



## **STATEMENT OF CEC STAFF APPROVAL OF POST- CERTIFICATION CHANGE HUBMOLDT BAY GENERATING STATION (06-AFC-07C)**

On March 17, 2021, Pacific Gas & Electric (PG&E) (project owner) filed a post-certification petition for post certification change (TN 237198) with the California Energy Commission (CEC) for the Humboldt Bay Generating Station (HBGS).

The HBGS is a 163-megawatt (MW) facility consisting of ten dual-fuel (natural gas and/or #2 diesel) Wärtsilä 18V50DF 16.3 MW reciprocating engine generator sets and associated equipment. The HBGS was certified by the CEC in September 2008 and began commercial operation in October 2012. The facility is in the City of Eureka, Humboldt County.

### **DESCRIPTION OF PROPOSED CHANGE**

The project owner seeks approval to allow HBGS operations at less than 50 percent load to support local operations. The proposed changes include "low loading mode" and "black start mode" (the project), which can be a low as 3 MW.

For additional information, the CEC's project webpage, <https://www.energy.ca.gov/powerplant/simple-cycle/humboldt-bay-generating-station>, has a link to the petition accessible through the webpage in the box labeled "Compliance Proceeding." Click on the option.

### **CEC STAFF REVIEW AND CONCLUSIONS**

California Code of Regulations, title 20, section 1769 requires a project owner to petition the CEC for the approval of any change the project owner proposes to the project design, operation, or performance requirements of a certified facility.

Consistent with California Code of Regulations, title 20, section 1769(a)(3)(A), the CEC technical staff (CEC staff) reviewed the petition for potential environmental effects; consistency with the applicable laws, ordinances, regulations, and standards (LORS); and HBGS conditions of certification. CEC staff has determined the modified HBGS (1) would not have a significant effect on the environment, (2) would continue to comply with the applicable LORS and (3) would not require a change to, or deletion of, any conditions of certification as adopted in the Final Commission Decision (Decision) except for those related to Air Quality.

For the changes to the Air Quality conditions of certification in the Decision and consistent with California Code of Regulations, title 20 section 1769(a)(3)(B), CEC staff has

determined that the modified HBGS (1) would not have a significant effect on the environment, (2) would continue to comply with the applicable LORS, and (3) would not increase any daily, quarterly, annual, or other emission limit. The details of the proposed changes to Air Quality conditions of certification can be found under the Air Quality section in this Statement of Staff Approval.

CEC staff's conclusions for all technical and environmental areas are summarized in **Table 1**. The bases for each of CEC staff's conclusions are provided below the table.

**Table 1**  
**Summary of Conclusions for Each Technical Area**

Technical Areas Reviewed	CEQA				Conforms with applicable LORS
	Potentially Significant Impact	Less Than Significant Impact with Mitigation (with Revised or New COCs)	Less Than Significant Impact (with or without Existing COCs)	No Impact	
Air Quality			X		X
Biological Resources				X	X
Cultural Resources				X	X
Efficiency				X	
Facility Design					X
Geological and Paleontological Resources				X	X
Hazardous Materials Management				X	X
Land Use				X	X
Noise and Vibration				X	X
Public Health			X		X
Reliability					
Socioeconomics				X	
Soil and Water Resources				X	X
Traffic and Transportation				X	X
Transmission Line Safety and Nuisance				X	X
Transmission System Engineering					X
Visual Resources				X	X
Waste Management				X	X
Worker Safety and Fire Protection				X	X

Areas shown in gray are not subject to CEQA consideration or have no applicable LORS HBGS must comply with.

## **AIR QUALITY**

The proposed project changes do not require any physical alteration of the equipment or the HBGS site. The only purpose is to allow the operation of HBGS gensets in black start and/or low load modes. Operations of the engines in black start and/or low load modes with either diesel or natural gas are expected to result in emissions that are less than the current permitted limits. Thus, running the facility in low loading mode with black start would likely result in a net decrease in emissions, both in terms of short term (pounds per hour) and long term annual (tons per year). Since the black start/low load mode of operations would only occur for very limited short duration, impacts to the long-term annual averages were not assessed. The short-term worst-case impacts are less than the most stringent air quality standards for all pollutants except of 24-hour PM10. The 24-hour PM10 impact exceeds the limit mainly due to the existing high background concentration. However, the project impact is only 7 percent of the background concentration, which is well below the significant impact level of 5 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) and much less than previously modeled and approved impacts in the original decision. Therefore, operation in black start/low load modes would comply with California Ambient Air Quality Standards or the National Ambient Air Quality Standards.

There would be no increase in greenhouse gas (GHG) emissions due to the proposed low load and black start modes. Therefore, the GHG emissions impacts would not change from what has been previously analyzed.

Please see the Air Quality analysis within this Statement of Staff Approval for additional details of CEC staff's conclusions, including Public Health and GHG emissions.

## **BIOLOGICAL RESOURCES**

No physical changes at the site; operations changes would not impact biological resources.

## **CULTURAL RESOURCES**

This is an operational change only, does not include ground disturbance, and would have no impacts to cultural or tribal cultural resources.

## **EFFICIENCY**

Decreasing the load to less than 50 percent, down to 3 MW per engine to support operations as described in this petition may slightly reduce the project's overall thermal efficiency, but the impact would be less than significant.

## **FACILITY DESIGN**

Decreasing the load to less than 50 percent as described in the petition would result in no impact to facility design. No construction is required, and no ground disturbance is necessary.

## **GEOLOGICAL AND PALEONTOLOGICAL RESOURCES**

The project does not involve ground disturbance. All project work would be completed on existing concrete foundations and surfaces. There would be no impacts to geological and paleontological resources.

## **HAZARDOUS MATERIALS MANAGEMENT**

The project change would not change the hazardous materials management of the power plant. Therefore, the project change would have no impact on the offsite public or the environment.

## **LAND USE**

The proposed changes do not require any physical alteration of the Wartsila engines or the project site. The only changes will be in the mode of operation of the engines and control software.

## **NOISE AND VIBRATION**

Decreasing the load to less than 50 percent as described in the petition may result in a slight reduction in operational noise. There would be no construction activities.

## **PUBLIC HEALTH**

The petition does not require changes to the Public Health environmental baseline information as described in the CEC decision (CEC 2008) and previous amendments (CEC 2010, CEC 2018). The expected short-term operation at low loads will result in hazardous air pollutants (HAP) emissions, including Diesel Particulate Matter at levels that are less than the full load operations which were analyzed previously. Therefore, public health impacts due to the proposed black start/low load mode would be less than significant.

Please see the Air Quality (including Public Health and GHG emissions) analysis included with this Statement of Staff Approval for details of CEC staff's conclusions.

## **RELIABILITY**

HBGS reliability would remain the same.

## **SOCIOECONOMICS**

The proposed changes do not require any physical alteration of the Wartsila engines or the project site. The only changes will be in the mode of operation of the engines and control software.

## **SOIL AND WATER**

The proposed modification would not involve construction or ground disturbing activities at the HBGS site, nor would the modification result in an increase in potable or recycled water consumption. Therefore, the proposed modification would not result in adverse impacts on soil and water resources.

