



Rhonda J. Alexander
Manager
Regulatory Forecasting & Pricing

One Energy Place
Pensacola, FL 32520-0780
850 444 6743 tel
850 444 6026 fax
rjalexad@southernco.com

April 2, 2018

Ms. Carlotta Stauffer, Commission Clerk
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, FL 32399-0850

Re: Docket No. 20180007-EI

Dear Ms. Stauffer:

Attached for official filing in the above-referenced docket is Gulf Power Company's Environmental Compliance Program Update.

Sincerely,

A handwritten signature in blue ink that reads "Rhonda J. Alexander".

Rhonda J. Alexander
Regulatory, Forecasting and Pricing Manager

md

Attachments

cc : Gulf Power Company
Jeffrey A. Stone, Esq., General Counsel
Beggs & Lane
Russell Badders, Esq.

**GULF POWER COMPANY
ENVIRONMENTAL COMPLIANCE
PROGRAM UPDATE**

April 2, 2018



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I. EXECUTIVE SUMMARY

Since the Clean Air Act Amendments (CAAA) were passed by Congress in 1990, Gulf Power Company (Gulf Power or Gulf) has reviewed and updated its environmental compliance planning as needed on an on-going basis. The goal of this process is to identify reasonable, cost-effective compliance strategies that will minimize the impact on Gulf Power's customers while achieving environmental objectives and assuring compliance with all environmental requirements.

Gulf's original environmental Compliance Plan was filed on March 29, 2007. That document: (a) addressed the requirements of the Clean Air Interstate Rule (CAIR), Clean Air Mercury Rule (CAMR), and the Clean Air Visibility Rule (CAVR); (b) reviewed the decision process for assuring compliance at Gulf Power; and (c) provided cost estimates for incorporating these requirements at Gulf Power. The document reviewed the specific issues, timing, alternatives, process, and costs necessary for compliance with the new federal rules and the corresponding implementation programs developed by the Florida Department of Environmental Protection (FDEP) and the Mississippi Department of Environmental Quality (MDEQ). Gulf's original Compliance Plan was submitted with the Company's petition for review and approval of the plan and acceptance of its components for cost recovery through the Environmental Cost Recovery Clause (ECRC).

On June 22, 2007, the Office of Public Counsel (OPC), the Florida Industrial Power Users' Group (FIPUG) and Gulf filed a petition for approval of a stipulation regarding the substantive provisions of Gulf's Compliance Plan. That stipulation identified 10 specific components of Gulf's Program that were entering the implementation phase as being reasonable and prudent and set forth a process for review, in connection with subsequent components of the Program. On August 14, 2007, the Florida Public Service Commission (Commission or FPSC) voted to approve the stipulation with the proviso that Gulf provide an annual status report regarding cost-effectiveness and prudence of the subsequent phases in its program into which the Company is moving. The Commission's approval of the stipulation is memorialized in Order No. PSC-07-0721-S-EI. On April 1, 2010, Gulf filed its second supplemental petition to update its Compliance Plan to include the Plant Daniel SCRs, which were ultimately approved for cost recovery through the ECRC in FPSC Order No. PSC-10-0683-FOF-EI.

During April of each year from 2010 through 2016, Gulf filed annual Environmental Compliance Program Updates that addressed Gulf's ongoing air quality compliance projects. Each of the projects addressed in Gulf's Air Quality Compliance Plan (including the updates since 2007) have either been installed or have been eliminated from consideration.

The 2018 Compliance Plan is a continuation of Gulf providing the Commission an update on known future environmental compliance activities. As shown in Gulf's 2018 Ten Year Site Plan on Schedule 1, Plant Crist Units 4 & 5 are the closest of Gulf's generating fleet to reaching the expected retirement dates for depreciation purposes. Therefore, this update

places particular emphasis on Plant Crist Units 4 & 5. Since Plant Crist Units 4 & 5 share many common facilities with Plant Crist Units 6 & 7, Gulf has also included analyses for Crist Units 4-7. The 2018 Compliance Plan provides an update on potential future Effluent Limitations Guidelines (ELG), Coal Combustion Residuals (CCR), and 316(b) environmental requirements for these units, and it discusses preliminary analysis of continuing to operate these units in light of those costs, as well as their replacement with other generating options. The analysis provided in the 2018 Compliance Plan is preliminary, and control requirements and dates were based on the environmental compliance requirements of currently final, proposed, and/or expected environmental rules and regulations, along with permit requirements. As preliminary or proposed rules are finalized and new permits issued, some of these requirements, dates, and costs may change; however, those included in the analysis are based on the most recent knowledge and expectations.

Consistent with Gulf's previous practice, with regard to environmental compliance activities, Gulf is providing this preliminary information to the Commission to allow sufficient time for the Commission to review Gulf's environmental compliance activities prior to Gulf committing significant resources. Gulf is not requesting recovery of any new ECRC projects or programs at this time. Ongoing O&M and capital retrofit cost projections for Gulf's previously-approved ECRC projects will be addressed in Gulf's annual ECRC projection filings. The remaining potential future environmental compliance activities discussed in this document will be addressed in future periods as more information is available. Once future and pending regulations and any associated permit requirements are finalized, Gulf will update the cost projections and request ECRC recovery of new projects or programs.

II. REGULATORY AND LEGISLATIVE UPDATE

This section provides a general regulatory and legislative update and review of future and/or pending regulations and permit requirements that may impact Gulf's generating units.

