OglethorpePower

Oglethorpe Power Corporation
2100 East Exchange Place
Tucker, GA 30084-5336
phone 770-270-7600
fax 770-270-7872
An Electric Membership Cooperative

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AIR PROTECTION BRANCH

March 5, 2010

Mr. Eric Cornwell
Georgia Environmental Protection Division
Air Protection Branch
4244 International Parkway, Suite 120
Atlanta, GA 30354

Subject: Oglethorpe Power Corporation – Warren County PSD Permit Application Startup Modeling Analysis

Dear Mr. Cornwell:

Oglethorpe Power Corporation (Oglethorpe) appreciates meeting with you on December 10, 2009 regarding the proposed nominal 100 megawatt (MW) biomass-fueled electric generating facility in Warren County, Georgia.

This letter addresses one of the items discussed at the December 10, 2009 meeting. During the meeting, Georgia EPD requested that Oglethorpe develop a best engineering estimate of hour-by-hour emissions during startup and then demonstrate that the hourly emission rates do not exceed ambient air quality standards. Georgia EPD did note that the agency had no intention of issuing permit limits at those emission rates. Given the uncertainty surrounding these best engineering estimates, Oglethorpe agrees with Georgia EPD that the values listed are inappropriate for emissions limits.

Based on Georgia EPD's request, specific stack parameters and emissions were estimated for each hour of operation. Dispersion modeling was then conducted with these estimates for two scenarios: one with startup beginning at midnight, and the other with startup beginning at noon.

STARTUP PARAMETER AND EMISSIONS ESTIMATES

Sections 2.2 of Volume I of the Prevention of Significant Deterioration (PSD) permit application addressed expected startup operations, denoting the various phases of startup and fuels/control devices in use for each phase. Section 3.1.1 of Volume I of the PSD permit application addressed the expected worst-case emissions from each phase of startup, presenting the worst-case rate for each pollutant expected during that phase. A typical cold startup on pure biodiesel (B100) is expected to last up to 12 hours in duration at which point normal operation commences. Note that a B100 startup is considered for this assessment as it will have higher hourly heat inputs and emissions than a startup on ultra low sulfur diesel (ULSD) or a biodiesel/ULSD blend (Bxx). Additionally, detailed engineering was completed for the B100 startup based on boiler vendor information, while the ULSD and Bxx scenarios were based on ratios of the B100 case.

Boiler vendor and engineering firm data of the startup emissions, heat inputs, and exhaust parameter data are available for Hours 6, 7, and 10 of the expected B100 cold startup. Load data, fuels used, and control device operational status are available for all B100 startup hours. Normal operations will occur from hours 13-24 and are based on proposed BACT limits and vendor data for the sustained 100% load operating case (1,282 MMBtu/hr, off-design spec fuel).

Using the information provided by the boiler vendors and engineering firm, Oglethorpe estimated the missing heat input, emissions, and exhaust parameters for the remaining startup hours. The following sections outline the assumptions used to estimate the data for Hours 1-5, 8-9, and 11-12.

HOURS 1-2, B100-ONLY COMBUSTION

During Hours 1-2, only B100 is being combusted, and no control devices are in operation. During this period, the boiler load is increased from 0 to 14%. To estimate the heat input from B100 during this period, Oglethorpe ratioed the known Hour 6 (26% load, B100 only) heat input with the various loads.

For oxides of nitrogen (NO_X) and carbon monoxide (CO) emissions during this period, Oglethorpe assumed the lb/MMBtu factors would remain constant from 0% to the known factors at 26% load (Hour 6), since these are for a similar operating scenario using the same fuel and no control devices. Unlike NO_X and CO, filterable particulate matter (PM) and sulfur dioxide (SO_2) are largely a function of fuel properties. Therefore, the lb/MMBtu factors for these pollutants were set equal to the known factors at 26% load (Hour 6) for a similar operating scenario using the same fuel and no control devices.

Temperature for Hours 1-2 were assumed to be equal to that of Hour 6 since combustion of the fuel oil at different low loads is not expected to have much variation. Flow rate for Hours 1-2 is a function of the amount of fuel being combusted. To estimate the flow rate from B100 during this period, Oglethorpe ratioed the known Hour 6 (26% load, B100 only) heat input with the various loads.

