ENGINEERING EVALUATION

Facility Name:	Pio Pico Energy Center
Equipment Type:	power generating turbines (20F, AMD)
Application Number:	APCD2018-APP-005536
Facility ID:	APCD2010-SITE-00471
Equipment Address:	7363 Calzada de la Fuente San Diego, CA 92154
Facility Contact:	Ian Fudalski
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Permit Engineer

X

Jim Swaney
Senior Air Pollution Control Engineer

Senior Engineer Signature:

X

Mohsen Nazemi
Engineering Chief

1.0 BACKGROUND

1.1 Type of Application: AMD (20F)

This application is an amendment to Application No. APCD2014-APP-003627 to allow for tuning of emission control systems with higher limits of NOx, CO, and VOC emissions during the tuning operation. No increase in SOx or PM10 emissions or any increase in annual emissions of NOx, CO and VOCs are requested or expected. The current Startup Authorization contains a definition of tuning operations but has no provisions to allow its use.

Additionally, the previous requirement to monitor VOC emissions via a Continuous Emissions Monitor System (CEMS) measuring CO emissions through establishing a surrogacy between VOCs and CO emissions and using the CO CEMS will be removed, as discussed below, as part of this application.

1.2 Permit History:

The initial application for a Preliminary Determination of Compliance (PDOC), which is the equivalent of a Draft Authority to Construct at the District, (Application No. APCD2010-APP-001251) was submitted on 7/13/2010. This was subsequently amended

by another application (Application No. APCD2011-APP-001540), which was submitted on 2/15/11 and changed the location of the project prior to the initial application being deemed complete. A Final Determination of Compliance (FDOC), which is equivalent to a Final Authority to Construct at the District, was issued on May 4, 2012, and amended August 25, 2015, under Application No. APCD2014-APP-003627 to increase the maximum design heat rate of each gas turbine. The facility subsequently received a license from the California Energy Commission (CEC) incorporating the District's recommended conditions in the FDOC for Application No. APCD2014-APP-003627. The FDOC had all the rights and privileges of a District ATC upon CEC approval. The project was constructed under the FDOC and construction was completed in July 2016 and is currently operating under a District startup authorization (SA) based on the FDOC with minor administrative changes.

1.3 Facility Description:
This facility is an approximately 320 Mega Watts (MW) load following and peaking power plant with three simple-cycle combustion turbines. Each turbine is equipped with an oxidation catalyst and selective catalytic reduction (SCR) system for control of CO, VOCs and NOx emissions, respectively.

1.4 Other Background Information:
This facility is a major source and requires a Title V Operating Permit. The applicant has submitted an application for their initial Title V Permit under Application No. APCD2017-APP-005036.

2.0 PROCESS DESCRIPTION

2.1 Equipment Description:
This facility is an approximately 320 MW peaking power plant with three simple-cycle combustion turbines as follows.

Turbine No. 1: A natural-gas-fired, simple-cycle, intercooled GE LMS100 PA combustion turbine generator rated at 1000 MMBtu/hr (HHV) heat input and 106.4 MW, Serial Number 7244965, equipped with an evaporative cooler for the inlet air; a compressor intercooler utilizing a heat exchanger and a shared partial dry cooling system with a wet surface air cooler; a continuous emission monitoring system (CEMS) for NOx, O2, and CO; a data acquisition and handling system (DAHS) to record key operational parameters; water injection; ducted to a selective catalytic reduction system (SCR) with a Haldor Topsoe DNX catalyst; an ammonia vaporization system, and an oxidation catalyst with a BASF CAMET CO catalyst.

Turbine No. 2: A natural-gas-fired, simple-cycle, intercooled GE LMS100 PA combustion turbine generator rated at 1000 MMBtu/hr (HHV) heat input and 106.4 MW, Serial Number 7244966, equipped with an evaporative cooler for the inlet air; a compressor intercooler utilizing a heat exchanger and a shared partial dry cooling system with a wet surface air cooler; a continuous emission monitoring system (CEMS) for NOx, O2, and CO; a data acquisition and handling system (DAHS) to record key operational parameters; water injection; ducted to a selective catalytic reduction system (SCR) with a Haldor Topsoe DNX catalyst; an ammonia vaporization system, and an oxidation catalyst with a BASF CAMET CO catalyst.

Turbine No. 3: A natural-gas-fired, simple-cycle, intercooled GE LMS100 PA combustion turbine generator rated at 1000 MMBtu/hr (HHV) heat input and 106.4 MW,

Serial Number 7244967, equipped with an evaporative cooler for the inlet air; a compressor intercooler utilizing a heat exchanger and a shared partial dry cooling system with a wet surface air cooler; a continuous emission monitoring system (CEMS) for NOx, O2, and CO; a data acquisition and handling system (DAHS) to record key operational parameters; water injection; ducted to a selective catalytic reduction system (SCR) with a Haldor Topsoe DNX catalyst; an ammonia vaporization system, and an oxidation catalyst with a BASF CAMET CO catalyst.

2.2 Process:

The most likely component of the emission control system to be tuned is the selective catalytic reduction (SCR) emission control system for NOx (see below) that reduces NOx by reacting it with ammonia (NH_3) used as the reducing agent over a catalyst. Tuning of SCR systems are typically necessary to maintain compliance with NOx and NH_3 slip emission limits. The effectiveness of the SCR system depends on having the correct amount of ammonia flowing to the SCR at the right temperature. The correct amount of ammonia for each portion of catalyst depends on its location since the concentration of NOx in the exhaust flow and exhaust flow velocity and temperature vary across the face of the SCR catalyst. Tuning is usually required periodically but is not done more than once per year and is usually a less frequent occurrence.

Typically, the SCR tuning is to adjust the ammonia flows at various points on the ammonia distribution grid upstream of the SCR, which may result in temporarily elevated NOx emissions during the tuning process. In addition, operations for extended periods at low-loads or other irregular operating conditions may be necessary. These irregular operating conditions may include adjustments to the water injection rate, which can potentially increase NOx, CO, or VOC emissions, or startups and shutdowns that occur in the midst of tuning operations with potentially increased emissions of NOx, CO, and VOCs during those periods. The applicant has requested higher emission limits for NOx, CO, and VOCs during normal tuning operations (i.e., operations except startups and shutdowns) and during startups and shutdowns during any tuning operation.

2.3 Emissions Controls:

Water injection, a selective catalytic reduction system (SCR) with an ammonia vaporization system for NOx control and an oxidation catalyst to control CO and VOCs.

3.0 EMISSIONS

3.1 Emission Estimate Summary (in parts per million volume dry (ppmvd), pounds per hour (lbs/hr), pounds per event (lbs/event) and in tons per year (tons/yr):

Table 1: Pre-Modified Project Emissions

Operating Scenario	Duration	NOx	CO	VOC	PM10	PM2.5	SOx
Normal Operation, per turbine, ppmvd @15% O2	1 hour	2.5	4.0	2.0			
Normal Operation, per turbine lbs/hr	1 hour	8.2	8.0	2.3	5.0	5.0	1.9
Normal Operation, per turbine lbs/day	1 day	288.1	428.9	79.2	132	132	45.6
Startup, per turbine, lbs/event	30 min.	22.5	17.9	4.7			

Shutdown, per turbine, lbs/event	11 min.	6.0	47.0	3.0			
Startup, per turbine, lbs/hr	1 hour	26.6	21.8	5.8	5.5	5.5	<1.9
Shutdown, per turbine, lbs/hr	1 hour	12.7	53.5	4.9	5.5	5.5	<1.9
Existing Annual Limits, single turbine, tons/yr	annual	23.5	32.1	6.5	11.9	11.9	1.4
Existing Annual Limits, three turbines combined, tons/yr	annual	70.4	96.4	19.4	35.8	35.8	4.1
AQIA limit, single turbine, lbs/hr	1 hour	50	75				
AQIA limit, three turbines combined, lbs/hr	1 hour	150	225				
Rule 69.3.1 Limit, ppmvd @15% O2	1 hour	13.9					

Notes: 1. Normal operations based on BACT limits. Daily limits assume 4 hours with one startup, 4 hours with one shutdown, and 16 hours at full load. Annual limits assume 4335 hours of operation and 500 startups and shutdowns. See FDOC dated May 4, 2012, for complete calculation methodology:
2. Rule 69.3.1 limits applicable during tuning operations.

Table 2: Post-Modified Project Tuning Emissions

Operating Scenario	Duration	NOx	CO	VOC	PM10	PM2.5	SOx
Normal Operation, per turbine, ppmvd @15% O2	1 hour	2.5	4.0	2.0			
Tuning Operation, per turbine, ppmvd @15% O2	1 hour	13.9	37.5				
Normal Operation, per turbine lbs/hr	1 hour	8.2	8.0	2.3	5.0	5.0	1.9
Startup, per turbine, lbs/event	30 min.	22.5	17.9	4.7			
Shutdown, per turbine, lbs/event	11 min.	6.0	47.0	3.0			
Startup, per turbine, lbs/hr	1 hour	26.6	21.8	5.8	5.5	5.5	1.9
Shutdown, per turbine, lbs/hr	1 hour	12.7	53.5	4.9	5.5	5.5	1.9
Tuning Operation, per turbine, lbs/hr	1 hour	45.6	75.0	21.6			
Tuning Operation, per turbine, lbs/day (720 min/day max)	1 day	547.2	900	259.2			
Maximum Daily Operation, per turbine with tuning, lbs/day	1 day	737.2	1233.4	311.1	132	132	45.6
Annual tuning emissions limits, all three turbines, tons/yr	annual	2.7	4.5	1.3			
Annual Limits, single turbine, tons/yr	annual	23.5	32.1	6.5	11.9	11.9	1.4
Annual Limits, three turbines combined, tons/yr	annual	70.4	96.4	19.4	35.8	35.8	4.1
AQIA and tuning limit, single turbine, lbs/hr	1 hour	50	75				

AQIA and tuning limit, three turbines combined, lbs/hr	1 hour	150	225				
Rule 69.3.1 limit, ppmvd @15% O2	1 hour	13.9					

Notes:
1. There will be no change in emissions from the turbines previously approved conditions except during tuning operations.
2. NOx emissions based on existing AQIA and Rule 69.3.1 limits.
3. NOx limit during tuning also applies to all three turbines combined. The hourly limit assumes a single turbine being tuned with no other turbines operating. Only one turbine shall be tuned at any one time.
4. Tuning operations shall not exceed 720 minutes per calendar day. Tuning emissions shall not exceed 40 hours per calendar year per turbine. There will be no increase to annual emission limits.
5. Daily emissions = (tuning operation, lbs/hr)(12 hrs/day) + (startup emissions)(4 hrs/day) + (shutdown emissions)(4 hrs/day) + (normal operation)(4 hrs/day)
6. PM10 and SOx emissions are based on fuel usage and are unaffected by tuning operations.
7. See FDOC dated May 4, 2012, for full calculation methodology.

Tuning NOx, CO and VOCs Emission Increases

While not operating uncontrolled during the tuning process, the control equipment will not be operating optimally. The applicant initially estimated that the maximum emissions during tuning operations will be 15 ppmvd @15% oxygen for NOx and 37.5 ppmvd @15% oxygen for CO. However, in order to comply with Rule 69.3.1, emissions must be limited to 13.9 ppmvd @15% oxygen for NOx. CO and VOCs are naturally related as changes in combustion efficiency will influence emissions of both pollutants to increase or decrease in the same direction. Current permit conditions, as specified in the FDOC, limit tuning operations to 720 minutes per calendar day and 40 hours per calendar year for each turbine. However, no specific emissions limits were established at the time the FDOC was approved. No annual increases are proposed or allowed by this revision.

VOC/CO Surrogate Requirements

In addition to the amendment application to allow for turbine tuning, the original conditions stated that the site must monitor VOC emissions from the equipment via CEMS. A VOC/CO surrogate for each turbine was proposed, with the measured CO concentration from the CO CEMS being used to determine the corresponding VOC concentration. Several source tests were performed to collect emissions data and create a VOC/CO surrogate relationship unique to each turbine.

Table 3: CO and VOC Source Test Results

Year	Unit	Run	CO, ppm	VOC, ppm	CO/VOC
2018	1	1	1.19	0.00	n/a
		2	1.02	0.00	n/a
		3	0.95	0.00	n/a
	2	1	0.91	0.00	n/a
		2	1.01	0.00	n/a
		3	1.07	0.00	n/a
	3	1	0.97	0.00	n/a
		2	0.96	0.00	n/a
		3	0.97	0.00	n/a
2019	1	1	1.83	0.97	1.89
		2	1.89	0.44	4.30

		3	1.97	0.19	10.37
	2	1	1.20	0.24	5.00
		2	1.16	0.54	2.15
		3	1.16	0.17	6.82
	3	1	1.29	0.66	1.95
		2	1.38	0.42	3.29
		3	1.30	0.51	2.55
2021	1	1	1.44	3.50	0.41
		2	1.44	0.11	13.09
		3	1.52	0.11	13.82
	2	1	1.10	0.00	n/a
		2	1.19	0.00	n/a
		3	1.22	0.00	n/a
	3	1	1.27	0.05	25.40
		2	1.31	0.24	5.46
		3	1.38	0.05	27.60

Notes: 1. A source test was not required in 2020 because the turbines did not operate enough hours.
2. VOC entries of 0.00 indicate concentrations were below the detection levels of the test.
3. All concentrations are corrected to 15% oxygen.

The District had initially proposed using the CO CEMS as a means to continuously monitor VOC emissions. CO and VOC are naturally related as changes in combustion efficiency will influence emissions of both pollutants to increase or decrease in the same direction. However, after multiple tests on each turbine the District has concluded that a linear relationship between CO and VOC does not exist. This is due to the very low emissions concentration levels of both CO and VOC which magnifies any relative error in measurements. VOC concentrations are typically below 1.0 ppm (permit limit is 2.0 ppm) and often below the detection level of the test. Hence the CO/VOC ratio varies greatly and cannot be used to accurately predict VOC emissions on a regular basis. Table 3 above shows source test results for CO and VOC for 2018, 2019, and 2021. Based on the fact that this data does not support any reliable correlation between the CO/VOC ratio, the requirements to establish and maintain a CO/VOC surrogate value will be removed from the permit conditions. The current periodic source testing requirement will demonstrate compliance with the VOC limits during steady-state operation. A separate source test will be done during startup and shutdown conditions. This particular test will be done in accordance with an approved test protocol (submitted within 30 days of the final approval of this permit) and will be initially required to be performed on the first renewal test following the approval of the test protocol. The test will then be periodically required once every five years during the same year as the Title V renewal.

4.0 APPLICABLE RULES

4.1 Prohibitory Rules:

Rule 50 – Visible Emissions:

This rule limits air contaminant emissions into the atmosphere of shade greater than Ringlemann Number 1, to a maximum aggregate of three minutes in any consecutive sixty-minute time period.
This requirement is specified in permit conditions and the use of natural gas as fuel is expected to ensure compliance with this requirement.

Rule 51 – No Nuisance:
This rule prohibits discharge of air contaminants that cause or have a tendency to cause injury, nuisance, or annoyance to people and/or the public or damage to business or property.
Permit conditions specify this requirement and the use of natural gas as fuel is expected to ensure that no public nuisance results from this equipment.

Rule 53 – Specific Air Contaminants:
This rule prohibits the discharge of sulfur compounds, calculated as SO_2 in excess of 0.05% by volume on a dry basis and the discharge of particulate matter from combustion sources in excess of 0.10 grains/dscf standardized to 12% CO_2.
Grain loading is calculated at 0.005 gr/dscf. Initial and periodic testing have confirmed compliance with the standards of this rule. This amendment will not result in an increase in particulate emissions. Therefore, continued compliance with this rule is expected and will be confirmed through periodic testing.

Rule 62 – Sulfur Content of Fuels:
This rule prohibits the use of any gaseous fuel containing more than 10 grains of sulfur compounds, calculated as H_2S, per 100 dscf of gas, and any liquid fuel containing more than 0.5% sulfur by weight.
Permit conditions require the use of natural gas fuel containing less than 0.75 gr S/100 scf for the gas turbines and diesel fuel containing no more than 15 ppmw sulfur, which ensures compliance with this rule.

Rule 68 – Oxides of Nitrogen from Fuel Burning Equipment:
This rule applies to any fuel burning equipment with a maximum heat input rating of 50 MMBtu/hr or more, so it would apply only to the gas turbines. However, Rule 69.3.1, which is applicable to the combustion turbines, is more stringent and supersedes the limits of this rule. Additionally, Rule 69.4, which is applicable to the diesel engines, state that any emission unit subject to the rule is exempt from Rule 68. Therefore, the limits of Rule 68 are either superseded or not applicable to this equipment.

Rule 69.3.1 – Stationary Gas Turbines:
This rule also applies to gas turbines. This rule limits NOx emissions from gas turbines based on the thermal efficiency of the turbine. For units with a power rating greater than 10 MW, the standards, when operating on gaseous fuel, are (in ppmvd corrected to 15% O_2): 15 x E/25 when no post combustion controls are installed and 9 x E/25 when post combustion (SCR/oxidation catalyst) controls are installed, where E is the thermal efficiency based on the fuel's LHV.
From the FDOC, the controlled emission limit is 13.9 ppmvd at 15% oxygen. This limit shall apply at all times, including tuning operations, but not during startups and shutdowns as defined in this rule. Initial and periodic testing have confirmed compliance with the standards of this rule. Therefore, continued compliance with this rule is expected and will be confirmed through the CEMS and periodic testing.

Mass emission rate = (13.9 ppm / 2.5 ppm) (8.2 lbs/hr) = 45.6 lbs/hr

4.2 New Source Review:

Rule 20.1(d)(1)(i) – Pre-Modified Project Emissions:
Pre-project emissions are stated in Table 1. These emissions are taken from the Final Determination of Compliance as evaluated under APCD2014-APP-003627.

Rule 20.1(d)(1)(i)(C)(4) – Pre-Modified Project Emissions, Federal Major Modification:
This facility is a federal major stationary source for NOx and no other pollutant. *Projected annual emissions have been calculated as part of the FDOC, amendment application APCD2014-APP-003627, and this amendment evaluation. Pre-modified project emissions for this equipment have been calculated as part of the FDOC and are listed in that document. Although the post-project PTEs will increase on an hourly and daily basis for NOx, CO, and VOC emissions, they will not increase on an annual basis. Because an initial permit to operate has not been issued the entire project will be considered for purposes of NSR to be a new major stationary source.*

Rule 20.1(c)(66) – Prevention of Significant Deterioration (PSD) Stationary Source and PSD Modifications:
A PSD stationary source is defined by Rule 20.1 as any stationary source that has or will have after issuance of a permit an aggregate PTE in excess of limits that depend on the type of stationary source. If the facility is classified as a "fossil fuel fired steam electrical plant of more than 250 MMBtu/hr heat input," those limits are 100 ton/yr of any of the following pollutants: PM_{10}, NOx, VOC, SOx, CO. If the facility is not classified this way (there are other source categories listed in Table 20.1-11 subject to the 100 ton/yr limits, but they are not relevant to this discussion), the limits are a PTE in excess of 250 ton/yr for any of these same pollutants.
This facility does not use boilers for power generation and is not considered a fossil fuel fired steam electrical plant. Therefore, the PSD thresholds are 250 tons/yr for each pollutant. Based on its annual potential to emit, this site is not a PSD stationary source for any pollutant. NOx and CO emissions will be verified through a CEMS and periodic source testing. VOC emissions will be verified through periodic source testing.

Rule 20.3 (d)(1)(iv) – Best Available Control Technology (BACT) and Lowest Achievable Emission Rate (LAER):
As a modification of an existing major stationary source, this project and the installation of the new emission units are potentially subject to the BACT and LAER requirements of Rule 20.3(d)(1). BACT is required for any new or modified emission unit with a potential to emit greater than or equal to 10 lb/day of NOx, VOC, PM_{10}, or SOx.
This equipment has been extensively evaluated for BACT and LAER during the initial review for the PDOC and FDOC, including reviews of the RACT/BACT/LAER Clearinghouses. This modification will not result in any increase in emissions during normal operation of the gas turbines, therefore, no new analysis for BACT/LAER for normal operations is required. However, the proposed modification will result in an increase of hourly and daily NOx (and potentially CO and VOC) emissions during tuning operations but continuing to maintain emissions within the annual emissions limit. The existing permits do not have any emission limits for the tuning operations, and therefore, this modification will add new emission limits during tuning operations.

The modified permit will still require the use of both SCR and Oxidation Catalysts during tuning operations so the emissions of NOx, CO and VOCs will be controlled to the maximum extent feasible. A search of the current RACT/BACT/LAER Clearinghouses showed one facility, the Alaska Gasline Development Corporation, was issued a Construction Permit for a natural gas liquification plant in July 2022 which included simple cycle turbines which will operate gas compressors. These turbines, rated at 1113 MMBtu/hr, were permitted at 2.0 ppm for NOx and 5.0 ppm for CO through the use of dry low NOx burners and an SCR system. These limits were proposed by the applicant. These limits are for normal operation of the gas turbines, however, as indicated earlier the proposed modification is not going to result in any hourly, daily or annual NOx, CO or VOC emissions during normal operations of the gas turbines, so no BACT/LAER analysis is required for normal operations. Also, it should be noted that while the NOx limit for normal operations is lower than that of PPEC, the CO limit is higher. Additionally, the equipment has not yet been constructed and compliance with the emission limits have not yet been verified. As the turbines being evaluated are already constructed and there are no increases of NOx, CO or VOCs during normal operation of the gas turbines, no revisions to the current BACT determination are needed. Another gas turbine for the City of Riverside Public Utilities Department (in California) was issued a permit at 2.3 ppm NOx and 4.0 ppm CO. However, this turbine is only 490 MMBtu/hr and is used for peaker purposes only (and not the load following operation that the Pio Pico Energy Center does). Therefore, it is not applicable to the turbines being evaluated.

Tuning operations are intended to ensure the turbines are operating optimally during normal operation but may entail operation without controls fully operational while the turbine and control devices are being tuned. A search of current RACT/BACT/LAER Clearinghouses showed BACT determinations have been made for startup, shutdown, and maintenance operations for simple cycle gas turbines. The Sabine Pass LNG LP (in Louisiana) limited NOx emissions to 96 ppm during these conditions and the Washington Parish Energy Center One (in Louisiana) limited emissions to 86.38 lbs/hr of NOx, 800.0 lbs/hr of CO, and 6.3 lbs/hr of PM10 and PM2.5. Current permit conditions limit emissions during tuning operations to 13.9 ppm and 45.6 lbs/hr for NOx, 75.0 lbs/hr for CO, and 5.0 lbs/hr for PM10 and PM2.5. Therefore, current BACT limits, as determined during the PDOC and FDOC reviews, remain valid.

LAER is applicable only to federal nonattainment pollutants or their precursors. For the District, the only nonattainment pollutants are NOx and VOCs which are precursors for ozone for which the District is in nonattainment of the federal 8-hour ambient air quality standard. At existing major sources, LAER is applicable to projects that have a contemporaneous emission increase equal to or greater than 25 tons per year, which constitutes a major modification under District NSR rules, or to emission units with an emission increase that constitute a new major source by themselves.
This equipment was previously subject to and complied with LAER. This modification will not result in an increase in annual emissions and is therefore not considered a major modification. Tuning operations are required to ensure the turbines are operating optimally during normal operation but may entail operation without controls fully operational while the turbine and control devices are being tuned. There are no lower emitting alternatives available and no additional LAER requirements that would apply during tuning operations. As stated above, a search of current RACT/BACT/LAER Clearinghouses showed one site with a lower NOx limit but with a

higher CO limit. Therefore, no changes to the current limits of 2.5 ppm for NOx and 4.0 ppm for CO are needed. Additionally, RACT/BACT/LAER limits during startups, shutdowns, and maintenance were less stringent than current emission limits. Therefore, current LAER requirements, as determined during the PDOC and FDOC reviews, remain valid.

Rule 20.3(d)(2) – Air Quality Impact Analysis (AQIA):

This section requires that the District conduct an air quality impact analysis (AQIA) for all projects resulting in increases of emissions above thresholds listed in Table 20.3-1 of the rule to assess the impacts of the proposed equipment on compliance with applicable ambient air quality standards. Each project must be shown not to cause new violations or additional violations of either the State or National Ambient Air Quality Standards or prevent or interfere with the attainment or maintenance of those standards.

AQIA thresholds are exceeded for hourly NOx emissions. A revised AQIA was conducted by the District's Monitoring Group to determine if the additional emissions from this modification will contribute to an exceedance of the national ambient air quality standards or the state ambient air quality standards (see attached AQIA report). The modeling was done under expected worst-case hourly and annual emission rates during tuning operations. The analysis shows no violation of any national or state ambient air quality standard. Permit conditions will contain hourly and annual emission limits that are applicable at all times to ensure that the project will not cause or contribute to a violation of any National Ambient Air Quality Standard or California Ambient Air Quality Standard.

. Rule 20.2(d)(3) – Prevention of Significant Deterioration (PSD):

This subsection requires that a PSD evaluation be performed for any new PSD stationary source (a source that has an aggregate potential to emit of one or more air contaminants in amount equal to or greater than the PSD thresholds) and to any PSD modification (contemporaneous emission increase occurring at a modified PSD stationary source equal to or greater than the PSD modification thresholds), for those air contaminants for which the District is classified as attainment or unclassified with respect to a national ambient air quality standard.

Annual emission limits on NOx, CO, VOC are well below the PSD thresholds specified in Rule 20.3(a)(3). NOx and CO emissions are continuously monitored with CEMS and are also verified through periodic source testing. Compliance with steady-state VOC limits will be verified by periodic source testing and compliance with VOC limits during startups and shutdowns will be verified by periodic source testing.

Rule 20.3(d)(4) – Public Notice and Comment:

The District is required, at least 40 days before taking final action approving the Authority to Construct or Modify, to provide the public, California Air Resources Board (CARB), federal Environmental Protection Agency (EPA) and any tribal air pollution control agencies having jurisdiction in San Diego Air Basin with notice of proposed action and provide at least a 30-day public comment period for any emission unit or project subject to AQIA notification requirements, that results in emissions increase of VOC equal to or greater than 250 pounds per day or 40 tons per year, or that would otherwise constitute a new major stationary source, a new federal stationary source, a major modification, or a federal major modification.

As this application is subject to AQIA notification requirements, a notice of the proposed amendment to the PPEC will be published in the San Diego Union Tribune and on the District website as well as sent to EPA, ARB, and surrounding air districts

for a 30-day comment period in accordance with Rule 20.3(d)(4). The District will consider all comments received before taking final action.

Rule 20.3(d)(5)-(8) – Emission Offsets:

Offsets are required for any new or modified emission unit which results in an emission increase that constitutes a new major stationary source, a new federal major source, a major modification, or a federal major modification for NOx or VOC, or for any air contaminant, or its precursor air contaminants, for which the San Diego Air Basin has been designated by EPA as nonattainment for the NAAQS for such air contaminant, unless emission offsets are provided, on a pollutant-specific basis.

Emission offsets were required for the initial applications and were submitted prior to operation of the first turbine. This amendment will not result in an increase in annual emissions; therefore, no additional offsets are required.

Rule 20.3(e)(1) – Compliance Certification:

This project is subject to LAER and offset requirements, and, therefore, a compliance certification is required, prior to issuance of the CEC final decision certifying that all major sources operated by the applicant in the state are in compliance with all applicable emissions limitations and standards under the federal Clean Air Act.

The applicant, Pio Pico Energy Center, LLC, does not own or operate any other major stationary sources in California. A fund managed by Energy Investors Funds Management, LLC (EIF) indirectly owns PPEC. Other funds managed by EIF also indirectly own, control, and operate two major stationary sources in the state, the Burney Forest Power and the Panoche Energy Center. The required compliance certification for all major sources in the state has been submitted to the District.

Rule 20.3(e)(2) – Alternate Siting and Alternatives Analysis:

This project is not subject to LAER or offset requirements, therefore an alternative siting and alternatives analysis is not required.

The Applicant has previously provided an analysis of various alternatives to the project through the CEC process.

Rule 20.5 – Power Plants:

This section requires that the District issue a preliminary determination of compliance (PDOC) as part of the application for certification process once it has determined that the proposed power plant will comply with all applicable District regulations. After a comment period has been provided and the District has considered any comments submitted, the District issues a final determination of compliance (FDOC) which will confer the same rights and privileges as an authority to construct after the project license application is approved by the CEC.

The District has previously issued a PDOC and FDOC in accordance with these requirements.

4.3 Toxics New Source Review:

Rule 1200 – Toxic Air Contaminants, New Source Review

Rule 1200 regulates the emissions of toxic air contaminants in San Diego County by placing limits on allowable health risk and health effects on surrounding residences and businesses due to increases in emissions of these air contaminants. Rule 1200 limits the increase in health hazard index (HHI) to no more than 1.0 for both chronic and acute health effects. HHI is a ratio of potential exposure to the exposure required to produce

health effects in more sensitive individuals, so a value less than 1.0 indicates no expected adverse health effects. Cancer risk increase is limited to an increase of no more than one in one million unless the equipment is equipped with toxics best available control technology (T-BACT) in which case the standard is no more than an increase of ten in one million.

A Health Risk Assessment was performed by the District's Toxics Group for the increase in hourly and daily emissions due to this modification. Increases in toxic emissions were estimated by using the ratio of VOC emissions during tuning operations to the maximum hourly steady-state VOC emissions. As there will be no increases in annual emissions, no change to the chronic cancer risk or chronic HHI is expected. The total acute HHI was determined to be 0.15. Compliance with this rule is expected (see attached HRA report).

4.4 AB3205:

This assembly bill requires public notification prior to issuing an Authority to Construct for equipment emitting hazardous air contaminants within 1000 feet of a school (kindergarten through 12th grade).

There are no schools within 1000 feet of this equipment. Therefore, AB3205 does not apply.

4.5 Federal and State Regulations:

40 CFR Part 60 Subpart KKKK – Stationary Combustion Turbines

This subpart applies to all stationary combustion turbines with heat input in excess of 10 MMBtu/hr based on HHV.

Section 60.4320 requires that the turbines meet an emission limit for NOx contained in Table 1 of the subpart. Inspection of this table shows that the applicable standard for these >850 MMBtu/hr, electrical generating, gas turbines is 15 ppmvd at 15% O_2 (or alternatively 0.43 lb/MW-hr) when the turbine is operating in excess of 75% load. When operating at less than 75% load, the emission limitation is 96 ppmvd NOx at 15% O_2 (or 4.7 lb/MW-hr). These limits apply at all times, including startups, shutdowns, and tuning operations.

Permit conditions will limit NOx emissions to 13.9 ppmvd at 15% oxygen. Compliance will be demonstrated through the use of CEMS and periodic testing.

All other subsections of this Subpart were reviewed during the FDOC process and are unaffected by this modification. Existing conditions will ensure compliance with this Subpart.

40CFR Part 72 Subpart A – Acid Rain Program

This subpart includes general provisions including definitions and applicability for the Acid Rain Program. This program is designed to reduce emissions of compounds that form acid including NOx and SOx. This is accomplished through a market-based trading program where sources of pollution are assigned allowances based on their level of electricity production and emissions. These allowances may be transferred between parties, with each entity required to hold sufficient allowances to cover their emissions. Each gas turbine is subject to this program as a new "utility unit".

40CFR Part 72 Subpart C – Acid Rain Permit Applications

This facility is subject to Title V permitting because it is subject to the federal Acid Rain program. Therefore, both District permits and the body of the Title V permit

include conditions pursuant to the Acid Rain program, specifically 40 CFR §72, 73, and 75.

4.6 Attachments:

AQIA Evaluation (APP005536 Pio Pico Tuning AQIA Final.docx)

Rule 1200 HRA Evaluation (HRA PioPicoEnergyCenter Application005536 060719 REV1.1.doc)

5.0 RECOMMENDATION

This equipment is expected to comply with all applicable federal, state and San Diego County Air Pollution Control District air quality rules and regulations. As a Startup Authorization has already been issued for this project, and no construction is required for this modification, it is recommended that after completion of the public comment period and consideration and response to all comments received during the public comment period, a combined Authority to Construct / Startup Authorization be issued with the conditions specified below.

6.0 RECOMMENDED CONDITIONS

The conditions contained in APCD2023-CON-001984 are recommended.

6.1 Attachments:

Draft Authority to Construct / Startup Authorization

AIR QUALITY IMPACT ANALYSIS

PIO PICO ENERGY CENTER PROJECT
TUNING ACTIVITIES
APPLICATION 2018-APP-005536

August, 2019

Prepared For
Special Projects
San Diego Air Pollution Control District
10124 Old Grove Road
San Diego, California 92131

Prepared By
Bill Reeve
Monitoring and Technical Services
San Diego Air Pollution Control District
10124 Old Grove Road
San Diego, California 92131

An Air Quality Impact Analysis (AQIA) was performed to assess the impact to air quality from tuning activities for three gas turbines at the Pio Pico Energy Center. Dispersion modeling was performed to determine the project impacts on the Federal and California NO_2 and CO air quality standards. Modeling was done for four different scenarios: cold startup, hot shutdown, full load, and half load to make sure that under any of these operating conditions an air quality standard is not violated.

EPA's AERMOD model (Version 18081) was used to determine maximum predicted NO_2 and CO concentrations in the project vicinity. The modeling was performed in accordance with EPA guidance and District standard procedures. The receptor grid was sufficiently dense to identify maximum impacts. Receptor and source elevations were determined using EPA's AERMAP model. Because only one turbine is tuned at a time, for the 1-hour runs only one turbine was modeled. For the annual average model runs total emissions from all three turbines were combined into one source since the highest model impacts are a long distance downwind given the tall stacks and release parameters, and the three turbines are relatively close together.

Meteorological data used for EPA's AERMOD model consisted of data from the District's Donovan meteorological site (located very close to the Pio Pico project site) for the 2015 through 2017 time period. The data was processed by the District using EPA's AERMET meteorological data processor to produce AERMOD ready files.

The modeling input parameters are detailed in Table 1.

Table 1
Modeling Input Parameters

Operating Mode	NOx Emission Rate grams/sec	CO Emission Rate grams/sec	Stack Height meters	Stack Temp Fahrenheit	Stack Diameter meters	Exit Velocity meters/sec
Cold Startup	18.9	9.45	30.5	425.9	4.42	15.30
Hot Shutdown	18.9	9.45	30.5	753.6	4.42	10.39
Half Load	3.5	9.45	30.5	719.4	4.42	20.79
Full Load	5.7	9.45	30.5	796.1	4.42	30.75

To assess the 1-hour and annual NO_2 impacts and to account for conversion of NOx to NO_2 the Ozone Limiting Method (OLM) was used in AERMOD. Background Ozone and NO_2 data from the Donovan monitoring station was used for this purpose. The maximum 1-hour and annual NO_2 data post processing program in AERMOD was used to perform a refined analysis of the facility predicted NO_2 impacts. This program adds the predicted hour by hour NO_2 impacts to the monitored background NO_2 value for that hour for each receptor. The highest combination of predicted plus background NO_2 concentration at any receptor during the 3 years modeled is compared to the California 1-hour standard for determination of compliance. Per the form of the Federal 1-hour standard, for each modeled year the highest hourly combination of predicted plus background concentration at each receptor is first determined. The 98^{th} percentile value (8^{th} high) can then be calculated for each receptor for each of the three years. The highest 98^{th} percentile value for the three years can then be compared to the Federal 1-hour standard to determine compliance with this standard. The results of the refined NO_2 modeling, including monitored background concentrations, are summarized in the tables below for the four operating scenarios.

Table 2
Predicted Maximum Ambient NO_2 Concentrations
And Air Quality Standards
Cold Startup

Average Period	Model Predicted μg/m³	Background μg/m³	Total Impact (predicted+ background) μg/m³	California Standard μg/m³	Federal Standard μg/m³
1-Hour 98th Percentile	161.99	9.41	171.40	N/A	188
1-Hour	193.63	65.85	259.48	339	N/A
Annual	.01	19.58	19.59	57	100

Table 3
Predicted Maximum Ambient NO_2 Concentrations
And Air Quality Standards
Hot Shutdown

Average Period	Model Predicted μg/m³	Background μg/m³	Total Impact (predicted+ background) μg/m³	California Standard μg/m³	Federal Standard μg/m³
1-Hour 98th Percentile	122.10	56.44	178.54	N/A	188
1-Hour	199.32	65.85	265.17	339	N/A
Annual	.01	19.58	19.59	57	100

Table 4
Predicted Maximum Ambient NO_2 Concentrations
And Air Quality Standards
Half Load

Average Period	Model Predicted μg/m³	Background μg/m³	Total Impact (predicted+ background) μg/m³	California Standard μg/m³	Federal Standard μg/m³
1-Hour 98th Percentile	3.76	99.64	103.40	N/A	188
1-Hour	.06	139.12	139.18	339	N/A
Annual	N/A	N/A	N/A	57	100

Table 5
Predicted Maximum Ambient NO_2 Concentrations
And Air Quality Standards
Full Load

Average Period	Model Predicted μg/m³	Background μg/m³	Total Impact (predicted+ background) μg/m³	California Standard μg/m³	Federal Standard μg/m³
1-Hour 98th Percentile	3.79	99.64	103.43	N/A	188
1-Hour	.03	139.12	139.15	339	N/A
Annual	.01	19.58	19.59	57	100

Modeling was also performed for CO. Modeling was run for hourly averages only and then to be conservative it was assumed that the maximum hourly average concentrations occurred for 8 straight hours so that the 8-hour average CO concentration was the same as the hourly. Then the maximum modeled concentrations were added to the background CO concentrations to get the total CO impact from Pio Pico tuning activities. The maximum 1-hour and 8-hour CO concentrations at the Downtown San Diego monitoring station for the years 2015-2017 was used as the background for this project. The model was run for the four scenarios: cold startup, hot shutdown, half load, and full load. The results are summarized in the tables below.

Table 6
Predicted Maximum Ambient CO Concentrations
And Air Quality Standards
Cold Startup

Average Period	Model Predicted μg/m³	Background μg/m³	Total Impact (predicted+ background) μg/m³	California Standard μg/m³	Federal Standard μg/m³
1-Hour	223	2980	3203	23000	40000
8-Hour	223	2180	2403	10000	10000

Table 7
Predicted Maximum Ambient CO Concentrations
And Air Quality Standards
Hot Shutdown

Average Period	Model Predicted μg/m³	Background μg/m³	Total Impact (predicted+ background) μg/m³	California Standard μg/m³	Federal Standard μg/m³
1-Hour	229	2980	3209	23000	40000
8-Hour	229	2180	2409	10000	10000

Table 8
Predicted Maximum Ambient CO Concentrations
And Air Quality Standards
Half Load

Average Period	Model Predicted μg/m³	Background μg/m³	Total Impact (predicted+ background) μg/m³	California Standard μg/m³	Federal Standard μg/m³
1-Hour	163	2980	3143	23000	40000
8-Hour	163	2180	2343	10000	10000

Table 9
Predicted Maximum Ambient CO Concentrations
And Air Quality Standards
Full Load

Average Period	Model Predicted μg/m³	Background μg/m³	Total Impact (predicted+ background) μg/m³	California Standard μg/m³	Federal Standard μg/m³
1-Hour	118	2980	3098	23000	40000
8-Hour	118	2180	2298	10000	10000

Based upon the modeling results presented in Tables 2 through 9, the tuning of the three turbines at Pio Pico will not result in a violation of the Federal or California ambient air quality standards for NO_2 or CO.

Rule 1200 Health Risk Assessment Report

Site ID:	00471
Application:	005536
Project Engineer:	Steven Moore
Toxics Risk Analyst:	Michael Kehetian
HRA Tools Used:	AERMOD (18081) / HARP ADMRT (19044)
Report Date:	June 07, 2019

Health Risk Assessment (HRA) evaluation for the Pio Pico Energy Center Project (PPEC)

A supplemental health risk assessment (HRA) for tuning was evaluated for the Pio Pico Energy Center Project (PPEC). The project is for a 300 megawatt power plant consisting of three simple cycle General Electric LMS 100 natural gas turbines and a cooling tower to be located in Otay Mesa on the southeast instersection of Alta Road and Calzada de la Fuente Road.

Rule 1200 requires the HRA address the increases in potential to emit (PTE) associated with any new or modified emission units. The emission increases for the PPEC are associated with the following sources:

- The tuning of three simple cycle turbines each maximally rated at 1000 MMBtu/hr and equipped with an oxidation catalyst to control volatile organic compounds (VOC) and carbon monoxide (CO) emissions. The oxidation catalyst is assumed to reduce toxic air contaminant (TAC) emissions by 50% during normal operations. The turbines are also equipped with a selective catalytic reduction (SCR) system to control oxides of nitrogen.

The operating scenarios evaluated to determine the maximum potential health impacts include cancer, chronic, 8-hour, and acute risk from startups, shutdowns and steady sate full load operations during tuning operations.

Since the turbines are located relatively close together and the maximum impact points are relatively far away, the middle of the impacts from the middle turbine were used as a surrogate as potential impacts from the other two turbines. Therefore, for assessing annual impacts, total estimated annual emissions from all three turbines were assumed to originate from the middle turbine. For assessing acute impacts, the maximum impact from the middle turbine, was used as a surrogate for the maximum impact from the other two. Note that only one turbine is allowed to be operating in a tuning mode at any time.

To assess acute impacts, the following scenarios were evaluated to encompass the :

- A turbine operating at full load during tuning with the maximum estimated increase for and hour.

- Tuning – Each turbine is limited to 40 hour a year.

Worst-Case Potential Health Impacts

Category	Health Impact	Rule 1200 Significance Level
Maximum Incremental Cancer Risk— *Point of Maximum Impact	4.13	
Maximum Incremental Cancer Risk—Resident (in one million)	0.19	1.0 or 10 (with TBACT)
Startup	0.013	
Shutdown	0.004	
Tuning Full Load	0.173	
Maximum Incremental Cancer Risk—Worker (in one million)	0.29	1.0 or 10 (with TBACT)
Startup	0.019	
Shutdown	0.004	
Tuning Full Load	0.267	
Total Chronic Noncancer Health Hazard Index - Resident	1.58E-06	1.0
Total 8-Hour Noncancer Health Hazard Index - Worker	2.42E-05	1.0
Total Acute Noncancer Health Hazard Index – Point of Maximum Impact		
Startup	7.09E-02	1.0
Shutdown	4.62E-02	1.0
Tuning Full Load	2.98E-02	1.0

*The point of maximum impact (PMI) is the maximum impact point beyond the facility boundary conservatively calculated as residential cancer risk. Since there is no actual exposure to residents at the PMI, the risk value is for reference.

Cancer risk is due to Benzo[b]Fluoranthene (61%), Benzo(a)Pyrene (22%), and Benzo[k]Fluoranthene (17%).

The chronic health hazard index (HHI) is primarily due to Ammonia (62%) and Acrolein (35%).

The chronic 8-hour HHI is primarily due to Acrolein (99%).

The acute HHI is due to Ammonia (56%) and Acrolein (43%), and Acetaldehyde (1%).

Emission Factors

Emission factors reference the U.S. EPA AP-42 (Table 3.1-3) and California Air Toxic Emission Factor (CATEF) database for toxic compounds. The turbines are proposed to be equipped with an oxidation catalyst reducing the emission factors by 50% during normal operations. The emission factor for ammonia was calculated based on the proposed permit limit.

Toxic Air Contaminant	Emission Factor Uncontrolled (lb/MMBtu)	Source	Emission Factor Controlled (lb/MMBtu)
ACETALDEHYDE	4.00E-05	AP-42	2.00E-05
ACROLEIN	6.40E-06	AP-42	3.20E-06
AMMONIA	6.81E-03	SDAPCD	6.81E-03
BENZENE	1.20E-05	AP-42	6.00E-06
BUTADIENE, 1,3-	4.30E-07	AP-42	2.15E-07
ETHYL BENZENE	3.20E-05	AP-42	1.60E-05
FORMALDEHYDE	9.08E-04	CATEF	4.54E-04
HEXANE-N	2.56E-04	CATEF	1.28E-04
NAPHTHALENE	1.64E-06	AP-42	8.22E-07
PAHs			
ACENAPHTHENE	1.88E-08	CATEF	9.41E-09
ACENAPTHYENE	1.46E-08	CATEF	7.28E-09
ANTHRACENE	3.35E-08	CATEF	1.67E-08
BENZO[a]ANTHRACENE	2.24E-08	CATEF	1.12E-08
BENZO[a]PYRENE	1.38E-08	CATEF	6.88E-09
BENZO[e]PYRENE	5.39E-10	CATEF	2.69E-10
BENZO[b]FLUORANTHENE	1.12E-08	CATEF	5.59E-09
BENZO[k]FLUORANTHENE	1.09E-08	CATEF	5.45E-09
BENZO[g,h,i]PERYLENE	1.36E-08	CATEF	6.78E-09
CHRYSENE	2.50E-08	CATEF	1.25E-08
DIBENZ[a,h]ANTHRACENE	2.33E-08	CATEF	1.16E-08
FLUORANTHENE	4.28E-08	CATEF	2.14E-08
FLUORENE	5.74E-08	CATEF	2.87E-08
INDENO(1,2,3-cd)PYRENE	2.33E-08	CATEF	1.16E-08
PHENANTHRENE	3.10E-07	CATEF	1.55E-07
PYRENE	2.74E-08	CATEF	1.37E-08
PROPYLENE	7.63E-04	CATEF	3.82E-04
TOLUENE	1.30E-04	AP-42	6.50E-05
XYLENES	6.40E-05	AP-42	3.20E-05

Emissions - Startup

Toxic Air Contaminant	Emissions (lb/hr)	Emissions (lb/yr)
ACETALDEHYDE	1.71E-01	1.11E+00
ACROLEIN	2.75E-02	1.79E-01
AMMONIA	3.99E+01	9.11E+02
BENZENE	5.13E-02	3.33E-01
BUTADIENE, 1,3-	1.84E-03	1.20E-02

ETHYL BENZENE	1.37E-01	8.90E-01
FORMALDEHYDE	3.85E+00	2.50E+01
HEXANE-N	1.09E+00	7.07E+00
NAPHTHALENE	5.59E-03	3.63E-02
PAHs		
ACENAPHTHENE	7.98E-05	5.19E-04
ACENAPTHYENE	6.17E-05	4.01E-04
ANTHRACENE	1.42E-04	9.24E-04
BENZO[a]ANTHRACENE	9.50E-05	6.18E-04
BENZO[a]PYRENE	5.84E-05	3.80E-04
BENZO[e]PYRENE	2.29E-06	1.49E-05
BENZO[b]FLUORANTHENE	4.74E-05	3.08E-04
BENZO[k]FLUORANTHENE	4.62E-05	3.01E-04
BENZO[g,h,i]PERYLENE	5.75E-05	3.74E-04
CHRYSENE	1.06E-04	6.90E-04
DIBENZ[a,h]ANTHRACENE	9.85E-05	6.40E-04
FLUORANTHENE	1.82E-04	1.18E-03
FLUORENE	2.44E-04	1.59E-03
INDENO(1,2,3-cd)PYRENE	9.85E-05	6.40E-04
PHENANTHRENE	1.32E-03	8.57E-03
PYRENE	1.16E-04	7.57E-04
PROPYLENE	3.24E+00	2.10E+01
TOLUENE	5.59E-01	3.63E+00
XYLENES	2.74E-01	1.78E+00

Emissions - Shutdown

Toxic Air Contaminant	Emissions (lb/hr)	Emissions (lb/yr)
ACETALDEHYDE	4.16E-02	2.29E-01
ACROLEIN	6.68E-03	3.67E-02
AMMONIA	3.99E+01	8.99E+02
BENZENE	1.25E-02	6.86E-02
BUTADIENE, 1,3-	4.48E-04	2.46E-03
ETHYL BENZENE	3.33E-02	1.83E-01
FORMALDEHYDE	9.37E-01	5.15E+00
HEXANE-N	2.64E-01	1.45E+00
NAPHTHALENE	1.36E-03	7.48E-03
PAHs		
ACENAPHTHENE	1.94E-05	1.07E-04
ACENAPTHYENE	1.50E-05	8.25E-05
ANTHRACENE	3.46E-05	1.90E-04
BENZO[a]ANTHRACENE	2.31E-05	1.27E-04
BENZO[a]PYRENE	1.42E-05	7.81E-05

BENZO[e]PYRENE	5.56E-07	3.06E-06
BENZO[b]FLUORANTHENE	1.15E-05	6.34E-05
BENZO[k]FLUORANTHENE	1.12E-05	6.18E-05
BENZO[g,h,i]PERYLENE	1.40E-05	7.69E-05
CHRYSENE	2.58E-05	1.42E-04
DIBENZ[a,h]ANTHRACENE	2.39E-05	1.32E-04
FLUORANTHENE	4.41E-05	2.43E-04
FLUORENE	5.93E-05	3.26E-04
INDENO(1,2,3-cd)PYRENE	2.39E-05	1.32E-04
PHENANTHRENE	3.21E-04	1.76E-03
PYRENE	2.83E-05	1.56E-04
PROPYLENE	7.87E-01	4.33E+00
TOLUENE	1.36E-01	7.48E-01
XYLENES	6.66E-02	3.66E-01

Emissions - Full Load Tuning Mode

Toxic Air Contaminant	Emissions (lb/hr)	Emissions (lb/yr)
ACETALDEHYDE	1.88E-01	2.03E+01
ACROLEIN	3.01E-02	3.25E+00
AMMONIA	1.21E+01	1.31E+03
BENZENE	5.62E-02	6.06E+00
BUTADIENE, 1,3-	2.02E-03	2.18E-01
ETHYL BENZENE	1.50E-01	1.62E+01
FORMALDEHYDE	4.22E+00	4.56E+02
HEXANE-N	1.19E+00	1.29E+02
NAPHTHALENE	6.12E-03	6.61E-01
PAHs		
ACENAPHTHENE	8.74E-05	9.44E-03
ACENAPTHYENE	6.76E-05	7.30E-03
ANTHRACENE	1.56E-04	1.68E-02
BENZO[a]ANTHRACENE	1.04E-04	1.12E-02
BENZO[a]PYRENE	6.39E-05	6.91E-03
BENZO[e]PYRENE	2.50E-06	2.70E-04
BENZO[b]FLUORANTHENE	5.19E-05	5.61E-03
BENZO[k]FLUORANTHENE	5.06E-05	5.47E-03
BENZO[g,h,i]PERYLENE	6.30E-05	6.80E-03
CHRYSENE	1.16E-04	1.26E-02
DIBENZ[a,h]ANTHRACENE	1.08E-04	1.16E-02
FLUORANTHENE	1.99E-04	2.15E-02
FLUORENE	2.67E-04	2.89E-02

INDENO(1,2,3-cd)PYRENE	1.08E-04	1.16E-02
PHENANTHRENE	1.44E-03	1.56E-01
PYRENE	1.28E-04	1.38E-02
PROPYLENE	3.54E+00	3.83E+02
TOLUENE	6.12E-01	6.61E+01
XYLENES	3.00E-01	3.24E+01

Hourly TAC emissions during startup, shutdown, and tuning full load are scaled as a ratio of volatile emissions from full load operations.

Hourly Emissions – Scaled VOCs for Startup, Shutdown and Tuning Full Load

Operating Mode	VOC Emissions lb/hr (event)	Ratio of Normal Operations Full Load	Ammonia (NH3) Emissions (lb/hr)
Full Load	2.3		12.12
Startup	19.69	8.56	
Shutdown	4.79	2.08	
Tuning Full Load	21.56	9.38	

Annual Emissions –VOCs for Startup, Shutdown and Tuning Full Load

Operating Mode	VOC Emissions lb/hr (event)	VOC Emissions lb/yr
Startup	0.0146	128
Shutdown	0.0030	26.3
Tuning Full Load	0.2658	2328.8

Air Dispersion Modeling

The US Environmental Protection Agency (EPA) AERMOD Dispersion Model (Version 18081) was used with AERMET Donovan Ustar Adjusted 2015-2017 meteorological data, AERMAP terrain processing, and rural dispersion coefficients. The receptor grid was sufficiently dense to identify maximum impacts.

Release Parameters – Modeled Operating Modes (1-Hour)

Operating Mode	Stack Height (feet)	Stack Diameter (feet)	Exhaust Temperature (deg F)	Exhaust Velocity (m/s)
Startup	100	14.5	425.93	15.3
Shutdown	100	14.5	753.53	10.39
Tuning Full Load	100	14.5	719.33	20.79

Release Parameters – Modeled Operating Modes (Annual)

Operating Mode	Stack Height (feet)	Stack Diameter (feet)	Exhaust Temperature (deg F)	Exhaust Velocity (m/s)
Startup	100	14.5	514.67	20.59
Shutdown	100	14.5	789.89	11.84
Tuning Full Load	100	14.5	796.01	30.75

Risk Calculations

The HRA was reviewed using ARB's Hotspots Analysis and Reporting Program (HARP2), Version 19044, referencing the OEHHA Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments, February, 2015.

- Residential cancer risk was calculated using the ARB Risk Management Policy (RMP) daily breathing rates (DBR) for inhalation-based residential cancer risk. For the 30-year exposure duration, use the 95th percentile DBR for age groups less than 2 years old (3rd trimester through age 2) and the 80th DBR for age groups greater than 2 years old. Reference the ARB/CAPCOA Risk Management Guidance Document, July 2015.

- Cancer and chronic risk calculations included the minimum oral exposure pathways (dermal contact, soil ingestion, and mother's milk for cancer residential exposure) referencing the OEHHA Guidance Manual, Criteria for Exposure Pathway Evaluation, Section 5.2, February 2015.

- Referencing the OEHHA Guidance Manual, Non-Continuous Sources, Section 4.12.2.1, a worker adjustment factors (WAF) adjustment factor was applied to occupational cancer and the 8-hour chronic risk calculations considering emissions may not be continuous over 24 hours per day and 7 days per week.

- Since there is no school within a 1 in one million residential cancer risk isopleth, a fraction of time (FAH) was applied to ages less than 16 years.

San Diego County Air Pollution Control District

COUNTY OF SAN DIEGO, AIR POLLUTION CONTROL DISTRICT
10124 OLD GROVE ROAD, SAN DIEGO, CA 92131
PHONE (858) 586-2600 Fax (858) 586-2601
www.sdapcd.org

Sectors: 5, S
Site Record ID: APCD2010-SITE-00471
Application Record ID: APCD2018-APP-005536

Startup Authorization Expires:
No Date Entered

Pio Pico Energy Center, LLC
Plant Manager Jason King
7363 Calzada de la Fuente
San Diego CA 92154

EQUIPMENT ADDRESS
Pio Pico Energy Center, LLC
Plant Manager Jason King
7363 Calzada de la Fuente
San Diego CA 92154

STARTUP AUTHORIZATION

After examination of your Application APCD2018-APP-005536 for an Air Pollution Control District (hereinafter referred to as "the District") Authority to Construct and Permit to Operate for equipment located at 7363 Calzada de la Fuente San Diego CA 92154 in San Diego County, the District has decided on the following actions:

This Startup Authorization is granted pursuant to Rule 21 of the Air Pollution Control District Rules and Regulations for equipment to consist of:

Turbine No. 1: A natural-gas-fired, simple-cycle, intercooled GE LMS100 PA combustion turbine generator rated at 1000 MMBtu/hr (HHV) heat input and 106.4 MW, Serial Number 7244965, equipped with an evaporative cooler for the inlet air; a compressor intercooler utilizing a heat exchanger and a shared partial dry cooling system with a wet surface air cooler; a continuous emission monitoring system (CEMS) for NOx, O2, and CO; a data acquisition and handling system (DAHS) to record key operational parameters; water injection; a selective catalytic reduction system (SCR); an ammonia vaporization system, and an oxidation catalyst.

Turbine No. 2: A natural-gas-fired, simple-cycle, intercooled GE LMS100 PA combustion turbine generator rated at 1000 MMBtu/hr (HHV) heat input and 106.4 MW, Serial Number 7244966, equipped with an evaporative cooler for the inlet air; a compressor intercooler utilizing a heat exchanger and a shared partial dry cooling system with a wet surface air cooler; a continuous emission monitoring system (CEMS) for NOx, O2, and CO; a data acquisition and handling system (DAHS) to record key operational parameters; water injection; a selective catalytic reduction system (SCR); an ammonia vaporization system, and an oxidation catalyst.

Turbine No. 3: A natural-gas-fired, simple-cycle, intercooled GE LMS100 PA combustion turbine generator rated at 1000 MMBtu/hr (HHV) heat input and 106.4 MW, Serial Number 7244967, equipped with an evaporative cooler for the inlet air; a compressor intercooler utilizing a heat exchanger and a shared partial dry cooling system with a wet surface air cooler; a continuous emission monitoring system (CEMS) for NOx, O2, and CO; a data acquisition and handling system (DAHS) to record key operational parameters; water injection; a selective catalytic reduction system (SCR); an ammonia vaporization system, and an oxidation catalyst.

This Startup Authorization is issued with the following conditions:

1. This equipment shall be properly maintained and kept in good operating condition at all times, and, to the extent practicable, the owner or operator shall maintain and operate the equipment and any associated air pollution control equipment in a manner consistent with good air pollution control practices for minimizing emissions. [Rule 21 and/or 40 CFR §60.11]
2. A rolling 12-calendar-month period is one of a series of successive consecutive 12-calendar-month periods. The initial 12-month-calendar period of such a series shall begin on the first day of the month in which the applicable beginning date for that series occurs as specified in this permit. [Rule 20.3(d)(1), Rule 20.3(d)(3), Rule 21].
3. The permittee shall comply with all the applicable provisions of 40 CFR 73, including requirements to offset, hold and retire SO2 allowances. [40 CFR Part 73]

4. All records required by this permit shall be maintained on site for a minimum of five years and made available to the District upon request. [Rule 1421]
5. Unless otherwise defined for purposes of a specific condition, for purposes of determining compliance with the emission limits of this permit, a shutdown period is the 11-minute period preceding the moment at which fuel flow ceases. [Rule 20.3(d)(1)]
6. A startup period is the period of time that begins when fuel flows to the combustion turbine following a non-operational period. Unless otherwise defined for purposes of a specific condition, for purposes of determining compliance with the emission limits of this permit, the duration of a startup period shall not exceed 30 consecutive minutes. [Rule 20.3(d)(1)]
7. A non-operational period is any five-consecutive-minute period when fuel does not flow to the combustion turbine. [Rule 20.3(d)(1)]
8. A Continuous Emission Monitoring System (CEMS) protocol is a document approved in writing by the District that describes the methodology and quality assurance and quality control procedures for monitoring, calculating, and recording stack emissions from the combustion turbine that is monitored by the CEMS. [Rules 69.3.1, and 20.3(d)(1) and 40 CFR Part 60 Subpart KKKK, 40 CFR Part 60 Appendix B and F, and 40 CFR Part 75]
9. For each combustion turbine, a unit operating day, hour, and minute mean the following:
   a. A unit operating day means any calendar day in which the turbine combusts fuel.
   b. A unit operating hour means any clock hour in which the turbine combusts fuel.
   c. A unit operating minute means any clock minute in which the turbine combusts fuel.
   [Rule 21, 40 CFR Part 75, Rule 20.3(d)(1), 40 CFR Part 60 Subpart KKKK]
10. Tuning is defined as adjustments to the combustion or emission control system that involves operating the combustion turbine or emission control system in a manner such that the emissions control equipment may not be fully effective or operational. Only one gas turbine shall be tuned at any given time. Tuning events shall not exceed 720 unit operating minutes in a calendar day nor exceed 40 hours in a calendar year for each turbine. The District compliance division shall be notified at least 24 hours in advance of any tuning event. For purposes of this condition, the number of hours of tuning in a calendar year is defined as the total unit operating minutes of tuning during the calendar year divided by 60. [Rule 20.3(d)(1)]
11. The exhaust stacks for each combustion turbine shall be at least 100 feet in height above site base elevation and with an interior exhaust stack diameter of no more than 14.5 feet at the point of release unless it is demonstrated to the District that all requirements of District Rules 20.3 and 1200 are satisfied with a different stack configuration. [Rules 20.3(d)(2) and 1200]
12. The combustion turbines shall be fired on Public Utility Commission (PUC) quality natural gas. The permittee shall maintain, on site, quarterly records of the natural gas sulfur content expressed in units of grains of sulfur per 100 dscf of natural gas and hourly records of the higher heating values of the natural gas expressed in units of Btu/scf. These records shall be provided to District personnel upon request. Natural gas sulfur content records must be kept with a minimum reporting limit of 0.25 grains sulfur compounds per 100 dscf of natural gas. [Rule 20.3(d)(1)]
13. Unless otherwise specified in this permit, all continuous monitoring data shall be collected at least once every clock-minute. [Rules 69.3.1, and 20.3(d)(1)]
14. For purposes of determining compliance with emission limits based on source testing, the average of three subtests shall be used. For purposes of determining compliance with emission limits based on a Continuous Emission Monitoring System (CEMS), data collected in accordance with the CEMS protocol shall be used and the averages for averaging periods specified herein shall be calculated as specified in the CEMS protocol. [Rules 69.3.1, 20.3(d)(1) and 40 CFR Part 60 Subpart KKKK, 40 CFR Part 60 Appendix B and F, and 40 CFR Part 75]
15. For purposes of determining compliance with emission limits based on CEMS data, all CEMS calculations, averages, and aggregates shall be performed in accordance with the CEMS protocol approved in writing by the District. [Rules 69.3.1, 20.3(d)(1) and 40 CFR Part 60 Subpart KKKK, 40 CFR Part 60 Appendix B and F, and 40 CFR Part 75]
16. For each emission limit expressed as pounds, pounds per hour, or parts per million based on a one-hour or less averaging period or compliance period, compliance shall be based on using data collected at least once every

minute when compliance is based on CEMS data except as specified in the District-approved CEMS Protocol. [Rules 69.3.1, and 20.3(d)(1)]

17. When a combustion turbine is combusting fuel (operating), the emission concentration of oxides of nitrogen (NOx), calculated as nitrogen dioxide (NO2), shall not exceed 2.5 ppmvd corrected to 15% oxygen averaged over a one-clock-hour period, except during tuning, startup, and shutdown periods for that turbine. [Rule 20.3(d)(1)]
18. When a combustion turbine is operating, the emission concentration of carbon monoxide (CO) shall not exceed 4.0 ppmvd corrected to 15 % oxygen, averaged over a one-clock-hour period, except during tuning, startup, and shutdown periods for that turbine. [Rule 20.3(d)(1)]
19. When a combustion turbine is operating, the volatile organic compound (VOC) concentration, calculated as methane, measured in the exhaust stack, shall not exceed 2.0 ppmvd corrected to 15% oxygen, averaged over a 1 -clock-hour period, except during tuning operations, startup periods, and any clock minutes that are not excluded from shutdown periods for that turbine. For purposes of determining compliance based on source testing, an average of three subtests shall be used. [Rule 20.3(d)(1)]
20. When a combustion turbine is operating, the ammonia concentration (ammonia slip), shall not exceed 5.0 ppmvd corrected to 15 % oxygen and averaged over a one-clock-hour period, except during tuning, startup, and shutdown periods for that turbine. [Rule 1200]
21. When a combustion turbine is operating with post-combustion air pollution control equipment that controls oxides of nitrogen (NOx) emissions, the emission concentration NOx, calculated as nitrogen dioxide (NO2), shall not exceed 13.9 ppmvd averaged over each one-clock-hour period and corrected to 15% oxygen, except for startup and shutdown periods for that turbine, as defined in Rule 69.3.1. [Rule 69.3.1]
22. When a combustion turbine is operating without any post-combustion air pollution control equipment that controls oxides of nitrogen (NOx) emissions, the emission concentration of NOx calculated as nitrogen dioxide (NO2) from each turbine shall not exceed 23.2 ppmvd averaged over each one-clock-hour period and corrected to 15% oxygen, except for startup and shutdown periods for that turbine, as defined in Rule 69.3.1. [Rule 69.3.1]
23. For each rolling four-unit-operating-hour period, average emission concentration of oxides of nitrogen (NOx) for each turbine calculated as nitrogen dioxide (NO2) in parts per million by volume dry (ppmvd) corrected to 15% oxygen or, alternatively, as elected by the permittee, the average NOx emission rate in pounds per megawatt-hour (lb/MWh) shall not exceed an average emission limit calculated in accordance with 40 CFR Section 60.4380(b)(3). The emission concentration and emission rate averages shall be calculated in accordance with 40 CFR Section 60.4380(b)(1). The average emission concentration limit and emission rate limit shall be based on an average of hourly emission limits over the four-unit-operating-hour period including the operating-hour and three-unit-operating-hours immediately preceding. For any unit-operating-hour where multiple emission standards would apply based on load of the turbine, the applicable standard shall be the higher of the two limits. The hourly emission concentration limit and emission rate limit shall be as follows based on the load of the turbine over the four-unit-operating-hour period:

Case	Emission Limit, ppmvd at 15% O2	Emission Limit, lb/MWh
i. All four hours at or above 75% Load	15	0.43
ii. All four hours below 75% Load	96	4.7
iii. Combination of hrs	(a x 15+b x 96)/4	(a x 0.43+b x 4.7)/4

Where: a = the number of unit operating hours in the four-hour period with all operation above 75% load and b = 4-a.

The averages shall include emissions during all times that the equipment is operating including, but not limited to, emissions during startup and shutdown periods. For each six-calendar-month period, emissions in excess of these limits and monitor downtime shall be identified in accordance with 40 CFR Sections 60.4350 and 60.4380(b)(2), except that Section 60.4350(c) shall not apply for identifying periods in excess of a NOx concentration limit. For

the purposes of this condition, unit-operating-hour shall have the meaning as defined in 40 CFR 60.4420. [40 CFR Part 60 Subpart KKKK]

24. The emissions of particulate matter less than or equal to 10 microns in diameter (PM10) from the exhaust stack of each combustion turbine shall not exceed 5.0 pounds per hour for each combustion turbine. Compliance with this limit shall be demonstrated based upon source testing and calculated as the average of three subtests. [Rule 20.3 (d)(1) and (d)(2)]

25. The emissions of particulate matter less than or equal to 10 microns in diameter (PM10) from the exhaust stacks of the combustion turbines shall not exceed 3.5 pounds per hour per turbine, calculated as the arithmetic average of the source test results from the six most recent sets of valid source tests performed on the three turbines. For the purpose of this condition, a valid source test is a source test for which the results have been approved by the District, and that included at least three subtests in the calculation of average emission rate. [Rule 20.3(d)(1) and (d)(2)]

26. The discharge of particulate matter from the exhaust stack of each combustion turbine shall not exceed 0.10 grains per dry standard cubic foot (0.23 grams/dscm) corrected to 12% carbon dioxide by volume. The District may require periodic testing to verify compliance with this standard. [Rule 53]

27. Visible emissions from the lube oil vents and the exhaust stack of each combustion turbine shall not exceed 20% opacity for more than three (3) minutes in any period of 60 consecutive minutes. [Rule 50]

28. Mass emissions from each combustion turbine of oxides of nitrogen (NOx), calculated as NO2; carbon monoxide (CO); and volatile organic compounds (VOC), calculated as methane, shall not exceed the following limits, except during tuning, startup, and shutdown periods for that turbine. A one-clock-hour averaging period for these limits shall be used when compliance is determined using CEMS data.

Pollutant	Emission Limit, lb/hour
a. NOx	8.2
b. CO	8.0
c. VOC	2.3

[Rule 20.3(d)(2)]

29. Cumulative mass emissions from each combustion turbine of oxides of nitrogen (NOx), calculated as NO2; carbon monoxide (CO); and volatile organic compounds (VOC), calculated as methane, shall not exceed the following limits during each of that turbine's tuning operations.

	Pollutant Emission Limit, lbs/hr
a. NOx	45.6
b. CO	75.0

[Rule 20.3(d)(1)]

30. Excluding any minutes that are coincident with a shutdown period, cumulative mass emissions from each combustion turbine of oxides of nitrogen (NOx), calculated as NO2; carbon monoxide (CO); and volatile organic compounds (VOC), calculated as methane, shall not exceed the following limits during each of that turbine's startup periods.

Pollutant	Emission Limit, lb/event
a. NOx	22.5
b. CO	17.9
c. VOC	4.7

[Rule 20.3(d)(1)]

31. Cumulative mass emissions from each combustion turbine of oxides of nitrogen (NOx), calculated as NO2; carbon monoxide (CO); and volatile organic compounds (VOC), calculated as methane, shall not exceed the following limits during each of that turbine's shutdown periods.

Pollutant	Emission Limit, lb/event
a. NOx	6.0
b. CO	47.0
c. VOC	3.0

[Rule 20.3(d)(1)]

32. The total aggregate oxides of nitrogen (NOx) emissions from all combustion turbines combined shall not exceed 150 pounds per hour, calculated as nitrogen dioxide and measured over each one-clock-hour period. This emission limit shall apply during all times one or more turbines are operating, including, but not limited to, emissions during tuning, startup, and shutdown periods. [Rule 20.3(d)(2)]

33. The carbon monoxide (CO) emissions from each combustion turbine shall not exceed 75 pounds per hour and total aggregate CO emissions from all combustion turbines combined shall not exceed 225 pounds per hour measured over each one-clock-hour period. This emission limit shall apply during all times that one or more turbines are operating, including, but not limited to emissions during tuning, startup, and shutdown periods. [Rule 20.3(d)(2)(i)]

34. Aggregate emissions of oxides of nitrogen (NOx), calculated as nitrogen dioxide (NO2); carbon monoxide (CO); volatile organic compounds (VOCs), calculated as methane; particulate matter less than or equal to 10 microns in diameter (PM10); and oxides of sulfur (SOx), calculated as sulfur dioxide (SO2), from the combustion turbines authorized to be constructed under this permit, except emissions from emission units excluded from the calculation of aggregate potential to emit as specified in Rule 20.1 (d) (1), as it exists on the date the permit to operate for this equipment is approved, shall not exceed the following limits for each rolling 12- calendar-month period:

Pollutant	Emission Limit, tons per year
a. NOx	70.4
b. CO	96.4
c. VOC	19.4
d. PM10	35.8
e. SOx	4.1

The aggregate emissions of each pollutant shall include emissions during all times that the equipment is operating including, but not limited to, emissions during tuning, startup, and shutdown periods. All calculations performed to show compliance with these limits shall be performed according to a protocol approved in advance in writing by the District. [Rules 20.3(d)(2), 20.3(d)(3), 20.3(d)(5), 20.3(d)(8) and 21]

35. The wet surface air cooler (WSAC) shall be equipped with a mist eliminator designed to achieve a drift rate of 0.001% or less. In addition, the maximum total dissolved solids (TDS) concentration of the air-side recirculating cooling water used in the WSAC shall not exceed 5,600 ppm. The TDS concentration shall be verified through calendar quarterly testing of the water by a certified lab using an EPA approved method. In addition, emissions of PM10 from the WSAC shall not exceed 1.46 tons for each rolling 12-calendar-month period. For each calendar month, PM10 emissions from the WSAC shall be calculated using a District approved protocol that is based on either the design maximum air-side recirculating cooling water flow to the WSAC or the measured total air-side recirculating water flow to the WSAC during the calendar month; the design maximum drift rate; the TDS concentration from the calendar quarterly measurement for the calendar quarter that contains the month; and the actual hours of operation of the WSAC fans during the calendar month. Except for the TDS concentration, for which the owner or operator shall maintain records not less frequently than a calendar quarterly basis, the owner or operator shall maintain records not less frequently than a calendar monthly basis of each variable parameter necessary to calculate the WSAC PM10 emissions with the District approved protocol methodology including, but not limited to, the recirculating air-side cooling water flow rate and actual hours of operation of the WSAC fans, if applicable. [Rule 20.3(d)(1)]

36. For each calendar month and each rolling 12-calendar-month period, the owner or operator shall maintain records, as applicable, on a calendar monthly basis, of mass emissions during each calendar month and rolling 12-calendar month period of NOx, calculated as NO2; CO; VOCs, calculated as methane; PM10; and SOx, calculated as SO2, in tons, from each emission unit located at this stationary source, except for emissions from emission

units excluded from the calculation of aggregate potential to emit as specified in Rule 20.1 (d) (1) as it exists on the date the permit to operate for this equipment is approved. These records shall be made available for inspection within 15 calendar days after the end of each calendar month. The recorded emissions shall be calculated in accordance with an emission calculation protocol approved by the District. Where applicable, this protocol may rely in whole or in part on the CEMS Protocol or other monitoring protocols required by this permit. [Rules 20.3(d)(3), 20.3(d)(8) and 21]

37. For each calendar month and each rolling 12-calendar-month period, the owner or operator shall maintain records, as applicable, on a calendar monthly basis, of mass emissions during each calendar month and rolling 12-calendar-month period of NOx calculated as NO2, CO, VOCs calculated as methane, PM10, and SOx calculated as SO2, in tons, from each emission unit located at this stationary source, except for emissions from emission units excluded from the calculation of aggregate potential to emit as specified in Rule 20.1 (d)(1) as it exists on the date the initial Permit to Operate for this equipment is approved. These records shall be made available for inspection within 15 calendar days after the end of each calendar month. [Rule 20.3(d)(1), Rule 20.3(d)(5), Rule 21]

38. The associated ammonia vaporizer system shall be operated and maintained in accordance with the manufacturer's instructions and shall begin operating as soon as feasible before a turbine startup period begins and be fully operational at all times when a combustion turbine is operating. [Rules 20.3(d)(1) and 21]

39. When a combustion turbine is operating, ammonia shall be injected at all times provided that all of the following are satisfied:
a. The associated selective catalytic reduction (SCR) system catalyst inlet temperature is 570 degrees Fahrenheit (°F) or greater;
b. The associated ammonia vaporizer system air heater exit temperature has attained 300 °F or greater after the beginning of the startup period and is greater than 250 °F during continuous operations;
c. The associated ammonia vaporizer system ammonia-air mixing header exit temperature has attained 275 °F or greater after the beginning of the startup period and is greater than 215 °F during continuous operations.
For purposes of this condition, the SCR inlet temperature shall be determined as the smallest of the temperatures measured by the SCR inlet temperature monitors including only those monitors that are fully operational and measuring temperature within their specified accuracy. [Rules 20.3(d)(1) and 21]

40. Continuous monitors shall be installed on each SCR system and associated ammonia vaporizer system to monitor or calculate, as applicable, and record each unit operating minute the ammonia solution injection rate in pounds per hour, the SCR inlet temperature at three points at the inlet to the SCR in degrees Fahrenheit (°F), the ammonia vaporizer system air heater exit temperature in °F, and ammonia-air mixing header exit temperature in °F. The monitors shall be calibrated, maintained, and operated in accordance with a District approved protocol, which may be part of the CEMS Protocol. If the District has not approved any protocol the monitors shall be calibrated, maintained, and operated in accordance with the manufacturer's instructions until the date that a District approved protocol is in effect. The monitors shall be in full operation at all times when the turbine is in operation. [Rules 20.3(d)(1)]

41. Except during periods when the ammonia injection system is being tuned or one or more ammonia injection systems is in manual control for compliance with applicable permit conditions, the automatic ammonia injection system serving each SCR system shall be in operation in accordance with manufacturer's specifications at all times when ammonia is being injected into the SCR system. Manufacturer specifications shall be maintained on site and made available to District personnel upon request. [Rules 20.3(d)(1), 21]

42. The concentration of ammonia solution used in the ammonia injection system shall be less than 20% ammonia by weight. Records of ammonia solution concentration shall be maintained on site and made available to district personnel upon request

43. All source test or other tests required by this permit shall be performed by the District or performed by an independent contractor and witnessed and approved by the District. Unless otherwise specified in this permit or authorized in writing by the District, a proposed test protocol shall be submitted to the District for written approval at least 45 calendar days prior to source testing for all testing performed by an independent contractor. Additionally, the District shall be notified a minimum of 30 calendar days prior to the test so that observers may be present unless otherwise authorized in writing by the District. [Rules 20.2(d)(1) and 1200 and 40 CFR Part 60

Subpart GG and 40 CFR §60.8]

44. Within 30 days of the issuance of this Permit to Operate, the owner or operator of this equipment shall submit a source test protocol to measure concentrations and mass emissions of Volatile Organic Compounds (VOCs), including formaldehyde, during startup and shutdown conditions. Measurement of VOC emissions shall be conducted in accordance with EPA Method 18, or alternative methods approved by the District and EPA. Measurement of emissions of formaldehyde shall be conducted in accordance with EPA Method 316 or 323, or an alternative method approved by the District and EPA. This test shall be conducted on the same dates as the first renewal test performed for each turbine after the approval of the source test protocol and subsequently during the first permit year of each five-year Title V Permit renewal. [Rule 20.3]

45. Unless otherwise specified in this permit or authorized in writing by the District, within 45 days after completion of a source test or Relative Accuracy Test Audit (RATA) performed by an independent contractor, a final test report shall be submitted to the District for review and approval. [Rules 20.3(d)(1) and 1200 and 40 CFR Part 60 Subpart KKKK, 40 CFR §60.8, and 40 CFR Part 75]

46. A renewal source test and a NOx and CO Relative Accuracy Test Audit (RATA) shall be periodically conducted on each combustion turbine to demonstrate compliance with the NOx, CO, VOC, PM10, and ammonia emission standards of this permit and applicable relative accuracy requirements for the CEMS systems using District-approved methods. The renewal source test and the NOx and CO RATAs shall be conducted in accordance with the applicable RATA frequency requirements of 40 CFR 75, Appendix B, Sections 2.3.1 and 2.3.3. The renewal source test shall be conducted in accordance with a protocol complying with all the applicable requirements of the source test protocol for the Initial Emissions Source Test. [Rules 69.3.1, and 20.3(d)(1) and 40 CFR Part 60 Subpart KKKK, and 40 CFR Part 75]

47. Each combustion turbine shall be source tested to demonstrate compliance with the NOx, CO, VOC, PM10, and ammonia emission standards of this permit. The source test protocol shall comply with all of the following requirements:

    a. Measurements of NOx and CO concentrations and emissions and oxygen (O2) concentration shall be conducted in accordance with U.S. Environmental Protection Agency (EPA) methods 7E, 10, and 3A, respectively, and District source test Method 100, or alternative methods approved by the District and EPA;
    b. Measurement of VOC concentrations and emissions, except for formaldehyde, shall be conducted in accordance with EPA Method 18, or an alternative method approved by the District and EPA;
    c. Measurement of formaldehyde concentrations and emissions shall be conducted in accordance with EPA Method 316 or 323, as specified by the District, or an alternative method approved by the District and EPA;
    d. Total VOC concentrations and emissions shall be the sum of those concentrations and emissions determined using Method 18 and the formaldehyde concentrations and emissions;
    e. Measurements of ammonia concentrations shall be conducted in accordance with Bay Area Air Quality Management District Method ST-1B or an alternative method approved by the District and EPA;
    f. Measurements of PM10 emissions shall be conducted in accordance with EPA Methods 201A and 202, or EPA Methods 5 and 202 (reporting PM as PM10), or an alternative method approved by the District and EPA;
    g. Source testing shall be performed at the normal load level, as specified in 40 CFR Part 75 Appendix A Section 6.5.2.1 (d), provided it is not less than 80% of the combustion turbine's rated load unless it is demonstrated to the satisfaction of the District that the combustion turbine cannot operate under these conditions. If the demonstration is accepted, then emissions source testing shall be performed at the highest achievable continuous power level. The District may specify additional testing at different load levels or operational conditions to ensure compliance with the emission and concentration limits of this permit and District Rules and Regulations.
    h. Measurements of particulate matter emissions shall be conducted in accordance with SDAPCD Method 5 or an alternative method approved by the District and EPA; and
    i. Unless otherwise authorized in writing by the District, testing for NOx, CO, VOC, PM10, and ammonia concentrations and emissions, as applicable, shall be conducted concurrently with the NOx and CO continuous emission monitoring system (CEMS) Relative Accuracy Test Audit (RATA).
    [Rules 20.3(d)(1) and 1200]

48. Relative Accuracy Test Audits (RATAs) and all other required certification tests shall be performed and completed on the NOx CEMS in accordance with applicable provisions of 40 CFR Part 75 Appendix A and B and 40 CFR

§60.4405 and on the CO CEMS in accordance with applicable provisions of 40 CFR Part 60 Appendix B and F. In order to provide for a reasonable assurance of compliance with the permitted emission limits, the CP CEMS must meet one of the following performance criteria:
a. A Relative Accuracy of 10% when the average reference method value is used in the denominator of Equation 2-6 of 40 CFR 60, Performance Specification 2;
b. A Relative Accuracy of 5.0% when the applicable emission standard is used n the denominator of Equation 2-6 of 40 FR, Performance Specification 2;
c. 0.50 ppmvd corrected to 15% oxygen and 1.0 lb/hr when the RA is calculated as the absolute average difference between the RM and CEMS plus the 2.5 percent confidence coefficient.

[Rule 21, Rule 20.3 (d)(1), 40 CFR Part 60 Subpart KKKK, and 40 CFR Part 75]

49. A monitoring plan in conformance with 40 CFR 75.53 shall be submitted to U.S. EPA Region 9 and the District at least 45 days prior to the Relative Accuracy Test Audit test, as required in 40 CFR 75.62. (40 CFR Part 75)

50. The District may require one or more of the following compounds, or additional compounds, to be quantified through source testing periodically to ensure compliance with Rule 1200 and other conditions of this permit and to quantify toxic emissions:
a. Acetaldehyde
b. Acrolein
c. Benzene
d. Formaldehyde
e. Toluene
f. Xylenes
If the District requires the permittee to perform this source testing, the District shall request the testing in writing a reasonable period of time prior to the testing date. [Rule 1200, California H&S Code §41510]

51. The higher heating value of the combustion turbine fuel shall be measured by ASTM D1826–94, Standard Test Method for Calorific Value of Gases in Natural Gas Range by Continuous Recording Calorimeter or ASTM D1945–96, Standard Method for Analysis of Natural Gas by Gas Chromatography or an alternative test method approved by the District and EPA. [Rules 69.3.1, and 20.3(d)(1) and 40 CFR Part 60 Subpart KKKK, and 40 CFR Part 75]

52. The sulfur content of the combustion turbine fuel shall be sampled not less than once each calendar quarter in accordance with a protocol approved by the District and measured with ASTM D1072–90 (Reapproved 1994), Standard Test Method for Total Sulfur in Fuel Gases; ASTM D3246–05, Standard Test Method for Sulfur in Petroleum Gas by Oxidative Microcoulometry; ASTM D4468–85 (Reapproved 2000), Standard Test Method for Total Sulfur in Gaseous Fuels by Hydrogenolysis and Rateometric Colorimetry; ASTM D6228–98 (Reapproved 2003), Standard Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Flame Photometric Detection; or ASTM D6667–04, Standard Test Method for Determination of Total Volatile Sulfur in Gaseous Hydrocarbons and Liquefied Petroleum Gases by Ultraviolet Fluorescence or an alternative test method approved by the District and EPA. [Rule 20.3(d)(1), Rule 21, and 40 CFR Part 75]

53. The permit holder shall comply with the applicable continuous emission monitoring requirements of 40 CFR Part 75 and 40 CFR Part 60. [40 CFR Part 75 and 40 CFR Part 60]

54. A continuous emission monitoring system (CEMS) shall be installed on each combustion turbine and properly maintained and calibrated to measure, calculate, and record the following, in accordance with the District-approved CEMS protocol:
a. Clock-hourly average concentration of oxides of nitrogen (NOx) in parts per million (ppmvd) both uncorrected and corrected to 15% oxygen;
b. Clock-hourly average concentration of carbon monoxide (CO) in parts per million (ppmvd) both uncorrected and corrected to 15% oxygen;
c. Percent oxygen (O2) in the exhaust gas for each unit operating minute;
d. Clock-hourly mass emissions of oxides of nitrogen (NOx) calculated as NO2, in pounds;
e. Cumulative mass emissions of oxides of nitrogen (NOx) calculated as NO2 in each tuning operation, and startup and shutdown period, in pounds;
f. Calendar daily mass emissions of oxides of nitrogen (NOx) calculated as NO2, in pounds;

g. Calendar monthly mass emissions of oxides of nitrogen (NOx) calculated as NO2, in pounds;
h. Rolling four-unit-operating-hour average concentration of oxides of nitrogen (NOx) in parts per million (ppmvd) corrected to 15% oxygen;
i. Rolling four-unit-operating-hour average emission rate of oxides of nitrogen (NOx), calculated as NO2, in pounds per megawatt-hour (lb/MWh);
j. Calendar quarter, calendar year, and rolling 12-calendar-month period mass emissions of oxides of nitrogen (NOx) calculated as NO2, in tons;
k. Cumulative mass emissions of carbon monoxide (CO) in each tuning operation, and startup and shutdown period, in pounds;
l. Clock-hourly mass emissions of carbon monoxide (CO), in pounds;
m. Calendar-daily mass emission of carbon monoxide (CO), in pounds;
n. Calendar-monthly mass emission of carbon monoxide (CO), in pounds;
o. Rolling 12-calendar-month period mass emission of carbon monoxide (CO), in tons;
p. Average concentration of oxides of nitrogen (NOx) and carbon monoxide (CO) in parts per million (ppmvd) both uncorrected and corrected to 15% oxygen during each unit operating minute; and
q. Average emission rate in pounds per hour of oxides of nitrogen (NOx) calculated as NO2 and carbon monoxide (CO) during each unit operating minute.
[Rules 69.3.1, and 20.3(d)(1) and 40 CFR Part 60 Subpart KKKK, and 40 CFR Part 75]

55. The oxides of nitrogen (NOx) and oxygen (O2) components of the CEMS shall be certified and maintained in accordance with applicable federal regulations including the requirements of §§ 75.10 and 75.12 of Title 40 Code of Federal Regulations Part 75 (40 CFR 75), the performance specifications of Appendix A of 40 CFR 75, the quality assurance procedures of Appendix B of 40 CFR 75 and the CEMS Protocol approved by the District. The carbon monoxide (CO) component of the CEMS shall be certified and maintained in accordance with District Rule 19, 40 CFR 60, appendices B and F and the CEMS Protocol approved by the District. (District Rules 69.3.1, 20.3 (d)(1); 40 CFR 60 Subpart KKKK; 40 CFR 60, appendices B and F; 40 CFR Part 75)

56. The CEMS shall be in operation in accordance with the District-approved CEMS Protocol at all times when the turbine is in operation. A copy of the District-approved CEMS Protocol shall be maintained on site and made available to District personnel upon request. (District Rules 69.3.1, and 20.3(d)(1); 40 CFR 60 Subpart KKKK; 40 CFR Part 75)

57. When the CEMS is not recording data and the combustion turbine is operating, hourly NOx emissions for purposes of calendar year and rolling 12-calendar-month period emission calculations shall be determined in accordance with 40 CFR 75 Subpart C. Additionally, hourly CO emissions for rolling 12-calendar-month period emission calculations shall be determined using CO emission factors to be determined from source test emission factors, recorded CEMS data, and fuel consumption data, in terms of pounds per hour of CO for the gas turbine. Emission calculations used to determine hourly emission rates shall be reviewed and approved by the District, in writing, before the hourly emission rates are incorporated into the CEMS emission data. [Rules 20.3(d)(3) and 21 and 40 CFR Part 75]

58. Any violation of any emission standard as indicated by the CEMS shall be reported to the District's Compliance Division within 96 hours after such occurrence. (CA Health and Safety Code, Division 26, Part 4, Chapter 5 § 42706)

59. The CEMS shall be maintained and operated, and reports submitted, in accordance with the requirements of Rule 19.2 Sections (D), (E), (F)(2), (F)(3), (F)(4) and (F)(5) and CEMS Protocol approved by the District. [Rule 19.2]

60. Except for changes that are specified in the initial approved CEMS protocol or a subsequent revision to that protocol that is approved in advance, in writing, by the District, the District shall be notified in writing at least thirty (30) calendar days prior to any planned changes made in the CEMS or Data Acquisition and Handling System (DAHS), including, but not limited to, the programmable logic controller, software which affects the value of data displayed on the CEMS / DAHS monitors with respect to the parameters measured by their respective sensing devices and any planned changes to the software that controls the ammonia flow to the SCR. Unplanned or emergency changes shall be reported within 96 hours. [Rules 69.3.1, and 20.3(d)(1) and 40 CFR Part 60 Subpart KKKK, and 40 CFR Part 75]

61. Copies of the approved CEMS protocol and the District's written approval shall be maintained on site and made

available to District personnel upon request.

62. Fuel flowmeters shall be installed and maintained to measure the fuel flow rate, corrected for temperature and pressure, to each combustion turbine. Correction factors and constants shall be maintained on site and made available to the District upon request. The fuel flowmeters shall meet the applicable quality assurance requirements of 40 CFR Part 75, Appendix D, Section 2.1.6. [Rules 69.3.1, and 20.3(d)(1) and 40 CFR Part 60 Subpart KKKK, and 40 CFR Part 75]

63. Each combustion turbine shall be equipped with continuous monitors to measure, calculate, and record unit operating days, hours, and minutes and the following operational characteristics:

    a. Date and time;
    b. Natural gas flow rate to the combustion turbine during each unit operating minute, in standard cubic feet per minute;
    c. Total heat input to the combustion turbine based the fuels higher heating value during each unit operating minute, in million British thermal units per hour (MMBtu/hr);
    d. Higher heating value of the fuel on an hourly basis, in British thermal units per standard cubic foot (Btu/scf);
    e. Gross electrical power output during each unit operating minute in megawatts (MW); and
    f. Water injection rate in gallons per minute (gpm) or pounds per hour (lb/hr).

    The values of these operational characteristics shall be recorded at least once each unit operating minute. The monitors shall be installed, calibrated, maintained, and operated in accordance with a turbine operation monitoring protocol, which may be part of the CEMS Protocol and which shall include any relevant calculation methodologies, which is approved, in advance, in writing, by the District. The monitors shall be in full operation at all times when the combustion turbine is in operation. Calibration records for the continuous monitors shall be maintained on site and made available to the District upon request. [Rules 69.3.1, and 20.3(d)(1) and 40 CFR Part 60 Subpart KKKK, and 40 CFR Part 75]

64. Operating logs or Data Acquisition and Handling System (DAHS) records shall be maintained to record the beginning and end times and durations of all tuning periods, and startup and shutdown periods to the nearest minute, quantity of fuel used in each clock minute, clock hour, calendar month, and 12-calendar-month period in standard cubic feet; hours of operation each day; and hours of operation during each calendar year. For purposes of this condition, the hours of turbine operation is defined as the total minutes the turbine is combusting fuel during the calendar year divided by 60 rounded to the nearest hundredth of an hour. [Rules 69.3.1, and 20.3(d)(1) and 40 CFR Part 60 Subpart KKKK, and 40 CFR Part 75]

65. The permittee shall file semiannual reports in accordance with 40 CFR § 60.4375. (40 CFR 60 Subpart KKKK § 60.4375(a))

66. Each semiannual report must cover the semiannual reporting period from January 1 through June 30 or the semiannual reporting period from July 1 through December 31. Each such semiannual compliance report shall be postmarked or delivered no later than January 30 or July 30, whichever date is the first date following the end of the semiannual reporting period. (40 CFR 60 Subpart KKKK; Rule 21)

67. All semiannual compliance reports shall be submitted to the District Compliance Division. (40 CFR § 60.7)

68. Access, facilities, utilities and any necessary safety equipment for source testing and inspection shall be provided upon request of the Air Pollution Control District.

69. This Air Pollution Control District Permit does not relieve the holder from obtaining permits or authorizations required by other governmental agencies.

70. The permittee shall, upon determination of applicability and written notification by the District, comply with all applicable requirements of the Air Toxics "Hot Spots" Information and Assessment Act (California Health and Safety Code Section 44300 et seq.)

San Diego County Air Pollution Control District

COUNTY OF SAN DIEGO, AIR POLLUTION CONTROL DISTRICT
10124 OLD GROVE ROAD, SAN DIEGO, CA 92131
PHONE (858) 586-2600 Fax (858) 586-2601
www.sdapcd.org

Sectors: 5, S
Site Record ID: APCD2010-SITE-00471
Application Record ID: APCD2018-APP-005536

Startup Authorization Expires:
No Date Entered

This authorization is for temporary operation of the above-specified equipment. This temporary Permit to Operate will remain in effect, unless withdrawn or modified by the District or a Permit to Operate is granted or denied.

This Startup Authorization shall be posted on or within 25 feet of the described equipment or maintained readily available at all times on the operating premises.

This Startup Authorization does not relieve the holder from obtaining permits or authorizations, which may be required by other governmental agencies.This Startup Authorization is not an authorization to exceed any applicable emission standard established by this District or any other governmental agency. This authorization is subject to cancellation if any emission standard or condition is violated.

Within 30 days after receipt of this Startup Authorization, the applicant may petition the Hearing Board for a hearing on any conditions imposed herein in accordance with Rule 25.

This Startup Authorization will expire on No Date Entered, unless an extension is granted in writing.

If you have any questions regarding this action, please contact me at 858-997-5469 or via email at jim.swaney@sdapcd.org.

Jim Swaney

Senior Engineer

CC: Compliance Division