DRAFT- ENGINEERING EVALUATION
Facility ID No. 17315
C&H Sugar Company, Inc.
830 Loring Avenue, Crockett, CA 94525
Application No. 692090

Background

Trinity Consultants on behalf of C&H Sugar Company, Inc. is applying for an Authority to Construct/Permit to Operate for the following equipment:

S-32105 Prime Diesel Generator (Twin Set Engine A)
Make: Volvo Penta, Model: TWD1673GE
Year: 2023, 796 bhp, 36.8 gal/hr, 5.06 MMBtu/hr
Abated by an integral Selective Catalytic Reduction System

S-32106 Prime Diesel Generator (Twin Set Engine B)
Make: Volvo Penta, Model: TWD1673GE
Year: 2023, 796 bhp, 36.8 gal/hr, 5.06 MMBtu/hr
Abated by an integral Selective Catalytic Reduction System

C&H Sugar Company has requested authorization to install one 1,100-kW twin-pack generator powered by two 796-bhp diesel engines to provide backup power to the facility's Joint Treatment Plant (JTP). The proposed HiPower Model HRVW-1375 generator consists of two engines, identified as S-32105 and S-32106, mounted as a twin set on a common base.

Each engine can operate independently and has a separate emission point and integral Selective Catalytic Reduction (SCR) system. The two exhaust points are approximately 10 feet apart and are located within the same enclosure/platform.

S-32105 and S-32106 will operate at C&H Sugar's facility located at 830 Loring Avenue, Crockett, California. The JTP is located west of the refinery, across I-80 and the Carquinez Bridge Trail, within an Overburdened Community as defined by Air District Regulation 2-1. C&H operates a cane sugar refinery and an associated wastewater treatment system.

The JTP includes a stormwater tank that receives process water from the refinery, an equalization tank, treatment reactors, and two dissolved air flotation (DAF) clarifier tanks. The proposed engines will provide electricity to JTP during planned maintenance shutdowns of its electrical steam generators. These shutdowns are scheduled in advance by the facility and may result in operation of the engines for up to 1,300 hours per year. Maximum daily emissions are based on 24 hours of operation, representing the potential worst-case operating scenario during these maintenance periods.

Crockett Cogeneration significantly assists C&H Sugar in production of its principal product, refined sugar. Therefore, Crockett Cogeneration is considered part of the C&H Sugar Facility.

The two facilities have a significant operational relationship. Crockett Cogeneration supplies high-pressure steam to C&H Sugar, and according to information provided by Crockett Cogeneration, approximately 54% of its total thermal steam production in 2025 was supplied to C&H Sugar. This represents more than half of Crockett Cogeneration's thermal steam production. In comparison,

100% of Crockett Cogeneration's net electrical production in 2025, approximately 1,288,366 MWh, was delivered to the electrical grid.

In addition, C&H returns steam condensate to Crockett Cogeneration for reuse. On rare occasions when both the Crockett Cogeneration turbine and the C&H process are shut down, C&H provides a limited amount of PG&E-supplied electricity to Crockett Cogeneration to allow its boilers to remain in standby while required maintenance is performed on Crockett Cogeneration's power interconnection.

Therefore, C&H Sugar and Crockett Cogeneration are considered a single facility under Regulation 2-1-213. The Air District considers the facilities to be related/supporting facilities for purposes of the offsets and risk evaluation. Also, the combined plants are a major facility as defined by Regulation 2-6-212. Each site is subject to Title V and has a Title V permit.

Also, C&H considers that the Crockett refinery is within its plant boundary for the purpose of evaluating risk.

Emissions

Table 1. Annual and Daily Emissions from EPA/CARB Certified Data for S-32105 and S-32106.

