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Gas Treatment Plant (GTP) Best Available Control Technology (BACT) Analysis

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MODIFICATION HISTORY

Rev	Section	Modification
1	All	Updated as an AGDC document, revised to exclude information subject to equipment manufacturer non-disclosure agreements
1	All	Shift from JVA DCN USAG-PE-SRZZZ-00-000002-000 to AGDC DCN
1	Appendices	Security Classifications for Appendices A & F are Public, whereas Appendices B-E are Confidential
2	All	Updated SCR cost calculations for gas turbines based on recent vendor estimates. Heater SCR cost data is individually identified in Section 1.3 per the January 2019 RFI-563-ADEC-008 response
2	Appendices	Security Classifications for Appendix A is Public, whereas Appendices B-F are Confidential. Note – the previous Appendix F, which was a public document that included meeting minutes, has been replaced by a new Appendix F in this application.

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B: *Confidential* - BACT Cost Effectiveness (Treated Gas Compressor Drivers)
C: *Confidential* - BACT Cost Effectiveness (CO_2 Compressor Drivers)
D: *Confidential* - BACT Cost Effectiveness (Main Power Generator)
E: *Confidential* - BACT Cost Effectiveness (Utility Heaters)
F: *Confidential* - BACT Cost Effectiveness Turbine Supporting Data

ACRONYMS AND ABBREVIATIONS

%..................................percent
AAC...............................Alaska Administrative Code
ADEC.............................Alaska Environmental Conservation Agency
A/F................................air-to-fuel
AGRU ....Acid Gas Removal Unit
APP ....Alaska Pipeline Project
BACT.............................Best Available Control Technology
CCS ....Carbon Capture and Sequestration
CFR ....Code of Federal Regulation
CGF ....Central Gas Facility
CH_4................................methane
CO.................................carbon monoxide
CO_2 ....carbon dioxide
CO_2e ....carbon dioxide equivalent
DLE ....Dry Low Emissions
DLN...............................Dry Low NOx
EOR...............................enhanced oil recovery
EPA ....United States Environmental Protection Agency
°F ....degrees Fahrenheit
FOIA..............................Freedom of Information Act
GHG ....greenhouse gas
GTP ....Gas Treatment Plant
GWP ....Global Warming Potential
H_2S................................hydrogen sulfide
HFC ....hydrofluorocarbon
HHV ....Higher Heating Value
hours/yr ....hours per year
K_2CO_3 ....potassium carbonate
KNO_2.............................potassium nitrite
KNO_3.............................potassium nitrate
kW ....kilowatt
LDAR.............................Leak Detection and Repair
LHV ....Lower Heating Value
MACT............................Maximum Achievable Control Technology
MDEA ....methyl diethanol amine
MMBtu ....million British thermal units
MMBtu/hr ....million British thermal units per hour
MW ....megawatts
NOx ....nitrogen oxides (NO and NO_2)

NSCR..............................Non-selective Catalytic Reduction
NSPS ....New Source Performance Standards
O_2..................................oxygen
PBU...............................Prudhoe Bay Unit
PFC ....perfluorocarbon
PM ....particulate matter
ppmv ....parts per million by volume
Pre-FEED........................Pre-Front End Engineering Design
Project...........................Alaska LNG Project
PSD ....Prevention of Significant Deterioration
PTU...............................Point Thomson Unit
RBLC ....RACT/BACT/LAER Clearinghouse
SCR ....Selective Catalytic Reduction
SF..................................supplemental firing
SF_6 ....sulfur hexafluoride
SNCR.............................Selective Non-catalytic Reduction
SO_2................................sulfur dioxide
TEG ....Triethylene Glycol
ULNB ....Ultra-Low NOx Burners
VOC ....volatile organic compound
WHR ....waste heat recovery

1. INTRODUCTION

Alaska Gasline Development Corporation (AGDC) requests Alaska Department of Environmental Conservation (ADEC) approval to extend the Air Quality Control Construction Permit deadline of February 13, 2025 for commencing construction of the Gas Treatment Plant (GTP). As ADEC requested, AGDC is submitting this updated construction permit application to support granting of the extension. This application includes an updated Best Available Control Technology (BACT) analysis to support issuance of the construction permit. BACT is determined following the United States Environmental Protection Agency (EPA) "Top-Down" analysis approach, which identifies each control technology and then considers the technical feasibility, commercial availability, costs, and site-specific factors to ultimately make a control technology determination.

To support the Project design for the GTP, the Pre-Front End Engineering Design (Pre-FEED) and Optimization phase included a task to prepare a BACT or BACT analysis for various Project options and driver selections. This report provides the BACT analysis for the gas compressors and generators proposed for the GTP, including six treated gas compressors, six carbon dioxide (CO_2) compressors, and six main power generators. This report also includes the BACT analysis for the gas-fired utility heaters, diesel-fired internal combustion engines, and vent gases generated on site that must be disposed.[1] The analysis provides a review of the possible technologies and emission limits that could be imposed as BACT for major Project equipment and operations during normal operating conditions[2]. The information provided in this analysis will be used to support GTP facility design decisions regarding emission control technologies and permit emission limits, based on feasibility and costs. Cost data and assumptions developed for the original permit application have been updated in this submittal (See Appendix F and "Fluor GTP SCR Study Jan-2025" references in Appendix B – D cost effectiveness calculations).

The analysis focuses on the following pollutants emitted from proposed units: nitrogen oxide (NOx), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter (PM), volatile organic compounds (VOCs), and greenhouse gases (GHGs). Emission controls for each of these pollutants are evaluated and a BACT determination is made following the EPA "top-down" approach. BACT determinations based on the analysis are shown in Tables 1 through 5, below.

[1] The BACT analysis addresses the disposal of vent gas containing hydrocarbon. It does not address the Acid Gas Removal Unit byproduct process stream since the Project would inject all volumes for enhanced oil recovery, except those minimal volumes flared during start-up and upset.

[2] During the initial phase of operation and the completion of construction, there may be a period in which the gas turbines and other fuel gas combustion devices would operate on raw gas because the gas treatment equipment would not be operational.

1.1. Compression Turbines

Table 1: BACT Determination for the Treated Gas Compressors and CO_2 Compressors

Pollutant	BACT Determination for Treated Gas Compressors	BACT Determination for CO_2 Compressors
NOx	Installation of Dry Low Emissions (DLE) and inlet bleed heat to pre-heat to achieve 9 parts per million by volume (ppmv) NOx @ 15% oxygen (O_2)	Installation of Dry Low Emissions (DLE) and inlet bleed heat to pre-heat to achieve 9 parts per million by volume (ppmv) NOx @ 15% oxygen (O_2)
SO_2	Good combustion practices/clean fuels	Same as treated gas compressors
PM	Good combustion practices/clean fuels	Same as treated gas compressors
VOC	Good combustion practices/clean fuels	Same as treated gas compressors
CO	Installation of CO catalyst to achieve 10 ppmv or lower CO at 15% O_2.	Installation of CO catalyst to achieve 10 ppmv or lower CO at 15% O_2.
GHGs	Use of low-carbon fuel (i.e., natural gas) and implementation of energy efficiency measures (e.g., good combustion practice, periodic burner tunings, instrumentation and controls to optimize fuel gas combustion, etc.), and optimized use of heat recovery	Same as treated gas compressors

Relative to NOx, the BACT analysis did not find that the installation of Selective Catalytic Reduction (SCR) was cost-effective to reduce NOx emissions. The cost-effectiveness of this control option was between $22,000 and $28,000 per ton for the CO_2 and Treated Gas Compressor units, which is in excess of the ADEC-recommended upper bound cost-effectiveness threshold of $10,000 per ton.

For CO, this analysis found that the installation of a CO catalyst bed may be cost effective for both the Treated Gas Compressors and CO_2 Compressors.

Use of pipeline-quality natural gas and good combustion practices achieve stringent control of SO_2, PM and VOC.

The GHG BACT determination relies on efficiency improvement measures to reduce overall fuel use, which in turn results in lower GHG emissions.

1.2. Power Generation Turbines

Table 2: BACT Determination for the Main Power Generators

Pollutant	BACT Determination
NOx	Installation of DLE and inlet bleed heat to pre-heat to achieve 9 ppmv NOx @ 15% O_2
SO_2	Good combustion practices/clean fuels
PM	Good combustion practices/clean fuels
VOC	Good combustion practices/clean fuels
CO	Good combustion practices/clean fuels

Pollutant	BACT Determination
GHGs	Use of low-carbon fuel (i.e., natural gas) and implementation of energy efficiency measures (e.g., good combustion practice, periodic burner tunings, instrumentation, and controls to optimize fuel gas combustion, etc.)

For NOx, the BACT analysis did not find that the installation of SCR was cost-effective to reduce NOx emissions. The cost-effectiveness of this control option was approximately $66,000 per ton, which is in excess of the ADEC-recommended upper bound cost-effectiveness threshold of $10,000 per ton.

For CO, the BACT analysis did not find that installation of a catalyst was cost-effective for reducing CO emissions.

Relative to the other criteria pollutants (i.e., SO_2, PM, and VOC), the same BACT observations made for the compression turbines apply to the power generation turbines.

For GHGs, the Project has proposed a simple cycle design for power generation. Combined heat and power is not proposed as BACT because of feasibility issues (i.e., adequate fresh water supplies).

1.3. Utility Heaters

Table 3: BACT Determination for the Utility Heaters

Pollutant	BACT Determination for Building Heat Medium Heaters	BACT Determination for Buyback Gath Bath and Operation Camp Heaters
NOx	Installation of low NOx or ultra-low NOx burners to achieve 30 ppmv or lower NOx @ 3% O_2	Installation of low NOx or ultra-low NOx burners to achieve 30 ppmv or lower NOx @ 3% O_2
SO_2	Use of clean fuels	Use of clean fuels
PM	Good combustion practices/clean fuels	Good combustion practices/clean fuels
VOC	Good combustion practices/clean fuels	Good combustion practices/clean fuels
CO	Good combustion practices (see further discussion below)	Good combustion practices (see further discussion below)
GHGs	Use of low-carbon fuel (i.e., natural gas) and implementation of energy efficiency measures (e.g., good combustion practice, periodic burner tunings, instrumentation, and controls to optimize fuel gas combustion, etc.)	Use of low-carbon fuel (i.e., natural gas) and implementation of energy efficiency measures (e.g., good combustion practice, periodic burner tunings, instrumentation, and controls to optimize fuel gas combustion, etc.)

For the utility heaters (including the building heat medium, buyback gas bath, and operation camp heaters), the BACT analysis did not find that the installation of SCR was cost-effective. The cost-effectiveness was calculated to range between $26,400 to $394,940 per ton of NOx removed.

Relative to CO, the analysis determined that good combustion practice would constitute BACT for the smaller heaters. While the current federal and state BACT databases for the mid-size heaters suggest that a CO oxidation catalyst has been installed in similar sized units, no listings were found for oxidation catalyst installations in larger (>250 MMBtu/hr) heaters. As such, good combustion practices have been identified as BACT for the building heat medium heaters.

1.4. Vent Gas Disposal (Flares)

Table 4: BACT Determination for Vent Gas Disposal (Flares)

Pollutant	BACT Determination
VOC	Waste gas minimization and flare/thermal oxidizer design
GHGs	Waste gas minimization, and flare/thermal oxidizer design

The BACT analysis found that the proposed waste gas minimization techniques and efficient combustion design of the flaring devices meet current BACT. The waste gas minimization techniques minimize not only VOC and GHGs, but also combustion contaminants (e.g., NOx, CO, SO_2, and PM).

1.5. Compression Ignition Engines

Table 5: BACT Determination for the Compression Ignition Diesel Engines

Pollutant	BACT Determination
NOx	Good combustion practices/clean fuels Compliance with 40 Code of Federal Regulation (CFR) New Source Performance Standards (NSPS) Subpart IIII or 40 CFR Part 1039, as applicable
SO_2	Good combustion practices; use of ultra-low sulfur diesel
PM	Good combustion practices/clean fuels Compliance with 40 CFR NSPS Subpart IIII or 40 CFR Part 1039, as applicable
VOC	Good combustion practices/clean fuels Compliance with 40 CFR NSPS Subpart IIII or 40 CFR Part 1039, as applicable
CO	Good combustion practices/clean fuels Compliance with 40 CFR NSPS Subpart IIII or 40 CFR Part 1039, as applicable
GHGs	Good combustion practices/clean fuels

EPA has established emissions standards for internal combustion engines. Manufacturers are required to produce engines that meet the EPA Tiered Emission Standards. Meeting EPA standards constitutes current BACT for all pollutants.

2. PURPOSE AND SCOPE

Per AAC Title 18, Section 50.306 (Prevention of Significant Deterioration, or PSD), evaluation of a stationary source that requires a PSD permit prior to construction must include a control technology review, as required by the CFR Title 40, Section 52.21(j), incorporated by reference per 18 AAC 50.040(h). 40 CFR 52.21(j)(2) specifies that "[a] new major stationary source shall apply best available control technology for each regulated NSR pollutant that it would have the potential to emit in significant amounts." BACT analyses are case-by-case evaluations and include consideration of cost, technical feasibility, commercial availability, and site-specific factors. EPA requires that the "top-down" BACT analysis approach be used in these evaluations.

This report provides the BACT analysis for the following equipment proposed for the GTP:

- Treated gas compressor drivers
- CO_2 compressor drivers
- Main power generators
- Gas-fired heaters
- Internal combustion engines
- Waste gases (flares)

This analysis provides a review of the possible technologies and emission limits that could be imposed as BACT, including estimated cost of each technology. The information provided in this analysis will be used to support GTP facility design decisions regarding which emission control technologies and permit emission limits constitute BACT.

This BACT analysis addresses NOx, SO_2, CO, PM (including fine particulate matter [PM_{10}] and ultrafine particulate matter [$PM_{2.5}$]), VOCs, and GHG emissions based on the following key assumptions and boundary conditions.

- This BACT analysis is based on the current Project design and estimated equipment emissions provided by the GTP design contractor in pre-FEED engineering.
- Current vendor cost data, solicited by AGDC through a third party engineering firm, were used to the extent feasible in this analysis. Where vendor data were unavailable, data from the EPA *Air Pollution Control Cost Manual*, Sixth Edition, January 2002, were used. The basis for cost estimates is documented in this analysis.
- NOx and CO emissions control limits and expectations for performance are based on vendor quotes, as modified for Alaskan operating conditions.
- AGDC's response to ADEC's information request in December 2019, where additional factors pertinent to the use of the EPA 6^{th} edition cost-effectiveness calculations were presented, have been included in this analysis.

This BACT analysis does not address operating conditions that may exist during start-up of the GTP. Potentially during start-up, there will be a period of time when the gas turbines and other fuel gas combustion devices may operate on raw untreated gas.

3. BACT METHODOLOGY

BACT is defined in the federal PSD regulations at 40 CFR 52.21(b)(12) as:

> *…an emission limitation, including a visible emission standard, based on the maximum degree of reduction for each pollutant subject to regulation…which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification…*

This BACT analysis follows the "top-down" methodology described in the EPA New Source Review Workshop Manual.[3] The "top-down" process involves the identification of all applicable control technologies according to control effectiveness. The "top", or most stringent, control alternative is evaluated first. If the most stringent alternative is shown to be technically infeasible, economically unreasonable, or if environmental or other impacts are severe enough to preclude its use, then the next most stringent control technology is similarly evaluated. This process continues until the emissions control method under consideration is not eliminated by technical, economic, energy, environmental, or other impacts.

The five steps of a top-down BACT Analysis are described below:

- Step 1: Identify all available control technologies with practical potential for application to the specific emission unit for the regulated pollutant under evaluation.
- Step 2: Eliminate all technically infeasible control technologies.
- Step 3: Rank remaining control technologies by control effectiveness and tabulate a control hierarchy.
- Step 4: Evaluate most effective controls and document results.
- Step 5: Select BACT, which will be the most effective practical option not rejected, based on economic, environmental, energy and other impacts.

A further description of each step is provided below.

Step 1

Identify potential control technologies for the GTP based on information found on the EPA's RACT/BACT/LAER Clearinghouse (RBLC), state websites, Freedom of Information Act (FOIA) requests, recent Alaska combustion turbine projects, and vendor input.

Step 2

Evaluate the operating principles, control efficiencies, and technical feasibility of each potential control technology; technologies determined to be technically infeasible are eliminated in this step.

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[3] *DRAFT New Source Review Workshop Manual*, EPA, Office of Air Quality Planning and Standards, October 1990

Step 3

The remaining technologies that are technically feasible are ranked based on control effectiveness.

Step 4

Under Step 4, energy, environmental, and cost-effectiveness impacts are evaluated. This evaluation begins with the analysis of the most stringent control option and continues until a technology under consideration cannot be eliminated based on adverse energy, environmental, or economic impacts. The factors that are considered in these analyses are as follows:

- Energy Impacts: The energy requirements of a control technology can be examined to determine whether the use of that technology results in any significant or unusual energy penalties or benefits. Energy impacts may be in the form of additional energy required to operate the emitting unit, or additional energy required to operate the control device.
- Environmental Impacts: Installation of control devices may result in environmental impacts separate from the pollutant being controlled. Environmental impacts may include solid or hazardous waste generation, discharges of polluted water from a control device, visibility impacts, increased emissions of other criteria or non-criteria pollutants, increased water consumption, and land use impacts from waste disposal. The environmental impact analysis is made taking consideration of site-specific circumstances.
- Economic Impacts: For a technology to be considered BACT, it must be considered "cost effective." The economic or "cost-effectiveness" analysis is conducted in a manner consistent with EPA's *Air Pollution Control Cost Manual*, Sixth Edition and subsequent revisions. For this analysis, the cost data are obtained primarily from vendor supplied information and supplemented with estimates provided in the EPA's Control Cost Manual where vendor supplied information was not available.
- Cost effectiveness thresholds are not published, nor guaranteed by regulatory agencies; however, based on other BACT evaluations in Alaska, the threshold at which a NOx, SO_2, CO, PM or VOC control technology evaluated is likely to be considered cost effective is $3,000 per ton of pollutant removed or less. If the evaluated cost is greater than $10,000 per ton of pollutant removed then the technology would not likely be considered cost effective. Evaluations where the cost-effectiveness is calculated between $3,000 and $10,000 may require additional strategic evaluation and should be validated with ADEC.
- Consistent with the BACT analysis reviewed by ADEC in the original application for the GTP facility, the following benchmarks are considered reasonable measures for determining what would be cost-effective:

- $35 per ton of carbon dioxide equivalent (CO_2e), based on the annual average secondary market price for California and Quebec Cap-and-Trade GHG allowances escalated by approximately 8 percent in the year 2024[4].
- $15 - $41 per ton escalating from 2016 to 2030 based on Project estimates.

Step 5

The most stringent control that has not been eliminated in all prior steps is selected as BACT. With the control technology selection, a BACT emission target is established. The BACT target becomes a limit, which applies at all times, except during specific conditions listed in the permit (e.g., start-up and shutdown). Where a BACT emission limit cannot be achieved in operation, an alternative work practice or emissions limit must be proposed. That alternative limit must go through the same BACT analysis steps noted above.

Greenhouse Gases (GHGs)

EPA recommends use of the same "top-down" analysis approach used for criteria pollutants be used in evaluating GHGs subject to BACT[5]. The analysis that follows has been prepared consistent with this guidance.

With respect to what constitutes "GHGs," 40 CFR 52.21 (b)(49)(i) (Prevention of Significant Deterioration) defines GHGs to include the following six GHGs: CO_2, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Mass emissions of GHGs are converted into CO_2e emissions for ease of comparison. CO_2e is a quantity that equates the global warming potential (GWP) of a given mixture and amount of GHGs, to the amount of CO_2 that would have the same GWP in the atmosphere over a 100-year period. GWPs for these GHGs are provided in 40 CFR 98 (Mandatory Greenhouse Gas Reporting) Table A-1 (Global Warming Potentials).

As direct CO_2 emissions account for more than 99% of the combustion-related GHGs (measured as CO_2e) associated with the Project, and CH_4 and N_2O account for less than 1% of the combustion-related turbine GHG emissions, this analysis of BACT focuses on CO_2 as a surrogate for CO_2e.

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[4] See the California Cap and Trade Program – Summary of California-Quebec Joint Auction Settlement Prices and Results (https://ww2.arb.ca.gov/sites/default/files/2020-08/results_summary.pdf), last updated November 2024. The year 2024 was used in the analysis based on the timing of permit application re-submittal. The BACT that is employed for a project is considered at the time the permit is issued, and is not revisited during the operating life of the facility.

[5] See *PSD and Title V Permitting Guidance for Greenhouse Gases*, U.S. Environmental Protection Agency, Document No. EPA-457/B-11-001, March 2011, available at www.epa.gov/sites/production/files/2015-12/documents/ghgpermittingguidance.pdf

4. COMPRESSION TURBINES

4.1. Overview of the Compressor Drivers

Studies have been undertaken during the project to identify the gas turbine models commercially available that best meet the power, operating speed range, emissions, and physical size limitations of each turbine service. The gas turbine drivers for the GTP were selected during the Optimization Phase. The selected drivers were re-evaluated against the power requirements of three design basis operating cases to verify that the selected equipment would be properly sized to support the various operating conditions of the GTP, after taking into account the Project's criteria for de-rating, fouling, load growth and contingency. Additionally, updated vendor information on performance and emissions was obtained.

A summary of the gas turbines selected for the gas compression and CO_2 compression turbines to be operated at GTP is given in Table 6.

Table 6: BACT Determination for the Treated Gas Compressors and CO_2 Compressors

Service	Quantity Installed	Nominal Output @ ISO Conditions (MW)	Efficiency @ ISO Conditions	Heat Recovery Included
Treated Gas Compressor Drivers	6	38	40%	Yes
CO_2 Compressor Drivers	6	24	34%	Yes

Note: Nominal output based on vendor information received. Values assume lean fuel gas and new turbine (filter and pulse clean dP). Efficiency is for turbine only and does not include waste heat recovery (WHR).

A nominal 38 megawatts (MW) (ISO) gas turbine is proposed as the mechanical driver for the six (6) Treated Gas compressors and a nominal 24 MW (ISO) gas turbine is proposed for the six (6) CO_2 compressors. Two of each compressor service are located within each of the three trains. The turbines are equipped with an inlet bleed heat system that recycles a portion of the turbine compressor discharge to preheat the inlet air to the turbine when ambient temperatures are low. Both turbine types would be equipped with the latest DLE burner technology.

A WHR unit is located downstream of each mechanical drive turbine to recover heat from the turbine exhaust and to use it elsewhere in the GTP process. Supplemental firing (SF) in the turbine exhaust duct is also utilized in the design to increase the amount of heat recovered in the WHR unit to meet process needs.

The GTP facility would process residue gas from the existing Central Gas Facility (CGF) at Prudhoe Bay, and gas from the Point Thomson Unit (PTU), to produce a treated gas stream that does not require further H_2S or CO_2 removal at the Alaska LNG Liquefaction Plant. The treated gas stream is essentially clean natural gas, which would be the source of fuel for the plant when the GTP is fully functional.

This evaluation is based on the use of treated gas as fuel gas during normal plant operation. During commissioning and start-up, the GTP would use the residue gas from CGF as fuel gas, which has a lower heating value (LHV) and higher levels of CO_2 and H_2S than the treated gas used during normal operation.

4.2. NOx BACT Analysis

NOx is formed during the combustion process due to high temperature zones in the combustion burner or chamber. This BACT analysis evaluates control techniques and technologies used to mitigate NOx emissions from the proposed gas turbines.

4.2.1. Step 1: Identify All Control Technologies

The following list of potential control technologies for NOx emissions from simple cycle turbines to be addressed in a BACT analysis were identified in the Project BACT Survey [2], the APP pre-BACT Analysis [1], or the RBLC. These are technologies that either have been applied to turbines for NOx control or have been discussed in other turbine BACT analyses:

1. Dry Low-NOx (DLN) Burners
2. Water/Steam Injection
3. Selective Catalytic Reduction (SCR)
4. Selective Non-Catalytic Reduction (SNCR)
5. Non-Selective Catalytic Reduction (NSCR)
6. SCONOx™
7. XONON

These control methods may be used alone or in combination to achieve the various degrees of NOx emissions control. Each technology is summarized below.

Dry Low Emissions (DLE) and Dry Low NOx Combustors (DLN or SoLoNOx Combustors)

DLE/DLN combustors (marketed under many similar names such as SoLoNOx) utilize multistage premix combustors where the air and fuel is mixed at a lean (high oxygen) fuel-to-air ratio. The excess air in the lean mixture acts as a heat sink, which lowers peak combustion temperatures and also ensures a more homogeneous mixture, both resulting in greatly reduced NOx formation rates. The performance levels that DLE/DLN can achieve vary based on burner design and availability for specific turbines.

DLE/DLN Burners are a common BACT control for turbines, are considered feasible for the GTP turbines, and are part of the project's Base Case design.

With the DLE or DLN technology, inlet air heating may be incorporated into the design to provide consistent emission control over a range of operation conditions. This control method heats the air entering the combustion chamber above ambient temperatures. This is an effective NOx abatement technology by controlling the air/fuel mixing within the combustion chamber. As ambient temperatures go below 0 degrees Fahrenheit (°F), combustion instabilities within the combustion chamber require the air/fuel mixing to be changed which sometimes results in higher NOx generation. By providing inlet air heating to maintain an inlet air temperature to the gas turbine above 0°F, the turbine's NOx performance doesn't degrade at low ambient temperatures.

Inlet air heating is considered technically feasible for GTP turbines. The selected turbines include an inlet bleed heat system that recycles a portion of the turbine compressor discharge to preheat the inlet air to the turbine when ambient temperatures are low. Since inlet bleed heat is a part of the base design for the GTP turbines, inlet air heating is not required to lower the NOx emissions.

Water/Steam Injection

Water/steam injection as a control technology involves the introduction of water or steam into the combustion zone. The injected fluid provides a heat sink which absorbs some of the heat of reaction, causing a lower flame temperature. The lower flame temperature results in lower thermal NOx formation. Steam and water injection are capable of obtaining the same level of control. The process requires approximately 0.8 to 1.0 pound of water or steam per pound of fuel burned. The main technical consideration is the required purity of the large volumes of water or steam, which is required to protect the equipment from dissolved solids. Obtaining water or steam of sufficient purity normally requires the installation of rigorous water treatment and deionization systems.

While water or Steam injection is a common control technique in many turbine applications (particularly for turbines/services for which dry low NOx combustors are not available), the technology is not considered feasible in Alaska due primarily to the following considerations:

- Limited availability of fresh water and high cost of water treatment to obtain suitable quality and quantity in the Arctic;
- Freezing potential due to extreme cold ambient temperatures; and
- Increased humidity of exhaust gas has the potential to lead to hazardous ice fog conditions.

Selective Catalytic Reduction (SCR)

SCR is a post-combustion gas treatment technique for reduction of NO and NO_2 in the turbine exhaust stream to molecular nitrogen, water, and oxygen. In the SCR process, ammonia (NH3, anhydrous, aqueous or urea) is used as the reducing agent, and is injected into the flue gas upstream of a catalyst bed. The function of the catalyst is to lower the activation energy of the NOx decomposition reaction. NOx and NH3 combine at the catalyst surface forming an ammonium salt intermediate, which subsequently decomposes to produce elemental nitrogen and water. Depending on the overall ammonia-to-NOx ratio, removal efficiencies can be as high as 80 to 90%.

To evaluate the technical feasibility of an SCR system on the North Slope, installations and operating experience of SCR systems at other locations in Alaska was sought [3]. Only a few SCR units in Alaska have been identified to date.

- Teck Cominco Alaska, Inc. was required to install SCR on the most recent engine addition at the Red Dog Mine located 90 miles north of Kotzebue, Alaska. This unit utilizes Urea with an open catalyst cell structure to improve the NOx conversion to ~90% reduction. [4].
- An SCR was required by EPA as part of a settlement agreement for Healy Unit 2, which is located in Healy, AK, just south of Fairbanks at the edge of Denali National Park. The installation was completed in 2018 however due to numerous reliability issues at the plant Golden Valley Electric Association made the decision in 2024 to shut down Healy Unit 2 once an alternative source of reliable, low cost energy can be identified [5].
- The Southcentral Power Project at the Anchorage Airport (Chugach Electric Association) includes SCR on each of the LM6000PF turbines. These SCR units utilize 29% aqueous ammonia and only reduce NOx emissions by approximately 25% (11 parts per million [ppm] instead of 15 ppm) [6].

The SCR units expected to be installed in Alaska, as described above, include design elements that would be challenging to incorporate into a North Slope installation. The SCR unit at the Red Dog Mine uses urea, which is easier to transport but requires more on-site equipment, including a hydrolyser, solid material handling equipment, and extensive heat tracing. To hydrolyze the urea requires more treated water on the North Slope, which is already a limited utility, and more power for the electric tracing. Utility consumption and equipment cost for a urea system is high compared to other ammonia solutions, rendering utilization of urea uncompetitive except for small capacity units [4].

Aqueous ammonia is commercially available in 19 wt.% and 29 wt.% solutions. The advantage of aqueous ammonia is that it is safer to store and use than anhydrous ammonia. However, it requires larger storage volumes, greater truck traffic, and a more complicated delivery system. Of the two varieties of aqueous ammonia, 29 wt.% has greater regulatory reporting requirements than 19 wt.%. Therefore, of the two aqueous ammonia solutions, 19 wt.% aqueous ammonia is deemed to be the safer alternative for the North Slope.

One other disadvantage of 19 wt.% aqueous ammonia is it has a freeze point near -30°F [9]. Consequently, utilization of 19 wt.% aqueous ammonia would require extensive heat tracing to ensure operation is maintained. There is no documentation to confirm that a complicated, heat traced 19 wt.% aqueous ammonia injection unit could be constructed, maintained, and provide reliable support for a North Slope application.

The other technical concern regarding SCR on the North Slope is NOx reduction performance. The installed SCR units in Alaska only demonstrate 25-90% NOx reduction. While installations of ultra-low NOx SCR have been shown to reduce NOx to approximately 4 ppm with stringent control, these installations do not involve the complications associated with the North Slope environment [9]. Furthermore, there have been known issues with the use of SCR in variable load applications [10] and mechanical drive applications. It is anticipated that it would be extremely difficult to maintain the uniform ammonia injection required over the wide range of ambient temperatures and load ranges of the GTP machines.

Despite the technical concerns noted, SCR is considered a technically feasible control option for the GTP turbines for the purposes of this analysis.

Selective Non-catalytic Reduction (SNCR)

SNCR involves the non-catalytic decomposition of NOx in the flue gas to nitrogen and water using reducing agents, such as urea or ammonia. The process utilizes a gas phase homogeneous reaction between NOx and the reducing agent within a specific temperature window. The reducing agent must be injected into the flue gas at a location in the unit that provides the optimum reaction temperature and residence time. The ammonia process (e.g., trade name - Thermal DeNOx) requires a reaction temperature window of 1,600°F to 2,200°F. In the urea process (e.g., trade name - NOXOUT), the optimum temperature ranges between 1,600°F and 2,100°F.

SNCR is not considered technically feasible because turbine exhausts operate at too low a temperature for SNCR.

Non-selective Catalytic Reduction (NSCR)

NSCR technology is designed to simultaneously reduce NOx and oxidize CO and hydrocarbons (HCs) in the combustion gas to nitrogen, CO_2, and water. The catalyst, usually a noble metal, causes the reducing gases in the exhaust stream (hydrogen [H_2], CH_4, and CO) to reduce both NO and NO_2 to nitrogen at a temperature between 800°F and 1,200°F. NSCR requires a low excess oxygen concentration in the exhaust gas stream to be effective because the oxygen must be depleted before the reduction chemistry can proceed. NSCR is only effective with rich-burn gas-fired units that operate at all times with an air-to-fuel (A/F) ratio controller at or close to stoichiometric conditions.

NSCR is not considered technically feasible because gas turbine exhausts operate at too high an excess oxygen level in the exhaust stream.

SCONOX™

The SCONOX™ technology was originally developed by Goal Line Environmental Technologies, Inc. to treat exhaust gas of natural gas and diesel fired turbines. Now offered by EmeraChem, the technology is marketed under the name EMx. The EMx catalytic absorption system uses a potassium carbonate coated catalyst to reduce nitrogen oxide emissions. The catalyst oxidizes CO to CO_2, and NO to NO_2 and potassium nitrates (KNO_3). The catalyst is regenerated by passing dilute hydrogen gas over the catalyst bed, which converts the potassium nitrite (KNO_2) and KNO_3 to potassium carbonate (K_2CO_3), water, and elemental nitrogen. The catalyst is renewed and available for further absorption while the water and nitrogen are exhausted. To maintain continuous operation during catalyst regeneration, the system is furnished in arrays of five module catalyst sections. During operation, four of the five modules are online and treating flue gas, while one module is isolated from the flue gas for regeneration. NOx reduction in the system occurs in an operating temperature range of 300°F to 700°F, and therefore, must be installed in the appropriate temperature section of the WHR unit [12]. Additionally, the EMx catalyst must be recoated, or “washed” every 6 months to 1 year, depending on the sulfur content of the fuel. The “washing” consists of removing the catalyst modules from the unit and placing each module in a potassium carbonate reagent tank, which is the active ingredient of the catalyst [12].

The EMx catalyst is subject to reduced performance and deactivation due to exposure to sulfur oxides, requiring an additional catalytic oxidation/absorption system (SMx) upstream of the EMx catalyst. During commissioning, start-up and early years of operation, an SMx system may be required upstream of the EMx catalyst due to the sulfur content of the initial fuel gas (CGF residue gas). The SMx catalyst is regenerated in the same manner as the EMx catalyst [12].

Commercial experience with EMx is limited, with a majority of the units operating on units of 15 MW or less [13]. No known installations exist in low ambient temperature settings. At least one installation of EMx has reported trouble meeting permit limits [13].

EMx is not considered feasible for the GTP because it has limited commercial experience and has not been demonstrated in low ambient temperature settings. Additionally, dampers needed to re-route air streams to regenerate the catalyst raise feasibility concerns regarding reliable mechanical operation of the dampers, effect on the WHR unit, which is essential to the Process Heat Medium system, and impacts to the module sizing.

It should be noted that an analysis of the EMx demonstrated cost effectiveness comparable to SCR [13]. Additionally, projects that have been given the opportunity to install either EMx or SCR have chosen SCR instead [13].

XONON™

XONON™ is a catalytic technology developed by Catalytica Energy Systems, Inc. and is now owned by Kawasaki. XONON™ uses partial combustion of fuel in the catalyst module followed by complete combustion downstream of the catalyst in the burnout zone. Partial combustion within the catalyst produces no NOx. Homogeneous combustion downstream of the catalyst usually produces little NOx as combustion occurs at a uniformly low temperature. A small amount of fuel is combusted in a pre-burner which results in a small amount of NOx emissions.

XONON™ was not identified as BACT in the RBLC and is considered technically infeasible because it is not yet commercially available. This catalyst technology is currently being tested by turbine manufacturers.

4.2.2. Step 2: Eliminate Technically Infeasible Options

Based on the discussion under Step 1, the following technologies were determined to be technically infeasible, as summarized in Table 7.

Table 7: Control Technology Options Determined to be Technically Infeasible

Technology Alternative	Basis
Water/Steam Injection	The base model turbine is equipped with DLE combustors. Water/steam injection is not used on burners equipped with DLE.
SNCR	The exhaust temperature of the combustion turbine is less than the optimum temperature range (1,500°F to 1,900°F) for SNCR.
NSCR	The oxygen concentration of the combustion turbine is approximately 15% O_2 which is much higher than the optimum oxygen concentration range for NSCR.

Technology Alternative	Basis
XONON™	There are no documented installations of this type of control on large combustion turbines.

4.2.3. Step 3: Rank Remaining Control Technologies by Control Effectiveness

The emission control technologies not eliminated by practical or operational limitations are listed in Table 8. These technologies are ranked by control efficiency.

Table 8: Control Technology Options Determined to be Technically Feasible

Rank	Control Technology	Control Efficiency (%) or Emissions Target (ppmv)
1	SCR	25% to 90% (as low as 2 ppmv @ 15% O_2)
2	DLE Burner with inlet air pre-heat	9 ppmv @ 15% O_2

Since the DLE combustor and inlet bleed heat are a part of the GTP turbine base design, only the SCR technology was further evaluated for economic feasibility under Step 4.

For reference as the baseline, Table 9 provides the NOx performance for each machine and supplemental firing for the Base Case as described in Section 4.1 before the application of further emission control.

Table 9: Proposed Baseline NOx Performance by Turbine

Service	ISO Rating	Baseline NOx Performance (machine only)	Baseline NOx Performance (machine + Supp. Fire)
Treated Gas Compression	38 MW	9 ppmvd at 15% O_2	11 ppmvd at 15% O_2
CO_2 Compression	24 MW	9 ppmvd at 15% O_2	11 ppmvd at 15% O_2

Note: (1) The mechanical drivers + SF NOx will vary slightly based on turbine load and SF requirements for process heat; (2) ISO Rating does not reflect derates.

4.2.4. Step 4: Evaluate Most Effective Controls and Document Results

This section summarizes the energy, environmental, and economic impacts of the control technologies noted above. The cost-effectiveness calculations use a “NOx emission base case” of approximately 11 ppmv and emission control endpoints of 2 ppmv (DLE plus SCR).

4.2.4.1. Energy Impact Analysis

No unusual energy impacts were identified for the technically feasible NOx controls evaluated in this BACT analysis.

4.2.4.2. Environmental Impact Analysis

For this analysis, operation of SCR would result in some “slip” of ammonia releases to the environment as well as disposal of spent catalyst. Neither ammonia slip nor waste disposal considerations are expected to preclude use of SCR as a potential control device for this BACT analysis.

4.2.4.3. Economic Analysis

Economic analysis of costs to install NOx control is based on the following key factors:

- Size of the turbine
- Baseline emissions levels
- Controlled emissions levels, and
- Emission control installation and operating costs.

The cost-effectiveness of DLE and SCR is summarized in Table 10 and Table 11. As shown in these tables, DLE plus SCR is not cost-effective, as it exceeds the $10,000 per ton guideline.

The baseline and controlled NOx emissions for each control alternative proposed are as provided by the GTP design team along with updated engineering input obtained in 2025. The SCR capital and installation cost estimates are based on vendor quotes as provided by the GTP design team during the optimization phase as well as earlier phases of the project [3] and updated information obtained in 2025. Annual operating costs were also based on predicted turbine catalyst replacement costs, ammonia reagent costs, power costs, and other factors. The total annual cost for each class of turbine represents the sum of the annual operating costs plus the “annualized” total capital investment. Capital costs were annualized assuming 7% interest over 10 years. Further details of these costs are shown in Appendices B and C.

Table 10: NOx Economic Analysis – Treated Gas Compressors

Estimated NOx Emissions from Alternative Control Technologies	
Control Option	Control Technology Alternatives
	DLE and SCR
Baseline emissions ppmvd@15%O_2	9
Baseline emissions (tpy)	160.10
Controlled emissions ppmvd@15%O_2	2
Controlled emissions (tpy)	22.55
NOx emission reduction (tpy)	137.55
Total Annualized Operating Cost	$3,113,446
Cost of NOx removal ($/ton)	$22,635

Table 11: NOx Economic Analysis – CO_2 Gas Compressors

Estimated NOx Emissions from Alternative Control Technologies	
Control Option	Control Technology Alternatives
	DLE and SCR
Baseline emissions ppmvd@15%O_2	9
Baseline emissions (tpy)	111.92
Controlled emissions ppmvd@15%O_2	2
Controlled emissions (tpy)	16.12
NOx emission reduction (tpy)	95.80
Total Annualized Operating Cost	$2,761,347
Cost of NOx removal ($/ton)	$28,824

4.2.5. Step 5: Select BACT

Since SCR is not cost-effective, the next highest or "top" control technology is the use of the best available DLE or equivalent combustors for each turbine, and the use of inlet air pre-heat. Both DLE and inlet bleed heat to pre-heat the air are included in the GTP gas turbine design.

It should be noted that this BACT analysis is based on a number of assumptions. The assumptions and conclusions may be updated as the GTP design progresses and more detailed emissions data and cost estimates become available.

4.3. CO BACT Analysis

Carbon monoxide is formed during the combustion process as a result of incomplete fuel combustion. Factors contributing to incomplete fuel combustion include low air temperatures, insufficient combustion zone turbulence and residence times, inadequate amounts of excess air, as well as competing combustion conditions employed to mitigate NOx formation. This BACT analysis evaluates control techniques and technologies to mitigate CO emissions.

4.3.1. Step 1: Identify All Control Technologies

The following list of potential control technologies for CO emissions from simple cycle turbines to be addressed in a BACT analysis were identified in the Project's BACT Survey [2] and/or the APP BACT Analysis [1]. These are technologies that either have been applied to turbines for CO control or have been discussed in other turbine BACT analyses:

- Good Combustion Practices/Clean Fuel
- Catalytic Oxidation
- SCONOx™
- NSCR

These control methods may be used alone or in combination to achieve the various degrees of CO emissions control. Each technology is summarized below.

Good Combustion Practices/Clean Fuel

The rate of CO emissions is dependent on fuel choice and good combustion practices including proper mixing of fuel and combustion air as well as adequate residence time at temperatures to complete the oxidation process. The proposed base models are designed to combust natural gas and optimize CO emissions through use of natural gas and good combustion practices.

Inlet air heating is considered technically feasible for GTP turbines. The selected turbines for the compressor drivers and power generation include an inlet bleed heat system that recycles a portion of the turbine compressor discharge to preheat the inlet air to the turbine when ambient temperatures are low.

CO Oxidation Catalyst

Catalytic oxidation is a flue gas control that oxidizes CO to CO_2 in the presence of a noble metal catalyst; no reaction reagent is necessary. Catalytic oxidizers can provide oxidation efficiencies of 80 percent or greater at temperatures between 750°F and 1,000°F; the efficiency of the oxidation temperature quickly deteriorates as the temperature decreases. The temperature of the turbine is expected to exhaust between 700°F and 1,000°F (after quenching), remaining within the temperature range for CO oxidation catalysts.

SCONOx™

As discussed in the NOx BACT analysis, above, SCONOx™ reduces CO emissions by oxidizing the CO to CO_2. This technology combines catalytic conversion of CO with an absorption and regeneration process without using ammonia reagent. SCONOx™ catalyst must operate in a temperature range of 300°F to 700°F and therefore, turbine exhaust temperature must be reduced through the installation of a cooling system prior to entry to the SCONOx™ system. Notably, demonstrated applications for this technology are currently limited to combined cycle combustion turbine units rated less than 40 MW.

Non-Selective Catalytic Reduction (NSCR)

As discussed in the NOx BACT analysis, above, NSCR uses a catalyst reaction to reduce CO to CO_2. The catalyst is usually a noble metal. The operating temperature for NSCR system ranges from about 700°F to 1500°F, depending on the catalyst. NSCR requires a low excess oxygen concentration in the exhaust gas stream (typically less than 1%) to be effective, as the oxygen must be depleted before the reduction chemistry can proceed. As such, NSCR is only effective with rich-burn gas-fired units that operate at all times with an air to fuel ratio controller at or close to stoichiometric conditions.

4.3.2. Step 2: Eliminate Technically Infeasible Technologies

Based on the discussion under Step 1, the following technologies were determined to be technically infeasible as summarized in Table 12, below:

Table 12: Control Technology Options Determined to be Technically Infeasible

Technology Alternative	Basis
SCONOx™	There are no documented installations of this type of control on large combustion turbines.
NSCR	The oxygen concentration of the combustion turbine is approximately 15% O_2, which is much higher than the optimum oxygen concentration range for NSCR.

SCONOx™

SCONOx™ (rebranded as EMx) technology has not been widely adopted. Issues that may impact application of the technology include relatively high capital cost, a large reactor size, increased system complexity, high utilities cost and demand (steam, natural gas, compressed air and electricity are required), and a gradual decrease in effectiveness over time, requiring a 1 to 2 day renewal of catalyst.

Commercial experience with this technology is limited, with a majority of the units operating on units of 15 MW or less. No known installations exist in low ambient temperature settings similar to Alaska. At least one installation has reported trouble meeting permit limits. The use of SCONOx™ technology is not considered feasible for the GTP project because it has limited commercial experience and has not been demonstrated in low ambient temperature settings.

Non-Selective Catalytic Reduction (NSCR)

NSCR requires a low excess oxygen concentration in the exhaust gas stream (typically below 1%) to be effective, as the oxygen must be depleted before the reduction chemistry can proceed. As such, NSCR is only effective with rich-burn gas-fired units that operate at all times with an A/F ratio controller at or close to stoichiometric conditions. As gas turbines typically operate with an excess oxygen concentration of approximately 15%, it is outside of the acceptable operating range for NSCR and is not considered technically feasible for this analysis.

4.3.3. Step 3: Rank Remaining Control Technologies by Control Effectiveness

The emission control technologies not eliminated by practical or operational limitations are listed in Table 13, below. These technologies are ranked by control efficiency:

Table 13: Remaining Control Options and Control Effectiveness

Rank	Control Technology	Control Efficiency (%) or Emissions Target (ppmv)
1	CO catalyst	As low as 5 ppmv at 15% O_2
2	Good combustion practices/clean fuels inlet air preheating	50 ppmv or lower at 15% O_2

For reference as the baseline, Table 14 provides the CO performance for each machine and supplemental firing for the Base Case as described above before the application of further emission control.

Table 14: Proposed Baseline CO Performance by Turbine

Service	ISO Rating	Baseline CO Performance (machine only)	Baseline CO Performance (machine + Supp. Fire)
Treated Gas Compression	38 MW	25 ppmvd	30 ppmvd
CO2 Compression	24 MW	25 ppmvd	30 ppmvd

4.3.4. Step 4: Evaluate Most Effective Control and Document Results

This section summarizes the energy, environmental, and economic impacts of the control technologies noted above.

The BACT Survey [2] identifies oxidation catalyst performance in the range of 5 to 6 ppmvd outlet CO concentration. This analysis assumes performance achieving 5 ppmvd (at 15% excess O_2) at GTP.

4.3.4.1. Energy Impact Analysis

No unusual energy impacts were identified for the technically feasible CO controls evaluated in this BACT analysis.

4.3.4.2. Environmental Impact Analysis

For this analysis, implementation of good combustion practices/clean fuels is not expected to cause an environmental impact. Operation of a CO catalyst will result in the disposal of spent catalyst; however, waste disposal considerations are not expected to preclude use of a CO catalyst as a potential control option for this BACT analysis.

4.3.4.3. Economic Impact Analysis

Catalytic Oxidation

An evaluation of the economic feasibility of oxidation catalyst is discussed in the following paragraphs and further details of the cost estimates are presented in Appendices B and C.

The emissions reduction potential for using Oxidation Catalyst on each of the turbines is shown in Table 15. The baseline and controlled CO emissions for the proposed control system are as provided by the GTP design team. All emissions in these tables represent operation of each turbine a full 8,760 hours per year (hours/yr).

Table 15: CO Economic Analysis – Mechanical Drive Turbines

Estimated CO Emissions from Alternative Control Technologies		
Control Option	Control Technology Alternatives	
	Treated Gas Compressors	CO_2 Compressors
Baseline emissions ppmvd@15%O_2	25	25
Baseline emissions (tpy)	143.02	201.91
Controlled emissions ppmvd@15%O_2	5	5
Controlled emissions (tpy)	24.55	34.35
CO emission reduction (tpy)	118.47	167.56
Total Annualized Operating Cost	$1,146,884	$1,210,237
Cost of CO removal ($/ton)	$9,681	$7,223

Based on the estimated cost-effectiveness shown in Table 15, installation of CO catalyst controls for the CO_2 compressors and the treated gas compressors are just below $10,000 per ton ADEC benchmark.

It should also be noted that in addition to controlling CO, the use of oxidation catalyst would have the small additional benefit of providing slightly lowering VOC emissions. However, VOC emissions from natural gas combustion are already so low that the small incidental VOC emissions reduction is inconsequential to the CO BACT analysis.

Good Combustion Practice/Inlet Air Heating

The selected gas turbines at GTP already incorporate inlet air preheating. No further evaluation of cost is necessary for this option.

4.3.5. Step 5: Select BACT

Good combustion practices/clean fuels (Inlet air preheating), as well as operation of a catalytic oxidation system have been chosen to satisfy BACT for reduction of CO emissions for the Treated Gas compressors and the CO_2 Compressors.

4.4. SO_2 BACT Analysis

SO_2 emissions are formed as a result of the combusting sulfur containing fuels. This BACT analysis evaluates control techniques and technologies used to mitigate SO_2 emissions.

4.4.1. Step 1: Identify All Control Technologies

Potential control technologies for this Project were based on information found on the EPA's RBLC, state websites, FOIA requests, recent Alaska combustion turbine projects, and vendor input. This review focused on simple cycle natural gas-fired combustion turbines greater than 25 MW from year 2015 to the present. A summary of the data collected by this review is included in Appendix A.

The only control technology identified as a potential SO_2 control technology for gas turbines was the use of clean fuels. The GTP turbines are designed to combust natural gas, which is considered a low sulfur content clean fuel.

4.4.2. Step 2: Eliminate Technically Infeasible Options

Use of clean fuels is a common BACT control for gas turbines and is considered a technically feasible control option for the GTP turbines for the purposes of this analysis.

4.4.3. Step 3: Rank Remaining Control Technologies by Control Effectiveness

Use of clean fuels is a common BACT control for gas turbines and is considered a technically feasible control option for the GTP turbines for the purposes of this analysis. As this is the only control option considered, ranking by emissions control effectiveness is not necessary.

4.4.4. Step 4: Evaluate Most Effective Controls and Document Results

As use of clean fuels would be implemented for this project, economic analysis is not required.

4.4.5. Step 5: Select BACT

Use of clean fuels has been chosen to satisfy BACT for reduction of SO_2 emissions. This BACT analysis concludes, similar to other comparable projects evaluated, that use of clean fuels meets BACT for a gas turbine of this type and application (see Appendix A for a list of other BACT determinations reviewed).

4.5. PM and VOC BACT Analysis

PM and VOC are emitted from the combustion process as a result of dirty fuels and/or incomplete fuel combustion. Factors contributing to incomplete fuel combustion include low air temperatures, insufficient combustion zone turbulence and residence times, inadequate amounts of excess air, as well as competing combustion conditions employed to mitigate NOx formation. This BACT analysis evaluates control techniques and technologies used to mitigate PM and VOC emissions.

4.5.1. Step 1: Identify All Control Technologies

Potential control technologies for this Project were based on information found on the EPA's RBLC, state websites, FOIA requests, recent Alaska combustion turbine projects, and vendor input. This review focused on simple cycle natural gas-fired combustion turbines greater than 25 MW from year 2015 to the present. A summary of the data collected by this review is included in Appendix A.

The only control technology identified as a potential PM and VOC control technology for simple cycle gas turbines was good combustion practices/clean fuels. The rate of PM and VOC emissions is dependent on fuel choice and good combustion practices including: proper mixing of fuel and combustion air, as well as adequate residence time at temperatures to complete the oxidation process. The GTP turbines are designed to combust natural gas and minimize PM and VOC emissions through use of natural gas and good combustion practices.

4.5.2. Step 2: Eliminate Technically Infeasible Options

Good combustion practices/clean fuel is a common BACT control for gas turbines and is considered a technically feasible control option for the GTP turbines for the purposes of this analysis.

4.5.3. Step 3: Rank Remaining Control Technologies by Control Effectiveness

Good combustion practices/clean fuel is a common BACT control for gas turbines and is considered a technically feasible control option for the GTP turbines for the purposes of this analysis. As this is the only control option considered, ranking by emissions control effectiveness is not necessary.

4.5.4. Step 4: Evaluate Most Effective Controls and Document Results

As good combustion practices/clean fuel would be implemented for this Project, economic analysis is not required.

4.5.5. Step 5: Select BACT

Good combustion practices/clean fuels have been chosen to satisfy BACT for reduction of PM and VOC emissions. This BACT analysis concludes, similar to other comparable projects evaluated, that good combustion practices/clean fuel meets BACT for a gas turbine of this type and application (see Appendix A for a list of other BACT determinations reviewed).

4.6. Special Considerations

This BACT analysis assumes the use of pipeline quality gas in the GTP turbines. Pipeline quality natural gas has a low sulfur content, which reduces emissions of SO_2 and PM from the combustion of fuel. The treated gas product specifications are expected to have a maximum limit of 4 ppmv H_2S and total sulfur of 16 ppmv (as H_2S). The combustion of pipeline quality gas is dependent on the completion of the three natural gas treatment trains at the GTP, and the connection to the Prudhoe Bay Unit (PBU) and Point Thomson Unit (PTU) Gas Transmission Lines from the PBU and PTU gas production facilities.

It is anticipated that the GTP turbines would be online prior to the completion of GTP natural gas treatment trains. During this initial phase, the available natural gas would be untreated for SO_2; therefore, emissions of SO_2 would be temporarily elevated. Typical determinations define BACT for the combustion units as the use of pipeline quality/sweet gas; the availability of sweet gas depends on having a gas treatment facility that can provide the requisite fuel. As there are no other facilities that can provide sweet gas, the gas turbines must rely on the available sour gas until the GTP treatment facilities are completed.

4.7. GHG BACT Analysis

EPA recommends that the same "top-down" analysis approach used for criteria pollutants should be used in evaluating GHGs subject to BACT[6]. The analysis that follows has been prepared, consistent with this guidance.

With respect to what constitutes "GHGs," 40 CFR 52.21 (b)(49)(i) (Prevention of Significant Deterioration) defines GHGs to include the following six GHGs: CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6. Mass emissions of GHGs are converted into CO_2e emissions for ease of comparison. CO_2e is a quantity that equates the GWP of a given mixture and amount of GHGs, to the amount of CO_2 that would have the same GWP in the atmosphere over a 100-year period. GWPs for these GHGs are provided in 40 CFR 98 (Mandatory Greenhouse Gas Reporting) Table A-1 (Global Warming Potentials).

As direct CO_2 emissions account for more than 99% of the combustion-related GHGs (measured as CO_2e) associated with gas turbines, and CH_4 and N_2O account for less than 1% of the combustion-related turbine GHG emissions, this analysis of BACT focuses on CO_2 as a surrogate for CO_2e.

4.7.1. Step 1: Identify All Control Technologies

The following list of potential control technologies for simple cycle turbines to be addressed in a BACT analysis were identified in the Project's BACT Survey [2] and/or the APP BACT Analysis [1]. These are technologies that either have been applied to turbines for CO_2 control or have been discussed in other turbine BACT analyses.

Control technologies identified for GHG control of simple cycle gas turbines include the following:

1. Use of low-carbon fuel
2. Electrically-driven compressors
3. WHR
4. Design and operational energy efficiency

[6] See *PSD and Title V Permitting Guidance for Greenhouse Gases*, U.S. Environmental Protection Agency, Document No. EPA-457/B-11-001, March 2011, available at www.epa.gov/sites/production/files/2015-12/documents/ghgpermittingguidance.pdf

These control methods may be used alone or in combination to achieve the various degrees of GHG emissions control. Each of the control methods are described below.

Notably, another emission control technique, which is identified in the EPA GHG BACT guidance, is the use of Carbon Capture and Sequestration (CCS). CCS is discussed in its own section (See Section 9.1). As shown in the BACT analysis for CCS, the technology is potentially infeasible and is not cost-effective. CCS will not be discussed further in this section of the analysis.

Use of Low-Carbon Fuel

CO_2 is a combustion product of carbon-containing fuel. The preferential use of natural gas, a low-carbon fuel, is a method of lowering CO_2 emissions versus other fuels, such as diesel. Table 16 illustrates the CO_2 emission factors for combustion of typical turbine fuels.

During normal operation, all the GTP turbines are proposed to use clean burning natural gas with efficiently designed burners and a burner management system to maximize the efficiency of fuel combustion and turbine operation, thereby minimizing CO_2 production.

Table 16: Typical CO_2 Emissions Factors

Fuel	Pounds CO_2 per MMBtu
Distillate Oil[1]	161
Natural Gas[2]	117

Notes:
[1] Source: US Energy Information Administration, http://www.eia.doe.gov/oiaf/1605/coefficients.html
[2] Source GHG MRR Rule, Subpart C, Table C-1

Electrically-Driven Compressors

The use of an energy efficient turbine reduces energy consumption and reduces GHG emissions. Accordingly, a detailed evaluation was conducted to select the most appropriate type of turbine for each specific service. Energy efficiency and GHG emissions were considered as factors in that engineering evaluation. Other options evaluated to potentially improve energy efficiency include electrically-driven compressors. Motor-driven gas compression systems use electricity as the power source for the compressor rather than a gas turbine compressor. Electrically-driven motors for compressors of this size require a large source of electrical power.

Waste Heat Recovery (WHR)

A WHR unit is a heat exchanger that recovers heat from hot streams with potential high energy content, such as hot exhaust gas from a turbine. It can be installed on turbines where there is a use for the recovered heat. The use of heat recovery does not reduce the CO_2 emissions of a turbine; however, the recovered heat satisfies other facility needs, reducing CO_2 emissions elsewhere at the facility. WHR is planned to be implemented on twelve of the GTP combustion turbines to help satisfy the significant process heat requirements at the facility. At the GTP, heat recovery units are planned for the following gas turbine exhausts:

- Six treated gas compressor gas turbines

- Six CO_2 gas compressor gas turbines

The recovered heat from each of the GTP WHR units would be used to provide the majority of the required duty of the process heat medium system. They would be designed to raise the temperature of the heat medium fluid by cooling the turbine exhaust gas below 450°F, which allows for the maximum amount of heat to be recovered while avoiding any potential water dew point concerns in the flue gas.

In addition to beneficially using the available turbine exhaust heat, additional heat would be provided to the heat recovery system by using duct burners in the exhaust of each of the 12 turbines to meet the needs of the process heat medium system. From a GHG perspective, the use of duct burners instead of installing additional fired heaters is advantageous since the duct burners are more efficient than fired heaters and can be turned on and off as needed.

The GTP's planned heat recovery system results in analogous GHG benefits compared with other forms of WHR used in other types of facilities, such as a combined cycle unit that captures the exhaust heat in the form of steam that turns a steam turbine to generate electricity. Similarly, some facilities use the Rankine Cycle to capture heat in another fluid and expand it through an electricity-generating turbine. From a GHG emissions reduction perspective, these other heat recovery schemes are similar to those proposed for the GTP in that waste heat is recovered for a useful purpose which avoids or reduces GHG emissions from other sources. In the case of the GTP facility, the most efficient use of the exhaust heat is to recover the heat into the Process Heat Medium system. Each gas treatment train and the associated turbines have been specifically designed such that the heat recovered by the turbines associated with the train directly provides the process heat needed within the specific gas treatment train.