A. EFFLUENT LIMITATIONS GUIDELINES

In 2015, the EPA finalized revisions to the steam electric effluent limitations guidelines (ELG) rule, which imposes stringent technology-based requirements for certain waste streams from steam electric generating units. The revised technology-based limits and compliance dates will likely require extensive modifications to existing ash and wastewater management systems or the installation and operations of new ash and wastewater management systems. Compliance applicability dates range from November 1, 2018, to December 31, 2023, with state environmental agencies incorporating specific applicability dates in the National Pollutant Discharge Elimination System (NPDES) permitting process based on information provided for each waste stream. The EPA has committed to a new rulemaking that could potentially revise the 2015 limitations and applicability dates of the bottom ash transport water and flue gas desulfurization (FGD) wastewater requirements. The EPA plans to propose rule revisions in 2019 and to finalize the rulemaking in 2020.

B. COAL COMBUSTION RESIDUALS (CCR) REGULATION

The CCR rule, which became effective in October 2015, regulates the disposal of CCR, including coal ash and gypsum, as non-hazardous solid waste in landfills and surface impoundments (CCR units) at active generating power plants. The CCR rule requires CCR units to be evaluated against a set of performance criteria and potentially closed if minimum criteria are not met. Closure of existing CCR units will require installation of equipment and infrastructure to manage CCR in accordance with the rule. The EPA has announced plans to reconsider certain portions of the CCR rule by no later than December 2019, which could result in changes to deadlines and corrective action requirements. The EPA's reconsideration of the CCR rule is due, in part, to a legislative development that impacts the potential oversight role of state agencies. Under the Water Infrastructure Improvements for the Nation Act, which became law in 2016, states are allowed to establish permit programs for implementing the CCR rule.

The Company has posted documents to its public website as required by the CCR rule; however, the ultimate impact of the CCR rule will depend on the results of initial and ongoing minimum criteria assessments and the implementation of state or federal permit programs. As further analysis is performed, including evaluation of the expected method of compliance, refinement of assumptions underlying the cost estimates, such as the quantities of CCR at each site and the determination of timing with respect to compliance, the Company expects to continue to periodically update cost estimates and schedules for the CCR compliance activities.

C. 316(B) INTAKE STRUCTURE REGULATION

The EPA published a final 316(b) rule in 2014 that establishes standards for reducing effects on fish and other aquatic life caused by cooling water intake structures at existing power plants and manufacturing facilities. The rule also addresses cooling water intake structures for new units at existing facilities. Compliance with the final rule may require changes to existing cooling water intake structures at certain Gulf generating facilities; however, the ultimate effect of this final rule will depend on the results of additional studies and implementation of the rule by regulators based on site-specific factors. NPDES industrial wastewater permits issued after July 14, 2018, must include conditions to implement and ensure compliance with the standards and measures required by the rule, unless the permittee has requested and has been granted an alternative schedule for compliance.

D. NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)

In 2010, the EPA revised the NAAQS for sulfur dioxide (SO₂), establishing a new one-hour standard, and is completing designations in multiple phases. The EPA has issued several rounds of area designations, and no areas in the vicinity of Company-owned SO₂ sources have been designated nonattainment under the 2010 one-hour SO₂ NAAQS. However, final SO₂ one-hour designations for certain areas are still pending and, if other areas are designated as nonattainment in the future, increased compliance costs could result.

The EPA regulates fine particulate matter concentrations on an annual and 24-hour average basis. All areas within the Company's service area have achieved attainment with the 1997 and 2006 particulate matter NAAQS. On January 15, 2013, the EPA published a final rule that increases the stringency of the annual fine particulate matter standard. The new standard could result in the designation of new nonattainment areas within the Company's service area.

In 2008, the EPA adopted a revised eight-hour ozone NAAQS and published its final area designations in 2012. All areas within the Company's geographic service area have achieved attainment of the 2008 standard. In October 2015, the EPA published a more stringent eight-hour ozone NAAQS. The EPA plans to complete designations for this rule no later than April 30, 2018. No areas in the Company's geographic service area have been or are anticipated to be designated non-attainment under the 2015 ozone NAAQS.

In 2011, the EPA finalized the Cross-State Air Pollution Rule (CSAPR) and its NO_x annual, NO_x seasonal, and SO₂ annual programs to replace CAIR. In October 2016, the EPA published a final rule that updates the CSAPR ozone-season NO_x program, which removed Florida from all CSAPR programs, left the Georgia seasonal NO_x budget unchanged, and established more stringent NO_x emissions budgets in Mississippi. Georgia remains in the CSAPR annual SO₂ and NO_x programs. The outcome of ongoing CSAPR litigation is

unknown at this time and could have an impact on the State of Mississippi's allowance allocations under the CSAPR seasonal NO_x program.

E. REGIONAL HAZE RULE

The Regional Haze Rule (formerly called the Clean Air Visibility Rule) was finalized in 2005, with a goal of restoring natural visibility conditions in certain areas (primarily national parks and wilderness areas) by 2064.

On January 10, 2017, EPA published a final rule to review and amend the Regional Haze Rule and associated State Implementation Plan (SIP) requirements. The rule extended the deadline for the next SIP submittal from July 31, 2018, to July 31, 2021. Subsequently, on January 17, 2018, EPA announced its decision to revisit certain aspects of the rule. State implementation of the reasonable progress requirements defined in this final rule could require further reductions of SO₂ or NO_x emissions.

