

EVALUATION REPORT

PRELIMINARY DETERMINATION OF COMPLIANCE

FOR

DUKE ENERGY MORRO BAY LLC  
1290 EMBARCADERO ROAD  
MORRO BAY, CA 93442

APPLICATION NUMBER 3038  
CEC DOCKET NUMBER 00-AFC-12

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DATE: [signed May 15, 2001]

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## EVALUATION DATA

Company: Duke Energy Morro Bay LLC  
Address: 1290 Embarcadero Road  
Morro Bay, CA 93442

Application #: 3038

Contact Person: Andy Trump

District Engineer: Gary E. Willey

Site Location: 1290 Embarcadero Road  
Morro Bay, California

### **I. PROJECT DESCRIPTION**

Duke Energy Morro Bay LLC (Duke) submitted an Application for Certification (AFC) to the California Energy Commission on October 23, 2000 for the proposed modernization of the Morro Bay Power Plant (MBPP). The AFC also acts as an application to the District.

The proposed project consists of the installation of two (2) combined cycle turbine units and the shutdown of four existing natural gas fired steam boilers. If fully implemented, this proposed project will result in an increase in the total nominal power production of the Morro Bay Power Plant from the presently permitted 1,002 MW to 1,200 MW. Through improvements in efficiency, the maximum amount of fuel the plant can burn will be reduced from 10,400 mmBtu/hr to 8,565 mmBtu/hr.

The combined cycle packaged units are each nominally rated at 600 MW (Power Output to the Grid). Each unit consists of two 180 MW Gas Turbines, two Heat Recovery Steam Generators with Duct Burners and one 240 MW Steam Turbine.

This evaluation report covers the air quality rules, requirements and conditions applicable to the permitted equipment for this project. Comparison to the existing plant, air quality impacts from non-permitted equipment and processes (construction, ammonia transportation issues, etc) and other air quality CEQA issues have been addressed by the District through comments to the California Energy Commission (CEC).

### **II. APPLICABLE RULES**

Rule 113	Continuous Emissions Monitoring
Rule 203	Applications
Rule 204	Requirements
Rule 206	Conditional Approval
Rule 209	Provision for Sampling and Testing Facilities
Rule 210	Periodic Inspection, Testing and Renewal of Permits to Operate
Rule 211	Emission Banking
Rule 213	Calculations

Rule 214	Notification
Rule 216	Federal Part 70 Permits
Rule 217	Federal Part 72 Permits
Rule 219	Toxics New Source Review
Rule 223	Power Plants
Rule 302	Schedule of Fees
Rule 401	Visible Emissions
Rule 402	Nuisance
Rule 403	Particulate Matter Emission Standards
Rule 404	Sulfur Compounds Emission Standards, Limitations and Prohibitions
Rule 405	Nitrogen Oxides Emission Standards, and Prohibitions
Rule 406	Carbon Monoxide Emission Standards and Limitations
	Rule 429 Oxides of Nitrogen and Carbon Monoxide Emissions from Electric Power Generation Boilers
Rule 601	New Source Performance Standards (NSPS)
Rule 701	National Emission Standards for Hazardous Air Pollutants (NESHAPS)

### III. EQUIPMENT LIST

Combined Cycle Unit 1 Consisting of:

#### Gas Turbine Unit 1A

Gas Turbine Generator, General Electric Frame 7, Model PG7241, rated at 1,850 mmBtu/Hr maximum heat input and 180 MW nominal electrical output, dry low-NO<sub>x</sub> combustor.

Duct burner, Rated at 426 mmBtu/hr

Heat recovery steam generator (HRSG), nominal ratings: high pressure steam capacity: 745,000 lb/hr @ 1670 psia and 1050 deg F, intermediate pressure steam capacity: 765,000 lb/hr @ 480 psia and 1035 deg F, low pressure steam capacity: 17,500 lb/hr @ 80 psia and 610 deg F.

Ammonia injection system

Selective catalytic reduction NO<sub>x</sub> control system located within the HRSG.

Oxidation catalyst

Continuous emission monitoring system (CEMS) designed to continuously record the measured gaseous concentrations, and calculate and continuously monitor and record the NO<sub>x</sub> and CO concentrations corrected to fifteen (15) percent oxygen (O<sub>2</sub>) on a dry basis.

#### Gas Turbine Unit 1B

Gas Turbine Generator, General Electric Frame 7, Model PG7241, rated at 1,850 mmBtu/Hr maximum heat input and 180 MW nominal electrical output, dry low-NO<sub>x</sub> combustor.

Duct burner, Rated at 426 mmBtu/hr

Heat recovery steam generator (HRSG), nominal ratings: high pressure steam capacity: 745,000 lb/hr @ 1670 psia and 1050 deg F, intermediate pressure steam capacity: 765,000 lb/hr @ 480 psia and 1035 deg F, low pressure steam capacity: 17,500 lb/hr @ 80 psia and 610 deg F.

Ammonia injection system

Selective catalytic reduction NO<sub>x</sub> control system located within the HRSG.

Oxidation catalyst

Continuous emission monitoring system (CEMS) designed to continuously record the measured gaseous concentrations, and calculate and continuously monitor and record the NO<sub>x</sub> and CO concentrations corrected to fifteen (15) percent oxygen (O<sub>2</sub>) on a dry basis.

Unit 1 Steam turbine generator and condenser serving gas turbine units 1A and 1B, quadruple admission, triple extraction, 258 MW nominal rated electrical output.

Combined Cycle Unit 2 Consisting of:

Gas Turbine Unit 2A

Gas Turbine Generator, General Electric Frame 7, Model PG7241, rated at 1,850 mmBtu/Hr maximum heat input and 180 MW nominal electrical output, dry low-NO<sub>x</sub> combustor.

Duct burner, Rated at 426 mmBtu/hr

Heat recovery steam generator (HRSG), nominal ratings: high pressure steam capacity: 745,000 lb/hr @ 1670 psia and 1050 deg F, intermediate pressure steam capacity: 765,000 lb/hr @ 480 psia and 1035 deg F, low pressure steam capacity: 17,500 lb/hr @ 80 psia and 610 deg F.

Ammonia injection system

Selective catalytic reduction NO<sub>x</sub> control system located within the HRSG.

Oxidation catalyst

Continuous emission monitoring system (CEMS) designed to continuously record the measured gaseous concentrations, and calculate and continuously monitor and record the NO<sub>x</sub> and CO concentrations corrected to fifteen (15) percent oxygen (O<sub>2</sub>) on a dry basis.

## Gas Turbine Unit 2B

Gas Turbine Generator, General Electric Frame 7, Model PG7241, rated at 1,850 mmBtu/Hr maximum heat input and 180 MW nominal electrical output, dry low-NO<sub>x</sub> combustor.

Duct burner, Rated at 426 mmBtu/hr

Heat recovery steam generator (HRSG), nominal ratings: high pressure steam capacity: 745,000 lb/hr @ 1670 psia and 1050 deg F, intermediate pressure steam capacity: 765,000 lb/hr @ 480 psia and 1035 deg F, low pressure steam capacity: 17,500 lb/hr @ 80 psia and 610 deg F.

Ammonia injection system

Selective catalytic reduction NO<sub>x</sub> control system located within the HRSG.

Oxidation catalyst

Continuous emission monitoring system (CEMS) designed to continuously record the measured gaseous concentrations, and calculate and continuously monitor and record the NO<sub>x</sub> and CO concentrations corrected to fifteen (15) percent oxygen (O<sub>2</sub>) on a dry basis.

Unit 2 Steam turbine generator and condenser serving gas turbine units 1A and 1B, quadruple admission, triple extraction, 258 MW nominal rated electrical output.

## IV. PROPOSED OPERATION

Duke Energy Morro Bay LLC proposes to operate the Combined Cycle Units on a “merchant plant” basis. The equipment will be operated when it is economically viable for the power generated to be sold to the power grid.

