Environmental Assessment

Effingham Energy Facility Combustion Turbine Upgrade Project

Rincon, Georgia

U.S. Department of Agriculture
Rural Utilities Service (RUS)

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LIST OF ABBREVIATIONS

Abbreviation	Term/Phrase/Name
AAC	Acceptable Air Concentration
AGP	Advanced Gas Path
BACT	Best Available Control Technology
Burns & McDonnell	Burns & McDonnell Engineering Company, Inc.
CCCT	Combined-cycle combustion turbine
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon monoxide
CO_2e	Carbon dioxide equivalents
EMC	Electric membership corporation
EPA	U.S. Environmental Protection Agency
EPD	Environmental Protection Division
Facility	Effingham Energy Facility
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
FWS	U.S. Fish and Wildlife Service
GDNR	Georgia Department of Natural Resources
GHG	Greenhouse gases
H_2SO_4	Sulfuric acid
IPaC	Information for Planning & Consultation System
LAS	Land application system
LLTD	Low Load Turndown
MER	Minimum Emission Rate
MW	Megawatts
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act

NO_2	Nitrogen dioxide
NO_X	Nitrogen oxides
NSA	Noise Sensitive Area
NSPS	New Source Performance Standards
NSR	New Source Review
O_2	Oxygen
Oglethorpe	Oglethorpe Power Corporation
$PM_{2.5}$	Particulate matter less than 2.5 microns in diameter
PM_{10}	Particulate matter less than 10 microns in diameter
ppm	Parts per million
Program	RUS Electric Loan Program
Project	The Combustion Turbine Upgrades Project
PSD	Prevention of Significant Deterioration
RE Act	Rural Electrification Act
RUS	Rural Utilities Service
SER	Significant Emission Rate
SO_2	Sulfur dioxide
TAP	Toxic air pollutants
TIA	Toxic Impact Assessment
tpy	Tons per year
TSPLOST	Transportation Special Purpose Local Option Sales Tax
USC	United States Code
USDA	U.S. Department of Agriculture
VOC	Volatile organic compounds

1.0 INTRODUCTION

Oglethorpe Power Corporation (Oglethorpe) is seeking financing assistance from the Rural Utilities Service (RUS) to make software and hardware upgrades at its existing Effingham Energy Facility (Facility), a natural gas-fired combined-cycle electrical power generating facility, near Rincon, Georgia. This Facility was formerly known as the Effingham County Power Facility when it was owned by Effingham County Power, LLC. The Facility's Combustion Turbine Upgrades Project (Project) would increase efficiency, improve energy output, increase the amount of time between major overhauls, and increase operating flexibility by allowing the units to operate at lower operating loads during periods of low demand to decrease wear and tear on associated units. This draft Environmental Assessment (EA) describes the alternatives evaluated, the affected environment, potential environmental consequences, cumulative effects, mitigation measures, and agency scoping for the Project.

The RUS action is the decision to provide financing assistance for the Project. Under the Rural Electrification Act (RE Act), as amended, the Secretary of Agriculture is authorized and empowered to make loans to nonprofit cooperatives and others for rural electrification "for the purpose of financing the construction and operation of generating plants, electric transmission and distribution lines, or systems for the furnishing and improving of electric service to persons in rural areas" (7 U.S. Code [USC] § 904). A primary function or mission of RUS is to carry out this electric loan program (7 USC § 6942).

Oglethorpe, which is headquartered in Tucker, Georgia, is a generation cooperative operating on a not-for-profit basis that generates electricity for 38 of Georgia's electric membership cooperatives (EMCs). Oglethorpe's objective is to provide reliable energy to its EMC members to meet their existing and expanding power supply needs. The Facility, near the city of Rincon in Effingham County, Georgia, is owned and operated by Oglethorpe. The Facility is located on 406.49 acres across two parcels which also contains two transmission substations owned and operated by Georgia Power (a subsidiary of Southern Company) and Georgia Transmission Company respectively, a natural gas regulator station, paved property, and undeveloped land, which are owned and operated by Georgia Power and Georgia Transmission Company (see **Figure 1-1**). Surrounding lands include planted pine, woodland, agriculture, forested wetland, streams, and solar farms. The subject property was acquired by the Effingham County Industrial Development Authority in 2001, and construction began of the current power plant in 2002. Oglethorpe acquired the Facility in 2021 and changed the name of the Facility to Effingham Energy Facility.

Effingham Power Plant Location

Property Boundary

NHD Flowline

NORTH

1,500 750 0 1,500

Scale in Feet

BURNS McDONNELL

Figure 1-1
Project Location
Effingham Energy Facility
Oglethorpe Power Corporation
Effingham County, Georgia

Issued: 4/15/2022

Source: Esri, USGS, NHD, USFWS, NWI, FEMA, NFHL,

Path: D:\GIS_Req\142475_EffinghamEA\142475_EffinghamEA.aprx olhaney 4/15/2022
Service Layer Credits: World Navigation Map: Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS

Oglethorpe intends to finance this Project under the RUS Electric Loan Program (the Program). As a result, the Project represents a federal action that must be reviewed under the National Environmental Policy Act (NEPA) of 1969. The responsible agency will be the RUS. This EA has been prepared in compliance with RUS's Policies and Procedures, 7 Code of Federal Regulations (CFR) Part 1970 and the Council on Environmental Quality (CEQ) Regulations for implementation of NEPA 40 CFR Parts 1500-1508. As part of its broad environmental review process, RUS must also take into account the effect of the Project on historic properties in accordance with Section 106 of the National Historic Preservation Act and its implementing regulation, "Protection of Historic Properties" (36 CFR Part 800). According to the Acting Federal Preservation Officer for RUS, the Project would meet the criteria for "No Potential to Effect" historic properties or cultural resources, as indicated in the May 9, 2022, email provided in **Appendix A**. Pursuant to 36 CFR § 800.2(d)(3), there is no Section 106 requirement for public comment once RUS determines "No Potential To Effect." Therefore, a Section 106 review under the National Historic Preservation Act has been deemed unnecessary, and no Tribal entities have been contacted regarding the Project.

1.1 Project Description

The proposed Project would involve the implementation of two General Electric upgrades for the gas combustion turbines at Effingham Energy Facility – Advanced Gas Path (AGP) and Low Load Turndown (LLTD).

The AGP upgrade would improve facility electrical output and efficiency and it would extend the maintenance interval of the units by replacing certain existing gas turbine hardware with hardware using improved designs and materials and modifying site-specific control logic. This would increase the capacity of the Facility by approximately 23 MWs (from 500 MW to 523 MW, depending on ambient temperatures), improve efficiency by approximately 2%, and extend the time between major maintenance activities.

The LLTD upgrade would include installation of new gas turbine components and software controls to replace existing equipment and connected accessories to allow the units to operate at lower operating loads during periods of low demand. Currently, a reduced system demand causes the units to decrease their output to approximately 70% load or shut down completely and restart when load increases. The LLTD upgrade would allow the gas turbines to operate at reduced steady-state minimum loads to as low as 50 MWs per gas turbine (from the current minimum load of approximately 110 MWs per gas turbine), with variations for ambient temperatures, while continuing to maintain emissions concentrations of nitrogen oxides (NO_X) and carbon monoxide (CO) in compliance with the Facility's permitted emission

limits. As a result, this upgrade would allow the Facility to continue to operate with less frequent shutdowns and restarts, thereby reducing fuel costs, equipment maintenance, and wear and tear on units.

Overall, the two upgrades mentioned herein would allow Oglethorpe to run the units for longer periods of time without shut down and at higher capacity. Both the AGP and LLTD would be applied to the current gas turbines within the current Facility footprint. All physical changes will be inside the existing turbine equipment; no new structures would be built, and no ground disturbing activities would occur. All current infrastructure is adequate for the AGP and LLTD upgrades.

The Project would result in increases in maximum heat input and “projected actual" annual air emissions. It is anticipated the Project may result in a potential increase in the short-term air emission rate, and Oglethorpe is permitting the project as a modification under the federal New Source Performance Standards (NSPS) regulations. As such, the combustion turbines would be subject to the NSPS in 40 CFR 60 Subpart KKKK, Standards of Performance for Stationary Combustion Turbines, after completion of the Project. The Facility's Title V permit includes more stringent NO_X emission limits than the limits under Subpart KKKK. The NO_X emission limits under Subpart KKKK (15 ppm at 15% oxygen [O_2] when operating at or above 75% of peak load; 96 ppm at 15% O_2 when operating below 75% of peak load) would be subsumed by the more stringent existing NO_X emission limit under the Facility’s Title V permit (3.0 ppm at 15% O_2). Therefore, the Facility will use its existing air pollution control devices and emissions monitoring systems to comply with Subpart KKKK. No installation of new devices or equipment is required.

The Project is expected to result in a small increase in water use and discharge. However, Oglethorpe anticipates this small increase will not require any additional or modified permits for the Facility. The Facility currently maintains a land application system (LAS) permit from the Georgia Environmental Protection Division (EPD) with a maximum discharge limit of 0.24 MGD. The LAS permit is in the process of being renewed with Georgia EPD. The new permit will take effect on October 1, 2022, and will include the same maximum discharge limit. The increased discharge amounts from the Project, provided in Section 3.9.3 of this EA, would be within the current permit limits and the effluent composition will remain unchanged. Therefore, a permit modification is not anticipated for the Project. In addition, the Facility is not required to maintain a permit with the City of Savannah for water usage. Therefore, no additional permits or modifications would be required for the proposed increased water usage.

Implementation of the Project is not expected to increase the noise from the Facility above historical levels, nor would it require changes in the infrastructure for gas supply, electrical transmission, or water

usage/discharge. The Project would involve software and mechanical upgrades to existing equipment within the current Facility structures. Oglethorpe has consulted with Georgia Transmission Corporation and confirmed that the existing integrated transmission system can accommodate the new increase in capacity. Therefore, no infrastructure upgrades to the transmission system are anticipated to support the Project. No new ground-disturbing activities or new facilities, equipment, or buildings would be constructed within or outside the current Facility footprint. As a result, the Project would not adversely impact biological resources, soils, geological resources, cultural resources, socioeconomic resources, environmental justice communities, hazardous materials, or wetlands.

1.2 Purpose and Need

1.2.1 Oglethorpe Power Purpose and Need

Oglethorpe is responsible for providing reliable, efficient, and low-cost power to the 38 EMC members of the not-for-profit generation cooperative who provide power to over 4 million Georgians. Oglethorpe continues to evaluate methods for increasing the reliability and efficiency of their power generation while continuing to lower costs to their members.

The proposed Project would increase capacity at the existing Facility and allow Oglethorpe to meet system demand with the Facility operating its existing units rather than starting other less efficient units, purchasing power from others, or constructing or obtaining new generation. The Project would lower start-up costs because the Facility would have to shut down less frequently, thereby reducing maintenance costs and improving the Facility's overall operating efficiency.

The additional capacity at lower costs would meet the need of providing more efficient and less expensive power to its members and the Georgians they serve.

1.2.2 RUS Potential Funding Action

Utilities can seek financial assistance for capital projects that meet the U.S. Department of Agriculture (USDA) Rural Development objectives. USDA, Rural Development is a mission area that includes three federal agencies – Rural Business-Cooperative Service, Rural Housing Service, and Rural Utilities Service. The agencies have in excess of 50 programs that provide financial assistance and a variety of technical and educational assistance to eligible rural and tribal populations, eligible communities, individuals, cooperatives, and other entities with a goal of improving the quality of life, sustainability, infrastructure, economic opportunity, development, and security in rural America. Financial assistance can include direct loans, guaranteed loans, and grants in order to accomplish program objectives. The Rural Electrification Act of 1936 allows for the Secretary of Agriculture, through RUS, to approve loans,

loan guarantees, grants, and other project financing to electric utilities and projects that serve rural communities. Oglethorpe is seeking financial assistance for the Project from this Program to increase capacity and lower maintenance costs to its 38 EMC members. RUS' reviews of financial assistance applications include information ranging from purpose and need of the Project, engineering feasibility of the Project, cost, alternatives considered and environmental impacts. RUS uses these reviews and analyses to determine whether to provide financial assistance to a project, which is a federal action for RUS. RUS' financial decision for the Project is based on funds available in the agency's budget. Therefore, publication of the EA and execution of environmental findings does not constitute RUS's approval of funds for the Project, but is required as part of the decision making process to provide financial assistance.

2.0 ALTERNATIVES EVALUATED

In accordance with NEPA and RUS policies, Oglethorpe considered alternatives to the Project to determine if an alternative would be environmentally preferable, reasonable, and/or technically and economically feasible to the proposed action. As the proposed action does not require any new ground disturbances or construction of new facilities, site alternatives are not further discussed. Oglethorpe evaluated the no action alternative and compared it to the proposed action using three criteria:

1. Would the no action alternative meet the objectives of the proposed action?
2. Would the no action alternative offer a significant environmental advantage over the proposed action?
3. Would the no action alternative be technically and economically feasible, reasonable, and practical?

2.1 Proposed Action

The proposed action includes hardware and software upgrades to the combined-cycle Facility to improve the performance, heat rate, and capacity of the turbines, and allow them to continue to operate during periods of low demand to reduce the frequency of shutdowns. Oglethorpe has consulted with Georgia Transmission Corporation regarding the capacity of the existing grid infrastructure to accept increased power output from the Facility, and the proposed upgrades will allow Oglethorpe to provide generation at a lower price per MW of power generated without the anticipated need for upgrades on the existing grid infrastructure.

The mechanical upgrades would be performed during one of the routine major outages at the Facility that occur after a certain number of operating hours or currently approximately every 6 years. The proposed combustion turbine upgrades would increase the interval between routine major outages to every 8 years. During a major outage, the Facility is shut down for a longer period of time and a larger number of contractors and personnel are brought to the Facility to perform maintenance and upgrades, if applicable. The contractors performing the major outage would also perform the mechanical upgrades for the Project, and a permanent increase in personnel at the Facility is not proposed. Multiple one-time shipments of mechanical equipment will be required to install these upgrades, but no significant increases in traffic or equipment is proposed.

2.2 Other Alternatives Evaluated

This EA does not look at alternative sites for increased capacity, as a new site would require the construction of a large amount of infrastructure (transmission, water intake, etc.) that currently exists at the Facility site. Increasing capacity at other existing facilities could also potentially require significant infrastructure upgrades resulting in more significant environmental impacts associated with the upgrades.

2.3 No Action Alternative

Under the no action alternative, the software and mechanical upgrades associated with Project would not be implemented, and the Facility would continue to operate in its current state. Therefore, the capacity would not increase and the price per MW of power generated would not decrease as a result of efficiency improvements from the Project. Oglethorpe may need to start other units or purchase power from others to meet the system demands. Additionally, the Facility would not be able to remain online through periods of low demand resulting in more shutdowns and startups, and, in turn, increased wear and tear on the equipment. For these reasons, the no action alternative is not preferable to or does not provide a significant environmental advantage over the proposed action, and it is not recommended.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The Project would occur within the boundaries and buildings of the current Facility and would only involve software and mechanical upgrades to existing computer and generation equipment. The Project would not result in impacts to biological resources, soils and geological resources, cultural resources, socioeconomic resources, environmental justice communities, visual resources, hazardous materials, wetlands, infrastructure for water usage or discharge, noise emissions above historical levels, or gas supply infrastructure. The following discusses a variety of natural and social resources and the potential project-related consequences to each.

3.1 Aesthetics

As shown in the aerial imagery on Figure 1-1, the Project would occur within the existing footprint of the Facility. The surrounding land use is primarily residential, undeveloped, and industrial, including the Effingham County Wastewater Treatment Plant to the north and a gas regulator station owned and operated by Georgia Power to the south. Since there would be no changes to the current or future aesthetics within or surrounding the Facility, no impact on the aesthetic environment would occur as a result of the Project. No environmental consequences would occur, and no mitigation is proposed.

3.2 Air Quality

The current air quality of the area surrounding the Facility, along with the anticipated impacts on air quality as a result of the Project, are discussed in this following section.

Ambient air quality is protected by federal and state regulations. The U.S. Environmental Protection Agency (EPA) established National Ambient Air Quality Standards (NAAQS) to protect human health and welfare. Primary standards protect human health, including the health of defined sensitive populations, such as asthmatics, children, and the elderly. NAAQS have been developed for sulfur dioxide (SO_2), particulate matter (PM) with a diameter of 10 microns or less (PM_{10}), PM with a diameter of 2.5 microns or less ($PM_{2.5}$), nitrogen dioxide (NO_2), CO, ozone, and lead, and include levels for short-term (acute) and long-term (chronic) exposures as applicable. Ozone is not a pollutant emitted directly into the air. It is formed from a chemical reaction involving NO_X and volatile organic compounds (VOC) in the presence of sunlight. Consequently, emissions of NO_X and VOCs are regulated by the EPA as "precursors" to the formation of ground-level ozone. VOC means any compound of carbon (excluding CO, carbon dioxide [CO_2], carbonic acid, metallic carbides or carbonates, and ammonium carbonate) which participates in atmospheric photochemical reactions (40 CFR 51.100s). The current NAAQS are listed on the EPA's website (EPA, 2022).

3.2.1 Affected Environment

New Source Review (NSR) is a pre-construction permitting program designed to protect air quality when air pollutant emissions are increased either through the modification of existing sources or through the construction of a new source of air pollution. In areas with good air quality, NSR ensures that the new emissions do not significantly degrade the air quality. This is achieved through the implementation of the Prevention of Significant Deterioration (PSD) permitting program or state minor permit programs. In areas with poor air quality, Nonattainment NSR ensures that the new emissions do not inhibit progress toward cleaner air. In addition, NSR ensures that any new or modified large industrial source uses the Best Available Control Technology (BACT) to reduce its air emissions. Air permitting of stationary sources has been delegated to the State of Georgia. The Facility is considered a PSD major source because it has potential emissions of multiple regulated pollutants exceeding the major source threshold of 100 tons per year (tpy) for a listed source (fossil fuel-fired steam electric plants of more than 250 million British thermal units per hour heat input). Therefore, an NSR-emissions increase analysis is required to determine whether PSD permitting applies to the Project. Nonattainment NSR permitting is not potentially applicable for the Project, as the Facility is located in Effingham County, which has been designated by EPA as “attainment” or “unclassifiable” for all NAAQS (40 CFR 81.311).

3.2.2 Environmental Consequences

The Project would result in increases in maximum heat input and projected actual annual emissions from the combined cycle combustion turbines (CCCTs). It is anticipated the Project may also result in an increase in potential short-term emission rate. Annual emission increases from the Project were evaluated using the actual-to-projected actual applicability test defined in the federal PSD regulations. Specifically, emissions increases were calculated as the difference between projected actual and baseline actual emissions, excluding the portion of emissions following the project that the unit could have accommodated prior to the Project and that are unrelated to the Project. The federal PSD regulations define “projected actual emissions” as the maximum annual rate at which an existing unit is projected to emit a regulated NSR pollutant in any of the 10 years following the date the unit resumes regular operation after the project (40 CFR 52.21(b)(41)(i)). As such, the emissions increase estimates for the Project are conservatively high, because they are based on the future *maximum* projection of actual emissions, not the future *expected* or most likely actual emissions.

The resulting analysis calculates increases for each pollutant at levels lower than their respective PSD Significant Emission Rates (SER), and it has therefore been determined that PSD permitting will not be required for the Project. Oglethorpe has prepared and submitted to the Georgia EPD a Title V Operating Permit Modification and state construction permit for the Project (**Appendix B**).

A comparison of the emissions increase from the Project for each pollutant to its SER is provided in Table 3.2-1, below.

Table 3.2-1: Emission Estimates Pre- and Post-Project Implementation

Pollutant	CCCT Baseline Actual Emissions (tpy)	CCCT Projected Actual Emissions (tpy)	CCCT Emissions that Could Have Been Accommodated (tpy)	CCCT Demand Growth Exclusion (tpy)	CCCT Project Emissions Increase[(a)] (tpy)	Cooling Tower Associated Emissions Increase[(b)] (tpy)	Total Project Emissions Increase (tpy)	PSD SER (tpy)	PSD Permitting Required?
NO_X	82.6	140.2	103.2	20.6	37.0	--	37.0	40	No
CO	188.9	289.0	289.0	100.1	0.0	--	0.0	100	No
PM	50.2	77.5	68.0	17.8	9.5	0.8	10.3	25	No
PM_{10}	50.2	77.5	68.0	17.8	9.5	0.6	10.1	15	No
$PM_{2.5}$	50.2	77.5	68.0	17.8	9.5	0.0018	9.5	10	No
VOC	20.1	31.0	27.2	7.1	3.8	--	3.8	40	No
SO_2	6.0	9.3	8.2	2.2	1.1	--	1.1	40	No
H_2SO_4	0.3	0.4	0.4	0.1	0.05	--	0.05	7	No
CO_2e	1,194,844	1,844,417	1,618,359	423,515	226,058	--	226,058	75,000	No[(c)]

(a) CCCT Project Emissions Increase (tpy) = CCCT Projected Actual Emissions (tpy) - CCCT Demand Growth Exclusion (tpy) - CCCT Baseline Actual Emissions (tpy)

(b) The cooling tower will have an associated emissions increase due to increases in drift loss following the Project. There are no modifications to the cooling tower occurring as part of this Project.

(c) PSD permitting for CO_2e is only required if 1) the emissions increase exceeds the SER of 75,000 tpy AND 2) the project triggers PSD anyway for at least one other PSD-regulated pollutant.

Source: Title V Operating Permit Modification with Construction Application (Appendix B)

Since the Project does not require PSD permitting, Oglethorpe is not required to evaluate BACT for its CCCTs or perform an ambient air quality analysis. However, because the Project may result in an increase in potential short-term emission rate, Oglethorpe is conservatively permitting the Project as a modification under the federal NSPS regulations. Both CCCTs would be subject to the NSPS in 40 CFR 60 Subpart KKKK, Standards of Performance for Stationary Combustion Turbines, following the completion of the Project. The NO_X emission limits under Subpart KKKK (15 ppm at 15% oxygen [O_2] when operating at or above 75% of peak load; 96 ppm at 15% O_2 when operating below 75% of peak load) would be subsumed by the more stringent existing NO_X emission limit under the Facility's Title V permit (3.0 ppm at 15% O_2). The Facility will use its existing air pollution control devices and emissions monitoring systems to comply with Subpart KKKK. No installation of new devices or equipment is required.

Oglethorpe plans to submit an application to the Georgia EPD seeking a combined Title V operating permit modification and state construction permit, which will authorize the implementation of the proposed Project and incorporate the requirements of 40 CFR 60 Subpart KKKK into the Facility's

permit. The application, provided in **Appendix B**, outlines the methodology used to evaluate the Project emissions increase, details the requirements of 40 CFR 60 Subpart KKKK, and includes a Toxic Impact Assessment (TIA) in accordance with state guidelines. In the TIA, the potential emissions of individual toxic air pollutants (TAPs) from the Facility's operations are compared to each TAP's Minimum Emission Rate (MER) in Appendix A of the TIA guidelines. For each TAP with potential emissions exceeding the MER, screening modeling (SCREEN3) is then used to demonstrate that the ambient impact from the Facility's operations is well below the TAP's Acceptable Ambient Concentration (AAC) in Appendix A of the TIA guidelines.

3.2.3 Mitigation

The Project will not require a PSD permit. No new ground-disturbing activities are proposed for the Project, and there will be no emissions associated with earth-moving for construction (i.e., fugitive dust). Therefore, no mitigation is proposed in connection with the Project. However, the Facility will continue to utilize its existing air emission control measures, including dry low NO_X combustors on the turbines and selective catalytic reduction (SCR) for NO_X emissions control, and the use of low-sulfur fuel (natural gas), in accordance with the Facility's existing air permits.

3.3 Floodplains

The Project would occur within the existing footprint of the Facility, and the Facility falls within an area of minimal flood hazard (Zone X). No floodplains would be affected by the Project (**Appendix C**). Since no impact on floodplains would occur as a result of the Project, no environmental consequences would occur, and no floodplain mitigation is proposed.

3.4 Geology, Soils, and Farmland

The Project would occur within the existing footprint of the Facility, and there would be no ground-disturbing impacts or new facilities, equipment, or buildings constructed within or outside the current Facility footprint. Since no impacts would occur to geology, soils, or farmland as a result of the Project, no environmental consequences would occur, and no mitigation is proposed.

3.5 Historic and Cultural Resources

No impacts beyond the existing Facility footprint are proposed. According to the Acting Federal Preservation Officer for RUS, the Project would meet the criteria for "No Potential to Effect" historic properties or cultural resources, as indicated in the memo provided in **Appendix A**. Therefore, no impacts on cultural, archeological, or paleontological resources would occur as a result of the Project, and no mitigation is proposed.

3.6 Human Health and Safety

The Project would occur within the existing footprint of the Facility; and there would be no ground-disturbing impacts within or beyond the existing footprint. The Project will result in an increase in potential air emissions, and Oglethorpe has submitted an application for a Title V permit modification with construction for the Project to the Georgia EPD. Georgia EPD is the agency responsible for protecting Georgia's air quality through the regulation of air emissions from industrial and mobile sources. Oglethorpe will obtain an air permit from Georgia EPD prior to commencing the Project and will comply with all applicable air regulations and permit requirements in order to protect public health. As a result, there would be no impacts or environmental consequence to human health and safety as a result of the Project, and no mitigation is proposed.

3.7 Land Use

The Project would not result in the temporary or permanent conversion of existing land use types; therefore, no impacts on land use would occur, and no mitigation is proposed.

3.8 Noise

The Project would not result in increased noise levels above historical levels at noise sensitive areas (NSAs). The nearest NSA (Bible Lutheran Church, 812 Blue Jay Road, Rincon, Georgia) is approximately ½ mile east from the Facility; therefore, no noise impacts to NSAs would occur, and no mitigation is proposed.

3.9 Socioeconomics and Environmental Justice

3.9.1 Socioeconomics

Socioeconomics includes population growth trends, racial and ethnic characteristics, employment, income, public services (education facilities, medical facilities, fire protection, police protection), and recreation and open space. The Project includes software and mechanical upgrades to existing equipment during a routine outage and would not result in any changes or impacts to population trends, racial and ethnic characteristics, employment, public services, or recreational spaces.

3.9.2 Environmental Justice

Environmental Justice is the analysis of human health or environmental effects of a proposed project on minority or low-income populations to determine if they would be disproportionately adversely impacted by the proposed project. As the Project would not result in any significant adverse impacts, it would not create any concerns for minority or low-income populations. The Project would allow the Facility to

operate with less frequent shutdowns and restarts, thereby reducing fuel costs, equipment maintenance, and wear and tear on units. The increased efficiency and lower costs would benefit the local EMCs and thus could reduce costs to the local community.

3.9.3 Utilities

3.9.3.1 Affected Environment

Public utilities include water supply, treated wastewater, sanitary sewer, electricity, gas, and solid waste services. The Project would not result in any changes or impacts to sanitary sewer, electricity, and solid waste services. There would be changes to the quantity of natural gas received, although no changes to the existing gas supply line infrastructure would be required to support the Project. The air emissions potentially resulting from the increased natural gas consumption were previously outlined in Section 3.2 of this EA. Additionally, there would be an increase in the total intake and discharge of water supplied for the cooling towers.

The Facility currently uses potable water from the City of Savannah in the cooling towers, averaging 2.5 million gallons per day (MGD), where water is typically cycled up to 12 times or as long as effluent concentrations meet operational parameters. The Facility utilizes a LAS (Permit number GAJ010564) for its blowdown effluent from the cooling towers, including a 2.5 million gallon holding pond, five spray fields covering 30.33 acres of spray nozzles, and four monitoring wells. This LAS applies 0.17 MGD on average, with a permit limit of 0.24 MGD.

The City of Savannah utilizes two main sources for its water supply: the Floridian Aquifer and Abercorn Creek, which is a tributary of the Savannah River (Savannahga.gov, 2022).

3.9.3.2 Environmental Consequences

The Project would result in increased water usage and discharge quantities, as depicted in **Table 3.9-1**. The Facility's water usage and discharge to the existing on-site LAS are modeled to increase in quantity but are within the 0.24 MGD permit limit. The Facility will continue to operate within the parameters of the existing LAS Permit, and no physical changes to the existing LAS are required to accommodate the Project. **Table 3.9-1** provides current intake and discharge of water during normal and peak operations in the summertime.

Table 3.9-1: Daily Water Usage and Discharges During Summer (gallons per minute)

Facility Water Usage	Current Maximum Usage	Current Normal Usage	Proposed Maximum Usage	Proposed Normal Usage	Change in Maximum Usage	Change in Normal Usage
Supply Water (gpm)	2,501	2,405.2	2,541.2	2,443.6	+40.2	+38.4
Discharge Water (gpm)	193	185.8	196.1	188.7	+3.1	+2.9

Notes: Maximum capacity represents a hot day with 95ºF temperatures. Normal capacity represents a typical summer day with 85ºF temperatures

The estimated increase of approximately 40.2 gpm for daily maximum facility water usage would not affect the existing water supply nor would it result in modifications to existing water supply infrastructure.

3.9.4 Mitigation

The Facility's LAS permit will likely not require modification as a result of the Project because the effluent composition will remain unchanged and the Project will only result in minor increases in water discharge levels. The Project would have increased daily water usage, but supply is from the City of Savannah and does not have an associated permit for water intake. Therefore, there are no mitigation measures for the increased withdraws or discharges.

3.10 Threatened and Endangered Species

Table 3.10-1 provides a list of federally protected species with potential to occur in the Facility property. Protected species information was obtained from the U.S. Fish and Wildlife Service (FWS) Information for Planning, & Consultation System (IPaC) for the Project site. Any impacts from the Project would be limited to the existing Facility boundaries. There is no known habitat or previous occurrences documented for federal or state protected species within the Facility footprint, as documented in the IPaC documentation attached in **Appendix D**. There also is no designated critical habitat for protected species within the area (FWS, 2022). Further, no land disturbance activities would occur as a result of the Project; therefore, the Project would not result in impacts on protected species.

Table 3.10-1: Protected Species Potentially occurring in Effingham Energy Facility

Common Name	Scientific Name	Federal Status	State Status
Reptiles and Amphibians			
Eastern Indigo Snake	*Drymarchon corais couperi*	T	ST
Gopher Tortoise	*Gopherus polyphemus*	C[1]	ST
Frosted Flatwoods Salamander	*Ambystoma cingulatum*	T	ST

Common Name	Scientific Name	Federal Status	State Status
Insects			
Monarch Butterfly	*Danaus plexippus*	C[1, 2]	-
Plants			
Pondberry	*Lindera melissifolia*	E	SE

[1] Candidate species have sufficient information to propose them as threatened or endangered under the Endangered Species Act (ESA), but receive no protection under the ESA.
[2] The monarch butterfly was returned to the USFWS IPaC as a candidate species. GA DNR does not track this species.
E= federally endangered, T = federally threatened, C = candidate, SE = state endangered, ST = state threatened
Source: FWS, 2022

The Facility is located within the HUC 10 Dasher Creek-Savannah River watershed. There are currently 24 state-protected species of plants and animals with potential to occur in this watershed (GDNR, 2022). As the Project would involve only software and mechanical upgrades inside the Facility there will be no new ground disturbing impacts or clearing of vegetation. For these reasons and in accordance with 50 CFR 40 and 1970.657(b), RUS has determined that the proposed Project will have "No Effect" on those listed species or their critical habitat and written concurrence from USFWS is not required. Therefore, no further consultation with USFWS is required and the Section 7 review is complete. Since no impacts are anticipated, no special mitigation for protected species is proposed.

3.11 Transportation

Since the upgrades for the Project would occur during a routine major outage, there would already be a temporary increase in traffic at the Facility, and impacts from additional personnel and equipment to install the Project equipment would be negligible. No additional full-time employees would be hired for operation of the Facility due to the Project, therefore, no long-term or permanent traffic impacts are anticipated. Therefore, no traffic or transportation mitigation is proposed.

3.12 Vegetation

The Project would not require clearing of vegetation, as all control and mechanical adjustments would occur within the existing Facility. Therefore, no mitigation is proposed.

3.13 Water Resources and Wetlands

The proposed Project would not result in ground disturbing impacts; and all control and mechanical adjustments would occur within existing Facility structures. Implementation of the upgrades would not result in any new impacts to the receiving waters or associated wetlands within or near the Facility. Therefore, no mitigation is proposed.

3.14 Wildlife

The property is entirely fenced for security purposes. The existing fence is approximately eight feet high, which deters wildlife from entering the Facility. No changes to the existing Facility footprint or fence line are proposed. Therefore, no impacts on wildlife are anticipated and no mitigation is proposed.

4.0 CUMULATIVE EFFECTS

In accordance with NEPA, Oglethorpe considered the cumulative impacts of the Project and other projects or actions in the area. As defined by the CEQ, a cumulative effect is the impact on the environment that results from the incremental impact of the proposed action when added to other past, present, or reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions (CEQ, 1997). Although the individual impact of each separate project may be minor, the additive or synergistic effects of multiple projects could be significant. The Facility is an industrial site previously owned by Effingham County Power, LLC, which started operations in 2002, and transferred ownership to Oglethorpe in 2021.

In order to understand the contribution of past actions to the cumulative impacts of the proposed action, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects. In this analysis, RUS has generally considered the impacts of past projects within the resource-specific geographic scopes as part of the affected environment (environmental baseline), which was described under the specific resources discussed throughout section 3.0. This cumulative impact analysis includes other actions meeting the following three criteria:

- the action impacts a resource that is also potentially affected by the Facility's Combustion Turbine Upgrades Project;
- the action causes impacts within all or part of the same geographic scope as the Facility's Combustion Turbine Upgrades Project; and
- the action causes impacts within all or part of the temporal scope for the potential impacts from the Facility's Combustion Turbine Upgrades Project.

Based on the previous findings discussed throughout Section 3.0, the Project would only result in minor impacts on air quality and water use. Therefore, when combined with other past, present, and reasonably foreseeable future projects, the Facility's planned Project could only contribute toward cumulative impacts on air quality and water use. For the Project to contribute towards a cumulative impact on air quality and/or water use, the other contributing project(s) must overlap the same geographic and temporal scope as the planned Project.

For air quality, the distance used to establish a geographic scope was derived from the EPA's cumulative modeling of large PSD sources during permitting and follows 40 CFR 51, Appendix W, Section 4.1. This references a 31-mile (50-kilometer) radius of current or proposed sources of operational emissions. Although PSD modeling was not required or performed for this Project, if there is another ongoing or newly proposed emission source within the Facility's 31-mile radius, a cumulative impact could occur when the other project(s) is combined with the Project.

Oglethorpe then reviewed other proposed or pending projects within that 31-mile radius. Oglethorpe is unaware of any newly proposed or pending power generating facilities within that geographic scope. Other proposed or pending non-energy projects identified within the same geographic scope as the proposed Project include:

- General residential, commercial, and manufacturing/industrial development and construction.
- New and existing roadway construction and maintenance through the funds received from the Transportation Special Purpose Local Option Sales Tax (TSPLOST) program; and
- Landfills currently operating under a Title V permit.

4.1 Cumulative Impacts by Resource

4.1.1 Air Quality

Oglethorpe is not aware of any planned projects for other sources located near the Facility for which the Project would have a cumulative impact on air quality. Any other projects near the Facility would need to evaluate on a case-by-case basis whether cumulative modeling is required under the PSD regulations to demonstrate no violations of the NAAQS or PSD Increment will occur. Should such modeling be required in the future, the other projects and sources would include the Facility's post-Project potential emissions in its cumulative modeling evaluation.

4.1.2 Utilities

The Project would result in minor increases in water intake from the City of Savannah. The minor increase would not adversely affect the current or future available water supply. When combined with other past, present, or reasonably foreseeable future projects, the increased demand for water is insignificant compared to the volume of available water provided by the City of Savannah's two main intake sources.