HOURS 3-5, B100-ONLY COMBUSTION

Hour 5 is identical to the Hour 6 data provided by the vendors and the engineering firm. For Hours 3-4, provided as 24% load, Oglethorpe conservatively assumed these periods were identical to the 26% load parameters for the Hour 6 data as the biodiesel burners should have completed any ramp up in operation by this time.

HOURS 8-9, TRANSITION

Hours 8 and 9 are part of the transition period when B100 combustion is decreasing while biomass combustion is increasing. The duct sorbent injection and baghouse are both in operation during this period. Heat input for each of the fuels was estimated by ratioing the known Hours 7 and 10 transition period heat inputs for each fuel, assuming a linear relationship. Sample proprietary startup curves provided to Oglethorpe indicate one boiler vendor expects a linear fuel relationship in terms of MMBtu/hr while the second boiler vendor's relationship is nearly linear.

For NO_X and CO lb/MMBtu emissions, Oglethorpe also assumed a linear relationship between Hours 7 and 10. For SO_2 and PM_{10}, the control devices were in operation during Hours 8 and 9, and emissions of these pollutants are largely a function of the fuel properties. Therefore, the emissions were assumed to be equal to the proposed BACT lb/MMBtu emission rates.

A linear relationship between Hours 7 and 10 was also assumed for the exhaust gas temperature and flow rate.

HOURS 11-12, END OF STARTUP

During Hours 11 and 12, only biomass is being combusted. All control devices are in operation for Hour 11 except the SNCR which commences operation for Hour 12. Total heat input for Hours 11 and 12 was estimated by ratioing the operating loads with the total heat input from Hours 13-24 (normal operation).

Emissions, on a lb/MMBtu basis for CO, SO_2, and PM_{10} were set equal to the proposed best available control technology (BACT) limits from normal operation since all control devices are in operation. (Although CO emissions are not directly impacted by usage of control devices, the boiler performance specifications provided by the engineering firm for 60% operating load lists CO emissions equal to the normal operation emissions on a lb/MMBtu basis.) For NO_X, the Hour 11 emissions were based on the uncontrolled emission rate at 60% operating load as listed in the boiler performance specifications provided by the engineering firm. For Hour 12, the NO_X emissions were set equal to the proposed BACT limit since the SNCR is now in operation.

For the exhaust temperatures, the boiler performance specifications list 330 °F for 60% operating load; this value was assumed for both Hours 11 and 12 (54% and 66% load) since biomass is being fired exclusively. For the flow rate, the value listed in the boiler performance specifications for 60% load was utilized for Hour 12 (scaled to 66% load). For Hour 11, the flow rate was estimated by ratioing the known 100% load flow rate for Hour 13 and the estimated flow rate for Hour 12, assuming a linear relationship.

SUMMARY OF ESTIMATED PARAMETERS AND EMISSIONS TO BE USED IN MODELING

Based on the provided data from the boiler vendors and engineering firm, coupled with various assumptions, Oglethorpe used the data shown in Table 1 to conduct hour-by-hour startup modeling for the proposed Warren facility biomass boiler.

TABLE 1. BOILER DATA FOR HOUR-BY-HOUR STARTUP MODELING

Startup Hour	Phase Description	Emissions (g/s) NOx	CO	SO_2	PM_{10}	Height (m)	Temperature (K)	Diameter (m)	Velocity (m/s)
1	Biodiesel Firing	5.293E+00	2.217E+01	2.015E-02	1.478E+00	67.06	393.2	3.658	1.954
2	Biodiesel Firing	1.059E+01	4.433E+01	4.030E-02	2.955E+00	67.06	393.2	3.658	3.907
3	Biodiesel Firing	1.966E+01	8.233E+01	7.484E-02	5.489E+00	67.06	393.2	3.658	7.256
4	Biodiesel Firing	1.966E+01	8.233E+01	7.484E-02	5.489E+00	67.06	393.2	3.658	7.256
5	Biodiesel Firing	1.966E+01	8.233E+01	7.484E-02	5.489E+00	67.06	393.2	3.658	7.256
6	Biodiesel Firing	1.966E+01	8.233E+01	7.484E-02	5.489E+00	67.06	393.2	3.658	7.256
7	Transition	2.774E+01	4.865E+01	1.315E+00	6.514E+00	67.06	403.2	3.658	10.116
8	Transition	2.802E+01	4.563E+01	6.722E-01	1.210E+00	67.06	404.3	3.658	10.358
9	Transition	2.854E+01	3.907E+01	7.018E-01	1.263E+00	67.06	406.5	3.658	10.841
10	Transition	2.973E+01	1.502E+01	7.907E-01	1.423E+00	67.06	413.2	3.658	12.290
11	End of Startup	1.570E+01	6.978E+00	8.723E-01	1.570E+00	67.06	438.7	3.658	15.028
12	End of Startup	1.173E+01	8.529E+00	1.066E+00	1.919E+00	67.06	438.7	3.658	17.191
13-24	Normal Operation	1.777E+01	1.292E+01	1.615E+00	2.908E+00	67.06	438.7	3.658	23.321