Design and Operational Energy Efficiency

Design and operational energy efficiencies affecting emissions and efficiency include:

1. Output efficiency per heat input
2. Periodic burner tuning
3. Proper instrumentation and controls
4. Reliability

Each of these is summarized below.

- **Efficiency**: Turbine models under consideration will be evaluated for output efficiency compared to the heat input rate. More efficient models require less heat input for the equivalent amount of fuel consumed.
- **Periodic Burner Tuning**: Periodic inspections and tuning will be planned to maintain/restore high efficient and low emissions operation.
- **Instrumentation and Controls**: Control systems will be of the type to monitor and modulate fuel flow and/or combustion air, and other vital parameters to achieve optimal high efficiency low-emission performance for full-load and part-load conditions.

- **Reliability**: Turbine models under consideration will be evaluated for reliability of design for the specific operational design and conditions.

4.7.1.1. Technologies Excluded Based on a Fundamental Change to the Nature of the Source

The EPA has recognized that the list of potential control technologies in Step 1 of a BACT analysis should not redefine the nature of the source proposed by an applicant. As stated by EPA in its guidance, "BACT should generally not be applied to regulate the applicant's purpose or objective for the proposed facility."[7] Notwithstanding this guideline, permitting agencies are provided discretion in recommending minor changes or adjustments to a BACT proposal, which achieves lower overall emissions without disrupting the applicant's basic business purpose of the facility.

To evaluate whether or not a proposed control technology or strategy "fundamentally redefines the nature of the source," EPA has established a framework to evaluate control technologies during the permitting process.[8] This framework is briefly summarized below, along with its applicability to the GTP facility and the mechanical drive turbines:

1. **Evaluation of Basic Design and Purpose**: First, the basic design, purpose, and objectives should be evaluated based on the information provided as part of the permitting process. Relative to the GTP facility, the purpose or objective of the gas compression turbines is to compress the treated natural gas in stages prior to routing to the gas chilling unit and compressing the CO_2 removed from each of the treatment trains.
2. **Design Features Analysis**: Second, the proposed design is then evaluated to determine which design elements are inherent to the facility purpose and should not be changed, versus the design elements that may be changed to achieve pollutant emissions reductions without disrupting the applicant's basic business purpose for the proposed facility. With respect to the GTP facility, the process heat needs for the facility (specifically within each gas treatment train) are satisfied by the WHR on the treated gas compression and CO_2 compression turbines serving each gas train. The gas treatment trains have been designed this way to maintain their modular and independent design, and to accommodate the harsh environmental conditions of the North Slope.
3. **Exclusion of Control Technologies that Potentially Redefine the Source:** Third, a control technology can be excluded from consideration as BACT if it can be shown that application of the control option would disrupt the facility's basic/fundamental purpose or objective. Justification for excluding an option should not rely on later steps of the top-down BACT process, including:
   - Technical feasibility (Step 2)
   - Cost (Step 4)

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[7] *PSD and Title V Permitting Guidance for Greenhouse Gases* (EPA-457/B-11-001), U.S. Environmental Protection Agency, March 2011, page 26, available at http://www.epa.gov/sites/production/files/2015-12/documents/ghgpermittingguidance.pdf

[8] IBID, pgs. 26-31

- Energy impacts (Step 4)

Of the potential GHG control technologies noted above, the use of electrically-driven compressors redefine the nature of the proposed source. This technology choice has been removed from further evaluation in the BACT analysis for the following reasons:

- Electrically-driven compressors change the operability and heat balance within the gas treatment trains. Each process train has been designed to be self-sufficient balancing process needs and heat requirements. The use of electrically-driven compressors disrupts that important balance that must be maintained in the harsh environment of the North Slope.
- There is no local electrical power grid on the North Slope. Thus, all power supplied to the GTP process must be self-generated. The Project has no intent to install additional electrical generation capacity to serve electrically-driven compressors.

4.7.2. Step 2: Eliminate Technically Infeasible Options

Except for turbine selections that fundamentally redefine the source, the technologies discussed above are applicable and feasible control measures that are proposed to be used for the gas compressor and CO_2 compressor turbines at GTP facility.

4.7.3. Step 3: Rank Remaining Control Technologies by Control Effectiveness

The emission control technologies not eliminated by practical or operational limitations are listed in Table 17, below. These technologies are ranked by control efficiency.

Table 17: Remaining Control Options and Control Effectiveness

Rank	Control Technology	Control Efficiency (%)
1	Operational efficiencies/low carbon fuels	Variable
2	WHR (mechanical drive gas turbines only)	Variable

4.7.4. Step 4: Evaluate Most Effective Controls and Document Results

All of the remaining technologies proposed for the turbines are expected to be incorporated into the mechanical drive design; no analysis of cost is required for these options.

4.7.5. Step 5: Select BACT

This BACT analysis concludes that the use of the following measures for the GTP turbines achieves BACT:

- The use of natural gas fuel
- The use of energy efficient turbines
- The optimized use of heat recovery on the treated gas, and CO_2 compression turbines at GTP

4.8. Conclusions

The objective of this analysis was to examine the turbines as the drivers selected for GTP CO_2 compression and treated gas compression, respectively. The analysis considered the technology, feasibility, cost, and other site-specific factors to control of NOx, CO, PM/VOC, and GHG emissions. The BACT analysis determined the following levels of control for the GTP drivers:

- NOx: DLE and inlet air pre-heating
- CO[9]: CO catalyst controls for the Treated Gas compressors and CO_2 compressors
- SO_2: Clean fuels
- PM and VOC: Good combustion practices/clean fuels
- GHGs: Use of pipeline quality natural gas and implementation of measures to improve overall efficiency of the gas turbine operations.

Notably, the BACT determination for NOx did not incorporate the most stringent and feasible control option. The most stringent control option was eliminated in the analysis based on technical feasibility and/or cost-effectiveness.

Relative to SO_2, PM and VOC, this BACT analysis did not identify any more stringent control technologies that could impact turbine design.

5. POWER GENERATION TURBINES

5.1. Overview of Power Generation Drivers

Various studies have been undertaken during previous phases of the project to identify the gas turbine models commercially available that best meet the power, operating speed range, emissions, and physical size limitations of each turbine service. The gas turbine generators for the GTP were selected during the Optimization Phase. The selected gas turbine generators were re-evaluated against the power requirements of three design basis operating cases to verify that the selected equipment would be properly sized to support the various operating conditions of the GTP, after taking into account the Project's criteria for de-rating, fouling, load growth and contingency. Additionally, updated vendor information on performance and emissions was obtained.

Information on the gas turbines selected for power generation at GTP is given in Table 18.

Table 18: BACT Determination for the Power Generation Turbines

Service	Quantity Installed	Nominal Output @ ISO Conditions (MW)	Efficiency @ ISO Conditions	Heat Recovery Included
Main Power Generator	6	37	40%	No

Note: Nominal output based on vendor information received. Values assume lean fuel gas and new turbine (filter and pulse clean dP). Efficiency is for turbine only.

Main Power Generator Driver

Six gas turbine generators are anticipated to provide the plant load requirements throughout the design ambient temperature range (-40°F to 80°F). The turbine drivers operate with higher power output at lower ambient temperatures, which falls off as the temperature rises. At the same time, plant loads are expected to increase during warmer periods, mainly due to increased refrigeration duty. The number of operating generators required is determined by ambient temperature and is anticipated to vary depending on the time of year.

The turbines would be equipped with DLE combustors and inlet bleed heat.

In summary, the base case design of the turbine used for main power generation in this analysis is:

- Gas turbine generators with DLE combustors
- Inlet air preheat (inlet bleed heat)

5.2. NOx BACT Analysis

NOx is formed during the combustion process due to high temperature zones in the combustion burner or chamber. This BACT analysis evaluates control techniques and technologies used to mitigate NOx emissions from the proposed gas turbines.

5.2.1. Step 1: Identify All Control Technologies

The following list of potential control technologies for NOx emissions from simple cycle turbines to be addressed in a BACT analysis were identified in the Project's BACT Survey [2] and/or the APP BACT Analysis [1]. These are technologies that either have been applied to turbines for NOx control or have been discussed in other turbine BACT analyses:

1. SCR
2. SNCR
3. NSCR
4. DLE burners
5. Water/steam injection
6. SCONOx™
7. XONON

These control methods may be used alone or in combination to achieve the various degrees of NOx emissions control. A description of each of these control technologies is provided in Section 4.2.1 to this document.

5.2.2. Step 2: Eliminate Technically Infeasible Options

Based on the discussion under Step 1, the following technologies were determined to be technically infeasible, as summarized in Table 19.

Table 19: Control Technology Options Determined to be Technically Infeasible

Technology Alternative	Basis
Water/steam injection	The base model turbine is equipped with DLE combustors. Water/steam injection is not used on burners equipped with DLE.
SNCR	The exhaust temperature of the combustion turbine is less than the optimum temperature range (1,500°F to 1,900°F) for SNCR.
NSCR	The oxygen concentration of the combustion turbine is approximately 15% O_2, which is much higher than the optimum oxygen concentration range for NSCR.
SCONOx™	There are no documented installations of this type of control on large combustion turbines.
XONON™	There are no documented installations of this type of control on large combustion turbines.

5.2.3. Step 3: Rank Remaining Control Technologies by Control Effectiveness

The emission control technologies not eliminated by practical or operational limitations are listed in Table 20. These technologies are ranked by control efficiency.

Table 20: Power Generation Turbines - Remaining Control Options and Control Effectiveness

Rank	Control Technology	Control Efficiency (%) or Emissions Target (ppmv)
1	SCR	25% to 90% (as low as 2 ppmv @ 15% O_2)
2	DLE burner with inlet air pre-heat	9 ppmv @ 15%O_2

Since the DLE combustor and inlet bleed heat are a part of the GTP turbine base design, only the SCR technology is evaluated for economic feasibility.

5.2.4. Step 4: Evaluate Most Effective Controls and Document Results

This section summarizes the energy, environmental, and economic impacts of the control technologies noted above. The cost-effectiveness calculations use a "NOx emission base case" of 9 ppmv and emission control endpoints of 2 ppmv (DLE, plus SCR).

5.2.4.1. Energy Impact Analysis

No unusual energy impacts were identified for the technically feasible NOx controls evaluated in this BACT analysis.

5.2.4.2. Environmental Impact Analysis

For this analysis, operation of SCR would result in some "slip" of ammonia releases to the environment as well as disposal of spent catalyst. Neither ammonia slip nor waste disposal considerations are expected to preclude use of SCR as a potential control device for this BACT analysis.

5.2.4.3. Economic Analysis

Economic analysis of costs to install NOx control is based on the following key factors:

- Size of the turbine
- Baseline emissions levels
- Controlled emissions levels, and
- Emission control installation and operating costs.

The cost-effectiveness of DLE and SCR is summarized in Table 21; DLE plus SCR is not cost-effective, as it exceeds the $10,000 per ton guideline.

The baseline and controlled NOx emissions for each proposed control system are as provided by the GTP design team. The SCR capital and installation cost estimates are based on vendor quotes as provided by the project team during the optimization phase as well as earlier phases of the Project [3] and the updated 2025 vendor quotes. Annual operating costs were also based on predicted turbine catalyst replacement costs, ammonia reagent costs, power costs, and other factors. The total annual cost for each class of turbine represents the sum of the annual operating costs plus the "annualized" total capital investment. Capital costs were annualized assuming 7% interest over 10 years. Further details of these costs are shown in Appendices D and F.

Table 21: NOx Economic Analysis – Power Generation

Estimated NOx Emissions from Alternative Control Technologies	
Control Option	**Control Technology Alternatives**
	DLE and SCR
Baseline emissions ppmvd@15%O_2	9
Baseline emissions (tpy)	60.37
Controlled emissions ppmvd@15%O_2 **	2
Controlled emissions (tpy)	13.41
NOx emission reduction (tpy)	46.95
Total Annualized Operating Cost	$3,108,429
Cost of NOx removal ($/ton)	$66,205

Note: **Anticipated level of control. Permit limits may be set higher to accommodate fluctuations in emissions.

Based on these cost-effectiveness estimates, SCR would not be cost-effective as BACT for the power generation turbines at the GTP, especially given the fact that some of the operating costs have not been included.

5.2.5. Step 5: Select BACT

Since SCR was not cost-effective, the next highest or "top" control technology is the use of the best available DLE or equivalent combustors for the power generation turbines, and the use of inlet air pre-heat. Both DLE and inlet bleed heat to pre-heat the air are included in the GTP gas turbine design.

It should be noted that this BACT analysis is based on a number of assumptions. The assumptions and conclusions will be revisited as the GTP design progresses and more detailed emissions data and cost estimates become available.

5.3. CO BACT Analysis

Carbon monoxide is formed during the combustion process as a result of incomplete fuel combustion. Factors contributing to incomplete fuel combustion include, low air temperatures, insufficient combustion zone turbulence and residence times, inadequate amounts of excess air, as well as competing combustion conditions employed to mitigate NOx formation. This BACT analysis evaluates control techniques and technologies used to mitigate CO emissions.

5.3.1. Step 1: Identify All Control Technologies

The following list of potential control technologies for CO emissions from simple cycle turbines to be addressed in a BACT analysis were identified in the Project's BACT Survey [2] and/or the APP BACT Analysis [1]. These are technologies that either have been applied to turbines for CO control or have been discussed in other turbine BACT analyses:

- Catalytic oxidation
- Good combustion practice
- Clean fuel

- SCONOx™
- NSCR

These control methods may be used alone or in combination to achieve the various degrees of CO emissions control. A description of each of these control technologies is provided in Section 4.3.1 of this document.

5.3.2. *Step 2: Eliminate Technically Infeasible Technologies*

Based on the discussion under Step 1, the following technologies were determined to be technically infeasible as summarized in Table 22:

Table 22: Control Technology Options Determined to be Technically Infeasible

Technology Alternative	Basis
SCONOx™	There are no documented installations of this type of control on large combustion turbines.
NSCR	The oxygen concentration of the combustion turbine is approximately 15% O_2 which is much higher than the optimum oxygen concentration range for NSCR.

SCONOx™

SCONOx™ technology is still in the early stages of market introduction. Issues that may impact application of the technology include relatively high capital cost, a large reactor size, increased system complexity, high utilities cost and demand (steam, natural gas, compressed air and electricity are required), and a gradual decrease in effectiveness over time, requiring a one-to-two-day renewal of catalyst. Commercial experience with this technology is limited, with a majority of the units operating on units of 15 MW or less. No known installations exist in low ambient temperature settings similar to Alaska. At least one installation of has reported trouble meeting permit limits. While the use of SCONOx™ technology may be applicable in theory, it is not considered feasible for the LNG project because it has limited commercial experience and has not been demonstrated in low ambient temperature settings. Additionally, projects that have been given the opportunity to install either SCONOx™ or SCR have chosen SCR instead.

Non-Selective Catalytic Reduction (NSCR)

NSCR requires a low excess oxygen concentration in the exhaust gas stream (typically below 1%) to be effective as the oxygen must be depleted before the reduction chemistry can proceed. As such, NSCR is only effective with rich-burn gas-fired units that operate at all times with an A/F ratio controller at or close to stoichiometric conditions. As gas turbines typically operate with an excess oxygen concentration of approximately 15%, it is outside of the acceptable operating range for NSCR and is not considered technically feasible for this analysis.

5.3.3. *Step 3: Rank Remaining Control Technologies by Control Effectiveness*

The emission control technologies not eliminated by practical or operational limitations are listed in Table 23. These technologies are ranked by control efficiency:

Table 23: Remaining Control Options and Control Effectiveness

Rank	Control Technology	Control Efficiency (%) or Emissions Target (ppmv)
1	CO catalyst	As low as 5 ppmv at 15% O_2
2	Good combustion practices/clean fuels inlet air preheating	50 ppmv or lower at 15% O_2

The BACT Survey [2] identifies oxidation catalyst performance 10 ppmvd or lower outlet CO concentration. This analysis assumes performance achieving 5 ppmvd (at 15% excess O_2) at GTP.

5.3.4. *Step 4: Evaluate Most Effective Control and Document Results*

This section summarizes the energy, environmental, and economic impacts of the control technologies noted above.

5.3.4.1. Energy Impact Analysis

No unusual energy impacts were identified for the technically feasible CO controls evaluated in this BACT analysis.

5.3.4.2. Environmental Impact Analysis

For this analysis, implementation of good combustion practices/clean fuels is not expected to cause an environmental impact. Operation of a CO catalyst would result in the disposal of spent catalyst; however, waste disposal considerations are not expected to preclude use of a CO catalyst as a potential control device for this BACT analysis.

5.3.4.3. Economic Impact Analysis

Economic analysis of costs to install CO control is based on the following key factors:

- Capacity of the turbine
- Baseline emissions levels
- Controlled emissions levels
- Emission control installation and operating costs

The oxidation catalyst capital and installation cost estimates are based on vendor quotes, as provided by the Project team during the optimization phase as well as earlier phases of the Project and utilize the same installation factors as SCR [3]. The total annual cost represents the sum of the annual operating costs, plus the “annualized” total capital investment. Capital costs were annualized assuming 7% interest over 10 years. Further details of these costs are shown in Appendix D.

The cost-effectiveness of a CO catalyst installation on the power generation turbines is summarized in Table 24.

Table 24: Economic Analysis – CO Catalyst Power Generation

Estimated CO Emissions from Alternative Control Technologies	
Control Option	**Control Technology Alternatives**
	Power Generation
Baseline emissions ppmvd@15%O_2	25
Baseline emissions (tpy)	102.17
Controlled emissions ppmvd@15%O_2 **	5
Controlled emissions (tpy)	20.43
CO emission reduction (tpy)	81.74
Total Annualized Operating Cost	$1,155,173
Cost of CO removal ($/ton)	$14,133

The baseline and controlled CO emissions for the proposed control system are as provided by the GTP design team. All emissions in these tables represent operation of each turbine a full 8,760 hours/yr. It should also be noted that in addition to controlling CO, the use of oxidation catalyst would have the small additional benefit of providing slightly lowering VOC emissions. However, VOC emissions from natural gas combustion are already so low that the small incidental VOC emissions reduction is inconsequential to the CO BACT analysis.

The cost-effectiveness shown in Table 24 is higher than the “rule of thumb” cost-effectiveness range provided by ADEC.

5.3.5. Step 5: Select BACT

Good combustion practices/clean fuels (Inlet air preheating) are expected to be BACT for reduction of CO emissions. This BACT relies on other comparable projects evaluated (see Appendix A).

5.4. SO_2 BACT Analysis

The SO_2 BACT analysis for the power generation turbine is identical to the gas compressor and CO_2 compressor turbines; see Section 4.4, above.

5.5. PM and VOC BACT Analysis

The PM and VOC BACT analysis for the power generation turbine is identical to the gas compressor and CO_2 compressor turbines; see Section 4.5, above.

5.6. GHG BACT Analysis

CO_2, a GHG, is the main combustion product from gas turbines. Incomplete combustion will cause CH_4 to be emitted, which is also a GHG. This section describes the techniques that would be employed to reduce GHGs from the power generation turbines.

5.6.1. Step 1: Identify All Control Technologies

This analysis focused on natural gas-fired combustion turbines greater than 25 MW from year 2015 to the present. A summary of the data collected by this review is included in Appendix A.

Control technologies identified for GHG control of gas turbines include the following:

- Use of low-carbon fuel
- WHR
- Design and operational energy efficiency
- Use of electric grid power

These control methods may be used alone or in combination to achieve various degrees of GHG emissions control. These control methods are generally described in Section 4.7.1.

5.6.1.1. Technologies Excluded Based on a Fundamental Change to the Nature of the Source

As discussed in Section 4.7.1, the purpose of the BACT analysis is not to "redefine the source." Nevertheless, permitting agencies are provided discretion in recommending minor changes or adjustments to a BACT proposal, which achieves lower overall emissions without disrupting the applicant's basic business purpose of the facility. To evaluate whether or not a proposed control technology or strategy "fundamentally redefines the nature of the source," EPA has established a framework to evaluate control technologies during the permitting process.[9] This framework is discussed in Section 4.7.1.1.

Of the potential GHG control technologies noted above, use of WHR on the gas turbine generators potentially redefines the nature of the proposed source. The rationale for this determination is provided below.

Use of WHR (Combined Heat and Power or Combined Cycle)

The power generation turbines are not expected to include WHR, as it includes technical challenges and redefines the purpose of the source. The power generation turbines are remote from the processing facilities (approximately 1/3 mile away), and there is no additional demand for the recovered waste heat. The process heat needs for the facility (specifically within each gas treatment train) are satisfied by the WHR on the treated gas compression and CO_2 compression turbines serving each gas train. The gas treatment trains have been designed this way to maintain their modular and independent design, and to accommodate the harsh environmental conditions of the North Slope.

Additionally, the power generation turbines provide a secure, stable power source dedicated to the GTP. The power generation system is a critical service for the GTP because there is no power grid to rely on as a primary or alternate source of power. The operating power demand profile for the power generation

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[9] *PSD and Title V Permitting Guidance for Greenhouse Gases* (EPA-457/B-11-001), U.S. Environmental Protection Agency, March 2011, page 26, available at http://www.epa.gov/sites/production/files/2015-12/documents/ghgpermittingguidance.pdf

turbines has more load variance than the mechanical drives, making the control of a WHR system (i.e., combined heat and power) technically difficult with frequent starts and stops or load changes to units which could result in freezing or sub-cooling issues. The varying load means the power generation turbines would be considered a transitory waste heat source and cannot be relied on to provide steady heat for process operations.

One potential option for the excess heat is to generate additional power at the GTP using a combined cycle arrangement. However, this change would also complicate the operation, as there is no connection to the grid to balance the power demand or supply to/from the facility. In addition, a steam system has never been implemented on the North Slope, hence the uncertainty of performance and reliability of combined cycle in the North Slope environment would result in prohibitive, adverse risk. Furthermore, implementation of a combined cycle would result in a larger facility footprint for a larger water reservoir, cooling system to condense the steam, and water treatment system. Finally, the limited fresh water supply cannot support the additional water requirement for makeup water for the steam system.

Because of the load-following nature of these turbines, the use of heat recovery fundamentally changes the intended GTP design philosophy (i.e., independent and modularized process trains with balanced heat and power needs).

5.6.2. Step 2: Eliminate Technically Infeasible Options

The only technology eliminated at Step 2 is the use of electrical grid power. As noted in Section 4.7.1, there is no electrical grid on the North Slope capable of providing the power necessary for the GTP. Therefore, all power must be self-generated, as proposed by the Project.

5.6.3. Step 3: Rank Remaining Control Technologies by Control Effectiveness

The emission control technologies not eliminated by practical or operational limitations are listed in Table 25. These technologies are ranked by control efficiency.

Table 25: Remaining Control Options and Control Effectiveness

Rank	Control Technology	Control Efficiency (%)
1	Operational Efficiencies/Low Carbon Fuels	Variable

5.6.4. Step 4: Evaluate Most Effective Controls and Document Results

The remaining technologies proposed for the turbines would be incorporated into the design; no analysis of cost is required for these options.

5.6.5. Step 5: Select BACT

This BACT analysis concludes that the used of the following measures for the GTP power generation turbines achieves BACT:

- The use of natural gas fuel

- The use of energy efficient turbines

5.7. Conclusions

The objective of this analysis was to examine the driver selected for GTP power generation. The analysis considered the technology, feasibility, cost, and other site-specific factors to control of NOx, CO, PM/VOC, and GHG emissions. The BACT analysis determined the following levels of control for the GTP power generation drivers:

- NOx: DLE and inlet air pre-heating
- CO: Good combustion practices/clean fuels
- SO_2: Clean fuels
- PM and VOC: Good combustion practices/clean fuels
- GHGs: Use of pipeline quality natural gas and implementation of measures to improve overall efficiency of the gas turbine operations.

Notably, the BACT determination for NOx did not incorporate the most stringent and feasible control option. The most stringent control option was eliminated in the analysis based on cost-effectiveness.

The same conclusion is true for CO control. Catalyst controls were not found to be cost-effective based on vendor information.

Relative to SO_2, PM and VOC, this BACT analysis did not identify any more stringent control technologies that could impact turbine design.

6. UTILITY HEATERS

The project anticipates the installation of several heaters to supply heat to buildings and other miscellaneous users throughout the GTP site. The building heater medium heaters are sized to supply the required heat for all of the process trains' building heat requirements and all of the buildings located in the common area, which are heated via heat medium. There are 3 x 50% fired heaters with a design duty of 225 million British thermal units (MMBtu) per hour (MMBtu/hr) each.

The three (3) operations camp heaters are natural gas-fired process heaters, with a design duty of 32 MMBtu/hr each, and would be expected to operate year-round. The primary buyback gas bath heater has a design duty of 25 MMBtu/hr, and the secondary buyback gas bath heater has a design duty of 19 MMBtu/hr, each of which is expected to operate no more than 500 hours per year.

6.1. NOx BACT Analysis

NOx is formed during the combustion process due to high temperature zones in the combustion burner or chamber. This BACT analysis evaluates control techniques and technologies used to mitigate NOx emissions from the utility heaters.

6.1.1. Step 1: Identify All Control Technologies

The following list of potential control technologies for natural gas boilers/process heaters to be addressed in a BACT analysis were identified in the Project's BACT Survey [2]. These are technologies that either have been applied to process heaters for control of NOx or have been discussed in other BACT analyses:

- SCR
- SNCR
- Low NOx burners (LNB)
- Flue gas recirculation

The following subsections discuss the general operating principles of each technology and their potential technical feasibility for NOx control of the GTP utility heaters.

Selective Catalytic Reduction (SCR)

A description of SCR is given in Section 4.2.1. It is expected that operating an SCR on a utility heater would have many of the same challenges noted for the turbines, such as reliability of heat tracing to keep 19 wt. % aqueous ammonia from freezing, NOx reduction performance in a North Slope environment, and uniform ammonia injection over a range of ambient temperatures and load ranges. Despite these technical concerns, SCR is considered a technically feasible control option for the GTP utility heaters for the purposes of this analysis.

Selective Non-Catalytic Reduction (SNCR)

A description of SNCR is given in Section 4.2.1. SNCR is not considered technically feasible because the temperature of the flue gas from the radiant section of the heater is too low for SNCR.

Low NOx Burners (LNB)

LNB are designed to control the fuel and air stoichiometry to control the flame pattern and length. Controlling the fuel to air ratio and rate of mixing within the core of LNB flame envelope limits the amount of oxygen available, slowing down the overall combustion process. A slower combustion process reduces the open flame temperature at the burner and in the furnace, resulting in lower thermal NOx generation. Ultra-low NOx burners (ULNBs) achieve NOx emission levels in the single digits.

Low NOx burners are common forms of NOx control on process heaters and are considered feasible for the GTP utility heaters and are part of the Project's base design.

Flue Gas Recirculation

In flue gas recirculation, a portion of the flue gas is recirculated and mixed with the incoming combustion air upstream of the burners. The addition of flue gas to the combustion air reduces the oxygen concentration and increases the amount of gas that must be heated by combustion of the fuel, which reduces the peak flame temperature and the formation of thermal NOx.

Flue gas recirculation is considered feasible for the GTP heaters.

6.1.2. Step 2: Eliminate Technically Infeasible Options

Based on the discussion under Step 1, the following technologies were determined to be technically infeasible as summarized in Table 26.

Table 26: Control Technology Options Determined to be Technically Infeasible

Technology Alternative	Basis
SNCR	The temperature of the flue gas from the radiant section of the heater is too low for SNCR

6.1.3. Step 3: Rank Remaining Control Technologies by Control Effectiveness

The three NOx control technologies discussed in Section 6.1 that have been identified as feasible and applicable to the GTP utility heaters in order of effectiveness are:

- SCR
- LNB or ULNB
- Flue gas recirculation

LNB are part of the base case design of the building heat medium heaters. An evaluation of the economic feasibility of SCR is presented below. Flue gas recirculation is not evaluated since LNB provides better NOx reduction performance and is part of the design.

Table 27 provides the baseline NOx emissions and the emissions reduction potential for using SCR. The NOx emissions are based on information provided by the GTP design team. Emissions in this table represent operation up to 8,760 hours/yr for the building heat medium and operations camp heaters, whereas the buyback gas bath heaters are expected to operate no more than 500 hours per year. This is deemed to be conservative, as the building heat requirements in the summer would be much lower than the design duty.

Table 27: Base Case NOx Emissions for Utility Heaters

Heater Service	Rating	Baseline NOx Emission Rate	Baseline NOx Emission (tpy)	NOx Emissions with SCR (tpy)	NOx Emissions Reduction (tpy)
Building Heat Medium Heater	275 MMBtu/hr	0.035 lb/MMBtu	35.9	6.0	29.9
Operations Camp Heaters	32 MMBtu/hr	0.080 lb/MMBtu	11.2	0.85	10.32
Primary Buyback Gas Bath Heater	25 MMBtu/hr	0.080 lb/MMBtu	0.51	0.04	0.47
Secondary Buyback Gas Bath Heater	21 MMBtu/hr	0.080 lb/MMBtu	0.42	0.03	0.39

Note: Per heater, assume 100% load and no variation in emissions with ambient temperature.

6.1.4. Step 4: Evaluate Most Effective Controls and Document Results

This section summarizes the energy, environmental, and economic impacts of the control technologies noted above. The cost-effectiveness calculations use a "NOx emission base case" of 30 ppmv and emission control endpoints of 5 ppmv for the Building Heater Medium Heater. The smaller operations camp, and buyback gas bath heaters assume a baseline NOx emission rate of 0.08 lb/MMBtu (65.84 ppmv) and a control endpoint of 5 ppmv. For this analysis, the cost data are obtained primarily from vendor supplied information and supplemented with estimates provided in the EPA's Control Cost Manual where vendor supplied information was not available.

6.1.4.1. Energy Impact Analysis

No unusual energy impacts were identified for the technically feasible NOx controls evaluated in this BACT analysis.

6.1.4.2. Environmental Impact Analysis

For this analysis, operation of SCR would result in some "slip" of ammonia releases to the environment as well as disposal of spent catalyst. Neither ammonia slip nor waste disposal considerations are expected to preclude use of SCR as a potential control device for this BACT analysis.

6.1.4.3. Economic Analysis

Economic analysis of costs to install NOx control is based on the following key factors:

- Size of the utility heaters;
- Baseline emissions levels;
- Controlled emissions levels; and
- Emission control installation and operating costs.

The cost-effectiveness of SCR is summarized in Table 28. As shown in this table, SCR is not cost-effective, as it exceeds the $10,000 per ton guideline for each group of heaters.

Table 28: Economic Analysis – SCR Heaters

Estimated NOx Emissions from Alternative Control Technologies SCR				
Heaters:	**Building Heater**	**Operations Camp**	**Buyback Heater Primary**	**Buyback Heater Secondary**
Baseline emissions ppmvd@15%O_2	30	65.84	65.84	65.84
Baseline emissions (tpy)	43.82	11.17	0.51	0.42
Controlled emissions ppmvd@15%O_2	5	5	5	5
Controlled emissions (tpy)	7.30	0.85	0.04	0.03
NOx emission reduction (tpy)	36.52	10.32	0.47	0.39
Total Annualized Operating Cost	$1,184,181	$272,473	$184,829	$149,836
Cost of NOx removal ($/ton)	$32,428	$26,402	$394,940	$387,431

The SCR capital and installation cost estimates are based on vendor quotes, as provided by the Project team during the optimization phase as well as earlier phases of the Project [3]. Annual operating costs were also estimated by the engineering teams based on predicted catalyst replacement costs, ammonia reagent costs, power costs, and other factors. The total annual cost for each heater represents the sum of the annual operating costs, plus the “annualized” total capital investment, assuming 7% interest over 10 years. Further details of these costs are shown in Appendix E, as updated in RFI-563-ADEC-008.

Based on these cost-effectiveness estimates, SCR would not be cost-effective as BACT for the GTP utility heaters listed, especially given the fact that some of the operating costs have not been included.

6.1.5. Step 5: Select BACT

Since SCR was determined to not be cost-effective, the highest or “top” control technology is the use of low NOx or ULNBs.

6.2. CO BACT Analysis

Carbon monoxide is formed during the combustion process as a result of incomplete fuel combustion. Factors contributing to incomplete fuel combustion include low air temperatures, insufficient combustion zone turbulence and residence times, inadequate amounts of excess air, as well as competing combustion conditions employed to mitigate NOx formation. This BACT analysis evaluates control techniques and technologies used to mitigate CO emissions.

6.2.1. Step 1: Identify All Control Technologies

The following list of potential control technologies for natural gas boilers/process heaters to be addressed in a BACT analysis were identified in the Project's BACT Survey [2]. These are technologies that have either been applied to process heaters for CO control or have been discussed in other turbine BACT analyses:

- Catalytic oxidation
- Good combustion practice

Catalytic Oxidation

Catalytic oxidation is a flue gas treatment control that oxidizes remaining CO in the exhaust gas to CO_2 in the presence of a noble metal catalyst. Catalytic oxidizers can provide oxidation efficiencies of 80% or greater at temperatures between 750°F and 1,000°F.

Good Combustion Practices

Natural gas is a very clean burning fuel and naturally results in fairly low CO emissions. The rate of CO emissions is dependent on proper mixing of the fuel and combustion air and adequate residence time at temperatures to complete the oxidation process. The GTP heaters are expected to use clean burning natural gas and burners designed to minimize CO emissions through maximizing the efficiency of fuel combustion and operation with sufficient excess oxygen.

6.2.2. Step 2: Eliminate Technically Infeasible Technologies

Based on the discussion under Step 1, none of the technologies are considered infeasible.

6.2.3. Step 3: Rank Remaining Control Technologies by Control Effectiveness

The emission control technologies not eliminated by practical or operational limitations are listed in Table 29. These technologies are ranked by control efficiency:

Table 29: Remaining Control Options and Control Effectiveness

Rank	Control Technology	Control Efficiency (%) or Emissions Target (ppmv)
1	CO catalyst	As low as 10 ppmv at 3% O_2 or 80% Reduction
2	Good combustion practices/clean fuels	Variable

Good combustion practices are a part of the base case design and operation of the building heat medium heaters. An evaluation of the economic feasibility of oxidation catalyst is presented below. This analysis assumes a 10-ppmv (or lower) controlled emissions level similar to other heaters of this size.

6.2.4. Step 4: Evaluate Most Effective Controls and Document Results

This section summarizes the energy, environmental, and economic impacts of the control technologies noted above.

For this analysis, the cost data are obtained primarily from vendor supplied information and supplemented with estimates provided in the EPA's Control Cost Manual where vendor supplied information was not available.

6.2.4.1. Energy Impact Analysis

No unusual energy impacts were identified for the technically feasible CO controls in this BACT analysis.

6.2.4.2. Environmental Impact Analysis

For this analysis, implementation of good combustion practices/clean fuels is not expected to cause an environmental impact. Operation of a CO catalyst would result in the disposal of spent catalyst; however, waste disposal considerations are not expected to preclude use of a CO catalyst as a potential control device for this BACT analysis.

6.2.4.3. Economic Analysis

Economic analysis of costs to install CO control is based on the following key factors:

- Size of the utility heaters;
- Baseline emissions levels;
- Controlled emissions levels; and
- Emission control installation and operating costs.

The cost-effectiveness of an oxidation catalyst is summarized in Table 30. As shown in this table, an oxidation catalyst is expected to be above the ADEC cost-effectiveness threshold of $10,000 per ton for all but the building heaters. Building heaters are discussed further in 6.2.5 below.

Table 30: Economic Analysis – CO Catalyst Utility Heaters

Estimated CO Emissions from Alternative Control Technologies CO Catalyst				
Control Option	**Building Heater**	**Operations Camp**	**Buyback Heater Primary**	**Buyback Heater Secondary**
Baseline emissions ppmvd 3%O_2	50	50	50	50
Baseline emissions (tpy)	44.50	5.16	4.10	3.39
Controlled emissions ppmvd 3%O_2	10	10	10	10
Controlled emissions (tpy)	8.90	1.03	0.82	0.68
CO emission reduction (tpy)	35.60	4.13	3.28	2.71
Total Annualized Operating Cost	$156,556	$68,901	$66,540	$64,955
Cost of NOx removal ($/ton)	$4,397	$16,684	$20,280	$23,956

The oxidation catalyst capital and installation cost estimates are based on scaling vendor quotes as provided by the GTP design team during the optimization phase as well as earlier phases of the Project [3]. the total annual cost for each heater represents the sum of the annual operating costs plus the “annualized” total capital investment, assuming 7% interest over 10 years. Further details of these costs are shown in Appendix E.

6.2.5. Step 5: Select BACT

Use of good combustion practices and clean fuels is determined to be BACT for the utility heaters. While the cost calculations above would suggest that installation of a CO catalyst is potentially cost effective on the building heater medium heaters, no examples of CO catalyst controls in the RBLC were found for the same size heater (> 250 MMBtu/hr), or for the smaller (less than 50 MMBtu/hr) heaters. It is considered unlikely that CO controls would be imposed given this past precedent.

6.3. SO2 BACT Analysis

SO_2 emissions are formed as a result of the combustion sulfur containing fuels. This BACT analysis evaluates control techniques and technologies used to mitigate SO_2 emissions.

6.3.1. Step 1: Identify All Control Technologies

Potential control technologies for this project were based on information found on the EPA’s RBLC. This review focused on heaters and boilers from year 2015 to the present. A summary of the data collected by this review is included in Appendix A.

The only control technology identified as a potential SO_2 control technology for natural gas heaters and boilers was the use of clean fuels. The heaters are designed to combust natural gas which is considered a low sulfur content clean fuel.

6.3.2. Step 2: Eliminate Technically Infeasible Options

Use of clean fuels is a common BACT control for heaters and boilers and is considered a technically feasible control option for the GTP utility heaters for the purposes of this analysis.

6.3.3. Step 3: Rank Remaining Control Technologies by Control Effectiveness

Use of clean fuels is a common BACT control for utility heaters and is considered a technically feasible control option for the utility heaters for the purposes of this analysis. As this is the only control option considered, ranking by emissions control effectiveness is not necessary.

6.3.4. Step 4: Evaluate Most Effective Controls and Document Results

As use of clean fuels are expected to be implemented for this Project, economic analysis is not required.

6.3.5. Step 5: Select BACT

Use of clean fuels has been chosen to satisfy BACT for reduction of SO_2 emissions. This BACT analysis concludes, similar to other comparable projects evaluated, that use of clean fuels meets BACT for a utility heater of this type and application (see Appendix A for a list of other BACT determinations reviewed).

6.4. PM and VOC BACT Analysis

PM and VOC are emitted from the combustion process as a result of dirty fuels and/or incomplete fuel combustion. Factors contributing to incomplete fuel combustion include, low air temperatures, insufficient combustion zone turbulence and residence times, inadequate amounts of excess air, as well as competing combustion conditions employed to mitigate NOx formation. This BACT analysis evaluates control techniques and technologies used to mitigate PM and VOC emissions.

6.4.1. Step 1: Identify All Control Technologies

Potential control technologies for this project were based on information found on the EPA's RBLC. This review focused on natural gas boilers and heaters from year 2015 to the present. A summary of the data collected by this review is included in Appendix A.

The only control technology identified as a potential PM and VOC control technology for natural gas boilers and heaters was good combustion practices/clean fuels. The rate of PM and VOC emissions is dependent on fuel choice and good combustion practices, including proper mixing of fuel and combustion air, as well as adequate residence time at temperatures to complete the oxidation process. The utility heaters are designed to combust natural gas and minimize PM and VOC emissions through use of natural gas and good combustion practices.

6.4.2. Step 2: Eliminate Technically Infeasible Options

Good combustion practices/clean fuel is a common BACT control for utility heaters and is considered a technically feasible control option for the utility heaters for the purposes of this analysis.

6.4.3. Step 3: Rank Remaining Control Technologies by Control Effectiveness

Good combustion practices/clean fuel is a common BACT control for utility heaters and is considered a technically feasible control option for the utility heaters for the purposes of this analysis. As this is the only control option considered, ranking by emissions control effectiveness is not necessary.

6.4.4. Step 4: Evaluate Most Effective Controls and Document Results

As good combustion practices/clean fuel are expected to be implemented for this project, economic analysis is not required.

6.4.5. Step 5: Select BACT

Good combustion practices/clean fuels has been chosen to satisfy BACT for reduction of PM and VOC emissions. This BACT analysis concludes, similar to other comparable projects evaluated, that good combustion practices/clean fuel meets BACT for a gas turbine of this type and application (see Appendix A for a list of other BACT determinations reviewed).

6.5. GHG BACT Analysis

This section summarizes the BACT analysis for controlling GHG emissions at the utility heaters. This analysis follows the same "top-down" analysis used for criteria pollutants.

6.5.1. Step 1: Identify All Control Technologies

The following list of potential control technologies for heaters to be addressed in a BACT analysis were identified in the Project's BACT Survey [2] and/or the APP BACT Analysis [1]. These are technologies that have either been applied to heaters for CO_2 control or have been discussed in other turbine BACT analyses.

Control technologies identified for GHG control of gas-fired heaters include the following:

- Annual heater tune-up
- Low-carbon Fuel
- Controls to minimize excess oxygen
- Recycled heat medium (retains heat)
- Air preheat, economizer or convection section to maximize heat recovery

These control methods may be used alone or in combination to achieve the various degrees of GHG emissions control. Each of the control methods are described below.

Another emission control technique, which is identified in the EPA GHG BACT guidance, is the use of CCS. CCS is discussed in Section 9.1 of this document. As shown in the BACT analysis for CCS, the technology is potentially infeasible and is not cost-effective. CCS will not be discussed further in this section of the analysis.

Annual Heater Tune-up

The currently proposed commercial and industrial boiler MACT requires that process heaters that burn natural gas and have a maximum heat input capacity of 10 MMBtu/hr or more do an annual tune-up. Annual tuning can help the heater maintain optimal thermal efficiency, thereby minimizing fuel use and GHG emissions.

Low-Carbon Fuel

As described in the BACT analysis for the turbines, CO_2 is a product of combustion of any carbon-containing fuel. The preferential use of natural gas, a low-carbon fuel, is a method of lowering CO_2 emissions versus use other fuels such as diesel. The Project is expected to exclusively use natural gas in any fired heaters.

Controls to Minimize Excess Oxygen

Inlet air controls (such as O_2 monitor and inlet air flow control) limit excess air. Limiting the excess air enhances efficiency through reduction of the volume of air that needs to be heated in the combustion process. The excess air carries much of that heat out the stack. Air in slight excess of the stoichiometric fuel/air ratio is required for safe and complete combustion (minimizing CO and VOC emissions). Higher efficiency combustion means less fuel would be burned and fewer emissions. Controlling excess air control with exhaust O_2 monitoring is a feasible strategy to minimize CO_2 emissions on large heaters. An oxygen monitor and inlet air control would be included in the design of the building heat medium heaters.

Recycled Heat Medium

The use of a recycled heat medium fluid is an inherent feature of the plant's design. It ensures that the system would retain as much heat as possible; requiring the heaters to fire less much in the same way that recycling steam condensate in a boiler system improves the overall system energy efficiency.

Convection Section

One of the most significant ways to ensure a high thermal efficiency for a furnace is to ensure that there is sufficient heat transfer surface area within the heater to utilize as much of the heat in the warm stack flue gas as reasonably possible. The GTP building heat medium heaters would incorporate a convection section into their designs to absorb as much heat into the heat medium fluid as possible. Lowering the stack temperature 40% results in about 1% improvement in heater efficiency (and consequently decreased CO_2 emissions).

This is a form of WHR that ensures the heat in the exhaust gases is not wasted. This is similar to an economizer section on a boiler; all are merely different methods of recovering heat in the exhaust gases. The Building Heat Medium Heater would be equipped with a convection section to maximize thermal efficiency. The overall heater design, inclusive of convection section and O_2 controls, would result in a thermal efficiency of up to 89% on a LHV basis.

6.5.2. Step 2: Eliminate Technically Infeasible Options

This section summarizes the technical feasibility for GHG control of each air pollution control technology. With the exception of carbon capture of the CO_2 in the heater exhaust, all the technologies discussed above are both applicable and feasible control measures that are proposed to be used for the GTP heaters.

6.5.3. Step 3: Rank Remaining Control Technologies by Control Effectiveness

The above discussed technologies are applicable for the GTP building heat medium heaters, except for carbon capture of the CO_2 in the heater exhaust. These applicable and feasible control measures are proposed to be used.

6.5.4. Step 4: Evaluate Most Effective Controls and Document Results

As all feasible controls would be implemented for this Project, an economic analysis is not required.

6.5.5. Step 5: Select BACT

For the reasons stated above, BACT for the GTP building heat medium heaters is determined to be:

- Annual heater tuning
- The use of natural gas fuel
- The use of energy efficient heater designs incorporating
- A convection section
- Excess O_2 monitoring and use the heater control system
- Recycle of heat medium fluid

6.6. Conclusions

The objective of this analysis was to examine the utility heaters. The analysis considered the technology, feasibility, cost, and other site-specific factors to control NOx, CO, SO_2, PM/VOC, and GHG emissions. The BACT analysis determined the following levels of control for the GTP utility heaters:

- NOx: LNBs or ULNBs
- CO: Good combustion practices/clean fuels
- SO_2: Clean fuels
- PM and VOC: Good combustion practices/clean fuels
- GHGs: Annual heater tuning, use of natural gas fuel, use of energy efficient heater designs incorporating a convection section, excess O_2 monitoring and heater control system, and recycle of heat medium fluid

The proposed limits represent the expected maximum concentrations for NOx and CO. The actual NOx and CO emission limits will be determined based on vendor guarantees at the time of final equipment determination and purchase.

7. VENT GAS DISPOSAL (FLARES)

The GTP facility design includes four flare systems to handle the relief and blowdown requirements of the facility. These flare systems prevent the direct relief to the atmosphere of vent gases that contain VOC and GHGs (in the form of CH_4). The facility is designed to prevent routine flaring. Therefore, during normal operations, the only emissions from the facility flares would be from the combustion of pilot and purge gases. Pilot and purge gas emissions represent a small fraction of the GTP emissions. Natural gas, a low carbon-intensity fuel, is used as pilot and purge gas.

Flaring would occasionally be required for safety reasons, during start-up/shutdown/maintenance activities or during an upset condition.

This analysis provides a review of the possible technologies that could be imposed as BACT to control vent gas reliefs to atmosphere.

7.1. VOC and GHG BACT Analysis

This BACT analysis evaluates control techniques and technologies used to address vent gas disposal to mitigate VOC and GHG emissions.

7.1.1. Step 1: Identify All Control Technologies

The following control strategies have been identified to limit GHG emissions from flares:

- Flaring minimization – Reducing the amount of CO_2e generated from combustion in the flare by minimizing the amount of gas flared at the facility.
- Flare gas recovery – Recovering the gas sent to flares for re-use in the facility.
- Flare design – ensuring maximum combustion of flared streams.

The following subsections discuss the general operating principles of identified potential CO_2 control technologies and their potential technical feasibility for minimizing GHG emissions from the GTP Flares.

Flaring Minimization[10]

The most practical way to reduce the amount of CO_2e generated from combustion in the flare is to minimize the amount of gas flared. The GTP facility is expected to be designed to avoid any routine continuous venting to the flare (other than continuous maintenance of the pilot flames and the provision of purge gas to prevent oxygen ingress into the flare systems). Additionally, the GTP will have a flare minimization plan to reduce the frequency, magnitude, and duration of flaring events. The plan would present procedures and process controls that would be used to minimize or prevent emissions from the

[10] Flare gas recovery is a form a flaring minimization where streams directed to the flare are captured and recycled onsite for re-use. Flare gas recovery is not part of GTP flare system design, as there would be no routine and continuous venting of gas to the flares. Therefore, consideration of flare gas recovery is unnecessary as a potential control technology.

flares while providing for safe operation of the facility. The plan would address anticipated causes of flaring including emergency, operational upsets and start-up/shutdown/maintenance activities.

Flare Design

The GHGs CO_2, N_2O, and CH_4 are products of combustion when flaring occurs. Emissions of N_2O and CH_4 are more potent GHG than CO_2; therefore, maximizing the efficiency and availability of the flare system to maximize combustion of vented gases, and minimize emissions of CH_4 and N_2O, is another method to minimize GHG emissions. Unburned, the produced gas streams, which are primarily CH_4, have a higher GHG GWP than the combusted flare exhaust, which is primarily CO_2. Venting 1 ton of CH_4 without combustion results in approximately seven times the amount of CO_2e emissions compared to flaring that 1 ton of produced gas. By diverting any hydrocarbon vent requirements to the flare (GTP design), GHG emissions are reduced.

Proper flare design can improve the combustion efficiency of the flare. Design considerations include maintaining a pilot flame, ensuring the heating value of the flare gas is adequate and restricting the velocity of low-BTU flare gas for flame stability.

7.1.2. Step 2: Eliminate Technically Infeasible Technologies

All of the technologies noted in Step 1 are considered feasible. Therefore, none are eliminated at this step.

7.1.3. Step 3: Rank Remaining Control Technologies by Control Effectiveness

The emission control technologies not eliminated by practical or operational limitations are identified below. These technologies are ranked by control efficiency.

- Flare minimization
- Flare design

These technologies are planned to be incorporated into the GTP design.

7.1.4. Step 4: Evaluate Most Effective Controls and Document Results

Since all remaining control options (flare minimization and flare design) are expected to be implemented for this Project, economic analysis is not required.

7.1.5. Step 5: Select BACT

Utilizing flares instead of direct venting of hydrocarbons is the primary BACT proposed by the GTP. A flare minimization plan would be developed prior to operation to further reduce GHG emissions by addressing the frequency and duration of any relief event. Ensuring the flare design maximizes combustion efficiency and availability of the flare would continue in future phases of the Project. Flare gas recovery would be investigated if any continuous flaring sources are identified, which is unlikely in the current design.

8. COMPRESSION IGNITION DIESEL IC ENGINES

This BACT analysis address the following compression ignition engines proposed for use in support of the Project at the GTP facility:

- 150-kilowatt (kW) communications tower diesel generator
- 250-kW dormitory emergency diesel generator
- 2,500-kW black start diesel generator
- Three (3) 250 HP diesel engine driven fire water pumps

These engines would be used to provide assistance during black start of the GTP, emergency power generation, and fire water for the operations camp. During normal operation, all diesel internal combustion engines are assumed to operate a total of 99 hours per year, approximately 8.25 hours a month, for periodic testing and minimal operation. Because their normal use is limited, their total emissions are very small.

This analysis provides a review of the possible technologies and emission limits that could be imposed as BACT. Relative to internal combustion engines, only a cursory BACT analysis was performed.

Control technologies identified for NOx, SO_2, CO PM, VOC, and GHGs include the following:

- Good combustion practices/clean fuels (all pollutants)
- Compliance with 40 CFR NSPS Subpart IIII (NOx, VOC, CO and PM)
- Diesel particulate filters (PM)
- CO catalyst (CO and VOC)
- Selective catalytic reduction (NOx)[11]

These control methods may be used alone or in combination to achieve various degrees of emissions control. Each technology is summarized below.

Notably, another emission control technique, which is identified in the EPA GHG BACT guidance, is the use of CCS. CCS is discussed in Section 9.1. As shown in the BACT analysis for CCS, the technology is potentially infeasible and is not cost-effective. CCS will not be discussed further in this section of the analysis.

Good Combustion Practices/Clean Fuels

The rate of combustion emissions is dependent on fuel choice and good combustion practices including proper mixing of fuel and combustion air as well as the proper operation and maintenance of the engines.

[11] Other potential catalytic type control technologies could be analyzed as part of this compression ignition pre-BACT analysis; however, SCR is the most commonly utilized catalytic control technology for BACT applicability and is the focus of this analysis.

These engines are designed to combust diesel fuel and optimized to minimize combustion emissions through use of good combustion practices.

Compliance with 40 CFR Part 69 and Part 1039

These compression ignition engines are expected to be subject to the following emission limits/standards:

- Non-Emergency Diesel-Fired Generators: 40 CFR Part 1039 Subpart B, Tier 4
- Emergency Diesel-Fired Generators: 40 CFR 60 Subpart III, Tier 2
- Emergency Diesel-Fired Fire Water Pumps: 40 CFR 60 Subpart III, Appendix Table 4 standards for engines between 175 and 300 hp installed post 2009.

Diesel Particulate Filter, CO Catalyst and SCR

Due to the limited use and the urgent nature of emergency situations, emergency type engines are not typically required to install diesel particulate filters, CO, or SCR catalysts.

8.1. Conclusions

For the GTP facility, BACT for the internal combustion engines is proposed to be good combustion practices by maintaining and operating the engines in accordance with manufacturer’s recommendations and compliance with the applicable emission standard.

9. FACILITY WIDE GREENHOUSE GAS MEASURES

For the purposes of a BACT analysis for GHG, EPA classifies CCS as an add-on pollution control technology that is "available" for facilities emitting CO_2. Technical feasibility and cost have generally eliminated this GHG reduction technology from further consideration in all BACT analyses reviewed at EPA, state, and local BACT clearinghouses and databases. However, as requested by the ADEC during the May 2016 meeting, application of CCS at the GTP must be considered in the BACT analysis [14].

This BACT analysis does not address the acid gas removal unit (AGRU) byproduct process stream that would be injected for enhanced oil recovery at the PBU. This section addresses the capture and control of dilute GHG streams resulting from natural gas combustion.

9.1. Carbon Capture and Sequestration (CCS)

CCS consists of two main operations: (1) CO_2 capture, compression and transport; and (2) sequestration (storage). To capture CO_2, CCS systems generally involve use of adsorption or absorption processes to remove CO_2 from exhaust gas, with subsequent desorption to produce a concentrated CO_2 stream. Research into technically and economically feasible capture systems is ongoing and is the focus of many large scale grants from the U.S. Department of Energy.

In the CCS process, the concentrated CO_2 would be compressed to "supercritical" temperature and pressure, a state in which CO_2 exists neither as a liquid or a gas, but instead has physical properties of both liquids and gases. The supercritical CO_2 would then be transported to an appropriate location for underground injection into a suitable geological storage reservoir, such as a deep saline aquifer or depleted coal seam, or used in crude oil production for enhanced oil recovery. Transportation of "supercritical" temperature and pressure CO_2 can be accomplished via truck, ship, or pipeline depending on the location of the generation site and the storage site. However, unless the storage site is relatively close to the site of generation, this transportation is costly and increases significantly with distance. The concentration of CO_2 is required because injection of exhaust streams containing high levels of nitrogen, O_2, and dilute CO_2 is not technically feasible. Adequate techniques for compression of CO_2 exist, but such compression systems require large amounts of energy.

Carbon sequestration is the long-term isolation of CO_2 from the atmosphere through physical, chemical, biological, or engineered processes. In general, carbon sequestration is achieved through storage in geologic formations or in terrestrial ecosystems, or through conversion into commercial products. Without an existing market to use recovered CO_2, the material would instead require sequestration, or permanent storage. Geologic sequestration refers to the injection and storage of captured CO_2 in an underground location where it will not readily escape into the atmosphere, such as within deep rock formations at pressures and temperatures where CO_2 is in the supercritical phase (typically 0.8 kilometers or more below ground surface). In general, CO_2 storage could be successful in porous, high-permeability rock formations or deep saline aquifer formations that are overlain by a thick, continuous layer of low-permeability rock, such as shale, where CO_2 may remain immobilized beneath the ground surface for extended periods of time. Other geologic formations deemed suitable for geologic sequestration include coal beds that are too thin or deep to be cost effectively mined and depleted oil and gas reservoirs, where in addition to CO_2 storage, economic gains may also be achieved (most notably through the use of enhanced oil recovery to obtain residual oil in mature oil fields).

An understanding of site-specific geologic studies and formation characteristics is critical to determine the ultimate CO_2 storage capacity and, ultimately the feasibility of geologic sequestration, for a particular area. Other factors to consider when determining the feasibility (both technical and economic) of geologic sequestration are:

- The cost, constructability, and potential environmental impacts of infrastructure necessary for the transportation of captured CO_2 from the source to the ultimate geologic sequestration site;
- The amount of measurement, monitoring (baseline, operational, etc.); and
- Verification of CO_2 distribution required following injection into the subsurface to ensure the risk of leakage of CO_2 is minimized or eliminated.

Potential uses/long term storage options for CO_2 are described below.

Enhanced Oil Recovery

Enhanced oil recovery (EOR) injection systems pump CO_2 into partially depleted oil reservoirs. Injection enhances the recovery of oil from partially depleted reservoirs allowing additional recovery. EOR systems have been used to enhance oil recovery at many oil reservoirs. Optimal EOR operation is dependent on reservoir temperature, pressure, depth, net pay, permeability, remaining oil and water saturations, porosity, and fluid properties, such as American Petroleum Institute gravity and viscosity.

Saline Aquifer Injection

Saline aquifer injection systems pump CO_2 into deep saline aquifers. Saline aquifers may be the largest long-term subsurface CCS option. Such aquifers are generally saline and are usually hydraulically separated from the shallower "sweet water" aquifers and surface water supplies accessible by drinking water wells. The injected CO_2 displaces the existing liquid and is trapped as a free phase (pure CO_2), which is referred to as "hydrodynamic trapping." A fraction of the CO_2 will dissolve into the existing fluid. The ultimate CO_2 sequestration capacity of a given aquifer is the difference between the total capacity for CO_2 at saturation and the total inorganic carbon currently in solution in that aquifer. The solubility of CO_2 depends on the pressure, temperature, and salinity of the formation water. Low salinity, low temperature, and high pressure environment is the most effective for sequestering CO_2 in widespread, deep, saline aquifers. The potential sequestration capacity of deep horizontal reservoirs is many times that of depleted, really restricted, structural, or stratigraphic oil and gas reservoirs.

Sequestration of CO_2 is generally accomplished via available geologic reservoirs that must be either local to the point of capture, or accessible via pipeline to enable the transportation of recovered CO_2 to the permanent storage location. The *United States 2012 Carbon Utilization and Storage Atlas* (Fourth Edition published by the U.S. Department of Energy, Office of Fossil Energy) identifies an extensive saline aquifer directly below Nikiski as being "screened, high sequestration potential." However, this area has not had detailed evaluation for CO_2 sequestration and lies in a fault zone. This saline aquifer is not deemed to be suitable for CCS at this time.

Oceanic Dispersion

Ocean dispersion has not yet been deployed or demonstrated and is still in the research phase. This CCS system would inject CO_2 directly into the ocean at depths greater than 3,000 feet. Injection is achieved by transporting CO_2 via pipelines or ships to an ocean storage site where it is injected. The dissolved and dispersed CO_2 would subsequently become part of the global carbon cycle. At this depth it is theorized that most of the CO_2 would be isolated from the atmosphere for centuries.

