49.50 m
X-Position of wedge tip = 767.77 m
Thickness at discharge (end of NFR) = 1.03 m
(Wedge thickness gradually decreases to zero at wedge tip.)

In this case, the upstream INTRUSION IS VERY LARGE, exceeding 10 times
the local water depth.
This may be caused by a very small ambient velocity, perhaps in combination
with large discharge buoyancy.
If the ambient conditions are strongly transient (e.g. tidal), then the
CORMIX steady-state predictions of upstream intrusion are probably
unrealistic.
The plume predictions prior to boundary impingement and wedge formation
will be acceptable, however.

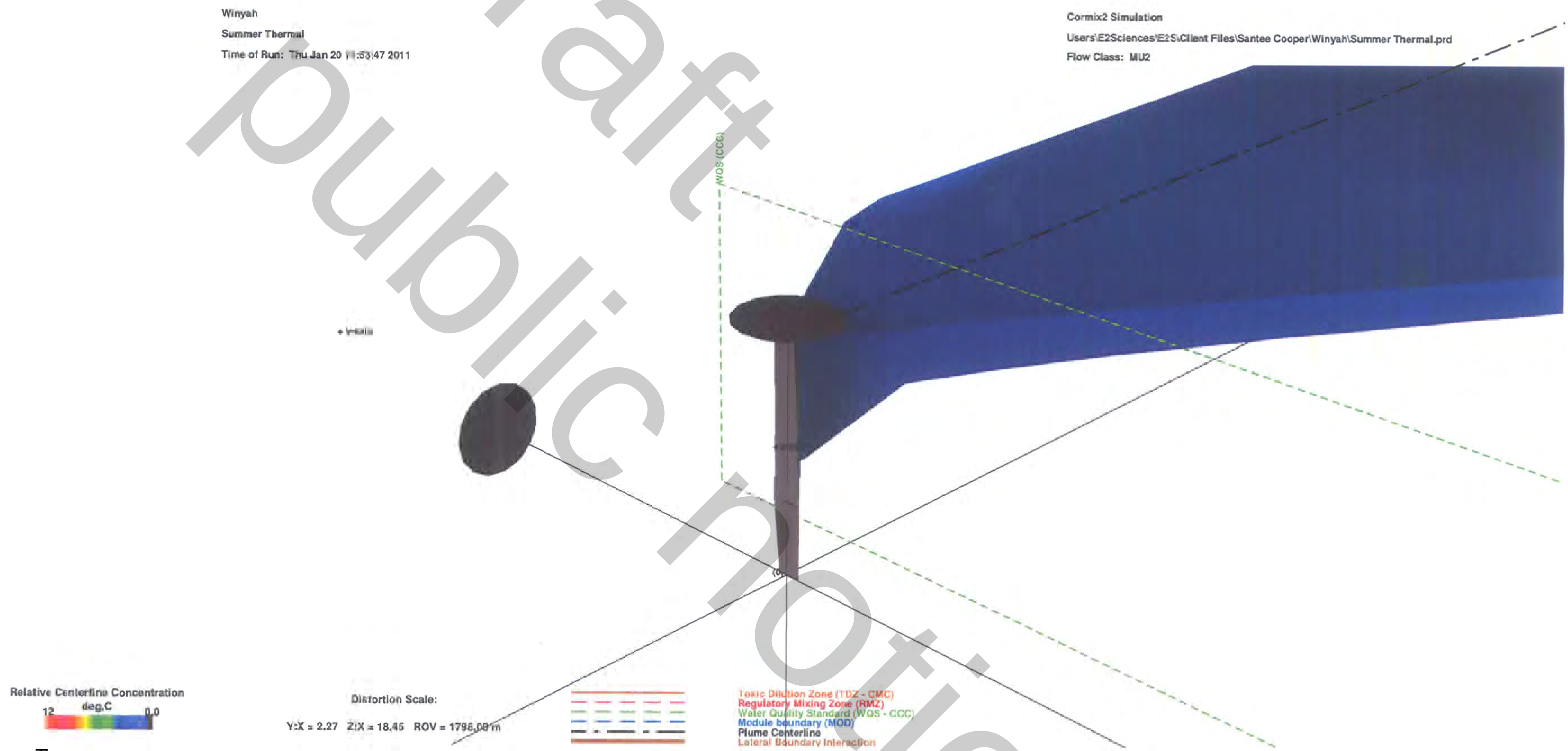
X	Y	Z	S	C	BV	BH	ZU	ZL	TT
817.27	16.70	2.80	57.1	0.207E+00	2.80	179.80	2.80	0.00	.49514E+05

Cumulative travel time = 49513.5352 sec

VERTICALLY AND LATERALLY FULLY MIXED over layer depth: END OF SIMULATION!

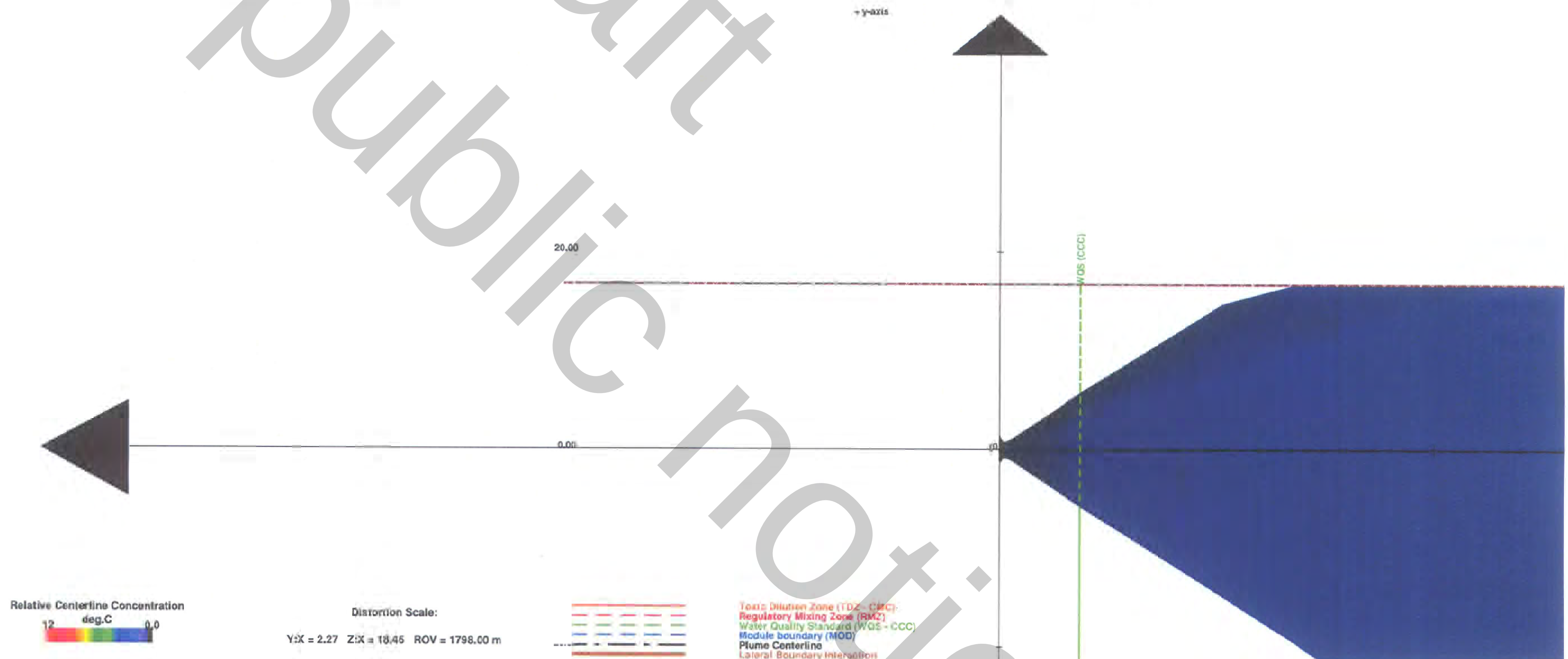
END OF MOD281: MIXED PLUME/BOUNDED CHANNEL/POSSIBLE UPSTREAM WEDGE INTRUSION

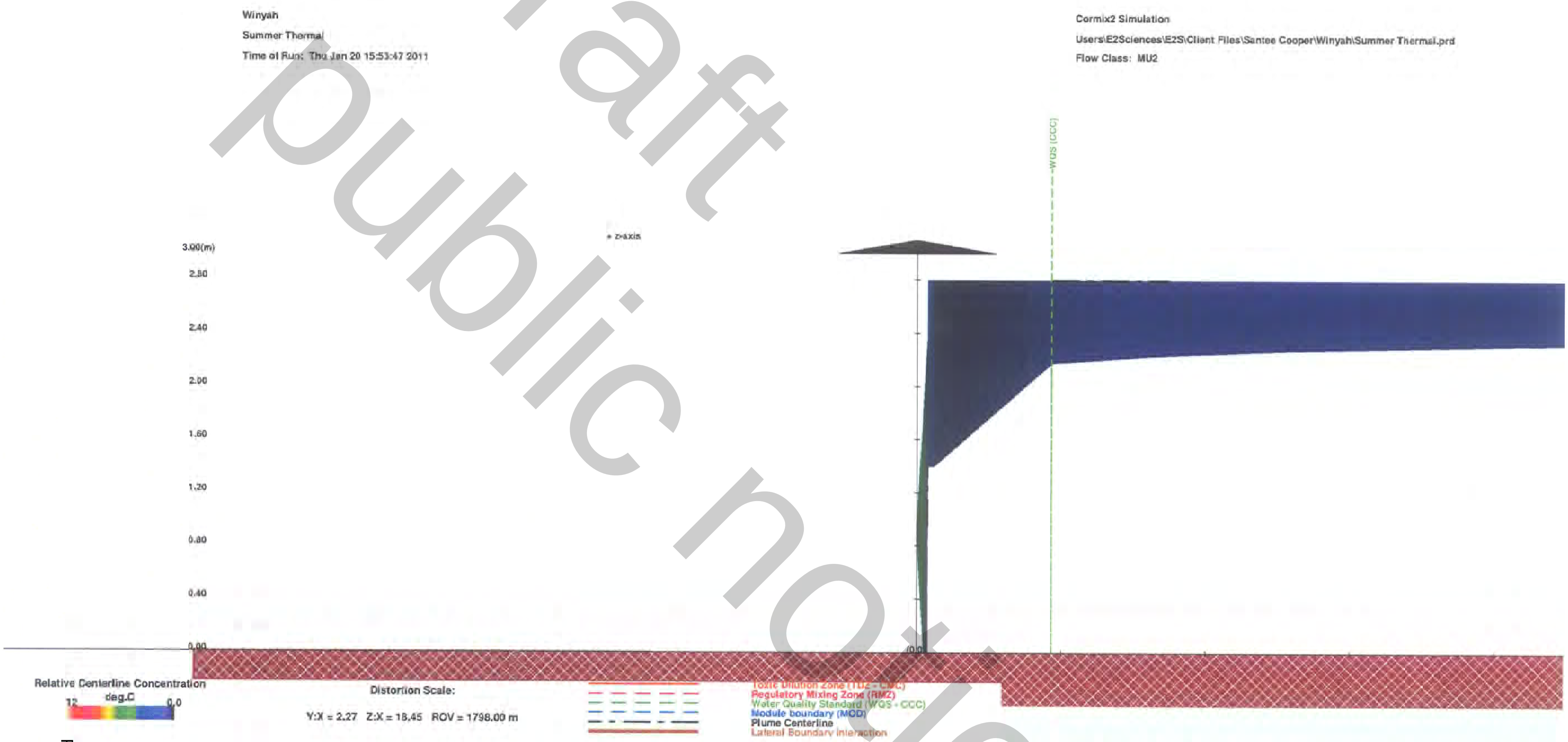
CORMIX2: Multiport Diffuser Discharges End of Prediction File
2222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222


Winyah
Summer Thermal
Time of Run: Thu Jan 20 [illegible]:53:47 2011
Cormix2 Simulation
Users\E2Sciences\E2S\Client Files\Santee Cooper\Winyah\Summer Thermal.prd
Flow Class: MU2
WQS (CCC)
Relative Centerline Concentration
deg.C
12
0.0
Distortion Scale:
Y:X = 2.27 Z:X = 18.45 ROV = 1796.08 m
Toxic Dilution Zone (TDZ - CMC)
Regulatory Mixing Zone (RMZ)
Water Quality Standard (WQS - CCC)
Module boundary (MOD)
Plume Centerline
Lateral Boundary Interaction

Winyah
Summer Thermal
Time of Run: Thu Jan 20 15:33:47 2011

Cormix2 Simulation
Users\E2Sciences\E2S\Client Files\Santee Cooper\Winyah\Summer Thermal.prd
Flow Class: MU2





Winyah
Summer Thermal
Time of Run: Thu Jan 20 15:53:47 2011
Cormix2 Simulation
Users\E2Sciences\E2S\Client Files\Santee Cooper\Winyah\Summer Thermal.prd
Flow Class: MU2
WQS (CCC)
z-axis
3.00(m)
2.80
2.40
2.00
1.60
1.20
0.80
0.40
0.00
Relative Centerline Concentration
deg.C
12
0.0
Distortion Scale:
Y:X = 2.27 Z:X = 18.45 ROV = 1798.00 m
Regulatory Mixing Zone (RMZ)
Water Quality Standard (WQS - CCC)
Module boundary (MOD)
Plume Centerline
Lateral Boundary Interaction

LABORATORY REPORTS

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 – (843) 556–8171 – www.gel.com

Certificate of Analysis Report
for

GEEL001 GEL Engineering, LLC

Client SDG: 268728 GEL Work Order: 268728

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a surrogate compound
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the detection limit.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Jake Crook.