Note that normal operations (Hours 13-24) were based on the operating scenario of 100% load, off-spec biomass yielding a sustainable heat input rate of 1,282 MMBtu/hr, which is the expected normal operating scenario.

STARTUP DISPERSION MODELING METHODOLOGY

The supplemental Significance Analyses were conducted to determine whether the emissions increases associated with the boiler startup scenario for the proposed facility would cause a significant impact upon the area surrounding the facility or at Class I areas. The Significance Analysis was limited to CO, NO_X, PM_{10}, and SO_2, as these are the only pollutants for which PSD modeling requirements are triggered (refer to Section 3 of Volume II of the original PSD permit application regarding $PM_{2.5}$ and ozone). "Significant" impacts are defined by ambient concentration thresholds commonly referred to as the Significance Impact Levels (SILs), shown in Table 2.

TABLE 2. SIGNIFICANT IMPACT LEVELS FOR CRITERIA AIR POLLUTANTS

Pollutant	Averaging Period	Class II SIL ($\mu g/m^3$)	Class I Proposed SIL[1] ($\mu g/m^3$)
CO	1-hour	2,000	--
	8-hour	500	--
NO_2	Annual	1	0.1
Ozone	8-hour	--[2]	--
PM_{10}	24-hour	5	0.3
	Annual	1	0.2
SO_2	3-hour	25	1
	24-hour	5	0.2
	Annual	1	0.1

1. No PSD SILs have been established for Class I areas. Values shown are proposed levels.
2. No PSD SIL has been established for Ozone.

If the highest off-property concentration for a given pollutant is less than the SIL for all averaging periods, then further analyses for that pollutant are not required. This is because the emissions increases resulting in impacts less than the SIL, by definition, are unable to either cause or contribute to any exceedance of the NAAQS or PSD Increment. If concentrations exceed the SIL, NAAQS and PSD Increment analyses are required to demonstrate that the project neither causes nor contributes to any exceedances.

To develop the Significance Analysis startup modeling files, Oglethorpe utilized the previously submitted analyses as the basis and replaced the boiler's single emission rate and stack parameters with the varying startup emission rates and parameters.[1] First each of the twelve startup hours was assigned an individual source ID with specific stack parameters as described in Table 1. Hours 13 to 24, which encompass normal operation at 100% load for the off-design fuel blend scenario (1,282 MMBtu/hr), were modeled as one source since the stack parameters and emission rates do not change over this time interval. Next, the EMISFACT and HOUREMIS keywords within AERMOD were enabled for each boiler source ID. This keyword combination provides the option of specifying hourly emission rates for modeled sources. Thus, each boiler source ID was assigned a non-zero emission rate only for the hour(s) that it represents and zero emissions from that source ID for all other hours of the day. This hour-by-hour cycle is repeated in

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[1] Note that the receptor grids used for the current analyses encompass a radius of 10 km around the Warren facility while the Significance Analyses previously submitted in October 2009 were based on a receptor grid with a 20 km radius. The October 2009 submitted results demonstrated that the facility's maximum impacts for all pollutants are constrained to the vicinity of the facility and that a 10 km radius receptor grid is adequate for the startup modeling analyses. (Class I receptors remain the same as in the submitted October 2009 analyses.)

