1200 Wall Street West
5th Floor
Lyndhurst, NJ 07071

201.933.5541 PHONE
201.933.5601 FAX

www.trcsolutions.com

August 31, 2016
mk033-16

Mr. Bachir Bouzid
Section Chief, Operating Permits
Air Quality Permitting Program
New Jersey Department of Environmental Protection
P.O. Box 027
401 East State Street
Trenton, New Jersey 08625-0027

Subject: CPV Keasbey, LLC
Township of Woodbridge, Middlesex County, New Jersey
Facility ID: 18940
Submittal of Air Permit Application for a Nominal 630 MW Combined Cycle Power Facility

Dear Mr. Bouzid:

TRC Environmental Corporation (TRC) is providing a copy of this Subchapter 22.24 air permit application and technical support documentation on behalf of CPV Keasbey, LLC (CPV Keasbey) to construct a nominal 630-megawatt combined cycle electric generating facility (to be known as the Keasbey Energy Center) on a parcel of land controlled by CPV Shore Urban Renewal, LLC in the Township of Woodbridge, Middlesex County, New Jersey. This parcel of land borders the existing CPV Shore, LLC Woodbridge Energy Center. This application was submitted via NJDEP online on August 31, 2016.

The Keasbey Energy Center will represent a significant modification of the Woodbridge Energy Center. Since the Keasbey Energy Center, as a major modification, will potentially emit more than the Significant Emission Rates (SERs) of several air pollutants, it is subject to Prevention of Significant Deterioration (PSD) permitting.

The enclosed air permit application support document, which includes a print of the RADIUS application in Appendix A, describes the emissions processes and equipment at the facility, details the emissions calculations, and addresses applicable regulatory requirements for the proposed Project. Once air quality dispersion modeling for the project has been completed, both the Air Quality Impact Analysis and Environmental Justice will be submitted to the Department under separate cover as Sections 5 and 6, respectively, of the technical support document.

The Keasbey Energy Center will consist of one (1) General Electric (GE) 7HA.02 combustion turbine generator with a heat recovery steam generator (HRSG) equipped with a natural gas fired duct burner that will be tied into one (1) steam turbine generator.

The proposed facility will be fueled primarily by natural gas but will be capable of utilizing ultra-low sulfur diesel (ULSD). Engineering design plans also reflect the use of a wet mechanical draft cooling tower with additional supporting ancillary equipment including a natural gas fired auxiliary boiler, an emergency diesel generator, an emergency diesel fire pump, a one (1) million gallon ULSD storage tank, and one (1) 20,000 gallon aqueous ammonia storage tank. The combined cycle combustion turbine will be designed to operate on a continuous basis but will not operate at steady-state below 30% load on natural gas and 50% load on ULSD.

Please feel free to contact me at 201-508-6954 or Ted Main at 201-508-6960 should you have any questions regarding this application. We look forward to the opportunity to work with you on this project.

Sincerely,

TRC

Michael D. Keller
Principal – Power Generation and Air Quality

Attachment

cc: G. John, NJDEP (CD-ROM attachment)
S. Riva, U.S. EPA Region II (with attachment)
J. Webster, U.S. FWS (CD-ROM attachment)
S. Johnson, National Park Service (CD-ROM attachment)
J. Donovan, CPV (CD-ROM attachment)
A. Urquhart, CPV (with attachment)
T. Main, TRC (without attachment)
TRC Project File 252973

mk033-16.ltr.doc

Keasbey Energy Center
Combined Cycle Power Facility
PSD Air Permit Application

Prepared for:

CPV Keasbey, LLC

Prepared by:

TRC Environmental Corporation
1200 Wall Street West, 5th Floor
Lyndhurst, NJ 07071

August 2016

TABLE OF CONTENTS

Section **Page**

TABLE OF CONTENTS
(Continued)

Section **Page**

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

<u>**Section**</u> <u>**Page**</u>

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ACRONYMS

Acronym	Definition
AAR	Authorized Account Representative
AGL	above grade level
AP-42	Compilation of Air Pollutant Emission Factors, Fifth Edition
AQRV	Air Quality Related Values
BACT	Best Available Control Technology
BHP	Brake Horsepower
BPIPPRM	Building Profile Input Program for PRIME (version 04274)
Btu	British thermal unit
CAAA	Clean Air Act Amendments
CAIR	Clean Air Interstate Rule
CEMS	continuous emissions monitoring system
CFR	Code of Federal Regulations
CHP	combined heat and power, or cogeneration
CO	carbon monoxide
CO_2	carbon dioxide
CTG	combustion turbine generator
DB	duct burner
DEM	Digital Elevation Model
DLN	dry low-NO_x
EJ	Environmental Justice
ERCs	emission reduction credits
F	Fluoride
°F	Degrees in Fahrenheit
FGD	Flue Gas Desulfurization
FGR	flue gas recirculation
FLM	Federal Land Manager
ft	Feet
FTE	Full Time Equivalent (employee)
GE	General Electric
GEP	good engineering practice
GPM	gallons per minute
GHG	greenhouse gas
H_2O	Water
H_2SO_4	sulfuric acid
HAP	Hazardous Air Pollutant
HF	Hydrogen Fluoride

Acronym	**Definition**
HHV	higher heating value
HRSG	heat recovery steam generator
°K	degrees on the Kelvin scale
Km	kilometer
LAER	Lowest Achievable Emission Rate
lb/hr	pounds per hour
lb/MMBtu	pounds per million British thermal units
LNB	low-NO_x burner
$\mu g/m^3$	microgram per cubic meter
m/s	meters per second
MACT	Maximum Achievable Control Technology
KEC	Keasbey Energy Center
MCUA	Middlesex County Utilities Authority
MMBtu/hr	million British thermal units per hour
MSL	mean sea level
MW	megawatt
N_2	nitrogen
NAAQS	National Ambient Air Quality Standards
NAD83	North American Datum 1983
NCDC	National Climatic Data Center
NESHAP	National Emission Standards for Hazardous Air Pollutants
NH_3	ammonia
$(NH_4)_2SO_4$	ammonium sulfate
NH_4HSO_4	ammonium bisulfate
NJAC	New Jersey Administrative Code
NJDEP	New Jersey Department of Environmental Protection
NO	nitric oxide
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NSPS	New Source Performance Standards
NNSR	Non-Attainment New Source Review
NSR	New Source Review
NWA	National Wilderness Area
NWR	National Wildlife Refuge
NWS	National Weather Service
O_2	Oxygen
O_3	Ozone
OTC	Ozone Transport Commission

Acronym	Definition
OTR	Ozone Transport Region
Pb	Lead
PM	particulate matter
PM-2.5	Particulate matter with an aerodynamic diameter of 2.5 microns or less
PM-10	particulate matter with an aerodynamic diameter of 10 microns or less
ppm	parts per million
ppmvd	parts per million dry volume
PSD	Prevention of Significant Deterioration
PTE	potential to emit
RACT	Reasonably Available Control Technology
RBLC	RACT/BACT/LAER Clearinghouse
RGGI	Regional Greenhouse Gas Initiative
scf	standard cubic feet
SCR	Selective Catalytic Reduction
SER	Significant Emission Rate
SICs	Significant Impact Concentrations
SILs	Significant Impact Levels
SIP	State Implementation Plan
SMC	Significant Monitoring Concentration
SNCR	selective noncatalytic reduction
SOTA	State of the Art
SO_2	sulfur dioxide
SO_3	sulfur trioxide
SOTA	State of the Art
STG	steam turbine generator
TDS	Total Dissolved Solids
tpy	tons per year
TRI	Toxic Release Inventory
TSP	total suspended particulate
TSS	Total Suspended Solids
ULSD	Ultra-low sulfur diesel
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VOC	volatile organic compounds

1.0 INTRODUCTION

1.1 Project Overview

CPV Power Holdings, LP (CPV) is a leading North American electric power generation development and asset management company headquartered in Silver Spring, Maryland with offices in Braintree, Massachusetts and San Francisco, California. CPV Keasbey, LLC (CPV Keasbey), a wholly owned business entity of CPV, is proposing to construct a nominal 630-megawatt (MW) dual fuel (natural gas and ultra-low sulfur diesel – ULSD) fired 1-on-1 combined cycle electric power facility, to be known as the Keasbey Energy Center (the Project), on land directly adjacent to the existing 725 MW Woodbridge Energy Center.

The proposed Project will be constructed on an approximately eleven (11) acre parcel of land (the "Property") located at 1070 Riverside Drive Township of Woodbridge, Middlesex County, New Jersey (Block 93, Lot 100.02 on the official Woodbridge Township Tax Maps). The Property is located within the Keasbey Brownfield Redevelopment Area on a former chemical plant site that has undergone clean-up and remediation pursuant to the NJDEP's Site Remediation Program. The Property and will be sub-divided from the approximately 27.5 acre parcel of land controlled by CPV Shore Urban Renewal, LLC and share a property boundary with CPV Shore, LLC's (CPV Shore) Woodbridge Energy Center. Figures 1-1 and 1-2, respectively, show the proposed Project location and the surrounding area.

The Project air contaminant emissions sources will include a single dual-fuel fired combustion turbine with a natural gas supplementary-fired heat recovery steam generator (HRSG); a natural gas-fired auxiliary boiler and; an emergency diesel generator and emergency diesel fire pump. Combined cycle power will be generated from a steam turbine generator serviced by a wet evaporative cooling tower. The Project will be permitted as a major modification to an existing major source, CPV Shore's Woodbridge Energy Center (PID # 18940 Woodbridge Energy Center) due to CPV's common control of both facilities. CPV's common control of both facilities arises from CPV's majority ownership in both CPV Keasbey and CPV Shore, where CPV controls 100% ownership interest in CPV Keasbey and 57.5% ownership interest in CPV Shore. For this reason CPV is considered to have common control of both facilities.

The proposed Project is located in an attainment area for sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), particulate matter with an aerodynamic diameter less than 10 micrometers (um) (PM-10), and particulate matter with an aerodynamic diameter less than 2.5 um (PM-2.5). Since the Project will potentially emit in excess of the Significant Emission Rates (per year of several air pollutants), it will be subject to Prevention of Significant Deterioration (PSD) permitting (see Table 1-1). Emissions of nitrogen oxides (NO_x), ozone (as VOC), sulfuric acid (H_2SO_4), PM-10, PM-2.5, and CO will exceed the pollutant specific PSD significant emission rates (SER) and, consequently, a Best Available Control Technology (BACT) analysis and an air dispersion modeling analysis is required for these pollutants.

Middlesex County is designated as moderate non-attainment for the 8-hour ozone standard. Since potential annual emissions of NO_x and VOC, both ozone precursors, exceed the major source thresholds (i.e., 25 tons per year of NO_x and/or 25 tons per year of VOC), the proposed facility is subject to non-attainment New Source Review (NSR) for these two ozone precursors.

An air quality impact analysis will be required to demonstrate that the proposed facility will be compliant with all applicable PSD increment levels, National Ambient Air Quality Standards (NAAQS), and New Jersey Ambient Air Quality Standards (NJAAQS). Initially, the air quality impact of the proposed facility will be modeled using potential emission rates to determine if the facility will yield significant air quality impacts (i.e., maximum modeled concentrations greater than the PSD significant impact concentrations). The significance modeling will be performed for multiple operating loads and multiple ambient temperatures. The pollutant-specific "worst-case" operating scenario determined from the significance modeling analysis will be used in all subsequent modeling, including any PSD increment and multiple source NAAQS/NJAAQS analyses, if necessary.

The proposed Keasbey Energy Center will consist of one (1) General Electric (GE) 7HA.02 combustion turbine generator (CTG) that will utilize natural gas as its primary fuel source. Ultra-low sulfur diesel (ULSD) will be utilized as a back-up fuel for up to 720 hours per year. A heat recovery steam generator (HRSG) downstream of the combustion turbine will recover heat from the exhaust gases to generate steam. It will be equipped with a natural gas fired duct burner for supplementary firing. The HRSG will tie-in to a single steam turbine generator (STG). Electricity generated by the Project will be sold to the regional Pennsylvania-New Jersey-Maryland (PJM) electric power grid. Supporting ancillary equipment includes a natural gas fired auxiliary boiler, a wet mechanical draft cooling tower, an emergency diesel generator and supporting day tank, an emergency diesel fire pump and supporting day tank, and one (1) 20,000 gallon aqueous ammonia tank. Both the emergency diesel generator and the diesel fire pump will be fueled by ULSD.

The combustion turbine will utilize a dry low-NO_x (DLN) combustor (during natural gas firing), water injection (during ULSD firing), and selective catalytic reduction (SCR) system to control NO_x emissions. An oxidation catalyst will be located in the HRSG upstream of the SCR and used to control emissions of carbon monoxide (CO) as well as volatile organic compounds (VOC). Exhaust gases from the combined cycle unit (after emission controls) will be directed to an individual stack at 160 feet above grade with an inner exit flue diameter of 22 feet. In addition, CTG inlet air will be cooled using an evaporative cooler and/or wet compression when ambient temperatures are high, in order to cool the compressor inlet air which will improve CTG efficiency and increase CTG generation output.

The Project will operate up to the equivalent of 8,760 full-load hours per year, but may operate at partial loads. Part-load turbine operation will be limited to the range between 30 to 100% of turbine load on natural gas firing and between 50 to 100% of turbine load on ULSD firing.

1.2 Summary of Federal and State-Level Emission Control Requirements

The following provides a general description of the proposed facility's regulatory and emission control requirements set forth by applicable Federal and State-Level air programs. Please see Section 3 of this Air Permit application for a detailed regulatory analysis and Table 3-3 for a comparison of the proposed facility's potential emissions to the regulatory applicability thresholds.

1.2.1 Lowest Achievable Emission Rate

Because the proposed facility is located in a moderate ozone non-attainment area (8-hour standard) and potential emissions of NO_x and VOC, both ozone precursors, exceed 25 tons per year, non-attainment New Source Review (NSR) is required for emissions of NO_x and VOC. A component of NSR is a requirement to meet Lowest Achievable Emission Rate (LAER) limits. To meet the LAER requirement for NO_x emissions, the facility will employ dry low-NO_x burner combustion technology (during natural gas firing), water injection (during ULSD firing), and SCR control technology to control flue gas NO_x emissions from the combustion turbine. For VOC emissions, the facility will employ good combustion practices and an oxidation catalyst as LAER technology for the combined cycle unit. Proposed NO_x and VOC LAER emission limits and control technologies for all combustion units are described in Section 4.

1.2.2 Best Available Control Technology

Best Available Control Technology (BACT) must be applied to control emissions of pollutants that are subject to Prevention of Significant Deterioration (PSD) review based on potential emissions of each pollutant for which the project site area is in attainment. For the proposed combined cycle power facility, BACT is required for CO, sulfuric acid mist (H_2SO_4), PM/PM-10/PM-2.5, and greenhouse gases (GHG). BACT is also triggered for $NO_{x.}$ Because NOx is subject to the more stringent LAER requirements discussed above, the LAER requirements for NOx will also satisfy BACT requirements for NO_x. The Project will meet BACT requirements for CO, H_2SO_4 and PM/PM-10/PM-2.5 emissions by using an oxidation catalyst to control CO emissions and low sulfur fuels for control of H_2SO_4 and PM/PM-10/PM-2.5 emissions. The Project will comply with BACT for GHGs by firing natural gas and ULSD and through energy efficiency measures. Section 4 presents detailed BACT proposals for the combined cycle unit, in addition to BACT for applicable pollutants from the auxiliary boiler, the wet mechanical draft cooling tower, the emergency diesel generator, and the emergency diesel fire pump.

1.2.3 State Of The Art Technology

Based upon the requirements of N.J.A.C. 7:27-8.12, emissions from new or modified emission units in New Jersey with uncontrolled emissions greater than 5 tons/year are required to incorporate State of the Art (SOTA) performance levels. Based on the SOTA emission thresholds, only the combustion turbine and the auxiliary boiler are subject to SOTA requirements. Compliance with LAER or BACT, or NSPS requirements promulgated on or after August 2, 1995 or performance levels present in a NJDEP SOTA manual(s), constitute compliance with SOTA requirements. Based upon this methodology, the only pollutants not subject to LAER, BACT, or NSPS for which SOTA performance levels are presented are ammonia slip (NH_3) and opacity from the combustion turbine. Keasbey Energy Center is proposing to meet the SOTA guideline performance level of 5 ppmvd @ 15% O_2 for ammonia slip and an opacity standard of 10% for normal steady-state operation.

1.3 Assessment of Air Quality Impact

1.3.1 Facility Location

Topography in the immediate area is generally flat, with elevations at sea level on the Raritan River and elevation rising upwards of and exceeding 200 feet in Fords, New Jersey. Typical terrain elevations on the Project site are approximately 21 feet above mean sea level (MSL).

Existing land uses in the vicinity of the proposed site include industrial development, commercial development, neighborhood businesses, and residential neighborhoods (See Figure 1-2). The nearest residential locations are approximately 0.8 miles (1.3 kilometers) to the northeast, along Sunnyview Oval immediately north of Route 440 and along Georges Post Road immediately south of Route 440.

The proposed facility exhaust stack will be located at approximately 40° 30' 53" North Latitude, 74° 19' 16" West Longitude, North American Datum 1983 (NAD83). The approximate Universal Transverse Mercator (UTM) coordinates of the proposed facility stack are 557,515 meters Easting, 4,485,100 meters Northing, in Zone 18, NAD83. The other emission sources are located in close proximity to the facility combustion turbine/HRSG exhaust stack on the proposed facility property.

1.3.2 Impact on Ambient Air Quality Standards and Class II PSD Increments within the Community

Atmospheric dispersion modeling (to be provided) was performed in accordance with United States Environmental Protection Agency (U.S. EPA) and New Jersey Department of Environmental Protection (NJDEP) modeling guidelines to estimate maximum expected air quality impacts from the proposed facility. The results of this modeling analysis will be reflected in Section 5 (to be provided), which demonstrate that both the National and NJ Ambient Air Quality Standards as well as the PSD Class II increments will be achieved by a comfortable margin within the host community for the Project.

1.3.3 Class I Area Impacts

Proposed major sources within 300 km of a Class I area may be required to perform an assessment of potential impacts in that Class I area. The only Class I area within 300 km of the proposed facility is the Brigantine Wilderness area located in the Edwin B. Forsythe National Wildlife Refuge in New Jersey. This area is located approximately 108 km south of the proposed facility.

On July 12, 2016, TRC submitted a request to the Federal Land Manager (FLM) of this Class I area for a determination as to the need for Class I area air quality and AQRV analyses for the Brigantine Wilderness. On July 13, 2016 the FLM notified TRC that an impact assessment at this Class I area will not be required for this Project (See Appendix D for copies of the relevant correspondence).

1.3.4 Impacts to Soils, Vegetation, Visibility, and Industrial, Commercial, and Residential Growth

An analysis was performed to assess the proposed facility's impact on soils, vegetation, visibility, and industrial, commercial, and residential growth. This analysis (to be provided in Section 5) demonstrated that the proposed facility would have negligible effects on these special concerns.

1.4 Conclusions

The conclusions reached from the results of the engineering and air quality modeling analyses are that the proposed combined cycle facility will: 1) meet all control technology requirements resulting from LAER, BACT, and SOTA; 2) not cause or contribute to a violation of the NAAQS for any pollutant; 3) not exceed the PSD Class II increment for any pollutant; 4) not cause adverse impacts to soils, vegetation, growth and visibility; and 5) comply with all other applicable Federal and New Jersey air quality requirements (to be provided in Section 5).

1.5 Summary of Proposed Emission Limits

Tables 1-2, 1-3, and 1-4, respectively, present a summary of the anticipated permit limits proposed for the Keasbey Energy Center that is located in Woodbridge Township, Middlesex County, New Jersey. These limits reflect the application of LAER, BACT or SOTA control technology, as appropriate. In addition, Section 5 (to be provided) of this application provides atmospheric dispersion modeling documentation that confirms that the facility operating at the proposed limits will not contravene the NAAQS/NJAAQS or PSD Class II increment air quality levels.

1.6 Contents of Application Support Document and Appendices

The application forms for the project have been prepared using NJDEP's RADIUS software. Hard copies of the preconstruction permit application forms are included as Appendix A of this document. Emission calculation spreadsheets providing supporting calculations for the application forms are included as Appendix B. Appendix C presents the results of the RBLC search while Appendix D includes agency correspondence. The air quality modeling protocol is included in Appendix E and the Compliance Certification Statement is included in Appendix F.

1.7 Project Schedule

Preliminary schedule milestones for the planned Keasbey Energy Center combined cycle project are as follows:

• Air permit application submitted to NJDEP	August 2016
• Review Period	August 2016 – February 2017
• Public Comment Period	February 2017
• Final Permit Issuance	April/May 2017
• Construction Period	30 Months (anticipated)
• Commercial Operation	May, 2020

Table 1-1: Comparison of Facility Potential Emissions to PSD Significant Emission Rates and Non-attainment NSR Thresholds[a]

Pollutant	Proposed Facility Potential Emissions (tons/yr)	PSD Significant Emissions Increase Level (tons per year)	NNSR Major Source/Modification Threshold (tons per year)
Carbon Monoxide	110.3	100	NA
Sulfur Dioxide	39.9	40	NA
Particulate Matter (PM)	77.6	25	NA
Particulate Matter less than 10 microns (PM-10)	123.6	15	NA
Particulate Matter less than 2.5 microns (PM-2.5)	119.3	10	NA
Nitrogen Oxides	148.7	40	25[b]
Ozone (VOC)	49.9	40	25[b]
Greenhouse Gases (GHG)	2,374,633	75,000[c]	NA
Lead	0.03	0.6	NA
Fluorides	NA	3	NA
Sulfuric Acid Mist	25.1	7	NA
Hydrogen Sulfide	NA	10	NA
Total Reduced Sulfur (including H_2S)	NA	10	NA
Reduced Sulfur Compounds (including H_2S)	NA	10	NA

Notes:
[a] Pursuant to 40 CFR 52.21 (b)(23)(i).
[b] Per N.J.A.C 7:27-18.
[c] For a major modification to an existing major source.

Table 1-2: Summary of Proposed Permit Limits for the Combustion Turbine and Duct Burner (Natural Gas Fired Steady-State Operation)

Pollutant	Stack Emissions[a,b,c]	
	Gas Firing	
	(lb/MMBtu)	(ppm)
Nitrogen Oxides		
CT Only	0.0073	2.0
CT with Duct Burner	0.0074	2.0
Volatile Organic Compounds		
CT Only	0.0013	1.0
CT with Duct Burner	0.0026	2.0
Carbon Monoxide		
CT Only	0.0044	2.0
CT with Duct Burner	0.0045	2.0
PM/PM-10/PM-2.5[d]		
CT Only	0.0068	N/A
CT with Duct Burner	0.0070	N/A
Sulfur Dioxide		
CT Only	0.0021	N/A
CT with Duct Burner	0.0021	N/A
Sulfuric Acid Mist		
CT Only	0.0014	N/A
CT with Duct Burner	0.0014	N/A
Ammonia		
CT Only	N/A	5.0
CT with Duct Burner	N/A	5.0

(a) "ppm" refers to ppmvd @ 15% O_2; lb/MMBtu limits are HHV basis. All ppm values are one-hour averages, with the exception of NO_x (3-hour average).
(b) Facility may exceed short-term limits during defined startup and shutdown periods.
(c) All proposed emission limits (in units of ppm, lb/hr, and lb/MMBtu) do not serve as the basis for determining annual emission limits. Refer to Appendix B for potential annual emissions calculations.
(d) Includes filterables, condensables, and sulfates.

Table 1-3: Summary of Proposed Permit Limits for the Combustion Turbine (ULSD Fired Steady-State Operation)

Pollutant	Stack Emissions[a,b,c]	
	ULSD Firing	
	(lb/MMBtu)	(ppm)
Nitrogen Oxides		
CT Only	0.0155	4.0
Volatile Organic Compounds		
CT Only	0.0027	2.0
Carbon Monoxide		
CT Only	0.0047	2.0
PM/PM-10/PM-2.5[d]		
CT Only	0.0338	N/A
Sulfur Dioxide		
CT Only	0.0018	N/A
Sulfuric Acid Mist		
CT Only	0.0012	N/A
Ammonia		
CT Only	N/A	5.0

(a) "ppm" refers to ppmvd @ 15% O_2; lb/MMBtu limits are HHV basis. All ppm values are one-hour averages, with the exception of NO_x (3-hour average).
(b) Facility may exceed short-term limits during defined startup and shutdown periods.
(c) All proposed emission limits (in units of ppm, lb/hr, and lb/MMBtu) do not serve as the basis for determining annual emission limits. Refer to Appendix B for potential annual emissions calculations.
(d) Includes filterables, condensables, and sulfates.

Table 1-4: Summary of Proposed Permit Limits - Auxiliary Equipment

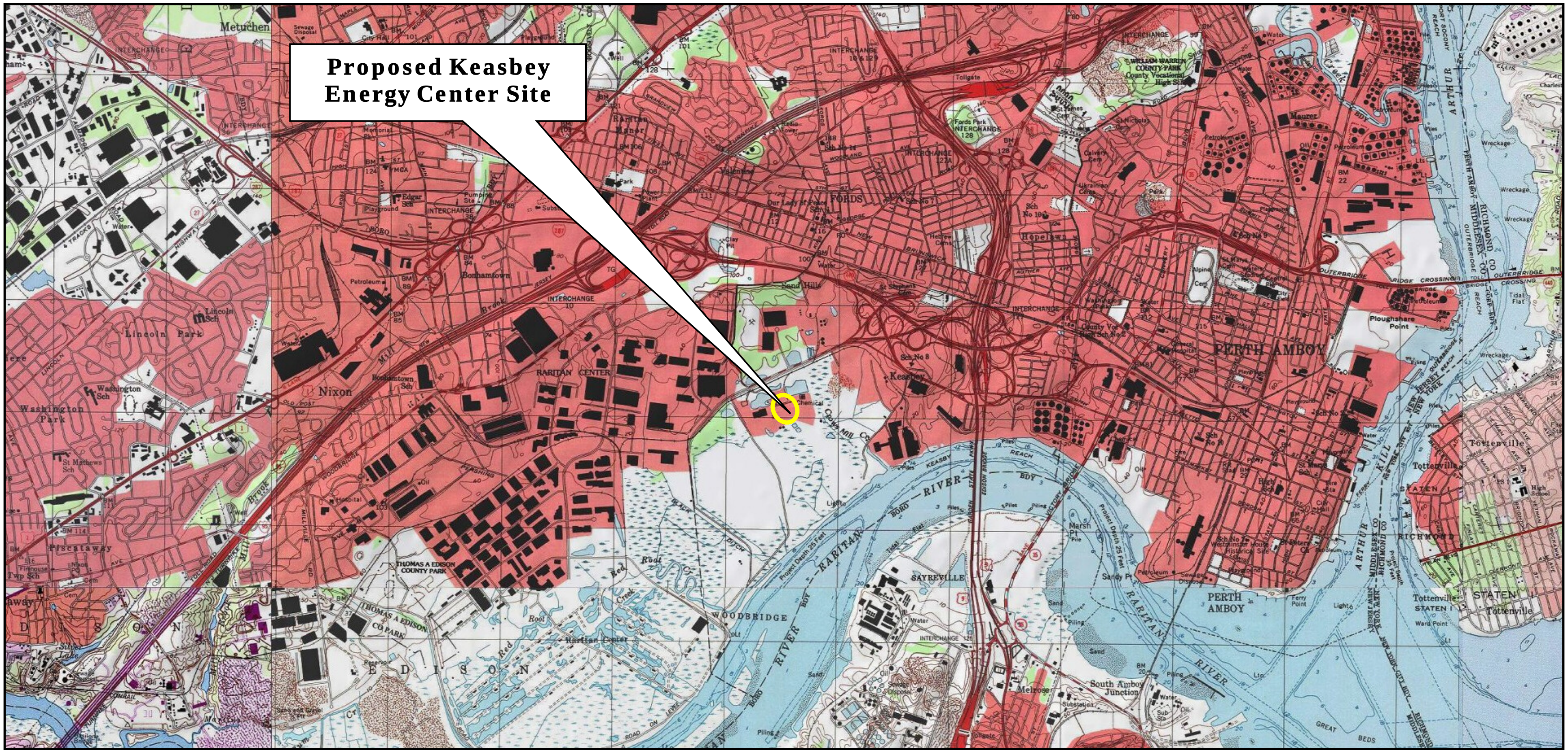
Pollutant	**Emissions**			
	Auxiliary Boiler	**Emergency Diesel Generator**	**Emergency Diesel Fire Pump**	**Cooling Tower**
	(lb/MMBtu)	**(g/bhp-hr)**	**(g/bhp-hr)**	**(lb/hr)**
NO_x	0.01	4.63	2.69	N/A
VOC	0.005	0.15	0.31	N/A
CO	0.037	2.61	1.42	N/A
PM/PM-10/PM-2.5	0.007	0.15	0.118	2.39/1.55/0.58
SO_2	0.006	0.01	0.005	N/A
H_2SO_4	0.00046	0.0008	0.0004	N/A

Note: Sum of NOx + NMHC (VOC) = 4.78 g/bhp-hr per NSPS IIII for EDG.
Sum of NOx + NMHC (VOC) = 3.00 g/bhp-hr per NSPS IIII for EDFP.

Keasbey Energy Center
Proposed Combined Cycle Power Facility
Township of Woodbridge, Middlesex County, New Jersey

Figure 1-1. Site Location Aerial Photograph

Source: Google Earth, 2016.



Keasbey Energy Center
Proposed Combined Cycle Power Facility
Township of Woodbridge, Middlesex County, New Jersey

Figure 1-2. Site Location Map

Source: USGS 7.5 Minute Quadrangle Maps

2.0 PROJECT DESCRIPTION

2.1 Facility Conceptual Design

CPV Keasbey is proposing to construct the Keasbey Energy Center (the Project) which will be a 630 MW (nominal) combined cycle electric power generating facility in Woodbridge Township, Middlesex County, New Jersey. The project will include one (1) General Electric (GE) 7HA.02 combustion turbine that will primarily utilize natural gas but will be capable of utilizing ULSD for up to 720 hours per year. A heat recovery steam generator (HRSG) downstream of the combustion turbine will recover heat from the exhaust gases to generate steam. The HRSG will be equipped with a natural gas fired duct burner and tie-in to a single steam turbine generator (STG). Electricity generated in the CTG and STG will be sold to the regional (PJM) electric power grid. By using the waste heat from the combustion turbine to produce steam and generate additional electricity, the Project will operate with a higher thermal efficiency than many other electricity generating facilities operating within New Jersey and adjacent states. The CTG will be equipped with inlet air cooling systems to further boost power and efficiency on hot days. Supporting ancillary equipment will include a natural gas fired auxiliary boiler, a wet mechanical draft cooling tower, an emergency diesel generator, an emergency diesel fire pump, and an aqueous ammonia tank. Figure 2-1 presents the Keasbey Energy Center general arrangement site plan and Figure 2-2 presents a simplified process flow diagram for the combined cycle unit.

Emissions from the combined cycle unit will be controlled by the use of dry low-NO_x burner technology (for gas firing), water injection (for ULSD firing), and SCR for NO_x, oxidation catalyst for CO and VOC, and the use of clean low-sulfur fuels to minimize emissions of SO_2, PM/PM-10/PM-2.5, and H_2SO_4. Exhaust gases from the combined cycle unit after emission controls will be dispersed to the atmosphere via one (1) 160-foot (above grade) stack. Steam from the steam turbine will be sent to a condenser where it will be cooled to a liquid state and returned to the HRSG. Waste heat from the condenser will be dissipated through the wet mechanical draft cooling tower.

2.2 Natural Gas and ULSD Fired Combined Cycle Unit

CPV Keasbey is proposing to install one (1) combined cycle General Electric (GE) 7HA.02 combustion turbine that will utilize natural gas as the primary fuel and ULSD as a back-up fuel. The maximum combustion turbine heat input capacity at -8 degrees Fahrenheit (°F) ambient temperature firing natural gas is 3,512 million British thermal units per hour (MMBtu/hr) based on the Higher Heating Value (HHV). The maximum combustion turbine heat input capacity at -8 degrees Fahrenheit (°F) ambient temperature firing ULSD is 3,626 million British thermal units per hour (MMBtu/hr) based on the HHV. The maximum duct burner heat input capacity firing natural gas is 950 million British thermal units per hour (MMBtu/hr) based on the HHV. The exhaust gases leaving the HRSG will be directed to one (1) 160-foot above grade stack.

Figure 2-1: General Arrangement Plan

Notes

EMISSION SOURCES
UTM (NAD 83) ZONE 18, US FEET

		NORTHING	EASTING
ES1	STACK	14714867	1829114
ES2	AUXILIARY BOILER	14715008	1829190
ES3	DIESEL GENERATOR	14715018	1829262
ES4	COOLING TOWER	14714739	1829237
ES5	DIESEL FIRE PUMP	14714948	1829011

Legend

BUILDING HEIGHTS (FT)

1	STACK	-
2	HRSG	94
3	COOLING TOWER	54
4	AIR INLET FILTER	44
5	OIL TANK	40
6	DEMIN WATER TANK	40
7	RAW WATER TANK	51

SITE BOUNDARY POINTS (P01-P14)
UTM (NAD 83) ZONE 18, US FEET

POINT	EQUIPMENT	NORTHING	EASTING
C01	DEMIN WATER TANK	14715208	1829294
C02	RAW WATER TANK	14714879	1829006
C03	OIL TANK	14715002	1829001
C04	COOLING TOWER 01	14714736	1829099
C05	COOLING TOWER 02	14714747	1829152
C06	COOLING TOWER 03	14714758	1829205
C07	COOLING TOWER 04	14714770	1829258
C08	COOLING TOWER 05	14714781	1829310
C09	COOLING TOWER 06	14714686	1829109
C10	COOLING TOWER 07	14714697	1829162
C11	COOLING TOWER 08	14714708	1829215
C12	COOLING TOWER 09	14714720	1829268
C13	COOLING TOWER 10	14714730	1829321

SITE BOUNDARY POINTS (P01-P14)
UTM (NAD 83) ZONE 18, US FEET

POINT	NORTHING	EASTING
P01	14715731	1829069
P02	14715413	1829081
P03	14745041	1828697
P04	14714377	1829058
P05	14714399	1829138
P06	14714418	1829219
P07	14714415	1829302
P08	14714403	1829384
P09	14714371	1829464
P10	14714319	1829512
P11	14714574	1830052
P12	14714674	1829963
P13	14715484	1829815
P14	14715879	1829382

Reference Drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
F	06/08/16	AF	FOR CLIENT REVIEW	KP	App'd
E	05/27/16	AF	FOR CLIENT REVIEW	KP	App'd
D	05/20/16	AF	FOR CLIENT REVIEW	KP	App'd
C	05/18/16	AF	FOR CLIENT REVIEW	KP	App'd
B	05/18/16	AF	FOR CLIENT REVIEW	KP	App'd
A	05/17/16	AF	FOR CLIENT REVIEW	KP	App'd

Mott MacDonald
One University Avenue
Suite 100, North Lobby
Westwood, MA 02090
United States
T +1 (781) 915-0015
F +1 (781) 915-0001
W www.mottmac.com

Client
Competitive Power Ventures, Inc.

Title
KEASBEY
NEW JERSEY
SITE ARRANGEMENT

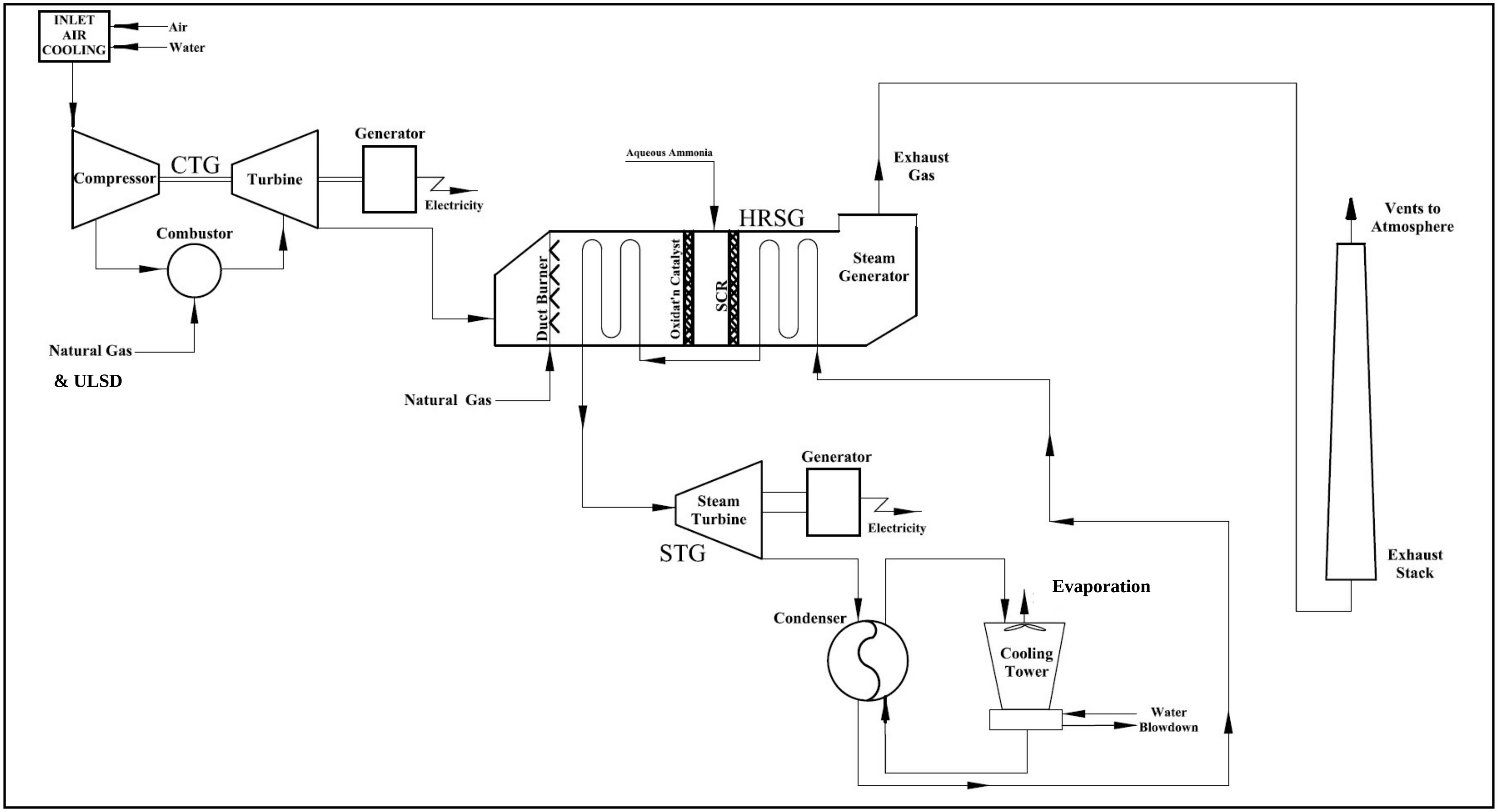
PRELIMINARY
NOT FOR
CONSTRUCTION
REPLACE WITH
ENGINEERS STAMP
AT CONSTRUCTION
AND/OR
FABRICATION

Designed	KP	Eng check	-
Drawn	AF	Approved	-
Dwg check	-	Project Mngr	-
Scale at ANSI E 1" = 50'-0"		Date 03/04/16	Rev F

Drawing Number
324698-ES-701

P:\CPV Woodbridge\Woodbridge2\CPV-WOODBRIDGE-LAYOUT1.dwg Jun 8, 2016 - 11:47AM FED77076

Figure 2-2: Conceptual Flow Diagram for Combined Cycle Unit



2.2.1 Control Equipment for the Combined Cycle Unit

The emission control technologies proposed for the combustion turbine exhaust gases include dry low-NO_x (DLN) combustors located within the combustion turbine and water injection and an SCR system located with the heat recovery steam generator to control NO_x emissions. An oxidation catalyst and efficient combustion controls will be used to control emissions of CO and VOC. Emissions of SO_2, PM/PM-10/PM-2.5, and H_2SO_4 will be minimized through the use of low sulfur fuel, as well as efficient combustion controls.

2.2.1.1 DLN Combustor

Dry low-NO_x combustion will control NO_x emissions from the combustion turbine. DLN combustion limits NO_x formation by controlling the combustion process through air/fuel optimization.

2.2.1.2 Selective Catalytic Reduction

The formation of NO_x is determined by the interaction of chemical and physical processes occurring during combustion. There are two principal forms of NO_x - "thermal" NO_x and "fuel" NO_x. Thermal NO_x formation is the result of oxidation of atmospheric nitrogen in the combustion zone. The major factors influencing thermal NO_x formation are temperature, concentrations of nitrogen and oxygen in the inlet air and residence time within the combustion zone. NO_x is formed by the oxidation of fuel-bound nitrogen. NO_x formation can be controlled by adjusting the combustion process and/or installing post-combustion controls.

Selective Catalytic Reduction (SCR) is a supplemental NO_x control technology that is placed in the flue gas stream within the HRSG and downstream of the natural gas-fired duct burner. SCR involves the injection of ammonia (NH_3) into the exhaust gas stream upstream of a catalyst bed. On the catalyst surface, NH_3 reacts with NO_x contained within the flue gas stream to form nitrogen gas (N_2) and water (H_2O) in accordance with the following chemical equations:

$$4NH_3 + 4NO + O_2 \rightarrow 4N_2 + 6H_2O$$
$$8NH_3 + 6NO_2 \rightarrow 7N_2 + 12H_2O$$

The catalyst's active surface includes a metal (e.g., titanium, vanadium, or equivalent) to promote the NO_x reduction process. The geometric configuration of the catalyst body is designed for maximum surface area and minimum obstruction of the flue gas flow path in order to achieve maximum conversion efficiency of NO_x to N_2.

Aqueous ammonia (19.5% by weight) is drawn from a storage tank, vaporized, and injected into the flue gas stream ahead of the catalyst bed. Excess ammonia which is not reacted in the SCR and which is emitted from the stack is referred to as ammonia slip.

2.2.1.3 Oxidation Catalyst

After combustion control, the only practical method to reduce CO emissions from the combined cycle unit is an oxidation catalyst. Exhaust gases from the combustion turbine are passed over a catalyst bed where excess air oxidizes the CO to carbon dioxide. The oxidation catalyst will also reduce VOC emissions. The oxidation catalyst will be located in an optimum temperature region within the HRSG immediately upstream of the SCR ammonia injection grid.

2.2.1.4 Process Controls

The Project will incorporate modern data acquisition and control systems, which will optimize combustion performance. These same systems will minimize pollutant emissions through a combination of operator and software-driven process adjustments and notifications.

2.3 Auxiliary Boiler

The Facility is proposing to install and operate one (1) auxiliary boiler to support start-up and shutdown activities for the combined cycle units. The auxiliary boiler will have a maximum heat input of up to 72.3 MMBtu/hr (HHV) and will combust natural gas only. The total estimated maximum operation is estimated to be 4,000 hours per year. The proposed package boiler will be equipped with an ultra-low NO_x burner and flue gas recirculation (FGR) to control NO_x emissions. Natural gas combustion will minimize the formation of PM/PM-10/PM-2.5 and SO_2. Good combustion practices and design will minimize CO and VOC emissions.

2.4 Emergency Diesel Engines

The proposed facility will include two auxiliary diesel internal combustion (IC) engines: the emergency generator and emergency diesel fire pump. Both of these emergency diesel engines will undergo periodic testing. Testing and operation will not exceed 100 hours per year per engine.

2.5 Cooling Tower

Steam leaving the steam turbine will be condensed in a non-contact condenser. The circulating water through the condenser will be cooled by an evaporative cooling tower. The proposed tower is a wet mechanical-draft design. Each cell has its own fan. The cooling tower will be equipped with a high efficiency drift eliminator (0.0005% efficiency) to minimize water drift losses and associated PM/PM-10/PM-2.5 emissions.

2.6 ULSD and Ammonia Storage Tanks

The Keasbey Energy Center will store ULSD in one (1) 1,000,000 gallon tank, in order to provide a backup fuel supply for the Project, as well as vendor supplied tanks for the emergency diesel and emergency diesel fire pump, respectively. The tanks will be equipped with modern vapor recovery systems. VOC emissions from the tanks are calculated and included in the facility's potential emissions.

Ammonia used in the SCR system of the combined cycle unit will be supplied from one (1) 20,000 gallon aqueous ammonia storage tank. The aqueous ammonia concentration will be limited to no greater than 19.5% by weight. The percentage concentration is below the 40 CFR Part 68, Section 112(r) (Table 1) risk management planning applicability threshold. The aqueous ammonia storage tank will be a closed loop system. As a result, the tank will have no air emissions.

2.7 Other Exempt and Trivial Auxiliary Equipment

In addition to the significant emission sources (combined cycle combustion turbine, auxiliary boiler, etc.), the proposed combined cycle power facility will also contain various exempt and trivial auxiliary equipment and activities, which will not require an air permit. Exempt and trivial auxiliary equipment either have zero emissions or are specifically listed as exempt or trivial in accordance with NJDEP air quality regulations.

2.8 Electrical Equipment Insulated with SF_6

The Keasbey Energy Center will include a total of two (2) new circuit breakers for the combined cycle power block. SF_6 emissions from the new circuit breakers are calculated using a predicted SF_6 annual leak rate of 0.5% by weight. The global warming potential factors used to calculate CO_2e emissions are based on 40 CFR Part 98.

2.9 Fuels

CPV Keasbey is proposing to utilize natural gas as the primary fuel for the combustion turbine. The natural gas is assumed to have a HHV of 1,024 Btu/standard cubic foot (scf) and an estimated sulfur content of 0.63 grains per 100 scf and is used for the basis of facility design and by GE in establishing emission calculations. The combustion turbine will also combust ULSD as a backup fuel for up to 720 hours per year.

The emergency diesel engines will also burn ULSD that is stored in two (2) separate day tanks. The ULSD is assumed to have a HHV of approximately 19,649 Btu/lb with a sulfur content of 15 ppm by weight. ULSD firing in the emergency engines will be limited to 100 hours per year per engine.

2.10 **Facility Operating Modes**

The combined cycle unit will be operated to follow electrical demand (i.e., dispatch mode). The combined cycle unit will not operate at steady-state below 30% load on natural gas and 50% load on ULSD.

2.11 **Source Emission Parameters**

Emissions of air contaminants from the proposed combined cycle power facility have been estimated based upon expected vendor emission guarantees, control analysis results, emission factors presented in the U.S. EPA publication AP-42, mass balance calculations, and engineering estimates. Emission calculations used to develop the emission estimates for the proposed equipment are included in this application as Appendix B.

2.11.1 Emissions from the Combined Cycle Unit

Emissions from the combined cycle unit will include criteria pollutants, non-criteria pollutants, and hazardous air pollutants (HAPs). Short-term and annual emission rates of these pollutants from the combined cycle unit are described below.

2.11.1.1 Criteria Pollutants

Combustion turbine performance and emissions are affected by ambient temperature, fuel consumption, power output, and fuel type. Proposed emission rates and exhaust characteristics for the combined cycle unit are provided in Appendix B.

Exhaust and emission parameters are presented for the combustion turbine while firing natural gas at different ambient temperatures (-8°F for worst-case winter conditions, 59°F for average annual conditions, and 105°F for worst-case summer conditions), five (5) combustion turbine steady-state loads (30%, 44%, 47%, 75%, and 100%), and operating conditions for HRSG duct firing. A total of sixteen (16) combustion turbine steady-state operating scenarios are presented for natural gas firing.

Exhaust and emission parameters are also presented for the combustion turbine while firing ULSD at different ambient temperatures (-8°F for worst-case winter conditions, 59°F for average annual conditions, and 105°F for worst-case summer conditions) and three (3) combustion turbine steady-state loads (50%, 75%, and 100%). A total of ten (10) combustion turbine steady-state operating scenarios are presented for ULSD firing.

Potential emission rates for NO_x, CO, VOC, SO_2, H_2SO_4, and PM/PM-10/PM-2.5 from the combined cycle unit are based on vendor emissions data.

2.11.1.2 Greenhouse Gases

For PSD purposes, greenhouse gases (GHGs) are a single air pollutant defined as the aggregate group of the following six gases: carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF_6). CO_2, N_2O, and CH_4 are the only pollutants of concern for the combustion turbine unit. Potential emissions of GHGs from the proposed facility are based on vendor guarantees (for CO_2) and 40 CFR Part 98 Emission Factors.

2.11.1.3 HAPs

Appendix B presents a summary table of potential emissions of HAPs from the proposed facility based on U.S. EPA's AP-42 Emission Factor Guidance Document. U.S. EPA's AP-42 emission factor for formaldehyde is expected to be much greater than actual formaldehyde emissions from the use of the GE 7HA.02 or equivalent combustion turbine. Formaldehyde emissions from the combustion turbine while firing natural gas or ULSD are based upon a GE recommended value of 91 ppbvd, which is consistent with the combustion turbine MACT standard. Potential facility formaldehyde emissions are less than 10 tons/yr. Total potential emissions of HAPs from all sources are less than 25 tons/yr. Therefore, the proposed combined cycle power facility will be a minor source for HAP emissions.

2.11.1.4 Other Pollutants

Sulfuric acid mist (H_2SO_4) emissions are based on the mass balance emission calculations for SO_2 and conversion rates of SO_2 to SO_3. The SCR and oxidation catalysts are expected to convert a significant portion of SO_2 to SO_3. Note that calculated potential emissions of SO_2 have not been reduced to reflect SO_2 to SO_3 conversion.

Potential emissions of ammonia (NH_3) are calculated from the proposed maximum ammonia slip emission rate of 5 ppmvd @ 15% O_2 during all operating scenarios.

2.11.2 Auxiliary Boiler Emissions

The Facility is proposing to use one natural gas-fired auxiliary boiler to support start-up and shutdown activities for the combined cycle unit. Short-term potential emission rates are provided based on a combination of equipment vendor design data and fuel sulfur content. GHG emissions from the auxiliary boiler are based on 40 CFR Part 98 Emission Factors. Potential annual emissions are estimated from the operating hours at maximum capacity (4,000 hrs/yr). Potential HAP emissions are based on emission factors from AP-42 Chapter 1.4 (July 1998) and Chapter 1.3 (September 1998). Please see Appendix B for potential emission calculation details.

2.11.3 Emergency Diesel Engines Emissions

CPV Keasbey, LLC is proposing to use two (2) diesel internal combustion engines for the emergency generator and emergency fire pump. Short-term potential emission rates for each engine are provided based on a combination of equipment vendor design data and fuel sulfur content. GHG emissions from the diesel engines are based on 40 CFR Part 98 Emission Factors. Potential HAP emissions are based on emission factors from AP-42 Chapter 3.3 (October 1996). Due to the limited operation of these sources, annual potential-to-emit (PTE) emissions are calculated using the maximum hourly emission rate and 100 hours per year operation per engine. Please see Appendix B for potential emission calculation details.

2.11.4 Cooling Tower Emissions

The proposed cooling tower can potentially emit particulate matter (filterable PM/PM-10/PM-2.5) emissions. Potential emissions of filterable PM/PM-10/PM-2.5 are determined by performing a mass balance calculation using the maximum water flow rate (up to 153,000 gpm), maximum drift rate (0.0005% for high efficiency drift eliminator design), and the maximum circulating water total dissolved solids (TDS)/total suspended solids (TSS) concentration (6,240 ppm). Annual potential emissions are calculated using the maximum hourly emission rate and 8,760 hours per year cooling tower operation. PM-10 and PM-2.5 emissions are calculated using the particulate size distribution recommended in the 2001 Reisman and Frisbie paper "Calculating Realistic PM-10 Emissions from Cooling Towers". Please see Appendix B for potential emission calculation details.

2.11.5 Modification Total Potential Annual Emissions

Total potential annual emissions for the proposed combined cycle power facility are presented in Table 2-1. Annual emission values in Table 2-1 represent total PTE from all proposed sources and were based on the following worst-case operating scenarios:

- Year-round (8,760 hours), full load operation of the combustion turbine (at 59^{o}F annual mean ambient temperature);
- The full load equivalent of 30 days (720 hours) of ULSD firing for the combined cycle combustion turbine;
- 8,040 hours of duct firing at maximum design firing rate for the combustion turbine;
- A total of 262 annual combined cycle gas fired rapid shutdown/startup events (10 cold starts, 52 warm starts and 200 hot starts, and a total of 10 annual combined cycle ULSD fired rapid shutdown/startup events (2 cold starts, 3 warm, starts, and 5 hot starts);
- 4,000 hours of operation of the auxiliary boiler;

- 100 hours per year of operation of the emergency diesel generator and 100 hours per year of operation of the diesel fire pump engine; and

- A maximum circulating water total dissolved solids (TDS)/total suspended solids (TSS) concentration of 6,240 ppm and 8,760 hours per year cooling tower operation.

To allow for maximum operational flexibility, Keasbey Energy Center requests that any operating limits be based on annual heat input values, rather than operating hours.

To allow for maximum operational flexibility, Keasbey Energy Center is requesting that the permit not contain limits on operating hours for the combustion turbine unit. Instead, the facility will demonstrate compliance with annual tons/year limits based on continuous emission monitoring system (CEMS) data for NO_x and CO, and combustion turbine fuel heat input values and emission factors for other pollutants. A sample monthly calculation based on monthly total heat input and lb/MMBtu emission factors is included below:

SO_2 (tons/month) = (X lb/MMBtu * H_{CTNG} + Y lb/MMBtu * H_{CTNGDB} + Z lb/MMBtu * H_{CTULSD})/2000 lb/ton

Where: H_{CTNG} = heat input to the combustion turbine per month from natural gas firing with duct burner off, MMBtu, HHV
H_{CTNGDB} = heat input to the combustion turbine per month from natural gas firing with duct burner on, MMBtu, HHV
H_{CTULSD} = heat input to the combustion turbine per month from ULSD firing, MMBtu, HHV

The facility's Data Acquisition and Handling System (DAHS) will track the heat input to the turbine continuously. Monthly emissions will be calculated for each pollutant using pollutant specific emission factors, as above. The pollutant emission factors will be based on permit limits for each operating condition, but stack test based factors will be used if stack testing indicates a lower lb/MMBtu than the permit limits. In this case, the DAHS system will be updated to include these new stack test results.

Monthly emissions for each unit are added to calculate facility-wide monthly emissions. Each month, the monthly total for each pollutant will be added to the total emissions for the previous eleven months to determine a 12-month rolling total.

2.11.6 Total Facility Potential Annual Emissions

The existing CPV Shore, LLC Facility (Woodbridge Energy Center) consists of 2 x GE 7FA.02 combustion turbines with heat recovery and a single steam turbine generator with associated ancillary equipment, is currently permitted to operate the following equipment and operating scenarios.

- Combined Cycle Units Steady-State Basis
- Combined Cycle Units Start-Up/Shutdown
- Auxiliary Boiler
- Fire Water Pump Diesel Engine
- Emergency Diesel Generator
- Cooling Tower

Total potential annual emissions for the currently permitted Woodbridge Energy Center as a combined cycle power generating facility are presented in Table 2-2. The total facility emissions (Woodbridge Energy Center and Keasbey Energy Center combined) are presented in Table 2-3.

Table 2-1: Summary of CPV Keasbey, LLC Project (Keasbey Energy Center) Criteria Pollutant and Total HAPs Annual Emissions

Source	Keasbey Energy Center Potential Annual Emissions (tons/yr)												
	NO_x	CO	VOC	SO_2	TSP	PM-10	PM-2.5	H_2SO_4	CO2e	NH_3	Pb	Maximum Individual HAP	Total HAPs
Combined Cycle Unit Steady-State Basis	146.0	82.5	47.3	39.0	66.1	115.7	115.7	25.1	2,357,557.9	125.5	2.7E-02		
Combined Cycle Unit Start-Up/Shutdown(1)	0.2	21.9	1.5	N/A	0.0	0.0	0.0	N/A	N/A	N/A	N/A		
Auxiliary Boiler	1.6	5.4	0.7	0.9	1.0	1.0	1.0	0.07	16,919.6		7.1E-05		
Fire Water Pump Diesel Engine	0.1	0.05	0.01	0.0002	0.004	0.004	0.004	0.00001	18.6		1.6E-06		
Emergency Diesel Generator	0.85	0.48	0.03	0.002	0.03	0.03	0.03	0.00014	118.6		1.0E-05		
Cooling Tower					10.5	6.8	2.6						
Circuit Breakers									18.1				
Fuel Oil Tank			0.23										
Total Project PTE	**148.7**	**110.3**	**49.9**	**39.9**	**77.6**	**123.6**	**119.3**	**25.1**	**2,374,632.8**	**125.5**	**2.7E-02**	**3.6**	**8.9**

Notes:

(a) The potential HAP emission calculations presented in Appendix B result in total HAP emissions less than 25 tons/yr. Additionally, potential annual emissions of the maximum individual HAP (hexane) are less than 10 tons/yr.

(b) Potential annual emissions from the combined cycle unit assume the equivalent of 8,040 hr/yr of combustion turbine operation on natural gas with 8,040 hours per year of duct firing, and the full load equivalent of 720 hours per year of combustion turbine operation on ULSD. To allow for maximum operating flexibility Keasbey Energy Center does not propose to include hourly operating restrictions into the permit, but rather comply through the use of annual heat input calculations.

(c) Combined cycle unit start-up/shutdown emissions are added to the baseline steady-state PTE values if the total start-up/shutdown emissions are more than the steady-state full-load equivalent during the period of unit off-line downtime and duration of the start-up (and previous shutdown). For start-up/shutdown emissions noted above as "—" for certain pollutants, the start-up/shutdown emissions addition to the baseline steady-state PTE is not applicable since mass emissions of these pollutants are fuel input based (lb/MMBtu) and the full-load, steady-state basis represents the worst-case scenario for PTE emission calculation purposes.

Table 2-2: Summary of CPV Shore LLC Project (Woodbridge Energy Center) Criteria Pollutant and Total HAPs Annual Emissions

Source	Woodbridge Energy Center Potential Annual Emissions (tons/yr)												
	NO_x	CO	VOC	SO_2	TSP	PM-10	PM-2.5	H_2SO_4	CO2e	NH_3	Pb	Maximum Individual HAP	Total HAPs
Combined Cycle Units Steady-State Basis	135.2	82.7	27.4	11.2	43.4	92.0	92.0	7.7	2,220,740	126.0	5.0E-03		
Combined Cycle Units Start-Up/Shutdown	10.7	205.4	5.8	N/A	0.0	0.0	0.0	N/A	N/A	N/A	N/A		
Auxiliary Boiler	0.92	3.44	0.14	0.05	0.17	0.46	0.46	0.004	10,718		4.5E-05		
Fire Water Pump Diesel Engine	0.1	0.1	0.01	1.6E-04	0.01	0.01	0.01		17.3		1.5E-06		
Emergency Diesel Generator	1.06	0.10	2.4E-02	1.0E-03	6.6E-03	6.6E-03	6.6E-03		110.6		9.4E-06		
Cooling Tower					10.1	6.6	2.4						
Total WEC PTE	**147.9**	**291.8**	**33.4**	**11.3**	**53.7**	**99.1**	**94.9**	**7.7**	**2,231,586**	**126.0**	**5.1E-03**	**2.7**	**10.0**

Table 2-3: Summary of Total Facility Criteria Pollutant and Total HAPs Annual Emissions

Source	Total Facility (KEC and WEC) Potential Annual Emissions (tons/yr)												
	NO_x	CO	VOC	SO_2	TSP	PM-10	PM-2.5	H_2SO_4	CO2e	NH_3	Pb	Maximum Individual HAP	Total HAPs
Combined Cycle Units Steady-State Basis	281.2	165.2	74.8	50.2	109.5	207.8	207.8	32.8	4,578,297.7	251.5	3.2E-02		
Combined Cycle Units Start-Up/Shutdown[(1)]	10.8	227.3	7.4	N/A	0.0	0.0	0.0	N/A	N/A	N/A	N/A		
Auxiliary Boiler	2.5	8.8	0.9	0.9	1.2	1.5	1.5	0.07	27,637.7		1.2E-04		
Fire Water Pump Diesel Engine	0.2	0.1	0.02	0.0003	0.01	0.01	0.01	0.00001	35.9		3.1E-06		
Emergency Diesel Generator	1.91	0.58	0.05	0.003	0.03	0.03	0.03	0.00014	229.2		2.0E-05		
Cooling Tower					20.58	13.39	4.99						
Circuit Breakers									18.1				
Fuel Oil Tank			0.2										
Total Facility PTE	**296.7**	**402.1**	**83.3**	**51.1**	**131.3**	**222.7**	**214.3**	**32.8**	**4,606,219**	**251.5**	**3.2E-02**	**6.3**	**18.9**

3.0 APPLICABLE REQUIREMENTS AND REQUIRED ANALYSES

This section contains an analysis of the applicability of federal and state air quality regulations to the planned 630 MW dual fuel fired combined cycle combustion turbine power facility in Woodbridge Township, Middlesex County, New Jersey. The specific regulations included in this applicability review are the Federal New Source Performance Standards (NSPS), Prevention of Significant Deterioration (PSD) and Non-Attainment New Source Review (NNSR) requirements, Maximum Achievable Control Technology (MACT) applicability for HAPs, Federal Acid Rain Program and NO_x Budget Program requirements, and NJDEP Regulations.

3.1 Federal New Source Performance Standards

The NSPS are technology-based standards applicable to new, modified, and reconstructed stationary sources. The NSPS requirements are established for approximately 70 source categories. Four subparts of these standards apply to the proposed facility: General Provisions (40 CFR 60, Subpart A), Standards of Performance for Stationary Combustion Turbines (40 CFR 60, Subpart KKKK), Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units (40 CFR 60, Subpart Dc), and Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (40 CFR 60, Subpart IIII).

3.1.1 Subpart A: General Provisions

Each source type that is subject to a NSPS of 40 CFR 60 is also subject to the general provisions of Subpart A. The applicable general provisions of Subpart A are detailed in 40 CFR Parts 60.7 (Notification and Recordkeeping) and 60.8 (Performance Tests).

3.1.2 Subpart KKKK: Stationary Combustion Turbines

On July 6, 2006, the U.S. EPA promulgated Subpart KKKK to establish emission standards and compliance schedules for the control of emissions from new stationary combustion turbines that commence construction, modification, or reconstruction after February 18, 2005. Note that stationary combustion turbines regulated under Subpart KKKK are exempt from Subpart GG requirements, which are applicable to units constructed, modified, or reconstructed prior to February 18, 2005. Additionally, heat recovery steam generators (HRSGs) and duct burners regulated under Subpart KKKK are exempt from the requirements set forth in Subparts Da, Db, and Dc for fossil fuel combustion units.

Subpart KKKK establishes emission limits for NO_x for combustion turbines with a heat input capacity (exclusive of duct burners) greater than 850 MMBtu/hr. During natural gas firing, NO_x

emissions are limited to 15 ppm (dry basis by volume, corrected to 15% O_2) or 0.43 lb/MW-hr of useful output. During ULSD firing, NO_x emissions are limited to 42 ppm (dry basis by volume, corrected to 15% O_2) or 1.3 lb/MW-hr of useful output Emissions of SO_2 from combustion turbines regardless of fuel type are limited to 0.90 lb/MW-hr gross output or low-sulfur fuel to achieve no greater than 0.060 lb/MMBtu. Subpart KKKK also limits NO_x emissions from associated duct burners (exclusive of emissions from the stationary combustion turbine) to 54 ppmvd @ 15% O_2 or 0.86 lb/MW-hr of useful output. Note that useful output is defined as the thermal energy made available for use in any industrial or commercial process, or used in any heating or cooling application (i.e., total thermal energy made available for processes and applications other than electrical or mechanical generation).

The Facility's proposed emission rates from the combustion turbine are well below the applicable Subpart KKKK emission standards.

3.1.3 Subpart Dc: Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

The auxiliary boiler is subject to the provisions of 40 CFR Part 60; Subpart Dc because the maximum heat input capacity is between 10 and 100 MMBtu/hr. Subpart Dc requires an initial notification and one-time opacity test for boilers that operate only on natural gas such as the unit proposed. In addition, records must be maintained regarding the amount of fuel burned on a monthly basis. However, since natural gas is the only fuel burned in the auxiliary boiler, there is no reporting requirement to EPA.

3.1.4 Subpart IIII: Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

Subpart IIII establishes emission standards, fuel sulfur limitations, maintenance requirements, operating limitations, monitoring requirements, and recordkeeping requirements for affected units. An affected unit must be a compression ignition designed internal combustion engine that is new (dates vary between April 1, 2006 and 2007 model year) or reconstructed after July 11, 2006. Keasbey Energy Center will purchase and install two (2) internal combustion diesel engines for the emergency generator and emergency fire pump that will meet the applicability requirements of Subpart IIII. Therefore, the proposed potential emission rates of NO_x, CO, PM-10, and VOC from the emergency diesel engines do <u>not</u> exceed the applicable emission standards set forth in Subpart IIII.

3.1.5 Subpart TTTT: Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units

Subpart TTTT establishes emission standards and electric generation monitoring/record keeping requirement for affected units. These standards reflect the degree of emission limitation achievable through the application of the best system of emission reduction (BSER) that the U.S. EPA has determined has been adequately demonstrated for each type of unit. An affected new source is any newly constructed fossil fuel-fired power plant that commenced construction on or after January 8, 2014 and with newly constructed stationary combustion turbines that have a base load rating for fossil fuels greater than 250 MMBtu/hr and serve a generator capable of selling more than 25 MW-net of electricity to the grid. U.S EPA determined that the BSER for new and reconstructed stationary combustion turbines is natural gas combined cycle (NGCC) technology. The final standard for base load combustion turbines is an emission limit of 1,000 pounds of CO_2 per megawatt-hour on a gross-output basis (lb CO_2/MWhr-g). This standard applies to all sizes of base load units.

The method to calculate compliance is to sum the emissions for all operating hours and to divide that value by the sum of the electric energy output over a rolling 12-operating-month period. In compliance determinations, sources must incorporate emissions from all periods, including startup or shutdown, during which fuel is combusted and emissions are being monitored, in addition to all power produced over the periods of emissions measurements.

Taking into account the efficiency metric for the combined-cycle power plant of pounds of CO_2 per gross MW-hr of electrical generation, the capability of HRSG duct firing, the inherent degradation in turbine performance over the life of the Facility, the inclusion of startup and shutdowns and part-load operation over the course of a year, and operation on ULSD backup fuel, it has been concluded that the Facility will meet the NSPS TTTT limit on a 12-month rolling average during the lifetime of facility operation.

3.1.6 Subpart Kb: Standards of Performance for Volatile Organic Liquid Storage Vessels

Subpart Kb establishes VOC standards for volatile organic liquid storage vessels (including petroleum liquid storage vessels) which commenced construction, reconstruction or modification after July 23, 1984. The Project will include the installation of a new ULSD storage tank, with a capacity of 1,000,000 gallons (3,785 cubic meters (m^3)). Subpart Kb exempts storage vessels with capacities greater than or equal to 151 cubic meters storing a liquid with a maximum true vapor pressure less than 3.5 kilopascals. Since the vapor pressure of ULSD is less than 3.5 kilopascals (kPa), Subpart Kb does not apply.

3.2 National Emission Standards for Hazardous Air Pollutants

The National Emissions Standards for Hazardous Air Pollutants (NESHAPs) are emissions standards set by the U.S. EPA for an air pollutant not covered by the National Ambient Air Quality Standards (NAAQS) and that may cause an increase in fatalities or in serious, irreversible, or incapacitating illness. The standards for a particular source category require the maximum degree of emission reduction that the U.S. EPA determines to be achievable, which is known as the Maximum Achievable Control Technology (MACT). These standards are authorized by Section 112 of the Clean Air Act and the regulations are published in 40 CFR Parts 61 and 63. The proposed facility is subject to the following two subparts: General Provisions (40 CFR Part 63, Subpart A) and the emission standards for Reciprocating Internal Combustion Engines (RICE) (40 CFR Part 63, Subpart ZZZZ).

3.2.1 40 CFR Part 63, Subpart A – General Provisions

The emergency diesel generator and fire pump are subject to the general provisions for NESHAPs units in 40 CFR Part 63 Subpart A. These include the requirements for notification, record keeping, and performance testing.

3.2.2 40 CFR Part 63, Subpart YYYY – National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines

Subpart YYYY establishes national emission limitations and operating limitations for HAP emissions from stationary combustion turbines located at major sources of HAP emissions and requirements to demonstrate initial and continuous compliance with the emission and operating limitations. The Keasbey Energy Center is considered an area source of HAPs since HAP emissions are less than the major source applicability limits under 40 CFR 63.6085(b). Therefore, 40 CFR 63 Subpart YYYY is <u>not</u> applicable.

3.2.3 40 CFR Part 63, Subpart ZZZZ – Reciprocating Internal Combustion Engines

Subpart ZZZZ establishes national emission limitations and operating limitations for hazardous air pollutants (HAPs) emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. An area source is defined as a source which is not a major source of HAP emissions. The proposed emergency diesel generator and fire pump are subject to these rules. By complying with the NSPS Subpart IIII, the units will comply with Subpart ZZZZ.

3.2.4 40 CFR 63 Subpart DDDDD – Industrial, Commercial, and Institutional Boilers and Process Heaters Major Sources

40 CFR 63 Subpart DDDDD, also known as Boiler MACT, regulates HAP emissions from boilers and process heaters at facilities that are a major source of HAP. While Keasbey Energy Center will install an auxiliary boiler, the facility will be an area source of HAP. Therefore, major source Boiler MACT does not apply.

3.2.5 40 CFR 63 Subpart JJJJJJ – Industrial, Commercial, and Institutional Boilers Area Sources

Subpart JJJJJJ regulates HAP emissions from boilers at area sources of HAP. The rule defines boiler as:[1]

> *An enclosed device using controlled flame combustion in which water is heated to recover thermal energy in the form of steam and/or hot water.*

Gas fired boilers are exempt from this regulation per 40 CFR 63.11195(e). Gas fired boilers are defined as:

> *Any boiler that burns gaseous fuels not combined with any solid fuels and burns liquid fuel only during periods of gas curtailment, gas supply interruption, startups, or periodic testing on liquid fuel. Periodic testing of liquid fuel shall not exceed a combined total of 48 hours during any calendar year.*

The proposed facility will include one (1) auxiliary boiler that will meet the definition of a gas fired boiler. Therefore, Subpart JJJJJJ does not apply.

3.3 New Jersey Department of Environmental Protection Regulations

Applicable regulations from Chapter 7:27 of the New Jersey Administrative Code are identified below:

- Subchapter 3 "Control and Prohibition of Smoke from Combustion of Fuel" - N.J.A.C. 7:27 - 3.5 limits the opacity from internal combustion engines and stationary combustion turbines to less than 20% opacity, exclusive of condensed water vapor for a period of more than 10 consecutive seconds. The combustion turbine will normally have opacity near zero and it is not expected to exceed even 10% for 10 consecutive seconds.

- Subchapter 4 "Control and Prohibition of Particles Combustion of Fuel" - N.J.A.C. 7:27 - 4.2(a) limits the mass emission of particulates from the proposed combined cycle unit, the auxiliary boiler, the emergency diesel generator, and the emergency diesel fire pump.

The proposed particulate limits from all combustion sources are all well below their respective standards.

- Subchapter 8 "Permits and Certificates" - requires a pre-construction permit to be obtained for a new facility or a minor modification. This application seeks a permit pursuant to Subchapter 22 for the combustion turbine, auxiliary boiler, emergency diesel generator, emergency diesel fire pump, and cooling tower, as a significant modification to an existing Title V facility and is covered by Subchapter 22.

- Subchapter 9 "Sulfur in Fuels" - This subchapter does not limit the sulfur content of gaseous fuels; only liquid and solid fuel sulfur content limits are prescribed. Subchapter 9 limits the sulfur content of ULSD used in the combustion turbine, emergency diesel generator, and fire pump to 15 ppm by weight. Per NSPS Subpart IIII, the Facility is required to use 0.0015% sulfur diesel oil in the emergency diesel generator and emergency diesel fire pump which is well below the Subchapter 9 limit.

- Subchapter 13 "Ambient Air Quality Standards" - The air quality impacts from the proposed facility are predicted not to exceed the standards presented in this subchapter as demonstrated in Section 5 (to be provided).

- Subchapter 16 "Control and Prohibition of Air Pollution by Volatile Organic Compounds" - N.J.A.C. 7:27-16.9 establishes VOC and CO limits of 50 ppm and 250 ppm respectively for a stationary gas turbine. The proposed limits are well below these values for all load cases. The auxiliary boiler is subject to N.J.A.C. 7:27-16.8 which limits VOC and CO emissions to 50 ppm and 100 ppm at 7% oxygen, respectively. The proposed emissions from the boiler are below these limits. Subchapter 16 does not apply to the emergency diesel generator or the emergency diesel fire pump.

- Subchapter 18 "Control and Prohibition of Air Pollution from New or Altered Sources Affecting Ambient Air Quality (Emission Offset Rules)" - Establishes emission offsets and LAER requirements for defined major stationary sources. See Sections 3 and 4 of this application.

- Subchapter 19 "Control and Prohibition of Air Pollution from Oxides of Nitrogen" - Subchapter 19 contains an efficiency limit for natural gas fired combined cycle combustion turbines of 0.75 lb/MW-hr and for ULSD fired combustion turbines of 1.2 lb/MW-hr. In addition, Subchapter 19 limits NO_x emissions for turbines firing ULSD to 0.75 lb/MW-hr during operation on high electric demand days, unless combusting gaseous fuel is not possible due to gas curtailment. The proposed turbine will comply with these limits. N.J.A.C. 7:27-19.7 limits NO_x emissions from the auxiliary boiler to 0.10 lb/MMBtu. The auxiliary boiler's proposed NO_x limit of 0.01 lb/MMBtu is well below the Subchapter 19 standard. In addition, the boiler is required to be adjusted annually. The emergency diesel generator is only subject to the recordkeeping requirements under N.J.A.C. 7:27-19.11. The emergency diesel fire pump is exempt from these regulations since the maximum power output is less than 500 hp.

- Subchapter 21 "Emission Statements" – The facility will submit an annual emissions statement for each reporting year to the NJDEP in accordance with Subchapter 21.

- Subchapter 22 "Operating Permits" – The facility will file for an operating permit modification which is covered by Subchapter 22.24 Significant modifications.

3.4 Attainment Status and Compliance with Air Quality Standards

The location of the proposed combined cycle power facility in Middlesex County, New Jersey is in an area currently designated as attainment for SO_2, NO_2, CO, PM-10, and PM-2.5. Therefore, for these pollutants, the proposed project is required to demonstrate compliance with the NAAQS and NJAAQS shown in Tables 3-1 and 3-2. Middlesex County is designated as moderate non-attainment for the 8-hour ozone standard. Although the proposed project is located in an area classified as moderate non-attainment for O_3, N.J.A.C. 7:27-18.2 states that an emissions increase of more than 25 tons per year of NO_x or VOC would subject the proposed project to non-attainment NSR for these pollutants. Because the Facility has potential emissions of NO_x and VOC above 25 tons per year, NNSR requirements will apply.

3.5 Prevention of Significant Deterioration

3.5.1 Applicability

The Project is seeking an air permit as a major modification to an existing major source. In this case, fossil fuel steam/electric generating facilities with a heat input capacity of more than 250 MMBtu/hr and criteria pollutant emissions greater than the Significant Emission Rate thresholds as tons per year of any regulated pollutant are subject to PSD review. The Project's emissions of CO, PM-10, PM-2.5, GHG's and H_2SO_4, exceed the applicable SER thresholds and, as such, are required to be reviewed subject to PSD regulation.

On June 3, 2010, EPA issued a final rule that "tailors" the applicability provisions of the PSD program to allow EPA and states to phase in permitting requirements for GHG emissions. This final rule is more commonly known as the "Tailoring Rule." The Tailoring Rule established PSD applicability for GHG emissions for a new stationary source to be 100,000 tpy, measured as CO_2e.

On June 23, 2014, the Supreme Court of the United States issued a decision with respect to GHG applicability to the PSD program as well as the Title V operating permit program. The decision stated that, "EPA exceeded its statutory authority when it interpreted the Clean Air Act to require PSD and Title V permitting for stationary sources based on their greenhouse gas emissions. Specifically, the Agency may not treat greenhouse gases as a pollutant for purposes of defining a 'major emitting facility' (or a 'modification' thereof) in the PSD context or a 'major source' in the Title V context." Util. Air Regulatory Grp. v. EPA, Case No. 12-1146, Slip Op. at 29 [June 23, 2014]. The decision goes on further to state that, "EPA may, however, continue to treat greenhouse gases as a 'pollutant subject to regulation under this chapter' for purposes of requiring BACT for 'anyway' sources." An "anyway" source is defined as a source that would be subject to PSD applicability "anyway" due to PSD applicability of another PSD pollutant. The Keasbey Energy Center is considered an "anyway" source, because the potential emissions of other PSD pollutants are above their respective SERs.

Therefore, based on the U.S. Supreme Court's decision, the Keasbey Energy Center, including its GHG emissions, is subject to PSD applicability or BACT review. Based on potential to emit, the proposed facility is subject to PSD permitting requirements for CO, PM/PM-10/PM-2.5, H_2SO_4, and GHG emissions.

3.5.2 Requirements

The PSD regulations state that facilities subject to PSD review must perform an air quality analysis (which can include atmospheric dispersion modeling and preconstruction ambient air quality monitoring), and a Best Available Control Technology (BACT) demonstration for those pollutants that exceed the pollutant-specific significant emission rates (SERs) identified in the regulations as well as an additional impacts analysis that examines the impacts of air emissions from the project on visibility, soils, and vegetation.

3.5.2.1 Best Available Control Technology

Keasbey Energy Center must utilize BACT controls for emissions of CO, PM/PM-10/PM-2.5, and H_2SO_4, from each piece of new equipment. As previously stated, BACT is defined as the optimum level of control applied to pollutant emissions based upon consideration of energy, economic, and environmental factors. In a BACT analysis, the energy, environmental, and economic factors associated with each alternate control technology are evaluated, in addition to the benefit of reduced emissions that the technology would bring. The BACT analysis for the proposed facility is detailed in Section 4.

3.5.2.2 Air Quality Analysis

The PSD air quality impact analysis (described in detail in Section 5, to be provided) requires dispersion modeling that uses emission rates and stack parameters (stack height and flue gas exit temperature and velocity) coupled with historical meteorology representative of the site to predict the location and magnitude of maximum impacts for various pollutants and averaging periods. If dispersion modeling indicates that the predicted air quality impact concentration of a given pollutant emitted from the proposed facility is lower than its respective Significant Impact Level (SIL) shown in Table 3-1, it is considered to have an insignificant impact and no further air quality analysis is required. If modeled concentrations of one or more pollutants exceed their respective SILs, the proposed facility is considered to have an area of impact and requires additional air quality analysis.

3.5.2.3 Ambient Air Quality Monitoring

Proposed facilities subject to PSD review may have to perform up to one year of preconstruction ambient air quality monitoring for those pollutants emitted in amounts exceeding the PSD SERs shown in Table 1-1, unless granted an exemption by the reviewing agency, NJDEP. Pre-application air quality monitoring guidance can be found in Chapter C, Section III.A of the "New Source Review Workshop Manual". Pursuant to the PSD regulations codified in 40 CFR 51.166 and 40 CFR 52.21, the PSD preconstruction monitoring requirement may be satisfied with existing monitoring data if these data can be shown to be representative of air quality in the area of the proposed facility.

TRC, on behalf of the Project, submitted a request to the NJDEP for the planned 630 MW (nominal) dual fuel fired combined cycle power facility for an exemption from the requirement to perform one year of pre-construction ambient air quality monitoring at the proposed facility site on July 12, 2016. The request for waiver from pre-construction ambient air quality monitoring can be found in Appendix D.

3.5.2.4 Impact Area Determination

A proposed facility subject to the PSD regulations must determine its impact on air quality for any pollutant for which it does not have an insignificant impact. The area of impact is defined as the greatest distance from the proposed facility site within which the emissions result in concentrations greater than the significant impact concentrations.

3.5.2.5 Additional Impact Analyses

The fact that the proposed facility's potential emissions are greater than the applicable PSD significant emission rate thresholds means that certain additional analyses are required as part of the PSD review. These include modeling to assess potential for impacts to soils and vegetation, visibility, and include emissions from associated industrial, commercial, and residential growth as well as the emissions from the proposed facility. A more detailed explanation of this analysis is presented in Section 5 of this application.

3.5.2.6 Impacts on Class I Areas

Applicants proposing major projects within 300 km of Class I areas may be required to perform an assessment of potential impacts in the Class I areas. The only Class I area within 300 km of the proposed facility is the Brigantine Wilderness area located in the Edwin B. Forsythe National Wildlife Refuge in New Jersey. This area is located approximately 108 km south of the proposed facility. The Federal Land Manager (FLM) for this Class I area was notified by letter on July 12, 2016 and requested to determine if assessments of impacts in the Class I area would be required. In an email dated July 13, 2016, the FLM indicated that no Class I modeling analyses would be necessary. Copies of both the letter and the FLM's response can be found in Appendix D.

3.5.2.7 Environmental Justice

The purpose of the Environmental Justice (EJ) program is to evaluate whether minority and low-income communities are affected adversely or disproportionately by the actions of federal agencies, including approvals under the PSD program. The EJ analysis is presented in Section 6 of this application.

3.5.2.8 Threatened and Endangered Species

Section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (ESA), directs all Federal agencies to use their existing authorities to conserve threatened and endangered species and, in consultation with the U.S. Fish and Wildlife Service (USFWS), to ensure that their actions do not jeopardize listed species or destroy or adversely modify critical habitat.

On July 15, 2011, the NJDEP and the EPA executed a Memorandum of Understanding that revised conditions of the PSD delegation agreement. More specifically, condition M of the delegation agreement specifies that "pursuant to Section 7 of the Endangered Species Act (ESA), 16 U.S.C. 1531 et seq, and 50 CFR part 402, Subpart B ("Consultation Procedures"), NJDEP shall:

1. Ensure that the USFWS, U.S. National Marine Fisheries Service (NMFS) or other appropriate Federal Land Manager is notified of each PSD application and a copy of the application is provided if requested;
2. Notify applicants of the potential need for consultation between EPA and USFWS/NMFS if the project may affect any endangered species; and
3. Refrain from issuing a final PSD permit until EPA has notified NJDEP that its obligations under the ESA, if any, have been met."

During the preparation of this PSD air permit application, TRC consulted with the USFWS to identify potential impacts to federally-listed threatened and endangered species. At this time, the Project will not require in-water activities or activities adjacent to the Raritan River, and, as such, consultation with NMFS was not conducted. If it is determined the Project will require in-water activities or require in-water work within the Raritan River, TRC will consult with NMFS at the appropriate time.

TRC performed a review of potentially federally-listed threatened and endangered species onsite or within the immediate vicinity of the site using the USFWS' Information Planning and Conservation System (IPAC). An official species list was obtained for the Project from the USFWS on July 5, 2016. The USFWS confirmed there are no federally-listed threatened or endangered species in the vicinity of the Project and there is no critical habitat within the Project area (see Appendix D). As such, no further consultation with the USFWS relative to the ESA is required.

3.6 Non-Attainment New Source (NSR) Review Requirements

3.6.1 Applicability

As stated above, since the proposed facility site is located within a moderate ozone non-attainment area and with potential annual emissions above applicability thresholds for NO_x and VOC, the source is subject to non-attainment NSR.

3.6.2 Requirements

The preconstruction review requirements for major new sources or major modifications located in areas designated non-attainment pursuant to Section 107 of the Clean Air Act Amendments of 1990 (CAAA) differ from the PSD requirements. First, the emissions control requirement for non-attainment areas, LAER, is defined differently and is more stringent than the BACT emissions control requirement. Second, the source must obtain any required emissions reductions (offsets) of the non-attainment pollutant precursors from other sources which impact the same area as the proposed source. Third, the applicant must certify that all other sources owned by the applicant in the State are complying with all applicable requirements of the CAAA, including all applicable requirements in the State Implementation Plan (SIP). Additionally, per the provisions of N.J.A.C. 7:27-18.3(c)(2), the applicant must perform an analysis of alternate sites, equipment sizes, production processes and environmental control technologies.

3.6.2.1 Lowest Achievable Emission Rate

Pollutants subject to non-attainment NSR must be limited to LAER levels. LAER is defined as either the most stringent emission limitation contained in a SIP (unless it is demonstrated to not be achievable) or the most stringent emission limitation which is achieved in practice by the class or category of source, whichever is the most stringent. Pollutants are subject to LAER if potential emissions of individual pollutants exceed significance levels as defined in N.J.A.C. 7:27-18.2. Based upon these criteria, emissions of NO_x and VOC are subject to LAER requirements. LAER analyses for each piece of new equipment with emissions of NO_x and VOC are presented in Section 4 of this application support document.

3.6.2.2 Emission Reduction Credit Requirements

Emissions reductions must be obtained as a condition for approval to operate a major source or major modification planned in a non-attainment area. The emissions reductions, generally obtained from existing sources located in the vicinity of a proposed source must (1) offset the emissions increase from the new source or modification and (2) provide a net air quality benefit. These offsets, obtained from existing sources that have implemented a permanent, enforceable, quantifiable and surplus emissions reduction, must equal the emission increase from the new source or modification multiplied by an offset ratio, and must provide a net air quality benefit. The New Jersey offset requirements are detailed in N.J.A.C. 7:27-18.5.

The amount of offsets required by the unit is determined by multiplying the proposed potential emissions by the offset ratio. Minimum offsets ratios are presented in N.J.A.C. 7:27-18.5, Table 2, and are based upon the distance of the facility from the source of the emission credits. Based upon these requirements, the minimum offset ratio required is 1.3:1.0. The calculation of required offsets for the facility based upon this minimum offset ratio is presented in Table 3-4. The offsets must be obtained and certified for use prior to commencing operation of the facility.

As listed in Table 3-3, Keasbey Energy Center will require 194 tons of NO_x and 65 tons of VOC emission reduction credits. CPV Keasbey, LLC has retained Emission Advisors, to assist in the procurement of the required offsets to satisfy this regulatory requirement.

3.6.2.3 Compliance Status of Other New Jersey Facilities

CPV Keasbey, LLC does not own or operate any other facilities within the State of New Jersey. The Project is being constructed on property owned by CPV Shore Urban Renewal, LLC, a wholly owned subsidiary of CPV Shore Holdings, LP. A Compliance Certification Statement can be found in Appendix F.

3.6.2.4 Analysis of Alternatives

Based on the provisions of N.J.A.C. 7:27-18.3 (c)(2), Keasbey Energy Center is subject to non-attainment new source review requirements. This section presents the results of our analysis of alternative sites, sizes, production processes and environmental control technologies for the proposed facility. The analysis demonstrates that the benefits of developing the facility at the proposed location significantly outweighs the environmental and social costs imposed as a result of the planned facility's construction and operation in Woodbridge Township, Middlesex County, New Jersey. An analysis of alternate sites, production processes and environmental control technologies, equipment sizes, fuel supplies, and other lower polluting energy generation technologies, such as wind or solar, is presented in Section 3.5.2.4.1 through 3.5.2.4.5.

3.6.2.4.1 Alternative Sites Evaluated

The screening and evaluation for the Keasbey Energy Center was performed when CPV was evaluating sites for the CPV Woodbridge Energy Center. The evaluation process started with identifying the electric market, in this case the PJM regional electric transmission grid and the identification of several properties in New Jersey and Pennsylvania where the sites had access to sufficient industrial zoned land in close proximity to electric transmission lines, fuel, and water. Screening efforts focused on evaluating potential sites from numerous perspectives as well as undertaking preliminary evaluations (e.g., PJM interconnection study, fuels supply, etc.) to identify a Project that would minimize impacts to the environment, be market-driven, create jobs, and facilitate economic development within the State of New Jersey. This evaluation also reflected an assessment relative to an extensive list of criteria that included, but was not limited to, the following:

- Proximity of the project to existing major electric transmission lines and/or substations
- Availability of more than 10 acres of land, preferably zoned industrial and with a buffer from sensitive receptor locations such as schools, hospitals and residences
- Availability of adequate water supply and waste water discharge capacity
- Proximity to and ability to cost effectively obtain required fuel supply interconnections

- Proximity to major roadways and/or railways (to facilitate major equipment delivery and construction needs)
- Availability of a site with minimal or no impacts to wetlands
- Availability of a site with no impacts to threatened and endangered species; and,
- Ability to access an adequate supply of labor for construction and operation phases of the project

Based on the evaluation criteria described above, CPV determined that the property in the Township of Woodridge, Middlesex County, New Jersey was the optimal site to develop a power generation facility.

Site Ownership

The site for the proposed Project is currently owned by CPV Shore Urban Renewal, LLC. CPV Shore Urban Renewal, LLC is subsidiary of CPV Power Holdings, L.P. which is the parent company for all of CPV's development projects, including CPV Keasbey, LLC.

Zoning

The Keasbey Energy Center will be built on a subdivided parcel, directly adjacent to the recently completed CPV Shore, LLC Woodbridge Energy Center. As one might have assumed with a similar power generation facility adjacent, the development of the site for the Keasbey Energy Center is compatible with existing and planned land uses and local ordinances. The project site is part of the Township of Woodbridge's EPEC Redevelopment Plan. The site is surrounded by properties utilized for a variety of industrial and commercial uses. Current uses in the area surrounding the site include power generation, warehousing and distribution, chemical manufacturing, bulk storage for transport of aggregates and petroleum products, asphalt batch plant operation and light industry. The closest residential area is located approximately 3,000 feet to the north-northeast and is buffered heavily by roads and highways.

Available Space

The Keasbey Energy Center will be built on land that will be subdivided from property that is currently owned by CPV Shore Urban Renewal, LLC and will be adjacent to the existing Woodbridge Energy Center, a nominal 725 MW natural gas fired combined cycle power generation facility. The subdivided property will be approximately 11 acres. The Woodbridge Energy Center was developed and designed to allow for a future expansion. Therefore, there is adequate space for the Keasbey Energy Center to be constructed and operated on the proposed site. The two power generation facilities will be able to utilize some of the same facilities, including a natural gas pipeline and an administrative building.

Proximity to Critical Infrastructure (Electric, Natural Gas, Water Supply, Wastewater Discharge, Labor and Transportation)

As part of the due diligence effort, CPV Keasbey, LLC evaluated the availability of off-site infrastructure necessary to support construction and operation of the proposed Project. This included an assessment of likely off-site interconnection points to satisfy fuel, transmission system delivery, water supply (reclaimed wastewater from Middlesex County Utilities Authority ("MCUA")) and wastewater disposal requirements. The analysis identified, on a preliminary basis, the potential infrastructure improvements or ancillary facilities necessary, their projected costs and associated environmental permitting requirements. Results are highlighted below:

Off-site infrastructure

Transmission – The facility is located within 2.2 miles of an existing substation (e.g., PSEG Metuchen) which is the preferred tie-in point for the electricity that would be generated by the new combined cycle facility. Electrical interconnection studies are being performed by PJM to identify the network upgrades, improvements and costs for electrically interconnecting at this location. Due to market conditions, this is a different electrical tie-in point than the Woodbridge Energy Center.

Natural Gas – Natural gas will serve the project from the existing Transco lateral that serves the existing Woodbridge Energy Center. This lateral terminates on the site and has enough excess capacity to serve the Keasbey Energy Center.

Reclaimed Water and Wastewater Disposal – The Keasbey Energy Center will utilize reclaimed wastewater supplied by the MCUA to meet the requirements of the facility. The MCUA is located south of the site location, across the Raritan River in Sayreville, Middlesex County, New Jersey. This is the same water treatment plant that serves the Woodbridge Energy Center. A new reclaimed water supply line will need to be built to serve the Keasbey Energy Center.

The ability to use reclaimed water at the facility is advantageous from an environmental perspective. The lack of adequate flow in the rivers, as a result of diversion for industrial purposes, can cause deterioration of water quality and ecosystem health. The use of reclaimed water will also minimize wastewater discharges to the Raritan River from the MCUA. By decreasing wastewater discharges to the Raritan River, the use of reclaimed water at the facility will ultimately contribute to the preservation and enhancement of the Rivers natural, marine habitat. In addition to these environmental benefits, CPV Keasbey, LLC will provide monetary compensation to the MCUA for the reclaimed water to be used at the facility.

CPV Keasbey, LLC will secure its potable water supply via the Middlesex Water Company existing on-site line. Backflow preventers will be constructed at appropriate locations to prevent cross contamination of potable water and reclaimed water supplies. Process water and sanitary discharges from the plant will be discharged to the Township of Woodbridge sewer system and ultimately back to the MCUA via the Woodbridge Energy Center's existing sanitary sewer line. The MCUA facilities comprise one of the largest sewage plants in the State of New Jersey and are equipped with state-or-the-art technology to treat industrial wastewater. Therefore, the MCUA will have sufficient capacity to treat effluent from the proposed facility.

Labor – There is an adequate labor pool in the area from which to draw on during facility construction and operation. It is anticipated that the required construction labor force for the project will be readily met with the available trades and union workforce in the Middlesex County area without the need for in-migration of construction workers from outside the New Jersey/New York metropolitan area.

Transportation – At the proposed site, sufficient options (i.e., roadways, railways and waterways) during construction for the delivery of equipment, materials and plant components and from employee access once operations commence. Major highways surrounding the Project site include routes I-287, I-95, Route 440 and Route 9. Railroad tracks owned by Consolidated Rail Corporation are located immediately to the north of the side along Industrial Avenue. The Raritan River is south of the site and has a several off-loading areas near the facility site.

3.6.2.4.2 Alternative Sizes

Based upon a variety of studies as part of its electric generation development evaluations (e.g., PJM electric interconnect studies, electric pricing, PJM capacity pricing, site availability/space, combustion turbine technology and availability, delivery schedule, cost and operational performances, etc.), CPV Keasbey has determined that the optimal development for the Project site is a nominal 630 MW, dual-fuel, combined cycle power generation facility operating in a 1x1 (i.e., 1 combustion turbine and 1 steam turbine) configuration with a natural gas duct burner. The project evaluated utilizing General Electric ("GE") 7FA.05 combustion turbines (currently operating at the Woodbridge Energy Center), but based on the current PJM pricing model, the desired operating efficiency and performance of the combustion turbine, the availability, and the cost, CPV Keasbey selected the GE 7HA.02 machine for the proposed Project. The GE 7HA.02 combustion turbine is the cleanest, most efficient combustion turbine available today.