F. EPA'S EXCESS EMISSION STATE IMPLEMENTATION PLANS

In 2015, the EPA published a final rule requiring certain states (including Florida, Georgia, and Mississippi) to revise or remove the provisions of their SIPs regulating excess emissions at industrial facilities, including electric generating facilities, during periods of startup, shut-down, or malfunction (SSM). The EPA has not yet responded to the SIP revisions proposed by the states of Florida, Georgia, and Mississippi.

G. CLEAN POWER PLAN AND GLOBAL CLIMATE UPDATE

In 2015, the EPA published final rules limiting CO₂ emissions from new, modified, and reconstructed fossil fuel-fired electric generating units and guidelines for states to develop plans to meet EPA-mandated CO₂ emission performance standards for existing units (known as the Clean Power Plan or CPP). In February 2016, the U.S. Supreme Court granted a stay of the CPP, which will remain in effect through the resolution of litigation in the U.S. Court of Appeals for the District of Columbia challenging the legality of the CPP and any review by the U.S. Supreme Court. On March 28, 2017, the U.S. President signed an executive order directing agencies to review actions that potentially burden the development or use of domestically produced energy resources, including review of the CPP and other CO₂ emissions rules. On October 10, 2017, the EPA published a proposed rule to repeal the CPP and, on December 28, 2017, published an advanced notice of proposed rulemaking regarding a CPP replacement rule. The ultimate implications of the CPP will depend on the outcome of litigation and current rulemaking.

In 2015, parties to the United Nations Framework Convention on Climate Change, including the United States, adopted the Paris Agreement, which established a non-binding universal framework for addressing greenhouse gas (GHG) emissions based on nationally determined contributions. On June 1, 2017, the U.S. President announced that the United States would

withdraw from the Paris Agreement and begin renegotiating its terms. The ultimate impact of this agreement or any renegotiated agreement depends on its implementation by participating countries.

III. GULF'S COMPLIANCE PROGRAM (Plant-by-Plant Updates)

Gulf owns and operates generating facilities at four sites in Northwest Florida (Plants Crist, Smith, Pea Ridge, and Perdido). Gulf also owns a 50 percent undivided ownership interest in Daniel Unit 1 and Unit 2 and a proportional undivided ownership interest in the associated common facilities at Mississippi Power Company's Daniel Electric Generating Facility. Gulf has a 25 percent undivided ownership share in Scherer Unit 3 and a proportional undivided ownership interest in the associated common facilities at the Scherer Electric Generating Facility located near Macon, Georgia. Scherer Unit 3 is operated for Gulf by Georgia Power Company, the unit's other co-owner. This fleet of generating units consists of seven fossil steam units, one combined cycle (CC) unit, one combustion turbine (CT), three small natural gas-fired combustion turbines, and two internal combustion engine units fueled by landfill gas. The nameplate generating capacity of Gulf's generating fleet is 2,585 megawatts (MW).

A. PLANT CRIST

Plant Crist is a four unit, coal and gas-fired electric generating facility located just north of Pensacola, Florida. Three older natural gas/oil-fired units at the site have been retired. Units 4 and 5 each have a nameplate rating of 93.75 MW, and Units 6 and 7 have nameplate ratings of 370 MW and 578 MW, respectively.

As shown in Gulf's 2018 Ten Year Site Plan, Schedule 1, Plant Crist Units 4 & 5 are the closest of Gulf's generating fleet to reaching the expected retirement dates for depreciation purposes. While a final decision on the actual retirement dates of Plant Crist Units 4 & 5 has not been made, Gulf is considering their potential future retirement in decisions regarding future environmental costs for those units. Therefore, this update has particular emphasis on Plant Crist Units 4 & 5. Since Plant Crist Units 4 & 5 share many common facilities with Plant Crist Units 6 & 7, Gulf has included analyses for Crist Units 4-7. The 2018 Compliance Plan identifies potential future environmental compliance requirements for these units and discusses preliminary analysis of continuing to operate those units in light of those costs as compared to other generating options.

1. Plant Crist Generation Study

a) Economic Analysis

Gulf Power has conducted economic evaluations for Plant Crist. The Company evaluated the costs and benefits of continuing to operate Plant Crist relative to retiring the plant and replacing with various generating sources or converting the plant to natural gas. The evaluations included the facility as a whole and each of the Crist units individually. These economic evaluations consider a suite of currently final, proposed, and/or expected environmental regulations and their associated compliance requirements.

Section III.A.2 discusses the evaluations on an entire facility and individual unit basis. Even though applicable options are unit specific, the economic evaluation for each option is structured similarly.

Generally, the economic evaluation includes production cost impacts and all fixed costs for operating Plant Crist relative to various replacement generating sources. The fixed costs include:

- Revenue requirements for incremental capital additions for environmental controls
- Revenue requirements for maintenance capital and fixed operating costs
- Firm natural gas transportation costs, if any
- Revenue requirements associated with transmission projects required to retire units
- Revenue requirements associated with building replacement generation

System production cost impacts are estimated using the Southern electric system's marginal replacement energy costs. Marginal replacement costs are generated with the Aurora® model. The marginal replacement energy costs are then used in the Southern Company GenVal model to dispatch the existing unit, considering its marginal fuel cost, emission allowance price, and variable operation and maintenance costs (including any additional environmental variable operating costs). Similarly, the GenVal model is used to dispatch the replacement units for each scenario. The production cost impact is represented as the difference in the dispatch value of the existing unit and the replacement unit.