To establish emission offset levels, Duke proposes an overall plantwide yearly emission limits in addition to the emission limits determined by Best Available Control Technology (BACT). Duke based their proposed limit on some assumptions regarding operating practices. For each calendar quarter, Duke assumed each of the four Gas Turbines would operate 1,000 hours full load with duct burners, 1,000 hours full load without duct firing and 100 hours of start-up operation. This would equate to calculations based upon 8,000 full load hours of turbine operation, 4,000 hours of concurrent duct burner operation and an additional 400 hours of start-up operation per year total. Since the estimates of start-up and full load emissions reflect worst-case emission conditions, it is possible that operating hours could exceed 8,400 hours, without exceeding the emissions levels analyzed in this evaluation. Compliance with the proposed yearly emission levels will be determined by using a continuous emissions monitoring system and by limiting startups.

Duke is proposing the following facility cap for all power generation equipment at the facility:

Table 1, Applicant Proposed Facility Cap (tons per year, tpy)

NO <sub>x</sub>	SO <sub>x</sub>	CO	VOC	PM10
292.3	23.0	917.4	77.6	203.2

**V. AIR QUALITY IMPACT ANALYSIS**

In their Application for Certification (AFC), Duke provided an Air Quality Impact Analysis. This included both screening and refined modeling using the Industrial Source Complex Short-term model 3 (ISCST3) to address the impacts of the project. The modeled project impacts were combined with background concentrations to verify that the project would not contribute to violations of the Ambient Air Quality Standards. The District also hired an independent modeling contractor to model emissions as well. The contractor verified that the modeling presented in the application was done correctly.

The information has been extracted from the AFC and is tabulated below. The table addresses the project impacts combined with background concentrations versus the ambient air quality standards. Although the federal Prevention of Significant Deterioration (PSD) program and its associated increment analysis was included in the AFC, it's review and approval is under the jurisdiction of US EPA and is not included here.

Table 2, Cumulative Impacts Vs. Ambient Air Quality Standards

Pollutant	Avg. Period	Max. Project Impact (ug/m <sup>3</sup> )	Backgnd Conc. (ug/m <sup>3</sup> )	Total Impact (ug/m <sup>3</sup> )	State Standard (ug/m <sup>3</sup> )	Federal Standard (ug/m <sup>3</sup> )	Below Applicable Standard(s)
Carbon Monoxide (CO)	1-hour	8,615.4	6,988	15,603	23,000	40,000	yes
	8-hour	1,508.3	3,444	4,952	10,000	10,000	yes
Nitrogen Dioxide (NO <sub>2</sub> )	1-hour	220.4	122	342	470	--	yes
	annual	2.6	25	28	-----	100	yes
PM <sub>10</sub>	24-hour	24.2	57	81	50	150	no
	annual <sup>(1)</sup>	2.7	20.6	23	30	--	yes
	annual <sup>(2)</sup>	2.7	18.6	19	-----	50	yes
Sulfur Dioxide (SO <sub>2</sub> )	1-hour	17.3	106	123	650	--	yes
	24-hour	2.7	13	16	109	365	yes
	annual	0.2	0	0.2	-----	80	yes

<sup>(1)</sup> Annual Arithmetic Mean.

<sup>(2)</sup> Annual Geometric Mean.

This table above identifies that the project emission concentrations when combined with background concentrations do not exceed the ambient air quality standards with the exception of the State PM<sub>10</sub> standard. Although the table identifies an exceedance of the State PM<sub>10</sub> standard when background concentrations are added, the District has determined that this project will not cause or contribute to the violation of an ambient air quality standard. The basis for this determination is the fact that existing PM<sub>10</sub> concentrations already exceed the standard, and the fact that the facility is fully offsetting PM<sub>10</sub> emission increases via the use of banked emissions.

Therefore, the project as proposed complies with the Ambient Air Quality Standard provisions of Rule 204.D.

The independent contractor also modeled the new plant compared to the emissions from the existing boilers; however, that analysis is not legally required in District permitting and can not be part of the Determination of Compliance (DOC) review. The District intends to share this data with the public upon request and at a Preliminary Determination of Compliance (PDOC) workshop.

## VI HEALTH RISK ASSESSMENT

Health risk assessments typically evaluate three different types of health effects: carcinogenic, which are typically from long term exposure; acute non-cancer, which result from short term exposure and chronic non-cancer; which result from long term exposures. A toxic compound can cause any or all of these health effects.

The original AFC contained a screening health risk assessment for toxic emissions from the project. The screening risk assessment was modified twice since then to incorporate comments from the District's Data Adequacy review. The first modification occurred in a letter from Sierra Research dated November 1, 2000; it added hexane and propylene to the list of toxic contributors. The result was a small increase in the chronic health hazard index. Hexane and propylene do not have acute or carcinogenic risk factors.

The second change to the HRA was also a result of the data adequacy review and was documented in a letter from Sierra Research dated November 21, 2000. This change resulted from the use of the multi-pathway HRA model developed by the California Air Resources Board (ARB) and the Office of Environmental Health Hazard Assessment (OEHHA) called Health Risk Assessment Program Version 2.0e (11/1/00). Because of these changes and inconsistencies in the HRA version cited in the data requests, Sierra Research provided a new summary complete with new multi-pathway HRA model runs using all the latest figures in their letter dated May 9, 2001.

The new power plant cannot be permitted if the total risk exceeds ten in a million for cancer causing toxins. In addition, any project causing risk of greater than one in one million must install Toxic Best Available Control Technology (TBACT) on equipment that increase toxic emissions and on equipment that is relocated. Similar requirements apply for toxic emissions that have chronic and acute health risks, but chronic and acute significance thresholds are based on a ratio of actual exposures to reference exposure levels called the health hazard index (HHI). A project can not be permitted if its chronic or acute HHI exceeds 1.0 for all compounds combined. In addition, any project with an acute or chronic HHI of 0.1 must also apply TBACT to the contributing equipment. Shown in the table below are the risks for the maximum exposed individual. By definition the risks to all other offsite sources are lower.

Table 3, Health Risk and Hazard Levels

	Risk or Health Hazard Index From Project	TBACT Required Level	Significance level
Acute Non-Cancer Health Hazard Index <sup>(1)</sup>	0.355	0.1	1.0

Chronic Non-Cancer Health Hazard Index <sup>(1)</sup>	0.041	0.1	1.0
Cancer Risk to the Maximum Exposed Individual <sup>(1)</sup>	1.51 in one million	1 in one million	10 in one million
Cancer Risk without Diesel Engines to the Maximum Exposed Individual	0.17 in one million	Not applicable	Not applicable
<b>Note:</b> (1) Includes existing standby engines and motor vehicle gasoline fueling			

Table 3 shows that toxic emissions do not exceed absolute thresholds of ten in a million risk for cancer causing compounds or an HHI of one for acute and chronic effects. They do, however, exceed the TBACT levels for carcinogenic risk of one in million (1.51 in million) and the acute HHI of 0.1 (0.355). The dominating cancer risk and health hazard sources are from diesel exhaust particulate from the diesel standby engines and acrolein from turbine exhaust. Particulate traps are considered TBACT for the diesel engines and oxidation catalysts are considered TBACT for organic compounds like acrolein. The project already includes oxidation catalysts, so compliance with TBACT will be assured by adding a condition to the DOC requiring diesel particulate traps on the standby engines. Since the risk assessment did not take into account the risk reduction resulting from the use of oxidation catalysts or diesel particulate traps, the mitigated risk should be substantially lower than shown in Table 3.

## VII. EMISSIONS CALCULATIONS

### Rule 213, Calculations

The proposed project's emission parameters are shown in Table 4.

