NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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MAY 3 0 2023

Ms. Lisa F. Garcia
Regional Administrator
U.S. Environmental Protection Agency, Region 2
290 Broadway, 26th Floor
New York, NY 10007-1866

Dear Administrator Garcia:

On behalf of the Governor of the State of New York, I am submitting for approval by the U.S. Environmental Protection Agency (EPA) a Source-Specific State Implementation Plan Revision (SSSR) for Calpine JFK Energy Center in Jamaica, New York.

Title 6 of the New York Codes, Rules, and Regulations (NYCRR) contains several regulations that define Reasonably Available Control Technology (RACT) for certain categories of stationary sources. The Air Title V Permit for Calpine JFK Energy Center that was issued on June 28, 2022, includes conditions that establish RACT variances for NOx process emissions.

A public notice specifying that process specific RACT determinations would be submitted to EPA as a SSSR was published in the Environmental Notice Bulletin (ENB) on March 22, 2023. A public comment period occurred from March 22, 2023 to April 21, 2023. No comments were received.

The following documents, including those that were used by New York State Department of Environmental Conservation (NYSDEC) to evaluate and approve RACT emission limits, are enclosed with this proposed SSSR:

1. Source Specific State Implementation Plan Revision Calpine JFK Energy Center Permit ID: 2-6308-00096, May 2023
2. 6 NYCRR Part 227-2 Boiler NOx Reasonably Available Control Technology (RACT) Evaluation, January 2022
3. Public Notice as published in the *Environmental Notice Bulletin* on March 22, 2023.

If you have any questions or concerns, please contact Daniel Goss, Assistant Engineer, Division of Air Resources, Bureau of Air Quality Planning, SIP Planning Section at (518) 402-8396.

Sincerely,

Christopher M. LaLone, P.E.
Director, Division of Air Resources

Enclosures

c: R. Ruvo, EPA Region 2
R. Bielawa

NEW YORK STATE | Department of Environmental Conservation

Source Specific State Implementation Plan Revision

Reasonably Available Control Technology

CALPINE JFK ENERGY CENTER
PERMIT ID: 2-6308-00096/00009

MAY 2023

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Acronyms and Abbreviations

CAA	Federal Clean Air Act
DAR	DEC Division of Air Resources
DEC	New York State Department of Environmental Conservation
EPA	United State Environmental Protection Agency
NAAQS	National Ambient Air Quality Standards
NO_X	Oxides of Nitrogen
NYCRR	New York Codes, Rules, and Regulations
RACT	Reasonably Available Control Technology
SIP	State Implementation Plan
SSSR	Source Specific SIP Revision
VOCs	Volatile Organic Compounds

Introduction

The United States Environmental Protection Agency (EPA) defines Reasonably Available Control Technology (RACT) as the lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility.

Title 6 of the New York Codes, Rules, and Regulations (NYCRR) contains several regulations that define Reasonably Available Control Technology (RACT) for certain categories of stationary sources in New York. These regulations seek emissions reductions of nitrogen oxides (NO_x) and/or volatile organic compounds (VOCs) to help attain and/or maintain the 8-hour ozone National Ambient Air Quality Standards (NAAQS).

Depending upon the relevant RACT regulation, a source that is required to implement RACT must meet a presumptive RACT limit, meet an alternate limit determined from an approved technical analysis if reaching a presumptive RACT limit is technically or economically infeasible, or meet an approved case-by-case RACT limit for sources which do not have a presumptive RACT limit established in regulation. Individual source specific RACT determinations that are included in a facility's operating permit must be submitted to EPA as a revision to the New York State Implementation Plan (SIP) to satisfy the NO_x and/or VOC RACT requirements under sections 182 and 184 of the Clean Air Act (CAA).

The New York State Department of Environmental Conservation's (DEC's) DAR-20 guidance, titled "Economic and Technical Analysis for Reasonably Available Control Technology (RACT)," provides procedures for the economic and technical feasibility analysis that needs to be used to evaluate source-specific RACT determinations and to determine appropriate RACT emission limits. This analysis must also be completed at each renewal of the emission source owner's permit. The re-evaluation must contain the latest control technologies and strategies available for review and allow for an inflation-adjusted economic threshold.

Source-specific RACT Determination and RACT Analysis

The Air Title V Facility Permit for Calpine JFK Energy Center, issued on June 28, 2022, contains conditions that establish NO_x emission limits that vary from presumptive RACT limits for mid-size boilers, which is 0.08 pounds per million British thermal units pursuant to 6 NYCRR 227-2.4. On the basis of the May 15, 2017 NOx RACT and the January 24, 2022 variance analysis which are based on Air-Guide 20 "Economic and Technical analysis for Reasonably Available Control Networks" that the facility submitted, the facility was granted a variance by the Department.

The approved alternative NOx emission limit when each of the six boilers operate on natural gas (Processes BG1 & BG2) is 0.15 pounds of NOx per million Btus, and 0.25 pounds of NOx per million Btus while firing low sulfur distillate oil (Processes BD1 and BD2). In order to maintain compliance with 6 NYCRR Part 227-2, RACT requirements, emissions shall not exceed 24 tons per year, on a rolling 12-month basis, for the applicable boilers.

The technical analyses used by DEC to establish the RACT limits is included in this Source Specific SIP Revision (SSSR) as Appendix A.

Air Title V Facility Permit and Permit Review Report

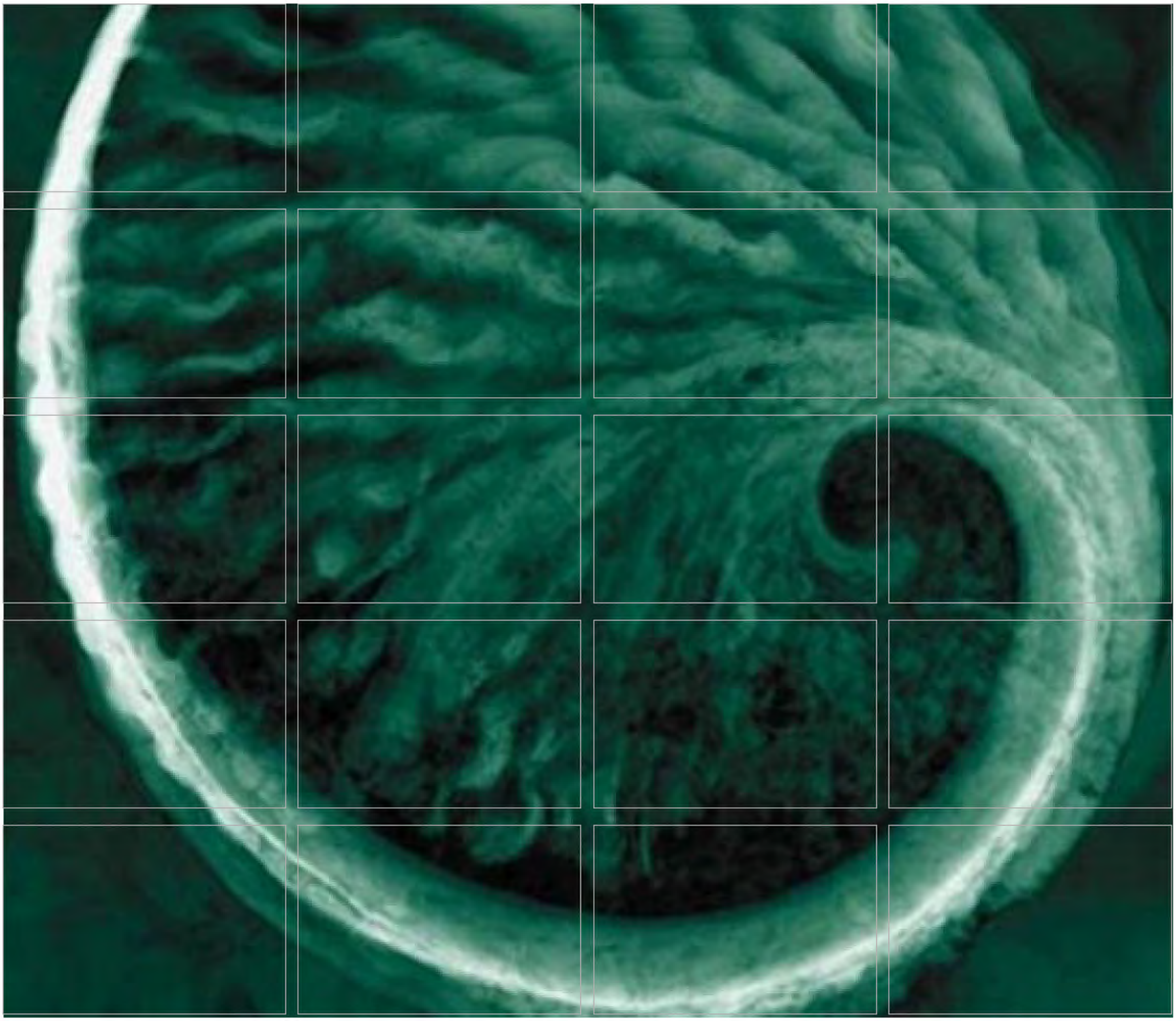
The RACT case-by-case permit conditions are included in Appendix B. The complete Air Title V Permit issued on June 28, 2022, for Calpine JFK Energy Center is available at:

PERMIT

The Permit Review Report for this facility is available at:

PRR

Appendix A: Technical Analyses



CALPINE CORPORATION

KIAC Cogeneration Plant - JFK Airport
Kennedy International Airport, Building 49
Jamaica, New York

6 NYCRR Part 227-2 Boiler NOx Reasonably Available Control Technology (RACT) Evaluation

January 2022

ERM

The world's leading sustainability consultancy

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EXECUTIVE SUMMARY

Calpine Corporation (Calpine) operates six hot water generators (HWGs or boilers) that are located at the existing Kennedy International Airport Cogeneration (KIAC) facility in Queens, New York. The six HWGs are intermittently used to produce additional hot water for the JFK Airport when the combustion turbine-based cogeneration units are not available or cannot otherwise meet the airport demand. The six HWGs range in size (heat input capacity) from 40 MMBtu/hr to 75 MMBtu/hr, and are capable of firing natural gas or distillate oil.

6 NYCRR Part 227-2 codifies the Reasonably Available Control Technology (RACT) requirements for facilities that qualify as major sources of Oxides of Nitrogen (NOx). Under the current version of this regulation, the six HWGs qualify as "mid-size boilers" that are subject to a presumptive NOx RACT emission limit of 0.08 pounds per million Btu (lb/MMBtu)[1]. Based upon emission test data, these six units cannot meet these presumptive emission limitations.

In accordance with the provisions of §227-2.5(c), this case-specific RACT demonstration has been prepared to evaluate the technical and economic feasibility of fuel switching, the use of a system averaging plan, as well as addition of any available control technologies.

Based upon this analysis, the use of low NOx burners (LNB) and Flue Gas Recirculation (FGR) are technologically feasible means to reduce NOx emissions from the six HWGs at the KIAC facility; however, these technologies are not cost-effective. It is recommended that the following emission limitations be retained in the facility's Title V permit for purposes of establishing emission limitations under 6 NYCRR 227-2.5(c) (NOx RACT):

- Total emissions of 24 tons per year (tons/yr) of NOx from the six boilers, on a rolling 12-month basis; and

[1] Per 6 NYCRR 200.1(cm), a "boiler" is defined as a device that combusts fossil fuel or wood and produces steam or heats water or any other heat transfer medium. Hence, the HWGs are considered boilers because they combust a fossil fuel (natural gas) and heat water. Per 6 NYCRR 227-2.2(b)(4), a "mid-size boiler" is defined as a boiler with a maximum heat input capacity greater than 25 million Btu per hour and equal to or less than 100 million Btu per hour.

- Maximum NOx emission rate of 0.15 lb/MMBtu for each of the six boilers when firing natural gas, and 0.25 lb/MMBtu when firing distillate oil.

1.0 REGULATORY BACKGROUND

Combustion installations that meet specific size criteria and are located at a facility that qualifies as a major source of emissions of Oxides of Nitrogen (NOx) are subject to the Reasonably Available Control Technology (RACT) of 6 NYCRR Part 227-2 (Part 227-2). Under this regulation, the source owner must either comply with the "presumptive RACT limits" or obtain a case-by-case determination from the New York State Department of Environmental Conservation (NYSDEC).

Presumptive RACT limits are category-wide requirements that are based on capabilities that are general to an emission source category. According to Part 227-2, there are four different presumptive RACT compliance options that are directly available to the source owner and do not require revision of the State Implementation Plan (SIP) for New York State. These four options are:

- Compliance with the applicable presumptive RACT emission limit prescribed in §227-2.4;
- Implementation of fuel switching (i.e., burning a cleaner fuel between May 1st and September 30th of each year);
- Use of a system averaging plan; or
- Commitment to shut down the emission source.

The regulation recognizes that the "presumptive RACT limits may not be attainable at every individual emission source". For those sources where the owner/operator can demonstrate that presumptive RACT limit of §227-2.4 is not technically or economically feasible, §227-2.5(c) states that the owner or operator may request that the NYSDEC set a higher source-specific emission limit. The request must be accompanied by a RACT analysis that considers the technological and economic circumstances of the individual emission source. Per §227-2.5(c), the analysis must include, at a minimum, an evaluation of the use of fuel switching, the use of a system averaging plan, and implementation of any available control technologies.

Based on our November 30, 2021 discussions with NYSDEC's Mike Jennings, ERM understands that the NYSDEC's current cost-effectiveness threshold is $6,000 per ton of NOx reduced, taking into account escalation and rounding up to the nearest $1,000.

2.0 FACILITY DESCRIPTION

Calpine Corporation (Calpine) operates the Kennedy International Airport Cogeneration (KIAC) facility that is located in the middle of the central terminal area of the JFK International Airport, in Building No. 49. The facility supplies electricity to the airport and the Consolidated Edison (Con Ed) Power Distribution Grid. The facility also supplies steam to the airport's central heating and refrigeration plant. The cogeneration plant consists of two identical gas combustion turbines, which are permitted to fire both natural gas and distillate oil.

The facility also includes six hot water generators (i.e., “boilers”) that are intermittently used to produce additional hot water for the airport. These boilers are operated by Calpine, however, are owned by the Port Authority of New York/New Jersey (PANY/NJ). Permit conditions currently limit the total NOx emissions from all six boilers to 24 tons/yr.

3.0 DESCRIPTION OF BOILERS

3.1 DESIGN OF AFFECTED BOILERS

The six boilers are single burner, water tube package boilers. Table 1 provides a summary of some pertinent information regarding each of the boilers. As Table 1 indicates, Boilers #1 and #4–#6 are equipped with oxygen trim systems. Boiler stack temperatures are in the range of 395 to 485 °F.