The system production cost impacts are evaluated across a range of integrated scenarios to capture variations in the operating environments that would affect the relative costs of the options. These scenarios were developed around uncertainty in fuel prices and CO₂ policy. Fuel prices (primarily natural gas driven) included low, moderate, and high scenarios, and CO₂ penalties range from \$0 to \$20 per metric tonne (escalating above inflation).

The Plant Crist economic evaluation assessed the continued operation for a 30-year period as compared to either converting to natural gas or retiring and replacing the entire facility or each of the units individually. This evaluation required feasible retirement or conversion dates to be selected as inputs for the analysis. It is important to note that these selected retirement or conversion dates are not representative of planned retirement or conversion dates for Plant Crist. The dates were selected solely to perform an appropriate economic evaluation of the on-going operations of Plant Crist. Multiple factors were considered in the selection of these dates, including transmission requirements, firm natural gas transportation requirements, environmental restrictions, and construction timelines. For all Plant Crist retirement dates, the transmission planning analysis was the primary driver in selecting the respective dates for retiring the entire facility or each of the units individually. For Plant Crist natural gas conversion dates, the gas pipeline infrastructure was the primary driver in selecting the dates for conversion to natural gas.

b) *Transmission Planning*

An analysis was performed by Gulf Power's transmission planning group to assess the potential impacts to the transmission system if individual or collective generating units at Plant Crist were to be retired. The analysis used to determine the transmission system impacts, as well as the associated transmission projects and estimated costs, consisted of power flow and dynamic analyses developed with transmission planning models for the years 2019 through 2027. These types of analyses represent the typical primary drivers of transmission expansion for Gulf Power, although operational considerations can also result in additional transmission requirements. The 2017 transmission planning models were used for this analysis, which were the latest models available at the time the analysis was performed. As a result, the generation assumptions of neighboring operating companies within Southern Company, as well as those of neighboring utilities, reflect the latest known forecast for such generation at that time and are subject to change.

Potential operational, thermal, steady-state voltage, and dynamic impacts on the transmission system associated with the simulated retirements of Crist 4, Crist 5, Crist 6, Crist 7, or Crist 4 through 7 were assessed. It was identified that, at a minimum, several currently planned transmission projects across the Southern Company system should first be completed prior to retiring generation units at Crist, either individually or collectively. Until these transmission projects are placed in-service, each of the Crist generating units are expected to continue to contribute towards system reliability. Collectively, the earliest that all of these currently-planned transmission projects could be completed is [REDACTED]. When evaluated on an individual basis, the retirements of Crist 4, 5, or 6 did not identify any incremental transmission projects beyond those currently planned. Consequently, the individual analysis for these units used a retirement date of year [REDACTED] as an input. The retirement of Crist 7 identified the need for at least [REDACTED] additional transmission projects (beyond those currently planned) at a cost of approximately [REDACTED]. Similarly, the retirement of Crist 4 through 7 identified the need for at least [REDACTED] additional transmission projects (beyond those currently planned) at a cost of approximately [REDACTED]. For the Crist 7 and Crist 4 through 7 analyses, the collective incremental transmission projects are estimated to have a [REDACTED] lead time, and therefore, a retirement date of year [REDACTED] was used as an input for both analyses. There are currently no plans to pursue any transmission projects incremental to the latest transmission expansion plan that should be completed to accommodate such retirements.

c) *Environmental Regulations*

Gulf Power develops an environmental strategy aimed at determining the least-cost compliance options that minimize customer impacts while ensuring compliance with all reasonably foreseeable environmental laws and regulations. Of specific interest to the evaluation are the impacts of EPA's CCR, ELG, and 316(b) intake structure regulations. Capital projects that may be driven by these regulations and could not be avoided by a unit retirement are not considered in the evaluation. Based on the current environmental strategy, no avoidable projects are included in the analysis for compliance with the CCR rule. The evaluation includes dry bottom ash projects for each of the units, with expected in-service

dates of 2023 for compliance with the ELG rule. The evaluation also considers cooling water intake structure modifications for Units 4 and 5, with expected in-service dates of 2025 for compliance with the 316(b) rule. The scope and cost for these projects are based on the best available information at the time of the evaluation, as explained in more detail in Section III.A.4, and will be updated by Gulf Power as more certainty regarding the regulations and new permit requirements are available. While the evaluation does not specifically address the Clean Power Plan, a range of future carbon prices are included to assess the impacts of future greenhouse gas regulation.

d) *Incremental Costs*

In addition to future environmental controls, other incremental costs associated with continued operation of the facility include delivered fuel, operation and maintenance expenses (O&M), maintenance capital, and emissions costs (NO_x, SO₂, and CO₂). O&M encompasses all labor, materials, engineering and support services, and overhead costs necessary to operate the plant. Costs such as delivered fuel, variable O&M, and emissions costs are incorporated in the production cost impacts. The remaining incremental costs and the revenue requirements on the environmental capital costs constitute the total fixed costs associated with the continued operation of Crist over a 30-year study period.

e) *Plant Crist Generation Study Options*

The Plant Crist economic evaluation considers continued operation for a 30-year period, as compared to converting to natural gas or retiring and replacing the entire facility or each of the units individually. The evaluation is based on specific retirement dates for the entire Plant Crist generating facility, as well as each of the Plant Crist generating units individually, as inputs. In selecting retirement dates for the analysis, varying factors were considered, including but not limited to transmission requirements, firm natural gas transportation requirements, environmental restrictions, and construction timelines. Based on these factors, the retirements were assumed to take place at the earliest possible date for each unit based on the transmission evaluation. These dates are [REDACTED] for Units 4, 5, and 6 and [REDACTED] for Unit 7 and Units 4-7 as a whole. The replacement generation was assumed to come online coincident with the retirement based on Gulf Power's expected need for capacity.