5.0 SUMMARY OF MITIGATION

No resources are significantly impacted by the Project, and therefore no mitigation efforts are proposed. The Facility would continue proper operation of air emission controls such as dry low NO_X combustors on the turbines, SCR, and the use of low-sulfur fuel, as required by the existing air permit.

6.0 COORDINATION, CONSULTATION, AND CORRESPONDENCE

This section describes the consultation and coordination RUS and Oglethorpe have had with the public, public officials, and government agencies during the preparation of this document. This section describes the steps taken to inform these groups of the Project, summarizes comments received, and outlines further coordination and consultation with the public and other interested parties.

According to the Acting Federal Preservation Officer for RUS, the Project would meet the criteria for "No Potential to Effect" historic properties or cultural resources, as indicated in the memo provided in **Appendix A**. Therefore, a Section 106 review under the National Historic Preservation Act has been deemed unnecessary, and no Tribal entities have been contacted regarding the Project.

6.1 Agency Coordination

Federal, state, and local government agencies were sent a scoping letter on May 12, 2022, requesting assistance in identifying specific resources and issues at and around the Facility (the Project site) that should be considered during the environmental review for the Project. The letters sent, as well as copies of the responses received, are included in **Appendix E**. The following summarizes the comments of those agencies responding.

The following is a brief overview of responses:

- The USDA Natural Resources Conservation Service reviewed the Facility site for the Farmland Protection Policy Act, and the Projects do not convert farmland and no further action is needed. The Facility site was evaluated for the Watershed Program that helps local communities with flood control and watershed protection, and there are no such structures in the near vicinity or downstream of the proposed Facility site that would be affected by these activities. The Facility site was also evaluated for easements related to the Wetland Reserve Program and the Farm and Ranchland Protection Program, and no easements were identified in the vicinity or downstream of the Facility site.
- FWS responded that based on the information provided, the proposed action is not expected to significantly impact fish and wildlife resources under the jurisdiction of FWS.
- The U.S. Army Corps of Engineers (USACE) Savannah District responded that if the Project does not involve water of the U.S. under USACE jurisdiction, then a permit is not required.

Additionally, a submission was made to FWS on behalf of the Project, through the FWS IPaC system. The resulting communication from FWS is provided as **Appendix D**, and indicates that there are no

threatened, endangered, or candidate species, nor any critical habitat, within the Project area. This communication is included to satisfy Section 7 Consultation for the Project.

6.2 Public Involvement

This EA will be made available to the public for a 14-day public review and comment period on DATE. Availability of the document for review and comment will be published in the Effingham Herald newspaper. Copies of the EA will be made available for public review on the RUS project website, https://www.rd.usda.gov/resources/environmental-studies/assessments., and at the headquarters of Oglethorpe at 2100 E Exchange Pl., Tucker, GA 30084.

All questions and comments should be emailed to:

Suzanne Kopich
Environmental Protection Specialist
U.S. Dept. of Agriculture, Rural Utilities Service
Environmental and Historic Preservation Division
Rural Utilities Service, Rural Development
suzanne.kopich@usda.gov
202-961-8514

Once RUS has reviewed the comments, it will issue its decision related to the Proposal. Should RUS choose to issue a Finding of No Significant Impact (FONSI) for the Proposal, a newspaper notice will be published informing the public of the RUS finding and the availability of the EA and FONSI. The notice shall be prepared in accordance with RUS guidance.

7.0 LIST OF PREPARERS

The EA for the Project was prepared by RUS in coordination with Oglethorpe Power Corporation, Inc. and Burns & McDonnell. The following is a list of preparers of this document.

RUS

- Suzanne Kopich, Environmental Protection Specialist

Oglethorpe

- Bob Kulbacki, Project Manager
- Don Cheatham, Director, Operations Support
- Jim Messersmith, Sr. Vice President, Plant Operations
- Bob Kulbacki, Effingham Energy Facility Plant Manager
- Courtney Adcock, Senior Environmental Specialist
- Toni Presnell, Vice President Environmental & Regulatory Affairs

Burns & McDonnell

- Sara Kent, Project Manager
- Robyn Susemihl, NEPA Manager
- Fawn Armagost, Environmental Scientist
- Olivia Haney, Environmental Scientist

8.0 REFERENCES

Council on Environmental Quality (CEQ). 1997. Environmental Justice Guidance under the National Environmental Policy Act. Executive Office of the President, Washington, DC.

Savannahga.gov. 2022. *Protecting the Source.* Blog on the City of Savannah's website. Available at https://www.savannahga.gov/Blog.aspx?IID=72#:~:text=The%20City%20of%20Savannah%20actually,tributary%20of%20the%20Savannah%20River. Accessed in June 2022.

U.S. Code (USC). 2022. Accessed via the internet on May 8, 2022, at: https://uscode.house.gov/

U.S. Environmental Protection Agency (EPA). 2022. NAAQS Table. Accessed via the internet on May 7, 2022, at: https://www.epa.gov/criteria-air-pollutants/naaqs-table.

U.S. Fish and Wildlife Service (FWS). 2022. List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your project. Consultation Code: 04EG1000-2022-SLI-1137. Event code: 04EG1000-2020-E-02100. Letter issued on March 1, 2022.

APPENDIX A – MEMO ADDRESSING IMPACTS TO CULTURAL RESOURCES

From: Kopich, Suzanne - RD, National Office
To: Kent, Sara S
Subject: FW: Effingham Energy Facility Combustion Turbines Upgrades Project No Potential
Date: Tuesday, May 10, 2022 9:58:10 AM
Attachments: image001.png
image002.png
image003.png
image004.png
image005.png
image006.png
image007.png
Oglethorpe_Effingham AGP-LLTD_Project Description_Additional Information.pdf

---

Good morning Sara,

See Basia's response to Section 106 below. Also, tribal notification is not needed.

Regards,

Suzanne

Suzanne Kopich
Environmental Protection Specialist
Water and Environmental Programs
Rural Utilities Service, Rural Development
United States Department of Agriculture
1400 Independence Ave., S.W.
Washington, DC 20250
Phone: 202-692-4907 / Mobile: 202-961-8514

From: Howard, Basia - RD, National Office <basia.howard@usda.gov>
Sent: Monday, May 9, 2022 10:46 AM
To: Kopich, Suzanne - RD, National Office <Suzanne.Kopich@usda.gov>
Cc: Korosec, Gregory - RD, National Office <Gregory.Korosec@usda.gov>
Subject: Effingham Energy Facility Combustion Turbines Upgrades Project No Potential

Good Morning,

After reviewing the information attached in accordance with 36 CFR 800.3(a)(1) I believe the Oglethorpe Effingham Energy Facility Combustion Turbines Upgrades Project, is a type of activity that does not have the potential to cause effects on historic properties, assuming such historic properties were present. Therefore, the agency official has no further obligations under section 106 or this part.

Please save a copy this this email and attached documentation to the file.

Basia Howard (She/Her)
Archaeologist, Acting FPO, Deputy FPO

Environmental & Historic Preservation Division
Rural Utilities Service, Rural Development
United States Department of Agriculture
1400 Independence Avenue, SW
Room 4018, Mail Stop 1570
Washington, DC 20250
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Effingham Energy Facility

Combustion Turbines Upgrades Project

Project Description

The proposed Combustion Turbines Upgrades Project (the Project) will involve the implementation of two upgrades for the Effingham Energy Facility's two combustion turbines: the Advanced Gas Path (AGP) upgrade and the Low Load Turndown (LLTD) upgrade. The Effingham Energy Facility (Facility) is located in Effingham County near Rincon, Georgia (Figure 1).

AGP will improve facility electrical output and efficiency, and extend the maintenance interval of the units. This is accomplished by replacing existing gas turbine hardware with hardware using improved designs and materials, upgrading certain auxiliary equipment, and modifying site-specific control logic. Replacement hardware will include gas turbine buckets, diaphragm nozzles, and shroud blocks. These changes will increase the capacity of the facility by approximately 23 MWs (from approximately 500 MW to 523 MW), with variations for ambient temperatures, improve efficiency by approximately 2%, and extend the time between major maintenance activities by 33% (from about every 3 years to every 4 years based on operating profile). These improvements will lower the costs to Oglethorpe's 38 EMC members.

LLTD will involve installation of new gas turbine components and software controls to replace existing equipment and connected accessories to allow sustained operations at lower operating loads during periods of low demand. These changes include combustion chamber upgrades, modifications to associated cooling equipment, and site-specific control logic optimizations. Currently, the Facility periodically shuts down during low system demand and restarts when demand increases. The LLTD upgrade will allow the gas turbines to operate at reduced steady-state minimum loads to as low as 50 MWs per gas turbine (from the current minimum load of approximately 110 MWs per gas turbine), with variations for ambient temperatures, while continuing to maintain emissions concentrations of nitrogen oxides (NO_X) and carbon monoxide (CO) in compliance with the Facility's permitted emission limits. As a result, this upgrade will allow the Facility to continue to operate with less frequent shutdowns and restarts, thereby reducing fuel costs and equipment maintenance. This also will lower costs to Oglethorpe's 38 EMC members.

The Project will result in increases in maximum heat input, maximum hourly rate of air emissions, and expected annual air emissions. A small increase in water usage and water discharges is also expected.

Oglethorpe is currently evaluating the increase in air emissions resulting from the Project to determine if the Project will require a major modification under the Prevention of Significant Deterioration (PSD) permitting program. If the Project emissions increases exceed the PSD permitting thresholds, an evaluation of Best Available Control Technology (BACT) and an air dispersion modeling evaluation will be required as part of the air permit application.

Oglethorpe anticipates the Project will constitute a modification, as defined in 40 CFR 60.2, of the combustion turbines. As such, the combustion turbines will become subject to the New Source Performance Standard (NSPS) in 40 CFR 60 Subpart KKKK, *Standards of Performance for Stationary Combustion Turbines*, following the completion of the proposed Project. The Project will not constitute a reconstruction of the units.

Implementation of the Project is not expected to increase the noise from the Facility above historical levels, nor will it require changes in the gas supply, electrical transmission, or water usage/discharge infrastructure for the Facility. The Project will involve software and mechanical upgrades to existing equipment within the current Facility structures. No new ground-disturbing activities or new facilities, equipment, or buildings will be constructed within or outside the current Facility footprint. As a result, the Project will not impact biological resources, soils and geological resources, cultural resources, socioeconomic resources, hazardous materials, or wetlands.

Air Quality

The Project will result in increases in maximum heat input and expected annual emissions for all pollutants emitted as products of natural gas combustion. For certain air pollutants, this would require a modification to the Facility's current operating air quality permit. Oglethorpe will apply for a combined Title V operating permit modification and state

construction permit from the Georgia Environmental Protection Division (EPD) to authorize the emission increases associated with the Project. However, the increase in air pollutants are not expected to trigger additional evaluations under federal permitting programs, and no additional ambient air modeling of criteria pollutants or mitigation is anticipated. The only emission increases directly resulting from the Project are related to the two existing combined cycle combustion turbines.

The combined Title V operating permit modification and state construction permit application will include an evaluation of annual emissions increases from the Project using the actual-to-projected applicability test defined in the federal Prevention of Significant Deterioration (PSD) regulations. The analysis is expected to demonstrate that the two upgrades will not result in emission increases greater than the PSD Significant Emission Rates (SER) for any PSD-regulated pollutant. Therefore, PSD permitting are not likely to be required, and additional ambient air modeling or mitigation are not expected to be required pending the analysis results and EDP authorization.

No ground-disturbing activities are proposed for the upgrades, and there will be no emissions associated with earth-moving construction equipment. As such, the Project is not likely to result in significant adverse impacts to air quality and is not expected to contribute to any cumulative degradation of air quality in the area.

Cultural Resources Review

Burns & McDonnell cultural resources specialists requested archaeological site files and previous surveys from the Georgia Archaeological Site File (GASF) and reviewed Georgia's Natural, Archaeological, and Historic Resources GIS (GNAHRGIS) to identify previously documented historic-age properties, including National Register of Historic Places (NRHP)-listed properties or districts within a Study Area extending 1-mile from the boundary of the property.

Review of GASF data identified seven archaeological sites within the 1-mile Study Area (Table 1; Figure 2). One site, 9EF249, is within the current property boundary. Site 9EF249 is a small, low density lithic scatter recorded by Environmental Services, Inc. in 2001 during a survey for the CP&L Blanford Site. The limits of the survey were not provided by GASF. Archaeologists recovered 17 flakes within a 35- by 40-meter area. No NRHP eligibility assessment was provided by GASF. The remaining archeological sites are outside the property boundary. Of the remaining sites, only 9EF155 was recommended for NRHP inclusion by the recorder. Official NRHP Determinations of Eligibility were not provided by GASF for any of the sites in the Study Area.

Table 1: Archaeological Sites within 1-mile Study Area

Trinomial	Site Type	NRHP Eligibility	Intersects Project Boundary?
9EF153	Historic-age Homestead	Recommended Ineligible	No
9EF155	Multi-Component	Recommended Eligible	No
9EF156	Historic-age Homestead	Recommended Ineligible	No
9EF157	Historic-age Homestead	Recommended Ineligible	No
9EF249	Lithic Scatter	No Data	Yes
9EF288	Historic-age artifact scatter	Recommended Ineligible	No
9EF289	Multi-Component	Recommended Ineligible	No

Source: GASF 2022

Twelve archaeological surveys have been previously conducted within the 1-mile Study Area, three of which intersect the property boundary (Table 2; Figure 2). The previous surveys were conducted primarily in support of pipeline projects and did not identify any additional archeological sites within the 1-mile Study Area.

Table 2: Previous Archaeological Surveys within 1-mile Study Area

GASF ID	Year	Consultant	Sponsor	Project	Intersects Project Boundary?
2624	2003	TRC	Sonlight Enterprises, LLC	Heritage Project	No
3212	2005	R.C. Goodwin & Assoc., Inc.	Southern Natural Gas Company	Cypress Pipeline	No
5189	2005	R.C. Goodwin & Assoc., Inc.	Cypress Natural Gas Company, LLC.	Cypress Pipeline	No
6509	2001	R.C. Goodwin & Assoc., Inc.	Southern Natural Gas Company	South System Expansion Pipeline	Yes
6733	2011	R.C. Goodwin & Assoc., Inc.	Elba Express Company, LLC.	Elba Express Pipeline	No
7064	2003	Environmental Services, Inc.	Stevenson and Palmer Engineering, Inc.	Wastewater Treatment Facility	No
7458	2006	Brockington and Associates, Inc.	Sligh Environmental Consultants, Inc.; Slyland Development, Inc.	Staffordshire Estates	No
8395	2013	R.C. Goodwin & Assoc., Inc.	Elba Express Company, LLC.	Pipeline Modification	No
8570	1991	Brockington and Associates, Inc.	Savannah Electric and Power Company	Plant Macintosh Railroad Corridor	No
9265	2016	R.C. Goodwin & Assoc., Inc.	AECOM; Kinder Morgan	Palmetto Pipeline	Yes
9378	2009	R.C. Goodwin & Assoc., Inc.	Elba Express Company, LLC.	Elba Express Pipeline	Yes
14212	2018	Brockington and Associates, Inc.	Georgia International Rail Park	Georgia International Rail Park	No

Source: GASF 2022

There are three previously-recorded, historic-age, non-archaeological resources within the 1-mile Study Area (Table 3; Figure 2). None intersect the property boundary. NRHP Determinations of Eligibility were not provided by GNAHRGIS for any of the historic-age resources in the Study Area.

Table 3: Historic Resources within 1-mile Study Area

GNAHRGIS ID	Resource Type	Year Constructed	Building Type/Style	NRHP Eligibility	Intersects Project Boundary?
25209	Building	1924	Dwelling; No Style	No Data	No
25210	Building	1904	Georgian Cottage	No Data	No

GNAHRGIS ID	Resource Type	Year Constructed	Building Type/Style	NRHP Eligibility	Intersects Project Boundary?
25211	Building	1924	Dwelling; No Style	No Data	No

Source: GNAHRGIS 2022

REFERENCES

Georgia Archaeological Site File (GASF)

2022 *Shy Place Solar Search Results*. Electronic communication received April 23, 2021 from gasf@uga.edu.

Georgia Department of Natural Resources, Historic Preservation Division

2022 Georgia's Natural, Archeological, and Historic Resources Geographic Information System (GNAHRGIS). Electronic document, https://www.gnahrgis.org/, accessed May 5, 2021.

Effingham Power Plant Location

Property Boundary

NHD Flowline

NORTH

1,500 750 0 1,500

Scale in Feet

BURNS McDONNELL

Figure 1
Project Location
Effingham Energy Facility
Oglethorpe Power Corporation
Effingham County, Georgia

Issued: 4/15/2022

Source: Esri, USGS, NHD, USFWS, NWI, FEMA, NFHL,

Path: D:\GIS_Req\142475_EffinghamEA\142475_EffinghamEA.aprx olhaney 4/15/2022
Service Layer Credits: World Navigation Map: Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS

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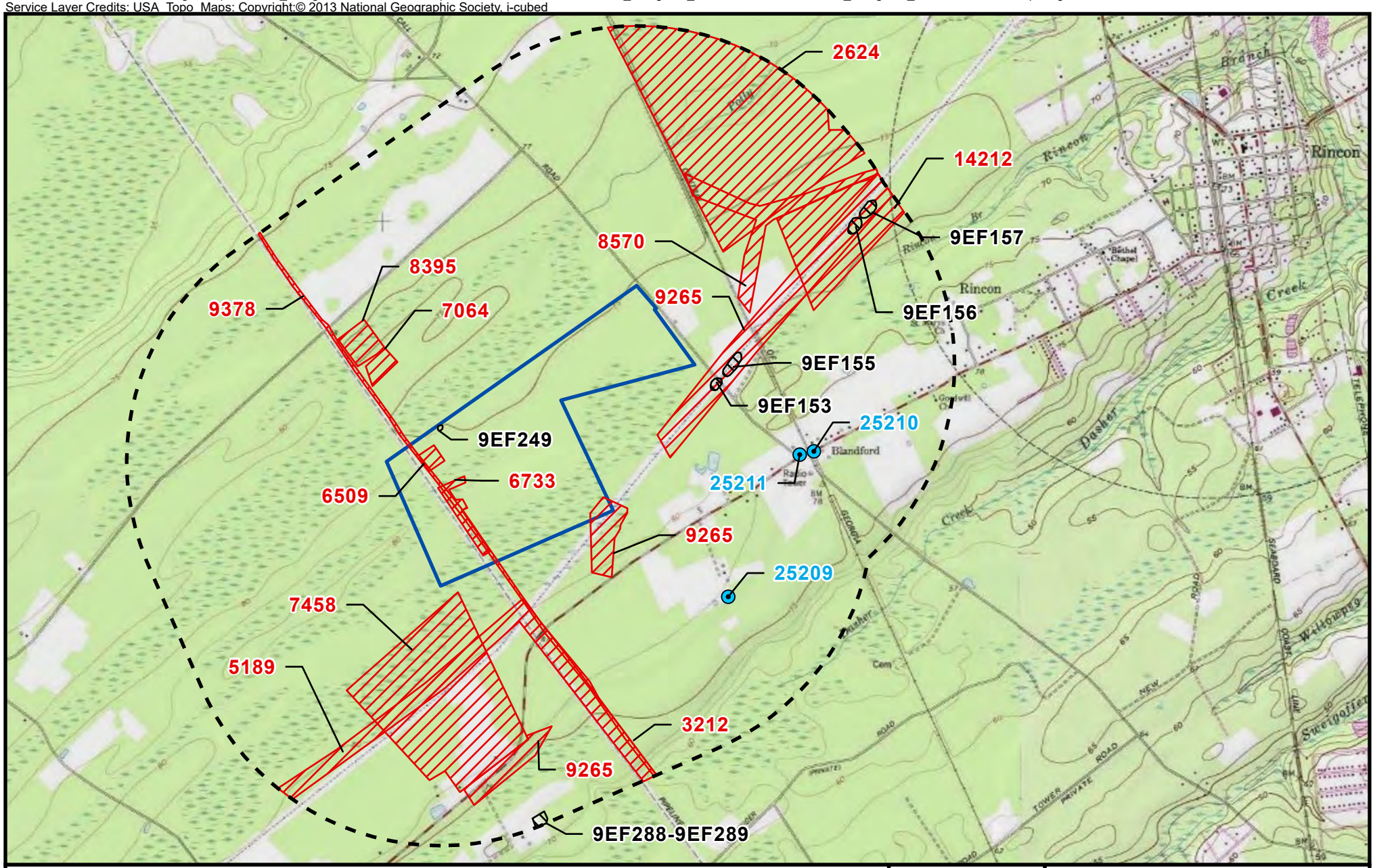
Service Layer Credits: USA_Topo_Maps: Copyright:© 2013 National Geographic Society, i-cubed



BURNS McDONNELL

Figure 2
1-Mile Facility Buffer
Effingham Energy Facility
Oglethorpe Power Corporation
Effingham County, Georgia

Source: ESRI; Burns & McDonnell Engineering Company, Inc

Issued: 4/12/2022

APPENDIX B – TITLE V OPERATING PERMIT MODIFICATION WITH STATE CONSTRUCTION APPLICATION

TITLE V SIGNIFICANT MODIFICATION WITH CONSTRUCTION APPLICATION

Oglethorpe Power Corporation > Effingham Energy Facility

TRINITY CONSULTANTS
3495 Piedmont Road
Building 10, Suite 905
Atlanta, GA 30305
(678) 441-9977

June 2022

Project 221101.0050

Trinity Consultants

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LIST OF TABLES

1. EXECUTIVE SUMMARY

Oglethorpe Power Corporation (OPC) owns and operates a gas-fired electrical power plant near Rincon, Georgia in Effingham County, known as the Effingham Energy Facility (OPC Effingham). OPC Effingham is a major source under both the Title V operating permit program and the Prevention of Significant Deterioration (PSD) construction permitting program. This facility currently operates under Part 70 Operating Permit No. 4911-103-0012-V-05-0, effective January 5, 2017, issued by the Georgia Environmental Protection Division (EPD). [1]

OPC Effingham is a natural gas-fired combined-cycle facility presently capable of producing a nominal power output of 525 megawatts (MW). The facility operates one power block consisting of two combined cycle combustion turbines (CCCTs) and one steam turbine, referred to as a "2-on-1" configuration. Each CCCT includes a GE 7FA combustion turbine (CT) exhausting to a heat recovery steam generator (HRSG), which generates steam to power the block's steam turbine. No supplementary heat input (i.e., duct burners) is installed on these units. To minimize the formation of oxides of nitrogen (NO_X), each CT is equipped with inherent controls of dry low NO_X combustors and Selective Catalytic Reduction (SCR) for control of NO_X emissions.

OPC Effingham's proposed CT Upgrades Project would increase the current generation capacity of the facility, helping to reduce the overall cost per megawatts (MW) of power generated, and would allow the facility's gas turbines to continue to operate at reduced power during times of low demand with less frequent shutdowns and subsequent restarts once demand increases. The project would result in increases in maximum heat input and projected actual annual air emissions. This application package contains the necessary state air construction and operating permit submittals for the proposed project. This application is being submitted using the Georgia EPD Online System (GEOS) with application ID No. 668257.

From functional and regulatory standpoints, the Effingham CT Upgrades Project that is the subject of this application is substantially similar to the CT Upgrades Project recently permitted for OPC's Chattahoochee Energy Facility under Permit Amendment No. 4911-149-0006-V-05-1 (Oct. 28, 2020). OPC respectfully suggests that it would be appropriate and efficient to permit the Effingham CT Upgrades Project using substantially the same permit terms used for the Chattahoochee Energy Facility CT Upgrades Project.

1.1 Proposed Project Description

The proposed CT Upgrades Project would involve the implementation of two upgrades for OPC Effingham's two combustion turbines: the Advanced Gas Path (AGP) and the Low Load Turndown (LLTD) upgrade.

The AGP upgrade would improve the combustion turbines, plant output, and heat rate as well as extend the maintenance interval of the units by installing enhanced hardware in the combustion turbines and adding site-specific control logic optimizations.

The LLTD upgrade would involve the installation of new combustion turbine components and software controls to replace selected equipment and connected accessories to allow for sustained operations at lower operating loads during periods of low demand.

[1] A renewal application for the facility Title V permit was submitted in June 2021, but a new Title V permit has not yet been issued for the facility. A name change application for the facility was also submitted in July 2021.

1.2 Permitting and Regulatory Requirements

OPC is submitting this construction and operating permit application to request authorization to modify and operate the facility's CTs. Since OPC Effingham is a major source under the PSD permitting program, emission increases from the proposed project must be evaluated and compared to the significant emission rates (SERs) for regulated pollutants under the PSD program. OPC has evaluated emissions increases of NO_X, carbon monoxide (CO), volatile organic compounds (VOC), particulate matter (PM), total particulate matter with an aerodynamic diameter of less than 10 microns (PM_{10}), total particulate matter with an aerodynamic diameter of less than 2.5 microns ($PM_{2.5}$), greenhouse gases (GHG) in terms of carbon dioxide equivalents (CO_2e), sulfur dioxide (SO_2), and sulfuric acid mist (H_2SO_4) resulting from the proposed project for comparison to their respective PSD SERs to determine whether PSD permitting is required, as shown in Table 1-1.[2]

Table 1-1. Proposed Project Emissions Increases

Pollutant	Units CTG1 and CTG2				Cooling Tower Associated Emissions Increase (tpy)	Total Project Emissions Increase (tpy)	PSD Significant Emission Rate (tpy)	PSD Triggered?
	Baseline Actual Emissions (tpy)	"Could Have Accommodated" Emissions (tpy)	Projected Actual Emissions (tpy)	Project Emissions Increase[1] (tpy)				
NO_X	82.6	103.2	140.2	**37.0**	-	**37.0**	40	No
CO	188.9	289.0	289.0	**0.0**	-	**0.0**	100	No
VOC	20.1	27.2	31.0	**3.80**	-	**3.8**	40	No
PM	50.2	68.0	77.5	**9.5**	0.8	**10.3**	25	No
PM_{10}	50.2	68.0	77.5	**9.5**	0.6	**10.1**	15	No
$PM_{2.5}$	50.2	68.0	77.5	**9.5**	1.84E-03	**9.5**	10	No
SO_2	6.0	8.2	9.3	**1.14**	-	**1.1**	40	No
H_2SO_4	0.28	0.4	0.4	**0.05**	-	**0.1**	7	No
CO_2e[2]	1,194,844	1,618,359	1,844,417	**226,058**	-	**226,058**	75,000	No

1. Project Emissions Increase = (Projected Actual Emissions - Baseline Actual Emissions) - ("Could Have Accommodated" Emissions - Baseline Actual Emissions)
2. For CO_2e, PSD may apply only if the emissions increase exceeds the SER for CO_2e and PSD is otherwise triggered by another PSD-regulated pollutant.

Since the combined project emissions increases of all pollutants that may trigger PSD for the project are below their respective SERs, the proposed project is not required to undergo PSD review. Emission calculations are described in Section 3 of this application, and New Source Review (NSR) applicability is detailed in Section 4.1.

OPC is submitting this construction and operating permit application package in accordance with all federal and state requirements. As described herein, the proposed project will be subject to federal New Source

[2] AP-42, Chapter 3, Section 1, *Stationary Gas Turbines,* lists the lead (Pb) emission factor for natural gas turbines as ND (no detect); therefore, Pb emissions increases for the proposed project were not evaluated. GHGs (as CO_2e) cannot trigger PSD permitting but may be subject to aspects of PSD permitting if GHGs (as CO_2e) exceed the SER and a SER is exceeded for another regulated pollutant.

Performance Standards (NSPS) and the Georgia Rules for Air Quality Control (GRAQC). Applicability of these programs is discussed in Section 4 of this application.

1.3 Application Contents

- Section 2 contains a description of the proposed project;
- Section 3 summarizes emissions calculation methodologies and assesses PSD applicability;
- Section 4 details the regulatory applicability analysis for the proposed project;
- Section 5 contains the toxics impact assessment;
- Appendix A includes an area map and simplified process flow diagram;
- Appendix B includes detailed potential emission calculations;
- Appendix C contains documentation for the toxics impact analysis; and
- Appendix D contains the EPD SIP construction permit application forms
- Appendix E contains the project emissions increase calculations for this project.

2. PROPOSED PROJECT DESCRIPTION

The proposed CT Upgrades Project would involve the implementation of two upgrades for OPC Effingham's two combustion turbines: the AGP and the LLTD upgrade.

The AGP upgrade would improve facility electrical output and efficiency, and extend the maintenance interval of the units. This would be accomplished by replacing existing gas turbine hardware with hardware using improved designs and materials and modifying site-specific control logic. Replacement hardware will include gas turbine buckets, diaphragm nozzles, and shroud blocks. These changes would increase the capacity of the facility by approximately 23 MW, with variations for ambient temperatures, improve efficiency by approximately 2%, and extend the time between major maintenance activities by 33% (from every 3 years to every 4 years based on operating profile). These improvements would decrease the cost of electricity generation.

The LLTD upgrade would involve the installation of new combustion turbine components and software controls to replace existing equipment and connected accessories to allow for sustained operations at lower operating loads during periods of low demand. These changes would include combustion chamber upgrades, modifications to associated cooling equipment, and site-specific control logic optimizations. Currently, the facility shuts down periodically during low system demand and then restarts when demand increases. The LLTD upgrades would allow the combustion turbines to operate at reduced steady-state minimum loads of approximately 50 MW (from the current minimum load of approximately 110 MW per gas turbine), with variations for ambient temperatures, while continuing to maintain emission concentrations of NO_X and CO in compliance with the facility's permitted emission limits. As a result, this upgrade would allow the facility to continue to operate with less frequent shutdowns during low demand periods, thereby reducing equipment maintenance and fuel costs associated with cycling through shutdowns and startups.

3. EMISSIONS CALCULATION METHODOLOGY

This section addresses the methodology used to quantify the emissions from the proposed project and assesses federal NSR permitting applicability. Pollutants with a potential emissions increase from the proposed project include CO, NO_X, SO_2, VOC, PM, PM_{10}, $PM_{2.5}$, H_2SO_4, GHG in the form of CO_2e, and hazardous air pollutants (HAP). These emissions occur as a result of natural gas combustion in the combustion turbines. Detailed project emission increase calculations are presented in Appendix E, while revised potential emission estimates for the facility are provided in Appendix B.

3.1 NSR Permitting Evaluation Methodology

The NSR permitting program generally requires that a source obtain a permit prior to construction of any project at an industrial facility if the proposed project results in increases in air pollution emissions in excess of certain threshold levels. The federal NSR program is comprised of two elements: Nonattainment NSR (NNSR) and PSD. The NNSR program potentially applies to new construction or modifications that result in emission increases of a particular pollutant for which the area the facility is located in is classified as "nonattainment" with the National Ambient Air Quality Standards (NAAQS) for that pollutant. The PSD program applies to project increases of those pollutants for which the area the facility is located in is classified as "attainment" or "unclassifiable" for the NAAQS. OPC Effingham is located in Effingham County, which has been designated by the U.S. EPA as "attainment" or "unclassifiable" for all criteria pollutants.[3] Therefore, PSD is the relevant permitting program under the federal NSR program. OPC Effingham is an existing PSD major source, as it has potential emissions of multiple regulated criteria pollutants exceeding the major source threshold of 100 tpy.[4] As a result, new construction or modifications that result in emissions increases for criteria pollutants are potentially subject to PSD permitting requirements.

The following sections discuss the methodology used in the project emissions increase evaluation conducted to assess PSD applicability. As the facility is classified as a major source for PSD, if the proposed project meets the definition of a *major modification*, then PSD permitting requirements apply. For all PSD-regulated pollutants other than CO_2e, PSD permitting is required if the emissions increase of a specific pollutant exceeds that pollutant's PSD SER. For CO_2e, PSD may apply only if the emissions increase exceeds the SER for CO_2e and PSD is otherwise triggered by another PSD-regulated pollutant.[5]

3.2 Defining Existing Versus New Emission Units

For purposes of calculating project emissions increases, different calculation methodologies are used for existing and new units; therefore, it is important to clarify whether the sources affected by the proposed project are considered new or existing emission units.

40 CFR 52.21(b)(7)(i) and (ii) define new unit and existing units, and are incorporated by reference in the GRAQC:

[3] 40 CFR 81.311

[4] Fossil fuel-fired steam electric plants of more than 250 MMBtu/hr input (which includes combined cycle natural gas plants) are on the "List of 28" named source categories which are subject to a lower major source threshold for criteria pollutants of 100 tpy.

[5] 40 CFR 52.21(b)(49)(iii) as incorporated by reference in the GRAQC

(i) *A new emissions unit is any emissions unit that is (or will be) newly constructed and that has existed for less than 2 years from the date such emissions unit first operated.*

(ii) *An existing emissions unit is any unit that does not meet the requirements in paragraph (b)(7)(i) of this section. A replacement unit, as defined in paragraph (b)(33) of this section, is an existing emissions unit.*

As the emission units at OPC Effingham have operated for more than two years, the proposed project involves physical or operational changes to existing emission units only – specifically, the facility's combustion turbines. There are no new emission units proposed for installation as part of this project.

3.3 Annual Emissions Increase Calculation Methodology

As OPC Effingham is classified as a major source for PSD, if the proposed project meets the definition of a *major modification*, then the full PSD permitting requirements apply. *Major modification* is defined by 40 CFR 52.21(b)(2)(i):

> *"Major Modification" means any physical change in or change in the method of operation of a major stationary source that would result in a significant emission increase … of a regulated NSR pollutant … and a significant net emissions increase of that pollutant …*

Certain exemptions to the major modification definition exist that, if applicable, mean a project does not require an emission increase assessment. The proposed project does not qualify for any of the established exemptions.

The project emissions have been analyzed using the current NSR Reform methodology to determine if a significant emissions increase will occur. *Net emissions increase* (NEI) is defined by 40 CFR 52.21(b)(3)(i):

> *"Net Emissions Increase" means, with respect to any regulated NSR pollutant … the amount by which the sum of the following exceeds zero:*
>
> *(a) The increase in emissions … as calculated pursuant to paragraph (a)(2)(iv) [for existing units, calculated by actual-to-projected actual[6] or actual-to-potential; for new units, calculated by actual-to-potential][7]*
>
> *(b) Any other increases or decreases in actual emissions…that are contemporaneous with the particular change and are otherwise creditable. Baseline emissions for calculating increases and decreases…shall be determined as provided…*

[6] 40 CFR 52.21(a)(2)(iv)(c), Actual-to-projected-actual applicability test for projects that only involve existing emissions units, states: A significant emissions increase of a regulated NSR pollutant is projected to occur if the sum of the difference between the projected actual emissions … and the baseline actual emissions … equals or exceeds the significant amount for that pollutant …

[7] 40 CFR 52.21(a)(2)(iv)(d), Actual-to-potential test for projects that only involve construction of new emissions units, states: A significant emissions increase of a regulated NSR pollutant is projected to occur if the sum of the difference between the potential to emit … and the baseline actual emissions … equals or exceeds the significant amount for that pollutant …

The first step (1) is commonly referred to as the "project emission increases" as it has historically accounted only for emissions related to the proposed project itself. If the emission increases estimated per step (1) exceed the major modification thresholds, then the applicant may move to step (2), commonly referred to as the 5-year netting analysis. The netting analysis includes all projects for which emission increases or decreases (e.g., equipment shutdown) occurred. If the resulting net emission increases exceed the major modification threshold, then NSR permitting is required. OPC has evaluated the project emissions increase for the proposed project (i.e., Step 1) using the methodologies outlined in the following sections. An evaluation of the net emissions increase (i.e., Step 2) was neither required nor conducted for the proposed project because no emission increases calculated under Step 1 exceed a major modification threshold.