AERMOD every day for the entire year. The boiler startup impacts are represented by the cumulative effect of all 13 boiler source IDs. All other proposed Warren facility emission units' parameters and emission rates included in the previously submitted PM_{10} analyses (i.e., material handling and storage units, cooling towers, and haul roads) remained unchanged.

Per Georgia EPD's request in the December 10 meeting, two boiler startup scenarios were evaluated: one with startup beginning at midnight (Scenario 1) and the other with startup beginning at noon (Scenario 2). The first scenario generally represents the most conservative case since increased atmospheric stability characteristics of the early morning hours, associated with the lower exhaust flow rates and temperature, will result in the least pollutant dispersion. The second scenario is representative of a more typical startup scenario.

The results of each startup scenario dispersion modeling analysis are presented in the following sections for the Class I and Class II receptors. Modeling files are provided on the CD included in the attachment to this letter.

CLASS II RECEPTOR GRID STARTUP RESULTS

The results of the Significance Analysis in the 10-km Class II receptor grid for each pollutant for both startup scenarios are provided in Tables 3 through 6. Calculated annual results are shown although they do not represent a realistic scenario as the facility cannot operate with a startup every day. Note that NO_2 was modeled using the NO_X rates shown in Table 1; the Ambient Ratio Method (ARM) was applied to the modeled results.

TABLE 3. CO CLASS II SIGNIFICANCE ANALYSIS RESULTS

		Midnight Startup Operations						Noon Startup Operations					
Averaging Period	Year	UTM East (km)	UTM North (km)	Max Conc. (μg/m^3)	SIL (μg/m^3)	Exceeds SIL?	SIA (km)	UTM East (km)	UTM North (km)	Max Conc. (μg/m^3)	SIL (μg/m^3)	Exceeds SIL?	SIA (km)
1-Hour	1989	349.00	3,696.10	250.8	2,000	No	N/A	348.90	3,697.70	197.9	2,000	No	N/A
	1990	348.90	3,697.60	272.7	2,000	No		348.50	3,697.80	208.7	2,000	No	
	1991	348.90	3,697.70	272.0	2,000	No		348.90	3,697.70	247.5	2,000	No	
	1992	349.00	3,696.10	261.8	2,000	No		348.90	3,697.70	221.5	2,000	No	
	1993	348.90	3,697.80	262.6	2,000	No		348.48	3,697.49	199.5	2,000	No	
	MAX	348.90	3,697.60	272.7	2,000	No		348.90	3,697.70	247.5	2,000	No	
8-Hour	1989	348.24	3,696.16	88.4	500	No	N/A	349.10	3,697.70	56.5	500	No	N/A
	1990	348.30	3,696.10	83.5	500	No		348.54	3,697.49	62.3	500	No	
	1991	349.00	3,696.20	98.5	500	No		349.00	3,697.70	56.0	500	No	
	1992	348.90	3,696.10	92.3	500	No		348.90	3,697.40	60.0	500	No	
	1993	348.31	3,696.09	85.1	500	No		348.80	3,697.70	73.3	500	No	
	MAX	349.00	3,696.20	98.5	500	No		348.80	3,697.70	73.3	500	No	

TABLE 4. NO_2 CLASS II SIGNIFICANCE ANALYSIS RESULTS

Averaging Period	Year	Midnight Startup Operations UTM East (km)	UTM North (km)	Max Conc. (μg/m³)	SIL (μg/m³)	Exceeds SIL?	SIA (km)	Noon Startup Operations UTM East (km)	UTM North (km)	Max Conc. (μg/m³)	SIL (μg/m³)	Exceeds SIL?	SIA (km)
Annual	1989	348.11	3,696.30	0.73	1	No	N/A	348.08	3,696.35	0.59	1	No	N/A
	1990	348.05	3,696.39	0.66	1	No		349.30	3,697.00	0.54	1	No	
	1991	348.05	3,696.39	0.69	1	No		347.95	3,696.62	0.66	1	No	
	1992	348.08	3,696.35	0.69	1	No		349.30	3,697.00	0.69	1	No	
	1993	348.05	3,696.39	0.59	1	No		349.30	3,697.10	0.63	1	No	
	MAX	348.11	3,696.30	0.73	1	No		349.30	3,697.00	0.69	1	No	