For the conversion to natural gas evaluation, the assumed retirement dates were based upon the firm natural gas transportation construction schedule. Units 6, 7, and 4-7 would require capital costs associated with a new gas pipeline lateral. Unit 7 and Units 4-7 would require additional capital investments to retrofit Unit 7 for 100 percent natural gas operation at full load. Optimistically, the pipeline construction and unit retrofit construction was assumed to be completed within [REDACTED] years. Thus, the conversion year assumed for Unit 6, Unit 7, and Units 4-7 is year [REDACTED]. The conversion for Units 4 and 5 was assumed to occur in [REDACTED] since construction for a new gas pipeline lateral would not be required.

The alternatives that were studied include:

- Continued Operation
- Retirement and Replacement with combustion turbines
- Conversion to 100% Natural Gas
- Retirement and Replacement with Solar Capacity
- Retirement and Replacement with a combination of Solar and Natural Gas Capacity
- Retirement and Replacement with a combination of Solar, Natural Gas Capacity, and Battery Storage

The replacement generation was assumed to be a generic unit located on Gulf’s system representing the amount of Crist generation being replaced.

2. Summary of Study Results

The following tables represent the 30-year net present value (NPV) of benefit associated with either Plant Crist as a whole or each individual Crist Unit. The results are calculated by comparing the existing unit’s costs and benefits to the corresponding costs and benefits of the replacement resource. When a positive value is shown for a scenario, the NPV of the existing unit is greater than the NPV for the compared option, meaning that continued operation of the existing unit is the better economic option.

a) Continued Operation

The NPV results of the costs and benefits for the continued operation of Crist Unit 4, Crist Unit 5, Crist Unit 6, Crist Unit 7, and Crist Units 4-7 are provided in the tables below. Although no specific replacement assumption is made, capacity is valued at the economic carrying cost of a reliability CT.

Table 1 - Unit 4 NPV Continued Operation

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas			
Mod Gas			
Low Gas			

Table 2 - Unit 5 NPV Continued Operation

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas			
Mod Gas			
Low Gas			

Table 3 - Unit 6 NPV Continued Operation

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas			
Mod Gas			
Low Gas			

Table 4 - Unit 7 NPV Continued Operation

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas			
Mod Gas			
Low Gas			

Table 5 - Units 4-7 NPV Continued Operation

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas			
Mod Gas			
Low Gas			

b) Retirement and Replacement with Combustion Turbines

The NPV results of the costs and benefits for the continued operation of Crist Unit 4, Crist Unit 5, Crist Unit 6, Crist Unit 7, and Crist Units 4-7 compared to replacement with Simple Cycle Technology-Dual Fuel Combustion Turbines are provided in the tables below.

Table 6 - Unit 4 NPV Retire and Replace with CT

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas			
Mod Gas			
Low Gas			

Table 7 - Unit 5 NPV Retire and Replace with CT

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas			
Mod Gas			
Low Gas			

Table 8 - Unit 6 NPV Retire and Replace with CT

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas			
Mod Gas			
Low Gas			

Table 9 - Unit 7 NPV Retire and Replace with CT

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas	[REDACTED]		
Mod Gas			
Low Gas			

Table 10 - Units 4-7 NPV Retire and Replace with CT

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas	[REDACTED]		
Mod Gas			
Low Gas			

c) Conversion to 100% Natural Gas

The NPV results of the costs and benefits for the continued operation of Crist Unit 4, Crist Unit 5, Crist Unit 6, Crist Unit 7, and Crist Units 4-7 compared to converting each unit and the entire facility to 100 percent natural gas operation are provided in the tables below. Units 6, 7, and 4-7 would require capital costs associated with a new gas pipeline lateral. Unit 7 and Units 4-7 would require additional capital investments to retrofit Unit 7 for 100 percent natural gas operation at full load.

Table 11 - Unit 4 NPV Convert to Natural Gas

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas	[REDACTED]		
Mod Gas			
Low Gas			

Table 12 - Unit 5 NPV Convert to Natural Gas

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas	[REDACTED]		
Mod Gas			
Low Gas			

Table 13 - Unit 6 NPV Convert to Natural Gas

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas	[REDACTED]		
Mod Gas			
Low Gas			

Table 14- Unit 7 NPV Convert to Natural Gas

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas	[REDACTED]		
Mod Gas			
Low Gas			

Table 15 - Units 4-7 NPV Convert to Natural Gas

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas	[REDACTED]		
Mod Gas			
Low Gas			

d) Retirement and Replacement with Solar Capacity

The NPV results of the costs and benefits for the continued operation of Crist Unit 4, Crist Unit 5, Crist Unit 6, Crist Unit 7, and Crist Units 4-7 compared to replacement with fixed-tilt solar capacity are provided in the tables below. The nameplate capacity of the replacement solar generation was assumed to match the recognized capacity of the existing units. However, an average Incremental Capacity Equivalent (ICE) factor of [REDACTED] percent was calculated for each solar replacement option. The capacity shortfall of the ICE solar replacement option was valued at the economic carrying cost of a reliability CT. The solar profile was based on an existing solar facility built within Gulf Power’s service area. In addition to the costs to build and operate the solar generation, a cost was included to mitigate the intermittent nature of the solar generation.