While the prior quotations only reference three components potentially relevant to an NEI calculation (actual, projected actual, and potential emissions), there are actually five potentially relevant calculated components, with the additional components being (1) a subset of the definition for *projected actual* and (2) additional associated emission unit increases:

- Potential emissions
- Baseline actual emissions
- Projected actual emissions
- "Could have accommodated" emissions exclusion (commonly called the demand growth exclusion)
- Additional associated emission unit increases

3.3.1 Potential Emissions

Potential emissions are defined by 40 CFR 52.21(b)(4) where the potential to emit:

> *…means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable…*

While potential emission estimates have not been relied upon for purposes of the PSD project emission increase analysis, post-project potential emissions are detailed in Appendix E for documentation of the facility estimated potential emissions following the project.

3.3.2 Baseline Actual Emissions

Baseline actual emissions are defined in GRAQC 391-3-1-.02(7)(a)2(i)(I):

> *For any existing electric utility steam generating unit, baseline actual emissions means the average rate, in tons per year, at which the unit actually emitted the pollutant during any consecutive 24-month period selected by the owner or operator within the 5-year period immediately preceding when the owner or operator begins actual construction of the project. …*

3.3.3 Projected Actual Emissions

Projected actual emissions are defined by GRAQC 391-3-1-.02(7)(a)2(ii)(I):

> *"Projected actual emissions" means the maximum annual rate, in tons per year, at which an existing emissions unit is projected to emit a regulated NSR pollutant in any one of the 5 years (12-month period) following the date the unit resumes regular operation after the project, or in any one of the 10 years following that date, if the project involves increasing the emissions unit's design capacity or its potential to emit that regulated NSR pollutant and full utilization of the unit would result in a significant emissions increase or a significant net emissions increase at the major stationary source.*

In determining projected actual emissions, following GRAQC 391-3-1-.02(7)(a)2(ii)(II)I, the source:

> *Shall consider all relevant information, including but not limited to, historical operational data, the company's own representations, the company's expected business activity and the company's highest projections of business activity, the company's filings with the State or Federal regulatory authorities, and compliance plans under the approved State Implementation Plan.*

In addition, when calculating projected actual emissions, OPC Effingham can exclude emissions that could have been accommodated prior to the project and that are unrelated to the project, pursuant to GRAQC 391-3-1-.02(7)(a)2(ii)(II)III.

3.3.4 Could Have Accommodated Emissions

An exclusion, per GRAQC 391-3-1-.02(7)(a)2(ii)(II)III, is included in the definition of projected actual emissions and is a value that can be subtracted from the projected actual emissions for existing emission units:

> *May exclude, in calculating any increase in emissions that results from the particular project, [1] that portion of the unit's emissions following the project that an existing unit could have accommodated during the consecutive 24-month period used to establish the baseline actual emissions under subparagraph (7)(a)2.(i) of this rule and that is also [2] unrelated to the particular project, including any increased utilization due to product demand growth (the increase in emissions that may be excluded under this subparagraph shall hereinafter be referred to as "demand growth emissions")... [numbers 1 and 2 added]*

3.3.5 Additional Associated Emission Unit Increases

In addition to the emission increases from new or modified units, emission increases from associated emission units that may realize an increase in emissions due to a project must be included in the assessment of the project emissions increases. OPC Effingham anticipates that the modifications to and increased utilization of the combustion turbines would result in an associated increase in drift loss and, therefore, air emissions from the facility's cooling tower. As such, associated emissions increases are included in this analysis for the cooling towers. No other facility emission units are anticipated to have any associated emissions increases related to this project.

3.4 Baseline Actual Emissions

The most recent 5-year lookback period was utilized for this analysis. Accordingly, a period of January 2020 to December 2021 was selected as the 2-year (consecutive 24-month) baseline period for all pollutants, except for CO, for which the period of March 2018 to February 2020 was selected. Baseline actual emissions data utilized for the NSR analysis for each combined cycle combustion unit can be found in Appendix E.

3.5 Projected Actual Emissions

Projected actual emissions for the modified equipment were determined for use in the NSR analysis, based on the highest projected level of actual annual utilization of the modified combustion turbine systems in the ten years following the project (at 31.0 x 10^6 MMBtu/yr total for both CCCTs), and estimated actual emission factors derived from facility operations, as summarized in Table 3-1.

Table 3-1. Criteria Pollutant Projected Actual Emission Factors for CCCT Units

Pollutant	Emission Factor (lb/MMBtu)
VOC[1]	2.00E-03
$PM_{10}/PM_{2.5}$[2]	5.00E-03
SO_2[3]	6.00E-04
H_2SO_4[4]	2.76E-05
CO_2[5]	118.86
CH_4[6]	2.20E-03
N_2O[6]	2.20E-04
CO_2e[7]	118.98
NOx[8]	9.05E-03
CO[8]	2.77E-02

1. VOC emission factor from the December 2000 PSD permit application for construction of the facility.

2. PM emissions are conservatively based on the results of the compliance testing performed at TA Smith in 2020 (GE 7FA units) multiplied by a 50% safety factor and rounded up to the nearest thousandths decimal place. The test results are inclusive of both the filterable and condensable portions of PM. It was conservatively assumed all PM is less than 2.5 microns in diameter (i.e., $PM_{2.5} = PM_{10} = PM$).

3. SO_2 emissions were estimated using the default SO_2 emission rate for pipeline natural gas from 40 CFR 75, Appendix D, Section 2.3.1.1, consistent with the methodology used to report the facility's SO_2 emissions under the CAMD programs.

4. H_2SO_4 emissions were calculated assuming a 3% conversion of SO_2 to H_2SO_4, consistent with the December 2000 PSD permit application for construction of the facility.

5. CO_2 emissions were calculated in accordance with 40 CFR 75, Appendix G, Equation G-4 using the F-factor for natural gas, consistent with the methodology used to report the facility's CO_2 emissions under the CAMD programs and the EPA GHG reporting rule.

6. CH_4 and N_2O emission factors for natural gas combustion are from 40 CFR 98, Subpart C, Table C-2, converted from kg to lb, consistent with the methodology used to report the facility's emissions under the EPA GHG reporting rule.

7. CO_2e was calculated as the sum of the emission factor for each GHG pollutant multiplied by that pollutant's global warming potential (GWP). GWPs were taken from 40 CFR 98, Subpart A, Table A-1:

CO_2: 1
CH_4: 25
N_2O: 298

8. The average NOX and CO emission factors (lb/MMBtu) were based on the total NOX and CO emissions divided by the total heat input during the 24-month baseline period for each pollutant, multiplied by a 10% safety factor.

3.6 Could Have Accommodated Emissions

The "could have accommodated" emissions for this project are based on the conservative approach to this calculation described in the "Georgia Pacific memo" and subsequent correspondence with U.S. EPA. That is, for purposes of this application, "could have accommodated" emissions were calculated using the maximum 30-day period during the respective baseline period.[8] Additional conservative assumptions were applied to the 30-day maximum period technique as outlined in the referenced Georgia Pacific memo.

Specifically, application of an additional seasonal variation was relied upon for this analysis. The maximum 30-day period from each season was evaluated and used to evaluate total emissions for the entire seasonal period. Seasonal breakdowns were evaluated as follows:

Spring: March – May
Summer: June – August
Fall: September – November
Winter: December – February

The maximum monthly emissions from each season were then used to compile data for a 12 month period. Specifically, the highest monthly emissions from each season were summed together and then multiplied by three months per season to calculate the "could have accommodated" emissions for this project used in this permit application. Emissions that are excluded from the projected actual emissions using this methodology are necessarily unrelated to the proposed project as they are based on existing capacity and actual data from the selected baseline period.

Additional data regarding the "could have accommodated" analysis is included in Appendix E.

3.7 NSR Emissions Increase Summary

Table 3-2 shows the total emissions increase of the proposed project compared to the PSD major modification thresholds.[9] Detailed emission calculations can be found in Appendix E of this application report.

[8] https://www.epa.gov/nsr/response-georgia-pacific-use-demand-growth-exclusion-projected-actual-emissions

[9] AP-42, Chapter 3, Section 1, *Stationary Gas Turbines,* lists the Pb emission factor for natural gas turbines as ND (no detect); therefore, Pb emissions increases for the proposed project were not evaluated.

Table 3-2. Project Emissions Increase

Pollutant	Units CTG1 and CTG2				Cooling Tower Associated Emissions Increase (tpy)	Total Project Emissions Increase (tpy)	PSD Significant Emission Rate (tpy)	PSD Triggered?
	Baseline Actual Emissions (tpy)	"Could Have Accommodated" Emissions (tpy)	Projected Actual Emissions (tpy)	Project Emissions Increase[1] (tpy)				
NO_X	82.6	103.2	140.2	**37.0**	-	**37.0**	40	No
CO	188.9	289.0	289.0	**0.0**	-	**0.0**	100	No
VOC	20.1	27.2	31.0	**3.80**	-	**3.8**	40	No
PM	50.2	68.0	77.5	**9.5**	0.8	**10.3**	25	No
PM_{10}	50.2	68.0	77.5	**9.5**	0.6	**10.1**	15	No
$PM_{2.5}$	50.2	68.0	77.5	**9.5**	1.84E-03	**9.5**	10	No
SO_2	6.0	8.2	9.3	**1.14**	-	**1.1**	40	No
H_2SO_4	0.28	0.4	0.4	**0.05**	-	**0.1**	7	No
CO_2e[2]	1,194,844	1,618,359	1,844,417	**226,058**	-	**226,058**	75,000	No

1. Project Emissions Increase = (Projected Actual Emissions - Baseline Actual Emissions) - ("Could Have Accommodated" Emissions - Baseline Actual Emissions)
2. For CO_2e, PSD may apply only if the emissions increase exceeds the SER for CO_2e and PSD is otherwise triggered by another PSD-regulated pollutant.

3.8 Potential Emissions Estimate

The following sections discuss the methodology used to calculate the potential emissions for each emission unit at the facility.

3.8.1 Combined Cycle Combustion Turbines

The potential emissions for each CCCT are determined on a pollutant-by-pollutant basis. Table 3-3 summarizes the criteria pollutant emission factors utilized for estimation of potential emissions from both CCCT units.

Table 3-3. Criteria Pollutant Emission Factors for CCCT Units

Pollutant	Emission Factor (lb/MMBtu)	Potential Emissions (tpy)
NO_X[1]	1.11E-02	218.0
CO[1]	2.01E-02	289.0
VOC[2]	2.00E-03	33
PM[3]	21.6 (lb/hr)	189.2
Total PM_{10}[3]	21.6 (lb/hr)	189.2
Total $PM_{2.5}$[3]	21.6 (lb/hr)	189.2
SO_2[4]	6.00E-04	9.82
H_2SO_4[5]	2.76E-05	0.45
CO_2[6]	1.19E+02	1,946,028
CH_4[7]	2.20E-03	36.0
N_2O[7]	2.20E-04	3.60
CO_2e[8]	1.19E+02	1,947,993

1. The NO_X and CO emission factors are based on the facility's permitted annual emission limits for each combustion turbine found in Permit Condition No. 3.3.5.

2. VOC emission factor from the December 2000 PSD permit application for construction of the facility.

3. PM emissions are based on the facility's permitted annual emission limits for each combustion turbine found in Permit Condition No. 3.3.4 (d), given in units of lb/hr. It was conservatively assumed all PM is less than 2.5 microns in diameter (i.e., $PM_{2.5}$ = PM_{10} = PM).

4. SO_2 emissions were estimated using the default SO_2 emission rate for pipeline natural gas from 40 CFR 75, Appendix D, Section 2.3.1.1, consistent with the methodology used to report the facility's SO_2 emissions under the CAMD programs.

5. H_2SO_4 emissions were calculated assuming a 3% conversion of SO_2 to H_2SO_4, consistent with the December 2000 PSD permit application for construction of the facility.

6. CO_2 emissions were calculated in accordance with 40 CFR 75, Appendix G, Equation G-4 using the F-factor for natural gas, consistent with the methodology used to report the facility's CO_2 emissions under the CAMD programs and the EPA GHG reporting rule.

7. CH_4 and N_2O emission factors for natural gas combustion are from 40 CFR 98, Subpart C, Table C-2, converted from kg to lb, consistent with the methodology used to report the facility's emissions under the EPA GHG reporting rule.

8. CO_2e was calculated as the sum of the emission factor for each GHG pollutant multiplied by that pollutant's global warming potential (GWP). GWPs were taken from 40 CFR 98, Subpart A, Table A-1:

CO_2:	1
CH_4:	25
N_2O:	298

3.8.2 HAP/TAP Emissions

HAP and toxic air pollutant (TAP) emissions are evaluated from each CCCT using AP-42 based emission factors , unless otherwise noted. Details regarding the estimation of HAP/TAP emissions can be found in Appendices B and C.

3.8.3 Preheater and Auxiliary Boiler

Criteria emissions from both the 1.875 MMBtu/hr natural gas-fired preheater and the 17 MMBtu/hr natural-gas fired auxiliary boiler are evaluated using AP-42 Table 1.4-2 ("Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion") and the Title V operating permit requirements, which can be found in Condition 3.3.6 for the preheater and 3.3.7 for the boiler. HAP and TAP emissions are evaluated using AP-42 Table 1.4-2 ("Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion"), Table 1.4-3 ("Emission Factors for Speciated Organic Compounds from Natural Gas Combustion"), and Table 1.4-4 ("Emission Factors for Metals from Natural Gas Combustion"). Details regarding the estimation of criteria pollutants and HAP/TAP for these emission units can be found in Appendix B. Tables 3-4 and 3-5 summarizes the criteria pollutant emission factors utilized for estimation of potential emissions for the preheater and the boiler, respectively.

Table 3-4. Criteria Pollutant Emission Factors for the Natural-Gas Fired Preheater

Pollutant	Emission Factor ($lb/10^6$ scf)[1]	Potential Emissions (tpy)[2]
NO_X[3]	51	0.41
CO[4]	83.64	0.67
VOC	5.50	4.43E-02
PM	7.60	6.12E-02
Total PM_{10}	7.60	6.12E-02
Total $PM_{2.5}$	7.60	6.12E-02
SO_2	0.60	4.83E-03

1. Emission factors are based on AP-42 Table 1.4-2 "Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion" (July 1998), unless otherwise specified.

2. Tons per year calculation assumes 8,760 hours of operation in a year.

3. Hourly emission rate for NO_X from FP1 specified as 0.05 lb/MMBtu, per Condition 3.3.6(a) in Title V operating permit.

4. Hourly emission rate for CO from FP1 specified as 0.082 lb/MMBtu, per Condition 3.3.6(b) in Title V operating permit.

Table 3-5. Criteria Pollutant Emission Factors for the Natural-Gas Fired Auxiliary Boiler

Pollutant	Emission Factor ($lb/10^6$ scf)[1]	Potential Emissions (tpy)[2]
NO_X[3]	99.96	2.08
CO[4]	83.64	1.74
VOC	5.50	0.11
PM	7.60	0.16
Total PM_{10}	7.60	0.16
Total $PM_{2.5}$	7.60	0.16
SO_2	0.60	1.25E-02

1. Emission factors are based on AP-42 Table 1.4-2 "Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion" (July 1998), unless otherwise specified.

2. Tons per year calculation assumes 2,500 hours of operation in a year.

3. Hourly emission rate for NO_X from FP1 specified as 0.098 lb/MMBtu, per Condition 3.3.6(a) in Title V operating permit.

4. Hourly emission rate for CO from FP1 specified as 0.082 lb/MMBtu, per Condition 3.3.6(b) in Title V operating permit.

3.8.4 Emergency Firewater Pump

The Effingham facility contains one (1) diesel-powered emergency firewater pump rated at 235 bhp. Criteria emissions for the emergency pump are taken from AP-42 Table 3.3-1 "Emission Factors for Uncontrolled Gasoline and Diesel Industrial Engines", and HAP/TAP emissions are based on AP-42 Table 3.3-2 "Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engines". The pump was conservatively estimated to operate for 500 hours per year in accordance with Condition 3.2.2 in the permit. Appendix B contains further information about the emissions estimate for the emergency firewater pump.

3.8.5 Cooling Tower

Cooling tower emissions, as found in Appendix B, are calculated based on a vendor-based drift rate, and facility records of the Total Dissolved Solids (TDS) concentration present in the waters processed at the cooling tower. This data is relied upon using emission estimation methods for cooling towers outlined in *Calculating Realistic PM_{10} Emissions from Cooling Towers* by Joel Reisman and Gordon Frisbie, 2002, to estimate potential emissions from the facility cooling towers.

3.8.6 Insignificant Emissions Sources

The facility has other small insignificant sources of emissions (e.g., fugitive piping leaks, roads, etc.) at the facility which are not quantified within the potential to emit estimates within this application.

3.8.7 Total Potential Emissions

The post-project total potential emissions for the OPC Effingham facility can be found in Table 3.4 below:

Table 3-6. Post Project Potential to Emit

Pollutant	Potential Emissions (tpy)
NO_X	222.3
CO	291.8
VOC	33.0
PM	104.2
Total PM_{10}	104
Total $PM_{2.5}$	97
SO_2	9.96
H_2SO_4	0.45
CO_2	1,946,028
CH_4	36.0
N_2O	3.60
CO_2e	1,947,993
Total HAP	7.31
Max Single HAP in CCCT[1]	2.13

1. Maximum single HAP is Toluene.

4. REGULATORY APPLICABILITY ANALYSIS

The project will be subject to certain federal and state air regulations. This section of the application summarizes the air permitting requirements and key air quality regulations that will potentially apply to OPC Effingham as a result of the proposed project. Potential applicability of NSR, Title V, NSPS, National Emission Standards for Hazardous Air Pollutants (NESHAP), GRAQC, and other regulations to the proposed project are addressed herein.

4.1 New Source Review Applicability

The NSR permitting program generally requires a source to obtain a permit and undertake other obligations prior to construction of any project at an industrial facility if the proposed project results in an emissions increase in excess of certain pollutant threshold levels. EPD administers its major NSR permitting program through GRAQC Rule 391-3-1-.02(7), *Prevention of Significant Deterioration of Air Quality*, which establishes preconstruction, construction, and operation requirements for new and modified sources.

The federal NSR program is comprised of two elements: NNSR and PSD. The NNSR program potentially applies to new construction or modifications that result in emission increases of a particular pollutant for which the area where the facility is located is classified as "nonattainment" for that pollutant. The PSD program applies to project increases of those pollutants for which the area the facility is located in is classified as "attainment" or "unclassifiable." OPC Effingham is located in Effingham County, which has been designated by the U.S. EPA as "attainment" or "unclassifiable" for all criteria pollutants.[10] Therefore, PSD is the applicable potential permitting program under the federal NSR program.

The PSD program only regulates emissions from "major" stationary sources of regulated air pollutants. A stationary source is considered PSD major if potential emissions of any regulated pollutant exceed the major source thresholds. The PSD major source threshold for OPC Effingham is 100 tpy for all regulated pollutants, except GHG.[11, 12] OPC Effingham is classified as an existing PSD major source since potential emissions of at least one regulated pollutant exceeds 100 tpy. For sources which are PSD major for at least one regulated pollutant, the emissions increases for all regulated pollutants resulting from the proposed project must be compared against the PSD SER to determine if the project is subject to PSD review. For CO_2e, PSD only applies if the emissions increase from the proposed project exceeds the SER for CO_2e and the project is already undergoing PSD permitting for at least one other PSD-regulated pollutant.

The emissions increases from the proposed project for each regulated pollutant compared to the respective SERs are shown in Table 4-1.

[10] 40 CFR 81.311

[11] Fossil fuel-fired steam electric plants of more than 250 MMBtu/hr input (which includes combined cycle natural gas plants) are on the "List of 28" named source categories which are subject to a lower major source threshold for criteria pollutants of 100 tpy.

[12] 40 CFR 52.21(b)(49)(iii)

Table 4-1. Project Emission Increase Compared to PSD SERs

Pollutant	Units CTG1 and CTG2				Cooling Tower Associated Emissions Increase (tpy)	Total Project Emissions Increase (tpy)	PSD Significant Emission Rate (tpy)	PSD Triggered?
	Baseline Actual Emissions (tpy)	"Could Have Accommodated" Emissions (tpy)	Projected Actual Emissions (tpy)	Project Emissions Increase[1] (tpy)				
NO_X	82.6	103.2	140.2	**37.0**	-	**37.0**	40	No
CO	188.9	289.0	289.0	**0.0**	-	**0.0**	100	No
VOC	20.1	27.2	31.0	**3.80**	-	**3.8**	40	No
PM	50.2	68.0	77.5	**9.5**	0.8	**10.3**	25	No
PM_{10}	50.2	68.0	77.5	**9.5**	0.6	**10.1**	15	No
$PM_{2.5}$	50.2	68.0	77.5	**9.5**	1.84E-03	**9.5**	10	No
SO_2	6.0	8.2	9.3	**1.14**	-	**1.1**	40	No
H_2SO_4	0.28	0.4	0.4	**0.05**	-	**0.1**	7	No
CO_2e[2]	1,194,844	1,618,359	1,844,417	**226,058**	-	**226,058**	75,000	No

1. Project Emissions Increase = (Projected Actual Emissions - Baseline Actual Emissions) - ("Could Have Accommodated" Emissions - Baseline Actual Emissions)
2. For CO_2e, PSD may apply only if the emissions increase exceeds the SER for CO_2e and PSD is otherwise triggered by another PSD-regulated pollutant.

As illustrated in Table 4-1, the project emissions increases do not exceed the SERs for any pollutant. Accordingly, PSD review is not required.

4.2 Title V Operating Permits

40 CFR 70 establishes the federal Title V operating permit program. Georgia has incorporated the provisions of this federal program in its state regulation, Rule 391-3-1-.03(10), *Title V Operating Permits.* This regulation requires that all new and existing Title V major sources of air emissions obtain federally-approved state-administered operating permits. A major source as defined under the Title V program is a facility that has the potential to emit either more than 100 tpy for any criteria pollutant, more than 10 tpy for any single HAP, or more than 25 tpy for combined HAP. Potential emissions from OPC Effingham exceed the major source threshold for several criteria pollutants. Therefore, OPC Effingham is subject to the Title V program and currently operates under the State issued Part 70 Operating Permit No. 4911-103-0012-V-05-0.

The proposed project involves a Title I (NSPS) modification as discussed in section 4.3.7 below and, therefore, represents a significant modification of the operating permit. As such, the required Title V modification application elements are included in the GEOS submittal with application ID No. 668257.

4.3 New Source Performance Standards

NSPS, promulgated in 40 CFR 60, require new, modified, or reconstructed sources to control emissions to the level achievable by the best demonstrated technology as specified in the applicable provisions. The following is a summary of applicability and non-applicability determinations for NSPS regulations of relevance to the proposed project. Rules that are specific to certain source categories unrelated to the proposed project are not discussed in this regulatory review.

4.3.1 40 CFR 60 Subpart A – General Provisions

All affected sources subject to source-specific NSPS are subject to the general provisions of NSPS Subpart A unless specifically excluded by the source-specific NSPS. Subpart A requires initial notification, performance testing, recordkeeping and monitoring, provides reference methods, and mandates general control device requirements for all other subparts as applicable.

4.3.2 40 CFR 60 Subpart D – Fossil Fuel-Fired Steam Generators > 250 MMBtu/hr

NSPS Subpart D, *Standards of Performance for Fossil-Fuel-Fired Steam Generators*, applies to fossil fuel-fired steam generating units with heat input capacities greater than 250 MMBtu/hr that have been constructed or modified since August 17, 1971.[13] The rule defines a fossil fuel-fired steam generating unit as:[14]

> *A furnace or boiler used in the process of burning fossil fuel for the purpose of producing steam by heat transfer.*

The combustion turbines will not be subject to NSPS Subpart D, as they are not classified as steam generating units under this NSPS.

4.3.3 40 CFR 60 Subpart Da – Electric Utility Steam Generating Units

NSPS Subpart Da, *Standards of Performance for Electric Utility Steam Generating Units*, provides standards of performance for electric utility steam generating units with heat input capacities greater than 250 MMBtu/hr of fossil fuel (alone or in combination with any other fuel) for which construction, modification, or reconstruction commenced after September 18, 1978.[15] The term "steam generating unit" is defined under this regulation as:[16]

> *For units constructed, reconstructed, or modified after May 3, 2011, steam generating unit means any furnace, boiler, or other device used for combusting fuel for the purpose of producing steam (including fossil-fuel-fired steam generators associated with combined cycle gas turbines…*

The combustion turbines will not be subject to NSPS Subpart Da, because:

- The combustion turbines are not classified as steam generating units under this regulation; and
- Heat recovery steam generators that are subject to NSPS Subpart KKKK are not subject to NSPS Subpart Da. Following the proposed modifications, OPC Effingham's combustion turbines and HRSG will be NSPS Subpart KKKK affected facilities (see section 4.3.7).[17]

4.3.4 40 CFR 60 Subpart Db – Steam Generating Units > 100 MMBtu/hr

NSPS Subpart Db, *Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units*, provides standards of performance for steam generating units with capacities greater than 100 MMBtu/hr

[13] 40 CFR 60.40

[14] 40 CFR 60.41

[15] 40 CFR 60.40Da(a)

[16] 40 CFR 60.41Da

[17] 40 CFR 60.40Da(e)

for which construction, modification, or reconstruction commenced after June 19, 1984.[18] The term "steam generating unit" is defined under this regulation as:[19]

> *Steam generating unit means a device that combusts any fuel or byproduct/waste and produces steam or heats water or heats any heat transfer medium. This term includes any municipal-type solid waste incinerator with a heat recovery steam generating unit or any steam generating unit that combusts fuel and is part of a cogeneration system or a combined cycle system. This term does not include process heaters as they are defined in this subpart.*

The combustion turbines will not be subject to NSPS Subpart Db, because:

- The combustion turbines are not classified as steam generating units under this regulation; and
- Heat recovery steam generators that are subject to NSPS Subpart KKKK are not subject to NSPS Subpart Db. Following the proposed modifications, OPC Effingham's combustion turbines and HRSG will be NSPS Subpart KKKK affected facilities (see section 4.3.7).[20]

4.3.5 40 CFR 60 Subpart Dc – Small Steam Generating Units

NSPS Subpart Dc, *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units*, provides standards of performance for each steam generating unit for which construction, modification, or reconstruction commenced after June 9, 1989, and that the maximum design heat input capacity of 100 MMBtu/hr or less, but greater than or equal to 10 MMBtu/hr.[21] The term "steam generating unit" is defined under this regulation as:[22]

> *Steam generating unit means a device that combusts any fuel and produces steam or heats water or heats any heat transfer medium. This term does not include process heaters as defined in this subpart.*

The combustion turbines at OPC Effingham will not be subject to NSPS Subpart Dc after the completion of the proposed project, because:

- The combustion turbines do not meet the definition of steam generating units; and
- Heat recovery steam generators that are subject to NSPS Subpart KKKK are not subject to NSPS Subpart Dc. Following the proposed modifications, OPC Effingham's combustion turbines and HRSG with duct burners will be NSPS Subpart KKKK affected facilities (see section 4.3.7).[23]

OPC Effingham does operate a natural gas-fired auxiliary boiler that is subject to NSPS Subpart Dc. The boiler will not be modified as part of the proposed project, and the applicable requirements for the unit will not be impacted as a result of the project.

[18] 40 CFR 60.40b(a)

[19] 40 CFR 60.41b

[20] 40 CFR 60.40b(i)

[21] 40 CFR 60.40c(a)

[22] 40 CFR 60.41c

[23] 40 CFR 60.40c(e)

4.3.6 40 CFR 60 Subpart GG – Stationary Gas Turbines

NSPS Subpart GG, *Standards of Performance for Stationary Gas Turbines*, applies to all stationary gas turbines with a heat input at peak load equal to or greater than 10 MMBtu/hr, based on the lower heating value of the fuel fired, that are constructed, modified, or reconstructed after October 3, 1977.[24]

Presently, the combustion turbines at OPC Effingham are subject to NSPS Subpart GG. However, upon completion of the proposed modifications, the combustion turbine systems will be subject to the more recently promulgated standards for Stationary Combustion Turbines under NSPS Subpart KKKK (see section 4.3.7). Pursuant to 40 CFR 60.4305(b) (NSPS Subpart KKKK), stationary combustion turbines regulated under NSPS Subpart KKKK are exempt from the requirements of NSPS Subpart GG. Therefore, NSPS Subpart GG will no longer apply to the OPC Effingham combustion turbines following completion of the proposed project.

4.3.7 40 CFR 60 Subpart KKKK – Stationary Combustion Turbines

NSPS Subpart KKKK, *Standards of Performance for Stationary Combustion Turbines*, applies to all stationary combustion turbines with a heat input at peak load equal to or greater than 10 MMBtu/hr, based on the lower heating value of the fuel fired, and were constructed, reconstructed, or modified after February 18, 2005.[25] OPC Effingham consists of two natural gas-fired turbines, each of which was constructed prior to 2005 and has a heat input capacity exceeding 10 MMBtu/hr. To determine if the turbines will be subject to NSPS Subpart KKKK following the proposed project, it is necessary to ascertain if a "modification" per the NSPS has occurred. For purposes of NSPS, a modification is defined as:[26]

> *…any physical change in, or change in the method of operation of, an existing facility which increases the amount of any air pollutant (to which a standard applies) emitted into the atmosphere by that facility or which results in the emission of any air pollutant (to which a standard applies) into the atmosphere not previously emitted.*

More specifically, for an existing electric utility steam generating unit:[27]

> *No physical change, or change in the method of operation, at an existing electric utility steam generating unit shall be treated as a modification…provided that such change does not increase the maximum hourly emissions of any pollutant regulated under this section above the maximum hourly emissions achievable at that unit during the 5 years prior to the change.*

The CT Upgrades Project will result in an increase in the hourly heat input capacity for the combustion turbines. On this basis, OPC has conservatively presumed that an increase in the amount of an air pollutant regulated by NSPS Subpart KKKK could occur on a short-term (hourly) basis. Therefore, once the proposed modifications are complete, the OPC Effingham combustion turbines will be subject to NSPS Subpart KKKK. Pursuant to 40 CFR 60.4305(a), the associated HRSG will also be subject to NSPS Subpart KKKK.

[24] 40 CFR 60.330

[25] 40 CFR 60.4305(a), (b)

[26] 40 CFR 60.2

[27] 40 CFR 60.14(h)

Per 40 CFR 60.4305(b), stationary combustion turbines regulated under NSPS Subpart KKKK are exempt from the requirements of NSPS Subpart GG. HRSGs regulated under NSPS Subpart KKKK are also exempt from the requirements of NSPS Subparts Da, Db, and Dc.

The following sections detail the applicable requirements as a result of NSPS Subpart KKKK applicability.

4.3.7.1 Emission Limits

Per Table 1 to NSPS Subpart KKKK, a modified combustion turbine is subject to NO_X emission limits depending on the type of fuel combusted and the heat input at peak load. For modified combustion turbines firing natural gas with a rating greater than 850 MMBtu/hr, the NO_X emission standard is 15 ppm at 15% O_2 or 0.43 lb/MWh useful output. NSPS Subpart KKKK also includes, for units greater than 30 MW output, a NO_X limit of 96 ppm at 15% O_2 or 4.7 lb/MWh useful output for turbine operation at ambient temperatures less than 0°F and turbine operation at loads less than 75% of peak load.[28] Compliance with the NO_X emission limit is determined on a 30 unit operating day rolling average basis.[29] As the combustion turbines are presently subject to a NO_X limitation of 3.0 ppm at 15% O_2, 3-hour average per Condition 3.3.4.a of the existing Title V operating permit, the new NSPS Subpart KKKK NO_X limitations will be subsumed by the facility's NO_X BACT limitation.

SO_2 emissions from combustion turbines located in the continental U.S. are limited to 0.9 lb/MWh gross output (or 110 ng/J), or the units must not burn any fuel with total potential sulfur emissions in excess of 0.060 lb SO_2/MMBtu heat input.[30]

4.3.7.2 Monitoring and Testing Requirements

Pursuant to 40 CFR 60.4333(a), the combustion turbines, air pollution control equipment, and monitoring equipment will be maintained in a manner that is consistent with good air pollution control practices for minimizing emissions. This requirement applies at all times including during startup, shutdown, and malfunction.

4.3.7.2.1 NO_X Compliance Demonstration Requirements

The combustion turbine systems presently employ a continuous emission monitoring system (CEMS) for NO_X per the requirements of the Acid Rain Program (ARP), promulgated in 40 CFR Part 75. Pursuant to 40 CFR 60.4340(b)(1) and 40 CFR 60.4345, OPC Effingham can rely on its existing NO_X CEMS installed and certified according to 40 CFR Part 75 Appendix A to demonstrate ongoing compliance with the NSPS Subpart KKKK NO_X emission limits. Sources demonstrating compliance with the NO_X emission limit via CEMS are not subject to the requirement to perform initial and annual NO_X stack tests.[31] Initial compliance with the NO_X emission limit will be demonstrated by comparing the arithmetic average of the NO_X emissions measurements taken during the initial relative accuracy test audit (RATA) required pursuant to 40 CFR 60.4405 to the NO_X emission limit under this subpart.[32]

[28] Table 1 to Subpart KKKK of Part 60

[29] 40 CFR 60.4350(h), 40 CFR 60.4380(b)(1)

[30] 40 CFR 60.4330(a)(1) or (a)(2), respectively

[31] 40 CFR 60.4340(b), 40 CFR 60.4405

[32] 40 CFR 60.4405(c)

4.3.7.2.2 SO_2 Compliance Demonstration Requirements

For compliance with the SO_2 emission limit, facilities are required to perform regular determinations of the total sulfur content of the combustion fuel and to conduct initial and annual compliance demonstrations. The total sulfur content of gaseous fuel combusted in the combustion turbine must be determined and recorded once per operating day or using a custom schedule as approved by EPD;[33] however, OPC elects to opt out of this provision of the rule by using a fuel that is demonstrated not to exceed potential sulfur emissions of 0.060 lb/MMBtu SO_2.[34] This demonstration can be made using one of the following methods:

- By using a purchase contract specifying that the fuel sulfur content for the natural gas is less than or equal to 20 grains of sulfur per 100 standard cubic feet and results in potential emissions not exceeding 0.060 lb/MMBtu; or
- By using representative fuel sampling data meeting the requirements of 40 CFR 75, Appendix D, Sections 2.3.1.4 or 2.3.2.4 which show that the sulfur content of the fuel does not exceed 0.060 lb SO_2/MMBtu heat input.

OPC is currently required to monitor the sulfur content of the natural gas burned in the combustion turbines through submittal of a semiannual analysis of the gas by the supplier or the facility to demonstrate that the sulfur content does not exceed its permit-provided excursion threshold of 2.5 grains per 100 standard cubic feet.[35] This sulfur content analysis by the supplier or OPC satisfies the sulfur content demonstration requirement of 40 CFR 60.4365. Therefore, continued compliance with this existing permit condition will guarantee compliance with the NSPS Subpart KKKK sulfur monitoring requirement.

4.3.7.3 Initial Notification

Per 40 CFR 60.7(a)(4), this permit application serves as the required notification for any physical or operational change to an existing facility which qualifies as an NSPS modification.

4.3.8 40 CFR 60 Subpart TTTT – Greenhouse Gas Emissions for Electric Generating Units

NSPS Subpart TTTT, *Standards of Performance for Greenhouse Gas Emissions for Electric Generating Units,* applies to any fossil fuel fired steam generating unit, Integrated Gasification Combined Cycle (IGCC) unit, or stationary combustion turbine constructed after January 8, 2014 or reconstructed after June 18, 2014, and to any steam generating unit or IGCC modified after June 18, 2014, provided that unit has a base load rating greater than 250 MMBtu/hr and serves a generator capable of selling greater than 25 MW of electricity to the grid.[36] The existing CCCT generating units for OPC Effingham each have peak heat inputs greater than 250 MMBtu/hr and serve a generator greater than 25 MW. Therefore, the CCCT generating units (including the duct burners) could potentially be subject to the provisions of NSPS TTTT.