Pollutant	Emission Factor (g/bhp-hr)	Max Daily Emissions per Engine (lb/day)	Annual Emissions per Engine (lb/yr)	Annual Emissions per Engine (tons/yr)	Annual Emissions per Project (tons/yr)
NO_x	0.26	11.0	595	0.298	0.593
POC	0.14	5.9	319	0.160	0.319
CO	0.07	3.1	170	0.080	0.160
$PM_{10}/PM_{2.5}$[1]	0.01	0.6	34	0.011	0.023
SO_{2z}	N/A[2]	0.2	13	0.006	0.013

Basis:
- Annual emissions: 1300 hours per engine.
- Max daily emissions: 24-hour operation
- Emission factors from EPA Engine Family PVPXL16.1CDC for each engine.
- [1] Conservative Assumption: All PM emissions are $PM_{2.5}$
- [2] SO_2 emission factor from AP-42 Table 3.4-1, SO_2 (15 ppm) = 0.00809*0.0015 lb SO_2/bhp-hr
- Fuel Consumption 36.8 gallons per hour.

Table 2. Annual and Daily Emissions Ammonia Slip from the SCR systems for S-32105 and S-32106.

Pollutant	CAS#	Hourly Emission Rate (lb/hr)	Acute Trigger Level (lb/hr)	Exceeds Acute Trigger Level?	Annual Emission Rate (lb/yr)	Chronic Trigger Level (lb/yr)	Exceeds Acute Trigger Level?
Ammonia (NH3)	7664-41-7	4.2E-02	7.1E+00	No	5.5E+01	7.7E+03	No
Project		8.4E-02	7.1E+00	No	1.1E+02	7.7E+03	No

Plant Cumulative Increase

The cumulative increase is based on 1300 hours per year for each engine.

Table 3. Plant Cumulative Emissions Increase, Post 4/5/91

Pollutant	Existing Emissions Post 4/5/91 (tons/yr)	Application Emissions (tons/yr)	Cumulative Emissions (tons/yr)
NO_x	0.000	0.595	0.595
POC	0.000	0.319	0.319
CO	0.000	0.160	0.160
$PM_{10}/PM_{2.5}$	0.004	0.023	0.027
SO_2	0.000	0.013	0.013

Health Risk Assessment (HRA)

This analysis estimates the incremental health risk resulting from toxic air contaminant (TAC) emissions from non-emergency operation of a standby diesel engine at this facility. Results from this HRA indicate that the project cancer risk is estimated at 0.49 in a million, and the project chronic hazard index (HI) is estimated at 0.00016.

Receptor	Cancer Risk (chances in a million)	Non-cancer Hazard Index
Resident	0.49	0.00013
Worker	0.21	0.00016

Best Available Control Technology for Toxics (TBACT)
In accordance with the Air District's Regulation 2-5-301, S-32105 and S-32106 do not require TBACT because the estimated source cancer risk is less than 1.0 in a million.

Project Risk Limits
Since the proposed engines, operating at 1300 hours/year do not require TBACT, and the estimated project cancer risk does not exceed 10 in a million and the chronic hazard index does not exceed 1.0, this project complies with the Air District's Regulation 2-5-302 project risk requirements.

Also, C&H included the Crockett refinery is its plant boundary for the purpose of evaluating risk. This means that the Crockett workers were not considered to be off-site workers.

Best Available Control Technology (BACT)

In accordance with Regulation 2-2-301, BACT is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, NO_X, CO, SO_2, $PM_{10,}$ or $PM_{2.5}$.

As shown in Table 1, NO_X emissions exceed 10 pounds per day and thus trigger BACT requirements.

A BACT determination was conducted for S-32105 and 32106 (see attached **Appendix A** for the detailed BACT determination). BACT was determined to be in compliance with the EPA Tier 4 emissions standard for NO_X for the respective horsepower range.

As shown in Table 1, S-32105 and 32106 are identical and are expected to meet 0.26 g NO_X/bhp-hour which is below the EPA Tier 4 standard of 0.5 g/bhp-hour. Therefore, S-32105 and 32106 are both expected to comply with BACT Achieved in Practice.

