



**U.S. Environmental Protection Agency  
Region 2**

**FACT SHEET**

**Clean Air Act  
Prevention of Significant Deterioration of Air Quality  
Draft Permit Revisions**

**Caithness Long Island Energy Center  
Brookhaven, New York**

Date: November 30, 2022

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## I. Background

Caithness Long Island Energy Center (“CLIEC” or “facility”) is a 346 megawatt (MW) combined-cycle electric power generating facility located in the town of Brookhaven, Suffolk County, New York. CLIEC is authorized to operate under a Prevention of Significant Deterioration (“PSD”) permit issued by the US Environmental Protection Agency Region 2 office (EPA) on April 7, 2006,<sup>1</sup> as revised by EPA on August 19, 2020 (“current PSD permit” or “2020 PSD permit”) pursuant to 40 CFR 52.21. A copy of the current PSD permit is available on the EPA website at <https://www.epa.gov/caa-permitting/caithness-long-island-llc-brookhaven-ny-4>. The current PSD permit includes a combined cycle combustion turbine generator (“CT”) and the associated Heat Recovery Steam Generators (“HRSG”), an auxiliary boiler that is, currently, permitted to provide steam for the facility when the CT is not in operation or during CT startup events, a fuel gas heater, and an emergency fire pump. Both the CT and auxiliary boiler are permitted to combust natural gas as the primary fuel with ultra-low sulfur diesel (“ULSD”) as backup. The fuel gas heater and the HRSG are permitted to combust only natural gas, and the emergency fire pump is permitted to combust only ULSD. The current permit limits the sulfur content in natural gas to 0.35 grains per 100 standard cubic feet and the sulfur content in fuel oil to 0.0015% by weight. The facility was designed to operate on a continuous basis but can also operate at partial loads when it is dispatched. Partial load turbine operation is limited to between 75 and 100% of turbine load for both natural gas and distillate fuel oil firing.

When initially permitted in 2006, CLIEC was subject to PSD for the following pollutants: nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), particulate matter (PM), particulate matter with an aerodynamic diameter of less than or equal to 10 micrometers (PM<sub>10</sub>), sulfur dioxide (SO<sub>2</sub>) and sulfuric acid mist (H<sub>2</sub>SO<sub>4</sub>). Thus, CLIEC was required to employ Best Available Control Technology (“BACT”) and comply with BACT emission limits for each of the above listed PSD affected pollutants. A selective catalytic reduction (SCR) system and an oxidation catalyst were installed to control NO<sub>x</sub>, CO, and VOC emissions from the CTG and HRSG. In addition, the CTG inlet air was required to be cooled by the use of an evaporative cooler when the ambient temperature is high to improve the CTG efficiency and increase generation output. The auxiliary boiler was required to employ a low-NO<sub>x</sub> burner and flue gas recirculation to control emissions of NO<sub>x</sub>. The fuel gas heater was required to use a forced draft burner to minimize NO<sub>x</sub> emissions.

A detailed description of how each of the PSD affected pollutants is formed, and the control technology that EPA determined as BACT for each of the PSD affected pollutant at each combustion source can be found in the 2006 Fact Sheet pp. 2 to 3 on the EPA website at <https://www.epa.gov/caa-permitting/caithness-long-island-llc-brookhaven-ny-0>.

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<sup>1</sup> Following the issuance of the 2006 PSD permit, the New York State Department of Conservation (NYSDEC) transferred the requirements of the 2006 PSD permit into the title V permit issued by NYSDEC for Caithness.

## II. Summary of Proposed Revisions to the 2020 PSD Permit

### A. Description and Basis of the Proposed Revisions to 2020 PSD Permit: 2022 PSD Permit Revisions Request

On March 21, 2022, EPA received a request from CLIEC to revise the 2020 PSD permit. Additional information and clarifications regarding the revisions requested were subsequently provided by CLIEC via emails at various dates<sup>2</sup> and also during a May 9, 2022 call. CLIEC's revision request also includes an air quality analysis done by Caithness in support of the requested revisions. CLIEC requested revisions to the 2020 PSD permit are described below:<sup>3</sup>