Table 1: Summary of Pertinent Design Information for Six Boilers

Emission Source ID	KIAC Description	Manufacturer and Model	Nameplate Heat Input Capacity (MMBtu/hr)	Start-up Date	O2 Trim System?	Emission Point	Flue Gas Temp (°F)
HWG01	Boiler #1	IBW Model TJW-C-40	40	1987	Yes	00015	395
HWG02	Boiler #2	Lamont Model LFW-20	40	1956	No	00016	485
HWG03	Boiler #3	Lamont Model LFW-20	40	1956	No	00017	485
HWG04	Boiler #4	IBW Model TJW-C-75	75	1987	Yes	00018	395
HWG05	Boiler #5	Lamont Model LFW-30	60	1961	Yes	00019	485
HWG06	Boiler #6	Lamont Model LFW-30	60	1961	Yes	00020	485

3.2 PART 227-2 PRESUMPTIVE NOX EMISSION LIMITS APPLICABLE TO AFFECTED BOILERS

Based upon the nameplate capacity, each of the six boilers meets the definition of a "mid-size boiler" under Part 227-2. For mid-size boilers that fire distillate oil/gas, the presumptive NOx RACT emission limit is 0.08 lb/MMBtu.

In February 2020, Calpine conducted NOx emissions testing for four of the boilers (HWG01, HWG02, HWG04, and HWG06) as representative of all six boilers, as prescribed in the Title V permit. Testing was conducted while firing natural gas and distillate oil. A copy of this test report was provided to the NYSDEC in March 2020.

Based upon the 2020 emission test results summarized in Table 2 below, with the exception of Boiler #2 when firing natural gas, NOx emissions from the boilers exceed the presumptive RACT emission limit of 0.08 lb/MMBtu when firing either natural gas or distillate oil. At 0.075 lb/MMBtu, Boiler #2's NOx emissions were only slightly below 0.08 lb/MMBtu when firing natural gas, with little compliance margin, especially given that 2017 emission testing on Boiler #2 showed NOx emissions of 0.08 lb/MMBtu. With the exception of Boiler #6, NOx emissions when firing distillate oil were higher than when firing natural gas. There does not appear to be a clear, consistent difference between the units that are and are not equipped with an oxygen trim system.

Table 2: Summary of NOx Emissions from Six Boilers
(NOx Emission Test Data for Testing Performed February 24–28, 2020)

Boiler Information				NOx Emission Rate (lb/MMBtu)	
Emission Source ID	**KIAC Description**	**Emission Source Description**	**Nameplate Heat Input Capacity (MMBtu/hr)**	**Natural Gas**	**Distillate Oil**
HWG01	Boiler #1 [2]	IBW Model TJW-C-40	40	0.126	0.145
HWG02	Boiler #2	Lamont Model LFW-20	40	0.075	0.128
HWG03	Boiler #3	Lamont Model LFW-20	40	*Boiler Not Tested[1]*	*(Same as HWG02)[1]*
HWG04	Boiler #4 [2]	IBW Model TJW-C-75	75	0.100	0.225
HWG05	Boiler #5 [2]	Lamont Model LFW-30	60	*Boiler Not Tested[1]*	*(Same as HWG06)[1]*
HWG06	Boiler #6 [2]	Lamont Model LFW-30	60	0.099	0.096
			AVERAGE	0.10	0.15
			MAXIMUM	0.13	0.23
			RECOMMENDED EMISSION LIMIT	**0.15[3]**	**0.25[3]**

[1] NOx emission testing was not performed on Boilers #3 and #5, because they are of the same equipment manufacturer, make and model number as Boilers #2 and #6, respectively. Therefore, NOx emissions from Boilers #2 and #6 are considered representative of, and their NOx emissions are presumed to be the same as, Boilers #3 and #5, respectively.

[2] Boiler is equipped with an oxygen trim system.

[3] Current Title V permit limits.

In accordance with the provisions of §227-2.5(c), a higher source-specific NOx emission limitation may be requested if it can be demonstrated that the presumptive RACT emission limit of 0.08 lb/MMBtu is not technically and/or economically feasible. This document is intended to provide the required case-by-case demonstration.

3.3 OPERATIONAL USE OF BOILERS

The six boilers at the KIAC facility are intermittently used (primarily during the winter months) to produce additional hot water for the airport. Boilers #1 and #4 tend to be used more frequently, because they are newer.

Table 3 provides a summary of the usage of the six boilers for calendar years 2006–2020. This data shows that the use of these boilers is quite limited in terms of their maximum operations, and highly variable from year to year. There are no plans to increase the utilization of these boilers beyond the airport's demand for hot water when the cogeneration units are not available or cannot otherwise meet the airport demand. However, there are plans to replace these boilers with new, more efficient units that would meet the presumptive 0.08 lb/MMBtu NOx RACT limit. The schedule for the replacement of the boilers is tied to the larger JFK Airport expansion project and is therefore uncertain.

Table 3: Summary of Historical Usage for Six Boilers

YEAR	Total Heat Input (MMBtu/yr)	Total No. of Equivalent Hours Firing Fuel (hr/yr)*	No. of Equivalent Hours Firing Natural Gas (hr/yr)*	No. of Equivalent Hours Firing Distillate Oil (hr/yr)*
2006	1,395	4.4	4.4	0
2007	46,708	155.7	148.3	7.4
2008	93,818	297.8	297.8	0
2009	32,546	140.46	103.32	37.14
2010	3,959	12.7	12.6	0.1
2011	19,364	61.6	61.5	0.1
2012	2,785	10.27	8.84	1.43
2013	8,695	50.7	27.6	23.1
2014	6,731	102.33	21.37	80.97
2015	4,737	15.0	15.0	0
2016	9,900	31.4	31.4	0
2017	17,727	56.3	53.7	2.6
2018	11,659	37.0	34.3	2.7
2019	40,784	129.47	129.44	0.03
2020	76,178	241.8	238.2	3.6

***The calculations for No. of Equivalent Hours assume that all six boilers were operating at full load.**

4.0 RACT ANALYSIS

In order to comply with the case-specific NOx RACT provisions of 6 NYCRR 227-2.5(c), this technical and economic analysis must consider the following:

- Compliance with the applicable presumptive RACT emission limit prescribed in §227-2.4 (i.e., a NOx emission limit of 0.08 pounds per MMBtu for mid-size boilers that fire distillate oil/gas);
- Implementation of fuel switching;
- Use of a system averaging plan; and
- Implementation of control strategy or equipment modifications.

The following subsections present a discussion of each option.

4.1 COMPLIANCE WITH PRESUMPTIVE RACT EMISSION LIMIT

For a mid-size boiler that fires distillate oil/gas, §227-2.4(c)(ii) prescribes a presumptive NOx RACT emission limit of 0.08 lb/MMBtu. As shown by the 2020 NOx test data in Table 2 above, these boilers have NOx emission rates ranging from 0.075 to 0.126 when firing natural gas, and 0.096 to 0.225 lb/MMBtu when firing distillate oil. The 2020 test data is generally consistent with the prior (2017) test data, which showed NOx emission rates ranging from 0.080 to 0.124 when firing natural gas, and 0.135 to 0.189 lb/MMBtu when firing distillate oil. Because the NOx emission rates consistently exceed the NOx RACT limit of 0.08 lb/MMBtu, the boilers cannot comply with the presumptive NOx RACT limit. For this reason, other compliance options are considered in this case-by-case RACT evaluation.

4.2 IMPLEMENTATION OF A FUEL SWITCHING APPROACH

The six boilers at KIAC are currently permitted to burn both natural gas and distillate oil. As shown by the NOx test data in Table 2, the NOx emissions when firing distillate oil are generally higher than when firing natural gas. The preponderance of fuel fired in the boilers is natural gas. Over the 15-year period of 2006-2020, oil firing represented less than 12% of total fuel fired in the boilers. It is important to note that the majority of the NOx formed during the combustion of natural gas and distillate oil is attributable to thermal NOx, rather than the nitrogen content of the fuel itself.

On a heat input basis (MMBtu), less than 1.6% of the total annual fuel usage occurred during the months of May–September. Only 3.4% of the total fuel used during these months was distillate oil.

Regarding fuel switching, §227-2.5(a) indicates that "the owner or operator…may commit to burning a cleaner fuel between May 1st and September 30th of each year". Because nearly 97% of the fuel used during this 5-month period was natural gas, and natural gas is the preferred fuel for low NOx emissions, the NOx reductions resulting from the use of 100% natural gas during these months are minimal.

4.3 USE OF SYSTEM AVERAGING PLAN

The owner or operator may apply to have the emission source included in a system averaging plan. The plan would employ a weighted average permissible emission rate that is calculated based on total emissions from a defined set of emission sources. The sources that are averaged together would need to comply with the most stringent emission rate.

The combustion turbines at the KIAC facility operate under a case-specific RACT issued pursuant to §227-2.4(e)(3). Under the current Title V permit, these combustion turbines are required to utilize continuously monitor the NOx emissions to ensure that NOx remains below specified concentration limitations (ppm of NOx). The six boilers will not be subject to continuous monitoring requirements; the emission limitation will be specified in terms of the heat input quantity (i.e., lb/ MMBtu) in order to be consistent with the standard. These differences in monitoring requirements, as well as emission limitations, will present a practical obstacle to the implementation of a system averaging approach.

Subpart 227-2 also provides for system averaging with other facilities. Since every owner or operator that participates in the system averaging plan is liable for any and all violations of 6 NYCRR 227-2, this compliance approach is not advisable.

Calpine owns and operate two other facilities in New York that are subject to Subpart 227-2; however, system averaging is not a feasible approach. At Calpine's Bethpage facility (Permit ID 1-2824-00947/00004) and SUNY Stony Brook facility (Permit ID 1-4722-02441/00003), all affected units are combustion turbines that operate under case-specific RACT limits issued pursuant to §227-2.4(e)(3).

As discussed in section 4.1 above, NOx emissions testing on the six boilers bears out that they cannot meet the presumptive NOx RACT limit of 0.08 lb/MMBtu for either natural gas or distillate oil firing. This section will review the feasibility of reducing NOx emissions through equipment modifications and/or the installation of emission control technology.

Formation of NOx During Fuel Combustion

In a combustion process, there are three processes that result in NOx formation:

- thermal NOx (which is driven by furnace zone factors described below);
- prompt NOx (where nitrogen in the combustion air reacts with hydrocarbon radicals formed during fuel combustion); and
- fuel NOx (where nitrogen in the fuel reacts with the combustion air).

The majority of NOx formed during the combustion of natural or distillate oil is attributable to thermal NOx. Although the mechanisms for NOx formation are different, both thermal and fuel NOx are promoted by rapid mixing of fuel and combustion air. The primary combustion modification controls for both thermal and fuel NOx typically address the following:

- peak flame temperature;
- gas residence time in the flame zone; or
- oxygen concentration in the flame zone.

The nitrogen content of natural gas or light distillate fuels is generally negligible. Natural gas is the preferred fuel for low NOx emissions, therefore, alternatives to natural gas will not be considered.

Modifications to Combustion Process

A review of the RACT/BACT/LAER Clearinghouse database for most commonly used control devices for NOx emissions from gas boilers with comparable heat inputs was performed. The results indicated that Low NOx Burners (LNBs) were typically used to satisfy Best Available Control Technology (BACT) requirements.

Alternative technologies for water tube boilers firing natural gas or distillate oil were identified through the USEPA's "Alternative Control Techniques Document (ACT) - NOx Emissions from Industrial/

Commercial/ Institutional (ICI) Boilers (EPA-453-94-022)". Table 2-4 of the ACT lists the following technologies as the control techniques for combustion modification for water tube boilers.

Table 4: Summary of NOx Reduction Technologies Identified in USEPA's "Alternative Control Techniques Document (ACT) - NOx Emissions from Industrial/ Commercial/ Institutional (ICI) Boilers (EPA-453-94-022)"

ICI Boiler and Fuel	NOx Control	Percent NOx Reduction	Controlled NOx Level lb/MMBtu	Comments
Natural gas-fired	SCA[1]	17-46	0.06-0.24	Techniques includes BOOS[2] and OFA[3]. Many LNB include SCA technique.
	LNB	39-71	0.03-0.17	Popular technique. Many designs and vendors available.
	FGR	53-74	0.02-0.10	Popular technique with LNB
	LNB+FGR	55-84	0.02-0.09	Most popular technique for clean fuels.
	LNB+SCA	N.A.	0.10-0.20	Some LNB designs include internal staging.
Distillate oil-fired	LNB	N.A.	0.08-0.33	Low-excess air burner designs.
	FGR	20-68	0.04-0.15	Widely used technique because of effectiveness.
	SCA	30	0.09-0.12	Limited applications except BOOS, Bias and selected OFA for large watertube.
	LNB+FGR	N.A.	0.03-0.13	Most common technique. Many LNB include FGR.
	LNB+SCA	N.A.	0.20	SCA also included in many LNB designs.

[1] Staged Combustion Air
[2] Burners Out Of Service
[3] Overfire Air

Consistent with Calpine's 2017 NOx RACT evaluation for these boilers, which was based upon ERM's discussion with NYSDEC personnel from the Central Office, we understand that this evaluation only needs to include Low NOx Burners (LNB) and Flue Gas Recirculation (FGR).

<u>Low NOx Burners</u>

A low NOx Burner (LNB) is designed to control the air/fuel mixing process in order to reduce the peak combustion temperature in natural gas boilers. The design of an LNB stages (and thereby slows down) the combustion process. By modifying the flame structure, the LNB reduces the peak temperature and lowering the amount of oxygen available in the hottest part of the flame, thereby reducing the formation of thermal NOx.

USEPA's "ACT" document for ICI Boilers states that LNBs can result in emission reductions of 39-71% for natural gas-fired boilers. (Data for distillate oil-fired boilers is not available). Therefore, LNBs represent a technically feasible NOx emission control technology for the six boilers at the KIAC facility.

Flue Gas Recirculation

In an FGR system, a portion of the flue gas exiting the process is redirected back into the furnace. FGR will reduce NOx formation by promoting additional mixing of the combustion gases with additional combustion air. This mixing will reduce the available concentration of oxygen to the combustion process, as well as act as a heat sink to lower the peak flame temperature and residence time at peak flame temperature. FGR systems can be used in combination with LNB by integrating a FGR component to the LNB design. Therefore, FGR is a technically feasible NOx emission control technology.

Installation of Emission Controls

Based upon ERM's discussion with NYSDEC personnel from the Central Office, we understand that this evaluation only needs to include Low NOx Burners (LNB) and Flue Gas Recirculation (FGR).