Offsets

Pursuant to Regulation 2-2, offsets are required when a facility's emissions or potential to emit exceed the applicable thresholds specified in Sections 2-2-302 and 2-2-303.

As discussed in the Background section, C&H Sugar (Facility No. 17315) and Crockett Cogeneration (Facility No. 8664) are separately owned and operated. However, based on the support relationship between the two operations, the Air District has determined that C&H Sugar and Crockett Cogeneration are considered a single facility pursuant to Regulation 2-1-213 for purposes of applicable regulatory evaluations, including offsets and health risk assessment. The combined facility is also a major facility as defined by Regulation 2-6-212. Both C&H Sugar and Crockett Cogeneration currently operate under individual Title V permits.

Accordingly, for purposes of determining the offset requirements applicable to this project, emissions from C&H Sugar and Crockett Cogeneration were evaluated together. The combined emissions, including the emissions increase associated with Application No. 692090, were compared with the applicable offset thresholds established by Regulation 2-2.

Table 4a. Offsets Review

Pollutant	PTE Crockett Cogen – FID 8664 (TPY)	PTE C&H Sugar – FID 17315 (TPY)	New Emissions (TPY)	Total PTE (TPY)	Offsets?	ERC (TPY)	Net Increase (TPY)
NO_x	160.85	0	0.593	161.443	Yes	184.86	0.593
POC	48.45	0	0.319	48.769	Yes	53.058	0.319
CO	73.27	0	0.160	73.430	N/A		73.430
PM_{10}	58.19	0.214	0.023	58.427	No	0.231	58.217
SO_x	8.01	0	0.013	8.023	No		8.023

Basis:

- Existing emissions from Crockett Cogen and C&H are those accumulated after 1991 pursuant to Air District Regulation 2-2-606.
- Emissions Reduction Credits for NOx and POC were provided by Crockett Cogen in Application No. 8658.
- Emissions Reduction Credits for PM10 were provided by C&H in Application No. 16401.

Pursuant to Air District Regulation 2-2-302.2, federally enforceable offsets must be provided for NOx and POC in a ratio of 1.15:1, according to the following:

Table 4b. Offsets Review for FID17315

Pollutant	Total PTE (TPY)	ERC/On Site Credits (TPY)	Net Increase (TPY)	Offsets (Ratio 1.15:1)
NO_x	161.443	-184.86	0.593	0.682
POC	48.769	-53.058	0.319	0.367

C&H Sugar does not have the offsets as of the date of the public notice but will have to provide them before issuance of an Authority to Construct.

Statement of Compliance

The owner/operator is expected to comply with all applicable requirements. Key requirements are listed below:

Airborne Toxic Control Measure for Stationary Compression Ignition Engines

Each engine is subject to the Airborne Toxics Control Measure for Stationary Compression Ignition Engines (ATCM) and required to comply with the following requirements in the section 93115, title 17, CA Code of Regulations. Emissions Standards and Hours of Operating Requirements for New Stationary Prime Diesel-Fueled Engines (>50 bhp):

a. Meet the applicable emission standards for all pollutants for the same model year and maximum horsepower rating as specified in Table 4 Emission Standards for New Stationary Prime Diesel-Fueled CI Engines, in Effect on the date of acquisition or submittal, as defined in section 93115.7, and

b. after December 31, 2008, be certified to the new nonroad compression-ignition (CI) engine emission standards for all pollutants for 2007 and later model year engines as specified in 40 CFR, PART 60, Subpart IIII-Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (2006).