Table 4, Emission Rates

		CONCENTRATION (ppmvd @ 15% O <sub>2</sub> )	EMISSION FACTOR (lb/mmBtu)	EMISSION RATE <sup>(1)</sup> (lb/hr)
Each Gas Turbine Baseload no duct firing	NO <sub>x</sub>	2.5 <sup>(3)</sup>	0.00904	16.72
	SO <sub>x</sub>	0.139	0.000703 <sup>(2)</sup>	1.30
	VOC	1.15 <sup>(3)</sup>	0.0015	2.71
	CO	6.0 <sup>(3)</sup>	0.0132	24.41
	PM <sub>10</sub> /TSP		0.0059 <sup>(4)</sup>	11.0 <sup>(4)</sup>
Each Gas Turbine Baseload with duct firing	NO <sub>x</sub>	2.5 <sup>(3)</sup>	0.00904	19.32
	SO <sub>x</sub>		0.000703 <sup>(3)</sup>	1.50
	VOC	2.0 <sup>(3)</sup>	0.0025	5.39
	CO	6.0 <sup>(3)</sup>	0.0132	28.26
	PM <sub>10</sub> /TSP		0.0064 <sup>(4)</sup>	13.3 <sup>(4)</sup>
Each Gas Turbine Start-up	NO <sub>x</sub>			80.0 <sup>(4)</sup>
	SO <sub>x</sub>		0.000703 <sup>(2)</sup>	1.30 <sup>(2)</sup>
	VOC			16.0 <sup>(4)</sup>
	CO			620 <sup>(4)</sup>
	PM <sub>10</sub> /TSP			9.0 <sup>(4)</sup>

- Notes:
- (1) Maximum emission rates based upon maximum heat input of 1,850.4 mmBtu/Hr for the turbines and 290.8 mmBtu/Hr for the duct burners.
  - (2) Based upon fuel sulfur content of 0.25 gr/100 dscf natural gas.
  - (3) BACT levels established by Rule 204.
  - (4) Emission rate provided by vendor; factor shown was back-calculated.
  - (5) ppmvd is "parts per million by volume on a dry basis"

The maximum daily potential to emit is shown in table 5 for oxides of nitrogen (NO<sub>x</sub>), carbon monoxide (CO) and volatile organic compounds (VOC); it is based upon an operating scenario where each turbine has 4-hour cold start-up cycle, 4 hours of base load without duct firing, and 16 hours of full load operation with duct firing. The maximum daily emissions for particulate matter less than ten microns (PM10) and sulfur dioxide (SO<sub>2</sub>) do not vary with startup, so their maximum emissions occur with the largest fuel use day. This occurs when there is no startup and each turbine is operated at 8 hours of base load without duct firing and 16 hours of full load operation with duct firing.

Table 5, Maximum Daily Potential to Emit (Pounds/Day)

EQUIPMENT	NO <sub>x</sub>	SO <sub>x</sub>	VOC	CO	PM <sub>10</sub>
Gas Turbine (1 of 4) Start-up <sup>(1)</sup>	320.0	5.2	64.0	2,480.0	44.0
Gas Turbine Baseload (1 of 4) No duct burner <sup>(2)</sup>	66.9	5.2	10.8	97.6	44.0
Gas Turbine Baseload (1 of 4) With Duct Burners <sup>(3)</sup>	309.1	23.2	86.2	452.2	212.8
Total one turbine w/ Duct burner	696.0	33.6	161.0	3,029.8	300.8
Total all four turbines	2,784.0	134.4	644.0	12,119.0	1,203.2

- Notes: <sup>(1)</sup> 4 hour cold start-up for NO<sub>x</sub>, VOC and CO, 4 hours base load no duct burners for SO<sub>x</sub> and PM<sub>10</sub>.  
<sup>(2)</sup> 4 hours of operation at full turbine load no duct burners  
<sup>(3)</sup> 16 hours of operation at full load turbines and duct burners

The proposed project's emissions are based on the facility emissions cap and are shown in Section IV above.

**Best Available Control Technology (BACT)**

The applicable BACT thresholds from Rule 204, Section A, the proposed maximum daily emissions for each turbine' and the determination as to whether BACT is required are shown below in table 6. As can be seen in the table above, BACT is required for all of the criteria pollutants

**Table 6, Determination if BACT is**

Pollutant	BACT Emission Threshold (Lbs/day)	Proposed Project Emissions (Lbs/day)	BACT Required
NO <sub>x</sub> as NO <sub>2</sub>	25	696.0	Yes
SO <sub>x</sub> as SO <sub>2</sub>	25	33.6	Yes
VOC	25	161.0	Yes
CO	250	3,029.8	Yes
PM <sub>10</sub>	25	300.8	Yes

For the gas turbines, Duke has proposed the following as BACT.

**Table 7, Gas Turbine BACT**

Pollutant	Applicant's Proposal	BACT as Defined in ARB Power Plant Siting Document	Additional Discussion Required?
NO <sub>x</sub> as NO <sub>2</sub>	2.5 ppmvd @ 15% O <sub>2</sub> 1-hour rolling average	Same	Yes
SO <sub>x</sub> as SO <sub>2</sub>	Emission Limit Based on Natural Gas Fuel with <0.25 grains-S/100 dscf	Emission Limit Based on Natural Gas Fuel with <1 grain-S/100 dscf	No
VOC	2.0 ppmvd @ 15% O <sub>2</sub> 1-hour rolling average	Same	No
CO	6.0 ppmvd @ 15% O <sub>2</sub> 3-hour rolling average	Same	No
PM <sub>10</sub>	Emission Limit Based on Natural Gas Fuel with <0.25 grains-S/100 dscf	Emission Limit Based on Natural Gas Fuel with <1 grain-S/100 dscf	No

The applicant has proposed BACT as recommended by the California Air Resources Board or better for all criteria pollutants. For NO<sub>x</sub>, that level is 2.5 ppmvd @ 15% O<sub>2</sub> on a 1-hour rolling average with 5 ppmvd ammonia slip. In data request number 187, the CEC explained that they recently approved a similar turbine project with a NO<sub>x</sub> limit of 2.0 ppmvd; they asked how the applicant would achieve the BACT level of 2.0 ppmvd NO<sub>x</sub>. The applicant responded that the 2.0 ppmvd NO<sub>x</sub> limits included the allowance of 10 ppmvd ammonia slip. During the PDOC comment period, the District will be evaluating the feasibility, benefits and operational impacts of a BACT limit of 2.0 ppmvd NO<sub>x</sub>.

**Offsets, Rule 204, Section B**

Rule 204, Section B requires that offsets be provided for all emissions increases where the potential to emit is above 25 tons per year for NO<sub>x</sub>, VOC, PM10 and SO<sub>x</sub> and 250 tons per year for CO. This project exceeds the thresholds for all five pollutants.

The calculation of the emissions increase is determined by the requirements of Rule 213.D.1. This section specifies the projects emissions increase as the potential to emit for the new turbines, which will be based upon the proposed facility emissions cap.

**Emissions Banking, Rule 211**

The offsets for the proposed project are coming from three sources: Emission Reduction Credits (ERCs) from the elimination of fuel oil use (Certificate #694-Z1), ERCs acquired from Chevron USA (Certificate #s 359-Z2, 690-Z1, 691-Z1, 692-Z1 & 693-Z1), and emission reductions from the shutdown of the existing four boilers at the current power plant. The first two sources are certified ERCs that have recently been through the banking process and do not require further review. However, the emissions from the shutdown of four boilers have not been evaluated for banking criteria. The basic criteria for banking are that the reductions are real, quantifiable, permanent, surplus and enforceable.

**REAL:** Boiler use has been documented in the emissions inventory, with continuous emissions monitoring data and through inspections. Real reductions will occur when boilers are permanently shutdown.

**QUANTIFIABLE:** The reductions have been quantified using accepted methods from the EPA publication (AP42 Volume II) and from continuous emissions monitoring data.

**PERMANENT:** The equipment will be taken out of service and the associated right to operate under permit will be canceled.