With respect to stationary combustion turbines, NSPS Subpart TTTT applies only to units that commenced construction or reconstruction after the specified dates, not modification. "Reconstruction" is defined under 40 CFR 60 Subpart A as the replacement of components of an existing affected facility such that the fixed capital cost of the new components exceeds 50% of the fixed capital cost that would be required to construct a comparable, entirely new affected facility that is technologically and economically capable of

[33] 40 CFR 60.4370(b) and (c)

[34] 40 CFR 60.4365

[35] Permit No. 4911-103-0012-V-05-0, Conditions 5.2.3, 6.1.7.c.i.

[36] 40 CFR 60.5509(a)

complying with the applicable standards.[37] The total cost of the TPU1 and LLTD upgrades is well under 50% of the cost for two comparable new CCCT units. As the combustion turbines at OPC Effingham are existing units and the proposed project does not meet the reconstruction definition, the modifications to the turbine systems will not trigger applicability of NSPS Subpart TTTT requirements.[38]

4.3.9 Non-Applicability of All Other NSPS

NSPS are developed for particular industrial source categories. The applicability of a particular NSPS to the proposed project can be readily ascertained based on the industrial source category covered. All other NSPS, besides Subpart A, are categorically not applicable to the proposed project.

4.4 National Emission Standards for Hazardous Air Pollutants

NESHAP, located in 40 CFR 61 and 40 CFR 63, have been promulgated for source categories that emit HAP to the atmosphere. A facility that is a major source of HAP is defined as having potential emissions of greater than 25 tpy of total HAP and/or 10 tpy of individual HAP. Facilities with a potential to emit HAP at an amount less than that which is defined as a major source are otherwise considered an area source. Under 40 CFR 63, the NESHAP allowable emissions limits are most often established on the basis of a maximum achievable control technology (MACT) determination for the particular major source. These NESHAP apply to sources in specifically regulated industrial source categories (Clean Air Act Section 112(d)) or on a case-by-case basis (Section 112(g)) for facilities not regulated as a specific industrial source type.

The following NESHAP could potentially apply to the Effingham facility:

- Industrial, Commercial, and Institutional Boilers and Process Heaters (at Major Sources), NESHAP Subpart DDDDD
- Industrial, Commercial, and Institutional Boilers and Process Heaters (at Area Sources), NESHAP Subpart JJJJJJ
- Stationary Combustion Turbines (at Major Sources), NESHAP Subpart YYYY
- Stationary Reciprocating Internal Combustion Engines (at Major and Area Sources), NESHAP Subpart ZZZZ

As demonstrated in Appendix B, the Effingham facility is a minor, or area, source of HAPs since total HAP emissions are below 25 tpy and maximum individual HAP emissions are less than 10 tpy. Therefore, the facility is only potentially subject to NESHAP Subparts JJJJJJ and ZZZZ. However, NESHAP Subpart JJJJJJ does not apply to the facility because the combustion turbines do not meet the definition of a boiler[39]. Furthermore, the natural gas-fired auxiliary boiler and process heater are not subject to NESHAP Subpart JJJJJJ because neither natural gas-fired boilers nor process heaters are subject to this subpart.[40]

NESHAP Subpart ZZZZ does apply to the Emergency Firewater Pump as an existing unit at an area source of HAP. The engine will not be modified as part of the proposed project, and the applicable requirements for the unit will not be impacted as a result of the project.

[37] 40 CFR 60.15

[38] 40 CFR 60.5509(a)

[39] 40 CFR 63.11237

[40] 40 CFR §63.11195(e)

4.5 Compliance Assurance Monitoring

Under 40 CFR 64, Compliance Assurance Monitoring (CAM), facilities are required to prepare and submit monitoring plans for certain emissions units as part of Title V operating permit applications. The CAM plans are intended to provide an on-going and reasonable assurance of compliance with emission limits for units equipped with air pollution control devices. Pursuant to 40 CFR 64.2(b)(1)(vi), emission limits for which a Part 70 Permit specifies a continuous compliance determination method are exempt from CAM requirements. Since Condition 5.2.1 of OPC Effingham's permit requires the operation of NO_X and CO CEMS for both CCCT stacks, OPC Effingham has previously requested in its June 2021 Title V permit renewal application that EPD remove the CAM-related conditions from the facility's permit. Therefore, no CAM documentation has been included within this permit application.

4.6 Risk Management Plan

Subpart B of 40 CFR 68 outlines requirements for Risk Management prevention Plans (RMP) pursuant to Section 112(r) of the Clean Air Act. Applicability of the subpart is determined based on the type and quantity of chemicals stored at a facility. Oglethorpe has evaluated the amount of Section 112(r) substances stored at the Facility and has determined that no substances are stored above the triggering threshold. Thus, the Facility is not required to develop a RMP.

4.7 Stratospheric Ozone Protection

The requirements originating from Title VI of the Clean Air Act, entitled *Protection of Stratospheric Ozone*, are contained in 40 CFR 82. Subparts A through E and Subparts G and H of 40 CFR 82 are not applicable to OPC Effingham. 40 CFR 82 Subpart F, *Recycling and Emissions Reduction*, potentially applies if the facility operates, maintains, repairs, services, or disposes of appliances that utilize Class I, Class II, or non-exempt substitute refrigerants.[41] Subpart F generally requires persons completing the repairs, service, or disposal to be properly certified. The facility utilizes certified technicians to perform repairs, service, and disposal of regulated refrigerants from such equipment (air conditioners, refrigerators, etc.). OPC Effingham will continue to comply with 40 CFR 82 Subpart F.

4.8 Clean Air Markets Regulations

Starting with the Acid Rain Program (ARP) mandated by the 1990 Clean Air Act Amendments, U.S. EPA has developed several market-based "cap and trade" regulatory programs. All market-based regulatory programs are overseen by U.S. EPA's Clean Air Markets Divisions (CAMD) and are referred to as CAMD regulations. The programs that are potentially applicable to OPC Effingham are:

- Acid Rain Program (ARP) – 1990 - ongoing
- Clean Air Interstate Rule (CAIR) – 2009 - 2014
- Cross-State Air Pollution Rule (CSAPR) – 2015 (ongoing)

4.8.1 Acid Rain Program

In order to reduce acid rain in the United States and Canada, Title IV (40 CFR 72 *et seq.*) of the Clean Air Act Amendments of 1990 established the ARP to substantially reduce SO_2 and NO_X emissions from electric utility plants. Affected units are specifically listed in Tables 1 and 2 of 40 CFR 73.10 under Phase I and Phase II of the program. Upon Phase III implementation, the ARP in general applies to fossil fuel-fired

[41] 40 CFR 82.150

combustion sources that drive generators for the purposes of generating electricity for sale. The turbines at OPC Effingham are utility units subject to the ARP. The facility is subject to the requirements of 40 CFR 72 (permits), 40 CFR 73 (SO_2), and 40 CFR 75 (monitoring) but is not subject to the NO_X provisions (40 CFR 76) of the ARP regulations because the turbines do not have the capability to burn coal.

Under 40 CFR 75 of the ARP, OPC Effingham is required to operate a NO_X CEMS for each unit to monitor the NO_X emission rate (lb/MMBtu) and to determine SO_2 and CO_2 mass emissions (tons) following the procedures in Appendices D and G, respectively. Further, the ARP requires the facility to possess SO_2 allowances for each ton of SO_2 emitted. The ARP also requires initial certification of required monitoring systems within 90 days of commencement of commercial operation and the submittal of quarterly reports and an annual compliance certification. The ARP requirements are outlined in Section 7.9 and Attachment D of the Title V Permit No. 4911-103-0012-V-05-0. The proposed project will not alter any applicable requirements or compliance options of ARP to the OPC Effingham operations. The facility will continue to maintain sufficient allowances under ARP for its operations.

4.8.2 Clean Air Interstate Rule / Cross-State Air Pollution Rule

The CAIR, 40 CFR 96, called for reductions in SO_2 and NO_X emissions by utilizing an emissions trading program. More broadly, 40 CFR 96 also includes a forerunner to CAIR, the NO_X SIP Call / NO_X Budget program, and the name of 40 CFR 96 (NO_X Budget Trading Program for State Implementation Plans) still reflects the origins in regulating only NO_X.

The CSAPR was developed to require affected states to reduce emissions from power plants that contribute to ozone and/or particulate matter emissions.[42] Following legal challenges, CSAPR replaced CAIR[43] and began Phase 1 implementation on January 1, 2015 for annual programs and May 1, 2015 for the ozone season program. Phase 2 implementation began on January 1, 2017 for annual programs and May 1, 2017 for ozone season programs.

Therefore, since CSAPR is currently effective, it is the program currently relevant for evaluating potential applicability. CSAPR applicability is found in 40 CFR 97.404 and definitions in 40 CFR 97.402 and implemented via Georgia EPD through GRAQC 391-3-1-.02(12) – (13). Georgia is subject to CSAPR programs for both fine particles (SO_2 and annual NO_X) and ozone (ozone season NO_X).[44]

CSAPR applicability is similar but distinct from ARP, with applicability criteria and definitions per 40 CFR 97.402.[45] In general, CSAPR regulates fossil-fuel-fired boilers and combustion turbines serving, on any day starting November 15, 1990 or later, an electrical generator with a nameplate capacity exceeding 25 MWe and producing power for sale. OPC Effingham's CCCTs are affected sources under this regulation, and the proposed project will not alter any applicable requirements or compliance options of CSAPR to the facility's operations. OPC Effingham will continue to maintain sufficient allowances under CSAPR for its operations.

[42] http://www.epa.gov/airtransport/

[43] EME Homer City Generation, L.P. v. U.S. EPA. U.S. Court of Appeals for the District of Columbia Circuit, No. 11-1302, decided October 23, 2014 (lifting stay of CSAPR).

[44] https://www.epa.gov/airmarkets/map-states-covered-csapr

[45] CSAPR applicability and definitions are repeated in four separate subparts of 40 CFR 97, but each has identical definitions and applicability requirements. Subpart AAAAA (5A), which is for the NO_X Annual program, is used in this discussion.

4.9 State Regulatory Requirements

In addition to federal air regulations, GRAQC Chapter 393-3-1 establishes regulations applicable at the emission unit level (source specific) and at the facility level.[46] This section reviews the source specific requirements for the proposed project and does not detail generally applicable requirements such as payment of permit fees.

4.9.1 GRAQC 391-3-1-.02(2)(b) – Visible Emissions

Rule (b) limits the visible emissions from any emissions source not subject to some other visible emissions limitation under GRAQC 391-3-1-.02 to 40% opacity. Visible emissions testing may be required at the discretion of the Director. The combustion turbines and the emergency firewater pump at OPC Effingham are subject to this regulation.

The combustion turbines fire pipeline-quality natural gas with emissions exhibiting minimal opacity; the firing of clean fuels in conjunction with proper operation ensures compliance with this rule for both the emergency firewater pump and the combustion turbines. No applicable requirements per Rule (b) will be altered as a result of the proposed project. The opacity limitation for the combustion turbines is subsumed by the more stringent opacity limitation given in Condition 3.3.6.e of the current operating permit. The emergency fire water pump will not be modified as part of the proposed project, and the applicable requirements for the unit will not be impacted as a result of the project

4.9.2 GRAQC 391-3-1-.02(2)(d) – Fuel-Burning Equipment

Rule (d) limits the PM emissions, visible emissions, and NO_X emissions from fuel-burning equipment. The standards are applied based on installation date, the heat input capacity of the unit, and the fuel(s) combusted. The GRAQC define "fuel-burning equipment" as follows:[47]

> *"Fuel-burning equipment" means equipment the primary purpose of which is the production of thermal energy from the combustion of any fuel. Such equipment is generally that used for, but not limited to, heating water, generating or super heating steam, heating air as in warm air furnaces, furnishing process heat indirectly, through transfer by fluids or transmissions through process vessel walls.*

The combustion turbines are used for the generation of electric power, not the production of thermal energy. Therefore, they do not meet the definition of fuel burning equipment.

However, both the natural gas-fired auxiliary boiler and the natural-gas fired preheater meet this definition and are therefore subject to this rule. This regulation limits the PM emissions from the boiler and the heater to 0.48 lb/MMBtu, high heating value (HHV) basis and limits opacity to 20%. Exclusive combustion of pipeline-quality natural gas allows the fuel heaters to easily meet the 20% opacity limit.

All fuel-burning equipment constructed after January 1, 1972 is subject to a visible emissions limit of 20% except for one six minute period per hour of not more than 27% opacity. Neither the PM limit nor the opacity limit under this rule will change once the proposed modifications are complete.

[46] Current through rules and regulations filed through June 3, 2022. http://rules.sos.ga.gov/gac/391-3-1

[47] GRAQC 391-3-1-.01(cc)

4.9.3 GRAQC 391-3-1-.02(2)(e) – Particulate Emissions from Manufacturing Processes

Rule (e), commonly known as the process weight rule, establishes PM limits where not elsewhere specified. Combustion turbines are not subject to Rule (d) and historically have not been regulated by Rule (e). Therefore, the combustion turbines at OPC Effingham are not subject to this regulation.

4.9.4 GRAQC 391-3-1-.02(2)(g) – Sulfur Dioxide

Rule (g) limits the maximum sulfur content of any fuel combusted in a fuel-burning source, based on the heat input capacity. As this rule applies to fuel-burning sources, not "fuel-burning equipment," this regulation presently applies to the combustion turbines, the auxiliary boiler, the emergency firewater pump, and the preheater. For the auxiliary boiler, the pump, and the preheater, all of which have heat input capacities below 100 MMBtu/hr, the fuel sulfur content is limited to not more than 2.5% by weight.[48] For the combustion turbines, which have heat input capacities greater than 100 MMBtu/hr, the fuel sulfur content is limited to not more than 3% by weight.[49] The proposed project does not alter the applicable requirements of Rule (g), and OPC Effingham will continue to comply with Rule (g). This limit is subsumed by the more stringent fuel sulfur limit under NSPS Subpart KKKK.

4.9.5 GRAQC 391-3-1-.02(2)(n) – Fugitive Dust

Rule (n) requires facilities to take reasonable precautions to prevent fugitive dust from becoming airborne. OPC Effingham will continue to take the appropriate precautions to prevent fugitive dust from becoming airborne for any applicable equipment.

4.9.6 GRAQC 391-3-1-.02(2)(tt) – VOC Emissions from Major Sources

Rule (tt) limits VOC emissions from facilities that are located in or near the original Atlanta 1-hour ozone nonattainment area. OPC Effingham is not located within the geographic area covered by this rule and is, therefore, not subject to this regulation.[50]

4.9.7 GRAQC 391-3-1-.02(2)(uu) – Visibility Protection

Rule (uu) requires EPD to provide an analysis of a proposed major source or a major modification to an existing source's anticipated impact on visibility in any federal Class I area to the appropriate Federal Land Manager (FLM). The proposed project does not represent a major modification as defined in GRAQC 391-3-1-.02(2)(uu)6, and therefore is not subject to this regulation.

4.9.8 GRAQC 391-3-1-.02(2)(jjj) – NO_X from Electric Utility Steam Generating Units

Rule (jjj) limits NO_X emissions from coal-fired electric utility steam generating units with heat input capacity greater than 250 MMBtu/hr located in or near the original Atlanta 1-hour ozone nonattainment area. OPC Effingham only combusts natural gas, is not in one of the listed counties subject to this Rule, and is therefore not subject to Rule(jjj).

[48] GRAQC 391-3-1-.02(2)(g)2

[49] GRAQC 391-3-1-.02(2)(g)2

[50] GRAQC 391-3-1-.02(2)(tt)3

4.9.9 GRAQC 391-3-1-.02(2)(lll) – NO_X from Fuel-Burning Equipment

Rule (lll) limits the NO_X emissions from fuel-burning equipment with a maximum design heat input capacity between 10 and 250 MMBtu/hr located in or near the Atlanta nonattainment area that was installed or modified on or after May 1, 1999. While the auxiliary boiler is a fuel-burning equipment of the correct size range, Rule (lll) does not apply since OPC Effingham is located outside of the affected counties.[51]

4.9.10 GRAQC 391-3-1-.02(2)(mmm) – NO_X Emissions from Stationary Gas Turbines and Stationary Engines used to Generate Electricity

Rule (mmm) restricts NO_X emissions from small combustion turbines located in or near the Atlanta nonattainment area that are used to generate electricity. The combustion turbines at OPC Effingham exceed 25 MWe capacity and are not located in one of the applicable counties under the Rule so are, therefore, not subject to Rule (mmm).[52]

4.9.11 GRAQC 391-3-1-.02(2)(nnn) – NO_X Emissions from Large Stationary Gas Turbines

Rule (nnn) restricts NO_X emissions from sources located in or near the original Atlanta 1-hour ozone nonattainment area. Specifically, these regulations limit NO_X emissions from stationary gas turbines with nameplate capacity greater than 25 MWe used to generate electricity. OPC Effingham is located in Effingham County, which is not one of the listed counties regulated under this rule.[53]

4.9.12 GRAQC 391-3-1-.02(2)(rrr) – NO_X from Small Fuel-Burning Equipment

Rule (rrr) specifies requirements for fuel-burning equipment with capacities of less than 10 MMBtu/hr that are located in or near the original Atlanta 1-hour ozone nonattainment area. OPC Effingham is not located in the geographic area covered by this rule. Therefore, this rule does not apply.

4.9.13 GRAQC 391-3-1-.02(2)(sss) – Multipollutant Control for Electric Utility Steam Generating Units

Rule (sss) applies to certain large electric utility steam generating units listed within the rule. OPC Effingham is not subject to this regulation, because none of its units are listed in the regulation.

4.9.14 GRAQC 391-3-1-.02(2)(uuu) – SO_2 Emissions from Electric Utility Steam Generating Units

Rule (uuu) applies to certain large electric utility steam generating units listed within the rule. OPC Effingham is not subject to this regulation, because none of its units are listed in the regulation.

4.9.15 GRAQC 391-3-1-.03(1) – Construction (SIP) Permitting

The proposed project will require physical modifications to complete the proposed upgrades. Emissions increases associated with the proposed project are above the *de minimis* construction permitting thresholds specified in GRAQC 391-3-1-.03(6)(i). Therefore, a construction permit application is necessary, and the appropriate forms are included in Appendix D. As noted in Question 7 on the SIP Air Permit Application in

[51] GRAQC 391-3-1-.02(2)(lll)4

[52] GRAQC 391-3-1-.02(2)(mmm)1

[53] GRAQC 391-3-1-.02(2)(nnn)6

Appendix D, OPC has not relied on the exemption in Georgia Rule 391-3-1-.03(6)(i)(3) for any previous modifications to OPC Effingham.

4.9.16 GRAQC 391-3-1-.03(10) – Title V Operating Permits

The potential emissions of certain pollutants exceed the major source thresholds established by Georgia's Title V operating permit program. Therefore, OPC Effingham is a Title V major source. The facility currently operates under Permit No. 4911-103-0012-V-05-0. This application represents a significant modification to the existing Title V operating permit; accordingly a GEOS application has been submitted to address Title V related permitting requirements.

4.9.17 Incorporation of Federal Regulations by Reference

The following federal regulations are incorporated in the GRAQC by reference and were addressed previously in the application:

- GRAQC 391-3-1-.02(7) – PSD
- GRAQC 391-3-1-.02(8) – NSPS
- GRAQC 391-3-1-.02(9) – NESHAP
- GRAQC 391-3-1-.02(10) – Chemical Accident Prevention
- GRAQC 391-3-1-.02(11) – CAM
- GRAQC 391-3-1-.02(12) – CSAPR for Annual NO_X
- GRAQC 391-3-1-.02(13) – CSAPR for Annual SO_2
- GRAQC 391-3-1-.02(14) – CSAPR for Ozone Season NO_X
- GRAQC 391-3-1-.03(10) – Title V Operating Permits
- GRAQC 391-3-1-.13 – ARP

4.9.18 Non-Applicability of Other GRAQC

A thorough examination of the GRAQC applicability to the proposed project reveals many GRAQC that do not currently apply, will not apply once the proposed modifications are complete, and do not impose additional requirements on operations. Such GRAQC rules include those specific to a particular type of industrial operation which is not and will not be performed at OPC Effingham or is not impacted by the proposed project.

5. TOXICS IMPACT ANALYSIS

EPD regulates the TAP emissions through a program approved under the provisions of GRAQC 391-3-1-.02(2)(a)3(ii). A TAP is defined as any substance that may have an adverse effect on public health, excluding any specific substance that is covered by a State or Federal ambient air quality standard. Procedures governing EPD's review of toxic air pollutant emissions as part of air permit reviews are contained in EPD's *Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions (Guideline)*.[54]

5.1 Derivation of Facility-Wide Emission Rates

According to the *Guideline*, dispersion modeling should be completed for each potentially toxic pollutant which has quantifiable emission increases and for which the facility-wide potential emissions are above the Minimum Emission Rate (MER) provided in Appendix A of the *Guideline*. The *Guideline* infers that a pollutant is identified as a toxic pollutant if any of the following toxicity-determined values have been established for that pollutant:

- EPA Integrated Risk Information System (IRIS) reference concentration (RfC) or unit risk;
- Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PEL);
- American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV);
- National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limits (REL);
- Lethal Dose – 50% (LD50) Standards; and
- The *Guideline* specifies that the resources should be referenced in the priority schedule listed above to determine long-term and short-term acceptable ambient concentrations (AACs) based on the exposure limits that are provided.

Per the *Guideline* under "Procedures for Demonstrating Compliance with AAC," the general procedure for determination of TAPs impact is a simple comparative method:

- When the facility-wide emission rate for a given TAP is below its respective MER established in the table in Appendix A of the *Guideline*, no further analysis is required for that TAP.
- When the facility-wide emission rate for a given TAP is above its respective MER established in the table in Appendix A, a toxic impact analysis for that TAP is required.

Table 5-1 summarizes OPC Effingham's potential emission rates for individual TAPs and compares them to the respective MERs.

[54] *Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions*. Georgia Department of Natural Resources, Environmental Protection Division, Air Protection Branch, Revised, May, 2017.

Table 5-1. OPC Effingham TAP Emissions and Respective MERs

Toxic Air Pollutant (TAP)[4],[5]	Annual Emissions (tpy)	Annual Emissions[1] (lb/yr)	Short Term Emission Rate[2] (g/s)	Minimum Emission Rate (MER)[3] (lb/yr)	Above MER?
Arsenic	5.78E-06	0.01	1.66E-07	5.67E-02	No
Ammonia	2.29E+02	4.58E+05	6.59E+00	2.43E+04	Yes
Beryllium	3.47E-07	0.00	9.97E-09	0.97	No
Cadmium	3.18E-05	0.1	9.14E-07	1.35	No
Acrolein	1.05E-01	210	3.01E-03	4.87	Yes
Lead	1.44E-05	0	4.15E-07	5.84	No
1,3-Butadiene	7.04E-03	14.1	2.02E-04	7.30	Yes
Cobalt	2.43E-06	0.00	6.98E-08	11.7	No
Manganese	1.10E-05	0.02	3.16E-07	12.2	No
Selenium	6.93E-07	0.00	1.99E-08	23.4	No
Chromium	4.04E-05	0.1	1.16E-06	24.33	No
Benzene	1.97E-01	393	5.65E-03	31.6	Yes
Nickel	6.07E-05	0.1	1.74E-06	38.6	No
Barium	--	--	--	57.9	No
Mercury	7.51E-06	0.02	2.16E-07	73.0	No
Copper	--	--	--	117	No
Sulfuric Acid	4.27E-01	854	1.23E-02	117	Yes
Formaldehyde	1.87E+00	3,737	5.37E-02	267	Yes
Propylene Oxide	4.75E-01	949	1.37E-02	657	Yes
Naphthalene	2.13E-02	42.6	6.13E-04	730	No
Acetaldehyde	6.55E-01	1,310	1.88E-02	1,107	Yes
Molybdenum	--	--	--	1,738	No
Xylenes	1.05E+00	2,095	3.01E-02	24,333	No
Hexane	5.20E-02	104	1.50E-03	170,331	No
1,4-Dichlorobenzene	3.47E-05	0.1	9.97E-07	194,664	No
Propane	--	--	--	208,600	No
Ethylbenzene	5.24E-01	1,048	1.51E-02	243,330	No
Pentane	--	--	--	341,858	No
Toluene	2.13E+00	4,256	6.12E-02	1,216,650	No

1. Annual Emissions (lb/yr) = Annual Emissions (ton/yr) * 2,000 lb/ton.
2. Short Term Emission Rate (g/s) = Annual Emissions (lb/yr) * 453.592 (g/lb) / 31,536,000 (s/yr)
3. From EPD's *Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions,* updated October 2018.
4. Based on formaldehyde emission factor from AP-42, Section 3.1 Database (April 2000) for Frame Type CTs greater than 40 MW.
5. Ammonia emission factor convervatively set to 0.014 lb/MMBtu, which is based on 10 ppm ammonia slip from the SCR.

5.2 Determination of Toxic Air Pollutant Impact

Based on the comparison of OPC Effingham's emissions of individual TAPs to their respective MERs, multiple pollutants have emission rates above the MER; therefore, SCREEN3 (version 13043) was used to evaluate the short-term (1-hour) concentration average for each individual TAP exceeding its MER. The modeled 1-hour average concentration was then converted to concentrations in both shorter (15-minute) and longer-term (24-hour or annual, as applicable) averaging periods.

For each TAP requiring further analysis, the total emissions of the TAP from both of the facility's CCCT stacks were conservatively modeled as being emitted from only one of the two stacks. This is conservative as this assumes perfect alignment of modeled impacts from both sources. The distance to the fence line between the two stacks have no eventual bearing on modeling results as the maximum modeled impacts

were predicted well beyond the boundary area of the fence line. The stack parameters are included in Table 5-2.

Table 5-2. Stack Parameters

Source Type	Height (m)	Diameter (m)	Velocity (m/s)	Gas Temperature (K)
Point	50.292	5.791	14.965	352.03

The rural option of SCREEN3 was used, as is specified in the SCREEN3 modeling files. A single SCREEN3 run was conducted using an emission rate of 1 gram per second (g/s). The 1-hour maximum impact generated from SCREEN3 was adjusted using the multiplying factors in the *Guideline* to obtain the estimated maximum impacts for the 15-minute, 24-hour, and annual averaging periods. The modeling results at 1 g/s are included in Table 5-3.

Table 5-3. SCREEN3 Modeling Results at 1 g/s

Maximum 1-Hour Impact	1.353E+0 µg/m³
Maximum 15-Minute Impact[1]	1.786E+0 µg/m³
Maximum 24-Hour Impact[2]	5.412E-1 µg/m³
Maximum Annual Impact[3]	1.082E-1 µg/m³

1. The 15-minute impact equals the 1-hour impact times 1.32 per the EPD *Guideline*.
2. The 24-hour impact equals the 1-hour impact times 0.4 per the EPD *Guideline*.
3. The annual impact equals the 1-hour impact times 0.08 per the EPD *Guideline*.

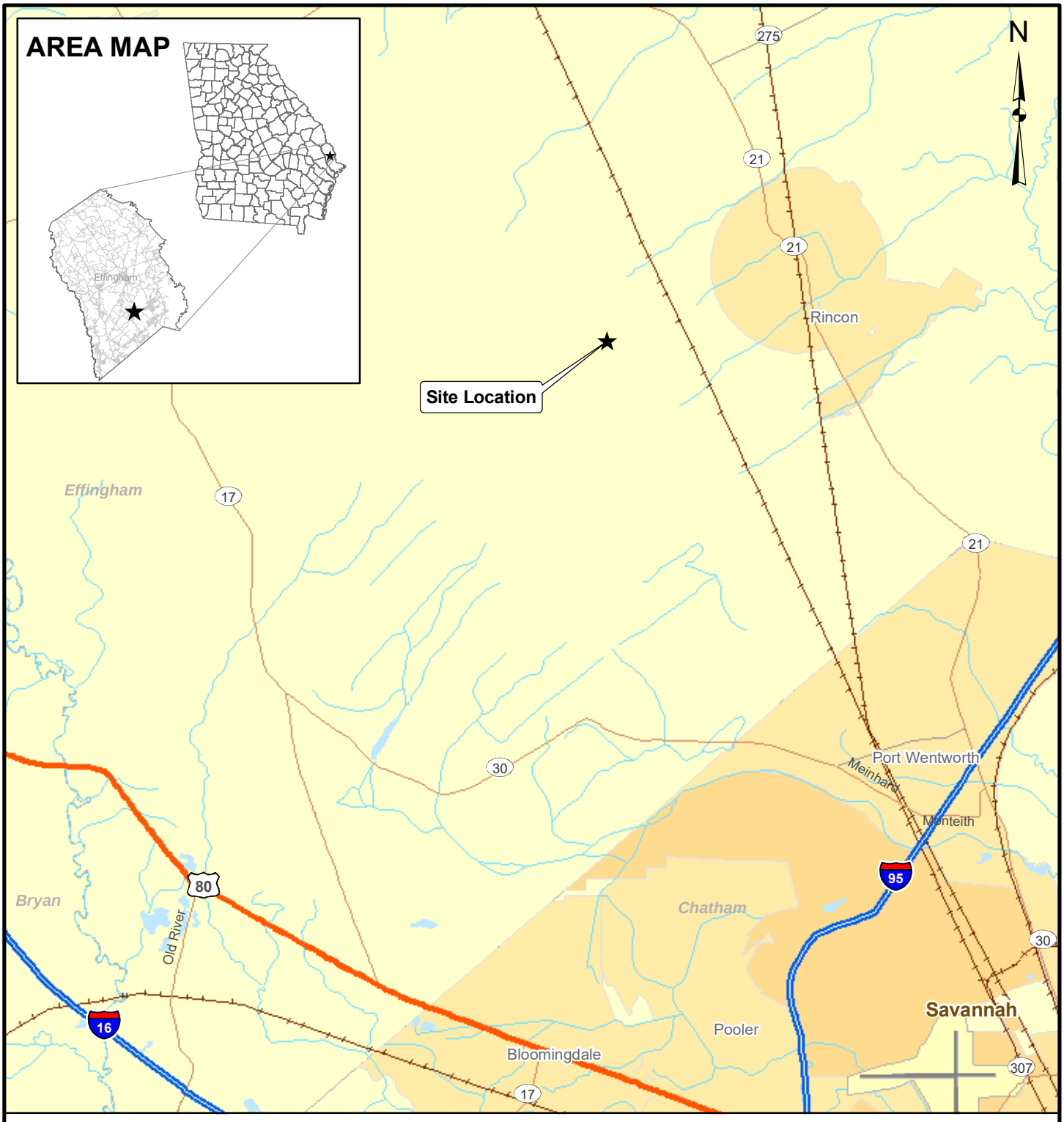
The modeled impact for each averaging period was then scaled from an emission rate of 1 g/s to the facility-wide emission rate of each pollutant, assuming all facility-wide emissions are emitted from the "worst case" of the facility's two stacks and that the modeled impact is directly proportional to the mass emission rate. As shown in Table 5-4, the impacts of all TAP from OPC Effingham are well below the respective annual, 24-hour, and 15-minute AACs. The SCREEN3 modeling file and TAP emission calculations are included in Appendix C of this application.

Table 5-4. Modeling Results Compared to AAC Values

Toxic Air Pollutant (TAP)	Maximum Annual Impact µg/m³	Annual AAC µg/m³	% of AAC	Maximum 24-Hour Impact µg/m³	24-Hour AAC µg/m³	% of ACC	Maximum 15-Minute Impact µg/m³	15-Minute AAC µg/m³	% of AAC
Ammonia	7.14E-01	1.00E+02	0.714%		N/A		1.18E+01	2.40E+03	0.491%
Acrolein	3.26E-04	2.00E-02	1.631%		N/A		5.38E-03	2.30E+01	0.023%
1,3-Butadiene	2.19E-05	3.00E-02	0.073%		N/A		3.62E-04	1.10E+03	0.000%
Benzene	6.12E-04	1.30E-01	0.471%		N/A		1.01E-02	1.60E+03	0.001%
Sulfuric Acid		N/A		6.65E-03	2.40E+00	0.277%	2.19E-02	3.00E+02	0.007%
Formaldehyde	5.82E-03	1.10E+00	0.529%		N/A		9.60E-02	2.45E+02	0.039%
Propylene Oxide	1.48E-03	2.70E+00	0.055%		N/A		2.44E-02	N/A	--
Acetaldehyde	2.04E-03	4.55E+00	0.045%		N/A		3.36E-02	4.50E+03	0.001%

1. AAC values from EPD's *Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions (Guideline)*, updated October 2018.

APPENDIX A. AREA MAP AND PROCESS FLOW DIAGRAM



LEGEND

★ Effingham Energy Facility Location

0 1 2 4 Miles

	SCALE AS SHOWN	**GENERAL LOCATION**	
	DATE 5/7/2010		
	DESIGN SKM		
	GIS NRL		
FILE No. 10387522_A001	CHECK XXX	OGLETHORPE POWER COMPANY	FIGURE 1-1
PROJECT No. 103-87522 REV. 0	REVIEW XXX		

LEGEND

- ★ Effingham Power Plant Location
- Property Boundary

0 1,000 2,000 4,000 Feet

	SCALE AS SHOWN	**SITE LOCATION**	
	DATE 5/7/2010		
	DESIGN SKM		
	GIS NRL		
FILE No. 10387522_A002	CHECK XXX	OGLETHORPE POWER COMPANY	FIGURE 1-2
PROJECT No. 103-87522 REV. 0	REVIEW XXX		

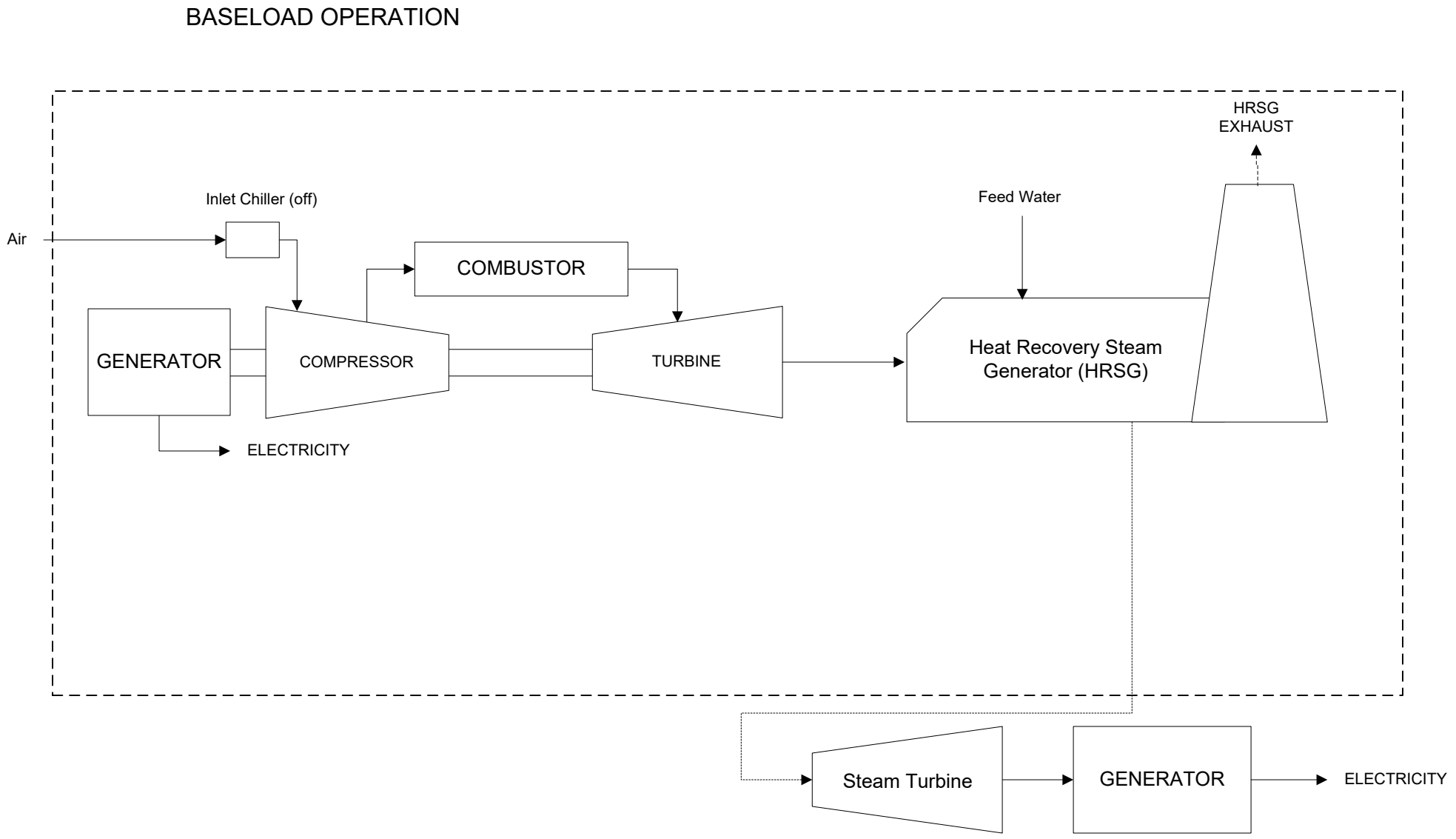


Figure 1-3. Process Flow Diagram for Each CT/HRSG Train Baseload Operation, Turbine Inlet Temperature of 59°F Effingham Power Plant, GA

Process Flow Legend
Solid/Liquid
Gas
Steam

APPENDIX B. POTENTIAL EMISSION CALCULATIONS

Table B-1. Combustion Turbines - Operating Parameters - Design Capacity

Emission Source	Source No.	Fuel Type	Maximum Annual Operating Capacity[1] (Million MMBtu/yr)	Potential Annual Operation (hr/yr)
CTG1 Combustion Turbine	CTG1	Natural Gas	16.37	8,760
CTG2 Combustion Turbine	CTG2	Natural Gas	16.37	8,760

1. Based on post project heat input capacity per turbine at 59F (1,869 MMBtu/hr) times potential operation of 8,760 hrs/yr.