Table 4: Emission Standards for New Stationary Prime Diesel-Fueled CI Engines > 50 BHP g/bhp-hr (g/kW-hr)[1]

Maximum Engine Power	Model year(s)	PM	NOx	NMHC+NOx	NMHC	CO
50 ≤ HP <75 (37 ≤ KW <56)	2007	0.01 (0.02)		5.6 (7.5)		3.7 (5.0)
	2008-2012	0.01 (0.02)		3.5 (4.7)		3.7 (5.0)
	2013+	0.02 (0.03)		3.5 (4.7)		3.7 (5.0)
75≤ HP <100 (56≤ KW <75)	2007	0.01 (0.02)		5.6 (7.5)		3.7 (5.0)
	2008-2011	0.01 (0.02)		3.5 (4.7)		3.7 (5.0)
	2012-2014	0.01 (0.02)	2.5 (3.4)		0.14 (0.19)	3.7 (5.0)
	2015+	0.01 (0.02)	0.30 (0.40)		0.14 (0.19)	3.7 (5.0)
100 ≤ HP <175 (75≤ KW <130)	2007-2011	0.01 (0.02)		3.0 (4.0)		3.7 (5.0)
	2012-2014	0.01 (0.02)	2.5 (3.4)		0.14 (0.19)	3.7 (5.0)
	2015+	0.01 (0.02)	0.30 (0.40)		0.14 (0.19)	3.7 (5.0)
175 ≤ HP < 750 (130≤KW<560)	2007-2010	0.01 (0.02)		3.0 (4.0)		2.6 (3.5)
	2011-2013	0.01 (0.02)	1.5 (2.0)		0.14 (0.19)	2.6 (3.5)
	2014+	0.01 (0.02)	0.30 (0.40)		0.14 (0.19)	2.6 (3.5)
750<HP≤1,207 (560<KW≤900) Gen. sets	2007-2010	0.01 (0.02)		4.8 (6.4)		2.6 (3.5)
	2011-2014	0.02 (0.03)	2.6 (3.5)		0.30 (0.40)	2.6 (3.5)
	2015+	0.02 (0.03)	0.50 (0.67)		0.14 (0.19)	2.6 (3.5)
HP > 1,207 (KW > 900) Gen. sets	2007-2010	0.01 (0.02)		4.8 (6.4)		2.6 (3.5)
	2011-2014	0.02 (0.03)	0.50 (0.67)		0.30 (0.40)	2.6 (3.5)
	2015+	0.02 (0.03)	0.50 (0.67)		0.14 (0.19)	2.6 (3.5)

1. May be subject to additional emission limitations as specified in current district rules, regulations, or policies governing distributed generation.

Each engine meets the emission standards for all pollutants set in Table 4 above and is subject to and in compliance with the EPA Interim Tier 4 off-road CI engine standards. Since the engines are 2023 model year engines, they are in compliance with the above ATCM requirements.

Air District Rules

Regulation 6-1-303 (*Ringelmann No. 2 Limitation*)
Regulation 6-1-310 *(Total Suspended Particulate (TSP))*
Section 6-1-310.1 No person shall emit TSP from any source in excess of 343 mg per dscm (0.15 gr per dscf) of exhaust gas volume.
Section 6-1-310.2 Effective July 1, 2020, Table 6-1-310.2 emission limits shall apply to any source with a Potential to Emit TSP (as defined in Regulation 2-1-217) greater than 1,000 kg per year. No applicable source shall emit TSP at a concentration in excess of the limit indicated for the source's Exhaust Gas Rate in Table 6-1-310.2.

The engine emits 15.4 kg/yr. Therefore, only section 6-1-310.1 applies to this project.

TSP Concentration can be calculated using the formula below:

$$\frac{\left(Engine\ PM10\ Hourly\ Emissions\ \left(\frac{gr}{hr}\right)\right)}{Dry\ Engine\ Maximum\ Exhaust\ Flow\ Rate\ \left(\frac{dscf}{hr}\right)} = TSP\ Concentration\ \left(\frac{gr}{dscf}\right)$$

Engine Maximum Exhaust Flow Rate: 4471 acfm =94858.4 dscf/hr
Engine Maximum Exhaust Temperature: 851 F
Water (H2O) Content (%): 12.5%
PM_{10} abatement for Engine: N/A
Engine PM_{10} emissions: 183 gr/hr
TSP Concentration for Engine: 0.002 gr/dscf

The TSP Concentration is below the allowable limit of 0.15 gr/dscf for each engine in the project.