Reviewed by ____________________

List of current GEL Certifications as of 28 December 2010

State	Certification
Arizona	AZ0668
Arkansas	88-0651
CLIA	42D0904046
California – NELAP	01151CA
Colorado	GEL
Connecticut	PH-0169
Dept. of Navy	NFESC 413
EPA Region 5	WG-15J
Florida – NELAP	E87156
Georgia	E87156 (FL/NELAP,)
Georgia DW	967
Hawaii	N/A
ISO 17025	2567.01
Idaho	SC00012
Illinois – NELAP	200029
Indiana	C-SC-01
Kansas – NELAP	E-10332
Kentucky	90129
Louisiana – NELAP	03046
Maryland	270
Massachusetts	M-SC012
Nevada	SC00012
New Jersey – NELAP	SC002
New Mexico	FL NELAP E87156
New York – NELAP	11501
North Carolina	233
North Carolina DW	45709
Oklahoma	9904
Pennsylvania – NELAP	68-00485
South Carolina	10120001/10120002
Tennessee	TN 02934
Texas – NELAP	T104704235-07B-TX
U.S. Dept. of Agriculture	S-52597
Utah – NELAP	GEL
Vermont	VT87156
Virginia	00151
Washington	C1641

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : GEL Engineering, LLC
Address : P.O. Box 30712
Charleston, South Carolina 29417

Report Date: December 28, 2010

Contact: Mr. John McLure
Project: **Winyah NPDES Permit Renewal**

Client Sample ID:	Outfall 02A Comp	Project:	SOOP06310C
Sample ID:	268728001	Client ID:	GEEL001
Matrix:	Waste Water		
Collect Date:	15-DEC-10 11:25		
Receive Date:	15-DEC-10		
Collector:	Client		

Parameter	Qualifier	Result	RL	Units	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis										
SM 5310 D Total Organic Carbon "As Received"										
Total Organic Carbon Average		20900	10000	ug/L	10	TSM	12/17/10	1223	1057925	1
Micro-biology										
SM18_5210B BOD, 5DAY "As Received"										
BOD, 5 DAY		35800	20000	ug/L		LXH2	12/16/10	1025	1057983	2
Nutrient Analysis										
EPA 350.1 Nitrogen, Ammonia L "As Received"										
Nitrogen, Ammonia		1760	100	ug/L	1	AXH3	12/16/10	1434	1057991	3
Solids Analysis										
SM 2540D Total Suspended Liq "As Received"										
Total Suspended Solids	U	ND	10000	ug/L		LYG1	12/16/10	1042	1058094	4
Spectrometric Analysis										
HACH Chemical Oxygen Demand "As Received"										
COD		98900	20000	ug/L	1	TXT1	12/27/10	1745	1060442	5

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 350.2 Prep	EPA 350.1 Ammonia Nitrogen Prep	SXJ1	12/16/10	0915	1057990

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SM 5310 D	
2	SM 18-5210B	
3	EPA 350.1	
4	SM 2540D	
5	HACH 8000	

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 28, 2010

GEL Engineering, LLC
P.O. Box 30712
Charleston, South Carolina

Contact: Mr. John McLure

Workorder: 268728

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Carbon Analysis										
Batch 1057925										
QC1202286905 268666002 DUP										
Total Organic Carbon Average		6850		6940	ug/L	1.30 ^		(+/-2000)	TSM	12/16/10 17:13
QC1202286907 LCS										
Total Organic Carbon Average	10000			10300	ug/L		103	(85%-115%)		12/16/10 16:47
QC1202286904 MB										
Total Organic Carbon Average			U	ND	ug/L					12/16/10 16:38
QC1202286906 268666002 PS										
Total Organic Carbon Average	10.0	3.43		13.5	mg/L		101	(65%-121%)		12/16/10 17:33
Micro-biology										
Batch 1057983										
QC1202287060 268665002 DUP										
BOD, 5 DAY		41000		39900	ug/L	2.91		(0%-20%)	LXH2	12/16/10 10:25
QC1202287059 LCS										
BOD, 5 DAY	198000			202000	ug/L		102	(85%-115%)		12/16/10 10:24
QC1202287058 MB										
BOD, 5 DAY			U	ND	ug/L					12/16/10 10:24
QC1202287061 SEED										
BOD, 5 DAY			U	ND	ug/L					12/16/10 10:24
Nutrient Analysis										
Batch 1057991										
QC1202287071 268665001 DUP										
Nitrogen, Ammonia		209		246	ug/L	16.3 ^		(+/-50.0)	AXH3	12/16/10 14:29
QC1202287074 LCS										
Nitrogen, Ammonia	1000			986	ug/L		98.6	(90%-110%)		12/16/10 14:27
QC1202287070 MB										
Nitrogen, Ammonia			U	ND	ug/L					12/16/10 14:26
QC1202287072 268665001 MS										
Nitrogen, Ammonia	1000	209		1210	ug/L		100	(90%-110%)		12/16/10 14:30
QC1202287073 268665001 MSD										
Nitrogen, Ammonia	1000	209		1330	ug/L	9.22	112*	(0%-15%)		12/16/10 14:31
Solids Analysis										
Batch 1058094										
QC1202287376 268730001 DUP										
Total Suspended Solids		50400		50000	ug/L	0.797		(+/-10000)	LYG1	12/16/10 10:42
QC1202287377 LCS										
Total Suspended Solids	500000			495000	ug/L		99	(95%-105%)		12/16/10 10:42
QC1202287373 MB										
Total Suspended Solids			U	ND	ug/L					12/16/10 10:42
Spectrometric Analysis										
Batch 1060442										
QC1202293233 268656002 DUP										
COD		50000		50000	ug/L	0.00 ^		(+/-20000)	TXT1	12/27/10 17:43
QC1202293232 LCS										

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QC Summary

Workorder: 268728

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Spectrometric Analysis										
Batch 1060442										
COD	75000			69800	ug/L		93.1	(90%-110%)		12/27/10 17:42
QC1202293231 MB										
COD			U	ND	ug/L				TXT1	12/27/10 17:36
QC1202293234 268656002 PS										
COD	50.0	50.0		96.6	mg/L		93.1	(90%-110%)		12/27/10 17:44

Notes:
The Qualifiers in this report are defined as follows:

- ** Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- A The TIC is a suspected aldol-condensation product
- B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of the sample
- E General Chemistry--Concentration of the target analyte exceeds the instrument calibration range
- F Estimated Value
- H Analytical holding time was exceeded
- J Value is estimated
- M Matrix Related Failure
- N/A RPD or %Recovery limits do not apply.
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
- R Sample results are rejected
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y QC Samples were not spiked with this compound
- Z Paint Filter Test--Particulates passed through the filter, however no free liquids were observed.
- ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
- d 5-day BOD--The 2:1 depletion requirement was not met for this sample
- h Preparation or preservation holding time was exceeded

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QC Summary

Workorder: 268728

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Page: ______ of ______
Project #: S00P06310
GEL Quote #:
COC Number [1]:
PO Number:

GEL Chain of Custody and Analytical Request

GEL Work Order Number: 268728

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: GEL (S00P06310) Phone #:
Project/Site Name: Winyah NPDES Renewal Fax #:
Address: Georgetown, SC
Collected by: Client (T. Neal) Send Results To: J. McLure

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Sample ID * For composites - indicate start and stop date/time	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Should this sample be considered: Radioactive	TSCA Regulated	Total number of containers	BOD	COD, NH3	TOC	TSS							Comments Note: extra sample is required for sample specific QC
<-- Preservative Type (6)										SA	SA								
Outfall 02 A Comp	12/15/10	1125	C	N	WW			4	1	1	1	1							

TAT Requested: Normal: ✓ Rush: Specify: (Subject to Surcharge) Fax Results: Yes / No Circle Deliverable: C of A / QC Summary / Level 1 / Level 2 / Level 3 / Level 4

Remarks: *Are there any known hazards applicable to these samples? If so, please list the hazards*

Sample Collection Time Zone
Eastern Pacific
Central Other ______
Mountain

Chain of Custody Signatures

	Relinquished By (Signed)	Date	Time		Received by (signed)	Date	Time
1	T. Neal	12/15/10	1335	1	[signature]	12/15/10	13:55
2				2			
3				3			

Sample Shipping and Delivery Details

GEL PM:
Method of Shipment: Date Shipped:
Airbill #:
Airbill #:

For Lab Receiving Use Only
Custody Seal Intact? YES NO
Cooler Temp: 2 C

1.) Chain of Custody Number = Client Determined
2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal
5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).
6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: SOLP			SDG/AR/COC/Work Order: 268728
Received By: Shanta Whitlock			Date Received: 12/15/10
Suspected Hazard Information	Yes	No	*If Counts > x2 area background on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?			Maximum Counts Observed*: 23
Classified Radioactive II or III by RSO?		—	
COC/Samples marked containing PCBs?		—	
Shipped as a DOT Hazardous?		—	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		—	

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?	✓			Preservation Method: Ice bags Blue ice Dry ice None Other (describe) 20
2a	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: 615296 46 Secondary Temperature Device Serial # (If Applicable):
3	Chain of custody documents included with shipment?	✓			
4	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?	✓			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?		✓		Sample ID's and containers affected:
7	Are Encore containers present?		✓		(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Sample ID's affected:
11	Number of containers received match number indicated on COC?	✓			Sample ID's affected:
12	COC form is properly signed in relinquished/received sections?	✓			
13	Carrier and tracking number.				Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials JP Date 12-15-10 Page 1 of 1

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Certificate of Analysis Report
for

GEEL001 GEL Engineering, LLC

Client SDG: 268656 GEL Work Order: 268656

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a surrogate compound
- E Organics—Concentration of the target analyte exceeds the instrument calibration range
- H Analytical holding time was exceeded
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
- d 5-day BOD—The 2:1 depletion requirement was not met for this sample

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the detection limit.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Jake Crook.