## **TRAFFIC AND TRANSPORTATION**

The proposed changes do not require any physical alteration of the Wartsila engines or the project site. The only changes will be in the mode of operation of the engines and control software.

## **TRANSMISSION LINE SAFETY AND NUISANCE**

Since there is no change to the existing transmission line, there is no impact to transmission line safety and nuisance.

## **TRANSMISSION SYSTEM ENGINEERING**

The proposed project change does not include activities with the transmission lines or within the project switchyard and would not impact the transmission grid. Therefore, there will be no impacts to transmission system engineering. In addition, the project will comply with applicable LORS, and will not require a change to any of the conditions of certification.

## **VISUAL RESOURCES**

The proposed changes do not require any physical alteration of the Wartsila engines or the project site. The only changes will be in the mode of operation of the engines and control software.

## **WASTE MANAGEMENT**

The proposed change will not result in the creation of any new solid waste streams, and the current quantities of solid waste generated at the facility will not fluctuate outside the requirements currently outlined in the existing conditions of certification. Therefore, there will be no impact to solid waste generation or management at the facility as a result of the proposed change.

## **WORKER SAFETY AND FIRE PROTECTION**

The project change would not change the worker safety practices or fire protection equipment of the plant. Therefore, the project change would have no impact on worker health safety.

## CALENVIROSCREEN

Staff reviewed CalEnviroScreen 4.0 data to determine whether the United States census tract where the HBGS is located (6023010700) is identified as a disadvantaged community. This science-based mapping tool is used by the California Environmental Protection Agency (CalEPA) to identify disadvantaged communities based on geographic, socioeconomic, public health, and environmental hazard criteria pursuant to Health and Safety Code section 39711 as enacted by Senate Bill 535 (De León, Chapter 830, Statutes of 2012). The CalEnviroScreen 4.0 overall percentile score for this census tract is 40. Based on the four categories of geographic areas CalEPA formally designates as disadvantaged communities, this census tract is not identified as a disadvantaged community<sup>1</sup>.

## ENVIRONMENTAL JUSTICE

**Environmental Justice – Figure 1** shows the 2010 census blocks in the 6-mile radius of the HBGS with a minority population greater than or equal to 50 percent. The population in these census blocks represents an environmental justice (EJ) population based on race and ethnicity as defined in the United States Environmental Protection Agency's *Guidance on Considering Environmental Justice During the Development of Regulatory Actions*. Staff conservatively obtains demographic data within a 6-mile radius around a project site based on the parameters for dispersion modeling used in staff's air quality analysis. Air quality impacts are generally the type of project impacts that extend the furthest from a project site. Beyond a 6-mile radius, air emissions have either settled out of the air column or mixed with surrounding air to the extent that potential impacts are less than significant. The area of potential impacts would not extend this far from the project site for most other technical areas included in staff's EJ analysis.

Based on California Department of Education data in **Environmental Justice – Table 1**, staff concluded that the percentage of those living in the Eureka City Unified, Loleta Union, and Peninsula Union school districts (in a 6-mile radius of the project site) and enrolled in the free or reduced price meal program is larger than those in the reference geography, and thus are considered an EJ population based on low income as defined in *Guidance on Considering Environmental Justice During the Development of Regulatory Actions*.

**Environmental Justice – Figure 2** shows where the boundaries of the school district are in relation to the 6-mile radius around the HBGS site.

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1 The four categories of geographic areas identified by CalEPA as disadvantaged are: 1) Census tracts receiving the highest 25 percent of overall scores in CalEnviroScreen 4.0, 2) Census tracts lacking overall scores in CalEnviroScreen 4.0 due to data gaps, but receiving the highest 5 percent of CalEnviroScreen 4.0 cumulative pollution burden scores, 3) Census tracts identified in the 2017 DAC designation, regardless of their scores in CalEnviroScreen 4.0, and 4) Lands under the control of federally recognized Tribes.

Source: CalEPA Final Designation of Disadvantaged Communities: May 2022  
<https://calepa.ca.gov/envjustice/ghginvest/>

**Environmental Justice – Table 1  
 Low Income Data within the Project Area**

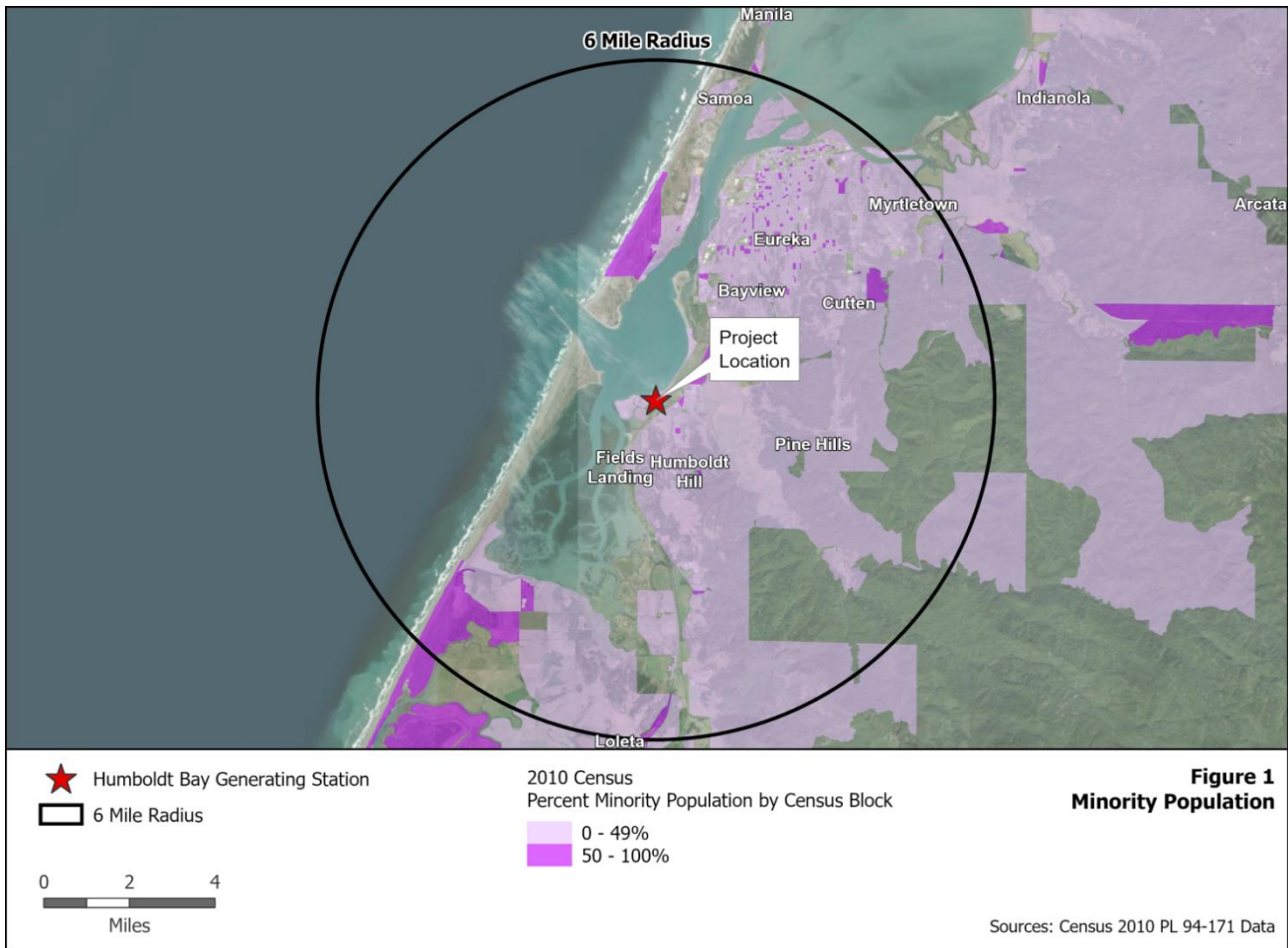
SCHOOL DISTRICT IN SIX-MILE RADIUS	Enrollment Used for Meals	Free or Reduced-Price Meals	
Eureka City Unified	3,877	2,644	68.2%
Loleta Union Elementary	100	89	89.0%
Peninsula Union Elementary	44	44	100%
REFERENCE GEOGRAPHY			
Humboldt County	18,109	10,553	58.3%