3.6.2.4.3 Production Process and Fuel Supply

The Project is designed primarily as a natural gas fired combined cycle facility with the ability to use ultra-low sulfur diesel (ULSD) as a backup fuel source to enhance reliability. The use of modern combined cycle technology promotes the efficient utilization of fuel for electric generation. Increasing fuel efficiency favorably affects the cost of generating electricity. The proposed Keasbey Energy Center has been designed to meet the objective of providing reliable, efficient, economical and environmentally safe electricity to meet the current and future demands for electric generation capacity in the State of New Jersey.

With its design reflecting the storage and use of ULSD, Keasbey Energy Center will be able to provide a sustained and predictable supply of electric capacity to the PJM system, especially when other PJM generation assets may not be available to deliver power due to the impacts of extended cold temperatures (e.g., unprecedented forced outage rates were experienced by power generators during recent winters). Finally, the Project's dual fuel capability will also satisfy the Federal Energy Regulatory Commission's PJM Capacity Performance Filing of 12/12/14, as amended in April 2015.

3.6.2.4.4 Alternative Energy Generation Technologies Consideration

CPV Keasbey evaluated the environmental, economic, and social costs for the development/ construction of alternative energy generation technologies at the existing CPV Shore site. The conclusion was that development of the previously planned-for combined cycle electric generation plant at this location was the most effective way to revitalize and redevelop the area. Development of wind energy is not a viable option due to the lack of sustainable wind resources and available space on the property. Likewise, development of the site with solar panel arrays is an option that CPV Keasbey has evaluated. However, this is not viable due to lack of sufficient space to generate an equivalent 630 MW. Further, it is not an efficient use of the land, based on the MW/acre energy generating density offered by photovoltaic panels. The original development project (Woodbridge Energy Center) proposed economic justification and the Township's expectations relative to the subsequent future development of the site reinforced CPV Keasbey's plans to develop a second combined cycle power plant project at this location.

3.6.2.4.5 Environmental Control Technologies

Based upon the Project's site location and non-attainment status, the premise for development of the Keasbey Energy Center is that it would be designed to meet federal BACT and Lowest LAER standards to comply with PSD requirements, NSR requirements, and New Jersey SOTA requirements. The facility's design reflects the following:

- Utilization of the highly efficient GE 7HA.02 combustion turbine.
- Dry low NO_x combustion technology for the combustion turbine (during natural gas firing), water injection (during ULSD firing), and selective catalytic reduction system (SCR) for NO_x control.
- An oxidation catalyst for CO and VOC control.
- Natural gas and ULSD to minimize emissions of SO_2 and PM/PM-10/PM-2.5.
- A cooling tower design that will include high efficiency drift eliminators that are designed to meet 0.0005% control efficiency.
- Utilization of aqueous ammonia (at 19.5%) as opposed to anhydrous ammonia for the SCR system.
- Lastly, the Project's engineering design reflects the planned use of treated wastewater effluent (gray water) from the Middlesex County Utilities Authority regional wastewater treatment plant which is consistent with the New Jersey Department of Environmental Protection's policy of encouraging the use of reclaimed water for beneficial reuse.

3.6.2.4.6 Environmental/Social Costs and Benefits of the Proposed Facility

The proposed Keasbey Energy Center meets or exceeds key objectives articulated by New Jersey State officials for projects that are market driven, create jobs, and produce economic development within the State and Middlesex County. The proposed Project also satisfactorily addresses the evaluation criteria detailed above. These include:

- Construction of the proposed Project will require an average work force of 500-600 people during the 30-month construction schedule.
- The facility, once operational, will employ up to an additional six (6) Full Time Equivalent (FTE); total FTEs at the combined facility will be 28 skilled staff for facility operations.
- There will be minimal, if any, impact on local roadways after construction.
- Middlesex County Utilities Authority, will receive additional revenue for water supply as part of an agreement between Keasbey Energy Center and the Authority.
- The facility's engineering design will ensure compliance with BACT, LAER, and New Jersey SOTA regulatory requirements.
- The Project will have minimal or no impacts on wetlands. It also is not anticipated to impact scenic, recreational, or cultural resources.
- The Project will comply with both state and local noise requirements.
- The Project is located in an ozone non-attainment area and will purchase emission reduction credits for NO_x and VOC at a ratio of 1.3 to 1.0.

- Woodbridge Township will receive an annual payment pursuant to an executed Payment In-Lieu of Taxes (PILOT) Agreement.

3.7 Cross State Air Pollution Rule

U.S. EPA finalized the Cross State Air Pollution Rule (CSAPR) in July 2011 as a replacement for the Clean Air Interstate Rule (CAIR). On December 30, 2011, the D.C. Circuit stayed the rule two days before it was set to go into effect, ordering the EPA to continue administering the previously promulgated CAIR until a final decision could be made on the merits of CSAPR. On August 21, 2012, the U.S. Court of Appeals for the District of Columbia vacated CSAPR in a 2-1 decision. In the August 21, 2012 Order, the panel held that CSAPR exceeded the EPA's statutory authority under the Clean Air Act in two ways: (1) the court determined that CSAPR may require upwind states to reduce their emissions by more than their own significant contributions to a downwind state's nonattainment, contrary to the statute, and (2) the court found that the EPA lacked authority to implement the required emissions reductions through Federal Implementation Plans (FIPs), rather than affording the states an initial opportunity to implement the reductions through State Implementation Plans (SIPs).

On October 5, 2012, the EPA filed a petition with the U.S. Court of Appeals for the District of Columbia requesting en banc rehearing of its ruling on CSAPR, which was denied. However, on June 24, 2013, the U.S. Supreme Court granted EPA's petition to review the D.C. Court of Appeals' decision. On April 29, 2014, the U.S. Supreme Court issued an opinion reversing the August 21, 2012 D.C. Circuit decision that had vacated CSAPR. Following the remand of the case to the D.C. Circuit, EPA requested that the court lift the CSAPR stay and toll the CSAPR compliance deadlines by three years. On October 23, 2014, the D.C. Circuit granted EPA's request. Accordingly, CSAPR Phase 1 implementation began on January 1, 2015, with Phase 2 beginning in 2017. Similar to other trading programs, CSAPR establishes an allowance trading system to reduce emissions NO_x and SO_2 from power plants. EPA established individual state emissions budgets based on the emissions reductions that each upwind state must achieve to prevent it from unlawfully interfering with other states efforts to achieve the NAAQS. CSAPR also includes an "assurance provision" which requires a state's covered sources to surrender additional allowances if the state's overall emissions threshold is exceeded.

3.8 Greenhouse Gas Monitoring

On September 22, 2009, EPA promulgated the final 40 CFR Part 98 greenhouse gas monitoring and reporting regulations that require approximately 10,000 facilities to report their greenhouse gas (GHG) emissions annually. The reporting rule generally applies to facilities that emit more than 25,000 tons of GHG a year and identifies 29 specific categories of covered sources, such as oil refineries, pulp and paper manufacturing, landfills, manure management, and producers of aluminum, cement, iron and steel, glass, and various chemicals, as well as a residual category for facilities with large stationary fuel burning sources. Covered facilities started monitoring on January 1, 2010. The proposed facility is subject to the federal GHG Monitoring requirements and will meet them through use of 40 CFR Part 75 monitoring methodologies.

3.9 Section 112(r) Applicability

Aqueous ammonia will be used as the reducing agent in the project's SCR system for controlling NO_x emissions from the combustion turbine. The NO_x reduction achieved by the SCR system is affected by the ratio of ammonia (NH_3) to NO_x. Section 112(r) of the Clean Air Act and the U.S. EPA's Risk Management Program regulations (40 CFR Part 68) require modeling a catastrophic release of any stored ammonia at 20% concentration or above in order to ensure the protection of the off-site public. Furthermore, based on the "general duty" clause of Section 112(r), such analyses can be required even if the aqueous ammonia solution is diluted below 20%. Keasbey Energy Center proposes to store aqueous ammonia at a maximum ammonia concentration of 19.5% or less as the means of complying with Section 112(r).

Table 3-1: National Ambient Air Quality Standards, PSD Increments, Significant Monitoring Concentrations, and Significant Impact Levels

Pollutant	Averaging Period	NAAQS[a] ($\mu g/m^3$)	Class II PSD Increment ($\mu g/m^3$)	Significant Monitoring Concentrations ($\mu g/m^3$)	Significant Impact Level ($\mu g/m^3$)
Carbon Monoxide	1-Hour 8-Hour	40,000 10,000	-- --	-- 575	2,000 500
Nitrogen Dioxide	1-Hour Annual	188 100	-- 25	-- 14	7.5 1
Ozone (VOC)	8-Hour	160	--	--	--
Coarse Particulate Matter (PM-10)	24-Hour Annual	150 --	30 17	10 --	5 1
Fine Particulate Matter (PM-2.5)	24-Hour Annual	35 12	9 4	4 --	1.2 0.3
Sulfur Dioxide	1-Hour 24-Hour Annual 3-Hour	197 -- 80 --	-- 91 20 512	-- 13 -- --	7.9[b] 5 1 25
Lead	3-Month	0.15	--	0.1	--

Notes:
(--) indicates there are no standards for this pollutant.
[a]All short-term (1-hr, 3-hr, 8-hr, and 24-hr) standards except ozone, PM-2.5,PM-10, and 1-hour SO_2 and NO_2 are not to be exceeded more than once per year. For 8-hr ozone, EPA uses the average of the annual 4th highest 8-hour daily maximum concentrations from each of the last three years of air quality monitoring data to determine a violation of the standard. For 24-hour PM-10, EPA uses the 6th highest 24-hour maximum concentration from the last three years of air quality monitoring data to determine a violation of the standards. For 24-hour PM-2.5, EPA uses the 98th percentile 24-hour maximum concentration from the last three years of air quality monitoring data to determine a violation of the standard. For the 1-hour NO_2 NAAQS, compliance would be determined by the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area and for the 1-hour SO_2 NAAQS, compliance would be determined with the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area.
[b]Interim SIL per August 12, 2010 memorandum "Guidance Concerning the Implementation of the 1-hour SO2 NAAQS for the Prevention of Significant Deterioration Program" from Steven Page (Director of U.S. EPA OAQPS).

Table 3-2: New Jersey Ambient Air Quality Standards

Pollutant	Standard	Averaging Period	NJAAQS[a] (ug/m³)
Sulfur Dioxide	Primary Primary Secondary Secondary Secondary	12-month arith. mean 24-hour average 12-month arith. mean 24-hour average 3-hour average	80 365 60 260 1,300
Total Suspended Particulates	Primary Primary Secondary Secondary	12-month geom. mean 24-hour average 12-month geom. mean[b] 24-hour average	75 260 60 150
Carbon Monoxide	Primary & Secondary Primary & Secondary	8-hour average 1-hour average	10,000 40,000
Ozone[c]	Primary Secondary	Max. daily 1-hour average 1-hour average	235 160
Nitrogen Dioxide	Primary & Secondary NJDEP Guideline	12-month arith. mean 1-hour average	100 470
Lead	Primary & Secondary	Rolling 3-month average	1.5

Notes:
[a]New Jersey short-term standards are not to be exceeded more than once in any 12 month period. Long-term standards are never to be exceeded.
[b]Intended as a guideline for achieving short-term standard.
[c]Maximum daily 1-hour average: averaged over a three year period, the expected number of days above the standard must be less than or equal to 1.

Table 3-3: Emission Reduction Credits Required for Keasbey Energy Center

Pollutant	Proposed Facility Potential Emissions (tons/yr)	Minimum Offset Ratio	Minimum Required ERC's (tons)
NO_x	148.7	1.3 to 1	194
VOC	49.9	1.3 to 1	65

4.0 CONTROL TECHNOLOGY ANALYSIS

4.1 Overview

Pre-construction review for new major stationary sources located in the State of New Jersey involves an evaluation of Best Available Control Technology (BACT), Lowest Achievable Emission Rate (LAER) technology and/or State-of-the-Art (SOTA). If an area is designated by U.S. EPA as attainment or unclassifiable for a particular pollutant, then new major sources will require permitting under the Prevention of Significant Deterioration (PSD) program, including a BACT demonstration for pollutants emitted in quantities greater than the regulatory thresholds. However, if an area is designated by U.S. EPA as non-attainment for a given pollutant and the major source has the potential to emit the non-attainment pollutant at levels greater than the pollutant-specific regulatory thresholds, then non-attainment new source review (NSR) applies. NNSR requires the application of LAER technology and the requirement to obtain emission offsets. If the proposed project's emissions increase exceeds NJDEP's SOTA threshold for regulated pollutants, SOTA requirements will also apply.

A control technology analysis has been performed for the proposed Facility based upon guidance presented in the draft U.S. EPA Guidance Document *New Source Review Workshop Manual*, (October 1990) and the NJDEP's *State of the Art (SOTA) Manual for Combustion Turbines* (December 21, 2004).

Note that throughout this section, "ppm" concentration levels for gaseous pollutants are parts per million by volume, dry basis, corrected to 15% O_2 content (ppmvd @ 15% O_2), unless otherwise noted. Likewise, all emission factors expressed as pounds of pollutant per million Btu of fuel (lb/mmBtu) are based upon the HHV of the fuel.

4.2 Applicability of Control Technology Requirements

An applicability determination, as discussed in this section, is the process of determining the level of emission control required for each applicable air pollutant. Control technology requirements are generally based upon the potential emissions from the new or modified source and the attainment status of the area in which the source is to be located. A detailed determination of applicable regulations, including control technology requirements under the PSD and non-attainment rules, is provided in Section 3 of this application. The following sections discuss the applicability of BACT, LAER, and additional NJDEP requirements for emissions from equipment included in this permit application.

4.2.1.1 PSD Pollutants Subject To BACT

Pollutants subject to PSD review are subject to a BACT analysis. BACT is defined as an emission limitation based on the maximum degree of reduction, on a case-by-case basis, taking into account energy, environmental and economic considerations. The proposed Facility is considered a "major" modification to an existing major source for PSD purposes since potential emissions exceed Significant Emission Rate thresholds. Therefore, individual regulated pollutants are subject to BACT requirements if potential emissions exceed the significant emission rates presented in 40 CFR 52.21(b) (23) in a PSD (attainment) area, as presented in Table 1-1. Based upon these criteria, NO_x, CO, PM/PM-10/PM-2.5, H_2SO_4, and GHG are all subject to BACT requirements. Since the area is designated attainment for NO_2, NO_x emissions are subject to BACT, as well as the more stringent LAER requirements under the ozone non-attainment provisions, since NO_x is also a precursor for ozone formation and subject to non-attainment NSR. Since LAER technology is generally at least as stringent as BACT, the LAER analysis will satisfy the BACT requirements for NO_x.

4.2.1.2 Non-Attainment Pollutants Subject To LAER

Pollutants subject to NNSR must be limited to LAER levels. LAER is defined as the more stringent of (1) the most stringent emission limitation which is achieved in practice by the class or category of source or (2) the most stringent emission limitation contained in the applicable State Implementation Plan (SIP) (unless such emission rate is demonstrated not to be achievable), whichever is more stringent. LAER will be based upon the lowest permitted emission rates that are verified as being achieved in practice, as discussed in the appropriate section by pollutant. Pollutants are subject to LAER if potential emissions of individual pollutants exceed area-specific emission thresholds. Although the proposed project is located in an area classified as moderate non-attainment for O_3, N.J.A.C. 7:27-18.2 states that an emissions increase of more than 25 tons per year of NO_x or VOC (listed in Table 1-1) will subject the proposed Project to non-attainment NSR and LAER for these pollutants. Based upon these criteria, emissions of NO_x and VOC are subject to LAER requirements.

4.2.1.3 Pollutants Subject to SOTA

SOTA is a New Jersey State requirement that is defined as equipment, devices, methods or techniques as determined by the NJDEP which will prevent, reduce or control emissions of an air contaminant to the maximum degree possible and which are available or may be made available. SOTA for most sources is well defined based upon previous permitting efforts or emission levels presented in NJDEP SOTA Manuals. As defined in Section 1.4 of the SOTA Manual (July 1997), compliance with SOTA requirements can be shown through documentation of compliance with emission levels or technology requirements defined in an applicable SOTA

Manual. Pollutants for which potential emissions are below 5 tons per year (TPY) are not subject to NJDEP SOTA requirements. Pollutants subject to LAER, BACT, or NSPS (promulgated on or after August 2, 1995) meet or exceed New Jersey SOTA requirements. Those emissions of pollutants not subject to BACT, LAER, or NSPS are subject to SOTA requirements. For the proposed facility, pollutants subject to SOTA only include ammonia (NH_3) and opacity from turbine operations. Note that since emissions of ammonia from the ammonia storage tank are less than 5 TPY, the storage tank is not subject to the SOTA provisions. Additionally, SOTA requirements for opacity emissions have been addressed in Section 4.11.

4.3 Approach Used in BACT Analysis

PSD BACT as defined in 40 CFR 52.21 means:

"an emissions limitation (including a visible emission standard) based on the maximum degree of reduction for each pollutant subject to regulation under the Act which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant. In no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR Parts 60 and 61."

Typically, PSD BACT follows a five step "top-down" approach: (1) identify all control technologies; (2) eliminate technically infeasible options; (3) rank remaining control technologies by control effectiveness; (4) evaluate most effective controls and document results; and (5) select BACT.

However, a key exception to the strict, five-step "top-down" approach is described in page B-8 of the U.S. EPA's October 1990 draft New Source Review Workshop Manual (the "NSR Manual):

"If the applicant accepts the top alternative in the listing as BACT, the applicant proceeds to consider whether impacts of unregulated air pollutants or impacts in other media would justify selection of an alternative control option. If there are no outstanding issues regarding collateral environmental impacts, the analysis is ended and the results proposed as BACT. In the event that the top candidate is shown to be inappropriate, due to energy, environmental, or economic impacts, the rationale for this finding should be documented for the public record.

Then the next most stringent alternative in the listing becomes the new control candidate and is similarly evaluated. This process continues until the technology under consideration cannot be eliminated by any source-specific environmental, energy, or economic impacts which demonstrate that alternative to be inappropriate as BACT."

The BACT analysis for the planned Keasbey Energy Center Project was conducted consistent with the above definition as well as U.S. EPA's five step "top-down" BACT process. This methodology results in the selection of the most stringent control technology in consideration of the technical feasibility and the energy, environmental, and economic impacts. Control options are first identified for each pollutant subject to BACT and evaluated for their technical feasibility. Options found to be technically feasible are ranked in order of their effectiveness and then evaluated for their energy, economic, and environmental impacts. In the event that the most stringent control identified is selected, no further analysis of impacts is performed. If the most stringent control is ruled out based upon economic, energy, or environmental impacts, the next most stringent technology is similarly evaluated until BACT is determined.

After establishing the baseline emissions levels required to meet any applicable New Source Performance Standards (NSPS), National Emissions Standards for Hazardous Air Pollutants (NESHAPs), or SIP limitations, the "top-down" procedure followed for each pollutant subject to BACT is outlined as follows:

Step 1: Identify available control options from review of U.S. EPA RACT/BACT/LAER Clearinghouse (RBLC), agency permits for similar sources, literature review, and contacts with air pollution control system vendors.

Step 2: Eliminate technically infeasible options - evaluation of each identified control to rule out those technologies that are not technically feasible (i.e., not available and applicable per USEPA guidance).

Step 3: Rank remaining control technologies - "Top-down" analysis, involving ranking of control technology effectiveness.

Step 4: Evaluate most effective controls and document results - Economic, energy, and environmental impact analyses are conducted if the "top" or most stringent control technology is not selected to determine if an option can be ruled out based on unreasonable economic, energy or environmental impacts.

Step 5: Select the BACT based upon the highest ranked option that cannot be eliminated, which includes development of an achievable emission limitation based on that technology.

As previously stated, BACT is defined as the optimum level of control applied to pollutant emissions based upon consideration of energy, economic and environmental factors. The BACT analyses may include reductions achieved through the application of processes, systems, and techniques for the control of each air pollutant. U.S. EPA has placed potentially applicable control alternatives identified and evaluated in the BACT analysis into the following three categories:

(1) Inherently lower-emitting processes/practices/designs;
(2) Add-on controls, and;
(3) Combinations of (1) and (2).

4.3.1 Inherently lower-emitting processes/practices/designs

Lower-polluting processes (including design considerations) should be considered based on demonstrations made on the basis of manufacturing identical or similar products from identical or similar raw materials or fuels.

4.3.1.1 Change in raw materials

This emissions limiting technique typically applies to industrial processes that use chemicals, such as solvents, where substitution with a lower emitting chemical may be technically feasible. In the case of the proposed Project, the "raw material" is the fuel combusted for the generation of electricity. The Project proposes the primary use of natural gas with back-up ULSD operation as BACT for the combustion turbine.

4.3.1.2 Process Modifications

Process modifications may be implemented if a change in the process methods or conditions can result in lower emissions. In the case of the Project, the "process" is the combustion turbine firing natural gas or ULSD. The GE 7HA.02 combined cycle technology is among the most efficient fossil fuel power plant designs currently available. Therefore, process modifications beyond what is already proposed are not technologically feasible.

4.3.2 Technically Feasible Add-on Control Options

The first step is identification of available technically feasible control technology options, including consideration of transferable and innovative control measures that may not have previously been applied to the source type under analysis. The minimum requirement for a BACT proposal is an option that meets federal NSPS limits or other minimum state or local requirements that would prevail in the absence of BACT decision-making such as NJDEP SOTA emission standards. After elimination of technically infeasible control technologies, the remaining options are ranked by control effectiveness.

If there is only a single feasible option, or if the applicant is proposing the most stringent alternative, then no further analysis is required. If two or more technically feasible options are identified, the next three steps are applied to identify and compare the economic, energy, and environmental impacts of the options. Technical considerations and site-specific sensitive issues will often play a role in BACT determinations. Generally, if the most stringent technology is rejected as BACT, the next most stringent technology is evaluated, and so on.

In order to identify options for each class of equipment, a search of the U.S. EPA's RACT/BACT/LAER Clearinghouse (RBLC) has been performed. Individual searches have been performed for each pollutant (subject to BACT/LAER) emitted from each emissions unit. The most recently issued permits for GE 7HA.02 combustion turbines not yet on the RBLC were also analyzed. Results of the RBLC and the review of other recent permits are summarized in Appendix C.

4.3.2.1 Economic (Cost-Effectiveness) Analysis

This analysis consists of estimation of costs and calculation of the cost-effectiveness of each control technology, on a dollar per ton ($/ton) of pollution removed basis. Annual emissions of an option are subtracted from base case emissions to calculate tons of pollutant controlled per year. The base case may be uncontrolled emissions or the maximum emission rate allowable without BACT considerations that would generally correspond to an NSPS or SOTA level. Annual costs, in dollars per year ($/yr), are calculated by adding annual operation and maintenance costs to the annualized capital cost of an option. Cost-effectiveness ($/ton) of an option is simply the equivalent annual cost ($/yr) divided by the annual reduction in emissions (ton/yr).

Note that no economic analysis is required if either the most effective option is proposed or if there are no technically feasible control options.

4.3.2.2 Energy Impact Analysis

Two forms of energy impacts that may be associated with a control option can normally be quantified. Increases in energy consumption resulting from increased heat rate may be shown as incremental Btu's or fuel consumed per year. Also, the installation of a control option may reduce the output and/or reliability of the proposed equipment. This reduction would also result in loss of revenue from power sales.

4.3.2.3 Environmental Impact Analysis

The primary focus of the environmental impact analysis is the reduction in ambient concentrations of the pollutant being emitted. Increases or decreases in emissions of other criteria or non-criteria pollutants may occur with some technologies, and should also be identified. Non-air related impacts, such as solid waste disposal and increased water consumption/treatment, may be an issue for some projects and control options.

4.3.3 Achievability

BACT and LAER are based on the premise that the limit established through the respective process must be achievable. However, there is an important distinction between emission rates achieved at a specific time on a specific unit, and an emission limitation that a unit must be able to meet continuously over its operating life.

The U.S. EPA has reached the following conclusion in prior determinations for PSD permits:

"Agency guidance and our prior decisions recognize a distinction between, on the one hand, measured 'emissions rates,' which are necessarily data obtained from a particular facility at a specific time, and on the other hand, the 'emissions limitation' determined to be BACT and set forth in the permit, which the facility is required to continuously meet throughout the facility's life. Stated simply, if there is uncontrollable fluctuation or variability in the measured emission rate, then the lowest measured emission rate will necessarily be more stringent than the "emissions limitation" that is "achievable" for that pollution control method over the life of the facility. Accordingly, because the "emissions limitation" is applicable for the facility's life, it is wholly appropriate for the permit issuer to consider, as part of the BACT analysis, the extent to which the available data demonstrate whether the emissions rate at issue has been achieved by other facilities over a long term."[2]

Therefore, BACT must be set at the lowest feasible emission rate recognizing that the facility must be in compliance with that limit for the lifetime of the facility on a continuous basis. While viewing individual unit performance can be instructive in evaluating what BACT might be, any actual performance data must be viewed carefully, as rarely will the data be adequate to truly assess the performance that a unit will achieve during its entire operating life.

In addition, emission limits from existing permitted facilities must be used with caution in assessing what is "achievable." For example, limits established for facilities that were never built must be viewed with caution, as they have never been demonstrated and that facility/company/applicant never took a significant liability in having to meet that limit. Likewise, permitted units that have not yet commenced construction must also be viewed with caution for similar reasons.

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[2] EPA Environmental Appeals Board Decision, In re: Newmont Nevada Energy Investment LLC PSD Appeal No. 05-04, decided December 21, 2005.

4.3.4 BACT Proposal

The determination of BACT for each pollutant from a given emission unit is based on a review of the above-listed impact categories and the technical factors that affect feasibility of the control alternatives under consideration. The methodology described above is applied to the proposed Project for the pollutants specified in Section 4.2.1.1.

4.4 LAER/BACT Analysis for Nitrogen Oxides

This section presents LAER and BACT determinations for control of NO_x emissions from the combined cycle combustion turbine and duct burner, the auxiliary boiler, the emergency diesel generator, and the emergency diesel fire pump. For each type of equipment, alternative control technologies are evaluated and existing permit limits for units in the same source categories are identified.

As previously discussed, a LAER determination for a source category is based upon the more stringent of either 1) the most stringent emission limitation contained in the SIP for such class or category of source or 2) the most stringent emission limitation achieved in practice by such class or category of source unless demonstrated to not be achievable. To determine the most stringent permit limit, a search of the RBLC and recently issued applicable air permits was performed. The results of the search are presented in Section 4.4.1 and Appendix C.

The formation of NO_x in combustion units is determined by the interaction of chemical and physical processes occurring within the combustion chamber. There are two principal forms of NO_x, designated as "thermal" NO_x and "fuel" NO_x. Thermal NO_x formation is the result of oxidation of atmospheric nitrogen contained in the inlet gas in the high temperature, post flame region of the combustion zone. The major factors influencing thermal NO_x formation are temperature, concentrations of nitrogen and oxygen in the inlet air and residence time within the combustion zone. Fuel NO_x is formed by the oxidation of fuel bound nitrogen. NO_x formation can be controlled by adjusting the combustion process and/or by installing post combustion controls. Section 4.4.2 provides a technical description of NO_x control techniques for all the applicable equipment and the relative availability and suitability for the proposed Project.

4.4.1 Review of NO_x RBLC Database

4.4.1.1 Combined Cycle Combustion Turbine

A search of the RBLC and available permits identified numerous recent natural gas-fired combined cycle combustion turbine projects with NO_x emissions limits of 2.0 ppm. All of the projects permitted for a NO_x emission limit of 2.0 ppm use selective catalytic reduction (SCR) in addition to dry low-NO_x (DLN) or low-NO_x burner (LNB) technology. No permit was found with an emissions level below 2 ppm. The remaining projects have limits between 2.5 and 15 ppm.

For ULSD firing, there are far fewer recently permitted combined-cycle combustion turbine projects. The most recently permitted combined-cycle combustion turbines firing ULSD are permitted with NO_x emissions limits ranging from 4.0 ppm to 10.0 ppm. All of the projects permitted at these levels use SCR in addition to DLN or LNB technology.

4.4.1.2 Auxiliary Boiler

An RBLC search of recent air permits for natural gas-fired boilers between 10 and 100 mmBtu/hr identified numerous projects with NO_x emissions limits ranging from 0.01 lb/mmBtu to 0.05 lb/mmBtu with a majority of the recently permitted projects having NO_x emissions of 0.011 lb/MMBTU. All of the projects permitted at these levels utilize LNB technology.

4.4.1.3 Emergency Diesel Engines

The RBLC indicates that the range of permitted NO_x limits for diesel engines similar to the Project's emergency diesel fire pump are 0.57 to 4.43 lb/mmBtu, as summarized in Appendix C. The range of permitted NO_x limits for diesel engines similar in size to the Project's emergency diesel generator are 0.01 to 4.43 lb/mmBtu, as summarized in Appendix C.

4.4.2 Identification of NO_x Control Options and Technical Feasibility

The following sections detail the options that were identified for controlling NO_x emissions from the combined cycle combustion turbine, auxiliary boiler, and emergency diesel engines. Their technical feasibility and respective level of commercially demonstrated NO_x reduction of each option is also discussed.

4.4.2.1 Combined Cycle Combustion Turbine

The following control technologies for NO_x were evaluated: Lean Burn Combustion, Selective Catalytic Reduction (SCR), Selective Non-Catalytic Reduction (SNCR), XONON™ and $SCONO_x$™.

Lean Burn Combustion – Typical gas turbines are designed to operate at a nearly stoichiometric ratio of fuel and in the combustion zone, with additional air introduced downstream. This is the point where the highest combustion temperature and quickest combustion reactions (including NO_x formation) occur. Fuel-to-air ratios below stoichiometric are referred to as fuel-lean mixtures (i.e., excess air in the combustion chamber); fuel-to-air ratios above stoichiometric are referred to as fuel-rich (i.e., excess fuel in the combustion chamber). The rate of NO_x production falls off dramatically as the flame temperature decreases. Thus, very lean, dry combustors can be used to control emissions.

Based upon this concept, lean combustors are designed to operate below the stoichiometric ratio, thereby reducing thermal NO_x formation within the combustion chamber. The lean combustors typically are two-staged, premixed combustors designed for use with natural gas fuel. The first stage serves to thoroughly mix the fuel and air and to deliver a uniform, lean, unburned fuel-air mixture to the second stage.

Selective Catalytic Reduction (SCR) – SCR is an add-on NO_x control technique that is placed in the exhaust stream following the gas turbine/duct burner. SCR involves the injection of ammonia (NH_3) into the exhaust gas stream upstream of a catalyst bed. On the catalyst surface, ammonia reacts with NO_x contained within the flue gas to form nitrogen gas (N_2) and water (H_2O) in accordance with the following chemical equations:

$$4NH_3 + 4NO + O_2 \rightarrow 4N_2 + 6H_2O$$
$$8NH_3 + 6NO_2 \rightarrow 7N_2 + 12H_2O$$

The catalyst's active surface is usually a noble metal (platinum), base metal (titanium or vanadium) or a zeolite-based material. Metal-based catalysts are usually applied as a coating over a metal or ceramic substrate. Zeolite catalysts are typically a homogenous material that forms both the active surface and the substrate. The geometric configuration of the catalyst body is designed for maximum surface area and minimum obstruction of the flue gas flow path in order to achieve maximum conversion efficiency and minimum back pressure on the gas turbine/duct burner. The most common configuration is a "honeycomb" design. Ammonia is then fed and mixed into the combustion gas stream upstream of the catalyst bed. Excess ammonia (NH_3) that does not react in the catalyst bed and that is emitted from the stack is referred to as ammonia slip.

An important factor that affects the performance of an SCR is operating temperature. The temperature range for standard base metal catalysts is between 400 and 800^{o}F. Since SCR's effective temperatures are below the turbine exit temperature and above the stack temperature, the catalyst must be located within the HRSG.

An undesirable side-effect of SCR is the potential formation of ammonium bisulfate (NH_4HSO_4) and ammonium sulfate ($(NH_4)_2SO_4$), referred to as ammonium salts, which are corrosive and can stick to the heat recovery surfaces, duct work, or stack at low temperatures and results in additional PM/PM-10/PM-2.5 formation if emitted. Ammonium bisulfate and ammonium sulfate are reaction products of SO_3 and ammonia. Use of low sulfur fuels minimizes the formation of SO_3 and the subsequent formation of these ammonium salts.

Selective Non-Catalytic Reduction (SNCR) – SNCR is another method of post-combustion control of NO_x emissions. SNCR selectively reduces NO_x into nitrogen and water vapor by reacting the flue gas with a reagent. The SNCR system is dependent upon the reagent injection location and temperature to achieve proper reagent/flue gas mixing for optimum NO_x reduction. SNCR systems require a fairly narrow temperature range for reagent injection in order to achieve a specific NO_x removal efficiency. The optimum temperature range for ammonia injection is 1,500 to 1,900°F. The NO_x removal efficiency of an SNCR system decreases rapidly at temperatures outside the optimum temperature window. Operation below this temperature window results in excessive ammonia slip. Operation above the temperature window results in increased NO_x emissions.

Because the exhaust temperature at the exit of the Project's combustion turbine unit is around 1,000 to 1,200°F, which is significantly less than the optimum temperature range for the application of this technology, it is not technically feasible to apply this technology to this Project and it will be eliminated from further evaluation in this LAER analysis.

XONON™ – A NO_x control technology has been developed by Catalytica Energy Systems, with the trade name of XONON™. This combustion technology includes a pre-burner, a fuel injection and mixing system, a flameless catalyst module and a flameless burnout zone. The pre-burner starts the turbine and a fuel injection system provides a uniform fuel and air mixture to the catalyst, where a portion of the fuel is combusted at reduced temperature to reduce thermal NO_x emissions. Catalytica has reported NO_x emissions at less than 3 ppm at 15 percent O_2 from test units under 2 MW. The first commercial version of the XONON™ combustion system is operating in a 1.55 MW gas turbine in Santa Clara, CA. This system has demonstrated NO_x emission levels of less than 2.5 ppm.

The XONON™ system is not yet commercially available from Catalytica Energy Systems for turbines of the size proposed for the Project. However, in December 2000, the California Energy Commission approved the construction of a 750-MW facility in Bakersfield, California. The Pastoria Energy Facility (Pastoria) proposed to use the XONON™ system as BACT to control NO_x emissions from three large combined cycle combustion turbines. The approval was based on the anticipation that the XONON™ technology would be available by the time installation of the Project components was scheduled. If XONON™ was not available in time, Pastoria would install SCR to control emissions of NO_x. Calpine completed construction of the Pastoria facility in 2005 and ultimately installed SCR technology as opposed to XONON™. To date, XONON™ technology is not commercially available for large combustion turbines such as the Project.

Based on the fact that the XONON™ technology is not currently commercially available and has not been proven on combustion turbines of the size proposed by the Project, it is not further considered in this analysis.

SCONO$_x$™ – SCONO$_x$™ or EM$_x$™ is a proprietary catalytic oxidation and adsorption technology that uses a single catalyst for the control of NO_x, CO, and VOC emissions. The catalyst is a monolithic design, made from a ceramic substrate with both a proprietary platinum-based oxidation catalyst and a potassium carbonate adsorption coating. The catalyst simultaneously oxidizes NO to NO_2, CO to CO_2, and VOC to CO_2 and water, while NO_2 is adsorbed onto the catalyst surface and chemically converted to and stored as potassium nitrates and nitrites. The SCONO$_x$™ potassium carbonate layer has a limited adsorption capability and requires regeneration approximately every 12-15 minutes in normal service. Each regeneration cycle requires approximately 3-5 minutes. At any point in time, approximately 20% of the 40 to 60 compartments in a SCONO$_x$™ system would be in regeneration mode, and the remaining 80% of the compartments would be in oxidation/adsorption mode.

Regeneration of the adsorption layer requires exposure of the catalyst to hydrogen gas. In practice, this is accomplished by reforming natural gas with high-pressure steam to produce a gas mixture consisting of methane, carbon dioxide, and hydrogen that is passed over the catalyst beds. Initial attempts by the developer of the process to create regeneration gases from natural gas and steam within the SCONO$_x$™ catalyst bed (internal autothermal regeneration) failed to produce consistent results; this approach was abandoned in favor of the current offering, which uses an external steam-heated reformer that partially reforms the natural gas to produce the gas mixture that is introduced into the catalyst bed. The reformation reaction continues to some extent within the catalyst bed due to the presence of steam and the temperature of the catalyst surface, but some methane and VOC from the natural gas remain.

Because the active regenerant gas is hydrogen, the regeneration process must be performed in an atmosphere of low oxygen to prevent dilution of the hydrogen. In practice, the oxygen present in the exhaust gas of combustion turbines is excluded from the catalyst bed by dividing the catalyst bed into a number of individual cells or compartments that are equipped with front and rear dampers that are closed at the beginning of each regeneration cycle. Proper regeneration of the SCONO$_x$™ catalyst system depends upon the proper functioning and sealing of these sets of dampers approximately 4 times per hour so that an adequate concentration of hydrogen can be maintained in each module to accomplish complete regeneration of the catalyst before the dampers are opened and the compartment is placed back in service.

Because the $SCONO_x$™ catalyst can be "poisoned" or rendered inactive by even the very small amounts of sulfur compounds present in natural gas, a $SCOSO_x$ catalyst bed, intended to remove trace quantities of sulfur-bearing compounds from the exhaust gas stream, is installed upstream of the $SCONO_x$™ catalyst bed. Like the $SCONO_x$™ catalyst, the $SCOSO_x$ catalyst must be regenerated. Regeneration of the two catalyst types occurs at the same time, with the same regeneration gas supply provided to both; however, the sulfur-bearing regeneration gas for the $SCOSO_x$ catalyst exits the $SCONO_x$™ modules separately from the $SCONO_x$™ regeneration gas to avoid contaminating the $SCONO_x$™ catalyst beds. Both the regeneration gas streams are returned to the gas turbine exhaust stream downstream of the $SCONO_x$™ module.

The external reformer used to create the regeneration gases is supplied with steam and natural gas. To avoid poisoning the reformer catalyst, the natural gas supplied to the reformer passes through an activated carbon filter to remove some of the sulfur-bearing compounds that are added to natural gas to facilitate leak detection.

The regeneration cycle time is expected to be controlled using a feedback system based on NO_x emission rates. That is, the higher the NO_x emissions are relative to the design level, the shorter the absorption cycle, and regeneration cycles will occur more frequently. This is analogous to the use of feedback systems for controlling reagent (ammonia or urea) flow rates in an SCR system.

Maintenance requirements for $SCONO_x$™ systems are expected to include periodic replacement of the reformer fuel sulfur carbon unit, periodic replacement of the reformer catalyst, periodic washings of the $SCOSO_x$ and $SCONO_x$™ catalyst beds, and periodic replacement of the catalyst beds. The replacement frequency for the reformer sulfur carbon unit and reformer catalyst is unknown at present. The $SCOSO_x$ catalyst is expected to require washing once per year. The lead (upstream) $SCONO_x$™ catalyst bed is expected to require washing once per year, while the trailing (downstream) $SCONO_x$™ catalyst bed(s) are expected to require washing once every three years. The annual catalyst washing process is expected to take several days for large combustion turbines and produce hundreds of thousands of gallons of wastewater. The estimated catalyst life is reported to be 7 washings; the guaranteed catalyst life is three years.

Estimates of the control system efficiency vary. ABB Environmental (now ALSTOM Power) has indicated that the $SCONO_x$™ system is capable of achieving a 90% reduction in NO_X; a 90% reduction in CO, to a level of 2 ppm; and an 80-85% reduction in VOC emissions (ABB Environmental). The VOC reduction is not likely to be achieved with low VOC inlet concentrations, in the 1-2 ppm range. Commercially quoted NO_x emission rates for the $SCONO_x$™ system range from 2.0 ppm on a 3-hour average basis, representing a 78% reduction

(ABB TMP), to a 1.0 ppm with no averaging period specified. The $SCONO_x$™ system does not control or reduce emissions of sulfur oxides or particulate matter from the combustion device.

The Redding Power Plant in California, a 43 MW natural gas-fired combustion turbine, was permitted with a 2.0 ppm demonstration limit using SCONOX. However, the unit could not meet the demonstration limit; consequently, the permit limit had to be revised upwards to 2.5 ppm (letter from Shasta County Department of Resource Management to Redding Electric Utility dated June 23, 2005).

To date, $SCONO_x$™ technology has been commercially demonstrated on natural gas and dual-fuel turbine installations presented in the following table.

Turbine & Fuel	Facility	Location	Startup Date	NO_x Permit Limit
5 MW Solar Taurus 60 dual-fuel[1] turbine	Wyeth BioPharma cogeneration facility Unit #2	Andover, MA	September 2003	2.5 ppm (gas) 15.0 ppm (oil)
5 MW Solar Taurus 60 dual-fuel[1] turbine	Montefiore Medical Center cogeneration Facility	Bronx, NY	June 2002	2.5 ppm (gas) 15.0 ppm (oil)
45 MW ALSTOM GTX100 gas turbine	Redding Electric municipal plant	Redding, CA	June 2002	2.0 ppm (gas)
Two 15 MW Solar Titan 130 gas turbines	University of California cogeneration facility	San Diego, CA	July 2001	2.5 ppm (gas)
5 MW Solar Taurus 60 dual-fuel turbine	Wyeth BioPharma cogeneration facility Unit #1	Andover, MA	1999	2.5 ppm (gas) 15.0 ppm (oil)
32 MW GE LM2500 gas turbine	Sunlaw Federal cogeneration facility	Vernon, CA	1996	Actual[2]

[1] Dual-fuel: pipeline natural gas and low-sulfur diesel fuel oil.
[2] Below 2.0 ppm for nearly all of the plant's operating hours in 2000 and 2001, below 1.5 ppm performance for 97% of those operating hours, and below 1.0 ppm for over 90% of the hours.

The performance of SCR and $SCONO_x$™, insofar as NO_x emission levels are concerned, is essentially equivalent. Both technologies have demonstrated the ability to reduce NO_x emissions by at least 90%. The principal differences between the two technologies are associated with whether the low emission levels proposed have been "achieved in practice," cost-effectiveness, and secondary environmental impacts.

SCONO$_x$™ technology has been found to be capable of achieving compliance with permitted NO_x levels of 2.0 and 15.0 ppm for natural gas and fuel oil operation, respectively. The presently available technical information does not support a conclusion that this technology can be proven on larger combustion turbines such as the Project.

4.4.2.2 Auxiliary Boiler

The following control technologies for NO_x were evaluated: Low-NO_x Burners, Flue Gas Recirculation (FGR), SCR, and SNCR.

Low-NO_x Burners – Dry low NO_x burners reduce NO_x through staged combustion. Staging partially delays the combustion process, resulting in a cooler flame, which suppresses thermal NO_x formation. NO_x emission reductions of 40 to 85 percent (relative to uncontrolled emission levels) have been observed with low-NO_x burners.

Flue Gas Recirculation (FGR) – In an FGR system, a portion of the flue gas is recirculated from the exhaust stream back to the burner. The recirculated gas is mixed with combustion air as an inert diluent prior to being fed to the burner. The FGR system reduces NO_x emissions because the recirculated gas reduces combustion temperatures, thus suppressing the thermal NO_x mechanism. FGR also reduces NO_x formation by lowering the oxygen concentration in the primary flame zone. An FGR system is normally used in combination with specially designed low-NO_x burners capable of sustaining a stable flame despite the increased recirculated gas flow resulting from the use of FGR. Together, low-NO_x burners and FGR are capable of reducing NO_x emissions by 60 to 90 percent.

Selective Catalytic Reduction (SCR) – SCR technology uses ammonia as a reducing agent in the presence of oxygen over a catalyst. The general chemical reaction is:

$$4NO + 4NH_3 + O_2 \rightarrow 4N_2 + 6H_2O$$

The process includes an ammonia delivery system and a selective catalytic reaction section. Vaporized ammonia (or urea) is introduced into the flue gas stream via an injection grid located upstream of the catalyst. NO_x emission reductions of 75 to 90 percent have been achieved through the use of SCR.

The proposed auxiliary boiler for the combined cycle project will be limited to natural gas firing only and will be operated for the purposes of supplying steam for fast-startup of the plant, including equipment piping pre-warming and startup fuel heating. Additionally, it will be used to maintain vacuum in the condenser and to provide steam seals when the combined cycle facility is shutdown, but expected to be brought back online for either a warm or hot start. SCR emission control technology is not considered technically feasible for the proposed auxiliary boiler because the design effectiveness of an SCR is not achieved until the flue gas temperature reaches between 400 and 800°F. The proposed auxiliary boiler will be required to supply steam in an expedited manner to minimize the duration of the combined cycle unit start-up, which produces elevated pollutant emission concentrations from the turbine during each start-up procedure.

4.4.2.3 Emergency Diesel Engines

U.S. EPA's Alternative Control Techniques (ACT) Document for reciprocating engines lists add-on techniques such as SCR, as well as combustion control techniques such as ignition timing retard, for NO_x control from diesel engines. The ACT concludes that add-on controls are not cost effective for small emergency diesel engines that operate less than 500 hours/year. While cost is not a factor that may be considered in LAER determinations, add-on techniques would be ineffective. Since the emergency diesel fire pump and emergency diesel generator will run for limited durations, the SCR would never reach the operating temperature required to remove any substantial NO_x emissions, and thus would provide no benefit. Therefore, add-on controls do not represent NO_x LAER for the emergency diesel engines.

4.4.2.4 Determination of LAER for NO_x

4.4.2.4.1 Combined Cycle Combustion Turbine

Keasbey Energy Center proposes DLN in combination with SCR, in order to achieve LAER for NO_x emissions from the Project's combined-cycle unit. These technologies, when considered together, represent the most stringent NO_x controls available for combined cycle combustion turbines. The proposed NO_x emission limit for the turbine during natural gas operation is 2.0 ppmvd @15% O_2, to be achieved at all operating loads between 30 and 100% of full load.

The proposed NO_x emission limit for the turbine during ULSD operation is 4.0 ppmvd @15% O_2, to be achieved at all operating loads between 50 and 100% of full load. Based upon a review of RBLC and other recent permits for ULSD fired combined cycle turbines, there are two Projects permitted less than 4.0 ppmvd @15% O_2. These projects are the Sewaren Generating Station and the Middlesex Energy Center, both of which will use GE 7HA.02 combustion turbine technology. Therefore, 4.0 ppmvd @15% O_2 is considered the most stringent limit guaranteed for a large ULSD fired H-Class combined cycle turbine.

4.4.2.4.2 Auxiliary Boiler

Based on the analysis presented above, the Project is proposing to limit the total hours of operation of the auxiliary boiler to 4,000 hrs/year and utilize ultra-low-NO_x burners, flue gas recirculation (FGR) and good combustion practices to achieve a NO_x emission rate of 0.01 lb/mmBtu as LAER for the natural gas-fired auxiliary boiler. This vendor guaranteed limit, equivalent to 9.0 ppmvd @ 3% O_2, is equal to the lowest permitted emission rate identified in Appendix C (RBLC results). For these reasons, LAER for NO_x emissions from the auxiliary boiler was selected as 0.01 lb/mmBtu.

4.4.2.4.3 Emergency Diesel Engines

Although add-on controls, such as SCR, have been employed to reduce emissions from diesel engines with greater annual operating capacity factors, the limited annual operation rules out such controls. Thus, the Project proposes limited hours of operation (100 hours per year for each), good combustion practices, and the use of ULSD as LAER to achieve a NO_x emission rate of 1.19 lb/mmBtu for the emergency diesel generator and 0.80 lb/mmBtu for the emergency diesel fire pump. For the emergency diesel generator, the limit is based on the NSPS Subpart IIII emissions standard of 6.4 g/kW-hr (NO_x + NMHC) for Tier 2 engines found in Table 1, 40 CFR 89.112. It corresponds to a NO_x permit limit of 4.63 g/hp-hr. For the emergency fire pump, the limit is based on the NSPS Subpart IIII emissions standard of 3.0 g/hp-hr (NO_x + NMHC). These two limits result in 0.85 tons of NO_x per year from the emergency generator and 0.09 tons per year from the emergency fire pump due to their limited hours of operation.

4.5 LAER Analysis for Volatile Organic Compounds

Since potential emissions from the Project exceed the 25 ton/year non-attainment NSR threshold, VOC emissions must meet LAER requirements. The combined cycle combustion turbine, auxiliary boiler, and emergency diesel engines are all sources of VOC emissions at the proposed Project. This section demonstrates that the proposed VOC emissions and controls meet the requirements of LAER. Because LAER requirements are at least as stringent as BACT or SOTA, the LAER analysis also satisfies the BACT and SOTA demonstration for VOC.

4.5.1 Review of VOC RBLC Database

4.5.1.1 Combined Cycle Combustion Turbine

The search of the RBLC and available permits identified numerous natural gas-fired combined cycle combustion turbine projects with VOC emission limits ranging from 0.7 to 4.0 ppm with the majority of the VOC emission limits in the 1.0-2.0 ppm range. The majority of these units employ an oxidation catalyst and good combustion practices to control VOC emissions.

For ULSD firing, there are far fewer recently permitted combined-cycle combustion turbine Projects. The most recently permitted combined-cycle combustion turbines firing ULSD are permitted with VOC emissions limits ranging from 2.0 ppm to 13.0 ppm. All of the projects permitted at these levels use oxidation catalyst technology.

4.5.1.2 Auxiliary Boiler

The RBLC and recent air permit search for natural gas-fired boilers between 10 and 100 mmBtu/hr in size identified VOC emission limits between 0.002 to 0.016 lb/mmBtu with a majority of boilers being permitted in the 0.003-0.005 lb/mmBtu range. More recent boiler permits are in the 0.004-0.005 lb/mmBtu range with the most stringent permit limit reported being 0.0015 lb/mmBtu.

4.5.1.3 Emergency Diesel Engines

An RBLC and recent permit search for emergency diesel generators indicated a range between 0.003 and 0.15 lb/mmBtu. The most recent permit, issued November 2014, for an emergency generator of identical size is the Moundsville Combined Cycle Power Plant in West Virginia, which was permitted for 0.09 lb/mmBtu. The most stringent VOC emission permit limit shown in the RBLC database and permit search for a diesel fire pump of similar size and use as the proposed diesel fire pump is 0.017 lb/mmBtu. The range of VOC emission limits for diesel fire pumps is 0.017 – 1.763 lb/mmBtu.

4.5.2 Identification of VOC Control Options and Technical Feasibility

4.5.2.1 Combined Cycle Combustion Turbine

Combustion turbines have inherently low VOC emissions. The emissions of VOC in a combustion process are a result of the incomplete combustion of organic compounds within the fuel. In an ideal combustion process, all carbon and hydrogen contained within the fuel are oxidized to form CO_2 and H_2O.

The only post-combustion control method practical to reduce VOC emissions from combustion turbines is an oxidation catalyst. The optimum location for VOC control, in the 900 to 1,100°F range, would be upstream of the HRSG or in the front-end section of the HRSG. However, at the high temperatures necessary to make the oxidation catalyst optimized for VOC reduction, there is the undesirable result of causing substantially more conversion of SO_2 to SO_3 which may, in turn, react with water and/or ammonia to form sulfuric acid mist and/or ammonia salt PM-10/PM-2.5 emissions. Therefore, the placement of the oxidation catalyst in the "cooler" section of the HRSG necessary for CO control is optimal, and has the additional side benefit of reducing VOC emissions from the combustion turbine.

4.5.2.2 Auxiliary Boiler

The rate of VOC emissions from boilers depends on combustion efficiency. Fuel hydrocarbons not converted to CO_2 can result in VOC emissions due to incomplete combustion. VOC emissions are minimized by combustion practices that promote high combustion temperatures, long residence times at those temperatures, and turbulent mixing of fuel and combustion air. Although the primary hydrocarbon constituents of natural gas – methane and ethane – are not considered to be VOC, trace amounts of VOC species in the natural gas fuel may also contribute to VOC emissions if they are not completely combusted in the boiler.

No technically feasible post-combustion control methods have been identified to assure the reduction of VOC emissions from auxiliary boilers. However, it is feasible to utilize an oxidation catalyst to control CO emissions from a boiler, which may also reduce VOC emissions. As described in the CO BACT analysis, a few recently issued air permits specify oxidation catalysts for boilers.

4.5.2.3 Emergency Diesel Engines

VOC from diesel engines are composed of a variety of organic compounds emitted into the atmosphere because of incomplete combustion. Most unburned hydrocarbon emissions result from fuel droplets that were transported or injected into the quench layer during combustion. The quench layer is the region immediately adjacent to the combustion chamber surfaces, where heat transfer outward through the cylinder walls causes the mixture temperature to be too low to support combustion. Partially burned hydrocarbons can occur because of poor air and fuel homogeneity due to incomplete mixing, before or during combustion; incorrect air/fuel ratios in the cylinder during combustion due to maladjustment of the engine fuel system; excessively large fuel droplets (diesel engines); and low cylinder temperature due to excessive cooling (quenching) through the walls or early cooling of the gases by expansion of the combustion volume caused by piston motion before combustion is completed. Add-on controls are not technically feasible.

4.5.3 Determination of LAER for VOC

4.5.3.1 Combined Cycle Combustion Turbine

The Project is proposing to install an oxidation catalyst designed to reduce VOC emissions when firing natural gas to 1.0 ppm without duct burning and 2.0 ppm with duct burning at normal operating loads between 30% and full load. Based upon a review of LAER and BACT determinations in U.S. EPA's RBLC and permits for Projects not included in the RLBC, the majority of recent VOC BACT determinations include combustion controls and oxidation catalysts. The most stringent limits on Projects that are in operation are 1.0 ppm for VOC without duct firing and a range of 1.5 ppm to 3.9 ppm with duct firing.

The Projects that have VOC limits that are more stringent are: the Brunswick Power Project (0.7 ppm without duct firing) and the West Deptford Energy Station (0.7 ppm without duct firing and 1.0 ppm with duct firing). The Brunswick Power Station is currently under construction and the West Deptford Energy Station Project Expansion is not yet operating. As such, a VOC limit less than 1.0 ppm without duct firing and 2.0 ppm with duct firing is not yet considered demonstrated in practice due to lack of sufficient operating history at those levels.

The Project is proposing to install an oxidation catalyst designed to reduce VOC emissions when firing ULSD to 2.0 ppm without duct burning at normal operating loads between 50% and full load. The permitted VOC emission rate for ULSD firing of the Pioneer Valley Generating Project is 6.0 ppm and for the Kleen Energy Project is 3.6 ppm. The vendor guarantee for the GE 7HA.02 turbine firing ULSD is 2.0 ppm with the installation of an oxidation catalyst. This emission level is below the lowest permitted limits for ULSD fired combustion turbines and is equivalent to the proposed permit limit by CPV Towantic for a GE 7HA.01 turbine. AND Sewaren Generating Station for a GE 7HA.02 turbine.

4.5.3.2 Auxiliary Boiler

The auxiliary boiler is proposed to employ good combustion practices and have a restriction on annual operation of 4,000 hours per year. The Project proposes that these control methods represent VOC LAER by limiting emissions to 0.005 lb/mmBtu.

4.5.3.3 Emergency Diesel Engines

The application of good combustion practices and limited operating hours is proposed in order to achieve LAER for the emergency diesel fire pump and emergency diesel generator. The maximum VOC emissions from the emergency diesel generator and emergency fire pump are 0.15 g/hp-hr and 0.31 g/hp-hr, respectively. Potential VOC emissions from these units are less than 0.04 tons/year combined.

4.6 BACT Analysis for Carbon Monoxide

The combined cycle combustion turbine and duct burner, auxiliary boiler, emergency diesel generator, and emergency diesel fire pump are all sources of CO emissions at the proposed

Project. Since potential CO emissions from the Project exceed the PSD significant emission rate threshold, CO emissions from all the units must incorporate BACT.

4.6.1.1 Review of CO BACT Database

4.6.1.2 Combined Cycle Combustion Turbine

A review of numerous natural gas-fired combined cycle facilities listed in the U.S. EPA's RBLC as well as recently issued air permits lists CO emission limits primarily ranging from 1.5 to 4 ppm. There are only six recent projects within the RBLC that have proposed permit limits for ULSD fired combustion turbines that have CO limits. These projects have CO limits ranging from 1.8 ppm to 9 ppm.

4.6.1.3 Auxiliary Boiler

The CO limits for boilers of similar type listed in the RBLC primarily range from 0.007 to 0.083 lb/mmBtu. Most recently issued permitted limits are in the 0.017-0.037 lb/mmBtu range. A recently issued draft permit is for a 97.5 mmBtu/hr boiler at the Middlesex Energy Center, Sayreville, NJ, with a permitted limit of 0.037 lb/mmBtu.

4.6.1.4 Emergency Diesel Engines

The RBLC indicates that the CO permit limits for diesel engines similar in size to the proposed emergency diesel generator primarily range from 0.04 to 0.82 lb/mmBtu, as summarized in Appendix C. The permit limits for diesel engines similar in size to the proposed emergency diesel fire pump primarily range from 0.03 to 0.82 lb/mmBtu, as summarized in Appendix C.

4.6.2 Identification of CO Control Options and Technical Feasibility

The following sections detail the options that were identified for controlling CO emissions from the combustion turbine/duct burner, auxiliary boiler, emergency diesel generator, and emergency diesel fire pump. The technical feasibility of each option is also discussed.

4.6.2.1 Combined Cycle Combustion Turbine

The formation of CO in the exhaust of a combustion turbine is the result of incomplete combustion of fuel. Several conditions can lead to incomplete combustion, including insufficient O_2 availability, poor air/fuel mixing, cold wall flame quenching, reduced combustion temperature, and decreased combustion residence time and load reduction. By controlling the combustion process carefully, CO emissions can be minimized.

After combustion control, the only practical control method to reduce CO emissions from combustion turbines is an oxidation catalyst. Exhaust gases from the turbine are passed over a catalyst bed where excess air oxidizes the CO to CO_2. CO reduction efficiencies in the range of 80 to 90 percent can be guaranteed, although CO reduction may at times be somewhat less than the design value at the low inlet concentrations that are expected for the GE 7HA.02. No other technically feasible options are identified for combustion turbine CO control. Drawbacks of the oxidation catalyst include added cost, reduced turbine output and efficiency due to increased back pressure, and the potential for increased PM/PM-10/PM-2.5 and/or sulfuric acid mist emissions.

4.6.2.2 Auxiliary Boiler

An oxidation catalyst for the auxiliary boiler is not considered technically feasible since the auxiliary boiler is required to quickly supply steam to the combined cycle unit during the start-up procedure and the oxidation catalyst requires a high flue gas temperature to achieve effective control. A more effective method of reducing emissions, including CO, is by restricting operation on an annual basis.

4.6.2.3 Emergency Diesel Engines

As reflected by existing permits, add-on control technology is not practicable for control of CO emissions from an emergency diesel engine operating less than 100 hours per year. Good combustion control practices and limited operating hours represent CO BACT for the Project's emergency diesel fire pump and emergency diesel engine.

4.6.3 Determination of BACT for CO

4.6.3.1 Combined Cycle Combustion Turbine

The Project is proposing to install an oxidation catalyst designed to reduce CO emissions to 2.0 ppm @15% O_2 during normal operation on natural gas from 30% to full load. There have been recent permits issued (West Deptford Energy Station, Brunswick Power Station, Palmdale Hybrid Power, Avenal Energy, Warren County Power, and CPV Towantic) with lower limits than 2.0 ppm. The Brunswick and Warren Power Projects are currently under construction and the Avenal, Palmdale, West Deptford, and Towantic Projects have not yet started construction. As such, CO limits less than 2.0 ppm are not yet considered demonstrated in practice due to lack of sufficient operating history at those levels. Therefore, the 2.0 ppm limit is considered the most stringent limit achieved in practice for a large combined cycle turbine.

Additionally, although the proposed emission rate is marginally higher than a couple of recently permitted projects, the U.S. EPA's Environmental Appeals Board (EAB) decision[3] on March 14, 2014 regarding the appeal of the La Paloma Energy Center, LLC PSD permit makes clear that minor differences in permitted PSD emission rates are allowable to account for different technologies, and that turbine model selection cannot be taken into account when determining BACT for a project. The proposed CO BACT emission rate during natural gas firing represents the vendor guarantee with an oxidation catalyst and is consistent with the majority of recently permitted projects.

The Project is proposing to install an oxidation catalyst designed to reduce CO emissions to 2.0 ppm @15% O_2 during normal operation on ULSD from 50% to full load. The Kleen Energy project is limited to 1.8 ppmvd at 15% O_2. The GE guaranteed CO emission rate for ULSD firing with an oxidation catalyst is 2.0 ppmvd at 15% O_2 for the 7HA.02 combustion turbine. The GE guarantee is marginally higher than the Kleen Energy CO limit, which comes at the expense of a higher VOC limit that is higher than some VOC limits in the RBLC database. Therefore, CO BACT for oil firing is proposed to be 2.0 ppmvd, which is consistent with the levels achieved by the Caithness Bellport Energy Center (now known as Caithness Long Island Energy Center, using Siemens F Class equipment), and recent guarantees by GE on other Projects with H Class combustion turbines.

4.6.3.2 Auxiliary Boiler

The Project is proposing to limit the auxiliary boiler CO emissions to a limit of 0.037 lb/mmBtu, corresponding to the anticipated guarantee level of 50 ppm, and to restrict full load operation to 4,000 hours per year to satisfy BACT requirements. The lowest CO limit identified for any auxiliary boiler at an operational combined cycle combustion turbine facility without an oxidation catalyst as summarized in Appendix C is 0.036 lb/mmBtu (Caithness Bellport Energy Center).

4.6.3.3 Emergency Diesel Engines

Existing permits show that add-on control technology is not practical for control of CO emissions from emergency equipment. Therefore, the Project is proposing BACT for CO emissions through good combustion practices and limiting operating hours. The proposed emission rate from the emergency diesel generator is 2.61 g/hp-hr. The proposed emission rate for the emergency diesel fire pump is 1.42 g/hp-hr.

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3 http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/Recent~Additions/687C700F9FD042F585257C9B006369CE/$File/La%20Paloma.pdf

4.7 BACT Analysis for PM/PM-10/PM-2.5

The combined cycle combustion turbine and duct burner, auxiliary boiler, emergency diesel engines, and cooling tower are all sources of PM, PM-10, and PM-2.5 emissions. Because potential emissions from the Project exceed the PSD significant emission rates for PM/PM-10/PM-2.5 emissions, PM/PM-10/PM-2.5 emissions from the aforementioned equipment must meet BACT emission rates.

4.7.1 Review of PM/PM-10/PM-2.5 BACT Databases

4.7.1.1 Combined Cycle Combustion Turbine

A review of numerous natural gas-fired combined cycle facilities from the U.S. EPA's RBLC and recently issued air permit searches (see Appendix C) lists a wide range of PM/PM-10/PM-2.5 emissions on a pound per hour, lb/mmBtu, and grains of sulfur per 100 scf of natural gas basis. The PM emission limits for combustion turbine projects are dependent on the make and model of the combustion turbine selected, the fuel sulfur content, the vendor guaranteed emission rate at full load and at part loads, and the duct burner operational status. Vendors typically will provide higher emission guarantees on a lb/mmBtu basis at part load even though emissions on a pound per hour basis are lower at part load.

A review of recently permitted combined cycle facilities from the USEPA's RBLC and recently issued air permit searches (see Appendix C) lists PM/PM-10/PM-2.5 emission limits ranging from 0.003 to 0.008 lb/mmBtu for natural gas and PM/PM-10/PM-2.5 emission limits ranging from 0.01 to 0.05 lb/mmBtu for ULSD.

4.7.1.2 Auxiliary Boiler

A review of the RBLC (see Appendix C) shows that typically good combustion practices and low-sulfur fuel have been used as BACT for gas-fired boilers. PM/PM-10/PM-2.5 emission limits for gas-fired boilers of similar size range between 0.002 and 0.008 lb/mmBtu.

4.7.1.3 Emergency Diesel Engines

A review of the RBLC (see Appendix C) shows that only good combustion, limitations on operating hours, and low-sulfur fuels have been used as BACT for emergency diesel engines. The RBLC PM/PM-10/PM-2.5 emission levels for diesel generators range primarily from 0.006 to 0.047 lb/mmBtu, as summarized in Appendix C. The RBLC PM/PM-10/PM-2.5 emission levels for emergency diesel fire pumps range primarily from 0.024 to 0.048 lb/mmBtu, as summarized in Appendix C.

4.7.1.4 Cooling Tower

A review of PM/PM-10/PM-2.5 emission limits for cooling towers presented in the RBLC establishes drift/mist eliminators as the most commonly used control technique for PM/PM-10/PM-2.5 emissions. The lowest drift/mist eliminator rate identified in the RBLC for cooling towers is 0.0005% (see Appendix C).

4.7.2 Identification of PM/PM-10/PM-2.5 Control Options and Technical Feasibility

4.7.2.1 Combined Cycle Combustion Turbine

PM, PM-10, and PM-2.5 emissions from the combustion turbine may be formed from non-combustible constituents in fuel or combustion air, from products of incomplete combustion, or from the formation of ammonium sulfates due to the conversion of SO_2 to SO_3, which is then available to react with ammonia and form ammonium sulfate or ammonium bisulfate post combustion. It is conservatively expected that all PM from the turbine will be equal to PM-10 and PM-2.5. PM, PM-10, and PM-2.5 emissions from the combustion turbine are inherently low.

The combustion of clean burning fuels is the most effective means for controlling PM emissions from combustion equipment. The Project is not aware of any natural gas-fired combustion turbine project that has been required to add on PM, PM-10, or PM-2.5 controls. Post-combustion controls, such as baghouses, scrubbers and electrostatic precipitators (ESP) are impractical due to the high pressure drops associated with these units, the large flue gas volumes, and the low concentrations of PM/PM-10/PM-2.5 present in the exhaust gas.

4.7.2.2 Auxiliary Boiler

PM/PM-10/PM-2.5 emissions from natural gas-fired boilers may be due to products of incomplete combustion as well as non-combustible constituents in the flue gas stream. Proper burner design and operation, as well as the primary use of natural gas, will control PM/PM-10/PM-2.5 emissions to low levels. PM/PM-10/PM-2.5 control technologies, such as ESP or fabric filters, are common practice on solid fuel boilers. ESPs are also applied on boilers firing residual oil, where the filterable component of PM is greater than that for the proposed Project.

4.7.2.3 Emergency Diesel Engines

Particulate matter emissions from diesel fired internal combustion engines may result from trace metals present in the fuel, unburned carbon-containing materials, and sulfate formation. Good combustion practices and use of clean fuels are the methods currently utilized to minimize

PM/PM-10/PM-2.5 emissions from diesel engines. Post-combustion controls, such as baghouses, scrubbers, and ESPs are impractical due to the high-pressure drops associated with these technologies and the low concentrations of PM, PM-10, and PM-2.5 present in the exhaust gas. In addition, any add-on controls applied would have extremely high cost, on a dollar per ton PM/PM-10/PM-2.5 removed basis, since this emergency equipment is expected to operate infrequently. No other PM/PM-10/PM-2.5 control devices are identified for diesel engines in U.S. EPA's AP-42, Compilation of Air Pollutant Emission Factors, Section 3.

4.7.2.4 Cooling Tower

PM/PM-10/PM-2.5 emissions from cooling towers occur because wet cooling towers provide direct contact between the cooling water and the air passing through the tower. Some of the liquid water may be entrained within the air stream and be carried out of the tower as "drift" droplets. Therefore, the PM/PM-10/PM-2.5 constituent (suspended and dissolved solids) of the drift droplets may be classified as an emission. Because drift droplets contain the same chemical impurities as does the water circulating through the tower, these impurities can be converted into airborne emissions. To reduce drift from cooling towers, drift eliminators are usually incorporated into the tower design to prevent water droplets from leaving the tower and to reduce particulate emissions. The only alternative would be to reduce the solids content of the water, either by water treatment or by reducing the cycles of concentration, which would increase the blow down discharge and make-up water requirements of the tower.

4.7.3 Determination of BACT for PM/PM-10

4.7.3.1 Combined Cycle Combustion Turbine

Good combustion techniques and low-sulfur fuels have been proposed to limit PM/PM-10/PM-2.5 emissions. The proposed emission limit for PM/PM-10/PM-2.5 when firing natural gas in the combined cycle combustion turbine is 0.0068 lb/mmBtu without duct firing and 0.0070 lb/mmBtu with duct firing. During ULSD firing, the Project is proposing to limit PM/PM-10/PM-2.5 emissions to 0.0368 lb/mmBtu. These values are within the range of recent BACT determinations for combined cycle combustion turbines. It should be noted that the Pennsylvania DEP recently issued a Plan Approval Permit[4] for the Moxie Freedom Project for GE 7HA.02 combustion turbines with very similar lb/mmBtu limits during natural gas operation (the Moxie Freedom Project is proposed with natural gas operation only).

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[4] http://www.pabulletin.com/secure/data/vol45/45-22/1012a.html

4.7.3.2 Auxiliary Boiler

The Project proposes the exclusive use of natural gas, a clean-burning and low sulfur fuel in conjunction with good combustion practices as BACT. The proposed PM/PM-10/PM-2.5 limit for the auxiliary boiler is 0.007 lb/mmBtu, which is consistent with many other recent BACT determinations for natural gas-fired boilers.

4.7.3.3 Emergency Diesel Engines

The Project proposes to use low sulfur fuel, employ good combustion practices, and limit operating hours as BACT for PM/PM-10/PM-2.5. For the emergency diesel generator, the proposed limit is 0.15 g/hp-hr, and is equal to the NSPS Subpart IIII emissions standard of 0.2 g/kW-hr for Tier 2 engines found in Table 1, 40 CFR 89.112, which is equivalent to 0.15 g/hp-hr. For the emergency diesel fire pump, the limit is 0.118 g/hp-hr, and is less than the NSPS Subpart IIII, emissions standard of 0.15 g/hp-hr.

4.7.3.4 Cooling Tower

The cooling tower for the proposed Project will be equipped with high-efficiency drift eliminators for emission control of PM/PM-10/PM-2.5 occurring as dissolved and suspended solids in the drift droplets. The proposed BACT limits for the cooling tower are a drift eliminator rate of 0.0005%, which is the lowest drift rate that will be guaranteed by cooling tower vendors and will limit the potential PM emissions to 2.39 lb/hr, the potential PM-10 emissions to 1.55 lb/hr, and the potential PM-2.5 emissions to 0.58 lb/hr. Because the proposed BACT proposal for PM/PM-10/PM-2.5 emissions from the cooling tower is consistent with the most stringent limit found in the RBLC database, no further analysis is required.

4.8 BACT Analysis for Sulfuric Acid Mist

H_2SO_4 emissions, in addition to being a function of fuel sulfur content, are also related to the amount of oxidation of fuel sulfur to SO_3. Sulfuric acid is produced when SO_2 is converted to SO_3 in the presence of a catalyst and is then further combined with water to form H_2SO_4 (sulfuric acid). To be available to react with water to form sulfuric acid, the SO_3 will have to avoid first reacting with ammonia slip (and forming ammonia salts). During the combustion process, most of the sulfur is converted to SO_2. For the combustion turbine, forty-five percent of the SO_2 is assumed to be converted to SO_3 as a result of the combined effects of the combustion process and oxidation of the SCR and oxidation catalysts, and eventually to H_2SO_4 and/or ammonium sulfate salts.

4.8.1 Review of H_2SO_4 BACT Database

A review of the RBLC and search of recently issued air permits indicated only one option for H_2SO_4 control. For all units where H_2SO_4 control was identified, the only option considered was the combustion of low-sulfur fuels. No other controls have been implemented on a combustion turbine, boiler, or diesel engine.

4.8.1.1 Combined Cycle Combustion Turbine

A search of numerous permits for natural gas-fired combined cycle combustion turbines yielded BACT H_2SO_4 emission limits ranging primarily between 0.0001 and 0.003 lb/mmBtu. A search of recent Projects with H_2SO_4 limits for fuel oil-fired combined cycle combustion turbines yielded a range of H_2SO_4 emission limits between 0.0012 and 0.015 lb/mmBtu.

4.8.1.2 Auxiliary Boiler

A search of the RBLC for H_2SO_4 emissions from natural gas fired boilers similar in size to the auxiliary boiler proposed at the Project shows BACT limits of 0.00009 lb/mmBtu to 0.0005 lb/mmBtu.

4.8.1.3 Emergency Diesel Engines

A search of the RBLC for H_2SO_4 emissions from emergency diesel engines yielded results ranging from 0.0002 to 0.0004 lb/mmBtu.

4.8.2 Identification of H_2SO_4 Control Options and Technical Feasibility

4.8.2.1 Combined Cycle Combustion Turbine

Strategies for the control of H_2SO_4 emissions can be divided into pre- and post-combustion categories. Pre-combustion controls entail the use of low-sulfur fuels. Post-combustion controls comprise various wet and dry flue gas desulfurization (FGD) processes. However, FGD alternatives are undesirable for use on combustion turbine power facilities due to high-pressure drops across the device, and would be particularly impractical for the large flue gas volumes and low sulfur concentrations in this situation. The use of natural gas or ULSD results in low emission levels of H_2SO_4.

4.8.2.2 Auxiliary Boiler

FGD is a technology used to control sulfur emissions from various combustion sources. Installation of such systems is an established technology principally on coal-fired and high-sulfur oil-fired steam electric generating stations, but is not feasible for boilers fired with natural gas, such as the one proposed for this Project.

4.8.2.3 Emergency Diesel Engines

The only practical control technique available for emergency diesel engines that will operate no more than 100 hours per year is the use of low-sulfur fuel.

4.8.3 Determination of BACT for H_2SO_4

4.8.3.1 Combined Cycle Combustion Turbine

The most stringent level of control for H_2SO_4 emissions is the firing of natural gas. The Project proposes to use natural gas as the primary fuel along with ULSD as a backup fuel with limited hours of operation to meet BACT for H_2SO_4. The sulfur content of the natural gas of 0.63 grains/100 scf was used as the design basis but does not necessarily represent the maximum sulfur content anticipated for the natural gas. CPV has no control over the sulfur content of the natural gas supplied to the facility. ULSD will have a sulfur content less than or equal to 0.0015%, by weight, which is nearly equivalent to the sulfur content proposed for natural gas.

4.8.3.2 Auxiliary Boiler

The Project proposes to fire low sulfur fuels (0.63 grains S/100 scf of natural gas as the design basis) in the auxiliary boiler to meet BACT for sulfuric acid. This proposal is consistent with the lowest limits identified in the RBLC for auxiliary boilers located at large combined cycle power plants.

4.8.3.3 Diesel Internal Combustion Engines

The Project proposes to utilize ULSD with a maximum sulfur content of 0.0015% by weight in the emergency diesel engines to meet BACT for H_2SO_4. The selection of this fuel represents the greatest level of H_2SO_4 reduction and represents the top level of control.

4.9 BACT Analysis for Greenhouse Gas (GHG) Emissions

The sources of GHG emissions for the Project are the combined cycle combustion turbine, the auxiliary boiler, the emergency diesel engine, the emergency diesel fire pump, and electrical equipment insulated with SF_6.

4.9.1 Review of GHG BACT Database

4.9.1.1 Combined Cycle Combustion Turbine

A summary of recent GHG BACT determinations for combined cycle power plants obtained from the RBLC and from review of other permits not in the RBLC is provided in Appendix C. Direct comparison of BACT limits is complicated by inconsistencies in the bases used to establish GHG BACT limits. For example, some heat rate (Btu/KW-hr) and output based limits (lb CO_2/MW-hr) are provided on a gross basis (i.e., the full electric output of the equipment without consideration of internal plant loads such as pumps and fans) and others are provided on a net basis (i.e., the amount of energy actually sold to the grid). Furthermore, design performance and degradation factors that are used to adjust the base heat rates based upon vendor design data to realistic long term limits vary from permit to permit.

The most recent heat rate BACT limits during natural gas operation at large combined cycle power plants range from 7,247 to 7,750 Btu/KW-hr. The most recent output based limits range from 774 to 1,000 lb CO_2/MW-hr. There is a single dual fuel large combined cycle combustion turbine BACT determination that includes a 1,000 lb CO_2/MW-hr limit (i.e., the Troutdale Energy Center). The CPV Shore facility was issued its permit at 925 lb CO_2/MW-hr, while Sewaren Generating Station (final permit) and Middlesex Energy Center (draft permit) both have been permitted at 888 lb CO_2/MW-hr.

4.9.1.2 Auxiliary Boiler

The GHG BACT limits in the RLBC and those listed in a review of proposed permits for auxiliary boilers at combined cycle combustion turbine facilities are based upon an annual ton per year limit, with the exception of the Troutdale Energy Center that is based upon a lb CO_2/mmbtu limit. Appendix C provides the annual limits. However, note that annual limits reflect the particular boiler size and gas throughput limits and will vary substantially from project to project based upon the intended purpose of the boiler.

4.9.1.3 Diesel Internal Combustion Engines

A review of the RBLC database indicates that recent permits for emergency diesel generators of the size proposed for this Project are 526 g/hp-hr and 163 lb/mmbtu. There are many permit limits based upon an annual tons per year limit that are determined per the anticipated maximum annual operation and size of the engine. The limits for emergency diesel fire pumps are similar to those for emergency diesel engines.

4.9.1.4 Electrical Equipment Insulated with SF_6

A search of the RBLC for “carbon dioxide” did not yield any results for electrical equipment insulated with SF_6 (circuit breakers).

4.9.2 Identification of GHG Control Options and Technical Feasibility

4.9.2.1 Combined Cycle Combustion Turbine

The following potentially applicable control technologies for GHG were evaluated:

CO_2 Capture and Storage – Capture and compression, transport, and geologic storage of the CO_2 is a post-combustion technology that is not considered commercially viable at this time for combined cycle power plants. However, based on requests for other GHG permit applications, carbon capture and sequestration (CCS) is evaluated further in this analysis. CCS systems involve the use of adsorption or absorption processes to remove CO_2 from flue gas, with subsequent desorption to produce a concentrated CO_2 stream. The concentrated CO_2 is then compressed to supercritical temperature and pressure, a state in which CO_2 exists neither as a liquid nor a gas, but instead has physical properties of both liquids and gases. The supercritical CO_2 would then be transported to an appropriate location for underground injection into a suitable geological storage reservoir, such as a deep saline aquifer or depleted coal seam, or used in crude oil production for enhanced oil recovery.

With regard to CCS, as identified by U.S. EPA, CCS is composed of three main components: CO_2 capture and/or compression, transport, and storage. CCS may be eliminated from a BACT analysis in Step 2 if it can be shown that there are significant differences pertinent to the successful operation for each of these three main components from what has already been applied to a differing source type. For example, the temperature, pressure, pollutant concentration, or volume of the gas stream to be controlled, may differ so significantly from previous applications that it is uncertain the control device will work in the situation currently undergoing review. Furthermore, CCS may be eliminated from a BACT analysis in Step 2 if the three components working together are deemed technically infeasible for the proposed source, taking into account the integration of the CCS components with the base facility and site-specific considerations (e.g., space for CO_2 capture equipment at an existing facility, right-of-ways to build a pipeline or access to an existing pipeline, access to suitable geologic reservoirs for sequestration, or other storage options).

Each component of CCS technology (i.e., capture and compression, transport, and storage) is discussed separately.

CO_2 Capture and Compression - Though amine absorption technology for CO_2 capture has been applied to processes in the petroleum refining and natural gas processing industries and to exhausts from gas-fired industrial boilers, it is more difficult to apply to power plant gas turbine exhausts, which have considerably larger flow volumes and considerably lower CO_2 concentrations. The Obama Administration's Interagency Task Force on Carbon Capture and Storage confirms this in its recently completed report on the current status of development of CCS systems:

> "Current technologies could be used to capture CO_2 from new and existing fossil energy power plants; however, they are not ready for widespread implementation primarily because they have not been demonstrated at the scale necessary to establish confidence for power plant application. Since the CO_2 capture capacities used in current industrial processes are generally much smaller than the capacity required for the purposes of GHG emissions mitigation at a typical power plant, there is considerable uncertainty associated with capacities at volumes necessary for commercial deployment."[5]

In its CCS research program plans, the DOE-NETL confirms that commercial CO_2 capture technology for large-scale power plants is not yet available and suggests that it may not be available until at least 2020:

> "The overall objective of the Carbon Sequestration Program is to develop and advance CCS technologies that will be ready for widespread commercial deployment by 2020. To accomplish widespread deployment, four program goals have been established:
>
> (1) Develop technologies that can separate, capture, transport, and store CO_2 using either direct or indirect systems that result in a less than 10 percent increase in the cost of energy by 2015;
> (2) Develop technologies that will support industries' ability to predict CO_2 storage capacity in geologic formations to within ±30 percent by 2015;
> (3) Develop technologies to demonstrate that 99 percent of injected CO_2 remains in the injection zones by 2015;
> (4) Complete Best Practices Manuals (BPMs) for site selection, characterization, site operations, and closure practices by 2020. Only by accomplishing these goals will CCS technologies be ready for safe, effective commercial deployment both domestically and abroad beginning in 2020 and through the next several decades."[6]

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[5] *Report of the Interagency Task Force on Carbon Capture and Storage* at 50 (Aug. 2010).
[6] DOE-NETL, *Carbon Sequestration Program: Technical Program Plan,* at 10 (Feb. 2011).

Another challenge of CO_2 capture is conservation of water resources. Adding CO_2 separation facilities and compression equipment significantly increases the cooling water requirements of a generating station. Studies have indicated that a natural gas fired combined cycle facility with CCS may have an increased water consumption of nearly double that of a similar facility without CCS.

CO_2 Transport and Storage - Even if it is assumed that CO_2 capture and compression could feasibly be achieved for the proposed Project, the high-volume CO_2 stream generated would need to be transported to a facility capable of storing it by an existing pipeline. The nearest CO_2 pipelines to the Project are in northern Michigan and southern Mississippi.

CO_2 Storage - Even if it is assumed that CO_2 capture and compression could feasibly be achieved for the proposed Project and that the CO_2 could be transported economically, the feasibility of CCS technology would still depend on the availability of a suitable sequestration site. The suitability of potential storage sites is a function of volumetric capacity of their geologic formations, CO_2 trapping mechanisms within formations (including dissolution in brine, reactions with minerals to form solid carbonates, and/or adsorption in porous rock), and potential environmental impacts resulting from injection of CO_2 into the formations. Potential environmental impacts resulting from CO_2 injection that still require assessment before CCS technology can be considered feasible include:

- Uncertainty concerning the significance of dissolution of CO_2 into brine;
- Risks of brine displacement resulting from large-scale CO_2 injection, including a pressure leakage risk for brine into underground drinking water sources and/or surface water;
- Risks to fresh water as a result of leakage of CO_2, including the possibility for damage to the biosphere, underground drinking water sources, and/or surface water; and,
- Potential effects on wildlife.

It should be noted that, based on the suitability factors described above, currently the suitability of the Newark Basin to store a substantial portion of the large volume of CO_2 generated by a facility comparable in size to the proposed Project has yet to be fully demonstrated. As concluded in the 2010 Report of the Interagency Task Force on Carbon Capture and Storage that while there is currently estimated to be a large volume of potential storage sites, "to enable widespread, safe, and effective CCS, CO_2 storage should continue to be field-demonstrated for a variety of geologic reservoir classes" and that "scale-up from a limited number of demonstration projects to wide scale commercial deployment may necessitate the consideration of basin-scale factors (e.g., brine displacement, overlap of pressure fronts, spatial variation in depositional environments, etc.)".

Based on the abovementioned U.S. EPA guidance regarding technical feasibility and the conclusions of the Interagency Task Force for the CO_2 capture component alone (let alone a detailed evaluation of the technical feasibility of right-of-ways to build a pipeline or storage sites), CCS has been determined to not be technically feasible. Thus, CCS technology should be eliminated from further consideration as a potential feasible control technology for purposes of this BACT analysis.

Electrical Generation Efficiency – Other than capture and sequestration of GHG emitted by combustion, the only known option for reducing GHG emissions is through maximization of the energy released during the combustion process and then through the maximization of the use or capture of that energy. To minimize GHG emissions, it is desirable to use less fuel to generate a given amount of electrical energy. There are several factors that may be examined that affect the amount of GHG produced per MW-hour of energy produced. The following energy efficiency practices were considered for the Project:

<u>Use of Low Carbon Fuel –</u> The first aspect to evaluate with regard to an energy efficient process is the source of fuel. 40 CFR Part 98 provides emission factors for GHG from the combustion of various fuels. Natural gas is listed as the third cleanest fuel with respect to CO_2 emissions, the third cleanest fuel with respect to CH_4 emissions, and the cleanest fuel with respect to N_2O emissions. The two cleaner fuels with respect to CO_2 emissions (coke oven gas and biogas) are not feasible sources of fuel for the Project. Therefore, with regard to fuels that can be utilized by the Project, natural gas produces the lowest GHG emissions profile. The proposed combustion turbine unit will primarily burn natural gas.

<u>Turbine Design/Selection</u> – In a combined cycle configuration, a HRSG is used to recover what would otherwise be waste heat lost to the atmosphere in the hot turbine exhaust. Use of heat recovery from the turbine exhaust to produce steam to power a steam turbine which generates additional electric power is the single most effective means of increasing the efficiency of combustion turbines used for electric power generation. In applications where process heat is needed, the steam produced in the HRSG can also be used to provide heat to plant processes in addition to or instead of being used to produce additional electricity. This "cogeneration" technology is not applicable to electric power generation unless there is a co-located steam host or other means of using additional recoverable waste heat.

The driving factor in the evaluation of energy efficiency is the core efficiency of the selected combustion turbine. However, in the EAB's recent decision in the La Paloma Energy Center case, it was concluded that "combined cycle combustion turbines with efficient turbine design is the most energy efficient way to generate electricity" and that minor differences in efficiency and

GHG emission rates between different combustion turbine models are acceptable. The Project is proposing to install a single "H" Class turbine in combined-cycle configuration, which are the most efficient class of combustion turbines commercially available. The combined cycle heat rate of the proposed unit compares very favorably to the heat rate limits included in recent permits for other comparable combined cycle units which are summarized in Appendix C.

Periodic Maintenance and Tune-up – Periodic tune-up of the turbine helps to maintain optimal thermal efficiency. After several months of continuous operation of the combustion turbine, fouling and degradation results in a loss of thermal efficiency. A periodic maintenance program consisting of inspection of key equipment components and tune up of the combustor will restore performance to near original conditions. The facility will implement an extensive inspection and maintenance program.

Instrumentation and Controls – Proper instrumentation ensures efficient turbine operation to minimize fuel consumption and resulting GHG emissions. Today's H Class turbines, like the one being proposed for this Project, come from the manufacturer with a digital control package included. These systems control turbine operation, including fuel and air flow, to optimize combustion for control of criteria pollutant emissions (NO_x and CO) in addition to maintaining high operating efficiency to minimize fuel usage over the full range of operating conditions and loads.

4.9.2.2 Auxiliary Boiler

The only feasible option for reducing GHG emissions from the auxiliary boiler is to use natural gas and to limit the hours of annual operation, both of which are proposed in this PSD permit application. Natural gas has the lowest pollutant emissions amongst feasible fuels.

4.9.2.3 Emergency Diesel Engines

The emergency engines provide electricity and/or fire protection during a loss of power or fire at the facility. In accordance with National Fire Protection Agency (NFPA) requirements under NFPA-20 (Standard for the Installation of Stationary Pumps for Fire Protection), emergency fire pump engines must be either diesel or electric engines and cannot be spark-ignited engines (i.e., natural gas, propane or gasoline). Furthermore, NFPA-20 emergency fire pump engines must have a dedicated diesel fuel tank. Spark ignition engines are not suitable for fire protection due to their unreliability as compared to diesel engines.

Similar to fire pump engines, a diesel generator is required for reliability and safety purposes during an emergency. Unlike a diesel engine, an electric engine cannot be used as an emergency generator as that equipment, by design, operates only when electricity is available.

Like the other project sources, CCS could theoretically capture and store CO_2 emissions from the emergency engines. However, based upon the technical deficiencies of the current CCS technology and the lack of suitable sequestration facilities near the Project, CCS was eliminated as a BACT option for GHG control. Since spark ignition engines were eliminated as technically feasible, diesel engines are the lowest emitting technology available. Thus, the only feasible option for reducing GHG emissions from the emergency diesel engines is to limit annual operation of the units.

4.9.2.4 Electrical Equipment Insulated with SF_6

State-of-the-art enclosed-pressure SF_6 technology with leak detection is the primary technology used to limit fugitive emissions. In comparison to older SF_6 circuit breakers, modern breakers are designed as a totally enclosed-pressure system with far lower potential for SF_6 emissions. In addition, the effectiveness of leak-tight closed systems can be enhanced by equipping them with a density alarm that provides a warning when 10% of the SF_6 (by weight) has escaped. The use of an alarm identifies potential leak problems before the bulk of the SF_6 has escaped, so that it can be addressed proactively to prevent further release of the gas.

A second alternative considered in this analysis is to substitute another, non-GHG substance for SF_6 as the dielectric material in the breakers. Potential alternatives to SF_6 were addressed in the National Institute of Standards and Technology (NTIS) Technical Note 1425, *Gases for Electrical Insulation and Arc Interruption: Possible Present and Future Alternatives to Pure SF_6*.[7] According to the NTIS Technical Note 1425, SF_6 is a superior dielectric gas for nearly all high voltage applications. It is easy to use, exhibits exceptional insulation and arc-interruption properties, and has proven its performance during many years of use and investigation. It is clearly superior in performance to the air and oil insulated equipment used prior to the development of SF_6-insulated equipment. The report concluded that although "...various gas mixtures show considerable promise for use in new equipment, particularly if the equipment is designed specifically for use with a gas mixture... it is clear that a significant amount of research must be performed for any new gas or gas mixture to be used in electrical equipment." Therefore, there are currently no technically feasible options besides use of SF_6.

[7] Christophorous, L.G., J.K. Olthoff, and D.S. Green, *Gases for Electrical Insulation and Arc Interruption: Possible Present and Future Alternatives to Pure SF6*, NIST Technical Note 1425, Nov.1997.

4.9.3 Determination of BACT for GHG

4.9.3.1 Combined Cycle Combustion Turbine

BACT for GHG emissions has been determined to be the application of advanced combined-cycle technology with natural gas firing as the primary fuel with USLD firing limited to certain operating periods. In accordance with BACT requirements, BACT must be established as a federally enforceable emission rate. The recently permitted GHG emission rates in Appendix C take into account degradation in turbine performance over the expected lifetime of each project. The majority of the GHG BACT decisions in Appendix C apply several degradation factors initially established by the Bay Area Air Quality Management District for the permitting of the Russell City Energy Center. These degradation factors have been approved in numerous recent PSD permits issued by U.S. EPA and other PSD-delegated agencies. As these degradation factors have been approved by U.S. EPA, they are proposed to be applied for the Project to establish the GHG BACT emission rate. The following is a discussion of these factors and the proposed GHG BACT emission rate:

- The first factor accounts for design margin to reflect the likelihood that the equipment as constructed and installed may not fully achieve the optimal vendor specified design performance. A design margin of 3.3 percent is taken into account for this purpose.
- The second factor accounts for performance margin to reflect normal wear and tear of the combustion turbine over its useful life. A performance margin of 6.0 percent is taken into account for this purpose.
- The third factor accounts for degradation of auxiliary plant equipment (i.e., HRSG, steam turbine, ancillary pumps and motors, etc.) to reflect normal wear and tear. An auxiliary equipment degradation margin of 3.0 percent is taken into account for this purpose.

These three factors are expected to compound upon each preceding factor such that the overall degradation in plant performance is estimated to be 12.8 percent over the useful life of the combustion turbine.

Several of the projects identified in Appendix C have been permitted with a heat rate limit. Most of these limits have been established solely for a natural gas-fired operating condition, without duct firing, at ISO conditions. The proposed GE 7HA.02 CTG has a new and clean designed heat rate (in combined cycle mode) for the Project of 6,453 Btu/KW-hr HHV on a gross-output basis when firing natural gas at ISO conditions without duct firing. Applying the 12.8 percent performance degradation and margin factor discussed above, yields a gross heat rate of 7,279 Btu/KW-hr when firing natural gas at ISO conditions without duct firing. This gross heat rate is amongst the lowest heat rates identified for recent combined cycle combustion Projects and is proposed as GHG BACT for the Project. Note that the heat rate limits for three recent Projects proposed with GE 7HA.02 combustion turbines are 7,047 Btu/KW-hr (Gross, HHV), 7,368 Btu/KW-hr (Gross, HHV) and, 6,901 Btu/KW-hr (Gross, HHV) for the Colorado Bend II, Moxie Freedom, and Middlesex Energy Center projects, respectively. Thus, the Project design has been optimized such that it will perform more in-line with recent Projects proposed with identical combustion turbines.

The Project proposes as BACT, the following energy efficiency processes, practices, and designs for the proposed combustion turbine:

- Use of combined cycle power generation technology
- Use of natural gas as the primary fuel
- Efficient turbine design
- Periodic maintenance and tune up
- Instrumentation and controls

The Project is proposing the following GHG BACT limits:

- Heat rate of 7,279 Btu/KW-hr Gross (HHV) at ISO conditions during natural gas operation and at baseload without duct firing; and
- Total annual GHG emissions for the combined cycle combustion turbine including duct firing, backup ULSD operation, and operation at part loads, will be limited to 2,357,558 tons CO_2e per year

The proposed heat rate above is corrected to ISO conditions of:

- Ambient Dry Bulb Temperature: 59°F
- Ambient Relative Humidity: 60%
- Barometric Pressure: 14.7 psia
- Fuel (natural gas) Higher Heating Value: 22,888 Btu/lb

The facility will utilize 40 CFR Part 75 monitoring methodology along with 40 CFR Part 98 emission factors for CH_4 and N_2O to determine compliance. Compliance with the heat rate limit at base load on natural gas without duct firing will be based on an initial performance test. Compliance with the annual tons/year limit will be based on a rolling monthly total.
Note that the Project also will comply with the U.S. EPA's recently promulgated NSPS TTTT that will limit CO_2 emissions from new natural gas base load combustion turbines to 1,000 pounds CO_2/MW-hr-g of electricity generated on a gross basis (12-month rolling average). Based upon this U.S. EPA rule, a GHG emissions performance standard of 1,000 lb CO_2e per gross MW-hr is intended to reflect degradation of the equipment over time and the emissions associated with turndowns, startup, and shutdown.