Reviewed by ______________________

List of current GEL Certifications as of 28 December 2010

State	Certification
Arizona	AZ0668
Arkansas	88-0651
CLIA	42D0904046
California – NELAP	01151CA
Colorado	GEL
Connecticut	PH-0169
Dept. of Navy	NFESC 413
EPA Region 5	WG-15J
Florida – NELAP	E87156
Georgia	E87156 (FL/NELAP)
Georgia DW	967
Hawaii	N/A
ISO 17025	2567.01
Idaho	SC00012
Illinois – NELAP	200029
Indiana	C-SC-01
Kansas – NELAP	E-10332
Kentucky	90129
Louisiana – NELAP	03046
Maryland	270
Massachusetts	M-SC012
Nevada	SC00012
New Jersey – NELAP	SC002
New Mexico	FL NELAP E87156
New York – NELAP	11501
North Carolina	233
North Carolina DW	45709
Oklahoma	9904
Pennsylvania – NELAP	68-00485
South Carolina	10120001/10120002
Tennessee	TN 02934
Texas – NELAP	T104704235-07B-TX
U.S. Dept. of Agriculture	S-52597
Utah – NELAP	GEL
Vermont	VT87156
Virginia	00151
Washington	C1641

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : GEL Engineering, LLC
Address : P.O. Box 30712
Charleston, South Carolina 29417

Report Date: December 28, 2010

Contact: Mr. John McLure
Project: **Winyah NPDES Permit Renewal**

Client Sample ID:	Outfall 02A Grab	Project:	SOOP06310C
Sample ID:	268656001	Client ID:	GEEL001
Matrix:	Waste Water		
Collect Date:	14-DEC-10 11:15		
Receive Date:	14-DEC-10		
Collector:	Client		

Parameter	Qualifier	Result	RL	Units	DF	Analyst	Date	Time	Batch	Method
Field Data										
GEL Field Residual Chlorine Method "As Received"										
Field Residual Chlorine		0.25		mg/L		BYD1	12/14/10	1115	1057578	1
GEL Field pH Method "As Received"										
Field Temperature		20.7		Celsius		BYD1	12/14/10	1115	1057578	2
Field pH		7.40		SU						
Oil & Grease Analysis										
EPA 1664A n-Hexane Extractable Material (Oil and Grease) "As Received"										
Oil and Grease	U	ND	5.00	mg/L		JXT1	12/16/10	1022	1058017	3

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	GEL Field Method	
2	GEL Field Method	
3	EPA 1664A	

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Certificate of Analysis

Company : GEL Engineering, LLC
Address : P.O. Box 30712
Charleston, South Carolina 29417

Report Date: December 28, 2010

Contact: Mr. John McLure
Project: **Winyah NPDES Permit Renewal**

Client Sample ID:	Outfall 002 Grab	Project:	SOOP06310C
Sample ID:	268656002	Client ID:	GEEL001
Matrix:	Waste Water		
Collect Date:	14-DEC-10 11:40		
Receive Date:	14-DEC-10		
Collector:	Client		

Parameter	Qualifier	Result	RL	Units	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis										
SM 5310 D Total Organic Carbon "As Received"										
Total Organic Carbon Average		6160	1000	ug/L	1	TSM	12/18/10	0348	1056646	1
Field Data										
GEL Field Residual Chlorine Method "As Received"										
Field Residual Chlorine		0.05		mg/L		BYD1	12/14/10	1140	1057578	2
GEL Field pH Method "As Received"										
Field Temperature		18.6		Celsius		BYD1	12/14/10	1140	1057578	3
Field pH		7.80		SU						
Flow Injection Analysis										
EPA 335.4 Cyanide, Total "As Received"										
Cyanide, Total	U	ND	10.0	ug/L	1	SDS	12/15/10	1357	1057546	4
EPA 420.4 Total Phenols "As Received"										
Total Phenol	U	ND	5.00	ug/L	1	SDS	12/22/10	0855	1058823	5
Ion Chromatography										
EPA300.0 Bromide Liquid "As Received"										
Fluoride		3200	500	ug/L	5	MAR1	12/17/10	2025	1057986	6
Bromide		73500	10000	ug/L	50	MAR1	12/17/10	2146	1057986	7
Chloride		1030	20.0	mg/L	100	MAR1	12/17/10	2306	1057986	8
Sulfate		997000	40000	ug/L	100					
Metals Analysis-ICP										
200.2/200.7 Titanium "As Received"										
Titanium	U	ND	25.0	ug/L	5	LS	12/17/10	1006	1057735	9
Metals Analysis-ICP-MS										
200.8/200.2 NPDES Metals "As Received"										
Aluminum		280	50.0	ug/L	1	BAJ	12/18/10	0348	1057531	10
Arsenic		66.7	5.00	ug/L	1					
Cadmium	U	ND	0.100	ug/L	1					
Chromium	U	ND	5.00	ug/L	1					
Cobalt	U	ND	20.0	ug/L	1					
Copper	U	ND	10.0	ug/L	1					
Iron		3030	20.0	ug/L	1					
Lead	U	ND	2.00	ug/L	1					
Molybdenum		156	20.0	ug/L	1					
Nickel		31.8	10.0	ug/L	1					
Silver	U	ND	5.00	ug/L	1					
Beryllium	U	ND	1.00	ug/L	1	BAJ	12/21/10	0514	1057531	11

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Certificate of Analysis

Company : GEL Engineering, LLC
Address : P.O. Box 30712
Charleston, South Carolina 29417

Report Date: December 28, 2010

Contact: Mr. John McLure
Project: **Winyah NPDES Permit Renewal**

Client Sample ID: Outfall 002 Grab
Sample ID: 268656002

Project: SOOP06310C
Client ID: GEEL001

Parameter	Qualifier	Result	RL	Units	DF	Analyst	Date	Time	Batch	Method
Metals Analysis-ICP-MS										
200.8/200.2 NPDES Metals "As Received"										
Zinc		19.3	10.0	ug/L	1					
Antimony		10.5	5.00	ug/L	1	BAJ	12/21/10	0333	1057531	12
Thallium		1.42	0.500	ug/L	1					
Tin	U	ND	10.0	ug/L	1					
Boron		16000	1500	ug/L	100	BAJ	12/21/10	0256	1057531	13
Magnesium		177000	1500	ug/L	100					
Barium		158	50.0	ug/L	10	BAJ	12/21/10	0315	1057531	14
Manganese		776	50.0	ug/L	10					
Selenium		177	50.0	ug/L	10					
Micro-biology										
SM18_5210B BOD, 5DAY "As Received"										
BOD, 5 DAY		2900	2000	ug/L		LXH2	12/15/10	0553	1057480	15
Nutrient Analysis										
EPA 350.1 Nitrogen, Ammonia L "As Received"										
Nitrogen, Ammonia		581	100	ug/L	1	AXH3	12/15/10	1440	1057541	16
EPA 353.2 Nitrogen, Nitrate/Nitrite "As Received"										
Nitrogen, Nitrate/Nitrite		131	100	ug/L	5	AXH3	12/15/10	0825	1057534	17
EPA 365.4 Phosphorus, Total in "As Received"										
Phosphorus, Total as P		94.0	50.0	ug/L	1	AXH3	12/16/10	0803	1057536	18
Nitrogen, Total Kjeldahl (TKN) "As Received"										
Nitrogen, Total Kjeldahl		1310	100	ug/L	1	AXH3	12/15/10	1348	1057538	19
EPA 351.2/350.1 Total Organic Nitrogen "See Parent Products"										
Total Organic Nitrogen		724	100	ug/L	1	AXH3	12/15/10	1449	1057542	20
Oil & Grease Analysis										
EPA 1664A n-Hexane Extractable Material (Oil and Grease) "As Received"										
Oil and Grease	U	ND	5.00	mg/L		JXT1	12/16/10	1022	1058017	21
Semi-Volatile-GC/MS										
625/3510C FORM2C BNA H2O "As Received"										
2,4,6-Trichlorophenol	U	ND	10.0	ug/L	1	BYT1	12/16/10	1615	1057857	22
2,4-Dichlorophenol	U	ND	10.0	ug/L	1					
2,4-Dimethylphenol	U	ND	10.0	ug/L	1					
2,4-Dinitrophenol	U	ND	50.0	ug/L	1					
2-Chlorophenol	U	ND	10.0	ug/L	1					
2-Methyl-4,6-dinitrophenol	U	ND	10.0	ug/L	1					
2-Nitrophenol	U	ND	10.0	ug/L	1					
4-Chloro-3-methylphenol	U	ND	10.0	ug/L	1					
4-Nitrophenol	U	ND	10.0	ug/L	1					
Pentachlorophenol	U	ND	10.0	ug/L	1					
Phenol	U	ND	10.0	ug/L	1					

Certificate of Analysis

Company : GEL Engineering, LLC
Address : P.O. Box 30712
Charleston, South Carolina 29417

Report Date: December 28, 2010

Contact: Mr. John McLure
Project: **Winyah NPDES Permit Renewal**

Client Sample ID: Outfall 002 Grab
Sample ID: 268656002
Project: SOOP06310C
Client ID: GEEL001

Parameter	Qualifier	Result	RL	Units	DF	Analyst	Date	Time	Batch	Method
Solids Analysis										
SM 2540D Total Suspended Liq "As Received"										
Total Suspended Solids		11800	5000	ug/L		LYG1	12/15/10	1053	1057593	23
Spectrometric Analysis										
HACH Chemical Oxygen Demand "As Received"										
COD		50000	20000	ug/L	1	TXT1	12/27/10	1742	1060442	24
SM 4500-S(2-) D Sulfide "As Received"										
Total Sulfide	U	ND	100	ug/L	1	TXT1	12/16/10	1421	1058095	25
SM 5540 C Surfactants (MBAS) "As Received"										
MBAS	U	ND	50.0	ug/L	1	LXA1	12/15/10	1757	1057624	26
Titration Analysis										
SM4500 Sulfite Liquid "As Received"										
Sulfite	HU	ND	2000	ug/L		TXT1	12/14/10	1723	1057425	27
Volatile Organics										
EPA 624 Form 2C Liquid "As Received"										
1,1,1-Trichloroethane	U	ND	2.00	ug/L	1	JEB	12/16/10	0653	1057980	28
1,1,2,2-Tetrachloroethane	U	ND	2.00	ug/L	1					
1,1,2-Trichloroethane	U	ND	2.00	ug/L	1					
1,1-Dichloroethane	U	ND	2.00	ug/L	1					
1,1-Dichloroethylene	U	ND	2.00	ug/L	1					
1,2,4-Trichlorobenzene	U	ND	2.00	ug/L	1					
1,2-Dichlorobenzene	U	ND	2.00	ug/L	1					
1,2-Dichloroethane	U	ND	2.00	ug/L	1					
1,2-Dichloropropane	U	ND	2.00	ug/L	1					
1,3-Dichlorobenzene	U	ND	2.00	ug/L	1					
1,3-Dichloropropylene(total)	U	ND	2.00	ug/L	1					
1,4-Dichlorobenzene	U	ND	2.00	ug/L	1					
2-Chloroethylvinyl ether	U	ND	5.00	ug/L	1					
Acrolein	U	ND	5.00	ug/L	1					
Acrylonitrile	U	ND	5.00	ug/L	1					
Benzene	U	ND	2.00	ug/L	1					
Bromodichloromethane	U	ND	2.00	ug/L	1					
Bromoform	U	ND	2.00	ug/L	1					
Bromomethane	U	ND	2.00	ug/L	1					
Carbon tetrachloride	U	ND	2.00	ug/L	1					
Chlorobenzene	U	ND	2.00	ug/L	1					
Chloroethane	U	ND	2.00	ug/L	1					
Chloroform	U	ND	2.00	ug/L	1					
Chloromethane	U	ND	2.00	ug/L	1					
Dibromochloromethane	U	ND	2.00	ug/L	1					
Dichlorodifluoromethane	U	ND	2.00	ug/L	1					
Ethylbenzene	U	ND	2.00	ug/L	1					

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Certificate of Analysis

Company : GEL Engineering, LLC
Address : P.O. Box 30712
Charleston, South Carolina 29417

Report Date: December 28, 2010

Contact: Mr. John McLure
Project: **Winyah NPDES Permit Renewal**

Client Sample ID: Outfall 002 Grab
Sample ID: 268656002

Project: SOOP06310C
Client ID: GEEL001

Parameter	Qualifier	Result	RL	Units	DF	Analyst	Date	Time	Batch	Method
Volatile Organics										
EPA 624 Form 2C Liquid "As Received"										
Methylene chloride	U	ND	2.00	ug/L	1					
Tetrachloroethylene	U	ND	2.00	ug/L	1					
Toluene	U	ND	2.00	ug/L	1					
Trichloroethylene	U	ND	2.00	ug/L	1					
Trichlorofluoromethane	U	ND	2.00	ug/L	1					
Vinyl chloride	U	ND	2.00	ug/L	1					
trans-1,2-Dichloroethylene	U	ND	2.00	ug/L	1					

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 200.2	ICP-MS 200.2 PREP	LYH1	12/16/10	0845	1057530
EPA 200.2	ICP-TRACE 200.2 Liquid Prep	LYH1	12/16/10	0845	1057734
EPA 335.4	EPA 335.4 Total Cyanide	AXS5	12/15/10	1329	1057544
EPA 350.2 Prep	EPA 350.1 Ammonia Nitrogen Prep	SXJ1	12/15/10	1215	1057540
EPA 351.2 Prep	EPA 351.2 Total Kjeldahl Nitrogen Prep	SXJ1	12/15/10	0800	1057537
EPA 365.4 Prep	EPA 365.4 Phosphorus, Total in liquid PR	SXJ1	12/15/10	0800	1057535
EPA 420.4	EPA 420.4 Phenols, Total in liquid PREP	AXS5	12/20/10	1406	1058822
SW846 3510C	3510C Form 2C NPDES + XCMDS prep	TXA2	12/15/10	2106	1057850