1. Ambient Ratio Method (ARM) was applied to the modeled results as NO_X was modeled in the startup analyses.

TABLE 5. PM_{10} CLASS II SIGNIFICANCE ANALYSIS RESULTS

Averaging Period	Year	Midnight Startup Operations UTM East (km)	UTM North (km)	Max Conc. (μg/m³)	SIL (μg/m³)	Exceeds SIL?	SIA (km)	Noon Startup Operations UTM East (km)	UTM North (km)	Max Conc. (μg/m³)	SIL (μg/m³)	Exceeds SIL?	SIA (km)
24-Hour	1989	348.03	3,697.54	27.804	5	Yes	3.72	348.03	3,697.54	27.819	5	Yes	3.72
	1990	348.03	3,697.54	29.788	5	Yes		348.03	3,697.54	29.869	5	Yes	
	1991	348.81	3,696.96	24.100	5	Yes		348.81	3,696.96	24.212	5	Yes	
	1992	348.03	3,697.54	33.183	5	Yes		348.03	3,697.54	33.195	5	Yes	
	1993	348.81	3,696.96	18.554	5	Yes		348.81	3,696.96	18.570	5	Yes	
	MAX	348.03	3,697.54	33.183	5	Yes		348.03	3,697.54	33.195	5	Yes	
Annual	1989	348.03	3,696.43	3.419	1	Yes	1.40	348.03	3,696.43	3.470	1	Yes	1.43
	1990	348.01	3,696.48	3.452	1	Yes		348.01	3,696.48	3.505	1	Yes	
	1991	348.01	3,696.48	4.175	1	Yes		348.01	3,696.48	4.244	1	Yes	
	1992	348.01	3,696.48	4.032	1	Yes		348.01	3,696.48	4.095	1	Yes	
	1993	348.01	3,696.48	3.251	1	Yes		348.01	3,696.48	3.291	1	Yes	
	MAX	348.01	3,696.48	4.175	1	Yes		348.01	3,696.48	4.244	1	Yes	

TABLE 6. SO_2 CLASS II SIGNIFICANCE ANALYSIS RESULTS

		Midnight Startup Operations						Noon Startup Operations					
Averaging Period	Year	UTM East (km)	UTM North (km)	Max Conc. ($\mu g/m^3$)	SIL ($\mu g/m^3$)	Exceeds SIL?	SIA (km)	UTM East (km)	UTM North (km)	Max Conc. ($\mu g/m^3$)	SIL ($\mu g/m^3$)	Exceeds SIL?	SIA (km)
3-Hour	1989	349.00	3,696.10	1.23	25	No	N/A	348.17	3,696.23	1.02	25	No	N/A
	1990	349.00	3,696.20	1.36	25	No		348.30	3,697.80	1.27	25	No	
	1991	349.10	3,697.60	1.15	25	No		348.00	3,696.50	1.00	25	No	
	1992	348.70	3,697.90	1.05	25	No		348.30	3,697.70	1.09	25	No	
	1993	348.70	3,697.90	1.14	25	No		349.00	3,696.30	1.27	25	No	
	MAX	349.00	3,696.20	1.36	25	No		349.00	3,696.30	1.27	25	No	
24-Hour	1989	348.13	3,696.26	0.38	5	No	N/A	347.80	3,696.30	0.31	5	No	N/A
	1990	348.40	3,697.60	0.37	5	No		347.40	3,696.00	0.24	5	No	
	1991	348.00	3,696.40	0.31	5	No		347.70	3,696.20	0.23	5	No	
	1992	348.03	3,696.43	0.33	5	No		347.60	3,696.30	0.22	5	No	
	1993	347.89	3,696.76	0.31	5	No		348.40	3,697.80	0.23	5	No	
	MAX	348.13	3,696.26	0.38	5	No		347.80	3,696.30	0.31	5	No	
Annual	1989	348.05	3,696.39	0.04	1	No	N/A	348.08	3,696.35	0.02	1	No	N/A
	1990	348.01	3,696.48	0.04	1	No		348.03	3,696.43	0.02	1	No	
	1991	347.95	3,696.62	0.04	1	No		348.00	3,696.50	0.02	1	No	
	1992	349.40	3,697.00	0.04	1	No		347.90	3,696.50	0.02	1	No	
	1993	349.40	3,697.00	0.04	1	No		347.90	3,696.50	0.02	1	No	
	MAX	347.95	3,696.62	0.04	1	No		348.08	3,696.35	0.02	1	No	