9.1.1. CCS Technical Feasibility

CCS has several technical challenges from facility design and operation to transport and ultimate disposal of CO_2 streams. The capture of CO_2 from the exhaust of combustion turbines is difficult due to two predominant factors: the turbine exhaust's low CO_2 concentration, and its low pressure. Natural gas combustion turbine exhaust streams have relatively low CO_2 concentrations compared to coal power plants. Approximately 3% CO_2 is expected in the GTP turbine exhaust. This means that for a natural gas turbine, a very large volume of gas needs to be treated to recover the CO_2. Additionally, the low concentration and low pressure complicate CO_2 absorption into a solvent and desorption from the solvent to produce a concentrated CO_2 stream. This increases the energy required. Further, a low pressure absorption system creates a low pressure CO_2 stream, which requires a very high energy demand for compression prior to transport. All these factors make the application of CO_2 capture on any natural gas combustion exhaust extremely difficult and expensive.

There is additional complexity and expense of attempting post-combustion carbon capture in a remote Arctic environment. Significantly more development, testing, and technology improvements would be needed to make post-combustion carbon capture a feasible control option for this Project.

9.1.2. CCS Cost-Effectiveness

The Project does not believe that carbon capture is an applicable and available control option for the turbine exhaust from this Project. Notwithstanding this position, in 2010, the GTP engineering contractor prepared an engineering evaluation and cost analysis for post-combustion carbon capture of the GTP turbine exhaust CO_2. This information was scaled to reflect the current turbine configuration of the GTP and escalated to 2016. Because of the difficulties in capturing low concentration and low pressure CO_2, the costs are extremely high. The capital cost of a carbon capture system is estimated to be more than $3 billion. Even assuming 90% capture of the CO_2, resulting in avoided emissions of 4.2 million tons of CO_2 per year, the cost effectiveness is more than $900 per ton controlled [15]. This is well above the $12 - $41 per ton benchmark noted earlier in this analysis.

The estimated cost of the carbon capture system alone represents a significant fraction (on the order of 50%) of the cost of the entire GTP facility. The estimated cost of $3 billion does not include any changes to the CO_2 pipeline size to accommodate the additional CO_2 volume from the carbon capture system that may be necessary to transport the CO_2 back to PBU. Although no specific guidance has been provided on what is considered cost effective for CCS, a control technology which approaches 50% of the cost for the entire facility would generally not be considered reasonable.

9.2. Other Facility Wide GHG Measures

To employ resources effectively, decrease costs, and reduce energy consumption, heat integration was incorporated into the GTP design, specifically in the following systems:

- AGRU
- Treated gas dehydration unit
- CO_2 dehydration unit
- Process heat medium system
- Process energy efficiency measures

For example, in the AGRU, the lean/rich exchangers recover energy within the regeneration system, lowering the required heating duty of the AGRU solvent reboiler and the cooling duty of the AGRU lean solvent coolers. A similar approach is utilized in both the treated gas and CO_2 dehydration units, whereby rich TEG flows through the cold and hot TEG lean/rich exchangers.

The purpose of the process heat medium system is to transfer energy (heat) from supplemental firing and gas turbine WHR exchangers to the AGRU reboilers. This avoids the need for direct fired reboilers at each required location throughout the GTP, and thus minimizes firing sources and fuel consumption in the facility. Waste heat is recovered in the following units:

- Treated gas compressor turbine drivers
- CO_2 compressor turbine drivers

Finally, process energy efficiency measures have been incorporated into the design of the GTP, including:

- Extensive use of heat integration in the process design of the GTP (i.e., use of hot streams to heat cool streams).
- An integrated approach was furthermore utilized to improve the overall facility and process design. Various process and heat medium streams were integrated to minimize energy consumption while maintaining operational stability and flexibility.
- Use of high efficiency rotating equipment (i.e., gas turbines and pumps, and variable frequency drives for large motors).
- Uses of methyl diethanol amine (MDEA) in AGRU. MDEA has the advantage of low regeneration energy to remove CO_2 versus other types of amines, minimizing energy consumption.
- Use of WHR units on the exhaust stacks of the mechanical drive gas turbines at GTP to recover the available high level, high value heat.

10.REFERENCES

Reference Number	Document Number	Document Title
[1]	USAG-UR-SRZZZ-000035, Rev. A	Alaska Pipeline Project Preliminary BACT Analysis
[2]	USAG-EC-PCCAL-00-000131, Rev. B	Alaska LNG BACT Survey to Support Pre-FEED Design
[3]	USAG-EC-PRZZZ-00-00004-000, Rev. 0	SCR Study Summary
[4]	Case No. 504	Case No. 504: Urea SCR System Installed on a 6555 HP Wartsila 16V32 Diesel Engine Used for Prime Power. URL: https://www.murcal.com/pdf%20folder/15.johnson_stationary_lit6.pdf
[5]	NA	Golden Valley Electric Association: Healy Unit 2 Power Plant. URL: https://www.gvea.com/news-releases/gvea-board-takes-action-on-future-generation-healy-unit-1/ https://www.gvea.com/strategicgeneration/
[6]	NA	Top Plant: Southcentral Power Project, Anchorage, Alaska. PowerMag, vol. 157 (9), September 2013. URL: https://www.powermag.com/southcentral-power-project-anchorage-alaska/
[7]	NA	SCR DeNOx Systems. Presentation by Bob McGinty, Mitsubishi Hitachi Power Systems.
[8]	NA	Jennings, Burgess. Tables of the Properties of Aqua-Ammonia Solutions. Part 1 of the Thermodynamics of Absorption Refrigeration. Lehigh University Studies Science and Technology Series, 1938.
[9]	NA	Evely, Dale and Manning, Harrison. SCR Control Strategy and CEMS for an Ultra-Low NOx Emitter.
[10]	NA	Klein, Manfred. Emissions Control for Gas Turbine Energy Systems. Cogeneration & On-Site Power Production, January 2012. http://www.cospp.com/articles/print/volume-13/issue-2/features/emissions-control.html
[11]	Permit 4911-127-0075-P-02-0	Like Oaks Power Plant Air Quality Permit, State of Georgia, Department of Natural Resources, Environmental Protection Division, April 2010.
[12]	Docket No. 07-AFC-09	ECM Technology White Paper on EMx/ESx Catalyst Systems for SCPPA Canyon Power Plant, August 2008.
[13]	NA	BACT Analysis for the Grays Harbor Energy Project: http://www.efsec.wa.gov/Satsop/SCA%20Amend%205%202009/Appendix%20A-1.pdf
[14]	USAI-PS-BPDCC-00-000002-005	Alaska LNG Minutes of Meeting with ADEC, BACT and Dispersion Modeling Overview, GTP and Liquefaction Facilities, May 18, 2016.

Reference Number	Document Number	Document Title
[15]	USAG-WD-PRTEC-000045	Alaska Pipeline Project Gas Treatment Plant CO_2 Capture Study, March, 18, 2010.

APPENDIX A

Summary of BACT Determinations for Recent Alaska Projects, Simple Cycle Turbine Installations, and Boilers/Heaters

Summary of BACT Determinations

RBLC Seach Parameters:	Small (< 25MW) Simple Cycle Gas Turbines
Date Range:	2015 - 2025
Fuel:	Natural Gas
Process Code:	16.110
RBLC Search Date:	1/31/2025

Project	Process	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
HELIX IRONWOOD LLC HELIX IRONWOOD LLC/LEBANON LEBANON, PA	001 Turbines	*PA-0340	01/13/2024 ACT	TRUE	SCR	4.5 PPMDV @ 15% O2 / 3 HR ROLLING BLOCK AVG	0	5 PPMDV @ 15% O2 / 3 HR ROLLING BLOCK AVG	Oxidation catalyst	2 PPM ONE-HOUR AVERAGE DRY VOLUME CORRECTED T				
NRG CEDAR BAYOU LLC UNIT 5 CHAMBERS, TX	SIMPLE CYCLE TURBINE	TX-0915	03/17/2021 ACT	FALSE			Oxidation catalyst	3.5 PPMVD 3-HR ROLLING	Oxidation catalyst	1.5 PPMVD 3-HR ROLLING			Low sulfur natural gas fuel	
NRG CEDAR BAYOU LLC UNIT 5 CHAMBERS, TX	TURBINE-AUXILLARY BOILER	TX-0915	03/17/2021 ACT	FALSE			Low sulfur natural gas fuel	0.037 LB/MMBTU	Low sulfur natural gas fuel	0.0054 LB/MMBTU			Low sulfur natural gas fuel	
XCEL ENERGY BLUE LAKE SCOTT, MN	Turbine 7 / EQUI 7	*MN-0095	08/07/2024 ACT	TRUE	Dry Low NOx Combustor	11 PPM 24 HOUR ROLLING AVERAGE AT 15% O2		9 PPM 24 HOUR ROLLING AVERAGE AT 15% O2, DRY	0	4.6 PPM 3 HOUR AVERAGE AS METHANE			Utilize proper piping design conforming to ANSI, API, ASME, or other standards, and best management practices to prevent, detect, and repair leaks of natural gas. Conduct audio/visual/olfactory (AVO) inspections each calendar quarter for natural gas piping components to detect leaks of natural gas. Keep records of the quarterly AVO leak inspections on natural gas piping components.	110 LB/MMBTU 3 HOUR ROLLING AVERAGE
XCEL ENERGY BLUE LAKE SCOTT, MN	Turbine 8 / EQUI 8	*MN-0095	08/07/2024 ACT	TRUE	Dry Low NOx combustor	11 PPM 24 HOUR ROLLING AVERAGE AT 15% O2	0	9 PPM 24 HOUR ROLLING AVERAGE AT 15% O2	0	4.6 PPM 3 HOUR AVERAGE AS METHANE			Utilize proper piping design conforming to ANSI, API, ASME, or other standards, and best management practices to prevent, detect, and repair leaks of natural gas. Conduct audio/visual/olfactory (AVO) inspections each calendar quarter for natural gas piping components to detect leaks of natural gas. Keep records of the quarterly AVO leak inspections on natural gas piping components.	110 LB/MMBTU 3 HOUR ROLLING AVERAGE
VENTURE GLOBAL CALCASIEU PASS, LLC CALCASIEU PASS LNG PROJECT CAMERON, LA	Aeroderivative Simple Cycle Combustion Turbine	LA-0331	09/21/2018 ACT	FALSE	Selective Catalytic Reduction (SCR), exclusive combustion of fuel gas, and good combustion practices.	25 PPMV 30 DAY ROLLING AVERAGE	Proper Equipment Design, Proper Operation, and Good Combustion Practices.	36 PPMV 30 DAY ROLLING AVERAGE	Proper Equipment Design, Proper Operation, and Good Combustion Practices.	1.5 PPMV 3 HOUR AVERAGE			Combust low carbon fuel gas, good combustion practices, good operation and maintenance practices and insulation.	134907 T/YR ANNUAL TOTAL
AFE, INC AFE, INC. â€“LCM PLANT RACINE, WI	P90 â€“ Natural Gas-Fired Emergency Generator	WI-0283	04/24/2018 ACT	FALSE	Good Combustion Practices and the Use of Turbocharger and Aftercooler	2 G/BHP-HR	Good Combustion Practices	4 G/BHP-HR	Good Combustion Practices	1 G/BHP-HR	The Use of Pipeline Quality Natural Gas and Good Combustion Practices	0	Good Combustion Practices and the Use of Pipeline Quality Natural Gas	0
ROBINSON POWER COMPANY, LCC BEECH HOLLOW WASHINGTON, PA	COMBUSTION TURBINE without DUCT BURNERS UNIT	*PA-0314	12/27/2017 ACT	TRUE	SCR	2 PPMDV CORRECTED TO 15% O2	Oxidation Catalyst	2 PPDV CORRECTED TO 15% O2		1.3 PPMDV CORRECTED TO 15 % O2				404917 LB HOUR
DTE GAS COMPANY DTE GAS COMPANY - MILFORD COMPRESSOR STATION OAKLAND, MI	FGTURNBINES (5 Simple Cycle CTs: EUTURBINE1, EUTURBINE2, EUTURBINE3, EUTURBINE4, EUTURBINE5)	MI-0426	03/24/2017 ACT	FALSE	Dry ultra-low NOx burners.	15 PPM	Good combustion practices and clean burn fuel (pipeline quality natural gas).	25 PPM					Use of pipeline quality natural gas and energy efficiency measures.	196998 T/YR 12-MO. ROLLING TIME PERIOD
DTE GAS COMPANY DTE GAS COMPANY--MILFORD COMPRESSOR STATION OAKLAND, MI	FG-TURBINES	MI-0420	06/03/2016 ACT	FALSE	Dry ultra-low NOx burners	15 PPM TEST PROTOCOL	Good combustion practices and clean burn fuel (pipeline quality natural gas).	25 PPM TEST PROTOCOL					Use of pipeline quality natural gas and energy efficiency measures.	196998 T/YR 12 MO ROLLING TIME PERIOD
AGRIUM U.S. INC. KENAI NITROGEN OPERATIONS USA, AK	Five (5) Natural Gas Fired Combustion Turbines	AK-0083	01/06/2015 ACT	FALSE	Selective Catalytic Reduction	7 PPMV 3-HR AVG @ 15 % O2		50 PPMV 3-HR AVG @ 15 % O2		0.0021 LB/MMBTU 3-HR AVG		0.0074 LB/MMBTU 3-HR AVG		59.61 TONS/MMCF 3-HR AVG

Summary of BACT Determinations

RBLC Seach Parameters:	Large (> 25MW) Simple Cycle Gas Turbines
Date Range:	2015 - 2025
Fuel:	Natural Gas
Process Code:	15.110
RBLC Search Date:	1/31/2025

Project	Process	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
ALASKA GASLINE DEVELOPMENT CORPORATION GAS TREATMENT PLANT NORTH SLOPE BOROUGH, AK	Six (6) Simple Cycle Gas-Turbines (Power Generation)	AK-0085	08/13/2020 ACT	FALSE	DLN combustors and Good Combustion Practices	15 PPMV @ 15% O2 3-HOUR AVERAGE	Good Combustion Practices and burning clean fuels (NG)	15 PPMV @ 15% O2 3-HOUR AVERAGE	Good Combustion Practices and burning clean fuels (NG)	0.0022 LB/MMBTU 3-HOUR AVERAGE	Good Combustion Practices and burning clean fuels (NG)	0.007 LB/MMBTU 3-HOUR AVERAGE	Good combustion practices and clean burning fuel (NG)	117.1 LB/MMBTU 3-HOUR AVERAGE
ALASKA GASLINE DEVELOPMENT CORPORATION LIQUEFACTION PLANT KENAI PENNINSULA BOROUGH, AK	Six Simle Cycle Gas-Fired Turbines	AK-0088	07/07/2022 ACT	FALSE	SCR, DLN combustors, and good combustion practices	2 PPMV @ 15% O2 3-HOURS	Oxidation Catalyst and good combustion practices	5 PPMV @ 15% O2 3-HOURS	Oxidation catalyst and good combustion practices	2 PPMV @ 15% O2 3-HOURS	Good combustion practices and burning clean fuel (natural gas)	0.007 LB/MMBTU 3-HOURS	Good combustion practices and burning clean fuels (natural gas)	117.1 LB/MMBTU 3-HOURS
COMMONWEALTH LNG, LLC COMMONWEALTH LNG FACILITY CAMERON PARISH, LA	Refrgeration Turbines and Generator Turbines (EQT0001 - EQT0006 and EQT0013 - EQT0015)	*LA-0324	03/28/2023 ACT	TRUE	Good combustion practices and use clean fuel. Dry low-NOx and selective catalytic reduction.	2.5 PPMVD @15% O2	Good combustion practices and use of clean fuel.	1.7 PPMVD @15% O2	Good combustion practices and use of clean fuel.	3 PPMVD @15% O2				
ECTOR COUNTY ENERGY CENTER LLC ECTOR COUNTY ENERGY CENTER ECTOR, TX	Simple Cycle Turbines	TX-0900	08/17/2020 ACT	FALSE	Equipped with dry-low NOx burners with best management practices and good combustion practices. Minimize the duration of startup and shutdown events to less than 60 minutes per event. Limit MSS by 140 lb/hr maximum allowable emission rate for each turbine	9 PPMVD 3% O2 3 HR AVG							Best management practices and good combustion practices, clean fuel	1514 LB/MWHR
FPEC, LLC FREESTONE PEAKERS PLANT FREESTONE, TX	Simple Cycle Gas Turbines	*TX-0975	06/13/2024 ACT	TRUE	Dry low-NOx burners (DLNB) and good combustion practices.	9 PPMVD 15% O2	Good combustion practices	9 PPMVD 15% O2	Good combustion practices	2 PPMVD 15% O2			Good combustion practices	800 LB/MWH BASE LOAD
JACK COUNTY POWER LLC JACK COUNTY GENERATION FACILITY JACK, TX	COMBUSTION TURBINES	*TX-0986	12/27/2024 ACT	TRUE	Each turbine is limited to 15 ppmvd concentration at 15% O2 on a 3-hour average through an upgrade to â€˜HR3â€™ Dry Low-NOx (DLN) burners. 14 ppmvd at 15% O2 is achieved on an annual average and also includes during periods when wet compression (evaporative air cooling) is applied. MSS - Limited to 50 startups and 50 shutdowns per year for each turbine. Startup and shutdown events are each expected to last less than an hour in duration.	15 PPMVD 15% O2	Each turbine is limited to 9 ppmvd at 15% O2 on a 3-hour average, which meets Tier I BACT. Good combustion practices are used. MSS - Limited to 50 startups and 50 shutdowns per year for each turbine. Startup and shutdown events are each expected to last less than an hour in duration.	9 PPMVD 15% O2, 3-HR AVG	Each turbine is limited to 2 ppmvd at 15% O2, which meets Tier I BACT. Good combustion practices are used. MSS - Limited to 50 startups and 50 shutdowns per year for each turbine. Startup and shutdown events are each expected to last less than an hour in duration.	2 PPMVD 15% O2			JCP proposes an output-based standard of 1,400 lb/MW-hr on an annual average, or an input-based standard of 120 lb CO2/MMBtu on an annual average, achieved through energy efficient design and use of low carbon fuels. As stated above, the gas turbines are not subject to 40 CFR 60 Subpart TTTT or 40 CFR 60 Subpart TTTTa, which would require more stringent CO2e emission standards. An RBLC search was conducted to evaluate the applicant-proposed BACT, which showed that previous determinations for natural gas fired simple cycle turbines were between 800 and 1,707 lb/MW-hr, with most in the range of 1,300 and 1,450 lb/MW-hr.	0
LAKE CHARLES LNG EXPORT COMPANY, LLC LAKE CHARLES LNG EXPORT TERMINAL CALCASIEU PARISH, LA	Turbines (EQT0020 - EQT0031)	LA-0383	09/03/2020 ACT	FALSE	LNB + SCR	3.1 PPMVD @15%O2 3-HOUR AVERAGE	catalytic oxidation and carbon monoxide turndown	10 PPMVD @15%O2 3-HOUR AVERAGE, @ LOAD =>50%	Good combustion practices				Low carbon fuels Energy efficient designs and operation	0
NACERO TX 1 LLC NACERO PENWELL FACILITY ECTOR, TX	TURBINE	TX-0933	11/17/2021 ACT	FALSE	LOW NOX BURNERS AND SCR	9 PPMVD 15% O2	Oxidization catalyst, good combustion practices and the use of gaseous fuel	9 PPMVD 15% O2	Oxidization catalyst, good combustion practices and the use of gaseous fuel	1.7 PPMVD			good combustion practices and the use of gaseous fuel	0
TENNESSEE VALLEY AUTHORITY COLBERT COMBUSTION TURBINE PLANT COLBERT, AL	Three 229 MW Simple Cycle Combustion Turbines	AL-0329	09/21/2021 ACT	FALSE		9 PPMVD 3 HOUR AVG @ 15% O2		9 PPMVD 3 HOUR AVG / @15% O2						
TENNESSEE VALLEY AUTHORITY TENNESSEE VALLEY AUTHORITY - JOHNSONVILLE COMBUSTION TURBINE HUMPHREYS, TN	Ten Simple Cycle NG Turbines	*TN-0187	08/31/2022 ACT	TRUE	dry low-NOx burners selective catalytic reduction	5 PPMVD @ 15% O2 4-HOUR ROLLING AVERAGE EXCLUDING STA/SHU	oxidation catalyst	5 PPMVD @ 15% O2 4-HOUR ROLLING AVERAGE EXCLUDING STA/SHU			good combustion design and operating practices and the use of low sulfur fuel	3.65 LB/HR	Efficient turbine operation and good combustion practices	120 LB/MMBTU
LANSING BOARD OF WATER AND LIGHT LBWL-ERICKSON STATION EATON, MI	EUCTGSC1--A nominally rated 667 MMBTU/H natural gas-fired simple cycle CTG	MI-0454	12/20/2022 ACT	FALSE	DLNB and good combustion practices.	25 PPM 4-HR ROLLING AVG EXCEPT	Dry low NOx burners and good combustion practices.	9 LB/H HOURLY EXCEPT DURING SU/SD	Good combustion practices.	5 LB/H HOURLY EXCEPT DURING SU/SD			Low carbon fuel (pipeline quality natural gas), good combustion practices, and energy efficiency measures.	318404 T/YR 12-MO ROLLING TIME PERIOD
LANSING BOARD OF WATER AND LIGHT LBWL--ERICKSON STATION EATON, MI	EUCTGSC1-natural gas fired simple cycle CTG	MI-0447	01/07/2021 ACT	FALSE	DLNB and good combustion practices.	25 PPM 4-HR ROLL AVG EXCEPT LESS THAN 75% PEAK	Dry low NOx burners and good combustion practices	9 LB/H HOURLY; EXCEPT DURING STARTUP/SHUTDOWN	Good combustion practices	5 LB/H HOURLY; EXCEPT DURING STARTUP/SHUTDOWN				
	EUCTGSC1-A nominally rated 667 MMBTU/hr natural gas-fired simple cycle CTG	MI-0441	12/21/2018 ACT	FALSE	Dry low NOx burners (DLNB) and good combustion practices.	25 PPM AT 15%O2;4-HR ROLL AVG; SEE NOTES BELOW	Dry low NOx burners and good combustion practices.	9 LB/H HOURLY EXCEPT DURING STARTUP/SHUTDOWN	Good combustion practices.	5 LB/H HOURLY EXCEPT DURING STARTUP/SHUTDOWN				
SABINE PASS LNG LP AND SABINE PASS LIQUEFACTION LL SABINE PASS LNG TERMINAL CAMERON, LA	gas turbines during startups, shutdowns, and maintenance	LA-0343	09/06/2019 ACT	FALSE	good combustion practices	96 PPMV @ 15% O2								
RIO GRANDE LNG LLC RIO BRAVO PIPELINE FACILITY CAMERON, TX	Refrigeration Compression Turbines	TX-0851	12/17/2018 ACT	FALSE	Dry Low NOx burners. Good combustion practices	9 PPMVD 15% O2	Dry Low NOx burners. Good combustion practices	25 PPMVD 15% O2	Good combustion practices	2 PPMVD 15% O2			Good combustion practices and use of pipeline quality natural gas.	

Summary of BACT Determinations

RBLC Seach Parameters:	Large (> 25MW) Simple Cycle Gas Turbines
Date Range:	2015 - 2025
Fuel:	Natural Gas
Process Code:	15.110
RBLC Search Date:	1/31/2025

Project	Process	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
VENTURE GLOBAL CALCASIEU PASS, LLC CALCASIEU PASS LNG PROJECT CAMERON, LA	Simple Cycle Combustion Turbines (SCCT1 to SCCT3)	LA-0331	09/21/2018 ACT	FALSE	Dry Low NOx Combustor Design, Good Combustion Practices, and Natural Gas Combustion.	9 PPMV 30 DAY ROLLING AVERAGE	Proper Equipment Design, Proper Operation, and Good Combustion Practices.	25 PPMV 30 DAY ROLLING AVERAGE	Proper Equipment Design, Proper Operation, and Good Combustion Practices.	1.4 PPMV 3 HOUR AVERAGE			Exclusively combust low carbon fuel gas, good combustion practices, good operation and maintenance practices, and insulation	1426146 T/YR ANNUAL TOTAL
DRIFTWOOD LNG LLC DRIFTWOOD LNG FACILITY CALCASIEU, LA	Compressor Turbines (20)	LA-0349	07/10/2018 ACT	FALSE	DLN and SCR	5 PPMVD @ 15% O2	Good Combustion Practices	25 PPMVD @ 15% O2	Good Combustion Practices and Use of low sulfur facility fuel gas	0.002 LB/MM BTU HHV			Use Low Carbon Fuel, Energy Efficiency Measures, and Good Combustion Practices	0
WASHINGTON PARISH ENERGY CENTER ONE, LLC WASHINGTON PARISH ENERGY CENTER WSHINGTON PARISH, LA	CTG01 NO - Simple-Cycle Combustion Turbine 1 (Normal Operations) [EQT0017]	*LA-0327	05/23/2018 ACT	TRUE	Pipeline quality natural gas & dry-low-NOX burners	9 PPMVD @15%O2 30-DAY ROLLING AVERAGE	Good combustion practices & use of pipeline quality natural gas	6 PPMVD AT 15% OXYGEN ANNUAL AVERAGE	Good combustion practices & use of pipeline quality natural gas	0			Facility-wide energy efficiency measures , such as improved combustion measures, and use of pipeline quality natural gas.	50 KG/GJ ANNUAL AVERAGE
WASHINGTON PARISH ENERGY CENTER ONE, LLC WASHINGTON PARISH ENERGY CENTER WSHINGTON PARISH, LA	CTG02 NO - Simple-Cycle Combustion Turbine 2 (Normal Operations) [EQT0018]	*LA-0327	05/23/2018 ACT	TRUE	Pipeline quality natural gas & dry-low-NOX burners	9 PPMVD @15%O2 30-DAY ROLLING AVERAGE	Good combustion practices & use of pipeline quality natural gas	6 PPMVD AT 15% O2 ANNUAL AVERAGE	Good combustion practices & use of pipeline quality natural gas	0			Facility-wide energy efficiency measures , such as improved combustion measures, and use of pipeline quality natural gas.	50 KG/GJ ANNUAL AVERAGE
WASHINGTON PARISH ENERGY CENTER ONE, LLC WASHINGTON PARISH ENERGY CENTER WSHINGTON PARISH, LA	CTG01 SUSD - Simple-Cycle Combustion Turbine 1 (Startup/Shutdown/ Maintenance/Tuning/Runback) [EQT0019]	*LA-0327	05/23/2018 ACT	TRUE	Pipeline quality natural gas & dry-low-NOX burners	86.38 LB/HR HOURLY MAXIMUM	Good combustion practices & use of pipeline quality natural gas	800.08 LB/HR HOURLY MAXIMUM	Good combustion practices & use of pipeline quality natural gas	0			Facility-wide energy efficiency measures , such as improved combustion measures, and use of pipeline quality natural gas.	120 LB/MM BTU ANNUAL AVERAGE
WASHINGTON PARISH ENERGY CENTER ONE, LLC WASHINGTON PARISH ENERGY CENTER WSHINGTON PARISH, LA	CTG02 SUSD - Simple-Cycle Combustion Turbine 2 (Startup/Shutdown/ Maintenance/Tuning/Runback) [EQT0020]	*LA-0327	05/23/2018 ACT	TRUE	Pipeline quality natural gas & dry-low-NOX burners	86.38 LB/HR HOURLY MAXIMUM	Good combustion practices & use of pipeline quality natural gas	800.08 LB/HR HOURLY MAXIMUM	Good combustion practices & use of pipeline quality natural gas	0			Facility-wide energy efficiency measures , such as improved combustion measures, and use of pipeline quality natural gas.	120 LB/MM BTU ANNUAL AVERAGE
WASHINGTON PARISH ENERGY CENTER ONE, LLC WASHINGTON PARISH ENERGY CENTER WSHINGTON PARISH, LA	CTG01 CO - Simple-Cycle Combustion Turbine 1 (Commissioning) [SCN0005]	*LA-0327	05/23/2018 ACT	TRUE	Pipeline quality natural gas & dry-low-NOX burners	240 LB/HR HOURLY MAXIMUM	Good combustion practices & use of pipeline quality natural gas	2000 LB/HR HOURLY MAXIMUM	Good combustion practices & use of pipeline quality natural gas	0				
WASHINGTON PARISH ENERGY CENTER ONE, LLC WASHINGTON PARISH ENERGY CENTER WSHINGTON PARISH, LA	CTG02 CO - Simple-Cycle Combustion Turbine 2 (Commissioning) [SCN0006]	*LA-0327	05/23/2018 ACT	TRUE	Pipeline quality natural gas & dry-low-NOX burners	240 LB/HR HOURLY MAXIMUM	Good combustion practices & use of pipeline quality natural gas	2000 LB/HR HOURLY MAXIMUM	Good combustion practices & use of pipeline quality natural gas	0				
PLEASANTS ENERGY LLC WAVERLY POWER PLANT PLEASANTS, WV	GE 7FA.004 Turbine	WV-0028	03/13/2018 ACT	FALSE	Dry LNB	69 LB/HR	Combustion Controls	33.9 LB/HR					Use of natural gas & use of GE 7FA.004	
SOUTHERN POWER JACKSON COUNTY GENERATORS JACKSON, TX	COMBUSTION TURBINES	TX-0833	01/26/2018 ACT	FALSE	Dry low NOx burners	9 PPMVD	Dry low NOx burners	9 PPMVD	Good combustion practices	2 PPMVD				
GOLDEN SPREAD ELECTRIC COOPERATIVE, INC. MUSTANG STATION YOAKUM, TX	Simple Cycle Turbine	TX-0826	08/16/2017 ACT	FALSE	Dry low-NOx burners	9 PPMVD							Pipeline quality natural gas and good combustion practices	120 LB/MMBTU
SOUTHERN POWER JACKSON COUNTY GENERATING FACILITY JACKSON, TX	Simple Cycle Turbines	TX-0824	06/30/2017 ACT	FALSE									energy efficiency designs, practices, and procedures, CT inlet air cooling, periodic CT burner maintenance and tuning, reduction in heat loss, i.e., insulation of the CT, instrumentation and controls	1316 LB/MW HR
SOUTHWESTERN PUBLIC SERVICE COMPANY GAINES COUNTY POWER PLANT , TX	Simple Cycle Turbine	TX-0819	04/28/2017 ACT	FALSE	Dry Low NOx burners (control), natural gas, good combustion practices, limited operating hours (prevention)	9 PPMV 15% O2 3-H AVG	Good combustion practices; limited operating hours	9 PPMVD 3% O2 3-H AVG	Pipeline quality natural gas; limited hours; good combustion practices	2 PPMVD 145% O2	Pipeline quality natural gas; limited hours; good combustion practices	8.5 T/YR	Pipeline quality natural gas; limited hours; good combustion practices	1300 LB/MW H
DUKE ENERGY INDIANA, LLC VERMILLION GENERATING STA VERMILLION GENERATING STATION VERMILLION, IN	SIMPLE CYCLE, NATURAL GAS FIRED COMBUSTION TURBINES	IN-0261	02/28/2017 ACT	FALSE	GOOD COMBUSTION PRACTICES	250 LB/H EACH TURBINE	GOOD COMBUSTION PRACTICES	525 LB/H EACH TURBINE	GOOD COMBUSTION PRACTICES	17.6 LB/H EACH TURBINE				
CAMERON LNG LLC CAMERON LNG FACILITY CAMERON, LA	Gas turbines (9 units)	LA-0316	02/17/2017 ACT	FALSE	good combustion practices and dry low nox burners	15 PPMVD @15%O2	good combustion practices and fueled by natural gas	15 PPMVD @15%O2	good combustion practices and fueled by natural gas	1.6 PPMVD @15%O2			good combustion practices and fueled by natural gas; Use high thermal efficiency turbines	0
CORPUS CHRISTI LIQUEFACTION STAGE III, LLC CORPUS CHRISTI LIQUEFACTION SAN PATRICIO, TX	Refrigeration compressor turbines	TX-0816	02/14/2017 ACT	FALSE	Dry low emission burners	25 PPMDV @ 15% O2	Dry low emission burners	29 PPMDV @ 15% O2	Good combustion practices	0.68 LB/H				1793574 T/YR
PLEASANTS ENERGY, LLC WAVERLY FACILITY PLEASANTS, WV	GE Model 7FA Turbine	WV-0026	01/23/2017 ACT	FALSE	Dry Low-NOx Combustion System (DLNB), Water Injection	9 PPM NATURAL GAS	Good Combustion Practices	9 PPM NATURAL GAS						
AES OHIO GENERATION, LLC MONTPELIER GENERATING STATION WELLS, IN	PRATT & TWIN-PAC SIMPLE CYCLE TURBINES	IN-0264	01/06/2017 ACT	FALSE	WATER INJECTION	25 PPMV AT 15% O2 FOR NATURAL GAS	NATURAL GAS AS PRIMARY FUEL; GOOD COMBUSTION PRACTICES	0.2 LB/MMBTU NATURAL GAS						
PUENTE POWER VENTURA, CA	Gas turbine	CA-1238	10/13/2016 ACT	FALSE		2.5 PPMVD 1 HOUR@15%O2				2 PPMVD AS METHANE 1 HOUR@15%O2				
DOSWELL LIMITED PARTNERSHIP DOSWELL ENERGY CENTER DOSWELL ENERGY CENTER HANAOVER, VA	Two (2) GE 7FA simple cycle combustion turbines	VA-0326	10/04/2016 ACT	FALSE	Low NOx Burners/Combustion Technology	9 PPM VD/12 MO ROLLING TOTAL	Pipeline Quality Natural Gas	13.99 LB H/12 MO ROLLING TOTAL					Good combustion, maintenance and use of active combustion dynamic monitoring systems.	
INVENERGY INVENERGY NELSON EXPANSION LLC LEE, IL	Two Simple Cycle Combustion Turbines	IL-0121	09/27/2016 ACT	FALSE	Dry low-NOx combustion technology for natural gas and low-NOx combustion technology and water injection for ULSD.	0.033 LB/MMBTU							Turbine-generator design and proper operation	
GREENIDGE GENERATION LLC GREENIDGE STATION YATES, NY	Turbine - natural gas	NY-0106	09/07/2016 ACT	FALSE	Advanced low NOx burners, closed-coupled and staged over-fire air, Selective Non-Catalytic Reduction, and Selective Catalytic Reduction	0.03 LB/MMBTU 12 MO		0.095 LB/MMBTU 12 MO						

Summary of BACT Determinations

RBLC Seach Parameters:	Large (> 25MW) Simple Cycle Gas Turbines
Date Range:	2015 - 2025
Fuel:	Natural Gas
Process Code:	15.110
RBLC Search Date:	1/31/2025

Project	Process	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
BAYONNNE ENERGY CENTER LLC BAYONNNE ENERGY CENTER HUDSON, NJ	Simple Cycle Stationary Turbines firing Natural gas	NJ-0086	08/26/2016 ACT	FALSE	Selective Catalytic Reduction, water injection, use of natural gas a low NOx emitting fuel	2.5 PPMVD@15%O2 3 H ROLLING AV BASED ON ONE H BLOCK AV	Add-on control is CO Oxidation Catalyst, and use of natural gas as fuel for pollution prevention	5 PPMVD@15%O2 3 H ROLLING AV BASED ON ONE H BLOCK AV	Add-on VOC control is Oxidation Catalyst, and use of natural gas as fuel for pollution prevention	2 PPMVD@15%O2 3 H ROLLING AV BASED ON ONE H BLOCK AV				
BRAZOS ELECTRIC COOPERATIVE HILL COUNTY GENERATING FACILITY HILL, TX	Simple Cycle Turbine	TX-0794	04/07/2016 ACT	FALSE	Emission controls consist of dry low-NOx combustors (DLN). DLN combustors use two stages of combustion, transitioning from initial startup with fuel and flame in the primary nozzles only, through a lean lean stage with fuel and flame in the primary and secondary nozzles, to fuel in the secondary stage only, extinguishing the primary flame, and in full operation, premix mode, with fuel to both nozzles, but flame only in the second stage. When natural gas and air are well-mixed before combustion, the flame temperature and resulting NOx emissions are greatly reduced compared to conventional	9 PPMVD @ 15% O2 3-HR ROLLING AVERAGE	Premixing of fuel and air enhances combustion efficiency and minimizes emissions.	9 PPMVD @ 15% O2 3-HR AVERAGE	Premixing of fuel and air enhances combustion efficiency and minimizes emissions.	5.4 LB/H				1434 LB/MWH
APEX TEXAS POWER LLC NECHES STATION CHEROKEE, TX	Large Combustion Turbines > 25 MW	TX-0788	03/24/2016 ACT	FALSE	Dry low-NOx burners (DLN), good combustion practices	9 PPM	good combustion practices	9 PPM	good combustion practices	2 PPM			good combustion practiceS	1341 LB/MW H
MAGNOLIA LNG, LLC MAGNOLIA LNG FACILITY CALCASIEU, LA	Gas Turbines (8 units)	LA-0307	03/21/2016 ACT	FALSE	Dry Low NOX burners and good combustion practices	25 PPMVD @15 %O2	good combustion practices and fueled by natural gas	0.062 LB/MM BTU THREE ONE-HOUR TEST AVERAGE	good combustion practices and fueled by natural gas	0			good combustion/operating/maintenance practices and fueled by natural gas; use intake air chiller	0
PSEG FOSSIL LLC PSEG FOSSIL LLC SEWAREN GENERATING STATION MIDDLESEX, NJ	Combined Cycle Combustion Turbine without Duct Burner Firing Natural Gas	NJ-0084	03/10/2016 ACT	FALSE	SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM	2 PPMVD@15%O2 3 H ROLLING AV BASED ON ONE H BLOCK	OXIDATION CATALYST AND GOOD COMBUSTION PRACTICES	2 PPMVD@15%O2 3 H ROLLING AV BASED ON ONE H BLOCK	OXIDATION CATALYST AND GOOD COMBUSTION PRACTICES	1 PPMVD@15%O2 3 H ROLLING AV BASED ON ONE H BLOCK				
PSEG FOSSIL LLC PSEG FOSSIL LLC SEWAREN GENERATING STATION MIDDLESEX, NJ	Combined Cycle Combustion Turbine with Duct Burner firing natural gas	NJ-0084	03/10/2016 ACT	FALSE	SCR and use of natural gas a clean burning fuel	2 PPMVD@15%O2 3 H ROLLING AV BASED ON ONE H BLOCK	Oxidation Catalyst and good combustion practices	2 PPMVD@15%O2 3 H ROLLING AV BASED ON ONE H BLOCK	Oxidation Catalyst and good combustion practices	2 PPMVD 3 H ROLLING AV BASED ON ONE H BLOCK				
NACOGDOCHES POWER NACOGDOCHES POWER ELECTRIC GENERATING PLANT NACOGDOCHES, TX	Combined Cycle & Cogeneration	TX-0786	03/01/2016 ACT	FALSE									Good Combustion Practices	1316 LB/MW HR
TENASKA PA PARTNERS LLC TENASKA PA PARTNERS/WESTMORELAND GEN FAC WESTMORELAND, PA	Large combustion turbine	PA-0306	02/12/2016 ACT	FALSE					Ox Cat and good combustion practices	1.4 PPMVD @ 15% O2				
CRICKET VALLEY ENERGY CENTER LLC CRICKET VALLEY ENERGY CENTER USA, NY	Turbines and duct burners	NY-0103	02/03/2016 ACT	FALSE	dry low NOx burners in combination with selective catalytic reduction	2 PPMVD @ 15% O2 1 H	good combustion practice and oxidation catalyst	2 PPMVD @ 15% O2 1 H	good combustion practices and oxidation catalyst	0.7 PPMVD @ 15% O2 1 H			max heat rate 7,604 btu/kw-h HHV without duct firing good combustion practice and burning natural gas	0
NAVASOTA NORTH PEAKERS OPERATING COMPANY I, LLC. VAN ALSTYNE ENERGY CENTER GRAYSON, TX	Simple Cycle Turbine	TX-0780	01/13/2016 ACT	FALSE										

Summary of BACT Determinations
RBLC Seach Parameters: Large (> 25MW) Simple Cycle Gas Turbines
Date Range: 2015 - 2025
Fuel: Natural Gas
Process Code: 15.110
RBLC Search Date: 1/31/2025

Project	Process	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
NAVASOTA SOUTH PEAKERS OPERATING COMPANY II, LLC. UNION VALLEY ENERGY CENTER NIXON, TX	Simple Cycle Turbine	TX-0778	12/16/2015 ACT	FALSE										1461 LB/MW H
NAVASOTA SOUTH PEAKERS OPERATING COMPANY I, LLC. UNION VALLEY ENERGY CENTER NIXON, TX	Simple Cycle Turbine	TX-0777	12/09/2015 ACT	FALSE	dry low NOX burners	9 PPMVD @ 15% O2 3-HR ROLLING AVERAGE PEAK	dry low NOx burners and good combustion practices	9 PPMVD @ 15% O2 ALL LOADS						
NAVASOTA SOUTH PEAKERS OPERATING COMPANY II, LLC. CLEAR SPRINGS ENERGY CENTER (CSEC) GUADALUPE, TX	Simple Cycle Turbine	TX-0775	11/13/2015 ACT	FALSE									Low carbon fuel, good combustion, efficient combined cycle design	1461 LB/MW H
NAVASOTA SOUTH PEAKERS OPERATING COMPANY II, LLC. CLEAR SPRINGS ENERGY CENTER (CSEC) GUADALUPE, TX	Simple Cycle Turbine	TX-0734	05/08/2015 ACT	FALSE	dry low-NOx (DLN) burners	9 PPMVD @ 15% O2 3-HR AVERAGE	DLN burners and good combustion practices	9 PPMVD @ 15% O2 ALL LOADS						
SHAWNEE ENERGY CENTER, LLC SHAWNEE ENERGY CENTER HILL, TX	Simple cycle turbines greater than 25 megawatts (MW)	TX-0771	11/10/2015 ACT	FALSE										1398 LB/MWH
SHAWNEE ENERGY CENTER, LLC SHAWNEE ENERGY CENTER HILL, TX	Simple cycle turbines greater than 25 megawatts (MW)	TX-0768	10/09/2015 ACT	FALSE	Dry Low NOx burners	9 PPMVD @ 15% O2	dry low NOx burners and lmiited operation, clean fuel	9 PPMVD @ 15% O2	Pipeline quality natural gas; limited hours; good combustion practices.	1.4 PPMV				
NAVASOTA NORTH COUNTRY PEAKERS OPERATING COMPANY I VAN ALSTYNE ENERGY CENTER (VAEC) GRAYSON, TX	Simple Cycle Turbine	TX-0769	10/27/2015 ACT	FALSE	DLN burners	9 PPMVD @ 15% O2 3-HR AVERAGE	DLN burners and good combustion practices	9 PPMVD @ 15% O2						
NACOGDOCHES POWER, LLC NACOGDOCHES POWER ELECTRIC GENERATING PLANT NACOGDOCHES, TX	Natural Gas Simple Cycle Turbine (>25 MW)	TX-0764	10/14/2015 ACT	FALSE	Dry Low NOx burners, good combustion practices, limited operations	9 PPMVD @ 15% O2	dry low NOx burners, good combustion practices, limited operation	9 PPMVD @ 15% O2	Pipeline quality natural gas; limited hours; good combustion practices.	2 PPMVD @ 15% O2	Pipeline quality natural gas; limited hours; good combustion practices.	12.09 LB/HR		
NRG TEXAS POWER SR BERTRON ELECTRIC GENERATING STATION HARRIS, TX	Simple cycle turbines greater than 25 megawatts (MW) firing natural gas	TX-0761	09/15/2015 ACT	FALSE										
NRG TEXAS POWER CEDAR BAYOU ELECTRIC GENERATING STATION CHAMBERS, TX	Simple cycle turbines greater than 25 megawatts (MW)	TX-0762	09/15/2015 ACT	FALSE										
FLORIDA POWER & LIGHT (FPL) FORT MYERS PLANT LEE, FL	COMBUSTION TURBINES	FL-0355	09/10/2015 ACT	FALSE	DLN and wet injection (for ULSD operation)	9 PPMVD@15% O2 GAS FIRING, 24-HR BLOCK AVG					Use of clean fuels, and annual VE test	2 GR S / 100 SCF GAS FOR NATURAL GAS	Use of low-emitting fuel and efficient turbine	1374 LB CO2E / MWH FOR NATURAL GAS OPERATION
FLORIDA POWER & LIGHT LAUDERDALE PLANT BROWARD, FL	Five 200-MW combustion turbines	FL-0354	08/25/2015 ACT	FALSE	Dry-low-NOx combustion system. Wet injection when firing ULSD.	9 PPMVD@15%O2 24-HR BLOCK AVERAGE	Good combustion minimizes CO formation	4 PPMVD@15%O2 NAT GAS, THREE 1-HR RUNS			Clean fuel prevents PM formation	2 GR. S / 100 SCF GAS FUEL RECORD KEEPING		

Summary of BACT Determinations

RBLC Seach Parameters:	Large (> 25MW) Simple Cycle Gas Turbines
Date Range:	2015 - 2025
Fuel:	Natural Gas
Process Code:	15.110
RBLC Search Date:	1/31/2025

Project	Process	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
SHELL CHEMICAL APPALACHIA SHELL CHEM APPALACHIA/PETROCHEMICALS COMPLEX BEAVER, PA	Combustion turbine wih duct burner and heat recovery steam generator	PA-0305	06/18/2015 ACT	FALSE		2 PPMDV @ 15% O2 1 HOUR AVG EX DURING STARTUP AND SHUTDOW		2 PPMDV @ 15% O2 1 HR AVG EX DURING STARTUP AND SHUTDOWN		1 PPMDV @ 15% O2 1 HR AVERAGE				1030 CO2E/MWH 30 DAY ROLLING AVG*
CASH CREEK GENERATION, L.L.C CASH CREEK GENERATING STATION HENDERSON, KY	Combined cycle combustion turnbine with HRSG and duct firing	KY-0104	06/10/2015 ACT	FALSE	SCR, low NOx burners	2 PPMVD @15% O2 THREE HOUR ROLLING AVERAGE	Catalytic Oxidation	2 PPMVD @15%O2 BASED ON 3-HOUR ROLLING AVERAGE	burn Pipeline quality Natural Gas		Combust only pipeline quality natural gas	0.0088 LB.MMBTU THREE HOUR ROLLING AVERAGE	Combust only pipeline quality natural gas	884 LB/MWH 12 MONTH ROLLING AVERAGE
GOLDEN SPREAD ELECTRIC COOPERATIVE, INC. ANTELOPE ELK ENERGY CENTER HALE, TX	Simple Cycle Turbine & Generator	TX-0735	05/20/2015 ACT	FALSE									Energy efficiency, good design & combustion practices	1304 LB CO2/MWHR
GOLDEN SPREAD ELECTRIC COOPERATIVE, INC. ANTELOPE ELK ENERGY CENTER HALE, TX	Simple Cycle Turbine & Generator	TX-0733	05/12/2015 ACT	FALSE	Dry Low NOx burners	9 PPMVD AT 15% O2	Good combustion practices; limited operating hours	9 PPMVD @ 15% O2 3-HR AVERAGE	Good combustion practices	2 PPMVD @ 15% O2	Pipeline quality natural gas; limited hours; good combustion practices.			
CORPUS CHRISTI LIQUEFACTION LLC CORPUS CHRISTI LIQUEFACTION PLANT GREGORY, TX	Refrigeration compressor turbines	TX-0679	02/27/2015 ACT	FALSE									install efficient turbines, follow the turbine manufacturerâ€™s emission-related written instructions for maintenance activities including prescribed maintenance intervals to assure good combustion and efficient operation. Compressors shall be inspected and maintained according to a written maintenance plan to maintain efficiency	146754 TPY ROLLING 12-MONTH BASIS
INDECK WHARTON, L.L.C. INDECK WHARTON ENERGY CENTER WHARTON, TX	(3) combustion turbines	TX-0694	02/02/2015 ACT	FALSE	DLN combustors	9 PPMVD @15% O2, 3-HR ROLLING AVERAGE	DLN combustors	4 PPMVD @15% O2, 3-HR ROLLING AVG - SIEMENS						

Summary of BACT Determinations

RBLC Seach Parameters:	Small (< 25MW) Combined Cycle Gas Turbines
Date Range:	2015 - 2025
Fuel:	Natural Gas
Process Code:	16.210
RBLC Search Date:	1/31/2025

Project	Process	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
AGRIUM U.S. INC. KENAI NITROGEN OPERATIONS KENAI PENNINSULA BOROUGH, AK	Five (5) Natural Gas-Fired Combustion Turbines	AK-0086	03/26/2021 ACT	FALSE	Selective Catalytic Reduction and SoLoNOx Technology on Turbines	5 PPMV AT 15% O2 THREE-HOUR AVERAGE	Good Combustion Practices and Clean Burning Fuel	50 PPMV AT 15% O2 THREE-HOUR AVERAGE	Good Combustion Practices	0.0036 LB/MMBTU THREE-HOUR AVERAGE	Good Combustion Practices	0.0075 LB/MMBTU THREE-HOUR AVERAGE	Good Combustion Practice and Waste Heat Recovery	58.4 TON/MMSCF THREE-HOUR AVERAGE
SABINE PASS LNG, LP AND SABINE PASS LIQUEFACTION SABINE PASS LNG TERMINAL CAMERON, LA	Generator Turbines	LA-0375	09/17/2020 ACT	FALSE	Dry Low NOx and good combustion practices	150 PPM @ 15%O2 AND < 75% LOAD	Good combustion practices and use od clean natural gas	25 PPM @ 15%O2 AT ALL LOAD						
US NAVY NORFOLK NAVAL SHIPYARD NORFOLK NAVAL SHIPYARD NORFOLK, VA	Two (2) turbines - HRSG	VA-0333	12/09/2020 ACT	FALSE									use of low carbon fuel and efficient power generation.	117.1 LB MMBTU
THE REGENTS OF THE UNIVERSITY OF MICHIGAN CENTRAL POWER PLANT WASHTENAW, MI	EU-CPP-CHPHRSG (combined heat and power unit)	MI-0436	08/23/2018 ACT	FALSE									Follow manufacturer inspection and maintenance recommendations, install insulation where appropriate to minimize heat loss, use of computer-based control system that enables monitoring and optimal fuel and air flows, select system design to maximum efficiency, an audible, visible, and olfactory inspection and maintenance routine to minimize leaks in gas piping components.	155597 T/YR OF CO2E
MASSACHUSETTS INSTITUTE OF TECHNOLOGY MIT CENTRAL UTILITY PLANT MIDDLESEX, MA	Combustion Turbine with Duct Burner	MA-0043	06/21/2017 ACT	FALSE	Dry Low NOx combustor for CTG & Selective Catalytic Reduction	2 PPMVD@15% O2 1 HR BLOCK AVG/EXCLUDING SS, NG FIRING	Oxidation Catalyst	2 PPMVD@15% O2 1 HR BLOCK AVG/EXCLUDING SS, NG FIRING	Oxidation Catalyst	1.7 PPMVD@15% O2 1 HR BLOCK AVG/EXCLUDING SS, NG FIRING				117.098 LB/MMBTU 1 HR BLOCK AVG/EXCLUDING SS, NG FIRING
EQUISTAR CHEMICALS, LP WESTLAKE FACILITY CALCASIEU, LA	Solar Titan 130 Gas Turbine with Unfired HRSG (3-08, EQT 323)	LA-0295	07/12/2016 ACT	FALSE	Dry low NOx combustor (SoLoNOx) and good combustion practices, including good equipment design, use of gaseous fuels for good mixing, and proper combustion techniques (see notes below)	14.25 LB/HR HOURLY MAXIMUM			Good combustion practices, including good equipment design, use of gaseous fuels for good mixing, and proper combustion techniques consistent with the manufacturer's recommendations to maximize fuel efficiency and minimize emissions (see notes below)	1.64 LB/H HOURLY MAXIMUM				
MATEP LIMITED PARTNERSHIP MEDICAL AREA TOTAL ENERGY PLANT SUFFOLK, MA	Combustion Turbine with Duct Burner	MA-0041	07/01/2016 ACT	FALSE	Dry Low NOx Combustor & Selective Catalytic Reduction	2 PPMVD@15% O2 1 HR BLOCK AVG/EXCLUDING SS, NG FIRING	Oxidation Catalyst	2 PPMVD@15% O2 1 HR BLOCK AVG/EXCLUDING SS, NG FIRING	Oxidation Catalyst	1.7 PPMVD@15% O2 1 HR BLOCK AVG/EXCLUDING SS, NG FIRING				119 LB/MMBTU 1 HR BLOCK AVG/EXCLUDING SS, NG FIRING

Summary of BACT Determinations

RBLC Seach Parameters:	Large (> 25MW) Combined Cycle Gas Turbines
Date Range:	2015 - 2025
Fuel:	Natural Gas
Process Code:	15.210
RBLC Search Date:	1/31/2025

Project	Process	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
MAPLE CREEK ENERGY LLC SULLIVAN, IN	Combined Cycle Turbine CTGA	*IN-0365	06/19/2023 ACT	TRUE	Selective catalytic reduction system and dry-low-NOx combustors	0.0085 POUND PER MMBTU	Oxidation catalyst	2 PPMVD 15% O2 BASED ON A 3-HR AVERAGE	Oxidation catalyst	0.0015 POUNDS PER MMBTU	0	0.0049 POUND PER MMBTU	0	726 LB/MW-HR (GROSS) CORRECTED TO ISO CONDITIONS
	Combined Cycle Turbine CTGB	*IN-0365	06/19/2023 ACT	TRUE	Selective Catalytic Reduction system and dry-low-NOx combustors.	2 PPMVD 15% O2 BASED ON A 3-HR AVERAGE	oxidation catalyst	2 PPMVD @ 15% O2 BASED ON A 3-HR AVERAGE	catalytic oxidation	0.0013 POUNDS PER MMBTU	0	0.0074 POUND PER MMBTU	0	826 LB/MW-HR (GROSS) CORRECTED TO ISO CONDITIONS
WABASH VALLEY RESOURCES, LLC VIGO, IN	Integrated Gasification Combined Cycle Combustion Turbine	*IN-0371	01/11/2024 ACT	TRUE	Steam Injection/SCR and Good Combustion Practices	2 PPMV 15% OXYGEN WHEN COMBUSTING >50% NAT. GAS							Good Combustion Practices	110 LB/MMBTU
ALASKA GASLINE DEVELOPMENT CORPORATION GAS TREATMENT PLANT NORTH SLOPE BOROUGH, AK	Six (6) Cogeneration Gas-Fired Turbines (CO2 Compressor Turbines))	AK-0085	08/13/2020 ACT	FALSE	DLN combustors and good combustion practices	17 PPMV @ 15% O2 3-HOUR AVERAGE	Oxidation catalyst and good combustion control practices	5 PPMV @ 15% O2 3-HOUR AVERAGE	Oxidation catalyst and good combustion control practices	0.0022 LB/MMBTU 3-HOUR AVERAGE	Good Combustion Practices and burning clean fuels (NG)	0.0063 LB/MMBTU 3-HOUR AVERAGE	Good combustion practices and clean burning fuel (NG)	117.1 LB/MMBTU 3-HOUR AVERAGE
	Six (6) Cogeneration Gas-Fired Turbines (Treated Gas Compressor Turbines)	AK-0085	08/13/2020 ACT	FALSE	DLN combustors and Good Combustion Practices	17 PPMV @ 15% O2 3-HOUR AVERAGE	Oxidation catalyst and good combustion practices	5 PPMV @ 15% O2 3-HOUR AVERAGE	Oxidation catalyst and good combustion practices	0.0022 LB/MMBTU 3-HOUR AVERAGE	Good Combustion Practices and burning clean fuels (NG)	0.0063 LB/MMBTU 3-HOUR AVERAGE	Good combustion practices and clean burning fuel (NG)	117.1 LB/MMBTU 3-HOUR AVERAGE
ALASKA GASLINE DEVELOPMENT CORPORATION LIQUEFACTION PLANT KENAI PENNINSULA BOROUGH, AK	Four Combined Cycle Gas-Fired Turbines	AK-0088	07/07/2022 ACT	FALSE	SCR, DLN combustors, and good combustion practices	2 PPMV @ 15% O2 3-HOURS	Oxidation Catalyst and good combustion practices	2 PPMV @ 15% O2 3-HOURS	Oxidation catalyst and good combustion practices	2 PPMV @ 15% O2 3-HOURS	Good combustion practices and burning clean fuel (natural gas)	0.007 LB/MMBTU 3-HOURS	Good combustion practices and burning clean fuels (natural gas)	117.1 LB/MMBTU 3-HOURS
CALPINE MID-MERIT LLC YORK ENERGY CRT DELTA YORK, PA	Combined Cycle Combustion Turbines	*PA-0336	12/14/2021 ACT	TRUE			Oxidation Catalyst	2 PPMVD >=90% LOAD						
EL PASO ELECTRIC COMPANY NEWMAN POWER STATION EL PASO, TX	Simple Cycle Turbine	TX-0908	08/27/2021 ACT	FALSE	Dry Low NOx Burners and SCR	2.5 PPMVD	Oxidation catalyst	3 PPMVD	Use of Natural gas, good combustion practices, and oxidation catalyst	2 PPMVD			Use of natural gas and good combustion practices	0
	Combined Cycle Turbines	TX-0939	03/13/2023 ACT	FALSE			Oxidation Catalyst and good combustion practices	2 PPMVD 15% O2 24-HR AVERAGE	Oxidation Catalyst and good combustion practices	2 PPMVD 15% O2 3-HR AVERAGE			good combustion practices and clean fuel	0
FG LA LLC FG LA COMPLEX ST. JAMES, LA	Cogeneration Units	LA-0364	01/06/2020 ACT	FALSE	Dry low NOx combustor design along with SCR.	2 PPMVD 12-MONTH ROLLING AVERAGE	Good combustion practices and catalytic oxidation	4 PPMVD	Good combustion practices and catalytic oxidation	4 PPMVD			Use of natural gas as fuel, energy-efficient design options, and	1096666 TONS/YR
LINCOLN LAND ENERGY CENTER (A/K/A EMBERCLEAR) LINCOLN LAND ENERGY CENTER SANGAMON, IL	Combined-Cycle Combustion Turbines	IL-0133	07/29/2022 ACT	FALSE	Dry low-NOx combustion with ultra-low NOx combustors; low-NOx duct burners; and selective catalytic reduction (SCR)	2 PPMV @ 15% O2 SEE NOTES	Oxidation catalyst and good combustion practices	1.5 PPMV @ 15% O2 TURBINE LOAD > OR = 60% W/O DUCT BURNERS	Oxidation catalyst and good combustion practices.	1 PPMV, ADJ. TO 15% O2 ROLLING 3-OPERATING HOUR	Good combustion practices	0.0032 POUNDS/MMBTU WITH DUCT BURNER; ROLLING 3-OPERATING HR	Inherently lower-polluting design, good combustion practices and operational energy efficiency	850 LB/MW-HR (GROSS) 12 CONSECUTIVE OPERATING MONTHS
	Combined Cycle Gas Turbine w/ Duct Burners and HRSG	LA-0391	06/03/2022 ACT	FALSE	Dry low-NOx combustor design, selective catalytic reduction (SCR), and good	2 PPMVD 24-HR ROLLING AVG BASED ON 1-HR AVG	Catalytic oxidation and good combustion practices.	2 PPMVD 24-HR ROLLING AVG BASED ON 1-HR AVG	Catalytic oxidation and good combustion practices.	1 PPMVD 3 1-HR TEST AVERAGE			Use of gaseous fuel (pipeline-quality natural gas), thermally efficient	875 LB/MW-H ANNUAL AVERAGE
MARSHALL ENERGY CENTER, LLC MEC NORTH, LLC CALHOUN, MI	EUCTGHRSG (North Plant): A combined cycle natural gas fired combustion turbine generator with heat recovery steam generator	MI-0451	06/23/2022 ACT	FALSE	SCR with DLNB (Selective catalytic reduction with Dry low NOx burners)	2.5 PPM 24-HR ROLLING AVG	Oxidation catalyst technology and good combustion practices.	2 PPM 24-HR ROLLING AVG	Oxidation catalyst technology and good combustion practices.	2 PPM HOURLY			Energy efficiency measures and the use of a low carbon fuel (pipeline quality natural gas)	2001019 T/YR 12-MO ROLLING TIME PERIOD
MARSHALL ENERGY CENTER, LLC MEC SOUTH, LLC CALHOUN, MI	EUCTGHRSG (South Plant): A combined-cycle natural gas-fired combustion turbine generator with heat recovery steam generator.	MI-0452	06/23/2022 ACT	FALSE	SCR with DLNB [Selective Catalytic Reduction with Dry Low NOx Burners]	2 PPM 24-HR ROLLING AVG	Oxidation Catalyst Technology and Good Combustion Practices	2 PPM 24-HR ROLLING AVG	Oxidation Catalyst Technology and Good Combustion Practices	2 PPM HOURLY			Energy Efficiency Measures and the use of a low carbon fuel (pipeline quality natural gas)	2001019 T/YR 12-MO ROLLING TIME PERIOD