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	SM 5310 D	
2	GEL Field Method	
3	GEL Field Method	
4	EPA 335.4	
5	EPA 420.4	
6	EPA 300.0	
7	EPA 300.0	
8	EPA 300.0	
9	EPA 200.7	
10	EPA 200.8 SC_NPDES	
11	EPA 200.8 SC_NPDES	
12	EPA 200.8 SC_NPDES	
13	EPA 200.8 SC_NPDES	

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Certificate of Analysis

Company : GEL Engineering, LLC
Address : P.O. Box 30712
Charleston, South Carolina 29417

Report Date: December 28, 2010

Contact: Mr. John McLure
Project: **Winyah NPDES Permit Renewal**

Client Sample ID:	Outfall 002 Grab		Project:	SOOP06310C
Sample ID:	268656002		Client ID:	GEEL001

Parameter	Qualifier Result	RL	Units	DF	Analyst	Date	Time	Batch	Method
14	EPA 200.8 SC_NPDES								
15	SM 18-5210B								
16	EPA 350.1								
17	EPA 353.2 Low Level								
18	EPA 365.4								
19	EPA 351.2								
20	EPA 351.2/350.1								
21	EPA 1664A								
22	EPA 625								
23	SM 2540D								
24	HACH 8000								
25	SM 4500-S (2-) D								
26	SM 5540 C								
27	SM 4500-SO3 (2-) B								
28	EPA 624 SC_NPDES								

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
2-Fluorobiphenyl	625/3510C FORM2C BNA H2O "As Received"	32.8 ug/L	47.2	69.5	(32%-110%)
Nitrobenzene-d5	625/3510C FORM2C BNA H2O "As Received"	40.5 ug/L	47.2	85.9	(33%-115%)
p-Terphenyl-d14	625/3510C FORM2C BNA H2O "As Received"	34.2 ug/L	47.2	72.5	(44%-140%)
2,4,6-Tribromophenol	625/3510C FORM2C BNA H2O "As Received"	69.1 ug/L	94.3	73.2	(21%-136%)
2-Fluorophenol	625/3510C FORM2C BNA H2O "As Received"	32.5 ug/L	94.3	34.4	(7%-88%)
Phenol-d5	625/3510C FORM2C BNA H2O "As Received"	22.0 ug/L	94.3	23.3	(10%-61%)
1,2-Dichloroethane-d4	EPA 624 Form 2C Liquid "As Received"	50.9 ug/L	50.0	102	(71%-130%)
Bromofluorobenzene	EPA 624 Form 2C Liquid "As Received"	50.7 ug/L	50.0	101	(80%-120%)
Toluene-d8	EPA 624 Form 2C Liquid "As Received"	49.7 ug/L	50.0	99.4	(80%-120%)

The Following NCRs have been identified

NCR ID:908837 Batch ID: 1057425 1. Sample received out of holding:

268656 002

GEL LABORATORIES LLC

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QC Summary

Report Date: December 28, 2010

GEL Engineering, LLC
P.O. Box 30712
Charleston, South Carolina

Contact: Mr. John McLure

Workorder: 268656

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Carbon Analysis										
Batch 1056646										
QC1202283731 268384002 DUP										
Total Organic Carbon Average		4480		4670	ug/L	4.09 ^		(+/-1000)	TSM	12/18/10 00:27
QC1202283735 LCS										
Total Organic Carbon Average	10000			10400	ug/L		104	(85%-115%)		12/18/10 00:01
QC1202283730 MB										
Total Organic Carbon Average			U	ND	ug/L					12/17/10 23:52
QC1202283733 268384002 PS										
Total Organic Carbon Average	10.0	4.48		14.7	mg/L		102	(65%-121%)		12/18/10 00:47
Flow Injection Analysis										
Batch 1057546										
QC1202285963 268653001 DUP										
Cyanide, Total		U ND	U	ND	ug/L	N/A			SDS	12/15/10 13:51
QC1202285966 LCS										
Cyanide, Total	50.0			45.1	ug/L		90.2	(90%-110%)		12/15/10 13:45
QC1202285962 MB										
Cyanide, Total			U	ND	ug/L					12/15/10 13:44
QC1202285964 268653001 MS										
Cyanide, Total	100	U ND		103	ug/L		103	(90%-110%)		12/15/10 13:52
QC1202285965 268653001 MSD										
Cyanide, Total	100	U ND		105	ug/L	1.92	105	(0%-20%)		12/15/10 13:56
Batch 1058823										
QC1202289180 LCS										
Total Phenol	50.0			52.3	ug/L		105	(90%-110%)	SDS	12/22/10 08:54
QC1202289177 MB										
Total Phenol			J	3.12	ug/L					12/22/10 08:54
QC1202289178 268656002 MS										
Total Phenol	50.0	J 2.06		55.6	ug/L		107	(90%-110%)		12/22/10 08:56
QC1202289179 268656002 MSD										
Total Phenol	50.0	J 2.06		59.0	ug/L	5.93	114*	(0%-29%)		12/22/10 08:57
Ion Chromatography										
Batch 1057986										
QC1202287063 268656002 DUP										
Bromide		73500		73200	ug/L	0.416		(0%-20%)	MAR1	12/17/10 22:12
Chloride		1030		1030	mg/L	0.0718		(0%-20%)		12/17/10 23:33
Fluoride		3200		3150	ug/L	1.76		(0%-20%)		12/17/10 20:52
Sulfate		997000		997000	ug/L	0.0191		(0%-20%)		12/17/10 23:33
QC1202287065 LCS										
Bromide	2500			2490	ug/L		99.8	(90%-110%)		12/16/10 23:45
Chloride	10.0			9.35	mg/L		93.5	(90%-110%)		
Fluoride	5000			4930	ug/L		98.6	(90%-110%)		
Sulfate	20000			19000	ug/L		95.2	(90%-110%)		
QC1202287062 MB										

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QC Summary

Workorder: 268656

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Ion Chromatography										
Batch 1057986										
Bromide			U	ND	ug/L					12/16/10 23:18
Chloride			U	ND	mg/L				MARI	
Fluoride			U	ND	ug/L					
Sulfate			U	ND	ug/L					
QC1202287064 268656002 PS										
Bromide	2.50	1.47		3.97	mg/L		100	(90%-110%)		12/17/10 22:39
Chloride	10.0	10.3		21.4	mg/L		111*	(90%-110%)		12/18/10 00:00
Fluoride	5.00	0.640		5.63	mg/L		99.7	(90%-110%)		12/17/10 21:19
Sulfate	20.0	9.97		30.4	mg/L		102	(90%-110%)		12/18/10 00:00
Metals Analysis - ICPMS										
Batch 1057531										
QC1202285932 LCS										
Aluminum	2000			1890	ug/L		94.5	(85%-115%)	BAJ	12/18/10 03:30
Antimony	50.0			50.6	ug/L		101	(85%-115%)		12/21/10 02:53
Arsenic	50.0			49.1	ug/L		98.1	(85%-115%)		12/18/10 03:30
Barium	50.0			50.5	ug/L		101	(85%-115%)		12/21/10 02:53
Beryllium	50.0			54.6	ug/L		109	(85%-115%)		12/21/10 04:33
Boron	100			102	ug/L		102	(85%-115%)		12/21/10 02:53
Cadmium	50.0			48.6	ug/L		97.2	(85%-115%)		12/18/10 03:30
Chromium	50.0			44.9	ug/L		89.8	(85%-115%)		
Cobalt	50.0			44.9	ug/L		89.7	(85%-115%)		
Copper	50.0			47.6	ug/L		95.3	(85%-115%)		
Iron	2000			1960	ug/L		97.9	(85%-115%)		
Lead	50.0			49.7	ug/L		99.5	(85%-115%)		
Magnesium	2000			1980	ug/L		99.2	(85%-115%)		12/21/10 02:53
Manganese	50.0			52.7	ug/L		105	(85%-115%)		
Molybdenum	50.0			45.6	ug/L		91.3	(85%-115%)		12/18/10 03:30
Nickel	50.0			46.2	ug/L		92.4	(85%-115%)		
Selenium	50.0			50.4	ug/L		101	(85%-115%)		12/21/10 02:53
Silver	50.0			49.0	ug/L		98	(85%-115%)		12/18/10 03:30
Thallium	50.0			48.3	ug/L		96.7	(85%-115%)		12/21/10 02:53
Tin	50.0			52.4	ug/L		105	(85%-115%)		
Zinc	50.0			53.3	ug/L		107	(85%-115%)		12/21/10 04:33
QC1202285931 MB										
Aluminum			U	ND	ug/L					12/18/10 03:23
Antimony			U	ND	ug/L					12/21/10 02:50
Arsenic			U	ND	ug/L					12/18/10 03:23
Barium			U	ND	ug/L					12/21/10 02:50
Beryllium			U	ND	ug/L					12/21/10 04:30
Boron			U	ND	ug/L					12/21/10 02:50
Cadmium			U	ND	ug/L					12/18/10 03:23
Chromium			U	ND	ug/L					

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QC Summary

Workorder: 268656

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 1057531											
Cobalt				U	ND	ug/L					
Copper				U	ND	ug/L				BAJ	12/18/10 03:23
Iron				U	ND	ug/L					
Lead				U	ND	ug/L					
Magnesium				U	ND	ug/L					12/21/10 02:50
Manganese				U	ND	ug/L					
Molybdenum				U	ND	ug/L					12/18/10 03:23
Nickel				U	ND	ug/L					
Selenium				U	ND	ug/L					12/21/10 02:50
Silver				U	ND	ug/L					12/18/10 03:23
Thallium				U	ND	ug/L					12/21/10 02:50
Tin				U	ND	ug/L					
Zinc				U	ND	ug/L					12/21/10 04:30
QC1202285933 268656002 MS											
Aluminum	2000		280		2250	ug/L		98.7	(75%-125%)		12/18/10 03:54
Antimony	50.0		10.5		64.1	ug/L		107	(75%-125%)		12/21/10 03:37
Arsenic	50.0		66.7		120	ug/L		107	(75%-125%)		12/18/10 03:54
Barium	50.0		158		213	ug/L		112	(75%-125%)		12/21/10 03:18
Beryllium	50.0	J	0.202		52.3	ug/L		104	(75%-125%)		12/21/10 05:17
Boron	100		16000		16500	ug/L		N/A	(75%-125%)		12/21/10 02:59
Cadmium	50.0	J	0.086		46.0	ug/L		91.8	(75%-125%)		12/18/10 03:54
Chromium	50.0	J	1.34		46.8	ug/L		91	(75%-125%)		
Cobalt	50.0	J	3.97		45.7	ug/L		83.4	(75%-125%)		
Copper	50.0	J	8.52		52.1	ug/L		87.2	(75%-125%)		
Iron	2000		3030		5010	ug/L		99	(75%-125%)		
Lead	50.0	U	ND		49.0	ug/L		97.5	(75%-125%)		
Magnesium	2000		177000		192000	ug/L		N/A	(75%-125%)		12/21/10 02:59
Manganese	50.0		776		841	ug/L		N/A	(75%-125%)		12/21/10 03:18
Molybdenum	50.0		156		215	ug/L		117	(75%-125%)		12/18/10 03:54
Nickel	50.0		31.8		73.2	ug/L		82.7	(75%-125%)		
Selenium	50.0		177		247	ug/L		140*	(75%-125%)		12/21/10 03:18
Silver	50.0	U	ND		47.4	ug/L		94.7	(75%-125%)		12/18/10 03:54
Thallium	50.0		1.42		43.7	ug/L		84.5	(75%-125%)		12/21/10 03:37
Tin	50.0	U	ND		54.9	ug/L		109	(75%-125%)		
Zinc	50.0		19.3		65.9	ug/L		93.2	(75%-125%)		12/21/10 05:17
QC1202285934 268656002 MSD											
Aluminum	2000		280		2270	ug/L	0.860	99.6	(0%-20%)		12/18/10 04:00
Antimony	50.0		10.5		61.9	ug/L	3.38	103	(0%-20%)		12/21/10 03:40
Arsenic	50.0		66.7		120	ug/L	0.354	107	(0%-20%)		12/18/10 04:00
Barium	50.0		158		204	ug/L	4.31	93.8	(0%-20%)		12/21/10 03:21
Beryllium	50.0	J	0.202		50.2	ug/L	4.12	100	(0%-20%)		12/21/10 05:20
Boron	100		16000		15700	ug/L	5.22	N/A	(0%-20%)		12/21/10 03:02