Requested Revision 1 - The current PSD permit establishes a maximum limit of 4,800 hours during any 12-month consecutive period for the auxiliary boiler ("AB") and does not allow the AB to be operated simultaneously with the Combustion Turbine ("CT") except during periods of CT startup events (either on natural gas or on fuel oil), for a period of 102 minutes/warm startup event, and 115 minutes/cold startup event, respectively. CLIEC requested that the permit be revised to allow the AB to be operated simultaneously with the CT under the following additional three scenarios which were not anticipated by CLIEC in 2006 at the time of issuance of the initial PSD permit: (1) periodic testing of the AB following repairs and maintenance work on the AB as well as for any regulatory required testing of the AB, to ensure that the AB will be ready and fully operational by the time the CT is not in operation; (2) two (2) hours prior to the CT shutdown events (CT shutdown while on either natural gas or fuel oil); and (3) during CT shutdown events (shutdown on either natural gas or fuel oil). The facility's justification for scenarios 2 and 3 is that CLIEC must ensure that sufficient steam (generated by the AB) is available for the facility needs by the time the CT is not in operation. The facility has not requested any changes to the existing 4,800 hour limit, to any current permit emissions limits for the AB or CT, or to the duration of a shutdown which the current permit limits to 90 minutes. CLIEC conducted an air quality analysis to determine whether the emissions resulting from the simultaneous operation of the CT and AB under the 3 above-described newly added scenarios would comply with the National Ambient Air Quality Standards ("NAAQS") and PSD Class II Increments. EPA has reviewed CLIEC's analysis and determined that the requested revisions will not pose any air quality concerns under the PSD program. See "Section III. Air Quality Analysis" of this Fact Sheet for details on the modeling analysis, the maximum concentrations for each pollutant as supplied by the model(s), and how each one of those concentrations compares with the NAAQS and PSD Class II Increments.

Requested Revision 2 - CLIEC requested that the current PSD permit condition that establishes a maximum limit of 4,380 hours during any 12-month consecutive period for the Duct Burner ("DB") operation be removed and replaced with the DB's maximum heat input

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<sup>2</sup>The 2022 application and additional information are available on the EPA website at <https://www.epa.gov/caa-permitting/caa-permits-issued-epa-region-2#pendingpsd>

<sup>3</sup> CLIEC also requested that EPA remove the (1) SO<sub>2</sub> and H<sub>2</sub>SO<sub>4</sub> BACT emission limits for the CT; (2) SO<sub>2</sub> BACT emission limits for the AB; and (3) performance testing requirements for the H<sub>2</sub>SO<sub>4</sub> and SO<sub>2</sub> BACT emissions limits, from the current PSD permit. Today's proposed action does not address this request. EPA previously communicated with CLIEC about this request during a May 9, 2022 call in which EPA discussed the lack of a regulatory basis for removing the current permit's BACT emission limits.

limit of 2,163,720 million British Thermal Units (“MMBTU”) during any 12-month consecutive period. The CLIEC rationale for this revision is that compliance with a maximum heat input capacity limit, instead of an annual hourly limit for the DB, would provide the facility with the needed operational flexibility. The replacement of the hour limit with a maximum heat input limit does not impact any emission limits established in the permit.

Requested Revision 3 - CLIEC requested that EPA remove the Fuel Gas Heater from the current PSD permit, since it was already removed from service.

B. 2020 PSD Permit Conditions Edited with the Revisions Requested by CLIEC

CLIEC’s proposed revisions are acceptable and therefore EPA is proposing to alter the conditions of the 2020 PSD permit as follows. Please note that ~~strikethrough~~ denotes deletion and the language in *italics* denotes additions.