Table B-2. CCCT Potential Criteria Pollutant Emissions

Pollutant	Emission Factor (lb/MMBtu)	Potential Emissions (tpy)
NO_X[1]	1.11E-02	218.0
CO[1]	2.01E-02	289.0
VOC[2]	2.00E-03	33
PM[3]	21.6 (lb/hr)	189.2
Total PM_{10}[3]	21.6 (lb/hr)	189.2
Total $PM_{2.5}$[3]	21.6 (lb/hr)	189.2
SO_2[4]	6.00E-04	9.82
H_2SO_4[5]	2.76E-05	0.45
CO_2[6]	1.19E+02	1,946,028
CH_4[7]	2.20E-03	36.0
N_2O[7]	2.20E-04	3.60
CO_2e[8]	1.19E+02	1,947,993

1. The NO_X and CO emission factors are based on the facility's permitted annual emission limits for each combustion turbine found in Permit Condition No. 3.3.5.

2. VOC emission factor from the December 2000 PSD permit application for construction of the facility.

3. PM emissions are based on the facility's permitted annual emission limits for each combustion turbine found in Permit Condition No. 3.3.4 (d), given in units of lb/hr. It was conservatively assumed all PM is less than 2.5 microns in diameter (i.e., $PM_{2.5}$ = PM_{10} = PM).

4. SO_2 emissions were estimated using the default SO_2 emission rate for pipeline natural gas from 40 CFR 75, Appendix D, Section 2.3.1.1, consistent with the methodology used to report the facility's SO_2 emissions under the CAMD programs.

5. H_2SO_4 emissions were calculated assuming a 3% conversion of SO_2 to H_2SO_4, consistent with the December 2000 PSD permit application for construction of the facility.

6. CO_2 emissions were calculated in accordance with 40 CFR 75, Appendix G, Equation G-4 using the F-factor for natural gas, consistent with the methodology used to report the facility's CO_2 emissions under the CAMD programs and the EPA GHG reporting rule.

7. CH_4 and N_2O emission factors for natural gas combustion are from 40 CFR 98, Subpart C, Table C-2, converted from kg to lb, consistent with the methodology used to report the facility's emissions under the EPA GHG reporting rule.

8. CO_2e was calculated as the sum of the emission factor for each GHG pollutant multiplied by that pollutant's global warming potential (GWP). GWPs were taken from 40 CFR 98, Subpart A, Table A-1:

CO_2:	1
CH_4:	25
N_2O:	298

Table B-3. Combustion Turbines - Operating Parameters - Design Capacity

Emission Source	Source No.	Fuel Type	Maximum Annual Operating Capacity[1] (Million MMBtu/yr)	Potential Annual Operation (hr/yr)
CTG1 Combustion Turbine	CTG1	Natural Gas	16.37	8,760
CTG2 Combustion Turbine	CTG2	Natural Gas	16.37	8,760

1. Based on post project heat input capacity per turbine at 59F (1,869 MMBtu/hr) times potential operation of 8,760 hrs/yr.

Table B-4. Combustion Turbines Potential HAP Emissions

Pollutant	Emission Factor[1] (lb/MMBtu)	Potential Emissions[2] Combustion Turbines (tpy)
Lead	--	--
1,3-Butadiene	4.30E-07	7.04E-03
Acetaldehyde	4.00E-05	6.55E-01
Acrolein	6.40E-06	1.05E-01
Benzene	1.20E-05	1.96E-01
Ethylbenzene	3.20E-05	5.24E-01
Formaldehyde[3]	1.14E-04	1.87
Naphthalene	1.30E-06	2.13E-02
Propylene Oxide	2.90E-05	4.75E-01
Toluene	1.30E-04	2.13
Xylenes	6.40E-05	1.05E+00
Total HAP[4]	**4.29E-04**	**7.03**
Max Single HAP[5]	**1.30E-04**	**2.13**

1. Emission factors per AP-42, Section 3.1 Stationary Gas Turbines, Tables 3.1.-2a and 3.1-3 unless otherwise noted.
2. Potential Emissions (tpy) = Emission Factor (lb/MMBtu) * Maximum Annual Operating Capacity (Million MMBtu/yr) * 1E6 MMBtu/ Million MMBtu / 2,000 lb/ton
3. Formaldehyde emission factor based on AP-42 Section 3.1 Database (April 2000) for Frame Type CTs greater than 40 MW.
4. Total HAP emission factor is the sum of all speciated HAP emission factors.
5. Largest HAP from combustion turbines is Toluene.

Table B-5. Preheater Parameters

Emission Source	Heat Input Natural Gas (MMBtu/hr)	Heating Value (Btu/scf)	Annual Fuel Usage (MMscf/yr)
FP1	1.875	1,020	16.10

Table B-6. Preheater Potential Criteria Pollutant Emissions

Pollutant	Emission Factor ($lb/10^6$ scf)[1]	Potential Emissions (tpy)[2]
NO_X[3]	51	0.41
CO[4]	83.64	0.67
VOC	5.50	4.43E-02
PM	7.60	6.12E-02
Total PM_{10}	7.60	6.12E-02
Total $PM_{2.5}$	7.60	6.12E-02
SO_2	0.60	4.83E-03

1. Emission factors are based on AP-42 Table 1.4-2 "Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion" (July 1998), unless otherwise specified.

2. Tons per year calculation assumes 8,760 hours of operation in a year.

3. Hourly emission rate for NO_X from FP1 specified as 0.05 lb/MMBtu, per Condition 3.3.6(a) in Title V operating permit.

4. Hourly emission rate for CO from FP1 specified as 0.082 lb/MMBtu, per Condition 3.3.6(b) in Title V operating permit.

Table B-7. Preheater Potential HAP Emissions

Pollutant	Emission Factor[1] (lb/MMBtu)	Potential Emissions[2] Preheater (tpy)
2-Methylnaphthalene	2.4E-05	1.93E-07
3-Methylchloranthrene	1.8E-06	1.45E-08
7,12-Dimethylbenz(a)anthracene	1.6E-05	1.29E-07
Acenaphthene	1.8E-06	1.45E-08
Acenaphthylene	1.8E-06	1.45E-08
Anthracene	2.4E-06	1.93E-08
Arsenic	2.0E-04	1.61E-06
Beryllium	1.2E-05	9.66E-08
Benzene	2.1E-03	1.69E-05
Benz(a)anthracene	1.8E-06	1.45E-08
Benzo(a)pyrene	1.2E-06	9.66E-09
Benzo(b)fluoranthene	1.8E-06	1.45E-08
Benzo(g,h,i)perylene	1.2E-06	9.66E-09
Benzo(k)fluoranthene	1.8E-06	1.45E-08
Cadmium	1.1E-03	8.86E-06
Chromium	1.4E-03	1.13E-05
Chrysene	1.8E-06	1.45E-08
Cobalt	8.4E-05	6.76E-07
Dibenzo(a,h)anthracene	1.2E-06	9.66E-09
Dichlorobenzene	1.2E-03	9.66E-06
Fluoranthene	3.0E-06	2.42E-08
Fluorene	2.8E-06	2.25E-08
Formaldehyde	7.5E-02	6.04E-04
Hexane	1.8E+00	1.45E-02
Indeno(1,2,3-cd)pyrene	1.8E-06	1.45E-08
Lead	5.0E-04	4.03E-06
Manganese	3.8E-04	3.06E-06
Mercury	2.6E-04	2.09E-06
Naphthalene	6.1E-04	4.91E-06
Nickel	2.1E-03	1.69E-05
Phenanthrene	1.7E-05	1.37E-07
Pyrene	5.0E-06	4.03E-08
Selenium	2.4E-05	1.93E-07
Toluene	3.4E-03	2.74E-05
Total HAP[4]	**1.89E+00**	**1.52E-02**
Max Single HAP[5]	**1.80E+00**	**1.45E-02**

1. Emission factors are based on AP-42 Table 1.4-2 "Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion", Table 1.4-3 "Emission Factors for Speciated Organic Compounds from Natural Gas Combustion", and Table 1.4-4 "Emission Factors for Metals from Natural Gas Combustion" (July 1998).

2. Emission factors are based on an average natural gas high heating value (HHV) of 1,020 Btu/scf.

3. Tons per year calculation assumes 8,760 hours of operation in a year.

4. Total HAP emission factor is the sum of all speciated HAP emission factors.

5. Largest HAP from the preheater is Hexane.

Table B-8. Boiler Parameters

Emission Source	Heat Input Natural Gas (MMBtu/hr)	Heating Value (Btu/scf)	Annual Fuel Usage[1] (MMscf/yr)
AB1	17	1,020	41.67

1. Annual hours of operation limited to 2,500 per Condition 3.2.1 in the permit.

Table B-9. Boiler Potential Criteria Pollutant Emissions

Pollutant	Emission Factor ($lb/10^6$ scf)[1]	Potential Emissions (tpy)[2]
NO_X[3]	99.96	2.08
CO[4]	83.64	1.74
VOC	5.50	0.11
PM	7.60	0.16
Total PM_{10}	7.60	0.16
Total $PM_{2.5}$	7.60	0.16
SO_2	0.60	1.25E-02

1. Emission factors are based on AP-42 Table 1.4-2 "Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion" (July 1998), unless otherwise specified.

2. Tons per year calculation assumes 2,500 hours of operation in a year.

3. Hourly emission rate for NO_X from FP1 specified as 0.098 lb/MMBtu, per Condition 3.3.6(a) in Title V operating permit.

4. Hourly emission rate for CO from FP1 specified as 0.082 lb/MMBtu, per Condition 3.3.6(b) in Title V operating permit.

Table B-10. Boiler Potential HAP Emissions

Pollutant	Emission Factor[1] (lb/MMBtu)	Potential Emissions[2] Boiler (tpy)
2-Methylnaphthalene	2.4E-05	5.00E-07
3-Methylchloranthrene	1.8E-06	3.75E-08
7,12-Dimethylbenz(a)anthracene	1.6E-05	3.33E-07
Acenaphthene	1.8E-06	3.75E-08
Acenaphthylene	1.8E-06	3.75E-08
Anthracene	2.4E-06	5.00E-08
Arsenic	2.0E-04	4.17E-06
Beryllium	1.2E-05	2.50E-07
Benzene	2.1E-03	4.38E-05
Benz(a)anthracene	1.8E-06	3.75E-08
Benzo(a)pyrene	1.2E-06	2.50E-08
Benzo(b)fluoranthene	1.8E-06	3.75E-08
Benzo(g,h,i)perylene	1.2E-06	2.50E-08
Benzo(k)fluoranthene	1.8E-06	3.75E-08
Cadmium	1.1E-03	2.29E-05
Chromium	1.4E-03	2.92E-05
Chrysene	1.8E-06	3.75E-08
Cobalt	8.4E-05	1.75E-06
Dibenzo(a,h)anthracene	1.2E-06	2.50E-08
Dichlorobenzene	1.2E-03	2.50E-05
Fluoranthene	3.0E-06	6.25E-08
Fluorene	2.8E-06	5.83E-08
Formaldehyde	7.5E-02	1.56E-03
Hexane	1.8E+00	3.75E-02
Indeno(1,2,3-cd)pyrene	1.8E-06	3.75E-08
Lead	5.0E-04	1.04E-05
Manganese	3.8E-04	7.92E-06
Mercury	2.6E-04	5.42E-06
Naphthalene	6.1E-04	1.27E-05
Nickel	2.1E-03	4.38E-05
Phenanthrene	1.7E-05	3.54E-07
Pyrene	5.0E-06	1.04E-07
Selenium	2.4E-05	5.00E-07
Toluene	3.4E-03	7.08E-05
Total HAP[4]	**1.89E+00**	**3.93E-02**
Max Single HAP[5]	**1.80E+00**	**3.75E-02**

1. Emission factors are based on AP-42 Table 1.4-2 "Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion", Table 1.4-3 "Emission Factors for Speciated Organic Compounds from Natural Gas Combustion", and Table 1.4-4 "Emission Factors for Metals from Natural Gas Combustion" (July 1998).

2. Emission factors are based on an average natural gas high heating value (HHV) of 1,020 Btu/scf.

3. Tons per year calculation assumes 2,500 hours of operation in a year.

4. Total HAP emission factor is the sum of all speciated HAP emission factors.

5. Largest HAP from the boiler is Hexane.

Table B-11. Fire Pump Parameters

Emission Source	Capacity MMBtu/hr	Capacity hp	Hours of Operation[1] hrs/yr
DWP1	2.06	235	500.00

1. Annual hours of operation limited to 500 per Condition 3.2.2 in the permit.

Table B-12. Fire Pump Potential Criteria Pollutant Emissions

Pollutant	Emission Factor (lb-hp-hr)[1]	Potential Emissions (tpy)[2]
NO_X	3.10E-02	1.82
CO	6.68E-03	0.39
VOC	2.47E-03	0.15
PM	2.20E-03	0.13
Total PM_{10}	2.20E-03	0.13
Total $PM_{2.5}$	2.20E-03	0.13
SO_2	2.05E-03	0.12

1. Emission factors are based on AP-42 Table 3.3-1 "Emission Factors for Uncontrolled Gasoline and Diesel Industrial Engines" (July 1998).

2. Hours of operation emission limited to 500 hours during any twelve consecutive months, per Condition 3.2.2 in the permit.

Table B-13. Fire Pump Potential HAP Emissions

Pollutant	Emission Factor (lb/MMBtu)[1]	Potential Emissions Fire Pump (tpy)[2]
Acenaphthylene	5.06E-06	2.97E-04
Acenaphthene	1.42E-06	8.34E-05
Acetaldehyde	7.67E-04	4.51E-02
Acrolein	9.25E-05	5.43E-03
Anthracene	1.87E-06	1.10E-04
Benzene	9.33E-04	5.48E-02
Benzo(a)anthracene	1.68E-06	9.87E-05
Benzo(a)pyrene	1.88E-07	1.10E-05
Benzo(b)fluoranthene	9.91E-08	5.82E-06
Benzo(g,h,l)perylene	4.89E-07	2.87E-05
Benzo(k)fluoranthene	9.91E-08	5.82E-06
1,3-Butadiene	3.91E-05	2.30E-03
Chrysene	3.53E-07	2.07E-05
Dibenz(a,h)anthracene	5.83E-07	3.43E-05
Fluoranthene	7.61E-06	4.47E-04
Fluorene	2.92E-05	1.72E-03
Formaldehyde	1.18E-03	6.93E-02
Indeno(1,2,3-cd)pyrene	3.75E-07	2.20E-05
Naphthalene	8.48E-05	4.98E-03
Phenanthrene	2.94E-05	1.73E-03
Pyrene	4.78E-06	2.81E-04
Toluene	4.09E-04	2.40E-02
Xylenes	2.85E-04	1.67E-02
Total HAP[3]	**3.87E-03**	**2.28E-01**
Max Single HAP[4]	**1.18E-03**	**6.93E-02**

1. Emission factors are based on AP-42 Table 3.3-2 "Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engines" (July 1998).

3. Tons per year calculation assumes 500 hours of operation in a year.

3. Total HAP emission factor is the sum of all speciated HAP emission factors.

4. Largest HAP from the fire pump is Formaldehyde.

Table B-14. Cooling Tower Potential Emissions

Emission Source	Drift Loss Flow[1] (gpm)	Total Dissolved Solids[2] (mg/L)	Filterable PM Emissions[3,4] (lb/hr)	(tpy)	Total PM_{10} Emissions[5] (lb/hr)	(tpy)	Total $PM_{2.5}$ Emissions[5] (lb/hr)	(tpy)
Cooling Tower	7.00	602.00	2.11	9.24	2.02	8.83	4.52E-01	1.98

1. Based on cooling tower system operational data from Siemens.
2. Based on facility operational data.
3. Hourly PM emission rate (lb/hr) = Flow rate (gal/min) × TDS (mg/L) × 3.78541 (L/gal) × 2.2045E-06 (lb/mg) x 60 min/hr
4. Annual PM emission rate (ton/yr) = Hourly emission rate (lb/hr) × 8,760 (hours/yr)/2,000 (lb/ton).
5. PM_{10} and $PM_{2.5}$ emissions are estimated based on the particulate size distribution below, interpolated from data in *Calculating Realistic PM_{10} Emissions from Cooling Towers* by Joel Reisman and Gordon Frisbie, 2002. Detailed derivation of $PM_{10}/PM_{2.5}$ fractions are discussed in Table B-7.

Table B-15. Derivation of $PM_{10}/PM_{2.5}$ Fraction[1]

Drift Droplet Diameter (D_d) (µm)	Drift Droplet Volume[2] ($V_{droplet}$) (µm³)	Drift Droplet Mass[3] ($M_{droplet}$) (µg)	Droplet Particle Mass[4] (M_{TDS}) (µg)	Solid Particle Diameter[5] (D_{TDS}) (µm)	EPRI Cumulative % Mass Smaller[6] (%)	Interpolation Value for $PM_{2.5}$[7] (%)	Interpolation Value for PM_{10}[7] (%)
0	0.00E+00	0.00E+00	0.00E+00	0.000	0	--	--
10	5.24E+02	5.24E-04	5.24E-08	0.357	0	--	--
20	4.19E+03	4.19E-03	4.19E-07	0.714	0.196	--	--
30	1.41E+04	1.41E-02	1.41E-06	1.071	0.226	--	--
40	3.35E+04	3.35E-02	3.35E-06	1.428	0.514	--	--
50	6.54E+04	6.54E-02	6.54E-06	1.784	1.816	--	--
60	1.13E+05	1.13E-01	1.13E-05	2.141	5.702	--	--
70	1.80E+05	1.80E-01	1.80E-05	2.498	21.348	--	--
90	3.82E+05	3.82E-01	3.82E-05	3.212	49.812	21.421	--
110	6.97E+05	6.97E-01	6.97E-05	3.926	70.509	--	--
130	1.15E+06	1.15E+00	1.15E-04	4.639	82.023	--	--
150	1.77E+06	1.77E+00	1.77E-04	5.353	88.012	--	--
180	3.05E+06	3.05E+00	3.05E-04	6.424	91.032	--	--
210	4.85E+06	4.85E+00	4.85E-04	7.495	92.468	--	--
240	7.24E+06	7.24E+00	7.24E-04	8.565	94.091	--	--
300	1.41E+07	1.41E+01	1.41E-03	10.706	96.288	--	95.563
350	2.24E+07	2.24E+01	2.24E-03	12.491	97.011	--	--
400	3.35E+07	3.35E+01	3.35E-03	14.275	98.34	--	--
450	4.77E+07	4.77E+01	4.77E-03	16.060	99.071	--	--
600	1.13E+08	1.13E+02	1.13E-02	21.413	100	--	--

1. Based on the methodology discussed in "Calculating Realistic PM_{10} Emissions from Cooling Towers" by Joel Reisman and Gordon Frisbie, 2002 (the Document). https://yosemite.epa.gov/r9/air/epss.nsf/6924c72e5ea10d5e882561b100685e04/44841bd36885b15e882579f80062a144/$FILE/Cooling%20Tower%20PM%20Emissions.pdf

Assumptions/helpful equations
Volume of a sphere = $4 \pi r^3/3$

2. $V_{droplet} = 4/3 \pi (D_d/2)^3$ [Equation 2 of the Document]
3. $M_{droplet}$ = density (ρ_w) of water * $V_{droplet} = \rho_w * 4/3 \pi (D_d/2)^3$

$\rho_w =$ 1.00E-06 µg/µm³

4. $M_{TDS} = TDS * M_{droplet}$ [Equation 3 of the Document, with TDS in units of ppm]

TDS = 100 mg/L Total Dissolved Solids Per Table B-6
TDS = 100 ppm

5. $M_{TDS} = (\rho_{TDS})(V_{TDS}) = (\rho_{TDS})(4/3)\pi (D_{TDS}/2)^3$ [Equation 5 of the Document]

Therefore, the equation can be solved for D_{TDS}: $D_{TDS} = \{M_{TDS}/[(\rho_{TDS})* 4/3 * \pi]\}^{1/3} \times 2$

Assume solid particulates have the same density (ρ_{TDS}) as sodium chloride per the Document: 2.20E-06 µg/µm³

6. Based on drift eliminator test data from a test conducted by Environmental Systems Corporation (ESC) at the Electric Power Research Institute (EPRI) test facility in Houston, Texas in 1988 (Aull, 1999) as documented in Table 1 of the Document.
7. D_{TDS} represents the particle size of collected material in droplet. The EPRI cumulative % mass smaller indicates the percentage of material in that specific water droplet size that has a diameter smaller than D_{TDS}. Therefore, linear interpolation between calculated D_{TDS} is necessary to ascertain the specific mass percentages to estimate PM_{10} and $PM_{2.5}$ emissions. For example, at 1,000 mg/L TDS:
%MassPM_{10} = %Mass Less than 10 D_{TDS} + [(10 - D_{TDS} Less Than 10) / (D_{TDS} Greater Than 10 - D_{TDS} Less Than 10)] * (%Mass Greater than 10 D_{TDS} - %Mass Less than 10 D_{TDS})
i.e. 82.041% = 82.023% + [(10 - 9.995) / (11.533 - 9.995)] * (88.012% - 82.023%)

Table B-16. Site-wide Potential to Emit

Pollutant	Potential Emissions (tpy)
NO_X	222.3
CO	291.8
VOC	33.0
PM	198.8
Total PM_{10}	198
Total $PM_{2.5}$	192
SO_2	9.96
H_2SO_4	0.45
CO_2	1,946,028
CH_4	36.0
N_2O	3.60
CO_2e	1,947,993
Total HAP	7.31
Max Single HAP in CCCT[1]	2.13

1. Maximum single HAP is Toluene.

APPENDIX C. TOXICS IMPACT ANALYSIS DOCUMENTATION

Table C-1. Combustion Turbines - Operating Parameters

Emission Source	Source No.	Fuel Type	Estimated Maximum Annual Operating Capacity[1] (Million MMBtu/yr)
CTG1 Combustion Turbine	CTG1	Natural Gas	16.37
CTG2 Combustion Turbine	CTG2	Natural Gas	16.37

1. Based on post project heat input capacity per turbine at 59F (1,869 MMBtu/hr) times potential operation of 8,760 hrs/yr.

Table C-2. Combustion Turbines Potential HAP and TAP Emissions

Pollutant	TAP? (Y/N)	HAP? (Y/N)	Emission Factor[1] (lb/MMBtu)	Potential Emissions[2] Combustion Turbines (tpy)[3]
Ammonia	Y	N	1.40E-02	229
Lead	Y	Y	--	--
1,3-Butadiene	Y	Y	4.30E-07	7.04E-03
Acetaldehyde	Y	Y	4.00E-05	0.655
Acrolein	Y	Y	6.40E-06	0.105
Benzene	Y	Y	1.20E-05	0.196
Ethylbenzene	Y	Y	3.20E-05	0.52
Formaldehyde	Y	Y	1.14E-04	1.87
Naphthalene	Y	Y	1.30E-06	2.13E-02
PAH	N	Y	2.20E-06	3.60E-02
Propylene Oxide	Y	Y	2.90E-05	0.47
Toluene	Y	Y	1.30E-04	2.13
Xylenes	Y	Y	6.40E-05	1.05
Hexane	Y	Y	--	--
Total HAP			**4.31E-04**	**7.06**
Max Single HAP			**1.30E-04**	**2.13**

1. Emission factors per AP-42, Section 3.1 Stationary Gas Turbine, Tables 3.1.-2a and 3.1-3. (April 2000) unless otherwise specified. Formaldehyde emission factor from AP-42, Section 3.1 Database (April 2000) for Frame Type CTs greater than 40 MW. Ammonia emission factor conservatively based on a 10 ppm ammonia slip value from the SCR.
2. Potential Emissions (tpy) = Emission Factor (lb/MMBtu) * Maximum Annual Operating Capacity (Million MMBtu/yr) * 1E6 MMBtu/ Million MMBtu / 2,000 lb/ton
3. Maximum Annual Operating Capacity anticipated for sustainable operation.

Tabe C-3. Preheater and Boiler - Operating Parameters

Emission Source	Heat Input Natural Gas (MMBtu/hr)	Heating Value (Btu/scf)	Annual Fuel Usage[1] (MMscf/yr)
Preheater	1.875	1020	16.1
Boiler	17	1020	41.7

1. Annual hours of operation for the boiler limited to 2,500 per Condition 3.2.1 in the permit.

Table C-4. Preheater and Boiler Potential HAP Emissions

Pollutant	TAP? (Y/N)	HAP? (Y/N)	Emission Factor[1] (lb/MMBtu)	Potential Emissions[2] Combustion Turbines (tpy)
2-Methylnaphthalene	N	Y	2.4E-05	6.93E-07
3-Methylchloranthrene	N	Y	1.8E-06	5.20E-08
7,12-Dimethylbenz(a)anthracene	N	Y	1.6E-05	4.62E-07
Acenaphthene	N	Y	1.8E-06	5.20E-08
Acenaphthylene	N	Y	1.8E-06	5.20E-08
Anthracene	N	Y	2.4E-06	6.93E-08
Arsenic	Y	Y	2.0E-04	5.78E-06
Beryllium	Y	Y	1.2E-05	3.47E-07
Benzene	Y	Y	2.1E-03	6.07E-05
Benz(a)anthracene	N	Y	1.8E-06	5.20E-08
Benzo(a)pyrene	N	Y	1.2E-06	3.47E-08
Benzo(b)fluoranthene	N	Y	1.8E-06	5.20E-08
Benzo(g,h,i)perylene	N	Y	1.2E-06	3.47E-08
Benzo(k)fluoranthene	N	Y	1.8E-06	5.20E-08
Cadmium	Y	Y	1.1E-03	3.18E-05
Chromium	Y	Y	1.4E-03	4.04E-05
Chrysene	N	Y	1.8E-06	5.20E-08
Cobalt	Y	Y	8.4E-05	2.43E-06
Dibenzo(a,h)anthracene	N	Y	1.2E-06	3.47E-08
1,4-Dichlorobenzene	Y	Y	1.2E-03	3.47E-05
Fluoranthene	N	Y	3.0E-06	8.67E-08
Fluorene	N	Y	2.8E-06	8.09E-08
Formaldehyde	Y	Y	7.5E-02	2.17E-03
Hexane	Y	Y	1.8E+00	5.20E-02
Indeno(1,2,3-cd)pyrene	N	Y	1.8E-06	5.20E-08
Lead	Y	Y	5.0E-04	1.44E-05
Manganese	Y	Y	3.8E-04	1.10E-05
Mercury	Y	Y	2.6E-04	7.51E-06
Naphthalene	Y	Y	6.1E-04	1.76E-05
Nickel	Y	Y	2.1E-03	6.07E-05
Phenanthrene	N	Y	1.7E-05	4.91E-07
Pyrene	N	Y	5.0E-06	1.44E-07
Selenium	Y	Y	2.4E-05	6.93E-07
Toluene	Y	Y	3.4E-03	9.82E-05
Total HAP			**1.89E+00**	**5.45E-02**
Max Single HAP			**1.80E+00**	**5.20E-02**

1. Emission factors are based on AP-42 Table 1.4-2 "Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion", Table 1.4-3 "Emission Factors for Speciated Organic Compounds from Natural Gas Combustion", and Table 1.4-4 "Emission Factors for Metals from Natural Gas Combustion" (July 1998).
2. Emission factors are based on an average natural gas high heating value (HHV) of 1,020 Btu/scf.
3. Tons per year calculation assumes 8,760 hours of operation in a year for the preheater and 2,500 hours annually for the boiler.

Table C-5. Toxic Air Pollutant Emissions Compared to Minimum Emission Rates

Toxic Air Pollutant (TAP)[4],[5]	Annual Emissions (tpy)	Annual Emissions[1] (lb/yr)	Short Term Emission Rate[2] (g/s)	Minimum Emission Rate (MER)[3] (lb/yr)	Above MER?
Arsenic	5.78E-06	0.01	1.66E-07	0.0567	No
Ammonia	2.29E+02	458360	6.59E+00	24333	Yes
Beryllium	3.47E-07	0.00	9.97E-09	0.97	No
Cadmium	3.18E-05	0.1	9.14E-07	1.35	No
Acrolein	1.05E-01	210	3.01E-03	4.87	Yes
Lead	1.44E-05	0	4.15E-07	5.84	No
1,3-Butadiene	7.04E-03	14.1	2.02E-04	7.30	Yes
Cobalt	2.43E-06	0.00	6.98E-08	11.7	No
Manganese	1.10E-05	0.02	3.16E-07	12.2	No
Selenium	6.93E-07	0.00	1.99E-08	23.4	No
Chromium	4.04E-05	0.1	1.16E-06	24.33	No
Benzene	1.97E-01	393	5.65E-03	31.6	Yes
Nickel	6.07E-05	0.1	1.74E-06	38.6	No
Barium	--	--	--	57.9	No
Mercury	7.51E-06	0.02	2.16E-07	73.0	No
Copper	--	--	--	117	No
Sulfuric Acid	4.27E-01	854	1.23E-02	117	Yes
Formaldehyde	1.87E+00	3,737	5.37E-02	267	Yes
Propylene Oxide	4.75E-01	949	1.37E-02	657	Yes
Naphthalene	2.13E-02	42.6	6.13E-04	730	No
Acetaldehyde	6.55E-01	1,310	1.88E-02	1,107	Yes
Molybdenum	--	--	--	1,738	No
Xylenes	1.05E+00	2,095	3.01E-02	24,333	No
Hexane	5.20E-02	104	1.50E-03	170,331	No
1,4-Dichlorobenzene	3.47E-05	0.1	9.97E-07	194,664	No
Propane	--	--	--	208,600	No
Ethylbenzene	5.24E-01	1,048	1.51E-02	243,330	No
Pentane	--	--	--	341,858	No
Toluene	2.13E+00	4,256	6.12E-02	1,216,650	No

1. Annual Emissions (lb/yr) = Annual Emissions (ton/yr) * 2,000 lb/ton.
2. Short Term Emission Rate (g/s) = Annual Emissions (lb/yr) * 453.592 (g/lb) / 31,536,000 (s/yr)
3. From EPD's *Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions,* updated October 2018.
4. Based on formaldehyde emission factor from AP-42, Section 3.1 Database (April 2000) for Frame Type CTs greater than 40 MW.
5. Ammonia emission factor convervatively set to 0.014 lb/MMBtu, which is based on 10 ppm ammonia slip from the SCR.

Table C-6. Worst Case Stack Parameters for SCREEN3[1]

Source Type	Height (m)	Diameter (m)	Velocity (m/s)	Gas Temperature (K)
Point	50.292	5.7910	14.965	352.03

1. Conservatively assumes all emissions are from a single stack.

Table C-7. SCREEN3 Modeling Results at 1 g/s

Maximum 1-Hour Impact	1.353E+0 µg/m³
Maximum 15-Minute Impact[1]	1.786E+0 µg/m³
Maximum 24-Hour Impact[2]	5.412E-1 µg/m³
Maximum Annual Impact[3]	1.082E-1 µg/m³

1. The 15-minute impact equals the 1-hour impact times 1.32 per the EPD *Guideline*.
2. The 24-hour impact equals the 1-hour impact times 0.4 per the EPD *Guideline*.
3. The annual impact equals the 1-hour impact times 0.08 per the EPD *Guideline*.