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QC Summary

Workorder: 268656

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 1057531											
Cadmium	50.0	J	0.086		45.0	ug/L	2.18	89.8	(0%-20%)		12/18/10 04:00
Chromium	50.0	J	1.34		48.5	ug/L	3.45	94.3	(0%-20%)	BAJ	
Cobalt	50.0	J	3.97		47.3	ug/L	3.52	86.7	(0%-20%)		
Copper	50.0	J	8.52		54.0	ug/L	3.67	91.1	(0%-20%)		
Iron	2000		3030		5310	ug/L	5.88	114	(0%-20%)		
Lead	50.0	U	ND		48.5	ug/L	0.986	96.5	(0%-20%)		
Magnesium	2000		177000		170000	ug/L	12.4	N/A	(0%-20%)		12/21/10 03:02
Manganese	50.0		776		800	ug/L	5.02	N/A	(0%-20%)		12/21/10 03:21
Molybdenum	50.0		156		209	ug/L	2.66	106	(0%-20%)		12/18/10 04:00
Nickel	50.0		31.8		76.2	ug/L	4.04	88.7	(0%-20%)		
Selenium	50.0		177		224	ug/L	9.78	94.1	(0%-20%)		12/21/10 03:21
Silver	50.0	U	ND		47.6	ug/L	0.476	95.2	(0%-20%)		12/18/10 04:00
Thallium	50.0		1.42		43.3	ug/L	0.763	83.8	(0%-20%)		12/21/10 03:40
Tin	50.0	U	ND		53.3	ug/L	3.04	106	(0%-20%)		
Zinc	50.0		19.3		62.5	ug/L	5.35	86.3	(0%-20%)		12/21/10 05:20
QC1202285935 268656002 SDILT											
Aluminum			280		57.8	ug/L	3.04		(0%-10%)		12/18/10 04:06
Antimony			10.5		2.22	ug/L	5.87		(0%-10%)		12/21/10 03:43
Arsenic			66.7		14.0	ug/L	4.84		(0%-10%)		12/18/10 04:06
Barium			15.8		3.00	ug/L	4.85		(0%-10%)		12/21/10 03:24
Beryllium		J	0.202	U	ND	ug/L	N/A				12/21/10 05:23
Boron			160		36.9	ug/L	15.2		(0%-10%)		12/21/10 03:05
Cadmium		J	0.086	U	ND	ug/L	N/A				12/18/10 04:06
Chromium		J	1.34	U	ND	ug/L	N/A				
Cobalt		J	3.97	J	0.901	ug/L	13.5		(0%-10%)		
Copper		J	8.52		2.28	ug/L	33.6		(0%-10%)		
Iron			3030		844	ug/L	39.4*		(0%-10%)		
Lead		U	ND	U	ND	ug/L	N/A		(0%-10%)		
Magnesium			1770		351	ug/L	.817		(0%-10%)		12/21/10 03:05
Manganese			77.6		15.8	ug/L	1.54		(0%-10%)		12/21/10 03:24
Molybdenum			156		31.1	ug/L	.436		(0%-10%)		12/18/10 04:06
Nickel			31.8		7.70	ug/L	20.9		(0%-10%)		
Selenium			17.7	J	3.65	ug/L	2.98		(0%-10%)		12/21/10 03:24
Silver		U	ND	U	ND	ug/L	N/A		(0%-10%)		12/18/10 04:06
Thallium			1.42		1.46	ug/L	412		(0%-10%)		12/21/10 03:43
Tin		U	ND	U	ND	ug/L	N/A		(0%-10%)		
Zinc			19.3	J	4.18	ug/L	8.23		(0%-10%)		12/21/10 05:23
Metals Analysis-ICP											
Batch 1057735											
QC1202286461 268656002 DUP											
Titanium		J	16.1	J	16.2	ug/L	0.704 ^		(+/-25.0)	LS	12/17/10 10:09
QC1202286460 LCS											

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QC Summary

Workorder: 268656

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1057735											
Titanium	500				493	ug/L		98.5	(85%-115%)		12/16/10 18:16
QC1202286459 MB											
Titanium				U	ND	ug/L				LS	12/16/10 18:13
QC1202286462 268656002 MS											
Titanium	500	J	16.1		514	ug/L		99.6	(75%-125%)		12/17/10 10:12
QC1202286463 268656002 SDILT											
Titanium		J	3.21	U	ND	ug/L	N/A				12/17/10 10:16
Micro-biology											
Batch 1057480											
QC1202285760 268647001 DUP											
BOD, 5 DAY		Ud	ND	Ud	ND	ug/L	N/A			LXH2	12/15/10 05:53
QC1202285759 LCS											
BOD, 5 DAY	198000			J	199000	ug/L		101	(85%-115%)		12/15/10 05:53
QC1202285758 MB											
BOD, 5 DAY				U	ND	ug/L					12/15/10 05:53
QC1202285761 SEED											
BOD, 5 DAY				U	ND	ug/L					12/15/10 05:53
Nutrient Analysis											
Batch 1057534											
QC1202285942 268656002 DUP											
Nitrogen, Nitrate/Nitrite			131		130	ug/L	1.15		(0%-20%)	AXH3	12/15/10 08:26
QC1202285944 LCS											
Nitrogen, Nitrate/Nitrite	1000				988	ug/L		98.8	(90%-110%)		12/15/10 08:15
QC1202285941 MB											
Nitrogen, Nitrate/Nitrite				J	9.74	ug/L					12/15/10 08:14
QC1202285943 268656002 PS											
Nitrogen, Nitrate/Nitrite	1.00		0.0262		1.00	mg/L		97.4	(90%-110%)		12/15/10 08:27
Batch 1057536											
QC1202285946 268656002 DUP											
Phosphorus, Total as P			94.0		110	ug/L	15.7 ^		(+/-50.0)	AXH3	12/16/10 08:04
QC1202285949 LCS											
Phosphorus, Total as P	1000				1170	ug/L		117	(63%-138%)		12/16/10 08:02
QC1202285945 MB											
Phosphorus, Total as P				U	ND	ug/L					12/16/10 08:08
QC1202285947 268656002 MS											
Phosphorus, Total as P	1000		94.0		847	ug/L		75.3	(35%-148%)		12/16/10 08:04
QC1202285948 268656002 MSD											
Phosphorus, Total as P	1000		94.0		905	ug/L	6.62	81.1	(0%-24%)		12/16/10 08:05
Batch 1057538											
QC1202285951 268656002 DUP											
Nitrogen, Total Kjeldahl			1310		908	ug/L	35.9*		(0%-20%)	AXH3	12/15/10 13:49
QC1202285954 LCS											
Nitrogen, Total Kjeldahl	1000				1020	ug/L		102	(90%-110%)		12/15/10 13:48
QC1202285950 MB											
Nitrogen, Total Kjeldahl				U	ND	ug/L					12/15/10 13:47
QC1202285952 268656002 MS											
Nitrogen, Total Kjeldahl	1000		1310		1360	ug/L		5.8*	(90%-110%)		12/15/10 13:50

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QC Summary

Workorder: 268656

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Nutrient Analysis										
Batch 1057538										
QC1202285953 268656002 MSD										
Nitrogen, Total Kjeldahl	1000	1310		1500	ug/L	9.57	19.5*	(0%-20%)	AXH3	12/15/10 13:51
Batch 1057541										
QC1202285956 268656002 DUP										
Nitrogen, Ammonia		581		565	ug/L	2.79		(0%-20%)	AXH3	12/15/10 14:41
QC1202285959 LCS										
Nitrogen, Ammonia	1000			1100	ug/L		110	(90%-110%)		12/15/10 14:39
QC1202285955 MB										
Nitrogen, Ammonia			U	ND	ug/L					12/15/10 14:38
QC1202285957 268656002 MS										
Nitrogen, Ammonia	1000	581		1540	ug/L		95.9	(90%-110%)		12/15/10 14:42
QC1202285958 268656002 MSD										
Nitrogen, Ammonia	1000	581		1660	ug/L	7.68	108	(0%-15%)		12/15/10 14:43
Oil & Grease Analysis										
Batch 1058017										
QC1202287140 LCS										
Oil and Grease	40.0			35.4	mg/L		88.5	(78%-114%)	JXT1	12/16/10 10:22
QC1202287447 LCSD										
Oil and Grease	40.0			36.7	mg/L	3.61	91.8	(0%-18%)		12/16/10 10:22
QC1202287136 MB										
Oil and Grease			J	1.50	mg/L					12/16/10 10:22
QC1202287139 268714001 MS										
Oil and Grease	43.2 U	ND		38.1	mg/L		85	(78%-114%)		12/16/10 10:25
Semi-Volatile-GC/MS										
Batch 1057857										
QC1202286740 LCS										
2,4,6-Trichlorophenol	100			73.2	ug/L		73.2	(54%-108%)	BYT1	12/16/10 14:49
2,4-Dichlorophenol	100			69.0	ug/L		69	(54%-98%)		
2,4-Dimethylphenol	100			63.4	ug/L		63.4	(38%-100%)		
2,4-Dinitrophenol	100			89.7	ug/L		89.7	(28%-138%)		
2-Chlorophenol	100			63.8	ug/L		63.8	(51%-93%)		
2-Methyl-4,6-dinitrophenol	100			81.5	ug/L		81.5	(42%-126%)		
2-Nitrophenol	100			65.4	ug/L		65.4	(54%-100%)		
4-Chloro-3-methylphenol	100			79.3	ug/L		79.3	(59%-101%)		
4-Nitrophenol	100			33.2	ug/L		33.2	(15%-61%)		
Pentachlorophenol	100			76.0	ug/L		76	(41%-123%)		
Phenol	100			28.5	ug/L		28.5	(10%-52%)		
**2,4,6-Tribromophenol	100			83.7	ug/L		83.7	(21%-136%)		
**2-Fluorobiphenyl	50.0			33.6	ug/L		67.3	(32%-110%)		
**2-Fluorophenol	100			42.2	ug/L		42.2	(7%-88%)		
**Nitrobenzene-d5	50.0			41.9	ug/L		83.8	(33%-115%)		
**Phenol-d5	100			27.5	ug/L		27.5	(10%-61%)		
**p-Terphenyl-d14	50.0			37.9	ug/L		75.7	(44%-140%)		
QC1202286769 LCSD										
2,4,6-Trichlorophenol	100			76.2	ug/L	3.94	76.2	(0%-20%)		12/16/10 15:18

QC Summary

Workorder: 268656

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatile-GC/MS										
Batch 1057857										
2,4-Dichlorophenol	100			73.5	ug/L	6.40	73.5	(0%-20%)		
2,4-Dimethylphenol	100			71.8	ug/L	12.4	71.8	(0%-20%)	BYT1	12/16/10 15:18
2,4-Dinitrophenol	100			97.9	ug/L	8.76	97.9	(0%-20%)		
2-Chlorophenol	100			66.5	ug/L	4.19	66.5	(0%-20%)		
2-Methyl-4,6-dinitrophenol	100			90.7	ug/L	10.7	90.7	(0%-20%)		
2-Nitrophenol	100			70.3	ug/L	7.33	70.3	(0%-20%)		
4-Chloro-3-methylphenol	100			84.6	ug/L	6.57	84.6	(0%-27%)		
4-Nitrophenol	100			37.5	ug/L	12.4	37.5	(0%-20%)		
Pentachlorophenol	100			83.8	ug/L	9.79	83.8	(0%-20%)		
Phenol	100			30.9	ug/L	7.84	30.9	(0%-20%)		
**2,4,6-Tribromophenol	100			85.1	ug/L		85.1	(21%-136%)		
**2-Fluorobiphenyl	50.0			34.3	ug/L		68.6	(32%-110%)		
**2-Fluorophenol	100			43.6	ug/L		43.6	(7%-88%)		
**Nitrobenzene-d5	50.0			42.1	ug/L		84.2	(33%-115%)		
**Phenol-d5	100			29.5	ug/L		29.5	(10%-61%)		
**p-Terphenyl-d14	50.0			42.9	ug/L		85.8	(44%-140%)		
QC1202286739 MB										
2,4,6-Trichlorophenol			U	ND	ug/L					12/16/10 14:21
2,4-Dichlorophenol			U	ND	ug/L					
2,4-Dimethylphenol			U	ND	ug/L					
2,4-Dinitrophenol			U	ND	ug/L					
2-Chlorophenol			U	ND	ug/L					
2-Methyl-4,6-dinitrophenol			U	ND	ug/L					
2-Nitrophenol			U	ND	ug/L					
4-Chloro-3-methylphenol			U	ND	ug/L					
4-Nitrophenol			U	ND	ug/L					
Pentachlorophenol			U	ND	ug/L					
Phenol			U	ND	ug/L					
**2,4,6-Tribromophenol	100			64.3	ug/L		64.3	(21%-136%)		
**2-Fluorobiphenyl	50.0			31.3	ug/L		62.7	(32%-110%)		
**2-Fluorophenol	100			37.0	ug/L		37	(7%-88%)		
**Nitrobenzene-d5	50.0			41.2	ug/L		82.4	(33%-115%)		
**Phenol-d5	100			25.2	ug/L		25.2	(10%-61%)		
**p-Terphenyl-d14	50.0			38.6	ug/L		77.1	(44%-140%)		
Solids Analysis										
Batch 1057593										
QC1202286064 268656002 DUP										
Total Suspended Solids		11800		11800	ug/L	0.00		(0%-20%)	LYG1	12/15/10 10:53
QC1202286065 LCS										
Total Suspended Solids	500000			501000	ug/L		100	(95%-105%)		12/15/10 10:53
QC1202286063 MB										
Total Suspended Solids			U	ND	ug/L					12/15/10 10:53
Spectrometric Analysis										