As shown in the preceding tables, CO, NO_2, and SO_2 impacts during startup are below the SILs, and no further modeling is required to demonstrate compliance with the air quality standards. Worst-case impacts from the two startup scenarios for these pollutants are equal to or smaller than the impacts from the Significance Analyses based on normal boiler operations as shown in Table 7.[2]

[2] Note that the comparisons shown in Table 7 are based on the original October 2009 submittal for CO, NO_X, and SO_2. For PM_{10}, the comparison is based on the March 2010 submittal that used more realistic worst-case dispersion parameters as requested by Georgia EPD.

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TABLE 7. COMPARISON OF NORMAL AND STARTUP SCENARIO MAXIMUM IMPACTS AT CLASS II RECEPTORS

Pollutant	Averaging Period	Maximum Concentations ($\mu g/m^3$) Normal Operations	Midnight Startup	Noon Startup
CO	1-Hour	568.3	272.7	247.5
	8-Hour	138.6	98.5	73.3
NO_2	Annual	0.73	0.73	0.69
PM_{10}	24-Hour	33.184	33.183	33.195
	Annual	4.123	4.175	4.244
SO_2	3-Hour	16.79	1.36	1.27
	24-Hour	4.23	0.38	0.31
	Annual	0.09	0.04	0.02

As with the steady-state modeling, the PM_{10} impacts from startup modeling exceed the Class II SILs, requiring further analysis to demonstrate compliance with NAAQS and Class II Increment. However, the startup scenarios' impacts reflect only a slight (0.03%) increase in worst-case impacts and yield the same overall maximum SIA (3.72 km) steady-state PM_{10} analyses for the 24-hour averaging period.

NAAQS and Class II Increment analyses conducted for the 1,282 MMBtu/hr normal operations scenario were submitted to Georgia EPD and demonstrated that the proposed project did not cause or contribute to an exceedance of the NAAQS or Class II Increment.[3] No further NAAQS or Class II Increment analyses were conducted for the startup scenarios given their close similarity to the steady-state modeling.

CLASS I RECEPTOR GRID STARTUP RESULTS

As in the originally submitted Class I area Significance Analysis, Oglethorpe appended 10 receptors for each Class I area to the receptor grid used for the Class II Significance Analysis. These receptors are located 50 km from the facility, spaced 1 km apart, arrayed outward from a line connecting the Warren facility and Class I areas. The results from these receptors are compared against the proposed Class I Modeling SILs for both startup scenarios as shown in Tables 8 through 10. Note that NO_2 was modeled using the NO_X rates shown in Table 1; ARM was applied to the modeled results.

[3] Letter to Mr. Eric Cornwell (Georgia EPD) from Mr. Doug Fulle (Oglethorpe), dated March 5, 2010.

TABLE 8. NO_2 CLASS I SIGNIFICANCE ANALYSIS RESULTS

Averaging Period	Year	Midnight Startup Operations UTM East (km)	UTM North (km)	Max Conc. (µg/m^3)	SIL (µg/m^3)	Exceeds SIL?	Noon Startup Operations UTM East (km)	UTM North (km)	Max Conc. (µg/m^3)	SIL (µg/m^3)	Exceeds SIL?
Annual	1989	397.47	3,686.30	0.020	0.1	No	398.44	3,693.22	0.016	0.1	No
	1990	398.44	3,693.22	0.019	0.1	No	398.44	3,693.22	0.016	0.1	No
	1991	398.44	3,693.22	0.021	0.1	No	398.44	3,693.22	0.018	0.1	No
	1992	398.44	3,693.22	0.022	0.1	No	398.44	3,693.22	0.019	0.1	No
	1993	398.44	3,693.22	0.022	0.1	No	398.44	3,693.22	0.018	0.1	No
	MAX	398.44	3,693.22	0.022	0.1	No	398.44	3,693.22	0.019	0.1	No