Table C-8. Modeling Results Compared to AAC Values[1]

Toxic Air Pollutant (TAP)	Maximum Annual Impact µg/m³	Annual AAC µg/m³	% of AAC	Maximum 24-Hour Impact µg/m³	24-Hour AAC µg/m³	% of ACC	Maximum 15-Minute Impact µg/m³	15-Minute AAC µg/m³	% of AAC
Ammonia	7.14E-01	1.00E+02	0.714%		N/A		1.18E+01	2.40E+03	0.491%
Acrolein	3.26E-04	2.00E-02	1.631%		N/A		5.38E-03	2.30E+01	0.023%
1,3-Butadiene	2.19E-05	3.00E-02	0.073%		N/A		3.62E-04	1.10E+03	0.000%
Benzene	6.12E-04	1.30E-01	0.471%		N/A		1.01E-02	1.60E+03	0.001%
Sulfuric Acid		N/A		6.65E-03	2.40E+00	0.277%	2.19E-02	3.00E+02	0.007%
Formaldehyde	5.82E-03	1.10E+00	0.529%		N/A		9.60E-02	2.45E+02	0.039%
Propylene Oxide	1.48E-03	2.70E+00	0.055%		N/A		2.44E-02	N/A	--
Acetaldehyde	2.04E-03	4.55E+00	0.045%		N/A		3.36E-02	4.50E+03	0.001%

1. AAC values from EPD's *Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions (Guideline)*, updated October 2018.

05/17/22
12:06:27

```
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 13043 ***

EFFINGHAM AGP-LLTD TOXICS

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE            =        POINT
   EMISSION RATE (G/S)    =     1.000000
   STACK HEIGHT (M)       =      50.2920
   STK INSIDE DIAM (M)    =       5.7912
   STK EXIT VELOCITY (M/S)=      14.9657
   STK GAS EXIT TEMP (K)  =     352.0389
   AMBIENT AIR TEMP (K)   =     293.0000
   RECEPTOR HEIGHT (M)    =       0.0000
   URBAN/RURAL OPTION     =        RURAL
   BUILDING HEIGHT (M)    =       0.0000
   MIN HORIZ BLDG DIM (M) =       0.0000
   MAX HORIZ BLDG DIM (M) =       0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.


BUOY. FLUX =  206.358 M**4/S**3;  MOM. FLUX = 1562.957 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***
```

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
1.	0.000	1	1.0	1.1	897.5	896.53	8.07	8.06	NO
100.	0.4830E-05	5	1.0	1.8	10000.0	195.77	33.63	33.26	NO
200.	0.1939E-02	5	1.0	1.8	10000.0	195.77	43.16	42.03	NO
300.	0.2303E-02	5	1.0	1.8	10000.0	195.77	44.87	42.46	NO
400.	0.4008E-02	1	3.0	3.4	960.0	332.37	102.48	83.49	NO
500.	0.1106	1	3.0	3.4	960.0	332.37	123.87	116.27	NO
600.	0.5145	1	3.0	3.4	960.0	332.37	144.67	164.23	NO
700.	0.8461	1	3.0	3.4	960.0	332.37	164.98	222.55	NO
800.	0.9178	1	3.0	3.4	960.0	332.37	184.88	291.37	NO
900.	1.168	1	1.5	1.7	615.4	614.45	242.18	392.86	NO
1000.	1.322	1	1.5	1.7	615.4	614.45	263.49	481.51	NO

```
MAXIMUM 1-HR CONCENTRATION AT OR BEYOND     1. M:
  1078.    1.353        1     1.5    1.7   615.4  614.45  275.00  554.93    NO

 DWASH=   MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

 ******************************************
 *  SUMMARY OF TERRAIN HEIGHTS ENTERED FOR  *
 *    SIMPLE ELEVATED TERRAIN PROCEDURE     *
 ******************************************

      TERRAIN        DISTANCE RANGE (M)
       HT (M)       MINIMUM     MAXIMUM
      -------      --------    --------
           0.            1.       1000.

     ***************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ***************************************

 CALCULATION        MAX CONC    DIST TO   TERRAIN
  PROCEDURE        (UG/M**3)    MAX (M)    HT (M)
--------------    -----------   ---------   -------
SIMPLE TERRAIN       1.353         1078.        0.


**************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
**************************************************
```

APPENDIX D. EPD SIP FORMS

State of Georgia
Department of Natural Resources
Environmental Protection Division
Air Protection Branch

Stationary Source Permitting Program
4244 International Parkway, Suite 120
Atlanta, Georgia 30354
404/363-7000
Fax: 404/363-7100

EXPEDITED PERMITTING PROGRAM – APPLICATION FOR ENTRY TO PROGRAM FOR AIR PERMITS

EPD Use Only

Date Received: _____ Application No. _____

To be eligible for expedited review, this application form must be accompanied by the complete permit application for the type of air permit being requested.

1. Contact Information

Facility Name: Effingham Energy Facility
AIRS No. (if known): 04-13- 103 -00012
Contact Person: Courtney Adcock Title: Senior Environmental Specialist
Telephone No.: 770-270-7678 Alternate Phone No.: 404-989-6796
Email Address: courtney.adcock@opc.com

If EPD is unable to contact me, please contact the alternate contact person:

Contact Person: Justin Fickas Title: Principal Consultant
Telephone No.: 404-751-0228 Alternate Phone No.: _____
Email Address: jfickas@trinityconsultants.com

On Page 2 of this form, please check the appropriate box for which type of air permit you are requesting expedited review.

I have read the Expedited Review Program Standard Operating Procedures and accept all of the terms and conditions within. I have participated in the required pre-application meeting with EPD. I understand that it is my responsibility to ensure an application of the highest quality is submitted and to address any requests for additional information by the deadline specified. I understand that submittal of this request form is not a guarantee that expedited review will be granted.

Signature: Courtney Adcock Date: 6/29/2022

2. Applying For Which Type Of Permit: (Please Check Appropriate Box)

Expedited Review Fees for Air Permits	
Permit Type – Please Check One	**Expedited Review Fee* as of March 1, 2021**
☐ Generic Permit: Concrete Batch Plant – Minor Source	$1,250
☐ Generic Permit: Concrete Batch Plant – Synthetic Minor Source	$1,875
☐ Generic Permit: Hot Mix Asphalt Plant – Synthetic Minor Source	$2,500
☐ Minor Source Permit (or Amendment)	$3,750
☐ Synthetic Minor Permit (or Amendment)	$5,000
☐ Major Source SIP Permit not subject to PSD or 112(g)	$7,500
☐ Title V 502(b)(10) Permit Amendment	$5,000
☐ Title V Minor Modification with Construction	$5,000
■ Title V Significant Modification	$7,500
☐ Major Source SIP Permit subject to 112(g) but not subject to PSD	$18,750
☐ PSD Permit (or Amendment) not subject to NAAQS and/or PSD Increment Modeling	$18,750
☐ PSD Permit (or Amendment) subject to NAAQS and/or PSD Increment Modeling but not subject to Modeling for $PM_{2.5}$, NO_2, or SO_2	$25,000
☐ PSD Permit (or Amendment) subject to NAAQS and/or PSD Increment Modeling for $PM_{2.5}$, NO_2, or SO_2	$31,250
☐ PSD Permit (or Amendment) subject to NAAQS and/or PSD Increment Modeling for $PM_{2.5}$, NO_2, or SO_2 and also impacting a Class I Area	$37,500
☐ Nonattainment NSR Review Permit (or Amendment)	$50,000
* Do not send fee payment with this form. Upon acceptance of application for the expedited permit program, EPD will notify you and an invoice will appear on GECO. Fees must be paid via check to “Georgia Department of Natural Resources” within ten (10) business days of acceptance.	

3. Comments.

This section is optional. Applicants may use this field to include specific comments or requests for EPD consideration. For example, the applicant may use this field to request a public hearing or to remind EPD of review time needs and/or expectations that may differ from the time frames in the procedures.

State of Georgia
Department of Natural Resources
Environmental Protection Division
Air Protection Branch

Stationary Source Permitting Program
4244 International Parkway, Suite 120
Atlanta, Georgia 30354
404/363-7000
Fax: 404/363-7100

SIP AIR PERMIT APPLICATION

EPD Use Only

Date Received: _____ Application No. _____

FORM 1.00: GENERAL INFORMATION

1. Facility Information

Facility Name: Effingham Energy Facility
AIRS No. (if known): 04-13- 103 – 00012
Facility Location: Street: 3440 McCall Road
City: Rincon Georgia Zip: 31326 County: Effingham
Is this facility a "small business" as defined in the instructions? Yes: ☐ No: ☒

2. Facility Coordinates

Latitude: 32° 16' 43" **NORTH** Longitude: 81° 17' 01" **WEST**
UTM Coordinates: 473293 **EAST** 3571354 **NORTH** **ZONE** 17

3. Facility Owner

Name of Owner: Oglethorpe Power Corporation
Owner Address Street: 2100 East Exchange Place
City: Tucker State: Georgia Zip: 30084

4. Permitting Contact and Mailing Address

Contact Person: Courtney Adcock Title: Sr. Environmental Specialist
Telephone No.: 770-270-7678 Ext. _____ Fax No.: (770) 270-7920
Email Address: Courtney.adcock@opc.com
Mailing Address: Same as: Facility Location: ☐ Owner Address: ☒ Other: ☐
If Other: Street Address: _____
City: _____ State: _____ Zip: _____

5. Authorized Official

Name: James Messersmith Title: Sr. Vice President, Plant Operations
Address of Official Street: 2100 East Exchange Place
City: Tucker State: GA Zip: 30084

This application is submitted in accordance with the provisions of the Georgia Rules for Air Quality Control and, to the best of my knowledge, is complete and correct.

Signature: James A Messersmith Date: 6/29/2022

6. Reason for Application: (Check all that apply)

☐ New Facility (to be constructed)

☒ Existing Facility (initial or modification application)

☒ Permit to Construct

☒ Permit to Operate

☐ Change of Location

☒ Permit to Modify Existing Equipment: Affected Permit No.: 4911-103-0012-V-05-0

☐ Revision of Data Submitted in an Earlier Application

Application No.: _____

Date of Original Submittal: _____

7. Permitting Exemption Activities (for permitted facilities only):

Have any exempt modifications based on emission level per Georgia Rule 391-3-1-.03(6)(i)(3) been performed at the facility that have not been previously incorporated in a permit?

☒ **No** ☐ **Yes, please fill out the SIP Exemption Attachment** (See Instructions for the attachment download)

8. Has assistance been provided to you for any part of this application?

☐ **No** ☐ **Yes, SBAP** ☒ **Yes, a consultant has been employed or will be employed.**

If yes, please provide the following information:

Name of Consulting Company: Trinity Consultants

Name of Contact: Justin Fickas

Telephone No.: 404-751-0228 Fax No.: 678-441-9978

Email Address: JFickas@trinityconsultants.com

Mailing Address: Street: 3495 Piedmont Road Building 10, Suite 905

City: Atlanta State: GA Zip: 30305

Describe the Consultant's Involvement:

Preparation of application.

9. Submitted Application Forms: Select only the necessary forms for the facility application that will be submitted.

No. of Forms	Form
1	2.00 Emission Unit List
1	2.01 Boilers and Fuel Burning Equipment
	2.02 Storage Tank Physical Data
	2.03 Printing Operations
	2.04 Surface Coating Operations
	2.05 Waste Incinerators (solid/liquid waste destruction)
	2.06 Manufacturing and Operational Data
1	3.00 Air Pollution Control Devices (APCD)
	3.01 Scrubbers
	3.02 Baghouses & Other Filter Collectors
	3.03 Electrostatic Precipitators
1	4.00 Emissions Data
1	5.00 Monitoring Information
	6.00 Fugitive Emission Sources
1	7.00 Air Modeling Information

10. Construction or Modification Date

Estimated Start Date: November 2022

11. If confidential information is being submitted in this application, were the guidelines followed in the "Procedures for Requesting that Submitted Information be treated as Confidential"?

☐ No ☐ Yes

12. New Facility Emissions Summary

Criteria Pollutant	New Facility	
	Potential (tpy)	Actual (tpy)
Carbon monoxide (CO)		
Nitrogen oxides (NOx)		
Particulate Matter (PM) (filterable only)		
PM <10 microns (PM10)		
PM <2.5 microns (PM2.5)		
Sulfur dioxide (SO_2)		
Volatile Organic Compounds (VOC)		
Greenhouse Gases (GHGs) (in CO2e)		
Total Hazardous Air Pollutants (HAPs)		
Individual HAPs Listed Below:		

13. Existing Facility Emissions Summary

Criteria Pollutant	Current Facility		After Modification	
	Potential (tpy)	Actual (tpy)	Potential (tpy)	Actual (tpy)
Carbon monoxide (CO)	291.8	< 291.8	291.8	< 291.8
Nitrogen oxides (NOx)	222.3	< 222.3	222.3	< 222.3
Particulate Matter (PM) (filterable only)	198.8	< 198.8	198.8	< 198.8
PM <10 microns (PM10)	198	< 198	198	< 198
PM <2.5 microns (PM2.5)	192	< 192	192	< 192
Sulfur dioxide (SO_2)	7.04	< 7.04	9.96	< 9.96
Volatile Organic Compounds (VOC)	23.3	< 23.3	33.0	< 33.0
Greenhouse Gases (GHGs) (in CO2e)	1,368,270	< 1,368,270	1,947,993	< 1,947,993
Total Hazardous Air Pollutants (HAPs)	5.22	< 5.22	7.31	< 7.31
Individual HAPs Listed Below:				
Maximum Single HAP (Toluene)	1.50	< 1.50	2.13	< 2.13

14. 4-Digit Facility Identification Code:

SIC Code: 4911 SIC Description: Electric Services

NAICS Code: 221112 NAICS Description: Electric power generation, fossil fuel

15. Description of general production process and operation for which a permit is being requested. If necessary, attach additional sheets to give an adequate description. Include layout drawings, as necessary, to describe each process. References should be made to source codes used in the application.

See attached narrative.

16. Additional information provided in attachments as listed below:

Attachment A - Area Map and Process Flow Diagram

Attachment B - Emission Calculations

Attachment C - Toxics Impact Analysis

Attachment D - SIP Permit Application Forms

Attachment E - NSR Calculations

Attachment F -

17. Additional Information: Unless previously submitted, include the following two items:

☒ Plot plan/map of facility location or date of previous submittal: See Appendix A

☒ Flow Diagram or date of previous submittal: See Appendix A

18. Other Environmental Permitting Needs:

Will this facility/modification trigger the need for environmental permits/approvals (other than air) such as Hazardous Waste Generation, Solid Waste Handling, Water withdrawal, water discharge, SWPPP, mining, landfill, etc.?

☒ **No** ☐ **Yes, please list below:**

19. List requested permit limits including synthetic minor (SM) limits.

See attached narrative.

20. Effective March 1, 2019, permit application fees will be assessed. The fee amount varies based on type of permit application. Application acknowledgement emails will be sent to the current registered fee contact in the GECO system. If fee contacts have changed, please list that below:

Fee Contact name: Courtney Adcock

Fee Contact email address: courtney.adcock@opc.com

Fee Contact phone number: 770-270-7678

Fee invoices will be created through the GECO system shortly after the application is received. It is the applicant's responsibility to access the facility GECO account, generate the fee invoice, and submit payment within 10 days after notification.

Facility Name: Effingham Energy Facility **Date of Application:** June 2022

FORM 2.00 – EMISSION UNIT LIST

Emission Unit ID	Name	Manufacturer and Model Number	Description
CTG1	Combustion Turbine Unit 1	GE 7FA	Combustion Turbine
CTG2	Combustion Turbine Unit 2	GE 7FA	Combustion Turbine
AB1	Auxiliary Boiler	Cleaver Brooks CB-LE	17 MMBtu/hr Auxiliary Boiler
DWP1	Diesel Fire Water Pump	Caterpillar 3208	235 bhp Emergency Fire Pump
CT1	Cooling Tower	GEA 484833-8I-33-WCF	8 Cell Cooling Tower
FP1	Preheater	Eclipse WX0200	1.9 MMBtu/hr Preheater

Facility Name: Effingham Energy Facility **Date of Application:** June 2022

FORM 2.01 – BOILERS AND FUEL BURNING EQUIPMENT

Emission Unit ID	Type of Burner	Type of Draft[1]	Design Capacity of Unit (MMBtu/hr Input)	Percent Excess Air	Dates		Date & Description of Last Modification
					Construction	Installation	
CTG1	Combined Combustion Turbine	N/A	1,869 MMBtu/hr[2]		2003	2003	N/A
CTG2	Combined Combustion Turbine	N/A	1,869 MMBtu/hr[2]		2003	2003	N/A
AB1	Aux Boiler Stack	N/A	17 MMBtu/hr		2003	2003	N/A
DWP1	Diesel Fire Water Pump	N/A	2 MMBtu/hr		2003	2003	N/A
FP1	Preheater	N/A	1.8 MMBtu/hr		2003	2003	N/A

[1] This column does not have to be completed for natural gas only fired equipment.
[2] 1,869 MMBtu/hr represents the maximum short-term heat input capacity of each CCCT once the proposed project is complete. The projected actual heat input capacity is estimated to be 15.5 million MMBtu/yr per CCCT.

Facility Name: Effingham County Power, LLC **Date of Application:** May 2022

FUEL DATA

Emission Unit ID	Fuel Type	Potential Annual Consumption				Hourly Consumption		Heat Content		Percent Sulfur		Percent Ash in Solid Fuel	
		Total Quantity		Percent Use by Season									
		Amount	Units	Ozone Season May 1 - Sept 30	Non-ozone Season Oct 1 - Apr 30	Max.	Avg.	Min.	Avg.	Max.	Avg.	Max.	Avg.
CCCT1	Natural Gas	16.37	Million MMBtu/yr			1,869 MMBtu/hr	Varies	~1,020 MMBtu/ MMscf	~1,020 MMBtu/ MMscf				
CCCT2	Natural Gas	16.37	Million MMBtu/yr			1,869 MMBtu/hr	Varies	~1,020 MMBtu/ MMscf	~1,020 MMBtu/ MMscf				
AB1	Natural Gas	0.149	Million MMBtu/yr			17 MMBtu/hr	Varies	~1,020 MMBtu/ MMscf	~1,020 MMBtu/ MMscf				
DWP1	Diesel Fuel	0.018	Million MMBtu/yr			2.06 MMBtu/hr	Varies	~ 0.14 MMBtu/ gal	~ 0.14 MMBtu/ gal	0.05	< 0.05		
FP1	Natural Gas	0.016	Million MMBtu/yr			1.875 MMBtu/hr	Varies	~1,020 MMBtu/ MMscf	~1,020 MMBtu/ MMscf				

Fuel Supplier Information						
Fuel Type	Name of Supplier	Phone Number	Supplier Location			
			Address	City	State	Zip
Pipeline Quality Natural Gas						
Diesel Fuel						

Facility Name: Effingham Energy Facility **Date of Application:** June 2022

Form 3.00 – AIR POLLUTION CONTROL DEVICES - PART A: GENERAL EQUIPMENT INFORMATION

APCD Unit ID	Emission Unit ID	APCD Type (Baghouse, ESP, Scrubber etc)	Date Installed	Make & Model Number (Attach Mfg. Specifications & Literature)	Unit Modified from Mfg Specifications?	Gas Temp. °F		Inlet Gas Flow Rate (acfm)
						Inlet	Outlet	
SCR1	CTG1	Selective Catalytic Reduction	2003	Peerless 2MF-270	N/A		Stack Outlet is 159°F	
SCR2	CTG2	Selective Catalytic Reduction	2003	Peerless 2MF-270	N/A		Stack Outlet is 159°F	

Facility Name: Effingham Energy Facility **Date of Application:** June 2022

Form 3.00 – AIR POLLUTION CONTROL DEVICES – PART B: EMISSION INFORMATION

APCD Unit ID	Pollutants Controlled	Percent Control Efficiency		Inlet Stream To APCD		Exit Stream From APCD		Pressure Drop Across Unit (Inches of water)
		Design	Actual	lb/hr	Method of Determination	lb/hr	Method of Determination	
SCR1	NO_x	~85%	< 85%					N/A
SCR2	NO_x	~85%	< 85%					N/A

Facility Name: Effingham Energy Facility **Date of Application:** June 2022

FORM 4.00 – EMISSION INFORMATION

Emission Unit ID	Air Pollution Control Device ID	Stack ID	Pollutant Emitted	Emission Rates				
				Hourly Actual Emissions (lb/hr)	Hourly Potential Emissions (lb/hr)	Actual Annual Emission (tpy)	Potential Annual Emission (tpy)	Method of Determination
CTG1	SCR1	ST1	See emission calculations in Appendix B: Emission Calculations					
CTG2	SCR2	ST2	See emission calculations in Appendix B: Emission Calculations					
AB1	-	ST3	See emission calculations in Appendix B: Emission Calculations					
DWP1	-	ST4	See emission calculations in Appendix B: Emission Calculations					
CT1	-	ST5	See emission calculations in Appendix B: Emission Calculations					
Preheater	-	ST6	See emission calculations in Appendix B: Emission Calculations					

Facility Name: Effingham Energy Facility **Date of Application:** June 2022

FORM 5.00 MONITORING INFORMATION

Emission Unit ID/ APCD ID	Emission Unit/APCD Name	Monitored Parameter		Monitoring Frequency
		Parameter	Units	
CTG1	Combined Combustion Turbine	CO	ppmvd @ 15% O_2	3-Hour Rolling Average
CTG2	Combined Combustion Turbine	CO	ppmvd @ 15% O_2	3-Hour Rolling Average
CTG1	Combined Combustion Turbine	NO_x	ppmvd @ 15% O_2	3-Hour Rolling Average/4-Hour Rolling Average
CTG2	Combined Combustion Turbine	NO_x	ppmvd @ 15% O_2	3-Hour Rolling Average/4-Hour Rolling Average

Comments:

OPC requests that NSPS Subpart GG Monitoring & Testing conditions be removed since the facility will no longer be subject to these subparts after the proposed project is completed. OPC also requests that NSPS Subpart KKKK related Monitoring & Testing conditions be added as the combined cycle combustion turbines will be subject to that Subpart once the proposed project is completed.

Facility Name: Effingham Energy Facility **Date of Application:** June 2022

FORM 7.00 – AIR MODELING INFORMATION: Stack Data

Stack ID	Emission Unit ID(s)	Stack Information			Dimensions of largest Structure Near Stack		Exit Gas Conditions at Maximum Emission Rate			
		Height Above Grade (ft)	Inside Diameter (ft)	Exhaust Direction	Height (ft)	Longest Side (ft)	Velocity (ft/sec)	Temperature (°F)	Flow Rate (acfm)	
									Average	Maximum
ST1	CTG1	165	19	Unobstructed Up	N/A		49.1	174	< 834,780	834,780
ST2	CTG2	165	19	Unobstructed Up	N/A		49.1	174	< 834,780	834,780

NOTE: If emissions are not vented through a stack, describe point of discharge below and, if necessary, include an attachment. List the attachment in Form 1.00 *General Information*, Item 16.

Facility Name: Effingham Energy Facility **Date of Application:** June 2022

FORM 7.00 AIR MODELING INFORMATION: Chemicals Data

Chemical	Potential Emission Rate (lb/hr)	Toxicity	Reference	MSDS Attached
See Appendix C: Toxics Impact Analysis				☐
				☐
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APPENDIX E. PROJECT EMISSIONS INCREASE CALCULATIONS

Tabe E-1. Emission Factors for NSR Analysis

Pollutant	Emission Factor (lb/MMBtu)
VOC[1]	2.00E-03
$PM_{10}/PM_{2.5}$[2]	5.00E-03
SO_2[3]	6.00E-04
H_2SO_4[4]	2.76E-05
CO_2[5]	118.86
CH_4[6]	2.20E-03
N_2O[6]	2.20E-04
CO_2e[7]	118.98

1. VOC emission factor from the December 2000 PSD permit application for construction of the facility.

2. PM emissions are based on the results of the compliance testing performed at TA Smith in 2020 (GE 7FA units) multiplied by a 50% safety factor and rounded up to the nearest thousandths decimal place. The test results are inclusive of both the filterable and condensable portions of PM. It was conservatively assumed all PM is less than 2.5 microns in diameter (i.e., $PM_{2.5}$ = PM_{10} = PM).

3. SO_2 emissions were estimated using the default SO_2 emission rate for pipeline natural gas from 40 CFR 75, Appendix D, Section 2.3.1.1, consistent with the methodology used to report the facility's SO_2 emissions under the CAMD programs.

4. H_2SO_4 emissions were calculated assuming a 3% conversion of SO_2 to H_2SO_4, consistent with the December 2000 PSD permit application for construction of the facility.

5. CO_2 emissions were calculated in accordance with 40 CFR 75, Appendix G, Equation G-4 using the F-factor for natural gas, consistent with the methodology used to report the facility's CO_2 emissions under the CAMD programs and the EPA GHG reporting rule.

6. CH_4 and N_2O emission factors for natural gas combustion are from 40 CFR 98, Subpart C, Table C-2, converted from kg to lb, consistent with the methodology used to report the facility's emissions under the EPA GHG reporting rule.

7. CO_2e was calculated as the sum of the emission factor for each GHG pollutant multiplied by that pollutant's global warming potential (GWP). GWPs were taken from 40 CFR 98, Subpart A, Table A-1:

CO_2:	1
CH_4:	25
N_2O:	298

Table E-2. Past Actual Emissions - Unit CTG1

Month[1]	Monthly Heat Input (MMBtu/mo) [2]	Monthly Emissions (tons/mo)						
		NO_X[2]	CO[3]	VOC	$PM_{10}/PM_{2.5}$	SO_2	H_2SO_4	CO_2e
Jan-18	283,514	2.6	6.3	0.28	0.7	0.09	3.9E-03	16,866
Feb-18	0	0.0	0.0	0.00	0.0	0.00	0.0E+00	0
Mar-18	181,589	1.7	4.4	0.18	0.5	0.05	2.5E-03	10,803
Apr-18	583,143	3.4	11.0	0.58	1.5	0.17	8.0E-03	34,691
May-18	919,680	4.9	14.3	0.92	2.3	0.28	1.3E-02	54,711
Jun-18	932,459	4.6	14.4	0.93	2.3	0.28	1.3E-02	55,471
Jul-18	960,841	5.0	13.8	0.96	2.4	0.29	1.3E-02	57,159
Aug-18	954,837	5.1	14.1	0.95	2.4	0.29	1.3E-02	56,802
Sep-18	940,029	4.4	10.1	0.94	2.4	0.28	1.3E-02	55,921
Oct-18	611,689	3.0	9.1	0.61	1.5	0.18	8.4E-03	36,389
Nov-18	170,876	1.2	3.7	0.17	0.4	0.05	2.4E-03	10,165
Dec-18	139,391	1.1	3.9	0.14	0.3	0.04	1.9E-03	8,292
Jan-19	59,723	0.6	2.3	0.06	0.1	0.02	8.2E-04	3,553
Feb-19	161,022	1.7	7.9	0.16	0.4	0.05	2.2E-03	9,579
Mar-19	849,585	3.1	2.0	0.85	2.1	0.25	1.2E-02	50,541
Apr-19	902,641	4.0	8.1	0.90	2.3	0.27	1.2E-02	53,697
May-19	168,150	0.8	1.6	0.17	0.4	0.05	2.3E-03	10,003
Jun-19	1,141,930	4.5	7.0	1.14	2.9	0.34	1.6E-02	67,932
Jul-19	1,246,332	4.6	4.2	1.25	3.1	0.37	1.7E-02	74,143
Aug-19	1,209,039	4.5	5.0	1.21	3.0	0.36	1.7E-02	71,925
Sep-19	1,094,480	4.1	3.2	1.09	2.7	0.33	1.5E-02	65,110
Oct-19	961,467	4.6	12.3	0.96	2.4	0.29	1.3E-02	57,197
Nov-19	362,748	1.6	2.1	0.36	0.9	0.11	5.0E-03	21,580
Dec-19	144,226	1.0	2.8	0.14	0.4	0.04	2.0E-03	8,580
Jan-20	239,292	1.9	4.2	0.24	0.6	0.07	3.3E-03	14,235
Feb-20	410,241	2.5	4.9	0.41	1.0	0.12	5.7E-03	24,405
Mar-20	576,945	2.5	4.1	0.58	1.4	0.17	7.9E-03	34,322
Apr-20	1,283,141	4.5	1.3	1.28	3.2	0.38	1.8E-02	76,333
May-20	1,044,725	4.2	6.8	1.04	2.6	0.31	1.4E-02	62,150
Jun-20	1,066,803	4.4	9.3	1.07	2.7	0.32	1.5E-02	63,463
Jul-20	1,313,944	4.6	1.0	1.31	3.3	0.39	1.8E-02	78,165
Aug-20	1,190,916	4.2	1.5	1.19	3.0	0.36	1.6E-02	70,846
Sep-20	1,227,006	4.3	1.9	1.23	3.1	0.37	1.7E-02	72,993
Oct-20	1,286,632	4.5	2.6	1.29	3.2	0.39	1.8E-02	76,540
Nov-20	504,211	2.5	3.4	0.50	1.3	0.15	6.9E-03	29,995
Dec-20	476,005	2.0	2.2	0.48	1.2	0.14	6.6E-03	28,317
Jan-21	722,745	3.2	1.6	0.72	1.8	0.22	1.0E-02	42,995
Feb-21	102,999	0.8	1.0	0.10	0.3	0.03	1.4E-03	6,127
Mar-21	322,795	1.5	1.7	0.32	0.8	0.10	4.4E-03	19,203
Apr-21	1,274,710	4.4	0.9	1.27	3.2	0.38	1.8E-02	75,831
May-21	961,452	3.7	3.0	0.96	2.4	0.29	1.3E-02	57,196
Jun-21	1,054,152	4.3	10.4	1.05	2.6	0.32	1.5E-02	62,710
Jul-21	1,056,989	4.3	5.3	1.06	2.6	0.32	1.5E-02	62,879
Aug-21	1,218,383	4.8	0.6	1.22	3.0	0.37	1.7E-02	72,480
Sep-21	1,115,564	4.6	1.5	1.12	2.8	0.33	1.5E-02	66,364
Oct-21	930,493	4.0	1.2	0.93	2.3	0.28	0.01	55,354
Nov-21	1,237,981	4.9	0.8	1.24	3.1	0.37	0.02	73,646
Dec-21	1,115,373	4.5	1.1	1.12	2.8	0.33	0.02	66,352
Maximum	**1,313,944**	**5.1**	**14.40**	**1.31**	**3.3**	**0.39**	**0.02**	**78,165**

1. A five-year lookback period is allowed for determining baseline actual emissions for existing electric utility steam generating units, per 40 CFR 52.21(b)(48)(i).

2. Per the facility's quarterly Part 75 emissions reports to EPA submitted through the Emissions Collection and Monitoring Plan System (ECMPS).

3. From the facility's CEMS DAHS.

Table E-3. Past Actual Emissions - Unit CTG2

Month[1]	Monthly Heat Input (MMBtu/mo) [2]	Monthly Emissions (tons/mo)						
		NO_X[2]	CO[3]	VOC	$PM_{10}/PM_{2.5}$	SO_2	H_2SO_4	CO_2e
Jan-18	291,074	2.4	5.2	0.29	0.7	0.09	4.0E-03	17,316
Feb-18	0	0.0	0.0	0.00	0.0	0.00	0.0E+00	0
Mar-18	205,215	1.3	2.7	0.21	0.5	0.06	2.8E-03	12,208
Apr-18	798,710	4.9	13.9	0.80	2.0	0.24	1.1E-02	47,514
May-18	923,411	4.9	11.4	0.92	2.3	0.28	1.3E-02	54,933
Jun-18	898,646	4.7	11.3	0.90	2.2	0.27	1.2E-02	53,460
Jul-18	954,870	5.2	15.2	0.95	2.4	0.29	1.3E-02	56,804
Aug-18	966,965	5.6	16.7	0.97	2.4	0.29	1.3E-02	57,524
Sep-18	945,745	5.0	11.3	0.95	2.4	0.28	1.3E-02	56,261
Oct-18	431,149	3.0	11.7	0.43	1.1	0.13	5.9E-03	25,649
Nov-18	191,090	1.1	2.3	0.19	0.5	0.06	2.6E-03	11,368
Dec-18	100,522	0.8	2.4	0.10	0.3	0.03	1.4E-03	5,980
Jan-19	29,162	0.4	1.5	0.03	0.1	0.01	4.0E-04	1,735
Feb-19	179,628	1.4	5.0	0.18	0.4	0.05	2.5E-03	10,686
Mar-19	490,102	2.0	1.9	0.49	1.2	0.15	6.8E-03	29,156
Apr-19	934,871	3.6	5.7	0.93	2.3	0.28	1.3E-02	55,614
May-19	557,903	3.6	18.9	0.56	1.4	0.17	7.7E-03	33,189
Jun-19	942,847	4.8	18.9	0.94	2.4	0.28	1.3E-02	56,089
Jul-19	1,199,622	5.0	6.1	1.20	3.0	0.36	1.7E-02	71,364
Aug-19	1,152,083	5.0	8.2	1.15	2.9	0.35	1.6E-02	68,536
Sep-19	843,794	4.7	19.2	0.84	2.1	0.25	1.2E-02	50,196
Oct-19	856,625	4.7	17.7	0.86	2.1	0.26	1.2E-02	50,960
Nov-19	143,819	0.8	2.3	0.14	0.4	0.04	2.0E-03	8,556
Dec-19	122,189	0.5	0.6	0.12	0.3	0.04	1.7E-03	7,269
Jan-20	330,903	1.6	3.6	0.33	0.8	0.10	4.6E-03	19,685
Feb-20	400,763	2.1	2.8	0.40	1.0	0.12	5.5E-03	23,841
Mar-20	518,644	2.4	2.7	0.52	1.3	0.16	7.1E-03	30,854
Apr-20	1,252,989	4.8	1.5	1.25	3.1	0.38	1.7E-02	74,539
May-20	1,131,862	4.8	4.5	1.13	2.8	0.34	1.6E-02	67,333
Jun-20	1,174,875	4.8	2.2	1.17	2.9	0.35	1.6E-02	69,892
Jul-20	1,275,797	5.0	0.8	1.28	3.2	0.38	1.8E-02	75,896
Aug-20	1,160,146	4.6	1.1	1.16	2.9	0.35	1.6E-02	69,016
Sep-20	1,119,109	4.8	2.8	1.12	2.8	0.34	1.5E-02	66,575
Oct-20	1,154,646	4.8	2.3	1.15	2.9	0.35	1.6E-02	68,689
Nov-20	328,227	1.6	1.3	0.33	0.8	0.10	4.5E-03	19,526
Dec-20	298,226	1.5	1.6	0.30	0.7	0.09	4.1E-03	17,741
Jan-21	61,082	0.7	1.7	0.06	0.2	0.02	8.4E-04	3,634
Feb-21	54,897	0.4	0.6	0.05	0.1	0.02	7.6E-04	3,266
Mar-21	228,330	1.5	4.8	0.23	0.6	0.07	3.1E-03	13,583
Apr-21	956,604	4.21	6.7	0.96	2.4	0.29	1.3E-02	56,907
May-21	974,380	3.6	1.8	0.97	2.4	0.29	1.3E-02	57,965
Jun-21	937,511	4.6	11.9	0.94	2.3	0.28	1.3E-02	55,772
Jul-21	973,717	4.4	6.7	0.97	2.4	0.29	1.3E-02	57,925
Aug-21	1,185,648	4.7	0.9	1.19	3.0	0.36	1.6E-02	70,533
Sep-21	411,852	1.8	1.8	0.41	1.0	0.12	5.7E-03	24,501
Oct-21	917,683	3.7	1.4	0.92	2.3	0.28	0.01	54,592
Nov-21	1,230,298	4.7	0.8	1.23	3.1	0.37	0.02	73,189
Dec-21	358,595	1.5	1.0	0.36	0.9	0.11	0.00	21,332
Maximum	**1,275,797**	**5.6**	**19.20**	**1.28**	**3.2**	**0.38**	**0.02**	**75,896**

1. A five-year lookback period is allowed for determining baseline actual emissions for existing electric utility steam generating units, per 40 CFR 52.21(b)(48)(i).
2. Per the facility's quarterly Part 75 emissions reports to EPA submitted through the Emissions Collection and Monitoring Plan System (ECMPS).
3. From the facility's CEMS DAHS.