Regulation 9-1-301 (*Limitations on Ground Level Concentrations of SO_2*)
The engines will burn ultra-low sulfur diesel available in California, therefore, are expected to comply with the requirements in this section.

Regulation 9-8 (*NO_x and CO from Stationary Internal Combustion Engines*)
Section 9-8-304.2 – Emission Limits – Compression-Ignited Engines
The limits in this section apply to the sources in this application. The identical engines comply by having a NO_x and CO emission factor below the limits as shown in the table below.

Compression Ignited Engine (bhp)	Emission Standards CO (ppmvd)	Emission Standards NOx (ppmvd)
Greater than 175	310	110

Section 9-8-502 – Recordkeeping
Section 9-8-503 – Quarterly Demonstration of Compliance

Any person who must comply with Section 9-8-301, 302, 303, 304, 305, or 306 shall use a portable analyzer to take NO_x and CO emission readings to verify compliance with the applicable emission limits in Sections 9-8-301 through 305 at least once during each calendar quarter in which a source test is not performed. This will be enforced through the permit conditions along with the recordkeeping requirements.

California Environmental Quality Act (CEQA)
This permit application is categorically exempt from the California Environmental Quality Act (CEQA). CEQA Guidelines, Section 15301 exempts projects that involve negligible or no expansion of use. The backup prime engines will not expand the facility's normal operation and will result in no increase or only a negligible increase in use of the facility. Further, based on the review of the permit application materials, including Appendix H, environmental information form, the project will not have any significant environmental impacts, and cumulative impacts from successive projects of the same type in the same place will not result in significant environmental impacts. In addition, the project has been approved by the Contra Costa County Fire Protection District.

New Source Performance Standards (NSPS)
40 CFR 60, Subpart IIII (*Stationary Compression Ignition Internal Combustion Engines*)
Per Section 1039.105(a)(3), engines certified to PM emission standard of 0.07 g/kW-hr (0.05 g/bhp-hr) or lower are not subject to the smoke emissions standards of Section 1039.105.

Sections 60.4206 and 60.4211(a) require that the owner/operator operate and maintain the engine according to the manufacturer's written instructions or procedures developed by the owner or operator that are approved by the engine manufacturer, over the entire life of the engine. The owner/operator is expected to comply with this requirement.

Section 60.4207(b) requires that by October 1, 2010, the owner/operator must use fuel that complies with 40 CFR 80.510(b). This means that the fuel must have a maximum sulfur content of 15 ppm and the same cetane index or aromatic content as above. The owner/operator is expected to comply with this requirement because CARB diesel fuel, which meets this requirement, must be used in California.

The engines will comply with the requirements of Section 60.4211(c) because they have been certified to meet the emission standards specified in Section 60.4204(b).

Pollutant	**Emission Factor** (g/bhp-hour)	**Emissions Standard required per Subpart IIII for Tier 4 Final Engines** (g/bhp-hour)
NO_x	0.26	2.6
CO	0.14	2.6
POC	0.07	0.14
PM	0.01	0.03

National Emissions Standards for Hazardous Air Pollutants (NESHAP)
40 CFR 63, Subpart ZZZZ (*Stationary Reciprocating Internal Combustion Engines (RICE)*)

S-32105 and S-32106 are new engines at an area source of hazardous air pollutants (HAPs) and must meet the requirements in 40 CFR 60, Subpart IIII (as shown above). No further requirements apply to these engines under this subpart according to Section 63.5690(c)(1).

Prevention of Significant Deterioration (PSD)
PSD requirements have been established in 40 CFR Part 52.21 and apply to projects at existing major stationary sources in an area designated as attainment or unclassifiable under the Clean Air Act. Emissions of all criteria pollutants are expected from the proposed Project. Of the criteria pollutants, the Bay Area is considered in attainment of PM_{10}, SO_2, NO_2, and CO. As shown in Table 1, the proposed project is below the significant emission increase thresholds as shown in Air District Regulation 2-2-227.2. As such, the PSD requirements do not apply to the proposed Project.

California Health & Safety Code §42301.6 and Regulation 2-1-412 (Public Notice, Schools & Overburdened Communities (OBC))
Prior to approving an application for an authority to construct or permit to operate, a public notice, fully describing the potential emissions, shall be prepared for the following cases:

(i) A new or modified source located within 1000 feet of the outer boundary of a K-12 school site and which results in the increase in emissions of any substance into the ambient air which has been identified by the California Air Resources Board or the APCO as a toxic air contaminant or a hazardous air contaminant or which is on the list required to be prepared pursuant to subdivision (a) of Section 25532 or Section 44321 subsections(a) to (f) inclusive of the Health and Safety Code.

(ii) A new or modified source located within an OBC as defined in Section 2-1-243 and for which a Health Risk Assessment is required pursuant to Section 2-5-401

Since the proposed sources will operate within an OBC and triggers an HRA, they are subject to the public notice requirements. There are no K-12 schools within 1000 ft of the sources.

Permit Conditions

Permit Condition #100535 for S-32105 and S-32106

1. The owner/operator of S-32105 and S-32106 shall not operate these engines any more than the hours listed below in any consecutive 12-month period.
   S-32105 1300 hours
   S-32106 1300 hours
   [Basis: Cumulative Increase, Regulation 2-5]

2. The owner/operator of S-32105 and S-32106 shall only operate these engines if each is equipped with a properly operated and properly maintained non-resettable totalizing meter (with a minimum display capability of 9,999 hours) that measures the hours of operation. [Basis: "Stationary Diesel Engine ATCM" section 93115.10(e), title 17, CA Code of Regulations]

3. The owner/operator of S-32105 and S-32106 shall only operate these engines when each is equipped with a properly maintained and properly operated integral Selective Catalytic Reduction (SCR) system.
   [Basis: Cumulative Increase, Title 17 CCR Section 93115.6(a)(3), 40 CFR 1039.101, BACT]

4. The owner/operator shall ensure urea injection commences as soon as the SCR catalyst bed reaches minimum operating temperature as specified by the manufacturer. [Basis: Cumulative Increase, Title 17 CCR Section 93115.6(a)(3), 40 CFR 1039.101, BACT, TBACT]

5. The owner/operator shall ensure the engine emissions do not exceed an ammonia (NH_3) slip of 10 ppmv, dry @ 15% O_2 from the SCR system. If deemed necessary to demonstrate compliance with Regulation 2, Rule 5, the Air District may require a source test to determine compliance with this emission limit.
   [Basis: Regulation 2, Rule 5]

6. The owner/operator of S-32105 and S-32106 shall fire these engines exclusively with diesel fuel with sulfur content no greater than 0.0015 wt%.
   [Basis: Cumulative increase; Regulation 9-1]

7. The owner/operator of shall not exceed the following limits at each engine S-32105 and S-32106:
   0.26 g/hp-hr of NOx
   0.07 g/hp-hr of CO
   0.14 g/hp-hr of POC
   0.01 g/hp-hr of PM
   For the purposes of this condition, NMOC is equivalent to POC.
   [Basis: Regulation 9-8-304.2; Cumulative Increase; "Stationary Diesel Engine ATCM" section 93115.7(a), title 17, CA Code of Regulations]

8. To demonstrate compliance with Part 7, the owner/operator shall use a portable analyzer to take NOx and CO emission readings to verify compliance with the applicable emission limits in Part 7 at least once during each calendar quarter in which a source test is not performed. The first of these readings shall occur within 24 hours of initial start-up of the source. All emission readings shall be taken with the engine operating either at conditions representative of normal operations or conditions specified in the permit to operate. The analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations.
   [Basis: Regulation 9-8-503]

9. Within 60 days of issuance of the Authority to Construct pursuant to Application 692090 and annually thereafter, the owner/operator shall conduct an Air District approved source test at the outlet of each source (S-32105 and S-32106) to demonstrate compliance with Part 7 and with Regulation 9-8-304.2. The owner/operator shall notify the Air District's Source Test Section, in writing, of the source test protocol and projected test date at least 7 days prior to testing. The owner/operator shall submit the source test results to the Air

District's Source Test Section no later than 30 days after the source test. This condition does not replace any other regulatory requirement to conduct source tests.
[Basis: Regulation 9-8-304.2; Cumulative Increase; "Stationary Diesel Engine ATCM" section 93115.7(a), title 17, CA Code of Regulations]

10. To determine compliance with the above conditions for each source S-32105 and S-32106, the owner/operator shall maintain the following records and provide all of the data necessary to evaluate compliance with the above conditions:
a. Total hours of operation of each engine to demonstrate compliance with Part 1.
b. Total consumption of diesel fuel at each source.
c. Hours of operation in Part 1 and amount of diesel fuel shall be totaled on a rolling consecutive 12-month basis.
d. Engine SCR maintenance records.
e. SCR system owner's manual or manufacturer's specifications.
g. Source test results.
h. Quarterly Demonstration of Compliance per Part 8 and the measured NOx and CO concentration, corrected to 15% oxygen, dry basis.

The owner/operator shall record all records in an Air District-approved log. The owner/operator shall retain the records with the equipment for 60 months if the facility has been issued a Title V Major Facility Review Permit or Synthetic Minor Operating Permit, from the date of entry, and make them available for inspection by Air District staff upon request. These record-keeping requirements shall not replace the record-keeping requirements contained in any applicable Air District Regulations.
[Basis: Recordkeeping]

End of Conditions

Recommendation

The Air District has reviewed the material contained in the permit application for the proposed project and has made a preliminary determination that the project is expected to comply with all applicable requirements of Air District, state, and federal air quality-related regulations. The preliminary recommendation is to issue an Authority to Construct for the equipment listed below.

However, the proposed source will be located within an Overburdened Community and required an HRA, which triggers the public notification requirements of Regulation 2-1-412. After the comments are received from the public and reviewed, the Air District will make a final determination on the permit.

I recommend that the Air District initiate a public notice and consider any comments received prior to taking any final action on issuance of an Authority to Construct and/or a Permit to Operate for the following equipment:

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Make: Volvo Penta, Model: TWD1673GE

Year: 2023, 796 bhp, 36.8 gal/hr, 5.06 MMBtu/hr
Abated by an integral Selective Catalytic Reduction System

S-32106 Prime Diesel Generator (Twin Set Engine B)
Make: Volvo Penta, Model: TWD1673GE
Year: 2023, 796 bhp, 36.8 gal/hr, 5.06 MMBtu/hr
Abated by an integral Selective Catalytic Reduction System

Prepared by: Isis Virrueta,
Senior Air Quality Engineer
September 2026

Appendix A

BACT Determination for Diesel Engines for Non-Emergency (Prime) Generators.

Definition of Best Available Control Technology

Per Section 2-2-202, Best Available Control Technology (BACT) is defined as an emission limitation, control device, or control technique applied at a source that is the most stringent of:

- The most effective device or technique successfully utilized;
- The most stringent emission limitation achieved by an emission control device or technique for the type of equipment comprising such a source;
- The most effective emission control limitation for the type of equipment comprising such a source that is contained in an approved implementation plan of any state; or,
- The most effective control device or technique or most stringent emission limitation that is technologically feasible, taking into consideration cost-effectiveness, any ancillary health and environmental impacts, and energy requirements.

These requirements are generally categorized as either technologically feasible and cost-effective (termed "BACT 1") or achieved-in-practice (termed "BACT 2").

BACT 2 is either equal to or less stringent than BACT 1. Because achieved-in-practice is required regardless of cost and BACT 1 is more stringent than BACT 2, an evaluation for what has been achieved-in-practice is first conducted.