Therefore, taking into account the efficiency metric for the combined-cycle power plant of pounds of CO_2 per gross MW-hr of electrical generation, the capability of HRSG duct firing, the inherent degradation in turbine performance over the life of the Facility, and the inclusion of startup and shutdowns over the course of a year of operation, it has been concluded that the Facility will meet the NSPS TTTT limit on a 365-day rolling average during facility operation. Note that during natural gas fired operation at part load, the emissions on a lb CO_2 per MW-hr basis typically range from 880 to 1,029. Thus, the 1,000 lb/MW-hr NSPS is consistent with the lifetime annual operation of the Facility that includes degradation of the equipment over time and the emissions associated with turndowns, startup, shutdown, and part load operation that are incorporated into this annual limit. It should be noted that the Pennsylvania DEP recently issued a Plan Approval Permit[8] for the Moxie Freedom Project with a lb CO_2 per MW-hr limit of 1,000, which is consistent with the NSPS. The Moxie Freedom Project also includes two (2) GE 7HA.02 combined cycle combustion turbines in 1x1 configurations, which is a similar recent combined cycle project as compared to Keasbey Energy Center.

4.9.3.2 Auxiliary Boiler

The Project proposes to burn natural gas as the fuel and limit total operation to 4,000 hours per year. Total annual CO_2e emissions from the auxiliary boiler will be limited to 16,920 tons/year.

4.9.3.3 Diesel Internal Combustion Engines

The Project proposes to limit the total operating hours for the emergency diesel generator and fire pump to 100 hours per year each. Total annual CO_2e emissions from the emergency diesel generator and emergency diesel fire pump will be limited to 118.6 and 18.6 tons/year, respectively.

4.9.3.4 Electrical Equipment Insulated with SF_6

The Project proposes to use circuit breakers with totally enclosed insulation systems equipped with a low pressure alarm and low pressure lockout. The lockout will prevent operation of the breaker if insufficient SF_6 remains in the system.

4.10 **SOTA Analysis for Ammonia**

Ammonia (NH_3) emissions from the proposed combined cycle unit result from the use of SCR for NO_x control. The Project has assumed a maximum ammonia slip from the SCR system of 5 ppm. This proposed emission limit is equal to the value identified in NJDEP's most recent

[8] http://www.pabulletin.com/secure/data/vol45/45-22/1012a.html

SOTA Technical Manual for combustion turbines. Therefore, the SOTA proposal for ammonia emissions is a 5 ppm emission limit.

4.11 SOTA Analysis for Opacity

Opacity is defined as the property of a substance which renders it partially or wholly obstructive to the transmission of visible light expressed as the percentage to which the light is obstructed. Particulates in large concentrations can decrease visibility by scattering and absorbing light. The opacity resulting from the operation of a natural gas fired combustion turbine is inherently low due to the low particulate emission rate.

The Project has assumed a maximum stack opacity of 10% during normal operations of the combustion turbine. The opacity may rise to as high as 20% during start-up and shutdown. Therefore, the Project is proposing to meet the NJDEP SOTA limits for opacity of 10% during normal operations on natural gas and 20% during start-up and shutdown and on ULSD firing (exclusive of visible condensed water vapor, for a period of no more than 10 seconds) as presented in the SOTA manual.

4.12 Summary of Control Technology Proposals

Tables 4–1 through 4-4 provide a summary of the control technology proposals for the Project for listed regulated pollutants.

Table 4-1: Summary of Proposed Emissions – Combined Cycle Combustion Turbine

Pollutant	Section	LAER/BACT/SOTA	Method	Basis
NO_x	4.4	2.0 ppm (NG with and without DB) 4.0 ppm (ULSD)	SCR and Dry LNB	LAER
VOC	4.5	1.0 ppm (NG without DB) 2.0 ppm (NG with DB) 2.0 ppm (ULSD)	Oxidation catalyst & good combustion practices	LAER
CO	4.6	2.0 ppm (NG with and without DB) 2.0 ppm (ULSD)	Oxidation catalyst & good combustion practices	BACT
PM/PM-10/PM-2.5	4.7	0.0070 lb/mmBtu (NG with DB) 0.0068 lb/mmBtu (NG without DB) 0.0338 lb/mmBtu (ULSD)	Low-sulfur fuels	BACT
SO_2	3.1.2	NG composition with 0.63 grains S per 100 scf[(2)] ULSD with 15 ppm S	Low-sulfur fuels	NSPS (KKKK)
H_2SO_4	4.8	NG composition with 0.63 grains S per 100 scf[(2)] ULSD with 15 ppm S	Low-sulfur fuels	BACT
CO_2e	4.9	7,279 Btu/KW-hr Gross (HHV)[(1)] 2,357,558 tons CO_2e per year	Clean fuel and thermal efficiency	BACT
NH_3	4.10	5 ppm	N/A	SOTA

(1) At ISO conditions during natural gas operation at baseload without duct firing.

(2) Design basis sulfur content

Table 4-2: Summary of Proposed Emissions – Auxiliary Boiler

Pollutant	Section	LAER/BACT/SOTA	Method	Basis
NO_x	4.4	0.01 lb/mmBtu	Low NO_x Burners	LAER
VOC	4.5	0.005 lb/mmBtu	Good combustion controls	LAER
CO	4.6	0.037 lb/mmBtu	Good combustion controls	BACT
PM/ PM-10/ PM-2.5	4.7	0.007 lb/mmBtu	Low sulfur fuel	BACT
H_2SO_4	4.8	NG composition with 0.63 grains S per 100 scf(1)	Low sulfur fuel	BACT
CO_2e	4.9	16,920 tons CO_2e per year	Good combustion practices and limited operation	BACT

(1) Design basis sulfur content

Table 4-3: Summary of Proposed Emissions – Emergency Diesel Engines

Pollutant	Section	Emergency Diesel Fire Pump	Emergency Diesel Generator	Method	Basis
NO_x	4.4	2.69 g/bhp-hr	4.63 g/bhp-hr	Good combustion controls	LAER
VOC	4.5	0.31 g/bhp-hr	0.15 g/bhp-hr	Good combustion controls	LAER
CO	4.6	1.42 g/bhp-hr	2.61 g/bhp-hr	Good combustion controls	BACT
PM/ PM-10/ PM-2.5	4.7	0.12 g/bhp-hr	0.15 g/bhp-hr	Low sulfur fuels	BACT
H_2SO_4	4.8	ULSD with 15 ppm S	ULSD with 15 ppm S	Low sulfur fuels	BACT
CO_2e	4.9	18.6 tons CO_2e per year	118.6 tons CO_2e per year	Limited Operation	BACT

Note: Sum of NOx + NMHC (VOC) = 4.78 g/bhp-hr per NSPS IIII for EDG.
Sum of NOx + NMHC (VOC) = 3.00 g/bhp-hr per NSPS IIII for EDFP

Table 4-4: Summary of Proposed Emissions – Cooling Tower

Pollutant	Section	BACT	Method	Basis
PM/PM-10/ PM-2.5	4.7	0.0005% drift	High efficiency drift Eliminators	BACT

APPENDIX A

NJDEP
RADIUS FORMS

CERTIFICATION

Facility ID: 18940

Facility Name: CPV Keasbey (Keasbey Energy Center, modification to Woodbridge Energy Center)

Responsible Official:

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attached documents and, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant civil and criminal penalties, including the possibility of fine or imprisonment or both, for submitting false, inaccurate or incomplete information.

Name: Kenneth Earl **Signature:** Consolidated Asset Management Services, a New Jersey limited liability company By: [signature] **Date:** 8 / 26 / 2016

Individuals with Direct Knowledge:

I certify under penalty of law that I believe the information provided in this document is true, accurate and complete. I am aware that there are significant civil and criminal penalties, including the possibility of fine or imprisonment or both, for submitting false, inaccurate or incomplete information.

Name: Theodore Main **Signature:** [signature] **Date:** 8 / 30 / 2016

Section Being Certified: Emissions Calculations, RADIUS application, Sections 1-4, and Appendices of Technical Support document

Name: **Signature:** **Date:** / /

Section Being Certified:

Name: **Signature:** **Date:** / /

Section Being Certified:

Name: **Signature:** **Date:** / /

Section Being Certified:

114694354v1

New Jersey Department of Environmental Protection
Reason for Application

Permit Being Modified

Permit Class: BOP **Number:** 160001

Description of Modifications:

CPV Power Holdings, LP (CPV) is a leading North American electric power generation development and asset management company headquartered in Silver Spring, Maryland with offices in Braintree, Massachusetts and San Francisco, California. CPV Keasbey, LLC (CPV Keasbey), a wholly owned business entity of CPV, is proposing to construct a nominal 630-megawatt (MW) dual fuel (natural gas and ultra-low sulfur diesel - ULSD) fired 1-on-1 combined cycle electric power facility, to be known as the Keasbey Energy Center (the Project), on land directly adjacent to the existing 725 MW Woodbridge Energy Center.

The proposed Project will be constructed on an approximately eleven (11) acre parcel of land (the "Property") located at 1070 Riverside Drive Township of Woodbridge, Middlesex County, New Jersey (Block 93, Lot 100.02 on the official Woodbridge Township Tax Maps). The Property is located within the Keasbey Brownfield Redevelopment Area on a former chemical plant site that has undergone clean-up and remediation pursuant to the NJDEP's Site Remediation Program. The Property and will be sub-divided from the approximately 27.5 acre parcel of land controlled by CPV Shore Urban Renewal, LLC and share a property boundary with CPV Shore, LLC's (CPV Shore) Woodbridge Energy Center.

The Project air contaminant emissions sources will include a single dual-fuel fired combustion turbine with a natural gas supplementary-fired heat recovery steam generator (HRSG); a natural gas-fired auxiliary boiler and; an emergency diesel generator and emergency diesel fire pump. Combined cycle power will be generated from a steam turbine generator serviced by a wet evaporative cooling tower. The Project will be permitted as a major modification to an existing major source, CPV Shore's Woodbridge Energy Center (PID # 18940 Woodbridge Energy Center) due to CPV's common control of both facilities. CPV's common control of both facilities arises from CPV's majority ownership in both CPV Keasbey and CPV Shore, where CPV controls 100% ownership interest in CPV Keasbey and 57.5% ownership interest in CPV Shore. For this reason CPV is considered to have common control of both facilities and this application is for a Significant Modification to the existing Woodbridge Energy Center facility.

New Jersey Department of Environmental Protection
Facility Profile (General)

Facility Name (AIMS): WOODBRIDGE ENERGY CENTER **Facility ID (AIMS):** 18940

Street Address: INDUSTRIAL HWY
WOODBRIDGE, NJ

Mailing Address: CPV SHR INC
1070 RIVERSIDE DR
STE 300
KEASBEY, NJ 08832

County: Middlesex

Location Description:

State Plane Coordinates:

X-Coordinate: 557,515
Y-Coordinate: 4,485,100
Units: Other
Datum: NAD83
Source Org.: Submittal Document
Source Type: Digital Image

Industry:

Primary SIC:
Secondary SIC:
NAICS: 221112

New Jersey Department of Environmental Protection
Facility Profile (General)

Contact Type: Consultant

Organization: TRC **Org. Type:** Private
Name: Theodore Main **NJ EIN:**
Title: Air Permitting Project Manager
Phone: (201) 508-6960 x
Fax: (201) 933-5541 x
Other: ( ) - x
Type:
Email: tmain@trcsolutions.com

Mailing Address: 1200 Wall Street West
5th Floor
Lyndhurst , NJ 07071

Contact Type: General Contact

Organization: Consolidated Asset Management Services **Org. Type:** Corporation
Name: Kenneth Earl **NJ EIN:**
Title: Plant Manager - Woodbridge Energy Center
Phone: (732) 661-3301 x
Fax: ( ) - x
Other: ( ) - x
Type:
Email: kearl@cpvwoodbridge.com

Mailing Address: 1070 Riverside Dr.
Suite 300
Keasbey, NJ 08832

Contact Type: Operator

Organization: CPV Shore, LLC **Org. Type:** Corporation
Name: CPV Shore, LLC **NJ EIN:**
Title:
Phone: ( ) - x
Fax: ( ) - x
Other: ( ) - x
Type:
Email:

Mailing Address: 50 Braintree Hill Office Park
Suite 300
Braintree, MA 02184

New Jersey Department of Environmental Protection
Facility Profile (General)

Contact Type: Owner (Current Primary)

Organization: Consolidated Asset Management Services **Org. Type:** Corporation

Name: Consolidated Asset Management Services **NJ EIN:**

Title:

Phone: ( ) - x

Fax: ( ) - x

Other: ( ) - x

Type:

Email:

Mailing Address: 50 Braintree Hill Office Park
Suite 300
Braintree, MA 02184

Contact Type: Responsible Official

Organization: Consolidated Asset Management Services **Org. Type:** Corporation

Name: Kenneth Earl **NJ EIN:**

Title: Plant Manager - Woodbridge Energy Center

Phone: (732) 661-3301 x

Fax: ( ) - x

Other: ( ) - x

Type:

Email: kearl@cpvwoodbridge.com

Mailing Address: 1070 Riverside Dr.
Suite 300
Keasbey, NJ 08832

New Jersey Department of Environmental Protection
Facility Profile (Permitting)

1. Is this facility classified as a small business by the USEPA?	No
2. Is this facility subject to N.J.A.C. 7:27-22?	Yes
3. Are you voluntarily subjecting this facility to the requirements of Subchapter 22?	No
4. Has a copy of this application been sent to the USEPA?	No
5. If not, has the EPA waived the requirement?	No
6. Are you claiming any portion of this application to be confidential?	No
7. Is the facility an existing major facility?	Yes
8. Have you submitted a netting analysis?	No
9. Are emissions of any pollutant above the SOTA threshold?	Yes
10. Have you submitted a SOTA analysis?	Yes
11. If you answered "Yes" to Question 9 and "No" to Question 10, explain why a SOTA analysis was not required	
12. Have you provided, or are you planning to provide air contaminant modeling?	Yes

WOODBRIDGE ENERGY CENTER (18940) Date: 8/30/2016

New Jersey Department of Environmental Protection
Equipment Inventory

Equip. NJID	Facility's Designation	Equipment Description	Equipment Type	Certificate Number	Install Date	Grand-Fathered	Last Mod. (Since 1968)	Equip. Set ID
E201	U200 CC Turb	Natural Gas or ULSD Fired Combined Cycle Combustion Turbine	Combustion Turbine			No		
E202	U200 CC DB	Heat Recovery Steam Generator with DB for GE 7HA CC Unit	Duct Burner			No		
E203	U200 AB	Natural Gas Fired Auxilairy Boiler for U200	Boiler			No		
E204	U200 FP	Diesel Fired Fire Pump for U200	Emergency Fire Pump			No		
E205	U200 EDG	Diesel Fired Emergency Generator for U200	Emergency Generator			No		
E206	U200CoolTow	Cooling Tower for U200	Other Equipment			No		
E207	U200ULSDTA	ULSD Storage Tank for U200	Storage Vessel			No		

000000 E201 (Combustion Turbine)
Print Date: 8/30/2016

Make:	General Electric
Manufacturer:	General Electric
Model:	7HA.02
Maximum rated Gross Heat Input (MMBtu/hr-HHV):	3,626.20
Type of Turbine:	
Type of Cycle:	Combined-Cycle
Description:	
Industrial Application:	Electical Generator
Description:	
Power Output:	630.00
Units:	Megawatts

Is the combustion turbine using (check all that apply):

A Dry Low NOx Combustor:	☑		
Steam Injection:	☐	Steam to Fuel Ratio:	
Water Injection:	☐	Water to Fuel Ratio:	
Other:	☐	Description:	

Is the turbine Equipped with a Duct Burner? ● Yes ○ No

Have you attached a diagram showing the location and/or the configuration of this equipment? ● Yes ○ No

Have you attached any manuf.'s data or specifications to aid the Dept. in its review of this application? ● Yes ○ No

Comments:

000000 E202 (Duct Burner)
Print Date: 8/30/2016

Make:	TBD
Manufacturer:	TBD
Model:	TBD
Maximum rated Gross Heat Input (MMBtu/hr-HHV):	950.00
Equipment Type Description:	Natural Gas Fired Duct Burner for Supplemental Firing

Have you attached a diagram showing the location and/or the configuration of this equipment?

- (●) Yes
- ( ) No

Have you attached any manuf.'s data or specifications to aid the Dept. in its review of this application?

- ( ) Yes
- (●) No

Comments:

Include Emission Rates on the Potential to Emit Screen for each contaminant in ppmvd @ 7%O2 in addition to lbs/hr and tons/yr.

000000 E203 (Boiler)
Print Date: 8/30/2016

Make:	TBD
Manufacturer:	TBD
Model:	TBD
Maximum Rated Gross Heat Input (MMBtu/hr - HHV):	72.30
Boiler Type:	Water Tube
Utility Type:	
Output Type:	
Steam Output (lb/hr):	
Fuel Firing Method:	Other firing method
Description (if other):	Low NOx burner with FGR
Draft Type:	Forced
Heat Exchange Type:	

Is the boiler using? (check all that apply):

Low NOx Burner:	☑	Type:	
Staged Air Combustion:	☐		
Flue Gas Recirculation (FGR):	☑	Amount (%):	

Have you attached a diagram showing the location and/or the configuration of this equipment?	Yes
Have you attached any manuf.'s data or specifications to aid the Dept. in its review of this application?	No

Comments:

000000 E205 (Emergency Generator)
Print Date: 8/30/2016

Make:	TBD
Manufacturer:	TBD
Model:	TBD
Maximum rated Gross Heat Input (MMBtu/hr-HHV):	14.41
Will the equipment be used in excess of 500 hours per year?	○ Yes ● No

Have you attached a diagram showing the location and/or the configuration of this equipment?	● Yes ○ No	Have you attached any manuf.'s data or specifications to aid the Dept. in its review of this application?	○ Yes ● No

Comments:

000000 E206 (Other Equipment)
Print Date: 8/30/2016

Make:	TBD
Manufacturer:	TBD
Model:	TBD
Equipment Type:	Mechanical Induced Draft Cooling Tower
Capacity:	2,550.00
Units:	other units
Description:	gallons per second

Have you attached a diagram showing the location and/or the configuration of this equipment?

- ● Yes
- ○ No

Have you attached any manuf.'s data or specifications to aid the Dept. in its review of this application?

- ○ Yes
- ● No

Comments:

000000 E207 (Storage Vessel)
Print Date: 8/30/2016

What type of contents is this storage vessel equipped to contain by design?	Liquids Only
Storage Vessel Type:	Tank
Design Capacity:	1,000,000
Units:	gallons
Ground Location:	Above Ground
Is the Shell of the Equipment Exposed to Sunlight?	Yes
Shell Color:	Other
Description (if other):	
Shell Condition:	
Paint Condition:	Good
Shell Construction:	
Is the Shell Insulated?	
Type of Insulation:	
Insulation Thickess (in):	
Thermal Conductivity of Insulation [(BTU)(in)(hr)(ft2)(deg F)]:	
Shape of Storage Vessel:	Cylindrical
Shell Height (From Ground to Roof Bottom) (ft):	
Length (ft):	
Width (ft):	
Diameter (ft):	
Other Dimension	
Description:	
Value:	
Units:	
Fill Method:	
Description (if other):	
Maximum Design Fill Rate:	
Units:	gal/min
Does the storage vessel have a roof or an open top?	Roof
Roof Type:	
Roof Height (From Roof Bottom to Roof Top) (ft):	
Roof Construction:	
Primary Seal Type:	
Secondary Seal Type:	
Total Number of Seals:	
Roof Support:	
Does the storage vessel have a Vapor Return Loop?	

Does the storage vessel

Does the storage vessel have a Conservation Vent?	
Have you attached a diagram showing the location and/or the configuration of this equipment?	Yes
Have you attached any manuf.'s data or specifications to aid the Dept. in its review of this application?	No

Comments:

New Jersey Department of Environmental Protection
Control Device Inventory

CD NJID	Facility's Designation	Description	CD Type	Install Date	Grand-Fathered	Last Mod. (Since 1968)	CD Set ID
CD201	U200 SCR	U200 Selective Catlytic Reduction System for GE 7HA.02	Selective Catalytic Reduction		No		
CD202	U200 Oxy Cat	U200 Oxidation Catalyst for GE 7HA.02	Oxidizer (Catalytic)		No		
CD203	U200 Drift E	U200 Drift Eliminator	Other		No		

WOODBRIDGE ENERGY CENTER (18940)

Date: 8/30/2016

New Jersey Department of Environmental Protection
Emission Points Inventory

PT NJID	Facility's Designation	Description	Config.	Equiv. Diam. (in.)	Height (ft.)	Dist. to Prop. Line (ft)	Exhaust Temp. (deg. F)			Exhaust Vol. (acfm)			Discharge Direction	PT Set ID
							Avg.	Min.	Max.	Avg.	Min.	Max.		
PT201	U200Turb201	U200 CC CT/DB GE 7HA.02	Round	264	160	160		158.0	280.0		841,244.0	1,992,107.0	Up	
PT202	U200AuxBoil	U200 Auxilary Boiler	Round	36	40	300	300.0	300.0	300.0	11,125.0	22,250.0		Up	
PT203	U200FirePump	U200 Emergency Diesel Fire Pump	Round	8	26	115	1,076.0	1,076.0	1,076.0	1,900.0	1,900.0	1,900.0	Up	
PT204	U200EDG	U200 Emergency Diesel Generator	Round	12	45	360	759.0	759.0	759.0	10,909.0	10,909.0	10,909.0	Up	
PT205	U200CoolTowr	U200 Cooling Tower	Round	330	54	140	80.0	80.0	80.0	1,448,000.0	1,448,000.0	1,448,000.0	Up	

000000 CD201 (Selective Catalytic Reduction)
Print Date: 8/30/2016

Make:	TBD
Manufacturer:	TBD
Model:	TBD
Minimum Temperature at Catalyst Bed (°F):	
Maximum Temperature at Catalyst Bed (°F):	
Minimum Temperature at Reagent Injection Point (°F):	
Maximum Temperature at Reagent Injection Point (°F):	
Type of Reagent:	
Description:	
Chemical Formula of Reagent:	
Minimum Reagent Charge Rate (gpm):	
Maximum Reagent Charge Rate (gpm):	
Minimum Concentration of Reagent in Solution (% Volume):	
Minimum NOx to Reagent Mole Ratio:	
Maximum NOx to Reagent Mole Ratio:	
Maximum Anticipated Ammonia Slip (ppm):	
Type of Catalyst:	
Volume of Catalyst (ft^3):	
Form of Catalyst:	
Anticipated Life of Catalyst:	
Units:	
Have you attached a catalyst replacement schedule?	Yes ● No
Method of Determining Breakthrough:	
Maximum Number of Sources Using this Apparatus as a Control Device (Include Permitted and Non-Permitted Sources):	
Alternative Method to Demonstrate Control Apparatus is Operating Properly:	
Have you attached any manufacturer's data or specifications in support of the feasibility and/or effectiveness of this control apparatus?	Yes ● No
Have you attached a diagram showing the location and/or configuration of this control apparatus?	Yes ● No

000000 CD201 (Selective Catalytic Reduction)
Print Date: 8/30/2016

Comments:

000000 CD202 (Oxidizer (Catalytic))
Print Date: 8/30/2016

Make:	TBD
Manufacturer:	TBD
Model:	TBD
Minimum Inlet Temperature (°F):	
Maximum Inlet Temperature (°F)	
Minimum Outlet Temperature (°F)	
Maximum Outlet Temperature (°F):	
Minimum Residence Time (sec)	
Fuel Type:	
Description:	
Maximum Rated Gross Heat Input (MMBtu/hr):	
Minimum Pressure Drop Across Catalyst (psi):	
Maximum Pressure Drop Across Catalyst (psi):	
Catalyst Material:	
Form of Catalyst:	
Description:	
Minimum Expected Life of Catalyst:	
Units:	
Volume of Catalyst (ft^3):	
Maximum Number of Sources Using this Apparatus as a Control Device (Include Permitted and Non-Permitted Sources):	
Alternative Method to Demonstrate Control Apparatus is Operating Properly:	
Have you attached data from recent performance testing?	Yes ○ No ●
Have you attached any manufacturer's data or specifications in support of the feasibility and/or effectiveness of this control apparatus?	Yes ○ No ●
Have you attached a diagram showing the location and/or configuration of this control apparatus?	Yes ○ No ●
Comments:	

000000 CD203 (Other)
Print Date: 8/30/2016

Make:	TBD
Manufacturer:	TBD
Model:	TBD
Maximum Air Flow Rate to Control Device (acfm):	
Maximum Temperature of Vapor Stream to Control Device (°F):	
Minimum Temperature of Vapor Stream to Control Device (°F):	
Minimum Moisture Content of Vapor Stream to Control Device (%):	
Minimum Pressure Drop Across Control Device (in. H20):	
Maximum Pressure Drop Across Control Device (in. H20):	
Maximum Number of Sources Using this Apparatus as a Control Device (Include Permitted and Non-Permitted Sources):	
Alternative Method to Demonstrate Control Apparatus is Operating Properly:	
Have you attached data from recent performance testing?	Yes ● No
Have you attached any manufacturer's data or specifications in support of the feasibility and/or effectiveness of this control apparatus?	Yes ● No
Have you attached a diagram showing the location and/or configuration of this control apparatus?	Yes ● No
Comments:	

New Jersey Department of Environmental Protection
Emission Unit/Batch Process Inventory

U 200 E201 GE 7HA Combined Cycle Unit 201 with GE 7HA.02 Turbine

UOS NJID	Facility's Designation	UOS Description	Operation Type	Signif. Equip.	Control Device(s)	Emission Point(s)	SCC(s)	Annual Oper. Hours Min.	Annual Oper. Hours Max.	VOC Range	Flow (acfm) Min.	Flow (acfm) Max.	Temp. (deg F) Min.	Temp. (deg F) Max.
OS1	CT NG WO/DB	E201 Firing NG - No duct burning	Normal - Steady State	E201	CD201 (P) CD202 (P)	PT201	2-01-002-01	0.0	8,760.0		841,244.0	1,658,131.0	158.0	177.0
OS2	CT NG W/DB	E201 Firing NG - with duct burning	Normal - Steady State	E202	CD201 (P) CD202 (P)	PT201	2-01-002-01	0.0	8,040.0		1,443,499.0	1,656,682.0	158.0	167.0
OS3	CT ULSD	E201 Firing ULSD - with duct burning	Normal - Steady State	E201	CD201 (P) CD202 (P)	PT201	2-01-002-01	0.0	720.0		1,102,478.0	1,992,107.0	248.0	280.0
OS4	CT NG RSU	E201 Firing NG - Rapid Response Start-Up	Startup	E201		PT201	2-01-002-01	0.0	108.8		0.0	841,244.0	0.0	158.0
OS5	CT NG RSD	E201 Firing NG - Rapid Response Shut Down	Shutdown	E201		PT201	2-01-002-01	0.0	52.4		0.0	841,244.0	0.0	158.0
OS6	CT ULSD RSU	E201 Firing ULSD - Rapid Response Start-Up	Startup	E201		PT201	2-01-002-01	0.0	5.2		0.0	1,147,454.0	0.0	248.0
OS7	CT ULSD RSD	E201 Firing ULSD - Rapid Response Shut Down	Shutdown	E201		PT201	2-01-002-01	0.0	1.2		0.0	1,147,454.0	0.0	248.0

U 203 E203 Aux Blr Auxiliary Boiler

UOS NJID	Facility's Designation	UOS Description	Operation Type	Signif. Equip.	Control Device(s)	Emission Point(s)	SCC(s)	Annual Oper. Hours Min.	Annual Oper. Hours Max.	VOC Range	Flow (acfm) Min.	Flow (acfm) Max.	Temp. (deg F) Min.	Temp. (deg F) Max.
OS1	Aux Boiler	Natural Gas Fired Auxiliary Boiler	Normal - Steady State	E203		PT202	1-02-006-02	0.0	4,000.0		11,125.0	22,250.0	300.0	300.0

New Jersey Department of Environmental Protection
Emission Unit/Batch Process Inventory

U 204 E204 FP Emergency Fire Pump

UOS NJID	Facility's Designation	UOS Description	Operation Type	Signif. Equip.	Control Device(s)	Emission Point(s)	SCC(s)	Annual Oper. Hours Min.	Annual Oper. Hours Max.	VOC Range	Flow (acfm) Min.	Flow (acfm) Max.	Temp. (deg F) Min.	Temp. (deg F) Max.
OS1	Fire Pump	Emergency Diesel Fire Pump	Normal - Steady State	E204		PT203	2-02-001-02	0.0	100.0		1,900.0	1,900.0	1,076.0	1,076.0

U 205 E205 EDG Emergency Diesel Generator

UOS NJID	Facility's Designation	UOS Description	Operation Type	Signif. Equip.	Control Device(s)	Emission Point(s)	SCC(s)	Annual Oper. Hours Min.	Annual Oper. Hours Max.	VOC Range	Flow (acfm) Min.	Flow (acfm) Max.	Temp. (deg F) Min.	Temp. (deg F) Max.
OS1	Emer Gen	Emergency Diesel Generator	Normal - Steady State	E205		PT204	2-01-001-02	0.0	100.0		10,909.0	10,909.0	759.0	759.0

WOODBRIDGE ENERGY CENTER (18940)

Date: 8/30/2016

New Jersey Department of Environmental Protection
Emission Unit/Batch Process Inventory

U 206 E206 C Tower Cooling Tower

UOS NJID	Facility's Designation	UOS Description	Operation Type	Signif. Equip.	Control Device(s)	Emission Point(s)	SCC(s)	Annual Oper. Hours Min.	Annual Oper. Hours Max.	VOC Range	Flow (acfm) Min.	Flow (acfm) Max.	Temp. (deg F) Min.	Temp. (deg F) Max.
OS1	Cool Tower	Mechanical Draft Cooling Tower (10 Cells)	Normal - Steady State	E206	CD203 (P)	PT205	A28-20-000-000	0.0	8,760.0			1,448,000.0	80.0	80.0

U 207 E207 Oil Tnk ULSD Storage Tank

UOS NJID	Facility's Designation	UOS Description	Operation Type	Signif. Equip.	Control Device(s)	Emission Point(s)	SCC(s)	Annual Oper. Hours Min.	Annual Oper. Hours Max.	VOC Range	Flow (acfm) Min.	Flow (acfm) Max.	Temp. (deg F) Min.	Temp. (deg F) Max.
OS1	ULSD Tank	1,000,000 Gallon ULSD Storage Tank	Normal - Steady State	E207			4-03-010-19	0.0	8,760.0	A	0.0	0.0	0.0	105.0

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **FC**

Operating Scenario:

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Carbon Dioxide					thousand tons/yr	No
CO			402.10000000	402.10000000	tons/yr	No
HAPs (Total)			18.90000000	18.90000000	tons/yr	No
NOx (Total)			296.70000000	296.70000000	tons/yr	No
Pb			0.03200000	0.03200000	tons/yr	No
PM-10 (Total)			222.70000000	222.70000000	tons/yr	No
PM-2.5 (Total)			214.30000000	214.30000000	tons/yr	No
SO2			51.10000000	51.10000000	tons/yr	No
TSP			131.30000000	131.30000000	tons/yr	No
VOC (Total)			83.30000000	83.30000000	tons/yr	No

Subject Item: **U200 E201 GE 7HA**

Operating Scenario: **OS0 Summary**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Ammonia			125.80000000	125.80000000	tons/yr	No
Arsenic compounds			0.01770000	0.01770000	tons/yr	No
Benzene			0.12100000	0.12100000	tons/yr	No
Carbon Dioxide			2,374.65100000	2,374.65100000	thousand tons/yr	No
Cadmium compounds			0.02480000	0.02480000	tons/yr	No
CO			110.30000000	110.30000000	tons/yr	No
Formaldehyde			1.78000000	1.78000000	tons/yr	No
HAPs (Total)			8.90000000	8.90000000	tons/yr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U200 E201 GE 7HA**

Operating Scenario: **OS0 Summary**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Hexane (n-)			3.61000000	3.61000000	tons/yr	No
Manganese Emissions			1.04000000	1.04000000	tons/yr	No
Mercury Emissions			0.00590000	0.00590000	tons/yr	No
Methane			46.30000000	46.30000000	tons/yr	No
Nitrous oxide			5.50000000	5.50000000	tons/yr	No
NOx (Total)			148.70000000	148.70000000	tons/yr	No
Pb			0.02660000	0.02660000	tons/yr	No
PM-10 (Total)			123.60000000	123.60000000	tons/yr	No
PM-2.5 (Total)			119.30000000	119.30000000	tons/yr	No
Polycyclic organic matter			0.08190000	0.08190000	tons/yr	No
Selenium compounds			0.03310000	0.03310000	tons/yr	No
SO2			39.90000000	39.90000000	tons/yr	No
Sulfuric Acid Mist Emissions			25.10000000	25.10000000	tons/yr	No
Toluene			0.87100000	0.87100000	tons/yr	No
TSP			77.60000000	77.60000000	tons/yr	No
VOC (Total)			49.80000000	49.80000000	tons/yr	No

Subject Item: **U200 E201 GE 7HA**

Operating Scenario: **OS1**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Ammonia			23.60000000	23.60000000	lb/hr	No
Arsenic Emissions			0.00068600	0.00068600	lb/hr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U200 E201 GE 7HA**

Operating Scenario: **OS1**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Benzene			0.04210000	0.04210000	lb/hr	No
Carbon Dioxide					lb/hr	No
Cadmium compounds			0.00377000	0.00377000	lb/hr	No
CO			15.50000000	15.50000000	lb/hr	No
Formaldehyde			0.76200000	0.76200000	lb/hr	No
HAPs (Total)			0.96300000	0.96300000	lb/hr	No
Hexane (n-)			0.00000000	0.00000000	lb/hr	No
Manganese Emissions			0.00130000	0.00130000	lb/hr	No
Mercury Emissions			0.00089200	0.00089200	lb/hr	No
Methane			7.70000000	7.70000000	lb/hr	No
Nitrous oxide			0.80000000	0.80000000	lb/hr	No
NOx (Total)			25.50000000	25.50000000	lb/hr	No
Pb			0.00171000	0.00171000	lb/hr	No
PM-10 (Total)			12.70000000	12.70000000	lb/hr	No
PM-2.5 (Total)			12.70000000	12.70000000	lb/hr	No
Polycyclic organic matter			0.00770000	0.00770000	lb/hr	No
Selenium Emissions			0.00008230	0.00008230	lb/hr	No
SO2			7.50000000	7.50000000	lb/hr	No
Sulfuric Acid Mist Emissions			4.80000000	4.80000000	lb/hr	No
Toluene			0.45700000	0.45700000	lb/hr	No
TSP			4.40000000	4.40000000	lb/hr	No
VOC (Total)			4.40000000	4.40000000	lb/hr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U200 E201 GE 7HA**

Operating Scenario: **OS2**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Ammonia			30.30000000	30.30000000	lb/hr	No
Arsenic Emissions			0.00087100	0.00087100	lb/hr	No
Benzene			0.04410000	0.04410000	lb/hr	No
Carbon Dioxide					lb/hr	No
Cadmium compounds			0.00479000	0.00479000	lb/hr	No
CO			20.00000000	20.00000000	lb/hr	No
Formaldehyde			0.83200000	0.83200000	lb/hr	No
HAPs (Total)			1.84000000	1.84000000	lb/hr	No
Hexane (n-)			1.67000000	1.67000000	lb/hr	No
Manganese Emissions			0.00166000	0.00166000	lb/hr	No
Mercury Emissions			0.00113000	0.00113000	lb/hr	No
Methane			9.80000000	9.80000000	lb/hr	No
Nitrous oxide			1.00000000	1.00000000	lb/hr	No
NOx (Total)			32.80000000	32.80000000	lb/hr	No
Pb			0.00218000	0.00218000	lb/hr	No
PM-10 (Total)			23.40000000	23.40000000	lb/hr	No
PM-2.5 (Total)			23.40000000	23.40000000	lb/hr	No
Polycyclic organic matter			0.00781000	0.00781000	lb/hr	No
Selenium Emissions			0.00010500	0.00010500	lb/hr	No
SO2			9.60000000	9.60000000	lb/hr	No
Sulfuric Acid Mist Emissions			6.10000000	6.10000000	lb/hr	No
Toluene			0.46000000	0.46000000	lb/hr	No
TSP			13.90000000	13.90000000	lb/hr	No
VOC (Total)			11.40000000	11.40000000	lb/hr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U200 E201 GE 7HA**

Operating Scenario: **OS3**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Ammonia			25.90000000	25.90000000	lb/hr	No
Arsenic Emissions			0.03990000	0.03990000	lb/hr	No
Benzene			0.19900000	0.19900000	lb/hr	No
Carbon Dioxide					lb/hr	No
Cadmium compounds			0.01740000	0.01740000	lb/hr	No
CO			17.10000000	17.10000000	lb/hr	No
Formaldehyde			1.02000000	1.02000000	lb/hr	No
HAPs (Total)			4.67000000	4.67000000	lb/hr	No
Hexane (n-)			0.00000000	0.00000000	lb/hr	No
Manganese Emissions			2.86000000	2.86000000	lb/hr	No
Mercury Emissions			0.00435000	0.00435000	lb/hr	No
Methane			24.00000000	24.00000000	lb/hr	No
Nitrous oxide			4.80000000	4.80000000	lb/hr	No
NOx (Total)			56.10000000	56.10000000	lb/hr	No
Pb			0.05080000	0.05080000	lb/hr	No
PM-10 (Total)			64.60000000	64.60000000	lb/hr	No
PM-2.5 (Total)			64.60000000	64.60000000	lb/hr	No
Polycyclic organic matter			0.14500000	0.14500000	lb/hr	No
Selenium Emissions			0.09070000	0.09070000	lb/hr	No
SO2			6.60000000	6.60000000	lb/hr	No
Sulfuric Acid Mist Emissions			4.30000000	4.30000000	lb/hr	No
Toluene			0.00000000	0.00000000	lb/hr	No
TSP			30.60000000	30.60000000	lb/hr	No
VOC (Total)			9.80000000	9.80000000	lb/hr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U200 E201 GE 7HA**

Operating Scenario: **OS4**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
CO			169.00000000	169.00000000	lb/hr	No
NOx (Total)			188.00000000	188.00000000	lb/hr	No
VOC (Total)			9.60000000	9.60000000	lb/hr	No

Subject Item: **U200 E201 GE 7HA**

Operating Scenario: **OS5**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
CO			125.00000000	125.00000000	lb/hr	No
NOx (Total)			7.00000000	7.00000000	lb/hr	No
VOC (Total)			26.00000000	26.00000000	lb/hr	No

Subject Item: **U200 E201 GE 7HA**

Operating Scenario: **OS6**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
CO			191.00000000	191.00000000	lb/hr	No
NOx (Total)			229.00000000	229.00000000	lb/hr	No
VOC (Total)			15.00000000	15.00000000	lb/hr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U200 E201 GE 7HA**

Operating Scenario: **OS7**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
CO			32.00000000	32.00000000	lb/hr	No
NOx (Total)			22.00000000	22.00000000	lb/hr	No
VOC (Total)			6.00000000	6.00000000	lb/hr	No

Subject Item: **U203 E203 Aux Blr**

Operating Scenario: **OS0 Summary**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Carbon Dioxide				16,902.00000000	tons/yr	No
CO			5.35000000	5.35000000	tons/yr	No
HAPs (Total)			0.27000000	0.27000000	tons/yr	No
Methane			0.32000000	0.32000000	tons/yr	No
Nitrous oxide			0.03200000	0.03200000	tons/yr	No
NOx (Total)			1.59000000	1.59000000	tons/yr	No
Pb			0.00007100	0.00007100	tons/yr	No
PM-10 (Total)			1.01000000	1.01000000	tons/yr	No
PM-2.5 (Total)			1.01000000	1.01000000	tons/yr	No
SO2			0.25000000	0.25000000	tons/yr	No
Sulfuric Acid Mist Emissions			0.02000000	0.02000000	tons/yr	No
TSP			1.01000000	1.01000000	tons/yr	No
VOC (Total)			0.72000000	0.72000000	tons/yr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U203 E203 Aux Blr**

Operating Scenario: **OS1**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Carbon Dioxide			8,451.00000000	8,451.00000000	lb/hr	No
CO			2.68000000	2.68000000	lb/hr	No
HAPs (Total)			0.13300000	0.13300000	lb/hr	No
Methane			0.16000000	0.16000000	lb/hr	No
Nitrous oxide			0.01600000	0.01600000	lb/hr	No
NOx (Total)			0.80000000	0.80000000	lb/hr	No
Pb			0.00003530	0.00003530	lb/hr	No
PM-10 (Total)			0.51000000	0.51000000	lb/hr	No
PM-2.5 (Total)			0.51000000	0.51000000	lb/hr	No
SO2			0.13000000	0.13000000	lb/hr	No
Sulfuric Acid Mist Emissions			0.01000000	0.01000000	lb/hr	No
TSP			0.51000000	0.51000000	lb/hr	No
VOC (Total)			0.36000000	0.36000000	lb/hr	No

Subject Item: **U204 E204 FP**

Operating Scenario: **OS0 Summary**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Carbon Dioxide			18.50000000	18.50000000	tons/yr	No
CO			0.05000000	0.05000000	tons/yr	No
HAPs (Total)			0.00053000	0.00053000	tons/yr	No
Methane			0.00075000	0.00075000	tons/yr	No
Nitrous oxide			0.00015000	0.00015000	tons/yr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U204 E204 FP**

Operating Scenario: **OS0 Summary**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
NOx (Total)			0.09000000	0.09000000	tons/yr	No
Pb			0.00000160	0.00000160	tons/yr	No
PM-10 (Total)			0.00400000	0.00400000	tons/yr	No
PM-2.5 (Total)			0.00400000	0.00400000	tons/yr	No
SO2			0.00017000	0.00017000	tons/yr	No
Sulfuric Acid Mist Emissions			0.00001300	0.00001300	tons/yr	No
TSP			0.00400000	0.00400000	tons/yr	No
VOC (Total)			0.00500000	0.00500000	tons/yr	No

Subject Item: **U204 E204 FP**

Operating Scenario: **OS1**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Carbon Dioxide			370.00000000	370.00000000	lb/hr	No
CO			0.95000000	0.95000000	lb/hr	No
HAPs (Total)			0.01060000	0.01060000	lb/hr	No
Methane			0.01500000	0.01500000	lb/hr	No
Nitrous oxide			0.00300000	0.00300000	lb/hr	No
NOx (Total)			1.81000000	1.81000000	lb/hr	No
Pb			0.00003160	0.00003160	lb/hr	No
PM-10 (Total)			0.08000000	0.08000000	lb/hr	No
PM-2.5 (Total)			0.08000000	0.08000000	lb/hr	No
SO2			0.00340000	0.00340000	lb/hr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U204 E204 FP**

Operating Scenario: **OS1**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Sulfuric Acid Mist Emissions			0.00026000	0.00026000	lb/hr	No
TSP			0.08000000	0.08000000	lb/hr	No
VOC (Total)			0.21000000	0.21000000	lb/hr	No

Subject Item: **U205 E205 EDG**

Operating Scenario: **OS0 Summary**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Carbon Dioxide			118.20000000	118.20000000	tons/yr	No
CO			0.15000000	0.15000000	tons/yr	No
HAPs (Total)			0.00338000	0.00338000	tons/yr	No
Methane			0.00480000	0.00480000	tons/yr	No
Nitrous oxide			0.00010000	0.00010000	tons/yr	No
NOx (Total)			0.98000000	0.98000000	tons/yr	No
Pb			0.00001010	0.00001010	tons/yr	No
PM-10 (Total)			0.01000000	0.01000000	tons/yr	No
PM-2.5 (Total)			0.01000000	0.01000000	tons/yr	No
SO2			0.00110000	0.00110000	tons/yr	No
Sulfuric Acid Mist Emissions			0.00008400	0.00008400	tons/yr	No
TSP			0.01000000	0.01000000	tons/yr	No
VOC (Total)			0.02400000	0.02400000	tons/yr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U205 E205 EDG**

Operating Scenario: **OS1**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Carbon Dioxide			2,364.00000000	2,364.00000000	lb/hr	No
CO			9.64000000	9.64000000	lb/hr	No
HAPs (Total)			0.06770000	0.06770000	lb/hr	No
Methane			0.10000000	0.10000000	lb/hr	No
Nitrous oxide			0.02000000	0.02000000	lb/hr	No
NOx (Total)			17.10000000	17.10000000	lb/hr	No
Pb			0.00020200	0.00020200	lb/hr	No
PM-10 (Total)			0.55000000	0.55000000	lb/hr	No
PM-2.5 (Total)			0.55000000	0.55000000	lb/hr	No
SO2			0.03690000	0.03690000	lb/hr	No
Sulfuric Acid Mist Emissions			0.00280000	0.00280000	lb/hr	No
TSP			0.55000000	0.55000000	lb/hr	No
VOC (Total)			0.55000000	0.55000000	lb/hr	No

Subject Item: **U206 E206 C Tower**

Operating Scenario: **OS0 Summary**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
CO			0.00000000	0.00000000	tons/yr	No
HAPs (Total)			0.00000000	0.00000000	tons/yr	No
NOx (Total)			0.00000000	0.00000000	tons/yr	No
Pb			0.00000000	0.00000000	tons/yr	No
PM-10 (Total)			6.81000000	6.81000000	tons/yr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U206 E206 C Tower**

Operating Scenario: **OS0 Summary**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
PM-2.5 (Total)			2.56000000	2.56000000	tons/yr	No
SO2			0.00000000	0.00000000	tons/yr	No
TSP			10.46000000	10.46000000	tons/yr	No
VOC (Total)			0.00000000	0.00000000	tons/yr	No

Subject Item: **U206 E206 C Tower**

Operating Scenario: **OS1**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
CO			0.00000000	0.00000000	lb/hr	No
HAPs (Total)			0.00000000	0.00000000	lb/hr	No
NOx (Total)			0.00000000	0.00000000	lb/hr	No
Pb			0.00000000	0.00000000	lb/hr	No
PM-10 (Total)			1.55000000	1.55000000	lb/hr	No
PM-2.5 (Total)			0.58000000	0.58000000	lb/hr	No
SO2			0.00000000	0.00000000	lb/hr	No
TSP			2.39000000	2.39000000	lb/hr	No
VOC (Total)			0.00000000	0.00000000	lb/hr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U207 E207 Oil Tnk**

Operating Scenario: **OS0 Summary**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
CO			0.00000000	0.00000000	tons/yr	No
HAPs (Total)			0.00000000	0.00000000	tons/yr	No
NOx (Total)			0.00000000	0.00000000	tons/yr	No
Pb			0.00000000	0.00000000	tons/yr	No
PM-10 (Total)			0.00000000	0.00000000	tons/yr	No
SO2			0.00000000	0.00000000	tons/yr	No
TSP			0.00000000	0.00000000	tons/yr	No
VOC (Total)			0.23000000	0.23000000	tons/yr	No

Subject Item: **U207 E207 Oil Tnk**

Operating Scenario: **OS1**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
CO			0.00000000	0.00000000	lb/hr	No
HAPs (Total)			0.00000000	0.00000000	lb/hr	No
NOx (Total)			0.00000000	0.00000000	lb/hr	No
Pb			0.00000000	0.00000000	lb/hr	No
PM-10 (Total)			0.00000000	0.00000000	lb/hr	No
SO2			0.00000000	0.00000000	lb/hr	No
TSP			0.00000000	0.00000000	lb/hr	No
VOC (Total)			0.05200000	0.05200000	lb/hr	No

APPENDIX B

EMISSION CALCULATIONS

Keasbey Energy Center

Table B-1. Total Proposed Equipment Potential-to-Emit (PTE) Summary

Source	Potential Annual Emissions (tons/yr)												
	NO_x	CO	VOC	SO_2	TSP	PM-10	PM-2.5	H_2SO_4	CO2e	NH_3	Pb	Maximum Individual HAP	Total HAPs
Combined Cycle Unit Steady-State Basis	146.0	82.5	47.3	39.0	66.1	115.7	115.7	25.1	2,357,557.9	125.5	2.7E-02		
Combined Cycle Unit Start-Up/Shutdown[1]	0.2	21.9	1.5	N/A	0.0	0.0	0.0	N/A	N/A	N/A	N/A		
Auxiliary Boiler	1.6	5.4	0.7	0.9	1.0	1.0	1.0	0.07	16,919.6		7.1E-05		
Fire Water Pump Diesel Engine	0.1	0.05	0.01	0.0002	0.004	0.004	0.004	0.00001	18.6		1.6E-06		
Emergency Diesel Generator	0.85	0.48	0.03	0.002	0.03	0.03	0.03	0.00014	118.6		1.0E-05		
Cooling Tower					10.5	6.8	2.6						
Circuit Breakers									18.1				
Fuel Oil Tank			0.2										
Total Project PTE	**148.7**	**110.3**	**49.9**	**39.9**	**77.6**	**123.6**	**119.3**	**25.1**	**2,374,632.8**	**125.5**	**2.7E-02**	**3.6**	**8.9**

Notes:

(1) Combined cycle unit start-up/shutdown emissions are added to the baseline steady-state PTE values if the total start-up/shutdown emissions are more than the steady-state full load equivalent during the period of unit off-line downtime and duration of the start-up (and previous shutdown). For start-up/shutdown emissions noted above as "N/A" for certain pollutants, the start-up/shutdown emissions addition to the baseline steady-state PTE is not applicable since mass emissions of these pollutants are fuel input based (lb/MMBtu) and the full load, steady-state basis represents the worst-case scenario for PTE emissions.

Keasbey Energy Center

Table B-2. Natural Gas and ULSD Firing Design Scenarios

		Design Scenario												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Combustion Turbine Parameters														
CT Fuel Type	--	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas
Ambient Temperature	°F	-8	-8	-8	-8	59	59	59	59	105	105	105	105	105
CT Percent Load Rate	%	100%	100%	75%	44%	100%	100%	75%	30%	100%	100%	100%	100%	75%
Evaporative Cooling (Y/N)	--	N	N	N	N	N	N	N	N	Y	Y	N	N	N
CT Heat Input Capacity, HHV	MMBtu/hr	3,512	3,512	2,804	1,993	3,307	3,307	2,613	1,491	3,492	3,492	2,985	2,985	2,362
Gas-Fired Duct Burner Parameters														
DB Operation (Y/N)	--	Y	N	N	N	Y	N	N	N	Y	N	Y	N	N
DB Heat Input Capacity, HHV	MMBtu/hr	950.0	0.0	0.0	0.0	940.0	0.0	0.0	0.0	925.0	0.0	840.0	0.0	0.0
HRSG Exhaust Composition														
Ar	% by vol	0.88%	0.89%	0.89%	0.89%	0.87%	0.88%	0.88%	0.89%	0.83%	84.01%	0.85%	0.86%	0.86%
N_2	% by vol	73.88%	74.77%	74.79%	75.08%	73.13%	74.05%	74.19%	74.60%	69.80%	70.64%	71.48%	72.35%	72.59%
O_2	% by vol	9.12%	11.62%	11.70%	12.53%	8.81%	11.43%	11.84%	13.05%	7.87%	10.35%	8.65%	11.18%	11.87%
CO_2	% by vol	5.47%	4.32%	4.29%	3.91%	5.53%	4.32%	4.13%	3.58%	5.55%	4.40%	5.39%	4.22%	3.90%
H_2O	% by vol	10.65%	8.40%	8.33%	7.59%	11.67%	9.32%	8.96%	7.88%	15.95%	13.77%	13.63%	11.39%	10.78%
Molecular Weight	lb/lbmol	28.29	28.43	28.44	28.49	28.19	28.33	28.36	28.42	27.72	27.85	27.96	28.10	28.14
Exhaust Temperature	°F	158	166	159	158	158	165	158	158	162	177	158	170	169
Exhaust Flow Rate	lb/hr	6,232,300	6,188,700	4,983,300	3,895,500	5,851,700	5,808,600	4,801,700	3,179,400	5,956,000	5,913,600	5,366,200	5,327,700	4,568,600
Total Stack Emission Rates (Controlled)														
NO_x	ppmvd @ 15% O_2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
CO	ppmvd @ 15% O_2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
VOC	ppmvd @ 15% O_2	2.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0	2.0	1.0	2.0	1.0	1.0
NH_3 (24-hr avg)	ppmvd @ 15% O_2	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
NO_x	lb/hr	32.8	25.5	20.4	14.5	31.3	24.0	19.0	10.8	32.5	25.4	28.2	21.7	17.2
CO	lb/hr	20.0	15.5	12.4	8.8	19.0	14.6	11.6	6.6	19.8	15.5	17.1	13.2	10.4
VOC	lb/hr	11.4	4.4	3.5	2.5	10.9	4.2	3.3	1.9	11.3	4.4	9.8	3.8	3.0
SO_2	lb/hr	9.6	7.5	6.0	4.2	9.1	7.0	5.5	3.2	9.5	7.4	8.2	6.3	5.0
PM/PM-10/PM-2.5 - without sulfates	lb/hr	17.7	8.2	8.2	8.2	17.5	8.1	8.2	8.3	17.4	8.2	16.6	8.2	8.2
PM/PM-10/PM-2.5 - with sulfates	lb/hr	23.4	12.7	11.8	10.8	23.0	12.3	11.6	10.2	23.1	12.6	21.5	12.0	11.2
TSP	lb/hr	13.9	4.4	4.4	4.3	13.7	4.4	4.4	4.3	13.6	4.4	12.7	4.4	4.3
SO_3	lb/hr	5.4	4.2	3.3	2.4	5.1	3.9	3.1	1.8	5.3	4.2	4.6	3.6	2.8
H_2SO_4	lb/hr	6.1	4.8	3.8	2.7	5.9	4.5	3.6	2.0	6.1	4.8	5.3	4.1	3.2
NH_3 (24-hr avg)	lb/hr	30.3	23.6	18.8	13.4	28.9	22.2	17.5	10.0	30.0	23.5	26.0	20.0	15.9
CO_2	lb/hr	531,000	414,000	331,000	235,000	505,000	390,000	308,000	176,000	525,000	411,000	455,000	352,000	279,000
N_2O	lb/hr	1.0	0.8	0.6	0.4	0.9	0.7	0.6	0.3	1.0	0.8	0.8	0.7	0.5
CH4	lb/hr	9.8	7.7	6.2	4.4	9.4	7.3	5.8	3.3	9.7	7.7	8.4	6.6	5.2
CO2e	lb/hr	531,539	414,424	331,339	235,241	505,513	390,400	308,316	176,180	525,534	411,422	455,462	352,361	279,285
CO2	lb/MW-hr	816	775	794	868	808	761	781	912	824	781	823	778	804
NO_x	lb/MMBtu	0.0074	0.0073	0.0073	0.0073	0.0074	0.0073	0.0073	0.0072	0.0074	0.0073	0.0074	0.0073	0.0073
CO	lb/MMBtu	0.0045	0.0044	0.0044	0.0044	0.0045	0.0044	0.0044	0.0044	0.0045	0.0044	0.0045	0.0044	0.0044
VOC	lb/MMBtu	0.0026	0.0013	0.0013	0.0013	0.0026	0.0013	0.0013	0.0013	0.0026	0.0013	0.0026	0.0013	0.0013
SO_2	lb/MMBtu	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021
TSP	lb/MMBtu	0.0031	0.0013	0.0016	0.0022	0.0032	0.0013	0.0017	0.0029	0.0031	0.0013	0.0033	0.0015	0.0018
PM/PM-10/PM-2.5 - without sulfates	lb/MMBtu	0.0040	0.0023	0.0029	0.0041	0.0041	0.0024	0.0031	0.0056	0.0039	0.0023	0.0043	0.0027	0.0035
PM/PM-10/PM-2.5 - with sulfates	lb/MMBtu	0.0052	0.0036	0.0042	0.0054	0.0054	0.0037	0.0044	0.0068	0.0052	0.0036	0.0056	0.0040	0.0047
H_2SO_4	lb/MMBtu	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014
NH_3 (24-hr avg)	lb/MMBtu	0.0068	0.0067	0.0067	0.0067	0.0068	0.0067	0.0067	0.0067	0.0068	0.0067	0.0068	0.0067	0.0067
CO_2	lb/MMBtu	119.0	117.9	118.0	117.9	118.9	117.9	117.9	118.0	118.9	117.7	118.9	117.9	118.1
CO_2e	lb/MMBtu	119.1	118.0	118.2	118.1	119.0	118.0	118.0	118.1	119.0	117.8	119.1	118.0	118.2
Formaldehyde	ppbvd @ 15% O_2	91.0	91.0	91.0	91.0	91.0	91.0	91.0	91.0	91.0	91.0	91.0	91.0	91.0
Formaldehyde	ppb actual	147.4	116.0	115.0	104.6	148.9	116.0	110.9	95.7	149.6	118.3	145.1	113.2	104.5
Stack Exhaust Flow Rate	ACFM	1656682.3	1658130.7	1319988.7	1028508.2	1561387.7	1559327.2	1273602.0	841244.5	1626456.9	1645877.9	1443499.3	1453743.6	1242982.9
Formaldehyde	lb/hr	0.975	0.758	0.605	0.429	0.928	0.714	0.563	0.321	0.965	0.754	0.836	0.644	0.509
Formaldehyde	lb/MMBtu	2.18E-04	2.16E-04	2.16E-04	2.16E-04	2.19E-04	2.16E-04	2.16E-04	2.15E-04	2.18E-04	2.16E-04	2.18E-04	2.16E-04	2.16E-04

		Design Scenario												
		14	15	16	17	18	19	20	21	22	23	24	25	26
Combustion Turbine Parameters														
CT Fuel Type	--	Gas	Gas	Gas	ULSD	ULSD	ULSD	ULSD	ULSD	ULSD	ULSD	ULSD	ULSD	ULSD
Ambient Temperature	°F	105	-8	105	-8	-8	59	59	59	105	105	105	105	-8
CT Percent Load Rate	%	47%	100%	100%	100%	50%	100%	75%	50%	100%	100%	50%	75%	75%
Evaporative Cooling (Y/N)	--	N	N	N	N	N	N	N	N	Y	N	N	N	N
CT Heat Input Capacity, HHV	MMBtu/hr	1,747	3,512	2,985	3,626	2,200	3,461	2,722	2,099	3,225	3,045	1,861	2,429	2,886
Gas-Fired Duct Burner Parameters														
DB Operation (Y/N)	--	N	Y	Y	N	N	N	N	N	N	N	N	N	N
DB Heat Input Capacity, HHV	MMBtu/hr	0.0	95.0	95.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HRSG Exhaust Composition														
Ar	% by vol	0.87%	0.89%	0.86%	0.84%	0.86%	0.83%	0.84%	0.85%	0.82%	0.82%	0.84%	0.83%	0.85%
N_2	% by vol	72.84%	74.68%	72.25%	70.93%	72.33%	70.11%	70.77%	71.36%	68.73%	68.97%	70.41%	69.60%	71.43%
O_2	% by vol	12.59%	11.37%	10.89%	10.34%	11.44%	10.28%	10.45%	10.73%	10.13%	10.20%	11.01%	10.34%	10.49%
CO_2	% by vol	3.56%	4.44%	4.35%	6.02%	5.52%	5.91%	5.91%	5.83%	5.76%	5.76%	5.47%	5.77%	6.00%
H_2O	% by vol	10.14%	8.63%	11.65%	11.87%	9.85%	12.87%	12.03%	11.23%	14.56%	14.25%	12.27%	13.46%	11.23%
Molecular Weight	lb/lbmol	28.17	28.42	28.08	28.30	28.47	28.18	28.27	28.35	27.98	28.01	28.20	28.10	28.37
Exhaust Temperature	°F	162	162	167	275	258	273	258	248	280	276	259	265	263
Exhaust Flow Rate	lb/hr	3,703,400	6,193,100	5,332,100	6,303,200	4,199,000	6,100,500	4,816,400	3,775,800	5,793,900	5,482,100	3,553,200	4,371,200	5,042,100
Total Stack Emission Rates (Controlled)														
NO_x	ppmvd @ 15% O_2	2.0	2.0	2.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
CO	ppmvd @ 15% O_2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
VOC	ppmvd @ 15% O_2	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
NH_3 (24-hr avg)	ppmvd @ 15% O_2	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
NO_x	lb/hr	12.7	26.3	22.4	56.1	34.0	53.5	42.2	32.5	49.9	47.1	28.8	37.6	44.7
CO	lb/hr	7.7	16.0	13.7	17.1	10.4	16.3	12.8	9.9	15.2	14.3	8.8	11.4	13.6
VOC	lb/hr	2.2	9.1	7.8	9.8	5.9	9.3	7.3	5.7	8.7	8.2	5.0	6.5	7.8
SO_2	lb/hr	3.7	7.7	6.5	6.6	4.0	6.3	5.0	3.8	5.9	5.6	3.4	4.5	5.3
PM/PM-10/PM-2.5 - without sulfates	lb/hr	8.3	17.7	17.7	60.5	60.8	60.6	60.7	60.8	60.6	60.6	60.8	60.7	60.7
PM/PM-10/PM-2.5 - with sulfates	lb/hr	10.5	22.3	21.6	64.6	63.2	64.4	63.7	63.1	64.2	64.0	62.9	63.4	63.8
TSP	lb/hr	4.3	9.1	9.1	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6
SO_3	lb/hr	2.1	4.3	3.7	3.7	2.3	3.6	2.8	2.2	3.3	3.1	1.9	2.5	3.0
H_2SO_4	lb/hr	2.4	4.92	4.2	4.27	2.59	4.07	3.2	2.47	3.8	3.6	2.2	2.9	3.4
NH_3 (24-hr avg)	lb/hr	11.7	24.3	21.6	25.9	15.7	24.7	19.5	15.0	23.1	21.8	13.3	17.4	20.6
CO_2	lb/hr	206,000	426,000	364,000	590,000	358,000	563,000	443,000	342,000	525,000	496,000	303,000	395,000	469,000
N_2O	lb/hr	0.4	0.8	0.7	4.8	2.9	4.6	3.6	2.8	4.3	4.0	2.5	3.2	3.8
CH4	lb/hr	3.9	8.0	6.8	24.0	14.6	22.9	18.0	13.9	21.3	20.1	12.3	16.1	19.1
CO2e	lb/hr	206,211	426,436	364,372	592,029	359,231	564,936	444,523	343,174	526,804	497,704	304,042	396,359	470,615
CO2	lb/MW-hr	867	779	784	1,169	1,258	1,152	1,156	1,222	1,162	1,165	1,255	1,183	1,183
NO_x	lb/MMBtu	0.0073	0.0073	0.0073	0.0155	0.0155	0.0155	0.0155	0.0155	0.0155	0.0155	0.0155	0.0155	0.0155
CO	lb/MMBtu	0.0044	0.0044	0.0044	0.0047	0.0047	0.0047	0.0047	0.0047	0.0047	0.0047	0.0047	0.0047	0.0047
VOC	lb/MMBtu	0.0013	0.0025	0.0025	0.0027	0.0027	0.0027	0.0027	0.0027	0.0027	0.0027	0.0027	0.0027	0.0027
SO_2	lb/MMBtu	0.0021	0.0021	0.0021	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018
TSP	lb/MMBtu	0.0025	0.0025	0.0030	0.0084	0.0139	0.0088	0.0112	0.0146	0.0095	0.0100	0.0164	0.0126	0.0106
PM/PM-10/PM-2.5 - without sulfates	lb/MMBtu	0.0048	0.0049	0.0057	0.0167	0.0276	0.0175	0.0223	0.0290	0.0188	0.0199	0.0327	0.0250	0.0210
PM/PM-10/PM-2.5 - with sulfates	lb/MMBtu	0.0060	0.0062	0.0070	0.0178	0.0287	0.0186	0.0234	0.0301	0.0199	0.0210	0.0338	0.0261	0.0221
H_2SO_4	lb/MMBtu	0.0014	0.0014	0.0014	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012
NH_3 (24-hr avg)	lb/MMBtu	0.0067	0.0067	0.0070	0.0071	0.0071	0.0071	0.0072	0.0071	0.0072	0.0072	0.0071	0.0072	0.0071
CO_2	lb/MMBtu	117.9	118.1	118.2	162.7	162.7	162.7	162.7	162.9	162.8	162.9	162.8	162.7	162.5
CO_2e	lb/MMBtu	118.1	118.2	118.3	163.3	163.3	163.2	163.3	163.5	163.4	163.4	163.3	163.2	163.1
Formaldehyde	ppbvd @ 15% O_2	91.0	91.0	91.0	91.0	91.0	91.0	91.0	91.0	91.0	91.0	91.0	91.0	91.0
Formaldehyde	ppb actual	95.5	119.2	116.8	124.6	114.2	122.3	122.4	120.7	119.2	119.1	113.0	119.5	124.3
Stack Exhaust Flow Rate	ACFM	994980.6	1649530.7	1448835.8	1992107.2	1288732.4	1931067.6	1488536.8	1147454.2	1864770.9	1752763.2	1102478.3	1372416.4	1563771.7
Formaldehyde	lb/hr	0.377	0.780	0.666	0.833	0.505	0.795	0.626	0.482	0.741	0.699	0.427	0.558	0.663
Formaldehyde	lb/MMBtu	2.16E-04	2.16E-04	2.16E-04	2.30E-04	2.30E-04	2.30E-04	2.30E-04	2.30E-04	2.30E-04	2.30E-04	2.30E-04	2.30E-04	2.30E-04

Notes: Combustion turbine and duct burner parameters, HRSG exhaust composition, and emission rates (ppm and lb/hr) provided by GE per T218 issued for 7HA.02 combustion turbine.

Notes: Supplemental emission rate formulas/calculations (i.e., lb/hr for SO3, N2O, CH4, CO2e, and formaldehyde and lb/mmBtu values) performed by TRC using the equations above and the required constants below.

Constants	Units	Value
Fuel Heating Values		
Natural Gas HHV	Btu/SCF	1,024
Natural Gas HHV	Btu/lb	22,888
ULSD HHV	Btu/Gal	137,541
ULSD HHV	Btu/lb	19,649
Fuel Sulfur Content		
Natural Gas Sulfur Content	grains/100 SCF	0.63
ULSD Sulfur Content	ppm by weight	15
Duct Burner Capacity Rating		
Maximum Heat Input Rating	MMBtu/hr (HHV)	949.98
SO_2 to SO_3 Conversion Rates		
Duct Burner	%	5%
CT	%	5%
SCR	%	5%
Ox. Cat.	%	30%
GHG 40 CFR 98 Emissions Factors (natural gas)		
CT - N_2O	2.20E-04	lb/MMBtu
CT - CH_4	2.20E-03	lb/MMBtu
GHG 40 CFR 98 Emissions Factors (distillate oil)		
N2O	1.32E-03	lb/MMBtu
CH4	6.61E-03	lb/MMBtu
GHG Global Warming Potentials		
CO_2	1	
N_2O	298	
CH_4	25	
Molecular Weights		
SO_2	lb/lbmol	64
SO_3	lb/lbmol	80

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Table B-3. Air Quality Modeling Data Input Parameters

	Units	Design Scenario																									
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Combustion Turbine Parameters																											
CT Fuel Type	--	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	ULSD	ULSD	ULSD	ULSD	ULSD	ULSD	ULSD	ULSD	ULSD	ULSD
Ambient Temperature	°F	-8	-8	-8	-8	59	59	59	59	105	105	105	105	105	105	-8	105	-8	-8	59	59	59	105	105	105	105	-8
CT Percent Load Rate	%	100%	100%	75%	44%	100%	100%	75%	30%	100%	100%	100%	100%	75%	47%	100%	100%	100%	50%	100%	75%	50%	100%	100%	50%	75%	75%
Evaporative Cooling (Y/N)	Y/N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N
DB Operation (Y/N)	Y/N	Y	N	N	N	Y	N	N	N	Y	N	Y	N	N	N	Y	Y	N	N	N	N	N	N	N	N	N	N
Stack Mass Flow Rate	lb/hr	6,232,300	6,188,700	4,983,300	3,895,500	5,851,700	5,808,600	4,801,700	3,179,400	5,956,000	5,913,600	5,366,200	5,327,700	4,568,600	3,703,400	6,193,100	5,332,100	6,303,200	4,199,000	6,100,500	4,816,400	3,775,800	5,793,900	5,482,100	3,553,200	4,371,200	5,042,100
Stack Temperature	°F	158	166	159	158	158	165	158	158	162	177	158	170	169	162	162	167	275	258	273	258	248	280	276	259	265	263
Stack Temperature	K	343.15	347.59	343.71	343.15	343.15	347.04	343.15	343.15	345.37	353.71	343.15	349.82	349.26	345.37	345.37	348.15	408.15	398.71	407.04	398.71	393.15	410.93	408.71	399.26	402.59	401.48
Stack Volumetric Flow Rate	ACFM	1,656,682	1,658,131	1,319,989	1,028,508	1,561,388	1,559,327	1,273,602	841,244	1,626,457	1,645,878	1,443,499	1,453,744	1,242,983	994,981	1,649,531	1,448,836	1,992,107	1,288,732	1,931,068	1,488,537	1,147,454	1,864,771	1,752,763	1,102,478	1,372,416	1,563,772
Stack Exit Velocity	ft/s	72.6	72.7	57.9	45.1	68.5	68.4	55.8	36.9	71.3	72.2	63.3	63.7	54.5	43.6	72.3	63.5	87.3	56.5	84.7	65.3	50.3	81.8	76.8	48.3	60.2	68.6
Stack Exit Velocity	m/s	22.14	22.16	17.64	13.74	20.87	20.84	17.02	11.24	21.74	22.00	19.29	19.43	16.61	13.30	22.04	19.36	26.62	17.22	25.81	19.89	15.33	24.92	23.42	14.73	18.34	20.90
NO_x	g/s	4.13	3.21	2.57	1.83	3.94	3.02	2.39	1.36	4.10	3.20	3.55	2.73	2.17	1.60	3.31	2.82	7.07	4.28	6.74	5.32	4.10	6.29	5.93	3.63	4.74	5.63
CO	g/s	2.52	1.95	1.56	1.11	2.39	1.84	1.46	0.83	2.49	1.95	2.15	1.66	1.31	0.97	2.02	1.73	2.15	1.31	2.05	1.61	1.25	1.92	1.80	1.10	1.44	1.71
VOC	g/s	1.44	0.56	0.45	0.32	1.37	0.53	0.42	0.24	1.42	0.56	1.23	0.48	0.38	0.28	1.15	0.98	1.23	0.75	1.17	0.92	0.71	1.09	1.03	0.63	0.82	0.98
SO_2	g/s	1.21	0.94	0.75	0.53	1.15	0.88	0.70	0.40	1.19	0.93	1.03	0.80	0.63	0.47	0.96	0.82	0.84	0.51	0.80	0.63	0.48	0.74	0.70	0.43	0.56	0.67
PM/PM-10/PM-2.5 (filterable + condensable)	g/s	2.95	1.60	1.49	1.36	2.90	1.55	1.46	1.29	2.91	1.59	2.71	1.51	1.41	1.32	2.81	2.72	8.14	7.96	8.11	8.03	7.95	8.09	8.06	7.93	7.99	8.04
extra PM-2.5	g/s	0.46	0.36	0.29	0.20	0.44	0.34	0.27	0.15	0.46	0.36	0.40	0.31	0.24	0.18	0.37	0.32	0.61	0.37	0.58	0.46	0.35	0.54	0.51	0.31	0.41	0.49
Total PM-2.5	g/s	3.41	1.96	1.77	1.56	3.34	1.89	1.73	1.44	3.37	1.94	3.11	1.82	1.65	1.50	3.18	3.04	8.75	8.33	8.70	8.49	8.31	8.63	8.58	8.24	8.40	8.53

Stack Parameters		
Height Above Grade =	160.0	ft
Height Above Grade =	48.8	m
Diameter =	22.0	ft
Diameter =	6.71	m

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Table B-4. Net PTE Increase Analysis for Start-Up/Shutdown Periods - Rapid Response Lite Starts on Natural Gas

CC Units Off-Line Period Durations:		
	Natural Gas	
Cold	72	hrs (minimum)
Warm	8	hrs (minimum)
Hot	4	hrs (minimum)
Start-Up Event Durations:		
Cold	0.75	hrs
Warm	0.67	hrs
Hot	0.33	hrs
Shutdown Event Duration:	0.20	hrs
No. of Start-Up/Shutdown Events:		
Cold	**10**	
Warm	**52**	
Hot	**200**	

Natural Gas

		Sample	Cold S/U Scenario				Warm S/U Scenario				Hot S/U Scenario			
	Units	Calc	NO_x	CO	VOC	PM-10/PM-2.5	NO_x	CO	VOC	PM-10/PM-2.5	NO_x	CO	VOC	PM-10/PM-2.5
PTE Baseline Emission Rate - 1 Unit	lbs/hr	(1)	24.0	14.6	4.2	12.3	24.0	14.6	4.2	12.3	24.0	14.6	4.2	12.3
PTE 'Reduction' for Off-Line Period	lbs/event	(2)	1,750.8	1,065.1	304.9	897.3	212.8	129.5	37.1	109.1	108.8	66.2	18.9	55.8
Start-Up Emissions - 1 Unit	lbs/event	(3)	188.0	169.0	9.6	7.8	126.0	140.0	9.4	6.9	67.0	120.0	8.4	3.5
Shutdown Emissions - 1 Unit	lbs/event	(4)	7.0	125.0	26.0	2.1	7.0	125.0	26.0	2.1	7.0	125.0	26.0	2.1
SU/SD Event Total Emissions	lbs/event	(5)	195.0	294.0	35.6	9.9	133.0	265.0	35.4	9.0	74.0	245.0	34.4	5.6
PTE 'Increase' per SU/SD Event	tons/event	(6)	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0
Total Annual PTE 'Increase'	tons/yr	(7)	0.0	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0	17.9	1.5	0.0

Notes/Sample Calculations:

(1) - Steady-State PTE Emission Rate = PTE per Unit (tons/yr) * 2,000 lbs/ton * yr/Max Unit hrs * No. of Units
(2) - PTE 'Reduction' for Off-Line Period = (1) * (Shutdown Duration + Off-Line Duration + Start-Up Duration)
(3) - Start-Up Emissions per Unit provided by vendor
(4) - Shutdown Emissions per Unit provided by vendor
(5) - SU/SD Event Total Emissions = ((3)+(4)) * No. of Units
(6) - PTE 'Increase per SU/SD Event = zero if (5)-(2) <= 0; or ((5)-(2)) * ton/2,000 lbs if (5)-(2) > 0
(7) - Total Annual PTE 'Increase' = (6) * No. of Events per Year per Start-Up Type

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Table B-5. Net PTE Increase Analysis for Start-Up/Shutdown Periods - Rapid Response Lite Starts on ULSD

CC Units Off-Line Period Durations:		
	ULSD	
Cold	72	hrs (minimum)
Warm	8	hrs (minimum)
Hot	4	hrs (minimum)
Start-Up Event Durations:		
Cold	0.75	hrs
Warm	0.67	hrs
Hot	0.33	hrs
Shutdown Event Duration:	0.12	hrs
No. of Start-Up/Shutdown Events:		
Cold	**2**	
Warm	**3**	
Hot	**5**	

ULSD

		Sample	Cold S/U Scenario				Warm S/U Scenario				Hot S/U Scenario			
	Units	Calc	NO_x	CO	VOC	PM-10/PM-2.5	NO_x	CO	VOC	PM-10/PM-2.5	NO_x	CO	VOC	PM-10/PM-2.5
PTE Baseline Emission Rate - 1 Unit	lbs/hr	(1)	24.0	14.6	4.2	12.3	24.0	14.6	4.2	12.3	24.0	14.6	4.2	12.3
PTE 'Reduction' for Off-Line Period	lbs/event	(2)	1,748.8	1,063.9	304.6	896.3	210.8	128.2	36.7	108.0	106.8	65.0	18.6	54.7
Start-Up Emissions - 1 Unit	lbs/event	(3)	229.0	191.0	15.0	52.0	207.0	188.0	14.0	46.0	143.0	177.0	12.0	23.0
Shutdown Emissions - 1 Unit	lbs/event	(4)	22.0	32.0	6.0	8.1	22.0	32.0	6.0	8.1	22.0	32.0	6.0	8.1
SU/SD Event Total Emissions	lbs/event	(5)	251.0	223.0	21.0	60.1	229.0	220.0	20.0	54.1	165.0	209.0	18.0	31.1
PTE 'Increase' per SU/SD Event	tons/event	(6)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Total Annual PTE 'Increase'	tons/yr	(7)	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.4	0.0	0.0

Notes/Sample Calculations:
(1) - Steady-State PTE Emission Rate = PTE per Unit (tons/yr) * 2,000 lbs/ton * yr/Max Unit hrs * No. of Units
(2) - PTE 'Reduction' for Off-Line Period = (1) * (Shutdown Duration + Off-Line Duration + Start-Up Duration)
(3) - Start-Up Emissions per Unit provided by vendor
(4) - Shutdown Emissions per Unit provided by vendor
(5) - SU/SD Event Total Emissions = ((3)+(4)) * No. of Units
(6) - PTE 'Increase per SU/SD Event = zero if (5)-(2) <= 0; or ((5)-(2)) * ton/2,000 lbs if (5)-(2) > 0
(7) - Total Annual PTE 'Increase' = (6) * No. of Events per Year per Start-Up Type

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Table B-6. Combined Cycle Unit Maximum Short-Term and Annual Emissions Summary

Natural Gas Firing

No. of Combined Cycle Units =	1
Total Annual Full Load CT NG Operation =	8,040
Total Annual Maximum DB Operation =	8,040

	Maximum Emission Rates (per unit)[1]						lb/hr	lb/hr	Steady-State	Start-Up &	PTE
	Natural Gas (w/ Duct Firing)			Natural Gas (w/o Duct Firing)			gas w/o db	gas w/ db	PTE[2]	Shutdown	Total
Pollutant	ppmvd @ 15% O_2	lb/MMBtu[3]	lb/hr	ppmvd @ 15% O_2	lb/MMBtu	lb/hr	used for annual PTE	used for annual PTE	tons/yr	PTE Increase tons/yr	CC Unit tons/yr
NO_x	2.0	0.0074	32.8	2.0	0.0073	25.5	24.0	31.3	125.8	0.0	**125.8**
CO	2.0	0.0045	20.0	2.0	0.0044	15.50	14.6	19.0	76.4	21.4	**97.8**
VOC	2.0	0.0026	11.4	1.0	0.0013	4.4	4.2	10.9	43.8	1.5	**45.4**
SO_2		0.0021	9.6		0.0021	7.5	7.0	9.1	36.6		**36.6**
TSP		0.0033	13.9		0.0029	4.4	4.4	13.7	55.1		**55.1**
PM-10/PM-2.5		0.0070	23.4		0.0068	12.7	12.3	23.0	92.5	0.0	**92.5**
NH_3 (24-hr avg)	5.0	0.0070	30.3	5.0	0.0067	23.6	22.2	28.9	116.2		**116.2**
H_2SO_4		0.0014	6.1		0.0014	4.8	4.5	5.9	23.5		**23.5**
CO2e[4]			558,116.0			435,145.5	409,919.6	530,788.8	2,133,771.0		**2,133,771.0**
CH4			9.8			7.7	7.3	9.4	37.6		**37.6**

Notes:
(1) Maximum short-term emission rates account for the maximum emission rates for any of the identified design scenarios.
(2) Potential annual emissions are based on the average annual design scenario (100% load, 59 °F ambient temperature, for gas firing).
(3) In some instances, the lb/MMBtu value for duct fired cases is lower than the lb/MMBtu value for unfired cases. Because duct firing may not always occur at the maximum heat input, the actual stack lb/MMBtu may more closely resemble unfired cases. Therefore, Keasbey requests that lb/MMBtu permit limits reflect the worst-case lb/MMBtu between fired and unfired cases
(4) Includes a five percent margin to account for thermal efficiency degradation between major inspection/maintenance intervals.

ULSD Firing

No. of Combined Cycle Units =	1
Total Annual Full Load CT ULSD Operation =	720

	Maximum Emission Rates (per unit)[1]						Y lb/hr	Steady-State	Start-Up &	PTE
	ULSD						ULSD	PTE[2]	Shutdown	Total
Pollutant	ppmvd @ 15% O_2	lb/MMBtu	lb/hr				used for annual PTE	tons/yr	PTE Increase tons/yr	CC Unit tons/yr
NO_x	4.0	0.0155	56.1				56.1	20.2	0.2	**20.4**
CO	2.0	0.0047	17.1				17.1	6.2	0.5	**6.7**
VOC	2.0	0.0027	9.8				9.8	3.5	0.0	**3.5**
SO_2		0.0018	6.6				6.6	2.4		**2.4**
TSP		0.0164	30.6				30.6	11.0		**11.0**
PM-10/PM-2.5		0.0338	64.6				64.6	23.3	0.0	**23.3**
NH_3 (24-hr avg)	5.0	0.0072	25.9				25.9	9.3		**9.3**
H_2SO_4		0.0012	4.3				4.3	1.5		**1.5**
CO2e[3]			621,630.4				621,630.4	223,787.0		**223,787**
CH4			24.0				24.0	8.6		**8.6**

Notes:
(1) Maximum short-term emission rates account for the maximum emission rates for any of the identified design scenarios.
(2) Potential annual emissions are based on the maximum cold ambient temperature emission rate (100% load, -8°F ambient temperature) for ULSD firing and the specified annual hour limitations of ULSD operation as noted above.
(3) Includes a five percent margin to account for thermal efficiency degradation between major inspection/maintenance intervals.

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Table B-7. Gas-Fired Auxiliary Boiler Potential Emissions Summary

Engine parameters

Heat Input Capacity (HHV)	72.3	MMBtu/hr
Fuel Firing Rate	70,594	SCF/hr
	282.4	mmscf/yr
Maximum Annual Operation	4,000	hr/yr

	Potential Emissions			
Pollutant	**lb/MMBtu** [1]	**lb/hr**	**g/s**	**Total Annual (ton/yr)**[4]
NO_x	0.01	0.80	0.10	1.59
CO	0.0370	2.68	0.34	5.35
VOC	0.005	0.36	0.05	0.72
TSP	0.007	0.51	0.06	1.01
PM-10/PM-2.5	0.007	0.51	0.06	1.01
SO_2	6.0E-03	0.43	0.05	0.87
H_2SO_4	4.6E-04	0.033	0.004	0.07
CO2	1.2E+02	8,451	1,065	16,902
CH4	2.2E-03	0.159	0.020	0.319
N2O	2.2E-04	0.016	0.002	0.032

[1] NO_x, CO, VOC, SO2, and PM emissions from manufacturer data

GHG emissions are based on 40 CFR Part 98, Subpart C.

All particulate is assumed to be less than 1.0 μm in size, therefore TSP = PM-10 = PM2.5. (Per AP-42 Table 1.4-2 footnote (c).)

Sulfur Content	0.630	grains/100 SCF
Higher Heating Value	1,024	Btu/SCF
Higher Heating Value	22,888	Btu/lb
Molecular Weight of S =	32	lb/lbmol
Molecular Weight of SO_2 =	64	lb/lbmol

[3] Based on stack temperature, H_2SO_4 may form from the conversion of SO_2 to SO_3 (assumed 5% conversion).

Molecular Weight of H_2SO_4 =	98	lb/lbmol

[4] The total annual operation restriction is noted above and reflected in the tons/yr PTE values.

Stack Parameters		
Exhaust Temperature	300	degrees F
Exhaust Flow	22,250	acfm
Exit Velocity	52.46	ft/s
	15.99	m/s
Stack Inner Diameter	36.0	in
	3.0	ft
	0.91	m
Stack Height AG	40	ft

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Table B-8. Fire Water Pump Diesel Engine Potential Emissions Summary

Engine parameters

Power output base load	305	hp
Heat Input Capacity (HHV)	2.3	MMBtu/hr
Annual fuel usage	1640.0	gal/yr
Maximum Annual Operation	100	hr/yr

Pollutant	Potential Emissions				
	g/bhp-hr[(1)]	lb/MMBtu	lb/hr	g/s	Total Annual (ton/yr)[(4)]
NO_x	2.69	0.8019	1.81	0.23	0.09
CO	1.42	0.4233	0.95	0.120	0.05
VOC	0.31	0.0924	0.21	0.026	0.010
TSP		0.0352	0.08	0.010	0.004
PM-10/PM-2.5	0.12	0.0352	0.08	0.010	0.004
SO_2[(3)]	0.005	0.0015	0.003	0.0004	1.72E-04
H_2SO_4	0.0004	0.00012	0.00026	0.00015	1.32E-05
CO2 [(5)]		164	370	47	18
CH4		6.61E-03	0.015	0.0019	0.0007
N2O		1.32E-03	0.003	0.0004	0.0001

(1) NO_x, VOC, CO and PM-10/PM-2.5 emissions are based upon Tier 3 emission limits identified in NSPS Subpart IIII.

All particulate is assumed to be less than 1.0 µm in size, therefore TSP = PM-10 = PM2.5. (Per AP-42 Table 3.3-1 footnote (b).)
To determine individual limits for NOx and VOC, Tier 3 limit for NO_X+HC was apportioned using representative ratios from engine manufacturers data.

(2) Emissions of SO_2 based on mass balance of sulfur in fuel:

Sulfur Content	15	ppm by weight
Higher Heating Value	19,649	Btu/lb
	137,541	Btu/gal
Molecular Weight of S =	32	lb/lbmol
Molecular Weight of SO_2 =	64	lb/lbmol

(3) Based on stack temperature, H_2SO_4 may form from the conversion of SO_2 to SO_3 (assumed 5% conversion).

Molecular Weight of H_2SO_4 =	98	lb/lbmol

(4) Unit will operate only during emergency situations and for limited periods per week for testing/maintenance purposes. Total annual operation due to testing/maintenance is limited to 250 hours per year.

(5) CO2 emission factor from AP-42 Table 3.3-1

(6) Stack exhaust parameters based on vendor data.

Stack Parameters[(6)]		
Exhaust Temperature	1,076	degrees F
Exhaust Flow	1,900	acfm
Exit Velocity	90.72	ft/s
	27.65	m/s
Stack Inner Diameter	8.0	in
	0.67	ft
	0.20	m
Stack Height AG	26	ft

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Table B-9. Emergency Diesel Generator Potential Emissions Summary

Engine parameters

Power output base load	1,250	kW
	1675	hp
Heat Input Capacity (HHV)	14.4	MMBtu/hr
	10480.0	gal/yr
Displacement per Cylinder	<10	Liters
Maximum Annual Operation	100	hr/yr

Pollutant	Potential Emissions				
	g/bhp-hr	lb/MMBtu	lb/hr	g/s	Total Annual (ton/yr)
NO_x	4.63	1.1861	17.10	2.15	0.85
CO	2.61	0.6686	9.64	1.21	0.48
VOC	0.15	0.0384	0.55	0.07	0.03
TSP		0.0384	0.55	0.070	0.03
PM-10/PM-2.5	0.15	0.0384	0.55	0.07	0.03
SO_2	0.010	0.0026	0.0369	0.0047	1.85E-03
H_2SO_4	0.0008	0.00020	0.0028	0.0016	1.41E-04
CO2		164.0	2,363.94	297.86	118.20
CH4		6.61E-03	0.10	0.012	0.005
N2O		1.32E-03	0.02	0.002	0.001

(1) NO_x, CO, VOC and PM emissions are based on NSPS Subpart IIII (references 40 CFR 89.112, Table 1)
To determine individual limits for NOx and VOC, Tier 2 limit for NO_X+HC was apportioned using representative ratios from engine manufacturers data.
All particulate is assumed to be less than 1.0 µm in size, therefore TSP = PM-10 = PM2.5. (Per AP-42 Table 3.3-1 footnote (b).)
CO2 emissions from AP-42 emission factor, Table 3.3-1

(2) Emissions of SO_2 based on engine manufacturers data.

Sulfur Content	15	ppm by weight
Higher Heating Value	19,649	Btu/lb
	137,541	Btu/gal
Molecular Weight of S =	32	lb/lbmol
Molecular Weight of SO_2 =	64	lb/lbmol

(3) Based on stack temperature, H_2SO_4 may form from the conversion of SO_2 to SO_3 (assumed 5% conversion).

Molecular Weight of H_2SO_4 =	98	lb/lbmol

(4) Unit will operate only during emergency situations and for limited periods per week for testing purposes. The total annual operation restriction is noted above and reflected in the tons/yr PTE values.

Stack Parameters		
Exhaust Temperature	759.0	degrees F
Exhaust Flow	10,908.7	acfm
Exit Velocity	231.49	ft/s
	70.56	m/s
Stack Inner Diameter	12.0	in
	1.0	ft
	0.30	m
Stack Height AG	20	ft

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Table B-10. Mechanical Draft Cooling Tower Potential Emissions Summary

Emissions Parameter	
Number of Cells	10
Maximum Total Air Flow Rate (acfm) (Each Cell)	1,448,000
Maximum Water Flow Rate (gpm) (Total Tower)	153,000
Maximum Drift Rate	0.0005%
Total Solids in Circulating Water (ppm)	6,240
10-cell Total TSP Emission Rate (lb/hr) (Total Tower) (1)	2.39
1-Cell TSP Emission Rate (g/s)	0.030
10-cell Total PM-10 Emission Rate (lb/hr) (Total Tower) (1)	1.55
1-Cell PM-10 Emission Rate (g/s)	0.020
10-cell Total PM-2.5 Emission Rate (lb/hr) (Total Tower) (1)	0.58
1-Cell PM-2.5 Emission Rate (g/s)	0.007
10-cell Total TSP Annual Emission Rate (ton/yr) (Total Tower) (2)	10.46
10-cell Total PM-10 Annual Emission Rate (ton/yr) (Total Tower) (2)	6.81
10-cell Total PM-2.5 Annual Emission Rate (ton/yr) (Total Tower) (2)	2.56
Exhaust Parameter	
Exhaust Height (ft above grade)	54
Exhaust Height (m above grade)	16.46
Collar Height (ft above grade)	40.00
Collar Height (m above grade)	12.19
Exhaust Temperature (^oF)	80
Exhaust Velocity (ft/sec)	40.63
Exhaust Velocity (m/sec)	12.38
Inner Diameter (ft)	27.5
Inner Diameter (m)	8.38

(1) Hourly TSP emissions calculated as follows:

TSP (lb/hr) = Flow(gpm) * Drift Rate(%) * Solids Conc(ppm)/10^6 * 60(min/hr) * 8.34 (lb/gal)

PM-10 emissions based on PM-10/TSP ratio from Reisman-Frisbie fractions	0.65
PM-2.5 emissions based on PM-2.5/TSP ratio from Reisman-Frisbie fractions	0.24

(2) Annual emissions are based on 8,760 hours of operation.