QC Summary

Workorder: 268656

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Spectrometric Analysis											
Batch 1057624											
QC1202286164 268656002 DUP											
MBAS		J	43.0		54.6	ug/L	23.9 ^		(+/-50.0)	LXA1	12/15/10 17:57
QC1202286163 LCS											
MBAS	500				489	ug/L		97.9	(86%-127%)		12/15/10 17:57
QC1202286162 MB											
MBAS				U	ND	ug/L					12/15/10 17:57
QC1202286165 268656002 PS											
MBAS	1.00	J	0.043		0.870	mg/L		82.7	(49%-130%)		12/15/10 17:57
Batch 1058095											
QC1202287380 268694001 DUP											
Total Sulfide		U	ND	U	ND	ug/L	N/A			TXT1	12/16/10 14:26
QC1202287379 LCS											
Total Sulfide	400				405	ug/L		101	(86%-116%)		12/16/10 14:20
QC1202287378 MB											
Total Sulfide				U	ND	ug/L					12/16/10 14:19
QC1202287381 268694001 PS											
Total Sulfide	0.400	U	ND		0.342	mg/L		85.6	(30%-152%)		12/16/10 14:32
Batch 1060442											
QC1202293233 268656002 DUP											
COD			50000		50000	ug/L	0.00 ^		(+/-20000)	TXT1	12/27/10 17:43
QC1202293232 LCS											
COD	75000				69800	ug/L		93.1	(90%-110%)		12/27/10 17:42
QC1202293231 MB											
COD				U	ND	ug/L					12/27/10 17:36
QC1202293234 268656002 PS											
COD	50.0		50.0		96.6	mg/L		93.1	(90%-110%)		12/27/10 17:44
Titration Analysis											
Batch 1057425											
QC1202285655 268656002 DUP											
Sulfite		HU	ND	HU	ND	ug/L	N/A			TXT1	12/14/10 17:25
QC1202285654 MB											
Sulfite				U	ND	ug/L					12/14/10 17:19
Volatile-GC/MS											
Batch 1057980											
QC1202287048 268574001 DUP											
1,1,1-Trichloroethane		U	ND	U	ND	ug/L	N/A			JEB	12/16/10 07:17
1,1,2,2-Tetrachloroethane		U	ND	U	ND	ug/L	N/A				
1,1,2-Trichloroethane		U	ND	U	ND	ug/L	N/A				
1,1-Dichloroethane		U	ND	U	ND	ug/L	N/A				
1,1-Dichloroethylene		U	ND	U	ND	ug/L	N/A				
1,2,4-Trichlorobenzene		U	ND	U	ND	ug/L	N/A				
1,2-Dichlorobenzene		U	ND	U	ND	ug/L	N/A				
1,2-Dichloroethane		U	ND	U	ND	ug/L	N/A				
1,2-Dichloropropane		U	ND	U	ND	ug/L	N/A				
1,3-Dichlorobenzene		U	ND	U	ND	ug/L	N/A				
1,3-Dichloropropylene(total)				U	ND	ug/L	N/A				

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 268656

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS												
Batch 1057980												
1,4-Dichlorobenzene		U	ND	U	ND	ug/L	N/A					
2-Chloroethylvinyl ether		U	ND	U	ND	ug/L	N/A			JEB	12/16/10	07:17
Acrolein		U	ND	U	ND	ug/L	N/A					
Acrylonitrile		U	ND	U	ND	ug/L	N/A					
Benzene		U	ND	U	ND	ug/L	N/A					
Bromodichloromethane		U	ND	U	ND	ug/L	N/A					
Bromoform		U	ND	U	ND	ug/L	N/A					
Bromomethane		U	ND	U	ND	ug/L	N/A					
Carbon tetrachloride		U	ND	U	ND	ug/L	N/A					
Chlorobenzene		U	ND	U	ND	ug/L	N/A					
Chloroethane		U	ND	U	ND	ug/L	N/A					
Chloroform		J	0.850	J	0.950	ug/L	11.1 ^		(+/-5.00)			
Chloromethane		U	ND	U	ND	ug/L	N/A					
Dibromochloromethane		U	ND	U	ND	ug/L	N/A					
Dichlorodifluoromethane		U	ND	U	ND	ug/L	N/A					
Ethylbenzene		U	ND	U	ND	ug/L	N/A					
Methylene chloride		U	ND	U	ND	ug/L	N/A					
Tetrachloroethylene		U	ND	U	ND	ug/L	N/A					
Toluene		J	4.06		1.50	ug/L	92.1 ^		(+/-5.00)			
Trichloroethylene		U	ND	U	ND	ug/L	N/A					
Trichlorofluoromethane		U	ND	U	ND	ug/L	N/A					
Vinyl chloride		U	ND	U	ND	ug/L	N/A					
trans-1,2-Dichloroethylene		U	ND	U	ND	ug/L	N/A					
**1,2-Dichloroethane-d4	50.0		48.8		49.6	ug/L		99.1	(71%-130%)			
**Bromofluorobenzene	50.0		50.6		50.9	ug/L		102	(80%-120%)			
**Toluene-d8	50.0		49.3		49.5	ug/L		99.1	(80%-120%)			
QC1202287047 MB												
1,1,1-Trichloroethane				U	ND	ug/L					12/15/10	17:52
1,1,2,2-Tetrachloroethane				U	ND	ug/L						
1,1,2-Trichloroethane				U	ND	ug/L						
1,1-Dichloroethane				U	ND	ug/L						
1,1-Dichloroethylene				U	ND	ug/L						
1,2,4-Trichlorobenzene				U	ND	ug/L						
1,2-Dichlorobenzene				U	ND	ug/L						
1,2-Dichloroethane				U	ND	ug/L						
1,2-Dichloropropane				U	ND	ug/L						
1,3-Dichlorobenzene				U	ND	ug/L						
1,3-Dichloropropylene(total)				U	ND	ug/L						
1,4-Dichlorobenzene				U	ND	ug/L						
2-Chloroethylvinyl ether				U	ND	ug/L						
Acrolein				U	ND	ug/L						
Acrylonitrile				U	ND	ug/L						

QC Summary

Workorder: 268656

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1057980										
Benzene			U	ND	ug/L					
Bromodichloromethane			U	ND	ug/L				JEB	12/15/10 17:52
Bromoform			U	ND	ug/L					
Bromomethane			U	ND	ug/L					
Carbon tetrachloride			U	ND	ug/L					
Chlorobenzene			U	ND	ug/L					
Chloroethane			U	ND	ug/L					
Chloroform			U	ND	ug/L					
Chloromethane			U	ND	ug/L					
Dibromochloromethane			U	ND	ug/L					
Dichlorodifluoromethane			U	ND	ug/L					
Ethylbenzene			U	ND	ug/L					
Methylene chloride			U	ND	ug/L					
Tetrachloroethylene			U	ND	ug/L					
Toluene			U	ND	ug/L					
Trichloroethylene			U	ND	ug/L					
Trichlorofluoromethane			U	ND	ug/L					
Vinyl chloride			U	ND	ug/L					
trans-1,2-Dichloroethylene			U	ND	ug/L					
**1,2-Dichloroethane-d4	50.0			49.8	ug/L		99.5	(71%-130%)		
**Bromofluorobenzene	50.0			50.4	ug/L		101	(80%-120%)		
**Toluene-d8	50.0			49.3	ug/L		98.5	(80%-120%)		
QC1202287049 268574001 PS										
1,1,1-Trichloroethane	50.0	U	ND	45.7	ug/L		91.5	(67%-127%)		12/16/10 07:41
1,1,2,2-Tetrachloroethane	50.0	U	ND	48.4	ug/L		96.8	(59%-129%)		
1,1,2-Trichloroethane	50.0	U	ND	45.9	ug/L		91.9	(67%-121%)		
1,1-Dichloroethane	50.0	U	ND	43.3	ug/L		86.5	(70%-120%)		
1,1-Dichloroethylene	50.0	U	ND	41.4	ug/L		82.8	(61%-123%)		
1,2,4-Trichlorobenzene	50.0	U	ND	31.3	ug/L		62.7	(57%-124%)		
1,2-Dichlorobenzene	50.0	U	ND	34.5	ug/L		69.1	(69%-117%)		
1,2-Dichloroethane	50.0	U	ND	45.0	ug/L		90	(65%-126%)		
1,2-Dichloropropane	50.0	U	ND	43.9	ug/L		87.7	(70%-121%)		
1,3-Dichlorobenzene	50.0	U	ND	31.8	ug/L		63.5*	(68%-117%)		
1,4-Dichlorobenzene	50.0	U	ND	31.2	ug/L		62.4*	(68%-116%)		
2-Chloroethylvinyl ether	250	U	ND	216	ug/L		86.5	(30%-191%)		
Benzene	50.0	U	ND	41.6	ug/L		83.1	(68%-117%)		
Bromodichloromethane	50.0	U	ND	42.5	ug/L		84.9	(72%-128%)		
Bromoform	50.0	U	ND	41.9	ug/L		83.8	(66%-131%)		
Bromomethane	50.0	U	ND	39.2	ug/L		78.3	(56%-135%)		
Carbon tetrachloride	50.0	U	ND	40.4	ug/L		80.7	(66%-133%)		
Chlorobenzene	50.0	U	ND	37.0	ug/L		74	(72%-115%)		
Chloroethane	50.0	U	ND	50.8	ug/L		102	(65%-120%)		

QC Summary

Workorder: 268656

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS												
Batch 1057980												
Chloroform	50.0	J	0.850		45.6	ug/L		89.5	(69%-121%)			
Chloromethane	50.0	U	ND		42.5	ug/L		85	(46%-129%)	JEB	12/16/10	07:41
Dibromochloromethane	50.0	U	ND		41.2	ug/L		82.4	(73%-128%)			
Dichlorodifluoromethane	50.0	U	ND		34.2	ug/L		68.3	(32%-142%)			
Ethylbenzene	50.0	U	ND		34.4	ug/L		68.9	(64%-123%)			
Methylene chloride	50.0	U	ND		43.0	ug/L		86.1	(64%-125%)			
Tetrachloroethylene	50.0	U	ND		35.1	ug/L		70.3	(64%-117%)			
Toluene	50.0	J	4.06		37.7	ug/L		67.2	(63%-118%)			
Trichloroethylene	50.0	U	ND		39.7	ug/L		79.3	(61%-128%)			
Trichlorofluoromethane	50.0	U	ND		41.7	ug/L		83.4	(63%-131%)			
Vinyl chloride	50.0	U	ND		39.7	ug/L		79.5	(53%-132%)			
trans-1,2-Dichloroethylene	50.0	U	ND		41.6	ug/L		83.1	(65%-121%)			
**1,2-Dichloroethane-d4	50.0		48.8		49.7	ug/L		99.4	(71%-130%)			
**Bromofluorobenzene	50.0		50.6		50.4	ug/L		101	(80%-120%)			
**Toluene-d8	50.0		49.3		49.3	ug/L		98.7	(80%-120%)			

Notes:
The Qualifiers in this report are defined as follows:

- ** Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- A The TIC is a suspected aldol-condensation product
- B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of the sample
- E General Chemistry--Concentration of the target analyte exceeds the instrument calibration range
- E Metals--%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- E Organics--Concentration of the target analyte exceeds the instrument calibration range
- F Estimated Value
- H Analytical holding time was exceeded
- J Value is estimated
- JNX Non Calibrated Compound
- M Matrix Related Failure
- N Metals--The Matrix spike sample recovery is not within specified control limits
- N Organics--Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
- N/A RPD or %Recovery limits do not apply.
- ND Analyte concentration is not detected above the detection limit

QC Summary

Workorder: 268656

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
P	Organics--The concentrations between the primary and confirmation columns/detectors is >40% different. For HPLC, difference is also <70%
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
R	Sample results are rejected
U	Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
UJ	Compound cannot be extracted
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	QC Samples were not spiked with this compound
Z	Paint Filter Test--Particulates passed through the filter, however no free liquids were observed.
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
d	5-day BOD--The 2:1 depletion requirement was not met for this sample
h	Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

GEL Chain of Custody and Analytical Request

Page: 1 of 2
Project #: S00P06310
GEL Quote #:
COC Number [1]:
PO Number:

GEL Work Order Number: ~~208057~~ 208656

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: GEL (S00P06310) Phone #: 12/14/10
Project/Site Name: Winyah NPDES Renewal Fax #:
Address: Georgetown, SC
Collected by: Client (T—L) Send Results To: S. McLure

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Sample ID (* For composites - indicate start and stop date/time)	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Should this sample be considered: Radioactive	TSCA Regulated	Total number of containers	Oil (HA)	BOD	COD, NH3 (SA)	TOC (SA)	TSS	Br, Cl, F, Color, Sulfate, Surf	NO2/3, TP, TKN, TON (SA)	Sulfides (SH)	Sulfite (EDTA)	Metals (NI)	Comments (Note: extra sample is required for sample specific QC)
Outfall 02A Grab	12/14/10	1115	G	N	WW			2	2										pH: 7.4 Temp: 20.7 Cl2: 0.25 DPD#: A7115
Outfall 002 Grab	12/14/10	1140						11	2	1	1	1	1	1	1	1	1	1	pH: 7.8 Temp: 18.6 Cl2: 0.05 DPD#: A7115

<-- Preservative Type (6)

TAT Requested: Normal: ✓ Rush: Specify: (Subject to Surcharge) Fax Results: Yes / No

Circle Deliverable: C of A / QC Summary / Level 1 / Level 2 / Level 3 / Level 4

Remarks: *Are there any known hazards applicable to these samples? If so, please list the hazards*

Sample Collection Time Zone: Eastern, Central, Mountain, Pacific, Other ______

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1 T—L	12/14/10	~~1520~~ 1510	1 [signature]	12/14/10	15:10
2			2		
3			3		

Sample Shipping and Delivery Details

GEL PM:
Method of Shipment: Date Shipped:
Airbill #:
Airbill #:

For Lab Receiving Use Only
Custody Seal Intact? YES NO
Cooler Temp: 4 C

1.) Chain of Custody Number = Client Determined
2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal
5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).
6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

GEL Chain of Custody and Analytical Request

Page: 2 of 2
Project #: S00P06310
GEL Quote #:
COC Number [1]:
PO Number:

GEL Work Order Number:

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: GEL (S00P06310) Phone #:
Project/Site Name: Winyah NPDES Renewal Fax #:
Address: Georgetown, SC
Collected by: Client (T— —L) Send Results To: J. McLure

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Sample ID (* For composites - indicate start and stop date/time)	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Should this sample be considered: Radioactive	TSCA Regulated	Total number of containers	Total Cyanide (SH)	Total Phenols (SA)	VOC (HA)	VOC	SVOA						Comments Note: extra sample is required for sample specific QC
Outfall 002 Grab	12/14/10	1140	G	N	WW			8	1	1	2	2	2						

<-- Preservative Type (6)

TAT Requested: Normal: ✓ Rush: Specify: (Subject to Surcharge) Fax Results: Yes / No

Circle Deliverable: C of A / QC Summary / Level 1 / Level 2 / Level 3 / Level 4

Remarks: *Are there any known hazards applicable to these samples? If so, please list the hazards*

Sample Collection Time Zone
Eastern Pacific
Central Other ______
Mountain

Chain of Custody Signatures

	Relinquished By (Signed)	Date	Time		Received by (signed)	Date	Time
1	J— —L	12/14/10	1520	1	[signature]	12/14/10	15:10
2				2			
3				3			

Sample Shipping and Delivery Details

GEL PM:
Method of Shipment: Date Shipped:
Airbill #:
Airbill #:

1.) Chain of Custody Number = Client Determined
2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal
5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).
6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

For Lab Receiving Use Only
Custody Seal Intact? YES NO
Cooler Temp: 4 C

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: SOOP		SDG/AR/COC/Work Order: ~~268657~~ 121410 268656	
Received By: Shasta Whitlock		Date Received: 12/14/10	

Suspected Hazard Information	Yes	No	*If Counts > x2 area background on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		/	Maximum Counts Observed*: 20
Classified Radioactive II or III by RSO?		/	
COC/Samples marked containing PCBs?		/	
Shipped as a DOT Hazardous?		/	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		/	

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	/			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?	/			Preservation Method: 4° Ice bags Blue ice Dry ice None Other (describe)
2a	Daily check performed and passed on IR temperature gun?	/			Temperature Device Serial #: 5105 2004 Secondary Temperature Device Serial # (If Applicable):
3	Chain of custody documents included with shipment?	/			
4	Sample containers intact and sealed?	/			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?	/			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?	/			Sample ID's and containers affected:
7	Are Encore containers present?		/		(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	/			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	/			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	/			Sample ID's affected:
11	Number of containers received match number indicated on COC?	/			Sample ID's affected:
12	COC form is properly signed in relinquished/received sections?	/			
13	Carrier and tracking number.				Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials SP Date 12-14-10 Page 1 of 1

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 – (843) 556–8171 – www.gel.com

Certificate of Analysis Report
for

GEEL001 GEL Engineering, LLC

Client SDG: 268657 GEL Work Order: 268657

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a surrogate compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the detection limit.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Jake Crook.

Reviewed by ______________________

List of current GEL Certifications as of 21 December 2010

State	Certification
Arizona	AZ0668
Arkansas	88-0651
CLIA	42D0904046
California – NELAP	01151CA
Colorado	GEL
Connecticut	PH-0169
Dept. of Navy	NFESC 413
EPA Region 5	WG-15J
Florida – NELAP	E87156
Georgia	E87156 (FL/NELAP)
Georgia DW	967
Hawaii	N/A
ISO 17025	2567.01
Idaho	SC00012
Illinois – NELAP	200029
Indiana	C-SC-01
Kansas – NELAP	E-10332
Kentucky	90129
Louisiana – NELAP	03046
Maryland	270
Massachusetts	M-SC012
Nevada	SC00012
New Jersey – NELAP	SC002
New Mexico	FL NELAP E87156
New York – NELAP	11501
North Carolina	233
North Carolina DW	45709
Oklahoma	9904
Pennsylvania – NELAP	68-00485
South Carolina	10120001/10120002
Tennessee	TN 02934
Texas – NELAP	T104704235-07B-TX
U.S. Dept. of Agriculture	S-52597
Utah – NELAP	GEL
Vermont	VT87156
Virginia	00151
Washington	C1641

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : GEL Engineering, LLC
Address : P.O. Box 30712
Charleston, South Carolina 29417

Report Date: December 21, 2010

Contact: Mr. John McLure
Project: **Winyah NPDES Permit Renewal**

Client Sample ID:	Field Blank	Project:	SOOP06310C
Sample ID:	268657001	Client ID:	GEEL001
Matrix:	Water		
Collect Date:	14-DEC-10 11:50		
Receive Date:	14-DEC-10		
Collector:	Client		

Parameter	Qualifier	Result	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA										
EPA 1631 Low Level Mercury Analysis "As Received"										
Mercury	U	<0.5	0.500	ng/L	1	ETL	12/20/10	0657	1057472	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 1631E	

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : GEL Engineering, LLC
Address : P.O. Box 30712
Charleston, South Carolina 29417

Report Date: December 21, 2010

Contact: Mr. John McLure
Project: **Winyah NPDES Permit Renewal**

Client Sample ID:	Outfall 002	Project:	SOOP06310C
Sample ID:	268657002	Client ID:	GEEL001
Matrix:	Waste Water		
Collect Date:	14-DEC-10 11:55		
Receive Date:	14-DEC-10		
Collector:	Client		

Parameter	Qualifier	Result	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA										
EPA 1631 Low Level Mercury Analysis "As Received"										
Mercury		8.11	0.500	ng/L	1	ETL	12/20/10	0711	1057472	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 1631E	

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : GEL Engineering, LLC
Address : P.O. Box 30712
Charleston, South Carolina 29417

Report Date: December 21, 2010

Contact: Mr. John McLure
Project: **Winyah NPDES Permit Renewal**

Client Sample ID:	Outfall 002 Dup	Project:	SOOP06310C
Sample ID:	268657003	Client ID:	GEEL001
Matrix:	Waste Water		
Collect Date:	14-DEC-10 12:00		
Receive Date:	14-DEC-10		
Collector:	Client		

Parameter	Qualifier	Result	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA										
EPA 1631 Low Level Mercury Analysis "As Received"										
Mercury		8.26	0.500	ng/L	1	ETL	12/20/10	0718	1057472	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 1631E	

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : GEL Engineering, LLC
Address : P.O. Box 30712
Charleston, South Carolina 29417

Report Date: December 21, 2010

Contact: Mr. John McLure
Project: **Winyah NPDES Permit Renewal**

Client Sample ID:	Trip Blank	Project:	SOOP06310C
Sample ID:	268657004	Client ID:	GEEL001
Matrix:	Water		
Collect Date:	14-DEC-10 12:05		
Receive Date:	14-DEC-10		
Collector:	Client		

Parameter	Qualifier	Result	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA										
EPA 1631 Low Level Mercury Analysis "As Received"										
Mercury	U	<0.5	0.500	ng/L	1	ETL	12/20/10	0650	1057472	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 1631E	

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: December 21, 2010
Page 1 of 2

GEL Engineering, LLC
P.O. Box 30712
Charleston, South Carolina

Contact: **Mr. John McLure**

Workorder: **268657**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Metals Analysis-Mercury										
Batch 1057472										
QC1202285730 LCS										
Mercury	5.00			5.35	ng/L		107	(77%-123%)	ETL	12/20/10 06:43
QC1202285729 MB										
Mercury			U	<0.2	ng/L					12/20/10 06:36
QC1202285731 268657002 MS										
Mercury	40.0	8.11		50.1	ng/L		105	(71%-125%)		12/20/10 07:25
QC1202285732 268657002 MSD										
Mercury	40.0	8.11		49.3	ng/L	1.54	103	(0%-24%)		12/20/10 07:32

Notes:
The Qualifiers in this report are defined as follows:

- ** Analyte is a surrogate compound
- < Result is less than value reported
- \> Result is greater than value reported
- A The TIC is a suspected aldol-condensation product
- B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of the sample
- E Metals--%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- F Estimated Value
- H Analytical holding time was exceeded
- J Value is estimated
- M Matrix Related Failure
- N Metals--The Matrix spike sample recovery is not within specified control limits
- N/A RPD or %Recovery limits do not apply.
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
- R Sample results are rejected
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y QC Samples were not spiked with this compound
- ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
- h Preparation or preservation holding time was exceeded

QC Summary

Workorder: 268657

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

GEL Chain of Custody and Analytical Request

Page: ______ of ______
Project #: SOOPOL310
GEL Quote #:
COC Number [1]:
PO Number:

GEL Work Order Number: 268657

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: GEL (SOOPOL310) Phone #:
Project/Site Name: Winyah NPDES Renewal Fax #:
Address: Georgetown, SC
Collected by: Client (V-Nall) Send Results To: S. McLure

Sample Analysis Requested [5] (Fill in the number of containers for each test)

<-- Preservative Type (6)

Sample ID * For composites - indicate start and stop date/time	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Should this sample be considered: Radioactive	TSCA Regulated	Total number of containers	LLHg	Comments Note: extra sample is required for sample specific QC
										Bottle ID:
Field Blank	12/14/10	1150	FB	N	WW			1	1	35013
Outfall 002	|	1155	G	|	|			1	1	35022
Outfall 002 Dup	|	1200	G	|	|			1	1	35020
Trip Blank	–	1205	TB	–	–			1	1	34163

PRESERVED
Date: 12/15/10
Time: 1018
Analyst: [signature]