**Source:** CDE 2020. California Department of Education, DataQuest, Free or Reduced-Price Meals, District level data for the year 2019-2020, <<http://dq.cde.ca.gov/dataquest/>>.

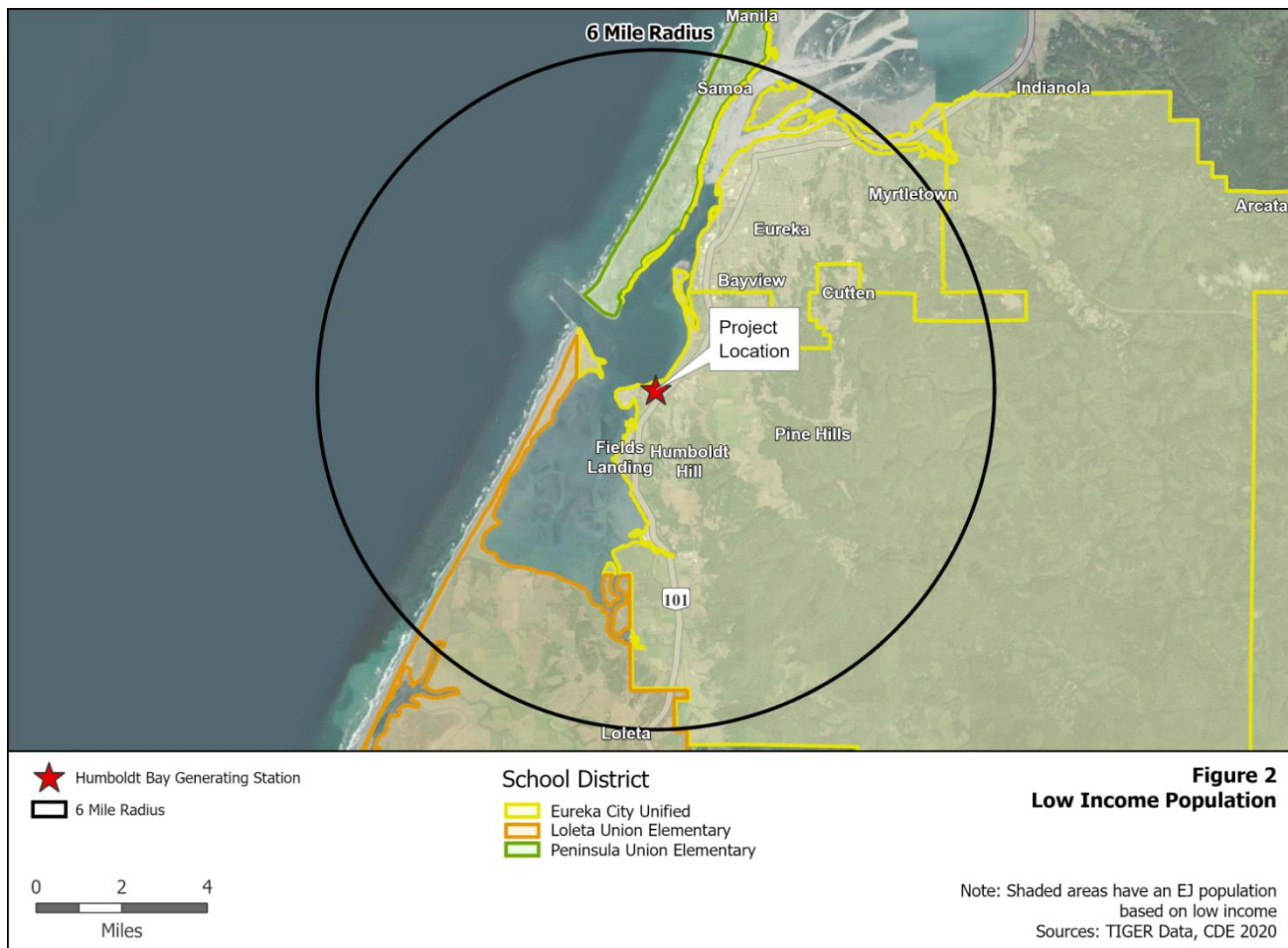
The following technical areas (if affected) consider impacts to EJ populations: Air Quality, Cultural Resources (indigenous people), Hazardous Materials Management, Land Use, Noise and Vibration, Public Health, Socioeconomics, Soil and Water resources, Traffic and Transportation, Transmission Line Safety and Nuisance, Visual Resources, Waste Management, and Worker Safety and Fire Protection.



### Environmental Justice – Figure 1



## Environmental Justice – Figure 2



### Environmental Justice Conclusions

For this petition, CEC staff concludes that impacts would be less than significant, and, thus, would be less than significant on the EJ population represented in **Environmental Justice – Figure 1, Figure 2, and Table 1.**

## **CEC STAFF CONCLUSIONS**

The CEC staff has reviewed the petition pursuant to California Code of Regulations, title 20, section 1769(a) (Changes in Project Design, Operation, or Performance) and has determined the proposed changes meet all the required criteria for approval by the CEC staff.

California Code of Regulations, title 20, section 1769(a)(3)(A) requires:

- i. There is no possibility that the change may have a significant effect on the environment, or the change is exempt from the California Environmental Quality Act;
- ii. The change would not cause the project to fail to comply with any applicable laws, ordinances, regulations, or standards; and
- iii. The change will not require a change to, or deletion of, a condition of certification adopted by the Commission in the Final Decision or subsequent amendments.

Additionally, California Code of Regulations, title 20, section 1769(a)(3)(B) requires when there is a change to Air Quality conditions of certification:

- i. The change meets the criteria in subdivisions (a)(3)(A)(i) and (ii); and
- ii. No daily, quarterly, annual or other emission limit will be increased as a result of the change.