Table 16 - Unit 4 NPV Retire and Replace with Solar

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas	[REDACTED]		
Mod Gas			
Low Gas			

Table 17 - Unit 5 NPV Retire and Replace with Solar

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas	[REDACTED]		
Mod Gas			
Low Gas			

Table 18 - Unit 6 NPV Retire and Replace with Solar

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas	[REDACTED]		
Mod Gas			
Low Gas			

Table 19 - Unit 7 NPV Retire and Replace with Solar

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas	[REDACTED]		
Mod Gas			
Low Gas			

Table 20 - Units 4-7 NPV Retire and Replace with Solar

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas	[REDACTED]		
Mod Gas			
Low Gas			

e) *Retirement and Replacement with a Combination of Solar and Natural Gas Capacity*

The NPV results of the costs and benefits for the continued operation of Crist Unit 4, Crist Unit 5, Crist Unit 6, Crist Unit 7, and Crist Units 4-7 compared to replacement with fixed-tilt solar capacity and natural gas capacity are provided in the tables below. Due to the size and operating characteristics of the units, the appropriate replacement gas capacity was determined to be Simple Cycle F Technology-Dual Fuel Combustion Turbines for Units 4 and 5. For Units 6, 7, and 4-7, the replacement natural gas capacity was determined to be a 2 on 1 Combined Cycle H Technology Unit. The capacity of the replacement natural gas options was based on the difference in capacity of the Crist Units and the ICE capacity of the solar option.

Table 21 - Unit 4 NPV Retire and Replace with Solar and Natural Gas

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas	[REDACTED]		
Mod Gas			
Low Gas			

Table 22 - Unit 5 NPV Retire and Replace with Solar and Natural Gas

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas	[REDACTED]		
Mod Gas			
Low Gas			

Table 23 - Unit 6 NPV Retire and Replace with Solar and Natural Gas

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas			
Mod Gas			
Low Gas			

Table 24 - Unit 7 NPV Retire and Replace with Solar and Natural Gas

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas			
Mod Gas			
Low Gas			

Table 25 - Units 4-7 NPV Retire and Replace with Solar and Natural Gas

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas			
Mod Gas			
Low Gas			

f) *Retirement and Replacement with a Combination of Solar, Natural Gas Capacity and Battery Storage*

The NPV results of the costs and benefits for the continued operation of Crist Unit 4, Crist Unit 5, Crist Unit 6, Crist Unit 7, and Crist Units 4-7 compared to replacement with fixed-tilt solar capacity, natural gas capacity, and battery storage are provided in the tables below. This option added approximately █ percent of the solar nameplate generation in battery storage capacity to offset the impacts associated with the intermittent nature of solar generation.

Table 26 - Unit 4 NPV Retire and Replace with Solar, Natural Gas Capacity and Battery Storage

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas			
Mod Gas			
Low Gas			

Table 27 - Unit 5 NPV Retire and Replace with Solar, Natural Gas Capacity and Battery Storage

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas			
Mod Gas			
Low Gas			

Table 28 - Unit 6 NPV Retire and Replace with Solar, Natural Gas Capacity and Battery Storage

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas			
Mod Gas			
Low Gas			

Table 29 - Unit 7 NPV Retire and Replace with Solar, Natural Gas Capacity and Battery Storage

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas			
Mod Gas			
Low Gas			

Table 30 - Units 4-7 NPV Retire and Replace with Solar, Natural Gas Capacity and Battery Storage

2018 NPV (M\$)	\$0 CO2	\$10 CO2	\$20 CO2
High Gas			
Mod Gas			
Low Gas			

3. Study Conclusion

This analysis is preliminary, and environmental control requirements and dates are based on the compliance requirements of currently final, proposed, and/or expected environmental rules and regulations, which are further discussed below. As preliminary or proposed rules are finalized and new permits issued, some of these requirements, dates, and costs may change. This analysis is based on the most recent knowledge and expectations available at the time the analysis was conducted. Once future and pending regulations and any associated permit requirements are finalized, Gulf will update the cost projections and request ECRC recovery of new projects or programs.

4. Future Land and Water Regulations

Under the 2015 ELG rule, Plant Crist would be required to eliminate the discharge of bottom ash transport water (BATW) to surface waters. Gulf was working on preliminary engineering and design for dry bottom ash handling and completing construction of two underground injection wells for ELG compliance when EPA announced reconsideration in late 2017 of the 2015 ELG rule. At that time, further work on the Plant Crist ELG projects was placed on hold until after the ELG rulemaking is resolved. The cost projections for the Plant Crist bottom ash project are based on a screening level cost estimate that will be updated after the ELG rule and design is finalized.

As required by the CCR rule, the Company has posted documents to its public website for Plant Crist. The ultimate impact of the CCR rule will depend on the results of initial and ongoing monitoring and the implementation of state or federal permit programs.