TAT Requested: Normal: ✓ Rush: Specify: (Subject to Surcharge) Fax Results: Yes / No

Circle Deliverable: C of A / QC Summary / Level 1 / Level 2 / Level 3 / Level 4

Remarks: *Are there any known hazards applicable to these samples? If so, please list the hazards*

Sample Collection Time Zone
Eastern Pacific
Central Other ______
Mountain

Chain of Custody Signatures

	Relinquished By (Signed)	Date	Time		Received by (signed)	Date	Time
1	[signature]	12/14/10	1570	1	[signature]	12/14/10	1510
2				2	[signature]	12/15/10	0815
3				3			

Sample Shipping and Delivery Details

GEL PM:
Method of Shipment: Date Shipped:
Airbill #:
Airbill #:

1.) Chain of Custody Number = Client Determined
2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal
5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).
6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

For Lab Receiving Use Only
Custody Seal Intact? YES NONE
Cooler Temp: 19 C

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: Seep	SDG/AR/COC/Work Order: 248657
Received By: Bh	Date Received: 12/15/10 0415

Suspected Hazard Information	Yes		No	*If Counts > x2 area background on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?			✓	Maximum Counts Observed*: 20
Classified Radioactive II or III by RSO?			✓	
COC/Samples marked containing PCBs?			✓	
Shipped as a DOT Hazardous?			✓	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?			✓	

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?		✓		Preservation Method: Ice bags Blue ice Dry ice None Other (describe) 19C
2a	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: 41502132 Secondary Temperature Device Serial # (If Applicable):
3	Chain of custody documents included with shipment?	✓			
4	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?	✓			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?		✓		Sample ID's and containers affected:
7	Are Encore containers present?			✓	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Sample ID's affected:
11	Number of containers received match number indicated on COC?	✓			Sample ID's affected:
12	COC form is properly signed in relinquished/received sections?	✓			
13	Carrier and tracking number.	✓			Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials NNC Date 12/15/10 Page 1 of 1

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

General Engineering Laboratories, LLC
PO Box 30712
Charleston, SC 29417
Attention: Denni Grunstra

Project Name: **SOOP06310**

Lot Number: **LL16003**
Date Completed: **12/16/2010**

Kelly M. Maberry
Project Manager

This report shall not be reproduced, except in its entirety, without the written approval of Shealy Environmental Services, Inc.

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.

Case Narrative

General Engineering Laboratories, LLC

Lot Number: LL16003

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Sample Summary
General Engineering Laboratories, LLC
Lot Number: LL16003

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	Outfall 002 Grab	Aqueous	12/14/2010 1140	12/16/2010

(1 sample)

Inorganic non-metals

Client: **General Engineering Laboratories, LLC**	Laboratory ID: **LL16003-001**
Description: **Outfall 002 Grab**	Matrix: **Aqueous**
Date Sampled: **12/14/2010 1140**	
Date Received: **12/16/2010**	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		(ADMI Color a) SM	1	12/16/2010 1005	HBB		
1		(ADMI Color a) SM	1	12/16/2010 1005	HBB		

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
ADMI Color at Original pH		SM 2120E	ND		25	color units	1
ADMI Color at pH 7.6		SM 2120E (7.6)	ND		25	color units	1

PQL = Practical quantitation limit
ND = Not detected at or above the PQL
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
B = Detected in the method blank
J = Estimated result < PQL and ≥ MDL
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
N = Recovery is out of criteria
H = Out of holding time

Inorganics Non-metals Quality Control Summary

Method Blank Sample Evaluation				
Parameter	Result (SU)	Control Limit (SU)	Analysis Date	Flag
ADMI Color	5	25	12/16/10	

Sample Duplicate Evaluation					
Sample ID:		Analysis Date:			
Parameter	Sample Result (SU)	Duplicate Sample Result (SU)	RPD	RPD Control Limit	Flag
ADMI Color	15.00	16.00	6	20	

Page: 1 of 1
Project #:
GEL Quote #:
COC Number [1]:
PO Number:

GEL Chain of Custody and Analytical Request

GEL Work Order Number:

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

LL16663
2686560

Client Name: GEL Laboratories, LLC | Phone #: 843-769-7390
Project/Site Name: SOOP01310 | Fax #:
Address:
Collected by: | Send Results To: team.crook@gel.com

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Sample ID * For composites - indicate start and stop date/time	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Should this sample be considered: Radioactive	TSCA Regulated	Total number of containers	color smalarf									< -- Preservative Type (6) Comments Note: extra sample is required for sample specific QC
Outfall 002 Grab	12/14/10	1140	G	N	WW			1	✓									

TAT Requested: Normal ✓ Rush: Specify: (Subject to Surcharge) Fax Results: Yes / No
Circle Deliverable: C of A / QC Summary / Level 1 / Level 2 / Level 3 / Level 4
Remarks: *Are there any known hazards applicable to these samples? If so, please list the hazards*
Sample Collection Time Zone: Eastern, Pacific, Central, Other ______, Mountain

Chain of Custody Signatures

	Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1	Buddy Daly	12-15-10	1535	1		
2				2 [signature]		
3	FeDex	12-16-10	0955	3 [signature]	12/16/10	0955

Sample Shipping and Delivery Details

GEL PM:
Method of Shipment: | Date Shipped:
Airbill #:
Airbill #:

For Lab Receiving Use Only
Custody Seal Intact? YES NO
Cooler Temp: °C

1.) Chain of Custody Number = Client Determined
2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal
5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).
6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

Sample Receipt Checklist (SRC)

Client: GVL   Cooler Inspected by/date: ea 12/16/10   Lot #: LL16103

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Airborne Exp ☐ Other

Yes ☐	No ☑	NA ☐	1. Were custody seals present on the cooler?
Yes ☐	No ☐	NA ☑	2. If custody seals were present, were they intact and unbroken?

Cooler ID/temperature upon receipt 1.8 °C ___/___ °C ___/___ °C ___/___ °C
___/___ °C ___/___ °C ___/___ °C ___/___ °C

Method: ☐ Temperature Blank ☑ Against Bottles
Method of coolant: ☑ Wet Ice ☐ Blue Ice ☐ Dry Ice ☐ None

If response is No (or Yes for 14, 15, 16), an explanation/resolution must be provided.

Yes ☐	No ☐	NA ☑	3. If temperature of any cooler exceeded 6.0°C, was Project Manager notified? PM notified by SRC, phone, note (circle one), other: . (For coolers received via commercial courier, PMs are to be notified immediately.)
Yes ☐	No ☑	NA ☐	4. Is the commercial courier's packing slip attached to this form?
Yes ☐	No ☑	NA ☐	5. Were proper custody procedures (relinquished/received) followed?
Yes ☑	No ☐	NA ☐	6. Were sample IDs listed?
Yes ☑	No ☐	NA ☐	7. Was collection date & time listed?
Yes ☑	No ☐	NA ☐	8. Were tests to be performed listed on the COC or was quote # provided?
Yes ☑	No ☐	NA ☐	9. Did all samples arrive in the proper containers for each test?
Yes ☑	No ☐	NA ☐	10. Did all container label information (ID, date, time) agree with COC?
Yes ☑	No ☐	NA ☐	11. Did all containers arrive in good condition (unbroken, lids on, etc.)?
Yes ☑	No ☐	NA ☐	12. Was adequate sample volume available?
Yes ☐	No ☑	NA ☐	13. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
Yes ☐	No ☑	NA ☐	14. Were any samples containers missing?
Yes ☐	No ☑	NA ☐	15. Were there any excess samples not listed on COC?
Yes ☐	No ☐	NA ☑	16. Were bubbles present >"pea-size" (¼" or 6mm in diameter) in any VOA vials?
Yes ☐	No ☐	NA ☑	17. Were all metals/O&G/HEM/nutrient samples received at a pH of <2?
Yes ☐	No ☐	NA ☑	18. Were all cyanide and/or sulfide samples received at a pH >12?
Yes ☐	No ☐	NA ☑	19. Were all applicable NH3/TKN/cyanide/phenol/BNA/pest/PCB/herb (<0.2mg/L) and toxicity (<0.1mg/L) samples free of residual chlorine?
Yes ☐	No ☐	NA ☐	20. Were collection temperatures documented on the COC for NC samples?

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) ____________ were received incorrectly preserved and were adjusted accordingly in sample receiving with ____________ (H_2SO_4, HNO_3, HCl, NaOH) with the SR # (number)

Sample(s) ____________ were received with bubbles >6 mm in diameter.

Sample(s) ____________ were received with TRC >0.2 mg/L for NH3/TKN/cyanide/BNA/pest/PCB/herb.

Toxicity sample(s) ____________ were received with TRC >0.1 mg/L and were analyzed by method 330.5.

Corrective Action taken, if necessary:

Was client notified: Yes ☐ No ☐   Did client respond: Yes ☐ No ☐
SESI employee: ____________   Date of response: ____________
Comments:

TRIDENT LABS SERVICES, INC.
ANALYTICAL LABORATORY
Soil, Water, Wastewater & Industrial Chemical Analysis
9104 Canvas Lane △ Ladson, South Carolina 29456
Telephone (843) 871-4999 △ Fax (843) 875-2266
e-mail: tls@tridentlabs.com

REPORT OF ANALYSIS

GEL Laboratories LLC
2040 Savage Rd.
Charleston, SC 29407
Attn: Julie Robinson

Report Date: 12/15/10

Sampled: 12/14/10 11:40
Collected By: CLIENT
Sample Matrix: WW
1 of 1

Received: 12/14/10 13:20
Received By: MR

Sample Id: 0103686
Sample Number(s): 133213
Project Name: SoOP06310
Location: Outfall 002 Grab

ANALYSIS	METHOD	RESULT	UNITS	DATE/TIME	ANALYST
Sample Type: Grab					
Fecal Coliform (MF)	SM 9222D	10 EST	CFU/100ml	12/14/10 13:50	LJH

LABORATORY I.D. NO. 10122
REPORT APPROVED BY:

Trident Labs, Inc. Chain of Custody Discrepancy Report

Chain of Custody # 0103686

Discrepancies Noted

_____ Incomplete collection Information-Circle the dicrepancies

Date Time Analysis Required Matrix Location

_____ No collector's signature

_____ Incorrect preservatives for ________________

_____ Incorrect sample container for ________________

_____ No sample provided for ________________

_____ Broken containers for ________________

_____ Incorrect transport temperature

_____ No Chain of Custody provided with samples

_____ pH checked at Log In out of limit. pH adjusted to ________

_____ Other ________________

Corrective Action

Client Notified By ________

Date ________

Time ________

Contact ________

Corrective Action Taken

_____ No discrepancies noted

GEL Chain of Custody and Analytical Request

Page: ______ of ______
Project #: S00P06310
GEL Quote #:
COC Number [1]:
PO Number:

GEL Work Order Number:

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: GEL (S00P06310) Phone #:
Project/Site Name: Winyah NPDES Renewal Fax #:
Address: Georgetown, SC
Collected by: Client (T. Mal) Send Results To: J. McLane

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Sample ID * For composites - indicate start and stop date/time	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Should this sample be considered: Radioactive	TSCA Regulated	Total number of containers	Fecal Coliform (ST)										<-- Preservative Type (6) / Comments Note: extra sample is required for sample specific QC
Outfall 002 Grab	12/14/10	1140	G	N	WW			1	1										133213

TAT Requested: Normal: ✓ Rush: Specify: (Subject to Surcharge) Fax Results: Yes / No Circle Deliverable: C of A / QC Summary / Level 1 / Level 2 / Level 3 / Level 4

Remarks: *Are there any known hazards applicable to these samples? If so, please list the hazards*

Sample Collection Time Zone
Eastern Pacific
Central Other ______
Mountain

Chain of Custody Signatures

	Relinquished By (Signed)	Date	Time		Received by (signed)	Date	Time
1	[signature]	12/14/10	1320	1	[signature]	12-14	1320
2				2			
3				3			

Sample Shipping and Delivery Details

GEL PM:
Method of Shipment: Date Shipped:
Airbill #:
Airbill #:

1.) Chain of Custody Number = Client Determined
2.) QC Codes: N = Normal Sample. TB = Trip Blank. FD = Field Duplicate. EB = Equipment Blank. MS = Matrix Spike Sample. MSD = Matrix Spike Duplicate Sample. G = Grab. C = Composite
3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal
5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).
6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate. If no preservative is added = leave field blank

For Lab Receiving Use Only
Custody Seal Intact? *YES* *NO*
Cooler Temp: 3 *C* ice

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT