DOCKETED	
Docket Number:	01-AFC-06C
Project Title:	Magnolia Power Project-Compliance
TN #:	265177
Document Title:	SCAQMD Engineering and Permitting Division
Description:	Draft Statement of Basis Analysis Significant Revision
Filer:	susan fleming
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	7/31/2025 11:27:59 AM
Docketed Date:	7/31/2025

Facility Name: Burbank City, Burbank Water and Power, SCPPA
Facility ID: 128243
Equipment Location: 164 W. Magnolia Blvd
Burbank, CA 91502

Application #(s): 657073, 657074
Application Submittal Date(s): 12/10/2024

Responsible Official: Frank Messineo
FMessineo@burbankca.gov
(818) 238-3858

South Coast AQMD Contact Person: Kelland Chow
Air Quality Engineer
Phone Number: (909) 396-3305
E-Mail Address: kchow@aqmd.gov

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1. Introduction and Scope of Permit

Title V is a national operating permit program for air pollution sources. Facilities subject to Title V must obtain a Title V permit and comply with specific Title V procedures to modify the permit. This permit replaces the facility's other existing permits. Title V does not necessarily include any new requirements for reducing emissions. It does, however, include new permitting, noticing, record keeping, and reporting requirements.

The South Coast AQMD implements Title V through Regulation XXX – Title V Permits, adopted by the South Coast AQMD Governing Board in order to comply with EPA's requirement that local air permitting authorities develop a Title V program. Regulation XXX was developed with the participation of the public and affected facilities through a series of public workshops, working group meetings, public hearings and other meetings.

The Title V major source threshold for a particular pollutant depends on the attainment status of the pollutant. For the federal standards, NO_2 (maintenance), SO_2, CO, and PM_{10} are in attainment, while $PM_{2.5}$ is serious non-attainment and ozone is extreme non-attainment. Lead is in partial non-attainment (Los Angeles County only). For the state standards, PM_{10}, $PM_{2.5}$, and ozone are non-attainment, while NO_2 and CO are attainment. For the South Coast Air Basin (SOCAB) the threshold levels are as follows:

Table 1. SOCAB Threshold Levels

Pollutant	SOCAB Major Source Thresholds (TPY)
VOC	10

NOx	10
SOx	100
CO	50
PM-10	70
PM-2.5	70
Single HAP	10
Combination of HAPS	25

The Burbank Water and Power (BWP) SCPPA facility is subject to Title V requirements because its potential to emit (PTE) of NOx and VOC emissions are greater than the major source thresholds. Additionally, the turbine at this facility is defined as an affected unit under the Acid Rain provisions, making this facility an affected source [40CFR Part 72, §72.6(a)(3)]. The facility is not a major source of HAPs.

Facility Description and History

The facility is located in the city of Burbank on a 23 acre parcel bound by Magnolia Blvd. on the north, Lake Avenue on the west, Olive Avenue on the south, and the Western Burbank Flood Control Channel, railway switching yards and Interstate 5 just a few hundred feet to the northeast. The facility is surrounded by light industrial areas to the north, south and east, with some retail space and residential areas to the west. The closest schools are Walt Disney Elementary School located approximately 2000 feet to the west, and William McKinley Elementary School and David Star Jordan Middle School, both located approximately 3600 feet to the south.

The SCPPA facility is a joint ownership project, producing power for the 12 member agencies (11 cities and 1 irrigation district), including the cities of Burbank, Anaheim, Glendale, Pasadena, and others. The plant is operated by the City of Burbank. The facility consists of a combined cycle turbine with an SCR and CO Oxidation catalyst. 19% aqueous ammonia is supplied by a 12000 gallon storage tank. Steam condensing is provided by a cooling tower.

There is a water treatment facility on site consisting of a soda ash and a lime storage silo along with acid storage which is part of a Zero Liquid Discharge (ZLD) system. ZLD is a water treatment process that treats the turbine cooling water on site for re-use. The system eliminates the need to discharge spent cooling water into the local sewer system.

Equipment on site that is exempt from permitting includes air conditioning units and the cooling tower.

It should be noted that BWP also operates a peaking turbine and 2 utility boilers on this site as well. The equipment is permitted under a different ID# (ID# 25638). The equipment under ID# 25638 is owned solely by the City of Burbank and is considered a separate facility for permitting purposes.

The facility submitted applications on December 10, 2024 to modify their permit by increasing operating hours, and deploying the General Electric (GE) Advanced Gas Path Tech Package (AGP)

and Advanced Compressor to the existing turbine system. The changes are discussed in more detail in Section 2. The following is a summary of the applications submitted for the project:

A/N	Equipment	BCAT	Processing Fee	XPP Fee
657073	Title V/RECLAIM Revision	555009	$3,508.09	N/A
657074	Gas Turbine, >50 MW, Other Fuel	013709	$29,113.23	$14,556.62
Total Processing Fee				**$47,177.94**

Recommended Action:

This proposed permit change is a Title V Significant Permit revision. EPA 45-day Review and 30-day Public Notice for public participation are required for the Significant Permit revision. After both the 45-day EPA review and the 30-day Public Notice period are completed, issue the Title V Permit with the addition of Permit to Construct/Operate for the following applications shown below under their equipment description.

Equipment Description:

Section H: Permit to Construct and Temporary Permit to Operate

Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions and Requirements	Conditions
Process 3: INTERNAL COMBUSTION: POWER GENERATION					
GAS TURBINE NO.1, COMBINED CYCLE, NATURAL GAS, GENERAL ELECTRIC, MODEL PG7241FA, WITH DRY LOW NOX COMBUSTORS DLN 2.6+, ~~1787~~ **2103** MMBTU/HR WITH A/N: ~~624214~~ **657074** GENERATOR, ~~181.1~~ **211.72** MW GENERATOR, HEAT RECOVERY STEAM STEAM TURBINE, STEAM, 142 MW	D4	C9 C10	NOX: MAJOR SOURCE	**CO**: 2000 PPMV (5) [RULE 407]; **CO**: 2PPMV (4) [RULE 1303]; **NOX**: 2 PPMV (4) [RULE 2005]; **NOX**: ~~105 PPM (8) [40CFR 60 SUBPART GG~~] **15 PPM [40CFR 60 SUBPART KKKK]**; **PM**: 0.1 GRAINS/SCF (5) [RULE 409]; **PM**: 0.01 GRAINS/SCF (5A) [RULE 475]; **PM**: 11 LBS/HR (5C) [RULE 475]; SO2: (9) [40CFR 72 – ACID RAIN]; **PM10: 0.005 LBS/MMBTU (5)[RULE 1303 OFFSET]; PM10: 0.006 LBS/MMBTU (5) [RULE 1303 OFFSET]; ~~SOX: 150 PPMV (8) [40CFR 60 SUBPART GG]~~ SO2: 0.060 LBS/MMBTU [40CFR 60 SUBPART KKKK]**; **VOC**: 2 PPMV (4) [RULE 1303]	**A63.2**, **A99.1, A195.5, A195.6, A195.7,** A327.1, **C1.5, C1.6**, D29.3, **D29.4**, D82.1, D82.2, E57.1, E193.1, H23.1, **I298.3**, K67.2
BURNER, DUCT, NATURAL GAS, 583 MMBTU/HR A/N: ~~624214~~ **657074**	D6	C9 C10	NOX: MAJOR SOURCE	**CO**: 2000 PPMV (5) [RULE 407]; **CO**: 2PPMV (4) [RULE 1303]; **NOX**: 2 PPMV (4) [RULE 2005]; **NOX**: ~~0.2 LBS/MMBTU (8B) [40CFR 60 SUBPART Da]~~ **15 PPM [40CFR 60 SUBPART KKKK]**; ~~**NOX: 114 PPMV**~~	**A63.2**, **A99.1, A195.5, A195.6, A195.7,** A327.1, C1.1, C1.2, C1.3, D29.3, **D29.4**,

Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions and Requirements	Conditions
				~~**NATURAL GAS (8A) [40CFR 60 SUBPART GG];**~~ **PM**: 0.1 GRAINS/SCF (5) [RULE 409]; **PM**: 0.01 GRAINS/SCF (5A) [RULE 475]; **PM**: 11 LBS/HR (5B) [RULE 475]; **PM10: 0.005 LBS/MMBTU (5)[RULE 1303 OFFSET]; PM10: 0.006 LBS/MMBTU (5) [RULE 1303 OFFSET]; SO2: 0.060 LBS/MMBTU [40CFR 60 SUBPART KKKK]**; ~~**PM: 0.03 LBS/MMBTU (8A) [40CFR 60 SUBPART Da]; SO2: 0.2 LBS/MMBTU (8A) [40CFR 60 SUBPART Da]; SOX: 150 PPMV (8A) [40CFR 60 SUBPART GG];**~~ **VOC**: 2 PPMV (4) [RULE 1303]	D82.1, D82.2, E57.1, E193.1, **I298.4**, K67.2
STACK, NO.1, HEIGHT: 150 FT; DIAMETER: 19 FT A/N: ~~**624214**~~ **657074**	S12				

2. PROCESS DESCRIPTION

The SCPPA facility is composed of a GE 7FA combustion turbine rated at 181.1 MW, a heat recovery generator (HRSG) equipped with a 583 mmBTU/hr duct burner, and one 142.0 MW steam turbine generator. Approximate heat input capacity to the combustion turbine is 1787 mmBTU/hr. The combustion turbine and duct burner use natural gas exclusively. Total plant output is 323.1 MW.

The turbine utilizes dry Low NOx combustion technology, and exhaust gas is further controlled with the use of a CO oxidation catalyst and an SCR control system.

The facility uses inlet air evaporative cooling and inlet gas compression. There is one cooling tower utilizing both potable and reclaimed water.

The exhaust stack is 150 feet high with a diameter of 19 feet.

The facility submitted A/N 657074 to deploy the General Electric (GE) Advanced Gas Path Tech Package (AGP) and Advanced Compressor to the existing turbine system. Details of the AGP and Advanced Compressor packages are provided below.

7F AGP Tech Package
The 7F AGP program utilizes 7F.04 Hot Gas Path (HGP) technology incorporating cooling and sealing enhancements and advanced materials to allow efficient operation at increased firing

temperatures. The AGP includes a complete set of 7FA.04 design HGP components, to include first, second, and third stage nozzles, buckets, and shrouds.

Advanced Compressor

The upgrade to advanced compressor consists of retrofitting a 7FA.05 compressor along with a Gen-V turbine rotor. The 7FA.05 compressor consists of 14 stages specifically modeled for higher flow rate, enabling greater output. The rotatory and stationary airfoils incorporate superfinish three-dimensional aerodynamic shape for reduced degradation and improved fuel efficiency. The first three stages of the compressor contain stator vanes that provide the gas turbine with a wider operating envelope and enhance hot-day and part-load efficiency. The rotor is bolted steel construction with two sets of durable concentric tie bolts specifically planned to improve the aerodynamic flow path. The rotor blades and wheels incorporate a circumferential dovetail design that permits removing the blades without pulling the rotor from the casing.

According to GE, implementation of the AGP and 7FA.05 compressor upgrade will provide the following benefits:

- Increased base load output & efficiency
- Improved part load efficiency
- Field replaceable compressor rotor blades
- Improved hot day performance
- Increase exhaust available energy to bottoming cycle for increased steam turbine output for combined cycle applications

In summary, the proposed modification to the turbine will increase the power output to 211.72 MW(Gross) and maximum fuel rating to 2,103 MMBtu/hr HHV. The tables below compare the pre-modification and post-modification equipment specifications. Changes are **underlined in bold.**

Turbine Specifications

	Pre-Modification	**Post-Modification**
Manufacturer/Model	GE/PG72417FA	GE/PG72417FA
Fuel Type	Pipeline natural gas	Pipeline natural gas
Maximum Heat Input Rating (CTG only)	1787 mmbtu/hr	**2,103** mmbtu/hr
Maximum Exhaust Flow (CTG only)[1]	55.14 mmscf/hr	**64.89** mmscf/hr
Maximum Fuel Consumption (CTG only)	1.702 mmscf/hr @ 1050 btu/scf	**2.003** MMscf/hr @ 1050 btu/scf
CTG Gross Power Output	181.1 MW	**211.72** MW
Steam Turbine Gross Power Output	85 MW (no duct firing) 142 MW (with duct firing)	85 MW (no duct firing) 142 MW (with duct firing)
Duct Burner Max Heat Input	583 mmbtu/hr	583 mmbtu/hr
Duct Burner Max Fuel Consumption	0.555 mmscf/hr @ 1050 btu/scf	0.555 mmscf/hr @ 1050 btu/scf
Gross Plant Power Output	323.1 MW	**353.72** MW
Maximum Heat Input Rating (CTG + DB)	2370 mmbtu/hr	**2686** mmbtu/hr
Maximum Exhaust Flow (CTG + DB)[1]	73.13 mmscf/hr	**82.87** mmscf/hr
Maximum Fuel Consumption (CGT + DB)	2.257 mmscf/hr @ 1050 btu/scf	**2.558** mmscf/hr @ 1050 btu/scf
NOx Combustion Control	DLN 9 ppm	DLN 9 ppm
Net Plant Heat Rate HHV	7,335 btu/kWh	**7,208** Btu/kWh
Net Plant Efficiency HHV	46.5%	**47.3**%

1- calculated using an F-factor of 8710 adjusted to 15% O2

SCR Specifications

Note: There will be no changes to the SCR system

Manufacturer	Cormetech
Catalyst Material	Vanadium/Titanium Oxide
Catalyst Volume	1,100 ft3
Maximum Temperature	850 °F
Minimum Temp for NH3 injection	450 °F
Space Velocity[2]	65,300 hr^{-1}
Maximum Ammonia Injection Rate	350 lbs/hr of 19% aqueous NH3
Ammonia Slip	5 ppm @ 15% O2
Outlet NOx	2 ppm @ 15% O2 (1 hour average)
Pressure Drop Across SCR	About 4 inch water

After the turbine upgrades, the turbine will undergo recommissioning. The recommissioning will consist of operating the turbine over various load ranges and operational modes to ensure proper combustion characteristics and emission levels. The recommissioning operation for the upgraded turbine will be performed by GE. The recommissioning process will take approximately 11 days. On the 11th day of recommissioning, the turbine will undergo performance testing for 12 hours, and after the performance testing the turbine will be ready for normal operation. The turbine will not be continuously "on" during recommissioning operation for 252 hours [(10 x 24) + 12 = 252] hours. The turbine will be shutoff for 51 out of the 252 hours during the process. Therefore, the gas turbine will be "on" for only 201 hours during the recommissioning operation. Details of the recommissioning operation provided by GE are summarized in Appendix B.

Besides the turbine upgrades mentioned above, the facility has proposed to increase the operating hours of the turbine to allow for a full year of operation and avoid unnecessary shutdowns. The annual hours of operation will increase to 8,508 hours from the currently permitted 8,322 hours. The numbers of startups and shutdowns per month will not change. The proposed first year operation schedule and normal operation schedule are summarized below.