Revision 1

- a. Updates Condition VII.B.2 of the current PSD permit by adding the following language:

~~“With the exception of turbine startups, the auxiliary boiler shall not operate simultaneously with the combustion turbine~~ *The auxiliary boiler shall not operate simultaneously with the combustion turbine except during the following events: turbine startups; periodic testing of the auxiliary boiler following repairs and maintenance work on the auxiliary boiler; up to two hours prior to, and during, a combustion turbine shutdown event when the combustion turbine had been firing either natural gas or fuel oil.”*

- b. Adds the following conditions to the current PSD permit:

[Note: The NO<sub>x</sub>, CO, and PM/PM<sub>10</sub> emission limits for each CT shutdown event (which is limited to 90 minutes)<sup>4</sup>, while the AB is also in operation, which are included below at Conditions VI.A.6.m through p, were calculated as the sum of the (1) emission limits for the CT shutdown in Conditions VI.A.6. k and l of the current PSD permit; and (2) emission limits for the AB in Conditions VII.B.1, 2 and 3 of the current PSD permit. The AB emission limits in Conditions VII.B.1, 2 and 3 were converted from lb/MMBTU to lb/hr using the AB maximum design heat input rates in Conditions VI. B. 1 of the current PSD permit. Then the pounds of NO<sub>x</sub>, CO, and PM/PM<sub>10</sub> for the AB for the duration of a CT shutdown event (which is 90 minutes) were compiled based on the lb/hr emission limits<sup>5</sup> that were calculated as described above.]

Condition VI.A.6.m:

*“For each shutdown while the combustion turbine is firing fuel oil, and the auxiliary boiler is firing fuel oil, NO<sub>x</sub>, CO and PM/PM<sub>10</sub> total emissions shall not exceed 160.2*

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<sup>4</sup> Condition VI.A.6.c. of the current PSD permit defines “shutdown” for the combustion turbine and limits the duration of each shutdown to 90 minutes.

<sup>5</sup>The pounds of pollutant for 90 minutes equal the [lb/hr] plus [1/2 x lb/hr]

*lbs, 851.64 lbs, 113.63 lbs, respectively.”*

Condition VI.A.6.n:

*“For each shutdown while the combustion turbine is firing fuel oil, and the auxiliary boiler is firing natural gas, NO<sub>x</sub>, CO and PM/PM<sub>10</sub> shall not exceed 156.485 lbs, 851.587 lbs, 113.145 lbs, respectively.”*

Condition VI.A.6.o:

*“For each shutdown while the combustion turbine is firing natural gas, and the auxiliary boiler is firing fuel oil, NO<sub>x</sub>, CO, and PM/PM<sub>10</sub> shall not exceed 81.2 lbs, 512.638 lbs, 12.145 lbs, respectively.”*

Condition VI.A.6.p:

*“For each shutdown while the combustion turbine is firing natural gas, and the auxiliary boiler is firing natural gas, NO<sub>x</sub>, CO, and PM/PM<sub>10</sub> shall not exceed 77.485 lbs, 511.529 lbs, 12.145 lbs, respectively.”*

Condition VI.A.9:

*“At all times during periodic testing of the auxiliary boiler following repairs and maintenance work on the auxiliary boiler while the auxiliary boiler and combustion turbine are operated simultaneously, CLIEC shall comply with the emission rate(s) that shall be calculated by summing (1) the mass emission limits for the combustion turbine in Conditions VIII. A.1, 2, 3, 4 and 5 of this permit; and (2) the mass emission limits for the auxiliary boiler in Conditions VIII.B.1, 2, 3 and 4 of this permit.”*

Condition VI.A.10:

*“At all times during the period up to two hours prior to combustion turbine shutdown while the auxiliary boiler and combustion turbine are operated simultaneously, CLIEC shall comply with the emission rate(s) that shall be calculated by summing (1) the mass emission limits for the combustion turbine in Conditions VIII. A.1, 2, 3, 4 and 5 of this permit; and (2) the mass emission limits for the auxiliary boiler in Conditions VIII.B.1, 2, 3 and 4 of this permit.”*

## Revision 2

[Note: The annual heat input limit of 2,163,720 MMBTU/yr is based on the DB's maximum heat input capacity of 494 MMBTU/hr and 4,380 hr/yr. The maximum heat input capacity of 494 MMBTU/hr of the DB operating on natural gas at higher heating value (HHV), is established in Condition VI.A.3 of the current PSD permit. Condition X.1.e of the current PSD permit already requires the facility to use an appropriate fuel flow meter to measure and record the natural gas flow to the DB. Condition XIII.1.c of the current PSD permit requires the facility to keep daily records of the natural gas flow to the duct burner, and, also, specifies a HHV of natural gas of 22,685 Btu/lb. The following updates to the current PSD permit conditions were done to reflect the addition of the annual heat input limit for the duct burner.]

- a. Updates Condition VI.A.5 of the current PSD permit by removing the reference to 4,380 hours and adding the language establishing the limit on the DB heat input requested by CLIEC.

*“The duct burner ~~may operate a maximum of 4,380 hours during any 12-month consecutive period~~ shall be limited to a maximum heat input of 2,163,720 MMBTU for any 12-month consecutive period.”*

- b. Updates the title of Section XII “Fuel Requirements” of the current PSD permit to read “Fuel Requirements *and Heat Input Calculations*”

- c. Adds Condition XII.4 to the current PSD permit to require the facility to calculate the actual heat input of the DB based on the actual measured natural gas fired in the DB and the natural gas HHV.

*“The actual heat input of the duct burner shall be calculated every hour the duct burner is in operation, based on the actual measured natural gas fired and the natural gas HHV specified in this permit.”*

- d. Adds Condition XIII.1.k to Section XIII. “Recordkeeping Requirements” of the current PSD permit to require the facility to keep daily the records of the actual heat input of the duct burner and of the related calculations.

*“Logs shall be kept and updated daily to record the following:  
the actual daily heat input of the duct burner and the associated actual heat input calculations”*

### Revision 3

The following updates to the current PSD permit conditions were done to reflect the removal of the Fuel Gas Heater from the facility:

- a. Removes Conditions VI.C., VII.C., VIII.C., and IX.5 from the current PSD permit.
- b. Updates Condition IX.5 by removing the reference to the fuel gas heater:

*“While firing gaseous fuels, CLIEC shall conduct monthly opacity observations at the turbine and auxiliary boiler, ~~and fuel gas heater~~ emission points in accordance with 40 CFR Part 60, Method 9....”*

- c. Updates Condition X.1.e by removing the reference to the fuel gas heater:

*“ a continuous monitoring system to measure and record fuel flow to the duct burner, ~~fuel gas heater~~ and auxiliary boiler. Upon EPA or NYSDEC request, CLIEC shall conduct a performance evaluation of the monitors.”*

### III. Air Quality Analysis

CLIEC conducted an air quality modeling analysis to demonstrate that the newly added scenario of simultaneous operation of the AB and CT will not exceed any applicable NAAQS and PSD Class II Increments. The facility evaluated two operating scenarios: (1) modeling the worst-case CT operating scenario when firing natural gas with the fuel gas heater, emergency diesel fire pump, and AB (when firing natural gas), assuming simultaneous operation (see Table 1, below); and (2) modeling the worst-case CT operating scenario when firing distillate fuel oil with the emergency diesel fire pump and AB (when firing distillate fuel oil), assuming simultaneous operation (see Table 2, below). Depending upon the pollutant, the worst-case CT operating cases were used in their modeling simulations.

AERMOD modeling system with regulatory default options were used in the analysis. Meteorological data from the National Weather Service station at Brookhaven Calabro Airport (WBAN 54790) and Brookhaven National Labs (WBAN 94703) from 2010-2014 were used. The closest NYSDEC monitoring sites were used to obtain the background ambient air quality data, which is added to the modeled concentrations to compare to the NAAQS.

The maximum concentrations for all pollutants do not exceed any applicable PSD Class II increment. When combined with the representative background concentration, the maximum concentrations for all pollutants do not exceed any applicable NAAQS. The modeling results adequately demonstrate that simultaneous operation of the AB and CT will not cause any exceedances of the NAAQS or PSD Class II increments.



Table 1: Facility Scenario 1 Maximum Modeled Concentrations Compared to PSD Class II Increments and NAAQS