Summary of BACT Determinations

RBLC Seach Parameters: Large (> 25MW) Combined Cycle Gas Turbines

Date Range: 2015 - 2025
Fuel: Natural Gas
Process Code: 15.210
RBLC Search Date: 1/31/2025

Project	Process	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
MOUNTAIN STATE CLEAN ENERGY, LLC MAIDSVILLE MONONGALIA, WV	Combustion Turbine & Duct Burner (CT-01/HRSG1 & CT-02/HRSG2)	*WV-0033	01/05/2022 ACT	TRUE	Dry Low NOx Combustor with SCR	2 PPMDV @ 15% O2 3-HOUR ROLLING AVERAGE	Good Combustion Practices and Oxidation catalyst	2 PPMDV @ 15% O2 3-HOUR BLOCK AVERAGE	good combustion practices and oxidation catalyst	1 PPMDV @ 15% O2 AVG OF 3 1-HR TEST RUNS (W/O DUCT FIRING	Good Combustion Practice and Clean Fuel	0.006 LB/MMBTU AVG OF 3 4-HR TEST RUNS		
	Natural-Gas-Fired Combined-Cycle Turbine (P01)	WI-0300	09/01/2020 ACT	FALSE	Selective Catalytic Reduction (SCR), low-NOx burners, Water injection when firing diesel fuel oil.	2 PPM AT 15% O2 24-HR ROLLING AVG., NATURAL GAS	Oxidation Catalyst and good combustion controls	1.5 PPM AT 15% O2 168-HR ROLLING AVG., NATURAL GAS	Oxidation Catalyst, good combustion control	2.7 PPM AT 15% O2 168-HR AVG., NAT. GAS, DUCT FIRING	Only combust pipeline quality natural gas and diesel fuel oil and use good combustion control according to the manufacturerâ€™s recommendations.	36.3 LB/H NATURAL GAS, DUCT FIRING	Efficient turbine design, only combust pipeline quality natural gas and diesel fuel oil, Oxidation Catalyst	850 LB CO2/MW-H 12-MO ROLLING AVG., NATURAL GAS
NRG CEDAR BAYOU LLC UNIT 5 CHAMBERS, TX	COMBINED CYCLE TURBINE	TX-0915	03/17/2021 ACT	FALSE			OXIDATION CATALYST	4 PPMVD 3-HR ROLLING	OXIDATION CATALYST	1 PPMVD 3-HR ROLLING			Low sulfur natural gas fuel	0
PANDA STONEWALL LLC PANDA STONEWALL LLC LOUDOUN, VA	Combustion Turbines, Two (2) and HRSG Duct Burners	*VA-0335	12/18/2020 ACT	TRUE	Selective Catalytic Reduction (SCR), with ammonia injection and dry low NOx combustion	2 PPMVD @ 15% O2 W & W/O DUCT BURNING	Catalytic Oxidizer	2 PPMVD @ 15% O2 NORMAL OPERATION W & W/O DUCT BURNING	Catalytic Oxidizer	1.5 PPMVD AT 15% O2 NORMAL OPERATIONS W DUCT BURNER/W/O DB				
PORT ARTHUR LNG, LLC LNG EXPORT TERMINAL JEFFERSON, TX	Refrigeration Compression Turbines	TX-0878	09/15/2022 ACT	FALSE	Dry low NOx burners and good combustion practices.	0 PPM 24-HR AVG	good combustion practices.	25 PPM 24-HR AVG	good combustion practices.	2 PPM 3-HR AVG	Dry low NOx burners and good combustion practices.	11 LB/HR	Equipment specifications & work practices - Good combustion practices and	504000 TON/Y
RENOVO ENERGY CENTER LLC RENOVO ENERGY CENTER LLC/RENOVO PLT CLINTON, PA	COMBUSTION TURBINE #1 (ULSD)	PA-0334	04/29/2021 ACT	FALSE	selective catalytic reduction (SCR) system, oxidation catalyst.	4 PPMVD @ 15% O2 / 1 HR	SCR, Catalytic Oxidizer	2 PPMVD @ 15% O2 / 1 HR	SCR, Catalytic Oxidizer	2 PPMVD @ 15% O2 / 1 HR	SCR, Catalytic Oxidizer	0.0122 LB/MMBTU		
	COMBUSTION TURBINE #2 (ULSD)	PA-0334	04/29/2021 ACT	FALSE	selective catalytic reduction (SCR) system, oxidation catalyst.	4 PPMVD @ 15% O2 / 1 HR	selective catalytic reduction (SCR) system, oxidation catalyst.	2 PPMVD @ 15% O2 / 1 HR	selective catalytic reduction (SCR) system, oxidation catalyst.	2 PPMVD @ 15% O2 / 1 HR	selective catalytic reduction (SCR) system, oxidation catalyst.	0.0122 LB/MMBTU		
	COMBUSTION TURBINE w DUCT BURNER #1 (Natural Gas)	PA-0334	04/29/2021 ACT	FALSE	SCR, Catalytic Oxidizer	2 PPMVD @ 15% O2 / 1 HR	SCR, Catalytic Oxidizer	1.5 PPMVD @ 15% O2 / 1 HR	SCR, Catalytic Oxidizer	1.6 PPMVD @ 15% O2 / 1 HR	SCR, Catalytic Oxidizer	0.005 LB/MMBTU		
	COMBUSTION TURBINE w DUCT BURNER #2 (Natural Gas)	PA-0334	04/29/2021 ACT	FALSE	SCR, CATALYTIC OXIDIZER	2 PPMVD @ 15% O2 / 1 HR	SCR, CATALYTIC OXIDIZER	1.5 PPMVD @ 15% O2 / 1 HR	SCR, CATALYTIC OXIDIZER	1.6 PPMVD @ 15% O2 / 1 HR	SCR, CATALYTIC OXIDIZER	0.005 LB/MMBTU		
SHADY HILLS ENERGY CENTER, LLC SHADY HILLS COMBINED CYCLE FACILITY PASCO, FL	GE 7HA.02 Combustion Turbine and HRSG with Duct Firing	FL-0371	06/07/2021 ACT	FALSE	Dry low-NOX combustors and Selective Catalytic Reduction (SCR)	2 PPMVD AT 15% O2 24-HOUR BLOCK AVERAGE BASIS (BACT)	Clean burning fuel with good combustion practices	4.3 PPMVD AT 15% O2 (TURBINE LOADS â‰¥ 90%); THREE 1-HR					Low-emitting fuel	875 LB/MWH 12-MO ROLLING (PRIMARY BACT)
	1-on-1 combined cycle unit (GE 7HA)	FL-0367	07/27/2018 ACT	FALSE	Dry low-NOX combustors and Selective Catalytic Reduction (SCR)	2 PPMVD AT 15% O2 24-HOUR BLOCK AVERAGE BASIS (BACT)	Clean burning fuel with good combustion practices	4.3 PPMVD @15% O2 (TURBINE LOADS â‰¥ 90%); THREE 1-HR RUNS						
VIRGINIA ELECTRIC AND POWER COMPANY DOMINION ENERGY - BRUNSWICK BRUNSWICK, VA	COMBUSTION TURBINE GENERATORS, (3) with Alternate Operating Scenario - Turbine Blade Water Washing	VA-0334	12/01/2020 ACT	FALSE	Dry, low NOx burners and selective catalytic reduction (SCR) with a NOx performance of 2.0 ppmvd at 15% O2.	604 LBS CALENDAR DAY/PER TURBINE	Oxidation catalyst and good combustion practices.	416 LBS CALENDAR DAY/PER TURBINE						
	COMBUSTION TURBINE GENERATORS, (3) with Alternate Operating Scenario - Turbine Tuning	VA-0334	12/01/2020 ACT	FALSE	Dry, low NOx burners and selective catalytic reduction (SCR) with a NOx performance of 2.0 ppmvd at 15% O2.	604 LBS CALENDAR DAY/PER TURBINE	Oxidation catalyst and good combustion practices.	416 LBS CALENDAR DAY/PER TURBINE						
WPL- RIVERSIDE ENERGY CENTER WPL- RIVERSIDE ENERGY CENTER ROCK, WI	Natural Gas Fired Combustion Turbine (P20, P21) Phase I Commissioning	WI-0306	02/28/2020 ACT	FALSE	0	110 PPMVD, 15% OXYGEN AVG. ANY 24-HR OPERATIONAL PERIOD	0	1750 PPMVD, 15% OXYGEN AVG. ANY 24-HR OPERATIONAL	0	0 SEE NOTES			0	118 LB CO2/MMBTU HEAT INPUT
	Natural Gas Fired Combustion Turbine (P20, P21) Phase II Commissioning	WI-0306	02/28/2020 ACT	FALSE	0	55 PPMVD, 15% OXYGEN AVG. ANY 24-HR OPERATIONAL PERIOD	0	150 PPMVD, 15% OXYGEN AVG. ANY 24-HR OPERATIONAL PERIOD	0	0 (SEE NOTES)				
	Natural Gas Fired Combustion Turbine (P20, P21)- Startup operation during Phase I Commissioning	WI-0306	02/28/2020 ACT	FALSE	0	110 PPMVD, 15% OXYGEN AVG. ANY 24-HR OPERATIONAL PERIOD								
	Natural Gas Fired Combustion Turbine (P20, P21)- Startup operation during Phase II Commissioning	WI-0306	02/28/2020 ACT	FALSE	0	55 PPMVD, 15% OXYGEN AVG. ANY 24-HR OPERATIONAL PERIOD								

Summary of BACT Determinations

RBLC Seach Parameters: Large (> 25MW) Combined Cycle Gas Turbines

Date Range: 2015 - 2025
Fuel: Natural Gas
Process Code: 15.210
RBLC Search Date: 1/31/2025

Project	Process	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
MIDLAND COGENERATION VENTURE LIMITED PARTNERSHIP MIDLAND COGENERATION VENTURE LIMITED PARTNERSHIP MIDLAND, MI	EUCTGHRSG1	MI-0455	02/01/2023 ACT	FALSE	Selective catalytic regeneration	2 PPM PPMVD AT 15%O2; 24-HR ROLL AVG EXC SU/SD	Oxidation catalyst	2 PPM PPMVD AT 15%O2; 24-HR ROLL AVG EXC SU/SD	Oxidation catalyst	2.4 PPM PPMVD AT 15%O2; HOURLY EXC SU/SD			Low carbon fuel, good combustion practices, energy efficiency measures	2375313 T/YR 12-MO ROLLING TIME PERIOD
LANSING BOARD OF WATER AND LIGHT LBWL-ERICKSON STATION EATON, MI	EUCTGHRSG1	MI-0454	12/20/2022 ACT	FALSE	Dry low NOx burners and selective catalytic reduction for NOx control for each CTG/HRSG unit.	3 PPM PPMVD AT 15%O2; 24-HR ROLL AVG EXC SU/SD	An oxidation catalyst for CO control for each CTG/HRSG unit, good combustion practices.	9 LB/H HOURLY EXCEPT DURING SU/SD	An oxidation catalyst for VOC control for each CTG/HRSG unit, good combustion practices.	3 PPM PPMVD AT 15%O2; HOURLY EXC SU/SD			low carbon fuel (pipeline quality natural gas), good combustion practices, and energy efficiency measures.	430349 T/YR 12-MO ROLLING TIME PERIOD; DUR. ALL MODE
	EUCTGHRSG2	MI-0454	12/20/2022 ACT	FALSE	Dry low NOx burners and selective catalytic reduction for NOx control for each CTG/HRSG unit.	3 PPM @15%OX; 24-HR ROLL AVG EXCEPT START/SHUT	An oxidation catalyst for CO control for each CTG/HRSG unit, good combustion practices.	4 PPM PPMVD AT 15%O2; 24-HR ROLL AVG EXC SU/SD	An oxidation catalyst for VOC control for each CTG/HRSG unit, good combustion practices.	3 PPM PPMVD AT 15%O2; HOURLY EXC SU/SD. CC MOD			Low carbon fuel (pipeline quality natural gas), good combustion practices, and energy efficiency measures.	430349 T/YR 12-MO ROLLING TIME PERIOD
LANSING BOARD OF WATER AND LIGHT LBWL--ERICKSON STATION EATON, MI	EUCTGHRSG1	MI-0447	01/07/2021 ACT	FALSE	Dry low NOx burners and selective catalytic reduction for NOx control for each CTG/HRSG unit.	60 LB/H HOURLY; INCL STRT/SHUT IN COMBINED CYCLE	An oxidation catalyst for CO control for each CTG/HRSG unit, good combustion practices.	4 PPM 24-HR ROLL AVG EXCEPT STARTUP/SHUTDOWN	An oxidation catalyst for VOC control for each CTG/HRSG unit, good combustion practices.	3 PPM HOURLY EXCEPT STARTUP SHUTDOWN			Low carbon fuel (pipeline quality natural gas), good combustion practices, and energy efficiency measures.	430349 T/YR 12-MO ROLLING TIME PERIOD
	EUCTGHRSG2	MI-0447	01/07/2021 ACT	FALSE	Dry low NOx burners and selective catalytic reduction for NOx control for each CTG/HRSG unit.	60 LB/H HOURLY; INCL STRT/SHUT IN COMBINED CYCLE	An oxidation catalyst for CO control for each CTG/HRSG unit, good combustion practices.	4 PPM 24-HR ROLL AVG EXCEPT STARTUP/SHUTDOWN	An oxidation catalyst for VOC control for each CTG/HRSG unit, good combustion practices.	3 PPM HOURLY; EXCEPT DURING STARTUP/SHUTDOWN			Low carbon fuel (pipeline quality natural gas), good combustion practices, and energy efficiency measures.	430349 T/YR 12-MO ROLLING TIME PERIOD
	EUCTGHRSG1--A 667 MMBTU/H NG fired combustion turbine generator coupled with a heat recovery steam generator (HRSG)	MI-0441	12/21/2018 ACT	FALSE	Dry low NOx burners and selective catalytic reduction for NOx control.	3 PPM PPMVD@15%O2; 24-H ROLL AVG; SEE NOTES	An oxidation catalyst for CO control for each CTG/HRSG unit; good combustion practices.	4 PPM PPMVD@15%O2;24-H ROLL AVG; SEE NOTES	An oxidation catalyst for VOC control for each CTG/HRSG unit, good combustion practices.	3 PPM PPMVD@15%O2; HOURLY EXC.START/SHUT; NOTE			Low carbon fuel (pipeline quality natural gas), good combustion practices and energy efficiency measures.	430349 T/YR 12-MO ROLLING TIME PERIOD
	EUCTGHRSG2--A 667 MMBTU/H natural gas fired CTG with a HRSG.	MI-0441	12/21/2018 ACT	FALSE	Dry low NOx burners and selective catalytic reduction for NOx control.	3 PPM PPMVD@15%O2; 24-H AVG; SEE NOTES	An oxidation catalyst for CO control for each CTG/HRSG unit, good combustion practices.	4 PPM PPMVD@15%O2; 24-H AVG; SEE NOTES	An oxidation catalyst for VOC control and good combustion practices.	3 PPM PPMVD@15%O2; HOURLY; SEE NOTES			low carbon fuel (pipeline quality natural gas), good combustion practices and energy efficiency measures.	430349 T/YR 12-MO ROLLING TIME PERIOD
ALABAMA POWER COMPANY PLANT BARRY MOBILE, AL	Two 744 MW Combined Cycle Units	AL-0328	11/09/2020 ACT	FALSE	SCR	2 PPM 3 HOUR AVG / @15% O2	Oxidation Catalyst	23.8 LB/HR 3 HOUR AVG	Oxidation Catalyst	13.6 LB/HR 3 HOUR AVG				
INDECK NILES, LLC INDECK NILES, LLC CASS, MI	FGCTGHRSG	*MI-0445	11/26/2019 ACT	TRUE	SCR with DLNB (Selective Catalytic Reduction with Dry Low NOx Burners)	2 PPM PPMVD @15% O2. 24HR ROLL AVG EXCEPT SS	Oxidation catalyst technology and good combustion practices.	4 PPM PPMVD @15% O2. 24HR ROLL AVG EXCEPT SS	Good combustion practices, inlet air conditioning, and the use of pipeline quality natural gas.	4 PPM PPMVD@15%O2, HOURLY; EACH			Good combustion practices, inlet air conditioning, and the use of pipeline quality natural gas.	1911481 T/YR 12-MO ROLLING TIME PERIOD; EACH CTGHRSG

Summary of BACT Determinations

RBLC Seach Parameters:	Large (> 25MW) Combined Cycle Gas Turbines
Date Range:	2015 - 2025
Fuel:	Natural Gas
Process Code:	15.210
RBLC Search Date:	1/31/2025

Project	Process	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
	FGCTGHRSG (2 Combined Cycle CTGs with HRSGs)	MI-0423	01/04/2017 ACT	FALSE	SCR with DLNB (selective catalytic reduction with dry low NOx burners)	38.1 LB/H 24-H ROLLING AVERAGE	Oxidation catalyst technology and good combustion practices.	24.7 LB/H 24-H ROLLING AVG	Oxidation Catalyst Technology and Good Combustion Practices	4 PPM TEST PROTOCOL WILL SPECIFY			Energy efficiency measures and the use of a low carbon fuel (pipeline quality natural gas).	2097001 T/YR 12-MONTH ROLLING TIME PERIOD
HOLLYFRONTIER EL DORADO REFINING LLC HOLLYFRONTIER EL DORADO REFINERY BUTLER, KS	L3804	KS-0041	10/30/2019 ACT	FALSE	Steam/water injection	25 PPMVD 1-HOUR ROLLING AVERAGE	Proper combustion and operation	40 PPMVD 3-HOUR ROLLING AVERAGE	Proper combustion and operation	0.0021 LB/MMBTU 3-HOUR ROLLING AVERAGE	Proper combustion and operation	0.0066 LB/MMBTU 3-HOUR ROLLING AVERAGE		
THOMAS TOWNSHIP ENERGY, LLC THOMAS TOWNSHIP ENERGY, LLC SAGINAW, MI	FGCTGHRSG	MI-0442	08/21/2019 ACT	FALSE	Good combustion practices, dry low NOx burners and selective catalytic reduction (SCR).	2 PPM EACH; 24-HR ROLL.AVG EXCEPT START/SHUT	Oxidation catalyst and good combustion practices	2 PPM PPMVD; EACH UNIT; 24-HR AVG, NO START/SH	Oxidation catalyst and good combustion practices.	0.004 LB/MMBTU HOURLY; NOT STARTUP/SHUTDOWN;EACH UNIT	Low sulfur fuel and good combustion practices.	0.0034 LB/MMBTU HOURLY; EACH UNIT	Energy efficiency measures	2739722 T/YR 12-MONTH ROLLING TIME PERIOD; EACH UNIT
ESC TIOGA COUNTY POWER, LLC ESC TIOGA COUNTY POWER LLC/ELEC PWR GEN FAC TIOGA, PA	COMBUSTION TURBINE/DUCT BURNER	PA-0333	08/20/2019 ACT	FALSE	SCR, Catalytic Oxidizer	2 PPMVD @ 15% O2 / 1 HR	0	1.5 PPMVD @ 15% O2 / 1 HR						
COGEN TECH LINDEN VENTURE LP COGEN TECH LINDEN VENTURE LP UNION, NJ	250 MW COMBINED CYCLE COMBUSTION TURBINE FIRING NATURAL GAS	NJ-0088	07/30/2019 ACT	FALSE	Selective Catalytic Reduction, Dry Low NOx, and use of Natural gas as Primary fuel	18.3 LB/H AV OF THREE ONE H STACK TESTS EVERY 5 YR	Oxidation catalyst and use of clean burning fuels, natural gas and ULSD	11.1 LB/H AV OF THREE ONE H STACK TESTS EVERY 5 YR	Add on Oxidation Catalyst and use of Natural Gas as primary fuel for pollution prevention	3.2 LB/H AV OF THREE ONE H STACK TESTS EVERY 5 YR				
LOUISIANA GENERATING, LLC BIG CAJUN I POWER PLANT POINTE COUPEE, LA	Combustion Turbine #1 (EQT0002, CTG-1)	*LA-0365	06/27/2019 ACT	TRUE	Dry low NOX Burners & water injection	23 PPMV THREE HOUR ROLLING AVERAGE	0	25 PPMV THREE HOUR ROLLING AVERAGE						
	Combustion Turbine #2 (EQT0003, CTG-2)	*LA-0365	06/27/2019 ACT	TRUE	Dry low NOX burners & water injection	23 PPMV THREE HOUR ROLLING AVERAGE	0	25 PPMV THREE HOUR ROLLING AVERAGE						
CHICKAHOMINY POWER LLC CHICKAHOMINY POWER LLC CHARLES CITY, VA	Three (3) Mitsubishi Hitachi Power Systems combustion turbine generators	VA-0332	06/24/2019 ACT	FALSE	Controlled by dry, low NOx burners and selective catalytic reduction (SCR).	2 PPMVD 15% O2 1 HR AVG	Controlled by an oxidation catalyst and good combustion practices (e.g. controlled fuel/air mixing	1 PPMVD @ 15% O2 3 HR AVG	Controlled by an oxidation catalyst and good combustion practices (e.g. controlled fuel/air mixing	0.7 PPMVD @ 15% O2 3 HR AVG			Energy efficient combustion practices and low GHG fuels	812 LB/CO2E/MW-H 12 MO ROLLING TOTAL
	Three (3) Mitsubishi Hitachi Power Systems Combustion	VA-0332	06/24/2019 ACT	FALSE	dry, low NOx burners and selective catalytic reduction	703 LB/TURBINE/CAL. DAY 24 HR TOTAL	Oxidation catalyst and good combustion practices	214 LB/TURBINE/DAY 24 HR TOTAL						
CONSUMERS ENERGY COMPANY JACKSON GENERATING STATION JACKSON, MI	FGLMDB1-6 (6 combined cycle natural gas fired CTG each equipped with a HRSG)	MI-0439	04/02/2019 ACT	FALSE	Steam injection, good combustion practices and only combust natural gas.	25 PPM AT 15% O2; 30 DAY ROLLING AVG; EACH UNIT							Use of low carbon fuel (natural gas), good combustion practices, and energy efficiency measures.	1000257 T/YR 12-MONTH ROLLING TIME PERIOD
JACKSON GENERATION, LLC JACKSON ENERGY CENTER WILL, IL	Combined-Cycle Combustion Turbine	IL-0130	12/31/2018 ACT	FALSE	Selective Catalytic Reduction (SCR) and low-NOx technology (dry low-NOx combustion technology)	2 PPMV 3-UNIT OPERATING HOURS @ 15% O2	Oxidation catalyst	2 PPMV 3 OPERATING HOUR AVERAGE @ 15% O2			Good combustion practices	0.0026 LB/MMBTU 3-HR BLOCK AVERAGE	Equipment design and proper operation	4733910 TONS/YEAR 12-MONTH ROLLING AVERAGE
VENTURE GLOBAL CALCASIEU PASS, LLC CALCASIEU PASS LNG PROJECT CAMERON, LA	Combined Cycle Combustion Turbines (CCCT1 to CCCT5)	LA-0331	09/21/2018 ACT	FALSE	Low NOx Burners, SCR, and Good Combustion Practices	2.5 PPMV 30 DAY ROLLING AVERAGE	Oxidation Catalyst, Proper Design, Good Combustion Practices.	5 PPMV 30 DAY ROLLING AVERAGE	Catalytic Oxidation, Proper Equipment Design and Good Combustion	1.1 PPMV 3 HOUR AVERAGE			Combust low carbon fuel gas and good combustion practices	2602275 T/YR ANNUAL TOTAL
ESC BROOKE COUNTY POWER I, LLC BROOKE COUNTY POWER PLANT BROOKE, WV	GE 7HA.01 Turbine	*WV-0032	09/18/2018 ACT	TRUE	Dry-Low NOx Burners, SCR	23.2 LB/HR	Oxidation Catalyst, Good Combustion Practices	14.1 LB/HR	Oxidation Catalyst, Good Combustion Practices	8.1 LB/HR	Air Filter, Use of Natural Gas, Good Combustion Practices	16.9 LB/HR	Use of Natural Gas, Model GE7HA	417382 LB/HR
APV RENAISSANCE PARTNERS RENAISSANCE ENERGY CENTER GREENE, PA	COMBUSTION TURBINE UNIT w/o DUCT BURNERS UNIT	*PA-0319	08/27/2018 ACT	TRUE	SCR	2 PPMDV @15% O2	Oxidation Catalyst	2 PPPDV @15% O2	Oxidation Catalyst	1 PPMDV @15% O2	0	0.0043 LB/MMBTU		
	COMBUSTION TURBINE UNIT with DUCT BURNERS UNIT	*PA-0319	08/27/2018 ACT	TRUE					0	1.4 PPMDV @15% O2				
CPV THREE RIVERS, LLC CPV THREE RIVERS ENERGY CENTER GRUNDY, IL	Combined Cycle Combustion Turbines	IL-0129	07/30/2018 ACT	FALSE	Selective catalytic reduction (SCR) and low-NOx combustion technology (dry low-NOx combustion technology for natural gas; water injection for ULSD)	2 PPMV @ 15% O2 3-UNIT OPERATING HOURS	Oxidation catalyst	2 PPMV @ 15 % O2 3 OPERATING-HOUR, ROLLED HOURLY, AVERAGE					Equipment design and proper operation	0
NEW COVERT GENERATING COMPANY, LLC NEW COVERT GENERATING FACILITY VAN BUREN, MI	FG-TURB/DB1-3 (3 combined cycle combustion turbine and heat recovery steam generator trains)	MI-0432	07/30/2018 ACT	FALSE	Good combustion practices, DLN burners and SCR.	2 PPMVD AT 15%O2; EACH INDIV. CT/HRSG TRAIN	Oxidation catalyst technology and good combustion practices.	2 PPMVD EACH CT/HRSG TRAIN; 24-HR ROLL AVG	An oxidation catalyst and good combustion practices.	1 PPMVD HOURLY; EACH CT/HRSG TRAIN			Several energy efficiency measures and the use of natural gas.	1425081 T/YR EACH CT/HRSG TRAIN; 12-MO. ROLL TIME PER
DTE ELECTRIC COMPANY BELLE RIVER COMBINED CYCLE POWER PLANT ST. CLAIR, MI	FGCTGHRSG (EUCTGHRSG1 & EUCTGHRSG2)	MI-0435	07/16/2018 ACT	FALSE	SCR with DLNB (Selective catalytic reduction with dry low NOx burners).	2 PPMVD AT 15%O2; 24-H ROLL AVG; EACH UNIT;	Oxidation catalyst technology and good combustion practices.	0.0045 LB/MMBTU EACH UNIT; 24-H ROLL AVG; NOT S.S.	Oxidation catalyst technology and good combustion practices.	0.0026 LB/MMBTU EACH UNIT; HOURLY EXCEPT S.S.			Energy efficiency measures	2042773 T/YR 12-MO ROLLING TIME PERIOD; EACH UNIT

Summary of BACT Determinations

RBLC Seach Parameters: Large (> 25MW) Combined Cycle Gas Turbines

Date Range: 2015 - 2025
Fuel: Natural Gas
Process Code: 15.210
RBLC Search Date: 1/31/2025

Project	Process	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
MARSHALL ENERGY CENTER LLC MEC NORTH, LLC AND MEC SOUTH LLC CALHOUN, MI	EUCTGHRSG (North Plant): A combined-cycle natural gas-fired combustion turbine generator with heat recovery steam generator.	MI-0433	06/29/2018 ACT	FALSE	SCR with DLNB (Selective catalytic reduction with Dry Low NOx burners).	2 PPMVD AT 15%O2; 24-H ROLL AVG; NOT S.S.	Oxidation catalyst technology and good combustion practices.	4 PPMVD AT 15%O2; 24-H ROLL AVG; NOT INCL ST/SH	Oxidation catalyst technology and good combustion practices.	4 PPMVD AT 15%O2; HOURLY			Energy efficiency measures and the use of a low carbon fuel (pipeline quality natural gas).	1978297 T/YR 12-MO ROLL TIME PERIOD
	EUCTGHRSG (South Plant): A combined cycle natural gas-fired combustion turbine generator with heat recovery steam generator.	MI-0433	06/29/2018 ACT	FALSE	SCR with DLNB (Selective catalytic reduction with dry low NOx burners).	2 PPMV AT 15%O2; 24-HR ROLL AVG NOT S.S.	Oxidation catalyst technology and good combustion practices.	4 PPMV AT 15%O2; 240HR ROLL AVG; NOT S.S.	Oxidation catalyst technology and good combustion practices.	4 PPMVD AT 15%O2; NOT INCL. STARTUP/SHUTDOWN			Energy efficiency measures and the use of a low carbon fuel (pipeline quality natural gas).	1978297 T/YR 12-MO ROLLING TIME PERIOD
INDECK NILES LLC INDECK NILES LLC CASS, MI	FGCTGHRSG (2 Combined Cycle CTG with HRSGs)	MI-0431	06/26/2018 ACT	FALSE	SCR with DLNB (Selective Catalytic Reduction with Dry Low NOx Burners)	2 PPM AT 15%O2; 24-HR ROLL AVG								
NOVI ENERGY C4GT, LLC USA, VA	GE Combustion Turbine - Option 1 - Normal Operation	VA-0328	04/26/2018 ACT	FALSE	dry, low NOx burners and selective catalytic reduction	2 PPMVD @ 15% O2 1 H AV	Oxidation catalyst and good combustion practices	1 PPMVD@ 15% O2 3 HR AV/WITHOUT DB	Oxidation catalyst and good combustion practices	0.7 PPMVD @ 15% O2 3 HR AV/WITHOUT DB			Energy efficient combustion practices and low GHG fuels	883 LB CO2E/MW-H 12 MO ROLLING TOTAL
	Siemens Combusion Turbine - Option 2 - Normal Operation	VA-0328	04/26/2018 ACT	FALSE	DRY, LOW NOx BURNERS & SCR	2 PPMVD @ 15% O2 1 H AV	Oxidation catalyst & good combustion practice	1.8 PPMVD @ 15% O2 3 H AV/WITH OR WITHOUT DB	Oxidation catalyst and good combustion practice	1 PPMVD @ 15% O2 3 H AV/WITHOUT DB			Energy efficient combustion practices and low GHG fuels	883 LB CO2E/MW H 12 MO ROLLING TOTAL
	GE Combustion Turbine - Tuning & Water Washing	VA-0328	04/26/2018 ACT	FALSE	dry, low NOx burners and SCR	638 LB/TURBINE/CAL DAY 24 HR AV	Oxidation catalyst and good combustion practices	194 LB/TURBINE/DAY 24 HR AV						
	Siemens Combustion Turbine - Tuning & Water Washing	VA-0328	04/26/2018 ACT	FALSE	dry, low NOx burners and SCR	564 LB/TURBINE CAL DAY 24 HR AV	Oxidation catalyst and good combustion practices	309 LB/TURBINE/DAY 24 HR AV						
PALMDALE ENERGY, LLC PALMDALE ENERGY PROJECT LOS ANGELES, CA	Combustion Turbines (GEN1 and GEN2)	CA-1251	04/25/2018 ACT	FALSE	Selective Catalytic Reduction, Dry Low NOx Burners	2 PPM @ 15% O2 1-HOUR	Oxidation Catalyst	1.5 PPM @ 15% O2 1-HR, DEMO LIMIT, W/O DUCT FIRING						
HARRISON POWER HARRISON POWER HARRISON, OH	General Electric (GE) Combustion Turbines (P005 & P006)	OH-0377	04/19/2018 ACT	FALSE	dry low NOx burners and an SCR system	29.5 LB/H WITH DUCT BURNER. SEE NOTES.	Good combustion practices and oxidation catalyst	17.9 LB/H WITH DUCT BURNER. SEE NOTES.	Good combustion practices and oxidation catalyst	4.36 LB/H WITH DUCT BURNER. SEE NOTES.	Good combustion practices and pipeline quality natural gas	0.0052 LB/MMBTU WITH DUCT BURNER. SEE NOTES.	High efficient combustion technology	1000 LB/MW-H WITH DUCT BURNER. SEE NOTES.
	Mitsubishi Hitachi Power Systems (MHPS) Combustion Turbines (P007 & P008)	OH-0377	04/19/2018 ACT	FALSE	dry low NOx burners and an SCR system	28 LB/H WITH DUCT BURNER. SEE NOTES.	Good combustion practices and oxidation catalyst	17.1 LB/H WITH DUCT BURNER. SEE NOTES.	Good combustion practices and oxidation catalyst	9.8 LB/H WITH DUCT BURNER. SEE NOTES.	Good combustion practices and pipeline quality natural gas	0.005 LB/MMBTU WITH DUCT BURNER. SEE NOTES.	High efficient combustion technology	1000 LB/MW-H WITH DUCT BURNER. SEE NOTES.
ENTERGY TEXAS INC MONTGOMERY COUNTY POWER STATIOIN MONTGOMERY, TX	COMBINED CYCLE TURBINE	TX-0834	03/30/2018 ACT	FALSE	SCR and Dry Low NOx burners	2 PPMVD 15% O2 1-HOUR AVERAGE	OXIDATION CATALYST	2 PPMVD 15% O2 3 HOUR AVERAGE	Oxidation catalyst	2 PPMVD 15% O2 3 HOUR AVERAGE	PIPELINE NATURAL GAS, GOOD COMBUSTION	125.7 TON/YR	PIPELINE QUALITY NATURAL GAS, GOOD COMBUSTION	884 LB/MWH

Summary of BACT Determinations

RBLC Seach Parameters:	Large (> 25MW) Combined Cycle Gas Turbines
Date Range:	2015 - 2025
Fuel:	Natural Gas
Process Code:	15.210
RBLC Search Date:	1/31/2025

Project	Process	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
ESC HARRISON COUNTY POWER, LLC HARRISON COUNTY POWER PLANT HARRISON, WV	GE 7HA.02 Turbine	*WV-0029	03/27/2018 ACT	TRUE	Dry-Low NOx Burners, SCR	32.9 LB/HR 1-HOUR AVERAGE	Oxidation Catalyst, Good Combustion Practices	20 LB/HR 1-HOUR AVERAGE	Oxidation Catalyst, Good Combustion Practices	11.4 LB/HR	Air Filter, Use of Natural Gas, Good Combustion Practices	18.2 LB/HR	Use of Natural Gas, Model GE7HA	528543 LB/HR
SEMINOLE ELECTRIC COOPERATIVE, INC. SEMINOLE GENERATING STATION PUTNAM, FL	2-on-1 natural gas combined-cycle unit (GE 7HA.02)	FL-0364	03/21/2018 ACT	FALSE					Oxidation catalyst	1 PPMVD@15% O2 WITHOUT DUCT BURNER FIRING				
TENNESSEE VALLEY AUTHORITY TVA - JOHNSONVILLE COGENERATION HUMPHREYS, TN	Dual-fuel CT and HRSG with duct burner	*TN-0164	02/01/2018 ACT	TRUE	SCR, good combustion design & practices	2 PPMVD @ 15% O2 30-DAY AVG WHEN BURNING NATURAL GAS	Oxidation catalyst, good combustion design & practice	2 PPMVD @ 15% O2 30-DAY AVG WHEN BURNING NATURAL GAS					Good combustion design & practices	1800 LB/MWH 12-MONTH MOVING AVERAGE
RENOVO ENERGY CENTER, LLC RENOVO ENERGY CENTER, LLC CLINTON, PA	Combustion Turbine Firing NG	*PA-0316	01/26/2018 ACT	TRUE	SCR	2 PPMDV CORRECTED TO 15% O2			0	1 PPMDV CORRTECTED TO 15% O2				
FLORIDA POWER AND LIGHT COMPANY DANIA BEACH ENERGY CENTER BROWARD, FL	2-on-1 combined cycle unit (GE 7HA)	FL-0363	12/04/2017 ACT	FALSE			Clean burning fuel with lean pre-mix turbines	4.3 PPMVD@15% O2 AT LOADS > 90%	Clean fuels	1 PPMVD@15% O2 FOR NATURAL GAS OPERATION				
FILER CITY STATION LIMITED PARTNERSHIP FILER CITY STATION MANISTEE, MI	EUCCT (Combined cycle CTG with unfired HRSG)	MI-0427	11/17/2017 ACT	FALSE	SCR with DLNB (Selective catalytic reduction with dry low NOx burners).	3 PPM 24-H ROLL.AVG., EXCEPT STARTUP/SHUTDOWN	Oxidation catalyst technology and good combustion practices.	4 PPM 24-H ROLL.AVG., EXCEPT STARTUP/SHUTDOWN					Energy efficiency measures and the use of a low carbon fuel (pipeline quality natural gas).	992286 T/YR 12-MO.ROLL.TIME PERIOD
LONG RIDGE ENERGY GENERATION LLC - HANNIBAL POWER LONG RIDGE ENERGY GENERATION LLC - HANNIBAL POWER MONROE, OH	General Electric Combustion Turbine (P004)	OH-0375	11/07/2017 ACT	FALSE	dry low NOx burners and an SCR system	26.1 LB/H EXCEPT STARTUP AND SHUTDOWN. SEE NOTES	Oxidation catalyst and good combustion practices as recommended by the manufacturer.	15.9 LB/H EXCEPT STARTUP AND SHUTDOWN. SEE NOTES	Oxidation catalyst and good combustion practices as recommended by the manufacturer.	4.54 LB/H EXCEPT STARTUP AND SHUTDOWN. SEE NOTES			high efficiency combustion practices as recommended by the manufacturer	775 LB/MW-H SEE NOTES.
	Mitsubishi Combustion Turbine (P005)	OH-0375	11/07/2017 ACT	FALSE	dry low NOx burners and an SCR system	25.1 LB/H WITH DUCT BURNER. SEE NOTES.	oxidation catalyst and shall operate the emissions unit in accordance with good combustion practices as recommended by the manufacturer	15.3 LB/H WITH DUCT BURNER. SEE NOTES.	oxidation catalyst and shall operate the emissions unit in accordance with good combustion practices as recommended by the manufacturer	8.8 LB/H WITH DUCT BURNER. SEE NOTES.			high efficiency combustion practices as recommended by the manufacturer	1000 LB/MW-H WITH DUCT BURNER. SEE NOTES.
	Siemens Combustion Turbine (P006)	OH-0375	11/07/2017 ACT	FALSE	dry low NOx burners and an SCR system	27.1 LB/H WITH DUCT BURNER. SEE NOTES.	oxidation catalyst and shall operate the emissions unit in accordance with good combustion practices as recommended by the manufacturer	16.5 LB/H WITH DUCT BURNER. SEE NOTES.	oxidation catalyst and shall operate the emissions unit in accordance with good combustion practices as recommended by the manufacturer	9.5 LB/H WITH DUCT BURNER. SEE NOTES.			high efficiency combustion practices as recommended by the manufacturer	1000 LB/MW-H WITH DUCT BURNER. SEE NOTES.
GUERNSEY POWER STATION LLC GUERNSEY POWER STATION LLC GUERNSEY, OH	Combined Cycle Combustion Turbines (3, identical) (P001 to P003)	OH-0374	10/23/2017 ACT	FALSE	dry low NOx burners and SCR	33.85 LB/H WITH DUCT BURNER. SEE NOTES.	oxidation catalyst and good combustion practices as recommended by the manufacturer	20.76 LB/H WITH DUCT BURNER. SEE NOTES.	oxidation catalyst and good combustion practices as recommended by the manufacturer	11.73 LB/H WITH DUCT BURNER. SEE NOTES.	pipeline quality natural gas	0.0073 LB/MMBTU SEE NOTES.	high efficiency combustion practices as recommended by the manufacturer	846 LB/MW-H WITHOUT DUCT BURNER. SEE NOTES.
OREGON ENERGY CENTER OREGON ENERGY CENTER LUCAS, OH	Combined Cycle Combustion Turbines (two, identical) (P001 and P002)	OH-0372	09/27/2017 ACT	FALSE	Dry low NOX combustors and selective catalytic reduction (SCR)	25.3 LB/H WITH DUCT BURNER. SEE NOTES.	oxidation catalyst and good combustion control	15.5 LB/H WITH DUCT BURNER. SEE NOTES.	oxidation catalyst and good combustion control	8.8 LB/H WITH DUCT BURNER. SEE NOTES.			high efficiency combustion design	401921 LB/H SEE NOTES.

Summary of BACT Determinations

RBLC Seach Parameters:	Large (> 25MW) Combined Cycle Gas Turbines
Date Range:	2015 - 2025
Fuel:	Natural Gas
Process Code:	15.210
RBLC Search Date:	1/31/2025

Project	Process	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
TRUMBULL ENERGY CENTER TRUMBULL ENERGY CENTER TRUMBULL, OH	Combined Cycle Combustion Turbines (two, identical) (P001 and P002)	OH-0370	09/07/2017 ACT	FALSE	dry low NOx combustors (DLN) and selective catalytic reduction (SCR)	25.3 LB/H WITH DUCT BURNER. SEE NOTES.	Good combustion controls and oxidation catalyst	15.5 LB/H WITH DUCT BURNER. SEE NOTES.	Good combustion controls and oxidation catalyst	8.8 LB/H WITH DUCT BURNER. SEE NOTES.			High efficient combustion technology	833 LB/MW-H SEE NOTES.
NTE CONNECTICUT, LLC KILLINGLY ENERGY CENTER WINDHAM, CT	Natural Gas w/o Duct Firing	CT-0161	06/30/2017 ACT	FALSE	SCR	2 PPMVD @15% O2 1 HOUR BLOCK	Oxidation Catalyst	0.9 PPMVD @15% O2 1 HOUR BLOCK	Oxidation Catalyst	0.7 PPMVD @15% O2			Use of low carbon fuel	7273 BTU/KW-HR 12-MONTH ROLLING (NET PLANT, GAS ONLY)
	Natural Gas w/Duct Firing	CT-0161	06/30/2017 ACT	FALSE	SCR	2 PPMVD @15% O2 1 HOUR BLOCK	Oxidation Catalyst	1.7 LB/MMBTU 1 HOUR BLOCK	Oxidation Catalyst	1.6 PPMVD @15% O2				
SOUTHWESTERN PUBLIC SERVICE COMPANY GAINES COUNTY POWER PLANT , TX	Combined Cycle Turbine with Heat Recovery Steam Generator, fired Duct Burners, and Steam Turbine Generator	TX-0819	04/28/2017 ACT	FALSE	Selective Catalytic Reduction (SCR) and Dry Low NOx burners	2 PPMVD 15% O2 3-H AVG	Selective Catalytic Reduction (SCR) and Dry Low NOx burners	2 PPMVD 15% O2 3-H AVG	Oxidation catalyst and good combustion practices	3.5 PPMVD 15% O2	Pipeline quality natural gas; good combustion practices	0	Pipeline quality natural gas	960 LB / MW H
	Combustion Turbine without Duct Burner	*PA-0315	04/12/2017 ACT	TRUE	0	2 PPMDV CORRECTED TO 15% O2	Oxidation Catalyst	2 PPMDV CORRECTED TO 15% O2	0	1 PPMDV CORRECTED TO 15% O2	0	0.0072 LB MMBTU	0	879 LB MWH (GROSS)
	Combustion Turbine With Duct Burner	*PA-0315	04/12/2017 ACT	TRUE					0	2 PPMDV CORRECTED TO 15% O2				
INEOS USALLC CHOCOLATE BAYOU STEAM GENERATING (CBSG) STATION BRAZORIA, TX	Combined Cycle Cogeneration	TX-0817	02/17/2017 ACT	FALSE					OXIDATION CATALYST	1 PPMDV	0	6.98 LB/H	0	1000 LB/MW H
HOLLAND BOARD OF PUBLIC WORKS HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET OTTAWA, MI	FGCTGHRSG (2 Combined cycle CTGs with HRSGs; EUCTGHRSG10 & EUCTGHRSG11)	MI-0424	12/05/2016 ACT	FALSE	Selective catalytic reduction with dry low NOx burners (SCR with DLNB).	3 PPM AT 15% O2 24-H ROLLING AVG; EACH EU	Oxidation catalyst technology and good combustion practices.	4 PPM EACH EU; 24-H ROLL AVG EXCEPT	Oxidation catalyst technology and good combustion practices.	4 PPM AT 15% O2 TEST PROTOCOL WILL SPECIFY AVG TIME			Energy efficiency measures and the use of a low carbon fuel (pipeline quality natural gas).	312321 T/YR 12-MO. ROLLING TIME PERIOD; EACH EU.
DECORDOVA II POWER COMPANY LLC DECORDOVA STEAM ELECTRIC STATION (DECORDOVA STATION) HOOD, TX	Combined Cycle and Cogeneration (>25 MW)	TX-0810	10/04/2016 ACT	FALSE									good combustion practices and firing low carbon fuel.	966 LB/MW H
SOUTH FIELD ENERGY LLC SOUTH FIELD ENERGY LLC COLUMBIANA, OH	Combined Cycle Combustion Turbines (two, identical) (P001 and P002)	OH-0367	09/23/2016 ACT	FALSE	Dry low NOx (DLN) burners for natural gas firing, wet injection when firing ultra low sulfur diesel, and selective catalytic reduction (SCR) for both natural gas and ultra low sulfur diesel.	30.51 LB/H WITH DUCT BURNER. SEE NOTES.	Good combustion controls and oxidation catalyst	18.57 LB/H WITH DUCT BURNER. SEE NOTES.	Good combustion controls and oxidation catalyst	10.64 LB/H WITH DUCT BURNER. SEE NOTES.			High efficient combustion technology	481301 LB/H NAT GAS, WITH DUCT BURNER. SEE NOTES.
CPV FAIRVIEW, LLC CPV FAIRVIEW ENERGY CENTER CAMBRIA, PA	Combustion turbine and HRSG with duct burner NG only	PA-0310	09/02/2016 ACT	FALSE	Dry Low NOx combustion technology, SCR at all steady state operating loads, good combustion and operating practices	2 PPMDV @ 15% O2	Oxidation catalyst operated at all steady state operating loads and good combustion practices	2 PPMDV @ 15% O2	Oxidation catalyst and good combustion practices	1.5 PPMDV @ 15% O2	Low sulfur fuel, good combustion practicies	0.005 LB/MMBTU	low sulfur fuel and good combustion practices	3352086 TONS 12-MONTH ROLLING BASIS
	Combustion turbine and HRSG without duct burner NG only	PA-0310	09/02/2016 ACT	FALSE					0	1 PPMDV @ 15% O2	Low sulfur fuels and good combustion practices	0.0068 LB/MMBTU		
ENTERGY LOUISIANA, LLC ST. CHARLES POWER STATION ST. CHARLES, LA	SCPS Combined Cycle Unit 1A	LA-0313	08/31/2016 ACT	FALSE	Selective Catalytic Reduction (SCR) with Dry Low NOx Burners (DLNB)	26.91 LB/H HOURLY MAXIMUM	Catalytic Oxidation and good combustion practices during normal operations.	125.21 LB/H HOURLY MAXIMUM	Catalytic oxidation and good combustion practices for normal operations, and	61.27 LB/H HOURLY MAXIMUM			Thermally efficient combustion turbines and good combustion practices	0
	SCPS Combined Cycle Unit 1B	LA-0313	08/31/2016 ACT	FALSE	Selective Catalytic Reduction (SCR) with Dry Low NOx Burners (DLNB)	26.91 LB/H HOURLY MAXIMUM	Catalytic oxidation and good combustion practices during normal operations.	125.21 LB/H HOURLY MAXIMUM	Catalytic oxidation and good combustion practices during normal operations.	61.27 LB/H HOURLY MAXIMUM			Thermally efficient combustion turbines and good combustion practices	0
STONEGATE POWER, LLC MIDDLESEX ENERGY CENTER, LLC MIDDLESEX, NJ	Combined Cycle Combustion Turbine firing Natural Gas without Duct Burner	NJ-0085	07/19/2016 ACT	FALSE	Selective Catalytic Reduction System and Dry Low NOx	2 PPMVD@15%O2 3 H ROLLING AV BASED ON ONE H BLOCK AV	OXIDATION CATALYST AND GOOD COMBUSTION	2 PPMVD@15% O2 3 H ROLLING AV BASED ON ONE H BLOCK AV	Oxidation catalyst and good combustion practices	1 PPMVD@15%O2 AV OF THREE ONE H STACK TESTS EVERY 5 YR			USE OF NATURAL GAS A CLEAN BURNING FUEL	888 LB/MW-H BASED ON CONSECUTIVE 12 MONTH ROLLING
	Combined Cycle Combustion Turbine firing Natural Gas with Duct Burner	NJ-0085	07/19/2016 ACT	FALSE	SELECTIVE CATALYTIC REDUCTION AND DRY LOW NOX	2 PPMVD@15%O2 3 H ROLLING AV BASED ON ONE H BLOCK AV	Oxidation Catalyst and good combustion practices	2 PPMVD@15%O2 3 H ROLLING AV BASED ON ONE H BLOCK AV	Oxidation Catalyst and good combustion practices	2 PPMVD@15%O2 AV OF THREE ONE H STACK TESTS EVERY 5 YR			USE OS NATURAL GAS A CLEAN BURNING FUEL	888 LB/MW-H BASED ON CONSECUTIVE 12 MONTH ROLLING
EAGLE MOUNTAIN POWER COMPANY EAGLE MOUNTAIN STEAM ELECTRIC STATION TARRANT, TX	Combined Cycle & Cogeneration	TX-0805	07/19/2016 ACT	FALSE									Good Combustion Practices	917 LB/MW H
VIRGINIA ELECTRIC AND POWER COMPANY GREENSVILLE POWER STATION GREENSVILLE, VA	COMBUSTION TURBINE GENERATOR WITH DUCT-FIRED HEAT RECOVERY STEAM GENERATORS (3)	VA-0325	06/17/2016 ACT	FALSE	SCR	2 PPMVD 1 HR AVG	Oxidation Catalyst	1.6 PPMVD 3 HR AVG	Oxidation Catalyst and good combustion practices	1.4 PPMVD			0	890 LB/MWH NET OUTPUT AFTER 30 YEARS OF OPERATION
TENNESSEE VALLEY AUTHORITY JOHNSONVILLE COGENERATION HUMPHREYS, TN	Natural Gas-Fired Combustion Turbine with HRSG	TN-0162	04/19/2016 ACT	FALSE	Good combustion design and practices, selective catalytic reduction (SCR)	2 PPMVD @ 15% O2 30 UNIT-OPERATING-DAY MOVING AVERAGE	Good combustion design and practices, oxidation catalyst	2 PPMVD @ 15% O2 30 UNIT-OPERATING-DAY MOVING AVERAGE			Good combustion design and practices	0.005 LB/MMBTU	Good combustion design and practices	1800 LB/MWH 12-MONTH MOVING AVERAGE
APEX TEXAS POWER LLC NECHES STATION CHEROKEE, TX	Combined Cycle & Cogeneration	TX-0788	03/24/2016 ACT	FALSE	Selective Catalytic Reduction	2 PPM	OXIDATION CATALYST	4 PPM HOURLY	OXIDATION CATALYST	2 PPM			GOOD COMBUSTION PRACTICES	924 LB/MWH
ROCKWOOD ENERGY CENTER, LLC ROCKWOOD ENERGY CENTER COLORADO, TX	Combined Cycle & Cogeneration (> 25 megawatts (MW))	TX-0791	03/18/2016 ACT	FALSE									Good combustion practices	901 LB/MWH
	Combined Cycle & Cogeneration (> 25 MW)	TX-0791	03/18/2016 ACT	FALSE									Good combustion practices	865 LB/MWH
		TX-0791	03/18/2016 ACT	FALSE										
		TX-0791	03/18/2016 ACT	FALSE										

Summary of BACT Determinations

RBLC Seach Parameters:	Large (> 25MW) Combined Cycle Gas Turbines
Date Range:	2015 - 2025
Fuel:	Natural Gas
Process Code:	15.210
RBLC Search Date:	1/31/2025

Project	Process	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
		TX-0791	03/18/2016 ACT	FALSE										
		TX-0791	03/18/2016 ACT	FALSE										
FLORIDA POWER & LIGHT OKEECHOBEE CLEAN ENERGY CENTER OKEECHOBEE, FL	Combined-cycle electric generating unit	FL-0356	03/09/2016 ACT	FALSE	Selective catalytic reduction; dry low-NOx; and wet injection	2 PPMVD@15% O2 GAS, 24-HR BLOCK, EXCLUDING SSM	Clean burners that prevent CO formation	4.3 PPMVD@15% O2 3-HR AVERAGE, NATURAL GAS OPERATION	Complete combustion minimizes VOC	1 PPMVD@15%O2 GAS OPERATION	Use of clean fuels	2 GRAIN S/100 SCF GAS FOR NATURAL GAS	Use of low-emitting fuels and technologies	850 LB/MWH FOR GAS OPERATION, 12-MO ROLLING
DECORDOVA II POWER COMPANY LLC DECORDOVA STEAM ELECTRIC STATION HOOD, TX	Combined Cycle & Cogeneration	TX-0789	03/08/2016 ACT	FALSE	Selective Catalytic Reduction	2 PPM	OXIDATION CATALYST	4 PPM	OXIDATION CATALYST	2 PPM				
SOUTHERN POWER TRINIDAD GENERATING FACILITY HENDERSON, TX	Combined Cycle & Cogeneration	TX-0787	03/01/2016 ACT	FALSE									Good Combustion Practices	937 LB/MW HR
PORT ARTHUR LNG, LLC PORT ARTHUR LNG EXPORT TERMINAL JEFFERSON, TX	Refrigeration Compression Turbines	TX-0790	02/17/2016 ACT	FALSE	Dry low NOx burners and good combustion practices	9 PPM ROLLING 24-HR AVERAGE	Dry low NOx burners and good combustion practices	25 PPM ROLLING 3-HR AVERAGE	Dry low NOx burners and good combustion practices	2 PPM 3-HR AVG			Equipment specifications & work practices - Good combustion practices and	504517 T/YR
	Simple Cycle Electrical Generation Gas Turbines 15.210	TX-0790	02/17/2016 ACT	FALSE	SELECTIVE CATALYTIC REDUCTION	5 PPM ROLLING 24-HR AVERAGE	OXIDATION CATALYST	9 PPM ROLLING 3-HR AVERAGE	OXIDATION CATALYST	2 PPM 3-HR AVERAGE			Equipment specifications & work practices - Good combustion practices and	156912 T/YR
TENASKA PA PARTNERS LLC TENASKA PA PARTNERS/WESTMORELAND GEN FAC WESTMORELAND, PA	Large combustion turbine	PA-0306	02/12/2016 ACT	FALSE	SCR, DLN, and good combustion practice	2 PPMVD@15% O2	Oxidation Catalyst and good combustion practice	15.9 LB/HR 3 HR AVERAGE	Ox Cat and good combustion practices	2.4 PPMDV@15% O2	Good combustion practices with the use of low ash/sulfer fuels	0.0039 LB/MMBTU	Good combustion practices	1881905 TPY
LACKAWANNA ENERGY CENTER, LLC LACKAWANNA ENERGY CTR/JESSUP LACKAWANNA, PA	Combustion Turbine without Duct Burner	PA-0309	12/23/2015 ACT	FALSE					Oxidation catalyst, combustion controls, exclusive natural gas	1 PPNDV @ 15% O2				
	Combustion Turbine With Duct Burner	PA-0309	12/23/2015 ACT	FALSE	Dry low-NOx burners, SCR, exclusive natural gas	2 PPMDV @15% O2	Oxidation catalyst, combustion controls, exclusive natural gas	2 PPMDV @ 15 % O2	Oxidation catalyst, combustion controls, exclusive natural gas	1.5 PPMDV @ 15% O2			0	1629115 TONS YEAR
CPV TOWANTIC, LLC CPV TOWANTIC, LLC NEW HAVEN, CT	Combined Cycle Power Plant	CT-0157	11/30/2015 ACT	FALSE	SCR	2 PPMVD @15% O2 1 HR BLOCK	Oxidation Catalyst	0.9 PPMVD @15% O2 1 HR BLOCK	Oxidation Catalyst	1 PPMVD @15% O2				
		CT-0158	11/30/2015 ACT	FALSE										
MATTAWOMAN ENERGY, LLC MATTAWOMAN ENERGY CENTER PRINCE GEORGE'S, MD	2 COMBINED-CYCLE COMBUSTION TURBINES	MD-0045	11/13/2015 ACT	FALSE	GOOD COMBUSTION PRACTICES, DRY LOW-NOX COMBUSTOR DESIGN AND SELECTIVE CATALYTIC REDUCTION (SCR)	2 PPMVD @ 15% O2 3-HOUR BLOCK AVERAGE (EXCLUDING SU/SD)	GOOD COMBUSTION PRACTICES AND OXIDATION CATALYST	2 PPMVD @ 15% O2 3-HOUR BLOCK AVERAGE (EXCLUDING SU/SD)	OXIDATION CATALYST AND GOOD COMBUSTION PRACTICES	1 PPMVD @ 15% O2 3-HR BLOCK AVG. W/OUT DUCT FIRING			0	865 LB/MW-H 12-MONTH ROLLING AVERAGE
	2 COMBINED-CYCLE COMBUSTION TURBINES - COLD STARTUP	MD-0045	11/13/2015 ACT	FALSE	GOOD COMBUSTION PRACTICES, DRY LOW-NOX COMBUSTOR DESIGN AND SELECTIVE CATALYTIC REDUCTION (SCR)	153 LB/EVENT COLD STARTUP	GOOD COMBUSTION PRACTICES AND OXIDATION CATALYST	1772 LB/EVENT COLD STARTUP	OXIDATION CATALYST AND GOOD COMBUSTION PRACTICES	301 LB/EVENT COLD STARTUP				
	2 COMBINED-CYCLE COMBUSTION TURBINES - WARM STARTUP	MD-0045	11/13/2015 ACT	FALSE	GOOD COMBUSTION PRACTICES, DRY LOW-NOX COMBUSTOR DESIGN AND SELECTIVE CATALYTIC REDUCTION (SCR)	132 LB/EVENT WARM STARTUP	GOOD COMBUSTION PRACTICES AND OXIDATION CATALYST	1461 LB/EVENT WARM STARTUP	OXIDATION CATALYST AND GOOD COMBUSTION PRACTICES	258 LB/EVENT WARM STARTUP				
	2 COMBINED-CYCLE COMBUSTION TURBINES - HOT STARTUP	MD-0045	11/13/2015 ACT	FALSE	GOOD COMBUSTION PRACTICES, DRY LOW-NOX COMBUSTOR DESIGN AND SELECTIVE CATALYTIC REDUCTION (SCR)	105 LB/EVENT HOT STARTUP	GOOD COMBUSTION PRACTICES AND OXIDATION CATALYST	1216 LB/EVENT HOT STARTUP	OXIDATION CATALYST AND GOOD COMBUSTION PRACTICES	207 LB/EVENT HOT STARTUP				
FGE EAGLE PINES, LLC FGE EAGLE PINES PROJECT CHEROKEE, TX	Combined Cycle Turbines (>25 MW)	TX-0773	11/04/2015 ACT	FALSE	Selective Catalytic Reduction	2 PPM 24-HR AVERAGE	Oxidation Catalyst	2 PPM 3-HR AVERAGE	Oxidation Catalyst	2 PPM			Low carbon fuel, good combustion, efficient combined cycle design	886 LB/MW H WITHOUT DUCT FIRING
PUBLIC SERVICE COMPANY OF OKLAHOMA PSO COMANCHE POWER STATION COMANCHE, OK	COMBINED CYCLE COMBUSTION TURBINE	OK-0169	10/08/2015 ACT	FALSE	Use of Dry Low NOx Burners	0.15 LB/MMBTU 30-DAY ROLLING AVG	Controlled Startup and Shutdown procedures with respect to Dry Low NOx	0.0785 LB/MMBTU 3-HR AVG NORMAL OPERATION						