**ENFORCEABLE:** The equipment will be removed and the permit canceled.

**SURPLUS:** The amount of NO<sub>x</sub> reduction has been reduced by Best Available Retrofit Control Technology (BARCT) as required by State Law to ensure the credits are surplus. BARCT has been determined to be the NO<sub>x</sub> and CO concentration requirements of Rule 429 and the emissions from natural gas firing for SO<sub>x</sub>, PM10 and VOC. The emissions of CO, SO<sub>2</sub>, PM10 and VOC were reduced by 20% as required by District Rule 211.C.1.b, which requires an additional 20% reduction when a source already meets the BARCT requirement. That 20%, which is surplus to any state or federal regulation, is used to fund the District's Community Bank.

**Section B, Requirements:** Subsection B.1 requires that the ERCs be issued through the banking process, which is satisfied. Subsection B.2 requires that the existing permit be surrendered prior to granting the credits. Any excess credit left over from the project will not be issued until the boiler permit is canceled.

**Section C. Emission Reduction Discounts and Limitations:** Subsection 1 applies to this shutdown (see SURPLUS discussion above).

### ***Banking and Offset Calculations.***

Table 8 below show the project's bankable emissions and the offset calculation procedure complete with offset profile calculations (Full calculation spreadsheet is attached).

The boiler shutdown emissions calculations provided in the application were generally correct. Some minor differences resulted from the District's use of a gas higher heating value of 1,020 Btu/scf versus the applicant's use of 1,025 Btus/scf. The offset calculations for SO<sub>x</sub> and PM10 were significantly different. The differences arose because the applicant applied SO<sub>x</sub> ERCs to offset PM10 increases prior to exhausting PM10 ERCs. The District requires that all other direct offsets be exhausted prior to authorizing inter-pollutant trades. For the remaining PM10 deficit after utilizing all PM10 offsets, each ton of PM10 increase will be offset with a ton of SO<sub>2</sub> ERC as allowed under the State Air Resources Board's Guidance for Power Plant Siting and Best Available Control Technology (September 1999). Duke has further agreed to retire any leftover SO<sub>2</sub> credits' which results in a defacto ratio of over 2.0 tons of SO<sub>2</sub> credits for every ton of PM10 increase. The offset profile checks, shown as the Percentage Emissions per Quarter in the

attached tables, meet the 80% requirement for all five pollutants.

Table 8a

NOx Offsets (tons)	1st qtr	2nd qtr	3rd qtr	4th qtr	total/yr
Boiler Shutdown ERC	46.43	52.73	115.84	79.68	294.69
Chevron ERCs	5.73	5.73	5.73	5.73	22.92
Fuel Oil ERCs	4.10	1.36	0.00	2.73	8.19
total ERC	56.26	59.82	121.57	88.14	325.80
Residual NOx ERC	5.96	5.96	12.99	8.89	33.80
NOx Offset Package	50.30	53.86	108.58	79.25	292.00
NOx Emission Increase	73.00	73.00	73.00	73.00	292.00
Percentage Emission Per Quarter					
	1st	2nd	3rd	4th	year
Offset Profile	17.2%	18.4%	37.2%	27.1%	100.0%
Emission Profile	25.0%	25.0%	25.0%	25.0%	100.0%
Lower Percentage	17.2%	18.5%	25.0%	25.0%	85.7%
Residual NOx ERC =	5.96	5.96	12.99	8.89	33.80
Residual NOx profile	17.6%	17.6%	38.4%	26.3%	100.0%

Table 8b

PM10 Offsets	1st qtr	2nd qtr	3rd qtr	4th qtr	total/yr
Boiler Shutdown ERC	17.79	18.17	34.37	26.72	97.05
Chevron ERCs	0.48	0.48	0.48	0.48	1.92
Fuel oil PM10 ERCs	8.61	2.88	0.00	5.74	17.23
Fuel oil SO2	41.66	15.21	0.00	30.13	87.00
total ERC	68.54	36.73	34.85	63.07	203.20
Residual PM10 ERC	0.00	0.00	0.00	0.00	0.00
PM10 Offset Package	68.54	36.73	34.85	63.07	203.20
PM10 Emission Increase	50.80	50.80	50.80	50.80	203.20
Percentage Emission Per Quarter					
	1st	2nd	3rd	4th	year
Offset Profile	33.7%	18.1%	17.2%	31.0%	100.0%
Emission Profile	25.0%	25.0%	25.0%	25.0%	100.0%
Lower Percentage	25.0%	18.1%	17.2%	25.0%	85.2%
Residual PM10 ERC	0.00	0.00	0.00	0.00	0.00

Table 8c

SOx Offsets	1st qtr	2nd qtr	3rd qtr	4th qtr	total/yr
Boiler Shutdown ERC	1.40	1.43	2.71	2.11	7.66
Chevron ERCs	0.31	0.31	0.31	0.31	1.24
Fuel oil SOx ERCs	55.81	17.35	0.00	34.78	107.94
total ERC	57.52	19.09	3.02	37.20	116.84
Residual SOx ERC	48.50	15.21	0.00	30.13	93.84
SOx Offset Package	9.02	3.88	3.02	7.07	23.00
SOx Emission Increase	5.75	5.75	5.75	5.75	23.00
Percentage Emission Per Quarter					
	1st	2nd	3rd	4th	year
Offset Profile	39.2%	16.9%	13.1%	30.7%	100.0%
Emission Profile	25.0%	25.0%	25.0%	25.0%	100.0%
Lower Percentage	25.0%	16.9%	13.1%	25.0%	80.0%
Residual SOx ERC	48.50	15.21	0.00	30.13	93.84
Profile	51.7%	16.2%	0.0%	32.1%	100.0%

Table 8d

VOC Offsets	1st qtr	2nd qtr	3rd qtr	4th qtr	total/yr
Boiler Shutdown ERC	12.88	13.15	24.87	19.34	70.23
Chevron ERCs	8.22	8.22	8.22	8.22	32.88
total ERC	21.10	21.37	33.09	27.56	103.11
Residual VOC ERC	6.38	6.38	6.38	6.37	25.51
VOC Offset Package	14.72	14.99	26.71	21.19	77.60
VOC Emission Increase	19.40	19.40	19.40	19.40	77.60
Percentage Emission Per Quarter					
	1st	2nd	3rd	4th	year
Offset Profile	19.0%	19.3%	34.4%	27.3%	100.0%
Emission Profile	25.0%	25.0%	25.0%	25.0%	100.0%
Lower Percentage	19.0%	19.3%	25.0%	25.0%	88.3%
Residual VOC ERC	6.38	6.38	6.38	6.37	25.51
Profile	25.0%	25.0%	25.0%	25.0%	100.0%

Table 8e

CO Offsets	1st qtr	2nd qtr	3rd qtr	4th qtr	total/yr
Boiler Shutdown ERC	184.73	216.24	527.09	230.69	1158.75
Chevron ERCs	0.66	0.66	0.66	0.66	2.62
total ERC	185.38	216.90	527.74	231.35	1161.37
Residual CO ERC	39.00	45.60	115.77	45.00	245.37
CO Offset Package	146.38	171.30	411.97	186.35	916.00
CO Emission Increase	229.00	229.00	229.00	229.00	916.00
Percentage Emission Per Quarter					
	1st	2nd	3rd	4th	year
Offset Profile	16.0%	18.7%	45.0%	20.3%	100.0%
Emission Profile	25.0%	25.0%	25.0%	25.0%	100.0%
Lower Percentage	16.0%	18.7%	25.0%	20.3%	80.0%
Residual CO ERC	39.00	45.60	115.77	45.00	245.37
Profile	15.9%	18.6%	47.2%	18.3%	100.0%

## **VIII. CONCLUSIONS** Compliance Check

### Rule 113 Continuous Emissions Monitoring

This rule requires fossil fuel fired steam generators with heat input rates above 250 mmBtu/hr to install Continuous Emissions Monitoring Systems (CEMs) according to the requirements

### 203 Application

This rule requires that applications be filed in form and content as required by the APCO so that a determination of compliance can be made. Duke Energy Morro Bay LLC filed an Application for Certification (AFC) with the California Energy Commission. Under Rule 223, Power Plants, the AFC is treated like an Authority to Construct application. Duke has met the requirements of Rule 203 through the data adequacy review process.

### 204 Requirements

This is the core of the new source review rules (Rules 204, 211, 212, 213, and 214); it contains control technology and offsets provisions. The proposed facility is in compliance with this Rule as shown in Section VII above. Both BACT and offset provisions of this Rule (Sections A and B) were triggered and are included in the above analysis. The Certification of Statewide Compliance (Section E) was also triggered and has been met as documented in a letter from Duke. The permit will be conditioned such that compliance with the emission limits established by this Rule will be continually monitored.

### Rule 206 Conditional Approval

This rule authorizes the APCO to place conditions of approval on the proposed facility. This Determination of Compliance contains conditions designed to ensure the facility will operate in compliance with regulatory requirements.

### Rule 209 Provision for Sampling and Testing Facilities

The permit will include conditions for air sampling facilities as required by this Rule.

### Rule 210 Periodic Inspection, Testing and Renewal of Permits to Operate

The equipment under permit will be inspected periodically, independent emission testing will be required every twelve months, and the permit will be subject to review and public comment during the permit renewal process.

### Rule 211 Emission Banking

The emission reductions from the boiler shutdowns were evaluated under the provisions of this rule and found to meet the requirements (See Section VII above).

### Rule 213 Calculations

This rule specifies the emission increase and emission reduction credit calculations. All calculations were done according to the procedures of this Rule.

Rule 214 Notification

Prior to authorizing a project where emissions will be greater than 100 pounds per day, the APCO must publish a preliminary decision and hold a 30 day comment period. This process will be accomplished through the preliminary and final determination of compliance processes (PDOC&DOC). A notice of the PDOC will be published in the Tribune of San Luis Obispo County and a comment period will follow. All applicable comments will be addressed in the final DOC.

Rule 216 Federal Part 70 Permits

The permits will be conditioned such that the facility's Title V permit must undergo a "Major Modification" prior to combusting fuel in the Gas Turbines. Upon completing this Title V permit issuance for this "Major Modification", the facility will be in compliance with the requirements of this Rule.

Rule 217 Federal Part 72 Permits

The facility is presently an "Acid Rain" source, and will remain so after this project. A new application for a Acid Rain Permit has been received; when approved it will be incorporated into the facility's Title V Permit. Therefore, when the Title V Permit is updated as required by Rule 216, the facility will also be in compliance with the requirements of this Rule.

Rule 219 Toxics New Source Review

The project is subject to section E.4 of Rule 219. Compliance with this rule, as discussed Section VI, Health Risk Assessment, is shown with a cancer risk of less than ten in million and TBACT (diesel particulate trap requirement) and an HHI of less than one (1.0) and TBACT (turbine oxidation catalyst).

Rule 223 Power Plants

This rule specifies the procedures used by the District to evaluate projects that are filed through an Application for Certification with the California Energy Commission. This rule requires the project to comply with the same requirements as an Authority to Construct. This DOC evaluation has used the same standards as required for an Authority to Construct.

Rule 302 Schedule of Fees

Fees for issuance of an Authority to Construct, which is equivalent to this DOC, are based on the actual cost incurred by the District. Duke has entered into a reimbursement agreement which the District to cover these costs.

401 Visible Emissions

The equipment is natural gas fired, and therefore should easily comply with the 40% opacity standard from this Rule. Appropriate conditions will be include on the permits to ensure compliance with the requirements of this Rule.

402 Nuisances

With the equipment being fired on natural gas, nuisance type problems are not expected from this operation. However, appropriate conditions will be included on the permits to

ensure compliance with the requirements of this Rule.

Rule 403 Particulate Matter Emission Standards

The 0.3 grains per dry standard cubic foot @12%CO<sub>2</sub> emission limit is applicable to the Gas Turbines at the facility, but this standard is superseded by the emission limitations imposed through the new source review permitting process. Based on the requirements of Rule 403, the volumetric flow rate of 18.65 mm SCFH for the Gas Turbine would establish an emission limit of 799 lbs PM<sub>10</sub>/hr [(18.65 mmSCFH)\*(0.3 grains/SDCF)\*(1 lb/7000 grains) = 799 lbs PM<sub>10</sub>/hr]. Based on the emission limits required through this permitting process, the PM<sub>10</sub> emission limit for each gas turbine with Duct burner is 13.3 lbs/hr, which is well below the applicable Rule 403 standards. Section C also contains a 10 lb/hr particulate matter limit for each individual combustion device. The total maximum emissions from a turbine and duct burner system is 13.3 lb/hr. Of that total, each turbine will not exceed 9.0 lb/hr and each Duct burner will not exceed 4.3 lb/hr. Both are below the 10 lb/hr prohibition in the rule.

Rule 404 Sulfur Compounds Emission Standards, Limitations and Prohibitions

This rule, which limits the sulfur content of any gaseous fuel combusted to 50 grains or less of sulfur per 100 cubic feet, is applicable to this equipment. The sulfur content limits proposed in the application are 0.25 grains per 100 cubic feet of natural gas. This sulfur limit will be included on the permit.

Rule 405 Nitrogen Oxides Emission Standards, and Prohibitions

This rule contains a 140 lb/hr NO<sub>x</sub> limit for each individual combustion device. The maximum emission from any single combustion device is 80 lb/hr of NO<sub>x</sub> from a turbine in startup mode. This is well below the 140 lb/hr prohibition.

Rule 406 Carbon Monoxide Emission Standards and Limitations

This rule contains a 2,000 ppmvd CO emission limit for any discharge point. The turbine unit is equipped with a CO catalyst and has an emission limit of 6 ppmvd which is well below the 2,000 ppmvd prohibition.

Rule 429 Oxides of Nitrogen and Carbon Monoxide Emissions from Electric Power Generation Boilers

This rule establishes numerous requirements on the existing boilers at the Morro Bay Power Plant. These boilers are being removed from service so the requirements of this rule will not apply to new power plant.

Rule 601 New Source Performance Standards (NSPS)

40 CFR Part 60, Subpart A - General Provisions

The facility is subject to the requirements of this part because the equipment is subject to 40 CFR Subpart GG and Subpart Da which in turn requires compliance Subpart A.

The notification and record keeping, performance tests, compliance with standards and maintenance requirements, circumvention, monitoring requirements, and general notification and reporting requirement provisions contained in §§60.7, 60.8, 60.11, 60.12, 60.13, and 60.19 will be satisfied under the testing, monitoring, reporting requirements

established as conditions on this permit pursuant to District requirements. This will include initial testing, annual testing, record keeping, reporting, and the requirement to monitor operations with the use of CEMs

***40 CFR Part 60, Subpart GG - Standards Of Performance For Stationary Gas Turbines***

The Gas Turbines are subject to the requirements of this NSPS. In addition to utilizing good combustion practices and combusting only natural gas, the Gas Turbines utilize dry-low NO<sub>x</sub> combustion, and the back-end control of selective catalytic reduction (SCR) to limit pollutant emissions.

The allowable NO<sub>x</sub> concentration limit derived from §60.332(a)(1) would be 169 ppmvd, when using the heat rate 6.375 kJ/W-hr. This 169 ppmvd limit far exceeds the 2.5 ppmvd limit established by the BACT requirements. Therefore, the NO<sub>x</sub> limit from the NSPS will be satisfied by the NSR permit requirements that will be included on the permits. Note that the application assumed the wrong emissions standard §60.332(a)(2); however, it had no bearing on the outcome because of the more stringent BACT emission limit.

The allowable SO<sub>2</sub> concentration limit derived from §60.333 would be 150 ppmvd. Compliance with this limit is assured due to limits established by the BACT requirements of 0.25 grains per 100 scf of gas. The SO<sub>2</sub> concentration at this permitted emission level would be less than 1 ppmvd. This value is well below the 150 ppmvd SO<sub>2</sub> allowed for in the NSPS. Therefore, the SO<sub>2</sub> emission standard from this NSPS will be satisfied by the NSR permit requirement that will be included on the permits.