The CEC staff has first determined the proposed project change would result in no impacts or less than significant impacts on the environment and the project would remain in compliance with the applicable LORS, consistent with California Code of Regulations, title 20, section 1769(a)(3)(A). The CEC staff secondly determines the proposed project change would require only a change to, or deletion of, Air Quality conditions of certification in the Final Decision. Those changes to the Air Quality conditions of certification would result in no impact or less than significant impacts on the environment, continued compliance with the applicable LORS, and no daily, quarterly, annual, or other emission limit being increased as a result of the change, consistent with California Code of Regulations, title 20, section 1769(a)(3)(B).

## **WRITTEN COMMENTS**

This statement of the CEC staff approval of the proposed project changes has been filed in the docket for this project. Pursuant to California Code of Regulations, title 20, section 1769(a)(3)(C), any person may file an objection to the CEC staff's determination within 14 days of the filing of this statement on the grounds that the project change does not meet the criteria set forth in sections 1769(a)(3)(A) or 1769(a)(3)(B). Absent any objections as specified in section 1769(a)(3)(C), this petition will be approved 14 days after this statement is filed.

Written comments or objections to the CEC staff's determination may be submitted using the CEC's e-Commenting feature, as follows: Go to the [CEC's project webpage](#) and click on either the "[Submit e-Comment](#)" link. When your comments are filed, you will receive an email with a link to them.

Written comments or objections may also be mailed to:

California Energy Commission  
Docket Unit, MS-4  
Docket No. 06-AFC-7C  
715 P Street  
Sacramento, CA 95814-5512

All comments and materials filed with the Docket Unit will be added to the facility Docket Log and be publicly accessible on the CEC's webpage for the facility.

If you have questions about this statement, please contact Keith Winstead, Compliance Project Manager, Office of Compliance, Monitoring, and Enforcement at (916) 208-3849, (916) 776-0609, or via e-mail at [Keith.Winstead@energy.ca.gov](mailto:Keith.Winstead@energy.ca.gov).

For information on public participation, please contact the Public Advisor, Energy Equity, and Tribal Affairs , at (916) 957-7910 or email [publicadvisor@energy.ca.gov](mailto:publicadvisor@energy.ca.gov).

News media inquiries should be directed to the CEC Media Office at (916) 654-4989, or by email at [mediaoffice@energy.ca.gov](mailto:mediaoffice@energy.ca.gov).

Mail List: 7212

List Serve: Humboldt Bay Generating Station

**Humboldt Bay generating station (06-AFC-07C)**  
**Petition to Amend for Operating in Low Load and Black Start Modes**  
**Air Quality, Public Health, and Greenhouse Gases**  
**Tao Jiang, Ph.D., P.E.**

## **INTRODUCTION AND SUMMARY**

On March 17, 2021, PG&E filed a petition to amend (PTA) with the California Energy Commission (CEC) requesting approval to operate in low load and black start modes at the Humboldt Bay Generating Station (HBGS). With this PTA, the petitioner proposes to provide the facility the flexibility to operate at engine loads less than 50 percent, down to 3 megawatts (MW), which could include low load mode or black start events (HBGS 2021).

The CEC certified the HBGS in September 2008 (CEC 2008) and the facility began operations on October 1, 2010. The HBGS is a load following power plant consisting of 10 Wärtsilä 18V50DF 16.3 MW reciprocating engine generator sets and associated equipment with a combined nominal generating capacity of 163 MW. The engines' primary fuel is natural gas but can switch to 100 percent diesel during emergencies or natural gas curtailments. The project is in Eureka, California, on 5.4 acres of a 143-acre parcel formerly occupied by the existing PG&E Humboldt Bay Power Plant (HBPP). It is a replacement of the original 105 MW Units 1 and 2 and the two 15 MW Mobile Emergency Power Plants at the HBPP site.

In late 2019, PG&E requested multiple variances from the North Coast Unified Air Quality Management District (NCUAQMD or District) to allow testing of low loading operations. On December 14, 2019, PG&E was granted an interim variance by the District to test a subset of engines at low loads (<50%) to determine the potential emissions, which was performed on December 15–17, 2019. On February 3, 2020, PG&E received an approved regular variance order from the District to tune the ammonia injection control system by adding ammonia injection load points at loads less than 50 percent, and to conduct more low load mode testing. On May 27, 2020, PG&E submitted an application for variance to the District to obtain relief from permit conditions for two purposes: 1) to conduct engine tuning at low loads in an attempt to improve engine operation and reduce air emissions during engine startups; and 2) to operate the HBGS in low load mode during emergency events such as Public Safety Power Shutdown (PSPS) events/storm events while seeking modification of the HBGS permit. The variance was approved on July 10, 2020, with an expiration date of July 10, 2021.

This PTA requests to operate the facility at loads less than 50 percent, down to 3 MW to support regional power demands that include low load mode and black start unit operations. This PTA will enable the facility to provide local power during emergency events or as the local power needs dictate. No changes to equipment will occur, thus there will be no construction or earth moving impacts related to this amendment. To facilitate operations in either "low load mode" or "black start mode", this amendment modifies and adds corresponding conditions of certification (conditions), including the changes to operational load restrictions, addition of low load and black start operations as additional operating scenarios, revision of the engine startup limits in terms of the total number of engines and hours, addition of needed definitions of terms, and changes to selected emissions limitations.

The NCUAQMD completed the Engineering Evaluation (NCUAQMD 2022a) and Preliminary

Decision to Amend Title V Permit & Prevention of Significant Deterioration Permit (NCUAQMD 2022b) on February 11, 2022. The public notice period ended on March 14, 2022, and no comments were received by the district. The draft permit was sent to EPA for a 45-day review period which is scheduled to conclude on May 2, 2022.

Staff reviewed the PTA and the associated NCUAQMD analysis and condition language. In addition to the proposed changes from the PTA, the NCUAQMD also made administrative revisions to permit conditions. The CEC staff proposes to incorporate the revisions in the NCUAQMD air quality (AQ) conditions AQ-1, AQ-84, AQ-91, AQ-94, AQ-106, AQ-111, AQ-114, AQ-115, AQ-116, AQ-128, AQ-132, AQ-133, AQ-135, AQ-140, and AQ-142, with the addition of a new Condition AQ-101a, and the deletion of three conditions AQ-86, AQ-109, and AQ-112.

The modified project would comply with all laws, ordinances, regulations, and standards (LORS). Air quality, public health, and greenhouse gas impacts from the evaluated changes would be less than significant, including impacts to environmental justice populations. Therefore, there are no air quality, public health, or greenhouse gas environmental justice issues related to the evaluated facility modifications and no minority or low-income populations would be significantly or adversely impacted.

#### Laws, Ordinances, Regulations, and Standards Compliance

The HBGS is subject to all the LORS described in the Final Commission Decision for the HBGS (CEC 2008) and amendments thereafter (CEC 2010, 2018). The applicable LORS remain the same as previous analyses; the requested changes are not expected to affect the facility's compliance with LORS. The conditions of certification in the Final Commission Decision and amendments thereafter ensure that the facility would remain in compliance with all LORS.