Economic Analysis

Table 2-7 of the EPA "ACT" document indicates that LNBs are the most cost-effective NOx reduction technology for single burner water tube boilers. Attachment A provides a vendor quote for the installation of LNB's with 4% FGR on the six boilers. Although the vendor quote dates to November 2005, the fundamental componentry and performance of the LNB and FGR control technologies remain the same. Further, it is our understanding that hardware costs have increased in recent years, so the 2005 estimates are very conservative. For this analysis, the vendor cost estimates were escalated for inflation by using most current available data (December 2021) on www.bls.gov/inflation_calculator.htm. As seen from this quote, the cost to implement LNB-FGR varies by boiler. Boiler #4 requires the least cost expenditure, while Boiler #2 will requires the greatest expenditure. This quote will serve as the basis for a cost-effectiveness evaluation for LNB-FGR, as well as LNB only.

New York State Air Guide 20 ["DAR-20: Economic and Technical Analysis for Reasonably Available Control Technology (RACT) Networks"] requires that the RACT evaluation be calculated based upon *potential* (rather than *actual*) emissions of NOx. The total NOx emissions from the six boilers are limited to 24 tons/yr through a federally-enforceable permit condition driven from 6 NYCRR 231-2. This emission limitation (applied to a *single* boiler) will be used to define the *potential* NOx emissions for each boiler in the cost-effectiveness evaluation because, theoretically, a single boiler could emit 24 tons/yr of NOx. By comparison, actual NOx emissions from all six boilers over the 15-year period from 2006–2020 averaged about 1.5 tons/yr, with all 15 years below 4.7 tons/yr.

To further simplify the economic evaluation, the cost-effectiveness evaluation will be performed for Boiler #4 only. This is because Boiler #4 requires the least expenditure to implement LNB technology, and therefore, evaluations for all other boilers (using the same potential emission cap of 24 tons/yr) would result in higher costs per ton of NOx reduced. If the NOx technology is not cost-effective for Boiler #4, it will not be cost-effective for any of the other boilers.

Chapter 6 of the ACT contains the costing methodology used for this costing analysis. As discussed in section 6.1 of the document;

> *"Costs of retrofit NOx controls for boilers can be divided into two major cost categories – capital investment costs and annual operations and maintenance costs. Capital costs are the total investment necessary to purchase, construct, and make operational a control system. O&M costs are the total annual costs necessary to operate and maintain the control system, above what was required to operate the pre-retrofit boiler without NOx control."*

The cost-effectiveness evaluation for LNB-FGR on Boiler #4 is provided in Attachment B-2, while a similar evaluation for LNB only on Boiler #4 is provided in Attachment B-3. These cost-effectiveness calculations are consistent with DAR-20, as well as USEPA's draft New Source Review Workshop Manual guidance and other standardized factored cost estimating techniques. Among the calculation assumptions are an Equipment Life of 10 years and an Interest Rate of 7%. As described above in Section 1.0, based on our recent discussion with NYSDEC's Mike Jennings, ERM understands that the NYSDEC's current cost-effectiveness threshold is $6,000 per ton of NOx reduced.

5.0 *CONCLUSION*

The use of low NOx burners (LNB) and Flue Gas Recirculation (FGR) are technologically feasible means to reduce NOx emissions from the six boilers at the KIAC facility. However, these technologies are not currently cost-effective. As shown by Table 5, the calculated cost-effectiveness (calculated based upon potential emissions of NOx for Boiler #4) exceeds the threshold of $6,000/ton of NOx reduced for both LNB-FGR and LNB only; therefore these two technologies are not cost-effective for Boiler #4. Because Boiler #4 has the lowest cost to implement these technologies, and all other boilers would have the same expected NOx reductions, this analysis demonstrates that these technologies are not cost-effective for any of the six boilers.

NOTE: If this analysis were based upon the maximum *actual* NOx emissions, and the emissions from all six boilers occurred via Boiler #4 alone, the cost-effectiveness values would be at least five times higher than the values shown in Table 5.

Table 5: Summary of NOx RACT Economic Evaluation for Boiler #4

Boiler	NOx Control	Cost Effectiveness ($/ ton of NOx reduced)	Current Cost Effectiveness Threshold ($/ ton of NOx reduced)	Conclusions
#4	LNB-FGR	$7,976	$6,000	Technology is not cost-effective.
	LNB Only	$8,290		Technology is not cost-effective.

Proposal To:

Calpine

Subject:

JFK Airport, NY
Coen Turnkey Low NOx Retrofit
Units #1 - 6

Equipment:

(6) Delta NOx Burner Packages with Fyr-Logix BMS Installation

From: Brett Barnes
Proposal: 02-70-0570, Rev. A.6
Date: November 9, 2005

COEN
Clean combustion. Powerful results.

November 9, 2005

Calpine
1200 17th Street
Suite 770
Denver, CO 80202

Attention: Mr. Bill Stecker

Reference: JFK Airport, NY
Low NOx Retrofit
Units #1 - 6

Proposal: 02-70-0570, Rev. A.6

Dear Mr. Stecker:

Rev. A.1: Revised base offering.
Rev. A.2: Fixed progress payments. Added price option to remove windboxes (assuming no asbestos).
Rev. A.3: Updated pricing.
Rev. A.4: Updated pricing.
Rev. A.5: Modified progress payments.
Rev. A.6: Updated pricing. Changed to Fyr-Logix BMS.

Coen is pleased to provide this proposed solution to reduce NOx emissions on existing six HTHW generators, Unit #1 through Unit #6. Per the jobsite survey and meeting on September 17, 2002, existing units need to reduce NOx emissions by at least 70% from current permit levels on natural gas. This works out to a 35 ppm NOx requirement (current permit level is 0.14 lbs/mmbtu or 117 ppm). NOx levels firing #2 oil will be based on using the same Flue Gas Recirculation (FGR) rates as set up on natural gas.

Coen's Delta NOx burner is proposed which only requires 4% FGR for 35 ppm NOx. The Delta NOx burner design is simple yet rugged with no moving parts. The low NOx design features fuel staging using two fuel zones (outer and inner) which targets lower gas NOx emissions.

Coen BMS panels and scanners are proposed for all the units. Coen's Fyr-Logix utilizes an Allen Bradley Micor-Logix 1500 to perform all programming, timing, and switching functions. The BMS meets current NFPA 85 standards.

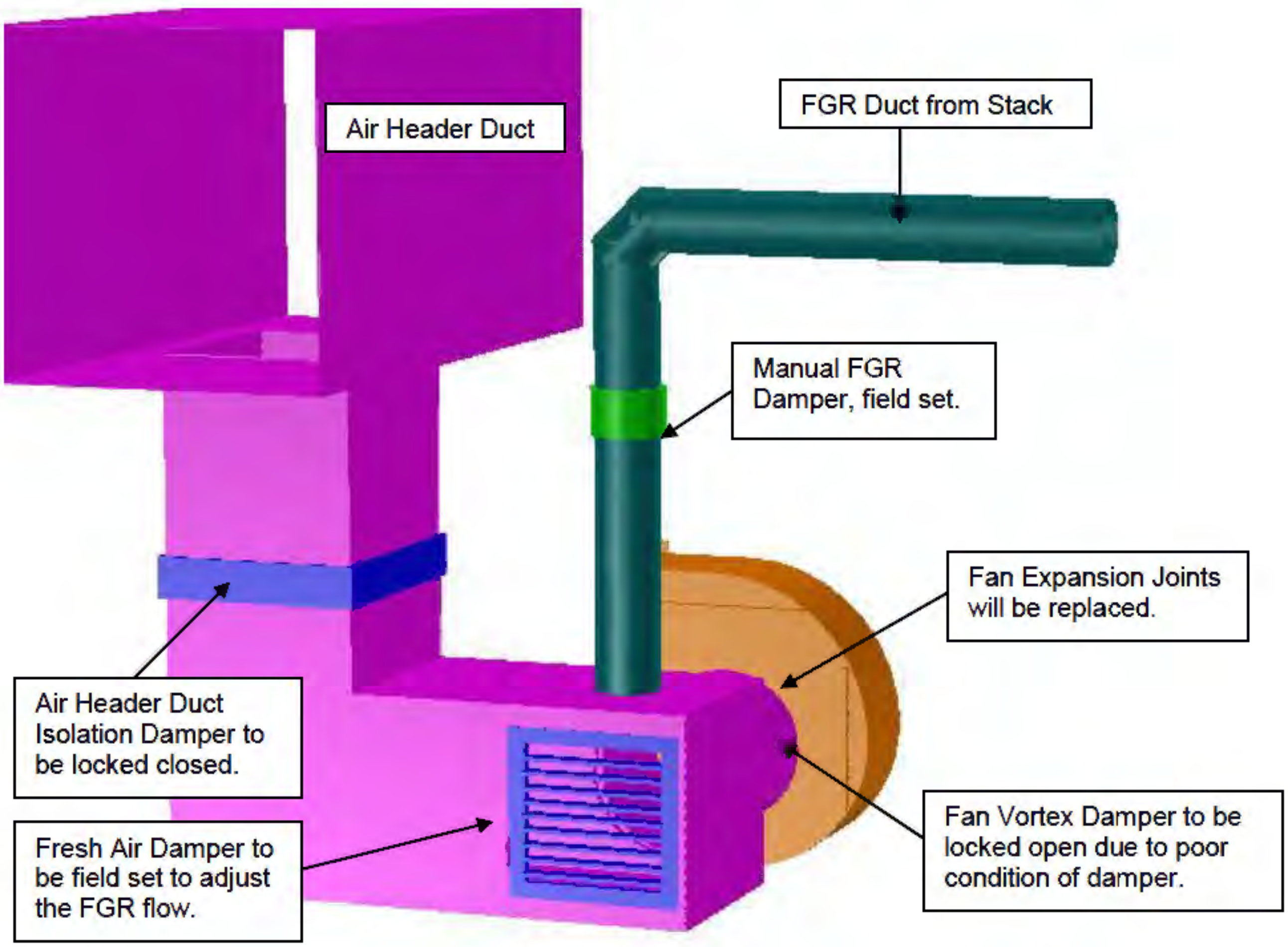
The BMS interface is through lights and buttons mounted on panel (see picture at left). A digitial display is included which shows First Out and Subsequent trips and alarms. For more details, please see Equipment Description section of this proposal.

Coen DSF-2000-SB scanners are proposed which is Coen's latest design in scanner technology. The scanner uses a solid state detector to scan in either UV or IR using the flame wavelengths. The scanner is reliable and requires low maintenance.

Fans and FGR:

Fan curves were received for Units #1/4 and were not available for the other units. Per given fan curves, these existing fans are large enough to reuse with the given derate and added FGR (Units #1/4). Since curves weren't available for the other units, Coen will supply new fans. The fans will be mounted on top of burner per our standard design (this is for Units #2/3 and #5/6).

For **Units #1/4**, the FGR will be induced by creating a negative pressure (about –1"w.c.) in the inlet duct going to fan. This will be accomplished by isolating the fan air ducts from the main air header duct and using the fresh air dampers on the inlet ducts to create a restriction. The restriction will be field set by adjusting the damper open or closed to set the FGR flow. The fan vortex damper (IVC) will be locked open since the existing dampers have backlash and so are not in suitable condition to give repeatable air flow conditions. Also, existing fan expansion joints will be replaced (as required) since they are in bad condition.

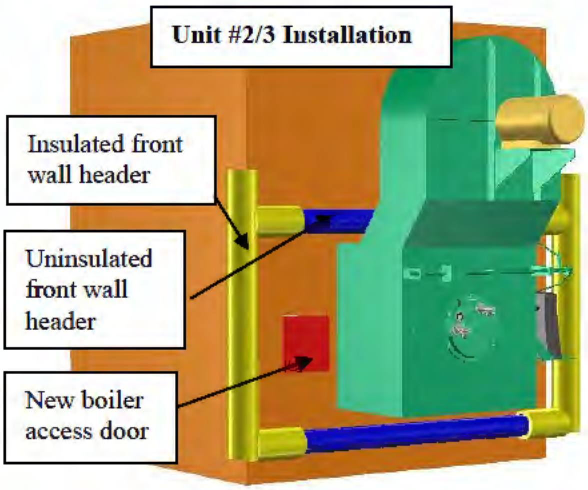


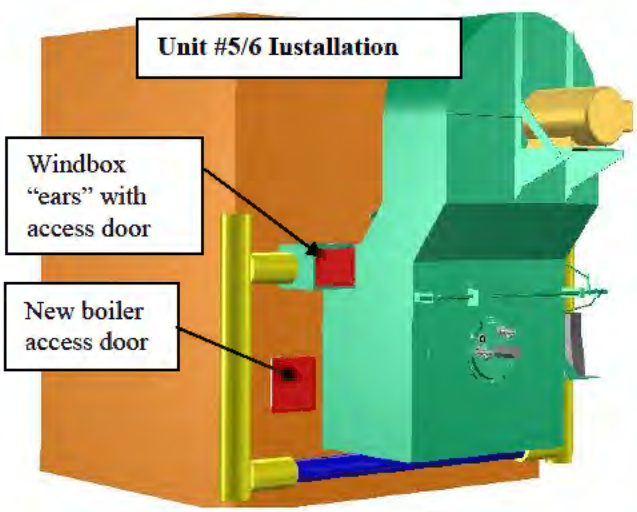
For Units #2/3 and #5/6, the FGR will be induced by placing the FGR duct right to the inlet of the FD fan (see pictures at end of quote).

Based on the fan curves for Unit #1 and #4 (Northern Blower fans), a maximum of about 5% FGR can be induced based on 100°F combustion air temperature and 50% relative humity (assume this would be maximum air temperature). On a colder day (say outside = 40°F, so combustion air is about 70°F above boilers), 10% FGR is possible which would reduce NOx down to 28 ppm or so. However, an adjustable FGR rate would require extra control elements (actuator on fresh air damper with position switches and an actuator on the FGR damper) which would add to project costs. And the NOx guarantee would still have to be based on worst case scenerio which is the 100°F combustion air temperature. So having adjustable FGR really wouldn't add value to the project. Please advise if this thinking is incorrect and we can provide adder for adjustable FGR rate.

Installations:

Units #1 and #4 have single Coen burners and so existing windboxes can be reused and retrofitted with new Delta NOx burners.





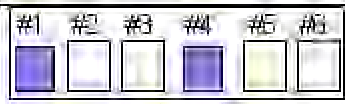
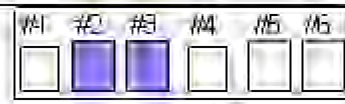
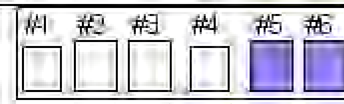
Units #2/3 and Units #5/6 have dual Todd burners with shallow windboxes. Coen proposes to replace these dual burners with single burner packaged units with all new fuel piping and windboxes. Switching from dual to single burners will reduce maintenance costs and improve reliability. The new, single burner windboxes will still be shallow enough to remove the oil gun without hitting the panel or wall.

As shown at left, the burners on Units #2/3 can be fit in between the front wall headers. New boiler access door will be installed since access into furnace is currently through the two Todd burners.