The testing and monitoring requirements contained in §§60.334 and 60.335 will be satisfied by the testing and monitoring requirements established under the NSR conditions contained on the permits. This will include the annual emissions testing requirement and the requirement to monitor operations with the use of CEMs.

***40 CFR Part 60, Subpart Da - Standards Of Performance For Electric Utility Steam Generating Units for which Construction is Commenced After September 18, 1978***

The duct burners combined with the HRSG are boilers and are subject to the requirements of this NSPS because the heat rating exceeds 250 mmBtu/hr. In addition to utilizing good combustion practices and combusting only natural gas, the duct burners are low NO<sub>x</sub> units with emissions further controlled by SCR systems and oxidation catalysts.

The allowable PM10 concentration limit contained in §60.42a is 0.03 lb/mmBtu. This 0.03 lb/mmBtu limit is less stringent than the 0.0064 lb/mmBtu limit established by the 13.26 lb/hr emission limit. It should be noted that this limit includes turbine exhaust, which may have slightly different emissions per mmBtu of fuel. However, the applicant's scenarios assume that operation with duct burners will result in slightly lower lb/mmBtu levels than without them. This means that the duct burners are expected to emit below 0.0064 lb/mmBtu. AP42 emission factors are also support the conclusion that emissions will be far below the 0.03 lb/mmBtu NSPS limit. Therefore, the PM10 limit from the NSPS will be satisfied by the NSR requirements that will be included on the permit.

The allowable SO<sub>2</sub> concentration limit derived from §60.43a is much greater than the emission level allowed by BACT. Compliance with this limit is assured due to limits established by the BACT requirements of 0.25 grains per 100 scf of gas. The SO<sub>2</sub> emissions at this level are 0.0007 lb/mmBtu which is far less than any standard in this regulation. Therefore, the SO<sub>2</sub> emission standard from this NSPS will be satisfied by the NSR permit requirement that will be included on the permits.

The allowable NO<sub>x</sub> concentration limit is §60.44a would be 0.20 lb/mmBtu. This 0.20 lb/mmBtu limit is less stringent than the 0.009 lb/mmBtu limit established by BACT requirements (2.5 ppmvd). Therefore, the NO<sub>x</sub> limit from the NSPS will be satisfied by the NSR permit requirements that will be included on the permits

The testing and monitoring requirements contained in §§60.47a will be satisfied by the testing and monitoring requirements established under the NSR conditions contained on the permits. This will include the annual emissions testing requirement and the requirement to monitor operations with the use of CEMs.

Rule 701 National Emission Standards for Hazardous Air Pollutants (NESHAPS)

**40 CFR Part 61, Subpart A - General Provisions**

The facility is subject to the requirements of this part because the facility is subject to 40 CFR Part 61, Subpart M. Historically, the facility has been in compliance with these requirements and continued compliance is expected.

**40 CFR Part 61, Subpart M - National Emission Standard For Asbestos**

The facility on occasion is subject to the requirements of 61.145 - 61.147 (Standards for Demolition and Renovation). Historically, the facility has been in compliance with these requirements and continued compliance is expected.

**Conclusions**

This equipment as proposed has the capability of complying with all applicable rules of the District.

**IX. RECOMMENDATION**

Issue the Preliminary Determination of Compliance for this project to the California Energy Commission. The CEC's order should contain the following conditions to verify compliance with District Rules and Regulations:

**Conditions Prior to Combusting Fuel**

- 1) Duke Energy Morro Bay LLC shall submit to the District all design criteria and specifications on the gas turbine generators, the heat recovery steam generators, the steam turbine generator, the condensers, the Selective Catalytic Reduction (SCR) system, the ammonia injection system, the oxidation catalyst and the continuous emission monitoring (CEM) systems, and receive Air Pollution Control Officer (APCO) approval prior to installation.

- 2) Pursuant to the requirements of District Rule 216, Duke Energy Morro Bay LLC shall apply for and receive a revised Title V permit for the Morro Bay Power Plant prior to combusting fuel in the Gas Turbines.
- 3) District-approved continuous emission monitors shall be installed, calibrated, and operational prior to first firing the Gas Turbines. After commissioning of the Gas Turbines, the detection range of these continuous emission monitors shall be adjusted as necessary to accurately measure the normal range of Carbon Monoxide (CO) and oxides of Nitrogen (NO<sub>x</sub>) emission concentrations. The type, specifications, and location of these monitors shall be subject to District review and approval.
- 4) Duke Energy Morro Bay LLC shall submit a plan to the District at least 30 days prior to combusting fuel in the Gas Turbines. This plan shall describe the procedures to be followed during the commissioning of the Gas Turbines, Duct burners, the heat recovery steam generator (HRSG), and the Steam Turbines. The plan shall include a description of each commissioning activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but not be limited to, the tuning of the dry-low-NO<sub>x</sub> combustors, the installation and operation of the SCR systems, the installation and operation of the oxidation catalyst system and the installation, calibration, and testing of the CO and NO<sub>x</sub> continuous emission monitors, and any activities requiring the firing of the Gas Turbines without abatement by the SCR and oxidation catalyst systems.
- 5) No later than seven (7) days prior to first combusting fuel in the Gas Turbines, Duke Energy Morro Bay LLC shall notify the District and arrange for an inspection of the equipment.
- 6) Duke Energy Morro Bay LLC shall surrender the offsets identified in this evaluation or other offsets approved by the APCO equal to the amount of permitted emissions prior to combusting fuel in the Gas Turbines.
- 7) Eighteen (18) months prior to first combusting fuel in the Gas Turbines or 90 days following CEC approval, whichever is later, Duke shall submit an air-monitoring plan and obtain APCO approval for the plan. The plan shall include air monitoring, performed by an APCO approved third party, for NO, NO<sub>2</sub>, NO<sub>x</sub>, particulate matter 10 microns or less in size (PM 10), and surface wind speed and direction at two separate locations in the Morro Bay area. The locations will be selected, subject to APCO approval, as best indicators of potential project air quality impacts. The monitoring shall meet all requirements for PSD monitoring contained in the District's GUIDELINES FOR AMBIENT AIR QUALITY AND METEOROLOGICAL MONITORING, dated March 1993, including a forthcoming update to electronic data submission requirements. Pre-combustion monitoring as specified in the approved plan shall occur at each of these sites for periods of up to a year prior to turbine startup, with the length of monitoring period subject to APCO approval.

At one site chosen by the APCO, post combustion monitoring shall continue for at

least one year following the start of commercial operation. The duration of this subsequent monitoring may be extended for up to three additional years if requested by the APCO and justified by the monitoring data according to a protocol to be developed and agreed upon by both the APCO and Duke.

- 8) If the turbine foundations are not completed within 30 months of the Final Determination of Compliance (FDOC) issuance, the project shall go through a new Best Available Control Technology (BACT) determination subject to APCO approval before the foundations are poured. This determination shall be made through a supplemental Authority to Construct application. The project shall comply with the new APCO approved BACT determination and any conditions required of that determination.
- 9) Duke Energy Morro Bay LLC shall obtain APCO approval of any offsite gas metering system that will provide fuel to new turbine units. The metering system shall not release natural gas under normal conditions.

#### **Turbine Commissioning Conditions**

- 10) Duke Energy Morro Bay LLC shall minimize emissions from the Gas Turbines to the maximum extent possible during the commissioning period.
- 11) At the earliest feasible opportunity in accordance with the recommendation of the equipment manufacturer, the combustors of the Gas Turbines shall be tuned to minimize emissions.
- 12) At the earliest feasible opportunity in accordance with the recommendations of the equipment manufacturer's, the SCR and oxidation catalyst systems shall be installed, adjusted, and operated to minimize the emissions of nitrogen oxides, ammonia and carbon monoxide from the gas turbines.
- 13) The total number of firing hours of each Gas Turbine and its duct burner without abatement of nitrogen oxide emissions by the SCR System shall not exceed 300 hours during the commissioning period. Such operation of the Gas Turbine without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR and oxidation catalyst systems in place. Upon completion of these activities, Duke Energy Morro Bay LLC shall provide written notice to the District and the unused balance of the 300 firing hours without abatement will expire.
- 14) The total mass emissions of nitrogen oxides, carbon monoxide, volatile organic compounds, PM<sub>10</sub>, and sulfur dioxide that are emitted from each Gas Turbine during the commissioning period shall accrue towards the yearly emission limits specified in Condition 22.
- 15) At the end of the commissioning period, Duke Energy Morro Bay LLC shall conduct a District and CEC approved source test to determine compliance with the emission limits listed below. The written test results of the performance tests shall be provided to the District and the CEC within thirty (30) days after the

testing. The source test for each Gas Turbine shall include a minimum of three start-up and three shutdown periods. A complete test protocol shall be submitted to the District no later than thirty (30) days prior to testing, and notification to the District at least ten (10) days prior to the actual date of testing shall be provided so that a District observer may be present. Changes to the test date made subsequent to the initial ten day notification may be communicated by telephone or other acceptable means no less than forty-eight (48) hours prior to the new test date.

**Gas Turbine Unit Operating Conditions:**

- 16) The heat input rate to each Gas Turbine unit shall not exceed the following:  
Gas turbine: 1,850.4 mmBtu/hr.  
Duct burner: 426.2 mmBtu/hr  
Combined: 2,141.2 mmBtu/hr, 34,259.2 mmBtu/day

- 17) The maximum daily combined emissions from the gas turbine units, including start-ups and shutdowns, shall not exceed the following limits:

<u>Pollutant</u>	<u>Lbs/Day</u>
Oxides of Nitrogen (NO <sub>x</sub> )	2,784.0
Carbon Monoxide (CO)	12,119.2
Particulate Matter <10 microns (PM <sub>10</sub> )	1,203.2
Volatile Organic Compounds (VOC)	644.3
Ammonia (NH <sub>3</sub> )	1,336.5
Sulfur Dioxide (SO <sub>2</sub> )	134.4

- 18) The pollutant mass emission rates in the exhaust discharged to the atmosphere from each Gas Turbine unit shall not exceed the following limits:

<u>Pollutant</u>	<u>Lbs/Hour</u>	<u>Lbs/Day</u>
Oxides of Nitrogen (NO <sub>x</sub> )	19.3	442.9
Carbon Monoxide (CO)	28.3	647.4
Particulate Matter <10 microns (PM <sub>10</sub> )	13.3	300.8
Volatile Organic Compounds (VOC)	5.4	107.9
Ammonia (NH <sub>3</sub> )	14.6	334.1
Sulfur Dioxide (SO <sub>2</sub> )	1.5	33.6

These limits shall not apply during start-up, which is not to exceed four (4) hours. SCR and oxidation catalyst controls and good engineering practices shall be used to the fullest extent practical during start-up to minimize pollutant emissions.

- 19) The pollutant concentrations discharged to the atmosphere from each Gas Turbine unit shall not exceed the following limits, calculated at 15 percent O<sub>2</sub>, dry, on a one-hour rolling average, unless otherwise noted:

<u>Pollutant</u>	<u>Concentration (ppmvd)</u>
Oxides of Nitrogen (as NO <sub>2</sub> )	2.5
Carbon Monoxide (CO)	6.0 (rolling three-hour average)

Ammonia (NH<sub>3</sub>) 5.0

These limits shall not apply during start-up, which is not to exceed four (4) hours, or shutdown, which is not to exceed two (2) hours. SCR catalytic controls and oxidation catalyst and good engineering practices shall be used to the fullest extent practical during start-up to minimize pollutant emissions. Start-up shall be defined as the period of time after fuel flow is initiated until the Gas Turbine achieves two consecutive CEM data points in compliance with the emission concentration limits of condition 19, not to exceed 4 hours. Shutdown shall be defined as the period of time from noncompliance with the emission concentration limits of condition 19 until termination of fuel flow to the Gas Turbine, not to exceed one hour

- 20) Start-up pollutant emission rates discharged to atmosphere from each Gas Turbine during a start-up shall not exceed the following limits. These limits apply to any start-up period which shall not exceed four (4) hours.

<u>Pollutant</u>	<u>Lb/startup</u>
Oxides of Nitrogen (as NO <sub>2</sub> )	320.0
Carbon Monoxide (CO)	3,608.0
Volatile Organic Compounds (as CH <sub>4</sub> )	64.0

- 21) Each Gas Turbine unit shall be limited to 400 hours of startup and shutdown time per year; no more than two turbines shall be in startup mode at any one time.
- 22). Yearly emission from all sources shall not exceed the following limits:

<u>Pollutant</u>	<u>tons/year</u>
Oxides of Nitrogen (NO <sub>x</sub> )	292.3
Carbon Monoxide (CO)	917.4
Particulate Matter <10 microns (PM <sub>10</sub> )	203.2
Volatile Organic Compounds (VOC)	77.6
Sulfur Dioxide (SO <sub>2</sub> )	23.0

Yearly emissions shall be defined as the emissions, which occur during any period of twelve consecutive calendar months.

- 23) CEM Systems, including remote District access, shall be installed and operated on each of the gas turbine units. These systems shall be designed to continuously record the measured gaseous concentrations, and shall calculate and continuously monitor and record the CO, O<sub>2</sub>, NH<sub>3</sub> and NO<sub>x</sub> concentrations, corrected to fifteen (15) percent oxygen (O<sub>2</sub>) on a dry basis.

The equipment installed for the continuous monitoring of CO shall be maintained and operated in accordance with 40 CFR Part 60 Appendix F. The equipment installed for the continuous monitoring of O<sub>2</sub> and NO<sub>x</sub> shall be maintained and operated in accordance with 40 CFR Parts 72 and 75.

For periods of missing CO data, CO hourly values shall be substituted from valid

hourly average data from the previous thirty (30) unit operating days, excluding periods of startup and shutdown. The CO data shall be substituted based on equivalent incremental load ranges.

- 24) Within sixty (60) days after the commissioning of the Gas Turbines, a Relative Accuracy Test Audit (RATA) must be performed on the CEMS in accordance with 40 CFR Part 60 Appendix B Performance Specifications; a performance test shall also be performed, and the written test results of the performance tests shall be provided to the District within thirty (30) days after testing. A complete test protocol shall be submitted to the District no later than thirty (30) days prior to testing; and notification to the District at least ten (10) days prior to the actual date of testing shall be provided so that a District observer may be present. Changes to the test date made subsequent to the initial ten day notification may be communicated by telephone or other acceptable means no less than forty-eight (48) hours prior to the new test date.

The performance tests shall include those parameters specified in the approved test protocol, and shall at a minimum include the following:

- a. Oxides of Nitrogen (as NO<sub>2</sub>): ppmv dry at 15% O<sub>2</sub> and lb/hr.
- b. Carbon Monoxide: ppmv dry at 15% O<sub>2</sub> and lb/hr.
- c. Ammonia (NH<sub>3</sub>): ppmv dry at 15% O<sub>2</sub> and lb/hr

and the following process parameters:

- d. Natural gas consumption.
- e. Turbine load in megawatts.
- f. Stack gas flow rate (SDCFM) calculated according to procedures in EPA method 19, and % CO<sub>2</sub>.

### **General Conditions**

- 25) Each turbine unit shall be abated by properly operated and maintained Selective Catalytic Reduction and Oxidative Catalyst systems.
- 26) The sulfur content of the natural gas shall be determined by an APCO approved method.
- 27) The APCO shall be notified in writing before any changes are made to operating procedures, equipment, or materials used which have the potential to increase the emission of any air contaminant
- 28) This equipment shall be operated and maintained in accordance with the manufacturer's recommendations and the information presented in the application under which this permit was granted.
- 29) If the APCO determines that the operation of this equipment is causing a public nuisance, the owner/operator shall take immediate action and eliminate the nuisance.