The compliance strategy for 316(b) or the Cooling Water Intake Structure Rule includes site specific biological and/or engineering design studies required to determine the Best Technology Available (BTA) for modifications that may be required to existing cooling water intake structures. Although the ultimate 316(b) compliance strategy and design will be approved by the State environmental permitting agencies, with possible input from the U.S. Fish and Wildlife Service, National Marine Fisheries Service and EPA, Gulf Power's current compliance strategy includes replacing the existing screens with traveling screens with a fish return system and is subject to change based on future planning assumptions. Crist Units 6 and 7 are already 316(b) compliant with closed-cycle cooling towers. Closed-cycle cooling tower monitoring systems are the only additional 316(b) capital expenditures currently projected to be required for these units. The required 316(b) studies and associated reports will provide the information required to identify the site specific BTA determination and will ultimately have to be approved by the State environmental permitting agency. The cost projections for Plant Crist 316(b) compliance are subject to change based on future planning assumptions.

5. Air Quality Compliance Program Update

Each of the projects for Plant Crist that were addressed in Gulf's Air Quality Compliance Plan (including the updates since 2007) either have been installed or have been eliminated from consideration for compliance with CSAPR (formerly CAIR), MATS (formerly CAMR), and Regional Haze Rule (formerly CAVR). All four units are equipped with a FGD scrubber and low-NOx burner systems. Plant Crist Units 4 and 5 have SNCR systems, while Crist Units 6 and 7 are equipped with SCR systems for NOx control.

B. PLANT DANIEL

Gulf Power's ownership interest at Plant Daniel involves two coal-fired electric generating units that have a nameplate rating of 548.25 MW each. Gulf Power and Mississippi Power Company each own 50 percent of Daniel Units 1 and 2. The plant is operated by Mississippi Power. The facility is located just north of Pascagoula, Mississippi, with direct transmission access across Alabama and into Florida.

1. Future Land and Water Regulations

Under the 2015 ELG rule, Plant Daniel would be required to eliminate the discharge of BATW to surface waters. As a result of ELG regulation and potential CCR requirements, new ash management and wastewater management projects are anticipated in order to reroute waters from the existing ash pond and to provide wastewater treatment as required by the NPDES industrial wastewater permit. As required by the CCR rule, Mississippi Power

Company has posted documents to its public website for Plant Daniel. The ultimate impact of the CCR rule will depend on the results of initial and ongoing minimum criteria assessments, monitoring and the implementation of state or federal permit programs.

Plant Daniel has a closed cycle cooling system that is expected to meet 316(b) requirements; therefore, very little impact is anticipated for 316(b) compliance at this time. Source waterbody studies are being completed and will be submitted with the next industrial wastewater permit revision.

2. Air Quality Compliance Program Update

Each of the projects for Plant Daniel that were addressed in Gulf's Air Quality Compliance Plan (including the updates since 2007) have either been installed or have been eliminated from consideration for compliance with CSAPR (formerly CAIR), MATS (formerly CAMR), and Regional Haze Rule (formerly CAVR). Plant Daniel Units 1 and 2 are equipped with scrubbers, bromine and activated carbon injection, Low-NOx burners, and MATS monitors.

C. PLANT SCHERER

Gulf Power's ownership interest at Plant Scherer involves one coal-fired electric generating unit, Scherer Unit 3, that has a nameplate rating of 891 MW. Gulf Power owns 25 percent of Scherer Unit 3. The plant is operated by Georgia Power. The facility is located north of Macon in Juliette, Georgia, with direct transmission access across Georgia and into Florida.

1. Future Land and Water Regulations

Under the 2015 ELG rule, Plant Scherer is required to address the discharge of FGD wastewater to surface waters. The proposed Plant Scherer ELG wastewater management system is based on a physical-chemical-biological treatment system. The FGD wastewater compliance strategy will be refined upon further research and following EPA's reconsideration and revision of the ELG regulation.

As a result of CCR requirements and ELG regulations, multiple ash and wastewater management projects are necessary to comply with new wastewater handling and treatment requirements. CCR ash management projects are underway to manage fly and bottom ash dry as part of the overall CCR compliance program. These projects will retrofit the fly and bottom ash handling systems to allow ash to be managed dry after the ash pond is removed from service.

CCR wastewater management projects are necessary to replace the treatment of low-volume waste streams currently being treated by the ash pond. These projects include treatment needed to meet CCR and ELG requirements as well as current NPDES permit requirements and Georgia water quality standards.

To prepare for ash pond closure, work is currently being performed to prepare for construction of Gypsum Cell 3 of the on-site landfill to store ash and gypsum. Cell 2 of the existing on-site landfill will be constructed in the future to provide for additional ash and/or gypsum storage capacity. Additionally, site characterization of a new landfill is scheduled to begin in 2018 to provide additional storage capacity for CCR. Phase 1 of the new landfill includes siting, engineering, permitting, and construction of a landfill cell intended to provide at least five years of storage capacity. The construction timeline of the new landfill may be revised based on CCR storage capacity needs of the plant.

Plant Scherer has a closed cycle cooling system that is expected to meet 316(b) requirements; therefore, very little impact is anticipated for 316(b) compliance at this time.

2. Air Quality Compliance Program Update

The baghouse, SCR, and scrubber at Plant Scherer were approved for recovery through the ECRC proceedings in 2017, subject to ongoing review of costs within the ECRC annual review process. Each of the projects for Plant Scherer that were addressed in previous proceedings have been installed for compliance with the Multipollutant Control for Electric Utility Steam Generating Units – Georgia Rule Chapter 391-3-1 Rule.02 (Georgia Multipollutant Rule) and assist with compliance for CSAPR/CAIR, MATS/CAMR, Acid Rain Program, the National Ambient Air Quality Standard for Fine Particulate Matter, the National Ambient Air Quality Standard for Ozone, and the Regional Haze Rule.