Units #5/6 installation is also shown at left. In this case, the windbox will have to cover the upper front wall header. The windbox will be designed to give access to the header for periodic tube rolling. The windbox will cover the whole upper front wall header to existing insulation using "ears". An access door wil be mounted on each "ear". Another access door will be designed on top of windbox (see below).

Coen's "MVI" guns are quoted which use 40% atomizing air flow than the "MV" guns which are existing on Units #1 and #4. Also, burners on Units #1 and #4 have auxiliary oil gun arrangement. New burners will have single oil gun arrangement since fuel oil has been switched to #2 oil and gun cleaning is not required as often.

Below is a table summarizing scope of supply in base proposal for each unit:

	 Units #1/4	 Units #2/3	 Units #5/6
Included in this proposal:	1. Delta NOx burner 2. Reuse windbox 3. Reuse fan 4. Gas pilot 5. Pre-cast throat piece 6. Main oil gun 7. Spare oil gun 8. Reuse all piping except: Unit #1 supply new gas SSO and oil SSO; Unit #2 supply loose Maxon VCS switches. 9. BMS panel 10. (2) Coen DSF-2000-SB scanners 11. Reuse limit switches 12. Gas spool with extra gas 'AC' valve. 13. Burner mounting plate for front of windbox. 14. Installation including: a. FGR duct installation b. Rewire all limits and valves for new BMS 15. Startup service	1. Delta NOx burner 2. New windbox, damper, and fan 3. Gas pilot 4. Pre-cast throat piece 5. Main oil gun 6. Spare oil gun 7. New gas, oil, atomzing air, pilot piping 8. BMS panel 9. (2) Coen DSF-2000-SB scanners 10. New fuel limit switches 11. New metering combustion controls 12. Installation including: a. New boiler front wall b. Boiler access door c. FGR duct installation d. New combustion controls 13. Startup service	1. Delta NOx burner 2. New windbox, damper, and fan 3. Gas pilot 4. Tile template 5. Main oil gun 6. Spare oil gun 7. New gas, oil, atomzing air, pilot piping 8. BMS panel 9. (2) Coen DSF-2000-SB scanners 10. New fuel limit switches 11. Installation including: a. New boiler front wall b. Boiler access door c. FGR duct installation d. Burner throat e. New motor starters 12. Startup service

Not included in this proposal	1. Combustion controls (will reuse existing) 2. Jackshaft power units (will reuse existing) 3. Re-calibrate existing transmitters and final control elements before startup.	**1. Abestos abatement. This also means Coen cannot remove existing windboxes. Demo of existing windboxes is by others.** 2. High/low expansion tank level switches (will reuse existing). 3. Will reuse all water side transmitters and switches for controls. 4. Fire safety switches (will reuse existing).	**1. Abestos abatement. This also means Coen cannot remove existing windboxes. Demo of existing windboxes is by others.** 2. Combustion controls (will reuse existing) 3. High/low expansion tank level switches (will reuse existing). 5. Will reuse all water side switches. 4. Fire safety switches (will reuse existing). 5. Jackshaft power units (will move power units from existing FD fans) 6. Re-calibrate existing transmitters and final control elements before startup.

I. Design Conditions

Per our field survey and our files, here is tabulated data on existing generators. Furnace pressure for Units #2/3 is still unknown. Hopefully, this will be resolved with the setting data that exists at the plant. Also, fan curves for Units #2/3 and Units #5/6 are not available. A field test may be required to determine maximum fan static available.

		Unit #1	Unit #2/3	Unit #4	Unit #5/6
Number of units:		1	2	1	2
Boiler manufacturer:		IBW	IBW	IBW	IBW
Boiler designation:		TJW-C-40	LFW-20	TJW-C-75	LFW-30
Original (mmbtu/hr)	Heat output:	40	40	75	60
	Heat input:	51.3	51.3	96.2	76.9
New (mmbtu/hr)	Heat output:	31.2	31.2	58.5	53
	Heat input:	40	40	75	68
Furnace dimensions (feet) Height:		7.66	9.5	9.9	10.2
Width:		7.55	7.6	9.5	8.5
Length:		12.9	11.7	15.8	14.7
Furnace pressure (based on new design heat input, no FGR, "w.c.):		1.5	1.0 (estimated)	3.3	0.7
Flue gas temperature (°F):		395	485	395	485
Existing burners:		Coen DAZ-24	(2) Todd	Coen DAZ-28	(2) Todd
Existing windbox dimensions (inches) Width:		48.0	~60.0	66.0	~68.0
Depth:		34.2	19.0	42.3	14.0
Burner ℄ to ℄ (inches):		NA	30.0	NA	34.0
Distance from boiler front to wall (inches):		>125	125	>125	120 Unit #6: 102" to MCC

Oil gun pull out length from boiler front required with new Delta NOx burner (inches):	90	85	106	95
Existing fan nameplate data:	Northern Blower S/N: A36295-2 Size: 3000 "A" Des: 5903	American Blower S/N: 270-117 Size: 270-HS	Northern Blower S/N: A36295-1 Size: 3300 "A" Des: 5903	Chicago S/N: 28800-1 Size: 27
Fan curve available?	Yes	No	Yes	No
Existing motor:	Siemens 25 hp	General Electric 20 hp	Siemens 40 hp	Unit #5: Electro-Dynamic, 25 hp Unit #6: Baldor 25 hp
New fan supplied?	No	Yes	No	Yes
New fan motor size (based on supply Coen integral fan):	NA	20 hp	NA	30 hp
Combustion air header isolation damper?	Yes	Yes (actuator disconnected)	Yes	No
Fresh air damper existing?	Yes	Yes (actuator disconnected)	Yes	No (screen inlet only)
Windbox damper existing?	Yes	No	Yes	No
BMS New?	Yes	Yes	Yes	Yes
BMS Mounted?	On burner front (same as existing)	Will go in same spot as exsting (on far wall)	On burner front (same as existing)	Unit #5: Will go on far wall but moved left or right to give more clearance for oil gun pull out. Unit #6: Will go in same spot as exsting (on far wall)

<u>General Design Data:</u>

Boiler water temperature inlet (F) 170
Boiler water temperature outlet (F) 300
Boiler efficiency (natural gas/#2 oil, %) 78/80
Combustion air temperature (F) 70-100
Plant elevation (FASL) 100
Instrument air supply (clean, dry, and oil-free) .... 90-100 psig
Fan electrical characteristics (v/hz/ph) 460/60/3
Panel electrical characteristics (v/hz/ph) 120/60/1
NEMA class rating .... Nema 1
Code requirements .... NFPA 85
Piping requirements .... Coen Standard
Location .... Indoor
Combustion air pre-heat .... No
Economizer used .... No

Burner Performance

All units will be replaced with single Delta NOx burners. 4% FGR is required to meet 35 ppm NOx firing natural gas. Oil NOx is based on 4% FGR and air atomization (atomizing with air instead of steam adds about 10% to NOx). Note, need confirmation of #2 oil nitrogen content. Have assumed 0.02% for the NOx guarantees.

	Unit #1	Unit #2/3	Unit #4	Unit #5/6
Number of proposed burners per boiler:	1	1	1	1
Proposed windbox:	Reuse	735	Reuse	755
Proposed burner:	Delta NOx-20	Delta NOx-20	Delta NOx-26	Delta NOx-24
Burner pressure drop based on 15% excess air, 100°F, 4% FGR (includes windbox damper, "w.c.):	4.0	4.0	5.0	4.9
Natural gas pressure required at burner (psig):	10	10	10	10
Natural gas pressure required at Coen train inlet (psig):	11	13	10.5	11
Oil pressure required at burner (psig):	72	72	109	94
Oil pressure required at train inlet after control valve and flow meter (psig):	80	80	120	100
Atomizing air pressure required at burner (psig):	74	74	111	96
Atomizing air pressure required at train inlet (psig):	95	95	120	120
Atomizing air flow required (scfm):	70	70	130	105
Natural gas NOx guarantee (ppm, ref. 3% O_2):	**35** (0.042 lbs/mmbtu)			
Induced FGR (%):	4	4	4	5
#2 oil NOx guarantee with 4% FGR (based on 0.02% fuel bound nitrogen, ppm, ref. 3% O_2):	**100** (0.13 lbs/mmbtu)	**100** (0.13 lbs/mmbtu)	**109** (0.14 lbs/mmbtu)	**105** (0.14 lbs/mmbtu)

Notes:
1. Guarantees are from 25 to 100% MCR only.
2. Emission Guarantees based on HHV.

General Burner Data:

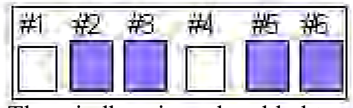
Fuels (main) .... N.Gas
.... #2 Oil
Fuel (ignition) .... Gas
Burner excess air 15
Turndown N.Gas/#2 Oil 8:1/8:1
Fuel oil viscosity required .... 30-40 SSU
Fuel oil higher heating value (btu/lb) 19460
Fuel oil fuel bound nitrogen (percent by weight) .... 0.02 **(assumed)**
Natural gas higher heating value (btu/lb) 22,000
Natural gas specific gravity 0.6

II. Equipment Description

We propose to furnish following equipment:

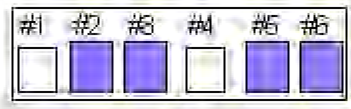
Item Qty Description Unit Legend

1 4 <u>Windbox</u>
(For Units #2/3 and #5/6)



Windbox, carbon steel, 3/16" side thickness and 1/4" front plate. The windbox is seal welded to the boiler front plate and is of sufficient size to provide air cooling to a major portion of the boiler front plate.

2 4 <u>Jackshaft mounted on Windbox</u>
(For Units #2/3 and #5/6)



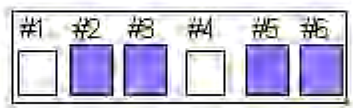
Jackshaft control drive system, which includes:

- Purge and low fire position switches
- Ball bearing pillow blocks, self aligning, and permanently lubricated
- Mechanical linkage constructed from 1/2" pipe with heavy duty, aircraft type ends to eliminate backlash.
- Jackshaft, 1-3/16 solid round stock

The jackshaft must be driven by an actuator and will be linked to the following components:

- Unit #2/3: Main gas 'AC' valve
- Unit #2/3: Oil 'AC' valve
- Gas 'AC' valve (trim valve)
- Windbox damper

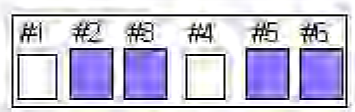
3 4 <u>Fan</u>
(For Units #2/3 and #5/6)



Fan wheel, backwardly inclined, arrangement 4 with screened fan inlet cone. The fan wheel is mounted in a scroll that is an integral part of the windbox with the inlet facing the boiler front so as to minimize noise in the firing aisle.

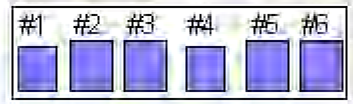
Unit #2/3: Motor: 20, ODP enclosure, 1740 RPM
Unit #5/6: Motor: 30, ODP enclosure, 1740 RPM

4 4 <u>Windbox Damper</u>
(For Units #2/3 and #5/6)



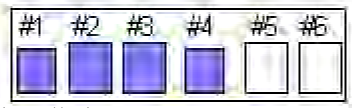
Air damper of the slow opening multibladed streamline design. The damper is built into the windbox and is designed to have a relatively straight line characteristic in respect to air flow versus damper positions. The maximum air leakage will not exceed 10% in the closed position.

5 6 <u>Delta NOx Burner</u>
(All Units)



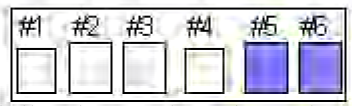
Register, type "DeltaNOx" burner. This is a venturi type burner which has two fuel zones when firing gas to reduce both thermal and prompt NOx. The primary fuel zone spuds are located within the burner while the secondary fuel zone spuds are located at the proximity of the refractory throat exit. The burner has no adjustable louvers nor moving parts under normal operation.

6 4 <u>Prefabricated Delta NOx Throat Piece</u>
(For Units #1/4 and #2/3)



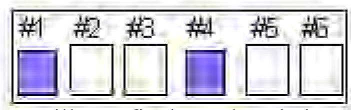
One piece refractory throat with integral mounting tub for ease of installation.

7 2 <u>Tile Template</u>
(Units #5/6)



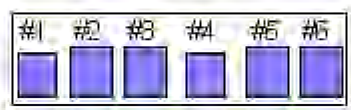
Front wall header will intefere with installation of pre-frabicated tile tub on Units #5/6. Delta NOx throat will be installed in the front wall using plastic refractory. Coen will provide the tile template to the contractor.

8 2 <u>Burner Mounting Plate</u>
(Units #1/4)



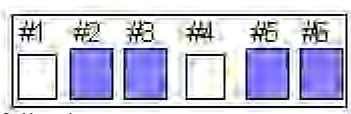
Existing windboxes can be reused for Units #1 and #4 but burner will not fit through existing windbox front plate cutout. Coen will provide square plate to be mounted on windbox front with new ID cutout for burner and proper bolt pattern. Contractor to cut square hole out of windbox front and weld new burner mounting plate.

9 6 <u>Gas Pilot</u>
(All Units)



Pilot, electrically ignited, interruptible type.

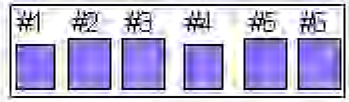
10 4 <u>Gas Pilot Train</u>
(For Units #2/3 and #5/6)



Pilot train, fully assembled and mounted on the windbox with the following components:

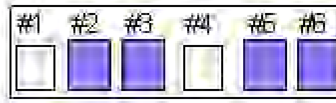
- One pressure regulating valve, 3/4" NPT, aluminum body.
- Two safety shutoff valves, 1/2" NPT aluminum body.
- One vent valve, 1/2" NPT, aluminum body.
- One manual shutoff valve, 3/8" NPT.
- One ignition transformer, 120/6000V.
- One low gas pressure switch.
- One gas supply pressure gage.

11 6 <u>Oil Gun (single arrangement)</u>
(All Units)



Oil burner gun, inside mix, air atomizing designed to fit into a burner socket to permit easy changing for cleaning. The socket includes a blowout device which will permit steam to be purged through the oil passages of the gun so that it may be removed without leaking or dripping oil. The system is complete with guide pipe, oil hose, air hose, vise/wrench set, and spare steam atomizing oil burner gun.

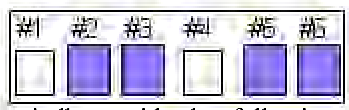
12 4 <u>Oil Train</u>
(For Units #2/3 and #5/6)



Oil train, factory assembled and mounted on the windbox with the following components are included:

- Two safety shutoff valves each with one SPDT switches, 3/4" NPT, bronze body, General Controls.
- One inlet strainer.
- One low oil pressure switch
- One high oil pressure switch
- One oil pressure at burner gage.
- One oil supply pressure gage.
- Units #2/3: One ‘AC’ valve, ¾”, linked to main jackshaft.
- Units #5/6: Will reuse existing fuel control valve.