Proposed 1st year operating schedule after modification

Parameter	**Value**
Number of operating hours in a year	8,508
Number of startups in a month	5
Number of hours in one startup	6
Number of startup hours in a year	360 (12 x 5 x 6)
Number of shutdowns in a month	5
Number of hours in one shutdown	0.5
Number of shutdowns in a year	30 (12 x 5 x 0.5)
Number of duct burner operation hours in a day	12
Number of duct burner operation hours in a month	240
Number of duct burner operation hours in a year	1,000
Total number of recommissioning hours in a year	252
Number of regular operation hours without recommissioning, startup, shutdown, or duct burner operation	6,866 (8,508 – 252 - 360 – 30 – 1,000)

Operating Schedule after recommissioning

Parameter	**Value**	
	Pre-Modification (Currently Permitted)	**Post-Modification (Requested)**

Number of operating hours in a year	8,322	8,508
Number of startups in a month	5	5
Number of hours in one startup	6	6
Number of startup hours in a year	360 (12 x 5 x 6)	360 (12 x 5 x 6)
Number of shutdowns in a month	5	5
Number of hours in one shutdown	0.5	0.5
Number of shutdowns in a year	30 (12 x 5 x 0.5)	30 (12 x 5 x 0.5)
Number of duct burner operation hours in a day	12	12
Number of duct burner operation hours in a month	240	240
Number of duct burner operation hours in a year	1,000	1,000
Number of regular operation hours without recommissioning, startup, shutdown, or duct burner operation	6,932 (8,322 – 360 – 30 – 1,000)	7,118 (8,508 – 360 – 30 – 1,000)

3. CONSTRUCTION AND PERMITTING HISTORY

Permitting since the Title V permit was renewed 1/10/2020, A/N 614246

The applicant filed the Title V renewal application no. 614246 and was approved on 1/10/2020. The following changes have been made to the facility permit since the last Title V renewal:

Item	Description	A/N	Date Approved
Minor Revision, Revision 27	Combustor Upgrade	624214	2/5/2021
Administrative Revision, Revision 29	P/C to P/O for Combustor Upgrade	624214, 613507	2/16/2022
Minor Revision, Revision 33	Replace CO catalyst	657491	3/20/2025

4. SUMMARY OF EMISSIONS AND HEALTH RISKS

Emission Factors (Normal Operation)

Pollutant	Emission Factor	Source
NOx	2.0 ppmv	Manufacturer guarantee
CO	2.0 ppmv	Manufacturer guarantee
VOC	2.0 ppmv	Manufacturer guarantee
PM10 (GT)	0.00495 lbs/MMbtu	Applicant
PM10 (Duct Burner)	0.0057 lbs/MMbtu	Applicant
SOx	0.60 lbs/MMscf	South Coast AQMD Default Emission Factor
NH3	5.0 ppm	Manufacturer guarantee

Normal operation emissions were calculated using the emission factors (EF) above. Under this application, the facility proposed to calculate normal operation emissions using a lower PM10 and SOx emission factor than what had been previously used.

Previously, PM10 emissions during the normal operation were calculated using the following emission factors: 0.0066 lb/MMBtu for the turbine without the duct burner and 0.0076 lb/MMBtu for the turbine with the duct burner. The facility has been source testing the turbine for PM10 emissions since the last 15 years to comply with permit conditions. A summary of these source test results indicated a wide variation in the source tested PM10 emission factors. The maximum PM10 EF was 0.002 lb/MMBtu for the turbine with the duct burner and 0.001 lb/MMBtu for the turbine with the duct burner. The facility is proposing to use the following reduced PM10 EF for this application:

Turbine without duct burner = [0.0066 – (0.25 x 0.0066)] = 0.00495 lbs/MMBtu
Turbine with duct burner = [0.0076 – (0.25 x 0.0076)] = 0.0057 lbs/MMBtu

The proposed PM10 EFs represent a reduction of 25% of the currently used PM10 EFs. The turbine will be subject to a PM10 emission limit of 0.005 lbs/MMBtu when operating without a duct burner and 0.006 lbs/MMBtu when operating with a duct burner.

Previously, SOx emissions during the normal operation were calculated using an EF of 0.75 lb/MMscf. The facility is proposing to use a SOx EF of 0.60 lb/MMscf. This EF is from South Coast AQMD's "Default Combustion Emission Factors (*revised January 2022)*".

Startup and Shutdown Emissions

Previously, startup and shutdown emissions are calculated using the following EFs:

Pollutant	Start Up Emission Rate	Total Start Up Emissions (6 hrs/event)	Shutdown Emission Rate	Total Shutdown Emissions (0.5 hrs/event)
	lbs/hr	lbs/event	lbs/hr	lbs/event
NOx	73.33	440	50	25
CO	83.33	500	240	120
VOC	5.00	30	34	17
PM10	11.79	70.74	11.79	5.90
SOx	1.28	7.68	1.28	0.64

All start up and shutdown emissions rates provided by the applicant, reference A/N 386305

The proposed modification will result in the turbine's heat input rating from 1,783 to 2,103 MMBtu/hr. For NOx, CO, and VOC, the startup and shutdown emission rates were estimated by multiplying with a factor of 1.18 (2,103/1,783). For PM10 and SOx, the startup and shutdown emission rates are assumed to be equal to the calculated hourly emission rates. The startup and shutdown emission rates used for this application are as follows:

Pollutant	Start Up Emission Rate	Total Start Up Emissions (6 hrs/event)	Shutdown Emission Rate	Total Shutdown Emissions (0.5 hrs/event)

	lbs/hr	lbs/event	lbs/hr	lbs/event
NOx	86.30	517.78	58.84	29.42
CO	98.07	588.39	282.44	141.22
VOC	5.88	35.30	40.01	20.01
PM10	10.41	62.46	10.41	5.20
SOx	1.20	7.21	1.20	0.60

Recommissioning Emissions

As stated earlier, the turbine will undergo recommissioning after the turbine upgrades. The recommissioning process will take approximately 11 days. On the 11th day of recommissioning, the turbine will undergo performance testing for 12 hours, and after the performance testing the turbine will be ready for normal operation. The turbine will not be continuously "on" during recommissioning operation for 252 hours [(10 x 24) + 12 = 252] hours. The turbine will be shutoff for 51 out of the 252 hours during the process. Therefore, the gas turbine will be "on" for only 201 hours during the recommissioning operation. Emission information for the recommissioning process was provided by GE. Maximum hourly, daily and total emissions during recommissioning are summarized below. Detailed recommissioning information can be found in Appendix B.

Maximum Hourly Recommissioning Emissions

Pollutant	Day of Task	Emissions, lbs/hr
NOx	Day 5B	127.00
CO	Day 5C	1,007.00
VOC	Day 5C	144.00
PM10	Day 2A, 3A	6.22
SOx	Day 1E, 6B, 6C, 10E	1.06
NH3	Day 11	13.73

Maximum Daily Recommissioning Emissions

Pollutant	Day of Task	Emissions, lbs/day
NOx	Day 5	857
CO	Day 5	4,166
VOC	Day 5	589
PM10	Day 11	231
SOx	Day 11	32
NH3	Day 2,3	244.27

Total Recommissioning Emissions

Pollutant	Emissions (lbs)
NOx	3,146
CO	8,863
VOC	1,236

PM10	975
SOx	162

Maximum Hourly Emissions, All Operations

Pollutant	Start Up	Shutdown	Recommissioning	Normal (No duct firing)		Normal (With duct firing)	
	Lbs/hr	Lbs/hr	Lbs/hr	Lbs/hr	Lbs/MMscf	Lbs/hr	Lbs/MMscf
NOx	86.30	58.84	127.00	15.51	7.74	19.80	7.74
CO	98.07	282.44	1,007.00	9.44	4.71	12.05	4.71
VOC	5.88	40.01	144.00	5.39	2.69	6.89	2.69
PM10	10.41	10.41	6.22	10.41	5.20	13.73	5.37
SOx	1.20	1.20	1.06	1.20	0.60	1.53	0.60
NH3	0	0	13.73	14.33	7.15	18.30	7.15

Highest Single Hour Emissions

Pollutant	Operating Scenario	Emissions, lbs/hr
NOx	Recommissioning	127.00
CO	Recommissioning	1,007.00
VOC	Recommissioning	144.00
PM10	Baseload Operation with Duct Firing	13.73
SOx	Baseload Operation with Duct Firing	1.53
NH3	Baseload Operation with Duct Firing	18.30

Maximum Daily Emissions

A. Pre Modification Maximum Daily Emissions

Pollutant	Operating Scenario	Daily Emissions
NOx	1 start + 1 shutdown + 12 hrs normal with duct firing + 5.5 hrs normal no duct firing	747.3
CO	1 start + 1 shutdown + 12 hrs normal with duct firing + 5.5 hrs normal no duct firing	791.8
VOC	1 start + 1 shutdown + 12 hrs normal with duct firing + 5.5 hrs normal no duct firing	145.2
PM10	24 hrs normal, 12 hours with duct firing	336.1
SOx	24 hrs normal, 12 hours with duct firing	35.8
NH3	24 hrs normal, 12 hours with duct firing	382.3

B. Maximum Daily Recommissioning Emissions (Post Modification Emissions)

		Daily Emissions

Pollutant	Operating Scenario	
NOx	Recommissioning Day 5	857
CO	Recommissioning Day 5	4,166
VOC	Recommissioning Day 5	589
PM10	Recommissioning Day 11	231
SOx	Recommissioning Day 11	32
NH3	Recommissioning Day 2,3	244.27

C. Maximum Daily Normal Operation Emissions (Post Modification Emissions)

Pollutant	Operating Scenario	Daily Emissions
NOx	1 start + 1 shutdown + 12 hrs normal with duct firing + 5.5 hrs normal no duct firing	870.1
CO	1 start + 1 shutdown + 12 hrs normal with duct firing + 5.5 hrs normal no duct firing	926.2
VOC	1 start + 1 shutdown + 12 hrs normal with duct firing + 5.5 hrs normal no duct firing	167.6
PM10	24 hrs normal, 12 hours with duct firing	289.7
SOx	24 hrs normal, 12 hours with duct firing	32.8
NH3	24 hrs normal, 12 hours with duct firing	391.5

Highest Daily Emissions

Pollutant	Operating Scenario	Emissions, lbs/day
NOx	Baseload Operation with Duct Firing	870.1
CO	Recommissioning (Day 5)	4,166
VOC	Recommissioning (Day 5)	589
PM10	Baseload Operation with Duct Firing	289.7
SOx	Baseload Operation with Duct Firing	32.8
NH3	Baseload Operation with Duct Firing	391.5

Change in Maximum Daily Emissions Pre-Modification vs Post Modification

Pollutant	Pre Modification Daily PTE Emissions	Post Modification Daily PTE Emissions	Change
NOx	747.3	870.1	+122.8
CO	791.8	4,166	+3,374.2
VOC	145.2	589	+443.8
PM10	336.1	289.7	-46.4
SOx	35.8	32.8	-3
NH3	382.3	391.5	+9.2

Monthly and 30 Day Average Emissions

A. Current PTE Calculation (Pre Modification Emissions)

Pollutant	Operating Scenario	Total Monthly Emissions	30-Day Average Emissions
NOx	5 starts+5 shutdowns + 240 hrs normal with duct firing + 447.5 hrs normal without duct firing	12,418	405
CO	5 starts+5 shutdowns + 240 hrs normal with duct firing + 447.5 hrs normal without duct firing	9,243	308
VOC	5 starts+5 shutdowns + 240 hrs normal with duct firing + 447.5 hrs normal without duct firing	3,744	125
PM10	720 hrs normal, 240 hrs with duct firing	9,552	318
SOx	720 hrs normal, 240 hrs with duct firing	1,022	34

B. Maximum Monthly Recommissioning Emissions (Post Modification Emissions)

Pollutant	Operating Scenario	Total Monthly Emissions	30-Day Average Emissions
NOx	Recommissioning + 5 start+ 5 shutdowns + 240 hrs normal with duct firing + 195.5 hrs normal without duct firing	13,666.17	455.5
CO	Recommissioning + 5 start+ 5 shutdowns + 240 hrs normal with duct firing + 195.5 hrs normal without duct firing	17,249.25	575.0
VOC	Recommissioning + 5 start+ 5 shutdowns + 240 hrs normal with duct firing + 195.5 hrs normal without duct firing	4,220.9	140.7
PM10	Recommissioning + 5 start+ 5 shutdowns + 240 hrs normal with duct firing + 195.5 hrs normal without duct firing	6,644.35	221.5
SOx	Recommissioning + 5 start+ 5 shutdowns + 240 hrs normal with duct firing + 195.5 hrs normal without duct firing	804.36	26.8

C. Maximum Monthly Normal Operation Emissions (Post Modification Emissions)

Pollutant	Operating Scenario	Total Monthly Emissions	30-Day Average Emissions
NOx	5 start+ 5 shutdowns + 240 hrs normal with duct firing + 447.5 hrs normal without duct firing	14,427.50	480.9
CO	5 start+ 5 shutdowns + 240 hrs normal with duct firing + 447.5 hrs normal without duct firing	10,764.62	358.8
VOC	5 start+ 5 shutdowns + 240 hrs normal with duct firing + 447.5 hrs normal without duct firing	4,343.16	144.8

PM10	720 hours normal, 240 hours with duct firing	8,292.64	276.4
SOx	720 hours normal, 240 hours with duct firing	945.19	31.5

Highest Monthly Emissions

Pollutant	Operating Scenario	Total Monthly Emissions	30-Day Average Emissions
NOx	5 start+ 5 shutdowns + 240 hrs normal with duct firing + 447.5 hrs normal without duct firing	14,427.50	480.9
CO	Recommissioning + 5 start+ 5 shutdowns + 240 hrs normal with duct firing + 195.5 hrs normal without duct firing	17,249.25	575.0
VOC	5 start+ 5 shutdowns + 240 hrs normal with duct firing + 447.5 hrs normal without duct firing	4,343.16	144.8
PM10	720 hours normal, 240 hours with duct firing	8,292.64	276.4
SOx	720 hours normal, 240 hours with duct firing	945.19	31.5

Change in Monthly Emissions Pre-Modification vs. Post-Modification

	Pre Modification		Post Modification		Change	
Pollutant	Monthly Emissions	30-Day Average	Monthly Emissions	30-Day Average	Monthly Emissions	30-Day Average
NOx	12,418	414	14,427.50	480.9	+2,009.5	+66.9
CO	9,243	308	17,249.25	575.0	+8,006.25	+267.0
VOC	3,744	125	4,343.16	144.8	+599.16	+19.8
PM10	9,552	318	8,292.64	276.4	-1,259.36	-41.6
SOx	1,022	34	945.19	31.5	-76.81	-2.5

The reductions in PM10 and SOx emissions are due to the lower emission factors proposed by the facility.

Annual Emissions (PTE)

Current annual emissions are calculated with 60 start-ups & shutdowns, 1000 hours of baseload operation with duct firing, and 6,932 hours of baseload operation without duct firing. Total annual operating hours is 8,322 hours.

Under this application, the facility is proposing to increase the annual operating hours from 8,322 hours to 8,508 hours. Thus, hours of baseload operation without duct firing will increase from 6,932 hours to 7,118 hours. The number of start-ups & shutdowns will remain at 60 and hours of baseload operation with duct firing will remain at 1,000 hours.

Additionally, the facility is proposing to operate at a capacity factor of 84.9%. The maximum annual heat input at 100% load is 18,475,324 MMBtu ((7,508 hours * 2,103 MMBtu/hr) + (1,000 hours * 2,686 MMBtu/hr)). Assuming a capacity factor limit of 84.9%, the maximum annual heat input will be

15,685,550 MMBtu. Thus, the maximum fuel usage will be 14,939 MMscf. A condition to limit total fuel usage will be added to enforce the capacity factor limit of 84.9%.

A. Current PTE Calculation (Pre Modification Emissions)

	# of Events	Hours	NOx	CO	VOC	PM10	SOx	NH3
Start Up	60	360	26400	30000	1800	4244	461	0
Shutdown	60	30	1500	7200	1020	354	38	0
GT Baseload	/////////	6932	91364	55595	31749	81728	8873	84362
GT + DB Baseload	/////////	1000	17480	10640	6080	16220	1700	16150
Total, lbs		8,322	136,744	103,435	40,649	102,546	11,072	100,512

B. Maximum Annual Emissions with Recommissioning (Post Modification Emissions)

	# of Events	Hours	NOx, lbs	CO, lbs	VOC, lbs	PM10, lbs	SOx, lbs	NH3, lbs
Start Up	60	360	31066.97	35303.57	2118.30	3747.55	432.62	0
Shutdown	60	30	1765.25	8473.20	1200.37	312.30	36.05	0
Recommissioning[1]	/////////	252	3,146	8,863	1,236	975	162	1,936.01
GT Baseload	/////////	6,866	106459.05	64801.16	37029.24	71474.03	8250.97	98358.90777
GT + DB Baseload	/////////	1,000	19,803.66	12,054.40	6,888.23	13,732.95	1,534.86	18,296.86
Totals, lbs		8,508	162,240.94	129,495.33	48,472.13	90,241.82	10,416.50	118,591.78
Totals, lbs[1] (with 84.9% capacity factor)		8,508	138,217.60	111,279.85	41,339.48	76,762.53	8,868.07	100,976.76

[1] *Capacity factor is only applied to normal operation emissions (excludes recommissioning)*

C. Maximum Annual Normal Operation Emissions (Post Modification Emissions)

	# of Events	Hours	NOx, lbs	CO, lbs	VOC, lbs	PM10, lbs	SOx, lbs	NH3, lbs
Start Up	60	360	31,066.97	35,303.57	2,118.30	3,747.55	432.62	0
Shutdown	60	30	1,765.25	8,473.20	1,200.37	312.30	36.05	0
GT Baseload	/////////	7,118	110,366.38	67,179.53	38,388.30	74,097.31	8,553.80	101,968.93
GT + DB Baseload	/////////	1,000	19,803.66	12,054.40	6,888.23	13,732.95	1,534.86	18,296.86
Totals, lbs		8,508	163,002.26	123,010.70	48,595.20	91,890.10	10,557.33	120,265.80
Totals, lbs (with 84.9% capacity factor)		8,508	138,388.92	104,436.08	41,257.33	78,014.7	8,963.17	102,105.66

Highest Annual Emissions

Pollutant	Operating Scenario	Emissions, lbs/year
NOx	Normal Operation Year	138,388.92
CO	Recommissioning Year	111,279.85
VOC	Recommissioning Year	41,339.48
PM10	Normal Operation Year	78,014.7
SOx	Normal Operation Year	8,963.17
NH3	Normal Operation Year	102,105.66

Change in Annual Emissions Pre-Modification vs Post-Modification

Pollutant	Pre Modification Annual PTE Emissions (lbs/yr)	Post Modification Annual PTE Emissions (lbs/yr)	Change (lbs/yr)
NOx	136,744	138,388.92	+1,644.92
CO	103,435	111,279.85	+7,844.85
VOC	40,649	41,339.48	+690.48
PM10	102,546	78,014.7	-24,531.30
SOx	11,072	8,963.17	-2,108.83
NH3	100,512	102,105.66	+1,593.66

Hazardous Air Pollutant (HAP) Emissions

HAP emissions are calculated in Appendix D. A summary is provided below.

Pollutant	Emission Factor	Emission Factor	Hourly Emissions	Annual Emissions
	lbs/MMBtu	lbs/MMscf	Lbs/hr	Lbs/yr
1,3 butadiene	4.30E-07	4.39E-04	1.12E-03	7.72
acetaldehyde	1.76E-04	1.80E-01	4.59E-01	3158.75
acrolein	3.62E-06	3.69E-03	9.45E-03	64.97
benzene	3.26E-06	3.33E-03	8.51E-03	58.51
ethylbenzene	3.20E-05	3.26E-02	8.35E-02	574.32
formaldehyde	3.60E-04	3.67E-01	9.39E-01	6461.08
naphthalene	1.30E-06	1.33E-03	3.39E-03	23.33
PAH (excluding naphthalene)	9.00E-07	9.18E-04	2.35E-03	16.15
propylene oxide	2.90E-05	2.96E-02	7.57E-02	520.48
toluene	1.30E-04	1.33E-01	3.39E-01	2333.17
xylenes	6.40E-05	6.53E-02	1.67E-01	1148.64
			Total, lbs/yr	14,367.12
			Total, tpy	7.2

Greenhouse Gas (GHG) Emissions

GHG Emissions are calculated in Appendix C. A summary is provided below.

GHG	Annual lbs @ 18,475,324 MMBtu/yr	Annual Tons @ 18,475,324 MMBtu/yr
CO2	2,161,170,904	1,080,585
CH4	40,730.7	20.4
N2O	4073.1	2.0
Total Mass	2,161,215,708	1,080,607
CO2e	2,163,390,727	1,081,695

5. REGULATORY APPLICABILITY DETERMINATIONS

Specific rule provisions, including the determinations made by South Coast AQMD as to the legal requirements which apply to each emission source at the facility are analyzed in the following section.

Rule 212: Standards for Approving and Issuing Public Notice (December 7, 1995 – SIP approved) (March 1, 2019)

This rule establishes criteria for the approval of permits by the South Coast AQMD, including procedures for notification of persons within a defined proximity of a certain project who may be affected by the proposed construction or modification. The rule requires a public notification for the following:

212(c)(1): This paragraph requires a public notice for any new or modified permit unit that may emit air contaminants located within 1,000 feet from the outer boundary of a school. There is no school located within 1,000 feet of the facility. Therefore, a public notice is not required by this paragraph. Below is the school grounds located nearest to the facility:

Name of School	Address	Distance from school grounds
Walt Disney Elementary School	1220 W Orange Grove Burbank, CA 91506	~2300 feet

212(c)(2): This paragraph requires a public notice for any new or modified facility which has on-site emission increases exceeding any of the daily maximums specified in subdivision (g). The emission increases, based on a 30 Day Average per *Rule Implementation Guidance – Rule 212 (E2019-01)*, for the facility exceed the daily maximum limit specified in Rule 212(g) for NOx. Therefore, a public notice is required by this paragraph.

Pollutant	A/N 657074 30DA (lb/day)	Daily Max Rule 212 (lb/day)	Trigger Public Notice?
VOC	+19.8	30	No
NO_X	+66.9	40	Yes
SO_X	-2.5	60	No
CO	+204.7	220	No
PM_{10}	-41.6	30	No

As shown in the above table, the project is subject to public notice because the daily maximum NOx emissions from this project will exceed the emission thresholds specified in subdivision (g) of this rule. The District will prepare the public notice. The notice will contain sufficient information to fully describe the project. In accordance with subdivision (d) of this rule, the applicant will be required to distribute the public notice to each address within ¼ mile radius of this project.

Rule 212(g) also requires: (1) the South Coast AQMD analysis and information submitted by the operator must be available for public inspection in an area near the source, (2) public notice will be published in a newspaper which serves the area that will be impacted by the project, and (3) public notice will be mailed to the U.S. Environmental Protection Agency (USEPA), California Air Resources Board (CARB), chief executives of the city and county where the source is located, any land use agencies, State and Federal Land Managers of Indian Governing Body whose lands may be affected by the project.

212(c)(3): This paragraph requires a public notice for all new or modified permit units with increases in emissions of toxic air contaminants resulting in a maximum individual cancer risk (MICR) greater than one-in-a-million (1×10^{-6}) for facilities with more than one permitted unit or ten-in-a-million (10×10^{-6}) for facilities with a single permitted unit, or for permit units that pose a potential risk of nuisance.

This facility has more than one permitted unit; therefore, the one-in-a-million (1.00E-6) threshold applies. The expected MICR from the equipment is less than 1 in a million. The CARB Hotspot Analysis Program Version (HARP2) model was performed to assess the health impact from the proposed project. Additionally, with proper maintenance and operation, this equipment is not expected to create a nuisance. Therefore, public notice is not required under this paragraph.

Application Number	Residential MICR	Commercial MICR	Threshold	Trigger Public Notice?
657074	0.32E-06	0.02E-06	1.0E-06	No

Rule 401: Visible Emissions (March 2, 1984 – SIP approved) (November 9, 2001)

This rule prohibits the discharge of visible emissions for a period aggregating more than three minutes in any one hour which is as dark or darker in shade than Ringelmann No. 1.

401(b)(1): Visible emissions are not expected from a well-maintained and properly operated equipment. Compliance is expected.

Rule 402: Nuisance (Amended May 7, 1976)

This rule prohibits discharge of air contaminants or materials which may cause nuisance to considerable number of persons or to the public.

No public nuisance is expected with the proper operation of this equipment. Therefore, compliance with Rule 402 is expected.

Rule 407: Liquid and Gaseous Air Contaminants (Amended April 2, 1982)

This rule limits the CO emissions to 2000 ppmvd and SO_2 emissions to 500 ppmvd averaged over 15 minutes.

The turbine is subject to a more stringent CO BACT limit of 2 ppm. After installation of the turbine upgrades, an initial performance test will be required to verify compliance with the CO limit.

This rule also limits SO_2 emissions to 500 ppmvd. However, per (c)(2), this limit is not applicable if the equipment complies with the gaseous fuel sulfur content limits of Rule 431.1

Rule 409: Combustion Contaminants (Amended August 7, 1981)

The rule limits particulate emissions to 0.1 gr/scf at 12% CO_2. The proposed turbine modifications are expected to have minimal effect on PM emissions. Also, the facility is required to perform PM source testing every 3 years. A history of PM source test results are tabulated below. Continued compliance is expected.

Test Date	Test Load	Results, gr/scf @ 12% CO_2
Initial Testing Oct 2005	No Duct Firing	0.001
	Duct Firing	0.001
Periodic Testing Nov 2008	No Duct Firing	0.00079
	Duct Firing	0.00074
Periodic Testing Aug 2001	No Duct Firing	0.00007
	Duct Firing	0.00078
Periodic Testing July 2014	No Duct Firing	0.00047
	Duct Firing	0.00041
Periodic Testing Sept 2017	Duct Firing	0.0003
Periodic Testing July 2020	No Duct Firing	0.00073
	Duct Firing	0.00043

The following theoretical calculation also supports the conclusion that the unit will be in compliance:

Grain Loading = [(A x B)/(C x D)] x 7000 gr/lb
where:

A = PM10 emission rate during normal operation
B = Rule specified percent of CO2 in the exhaust (12%)
C = Percent of CO2 in the exhaust (approx. 4.29% for natural gas)
D = Stack exhaust flow rate

Estimated grain loading at max rate = $\frac{13.73\ lbs/hr*(7000\ gr/lb)*(12/4.29)}{82.87*10^6\ scf/hr}$ = 0.003 gr/scf

Rule 429.2: Startup and Shutdown Exemption Provisions for Oxides of Nitrogen from Electricity Generating Facilities (January 7, 2022)

This rule applies to the electric generating units at electric generating facilities (EGF) subject to Rule 1135. It sets specific requirements for startup and shutdown durations.

429.2(d)(2) requires electric generating units installed prior to January 7, 2022 to limit the startup and shutdown duration to the times specified in Table 1 or the times specified in the current permit, whichever is more stringent.

For combined cycle gas turbines, Table 1 limits startup to 6 hours and shutdown to 2 hours. The current permit has a more stringent limit of 6 hours for startup and 30 minutes for shutdown. Therefore, the facility will retain its current startup and shutdown duration limit.

429.2(d)(4): On or after January 1, 2024, the startup duration of the electric generating unit shall not last longer than the time necessary to reach stable conditions to operate the NOx post-combustion control equipment. The unit was installed before January 7, 2022, so it has up to 6 hours minutes to startup. The startup period will be considered over whenever stable conditions are reached. The applicant stated that startup will be completed before 6 hours. Additionally, condition E57.1 specifies that ammonia injection shall commence once the exhaust temperature into the SCR has reached 450 degrees F.

429.2(d)(8) On or after January 1, 2024, the operator of an electric generating unit with NOx-post-combustion control equipment shall install and maintain an annually calibrated temperature measuring device at the inlet of the NOx post-combustion control equipment. The facility currently utilizes a temperature gauge at the inlet of the SCR reactor. Compliance is expected.

429.2(d)(9) On and after January 1, 2024, the operator of a generating unit with NOx post combustion system shall operate the entirety of the equipment within normal operating

conditions and comply with all emission limits. In this case, the facility is required to start ammonia injection as soon as the minimum temperature is reached.

Per Condition D12.2, the operator shall maintain the exhaust temperature at the inlet of the SCR between 450 and 900 degree F, except during start up and shutdown. Compliance is expected.

Rule 431.1: Sulfur Content of Gaseous Fuels (June 12, 1998 – SIP approved)

In accordance with paragraph (e)(3), an electric utility generating facility is required to maintain a continuous fuel gas monitoring system (CFGMS) to determine the sulfur content of the fuel, and submit monthly reports indicating the amount of gas combusted, the 4 hour average sulfur content of the gas, and the total SOx emissions. Compliance is expected. The rule requires that the natural gas supplier complies with a 16 ppmv sulfur limit (calculated as H2S). Commercial grade natural gas has an average sulfur content of about 4ppm.

Rule 475: Electric Power Generating Equipment (October 8, 1976 – SIP approved) (August 7, 1978)

This rule applies to power generating equipment rated at greater than 10 net MW permitted after May 7, 1976. The rule requires the equipment to discharge particulate matter no more than 11 pounds per hour and 0.01 gr/SCF, calculated at 3% O_2 on a dry basis averaged over at least 15 minutes.

$$Stack\ Exhaust\ Flow\left(\frac{scf}{hr}\right) = F_d\ x\ \frac{20.9}{(20.9 - \%O_2)}\ x\ TFD$$

where:
F_d = Dry F factor for fuel type, 8710 dcsf/MMBtu
O_2 = Rule specific dry oxygen content in the effluent stream, 3%
TFD = Total fired duty measured at HHV, 2686 MMBtu/hr

$$Combustion\ Particulate\left(\frac{grain}{scf}\right) = \frac{PM_{10}, lb/hr}{Stack\ Exhaust\ Flow, scf/hr}\ x\ 7000\ \frac{gr}{lb}$$

Stack exhaust flow = $8710\ \frac{dcsf}{MMBtu} * \frac{20.9}{17.9} * 2686\ \frac{MMBtu}{hr}$ = 27.3*10^6 scf/hr

Combustion particulate = $\frac{13.73\frac{lbs}{hr}}{27.3*10^6\frac{scf}{hr}} * 7000\ \frac{gr}{lb}$ = 0.0035 gr/scf

Based on the theoretical calculations above, compliance is expected.

Rule 1135: Emissions of Oxides of Nitrogen from Electricity Generating Facilities (October 4, 2024)

This rule is applicable to boilers and turbines (except cogen units) at investor owned, or publicly owned electric utilities, or at facilities with > 50 MW capacity, as well as the power generating engines on Catalina Island. The rule sets the NOx limit to 2 ppm for combined cycle turbines, 2.5 ppm to simple cycle turbines, and 5 ppm for utility boilers. The limits are all based on a 60 minute rolling average, however, the current limits in the permits for existing facilities can be kept if there is no equipment modification.

1135(d)(1)(B) requires boilers and gas turbines installed or for which the owner of operator has applied for Permits to Construct prior to November 2, 2018 to:

(i) Average the NOx emission limits in Table 1 over a 60-minute rolling average; or
(ii) Retain the averaging time requirements specified in the Permit of Operate as of November 2, 2018.

The turbine permit currently limits the NOx to 2.0 ppm @ 15% O_2 based on a 3 hour average. The current NOx limit meets the requirements of this rule. However, since this modification will result in a daily NOx emission greater than 1lb/day, BACT/LAER is triggered for NOx. BACT/LAER for NOx is 2.0 ppmv @ 15% O_2 based on a 1 hour average. The turbine will be subject to a NOx limit of 2.0 ppmv @ 15% O_2 based on a 1 hour average per BACT/LAER.

1135(e)(1) requires the owner or operator of a RECLAIM NOx facility to comply with Rule 2012.

Rule 2012 requires the turbine to utilize a NOx CEMS. The turbine currently utilizes a NOx CEMS and will continue utilizing a NOx CEMS after modification. Compliance with this subpart is expected.

1135(e)(10) requires units with a catalytic or non-catalytic control device with ammonia injection to:

(A) Conduct quarterly source test during the first 12 months of operation and annually thereafter or;
(B) Utilize an ammonia CEMS

Per condition D29.1, the facility is required to conduct a source test for ammonia emissions.

Reg. XIII: New Source Review (NSR)

This regulation sets forth pre-construction review requirements for new, modified, or relocated facilities to ensure that the operation of such facilities does not interfere with progress in attainment of the National Ambient Air Quality Standards (NAAQS), and that future economic growth within the South Coast AQMD jurisdiction is not unnecessarily restricted. The specific air quality goal of this regulation is to achieve no net increases from new or modified permitted sources of nonattainment air contaminants or their

precursors. In addition to nonattainment air contaminants, this regulation also limits emission increases of ammonia and ozone depleting compounds from new, modified or relocated facilities by requiring the use of BACT on each permit unit.

Rule 1303: Requirements (Amended December 6, 2002)

1303(a)(1) BACT:
The Best Available Control Technology (BACT) refers to the most stringent emission limitation or control technique and is defined in South Coast AQMD Rule 1302(h) as follows:

- has been achieved in practice for such category or class of source; or
- is contained in any State Implementation Plan (SIP) approved by the USEPA for such category or class of source. A specific limitation or control technique shall not apply if the owner or operator of the proposed source demonstrates to the satisfaction of the Executive Officer or designee that such limitations or control technique is not presently achievable; or
- is any other emission limitation or control technique, found by the Executive Officer or designee to be technologically feasible for such class or category of sources or for a specific source, and cost effective as compared to measures as listed in the Air Quality Management Plan (AQMP) or rules adopted by the District Governing Board.

This definition of BACT is consistent with the federal Lowest Achievable Emission Reduction (LAER) definition under the federal non-attainment New Source Review program.

The South Coast AQMD BACT Guideline Section I contains approved LAER/BACT determinations in permits issued by the South Coast AQMD. For gas turbines the control technology for NOx is SCR with ammonia injection, and the control technology for CO and VOC is oxidation catalyst. The BACT limits for natural gas fired combined cycle gas turbines are shown in the next table. The emissions limits have been applied to the city of Pasadena gas turbine permitted under A/N 579955 in February 2019, and to the city of Vernon gas turbine permitted under A/N 394164 in February 2004.

BACT for Stationary Gas Turbines Used for Combined Cycle Power Plant Configurations

NOx	CO	VOC	PM_{10}	SOx	NH_3

2.00 ppmvd @ 15 O_2, 1-hour rolling average	2.00 ppmvd @ 15 O_2, 1-hour rolling average	2.00 ppmvd @ 15 O_2, 1-hour rolling average	An emission limit corresponding to natural gas with fuel sulfur content of no more than 1 grain/scf	An emission limit corresponding to natural gas with fuel sulfur content of no more than 1 grain/scf (no more than 0.55 ppmvd @ 15% O_2)	5.00 ppmvd @ 15 O_2, 1-hour rolling average

The emissions limits proposed by Burbank for their unit are shown in the next table. The limits are consistent with the BACT requirements, as well as the achieved in practice limits nationwide.

BACT Proposed for the Burbank City Turbine

NOx	**CO**	**VOC**	**PM_{10}**	**SOx**	**NH_3**
2 ppmvd @ 15% O_2, 1-hour average	2 ppmvd @ 15% O_2, 1-hour average	2 ppmvd @ 15% O_2, 1-hour average	An emission limit corresponding to natural gas with fuel sulfur content of no more than 1 grain/scf	An emission limit corresponding to natural gas with fuel sulfur content of no more than 1 grain/scf	5.0 ppmvd @ 15% O_2, 1-hour average

1303(b)(1) Modeling:

Rule 1303 requires the project, through modeling, demonstrate that it will not cause a violation, or make significantly worse an existing violation according to Appendix A, of any state or national ambient air quality standards in Table A-2 of this rule. Rule 1303 does not require modeling analysis for VOC and SOx, or for NOx which will be reviewed under RECLAIM rules. Rule 1303 requires modeling review only for CO and PM_{10}. For CO, as it is an attainment pollutant, the project shall not cause a violation of ambient air quality standards. The area is attainment of PM_{10} NAAQS but non-attainment of PM_{10} CAAQS. Thus, the project shall not cause a violation of the PM_{10} NAAQS and shall not cause a significant deterioration of PM_{10} 24-hr CAAQS.

BWP performed a modeling analysis using the AERMOD dispersion model, version 23132 and five years (2018 through 2022) of meteorological data (Burbank Airport Station (KBUR)). The historical ambient air quality data from Central LA for years 2021-2023 were used. The modeling analysis was performed following the protocol approved by the South Coast AQMD.

South Coast AQMD staff completed the review of the air quality impact dispersion modeling analysis for the proposed project. Modeling results are summarized in a memo "Review of Air Quality Impact Analysis and Health Risk Assessment for a Modification

to a Combined Cycle Gas Turbine" dated 5/30/2025. Rule 1303 modeling results are summarized below.

PM_{10} Emissions

The table below shows the maximum impacts and significant change from the modeling results for PM_{10} during normal operation.

Pollutants	Averaging Time	Model Results ($\mu g/m^3$)	Significant Change Threshold ($\mu g/m^3$)	Significant (Yes/No)
PM_{10}	24-hour CAAQS	1.40	2.5	No
	Annual CAAQS	0.26	1.0	No

PM 24-hr average CAAQS: The highest impact is 1.40 $\mu g/m^3$, during normal operation. This is less than the significant change threshold of 2.5 $\mu g/m^3$ of Rule 1303.

PM annual average CAAQS: The impact is 0.26 $\mu g/m^3$, during normal operation. This is less than the significant change threshold of 1.0 $\mu g/m^3$ of Rule 1303.

CO Emissions

The project impact, the ambient concentrations, and the total impact are shown in the next table. They are compared with the most stringent ambient air quality standards. As shown in the table, the project will not cause a violation of the ambient air quality standards.

	Background	Project Impact	Total	AAQS	Violation
CO 1-hr ($\mu g/m^3$)	2,300	362.99*	2,663	23,000	No
CO 8-hr ($\mu g/m^3$)	1,840	198.63*	2,039	10,000	No

* during commissioning

1303(b)(2) Offsets

Rule 1303(b)(2) requires that all increases in emissions be offset unless exempt from offset requirements pursuant to Rule 1304. The emission offset ratios for PM10, SOx, and VOC are 1.2 to 1. Rule 1304 (d)(2) exempts a facility from offsets if the post modification potential to emit (PTE) is less than the following: 4 tons per year of VOC; 4 tons per year of NOx; 4 tons per year of SOx; 4 tons per year of PM10, and 29 tons per year of CO.

It has been determined that post modification VOC, SOx, and PM10 PTEs would be greater than 4 tons of VOC, 4 tons of SOx, and 4 tons of PM10. Therefore, VOC, SOx, and PM10 emission increases must be offset following the Rule 1306 emission offset calculations. In addition, because the MPP facility is a RECLAIM facility, it is subject to

Rule 2005 for NOx Regional Trading Credit (RTC) requirements rather than to Regulation XIII requirements.

The next table proves a summary of offset requirements from the proposed modification.

	VOC	PM10	SOx
30DA Emission Change (lb/day)	+19.8	-41.6	-2.5
Offset required	Yes	No	No
Offset ratio	1.2	1.2	1.2
ERC (lb/day)	**24 (19.8*1.2)**	**-**	-

The facility will be required to provide 24 lbs of VOC ERCs at the time of permit to construct issuance.

The reduction in PM10 emissions is due to the lower emission factors proposed by the facility. An initial source test and future periodic source tests are required for verification. The reduction in SOx emissions is also due to the use of a lower emission factor. However, that factor is approved by the District so verification is not required.

Rule 1325: Federal $PM_{2.5}$ New Source Review Program (Amended January 4, 2019)

This rule applies to any new major polluting facilities, major modifications to a major polluting facility, or any modifications to an existing facility that would constitute a major polluting facility in and of itself. A major polluting facility is defined as a facility located in a federal non-attainment area, which has actual emissions, or a potential to emit of greater than 70 tons per year of PM2.5. A major polluting facility which proposes a modification resulting in a significant increase is required to comply with the following requirements:

- Use of LAER
- Offset PM2.5 emissions at the offset ratio of 1.1:1
- Certification of compliance of emission limits
- Conduct an alternative analysis of the project

The existing facility is not a major source per this rule, and the proposed modifications under this application will not result in an increase in PM10 emissions. Therefore, BWP will continue to be a non-major polluting facility for PM2.5 and is not subject to the requirements of this rule.

Rule 1401: New Source Review of Toxic Air Contaminants (Amended September 1, 2017)

This rule specifies limits for maximum individual cancer risk (MICR), acute hazard index (HIA), chronic hazard index (HIC) and cancer burden (CB) from new permit units, relocations, or modifications to existing permits which emit toxic air contaminants.

BWP performed a Tier 4 cancer risk analysis using the Hotspots Analysis and Reporting Program (HARP2). Air dispersion modeling was performed using the USEPA guideline model AERMOD (Version 23132) following the modeling protocol approved by South Coast AQMD.

South Coast AQMD staff completed the review of the health risk analysis for the proposed project. Health risks results are summarized in a memo "Review of Air Quality Impact Analysis and Health Risk Assessment for a Modification to a Combined Cycle Gas Turbine" dated 5/30/2025. HRA source parameters and results are summarized below.

Health Risk Assessment Source Parameters

Operating Scenario	Release Height	Temperature (K)	Stack Velocity (m/s)	Stack Diameter (m)
Normal Operation	45.70	356.4	20.10	5.80

HRA Results

Receptor Type	Cancer Risk (in one million)	Chronic Hazard Index	Acute Hazard Index	Cancer Risk Threshold (in one million)	Acute/Chronic Hazard Index Threshold
Residential	0.32	2.97×10^{-3}	5.24×10^{-3}	10	1.0
Worker	0.02	2.97×10^{-3}	5.24×10^{-3}	10	1.0

These values are below the Rule 1401 thresholds. Compliance with this rule is expected.

Rule 1401.1: Requirements for New and Relocated Facilities Near Schools

This rule applies to new and relocated facilities, not to existing facilities. The rule defines existing facilities as "… or [have] an application for Permit to Construct/Operate that is deemed complete prior to February 2, 2006." Burbank City, Burbank Water & Power has had South Coast AQMD permit prior to 2006; therefore, this rule does not apply.

Rule 1703: PSD Analysis (Adopted October 7, 1988)

The South Coast Basin where the project is to be located is in attainment for CO, SO_2, and NO_2. This area is also an attainment area for PM_{10} under National Ambient Air Quality Standard (NAAQS), but not an attainment area for PM_{10} under California Ambient Air Quality Standard (CAAQS).

PSD applies on a pollutant-specific basis to a new major source, a significant increase in emissions from an existing major stationary source, or a modification at a non-major

source, if the modification is considered major in and of itself. For any of the 28 listed source categories, the major source threshold is 100 tons per year based on actual emissions or potential to emit. The major source threshold is 250 tons/yr for source categories that are not listed. As a natural gas fired combined cycle gas turbine power plant, the Burbank facility falls within the 28 source category definitions, and therefore the applicable threshold is 100 tpy.

If the facility is deemed to be major, Rule 1702 further defines a major modification as a significant emission increase of 40 tpy or more of NO2 or SO2, 15 tpy of PM10, or 100 tons per year or more of CO (determined on a new PTE vs. existing actual basis). The Burbank Water and Power facility is not defined as a major source, because its emissions are below 100 tpy. Furthermore, BWP will continue to be a minor source as the post-modification emissions are lower than the major source threshold of 100 tpy. Therefore, the requirements of PSD do not apply.

Rule 1714: Prevention of Significant Deterioration for Greenhouse Gases (Adopted October 7, 1988)

This rule establishes preconstruction review requirements for greenhouse gases (GHG). The provisions of this rule apply only to GHGs defined as an aggregate group of six GHGs: carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

Starting on January 2, 2011, GHGs are a regulated NSR pollutant under the PSD permitting program. A new source or a modified source that emits more than 75,000 tpy GHGs will be subject to PSD review. GHGs are reviewed under PSD program separately from other criteria pollutants, which are reviewed under Rule 1703. As summarized below, a court case determined that increases in GHG emissions alone cannot trigger the review of a permit application under PSD. An analysis under PSD for GHGs emission is only required when a source triggers PSD review for other criteria pollutants.

U.S. Supreme Court Decision in *Utility Air Regulatory Group v. EPA*

On June 23, 2014, the U.S. Supreme Court issued its decision in *Utility Air Regulatory Group v. EPA, 134 S.Ct. 2427 (2014)* ("*UARG")*. The Court held that EPA may not treat GHGs as an air pollutant for purposes of determining whether a source is a major source required to obtain a PSD or title V permit. The Court also held that PSD permits that are otherwise required (based on emissions of other pollutants) may continue to require limitations on GHG emissions based on the application of Best Available Control Technology (BACT). In accordance with the Supreme Court decision, on April 10, 2015, the D.C. Circuit issued an amended judgment in *Coalition for Responsible Regulation, Inc. v. Environmental Protection Agency,* Nos. 09-1322, 10-073, 10-1092 and 10-1167 (D.C. Cir. April 10, 2015), which, among other things, vacated the PSD and title V regulations under review in that case to the extent that they require a stationary source to obtain a PSD or title V permit solely because the source emits or has the potential to emit GHGs above the applicable major source thresholds. The D.C. Circuit also directed EPA to consider whether any further revisions to its regulations are appropriate in light of *UARG*, and if so, to undertake to make such revisions. In response to the Supreme Court

decision and the D.C. Circuit's amended judgment, the EPA intends to conduct future rulemaking action to make appropriate revisions to the PSD and operating permit rules.

Additionally, South Coast AQMD's BACT Guidelines: *"Part E – Policy and Procedures for Facilities Subject to Prevention of Significant Determinations for Greenhouse Gases (February 2, 2024)"* list PSD applicability determination for new and modified sources in Tables 7 and 8. Table 7 states that PSD applies to GHG if: (1) the source is otherwise subject to PSD for another regulated NSR pollutant, AND (2) the source has a GHG PTE ≥ 75,000 tpy CO_2e. Table 8 states that PSD applies to GHG if: (1) the modification is otherwise subject to PSD for another regulated NSR pollutant, AND (2) the modification results in a GHG emissions increase and net emissions increase of ≥ 75,000 tpy CO_2e, and > zero tpy mass basis.

Since BWP is not subject to PSD for another regulated NSR pollutant as evaluated in Rule 1703, this rule does not apply.

Reg. XX: Regional Clean Air Incentives Market (RECLAIM)

Rule 2005: New Source Review for RECLAIM (Amended November 5, 2021)

This rule sets forth pre-construction review requirements for new facilities subject to the requirements of the RECLAIM program, for modifications to RECLAIM facilities, and for facilities which increase their allocation to a level greater than their starting Allocation plus non-tradable credits. The purpose of this rule is to ensure that the operation of such facilities does not interfere with progress in attainment of the National Ambient Air Quality Standards, and that future economic growth in the South Coast Air Basin is not unnecessarily restricted.

2005(b)(1)(A)-BACT:

A detailed analysis was provided under Rule 1303 BACT analysis. The current NOx limit for the turbine is 2 ppm, 3 hour average, at 15% O2. The facility is proposing to change the averaging time from 3 hours to 1 hour to comply with BACT.

2005(b)(1)(B)-Modeling:

The facility is located in the South Coast air basin, an area that is in attainment of NO2 emissions. Rule 2005(c)(1)(B) requires the facility to conduct a modeling analysis to demonstrate the proposed NOx emissions will not cause a violation of the ambient air quality standards.

The ambient air quality standards for NO_2 are the 1-hour federal standard of 188 $\mu g/m^3$ based on 98th percentile of the last three year average, the 1-hour California standard of 339 $\mu g/m^3$, the annual federal standard of 100 $\mu g/m^3$ and annual California standard of 57 $\mu g/m^3$. It may be noted that for NO_2, the form of 1-hr CAAQS and NAAQS are different. The form for the 1-hr NO_2 NAAQS is the 3-year average of the 98th percentile of the annual distribution of daily maximum 1-hour average concentrations whereas for the

CAAQS, it is based on the monitored NO_2 1-hr average concentrations. The background air quality data from the East San Fernando Valley [North Hollywood (NOHO): 060374010] for years 2021-2023 are used in the modeling analysis.

The modeled annual impact is shown in the next table. It does not cause a violation of any ambient air quality standards.

	Background ($\mu g/m^3$)	Modeling Impacts ($\mu g/m^3$)	Total NOx ($\mu g/m^3$)	Air Quality Standard ($\mu g/m^3$)	Violation
1-hr NAAQS	89.4	29.0	118.40	188	No
1-hr CAAQS	122.9	43.41	166.31	339	No
Annual NAAQS	26.10	0.26	26.36	100	No
Annual CAAQS	26.10	0.26	26.36	57	No

2005(c)(2)-Offsets:

The facility is required to demonstrate that it holds sufficient RTCs to offset the annual emission increase for the first year of operation using a 1-to-1 offset ratio.

As calculated, the total NOx RTC requirement for the 1st year of operation is 137,099 lbs. This requirement is based on the emissions from the recommissioning and annual operating schedule provided by the facility. After the 1st year, the project will require 138,389 lbs of NOx RTC per year. It must be noted that post 1st year emissions will be higher than 1st year emissions.

BWP will either purchase the required NOx RTCs form the open market or use credits from the existing MPP. Compliance with the offset requirement is expected.

2005(g)-Additional Federal Requirements for Major Stationary Sources:

Rule 2005(g) requires that a major source also comply with the following requirements:

- Certify that all major sources in the state under control of the applicant are in compliance with all applicable federal emissions standards.
- Submit an analysis of alternative sites, sizes, production processes, and environmental control techniques for the proposed source.
- Conduct a visibility analysis if NOx emissions are over 40 tpy and the location of the source relative to a Class I area is within the distances specified in Table C-1 of the rule.

All major sources that are under the control of BWP are expected to be in compliance with all federal emission standards. An amendment to the California Energy Commission, Application for Certification (AFC) is being prepared for this project. The

AFC process is a certified regulatory program under the CEQA. Additionally, NOx emissions from the turbine do not exceed 40 tons per year. Therefore, the above three requirements have been met.

Rule 2012: Requirements for Monitoring, Reporting, and Recordkeeping for Oxides of Nitrogen (NOx) (Amended November 3, 2023)

The purpose of this rule is to establish the monitoring, reporting and recordkeeping requirements for NOx emissions under the RECLAIM program.

The turbine is a major NOx source under RECLAIM. As a major NOx source, the turbine is required to install and maintain a CEMS, which includes both NOx and O2 analyzers, a data handling system, a recording system, and a fuel meter. NOx emissions are required to be reported by electronic transmission daily, and the facility must submit monthly and annual NOx reports.

The turbine is equipped with a CEMS and has been reporting their emissions as required under this rule. Continued compliance is expected.

Reg. XXX: Title V Permits

The Title V permit system is the air pollution control permit system required to implement the federal Operating Permit Program as required by Title V of the federal Clean Air Act as amended in 1990. This regulation defines permit application and issuance procedures as well as compliance requirements associated with the program. As required by Title V of the federal Clean Air Act, the Title V permits include all of the emission limits, applicable requirements and operating conditions imposed on the equipment. Title V facilities are required to certify compliance with the Title V permits in addition to recordkeeping and mandatory reporting of any deviation from the permit conditions.

Burbank Water & Power, SCPPA is subject to Reg XXX, and an initial Title V permit was issued to this facility on 8/19/99. The Title V permit was last renewed on 1/10/20 under A/N 614246. Renewal of the Title V permit is currently pending under A/N 653998. Under this regulation, a person shall not modify equipment located at a Title V facility without first obtaining a Title V permit which allows for such modification. Permit revisions are classified as Administrative, Minor, De Minimis Significant, and Significant. The proposed revision for the modified turbine is a significant revision of the facility's Title V permit.

Rule 3000 General (Amended November 5, 2010)

The scope of the permit revision is to implement turbine upgrades at the facility. This modification will result in an increase in NOx, CO, and VOC emissions.

Paragraph (b)(31)(D) defines significant permit revision as any modification at a RECLAIM facility that results in an emissions increase of RECLAIM pollutants over

the facility's starting allocation plus the nontradeable allocations. Per Rule 2005(d), an emission increase occurs if a source's maximum hourly potential to emit immediately prior to the proposed modification is less than the source's post-modification maximum hourly potential to emit. As summarized earlier, hourly NOx emissions will increase from this modification. Therefore, this permit revision is considered significant.

Rule 3003: Applications (Amended November 5, 2010)

Pursuant to Rule 3003(j), a proposed permit incorporating this permit revision will be submitted to EPA for a 45-day review. Pursuant to Rule 3003(m), the public notice will be sent to the affected states (Pechanga and Pala Band of Indians).

Rule 3006: Public Participation (Amended March 1, 2019)

This proposed Title V facility permit renewal application will comply with the public participation procedures provided in this rule. The required Title V public notice will be distributed in accordance with Rule 3006(a)(1)(A).

Pursuant to 3006(a)(1)(D), any person wishing to comment on the air quality elements of the permits must submit comments in writing to the South Coast AQMD within at least 30 days of the publication of the notice.

Pursuant to Rule 3006(a)(1)(F), any person may request a proposed permit hearing on this application by filing with the Executive Officer a complete Hearing Request Form (500G) for a proposed hearing within 15 days of the publication of the notice. The deadline for a hearing request is included in the published public notice.

FEDERAL REGULATIONS:

40 CFR 60: Subpart Da – Standards of Performance for Electric Utility Steam Generating Units

Per 60.40Da(e)(1) affected facilities associated with a stationary combustion turbine that are capable of combusting more than 73 MW (250 MMBtu/h) heat input of fossil fuel are subject to this subpart except in cases when the affected facility meets the applicability requirements and is subject to subpart KKKK.

The associated HRSG and duct burner is subject to subpart KKKK and therefore, this subpart does not apply.

40 CFR 60: Subpart GG – Standards of Performance for Stationary Gas Turbines

This subpart applies to all stationary gas turbines that were constructed, modified, or reconstructed after October 3, 1997 and with a heat input at peak load equal to or greater than 10.7 gigajoules (10 million Btu) per hour. However, gas turbines that are subject to the requirements of Subpart KKKK are exempt from this subpart. The gas

turbine is subject to Subpart KKKK due to the proposed modification and thus exempt from this subpart.

40 CFR 60: Subpart KKKK – Standards of Performance for Stationary Combustion Turbines

This subpart applies to all stationary combustion turbines that were constructed, modified, or reconstructed after February 18, 2005 and with a heat input at peak load equal to or greater than 10.7 gigajoules (10 million Btu) per hour.

60.4320(a) requires turbines to meet the NOx limit specified in Table 1 of this subpart. Table 1 has a NOx limit of 15 ppm @ 15% O2 for new, modified, or reconstructed turbines firing natural gas rated > 850 MMBtu/h. The turbine is rated at 2,103 MMBtu/hr and is subject to a more stringent NOx BACT limit of 2.0 ppm @ 15% O2. Compliance is expected.

60.4330(a)(2) requires turbines to not burn any fuel which contains total potential sulfur emissions in excess of 26 ng SO2/J (0.060 lb SO2/MMBtu) heat input. The turbine will be fired on commercial grade natural gas which contains less sulfur than the limit. Compliance is expected.

This rule requires demonstration of compliance with the NOx limit. The gas turbine does not use water or steam injection and is subject to §60.4340. The operator can either conduct annual performance tests or install continuous monitoring systems (CEMS). The turbine utilizes a NOx CEMS as required per Rule 2012. Compliance is expected.

Demonstration of compliance with the SO_2 limit is required by monitoring the fuel sulfur in the combustion fuel. For natural gas fueled gas turbines, monitoring is not required if the fuel sulfur is less than 20 grains per 100 scf natural gas. The facility will use pipeline quality natural gas that has less than 1 grain per 100 scf natural gas. Thus, fuel sulfur monitoring is not required.

40 CFR 60: Subpart TTTT – Standards of Performance for Greenhouse Gas Emissions for Electric Generating Units

This subpart applies to stationary combustion turbines that commence construction after January 8, 2014, but on or before May 23, 2023, or commences reconstruction after June 18, 2014, but on or before May 23, 2023.

40 CFR 60 Subpart A – General Provisions defines "reconstruction" as the following:

> *(b) "Reconstruction" means the replacement of components of an existing facility to such an extent that:*

(1) The fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable entirely new facility, and

(2) It is technologically and economically feasible to meet the applicable standards set forth in this part.

(c) "Fixed capital cost" means the capital needed to provide all the depreciable components.

The turbine was constructed in 2003. Furthermore, according to the facility, this upgrade will be about $72 million. However, it will cost around $750 million to build an entirely new plant of this capacity. Because the upgrade cost for the turbine ($72 million) does not exceed the 50% of the $750 million costs for building and entirely new plant, this project is not considered a "reconstruction" as defined above. Therefore, the turbine will not be subject to this subpart.

40 CFR 63: Subpart YYYY – National Emissions Standards for Hazardous Air Pollutants for Stationary Combustion Turbines

The purpose of this part is to establish emission and operation limitations for hazardous air pollutants (HAP) emissions from stationary combustion turbines located at major sources of HAP emissions. §63.6085(b) defines a major source of HAP emissions as a contiguous site that emits or has potential to emit (PTE) any single HAP at a rate of 10 tons or more per year and any combination of HAP at a rate of 25 tons or more per year.

SCPPA is not considered a major source of HAP emissions. The reported TAC emission for 2023 are tabulated below:

Pollutant	Annual Emissions (lbs/year)	Annual Emissions (tons/year)
1,3-Butadiene	4.764	0.002
Acetaldehyde	443.195	0.222
Acrolein	70.933	0.035
Ammonia	3488.569	1.744
Arsenic	0.001	5.00E-07
Benzene	133.007	0.067
Cadmium	0	0
Chromium (VI)	0	0
ETHYL BENZENE	354.6	0.177
Formaldehyde	7866.296	3.933
HEXANE	0.044	2.20E-05
Lead (inorganic)	0	0
Naphthalene	14.413	7.21E-03
Nickel	0.004	2.00E-06

PAHs, total, with components not reported	9.974	0.005
Propylene oxide	321.294	0.161
Toluene	1440.551	0.720
Xylenes	709.261	0.355
Total	14856.906	7.43

40 CFR 64: Compliance Assurance Monitoring (Amended January 1, 2017)

The CAM regulation applies to emission units at major stationary sources required to obtain a Title V permit, which use control equipment to achieve a specified emission limit and which have emissions that are at least 100% of the major source thresholds on a pre-control basis (NOx & VOC = 10 tpy, CO = 50 tpy, PM10 = 100 tpy, and SOx = 100 tpy). The rule is intended to provide "reasonable assurance" that the control systems are operating properly to maintain compliance with the emission limits. The SCPPA turbine has emissions that exceed the major source thresholds on a pre control basis for NOx, CO, and VOC (but not PM10 or SOx), the turbine is subject to an emission limit for NOx, CO, and VOC, and the turbine uses control equipment to meet these limits.

NOx

- Emission Limit – NOx is subject to a 2.0 ppm 1 hour BACT limit
- Control Equipment – NOx is controlled with the SCR
- ✓ Requirement – As a NOx major source under RECLAIM, the turbine is required to have CEMS under Rule 2012. The use of a continuous monitor to show compliance with an emission limit is exempt from CAM under 64.2(b)(1)(vi).

CO

- Emission Limit – CO is subject to a 2.0 ppm 1 hour BACT limit
- Control Equipment – CO is controlled with the oxidation catalyst.
- ✓ Requirement – The turbine is required to have a CO CEMS by permit condition. The use of a continuous monitor to show compliance with an emission limit is exempt from CAM under 64.2(b)(1)(vi).

VOC

- Emission Limit – VOC is subject to a 2.0 ppm 1 hour BACT limit
- Control Equipment – VOC is controlled with the oxidation catalyst.
- ✓ Requirement – The facility is required to maintain a CO CEMS which is an indicator of the operating condition of the oxidation catalyst. The use of a continuous monitor to show compliance with an emission limit is exempt from CAM under 64.2(b)(1)(vi).

6. COMPLIANCE HISTORY

The South Coast AQMD compliance database shows 0 Notices to Comply and 0 Notices of Violation for this facility in the last 5 years.

CONCLUSION AND RECOMMENDATION

Permit Conditions

The following changes to the permit conditions are recommended:

~~A63.1~~ **A63.2**
The operator shall limit emissions from this equipment as follows:

CONTAMINANT	EMISSION LIMIT
CO	~~**9243**~~ **10,765** LBS IN ANY ONE MONTH
PM10	~~**9552**~~ **8,293** LBS IN ANY ONE MONTH
VOC	~~**3744**~~ **4,343** LBS IN ANY ONE MONTH
SOX	~~**1022**~~ **945** LBS IN ANY ONE MONTH

The above limit applies once the equipment commences commercial operation after the recommissioning is complete.

The operator shall calculate the emission limit(s) The operator shall calculate the emission limit(s) by using the monthly fuel use data and the following emissions factors: PM10 with duct firing = ~~**7.98**~~ **5.37** lb/MMscf, PM10 without duct firing = ~~**6.93**~~ **5.20** lb/MMscf, VOC with duct firing = 2.69 lb/MMscf, VOC without duct firing = 2.69 lb/MMscf, VOC startups = ~~**30**~~ **35** lb/event, VOC shutdown = ~~**17**~~ **20** lb/event, SOx = ~~**0.75**~~ **0.60** lb/MMscf.

The operator shall calculate the emission limit(s) for CO based upon the readings from the AQMD certified CEMS. In the event the CO CEMS is not operating or the emissions exceed the valid upper range of the analyzer, the emissions shall be calculated in accordance with the approved CEMS plan.

For the purposes of this condition, the limit(s) shall be based on the total combined emissions from equipment D4 (Gas Turbine 1) and D6 (Duct Burner).
[RULE 1303(b)(2)-Offset, 5-10-1996, Rule 1313(g)]
[Devices subject to this condition : D4, D6]

A99.1

The 0.005 lb/MMBtu PM10 emission limit(s) shall only apply to gas turbine operation without the duct burner. The 0.006 lb/MMBtu emission limit shall only apply to gas turbine operation with the duct burner.

[Rule 1303(b)(2)-Offset]
[Devices subject to this condition: D4, D6]

~~A195.2~~ **A195.5**
The 2 PPMV NOX emission limit(s) is averaged over ~~3~~ **1** hour~~s~~ at 15 percent oxygen, dry.

The 2.0 PPM NOX emission limit shall not apply during startup, recommissioning, and shutdown periods. Startup time shall not exceed 6 hours per startup per day. NOx emissions during the 6 hours after commencement of a start up shall not exceed ~~440~~ **518** lbs. Shutdown time shall not exceed 30 minutes per shutdown per day. NOx emissions during the 30 minutes prior to the conclusion of a shutdown shall not exceed ~~25~~ **29** lbs. The operator shall limit the number of start ups to 5 per month.

The operator shall keep records of the date, time and duration as well as minute by minute data (NOx, CO and O2 concentration and fuel flow rate at a minimum) of each startup and shutdown~~.~~

Recommissioning is a one time event that shall not exceed 201 turbine operating hours and 271 mmscf of fuel use. Once started, the recommissioning shall be completed within 60 days, unless an extension is granted by the Executive Officer.

The NOx emissions during recommissioning shall not exceed 3146 total lbs as determined through the use of the certified CEMS. The operator shall keep records of the date and time the turbine is operated during recommissioning, the duration of the operation, the fuel use and the NOx and CO emissions.

The operator shall notify AQMD prior to the start of the recommissioning operation and at the conclusion of the recommissioning operation.
[RULE 2005, 6-3-2011]
[Devices subject to this condition: D4, D6]

~~A195.3~~ **A195.6**
The 2 PPMV CO emission limit(s) is averaged over 1 hour at 15 percent oxygen, dry.

The 2.0 PPM CO emission limit shall not apply during startup, recommissioning, and shutdown periods. Startup time shall not exceed 6 hours per startup per day. CO emissions during the 6 hours after commencement of a start up shall not exceed **588** lbs. Shutdown time shall not exceed 30 minutes per shutdown per day. CO emissions during the 30 minutes prior to the conclusion of a shutdown shall not exceed ~~120~~ **141** lbs. The operator shall limit the number of start ups to 5 per month.

The operator shall keep records of the date, time and duration as well as minute by minute data (NOx, CO and O2 concentration and fuel flow rate at a minimum) of each startup and shutdown~~.~~

Recommissioning is a one time event that shall not exceed 201 turbine operating hours and 271 mmscf of fuel use. Once started, the recommissioning shall be completed within 60 days, unless an extension is granted by the Executive Officer.

The CO emissions during recommissioning shall not exceed 8863 lbs total as determined by the certified CEMS. The operator shall keep records of the date and time the turbine is operated

during recommissioning, the duration of the operation, the fuel use, and the NOx and CO emissions.

The operator shall notify AQMD prior to the start of the recommissioning operation and at the conclusion of the recommissioning operation.
[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002]
[Devices subject to this condition: D4, D6]

~~A195.4~~ **A195.7**
The 2 PPMV VOC emission limit(s) is averaged over 1 hour at 15 percent, dry.

This emission limit shall not apply during startup, recommissioning, and shutdown periods.

[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002]
[Devices subject to this condition: D4, D6]

C1.5
The operator shall limit the fuel usage to no more than 14,939 MM cubic feet per year.

For the purpose of this condition, the limit shall be based on the total combined fuel usage from equipment D4 (Gas Turbine 1) and D6 (Duct Burner).

[Rule 1303(b)(1)-Modeling]
[Devices subject to this condition : D4, D6]

~~C1.4~~ **C1.6**
The operator shall limit the operating time to no more than ~~8322~~ **8508** hour(s) in any one year.
[RULE 1303(b)(1)-Modeling, 5-10-1996; RULE 1303(b)(1)-Modeling, 12-6-2002;
RULE 2005, 6-3-2011]
[Devices subject to this condition : D4]

D29.4
The operator shall conduct source test(s) for the pollutant(s) identified below.

Pollutant to be Tested	Required Test Method(s)	Averaging Time	Test Location
VOC emissions	Approved District Method	1 hour	Outlet of the SCR
PM10 emissions	Approved District Method	District Approved Avg. Time	Outlet of the SCR
NH3 emissions	District Method 207.1	1 hour	Outlet of the SCR

The test shall be conducted within 180 days after the recommissioning, unless an extension is approved by the Executive Officer.

The source test is to demonstrate compliance with the 2 ppmv VOC and 5 ppmv NH3 limits, and applicable PM10 emission limits.

The source test shall be conducted at maximum achievable equipment load, with and without duct burner firing.

The test shall be conducted to determine the oxygen levels in the exhaust. In addition, the tests shall measure the fuel flow rate (CFH), the flue gas flow rate. The combined gas turbine and steam turbine generating output in MW shall also be recorded if applicable.

The test shall be conducted in accordance with a District approved source test protocol.

For gas turbines only the VOC test shall use the following method: a) Stack gas samples are extracted into Summa canisters, maintaining a final canister pressure between 400-500 mm Hg absolute, b) Pressurization of Summa canisters is done with zero gas analyzed/certified to having less than 0.05 ppmv total hydrocarbons as carbon, and c) Analysis of Summa canisters is per EPA Method TO-12 (with pre-concentration) and the canisters temperature when extracting samples for analysis is not below 70 degrees F.

The use of this alternative VOC test method is solely for the determination of compliance with the VOC BACT level of 2.0 ppmv calculated as carbon for natural gas fired turbines. The test results must be reported with two significant digits.

Source test results shall be submitted to the SCAQMD no later than 60 days after the source test was conducted.

[Rule 1303 – BACT, Rule 1303 – Offsets, Rule 2005]

[Device subject to this condition: D4]

~~I298.1~~ **I298.3**

This equipment shall not be operated unless the facility holds ~~**132444**~~ **134567** pounds of NOx RTCs in its allocation account to offset the annual emissions increase for the first year of operation. The RTCs held to satisfy the first year of operation portion of this condition may be transferred only after one year from the initial start of operation. In addition, this equipment shall not be operated unless the operator demonstrates to the Executive Officer that, at the commencement of each compliance year after the start of operation, the facility holds ~~**132444**~~ **134738** pounds of NOx RTCs valid during that compliance year. RTCs held to satisfy the compliance year portion of this condition may be transferred only after the compliance year for which the RTCs are held. If the initial or annual hold amount is partially satisfied by holding RTCs that expire midway through the hold period, those RTCs may be transferred upon their respective expiration dates. This hold amount is in addition to any other amount of RTCs required to be held under other condition(s) stated in this permit.

[RULE 2005, 6-3-2011]

[Devices subject to this condition : D4]

DUCT BURNER CONDITIONS

~~I298.2~~ **I298.4**

This equipment shall not be operated unless the facility holds ~~**4300**~~ **3651** pounds of NOx RTCs in its allocation account to offset the annual emissions increase for the first year of operation. The RTCs held to satisfy the first year of operation portion of this condition may be transferred only after one year from the initial start of operation. In addition, this equipment shall not be operated unless the operator demonstrates to the Executive Officer that, at the commencement of each compliance year after the start of operation, the facility holds ~~**4300**~~ **3651** pounds of NOx RTCs valid during that compliance year. RTCs held to satisfy the compliance year portion of this condition may be transferred only after the compliance year for which the RTCs are held. If the initial or annual hold amount is partially satisfied by holding RTCs that expire midway through the hold period, those RTCs may be transferred upon their respective expiration dates. This hold amount is in addition to any other amount of RTCs required to be held under other condition(s) stated in this permit.

[RULE 2005, 6-3-2011]

[Devices subject to this condition : D6]

Appendix A

Criteria Pollutant Calculations

Emission Factors

Pollutant	Emission Factor	Source
NOx	2.0 ppmv	Manufacturer guarantee
CO	2.0 ppmv	Manufacturer guarantee
VOC	2.0 ppmv	Manufacturer guarantee
PM10 (GT)	0.00495 lbs/mmbtu	Applicant
PM10 (Duct Burner)	0.0057 lbs/mmbtu	Applicant
SOx	0.6 lbs/mmscf	Applicant
NH3	5.0 ppm	Manufacturer guarantee

Data

GT rated heat input	=	2,103 mmbtu/hr
Duct burner rated heat input	=	583 mmbtu/hr
F Factor	=	8710 scf/mmbtu @ 0% O2
Fuel HHV	=	1050 btu/cf
NO2 MW	=	46 lbs/lb-mole
CO MW	=	28 lbs/lb-mole
VOC MW	=	16 lbs/lb-mole
Specific Molar Volume	=	385 ft3/lb-mole

GT Calculated exhaust rate	=	2103*8710*(20.9/5.9)	=	64.89 mmscf/hr
DB calculated exhaust rate	=	583*8710*(20.9/5.9)	=	17.99 mmscf/hr
Combined exhaust rate			=	82.87 mmscf/hr

GT calculated fuel use	=	2103/1050	=	2.003 mmscf/hr
DB calculated fuel use	=	583/1050	=	0.555 mmscf/hr
Combined fuel use			=	2.558 mmscf/hr

Emission Rates, Base Load Operation

Pollutant	GT Emission Rate		DB Emission Rate	Total	
	lbs/hr	lbs/MMscf	lbs/hr	lbs/hr	lbs/MMscf
NOx	15.51	7.74	4.30	19.80	7.74
CO	9.44	4.71	2.62	12.05	4.71
VOC	5.39	2.69	1.50	6.89	2.69

PM10	10.41	5.20	3.32	13.73	5.37
SOx	1.20	0.60	0.33	1.53	0.60
NH3	14.33	7.15	3.97	18.30	7.15

Sample Calculations

NOx (GT) = [2.0*8710*2103*(20.9/5.9)*46]/385E6
= 15.51 lbs/hr

PM10 (GT) = 0.00495 *2103
= 10.41 lbs/hr

Emission Rates, Start Ups and Shutdowns (Pre-Modification)[1]

Pollutant	Start Up Emission Rate	Total Start Up Emissions (6 hrs/event)	Shutdown Emission Rate	Total Shutdown Emissions (0.5 hrs/event)
	lbs/hr	lbs/event	lbs/hr	lbs/event
NOx	73.33	440	50	25
CO	83.33	500	240	120
VOC	5.00	30	34	17
PM10	11.79	70.74	11.79	5.90
SOx	1.28	7.68	1.28	0.64

[1] *All start up and shutdown emissions rates provided by the applicant, reference A/N 386305*

Emission Rates, Uncontrolled (Pre-Modification)[1]

Pollutant	Uncontrolled GT Emission Rate	Uncontrolled DB Emission Rate	Total
	lbs/hr	lbs/hr	lbs/hr
NOx	63	61	124
CO	73	31	104
VOC	14.1	3	17.1
PM10	11.79	4.43	16.22
SOx	1.28	0.42	1.7

[1] *All uncontrolled emissions rates provided by the manufacturer, reference A/N 386305*

Emission Rates, Start Ups and Shutdowns (Post-Modification)

Pollutant	Start Up Emission Rate	Total Start Up Emissions (6 hrs/event)	Shutdown Emission Rate	Total Shutdown Emissions (0.5 hrs/event)

	lbs/hr	lbs/event	lbs/hr	lbs/event
NOx	86.30	517.78	58.84	29.42
CO	98.07	588.39	282.44	141.22
VOC	5.88	35.30	40.01	20.01
PM10[1]	10.41	62.46	10.41	5.20
SOx[1]	1.20	7.21	1.20	0.60

[1]*Start Up and Shutdown emission rates for PM10 and SOx were assumed to be the same as that of base load operation*

Sample Calculation

NOx (start up emission rate) = 73.33*(2103/1787) = 86.30 lbs/hr

Emission Rates, Uncontrolled (Post-Modification)

Pollutant	Uncontrolled GT Emission Rate	Uncontrolled DB Emission Rate	Total
	lbs/hr	lbs/hr	lbs/hr
NOx	74.14	71.79	145.93
CO	85.91	36.48	122.39
VOC	16.59	3.53	20.12
PM10[1]	10.41	3.32	13.73
SOx[1]	1.20	0.33	1.53

[1]*Uncontrolled emission rates for PM10 and SOx were assumed to be the same as controlled emission rates during base load operation*

Sample Calculation

NOx (uncontrolled GT) = 63*(2103/1787) = 74.14 lbs/hr

Maximum Daily Emissions

A. Current PTE Calculation (Pre Modification Emissions)

The scenario which results in the highest daily emissions is assumed for each pollutant. For NOx CO, and VOC, maximum daily emissions are calculated assuming 1 start up at the beginning of the day, ½ hour shutdown at the end of the day, and full load operation for the remaining hours of the day, with duct firing for a maximum of 12 hours per day as limited by permit condition. For PM10, and SOx, maximum daily emissions are based on 24 hrs/day base load operation.

Pollutant	Uncontrolled Daily Emissions, lbs/day	Controlled Daily Emissions, lbs/day
NOx	2299.5	747.3
CO	2269.5	791.8
VOC	268.7	145.2

PM10	336.1	336.1
SOx	35.8	35.8
NH3	382.3	382.3

Calculations

NOx uncontrolled = 517.78 lbs + 124 lbs/hr*12 hrs + 63 lbs/hr*5.5 hrs + 25 lbs = 2299.5 lbs
NOx controlled = 440 lbs + 17.48 lbs/hr*12 hrs + 13.18*5.5 hrs + 25 lbs = 747.3 lbs

CO uncontrolled = 500 lbs + 104 lbs/hr*12 hrs + 73 lbs/hr*5.5 hrs + 120 lbs = 2269.5 lbs
CO controlled = 500 lbs + 10.64 lbs/hr*12 hrs + 8.02 lbs/hr*5.5 hrs + 120 lbs = 791.8 lbs

VOC controlled = 30 lbs + 6.08 lbs/hr*12 hrs + 4.58 lbs/hr*5.5 hrs + 17 lbs = 145.2 lbs

PM10 controlled = 16.22 lbs/hr*12 hrs + 11.79 lbs/hr*12 hrs = 336.1 lbs

B. Maximum Daily Normal Operation Emissions (Post-Modification Emissions)

The scenario which results in the highest daily emissions is assumed for each pollutant. For NOx CO, and VOC, maximum daily emissions are calculated assuming 1 start up at the beginning of the day, ½ hour shutdown at the end of the day, and full load operation for the remaining hours of the day, with duct firing for a maximum of 12 hours per day as limited by permit condition. For PM10, and SOx, maximum daily emissions are based on 24 hrs/day base load operation.

Pollutant	Uncontrolled Daily Emissions, lbs/day	Controlled Daily Emissions, lbs/day
NOx	2706.1	870.1
CO	2670.8	926.2
VOC	388.1	167.6
PM10	289.7	289.7
SOx	32.8	32.8
NH3	391.5	391.5

Calculations

NOx uncontrolled = 517.78 lbs + 145.93 lbs/hr*12 hrs + 74.14 lbs/hr*5.5 hrs + 29.42 lbs = 2706.1 lbs
NOx controlled = 517.78 lbs + 19.80 lbs/hr*12 hrs + 15.51*5.5 hrs + 29.42 lbs = 870.1 lbs

CO uncontrolled = 588.39 lbs + 122.39 lbs/hr*12 hrs + 85.91 lbs/hr*5.5 hrs + 141.22 lbs = 2670.8 lbs
CO controlled = 588.39 lbs + 12.05 lbs/hr*12 hrs + 9.44 lbs/hr*5.5 hrs + 141.22 lbs = 926.2 lbs

VOC uncontrolled = 35.30 lbs + 20.12 lbs/hr*12 hrs + 16.59 lbs/hr*5.5 hrs + 20.01 lbs = 388.1 lbs
VOC controlled = 35.30 lbs + 6.89 lbs/hr*12 hrs + 5.39 lbs/hr*5.5 hrs + 20.01 lbs = 167.6 lbs

PM10 uncontrolled = 13.73 lbs/hr*12 hrs + 10.41 lbs/hr*12 hrs = 289.7 lbs
PM 10 controlled = 13.73 lbs/hr*12 hrs + 10.41 lbs/hr*12 hrs = 289.7 lbs

SOx uncontrolled = 1.53 lbs/hr*12 hrs + 1.20 lbs/hr*12 hrs = 32.8 lbs
SOx controlled = 1.53 lbs/hr*12 hrs + 1.20 lbs/hr*12 hrs = 32.8 lbs

C. Maximum Daily Recommissioning Emissions (Post-Modification Emissions)

The applicant provided a breakdown of the daily recommissioning activities and the estimated emissions for NOx, CO, PM10 and SOx.

Pollutant	Maximum Recommissioning Daily Emissions, lbs/day
NOx	857 (Day 5)
CO	4166 (Day 5)
VOC	589 (Day 5)
PM10	231 (Day 11)
SOx	32 (Day 11)
NH3	244.27 (Day 2,3)

Highest Daily Emissions

Pollutant	Operating Scenario	Emissions, lbs/day
NOx	Baseload Operation with Duct Firing	870.1
CO	Recommissioning (Day 5)	4,166
VOC	Recommissioning (Day 5)	589
PM10	Baseload Operation with Duct Firing	289.7
SOx	Baseload Operation with Duct Firing	32.8
NH3	Baseload Operation with Duct Firing	391.5

Change in Maximum Daily Emissions Pre-Modification vs Post Modification

Pollutant	Pre Modification Daily PTE Emissions	Post Modification Daily PTE Emissions	Change
NOx	747.3	870.1	+122.8
CO	791.8	4,166	+3,374.2
VOC	145.2	589	+443.8
PM10	336.1	289.7	-46.4
SOx	35.8	32.8	-3
NH3	382.3	391.5	+9.2

Monthly Emissions

A. Current PTE Calculation (Pre Modification Emissions)

The scenario which results in the highest monthly emissions is assumed for each pollutant. For NOx, CO and VOC monthly emissions are based on 5 starts ups per month (and 5 shutdowns), with the remaining hours in base load operation (240 hrs with duct firing, 447.5 hrs without duct firing). For PM10 and SOx, monthly emissions are based on 720 hours in baseload operation (240 hrs with duct firing, 480 hrs without duct firing) and no start ups or shutdowns.

Pollutant	Total Monthly Emissions	30-Day Average Emissions
NOx	12,418	414
CO	9,243	308
VOC	3,744	125
PM10	9,552	318
SOx	1,022	34

Calculations

NOx = 440 lbs/start*5 starts + 17.48 lbs/hr*240 hrs + 13.18 lbs/hr*447.5 hrs + 25 lbs/shutdown*5 shutdowns
12418 lbs

CO = 500 lbs/start*5 starts + 10.64 lbs/hr*240 hrs + 8.02 lbs/hr*447.5 hrs + 120 lbs/shutdown*5 shutdowns
9243 lbs

VOC = 30 lbs/start*5 starts + 6.08 lbs/hr*240 hrs + 4.58 lbs/hr*447.5 hrs + 17 lbs/shutdown*5 shutdowns
3744 lbs

PM10 = 16.22 lbs/hr*240 hrs + 11.79 lbs/hr*480 hrs
9,552 lbs

SOx = 1.7 lbs/hr*240 hrs + 1.28 lbs/hr*480 hrs
1,022 lbs

B. Maximum Monthly Normal Operation Emissions (Post Modification Emissions)

The scenario which results in the highest monthly emissions is assumed for each pollutant. For NOx, CO and VOC monthly emissions are based on 5 starts ups per month (and 5 shutdowns), with the remaining hours in base load operation (240 hrs with duct firing, 447.5 hrs without duct firing). For PM10 and SOx, monthly emissions are based on 720 hours in baseload operation (240 hrs with duct firing, 480 hrs without duct firing) and no start ups or shutdowns.

Pollutant	Total Monthly Emissions	30-Day Average Emissions
NOx	14,427.5	480.9
CO	10,764.6	358.8
VOC	4,343.2	144.8
PM10	8,292.6	276.4
SOx	945.2	31.5

Calculations

NOx = 517.78 lbs/start*5 starts + 19.80 lbs/hr*240 hrs + 15.51 lbs/hr*447.5 hrs + 29.42 lbs/shutdown*5 shutdowns
14,427.5 lbs

CO = 588.39 lbs/start*5 starts + 12.05 lbs/hr*240 hrs + 9.44 lbs/hr*447.5 hrs + 141.22 lbs/shutdown*5 shutdowns
10, 764.6 lbs

VOC = 35.30 lbs/start*5 starts + 6.89 lbs/hr*240 hrs + 5.39 lbs/hr*447.5 hrs + 20.01 lbs/shutdown*5 shutdowns
4,343.2 lbs

PM10 = 13.73 lbs/hr*240 hrs + 10.41 lbs/hr*480 hrs
8,292.6 lbs

SOx = 1.53 lbs/hr*240 hrs + 1.20 lbs/hr*480 hrs
945.2 lbs

C. Maximum Monthly Recommissioning Emissions (Post Modification Emissions)

The scenario which results in the highest monthly emissions is assumed for each pollutant. The applicant provided an estimate of 252 hours of recommissioning. In order to estimate maximum monthly emissions of NOx, CO, VOC, PM10 and SOx it will be assumed that the turbine will operate the remaining hours in the month at base load with 5 start ups and 5 shutdowns (limit of 5 per month). Furthermore, it will be assumed that duct firing will occur at the maximum allowed duration of 240 hours, and the remaining base load operation will be without duct firing.

Operation Type	Duration, hours	NOx	CO	VOC	PM10	SOx
Recommissioning	252	3146.00	8863.00	1236	975	162

5 Start Ups (6 hours per start)	30	2588.91	2941.96	176.52	312.30	36.05
5 Shut Downs (0.5 hours per shutdown)	2.5	147.10	706.10	100.03	26.02	3.00
Base Load w/o duct firing	195.5	3031.28	1845.12	1054.36	2035.13	234.94
Base Load with duct firing	240	4752.88	2893.06	1653.18	3295.91	368.37
Total	720	13666.17	17249.25	4220.09	6644.35	804.36
30 Day Average		455.5	575.0	140.7	221.5	26.8

Calculations

NOx = 3146 + 517.78 lbs/start*5 starts + 19.80 lbs/hr*240 hrs + 15.51 lbs/hr*195.5 hrs + 29.42 lbs/shutdown*5 shutdowns
13666.17 lbs

CO = 8863 + 588.39 lbs/start*5 starts + 12.05 lbs/hr*240 hrs + 9.44 lbs/hr*195.5 hrs + 141.22 lbs/shutdown*3 shutdowns
17249.25 lbs

VOC = 1236 + 35.30 lbs/start*5 starts + 6.89 lbs/hr*240 hrs + 5.39 lbs/hr*195.5 hrs + 20.01 lbs/shutdown*5 shutdowns
4220.09 lbs

PM10 = 975 + 62.46 lbs/start*5 starts + 13.73 lbs/hr*240 hrs + 10.41 lbs/hr*195.5 hrs + 5.20 lbs/shutdown*5 shutdowns
6644.35 lbs

SOx = 162 + 7.21 lbs/start*5 starts + 1.53 lbs/hr*240 hrs + 1.20 lbs/hr*195.5 hrs + 0.60 lbs/shutdown*5 shutdowns
804.36 lbs

Highest Monthly Emissions

Pollutant	Operating Scenario	Total Monthly Emissions	30-Day Average Emissions
NOx	5 start+ 5 shutdowns + 240 hrs normal with duct firing + 447.5 hrs normal without duct firing	14,427.50	480.9
CO	Recommissioning + 5 start+ 5 shutdowns + 240 hrs normal with duct firing + 195.5 hrs normal without duct firing	17,249.25	575.0
VOC	5 start+ 5 shutdowns + 240 hrs normal with duct firing + 447.5 hrs normal without duct firing	4,343.16	144.8
PM10	5 start+ 5 shutdowns + 240 hrs normal with duct firing + 447.5 hrs normal without duct firing	8,292.64	276.4
SOx	5 start+ 5 shutdowns + 240 hrs normal with duct firing + 447.5 hrs normal without duct firing	945.19	31.5

Change in Monthly Emissions Pre-Modification vs. Post-Modification

	Pre Modification		Post Modification		Change	
Pollutant	Monthly Emissions	30-Day Average	Monthly Emissions	30-Day Average	Monthly Emissions	30-Day Average
NOx	12,418	414	14,427.50	480.9	+2,009.5	+66.9
CO	9,243	308	17,249.25	575.0	+8,006.25	+267.0
VOC	3,744	125	4,343.16	144.8	+599.16	+19.8
PM10	9,552	318	8,292.64	276.4	-1,259.36	-41.6
SOx	1,022	34	945.19	31.5	-76.81	-2.5

Annual Emissions (PTE)

Current annual emissions are calculated with 60 start-ups & shutdowns, 1000 hours of baseload operation with duct firing, and 6,932 hours of baseload operation without duct firing. Total annual operating hours is 8,322 hours.

Under this application, the facility is proposing to increase the annual operating hours from 8,322 hours to 8,508 hours. Thus, hours of baseload operation without duct firing will increase from 6,932 hours to 7,118 hours. The number of start-ups & shutdowns will remain at 60 and hours of baseload operation with duct firing will remain at 1,000 hours.

Additionally, the facility is proposing to operate at a capacity factor of 84.9%. The maximum annual heat input at 100% load is 18,475,324 MMBtu ((7,508 hours * 2,103 MMBtu/hr) + (1,000 hours * 2,686 MMBtu/hr)). Assuming a capacity factor limit of 84.9%, the maximum annual heat input will be 15,685,550 MMBtu. Thus, the maximum fuel usage will be 14,938 MMscf. A condition to limit total fuel usage will be added to enforce the capacity factor limit of 84.9%.

A. Current PTE Calculation (Pre Modification Emissions)

	# of Events	Hours	NOx, lbs	CO, lbs	VOC, lbs	PM10, lbs	SOx, lbs	NH3, lbs
Start Up	60	360	26400	30000	1800	4244	461	0
Shutdown	60	30	1500	7200	1020	354	38	0
GT Baseload	/////////	6932	91364	55595	31749	81728	8873	84362
GT + DB Baseload	/////////	1000	17480	10640	6080	16220	1700	16150
Totals		8,322	136,744	103,435	40,649	102,546	11,072	100,512

Calculations

NOx = 440 lbs/start*60 starts + 17.48 lbs/hr*1000 hrs + 13.18 lbs/hr*6932 hrs+ 25 lbs/shutdown*60 shutdowns
136744 lbs

CO = 500 lbs/start*60 starts + 10.64 lbs/hr*1000 hrs + 8.02 lbs/hr*6932 hrs + 120 lbs/shutdown*60 shutdowns
103435 lbs

VOC = 30 lbs/start*60 starts + 6.08 lbs/hr*1000 hrs + 4.58 lbs/hr*6932 hrs + 17 lbs/shutdown*60 shutdowns
40649 lbs

PM10 = 70.74 lbs/start*60 starts + 16.22 lbs/hr*1000 hrs + 11.79 lbs/hr*6932 hrs + 5.90 lbs/shutdown*60 shutdowns
102546 lbs

SOx = 7.68 lbs/start*60 starts + 1.7 lbs/hr*1000 hrs + 1.28 lbs/hr*6932 hrs + 0.64 lbs/shutdown*60 shutdowns
11072 lbs

NH3 = 16.15 lbs/hr*1000 hrs + 12.17 lbs/hr*6932 hrs
100,512 lbs

B. Maximum Annual Emissions with Recommissioning (Post Modification Emissions)

Under this latest application, Burbank is proposing 252 hours of recommissioning operation, 6,866 hrs of baseload operation without duct firing, 1,000 of baseload operation with duct firing, along with 60 start ups and 60 shutdowns, for a total of 8,508 hrs/yr.

	# of Events	Hours	NOx, lbs	CO, lbs	VOC, lbs	PM10, lbs	SOx, lbs	NH3, lbs
Start Up	60	360	31066.97	35303.57	2118.30	3747.55	432.62	0
Shutdown	60	30	1765.25	8473.20	1200.37	312.30	36.05	0
Recommissioning[1]	/////////	252	3,146	8,863	1,236	975	162	1,936.01
GT Baseload	/////////	6,866	106459.05	64801.16	37029.24	71474.03	8250.97	98358.90777
GT + DB Baseload	/////////	1,000	19,803.66	12,054.40	6,888.23	13,732.95	1,534.86	18,296.86
Totals, lbs		8,508	162,240.94	129,495.33	48,472.13	90,241.82	10,416.50	118,591.78
Totals, lbs[1] (with 84.9% capacity factor)		8,508	138,217.60	111,279.85	41,339.48	76,762.53	8,868.07	100,976.76

[1] *Capacity factor is only applied to normal operation emissions (excludes recommissioning)*

Calculations

NOx = 3146 lbs + 517.78 lbs/start*60 starts + 19.80 lbs/hr*1,000 hrs + 15.51 lbs/hr*6,866 hrs + 29.42 lbs/shutdown*60 shutdowns
162,240.94 lbs

CO = 8863 lbs + 588.39 lbs/start*60 starts + 12.05 lbs/hr*1,000 hrs + 9.44 lbs/hr*6,866 hrs + 141.22 lbs/shutdown*60 shutdowns
129,495.33 lbs

VOC = 1236 lbs + 35.30 lbs/start*60 starts + 6.89 lbs/hr*1,000 hrs + 5.39 lbs/hr*6,866 hrs + 20.01 lbs/shutdown*60 shutdowns
48,472.13 lbs

PM10 = 975 lbs + 62.46 lbs/start*60 starts + 13.73 lbs/hr*1,000 hrs + 10.41 lbs/hr*6,866 hrs + 5.20 lbs/shutdown*60 shutdowns
90,241.82 lbs

SOx = 162 lbs + 7.21 lbs/start*60 starts + 1.53 lbs/hr*1,000 hrs + 1.20 lbs/hr*6,866 hrs + 0.60 lbs/shutdown*60 shutdowns
10,416.50 lbs

C. Maximum Annual Normal Operation Emissions (Post Modification Emissions)

The scenario which results in the highest annual emissions is assumed for each pollutant. Annual emissions are based on 60 starts ups per year (and 60 shutdowns), with the remaining hours in base load operation (1,000 hrs with duct firing, 7,118 hrs without duct firing).

	# of Events	Hours	NOx, lbs	CO, lbs	VOC, lbs	PM10, lbs	SOx, lbs	NH3, lbs
Start Up	60	360	31,066.97	35,303.57	2,118.30	3,747.55	432.62	0
Shutdown	60	30	1,765.25	8,473.20	1,200.37	312.30	36.05	0
GT Baseload	/////////	7,118	110,366.38	67,179.53	38,388.30	74,097.31	8,553.80	101,968.93
GT + DB Baseload	/////////	1,000	19,803.66	12,054.40	6,888.23	13,732.95	1,534.86	18,296.86
Totals, lbs		8,508	163,002.26	123,010.70	48,595.20	91,890.10	10,557.33	120,265.80
Totals, lbs (with 84.9% capacity factor)		8,508	138,388.92	104,436.08	41,257.33	78,014.7	8,963.17	102,105.66

Calculations

NOx = 517.78 lbs/start*60 starts + 19.80 lbs/hr*1,000 hrs + 15.51 lbs/hr*7,118 hrs + 29.42 lbs/shutdown*60 shutdowns
163,002.26 lbs

CO = 588.39 lbs/start*60 starts + 12.05 lbs/hr*1,000 hrs + 9.44 lbs/hr*7,118 hrs + 141.22 lbs/shutdown*60 shutdowns
123,010.70 lbs

VOC = 35.30 lbs/start*60 starts + 6.89 lbs/hr*1,000 hrs + 5.39 lbs/hr*7,118 hrs + 20.01 lbs/shutdown*60 shutdowns
48,595.20 lbs

PM10 = 62.46 lbs/start*60 starts + 13.73 lbs/hr*1,000 hrs + 10.41 lbs/hr*7,118 hrs + 5.20 lbs/shutdown*60 shutdowns
91,890.10 lbs

SOx = 7.21 lbs/start*60 starts + 1.53 lbs/hr*1,000 hrs + 1.20 lbs/hr*7,118 hrs + 0.60 lbs/shutdown*60 shutdowns
10,557.33 lbs

Highest Annual Emissions

Pollutant	Operating Scenario	Emissions, lbs/year
NOx	Normal Operation Year	138,388.92
CO	Recommissioning Year	111,279.85
VOC	Recommissioning Year	41,339.48
PM10	Normal Operation Year	78,014.7
SOx	Normal Operation Year	8,963.17
NH3	Normal Operation Year	102,105.66

Change in Annual Emissions Pre-Modification vs Post-Modification

Pollutant	Pre Modification Annual PTE Emissions (lbs/yr)	Post Modification Annual PTE Emissions (lbs/yr)	Change (lbs/yr)
NOx	136,744	138,388.92	+1,644.92
CO	103,435	111,279.85	+7,844.85
VOC	40,649	41,339.48	+690.48
PM10	102,546	78,014.7	-24,531.30
SOx	11,072	8,963.17	-2,108.83
NH3	100,512	102,105.66	+1,593.66

Appendix B: Recommissioning Emissions

Ammonia emissions were not estimated for recommissioning operations. It was stated that "Typical exhaust gas temperatures threshold for activation of NH3 injection is approximately 520 – 570 °F. The SCR is typically activated 15 mintutes after cold start." Therefore, it was assumed that the SCR will be in operation during the full recommissioning process. Ammonia emissions will be estimated using the fuel usage data.

Summary of Hourly Recommioning Emissions

Table 3-15
Summary of Hourly Recommissioning Emissions
(see Table 3-14 for Additional Details)

		Hourly Stack Emissions				
Day of task	**Runtime**	**NOx**	**CO**	**VOC**	**PM10**	**SOx**
	hours	**lb**	**lb**	**lb**	**lb**	**lb**
1A	5.00	104.00	393.20	63.00	3.60	0.34
1B+1C	**1.0**	95.00	736.00	99.00	4.00	0.55
1D	2.00	9.00	19.50	0.00	4.50	0.74
1E	2.00	13.50	2.50	0.50	6.00	1.06
1F	14.00	6.79	2.29	0.21	4.43	0.73
2A	9.00	13.44	2.67	0.33	6.22	1.05
2B	15.00	6.80	2.33	0.20	4.47	0.73
3A	9.00	13.44	2.67	0.33	6.22	1.05
3B	15.00	6.80	2.33	0.20	4.47	0.73
4A	9.00	9.11	19.22	0.22	4.44	0.73
4B	15.00	0.00	0.00	0.00	0.00	0.00
5A	3.00	104.00	393.33	63.00	3.67	0.34
5B	2.00	127.00	466.00	53.50	3.50	0.51
5C	2.00	61.00	1007.00	144.00	4.00	0.61
5D	2.00	13.50	2.50	0.50	4.50	0.74
5E	6.00	13.50	2.33	0.33	6.17	1.06
5F	9.00	6.78	2.33	0.22	4.44	0.73
6A	7.00	9.14	19.29	0.29	4.43	0.73
6B	2.00	13.50	2.50	0.50	6.00	1.06
6C	2.00	13.50	2.50	0.50	6.00	1.06
6D	13.00	6.77	2.31	0.23	4.46	0.73
7A	5.00	13.40	2.60	0.40	6.20	1.05
7B	5.00	9.00	19.20	0.20	4.40	0.73
7C	14.00	6.79	2.29	0.21	4.43	0.73
8A	12.00	6.83	2.33	0.25	4.50	0.73
8B	12.00	0.00	0.00	0.00	0.00	0.00
9	24.00	0.00	0.00	0.00	0.00	0.00
10A1	**2.0**	104.00	393.50	63.00	3.50	0.35
10A2+BCD	**1.0**	94.00	427.00	63.00	3.00	0.42
10E	12.00	9.00	1.08	0.33	6.17	1.06
10F	9.00	6.78	2.33	0.22	4.44	0.73
11	12.00	3.33	3.00	0.33	5.50	1.15

Table 3-14
Summary of Recommissioning Emissions and Stack Exhaust Parameters

				Stack Emissions per Task						
Day of task	**CT Load** **MW**	**Runtime** **hours**	**Fuel Used** **MMBtu, HHV**	**NOx** **lb**	**CO** **lb**	**VOC** **lb**	**PM10** **lb**	**SOx** **lb**	**Stack Exhaust Temp** **°F**	**Stack Exhaust Flow Rate** **acfm**
1A	10	5.00	3,004	520	1,966	315	18	1.72	170	514,587
1B+1C	**60**	**1.0**	**969**	**95**	736	99	4	0.55	182	548,585
1D	50	2.00	2,566	18	39	0	9.0	1.47	218	695,692
1E	90	2.00	3,692	27	5	1	12.0	2.11	202	942,433
1F	50	14.00	17,964	95	32	3	62.0	10.27	218	695,692
2A	90	9.00	16,612	121	24	3	56.0	9.49	202	942,433
2B	50	15.00	19,247	102	35	3	67.0	11.00	218	695,692
3A	90	9.00	16,612	121	24	3	56.0	9.49	202	942,433
3B	50	15.00	19,247	102	35	3	67.0	11.00	218	695,692
4A	50	9.00	11,548	82	173	2	40.0	6.60	218	679,267
4B	0	15.00	0	0	0	0	0.0	0.00	130	0
5A	10	3.00	1,803	312	1,180	189	11.0	1.03	185	526,845
5B	25	2.00	1,760	254	932	107	7.0	1.01	191	533,721
5C	35	2.00	2,114	122	2,014	288	8.0	1.21	202	589,397
5D	50	2.00	2,566	27	5	1	9.0	1.47	218	695,692
5E	90	6.00	11,075	81	14	2	37.0	6.33	202	942,433
5F	50	9.00	11,548	61	21	2	40.0	6.60	218	695,692
6A	50	7.00	8,982	64	135	2	31.0	5.13	218	695,692
6B	90	2.00	3,692	27	5	1	12.0	2.11	202	942,433
6C	90	2.00	3,692	27	5	1	12.0	2.11	202	942,433
6D	50	13.00	16,681	88	30	3	58.0	9.53	218	695,692
7A	90	5.00	9,229	67	13	2	31.0	5.27	202	942,433

Table 3-14
Summary of Recommissioning Emissions and Stack Exhaust Parameters

				Stack Emissions per Task						
Day of task	**CT Load** **MW**	**Runtime** **hours**	**Fuel Used** **MMBtu, HHV**	**NOx** **lb**	**CO** **lb**	**VOC** **lb**	**PM10** **lb**	**SOx** **lb**	**Stack Exhaust Temp** **°F**	**Stack Exhaust Flow Rate** **acfm**
7B	50	5.00	6,416	45	96	1	22.0	3.67	218	695,692
7C	50	14.00	17,964	95	32	3	62.0	10.27	218	695,692
8A	50	12.00	15,397	82	28	3	54.0	8.80	218	695,692
8B	0	12.00	0	0	0	0	0.0	0.00	170	0
9	0	24.00	0	0	0	0	0.0	0	120	0
10A										
10A1	**10**	**2.0**	**1202**	**208**	787	126	7	0.69	170	514,587
10A2+BCD	**10**	**1.0**	**743**	**94**	427	63	3	0.42	191	579535
10E	90	12.00	22,150	108	13	4	74.0	12.66	202	942,433
10F	50	9.00	11,548	61	21	2	40.0	6.60	218	695,692
11		12.00	24,188	40	36	4	66.0	13.82	198	1,116,822

[a] see Appendix A-10 for details.

The highest hourly fuel usage during recommissioning occurred during day 11. (24,188 MMBtu/12 hours)

Maximum hourly ammonia emission: [5.0 ppm*8710*(20.9/5.9)*(24,188 MMBtu/12 hours)*17]/385E6 = 13.73 lbs/hr

Summary of Daily Recommioning Emissions

Appendix A-9 Daily Emissions during Recommissioning Operation (Test Plan 20241010)

				Stack Emissions per task				
Day of task	Task	Runtime hours	Fuel Used MMBtu, HHV	NOx Lb	CO lb	VOC Lb	PM10 lb	SOx Lb
1	Cold start, steam temp match, M1P mapping	5	3,004	520	1,966	315	18	1.72
1	M3P Checkout	0.5	440	64	233	27	2	0.25
1	M62P Checkout	0.5	528	31	503	72	2	0.30
1	M63P & M5P partload mapping	2	2,566	18	39	0	9	1.47
1	M63PA partload mapping	2	3,692	27	5	1	12	2.11
1	Overnight parking point	14	17,964	95	32	3	62	10.27
Day 1	Total Emissions	24	-	755	2,778	418	105	16.12
2	M63PA part/base/peak load mapping	9	16,612	121	24	3	56	9.49
2	Overnight parking point	15	19,247	102	35	3	67	11.00
Day 2	Total Emissions	24	-	223	59	6	123	20.49
3	M63PA part/base/peak load mapping	9	16,612	121	24	3	56	9.49
3	Overnight parking point	15	19,247	102	35	3	67	11.00
Day 3	Total Emissions	24	-	223	59	6	123	20.49
4	M63P & M5P partload mapping	9	11,548	82	173	2	40	6.60
4	Shutdown for fuel strainer removal	15	0	0	0	0	0	0.00
Day 4	Total Emissions	24	-	82	173	2	40	6.60
5	Warm start, steam temp match, M1P mapping	3	1,803	312	1,180	189	11	1.03
5	M3P mapping	2	1,760	254	932	107	7	1.01
5	M62P mapping	2	2,114	122	2,014	288	8	1.21
5	M63P & M5P partload mapping	2	2,566	27	5	1	9	1.47
5	M63PA base/peak load performance testing	6	11,075	81	14	2	37	6.33
5	Overnight parking point	9	11,548	61	21	2	40	6.60
Day 5	Total Emissions	24	-	857	4,166	589	112	17.65
6	M63P & M5P partload mapping	7	8,982	64	135	2	31	5.13
6	M63PA part/base/peak load mapping	2	3,692	27	5	1	12	2.11
6	M63PA base/peak load performance testing	2	3,692	27	5	1	12	2.11
6	Overnight parking point	13	16,681	88	30	3	58	9.53
Day 6	Total Emissions		-	206	175	7	113	18.88
7	M63PA autotune validation and AT loop stability testing	5	9,229	67	13	2	31	5.27
7	M63P & M5P autotune validation and AT loop stability te	5	6,416	45	96	1	22	3.67
7	Overnight parking point	14	17,964	95	32	3	62	10.27
Day 7	Total Emissions		-	207	141	6	115	19.21
8	M63P/M5P MECL performance testing	12	15,397	82	28	3	54	8.80
8	Shutdown for final software download & water wash	12	0	0	0	0	0	0.00
Day 8	Total Emissions	24	-	82	28	3	54	8.80
Day 9	Offline water wash	24	0	0	0	0	0	0.00
10	Cold start, steam temp match, final schedule	2.7	1,622	281	1,062	170	10	0.93
10	Load to base	0.1	88	13	47	5	0	0.05
10	Load to base	0.1	106	6	101	14	0	0.06
10	Load to base	0.1	128	2	4	0	0	0.07
10	Contractual Performance Testing	12	22,150	108	13	4	74	12.66
10	Overnight parking point	9	11,548	61	21	2	40	6.60
Day 10	Total Emissions	24	-	471	1,248	195	124	20.37
11	Contractual Performance Testing	12	24,188	40	36	4	66	13.82
11	Normal Operation with Duct Burner	12		238	145	83	165	18.36
Day 11	Total Emissions	24	-	278	181	87	231	32.18
		MAX		857	4,166	589	231	32

The highest daily fuel usage during recommissioning occurred during day 2 and 3. (35,859 MMBTu (16,612 MMBtu + 19,247 MMBtu))

Maximum daily ammonia emission: [5.0 ppm*8710*(20.9/5.9)*(35,859 MMBtu)*17]/385E6 = 244.27 lbs/day

Summary of Total Recommioning Emissions

Appendix A-8 Emissions during full Recommissioning Operation (Estimator Data 20241010)

				Stack Emissions per task				
Day of task	Task	Runtime hours	Fuel Used MMBtu, HHV	NOx Lb	CO lb	VOC Lb	PM10 lb	SOx Lb
1	Cold start, steam temp match, M1P mapping	5	3,004	520	1,966	315	18	1.72
1	M3P Checkout	0.5	440	64	233	27	2	0.25
1	M62P Checkout	0.5	528	31	503	72	2	0.30
1	M63P & M5P partload mapping	2	2,566	18	39	0	9	1.47
1	M63PA partload mapping	2	3,692	27	5	1	12	2.11
1	Overnight parking point	14	17,964	95	32	3	62	10.27
2	M63PA part/base/peak load mapping	9	16,612	121	24	3	56	9.49
2	Overnight parking point	15	19,247	102	35	3	67	11.00
3	M63PA part/base/peak load mapping	9	16,612	121	24	3	56	9.49
3	Overnight parking point	15	19,247	102	35	3	67	11.00
4	M63P & M5P partload mapping	9	11,548	82	173	2	40	6.60
4	Shutdown for fuel strainer removal	15	0	0	0	0	0	0.00
5	Warm start, steam temp match, M1P mapping	3	1,803	312	1,180	189	11	1.03
5	M3P mapping	2	1,760	254	932	107	7	1.01
5	M62P mapping	2	2,114	122	2,014	288	8	1.21
5	M63P & M5P partload mapping	2	2,566	27	5	1	9	1.47
5	M63PA base/peak load performance testing	6	11,075	81	14	2	37	6.33
5	Overnight parking point	9	11,548	61	21	2	40	6.60
6	M63P & M5P partload mapping	7	8,982	64	135	2	31	5.13
6	M63PA part/base/peak load mapping	2	3,692	27	5	1	12	2.11
6	M63PA base/peak load performance testing	2	3,692	27	5	1	12	2.11
6	Overnight parking point	13	16,681	88	30	3	58	9.53
7	M63PA autotune validation and AT loop stability	5	9,229	67	13	2	31	5.27
7	M63P & M5P autotune validation and AT loop st	5	6,416	45	96	1	22	3.67
7	Overnight parking point	14	17,964	95	32	3	62	10.27
8	M63P/M5P MECL performance testing	12	15,397	82	28	3	54	8.80
8	Shutdown for final software download & water v	12	0	0	0	0	0	0.00
9	Offline water wash	24	0	0	0	0	0	0.00
10	Cold start, steam temp match, final schedule	2.7	1,622	281	1,062	170	10	0.93
10	Load to base	0.1	88	13	47	5	0	0.05
10	Load to base	0.1	106	6	101	14	0	0.06
10	Load to base	0.1	128	2	4	0	0	0.07
10	Contractual Performance Testing	12	22,150	108	13	4	74	12.66
10	Overnight parking point	9	11,548	61	21	2	40	6.60
11	Contractual Performance Testing	12	24,188	40	36	4	66	13.82
All	Total runtime, fuel used, emissions for Recommissionir	252	284,209	3,146	8,863	1,236	975	162
	Fuel Used, MMscf (MMBtu/1050) and Emissions in lb/MMscf		270.675	11.62	32.74	4.57	3.60	0.60

Note:
SOx emissions are estimated using EF of 0.60 lb/MMsc (Ref 5).

As shown above, the total fuel usage during recommissioning is 284,209 MMBtu.
Total ammonia emission during recommissioning:
[5.0 ppm*8710*(20.9/5.9)*(284,209 MMBtu)*17]/385E6 = 1,936.01 lbs NH3

Appendix C

GHG Calculations

Out of the six GHG pollutants:

carbon dioxide, CO_2,
methane, CH_4,
nitrous oxide, N_2O
hydrofluorocarbons, HFCs
perfluorocarbons, PFCs
sulfur hexafluoride, SF_6

Only the first 3 are emitted by combustion sources. Sulfur hexafluoride can be emitted by circuit breakers.

The following emission factors and global warming potential (GWP) will be used in the calculations:

GHG Emission Factors

GHG	Emission Factor, natural gas	GWP
	kg/mmbtu	
CO2	53.06	1.0
CH4	1.0E-03	28
N2O	1.0E-04	265

CO2 equivalent (CO2e) is calculated using the following equation:

CO2e = CO2 + 28*CH4 + 2*N2O

Or, using heat input (HI):

CO2e = 53.06*HI + 0.001*28*HI + 0.0001*265*HI = 53.1145*HI (in kg)

CO2e = 117.09623*HI (in lbs)

Post-Modification Turbine Annual Operating Schedule

Event	Duration/yr	Heat Input
Start	360	*(included below)*
Shutdown	30	*(included below)*
100% Load @ w/o DB	7118	2103 MMBtu/hr (includes start ups/shutdowns)
100% Load with DB	1000	2686 MMBtu/hr
Total	8508	18,475,324 MMBtu/yr

Turbine GHG PTE

GHG	Annual lbs @ 18,475,324 MMBtu/yr	Annual Tons @ 18,475,324 MMBtu/yr
CO2	2,161,170,904	1,080,585
CH4	40,730.7	20.4
N2O	4073.1	2.0
Total Mass	2,161,215,708	1,080,607
CO2e	2,163,390,727	1,081,695

Appendix D

Toxic Emissions

Toxic emissions estimates are based on emission factors from USEPA AP-42 Table 3.1-3, except for Acetaldehyde, Formaldehyde, Benzene, and Acrolein emission factors which are from the Background document for AP-42 Section 3.1, Table 3.4-1 for a natural gas turbine with a CO catalyst.

The following data was used:

Fuel HHV = 1,050 btu/cf

Gas Turbine Fuel Use = 2,103 mmbtu/hr/1050 btu/cf = 2.003 mmscf/hr
Duct Burner Fuel Use = 583 mmbtu/hr/1050 btu/cf = 0.555 mmscf/hr
Total Fuel Use = 2.558 mmscf/hr

Hrs/yr with Duct Firing = 1000
Annual Fuel Use with DF = 2.558*1000 = 2,558 mmscf
Hrs/yr no Duct Firing = 7508 (includes start ups and shutdowns)
Annual Fuel Use No DF = 2.003*7508 = 15,037 mmscf

Total Annual Fuel Use = 17,596 mmscf

Pollutant	Emission Factor lbs/MMBtu	Emission Factor lbs/MMscf	Hourly Emissions Lbs/hr	Annual Emissions Lbs/yr
1,3 butadiene	4.30E-07	4.39E-04	1.12E-03	7.72
acetaldehyde	1.76E-04	1.80E-01	4.59E-01	3158.75
acrolein	3.62E-06	3.69E-03	9.45E-03	64.97
benzene	3.26E-06	3.33E-03	8.51E-03	58.51
ethylbenzene	3.20E-05	3.26E-02	8.35E-02	574.32
formaldehyde	3.60E-04	3.67E-01	9.39E-01	6461.08
naphthalene	1.30E-06	1.33E-03	3.39E-03	23.33
PAH (excluding naphthalene)	9.00E-07	9.18E-04	2.35E-03	16.15
propylene oxide	2.90E-05	2.96E-02	7.57E-02	520.48
toluene	1.30E-04	1.33E-01	3.39E-01	2333.17
xylenes	6.40E-05	6.53E-02	1.67E-01	1148.64
			Total, lbs/yr	14,367.12
			Total, tpy	7.2