#### Analysis

##### 1. Air Quality

The proposed project changes do not require any physical alteration of the equipment or the project site. The only purpose is to allow the operation of HBGS gensets in black start and/or low load modes. Black start is the process of restoring an electric power station or a portion of an electric grid to operation without relying on the area-wide external transmission network, and low load is the process of operating each engine on natural gas or diesel fuel at loads down to 3 MW in support of the local grid. Operations of the engines in low load mode with either diesel or natural gas are expected to result in emissions that are less than the current permitted limits. Thus, running the facility in low loading mode with black start would likely result in a net decrease in emissions, in both the short term (pounds per hour) and long term (tons per year).

A significant amount of time in these modes will be at loads below the current permit limit of 50 percent. The HBGS has recently conducted extensive source testing on the engines at loads below 50 percent (i.e., 4 MW and 6 MW), which represent loads of approximately 25 and 37 percent, respectively. Air Quality Table 1 shows the maximum hourly emissions of criteria pollutants during the extensive source testing, including nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), Volatile Organic Compounds (VOCs), sulfur dioxide (SO<sub>2</sub>), particulate matter with a diameter of 10 microns or less (PM<sub>10</sub>), and particulate matter with a diameter

of 2.5 microns or less (PM2.5). As shown in Air Quality Table 1, emissions of criteria pollutants are well below the currently permitted emission limits. The ability to run in black start/low load mode will not result in any potential exceedance to the currently permitted limits.

**Air Quality Table 1**  
**HBGS, Maximum Hourly Emissions of 4 MW and 6 MW Load Source Testing**

	<b>NOx</b>	<b>CO</b>	<b>VOC</b>	<b>SO<sub>2</sub></b>	<b>PM10/2.5</b>
<b>Natural Gas Mode</b>					
<b>Maximum Hourly Emission, Natural Gas Fuel (lbs/hr)</b>	2.24	0.34	0.12	0.05	0.44
<b>Current Permit Limit, Natural Gas Fuel (lbs/hr)</b>	3.1	4.13	5.1	0.4	3.6
<b>Current Startup/Shutdown Permit Limit, Natural Gas Fuel (lbs/hr)</b>	23.6	24.1	17.9	0.4	3.6
<b>Diesel Mode</b>					
<b>Maximum Hourly Emission, Diesel Fuel (lbs/hr)</b>	8.95	1.36	0.28	0.08	0.59
<b>Current Permit Limit, Diesel Fuel (lbs/hr)</b>	19.9	6.9	7.9	0.22	5.5
<b>Current Startup/Shutdown Permit Limit, Diesel Fuel (lbs/hr)</b>	164	25.5	17.2	0.22	5.5

Source: HBGS 2021.

The project owner conducted an air quality impact assessment using a computer model to evaluate the project operation, including black start and/or low loading modes, to determine the worst-case air quality impacts. For the engines, start-up and low load emission rates and concentrations were included in the analysis for short-term averages in the air quality modeling. Since the black start/low load mode of operations would only occur for very limited short duration, impacts to the long-term annual averages were not assessed.

Both diesel and natural gas modes are considered for 4 MW and 6 MW cases. For all pollutants, the 6 MW diesel mode of operation resulted in the highest short-term emission concentrations. To assess the short-term impacts, several emissions scenarios were evaluated:

- For the 1-hour NO<sub>2</sub> and CO startup modeling, up to six engines were in black start in



diesel mode with simultaneous operation of the emergency generator and the remaining four engines in natural gas mode. All were at 6 MW load.

- For the 8-hour CO modeling, all 10 engines were assumed to startup in diesel (1-hour) and operate for the seven remaining hours in diesel mode.
- For 24-hour PM10 and PM2.5 modeling, all 10 engines were in diesel black start for a 1-hour period plus 23 additional hours in diesel mode. All were at 6 MW load. The emergency generator was operated for 1-hour. This is worst-case for 24-hour average PM10 and PM2.5 impact analyses.
- SO2 modeling assumed diesel mode for all averaging periods.

The maximum short-term impacts from the HBGS operation are summarized in **Air Quality Table 2**. The nearest criteria pollutant air quality monitoring sites to the proposed project site would be the Humboldt Hill monitoring station for the period 2014 through 2018, which was installed as part of the original HBGS permit requirements. Although the station ceased operations at the end of 2018, the CEC staff still use the data from this station as it is the most representative to the project site due to its proximity. Background concentrations from the Humboldt Hill station were used for CO, SO<sub>2</sub>, and PM2.5. The next closest monitoring station is the Jacobs site which was used for PM10 and the NO<sub>2</sub> data. The highest background concentrations from these two sites for the most recent three-year period (2016–2018) are included in **Air Quality Table 2** to calculate the combined impacts (modeled + background).

**Air Quality Table 2**  
**HBGS Maximum Short-term Operation Impacts (µg/m<sup>3</sup>)**

Pollutant	Averaging Time	Project Impact	Background	Total Impact	Limiting Standard	Percent of Standard
<b>PM10</b>	24 hour	<b>3.74</b>	<b>53</b>	<b>56.74</b>	<b>50</b>	<b>113</b>
<b>PM2.5</b>	24 hour	1.4	11	12.4	35	35
<b>CO</b>	1 hour	1,026.4	2,748	3,774.4	23,000	16
	8 hour	59.14	2,519	2,578.1	10,000	26
<b>NO<sub>2</sub></b>	State 1 hour	242.4	58	300.4	339	89
	Federal 1 hour	115.1	19	134.1	188	71
<b>SO<sub>2</sub></b>	State 1 hour	15.72	7.3	23.02	655	4
	Federal 1 hour	13.18	2.6	15.78	196	8
	24 hour	1.8	3.1	4.9	105	5

Source: HBGS 2021 and independent staff analysis.

As shown in **Air Quality Table 2**, with the assumption that no more than six engines will be in black startup (diesel) and the remaining four engines operating in natural gas mode (at 6 MW), the worst-case impacts are less than the most stringent air quality standards for all pollutants except 24-hour PM10. The 24-hour PM10 impact plus worst case ambient background values exceeds the standard due to the existing high background concentration. However, the project impact is only 7 percent of the background concentration, which is well below the significant impact level of 5 µg/m<sup>3</sup> and much less than previously modeled and



approved in original decision. Therefore, operation in black start/low load mode will not result in any new violations of either the California Ambient Air Quality Standards or the National Ambient Air Quality Standards.

## 2. Public Health

The petition does not require changes to the Public Health environmental baseline information as described in the CEC decision (CEC 2008) and previous amendments (CEC 2010, CEC 2018). The expected short-term operation at low loads will result in hazardous air pollutants (HAP) emissions, including Diesel Particulate Matter at levels that are less than the full load operations which were analyzed previously. Therefore, public health impacts due to the proposed black start/low load mode would be less than significant.