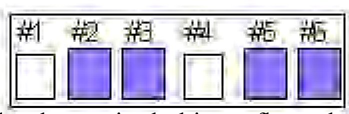
13 4 <u>Atomizing Air Train</u>
(For Units #2/3 and #5/6)



Atomizing air train, factory assembled and mounted on the windbox with the following components included:

- One safety shutoff valve, bronze body, Apollo.
- One atomizing air/oil differential valve, SS diaphragm, Cash.
- One low atomizing air pressure switch
- One low atomizing air flow switch
- One atomizing air pressure at burner gage.

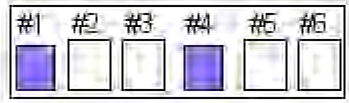
14 4 <u>Natural Gas Train</u>
(For Units #2/3 and #5/6)



Gas train, factory assembled supplied loose. Field mounting will only require bolting a flanged connection, electrical connection from prewired valves to burner mounted terminal strips, and providing proper support. The following components are included:

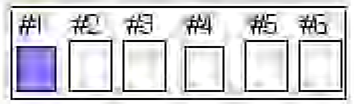
- Two safety shutoff valves each complete with one SPDT switch, cast iron body, Maxon.
- One vent valve, aluminum body, Asco.
- One manual shutoff valve complete with handle, cast iron body, Homestead.
- One Coen 'AC' trim flow control valve (for Delta NOx outer spuds), cast iron body.
- One high gas pressure switch
- One low gas pressure switch
- One gas pressure at burner gage.
- One gas supply pressure gage.
- Units #5/6: Will reuse existing fuel control valve.

15 2 Loose Gas Header Piping Spool
(For Units #1/4)



Delta NOx burner has two gas connections at the windbox. Coen will provide the connecting piping from the flanges outside the windbox to existing gas shutoff cock. This spool will contain a gas 'AC' valve which will be linked to the windbox jackshaft. This valve is used to trim the outer spuds as load is modulated.

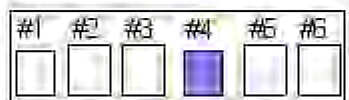
16 1 Loose Gas SSO Spool Piece
(For Unit #1)



Item E2 on Coen BMJ 20D-0202-1 does not show a proof of closure switch. This is required per NFPA standards. Since existing valves are threaded, the one gas SSO valve cannot be easily removed from gas train. A new gas SSO spool will be provided which will have (2) new Maxon SSO valves. Existing vent and hand valve will be reused.

Valves will be a Maxon, 3" FLG with proof of closure switch, cast iron body.

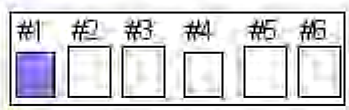
17 1 Loose Gas and Oil SSO Valve Proof of Closure Switch
(For Unit #4)



Item E2 and C3 on Coen BMJ 20D-0202-1 does not show a proof of closure switch. This is required per NFPA standards and so a new valve is quoted to replace existing.

Existing Maxon valves can be reused and new position switches will be supplied and added.

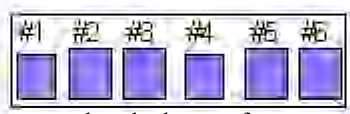
18 1 Loose Oil SSO Valve with Proof of Closure Switch
(For Unit #1)



Item C3 on Coen BMJ 20D-0202-2 do not show a proof of closure switch. This is required per NFPA standards and so new valves are quoted to replace existing.

Valve on Unit #1 will be a General Controls, 3/4" NPT with proof of closure switch, bronze body.

19 6 Fyr-Logix BMS and DSF-2000-SB Scanners
(For All Units)



Burner management system, Fyr-Logix BMS master logic cabinet mounted at the burner front. The master logic cabinet will house an Allen Bradley MicroLogix 1500 programmable logic controller, all necessary microprocessor hardware, isolation power supply breakers, power supplies, fuses, isolation relays, flame signal processor racks and all other equipment as required by the scope of the system proposed herein. The microprocessor has a battery backed RAM, for non-volatile program storage. All wiring to installed valves, limits, pressure, temperature and flow switches, and water column relays will be via terminals located inside the main panel at the burner front.

The Fyr-Logix BMS operator interface will be via lights, pushbuttons, selector switches and a display unit. The display will have four lines with sixteen characters per line andwill be able to display four messages simultaneously. The following is list of messages

1. Coen Company
2. High Gas Pressure

3. Low Gas Pressure
4. Low Oil Pressure
5. Low Atomizing Media Pressure
6. Low Atomizing Media Flow
7. F.D. Fan Starter Interlock
8. Low Combustion Air Pressure
9. Low Water Level Cutout (Aux)
10. Low Water Level Cutout (Primary)
11. Pushbutton-Water Bypass Closed
12. High Steam Pressure Recycle
13. High High Steam Pressure
14. Purge Limits Open
15. Light Off Limits Open
16. Critical Input Failure
17. Critical Ouput Failure
18. Scanner #1 Failure
19. Scanner #2 Failure
20. Flame Failure
21. Firstout
22. Controls to Purge
23. Controls to Lightoff
24. Spare
25. Spare
26. Spare
27. Spare
28. – 30. Spare.
31. Purging
32. Pilot Ignition
33. Main Ignition Relay
34. Main Ignition
35. System Reset
36. Spare
37. – 40. Spare

Following door mounted components will be supplied for status indication and control:

Symbol Description

LPV Pilot Valves Energized Light
LFD Flame Detected
LGV Gas Valves Energized Light
LOV Oil Valves Energized Light

Pushbuttons, switches and indicators for burner operation will be provided as listed below:

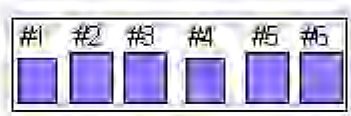
PSS System Start Pushbutton
PSR System Stop/Reset Pushbutton
PAA Alarm Silence Pushbutton
SFC Fuel Control Selector Switch
SFD Fan Control Selector Switch
PET Emergency Stop Pushbutton

Please note that this system is a standardized design and is not subject to revision. Also note that all the above lights, pushbuttons, selector switches, and drawings may not be applicable to the proposed burner. Active panel components will depend on fuels and other items included (such as number of scanners).

Dual Coen system consisting of the following equipment:

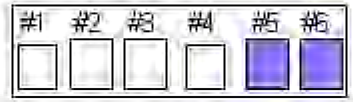
Scanner Model: DSF-2000-SB
Note: Scanner(s) require cooling/purge air.

20 6 <u>Programming Relays in the BMS Panel</u>
(For All Units)



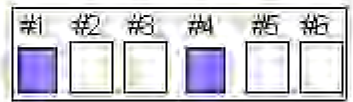
Programming relays for interfacing with combustion controls. Relays will supply dry contacts for the following programming requirements: purge, low-fire, release to modulate signals.

21 2 New Air Flow Element
(Units #5/6)



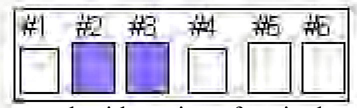
Fans on top of boilers for these units will be removed. Controls for these units will be metering (still) so new air flow element will be supplied, mounted on inlet cone of new fan on top of burner. Existing transmitter will be reused.

22 2 Square Mounting Plate
(Units #1/4)



This plate will mount on front of existing windboxes and will have cutout and bolts as required for new burner.

23 2 Combustion Controls
(Units #2/3)



Metering with O2 trim controls scheme is quoted in the base proposal with options for single point positioning in the Pricing Section.

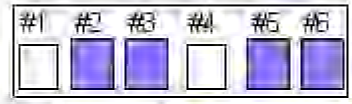
Existing control panel in front of Boiler #2/3 will be removed. New freestanding panel, 72” high by 36” wide by 30” deep will be mounted in same location as old panel. Panel includes furnishing, mounting and wiring the main supply circuit breaker, internal lighting and internal convenience outlet. The panel to house the following components, wired to terminals:

- Johnson Yokogawa YS150 Boiler Master Controller
- Johnson Yokogawa YS150 Natural Gas Flow Controller
- Johnson Yokogawa YS150 No. 2 Oil Flow Controller
- Johnson Yokogawa YS150 Combustion Air Flow/Oxygen Trim Controller
- Yokogawa Model ZR22 Oxygen Analyzer

The following field mounted equipment will be supplied:

- Combustion air flow differential transmitter
- Yokogawa Model ZR22 oxygen probe
- #2 oil mas flow transmitter, Foxboro
- Natural gas vortex flow meter, Yokogawa.
- HTHW inlet temperature transmitter.
- HTHW outlet temperature transmitter.
- Natural gas pressure transmitter
- Natural gas temperature transmitter
- HTHW flow transmitter
- Natural gas flow control valve, Fisher V150, carbon steel body
- #2 oil flow control valve, Fisher 667, cast iron body
- First Chesel 4500 chart recorder for:
  - N.Gas flow with totaliz.
  - #2 Oil flow with totaliz.
  - Water Inlet T
  - Water Outlet T
- Second Chesel 4500 chart recorder for:
  - N.Gas T
  - N.Gas P
  - Water Flow

24 4 <u>Fan VFDs</u>
(Units #2/3 and #5/6)



Model ABB ACS 601 VFDs will be included for the new Coen integral fan motors for these four units.

III. Turnkey Workscope

The field installation will be performed by a sub-contractor, under the direction of Coen. The price scope does not include the disposal of the old equipment removed, burners, etc., only their removal and relocation on your site. We have not included any special time or materials to remove asbestos and is considered the responsibility of others.

The field work scope will be as detailed below:

Coen's sub-contractor will furnish all labor, consumable materials, tools, cranes or lift machinery, welding & burning machines, insurance and supervision to accomplish the following scope of work and supply. The plant shall provide compressed air, electricity as required for both 220 volts and 120 volt devices, bathroom facilities, potable water, and a lay down area adjacent to the boiler for parking trucks, welding machines, and storing equipment.

a) All workers arrive at the jobsite to go through the safety orientation program and get familiar with the site and with the working conditions.
b) Prior to our arrival, the boiler shall be shut down and cool, all fuel lines blanked and locked out, all electrical supplies locked out, all steam lines secured and locked out, and the furnace shall be opened and ready for work to start. Hot work permits and confined space entry permits will be requested each day. Hole and fire watch will be provided as needed.

Units #1/4	Units #2/3	Units #5/6
c) Remove equipment off of burner front A/R to remove register. d) Cut large square hole in existing windbox. e) Modify existing boiler front wall A/R to install new tile tub. f) Install new tile tub. g) Mount square mounting plate on windbox front. h) Install DNX burner. i) Modify windbox for new gas inlets. j) Install loose gas spool pieces. k) Install new BMS panel. l) Rewire all valves/switches to new BMS panel. m) Install FGR duct with manual FGR damper. n) Repair or replace inlet box to FD fan. o) Isolate inlet box from air header. p) Replace expansion joint on fan. q) Remove #6 oil equpment: high/low oil temp switch, recirculation valve, and return piping. r) Install new oil SSO valve. s) Clean up jobsite. t) Test & tune burners for gas and oil firing. u) Re-tune combustion controls v) Training. w) Leave job site.	c) Remove dual Todd burner equipment. d) Remove dual burner gas, oil, atomizing air piping. e) Modify existing boiler front wall A/R to install new tile tub. f) Install new tile tub. g) Mount new windbox/burner to boiler front/tile tub. h) Connect all piping lines. i) Install loose BMS on far wall. j) Wire from burner to BMS. k) Mount new controls panel on far wall. l) Install all metering field elements and wire to panel. m) Move existing Rosemount power unit from existing FD fans on Units #1/4 to floor to drive windbox jackshaft. n) Remove FD fan/air duct from top of boiler. o) Install new boiler access door. p) Install FGR duct with manual FGR damper. q) Clean up jobsite. r) Test & tune burners for gas and oil firing s) Tune combustion controls. t) Training. u) Leave job site.	c) Remove dual Todd burner equipment. d) Remove dual burner gas, oil, atomizing air piping. e) Modify existing boiler front wall A/R to install new tile. f) Pound plastic refractory and install new throat. g) Mount new windbox/ burner to boiler front/tile tub. h) Connect all piping lines. i) Install loose BMS on far wall. j) Wire from burner to BMS. k) Remove FD fan/air duct from top of boiler. l) Move existing Rosemount power unit from existing FD fan to floor. m) Move existing air flow transmitter and move to fan inlet on top of burner. Wire to controls and tap to flow element on fan inlet. n) Install new boiler access door. o) Install FGR duct with manual FGR damper. p) Install motor starter for new 30 hp motor. q) Clean up jobsite. r) Test & tune burners for gas and oil firing. s) Re-tune combustion controls. t) Training. u) Leave job site.

The installation time required based on the above scope of work for the base bid is approximately 90 caledar days working one (1) eight (8) hour shift per working day. This schedule is based on the boiler free and clear of fuel to allow burning as required. This is also based on all electrical power and fuel being blanked and secured (lock-out) prior to start of work.

The turnkey work includes a Coen field start-up engineer to assist with start-up and tuning of the burners and all new equipment supplied by Coen. The start-up and tuning time is estimated at 10-12 days per unit after light-off.

IV. Paint and Finish

Coen surface preparation and painting will be as follows:

	Preparation	Primer	Finish
External Steel	SSPC-SP**3**	Red Oxide	Coen Green, Alkyd Enamel
Piping/Fittings	SSPC-SP1	Red Oxide	Coen Green, Alkyd Enamel
Electrical Panels	---Manufacturers Standard--		
Instruments	---Manufacturers Standard--		
Conduit	---Manufacturers Standard--		

V. Notes

1. Coen's proposed piping material and system design is in accordance with the requirements of NFPA 85, which requires compliance with NFPA 31and 54 for oil and gas piping inside industrial or institutional buildings. If this project is classified as a Power Application, NFPA requires compliance with ASME B31.1, or if classified as a Process Application, NFPA requires compliance with ASME B 31.3. Please contact Coen for equipment selection and pricing if applicable.
2. Air compressor capacity for Units #2/3 and #5/6 needs to be confirmed since atomizing air flow and air pressure requirements may change with new burner design.
3. Have assumed 1"w.c. furnace pressure for Units #2/3. Please confirm this number.
4. Coen is not responsible for piping, electrical or equipment outside the scope of supply described in the proposal that must work or interface with the new equipment supplied. It has been assumed that the existing equipment, piping and electrical devices that are not being replaced or modified are all in good working condition.
5. All work included with the proposal including but not limited to mechanical, electrical, refractory and start-up services is based on normal working hours. No overtime has been included.
6. Only the refractory work described in the proposal has been included. If additional refractory work is required after inspection of each furnace, the work will be an addition to the scope included with the proposal.
7. Third party final testing is not included.

VI. Pricing

Here is pricing on per unit basis assuming all units are purchased at the same time.

Base Proposal Pricing
(Note, pricing is based on all units being ordered at once)

	Unit #1	Unit #2	Unit #3	Unit #4	Unit #5	Unit #6	Total
Coen design and engineering drawings:	$27,800	$16,500	$16,500	$25,700	$18,250	$18,250	$123,000
Coen equipment totals (material and shop labor):	$43,868	$165,922	$165,922	$40,637	$92,077	$92,077	$600,504
Installation:	$87,554	$239,253	$239,253	$87,387	$228,676	$228,676	$1,110,799
Coen project coordination with contractor:	$4,567	$4,567	$4,567	$4,567	$4,567	$4,565	$27,400
Startup service, controls retune:	$18,500	$23,000	$23,000	$18,500	$23,000	$23,000	$129,000
Totals:	$185,988	$459,346	$459,346	$180,482	$376,227	$376,225	$1,990,702

Price Options
(Subtract or add these from the base pricing listed above)

	Unit #1	Unit #2	Unit #3	Unit #4	Unit #5	Unit #6
Include the removal of windboxes on units #2,3, 5, and 6 on the turnkey scope. This adder assumes there is no asbestos abatement involved..	-	$3,522	$3,522	-	$3,522	$3,522

Price Validity: Above prices are valid until March 1, 2005. See Schedule section, below, for estimated lead times.

Prices do not include taxes or any applicable permits. Freight cost is included in our price. Equipment will be shipped F.O.B. JFK Airport, NY, freight allowed.

VII. Schedule

Note, below schedule does not include time for asbestos abatement (this can be performed before burners arrive on site).

Unit #1/4

	Duration in work days	Week #
Receive P.O.	0	0
Trip to site:	3	1
Drawings delivered:	30	7
Drawings approved:	10	9
Shipment:	70	19
Delivery:	5	20
Installation:	15	23
Startup:	20	27

Unit #2/3

	Duration in work days	Week #
Receive P.O.	0	0
Drawings delivered:	30	9 (note, staggerd per your schedule)
Drawings approved:	10	11
Shipment:	70	21
Delivery:	5	22
Installation:	30	28
Startup:	15	31

Unit #5/6

	Duration in work days	Week #
Receive P.O.	0	0
Drawings delivered:	30	11 (note, staggerd per your schedule)
Drawings approved:	10	13
Shipment:	70	23
Delivery:	5	24
Installation:	30	30
Startup:	15	33

VIII. Terms and Conditions

Coen will guarantee that the NOx emissions level stated in this quotation will be met, and not exceeded. The Coen equipment will be set for optimum efficiency at, or below, the stated NOx emission level. Final NOx certification testing is by others.

Equipment and/or services quoted are subject to the attached Coen Terms and Conditions of Sale dated 6/15/01.

Coen field service included in this proposal will be performed in accordance with our standard Field Service Terms and Conditions.

Progress payments will be required according to the following schedule:

Phase 1: Progress Payment for "Design Engineering Drawings and Project Coordination"
50% of proposal value under this phase upon drawing submittal
50% of proposal value under this phase upon drawing approval (after issuance of an alteration permit by Manager of JFK Airport facilities division)

Phase 2: Progress Payment for "Coen Equipment Totals"
50% of proposal value under this phase upon shipment
50% of proposal value under this phase upon delivery to job site (after verification by a representative of port authority)

Phase 3: Progress Payment for "Installation, Start-up Service & Controls Retune"
20% of proposal value under this phase upon contractor mobilization
30% of proposal value under this phase upon 50% of completion of installation work.
30% of proposal value under this phase upon 80% of completion of installation work.
10% of proposal value under this phase upon installation completion (after issuance of a temporary permit to use by Manager of JFK facilities).
10% of proposal value under this phase upon final inspection (after issuance of final permit to use by Manager of JFK facilities)

We thank you for the opportunity to present this proposal and look forward to working with you in the future.

Very truly yours,
COEN COMPANY, INCORPORATED

Brett

Brett Barnes
Application Engineer
Steam Generation Systems

cc: Pentad Assoc.
5610 S. Curtice Street
Littleton, CO 80122-1108
Attn: Mike Thomas

Attn: Bob Blanchard

Enclosures: Terms & Conditions
Coen Field Service Terms & Conditions

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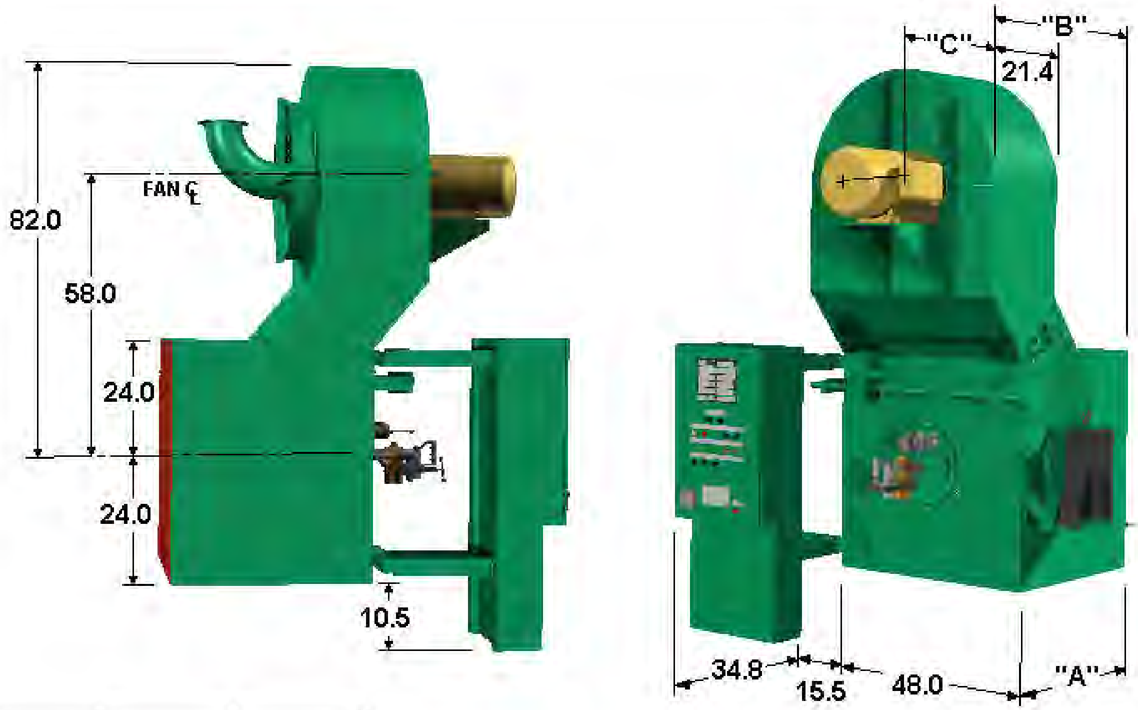
Units #2 and #3: Model 730, Delta NOx-20

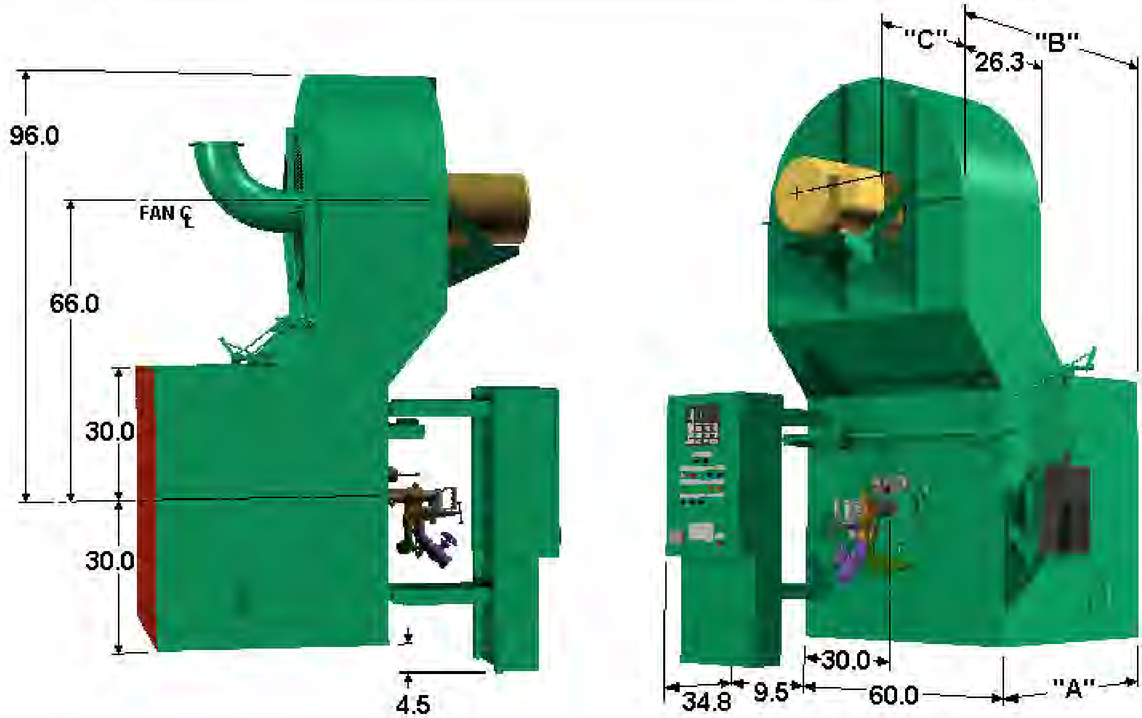


A	B	C
32.0	41.6	18.3

Notes:

1. All dimensions are in inches.
2. Dimensions are estimates only.
3. BMS will be mounted on far wall, not on burner.

Units #5 and #6: Model 750, Delta NOx 24



A	B	C
40.0	49.3	20.3

Notes:

1. All dimensions are in inches.
2. Dimensions are estimates only.
3. BMS will be mounted on far wall, not on burner.

Attachment B
Cost Effectiveness Analysis for Boiler #4

ATTACHMENT B-1: INFLATION ADJUSTMENT FOR PRICE QUOTE DATED 11/9/2005 FOR LOW-NOx BURNERS
CALPINE CORPORATION - KIAC FACILITY

PRICE QUOTE DATED 11/9/2005 - ADJUSTED FOR INFLATION

Inflation adjustment = 1.41 *Adjustment calculated by using most current available data (December 2021) on www.bls.gov/inflation_calculator.htm*

Base Proposal Pricing
(Note, pricing is based on all units being ordered at once)

	Unit #1	Unit #2	Unit #3	Unit #4	Unit #5	Unit #6	Total
Coen design and engineering drawings	$39,198	$23,265	$23,265	$36,237	$25,733	$25,733	**$173,430**
Coen equipment totals (material and shop labor):	**$67,069**	**$248,197**	**$248,197**	**$62,502**	**$143,445**	**$143,445**	**$846,711**
Installation:	$123,451	$337,347	$337,347	$123,216	$322,433	$322,433	**$1,566,227**
Coen project coordination with contractor:	$6,439	$6,439	$6,439	$6,439	$6,439	$6,437	**$38,634**
Startup service, controls retune:	$26,085	$32,430	$32,430	$26,085	$32,430	$32,430	**$181,890**
Totals:	$262,243	$647,678	$647,678	$254,480	$530,480	$530,477	**$2,806,890**

ATTACHMENT B-2: COST EFFECTIVENESS EVALUATION FOR BOILER 4 WITH LNB-FGR
CALPINE CORPORATION - KIAC FACILITY

Cost Effectiveness Evaluation - COEN Cost Estimate for Low NOx Burners (LNB) / Flue Gas Recirculation (FGR) Cost for Boiler 4

Note: Cost estimates are based on the Office of Air Quality Planning and Standards (USEPA) Control Cost Manual (6th Edition).

Item	Value	Basis
Control Efficiency (%):	70%	*COEN estimate dated 11/9/2005 indicates 70% reduction in NOx emissions (i.e., 117 ppm -> 35 ppm) when firing natural gas. Estimate reflects implementation of LNB and 4% FGR.* *Assume comparable control efficiency for NOx emissions resulting from jet fuel. Use of this 70% reduction quantity in these cost-effectivness calculations is viewed to be conservative. (Based upon the 2017 and 2020 test data, there would be only a 50% reduction in NOx).*
Uncontrolled NOx emission rate (lb/MMBtu):	0.25	*Represents a conservatively high emission rate while firing Jet Fuel. For testing conducted in Feb. 2017, the highest rate for a single test run was 0.189 for Jet Fuel. For testing conducted in Feb. 2020, the highest rate for a single test run was 0.240 for Jet Fuel.*
Post-control NOx emission rate (lb/MMBtu):	0.075	*Calculated Estimate*

Facility Data Inputs

Item	Value	Basis
Operating Schedule:		
Shifts per day	3	*Facility data*
Hours per day	24	*Facility data*
Days per week	7	*Facility data*
Hours per year	8,760	*Facility data*
Total Flowrate (wscfm)	18,603	*No data available. Conservatively assume Flue gas flow rate (wet) = Flue gas flow rate (dry) for Boiler #4*
Total Flowrate (dscfm)	18,603	*Measured stack flow rate for Boiler #4 when firing oil.*
NOx Emissions (ton/yr)	24.0	*Under Title V Permit, total NOx emissions from all six boilers are limited to 24 tpy to avoid Part 231-2 applicability.*
Electricity Cost ($/kWh)	$0.003	*Data provided by facility.{ = $3.00 / MWh)[1 MWh/ 1000 KWh] }*
Equipment Life (yr)	10	*OAQPS Control Cost Manual*
Interest rate (%)	7	*OAQPS Control Cost Manual. (Per page 2-13, use must use "social interest rate" which is set by OMB. Per Manual, "it is currently set at seven percent".*

Capital Costs

Item	Value	Basis
Direct Costs		
1.) Purchased Equipment Cost		
Equipment cost		**** COEN Cost Proposal dated 11/9/2005, updated to Dec. 2021 $***
a.) Equipment cost subtotal	**$62,502.48**	**A**
b.) Fans/Blowers	$0.00	*Included in COEN proposal **
c.) Sales taxes	$0.00	*Included in COEN proposal **
d.) Freight	$0.00	*Included in COEN proposal **
Total Purchased equipment cost, (PEC)	**$62,502.48**	**B**
2.) Direct installation costs		
a.) Foundations and supports	$0.00	*Included in COEN proposal **
b.) Handling and erection	$0.00	*Included in COEN proposal **
c.) Electrical	$0.00	*Included in COEN proposal **
d.) Piping	$0.00	*Included in COEN proposal **
e.) Insulation for ductwork	$0.00	*Included in COEN proposal **
f.) Painting	$0.00	*Included in COEN proposal **
Total direct installation cost	$123,215.67	*Included in COEN proposal **
3.) Site preparation (SP)	$0.00	*Included in COEN proposal **
4.) Buildings	$0.00	
Total Direct Cost, DC	**$185,718.15**	
Indirect Costs (installation)		
5.) Engineering	$36,237.00	*Included in COEN proposal **
6.) Construction and field expenses	$0.00	*Included in COEN proposal **
7.) Contractor fees	$6,439.47	*Included in COEN proposal **
8.) Start-up	$26,085.00	*Included in COEN proposal **
9.) Performance test	$16,000.00	*ERM Estimate*
10.) Contingencies	$1,875.07	*= 0.03 x B (Per OAQPS)*
11.) Other (ER, SPCC, RMP Plans)	$0.00	*Other*
Total Indirect Cost, IC	**$86,636.54**	*Calculated*
Total Capital Investment (TCI)	**$272,354.69**	