D. PLANT SMITH

Plant Smith includes an oil-fired combustion turbine (CT) and a natural gas-fired combined cycle unit with nameplate capacity ratings of 41.85 MW and 619.65 MW located just north of Panama City, Florida. The two coal-fired Units 1 and 2 were retired in March 2016.

1. Future Land and Water Regulations

Gulf is not currently projecting any additional capital expenditures associated with ELG compliance at Plant Smith. The Company has posted documents to its public website for Plant Smith as required by the CCR rule. The ultimate impact of the CCR rule will depend on the results of initial and ongoing minimum criteria assessments, monitoring and the implementation of state or federal permit programs.

Earlier this year, Gulf began construction of the Plant Smith industrial wastewater/reclaimed water pond. During 2018, Gulf plans to proceed with construction and associated activities to close a portion of the ash pond. The Smith pond closure includes construction of industrial wastewater ponds and a slurry wall as well as transferring CCR material upland to a dry stack area within the footprint of the pond and capping the dry stack area with closure turf material.

The Smith combined cycle unit (Unit 3) intake is located in the discharge canal of Units 1 and 2. The Plant Smith 316(b) strategy includes replacing the existing plant intake pumps with new lower capacity pumps. Plant Smith Unit 3 has a closed cycle cooling tower which will require installation of a cooling tower monitoring system for 316(b) compliance.

2. Air Quality Compliance Program Update

The retrofit of Plant Smith Units 1 and 2 with SNCRs and the installation of a CAIR parametric monitor for the Smith Combustion Turbine were the best option for compliance with CAIR as described in Gulf's original Compliance Plan evaluations.

In early 2015, the Company finalized its MATS compliance strategy and determined that the most cost-effective option to comply with the regulations imposed by EPA was to retire the Plant Smith coal-fired Units 1 and 2 in March of 2016. Plant Smith's remaining units will continue to operate and generate electricity.

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

IN RE: Environmental Cost)
Recovery Clause)

Docket No.: 20180007-EI

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true copy of the foregoing was furnished by electronic mail this 2nd day of April, 2018 to the following:

Ausley Law Firm
James D. Beasley
J. Jeffrey Wahlen
Post Office Box 391
Tallahassee, FL 32302
jbeasley@ausley.com
jwahlen@ausley.com

PCS Phosphate – White Springs
c/o Stone Mattheis Xenopoulos
& Brew, P.C.
James W. Brew/Laura A. Wynn
Eighth Floor, West Tower
1025 Thomas Jefferson St, NW
Washington, DC 20007
jbrew@smxblaw.com
law@smxblaw.com

Florida Power & Light Company
Kenneth Hoffman
215 South Monroe Street, Suite 810
Tallahassee, FL 32301-1858
Ken.Hoffman@fpl.com

Florida Industrial Power Users Group
c/o Moyle Law Firm
Jon C. Moyle, Jr.
118 North Gadsden Street
Tallahassee, FL 32301
jmoyle@moylelaw.com

Florida Power & Light Company
John T. Butler
Maria J. Moncada
700 Universe Boulevard
Juno Beach, FL 33408-0420
John.Butler@fpl.com
Maria.moncada@fpl.com

George Cavros, Esq.
Southern Alliance for Clean Energy
120 E. Oakland Park Blvd, Suite 105
Fort Lauderdale, FL 33334
george@cavros-law.com

Office of Public Counsel
J. Kelly/C. Rehwinkel/P. Christensen
c/o The Florida Legislature
111 W. Madison Street, Room 812
Tallahassee, FL 32399-1400
Christensen.patty@leg.state.fl.us
KELLY.JR@leg.state.fl.us
Sayler.erik@leg.state.fl.us

Duke Energy Florida, Inc.
Matthew R. Bernier
Cameron Cooper
106 East College Avenue, Suite 800
Tallahassee, FL 32301
Matthew.bernier@duke-energy.com
Cameron.Cooper@duke-energy.com

Duke Energy Florida, Inc.
John T. Burnett
Dianne M. Triplett
299 First Avenue North
St. Petersburg, FL 33701
Dianne.triplett@duke-energy.com
John.burnett@duke-energy.com

Tampa Electric Company
Ms. Paula K. Brown, Manager
Regulatory Coordination
P. O. Box 111
Tampa, FL 33601-0111
Regdept@tecoenergy.com

Office of the General Counsel
Charles Murphy
Stephanie Cuello
2540 Shumard Oak Blvd
Tallahassee, FL 32399-0850
cmurphy@psc.state.fl.us
scuello@psc.state.fl.us



JEFFREY A. STONE
General Counsel
Florida Bar No. 325953
jastone@southernco.com
Gulf Power Company
One Energy Place
Pensacola, FL 32520-0100
(850) 444-6550

RUSSELL A. BADDERS
Florida Bar No. 007455
rab@beggslane.com
STEVEN R. GRIFFIN
Florida Bar No. 0627569
srg@beggslane.com
Beggs & Lane
P. O. Box 12950
Pensacola FL 32591-2950
(850) 432-2451
Attorneys for Gulf Power