In the draft permit, the NCUAQMD imposes a new AQ condition (included as staff-proposed Condition **AQ-101a**) to limit HAP emissions below 9.9 tons of any single HAP or 24.9 tons of any combination of HAPs. The HBGS has been designated as a major source of HAP since the original CEC decision. A major source emits or has the potential to emit 10 tons per year (tpy) or more of a single HAP or 25 tpy or more of a combination of HAP emissions. On October 1, 2020, the EPA completed a final action that allows a major source of HAP to reclassify as an area source at any time after limiting emissions. PG&E has re-evaluated their potential HAP emissions, which are less than the major source thresholds. Therefore, the new District-initiated condition would reclassify and ensure the facility remains an area source.

## 3. Greenhouse Gas Emissions

There would be no increase in greenhouse gas (GHG) emissions due to the proposed low load and black start modes. Therefore, the GHG emissions impacts would not increase from what has been previously analyzed.

## CONCLUSIONS AND RECOMMENDATIONS

The requested changes would conform to applicable federal, state, and District LORS. Therefore, the amended facility would not cause any significant adverse air quality impacts, provided that the following conditions are included. Staff recommends approval of the amended conditions as shown below.

### Amended Conditions of Certification

Below is a list of conditions of certification that staff recommends being amended from those approved in the 2008 Energy Commission Final Decision (CEC 2008), as well as the 2010 and 2018 Orders Approving Petitions to Amend (CEC 2010, 2018). ~~Strikethrough~~ indicates deleted language and **underline and bold** is used for new language.

- AQ-1** The permittee shall submit to the Air Pollution Control Officer (APCO) a completed Title V permit application for renewal ~~according to the schedule established by the EPA and District~~ **no earlier than 18 months prior to the expiration date of the Title V permit and no later**

**than 6 months prior to the expiration date of the Title V permit.**

**Verification:** The project owner shall submit any request or application for a new air permit or modification of any existing air permit to the CPM within five working days of its submittal. This includes proposed air permits and modifications either by:

1. the project owner to an agency, or
2. receipt of proposed modifications from an agency. The project owner shall submit all modified air permits to the CPM within 15 days of receipt (**see AQ-SC6**).

**AQ-84** The permittee shall not operate reciprocating engines S-1 through S-12 such that the emissions of NOx, from a combination of all engines, exceeds 392 lbs per hour. Furthermore, the permittee shall not operate reciprocating engines S-1 through S-10 such that more than 2 units are in a diesel startup period during any one clock hour. **Notwithstanding the above, during periods of black start and/or low load operations, the Permittee may operate engines S-1 through S- 10 such that no more than six (6) units are in Diesel Startup period during any one Clock Hour.** [District Rule 102(E); PSD 2/09]

**Verification:** A summary of significant operation and maintenance events and monitoring records required shall be included in the semi-annual operation report (**AQ-SC9**).

**AQ-86** ~~The permittee shall not discharge carbon monoxide from reciprocating engines S-1 through S-10 in excess of 0.14 g/bhp-hr or 20 ppmv @ 15% O<sub>2</sub>. [40 CFR 63 Subpart ZZZZ; District Rule 110]~~

~~**Verification:** The project owner shall submit the results of source tests to both the District and CPM in accordance with condition **AQ-137**.~~

~~A summary of significant operation and maintenance events and monitoring records required shall be included in the semi-annual operation report (**AQ-SC9**).~~

**AQ-91** The permittee shall not operate reciprocating engines S-1 through S-10, such that they individually discharge pollutants exceeding the limits identified in Table 10 below based upon a three (3) hour average with the exception of NOx which shall be based upon a one (1) hour average. The limits shall not apply during startup or shutdown periods. **In addition, only the mass emissions limits in terms of lb/hr, as listed in Table 10, will apply at loads below 50%.** [40 CFR 63.6(f)(1); District Rule 102(E); PSD 2/09]

**Table 10 - Natural Gas Mode Emission Limits**

Pollutant	Emission Rate		
	ppmvd @ 15% O <sub>2</sub>	lb/hr	lb/MMBtu

CO	13	4.13	0.029
NH <sub>3</sub>	10	1.9	0.013
NO <sub>x</sub>	6.0	3.1	0.022
PM <sub>10</sub>	-	3.6	-
ROC	28	5.1	0.035
SO <sub>x</sub>	-	0.40	0.0028

**Verification:** The project owner shall make the site and records available for inspection by representatives of the District, ARB and Energy Commission upon request.

A summary of significant operation and maintenance events and monitoring records required shall be included in the semi-annual operational reports (**AQ-SC9**).

**AQ-94** The permittee shall not discharge pollutants into the atmosphere from the reciprocating engines S-1 through S-10 while in Diesel Mode, based upon a three (3) hour rolling average, in excess of the emission limits identified in Table 12 below. The limits shall not apply during startup or shutdown periods. **In addition, only the mass emissions limits in terms of lb/hr, as listed in Table 12, will apply at loads below 50%.**  
*[District Rule 102(E); 40 CFR 63.6(f)(1); PSD 2/09]*

**Table 12 - Diesel Mode Emission Limits**

Pollutant	Emission Rate		
	ppmvd @ 15% O <sub>2</sub>	lb/hr	lb/MMBtu
CO	20.0	6.9	0.047
NH <sub>3</sub>	10	2.1	0.014
NO <sub>x</sub>	35.0	19.9	0.134
PM <sub>10</sub>	-	5.5	0.137
ROC	40.0	7.9	0.053
SO <sub>x</sub>	0.40	0.22	0.0016

**Verification:** The project owner shall make the site and records available for inspection by representatives of the District, ARB and Energy Commission upon request.

A summary of significant operation and maintenance events and monitoring records required shall be included in the semi-annual operation reports (**AQ-SC9**).

**Hazardous Air Pollutants**

**AQ-101a** **The combined discharge from the engines S-1 through S-12 during any calendar year shall not exceed 9.9 tons of any single hazardous air pollutant or 24.9 tons of any combination of hazardous air pollutants. [District Rule 102(E)]**

**Verification: The project owner shall make the site and records available for inspection by representatives of the District, ARB, and Energy Commission upon request.**

**AQ-106** The permittee shall only operate the reciprocating engines S-1 through S-10 in Natural Gas Mode except during maintenance and testing, and during natural gas curtailments as set forth in this permit. **Notwithstanding the above, S-1 through S-10 may be operated in diesel mode during periods of black start and/or low load operations.**  
*[District Rule 102(E); PSD 2/09]*

**Verification:** A summary of significant operation and maintenance events and monitoring records required shall be included in the semi-annual operation report (**AQ-SC9**).

**AQ-109** ~~The permittee shall not operate the reciprocating engines S-1 through S-10 such that the combined hours of operation during startup and shutdown periods exceeds 30 engine hours per day.~~ *[District Rule 102(E); PSD 2/09]*

**Verification:** ~~A summary of combined engine hours of operation during startup and shutdown periods shall be included in the semi-annual operation reports (**AQ-SC9**).~~

**AQ-111** The permittee shall not operate any of the reciprocating engines S-1 through S-10 below 50 percent load except during startup and shutdown periods. **Notwithstanding the above, S-1 through S-10 may be operated at loads below 50% but not less than three (3) MW per engine during periods of black start and/or low load operations.**  
*[District Rule 102(E); PSD 2/09]*

**Verification:** A summary of engine operations below 50 percent load shall be included in the semi-annual operation reports (**AQ-SC9**).