ATTACHMENT B-2: COST EFFECTIVENESS EVALUATION FOR BOILER 4 WITH LNB-FGR
CALPINE CORPORATION - KIAC FACILITY

Cost Effectiveness Evaluation - COEN Cost Estimate for Low NOx Burners (LNB) / Flue Gas Recirculation (FGR) Cost for Boiler 4

Annual Operations & Maintenance Costs

Item	Value	Basis
1) Electricity		
Power Consumption (kW)	14.20	*Pump and Fan Power Estimate (Per OAQPS)*
Pressure Drop (inches in water column)	11.5	*Pump and Fan Power Estimate (Per OAQPS)*
Power Consumption Due to Pressure Drop (KWh/hr)	36	*Calculated*
Unit Cost ($/kWh)	$0.003	*Facility Data*
Cost ($/yr)	$373.12	*= power consumption * $/kwh*
2) Operating Labor		
FGR Requirement (hr/shift)	0.5	*Estimate*
Unit Cost ($/hr)	$52.90	*Data provided by facility.*
Cost ($/yr)	$28,883.40	*= (labor hrs/yr) * ($/hr)*
3) Supervisory Labor		
Cost ($/yr)	$4,332.51	*= 15% of Operating Labor (Per OAQPS)*
4) Maintenance Labor		
Maintenance Technician (hr/shift)	0.5	
Catalyst Replacement Labor Requirement (hr/shift)	0.00	
Reagent Delivery System Maintenance (hr/shift)	0.000	
Unit Cost ($/hr)	$52.90	*Data provided by facility.*
Labor Cost ($/yr)	$9,627.80	*8-hr shift 7 days per week*
Material Cost ($/yr)	$9,627.80	*= 100% of Maintenance Labor (Per OAQPS)*
Total Cost ($/yr)	$19,255.60	*= labor cost + material cost*
5) Indirect Annual Costs		
Overhead ($)	$31,482.91	*= 60% of O&M Costs (Per OAQPS)*
Administration ($)	$5,447.09	*= 2% of Total Capital Investment (Per OAQPS)*
Property Tax ($)	$2,723.55	*= 1% of Total Capital Investment (Per OAQPS)*
Insurance ($)	$2,723.55	*= 1% of Total Capital Investment (Per OAQPS)*
Capital Recovery Factor	0.1424	*= 10 Yr. Ammortization at 7% (Per OAQPS)*
Capital Recovery ($)	$38,777.18	*= FGR Unit Cost x CRF*
Total Indirect ($/yr)	$81,154.28	*= Indirect Capital Costs - Capital Recovery*
Total Annualized Cost ($/yr)	**$133,998.90**	
Total NO_x Removed (tpy)	**16.8**	
Cost Effectiveness ($/ton NO_x removed)	**$7,976**	

ATTACHMENT B-2: COST EFFECTIVENESS EVALUATION FOR BOILER 4 WITH LNB
CALPINE CORPORATION - KIAC FACILITY

Cost Effectiveness Evaluation - Estimated Cost for Low NOx Burners (LNB) for Boiler 4
Note: Cost estimates are based on the Office of Air Quality Planning and Standards (USEPA) Control Cost Manual (6th Edition).

Item	Value	Basis
Control Efficiency (%):	65.0%	*COEN estimate dated 11/9/2005 indicates that 70% reduction in NOx emissions when firing natural gas. Estimate reflects implementation of LNB and 4% FGR.* *Assume comparable control efficiency for NOx emissions resulting from jet fuel. Conservatively assume that LNB alone will achieve 65% reduction in NOx emissions. Use of this reduction quantity in these cost-effectivness calculations is viewed to be conservative. (Based upon the 2017 and 2020 test data, there would be <50% reduction in NOx for LNB-FGR).*
Uncontrolled NOx emission rate (lb/MMBtu):	0.25	*Represents a conservatively high emission rate while firing Jet Fuel. For testing conducted in Feb. 2017, the highest rate for a single test run was 0.189 for Jet Fuel. For testing conducted in Feb. 2020, the highest rate for a single test run was 0.240 for Jet Fuel.*
Post-control NOx emission rate (lb/MMBtu):	0.088	*Calculated Estimate*

Facility Data Inputs

	Value	Basis
Operating Schedule:		
Shifts per day	3	*Facility data*
Hours per day	24	*Facility data*
Days per week	7	*Facility data*
Hours per year	8,760	*Facility data*
		No data available. Conservatively assume
Total Flowrate (wscfm)	18,603	*Flue gas flow rate (wet) = Flue gas flow rate (dry) for Boiler #4*
Total Flowrate (dscfm)	18,603	*Measured stack flow rate for Boiler #4 when firing oil.*
NOx Emissions (ton/yr)	24.0	*Under Title V Permit, total NOx emissions from all six boilers are limited to 24 tpy to avoid Part 231-2 applicability.*
Electricity Cost ($/kWh)	$0.003	*Data provided by facility.{ = $3.00 / MWh)[1 MWh/ 1000 KWh] }*
Equipment Life (yr)	10	*OAQPS Control Cost Manual*
Interest rate (%)	7	*OAQPS Control Cost Manual. (Per page 2-13, use must use "social interest rate" which is set by OMB. Per Manual, "it is currently set at seven percent".*

Capital Costs

Item	Value	Basis
Direct Costs		
1.) Purchased Equipment Cost		
Equipment cost		**** Conservatively assumes that 90% of the equipment cost in COEN Cost Proposal dated 11/9/2005 (updated to 2017 $) is attributed to the LNB only.***
a.) Equipment cost subtotal	**$56,252.23**	**A**
b.) Fans/Blowers	$0.00	*Included in COEN proposal **
c.) Sales taxes	$0.00	*Included in COEN proposal **
d.) Freight	$0.00	*Included in COEN proposal **
Total Purchased equipment cost, (PEC)	**$56,252.23**	**B**
2.) Direct installation costs		
a.) Foundations and supports	$0.00	*Included in COEN proposal **
b.) Handling and erection	$0.00	*Included in COEN proposal **
c.) Electrical	$0.00	*Included in COEN proposal **
d.) Piping	$0.00	*Included in COEN proposal **
e.) Insulation for ductwork	$0.00	*Included in COEN proposal **
f.) Painting	$0.00	*Included in COEN proposal **
Total direct installation cost	$110,894.10	*Included in COEN proposal, adjusted by 0.9 **
3.) Site preparation (SP)	$0.00	*Included in COEN proposal **
4.) Buildings	$0.00	
Total Direct Cost, DC	**$167,146.34**	
Indirect Costs (installation)		
5.) Engineering	$32,613.30	*Included in COEN proposal, adjusted by 0.9 **
6.) Construction and field expenses	$0.00	*Included in COEN proposal **
7.) Contractor fees	$5,795.52	*Included in COEN proposal, adjusted by 0.9 **
8.) Start-up	$23,476.50	*Included in COEN proposal, adjusted by 0.9 **
9.) Performance test	$16,000.00	*ERM Estimate*
10.) Contingencies	$1,687.57	*0.03 x B (Per OAQPS)*
11.) Other (ER, SPCC, RMP Plans)	$0.00	*Other*
Total Indirect Cost, IC	**$79,572.89**	*Calculated*
Total Capital Investment (TCI)	**$246,719.22**	

ATTACHMENT B-2: COST EFFECTIVENESS EVALUATION FOR BOILER 4 WITH LNB
CALPINE CORPORATION - KIAC FACILITY

Cost Effectiveness Evaluation - Estimated Cost for Low NOx Burners (LNB) for Boiler 4

Annual Operations & Maintenance Costs

Item	Value	Basis
1) Electricity		
Power Consumption (kW)	14.20	*Pump and Fan Power Estimate (Per OAQPS)*
Pressure Drop (inches in water column)	11.5	*Pump and Fan Power Estimate (Per OAQPS)*
Power Consumption Due to Pressure Drop (KWh/hr)	36	*Calculated*
Unit Cost ($/kWh)	$0.003	*Facility Data*
Cost ($/yr)	$373.12	*= power consumption * $/kwh*
2) Operating Labor		
FGR Requirement (hr/shift)	0.5	*Estimate*
Unit Cost ($/hr)	$52.90	*Data provided by facility.*
Cost ($/yr)	$28,883.40	*= (labor hrs/yr) * ($/hr)*
3) Supervisory Labor		
Cost ($/yr)	$4,332.51	*= 15% of Operating Labor (Per OAQPS)*
4) Maintenance Labor		
Maintenance Technician (hr/shift)	0.5	
Catalyst Replacement Labor Requirement (hr/shift)	0.00	
Reagent Delivery System Maintenance (hr/shift)	0.000	
Unit Cost ($/hr)	$52.90	*Data provided by facility.*
Labor Cost ($/yr)	$9,627.80	*8-hr shift 7 days per week*
Material Cost ($/yr)	$9,627.80	*= 100% of Maintenance Labor (Per OAQPS)*
Total Cost ($/yr)	$19,255.60	*= labor cost + material cost*
5) Indirect Annual Costs		
Overhead ($)	$31,482.91	*= 60% of O&M Costs (Per OAQPS)*
Administration ($)	$4,934.38	*= 2% of Total Capital Investment (Per OAQPS)*
Property Tax ($)	$2,467.19	*= 1% of Total Capital Investment (Per OAQPS)*
Insurance ($)	$2,467.19	*= 1% of Total Capital Investment (Per OAQPS)*
Capital Recovery Factor	0.1424	*= 10 Yr. Ammortization at 7% (Per OAQPS)*
Capital Recovery ($)	$35,127.27	*= FGR Unit Cost x CRF*
Total Indirect ($/yr)	$76,478.94	*= Indirect Capital Costs - Capital Recovery*
Total Annualized Cost ($/yr)	**$129,323.57**	
Total NO_x Removed (tpy)	**15.6**	
Cost Effectiveness ($/ton NO_x removed)	**$8,290**	

Appendix B: Case-by-case Permit Conditions

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Condition 56: Compliance Certification
Effective between the dates of 06/28/2022 and 06/27/2027

Applicable Federal Requirement:6 NYCRR 227-2.5 (c)

Item 56.1:
The Compliance Certification activity will be performed for the facility:
The Compliance Certification applies to:

Emission Unit: B-OILRS Emission Point: 00015
Process: BD1 Emission Source: HWG01

Emission Unit: B-OILRS Emission Point: 00016

Process: BD1 Emission Source: HWG02

Emission Unit: B-OILRS Emission Point: 00017
Process: BD1 Emission Source: HWG03

Emission Unit: B-OILRS Emission Point: 00018
Process: BD1 Emission Source: HWG04

Emission Unit: B-OILRS Emission Point: 00019
Process: BD1 Emission Source: HWG05

Emission Unit: B-OILRS Emission Point: 00020
Process: BD1 Emission Source: HWG06

Emission Unit: B-OILRS Emission Point: 00015
Process: BD2 Emission Source: HWG01

Emission Unit: B-OILRS Emission Point: 00016
Process: BD2 Emission Source: HWG02

Emission Unit: B-OILRS Emission Point: 00017
Process: BD2 Emission Source: HWG03

Emission Unit: B-OILRS Emission Point: 00018
Process: BD2 Emission Source: HWG04

Emission Unit: B-OILRS Emission Point: 00019
Process: BD2 Emission Source: HWG05

Emission Unit: B-OILRS Emission Point: 00020
Process: BD2 Emission Source: HWG06

Emission Unit: B-OILRS Emission Point: 00015
Process: BG1 Emission Source: HWG01

Emission Unit: B-OILRS Emission Point: 00016
Process: BG1 Emission Source: HWG02

Emission Unit: B-OILRS Emission Point: 00017
Process: BG1 Emission Source: HWG03

Emission Unit: B-OILRS Emission Point: 00018
Process: BG1 Emission Source: HWG04

Emission Unit: B-OILRS Emission Point: 00019
Process: BG1 Emission Source: HWG05

Emission Unit: B-OILRS Emission Point: 00020
Process: BG1 Emission Source: HWG06

Emission Unit: B-OILRS Emission Point: 00015
Process: BG2 Emission Source: HWG01

Emission Unit: B-OILRS Emission Point: 00016

Process: BG2 Emission Source: HWG02

Emission Unit: B-OILRS Emission Point: 00017
Process: BG2 Emission Source: HWG03

Emission Unit: B-OILRS Emission Point: 00018
Process: BG2 Emission Source: HWG04

Emission Unit: B-OILRS Emission Point: 00019
Process: BG2 Emission Source: HWG05

Emission Unit: B-OILRS Emission Point: 00020
Process: BG2 Emission Source: HWG06

Regulated Contaminant(s):
CAS No: 0NY210-00-0 OXIDES OF NITROGEN

Item 56.2:
Compliance Certification shall include the following monitoring:

Monitoring Type: MONITORING OF PROCESS OR CONTROL DEVICE PARAMETERS AS SURROGATE
Monitoring Description:

On January 24, 2022, the facility submitted a NOx RACT evaluation that fulfilled the criteria of §227-2.5(c) and DAR- 20 ("Economic and Technical Analysis for Reasonably Available Control Technology Networks") for the six mid-size emergency boilers (Emission Sources HWG01, HWG02, HWG03, HWG04, HWG05 & HWG06). The evaluation was based upon stack test results provided in an emission test report dated February 22, 2017. The analysis concluded that no NOx control technologies were economically feasible for these six emergency boilers at the facility.

The NYSDEC has granted a variance from the presumptive RACT emission rate specified in §227-2.4(c)(1)(ii) for each of the six mid-size emergency boilers. Emission limitations (lb NOx/MMBtu of heat input) and source testing requirements are described in other permit conditions.

In order to maintain compliance with the Part 227-2 NOx RACT requirements for the six emergency boilers (Emission Sources HWG01, HWG02, HWG03, HWG04, HWG05 and HWG06), the total annual emissions of Nitrogen Oxides (NOx) from Emission Unit B-OILRS shall not exceed 24 tons per year, on a rolling 12-month basis.