1. Ambient Ratio Method (ARM) was applied to the modeled results as NO_X was modeled in the startup analyses.

TABLE 9. PM_{10} CLASS I SIGNIFICANCE ANALYSIS RESULTS

Averaging Period	Year	Midnight Startup Operations UTM East (km)	UTM North (km)	Max Conc. (µg/m^3)	SIL (µg/m^3)	Exceeds SIL?	Noon Startup Operations UTM East (km)	UTM North (km)	Max Conc. (µg/m^3)	SIL (µg/m^3)	Exceeds SIL?
24-Hour	1989	341.42	3,746.17	0.32	0.3	Yes	341.42	3,746.17	0.33	0.3	Yes
	1990	333.63	3,744.40	0.17	0.3	No	333.63	3,744.40	0.17	0.3	No
	1991	340.44	3,746.02	0.22	0.3	No	340.44	3,746.02	0.22	0.3	No
	1992	359.47	3,745.48	0.24	0.3	No	359.47	3,745.48	0.24	0.3	No
	1993	327.12	3,741.85	0.14	0.3	No	327.12	3,741.85	0.14	0.3	No
	MAX	341.42	3,746.17	0.32	0.3	Yes	341.42	3,746.17	0.33	0.3	Yes
Annual	1989	398.44	3,693.22	0.0074	0.2	No	398.44	3,693.22	0.0073	0.2	No
	1990	398.44	3,693.22	0.0084	0.2	No	398.44	3,693.22	0.0080	0.2	No
	1991	398.36	3,692.23	0.0089	0.2	No	398.36	3,692.23	0.0090	0.2	No
	1992	398.44	3,693.22	0.0092	0.2	No	398.44	3,693.22	0.0089	0.2	No
	1993	397.47	3,686.30	0.0086	0.2	No	398.44	3,693.22	0.0083	0.2	No
	MAX	398.44	3,693.22	0.0092	0.2	No	398.36	3,692.23	0.0090	0.2	No

TABLE 10. SO_2 CLASS I SIGNIFICANCE ANALYSIS RESULTS

Averaging Period	Year	Midnight Startup Operations UTM East (km)	UTM North (km)	Max Conc. ($\mu g/m^3$)	SIL ($\mu g/m^3$)	Exceeds SIL?	Noon Startup Operations UTM East (km)	UTM North (km)	Max Conc. ($\mu g/m^3$)	SIL ($\mu g/m^3$)	Exceeds SIL?
3-Hour	1989	398.14	3,690.24	0.08	1	No	398.14	3,690.24	0.10	1	No
	1990	359.47	3,745.48	0.08	1	No	398.44	3,693.22	0.09	1	No
	1991	358.49	3,745.68	0.07	1	No	358.49	3,745.68	0.09	1	No
	1992	397.67	3,687.28	0.07	1	No	397.67	3,687.28	0.09	1	No
	1993	397.02	3,684.35	0.06	1	No	365.23	3,743.82	0.07	1	No
	MAX	359.47	3,745.48	0.08	1	No	398.14	3,690.24	0.10	1	No
24-Hour	1989	321.03	3,738.42	0.014	0.2	No	397.25	3,685.32	0.016	0.2	No
	1990	356.53	3,746.04	0.012	0.2	No	356.53	3,746.04	0.015	0.2	No
	1991	398.36	3,692.23	0.016	0.2	No	358.49	3,745.68	0.014	0.2	No
	1992	398.14	3,690.24	0.012	0.2	No	397.67	3,687.28	0.013	0.2	No
	1993	397.02	3,684.35	0.013	0.2	No	397.47	3,686.30	0.013	0.2	No
	MAX	398.36	3,692.23	0.016	0.2	No	397.25	3,685.32	0.016	0.2	No
Annual	1989	398.44	3,693.22	0.0012	0.1	No	397.47	3,686.30	0.0013	0.1	No
	1990	398.44	3,693.22	0.0012	0.1	No	398.44	3,693.22	0.0012	0.1	No
	1991	398.44	3,693.22	0.0013	0.1	No	398.44	3,693.22	0.0013	0.1	No
	1992	398.44	3,693.22	0.0014	0.1	No	398.44	3,693.22	0.0013	0.1	No
	1993	398.44	3,693.22	0.0013	0.1	No	398.44	3,693.22	0.0014	0.1	No
	MAX	398.44	3,693.22	0.0014	0.1	No	398.44	3,693.22	0.0014	0.1	No