Summary of BACT Determinations

RBLC Seach Parameters:	Large (> 25MW) Combined Cycle Gas Turbines
Date Range:	2015 - 2025
Fuel:	Natural Gas
Process Code:	15.210
RBLC Search Date:	1/31/2025

Project	Process	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
LON C. HILL, L.P. LON C. HILL POWER STATION NUECES, TX	Combined Cycle Turbines (>25 MW)	TX-0767	10/02/2015 ACT	FALSE	Selective Catalytic Reduction	2 PPM ROLLING 24-HR AVERAGE	Oxidation Catalyst	2 PPM ROLLING 24-HR AVERAGE	oxidation catalyst	2 PPM				
NRG TEXAS POWER SR BERTRON ELECTRIC GENERATING STATION HARRIS, TX	Combined cycle and cogeneration turbines greater than 25 MW firing natural gas	TX-0761	09/15/2015 ACT	FALSE										
NRG TEXAS POWER CEDAR BAYOU ELECTRIC GENERATING STATION CHAMBERS, TX	Combined cycle and cogeneration turbines greater than 25 MW	TX-0762	09/15/2015 ACT	FALSE										
GOLDEN PASS PRODUCTS, LLC GOLDEN PASS LNG EXPORT TERMINAL JEFFERSON, TX	Refrigeration Compression Turbines	TX-0766	09/11/2015 ACT	FALSE									Equipment specifications & work practices - Good combustion practices and	614533 TPY
MOXIE FREEDOM LLC MOXIE FREEDOM GENERATION PLANT LUZERNE, PA	Combustion Turbine without Duct Burner	PA-0311	09/01/2015 ACT	FALSE	DLN burners, SCR, good engineering practice	2 PPMDV @15% O2	Oxidation catalyst, good engineering practice	2 PPMDV @ 15% O2	Oxidation catalyst, and good engineering practice	1.5 LB/MMBTU	0	0.0063 LB/MMBTU		
	Combustion Turbine With Duct Burner	PA-0311	09/01/2015 ACT	FALSE	DLN burner, SCR, good engineering practice	2 PPMDV @ 15% O2	Oxidation catalyst and good combustion practices	2 PPMDV @ 15% O2	Oxidation catalyst and good engineering practice	1.5 PPMDV @ 15% O2	0	0.0063 LB/MMBTU	0	1000 LB CO2/MWH GROSS ON A 12-MONTH ROLLING BASIS
CLEAN ENERGY FUTURE - LORDSTOWN, LLC CLEAN ENERGY FUTURE - LORDSTOWN, LLC TRUMBULL, OH	Combined Cycle Combustion Turbines (two, identical) (P001 and P002)	OH-0366	08/25/2015 ACT	FALSE	dry low NOx combustors, selective catalytic reduction (SCR)	23.5 LB/H WITH DUCT BURNER. SEE NOTES.	Good combustion controls and oxidation catalyst	14.3 LB/H WITH DUCT BURNER. SEE NOTES.	Good combustion controls and oxidation catalyst	8.2 LB/H WITH DUCT BURNER. SEE NOTES.			High efficient combustion technology	833 LB/MW-H WITHOUT DUCT BURNERS. SEE NOTES.
THE EMPIRE DISTRICT ELECTRIC COMPANY THE EMPIRE DISTRICT ELECTRIC COMPANY CHEROKEE, KS	COMBINED CYCLE COMBUSTION TURBINE	KS-0029	07/14/2015 ACT	FALSE							dry low NOx burners heat recovery steam generator (HRSG)	30.2 LB/H	0	1022755.9 TONS PER YEAR 12-MONTH ROLLING AVERAGE
CASTLETON COMMODITIES INTERNATIONAL (CCI) CORPUS C CCI CORPUS CHRISTI CONDENSATE SPLITTER FACILITY NUECES, TX	Boilers, BL-1 and BL-2	TX-0756	06/19/2015 ACT	FALSE					Good combustion practices will limit VOC emissions to 0.005 lb per 1000 scf. Fuel flow will be measured	0.005 LB/100 SCF EACH BOILER				
EAGLE MOUNTAIN POWER COMPANY LLC EAGLE MOUNTAIN STEAM ELECTRIC STATION TARRANT, TX	Combined Cycle Turbines (>25 MW) â€" natural gas	TX-0751	06/18/2015 ACT	FALSE	Selective Catalytic Reduction	2 PPM ROLLING 24-HR AVERAGE	Oxidation catalyst	2 PPM ROLLING 24-HR AVERAGE	Oxidation catalyst	2 PPM				
CALPINE MID-MERIT, LLC YORK ENERGY CENTER BLOCK 2 ELECTRICITY GENERATION PROJECT YORK, PA	Two Combine Cycle Combustion Turbine with Duct Burner	PA-0307	06/15/2015 ACT	FALSE	SCR, Dry Lo-NOx combustor, good combustion practices and low sulfur fuels	2 PPVDM @ 15 O2	Oxidation catalyst and good combustion practices	2 PPMDV @ 15% O2	Oxidation catalyst, good combustion practices and low sulfur fuels	1.9 PPMDV @ 15% O2	Good combustion practices and low sulfur fuels	0.0066 LB/MMBTU	Good combustion practices and oxidation catalyst	883 LB/MW-HR EXPRESSED AS CO2E (NET)
	Two combined cycle turbines with out duct burner	PA-0307	06/15/2015 ACT	FALSE					Oxidation catalyst, good combustion practices and low sulfur fuels	1.5 PPMDV @ 15% O2	Good combustion practices and low sulfur fuels	0.0068 LB/MMBTU		
ROLLING HILLS GENERATING, LLC VINTON, OH	Combustion Turbines, Scenario 1 (4, identical) (P001, P002, P004, P005)	OH-0365	05/20/2015 ACT	FALSE	dry-low NOx (DLN) burner and selective catalytic reduction (SCR)	14.7 LB/H WITHOUT DUCT BURNERS. SEE NOTES.	Oxidation catalyst	10.4 LB/H WITHOUT DUCT BURNERS. SEE NOTES.	good combustion practices along with clean fuels	611.38 T/YR PER ROLLING 12 MONTH PERIOD. SEE NOTES.	good combustion practices along with clean fuels	0.0068 LB/MMBTU HHV, 3 HR AVG. SEE NOTES.	high efficiency	7471 BTU/KW-H HHV NET PER EACH CCT BLOCK. SEE NOTES.
	Combustion Turbines, Scenario 2 (4, identical) (P001, P002, P004, P005)	OH-0365	05/20/2015 ACT	FALSE	dry-low NOx (DLN) burner and selective catalytic reduction (SCR)	15.6 LB/H WITHOUT DUCT BURNERS. SEE NOTES.	Oxidation catalyst	12 LB/H WITH DUCT BURNER. SEE NOTES.	good combustion practices along with clean fuels	0	good combustion practices along with clean fuels	0.0085 LB/MMBTU HHV, 3 HR AVG. SEE NOTES.	high efficiency	7471 BTU/KW-H HHV NET PER EACH CCT BLOCK. SEE NOTES.
COLORADO BEND II POWER, LLC COLORADO BEND ENERGY CENTER WHARTON, TX	Combined-cycle gas turbine electric generating facility	TX-0730	04/01/2015 ACT	FALSE	SCR and oxidation catalyst	2 PPMVD @ 15% O2 24-HR AVERAGE	SCR and oxidation catalyst	4 PPMVD @ 15% O2 3-HR AVERAGE	SCR and oxidation catalyst	4 PPMVD @ 15% O2 3-HR AVERAGE	efficient combustion, natural gas fuel	43 LB/H		
NRG TEXAS POWER LLC CEDAR BAYOU ELECTRIC GENERATING STATION CHAMBERS COUNTY, TX	Combined Cycle Turbines	TX-0727	03/31/2015 ACT	FALSE			Oxidation catalysts	15 PPMVD 15%O2						
CORPUS CHRISTI LIQUEFACTION LLC CORPUS CHRISTI LIQUEFACTION PLANT GREGORY, TX	Refrigeration Compressor Turbine	TX-0679	02/27/2015 ACT	FALSE									install efficient turbines, follow the turbine manufacturerâ€™s emission-related written instructions for	146754 TPY 12-MONTH ROLLING BASIS

Summary of BACT Determinations

RBLC Seach Parameters:	Commercial/Institutional Sized Boilers/Furnaces
Date Range:	2015 - 2025
Fuel:	Natural Gas
Process Code:	13.310
RBLC Search Date:	2/4/2025

Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
ALASKA GASLINE DEVELOPMENT CORPORATION GAS TREATMENT PLANT NORTH SLOPE BOROUGH, AK	Two (2) Buyback Gas Bath Heaters and Three (3) Operations Camp Heaters	Buyback Gas Bath Heater 1 (EU 34) has 25 MMBtu/hr throughput. Buyback Gas Bath Heater 1 (EU 35) has 21 MMBtu/hr throughput. Operations Camp Heaters 1 -3 (EUs 36 - 38) has 32 MMBtu/hr throughput each.	AK-0085	08/13/2020 ACT	FALSE	Low NOx Burners, Good Combustion Practices, Limited Operation of 500 hours per year per heater.	0.036 LB/MMBTU 3-HOUR AVERAGE	Good Combustion Practices, Clean Fuels, and Limited Operation of 500 hours per year per heater.	0.087 LB/MMBTU 3-HOUR AVERAGE	Good Combustion Practices, Clean Fuels, and Limited Operation of 500 hours per year per heater.	0.0057 LB/MMBTU 3-HOUR AVERAGE	Good Combustion Practices, Clean Fuels, and Limited Operation of 500 hours per year per heater.	0.0079 LB/MMBTU 3-HOUR AVERAGE	Good Combustion Practices, Clean Fuels, and Limited Operation of 500 hours per year per heater.	117.1 LB/MMBTU 3-HOUR AVERAGE
CHEVRON PHILLIPS CHEMICAL COMPANY LP ORANGE POLYETHYLENE PLANT ORANGE, TX	HEATERS		TX-0888	04/23/2020 ACT	FALSE	Low NOx burners and good combustion practice.	0.04 LB/MMBTU	Good combustion practice and proper design.	50 PPMVD 3% O2	Good combustion practice and proper design.	0.0054 LB/MMBTU			Good combustion practice, clean fuel, and proper design	0
DRIFTWOOD LNG LLC DRIFTWOOD LNG FACILITY CALCASIEU, LA	Hot Oil Heaters (5)		LA-0349	07/10/2018 ACT	FALSE	ULNB and Good Combustion Practices	0	Good Combustion Practices	0	Good Combustion Practices and Use of low sulfur facility fuel gas	0.0054 LB/MM BTU			Use Low Carbon Fuel, Energy Efficiency Measures, and Good Combustion Practices	0
MAGNOLIA LNG, LLC MAGNOLIA LNG FACILITY CALCASIEU, LA	Regenerative Heaters		LA-0307	03/21/2016 ACT	FALSE	good combustion practices	0	good combustion practices	0	good combustion practices	0			good combustion/operating /maintenance practices and fueled by natural gas	0
MIDWEST FERTILIZER COMPANY LLC MIDWEST FERTILIZER COMPANY LLC POSEY, IN	startup heater EU-002		IN-0263	03/23/2017 ACT	FALSE	GOOD COMBUSTION PRACTICES	12.611 LB/H 3 HOUR AVERAGE	GOOD COMBUSTION PRACTICES	2.556 LB/H 3 HOUR AVERAGE	GOOD COMBUSTION PRACTICES	0.378 LB/H 3 HOUR AVERAGE				
MIDWEST FERTILIZER COMPANY LLC MIDWEST FERTILIZER COMPANY LLC POSEY, IN			IN-0324	05/06/2022 ACT	FALSE										
NUCOR STEEL NUCOR STEEL MONTGOMERY, IN	Hot Water Circuit Burner for Galvanizing Line	This hot water circuit burner is used for Continuous Galvanizing Line.	IN-0359	03/30/2023 ACT	FALSE	low NOx burners, good combustion practices, use of pipeline quality natural gas	50 LB/MMSCF	good combustion practices	84 LB/MMSCF	good combustion practices	5.5 LB/MMSCF			good combustion practices and only pipeline quality natural gas shall be combusted	117.1 LB/MMBTU
NUCOR STEEL NUCOR STEEL MONTGOMERY, IN	Hot Water Circuit Burner for Sheet Metal Coating Line		IN-0359	03/30/2023 ACT	FALSE	low NOx burners, good combustion practices and only pipeline quality natural gas shall be combusted	50 LB/MMSCF	good combustion practices	84 LB/MMSCF	good combustion practices	5.5 LB/MMSCF			good combustion practices and only pipeline quality natural gas shall be combusted	2625 TONS/YR
NUCOR STEEL NUCOR STEEL MONTGOMERY, IN	Boiler (CC-BOIL)		IN-0359	03/30/2023 ACT	FALSE	low NOx burners	0.035 LB/MMBTU	good combustion practices	61 LB/MMSCF	good combustion practices and natural gas fuel (clean fuel)	0.0054 LB/MMBTU			energy efficiency measures and only pipeline quality natural gas fuel shall be combusted	117.1 LB/MMBTU
INEOS OLIGOMERS USA LLC INEOS OLIGOMERS CHOCOLATE BAYOU , TX	HOT OIL HEATER		TX-0955	03/14/2023 ACT	FALSE	Burner design for good combustion efficiency and to minimize NOx formation with a SCR system to further reduce NOx	0.014 LB/MMBTU 1-HR			Burner design for high efficiency combustion.	0				
INEOS OLIGOMERS USA LLC INEOS OLIGOMERS CHOCOLATE BAYOU , TX	HEATER NO 2		TX-0955	03/14/2023 ACT	FALSE	Burner design for good combustion efficiency and to minimize NOx formation.	0.01 LB/MMBTU 1-HR			Burner design for good combustion efficiency	0				
ENTERGY TEXAS, INC. ORANGE COUNTY ADVANCED POWER STATION ORANGE, TX	Water Bath Heater	EPNs OCPSNGWBHA and OCPSNGWBHB represent the two stacks from the natural gas heater.	TX-0939	03/13/2023 ACT	FALSE			Good combustion practices	50 PPMVD 3% O2	Good combustion practices	0.005 LB/MMBTU			Good combustion practices	0
LANSING BOARD OF WATER AND LIGHT LBWL-ERICKSON STATION EATON, MI	EUAUXBOILER--natural-gas fired auxiliary boiler, rated at less than or equal to 99 MMBTU/H	A natural gas-fired auxiliary boiler, rated at less than or equal to 50 MMBtu/hr will facilitate startup of the CTG/HRSG trains and provide steam to the steam turbine generator (STG) seals. The boiler will also provide warming steam to the HRSG, and other related services. The boiler will not produce high pressure steam for use in electric generation.	MI-0454	12/20/2022 ACT	FALSE	Low NOx Burners (LNB) or Flue Gas Recirculation (FGR) along with good combustion practices.	30 PPM HOURLY	Good combustion practices.	50 PPM PPMVD AT 3%O2; HOURLY	Good combustion practices.	0.3 LB/H HOURLY			Low carbon fuel (pipeline quality natural gas), good combustion practices, and energy efficiency measures.	25644 T/YR 12-MO ROLLING TIME PERIOD
INTEL OHIO SITE INTEL OHIO SITE LICKING, OH	29.4 MMBtu/hr Natural Gas-Fired Boilers: B001 through B028	Twenty-eight 29.4 MMBtu/hr Natural Gas-Fired Boilers: B001 through B028	OH-0387	09/20/2022 ACT	FALSE	Ultra-low NOX burners, good combustion practices, and the use of natural gas	9.74 T/YR PER ROLLING 12 MONTH PERIOD B001 TO B014	Good combustion practices and the use of natural gas	33 T/YR PER ROLLING 12 MONTH PERIOD B001 TO B014	Good combustion practices and the use of natural gas	4.86 T/YR PER ROLLING 12 MONTH PERIOD B001 TO B014				
INTEL OHIO SITE INTEL OHIO SITE LICKING, OH	45.6 MMBtu/hr Natural Gas-Fired Nitrogen Vaporizers: B029 through B032	Four 45.6 MMBtu/hr Natural Gas-Fired Nitrogen Vaporizers: B029 through B032	OH-0387	09/20/2022 ACT	FALSE	Ultra-low NOX burners, good combustion practices, and the use of natural gas	2.59 T/YR PER ROLLING 12 MONTH PERIOD COMBINED	Good combustion practices and the use of natural gas	8.76 T/YR PER ROLLING 12 MONTH PERIOD COMBINED	Good combustion practices and the use of natural gas	1.29 T/YR PER ROLLING 12 MONTH PERIOD COMBINED				
LINCOLN LAND ENERGY CENTER (A/K/A EMBERCLEAR) LINCOLN LAND ENERGY CENTER SANGAMON, IL	Auxiliary Boiler	The Auxiliary Boiler is used on an intermittent basis to produce intermediate pressure steam for heating the heat recovery steam generator (HRSG) and combined-cycle combustion turbines	IL-0133	07/29/2022 ACT	FALSE	Ultra low-NOx burners and flue gas recirculation, air preheater, automated combustion management system, with an oxygen trim	0.01 POUNDS/MMBTU ROLLING 3-OPERATING HOUR	Good burner design and good combustion practices.	0.037 POUNDS/MMBTU ROLLING 3-OPERATING HOUR	Good burner design and good combustion practices	0.0015 POUNDS/MMBTU ROLLING 3-OPERATING HOUR	Good combustion practices.	0.0019 POUNDS/MMBTU ROLLING 3-OPERATING HOUR	Good combustion practices.	5059 TONS/YEAR 12 MONTH ROLLING

Summary of BACT Determinations

RBLC Seach Parameters:	Commercial/Institutional Sized Boilers/Furnaces
Date Range:	2015 - 2025
Fuel:	Natural Gas
Process Code:	13.310
RBLC Search Date:	2/4/2025

Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
NOVELIS CORPORATION NOVELIS CORPORATION - GUTHRIE TODD, KY	EU 037 - Sow Dryer	Natural gas-fired dryer preheats aluminum sows and other forms of hard "clean chargeâ€•prior to manually feeding into the furnaces. Control Device: None Maximum Capacity: 15.9 tons Al/hr Emissions calculated using AP-42, Chapter 1.4, vendor estimates for similar units, 40 CFR 98, Subpart C, and a HHV for natural gas of 1,000 Btu/scf. The metal processing capacity is based on 111.3 tons Al/batch, 7 hrs/batch.	KY-0116	07/25/2022 ACT	FALSE	Good Combustion & Operation Practices (GCOP) Plan, Low-Nox Burners (LNBs) capable of meeting 0.054 lb/MMBtu.	1.08 LB/HR MONTHLY AVERAGE	Good Combustion & Operation Practices (GCOP) Plan	1.46 LB/HR MONTHLY AVERAGE	Good Combustion & Operation Practices (GCOP) Plan	0.11 LB/HR MONTHLY AVERAGE			Design Requirements, Good Combustion & Operation Practices (GCOP) Plan	10258 TONS/YR 12-MONTH ROLLING TOTAL
NOVELIS CORPORATION NOVELIS CORPORATION - GUTHRIE TODD, KY	EU 041a - Direct-Fired Building Heating Systems	Building heating units across 10 different buildings/process areas designed for comfort with no direct discharge to atmosphere. Includes 53 direct-fired units. Maximum individual heating rate input for EU041a is 2.58 MMBtu/hr. Emissions calculated using AP-42, Chapter 1.4, 40 CFR 98, Subpart C, and a HHV for natural gas of 1,000 Btu/scf.	KY-0116	07/25/2022 ACT	FALSE	Good Combustion & Operation Practices (GCOP) Plan	5.3 LB/HR MONTHLY AVERAGE	Good Combustion & Operation Practices (GCOP) Plan	4.45 LB/HR MONTHLY AVERAGE	Good Combustion & Operation Practices (GCOP) Plan	0.29 LB/HR MONTHLY AVERAGE			Design Requirements, Good Combustion & Operation Practices (GCOP) Plan	27890 TONS/YR 12-MONTH ROLLING TOTAL
NOVELIS CORPORATION NOVELIS CORPORATION - GUTHRIE TODD, KY	EU 041b - Indirect-Fired Building Heating Systems â‰¤ 1 MMBtu	Building heating units across different buildings/process areas designed for comfort with no direct discharge to atmosphere. Includes 6 indirect-fired units â‰¤ 1 MMBtu/hr. Emissions calculated using AP-42, Chapter 1.4, 40 CFR 98, Subpart C, and a HHV for natural gas of 1,000 Btu/scf.	KY-0116	07/25/2022 ACT	FALSE	Good Combustion & Operation Practices (GCOP) Plan	0.3 LB/HR MONTHLY AVERAGE	Good Combustion & Operation Practices (GCOP) Plan	0.25 LB/HR MONTHLY AVERAGE	Good Combustion & Operation Practices (GCOP) Plan	0.02 LB/HR MONTHLY AVERAGE			Design Requirements, Good Combustion & Operation Practices (GCOP) Plan	1579 TONS/YR 12-MONTH ROLLING TOTAL
NOVELIS CORPORATION NOVELIS CORPORATION - GUTHRIE TODD, KY	EU 041c - Indirect-Fired Building Heating Systems > 1 MMBtu	Building heating units across 10 different buildings/process areas designed for comfort with no direct discharge to atmosphere. Includes 17 indirect-fired units > 1 MMBtu/hr. Maximum individual heating rate input is 1.5 MMBtu/hr. Emissions calculated using AP-42, Chapter 1.4, 40 CFR 98, Subpart C, and a HHV for natural gas of 1,000 Btu/scf.	KY-0116	07/25/2022 ACT	FALSE	Good Combustion & Operation Practices (GCOP) Plan	1.92 LB/HR MONTHLY AVERAGE	Good Combustion & Operation Practices (GCOP) Plan	1.61 LB/HR MONTHLY AVERAGE	Good Combustion & Operation Practices (GCOP) Plan	0.11 LB/HR MONTHLY AVERAGE			Design Requirements, Good Combustion & Operation Practices (GCOP) Plan	10104 TONS/YR 12-MONTH ROLLING TOTAL
MARSHALL ENERGY CENTER, LLC MEC NORTH, LLC CALHOUN, MI	EUAUXBOILER (North Plant): Auxiliary Boiler	A natural gas-fired auxiliary boiler, rated at 61.5 MMBTU/hr (HHV) to facilitate startup of the CTGHRSG train and to provide the required steam to support the startup of the facility, including but not limited to steam for sparging, STG seals, etc. The auxiliary boiler is equipped with low NOx burners (LNB) and flue gas recirculation (FGR).	MI-0451	06/23/2022 ACT	FALSE	Low NOx burners/Flue gas recirculation and good combustion practices.	0.04 LB/MMBTU 30-DAY ROLLING AVERAGE	Good combustion practices	0.08 LB/MMBTU HOURLY	Good combustion practices	0.004 LB/MMBTU HOURLY			Energy efficiency measures and the use of a low carbon fuel (pipeline quality natural gas).	31540 T/YR 12-MO ROLLING TIME PERIOD
MARSHALL ENERGY CENTER, LLC MEC SOUTH, LLC CALHOUN, MI	EUAUXBOILER (South Plant): Auxiliary Boiler	A natural gas-fired auxiliary boiler, rated at 61.5 MMBTU/hr (HHV) to facilitate startup of the CTGHRSG train and to provide the required steam to support the startup of the facility, including but not limited to steam for sparging, STG seals, etc. The auxiliary boiler is equipped with low NOx burners (LNB) and flue gas recirculation (FGR).	MI-0452	06/23/2022 ACT	FALSE	Low NOx Burners/Flue Gas Recirculation and Good Combustion Practices	0.04 LB/MMBTU 30-DAY ROLLING AVERAGE	Good combustion practices.	0.08 LB/MMBTU HOURLY	Good combustion practices	0.004 LB/MMBTU HOURLY			Energy Efficiency Measures and the use of a low carbon fuel (pipeline quality natural gas)	31540 T/YR 12-MO ROLLING TIME PERIOD
MAGNOLIA POWER LLC MAGNOLIA POWER GENERATING STATION UNIT 1 IBERVILLE, LA	Auxiliary Boiler		LA-0391	06/03/2022 ACT	FALSE	Ultra-low NOx burners and good combustion practices.	0.01 LB/MM BTU	Good combustion practices; compliance with 40 CFR 63 Subpart DDDDD.	0.05 LB/MM BTU	Good combustion practices; compliance with 40 CFR 63 Subpart DDDDD.	0.0054 LB/MM BTU			Good combustion practices; compliance with 40 CFR 63 Subpart DDDDD.	117 LB/MM BTU
BIG RIVER STEEL LLC BIG RIVER STEEL LLC MISSISSIPPI, AR	Pickle Line Boiler	SN-24	AR-0173	01/31/2022 ACT	FALSE	Low NOx burners Combustion of clean fuel Good Combustion Practices	0.035 LB/MMBTU	Combustion of Natural gas and Good Combustion Practice	0.0824 LB/MMBTU	Combustion of Natural gas and Good Combustion Practice	0.0054 LB/MMBTU			Good operating practices Minimum Boiler Efficiency	117 LB/MMBTU
BIG RIVER STEEL LLC BIG RIVER STEEL LLC MISSISSIPPI, AR	Galvanizing Line Boilers #1 and #2	SN-27 and SN-28	AR-0173	01/31/2022 ACT	FALSE	Low NOx burners Combustion of clean fuel Good Combustion Practices	0.035 LB/MMBTU	Combustion of Natural gas and Good Combustion Practice	0.0824 LB/MMBTU	Combustion of Natural gas and Good Combustion Practice	0.0054 LB/MMBTU			Good operating practices Minimum Boiler Efficiency	117 LB/MMBTU
BIG RIVER STEEL LLC BIG RIVER STEEL LLC MISSISSIPPI, AR	Pickle Galvanizing Line Boiler	SN-37	AR-0173	01/31/2022 ACT	FALSE	Low NOx burners Combustion of clean fuel Good Combustion Practices	0.035 LB/MMBTU	Combustion of Natural gas and Good Combustion Practice	0.0824 LB/MMBTU	Combustion of Natural gas and Good Combustion Practice	0.0054 LB/MMBTU			Good operating practices	117 LB/MMBTU
BIG RIVER STEEL LLC BIG RIVER STEEL LLC MISSISSIPPI, AR	Hydrogen Plant #2 Reformer Furnace	SN-114 six units, 12.5 MMBtu/hr each	AR-0173	01/31/2022 ACT	FALSE	Low NOx burners Combustion of clean fuel Good Combustion Practices	0.1 LB/MMBTU	Combustion of Natural gas and Good Combustion Practice	0.0824 LB/MMBTU	Combustion of Natural gas and Good Combustion Practice	0.0054 LB/MMBTU			Good Operating Practices	117 LB/MMBTU

Summary of BACT Determinations

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Date Range:	2015 - 2025
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Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
BIG RIVER STEEL LLC BIG RIVER STEEL LLC MISSISSIPPI, AR	Furnace Dedusting	SN-124	AR-0173	01/31/2022 ACT	FALSE	Combustion of Natural Gas and Good Combustion Practices	0.0032 LB/MMBTU	Combustion of Natural Gas and Good Combustion Practices	0.08 LB/MMBTU	Combustion of Natural Gas and Good Combustion Practices	0.01 LB/MMBTU			Good Operating Practices	54701 TPY
BIG RIVER STEEL LLC BIG RIVER STEEL LLC MISSISSIPPI, AR	Galvanizing Line #2 Furnace	SN-29	AR-0168	03/17/2021 ACT	FALSE	SCR, Low NOx burners Combustion of clean fuel Good Combustion Practices	0.035 LB/MMBTU	Combustion of Natural gas and Good Combustion Practice	0.0824 LB/MMBTU	Combustion of Natural gas and Good Combustion Practice	0.0054 LB/MMBTU	Combustion of Natural gas and Good Combustion Practice	0.0012 LB/MMBTU		
BIG RIVER STEEL LLC BIG RIVER STEEL LLC MISSISSIPPI, AR	Decarburizing Line Furnace Section	SN-40 and SN-42. SN-40 has a heat input of 36 MMBtu/hr. SN-42 has a heat input of 22 MBtu/hr.	AR-0168	03/17/2021 ACT	FALSE	Low NOx burners SCR Combustion of clean fuel Good Combustion Practices	0.1 LB/MMBTU	Combustion of Natural gas and Good Combustion Practice	0.0824 LB/MMBTU	Combustion of Natural gas and Good Combustion Practice	0.0054 LB/MMBTU	Combustion of Natural gas and Good Combustion Practice	0.013 LB/MMBTU		
BIG RIVER STEEL LLC BIG RIVER STEEL LLC MISSISSIPPI, AR	BOILER, PICKLE LINE		AR-0159	04/05/2019 ACT	FALSE	LOW NOX BURNERS COMBUSTION OF CLEAN FUEL GOOD COMBUSTION PRACTICES	0.035 LB/MMBTU	COMBUSTION OF NATURAL GAS AND GOOD COMBUSTION PRACTICE	0.0824 LB/MMBTU	COMBUSTION OF NATURAL GAS AND GOOD COMBUSTION PRACTICE	0.0054 LB/MMBTU				
BIG RIVER STEEL LLC BIG RIVER STEEL LLC MISSISSIPPI, AR			AR-0155	11/07/2018 ACT	FALSE										
BIG RIVER STEEL LLC BIG RIVER STEEL LLC MISSISSIPPI, AR	BOILERS SN-26 AND SN-27, GALVANIZING LINE		AR-0159	04/05/2019 ACT	FALSE	LOW NOX BURNERS COMBUSTION OF CLEAN FUEL GOOD COMBUSTION PRACTICES	0.035 LB/MMBTU	COMBUSTION OF NATURAL GAS AND GOOD COMBUSTION PRACTICE	0.0824 LB/MMBTU	COMBUSTION OF NATURAL GAS AND GOOD COMBUSTION PRACTICE	0.0054 LB/MMBTU				
BIG RIVER STEEL LLC BIG RIVER STEEL LLC MISSISSIPPI, AR	PREHEATERS, GALVANIZING LINE SN-28 and SN-29		AR-0159	04/05/2019 ACT	FALSE	SCR, LOW NOX BURNERS, AND COMBUSTION OF CLEAN FUEL AND GOOD COMBUSTION PRACTICES	0.035 LB/MMBTU	COMBUSTION OF NATURAL GAS AND GOOD COMBUSTION PRACTICE	0.0824 LB/MMBTU	COMBUSTION OF NATURAL GAS AND GOOD COMBUSTION PRACTICE	0.0054 LB/MMBTU				
BIG RIVER STEEL LLC BIG RIVER STEEL LLC MISSISSIPPI, AR	BOILER, ANNEALING PICKLE LINE		AR-0159	04/05/2019 ACT	FALSE	Low NOx burners, Combustion of clean fuel, and Good Combustion Practices	0.035 LB/MMBTU	Combustion of Natural gas and Good Combustion Practice	0.0824 LB/MMBTU	Combustion of Natural gas and Good Combustion Practice	0.0054 LB/MMBTU				
BIG RIVER STEEL LLC BIG RIVER STEEL LLC MISSISSIPPI, AR	BOILER SN-26, GALVANIZING LINE		AR-0155	11/07/2018 ACT	FALSE	LOW NOX BURNERS COMBUSTION OF CLEAN FUEL GOOD COMBUSTION PRACTICES	0.035 LB/MMBTU	COMBUSTION OF NATURAL GAS AND GOOD COMBUSTION PRACTICE	0.0824 LB/MMBTU	COMBUSTION OF NATURAL GAS AND GOOD COMBUSTION PRACTICE	0.054 LB/MMBTU				
BIG RIVER STEEL LLC BIG RIVER STEEL LLC MISSISSIPPI, AR	PREHEATER, GALVANIZING LINE SN-28		AR-0155	11/07/2018 ACT	FALSE	SCR, LOW NOX BURNERS, AND COMBUSTION OF CLEAN FUEL AND GOOD COMBUSTION PRACTICES	0.035 LB/MMBTU	COMBUSTION OF NATURAL GAS AND GOOD COMBUSTION PRACTICE	0.0824 LB/MMBTU	COMBUSTION OF NATURAL GAS AND GOOD COMBUSTION PRACTICE	0.0054 LB/MMBTU				
TENNESSEE VALLEY AUTHORITY COLBERT COMBUSTION TURBINE PLANT COLBERT, AL	Three Gas Heaters		AL-0329	09/21/2021 ACT	FALSE	0	0.011 LB/MMBTU 3 HOUR AVG	0	0.08 LB/MMBTU 3 HOUR AVG					0	117.1 LB/MMBTU
NUCOR CORPORATION NUCOR STEEL ARKANSAS MISSISSIPPI, AR	SN-202, 203, 204 Pickle Line Boilers	Three 12.5 MMBTY/hr boilers	AR-0172	09/01/2021 ACT	FALSE	Low NOx burners	0.035 LB/MMBTU	Good Combustion Practice	0.084 LB/MMBTU	Good Combustion Practice	0.0055 LB/MMBTU			Good Combustion Practice	121 LB/MMBTU
SHADY HILLS ENERGY CENTER, LLC SHADY HILLS COMBINED CYCLE FACILITY PASCO, FL	60 MMBtu/hour Auxiliary Boiler	Only fires natural gas	FL-0371	06/07/2021 ACT	FALSE	Low-NOx burners	0.05 LB/MMBTU	Good combustion practices and low-NOx burners	0.08 LB/MMBTU						
SHADY HILLS ENERGY CENTER, LLC SHADY HILLS COMBINED CYCLE FACILITY PASCO, FL		Only fire natural gas	FL-0367	07/27/2018 ACT	FALSE										
NUCOR STEEL GALLATIN, LLC NUCOR STEEL GALLATIN, LLC GALLATIN, KY	Heated Transfer Table Furnace (EP 02-03)	Max metal capacity is 3,500,000 tons/yr. Additional temperature control of the steel slabs/sheet will be conducted after the roughing mill by the Heated Transfer Table Furnace, which feeds the existing hot rolling mill. The Heated Transfer Table Furnace will be equipped with low-NOx burners designed to maintain 0.07 lb/MMBtu of NOx. Combustion gases from this Furnace will be routed through the enclosed furnace to a single stack (North A-Line Stack) for discharge to the atmosphere.	KY-0115	04/19/2021 ACT	FALSE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan. Equipped with low NOx burners (0.07 lb/MMBtu).	70 LB/MMSCF 3-HR AVERAGE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	84 LB/MMSCF 3-HR AVERAGE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	5.5 LB/MMSCF 3-HR AVERAGE			The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan and implement various design and operational efficiency requirements.	33952 TONS/YR 12-MONTH ROLLING

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NUCOR STEEL GALLATIN, LLC NUCOR STEEL GALLATIN, LLC GALLATIN, KY	Cold Mill Complex Makeup Air Units (EP 21-19)	Total of 40 MMBtu/hr of natural gas-fired air heaters located throughout the Cold Mill Complex to control humidity of indoor coil storage bay.	KY-0115	04/19/2021 ACT	FALSE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	100 LB/MMSCF	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	84 LB/MMSCF	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	5.5 LB/MMSCF			The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan and implement various design and operational efficiency requirements	20734 TONS/YR 12-MONTH ROLLING
NUCOR STEEL GALLATIN, LLC NUCOR STEEL GALLATIN, LLC GALLATIN, KY	Vacuum Degasser Boiler (EP 20-13)		KY-0115	04/19/2021 ACT	FALSE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan. Also equipped with low-NOx burners.	35 LB/MMSCF	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	61 LB/MMSCF	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	5.5 LB/MMSCF			The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan and implement various design and operational efficiency requirements	26125 TONS/YR 12-MONTH ROLLING
NUCOR STEEL GALLATIN, LLC NUCOR STEEL GALLATIN, LLC GALLATIN, KY	Pickle Line #2 â€“ Boiler #1 & #2 (EP 21-04 & EP 21-05)	Emission limitations are on an individual basis.	KY-0115	04/19/2021 ACT	FALSE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan. Equipped with low-NOx burners.	50 LB/MMSCF EACH	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	84 LB/MMSCF EACH	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	5.5 LB/MMSCF EACH			The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan and implement various design and operational efficiency requirements	12675 TONS/YR EACH
NUCOR STEEL GALLATIN, LLC NUCOR STEEL GALLATIN, LLC GALLATIN, KY	Galvanizing Line #2 Alkali Cleaning Section Heater (EP 21-07B)		KY-0115	04/19/2021 ACT	FALSE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan. This unit is also required to be equipped with low-NOx burners (0.07 lb/MMBtu)	50 LB/MMSCF	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	84 LB/MMSCF	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	5.5 LB/MMSCF			The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan and implement various design and operational efficiency requirements	11922 TONS/YR 12-MONTH ROLLING
NUCOR STEEL GALLATIN, LLC NUCOR STEEL GALLATIN, LLC GALLATIN, KY	Galvanizing Line #2 Radiant Tube Furnace (EP 21-08B)	The strip is thermal treated in order to achieve uniform metallurgical structure and strength prior to application of the zinc coating. Thermal treatment is provided by a direct-fired furnace (EP 21-08A) to preheat the strip followed by radiant tube heating (EP 21-08B) to reach the final annealing temperature. The preheat and radiant tube sections of the furnace are equipped with natural gas-fired low-NOx burners and controlled by selective catalytic reduction/selective non-catalytic reduction (SCR/SNCR). During a cold start, SCR does not reach operating temperature for approximately 30 minutes.During this time, only low-NOx burners are controlling emissions of NOx. NSG estimates the unit may undergo 1 cold start every two (2) weeks.	KY-0115	04/19/2021 ACT	FALSE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan. This unit is also equipped with a SCR/SNCR system to control emissions. During a cold start, SCR does not reach operating temperature for approximately 30 minutes. During this time, only low-NOx burners are controlling emissions of NOx. NSG estimates the unit may undergo 1 cold start every two (2) weeks.	7.5 LB/MMSCF 3-HR AVERAGE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	84 LB/MMSCF 3-HR AVERAGE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	5.5 LB/MMSCF			The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan and implement various design and operational efficiency requirements.	18660 TONS/YR 12-MONTH ROLLING
NUCOR STEEL GALLATIN, LLC NUCOR STEEL GALLATIN, LLC GALLATIN, KY	Galvanizing Line #2 Annealing Furnaces (15) (EP 21-15)	15 total furnaces.	KY-0115	04/19/2021 ACT	FALSE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan. This unit is equipped with low-NOx burners.	50 LB/MMSCF	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	84 LB/MMSCF	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	5.5 LB/MMSCF			The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan and implement various design and operational efficiency requirements	37581 TONS/YR 12-MONTH ROLLING, COMBINED
NUCOR STEEL GALLATIN, LLC NUCOR STEEL GALLATIN, LLC GALLATIN, KY	Galvanizing Line #2 Preheat Furnace (EP 21-08A)	The strip is thermal treated in order to achieve uniform metallurgical structure and strength prior to application of the zinc coating. Thermal treatment is provided by a direct-fired furnace to preheat the strip followed by radiant tube heating (EP 21-08B) to reach the final annealing temperature. The preheat and radiant tube sections of the furnace are equipped with natural gas-fired low-NOx burners and controlled by selective catalytic reduction/selective non-catalytic reduction (SCR/SNCR). During a cold start, SCR does not reach operating temperature for approximately 30 minutes. During this time, only low-NOx burners are controlling emissions of NOx. NSG estimates the unit may undergo 1 cold start every two (2) weeks.	KY-0115	04/19/2021 ACT	FALSE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan. This unit is also equipped with a SCR/SNCR system to control emissions. During a cold start, SCR does not reach operating temperature for approximately 30 minutes. During this time, only low-NOx burners are controlling emissions of NOx. NSG estimates the unit may undergo 1 cold start every two (2) weeks.	7.5 LB/MMSCF 3-HR AVERAGE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan.	84 LB/MMSCF 3-HR AVERAGE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	5.5 LB/MMSCF			The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan and implement various design and operational efficiency requirements.	48725 TONS/YR 12-MONTH ROLLING

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NUCOR STEEL GALLATIN, LLC NUCOR STEEL GALLATIN, LLC GALLATIN, KY	Galvanizing Line #2 Zinc Pot Preheater (EP 21-09)	Natural gas-fired (direct) heater used to melt initial zinc ingots upon startup or following extended outage. NSG requested an operational limitation on Zinc Pot Preheaters of 168 hours per year.	KY-0115	04/19/2021 ACT	FALSE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan. This unit is equipped with a low-NOx burner.	70 LB/MMSCF	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	84 LB/MMSCF	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	5.5 LB/MMSCF			The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan and implement various design and operational efficiency requirements	30 TONS/YR 12-MONTH ROLLING
WPL-RIVERSIDE ENERGY CENTER WPL- RIVERSIDE ENERGY CENTER ROCK, WI	Natural Gas Auxiliary Boiler (B22)		WI-0305	01/22/2021 ACT	FALSE									Combust only pipeline quality natural gas.	157 LB CO2/MMBTU ANY MONTH, AVG ANY CONSECUTIVE 12-MONTHS
LANSING BOARD OF WATER AND LIGHT LBWL--ERICKSON STATION EATON, MI	EUAUXBOILER--nat gas fired auxiliary boiler	A natural gas-fired auxiliary boiler, rated at less than or equal to 50 MMBTU/hour will facilitate startup of the CTG/HRSG trains and provide steam to the steam turbine generator (STG) seals. The boiler will also provide warming steam to the HRSG, and other related services. The boiler will not produce high pressure steam for use in electric generation.	MI-0447	01/07/2021 ACT	FALSE	Low NOx burners (LNB) or flue gas recirculation (FGR) along with good combustion practices.	30 PPM AT 3% O2; HOURLY	Good combustion practices.	50 PPM AT 3% O2; HOURLY	Good combustion practices	0.3 LB/H HOURLY			Low carbon fuel (pipeline quality natural gas), good combustion practices, and energy efficiency measures.	25644 T/YR 12-MO ROLLING TIME PERIOD
LANSING BOARD OF WATER AND LIGHT LBWL--ERICKSON STATION EATON, MI	EUAUXBOILER--natural gas fired auxiliary boiler rated at <= 99MMBTU/H	A natural-gas fired auxiliary boiler, rated at less than or equal to 99 MMBTU/H will facilitate startup of the CTG/HRSG trains and provide steam to the steam turbine generator (STG) seals. The boiler will also provide warming steam to the HRSG, and other related services. The boiler will not produce high pressure steam for use in electric generation.	MI-0441	12/21/2018 ACT	FALSE	Low NOx burners (LNB) or flue gas recirculation along with good combustion practices.	30 PPM @3%O2; HOURLY	Good combustion practices	50 PPM @3%O2; HOURLY	Good combustion practices.	0.5 LB/H HOURLY			Low carbon fuel (pipeline quality natural gas), good combustion practices and energy efficiency measures.	50776 T/YR 12-MO ROLLING TIME PERIOD
ARAUCO NORTH AMERICA GRAYLING PARTICLEBOARD CRAWFORD, MI	Thermal oil heater (EUTOH in FGTOH)	One natural gas-fired thermal oil heater for press and sifter rated at 38 MMBtu/hr fuel heat input (EUTOH in FGTOH). Also falls under the RBLC Process Type Code 30.590.	MI-0448	12/18/2020 ACT	FALSE	Good design and combustion practices, low NOx burners	0.05 LB/MMBTU HOURLY	Good design and operation	0.082 LB/MMBTU HOURLY	Good design and operating/combustion practices	0.0054 LB/MMBTU HOURLY			Good combustion and maintenance practices, natural gas only.	19490 T/YR 12-MO ROLLING TIME PERIOD
ARAUCO NORTH AMERICA GRAYLING PARTICLEBOARD CRAWFORD, MI	Thermal oil system for thermally fused lamination lines (EUFLTOS1 in FGTOH)	One natural gas-fired thermal oil system for thermally fused lamination lines rated at 10.2 MMBtu/hr fuel heat input (EUFLTOS1 in FGTOH).	MI-0448	12/18/2020 ACT	FALSE	Good design and combustion practices, low NOx burners	0.05 LB/MMBTU HOURLY	Good design and operation	0.082 LB/MMBTU HOURLY	Good Design and Operating/Combustion Practices	0.0054 LB/MMBTU HOURLY			Good Combustion and Maintenance Practices, Natural Gas Only	5254 T/YR 12-MO ROLLING TIME PERIOD
ARAUCO NORTH AMERICA GRAYLING PARTICLEBOARD CRAWFORD, MI	EUTOH in FGTOH	One natural gas-fired thermal oil heater for press and sifter rated at 38 MMBtu/hr fuel heat input (EUTOH in FGTOH). Also falls under the RBLC Process Type Code 30.590.	MI-0425	05/09/2017 ACT	FALSE	Good design and combustion practices, Low NOx burners.	0.05 LB/MMBTU TEST PROTOCOL SHALL SPECIFY	Good design and operation.	0.082 LB/MMBTU TEST PROTOCOL SHALL SPECIFY	Good design and operating/combustion practices.	0.0054 LB/MMBTU TEST PROTOCOL SHALL SPECIFY			Good combustion and maintenance practices, natural gas only.	19490 T/YR 12-MO ROLLING TIME PERIOD
ARAUCO NORTH AMERICA GRAYLING PARTICLEBOARD CRAWFORD, MI	EUFLTOS1 in FGTOH	One natural gas-fired thermal oil system for thermally fused lamination lines rated at 10.2 MMBTU/H fuel heat input (EUFLTOS1 in FGTOH). Note: The throughput capacity, 10.2 MMBTU/H, is not a change but instead a correction from the previous entry. The previous entry is under MI-0421 for the original permit.	MI-0425	05/09/2017 ACT	FALSE	Good design and combustion practices, low NOx burners.	0.05 LB/MMBTU TEST PROTOCOL SHALL SPECIFY	Good design and operation.	0.082 LB/MMBTU TEST PROTOCOL SHALL SPECIFY	Good design and operating/combustion practices.	0.0054 LB/MMBTU TEST PROTOCOL SHALL SPECIFY			Good combustion and maintenance practices, natural gas only.	5254 T/YR 12-MO ROLLING TIME PERIOD
ARAUCO NORTH AMERICA GRAYLING PARTICLEBOARD CRAWFORD, MI	EUTOH (In FGTOH)--Thermal Oil Heater	One natural gas fired thermal oil heater for press and sifter rated at 34 MMBTU/H fuel heat input (EUTOH in FGTOH). All falls under RBLC Process Type Code 30.590.	MI-0421	08/26/2016 ACT	FALSE	Low NOx burners and good design and combustion practices.	0.05 LB/MMBTU TEST PROTOCOL WILL SPECIFY AVG TIME	Good design and operation	0.082 LB/MMBTU TEST PROTOCOL WILL SPECIFY AVG TIME.	Good design and operating/combustion practices.	0.0054 LB/MMBTU TEST PROTOCOL WILL SPECIFY AVG TIME			Good combustion and maintenance practices, natural gas only.	17438 T/YR BASED UPON A 12-MO ROLLING TIME PERIOD
ARAUCO NORTH AMERICA GRAYLING PARTICLEBOARD CRAWFORD, MI	EUFLTOS1 in FGTOH (Thermal Oil System for Thermally Fused Lamination Lines)	One natural gas fired thermal oil system for thermally fused lamination lines rated at 10.2 MMBTU/H fuel heat input (EUFLTOS1 in FGTOH).	MI-0421	08/26/2016 ACT	FALSE	Low NOx burners and good design and combustion practices.	0.05 LB/MMBTU TEST PROTOCOL WILL SPECIFY AVG TIME	Good design and operation	0.082 LB/MMBTU TEST PROTOCOL WILL SPECIFY AVG TIME	Good design and operating/combustion practices.	0.0054 LB/MMBTU TEST PROTOCOL WILL SPECIFY AVG TIME			Good combustion and maintenance practices. Natural gas only.	5254 T/YR BASED UPON A 12-MO ROLLING TIME PERIOD
US NAVY NORFOLK NAVAL SHIPYARD NORFOLK NAVAL SHIPYARD NORFOLK, VA	Three (3) boilers	The steam from the boilers will be used for facility needs such as heating buildings and not for power generation	VA-0333	12/09/2020 ACT	FALSE									0	117.1 LB MMBTU

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DELEK US LION OIL COMPANY UNION COUNTY, AR	SN-803 - #4 Pre-Flash Column Reboiler	SN-803 is a 40 MMBtu/hr reboiler (nominal design) used to maintain the temperature in the pre-flash column in order to separate crude oil into gasoline and naphtha. The reboiler is fueled by NSPS Subpart J quality gas. It was installed in 1979 and will be retrofitted with next generation, ultra-low NOx burners. As a result of the refinery expansion permit revision, this source has undergone PSD review for PM10. BACT for this source is good combustion practice.	AR-0167	12/01/2020 ACT	FALSE	Ultra-low NOx burners and good combustion practice	1.9 LB/HR 3-HOUR AVERAGE								
DELEK US LION OIL COMPANY UNION COUNTY, AR	SN-805 - #4 Pre-Flash Reboiler	SN-805 is a 75 MM Btu/hr reboiler (nominal design). It was installed in 1996 and will be retrofitted with next generation, ultra-low NOx burners. On May 17, 2000, this source was tested for NOx emissions using EPA Reference Method 7E pursuant to Â§19.702 of Regulation 19, and 40 C.F.R., Part 52, Subpart E. The test results submitted to the Department demonstrated compliance. As a result of the refinery expansion permit revision, this source has undergone PSD review for PM10. BACT for this source is good combustion practice.	AR-0167	12/01/2020 ACT	FALSE	Ultra-low NOx burners and good combustion practice	3.5 LB/HR 3-HOUR AVERAGE								
DELEK US LION OIL COMPANY UNION COUNTY, AR	SN-808 - #7 FCCU Furnace	SN-808 is a 56 MMBtu/hr furnace (nominal design) used to heat gas oil. It is fueled by NSPS Subpart J quality gas. It was installed in 1979. BACT for this source is good combustion practice.	AR-0167	12/01/2020 ACT	FALSE	Good combustion practice	2.8 LB/HR 3-HOUR AVERAGE								
DELEK US LION OIL COMPANY UNION COUNTY, AR	SN-810 - #9 Hydrotreater Furnace/Reboiler	SN-810 is a 70 MMBtu/hr furnace (nominal design) used to heat naphtha. It is fueled NSPS Subpart J quality gas. It was installed in 1958. This source was declared subject to NSPS Subpart J as a result of the Consent Decree (CIV. No. 03-1028) between Lion Oil, ADEQ, and the US EPA.	AR-0167	12/01/2020 ACT	FALSE	0	12.7 LB/HR 3-HOUR AVERAGE								
DELEK US LION OIL COMPANY UNION COUNTY, AR	SN-842 - #12 Unit Distillate Hydrotreater	SN-842 is a 50.0 MMBtu/hr furnace (nominal design). It is fueled by NSPS Subpart J quality gas. It was installed in 1993. BACT for this source is good combustion practice.	AR-0167	12/01/2020 ACT	FALSE	Good combustion practice	5.3 LB/HR 3-HOUR AVERAGE								
ALABAMA POWER COMPANY PLANT BARRY MOBILE, AL	90.5 MMBtu/hr Aux Boiler		AL-0328	11/09/2020 ACT	FALSE	0	0.011 LB/MMBTU 3 HOUR AVG	0	0.037 LB/MMBTU	0	0.004 LB/MMBTU			0	46416 TPY
NEMADJI TRAIL ENERGY CENTER NEMADJI TRAIL ENERGY CENTER DOUGLAS, WI	Natural Gas-Fired Auxiliary Boiler (B02)	Boiler B02 â€“ One 100 MMBtu/hr Natural Gas-Fired Auxiliary Boiler with ultra-low NOx burners, Flue Gas Recirculation (FGR), and Oxidation Catalyst (C02)	WI-0300	09/01/2020 ACT	FALSE	Ultra-low NOx burners, flue gas recirculation, and operate and maintain B02 according to the manufacturerâ€™s	0.011 LB/MMBTU	Oxidation Catalyst and operate and maintain boiler according to the manufacturerâ€™s recommendations.	0.0037 LB/MMBTU	Oxidation catalyst and operate and maintain boiler according to manufacturerâ€™s recommendations.	0.0027 LB/MMBTU	Only use pipeline quality natural gas and operate and maintain B02 according to manufacturerâ€™s	0.01 LB/MMBTU	Ultra-low NOx burners and flue gas recirculation. Operate and maintain boiler according to manufacturerâ€™s	160 LB/MMBTU 12-MONTH ROLLING AVG.
NUCOR NUCOR STEEL BRANDENBURG MEADE, KY	EP 03-02 - Ingot Car Bottom Furnaces #1-#4	Four (4) direct-fired natural gas car bottom furnaces are employed to reheat ingots produced off-site. The slabs and ingots are heated to a uniform rolling temperature of approximately 2,250 Â°F.	KY-0110	07/23/2020 ACT	FALSE	Low-Nox Burner (Designed to maintain 0.18 lb/MMBtu); and a Good Combustion and Operating Practices (GCOP) Plan	181.6 LB/MMSCF	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	84 LB/MMSCF	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	5.5 LB/MMSCF			This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan and meet design standards	76717 TON/YR 12-MONTH ROLLING
NUCOR NUCOR STEEL BRANDENBURG MEADE, KY	EP 03-05 - Steckel Mill Coiling Furnaces #1 & #2	On each side of the Steckel mill, mandrels housed in direct-fired heated chambers continually wind and unwind the ribbon of steel as it passes back and forth through the Steckel mill. The goal is to reduce radiant heat loss so the steel can be rolled longer and thinner. These furnaces burn natural gas.	KY-0110	07/23/2020 ACT	FALSE	Low-Nox Burner (Designed to maintain 0.08 lb/MMBtu); and a Good Combustion and Operating Practices (GCOP) Plan.	81.6 LB/MMSCF	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	84 LB/MMSCF	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	5.5 LB/MMSCF			This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	18142 TON/YR 12-MONTH ROLLING

Summary of BACT Determinations

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Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
NUCOR NUCOR STEEL BRANDENBURG MEADE, KY	EP 04-03 - Tempering Furnace	The Tempering Furnace is heated with direct-fired, low NOx, natural gas cold air burners. The burners are grouped into specific heating zones and the temperature in each zone is automatically controlled. The burners fire directly into the furnace to maintain the furnace operating temperature at 1,200Â°F, and the waste combustion gases are vented from the furnace into an exhaust duct, pulled into an exhaust fan, and discharged to atmosphere through a vertical stack.	KY-0110	07/23/2020 ACT	FALSE	Low-Nox Burner (Designed to maintain 0.07 lb/MMBtu); and a Good Combustion and Operating Practices (GCOP) Plan.	70 LB/MMSCF	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	84 LB/MMSCF	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	5.5 LB/MMSCF			This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan and meet design requirements.	24881 TON/YR 12-MONTH ROLLING
NUCOR NUCOR STEEL BRANDENBURG MEADE, KY	EP 05-01 - Group 1 Car Bottom Furnaces #1 - #3	Groups of car bottom furnaces are used to perform various heat treatment processes, such as stress relieving, normalizing, tempering, austenitizing, and annealing, as required by customer specifications. Group 1 includes three direct-fired car bottom furnaces, fueled by natural gas. For plates that are austenitized, they are removed from the furnace and immediately lowered into the batch quench tank for a defined duration to complete the quenching process. After cooling, the fully hardened plates are placed into another car bottom furnace to temper the plate to the desired hardness.	KY-0110	07/23/2020 ACT	FALSE	Low-Nox Burner (Designed to maintain 0.08 lb/MMBtu); and a Good Combustion and Operating Practices (GCOP) Plan.	81.6 LB/MMSCF	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	84 LB/MMSCF	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	5.5 LB/MMSCF			This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan and meet design requirements.	43542 TON/YR 12-MONTH ROLLING, COMBINED
NUCOR NUCOR STEEL BRANDENBURG MEADE, KY	EP 05-02 - Group 2 Car Bottom Furnaces A & B	Groups of car bottom furnaces are used to perform various heat treatment processes, such as stress relieving, normalizing, tempering, austenitizing, and annealing, as required by customer specifications. Group 2 includes two direct-fired car bottom furnaces, fueled by natural gas. For plates that are austenitized, they are removed from the furnace and immediately lowered into the batch quench tank for a defined duration to complete the quenching process. After cooling, the fully hardened plates are placed into another car bottom furnace to temper the plate to the desired hardness. One is 28 MMBtu/hr, one is 32 MMBtu/hr.	KY-0110	07/23/2020 ACT	FALSE	Low-Nox Burner (Designed to maintain 0.08 lb/MMBtu); and a Good Combustion and Operating Practices (GCOP) Plan.	81.6 LB/MMSCF	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	84 LB/MMSCF	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	5.5 LB/MMSCF			This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan and meet design requirements.	31101 TON/YR 12-MONTH ROLLING, COMBINED
NUCOR NUCOR STEEL BRANDENBURG MEADE, KY	EP 15-01 - Natural Gas Direct-Fired Space Heaters, Process Water Heaters, & Air Makeup Heaters	Numerous small (	KY-0110	07/23/2020 ACT	FALSE	Low-Nox Burner (Designed to maintain 0.07 lb/MMBtu); and a Good Combustion and Operating Practices (GCOP) Plan.	70 LB/MMSCF	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	84 LB/MMSCF	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	5.5 LB/MMSCF			This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan and meet design requirements.	20734 TON/YR 12-MONTH ROLLING, COMBINED