- 30) Duke Energy Morro Bay LLC shall demonstrate compliance by using properly operated and maintained continuous emission monitors, (during all hours of operation including equipment Start-up and Shutdown periods, except for periods of CEM maintenance performed in accordance with District requirements, for all of the following parameters:
- a. Firing hours and Fuel Flow Rates.
  - b. Oxygen (O<sub>2</sub>) Concentrations, Nitrogen Oxide (NO<sub>x</sub>) Concentrations, and Carbon Monoxide (CO) Concentrations.
  - c. Ammonia Injection and emission Rates.

Duke Energy Morro Bay LLC shall record all of the above parameters every 15 minutes (excluding normal calibration periods) and shall summarize all of the above parameters for each clock hour. For each calendar day, Duke Energy Morro Bay LLC shall calculate and record the total Firing Hours, the average hourly Fuel Flow Rates, and pollutant emission concentrations.

Duke Energy Morro Bay LLC shall use the parameters measured above and District approved calculation methods to calculate the following parameters:

- d. Heat Input Rate.
  - e. Corrected NO<sub>x</sub> concentrations, NO<sub>x</sub> mass emissions (as NO<sub>2</sub>), corrected CO concentrations, and CO mass emissions.
- 31) For each emission source, Duke Energy Morro Bay LLC shall record the parameters specified in d. and e. of this Condition every 15 minutes (excluding normal calibration periods). As specified below, Duke Energy Morro Bay LLC shall calculate and record the following data:
- a. Total Heat Input Rate for every clock hour.
  - b. The NO<sub>x</sub> mass emissions (as NO<sub>2</sub>), and corrected average NO<sub>x</sub> emission concentration for every clock hour.
  - c. The CO mass emissions, and corrected average CO emission concentration for every rolling three-hour period.
  - d. On an hourly basis, the cumulative total NO<sub>x</sub> mass emission (as NO<sub>2</sub>) and the cumulative total CO mass emissions.
  - e. For each calendar day, the cumulative total NO<sub>x</sub> mass emission (as NO<sub>2</sub>) and the cumulative total CO mass emissions.
  - f. For each calendar quarter, the cumulative total NO<sub>x</sub> mass emission (as NO<sub>2</sub>) and the cumulative total CO mass emissions.
  - g. For each calendar year, the cumulative total NO<sub>x</sub> mass emission (as NO<sub>2</sub>) and the cumulative total CO mass emissions.
- 32) Duke Energy Morro Bay LLC shall calculate and record on a daily basis, the Volatile Organic Compound (VOC) mass emissions, Fine Particulate Matter (PM<sub>10</sub>) mass emissions, Sulfur Dioxide (SO<sub>2</sub>) mass emissions, and Ammonia (NH<sub>3</sub>) mass emissions from each source. Duke Energy Morro Bay LLC shall use the actual heat input rates, actual Start-up times, actual Shutdown times, and

District-approved emission factors to calculate these emissions. The calculated emissions shall be presented as follows:

- a. For each calendar day, VOC, PM<sub>10</sub>, SO<sub>2</sub>, and NH<sub>3</sub> mass emissions shall be summarized for each source.
  - b. On a daily basis, the cumulative total VOC, PM<sub>10</sub>, SO<sub>2</sub> and NH<sub>3</sub> mass emissions shall be summarized for each calendar quarter and for the calendar year.
- 33) Instrumentation must be operated to measure the SCR catalyst inlet temperature and pressure differential across the SCR catalyst.
- 34) Duke Energy Morro Bay LLC shall submit to the Air Pollution Control District a written report each month which shall include:
- a. time intervals, date, and magnitude of excess emissions;
  - b. nature and cause of the excess emission, and corrective actions taken;
  - c. time and date of each period during which the continuous monitoring system was inoperative, except for zero and span checks, and the nature of system repairs and adjustments; and
  - d. a negative statement when no excess emissions occurred.
- 35) Duke Energy Morro Bay LLC shall monitor and report SO<sub>2</sub> emissions in accordance with 40 CFR Parts 72 and 75.
- 36) Duke Energy Morro Bay LLC shall hold "Acid Rain" Sulfur Dioxide Allowances in the compliance subaccounts not less than the total annual emissions of sulfur dioxide for the previous calendar year.
- 37) The equipment installed for the continuous monitoring of CO<sub>2</sub> or O<sub>2</sub> and NO<sub>x</sub> shall be maintained and operated in accordance with 40 CFR Parts 72 and 75.
- 38) A written Quality Assurance program must be established in accordance with 40 CFR Part 75, Appendix B and 40 CFR Part 60, Appendix F which includes, but is not limited to: procedures for daily calibration testing, quarterly linearity and leak testing, record keeping and reporting implementation, and relative accuracy testing.
- 39) Pursuant to Clean Air Act Amendments (CAAA) Title IV, Part 75, Section 75.50, permanent records shall be maintained for a period of five years after creation. The records at a minimum shall include all items specified in Section 75.50.
- 40) Pursuant to CAAA, Title IV, Part 75, Section 75.64, quarterly reports shall be submitted to the District within 30 days following the end of the calendar quarter. The reports must be in electronic format and at a minimum must include all items listed in Section 75.64.
- 41) Duke Energy Morro Bay LLC shall perform monthly (or less frequently if deemed appropriate by the Air Pollution Control Officer) testing to be performed

to verify compliance with the Ammonia (NH<sub>3</sub>) slip limit. Duke Energy Morro Bay LLC shall conduct this testing in accordance with the collection method specified in BAAQMD Source Test Procedure ST-1B and the analysis specified in EPA method 350.3.

- 42) Annual performance tests shall be conducted once in every twelve-month period in accordance with Air Pollution Control District test procedures; the written results of the performance tests shall be provided to the District within thirty (30) days after testing. A testing protocol shall be submitted to the District no later than thirty (30) days prior to the testing, and notification to the District at least ten (10) days prior to the actual date of testing shall be provided so that a District observer may be present. Changes to the test date made subsequent to the initial ten day notification may be communicated by telephone or other acceptable means no less than forty-eight (48) hours prior to the new test date.

If the testing cannot be completed during a twelve month period due to the equipment being non-operational or in limited operation at the end of the current twelve month period, the APCO may delay testing until the unit is operating at sufficient capacity.

- 43) Duke Energy Morro Bay LLC shall report all breakdowns which result in the inability to comply with any emission standard or requirement contained on this permit to the Air Pollution Control Officer (APCO) as soon as reasonably possible, but in any case within 4 hours of its detection. The APCO may elect to take no enforcement action if Duke Energy Morro Bay LLC demonstrates to the APCO's satisfaction that a breakdown condition exists.

As soon as the occurrence has been corrected, but no later than 10 days after the breakdown, a written report shall be supplied to the APCO. This report shall include at a minimum:

- a. a statement that the condition or failure has been corrected and the date of correction; and
  - b. a description of the reasons for the occurrence; and
  - c. a description of the corrective measures undertaken and/or to be undertaken to avoid such an occurrence in the future; and
  - d. pictures of the failed equipment when applicable.
- 44) Duke Energy Morro Bay LLC shall provide adequate stack sampling ports and platforms to enable the performance of source testing. The location and configuration of the stack sampling ports shall be subject to District review and approval.
- 45) No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three (3) minutes in any one (1) hour which is as dark or darker than Ringlemann 1 or equivalent 20% opacity.
- 46) Duke Energy Morro Bay LLC shall install APCO approved oxidative type particulate traps or APCO approved equivalent controls on all standby diesel

engines rated at 50 hp or greater prior to combusting fuel in the Gas Turbines.

- 47) Any representative of the Air Pollution Control District authorized by the Air Pollution Control Officer shall be permitted, pursuant to the authority contained in Section 41510 of the California Health and Safety Code:
- a) to enter upon the premises where the source is located or in which any records are required to be kept under the terms and conditions of the Authority to Construct;
  - b) to have access to and copy any records required to be kept under the terms and conditions of this Authority to Construct;
  - c) to inspect any equipment, operation, or process described or required in this Authority to Construct; and,
  - d) to sample emissions from the source.

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