Pollutant	Averaging Period	Caithness Maximum Modeled Concentration ( $\mu\text{g}/\text{m}^3$ )	Existing Monitored Concentration (background) ( $\mu\text{g}/\text{m}^3$ )	Maximum Modeled + Background ( $\mu\text{g}/\text{m}^3$ )	PSD Class II Increment ( $\mu\text{g}/\text{m}^3$ )	NAAQS ( $\mu\text{g}/\text{m}^3$ )
CO	1 hour	28.7	2,185	2,213.7	-	40,000
	8 hours	9.6	1,265	1,274.6	-	10,000
NO <sub>2</sub>	1 hour	5.6	109.3	114.9	-	188
	Annual	0.73	35.0	35.73	25	100
PM <sub>2.5</sub>	24 hours	0.80	20.0	20.80	9	35
	Annual	0.10	7.7	7.8	4	12
PM <sub>10</sub>	24 hours	1.4	32.0	33.4	30	150
	Annual	0.11	-	-	17	-
SO <sub>2</sub>	1 hour	12.2	28.6	40.8	-	196
	24 hours	0.73	17.3	18.03	91	-
	Annual	0.02	3.1	3.12	20	-

Table 2: Facility Scenario 2 Maximum Modeled Concentrations Compared to PSD Class II Increments and NAAQS

Pollutant	Averaging Period	Caithness Maximum Modeled Concentration ( $\mu\text{g}/\text{m}^3$ )	Existing Monitored Concentration (background) ( $\mu\text{g}/\text{m}^3$ )	Maximum Modeled + Background ( $\mu\text{g}/\text{m}^3$ )	PSD Class II Increment ( $\mu\text{g}/\text{m}^3$ )	NAAQS ( $\mu\text{g}/\text{m}^3$ )
CO	1 hour	28.7	2,185	2,213.7	-	40,000
	8 hours	7.9	1,265	1,272.9	-	10,000
NO <sub>2</sub>	1 hour	7.2	109.3	116.5	-	188
	Annual	0.73	35.0	35.73	25	100
PM <sub>2.5</sub>	24 hours	2.91	20.0	22.91	9	35
	Annual	0.12	7.7	7.82	4	12
PM <sub>10</sub>	24 hours	5.8	32.0	37.8	30	150
	Annual	0.13	-	-	17	-
SO <sub>2</sub>	1 hour	12.2	28.6	40.8	-	196
	24 hours	4.9	17.3	22.2	91	-
	Annual	0.04	3.1	3.14	20	-

## Notes:

1. National Ambient Air Quality Standard (NAAQS) is the EPA air quality standard for public health.
2. PSD increment is the amount of pollution an area is allowed to increase. PSD increments prevent the air quality in clean areas from deteriorating to the level set by the NAAQS.

#### **IV. Administrative Procedures and Public Participation**

40 C.F.R. Part 124 establishes EPA's procedures for issuing PSD permits. Among other provisions in 40 C.F.R. Part 124, EPA follows the requirements of 40 C.F.R. § 124.8, on preparation of a fact sheet. As required in 40 C.F.R. § 124.10, EPA will provide a public announcement and offer the public the opportunity to comment on the draft revised permit conditions during a 30-day public comment period. All persons, including the applicant, who have comments on any revised condition of the draft revised permit, must raise all issues and submit all available arguments and all supporting materials for their arguments in full by the close of the 30-day public comment period. Comments should focus only on the draft PSD permit revisions as EPA is not accepting comments on conditions in the 2020 PSD permit that remain unchanged. The commence and closure dates of the public comment period will be available on the EPA website at <https://www.epa.gov/caa-permitting/draft-prevention-significant-deterioration-air-quality-permit-revisions-caithness> along with the administrative record for the draft permit. Additionally, EPA will hold a public hearing<sup>6</sup> if EPA determines that there is a significant degree of public interest in the draft permit. Following the close of the public comment period, and after the public hearing, if one is to be held, EPA will prepare a response to all substantive comments and make the responses available to the public on the EPA website at <https://www.epa.gov/caa-permitting/caa-permits-issued-epa-region-2#pendingpsd>. EPA will consider all written and oral comments submitted during the public comment period and during the public hearing, if one is held, before issuing a final permit decision on CLIEC's requested changes to the PSD permit. See the public announcement, which is available on the EPA website at <https://www.epa.gov/caa-permitting/draft-prevention-significant-deterioration-air-quality-permit-revisions-caithness> for more details.

EPA evaluated whether this action impacts an Environmental Justice (EJ) community. Since this permit revision does not result in an increase in emissions or air quality impacts, EPA concludes that there are no EJ implications associated with this action.

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<sup>6</sup> See 40 C.F.R. §§ 124.12