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NUCOR NUCOR STEEL BRANDENBURG MEADE, KY	EP 04-02 - Austenitizing Furnace	The Austenitizing Furnace uses only natural gas as fuel. The furnace is indirect fired with a nitrogen atmosphere to prevent scale formation and the resulting scale pickup that occurs on the roll surface. The furnace is equipped with radiant tube low-NOx burners that operate in flame and flameless modes. When a cold plate is charged, some of the first sections of the heat zone are momentarily pulled down below 1560ÂºF. When the radiant tube burners are below 1560ÂºF, they operate in flame mode with a guaranteed NOx emission rate of 0.252 lb/MMBtu. Once these burners reach 1560ÂºF, they return to flameless mode. The remaining sections of the heat zone and the soaking section continuously operate in flameless mode. The guaranteed NOx emission rate for the flameless mode is 0.155 lb/MMBtu. The burners fire into a radiant tube to isolate the waste gas from the furnace atmosphere. The burners are selfrecuperative, eliminating the need for a common recuperator. The waste gases from the burner are used to preheat combustion air, and the waste gases are then vented into an exhaust	KY-0110	07/23/2020 ACT	FALSE	Low-Nox Burner (Designed to maintain 0.15 lb/MMBtu in flameless mode and 0.25 lb/MMBtu in flame mode); and a Good Combustion and Operating Practices (GCOP) Plan.	158 LB/MMSCF FLAMELESS MODE	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	84 LB/MMSCF	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	5.5 LB/MMSCF			This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan and implement design standards.	27991 TON/YR 12-MONTH ROLLING
PETMIN USA INCORPORATED PETMIN USA INCORPORATED ASHTABULA, OH	Startup boiler (B001)	Startup boiler, natural gas fired with maximum heat input of 15.17 MMBtu/hr.	OH-0383	07/17/2020 ACT	FALSE			good combustion practices and the use of natural gas	1.25 LB/H						
PETMIN USA INCORPORATED PETMIN USA INCORPORATED ASHTABULA, OH			OH-0379	02/06/2019 ACT	FALSE										
PETMIN USA INCORPORATED PETMIN USA INCORPORATED ASHTABULA, OH	Ladle Preheaters (P002, P003 and P004)	Three identical Ladle dryers / preheaters, natural gas fired with maximum heat input of 15.00 MMBtu/hr, emissions are vented to the EAF baghouse. Throughputs and limits are for one preheater, except as noted.	OH-0383	07/17/2020 ACT	FALSE			Good combustion practices and the use of natural gas	0.521 LB/H						
PETMIN USA INCORPORATED PETMIN USA INCORPORATED ASHTABULA, OH			OH-0379	02/06/2019 ACT	FALSE										
GREEN BAY PACKAGING INC.- GB MILL DIV. GREEN BAY PACKAGING INC.- GB MILL DIV. BROWN, WI	Natural Gas-Fired Boiler (B01)		WI-0303	07/14/2020 ACT	FALSE									Only burn natural gas, good combustion practices, low NOx burner, and flue gas recirculation.	16771 T/Y ANY CONSECUTIVE 12-MONTH PERIOD
TOKAI CARBON CB LTD. TOKAI ADDIS FACILITY WEST BATON ROUGE, LA	1-19 Burner 1	Units are in mega watts.	LA-0377	05/27/2020 ACT	FALSE	Low NOx Burners and good combustion practices.	0.08 LB/MMBTU								
WPL- RIVERSIDE ENERGY CENTER WPL- RIVERSIDE ENERGY CENTER ROCK, WI	Temporary Boiler (B98A)		WI-0306	02/28/2020 ACT	FALSE	Low NOx burners, flue gas recirculation, shall be operated for no more than 500 hours, and shall combust only pipeline	0.04 LB/MMBTU AVG. OVER ANY CONSECUTIVE 3-HR PERIOD	Shall be operated for no more than 500 hours and combust only pipeline quality natural gas.	0.04 LB/MMBTU HEAT INPUT	Shall be operated for no more than 500 hours and combust only pipeline quality natural gas.	0 SEE NOTES	Combust only pipeline quality natural gas, can be operated for no more than 500 hours.	0.008 LB/MMBTU HEAT INPUT	Combust only pipeline quality natural gas.	118 LB CO2/MMBTU HEAT INPUT
PHILLIPS 66 COMPANY SWEENY REFINERY BRAZORIA, TX	Isostripper Reboiler (heater)		TX-0877	01/08/2020 ACT	FALSE					Good combustion practices, use of natural gas fuel for the project heater	0.0054 LB/MMBTU				
FG LA LLC FG LA COMPLEX ST. JAMES, LA	PR Waste Heat Boiler	Maximum operating rate. 86 MMBTU/h normal operating rate.	LA-0364	01/06/2020 ACT	FALSE	SCR and LNB	14.41 LB/H 12-MONTH ROLLING AVERAGE	Good combustion practices and oxidation catalyst.	26.21 LB/H	Good combustion practices and oxidation catalyst	13.37 LB/H			Use of natural gas or fuel gas as fuel, energy-efficient design options, and operational/maintenance practices.	455475 T/YR
FG LA LLC FG LA COMPLEX ST. JAMES, LA	Hot Oil Heaters 1 and 2	Hot oil heaters are identical and will not operated simultaneously.	LA-0364	01/06/2020 ACT	FALSE	LNB	0.06 LB/MMBTU	Good combustion practices and compliance with the applicable provisions of 40 CFR 63 Subpart DDDDD	0.037 LB/MMBTU	Good combustion practices and compliance with the applicable provisions of 40 CFR 63 Subpart DDDDD	4.02 LB/H			Use of fuel gas as fuel, energy-efficient design options, and operational/maintenance practices.	5858 TONS/YR
GREEN BAY PACKAGING INC. GREEN BAY PACKAGING- MILL DIVISION BROWN, WI	Natural Gas-Fired Space Heaters (P44)	Natural Gas-fired Space Heaters with a combined heat input capacity of 8.5 MMBtu/hr	WI-0297	12/10/2019 ACT	FALSE					0	0.0055 LB/MMBTU			Use only natural gas.	90 % AVG THERM EFF

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Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
INDECK NILES, LLC INDECK NILES, LLC CASS, MI	FGFUELHTR (Two fuel pre-heaters identified as EUFUELHTR1 & EUFUELHTR2)	Two natural gas fired dew point heaters for warming the natural gas fuel (EUFUELHTR1 & EUFUELHTR2 in flexible group FGFUELHTR). The total combined heat input during operation shall not exceed 27 MMBTU/H (each) as well. The CO2e limit is for both units combined; however the other limits are per unit.	MI-0423	01/04/2017 ACT	FALSE	Good combustion practices.	2.65 LB/H HOURLY; EACH UNIT	Good combustion practices.	2.22 LB/H HOURLY; EACH UNIT	Good combustion practices.	0.15 LB/H HOURLY; EACH FUEL HEATER			Energy efficiency measures and the use of a low carbon fuel (pipeline quality natural gas).	13848 T/YR 12-MO ROLLING TIME PERIOD; COMBINED LIMI
HOLLYFRONTIER EL DORADO REFINING LLC HOLLYFRONTIER EL DORADO REFINERY BUTLER, KS	B2701	Gas Con. Stripper Reboiler	KS-0041	10/30/2019 ACT	FALSE	Ultra Low NOx Burners	0.04 LB/MMBTU 30 DAY ROLLING AVERAGE	Ultra Low NOx Burners	0.035 LB/MMBTU 3 HR ROLLING AVERAGE	Ultra Low NOx Burners	0.0015 LB/MMBTU 3 HR ROLLING AVERAGE	Ultra Low NOx Burners	0.0075 LB/MMBTU 3 HR ROLLING AVERAGE		
HOLLYFRONTIER EL DORADO REFINING LLC HOLLYFRONTIER EL DORADO REFINERY BUTLER,	B2031	HTU1 Pre-Heater, induced draft	KS-0041	10/30/2019 ACT	FALSE	Ultra Low NOx Burners	0.04 LB/MMBTU 30 DAY ROLLING AVERAGE	Ultra Low NOx Burners	0.035 LB/MMBTU 3 HR ROLLING AVERAGE	Ultra Low NOx Burners	0.0015 LB/MMBTU 3 HR ROLLING AVERAGE	Ultra Low NOx Burners	0.0075 LB/MMBTU 3 HR ROLLING AVERAGE		
HOLLYFRONTIER EL DORADO REFINING LLC HOLLYFRONTIER EL DORADO REFINERY BUTLER,	B2502	HTU2 Debut. Reboiler, Induced Draft	KS-0041	10/30/2019 ACT	FALSE	Ultra Low NOx Burners	0.04 LB/MMBTU 30 DAY ROLLING AVERAGE	Ultra Low NOx Burners	0.035 LB/MMBTU 3 HR ROLLING AVERAGE	Ultra Low NOx Burners	0.0015 LB/MMBTU 3 HR ROLLING AVERAGE	Ultra Low NOx Burners	0.0075 LB/MMBTU 3 HR ROLLING AVERAGE		
HOLLYFRONTIER EL DORADO REFINING LLC HOLLYFRONTIER EL DORADO REFINERY BUTLER,	B3401	HTU4 Heater, Induced Draft	KS-0041	10/30/2019 ACT	FALSE	Ultra Low NOx Burners	0.04 LB/MMBTU 30 DAY ROLLING AVERAGE	Ultra Low NOx Burners	0.035 LB/MMBTU 3 HR ROLLING AVERAGE	Ultra Low NOx Burners	0.0015 LB/MMBTU 3 HR ROLLING AVERAGE	Ultra Low NOx Burners	0.0075 LB/MMBTU 3 HR ROLLING AVERAGE		
NORTHSTAR BLUESCOPE STEEL, LLC NORTHSTAR BLUESCOPE STEEL, LLC FULTON, OH	Tunnel Furnace #2 (P018)	Raises and equalizes the temperature of the steel slabs to a level suitable for hot rolling.	OH-0381	09/27/2019 ACT	FALSE	Use of natural gas, use of low NOx burners, good combustion practices and design	6.16 LB/H	Use natural gas, use of baffle type burners, good combustion practices and design	6.16 LB/H	Use of natural gas, good combustion practices and design	0.48 LB/H	Use of natural gas, good combustion practices and design	0.88 LB/H	Use of natural gas and energy efficient design	10283.06 LB/H
THOMAS TOWNSHIP ENERGY, LLC THOMAS TOWNSHIP ENERGY, LLC SAGINAW, MI	FGAUXBOILER	Two (2) natural gas-fired auxiliary boilers, each with a maximum rating of 80 MMBTU/H (HHV) to facilitate startup of the CTGHRSG and to provide the required steam to support the startup of the facility, including but not limited to: steam for sparging, STG seals, etc.	MI-0442	08/21/2019 ACT	FALSE	Good combustion practices and low NOx burners.	0.036 LB/MMBTU HOURLY; EACH BOILER	Good combustion practices	0.037 LB/MMBTU HOURLY; EACH BOILER	Good combustion practices.	0.0054 LB/MMBTU HOURLY; EACH BOILER	Low sulfur fuel (natural gas) and good combustion practices (efficient combustion).	1.9 LB/MMSCF HOURLY; EACH BOILER	Energy efficiency	41031 T/YR 12-MO ROLLING TIME PERIOD; EACH BOILER
THOMAS TOWNSHIP ENERGY, LLC THOMAS TOWNSHIP ENERGY, LLC SAGINAW, MI	FGPREHEAT	Two (2) natural gas-fired preheaters, each with a maximum heat input of 7 MMBTU/hr, used to preheat the natural gas above the dewpoint prior to combustion in the CTG.	MI-0442	08/21/2019 ACT	FALSE	Good combustion practices and low NOx burners	0.036 LB/MMBTU HOURLY; EACH UNIT	Good combustion practices	0.037 LB/MMBTU HOURLY; EACH UNIT	Good combustion practices	0.025 LB/MMBTU HOURLY; EACH UNIT	Low sulfur fuel (natural gas) and good combustion practices (efficient combustion).	1.9 LB/MMSCF HOURLY; EACH UNIT	Energy efficiency	3590 T/YR 12-MO ROLLING TIME PERIOD; EACH UNIT
MICHIGAN STATE UNIVERSITY MICHIGAN STATE UNIVERSITY INGHAM, MI	FGFUELHEATERS	Two natural gas fired fuel gas dew point heaters. Each heater has a 25 MMBTU/H throughput capacity.	MI-0440	05/22/2019 ACT	FALSE	Low NOx burners and good combustion practices.	0.05 LB/MMBTU HOURLY; EACH HEATER	Good combustion practices.	0.08 LB/MMBTU HOURLY; EACH HEATER	Good combustion practices	0.005 LB/MMBTU HOURLY; EACH UNIT			Utilize low-carbon fuels and implement energy efficiency measures and preventative maintenance	12822 T/YR 12-MO ROLLING TIME PERIOD; EACH UNIT
CANFOR SOUTHERN PINE CANFOR SOUTHERN PINE - CONWAY MILL HORRY, SC	Boiler No. 2	29.113 MMBtu/hr rated heat input capacity	SC-0192	05/21/2019 ACT	FALSE			Work Practice Standards	0.0375 LB/MMBTU	Work Practice Standards	0.0054 LB/MMBTU				
GEORGIA-PACIFIC CONSUMER PRODUCTS LLC GEORGIA-PACIFIC CONSUMER PRODUCTS LLC BROWN, WI	B98 & B99 Natural Gas Fired Temporary Boilers		WI-0289	04/01/2019 ACT	FALSE					Good Combustion Practices	0.0055 LB/MMBTU				
GREEN BAY PACKAGING INC. â€"MILL DIVISION GREEN BAY PACKAGING INC. â€"MILL DIVISION BROWN, WI	P44 Space Heaters		WI-0292	04/01/2019 ACT	FALSE					Good Combustion Practices, the Use of Low-NOx Burners	0.0055 LB/MMBTU			Good Combustion Practices, the Use of Low-NOx Burners	0
NUCOR CORPORATION NUCOR STEEL ARKANSAS 110000452180, AR	SN-142 Vacuum Degasser Boiler		AR-0171	02/14/2019 ACT	FALSE	Low Nox Burners	0.035 LB/MMBTU	Good combustion practices	0.075 LB/MMBTU	Good combustion practices	0.0026 LB/HR			Good combustion practices	121 LB/MMBTU
NUCOR CORPORATION NUCOR STEEL ARKANSAS 110000452180, AR	SN-233 Galvanizing Line Boilers		AR-0171	02/14/2019 ACT	FALSE	Low Nox Burners	0.1 LB/MMBTU 3-HR	Good combustion practices	0.084 LB/MMBTU	Good combustion practices	0.0055 LB/MMBTU			Good combustion practices	121 LB/MMBTU
GRAYMONT WESTERN LIME-EDEN GRAYMONT WESTERN LIME-EDEN FOND DU LAC, WI	P05 Natural Gas Fired Line Heater		WI-0291	01/28/2019 ACT	FALSE	Good Combustion Practices	0.1 LB/MMBTU	Good Combustion Practices	0.082 LB/MMBTU						
JACKSON GENERATION, LLC JACKSON ENERGY CENTER WILL, IL	Auxiliary Boiler	The auxiliary boiler is used on an intermittent basis (up to 2,000 hours/year) to produce intermediate pressure steam for heating the heat recovery steam generators (HRSGs) and steam turbines	IL-0130	12/31/2018 ACT	FALSE	Ultra low-NOx burners and flue gas recirculation air preheater, automated combustion management systems, automated	0.01 LB/MMBTU 3-HOUR AVERAGE	Good combustion practice	0.037 LB/MMBTU 3-HOUR			Good combustion practice	0.0075 LB/MMBTU 3-HOUR AVERAGE	Good combustion practice	11250 TONS/YEAR 12-MONTH ROLLING AVERAGE

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RIO GRANDE LNG LLC RIO BRAVO PIPELINE FACILITY CAMERON, TX	THERMAL OXIDIZER	Two thermal oxidizers to burn acid gas from natural gas Acid Gas Removal Units for Trains 1 and 2. In addition, for these two trains, the thermal oxidizers also accept breathing losses from the condensate tanks and the emissions from natural gas liquid truck loading.	TX-0851	12/17/2018 ACT	FALSE	Low NOx burners and good combustion practices.	0.162 LB/MMBTU	Natural Gas / Clean Fuel, good combustion practices.	0.082 LB/MMBTU	Natural Gas / Clean Fuel, good combustion practices.	0.0054 LB/MMBTU			Natural Gas / Clean Fuel, good combustion practices.	0
WINPAK HEAT SEAL CORPORATION WINPAK HEAT SEAL CORPORATION TAZEWELL, IL	Heating Units	Numerous comfort heaters and dryers each with a capacity less than 10 mmBtu/hr.	IL-0127	10/05/2018 ACT	FALSE					Units shall be operated in accordance with good combustion practices.	0				
GREEN BAY PACKAGING, INC. GREEN BAY PACKAGING, INC. - SHIPPING CONTAINER DIVISION BROWN, WI	Natural gas-fied boiler (Boiler B01)		WI-0266	09/06/2018 ACT	FALSE					Good combustion practices, use only natural gas, equip boiler with Low NOx burners and flue gas recirculation	0.0055 LB/MMBTU			Good combustion practices, use only natural gas, equip with Low NOx burners and flue gas recirculation	160 LBCO2E/1000 LB STEAM
ARKEMA INC. ARKEMA BEAUMONT PLANT JEFFERSON, TX	HEATERS		TX-0845	08/24/2018 ACT	FALSE	LOW NOX BURNERS, CLEAN FUEL	0.04 LB/MMBTU							low carbon fuel selection, and good combustion practices	0
CPV THREE RIVERS, LLC CPV THREE RIVERS ENERGY CENTER GRUNDY, IL	Auxiliary Boiler	The auxiliary boiler is used on an intermittent basis (up to 4,000 hr/yr) to produce intermediate pressure steam for heating the heat recovery steam generators (HRSG) and combustion turbines.	IL-0129	07/30/2018 ACT	FALSE	Ultra-low NOx burners and flue gas recirculation, air preheater, automated combustion management system with O2 trim system	0.011 LB/MMBTU 3-HOUR AVERAGE	Good combustion practices	0.037 LB/MMBTU 3-HOUR AVERAGE			Good combustion practices	0.0075	Good combustion practice	22500 TON/YR 12-MONTH ROLLING AVERAGE
DTE ELECTRIC COMPANY BELLE RIVER COMBINED CYCLE POWER PLANT ST. CLAIR, MI	EUAUXBOILER: Auxiliary Boiler	A natural gas-fired auxiliary boiler, rated at 99.9 MMBTU/H to facilitate startup of the CTG/HRSG trains and to provide steam to the steam turbine generator seals. The auxiliary boiler is equipped with low NOx burners (LNB) and flue gas recirculation (FGR).	MI-0435	07/16/2018 ACT	FALSE	Low NOx burners/Flue gas recirculation.	0.036 LB/MMBTU HOURLY	Good combustion practices	0.075 LB/MMBTU HOURLY	Good combustion practices	0.008 LB/MMBTU HOURLY			Energy efficiency measures, use of natural gas.	25623 T/YR 12-MO ROLLING TIME PERIOD
DTE ELECTRIC COMPANY BELLE RIVER COMBINED CYCLE POWER PLANT ST. CLAIR, MI	EUFUELHTR1: Natural gas fired fuel heater	A natural gas-fired 20.8 MMBTU/H heat input HP fuel heater.	MI-0435	07/16/2018 ACT	FALSE	Low NOx burner	0.75 LB/H HOURLY	Good combustion controls.	0.77 LB/H HOURLY	Good combustion controls	0.17 LB/H HOURLY			Natural gas fuel	6310 T/YR 12-MO ROLLING TIME PERIOD
DTE ELECTRIC COMPANY BELLE RIVER COMBINED CYCLE POWER PLANT ST. CLAIR, MI	EUFUELHTR2: Natural gas fired fuel heater	A natural gas-fired 3.8 MMBTU/H heat input HP fuel heater.	MI-0435	07/16/2018 ACT	FALSE	Low NOx burner	0.14 LB/H HOURLY	Good combustion controls	0.14 LB/H HOURLY	Good combustion controls.	0.03 LB/H HOURLY			Natural gas fuel	6310 T/YR 12-MONTH ROLLING TIME PERIOD
MARSHALL ENERGY CENTER LLC MEC NORTH, LLC AND MEC SOUTH LLC CALHOUN, MI	EUAUXBOILER (South Plant): Auxiliary Boiler	A natural gas-fired auxiliary boiler, rated at 61.5 MMBTU/H (HHV) to facilitate startup of the CTGHRSG train and to provide the required steam to support the startup of the facility, including but not limited to steam for sparging, STG seals, etc. The auxiliary boiler is equipped with low NOx burners (LNB) and flue gas recirculation (FGR).	MI-0433	06/29/2018 ACT	FALSE	Low NOx burners/flue gas recirculation and good combustion practices.	0.04 LB/MMBTU 30 DAY ROLLING AVG TIME PERIOD	Good combustion practices.	0.08 LB/MMBTU HOURLY	Good combustion practices.	0.004 LB/MMBTU HOURLY			Energy efficiency measures and the use of a low carbon fuel (pipeline quality natural gas).	31540 T/YR 12-MO ROLLING TIME PERIOD
MARSHALL ENERGY CENTER LLC MEC NORTH, LLC AND MEC SOUTH LLC CALHOUN, MI	EUAUXBOILER (North Plant): Auxiliary Boilder	A natural gas-fired auxiliary boiler, rated at 61.5 MMBTU/H (HHV) to facilitate startup of the CTGHRSG train and to provide the required steam to support the startup of the facility, including but not limited to steam for sparging, STG seals, etc. The auxiliary boiler is equipped with low NOx burners (LNB) and flue gas recirculation (FGR).	MI-0433	06/29/2018 ACT	FALSE	Low NOx burners/flue gas recirculation and good combustion practices.	0.04 LB/MMBTU 30-DAY ROLLING AVG TIME PERIOD	Good combustion practices.	0.08 LB/MMBTU HOURLY	Good combustion practices.	0.004 LB/MMBTU HOURLY			Energy efficiency measures and the use of a low carbon fuel (pipeline quality natural gas).	31540 T/YR 12-MO ROLLING TIME PERIOD
AFE, INC AFE, INC. â€"LCM PLANT RACINE, WI	B01-B12, Boilers	Each of the twelve boilers, 28 mmBTU/hr maximum rating	WI-0283	04/24/2018 ACT	FALSE	Ultra-low NOx Burners, Flue Gas Recirculation and Good Combustion Practices	0.0105 LB/MMBTU	Ultra-low NOx Burners, Flue Gas Recirculation and Good Combustion Practices	25 PPMVD	Ultra-low NOx Burners, Flue Gas Recirculation and Good Combustion Practices	0.0036 LB/MMBTU	Good Combustion Practices	0.0075 LB/MMBTU	Ultra-low NOx Burners, Flue Gas Recirculation, Good Combustion Practices and the Use of Pipeline Quality	160 LB/1000 LB CO2E 12-MONTH AVERAGE
SIO INTERNATIONAL WISCONSIN, INC. -ENERGY PLANT , WI	B13-B24 & B25-B36 Natural Gas-Fired Boilers	Twenty-four natural gas-fired boilers. Only 20 operating at any given time.	WI-0284	04/24/2018 ACT	FALSE	Ultra-Low NOx Burners, Flue Gas Recirculation, and Good Combustion Practices.	0.0105 LB/MMBTU 1-HOUR AVERAGE	Ultra-Low NOx Burners, Flue Gas Recirculation, and Good Combustion Practices.	25 PPMVD	Ultra-Low NOx Burners, Flue Gas Recirculation, and Good Combustion Practices.	0.0036 LB/MMBTU	Good Combustion Practices and The Use of Pipeline Quality Natural Gas	0.0075 LB/MMBTU	Ultra-Low NOx Burners, Flue Gas Recirculation, and Good Combustion Practices and the Use of Pipeline Quality	160 LB CO2E/1000LB STEAM 12 MONTH AVERAGE
HARRISON POWER HARRISON POWER HARRISON, OH	Auxiliary Boiler (B001)	44.55 MMBtu/hr natural gas-fired boiler equipped with low-NOx burners. The permit includes the option to install either General Electric turbines (with 80 MMBTU aux boiler B002) or Mitsubishi turbines (with 44.55 MMBTU aux boiler B001).	OH-0377	04/19/2018 ACT	FALSE	Good combustion practices and low NOx burner	1.56 LB/H	Good combustion practices	1.67 LB/H	Good combustion practices	0.16 LB/H	Pipeline quality natural gas	0.33 LB/H	Good combustion practices and pipeline quality natural gas	2817.6 T/YR PER ROLLING 12 MONTH PERIOD

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Date Range:	2015 - 2025
Fuel:	Natural Gas
Process Code:	13.310
RBLC Search Date:	2/4/2025

Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
HARRISON POWER HARRISON POWER HARRISON, OH	Auxiliary Boiler (B002)	80 MMBtu/hr natural gas-fired boiler equipped with low-NOx burners. The permit includes the option to install either General Electric turbines (with 80 MMBTU aux boiler B002) or Mitsubishi turbines (with 44.55 MMBTU aux boiler B001).	OH-0377	04/19/2018 ACT	FALSE	Good combustion practices and low NOx burner	2.19 LB/H	Good combustion practices	2.48 LB/H	Good combustion practices	0.248 LB/H	Pipeline quality natural gas	0.48 LB/H	Good combustion practices and pipeline quality natural gas	5009.1 T/YR PER ROLLING 12 MONTH PERIOD
SEMINOLE ELECTRIC COOPERATIVE, INC. SEMINOLE GENERATING STATION PUTNAM, FL	Two natural gas heaters (< 10 MMBtu/hr each)	Two natural gas heaters, each less than 10 MMBtu/hr	FL-0364	03/21/2018 ACT	FALSE					0	0.005 LB/MMBTU				
FLORIDA POWER AND LIGHT COMPANY DANIA BEACH ENERGY CENTER BROWARD, FL	99.8 MMBtu/hr auxiliary boiler	Fueled only with natural gas.	FL-0363	12/04/2017 ACT	FALSE			Clean fuel	0.08 LB/MMBTU						
FLORIDA POWER AND LIGHT COMPANY DANIA BEACH ENERGY CENTER BROWARD, FL	Two natural gas heaters		FL-0363	12/04/2017 ACT	FALSE	Manufacturer certification	0.1 LB/MMBTU DESIGN VALUE								
LONG RIDGE ENERGY GENERATION LLC - HANNIBAL POWER LONG RIDGE ENERGY GENERATION LLC - HANNIBAL POWER MONROE, OH	Auxiliary Boiler (B001)	26.8 MMBtu/hr natural gas-fired boiler with a low-NOx burner and flue gas recirculation	OH-0375	11/07/2017 ACT	FALSE	Flue gas recirculation and low NOX burner	0.29 LB/H	Good combustion controls	0.99 LB/H	Good combustion controls	0.13 LB/H	Low sulfur fuel	0.27 LB/H	Natural gas as the sole fuel	7845 T/YR PER ROLLING 12 MONTH PERIOD
GUERNSEY POWER STATION LLC GUERNSEY POWER STATION LLC GUERNSEY, OH	Fuel Gas Heaters (2 identical, P007 and P008)	Two identical Fuel Gas Heaters; 15.0 MMBtu/hr natural gas-fired fuel gas heater with low-NOx burners. The natural gas heaters will heat a water bath.	OH-0374	10/23/2017 ACT	FALSE	Low-NOx gas burner	0.3 LB/H	Combustion control	0.83 LB/H	Combustion control	0.075 LB/H	Combustion control	0.075 LB/H	Natural gas, low-emitting fuel	7695 T/YR PER ROLLING 12 MONTH PERIOD
OREGON ENERGY CENTER OREGON ENERGY CENTER LUCAS, OH	Auxiliary Boiler (B001)	37.8 mmBtu/hr natural gas fired auxiliary boiler with low- NOX burners and flue gas recirculation	OH-0372	09/27/2017 ACT	FALSE	low NOX burners and flue gas recirculation	0.76 LB/H	good combustion controls	2.08 LB/H	good combustion controls	0.23 LB/H			use of natural gas, good combustion controls	4502 T/YR PER ROLLING 12 MONTH PERIOD
TRUMBULL ENERGY CENTER TRUMBULL ENERGY CENTER TRUMBULL, OH	Auxiliary Boiler (B001)	Auxiliary Boiler 37.8 MMBtu/hr	OH-0370	09/07/2017 ACT	FALSE	Flue gas recirculation (FGR), low NOx burner	0.76 LB/H	Good combustion controls	2.08 LB/H	Good combustion controls	0.23 LB/H			Good combustion controls/natural gas combustion	4456 T/YR PER ROLLING 12 MONTH PERIOD
WHITING CLEAN ENERGY, INC. WHITING CLEAN ENERGY, INC. LAKE, IN	Space Heaters	(a) Six (6) Sterling TF-400 natural gas-fired space heaters, identified as HTR 1 through 6, constructed in 2000, with a maximum capacity of 0.4 MMBtu per hour, each, with low NOx burners, and exhausting to atmosphere. (b) Three (3) Carrier 48TCED natural gas-fired space heaters, identified as HTR 7 through 9, constructed in 2000, with a maximum capacity of 0.224 MMBtu per hour, each, and exhausting to atmosphere.	IN-0285	08/02/2017 ACT	FALSE	0	0.05 LB/MMBTU UNITS 1-6, COMBUSTING NATURAL GAS	0	0.038 LB/MMBTU WHEN COMBUSTING NATURAL GAS	0	0.0053 LB/MMBTU WHEN COMBUSTING NATURAL GAS	0	0.0072 LB/MMBTU WHEN COMBUSTING NATURAL GAS		
PERDUE AGRIBUSINESS, LLC PERDUE GRAIN AND OILSEED, LLC CHESAPEAKE, VA	(4) 27 MMBtu/hr boilers, Natural gas and No. 2 fuel oi		VA-0327	07/12/2017 ACT	FALSE					0	0.1 LB/HR				
PALLAS NITROGEN LLC PALLAS NITROGEN LLC COLUMBIANA, OH	Startup Heater (B001)	100 mmBtu/hr Startup Heater	OH-0368	04/19/2017 ACT	FALSE	Good combustion control (i.e., high temperatures, sufficient excess air, sufficient residence times, and good	10 LB/H	good combustion control (i.e., high temperatures, sufficient excess air, sufficient residence times, and good	8.24 LB/H	Good combustion control (i.e., high temperatures, sufficient excess air, sufficient residence times, and good	0.54 LB/H			Good combustion control (i.e., high temperatures, sufficient excess air, sufficient residence times, and good	2840 T/YR PER ROLLING 12 MONTH PERIOD
DTE GAS COMPANY DTE GAS COMPANY - MILFORD COMPRESSOR STATION OAKLAND, MI	FGAUXBOILERS (6 auxiliary boilers EUAUXBOIL2A, EUAUXBOIL3A, EUAUXBOIL2B, EUAUXBOIL3B, EUAUXBOIL2C, EUAUXBOIL3C)	Four natural gas-fired auxiliary boilers, each rated at 3 MMBTU/H fuel heat input (EUAUXBOIL2A, EUAUXBOIL3A, EUAUXBOIL2B and EUAUXBOIL3B in FGAUXBOILERS) and two natural gas-fired auxiliary boilers, each rated at 1 MMBTU/H fuel heat input (EUAUXBOIL2C and EUAUXBOIL3C in FGAUXBOILERS). The boilers are subject to 40 CFR Part 63 Subpart DDDDD which requires tune ups.	MI-0426	03/24/2017 ACT	FALSE	Ultra-low NOx burners and good combustion practices.	20 PPM AT 3% O2 EACH 3 MMBTU/H BOILER	Good combustion practices and clean burn fuel (pipeline quality natural gas).	84 LB/MMSCF EACH BOILER					Use of pipeline quality natural gas and energy efficiency measures.	7324 T/YR COMBINED FOR ALL BOILERS
HOLLAND BOARD OF PUBLIC WORKS HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET OTTAWA, MI	EUAUXBOILER (Auxiliary Boiler)	One natural gas fired auxiliary boiler rated at 83.5 MMBTU/hr fuel heat input (EUAUXBOILER).	MI-0424	12/05/2016 ACT	FALSE	Low NOx burners/Internal flue gas recirculation and good combustion practices.	0.05 LB/MMBTU TEST PROTOCOL WILL SPECIFY AVG TIME	Good combustion practices.	0.077 LB/MMBTU TEST PROTOCOL WILL SPECIFY AVG TIME	Good combustion practices.	0.008 LB/MMBTU TEST PROTOCOL WILL SPECIFY AVG TIME			Good combustion practices.	43283 T/YR 12-MO ROLLING TIME PERIOD
HOLLAND BOARD OF PUBLIC WORKS HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET OTTAWA, MI	EUFUELHTR (Fuel pre-heater)	One natural gas fired dew point heater for warming the natural gas fuel (EUFUELHTR).	MI-0424	12/05/2016 ACT	FALSE	Good combustion practices.	0.55 LB/H TEST PROTOCOL WILL SPECIFY AVG TIME.	Good combustion practices.	0.41 LB/H TEST PROTOCOL WILL SPECIFY AVG TIME	Good combustion practices.	0.03 LB/H TEST PROTOCOL WILL SPECIFY AVG TIME			Good combustion practices.	1934 T/YR 12-MO ROLLING TIME PERIOD

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Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
REXTAC, LLC ODESSA PETROCHEMICAL PLANT ECTOR, TX	small Boiler		TX-0813	11/22/2016 ACT	FALSE					best combustion practices	0.0005 MMBTU/HR				
SOUTH FIELD ENERGY LLC SOUTH FIELD ENERGY LLC COLUMBIANA, OH	Auxiliary Boiler (B001)	99 MMBtu/hr dual fuel [natural gas and ultra-low sulfur diesel (ULSD)-fired] boiler with low-NOx burners and flue gas recirculation	OH-0367	09/23/2016 ACT	FALSE	Flue gas recirculation (FGR), low NOx burner, and natural gas/ultra low sulfur diesel	9.9 LB/H	Good combustion controls and natural gas/ultra low sulfur diesel	7.92 LB/H	Good combustion controls and natural gas/ultra low sulfur diesel	0.59 LB/H			Good combustion controls, natural gas combustion, and ultra low sulfur diesel	32171 T/YR PER ROLLING 12 MONTH PERIOD
CPV FAIRVIEW, LLC CPV FAIRVIEW ENERGY CENTER CAMBRIA, PA	Auxilary boiler	Operation of the auxiliary boiler shall not exceed 4000 hrs in any continuous 12-month period.	PA-0310	09/02/2016 ACT	FALSE	Ultra low NOx burners, FGR, good combustion practices	0.011 LB/MMBTU AVG OF 3 1-HR TEST RUNS	ULSD and good combustion practices	0.037 LB/MMBTU AVG OF 3 1-HR TEST RUNS	ULSD and good combustion practices	0.004 LB/MMBTU AVG OF 3 1-HR TEST RUNS	ULSD and good combustion practices	0.007 LB/MMBTU		
STONEGATE POWER, LLC MIDDLESEX ENERGY CENTER, LLC MIDDLESEX, NJ	Auxiliary Boiler		NJ-0085	07/19/2016 ACT	FALSE	Low NOx burners and Flue Gas Recirculation (FGR) and use of natural gas a clean burning fuel	0.975 LB/H AV OF THREE ONE H INITIAL STACK TEST	USE OF NATURAL GAS A CLEAN BURNING FUEL AND GOOD COMBUSTION PRACTICES	3.61 LB/H AV OF THREE ONE H STACK TESTS INITIALLY	USE OF NATURAL GAS A CLEAN BURNING FUEL AND GOOD COMBUSTION PRACTICES	0.488 LB/H AV OF THREE ONE H STACK TESTS INITIALLY				
LAKE CHARLES METHANOL, LLC LAKE CHARLES METHANOL FACILITY CALCASIEU PARISH, LA	Gasifier Start-up Preheat Burners		LA-0305	06/30/2016 ACT	FALSE	good engineering practices, good combustion technology, and use of clean fuels	0	good engineering practices, good combustion technology, and use of clean fuels	0					good equipment design and good combustion practices	0
LAKE CHARLES METHANOL, LLC LAKE CHARLES METHANOL FACILITY CALCASIEU PARISH, LA	WSA Preheat Burners		LA-0305	06/30/2016 ACT	FALSE	good engineering design and practices and use of clean fuels	0	good engineering design and practices and use of clean fuels	0					good equipment design and good combustion practices	0
DTE GAS COMPANY DTE GAS COMPANY--MILFORD COMPRESSOR STATION OAKLAND, MI	FGAUXBOILERS	Two natural gas-fired auxiliary boilers, each rated at 6 MMBTU/H fuel heat input. The boilers are identified as EUAUXBOIL2 and EUAUXBOIL3 within the flexible group FGAUXBOILERS. The boilers are subject to 40 CFR Part 63 Subpart DDDDD, which requires tune ups.	MI-0420	06/03/2016 ACT	FALSE	Ultra low NOx burners and good combustion practices.	14 PPMVOL AT 15%O2; TEST PROTOCOL	Good combustion practices and clean burn fuel (pipeline quality natural gas)	0.08 LB/MMBTU TEST PROTOCOL					Use of pipeline quality natural gas and energy efficiency measures.	6155 T/YR 12-MO ROLLING TIME PERIOD
GEORGIA-PACIFIC WOOD PRODUCTS LLC BELK CHIP-N-SAW FACILITY FAYETTE, AL	60 MMBTU/HR NATURAL GAS-FIRED BOILER (ES-008)		AL-0312	05/26/2016 ACT	FALSE					GOOD COMBUSTION PRACTICES	0.0054 LB/MMBTU INPUT				
MERCEDES BENZ VANS, LLC MERCEDES BENZ VANS, LLC CHARLESTON, SC	Energy Center Boilers	Two Boilers, each rated at 14.27 MMBTU/hr	SC-0193	04/15/2016 ACT	FALSE					Annual tune ups per 40 CFR 63.7540(a)(10) are required.	5.5 LB/MMSCF 3 HOUR BLOCK AVERAGE	Annual tune ups per 40 CFR 63.7540(a)(10) are required.	7.6 LB/MMSCF 3 HR BLOCK AVERAGE		
MID-KANSAS ELECTRIC COMPANY, LLC - RUBART STATION MID-KANSAS ELECTRIC COMPANY, LLC - RUBART STATION GRANT, KS	Indirect fuel-gas heater	One (1) indirect fuel-gas heater, rated at 2 mmBtu/hr heat input, which shall only burn natural gas, for the purpose of heating the natural gas fuel prior to combustion in the Caterpillar 4SLB RICE.	KS-0030	03/31/2016 ACT	FALSE	0	0.2 LB/H EXCLUDES STARTUP, SHUTDOWN & MALFUNCTION	0	0.16 LB/H EXCLUDES STARTUP, SHUTDOWN & MALFUNCTION	0	0.011 LB/H EXCLUDES STARTUP, SHUTDOWN & MALFUNCTION	0	0.015 LB/H EXCLUDES STARTUP, SHUTDOWN & MALFUNCTION		
PSEG FOSSIL LLC PSEG FOSSIL LLC SEWAREN GENERATING STATION MIDDLESEX, NJ	Auxiliary Boiler firing natural gas	Maximum heat input rate for natural gas fired auxiliary boiler is 80 MMBtu/hr (HHV) permitted to operate for 8760 hrs/yr.	NJ-0084	03/10/2016 ACT	FALSE	low NOx burners and flue gas recirculation (FGR)	0.8 LB/H AV OF THREE ONE H STACK TESTS	Use of good combustion practices and use of natural gas a clean burning fuel	2.88 LB/H AV OF THREE ONE H STACK TESTS	Use of good combustion practices and use of natural gas a clean burning fuel	0.32 LB/H AV OF THREE ONE H STACK TESTS				
FLORIDA POWER & LIGHT OKEECHOBEE CLEAN ENERGY CENTER OKEECHOBEE, FL	Two natural gas heaters	Fueled only with gas. May operate one heater at a time.	FL-0356	03/09/2016 ACT	FALSE	Must have NOx emission design value less than 0.1 lb/MMBtu	0.1 LB/MMBTU								
FLORIDA POWER & LIGHT OKEECHOBEE CLEAN ENERGY CENTER OKEECHOBEE, FL	Auxiliary Boiler, 99.8 MMBtu/hr	Fires only natural gas. Limited to 2000 hr/yr.	FL-0356	03/09/2016 ACT	FALSE	Low-NOx burners	0.05 LB/MMBTU	Proper combustion prevents CO	0.08 LB/MMBTU			Use of clean fuels	10 % OPACITY	Use of natural gas only	0
CRICKET VALLEY ENERGY CENTER LLC CRICKET VALLEY ENERGY CENTER USA, NY	Auxiliary Boiler	Limited to 4,500 H/YR	NY-0103	02/03/2016 ACT	FALSE	flue gas recirculation with low NOx burners	0.0085 LB/MMBTU 1 H	good combustion practice	0.0375 LB/MMBTU 1 H	good combustion practice	0.0015 LB/MMBTU 1 H			good combustion practiced and pipeline quality natural gas	119 LB/MMBTU 12 MO
COMMERCIAL METALS COMPANY CMC STEEL OKLAHOMA BRYAN, OK	Heaters (Gas-Fired)	Numerous gas-fired heaters will be installed. The application requested that the sizes all be kept confidential.	OK-0173	01/19/2016 ACT	FALSE	Natural Gas Fuel	0.1 LB/MMBTU	Natural Gas Fuel.	0.084 LB/MMBTU	Natural Gas Fuel.	0.0055 LB/MMBTU			Natural Gas Fuel	120 LB/MMBTU
LACKAWANNA ENERGY CENTER, LLC LACKAWANNA ENERGY CTR/JESSUP LACKAWANNA, PA	AUXILLARY BOILER	Fired only on natural gas supplied by a public utility. Limited to 4000 hrs per year on a 12 month rolling basis.	PA-0309	12/23/2015 ACT	FALSE	SCR and ultra low NOx burners, Fired only on natural gas supplied by a public utility.	0.006 LB/MMBTU 30-DAY ROLLING AVERAGE BASIS	0	0.037 LB/MMBTU	0	0.005 LB/MMBTU 30-DAY ROLLING BASIS			0	44107 TON 12-MONTH ROLLING BASIS

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CPV TOWANTIC, LLC CPV TOWANTIC, LLC NEW HAVEN, CT	Aux Boiler		CT-0159	11/30/2015 ACT	FALSE	Boiler permit does not specify any add-on control other than ultr-low NOx burner. Unit may be required to use additional control	7 PPMVD @3% O2								
MATTAWOMAN ENERGY, LLC MATTAWOMAN ENERGY CENTER PRINCE GEORGE'S, MD	Auxiliary Boiler	PIPELINE QUALITY NATURAL GAS FUEL ONLY, OPERATION OF ULTRA LOW-NOX BURNER TECHNOLOGY SUBJECT TO NSPS SUBPART DC RECORDKEEPING AND REPORTING REQUIREMENTS	MD-0045	11/13/2015 ACT	FALSE	EXCLUSIVE USE OF PIPELINE QUALITY NATURAL GAS, ULTRA LOW-NOX BURNERS, AND GOOD COMBUSTION PRACTICES	0.01 LB/MMBTU 3-HOUR BLOCK AVERAGE	GOOD COMBUSTION PRACTICES	0.037 LB/MMBTU 3-HOUR BLOCK AVERAGE	EXCLUSIVE USE OF NATURAL GAS, AND GOOD COMBUSTION PRACTICES	0.003 LB/MMBTU 3-HOUR BLOCK AVERAGE				
JEFFERSON RAILPORT TERMINAL I TEXAS LLC PORT OF BEAUMONT PETROLEUM TRANSLOAD TERMINAL (PBPTT) ORANGE, TX	Commercial/Institutional-Size Boilers/Furnaces	Three boilers will be used intermittently to provide steam for heating tanks or railcars as necessary to reduce viscosity of heavy liquids.	TX-0772	11/06/2015 ACT	FALSE	Low NOx burners and flue gas recirculation	0.011 LB/MMBTU	Good combustion practice to ensure complete combustion.	50 PPMVD @ 3% O2	Good combustion practice to ensure complete combustion.	5.42 T/YR			Good combustion practices and use of low carbon fuel	119195 T/YR
JEFFERSON RAILPORT TERMINAL I TEXAS LLC PORT OF BEAUMONT PETROLEUM TRANSLOAD TERMINAL (PBPTT) ORANGE, TX		Boiler will be operated continuously to maintain system temperatures in the intermittent boilers and heavy liquid storage tanks.	TX-0772	11/06/2015 ACT	FALSE										
JEFFERSON RAILPORT TERMINAL I TEXAS LLC PORT OF BEAUMONT PETROLEUM TRANSLOAD TERMINAL (PBPTT) ORANGE, TX		Hot oil heater	TX-0772	11/06/2015 ACT	FALSE										
CONSTELLIUM ALLOYS PLANT COLBERT, AL	PACKAGE BOILER		AL-0307	10/09/2015 ACT	FALSE	LOW NOX BURNER FLUE GAS RECIRCULATION GCP	30 PPMVD 3% O2	GCP	0.08 LB/MMBTU	GCP	0.006 LB/MMBTU			0	34189 T/YR 12 MONTH ROLLING TOTAL
CONSTELLIUM ALLOYS PLANT COLBERT, AL	2 CALP LINE BOILERS	2 IDENTICAL BOILERS	AL-0307	10/09/2015 ACT	FALSE	LOW NOX BURNER FLUE GAS RECIRCULATION (FGR) GOOD COMBUSTION PRACTICES (GCP)	30 PPMVD 3% O2	GCP	0.08 LB/MMBTU	GCP	0.006 LB/MMBTU			0	34189 T/YR 12 MONTH ROLLING TOTAL
MOXIE FREEDOM LLC MOXIE FREEDOM GENERATION PLANT LUZERNE, PA	Auxilary boiler	Shall construct qualifying small gas combustion units capable of reducing nitrogen oxides (NOx) and carbon monoxide (CO) emissions to or below: i. 30 ppmdv NOx at 3% O2 when firing gas; ii. 300 ppmdv CO at 3% O2. The combustion unit(s) shall be fired only on natural gas or liquefied petroleum gas Total fuel usage of the auxiliary boiler shall not exceed 214.9 MMscf on a 12-month rolling basis. Shall maintain and operate the source in accordance with good engineering practice.	PA-0311	09/01/2015 ACT	FALSE	0	0.006 LB/MMBTU	0	0.037 LB/MMBTU	0	0.005 LB/MMBTU	0	0.007 LB/MMBTU	0	13561 TPY 12-MONTH ROLLING BASIS
CLEAN ENERGY FUTURE - LORDSTOWN, LLC CLEAN ENERGY FUTURE - LORDSTOWN, LLC TRUMBULL, OH	Auxiliary Boiler (B001)	34 MMBtu/hr (Higher Heating Value (HHV)) natural gas-fired auxiliary boiler	OH-0366	08/25/2015 ACT	FALSE	Flue gas recirculation (FGR) and low NOx burner	0.68 LB/H	Good combustion controls	1.87 LB/H	Good combustion controls	0.2 LB/H			Good combustion controls/natural gas combustion	4008 T/YR PER ROLLING 12 MONTH PERIOD
THE EMPIRE DISTRICT ELECTRIC COMPANY THE EMPIRE DISTRICT ELECTRIC COMPANY CHEROKEE, KS	Auxiliary Boiler	One (1) 18.6 MMBtu/hr natural gas-fired auxiliary boiler with the capacity to produce 15,000 pounds of steam per hour (approximately 18.6 MMBtu/hr)	KS-0029	07/14/2015 ACT	FALSE							0	0.005 LB PER MMBTU	0	9521.5 TONS PER YEAR 12-MONTH ROLLING AVERAGE BASIS
EAGLE MOUNTAIN POWER COMPANY LLC EAGLE MOUNTAIN STEAM ELECTRIC STATION TARRANT, TX	Commercial/Institutional Size Boilers (		TX-0751	06/18/2015 ACT	FALSE	0	0.01 MMBTU/H ROLLING 3-HR AVERAGE	0	50 PPM ROLLING 3-HR AVERAGE	0	4 PPM 1-HR AVG				
CALPINE MID-MERIT, LLC YORK ENERGY CENTER BLOCK 2 ELECTRICITY GENERATION PROJECT YORK, PA	Auxilary boiler	The proposed auxilary boiler will fire NG exclusively with maximum rated heat input capacity of 61.0 MMBtu/hr and is equipped with and ulatra-low NOx burner and a flue gas recirculation system for NOx control. It will be used for preheating components of HRSG and the 420 MW steam turbine during CT startup.	PA-0307	06/15/2015 ACT	FALSE	Good combustion practices, Ultra-Low NOx burners, FGR	0.0086 LB/MMBTU	Good combustion practices	0.06 LB/MMBTU	Good combustion practices and FGR	0.004 LB/MMBTU	Good combustion practices and low sulfur fuels	0.005 LB/MMBTU		
DELAWARE BASIN MIDSTREAM LLC RAMSEY GAS PLANT REEVES, TX	Hot Oil Heaters and Regeneration Heaters	Hot Oil Heaters: 60 MMBtu/hr; Regeneration Heaters: 36 MMBtu/hr	TX-0755	05/21/2015 ACT	FALSE	low NOx burners	0.045 LB/MMBTU	Good combustion practices and firing of residue gas with low carbon content	50 PPMVD @ 3% O2						
O G AND E SEMINOLE GNRTNG STA SEMINOLE, OK	NATURAL GAS-FIRED BOILER (<100MMBTUH)		OK-0168	05/05/2015 ACT	FALSE			NO CONTROLS FEASIBLE;GOOD COMBUSTION PRACTICES	0.0075 LB/MMBTU 3-HOUR AVERAGE (TEST)						

Summary of BACT Determinations

RBLC Seach Parameters:	Commercial/Institutional Sized Boilers/Furnaces
Date Range:	2015 - 2025
Fuel:	Natural Gas
Process Code:	13.310
RBLC Search Date:	2/4/2025

Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
FLAKEBOARD AMERICA LIMITED CAROLINA PARTICLEBOARD MARLBORO, SC	THERMAL OIL HEATER #2		SC-0179	03/18/2015 ACT	FALSE					NATURAL GAS USAGE AND GOOD COMBUSTION PRACTICES.	0.01 LB/H				
INDECK WHARTON, L.L.C. INDECK WHARTON ENERGY CENTER WHARTON, TX	heater		TX-0694	02/02/2015 ACT	FALSE	0	0.1 LB/MMBTU 1 HOUR	0	0.04 LB/MMBTU 1 HOUR						
TINKER AIR FORCE BASE LOGISTICS CENTER MIDWEST CITY AIR DEPOT OKLAHOMA, OK	Heaters/Boilers	Eight 17.3-MMBTUH hot water boilers, four 14.5-MMBTUH and four 13.5-MMBTUH steam boilers will be subject to 40 CFR 60, NSPS, Subpart Dc, and 40 CFR 63 Subpart DDDDD. Note: Avg. Time/Condition for both VOC and GHG is a total for all units.	OK-0164	01/08/2015 ACT	FALSE					1. Use pipeline-quality natural gas. 2. Good Combustion Practices w/emission rate limit of 0.005 lb/MMBTU based on AP-42 (7/1998).	7.1 TONS PER YEAR TOTAL FOR ALL UNITS.			1. Use pipeline-quality natural gas. 2. Good Combustion Practices. 3. Tune-ups for applicable boilers/heaters per 40CFR63, Subpart DDDDD.	153716 TONS PER YEAR TOTAL FOR ALL UNITS.
AGRIUM U.S. INC. KENAI NITROGEN OPERATIONS USA, AK	Five (5) Waste Heat Boilers	Five (5) Natural Gas-Fired 50 MMBtu/hr Waste Heat Boilers. Installed in 1986.	AK-0083	01/06/2015 ACT	FALSE	Selective Catalytic Reduction	7 PPMV 3-HR AVG @ 15 % O2	0	50 PPMV 3-HR AVG @ 15 % O2	0	0.0054 LB/MMBTU 3-HR AVG	0	0.0074 LB/MMBTU 3-HR AVG	0	59.61 TONS/MMCF 3-HR AVG

Summary of BACT Determinations

RBLC Seach Parameters:	Industrial Size Boilers/Furnaces (100 < 250 MMBtu/hr)
Date Range:	2015 - 2025
Fuel:	Natural Gas
Process Code:	12.310
RBLC Search Date:	2/4/2025

Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
MAGNOLIA LNG, LLC MAGNOLIA LNG FACILITY CALCASIEU, LA	Auxiliary boilers	0	LA-0307	03/21/2016 ACT	FALSE	Low Nox burners	0	good combustion practices	0	good combustion practices	0			good combustion/operating /maintenance practices and fueled by natural gas	0
MIDWEST FERTILIZER COMPANY LLC MIDWEST FERTILIZER COMPANY LLC POSEY, IN	natural gas-fired auxiliary boilers EU 012A and EU 012B	0	IN-0324	05/06/2022 ACT	FALSE	The natural gas-fired auxiliary boilers shall combust natural gas	20.4 LB/MMCF	The natural gas-fired auxiliary boilers shall combust natural gas	37.22 LB/MMCF THREE-HOUR AVERAGE	The natural gas-fired auxiliary boilers shall combust natural gas	5.5 LB/MMCF THREE-HOUR AVERAGE			The natural gas-fired auxiliary boilers shall combust natural gas; shall be designed to achieve a minimum 80% thermal efficiency (HHV); shall be equipped with the following energy efficient design features: air inlet controls, heat recovery, condensate recovery, and blow down heat recovery	59.61 TON/MMCF
MIDWEST FERTILIZER COMPANY LLC MIDWEST FERTILIZER COMPANY LLC POSEY, IN	NATURAL GAS AUXILIARY BOILERS (EU-012A, EU-012B, EU-012C)	0	IN-0263	03/23/2017 ACT	FALSE	LOW NOX BURNERS WITH FLUE GAS RECIRCULATION AND GOOD COMBUSTION PRACTICES	20.4 LB/MMCF EACH 3 HOUR AVERAGE	GOOD COMBUSTION PRACTICES AT ALL TIMES THE BOILERS ARE IN OPERATION	37.22 LB/MMCF EACH 3 HOUR AVERAGE	GOOD COMBUSTION PRACTICES AT ALL TIMES THE BOILERS ARE IN OPERATION	5.5 LB/MMCF EACH 3 HOUR AVERAGE	PROPER DESIGN AND GOOD COMBUSTION PRACTICES AT ALL TIMES THE BOILERS ARE IN OPERATION	1.9 LB/MMCF EACH 3 HOUR AVERAGE		
CRONUS CHEMICALS, LLC CRONUS CHEMICALS DOUGLAS, IL	Boilers	Two 179.4 mmBtu/hr boilers	*IL-0134	12/21/2023 ACT	TRUE	LNB and SCR	0.01 LB/MMBTU 3-HR AVG	Oxidation Catalysts, GCP and good burner design	0.0013 LB/MMBTU 3-HR AVG	Oxidation Catalysts, GCP and good burner design	0.0014 LB/MMBTU 3-HR AVG			0	0
BIG RIVER STEEL LLC BIG RIVER STEEL LLC MISSISSIPPI, AR	Reformer Natural Gas Fired	SN-123	AR-0173	01/31/2022 ACT	FALSE	Scrubber, Low Combustion of Natural Gas, and Good Combustion Practices NOX Burners.	383.3 TPY	Scrubber, Low Combustion of Natural Gas, and Good Combustion Practices NOX Burners.	543.2 TPY	Scrubber, Low Combustion of Natural Gas, and Good Combustion Practices NOX Burners.	35.6 TPY			Good Operating Practices	1680207 TPY
BIG RIVER STEEL LLC BIG RIVER STEEL LLC MISSISSIPPI, AR	Tunnel Furnaces	2 TUNNEL FURNCE SECTIONS 234 MMBTU/HR AND 192 MMBTU/HR MADE UP OF A SERIES OF INDIVIDUAL 3 MMBTU BURNERS. Also includes the Tunnel Furnace Shuttle Zone.	AR-0163	06/09/2019 ACT	FALSE	Low NOx burners Combustion of clean fuel Good Combustion Practices	0.1 LB/MMBTU	Combustion of Natural gas and Good Combustion Practice	0.0824 LB/MMBTU	Combustion of Natural gas and Good Combustion Practice	0.0054 LB/MMBTU				
NUCOR STEEL GALLATIN, LLC NUCOR STEEL GALLATIN, LLC GALLATIN, KY	A-Line Tunnel Furnace (EP 02-01)	Max metal capacity is 3,500,000 tons/yr. The A-Line Tunnel Furnace will maintain and equalize the temperature of slabs after the caster and before the 2-stand roughing mill. The A-Line Tunnel Furnace include a swivel furnace section to allow transfer of steel slabs to the B-Line Tunnel Furnace (EP 02-02). The furnace is equipped with low-NOx burners designed to maintain 0.07 pound (lb)/MMBtu of NOx. Combustion gases from the furnaces will be routed through the enclosed furnace to a single stack (South A-Line Stack) for discharge to the atmosphere.	KY-0115	04/19/2021 ACT	FALSE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan. Equipped with Low NOx burners (0.07 lb/MMBtu)	70 LB/MMSCF 3-HR AVERAGE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	84 LB/MMSCF 3-HR AVERAGE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan.	5.5 LB/MMSCF 3-HR AVERAGE			The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan and implement various design and operational efficiency requirements.	54065 TONS/YR 12-MONTH ROLLING
NUCOR STEEL GALLATIN, LLC NUCOR STEEL GALLATIN, LLC GALLATIN, KY	B-Line Tunnel Furnace (EP 02-02)	Max metal capacity is 3,500,000 tons/yr. The -Line Tunnel Furnace will maintain and equalize the temperature of slabs after the caster and before the 2-stand roughing mill. The B-Line Tunnel Furnace transfers steel slabs to the 2-stand roughing mill. The furnace is equipped with low-NOx burners designed to maintain 0.07 pound (lb)/MMBtu of NOx. Combustion gases from the furnaces will be routed through the enclosed furnace to a single stack (South A-Line Stack) for discharge to the atmosphere.	KY-0115	04/19/2021 ACT	FALSE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan. Equipped with low NOx burners (0.07 lb/MMBtu)	70 LB/MMSCF 3-HR AVERAGE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	84 LB/MMSCF 3-HR AVERAGE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	5.5 LB/MMSCF 3-HR AVERAGE			The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan and implement various design and operational efficiency requirements.	84544 TONS/YR 12-MONTH ROLLING
PETMIN USA INCORPORATED PETMIN USA INCORPORATED ASHTABULA, OH	Process gas heater (P001)	Process gas preheater, natural gas, indirect fired with maximum heat input of 218.9 MMBtu/hr, emissions are vented to a stack.	OH-0383	07/17/2020 ACT	FALSE	Low NOX burners, use of natural gas and good combustion practices	18.88 LB/H	Good combustion practices and the use of natural gas	11.17 LB/H					Good combustion practices and the use of natural gas	70203 LB/H
PETMIN USA INCORPORATED PETMIN USA INCORPORATED ASHTABULA, OH	Startup boiler (B001)	Startup boiler, natural gas fired with maximum heat input of 15.17 MMBtu/hr.	OH-0379	02/06/2019 ACT	FALSE	Low-NOX burners, good combustion practices and the use of natural gas	0.634 LB/H							Good combustion practices and the use of natural gas	1784 LB/H
INDECK NILES, LLC INDECK NILES, LLC CASS, MI	EUAUXBOILER	One natural gas-fired auxiliary boiler rated at 182 MMBTU/H fuel heat input (EUAUXBOILER).	*MI-0445	11/26/2019 ACT	TRUE	Low NOx burners/flue gas recirculation and good combustion practices.	0.04 LB/MMBTU 30-DAY ROLLING AVERAGE TIME PERIOD	Good combustion practices	0.04 LB/MMBTU HOURLY	Good combustion practices	0.004 LB/MMBTU HOURLY			Energy efficiency measures and the use of a low carbon fuel (pipeline quality natural gas).	93346 T/YR 12-MO ROLLING TIME PERIOD
INDECK NILES, LLC INDECK NILES, LLC CASS, MI	EUAUXBOILER (Auxiliary boiler)	One natural gas-fired auxiliary boiler rated at 182 MMBTU/H fuel heat input.	MI-0423	01/04/2017 ACT	FALSE	Low NOx burners/Flue gas recirculation and good combustion practices.	0.04 LB/MMBTU 30 DAY ROLLING AVG TIME PERIOD	Good combustion practices.	0.04 LB/MMBTU TEST PROTOCOL WILL SPECIFY AVG TIME	Good combustion practices.	0.004 LB/MMBTU TEST PROTOCOL WILL SPECIFY AVG TIME.			Energy efficiency measures and the use of a low carbon fuel (pipeline quality natural gas).	93346 T/YR 12-MO ROLLING TIME PERIOD