Table E-4. Baseline Actual Emissions - Units CTG1 and CTG2

Month	Total Monthly Emissions (tons/mo)							12-Month Rolling Total Emissions (tpy)							24-Month Rolling Annual Average Emissions (tpy)						
	NO_X	CO	VOC	$PM_{10}/PM_{2.5}$	SO_2	H_2SO_4	CO_2e	NO_X	CO	VOC	$PM_{10}/PM_{2.5}$	SO_2	H_2SO_4	CO_2e	NO_X	CO	VOC	$PM_{10}/PM_{2.5}$	SO_2	H_2SO_4	CO_2e
Jan-18	5.0	11.5	0.6	1.4	0.17	7.9E-03	34,182														
Feb-18	0.0	0.0	0.0	0.0	0.00	0.0E+00	0														
Mar-18	3.0	7.1	0.4	1.0	0.12	5.3E-03	23,011														
Apr-18	8.4	24.9	1.4	3.5	0.41	1.9E-02	82,205														
May-18	9.8	25.7	1.8	4.6	0.55	2.5E-02	109,644														
Jun-18	9.3	25.7	1.8	4.6	0.55	2.5E-02	108,931														
Jul-18	10.2	29.0	1.9	4.8	0.57	2.6E-02	113,964														
Aug-18	10.7	30.8	1.9	4.8	0.58	2.6E-02	114,326														
Sep-18	9.5	21.4	1.9	4.7	0.57	2.6E-02	112,183														
Oct-18	6.0	20.8	1.0	2.6	0.31	1.4E-02	62,037														
Nov-18	2.4	6.0	0.4	0.9	0.11	5.0E-03	21,533														
Dec-18	1.9	6.3	0.2	0.6	0.07	3.3E-03	14,272	76.1	209.2	13.4	33.5	4.0	0.18	796,286							
Jan-19	1.0	3.8	0.1	0.2	0.03	1.2E-03	5,288	72.1	201.5	12.9	32.2	3.9	0.18	767,392							
Feb-19	3.1	12.9	0.3	0.9	0.10	4.7E-03	20,265	75.3	214.4	13.2	33.1	4.0	0.18	787,657							
Mar-19	5.1	3.9	1.3	3.3	0.40	1.8E-02	79,697	77.4	211.2	14.2	35.5	4.3	0.20	844,343							
Apr-19	7.7	13.8	1.8	4.6	0.55	2.5E-02	109,312	76.7	200.1	14.6	36.6	4.4	0.20	871,450							
May-19	4.3	20.5	0.7	1.8	0.22	1.0E-02	43,192	71.3	194.9	13.5	33.8	4.1	0.19	804,999							
Jun-19	9.3	25.9	2.1	5.2	0.63	2.9E-02	124,021	71.3	195.1	13.8	34.5	4.1	0.19	820,089							
Jul-19	9.6	10.3	2.4	6.1	0.73	3.4E-02	145,507	70.7	176.4	14.3	35.8	4.3	0.20	851,633							
Aug-19	9.5	13.2	2.4	5.9	0.71	3.3E-02	140,461	69.5	158.8	14.8	36.9	4.4	0.20	877,768							
Sep-19	8.8	22.4	1.9	4.8	0.58	2.7E-02	115,306	68.8	159.8	14.8	37.0	4.4	0.20	880,891							
Oct-19	9.3	30.0	1.8	4.5	0.55	2.5E-02	108,156	72.1	169.0	15.6	39.0	4.7	0.21	927,010							
Nov-19	2.5	4.4	0.5	1.3	0.15	7.0E-03	30,135	72.2	167.4	15.7	39.3	4.7	0.22	935,612							
Dec-19	1.5	3.4	0.3	0.7	0.08	3.7E-03	15,849	71.8	164.5	15.8	39.4	4.7	0.22	937,189	74.0	186.9	14.6	36.4	4.4	0.20	866,737
Jan-20	3.4	7.8	0.6	1.4	0.17	7.9E-03	33,920	74.2	168.5	16.2	40.6	4.9	0.22	965,821	73.2	185.0	14.6	36.4	4.4	0.20	866,607
Feb-20	4.6	7.7	0.8	2.0	0.24	1.1E-02	48,246	75.7	163.3	16.7	41.8	5.0	0.23	993,802	75.5	188.9	15.0	37.4	4.5	0.21	890,730
Mar-20	4.9	6.8	1.1	2.7	0.33	1.5E-02	65,175	75.5	166.2	16.5	41.2	4.9	0.23	979,281	76.4	188.7	15.3	38.3	4.6	0.21	911,812
Apr-20	9.2	2.8	2.5	6.3	0.76	3.5E-02	150,872	77.0	155.2	17.2	42.9	5.1	0.24	1,020,841	76.9	177.7	15.9	39.8	4.8	0.22	946,146
May-20	8.9	11.3	2.2	5.4	0.65	3.0E-02	129,483	81.6	146.0	18.6	46.5	5.6	0.26	1,107,132	76.4	170.5	16.1	40.2	4.8	0.22	956,065
Jun-20	9.2	11.5	2.2	5.6	0.67	3.1E-02	133,355	81.5	131.6	18.8	46.9	5.6	0.26	1,116,466	76.4	163.4	16.3	40.7	4.9	0.22	968,277
Jul-20	9.6	1.8	2.6	6.5	0.78	3.6E-02	154,061	81.4	123.1	18.9	47.3	5.7	0.26	1,125,020	76.1	149.8	16.6	41.5	5.0	0.23	988,326
Aug-20	8.8	2.6	2.4	5.9	0.71	3.2E-02	139,862	80.7	112.5	18.9	47.3	5.7	0.26	1,124,421	75.1	135.7	16.8	42.1	5.0	0.23	1,001,094
Sep-20	9.0	4.7	2.3	5.9	0.70	3.2E-02	139,568	80.9	94.8	19.3	48.3	5.8	0.27	1,148,683	74.9	127.3	17.1	42.6	5.1	0.24	1,014,787
Oct-20	9.3	4.9	2.4	6.1	0.73	3.4E-02	145,229	80.9	69.7	19.9	49.8	6.0	0.27	1,185,756	76.5	119.4	17.8	44.4	5.3	0.24	1,056,383
Nov-20	4.1	4.7	0.8	2.1	0.25	1.1E-02	49,521	82.5	70.0	20.3	50.6	6.1	0.28	1,205,141	77.4	118.7	18.0	45.0	5.4	0.25	1,070,377
Dec-20	3.5	3.8	0.8	1.9	0.23	1.1E-02	46,058	84.6	70.4	20.8	51.9	6.2	0.29	1,235,351	78.2	117.5	18.3	45.7	5.5	0.25	1,086,270
Jan-21	3.9	3.3	0.8	2.0	0.24	1.1E-02	46,629	85.0	65.9	21.0	52.4	6.3	0.29	1,248,060	79.6	117.2	18.6	46.5	5.6	0.26	1,106,940
Feb-21	1.1	1.6	0.2	0.4	0.05	2.2E-03	9,393	81.5	59.8	20.3	50.8	6.1	0.28	1,209,207	78.6	111.6	18.5	46.3	5.6	0.26	1,101,505
Mar-21	3.0	6.5	0.6	1.4	0.17	7.6E-03	32,786	79.6	59.5	19.8	49.5	5.9	0.27	1,176,817	77.5	112.9	18.1	45.3	5.4	0.25	1,078,049
Apr-21	8.6	7.6	2.2	5.6	0.67	3.1E-02	132,739	79.1	64.3	19.5	48.7	5.8	0.27	1,158,684	78.0	109.8	18.3	45.8	5.5	0.25	1,089,763
May-21	7.2	4.8	1.9	4.8	0.58	2.7E-02	115,161	77.4	57.8	19.2	48.1	5.8	0.27	1,144,362	79.5	101.9	18.9	47.3	5.7	0.26	1,125,747
Jun-21	8.9	22.3	2.0	5.0	0.60	2.7E-02	118,482	77.1	68.6	19.0	47.5	5.7	0.26	1,129,489	79.3	100.1	18.9	47.2	5.7	0.26	1,122,977
Jul-21	8.7	12.0	2.0	5.1	0.61	2.8E-02	120,805	76.2	78.8	18.4	46.1	5.5	0.25	1,096,232	78.8	101.0	18.7	46.7	5.6	0.26	1,110,626
Aug-21	9.5	1.5	2.4	6.0	0.72	3.3E-02	143,013	76.9	77.7	18.5	46.2	5.5	0.25	1,099,383	78.8	95.1	18.7	46.7	5.6	0.26	1,111,902
Sep-21	6.3	3.3	1.5	3.8	0.46	2.1E-02	90,864	74.2	76.3	17.7	44.2	5.3	0.24	1,050,680	77.6	85.6	18.5	46.2	5.5	0.25	1,099,681
Oct-21	7.7	2.6	1.8	4.6	0.55	0.03	109,946	72.6	74.0	17.1	42.7	5.1	0.24	1,015,397	76.8	71.9	18.5	46.3	5.6	0.25	1,100,576
Nov-21	9.7	1.6	2.5	6.2	0.74	0.03	146,835	78.2	70.9	18.7	46.8	5.6	0.26	1,112,711	80.3	70.5	19.5	48.7	5.8	0.27	1,158,926
Dec-21	6.0	2.1	1.5	3.7	0.44	0.02	87,685	80.6	69.2	19.4	48.5	5.8	0.27	1,154,338	82.6	69.8	20.1	50.2	6.0	0.28	1,194,844
Maximum	**10.7**	**30.8**	**2.6**	**6.5**	**0.78**	**0.04**	**154,061**	**85.0**	**214.4**	**21.0**	**52.4**	**6.3**	**0.29**	**1,248,060**	**82.6**	**188.9**	**20.1**	**50.2**	**6.0**	**0.28**	**1,194,844**
													Baseline Period Start Date		**Jan-20**	**Mar-18**	**Jan-20**	**Jan-20**	**Jan-20**	**Jan-20**	**Jan-20**
													Baseline Period End Date		**Dec-21**	**Feb-20**	**Dec-21**	**Dec-21**	**Dec-21**	**Dec-21**	**Dec-21**

Table E-5. "Could Have Accommodated" (CHA) NO_X Emissions - Units CTG1 and CTG2

Month	Monthly NO_X Emissions (tons/mo)
Jan-20	3.4
Feb-20	4.6
Mar-20	4.9
Apr-20	9.2
May-20	8.9
Jun-20	9.2
Jul-20	9.6
Aug-20	8.8
Sep-20	9.0
Oct-20	9.3
Nov-20	4.1
Dec-20	3.5
Jan-21	3.9
Feb-21	1.1
Mar-21	3.0
Apr-21	8.6
May-21	7.2
Jun-21	8.9
Jul-21	8.7
Aug-21	9.5
Sep-21	6.3
Oct-21	7.7
Nov-21	9.7
Dec-21	6.0
CHA NO_X Emissions (tpy)[2]	**103.2**

1. The seasonally-adjusted monthly emissions are based on the highest monthly emissions during the three consecutive months in a season applied to all the consecutive months in the season. The seasons in Georgia are as follows:

Spring: March - May
Summer: June - August
Fall: September - November
Winter: December - February

2. The "Could Have Accommodated" emissions were based on the lesser of either (1) the facility's permitted annual emission limits for each combustion turbine found in Permit Condition No. 3.3.5 or (2) the emissions value calculated using the following equation:

CHA Emissions (tpy) = [Max. Monthly Emissions in Spring (tons/mo) + Max. Monthly Emissions in Summer (tons/mo) + Max. Monthly Emissions in Fall (tons/mo) + Max. Monthly Emissions in Winter (tons/mo)] × (3 months/season)

Table E-6. "Could Have Accommodated" (CHA) CO Emissions - Units CTG1 and CTG2

Month	Monthly CO Emissions (tons/mo)
Mar-18	7.1
Apr-18	24.9
May-18	25.7
Jun-18	25.7
Jul-18	29.0
Aug-18	30.8
Sep-18	21.4
Oct-18	20.8
Nov-18	6.0
Dec-18	6.3
Jan-19	3.8
Feb-19	12.9
Mar-19	3.9
Apr-19	13.8
May-19	20.5
Jun-19	25.9
Jul-19	10.3
Aug-19	13.2
Sep-19	22.4
Oct-19	30.0
Nov-19	4.4
Dec-19	3.4
Jan-20	7.8
Feb-20	7.7
CHA CO Emissions (tpy)[2]	**289.0**

1. The seasonally-adjusted monthly emissions are based on the highest monthly emissions during the three consecutive months in a season applied to all the consecutive months in the season. The seasons in Georgia are as follows:

Spring: March - May
Summer: June - August
Fall: September - November
Winter: December - February

2. The "Could Have Accommodated" emissions were based on the lesser of either (1) the facility's permitted annual emission limits for each combustion turbine found in Permit Condition No. 3.3.5 or (2) the emissions value calculated using the following equation:

CHA Emissions (tpy) = [Max. Monthly Emissions in Spring (tons/mo) + Max. Monthly Emissions in Summer (tons/mo) + Max. Monthly Emissions in Fall (tons/mo) + Max. Monthly Emissions in Winter (tons/mo)] × (3 months/season)

Table E-7. "Could Have Accommodated" (CHA) Emissions (except NO_X and CO) - Units C

Month	Monthly Emissions (tons/mo)				
	VOC	$PM_{10}/PM_{2.5}$	SO_2	H_2SO_4	CO_2e
Jan-20	0.6	1.4	0.17	7.9E-03	33,920
Feb-20	0.8	2.0	0.24	1.1E-02	48,246
Mar-20	1.1	2.7	0.33	1.5E-02	65,175
Apr-20	2.5	6.3	0.76	3.5E-02	150,872
May-20	2.2	5.4	0.65	3.0E-02	129,483
Jun-20	2.2	5.6	0.67	3.1E-02	133,355
Jul-20	2.6	6.5	0.78	3.6E-02	154,061
Aug-20	2.4	5.9	0.71	3.2E-02	139,862
Sep-20	2.3	5.9	0.70	3.2E-02	139,568
Oct-20	2.4	6.1	0.73	3.4E-02	145,229
Nov-20	0.8	2.1	0.25	1.1E-02	49,521
Dec-20	0.8	1.9	0.23	1.1E-02	46,058
Jan-21	0.8	2.0	0.24	1.1E-02	46,629
Feb-21	0.2	0.4	0.05	2.2E-03	9,393
Mar-21	0.6	1.4	0.17	7.6E-03	32,786
Apr-21	2.2	5.6	0.67	3.1E-02	132,739
May-21	1.9	4.8	0.58	2.7E-02	115,161
Jun-21	2.0	5.0	0.60	2.7E-02	118,482
Jul-21	2.0	5.1	0.61	2.8E-02	120,805
Aug-21	2.4	6.0	0.72	3.3E-02	143,013
Sep-21	1.5	3.8	0.46	2.1E-02	90,864
Oct-21	1.8	4.6	0.55	2.5E-02	109,946
Nov-21	2.5	6.2	0.74	3.4E-02	146,835
Dec-21	1.5	3.7	0.44	2.0E-02	87,685
CHA Emissions (tpy)[2]	**27.2**	**68.0**	**8.2**	**0.37**	**1,618,359**

1. The seasonally-adjusted monthly emissions are based on the highest monthly emissions during the three consecutive months in a season applied to all the consecutive months in the season. The seasons in Georgia are as follows:

Spring: March - May
Summer: June - August
Fall: September - November
Winter: December - February

2. The "Could Have Accommodated" emissions are calculated as follows:
CHA Emissions (tpy) = [Max. Monthly Emissions in Spring (tons/mo) + Max. Monthly Emissions in Summer (tons/mo) + Max. Monthly Emissions in Fall (tons/mo) + Max. Monthly Emissions in Winter (tons/mo)] × (3 months/season)

Table E-8. Projected Actual Emissions - Units CTG1 and CTG2

Estimated Future Max. Annual Heat Input (million MMBtu/yr)		31.0	31.00	31.0
Pollutant	**Emission Factor (lb/MMBtu)**	**Projected Actual Emissions (tpy)**		
NO_X[1]	9.05E-03	140.2	140.2	140.2
CO[1]	2.77E-02	289.0	289.0	289.0
VOC	2.00E-03	31.0	31.0	31.0
$PM_{10}/PM_{2.5}$	5.00E-03	77.5	77.5	77.5
SO_2	6.00E-04	9.3	9.3	9.3
H_2SO_4	2.76E-05	0.4	0.4	0.4
CO_2e	118.98	1,844,417	1,844,417	1,844,417

1. The average NO_X and CO emission factors (lb/MMBtu) were based on the total NO_X and CO emissions divided by the total heat input during the 24-month baseline period for each pollutant, multiplied by a 10% safety factor. Projected actual NO_X and CO emissions (tpy) were then based on the lesser of either (1) the facility's permitted annual emission limits for each combustion turbine found in Permit Condition No. 3.3.5 or (2) the emissions calculated using the projected annual heat input and the listed emission factor.

Table E-9. Cooling Tower Associated Emissions Increase

Emission Source	Total Dissolved Solids[1] (mg/L)	Drift Loss Increase[2] (gpm)	PM Emissions Increase[3] (tpy)	PM_{10} Emissions Increase[4] (tpy)	$PM_{2.5}$ Emissions Increase[4] (tpy)
Cooling Tower	1,235	0.29	0.78	0.60	1.8E-03

1. Average cooling tower water TDS content, per facility documentation.
2. Based on cooling tower modeling performed by Siemens at 59 °F ambient with duct burners firing.
3. Annual PM Emission Rate (ton/yr) = Drift Loss Increase (gal/min) × TDS (mg/L) × 3.78541 (L/gal) × 2.2045E-06 (lb/mg) × 60 (min/hr) × 8,760 (hr/yr) / 2,000 (lb/ton)
4. PM_{10} and $PM_{2.5}$ emissions are estimated based on the particulate size distribution below, interpolated from data in *Calculating Realistic PM $_{10}$ Emissions from Cooling Towers* by Joel Reisman and Gordon Frisbie, 2002. Detailed derivation of $PM_{10}/PM_{2.5}$ fractions is shown in the table below.

Table E-10. Derivation of $PM_{10}/PM_{2.5}$ Fraction for Cooling Tower Emissions[1]

Drift Droplet Diameter [D_d] (µm)	Drift Droplet Volume [$V_{droplet}$][2] (μm^3)	Drift Droplet Mass [$M_{droplet}$][3] (µg)	Droplet Particle Mass [M_{TDS}][4] (µg)	Solid Particle Diameter [D_{TDS}][5] (µm)	EPRI Cumulative % Mass Smaller[6] (%)	Interpolation Value for PM_{10}[7] (%)	Interpolation Value for $PM_{2.5}$[7] (%)
0	0.00E+00	0.00E+00	0.00E+00	0.000	0	--	--
10	5.24E+02	5.24E-04	6.47E-07	0.825	0	--	--
20	4.19E+03	4.19E-03	5.17E-06	1.650	0.196	--	--
30	1.41E+04	1.41E-02	1.75E-05	2.475	0.226	--	--
40	3.35E+04	3.35E-02	4.14E-05	3.300	0.514	--	0.235
50	6.54E+04	6.54E-02	8.08E-05	4.125	1.816	--	--
60	1.13E+05	1.13E-01	1.40E-04	4.950	5.702	--	--
70	1.80E+05	1.80E-01	2.22E-04	5.774	21.348	--	--
90	3.82E+05	3.82E-01	4.71E-04	7.424	49.812	--	--
110	6.97E+05	6.97E-01	8.61E-04	9.074	70.509	--	--
130	1.15E+06	1.15E+00	1.42E-03	10.724	82.023	76.970	--
150	1.77E+06	1.77E+00	2.18E-03	12.374	88.012	--	--
180	3.05E+06	3.05E+00	3.77E-03	14.849	91.032	--	--
210	4.85E+06	4.85E+00	5.99E-03	17.323	92.468	--	--
240	7.24E+06	7.24E+00	8.94E-03	19.798	94.091	--	--
300	1.41E+07	1.41E+01	1.75E-02	24.748	96.288	--	--
350	2.24E+07	2.24E+01	2.77E-02	28.872	97.011	--	--
400	3.35E+07	3.35E+01	4.14E-02	32.997	98.34	--	--
450	4.77E+07	4.77E+01	5.89E-02	37.122	99.071	--	--
600	1.13E+08	1.13E+02	1.40E-01	49.496	100	--	--

1. Based on the methodology discussed in *Calculating Realistic PM $_{10}$ Emissions from Cooling Towers* by Joel Reisman and Gordon Frisbie, 2002 (the Document). https://ww2.energy.ca.gov/sitingcases/palomar/documents/applicants_files/Data_Request_Response/Air%20Quality/Attachment%204-1.pdf
2. $V_{droplet} = 4/3\ \pi\ (D_d/2)^3$ [Equation 2 of the Document]
3. $M_{droplet}$ = density (ρ_w) of water * $V_{droplet} = \rho_w * 4/3\ \pi\ (D_d/2)^3$
   $\rho_w =$ 1.00E-06 $\mu g/\mu m^3$
4. $M_{TDS} = TDS * M_{droplet}$ [Equation 3 of the Document, with TDS in units of ppm]
   TDS = 1,235 mg/L Total Dissolved Solids content for CEF's cooling tower
   TDS = 1,235 ppm
5. $M_{TDS} = (\rho_{TDS})(V_{TDS}) = (\rho_{TDS})(4/3)\pi (D_{TDS}/2)^3$ [Equation 5 of the Document]
   Therefore, the equation can be solved for D_{TDS}: $D_{TDS} = \{M_{TDS}/[(\rho_{TDS}) * 4/3 * \pi]\}^{1/3} \times 2$
   Assume solid particulates have the same density (ρ_{TDS}) as sodium chloride per the Document: 2.20E-06 $\mu g/\mu m^3$
6. Based on drift eliminator test data from a test conducted by Environmental Systems Corporation (ESC) at the Electric Power Research Institute (EPRI) test facility in Houston, Texas in 1988 (Aull, 1999) as documented in Table 1 of the Document.
7. D_{TDS} represents the particle size of collected material in droplet. The EPRI cumulative % mass smaller indicates the percentage of material in that specific water droplet size that has a diameter smaller than D_{TDS}. Therefore, linear interpolation between calculated D_{TDS} is necessary to ascertain the specific mass percentages to estimate PM_{10} and $PM_{2.5}$ emissions. For example, at 1,000 mg/L TDS:

   %MassPM_{10} = %Mass Less than 10 D_{TDS} + [(10 - D_{TDS} Less Than 10) / (D_{TDS} Greater Than 10 - D_{TDS} Less Than 10)] * (%Mass Greater than 10 D_{TDS} - %Mass Less than 10 D_{TDS})
   i.e., 82.041% = 82.023% + [(10 - 9.995) / (11.533 - 9.995)] * (88.012% - 82.023%)

Table E-11. Project Emissions Increase

Pollutant	Units CTG1 and CTG2				Cooling Tower Associated Emissions Increase (tpy)	Total Project Emissions Increase (tpy)	PSD Significant Emission Rate (tpy)	PSD Triggered?
	Baseline Actual Emissions (tpy)	"Could Have Accommodated" Emissions (tpy)	Projected Actual Emissions (tpy)	Project Emissions Increase[1] (tpy)				
NO_X	82.6	103.2	140.2	**37.0**	-	**37.0**	40	No
CO	188.9	289.0	289.0	**0.0**	-	**0.0**	100	No
VOC	20.1	27.2	31.0	**3.80**	-	**3.8**	40	No
PM	50.2	68.0	77.5	**9.5**	0.8	**10.3**	25	No
PM_{10}	50.2	68.0	77.5	**9.5**	0.6	**10.1**	15	No
$PM_{2.5}$	50.2	68.0	77.5	**9.5**	1.84E-03	**9.5**	10	No
SO_2	6.0	8.2	9.3	**1.14**	-	**1.1**	40	No
H_2SO_4	0.28	0.4	0.4	**0.05**	-	**0.1**	7	No
CO_2e^2	1,194,844	1,618,359	1,844,417	**226,058**	-	**226,058**	75,000	No

1. Project Emissions Increase = (Projected Actual Emissions - Baseline Actual Emissions) - ("Could Have Accommodated" Emissions - Baseline Actual Emissions)

2. For CO_2e, PSD may apply only if the emissions increase exceeds the SER for CO_2e and PSD is otherwise triggered by another PSD-regulated pollutant.

APPENDIX C – FEMA MAP

National Flood Hazard Layer FIRMette

FEMA

81°17'21"W 32°17'1"N

81°16'43"W 32°16'30"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/1/2022 at 10:39 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX D – USFWS IPAC DOCUMENTATION

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Georgia Ecological Services Field Office
355 East Hancock Avenue
Room 320
Athens, GA 30601
Phone: (706) 613-9493 Fax: (706) 613-6059

In Reply Refer To: March 01, 2022
Project Code: 2022-0014065
Project Name: Effingham Energy Facility Project

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

Thank you for your request for information on federally listed species and important wildlife habitats that may occur in your project area. The U.S. Fish and Wildlife Service (Service) has responsibility for certain species of wildlife under the Endangered Species Act (ESA) of 1973 as amended (16 USC 1531 et seq.), the Migratory Bird Treaty Act (MBTA) as amended (16 USC 701-715), and the Bald and Golden Eagle Protection Act (BGEPA) as amended (16 USC 668-668c). We are providing the following guidance to assist you in determining which federally imperiled species may or may not occur within your project area and to recommend some conservation measures that can be included in your project design if you determine those species or designated critical habitat may be affected by your proposed project.

FEDERALLY-LISTED SPECIES AND DESIGNATED CRITICAL HABITAT

Attached is a list of endangered, threatened, and proposed species that may occur in your project area. Your project area may not necessarily include all or any of these species. Under the ESA, it is the responsibility of the Federal action agency or its designated representative to determine if a proposed action "may affect" endangered, threatened, or proposed species, or designated critical habitat, and if so, to consult with the Service further. Similarly, it is the responsibility of the Federal action agency or project proponent, not the Service, to make “no effect” determinations. If you determine that your proposed action will have “no effect” on threatened or endangered species or their respective critical habitat, you do not need to seek concurrence with the Service. Nevertheless, it is a violation of Federal law to harm or harass any federally listed threatened or endangered fish or wildlife species without the appropriate permit.

If you determine that your proposed action may affect federally listed species, please consult with the Service. Through the consultation process, we will analyze information contained in a biological assessment or equivalent document that you provide. If your proposed action is associated with Federal funding or permitting, consultation will occur with the Federal agency

under section 7(a)(2) of the ESA. Otherwise, an incidental take permit pursuant to section 10(a)(1)(B) of the ESA (also known as a Habitat Conservation Plan) may be necessary to exempt harm or harass federally listed threatened or endangered fish or wildlife species. For more information regarding formal consultation and HCPs, please see the Service's Consultation Handbook and Habitat Conservation Plans (https://www.fws.gov/endangered/esa-library/index.html#consultations).

Action Area. The scope of federally listed species compliance not only includes direct effects, but also any indirect effects of project activities (e.g., equipment staging areas, offsite borrow material areas, or utility relocations). The action area is the spatial extent of an action's direct and indirect modifications to the land, water, or air (50 CFR 402.02). Large projects may have effects to land, water, or air outside the immediate footprint of the project, and these areas should be included as part of the action area. Effects to land, water, or air outside of a project footprint could include things like lighting, dust, smoke, and noise. To obtain a complete list of species, the action area should be uploaded or drawn in IPaC rather than just the project footprint.

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. An updated list may be requested through IPaC.

If you determine that your action may affect any federally listed species and would like technical assistance from our office please send us a complete project review package, including the following information (reference to these items can be found in 50 CFR§402.13 and 402.14):

1. A description of the proposed action, including any measures intended to avoid, minimize, or offset effects of the action. Consistent with the nature and scope of the proposed action, the description shall provide sufficient detail to assess the effects of the action on listed species and critical habitat, including:
    - The purpose of the action;
    - The duration and timing of the action;
    - The location of the action;
    - The specific components of the action and how they will be carried out;
    - Description of areas to be affected directly or indirectly by the action;
    - Maps, drawings, blueprints, or similar schematics of the action
2. An updated Official Species List
3. Biological Assessments (may include habitat assessments and information on the presence of listed species in the action area);
4. Description of effects of the action on species in the action area and, if relevant, effect determinations for species and critical habitat;

5. Conservation measures and any other available information related to the nature and scope of the proposed action relevant to its effects on listed species or designated critical habitat (examples include: stormwater plans, management plans, erosion and sediment plans). Please see our Georgia HUC Watershed Guidance Reports for recommendations specific to your project area (https://www.fws.gov/athens/transportation/coordination.html).

Please submit all consultation documents via email to gaes_assistance@fws.gov or by using IPaC, uploaded documents, and sharing the project with a specific Georgia Ecological Services staff member. If the project is on-going, documents can also be sent to the Georgia Ecological Services staff member currently working with you on your project. For Georgia Department of Transportation related projects, please work with the Office of Environmental Services ecologist to determine the appropriate USFWS transportation liaison.

WETLANDS AND FLOODPLAINS

Under Executive Orders 11988 and 11990, Federal agencies are required to minimize the destruction, loss, or degradation of wetlands and floodplains, and preserve and enhance their natural and beneficial values. These habitats should be conserved through avoidance, or mitigated to ensure that there would be no net loss of wetlands function and value. We encourage you to use the National Wetland Inventory (NWI) maps in conjunction with ground-truthing to identify wetlands occurring in your project area. The Service's NWI program website, https://www.fws.gov/wetlands/data/mapper.html integrates digital map data with other resource information. We also recommend you contact the U.S. Army Corps of Engineers for permitting requirements under section 404 of the Clean Water Act if your proposed action could impact floodplains or wetlands.

MIGRATORY BIRDS

The MBTA prohibits the taking of migratory birds, nests, and eggs, except as permitted by the Service's Migratory Bird Office. To minimize the likelihood of adverse impacts to migratory birds, we recommend construction activities occur outside the general bird nesting season from March through August, or that areas proposed for construction during the nesting season be surveyed, and when occupied, avoided until the young have fledged.

We recommend review of Birds of Conservation Concern to fully evaluate the effects to the birds at your site. This list identifies birds that are potentially threatened by disturbance and construction. It can be found at https://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php

Information related to wind energy development and migratory birds can be found at this location: https://www.fws.gov/birds/management/project-assessment-tools-and-guidance/guidance-documents/wind-energy.php

BALD AND GOLDEN EAGLES

The bald eagle (*Haliaeetus leucocephalus*) was delisted under the ESA on August 9, 2007. Both the bald eagle and golden eagle (*Aquila chrysaetos*) are still protected under the MBTA and BGEPA. The BGEPA affords both eagles protection in addition to that provided by the MBTA, in

particular, by making it unlawful to “disturb” eagles. Under the BGEPA, the Service may issue limited permits to incidentally “take” eagles (e.g., injury, interfering with normal breeding, feeding, or sheltering behavior nest abandonment). For information on bald and golden eagle management guidelines, we recommend you review information provided at https://www.fws.gov/birds/management/managed-species/bald-and-golden-eagle-information.php and https://www.fws.gov/birds/management/managed-species/eagle-management.php. Additionally, the following site will help you determine if your activity is likely to take or disturb bald eagles in the southeast (https://www.fws.gov/southeast/our-services/eagle-technical-assistance).

NATIVE BATS

If your species list includes Indiana bat (*Myotis sodalis*) or northern long-eared bat (*M. septentrionalis*) and the project is expected to impact forested habitat that is appropriate for maternity colonies of these species, forest clearing should occur outside of the period when bats may be present. Federally listed bats could be actively present in forested landscapes from April 1 to October 15 of any year and have non-volant pups from May 15 to July 31 in any year. Non-volant pups are incapable of flight and are vulnerable to disturbance during that time.

Indiana, northern long-eared, and gray (*M. grisescens*) bats are all known to utilize bridges and culverts in Georgia. If your project includes maintenance, construction, or any other modification or demolition to transportation structures, a qualified individual should complete a survey of these structures for bats and submit your findings via the Georgia Bats in Bridges cell phone application, free on Apple and Android devices. Please include these findings in any biological assessment(s) or other documentation that is submitted to our office for technical assistance or consultation.

Additional information on bat avoidance and minimization can be found at the following link: https://www.fws.gov/athens/transportation/pdfs/Bat_AMMs.pdf.

MONARCH BUTTERFLY

On December 20, 2020, the Service determined that listing the Monarch butterfly (*Danaus plexippus*) under the Endangered Species Act is warranted but precluded at this time by higher priority listing actions. With this finding, the monarch butterfly becomes a candidate for listing. The Service will review its status each year until we are able to begin developing a proposal to list the monarch.

As it is a candidate for listing, the Service welcomes conservation measures for this species. Recommended, and voluntary, conservation measures for projects in Georgia can be found at https://www.fws.gov/athens/monarch.html

STATE AGENCY COORDINATION

Additional information that addresses at-risk or high priority natural resources can be found in the State Wildlife Action Plan (https://georgiawildlife.com/WildlifeActionPlan), at Georgia Department of Natural Resources, Wildlife Resources Division Biodiversity Portal (https://georgiawildlife.com/conservation/species-of-concern), Georgia's Natural, Archaeological, and Historic Resources GIS portal (https://www.gnahrgis.org/gnahrgis/index.do), and Georgia

Ecological Services Watershed Guidance (https://www.fws.gov/athens/transportation/coordination.html).

Thank you for your concern for endangered and threatened species. We appreciate your efforts to identify and avoid impacts to listed and sensitive species in your project area. For further consultation on your proposed activity, please email gaes_assistance@fws.gov and reference the project county and your Service Project Tracking Number.

This letter constitutes Georgia Ecological Services' general comments under the authority of the Endangered Species Act.

Attachment(s):

- Official Species List
- Migratory Birds
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Georgia Ecological Services Field Office
355 East Hancock Avenue
Room 320
Athens, GA 30601
(706) 613-9493

Project Summary

Project Code: 2022-0014065
Event Code: None
Project Name: Effingham Energy Facility Project
Project Type: Power Gen - Natural Gas
Project Description: Software and hardware upgrades at the existing Effingham Energy Facility, a natural gas-fired combined-cycle electrical power generating facility.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@32.277825750000005,-81.2827755514329,14z

Counties: Effingham County, Georgia

Endangered Species Act Species

There is a total of 5 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Reptiles

NAME	STATUS
Eastern Indigo Snake *Drymarchon corais couperi* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/646	Threatened
Gopher Tortoise *Gopherus polyphemus* Population: eastern No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6994	Candidate

Amphibians

NAME	STATUS
Frosted Flatwoods Salamander *Ambystoma cingulatum* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/4981	Threatened

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
Pondberry *Lindera melissifolia*	Endangered

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/1279

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Eastern Whip-poor-will *Antrostomus vociferus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Aug 20
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Swallow-tailed Kite *Elanoides forficatus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8938	Breeds Mar 10 to Jun 30

NAME	BREEDING SEASON
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season (■)

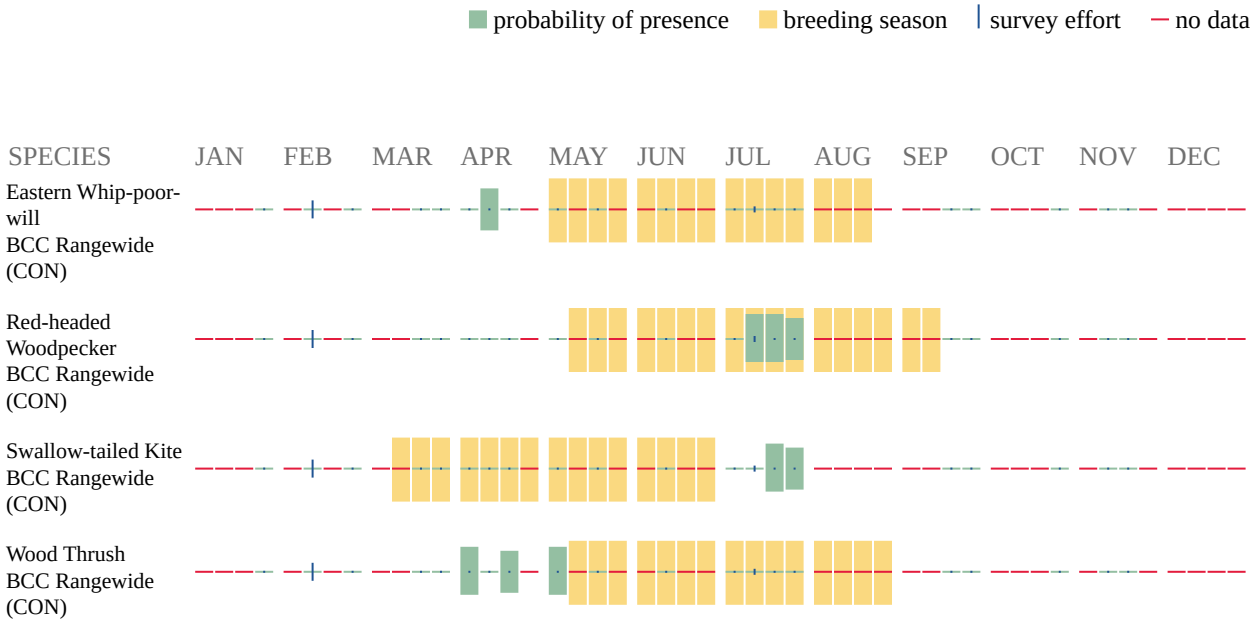
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.
Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits

may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?
The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?
The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?
To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);

2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities,

should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

WETLAND INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED. PLEASE VISIT HTTPS://WWW.FWS.GOV/WETLANDS/DATA/MAPPER.HTML OR CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

IPaC User Contact Information

Agency:	Burns & McDonnell
Name:	Fawn Armagost
Address:	4004 Summit Blvd
Address Line 2:	Ste 1200
City:	Atlanta
State:	GA
Zip:	30319
Email	farmagost@burnsmcd.com
Phone:	7249803913

Lead Agency Contact Information

Lead Agency: Rural Utilities Service

APPENDIX E – AGENCY COORDINATION LETTERS

May 12, 2022

Mr. Jon Burns
State Representative
Georgia House of Representatives
338 State Capitol
Atlanta, GA 30334

Re: Oglethorpe Power Corporation
Effingham Energy Facility Combustion Turbines Upgrade Project

Dear Mr. Burns:

Burns & McDonnell is conducting scoping as part of the preparation of an Environmental Assessment (EA) for the U.S. Department of Agriculture's Rural Utilities Services (RUS), as required by the National Environmental Policy Act (NEPA). Burns & McDonnell has been contracted by Oglethorpe Power Corporation ("Oglethorpe") to prepare an environmental report (ER) for submittal to RUS for preparation of an EA for the Combustion Turbines Upgrades Project (the "Project") at Oglethorpe's Effingham Energy Facility located in Effingham County, near Rincon, Georgia (the "Facility").