Keasbey Energy Center

Table B-11. Potential HAP Emissions Summary

Equipment Parameters:	Heat Input (mmBtu/hr)	Operation (hrs/year)	Number of Units	Catalytic Oxidation Reduction Efficiency (%)
Combustion Turbine - Gas (max)	3,512	8,040	1	50
Combustion Turbine - ULSD (max)	3,626	720	1	50
Duct Burner - Gas (max)	950	8,040	1	50
Combustion Turbine - Gas (Annual Avg.)	3,307	8,040	1	50
Auxiliary Boiler	72.3	4,000	1	
Emergency Diesel Generator	14.4	100	1	
Emergency Diesel Fire Pump	2.3	100	1	

Fuel Properties:		
Natural Gas Heat Content	1,024	Btu/scf
Natural Gas Sulfur Content	0.63	gr/100scf
Distillate Oil Density	7.0	lb/gal
Distillate Oil Sulfur Content	0.0015%	weight %

	New Combustion Turbine Natural Gas Firing		New Combustion Turbine Natural Gas Firing	Duct Burner Natural Gas Firing		CT + DB Natural Gas Firing	New Combustion Turbine ULSD Firing		CT ULSD Firing	Auxiliary Boiler Natural Gas Firing			Emer. Generator Fuel Oil Firing			Fire Water Pump Fuel Oil Firing			NJDEP Reporting Threshold	Total Facility PTE
	EF Basis (1)	Max Hourly Per CT		EF Basis (2)	Max Hourly Per DB		EF Basis (1)	Max Hourly Per CT		EF Basis (2)	Max Hourly		EF Basis (3)	Max Hourly		EF Basis (3)	Max Hourly			
Hazardous Air Pollutants (HAPs)	lb/MMBtu	lb/hr	lb/yr	lb/MMCF	lb/hr	lb/yr	lb/MMBtu	lb/hr	lb/yr	lb/MMCF	lb/hr	lb/yr	lb/MMBtu	lb/hr	lb/yr	lb/MMBtu	lb/hr	lb/yr	lb/yr	tons/yr
VOC-HAP																				
Acetaldehyde	4.00E-05	7.02E-02	615.2			531.8			0.0				7.67E-04	1.11E-02	1.11	7.67E-04	1.73E-03	0.173	1,800	2.7E-01
Acrolein	6.40E-06	1.12E-02	98.4			85.1			0.0				9.25E-05	1.33E-03	0.133	9.25E-05	2.09E-04	0.021	8	4.3E-02
Benzene	1.20E-05	2.11E-02	184.6	2.10E-03	9.74E-04	167.4	5.50E-05	9.97E-02	71.8	2.10E-03	1.48E-04	5.93E-01	9.33E-04	1.34E-02	1.34	9.33E-04	2.10E-03	0.210	400	1.2E-01
1,3-Butadiene	4.30E-07	7.55E-04	6.6			5.7	1.60E-05	2.90E-02	20.9										14	1.3E-02
Dichlorobenzene				1.20E-03	5.57E-04	4.5			0.0	1.20E-03	8.47E-05	3.39E-01							600	2.4E-03
Ethylbenzene	3.20E-05	5.62E-02	492.2			425.5			0.0										2,000	2.1E-01
Formaldehyde (see note #1)	2.17E-04	3.81E-01	3,337.7	7.50E-02	3.48E-02	3,164.8	2.80E-04	5.08E-01	365.5	7.50E-02	5.29E-03	2.12E+01	1.18E-03	1.70E-02	1.70	1.18E-03	2.66E-03	0.266	400	1.8E+00
Hexane				1.80E+00	8.35E-01	6,711.9			0.0	1.80E+00	1.27E-01	5.08E+02							2,000	3.6E+00
Naphthalene	1.30E-06	2.28E-03	20.0	6.10E-04	2.83E-04	19.6	3.50E-05	6.35E-02	45.7	6.10E-04	4.31E-05	1.72E-01	8.48E-05	1.22E-03	0.122	8.48E-05	1.91E-04	0.019	2,000	3.3E-02
Propylene Oxide	2.90E-05	5.09E-02	446.1			385.6			0.0										1,000	1.9E-01
Toluene	1.30E-04	2.28E-01	1,999.6	3.40E-03	1.58E-03	1,741.1			0.0	3.40E-03	2.40E-04	9.60E-01	4.09E-04	5.90E-03	0.59	4.09E-04	9.23E-04	0.092	2,000	8.7E-01
Xylenes	6.40E-05	1.12E-01	984.4			850.9			0.0				2.85E-04	4.11E-03	0.411	2.85E-04	6.43E-04	0.064	2,000	4.3E-01
Polycyclic Organic Compounds (POM)																				
Acenaphthene	8.53E-08	3.00E-04	2.6	1.80E-06	1.67E-06	2.3	1.36E-05	4.93E-02	35.5	1.80E-06	1.27E-07	5.08E-04	1.42E-06	2.05E-05	0.002	1.42E-06	3.20E-06	0.000		1.9E-02
Acenaphthylene	8.53E-08	3.00E-04	2.6	1.80E-06	1.67E-06	2.3	1.63E-07	5.91E-04	0.4	1.80E-06	1.27E-07	5.08E-04	5.06E-06	7.29E-05	0.007	5.06E-06	1.14E-05	0.001		1.4E-03
Anthracene	1.14E-07	4.00E-04	3.5	2.40E-06	2.23E-06	3.0	7.86E-07	2.85E-03	2.1	2.40E-06	1.69E-07	6.78E-04	1.87E-06	2.70E-05	0.003	1.87E-06	4.22E-06	0.000		2.6E-03
Benz(a)anthracene	8.53E-08	3.00E-04	2.6	1.80E-06	1.67E-06	2.3	2.58E-06	9.36E-03	6.7	1.80E-06	1.27E-07	5.08E-04	1.68E-06	2.42E-05	0.002	1.68E-06	3.79E-06	0.000		4.5E-03
Benzo(a)pyrene	5.69E-08	2.00E-04	1.8	1.20E-06	1.11E-06	1.5			0.0	1.20E-06	8.47E-08	3.39E-04	1.88E-07	2.71E-06	0.000	1.88E-07	4.24E-07	4.24E-05		7.6E-04
Benzo(b)fluoranthene	8.53E-08	3.00E-04	2.6	1.80E-06	1.67E-06	2.3	9.54E-07	3.46E-03	2.5	1.80E-06	1.27E-07	5.08E-04	9.91E-08	1.43E-06	0.000	9.91E-08	2.24E-07	2.24E-05		2.4E-03
Benzo(g,h,i)perylene	5.69E-08	2.00E-04	1.8	1.20E-06	1.11E-06	1.5	1.46E-06	5.29E-03	3.8	1.20E-06	8.47E-08	3.39E-04	4.89E-07	7.05E-06	0.001	4.89E-07	1.10E-06	1.10E-04		2.7E-03
Benzo(k)fluoranthene	8.53E-08	3.00E-04	2.6	1.80E-06	1.67E-06	2.3	9.54E-07	3.46E-03	2.5	1.80E-06	1.27E-07	5.08E-04	1.55E-07	2.23E-06	0.000	1.55E-07	3.50E-07	3.50E-05		2.4E-03
Chrysene	8.53E-08	3.00E-04	2.6	1.80E-06	1.67E-06	2.3	1.53E-06	5.55E-03	4.0	1.80E-06	1.27E-07	5.08E-04	3.53E-07	5.09E-06	0.001	3.53E-07	7.96E-07	7.96E-05		3.1E-03
Dibenzo(a,h)anthracene	5.69E-08	2.00E-04	1.8	1.20E-06	1.11E-06	1.5	1.08E-06	3.92E-03	2.8	1.20E-06	8.47E-08	3.39E-04	5.83E-07	8.40E-06	0.001	5.83E-07	1.32E-06	1.32E-04		2.2E-03
7,12-Dimethylbenz(a)anthracene				1.60E-05	1.48E-05	0.1			0.0	1.60E-05	1.13E-06	4.52E-03								6.2E-05
Fluoranthene	1.42E-07	4.99E-04	4.4	3.00E-06	2.78E-06	3.8	3.12E-06	1.13E-02	8.1	3.00E-06	2.12E-07	8.47E-04	7.61E-06	1.10E-04	0.011	7.61E-06	1.72E-05	0.002		6.0E-03
Fluorene	1.33E-07	4.67E-04	4.1	2.80E-06	2.60E-06	3.6	2.88E-06	1.04E-02	7.5	2.80E-06	1.98E-07	7.91E-04	2.92E-05	4.21E-04	0.042	2.92E-05	6.59E-05	0.007		5.6E-03
3-Methylchloranthrene				1.80E-06	1.67E-06	0.0			0.0	1.80E-06	1.27E-07	5.08E-04								7.0E-06
2-Methylnaphthalene				2.40E-05	2.23E-05	0.2			0.0	2.40E-05	1.69E-06	6.78E-03								9.3E-05
Indeno(1,2,3-cd)pyrene	8.53E-08	3.00E-04	2.6	1.80E-06	1.67E-06	2.3	1.38E-06	5.00E-03	3.6	1.80E-06	1.27E-07	5.08E-04	3.75E-07	5.41E-06	0.001	3.75E-07	8.46E-07	8.46E-05		2.9E-03
Phenanthrene	8.06E-07	2.83E-03	24.8	1.70E-05	1.58E-05	21.6	6.77E-06	2.45E-02	17.7	1.70E-05	1.20E-06	4.80E-03	2.94E-05	4.24E-04	0.042	2.94E-05	6.63E-05	0.007		2.0E-02
Pyrene	2.37E-07	8.32E-04	7.3	5.00E-06	4.64E-06	6.3	2.74E-06	9.94E-03	7.2	5.00E-06	3.53E-07	1.41E-03	4.78E-06	6.89E-05	0.007	4.78E-06	1.08E-05	0.001		6.8E-03
Total POM	2.20E-06	7.7E-03	67.7	8.82E-05	8.18E-05	59.2	4.00E-05	1.45E-01	104.4	8.82E-05	6.23E-06	2.49E-02	8.33E-05	1.20E-03	0.120	8.33E-05	1.88E-04	0.019	2	8.19E-02
Metal-HAPs																				
Arsenic	1.95E-07	6.86E-04	6.0	2.00E-04	1.86E-04	6.7	1.10E-05	3.99E-02	28.7	2.00E-04	1.41E-05	5.65E-02	1.10E-05	1.59E-04	0.016	1.10E-05	2.48E-05	0.002	1	1.8E-02
Beryllium	1.17E-08	4.11E-05	0.4	1.20E-05	1.11E-05	0.4	3.10E-07	1.12E-03	0.8	1.20E-05	8.47E-07	3.39E-03	3.10E-07	4.47E-06	0.000	3.10E-07	6.99E-07	6.99E-05	1.6	6.1E-04
Cadmium	1.07E-06	3.77E-03	33.0	1.10E-03	1.02E-03	36.8	4.80E-06	1.74E-02	12.5	1.10E-03	7.77E-05	3.11E-01	4.80E-06	6.92E-05	0.007	4.80E-06	1.08E-05	0.001	2	2.48E-02
Chromium	1.37E-06	4.80E-03	42.1	1.40E-03	1.30E-03	46.8	1.10E-05	3.99E-02	28.7	1.40E-03	9.88E-05	3.95E-01	1.10E-05	1.59E-04	0.016	1.10E-05	2.48E-05	0.002	1,000	3.8E-02
Lead	4.88E-07	1.71E-03	15.0	5.00E-04	4.64E-04	16.7	1.40E-05	5.08E-02	36.6	5.00E-04	3.53E-05	1.41E-01	1.40E-05	2.02E-04	0.020	1.40E-05	3.16E-05	0.003	2	2.671E-02
Manganese	3.71E-07	1.30E-03	11.4	3.80E-04	3.52E-04	12.7	7.90E-04	2.86E+00	2,062.6	3.80E-04	2.68E-05	1.07E-01	7.90E-04	1.14E-02	1.14	7.90E-04	1.78E-03	0.178	160	1.0E+00
Mercury	2.54E-07	8.92E-04	7.8	2.60E-04	2.41E-04	8.7	1.20E-06	4.35E-03	3.1	2.60E-04	1.84E-05	7.34E-02	1.20E-06	1.73E-05	0.002	1.20E-06	2.71E-06	0.000	2	5.9E-03
Nickel	2.05E-06	7.20E-03	63.1	2.10E-03	1.95E-03	70.2	4.60E-06	1.67E-02	12.0	2.10E-03	1.48E-04	5.93E-01	4.60E-06	6.63E-05	0.007	4.60E-06	1.04E-05	0.001	200	4.1E-02
Selenium	2.34E-08	8.23E-05	0.7	2.40E-05	2.23E-05	0.8	2.50E-05	9.07E-02	65.3	2.40E-05	1.69E-06	6.78E-03	2.50E-05	3.60E-04	0.036	2.50E-05	5.64E-05	0.006	20	3.3E-02
Total HAPs		9.63E-01	8,432.0		8.79E-01	**14,352.8**			**2,858.7**		1.33E-01	**533.2**		6.77E-02	**6.77**		1.06E-02	**1.06**	17,752	8.88E+00
																			Maximum Individual HAP:	**3.6**
																			Total Project HAPs:	**8.9**

Notes:
Emission Factor References -
(1) U.S. EPA AP-42 Emission Factor Guidance Document, Section 3.1 (Stationary Gas Turbines), Table 3.1-3. Note metal HAPs assumed to be equivalent to natural gas firing of external combustion sources (see Ref #3).
Formaldehyde emissions from the combustion turbine while firing natural gas or ULSD are based upon a GE recommended value of 91 ppbvd, which is consistent with the combustion turbine MACT standard.
(2) U.S. EPA AP-42 Emission Factor Guidance Document, Section 1.4 (Natural Gas Combustion), Tables 1.4-2, 1.4-3, and 1.4-4.
(3) U.S. EPA AP-42 Emission Factor Guidance Document, Section 3.3 (Diesel Industrial Engines), Table 3.3-2. Note metal HAPs assumed to be equivalent to distillate fuel oil firing of combustion turbine (see Ref #2).
Yellow highlighted HAPs are reportable.

PAH/POM Emission Factor Determination for Turbine Firing Natural Gas

Natural Gas Fuel HHV		1024	Btu/scf		
Total turbine PAH/POM		2.20E-06	/mmBtu from AP-42 Table 3.1-3		
		AP-42	Emission	Percent of	Calculated
		Emission Factor	Factor	Total	Emission Factor
Pollutant		(lb/mmCF)	(lb/mmBtu)	(%)	(lb/mmBtu)
Acenaphthene		1.80E-06	1.76E-09	3.88%	8.53E-08
Acenaphthylene		1.80E-06	1.76E-09	3.88%	8.53E-08
Anthracene		2.40E-06	2.34E-09	5.17%	1.14E-07
Benz(a)Anthracene		1.80E-06	1.76E-09	3.88%	8.53E-08
Benzo(a)pyrene		1.20E-06	1.17E-09	2.59%	5.69E-08
Benzo(b)fluoranthene		1.80E-06	1.76E-09	3.88%	8.53E-08
Benzo(g,h,I)perylene		1.20E-06	1.17E-09	2.59%	5.69E-08
Benzo(k)fluoranthene		1.80E-06	1.76E-09	3.88%	8.53E-08
Chrysene		1.80E-06	1.76E-09	3.88%	8.53E-08
Dibenzo(a,h)anthracene		1.20E-06	1.17E-09	2.59%	5.69E-08
Fluoranthene		3.00E-06	2.93E-09	6.47%	1.42E-07
Fluorene		2.80E-06	2.73E-09	6.03%	1.33E-07
Indeno(1,2,3-cd)pyrene		1.80E-06	1.76E-09	3.88%	8.53E-08
Phenanathrene		1.70E-05	1.66E-08	36.64%	8.06E-07
Pyrene		5.00E-06	4.88E-09	10.78%	2.37E-07
Totals[a]		4.64E-05	4.53E-08	100.00%	2.20E-06

Emission factors came from AP-42 Table 1.4.3.
PAH/POM are broken out for turbines using the same split for duct burners.

PAH/POM Emission Factor Determination for Turbine Firing ULSD

Pollutant		Percent of			
		Total	ulated		
	Fuel Oil	Fuel Oil	n Factor		
	lb/mgal	(%)	mBtu)		
Acenaphthene	2.11E-05	34.00%			
Acenaphthylene	2.53E-07	0.41%			
Anthracene	1.22E-06	1.97%			
Benz(a)Anthracene	4.01E-06	6.46%			
Benzo(a)pyrene					
Benzo(b)fluoranthene	1.48E-06	2.39%			
Benzo(g,h,I)perylene	2.26E-06	3.64%			
Benzo(k)fluoranthene	1.48E-06	2.39%			
Chrysene	2.38E-06	3.84%			
Dibenzo(a,h)anthracene	1.67E-06	2.69%			
Fluoranthene	4.84E-06	7.80%			
Fluorene	4.47E-06	7.20%			
Indeno(1,2,3-cd)pyrene	2.14E-06	3.45%			
Phenanathrene	1.05E-05	16.92%			
Pyrene	4.25E-06	6.85%			
Totals[a]	6.21E-05	100%			

Turbine PAH/POM Emission Rate Firing Fuel Oil:	4.00E-05		

Emission factors came from AP-42 Table 1.3-9.
PAH/POM are broken out for turbines using the split for oil fired boilers.
[a]Sum of constituent pollutants.

Keasbey Energy Center
Table B-12. SF_6 Emission Calculations for Electrical Equipment Insulation Leaks

Number of New Breakers	2	
Estimated Quantity of SF_6	318	pounds
Annual Leak Rate	0.50%	of quantity present
Annual Emission Rate (total)	1.59	lb/yr
	0.000795	ton/yr of SF_6
Global Warming Potential Factor for SF_6	22,800	from 40 CFR Part 98
Annual CO_2e Emissions	**18.13**	**ton/yr of CO_2e**

Keasbey Energy Center

Table B-13. Fuel Oil Tank Emissions

Tank Parameters

Number of Tanks	1	
Storage Capacity	1,000,000	gallons
Type of Roof	Fixed	
Diameter	70	ft
Height	40	ft
Fuel Stored	ULSD	
Throughput	18,982,446	gal/yr

	Per Tank VOC (lb/yr)
Working Losses	340
Breathing Losses	110
Total Losses	450

1. Tank losses calculated using TANKS 4.0.9d

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification	
User Identification:	CPV Keasbey
City:	Woodbridge Township (Keasbey)
State:	New Jersey
Company:	CPV Keasbey
Type of Tank:	Vertical Fixed Roof Tank
Description:	1 mmgallon ULSD storage tank
Tank Dimensions	
Shell Height (ft):	40.00
Diameter (ft):	70.00
Liquid Height (ft) :	35.00
Avg. Liquid Height (ft):	35.00
Volume (gallons):	1,000,000.00
Turnovers:	19.00
Net Throughput(gal/yr):	19,000,000.00
Is Tank Heated (y/n):	N
Paint Characteristics	
Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good
Roof Characteristics	
Type:	Cone
Height (ft)	40.00
Slope (ft/ft) (Cone Roof)	1.14
Breather Vent Settings	
Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Newark, New Jersey (Avg Atmospheric Pressure = 14.73 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

CPV Keasbey - Vertical Fixed Roof Tank
Woodbridge Township (Keasbey), New Jersey

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Distillate fuel oil no. 2	All	56.42	51.84	61.00	54.77	0.0058	0.0049	0.0067	130.0000			188.00	Option 1: VP50 = .0045 VP60 = .0065

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

CPV Keasbey - Vertical Fixed Roof Tank
Woodbridge Township (Keasbey), New Jersey

Annual Emission Calcaulations	
Standing Losses (lb):	109.6839
Vapor Space Volume (cu ft):	70,554.9349
Vapor Density (lb/cu ft):	0.0001
Vapor Space Expansion Factor:	0.0316
Vented Vapor Saturation Factor:	0.9944
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	70,554.9349
Tank Diameter (ft):	70.0000
Vapor Space Outage (ft):	18.3333
Tank Shell Height (ft):	40.0000
Average Liquid Height (ft):	35.0000
Roof Outage (ft):	13.3333
Roof Outage (Cone Roof)	
Roof Outage (ft):	13.3333
Roof Height (ft):	40.0000
Roof Slope (ft/ft):	1.1400
Shell Radius (ft):	35.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0001
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0058
Daily Avg. Liquid Surface Temp. (deg. R):	516.0864
Daily Average Ambient Temp. (deg. F):	54.7458
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	514.4358
Tank Paint Solar Absorptance (Shell):	0.1700
Tank Paint Solar Absorptance (Roof):	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	1,235.5816
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0316
Daily Vapor Temperature Range (deg. R):	18.3194
Daily Vapor Pressure Range (psia):	0.0019
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0058
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0049
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0067
Daily Avg. Liquid Surface Temp. (deg R):	516.0864
Daily Min. Liquid Surface Temp. (deg R):	511.5066
Daily Max. Liquid Surface Temp. (deg R):	520.6663
Daily Ambient Temp. Range (deg. R):	17.2750
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9944
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0058
Vapor Space Outage (ft):	18.3333
Working Losses (lb):	340.1122
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0058
Annual Net Throughput (gal/yr.):	19,000,000.0000
Annual Turnovers:	19.0000
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	1,000,000.0000
Maximum Liquid Height (ft):	35.0000
Tank Diameter (ft):	70.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	449.7961

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

CPV Keasbey - Vertical Fixed Roof Tank
Woodbridge Township (Keasbey), New Jersey

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	340.11	109.68	449.80

APPENDIX C

RACT/BACT/LAER CLEARINGHOUSE DATABASE SEARCH RESULTS

Appendix C
Table C-1
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Natural Gas Fired Combined Cycle Combustion Turbines > 25 MW
Nitrogen Oxide Emissions

FACILITY	LOCATION	PERMIT DATE	EQUIPMENT DESCRIPTION	CONTROL DESCRIPTION	TURBINE SIZE	PERMIT LIMIT BASIS	EMISSION LIMIT
SEWAREN GENERATING STATION	SEWAREN, NJ	Mar-16	ONE (1) GE 7HA.02 CCGT	SCR, DLN	3311 MMBTU/HR CT PLUS 730 MMBTU/HR DB		2 PPM
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		ONE (1) GE 7HA.02 CCGT	SCR, DLN	3462 MMBT/HR CT PLUS 599 MMBTU/HR DB	LAER	2 PPM
FOOTPRINT POWER SALEM HARBOR	ESSEX, MA	1/30/2014	TWO (2) GE 7F SERIES COMBINED CYCLE COMBUSTION TURBINES	SCR, DLN	630 MW	LAER	2 PPM
MOXIE FREEDOM GENERATION PLANT	SALEM TOWNSHIP, PA		TWO (2) GE 7HA.02 COMBINED CYCLE COMBUSTION TURBINES (WITH DBS) IN 1-ON-1 CONFIGURATIONS	SCR. DLN	3,329 MMBTU/HR (EACH CT) PLUS 200 MMBTU/HR (EACH DB);	LAER	2 PPM (WITH AND WOUT DB)
CRICKET VALLEY ENERGY CENTER	DOVER, NY	9/27/2012	THREE (3) GE 7FA.05 COMBINED CYCLE COMBUSTION TURBINES WITH DBS	SCR, DLN	2061 MMBTU/HR (EACH CT) PLUS 379 MMBTU/HR (EACH DB);	LAER	2 PPM (WITH AND WOUT DB)
CPV TOWANTIC ENERGY CENTER	OXFROD, CT		TWO (2) GE 7HA.01 COMBINED CYCLE COMBUSTION TURBINES, PRIMARILY FIRED WITH NATURAL GAS WITH ULSD AS BACKUP, WITH GAS FIRED DBS	SCR, DLN, WATER INJECTION		LAER	2 PPM (WITH AND WOUT DB) FIRING NATURAL GAS; 5 PPM (FIRING ULSD);
PIONEER VALLEY GENERATION COMPANY	HAMPDEN, MA	4/12/2012	ONE (1) MITSUBISHI 501G	SCR, DLN	2542 MMBTU/HR (NO DB)	LAER	2 PPM (WOUT DB) FIRING NATURAL GAS; 5 PPM FIRING ULSD;
COLORADO BEND ENERGY CENTER	WHARTON, TX	4/1/2015	COMBINED CYCLE POWER PLANT, TWO COMBUSTION TURBINES AND ONE STEAM TURBINE, MODEL GE 7HA.02	SCR	1100 MW	BACT-PSD	2 PPM
S R BERTRON ELECTRIC GENERATING STATION	HARRIS, TX	12/19/2014	ONE OF THREE OPTIONS: (1) TWO SIEMENS MODEL F5 (SF5) CTGS EACH RATED AT NOMINAL CAPABILITY OF 225 MEGAWATTS (MW). EACH CTG WILL HAVE A DUCT FIRED HRSG WITH A MAXIMUM HEAT INPUT OF 688 MILLION BRITISH THERMAL UNITS PER HOUR (MMBTU/HR). (2) TWO GENERAL ELECTRIC MODEL 7FA (GE7FA) CTGS EACH RATED AT NOMINAL CAPABILITY OF 215 MW. EACH CTG WILL HAVE A DUCT FIRED HRSG WITH A MAXIMUM HEAT INPUT OF 523 MMBTU/HR. (3) TWO MITSUBISHI HEAVY INDUSTRY G FRAME (MHI501G) CTGS EACH RATED AT A NOMINAL ELECTRIC OUTPUT OF 263 MW. EACH CTG WILL HAVE A DUCT FIRED HRSG WITH A MAXIMUM HEAT INPUT OF 686 MMBTU/HR.	SCR	225 MW EACH (SIEMENS); 215 MW EACH (GE)	BACT-PSD	2 PPM
UTILITY PLANT	NUECES, TX	12/2/2014	GENERAL ELECTRIC LM6000 COMBUSTION TURBINE WITH A 263 MMBTU/HR DB	SCR	49 MW	BACT-PSD	2 PPM
VICTORIA POWER STATION	VICTORIA, TX	12/1/2014	GENERAL ELECTRIC 7FA.04 AT 197 MW NOMINAL OUPUT. THE DUCT BURNERS WILL BE CAPABLE OF A FIRING RATE OF UP TO 483 MMBTU/HR (HHV).	SCR	197 MW	BACT-PSD	2 PPM
TRINIDAD GENERATING FACILITY	HENDERSON, TX	11/20/2014	MHI J MODEL COMBUSTION TURBINE NOMINALLY RATED AT 497 MW EQUIPPED WITH A HRSG AND DB WITH A MAXIMUM DESIGN CAPACITY OF 402 MMBTU/HR. THE GROSS NOMINAL OUTPUT OF THE CTG WITH HRSG AND DB IS 530 MW.	SCR	497 MW	BACT-PSD	2 PPM
CEDAR BAYOU ELECTRIC GENERATION STATION	CHAMBERS, TX	8/29/2014	TWO COMBUSTION TURBINES - THREE OPTIONS: Siemens Model F5, GE7Fa, and Mitsubishi Heavy Industry G Frame.	DLN, SCR	225 MW (EACH)	BACT-PSD	2 PPM
WEST DEPTFORD ENERGY STATION	GLOUCESTER, NJ	7/18/2014	THREE (3) 427 MW SIEMENS COMBINED CYCLE TURBINES WITH DUCT BURNERS HEAT INPUT RATE OF EACH TURBINE = 2276 MMBTU/HR (HHV) HEAT INPUT RATE OF EACH DUCT BURNER= 777 MMBTU/HR (HHV)	SCR	2276 MMBTU/HR (EACH CT); 777 MMBTU/HR (EACH DB)	LAER	2 PPM
FREEPORT LNG PRETREATMENT FACILITY	BRAZORIA, TX	7/16/2014	COMBUSTION TURBINE	SCR	87 MW	BACT-PSD	2 PPM
TENASKA BROWNSVILLE GENERATING STATION	CAMERON, TX	4/29/2014	2 COMBINED CYCLE TURBINES. EACH CTG IS 274 MW GROSS> TWO HRSGS WITH FULL DUCT BURNER FIRING PRODUCE ENOUGH STEAM TO GENERATE AN ADDITIONAL 336 MW, FOR A TOTAL OF 884 MW GROSS.	SCR	274 MW (EACH)	BACT-PSD	2 PPM
MARSHALLTOWN GENERATING STATION	MARSHALL, IA	4/14/2014	TWO IDENTICAL SIEMENS SGT6-5000F COMBINED CYCLE TURBINES WITHOUT DUCT FIRING, EACH AT 2258 MMBTU/HR GENERATING APPROX. 300 MW EACH.	LOW-NOX BURNERS AND SCR	2258 mmBtu/hr (EACH)	BACT-PSD	2 PPM
FGE TEXAS POWER I AND FGE TEXAS POWER II	MITCHELL, TX	3/24/2014	FOUR (4) ALSTOM GT24 CTGS, EACH WITH A HRSG AND DBS, MAX DESIGN CAPACITY 409 MMBTU/HR	SCR	230.7 MW	BACT-PSD	2 PPM
PSEG FOSSIL LLC SEWAREN GENERATING STATION	MIDDLESEX COUNTY, NJ	3/7/2014	THE HEAT INPUT RATE OF EACH OF THE SIEMENS TURBINES WILL BE 2,356 MMBTU/HR(HHV) WITH TWO 62.1 MMBTU DUCT BURNERS (HHV) OR THE HEAT INPUT RATE OF EACH OF THE GENERAL ELECTRIC COMBUSTION TURBINES WILL BE 2,312 MMBTU/HR(HHV) WITH TWO 164.4 MMBTU/HR DUCT BURNER (HHV).	SCR AND DRY LOW NOX	2356 MMBTU/HR (EACH SIEMENS), 62.1 MMBTU/HR (EACH DB) OR 2312 MMBTU/HR (EACH GE), 164.4 MMBTU/HR (EACH DB)	LAER	2 PPM
TROUTDALE ENERGY CENTER, LLC	MULTNOMAH, OR	3/5/2014	MITSUBISHI M501-GAC COMBUSTION TURBINE, COMBINED CYCLE CONFIGURATION WITH 499 MMBTU/HR DUCT BURNER	LOW-NOX BURNERS; WATER INJECTION (ULSD); SCR	2988 MMBtu/hr (EACH MHI), 499 MMBTU/HR (EACH DB)	BACT-PSD	2 PPM

Appendix C
Table C-1
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Natural Gas Fired Combined Cycle Combustion Turbines > 25 MW
Nitrogen Oxide Emissions

FACILITY	LOCATION	PERMIT DATE	EQUIPMENT DESCRIPTION	CONTROL DESCRIPTION	TURBINE SIZE	PERMIT LIMIT BASIS	EMISSION LIMIT
FUTURE POWER PA/GOOD SPRINGS NGCC FACILITY	SCHUYLKILL, PA	3/4/2014	SIEMENS 5000 COMBUSTION TURBINE	SCR	2267 MMBtu/hr (CT), 134.3 MMBTU/HR (DB)	BACT-PSD	2 PPM
PINECREST ENERGY CENTER	ANGELINA, TX	11/12/2013	TWO NATURAL GAS-FIRED COMBUSTION TURBINES (CTS), EACH EXHAUSTING TO A FIRED HEAT RECOVERY STEAM GENERATOR (HRSG) TO PRODUCE STEAM TO DRIVE A SHARED STEAM TURBINE GENERATOR. THE STEAM TURBINE IS RATED AT 271 MW OF ELECTRIC OUTPUT. THREE MODELS OF COMBUSTION TURBINES ARE BEING CONSIDERED FOR THIS SITE: THE GENERAL ELECTRIC 7FA.05, THE SIEMENS SGT6-5000F(4), AND THE SIEMENS SGT6-5000F(5). PLANT OUTPUT WILL RANGE BETWEEN 637 AND 735 MW, DEPENDING ON THE MODEL TURBINE. DUCT BURNERS ARE RATED AT 750 MMBTU/HR EACH.	SCR	700 MW (FACILITY)	BACT-PSD	2 PPM
IPL EAGLE VALLEY GENERATING STATION	MORGAN, IN	10/11/2013	TWO (2) COMBINED CYCLE COMBUSTION TURBINES	SCR	2542 MMBTU/HR		2 PPM
SAND HILL ENERGY CENTER	TRAVIS, TX	9/13/2013	ONE (1) GE 7FA WITH DB	SCR	173.9 MW	BACT-PSD	2 PPM
OREGON CLEAN ENERGY CENTER	LUCAS, OH	6/18/2013	2 COMBINED CYCLE UNITS - MITSUBISHI 501G or SIEMENS SCC6-8000H. TWO SIEMENS 2932 MMBTU/H COMBINED CYCLE COMBUSTION TURBINES , BOTH WITH 300 MMBTU/HR DUCT BURNERS. WILL INSTALL EITHER 2 SIEMENS OR 2 MITSUBISHI.	SCR; DRY LOW NOX COMBUSTORS	2932 MMBTU/HR (EACH SIEMENS OR MHI); 300 MMBTU/HR (EACH DB).	BACT-PSD	2 PPM
GREEN ENERGY PARTNERS/ STONEWALL, LLC	LOUDOUN, VA	4/30/2013	2 COMBINED CYCLE - GE 7FA.05 or SIEMENS SGT6-5000F5, 2230 MMBTU/HR (GE) OR 2260 MMBTU/HR (SIEMENS), EACH	SCR AND DRY LOW NOX	2230 MMBTU/HR (GE) OR 2260 MMBTU/HR (SIEMENS), EACH	LAER	2 PPM
MIDLAND COGENERATION VENTURE	MIDLAND, MI	4/23/2013	TWO (2) COMBINED CYCLE COMBUSTION TURBINES	DRY LOW NOX AND SCR	2237 MMBTU/HR (EACH)	BACT-PSD	2 PPM
HICKORY RUN ENERGY STATION	LAWRENCE, PA	4/23/2013	2 COMBINED CYCLE UNITS - GE 7FA, SIEMENS SGT6-5000F, MITSUBISHI 501G, SIEMENS SFT6-8000H	SCR	900 MW (NOMINAL FACILITY)	OTHER CASE-BY-CASE	2 PPM
SUNBURY GENERATION LP/SUNBURY SES	SNYDER, PA	4/1/2013	3 COMBINED CYCLE UNITS - SIEMENS 5000 F5ee or GE 7FA.05	SCR	2538 MMBTU/HR (EACH), 1064 MW	OTHER CASE-BY-CASE	2 PPM
BRUNSWICK COUNTY POWER STATION	BRUNSWICK, VA	3/12/2013	THREE (3) MITSUBISHI M501 GAC COMBUSTION TURBINE GENERATORS WITH DBS, 3442 MMBTU/HR EACH	SCR AND ULTRA LOW NOX BURNERS	3442 MMBTU/HR (EACH)	BACT-PSD	2 PPM

Appendix C
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CPV Keasbey, LLC
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Nitrogen Oxide Emissions

FACILITY	LOCATION	PERMIT DATE	EQUIPMENT DESCRIPTION	CONTROL DESCRIPTION	TURBINE SIZE	PERMIT LIMIT BASIS	EMISSION LIMIT
LA PALOMA ENERGY CENTER	CAMERON, TX	2/7/2013	TWO COMBUSTION TURBINES (CTS) CONNECTED TO ELECTRIC GENERATORS, PRODUCING BETWEEN 183 AND 232 MW OF ELECTRICITY. THE TWO HRSGS USE DUCT BURNERS RATED AT 750 MMBTU/HR EACH. SINGLE STEAM TURBINE WITH AN ELECTRICITY OUTPUT OF 271 MW. DEPENDING ON THE SELECTED CT, TOTAL PLANT OUTUT IS BETWEEN 637 MW AND 735 MW. THE THREE CT MODELS BEING CONSIDERED ARE: (1) GENERAL ELECTRIC 7FA.04; (2) SIEMENS SGT6-5000F(4); OR (3) SIEMENS SGT6-5000F(5).	SCR	650 MW (FACILITY)	BACT-PSD	2 PPM
MOXIE ENERGY LLC/PATRIOT GENERATION PLT	LYCOMING COUNTY, PA	1/31/2013	2 COMBINED CYCLE UNITS - SIEMENS SGT6-8000H or MITSUBISHI 501G, WITH DBS;	SCR	472 MW (EACH SIEMENS); 458 MW (EACH GE)	BACT-PSD	2 PPM
GARRISON ENERGY CENTER	KENT COUNTY, DE	1/30/2013	2 GE COMBUSTION TURBINES	LOW NOX COMBUSTORS, SCR	309 MW; 2260 MMBTU/HR	LAER	2 PPM
W. A. PARISH ELECTRIC GENERATING STATION	FORT BEND, TX	12/21/2012	GE 7EA TURBINE AND 225 MMBTU/HR DB	SCR	80 MW	LAER	2 PPM
WA PARISH ELECTRIC GENERATING STATION - DEMONSTRATION PROJECT	FORT BEND, TX	12/19/2012	GE FRAME 7EA, RATED AT A MAXIMUM BASE-LOAD ELECTRIC OUTPUT OF APPROXIMATELY 80 MW. DUCT BURNER HAS A MAXIMUM HEAT INPUT CAPACITY OF 225 MMBTU/HR.	DLN COMBUSTERS AND SCR	80 MW	LAER	2 PPM
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	FOUR (4) NATURAL GAS COMBINED CYCLE COMBUSTION TURBINES	SCR AND DRY LOW NOX BURNERS	2300 MMBTU/HR (EACH CT)	BACT-PSD	2 PPM
HESS NEWARK ENERGY CENTER	ESSEX, NJ	11/1/2012	2 COMBINED CYCLE UNITS - GE 7FA.05 (655 MW) WITH DBS	SCR	2320 MMBUT/HR (EACH CT)	LAER	2 PPM
CHANNEL ENERGY CENTER LLC	HARRIS, TX	10/15/2012	SIEMENS 501F RATED AT A NOMINAL 180 MW. THE DUCT BURNER WILL HAVE A MAXIMUM DESIGN HEAT INPUT OF 475 MMBTU/HR.	SCR	180 MW	LAER	2 PPM
POLK POWER STATION	POLK, FL	10/14/2012	COMBINED CYCLE POWER BLOCK (4 ON 1)	SCR/DLN	1160 MW	BACT-PSD	2 PPM
MOXIE LIBERTY LLC/ASYLUM POWER PLANT	BRADFORD COUNTY, PA	10/10/2012	2 COMBINED CYCLE UNITS - SIEMENS SGT6-8000H or MITSUBISHI 501G. THE HEAT INPUT RATING OF EACH COMBUSTION GAS TURBINE IS 2890 MMBTU/HR (HHV) OR LESS, AND THE HEAT INPUT RATING OF EACH SUPPLEMENTAL DUCT BURNER IS EQUAL TO 387 MMBTU/HR (HHV) OR LESS.	DRY LOW-NOX (DLN) COMBUSTOR AND SCR	2890 MMBTU/HR (EACH CT); 387 MMBTU/HR (EACH DB);	BACT-PSD	2 PPM
DEER PARK ENERGY CENTER	HARRIS, TX	9/26/2012	FIVE (5) SIEMENS 501F COMBUSTION TURBINES, EACH RATED AT A NOMINAL 180 MW. EACH DB WILL HAVE A MAXIMUM DESIGN RATE CAPABILITY OF 725 MMBTU/HR.	SCR	180 MW (EACH CT)	LAER	2 PPM
ES JOSLIN POWER PLANT	CALHOUN, TX	9/12/2012	THREE COMBUSTION TURBINE GENERATORS (CTG) WILL BE THE GENERAL ELECTRIC 7FA, EACH WITH A MAXIMUM BASE-LOAD ELECTRIC POWER OUTPUT OF APPROXIMATELY 195 MEGAWATTS (MW). THE STEAM TURBINE IS RATED AT APPROXIMATELY 235 MW. NO DUCT BURNERS.	SCR	195 MW (EACH CT)	BACT-PSD	2 PPM
WOODBRIDGE ENERGY CENTER	MIDDLESEX, NJ	7/25/2012	TWO GE 7FA CC TURBINES (EACH WITH A MAXIMUM HEAT INPUT OF 2,307 MMBTU/HR)AND TWO DUCT BURNERS (EACH WITH A MAXIMUM HEAT INPUT OF 500 MMBTU/HR).	DLN COMBUSTION SYSTEM WITH SCR	2307 MMBTU/HR (EACH CT); 500 MMBTU/HR (EACH DB)	LAER	2 PPM
PALMDALE HYBRID POWER PROJECT	LOS ANGELES, CA	10/18/2011	2 GE 7FA, 1736 MMBTU/HR EACH	DRY LOW NOX (DLN) COMBUSTORS, SCR	154 MW; 1736 MMBTU/HR (EACH CT)	BACT-PSD	2 PPM
THOMAS C. FERGUSON POWER PLANT	LLANO, TX	9/1/2011	(2) GE7FA AT 195 MW EACH, AND (1) STEAM TURBINE AT 200 MW.	DRY LOW NOX BURNERS AND SCR	195 MW (EACH CT)	BACT-PSD	2 PPM

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Nitrogen Oxide Emissions

FACILITY	LOCATION	PERMIT DATE	EQUIPMENT DESCRIPTION	CONTROL DESCRIPTION	TURBINE SIZE	PERMIT LIMIT BASIS	EMISSION LIMIT
AVENAL ENERGY PROJECT	KINGS, CA	6/21/2011	2 GE 7FA, 600 MW COMBINED CYCLE, 1856 MMBTU/HR EACH	SCR, DRY LOW NOX COMBUSTORS	180 MW (EACH CT); 1856 MMBTU/HR (EACH CT);	BACT-PSD	2 PPM
COLUSA GENERATING STATION	COLUSA, CA	3/11/2011	TWO (2) COMBINED CYCLE COMBUSTION TURBINES; TWO (2) 688 MMBTU/HR DBS	DRY LOW NOX BURNERS (LNB), SCR	172 MW (EACH CT);	BACT-PSD	2 PPM
CARTY PLANT	MORROW, OR	12/29/2010	COMBINED CYCLE POWER PLANT (MHI G)	SCR	2866 MMBTU/HR	BACT-PSD	2 PPM
WARREN COUNTY POWER PLANT - DOMINION	WARREN, VA	12/17/2010	THREE MITSUBISHI M501 GAC COMBUSTION TURBINES WITH DBS	DRY LOW-NOX COMBUSTOR AND SCR	2996 MMBTU/HR (EACH CT); 500 MMBTU/HR (EACH DB)	BACT-PSD	2 PPM
KING POWER STATION	HARRIS, TX	8/5/2010	THE PLANT WILL BE DESIGNED TO GENERATE 1,350 NOMINAL MW. THERE ARE TWO CONFIGURATION SCENARIOS: EITHER FOUR SIEMENS SGT6-5000F CTGS IN COMBINED-CYCLE MODE OR FOUR GE FRAME 7FA CTGS IN COMBINED CYCLE MODE.	DLN BURNERS AND SCR	1350 MW (TOTAL FACILITY)	LAER	2 PPM
LANGLEY GULCH POWER PLANT	PAYETTE, ID	6/25/2010	SIEMENS SGT6-5000F COMBUSTION TURBINE, NOMINAL 269 MW, 1-ON-1 COMBINED CYCLE;	SCR, DRY LOW NOX (DLN)	2375 MMBTU/HR	BACT-PSD	2 PPM
VICTORVILLE 2 HYBRID POWER PROJECT	SAN BERNARDINO, CA	3/11/2010	TWO (2) COMBINED CYCLE COMBUSTION TURBINES	SCR	154 MW (EACH CT)	BACT-PSD	2 PPM
TROUTDALE ENERGY CENTER, LLC	MULTNOMAH, OR	3/5/2014	THREE (3) MHI 501G COMBUSTION TURBINES;	WATER INJECTION, SCR	2988 MMBtu/hr (EACH MHI), 499 MMBTU/HR (EACH DB)	BACT-PSD	2.5 PPM
PIO PICO ENERGY CENTER	OTAY MESA, CA	11/19/2012	THREE (3) GE LMS 100 COMBUSTION TURBINES	WATER INJECTION, SCR	300 MW (TOTAL FACILITY)	BACT-PSD	2.5 PPM
YORK GENERATION FACILITY	YORK COUNTY, PA	3/1/2012	TWO (2) COMBUSTION TURBINES	WATER INJECTION, SCR	634 MMBTU/HR (EACH CT)	OTHER CASE-BY-CASE	2.5 PPM
LIVE OAKS POWER PLANT	GLYNN, GA	4/8/2010	2-ON-1 SIEMENS SGT6-5000F COMBUSTION TURBINES;	DRY LOW NOX BURNERS, SCR	600 MW (TOTAL FACILITY); 200 MW (EACH CT)	BACT-PSD	2.5 PPM
HIGH DESERT POWER PROJECT	SAN BERNADINO, CA	3/11/2010	3-ON-1 COMBINED CYCLE FACILITY	DRY LOW NOX BURNERS (LNB), SCR	190 MW (EACH CT); 720 MW (TOTAL FACILTY); 160 MMBTU/HR (EACH DB)	BACT-PSD	2.5 PPM
HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	OTTAWA, MI	12/4/2013	2-ON-1 COMBINED CYCLE COMBUSTION TURBINES, WITH DB	SCR WITH DLNB	647 MMBTU/HR (EACH CT)	BACT-PSD	3 PPM
THETFORD GENERATING STATION	GENESEE, MI	7/25/2013	FOUR (4) CTG, TECHNOLOGY A IS 2587 MMBTU/H DESIGN HEAT INPUT EACH CTG, TECHNOLOGY B IS 2688 MMBTU/H DESIGN HEAT INPUT EACH CTG. TWO F CLASS TURBINE TECHNOLOGIES. EACH CTG WILL BE RATED AT 211 TO 230 MW (GROSS) OUTPUT AND THE STATION NOMINAL GENERATING CAPACITY WILL BE UP TO 1,400 MW.	LOW NOX BURNERS AND SCR	2587 MMBTU/HR (EACH CT) OR 2688 MMBTU/HR (EACH CT)	BACT-PSD	3 PPM
DUKE ENERGY HANGING ROCK ENERGY	LAWRENCE, OH	12/18/2012	TURBINES (4) (MODEL GE 7FA) WITH AND WITHOUT DBS.	DRY LOW NOX BURNERS AND SCR	172 MW (EACH CT);	BACT-PSD	3 PPM
CHEYENNE PRAIRIE GENERATING STATION	LARAMIE, WY	8/28/2012	FIVE (5) GE LM6000 COMBUSTION TURBINES	SCR	40 MW (EACH CT)	BACT-PSD	3 PPM
PUEBLO AIRPORT GENERATING STATION	PUEBLO, CO	7/22/2010	FOUR (4) GE LMS6000 COMBUSTION TURBINES	DRY LOW NOX (DLN) COMBUSTOR AND SCR	373 MMBTU/HR (EACH CT)	BACT-PSD	3 PPM
NELSON ENERGY CENTER	LEE, IL	12/28/2010	FOUR (4) GE 7FA COMBUSTION TURBINES	SCR AND LOW-NOX COMBUSTORS	220 MW (EACH CT); 1100 MW (TOTAL FACILITY)	BACT-PSD	4.5 PPM
BAYPORT COMPLEX	HARRIS, TX	9/5/2013	(4) GE 7EA TURBINES	DLN	90 MW (EACH CT)	BACT-PSD	5 PPM
QUALCOMM INC.	SAN DIEGO, CA	7/9/2012	SOLAR TURBINE: MODEL MERCURY 50-6400R	SOLONOX BURNER	4.37 MW	OTHER CASE-BY-CASE	5 PPM
INTERNATIONAL STATION POWER PLANT	ANCHORAGE, AK	12/20/2010	(4) GE LM6000PF-25 TURBINES, WITH DBS	SCR AND DRY LOW NOX		BACT-PSD	5 PPM
NRG ENERGY CENTER DOVER	USA, DE	10/31/2012	500 MMBTU/HR GAS TURBINE (MODEL: GE LM6000) RATED AT 52 MW AND 155 MMBTU/HR HEAT RECOVERY STEAM GENERATOR RATED AT 18 MW.	SCR	655 MMBTU/HR (GAS TURBINE AND HRSG)	OTHER CASE-BY-CASE	5.76 LB/H
ECTOR COUNTY ENERGY CENTER	ECTOR, TX	8/1/2014	(2) GE 7FA.03 COMBUSTION TURBINES	DLN COMBUSTORS	180 MW (EACH CT)	BACT-PSD	9 PPM
LAUDERDALE PLANT	BROWARD, FL	4/22/2014	FIVE (5) 200-MW COMBUSTION TURBINES	DRY LOW-NOX TECHNOLOGY AND WET INJECTION	2000 MMBTU/HR (EACH CT)	BACT-PSD	9 PPM
SUMPTER POWER PLANT	WAYNE, MI	11/17/2011	COMBINED CYCLE COMBUSTION TURBINE W/ HRSG	LOW NOX BURNERS	130 MW	BACT-PSD	9 PPM
GEISINGER MED CTR/DANVILLE	MONTOUR, PA	6/18/2010	COMBINED HEAT AND POWER COMBUSTION TURBINE	SOLONOX COMBUSTOR	55.62 MMBTU/HR	OTHER CASE-BY-CASE	15 PPM
MOUNDSVILLE COMBINED CYCLE POWER PLANT	MARSHALL, WV	11/21/2014	(2) NOMINAL 197 MW GENERAL ELECTRIC FRAME 7FA.04 TURBINE W/ DUCT BURNERS.	SCR & DRY LOW-NOX BURNERS	2159 MMBTU/HR (EACH CT)	BACT-PSD	2 PPM
BERKS HOLLOW ENERGY ASSOC LLC/ONTELAUNEE	BERKS, PA	12/17/2013	2-ON-1 COMBINED CYCLE COMBUSTION TURBINES WITH DB, 855 MW (NOMINAL)	SCR	3046 MMBTU/HR (EACH CT)	BACT-PSD	131.6 TPY

Appendix C
Table C-2
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Natural Gas Fired Combustion Turbines > 25 MW
Carbon Monoxide Emissions

FACILITY	LOCATION	PERMIT DATE	EQUIPMENT DESCRIPTION	CONTROL DESCRIPTION	TURBINE SIZE	PERMIT LIMIT BASIS	EMISSION LIMIT
SEWAREN GENERATING STATION	SEWAREN, NJ	Mar-16	ONE (1) GE 7HA.02 CCGT	OXIDATION CATALYST	3311 MMBTU/HR CT PLUS 730 MMBTU/HR DB		2 PPM
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		ONE (1) GE 7HA.02 CCGT	OXIDATION CATALYST	3462 MMBTU/HR CT PLUS 599 MMBTU/HR DB	BACT-PSD	2 PPM
FOOTPRINT POWER SALEM HARBOR	ESSEX, MA	1/30/2014	TWO (2) GE 7F SERIES COMBINED CYCLE COMBUSTION TURBINES	OXIDATION CATALYST	630 MW	BACT-PSD	2 PPM
MOXIE FREEDOM GENERATION PLANT	SALEM TOWNSHIP, PA		TWO (2) GE 7HA.02 COMBINED CYCLE COMBUSTION TURBINES (WITH DBS) IN 1-ON-1 CONFIGURATIONS	OXIDATION CATALYST	3,329 MMBTU/HR (EACH CT) PLUS 200 MMBTU/HR (EACH DB);	BACT-PSD	2 PPM (WITH AND WOUT DB);
CRICKET VALLEY ENERGY CENTER	DOVER, NY	9/27/2012	THREE (3) GE 7FA.05 COMBINED CYCLE COMBUSTION TURBINES WITH DBS	OXIDATION CATALYST	2061 MMBTU/HR (EACH CT) PLUS 379 MMBTU/HR (EACH DB);	BACT-PSD	2 PPM (WITH AND WOUT DB);
CPV TOWANTIC ENERGY CENTER	OXFROD, CT		TWO (2) GE 7HA.01 COMBINED CYCLE COMBUSTION TURBINES, PRIMARILY FIRED WITH NATURAL GAS WITH ULSD AS BACKUP, WITH GAS FIRED DBS	OXIDATION CATALYST		BACT-PSD	0.9 PPM (WOUT DB); AND 1.7 PPM (WITH DB) FIRING NATURAL GAS; 2 PPM FIRING ULSD
PIONEER VALLEY GENERATION COMPANY	HAMPDEN, MA	4/12/2012	ONE (1) MITSUBISHI 501G	OXIDATION CATALYST	2542 MMBTU/HR (NO DB)	BACT-PSD	2 PPM FIRING NATURAL GAS; 6 PPM FIRING ULSD;
SUMPTER POWER PLANT	WAYNE, MI	11/17/2011	COMBINED CYCLE COMBUSTION TURBINE W/ HRSG		130 MW	OTHER CASE-BY-CASE	0.048 LB/MMBTU; 53.6 LB/HR
WEST DEPTFORD ENERGY STATION	GLOUCESTER, NJ	7/18/2014	THREE (3) 427 MW SIEMENS COMBINED CYCLE TURBINES WITH DUCT BURNERS HEAT INPUT RATE OF EACH TURBINE = 2276 MMBTU/HR (HHV) HEAT INPUT RATE OF EACH DUCT BURNER= 777 MMBTU/HR (HHV)	OXIDATION CATALYST	2276 MMBTU/HR (EACH CT); 777 MMBTU/HR (EACH DB)	BACT-PSD	0.9 PPM (WOUT DB); 1.5 (WITH DB)
BRUNSWICK COUNTY POWER STATION	BRUNSWICK, VA	3/12/2013	THREE (3) MITSUBISHI M501 GAC COMBUSTION TURBINE GENERATORS WITH DBS, 3442 MMBTU/HR EACH	OXIDATION CATALYST	3442 MMBTU/HR (EACH)	BACT-PSD	1.5 PPM (WOUT DB);
PALMDALE HYBRID POWER PROJECT	LOS ANGELES, CA	10/18/2011	2 GE 7FA, 1736 MMBTU/HR EACH	OXIDATION CATALYST	154 MW; 1736 MMBTU/HR (EACH CT)	BACT-PSD	1.5 PPM (WOUT DB); 2.0 PPM (WITH DB)
AVENAL ENERGY PROJECT	KINGS, CA	6/21/2011	2 GE 7FA, 600 MW COMBINED CYCLE, 1856 MMBTU/HR EACH	OXIDATION CATALYST	180 MW (EACH CT); 1856 MMBTU/HR (EACH CT);	BACT-PSD	1.5 PPM
WARREN COUNTY POWER PLANT - DOMINION	WARREN, VA	12/17/2010	THREE MITSUBISHI M501 GAC COMBUSTION TURBINES WITH DBS	OXIDATION CATALYST	2996 MMBTU/HR (EACH CT); 500 MMBTU/HR (EACH DB)	BACT-PSD	1.5 PPM (WOUT DB); 2.4 PPM (WITH DB)
CEDAR BAYOU ELECTRIC GENERATION STATION	CHAMBERS, TX	8/29/2014	TWO COMBUSTION TURBINES - THREE OPTIONS: Siemens Model F5, GE7Fa, and Mitsubishi Heavy Industry G Frame.	OXIDATION CATALYST	225 MW (EACH)	BACT-PSD	2 PPM
TENASKA BROWNSVILLE GENERATING STATION	CAMERON, TX	4/29/2014	2 COMBINED CYCLE TURBINES. EACH CTG IS 274 MW GROSS> TWO HRSGS WITH FULL DUCT BURNER FIRING PRODUCE ENOUGH STEAM TO GENERATE AN ADDITIONAL 336 MW, FOR A TOTAL OF 884 MW GROSS.	OXIDATION CATALYST	274 MW (EACH)	BACT-PSD	2 PPM
MARSHALLTOWN GENERATING STATION	MARSHALL, IA	4/14/2014	TWO IDENTICAL SIEMENS SGT6-5000F COMBINED CYCLE TURBINES WITHOUT DUCT FIRING, EACH AT 2258 MMBTU/HR GENERATING APPROX. 300 MW EACH.	CATALYTIC OXIDIZER	2258 mmBtu/hr (EACH)	BACT-PSD	2 PPM
FGE TEXAS POWER I AND FGE TEXAS POWER II	MITCHELL, TX	3/24/2014	FOUR (4) ALSTOM GT24 CTGS, EACH WITH A HRSG AND DBS, MAX DESIGN CAPACITY 409 MMBTU/HR	OXIDATION CATALYST	230.7 MW	BACT-PSD	2 PPM
PSEG FOSSIL LLC SEWAREN GENERATING STATION	MIDDLESEX COUNTY, NJ	3/7/2014	THE HEAT INPUT RATE OF EACH OF THE SIEMENS TURBINES WILL BE 2,356 MMBTU/HR(HHV) WITH TWO 62.1 MMBTU DUCT BURNERS (HHV) OR THE HEAT INPUT RATE OF EACH OF THE GENERAL ELECTRIC COMBUSTION TURBINES WILL BE 2,312 MMBTU/HR(HHV) WITH TWO 164.4 MMBTU/HR DUCT BURNER (HHV).	CO OXIDATION CATALYST	2356 MMBTU/HR (EACH SIEMENS), 62.1 MMBTU/HR (EACH DB) OR 2312 MMBTU/HR (EACH GE), 164.4 MMBTU/HR (EACH DB)	BACT-PSD	2 PPM (WITH AND WOUT DB)
PINECREST ENERGY CENTER	ANGELINA, TX	11/12/2013	TWO NATURAL GAS-FIRED COMBUSTION TURBINES (CTS), EACH EXHAUSTING TO A FIRED HEAT RECOVERY STEAM GENERATOR (HRSG) TO PRODUCE STEAM TO DRIVE A SHARED STEAM TURBINE GENERATOR. THE STEAM TURBINE IS RATED AT 271 MW OF ELECTRIC OUTPUT. THREE MODELS OF COMBUSTION TURBINES ARE BEING CONSIDERED FOR THIS SITE: THE GENERAL ELECTRIC 7FA.05, THE SIEMENS SGT6-5000F(4), AND THE SIEMENS SGT6-5000F(5). PLANT OUTPUT WILL RANGE BETWEEN 637 AND 735 MW, DEPENDING ON THE MODEL TURBINE. DUCT BURNERS ARE RATED AT 750 MMBTU/HR EACH.	OXIDATION CATALYST	700 MW (FACILITY)	BACT-PSD	2 PPM
IPL EAGLE VALLEY GENERATING STATION	MORGAN, IN	10/11/2013	TWO (2) COMBINED CYCLE COMBUSTION TURBINES	CATALYTIC OXIDATION	2542 MMBTU/HR		2 PPM
SAND HILL ENERGY CENTER	TRAVIS, TX	9/13/2013	ONE (1) GE 7FA WITH DB	OXIDATION CATALYST	173.9 MW	BACT-PSD	2 PPM
OREGON CLEAN ENERGY CENTER	LUCAS, OH	6/18/2013	2 COMBINED CYCLE UNITS - MITSUBISHI 501G or SIEMENS SCC6-8000H. TWO SIEMENS 2932 MMBTU/H COMBINED CYCLE COMBUSTION TURBINES , BOTH WITH 300 MMBTU/HR DUCT BURNERS. WILL INSTALL EITHER 2 SIEMENS OR 2 MITSUBISHI.	OXIDATION CATALYST	2932 MMBTU/HR (EACH SIEMENS OR MHI); 300 MMBTU/HR (EACH DB).	BACT-PSD	2 PPM (WITH AND WOUT DB)
GREEN ENERGY PARTNERS/ STONEWALL, LLC	LOUDOUN, VA	4/30/2013	2 COMBINED CYCLE - GE 7FA.05 or SIEMENS SGT6-5000F5, 2230 MMBTU/HR (GE) OR 2260 MMBTU/HR (SIEMENS), EACH	CATALYTIC OXIDIZER	2230 MMBTU/HR (GE) OR 2260 MMBTU/HR (SIEMENS), EACH	BACT-PSD	2 PPM
HICKORY RUN ENERGY STATION	LAWRENCE, PA	4/23/2013	2 COMBINED CYCLE UNITS - GE 7FA, SIEMENS SGT6-5000F, MITSUBISHI 501G, SIEMENS SFT6-8000H	CO CATALYST	900 MW (NOMINAL FACILITY)	OTHER CASE-BY-CASE	2 PPM (WITH AND WOUT DB)
SUNBURY GENERATION LP/SUNBURY SES	SNYDER, PA	4/1/2013	3 COMBINED CYCLE UNITS - SIEMENS 5000 F5ee or GE 7FA.05	OXIDATION CATALYST	2538 MMBTU/HR (EACH), 1064 MW	OTHER CASE-BY-CASE	2 PPM
LA PALOMA ENERGY CENTER	CAMERON, TX	2/7/2013	TWO COMBUSTION TURBINES (CTS) CONNECTED TO ELECTRIC GENERATORS, PRODUCING BETWEEN 183 AND 232 MW OF ELECTRICITY. THE TWO HRSGS USE DUCT BURNERS RATED AT 750 MMBTU/HR EACH. SINGLE STEAM TURBINE WITH AN ELECTRICITY OUTPUT OF 271 MW. DEPENDING ON THE SELECTED CT, TOTAL PLANT OUTUT IS BETWEEN 637 MW AND 735 MW. THE THREE CT MODELS BEING CONSIDERED ARE: (1) GENERAL ELECTRIC 7FA.04; (2) SIEMENS SGT6-5000F(4); OR (3) SIEMENS SGT6-5000F(5).	OXIDATION CATALYST	650 MW (FACILITY)	BACT-PSD	2 PPM
MOXIE ENERGY LLC/PATRIOT GENERATION PLT	LYCOMING COUNTY, PA	1/31/2013	2 COMBINED CYCLE UNITS - SIEMENS SGT6-8000H or MITSUBISHI 501G, WITH DBS;	CO CATALYST	472 MW (EACH SIEMENS); 458 MW (EACH GE)	BACT-PSD	2 PPM
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	FOUR (4) NATURAL GAS COMBINED CYCLE COMBUSTION TURBINES	OXIDATION CATALYST	2300 MMBTU/HR (EACH CT)	BACT-PSD	2 PPM
HESS NEWARK ENERGY CENTER	ESSEX, NJ	11/1/2012	2 COMBINED CYCLE UNITS - GE 7FA.05 (655 MW) WITH DBS	OXIDATION CATALYST	2320 MMBUT/HR (EACH CT)	BACT-PSD	2 PPM (WITH AND WOUT DB)

Appendix C
Table C-2
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Natural Gas Fired Combustion Turbines > 25 MW
Carbon Monoxide Emissions

FACILITY	LOCATION	PERMIT DATE	EQUIPMENT DESCRIPTION	CONTROL DESCRIPTION	TURBINE SIZE	PERMIT LIMIT BASIS	EMISSION LIMIT
MOXIE LIBERTY LLC/ASYLUM POWER PL T	BRADFORD COUNTY, PA	10/10/2012	2 COMBINED CYCLE UNITS - SIEMENS SGT6-8000H or MITSUBISHI 501G. THE HEAT INPUT RATING OF EACH COMBUSTION GAS TURBINE IS 2890 MMBTU/HR (HHV) OR LESS, AND THE HEAT INPUT RATING OF EACH SUPPLEMENTAL DUCT BURNER IS EQUAL TO 387 MMBTU/HR (HHV) OR LESS.	OXIDATION CATALYST	2890 MMBTU/HR (EACH CT); 387 MMBTU/HR (EACH DB);	BACT-PSD	2 PPM
WOODBRIDGE ENERGY CENTER	MIDDLESEX, NJ	7/25/2012	TWO GE 7FA CC TURBINES (EACH WITH A MAXIMUM HEAT INPUT OF 2,307 MMBTU/HR)AND TWO DUCT BURNERS (EACH WITH A MAXIMUM HEAT INPUT OF 500 MMBTU/HR).	OXIDATION CATALYST	2307 MMBTU/HR (EACH CT); 500 MMBTU/HR (EACH DB)	BACT-PSD	2 PPM (WITH AND WOUT DB)
AVENAL ENERGY PROJECT	KINGS, CA	6/21/2011	2 GE 7FA, 600 MW COMBINED CYCLE, 1856 MMBTU/HR EACH	OXIDATION CATALYST	180 MW (EACH CT); 1856 MMBTU/HR (EACH CT);	BACT-PSD	2 PPM
KING POWER STATION	HARRIS, TX	8/5/2010	THE PLANT WILL BE DESIGNED TO GENERATE 1,350 NOMINAL MW. THERE ARE TWO CONFIGURATION SCENARIOS: EITHER FOUR SIEMENS SGT6-5000F CTGS IN COMBINED-CYCLE MODE OR FOUR GE FRAME 7FA CTGS IN COMBINED CYCLE MODE.	OXIDATION CATALYST	1350 MW (TOTAL FACILITY)	BACT-PSD	2 PPM
DEER CREEK STATION	BROOKINGS, SD	6/29/2010	COMBINED CYCLE COMBUSTION TURBINE - 1,713 MMBTU/HR (LHV); DUCT BURNER - 615.2 MMBTU/HR (LHV)	CATALYTIC OXIDATION	300 MW (FACILITY)	BACT-PSD	2 PPM
LANGLEY GULCH POWER PLANT	PAYETTE, ID	6/25/2010	SIEMENS SGT6-5000F COMBUSTION TURBINE, NOMINAL 269 MW, 1-ON-1 COMBINED CYCLE;	CATALYTIC OXIDATION (CATOX)	2375 MMBTU/HR	BACT-PSD	2 PPM
LIVE OAKS POWER PLANT	GLYNN, GA	4/8/2010	2-ON-1 SIEMENS SGT6-5000F COMBUSTION TURBINES;	CATALYTIC OXIDATION	600 MW (TOTAL FACILITY); 200 MW (EACH CT)	BACT-PSD	2 PPM (WOUT DB); 3.2 PPM (WITH DB)
VICTORVILLE 2 HYBRID POWER PROJECT	SAN BERNARDINO, CA	3/11/2010	TWO (2) COMBINED CYCLE COMBUSTION TURBINES	OXIDATION CATALYST	154 MW (EACH CT)	BACT-PSD	2 PPM (WOUT DB); 3 PPM (WITH DB)
FUTURE POWER PA/GOOD SPRINGS NGCC FACILITY	SCHUYLKILL, PA	3/4/2014	SIEMENS 5000 COMBUSTION TURBINE	OXIDATION CATALYST	2267 MMBtu/hr (CT), 134.3 MMBTU/HR (DB)	BACT-PSD	3 PPM
NINEMILE POINT ELECTRIC GENERATING PLANT	JEFFERSON, LA	8/16/2011	TWO (2) COMBINED CYCLE COMBUSTION TURBINES WITH DBS	OXIDATION CATALYST	3573 MMBTU/HR (EACH CT)	BACT-PSD	3 PPM (WITH AND WOUT DB)
COLUSA GENERATING STATION	COLUSA, CA	3/11/2011	TWO (2) COMBINED CYCLE COMBUSTION TURBINES; TWO (2) 688 MMBTU/HR DBS	CATALYTIC OXIDATION	172 MW (EACH CT);	BACT-PSD	3 PPM
VICTORVILLE 2 HYBRID POWER PROJECT	SAN BERNARDINO, CA	3/11/2010	TWO (2) COMBINED CYCLE COMBUSTION TURBINES	OXIDATION CATALYST	154 MW (EACH CT)	BACT-PSD	2 PPM (WOUT DB); 3 PPM (WITH DB)
TROUTDALE ENERGY CENTER, LLC	MULTNOMAH, OR	3/5/2014	MITSUBISHI M501-GAC COMBUSTION TURBINE, COMBINED CYCLE CONFIGURATION WITH 499 MMBTU/HR DUCT BURNER	OXIDATION CATALYST	2988 MMBtu/hr (EACH MHI), 499 MMBTU/HR (EACH DB)	BACT-PSD	3.3 PPM
COLORADO BEND ENERGY CENTER	WHARTON, TX	4/1/2015	COMBINED CYCLE POWER PLANT, TWO COMBUSTION TURBINES AND ONE STEAM TURBINE, MODEL GE 7HA.02	OXIDATION CATALYST	1100 MW	BACT-PSD	4 PPM
S R BERTRON ELECTRIC GENERATING STATION	HARRIS, TX	12/19/2014	ONE OF THREE OPTIONS: (1) TWO SIEMENS MODEL F5 (SF5) CTGS EACH RATED AT NOMINAL CAPABILITY OF 225 MEGAWATTS (MW). EACH CTG WILL HAVE A DUCT FIRED HRSG WITH A MAXIMUM HEAT INPUT OF 688 MILLION BRITISH THERMAL UNITS PER HOUR (MMBTU/HR). (2) TWO GENERAL ELECTRIC MODEL 7FA (GE7FA) CTGS EACH RATED AT NOMINAL CAPABILITY OF 215 MW. EACH CTG WILL HAVE A DUCT FIRED HRSG WITH A MAXIMUM HEAT INPUT OF 523 MMBTU/HR. (3) TWO MITSUBISHI HEAVY INDUSTRY G FRAME (MHI501G) CTGS EACH RATED AT A NOMINAL ELECTRIC OUTPUT OF 263 MW. EACH CTG WILL HAVE A DUCT FIRED HRSG WITH A MAXIMUM HEAT INPUT OF 686 MMBTU/HR.	OXIDATION CATALYST	225 MW EACH (SIEMENS); 215 MW EACH (GE)	BACT-PSD	4 PPM
UTILITY PLANT	NUECES, TX	12/2/2014	GENERAL ELECTRIC LM6000 COMBUSTION TURBINE WITH A 263 MMBTU/HR DB	OXIDATION CATALYST	49 MW	BACT-PSD	4 PPM
VICTORIA POWER STATION	VICTORIA, TX	12/1/2014	GENERAL ELECTRIC 7FA.04 AT 197 MW NOMINAL OUPUT. THE DUCT BURNERS WILL BE CAPABLE OF A FIRING RATE OF UP TO 483 MMBTU/HR (HHV).	OXIDATION CATALYST	197 MW	BACT-PSD	4 PPM
TRINIDAD GENERATING FACILITY	HENDERSON, TX	11/20/2014	MHI J MODEL COMBUSTION TURBINE NOMINALLY RATED AT 497 MW EQUIPPED WITH A HRSG AND DB WITH A MAXIMUM DESIGN CAPACITY OF 402 MMBTU/HR. THE GROSS NOMINAL OUTPUT OF THE CTG WITH HRSG AND DB IS 530 MW.	OXIDATION CATALYST	497 MW	BACT-PSD	4 PPM
FREEPORT LNG PRETREATMENT FACILITY	BRAZORIA, TX	7/16/2014	COMBUSTION TURBINE	OXIDATION CATALYST	87 MW	BACT-PSD	4 PPM
LAUDERDALE PLANT	BROWARD, FL	4/22/2014	FIVE (5) 200-MW COMBUSTION TURBINES		2000 MMBTU/HR (EACH CT)	BACT-PSD	4 PPM
HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	OTTAWA, MI	12/4/2013	2-ON-1 COMBINED CYCLE COMBUSTION TURBINES, WITH DB	OXIDATION CATALYST	647 MMBTU/HR (EACH CT)	BACT-PSD	4 PPM
THETFORD GENERATING STATION	GENESEE, MI	7/25/2013	FOUR (4) CTG, TECHNOLOGY A IS 2587 MMBTU/H DESIGN HEAT INPUT EACH CTG, TECHNOLOGY B IS 2688 MMBTU/H DESIGN HEAT INPUT EACH CTG. TWO F CLASS TURBINE TECHNOLOGIES. EACH CTG WILL BE RATED AT 211 TO 230 MW (GROSS) OUTPUT AND THE STATION NOMINAL GENERATING CAPACITY WILL BE UP TO 1,400 MW.	CATALYTIC OXIDATION	2587 MMBTU/HR (EACH CT) OR 2688 MMBTU/HR (EACH CT)	BACT-PSD	4 PPM
W. A. PARISH ELECTRIC GENERATING STATION	FORT BEND, TX	12/21/2012	GE 7EA TURBINE AND 225 MMBTU/HR DB	OXIDATION CATALYST	80 MW	BACT-PSD	4 PPM
WA PARISH ELECTRIC GENERATING STATION - DEMONSTRATION PROJECT	FORT BEND, TX	12/19/2012	GE FRAME 7EA, RATED AT A MAXIMUM BASE-LOAD ELECTRIC OUTPUT OF APPROXIMATELY 80 MW. DUCT BURNER HAS A MAXIMUM HEAT INPUT CAPACITY OF 225 MMBTU/HR.	OXIDATION CATALYST	80 MW	BACT-PSD	4 PPM
CHANNEL ENERGY CENTER LLC	HARRIS, TX	10/15/2012	SIEMENS 501F RATED AT A NOMINAL 180 MW. THE DUCT BURNER WILL HAVE A MAXIMUM DESIGN HEAT INPUT OF 475 MMBTU/HR.		180 MW	BACT-PSD	4 PPM
DEER PARK ENERGY CENTER	HARRIS, TX	9/26/2012	FIVE (5) SIEMENS 501F COMBUSTION TURBINES, EACH RATED AT A NOMINAL 180 MW. EACH DB WILL HAVE A MAXIMUM DESIGN RATE CAPABILITY OF 725 MMBTU/HR.		180 MW (EACH CT)	BACT-PSD	4 PPM

Appendix C
Table C-2
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Natural Gas Fired Combustion Turbines > 25 MW
Carbon Monoxide Emissions

FACILITY	LOCATION	PERMIT DATE	EQUIPMENT DESCRIPTION	CONTROL DESCRIPTION	TURBINE SIZE	PERMIT LIMIT BASIS	EMISSION LIMIT
ES JOSLIN POWER PLANT	CALHOUN, TX	9/12/2012	THREE COMBUSTION TURBINE GENERATORS (CTG) WILL BE THE GENERAL ELECTRIC 7FA, EACH WITH A MAXIMUM BASE-LOAD ELECTRIC POWER OUTPUT OF APPROXIMATELY 195 MEGAWATTS (MW). THE STEAM TURBINE IS RATED AT APPROXIMATELY 235 MW. NO DUCT BURNERS.		195 MW (EACH CT)	BACT-PSD	4 PPM
CHEYENNE PRAIRIE GENERATING STATION	LARAMIE, WY	8/28/2012	FIVE (5) GE LM6000 COMBUSTION TURBINES	OXIDATION CATALYST	40 MW (EACH CT)	BACT-PSD	4 PPM
THOMAS C. FERGUSON POWER PLANT	LLANO, TX	9/1/2011	(2) GE7FA AT 195 MW EACH, AND (1) STEAM TURBINE AT 200 MW.	OXIDATION CATALYST	195 MW (EACH CT)	BACT-PSD	4 PPM
PUEBLO AIRPORT GENERATING STATION	PUEBLO, CO	7/22/2010	FOUR (4) GE LMS6000 COMBUSTION TURBINES	CATALYTIC OXIDATION	373 MMBTU/HR (EACH CT)	BACT-PSD	4 PPM
HIGH DESERT POWER PROJECT	SAN BERNADINO, CA	3/11/2010	3-ON-1 COMBINED CYCLE FACILITY	OXIDATION CATALYST	190 MW (EACH CT); 720 MW (TOTAL FACILTY); 160 MMBTU/HR (EACH DB)	BACT-PSD	4 PPM
YORK GENERATION FACILITY	YORK COUNTY, PA	3/1/2012	TWO (2) COMBUSTION TURBINES	CATALYTIC OXIDIZER	634 MMBTU/HR (EACH CT)	OTHER CASE-BY-CASE	5 PPM
NELSON ENERGY CENTER	LEE, IL	12/28/2010	FOUR (4) GE 7FA COMBUSTION TURBINES		220 MW (EACH CT); 1100 MW (TOTAL FACILITY)	BACT-PSD	5 PPM
ECTOR COUNTY ENERGY CENTER	ECTOR, TX	8/1/2014	(2) GE 7FA.03 COMBUSTION TURBINES		180 MW (EACH CT)	BACT-PSD	9 PPM
MIDLAND COGENERATION VENTURE	MIDLAND, MI	4/23/2013	TWO (2) COMBINED CYCLE COMBUSTION TURBINES		2237 MMBTU/HR (EACH)	BACT-PSD	9 PPM
MOUNDSVILLE COMBINED CYCLE POWER PLANT	MARSHALL, WV	11/21/2014	(2) NOMINAL 197 MW GENERAL ELECTRIC FRAME 7FA.04 TURBINE W/ DUCT BURNERS.	OXIDATION CATALYST	2159 MMBTU/HR (EACH CT)	BACT-PSD	2 PPM
MIDLAND COGENERATION VENTURE	MIDLAND, MI	4/23/2013	TWO (2) COMBINED CYCLE COMBUSTION TURBINES		2237 MMBTU/HR (EACH)	BACT-PSD	9 PPM (WOUT DB); 10.5 PPM (WITH DB)
CEDAR BAYOU ELECTRIC GENERATING STATION	CHAMBERS COUNTY, TX	3/31/2015	TWO (2) COMBINED CYCLE TURBINES	OXIDATION CATALYST	187 MW (PER CT)	BACT-PSD	15 PPM
BAYPORT COMPLEX	HARRIS, TX	9/5/2013	(4) GE 7EA TURBINES		90 MW (EACH CT)	BACT-PSD	15 PPM
NRG ENERGY CENTER DOVER	USA, DE	10/31/2012	500 MMBTU/HR GAS TURBINE (MODEL: GE LM6000) RATED AT 52 MW AND 155 MMBTU/HR HEAT RECOVERY STEAM GENERATOR RATED AT 18 MW.	OXIDATION CATALYST	655 MMBTU/HR (GAS TURBINE AND HRSG)	OTHER CASE-BY-CASE	19.54 LB/HR
GEISINGER MED CTR/DANVILLE	MONTOUR, PA	6/18/2010	COMBINED HEAT AND POWER COMBUSTION TURBINE		55.62 MMBTU/HR	OTHER CASE-BY-CASE	25 PPM
DUKE ENERGY HANGING ROCK ENERGY	LAWRENCE, OH	12/18/2012	TURBINES (4) (MODEL GE 7FA) WITH AND WITHOUT DBS.		172 MW (EACH CT);	BACT-PSD	6 PPM (WOUT DB); 3 PPM (WITH DB)
BERKS HOLLOW ENERGY ASSOC LLC/ONTELAUNEE	BERKS, PA	12/17/2013	2-ON-1 COMBINED CYCLE COMBUSTION TURBINES WITH DB, 855 MW (NOMINAL)	OXIDATION CATALYST	3046 MMBTU/HR (EACH CT)	BACT-PSD	211.92 TPY

Appendix C
Table C-3
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Natural Gas Fired Combined Cycle Combustion Turbines > 25 MW
Volatile Organic Compound Emissions

FACILITY	LOCATION	PERMIT DATE	EQUIPMENT DESCRIPTION	CONTROL DESCRIPTION	TURBINE SIZE	PERMIT LIMIT BASIS	EMISSION LIMIT
SEWAREN GENERATING STATION	SEWAREN, NJ	Mar-16	ONE (1) GE 7HA.02 CCGT	OXIDATION CATALYST	3311 MMBTU/HR CT PLUS 730 MMBTU/HR DB		1 PPM (WOUT DB); 2 PPM (WITH DB)
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		ONE (1) GE 7HA.02 CCGT	OXIDATION CATALYST	3462 MMBTU/HR CT PLUS 599 MMBTU/HR DB	LAER	1 PPM (WOUT DB); 2 PPM (WITH DB)
FOOTPRINT POWER SALEM HARBOR	ESSEX, MA	1/30/2014	TWO (2) GE 7F SERIES COMBINED CYCLE COMBUSTION TURBINES	OXIDATION CATALYST	630 MW	LAER	1 PPM (WOUT DB); 1.7 PPM (WITH DB);
MOXIE FREEDOM GENERATION PLANT	SALEM TOWNSHIP, PA		TWO (2) GE 7HA.02 COMBINED CYCLE COMBUSTION TURBINES (WITH DBS) IN 1-ON-1 CONFIGURATIONS	OXIDATION CATALYST	3,329 MMBTU/HR (EACH CT) PLUS 200 MMBTU/HR (EACH DB);	LAER	1 PPM (WOUT DB); 2 PPM (WITH DB);
CRICKET VALLEY ENERGY CENTER	DOVER, NY	9/27/2012	THREE (3) GE 7FA.05 COMBINED CYCLE COMBUSTION TURBINES WITH DBS	OXIDATION CATALYST	2061 MMBTU/HR (EACH CT) PLUS 379 MMBTU/HR (EACH DB);	LAER	1 PPM (WOUT DB); 2 PPM (WITH DB);
CPV TOWANTIC ENERGY CENTER	OXFROD, CT		TWO (2) GE 7HA.01 COMBINED CYCLE COMBUSTION TURBINES, PRIMARILY FIRED WITH NATURAL GAS WITH ULSD AS BACKUP, WITH GAS FIRED DBS	OXIDATION CATALYST		BACT-PSD	1 PPM (WOUT DB) AND 2 PPM (WITH DB) FIRING NATURAL GAS; 2 PPM (FIRING ULSD)
PIONEER VALLEY GENERATION COMPANY	HAMPDEN, MA	4/12/2012	ONE (1) MITSUBISHI 501G	OXIDATION CATALYST	2542 MMBTU/HR (NO DB)	BACT-PSD	1 PPM (WOUT DB) FIRING NATURAL GAS AND 6 PPM FIRING ULSD
WEST DEPTFORD ENERGY STATION	GLOUCESTER, NJ	7/18/2014	THREE (3) 427 MW SIEMENS COMBINED CYCLE TURBINES WITH DUCT BURNERS HEAT INPUT RATE OF EACH TURBINE = 2276 MMBTU/HR (HHV) HEAT INPUT RATE OF EACH DUCT BURNER= 777 MMBTU/HR (HHV)	OXIDATION CATALYST	2276 MMBTU/HR (EACH CT); 777 MMBTU/HR (EACH DB)	LAER	0.7 PPM (WITHOUT DB); 1.0 PPM (WITH DB)
BRUNSWICK COUNTY POWER STATION	BRUNSWICK, VA	3/12/2013	THREE (3) MITSUBISHI M501 GAC COMBUSTION TURBINE GENERATORS WITH DBS, 3442 MMBTU/HR EACH	OXIDATION CATALYST	3442 MMBTU/HR (EACH)	BACT-PSD	0.7 PPM
S R BERTRON ELECTRIC GENERATING STATION	HARRIS, TX	12/19/2014	ONE OF THREE OPTIONS: (1) TWO SIEMENS MODEL F5 (SF5) CTGS EACH RATED AT NOMINAL CAPABILITY OF 225 MEGAWATTS (MW). EACH CTG WILL HAVE A DUCT FIRED HRSG WITH A MAXIMUM HEAT INPUT OF 688 MILLION BRITISH THERMAL UNITS PER HOUR (MMBTU/HR). (2) TWO GENERAL ELECTRIC MODEL 7FA (GE7FA) CTGS EACH RATED AT NOMINAL CAPABILITY OF 215 MW. EACH CTG WILL HAVE A DUCT FIRED HRSG WITH A MAXIMUM HEAT INPUT OF 523 MMBTU/HR. (3) TWO MITSUBISHI HEAVY INDUSTRY G FRAME (MHI501G) CTGS EACH RATED AT A NOMINAL ELECTRIC OUTPUT OF 263 MW. EACH CTG WILL HAVE A DUCT FIRED HRSG WITH A MAXIMUM HEAT INPUT OF 686 MMBTU/HR.	OXIDATION CATALYST	225 MW EACH (SIEMENS); 215 MW EACH (GE)	BACT-PSD	1 PPM
MARSHALLTOWN GENERATING STATION	MARSHALL, IA	4/14/2014	TWO IDENTICAL SIEMENS SGT6-5000F COMBINED CYCLE TURBINES WITHOUT DUCT FIRING, EACH AT 2258 MMBTU/HR GENERATING APPROX. 300 MW EACH.	CATALYTIC OXIDIZER	2258 mmBtu/hr (EACH)	BACT-PSD	1 PPM
PSEG FOSSIL LLC SEWAREN GENERATING STATION	MIDDLESEX COUNTY, NJ	3/7/2014	THE HEAT INPUT RATE OF EACH OF THE SIEMENS TURBINES WILL BE 2,356 MMBTU/HR(HHV) WITH TWO 62.1 MMBTU DUCT BURNERS (HHV) OR THE HEAT INPUT RATE OF EACH OF THE GENERAL ELECTRIC COMBUSTION TURBINES WILL BE 2,312 MMBTU/HR(HHV) WITH TWO 164.4 MMBTU/HR DUCT BURNER (HHV).	OXIDATION CATALYST	2356 MMBTU/HR (EACH SIEMENS), 62.1 MMBTU/HR (EACH DB) OR 2312 MMBTU/HR (EACH GE), 164.4 MMBTU/HR (EACH DB)	LAER	1 PPM
SUNBURY GENERATION LP/SUNBURY SES	SNYDER, PA	4/1/2013	3 COMBINED CYCLE UNITS - SIEMENS 5000 F5ee or GE 7FA.05	OXIDATION CATALYST	2538 MMBTU/HR (EACH), 1064 MW (TOTAL FACILITY)	OTHER CASE-BY-CASE	1 PPM
MOXIE ENERGY LLC/PATRIOT GENERATION PLT	LYCOMING COUNTY, PA	1/31/2013	2 COMBINED CYCLE UNITS - SIEMENS SGT6-8000H or MITSUBISHI 501G, WITH DBS;	CO CATALYST	472 MW (EACH SIEMENS); 458 MW (EACH GE)	BACT-PSD	1 PPM
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	FOUR (4) NATURAL GAS COMBINED CYCLE COMBUSTION TURBINES	OXIDIZED CATALYST	2300 MMBTU/HR (EACH CT)	BACT-PSD	1 PPM
HESS NEWARK ENERGY CENTER	ESSEX, NJ	11/1/2012	2 COMBINED CYCLE UNITS - GE 7FA.05 (655 MW) WITH DBS	OXIDATION CATALYST	2320 MMBUT/HR (EACH CT)	LAER	1 PPM
MOXIE LIBERTY LLC/ASYLUM POWER PL T	BRADFORD COUNTY, PA	10/10/2012	2 COMBINED CYCLE UNITS - SIEMENS SGT6-8000H or MITSUBISHI 501G. THE HEAT INPUT RATING OF EACH COMBUSTION GAS TURBINE IS 2890 MMBTU/HR (HHV) OR LESS, AND THE HEAT INPUT RATING OF EACH SUPPLEMENTAL DUCT BURNER IS EQUAL TO 387 MMBTU/HR (HHV) OR LESS.	OXIDATION CATALYST	2890 MMBTU/HR (EACH CT); 387 MMBTU/HR (EACH DB);	LAER	1 PPM
POLK POWER STATION	POLK, FL	10/14/2012	COMBINED CYCLE POWER BLOCK (4 ON 1)		1160 MW	BACT-PSD	1.4 PPM
NINEMILE POINT ELECTRIC GENERATING PLANT	JEFFERSON, LA	8/16/2011	TWO (2) COMBINED CYCLE COMBUSTION TURBINES WITH DBS	OXIDATION CATALYST	7146 MMBTU/HR	BACT-PSD	1.4 PPM (WOUT DB); 3.8 PPM (WITH DB);
HICKORY RUN ENERGY STATION	LAWRENCE, PA	4/23/2013	2 COMBINED CYCLE UNITS - GE 7FA, SIEMENS SGT6-5000F, MITSUBISHI 501G, SIEMENS SFT6-8000H	OXIDATION CATALYST	900 MW (NOMINAL FACILITY)	OTHER CASE-BY-CASE	1.5 PPM
LENZING FIBERS, INC.	MOBILE, AL	1/22/2014	GAS TURBINE WITH DB	CO OXIDATION CATALYST	25 MW	BACT-PSD	1.6 PPM (WITH DB)
KING POWER STATION	HARRIS, TX	8/5/2010	THE PLANT WILL BE DESIGNED TO GENERATE 1,350 NOMINAL MW. THERE ARE TWO CONFIGURATION SCENARIOS: EITHER FOUR SIEMENS SGT6-5000F CTGS IN COMBINED-CYCLE MODE OR FOUR GE FRAME 7FA CTGS IN COMBINED CYCLE MODE.	OXIDATION CATALYST	1350 MW (TOTAL FACILITY)	LAER	1.8 PPM
FREEPORT LNG PRETREATMENT FACILITY	BRAZORIA, TX	7/16/2014	COMBUSTION TURBINE	OXIDATION CATALYST	87 MW	BACT-PSD	2 PPM

Appendix C
Table C-3
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Natural Gas Fired Combined Cycle Combustion Turbines > 25 MW
Volatile Organic Compound Emissions

FACILITY	LOCATION	PERMIT DATE	EQUIPMENT DESCRIPTION	CONTROL DESCRIPTION	TURBINE SIZE	PERMIT LIMIT BASIS	EMISSION LIMIT
TENASKA BROWNSVILLE GENERATING STATION	CAMERON, TX	4/29/2014	2 COMBINED CYCLE TURBINES. EACH CTG IS 274 MW GROSS> TWO HRSGS WITH FULL DUCT BURNER FIRING PRODUCE ENOUGH STEAM TO GENERATE AN ADDITIONAL 336 MW, FOR A TOTAL OF 884 MW GROSS.	OXIDATION CATALYST	274 MW (EACH CT)	BACT-PSD	2 PPM
FGE TEXAS POWER I AND FGE TEXAS POWER II	MITCHELL, TX	3/24/2014	FOUR (4) ALSTOM GT24 CTGS, EACH WITH A HRSG AND DBS, MAX DESIGN CAPACITY 409 MMBTU/HR	OXIDATION CATALYST	230.7 MW	BACT-PSD	2 PPM
PSEG FOSSIL LLC SEWAREN GENERATING STATION	MIDDLESEX COUNTY, NJ	3/7/2014	THE HEAT INPUT RATE OF EACH OF THE SIEMENS TURBINES WILL BE 2,356 MMBTU/HR(HHV) WITH TWO 62.1 MMBTU DUCT BURNERS (HHV) OR THE HEAT INPUT RATE OF EACH OF THE GENERAL ELECTRIC COMBUSTION TURBINES WILL BE 2,312 MMBTU/HR(HHV) WITH TWO 164.4 MMBTU/HR DUCT BURNER (HHV).	OXIDATION CATALYST	2356 MMBTU/HR (EACH SIEMENS), 62.1 MMBTU/HR (EACH DB) OR 2312 MMBTU/HR (EACH GE), 164.4 MMBTU/HR (EACH DB)	LAER	2 PPM (WITH DB); 1 PPM (WOUT DB);
TROUTDALE ENERGY CENTER, LLC	MULTNOMAH, OR	3/5/2014	MITSUBISHI M501-GAC COMBUSTION TURBINE, COMBINED CYCLE CONFIGURATION WITH 499 MMBTU/HR DUCT BURNER	OXIDATION CATALYST	2988 MMBtu/hr (EACH MHI), 499 MMBTU/HR (EACH DB)	BACT-PSD	2 PPM
FUTURE POWER PA/GOOD SPRINGS NGCC FACILITY	SCHUYLKILL, PA	3/4/2014	SIEMENS 5000 COMBUSTION TURBINE	CO CATALYST	2267 MMBtu/hr (CT), 134.3 MMBTU/HR (DB)	BACT-PSD	2 PPM
PINECREST ENERGY CENTER	ANGELINA, TX	11/12/2013	TWO NATURAL GAS-FIRED COMBUSTION TURBINES (CTS), EACH EXHAUSTING TO A FIRED HEAT RECOVERY STEAM GENERATOR (HRSG) TO PRODUCE STEAM TO DRIVE A SHARED STEAM TURBINE GENERATOR. THE STEAM TURBINE IS RATED AT 271 MW OF ELECTRIC OUTPUT. THREE MODELS OF COMBUSTION TURBINES ARE BEING CONSIDERED FOR THIS SITE: THE GENERAL ELECTRIC 7FA.05, THE SIEMENS SGT6-5000F(4), AND THE SIEMENS SGT6-5000F(5). PLANT OUTPUT WILL RANGE BETWEEN 637 AND 735 MW, DEPENDING ON THE MODEL TURBINE. DUCT BURNERS ARE RATED AT 750 MMBTU/HR EACH.	OXIDATION CATALYST	700 MW (FACILITY)	BACT-PSD	2 PPM
IPL EAGLE VALLEY GENERATING STATION	MORGAN, IN	10/11/2013	TWO (2) COMBINED CYCLE COMBUSTION TURBINES	CATALYTIC OXIDATION	2542 MMBTU/HR (EACH CT)	0	2 PPM
SAND HILL ENERGY CENTER	TRAVIS, TX	9/13/2013	ONE (1) GE 7FA WITH DB	OXIDATION CATALYST	173.9 MW	BACT-PSD	2 PPM
LA PALOMA ENERGY CENTER	CAMERON, TX	2/7/2013	TWO COMBUSTION TURBINES (CTS) CONNECTED TO ELECTRIC GENERATORS, PRODUCING BETWEEN 183 AND 232 MW OF ELECTRICITY. THE TWO HRSGS USE DUCT BURNERS RATED AT 750 MMBTU/HR EACH. SINGLE STEAM TURBINE WITH AN ELECTRICITY OUTPUT OF 271 MW. DEPENDING ON THE SELECTED CT, TOTAL PLANT OUTUT IS BETWEEN 637 MW AND 735 MW. THE THREE CT MODELS BEING CONSIDERED ARE: (1) GENERAL ELECTRIC 7FA.04; (2) SIEMENS SGT6-5000F(4); OR (3) SIEMENS SGT6-5000F(5).	OXIDATION CATALYST	650 MW (FACILITY)	BACT-PSD	2 PPM
W. A. PARISH ELECTRIC GENERATING STATION	FORT BEND, TX	12/21/2012	GE 7EA TURBINE AND 225 MMBTU/HR DB	OXIDATION CATALYST	80 MW	LAER	2 PPM
WA PARISH ELECTRIC GENERATING STATION -DEMONSTRATION PROJECT	FORT BEND, TX	12/19/2012	GE FRAME 7EA, RATED AT A MAXIMUM BASE-LOAD ELECTRIC OUTPUT OF APPROXIMATELY 80 MW. DUCT BURNER HAS A MAXIMUM HEAT INPUT CAPACITY OF 225 MMBTU/HR.	OXIDATION CATALYST	80 MW	LAER	2 PPM
CHANNEL ENERGY CENTER LLC	HARRIS, TX	10/15/2012	SIEMENS 501F RATED AT A NOMINAL 180 MW. THE DUCT BURNER WILL HAVE A MAXIMUM DESIGN HEAT INPUT OF 475 MMBTU/HR.		180 MW	BACT-PSD	2 PPM
DEER PARK ENERGY CENTER	HARRIS, TX	9/26/2012	FIVE (5) SIEMENS 501F COMBUSTION TURBINES, EACH RATED AT A NOMINAL 180 MW. EACH DB WILL HAVE A MAXIMUM DESIGN RATE CAPABILITY OF 725 MMBTU/HR.		180 MW (EACH CT)	BACT-PSD	2 PPM
ES JOSLIN POWER PLANT	CALHOUN, TX	9/12/2012	THREE COMBUSTION TURBINE GENERATORS (CTG) WILL BE THE GENERAL ELECTRIC 7FA, EACH WITH A MAXIMUM BASE-LOAD ELECTRIC POWER OUTPUT OF APPROXIMATELY 195 MEGAWATTS (MW). THE STEAM TURBINE IS RATED AT APPROXIMATELY 235 MW. NO DUCT BURNERS.		195 MW (EACH CT)	BACT-PSD	2 PPM
WOODBRIDGE ENERGY CENTER	MIDDLESEX, NJ	7/25/2012	TWO GE 7FA CC TURBINES (EACH WITH A MAXIMUM HEAT INPUT OF 2,307 MMBTU/HR)AND TWO DUCT BURNERS (EACH WITH A MAXIMUM HEAT INPUT OF 500 MMBTU/HR).	OXIDATION CATALYST	2307 MMBTU/HR (EACH CT); 500 MMBTU/HR (EACH DB)	LAER	2 PPM
THOMAS C. FERGUSON POWER PLANT	LLANO, TX	9/1/2011	(2) GE7FA AT 195 MW EACH, AND (1) STEAM TURBINE AT 200 MW.	OXIDATION CATALYST	195 MW (EACH CT)	BACT-PSD	2 PPM
COLUSA GENERATING STATION	COLUSA, CA	3/11/2011	TWO (2) COMBINED CYCLE COMBUSTION TURBINES; TWO (2) 688 MMBTU/HR DBS		172 MW (EACH CT);	BACT-PSD	2 PPM
LANGLEY GULCH POWER PLANT	PAYETTE, ID	6/25/2010	SIEMENS SGT6-5000F COMBUSTION TURBINE, NOMINAL 269 MW, 1-ON-1 COMBINED CYCLE;	CATALYTIC OXIDATION (CATOX)	2375 MMBTU/HR	BACT-PSD	2 PPM
LIVE OAKS POWER PLANT	GLYNN, GA	4/8/2010	2-ON-1 SIEMENS SGT6-5000F COMBUSTION TURBINES;	CATALYTIC OXIDATION	600 MW (TOTAL FACILITY); 200 MW (EACH CT)	BACT-PSD	2 PPM
OTAY MESA ENERGY CENTER LLC	SAN DIEGO, CA	7/22/2009	GAS TURBINE COMBINED CYCLE		171.7 MW	OTHER CASE-BY-CASE	2 PPM
YORK GENERATION FACILITY	YORK COUNTY, PA	3/1/2012	TWO (2) COMBUSTION TURBINES	CATALYTIC OXIDIZER	634 MMBTU/HR (EACH CT)	OTHER CASE-BY-CASE	2.7 PPM
HESS NEWARK ENERGY CENTER	ESSEX, NJ	11/1/2012	2 COMBINED CYCLE UNITS - GE 7FA.05 (655 MW) WITH DBS	OXIDATION CATALYST	2320 MMBUT/HR (EACH CT)	LAER	1 PPM
WOODBRIDGE ENERGY CENTER	MIDDLESEX, NJ	7/25/2012	TWO GE 7FA CC TURBINES (EACH WITH A MAXIMUM HEAT INPUT OF 2,307 MMBTU/HR)AND TWO DUCT BURNERS (EACH WITH A MAXIMUM HEAT INPUT OF 500 MMBTU/HR).	OXIDATION CATALYST	2307 MMBTU/HR (EACH CT); 500 MMBTU/HR (EACH DB)	LAER	2 PPMM (WITH DB); 2.9 LB/HR (WOUT DB)
CHEYENNE PRAIRIE GENERATING STATION	LARAMIE, WY	8/28/2012	FIVE (5) GE LM6000 COMBUSTION TURBINES	OXIDATION CATALYST	40 MW (EACH CT)	BACT-PSD	3 PPM
LAUDERDALE PLANT	BROWARD, FL	4/22/2014	FIVE (5) 200-MW COMBUSTION TURBINES		2000 MMBTU/HR (EACH CT)	BACT-PSD	3.77 LB/HR

Appendix C
Table C-3
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Natural Gas Fired Combined Cycle Combustion Turbines > 25 MW
Volatile Organic Compound Emissions

FACILITY	LOCATION	PERMIT DATE	EQUIPMENT DESCRIPTION	CONTROL DESCRIPTION	TURBINE SIZE	PERMIT LIMIT BASIS	EMISSION LIMIT
COLORADO BEND ENERGY CENTER	WHARTON, TX	4/1/2015	COMBINED CYCLE POWER PLANT, TWO COMBUSTION TURBINES AND ONE STEAM TURBINE, MODEL GE 7HA.02	OXIDATION CATALYST	1100 MW	BACT-PSD	4 PPM
VICTORIA POWER STATION	VICTORIA, TX	12/1/2014	GENERAL ELECTRIC 7FA.04 AT 197 MW NOMINAL OUPUT. THE DUCT BURNERS WILL BE CAPABLE OF A FIRING RATE OF UP TO 483 MMBTU/HR (HHV).	OXIDATION CATALYST	197 MW	BACT-PSD	4 PPM
TRINIDAD GENERATING FACILITY	HENDERSON, TX	11/20/2014	MHI J MODEL COMBUSTION TURBINE NOMINALLY RATED AT 497 MW EQUIPPED WITH A HRSG AND DB WITH A MAXIMUM DESIGN CAPACITY OF 402 MMBTU/HR. THE GROSS NOMINAL OUTPUT OF THE CTG WITH HRSG AND DB IS 530 MW.	OXIDATION CATALYST	497 MW	BACT-PSD	4 PPM
HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	OTTAWA, MI	12/4/2013	2-ON-1 COMBINED CYCLE COMBUSTION TURBINES, WITH DB	OXIDATION CATALYST	647 MMBTU/HR (EACH CT)	BACT-PSD	4 PPM
NELSON ENERGY CENTER	LEE, IL	12/28/2010	FOUR (4) GE 7FA COMBUSTION TURBINES		220 MW (EACH CT); 1100 MW (TOTAL FACILITY)	BACT-PSD	4 PPM
PUEBLO AIRPORT GENERATING STATION	PUEBLO, CO	7/22/2010	FOUR (4) GE LMS6000 COMBUSTION TURBINES	CATALYTIC OXIDATION	373 MMBTU/HR (EACH CT)	BACT-PSD	4 PPM
QUALCOMM INC.	SAN DIEGO, CA	7/9/2012	SOLAR TURBINE: MODEL MERCURY 50-6400R		4.37 MW	OTHER CASE-BY-CASE	7 PPM

Appendix C
Table C-4
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Natural Gas Fired Combined Cycle Combustion Turbines > 25 MW
Particulate Matter Emissions

FACILITY	LOCATION	PERMIT DATE	EQUIPMENT DESCRIPTION	CONTROL DESCRIPTION	TURBINE SIZE	PERMIT LIMIT BASIS	EMISSION LIMIT
FOOTPRINT POWER SALEM HARBOR	ESSEX, MA	1/30/2014	TWO (2) GE 7F SERIES COMBINED CYCLE COMBUSTION TURBINES	NATURAL GAS/LOW SULFUR FUEL	630 MW	BACT-PSD	0.0071 LB/MMBTU (WOUT DB); 0.0062 LB/MMBTU (WITH DB);
MOXIE FREEDOM GENERATION PLANT	SALEM TOWNSHIP, PA		TWO (2) GE 7HA.02 COMBINED CYCLE COMBUSTION TURBINES (WITH DBS) IN 1-ON-1 CONFIGURATIONS	EXCLUSIVE NATURAL GAS, HIGH EFFICIENCY INLET AIR FILTERS, DLN	3,329 MMBTU/HR (EACH CT) PLUS 200 MMBTU/HR (EACH DB);	BACT-PSD	0.0063 LB/MMBTU (WITH AND WOUT DBS);
CRICKET VALLEY ENERGY CENTER	DOVER, NY	9/27/2012	THREE (3) GE 7FA.05 COMBINED CYCLE COMBUSTION TURBINES WITH DBS	NATURAL GAS/LOW SULFUR FUEL	2061 MMBTU/HR (EACH CT) PLUS 379 MMBTU/HR (EACH DB);	BACT-PSD	0.005 LB/MMBTU (WOUT DB); 0.006 LB/MMBTU (WITH DB);
SEWAREN GENERATING STATION	SEWAREN, NJ	3/1/2016	ONE (1) GE 7HA.02 CCGT		3311 MMBTU/HR CT PLUS 730 MMBTU/HR DB		14.4 LB/HR (WOUT DB); 22.6 LB/HR (WITH DB)
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		ONE (1) GE 7HA.02 CCGT	NATURAL GAS/LOW SULFUR FUEL; GOOD COMBUSTION PRACTICES	3462 MMBTU/HR CT PLUS 599 MMBTU/HR DB	BACT-PSD	11.7 LB/HR (WOUT DB); 18.3 LB/HR (WITH DB)
CPV TOWANTIC ENERGY CENTER	OXFROD, CT		TWO (2) GE 7HA.01 COMBINED CYCLE COMBUSTION TURBINES, PRIMARILY FIRED WITH NATURAL GAS WITH ULSD AS BACKUP, WITH GAS FIRED DBS	GOOD COMBUSTION PRACTICES, USE OF NATURAL GAS, LIMITED ULSD FIRING		BACT-PSD	0.0041 LB/MMBTU (WOUT DB) AND 0.0081 LB/MMBTU (WITH DB) FIRING NATURAL GAS; 0.020 LB/MMBTU FIRING ULSD;
PIONEER VALLEY GENERATION COMPANY	HAMPDEN, MA	4/12/2012	ONE (1) MITSUBISHI 501G	NATURAL GAS AND ULSD	2542 MMBTU/HR (NO DB)	BACT-PSD	0.004 LB/MMBTU FIRING NATURAL GAS; 0.014 LB/MMBTU FIRING ULSD;
INTERNATIONAL STATION POWER PLANT	MUNCIPALITY OF ANCHORAGE, AK	12/20/2010	(4) GE LM6000PF-25 TURBINES, WITH DBS	GOOD COMBUSTION PRACTICES		BACT-PSD	0.0066 LB/MMBTU
VICTORVILLE 2 HYBRID POWER PROJECT	SAN BERNARDINO, CA	3/11/2010	TWO (2) COMBINED CYCLE COMBUSTION TURBINES	PUC QUALITY NATURAL GAS	154 MW (EACH CT)	BACT-PSD	12 LB/HR (WOUT DB); 18 LB/HR (WITH DB)
AVENAL ENERGY PROJECT	KINGS, CA	6/21/2011	2 GE 7FA, 600 MW COMBINED CYCLE, 1856 MMBTU/HR EACH	USE PUC QUALITY NATURAL GAS	180 MW (EACH CT); 1856 MMBTU/HR (EACH CT);	BACT-PSD	8.91 LB/HR (WOUT DB), 11.78 (WITH DB)
COLUSA GENERATING STATION	COLUSA, CA	3/11/2011	TWO (2) COMBINED CYCLE COMBUSTION TURBINES; TWO (2) 688 MMBTU/HR DBS	USE NATURAL GAS	172 MW (EACH CT);	BACT-PSD	13.5 LB/HR
PALMDALE HYBRID POWER PROJECT	LOS ANGELES, CA	10/18/2011	2 GE 7FA, 1736 MMBTU/HR EACH	USE PUC QUALITY NATURAL GAS	154 MW; 1736 MMBTU/HR (EACH CT)	BACT-PSD	0.0048 LB/MMBTU (WOUT DB); 0.0049 LB/MMBTU (WITH DB)
PUEBLO AIRPORT GENERATING STATION	PUEBLO, CO	7/22/2010	FOUR (4) GE LMS6000 COMBUSTION TURBINES	USE OF PIPELINE QUALITY NATURAL GAS AND GOOD COMBUSTOR DESIGN	373 MMBTU/HR (EACH CT)	BACT-PSD	4.3 LB/HR
GARRISON ENERGY CENTER	KENT COUNTY, DE	1/30/2013	2 GE COMBUSTION TURBINES	FUEL USAGE RESTRICTION TO NATURAL Gas	309 MW; 2260 MMBTU/HR	BACT-PSD	120.4 TONS
POLK POWER STATION	POLK, FL	10/14/2012	COMBINED CYCLE POWER BLOCK (4 ON 1)	WORK PRACTICES	1160 MW	BACT-PSD	2 GR S/100 SCF OF GAS
MARSHALLTOWN GENERATING STATION	MARSHALL, IA	4/14/2014	TWO IDENTICAL SIEMENS SGT6-5000F COMBINED CYCLE TURBINES WITHOUT DUCT FIRING, EACH AT 2258 MMBTU/HR GENERATING APPROX. 300 MW EACH.		2258 mmBtu/hr (EACH)	BACT-PSD	0.01 LB/MMBTU
LANGLEY GULCH POWER PLANT	PAYETTE, ID	6/25/2010	SIEMENS SGT6-5000F COMBUSTION TURBINE, NOMINAL 269 MW, 1-ON-1 COMBINED CYCLE;	GOOD COMBUSTION PRACTICES (GCP)	2375 MMBTU/HR	BACT-PSD	
NELSON ENERGY CENTER	LEE, IL	12/28/2010	FOUR (4) GE 7FA COMBUSTION TURBINES		220 MW (EACH CT); 1100 MW (TOTAL FACILITY)	BACT-PSD	0.012 LB/MMBTU
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	FOUR (4) NATURAL GAS COMBINED CYCLE COMBUSTION TURBINES	GOOD CUMBUSTION PRACTICE AND FUEL SPECIFICATION	2300 MMBTU/HR (EACH CT)	BACT-PSD	0.0078 LB/MMBTU
NINEMILE POINT ELECTRIC GENERATING PLANT	JEFFERSON, LA	8/16/2011	TWO (2) COMBINED CYCLE COMBUSTION TURBINES WITH DBS	WHILE FIRING NATURAL GAS: USE OF PIPELINE QUALITY NATURAL GAS AND GOOD COMBUSTION PRACTICES	3573 MMBTU/HR (EACH CT)	BACT-PSD	26.2 LB/HR (WOUT DB); 33.2 LB/HR (WITH DB)
COGENERATION PLANT	ASCENSION, LA	12/6/2011	THREE (3) 50 MW GE LM6000 PF SPRINT TURBINES WITH HRSGS, EACH EQUIPPED WITH A 70 MMBTU/HR DB	USE OF NATURAL GAS AS FUEL AND GOOD COMBUSTION PRACTICES	475 MMBTU/HR	BACT-PSD	3.72 LB/HR
SUMPTER POWER PLANT	WAYNE, MI	11/17/2011	COMBINED CYCLE COMBUSTION TURBINE W/ HRSG		130 MW	OTHER CASE-BY-CASE	0.0066 LB/MMBTU
MIDLAND COGENERATION VENTURE	MIDLAND, MI	4/23/2013	TWO (2) COMBINED CYCLE COMBUSTION TURBINES	GOOD COMBUSTION PRACTICES	2237 MMBTU/HR (EACH)	BACT-PSD	0.006 LB/MMBTU (WOUT DB); 0.008 LB/MMBTU (WITH DB)
THETFORD GENERATING STATION	GENESEE, MI	7/25/2013	FOUR (4) CTG, TECHNOLOGY A IS 2587 MMBTU/H DESIGN HEAT INPUT EACH CTG, TECHNOLOGY B IS 2688 MMBTU/H DESIGN HEAT INPUT EACH CTG. TWO F CLASS TURBINE TECHNOLOGIES. EACH CTG WILL BE RATED AT 211 TO 230 MW (GROSS) OUTPUT AND THE STATION NOMINAL GENERATING CAPACITY WILL BE UP TO 1,400 MW.	COMBUSTION AIR FILTERS, EFFICIENT COMBUSTION CONTROL, LOW SULFUR NATURAL GAS FUEL.	2587 MMBTU/HR (EACH CT) OR 2688 MMBTU/HR (EACH CT)	BACT-PSD	0.0066 LB/MMBTU
HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	OTTAWA, MI	12/4/2013	2-ON-1 COMBINED CYCLE COMBUSTION TURBINES, WITH DB	GOOD COMBUSTION PRACTICES AND THE USE OF PIPELINE QUALITY NATURAL GAS.	647 MMBTU/HR (EACH CT)	BACT-PSD	0.014 LB/MMBTU
PSEG FOSSIL LLC SEWAREN GENERATING STATION	MIDDLESEX COUNTY, NJ	3/7/2014	THE HEAT INPUT RATE OF EACH OF THE SIEMENS TURBINES WILL BE 2,356 MMBTU/HR(HHV) WITH TWO 62.1 MMBTU DUCT BURNERS (HHV) OR THE HEAT INPUT RATE OF EACH OF THE GENERAL ELECTRIC COMBUSTION TURBINES WILL BE 2,312 MMBTU/HR(HHV) WITH TWO 164.4 MMBTU/HR DUCT BURNER (HHV).	USE OF NATURAL GAS AS A CLEAN BURNING FUEL	2356 MMBTU/HR (EACH SIEMENS), 62.1 MMBTU/HR (EACH DB) OR 2312 MMBTU/HR (EACH GE), 164.4 MMBTU/HR (EACH DB)	BACT-PSD	13 LB/HR (SIEMENS WOUT DB); 14 LB/HR (SIEMENS WITH DB); 12.7 LB/HR (GE WOUT DB); 14.6 LB/HR (GE WITH DB);

Appendix C
Table C-4
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Natural Gas Fired Combined Cycle Combustion Turbines > 25 MW
Particulate Matter Emissions

FACILITY	LOCATION	PERMIT DATE	EQUIPMENT DESCRIPTION	CONTROL DESCRIPTION	TURBINE SIZE	PERMIT LIMIT BASIS	EMISSION LIMIT
WEST DEPTFORD ENERGY STATION	GLOUCESTER, NJ	7/18/2014	THREE (3) 427 MW SIEMENS COMBINED CYCLE TURBINES WITH DUCT BURNERS HEAT INPUT RATE OF EACH TURBINE = 2276 MMBTU/HR (HHV) HEAT INPUT RATE OF EACH DUCT BURNER= 777 MMBTU/HR (HHV)	USE OF NATURAL GAS A CLEAN BURNING FUEL	2276 MMBTU/HR (EACH CT); 777 MMBTU/HR (EACH DB)	BACT-PSD	0.0069 LB/MMBUT (WITH DB); 10 LB/HR (WOUT DB);
OREGON CLEAN ENERGY CENTER	LUCAS, OH	6/18/2013	2 COMBINED CYCLE UNITS - MITSUBISHI 501G or SIEMENS SCC6-8000H. TWO SIEMENS 2932 MMBTU/H COMBINED CYCLE COMBUSTION TURBINES , BOTH WITH 300 MMBTU/HR DUCT BURNERS. WILL INSTALL EITHER 2 SIEMENS OR 2 MITSUBISHI.	CLEAN BURNING FUEL, ONLY NATURAL GAS	2932 MMBTU/HR (EACH SIEMENS OR MHI); 300 MMBTU/HR (EACH DB).	BACT-PSD	0.00373 LB/MMBTU (MHI WITH DB); 0.00384 LB/MMBTU (MHI WOUT DB); 0.0055 LB/MMBTU (SIEMENS WITH DB); 0.0047 LB/MMBTU (SIEMENS WOUT DB);
DUKE ENERGY HANGING ROCK ENERGY	LAWRENCE, OH	12/18/2012	TURBINES (4) (MODEL GE 7FA) WITH AND WITHOUT DBS.	BURNING NATURAL GAS IN AN EFFICIENT COMBUSTION TURBINE	172 MW (EACH CT);	BACT-PSD	15 LB/HR (WOUT DB); 19.9 LB/HR (WITH DB)
CARTY PLANT	MORROW, OR	12/29/2010	COMBINED CYCLE POWER PLANT (MHI G)	CLEAN FUEL	2866 MMBTU/HR	BACT-PSD	2.5 LB/MMCF
TROUTDALE ENERGY CENTER, LLC	MULTNOMAH, OR	3/5/2014	MITSUBISHI M501-GAC COMBUSTION TURBINE, COMBINED CYCLE CONFIGURATION WITH 499 MMBTU/HR DUCT BURNER	UTILIZE ONLY NATURAL GAS OR ULSD FUEL; LIMIT THE TIME IN STARTUP OR SHUTDOWN.	2988 MMBtu/hr (EACH MHI), 499 MMBTU/HR (EACH DB)	BACT-PSD	23.6 LB/HR (WITH DB)
MOXIE LIBERTY LLC/ASYLUM POWER PL T	BRADFORD COUNTY, PA	10/10/2012	2 COMBINED CYCLE UNITS - SIEMENS SGT6-8000H or MITSUBISHI 501G. THE HEAT INPUT RATING OF EACH COMBUSTION GAS TURBINE IS 2890 MMBTU/HR (HHV) OR LESS, AND THE HEAT INPUT RATING OF EACH SUPPLEMENTAL DUCT BURNER IS EQUAL TO 387 MMBTU/HR (HHV) OR LESS.	USING FUEL WITH LITTLE OR NO ASH AND SULFUR CONTENT.	2890 MMBTU/HR (EACH CT); 387 MMBTU/HR (EACH DB);	BACT-PSD	0.004 LB/MMBTU (FOR 468 MW); 0.0057 LB/MMBTU (FOR 454 MW)
MOXIE ENERGY LLC/PATRIOT GENERATION PLT	LYCOMING COUNTY, PA	1/31/2013	2 COMBINED CYCLE UNITS - SIEMENS SGT6-8000H or MITSUBISHI 501G, WITH DBS;		472 MW (EACH SIEMENS); 458 MW (EACH GE)	OTHER CASE-BY-CASE	0.0057 LB/MMBTU
SUNBURY GENERATION LP/SUNBURY SES	SNYDER, PA	4/1/2013	3 COMBINED CYCLE UNITS - SIEMENS 5000 F5ee or GE 7FA.05		2538 MMBTU/HR (EACH), 1064 MW	OTHER CASE-BY-CASE	0.0088 LB/MMBTU
BERKS HOLLOW ENERGY ASSOC LLC/ONTELAUNEE	BERKS, PA	12/17/2013	2-ON-1 COMBINED CYCLE COMBUSTION TURBINES WITH DB, 855 MW (NOMINAL)		3046 MMBTU/HR (EACH CT)	BACT-PSD	48.56 TPY
FUTURE POWER PA/GOOD SPRINGS NGCC FACILITY	SCHUYLKILL, PA	3/4/2014	SIEMENS 5000 COMBUSTION TURBINE		2267 MMBtu/hr (CT), 134.3 MMBTU/HR (DB)	BACT-PSD	15.6 LB/HR (WITH DB)
KING POWER STATION	HARRIS, TX	8/5/2010	THE PLANT WILL BE DESIGNED TO GENERATE 1,350 NOMINAL MW. THERE ARE TWO CONFIGURATION SCENARIOS: EITHER FOUR SIEMENS SGT6-5000F CTGS IN COMBINED-CYCLE MODE OR FOUR GE FRAME 7FA CTGS IN COMBINED CYCLE MODE.	USE LOW ASH FUEL (NATURAL GAS OR LOW SULFUR DIESEL AS A BACKUP) AND GOOD COMBUSTION PRACTICES	1350 MW (TOTAL FACILITY)	BACT-PSD	11.1 LB/HR (SIEMENS); 19.8 LB/HR (GE)
THOMAS C. FERGUSON POWER PLANT	LLANO, TX	9/1/2011	(2) GE7FA AT 195 MW EACH, AND (1) STEAM TURBINE AT 200 MW.	PIPELINE QUALITY NATURAL GAS	195 MW (EACH CT)	BACT-PSD	33.43 LB/HR
CHANNEL ENERGY CENTER LLC	HARRIS, TX	10/15/2012	SIEMENS 501F RATED AT A NOMINAL 180 MW. THE DUCT BURNER WILL HAVE A MAXIMUM DESIGN HEAT INPUT OF 475 MMBTU/HR.	GOOD COMBUSTION AND THE USE OF GASEOUS FUEL	180 MW	BACT-PSD	27 LB/HR
DEER PARK ENERGY CENTER	HARRIS, TX	9/26/2012	FIVE (5) SIEMENS 501F COMBUSTION TURBINES, EACH RATED AT A NOMINAL 180 MW. EACH DB WILL HAVE A MAXIMUM DESIGN RATE CAPABILITY OF 725 MMBTU/HR.	GOOD COMBUSTION AND USE OF NATURAL GAS	180 MW (EACH CT)	BACT-PSD	27 LB/HR
ES JOSLIN POWER PLANT	CALHOUN, TX	9/12/2012	THREE COMBUSTION TURBINE GENERATORS (CTG) WILL BE THE GENERAL ELECTRIC 7FA, EACH WITH A MAXIMUM BASE-LOAD ELECTRIC POWER OUTPUT OF APPROXIMATELY 195 MEGAWATTS (MW). THE STEAM TURBINE IS RATED AT APPROXIMATELY 235 MW. NO DUCT BURNERS.		195 MW (EACH CT)	BACT-PSD	18 LB/HR
PINECREST ENERGY CENTER	ANGELINA, TX	11/12/2013	TWO NATURAL GAS-FIRED COMBUSTION TURBINES (CTS), EACH EXHAUSTING TO A FIRED HEAT RECOVERY STEAM GENERATOR (HRSG) TO PRODUCE STEAM TO DRIVE A SHARED STEAM TURBINE GENERATOR. THE STEAM TURBINE IS RATED AT 271 MW OF ELECTRIC OUTPUT. THREE MODELS OF COMBUSTION TURBINES ARE BEING CONSIDERED FOR THIS SITE: THE GENERAL ELECTRIC 7FA.05, THE SIEMENS SGT6-5000F(4), AND THE SIEMENS SGT6-5000F(5). PLANT OUTPUT WILL RANGE BETWEEN 637 AND 735 MW, DEPENDING ON THE MODEL TURBINE. DUCT BURNERS ARE RATED AT 750 MMBTU/HR EACH.	PIPELINE QUALITY NATURAL GAS AND GOOD COMBUSTION PRACTICES	700 MW (FACILITY)	BACT-PSD	26.2 LB/HR
FREEPORT LNG PRETREATMENT FACILITY	BRAZORIA, TX	7/16/2014	COMBUSTION TURBINE		87 MW	BACT-PSD	15.22 LB/HR
CEDAR BAYOU ELECTRIC GENERATION STATION	CHAMBERS, TX	8/29/2014	TWO COMBUSTION TURBINES - THREE OPTIONS: Siemens Model F5, GE7Fa, and Mitsubishi Heavy Industry G Frame.	GOOD COMBUSTION PRACTICES, NATURAL GAS	225 MW (EACH)	BACT-PSD	
BAYPORT COMPLEX	HARRIS, TX	9/5/2013	(4) GE 7EA TURBINES		90 MW (EACH CT)	BACT-PSD	

Appendix C
Table C-4
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Natural Gas Fired Combined Cycle Combustion Turbines > 25 MW
Particulate Matter Emissions

FACILITY	LOCATION	PERMIT DATE	EQUIPMENT DESCRIPTION	CONTROL DESCRIPTION	TURBINE SIZE	PERMIT LIMIT BASIS	EMISSION LIMIT
LA PALOMA ENERGY CENTER	CAMERON, TX	2/7/2013	TWO COMBUSTION TURBINES (CTS) CONNECTED TO ELECTRIC GENERATORS, PRODUCING BETWEEN 183 AND 232 MW OF ELECTRICITY. THE TWO HRSGS USE DUCT BURNERS RATED AT 750 MMBTU/HR EACH. SINGLE STEAM TURBINE WITH AN ELECTRICITY OUTPUT OF 271 MW. DEPENDING ON THE SELECTED CT, TOTAL PLANT OUTUT IS BETWEEN 637 MW AND 735 MW. THE THREE CT MODELS BEING CONSIDERED ARE: (1) GENERAL ELECTRIC 7FA.04; (2) SIEMENS SGT6-5000F(4); OR (3) SIEMENS SGT6-5000F(5).		650 MW (FACILITY)	BACT-PSD	
SAND HILL ENERGY CENTER	TRAVIS, TX	9/13/2013	ONE (1) GE 7FA WITH DB		173.9 MW	BACT-PSD	
VICTORIA POWER STATION	VICTORIA, TX	12/1/2014	GENERAL ELECTRIC 7FA.04 AT 197 MW NOMINAL OUPUT. THE DUCT BURNERS WILL BE CAPABLE OF A FIRING RATE OF UP TO 483 MMBTU/HR (HHV).		197 MW	BACT-PSD	
TRINIDAD GENERATING FACILITY	HENDERSON, TX	11/20/2014	MHI J MODEL COMBUSTION TURBINE NOMINALLY RATED AT 497 MW EQUIPPED WITH A HRSG AND DB WITH A MAXIMUM DESIGN CAPACITY OF 402 MMBTU/HR. THE GROSS NOMINAL OUTPUT OF THE CTG WITH HRSG AND DB IS 530 MW.		497 MW	BACT-PSD	
TENASKA BROWNSVILLE GENERATING STATION	CAMERON, TX	4/29/2014	2 COMBINED CYCLE TURBINES. EACH CTG IS 274 MW GROSS> TWO HRSGS WITH FULL DUCT BURNER FIRING PRODUCE ENOUGH STEAM TO GENERATE AN ADDITIONAL 336 MW, FOR A TOTAL OF 884 MW GROSS.		274 MW (EACH)	BACT-PSD	
S R BERTRON ELECTRIC GENERATING STATION	HARRIS, TX	12/19/2014	ONE OF THREE OPTIONS: (1) TWO SIEMENS MODEL F5 (SF5) CTGS EACH RATED AT NOMINAL CAPABILITY OF 225 MEGAWATTS (MW). EACH CTG WILL HAVE A DUCT FIRED HRSG WITH A MAXIMUM HEAT INPUT OF 688 MILLION BRITISH THERMAL UNITS PER HOUR (MMBTU/HR). (2) TWO GENERAL ELECTRIC MODEL 7FA (GE7FA) CTGS EACH RATED AT NOMINAL CAPABILITY OF 215 MW. EACH CTG WILL HAVE A DUCT FIRED HRSG WITH A MAXIMUM HEAT INPUT OF 523 MMBTU/HR. (3) TWO MITSUBISHI HEAVY INDUSTRY G FRAME (MHI501G) CTGS EACH RATED AT A NOMINAL ELECTRIC OUTPUT OF 263 MW. EACH CTG WILL HAVE A DUCT FIRED HRSG WITH A MAXIMUM HEAT INPUT OF 686 MMBTU/HR.		225 MW EACH (SIEMENS); 215 MW EACH (GE)	BACT-PSD	
COLORADO BEND ENERGY CENTER	WHARTON, TX	4/1/2015	COMBINED CYCLE POWER PLANT, TWO COMBUSTION TURBINES AND ONE STEAM TURBINE, MODEL GE 7HA.02	EFFICIENT COMBUSTION, NATURAL GAS FUEL	1100 MW	BACT-PSD	43 LB/HR
WARREN COUNTY POWER PLANT - DOMINION	WARREN, VA	12/17/2010	THREE MITSUBISHI M501 GAC COMBUSTION TURBINES WITH DBS	NATURAL GAS ONLY, FUEL HAS MAXIMUM SULFUR CONTENT OF 0.0003% BY WEIGHT.	2996 MMBTU/HR (EACH CT); 500 MMBTU/HR (EACH DB)	BACT-PSD	8 LB/HR (WOUT DB); 14 LB/HR (WITH DB);
GATEWAY COGENERATION 1, LLC - SMART WATER PROJECT	PRINCE GEORGE, VA	8/27/2012	TWO (2) COMBINED CYCLE COMBUSTION TURBINES (ROLLS ROYCE TRENT 60 WLE)	CLEAN BURNING FUELS AND GOOD COMBUSTION PRACTICES.	593 MMBTU/HR (EACH)	BACT-PSD	5 LB/HR
BRUNSWICK COUNTY POWER STATION	BRUNSWICK, VA	3/12/2013	THREE (3) MITSUBISHI M501 GAC COMBUSTION TURBINE GENERATORS WITH DBS, 3442 MMBTU/HR EACH	LOW SULFUR/CARBON FUEL AND GOOD COMBUSTION PRACTICES.	3442 MMBTU/HR (EACH)	BACT-PSD	0.0033 LB/MMBTU (WOUT DB);
MOUNDSVILLE COMBINED CYCLE POWER PLANT	MARSHALL, WV	11/21/2014	(2) NOMINAL 197 MW GENERAL ELECTRIC FRAME 7FA.04 TURBINE W/ DUCT BURNERS.	GOOD COMBUSTION PRACTICES, INLET AIR FILTRATION, & USE OF NATURAL GAS	2159 MMBTU/HR (EACH CT)	BACT-PSD	0.0035 LB/MMBTU
CHEYENNE PRAIRIE GENERATING STATION	LARAMIE, WY	8/28/2012	FIVE (5) GE LM6000 COMBUSTION TURBINES	GOOD COMBUSTION PRACTICES	40 MW (EACH CT)	BACT-PSD	4 LB/H
WOODBRIDGE ENERGY CENTER	MIDDLESEX, NJ	7/25/2012	TWO GE 7FA CC TURBINES (EACH WITH A MAXIMUM HEAT INPUT OF 2,307 MMBTU/HR)AND TWO DUCT BURNERS (EACH WITH A MAXIMUM HEAT INPUT OF 500 MMBTU/HR).	GOOD COMBUSTION PRACTICES AND USE OF NATURAL GAS,A CLEAN BURNING FUEL.	2307 MMBTU/HR (EACH CT); 500 MMBTU/HR (EACH DB)	BACT-PSD	12.1 LB/HR (WOUT DB); 19.1 LB/HR (WITH DB);
HESS NEWARK ENERGY CENTER	ESSEX, NJ	11/1/2012	2 COMBINED CYCLE UNITS - GE 7FA.05 (655 MW) WITH DBS	USE OF NATURAL GAS A CLEAN BURNING FUEL	2320 MMBUT/HR (EACH CT)	BACT-PSD	11 LB/HR (WOUT DB); 13.2 LB/HR (WITH DB)
PIO PICO ENERGY CENTER	OTAY MESA, CA	11/19/2012	THREE (3) GE LMS 100 COMBUSTION TURBINES	PUC-QUALITY NATURAL GAS	300 MW (TOTAL FACILITY)	BACT-PSD	0.0065 LB/MMBTU (HHV)
LENZING FIBERS, INC.	MOBILE, AL	1/22/2014	GAS TURBINE WITH HRSG	GOOD COMBUSTION PRACTICES.	25 MW	BACT-PSD	0.0075 LB/MM BTU
YORK GENERATION FACILITY	YORK COUNTY, PA	3/1/2012	TWO (2) COMBUSTION TURBINES	NATURAL GAS - PIPEILINE QUALITY NATURAL GAS	634 MMBTU/HR (EACH CT)	OTHER CASE-BY-CASE	5.9 LB/HR
DEER CREEK STATION	BROOKINGS, SD	6/29/2010	COMBUSTION TURBINE AND HRSG (300 MW)	GOOD COMBUSTION	1713 MMBTU/HR (LHV) FOR CT; 615.2 MMBTU/HR (LHV) FOR DB;	BACT-PSD	23.2 LB/HR (WITH DB); 18.6 LB/HR (WOUT DB)
WA PARISH ELECTRIC GENERATING STATION - DEMONSTRATION PROJECT	FORT BEND, TX	12/19/2012	GE FRAME 7EA, RATED AT A MAXIMUM BASE-LOAD ELECTRIC OUTPUT OF APPROXIMATELY 80 MW. DUCT BURNER HAS A MAXIMUM HEAT INPUT CAPACITY OF 225 MMBTU/HR.	GOOD COMBUSTION AND USE OF NATURAL GAS	80 MW	BACT-PSD	16.58 LB/HR
LAUDERDALE PLANT	BROWARD, FL	4/22/2014	FIVE (5) 200-MW COMBUSTION TURBINES	GOOD COMBUSTION PRACTICE AND LOW-SULFUR FUEL	2000 MMBTU/HR (EACH CT)	BACT-PSD	
IPL EAGLE VALLEY GENERATING STATION	MORGAN, IN	10/11/2013	TWO (2) COMBINED CYCLE COMBUSTION TURBINES	GOOD COMBUSTION PRACTICE AND FUEL SPECIFICATION	2542 MMBTU/HR (EACH)		0.0066 LB/MMBTU (WITH DB); 0.0055 LB/MMBTU (WOUT DB)
ECTOR COUNTY ENERGY CENTER	ECTOR, TX	8/1/2014	(2) GE 7FA.03 COMBUSTION TURBINES		180 MW (EACH CT)	BACT-PSD	
UTILITY PLANT	NUECES, TX	12/2/2014	GENERAL ELECTRIC LM6000 COMBUSTION TURBINE WITH A 263 MMBTU/HR DB		49 MW	BACT-PSD	
W. A. PARISH ELECTRIC GENERATING STATION	FORT BEND, TX	12/21/2012	GE 7EA TURBINE AND 225 MMBTU/HR DB	NATURAL GAS AS FUEL	80 MW	BACT-PSD	

Appendix C
Table C-5
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Natural Gas Fired Combined Cycle Combustion Turbines > 25 MW
Sulfuric Acid Mist Emissions

FACILITY	LOCATION	PERMIT DATE	EQUIPMENT DESCRIPTION	CONTROL DESCRIPTION	TURBINE SIZE	PERMIT LIMIT BASIS	EMISSION LIMIT
FOOTPRINT POWER SALEM HARBOR	ESSEX, MA	1/30/2014	TWO (2) GE 7F SERIES COMBINED CYCLE COMBUSTION TURBINES	FUEL SPECIFICATION	630 MW	BACT-PSD	0.001 LB/MMBTU
MOXIE FREEDOM GENERATION PLANT	SALEM TOWNSHIP, PA		TWO (2) GE 7HA.02 COMBINED CYCLE COMBUSTION TURBINES (WITH DBS) IN 1-ON-1 CONFIGURATIONS	EXCLUSIVE NATURAL GAS	3,329 MMBTU/HR (EACH CT) PLUS 200 MMBTU/HR (EACH DB);	BACT-PSD	0.00086 LB/MMBTU; 0.4 GR/100 SCF
CRICKET VALLEY ENERGY CENTER	DOVER, NY	9/27/2012	THREE (3) GE 7FA.05 COMBINED CYCLE COMBUSTION TURBINES WITH DBS	FUEL SPECIFICATION	2061 MMBTU/HR (EACH CT) PLUS 379 MMBTU/HR (EACH DB);	BACT-PSD	0.5 GR S/100 DSCF
CPV TOWANTIC ENERGY CENTER	OXFROD, CT		TWO (2) GE 7HA.01 COMBINED CYCLE COMBUSTION TURBINES, PRIMARILY FIRED WITH NATURAL GAS WITH ULSD AS BACKUP, WITH GAS FIRED DBS	Low sulfur fuel		BACT-PSD	0.00115 LB/MMBTU (WITH DB) AND 0.00117 LB/MMBTU (WOUT DB) FIRING NATURAL GAS; 0.00125 LB/MMBTU FIRING ULSD;
PIONEER VALLEY GENERATION COMPANY	HAMPDEN, MA	4/12/2012	ONE (1) MITSUBISHI 501G	FUEL SPECIFICATION	2542 MMBTU/HR (NO DB)	BACT-PSD	0.0019 LB/MMBTU FIRING NATURAL GAS; 0.0018 LB/MMBTU FIRING ULSD;
SEWAREN GENERATING STATION	SEWAREN, NJ	3/1/2016	ONE (1) GE 7HA.02 CCGT		3311 MMBTU/HR CT PLUS 730 MMBTU/HR DB		5.5 LB/HR (WOUT DB); 6.6 LB/HR (WITH DB)
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		ONE (1) GE 7HA.02 CCGT	NATURAL GAS	3464 MMBTU/HR CT PLUS 599 MMBTU/HR DB	BACT-PSD	3.61 LB/HR (WOUT DB); 4.26 LB/HR (WITH DB)
NRG ENERGY CENTER DOVER	USA, DE	10/31/2012	500 MMBTU/HR GAS TURBINE (MODEL: GE LM6000) RATED AT 52 MW AND 155 MMBTU/HR HEAT RECOVERY STEAM GENERATOR RATED AT 18 MW.		655 MMBTU/HR (GAS TURBINE AND HRSG)	OTHER CASE-BY-CASE	0.12 LB/H
GARRISON ENERGY CENTER	KENT COUNTY, DE	1/30/2013	2 GE COMBUSTION TURBINES		309 MW; 2260 MMBTU/HR	BACT-PSD	24.3 TONS
MARSHALLTOWN GENERATING STATION	MARSHALL, IA	4/14/2014	TWO IDENTICAL SIEMENS SGT6-5000F COMBINED CYCLE TURBINES WITHOUT DUCT FIRING, EACH AT 2258 MMBTU/HR GENERATING APPROX. 300 MW EACH.		2258 mmBtu/hr (EACH)	BACT-PSD	0.0032 LB/MMBTU
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	FOUR (4) NATURAL GAS COMBINED CYCLE COMBUSTION TURBINES		2300 MMBTU/HR (EACH CT)	BACT-PSD	0.75 GR S/100SCF
PSEG FOSSIL LLC SEWAREN GENERATING STATION	MIDDLESEX COUNTY, NJ	3/7/2014	THE HEAT INPUT RATE OF EACH OF THE SIEMENS TURBINES WILL BE 2,356 MMBTU/HR(HHV) WITH TWO 62.1 MMBTU DUCT BURNERS (HHV) OR THE HEAT INPUT RATE OF EACH OF THE GENERAL ELECTRIC COMBUSTION TURBINES WILL BE 2,312 MMBTU/HR(HHV) WITH TWO 164.4 MMBTU/HR DUCT BURNER (HHV).	USE OF NATURAL GAS A CLEAN BURNING FUEL	2356 MMBTU/HR (EACH SIEMENS), 62.1 MMBTU/HR (EACH DB) OR 2312 MMBTU/HR (EACH GE), 164.4 MMBTU/HR (EACH DB)	BACT-PSD	2.79 LB/HR (SIEMENS WITH AND WOUT DB); 2.74 LB/HR (GE WOUT DB); 2.93 LB/HR (GE WITH DB)
WEST DEPTFORD ENERGY STATION	GLOUCESTER, NJ	7/18/2014	THREE (3) 427 MW SIEMENS COMBINED CYCLE TURBINES WITH DUCT BURNERS HEAT INPUT RATE OF EACH TURBINE = 2276 MMBTU/HR (HHV) HEAT INPUT RATE OF EACH DUCT BURNER= 777 MMBTU/HR (HHV)	Use of natural gas a clean burning fuel	2276 MMBTU/HR (EACH CT); 777 MMBTU/HR (EACH DB)	OTHER CASE-BY-CASE	0.74 LB/HR (WOUT DB); 0.98 LB/HR (WITH DB)
DUKE ENERGY HANGING ROCK ENERGY	LAWRENCE, OH	12/18/2012	TURBINES (4) (MODEL GE 7FA) WITH AND WITHOUT DBS.	Burning natural gas in an efficient combustion turbine and using low sulfur fuel.	172 MW (EACH CT);	BACT-PSD	0.18 LB/HR (WOUT DB); 0.23 LB/HR (WITH DB)
TROUTDALE ENERGY CENTER, LLC	MULTNOMAH, OR	3/5/2014	MITSUBISHI M501-GAC COMBUSTION TURBINE, COMBINED CYCLE CONFIGURATION WITH 499 MMBTU/HR DUCT BURNER	Utilize only natural gas	2988 MMBtu/hr (EACH MHI), 499 MMBTU/HR (EACH DB)	BACT-PSD	
MOXIE LIBERTY LLC/ASYLUM POWER PLANT	BRADFORD COUNTY, PA	10/10/2012	2 COMBINED CYCLE UNITS - SIEMENS SGT6-8000H or MITSUBISHI 501G. THE HEAT INPUT RATING OF EACH COMBUSTION GAS TURBINE IS 2890 MMBTU/HR (HHV) OR LESS, AND THE HEAT INPUT RATING OF EACH SUPPLEMENTAL DUCT BURNER IS EQUAL TO 387 MMBTU/HR (HHV) OR LESS.		2890 MMBTU/HR (EACH CT); 387 MMBTU/HR (EACH DB);	OTHER CASE-BY-CASE	0.0002 LB/MMBTU
MOXIE ENERGY LLC/PATRIOT GENERATION PLT	LYCOMING COUNTY, PA	1/31/2013	2 COMBINED CYCLE UNITS - SIEMENS SGT6-8000H or MITSUBISHI 501G, WITH DBS;		472 MW (EACH SIEMENS); 458 MW (EACH GE)	OTHER CASE-BY-CASE	0.0005 LB/MMBTU
SUNBURY GENERATION LP/SUNBURY SES	SNYDER, PA	4/1/2013	3 COMBINED CYCLE UNITS - SIEMENS 5000 F5ee or GE 7FA.05		2538 MMBTU/HR (EACH), 1064 MW	OTHER CASE-BY-CASE	0.0018 LB/MMBTU
HICKORY RUN ENERGY STATION	LAWRENCE, PA	4/23/2013	2 COMBINED CYCLE UNITS - GE 7FA, SIEMENS SGT6-5000F, MITSUBISHI 501G, SIEMENS SFT6-8000H		900 MW (NOMINAL FACILITY)	OTHER CASE-BY-CASE	0.92 LB/HR (WOUT DB); 1.08 LB/HR (WITH DB)
BERKS HOLLOW ENERGY ASSOC LLC/ONTELAUNEE	BERKS, PA	12/17/2013	2-ON-1 COMBINED CYCLE COMBUSTION TURBINES WITH DB, 855 MW (NOMINAL)		3046 MMBTU/HR (EACH CT)	OTHER CASE-BY-CASE	2.97 T/YR
FUTURE POWER PA/GOOD SPRINGS NGCC FACILITY	SCHUYLKILL, PA	3/4/2014	SIEMENS 5000 COMBUSTION TURBINE		2267 MMBtu/hr (CT), 134.3 MMBTU/HR (DB)	BACT-PSD	3.4 LB/HR (WITH DB)
THOMAS C. FERGUSON POWER PLANT	LLANO, TX	9/1/2011	(2) GE7FA AT 195 MW EACH, AND (1) STEAM TURBINE AT 200 MW.	pipeline quality natural gas	195 MW (EACH CT)	BACT-PSD	13.68 LB/HR
S R BERTRON ELECTRIC GENERATING STATION	HARRIS, TX	12/19/2014	ONE OF THREE OPTIONS: (1) TWO SIEMENS MODEL F5 (SF5) CTGS EACH RATED AT NOMINAL CAPABILITY OF 225 MEGAWATTS (MW). EACH CTG WILL HAVE A DUCT FIRED HRSG WITH A MAXIMUM HEAT INPUT OF 688 MILLION BRITISH THERMAL UNITS PER HOUR (MMBTU/HR). (2) TWO GENERAL ELECTRIC MODEL 7FA (GE7FA) CTGS EACH RATED AT NOMINAL CAPABILITY OF 215 MW. EACH CTG WILL HAVE A DUCT FIRED HRSG WITH A MAXIMUM HEAT INPUT OF 523 MMBTU/HR. (3) TWO MITSUBISHI HEAVY INDUSTRY G FRAME (MHI501G) CTGS EACH RATED AT A NOMINAL ELECTRIC OUTPUT OF 263 MW. EACH CTG WILL HAVE A DUCT FIRED HRSG WITH A MAXIMUM HEAT INPUT OF 686 MMBTU/HR.		225 MW EACH (SIEMENS); 215 MW EACH (GE)	BACT-PSD	0.5 GR S/100 DSCF
COLORADO BEND ENERGY CENTER	WHARTON, TX	4/1/2015	COMBINED CYCLE POWER PLANT, TWO COMBUSTION TURBINES AND ONE STEAM TURBINE, MODEL GE 7HA.02	efficient combustion, natural gas fuel	1100 MW	BACT-PSD	2 GR/100 SCF
WARREN COUNTY POWER PLANT - DOMINION	WARREN, VA	12/17/2010	THREE MITSUBISHI M501 GAC COMBUSTION TURBINES WITH DBS	Natural Gas burning.	2996 MMBTU/HR (EACH CT); 500 MMBTU/HR (EACH DB)	BACT-PSD	0.0001 LB/MMBTU (WOUT DB); 0.0003 LB/MMBUT (WITH DB)
BRUNSWICK COUNTY POWER STATION	BRUNSWICK, VA	3/12/2013	THREE (3) MITSUBISHI M501 GAC COMBUSTION TURBINE GENERATORS WITH DBS, 3442 MMBTU/HR EACH	Low sulfur fuel	3442 MMBTU/HR (EACH)	BACT-PSD	0.0006 LB/MMBTU (WOUT DB)

Appendix C
Table C-6
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Natural Gas Fired Combined Cycle Combustion Turbines > 25 MW
Greenhouse Gas Emissions

FACILITY	LOCATION	PERMIT DATE	EQUIPMENT DESCRIPTION	CONTROL DESCRIPTION	TURBINE SIZE	PERMIT LIMIT BASIS	EMISSION LIMIT
FOOTPRINT POWER SALEM HARBOR	ESSEX, MA	1/30/2014	TWO (2) GE 7F SERIES COMBINED CYCLE COMBUSTION TURBINES		630 MW	BACT-PSD	6,688 BTU/KW-HR (HHV) INITIAL; 7247 BTU/KW-HR (HHV) LIFE OF FACILITY; 795 LB CO2E/MW-HR (INITIAL); 862 LB CO2E/MW-HR (LIFE OF FACILITY)
MOXIE FREEDOM GENERATION PLANT	SALEM TOWNSHIP, PA		TWO (2) GE 7HA.02 COMBINED CYCLE COMBUSTION TURBINES (WITH DBS) IN 1-ON-1 CONFIGURATIONS	ENERGY EFFICIENCY	3,329 MMBTU/HR (EACH CT) PLUS 200 MMBTU/HR (EACH DB);	BACT-PSD	6973 BTU/KW-HR (HHV) GROSS WOUT DB AT ISO, NEW AND CLEAN; 7368 BTU/KW-HR (HHV) GROSS WOUT DB AT ISO, LIFE OF FACILITY
SEWAREN GENERATING STATION	SEWAREN, NJ	Mar-16	ONE (1) GE 7HA.02 CCGT		3311 MMBTU/HR CT PLUS 730 MMBTU/HR DB		888 LB/MW-HR (GROSS); 6871 BUT/KWH (NET)
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		ONE (1) GE 7HA.02 CCGT		3462 MMBTU/HR CT PLUS 599 MMBTU/HR DB	BACT-PSD	888 LB/MW-HR (GROSS); 6901 BUT/KWH (GROSS)
CRICKET VALLEY ENERGY CENTER	DOVER, NY	9/27/2012	THREE (3) GE 7FA.05 COMBINED CYCLE COMBUSTION TURBINES WITH DBS		2061 MMBTU/HR (EACH CT) PLUS 379 MMBTU/HR (EACH DB);	BACT-PSD	7605 BTU/KW-HR (HHV AT ISO) WIHTOUT DB
CPV TOWANTIC ENERGY CENTER	OXFROD, CT		TWO (2) GE 7HA.01 COMBINED CYCLE COMBUSTION TURBINES, PRIMARILY FIRED WITH NATURAL GAS WITH ULSD AS BACKUP, WITH GAS FIRED DBS	ADVANCED COMBINED CYCLE TECHNOLOGY WITH NATURAL GAS FIRING (PRIMARY) WITH LIMITED ULSD FIRING		BACT-PSD	7,220 BTU/KW-HR (NET, AT ISO FULL LOAD, NO SUPPLEMENTAL FIRING, NATURAL GAS FIRING); 2,656,018 TONS
PIONEER VALLEY GENERATION COMPANY	HAMPDEN, MA	4/12/2012	ONE (1) MITSUBISHI 501G		2542 MMBTU/HR (NO DB)	BACT-PSD	895 LB/MWHR (NET)
BRUNSWICK COUNTY POWER STATION	BRUNSWICK, VA	3/12/2013	THREE (3) MITSUBISHI M501 GAC COMBUSTION TURBINE GENERATORS WITH DBS, 3442 MMBTU/HR EACH	Energy efficient combustion practices and low GHG fuels.	3442 MMBTU/HR (EACH)	BACT-PSD	7500 BTU/KW-HR
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	FOUR (4) NATURAL GAS COMBINED CYCLE COMBUSTION TURBINES	HIGH THERMAL EFFICIENCY DESIGN	2300 MMBTU/HR (EACH CT)	BACT-PSD	7646 BTU/KW-HR
IPL EAGLE VALLEY GENERATING STATION	MORGAN, IN	10/11/2013	TWO (2) COMBINED CYCLE COMBUSTION TURBINES		2542 MMBTU/HR		7750 BTU/KW-HR (HHV-NET)
NRG ENERGY CENTER DOVER	USA, DE	10/31/2012	500 MMBTU/HR GAS TURBINE (MODEL: GE LM6000) RATED AT 52 MW AND 155 MMBTU/HR HEAT RECOVERY STEAM GENERATOR RATED AT 18 MW.		655 MMBTU/HR (GAS TURBINE AND HRSG)	BACT-PSD	1085 LB/GROSS MWH
COGENERATION PLANT	ASCENSION, LA	12/6/2011	THREE (3) 50 MW GE LM6000 PF SPRINT TURBINES WITH HRSGS, EACH EQUIPPED WITH A 70 MMBTU/HR DB	USE OF NATURAL GAS AS FUEL AND GOOD COMBUSTION PRACTICES	475 MMBTU/HR	BACT-PSD	55576.77 LB/HR
SUNBURY GENERATION LP/SUNBURY SES	SNYDER, PA	4/1/2013	3 COMBINED CYCLE UNITS - SIEMENS 5000 F5ee or GE 7FA.05		2538 MMBTU/HR (EACH), 1064 MW	OTHER CASE-BY-CASE	281727 LB/HR (WITH DB); 298,106 LB/HR (WOUT DB)
OREGON CLEAN ENERGY CENTER	LUCAS, OH	6/18/2013	2 COMBINED CYCLE UNITS - MITSUBISHI 501G or SIEMENS SCC6-8000H. TWO SIEMENS 2932 MMBTU/H COMBINED CYCLE COMBUSTION TURBINES , BOTH WITH 300 MMBTU/HR DUCT BURNERS. WILL INSTALL EITHER 2 SIEMENS OR 2 MITSUBISHI.	state-of-the-art high efficiency combustion technology	2932 MMBTU/HR (EACH SIEMENS OR MHI); 300 MMBTU/HR (EACH DB).	BACT-PSD	318404 LB/HR; 840 LB/MWH (GROSS)
THOMAS C. FERGUSON POWER PLANT	LLANO, TX	11/10/2011	TWO (2) GE 7FA COMBUSTION TURBINES	Good Combustion Practices	1746 MMBTU/HR (EACH CT)	BACT-PSD	908957.6 LB/HR
MOUNDSVILLE COMBINED CYCLE POWER PLANT	MARSHALL, WV	11/21/2014	(2) NOMINAL 197 MW GENERAL ELECTRIC FRAME 7FA.04 TURBINE W/ DUCT BURNERS.		2159 MMBTU/HR (EACH CT)	BACT-PSD	254315 LB/HR; 793 LB/MW-HR

Appendix C
Table C-6
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Natural Gas Fired Combined Cycle Combustion Turbines > 25 MW
Greenhouse Gas Emissions

FACILITY	LOCATION	PERMIT DATE	EQUIPMENT DESCRIPTION	CONTROL DESCRIPTION	TURBINE SIZE	PERMIT LIMIT BASIS	EMISSION LIMIT
PALMDALE HYBRID POWER PROJECT	LOS ANGELES, CA	10/18/2011	2 GE 7FA, 1736 MMBTU/HR EACH		154 MW; 1736 MMBTU/HR (EACH CT)	BACT-PSD	774 LB/MW-HR; 7319 BTU/KW-HR;
COLORADO BEND ENERGY CENTER	WHARTON, TX	4/1/2015	COMBINED CYCLE POWER PLANT, TWO COMBUSTION TURBINES AND ONE STEAM TURBINE, MODEL GE 7HA.02	efficient processes, practices, and designs	1100 MW	BACT-PSD	879 LB/MW-HR; 7935 BTU/KWH-HR
HESS NEWARK ENERGY CENTER	ESSEX, NJ	11/1/2012	2 COMBINED CYCLE UNITS - GE 7FA.05 (655 MW) WITH DBS	Good Combustion Practices	2320 MMBUT/HR (EACH CT)	BACT-PSD	887 LB/MW-HR
FGE POWER, FGE TEXAS PROJECT	MITCHELL, TX	4/28/2014	FOUR (4) ALSTOM GT24 WITH DB; 1620 MW (GROSS FACILITY);		7625 BTU/KW-HR	BACT-PSD	889 LB/MW-HR (GROSS)
PSEG FOSSIL LLC SEWAREN GENERATING STATION	MIDDLESEX COUNTY, NJ	3/7/2014	THE HEAT INPUT RATE OF EACH OF THE SIEMENS TURBINES WILL BE 2,356 MMBTU/HR(HHV) WITH TWO 62.1 MMBTU DUCT BURNERS (HHV) OR THE HEAT INPUT RATE OF EACH OF THE GENERAL ELECTRIC COMBUSTION TURBINES WILL BE 2,312 MMBTU/HR(HHV) WITH TWO 164.4 MMBTU/HR DUCT BURNER (HHV).		2356 MMBTU/HR (EACH SIEMENS), 62.1 MMBTU/HR (EACH DB) OR 2312 MMBTU/HR (EACH GE), 164.4 MMBTU/HR (EACH DB)	BACT-PSD	925 LB/MW-HR
WOODBRIDGE ENERGY CENTER	MIDDLESEX, NJ	7/25/2012	TWO GE 7FA CC TURBINES (EACH WITH A MAXIMUM HEAT INPUT OF 2,307 MMBTU/HR)AND TWO DUCT BURNERS (EACH WITH A MAXIMUM HEAT INPUT OF 500 MMBTU/HR).	Good combustion practices	2307 MMBTU/HR (EACH CT); 500 MMBTU/HR (EACH DB)	BACT-PSD	925 LB/MW-HR
AUSTIN ENERGY, SAND HILL ENERGY CENTER	TRAVIS, TX	9/29/2014	(ONE) GE 7FA.04 COMBUSTION TURBINE WITH DB		7943 BTU/KW-HR (HHV, gross)	BACT-PSD	930 LB/MW-HR
MARSHALLTOWN GENERATING STATION	MARSHALL, IA	4/14/2014	TWO IDENTICAL SIEMENS SGT6-5000F COMBINED CYCLE		2258 mmBtu/hr (EACH)	BACT-PSD	951 LB/MW-HR
SUMPTER POWER PLANT	WAYNE, MI	11/17/2011	COMBINED CYCLE COMBUSTION TURBINE W/ HRSG		130 MW	BACT-PSD	954 LB/MW-HR
MIDLAND COGENERATION VENTURE	MIDLAND, MI	4/23/2013	TWO (2) COMBINED CYCLE COMBUSTION TURBINES	Good combustion practices and energy efficiency.	2237 MMBTU/HR (EACH CT); 2486 MMBTU/HR (EACH CT + DB)	BACT-PSD	995 LB/MW-HR (WOUT DB); 1071 LB/MW-HR (WITH DB)
BERKS HOLLOW ENERGY ASSOC LLC/ONTELAUNEE	BERKS, PA	12/17/2013	2-ON-1 COMBINED CYCLE COMBUSTION TURBINES WITH DB, 855 MW (NOMINAL)		3046 MMBTU/HR (EACH CT)	BACT-PSD	1000 LB/MW-HR
PIO PICO ENERGY CENTER	OTAY MESA, CA	11/19/2012	THREE (3) GE LMS 100 COMBUSTION TURBINES		300 MW (TOTAL FACILITY)	BACT-PSD	1328 LB/MW-HR
YORK GENERATION FACILITY	YORK COUNTY, PA	3/1/2012	TWO (2) COMBUSTION TURBINES		634 MMBTU/HR (EACH CT)	OTHER CASE-BY-CASE	1330 LB/MW-HR
TROUTDALE ENERGY CENTER, LLC	MULTNOMAH, OR	3/5/2014	MITSUBISHI M501-GAC COMBUSTION TURBINE, COMBINED CYCLE CONFIGURATION WITH 499 MMBTU/HR DUCT BURNER	Thermal efficiency Clean fuels	2988 MMBtu/hr (EACH MHI), 499 MMBTU/HR (EACH DB)	BACT-PSD	1000 PER GROSS MWH
HOUSTON CENTRAL GAS PLANT	COLORADO, TX	3/8/2013	TWO (2) COMBUSTION TURBINES		15000 HP (EACH CT)	BACT-PSD	65097 TONS/YR
GATEWAY COGENERATION 1, LLC - SMART WATER PROJECT	PRINCE GEORGE, VA	8/27/2012	TWO (2) COMBINED CYCLE COMBUSTION TURBINES (ROLLS ROYCE TRENT 60 WLE)	Controlled by the use of low carbon fuels and high efficiency design. The heat rate shall be no greater than 8,983 Btu/kW-h (HHV, gross).	593 MMBTU/HR (EACH)	BACT-PSD	1050 LB/MW-HR; 8983 BTU/KW-HR
HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	OTTAWA, MI	12/4/2013	2-ON-1 COMBINED CYCLE COMBUSTION TURBINES, WITH DB	Energy efficiency measures and the use of a low carbon fuel (pipeline quality natural gas).	647 MMBTU/HR (EACH CT)	BACT-PSD	8361 BTU/KW-HR; 992 LB/MW-HR (NET)
DEER PARK ENERGY CENTER LLC	HARRIS, TX	11/29/2012	SIEMENS 501F COMBUSTION TURBINE			BACT-PSD	920 LB/MW-HR
THETFORD GENERATING STATION	GENESEE, MI	7/25/2013	FOUR (4) CTG, TECHNOLOGY A IS 2587 MMBTU/H DESIGN HEAT INPUT EACH CTG, TECHNOLOGY B IS 2688 MMBTU/H DESIGN HEAT INPUT EACH CTG. TWO F CLASS TURBINE TECHNOLOGIES. EACH CTG WILL BE RATED AT 211 TO 230 MW (GROSS) OUTPUT AND THE STATION NOMINAL GENERATING CAPACITY WILL BE UP TO 1,400 MW.		2587 MMBTU/HR (EACH CT) OR 2688 MMBTU/HR (EACH CT)	BACT-PSD	1386286 TONS/YR

Appendix C
Table C-6
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Natural Gas Fired Combined Cycle Combustion Turbines > 25 MW
Greenhouse Gas Emissions

FACILITY	LOCATION	PERMIT DATE	EQUIPMENT DESCRIPTION	CONTROL DESCRIPTION	TURBINE SIZE	PERMIT LIMIT BASIS	EMISSION LIMIT
MOXIE LIBERTY LLC/ASYLUM POWER PLANT	BRADFORD COUNTY, PA	10/10/2012	2 COMBINED CYCLE UNITS - SIEMENS SGT6-8000H or MITSUBISHI 501G. THE HEAT INPUT RATING OF EACH COMBUSTION GAS TURBINE IS 2890 MMBTU/HR (HHV) OR LESS, AND THE HEAT INPUT RATING OF EACH SUPPLEMENTAL DUCT BURNER IS EQUAL TO 387 MMBTU/HR (HHV) OR LESS.	Good combustion practices.	2890 MMBTU/HR (EACH CT); 387 MMBTU/HR (EACH DB);	BACT-PSD	1480086 TONS/YR (468 MW); 1388540 TONS/YR (454 MW)
CHANNEL ENERGY ENERGY CENTER, LLC	HARRIS, TX	11/29/2012	SIEMENS 501F COMBUSTION TURBINE			BACT-PSD	920 LB/MW-HR
LUCERNE GAS PROCESSING PLANT	WELD, CO	1/13/2014	TWO (2) COMBUSTION TURBINES	Waste heat recovery, thermal efficiency, tune-ups & maintenance.	72.73 MMBTU/HR (EACH CT)	BACT-PSD	42268 TONS (EACH CT)
MARSHALLTOWN GENERATING STATION	MARSHALL, IA	4/14/2014	TWO IDENTICAL SIEMENS SGT6-5000F COMBINED CYCLE TURBINES WITHOUT DUCT FIRING, EACH AT 2258 MMBTU/HR GENERATING APPROX. 300 MW EACH.		2258 mmBtu/hr (EACH)	BACT-PSD	951 LB/MW-HR
GARRISON ENERGY CENTER	KENT COUNTY, DE	1/30/2013	2 GE COMBUSTION TURBINES	Fuel Usage Restriction to natural gas and low sulfur distillate fuel	309 MW; 2260 MMBTU/HR	BACT-PSD	1006304 TONS
WEST DEPTFORD ENERGY STATION	GLOUCESTER, NJ	7/18/2014	THREE (3) 427 MW SIEMENS COMBINED CYCLE TURBINES WITH DUCT BURNERS HEAT INPUT RATE OF EACH TURBINE = 2276 MMBTU/HR (HHV) HEAT INPUT RATE OF EACH DUCT BURNER= 777 MMBTU/HR (HHV)	Turbine efficiency and Use of Natural gas a clean burning fuel	2276 MMBTU/HR (EACH CT); 777 MMBTU/HR (EACH DB)	BACT-PSD	947 LB/MW-HR
HICKORY RUN ENERGY STATION	LAWRENCE, PA	4/23/2013	2 COMBINED CYCLE UNITS - GE 7FA, SIEMENS SGT6-5000F, MITSUBISHI 501G, SIEMENS SFT6-8000H		900 MW (NOMINAL FACILITY)	OTHER CASE-BY-CASE	3665974 TONS/YR
LENZING FIBERS, INC.	MOBILE, AL	1/22/2014	ONE (1) COMBUSTION TURBINE	Good combustion practices.	25 MW	BACT-PSD	137908 TONS/YR

Appendix C
Table C-7
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Oil Fired Combined Cycle Combustion Turbines > 25 MW
Nitrogen Oxide Emissions

FACILITY	LOCATION	PERMIT DATE	EQUIPMENT DESCRIPTION	CONTROL DESCRIPTION	TURBINE SIZE	PERMIT LIMIT BASIS	EMISSION LIMIT
SEWAREN GENERATING STATION	SEWAREN, NJ	Mar-16	ONE (1) GE 7HA.02 CCGT	SCR AND WATER INJECTION	3452 MMBTU/HR		4 PPM
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		ONE (1) GE 7HA.02 CCGT	SCR AND WATER INJECTION	3613 MMBTU/HR	LAER	4 PPM
TROUTDALE ENERGY CENTER, LLC	MULTNOMAH, OR	3/5/2014	MITSUBISHI M501-GAC COMBUSTION TURBINE, COMBINED CYCLE CONFIGURATION WITH 499 MMBTU/HR DB	SCR AND WATER INJECTION	2988 MMBtu/hr (EACH MHI), 499 MMBTU/HR (EACH DB)	BACT-PSD	5.5 PPM
KLEEN ENERGY SYSTEMS, LLC	MIDDLESEX, CT	2/25/2008	580 MW NOMINAL; TWO (2) SIEMENS SGT6-5000F COMBUSTION TURBINES	WATER INJECTION AND SCR	2117 MMBTU/HR	LAER	5.9 PPM; 40.48 LB/HR (WOUT DB); 50.5 LB/HR (WITH DB)
AECI - DELL	MISSISSIPPI, AR	3/31/2010	TWO (2) COMBINED CYCLE COMBUSTION TURBINES	SCR	2112 MMBTU/HR	BACT-PSD	6 PPM; 52.3 LB/HR;
CAITHNES BELLPORT ENERGY CENTER	SUFFOLK, NY	5/10/2006	COMBINED CYCLE COMBUSTION TURBINE	SCR	2125 MMBTU/HR	BACT-PSD	6 PPM
ATHENS GENERATING PLANT	GREENE, NY	1/19/2007	COMBINED CYCLE FACILITY RATED AT 1080 MW. THREE (3) WESTINGHOUSE 501G COMBUSTION TURBINES.	STEAM (OR WATER INJECTION)	2940 MMBTU/HR	LAER	9 PPM
EMPIRE POWER PLANT	RENSSELAER, NY	6/23/2005	NOMINAL 505 MW COMBINED CYCLE POWER PLANT. TWO (2) GE FRAME 7FA COMBUSTION TURBINES.	WATER INJECTION WITH SCR	2099 MMBTU/HR	LAER	9 PPM
FORSYTH ENERGY PLANT	FORSYTH, NC	9/29/2005	THREE (3) COMBINED-CYCLE COMBUSTION TURBINES WITH DB. THE ENTIRE PLANT WILL BE CAPABLE OF GENERATING A NOMINAL POWER OUTPUT OF 812 MW.	DRY LOW NOX COMBUSTORS AND USE OF WATER INJECTION.	2003.2 MMBTU/HR	BACT-PSD	10 PPM

Appendix C
Table C-8
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Oil Fired Combined Cycle Combustion Turbines > 25 MW
Carbon Monoxide Emissions

FACILITY	LOCATION	PERMIT DATE	EQUIPMENT DESCRIPTION	CONTROL DESCRIPTION	TURBINE SIZE	PERMIT LIMIT BASIS	EMISSION LIMIT
KLEEN ENERGY SYSTEMS, LLC	MIDDLESEX, CT	2/25/2008	580 MW NOMINAL; TWO (2) SIEMENS SGT6-5000F COMBUSTION TURBINES	CO CATALYST	2117 MMBTU/HR	BACT-PSD	1.8 PPM; 7.3 LB/HR (WOUT DB); 9.4 LB/HR (WITH DB);
CAITHNES BELLPORT ENERGY CENTER	SUFFOLK, NY	5/10/2006	COMBINED CYCLE COMBUSTION TURBINE	OXIDATION CATALYST	2125 MMBTU/HR	BACT-PSD	2 PPM
SEWAREN GENERATING STATION	SEWAREN, NJ	3/1/2016	ONE (1) GE 7HA.02 CCGT	OXIDATION CATALYST	3452 MMBTU/HR		2 PPM
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		ONE (1) GE 7HA.02 CCGT	OXIDATION CATALYST	3613 MMBTU/HR	BACT-PSD	2 PPM
PLANT MCDONOUGH COMBINED CYCLE	COBB, GA	1/7/2008	SIX (6) COMBINED CYCLE COMBUSTION TURBINES - MITSUBISHI 501G; EACH CT IS 254 MW.	OXIDATION CATALYST	254 MW	BACT-PSD	9 PPM
FORSYTH ENERGY PLANT	FORSYTH, NC	9/29/2005	THREE (3) COMBINED-CYCLE COMBUSTION TURBINES WITH DB. THE ENTIRE PLANT WILL BE CAPABLE OF GENERATING A NOMINAL POWER OUTPUT OF 812 MW.	EFFICIENT COMBUSTION PROCESS DESIGN	2003.2 MMBTU/HR	BACT-PSD	15.7 PPM (WOUT DB); 25.1 PPM (WITH DB)

Appendix C
Table C-9
CPV Keasbey, LLC
RACT/BACT/LAER Determinations for Oil Fired Combined Cycle Combustion Turbines > 25 MW
Volatile Organic Compound Emissions

FACILITY	LOCATION	PERMIT DATE	EQUIPMENT DESCRIPTION	CONTROL DESCRIPTION	TURBINE SIZE	PERMIT LIMIT BASIS	EMISSION LIMIT
EMPIRE POWER PLANT	RENSSELAER, NY	6/23/2005	NOMINAL 505 MW COMBINED CYCLE POWER PLANT. TWO (2) GE FRAME 7FA COMBUSTION TURBINES.	OXIDATION CATALYST	2099 MMBTU/HR	LAER	2 PPM
SEWAREN GENERATING STATION	SEWAREN, NJ	3/1/2016	ONE (1) GE 7HA.02 CCGT	OXIDATION CATALYST	3452 MMBTU/HR		2 PPM
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		ONE (1) GE 7HA.02 CCGT	OXIDATION CATALYST	3613 MMBTU/HR	LAER	2 PPM
KLEEN ENERGY SYSTEMS, LLC	MIDDLESEX, CT	2/25/2008	580 MW NOMINAL; TWO (2) SIEMENS SGT6-5000F COMBUSTION TURBINES	CO CATALYST	2117 MMBTU/HR	BACT-PSD	3.6 PPM; 9 LB/HR (WOUT DB); 11.3 LB/HR (WITH DB)
PLANT MCDONOUGH COMBINED CYCLE	COBB, GA	1/7/2008	SIX (6) COMBINED CYCLE COMBUSTION TURBINES MITSUBISHI 501G; EACH CT IS 254 MW.	OXIDATION CATALYST	254 MW	LAER	4 PPM
TROUTDALE ENERGY CENTER, LLC	MULTNOMAH, OR	3/5/2014	MITSUBISHI M501-GAC COMBUSTION TURBINE, COMBINED CYCLE CONFIGURATION WITH 499 MMBTU/HR DB	OXIDATION CATALYST	2988 MMBtu/hr (EACH MHI), 499 MMBTU/HR (EACH DB)	BACT-PSD	5 PPM
ATHENS GENERATING PLANT	GREENE, NY	1/19/2007	COMBINED CYCLE FACILITY RATED AT 1080 MW. THREE (3) WESTINGHOUSE 501G COMBUSTION TURBINES.	GOOD COMBUSTION CONTROL	2940 MMBTU/HR	LAER	13 PPM

Appendix C
Table C-10
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Oil Fired Combined Cycle Combustion Turbines > 25 MW
Particulate Matter Emissions

FACILITY	LOCATION	PERMIT DATE	EQUIPMENT DESCRIPTION	CONTROL DESCRIPTION	TURBINE SIZE	PERMIT LIMIT BASIS	EMISSION LIMIT
FORSYTH ENERGY PLANT	FORSYTH, NC	9/29/2005	THREE (3) COMBINED-CYCLE COMBUSTION TURBINES WITH DB. THE ENTIRE PLANT WILL BE CAPABLE OF GENERATING A NOMINAL POWER OUTPUT OF 812 MW.	USE OF ONLY CLEAN-BURNING, LOW-SULFUR FUELS AND GOOD COMBUSTION PRACTICES.	2003.2 MMBTU/HR	BACT-PSD	0.0358 LB/MMBTU
CAITHNESS BELLPORT ENERGY CENTER	SUFFOLK, NY	5/10/2006	COMBINED CYCLE COMBUSTION TURBINE	LOW SULFUR FUEL	2125 MMBTU/HR	BACT-PSD	0.051 LB/MMBTU
TROUTDALE ENERGY CENTER, LLC	MULTNOMAH, OR	3/5/2014	MITSUBISHI M501-GAC COMBUSTION TURBINE, COMBINED CYCLE CONFIGURATION WITH 499 MMBTU/HR DB	UTILIZE ONLY NATURAL GAS OR ULSD FUEL	2988 MMBtu/hr (EACH MHI), 499 MMBTU/HR (EACH DB)	BACT-PSD	42.3 LB/HR
SEWAREN GENERATING STATION	SEWAREN, NJ	3/1/2016	ONE (1) GE 7HA.02 CCGT		3452 MMBTU/HR		60.6 LB/HR
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		ONE (1) GE 7HA.02 CCGT		3613 MMBTU/HR	BACT-PSD	72 LB/HR
AECI - DELL	MISSISSIPPI, AR	3/31/2010	TWO (2) COMBINED CYCLE COMBUSTION TURBINES	GOOD COMBUSTION	2112 MMBTU/HR	BACT-PSD	0.009 LB/MMBTU; 48.9 LB/HR
KLEEN ENERGY SYSTEMS, LLC	MIDDLESEX, CT	2/25/2008	580 MW NOMINAL; TWO (2) SIEMENS SGT6-5000F COMBUSTION TURBINES		2117 MMBTU/HR	BACT-PSD	57 LB/HR (WITH AND WOUT DB)

Appendix C
Table C-11
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Oil Fired Combined Cycle Combustion Turbines > 25 MW
Sulfuric Acid Mist Emissions

FACILITY	LOCATION	PERMIT DATE	EQUIPMENT DESCRIPTION	CONTROL DESCRIPTION	TURBINE SIZE	PERMIT LIMIT BASIS	EMISSION LIMIT
FORSYTH ENERGY PLANT	FORSYTH, NC	9/29/2005	THREE (3) COMBINED-CYCLE COMBUSTION TURBINES WITH DB. THE ENTIRE PLANT WILL BE CAPABLE OF GENERATING A NOMINAL POWER OUTPUT OF 812 MW.	VERY LOW-SULFUR NO. 2 FUEL OIL	2003.2 MMBTU/HR	BACT-PSD	0.015% S BY WT
SEWAREN GENERATING STATION	SEWAREN, NJ	3/1/2016	ONE (1) GE 7HA.02 CCGT		3452 MMBTU/HR		4.3 LB/HR
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		ONE (1) GE 7HA.02 CCGT	LOW SULFUR FUEL	3613 MMBTU/HR	BACT-PSD	4.27 LB/HR
CAITHNES BELLPORT ENERGY CENTER	SUFFOLK, NY	5/10/2006	COMBINED CYCLE COMBUSTION TURBINE	LOW SULFUR FUEL	2125 MMBTU/HR	BACT-PSD	0.015 LB/MMBTU; 0.0128 LB/MMBTU

Appendix C
Table C-12
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Oil Fired Combined Cycle Combustion Turbines > 25 MW
Greenhouse Gas Emissions

FACILITY	LOCATION	PERMIT DATE	EQUIPMENT DESCRIPTION	CONTROL DESCRIPTION	TURBINE SIZE	PERMIT LIMIT BASIS	EMISSION LIMIT
TROUTDALE ENERGY CENTER, LLC	MULTNOMAH, OR	3/5/2014	MITSUBISHI M501-GAC COMBUSTION TURBINE, COMBINED CYCLE CONFIGURATION WITH 499 MMBTU/HR DB	THERMAL EFFICIENCY, CLEAN FUELS	2988 MMBtu/hr (EACH MHI), 499 MMBTU/HR (EACH DB)	BACT-PSD	1000 LBS/GROSS MWH
GATEWAY COGENERATION 1, LLC - SMART WATER PROJECT	PRINCE GEORGE, VA	8/27/2012	TWO (2) COMBINED CYCLE COMBUSTION TURBINES (ROLLS ROYCE TRENT 60 WLE)	LOW CARBON FUELS AND HIGH EFFICIENCY DESIGN. THE HEAT RATE SHALL BE NO GREATER THAN 8,983 BTU/KW-H (HHV, GROSS).	593 MMBTU/HR (EACH)	BACT-PSD	1050 LB/MWH

Appendix C
Table C-13
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Natural Gas Fired Boilers between 10 and 100 mmBtu/hr
NOx Emissions

FACILITY	LOCATION	PERMIT DATE	CONTROL DESCRIPTION	HEAT INPUT MMBTU/HR	EMISSION LIMIT LB/MMBTU	PERMIT LIMIT BASIS
SEWAREN GENERATING STATION	SEWAREN, NJ	3/1/2016		80	0.01	
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		LOW NOX BURNER	97.5	0.01	LAER
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	LOW NOX BURNER	24.0	0.011	BACT-PSD
MGM MIRAGE	CLARK, NV	11/30/2009	LOW NOX BURNER AND GOOD COMBUSTION PRACTICES	44.0	0.011	OTHER CASE-BY-CASE
GENENTECH, INC.	SAN MATEO, CA	9/27/2005	ULTRA LOW NOX BURNERS: NATCOM P-97-LOG-35-2127	97.0	0.011	BACT-PSD
COTTAGE HEALTH CARE - PUEBLO STREET	SANTA BARBARA, CA	5/16/2006	ULTRA-LOW NOX BURNER	25.0	0.011	BACT-PSD
VICTORVILLE 2 HYBRID POWER PROJECT	SAN BERNARDINO, CA	3/11/2010	OPERATIONAL RESTRICTION OF 500 HR/YR	35.0	0.011	BACT-PSD
AVENAL ENERGY PROJECT	KINGS, CA	6/21/2011	ULTRA LOW NOX BURNER, USE PUC QUALITY NATURAL GAS	37.4	0.011	BACT-PSD
MEDIMMUNE FREDERICK CAMPUS	FREDERICK, MD	1/28/2008	ULTRA LOW NOX BURNERS ON EACH OF THE FOUR IDENTICAL BOILERS	29.4	0.011	LAER
TENASKA BROWNSVILLE GENERATING STATION	CAMERON, TX	4/29/2014	ULTRA LOW-NOX BURNERS, LIMITED USE	90.0	0.011	BACT-PSD
CPV ST CHARLES	CHARLES, MD	11/12/2008	LOW NOX WITH FGR	93.0	0.011	BACT-PSD
MGM MIRAGE	CLARK, NV	11/30/2009	LOW NOX BURNER AND FLUE GAS RECIRCULATION	41.6	0.011	OTHER CASE-BY-CASE
CAITHNES BELLPORT ENERGY CENTER	SUFFOLK, NY	5/10/2006	LOW NOX BURNERS & FLUE GAS RECIRCULATION	29.4	0.011	BACT-PSD
HICKORY RUN ENERGY STATION	LAWRENCE, PA	4/23/2013		40.0	0.011	OTHER CASE-BY-CASE
MARSHALLTOWN GENERATING STATION	MARSHALL, IA	4/14/2014		60.1	0.013	BACT-PSD
FLOPAM INC.	IBERVILLE PARISH, LA	6/14/2010	ULTRA LOW NOX BURNERS	25.1	0.015	LAER
CHEYENNE PRAIRIE GENERATING STATION	LARAMIE, WY	7/16/2014	ULTRA LOW NOX BURNERS AND FLUE GAS RECIRCULATION	25.1	0.018	BACT-PSD
OREGON CLEAN ENERGY CENTER	LUCAS, OH	6/18/2013	LOW NOX BURNERS AND FLUE GAS RECIRCULATION	99.0	0.020	BACT-PSD
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	LOW-NOX BURNER AND BLUE GAS RECIRCULATION	16.8	0.030	BACT-PSD
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	LOW-NOX BURNER	31.4	0.031	BACT-PSD
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	LOW NOX BURNER WITH FLUE GAS RECIRCULATION	80.0	0.032	BACT-PSD
CONCORD STEAM CORPORATION	MERRIMACK, NH	2/27/2009	LOW NOX BURNERS, FLUE GAS RECIRCULATION	76.8	0.032	LAER
THYSSENKRUPP STEEL AND STAINLESS USA, LLC	MOBILE, AL	8/17/2007	ULNB & FGR	64.9	0.035	BACT-PSD
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	LOW NOX BURNER	35.4	0.035	BACT-PSD
TROUTDALE ENERGY CENTER, LLC	MULTNOMAH, OR	3/5/2014	UTILIZE LOW-NOX BURNERS AND FGR.	39.8	0.035	BACT-PSD
RAY COMPRESSOR STATION	MACOMB, MI	10/14/2010	LOW NOX BURNER.	12.3	0.035	BACT-PSD
TOLEDO SUPPLIER PARK- PAINT SHOP	LUCAS, OH	5/3/2007	LOW NOX BURNERS AND FLUE GAS RECIRCULATION	20.4	0.035	LAER
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	LOW NOX BURNER AND FLUE GAS RECIRCULATION	14.3	0.035	BACT-PSD
KLAUSNER HOLDING USA, INC	ORANGEBURG, SC	1/3/2013		46.0	0.036	OTHER CASE-BY-CASE
S R BERTRON ELECTRIC GENERATING STATION	HARRIS, TX	12/19/2014	LOW-NOX BURNERS	80.0	0.036	BACT-PSD
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	LOW NOX BURNER	21.0	0.037	BACT-PSD
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	LOW NOX BURNER	33.5	0.037	BACT-PSD
KIA MOTORS MANUFACTURING GEORGIA	TROUP, GA	7/27/2007	LOW NOX BURNERS ON BOILER BURNERS	NO DATA	0.037	BACT-PSD
VOLKSWAGEN GROUP OF AMERICA, CHATTANOOGA OPERATIONS	HAMILTON, TN	10/10/2008	LOW-NOX BURNERS, FLUE GAS RECIRCULATION	24.0	0.037	BACT-PSD
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	LOW NOX BURNER	16.7	0.049	BACT-PSD
TITAN TIRE CORPORATION OF BRYAN	WILLIAMS, OH	6/5/2008		50.4	0.049	BACT-PSD
CARTY PLANT	MORROW, OR	12/29/2010	LOW NOX BURNERS	91.0	0.049	BACT-PSD
FPL WEST COUNTY ENERGY CENTER	PALM BEACH, FL	1/10/2007		99.8	0.050	BACT-PSD
HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	OTTAWA, MI	12/4/2013	DRY LOW NOX BURNERS, FGR	95.0	0.050	BACT-PSD
HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	OTTAWA, MI	12/4/2013	LOW NOX BURNERS AND GOOD COMBUSTION PRACTICES	55.0	0.050	BACT-PSD
HESS NEWARK ENERGY CENTER	ESSEX, NJ	11/1/2012	LOW NOX BURNERS AND FLUE GAS RECIRCULATION	66.2	0.050	LAER
PRYOR PLANT CHEMICAL	MAYES, OK	2/23/2009	LOW-NOX BURNERS AND GOOD COMBUSTION PRACTICES	80.0	0.050	BACT-PSD
CHOUTEAU POWER PLANT	MAYES, OK	1/23/2009	LOW-NOX BURNERS	33.5	0.070	BACT-PSD

Appendix C
Table C-14
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Natural Gas Fired Boilers between 10 and 100 mmBtu/hr
CO Emissions

FACILITY	LOCATION	PERMIT DATE	CONTROL DESCRIPTION	HEAT INPUT MMBTU/HR	EMISSION LIMIT LB/MMBTU	PERMIT LIMIT BASIS
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	OPERATING IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATION	35.4	0.007	OTHER CASE-BY-CASE
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	OPERATING IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATION	16.7	0.007	OTHER CASE-BY-CASE
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	OPERATING IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATION	33.5	0.008	OTHER CASE-BY-CASE
MGM MIRAGE	CLARK, NV	11/30/2009	GOOD COMBUSTION PRACTICES	44.0	0.015	LAER
MARSHALLTOWN GENERATING STATION	MARSHALL, IA	4/14/2014	CO CATALYTIC OXIDIZER	60.1	0.016	BACT-PSD
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	OPERATING IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATION.	31.4	0.017	OTHER CASE-BY-CASE
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	FLUE GAS RECIRCULATION	16.8	0.017	OTHER CASE-BY-CASE
MGM MIRAGE	CLARK, NV	11/30/2009	GOOD COMBUSTION PROACTICES AND LIMITING THE FUEL TO NATURAL GAS ONLY	41.6	0.018	LAER
CPV ST CHARLES	CHARLES, MD	11/12/2008		93.0	0.020	BACT-PSD
CAITHNES BELLPORT ENERGY CENTER	SUFFOLK, NY	5/10/2006	GOOD COMBUSTION PRACTICES	29.4	0.036	BACT-PSD
HICKORY RUN ENERGY STATION	LAWRENCE, PA	4/23/2013		40.0	0.036	OTHER CASE-BY-CASE
SEWAREN GENERATING STATION	SEWAREN, NJ	3/1/2016		80.0	0.036	
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		ANNUAL OPERATING HOUR RESTRICTION	97.5	0.037	BACT-PSD
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	OPERATING IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATION	24.0	0.037	OTHER CASE-BY-CASE
S R BERTRON ELECTRIC GENERATING STATION	HARRIS, TX	12/19/2014	LOW-NOX BURNERS	80.0	0.037	BACT-PSD
GENENTECH, INC.	SAN MATEO, CA	9/27/2005	ULTRA LOW NOX BURNERS: NATCOM P-97-LOG-35-2127	97.0	0.037	BACT-PSD
COTTAGE HEALTH CARE - PUEBLO STREET	SANTA BARBARA, CA	5/16/2006	ULTRA-LOW NOX BURNER	25.0	0.037	BACT-PSD
VICTORVILLE 2 HYBRID POWER PROJECT	SAN BERNARDINO, CA	3/11/2010	OPERATIONAL RESTRICTION OF 500 HR/YR	35.0	0.037	BACT-PSD
AVENAL ENERGY PROJECT	KINGS, CA	6/21/2011	ULTRA LOW NOX BURNER, USE PUC QUALITY NATURAL GAS	37.4	0.037	BACT-PSD
HESS NEWARK ENERGY CENTER	ESSEX, NJ	11/1/2012	USE OF NATURAL GAS A CLEAN FUEL	66.2	0.037	BACT-PSD
FLOPAM INC.	IBERVILLE PARISH, LA	6/14/2010	GOOD EQUIPMENT DESIGN AND PROPER COMBUSTION PRACTICES	25.1	0.037	BACT-PSD
CHEYENNE PRAIRIE GENERATING STATION	LARAMIE, WY	7/16/2014	GOOD COMBUSTION	25.1	0.038	BACT-PSD
KLAUSNER HOLDING USA, INC	ORANGEBURG, SC	1/3/2013		46.0	0.039	OTHER CASE-BY-CASE
THYSSENKRUPP STEEL AND STAINLESS USA, LLC	MOBILE, AL	8/17/2007		64.9	0.040	BACT-PSD
TROUTDALE ENERGY CENTER, LLC	MULTNOMAH, OR	3/5/2014	UTILIZE LOW-NOX BURNERS AND FGR.	39.8	0.040	BACT-PSD
OREGON CLEAN ENERGY CENTER	LUCAS, OH	6/18/2013	GOOD COMBUSTION PRACTICES	99.0	0.055	BACT-PSD
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	FLUE GAS RECIRCULATION	14.3	0.071	OTHER CASE-BY-CASE
HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	OTTAWA, MI	12/4/2013	GOOD COMBUSTION PRACTICES.	95.0	0.077	BACT-PSD
HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	OTTAWA, MI	12/4/2013	GOOD COMBUSTION PRACTICES	55.0	0.077	BACT-PSD
FPL WEST COUNTY ENERGY CENTER	PALM BEACH, FL	1/10/2007		99.8	0.080	BACT-PSD
TITAN TIRE CORPORATION OF BRYAN	WILLIAMS, OH	6/5/2008		50.4	0.082	BACT-PSD
PRYOR PLANT CHEMICAL	MAYES, OK	2/23/2009	GOOD COMBUSTION PRACTICES	80.0	0.083	BACT-PSD
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	GOOD COMBUTSTION PRACTICES	80.0	0.083	BACT-PSD
TOLEDO SUPPLIER PARK- PAINT SHOP	LUCAS, OH	5/3/2007		20.4	0.083	BACT-PSD
CHOUTEAU POWER PLANT	MAYES, OK	1/23/2009	GOOD COMBUSTION	33.5	0.150	N/A
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	OPERATING IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATION	21.0	0.848	OTHER CASE-BY-CASE

Appendix C
Table C-15
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Natural Gas Fired Boilers between 10 and 100 mmBtu/hr
VOC Emissions

FACILITY	LOCATION	PERMIT DATE	CONTROL DESCRIPTION	HEAT INPUT MMBTU/HR	EMISSION LIMIT LB/MMBTU	PERMIT LIMIT BASIS
HICKORY RUN ENERGY STATION	LAWRENCE, PA	4/23/2013		40.0	0.002	OTHER CASE-BY-CASE
CHEYENNE PRAIRIE GENERATING STATION	LARAMIE, WY	7/16/2014	GOOD COMBUSTION PRACTICES	25.1	0.002	BACT-PSD
CPV ST CHARLES	CHARLES, MD	11/12/2008		93.0	0.002	LAER
MGM MIRAGE	CLARK, NV	11/30/2009	LIMITING THE FUEL TO NATURAL GAS ONLY AND GOOD COMBUSTION PRACTICES	41.6	0.002	OTHER CASE-BY-CASE
FLOPAM INC.	IBERVILLE PARISH, LA	6/14/2010	GOOD EQUIPMENT DESIGN AND PROPER COMBUSTION TECHNIQUES	25.1	0.003	LAER
KLAUSNER HOLDING USA, INC	ORANGEBURG, SC	1/3/2013		46.0	0.003	OTHER CASE-BY-CASE
HESS NEWARK ENERGY CENTER	ESSEX, NJ	11/1/2012	USE OF NATURAL GAS A CLEAN FUEL	66.4	0.004	LAER
RAY COMPRESSOR STATION	MACOMB, MI	10/14/2010		12.3	0.004	BACT-PSD
SEWAREN GENERATING STATION	SEWAREN, NJ	3/1/2016		80.0	0.004	
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		GOOD COMBUSTION PRACTICES; ANNUAL OPERATING HOUR RESTRICTION	97.5	0.005	LAER
MARSHALLTOWN GENERATING STATION	MARSHALL, IA	4/14/2014		60.1	0.005	BACT-PSD
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	GOOD COMBUSTION PRACTICES	80.0	0.005	BACT-PSD
TROUTDALE ENERGY CENTER, LLC	MULTNOMAH, OR	3/5/2014	UTILIZE LOW-NOX BURNERS AND FGR.	39.8	0.005	BACT-PSD
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	OPERATING IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATION	16.7	0.005	OTHER CASE-BY-CASE
US8 FACILITY	ANDERSON, SC	12/13/2012		33.6	0.005	BACT-PSD
TITAN TIRE CORPORATION OF BRYAN	WILLIAMS, OH	6/5/2008		50.4	0.005	BACT-PSD
TOLEDO SUPPLIER PARK- PAINT SHOP	LUCAS, OH	5/3/2007		20.4	0.005	LAER
LENZING FIBERS, INC.	MOBILE, AL	1/22/2014	GOOD COMBUSTION PRACTICES.	100.0	0.005	BACT-PSD
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	FLUE GAS RECIRCULATION	14.3	0.005	OTHER CASE-BY-CASE
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	FLUE GAS RECIRCULATION	16.8	0.005	OTHER CASE-BY-CASE
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	OPERATING IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATION	31.4	0.005	OTHER CASE-BY-CASE
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	FLUE GAS RECIRCULATION	35.4	0.005	OTHER CASE-BY-CASE
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	OPERATING IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATION	33.5	0.005	OTHER CASE-BY-CASE
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	OPERATING IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATION	24.0	0.005	OTHER CASE-BY-CASE
THYSSENKRUPP STEEL AND STAINLESS USA, LLC	MOBILE, AL	8/17/2007		64.9	0.006	BACT-PSD
MGM MIRAGE	CLARK, NV	11/30/2009	LIMITING THE FUEL TO NATURAL GAS ONLY AND GOOD COMBUSTION PRACTICES	44.0	0.006	OTHER CASE-BY-CASE
OREGON CLEAN ENERGY CENTER	LUCAS, OH	6/18/2013	GOOD COMBUSTION PRACTICES AND USING COMBUSTION OPTIMIZATION TECHNOLOGIES	99.0	0.006	BACT-PSD
PRYOR PLANT CHEMICAL	MAYES, OK	2/23/2009		80.0	0.006	BACT-PSD
HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	OTTAWA, MI	12/4/2013	GOOD COMBUSTION PRACTICES	95.0	0.008	BACT-PSD
HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	OTTAWA, MI	12/4/2013	GOOD COMBUSTION CONTROL	55.0	0.008	BACT-PSD
CHOUTEAU POWER PLANT	MAYES, OK	1/23/2009	GOOD COMBUSTION	33.5	0.016	BACT-PSD

Appendix C
Table C-16
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Natural Gas Fired Boilers between 10 and 100 mmBtu/hr
PM Emissions

FACILITY	LOCATION	PERMIT DATE	CONTROL DESCRIPTION	BOILER SIZE MMBTU/HR	EMISSION LIMIT	EMISSION LIMIT UNITS	PERMIT LIMIT BASIS
AVENAL ENERGY PROJECT	KINGS, CA	6/21/2011	USE PUC QUALITY NATURAL GAS	37.4	0.0034	GR/DSCF	BACT-PSD
TROUTDALE ENERGY CENTER, LLC	MULTNOMAH, OR	3/5/2014	GOOD COMBUSTION PRACTICES;	39.8	0.1	GR/DSCF	BACT-PSD
VICTORVILLE 2 HYBRID POWER PROJECT	SAN BERNARDINO, CA	3/11/2010	OPERATIONAL RESTRICTION OF 500 HR/YR	35.0	0.2	GRAINS PER 100 DSCF	BACT-PSD
FPL WEST COUNTY ENERGY CENTER	PALM BEACH, FL	1/10/2007		99.8	2.0	GR/100 SCF GAS	BACT-PSD
TITAN TIRE CORPORATION OF BRYAN	WILLIAMS, OH	6/5/2008		50.4	0.0019	LB/MMBTU	N/A
TOLEDO SUPPLIER PARK- PAINT SHOP	LUCAS, OH	5/3/2007		20.4	0.0020	LB/MMBTU	BACT-PSD
CAITHNES BELLPORT ENERGY CENTER	SUFFOLK, NY	5/10/2006	LOW SULFUR FUEL	29.4	0.0033	LB/MMBTU	BACT-PSD
FLOPAM INC.	IBERVILLE PARISH, LA	6/14/2010	GOOD EQUIPMENT DESIGN AND PROPER COMBUSTION PRACTICES	25.1	0.0040	LB/MMBTU	BACT-PSD
HESS NEWARK ENERGY CENTER	ESSEX, NJ	11/1/2012	USE OF NATURAL GAS A CLEAN FUEL	66.4	0.0050	LB/MMBTU	BACT-PSD
CPV ST CHARLES	CHARLES, MD	11/12/2008		93.0	0.0050	LB/MMBTU	BACT-PSD
SEWAREN GENERATING STATION	SEWAREN, NJ	3/1/2016		80.0	0.0050	LB/MMBTU	
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		GOOD COMBUSTION PRACTICES; LOW SULFUR FUEL	97.5	0.0050	LB/MMBTU	BACT-PSD
KLAUSNER HOLDING USA, INC	ORANGEBURG, SC	1/3/2013		46.0	0.0050	LB/MMBTU	OTHER CASE-BY-CASE
PRYOR PLANT CHEMICAL	MAYES, OK	2/23/2009		80.0	0.0063	LB/MMBTU	BACT-PSD
HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	OTTAWA, MI	12/4/2013	GOOD COMBUSTION PRACTICES	95.0	0.0070	LB/MMBTU	BACT-PSD
HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	OTTAWA, MI	12/4/2013	GOOD COMBUSTION PRACTICES	55.0	0.0070	LB/MMBTU	BACT-PSD
TOLEDO SUPPLIER PARK- PAINT SHOP	LUCAS, OH	5/3/2007		20.4	0.0074	LB/MMBTU	BACT-PSD
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	GOOD COMBUSTION PRACTICES AND FUEL SPECIFICATIONS	80.0	0.0075	LB/MMBTU	BACT-PSD
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	GOOD COMBUSTION PRACTICES	14.3	0.0075	LB/MMBTU	OTHER CASE-BY-CASE
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	OPERATING IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATION	33.5	0.0075	LB/MMBTU	OTHER CASE-BY-CASE
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	OPERATING IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATION	24.0	0.0075	LB/MMBTU	OTHER CASE-BY-CASE
MGM MIRAGE	CLARK, NV	11/30/2009	LIMITING THE FUEL TO NATURAL GAS ONLY AND GOOD COMBUSTION PRACTICES	44.0	0.0075	LB/MMBTU	LAER
THYSSENKRUPP STEEL AND STAINLESS USA, LLC	MOBILE, AL	8/17/2007		64.9	0.0076	LB/MMBTU	BACT-PSD
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	OPERATING IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATION	31.4	0.0076	LB/MMBTU	OTHER CASE-BY-CASE
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	OPERATING IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATION	35.4	0.0076	LB/MMBTU	OTHER CASE-BY-CASE
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	OPERATING IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATION	21.0	0.0076	LB/MMBTU	BACT-PSD
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	OPERATING IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATION	16.8	0.0077	LB/MMBTU	OTHER CASE-BY-CASE
MGM MIRAGE	CLARK, NV	11/30/2009	LIMITING THE FUEL TO NATURAL GAS ONLY AND GOOD COMBUSTION PRACTICES	41.6	0.0077	LB/MMBTU	OTHER CASE-BY-CASE
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	OPERATING IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATION	16.7	0.0078	LB/MMBTU	OTHER CASE-BY-CASE
OREGON CLEAN ENERGY CENTER	LUCAS, OH	6/18/2013	CLEAN BURNING FUEL, ONLY BURNING NATURAL GAS	99.0	0.0080	LB/MMBTU	BACT-PSD
TITAN TIRE CORPORATION OF BRYAN	WILLIAMS, OH	6/5/2008		50.4	0.0200	LB/MMBTU	N/A
CARTY PLANT	MORROW, OR	12/29/2010	CLEAN FUEL	91.0	2.5000	LB/MMCF	BACT-PSD

Appendix C
Table C-17
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Natural Gas Fired Boilers between 10 and 100 mmBtu/hr
H2SO4 Emissions

FACILITY	LOCATION	PERMIT DATE	CONTROL DESCRIPTION	HEAT INPUT MMBTU/HR	EMISSION LIMIT LB/MMBTU	PERMIT LIMIT BASIS
MARSHALLTOWN GENERATING STATION	MARSHALL, IA	4/14/2014		60.1	0.00009	BACT-PSD
CPV ST CHARLES	CHARLES, MD	11/12/2008		93.0	0.00010	BACT-PSD
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		LOW SULFUR FUELS	97.5	0.00010	BACT-PSD
OREGON CLEAN ENERGY CENTER	LUCAS, OH	6/18/2013	ONLY BURNING NATURAL GAS 0.5 GR/100 SCF	99.0	0.00011	BACT-PSD
SEWAREN GENERATING STATION	SEWAREN, NJ	3/1/2016		80.0	0.00025	
HICKORY RUN ENERGY STATION	LAWRENCE, PA	4/23/2013		40.0	0.00050	OTHER CASE-BY-CASE

Appendix C
Table C-18
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Natural Gas Fired Boilers between 10 and 100 mmBtu/hr
CO2 Emissions

FACILITY	LOCATION	PERMIT DATE	CONTROL DESCRIPTION	BOILER SIZE MMBTU/HR	EMISSION LIMIT	EMISSION LIMIT UNITS	PERMIT LIMIT BASIS
TROUTDALE ENERGY CENTER, LLC	MULTNOMAH, OR	3/5/2014	CLEAN FUELS	39.8	117	LB CO2/MMBTU	BACT-PSD
OREGON CLEAN ENERGY CENTER	LUCAS, OH	6/18/2013		99.0	11,671	TON/YR	BACT-PSD
BERKS HOLLOW ENERGY ASSOC LLC/ONTELAUNEE	BERKS, PA	12/17/2013		40.0	12,346	TON/YR	OTHER CASE-BY-CASE
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ			97.5	22,834	TON/YR	BACT-PSD
HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	OTTAWA, MI	12/4/2013	GOOD COMBUSTION PRACTICES	55.0	28,514	TON/YR	BACT-PSD
SEWAREN GENERATING STATION	SEWAREN, NJ	3/1/2016		80.0	41,031	TON/YR	
HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	OTTAWA, MI	12/4/2013	GOOD COMBUSTION PRACTICES	95.0	49,251	TON/YR	BACT-PSD
MARSHALLTOWN GENERATING STATION	MARSHALL, IA	4/14/2014		60.1	17,313	TON/YR	BACT-PSD
CHEYENNE PRAIRIE GENERATING STATION	LARAMIE, WY	7/16/2014	GOOD COMBUSTION PRACTICES AND ENERGY EFFICIENCY	25.1	12,855	TON/YR	BACT-PSD
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	OPERATION AND MAINTENANCE PRACTICES	80.0	81,996	TON/YR	BACT-PSD
HICKORY RUN ENERGY STATION	LAWRENCE, PA	4/23/2013		40.0	13,696	TON/YR	OTHER CASE-BY-CASE
LENZING FIBERS, INC.	MOBILE, AL	1/22/2014	GOOD COMBUSTION PRACTICES	100.0	112,508	TON/YR	BACT-PSD

Appendix C
Table C-19
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Emergency Diesel Generator Engines
NOx Emissions

FACILITY	LOCATION	PERMIT DATE	CONTROL DESCRIPTION	ENGINE SIZE MMBTU/HR	EMISSION LIMIT LB/MMBTU	PERMIT LIMIT BASIS
PEONY CHEMICAL MANUFACTURING FACILITY	BRAZORIA, TX	4/1/2015	MINIMIZED HOURS OF OPERATIONS TIER II ENGINE	10.50	0.01	LAER
CRONUS CHEMICALS, LLC	DOUGLAS, IL	9/5/2014	TIER IV STANDARDS FOR NON-ROAD ENGINES AT 40 CFR 1039.102, TABLE 7.	26.29	0.16	BACT-PSD
ML 35 LLC/PHILA CYBERCENTER	BUCKS, PA	6/1/2012	SCR	21.11	0.16	OTHER CASE-BY-CASE
MEDIMMUNE FREDERICK CAMPUS	FREDERICK, MD	1/28/2008	SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM FOR EACH GENERATOR	23.45	0.19	LAER
DUTCH HARBOR POWER PLANT	ALEUTIANS WEST CENSUS AREA, AK	1/31/2007	REDUCE NOX BY 90%	46.90	0.32	BACT-PSD
ADM CORN PROCESSING - CEDAR RAPIDS	LINN, IA	6/29/2007	ENGINE IS REQUIRED TO MEET LIMITS ESTABLISHED AS BACT (TIER 3 NONROAD)	3.78	0.88	BACT-PSD
ENERGY ANSWERS ARECIBO PUERTO RICO RENEWABLE ENERGY PROJECT	ARECIBO, PR	4/10/2014		4.69	0.90	BACT-PSD
TATE & LYLE INDGREDIENTS AMERICAS, INC.	WEBSTER, IA	9/19/2008		4.03	0.92	BACT-PSD
ARIZONA CLEAN FUELS YUMA	YUMA, AZ	4/14/2005		5.46	0.94	BACT-PSD
PYRAMAX CERAMICS, LLC	ALLENDALE, SC	2/8/2012	ENGINES MUST BE CERTIFIED TO COMPLY WITH NSPS, SUBPART IIII.	5.30	0.94	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		4.27	0.94	BACT-PSD
HIGHLANDS BIOREFINERY AND COGENERATION PLANT	HIGHLAND COUNTY, FL	9/23/2011	SEE POLLUTANT NOTES.	4.20	0.94	BACT-PSD
MAG PELLET LLC	WHITE, IN	4/24/2014		2.10	0.94	BACT-PSD
PACIFIC BELL	SAN DIEGO, CA	12/5/2011	TIER 2 CERTIFIED AND 50 HR/YR FOR M&T LIMIT	25.44	1.10	OTHER CASE-BY-CASE
GP ALLENDALE LP	ALLENDALE, SC	11/25/2008		9.80	1.16	BACT-PSD
GP CLARENDON LP	CLARENDON, SC	2/10/2009	TUNE-UPS AND INSPECTIONS WILL BE PERFORMED AS OUTLINED IN THE GOOD MANAGEMENT PRACTICE PLAN.	9.80	1.16	BACT-PSD
SAN DIEGO INTERNATIONAL AIRPORT	SAN DIEGO, CA	10/3/2011	TIER 2 CERTIFIED AND 50 HR/Y M&T LIMIT	13.17	1.23	OTHER CASE-BY-CASE
CITY OF SAN DIEGO PUD (PUMP STATION 1)	SAN DIEGO, CA	7/9/2012	TIER 2 CERTIFIED ENGINE AND 50 HR/YR FOR M&T	19.05	1.26	OTHER CASE-BY-CASE
HICKORY RUN ENERGY STATION	LAWRENCE, PA	4/23/2013		7.80	1.27	OTHER CASE-BY-CASE
PROJECT JUMBO	NUECES, TX	12/1/2014	EACH EMERGENCY GENERATOR'S EMISSION FACTOR IS BASED ON EPA'S TIER 2 STANDARDS	37.52	1.28	BACT-PSD
OHIO RIVER CLEAN FUELS, LLC	COLUMBIANA, OH	11/20/2008	GOOD COMBUSTION PRACTICES, GOOD ENGINE DESIGN, IGNITION TIMING RETARD, TURBOCHARGER	20.45	1.29	BACT-PSD
OREGON CLEAN ENERGY CENTER	LUCAS, OH	6/18/2013	PURCHASED CERTIFIED TO THE STANDARDS IN NSPS SUBPART IIII	21.11	1.32	BACT-PSD
MIDWEST FERTILIZER CORPORATION	POSEY, IN	6/4/2014	GOOD COMBUSTION PRACTICES	25.20	1.40	BACT-PSD
OHIO VALLEY RESOURCES, LLC	SPENCER, IN	9/25/2013	GOOD COMBUSTION PRACTICES	32.83	1.40	BACT-PSD
MIDWEST FERTILIZER CORPORATION	POSEY, IN	6/4/2014	GOOD COMBUSTION PRACTICES	25.20	1.40	BACT-PSD
WARREN TECHNICAL CENTER	MACOMB, MI	2/29/2012	NO ADD-ON CONTROLS, BUT IGNITION TIMING RETARDATION (ITR) IS GOOD DESIGN.	28.23	1.41	BACT-PSD
VICTORVILLE 2 HYBRID POWER PROJECT	SAN BERNARDINO, CA	3/11/2010	OPERATIONAL RESTRICTION OF 50 HR/YR	18.76	1.41	BACT-PSD
IOWA FERTILIZER COMPANY	LEE, IA	10/26/2012	GOOD COMBUSTION PRACTICES	19.88	1.41	BACT-PSD
ADM CORN PROCESSING - CEDAR RAPIDS	LINN, IA	6/29/2007	ENGINE IS REQUIRED TO MEET LIMITS ESTABLISHED AS BACT (TIER 2 NONROAD)	14.07	1.42	BACT-PSD
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		GOOD COMBUSTION PRACTICES; ANNUAL OPERATING HOUR RESTRICTION	14.40	1.43	LAER
TATE & LYLE INDGREDIENTS AMERICAS, INC.	WEBSTER, IA	9/19/2008		6.57	1.46	BACT-PSD
ENDICOTT PRODUCTION FACILITY, LIBERTY DEVELOPMENT PROJECT	PRUDHOE BAY, AK	6/15/2009	GOOD COMBUSTION PRACTICES	7.29	1.48	BACT-PSD
LAKE CHARLES GASIFICATION FACILITY	CALCASIEU, LA	6/22/2009	COMPLY WITH 40 CFR 60 SUBPART IIII	4.03	1.50	BACT-PSD
CHOUTEAU POWER PLANT	MAYES, OK	1/23/2009		15.40	1.50	BACT-PSD
INTERNATIONAL STATION POWER PLANT	MUNCIPALITY OF ANCHORAGE, AK	12/20/2010	TURBOCHARGER AND AFTERCOOLER	14.07	1.50	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	NORTH SLOPE, AK	8/20/2012		16.42	1.50	BACT-PSD
ARIZONA CLEAN FUELS YUMA	YUMA, AZ	4/14/2005		10.90	1.50	BACT-PSD
PALMDALE HYBRID POWER PROJECT	LOS ANGELES, CA	10/18/2011		18.78	1.50	BACT-PSD
SWEET SORGHUM-TO-ETHANOL ADVANCED BIOREFINERY	HENDRY COUNTY, FL	12/23/2010		18.76	1.50	BACT-PSD
HIGHLANDS BIOREFINERY AND COGENERATION PLANT	HIGHLAND COUNTY, FL	9/23/2011	SEE POLLUTANT NOTES.	18.76	1.50	BACT-PSD
LANGLEY GULCH POWER PLANT	PAYETTE, ID	6/25/2010	TIER 2 ENGINE-BASED,GOOD COMBUSTION PRACTICES (GCP)	7.04	1.50	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		18.87	1.51	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		6.24	1.51	BACT-PSD
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	COMBUSTION DESIGN CONTROLS AND USAGE LIMITS	7.04	1.51	BACT-PSD
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	COMBUSTION DESIGN CONTROLS AND USAGE LIMITS	14.08	1.51	BACT-PSD
MOUNDSVILLE COMBINED CYCLE POWER PLANT	MARSHALL, WV	11/21/2014		14.11	1.51	BACT-PSD
JOHN DEERE PRODUCT ENGINEERING CENTER	BLACK HAWK, IA	3/23/2005	GOOD COMBUSTION PRACTICES.	3.43	1.52	BACT-PSD
SUMPTER POWER PLANT	WAYNE, MI	11/17/2011	GOOD COMBUSTION PRACTICES	5.12	1.53	BACT-PSD
FLOPAM INC. FACILITY	IBERVILLE, LA	4/26/2011		4.14	1.53	LAER
MOXIE LIBERTY LLC/ASYLUM POWER PL T	BRADFORD COUNTY, PA	10/10/2012		NO DATA	1.55	OTHER CASE-BY-CASE
GP ALLENDALE LP	ALLENDALE, SC	11/25/2008	TUNE-UPS AND INSPECTIONS WILL BE PERFORMED AS OUTLINED IN THE GOOD MANAGEMENT PRACTICE PLAN.	3.68	1.61	BACT-PSD
GP CLARENDON LP	CLARENDON, SC	2/10/2009	TUNE-UPS AND INSPECTIONS WILL BE PERFORMED AS OUTLINED IN THE GOOD MANAGEMENT PRACTICE PLAN.	3.68	1.61	BACT-PSD
WARREN TECHNICAL CENTER	MACOMB, MI	2/29/2012	NO ADD-ON CONTROLS, BUT IGNITION TIMING RETARDATION (ITR) IS GOOD DESIGN.	21.39	1.63	BACT-PSD
WARREN TECHNICAL CENTER	MACOMB, MI	7/13/2012	NO ADD-ON CONTROL, BUT IGNITION TIMING RETARDATION (ITR) IS GOOD DESIGN.	23.45	1.68	BACT-PSD
GENERAL ELECTRIC AVIATION, EVENDALE PLANT	HAMILTON, OH	5/7/2013		NO DATA	1.70	LAER
LAKE CHARLES GASIFICATION FACILITY	CALCASIEU, LA	6/22/2009	COMPLY WITH 40 CFR 60 SUBPART IIII	9.39	1.82	BACT-PSD
CREOLE TRAIL LNG IMPORT TERMINAL	CAMERON, LA	8/15/2007	GOOD COMBUSTION PRACTICES AND GOOD ENGINE DESIGN INCORPORATING FUEL INJECTION TIMING RETARDATION	3.68	1.83	BACT-PSD
MID AMERICAN STEEL ROLLING MILL	MARSHALL, OK	9/8/2008	500 HOURS PER YEAR OPERATIONS	8.40	1.86	BACT-PSD
MGM MIRAGE	CLARK, NV	11/30/2009	TURBOCHARGING, AFTER-COOLING, AND LEAN-BURN TECHNOLOGY	15.44	1.87	Other Case-by-Case
MEDIMMUNE FREDERICK CAMPUS	FREDERICK, MD	1/28/2008		23.45	1.91	LAER
CONCORD STEAM CORPORATION	MERRIMACK, NH	2/27/2009	LESS THAN 500 HOURS OF OPERATION PER CONSECUTIVE 12 MONTH PERIOD	5.60	1.98	LAER
CONCORD STEAM CORPORATION	MERRIMACK, NH	2/27/2009	OPERATES LESS THAN 500 HOURS PER CONSECUTIVE 12 MONTH PERIOD.	11.60	1.98	LAER
MERCK & CO. WESTPOINT	MONTGOMERY, PA	2/23/2007		NO DATA	2.14	OTHER CASE-BY-CASE
NUCOR STEEL TUSCALOOSA, INC.	TUSCALOOSA, AL	7/22/2014		5.60	2.14	BACT-PSD
SHADY HILLS GENERATING STATION	PASCO, FL	1/12/2009	PURCHASE MODEL IS AT LEAST AS STRINGENT AS THE BACT VALUES, UNDER EPA CERTIFICATION.	23.45	2.17	BACT-PSD
JOHNSON MATTHEY INC/CATALYTIC SYSTEMS DIV	CHESTER, PA	6/1/2012		6.41	2.17	OTHER CASE-BY-CASE
CREOLE TRAIL LNG IMPORT TERMINAL	CAMERON, LA	8/15/2007	GOOD COMBUSTION PRACTICES AND GOOD ENGINE DESIGN INCORPORATING FUEL INJECTION TIMING RETARDATION (ITR)	4.62	2.18	BACT-PSD
SEWAREN GENERATING STATION	SEWAREN, NJ	3/1/2016		19.10	2.21	
DUTCH HARBOR POWER PLANT	UNORGANIZED BOROUGH, AK	7/14/2011	ENGINE HAS TURBO CHARGER AND AFTER COOLER INSTALLED AS PART OF THE DESIGN	41.27	2.30	BACT-PSD
NELLIS AIR FORCE BASE	CLARK, NV	2/26/2008	TURBOCHARGER AND AFTERCOOLER	NO DATA	2.39	BACT-PSD
CREOLE TRAIL LNG IMPORT TERMINAL	CAMERON, LA	8/15/2007	GOOD COMBUSTION PRACTICES AND GOOD ENGINE DESIGN INCORPORATING FUEL INJECTION TIMING RETARDATION (ITR)	15.18	2.50	BACT-PSD
SAKE PROSPECT DRILLING PROJECT	OCS, FL	5/30/2012	GOOD COMBUSTION PRACTICES	35.67	2.84	BACT-PSD
ANADARKO - PHEONIX PROSPECT	OCS, FL	6/13/2011	GOOD COMBUSTION PRACTICES	NO DATA	2.98	BACT-PSD
ENI - HOLY CROSS DRILLING PROJECT	OCS, FL	10/27/2011	GOOD COMBUSTION PRACTICES	NO DATA	2.98	BACT-PSD
PLAQUEMINE PVC PLANT	IBERVILLE, LA	2/27/2009	GOOD COMBUSTION PRACTICES AND GASEOUS FUEL BURNING	4.80	3.20	BACT-PSD
FAIRBAULT ENERGY PARK	RICE, MN	6/5/2007		16.42	3.43	BACT-PSD
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	THE UNIT IS EQUIPPED WITH A TURBOCHARGER.	8.62	3.43	BACT-PSD
NEARMAN CREEK POWER STATION	WYANDOTTE COUNTY, KS	10/18/2005	EMERGENCY DIESEL GENERATORS HAVE NOT BEEN REQUIRED TO INSTALL ADDITIONAL NOX CONTROLS (INTERMITTENT OPERATION)	24.10	3.52	BACT-PSD
TRIGEN	MERCER, NJ	3/8/2008		NO DATA	3.78	RACT
SAKE PROSPECT DRILLING PROJECT	OCS, FL	5/30/2012	GOOD COMBUSTION PRACTICES	41.13	4.25	BACT-PSD
GENERAL ELECTRIC AVIATION, EVENDALE PLANT	HAMILTON, OH	5/7/2013		NO DATA	4.40	LAER
GARYVILLE REFINERY	ST. JOHN THE BAPTIST, LA	12/27/2006	USE OF DIESEL WITH A SULFUR CONTENT OF 15 PPMV OR LESS	9.39	4.43	BACT-PSD

Appendix C
Table C-20
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Emergency Diesel Generator Engines
CO Emissions

FACILITY	LOCATION	PERMIT DATE	CONTROL DESCRIPTION	ENGINE SIZE MMBTU/HR	EMISSION LIMIT LB/MMBTU	PERMIT LIMIT BASIS
PEONY CHEMICAL MANUFACTURING FACILITY	BRAZORIA, TX	4/1/2015	MINIMIZED HOURS OF OPERATIONS TIER II ENGINE	10.50	0.004	OTHER CASE-BY-CASE
FLOPAM INC. FACILITY	IBERVILLE, LA	4/26/2011	NO ADDITIONAL CONTROL	4.14	0.007	BACT-PSD
MOXIE LIBERTY LLC/ASYLUM POWER PL T	BRADFORD COUNTY, PA	10/10/2012		NO DATA	0.041	OTHER CASE-BY-CASE
CREOLE TRAIL LNG IMPORT TERMINAL	CAMERON, LA	8/15/2007	GOOD COMBUSTION PRACTICES	4.62	0.065	BACT-PSD
LAKE CHARLES GASIFICATION FACILITY	CALCASIEU, LA	6/22/2009	COMPLY WITH 40 CFR 60 SUBPART IIII	9.39	0.066	BACT-PSD
NELLIS AIR FORCE BASE	CLARK, NV	2/26/2008	TURBOCHARGER AND AFTERCOOLER	9.45	0.069	OTHER CASE-BY-CASE
LAKE CHARLES GASIFICATION FACILITY	CALCASIEU, LA	6/22/2009	COMPLY WITH 40 CFR 60 SUBPART IIII	4.03	0.092	BACT-PSD
SUMPTER POWER PLANT	WAYNE, MI	11/17/2011	GOOD COMBUSTION PRACTICES	5.12	0.098	BACT-PSD
SEWAREN GENERATING STATION	SEWAREN, NJ	3/1/2016		19.10	0.180	
MERCK & CO. WESTPOINT	MONTGOMERY, PA	2/23/2007		NO DATA	0.25	OTHER CASE-BY-CASE
MGM MIRAGE	CLARK, NV	11/30/2009	TURBOCHARGER AND GOOD COMBUSTION PRACTICES	15.44	0.26	LAER
NEARMAN CREEK POWER STATION	WYANDOTTE COUNTY, KS	10/18/2005	GOOD ENGINE DESIGN IS PROPOSED AS BACT	24.10	0.29	BACT-PSD
GP ALLENDALE LP	ALLENDALE, SC	11/25/2008		9.80	0.31	BACT-PSD
GP CLARENDON LP	CLARENDON, SC	2/10/2009	GOOD MANAGEMENT PRACTICE PLAN	9.80	0.31	BACT-PSD
GP ALLENDALE LP	ALLENDALE, SC	11/25/2008	GOOD MANAGEMENT PRACTICE PLAN	3.68	0.35	BACT-PSD
CREOLE TRAIL LNG IMPORT TERMINAL	CAMERON, LA	8/15/2007	GOOD COMBUSTION PRACTICES	3.68	0.44	BACT-PSD
SAKE PROSPECT DRILLING PROJECT	OCS, FL	5/30/2012	GOOD COMBUSTION PRACTICES	NO DATA	0.47	BACT-PSD
SAKE PROSPECT DRILLING PROJECT	OCS, FL	5/30/2012	GOOD COMBUSTION PRACTICES	41.13	0.57	BACT-PSD
LAMAR LIGHT & POWER POWER PLANT	POWERS, CO	2/3/2006	GOOD COMBUSTION MANAGEMENT PRACTICE	10.50	0.61	BACT-PSD
OHIO RIVER CLEAN FUELS, LLC	COLUMBIANA, OH	11/20/2008	GOOD COMBUSTION PRACTICES AND GOOD ENGINE DESIGN	20.45	0.74	BACT-PSD
HICKORY RUN ENERGY STATION	LAWRENCE, PA	4/23/2013		7.80	0.74	OTHER CASE-BY-CASE
ENI - HOLY CROSS DRILLING PROJECT	OCS, FL	10/27/2011	GOOD COMBUSTION PRACTICES	NO DATA	0.78	BACT-PSD
FAIRBAULT ENERGY PARK	RICE, MN	6/5/2007		16.42	0.79	BACT-PSD
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	THE UNIT IS EQUIPPED WITH A TURBOCHARGER.	8.62	0.79	OTHER CASE-BY-CASE
MID AMERICAN STEEL ROLLING MILL	MARSHALL, OK	9/8/2008		8.40	0.79	BACT-PSD
NUCOR STEEL TUSCALOOSA, INC.	TUSCALOOSA, AL	7/22/2014		5.60	0.79	BACT-PSD
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		GOOD COMBUSTION PRACTICES; ANNUAL OPERATING HOUR RESTRICTION	14.40	0.81	BACT-PSD
CREOLE TRAIL LNG IMPORT TERMINAL	CAMERON, LA	8/15/2007	GOOD COMBUSTION PRACTICES	15.18	0.81	BACT-PSD
ENDICOTT PRODUCTION FACILITY, LIBERTY DEVELOPMENT PROJECT	PRUDHOE BAY, AK	6/15/2009	GOOD COMBUSTION PRACTICES	7.29	0.82	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		18.87	0.82	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		4.27	0.82	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		6.24	0.82	BACT-PSD
HIGHLANDS BIOREFINERY AND COGENERATION PLANT	HIGHLAND COUNTY, FL	9/23/2011	SEE POLLUTANT NOTES.	4.20	0.82	BACT-PSD
ADM CORN PROCESSING - CEDAR RAPIDS	LINN, IA	6/29/2007	NO SPECIFIC CONTROL TECHNOLOGY IS SPECIFED	3.78	0.82	BACT-PSD
ADM CORN PROCESSING - CEDAR RAPIDS	LINN, IA	6/29/2007	NO SPECIFIC CONTROL TECHNOLOGY IS SPECIFED	14.07	0.82	BACT-PSD
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	COMBUSTION DESIGN CONTROLS AND USAGE LIMITS	7.04	0.82	BACT-PSD
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	COMBUSTION DESIGN CONTROLS AND USAGE LIMITS	14.08	0.82	BACT-PSD
NINEMILE POINT ELECTRIC GENERATING PLANT	JEFFERSON, LA	8/16/2011	ULTRA LOW SULFUR DIESEL AND GOOD COMBUSTION PRACTICES	8.75	0.82	BACT-PSD
KARN WEADOCK GENERATING COMPLEX	BAY, MI	12/29/2009	ENGINE DESIGN AND OPERATION. 15 PPM SULFUR FUEL	3.68	0.82	BACT-PSD
ENERGY ANSWERS ARECIBO PUERTO RICO RENEWABLE ENERGY PROJECT	ARECIBO, PR	4/10/2014		4.69	0.82	BACT-PSD
OHIO VALLEY RESOURCES, LLC	SPENCER, IN	9/25/2013	GOOD COMBUSTION PRACTICES	32.83	0.82	BACT-PSD
MIDWEST FERTILIZER CORPORATION	POSEY, IN	6/4/2014	GOOD COMBUSTION PRACTICES	25.20	0.82	BACT-PSD
CHOUTEAU POWER PLANT	MAYES, OK	1/23/2009		15.40	0.82	BACT-PSD
OREGON CLEAN ENERGY CENTER	LUCAS, OH	6/18/2013	PURCHASED CERTIFIED TO THE STANDARDS IN NSPS SUBPART III	21.11	0.82	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	NORTH SLOPE, AK	8/20/2012		16.42	0.82	BACT-PSD
ARIZONA CLEAN FUELS YUMA	YUMA, AZ	4/14/2005		5.46	0.82	BACT-PSD
ARIZONA CLEAN FUELS YUMA	YUMA, AZ	4/14/2005		10.90	0.82	BACT-PSD
VICTORVILLE 2 HYBRID POWER PROJECT	SAN BERNARDINO, CA	3/11/2010	OPERATIONAL RESTRICTION OF 50 HR/YR	18.76	0.82	BACT-PSD
PALMDALE HYBRID POWER PROJECT	LOS ANGELES, CA	10/18/2011		18.78	0.82	BACT-PSD
SWEET SORGHUM-TO-ETHANOL ADVANCED BIOREFINERY	HENDRY COUNTY, FL	12/23/2010		18.76	0.82	BACT-PSD
HIGHLANDS BIOREFINERY AND COGENERATION PLANT	HIGHLAND COUNTY, FL	9/23/2011	SEE POLLUTANT NOTES.	18.76	0.82	BACT-PSD
LAUDERDALE PLANT	BROWARD, FL	4/22/2014	GOOD COMBUSTION PRACTICE	NO DATA	0.82	BACT-PSD
TATE & LYLE INDGREDIENTS AMERICAS, INC.	WEBSTER, IA	9/19/2008		6.57	0.82	BACT-PSD
TATE & LYLE INDGREDIENTS AMERICAS, INC.	WEBSTER, IA	9/19/2008		4.03	0.82	BACT-PSD
IOWA FERTILIZER COMPANY	LEE, IA	10/26/2012	GOOD COMBUSTION PRACTICES	19.88	0.82	BACT-PSD
CF INDUSTRIES NITROGEN, LLC - PORT NEAL NITROGEN COMPLEX	WOODBURY, IA	7/12/2013	GOOD COMBUSTION PRACTICES	25.20	0.82	BACT-PSD
LANGLEY GULCH POWER PLANT	PAYETTE, ID	6/25/2010	TIER 2 ENGINE-BASED,GOOD COMBUSTION PRACTICES (GCP)	7.04	0.82	BACT-PSD
CRONUS CHEMICALS, LLC	DOUGLAS, IL	9/5/2014	TIER IV STANDARDS FOR NON-ROAD ENGINES	26.29	0.82	BACT-PSD
KARN WEADOCK GENERATING COMPLEX	BAY, MI	12/29/2009	ENGINE DESIGN AND OPERATION. 15 PPM SULFUR FUEL.	18.76	0.82	BACT-PSD
ML 35 LLC/PHILA CYBERCENTER	BUCKS, PA	6/1/2012	CO OXIDATION CATALYST	NO DATA	0.82	OTHER CASE-BY-CASE
PYRAMAX CERAMICS, LLC	ALLENDALE, SC	2/8/2012	ENGINES MUST BE CERTIFIED TO COMPLY WITH NSPS, SUBPART III	5.30	0.82	BACT-PSD
PLAQUEMINE PVC PLANT	IBERVILLE, LA	2/27/2009	GOOD COMBUSTION PRACTICES AND GASEOUS FUEL BURNING	4.80	0.85	BACT-PSD
GARYVILLE REFINERY	ST. JOHN THE BAPTIST, LA	12/27/2006	USE OF DIESEL WITH A SULFUR CONTENT OF 15 PPMV OR LESS	9.39	0.96	BACT-PSD
SHADY HILLS GENERATING STATION	PASCO, FL	1/12/2009		NO DATA	2.68	BACT-PSD
GENERAL ELECTRIC AVIATION, EVENDALE PLANT	HAMILTON, OH	5/7/2013		NO DATA	5.10	N/A
GENERAL ELECTRIC AVIATION, EVENDALE PLANT	HAMILTON, OH	5/7/2013		NO DATA	7.30	N/A

Appendix C
Table C-21
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Emergency Diesel Generator Engines
VOC Emissions

FACILITY	LOCATION	PERMIT DATE	CONTROL DESCRIPTION	ENGINE SIZE MMBTU/HR	EMISSION LIMIT LB/MMBTU	PERMIT LIMIT BASIS
MOXIE LIBERTY LLC/ASYLUM POWER PL T	BRADFORD COUNTY, PA	10/10/2012		NO DATA	0.003	OTHER CASE-BY-CASE
CREOLE TRAIL LNG IMPORT TERMINAL	CAMERON, LA	8/15/2007	GOOD COMBUSTION PRACTICES AND GOOD ENGINE DESIGN	4.62	0.01	BACT-PSD
TATE & LYLE INDGREDIENTS AMERICAS, INC.	WEBSTER, IA	9/19/2008		4.03	0.02	BACT-PSD
CREOLE TRAIL LNG IMPORT TERMINAL	CAMERON, LA	8/15/2007	GOOD COMBUSTION PRACTICES AND GOOD ENGINE DESIGN	3.68	0.02	BACT-PSD
GP ALLENDALE LP	ALLENDALE, SC	11/25/2008		9.80	0.03	BACT-PSD
GP CLARENDON LP	CLARENDON, SC	2/10/2009	GOOD MANAGEMENT PRACTICE PLAN.	9.80	0.03	BACT-PSD
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		GOOD COMBUSTION PRACTICES; ANNUAL OPERATING HOUR RESTRICTION	14.40	0.04	LAER
MGM MIRAGE	CLARK, NV	11/30/2009	TURBOCHARGER AND GOOD COMBUSTION PRACTICES	15.44	0.04	OTHER CASE-BY-CASE
TATE & LYLE INDGREDIENTS AMERICAS, INC.	WEBSTER, IA	9/19/2008		6.57	0.05	BACT-PSD
SEWAREN GENERATING STATION	SEWAREN, NJ	3/1/2016		19.10	0.05	
ENERGY ANSWERS ARECIBO PUERTO RICO RENEWABLE ENERGY PROJECT	ARECIBO, PR	4/10/2014		4.69	0.05	BACT-PSD
ADM CORN PROCESSING - CEDAR RAPIDS	LINN, IA	6/29/2007	NO SPECIFIC CONTROL TECHNOLOGY IS SPECIFED	3.78	0.06	BACT-PSD
NELLIS AIR FORCE BASE	CLARK, NV	2/26/2008	TURBOCHARGER AND AFTERCOOLER	9.45	0.06	OTHER CASE-BY-CASE
PEONY CHEMICAL MANUFACTURING FACILITY	BRAZORIA, TX	4/1/2015	MINIMIZED HOURS OF OPERATIONS TIER II ENGINE	10.50	0.07	OTHER CASE-BY-CASE
OHIO RIVER CLEAN FUELS, LLC	COLUMBIANA, OH	11/20/2008	GOOD COMBUSTION PRACTICES AND GOOD ENGINE DESIGN	20.45	0.07	BACT-PSD
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	COMBUSTION DESIGN CONTROLS AND USAGE LIMITS	14.08	0.07	BACT-PSD
MOUNDSVILLE COMBINED CYCLE POWER PLANT	MARSHALL, WV	11/21/2014		14.11	0.09	BACT-PSD
HICKORY RUN ENERGY STATION	LAWRENCE, PA	4/23/2013		7.80	0.09	OTHER CASE-BY-CASE
ENI - HOLY CROSS DRILLING PROJECT	OCS, FL	10/27/2011	USE OF GOOD COMBUSTION PRACTICES	NO DATA	0.09	BACT-PSD
SAKE PROSPECT DRILLING PROJECT	OCS, FL	5/30/2012	USE OF GOOD COMBUSTION PRACTICES	35.67	0.09	BACT-PSD
SAKE PROSPECT DRILLING PROJECT	OCS, FL	5/30/2012	USE OF GOOD COMBUSTION PRACTICES	41.13	0.09	
MID AMERICAN STEEL ROLLING MILL	MARSHALL, OK	9/8/2008		8.40	0.09	BACT-PSD
IOWA FERTILIZER COMPANY	LEE, IA	10/26/2012	GOOD COMBUSTION PRACTICES	19.88	0.09	BACT-PSD
CRONUS CHEMICALS, LLC	DOUGLAS, IL	9/5/2014	TIER IV STANDARDS FOR NON-ROAD ENGINES	26.29	0.09	BACT-PSD
ADM CORN PROCESSING - CEDAR RAPIDS	LINN, IA	6/29/2007	NO SPECIFIC CONTROL TECHNOLOGY IS SPECIFED	14.07	0.09	BACT-PSD
MIDWEST FERTILIZER CORPORATION	POSEY, IN	6/4/2014	GOOD COMBUSTION PRACTICES	25.20	0.10	BACT-PSD
OHIO VALLEY RESOURCES, LLC	SPENCER, IN	9/25/2013	GOOD COMBUSTION PRACTICES	32.83	0.10	BACT-PSD
MIDWEST FERTILIZER CORPORATION	POSEY, IN	6/4/2014	GOOD COMBUSTION PRACTICES	25.20	0.10	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		18.87	0.10	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		4.27	0.10	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		6.24	0.10	BACT-PSD
FAIRBAULT ENERGY PARK	RICE, MN	6/5/2007		16.42	0.10	BACT-PSD
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	THE UNIT IS EQUIPPED WITH A TURBOCHARGER.	8.62	0.10	OTHER CASE-BY-CASE
CHOUTEAU POWER PLANT	MAYES, OK	1/23/2009	GOOD COMBUSTION	15.40	0.10	BACT-PSD
MERCK & CO. WESTPOINT	MONTGOMERY, PA	2/23/2007		NO DATA	0.10	OTHER CASE-BY-CASE
CREOLE TRAIL LNG IMPORT TERMINAL	CAMERON, LA	8/15/2007	GOOD COMBUSTION PRACTICES AND GOOD ENGINE DESIGN	15.18	0.11	BACT-PSD
GP ALLENDALE LP	ALLENDALE, SC	11/25/2008	GOOD MANAGEMENT PRACTICE PLAN	3.68	0.13	BACT-PSD
GP CLARENDON LP	CLARENDON, SC	2/10/2009	GOOD MANAGEMENT PRACTICE PLAN	3.68	0.13	BACT-PSD
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	COMBUSTION DESIGN CONTROLS AND USAGE LIMITS	7.04	0.15	BACT-PSD
OREGON CLEAN ENERGY CENTER	LUCAS, OH	6/18/2013	PURCHASED CERTIFIED TO THE STANDARDS IN NSPS SUBPART IIII	21.11	0.19	BACT-PSD
NINEMILE POINT ELECTRIC GENERATING PLANT	JEFFERSON, LA	8/16/2011	ULTRA LOW SULFUR DIESEL AND GOOD COMBUSTION PRACTICES	8.75	0.31	BACT-PSD
GARYVILLE REFINERY	ST. JOHN THE BAPTIST, LA	12/27/2006	USE OF DIESEL WITH A SULFUR CONTENT OF 15 PPMV OR LESS	NO DATA	0.36	BACT-PSD
GENERAL ELECTRIC AVIATION, EVENDALE PLANT	HAMILTON, OH	5/7/2013		NO DATA	0.70	N/A
CF INDUSTRIES NITROGEN, LLC - PORT NEAL NITROGEN COMPLEX	WOODBURY, IA	7/12/2013	GOOD COMBUSTION PRACTICES	25.20	0.94	BACT-PSD
PYRAMAX CERAMICS, LLC	ALLENDALE, SC	2/8/2012	PURCHASE ENGINES CERTIFIED TO COMPLY WITH NSPS, SUBPART IIII	5.30	0.94	BACT-PSD
LANGLEY GULCH POWER PLANT	PAYETTE, ID	6/25/2010	TIER 2 ENGINE-BASED,GOOD COMBUSTION PRACTICES (GCP)	7.04	1.50	BACT-PSD
US10 FACILITY	ANDERSON, SC	7/9/2012	BACT HAS BEEN DETERMINED TO BE COMPLIANCE WITH NSPS, SUBPART IIII	9.38	1.50	BACT-PSD

Appendix C
Table C-22
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Emergency Diesel Generator Engines
PM Emissions

FACILITY	LOCATION	PERMIT DATE	CONTROL DESCRIPTION	ENGINE SIZE MMBTU/HR	EMISSION LIMIT LB/MMBTU	PERMIT LIMIT BASIS
MOXIE LIBERTY LLC/ASYLUM POWER PL T	BRADFORD COUNTY, PA	10/10/2012		NO DATA	0.006	OTHER CASE-BY-CASE
LAKE CHARLES GASIFICATION FACILITY	CALCASIEU, LA	6/22/2009	COMPLY WITH 40 CFR 60 SUBPART IIII	9.39	0.006	BACT-PSD
INTERNATIONAL STATION POWER PLANT	MUNCIPALITY OF ANCHORAGE,	12/20/2010	GOOD COMBUSTION PRACTICES	14.07	0.009	BACT-PSD
INTERNATIONAL STATION POWER PLANT	ANCHORAGE, AK	12/20/2010	TURBO CHARGING AND AFTER COOLING	14.07	0.009	BACT-PSD
MGM MIRAGE	CLARK, NV	11/30/2009	TURBOCHARGER AND GOOD COMBUSTION PRACTICES	15.44	0.014	OTHER CASE-BY-CASE
SEWAREN GENERATING STATION	SEWAREN, NJ	3/1/2016		19.10	0.014	
PEONY CHEMICAL MANUFACTURING FACILITY	BRAZORIA, TX	4/1/2015	MINIMIZED HOURS OF OPERATIONS TIER II ENGINE	10.50	0.014	OTHER CASE-BY-CASE
LAMAR LIGHT & POWER POWER PLANT	POWERS, CO	2/3/2006	LOW SULFUR FUEL - %0.05 BY WEIGHT	10.50	0.016	BACT-PSD
LAKE CHARLES GASIFICATION FACILITY	CALCASIEU, LA	6/22/2009	COMPLY WITH 40 CFR 60 SUBPART IIII	4.03	0.020	BACT-PSD
CORNELL COMBINED HEAT & POWER PROJECT	TOMPKINS, NY	3/12/2008	ULTRA LOW SULFUR DIESEL AT 15 PPM S	9.38	0.020	BACT-PSD
GP ALLENDALE LP	ALLENDALE, SC	11/25/2008		9.80	0.020	BACT-PSD
GP CLARENDON LP	CLARENDON, SC	2/10/2009	GOOD MANAGEMENT PRACTICE PLAN.	9.80	0.020	BACT-PSD
CRONUS CHEMICALS, LLC	DOUGLAS, IL	9/5/2014	TIER IV STANDARDS FOR NON-ROAD ENGINES AT 40 CFR 1039.102, TABLE 7	26.29	0.024	BACT-PSD
NELLIS AIR FORCE BASE	CLARK, NV	2/26/2008	TURBOCHARGER AND AFTERCOOLER	9.45	0.026	OTHER CASE-BY-CASE
POINT THOMSON PRODUCTION FACILITY	NORTH SLOPE BOROUGH, AK	6/12/2013	GOOD OPERATION AND COMBUSTION PRACTICES	4.27	0.035	OTHER CASE-BY-CASE
GENERAL ELECTRIC AVIATION, EVENDALE PLANT	HAMILTON, OH	5/7/2013		NO DATA	0.038	N/A
OHIO RIVER CLEAN FUELS, LLC	COLUMBIANA, OH	11/20/2008	GOOD COMBUSTION PRACTICES AND GOOD ENGINE DESIGN	20.45	0.043	BACT-PSD
CREOLE TRAIL LNG IMPORT TERMINAL	CAMERON, LA	8/15/2007	GOOD COMBUSTION PRACTICES	15.18	0.045	BACT-PSD
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		ANNUAL OPERATING HOUR RESTRICTION; GOOD COMBUSTION PRACTICES	14.40	0.046	BACT-PSD
CHOUTEAU POWER PLANT	MAYES, OK	1/23/2009		15.40	0.047	BACT-PSD
OREGON CLEAN ENERGY CENTER	LUCAS, OH	6/18/2013	PURCHASED CERTIFIED TO THE STANDARDS IN NSPS SUBPART IIII	21.11	0.047	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	NORTH SLOPE, AK	8/20/2012		16.42	0.047	BACT-PSD
VICTORVILLE 2 HYBRID POWER PROJECT	SAN BERNARDINO, CA	3/11/2010	OPERATIONAL RESTRICTION OF 50 HR/YR; USE OF ULSD	18.76	0.047	BACT-PSD
PALMDALE HYBRID POWER PROJECT	LOS ANGELES, CA	10/18/2011	USE ULTRA LOW SULFUR FUEL	18.78	0.047	BACT-PSD
TATE & LYLE INDGREDIENTS AMERICAS, INC.	WEBSTER, IA	9/19/2008		6.57	0.047	BACT-PSD
TATE & LYLE INDGREDIENTS AMERICAS, INC.	WEBSTER, IA	9/19/2008		4.03	0.047	BACT-PSD
IOWA FERTILIZER COMPANY	LEE, IA	10/26/2012	GOOD COMBUSTION PRACTICES	19.88	0.047	BACT-PSD
CF INDUSTRIES NITROGEN, LLC - PORT NEAL NITROGEN COMPLEX	WOODBURY, IA	7/12/2013	GOOD COMBUSTION PRACTICES	25.20	0.047	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		18.87	0.047	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		4.27	0.047	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		6.24	0.047	BACT-PSD
ADM CORN PROCESSING - CEDAR RAPIDS	LINN, IA	6/29/2007	ENGINE IS REQUIRED TO MEET LIMITS ESTABLISHED AS BACT (TIER 3 NONROAD)	3.78	0.047	BACT-PSD
ADM CORN PROCESSING - CEDAR RAPIDS	LINN, IA	6/29/2007	ENGINE IS REQUIRED TO MEET LIMITS ESTABLISHED AS BACT (TIER 3 NONROAD)	14.07	0.047	BACT-PSD
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	COMBUSTION DESIGN CONTROLS AND USAGE LIMITS	7.04	0.047	BACT-PSD
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	COMBUSTION DESIGN CONTROLS AND USAGE LIMITS	14.08	0.047	BACT-PSD
MIDWEST FERTILIZER CORPORATION	POSEY, IN	6/4/2014	GOOD COMBUSTION PRACTICES	25.20	0.047	BACT-PSD
OHIO VALLEY RESOURCES, LLC	SPENCER, IN	9/25/2013	GOOD COMBUSTION PRACTICES	32.83	0.047	BACT-PSD
OHIO VALLEY RESOURCES, LLC	SPENCER, IN	9/25/2013	GOOD COMBUSTION PRACTICES	32.83	0.047	BACT-PSD
MIDWEST FERTILIZER CORPORATION	POSEY, IN	6/4/2014	GOOD COMBUSTION PRACTICES	25.20	0.047	BACT-PSD
MAG PELLET LLC	WHITE, IN	4/24/2014		2.10	0.047	BACT-PSD
NINEMILE POINT ELECTRIC GENERATING PLANT	JEFFERSON, LA	8/16/2011	ULTRA LOW SULFUR DIESEL AND GOOD COMBUSTION PRACTICES	8.75	0.047	BACT-PSD
ENERGY ANSWERS ARECIBO PUERTO RICO RENEWABLE ENERGY PROJECT	ARECIBO, PR	4/10/2014		4.69	0.047	BACT-PSD
MOUNDSVILLE COMBINED CYCLE POWER PLANT	MARSHALL, WV	11/21/2014		14.11	0.047	BACT-PSD
MERCK & CO. WESTPOINT	MONTGOMERY, PA	2/23/2007		NO DATA	0.050	OTHER CASE-BY-CASE
ENI - HOLY CROSS DRILLING PROJECT	OCS, FL	10/27/2011	USE OF GOOD COMBUSTION PRACTICES	NO DATA	0.056	BACT-PSD
SAKE PROSPECT DRILLING PROJECT	OCS, FL	5/30/2012	USE OF GOOD COMBUSTION PRACTICES	35.67	0.056	BACT-PSD
SAKE PROSPECT DRILLING PROJECT	OCS, FL	5/30/2012	USE OF GOOD COMBUSTION PRACTICES	41.13	0.056	BACT-PSD
FAIRBAULT ENERGY PARK	RICE, MN	6/5/2007		16.42	0.057	BACT-PSD
KARN WEADOCK GENERATING COMPLEX	BAY, MI	12/29/2009	ENGINE DESIGN AND OPERATION. 15 PPM SULFUR FUEL.	18.76	0.057	BACT-PSD
SUMPTER POWER PLANT	WAYNE, MI	11/17/2011	GOOD COMBUSTION PRACTICES	5.12	0.057	BACT-PSD
WOLVERINE POWER	PRESQUE ISLE, MI	6/29/2011		28.00	0.063	BACT-PSD
CREOLE TRAIL LNG IMPORT TERMINAL	CAMERON, LA	8/15/2007	GOOD COMBUSTION PRACTICES	3.68	0.076	BACT-PSD
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	THE UNIT IS EQUIPPED WITH A TURBOCHARGER.	8.62	0.100	OTHER CASE-BY-CASE
MID AMERICAN STEEL ROLLING MILL	MARSHALL, OK	9/8/2008		8.40	0.100	BACT-PSD
PLAQUEMINE PVC PLANT	IBERVILLE, LA	2/27/2009	GOOD COMBUSTION PRACTICES AND GASEOUS FUEL BURNING	4.80	0.100	BACT-PSD
GP ALLENDALE LP	ALLENDALE, SC	11/25/2008	GOOD MANAGEMENT PRACTICE PLAN.	3.68	0.112	BACT-PSD
GP CLARENDON LP	CLARENDON, SC	2/10/2009	GOOD MANAGEMENT PRACTICE PLAN.	3.68	0.112	BACT-PSD
DUTCH HARBOR POWER PLANT	UNORGANIZED BOROUGH, AK	7/14/2011	POSITIVE CRANKCASE VENTILATION INSTALLED AS PART OF THE DESIGN	41.27	0.118	BACT-PSD
SHADY HILLS GENERATING STATION	PASCO, FL	1/12/2009	OPERATIONAL RESTRICTION OF 500 HR/YR; USE OF ULSD	23.45	0.126	BACT-PSD
SHADY HILLS GENERATING STATION	PASCO, FL	1/12/2009	OPERATIONAL RESTRICTION OF 500 HR/YR; USE OF ULSD	23.45	0.126	BACT-PSD
CREOLE TRAIL LNG IMPORT TERMINAL	CAMERON, LA	8/15/2007	GOOD COMBUSTION PRACTICES	4.62	0.139	BACT-PSD
KARN WEADOCK GENERATING COMPLEX	BAY, MI	12/29/2009	ENGINE DESIGN AND OPERATION. 15 PPM SULFUR FUEL.	3.68	0.310	BACT-PSD
GARYVILLE REFINERY	ST. JOHN THE BAPTIST, LA	12/27/2006	USE OF DIESEL WITH A SULFUR CONTENT OF 15 PPMV OR LESS	9.39	0.314	BACT-PSD

Appendix C
Table C-23
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Emergency Diesel Generator Engines
H2SO4 Emissions

FACILITY	LOCATION	PERMIT DATE	ENGINE SIZE	EMISSION LIMIT	EMISSION LIMIT UNITS	PERMIT LIMIT BASIS
SEWAREN GENERATING STATION	SEWAREN, NJ	3/1/2016	19.1	0.0015	% S in ULSD	
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		14.4	0.0015	% S in ULSD	BACT-PSD
CORNELL COMBINED HEAT & POWER PROJECT	TOMPKINS, NY	3/12/2008	1000 KW	0.0002	LB/MMBTU	BACT-PSD

Appendix C
Table C-24
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Emergency Diesel Generator Engines
CO2 Emissions

FACILITY	LOCATION	PERMIT DATE	CONTROL DESCRIPTION	ENGINE SIZE	EMISSION LIMIT	EMISSION LIMIT UNITS	PERMIT LIMIT BASIS
MIDWEST FERTILIZER CORPORATION	POSEY, IN	6/4/2014	GOOD COMBUSTION PRACTICES	3600 HP	526.39	G/B-HP-H	BACT-PSD
OHIO VALLEY RESOURCES, LLC	SPENCER, IN	9/25/2013	GOOD COMBUSTION PRACTICES	4690 HP	526.39	G/B-HP-H	BACT-PSD
MIDWEST FERTILIZER CORPORATION	POSEY, IN	6/4/2014	GOOD COMBUSTION PRACTICES	3600 HP	526.39	G/B-HP-H	BACT-PSD
ENI - HOLY CROSS DRILLING PROJECT	OCS, FL	10/27/2011	USE OF GOOD COMBUSTION PRACTICES	NO DATA	700	G/KW-HR	BACT-PSD
SAKE PROSPECT DRILLING PROJECT	OCS, FL	5/30/2012	USE OF GOOD COMBUSTION PRACTICES	5875 HP	705	G/KW-HR	BACT-PSD
SUMPTER POWER PLANT	WAYNE, MI	11/17/2011	GOOD COMBUSTION PRACTICES	732 HP	716.6	LB/HR	BACT-PSD
MOUNDSVILLE COMBINED CYCLE POWER PLANT	MARSHALL, WV	11/21/2014		2015.7 HP	2416	LB/HR	BACT-PSD
CF INDUSTRIES NITROGEN, LLC - PORT NEAL NITROGEN COMPLEX	WOODBURY, IA	7/12/2013	GOOD COMBUSTION PRACTICES	180 GAL/H	1.55	LB/KW-HR	BACT-PSD
NINEMILE POINT ELECTRIC GENERATING PLANT	JEFFERSON, LA	8/16/2011	PROPER OPERATION AND GOOD COMBUSTION PRACTICES	1250 HP	163	LB/MMBTU	BACT-PSD
INDIANA GASIFICATION, LLC	SPENCER, IN	6/27/2012	USE OF GOOD ENGINEERING DESIGN	1341 HP	84	T/YR	BACT-PSD
INDIANA GASIFICATION, LLC	SPENCER, IN	6/27/2012	USE OF GOOD ENGINEERING DESIGN	575 HP	84	T/YR	BACT-PSD
SEWAREN GENERATING STATION	SEWAREN, NJ	3/1/2016		19.1 MMBTU/H	69	T/YR	
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		GOOD COMBUSTION PRACTICES; ANNUAL OPERATING HOUR RESTRICTION	14.4 MMBTU/H	118	T/YR	BACT-PSD
ENERGY ANSWERS ARECIBO PUERTO RICO RENEWABLE ENERGY PROJECT	ARECIBO, PR	4/10/2014		NO DATA	183	T/YR	BACT-PSD
OREGON CLEAN ENERGY CENTER	LUCAS, OH	6/18/2013		2250 KW	878	T/YR	BACT-PSD
GENERAL ELECTRIC AVIATION, EVENDALE PLANT	HAMILTON, OH	5/7/2013		NO DATA	74000	T/YR	N/A
GENERAL ELECTRIC AVIATION, EVENDALE PLANT	HAMILTON, OH	5/7/2013		NO DATA	74000	T/YR	N/A
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	GOOD ENGINEERING DESIGN AND FUEL EFFICIENT DESIGN	1006 HP	1186	T/YR	BACT-PSD
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	GOOD ENGINEERING DESIGN AND FUEL EFFICIENT DESIGN	2012 HP	1186	T/YR	BACT-PSD
ENI - HOLY CROSS DRILLING PROJECT	OCS, FL	10/27/2011	USE OF GOOD COMBUSTION PRACTICES	NO DATA	2.4	T/YR	BACT-PSD
ENI - HOLY CROSS DRILLING PROJECT	OCS, FL	10/27/2011	USE OF GOOD COMBUSTION PRACTICES	NO DATA	14.6	T/YR	BACT-PSD
ENI - HOLY CROSS DRILLING PROJECT	OCS, FL	10/27/2011	USE OF GOOD COMBUSTION PRACTICES	NO DATA	687	T/YR	BACT-PSD
ENI - HOLY CROSS DRILLING PROJECT	OCS, FL	10/27/2011	USE OF GOOD COMBUSTION PRACTICES	NO DATA	722	T/YR	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		610 HP	565	T/YR	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		2695 HP	2332	T/YR	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		891 HP	7194	T/YR	BACT-PSD
CF INDUSTRIES NITROGEN, LLC - PORT NEAL NITROGEN COMPLEX	WOODBURY, IA	7/12/2013	GOOD COMBUSTION PRACTICES	180 GAL/H	509	T/YR	BACT-PSD
IOWA FERTILIZER COMPANY	LEE, IA	10/26/2012	GOOD COMBUSTION PRACTICES	142 GAL/H	788.5	T/YR	BACT-PSD
HICKORY RUN ENERGY STATION	LAWRENCE, PA	4/23/2013		7.8 MMBTU/H	80.5	T/YR	OTHER CASE-BY-CASE
CRONUS CHEMICALS, LLC	DOUGLAS, IL	9/5/2014	TIER IV STANDARDS FOR NON-ROAD ENGINES	3755 HP	432	T/YR	BACT-PSD

Appendix C
Table C-25
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Emergency Diesel Fire Pump Engines
NOx Emissions

FACILITY	LOCATION	PERMIT DATE	CONTROL DESCRIPTION	ENGINE SIZE MMBTU/HR	EMISSION LIMIT LB/MMBTU	PERMIT LIMIT BASIS
HICKORY RUN ENERGY STATION	LAWRENCE, PA	4/23/2013		3.25	0.57	OTHER CASE-BY-CASE
PSEG FOSSIL LLC SEWAREN GENERATING STATION	MIDDLESEX COUNTY, NJ	3/7/2014		2.63	0.67	LAER
OREGON CLEAN ENERGY CENTER	LUCAS, OH	6/18/2013	PURCHASED CERTIFIED TO THE STANDARDS IN NSPS SUBPART IIII	2.10	0.81	BACT-PSD
MOXIE LIBERTY LLC/ASYLUM POWER PL T	BRADFORD COUNTY, PA	10/10/2012		NO DATA	0.82	OTHER CASE-BY-CASE
MOXIE ENERGY LLC/PATRIOT GENERATION PLT	LYCOMING COUNTY, PA	1/31/2013		NO DATA	0.82	OTHER CASE-BY-CASE
CRONUS CHEMICALS, LLC	DOUGLAS, IL	9/5/2014	TIER IV STANDARDS FOR NON-ROAD ENGINES	2.61	0.82	BACT-PSD
IOWA FERTILIZER COMPANY	LEE, IA	10/26/2012	GOOD COMBUSTION PRACTICES	1.96	0.88	BACT-PSD
MIDWEST FERTILIZER CORPORATION	POSEY, IN	6/4/2014	GOOD COMBUSTION PRACTICES	3.50	0.89	BACT-PSD
VICTORVILLE 2 HYBRID POWER PROJECT	SAN BERNARDINO, CA	3/11/2010	OPERATIONAL RESTRICTION OF 50 HR/YR	1.27	0.89	BACT-PSD
ENERGY ANSWERS ARECIBO PUERTO RICO RENEWABLE ENERGY PROJECT	ARECIBO, PR	4/10/2014		NO DATA	0.90	BACT-PSD
OHIO VALLEY RESOURCES, LLC	SPENCER, IN	9/25/2013	GOOD COMBUSTION PRACTICES	3.37	0.90	BACT-PSD
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		GOOD COMBUSTION PRACTICES; ANNUAL OPERATING HOUR RESTRICTION	2.25	0.91	LAER
DRAKE	YAVAPAI, AZ	4/12/2006		1.97	0.94	BACT-PSD
PALMDALE HYBRID POWER PROJECT	LOS ANGELES, CA	10/18/2011		1.27	0.94	BACT-PSD
PALM BEACH RENEWABLE ENERGY PARK	PALM BEACH, FL	12/23/2010	USE OF INHERENTLY CLEAN ULSD FUEL OIL AND GCP	NO DATA	0.94	BACT-PSD
LANGLEY GULCH POWER PLANT	PAYETTE, ID	6/25/2010	TIER 3 ENGINE-BASEDGOOD COMBUSTION PRACTICES (GCP)	2.20	0.94	BACT-PSD
PYRAMAX CERAMICS, LLC	ALLENDALE, SC	2/8/2012	PURCHASE OF CERTIFIED ENGINE BASED ON NSPS, SUBPART IIII.	3.50	0.94	BACT-PSD
SWEET SORGHUM-TO-ETHANOL ADVANCED BIOREFINERY	HENDRY COUNTY, FL	12/23/2010		NO DATA	0.94	BACT-PSD
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	COMBUSTION DESIGN CONTROLS AND USAGE LIMITS	2.60	0.94	BACT-PSD
CPV ST CHARLES	CHARLES, MD	11/12/2008		2.10	0.94	BACT-PSD
WOLVERINE POWER	PRESQUE ISLE, MI	6/29/2011		2.94	0.94	BACT-PSD
THETFORD GENERATING STATION	GENESEE, MI	7/25/2013	PROPER COMBUSTION DESIGN AND ULTRA LOW SULFUR DIESEL FUEL.	2.21	0.94	BACT-PSD
HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	OTTAWA, MI	12/4/2013	GOOD COMBUSTION PRACTICES	1.16	0.94	BACT-PSD
MOUNDSVILLE COMBINED CYCLE POWER PLANT	MARSHALL, WV	11/21/2014		1.76	0.94	BACT-PSD
FLOPAM INC. FACILITY	IBERVILLE, LA	4/26/2011		1.35	0.95	BACT-PSD
AVENAL ENERGY PROJECT	KINGS, CA	6/21/2011	EQUIPPED W/ A TURBOCHARGER AND AN INTERCOOLER/AFTERCOOLER	2.02	1.07	BACT-PSD
NELLIS AIR FORCE BASE	CLARK, NV	2/26/2008	TURBOCHARGER AND AFTERCOOLER	NO DATA	1.22	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		3.43	1.51	BACT-PSD
CPV ST CHARLES	CHARLES, MD	11/12/2008		NO DATA	1.51	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		0.71	1.54	BACT-PSD
PYRAMAX CERAMICS, LLC	ALLENDALE, SC	2/8/2012	PURCHASE OF CERTIFIED ENGINE.	0.20	1.76	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		0.69	1.76	BACT-PSD
FLOPAM INC. FACILITY	IBERVILLE, LA	4/26/2011		3.11	1.87	BACT-PSD
JOHNSON MATTHEY INC/CATALYTIC SYSTEMS DIV	CHESTER, PA	6/1/2012		4.09	2.17	
OHIO RIVER CLEAN FUELS, LLC	COLUMBIANA, OH	11/20/2008	GOOD COMBUSTION PRACTICES	2.10	2.33	BACT-PSD
CHOUTEAU POWER PLANT	MAYES, OK	1/23/2009		1.87	2.46	BACT-PSD
DETROIT EDISON--MONROE	MONROE, MI	12/21/2010	GOOD COMBUSTION PRACTICES.	1.76	2.46	BACT-PSD
CRESCENT CITY POWER	ORLEANS, LA	6/6/2005	GOOD ENGINE DESIGN AND PROPER OPERATING PRACTICES	2.98	2.99	BACT-PSD
FORSYTH ENERGY PLANT	FORSYTH, NC	9/29/2005		11.40	3.20	BACT-PSD
BLYTHE ENERGY PROJECT II	RIVERSIDE, CA	4/25/2007		2.12	3.54	BACT-PSD
KENAI NITROGEN OPERATIONS	USA, AK	1/6/2015	LIMITED OPERATION OF 168 HR/YR.	NO DATA	4.41	BACT-PSD
PLAQUEMINE PVC PLANT	IBERVILLE, LA	2/27/2009	GOOD COMBUSTION PRACTICES AND GASEOUS FUEL BURNING	NO DATA	4.41	BACT-PSD
ARSENAL HILL POWER PLANT	CADDO, LA	3/20/2008	PROPER ENGINE MAINTENANCE	2.17	4.43	BACT-PSD

Appendix C
Table C-26
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Emergency Diesel Fire Pump Engines
CO Emissions

FACILITY	LOCATION	PERMIT DATE	CONTROL DESCRIPTION	ENGINE SIZE MMBTU/HR	EMISSION LIMIT LB/MMBTU	PERMIT LIMIT BASIS
PSEG FOSSIL LLC SEWAREN GENERATING STATION	MIDDLESEX COUNTY, NJ	3/7/2014		2.63	0.03	BACT-PSD
FLOPAM INC. FACILITY	IBERVILLE, LA	4/26/2011		1.35	0.12	BACT-PSD
AVENAL ENERGY PROJECT	KINGS, CA	6/21/2011	EQUIPPED W/ A TURBOCHARGER AND AN INTERCOOLER/AFTERCOOLER	2.02	0.14	BACT-PSD
NELLIS AIR FORCE BASE	CLARK, NV	2/26/2008	TURBOCHARGER AND AFTERCOOLER	NO DATA	0.16	OTHER CASE-BY-CASE
MOXIE LIBERTY LLC/ASYLUM POWER PL T	BRADFORD COUNTY, PA	10/10/2012		NO DATA	0.16	OTHER CASE-BY-CASE
MOXIE ENERGY LLC/PATRIOT GENERATION PLT	LYCOMING COUNTY, PA	1/31/2013		NO DATA	0.16	OTHER CASE-BY-CASE
FLOPAM INC. FACILITY	IBERVILLE, LA	4/26/2011	GOOD EQUIPMENT DESIGN AND PROPER COMBUSTION PRACTICES	3.11	0.21	BACT-PSD
BLYTHE ENERGY PROJECT II	RIVERSIDE, CA	4/25/2007		2.12	0.33	BACT-PSD
CRESCENT CITY POWER	ORLEANS, LA	6/6/2005	GOOD ENGINE DESIGN AND PROPER OPERATING PRACTICES	2.98	0.63	BACT-PSD
MINNESOTA POWER, INC. - BOSWELL ENERGY CTR.	ITASCA, MN	8/13/2009		2.81	0.71	BACT-PSD
HICKORY RUN ENERGY STATION	LAWRENCE, PA	4/23/2013		3.25	0.79	OTHER CASE-BY-CASE
OREGON CLEAN ENERGY CENTER	LUCAS, OH	6/18/2013	PURCHASED CERTIFIED TO THE STANDARDS IN NSPS SUBPART IIII	2.10	0.81	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		3.43	0.82	BACT-PSD
SWEET SORGHUM-TO-ETHANOL ADVANCED BIOREFINERY	HENDRY COUNTY, FL	12/23/2010		NO DATA	0.82	BACT-PSD
ADM POLYMERS	CLINTON, IA	11/30/2006	GOOD COMBUSTION PRACTICES	3.22	0.82	BACT-PSD
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	COMBUSTION DESIGN CONTROLS AND USAGE LIMITS	2.60	0.82	BACT-PSD
MIDWEST FERTILIZER CORPORATION	POSEY, IN	6/4/2014	GOOD COMBUSTION PRACTICES	3.50	0.82	BACT-PSD
OHIO VALLEY RESOURCES, LLC	SPENCER, IN	9/25/2013	GOOD COMBUSTION PRACTICES	3.37	0.82	BACT-PSD
NINEMILE POINT ELECTRIC GENERATING PLANT	JEFFERSON, LA	8/16/2011	ULTRA LOW SULFUR DIESEL AND GOOD COMBUSTION PRACTICES	2.45	0.82	BACT-PSD
CPV ST CHARLES	CHARLES, MD	11/12/2008		2.10	0.82	BACT-PSD
CPV ST CHARLES	CHARLES, MD	11/12/2008		14.07	0.82	BACT-PSD
DETROIT EDISON--MONROE	MONROE, MI	12/21/2010	GOOD COMBUSTION PRACTICES.	1.76	0.82	BACT-PSD
THETFORD GENERATING STATION	GENESEE, MI	7/25/2013	PROPER COMBUSTION DESIGN AND ULTRA LOW SULFUR DIESEL FUEL	NO DATA	0.82	BACT-PSD
CHOUTEAU POWER PLANT	MAYES, OK	1/23/2009		1.87	0.82	BACT-PSD
ENERGY ANSWERS ARECIBO PUERTO RICO RENEWABLE ENERGY PROJECT	ARECIBO, PR	4/10/2014		NO DATA	0.82	BACT-PSD
OHIO RIVER CLEAN FUELS, LLC	COLUMBIANA, OH	11/20/2008	GOOD COMBUSTION PRACTICES AND GOOD ENGINE DESIGN	2.10	0.82	BACT-PSD
MOUNDSVILLE COMBINED CYCLE POWER PLANT	MARSHALL, WV	11/21/2014		1.76	0.82	BACT-PSD
DRAKE	YAVAPAI, AZ	4/12/2006		1.97	0.82	BACT-PSD
VICTORVILLE 2 HYBRID POWER PROJECT	SAN BERNARDINO, CA	3/11/2010	OPERATIONAL RESTRICTION OF 50 HR/YR	1.27	0.82	BACT-PSD
PALMDALE HYBRID POWER PROJECT	LOS ANGELES, CA	10/18/2011		1.27	0.82	BACT-PSD
PALM BEACH RENEWABLE ENERGY PARK	PALM BEACH, FL	12/23/2010	USE OF INHERENTLY CLEAN ULSD FUEL OIL AND GCP	NO DATA	0.82	BACT-PSD
LAUDERDALE PLANT	BROWARD, FL	4/22/2014	GOOD COMBUSTION PRACTICE.	NO DATA	0.82	BACT-PSD
IOWA FERTILIZER COMPANY	LEE, IA	10/26/2012	GOOD COMBUSTION PRACTICES	1.96	0.82	BACT-PSD
CRONUS CHEMICALS, LLC	DOUGLAS, IL	9/5/2014	TIER IV STANDARDS FOR NON-ROAD ENGINES	2.61	0.82	BACT-PSD
PYRAMAX CERAMICS, LLC	ALLENDALE, SC	2/8/2012	ENGINES CERTIFIED TO MEET NSPS, SUBPART IIII	3.50	0.82	BACT-PSD
FORSYTH ENERGY PLANT	FORSYTH, NC	9/29/2005		11.40	0.85	BACT-PSD
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		GOOD COMBUSTION PRACTICES; ANNUAL OPERATING HOUR RESTRICTION	2.25	0.83	BACT-PSD
KENAI NITROGEN OPERATIONS	USA, AK	1/6/2015	LIMITED OPERATION OF 168 HR/YR.	NO DATA	0.95	BACT-PSD
PLAQUEMINE PVC PLANT	IBERVILLE, LA	2/27/2009	GOOD COMBUSTION PRACTICES AND GASEOUS FUEL BURNING	2.94	0.95	BACT-PSD
ARSENAL HILL POWER PLANT	CADDO, LA	3/20/2008	PROPER ENGINE MAINTENANCE	2.17	0.95	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		0.69	1.17	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		0.71	1.17	BACT-PSD
HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	OTTAWA, MI	12/4/2013	GOOD COMBUSTION PRACTICES	1.16	1.17	BACT-PSD
KARN WEADOCK GENERATING COMPLEX	BAY, MI	12/29/2009	ENGINE DESIGN AND OPERATION. 15 PPM SULFUR FUEL.	0.38	1.18	BACT-PSD
PYRAMAX CERAMICS, LLC	ALLENDALE, SC	2/8/2012	HOURS OF OPERATION LIMITED TO 100 HOURS FOR MAINTENANCE AND TESTING	0.20	1.29	BACT-PSD

Appendix C
Table C-27
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Emergency Diesel Fire Pump Engines
VOC Emissions

FACILITY	LOCATION	PERMIT DATE	CONTROL DESCRIPTION	ENGINE SIZE MMBTU/HR	EMISSION LIMIT LB/MMBTU	PERMIT LIMIT BASIS
HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	OTTAWA, MI	12/4/2013	GOOD COMBUSTION PRACTICES	1.16	0.001	BACT-PSD
CRESCENT CITY POWER	ORLEANS, LA	6/6/2005	GOOD ENGINE DESIGN AND PROPER OPERATING PRACTICES	2.98	0.017	BACT-PSD
MOXIE LIBERTY LLC/ASYLUM POWER PL T	BRADFORD COUNTY, PA	10/10/2012		NO DATA	0.031	OTHER CASE-BY-CASE
MOXIE ENERGY LLC/PATRIOT GENERATION PLT	LYCOMING COUNTY, PA	1/31/2013		NO DATA	0.031	OTHER CASE-BY-CASE
NELLIS AIR FORCE BASE	CLARK, NV	2/26/2008	TURBOCHARGER AND AFTERCOOLER	NO DATA	0.044	OTHER CASE-BY-CASE
MIDWEST FERTILIZER CORPORATION	POSEY, IN	6/4/2014	GOOD COMBUSTION PRACTICES	3.50	0.044	BACT-PSD
OHIO VALLEY RESOURCES, LLC	SPENCER, IN	9/25/2013	GOOD COMBUSTION PRACTICES	3.37	0.044	BACT-PSD
MIDWEST FERTILIZER CORPORATION	POSEY, IN	6/4/2014	GOOD COMBUSTION PRACTICES	3.50	0.044	BACT-PSD
PSEG FOSSIL LLC SEWAREN GENERATING STATION	MIDDLESEX COUNTY, NJ	3/7/2014		2.63	0.045	LAER
ENERGY ANSWERS ARECIBO PUERTO RICO RENEWABLE ENERGY PROJECT	ARECIBO, PR	4/10/2014		2.35	0.047	BACT-PSD
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		GOOD COMBUSTION PRACTICES; ANNUAL OPERATING HOUR RESTRICTION	2.25	0.052	LAER
IOWA FERTILIZER COMPANY	LEE, IA	10/26/2012	GOOD COMBUSTION PRACTICES	1.96	0.059	BACT-PSD
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	COMBUSTION DESIGN CONTROLS AND USAGE LIMITS	2.60	0.062	BACT-PSD
FORSYTH ENERGY PLANT	FORSYTH, NC	9/29/2005		11.40	0.091	BACT-PSD
CRONUS CHEMICALS, LLC	DOUGLAS, IL	9/5/2014	TIER IV STANDARDS FOR NON-ROAD ENGINES	2.61	0.094	BACT-PSD
MOUNDSVILLE COMBINED CYCLE POWER PLANT	MARSHALL, WV	11/21/2014		1.76	0.097	BACT-PSD
OREGON CLEAN ENERGY CENTER	LUCAS, OH	6/18/2013	PURCHASED CERTIFIED TO THE STANDARDS IN NSPS SUBPART IIII	2.10	0.119	BACT-PSD
OHIO RIVER CLEAN FUELS, LLC	COLUMBIANA, OH	11/20/2008	GOOD COMBUSTION PRACTICES AND GOOD ENGINE DESIGN	2.10	0.124	BACT-PSD
NINEMILE POINT ELECTRIC GENERATING PLANT	JEFFERSON, LA	8/16/2011	ULTRA LOW SULFUR DIESEL AND GOOD COMBUSTION PRACTICES	2.45	0.315	BACT-PSD
HICKORY RUN ENERGY STATION	LAWRENCE, PA	4/23/2013		3.25	0.342	OTHER CASE-BY-CASE
CHOUTEAU POWER PLANT	MAYES, OK	1/23/2009	GOOD COMBUSTION	1.87	0.353	BACT-PSD
ARSENAL HILL POWER PLANT	CADDO, LA	3/20/2008	LIMITING OPERATING HOURS AND PROPER ENGINE MAINTENANCE	2.17	0.355	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		3.43	0.357	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		0.69	0.357	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		0.71	0.357	BACT-PSD
MUSKOGEE PORCELAIN FLOOR TILE PLT	MUSKOGEE, OK	10/21/2005	GOOD COMBUSTION	NO DATA	0.357	
KENAI NITROGEN OPERATIONS	USA, AK	1/6/2015	LIMITED OPERATION OF 168 HR/YR.	2.70	0.360	BACT-PSD
LANGLEY GULCH POWER PLANT	PAYETTE, ID	6/25/2010	TIER 3 ENGINE-BASED,GOOD COMBUSTION PRACTICES (GCP)	2.20	0.940	BACT-PSD
PYRAMAX CERAMICS, LLC	ALLENDALE, SC	2/8/2012	CERTIFIED ENGINES THAT COMPLY WITH NSPS, SUBPART IIII	3.50	0.940	BACT-PSD
US10 FACILITY	ANDERSON, SC	7/9/2012	BACT HAS BEEN DETERMINED TO BE COMPLIANCE WITH NSPS, SUBPART IIII	1.98	0.940	BACT-PSD
ADM POLYMERS	CLINTON, IA	11/30/2006	GOOD COMBUSTION PRACTICES	3.22	0.945	BACT-PSD
CPV ST CHARLES	CHARLES, MD	11/12/2008		14.07	1.512	BACT-PSD
PYRAMAX CERAMICS, LLC	ALLENDALE, SC	2/8/2012	HOURS OF OPERATION LIMITED TO 100 HOURS FOR MAINTENANCE AND TESTING	0.20	1.763	BACT-PSD

Appendix C
Table C-28
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Emergency Diesel Fire Pump Engines
PM Emissions

FACILITY	LOCATION	PERMIT DATE	CONTROL DESCRIPTION	ENGINE SIZE MMBTU/HR	EMISSION LIMIT LB/MMBTU	PERMIT LIMIT BASIS
CRONUS CHEMICALS, LLC	DOUGLAS, IL	9/5/2014	TIER IV STANDARDS FOR NON-ROAD ENGINES	2.61	0.024	BACT-PSD
FLOPAM INC. FACILITY	IBERVILLE, LA	4/26/2011		1.35	0.047	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	NORTH SLOPE BOROUGH,	6/12/2013	GOOD COMBUSTION AND OPERATING PRACTICES.	3.45	0.047	OTHER CASE-BY-CASE
VICTORVILLE 2 HYBRID POWER PROJECT	SAN BERNARDINO, CA	3/11/2010	OPERATIONAL RESTRICTION OF 50 HR/YR	1.27	0.047	BACT-PSD
PALMDALE HYBRID POWER PROJECT	LOS ANGELES, CA	10/18/2011	USE ULTRA LOW SULFUR FUEL	1.27	0.047	BACT-PSD
IOWA FERTILIZER COMPANY	LEE, IA	10/26/2012	GOOD COMBUSTION PRACTICES	1.96	0.047	BACT-PSD
CRESCENT CITY POWER	ORLEANS, LA	6/6/2005	GOOD ENGINE DESIGN AND PROPER OPERATING PRACTICES	2.98	0.047	BACT-PSD
BLYTHE ENERGY PROJECT II	RIVERSIDE, CA	4/25/2007		2.12	0.047	BACT-PSD
FLOPAM INC. FACILITY	IBERVILLE, LA	4/26/2011		3.11	0.047	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		3.43	0.047	BACT-PSD
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	COMBUSTION DESIGN CONTROLS AND USAGE LIMITS	2.60	0.047	BACT-PSD
MIDWEST FERTILIZER CORPORATION	POSEY, IN	6/4/2014	GOOD COMBUSTION PRACTICES	3.50	0.047	BACT-PSD
OHIO VALLEY RESOURCES, LLC	SPENCER, IN	9/25/2013	GOOD COMBUSTION PRACTICES	3.37	0.047	BACT-PSD
MIDWEST FERTILIZER CORPORATION	POSEY, IN	6/4/2014	GOOD COMBUSTION PRACTICES	3.50	0.047	BACT-PSD
NINEMILE POINT ELECTRIC GENERATING PLANT	JEFFERSON, LA	8/16/2011	ULTRA LOW SULFUR DIESEL AND GOOD COMBUSTION PRACTICES	2.45	0.047	BACT-PSD
CPV ST CHARLES	CHARLES, MD	11/12/2008		2.10	0.047	BACT-PSD
PSEG FOSSIL LLC SEWAREN GENERATING STATION	MIDDLESEX COUNTY, NJ	3/7/2014	USE OF ULTRA LOW SULFUR DISTILLATE OIL	NO DATA	0.047	BACT-PSD
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		GOOD COMBUSTION PRACTICES; ANNUAL OPERATING HOUR RESTRICTION	2.25	0.048	BACT-PSD
WOLVERINE POWER	PRESQUE ISLE, MI	6/29/2011		2.94	0.048	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		0.71	0.069	BACT-PSD
HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	OTTAWA, MI	12/4/2013	GOOD COMBUSTION PRACTICES	1.16	0.090	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		0.69	0.094	BACT-PSD
FORSYTH ENERGY PLANT	FORSYTH, NC	9/29/2005		11.40	0.100	BACT-PSD
DETROIT EDISON--MONROE	MONROE, MI	12/21/2010	GOOD COMBUSTION PRACTICES.	1.76	0.126	BACT-PSD
THETFORD GENERATING STATION	GENESEE, MI	7/25/2013	PROPER COMBUSTION DESIGN AND ULTRA LOW SULFUR DIESEL FUEL	2.21	0.272	BACT-PSD
KENAI NITROGEN OPERATIONS	USA, AK	1/6/2015	LIMITED OPERATION OF 168 HR/YR.	NO DATA	0.310	BACT-PSD
PLAQUEMINE PVC PLANT	IBERVILLE, LA	2/27/2009	GOOD COMBUSTION PRACTICES AND GASEOUS FUEL BURNING	NO DATA	0.310	BACT-PSD
KARN WEADOCK GENERATING COMPLEX	BAY, MI	12/29/2009	ENGINE DESIGN AND OPERATION. 15 PPM SULFUR FUEL.	0.38	0.310	BACT-PSD
ARSENAL HILL POWER PLANT	CADDO, LA	3/20/2008	LIMITING OPERATING HOURS AND PROPER ENGINE MAINTENANCE	2.17	0.313	BACT-PSD

Appendix C
Table C-29
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Emergency Diesel Fire Pump Engines
H2SO4 Emissions

FACILITY	LOCATION	PERMIT DATE	CONTROL DESCRIPTION	ENGINE SIZE MMBTU/HR	EMISSION LIMIT LB/MMBTU	PERMIT LIMIT BASIS
SEWAREN GENERATING STATION	SEWAREN, NJ	3/1/2016		2.63	0.0015 % S in ULSD	
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		GOOD COMBUSTION PRACTICES; ANNUAL OPERATING HOUR RESTRICTION	2.25	0.0015 % S in ULSD	BACT-PSD
HICKORY RUN ENERGY STATION	LAWRENCE, PA	4/23/2013		3.25	0.0004	OTHER CASE-BY-CASE

Appendix C
Table C-30
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Emergency Diesel Fire Pump Engines
CO_2 Emissions

FACILITY	LOCATION	PERMIT DATE	CONTROL DESCRIPTION	ENGINE SIZE	EMISSION LIMIT	EMISSION LIMIT UNITS	PERMIT LIMIT BASIS
MIDWEST FERTILIZER CORPORATION	POSEY, IN	6/4/2014	GOOD COMBUSTION PRACTICES	500 HP	527.4	G/HP-H	BACT-PSD
OHIO VALLEY RESOURCES, LLC	SPENCER, IN	9/25/2013	GOOD COMBUSTION PRACTICES	481 HP	527.4	G/HP-H	BACT-PSD
IOWA FERTILIZER COMPANY	LEE, IA	10/26/2012	GOOD COMBUSTION PRACTICES	14 GAL/H	1.55	G/KW-H	BACT-PSD
THOMAS C. FERGUSON POWER PLANT	LLANO, TX	11/10/2011	BEST WORK PRACTICE	617 HP	7027.8	LB/H	BACT-PSD
MOUNDSVILLE COMBINED CYCLE POWER PLANT	MARSHALL, WV	11/21/2014		251 HP	309	LB/HR	BACT-PSD
NINEMILE POINT ELECTRIC GENERATING PLANT	JEFFERSON, LA	8/16/2011	PROPER OPERATION AND GOOD COMBUSTION PRACTICES	350 HP	163	LB/MMBTU	BACT-PSD
HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	OTTAWA, MI	12/4/2013	GOOD COMBUSTION PRACTICES	165 HP	0.29	T/YR	BACT-PSD
THETFORD GENERATING STATION	GENESEE, MI	7/25/2013	PROPER COMBUSTION DESIGN AND ULTRA LOW SULFUR DIESEL FUEL.	315 HP	15.6	T/YR	BACT-PSD
BERKS HOLLOW ENERGY ASSOC LLC/ONTELAUNEE	BERKS, PA	12/17/2013		16 GAL/HR	19	T/YR	OTHER CASE-BY-CASE
GATEWAY COGENERATION 1, LLC - SMART WATER PROJECT	PRINCE GEORGE, VA	8/27/2012	FUEL-EFFICIENT DESIGN	1.86 MMBTU/H	30.5	T/YR	BACT-PSD
OREGON CLEAN ENERGY CENTER	LUCAS, OH	6/18/2013		300 HP	87	T/YR	BACT-PSD
ROCK SPRINGS FERTILIZER COMPLEX	SWEETWATER, WY	7/1/2014	LIMITED TO 500 HOURS OF OPERATION PER YEAR	200 HP	58	T/YR	BACT-PSD
ROCK SPRINGS FERTILIZER COMPLEX	SWEETWATER, WY	7/1/2014	LIMITED TO 500 HOURS OF OPERATION PER YEAR	200 HP	58	T/YR	BACT-PSD
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	GOOD ENGINEERING DESIGN AND FUEL EFFICIENT DESIGN	371 HP	172	T/YR	BACT-PSD
SEWAREN GENERATING STATION	SEWAREN, NJ	3/1/2016		2.6 MMBTU/H	21	T/YR	
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		GOOD COMBUSTION PRACTICES; ANNUAL OPERATING HOUR RESTRICTION	2.25 MMBTU/H	18.4	T/YR	BACT-PSD
KENAI NITROGEN OPERATIONS	USA, AK	1/6/2015	LIMITED OPERATION OF 168 HR/YR.	2.7 MMBTU/HR	37.2	T/YR	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		490 HP	163	T/YR	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		98 HP	356	T/YR	BACT-PSD
POINT THOMSON PRODUCTION FACILITY	USA, AK	1/23/2015		102 HP	516	T/YR	BACT-PSD
IOWA FERTILIZER COMPANY	LEE, IA	10/26/2012	GOOD COMBUSTION PRACTICES	14 GAL/H	91	T/YR	BACT-PSD
HICKORY RUN ENERGY STATION	LAWRENCE, PA	4/23/2013		3.25 MMBTU/H	33.8	T/YR	OTHER CASE-BY-CASE
CRONUS CHEMICALS, LLC	DOUGLAS, IL	9/5/2014	TIER IV STANDARDS FOR NON-ROAD ENGINES AT 40 CFR 1039.102, TABLE 7.	373 hp	72	T/YR	BACT-PSD

Appendix C
Table C-31
CPV Keasbey, LLC
Recent RACT/BACT/LAER Determinations for Cooling Towers
PM Emissions

FACILITY	LOCATION	PERMIT DATE	CONTROL DESCRIPTION	EMISSION LIMIT	EMISSION LIMIT UNITS	PERMIT LIMIT BASIS
FPL TURKEY POINT NUCLEAR PLANT	MIAMI-DADE, FL	5/30/2009	COOLING TOWER DESIGN PLUS HIGH EFFICIENCY DRIFT ELIMINATORS; HIGHER CONCENTRATIONS OF SOLIDS IN COOLING WATER RESULTS IN FORAMTION OF PM/PM10.	0.0005	%	BACT-PSD
OSCEOLA STEEL CO.	COOK, GA	12/29/2010	DRIFT ELIMINATORS	0.0005	% MASS FLOW RATE	BACT-PSD
ADM CORN PROCESSING - CEDAR RAPIDS	LINN, IA	6/29/2007	DRIFT ELIMINATORS	0.0005	% EFF. DRIFT ELIMIN	BACT-PSD
HOMELAND ENERGY SOLUTIONS, LLC, PN 06-672	CHICKASAW, IA	8/8/2007	DRIFT ELIMINATOR / DEMISTER	0.0005	% DRIFT LOSS	BACT-PSD
TATE & LYLE INDGREDIENTS AMERICAS, INC.	WEBSTER, IA	9/19/2008	DRIFT ELIMINATORS	0.0005	%	BACT-PSD
CF INDUSTRIES NITROGEN, LLC - PORT NEAL NITROGEN COMPLEX	WOODBURY, IA	7/12/2013	DRIFT ELIMINATOR	0.0005	%	BACT-PSD
POWER COUNTY ADVANCED ENERGY CENTER	POWER, ID	2/10/2009	DRIFT/MIST ELIMINATORS	0.0005	% OF TOTAL CIRC FLOW	BACT-PSD
ST. JOSEPH ENEGRY CENTER, LLC	ST. JOSEPH, IN	12/3/2012	DRIFT ELIMINATOR	0.0005	% DRIFT LOSS	BACT-PSD
MIDWEST FERTILIZER CORPORATION	POSEY, IN	6/4/2014	HIGH EFFICIENCY DRIFT ELIMINATORS	0.0005	% DRIFT LOSS	BACT-PSD
MIDWEST FERTILIZER CORPORATION	POSEY, IN	6/4/2014	HIGH EFFICIENCY DRIFT ELIMINATORS	0.0005	% DRIFT LOSS	BACT-PSD
OHIO VALLEY RESOURCES, LLC	SPENCER, IN	9/25/2013	HIGH EFFICIENCY DRIFT ELIMINATORS	0.0005	% DRIFT	BACT-PSD
NINEMILE POINT ELECTRIC GENERATING PLANT	JEFFERSON, LA	8/16/2011	HIGH EFFICIENCY MIST ELIMINATOR	0.0005	PERCENT DRIFT	BACT-PSD
TS POWER PLANT	EUREKA, NV	5/5/2005	DRIFT ELIMINATORS	0.0005	PERCENT DRIFT	BACT-PSD
TRIGEN-NASSAU ENERGY CORPORATION	NASSAU, NY	3/31/2005		0.0005	% DRIFT	BACT-PSD
MIDDLESEX ENERGY CENTER	SAYREVILLE, NJ		HIGH EFFICIENCY DRIFT ELIMINATORS	0.0005	% DRIFT	BACT-PSD
TENASKA BROWNSVILLE GENERATING STATION	CAMERON, TX	4/29/2014	MIST ELIMINATORS	0.0005	%	BACT-PSD
S R BERTRON ELECTRIC GENERATING STATION	HARRIS, TX	12/19/2014	DRIFT ELIMINATORS	0.0005	%	BACT-PSD
SEWAREN GENERATING STATION	SEWAREN, NJ	3/1/2016	DRIFT ELIMINATORS	0.001	% DRIFT	
POWER COUNTY ADVANCED ENERGY CENTER	POWER, ID	2/10/2009	DRIFT/MIST ELIMINATORS	0.001	% OF TOTAL CIRC FLOW	BACT-PSD
STEEL DYNAMICS, INC. - STRUCTURAL AND RAIL DIVISION	WHITLEY, IN	12/21/2012	DRIFT ELIMINATOR;DO NOT USE CHROMIUM-BASED WATER TREATMENT CHEMICALS IN ANY OF THE COOLING TOWERS.	0.001	% DRIFT RATE	BACT-PSD
MAGNETATION LLC	WHITE, IN	4/16/2013	DRIFT ELIMINATORS	0.001	% MAX DRIFT RATE	BACT-PSD
NINEMILE POINT ELECTRIC GENERATING PLANT	JEFFERSON, LA	8/16/2011	HIGH EFFICIENCY MIST ELIMINATOR	0.001	PERCENT DRIFT	BACT-PSD
EMBERCLEAR GTL MS	ADAMS, MS	5/8/2014	HIGH EFFICIENCY DRIFT ELIMINATORS	0.001	%	BACT-PSD
OPPD - NEBRASKA CITY STATION	OTOE, NE	3/9/2005		0.001	LB/H	BACT-PSD
LOW DENSITY POLYETHYLENE (LDPE) PLANT	CALHOUN, TX	8/8/2014	COOLING TOWER WILL HAVE DRIFT ELIMINATORS	0.001	%	BACT-PSD
LA PALOMA ENERGY CENTER	CAMERON, TX	2/7/2013	MIST ELIMINATORS	0.001	%	BACT-PSD
VICTORIA POWER STATION	VICTORIA, TX	12/1/2014	MIST ELIMINATORS	0.001	%	BACT-PSD
CELANESE CLEAR LAKE PLANT	HARRIS, TX	9/16/2013	DRIFT ELIMINATORS WITH A DRIFF FACTOR OF 0001% IS USED	0.001	PERCENT	BACT-PSD
TRINIDAD GENERATING FACILITY	HENDERSON, TX	11/20/2014	MIST ELIMINATORS	0.001	%	BACT-PSD
CHOCOLATE BAYOU FACILITY	BRAZORIA, TX	6/30/2009	DRIFT ELIMINATORS	0.002	%	BACT-PSD
STEEL DYNAMICS, INC. - STRUCTURAL AND RAIL DIVISION	WHITLEY, IN	12/21/2012	DRIFT ELIMINATOR;DO NOT USE CHROMIUM-BASED WATER TREATMENT CHEMICALS IN ANY OF THE COOLING TOWERS.	0.003	% DRIFT RATE	BACT-PSD
OREGON CLEAN ENERGY CENTER	LUCAS, OH	6/18/2013		0.0034	LB/H	BACT-PSD
STEEL DYNAMICS, INC. - STRUCTURAL AND RAIL DIVISION	WHITLEY, IN	12/21/2012	DRIFT ELIMINATOR;DO NOT USE CHROMIUM-BASED WATER TREATMENT CHEMICALS IN ANY OF THE COOLING TOWERS.	0.005	% DRIFT RATE	BACT-PSD
OHIO VALLEY RESOURCES, LLC	SPENCER, IN	9/25/2013	HIGH EFFICIENCY DRIFT ELIMINATORS	0.005	% DRIFT	BACT-PSD
GARYVILLE REFINERY	ST. JOHN THE BAPTIST, LA	12/27/2006	HIGH EFFICIENCY DRIFT ELIMINATORS	0.005	PERCENT	BACT-PSD
MINNESOTA STEEL INDUSTRIES, LLC	ITASCA, MN	9/7/2007	DESIGNED TO MINIMIZE DRIFT	0.005	% DRIFT RATE	BACT-PSD
ENERGY ANSWERS ARECIBO PUERTO RICO RENEWABLE ENERGY PROJECT	ARECIBO, PR	4/10/2014	DRIFT ELIMINATOR DESIGNED TO LIMIT CIRCULATING WATER FLOW DRIFT LOSS TO 0.0005% OR LESS.	0.005	LB/H	BACT-PSD
DRY FORK STATION	CAMPBELL, WY	10/15/2007	MIST ELIMINATORS-0.005% DRIFT LOSS	0.005	%	BACT-PSD
SAPPI CLOQUET LLC	CARLTON, MN	10/28/2009	DRIFT ELIMINATORS	0.01	LB/H	BACT-PSD
MOUNDSVILLE COMBINED CYCLE POWER PLANT	MARSHALL, WV	11/21/2014		0.01	LB/HR	BACT-PSD
LITTLE GYPSY GENERATING PLANT	ST. CHARLES, LA	11/30/2007	DRIFT ELIMINATOR WITH A 99.999% CONTROL EFFICIENCY	0.05	LB/H	BACT-PSD
NELLIS AIR FORCE BASE	CLARK, NV	2/26/2008	LIMIT OF TOTAL DISSOLVED SOLIDS IN THE CIRCULATING WATER TO 0.03 LBS/GAL, LIMIT OF THROUGHPUT TO 1,200 GAL/MIN, AND LIMIT OF DRIFT PERCENT TO 0.005	0.051	LB/H	OTHER CASE-BY-CASE
PLAQUEMINE PVC PLANT	IBERVILLE, LA	2/27/2009	GOOD DESIGN, MAINTENANCE, AND INTEGRATED DRIFT ELIMINATORS	0.057	LB/MM GAL	BACT-PSD
SHINTECH PLAQUEMINE PLANT 2	IBERVILLE, LA	7/10/2008	GOOD DESIGN, GOOD MAINTENANCE, AND MIST ELIMINATORS	0.06	LB/MMGAL	BACT-PSD
MAG PELLET LLC	WHITE, IN	4/24/2014		0.07	LB/H	BACT-PSD
DIRECT REDUCTION IRON PLANT	ST JAMES PARISH, LA	1/27/2011	BACT IS A COMBINATION OF LESS THAN OR EQUAL TO 1,000 MILLIGRAMS PER LITER TDS CONCENTRATION IN THE COOLING WATER AND DRIFT ELIMINATORS EMPLOYING A DRIFT MAXIMUM OF 0.0005%.	0.07	LB/H	BACT-PSD
PLAQUEMINE PVC PLANT	IBERVILLE, LA	2/27/2009	GOOD DESIGN, MAINTENANCE, AND INTEGRATED DRIFT ELIMINATORS	0.08	LB/MM GAL	BACT-PSD
SHINTECH PLAQUEMINE PLANT 2	IBERVILLE, LA	7/10/2008	GOOD DESIGNS, GOOD MAINTENANCE, AND MIST ELIMINATORS	0.08	LB/MMGAL	BACT-PSD
MGM MIRAGE	CLARK, NV	11/30/2009	EACH UNIT IS EQUIPPED WITH A DRIFT ELIMINATOR LIMITING THE DRIFT RATE TO 0.001% AND THE TOTAL DISSOLVED SOLIDS IN THE CURCULATION WATER IS LIMITED TO 3,600 PPM.	0.091	LB/H	LAER
GATEWAY COGENERATION 1, LLC - SMART WATER PROJECT	PRINCE GEORGE, VA	8/27/2012	USE OF DRIFT ELIMINATORS TO A DRIFT RATE OF 0.001% OF THE CIRCULATING WATER FLOW AND A TOTAL DISSOLVED SOLIDS CONTENT OF THE COOLING WATER OF NO MORE THAN 1200 MG/L.	0.1	LB/H	BACT-PSD
DIRECT REDUCTION IRON PLANT	ST JAMES PARISH, LA	1/27/2011	BACT IS A COMBINATION OF LESS THAN OR EQUAL TO 1,000 MILLIGRAMS PER LITER TDS CONCENTRATION IN THE COOLING WATER AND DRIFT ELIMINATORS EMPLOYING A DRIFT MAXIMUM OF 0.0005%.	0.11	LB/H	BACT-PSD
PEONY CHEMICAL MANUFACTURING FACILITY	BRAZORIA, TX	4/1/2015	DRIFT ELIMINATOR IS 0.0005% EFFICIENT	0.12	LB/HR	OTHER CASE-BY-CASE
PSEG FOSSIL LLC SEWAREN GENERATING STATION	MIDDLESEX COUNTY, NJ	3/7/2014		0.16	LB/H	BACT-PSD
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	A DRIFT ELIMINATOR CONTROLS DRIFT RATE TO 0.005%, AND THE PERMITTEE IS REQUIRED TO MAINTAIN TSD CONTENT IN THE COOLING WATER TO A MAXIMUM OF 2,520 PPM.	0.215	LB/H	OTHER CASE-BY-CASE
PEONY CHEMICAL MANUFACTURING FACILITY	BRAZORIA, TX	4/1/2015	DRIFT ELIMINATOR IS 0.0005% EFFICIENT	0.31	LB/HR	OTHER CASE-BY-CASE
AMMONIA PRODUCTION FACILITY	JEFFERSON, LA	3/27/2013	HIGH EFFICIENCY DRIFT ELIMINATORS TO CONTROL DRIFT TO NO MORE THAN 0.0005%.	0.34	LB/H	BACT-PSD
ACTIVATED CARBON FACILITY	RED RIVER, LA	5/28/2008	DRIFT ELIMINATION SYSTEM	0.41	LB/H	BACT-PSD
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	DRIFT ELIMINATOR TO REDUCE DRIFT RATE TO LESS THAN 0.005% AND MAINTAINING TOTAL DISSOLVED SOLIDS CONTENT IN THE COOLING WATER TO BELOW 3,000 PPM.	0.425	LB/H	OTHER CASE-BY-CASE
MOUNDSVILLE COMBINED CYCLE POWER PLANT	MARSHALL, WV	11/21/2014		0.5	LB/HR	BACT-PSD
AMMONIA PRODUCTION FACILITY	JEFFERSON, LA	3/27/2013	HIGH EFFICIENCY DRIFT ELIMINATORS TO CONTROL DRIFT TO NO MORE THAN 0.0005%.	0.56	LB/H	BACT-PSD
HARRAH'S OPERATING COMPANY, INC.	CLARK, NV	8/20/2009	BACT CONSISTS OF THE TWO REQUIREMENTS DESCRIBED IN THE PROCESS.	0.744	LB/H	OTHER CASE-BY-CASE
GAINESVILLE RENEWABLE ENERGY CENTER	ALACHUA, FL	12/28/2010	THE TOWER WILL BE EQUIPPED WITH DRIFT ELIMINATORES TO MEET A PROPOSED DRIFT RATE OF 0.0005%	1	T/YR	BACT-PSD
OREGON CLEAN ENERGY CENTER	LUCAS, OH	6/18/2013		1.03	LB/H	BACT-PSD
ENERGY ANSWERS ARECIBO PUERTO RICO RENEWABLE ENERGY PROJECT	ARECIBO, PR	4/10/2014	DRIFT ELIMINATOR DESIGNED TO LIMIT CIRCULATING WATER FLOW DRIFT LOSS TO 0.0005% OR LESS.	1.3	LB/H	BACT-PSD
GOLDEN GRAIN ENERGY	CERRO GORDO, IA	4/19/2006	MIST ELIMINATOR	1.33	LB/H	BACT-PSD
PLAQUEMINE COGENERATION FACILITY	IBERVILLE, LA	7/23/2008	GOOD OPERATING PRACTICES	1.4	LB/H	BACT-PSD
ARSENAL HILL POWER PLANT	CADDO, LA	3/20/2008	USE OF MIST ELIMINATORS	1.4	LB/H	BACT-PSD
VICTORVILLE 2 HYBRID POWER PROJECT	SAN BERNARDINO, CA	3/11/2010		1.6	LB/H	BACT-PSD
PALMDALE HYBRID POWER PROJECT	LOS ANGELES, CA	10/18/2011		1.6	LB/H	BACT-PSD
CRESCENT CITY POWER	ORLEANS, LA	6/6/2005		1.75	LB/H	BACT-PSD
HOLLAND BOARD OF PUBLIC WORKS - EAST 5TH STREET	OTTAWA, MI	12/4/2013	MIST/DRIFT ELIMINATORS	2.37	T/YR	BACT-PSD
CRESCENT CITY POWER	ORLEANS, LA	6/6/2005	MARLEY EXCEL DRIFT ELIMINATORS	2.61	LB/H	BACT-PSD
JOHN W. TURK JR. POWER PLANT	FULTON, AR	11/5/2008	DRIFT ELIMINATORS 0.0005% DRIFT RATE	5.2	LB/H	BACT-PSD
INDIANA GASIFICATION, LLC	SPENCER, IN	6/27/2012	HIGH EFFICIENCY DRIFT ELIMINATORS DESIGNED WITH A DRIFT LOSS RATE OF LESS THAN 0.0005%	1500	PPM	BACT-PSD

APPENDIX D

AGENCY CORRESPONDENCE

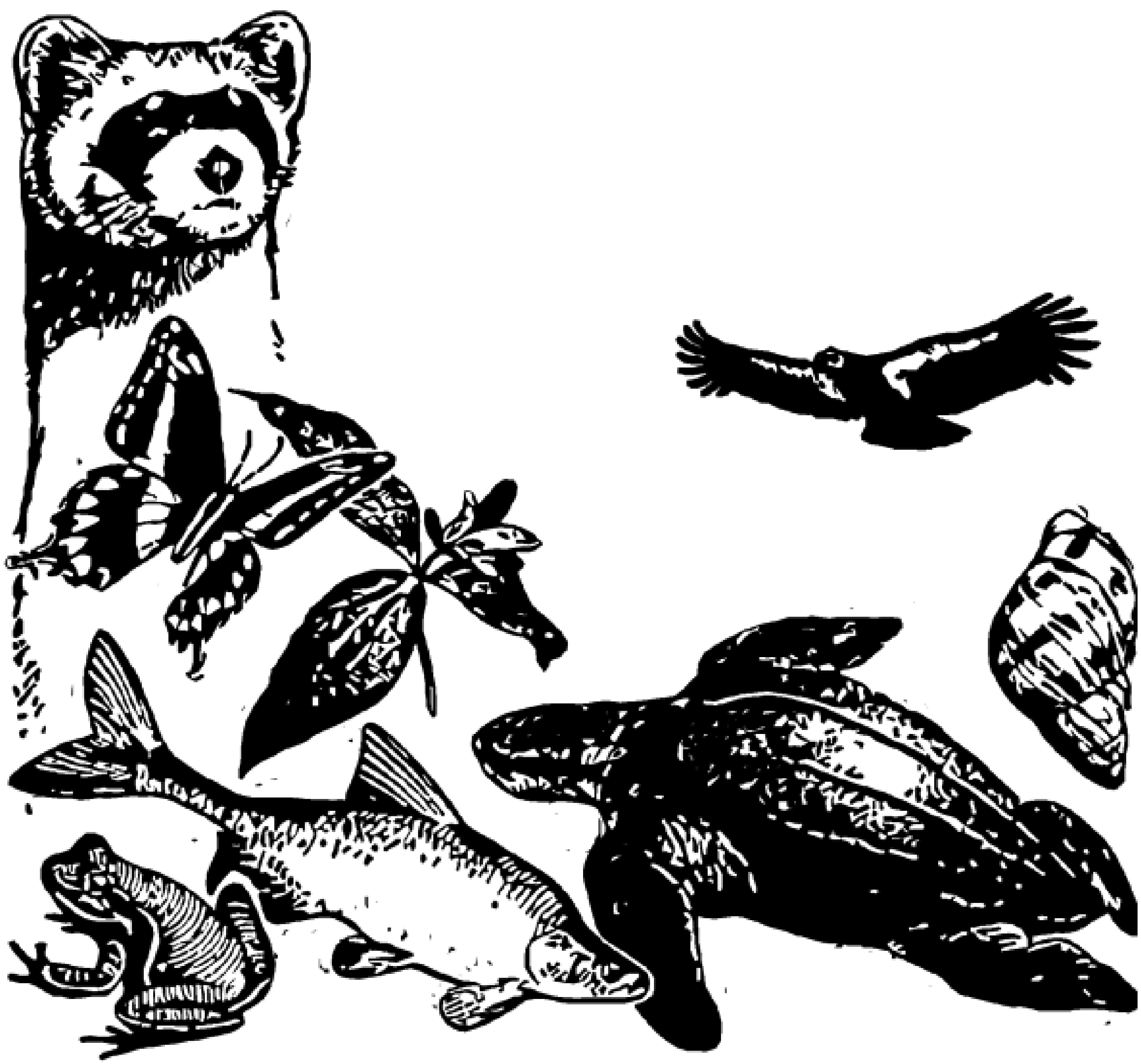
U.S. Fish & Wildlife Service

Keasbey Energy Center

IPaC Trust Resources Report

Generated July 05, 2016 11:17 AM MDT, IPaC v3.0.8

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

Table of Contents

U.S. Fish & Wildlife Service

IPaC Trust Resources Report

NAME

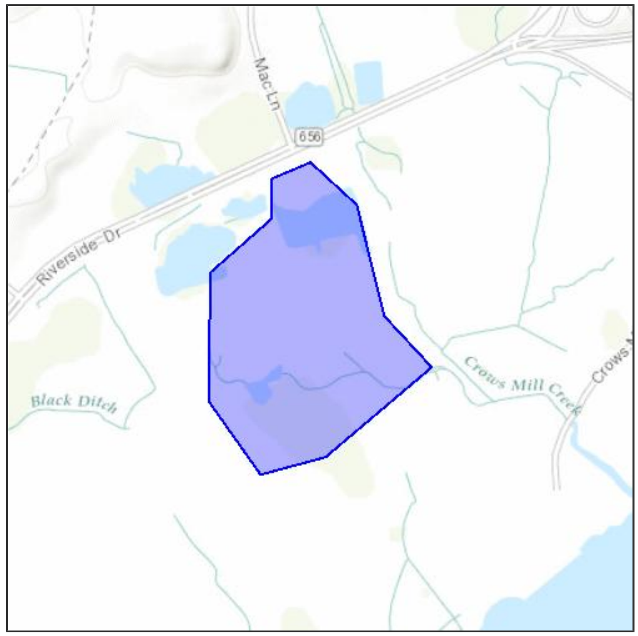
Keasbey Energy Center

LOCATION

Middlesex County, New Jersey

IPAC LINK

https://ecos.fws.gov/ipac/project/OKGMU-W3E4B-HWRMA-OGQWT-O47LWY



U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

New Jersey Ecological Services Field Office
927 North Main Street, Building D
Pleasantville, NJ 08232-1454
(609) 646-9310

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.

There are no endangered species in this location

Critical Habitats

There are no critical habitats in this location

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.[1] There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

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1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern
  http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.birdscanada.org/birdmon/default/datasummaries.jsp

The following species of migratory birds could potentially be affected by activities in this location:

American Oystercatcher Haematopus palliatus — Bird of conservation concern
On Land Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0G8

American Bittern Botaurus lentiginosus — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F3

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
On Land Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

Black Skimmer Rynchops niger — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0EO

Black-billed Cuckoo Coccyzus erythropthalmus — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HI

Blue-winged Warbler Vermivora pinus — Bird of conservation concern
On Land Season: Breeding

Canada Warbler Wilsonia canadensis — Bird of conservation concern
On Land Season: Breeding

Fox Sparrow Passerella iliaca — Bird of conservation concern
On Land Season: Wintering

Golden-winged Warbler Vermivora chrysoptera — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0G4

Gull-billed Tern Gelochelidon nilotica — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0JV

Hudsonian Godwit Limosa haemastica — Bird of conservation concern
At Sea Season: Migrating

Kentucky Warbler Oporornis formosus — Bird of conservation concern
On Land Season: Breeding

Least Bittern Ixobrychus exilis
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B092

Loggerhead Shrike Lanius ludovicianus — Bird of conservation concern
On Land Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FY

Peregrine Falcon Falco peregrinus — Bird of conservation concern
On Land Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU

Pied-billed Grebe Podilymbus podiceps — Bird of conservation concern
On Land Season: Year-round

Prairie Warbler Dendroica discolor — Bird of conservation concern
On Land Season: Breeding

Purple Sandpiper Calidris maritima — Bird of conservation concern
On Land Season: Wintering

Red Knot Calidris canutus rufa — Bird of conservation concern
On Land Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0DM

Rusty Blackbird Euphagus carolinus — Bird of conservation concern
On Land Season: Wintering

Saltmarsh Sparrow Ammodramus caudacutus — Bird of conservation concern
On Land Season: Breeding

Seaside Sparrow Ammodramus maritimus — Bird of conservation concern
On Land Season: Year-round

Short-eared Owl Asio flammeus — Bird of conservation concern
On Land Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD

Snowy Egret Egretta thula — Bird of conservation concern
On Land Season: Breeding

Upland Sandpiper Bartramia longicauda — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HC

Willow Flycatcher Empidonax traillii — Bird of conservation concern
On Land Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F6

Wood Thrush Hylocichla mustelina — Bird of conservation concern
On Land Season: Breeding

Worm Eating Warbler Helmitheros vermivorum — Bird of conservation concern
On Land Season: Breeding

Wildlife refuges and fish hatcheries

There are no refuges or fish hatcheries in this location

Wetlands in the National Wetlands Inventory

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

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

DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

This location overlaps all or part of the following wetlands:

Estuarine And Marine Wetland

E2EM1Pd
E2EM5/1Pd

Freshwater Emergent Wetland

PEM1E
PEM5R

Freshwater Forested/shrub Wetland

PSS1R

Freshwater Pond

PUBHx
PUBV

Riverine

R4SBC
R5UBH

A full description for each wetland code can be found at the National Wetlands Inventory website: http://107.20.228.18/decoders/wetlands.aspx

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Jersey Ecological Services Field Office
927 NORTH MAIN STREET, BUILDING D
PLEASANTVILLE, NJ 08232
PHONE: (609)646-9310 FAX: (609)646-0352
URL: www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

Consultation Code: 05E2NJ00-2016-SLI-0627 July 05, 2016
Event Code: 05E2NJ00-2016-E-00480
Project Name: Keasbey Energy Center

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

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species that may occur in your proposed action area and/or may be affected by your proposed project. This species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under Section 7(c) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*)

If the enclosed list indicates that any listed species may be present in your action area, please visit the New Jersey Field Office consultation web page as the next step in evaluating potential project impacts: http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

On the New Jersey Field Office consultation web page you will find:

- habitat descriptions, survey protocols, and recommended best management practices for listed species;
- recommended procedures for submitting information to this office; and
- links to other Federal and State agencies, the Section 7 Consultation Handbook, the Service's wind energy guidelines, communication tower recommendations, the National Bald Eagle Management Guidelines, and other resources and recommendations for protecting wildlife resources.

The enclosed list may change as new information about listed species becomes available. As per Federal regulations at 50 CFR 402.12(e), the enclosed list is only valid for 90 days. Please return to the ECOS-IPaC website at regular intervals during project planning and implementation to obtain an updated species list. When using ECOS-IPaC, be careful about drawing the boundary of your Project Location. Remember that your action area under the ESA is not limited to just the footprint of the project. The action area also includes all areas that may be indirectly affected through impacts such as noise, visual disturbance, erosion, sedimentation, hydrologic change, chemical exposure, reduced availability or access to food resources, barriers to movement, increased human intrusions or access, and all areas affected by reasonably forseeable future that would not occur without ("but for") the project that is currently being proposed.

We appreciate your concern for threatened and endangered species. The Service encourages Federal and non-Federal project proponents to consider listed, proposed, and candidate species early in the planning process. Feel free to contact this office if you would like more information or assistance evaluating potential project impacts to federally listed species or other wildlife resources. Please include the Consultation Tracking Number in the header of this letter with any correspondence about your project.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: Keasbey Energy Center

Official Species List

Provided by:

New Jersey Ecological Services Field Office
927 NORTH MAIN STREET, BUILDING D
PLEASANTVILLE, NJ 08232
(609) 646-9310
http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

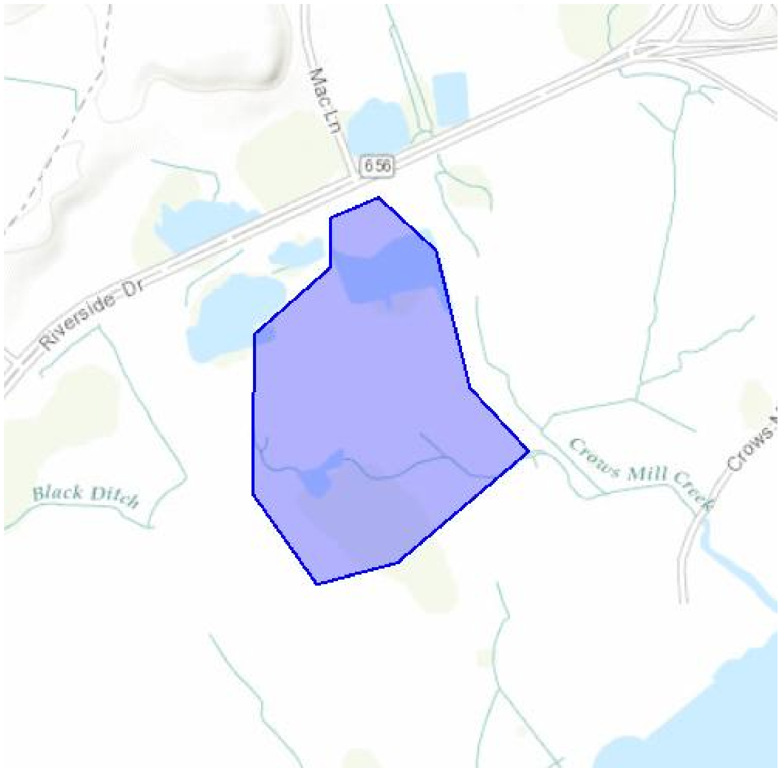
Consultation Code: 05E2NJ00-2016-SLI-0627
Event Code: 05E2NJ00-2016-E-00480

Project Type: POWER GENERATION

Project Name: Keasbey Energy Center
Project Description: CPV Keasbey, LLC is proposing to construct a combined cycle power facility on a parcel of land controlled by CPV that borders the existing Woodbridge Energy Center in the Township of Woodbridge, Middlesex County, New Jersey.

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

Project Location Map:



Project Coordinates: MULTIPOLYGON (((-74.32002067565918 40.51729008578551, -74.32117938995361 40.51693121343741, -74.32117938995361 40.516034024163, -74.3229818344116 40.51482687783199, -74.32302474975586 40.51340763745765, -74.32302474975586 40.511906798865034, -74.3215012550354 40.5102917285085, -74.3195915222168 40.51068326428807, -74.31648015975952 40.51270616273139, -74.31787490844727 40.513848094581704, -74.3186902999878 40.51634396363333, -74.32002067565918 40.51729008578551)))

Project Counties: Middlesex, NJ

Endangered Species Act Species List

There are a total of 0 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

There are no listed species identified for the vicinity of your project.

Critical habitats that lie within your project area

There are no critical habitats within your project area.

1200 Wall Street West
5th Floor
Lyndhurst, NJ 07071

201.933.5541 PHONE
201.933.5601 FAX

www.trcsolutions.com

July 12, 2016

Mr. Greg John
New Jersey Department of Environmental Protection
Division of Air Quality, Bureau of Technical Services
401 East State Street, 2nd Floor
Trenton, New Jersey 08625

Subject: CPV Keasbey, LLC
Keasbey Energy Center
Proposed Combined Cycle Power Facility
Township of Woodbridge, Middlesex County, New Jersey
Request for Waiver from Pre-Construction Ambient Air Quality Monitoring

Dear Mr. John:

This letter serves as a request on behalf of CPV Keasbey, LLC (CPV Keasbey) to the New Jersey Department of Environmental Protection ("NJDEP") for a waiver from the requirement to perform one year of pre-application ambient air quality monitoring for the proposed combined cycle power facility (to be known as the Keasbey Energy Center) to be located in the Township of Woodbridge, Middlesex County, New Jersey (see Figure 1) in accordance with Prevention of Significant Deterioration (PSD) of Air Quality regulations.

These regulations state that major new or modified facilities having annual emissions of regulated air contaminants in excess of significant emission rates (SER) must provide an analysis of air quality data in the area of the proposed facility that, in general, consist of continuous air quality monitoring data gathered over a year preceding receipt of the application. As fully described below, this request is for a waiver from the pre-application ambient monitoring data requirement for the air contaminants: carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter with an aerodynamic diameter less than 10 micrometers (μm) (PM-10), and less than 2.5 micrometers (PM-2.5).

Pursuant to the PSD regulations codified in 40 CFR 51.166 and 40 CFR 52.21, U.S. EPA may exempt a proposed PSD source, otherwise subject to the one-year pre-construction ambient monitoring requirement, if either:

(1) representative existing ambient air monitoring data exists in the affected area and is of the quality and nature which demonstrates the current conditions of the area's air quality; or

(2) representative ambient air monitoring data exists from a prior time period which can be demonstrated to be conservative (i.e., higher) in establishing the current conditions of the area's air quality.

See also, 40 CFR 52.21.1670 (approved Part 231 at 75 Fed. Reg. 70, 140 (Nov. 17, 2010)) ("applicant makes an acceptable showing that representative existing ambient monitoring data exists in the affected area of the quality and nature which demonstrates the current conditions of the air quality of the area"); New Source Review Workshop Manual (Draft, October 1990) at C.18 ("To be acceptable, such data must be judged by the permitting agency to be representative of the air quality for the area in which the proposed project would be constructed and operated"). As shown below, representative data satisfying these requirements exists.

CPV Keasbey is also requesting an exemption from the pre-application ambient monitoring requirement for lead (Pb) because it will be emitted in amounts less than its SER; for fluorides, hydrogen sulfide, total reduced sulfur, and reduced sulfur compounds because they are not anticipated as a product of natural gas combustion (i.e., from the combustion turbine and auxiliary boiler) and fuel oil combustion (i.e., from the combustion turbine, emergency diesel generator, and emergency diesel fire pump); and for sulfuric acid (H_2SO_4) mist because there is no approved monitoring technique available.

Project Description

CPV Keasbey, LLC is proposing to construct a nominal 630-megawatt (MW) 1-on-1 combined cycle power facility (to be known as the Keasbey Energy Center) on a parcel of land in the Township of Woodbridge, Middlesex County, New Jersey. The combustion turbine will be primarily fueled by natural gas but will be capable of firing ultra-low sulfur diesel (ULSD) for up to 720 hours per year.

The Keasbey Energy Center will consist of one (1) General Electric (GE) 7HA.02 combustion turbine at the proposed facility site. Hot exhaust gases from the combustion turbine will flow into one (1) heat recovery steam generator (HRSG). The HRSG will produce steam to be used in the steam turbine and will be equipped with a natural gas fired duct burner. Upon leaving the HRSG, the turbine exhaust gases will be directed to one (1) exhaust stack. Other ancillary equipment at the proposed facility will include one (1) gas fired auxiliary boiler, one (1) emergency diesel fire pump, one (1) emergency diesel generator, and a wet mechanical draft cooling tower.

Emissions from the combined cycle unit will be controlled by the use of dry low-NO_x burner technology (during natural gas firing), water injection (during ULSD firing), and selective catalytic reduction (SCR) for NO_x control, an oxidation catalyst for CO and volatile organic compounds (VOCs) control, and the use of clean low-sulfur fuels (i.e., natural gas and ULSD) to minimize emissions of SO_2, PM/PM-10/PM-2.5, and H_2SO_4. Exhaust gases from the combined cycle unit after emission controls will be dispersed to the atmosphere via one (1) stack. Steam from the steam turbine will be sent to a condenser where it will be cooled to a liquid state and returned to the HRSG. Waste heat from the condenser will be dissipated through a wet mechanical draft cooling tower.

Facility Emissions

The proposed facility (as a significant modification to a major source) is located in an attainment area for SO_2, NO_2, CO, PM-10, and PM-2.5. The proposed facility will potentially emit more than the SERs for several air pollutants, and will be subject to PSD permitting for these constituents. Under PSD regulations, an air quality dispersion modeling analysis is required to ensure that CO, PM-10, PM-2.5, SO_2, and NO_2 emissions from the proposed facility will be compliant with NAAQS and applicable PSD Class II increments.

Table 1 presents projected facility emission rates and the pollutant specific significant emission rates (SERs) defined in the PSD regulations. The proposed facility is projected to have annual emissions in excess of PSD SERs for CO, NO_2, particulates (PM/PM-10/PM-2.5), and H_2SO4. The emissions of SO_2 and lead are below their SERs.

Existing Background Ambient Air Quality Data

Based on a review of the locations of NJDEP ambient air quality monitoring sites, the closest “regional” NJDEP monitoring sites will be used to represent the current background air quality in the site area.

Background data for CO was obtained from a New Jersey monitoring station located in Union County (EPA AIRData #34-039-0004). The monitor is located at Interchange 13 on the New Jersey Turnpike (Elizabeth Lab), approximately 17 km northeast of the proposed facility. This monitor is located in an area with a greater amount of mobile and point sources of air emissions as compared to the project area. Thus, this monitor would be considered to conservatively represent the ambient air quality within the project area.

Background data for PM-10 was obtained from a Jersey City monitoring station located in Hudson County, New Jersey (EPA AIRData # 34-017-1003), approximately 32 km northeast of the proposed facility. The monitor is located at 355 Newark Avenue in a commercial/urban area. This monitor is located in an area with a greater amount of mobile and point sources of air emissions as compared to the project area. Thus, this monitor would be considered to conservatively represent the ambient air quality within the project area.

Background data for NO_2 was obtained from an East Brunswick monitoring station located in Middlesex County, New Jersey (EPA AIRData # 34-023-0011), approximately 11 km west-southwest of the proposed facility. The monitor is located at Rutgers University (Veg. Research Farm #3 on Ryders Lane) in an agricultural/rural area with proximate commercial uses (i.e., Route 1 and Interstate 95). This monitor’s close proximity to the Project site would qualify it to be representative of the ambient air quality within the project area.

Background data for PM-2.5 was obtained from a New Brunswick Township monitoring station located in Middlesex County, New Jersey (EPA AIRData # 34-023-0006), approximately 10 km west-southwest of the proposed facility. The monitor is located at Rutgers University’s Cook College (Log Cabin Road) in an agricultural/rural area with proximate commercial uses. This monitor’s close proximity would qualify it to be representative of the ambient air quality within the project area.

The monitoring data for the most recent three years (2013-2015) are presented in Table 2 while Figure 2 displays the locations of the aforementioned air quality monitors in relation to the proposed facility.

Monitoring Waiver Request

In summary, CPV Keasbey, LLC is requesting a waiver from the requirement to perform pre-application ambient air quality monitoring for CO, NO_2, PM-10, and PM-2.5 because there exists acceptable quality assured ambient air quality data from alternate locations that satisfy the requirements of 40 CFR 52.21.1670. Further, CPV Keasbey is requesting an exemption from the requirement to perform pre-application ambient monitoring for SO_2 and lead because they will be emitted in amounts less than their SERs; for fluorides, hydrogen sulfide, total reduced sulfur, and reduced sulfur compounds because they are not anticipated as a product of natural gas combustion (i.e., from the combustion turbine, and auxiliary boiler) and fuel oil combustion (i.e., from the combustion turbine, emergency diesel generator, and emergency diesel fire pump); and for H_2SO_4 because there is no approved monitoring technique available.

Please feel free to contact me (201) 508-6960 or tmain@trcsolutions.com should you have any questions regarding this monitoring exemption request.

Sincerely,

TRC

Theodore Main
Principal Consulting Meteorologist

cc: A. Colecchia, U.S. EPA Region II
J. Donovan, CPV
A. Urquhart, CPV
M. Keller, TRC
TRC Project File 252973

Table 1
Comparison of Projected Facility Emissions to PSD Significant Emission Rates

Pollutant	Projected Emission Rate (tons per year)	Significant Emission Rate (tons per year)
Carbon Monoxide	110.0	100
Sulfur Dioxide	39.3	40
Particulate Matter (PM)	77.6	25
Particulate Matter less than 10 microns (PM-10)	123.6	15
Particulate Matter less than 2.5 microns (PM-2.5)	119.3	10
Nitrogen Oxides	148.9	40
Lead	0.03	0.6
Fluorides	[a]	3
Sulfuric Acid Mist[b]	25.1	7
Hydrogen Sulfide	[a]	10
Total Reduced Sulfur (including H_2S)	[a]	10
Reduced Sulfur Compounds (including H_2S)	[a]	10

[a]Not anticipated as a product of natural gas (i.e., from the combustion turbine and auxiliary boiler) or fuel oil combustion (i.e., from the combustion turbine, emergency diesel generator, and emergency diesel fire pump), and assumed zero.

[b]No acceptable monitoring techniques exist for this pollutant.

Table 2
Ambient Concentrations of Criteria Pollutants
Proposed to be Used to Represent Site Conditions

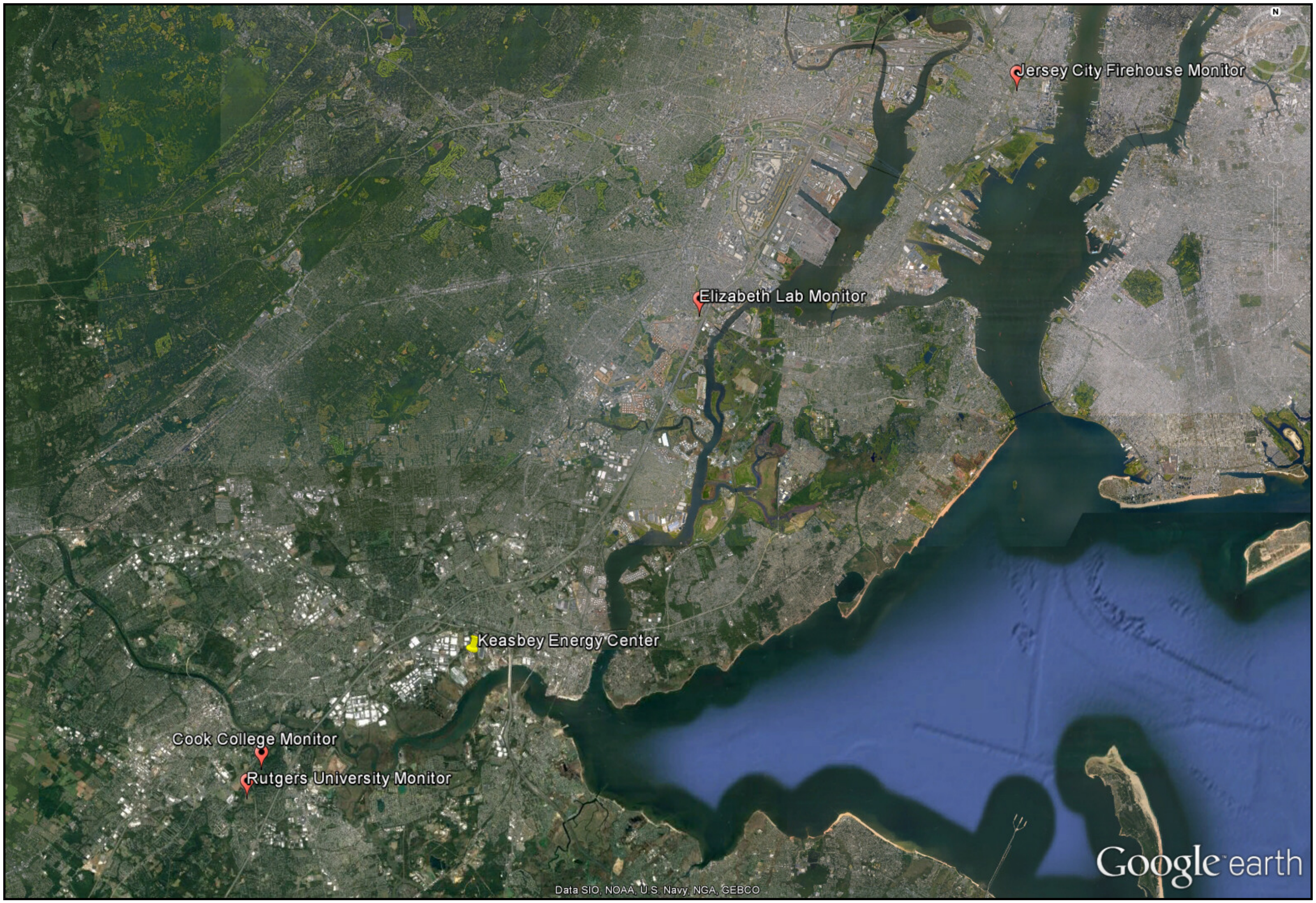
Pollutant	Averaging Period	Maximum Ambient Concentrations (μg/m³)		
		2013	2014	2015
NO_2	1-Hour[a]	75.2	88.4	90.2
	Annual	18.8	16.9	19.3
CO	1-Hour	2,300	2,530	2,760
	8-Hour	1,495	2,070	1,840
PM-10	24-Hour	43	37	44
PM-2.5[b]	24-Hour	19.1	20	20
	Annual	8.0	8.2	7.9

[a]1-hour 3-year average 98th percentile value for NO_2 is **84.6** ug/m³.
[b]24-hour 3-year average 98th percentile value for PM-2.5 is **19.7** ug/m³; Annual 3-year average value for PM-2.5 is **8.0** ug/m³.
High second-high short term (1-, 8-, and 24-hour) and maximum annual average concentrations presented for all pollutants other than PM-2.5 and 1-hour NO_2.
Monitored background concentrations obtained from the U.S. EPA AIRData, AirExplorer and Air Quality System (AQS) websites.

Keasbey Energy Center
Proposed Combined Cycle Power Facility
Township of Woodbridge, Middlesex County, New Jersey

Figure 1. Site Location Aerial Photograph

Source: Google Earth, 2016.



Keasbey Energy Center
Proposed Combined Cycle Power Facility
Township of Woodbridge, Middlesex County, New Jersey

Figure 2. Background Ambient Air Quality Monitors

Source: Google Earth, 2016.

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5th Floor
Lyndhurst, NJ 07071

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201.933.5601 FAX

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July 12, 2016

Ms. Jill Webster
Environmental Scientist
United States Department of the Interior
U.S. Fish & Wildlife Service
National Wildlife Refuge System
7333 W. Jefferson Ave., Suite 375
Lakewood, Colorado 80235-2017

Subject: CPV Keasbey, LLC
Keasbey Energy Center
Proposed Combined Cycle Power Facility
Township of Woodbridge, Middlesex County, New Jersey
Need for Class I Area Air Quality and Air Quality Related Values (AQRV) Analyses for the Brigantine Wilderness Class I Area

Dear Ms. Webster:

TRC has been retained by CPV Keasbey, LLC (CPV Keasbey) to prepare a Prevention of Significant Deterioration (PSD) permit application for a proposed nominal 630-megawatt (MW) combined cycle power facility (to be known as the Keasbey Energy Center) to be constructed in the Township of Woodbridge, Middlesex County, New Jersey. The approximate Universal Transverse Mercator (UTM) coordinates of the Keasbey Energy Center are 557,517 meters Easting, 4,485,098 meters Northing, in Zone 18, NAD83.

The Keasbey Energy Center project design reflects the planned installation of one (1) General Electric (GE) 7HA.02 combustion turbine at the facility. The combustion turbine will be primarily natural gas-fired but will be capable of utilizing ultra-low sulfur diesel (ULSD) for up to 720 hours per year. Dry low NO_x burners (during natural gas firing), water injection (during ULSD firing), and Selective Catalytic Reduction (SCR) will be used to reduce nitrogen oxides (NO_x) emissions from the combustion turbine. The firing of natural gas and ULSD will minimize emissions of particulate matter with an aerodynamic diameter less than 10 microns (PM-10), sulfur dioxide (SO_2) and sulfuric acid mist (H_2SO_4). Additionally, an oxidation catalyst will be installed to control the emissions of carbon monoxide (CO) and volatile organic compounds (VOC).

Exhaust gases from the combustion turbine will flow into an adjacent heat recovery steam generator (HRSG). The HRSG will produce steam to be used in the steam turbine generator and will be equipped with a natural gas fired duct burner. Combustion products will be discharged through one (1) exhaust stack. Supporting auxiliary equipment includes a gas fired auxiliary boiler, one (1) emergency diesel generator, one (1) emergency diesel fire pump, and a wet mechanical draft cooling tower.

Estimated potential short-term (24-hour) maximum emissions and annual emissions are presented in Table 1. The PM-10 emission rates presented in Table 1 include filterable and condensable particulates.

Table 1: Estimated Potential Emissions

Pollutant	Combustion Turbine Maximum Short-Term Emissions (lb/hr)		Annual Emissions[1] (tpy)	Annual Emissions[2] (tpy)
	Natural Gas Fired	ULSD Fired		
Nitrogen Oxides (NO_x)	32.8	56.1	152.1	246
Sulfur Dioxide (SO_2)	9.6	6.6	41.0	29
Particulate Matter with an aerodynamic diameter less than 10 microns (PM-10)	23.4	64.6	117.3	283
Sulfuric Acid Mist (H_2SO_4)	6.1	4.3	26.1	19

[1]Annual emissions based on one (1) GE 7HA.02 combustion turbine operating 8,040 hours per year on natural gas and 720 hours per year on ULSD at the respective maximum short-term emission rates.
[2]Annual emissions based on one (1) GE 7HA.02 combustion turbine hypothetically operating 8,760 hours per year on ULSD at the ULSD short-term emission rate (solely for comparison to FLAG Q/D guidance, and not for permitting).

The Brigantine Wilderness Class I area located in the Edwin B. Forsythe National Wildlife Refuge in New Jersey is approximately 108 km south of the proposed facility. Following the Draft Revised FLAG guidance (2010), TRC believes that the proposed facility may be eligible for an exemption from the requirement to perform a Class I area modeling analysis because of its inherent low emissions and distance to the Class I area. We understand that the maximum short-term emission rates are used in the exemption analysis. Assuming full year operation (8,760 hours) of the combined cycle combustion turbine (firing ULSD) yields a (emission in tpy)/(distance in km) ratio (577 tons per year/108 km) of approximately 5.3. It should be noted that this assumption is conservative since the combustion turbine will be capable of firing ULSD for up to 720 hours per year. It is our understanding that according to the Q/D test, the FLM should consider this source (which is located greater than 50 km from the Brigantine Wilderness Class I area) and has a ratio of annual equivalent emissions (Q in tons per year) divided by distance (D in km) from the Brigantine Wilderness Class I area (km) < 10, as having negligible impacts with respect to Class I visibility impacts and that there would not be any Class I visibility impact analyses required from this source.

With this letter, TRC, on behalf of CPV Keasbey, LLC, is formally requesting a determination that there is no need to perform a Class I area air quality and AQRV analysis for the Brigantine Wilderness Area as part of the facility's PSD Air Permit application. If you should require additional information on the proposed Project or have any questions, please feel free to contact me at (201) 508-6960 or tmain@trcsolutions.com.

Sincerely,

TRC

Theodore Main
Principal Consulting Meteorologist

cc: J. Donovan, CPV
A. Urquhart, CPV
M. Keller, TRC
TRC Project File 252973

Keller, Michael

From: Webster, Jill <jill_webster@fws.gov>
Sent: Wednesday, July 13, 2016 11:09 AM
To: Keller, Michael
Subject: Re: CPV Keasbey, LLC - Need for Class I AQ Analyses for Brigantine Wilderness Area

Mr. Keller,

Thank you for sending the information regarding CPV Keasbey, LLC located in Middlesex County, New Jersey. Based on the information contained in the letter dated July 12, 2016, the Fish and Wildlife Service anticipates that modeling would not show any significant additional impacts to air quality related values (AQRV) a the Brigantine Wilderness. Therefore, we are not requesting that a Class I analysis be included in the PSD permit application.

The state and/or EPA may have a different opinion regarding the need for a Class I increment analysis. Should the emissions or the nature of the project change significantly, please contact me directly so that we might re-evaluate the proposed project.

Thank you for keeping us informed and involving the Fish and Wildlife Service in the project review.

On Wed, Jul 13, 2016 at 5:43 AM, Keller, Michael <MKeller@trcsolutions.com> wrote:

> Ms. Webster,
>
> TRC, on behalf of CPV Keasbey, LLC, is formally requesting a determination (see attachment) that there is no need to perform a Class I area air quality and air quality related values analysis for the Brigantine Wilderness Class I area as part of the facility's PSD permit application.
>
> If you have any questions, please call or email.
>
> Thanks for your attention.
>
> Michael
>
> Michael D. Keller
> Senior Project Manager

1200 Wall Street West, 5th Floor, Lyndhurst, NJ 07071

T: 201.508.6954 | F: 201.933.5601 | MKeller@trcsolutions.com

LinkedIn | Twitter | Blog | Flickr | www.TRCsolutions.com

--

Jill Webster, Environmental Scientist
US Fish and Wildlife Service
National Wildlife Refuge System
Branch of Air and Water Resources
7333 W. Jefferson Ave., Suite 375
Lakewood, CO 80235-2017
(303) 914-3804
fax: (303) 969-5444

APPENDIX E

AIR QUALITY MODELING PROTOCOL

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5th Floor
Lyndhurst, NJ 07071

201.933.5541 PHONE
201.933.5601 FAX

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August 30, 2016
mk031-16

Mr. Greg John
New Jersey Department of Environmental Protection
Division of Air Quality, Bureau of Technical Services
401 East State Street, 2nd Floor
Trenton, New Jersey 08625

Subject: CPV Keasbey, LLC
Keasbey Energy Center
Proposed Combined Cycle Power Facility
Township of Woodbridge, Middlesex County, New Jersey
Atmospheric Dispersion Modeling Protocol

Dear Mr. John:

Please find the enclosed copy of the atmospheric dispersion modeling protocol for the proposed CPV Keasbey, LLC Keasbey Energy Center combined cycle power facility to be constructed in the Township of Woodbridge, Middlesex County, New Jersey. The proposed 630 megawatt (nominal) combined cycle power facility will consist of one (1) General Electric (GE) 7HA.02 combustion turbine generator with a heat recovery steam generator (HRSG) equipped with a natural gas fired duct burner that will be tied into one (1) steam turbine generator. The proposed facility will be fueled primarily by natural gas but will be capable of utilizing ultra-low sulfur diesel (ULSD). Engineering design plans also reflect the use of a wet mechanical draft cooling tower with additional supporting ancillary equipment including a natural gas fired auxiliary boiler, an emergency diesel generator, an emergency diesel fire pump, a one (1) million gallon ULSD storage tank, and one (1) 20,000 gallon aqueous ammonia storage tank.

The enclosed protocol contains a project and site description and a general arrangement site plan. The protocol also contains a detailed description of the modeling methodology proposed for the air quality impact analysis to be included in the PSD permit application to be submitted for the proposed facility.

Please feel free to contact me at 201-508-6954 or Ted Main at 201-508-6960 should you have any questions regarding the enclosed protocol. We look forward to receiving the Department's review comments/approval, as well as the opportunity to work with you on this project.

Sincerely,

TRC

Michael D. Keller
Principal – Power Generation and Air Quality

Attachment

cc: A. Colecchia, U.S. EPA Region II
J. Donovan, CPV
A. Urquhart, CPV
T. Main, TRC
TRC Project File 252973

mk031-16.ltr.doc

TRC
Results you can rely on

AIR QUALITY MODELING PROTOCOL

Prepared for the

CPV Keasbey, LLC
Keasbey Energy Center
Combined Cycle Power Facility
Township of Woodbridge, Middlesex County,
New Jersey

Submitted to

New Jersey Department of Environmental Protection
Trenton, New Jersey

Prepared by

TRC
1200 Wall Street West, 5th Floor
Lyndhurst, New Jersey 07071

August 2016

TABLE OF CONTENTS

Section		Page

TABLE OF CONTENTS
(Continued)

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

CPV Power Holdings, LP (CPV) is a leading North American electric power generation development and asset management company headquartered in Silver Spring, Maryland with offices in Braintree, Massachusetts and San Francisco, California. CPV Keasbey, LLC (CPV Keasbey), a wholly owned business entity of CPV, is proposing to construct a nominal 630-megawatt (MW) dual fuel (natural gas and ultra-low sulfur diesel – ULSD) fired 1-on-1 combined cycle electric power facility, to be known as the Keasbey Energy Center (the Project), on land directly adjacent to the existing 725 MW Woodbridge Energy Center.

The proposed Project will be constructed on an approximately eleven (11) acre parcel of land (the "Property") located at 1070 Riverside Drive Township of Woodbridge, Middlesex County, New Jersey (Block 93, Lot 100.02 on the official Woodbridge Township Tax Maps). The Property is located within the Keasbey Brownfield Redevelopment Area on a former chemical plant site that has undergone clean-up and remediation pursuant to the NJDEP's Site Remediation Program. The Property will be sub-divided from the approximately 27.5 acre parcel of land controlled by CPV Shore Urban Renewal, LLC and share a property boundary with CPV Shore, LLC's (CPV Shore) Woodbridge Energy Center.

The Project air contaminant emissions sources will include a single dual-fuel fired combustion turbine with a natural gas supplementary-fired heat recovery steam generator (HRSG); a natural gas-fired auxiliary boiler, and; an emergency diesel generator and emergency diesel fire pump. Combined cycle power will be generated from a steam turbine generator serviced by a wet evaporative cooling tower. The Project will be permitted as a major modification to an existing major source, CPV Shore's Woodbridge Energy Center (PID # 18940 Woodbridge Energy Center) due to CPV's common control of both facilities. CPV's common control of both facilities arises from CPV's majority ownership in both CPV Keasbey and CPV Shore, where CPV controls 100% ownership interest in CPV Keasbey and 57.5% ownership interest in CPV Shore. For this reason, CPV is considered to have common control of both facilities.

The proposed Project is located in an attainment area for sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), particulate matter with an aerodynamic diameter less than 10 micrometers (um) (PM-10), and particulate matter with an aerodynamic diameter less than 2.5 um (PM-2.5). Since the Project will potentially emit in excess of the Significant Emission Rates (per year of several air pollutants), it will be subject to Prevention of Significant Deterioration (PSD) permitting. Emissions of nitrogen oxides (NO_x), ozone (as VOC), sulfuric acid (H_2SO_4), PM-10, PM-2.5, and CO will exceed the pollutant specific PSD significant emission rates (SER) and, consequently, a Best Available Control Technology (BACT) analysis and an air dispersion modeling analysis is required for these pollutants.

Middlesex County is designated as moderate non-attainment for the 8-hour ozone standard. Since potential annual emissions of NO_x and VOC, both ozone precursors, exceed the major source thresholds (i.e., 25 tons per year of NO_x and/or 25 tons per year of VOC), the proposed facility is subject to non-attainment New Source Review (NSR) for these two ozone precursors.

An air quality analysis is required to demonstrate that the proposed facility will be compliant with all applicable PSD increment levels, National Ambient Air Quality Standards (NAAQS), and New Jersey Ambient Air Quality Standards (NJAAQS). Initially, the air quality impact of the proposed facility will be modeled using potential emission rates to determine if the facility will yield significant air quality impacts (i.e., maximum modeled concentrations greater than the PSD significant impact concentrations). The significance modeling will be performed for multiple operating loads and ambient temperatures. The pollutant-specific "worst-case" operating scenario determined from the significance modeling analysis will be used in all subsequent modeling, including any PSD increment and multiple source NAAQS/NJAAQS analyses, if necessary.

2.0 AREA DESCRIPTION

The proposed Keasbey Energy Center will be located on a parcel of land controlled by CPV Shore Urban Renewal, LLC located in the Township of Woodbridge, Middlesex County, New Jersey (see Figure 2-1). The project site's eastern border is immediately adjacent to the Woodbridge Energy Center operated by CPV Shore, LLC. Existing land uses in the vicinity of the proposed site include industrial development, commercial development, neighborhood businesses, and residential neighborhoods. The nearest residential locations are approximately 0.8 miles (1.3 kilometers) to the northeast), along Sunnyview Oval immediately north of Route 440 and along King Georges Post Road immediately south of Route 440. Access to the property is provided directly from Riverside Drive.

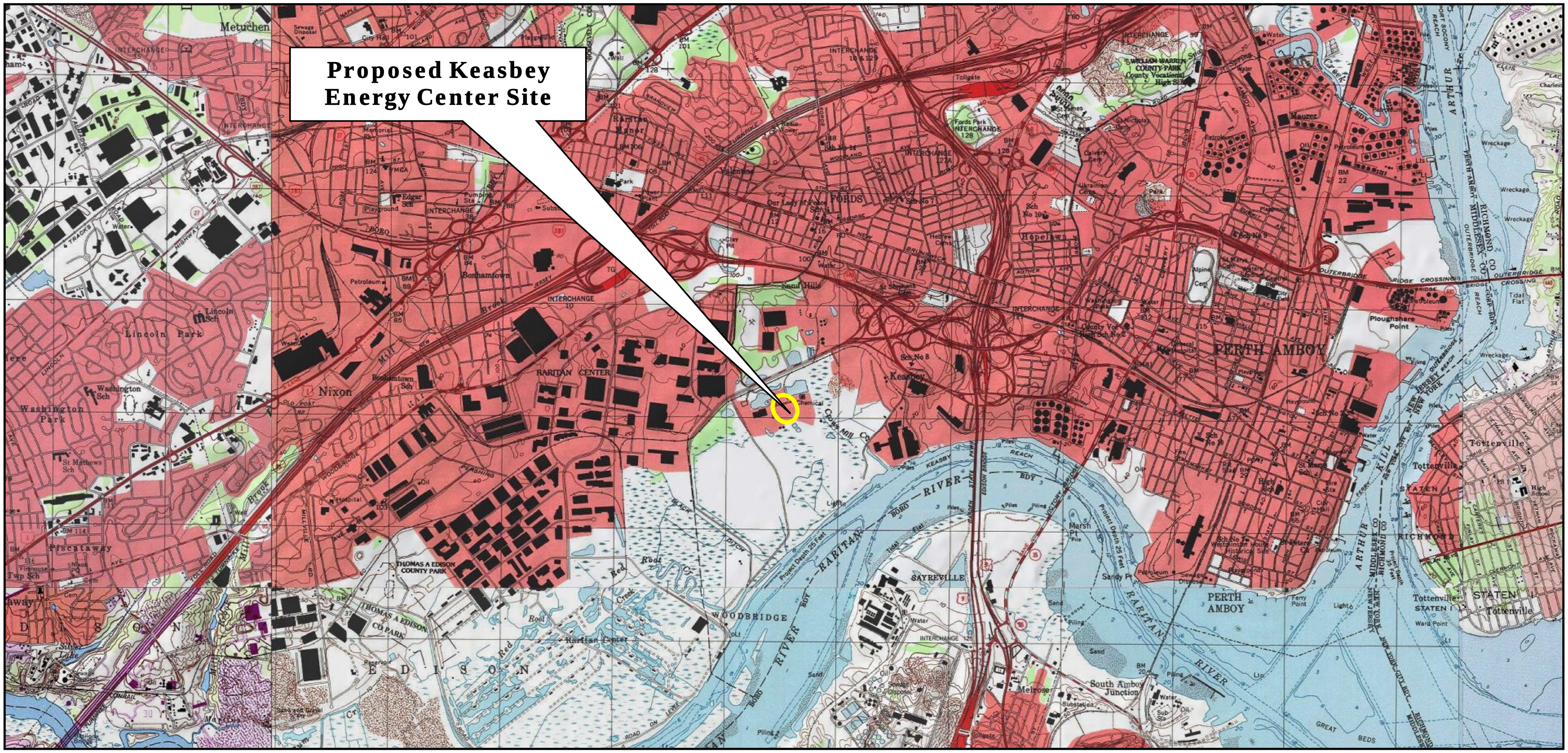
The proposed facility site is located along the northwestern edge of the Atlantic Coastal Plain Province in New Jersey. Terrain elevations in this Province range from sea level to 391 feet above mean sea level (MSL), at Crawford Hill. Topography in the immediate area is generally flat, with elevations at sea level on the Raritan River and elevations rising upwards of and exceeding 200 feet in Fords, New Jersey. The elevation of the proposed facility site is approximately 20 feet above MSL.

The proposed facility will be located at approximately 40° 30' 53" North Latitude, 74° 19' 16" West Longitude, North American Datum 1983 (NAD83). The approximate Universal Transverse Mercator (UTM) coordinates of the proposed facility are 557,515 meters Easting, 4,485,100 meters Northing, in Zone 18, NAD83. Figure 2-2 shows the proposed facility location and the surrounding area.

Keasbey Energy Center
Proposed Combined Cycle Power Facility
Township of Woodbridge, Middlesex County, New Jersey

Figure 2-1. Site Location Aerial Photograph

Source: Google Earth, 2016.



TRC

Keasbey Energy Center
Proposed Combined Cycle Power Facility
Township of Woodbridge, Middlesex County, New Jersey

Figure 2-2. Site Location Map

Source: USGS 7.5 Minute Quadrangle Maps

3.0 FACILITY DESCRIPTION

3.1 Equipment/Fuels

The Keasbey Energy Center will consist of one (1) General Electric (GE) 7HA.02 combustion turbine at the proposed facility site. The maximum heat input for this turbine firing natural gas (design basis assumes sulfur in fuel is 0.63 grains/100 SCF at 1,024 Btu/SCF) at -8 degrees Fahrenheit (deg F) is 3,512 million British Thermal Units per hour (mmBTU/hr), Higher Heating Value (HHV). The maximum combustion turbine heat input capacity at -8 degrees Fahrenheit (°F) ambient temperature firing ULSD is 3,626 million British thermal units per hour (MMBtu/hr) based on the Higher Heating Value (HHV). Hot exhaust gases from the combustion turbine will flow into an adjacent heat recovery steam generator (HRSG) that will be equipped with a natural gas fired duct burner. The maximum duct burner heat input capacity firing natural gas is 950 million British thermal units per hour (MMBtu/hr) based on the Higher Heating Value (HHV). The HRSG will produce steam to be used in the steam turbine. Upon leaving the HRSG, the turbine exhaust gases will be directed to one (1) exhaust stack. Other ancillary equipment at the proposed facility will include a gas-fired auxiliary boiler, an emergency diesel fire pump, an emergency diesel generator, and a wet mechanical draft cooling tower. The auxiliary boiler is sized up to 72.3 mmBtu/hr, will fire natural gas exclusively, and operate for up to 4,000 hours per year. The emergency diesel fire pump is sized up to 2.3 mmBtu/hr (305 hp), will fire ULSD, and operate up to 100 hours per year for testing and maintenance. The emergency diesel generator is sized up to 14.4 mmBtu/hr, will fire ULSD, and operate up to 100 hours per year for testing and maintenance.

Emissions from the combined cycle unit will be controlled by the use of dry low-NO_x burner technology (during natural gas firing), water injection (during ULSD firing), and SCR for NO_x control; an oxidation catalyst for CO and VOC control; and the use of clean low-sulfur fuels (i.e., natural gas and ULSD) to minimize emissions of SO_2, PM/PM-10/PM-2.5, and H_2SO_4. Steam from the steam turbine will be sent to a condenser where it will be cooled to a liquid state and returned to the HRSG. Waste heat from the condenser will be dissipated through the wet mechanical draft cooling tower.

3.2 Operation

The combined cycle unit will be operated to follow electrical demand (i.e., dispatch mode), but will be designed and permitted to operate on a continuous basis. The combined cycle unit will not operate at steady-state below 30% load on natural gas and 50% load on ULSD.

3.3 Selection of Sources for Modeling

The emission source responsible for most of the potential emissions from the project is the combustion turbine. This unit will be included in and is the main focus of the air quality modeling analyses. As discussed in Section 3.4, the modeling will include consideration of operation over a range of turbine loads and operating scenarios. Initial modeling of the turbine by itself will be conducted to identify those operating conditions for each pollutant and averaging period that yield the maximum modeled impacts. Any subsequent modeling incorporating other emissions units at the plant or other facilities will include the turbine operating conditions that yield the maximum modeled impacts. Modeling conducted for PM-10 and PM-2.5 will include filterable and condensable PM.

Ancillary sources (the emergency diesel generator, emergency diesel fire pump, and auxiliary boiler) will also be included in the modeling for appropriate pollutants and averaging periods. The emergency equipment may operate for up to one hour per day for readiness testing and maintenance purposes. Operation of the emergency equipment for longer periods of time in an emergency mode would not be expected to occur when the turbines are operating.

Although only limited operation is expected from the emergency equipment, initial modeling to assess short-term project impacts will assume concurrent operation of the emergency equipment for readiness testing (i.e., up to 1-hour per day) with the combustion turbine.

According to NJDEP guidance found in the Technical Manual 1002: Guidance on Preparing an Air Quality Modeling Protocol (NJDEP, November 2009), the mechanical draft cooling tower will be included in the modeling analysis for PM-10/PM-2.5 standards compliance if the total PM-10/PM-2.5 emission rate from the tower is greater than 1.0 pound per hour. Since the total PM-10 emission rate from the tower is greater than 1.0 pound per hour (see Table 3-3), the cooling tower will be included in the modeling analysis for PM-10 standards compliance. However, since the total PM-2.5 emission rate from the tower is less than 1.0 pound per hour (see Table 3-3), the cooling tower will not be included in the modeling analysis for PM-2.5 standards compliance.

The air permit application will assume that the Process Water Supply will come from treated effluent from the Middlesex County Utilities Authority (MCUA) and will be the source of the cooling tower water. The cooling tower circulating water total dissolved solids (TDS) concentration is managed operationally using conductivity as a surrogate for TDS and by increasing or decreasing the cooling tower blowdown rate. This is controlled automatically based on the level set by the control room operator. Tower blowdown is a side-stream of the circulating water that is directed to the wastewater discharge. Increasing the blowdown rate will cause a decrease in the circulating water TDS concentration since a greater flow of lower TDS makeup water is added to the tower. While the makeup water has a fairly low TDS, it is not entirely constant and, as such, monitoring the circulating water TDS and controlling the blowdown rate provide a reliable method for maintaining a constant circulating water TDS.

In order to minimize makeup water flow, the circulating water TDS set point can be set high, which causes a lower blowdown rate. Conversely, in order to minimize tower drift particulate, the circulating water TDS can be set lower, causing the makeup water rate to be increased to a level that will balance the reduced particulate emissions. The tradeoff is with the operating cost of increased makeup water usage.

The droplet size distribution used in the emission calculation was for a cooling tower using a high-efficiency drift eliminator. The droplet size distribution represents the total liquid drift from the tower, of which, when the droplets evaporate (assumed to be essentially immediately), will form total suspended particulate (TSP). The fractions of PM-10 and PM-2.5 were estimated using the calculation method posited by Reisman and Frisbie (Reisman, J., and Frisbie, G. 2002, Calculating Realistic PM10 Emissions from Cooling Towers, Abstract No. 216 presented at the 2001 94th Annual Air and Waste Management Association Conference and Exhibition in Orlando, Florida, June 25th to 28th). The particle size calculation methodology is based on the Reisman and Frisbie formulas. As can be demonstrated in the worksheet, the PM-10 and PM-2.5 fractions are calculated using a linear interpolation of the evaporated drift droplet particulates. For reference purposes, the particle size calculation worksheet and the droplet size distribution for an industry standard high efficiency drift eliminator is included in Appendix A.

3.4 Exhaust Stack Configuration and Emission Parameters (Keasbey Energy Center)

The general arrangement site plan for the proposed facility is presented in Figure 3-1. Preliminary exhaust characteristics of the turbine/heat recovery steam generator stack during different operating scenarios are provided in Tables 3-1a and 3-1b. Exhaust parameters are presented for natural gas firing at three ambient temperatures (-8 degrees Fahrenheit, 59 degrees Fahrenheit, and 105 degrees Fahrenheit), five loads (30%, 44%, 47%, 75%, and 100%), and operating conditions for HRSG duct firing. Exhaust parameters are also presented for ULSD firing at three ambient temperatures (-8 degrees Fahrenheit, 59 degrees Fahrenheit, and 105 degrees Fahrenheit) and three (3) loads (50%, 75%, and 100%). Table 3-2 presents the preliminary potential emission rates for each of the operating scenarios. In addition, emission rates and stack parameters are presented for evaporative cooling during natural gas and ULSD operation at 100% load. Thus, emission rates and stack parameters for twenty-six (26) ambient temperatures and load combinations will be used to determine the "worst-case" operating scenario for the turbine. Note that per U.S. EPA PM-2.5 modeling guidance, the emissions of

PM-2.5 should account for NO_2 and SO_2 precursor emissions (U.S. EPA, 2013). CPV Keasbey, LLC proposes to use a numerical screening approach suggested by the Northeast States for Coordinated Air Use Management (NESCAUM) in a May 30, 2013 comment letter to George Bridgers (Air Quality Modeling Group, U.S. EPA) responding to "Draft Guidance for PM-2.5 Permit Modeling" released by U.S. EPA on March 4, 2013. The approach calls for the use of a 7 percent per hour SO_2 to sulfate conversion rate and a 5 percent per hour NO_2 to nitrate conversion rate. The direct PM-2.5 emission rate is then increased accordingly by adding these incremental emissions. NESCAUM notes that it believes this method "would provide a conservative, definitive, and defensible value of the estimated contribution of secondary particulates". (NESCAUM, 2013) For reference purposes, this letter can be found in Appendix A.

The following calculations were used (per the aforementioned NESCAUM letter on page 6):

Secondary PM-2.5 from SO_2 = X lb/hr SO_2 ▪ 0.07 ▪ 2.06
Secondary PM-2.5 from NO_x = X lb/hr NO_x ▪ 0.05 ▪ 0.8 ▪ 1.74

<u>Combustion Turbine (Case #1 example calculation)</u>
Secondary PM-2.5 from SO_2 = 9.6 lb/hr SO_2 ▪ 0.07 ▪ 2.06 = 1.38 lb/hr
Secondary PM-2.5 from NO_x = 32.8 lb/hr NO_x ▪ 0.05 ▪ 0.8 ▪ 1.74 = 2.28 lb/hr
Primary PM-2.5 = 23.4 lb/hr
Total Primary PM-2.5 + Secondary PM-2.5 = 27.06 lb/hr

<u>Auxiliary Boiler</u>
Secondary PM-2.5 from SO_2 = 0.43 lb/hr SO_2 ▪ 0.07 ▪ 2.06 = 0.062 lb/hr
Secondary PM-2.5 from NO_x = 0.80 lb/hr NO_x ▪ 0.05 ▪ 0.8 ▪ 1.74 = 0.06 lb/hr
Primary PM-2.5 = 0.51 lb/hr
Total Primary PM-2.5 + Secondary PM-2.5 = 0.63 lb/hr

<u>Emergency Diesel Fire Pump</u>
Secondary PM-2.5 from SO_2 = 0.003 lb/hr SO_2 ▪ 0.07 ▪ 2.06 = 0.0004 lb/hr
Secondary PM-2.5 from NO_x = 1.81 lb/hr NO_x ▪ 0.05 ▪ 0.8 ▪ 1.74 = 0.13 lb/hr
Primary PM-2.5 = 0.08 lb/hr
Primary PM-2.5 + Secondary PM-2.5 = 0.21 lb/hr

<u>Emergency Diesel Generator</u>
Secondary PM-2.5 from SO_2 = 0.037 lb/hr SO_2 ▪ 0.07 ▪ 2.06 = 0.005 lb/hr
Secondary PM-2.5 from NO_x = 17.10 lb/hr NO_x ▪ 0.05 ▪ 0.8 ▪ 1.74 = 1.19 lb/hr
Primary PM-2.5 = 0.55 lb/hr
Primary PM-2.5 + Secondary PM-2.5 = 1.75 lb/hr

Finally, Tables 3-4 to 3-6 present the preliminary stack parameters and emission rates for the auxiliary boiler, emergency diesel fire pump, and emergency diesel generator, respectively. As discussed in Section 3.3, the emergency diesel fire pump and emergency diesel generator will be included in the modeling analysis for appropriate pollutants and averaging periods when used for readiness testing (i.e., up to 1-hour per day). It should be noted that 1-hour NO_2 and 1-hour SO_2 modeling will not include emissions from the emergency equipment per the exemption as defined in the July 29, 2011 policy memorandum issued by NJDEP (i.e., the applicant proposes to agree to the conditions contained in the aforementioned policy memorandum). For reference purposes, this policy memorandum can be found in Appendix A.

3.4.1 Exhaust and Emission Parameters (Woodbridge Energy Center)

The exhaust and total facility emission parameters of sources at the existing Woodbridge Energy Center to be included in the air quality modeling analyses can be found in Appendix B. Tables B-1 and B-2 provide exhaust parameters and emission rates for the worst case operating scenarios for the combustion turbine/heat recovery steam generator stack (i.e., fuel, ambient temperature, load, evaporative cooling, and duct firing). Table B-3 provides exhaust parameters and particulate matter emission rates for the wet mechanical draft cooling tower. Exhaust parameters and emissions rates for the auxiliary boiler stack are provided in Table B-4. Tables B-5 and B-6 provide exhaust parameters and emission rates for the emergency diesel fire pump and emergency diesel generator, respectively.

3.5 Good Engineering Practice (GEP) Stack Height

Section 123 of the Clean Air Act (CAA) Amendments required the United States Environmental Protection Agency (U.S. EPA) to promulgate regulations to assure that the degree of emission limitation for the control of any air pollutant under an applicable State Implementation Plan (SIP) was not affected by (1) stack heights that exceed Good Engineering Practice (GEP) or (2) any other dispersion technique. The U.S. EPA provides specific guidance for determining GEP stack height and for determining whether building downwash will occur in the Guidance for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations), (EPA-450/4-80-023R, June, 1985). GEP is defined as "…the height necessary to ensure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies, and wakes that may be created by the source itself, nearby structures, or nearby terrain "obstacles"."

The GEP definition is based on the observed phenomenon of atmospheric flow in the immediate vicinity of a structure. It identifies the minimum stack height at which significant adverse aerodynamics (downwash) are avoided. The U.S. EPA GEP stack height regulations specify that the GEP stack height be calculated in the following manner:

$$H_{GEP} = H_B + 1.5L$$

Where: H_B = the height of adjacent or nearby structures, and
L = the lesser dimension (height or projected width of the adjacent or nearby structures).

A general arrangement site plan for the proposed Keasbey Energy Center is shown in Figure 3-1. A GEP stack height analysis has been conducted using the U.S. EPA approved Building Profile Input Program with PRIME (BPIPPRM, version 04274). The controlling structure will be the steam turbine generator building at a height of 94 feet above grade, resulting in a formula GEP height of 235 feet above grade. Since a non-GEP stack is proposed, direction-specific downwash parameters for the combustion turbine exhaust stack will be determined using BPIPPRM, version 04274. Direction-specific downwash parameters for the additional auxiliary equipment exhaust stacks to be modeled (i.e., auxiliary boiler, emergency equipment, and cooling tower) will also be determined using BPIPPRM, version 04274. Any direction-specific building downwash parameters will be input to the PSD modeling analysis.

Figure 3-1: General Arrangement Plan

P:\CPV Woodbridge\Woodbridge2\CPV-WOODBRIDGE-LAYOUT1.dwg Jun 8, 2016 - 11:47AM FED77076

Notes

EMISSION SOURCES
UTM (NAD 83) ZONE 18, US FEET

		NORTHING	EASTING
ES1	STACK	14714867	1829114
ES2	AUXILIARY BOILER	14715008	1829190
ES3	DIESEL GENERATOR	14715018	1829262
ES4	COOLING TOWER	14714739	1829237
ES5	DIESEL FIRE PUMP	14714948	1829011

Legend

BUILDING HEIGHTS (FT)

1	STACK	-
2	HRSG	94
3	COOLING TOWER	54
4	AIR INLET FILTER	44
5	OIL TANK	40
6	DEMIN WATER TANK	40
7	RAW WATER TANK	51

SITE BOUNDARY POINTS (P01-P14)
UTM (NAD 83) ZONE 18, US FEET

POINT	EQUIPMENT	NORTHING	EASTING
C01	DEMIN WATER TANK	14715208	1829294
C02	RAW WATER TANK	14714879	1829006
C03	OIL TANK	14715002	1829001
C04	COOLING TOWER 01	14714736	1829099
C05	COOLING TOWER 02	14714747	1829152
C06	COOLING TOWER 03	14714758	1829205
C07	COOLING TOWER 04	14714770	1829258
C08	COOLING TOWER 05	14714781	1829310
C09	COOLING TOWER 06	14714686	1829109
C10	COOLING TOWER 07	14714697	1829162
C11	COOLING TOWER 08	14714708	1829215
C12	COOLING TOWER 09	14714720	1829268
C13	COOLING TOWER 10	14714730	1829321

SITE BOUNDARY POINTS (P01-P14)
UTM (NAD 83) ZONE 18, US FEET

POINT	NORTHING	EASTING
P01	14715731	1829069
P02	14715413	1829081
P03	14745041	1828697
P04	14714377	1829058
P05	14714399	1829138
P06	14714418	1829219
P07	14714415	1829302
P08	14714403	1829384
P09	14714371	1829464
P10	14714319	1829512
P11	14714574	1830052
P12	14714674	1829963
P13	14715484	1829815
P14	14715879	1829382

Reference Drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
F	06/08/16	AF	FOR CLIENT REVIEW	KP	App'd
E	05/27/16	AF	FOR CLIENT REVIEW	KP	App'd
D	05/20/16	AF	FOR CLIENT REVIEW	KP	App'd
C	05/18/16	AF	FOR CLIENT REVIEW	KP	App'd
B	05/18/16	AF	FOR CLIENT REVIEW	KP	App'd
A	05/17/16	AF	FOR CLIENT REVIEW	KP	App'd

Mott MacDonald

One University Avenue
Suite 100, North Lobby
Westwood, MA 02090
United States
T +1 (781) 915-0015
F +1 (781) 915-0001
W www.mottmac.com

Client

Competitive Power Ventures, Inc.

Title

KEASBEY
NEW JERSEY
SITE ARRANGEMENT

PRELIMINARY
NOT FOR
CONSTRUCTION
REPLACE WITH
ENGINEERS STAMP
AT CONSTRUCTION
AND/OR
FABRICATION

Designed	KP	Eng check	-
Drawn	AF	Approved	-
Dwg check	-	Project Mngr	-
Scale at ANSI E 1" = 50'-0"		Date 03/04/16	Rev F

Drawing Number
324698-ES-701

Table 3-1a: Combustion Turbine Source Parameters (Natural Gas Fired)

Operating Case	Fuel	Operating Load (%)	Duct Firing (On/Off)	Evaporative Cooler Operation (On/Off)	Modeling Stack Parameters		
					Exhaust Temperature (K)	Exhaust Velocity (m/s)[a]	Exhaust Flow (acfm)
Case1	Gas	100	On	Off	343.15	22.14	1,656,682
Case2	Gas	100	Off	Off	347.59	22.16	1,658,131
Case3	Gas	75	Off	Off	343.71	17.64	1,319,989
Case4	Gas	44	Off	Off	343.15	13.74	1,028,508
Case5	Gas	100	On	Off	343.15	20.87	1,561,388
Case6	Gas	100	Off	Off	347.04	20.84	1,559,327
Case7	Gas	75	Off	Off	343.15	17.02	1,273,602
Case8	Gas	30	Off	Off	343.15	11.24	841,244
Case9	Gas	100	On	On	345.37	21.74	1,626,457
Case10	Gas	100	Off	On	353.71	22.00	1,645,878
Case11	Gas	100	On	Off	343.15	19.29	1,443,499
Case12	Gas	100	Off	Off	349.82	19.43	1,453,744
Case13	Gas	75	Off	Off	349.26	16.61	1,242,983
Case14	Gas	47	Off	Off	345.37	13.30	994,981
Case15	Gas	100	On	Off	345.37	22.04	1,649,531
Case16	Gas	100	On	Off	348.15	19.36	1,448,836

[a]Based on a stack diameter of 22 feet.
UTM coordinates of combustion turbine stack are 557,515 meters Easting, 4,485,100 meters Northing, NAD83, Zone 18 at a base elevation of 20 feet above mean sea level.

Table 3-1b: Combustion Turbine Source Parameters (ULSD Fired)

Operating Case	Fuel	Operating Load (%)	Duct Firing (On/Off)	Evaporative Cooler Operation (On/Off)	Modeling Stack Parameters		
					Exhaust Temperature (K)	Exhaust Velocity (m/s)[a]	Exhaust Flow (acfm)
Case17	ULSD	100	Off	Off	408.15	26.62	1,992,107
Case18	ULSD	50	Off	Off	398.71	17.22	1,288,732
Case19	ULSD	100	Off	Off	407.04	25.81	1,931,068
Case20	ULSD	75	Off	Off	398.71	19.89	1,488,537
Case21	ULSD	50	Off	Off	393.15	15.33	1,147,454
Case22	ULSD	100	Off	On	410.93	24.92	1,864,771
Case23	ULSD	100	Off	Off	408.71	23.42	1,752,763
Case24	ULSD	50	Off	Off	399.26	14.73	1,102,478
Case25	ULSD	75	Off	Off	402.59	18.34	1,372,416
Case26	ULSD	75	Off	Off	401.48	20.90	1,563,772

[a]Based on a stack diameter of 22 feet.
UTM coordinates of combustion turbine stack are 557,515 meters Easting, 4,485,100 meters Northing, NAD83, Zone 18 at a base elevation of 20 feet above mean sea level.

Table 3-2: Combustion Turbine Emission Rates

Operating Case	Modeled Emission Rate (g/s)			
	NO_x	CO	PM-10/PM-2.5[a]	SO_2
Case1	4.13	2.52	2.95/3.41	1.21
Case2	3.21	1.95	1.60/1.96	0.94
Case3	2.57	1.56	1.49/1.77	0.75
Case4	1.83	1.11	1.36/1.56	0.53
Case5	3.94	2.39	2.90/3.34	1.15
Case6	3.02	1.84	1.55/1.89	0.88
Case7	2.39	1.46	1.46/1.73	0.70
Case8	1.36	0.83	1.29/1.44	0.40
Case9	4.10	2.49	2.91/3.37	1.19
Case10	3.20	1.95	1.59/1.94	0.93
Case11	3.55	2.15	2.71/3.11	1.03
Case12	2.73	1.66	1.51/1.82	0.80
Case13	2.17	1.31	1.41/1.65	0.63
Case14	1.60	0.97	1.32/1.50	0.47
Case15	3.31	2.02	2.81/3.18	0.96
Case16	2.82	1.73	2.72/3.04	0.82
Case17	7.07	2.15	8.14/8.75	0.84
Case18	4.28	1.31	7.96/8.33	0.51
Case19	6.74	2.05	8.11/8.70	0.80
Case20	5.32	1.61	8.03/8.49	0.63
Case21	4.10	1.25	7.95/8.31	0.48
Case22	6.29	1.92	8.09/8.63	0.74
Case23	5.93	1.80	8.06/8.58	0.70
Case24	3.63	1.10	7.93/8.24	0.43
Case25	4.74	1.44	7.99/8.40	0.56
Case26	5.63	1.71	8.04/8.53	0.67

[a]Filterable plus condensable, and applying NESCAUM, 2013 for secondary PM-2.5.

Table 3-3: Cooling Tower Exhaust Characteristics and PM-10/PM-2.5 Emission Rates

Emissions Parameter	
Number of Cells (up to)	10
Maximum Total Air Flow Rate (acfm) (Each Cell)	1,448,000
Maximum Water Flow Rate (gpm) (Total Tower)	153,000
Maximum Drift Rate	0.0005%
Total Solids in Circulating Water (ppm)	6,240
10-cell Total TSP Emission Rate (lb/hr) (Total Tower)	2.39
1-cell TSP Emission Rate (g/s)	0.030
10-cell Total PM-10 Emission Rate (lb/hr) (Total Tower)	1.55
1-cell PM-10 Emission Rate (g/s)	0.020
10-cell Total PM-2.5 Emission Rate (lb/hr) (Total Tower)	0.58
1-cell PM-2.5 Emission Rate (g/s)	0.007
10-cell Total TSP Annual Emission Rate (ton/yr) (Total Tower)	10.46
10-cell Total PM-10 Annual Emission Rate (ton/yr) (Total Tower)	6.81
10-cell Total PM-2.5 Annual Emission Rate (ton/yr) (Total Tower)	2.56
Exhaust Parameter	
Exhaust Height (ft above grade)	54
Exhaust Height (m above grade)	16.46
Collar Height (ft above grade)	40
Collar Height (m above grade)	12.19
Exhaust Temperature (deg F)	80
Exhaust Velocity (ft/sec)	40.63
Exhaust Velocity (m/sec)	12.38
Inner Diameter (ft)	27.5
Inner Diameter (m)	8.38

Table 3-4: Auxiliary Boiler Exhaust Characteristics and Emissions

Emission Parameter	
Pollutant	**lb/hr**
NO_x	0.80
CO	2.68
PM-10/PM-2.5[a]	0.51/0.63
SO_2	0.43
Exhaust Parameter	
Exhaust Height (ft above grade)	40
Exhaust Height (m above grade)	12.19
Exhaust Temperature (deg F)	300
Exhaust Flow (acfm)	22,250
Exhaust Velocity (ft/sec)	52.46
Exhaust Velocity (m/sec)	15.99
Inner Diameter (ft)	3
Inner Diameter (m)	0.91
Stack Base Elevation (ft)	20
UTM Easting (m), NAD83, Zone 18	557,538
UTM Northing (m), NAD83, Zone 18	4,485,143

[a]Filterable plus condensable, and applying NESCAUM, 2013 for secondary PM-2.5.

Table 3-5: Emergency Diesel Fire Pump Exhaust Characteristics and Emissions

Emission Parameter	
Pollutant	**lb/hr**
NO_x	1.81
CO	0.95
PM-10/PM-2.5[a]	0.08/0.21
SO_2	0.003
Exhaust Parameter	
Exhaust Height (ft above grade)	26
Exhaust Height (m above grade)	7.92
Exhaust Temperature (deg F)	1,076
Exhaust Flow (acfm)	1,900
Exhaust Velocity (ft/sec)	90.72
Exhaust Velocity (m/sec)	27.65
Inner Diameter (ft)	0.67
Inner Diameter (m)	0.20
Stack Base Elevation (ft)	20
UTM Easting (m), NAD83, Zone 18	557,484
UTM Northing (m), NAD83, Zone 18	4,485,125

[a]Filterable plus condensable, and applying NESCAUM, 2013 for secondary PM-2.5.

Table 3-6: Emergency Diesel Generator Exhaust Characteristics and Emissions

Emission Parameter	
Pollutant	**lb/hr**
NO_x	17.10
CO	9.64
PM-10/PM-2.5[a]	0.55/1.75
SO_2	0.037
Exhaust Parameter	
Exhaust Height (ft above grade)	20
Exhaust Height (m above grade)	6.10
Exhaust Temperature (deg F)	759
Exhaust Flow (acfm)	10,908.7
Exhaust Velocity (ft/sec)	231.49
Exhaust Velocity (m/sec)	70.56
Inner Diameter (ft)	1
Inner Diameter (m)	0.30
Stack Base Elevation (ft)	20
UTM Easting (m), NAD83, Zone 18	557,560
UTM Northing (m), NAD83, Zone 18	4,485,146

[a]Filterable plus condensable, and applying NESCAUM, 2013 for secondary PM-2.5.

4.0 REGULATORY REQUIREMENTS

Air quality modeling requirements are specified under Federal U.S. EPA and NJDEP regulatory programs including PSD and non-attainment NSR programs, and the State of New Jersey Administrative Code, Title 7, Chapter 27, Subchapter 8 (N.J.A.C. 7:27-8) for preconstruction permits and minor source operating permits, and N.J.A.C. 7:27-22 for major source operating permits. All applicable requirements that include air quality impact assessments are outlined in this section.

4.1 New Source Review

The Federal New Source Review (NSR) program consists of the non-attainment NSR and PSD programs. Applicability of these programs to the proposed facility is determined based upon the attainment status and the potential emissions of the proposed facility. New Jersey's non-attainment NSR for NO_x and VOC requires the use of lowest achievable emission rate (LAER) controls and compliance with emission offset requirements should facility emissions exceed applicable thresholds. PSD requires the application of Best Available Control Technology (BACT).

4.1.1 Attainment Status

The U.S. EPA has established National Ambient Air Quality Standards (NAAQS) for each of the following criteria air pollutants: PM-10, PM-2.5, sulfur dioxide (SO_2), ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), and lead (Pb). Areas in which the NAAQS are being met are referred to as attainment areas. Areas in which the NAAQS are not being met are referred to as non-attainment areas. Areas that were formerly non-attainment areas but are now in attainment and covered by a maintenance plan are referred to as maintenance areas. Areas for which sufficient data are not available to determine a classification are referred to as unclassifiable. The federal attainment status designations of areas in New Jersey with respect to NAAQS are listed at 40 CFR 81.331. The project is located in Middlesex County in the New Jersey-New York-Connecticut Air Quality Control Region (AQCR).

The location of the Keasbey Energy Center facility is in an area currently designated as attainment for SO_2, NO_2, CO, PM-10, and PM-2.5. Middlesex County, however, is designated as marginal non-attainment for the 2008 8-hour ozone ambient air quality standard. Under the marginal non-attainment designation for 8-hour ozone, new sources with emissions of NO_x exceeding 25 tons per year and/or emissions of VOC exceeding 25 tons per year are subject to non-attainment new source review (NSR), require the application of LAER control technology, and must obtain NO_x and/or VOC offsets. The applicability of LAER and emission offsets in

New Jersey is set forth in N.J.A.C. 7:27-18. Potential net emission increases of 25 tons per year or greater of NO_x and or VOC emissions trigger Subchapter 18 applicability.

4.1.2 Prevention of Significant Deterioration

The New Jersey Administrative Code adopted the PSD program pursuant to 40 CFR 51.166, which is administered through the NJDEP permitting process, and applies to a new or modified major facility located in an attainment area. The Department accepted delegation of the administration of the PSD program from the U.S. EPA on February 22, 1983. As such, any fossil fuel fired steam electric plant with a heat input capacity greater than 250 mmBTU/hr and potential emissions greater than 100 tons per year of any regulated pollutant is considered a "major" source and is subject to the PSD regulations. The existing Woodbridge Energy Center is an existing major PSD source. The addition of the Keasbey Energy Center constitutes a major modification because criteria pollutant increases will exceed the PSD Significant Emission Rates (SERs) as shown in Table 4-1. As such, the Keasbey Energy Center will be subject to PSD review.

Facilities subject to PSD must perform an air quality analysis (which includes atmospheric dispersion modeling) and a best available control technology (BACT) demonstration for those pollutants that exceed the pollutant specific Significant Emission Rates (SERs) identified in the regulations. These emission rates, as well as the non-attainment NSR thresholds, are provided in Table 4-1. (Note that since NO_x and VOC are precursors to ozone formation, NO_x and VOC emissions will be controlled to the more stringent LAER emission levels if they exceed the non-attainment NSR thresholds).

Dispersion modeling for the PSD requirements consists of three analyses: a significance analysis, a NAAQS/NJAAQS analysis, and a PSD increment analysis. The significance analysis compares the maximum-modeled ambient concentrations from the proposed facility to the significant impact levels (SILs) listed in Table 4-2 for each pollutant. If the modeled concentrations for the proposed facility are less than the SILs, then more detailed NAAQS/NJAAQS and PSD increment analyses are not required under PSD regulations. However, if the modeled concentrations are greater than the SILs, then NAAQS/NJAAQS and PSD increment analyses are required for that pollutant. The NAAQS and PSD increments are listed in Table 4-2 while the NJAAQS are listed in Table 4-3.

4.1.3 Preconstruction Ambient Air Quality Monitoring Exemption

As discussed previously, PSD regulations require an applicant to perform an air quality analysis for those pollutants emitted in quantities exceeding the SERs shown in Table 4-1. This analysis can include the collection of up to one year of preconstruction ambient air quality monitoring data. Preliminary facility emissions indicate that air quality monitoring could be required for some of the pollutants listed in Table 4-1.

Pursuant to the PSD regulations codified in 40 CFR 52.21, U.S. EPA may exempt a proposed PSD source, otherwise subject to the one-year pre-construction ambient monitoring requirement, if existing quality assured ambient air quality data are available from alternate locations that are representative of conditions at the proposed facility location.

TRC, on behalf of CPV Keasbey, LLC, prepared and submitted a preconstruction monitoring exemption request to the NJDEP for its review on July 12, 2016. A copy of this request is included in Appendix A.

4.2 New Jersey Department of Environmental Protection Regulations

Applicable regulations from Chapter 7:27 of the New Jersey Administrative Code are identified below:

- Subchapter 3 "Control and Prohibition of Smoke from Combustion of Fuel" - N.J.A.C. 7:27 - 3.5 limits the opacity from internal combustion engines and stationary combustion turbines to less than 20% opacity, exclusive of condensed water vapor for a period of more than 10 consecutive seconds. The natural gas and ULSD fired combustion turbine will normally have opacity near zero and are not expected to exceed even 10% for 10 consecutive seconds.

- Subchapter 4 "Control and Prohibition of Particles Combustion of Fuel" - N.J.A.C. 7:27 - 4.2(a) limits the mass emission of particulates from the proposed combined cycle unit, the auxiliary boiler, the emergency diesel generator, and the emergency diesel fire pump.

- Subchapter 8 "Permits and Certificates" - requires a pre-construction permit to be obtained for the proposed Keasbey Energy Center since the total heat input is greater than 1,000,000 Btu/hr and imposes State of the Art (SOTA) requirements for new and/or modified sources.

- Subchapter 9 "Sulfur in Fuels" - This subchapter does not limit the sulfur content of gaseous fuels; only liquid and solid fuel sulfur content limits are prescribed. Subchapter 9 limits the sulfur content of diesel fuel to 15 ppmw from July 1, 2016 and onward. Thus, the facility will use 15 ppm ultra-low sulfur diesel for any fuel oil fired combustion equipment (i.e., the combustion turbine, emergency diesel generator, and emergency diesel fire pump) planned to be installed at the Keasbey Energy Center.

- Subchapter 13 “Ambient Air Quality Standards” - The air quality impacts from the proposed Keasbey Energy Center should not exceed the standards presented in this subchapter.

- Subchapter 16 “Control and Prohibition of Air Pollution by Volatile Organic Compounds” - N.J.A.C. 7:27-16.9 establishes VOC and CO limits of 50 ppm and 250 ppm respectively for stationary gas turbines. The proposed limits will be well below these values for all load and fuel cases.

- Subchapter 18 “Control and Prohibition of Air Pollution from New or Altered Sources Affecting Ambient Air Quality (Emission Offset Rules)” - Establishes emission offsets and LAER requirements for defined major stationary sources.

- Subchapter 19 “Control and Prohibition of Air Pollution from Oxides of Nitrogen” - Limits NO_x emissions based upon equipment sizes and types.

- Subchapter 22 “Operating Permits” – The facility will file for or obtain an operating permit within twelve months after commencing operation.

Table 4-1: Emission Rates, PSD Significant Emission Rates, and Non-attainment NSR Major Source Thresholds

Pollutant	Preliminary Emission Rate (tons per year)	PSD Significant Emission Rate (tons per year)	Non-attainment NSR Major Source Threshold (tons per year)
Carbon Monoxide	110.3	100	NA
Sulfur Dioxide	39.9	40	NA
Particulate Matter (PM)	77.6	25	NA
Particulate Matter less than 10 microns (PM-10)	123.6	15	NA
Particulate Matter less than 2.5 microns (PM-2.5)	119.3	10	NA
Nitrogen Oxides	148.7	40	25[a,b]
Ozone (VOC)	49.9	40	25[a,b]
Greenhouse Gases (GHG)	2,374,633	75,000	NA
Lead	0.03	0.6	10[c]
Fluorides	NA	3	NA
Sulfuric Acid Mist	25.1	7	NA
Hydrogen Sulfide	NA	10	NA
Total Reduced Sulfur (including H_2S)	NA	10	NA
Reduced Sulfur Compounds (including H_2S)	NA	10	NA

Note: Pursuant to 40 CFR 52.21 (b) (23) (i).
[a]Per N.J.A.C 7:27-18.
[b]As precursors to ozone.
[c]Considered to be lead compounds and a HAP, subject to the 10 ton per year major HAP source threshold.

Table 4-2: National Ambient Air Quality Standards, PSD Increments, Significant Monitoring Concentrations, and Significant Impact Levels

Pollutant	Averaging Period	NAAQS[a] (μg/m³)	Class II PSD Increment (μg/m³)	Significant Monitoring Concentrations (μg/m³)	Significant Impact Level (μg/m³)
Carbon Monoxide (CO)	1-Hour 8-Hour	40,000 10,000	-- --	-- 575	2,000 500
Nitrogen Dioxide (NO_2)	1-Hour Annual	188 100	-- 25	-- 14	10.0[b] 1
Ozone (VOC)	8-Hour	150	--	--	--
Inhalable Particulate Matter (PM-10)	24-Hour Annual	150 --	30 17	10 --	5 1
Fine Particulate Matter (PM-2.5)	24-Hour Annual	35 12	9 4	4 --	1.2 0.3
Sulfur Dioxide (SO_2)	1-Hour 24-Hour Annual 3-Hour	196 -- - 1,300	-- 91 20 512	-- 13 -- --	7.8[c] 5 1 25
Lead (Pb)	3-Month	0.15	--	0.1	--

Note: (--) indicates there are no standards for this pollutant.
[a]All short-term (1-hr, 3-hr, 8-hr, and 24-hr) standards except ozone, PM-2.5,PM-10, and 1-hour SO_2 and NO_2 are not to be exceeded more than once per year. For 8-hr ozone, EPA uses the average of the annual 4th highest 8-hour daily maximum concentrations from each of the last three years of air quality monitoring data to determine a violation of the standard. For 24-hour PM-10, EPA uses the 6th highest 24-hour maximum concentration from the last three years of air quality monitoring data to determine a violation of the standards. For 24-hour PM-2.5, EPA uses the 98th percentile 24-hour maximum concentration from the last three years of air quality monitoring data to determine a violation of the standard. For the 1-hour NO_2 NAAQS, compliance would be determined by the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area and for the 1-hour SO_2 NAAQS, compliance would be determined with the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area.
[b]Interim SIL per Guidance from NJDEP staff.
[c]Interim SIL of 3 ppb (7.8 ug/m³) per August 23, 2010 memorandum "Guidance Concerning the Implementation of the 1-hour SO_2 NAAQS for the Prevention of Significant Deterioration Program" from Steven Page (Director of U.S. EPA OAQPS).

Table 4-3: New Jersey Ambient Air Quality Standards

Pollutant	Standard	Averaging Period	NJAAQS[a] (ug/m^3)
Sulfur Dioxide	Primary Primary Secondary Secondary Secondary	12-month arith. mean 24-hour average 12-month arith. mean 24-hour average 3-hour average	80 365 60 260 1,300
Total Suspended Particulates	Primary Primary Secondary Secondary	12-month geom. mean 24-hour average 12-month geom. mean[b] 24-hour average	75 260 60 150
Carbon Monoxide	Primary & Secondary Primary & Secondary	8-hour average 1-hour average	10,000 40,000
Ozone[c]	Primary Secondary	Max. daily 1-hour average 1-hour average	235 160
Nitrogen Dioxide	Primary & Secondary NJDEP Guideline	12-month arith. mean 1-hour average	100 470
Lead	Primary & Secondary	Rolling 3-month average	1.5

[a]New Jersey short-term standards are not to be exceeded more than once in any 12 month period. Long-term standards are never to be exceeded.
[b]Intended as a guideline for achieving short-term standard.
[c]Maximum daily 1-hour average: averaged over a three year period, the expected number of days above the standard must be less than or equal to 1.

5.0 MODELING METHODOLOGY

Air quality dispersion modeling will be performed consistent with the procedures found in the following documents: Guideline on Air Quality Models (Revised) (U.S. EPA, 2005), New Source Review Workshop Manual (U.S. EPA, 1990), Screening Procedures for Estimating the Air Quality Impact of Stationary Sources (U.S. EPA, 1992), and Guidance on Preparing an Air Quality Modeling Protocol - Technical Manual 1002 (NJDEP, 2009).