Summary of BACT Determinations

RBLC Seach Parameters:	Industrial Size Boilers/Furnaces (100 < 250 MMBtu/hr)
Date Range:	2015 - 2025
Fuel:	Natural Gas
Process Code:	12.310
RBLC Search Date:	2/4/2025

Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
HOLLYFRONTIER EL DORADO REFINING LLC HOLLYFRONTIER EL DORADO REFINERY BUTLER, KS	FCCU Charge Heater	Induced Draft	KS-0041	10/30/2019 ACT	FALSE	Ultra Low-NOx Burners	0.04 LB/MMBTU 30 DAY ROLLING AVERAGE	Ultra Low NOx Burners	0.035 LB/MMBTU 3-HOUR ROLLING AVERAGE	Ultra Low NOx Burners	0.0015 LB/MMBTU 3-HOUR ROLLING AVERAGE	Ultra Low NOx Burners	0.0075 LB/MMBTU 3-HOUR ROLLING AVERAGE		
HOLLYFRONTIER EL DORADO REFINING LLC HOLLYFRONTIER EL DORADO REFINERY BUTLER, KS	Cogen Auxiliary Air Heater	Induced Draft	KS-0041	10/30/2019 ACT	FALSE										
HOLLYFRONTIER EL DORADO REFINING LLC HOLLYFRONTIER EL DORADO REFINERY BUTLER, KS	New Crude Heater	Induced Draft	KS-0041	10/30/2019 ACT	FALSE	Ultra Low NOx Burners	0.04 LB/MMBTU 30 DAY ROLLING AVERAGE	Ultra Low NOx Burners	0.035 LB/MMBTU 3 HR ROLLING AVERAGE	Ultra Low NOx Burners	0.0015 LB/MMBTU 3 HR ROLLING AVERAGE	Ultra Low NOx Burners	0.0075 LB/MMBTU 3 HR ROLLING AVERAGE		
HOLLYFRONTIER EL DORADO REFINING LLC HOLLYFRONTIER EL DORADO REFINERY BUTLER, KS	B306	Crude Heater	KS-0041	10/30/2019 ACT	FALSE	Ultra Low NOx Burners	0.035 LB/MMBTU 30 DAY ROLLING AVERAGE	Ultra Low NOx Burners	0.035 LB/MMBTU 3 HR ROLLING AVERAGE	Ultra Low NOx Burners	0.0015 LB/MMBTU 3 HR ROLLING AVERAGE	Ultra Low NOx Burners	0.0075 LB/MMBTU 3 HR ROLLING AVERAGE		
HOLLYFRONTIER EL DORADO REFINING LLC HOLLYFRONTIER EL DORADO REFINERY BUTLER, KS	B307	Crude Heater	KS-0041	10/30/2019 ACT	FALSE	Ultra Low NOx Burners	0.035 LB/MMBTU 30 DAY ROLLING AVERAGE	Ultra Low NOx Burners	0.035 LB/MMBTU 3 HR ROLLING AVERAGE	Ultra Low NOx Burners	0.0015 LB/MMBTU 3 HR ROLLING AVERAGE	Ultra Low NOx Burners	0.0075 LB/MMBTU 3 HR ROLLING AVERAGE		
HOLLYFRONTIER EL DORADO REFINING LLC HOLLYFRONTIER EL DORADO REFINERY BUTLER, KS	B140	FCCU Feed Heater, Induced Draft	KS-0041	10/30/2019 ACT	FALSE	Ultra Low NOx Burners	0.04 LB/MMBTU 30 DAY ROLLING AVERAGE	Ultra Low NOx Burners	0.035 LB/MMBTU 3 HR ROLLING AVERAGE	Ultra Low NOx Burners	0.0015 LB/MMBTU 3 HR ROLLING AVERAGE	Ultra Low NOx Burners	0.0075 LB/MMBTU 3 HR ROLLING AVERAGE		
NORTHSTAR BLUESCOPE STEEL, LLC NORTHSTAR BLUESCOPE STEEL, LLC FULTON, OH	Tunnel Furnace (P001)	Raises and equalizes the temperature of the steel slabs to a level suitable for hot rolling.	OH-0381	09/27/2019 ACT	FALSE	Use of natural gas, use of low NOx burners, good combustion practices and design	7.84 LB/H	Use of natural gas, use of baffle type burners, good combustion practices and design	7.84 LB/H	Use of natural gas, good combustion practices and design	0.62 LB/H			Use of natural gas and energy efficient design	13087.2 LB/H
GUERNSEY POWER STATION LLC GUERNSEY POWER STATION LLC GUERNSEY, OH	Auxiliary Boiler (B001)	185.0 MMBtu/hr natural gas-fired boiler with low-NOx burners and flue gas recirculation (FGR)	OH-0374	10/23/2017 ACT	FALSE	low-NOx burners and flue gas recirculation	3.7 LB/H	Gas combustion control	10.18 LB/H	Gas combustion control	0.93 LB/H	Gas combustion control	1.3 LB/H	Natural gas, low-emitting fuel	54167 T/YR PER ROLLING 12 MONTH PERIOD
AGRIUM U.S. INC. KENAI NITROGEN OPERATIONS USA, AK	Startup Heater	Natural Gas-Fired 101 MMBtu/hr Startup Heater. Installed in 1976.	AK-0083	01/06/2015 ACT	FALSE	Limited Use (200 hr/yr)	0.098 LB/MMBTU	Limited Use (200 hr/yr)	0.082 LB/MMBTU	Limited Use (200 hr/yr)	0.0054 LB/MMBTU	Limited Use (200 hr/yr)	0.0074 LB/MMBTU	Limited Use (200 hr/yr)	59.61 TONS/MMCF
AGRIUM U.S. INC. KENAI NITROGEN OPERATIONS USA, AK	Three (3) Package Boilers	Three (3) New Natural Gas-Fired 243 MMBtu/hr Package Boilers	AK-0083	01/06/2015 ACT	FALSE	Ultra Low NOx Burners	0.01 LB/MMBTU 30-DAY AVERAGE	0	50 PPMV 3-HR AVG @ 3% O2	0	0.0054 LB/MMBTU 3-HR AVG	0	0.0074 LB/MMBTU 3-HR AVG	0	59.61 TONS/MMCF 3-HR AVG
COMMONWEALTH LNG, LLC COMMONWEALTH LNG FACILITY CAMERON PARISH, LA	Hot Oil Heater (EQT0021)	0	*LA-0324	03/28/2023 ACT	TRUE	Good combustion practices and use of clean fuel. Low-NOx burners	0.07 LB/MM BTU	Good combustion practices and use of clean fuel. Minimization of operating time	0.0824 LB/MM BTU	Good combustion practices and use of clean fuel. Minimization of operating time	0.0054 LB/MM BTU				
AGRIUM U.S. INC. KENAI NITROGEN OPERATIONS KENAI PENNINSULA BOROUGH, AK	Startup Heater	Natural Gas-Fired 101 MMBtu/hr Startup Heater. Installed in 1976. Limited to 200 hours per 12 consecutive month period.	AK-0086	03/26/2021 ACT	FALSE	Good Combustion Practices and Limited Use	0.098 LB/MMBTU THREE-HOUR AVERAGE	Good Combustion Practices and Limited Use	0.082 LB/MMBTU THREE-HOUR AVERAGE	Good Combustion Practices and Limited Use	0.0054 LB/MMBTU THREE-HOUR AVERAGE	Good Combustion Practices and Limited Use	0.0075 LB/MMBTU THREE-HOUR AVERAGE	Good Combustion Practices and Limited Use	60.4 TON/MMSCF THREE-HOUR AVERAGE
AGRIUM U.S. INC. KENAI NITROGEN OPERATIONS KENAI PENNINSULA BOROUGH, AK	Three (3) Package Boilers	Three (3) Cleaver Brooks Natural Gas-Fired 243 MMBtu/hr Package Boilers	AK-0086	03/26/2021 ACT	FALSE	Selective Catalytic Reduction	0.01 LB/MMBTU THIRTY-DAY AVERAGE	Good Combustion Practices	50 PPMV AT 15% O2 THREE-HOUR AVERAGE	Good Combustion Practices	0.0054 LB/MMBTU THREE-HOUR AVERAGE	Good Combustion Practices	0.0075 LB/MMBTU THREE-HOUR AVERAGE	Good Combustion Practices	60.2 TON/MMSCF THREE-HOUR AVERAGE
MARATHON PETROLEUM COMPANY LP GARYVILLE REFINERY ST. JOHN THE BAPTIST, LA	Reboilers/Heaters (EQT0164, EQT0181, EQT0376)	EQT0164 = 452 MM BTU/hr EQT0181 = 100 MM BTU/hr EQT0376 = 120 MM BTU/hr	LA-0385	02/11/2021 ACT	FALSE	LNB	0.04 LB/MM BTU ANNUAL AVERAGE	Comply with work practice standards of 40 CFR 63 Subpart DDDDD	0	Comply with work practice standards of 40 CFR 63 Subpart DDDDD	0			Comply with work practice standards of 40 CFR 63 Subpart DDDDD	0
ONEOK HYDROCARBONS LP MONT BELVIEU NGL FRACTIONATION UNIT CHAMBERS, TX	HOT OIL HEATERS	EPNs: H-EP2, H-61500, H-61501, H-71500, H-71501	TX-0886	03/31/2020 ACT	FALSE	Low-NOx burners and selective catalytic reduction (SCR)	0.01 LB/MMBTU HOURLY			clean fuel, good combustion practices	0.002 LB/MMBTU				
ONEOK HYDROCARBONS LP MONT BELVIEU NGL FRACTIONATION UNIT CHAMBERS, TX	HOT OIL HEATERS MSS	BURNER CLEANING	TX-0886	03/31/2020 ACT	FALSE	LIMITED MSS OPERATIONS	0.05 LB/MMBTU								
SHINTECH LOUISIANA LLC PLAQUEMINE ETHYLENE PLANT 1 IBERVILLE, LA	Cracking Heater H (EP-8, EQT0426)	0	LA-0352	12/12/2019 ACT	FALSE	LNB + SCR good combustion practices	0.01 LB/MM BTU 30 DAY ROLLING AVERAGE	good combustion practices	0.0425 LB/MM BTU	LNB + SCR good combustion practices	0.0054 LB/MM BTU 30 DAY ROLLING AVERAGE			Energy efficiency measures	0
SHINTECH LOUISIANA LLC PLAQUEMINE ETHYLENE PLANT 1 IBERVILLE, LA	BP Steam Boiler Packages (EU-2/EU-2, EQT0266/EQT0267)	0	LA-0352	12/12/2019 ACT	FALSE	LNB + SCR and good combustion practices	0.021 LB/MM BTU 30 DAY ROLLING AVERAGE								
LEHIGH CEMENT COMPANY LLC LEHIGH CEMENT COMPANY LLC LAWRENCE, IN	Finish Mill Air Heaters	0	IN-0312	06/27/2019 ACT	FALSE	Low NOx Burner (LNB), Flue Gas Recirculation and Good Combustion Practices (GCP)	50 LB/MMCF NATURAL GAS NA	Good Combustion Practices (GCP)	0.05 LB/MMBTU -	Good Combustion Practices (GCP)	0.0054 LB/MMBTU --			Good Combustion Practices (GCP) and use of natural gas fuel only	8657 TONS/YEAR --
CHICKAHOMINY POWER LLC CHICKAHOMINY POWER LLC CHARLES CITY, VA	Two (2) Auxiliary Boilers	One on one configuration: 4,066 MMBtu/H combustion turbine. Emission limits reflect the operation of each of the three turbines.	VA-0332	06/24/2019 ACT	FALSE										
NUCOR STEEL KANKAKEE, INC. NUCOR STEEL KANKAKEE, INC. KANKAKEE, IL	Gas-Fired Space Heaters	Throughput addresses all space heaters	IL-0126	11/01/2018 ACT	FALSE	Good combustion practices	0.1 LB/MMBTU							Good combustion practices	10197 TON/YR
TARGA MIDSTREAM SERVICES LLC MONT BELVIEU CHAMBERS, TX	AMINE UNITS	0	TX-0849	10/16/2018 ACT	FALSE					The gas is routed to the plant fuel system during normal operations and to the flares during MSS and upsets	0				

Summary of BACT Determinations

RBLC Seach Parameters:	Industrial Size Boilers/Furnaces (100 < 250 MMBtu/hr)
Date Range:	2015 - 2025
Fuel:	Natural Gas
Process Code:	12.310
RBLC Search Date:	2/4/2025

Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
VENTURE GLOBAL CALCASIEU PASS, LLC CALCASIEU PASS LNG PROJECT CAMERON, LA	Hot Oil Heaters (HOH1 to HOH6)	0	LA-0331	09/21/2018 ACT	FALSE	Ultra Low NOx Burners and Good Combustion Practices	0.038 LB/MM BTU 3-HOUR AVERAGE	Exclusive Combustion of Fuel Gas and Good Combustion Practices.	0.082 LB/ MM BTU 3 HOUR AVERAGE	Proper Equipment Design and Operation, Good Combustion Practices, and Exclusive Combustion of Fuel Gas	0.0054 LB/MM BTU 3 HOUR AVERAGE			Exclusive combustion of Low-Carbon Fuel Gas, Good Combustion Practices, Good Operation & Maintenance Practices and Insulation	354456 T/YR
NOVI ENERGY C4GT, LLC USA, VA	Auxiliary Boiler	Option 1: Two on one configuration: 3,482 MMBtu/hr combustion turbine with 475 MMBtu/hr duct-fired HRSG. Emission limits reflect the operation of one turbine with or without duct firing.	VA-0328	04/26/2018 ACT	FALSE										
PRAXIAR INC PRAXIAR CLEAR LAKE HARRIS, TX	HYCO HEATER	0	TX-0830	10/20/2017 ACT	FALSE			The use of gaseous fuel and good combustion practices	50 PPMVD@3% O2					Annual tune-ups. Emissions are based on a plantwide grouped limit	1148305 TON/YR
PRAXAIR INC PRAXAIR CLEAR LAKE PLANT HARRIS, TX	HYCO HEATER	0	TX-0827	10/19/2017 ACT	FALSE			The use of gaseous fuel and good combustion practices	50 PPMVD @ 3% O2					Annual tune-ups. Emissions are based on a plantwide grouped limit.	1148305 T/YR
VIRGINIA ELECTRIC AND POWER COMPANY GREENSVILLE POWER STATION GREENSVILLE, VA	AUXILIARY BOILER (1) AND FUEL GAS HEATERS (6)	The auxiliary boiler will provide steam to the steam turbine at startup and at cold starts to warm up the ST rotor. The steam from the auxiliary boiler will not be used to augment the power generation of the combustion turbines or steam turbine. The boiler is proposed to operate 8760 hrs/yr but will be limited by an annual fuel throughput based on a capacity factor of 10%.	VA-0325	06/17/2016 ACT	FALSE	ultra low-NOâ€ž burners	0.011 LB/MMBTU	Clean fuel and good combustion practices	0.035 LBS/MMBTU	Good combustion pratices	0.5 T/12 MO ROLL AVG 12 MONTH ROLLING TOTAL			Natural gas and fuel and high efficiency design and operation.	117.1 LB/MMBTU
SASOL CHEMICALS (USA) LLC LINEAR ALKYL BENZENE (LAB) UNIT CALCASIEU, LA	Heaters (3 units)	LH-1(H-201): 87.3 MM BTU/hr - fires CH4 & Ethane LH-2(H-202): 21.0 MM BTU/hr - fires CH4 & Ethane LH-3(H-601): 220.5 MM BTU/hr - fires CH4, Ethane, and hydrogen waste gas	LA-0275	04/29/2016 ACT	FALSE	Low NOX burners	0								
VALENCIA PROJECT LLC VALENCIA PROJECT LLC WYANDOT, OH	Boilers #1 and #2 - 122 MMBtu/hr (B001 and B002)	Two 122 MMBTU/hr natural gas fired boilers. BACT emissions limitations represent each boiler individually (not combined).	*OH-0391	10/27/2023 ACT	TRUE					use of low-carbon natural gas fuel, good combustion practice	2.89 T/YR PER ROLLING 12-MONTH PERIOD	use of low-carbon natural gas fuel, good combustion practice	0.27 T/YR PER ROLLING 12-MONTH PERIOD	use of low-carbon natural gas fuel, good combustion practice	62441 T/YR PER ROLLING 12-MONTH PERIOD
OKLAUNION INDUSTRIAL PARK LLC OKLAUNION INDUSTRIAL PARK WILBARGER, TX	Boiler	operates 8760 hr/yr	TX-0941	01/17/2023 ACT	FALSE			Good combustion practices. CEMS installed to monitor emissions and ensure good combustion.	50 PPMVD 3% O2	GOOD COMBUSTION PRACTICES, CLEAN FUEL	0.004 LB/MMBTU				
INDORAMA VENTURES OLEFINS, LLC WESTLAKE ETHYLENE PLANT CALCASIEU PARISH, LA	Boilers (EQT0011, EQT0012, EQT0016)	EQT0010 = 248 mm but/hr eqt0011 = 248 mm btu/hr eqt0016 = 229 mm btu/hr	*LA-0397	04/29/2022 ACT	TRUE	SCR + LNB + FGR	0.01 LB/MM BTU								
INEOS STYROLUTION AMERICA LLC TEXAS CITY CHEMICAL PLANT GALVESTON, TX	Boilers	0	TX-0853	02/08/2019 ACT	FALSE									BEST COMBUSTION PRACTICES CLEAN FUEL	0
INEOS STYROLUTION AMERICA LLC TEXAS CITY CHEMICAL PLANT GALVESTON, TX	Boilers	0	TX-0919	02/08/2019 ACT	FALSE									0	273225 T/YR
INEOS STYROLUTION AMERICA LLC TEXAS CITY CHEMICAL PLANT GALVESTON, TX	BOILERS	Routine 255.3 MMBtu/hr/boiler 3 boilers), 765.9 MMBtu/hr/combined, Alternate 344.1 MMBtu (2 boilers)	TX-0913	09/27/2021 ACT	FALSE			Good combustion practices, natural gas	50 PPMV 3% O2					Good combustion practices, natural gas	0
SHINTECH LOUISIANA LLC SHINTECH PLAQUEMINE PLANT 3 IBERVILLE, LA	Boiler D (EQT0482)	0	*LA-0339	01/19/2021 ACT	TRUE	LNB + SCR Good combustion practices	0.01 LB/MM BTU	Good combustion practices	0.0362 LB/MM BTU	Good combustion practices	0.0026 LB/MM BTU			Improved combustion measures; Insulation; Minimization of air infiltration; Reduced carbon feedstock and fuel	0
DELEK US LION OIL COMPANY UNION COUNTY, AR	SN-811 - #9 Reformer Furnace	SN-811 is a 170 MMBtu/hr furnace (nominal design) used to heat the #9 Unit Stripper bottoms. It is fueled by NSPS Subpart J quality gas. It was installed in 1980. BACT for this source is good combustion practice. This source is equipped with a CEMS for monitoring NOx emissions	AR-0167	12/01/2020 ACT	FALSE	Good combustion practice and CEMS for monitoring NOx emissions	9.1 LB/HR 3-HOUR AVERAGE								
DELEK US LION OIL COMPANY UNION COUNTY, AR	SN-805N - #4 Vacuum Furnace	SN-805N is a 142.2 MMBTU/hr (annual) source. The furnace will be fueled by NSPS Subpart J quality gas. As a result of the refinery expansion permit revision, this source has undergone PSD review for PM10, NOx, and CO. BACT for this source is good combustion practice and next generation ultra low NOx burners.	AR-0167	12/01/2020 ACT	FALSE	Ultra-low NOx burners and good combustion practice	6.5 LB/HR 3-HOUR AVERAGE	Good combustion practice	7.4 LB/HR 3-HOUR AVERAGE						
CARDINAL FG COMPANY CARDINAL FG COMPANY DUNN, WI	Float Glass Furnace	Throughput is in â€œTons of glass per day.â€•Three controls exist for Process P01.	WI-0294	08/26/2019 ACT	FALSE							Electrostatic precipitator (ESP)	25.5 LB/H		

Summary of BACT Determinations

RBLC Seach Parameters:	Industrial Size Boilers/Furnaces (100 < 250 MMBtu/hr)
Date Range:	2015 - 2025
Fuel:	Natural Gas
Process Code:	12.310
RBLC Search Date:	2/4/2025

Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
ND PAPER, INC. ND PAPER, INC. - BIRON DIVISION WOOD, WI	Boiler B26 - Natural gas/biogas-fired boiler	Boiler can burn natural gas and/or biogas generated from wastewater anaerobic digester	WI-0268	02/19/2019 ACT	FALSE			Good combustion practices, use of natural gas and/or biogas	0.044 LB/MMBTU	Good combustion practices, Use only natural gas and/or biogas, low-Nox burners with flue gas recirculation	0.0054 LB/MMBTU			Good combustion practices, use only natural gas and/or biogas, low-NOx burners with flue gas recirculation	160 LB CO2E/1000LB STEAM 12-MONTH AVG
DUKE ENERGY INDIANA, LLC - EDWARDSPORT GENERATING DUKE ENERGY INDIANA, LLC - EDWARDSPORT GENERATING STATION KNOX, IN	Auxiliary Boiler	0	IN-0287	07/10/2018 ACT	FALSE			good combustion practices	0.036 LB/MMBTU	good combustion practices	0.005 LB/MMBTU	good combustion practices	0.0075 LB/MMBTU		
TENNESSEE VALLEY AUTHORITY TVA - JOHNSONVILLE COGENERATION HUMPHREYS, TN	Two Auxiliary Boilers	Rated input capacity is 1020 MMBtu/hr (CT) and 319 MMBtu/hr (duct burner) when burning natural gas and 1084 MMBtu/hr when burning #2 oil.	*TN-0164	02/01/2018 ACT	TRUE										
FILER CITY STATION LIMITED PARTNERSHIP FILER CITY STATION MANISTEE, MI	EUAUXBOILER (Auxiliary boiler)	A natural gas fired auxiliary boiler, rated at 182 MMBTU/H to provide auxiliary steam when the plant is off-line, used to maintain warm drums on the HRSG and maintain the steam turbine generator seals.	MI-0427	11/17/2017 ACT	FALSE	LNB that incorporate internal (within the burner) FGR and good combustion practices.	0.04 LB/MMBTU 30 DAY ROLLING AVERAGE	Good combustion practices	0.04 LB/MMBTU					Good combustion practices.	93346 T/YR 12-MO.ROLL. TIME PERIOD
AGRIUM US, INC AMMONIA AND UREA PLANT HUTCHINSON, TX	Package Boiler 1	730,000 TPY Urea and 702,625 TPY Ammonia Greenhouse gas (GHG) will be controlled by using Carbon dioxide (CO2) as a raw material to produce urea. If the Urea Plant is not operating, the CO2 generated in the ammonia process will be vented to the atmosphere	TX-0814	01/05/2017 ACT	FALSE										
REXTAC, LLC ODESSA PETROCHEMICAL PLANT ECTOR, TX	Boilers	2 boilers	TX-0813	11/22/2016 ACT	FALSE					Best combustion practices	0.0005 LB/MMBTU			Minimum thermal design efficiency of 75 percent	63796 T/YR
INEOS OLIGOMERS USA LLC LINEAR ALPHA OLEFINS PLANT BRAZORIA, TX	Industrial-Sized Furnaces, Natural Gas-fired	Thermal Fluid (â€œhot oilâ€) Heater, throughput based on higher heating value basis	TX-0811	11/03/2016 ACT	FALSE	Low-NOX burners and Selective Catalytic Reduction (SCR). Ammonia slip limited to 10 ppmv (corrected to 3% O2) on a 1-hr block average.	0.006 LB / MM BTU HHV BASIS, ANNUAL AVERAGE			Good combustion practices	2.15 T/YR				
GRAVITY MIDSTREAM CORPUS CHRISTI LLC CRUDE OIL PROCESSING FACILITY NUECES, TX	Industrial Boilers and Furnaces (Natural gas fired)	Direct-fired process heater	TX-0812	10/31/2016 ACT	FALSE									An automated air-fuel controller shall be used to ensure a minimum net thermal efficiency of 80%.	54800 T/YR
INDORAMA VENTURES OLEFINS, LLC INDORAMA LAKE CHARLES FACILITY CALCASIEU, LA	boiler A and B (010 and 011)	0	LA-0314	08/03/2016 ACT	FALSE	good combustion practices; fueled by natural gas or process fuel gas; ULNB (FGR and economizer)	0.06 LB/MM BTU THREE ONE-HOUR TEST AVERAGE	good combustion practices and proper operation and maintenance	0.082 LB/MM BTU THREE ONE-HOUR TEST AVERAGE	good combustion practices and proper operation and maintenance	0.0054 LB/MM BTU THREE ONE-HOUR TEST AVERAGE			good combustion practices and proper operation and maintenance; gaseous fuels; economizers & Insulation; combustion air preheating; condensate return system	0
INDORAMA VENTURES OLEFINS, LLC INDORAMA LAKE CHARLES FACILITY CALCASIEU, LA	boiler B-201	0	LA-0314	08/03/2016 ACT	FALSE	good combustion practices; fueled by natural gas or process fuel gas; ULNB (FGR and economizer)	0.06 LB/MM BTU THREE ONE-HOUR TEST AVERAGE	good combustion practices and proper operation and maintenance	0.037 LB/MM BTU THREE ONE-HOUR TEST AVERAGE	good combustion practices and proper operation and maintenance	0.0054 LB/MM BTU THREE ONE-HOUR TEST AVERAGE			good combustion practices and proper operation and maintenance; gaseous fuels; economizers & Insulation; combustion air preheating; condensate return system	0
TENNESSEE VALLEY AUTHORITY JOHNSONVILLE COGENERATION HUMPHREYS, TN	Two Natural Gas-Fired Auxiliary Boilers	Two 450 MMBtu/hr natural gas-fired auxiliary boilers will provide steam generation during threshold transitional periods and during malfunction events when the CT and HRSG are not able to operate.	TN-0162	04/19/2016 ACT	FALSE	Good combustion design and practices, selective catalytic reduction (SCR), low-NOX burners with flue gas recirculation	0.013 LB/MMBTU	Good combustion design and practices	0.084 LB/MMBTU			Good combustion design and practices	0.008 LB/MMBTU	Efficient design (including insulation to reduce ambient heat loss), good combustion practices, good operating and maintenance practices.	117 LB/MMBTU
TENASKA PA PARTNERS LLC TENASKA PA PARTNERS/WESTMORELAND GEN FAC WESTMORELAND, PA	245 MMBtu natural gas fired Auxiliary boiler	Total fuel usage of the auxiliary boiler shall not exceed 1052 MMsch/yr on a 12-month rolling basis	PA-0306	02/12/2016 ACT	FALSE	Good combustion practices and ULNOx burners	0.011 LB/MMBTU	Good combustion practices	0.037 LB/MMBTU	Good combustion practice	0.0054 LB/MMBTU	Good combustion practices	4 TPY		
GOLDEN PASS PRODUCTS, LLC GOLDEN PASS LNG EXPORT TERMINAL JEFFERSON, TX	Auxiliary Boiler	Six GE Frame 7 Turbines at site.	TX-0766	09/11/2015 ACT	FALSE										
DE CITY REFINING COMPANY, LLC DE CITY REFINING COMPANY, LLC NEW CASTLE, DE	Steam-Methane Reformer with Pressure Swing Adsorption System	0	DE-0025	07/13/2015 ACT	FALSE										
MAGELLAN PROCESSING LP CORPUS CHRISTI TERMINAL CONDENSATE SPLITTER NUECES, TX	Industrial-Size Boilers/Furnaces	(2) 129 Million British Thermal Units per hour (MMBtu/hr) direct-fired process heaters and (2) 106 MMBtu/hr thermal fluid heaters (one pair for each train)	TX-0731	04/10/2015 ACT	FALSE	Selective catalytic reduction (SCR)	0.006 LB/MMBTU 12-MONTH AVG	Good combustion practice to ensure complete combustion	50 PPMVD @ 3% O2 1-HR AVG						

Summary of BACT Determinations

RBLC Seach Parameters:	Industrial Size Boilers/Furnaces (100 < 250 MMBtu/hr)
Date Range:	2015 - 2025
Fuel:	Natural Gas
Process Code:	12.310
RBLC Search Date:	2/4/2025

Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
AG PROCESSING INC., A COOPERATIVE AGP SOY ADAMS, NE	Boiler #1	The boiler is capable of combusting natural gas and Fuel Oil	NE-0059	03/25/2015 ACT	FALSE					0	0.0054 LB/MMBTU 3-HOUR OR TEST METHOD AVERAGE				
AG PROCESSING INC., A COOPERATIVE AGP SOY ADAMS, NE	Boiler #2	The boiler is capable of combusting natural gas and Fuel Oil	NE-0059	03/25/2015 ACT	FALSE					0	0.0054 LB/MMBTU 3-HOUR OR TEST METHOD AVERAGE				

Summary of BACT Determinations

RBLC Seach Parameters:	Utility and Large Industrial Size Boilers/Furnaces (> 250 MMBtu/hr)
Date Range:	2015 - 2025
Fuel:	Natural Gas
Process Code:	11.310
RBLC Search Date:	2/4/2025

Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
HOLLYFRONTIER EL DORADO REFINING LLC HOLLYFRONTIER EL DORADO REFINERY BUTLER, KS	New Boiler	Induced Draft	KS-0041	10/30/2019 ACT	FALSE	Ultra Low NOx Burners	0.04 LB/MMBTU 30 DAY ROLLING AVERAGE	Ultra Low NOx Burners	0.035 LB/MMBTU 3 HR AVERAGE	Ultra Low NOx Burners	0.0015 LB/MMBTU 3 HR ROLLING AVERAGE	Ultra Low NOx Burners	0.0075 LB/MMBTU 3 HR AVERAGE		
AGRIUM U.S. INC. KENAI NITROGEN OPERATIONS USA, AK	Primary Reformer Furnace	Natural Gas-, Process Gas-Fired 1,350 MMBtu/hr Primary Reformer Furnace. Installed in 1976.	AK-0083	01/06/2015 ACT	FALSE	Selective Catalytic Reduction	17 PPMV 30-DAY AVERAGE @ 3% O2	0	0.043 LB/MMBTU 3-HR AVG	0	0.0054 LB/MMBTU 3-HR AVG	0	0.0074 LB/MMBTU 3-HR AVG	0	59.61 TONS/MMCF 3-HR AVG
AGRIUM U.S. INC. KENAI NITROGEN OPERATIONS KENAI PENNINSULA BOROUGH, AK	Primary Reformer	Natural Gas-, Process Gas-Fired 1,350 MMBtu/hr Primary Reformer Furnace. Installed in 1976.	AK-0086	03/26/2021 ACT	FALSE	Selective Catalytic Reduction	17 PPMV AT 15% O2 THIRTY-DAY AVERAGE	Good Combustion Practices	0.043 LB/MMBTU THREE-HOUR AVERAGE	Good Combustion Practices	0.0054 LB/MMBTU THREE-HOUR AVERAGE	Good Combustion Practices	0.0075 LB/MMBTU THREE-HOUR AVERAGE	Good Combustion Practices and Burning Clean Fuel	60.4 TON/MMSCF THREE-HOUR AVERAGE
MARATHON PETROLEUM COMPANY LP GARYVILLE REFINERY ST. JOHN THE BAPTIST, LA	FCCU Charge Heater (EQT0163)		LA-0385	02/11/2021 ACT	FALSE	LNB	0.06 LB/MM BTU ANNUAL AVERAGE	Comply with work practice standards of 40 CFR 63 Subpart DDDDD	0	Comply with work practice standards of 40 CFR 63 Subpart DDDDD	0			Comply with work practice standards of 40 CFR 63 Subpart DDDDD	0
MARATHON PETROLEUM COMPANY LP GARYVILLE REFINERY ST. JOHN THE BAPTIST, LA	Crude Heaters (EQT0292)		LA-0385	02/11/2021 ACT	FALSE	LNB + SCR	0.0125 LB/MM BTU ANNUAL AVERAGE	Proper design and good engineering practices Fueled by refinery fuel gas and natural gas	0.02 LB/MM BTU ANNUAL AVERAGE	Proper design and good engineering practices Fueled by refinery fuel gas and natural gas	0.0015 LB/MM BTU ANNUAL AVERAGE			Comply with work practice standards of 40 CFR 63 Subpart DDDDD	0
MARATHON PETROLEUM COMPANY LP GARYVILLE REFINERY ST. JOHN THE BAPTIST, LA	Charge Heaters (EQT0377, EQT0378)	EQT0377 = 275 MM BTU/hr EQT0378 = 375 MM BTU/hr	LA-0385	02/11/2021 ACT	FALSE	LNB	0.06 LB/MM BTU ANNUAL AVERAGE	Comply with work practice standards of 40 CFR 63 Subpart DDDDD	0	Comply with work practice standards of 40 CFR 63 Subpart DDDDD	0			Comply with work practice standards of 40 CFR 63 Subpart DDDDD	0
TARGA MIDSTREAM SERVICES LLC MONT BELVIEU CHAMBERS, TX	HOT OIL HEATERS		TX-0849	10/16/2018 ACT	FALSE					CLEAN NATL GAS	0				
DELEK US LION OIL COMPANY UNION COUNTY, AR	SN-804 - #4 Atmospheric Furnace	SN-804 is a 280 MMBTU/hr source used to heat the bottoms from the pre-flash column in order to separate them into naphtha, kerosene, diesel, and gas oil. The furnace is fueled by NSPS Subpart J quality gas. As a result of the refinery expansion permit revision, this source has undergone PSD review for PM10, NOx, and CO. BACT for this source is good combustion practice and next generation ultra-low NOx burners. This source is equipped with a CEMS for monitoring NOx emissions.	AR-0167	12/01/2020 ACT	FALSE	Good combustion practice, ultra-low NOx burners, and CEMS for monitoring NOx emissions.	16.4 LB/HR 3-HOUR AVERAGE	Good combustion practice	14.6 LB/HR 3-HOUR AVERAGE						
AGRIUM US, INC AMMONIA AND UREA PLANT HUTCHINSON, TX	Reformer Furnace 101-B	1100 MMBTU/HR	TX-0814	01/05/2017 ACT	FALSE									Agrium uses good engineering practices to minimize CO2 e emissions.	564019 T/YR

Summary of BACT Determinations

RBLC Seach Parameters:	Flares
Date Range:	2015 - 2025
Fuel:	
Process Code:	19.390
RBLC Search Date:	1/27/2025

Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
WABASH VALLEY RESOURCES, LLC VIGO, IN	Ammonia Process Flare		*IN-0371	01/11/2024 ACT	TRUE	The pilot and purge gas fuels shall be natural gas	0.068 LB/MMBTU DURING NORMAL OPERATION							The pilot and purge gas fuels shall be natural gas	117 LB/MMBTU DURING NORMAL OPERATION
	Ammonia Tank Flare		*IN-0371	01/11/2024 ACT	TRUE	Good combustion practices and pilot and purge gas fuels shall be natural gas.	0.068 LB/MMBTU DURING NORMAL OPERATION							Good combustion practices and pilot and purge gas fuels shall be natural gas.	168 HOURS VENTING PER TWELVE (12) CONSECUTIVE MONTH PERIOD
ALASKA GASLINE DEVELOPMENT CORPORATION GAS TREATMENT PLANT NORTH SLOPE BOROUGH, AK	Eight (8) Flares for Vent Gas Disposal	Flares for Disposal of Vent Gas. EU 45 - HP Hydrocarbon Flare East - 76,000 Mscf/hr (7.3 Mscf/hr pilot, purge, & assist). EU 46 - HP Hydrocarbon Flare West 76,000 Mscf/hr (7.3 Mscf/hr pilot, purge, & assist). EU 47 - LP Hydrocarbon Flare East 4,200 Mscf/hr (1.3 Mscf/hr pilot, purge, & assist). EU 48 - LP Hydrocarbon Flare West - 4,2003 Mscf/hr (1.3 Mscf/hr pilot, purge, & assist). EU 49 HP Byproduct (CO2) Flare East - 9,500 Mscf/hr (2.7 Mscf/hr pilot, purge, & assist). EU 50 - HP Byproduct (CO2) Flare West - 9,500 Mscf/hr (2.7 Mscf/hr pilot, purge, & assist). EU 51 - LP Byproduct (CO2) Flare East - 29,000 Mscf/hr (6.3 Mscf/hr pilot, purge, & assist). EU 52 - LP Byproduct (CO2) Flare â€" West 29,000 Mscf/hr (6.3 Mscf/hr pilot, purge, & assist).	AK-0085	08/13/2020 ACT	FALSE	Proper flare work practice requirements, establishing a flaring minimization plan, and limit operations to 500 hours per year per unit flaring during startup, shutdown, and maintenance events.	0.068 LB/MMBTU 3-HOUR AVERAGE	Proper flare work practice requirements, establishing a flaring minimization plan, and limit operations to 500 hours per year per unit flaring during startup, shutdown, and maintenance events.	0.37 LB/MMBTU 3-HOUR AVERAGE	Proper flare work practice requirements, establishing a flaring minimization plan, and limit operations to 500 hours per year per unit flaring during startup, shutdown, and maintenance events.	0.57 LB/MMBTU 3-HOUR AVERAGE	Proper flare work practice requirements, establishing a flaring minimization plan, and limit operations to 500 hours per year per unit flaring during startup, shutdown, and maintenance events.	40 UG/L 3-HOUR AVERAGE	Proper flare work practice requirements, establishing a flaring minimization plan, and limit operations to 500 hours per year per unit flaring during startup, shutdown, and maintenance events.	117.1 LB/MMBTU 3-HOUR AVERAGE
ALASKA GASLINE DEVELOPMENT CORPORATION LIQUEFACTION PLANT KENAI PENNINSULA BOROUGH, AK	Seven Flares for Vent Gas Disposal	Three flare gas systems (i.e., wet, dry, and low-pressure, EUs 14 - 20). Maximum gas throughputs for EUs 14, 16, & 18 of 55,000 Mscf/hr each, EUs 15, 17, & 19 of 13,000 Mscf/hr, and EU 20 of 990 Mscf/hr.	AK-0088	07/07/2022 ACT	FALSE	Limited Operation; Flare Work Practices; Flaring Minimization Plan	0.068 LB/MMBTU 3-HOURS	Limited Operation; Flare Work Practices; Flaring Minimization Plan	0.31 LB/MMBTU 3-HOURS	Limited Operation; Flare Work Practices; Flaring Minimization Plan	0.66 LB/MMBTU 3-HOURS	Limited Operation; Flare Work Practices; Flaring Minimization Plan	40 UG/L 3-HOURS	Limited Operation; Flare Work Practices; Flaring Minimization Plan	117.1 LB/MMBTU 3-HOURS
CAMERON LNG LLC CAMERON LNG FACILITY CAMERON, LA	Flares (3 units)	ground flare EU20 = 91 MM BTU/hr low pressure flare EU20A = 1077 mm btu/hr	LA-0316	02/17/2017 ACT	FALSE	proper plant operations and maintaining the presence of the flame at the flare tips when vent gas is routed to the flares	0	proper plant operations and maintaining the presence of the flame at the flare tips when vent gas is routed to the flares	0	proper plant operations and maintaining the presence of the flame at the flare tips when vent gas is routed to the flares	0			proper plant operations and maintaining the presence of the flame at the flare tips when vent gas is routed to the flares	0
CHEVRON PHILLIPS CHEMICAL COMPANY LP ORANGE POLYETHYLENE PLANT ORANGE, TX	MULTIPOINT GROUND FLARE	Controls routine operations: loading, Ethylene Treater Regeneration Vents, excess tailgas, purge gas, etc. Controls MSS operations: converters, dryers, towers, treaters, filters, pumps, heat exchangers, compressors, equipment repairs, MSS degassing, etc.	TX-0888	04/23/2020 ACT	FALSE	Good operating practices and minimizing the amount of flaring to the extent possible.	0	Good operating practices and minimizing the amount of flaring to the extent possible.	0	Good operating practices and minimizing the amount of flaring to the extent possible.	0			Good operating practices and minimizing the amount of flaring to the extent possible.	0
CHEVRON PHILLIPS CHEMICAL COMPANY LP SWEENY OLD OCEAN FACILITIES BRAZORIA, TX	FLARE		TX-0928	10/15/2021 ACT	FALSE	Good combustion practices, proper design and operation. Minimize waste gas flows to the extent possible to reduce emissions of NOX	0.138 LB/MMBTU UNASSISTED	Good combustion practices, proper design and operation. Minimize waste gas flows to the extent possible	0	Good combustion practices, proper design and operation. Minimize waste gas flows to the extent possible	0			Good combustion practices, proper design and operation. Minimize waste gas flows to the extent possible	0
COMMONWEALTH LNG, LLC COMMONWEALTH LNG FACILITY CAMERON PARISH, LA	Flares (EQT0007 - EQT0010)	(Pilot gas)	*LA-0324	03/28/2023 ACT	TRUE	Good combustion practices (including work practices listed in 40 CFR 60.18); Burner optimization and flare gas recovery; Use of facility fuel gas for pilot and purge	0	Good combustion practices (including work practices listed in 40 CFR 60.18); Burner optimization and flare gas recovery; Use of facility fuel gas for pilot and purge	0	Good combustion practices (including work practices listed in 40 CFR 60.18); Burner optimization and flare gas recovery; Use of facility fuel gas for pilot and purge	0				
DRIFTWOOD LNG LLC DRIFTWOOD LNG FACILITY CALCASIEU, LA	Flares (9)		LA-0349	07/10/2018 ACT	FALSE	Good Equipment Design, Best Operational Practices, Use of low sulfur facility fuel gas	0.068 LB/MM BTU HHV	Good Equipment Design, Best Operational Practices, Use of low sulfur facility fuel gas	0.31 LB/MM BTU HHV	Good Equipment Design, Best Operational Practices, Use of low sulfur facility fuel gas	0			Use Low Sulfur Facility Fuel Gas for Pilots	0
GOLDEN PASS PRODUCTS, LLC GOLDEN PASS LNG EXPORT TERMINAL JEFFERSON, TX	Flares	One ground flare and one elevated flare at site	TX-0766	09/11/2015 ACT	FALSE									Equipment specifications & work practices- good combustion practices	0
INVISTA S.A R.L. ADN UNIT VICTORIA, TX	FLARE	Controlling tanks and process units	TX-0804	07/15/2016 ACT	FALSE	Good combustion control, The flare must follow 40 CFR 60.18	3.65 T/YR	Good combustion control	10.51 T/YR						
LAKE CHARLES LNG EXPORT COMPANY, LLC LAKE CHARLES LNG EXPORT TERMINAL CALCASIEU PARISH, LA	Flares (EQT0004 - EQT0010)		LA-0383	09/03/2020 ACT	FALSE	Good combustion practices Maintain pilot flame all the times Maintain minimum heating value = 300 BTU/scf	0	Good combustion practices Maintain pilot flame all the times Maintain minimum heating value = 300 BTU/scf	0					Good combustion practices Maintain pilot flame all the times Maintain minimum heating value = 300 BTU/scf	0
MAGELLAN TERMINALS HOLDINGS, L.P. PASADENA TERMINAL HARRIS, TX	Portable Flare	Used as an abatement device for butane pressure tank degassing	TX-0825	07/14/2017 ACT	FALSE					Equipped with flow monitor, continuous flame, and has a destruction rate efficiency of 98%	1.2 T/YHR				

Summary of BACT Determinations

RBLC Seach Parameters:	Flares
Date Range:	2015 - 2025
Fuel:	
Process Code:	19.390
RBLC Search Date:	1/27/2025

Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	GHG BACT	GHG BACT Limit
MAGNOLIA LNG, LLC MAGNOLIA LNG FACILITY CALCASIEU, LA	Flares		LA-0307	03/21/2016 ACT	FALSE	good combustion practices	0	good combustion practices	0	good combustion practices	0			good combustion/operating /maintenance practices and fueled by natural gas	0
MIDWEST FERTILIZER COMPANY LLC MIDWEST FERTILIZER COMPANY LLC POSEY, IN	AMMONIA STORAGE FLARE (EU-016)		IN-0263	03/23/2017 ACT	FALSE	0	125 LB/H WHILE VENTING 3 HOUR AVG.	0	0.37 LB/MMBTU NORMAL OPERATION 3 HR AVG.	0	0.0054 LB/MMBTU NORMAL OPERATIONS 3 HR AVG.	0	0.0019 LB/MMBTU 3 HOUR AVERAGE		
	ammonia storage flare EU-016		IN-0324	05/06/2022 ACT	FALSE	The pilot and purge gas fuels shall be natural gas	168 HR/YR TWELVE CONSECUTIVE MONTH PERIOD	The pilot and purge gas fuels shall be natural gas	168 HR/YR TWELVE CONSECUTIVE MONTH PERIOD	The pilot and purge gas fuels shall be natural gas	168 HR/YR TWELVE CONSECUTIVE MONTH PERIOD			The pilot and purge gas fuels shall be natural gas	563 LB/MMBTU DURING NORMAL OPERATION
	BACK END FLARE (EU-018)		IN-0263	03/23/2017 ACT	FALSE	0	0.068 LB/MMBTU NORMAL OPS. 3 HR AVG.	0	0.37 LB/MMBTU NORMAL OPS. 3 HR AVG.	0	0.0054 LB/MMBTU NORMAL OPS. 3 HR AVG.	0	0.0019 LB/MMBTU 3 HR AVG		
	Back End Flare EU-018		IN-0324	05/06/2022 ACT	FALSE	The pilot and purge gas fuels shall be natural gas	336 HR/YR TWELVE CONSECUTIVE MONTH PERIOD	The pilot and purge gas fuels shall be natural gas	336 HR/YR TWELVE CONSECUTIVE MONTH PERIOD	The pilot and purge gas fuels shall be natural gas	336 HR/YR TWELVE CONSECUTIVE MONTH PERIOD			The pilot and purge gas fuels shall be natural gas	336 HR/YR TWELVE CONSECUTIVE MONTH PERIOD
	Discontinuous Urea Flare EU-DUF		IN-0324	05/06/2022 ACT	FALSE	The pilot and purge gas fuels shall be natural gas	240 HR/YR TWELVE CONSECUTIVE MONTH PERIOD	The pilot and purge gas fuels shall be natural gas	240 HR/YR TWELVE CONSECUTIVE MONTH PERIOD	The pilot and purge gas fuels shall be natural gas	240 HR/YR TWELVE CONSECUTIVE MONTH PERIOD			The pilot and purge gas fuels shall be natural gas	240 HR/YR TWELVE CONSECUTIVE MONTH PERIOD
	Emergency Urea Flare EU-EUF		IN-0324	05/06/2022 ACT	FALSE	The pilot and purge gas fuels shall be natural gas	0.068 LB/MMBTU DURING NORMAL OPERATION	The pilot and purge gas fuels shall be natural gas	0.37 LB/MMBTU DURING NORMAL OPERATION	The pilot and purge gas fuels shall be natural gas	0.0054 LB/MMBTU DURING NORMAL OPERATION			The pilot and purge gas fuels shall be natural gas	116.89 LB/MMBTU DURING NORMAL OPERATION
	Front End Flare EU 017		IN-0324	05/06/2022 ACT	FALSE	The pilot and purge gas fuels shall be natural gas	336 HR/YR TWELVE CONSECUTIVE MONTH PERIOD	shall be natural gas	336 HR/YR TWELVE CONSECUTIVE MONTH PERIOD	The pilot and purge gas fuels shall be natural gas	336 HR/YR TWELVE CONSECUTIVE MONTH PERIOD			The pilot and purge gas fuels shall be natural gas	336 HR/YR TWELVE CONSECUTIVE MONTH PERIOD
	FRONT END FLARE EU-017		IN-0263	03/23/2017 ACT	FALSE	0	0.068 LB/MMBTU NORMAL OPS. 3 HR AVG.	0	0.37 LB/MMBTU NORMAL OPS. 3 HR AVG.	0	0.0054 LB/MMBTU NORMAL OPS. 3 HR AVG	0	1.9 LB/MMCF 3 HR AVG.		
ONEOK HYDROCARBONS LP MONT BELVIEU NGL FRACTIONATION UNIT CHAMBERS, TX	MSS FLARE		TX-0886	03/31/2020 ACT	FALSE	GOOD COMBUSTION PRACTICES	0			GOOD COMBUSTION PRACTICES	0				
PRAXAIR INC PRAXAIR CLEAR LAKE PLANT HARRIS, TX	HYCO FLARE		TX-0827	10/19/2017 ACT	FALSE			Meet the design and operating requirements of 40 CFR 60.18	609 T/YR					Meet the design and operating requirements of 40 CFR 60.18. Emissions are based on a plantwide grouped LIMIT	0
PRAXIAR INC PRAXIAR CLEAR LAKE HARRIS, TX	HYCO FLARE		TX-0830	10/20/2017 ACT	FALSE			Meet the design and operating requirements of 40 CFR 60.18	609.2 TON/YR					Meet the design and operating requirements of 40 CFR 60.18. Emissions are based on a plantwide grouped limit	1148305 TON/YR
SABINE PASS LNG LP AND SABINE PASS LIQUEFACTION LL SABINE PASS LNG TERMINAL CAMERON, LA	Wet gas / dry gas / marine flares		LA-0342	09/20/2017 ACT	FALSE	Comply with 40 CFR 60.18	0	Comply with 40 CFR 60.18	0	Comply with 40 CFR 60.18	0				
SEADRIFT COKE L.P. SEADRIFT FACILITY CALHOUN, TX	PLANT FLARE	Steam-assisted smokeless plant flare EPN CB-1701	*TX-0973	05/03/2024 ACT	TRUE	Comply with 40 CFR 60.18, good combustion practices	0							good combustion practices	0
SOUTH LOUISIANA METHANOL LP ST. JAMES METHANOL PLANT ST. JAMES, LA	FL1-13 - Process Flare (EQT0008)	Natural Gas: 2.165 MMBTU/hr; Purge Gas: 149 MM BTU/hr; Topping Column: 37.3 MMBTU/hr	*LA-0312	06/30/2017 ACT	TRUE	Compliance with NESHAP Subpart A for flare performance standards. Correct Flare Design and Proper Combustion.	12.82 LB/HR	Compliance with NESHAP Subpart A for flare performance standards. Correct Flare Design and Proper Combustion.	58.44 LB/HR	Compliance with NESHAP Subpart A for flare performance standards. Correct Flare Design and Proper Combustion.	22.08 LB/HR			Compliance with NESHAP Subpart A for flare performance standards. Correct Flare Design and Proper Combustion.	1949 TPY
	FL1-13-SUSD - Process Flare Startup/Shutdown (EQT0010)	Max in any 24 hr period is 83153 MMBTU/day. Operating hours limit: 128 hr/yr.	*LA-0312	06/30/2017 ACT	TRUE	Compliance with NESHAP Subpart A for flare performance standards. Correct Flare Design and Proper Combustion.	0	Compliance with NESHAP Subpart A for flare performance standards. Correct Flare Design and Proper Combustion.	0	Compliance with NESHAP Subpart A for flare performance standards. Correct Flare Design and Proper Combustion.	0			Compliance with NESHAP Subpart A for flare performance standards. Correct Flare Design and Proper Combustion.	35890 TPY
TPC GROUP LLC HOUSTON PLANT - 22052 HARRIS, TX	MARINE LOADING FLARE		TX-0921	06/13/2022 ACT	FALSE					Use of natural gas and good combustion practices	5.5 LB/MMSCF			Use of natural gas and good combustion practices	0
VENTURE GLOBAL CALCASIEU PASS, LLC CALCASIEU PASS LNG PROJECT CAMERON, LA	Flares (WRMFLR, CLDFLR, LPFLR)	Flare system to provide safe and reliable disposal of streams released during start-up, shutdown, plant upsets, and emergency conditions.	LA-0331	09/21/2018 ACT	FALSE	Proper equipment design, proper operation, and good combustion practices.	0.068 LB/MM BTU	Proper equipment design, proper operation, and good combustion practices.	0.31 LB/MM BTU	Proper equipment design, proper operation, and good combustion practices.	0.006 LB/H			Proper equipment design, proper operation, and good combustion practices.	0
	MARINE LOADING FLARE	Control Device for LNG loading process.	LA-0331	09/21/2018 ACT	FALSE	Proper equipment design, proper operation, and good combustion practices.	0.068 LB/MM BTU	Proper equipment design, proper operation, and good combustion practices.	0.31 LB/MM BTU	Proper equipment design, proper operation, and good combustion practices.	0.006 LB/H			Proper equipment design, proper operation, and good combustion practices.	1107 T/YR ANNUAL TOTAL

Summary of BACT Determinations	
RBLC Seach Parameters:	Large Internal Combustion Engines
Date Range:	2020-2025
Fuel:	Liquid
Process Code:	17.110
RBLC Search Date:	2/3/2025

Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	PM2.5 BACT Limit	PM10 BACT Limit	GHG BACT	GHG BACT Limit
ALASKA GASLINE DEVELOPMENT CORPORATION GAS TREATMENT PLANT NORTH SLOPE BOROUGH, AK	One (1) Black Start Generator Engine	EU 39 is a 4,060 hp diesel generator.	AK-0085	08/13/2020 ACT	FALSE	Good combustion practices, limit operation to 500 hours per year.	3.3 G/HP-HR 3-HOUR AVERAGE	Oxidation Catalyst, Good Combustion Practices, and 500 hour limit per year.	3.3 G/HP-HR 3-HOUR AVERAGE	Oxidation Catalyst, Good combustion practices, and limit operation to 500 hours per year.	0.18 G/HP-HR 3-HOUR AVERAGE	Good combustion practices, ULSD, and limit operation to 500 hours per year.	0.045 G/HP-HR 3-HOUR AVERAGE	0.045 G/HP-HR 3-HOUR AVERAGE	0.045 G/HP-HR 3-HOUR AVERAGE	Good combustion practices and limit operation to 500 hours per year	163.6 LB/MMBTU 3-HOUR AVERAGE
ALASKA GASLINE DEVELOPMENT CORPORATION LIQUEFACTION PLANT KENAI PENNINSULA BOROUGH, AK	Diesel Fire Pump Engine	EU 11 is a 575 hp diesel fire pump engine which is required to meet E.F.s from Table 4 of NSPS Subpart IIII, which is the equivalent to EPA Nonroad Tier 3. BACT E.F.s include not to exceed factor of safety as identified in 40 CFR 1039.101(e).	AK-0088	07/07/2022 ACT	FALSE	Good Combustion Practices; Limited Operation; 40 CFR 60 Subpart IIII	3.6 G/HP-HR	Oxidation Catalyst; Limited Operation; 40 CFR 60 Subpart IIII	3.3 G/HP-HR	Oxidation Catalyst; Limited Operation; 40 CFR 60 Subpart IIII	0.19 G/HP-HR	Good Combustion Practices; Limited Operation; 40 CFR 60 Subpart IIII	0.19 G/HP-HR	0.19 G/HP-HR	0.19 G/HP-HR	Good Combustion Practices; Limited Operation;	163.6 LB/MMBTU 3-HOURS
SHINTCH LOUISIANA, LLC SHINTECH PLAQUEMINE PLANT 4 IBERVILLE, LA	4C-6A - C/A Emergency Generator A	Operates for 100 hours per year.	*LA-0403	12/16/2024 ACT	TRUE	Compliance with 40 CFR 60 Subpart IIII	18.41 LB/HR	Compliance with 40 CFR 60 Subpart IIII.	13.5 LB/HR	Compliance with 40 CFR 60 Subpart IIII	6.27 LB/HR			0.76 LB/HR	0.77 LB/HR	BACT is determined to be the implementation of the following energy efficiency measures: Improved Combustion Measures, Insulation, and Minimization of Air Infiltration	0
	4C-6B - C/A Emergency Generator B	Operates for 100 hours per year.	*LA-0403	12/16/2024 ACT	TRUE	Compliance with 40 CFR 60 Subpart IIII	18.41 LB/HR	Compliance with 40 CFR 60 Subpart IIII	13.5 LB/HR	Compliance with 40 CFR 60 Subpart IIII	6.27 LB/HR			0.76 LB/HR	0.77 LB/HR	BACT is determined to be the implementation of the following energy efficiency measures: Improved Combustion Measures, Insulation, and Minimization of Air Infiltration	0
	4C-6C - C/A Emergency Generator C	Operates for 100 hours per year.	*LA-0403	12/16/2024 ACT	TRUE	Compliance with 40 CFR 60 Subpart IIII	18.41 LB/HR	Compliance with 40 CFR 60 Subpart IIII	13.5 LB/HR	Compliance with 40 CFR 60 Subpart IIII	6.27 LB/HR			0.76 LB/HR	0.77 LB/HR	BACT is determined to be the implementation of the following energy efficiency measures: Improved Combustion Measures, Insulation, and Minimization of Air Infiltration	0
	4U-7A - Fire Water Pump A	Operates for 100 hours per year.	*LA-0403	12/16/2024 ACT	TRUE	Compliance with 40 CFR 60 Subpart IIII	2.71 LB/HR	Compliance with 40 CFR 60 Subpart IIII	2.71 LB/HR	Compliance with 40 CFR 60 Subpart IIII	0.92 LB/HR			0.18 LB/HR	0.18 LB/HR		
	4U-7B - Fire Water Pump B	Operates for 100 hours per year.	*LA-0403	12/16/2024 ACT	TRUE	Compliance with 40 CFR 60 Subpart IIII	2.71 LB/HR	Compliance with 40 CFR 60 Subpart IIII	3.18 LB/HR	Compliance with 40 CFR 60 Subpart IIII	0.92 LB/HR			0.18 LB/HR	0.18 LB/HR		
	4U-7C - Fire Water Pump C	Operates for 100 hours per year	*LA-0403	12/16/2024 ACT	TRUE	Compliance with 40 CFR 60 Subpart IIII	2.71 LB/HR	Compliance with 40 CFR 60 Subpart IIII	3.18 LB/HR	Compliance with 40 CFR 60 Subpart IIII	0.92 LB/HR			0.18 LB/HR	0.18 LB/HR		
	4U-10 - Utility Emergency Generator	Operates for 65 hours per year.	*LA-0403	12/16/2024 ACT	TRUE	Compliance with 40 CFR 60 Subpart IIII	15.79 LB/HR	Compliance with 40 CFR 60 Subpart IIII	11.57 LB/HR	Compliance with 40 CFR 60 Subpart IIII	5.38 LB/HR			0.66 LB/HR	0.66 LB/HR	BACT is determined to be the implementation of the following energy efficiency measures: Improved Combustion Measures, Insulation, and Minimization of Air Infiltration	0

Summary of BACT Determinations

RBLC Seach Parameters:	Large Internal Combustion Engines
Date Range:	2020-2025
Fuel:	Liquid
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RBLC Search Date:	2/3/2025

Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	PM2.5 BACT Limit	PM10 BACT Limit	GHG BACT	GHG BACT Limit
	4U-12 - VCM/CA/UT CCR Emergency Generator	Operates for 65 hours per year	*LA-0403	12/16/2024 ACT	TRUE	Compliance with 40 CFR 60 Subpart IIII	5.97 LB/HR	Compliance with 40 CFR 60 Subpart IIII	4.37 LB/HR	Compliance with 40 CFR 60 Subpart IIII	2.03 LB/HR			0.25 LB/HR	0.25 LB/HR	BACT is determined to be the implementation of the following energy efficiency measures: Improved Combustion Measures, Insulation, and Minimization of Air Infiltration	0
	4M-11A - VCM Emergency Generator A	Operates for 100 hours per year.	*LA-0403	12/16/2024 ACT	TRUE	Compliance with 40 CFR 60 Subpart IIII	18.41 LB/HR	Compliance with 40 CFR 60 Subpart IIII	13.5 LB/HR	Compliance with 40 CFR 60 Subpart IIII	6.27 LB/HR			0.76 LB/HR	0.77 LB/HR		
	4M-11B - VCM Emergency Generator B	Operates for 100 hours per year.	*LA-0403	12/16/2024 ACT	TRUE	Compliance with 40 CFR 60 Subpart IIII	18.41 LB/HR	Compliance with 40 CFR 60 Subpart IIII	13.5 LB/HR	Compliance with 40 CFR 60 Subpart IIII	6.27 LB/HR			0.76 LB/HR	0.77 LB/HR		
LANSING BOARD OF WATER AND LIGHT LANSING BOARD OF WATER AND LIGHT--DELTA ENERGY PARK EATON, MI	EUEMGEN	The engine has a maximum horsepower of 762 brake horsepower (bhp).	*MI-0459	06/27/2024 ACT	TRUE	0	6.4 G/KW-H HOURLY	Good combustion practices	3.5 G/KW-H HOURLY	Good combustion practices	6.4 G/KW-H HOURLY			0.3 LB/H HOURLY	0.3 LB/H HOURLY	Good combustion practices, use of current energy efficiency measures.	205 T/YR 12-MONTH ROLLING TIME PERIOD
CRONUS CHEMICALS, LLC CRONUS CHEMICALS DOUGLAS, IL	Emergency Generator Engine		*IL-0134	12/21/2023 ACT	TRUE	0	6.4 G/KW-HR 3-HR AVG	0	3.5 G/KW-HR 3-HR AVG	0	6.4 G/KW-HR 3-HR AVG			0.2 G/KW-HR 3-HR AVG	0.2 G/KW-HR 3-HR AVG	0	160 TONS/YEAR
KOCH METHANOL ST. JAMES, LLC KOCH METHANOL (KME) FACILITY ST. JAMES, LA	EGEN - Plant Emergency Generator		*LA-0401	12/20/2023 ACT	TRUE	Compliance with 40 CFR 60 Subpart IIII	38.24 LB/HR	Compliance with 40 CFR 60 Subpart IIII	20.91 LB/HR	Compliance with 40 CFR 60 Subpart IIII	2.29 LB/HR			1.19 LB/HR	1.19 LB/HR		
	E. GEN 01 - Generac SD 2000		*LA-0401	12/20/2023 ACT	TRUE	Compliance with the requirements of 40 CFR 60 Subpart IIII	28.48 LB/HR	Compliance with the requirements of 40 CFR 60 Subpart IIII	2.9 LB/HR	Compliance with the requirements of 40 CFR 60 Subpart IIII	2.06 LB/HR			0.84 LB/HR	0.84 LB/HR		
	E. GEN 02 - Generac SD 2000		*LA-0401	12/20/2023 ACT	TRUE	Compliance with the requirements of 40 CFR 60 Subpart IIII	28.48 LB/HR	Compliance with the requirements of 40 CFR 60 Subpart IIII	2.9 LB/HR	Compliance with the requirements of 40 CFR 60 Subpart IIII	2.06 LB/HR			0.84 LB/HR	0.84 LB/HR		
SHELL CHEMICAL LP GEISMAR PLANT ASCENSION, LA	06-22 - AO-5 Emergency Generator		*LA-0394	12/12/2023 ACT	TRUE	Use of good combustion practices and compliance with NSPS Subpart IIII	4.24 LB/HR HOURLY MAXIMUM	Use of good combustion practices and compliance with NSPS Subpart IIII	3.81 LB/HR HOURLY MAXIMUM	Use of good combustion practices and compliance with NSPS Subpart IIII	0.11 LB/HR HOURLY MAXIMUM			0.22 LB/HR HOURLY MAXIMUM	0.22 LB/HR HOURLY MAXIMUM	Use of good combustion practices and compliance with NSPS Subpart IIII	0

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RBLC Seach Parameters:	Large Internal Combustion Engines
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Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	PM2.5 BACT Limit	PM10 BACT Limit	GHG BACT	GHG BACT Limit
	53-22 - PAO Emergency Generator		*LA-0394	12/12/2023 ACT	TRUE	Use of good combustion practices, compliance with NSPS Subpart IIII	4.24 LB/HR HOURLY MAXIMUM	Use of good combustion practices, compliance with NSPS Subpart IIII	3.81 LB/HR HOURLY MAXIMUM	Use of good combustion practices, compliance with NSPS Subpart IIII	0.11 LB/HR HOURLY MAXIMUM			0.22 LB/HR HOURLY MAXIMUM	0.22 LB/HR HOURLY MAXIMUM	Use of good combustion practices, compliance with NSPS Subpart IIII	0
HYBAR LLC HYBAR LLC MISSISSIPPI, AR	Emergency Generators	SN-17 through SN-20	*AR-0180	04/28/2023 ACT	TRUE	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	3.9 G/BHP-HR	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	0.9 G/BHP-HR			Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	0.1 G/BHP-HR	0.1 G/BHP-HR	0.1 G/BHP-HR	Good combustion practices	164 LB/MMBTU
NUCOR STEEL NUCOR STEEL MONTGOMERY, IN	Emergency Generator (CC-GEN1)		IN-0359	03/30/2023 ACT	FALSE	certified engine	4.8 G/HP-HR	oxidation catalyst and certified engine	2.61 G/HP-HR	certified engine	0.32 G/HP-HR	certified engine	0.15 G/HP-H	0.15 G/HP-H	0.15 G/HP-H	Good engineering design and manufacturerâ€™s recommended operating and maintenance procedures.	163.6 LB/MMBTU
LANSING BOARD OF WATER AND LIGHT LBWL-ERICKSON STATION EATON, MI	EUEMGD	EUEMGD-A 2,206 HP diesel-fueled emergency engine manufactured after 2006 serving a 1,500 kW generator with associated fuel oil tank. The engine generator is used to charge the batteries in the uninterruptible power supply battery system and to facilitate operations during idling of the plant for routine maintenance checks and readiness testing	MI-0454	12/20/2022 ACT	FALSE	Good combustion practices and will be NSPS compliant.	6.4 G/KW-H HOURLY	Good combustion practices and will be NSPS compliant.	3.5 G/KW-H HOURLY					1 LB/H HOURLY	1 LB/H HOURLY	low carbon fuel (pipeline quality natural gas), good combustion practices, and energy efficiency measures.	590 T/YR 12-MO ROLLING TIME PERIOD
NORFOLK CRUSH, LLC NORFOLK CRUSH, LLC MADISON, NE	Emergency Fire Water Pump Engine 1	An emergency fire water pump engine (EP-132).	*NE-0064	11/21/2022 ACT	TRUE	0	2.38 G/HP-HR 3-HOUR OR TEST METHOD AVERAGE			0	0.62 G/HP-HR 3-HOUR OR TEST METHOD AVERAGE	0	0.15 G/HP-HR 3-HOUR OR TEST METHOD AVERAGE				
INTEL OHIO SITE INTEL OHIO SITE LICKING, OH	5,051 bhp (3,768 kWm) Diesel-Fired Emergency Generators: P001 through P046	Forty-six 5,051 bhp (3,768 kWm) Diesel-Fired Emergency Generators: P001 through P046	OH-0387	09/20/2022 ACT	FALSE	Certified to meet Tier 2 standards and good combustion practices	6.4 G/KW-H 6.4 GRAMS NOX + NMHC/KW-HR	Certified to meet Tier 2 standards and good combustion practices	3.5 G/KW-H	Certified to meet Tier 2 standards and good combustion practices	0.4 G/KW-H	Certified to meet Tier 2 standards and good combustion practices	0.2 G/KW-H	0.07 LB/H EACH GENERATOR	0.07 LB/H EACH GENERATOR		
LINCOLN LAND ENERGY CENTER (A/K/A EMBERCLEAR) LINCOLN LAND ENERGY CENTER SANGAMON, IL	Emergency Engines	Two engine-generators will power an electrical generator to provide power to critical equipment during power outages. Ultra-low sulfur diesel fuel (sulfur content	IL-0133	07/29/2022 ACT	FALSE	0	6.4 GRAMS KILOWATT-HOUR	0	3.5 GRAMS KILOWATT-HOUR			0	0.2 GRAMS KILOWATT-HOUR			0	508 TONS/YEAR
MARSHALL ENERGY CENTER, LLC MEC NORTH, LLC CALHOUN, MI	EUEMENGINE (North Plant): Emergency engine	A 1,341 HP (1,000 kilowatts (kW)) diesel-fired emergency engine with a model year of 2011 or later, and a displacement of	MI-0451	06/23/2022 ACT	FALSE	Good combustion practices and meeting NSPS Subpart IIII requirements.	6.4 G/KW-H HOURLY	Good combustion practices and meeting NSPS IIII requirements.	3.5 G/KW-H HOURLY	Good combustion practices	0.86 LB/H HOURLY			0.52 LB/H HOURLY	0.54 LB/H HOURLY	Good combustion practices	383 T/YR 12-MO ROLLING TIME PERIOD
MARSHALL ENERGY CENTER, LLC MEC SOUTH, LLC CALHOUN, MI	EUEMENGINE (South Plant): Emergency engine	A 1,341 HP (1,000 kilowatts (kW)) diesel-fired emergency engine with a model year of 2011 or later, and a displacement of	MI-0452	06/23/2022 ACT	FALSE	Good Combustion Practices and meeting NSPS Subpart IIII requirements	6.4 G/KW-H HOURLY	Good Combustion Practices and meeting NSPS Subpart IIII requirements	3.5 G/KW-H HOURLY	Good combustion practices.	0.86 LB/H HOURLY			0.52 LB/H HOURLY	0.54 LB/H HOURLY	Good combustion practices	383 T/YR 12-MO ROLLING TIME PERIOD

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RBLC Seach Parameters:	Large Internal Combustion Engines
Date Range:	2020-2025
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Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	PM2.5 BACT Limit	PM10 BACT Limit	GHG BACT	GHG BACT Limit
MAGNOLIA POWER LLC MAGNOLIA POWER GENERATING STATION UNIT 1 IBERVILLE, LA	Emergency Diesel Generator Engine		LA-0391	06/03/2022 ACT	FALSE	Compliance with 40 CFR 60 Subpart IIII, good combustion practices, and use of ultra-low sulfur diesel fuel.	4.8 G/HP-HR	Compliance with 40 CFR 60 Subpart IIII, good combustion practices, and the use of ultra-low sulfur diesel fuel.	2.6 G/HP-HR	Compliance with 40 CFR 60 Subpart IIII standards, good combustion practices, and the use of ultra-low sulfur diesel fuel.	4.8 G/HP-HR			0.15 G/HP-HR	0.15 G/HP-HR	Compliance with 40 CFR 60 Subpart IIII, good combustion practices, and the use of ultra-low sulfur diesel fuel.	74.21 KG/MM BTU
CSP DERIDDER, LLC DERIDDER SAWMILL BEAUREGARD, LA	GEN-1 - Emergency Generator No. 1		LA-0390	05/10/2022 ACT	FALSE					Good combustion practices and maintenance and compliance with applicable 40 CFR 60 Subpart JJJJ limitation for VOC.	1.98 LB/HR						
	GEN-2 - Emergency Generator No. 2		LA-0390	05/10/2022 ACT	FALSE					Good combustion practices and maintenance and compliance with applicable 40 CFR 60 Subpart JJJJ limitation for VOC	1.98 LB/HR						
	GEN-3 - Emergency Generator No. 2		LA-0390	05/10/2022 ACT	FALSE					Good Combustion practices and maintenance and compliance with applicable 40 CFR 60 Subpart JJJJ limitations for VOC	1.98 LB/HR						
SHADY HILLS ENERGY CENTER, LLC SHADY HILLS COMBINED CYCLE FACILITY PASCO, FL	1,500 kW Emergency Diesel Generator	The emergency generator will operate a combined total of 100 hr/yr for maintenance checks, and readiness testing, which includes a maximum 50 hr/yr for non-emergency operation.	FL-0371	06/07/2021 ACT	FALSE	0	6.4 G/KW-HOUR FOR NMHC+NOX	0	3.5 G/KW-HOUR			0	0.2 G/KW-HOUR				
SHINTECH LOUISIANA, LLC SHINTECH PLAQUEMINES PLANT 1 IBERVILLE, LA	VCM Unit Emergency Generator A	Maximum horsepower rating.	LA-0379	05/04/2021 ACT	FALSE	Good combustion practices/gaseous fuel burning.	6.9 G/HP-HR	Good combustion practices/gaseous fuel burning.	8.5 G/HP-HR			Good combustion practices/gaseous fuel burning.	0.4 G/HP-HR		0.4 G/HP-HR		
	C/A Emergency Generator B	Maximum horsepower rating.	LA-0379	05/04/2021 ACT	FALSE	Good combustion practices/gaseous fuel burning.	6.9 G/HP-HR	Good combustion practices/gaseous fuel burning.	8.5 G/HP-HR			Good combustion practices/gaseous fuel burning.	0.4 G/HP-HR		0.4 G/HP-HR		
NUCOR STEEL GALLATIN, LLC NUCOR STEEL GALLATIN, LLC GALLATIN, KY	New Pumphouse (XB13) Emergency Generator #1 (EP 08-05)	No controls.	KY-0115	04/19/2021 ACT	FALSE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	0	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	0					0.15 G/HP-HR	0.15 G/HP-HR		
	Tunnel Furnace Emergency Generator (EP 08-06)		KY-0115	04/19/2021 ACT	FALSE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	0	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	0					0.15 G/HP-HR	0.15 G/HP-HR		

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RBLC Search Date:	2/3/2025

Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	PM2.5 BACT Limit	PM10 BACT Limit	GHG BACT	GHG BACT Limit
	Caster B Emergency Generator (EP 08-07)		KY-0115	04/19/2021 ACT	FALSE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	0	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	0					0.15 G/HP-HR	0.15 G/HP-HR		
	Air Separation Unit Emergency Generator (EP 08-08)		KY-0115	04/19/2021 ACT	FALSE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	0	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	0					0.15 G/HP-HR	0.15 G/HP-HR		
LANSING BOARD OF WATER AND LIGHT LBWL--ERICKSON STATION EATON, MI	EUEMGD--emergency engine	EUEMGD--A 2,206 HP diesel-fueled emergency engine manufactured after 2006 serving a 1,500 KW generator with associated fuel oil tank. The engine generator is used to charge the batteries in the uninterruptible power supply battery system and to facilitate operations during idling of the plant for routine maintenance checks and readiness testing	MI-0447	01/07/2021 ACT	FALSE			Good combustion practices and will be NSPS compliant.	3.5 G/KW-H HOURLY					1 LB/H HOURLY	1 LB/H HOURLY	low carbon fuel (pipeline quality natural gas), good combustion practices, and energy efficiency measures.	590 T/YR 12-MO ROLLING TIME PERIOD
NEMADJI TRAIL ENERGY CENTER NEMADJI TRAIL ENERGY CENTER DOUGLAS, WI	Emergency Diesel Generator (P07)		WI-0300	09/01/2020 ACT	FALSE	Operation limited to 500 hours/year and operate and maintain according to the manufacturerâ€™s recommendations.	4.8 G/HP-H	Operation limited to 500 hours/year, and operate and maintain generator according to the manufacturerâ€™s recommendations.	2.6 G/HP-H	Operation limited to 500 hours/year and operate and maintain generator according to the manufacturerâ€™s recommendations	0.32 G/HP-H	Limited to operate 500 hours/year, sulfur content of the diesel fuel oil fired may not exceed 15 ppm, and operate and maintain according to the manufacturerâ€™s recommendations.	0.15 G/HP-H	0.15 G/HP-H	0.15 G/HP-H	Certified to at least meet EPAâ€™s criteria for Tier 2 reciprocating internal combustion engines and the 40 CFR 60, Subpart IIII emission limitations, operation limited to 500 hours/year, and operate and maintain generator according	0
NUCOR NUCOR STEEL BRANDENBURG MEADE, KY	EP 10-01 - Caster Emergency Generator	Diesel emergency generator used to provide emergency power supply for critical operations should the facility power supply be interrupted. This generator has a displacement of less than 30 liters per cylinder.	KY-0110	07/23/2020 ACT	FALSE	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	4.77 G/HP-HR NMHC + NOX	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	2.61 G/HP-HR	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0			0.15 G/HP-HR	0.15 G/HP-HR	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0
	EP 10-02 - North Water System Emergency Generator	Diesel emergency generator used to provide emergency power supply for critical operations should the facility power supply be interrupted. This generator has a displacement of less than 30 liters per cylinder.	KY-0110	07/23/2020 ACT	FALSE	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	4.77 G/HP-HR NMHC + NOX	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	2.61 G/HP-HR	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0			0.15 G/HP-HR	0.15 G/HP-HR	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0
	EP 10-03 - South Water System Emergency Generator	Diesel emergency generator used to provide emergency power supply for critical operations should the facility power supply be interrupted. This generator has a displacement of less than 30 liters per cylinder.	KY-0110	07/23/2020 ACT	FALSE	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	4.77 G/HP-HR NMHC + NOX	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	2.61 G/HP-HR	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0			0.15 G/HP-HR	0.15 G/HP-HR	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0
	EP 10-04 - Emergency Fire Water Pump	Diesel emergency fire water pump used to provide emergency fire water supply for critical operations should the facility power supply be interrupted. This generator has a displacement of less than 30 liters per cylinder.	KY-0110	07/23/2020 ACT	FALSE	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	4.77 G/HP-HR NMHC + NOX	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	2.61 G/HP-HR	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0			0.15 G/HP-HR	0.15 G/HP-HR	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0
	EP 10-07 - Air Separation Plant Emergency Generator	Diesel emergency generator used to provide emergency power supply for critical operations should the facility power supply be interrupted. This generator has a displacement of less than 30 liters per cylinder.	KY-0110	07/23/2020 ACT	FALSE	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	4.77 G/HP-HR NMHC + NOX	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	2.61 G/HP-HR	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0			0.15 G/HP-HR	0.15 G/HP-HR	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0

Summary of BACT Determinations

RBLC Seach Parameters:	Large Internal Combustion Engines
Date Range:	2020-2025
Fuel:	Liquid
Process Code:	17.110
RBLC Search Date:	2/3/2025

Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	PM2.5 BACT Limit	PM10 BACT Limit	GHG BACT	GHG BACT Limit
PETMIN USA INCORPORATED PETMIN USA INCORPORATED ASHTABULA, OH	Diesel-fired emergency fire pumps (2) (P009 and P010)	Two identical fire pump 3131 HP diesel engines. Throughputs and limits are for one engine, except as noted.	OH-0383	07/17/2020 ACT	FALSE	Tier IV NSPS standards certified by engine manufacturer.	0	Tier IV NSPS standards certified by engine manufacturer.	0					0.15 G/B-HP-H	0.15 G/B-HP-H		
	Emergency Generators (P005 and P006)	Two identical Emergency generators, 3131 HP diesel engines. Throughputs and limits are for one generator, except as noted.	OH-0383	07/17/2020 ACT	FALSE			Tier IV engine Good combustion practices	0								

Summary of BACT Determinations

RBLC Seach Parameters:	Small Internal Combustion Engines
Date Range:	2020-2025
Fuel:	Liquid
Process Code:	17.210
RBLC Search Date:	2/3/2025

Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	PM2.5 BACT Limit	PM10 BACT Limit	GHG BACT	GHG BACT Limit
ALASKA GASLINE DEVELOPMENT CORPORATION GAS TREATMENT PLANT NORTH SLOPE BOROUGH, AK	Three (3) Firewater Pump Engines and two (2) Emergency Diesel Generators	Three firewater pump engines (EUs 40 - 42) rated at 250 hp each with 14.47 gph diesel throughput. Dormitory Emergency Generator Engine (EU 43) rated at 335 hp with 19.4 gph of diesel throughput. Communications Tower Emergency Generator Engine (EU 44) rated at 200 hp with 11.64 gph of diesel throughput.	AK-0085	08/13/2020 ACT	FALSE	Good combustion practices, limit operation to 500 hours per year per engine	3.6 G/HP-HR 3-HOUR AVERAGE	Good combustion practices, limit operation to 500 hours per year per engine	3.3 G/HP-HR 3-HOUR AVERAGE	Good combustion practices, ULSD, and limit operation to 500 hours per year.	0.19 G/HP-HR 3-HOUR AVERAGE	Good combustion practices, ULSD, and limit operation to 500 hours per year per engine	0.19 G/HP-HR 3-HOUR AVERAGE	0.19 G/HP-HR 3-HOUR AVERAGE	0.19 G/HP-HR 3-HOUR AVERAGE	Good combustion practices and limit operation to 500 hours per year per engine	163.6 LB/MMBTU 3-HOUR AVERAGE
ALASKA GASLINE DEVELOPMENT CORPORATION LIQUEFACTION PLANT KENAI PENNINSULA BOROUGH, AK	Auxiliary Air Compressor Engine	EU 12 is a 300 hp diesel auxiliary air compressor engine which is required to meet EPA nonroad Tier 4 final E.F.s. BACT E.F.s include not to exceed factor of safety as identified in 40 CFR 1039.101(e).	AK-0088	07/07/2022 ACT	FALSE	Good Combustion Practices; Limited Operation; 40 CFR 60 Subpart IIII	0.45 G/HP-HR	Good Combustion Practices; Limited Operation; 40 CFR 60 Subpart IIII	3.3 G/HP-HR	Good Combustion Practices; Limited Operation; 40 CFR 60 Subpart IIII	0.22 G/HP-HR	Good Combustion Practices; Limited Operation; 40 CFR 60 Subpart IIII	0.022 G/HP-HR	0.022 G/HP-HR	0.022 G/HP-HR	Good Combustion Practices; Limited Operation	163.6 LB/MMBTU 3-HOURS
CHEVRON PHILLIPS CHEMICAL COMPANY LP SWEENY OLD OCEAN FACILITIES BRAZORIA, TX	Emergency Generator Engines		TX-0889	08/08/2020 ACT	FALSE			Good combustion practices and limited hours of operation	100 HR/YR							Good combustion practices and limited hours of operation	0
ONEOK HYDROCARBONS LP MONT BELVIEU NGL FRACTIONATION UNIT CHAMBERS, TX	EMERGENCY DIESEL ENGINE		TX-0886	03/31/2020 ACT	FALSE	Limited operating hours, good combustion practices meets NSPS IIII Tier 3 engine	0			Limited operating hours, good combustion practices meets NSPS IIII Tier 3 engine	0						
SHINTCH LOUISIANA, LLC SHINTECH PLAQUEMINE PLANT 4 IBERVILLE, LA	4U-11 - Substation Emergency Generator	Operates for 98 hours per year.	*LA-0403	12/16/2024 ACT	TRUE	Compliance with 40 CFR 60 Subpart IIII	0.4 LB/HR	Compliance with 40 CFR 60 Subpart IIII	0.58 LB/HR	Compliance with 40 CFR 60 Subpart IIII	0.14 LB/HR			0.05 LB/HR	0.05 LB/HR	BACT is determined to be the implementation of the following energy efficiency measures: Improved Combustion Measures, Insulation, and Minimization of	0
	4M-11C - VCM Emergency Pump A	Operates for 100 hours per year.	*LA-0403	12/16/2024 ACT	TRUE	Compliance with 40 CFR 60 Subpart IIII	0.98 LB/HR	Compliance with 40 CFR 60 Subpart IIII	1.15 LB/HR	Compliance with 40 CFR 60 Subpart IIII	0.33 LB/HR			0.07 LB/HR	0.07 LB/HR		
	4M-11D - VCM Emergency Pump B	Operates for 100 hours per year.	*LA-0403	12/16/2024 ACT	TRUE	Compliance with 40 CFR 60 Subpart IIII	0.98 LB/HR	Compliance with 40 CFR 60 Subpart IIII	1.15 LB/HR	Compliance with 40 CFR 60 Subpart IIII	0.33 LB/HR			0.07 LB/HR	0.07 LB/HR		
	4M-11E - VCM Emergency Pump C	Operates for 100 hours per year.	*LA-0403	12/16/2024 ACT	TRUE	Compliance with 40 CFR 60 Subpart IIII	0.98 LB/HR	Compliance with 40 CFR 60 Subpart IIII	1.15 LB/HR	Compliance with 40 CFR 60 Subpart IIII	0.33 LB/HR			0.76 LB/HR	0.07 LB/HR		
LANSING BOARD OF WATER AND LIGHT LANSING BOARD OF WATER AND LIGHT--DELTA ENERGY PARK EATON, MI	EUFIREPUMP	The engine has a maximum horsepower of 500 brake horsepower (bhp).	*MI-0459	06/27/2024 ACT	TRUE	0	4 G/KW-H HOURLY	Good combustion practices	3.5 G/KW-H HOURLY	Good combustion practices	4 G/KW-H HOURLY			1.1 LB/H HOURLY	1.1 LB/H HOURLY	Good combustion practices, use of current energy efficiency measures.	27 T/YR 12-MONTH ROLLING TIME PERIOD
CRONUS CHEMICALS, LLC CRONUS CHEMICALS DOUGLAS, IL	Firewater Pump Engine		*IL-0134	12/21/2023 ACT	TRUE	0	4 G/KW-HR 3-HR AVG	0	3.5 G/KW-HR 3-HR AVG	0	4 G/KW-HR 3-HR AVG			0.2 G/KW-HR 3-HR AVG	0.2 G/KW-HR 3-HR AVG	0	25 TONS/YEAR
KOCH METHANOL ST. JAMES, LLC KOCH METHANOL (KME) FACILITY ST. JAMES, LA	FWP-01 - Firewater Pump Engine No. 1		*LA-0401	12/20/2023 ACT	TRUE	Compliance with 40 CFR 60 Subpart IIII	3.96 LB/HR	Compliance with 40 CFR 60 Subpart IIII	3.44 LB/HR	Compliance with 40 CFR 60 Subpart IIII	1.47 LB/HR			0.2 LB/HR	0.2 LB/HR		
	FWP-02 - Firewater Pump Engine No. 2		*LA-0401	12/20/2023 ACT	TRUE	Compliance with 40 CFR 60 Subpart IIII	3.96 LB/HR	Compliance with 40 CFR 60 Subpart IIII	3.44 LB/HR	Compliance with 40 CFR 60 Subpart IIII	1.47 LB/HR			0.2 LB/HR	0.2 LB/HR		
	FWP-03 - Firewater Pump Engine No. 3		*LA-0401	12/20/2023 ACT	TRUE	Compliance with the requirements of 40 CFR 60 Subpart IIII	1.49 LB/HR	Compliance with the requirements of 40 CFR 60 Subpart IIII	0.5 LB/HR	Compliance with the requirements of 40 CFR 60 Subpart IIII	0.61 LB/HR			0.06 LB/HR	0.06 LB/HR		
BUNGE CHEVRON AG RENEWABLES, LLC DESTREHAN OIL PROCESSING FACILITY ST. CHARLES, LA	HLK39 - Emergency Diesel Fire Pump Engine (EQT0094)	Non-emergency use of engine limit is 100 hr/yr per 40 CFR 60.4211(f)(2)	*LA-0402	12/13/2023 ACT	TRUE					Compliance with 40 CFR 60 Subpart IIII	0.14 LB/H HOURLY MAXIMUM			0.14 LB/H HOURLY MAXIMUM	0.14 LB/H HOURLY MAXIMUM	Good Combustion Practices	12 T/YR ANNUAL MAXIMUM
SHELL CHEMICAL LP GEISMAR PLANT ASCENSION, LA	05-22 - AO-5 BDL Area PAD Sump Pump Driver		*LA-0394	12/12/2023 ACT	TRUE	Use of good combustion practices and compliance with NSPS Subpart IIII	1.26 LB/HR HOURLY MAXIMUM	Use of good combustion practices and compliance with NSPS Subpart IIII	1.14 LB/HR HOURLY MAXIMUM	Use of good combustion practices and compliance with NSPS Subpart IIII	0.03 LB/HR HOURLY MAXIMUM			0.06 LB/HR HOURLY MAXIMUM	0.06 LB/HR HOURLY MAXIMUM	Use of good combustion practices and compliance with NSPS Subpart IIII	0
	52-22 - PAO Area PAD Sump Pump Driver		*LA-0394	12/12/2023 ACT	TRUE	Use of good combustion practices, compliance with NSPS Subpart IIII	1.26 LB/HR HOURLY MAXIMUM	Use of good combustion practices, compliance with NSPS Subpart IIII	1.14 LB/HR HOURLY MAXIMUM	Use of good combustion practices, compliance with NSPS Subpart IIII	0.03 LB/HR HOURLY MAXIMUM			0.06 LB/HR HOURLY MAXIMUM	0.06 LB/HR HOURLY MAXIMUM	Use of good combustion practices, compliance with NSPS Subpart IIII	0
HYBAR LLC HYBAR LLC MISSISSIPPI, AR	Emergency Water Pumps	SN-21 and SN-22	*AR-0180	04/28/2023 ACT	TRUE	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	14.06 G/BHP-HR	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	3.03 G/BHP-HR			Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	1 G/BHP-HR	1 G/BHP-HR	1 G/BHP-HR	Good combustion practices	164 LB/MMBTU
NUCOR STEEL NUCOR STEEL MONTGOMERY, IN	Emergency Generator (CC-GEN2)		IN-0359	03/30/2023 ACT	FALSE	certified engine	3 G/HP-HR	oxidation catalyst and certified engine	2.61 G/HP-HR	certified engine	1.13 G/HP-HR	certified engine	0.15 G/HP-H	0.15 G/HP-H	0.15 G/HP-H	Good engineering design and manufacturerâ€™s recommended operating and maintenance procedures	163.6 LB/MMBTU
IRON UNITS LLC IRON UNITS LLC LUCAS, OH	P010 - 225 Hp Diesel engine for bulk material screen		OH-0388	12/22/2022 ACT	FALSE	Good combustion practices to meet Tier IV emissions	0.15 LB/H	Good combustion practices to meet Tier IV emissions	1.29 LB/H					0.02 LB/H SEE NOTES	0.02 LB/H SEE NOTES	Good combustion practices	1209 T/YR PER ROLLING 12-MONTH PERIOD
	P012 - 125 Hp Diesel Engine for Screen Bypass Screen		OH-0388	12/22/2022 ACT	FALSE	Good combustion practices to meet Tier IV emissions	0.08 LB/H	Good combustion practices to meet Tier IV emissions	1.03 LB/H					0.01 LB/H	0.01 LB/H	Good combustion practices	65 T/YR PER ROLLING 12-MONTH PERIOD
	P011 and P013 - 100 Hp Diesel Engine	P011 - 100 Hp Diesel Engine for Bulk Material Stacker P013 - 100 Hp Diesel Engine for Screen Bypass Stacker All emission limits are for each engine (not combined)	OH-0388	12/22/2022 ACT	FALSE	Good combustion practices to meet Tier IV emissions	0.07 LB/H	Good combustion practices to meet Tier IV emissions	0.83 LB/H					0.01 LB/H	0.01 LB/H	Good combustion practices	539 T/YR PER ROLLING 12-MONTH PERIOD
LANSING BOARD OF WATER AND LIGHT LBWL-ERICKSON STATION EATON, MI	EUFPRICE--A 315 HP diesel-fueled emergency engine	A 315 HP diesel-fueled emergency engine manufactured after 2009, with a heat input of 2.5 MMBtu/hr and associated fuel oil tank. The engine powers a fire pump used for fire suppression during an emergency.	MI-0454	12/20/2022 ACT	FALSE	Good combustion practices.	3 G/HP-H HOURLY	Good combustion practices.	2.6 G/HP-H HOURLY					0.69 LB/H HOURLY	0.69 LB/H HOURLY	Low carbon fuel (pipeline quality natural gas), good combustion practices, and energy efficiency measures.	20 T/YR 12-MO ROLLING TIME PERIOD
NORFOLK CRUSH, LLC NORFOLK CRUSH, LLC MADISON, NE	Emergency Fire Water Pump Engine 2	An emergency fire water pump engine (EP-133).	*NE-0064	11/21/2022 ACT	TRUE	0	2.38 G/HP-HR 3-HOUR OR TEST METHOD AVERAGE			0	0.62 G/HP-HR 3-HOUR OR TEST METHOD AVERAGE	0	0.15 G/HP-HR 3-HOUR OR TEST METHOD AVERAGE				
GENERAL MOTORS LLC GENERAL MOTORS LLC ORION ASSEMBLY OAKLAND, MI	FGEMENGINES	Group of six diesel-fired emergency engines (EUEMENG01A, EUEMENG04A, EUEMENG06, EUEMENG07, EUEMENG08, EUEMENG09) 500 hours/year for each individual engine.	MI-0453	09/27/2022 ACT	FALSE					Hours of Operation Restriction, Good Combustion Practices, Compliance with NSPS	0.19 G/B-HP-H HOURLY (EACH INDIVIDUAL EMISSION UNIT)			0.15 G/B-HP-H HOURLY (EACH INDIVIDUAL EMISSION UNIT)	0.15 G/B-HP-H HOURLY (EACH INDIVIDUAL EMISSION UNIT)	Hours of Operation Restriction, Good Combustion Practices, Compliance with NSPS	656.2 T/YR 12-MO ROLLING TIME PERIOD

Summary of BACT Determinations

RBLC Seach Parameters:	Small Internal Combustion Engines
Date Range:	2020-2025
Fuel:	Liquid
Process Code:	17.210
RBLC Search Date:	2/3/2025

Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	PM2.5 BACT Limit	PM10 BACT Limit	GHG BACT	GHG BACT Limit
INTEL OHIO SITE INTEL OHIO SITE LICKING, OH	275 hp (205 kW) Diesel-Fired Emergency Fire Pump Engine		OH-0387	09/20/2022 ACT	FALSE	Certified to meet the standards in Table 4 of 40 CFR Part 60, Subpart IIII and good combustion practices	4 G/KW-H 4.0 GRAMS NOX + NMHC/KW-HR	Certified to meet the standards in Table 4 of 40 CFR Part 60, Subpart IIII and good combustion practices	3.5 G/KW-H	Certified to meet the standards in Table 4 of 40 CFR Part 60, Subpart IIII and good combustion practices	0.7 LB/H	Certified to meet the standards in Table 4 of 40 CFR Part 60, Subpart IIII and good combustion practices	0.2 G/KW-H	0.6 LB/H	0.6 LB/H		
LINCOLN LAND ENERGY CENTER (A/K/A EMBERCLEAR) LINCOLN LAND ENERGY CENTER SANGAMON, IL	Fire Water Pump Engine	The fire water pump engine will power the pump in the plant's fire water system	IL-0133	07/29/2022 ACT	FALSE	0	4 GRAMS KILOWATT-HOUR	0	3.5 GRAMS KILOWATT-HOUR			0	0.2 GRAMS KILOWATT-HOUR			0	92 TONS/YEAR
MARSHALL ENERGY CENTER, LLC MEC NORTH, LLC CALHOUN, MI	EUFPENGINE (North Plant): Fire Pump Engine	A 300 HP diesel-fired emergency fire pump engine with a model year of 2011 or later, and a displacement of	MI-0451	06/23/2022 ACT	FALSE	Good combustion practices and meeting NSPS Subpart IIII requirements.	3 G/B-HP-H HOURLY	Good combustion practices and meeting NSPS Subpart IIII requirements	2.6 G/B-HP-H HOURLY	Good combustion practices.	0.75 LB/H HOURLY			0.66 LB/H HOURLY	0.66 LB/H HOURLY	Good combustion practices	85.6 T/YR 12-MO ROLLING TIME PERIOD
MARSHALL ENERGY CENTER, LLC MEC SOUTH, LLC CALHOUN, MI	EUFPENGINE (South Plant): Fire pump engine	A 300 HP diesel-fired emergency fire pump engine with a model year of 2011 or later, and a displacement of	MI-0452	06/23/2022 ACT	FALSE	Good Combustion Practices and meeting NSPS Subpart IIII requirements	3 G/B-HP-H HOURLY	Good Combustion Practices and meeting NSPS Subpart IIII requirements	2.6 G/B-HP-H HOURLY	Good Combustion Practices	0.75 LB/H HOURLY			0.66 LB/H HOURLY	0.66 LB/H HOURLY	Good combustion practices.	85.6 T/YR 12-MO ROLLING TIME PERIOD
MAGNOLIA POWER LLC MAGNOLIA POWER GENERATING STATION UNIT 1 IBERVILLE, LA	Emergency Diesel Fired Water Pump Engine		LA-0391	06/03/2022 ACT	FALSE	Compliance with 40 CFR 60 Subpart IIII, good combustion practices, and use of ultra-low sulfur diesel fuel.	3 G/HP-HR	Compliance with 40 CFR 60 Subpart IIII, good combustion practices, and the use of ultra-low sulfur diesel fuel.	2.6 G/HP-HR	Compliance with 40 CFR 60 Subpart IIII, good combustion practices, and the use of ultra-low sulfur diesel fuel.	3 G/HP-HR			0.15 G/HP-HR	0.15 G/HP-HR	Compliance with 40 CFR 60 Subpart IIII, good combustion practices, and the use of ultra-low sulfur diesel fuel.	74.21 KG/MM BTU
CSP DERIDDER, LLC DERIDDER SAWMILL BEAUREGARD, LA	ENG1 - Emergency Fire Water Pump		LA-0390	05/10/2022 ACT	FALSE					Good combustion practices and maintenance and compliance with applicable 40 CFR 60 Subpart JJJJ limitation for VOC	1.85 LB/HR						
INDORAMA VENTURES OLEFINS, LLC WESTLAKE ETHYLENE PLANT CALCASIEU PARISH, LA	Emergency Generators and Fire Water Pumps (EQT0027 - EQT0032, EQT0044, EQT0045)	482 hp, 350 hp, 40 hp	*LA-0397	04/29/2022 ACT	TRUE	Compliance with applicable requirements of 40 CFR 60 Subpart IIII	0	Compliance with applicable requirements of 40 CFR 60 Subpart IIII	0	Compliance with applicable requirements of 40 CFR 60 Subpart IIII	0				0		
HUNT FOREST PRODUCTS, LLC TAYLOR SAWMILL BIENVILLE, LA	Firewater Pump Engine (FIR)		*LA-0387	04/12/2022 ACT	TRUE					Compliance with 40 CFR 60 Subpart IIII	0.02 TPY						
BIG RIVER STEEL LLC BIG RIVER STEEL LLC MISSISSIPPI, AR	Emergency Water Pumps	SN-85 through SN-90 SN-136	AR-0173	01/31/2022 ACT	FALSE	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	14.06 G/BHP-HR	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	3.03 G/BHP-HR	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	1.12 G/BHP-HR			1 G/BHP-HR	1 G/BHP-HR	Good Operating Practices	164 LB/MMBTU
BIG RIVER STEEL LLC BIG RIVER STEEL LLC MISSISSIPPI, AR	Emergency Engines	SN-69 through SN-84 SN-135	AR-0173	01/31/2022 ACT	FALSE	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	3.9 G/BHP-HR	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	0.9 G/BHP-HR	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	0.13 G/BHP-HR			0.1 G/BHP-HR	0.1 G/BHP-HR	Good Operating Practices	164 LB/MMBTU
BIG RIVER STEEL LLC BIG RIVER STEEL LLC MISSISSIPPI, AR	Emergency Engines	SN-110a through SN-110e. 2700 kW each.	AR-0168	03/17/2021 ACT	FALSE	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	4.86 G/KW-HR	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	3.5 G/KW-HR	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	1.55 G/KW-HR	Good Operating Practices, limited hours of operation, Compliance with NSPS Subpart IIII	0.2 G/KW-HR	0.2 G/KW-HR	0.2 G/KW-HR		
EL PASO ELECTRIC COMPANY NEWMAN POWER STATION EL PASO, TX	Emergency Engine		TX-0908	08/27/2021 ACT	FALSE	Meet the requirements of 40 CFR Part 60, Subpart IIII. Firing ultra-low diesel fuel. Limited to 100 hrs/yr of non-emergency operation.	100 HR/YR	Meet the requirements of 40 CFR Part 60, Subpart IIII. Firing ultra-low diesel fuel. Limited to 100 hrs/yr of non-emergency operation.	0	Meet the requirements of 40 CFR Part 60, Subpart IIII. Firing ultra-low diesel fuel. Limited to 100 hrs/yr of non-emergency operation.	0					Meet the requirements of 40 CFR Part 60, Subpart IIII. Firing ultra-low diesel fuel. Limited to 100 hrs/yr of non-emergency operation.	0
SHADY HILLS ENERGY CENTER, LLC SHADY HILLS COMBINED CYCLE FACILITY PASCO, FL	Emergency Fire Pump Engine (347 HP)	Limits equal Subpart IIII limits	FL-0371	06/07/2021 ACT	FALSE	0	4 G/KW-HOUR NMHC + NOX STANDARD	0	3.5 G/KW-HOUR			0	0.2 G/KW-HOUR				
DRAX BIOMASS INC. LASALLE BIOENERGY LLC LASALLE PARISH, LA	Generators and Firewater Pumps Engines		LA-0386	05/05/2021 ACT	FALSE	Comply with 40 CFR 60 Subpart IIII	0	Comply with 40 CFR 60 Subpart IIII	0	Comply with 40 CFR 60 Subpart IIII	0			0	0	Comply with 40 CFR 60 Subpart IIII	0
SHINTECH LOUISIANA, LLC SHINTECH PLAQUEMINES PLANT 1 IBERVILLE, LA	PVC Emergency Combustion Equipment A	Maximum horsepower rating.	LA-0379	05/04/2021 ACT	FALSE	Good combustion practices/gaseous fuel burning.	6.9 G/HP-HR	Good combustion practices/gaseous fuel burning.	8.5 G/HP-HR			Good combustion practices/gaseous fuel burning	0.4 G//HP-HR		0.4 G/HP-HR		
	VCM Unit Emergency Generator B	Maximum horsepower rating.	LA-0379	05/04/2021 ACT	FALSE	Good combustion practices/gaseous fuel burning.	6.9 G/HP-HR	Good combustion practices/gaseous fuel burning.	8.5 G/HP-HR			Good combustion practices/gaseous fuel burning.	0.4 G/HP-HR		0.4 G/HP-HR		
	VCM Unit Emergency Cooling Water Pumps	Maximum horsepower rating. Three engines total of the same model.	LA-0379	05/04/2021 ACT	FALSE	Good combustion practices/gaseous fuel burning.	2.98 G/KW-HR	Good combustion practices/gaseous fuel burning.	3.5 G/KW-HR			Good combustion practices/gaseous fuel burning.	0.2 G/KW-HR		0.2 G/KW-HR		
	PVC Emergency Combustion Equipment B	Maximum horsepower rating.	LA-0379	05/04/2021 ACT	FALSE	Good combustion practices/gaseous fuel burning.	4.41 LB/MM BTU	Good combustion practices/gaseous fuel burning.	0.95 LB/MM BTU			Good combustion practices/gaseous fuel burning.	0.31 LB/MM BTU		0.31 LB/MM BTU		
	PVC Emergency Combustion Equipment 2A and 2B	Maximum horsepower rating. Two engines of the same model.	LA-0379	05/04/2021 ACT	FALSE	Compliance with 40 CFR 60 Subpart IIII.	0.4 G/KW-HR	Compliance with 40 CFR 60 Subpart IIII.	2.6 G/HP-HR	Compliance with 40 CFR 60 Subpart IIII.	0.19 G/KW-HR			0.15 G/HP-HR	0.15 G/HP-HR		
NUCOR STEEL GALLATIN, LLC NUCOR STEEL GALLATIN, LLC GALLATIN, KY	Cold Mill Complex Emergency Generator (EP 09-05)		KY-0115	04/19/2021 ACT	FALSE	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	0	The permittee must develop a Good Combustion and Operating Practices (GCOP) Plan	0					0.15 G/HP-HR	0.15 G/HP-HR		
AGRIUM U.S. INC. KENAI NITROGEN OPERATIONS KENAI PENNINSULA BOROUGH, AK	Diesel Fired Well Pump	2.7 MMBtu/hr Diesel Fired Well Pump. Installed in 1966.	AK-0086	03/26/2021 ACT	FALSE	Good Combustion Practices and Limited Use	4.41 LB/MMBTU THREE-HOUR AVERAGE	Good Combustion Practices and Limited Use	0.95 LB/MMBTU THREE-HOUR AVERAGE	Good Combustion Practices and Limited Use	0.36 LB/MMBTU THREE-HOUR AVERAGE	Good Combustion Practices and Limited Use	0.31 LB/MMBTU THREE-HOUR AVERAGE	0.31 LB/MMBTU THREE-HOUR AVERAGE	0.31 LB/MMBTU THREE-HOUR AVERAGE	Good Combustion Practices and Limited Use	164 LB/MMBTU THREE-HOUR AVERAGE
SHELL CHEM APPALACHIA LLC SHELL POLYMERS MONACA SITE BEAVER, PA	Emergency Generator Parking Garage		*PA-0326	02/18/2021 ACT	TRUE	Use of certified engines, design of engines to include turbocharger and an intercooler/aftercooler, good combustion practices and proper operation and maintenance including certification to applicable federal emission standards	2.37 GRAM HP-HR	The use of certified engines, design of engines to include turbocharger and an intercooler/aftercooler, good combustion practices and proper operation and maintenance including certification to applicable federal emission standards	0.5 G HP-HR	The use of certified engines, design of engines to include turbocharger and an intercooler/aftercooler, good combustion practices and proper operation and maintenance including certification to applicable federal emission standards	2.37 GRAM HP-HR			0.06 G HP-HR		Good Combustion Practices - no feasible control technologies, 10 tons CO2e Year 12 month rolling basis for Parking Garage and Telecom emergency generators combined	10 TONS YEARLY ON 12 MONTH ROLLING
	Emergency GeneratorTelecom Hut & Tower		*PA-0326	02/18/2021 ACT	TRUE	The use of certified engines, design of engines to include turbocharger and an intercooler/aftercooler, good combustion practices and proper operation and maintenance including certification to applicable federal emission standards	2.83 G HP-HR	The use of certified engines, design of engines to include turbocharger and an intercooler/aftercooler, good combustion practices and proper operation and maintenance including certification to applicable federal emission standards	0.5 G HP-HR	The use of certified engines, design of engines to include turbocharger and an intercooler/aftercooler, good combustion practices and proper operation and maintenance including certification to applicable federal emission standards	2.83 G HP-HR			0.22 G HP-HR		Good Combustion Practices - no feasible control technologies, 10 tons CO2e Year 12 month rolling basis for Parking Garage and Telecom emergency generators combined	10 TONS YEARLY ON 12 MONTH ROLLING

Summary of BACT Determinations

RBLC Seach Parameters:	Small Internal Combustion Engines
Date Range:	2020-2025
Fuel:	Liquid
Process Code:	17.210
RBLC Search Date:	2/3/2025

Project	Process	Process Description	Code	App	DRAFT	NOx BACT	NOx BACT Limit	CO BACT	CO BACT Limit	VOC BACT	VOC BACT Limit	PM BACT	PM BACT Limit	PM2.5 BACT Limit	PM10 BACT Limit	GHG BACT	GHG BACT Limit
WEYERHAEUSER NR COMPANY HOLDEN WOOD PRODUCTS MILL LIVINGSTON, LA	Fire Pump, Sawmill Emergency, and Planer Mill Emergency Generator Engines	Fire Pump is 804.6 horsepower. Sawmill and Planer Mill Emergency engines are 80.5 horsepower.	LA-0366	02/03/2021 ACT	FALSE					Good Combustion Practices and Compliance with NSPS 40 CFR 60 Subpart IIII	804.6 HP						
SHINTECH LOUISIANA LLC SHINTECH PLAQUEMINE PLANT 3 IBERVILLE, LA	Emergency Diesel Fired IC Engines (EQT0454 - EQT0459)		*LA-0339	01/19/2021 ACT	TRUE	Compliance with 40 CFR 60 Subpart IIII	4 G/KW-HR NMEHC + NOX	Compliance with 40 CFR 60 Subpart IIII	3.5 G/KW-HR	Compliance with 40 CFR 60 Subpart IIII	4 G/KW-HR NMEHC + NOX					Energy efficiency measures to minimize the amount of fuel used	0
LANSING BOARD OF WATER AND LIGHT LBWL--ERICKSON STATION EATON, MI	EUFPRICE--A 315 HP diesel fueled emergency engine	A 315 HP diesel-fueled emergency engine manufactured after 2009 with a heat input of a 2.5 MMBTU/H and associated fuel oil tank. The engine powers a fire pump used for fire suppression during an emergency.	MI-0447	01/07/2021 ACT	FALSE			Good combustion practices	2.6 G/HP-H HOURLY					0.12 LB/H HOURLY	0.12 LB/H HOURLY	Low carbon fuel (pipeline quality natural gas), good combustion practices and energy efficiency measures.	20 T/YR 12-MO ROLLING TIME PERIOD
FCA US LLC MACK AVENUE ASSEMBLY PLANT WAYNE, MI	EUFIREPUMP1	A diesel0fired emergency fire pump identified as EUFIREPUMP1.	*MI-0446	10/30/2020 ACT	TRUE					0	0.1 G/B-HP-H HOURLY						
	EUFIREPUMP2	A diesel-fired emergency fire pump identified as EUFIREPUMP2.	*MI-0446	10/30/2020 ACT	TRUE					0	0.1 G/B-HP-H HOURLY						
NEMADJI TRAIL ENERGY CENTER NEMADJI TRAIL ENERGY CENTER DOUGLAS, WI	Emergency Diesel Fire Pump (P06)		WI-0300	09/01/2020 ACT	FALSE	Operation limited to 500 hours/year and shall be operated and maintained according to the manufacturerâ€™s recommendations.	3 G/HP-H	Operation limited to 500 hours/year and shall be operated and maintained according to the manufacturerâ€™s recommendations.	2.6 G/HP-H	Operation limited to 500 hours/year and operate and maintain according to the manufacturerâ€™s recommendations.	1.1 G/HP-H	Operation limited to 500 hours/year, sulfur content of diesel fuel oil fired may not exceed 15 ppm, and shall be operated and maintained according to the manufacturerâ€™s recommendations.	0.15 G/HP-H	0.15 G/HP-H	0.15 G/HP-H	Be certified by manufacturer to EPAâ€™s criteria for Tier 3 reciprocating internal combustion engines and to the 40 CFR 60, Subpart IIII emission limitations, operation limited to 500 hours/year, and operate and maintain according to the manufacturerâ€™s recommendations.	0
NUCOR NUCOR STEEL BRANDENBURG MEADE, KY	EP 11-01 - Melt Shop Emergency Generator	Diesel emergency generator used to provide emergency power supply for critical operations should the facility power supply be interrupted. This generator has a displacement of less than 30 liters per cylinder.	KY-0110	07/23/2020 ACT	FALSE	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	2.98 G/HP-HR NMHC + NOX	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	2.61 G/HP-HR	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0			0.15 G/HP-HR	0.15 G/HP-HR	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0
	EP 11-02 - Reheat Furnace Emergency Generator	Diesel emergency generator used to provide emergency power supply for critical operations should the facility power supply be interrupted. This generator has a displacement of less than 30 liters per cylinder.	KY-0110	07/23/2020 ACT	FALSE	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	2.98 G/HP-HR NMHC + NOX	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	2.61 G/HP-HR	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0			0.15 G/HP-HR	0.15 G/HP-HR	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0
	EP 11-03 - Rolling Mill Emergency Generator	Diesel emergency generator used to provide emergency power supply for critical operations should the facility power supply be interrupted. This generator has a displacement of less than 30 liters per cylinder.	KY-0110	07/23/2020 ACT	FALSE	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	2.98 G/HP-HR NMHC + NOX	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	2.61 G/HP-HR	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0			0.15 G/HP-HR	0.15 G/HP-HR	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0
	EP 11-04 - IT Emergency Generator	Diesel emergency generator used to provide emergency power supply for critical operations should the facility power supply be interrupted. This generator has a displacement of less than 30 liters per cylinder.	KY-0110	07/23/2020 ACT	FALSE	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	2.98 G/HP-HR NMHC + NOX	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	2.61 G/HP-HR	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0			0.15 G/HP-HR	0.15 G/HP-HR	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0
	EP 11-05 - Radio Tower Emergency Generator	Diesel emergency generator used to provide emergency power supply for critical operations should the facility power supply be interrupted. This generator has a displacement of less than 30 liters per cylinder.	KY-0110	07/23/2020 ACT	FALSE	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	3.5 G/HP-HR NMHC + NOX	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	3.73 G/HP-HR	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0			0.3 G/HP-HR	0.3 G/HP-HR	This EP is required to have a Good Combustion and Operating Practices (GCOP) Plan.	0
PETMIN USA INCORPORATED PETMIN USA INCORPORATED ASHTABULA, OH	Black Start Generator (P007)	Black start generator, 158 HP diesel engine	OH-0383	07/17/2020 ACT	FALSE			Tier IV engine Good combustion practices	0.0644 T/YR							Tier IV engine Good combustion practices	9.09 T/YR
WASHINGTON PARISH ENERGY CENTER LLC WASHINGTON PARISH ENERGY CENTER WASHINGTON, LA	Emergency Fire Pump Engine (EQT0021, ENG-1)	Normal Operating Rate: 157 HP, Normal Operating Time: 100 hours per year.	*LA-0370	04/27/2020 ACT	TRUE	The use of low sulfur fuels and compliance with 40 CFR 60 Subpart IIII	1.15 LB/HR HOURLY MAXIMUM	The use of low sulfur fuels and compliance with 40 CFR 60 Subpart IIII	0.4 LB/HR HOURLY MAXIMUM					0.04 LB/HR HOURLY MAXIMUM	0.04 LB/HR HOURLY MAXIMUM	Good combustion practices in order to comply with 40 CFR 60 Subpart IIII	9 TPY ANNUAL MAXIMUM
WPL- RIVERSIDE ENERGY CENTER WPL- RIVERSIDE ENERGY CENTER ROCK, WI	Diesel-Fired Fire Pump Engine (P04)		WI-0302	02/28/2020 ACT	FALSE	Only use diesel fuel oil with a sulfur content of no greater than 0.0015% by weight	3.64 LB/H	Good combustion practices	0.33 LB/H	Good combustion practices	0.26 LB/H	Good combustion practices, use diesel fuel oil with sulfur content of no greater than 0.0015% by weight	0.11 LB/H		0.11 LB/H		

APPENDIX B

BACT Cost Effectiveness (Treated Gas Compressor Drivers)

Confidential, provided under separate cover – Attachment 3

APPENDIX C

BACT Cost Effectiveness (CO_2 Compressor Drivers)

Confidential, provided under separate cover – Attachment 3

APPENDIX D

BACT Cost Effectiveness (Main Power Generator)

Confidential, provided under separate cover – Attachment 3

APPENDIX E

BACT Cost Effectiveness (Utility Heaters)

Confidential, provided under separate cover – Attachment 3

APPENDIX F

BACT Cost Effectiveness Turbine Supporting Data

Confidential, provided under separate cover – Attachment 3