As shown in Tables 8 and 10, NO_2 and SO_2 are below the proposed Class I SILs, and no further modeling is required to demonstrate compliance with the air quality standards. Worst-case impacts from the two startup scenarios for these pollutants are very similar to the impacts from the Significance Analyses based on normal boiler operations as shown in Table 11.[4]

[4] Note that the comparisons shown in Table 11 are based on the original October 2009 submittal for NO_X and SO_2. For PM_{10}, the comparison is based on the March 2010 submittal that used more realistic worst-case dispersion parameters as requested by Georgia EPD.

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TABLE 11. COMPARISON OF NORMAL AND STARTUP SCENARIO MAXIMUM IMPACTS AT CLASS I RECEPTORS

Pollutant	Averaging Period	Maximum Concentations ($\mu g/m^3$) Normal Operations	Midnight Startup	Noon Startup
NO_2	Annual	0.021	0.022	0.019
PM_{10}	24-Hour	0.324	0.324	0.326
	Annual	0.0083	0.0092	0.0090
SO_2	3-Hour	0.97	0.08	0.10
	24-Hour	0.128	0.016	0.016
	Annual	0.0025	0.0014	0.0014

As shown in Table 8, the predicted concentrations of PM_{10} slightly exceed the 24-hour average Class I SIL for one receptor, which represents the Shining Rock Wilderness Area (Shining Rock). The start-up modeling presented here is limited to the Class I Significance Analysis screening for PM_{10}. A Class I CALPUFF analysis for PM_{10} will be submitted in a separate letter to Georgia EPD that evaluates the potential impacts from the more realistic normal operating scenario. Given the close similarity in impacts between the 24-hr PM_{10} impacts in normal operations and in startup, Oglethorpe intends the CALPUFF analysis to only address normal operations.

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If you have any questions about the material presented in this letter or require additional information, please do not hesitate to call me at 770-270-7166.

Sincerely,

OGLETHORPE POWER CORPORATION

Douglas J. Fulle
Vice President, Environmental Affairs

Attachment

cc: Mr. Pete Courtney (Georgia EPD)
Ms. Wende Martin (OPC)
Mr. Russell Bailey (Trinity)
File: Biomass 400.11

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Attachment – Supporting Information

CD File Index

The CD contains copies of the AERMOD files utilized in the startup modeling analyses. A summary of the CD folders is as follows.

Scenario 1 - Midnight Startup

Contains the AERMOD input (.ami), output (.lst) and plot (.plt) files from the boiler startup modeling for the scenario with startup commencing at midnight. For all of the files, the nomenclature is as follows:

ABCDEYY.xxx where:

- *A* = pollutant ID (*C* = CO, *N* = NO_X, *P* = PM_{10}, *S* = SO_2)
- *B* = type of analysis (*S* = significance)
- *C = S for startup*
- *D* = time of day for startup (*M* = midnight)
- *E* = averaging period for plot files (*A* = annual, *D* = daily/24-hour, *1* = 1-hour, *3* = 3-hour, *8* = 8-hour)
- *YY* = modeled year (1989-1993)
- *xxx* = input, output or plot file (*.ami* = input, *.lst* = output, *.plt*=plot)

Scenario 2 - Noon Startup

Contains the AERMOD input (.ami), output (.lst) and plot (.plt) files from the boiler startup modeling for the scenario with startup commencing at noon. For all of the files, the nomenclature is as follows:

ABCDEYY.xxx where:

- *A* = pollutant ID (*C* = CO, *N* = NO_X, *P* = PM_{10}, *S* = SO_2)
- *B* = type of analysis (*S* = significance)
- *C = S for startup*
- *D* = time of day for startup (*N* = noon)
- *E* = averaging period for plot files (*A* = annual, *D* = daily/24-hour, *1* = 1-hour, *3* = 3-hour, *8* = 8-hour)
- *YY* = modeled year (1989-1993)
- *xxx* = input, output or plot file (*.ami* = input, *.lst* = output, *.plt*=plot)