Oglethorpe is considering making changes within the existing footprint of the Facility that would increase the plant capacity by approximately 23 megawatts (MW) from approximately 500 MW to 523 MW. These changes would improve the gas turbine and plant output, efficiency, extend intervals between required maintenance, and allow the Facility to continue to operate with less frequent shutdowns during low demand periods, thereby reducing maintenance, and fuel costs associated with startups.

The Project would lower the cost per MW to the 38 members of Oglethorpe, a not-for-profit generation cooperative. These upgrades would result in small increases in maximum heat input, maximum hourly rate of air emissions, and expected annual air emissions, requiring a modification to the Facility's air quality permit. A small increase in water usage and discharge to the Facility's existing on-site land application system is also expected. Implementation of the Project is not expected to increase the noise from the Effingham Facility above historical levels nor will it require changes in the gas supply infrastructure for the Effingham Facility. No ground-disturbing activities are proposed for the Project.

This letter requests that your agency participate in this Project by providing information on the resources, issues, and impacts that will be addressed in the ER documentation. A Project Site Map is included in Appendix A for your reference. Your input on any of the following resources is appreciated:

- Land use

4004 Summit Boulevard NE \ Suite 1200 \ Atlanta, GA 30319
O 770-587-4776 \ F 770-587-4772 \ burnsmcd.com

- Aesthetics
- Water quality and wetlands
- Soils and geology
- Wildlife, vegetation and fisheries, including threatened and endangered species
- Socioeconomics (population, employment, growth, development)
- Hazardous materials sites
- Cultural resources (historic and archaeological sites, cemeteries)
- Transportation and roads (airport and roadway expansions, construction, operations and maintenance)

Please contact me at (470) 508-9904 or at sskent@burnsmcd.com with your feedback on these items and if you need additional information. We would appreciate your response within thirty (30) days of your receipt of this request.

Thank you for your participation and support of this Project.

Sincerely,

Sara Kent
Burns & McDonnell, Project Manager

Enclosure Attachment
cc: Type name(s) for copies of letter

ATTACHMENT – PROJECT SITE MAP

Effingham Power Plant Location

Property Boundary

NHD Flowline

NORTH

1,500 750 0 1,500

Scale in Feet

BURNS McDONNELL

Project Location
Effingham Energy Facility
AGP/LLTD Project
Oglethorpe Power Corporation
Effingham County, Georgia

Issued: 4/15/2022

Source: Esri, USGS, NHD, USFWS, NWI, FEMA, NFHL,

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Service Layer Credits: World Navigation Map: Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS

May 12, 2022

Mr. Tim Callanan
County Manager
Effingham County Georgia
804 S Laurel Street
Springfield, GA 31329

Re: Oglethorpe Power Corporation
Effingham Energy Facility Combustion Turbines Upgrade Project

Dear Mr. Callanan:

Burns & McDonnell is conducting scoping as part of the preparation of an Environmental Assessment (EA) for the U.S. Department of Agriculture's Rural Utilities Services (RUS), as required by the National Environmental Policy Act (NEPA). Burns & McDonnell has been contracted by Oglethorpe Power Corporation ("Oglethorpe") to prepare an environmental report (ER) for submittal to RUS for preparation of an EA for the Combustion Turbines Upgrades Project (the "Project") at Oglethorpe's Effingham Energy Facility located in Effingham County, near Rincon, Georgia (the "Facility").

Oglethorpe is considering making changes within the existing footprint of the Facility that would increase the plant capacity by approximately 23 megawatts (MW) from approximately 500 MW to 523 MW. These changes would improve the gas turbine and plant output, efficiency, extend intervals between required maintenance, and allow the Facility to continue to operate with less frequent shutdowns during low demand periods, thereby reducing maintenance, and fuel costs associated with startups.

The Project would lower the cost per MW to the 38 members of Oglethorpe, a not-for-profit generation cooperative. These upgrades would result in small increases in maximum heat input, maximum hourly rate of air emissions, and expected annual air emissions, requiring a modification to the Facility's air quality permit. A small increase in water usage and discharge to the Facility's existing on-site land application system is also expected. Implementation of the Project is not expected to increase the noise from the Effingham Facility above historical levels nor will it require changes in the gas supply infrastructure for the Effingham Facility. No ground-disturbing activities are proposed for the Project.

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Please contact me at (470) 508-9904 or at sskent@burnsmcd.com with your feedback on these items and if you need additional information. We would appreciate your response within thirty (30) days of your receipt of this request.

Thank you for your participation and support of this Project.

Sincerely,

Sara Kent
Burns & McDonnell, Project Manager

Enclosure Attachment
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Effingham Power Plant Location

Property Boundary

NHD Flowline

NORTH

1,500 750 0 1,500

Scale in Feet

BURNS McDONNELL

Project Location
Effingham Energy Facility
AGP/LLTD Project
Oglethorpe Power Corporation
Effingham County, Georgia

Issued: 4/15/2022

Source: Esri, USGS, NHD, USFWS, NWI, FEMA, NFHL,

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Service Layer Credits: World Navigation Map: Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS

May 12, 2022

Mr. James Capp
Branch Chief
Georgia Environmental Protection Division, Watershed Protection Branch
Georgia Department of Natural Resources
2 Martin Luther King Jr. Drive
Atlanta, GA 30334

Re: Oglethorpe Power Corporation
Effingham Energy Facility Combustion Turbines Upgrade Project

Dear Mr. Capp:

Burns & McDonnell is conducting scoping as part of the preparation of an Environmental Assessment (EA) for the U.S. Department of Agriculture's Rural Utilities Services (RUS), as required by the National Environmental Policy Act (NEPA). Burns & McDonnell has been contracted by Oglethorpe Power Corporation ("Oglethorpe") to prepare an environmental report (ER) for submittal to RUS for preparation of an EA for the Combustion Turbines Upgrades Project (the "Project") at Oglethorpe's Effingham Energy Facility located in Effingham County, near Rincon, Georgia (the "Facility").

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4004 Summit Boulevard NE \ Suite 1200 \ Atlanta, GA 30319
O 770-587-4776 \ F 770-587-4772 \ burnsmcd.com

- Land use
- Aesthetics
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- Wildlife, vegetation and fisheries, including threatened and endangered species
- Socioeconomics (population, employment, growth, development)
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- Transportation and roads (airport and roadway expansions, construction, operations and maintenance)

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Thank you for your participation and support of this Project.

Sincerely,

Sara Kent
Burns & McDonnell, Project Manager

Enclosure Attachment
cc: Type name(s) for copies of letter

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Effingham Power Plant Location

Property Boundary

NHD Flowline

NORTH

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Scale in Feet

BURNS McDONNELL

Project Location
Effingham Energy Facility
AGP/LLTD Project
Oglethorpe Power Corporation
Effingham County, Georgia

Issued: 4/15/2022

Source: Esri, USGS, NHD, USFWS, NWI, FEMA, NFHL,

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Service Layer Credits: World Navigation Map: Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS

May 12, 2022

Mr. Buddy Carter
U.S. Congressman
U.S. House of Representatives
2432 Rayburn House Office Building
Washington DC 20515

Re: Oglethorpe Power Corporation
Effingham Energy Facility Combustion Turbines Upgrade Project

Dear Mr. Carter:

Burns & McDonnell is conducting scoping as part of the preparation of an Environmental Assessment (EA) for the U.S. Department of Agriculture's Rural Utilities Services (RUS), as required by the National Environmental Policy Act (NEPA). Burns & McDonnell has been contracted by Oglethorpe Power Corporation ("Oglethorpe") to prepare an environmental report (ER) for submittal to RUS for preparation of an EA for the Combustion Turbines Upgrades Project (the "Project") at Oglethorpe's Effingham Energy Facility located in Effingham County, near Rincon, Georgia (the "Facility").

Oglethorpe is considering making changes within the existing footprint of the Facility that would increase the plant capacity by approximately 23 megawatts (MW) from approximately 500 MW to 523 MW. These changes would improve the gas turbine and plant output, efficiency, extend intervals between required maintenance, and allow the Facility to continue to operate with less frequent shutdowns during low demand periods, thereby reducing maintenance, and fuel costs associated with startups.

The Project would lower the cost per MW to the 38 members of Oglethorpe, a not-for-profit generation cooperative. These upgrades would result in small increases in maximum heat input, maximum hourly rate of air emissions, and expected annual air emissions, requiring a modification to the Facility's air quality permit. A small increase in water usage and discharge to the Facility's existing on-site land application system is also expected. Implementation of the Project is not expected to increase the noise from the Effingham Facility above historical levels nor will it require changes in the gas supply infrastructure for the Effingham Facility. No ground-disturbing activities are proposed for the Project.

This letter requests that your agency participate in this Project by providing information on the resources, issues, and impacts that will be addressed in the ER documentation. A Project Site Map is included in Appendix A for your reference. Your input on any of the following resources is appreciated:

- Land use

4004 Summit Boulevard NE \ Suite 1200 \ Atlanta, GA 30319
O 770-587-4776 \ F 770-587-4772 \ burnsmcd.com

- Aesthetics
- Water quality and wetlands
- Soils and geology
- Wildlife, vegetation and fisheries, including threatened and endangered species
- Socioeconomics (population, employment, growth, development)
- Hazardous materials sites
- Cultural resources (historic and archaeological sites, cemeteries)
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Please contact me at (470) 508-9904 or at sskent@burnsmcd.com with your feedback on these items and if you need additional information. We would appreciate your response within thirty (30) days of your receipt of this request.

Thank you for your participation and support of this Project.

Sincerely,

Sara Kent
Burns & McDonnell, Project Manager

Enclosure Attachment
cc: Type name(s) for copies of letter

ATTACHMENT – PROJECT SITE MAP

Effingham Power Plant Location

Property Boundary

NHD Flowline

NORTH

1,500 750 0 1,500

Scale in Feet

BURNS McDONNELL

Project Location
Effingham Energy Facility
AGP/LLTD Project
Oglethorpe Power Corporation
Effingham County, Georgia

Issued: 4/15/2022

Source: Esri, USGS, NHD, USFWS, NWI, FEMA, NFHL,

Path: D:\GIS_Req\142475_EffinghamEA\142475_EffinghamEA.aprx olhaney 4/15/2022
Service Layer Credits: World Navigation Map: Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS

May 12, 2022

Ms. Denesia Cheek
Southeast Regional Air Resource Coordinator
National Park Service
PO Box 25287
Denver, CO 80225

Re: Oglethorpe Power Corporation
Effingham Energy Facility Combustion Turbines Upgrade Project

Dear Ms. Cheek:

Burns & McDonnell is conducting scoping as part of the preparation of an Environmental Assessment (EA) for the U.S. Department of Agriculture's Rural Utilities Services (RUS), as required by the National Environmental Policy Act (NEPA). Burns & McDonnell has been contracted by Oglethorpe Power Corporation ("Oglethorpe") to prepare an environmental report (ER) for submittal to RUS for preparation of an EA for the Combustion Turbines Upgrades Project (the "Project") at Oglethorpe's Effingham Energy Facility located in Effingham County, near Rincon, Georgia (the "Facility").

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O 770-587-4776 \ F 770-587-4772 \ burnsmcd.com

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Thank you for your participation and support of this Project.

Sincerely,

Sara Kent
Burns & McDonnell, Project Manager

Enclosure Attachment
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ATTACHMENT – PROJECT SITE MAP

Effingham Power Plant Location

Property Boundary

NHD Flowline

NORTH

1,500 750 0 1,500

Scale in Feet

BURNS McDONNELL

Project Location
Effingham Energy Facility
AGP/LLTD Project
Oglethorpe Power Corporation
Effingham County, Georgia

Issued: 4/15/2022

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May 12, 2022

Mr. Eric Cornwell
Stationary Source Permitting Manager
Georgia Environmental Protection Division, Watershed Protection Branch
Georgia Department of Natural Resources
4244 International Parkway, Suite 120
Atlanta, GA 30354

Re: Oglethorpe Power Corporation
Effingham Energy Facility Combustion Turbines Upgrade Project

Dear Mr. Cornwell:

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- Soils and geology
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Sincerely,

Sara Kent
Burns & McDonnell, Project Manager

Enclosure Attachment
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ATTACHMENT – PROJECT SITE MAP

Effingham Power Plant Location

Property Boundary

NHD Flowline

NORTH

1,500 750 0 1,500

Scale in Feet

BURNS McDONNELL

Project Location
Effingham Energy Facility
AGP/LLTD Project
Oglethorpe Power Corporation
Effingham County, Georgia

Issued: 4/15/2022

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May 12, 2022

Dr. David Crass
Division Director and Deputy State Historic Preservation Officer
Georgia Department of Natural Resources
Jewett Center for Historic Preservation
2610 GA Hwy 155 SW
Stockbridge, GA 30281

Re: Oglethorpe Power Corporation
Effingham Energy Facility Combustion Turbines Upgrade Project

Dear Dr. Crass:

Burns & McDonnell is conducting scoping as part of the preparation of an Environmental Assessment (EA) for the U.S. Department of Agriculture's Rural Utilities Services (RUS), as required by the National Environmental Policy Act (NEPA). Burns & McDonnell has been contracted by Oglethorpe Power Corporation ("Oglethorpe") to prepare an environmental report (ER) for submittal to RUS for preparation of an EA for the Combustion Turbines Upgrades Project (the "Project") at Oglethorpe's Effingham Energy Facility located in Effingham County, near Rincon, Georgia (the "Facility").

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- Land use
- Aesthetics
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- Wildlife, vegetation and fisheries, including threatened and endangered species
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Thank you for your participation and support of this Project.

Sincerely,

Sara Kent
Burns & McDonnell, Project Manager

Enclosure Attachment
cc: Type name(s) for copies of letter

ATTACHMENT – PROJECT SITE MAP

Effingham Power Plant Location

Property Boundary

NHD Flowline

NORTH

1,500 750 0 1,500

Scale in Feet

BURNS McDONNELL

Project Location
Effingham Energy Facility
AGP/LLTD Project
Oglethorpe Power Corporation
Effingham County, Georgia

Issued: 4/15/2022

Source: Esri, USGS, NHD, USFWS, NWI, FEMA, NFHL,

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May 12, 2022

Mr. Jamie DeLoach
District #3 Commissioner
Effingham County Georgia
804 S Laurel Street
Springfield, GA 31329

Re: Oglethorpe Power Corporation
Effingham Energy Facility Combustion Turbines Upgrade Project

Dear Mr. DeLoach:

Burns & McDonnell is conducting scoping as part of the preparation of an Environmental Assessment (EA) for the U.S. Department of Agriculture's Rural Utilities Services (RUS), as required by the National Environmental Policy Act (NEPA). Burns & McDonnell has been contracted by Oglethorpe Power Corporation ("Oglethorpe") to prepare an environmental report (ER) for submittal to RUS for preparation of an EA for the Combustion Turbines Upgrades Project (the "Project") at Oglethorpe's Effingham Energy Facility located in Effingham County, near Rincon, Georgia (the "Facility").

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- Land use

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O 770-587-4776 \ F 770-587-4772 \ burnsmcd.com

- Aesthetics
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- Wildlife, vegetation and fisheries, including threatened and endangered species
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Thank you for your participation and support of this Project.

Sincerely,

Sara Kent
Burns & McDonnell, Project Manager

Enclosure Attachment
cc: Type name(s) for copies of letter

ATTACHMENT – PROJECT SITE MAP

Effingham Power Plant Location

Property Boundary

NHD Flowline

NORTH

1,500 750 0 1,500

Scale in Feet

BURNS McDONNELL

Project Location
Effingham Energy Facility
AGP/LLTD Project
Oglethorpe Power Corporation
Effingham County, Georgia

Issued: 4/15/2022

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May 12, 2022

Mr. Eric Duff
Administrator, Environmental Services
Georgia Department of Transportation
One Georgia Center
600 West Peachtree Street NW, 16th Floor
Atlanta, GA 30308

Re: Oglethorpe Power Corporation
Effingham Energy Facility Combustion Turbines Upgrade Project

Dear Mr. Duff:

Burns & McDonnell is conducting scoping as part of the preparation of an Environmental Assessment (EA) for the U.S. Department of Agriculture's Rural Utilities Services (RUS), as required by the National Environmental Policy Act (NEPA). Burns & McDonnell has been contracted by Oglethorpe Power Corporation ("Oglethorpe") to prepare an environmental report (ER) for submittal to RUS for preparation of an EA for the Combustion Turbines Upgrades Project (the "Project") at Oglethorpe's Effingham Energy Facility located in Effingham County, near Rincon, Georgia (the "Facility").

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O 770-587-4776 \ F 770-587-4772 \ burnsmcd.com

- Land use
- Aesthetics
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Thank you for your participation and support of this Project.

Sincerely,

Sara Kent
Burns & McDonnell, Project Manager

Enclosure Attachment
cc: Type name(s) for copies of letter

ATTACHMENT – PROJECT SITE MAP

Effingham Power Plant Location

Property Boundary

NHD Flowline

NORTH

1,500 750 0 1,500

Scale in Feet

BURNS McDONNELL

Project Location
Effingham Energy Facility
AGP/LLTD Project
Oglethorpe Power Corporation
Effingham County, Georgia

Issued: 4/15/2022

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May 12, 2022

Mr. Billy Hickman
State Senator
304-A Coverdell Legislative Office Bldg.
18 Capitol Square, SW
Atlanta, GA 30334

Re: Oglethorpe Power Corporation
Effingham Energy Facility Combustion Turbines Upgrade Project

Dear Mr. Hickman:

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Sara Kent
Burns & McDonnell, Project Manager

Enclosure Attachment
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ATTACHMENT – PROJECT SITE MAP

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Property Boundary

NHD Flowline

NORTH

1,500 750 0 1,500

Scale in Feet

BURNS McDONNELL

Project Location
Effingham Energy Facility
AGP/LLTD Project
Oglethorpe Power Corporation
Effingham County, Georgia

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May 12, 2022

Mr. Bill Hitchens
State Representative
Georgia House of Representatives
501-A Coverdell Legislative Office Bldg.
Atlanta, GA 30334

Re: Oglethorpe Power Corporation
Effingham Energy Facility Combustion Turbines Upgrade Project

Dear Mr. Hitchens:

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Sara Kent
Burns & McDonnell, Project Manager

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Property Boundary

NHD Flowline

NORTH

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Scale in Feet

BURNS McDONNELL

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Effingham Energy Facility
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May 12, 2022

Mr. Ken Lee
Mayor of Rincon
302 S Columbia Avenue
Rincon, GA 31326

Re: Oglethorpe Power Corporation
Effingham Energy Facility Combustion Turbines Upgrade Project

Dear Mr. Lee:

Burns & McDonnell is conducting scoping as part of the preparation of an Environmental Assessment (EA) for the U.S. Department of Agriculture's Rural Utilities Services (RUS), as required by the National Environmental Policy Act (NEPA). Burns & McDonnell has been contracted by Oglethorpe Power Corporation ("Oglethorpe") to prepare an environmental report (ER) for submittal to RUS for preparation of an EA for the Combustion Turbines Upgrades Project (the "Project") at Oglethorpe's Effingham Energy Facility located in Effingham County, near Rincon, Georgia (the "Facility").

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- Water quality and wetlands
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- Wildlife, vegetation and fisheries, including threatened and endangered species
- Socioeconomics (population, employment, growth, development)
- Hazardous materials sites
- Cultural resources (historic and archaeological sites, cemeteries)
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Please contact me at (470) 508-9904 or at sskent@burnsmcd.com with your feedback on these items and if you need additional information. We would appreciate your response within thirty (30) days of your receipt of this request.

Thank you for your participation and support of this Project.

Sincerely,

Sara Kent
Burns & McDonnell, Project Manager

Enclosure Attachment
cc: Type name(s) for copies of letter

ATTACHMENT – PROJECT SITE MAP

Effingham Power Plant Location

Property Boundary

NHD Flowline

NORTH

1,500 750 0 1,500

Scale in Feet

BURNS McDONNELL

Project Location
Effingham Energy Facility
AGP/LLTD Project
Oglethorpe Power Corporation
Effingham County, Georgia

Issued: 4/15/2022

Source: Esri, USGS, NHD, USFWS, NWI, FEMA, NFHL,

Path: D:\GIS_Req\142475_EffinghamEA\142475_EffinghamEA.aprx olhaney 4/15/2022
Service Layer Credits: World Navigation Map: Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS

May 12, 2022

Mr. Reggie Loper
District #4 Commissioner
Effingham County Georgia
804 S Laurel Street
Springfield, GA 31329

Re: Oglethorpe Power Corporation
Effingham Energy Facility Combustion Turbines Upgrade Project

Dear Mr. Loper:

Burns & McDonnell is conducting scoping as part of the preparation of an Environmental Assessment (EA) for the U.S. Department of Agriculture's Rural Utilities Services (RUS), as required by the National Environmental Policy Act (NEPA). Burns & McDonnell has been contracted by Oglethorpe Power Corporation ("Oglethorpe") to prepare an environmental report (ER) for submittal to RUS for preparation of an EA for the Combustion Turbines Upgrades Project (the "Project") at Oglethorpe's Effingham Energy Facility located in Effingham County, near Rincon, Georgia (the "Facility").

Oglethorpe is considering making changes within the existing footprint of the Facility that would increase the plant capacity by approximately 23 megawatts (MW) from approximately 500 MW to 523 MW. These changes would improve the gas turbine and plant output, efficiency, extend intervals between required maintenance, and allow the Facility to continue to operate with less frequent shutdowns during low demand periods, thereby reducing maintenance, and fuel costs associated with startups.

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- Land use

4004 Summit Boulevard NE \ Suite 1200 \ Atlanta, GA 30319
O 770-587-4776 \ F 770-587-4772 \ burnsmcd.com

- Aesthetics
- Water quality and wetlands
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Scale in Feet

BURNS McDONNELL

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Effingham Energy Facility
AGP/LLTD Project
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May 12, 2022

Mr. Christopher Militscher
Chief, NEPA Program Office
U.S. Environmental Protection Agency
61 Forsyth Street SW
Atlanta, GA 30303

Re: Oglethorpe Power Corporation
Effingham Energy Facility Combustion Turbines Upgrade Project

Dear Mr. Militscher:

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NHD Flowline

NORTH

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Scale in Feet

BURNS McDONNELL

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AGP/LLTD Project
Oglethorpe Power Corporation
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May 12, 2022

Mr. Troy Pittman
District Engineer
Georgia Department of Transportation
PO Box 610
Jesup, GA 31598

Re: Oglethorpe Power Corporation
Effingham Energy Facility Combustion Turbines Upgrade Project

Dear Mr. Pittman:

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Sara Kent
Burns & McDonnell, Project Manager

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NORTH

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Scale in Feet

BURNS McDONNELL

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Effingham Energy Facility
AGP/LLTD Project
Oglethorpe Power Corporation
Effingham County, Georgia

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May 12, 2022

Mr. Terrance Rudolph
State Conservationist
National Resources Conservation Service
355 East Hancock Avenue, Stop Number 200
Athens, GA 30601

Re: Oglethorpe Power Corporation
Effingham Energy Facility Combustion Turbines Upgrade Project

Dear Mr. Rudolph:

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Sara Kent
Burns & McDonnell, Project Manager

Enclosure Attachment
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ATTACHMENT – PROJECT SITE MAP

Effingham Power Plant Location

Property Boundary

NHD Flowline

NORTH

1,500 750 0 1,500

Scale in Feet

BURNS McDONNELL

Project Location
Effingham Energy Facility
AGP/LLTD Project
Oglethorpe Power Corporation
Effingham County, Georgia

Issued: 4/15/2022

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May 12, 2022

Mr. William Rutlin
Chief, Coastal Branch
U.S. Army Corps of Engineers
Savannah District, Regulatory Division
100 W. Oglethorpe Avenue
Savannah, GA 31402

Re: Oglethorpe Power Corporation
Effingham Energy Facility Combustion Turbines Upgrade Project

Dear Mr. Rutlin:

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O 770-587-4776 \ F 770-587-4772 \ burnsmcd.com

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Sara Kent
Burns & McDonnell, Project Manager

Enclosure Attachment
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ATTACHMENT – PROJECT SITE MAP

Effingham Power Plant Location

Property Boundary

NHD Flowline

NORTH

1,500 750 0 1,500

Scale in Feet

BURNS McDONNELL

Project Location
Effingham Energy Facility
AGP/LLTD Project
Oglethorpe Power Corporation
Effingham County, Georgia

Issued: 4/15/2022

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May 12, 2022

Ms. Joyce Stanley
Regional Environmental Officer
Office of Environmental Policy and Compliance
U.S. Department of the Interior
75 Ted Turner Drive SW, Suite 1144
Atlanta, GA 30303

Re: Oglethorpe Power Corporation
Effingham Energy Facility Combustion Turbines Upgrade Project

Dear Ms. Stanley:

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NORTH

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Scale in Feet

BURNS McDONNELL

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May 12, 2022

Mr. Daniel Westcot
District Conservationist
Springfield Service Center
National Resources Conservation Service
203 South Laurel Street, Suite 209
Springfield, GA 31329

Re: Oglethorpe Power Corporation
Effingham Energy Facility Combustion Turbines Upgrade Project

Dear Mr. Westcot:

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May 12, 2022

Mr. Bill Wikoff
Supervisory Biologist
U.S. Fish and Wildlife Service
4890 Wildlife Drive NE
Townsend, GA 31331

Re: Oglethorpe Power Corporation
Effingham Energy Facility Combustion Turbines Upgrade Project

Dear Mr.Wikoff:

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Oglethorpe Power Corporation
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AGENCY RESPONSES

BURNS McDONNELL

U. S. Fish and Wildlife Service
RG Stephens, Jr. Federal Building
355 E. Hancock Ave, Room 320, Box 7
Athens, GA 30601
706-613-9493

2022-0044160
FWS Log No.

May 12, 2022

Based on the information provided, the proposed action is not expected to significantly impact fish and wildlife resources under the jurisdiction of the U.S. Fish & Wildlife Service

Mr. Bill Wikoff
Supervisory Biologist
U.S. Fish and Wildlife Service
4890 Wildlife Drive NE
Townsend, GA 31331

Peter Maholland, Acting Deputy Field Supervisor

May 19, 2022
Date

Re: Oglethorpe Power Corporation
Effingham Energy Facility Combustion Turbines Upgrade Project

Dear Mr.Wikoff:

Burns & McDonnell is conducting scoping as part of the preparation of an Environmental Assessment (EA) for the U.S. Department of Agriculture's Rural Utilities Services (RUS), as required by the National Environmental Policy Act (NEPA). Burns & McDonnell has been contracted by Oglethorpe Power Corporation ("Oglethorpe") to prepare an environmental report (ER) for submittal to RUS for preparation of an EA for the Combustion Turbines Upgrades Project (the "Project") at Oglethorpe's Effingham Energy Facility located in Effingham County, near Rincon, Georgia (the "Facility").

Oglethorpe is considering making changes within the existing footprint of the Facility that would increase the plant capacity by approximately 23 megawatts (MW) from approximately 500 MW to 523 MW. These changes would improve the gas turbine and plant output, efficiency, extend intervals between required maintenance, and allow the Facility to continue to operate with less frequent shutdowns during low demand periods, thereby reducing maintenance, and fuel costs associated with startups.

The Project would lower the cost per MW to the 38 members of Oglethorpe, a not-for-profit generation cooperative. These upgrades would result in small increases in maximum heat input, maximum hourly rate of air emissions, and expected annual air emissions, requiring a modification to the Facility's air quality permit. A small increase in water usage and discharge to the Facility's existing on-site land application system is also expected. Implementation of the Project is not expected to increase the noise from the Effingham Facility above historical levels nor will it require changes in the gas supply infrastructure for the Effingham Facility. No ground-disturbing activities are proposed for the Project.

This letter requests that your agency participate in this Project by providing information on the resources, issues, and impacts that will be addressed in the ER documentation. A Project Site Map is included in Appendix A for your reference. Your input on any of the following resources is appreciated:

- Land use

- Aesthetics
- Water quality and wetlands
- Soils and geology
- Wildlife, vegetation and fisheries, including threatened and endangered species
- Socioeconomics (population, employment, growth, development)
- Hazardous materials sites
- Cultural resources (historic and archaeological sites, cemeteries)
- Transportation and roads (airport and roadway expansions, construction, operations and maintenance)

Please contact me at (470) 508-9904 or at sskent@burnsmcd.com with your feedback on these items and if you need additional information. We would appreciate your response within thirty (30) days of your receipt of this request.

Thank you for your participation and support of this Project.

Sincerely,

Sara Kent
Burns & McDonnell, Project Manager

Enclosure Attachment
cc: Type name(s) for copies of letter

4004 Summit Boulevard NE \ Suite 1200 \ Atlanta, GA 30319
O 770-587-4776 \ F 770-587-4772 \ burnsmcd.com

May 17, 2022

Sara Kent, Project Manager
Burns & McDonnell
4004 Summit Boulevard NE, Suite 1200
Atlanta, GA 30319

Re: Executive Order 12372 Request for Effingham Energy Combustion Turbines Upgrade Project, Effingham County.

Dear Ms. Kent:

This letter replies to your request for information on the possible impacts the proposed project to increase the plant capacity improving the gas turbine and plant output may have on land use, conservation, water quality and other general environmental concerns that may be of interest to our agency. The following outlines our concerns with the proposed project with regards to farmland protection, and Natural Resources Conservation Service (NRCS) watershed dams and project easements.

Farmland Protection

The Farmland Protection Policy Act (FPPA) is intended to minimize the impact federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a federal agency or with assistance from a federal agency. For FPPA purposes, farmland includes areas located within soil map units rated as prime farmland, unique farmland, or land of statewide or local importance not currently in urban/built up land use. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land uses, but not water or urban built-up land. It should be noted that the FPPA does not authorize the Federal Government to regulate the use of private or nonfederal land or, in any way, affect the property rights of owners.

NRCS uses a Land Evaluation and Site Assessment (LESA) system to establish a farmland conversion impact rating score on proposed sites of federally funded and assisted projects. This score is used as an indicator for the project sponsor to consider alternative sites if the potential adverse impacts on the farmland exceed the recommended allowable level. It is our understanding that the proposed project involves federal funds or assistance, and thus could be subject to this assessment. **However, this site does not involve soils rated as prime, unique, or statewide importance farmland and is thus exempt from this assessment. You need take no further action for FPPA purposes.**

NRCS Watershed Dams

More than 50 years ago, the U.S. Department of Agriculture was authorized by Congress to help local communities with flood control and watershed protection through the Watershed Program (PL-534 Flood Control Act of 1944 and PL-566 Watershed Protection and Flood Prevention Act). As a result, local communities, with NRCS assistance, have constructed over 11,000 dams in 47 states since 1948. These dams were originally constructed for protection of farmlands from flooding impacts. In 2000, PL-566 was amended to provide NRCS authorization to assist communities with rehabilitation of their aging dams. The legislation authorizes NRCS to work with local communities and watershed project sponsors to address public health and safety concerns and potential environmental impacts of aging dams.

We have reviewed our records and have determined that there are no such structures downstream of the proposed project that could be affected by these activities.

NRCS Easements

NRCS easements relate to our Wetland Reserve Program and the Farm and Ranchland Protection Program. **We have reviewed our records and have determined that there are no such easements downstream or in the near vicinity of the proposed project that could be affected by these activities.**

NRCS appreciates this opportunity to comment. If you have questions or need any additional information, please contact Dan Wallace of my staff at (706) 546-2244 or dan.wallace@usda.gov.

Sincerely,

TERRANCE O. RUDOLPH
State Conservationist

cc: David Walden, Assistant State Conservationist (FO), NRCS, Baxley, GA
Daniel Westcot, District Conservationist, NRCS, Sylvania, GA
Casey Sowell, Resource Soil Scientist, NRCS, Statesboro, GA
Nelson Velazquez Gotay, Soil Scientist, NRCS, Athens, GA

Kent, Sara S

From: Rutlin, William M CIV USARMY CESAS (USA) <William.M.Rutlin@usace.army.mil>
Sent: Tuesday, May 24, 2022 9:48 AM
To: Kent, Sara S
Subject: Oglethorpe Power Corporation Effingham Energy Facility Combustion Turbines Upgrade Project

Ms. Kent,

Corps of Engineers Regulatory comments are as follows:

Please be advised that if your project/activities involve work in waters of the United States that are considered to be within the jurisdiction of the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act (CWA) and/or Section 10 of the Rivers and Harbors Act (RHA), a permit may be required. The placement of dredged or fill material into any waterways and/or their adjacent wetlands, including material re-deposited during mechanized land clearing or excavation of those wetlands, would likely require prior Department of the Army authorization. Proceeding with such work, without proper authorization, may result in our initiating a CWA and/or RHA enforcement action.

If your client is requesting an all upland call or jurisdictional determination for wetlands, please complete the "Request for Corps of Engineers Jurisdictional Determination (JD) and/or Delineation Review" form and return it to our office by email to CESAS-RD-C@usace.army.mil. The form can be found at: https://www.sas.usace.army.mil/Portals/61/docs/Regulatory/JD/Revised_Appendix%201v2.pdf?ver=2018-04-10-111939-157. Please keep in mind that an approved Jurisdictional Determination must be requested if you need the Corps to confirm that a site is composed entirely of dry land.

If your project does not involve waters of the United States under Corps jurisdiction, then a Department of the Army permit is not required. To learn more about our program you may want to access our website located at http://www.sas.usace.army.mil/Missions/Regulatory.aspx.

William M. Rutlin
Chief, Coastal Branch
Regulatory Division
US Army Corps of Engineers, Savannah District

100 West Oglethorpe Avenue

Savannah, Georgia 31401-3640
912-652-5893 (desk)
912-652-5995 (fax)

Thank you in advance for completing our Customer Survey Form. This can be accomplished by visiting our web site at https://regulatory.ops.usace.army.mil/customer-service-survey/, and completing the survey on-line. We value your comments and appreciate your taking the time to complete a survey each time you interact with our office.