5.1 Model Selection

The U.S. EPA has compiled a set of preferred, alternative, screening, and photochemical computer models for the calculation of pollutant impacts. The selection of a model depends on the characteristics of the source, as well as the nature of the surrounding study area. Of the four classes of models available, the Gaussian type model is the most widely used technique for estimating the impacts of nonreactive pollutants.

The U.S. EPA AERMOD model is proposed to be used. The AERMOD model was designed for assessing pollutant concentrations from a wide variety of sources (point, area, and volume). AERMOD is currently recommended for modeling studies in rural or urban areas, flat or complex terrain, and transport distances less than 50 kilometers, with one hour to annual averaging times.

AERMOD (version 15181 with PRIME) will be used for the preliminary modeling of the proposed facility's potential emissions to determine the maximum ambient air concentrations. The regulatory default option will be used in the dispersion modeling analysis performed for this project.

5.2 Surrounding Area and Land Use

A land cover classification analysis was performed to determine whether the urban source modeling option in AERMOD should be used in quantifying ground-level concentrations. The urban option in AERMOD accounts for the effects of increased surface heating on pollutant dispersion under stable atmospheric conditions. Essentially, the urban convective boundary layer forms in the night when stable rural air flows onto a warmer urban surface. The urban surface is warmer than the rural surface because the urban surface cools at a slower rate than the rural surface when the sun sets.

The USGS map (see Figure 5-1) covering the area within a 3-kilometer radius of the site as well as the full modeling domain (20 kilometers by 20 kilometers) was reviewed and indicated that the majority of the surrounding area includes water, wooded areas, parks, and non-densely packed structures.

Additionally, the "AERMOD Implementation Guide" published on October 19, 2007 cautions users against applying the Land Use Procedure on a source-by-source basis and instead consider the potential for urban heat island influences across the full modeling domain. This approach is consistent with the fact that the urban heat island is not a localized effect, but is more regional in character.

Because the urban heat island is more of a regional effect, the Urban Source option in AERMOD will not be utilized since the area within 3 kilometers of the proposed site as well as the full modeling domain is not located in the New York City metropolitan area and thus, would not be subject to the New York City metropolitan area heat island.

5.3 Meteorological Data

For any PSD modeling analysis conducted using the AERMOD model, two meteorological datasets are required: 1) hourly surface data and 2) upper air sounding data. According to the Guideline on Air Quality Models (Revised) (2005), the meteorological data used in a PSD modeling analysis should be selected based on its spatial and climatological representativeness of a proposed facility site and its ability to accurately characterize the transport and dispersion conditions in the area of concern. The spatial and climatological representativeness of the meteorological data are dependent on four factors:

1. The proximity of the meteorological monitoring site to the area under consideration;
2. The complexity of the terrain;
3. The exposure of the meteorological monitoring site; and,
4. The period of time during which data were collected.

This protocol presents one hourly surface dataset and one upper air sounding dataset for use in modeling the proposed facility to be located in the Township of Woodbridge, Middlesex County. Each of these meteorological datasets was reviewed using the U.S. EPA criteria. The nearest National Weather Service (NWS) operated meteorological monitoring station to the proposed facility site is at the Newark Liberty International Airport (WBAN 14734) in Essex County. The airport is located approximately 22 km north-northeast of the proposed facility site at an elevation of approximately 7 feet above MSL. Figure 5-2 shows the location of the Newark Liberty International Airport in relation to the proposed facility site. The meteorological monitoring station at the Airport continues to operate.

Both the proposed facility site and Newark Liberty International Airport are located within the same metropolitan, industrial area along the New Jersey/New York urban corridor. Further, there are no high ridges (i.e., intervening terrain) between the proposed facility site and the airport.

An Automated Surface Observing System (ASOS) station was installed at Newark Liberty International Airport on July 1, 1996 and data collected after this date was measured at a height of 32.8 feet. NJDEP has provided an AERMOD-ready Newark Liberty International Airport meteorological dataset (2010 – 2014) that will be used in the air quality modeling analysis.

A wind rose displaying the composite wind rose for all five years (2010 – 2014) of wind speed and direction for the Newark Liberty International Airport is shown in Figure 5-3. Over the five (5) year period, predominant winds varied from the northwest to the southwest. The average wind speed over the five years is 4.39 meters per second. Calm winds during the five years had an average frequency of calms of 0.61 percent. Additionally, the wind data recorded at the airport is reasonably consistent from year to year.

Thus, based on the information provided above, the applicant believes that the meteorological data recorded at the Newark Liberty International Airport are representative of the air regime at the proposed facility site and suitable to be used in the atmospheric dispersion modeling study for the Keasbey Energy Center because:

- Due to the proximity of the airport to the proposed facility site and the lack of significant intervening terrain features, overall climatological conditions would be expected to be quite similar at both the airport and the proposed facility site;
- The elevation of the airport (approximately 7 feet above MSL) and the proposed facility site elevation (approximately 20 feet above MSL) are comparable;
- The meteorological tower at the Newark Liberty International Airport is well sited and in an area free of obstructions to wind flow; and,
- The quality of the available data is good, exceeding U.S. EPA data recovery guidelines and displaying consistency from year to year of the available data record.

Concurrent upper air sounding data from Brookhaven National Labs, New York (WBAN 94703) was used with the hourly surface data from Newark Liberty International Airport by NJDEP to create the meteorological dataset required for the modeling analysis. Brookhaven National Labs is approximately 127 km to the east of the proposed facility site. Based on Holzworth's *Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution Throughout the Contiguous United States*, it is believed that upper air meteorological conditions in the Brookhaven, NY area are more representative than those from the next most proximate upper air station. Both the surface and upper air sounding data were processed by NJDEP using AERMOD's meteorological processor, AERMET (version 15181). The output from AERMET will be used as the meteorological database for the air quality modeling analysis and will consist of a surface data file and a vertical profile data file.

5.4 Sources

The proposed facility will consist of various types of emission sources. The AERMOD technical manual will be used to set up the various sources to develop a logical and comprehensive modeling assessment. The following identifies the types of sources and how they will be assessed.

- Combustion Turbine Exhaust Stack – Single point source
- Ancillary Equipment Exhaust Stacks – Single point sources

5.5 Load Analysis

The proposed facility's combustion turbine will be operated over a range of loads. The air permit application will provide a detailed discussion of all the sources at the proposed facility and how they are assessed in the air quality analysis. All twenty-six (26) combustion turbine operating cases as listed in Table 3-2 will be modeled to determine which case is the "worst-case" operating scenario for each pollutant and averaging period. These "worst-case" loads will then be used for any subsequent NAAQS or PSD Increment modeling, including additional facility sources and potentially offsite sources.

5.6 Startups/Shutdowns

Startup is a short-term, transitional mode of operation for the combined cycle unit. In combined cycle operation, where the exhaust gases are directed through a HRSG to produce steam for a steam turbine generator, additional startup time is necessary in order to reduce thermal shock and excessive wear in both the HRSG and the steam turbine. Emission rates of some pollutants may be higher during startup operations because emissions controls may not become fully effective until a minimum threshold operating load and or control device temperature is attained. The need for additional modeling to account for predicted short-term project impacts during startup of the combined cycle unit will be assessed for those criteria pollutants whose short-term emission rates during startup may exceed those during normal operation and for which a short-term NAAQS or PSD increment has been defined (i.e., for CO and NO_2). Furthermore, in order to facilitate startup of the CTG and steam turbine generator, as well as for maintenance purposes, the auxiliary boiler will be modeled as operating simultaneously with the combustion turbine using the emissions and stack parameters detailed in Table 3-4.

Startups are defined as cold, warm, and hot. The GE 7HA.02 combustion turbine can startup in a rapid response mode, which takes less time than a conventional start. The basic approach for rapid response mode is to thermodynamically decouple the gas turbine from the bottoming cycle, thereby allowing the gas turbine to start without the hold times needed to allow the HRSG and steam turbine to heat up. In other words, the rapid response start allows the plant to startup significantly faster than a conventional combined cycle plant by decoupling the steam turbine as the gas turbine ramps up and comes online.

The facility will require "cold starts," which are typically based on one startup after 72 hours or more of shutdown, "warm starts" (based on 8 hours to 72 hours of shutdown), and "hot starts" (based on 8 hours or less of shutdown). A cold gas-fired rapid start requires 45 minutes, a warm gas-fired rapid start requires 40 minutes, and a hot gas-fired rapid start requires 20 minutes. The combustion turbine also requires a 12 minute shutdown period. A cold ULSD-fired rapid start requires 45 minutes, a warm gas-fired rapid start requires 40 minutes, and a hot gas-fired rapid start requires 20 minutes. The combustion turbine also requires a 7 minute shutdown period.

The worst-case startup/shutdown emissions for CO and NO_x will be modeled if the pollutant(s) has higher emissions during startup and shutdown conditions when compared to normal operation. Startup emissions and associated stack parameters for the natural gas and ULSD rapid response scenarios have been estimated based on vendor data and are shown in Tables 5-1 and 5-2, respectively.

During the operational year, CPV Keasbey, LLC is proposing 10 cold gas fired rapid starts, 52 warm gas fired rapid starts, and 200 hot gas fired rapid starts. CPV Keasbey, LLC is also proposing ten (10) ULSD fired rapid starts. Only warm and hot gas fired rapid starts are proposed to be evaluated (for 1-hour NO_2, 1-hour CO, and 8-hour CO) since the number of cold gas fired rapid starts (10) can be deemed to occur infrequently (i.e., transient events). Further, ULSD fired rapid starts are not proposed to be evaluated since the number of each (10) can also be deemed to be transient events.

Because the startup/shutdown durations from some types will be shorter than some of the averaging periods modeled, the modeled concentrations for these averaging periods that extend beyond the start-up duration will be determined based on the combination of the startup conditions for the appropriate amount of time and the worst case full load pollutant and averaging period specific operating scenario determined in the combustion turbine load analysis.

Since SO_2 emissions are strictly dependent upon fuel flow (and lower during startup than continuous operation), SO_2 startups are not proposed to be evaluated. The worst-case startup/shutdown emissions for CO and NO_x will be modeled if the pollutant(s) have higher emissions during startup and shutdown conditions when compared to normal operation for short-term averaging periods. For annual averaging periods, start-ups will only be included in the modeling analysis if the potential to emit for the facility increases due to the inclusion of start-ups into the annual potential to emit calculation.

5.7 1-Hour NO_2 Modeling

The air quality modeling analysis for the 1-hour NO_2 NAAQS will be performed consistent with the guidance and procedures established in the September 30, 2014 guidance memorandum titled "Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO_2 NAAQS" and the March 1, 2011 guidance memorandum from Tyler Fox (EPA OAQPS) titled "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-Hour NO_2 NAAQS" (Memorandums). Based upon the discussion in the memorandums regarding the treatment of intermittent sources, it is proposed that only equipment or operating scenarios that "are continuous or frequent enough to contribute significantly to the annual distribution of daily maximum 1-hour concentrations" will be included in the 1-hour NO_2 modeling analysis.

This methodology, per the examples provided in the Memorandums, would exempt any facility equipment or operating scenarios from 1-hour NO_2 compliance modeling that does not operate on a normal daily or routine schedule. For example, the emergency diesel generator and emergency diesel fire pump are not expected to be tested more than once per week for more than 1-hour and thus, would not be expected to contribute significantly to the annual distribution of maximum 1-hour concentrations. For these reasons, and consistent with the Memorandums, it is proposed that the 1-hour NO_2 modeling will not include the emergency diesel generator and the emergency diesel fire pump.

Startup and shutdown conditions that are expected to contribute to the annual distribution of daily maximum concentrations due to their frequency on a yearly basis will be included in the air quality modeling analysis for the 1-hour NO_2 standard.

5.8 NJDEP Air Toxics Risk Analysis

The receptor-point concentrations of any toxic substance identified by NJDEP as a Hazardous Air Pollutant (HAP) that could potentially be emitted from the proposed facility will be assessed in order to evaluate the potential health risk to the public beyond the property line of the proposed facility. This will be done by considering each individual HAP emission that contributes to the evaluation as well as by considering the cumulative effects of the HAPs that contribute to the evaluation.

To assess the potential for offsite public health threats, the NJDEP Technical Manual 1003: Guidance on Preparing a Risk Assessment Protocol for Air Contaminant Emissions will be used. The NJDEP has prescribed and provided an Air Toxics Risk Screening Worksheet to ascertain the potential health effects from facilities seeking permits to emit air toxics. TRC proposes to use the 24-hour and annual unit concentrations (XOQ) from the proposed combustion turbine and evaluate the air toxic impact using the Risk Screening Worksheet. Screening concentrations will then be compared against the guidelines found in the NJDEP Technical Manual.

The HAPs and emission rates that will be evaluated in the risk assessment will be included in the PSD permit application that will be submitted to the NJDEP. It should be noted that although sulfuric acid mist is not listed as a HAP under the Clean Air Act, it is included in NJDEP's Risk Screening Worksheet.

5.9 Receptor Grid

5.9.1 Basic Grid

The AERMOD model requires receptor data consisting of location coordinates and ground-level elevations. The receptor generating program, AERMAP (Version 11103), will be used to develop a complete receptor grid to a distance of 10 kilometers from the proposed facility. AERMAP uses digital elevation model (DEM) or the National Elevation Dataset (NED) data obtained from the USGS. The preferred elevation dataset based on NED data will be used in AERMAP to process the receptor grid. This is currently the preferred data to be used with AERMAP as indicated in the U.S. EPA AERMOD Implementation Guide (U.S. EPA, 2009). AERMAP will be run to determine the representative elevation for each receptor using 1/3 arc second NED files that will be obtained for an area covering at least 20 kilometers in all directions from the facility. The NED data will be obtained through the Multi-Resolution Land Characteristics Consortium (MRLC) link at http://www.mrlc.gov/viewerjs/.

The following rectangular (i.e. Cartesian) receptors will be used to assess the air quality impact of the proposed facility:

- Fine grid receptors (100 meter spacing) for a 20 km (east-west) x 20 km (north-south) grid centered on the proposed facility site.

Receptors will be placed along the facility fence line or property boundary every 25 meters. Grid receptors within the fenced plant property will be excluded from the grid as public access will be precluded in this area.

5.10 Background Ambient Air Quality

Based on a review of the locations of NJDEP ambient air quality monitoring sites, the closest NJDEP monitoring site will be used to represent the current background air quality in the site area, if necessary. Background data for CO and SO_2 was obtained from a New Jersey monitoring station located in Union County (EPA AIRData #34-039-0004). The monitor is located at Interchange 13 on the New Jersey Turnpike (Elizabeth Lab), approximately 17 km northeast of the proposed facility. This monitor is located in an area with a greater amount of mobile and point sources of air emissions as compared to the project area. Thus, this monitor would be considered to conservatively represent the ambient air quality within the project area.

Background data for PM-10 was obtained from a Jersey City monitoring station located in Hudson County, New Jersey (EPA AIRData # 34-017-1003), approximately 32 km northeast of the proposed facility. The monitor is located at 355 Newark Avenue in a commercial/urban area. This monitor is located in an area with a greater amount of mobile and point sources of air emissions as compared to the project area. Thus, this monitor would be considered to conservatively represent the ambient air quality within the project area.

Background data for NO_2 was obtained from an East Brunswick monitoring station located in Middlesex County, New Jersey (EPA AIRData # 34-023-0011), approximately 11 km west-southwest of the proposed facility. The monitor is located at Rutgers University (Veg. Research Farm #3 on Ryders Lane) in an agricultural/rural area with proximate commercial uses (i.e., Route 1 and Interstate 95). This monitor's close proximity to the Project site would qualify it to be representative of the ambient air quality within the project area.

Background data for PM-2.5 was obtained from a New Brunswick Township monitoring station located in Middlesex County, New Jersey (EPA AIRData # 34-023-0006), approximately 10 km west-southwest of the proposed facility. The monitor is located at Rutgers University's Cook College (Log Cabin Road) in an agricultural/rural area with proximate commercial uses. This monitor's close proximity would qualify it to be representative of the ambient air quality within the project area.

The monitoring data for the most recently available three years (2013 – 2015) are presented and compared to the NAAQS in Table 5-3. The maximum measured concentrations for each of these pollutants during the last three years are all below applicable standards and are proposed to be used in a NAAQS analysis should one be required.

5.11 NAAQS/NJAAQS Analysis

Should modeled concentrations be greater than the SILs for one or more pollutants, NAAQS/NJAAQS analyses for those pollutants will be performed. The first step of conducting the NAAQS/NJAAQS analysis will be to determine the pollutant specific area(s) of impact of the proposed facility. The area of impact corresponds to the distance at which the model calculated pollutant concentrations fall below the SILs. The second step is obtaining off-site major source inventories within the area of impact plus a distance to be determined based upon discussions with NJDEP. Discussions with NJDEP will be centered on the development of an off-site source inventory and the procedures recommended for preparing a multiple source inventory. If required, these off-site major sources will be included in the NAAQS/NJAAQS modeling analysis along with all sources at the proposed facility. The resultant concentrations will then be added to the representative background concentration for comparison to the NAAQS/NJAAQS. If the modeled concentration plus the background concentration is less than the NAAQS/NJAAQS, the proposed facility is considered acceptable relative to the NAAQS/NJAAQS. CPV Keasbey, LLC will demonstrate that its modeled impact plus representative background concentrations will be in compliance with the NAAQS/NJAAQS presented in Tables 4-2 and 4-3, respectively.

5.12 PSD Increment Analysis

Should modeled concentrations be greater than the SILs, the source must also demonstrate compliance with the PSD increments established for SO_2, NO_2, and PM-10/PM-2.5. The proposed facility is located in a PSD Class II area. CPV Keasbey, LLC will demonstrate that its modeled impact will be in compliance with the Class II PSD increments presented in Table 4-2.

5.13 Environmental Justice

As it relates to Executive Order 12898 ("EO"), entitled "Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations" (February 11, 1994), TRC will prepare an environmental justice (EJ) analysis that is designed to determine whether the construction and operation of the proposed project will have a significant adverse and disproportionate effect on an "environmental justice community." The EO requires federal agencies to consider disproportionately high adverse human health or environmental effects of their actions on minority and low-income populations. Pursuant to the EO, EJ considerations are taken into account during PSD review.

5.14 Threatened and Endangered Species

As it relates to Section 7 of the Endangered Species Act (ESA), TRC will consult with the U.S. Fish and Wildlife Service (FWS) and/or U.S. Marine Fisheries (MF) to determine if the proposed project may affect any endangered species. At a minimum, this requires notifying and/or providing a copy of the PSD application to the FWS and/or MF.

5.15 Additional Impact Analyses

In addition to assessing impacts on the NAAQS and PSD increments, facilities subject to PSD review must assess the potential impact for the area as a result of growth, and the potential impacts to soils, vegetation, and visibility in the area surrounding the proposed facility.

5.15.1 Assessment of Impacts due to Growth

The proposed facility will be reviewed to assess the potential for affecting local and regional industrial, commercial, and residential growth. Factors that will be examined include the effects the transient working force will have during construction, which is anticipated to occur for up to 30 months, with a currently planned 2020 commercial operation date. If an increase in the permanent working force is required, the effects on the local growth will also be examined. Other effects to growth that will be examined include the air quality constraints the emissions from the proposed facility will have on precluding new growth, and the potential for drawing new industrial growth due to the electricity generated.

5.15.2 Assessment of Impacts on Soils and Vegetation

Pursuant to PSD regulations, an assessment of the potential impacts of the proposed facility on soils and vegetation will be prepared. The methodology outlined in <u>A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals</u>, EPA 450/2-81-078 will be used. This assessment will compare the maximum-modeled facility impacts plus background to pollutant-specific concentration levels. These pollutant-specific concentration levels are minimum pollutant concentration levels at which damage to the natural vegetation and predominant crops could occur. Therefore, if the maximum-modeled concentrations are less than the pollutant-specific concentration levels, then no damage to vegetation will be anticipated. The specific impact criteria levels to be used for the comparison will be identified for predominant soil and vegetation types based upon a review of the current literature.

5.15.3 Impact on Visibility

An assessment of the proposed facility's potential impact on visibility within the surrounding area will be performed using the U.S. EPA VISCREEN model (version 13190).

5.15.4 Impacts on Class I Areas

The only Class I area within 300 km of the proposed facility is the Brigantine Wilderness area located in the Edwin B. Forsythe National Wildlife Refuge in New Jersey. This area is located approximately 108 km south of the proposed facility. The Federal Land Manager (FLM) for this Class I area was notified by letter on July 12, 2016 and confirmed on July 13, 2016 that an assessment of impacts in the Class I area will not be required. Copies of both the letter and the FLM's response are included in Appendix A.

5.16 Modeling Submittal

The permit application for the proposed facility will include a section detailing the modeling methodology and results from the modeling analysis. All final stack parameters and emission rates will be presented in the report. All modeling input and output files used in the analysis will be submitted in electronic format (DVD-ROM) with the permit application.

Table 5-1: Combustion Turbine Start-up and Shutdown Emission Rates and Stack Parameters (Rapid Response – Natural Gas Fired)

Estimated Combustion Turbine Startup/Shutdown Parameters – Rapid Response (Natural Gas Fired)								
Event	**Elapsed Time (hr)**	**Stack NO_x (lb/event)**	**Stack NO_x (Max lb/hr)**	**Stack CO (lb/event)**	**Stack CO (Max lb/hr)**	**Average Stack Exhaust Flow (acfm)**	**Average Stack Exhaust Velocity (m/s)**	**Average Stack Exhaust Temperature (Degrees F)**
Cold Startup	0.75	188	188	169	169	671,086	8.97	160
Warm Startup	0.67	126	126	140	140	671,086	8.97	160
Hot Startup	0.33	67	67	120	120	671,086	8.97	160
Shutdown	0.20	7	7	125	125	671,086	8.97	160

	Type of Startup or Shutdown Event			
	Cold Startup	Warm Startup	Hot Startup	Shutdown
Duration of Turbine at 0% load prior to Start-up (hours)	72	8	4	-
Maximum Duration of Start-up or Shut-down Event (hours)	0.75	0.67	0.33	0.20
Maximum Number per Year	10	52	200	262

Note: Due to the infrequency of cold startups, modeling of these transient events for 1-hour NO_2, 1-hour CO, and 8-hour CO is not proposed.

Table 5-2: Combustion Turbine Start-up and Shutdown Emission Rates and Stack Parameters (Rapid Response Lite – ULSD Fired)

Estimated Combustion Turbine Startup/Shutdown Parameters – Rapid Response (ULSD Fired)								
Event	**Elapsed Time (hr)**	**Stack NO_x (lb/event)**	**Stack NO_x (Max lb/hr)**	**Stack CO (lb/event)**	**Stack CO (Max lb/hr)**	**Average Stack Exhaust Flow (acfm)**	**Average Stack Exhaust Velocity (m/s)**	**Average Stack Exhaust Temperature (Degrees F)**
Cold Startup	0.75	229	229	191	191	771,103	10.30	160
Warm Startup	0.67	207	207	188	188	771,103	10.30	160
Hot Startup	0.33	143	143	177	177	771,103	10.30	160
Shutdown	0.12	22	22	32	32	771,103	10.30	160

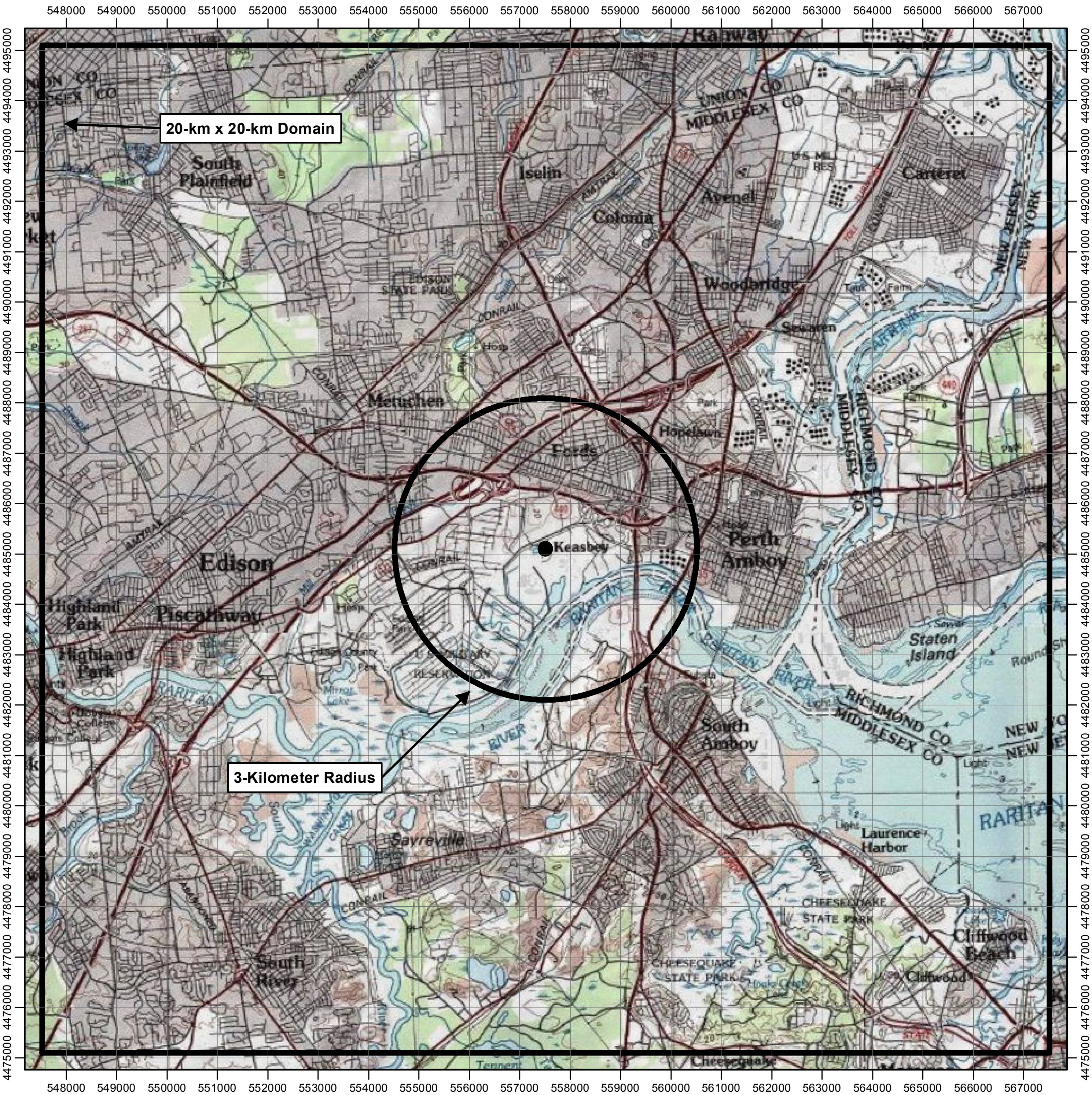
	Type of Startup or Shutdown Event			
	Cold Startup	Warm Startup	Hot Startup	Shutdown
Duration of Turbine at 0% load prior to Start-up (hours)	72	8	4	-
Maximum Duration of Start-up or Shut-down Event (hours)	0.75	0.67	0.33	0.12
Maximum Number per Year	2	3	5	10

Note: Due to the infrequency of ULSD fired startups, modeling of these transient events for 1-hour NO_2, 1-hour CO, and 8-hour CO is not proposed.

Table 5-3: Maximum Measured Ambient Air Quality Concentrations

Pollutant	Averaging Period	Maximum Ambient Concentrations ($\mu g/m^3$)			NAAQS ($\mu g/m^3$)
		2013	2014	2015	
SO_2	1-Hour[a]	36.7	34.1	39.3	197
	3-Hour	**28.8**	28.8	--	1,300
	24-Hour	**15.7**	13.1	11.8	365
	Annual	2.6	**2.6**	--	80
NO_2	1-Hour[b]	75.2	88.4	90.2	188
	Annual	18.8	16.9	**19.3**	100
CO	1-Hour	2,300	2,530	**2,760**	40,000
	8-Hour	1,495	**2,070**	1,840	10,000
PM-10	24-Hour	43	37	**44**	150
PM-2.5[c]	24-Hour	19.1	20	20	35
	Annual	8.0	8.2	7.9	12

[a]1-hour 3-year average 99th percentile value for SO_2 is **36.7** ug/m3.
[b]1-hour 3-year average 98th percentile value for NO_2 is **84.6** ug/m3.
[c]24-hour 3-year average 98th percentile value for PM-2.5 is **19.7** ug/m3; Annual 3-year average value for PM-2.5 is **8.0** ug/m3.
High second-high short term (1-, 3-, 8-, and 24-hour) and maximum annual average concentrations presented for all pollutants other than PM-2.5 and 1-hour SO_2 and NO_2.
Bold values represent the proposed background values for use in any necessary NAAQS analyses.
Monitored background concentrations obtained from the U.S. EPA AIRData, AirExplorer and Air Quality System (AQS) websites.



● Site Location

N

0 1,000 2,000 Meters

Base Map: USGS

TRC

Wannalancit Mills
650 Suffolk Street
Lowell, MA 01854
978-970-5600

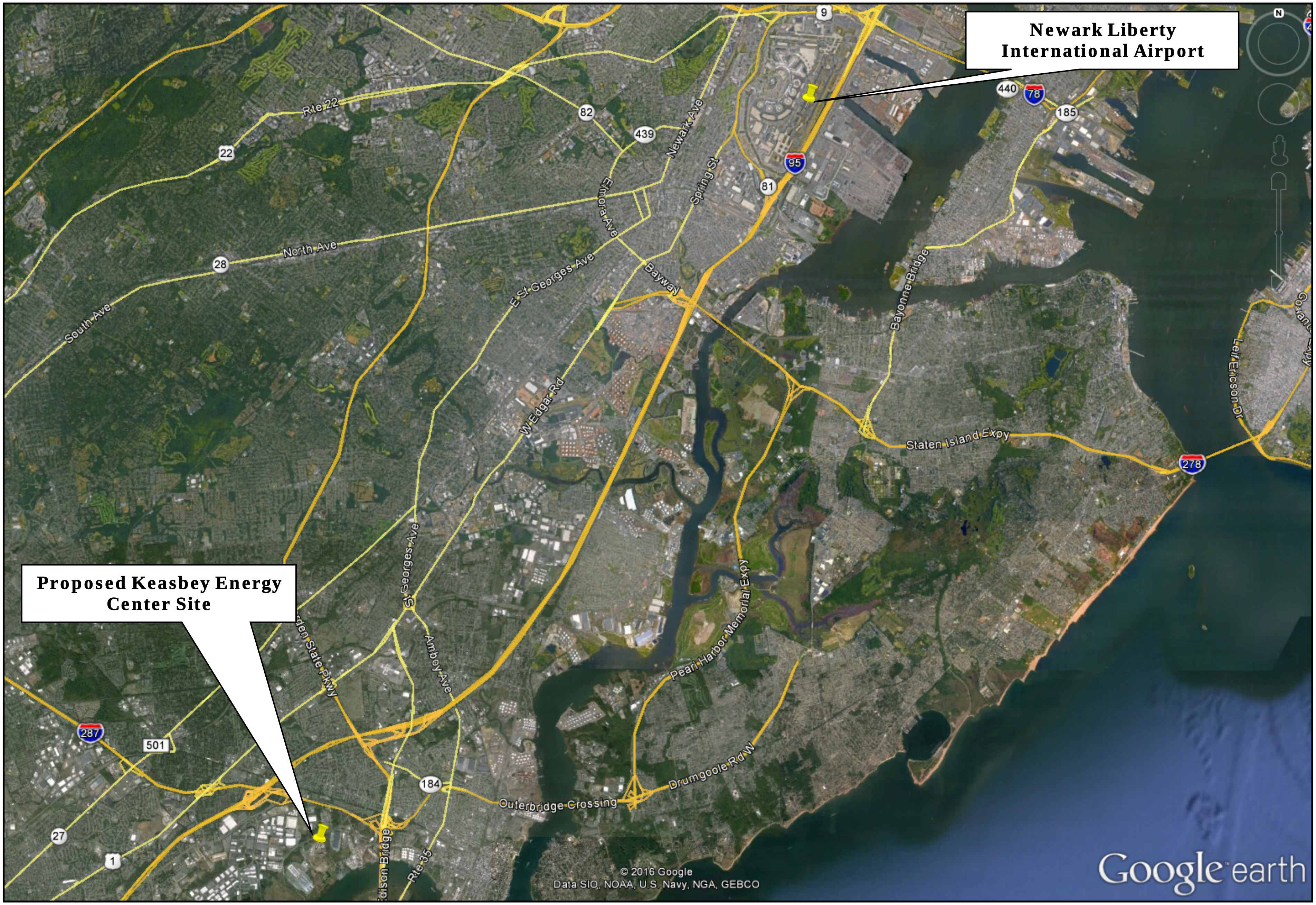
FULL MODELING DOMAIN AND 3-KM RADIUS AROUND THE PROJECT SITE

KEASBEY ENERGY CENTER
WOODBRIDGE, NEW JERSEY

FIGURE 5-1	July 2016

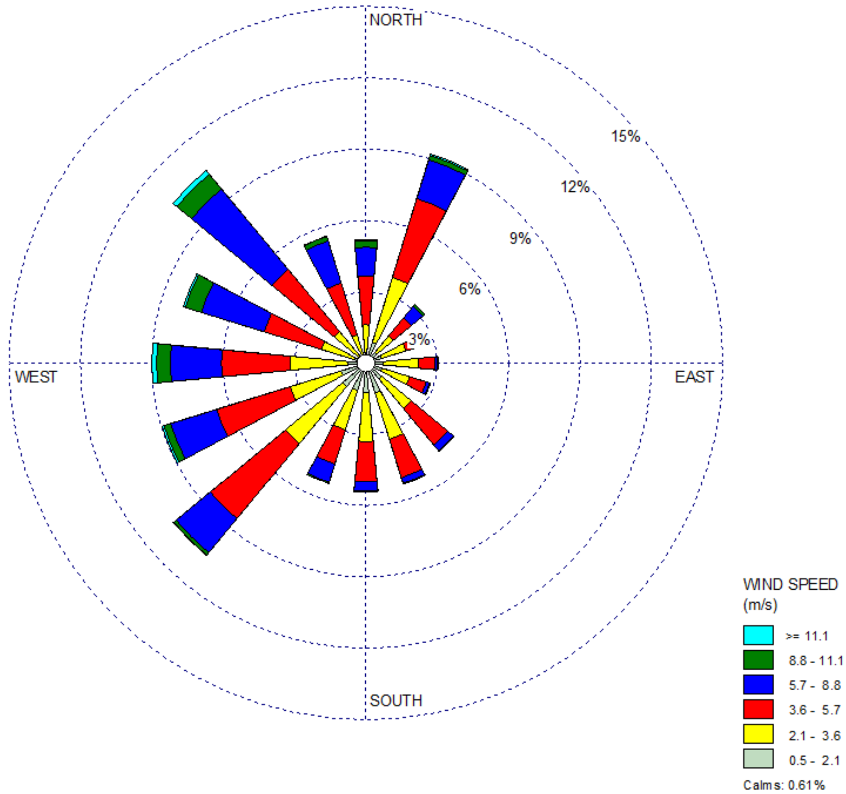
R:\Projects\GIS_2016\252973_Keasbey_Energy\mxd\Fig5-1_Keasbey_20km_Topo_20160705.mxd

Figure 5-2
Location of Proposed Keasbey Energy Center and Newark Liberty International Airport



WIND ROSE PLOT:

Newark Liberty International Airport Wind Rose (2010-2014)



COMMENTS:	DATA PERIOD: Start Date: 1/1/2010 - 00:00 End Date: 12/31/2014 - 23:00		
	CALM WINDS: 0.61%	TOTAL COUNT: 43720 hrs.	
	AVG. WIND SPEED: 4.39 m/s		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

Keasbey Energy Center
Proposed Combined Cycle Power Facility
Township of Woodbridge, Middlesex County, New Jersey

Figure 5-3: Wind Rose for Newark Liberty International Airport (2010 – 2014)

Source: WRPLOT – Lakes Environmental

TRC

6.0 REFERENCES

NESCAUM, 2013. NESCAUM letter to George Bridgers, Air Quality Modeling Group, U.S.EPA, providing comments to Draft Guidance for PM2.5 Permit Modeling, released by EPA on March 4, 2013. Boston, Massachusetts. May 30, 2013.

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U.S. EPA, 2011. Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-Hour NO_2 NAAQS. U.S. EPA. March 1, 2011.

U.S. EPA, 2005. Guideline on Air Quality Models (Revised). Appendix W to Title 40 U.S. Code of Federal Regulations (CFR) Parts 51 and 52, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency. Research Triangle Park, North Carolina. November 6, 2005.

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U.S. EPA, 1990. "New Source Review Workshop Manual, Draft". Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency. Research Triangle Park, North Carolina.

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APPENDIX A

AGENCY CORRESPONDENCE

TRC
Results you can rely on
1200 Wall Street West
5th Floor
Lyndhurst, NJ 07071
201.933.5541 PHONE
201.933.5601 FAX
www.trcsolutions.com

July 12, 2016

Ms. Jill Webster
Environmental Scientist
United States Department of the Interior
U.S. Fish & Wildlife Service
National Wildlife Refuge System
7333 W. Jefferson Ave., Suite 375
Lakewood, Colorado 80235-2017

Subject: CPV Keasbey, LLC
Keasbey Energy Center
Proposed Combined Cycle Power Facility
Township of Woodbridge, Middlesex County, New Jersey
Need for Class I Area Air Quality and Air Quality Related Values (AQRV) Analyses for the Brigantine Wilderness Class I Area

Dear Ms. Webster:

TRC has been retained by CPV Keasbey, LLC (CPV Keasbey) to prepare a Prevention of Significant Deterioration (PSD) permit application for a proposed nominal 630-megawatt (MW) combined cycle power facility (to be known as the Keasbey Energy Center) to be constructed in the Township of Woodbridge, Middlesex County, New Jersey. The approximate Universal Transverse Mercator (UTM) coordinates of the Keasbey Energy Center are 557,517 meters Easting, 4,485,098 meters Northing, in Zone 18, NAD83.

The Keasbey Energy Center project design reflects the planned installation of one (1) General Electric (GE) 7HA.02 combustion turbine at the facility. The combustion turbine will be primarily natural gas-fired but will be capable of utilizing ultra-low sulfur diesel (ULSD) for up to 720 hours per year. Dry low NO_x burners (during natural gas firing), water injection (during ULSD firing), and Selective Catalytic Reduction (SCR) will be used to reduce nitrogen oxides (NO_x) emissions from the combustion turbine. The firing of natural gas and ULSD will minimize emissions of particulate matter with an aerodynamic diameter less than 10 microns (PM-10), sulfur dioxide (SO_2) and sulfuric acid mist (H_2SO_4). Additionally, an oxidation catalyst will be installed to control the emissions of carbon monoxide (CO) and volatile organic compounds (VOC).

Exhaust gases from the combustion turbine will flow into an adjacent heat recovery steam generator (HRSG). The HRSG will produce steam to be used in the steam turbine generator and will be equipped with a natural gas fired duct burner. Combustion products will be discharged through one (1) exhaust stack. Supporting auxiliary equipment includes a gas fired auxiliary boiler, one (1) emergency diesel generator, one (1) emergency diesel fire pump, and a wet mechanical draft cooling tower.

Estimated potential short-term (24-hour) maximum emissions and annual emissions are presented in Table 1. The PM-10 emission rates presented in Table 1 include filterable and condensable particulates.

Table 1: Estimated Potential Emissions

Pollutant	Combustion Turbine Maximum Short-Term Emissions (lb/hr)		Annual Emissions[1] (tpy)	Annual Emissions[2] (tpy)
	Natural Gas Fired	ULSD Fired		
Nitrogen Oxides (NO_x)	32.8	56.1	152.1	246
Sulfur Dioxide (SO_2)	9.6	6.6	41.0	29
Particulate Matter with an aerodynamic diameter less than 10 microns (PM-10)	23.4	64.6	117.3	283
Sulfuric Acid Mist (H_2SO_4)	6.1	4.3	26.1	19

[1]Annual emissions based on one (1) GE 7HA.02 combustion turbine operating 8,040 hours per year on natural gas and 720 hours per year on ULSD at the respective maximum short-term emission rates.
[2]Annual emissions based on one (1) GE 7HA.02 combustion turbine hypothetically operating 8,760 hours per year on ULSD at the ULSD short-term emission rate (solely for comparison to FLAG Q/D guidance, and not for permitting).

The Brigantine Wilderness Class I area located in the Edwin B. Forsythe National Wildlife Refuge in New Jersey is approximately 108 km south of the proposed facility. Following the Draft Revised FLAG guidance (2010), TRC believes that the proposed facility may be eligible for an exemption from the requirement to perform a Class I area modeling analysis because of its inherent low emissions and distance to the Class I area. We understand that the maximum short-term emission rates are used in the exemption analysis. Assuming full year operation (8,760 hours) of the combined cycle combustion turbine (firing ULSD) yields a (emission in tpy)/(distance in km) ratio (577 tons per year/108 km) of approximately 5.3. It should be noted that this assumption is conservative since the combustion turbine will be capable of firing ULSD for up to 720 hours per year. It is our understanding that according to the Q/D test, the FLM should consider this source (which is located greater than 50 km from the Brigantine Wilderness Class I area) and has a ratio of annual equivalent emissions (Q in tons per year) divided by distance (D in km) from the Brigantine Wilderness Class I area (km) < 10, as having negligible impacts with respect to Class I visibility impacts and that there would not be any Class I visibility impact analyses required from this source.

With this letter, TRC, on behalf of CPV Keasbey, LLC, is formally requesting a determination that there is no need to perform a Class I area air quality and AQRV analysis for the Brigantine Wilderness Area as part of the facility's PSD Air Permit application. If you should require additional information on the proposed Project or have any questions, please feel free to contact me at (201) 508-6960 or tmain@trcsolutions.com.

Sincerely,

TRC

Theodore Main
Principal Consulting Meteorologist

cc: J. Donovan, CPV
A. Urquhart, CPV
M. Keller, TRC
TRC Project File 252973

TRC
Results you can rely on
1200 Wall Street West
5th Floor
Lyndhurst, NJ 07071

201.933.5541 PHONE
201.933.5601 FAX

www.trcsolutions.com

July 12, 2016

Mr. Greg John
New Jersey Department of Environmental Protection
Division of Air Quality, Bureau of Technical Services
401 East State Street, 2nd Floor
Trenton, New Jersey 08625

Subject: CPV Keasbey, LLC
Keasbey Energy Center
Proposed Combined Cycle Power Facility
Township of Woodbridge, Middlesex County, New Jersey
Request for Waiver from Pre-Construction Ambient Air Quality Monitoring

Dear Mr. John:

This letter serves as a request on behalf of CPV Keasbey, LLC (CPV Keasbey) to the New Jersey Department of Environmental Protection ("NJDEP") for a waiver from the requirement to perform one year of pre-application ambient air quality monitoring for the proposed combined cycle power facility (to be known as the Keasbey Energy Center) to be located in the Township of Woodbridge, Middlesex County, New Jersey (see Figure 1) in accordance with Prevention of Significant Deterioration (PSD) of Air Quality regulations.

These regulations state that major new or modified facilities having annual emissions of regulated air contaminants in excess of significant emission rates (SER) must provide an analysis of air quality data in the area of the proposed facility that, in general, consist of continuous air quality monitoring data gathered over a year preceding receipt of the application. As fully described below, this request is for a waiver from the pre-application ambient monitoring data requirement for the air contaminants: carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter with an aerodynamic diameter less than 10 micrometers (μm) (PM-10), and less than 2.5 micrometers (PM-2.5).

Pursuant to the PSD regulations codified in 40 CFR 51.166 and 40 CFR 52.21, U.S. EPA may exempt a proposed PSD source, otherwise subject to the one-year pre-construction ambient monitoring requirement, if either:

(1) representative existing ambient air monitoring data exists in the affected area and is of the quality and nature which demonstrates the current conditions of the area's air quality; or

(2) representative ambient air monitoring data exists from a prior time period which can be demonstrated to be conservative (i.e., higher) in establishing the current conditions of the area's air quality.

See also, 40 CFR 52.21.1670 (approved Part 231 at 75 Fed. Reg. 70, 140 (Nov. 17, 2010)) ("applicant makes an acceptable showing that representative existing ambient monitoring data exists in the affected area of the quality and nature which demonstrates the current conditions of the air quality of the area"); New Source Review Workshop Manual (Draft, October 1990) at C.18 ("To be acceptable, such data must be judged by the permitting agency to be representative of the air quality for the area in which the proposed project would be constructed and operated"). As shown below, representative data satisfying these requirements exists.

CPV Keasbey is also requesting an exemption from the pre-application ambient monitoring requirement for lead (Pb) because it will be emitted in amounts less than its SER; for fluorides, hydrogen sulfide, total reduced sulfur, and reduced sulfur compounds because they are not anticipated as a product of natural gas combustion (i.e., from the combustion turbine and auxiliary boiler) and fuel oil combustion (i.e., from the combustion turbine, emergency diesel generator, and emergency diesel fire pump); and for sulfuric acid (H_2SO_4) mist because there is no approved monitoring technique available.

Project Description

CPV Keasbey, LLC is proposing to construct a nominal 630-megawatt (MW) 1-on-1 combined cycle power facility (to be known as the Keasbey Energy Center) on a parcel of land in the Township of Woodbridge, Middlesex County, New Jersey. The combustion turbine will be primarily fueled by natural gas but will be capable of firing ultra-low sulfur diesel (ULSD) for up to 720 hours per year.

The Keasbey Energy Center will consist of one (1) General Electric (GE) 7HA.02 combustion turbine at the proposed facility site. Hot exhaust gases from the combustion turbine will flow into one (1) heat recovery steam generator (HRSG). The HRSG will produce steam to be used in the steam turbine and will be equipped with a natural gas fired duct burner. Upon leaving the HRSG, the turbine exhaust gases will be directed to one (1) exhaust stack. Other ancillary equipment at the proposed facility will include one (1) gas fired auxiliary boiler, one (1) emergency diesel fire pump, one (1) emergency diesel generator, and a wet mechanical draft cooling tower.

Emissions from the combined cycle unit will be controlled by the use of dry low-NO_x burner technology (during natural gas firing), water injection (during ULSD firing), and selective catalytic reduction (SCR) for NO_x control, an oxidation catalyst for CO and volatile organic compounds (VOCs) control, and the use of clean low-sulfur fuels (i.e., natural gas and ULSD) to minimize emissions of SO_2, PM/PM-10/PM-2.5, and H_2SO_4. Exhaust gases from the combined cycle unit after emission controls will be dispersed to the atmosphere via one (1) stack. Steam from the steam turbine will be sent to a condenser where it will be cooled to a liquid state and returned to the HRSG. Waste heat from the condenser will be dissipated through a wet mechanical draft cooling tower.

Facility Emissions

The proposed facility (as a significant modification to a major source) is located in an attainment area for SO_2, NO_2, CO, PM-10, and PM-2.5. The proposed facility will potentially emit more than the SERs for several air pollutants, and will be subject to PSD permitting for these constituents. Under PSD regulations, an air quality dispersion modeling analysis is required to ensure that CO, PM-10, PM-2.5, SO_2, and NO_2 emissions from the proposed facility will be compliant with NAAQS and applicable PSD Class II increments.

Table 1 presents projected facility emission rates and the pollutant specific significant emission rates (SERs) defined in the PSD regulations. The proposed facility is projected to have annual emissions in excess of PSD SERs for CO, NO_2, particulates (PM/PM-10/PM-2.5), and H_2SO4. The emissions of SO_2 and lead are below their SERs.

Existing Background Ambient Air Quality Data

Based on a review of the locations of NJDEP ambient air quality monitoring sites, the closest "regional" NJDEP monitoring sites will be used to represent the current background air quality in the site area.

Background data for CO was obtained from a New Jersey monitoring station located in Union County (EPA AIRData #34-039-0004). The monitor is located at Interchange 13 on the New Jersey Turnpike (Elizabeth Lab), approximately 17 km northeast of the proposed facility. This monitor is located in an area with a greater amount of mobile and point sources of air emissions as compared to the project area. Thus, this monitor would be considered to conservatively represent the ambient air quality within the project area.

Background data for PM-10 was obtained from a Jersey City monitoring station located in Hudson County, New Jersey (EPA AIRData # 34-017-1003), approximately 32 km northeast of the proposed facility. The monitor is located at 355 Newark Avenue in a commercial/urban area. This monitor is located in an area with a greater amount of mobile and point sources of air emissions as compared to the project area. Thus, this monitor would be considered to conservatively represent the ambient air quality within the project area.

Background data for NO_2 was obtained from an East Brunswick monitoring station located in Middlesex County, New Jersey (EPA AIRData # 34-023-0011), approximately 11 km west-southwest of the proposed facility. The monitor is located at Rutgers University (Veg. Research Farm #3 on Ryders Lane) in an agricultural/rural area with proximate commercial uses (i.e., Route 1 and Interstate 95). This monitor's close proximity to the Project site would qualify it to be representative of the ambient air quality within the project area.

Background data for PM-2.5 was obtained from a New Brunswick Township monitoring station located in Middlesex County, New Jersey (EPA AIRData # 34-023-0006), approximately 10 km west-southwest of the proposed facility. The monitor is located at Rutgers University's Cook College (Log Cabin Road) in an agricultural/rural area with proximate commercial uses. This monitor's close proximity would qualify it to be representative of the ambient air quality within the project area.

The monitoring data for the most recent three years (2013-2015) are presented in Table 2 while Figure 2 displays the locations of the aforementioned air quality monitors in relation to the proposed facility.

Monitoring Waiver Request

In summary, CPV Keasbey, LLC is requesting a waiver from the requirement to perform pre-application ambient air quality monitoring for CO, NO_2, PM-10, and PM-2.5 because there exists acceptable quality assured ambient air quality data from alternate locations that satisfy the requirements of 40 CFR 52.21.1670. Further, CPV Keasbey is requesting an exemption from the requirement to perform pre-application ambient monitoring for SO_2 and lead because they will be emitted in amounts less than their SERs; for fluorides, hydrogen sulfide, total reduced sulfur, and reduced sulfur compounds because they are not anticipated as a product of natural gas combustion (i.e., from the combustion turbine, and auxiliary boiler) and fuel oil combustion (i.e., from the combustion turbine, emergency diesel generator, and emergency diesel fire pump); and for H_2SO_4 because there is no approved monitoring technique available.

Please feel free to contact me (201) 508-6960 or tmain@trcsolutions.com should you have any questions regarding this monitoring exemption request.

Sincerely,

TRC

Theodore Main
Principal Consulting Meteorologist

cc: A. Colecchia, U.S. EPA Region II
J. Donovan, CPV
A. Urquhart, CPV
M. Keller, TRC
TRC Project File 252973

Table 1
Comparison of Projected Facility Emissions to PSD Significant Emission Rates

Pollutant	Projected Emission Rate (tons per year)	Significant Emission Rate (tons per year)
Carbon Monoxide	110.0	100
Sulfur Dioxide	39.3	40
Particulate Matter (PM)	77.6	25
Particulate Matter less than 10 microns (PM-10)	123.6	15
Particulate Matter less than 2.5 microns (PM-2.5)	119.3	10
Nitrogen Oxides	148.9	40
Lead	0.03	0.6
Fluorides	[a]	3
Sulfuric Acid Mist[b]	25.1	7
Hydrogen Sulfide	[a]	10
Total Reduced Sulfur (including H_2S)	[a]	10
Reduced Sulfur Compounds (including H_2S)	[a]	10

[a]Not anticipated as a product of natural gas (i.e., from the combustion turbine and auxiliary boiler) or fuel oil combustion (i.e., from the combustion turbine, emergency diesel generator, and emergency diesel fire pump), and assumed zero.

[b]No acceptable monitoring techniques exist for this pollutant.

Table 2
Ambient Concentrations of Criteria Pollutants
Proposed to be Used to Represent Site Conditions

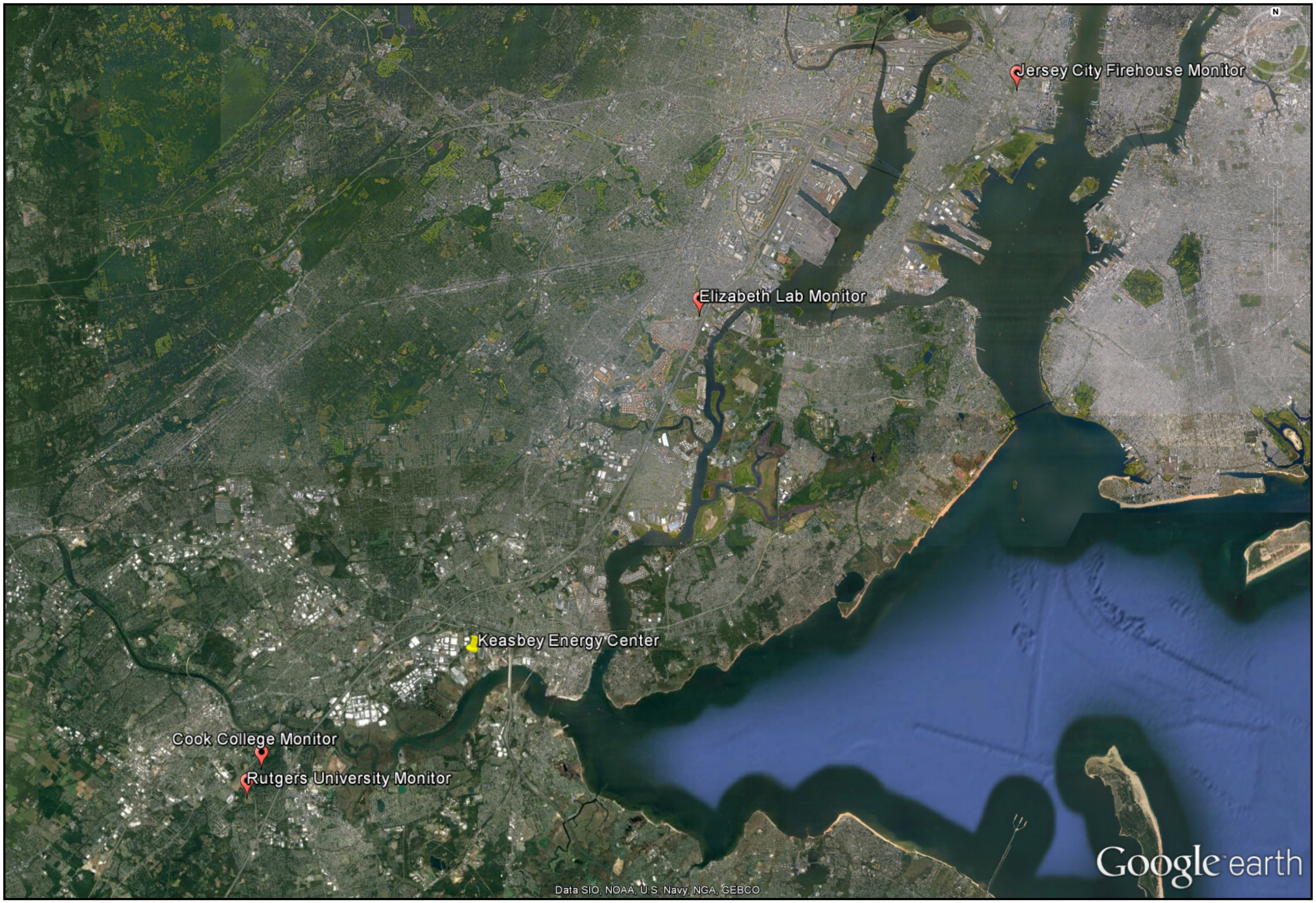
Pollutant	Averaging Period	Maximum Ambient Concentrations (µg/m³)		
		2013	2014	2015
NO_2	1-Hour[a] Annual	75.2 18.8	88.4 16.9	90.2 19.3
CO	1-Hour 8-Hour	2,300 1,495	2,530 2,070	2,760 1,840
PM-10	24-Hour	43	37	44
PM-2.5[b]	24-Hour Annual	19.1 8.0	20 8.2	20 7.9

[a]1-hour 3-year average 98th percentile value for NO_2 is **84.6** ug/m³.
[b]24-hour 3-year average 98th percentile value for PM-2.5 is **19.7** ug/m³; Annual 3-year average value for PM-2.5 is **8.0** ug/m³.
High second-high short term (1-, 8-, and 24-hour) and maximum annual average concentrations presented for all pollutants other than PM-2.5 and 1-hour NO_2.
Monitored background concentrations obtained from the U.S. EPA AIRData, AirExplorer and Air Quality System (AQS) websites.

Keasbey Energy Center
Proposed Combined Cycle Power Facility
Township of Woodbridge, Middlesex County, New Jersey

Figure 1. Site Location Aerial Photograph

Source: Google Earth, 2016.



Keasbey Energy Center
Proposed Combined Cycle Power Facility
Township of Woodbridge, Middlesex County, New Jersey

Figure 2. Background Ambient Air Quality Monitors

Source: Google Earth, 2016.

TRC
Results you can rely on

Keller, Michael

From: Webster, Jill <jill_webster@fws.gov>
Sent: Wednesday, July 13, 2016 11:09 AM
To: Keller, Michael
Subject: Re: CPV Keasbey, LLC - Need for Class I AQ Analyses for Brigantine Wilderness Area

Mr. Keller,

Thank you for sending the information regarding CPV Keasbey, LLC located in Middlesex County, New Jersey. Based on the information contained in the letter dated July 12, 2016, the Fish and Wildlife Service anticipates that modeling would not show any significant additional impacts to air quality related values (AQRV) a the Brigantine Wilderness. Therefore, we are not requesting that a Class I analysis be included in the PSD permit application.

The state and/or EPA may have a different opinion regarding the need for a Class I increment analysis. Should the emissions or the nature of the project change significantly, please contact me directly so that we might re-evaluate the proposed project.

Thank you for keeping us informed and involving the Fish and Wildlife Service in the project review.

On Wed, Jul 13, 2016 at 5:43 AM, Keller, Michael <MKeller@trcsolutions.com> wrote:

> Ms. Webster,
>
> TRC, on behalf of CPV Keasbey, LLC, is formally requesting a determination (see attachment) that there is no need to perform a Class I area air quality and air quality related values analysis for the Brigantine Wilderness Class I area as part of the facility's PSD permit application.
>
> If you have any questions, please call or email.
>
> Thanks for your attention.
>
> Michael
>
> Michael D. Keller
> Senior Project Manager

1200 Wall Street West, 5th Floor, Lyndhurst, NJ 07071

T: 201.508.6954 | F: 201.933.5601 | MKeller@trcsolutions.com

LinkedIn | Twitter | Blog | Flickr | www.TRCsolutions.com

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Jill Webster, Environmental Scientist
US Fish and Wildlife Service
National Wildlife Refuge System
Branch of Air and Water Resources
7333 W. Jefferson Ave., Suite 375
Lakewood, CO 80235-2017
(303) 914-3804
fax: (303) 969-5444

NESCAUM
www.nescaum.org
Northeast States for Coordinated Air Use Management
89 South Street, Suite 602 Boston, MA 02111
Phone 617-259-2000 Fax 617-742-9162
Arthur N. Marin, Executive Director

May 30, 2013

George Bridgers
Air Quality Modeling Group
U.S. Environmental Protection Agency
Mailcode: C439-01
109 T.W. Alexander Drive
Research Triangle Park, NC 27709

Re: *Draft Guidance for $PM_{2.5}$ Permit Modeling*

Dear Mr. Bridgers:

The Northeast States for Coordinated Air Use Management (NESCAUM) offers the following comments on the *Draft Guidance for $PM_{2.5}$ Permit Modeling* ("Draft Guidance") that was released by the U.S. Environmental Protection Agency (EPA) for public review on March 4, 2013. NESCAUM is the regional association of air pollution control agencies representing Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont.

NESCAUM thanks the EPA for its efforts in developing this Draft Guidance and encourages the EPA to release its Final Guidance at the earliest practicable date after incorporating stakeholder comments. NESCAUM also encourages the EPA to propose an amendment to the Guideline on Air Quality Modeling (40 CFR Part 51 Appendix W) referencing the Final Guidance to provide clear and consistent requirements for permitting authorities and applicants.

Introduction

Stationary sources that seek a Prevention of Significant Deterioration (PSD) permit must submit an application to the appropriate permitting authority. The application must demonstrate that violations of the national ambient air quality standards (NAAQS) for particulate matter with aerodynamic diameter less than 2.5 micrometers ($PM_{2.5}$) will not occur as a result of the construction and operation of the source. As such, state permitting authorities and permit modelers must have clarity about what is required to successfully demonstrate that $PM_{2.5}$ emissions for new projects will not pose health risks to surrounding areas.

The release of the Draft Guidance is a step toward fulfilling the EPA's pledge to supply states with additional recommendations for modeling analysis of $PM_{2.5}$ compliance demonstrations, especially with regard to secondary formation of $PM_{2.5}$, as described in the memorandum by Stephen Page dated March 23, 2010. The Draft Guidance also conforms with the EPA's commitment to evaluate updates to the EPA's *Guideline on Air Quality Models,* Appendix W of 40 CFR 51 to incorporate new analytical techniques or models for ozone and secondary $PM_{2.5}$ as appropriate, consistent with the EPA's January 4, 2012 grant of a petition for rulemaking on behalf of the Sierra Club. The EPA solicited feedback on its development of the Draft Guidance at multiple public forums, including the EPA's 10^{th} Modeling Conference in March 2012.

NESCAUM offers eight comments in response to the assessment methods described in the Draft Guidance, the process for selecting the assessment method, and the thresholds at which the methods are applicable. Our comments also address the modeling for $PM_{2.5}$ increments, as described in Section V of the Draft Guidance.

1. Revising Precursor Emission Thresholds in the Assessment Cases

Background: In its Draft Guidance, the EPA describes four "assessment cases" that define what air quality analyses (if any) an applicant would need to conduct to demonstrate compliance with the $PM_{2.5}$ NAAQS. These are outlined in Table II-1 on page 18 of the Draft Guidance, and describe the four scenarios in which direct emissions of $PM_{2.5}$ are above or below a Significant Emission Rate (SER) of 10 tons per year (tpy) and emissions of nitrogen oxides (NOx) or sulfur dioxide (SO_2) (which are precursors to secondary $PM_{2.5}$ formation) are above the SER of 40 tpy. Cases 3 and 4 describe the situation in which emissions of either NOx or SO_2 precursor species are above the SER of 40 tpy.

Comment: Based on photochemical modeling experience within the NESCAUM states, the near-source secondary $PM_{2.5}$ impacts from sources with limited $PM_{2.5}$ precursor emissions (e.g., 100 tpy or less) is very low. NESCAUM recommends that the EPA perform photochemical modeling to develop emissions thresholds that more accurately reflect the emission levels at which precursor emissions may be important for near-source impacts. NESCAUM further encourages the EPA to work with the states to develop state-specific or region-specific analyses that will indicate the importance of local conditions to the formation of secondary $PM_{2.5}$ and possibly set state- or region-specific thresholds based on these analyses.

2. Section III.2.1 Qualitative Assessment

Background: The first approach for assessing the impacts of precursor emissions on secondary $PM_{2.5}$ formation that the EPA suggests in its Draft Guidance is a qualitative analysis. Section III.2.1 of the Draft Guidance provides information about the qualitative assessment process, both when it is to be selected and how it is to be performed.

In introducing the qualitative assessment, the EPA states the following:

> In a number of NAAQS compliance demonstrations requiring an assessment of the impact from secondary $PM_{2.5}$ formation, it is anticipated that a holistic qualitative analysis of the new or modifying emissions source and the atmospheric environment in which the emissions source is to be located will suffice for determining that secondary $PM_{2.5}$ impacts associated with the source's precursor emissions will not cause or contribute to a violation of the 24-hour or annual $PM_{2.5}$ NAAQS (p.25, lines 13-18).

The EPA indicates that a modeling protocol should include a detailed conceptual description of the background air pollution concentrations and of the nature of the emissions sources surrounding the new or modifying emissions source. The conceptual description is to be comprised of the following types of information:

- current $PM_{2.5}$ concentrations in the surrounding region;
- current NAAQS-form relevant design values for $PM_{2.5}$;
- seasonality in $PM_{2.5}$ concentrations;
- speciated composition of current $PM_{2.5}$ levels;
- long term trends;
- background concentrations of precursor species, including ammonia, volatile organic compounds (VOCs), and ozone;
- mitigating factors such as low ammonia levels that could limit secondary formation;
- regionally representative meteorological conditions associated with time periods of higher and lower ambient 24-hour average $PM_{2.5}$ concentrations, including temperature inversions, stagnant high pressure systems, etc.;
- a description of how any meteorological factors could limit or enhance the formation of secondary $PM_{2.5}$ from precursor emissions; and
- an analysis of existing photochemical grid modeling in the context of understanding the general response of secondary $PM_{2.5}$ formation to significant changes in regional precursor emissions.

Finally, the qualitative assessment described in the Draft Guidance also includes a narrative description of how the secondary $PM_{2.5}$ formation resulting from precursor emissions could contribute to existing regional $PM_{2.5}$ levels.

<u>Comment:</u> Based on the range of scenarios in which this guidance will be applied, NESCAUM requests that the EPA consider the qualitative assessment as one option that may be applied in a weight-of-evidence type of analysis. For areas in which a qualitative analysis will suffice, results from the assessment technique presented in the EPA's Draft Guidance may offer meaningful insight about the proposed source.

If finalized, this qualitative approach would become an initial approach selected for demonstration that significant precursor emissions would not lead to violations of the $PM_{2.5}$ NAAQS. While NESCAUM supports having a qualitative assessment as one option for a weight-of-evidence type of analysis, NESCAUM raises the following two concerns about the EPA's proposal:

(1) **There is no clear threshold for passing the qualitative analysis.** Rather, the approval or denial of the permit application hinges on the professional judgment of its reviewer. While we have great confidence in the competence of permit review officials, relying on

their professional judgment does not lead to a clear, reliably reproducible outcome for the permit review process, and may lead to significant differences in permit application processes in different regions.

(2) **The process is open to potential for abuse.** Because the qualitative assessment is open to interpretation, it provides an opportunity for unintentional or intentional misinterpretation of the facts.

As such, NESCAUM requests that the EPA develop clear guidelines describing when the qualitative assessment is appropriate, or when other, numerical approaches may be warranted to support a weight-of-evidence approach. NESCAUM requests that the EPA develop an optional numerical approach to be used in place of or in addition to the described qualitative approach when necessary to complete a weight-of-evidence approach. Comment 3 of this document describes NESCAUM's suggestion for such a conservative, numerical, screening assessment for use in a weight-of-evidence approach.

By proposing this qualitative assessment approach and indicating that the EPA expects that this approach will suffice for most sources, the EPA appears to be indicating that near-source secondary formation is not important. If it is the opinion of the EPA that near-source secondary $PM_{2.5}$ formation is not important, the EPA should state that.

3. Optional Numerical Screening Approach

Comment: Based on the discussion in Comment 2 above, NESCAUM is suggesting a numerical approach as an option for supporting a weight-of-evidence analysis.

The weight-of-evidence approach for the evaluation of secondary formation of $PM_{2.5}$ should include the option of using worst-case SO_2 to sulfate and nitrogen dioxide (NO_2) to nitrate conversion rates. One set of worst-case conversion values could be designated for modeling 24-hour $PM_{2.5}$ impacts and another for annual $PM_{2.5}$ modeling. Use of these worst-case conversion factors would be limited to all receptors in the near-field for determination of significant impact levels (SILs) and PSD increment/NAAQS compliance, but not long-range transport modeling (greater than 50 km).

Based on our initial review of available literature, a 9 percent per hour conversion rate represents a typical worst-case short-term conversion rate of SO_2 to sulfate (summertime mid- to late afternoon); and 8 percent represents a typical worst-case short-term conversion rate of NO_2 to nitrate (daytime winter).[1]

[1] *See* Luria M, Imhoff RE, Valente RJ, Parkhurst WJ, Tanner RL, "Rates of Conversion of Sulfur Dioxide to Sulfate in a Scrubbed Power Plant Plume," *Journal of the Air & Waste Management Association*, 51 (2001), 1408-1413; Conners J, Heinold D, Paine R, Moore G, "Screening Approach to Account for Secondary $PM_{2.5}$ in Stationary Source Modeling," (paper presented at the Guideline on Air Quality Models: The Path Forward, Air & Waste Management Association meeting, Raleigh, North Carolina, March 2013); Eatough DJ, Caka FM, Farber RJ, "The

Because the $PM_{2.5}$ impact will be modeled for a 24-hour period rather than a one-hour period, the one-hour worst-case conversion rates listed above can be reduced to reflect the lower conversion rates that occur the remainder of the 24-hour period. Use of a 7 percent per hour SO_2 to sulfate conversion rate and a 5 percent per hour NO_2 to nitrate conversion rate would still represent very conservative assumptions when modeling the contribution of secondary particulates to the 24-hour $PM_{2.5}$ concentration.

From these short-term conversion rates, annual average worst-case per-hour conversion rates can be derived. Three percent per hour represents a reasonable worst-case **annual** conversion rate of SO_2 to sulfate, and 2.5 percent per hour represents a reasonable worst-case **annual** conversion rate of NO_2 to nitrate.

The simplest method of incorporating these conversion rates into the modeling would be to multiply the designated worst-case conversion rates by the hourly and annual emission rates of SO_2 and NOx in units of pounds per hour or tons per year, respectively.

These worst case secondary $PM_{2.5}$ formation values must be adjusted further before combining with the direct $PM_{2.5}$ emission rate.

- Apply the ambient ratio method (ARM) Tier 2 nitric oxide (NO) to NO_2 conversion rate to the NOx emission rate. For the 24-hour $PM_{2.5}$ modeling, the NOx hourly emission rate (pounds per hour) should be multiplied by 0.8. For the annual $PM_{2.5}$ modeling, the NOx annual emission rate (tons per year) should be multiplied by 0.75.

- Because SO_2 and NO_2 will be transformed in the atmosphere to heavier molecules, the SO_2 and NO_2 mass emission rate must be adjusted to reflect the molecular weight (MW) of ammonium sulfate $(NH_4)_2SO_4$ and ammonium nitrate NH_4NO_3. The calculation of the adjustment factors are presented below.

$$(NH_4)_2SO_4\ (lb/hr) = SO_2\ (lb/hr) \cdot (MW_{(NH_4)_2SO_4}/MW_{SO_2})$$

$$(NH_4)_2SO_4\ (lb/hr) = SO_2\ (lb/hr) \cdot (132/64)$$

$$(NH_4)_2SO_4\ (lb/hr) = SO_2\ (lb/hr) \cdot 2.06$$

$$NH_4NO_3\ (lb/hr) = NO_2\ (lb/hr) \cdot (MW_{NH_4NO_3}/MW_{NO_2})$$

$$NH_4NO_3\ (lb/hr) = NO_2\ (lb/hr) \cdot (80/46)$$

$$NH_4NO_3\ (lb/hr) = NO_2\ (lb/hr) \cdot 1.74$$

Conversion of SO_2 to Sulfate in the Atmosphere," *Israel Journal of Chemistry*, 34 (1994), 301-314; Zak BD, "Lagrangian Measurements of Sulfur Dioxide to Sulfate Conversion Rates," *Atmospheric Environment*, 15 (1981), No. 12, 2583-2591.

For example, if a source had 100 tpy (22.8 lb/hr) of both SO_2 and NOx, the calculation would be as follows:

$$\text{Secondary } PM_{2.5} \text{ from } SO_2 = 22.8 \text{ lb } PM_{2.5}/\text{hr} \cdot 0.07 \cdot 2.06 = 3.3 \text{ lb/hr}$$

$$\text{Secondary } PM_{2.5} \text{ from } SO_2 = 100 \text{ tons } PM_{2.5}/\text{yr} \cdot 0.03 \cdot 2.06 = 6.2 \text{ tons/yr}$$

$$\text{Secondary } PM_{2.5} \text{ from } NO_X = 22.8 \text{ lb } PM_{2.5}/\text{hr} \cdot 0.05 \cdot 0.8 \cdot 1.74 = 1.6 \text{ lb/hr}$$

$$\text{Secondary } PM_{2.5} \text{ from } NO_X = 100 \text{ tons } PM_{2.5}/\text{yr} \cdot 0.025 \cdot 0.75 \cdot 1.74 = 3.3 \text{ tons/yr}$$

Therefore, the direct $PM_{2.5}$ emission rate would be increased by 4.9 lb/hr (3.3 lb/hr + 1.6 lb/hr) when modeling 24-hour $PM_{2.5}$ impacts. The direct $PM_{2.5}$ emission rate would be increased by 9.5 tpy (2.2 lb/hr) when modeling annual $PM_{2.5}$ impacts.

Possible refinements to this screening assessment would be to designate SO_2 and NO_2 conversion rates by region of the country (Northeast, South, Midwest, and West) and/or by season, and/or by daytime and night.

We believe adding this method as an option in support of a top-level weight-of-evidence assessment would provide a conservative, definitive, and defensible value of the estimated contribution of secondary particulates. Many sources, especially the smaller sources of SO_2 and NOx, would be able to apply this method and show no adverse $PM_{2.5}$ impact.

4. Appendix C: Example of a Qualitative Assessment of the Potential for Secondary $PM_{2.5}$ Formation

Background: In Appendix C of the Draft Guidance, the EPA provides an example of a qualitative assessment of the potential for secondary $PM_{2.5}$ formation. Unfortunately, this example is for an oil and gas exploration drill ship and support fleet over open water on the Chukchi Sea in the Arctic Ocean, a source type and a location environment having little in common with the continental United States.

Comment: NESCAUM requests additional examples of the qualitative assessment for urban and rural areas in the eastern and western continental United States.

5. Clarity Needed in Selecting the Required Assessment Type

Background: The hybrid qualitative/quantitative assessment (described in section III.2.2 of the Draft Guidance) is intended by the EPA to provide further information when the proposed qualitative assessment will not suffice. When introducing the topic, the EPA states that "it may not always be possible to provide such a justification [based on the proposed qualitative assessment] without some quantification of the potential secondary $PM_{2.5}$ impacts from the proposed new or modifying source's precursor emissions" (page 29, lines 16-18). However, there is no discussion indicating when such a situation would occur.

<u>Comment:</u> NESCAUM requests that the Final Guidance clearly indicate what the thresholds for passing the top-tier and mid-tier analyses are. Without a clear, reproducible methodology for decisions regarding permit modeling demonstrations for secondary $PM_{2.5}$, the states may be vulnerable to lawsuit by permit applicants and third-parties.

6. Section III.2.3 Full Quantitative Photochemical Grid Modeling

<u>Comment:</u> There will be significant logistical and technical difficulties in any attempts to adapt the regional photochemical grid models to individual source permit applications. The use of such models for performing regional ozone and $PM_{2.5}$ state implementation plan (SIP) modeling is not readily transferable to PSD permit scale modeling without a significant set of revisions to the process and platforms used for the SIP-level modeling. Based on the NESCAUM states' expertise in performing such assessments using CMAQ and CAMx, there are several technical issues that make the application of these modeling systems to PSD permitting challenging.

- Sub-models within photochemical grid, meteorological, and emissions modeling systems require very intensive data processing. For example, in simulating the chemical interactions and transformations of precursors to secondary $PM_{2.5}$, it is essential to include an inventory of significant sources, not just the source under scrutiny. Further, most models included in the regional modeling platforms require significant computer and operating system resources that states typically reserve for SIP attainment modeling but more intensive than what most state permitting staff typically use for assessment of individual sources.
- Inventories currently in use for SIP level modeling may not be appropriate for permit modeling due to the inventory "age"—the 2007 inventory is currently the generally accepted base year for analysis—and the fact that these inventories have not been fully scrutinized or evaluated for use in $PM_{2.5}$ evaluations—they were developed primarily for ozone planning. Evidence from some evaluations that have been performed[2] indicates that CMAQ generally overpredicts $PM_{2.5}$ concentrations. Additional work is necessary to fully diagnose and resolve these issues. One such evaluation by New York indicates that CMAQ overestimates $PM_{2.5}$ concentrations and certain species. Further work is necessary to understand the reasons. Thus, more detailed, longer-term evaluations must be carried out, and not just "sample period" evaluations.
- Meteorological data for input into the CMAQ and CAMx systems require detailed processing and may not accurately reflect the small scale weather conditions in the near-field of the emissions source. Such processing has been confined in the past to a sample period or at most a season (e.g., ozone season). Any extension of the modeling to a set of years of meteorological data will involve a large effort not only in the processing, but in revisiting the scale of the grids used. Most of the SIP modeling for the NESCAUM region to date has relied upon, at best, a 12 km scale grid, which is occasionally overlaid with a nested 4 km grid in the areas of interest. In some instances, such as complex

[2] *See* NYSDEC 2012. Preliminary Evaluation of the 2007 CMAQ Level 3 12 km base case: $PM_{2.5}$ Mass and Speciation. NYSDEC document prepared for OTC discussions, dated December, 2012.

terrain setting, this latter grid might not be adequate either and a further refinement would be necessary. This added effort points to the need to start with a revised modeling platform, which will be resource-intensive. To run the WRF meteorological processing for one year's worth of data at the more refined grid scale would take about two months of runtime alone and will demand the same level of computational resources for generating the concentration fields.

All this work assumes that permitting staff at the state agencies and the EPA regional offices have the expertise and resources to review and/or perform independent verification of the photochemical model applications. Such expertise and the large computer resources (e.g., server clusters) at the states and regional offices are usually reserved for SIP level ozone modeling. The development of a comprehensive platform for $PM_{2.5}$ CMAQ modeling purposes has been estimated to exceed a million dollars in resources.

NESCAUM is concerned that state staff charged with evaluating permit applications may not have the capacity to review in detail the permit applications that contain results from photochemical grid models such as CMAQ and CAMx. Most permit modeling staff are very familiar with the dispersion modeling systems AERMOD and CALPUFF, and are very comfortable with reviewing permit modeling exercises that involve the use of those models. Expanding the use of CMAQ and/or CAMx to permit modeling will place a heavy burden on permit modeling staff, and may potentially result in inadequate review of permit applications that include results derived from photochemical modeling. Furthermore, photochemical grid modeling would require heavy financial investments from permit applicants and regulated sources.

Recommendations in the EPA's Guidance for performing photochemical grid modeling using CMAQ and CAMx must take these technical, logistical, and resource constraints into account.

NESCAUM suggests that the EPA support regional efforts to develop region-specific base inventories to serve as a basis for source-specific photochemical modeling analyses. This approach is a practical one for incorporating the contribution of secondary $PM_{2.5}$ from individual point sources in the permitting process when such detailed assessment is warranted. This approach will also allow the determination of the emission rates of the precursors that could trigger impacts over levels of significance as well as the downwind distances from a proposed source at which secondary formation becomes important enough for consideration of permitting conditions. Pending the availability of the results from this modeling platform, the agencies should be allowed to rely on less complex numerical approaches for the assessment of the secondary $PM_{2.5}$ contributions to total $PM_{2.5}$ impacts in permit application reviews, as described in Comments 3 and 7 in this document.

In summary, NESCAUM requests that the EPA limit the use of photochemical modeling to only the most in-depth analyses, exclude it from the hybrid modeling approach entirely, and encourage and facilitate the development of regional-level modeling efforts to serve as a basis for source-specific evaluations.

7. Use of the CALPUFF Model

Background: In the past, the EPA has approved of state personnel using the CALPUFF system at greater distances at which secondary pollutant formation becomes significant. In comparison to CMAQ, CALPUFF is designed for runtime efficiency in single source modeling. In addition, it will properly simulate interactive source modeling for PSD analysis. In modeling secondary $PM_{2.5}$ formation at greater distances, multiple years of analysis will be essential because inter-annual variability is more significant at these distances. It will be much more time and resource-effective to rely on CALPUFF than CMAQ for this purpose.

Comment: The Hybrid Qualitative/Quantitative Assessment should include a less subjective option than the proposed mix of the simplistic qualitative assessment and the use of the results from the highly complex regional photochemical SIP models. Somewhere within the final tiered modeling options that the EPA recommends in the Final Guidance should be a method of quantifying impacts of secondary $PM_{2.5}$ that is short of reliance on a photochemical model, but properly simulates the transport scenario and chemistry for PSD/interactive source modeling. This method should be valid beyond 50 km since secondary $PM_{2.5}$ formation can become significant at greater distances. A viable objective assessment of less complexity than using a photochemical grid model (e.g., CMAQ) would be the CALPUFF model, version 6.42, with the new ISORROPIA (version 2.1) chemistry algorithm for the source in question. The chemistry algorithm in CALPUFF version 6.42 has been found to be both more accurate and superior to that in the EPA's currently approved version of CALPUFF version 5.8.[3]

Another advantage of adopting CALPUFF version 6.42 as an option for estimating secondary $PM_{2.5}$ is that it would also improve model estimates of Class I Air Quality Related Values impacts and Class I increment consumption.

NESCAUM suggests that the EPA investigate the possible use of CALPUFF in single source mode (i.e., modeling the proposed source only) versus multiple source mode to determine the simplest creditable methods for evaluation of secondary particulate formation at greater distances when necessary. In addition, NESCAUM recommends that the EPA compare the results from CALPUFF and CMAQ analyses for the development of a hierarchy of viable modeling methods when screening methods fail.

8. Clarification of PSD Baseline Dates for Areas Redesignated to Attainment

Background: This section discusses the modeling of the $PM_{2.5}$ increments and the three important dates for setting the baseline: major source baseline date, trigger date, and the minor source baseline date. The 2010 PSD $PM_{2.5}$ Final Rule specified that the major source baseline date will be October 20, 2010 and the trigger date will be October 20, 2011.

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[3] *See* Scire JS, Strimaitis DG, Wu Z-X, "New Developments and Evaluations of the CALPUFF Model," presented at the 10th Conference of Air Quality Models, RTP, North Carolina, March 2012; Karamchandani P, Chen S-Y, Balmori R, "Evaluation of Original and Improved Versions of CALPUFF Using the 1995 SWWYTAF Data Base, AER Technical Report," prepared for API, Washington, DC, October 2009.

Comment: Some areas in the NESCAUM region were designated nonattainment for $PM_{2.5}$ when the major source baseline date (October 20, 2010) and the trigger date (October 20, 2011) occurred, but have since been redesignated to attainment for $PM_{2.5}$ after these dates. The Final Guidance should address the timeline for areas that were redesignated to nonattainment for $PM_{2.5}$ after the baseline and trigger dates discussed above.

Summary

The NESCAUM states will be implementing their programs with input from the EPA Guidance, and therefore we have a significant stake in ensuring that the Final Guidance reflects the best practices for permit modeling for $PM_{2.5}$. We look forward to working with the EPA so that the Final Guidance incorporates these practical ideas to streamline and improve the process of modeling in support of the permitting process to address secondary $PM_{2.5}$.

If you or your staff have any questions regarding the issues raised in these comments, please contact Leiran Biton of NESCAUM at 617-259-2027.

Sincerely,

Arthur N. Marin
Executive Director

cc: NESCAUM Directors
Dave Conroy, EPA Region 1
Donald Dahl, EPA Region 1
Brian Hennessey, EPA Region 1
Brendan McCahill, EPA Region 1
Ida McDonnell, EPA Region 1
John Filippelli, EPA Region 2
Anna Maria Coulter, EPA Region 2

PM-2.5 & PM-10 Cooling Tower Particulate Fractions Based on SPX TU-12 High Efficiency Drift Eliminator*

Drop Diameter (micrometers)	Mass Fraction	Particle size after evaporation (micrometers)	volume droplet	volume particle	particle diameter	CumMass
5	0	0.6	6.54E+01	1.39E-01	0.6	0
10	0.12	1.3	5.24E+02	1.12E+00	1.3	0.12
15	0.08	1.9	1.77E+03	3.76E+00	1.9	0.2
35	0.2	4.5	2.24E+04	4.78E+01	4.5	0.4
65	0.2	8.4	1.44E+05	3.06E+02	8.4	0.6
115	0.2	14.8	7.96E+05	1.70E+03	14.8	0.8
170	0.1	21.9	2.57E+06	5.48E+03	21.9	0.9
230	0.05	29.6	6.37E+06	1.36E+04	29.6	0.95
375	0.04	48.2	2.76E+07	5.88E+04	48.2	0.99
525	0.008	67.5	7.58E+07	1.61E+05	67.5	0.998
1000	0.002	128.7	5.24E+08	1.12E+06	128.7	1

6240 ppm TDS**
2.93 g/g salt density

** Keasbey Energy Center cooling tower TDS

24% PM2.5 Mass Fraction
65% PM10 Mass Fraction

2.17 **NaCl**
2.93 **$CaCO_3$**

*Based on "Calculating Realistic PM10 Emissions from Cooling Towers"
Abstract No. 216 Session No. AM-1b
Joel Reisman and Gordon Frisbie
Greystone Environmental Consultants, Inc., 650 University Avenue, Suite 100, Sacramento, California 95825

Methodology:
1. Calculate evaporated solid particle size diameters based on TU-12 droplet distribution.
2. Determine cumulative mass distribution for all particle sizes.
3. Determine PM2.5 and PM10 cumulative mass distributions using linear interpolation between particle diameters.

Reisman, J., and Frisbie, G. 2002. Calculating Realistic PM10 Emissions from Cooling Towers. Abstract No. 216 presented at the 2001 94th Annual Air and Waste Management Association Conference and Exhibition in Orlando, Florida, June 25 to 28.

SPX Cooling Technologies
Balcke | Hamon Dry Cooling | Marley

COOLING TOWER DRIFT MASS DISTRIBUTION
TU12 Excel Drift Eliminators

The following table represents the predicted mass distribution of drift particle size for cooling tower drift dispersed from Marley TU12 Excel Drift Eliminators.

Mass in Particles (%)		Droplet Size (Microns)
0.2	Larger Than	525
1.0	Larger Than	375
5.0	Larger Than	230
10.0	Larger Than	170
20.0	Larger Than	115
40.0	Larger Than	65
60.0	Larger Than	35
80.0	Larger Than	15
88.0	Larger Than	10

How to read table: Example – 0.2% of the drift will have particle sizes larger than 525 microns.

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
CLIMATE AND ENVIRONMENTAL MANAGEMENT
DIVISION OF AIR QUALITY
P.O. Box 420 Mailcode 401-02
TRENTON, NJ 08625-0420

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Commissioner

TO: Joel Leon
Section Chief, Air Quality Evaluation Section (AQES)

FROM: John Preczewski, Assistant Director
Air Quality Permitting Program

SUBJECT: Exempting Emergency Generator and Fire Pump Nitrogen Oxide (NO_2) and Sulfur Dioxide (SO_2) Emissions from 1-hour NO_2 and SO_2 Air Quality Modeling

DATE: July 29, 2011

This memorandum is meant to clarify modeling of NO_2 and SO_2 emissions from emergency generators and fire pumps which operate at combined cycle turbine facilities. This guidance applies primarily to large power generating sources; though, it can be applied on a case-by-case basis to other facilities.

Under the following permit conditions, modeling to show compliance with the 1-Hour NO_2 and SO_2 NAAQS will not include emissions from emergency generators or fire pumps located on-site:

1. The annual cumulative operation of the emergency generator or the fire pump during testing will not exceed more than 100 hours per year. The duration of these test operations will be restricted to 30 minutes.

2. There will be no simultaneous testing of emergency generators and/or fire pumps.

3. Testing of any emergency generator and/or the fire pump will not occur during start-up or shutdown of the turbine or boiler.

4. No testing will occur on designated "Ozone Action Days" as required by N.J.A.C. 7:27-19.2(d)2.

5. The emergency generator or fire pump may fire only ultralow sulfur diesel fuel (sulfur content less than 15 parts per million by weight) or natural gas.

Please contact me if there are any questions.

APPENDIX B

WOODBRIDGE ENERGY CENTER AIR QUALITY MODELING PARAMETERS

Table B-1: Woodbridge Energy Center Combustion Turbine Source Parameters

Operating Case	Fuel	Ambient Temperature (°F)	Operating Load (%)	Duct Firing (On/Off)	Evaporative Cooler Operation (On/Off)	Modeling Stack Parameters	
						Exhaust Temperature (K)	Exhaust Velocity (m/s)[a]
Case7[b]	Gas	59	Peak	On	Off	351.4	18.03
Case9[c]	Gas	59	50	Off	Off	345.5	11.85

[a]Based on a stack diameter of 20 feet.

[b]Worst case turbine operating scenario for all pollutants and averaging periods except 24-hour and annual PM-10/PM-2.5.

[c]Worst case turbine operating scenario for 24-hour and annual PM-10/PM-2.5.

UTM coordinates of 145 foot combustion turbine stack are 557,682 meters Easting, 4,485,152 meters Northing, NAD83, Zone 18 at a base elevation of 20 feet above mean sea level.

Table B-2: Woodbridge Energy Center Combustion Turbine Emission Rates

Operating Case	Modeled Emission Rate (g/s)			
	NO_x	CO	PM-10/PM-2.5[a]	SO_2
Case7[b]	2.31	1.41	2.41/2.65	0.57
Case9[c]	1.22	0.74	1.36/1.49	0.30

[a]Filterable plus condensable, and applying NESCAUM, 2013 for secondary PM-2.5.
[b]Worst case turbine operating scenario for all pollutants and averaging periods except 24-hour and annual PM-10/PM-2.5.
[c]Worst case turbine operating scenario for 24-hour and annual PM-10/PM-2.5.

Table B-3: Woodbridge Energy Center Cooling Tower Exhaust Characteristics and PM-10/PM-2.5 Emission Rates

Emissions Parameter	
Number of Cells	14
Maximum Total Air Flow Rate (acfm) (Each Cell)	1,341,000
Maximum Water Flow Rate (gpm) (Total Tower)	178,000
Maximum Drift Rate	0.0005%
Total Solids in Circulating Water (ppm)	6,240
14-cell Total TSP Emission Rate (lb/hr) (Total Tower)	2.78
1-cell TSP Emission Rate (g/s)	0.025
14-cell Total PM-10 Emission Rate (lb/hr) (Total Tower)	1.806
1-cell PM-10 Emission Rate (g/s)	0.016
14-cell Total PM-2.5 Emission Rate (lb/hr) (Total Tower)	0.667
1-cell PM-2.5 Emission Rate (g/s)	0.006
14-cell Total TSP Annual Emission Rate (ton/yr) (Total Tower)	12.17
14-cell Total PM-10 Annual Emission Rate (ton/yr) (Total Tower)	7.91
14-cell Total PM-2.5 Annual Emission Rate (ton/yr) (Total Tower)	2.92
Exhaust Parameter	
Exhaust Height (ft above grade)	55.18
Exhaust Height (m above grade)	16.82
Collar Height (ft above grade)	41.43
Collar Height (m above grade)	12.63
Exhaust Temperature (deg F)	85
Exhaust Velocity (ft/sec)	31.62
Exhaust Velocity (m/sec)	9.64
Inner Diameter (ft)	30
Inner Diameter (m)	9.14

Table B-4: Woodbridge Energy Center Auxiliary Boiler Exhaust Characteristics and Emissions

Emission Parameter	
Pollutant	**lb/hr**
NO_x	1.01
CO	3.43
PM-10/PM-2.5[a]	0.46/0.55
SO_2	0.16
Exhaust Parameter	
Exhaust Height (ft above grade)	40
Exhaust Height (m above grade)	12.19
Exhaust Temperature (deg F)	310
Exhaust Velocity (ft/sec)	57.3
Exhaust Velocity (m/sec)	17.5
Inner Diameter (ft)	3.3
Inner Diameter (m)	0.99
Stack Base Elevation (ft)	20
UTM Easting (m), NAD83, Zone 18	557,647
UTM Northing (m), NAD83, Zone 18	4,485,176

[a]Filterable plus condensable, and applying NESCAUM, 2013 for secondary PM-2.5.

Table B-5: Woodbridge Energy Center Emergency Diesel Fire Pump Exhaust Characteristics and Emissions

Emission Parameter	
Pollutant	**lb/hr**
NO_x	1.93
CO	2.10
PM-10/PM-2.5[a]	0.10/0.23
SO_2	0.003
Exhaust Parameter	
Exhaust Height (ft above grade)	20
Exhaust Height (m above grade)	6.10
Exhaust Temperature (deg F)	961
Exhaust Velocity (ft/sec)	171.1
Exhaust Velocity (m/sec)	52.2
Inner Diameter (ft)	0.4
Inner Diameter (m)	0.13
Stack Base Elevation (ft)	20
UTM Easting (m), NAD83, Zone 18	557,724
UTM Northing (m), NAD83, Zone 18	4,485,056

[a]Filterable plus condensable, and applying NESCAUM, 2013 for secondary PM-2.5.

Table B-6: Woodbridge Energy Center Emergency Diesel Generator Exhaust Characteristics and Emissions

Emission Parameter	
Pollutant	**lb/hr**
NO_x	22.02
CO	1.99
PM-10/PM-2.5[a]	0.13/1.66
SO_2	0.0208
Exhaust Parameter	
Exhaust Height (ft above grade)	30
Exhaust Height (m above grade)	9.14
Exhaust Temperature (deg F)	763.5
Exhaust Velocity (ft/sec)	528.1
Exhaust Velocity (m/sec)	161.0
Inner Diameter (ft)	0.7
Inner Diameter (m)	0.20
Stack Base Elevation (ft)	20
UTM Easting (m), NAD83, Zone 18	557,678
UTM Northing (m), NAD83, Zone 18	4,485,219

[a]Filterable plus condensable, and applying NESCAUM, 2013 for secondary PM-2.5.

APPENDIX F

COMPLIANCE CERTIFICATION STATEMENT

CERTIFICATION STATEMENT

I certify, in accordance with the provisions of N.J.A.C. 7:27-1.39 that the Keasbey Energy Center (CPV Keasbey, LLC) facility being developed in the Township of Woodbridge, Middlesex County, New Jersey will be operated in compliance with the provisions of N.J.A.C. Title 7, Chapter 27 and with all applicable emissions limitations and standards promulgated pursuant to the Federal Clean Air Act, once constructed. There are no other existing facilities in New Jersey that are owned or operated by CPV Keasbey, LLC, a Delaware limited liability company.

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attached documents and, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant civil and criminal penalties, including the possibility of fine or imprisonment or both, for submitting false, inaccurate, or incomplete information.

Consolidated Asset Management Services,
a New Jersey limited liability company

By: [signature] August 26, 2016

Name: Kenneth Earl Date

Title: Plant Manager

Facility:

CPV Shore, LLC
50 Braintree Hill Office Park
Suite 300
Braintree, Massachusetts 02184

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