**AQ-112** ~~The permittee shall not operate the reciprocating engines S-1 through S-10 for more than 80 engine hours per calendar day at loads less than 12.0MW.~~ *[District Rule 102(E); PSD 2/09]*

**Verification:** ~~A summary of total engine hours per calendar day at loads less than 12.0MW per engine based on readings taken every 15 minutes shall be included in the semi-annual operation report (**AQ-SC9**).~~

**AQ-114** For each oxidation catalyst installed, during the performance testing required pursuant to the Testing and Monitoring section of this permit, the permittee shall determine the pressure drop across each catalyst. The permittee shall operate the reciprocating engines S-1 through S-10 such that the pressure drop across the catalyst does not exceed the following acceptable range for any period of time: The acceptable pressure range is two inches of water column (plus or minus 10%) deviation from the

pressure drop established during performance testing. This Condition shall not apply during startup or shutdown periods. [~~40 CFR 63 Subpart ZZZZ~~ **District Rule 102(E); PSD 2/09 BACT**]

**Verification:** A summary of significant operation and maintenance events and monitoring records required shall be included in the semi-annual operation report (**AQ-SC9**).

**AQ-115** The permittee shall not operate reciprocating engines S-1 through S-10 if the inlet temperature of the oxidation catalyst is outside of the acceptable operating range for any period of time. The acceptable operating range of the oxidation catalyst is greater than or equal to 450 F and less than or equal to 1350 F. Each reciprocating engine is paired with a single oxidation catalyst unit. For purposes of compliance with this condition, each engine and catalyst pair is evaluated separately. This Condition does not apply during startup or shutdown periods. [~~40 CFR 63 Subpart ZZZZ~~ **District Rule 102(E); PSD 2/09 BACT**]

**Verification:** A summary of significant operation and maintenance events and monitoring records required (**AQ-128**) shall be included in the semi-annual operation reports (**AQ-SC9**).

**AQ-116** The permittee shall not operate reciprocating engines S-1 through S-10 unless the CO emissions from the units are abated by the oxidation catalyst at a rate greater than or equal to 70% over uncontrolled emission levels, calculated on a 3 hour rolling average. Verification of the emissions reduction shall be completed in accordance with 40 CFR 63 Subpart ZZZZ. [~~40 CFR 63 Subpart ZZZZ~~ **District Rule 102(E); PSD 2/09 BACT**]

**Verification:** A summary of significant operation and maintenance events and monitoring records required shall be included in the semi-annual operation report (**AQ-SC9**).

**AQ-128** The permittee shall continuously maintain onsite for the most recent five year period and shall be made available to the District APCO upon request, the records as listed in Table 20 below.

**Table 20 - Required Records for Engines S-1 through S-10**

Frequency	Information to be Recorded
Upon Occurrence	<p>A. Records of maintenance conducted on engines (40 CFR 60 Subpart IIII)</p> <p>B. Time, duration, and fuel firing mode for each enginestartup</p> <p>C. Time, duration, and fuel firing mode for each engineshutdown</p> <p>D. Time, duration, and reason for each period of operation inDiesel Mode</p> <p>E. For each bulk delivery of diesel fuel received, certification from the supplier that the diesel fuel meets or exceeds CARB diesel specifications</p> <p>F. For each bulk delivery of diesel fuel received, the higher heating value (HHV) and sulfur content of the fuel</p> <p>G. Fuel Mode – each operating minute shall be designated as either “Natural Gas Mode” or “Diesel Mode”</p> <p><b><u>H. For periods of black start and/or low load operations; period start and stop times, total duration of period, emissions during the period, operational parameters and other emissions support data during the period as deemed necessary by the APCO.</u></b></p>
At least one electronic reading every 15 minutes	<p>A. NO<sub>x</sub> (ppmvd @15% O<sub>2</sub>)</p> <p>B. CO (ppmvd @15% O<sub>2</sub>)</p> <p>C. O<sub>2</sub> (%)</p> <p>D. Exhaust gas temperature as SCR inlet (°F)</p> <p>E. Exhaust gas temperature at OC inlet (°F)</p> <p>F. Engine load (%)</p>

Hourly (for each engine)	<ul style="list-style-type: none"> <li>A. NOx (ppmvd @15% O<sub>2</sub>) and lb/hr, all on a 1 houraverage</li> <li>B. CO (ppmvd @15% O<sub>2</sub>) and lb/hr, all on a rolling 3 houraverage</li> <li>C. ROC (ppmvd @15% O<sub>2</sub>) and lb/hr, all on a rolling 3 houraverage</li> <li>D. NH<sub>3</sub> (ppmvd @15% O<sub>2</sub>) and lb/hr, all on a rolling 3 houraverage</li> <li>E. SO<sub>x</sub> (ppmvd @15% O<sub>2</sub>) and lb/hr, all on a rolling 3 houraverage</li> <li>F. Natural gas fuel consumption during Natural Gas Mode (MMBtu HHV, hourly average)</li> <li>G. Diesel fuel consumption during Natural Gas Mode (MMBtu HHV, hourly average)</li> <li>H. Percentage of total heat input derived from diesel during Natural Gas Mode (MMBtu HHV, hourly average)</li> <li>I. Diesel fuel consumption during Diesel Mode (MMBtu HHV, hourly average)</li> </ul>
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Frequency	Information to be Recorded
Daily	A. NOx (lbs/day, total for all engines) B. CO (lbs/day, total for all engines) C. ROC (lbs/day, total for all engines) D. SOx (lbs/day, total for all engines) E. PM10 (lbs/day, total for all engines) F. Diesel particulate matter (lbs/day, total for all engines) G. Natural gas fuel consumption (MMBtu HHV, and cubic feet consumed for each engine and total for all engines) H. Diesel pilot fuel consumption (MMBtu HHV, all engines combined) I. Diesel fuel consumption during Diesel Mode (MMBtu HHV, and gallons for each engine and total for all engines) J. Engine load – for all engines over the calendar day, the total hours operated at less than 12 MW K. Hours of operation - total for each engine and total for all engines as a sum of operating minutes
Monthly	A. Sulfur content of natural gas (gr/100scf, monthly fuel testing) B. Natural gas sulfur content (gr/100scf, 12 month rolling average) <b><u>C. Pressure drop across oxidation catalyst (inches of water column, minimum of one reading for each oxidation catalyst per month)</u></b>
Quarterly (combined total for all engines)	A. NOx (tons) B. CO (tons) C. SOx (tons) D. ROC (tons) E. PM (tons) F. Diesel particulate matter (tons) <b><u>G. Highest single HAP (tons)</u></b> <b><u>H. Combined HAPs (tons)</u></b> <del>G</del> I. Natural gas fuel consumption (MMBtu, HHV, and cubic feet) <del>H</del> J. Diesel pilot fuel consumption (MMBtu, HHV, and gallons) <del>I</del> K. Diesel fuel consumption during Diesel Mode (MMBtu, HHV, and gallons) <del>J</del> L. Sulfur content of natural gas (gr/100scf, 12 month rolling average) <del>K</del> M. Hours of operation (for each fuel mode)



Frequency	Information to be Recorded
Annually (combined total for all engines)	A. NOx (tons) B. CO (tons) C. SOx (tons) D. ROC (tons) E. PM (tons) F. Diesel particulate matter (tons) <b>G. Highest single HAP (tons)</b> <b>H. Combined HAPs (tons)</b> G <del>I</del> . Natural gas fuel consumption (MMBtu, HHV, and cubic feet) H <del>J</del> . Diesel pilot fuel consumption (MMBtu, HHV, and gallons) I <del>K</del> . Diesel fuel consumption during Diesel Mode (MMBtu, HHV, and gallons) J <del>L</del> . Sulfur content of natural gas (gr/100scf, annual average) K <del>M</del> . Hours of operation (for each fuel mode)

**Verification:** The project owner shall make the site and records available for inspection by representatives of the District, ARB, and Energy Commission upon request.

**AQ-132** Not later than 24 hours after determining that Diesel Mode operation is to occur as a result of an expected natural gas curtailment, **or a period of black start or low load operations**, the permittee shall notify the APCO by telephone, email, electronic page, or facsimile. The notification shall include, but not be limited to, the following [*District Rule 102(E); PSD 2/09*]:

- A. The anticipated start time and duration of operation in Diesel Mode under the natural gas curtailment **or black start or low load operations**; and
- B. The anticipated quantity of diesel fuel expected to be burned under the natural gas curtailment **or black start or low load operations**.

**Verification:** The project owner shall submit to both the District and CPM the notification within 24 hours after determining that Diesel Mode operation is to occur.

**AQ-133** Not later than ~~24~~**48** hours following the end of a period of any Diesel Mode operation **that results in the consumption of 500 or more gallons of diesel fuel**, the permittee shall notify the APCO by email or facsimile of the following [*District Rule 102(E); PSD 2/09*]:

- A. The actual start time and end time of the period of Diesel Mode operation;
- B. The identification of the reciprocating engines that were operated and the average load at which each reciprocating engine was operated on diesel fuel during the Diesel Mode operating period; and
- C. The actual quantity of diesel fuel consumed during the Diesel Mode operation.

**Verification:** The project owner shall submit to the District the notification within 24 hours after the end of Diesel Mode operation. The project owner shall submit to the CPM notification within 24 hours after the end of any Diesel Mode operation if any single engine consumed greater than 500 gallons.

The project owner shall submit the total quantity of diesel fuel actually used for the prior six-month and twelve-month period in the semi-annual operation reports.

The project owner shall make the site and records available for inspection by representatives of the District, ARB, and Energy Commission upon request.

**AQ-135** The permittee shall monitor and record exhaust gas temperature at the inlet and at the outlet of the oxidation catalyst. ~~[40 CFR 63 Subpart ZZZZ]~~ **District Rule 102(E)**

**Verification:** A summary of significant operation and maintenance events and monitoring records required (**AQ-128**) shall be included in the semi-annual operation reports (**AQ-SC9**).

**AQ-140** The permittee shall demonstrate compliance with the Diesel Mode emission limits via source testing conducted in accordance with the test methods listed below. For purposes of compliance with this condition, testing shall be conducted both while the engines are operated in Diesel Mode, and shall be conducted at the intervals and at the operating loads specified in Condition **AQ-141**. **Alternative test methods may be approved by the APCO.** *[District Rule 102(E); PSD 2/09 amended 6/15]:*

- A. Particulate matter - ARB Method 5 (front and back half), or EPA Methods 201a and 202.
- B. Diesel particulate matter – ARB Method 5 (front half only).
- C. Visible emissions - U.S. EPA Method 9.
- D. Ammonia – Bay Area Air Quality Management District Method ST-1B.

- E. Reactive organic gases –CARB Method 100.
- F. Nitrogen oxides -- CARB Method 100.
- G. Carbon monoxide –CARB Method 100.
- H. CO shall be measured at the inlet and outlet of the oxidationcatalyst
- I. Oxygen –CARB Method 100.
- J.      i. Oxygen shall be measured at the inlet and outlet of the oxidationcatalyst.
- K.      ii. Oxygen measurements shall be made at the same time as the COmeasurements.
- L.      Liquid fuel sulfur content – ASTM D5453-93.

**Verification:** The project owner shall submit the proposed protocol for the source tests30 days prior to the proposed source test date to both the District and CPM for approval.

The project owner shall notify the District and CPM no later than 7 days prior to theproposed source test date and time.

**AQ-142** The permittee shall demonstrate compliance with the hourly, daily, and annual ROC emission limits through the use of valid CO CEM data and the ROC/CO relationship determined by annual CO and ROC source tests; and APCO approved emission factors and methodology. [~~40 CFR63 Subpart ZZZZ~~; District Rule 102(E); PSD 2/09 amended 6/15]

**Verification:** The project owner shall make the site and records available for inspectionby representatives of the District, ARB, and Energy Commission upon request.

A summary of significant operation and maintenance events and monitoring recordsrequired shall be included in the semi-annual operation reports (**AQ-SC9**).

## **DEFINITIONS**

All definitions are new to the Energy Commission license and incorporated from theDistrict HBGS Title V Permit. As used for these conditions and verifications, the following terms shall have the meaning set out herein.

**Acfm: actual cubic feet per minute**

**Black Start Operations (BSO): the process of restoring an electric power station or a portion of an electric grid to operation without relying on the wide-area external transmission network.**

**HAP: Hazardous Air Pollutant, as defined in 42 U.S. Code §7412**

**Low Load Operations (LLO): the process of operating each engine on natural gas or diesel fuel at loads down to three (3) MW**

## REFERENCES

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- CEC 2008 - California Energy Commission (TN 48255). Final Commission Decision Humboldt Bay Repowering Project (06-AFC-07). September 30, 2008.
- CEC 2010 - California Energy Commission (TN 56555). Order Approving Petition to Modify air Quality & Public Health Conditions of Certification (06-AFC-07C). May 4, 2010.
- CEC 2018 – California Energy Commission (TN 223945). Order Approving Petition to Amend (06-AFC-07C). June 28, 2018.
- HBGS 2021 – Pacific Gas and Electric (PG&E) (TN 237196). Operating in Low Load and Black Start Modes for the Humboldt Bay Generating Station (06-AFC-07C). March 17, 2021.
- NCUAQMD 2022a – North Coast Unified Air Quality Management District. Engineering Evaluation Preliminary Decision to Amend Title V Permit to Operate NCU 059-12 & Prevention of Significant Deterioration Permit #000443-1 for the Humboldt Bay Generating Station, February 11, 2022.
- NCUAQMD 2022b – North Coast Unified Air Quality Management District. Title V Federal Operating Permit & District Permit to Operate, February 11, 2022.