The NOx emissions for each of the six boilers shall be calculated on a monthly basis. Emission calculations shall be based upon the quantity of each fuel burned in the boilers. Monthly emissions shall be calculated for each boiler using the following methodology:

M N = Monthly Emissions of NOx from Boiler when firing Natural Gas (tons/month) = (Q N) (1020 MMBtu/Mscf) (EF N) [ton / 2000 lb]

Where,
Q N = Quantity of Natural Gas burned in Boiler in Mscf/ month,
EF N = the measured NOx emission rate for the Boiler in lb/MMBtu, as determined by the most recent test of the boiler or a representative boiler at the facility that has the same equipment manufacturer, make and model number.

M D = Monthly Emissions of NOx from Boiler when firing Low Sulfur Distillate Oil (tons/month) = (Q L) (135 MMBtu/Kgal) (EF L) [ton / 2000 lb]

Where
Q L = Quantity of Low Sulfur Distillate Oil burned in Boiler in Kgal / month,
EF L = the measured NOx emission rate for the Boiler in lb/MMBtu, as determined by the most recent test of the boiler or a representative boiler at the facility that has the same equipment manufacturer, make and model number.

M T = Total Monthly Emissions of NOx from Boiler = M N + M D
M All = Total Monthly Emissions of NOx from All Boilers = sum {M T for all boilers}

KIAC shall calculate the total monthly NOx emissions for each boiler (M T) on a monthly basis. The total monthly NOx emissions for each of the six boilers shall be summed to determine the total monthly emissions for all six boilers (M All). A 12-month rolling total of NOx emissions for all six boilers shall be calculated each month.

Records of monthly NOx emissions shall be maintained in a permanently bound log or in electronic format. For each month, the record shall contain the amount of each fuel burned in each boiler, total NOx emissions from each boiler for the month, total NOx emissions from all boilers, and the 12-month rolling total NOx emissions from all boilers. Monthly fuel use data will be derived from metering and/or purchase records. This information, including fuel use records, must be kept at the facility for at least five years and must be made available to a representative of the Department upon request during normal business hours.

The RACT determination shall be re-evaluated once per permit term, or prior to any changes that could significantly impact the existing approved or pending RACT evaluation. The next re-evaluation shall be submitted no later than January 25, 2027.

Parameter Monitored: OXIDES OF NITROGEN
Upper Permit Limit: 24 tons per year
Monitoring Frequency: MONTHLY
Averaging Method: ANNUAL MAXIMUM ROLLED MONTHLY
Reporting Requirements: ANNUALLY (CALENDAR)
Reports due 30 days after the reporting period.
The initial report is due 4/30/2023.

Subsequent reports are due every 12 calendar month(s).

Condition 57: Compliance Certification
Effective between the dates of 06/28/2022 and 06/27/2027

Applicable Federal Requirement:6 NYCRR 227-2.5 (c)

Item 57.1:
The Compliance Certification activity will be performed for the facility:
The Compliance Certification applies to:

Emission Unit: B-OILRS Emission Point: 00015
Process: BD1 Emission Source: HWG01

Emission Unit: B-OILRS Emission Point: 00016
Process: BD1 Emission Source: HWG02

Emission Unit: B-OILRS Emission Point: 00017
Process: BD1 Emission Source: HWG03

Emission Unit: B-OILRS Emission Point: 00018
Process: BD1 Emission Source: HWG04

Emission Unit: B-OILRS Emission Point: 00019
Process: BD1 Emission Source: HWG05

Emission Unit: B-OILRS Emission Point: 00020
Process: BD1 Emission Source: HWG06

Emission Unit: B-OILRS Emission Point: 00015
Process: BD2 Emission Source: HWG01

Emission Unit: B-OILRS Emission Point: 00016
Process: BD2 Emission Source: HWG02

Emission Unit: B-OILRS Emission Point: 00017
Process: BD2 Emission Source: HWG03

Emission Unit: B-OILRS Emission Point: 00018
Process: BD2 Emission Source: HWG04

Emission Unit: B-OILRS Emission Point: 00019
Process: BD2 Emission Source: HWG05

Emission Unit: B-OILRS Emission Point: 00020
Process: BD2 Emission Source: HWG06

Regulated Contaminant(s):
CAS No: 0NY210-00-0 OXIDES OF NITROGEN

Item 57.2:
Compliance Certification shall include the following monitoring:

Monitoring Type: INTERMITTENT EMISSION TESTING

Monitoring Description:

The Calpine JFK Energy Center (KIAC) shall conduct NOx emission testing of the six mid-size boilers, (Emission Sources HWG01, HWG02, HWG03, HWG04, HWG05 & HWG06), to verify compliance with an emission limit of 0.25 lb NOx/MMBtu of heat input while firing distillate oil. This emission limitation is based upon a Part 227-2 NOx RACT Evaluation for the six boilers that was submitted on January 24, 2022.

Once every five (5) years, the facility shall conduct NOx emission testing to verify that the actual NOx emissions from a particular boiler are less than or equal to 0.25 pounds of NOx per million Btus, while firing low sulfur distillate oil, if that boiler fires oil for operational purposes, as opposed to testing purposes during the term of the permit. If more than four of the boilers fire low sulfur distillate oil for operational purposes, as opposed to testing purposes, during the term of the permit, emission testing may be conducted on four boilers that are selected to be representative of all boilers based upon equipment manufacturer, make and model number. To satisfy the emission test requirements of 6 NYCRR 227-2.6 (c), the owner or operator of an emission source required to conduct an emission test under 6 NYCRR 227-2.6 (a) of this section must:

(1) submit a compliance test protocol to the department for approval at least 30 days prior to emission testing. The conditions of the testing and the locations of the sampling devices must be acceptable to the department; and

(2) follow the procedures set forth in 6 NYCRR 202 and use the following procedures set forth in 40 CFR part 60, appendix A, or any other method acceptable to the department and the administrator for determining compliance with the appropriate NOx limit in section 227-2.4 of this Subpart:

(i) for mid-size boilers, use method 7, 7E, or 19 from 40 CFR part 60, appendix A;

(3) submit a compliance test report containing the results of the emission test to the department for approval no later than 60 days after completion of the emission test.

Regulation 6 NYCRR 227-2.5 (c) provides for the NYSDEC to set a higher emission limit (variance or alternative) if it can be demonstrated that the presumptive RACT emission limit in Part 227-2.4 are not economically or technically feasible. The facility shall comply with the NOx limit using a one-hour average based on the arithmetic mean of the test method used.

The RACT determination shall be re-evaluated once per permit term, or prior to any changes that could significantly impact the existing approved or pending RACT evaluation. The next re-evaluation shall be submitted no later than January 25, 2027.

Parameter Monitored: OXIDES OF NITROGEN

Upper Permit Limit: 0.25 pounds per million Btus
Reference Test Method: 40 CFR Part 60, Appendix A, Method 7, 7E or 19
Monitoring Frequency: Once every five years
Averaging Method: 1-HOUR AVERAGE
Reporting Requirements: ONCE / BATCH OR MONITORING OCCURRENCE

Condition 58: Compliance Certification
Effective between the dates of 06/28/2022 and 06/27/2027

Applicable Federal Requirement:6 NYCRR 227-2.5 (c)

Item 58.1:
The Compliance Certification activity will be performed for the facility:
The Compliance Certification applies to:

Emission Unit: B-OILRS Emission Point: 00015
Process: BG1 Emission Source: HWG01

Emission Unit: B-OILRS Emission Point: 00016
Process: BG1 Emission Source: HWG02

Emission Unit: B-OILRS Emission Point: 00017
Process: BG1 Emission Source: HWG03

Emission Unit: B-OILRS Emission Point: 00018
Process: BG1 Emission Source: HWG04

Emission Unit: B-OILRS Emission Point: 00019
Process: BG1 Emission Source: HWG05

Emission Unit: B-OILRS Emission Point: 00020
Process: BG1 Emission Source: HWG06

Emission Unit: B-OILRS Emission Point: 00015
Process: BG2 Emission Source: HWG01

Emission Unit: B-OILRS Emission Point: 00016
Process: BG2 Emission Source: HWG02

Emission Unit: B-OILRS Emission Point: 00017
Process: BG2 Emission Source: HWG03

Emission Unit: B-OILRS Emission Point: 00018
Process: BG2 Emission Source: HWG04

Emission Unit: B-OILRS Emission Point: 00019
Process: BG2 Emission Source: HWG05

Emission Unit: B-OILRS Emission Point: 00020
Process: BG2 Emission Source: HWG06

Regulated Contaminant(s):
CAS No: 0NY210-00-0 OXIDES OF NITROGEN

Item 58.2:
Compliance Certification shall include the following monitoring:

Monitoring Type: INTERMITTENT EMISSION TESTING
Monitoring Description:

The Calpine JFK Energy Center (KIAC) shall conduct NOx emission testing of the six mid-size boilers, (Emission Sources HWG01, HWG02, HWG03, HWG04, HWG05 & HWG06), to verify compliance with the alternative emission limit of 0.15 lb NOx/MMBtu of heat input while firing natural gas. This emission limitation is based upon a Part 227-2 NOx RACT Evaluation for the six boilers that was submitted on January 24, 2022. All six boilers operate on natural gas (Processes BG1 & BG2) and on aviation-grade kerosene - AGK and jet fuel or #2 light distillate fuel oil - #2 fuel oil (Processes BD1 & BD2).

Once every five (5) years, the facility shall conduct NOx emission testing to verify that the actual NOx emissions from the boilers are less than or equal to 0.15 pounds of NOx per million Btus, while firing natural gas. Emission testing shall be conducted on four boilers that are selected to be representative of all boilers based upon equipment manufacturer, make and model number. To satisfy the emission test requirements of 6 NYCRR 227-2.6 (c), the owner or operator of an emission source required to conduct an emission test under 6 NYCRR 227-2.6 (a) of this section must:

(1) submit a compliance test protocol to the department for approval at least 30 days prior to emission testing. The conditions of the testing and the locations of the sampling devices must be acceptable to the department; and

(2) follow the procedures set forth in 6 NYCRR 202 and use the following procedures set forth in 40 CFR part 60, appendix A, or any other method acceptable to the department and the administrator for determining compliance with the appropriate NOx limit in section 227-2.4 of this Subpart:

(i) for mid-size boilers, use method 7, 7E, or 19 from 40 CFR part 60, appendix A;

(3) submit a compliance test report containing the results of the emission test to the department for approval no later than 60 days after completion of the emission test.

Regulation 6 NYCRR 227-2.5 (c) provides for the NYSDEC to set a higher emission limit (variance or alternative) if it can be demonstrated that the presumptive RACT emission limit in Part 227-2.4 are not economically or technically feasible. The facility shall comply with the NOx limit using a one-hour average based on the arithmetic mean of the test method used.

The RACT determination shall be re-evaluated once per permit term, or prior to any changes that could significantly impact the existing approved or pending RACT evaluation. The next re-evaluation shall be submitted no later than January 25, 2027..

Parameter Monitored: OXIDES OF NITROGEN
Upper Permit Limit: 0.15 pounds per million Btus
Reference Test Method: 40 CFR Part 60, Appendix A, Method 7, 7E or 19
Monitoring Frequency: Once every five years
Averaging Method: 1-HOUR AVERAGE
Reporting Requirements: ONCE / BATCH OR MONITORING OCCURRENCE

[redacted]

Appendix C: Public Notice Documents

NEW YORK STATE | Department of Environmental Conservation

ENB Statewide Notices 3/22/2023

Public Notice

Source-Specific State Implementation Plan Revision For Reasonably Available Control Technology for Calpine JFK Energy Center, Permit ID 2-6308-00096/00009 in Jamaica, NY

Notice is hereby given that the New York State Department Of Environmental Conservation (NYS DEC) plans to submit a Source-Specific State Implementation Plan Revision (SSSR) for Reasonably Available Control Technology (RACT) for Calpine JFK Energy Center to the United States Environmental Protection Agency (US EPA) for approval.

Title 6 of the New York Codes, Rules, and Regulations (NYCRR) contains several regulations that define RACT for certain categories of stationary sources. These regulations seek emissions reductions of nitrogen oxides (NOx) and/or volatile organic compounds (VOCs) to help attain and/or maintain the 8-hour ozone National Ambient Air Quality Standards (NAAQS). Depending upon the relevant RACT regulation, a source that is required to implement RACT must meet a presumptive RACT limit, meet an alternate limit determined from an approved technical analysis if reaching a presumptive RACT limit is technically or economically infeasible, or meet an approved case-by-case RACT limit for sources which do not have a presumptive RACT limit established in regulation.

The Air Title V Facility Permit for Calpine JFK Energy Center that was issued by NYS DEC on June 28, 2022, contains conditions that establish NOx emission limits that vary from presumptive RACT limits for mid-size boilers, which is 0.08 pounds per million British thermal units (Btus) pursuant to 6 NYCRR 227-2.4. The facility was granted a variance by NYS DEC based on Calpine Corporation's January 2022 document entitled "6 NYCRR Part 227-2 Boiler NOx Reasonably Available Control Technology (RACT) Evaluation" which was developed pursuant to DEC's Air-Guide 20 "Economic and Technical analysis for Reasonably Available Control Networks." The approved alternative NOx emission limit when each of the six boilers operate on natural gas (Processes BG1 & BG2) is 0.15 pounds of NOx per million Btus, and 0.25 pounds of NOx per million Btus while firing low sulfur distillate oil (Processes BD1 & BD2). To maintain compliance with 6 NYCRR Subpart 227-2, emissions shall not exceed 24 tons per year, on a rolling 12-month basis, for the applicable boilers.

The Source-Specific State Implementation Plan Revision for Calpine JFK Energy Center that NYS DEC plans to submit to US EPA for approval is available at: https://www.dec.ny.gov/chemical/8403.html.

The Air Title V Facility Permit that contains the permit conditions is available at: https://www.dec.ny.gov/dardata/boss/afs/permits/263080009600009_r3.pdf?req=64126.

The Permit Review Report for this facility is available at https://www.dec.ny.gov/dardata/boss/afs/permits/prr_263080009600009_r3.pdf?req=39673.

Source-specific RACT determinations that are included in this permit will be submitted to the US EPA for approval as a SSSR. NYS DEC is providing a 30-day period to comment on the proposed SSSR or to request a hearing. **Written comments should be submitted by April 21, 2023 to:** Daniel P. Goss, NYS DEC - Division of Air Resources, 625 Broadway, Albany, NY 12233-3251, Phone: (518) 402-8396, E-mail: airsips@dec.ny.gov

Contact: Daniel P. Goss, NYS DEC - Division of Air Resources, 625 Broadway, Albany, NY 12233-3251, Phone: (518) 402-8396, E-mail: airsips@dec.ny.gov

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Notice of Adoption - Amendments to 6 NYCRR § 750 - 1.25 References