Achieved-in-Practice (BACT 2)

To understand what has been achieved in practice for controlling nitrogen oxides (NO_X), emissions from non-emergency diesel engines, the following sources of information were reviewed:

- Air District BACT Workbook;
- Regulations (Air District, Other California Air Districts);
- California Air Resources Board (CARB) BACT Clearinghouse; and,
- United States Environmental Protection Agency (EPA) Reasonably Available Control Technology (RACT)/Lowest Achievable Emission Rate (LAER)/BACT Clearinghouse (RBLC).

Air District BACT Workbook

The Air District's BACT Workbook, Section 2 (BACT Workbook) pertains to combustion sources, which include internal combustion engines with a horsepower rating of 50 brake horsepower (bhp) or greater. The guidelines in Document 96.1.4, Revision 6 (April 13, 2009), have been used to determine the Best Available Control Technology (BACT) for IC Engine – Compression Ignition, Stationary Prime, non-agricultural diesel-fired engines.

However, a new BACT determination for IC Engine – Compression Ignition, Stationary Prime, non-agricultural diesel-fired engines is necessary to compile new control technologies and cleaner engines.

Table A-1 lists the current values in the BACT Workbook for document 96.1.4, Revision 6 (April 13, 2009).

Table A-1. *Air District BACT Workbook IC Engine – Compression Ignition, Stationary Prime, non-agricultural.*

Pollutant	BACT 1. Technologically Feasible / Cost Effective 2. Achieved-in-Practice	Typical Technology
POC	1. 50% reduction of current tier standard for POC. 2. Current tier standard for POC at applicable horsepower rating.	1. Catalytic oxidation combined with current POC certified engine. 2. Current POC certified engine.
NO_X	1. 85% reduction of current tier standard for NOx 2. Current tier standard for NOx at the applicable horsepower rating.	1. Selective catalytic reduction (SCR) + current NOx certified engine. 2. Current NOx-certified engine.
CO	1. 50% reduction of current tier standard for CO. 2. 2.75 g/bhp-hr [319 ppmvd @ 15% O_2]	1. Catalytic oxidation combined with a current CO-certified engine. 2. Any engine demonstrated or certified to meet 2.75 g/bhp-hr.

PM_{10}	1. n/s 2. 0.01 g/bhp-hr or equivalent technology. 3. TBACT: 0.01 g/bhp-hr or equivalent technology.	1. n/s 2. Any engine/technology verified or certified to achieve 0.01 g/bhp-hr. 3. (See 2., above)
SO_2	1. n/s 2. Fuel sulfur content not to exceed 0.0015% (wt.)	3. n/s 4. CARB Diesel Fuel (ULSD)

The BACT determination within New Source Review (NSR) Application No. 692090 will add a determination for Non-Emergency Diesel Engines for NO_x.

California Air District Regulations

A review of California air district regulations was conducted to identify those districts that have adopted rules addressing NO_X emissions from Non-Emergency Diesel Engines.

Table A-2 includes the rules within those air districts that are relevant to diesel engines, specifically for prime generators.

Table A-2. *California Air District Regulations Applicable to Non-Emergency Diesel Engines.*

Agency	Source	Pollutant	Emission Limits/Typical Technology
Bay Area Air District	Regulation 2-2 New Source Review Regulation 9-8 Nitrogen Oxides and Carbon Monoxide from Stationary Internal Combustion Engines https://www.baaqmd.gov/en/rules-and-compliance/current-rules	NO_X	BACT and its applicability are defined in Section 2-2-202 and are required for all new or modified sources. The limits in Regulation 9-8-304 Emission Limits – Compression-Ignited Engines.
Sacramento Metropolitan Air Quality Management District (SMAQMD)	Rule 412 - Stationary IC Engines Located at Major Stationary Sources of NO_x https://www.airquality.org/businesses/rules-regulations	NO_X	The limits in this Rule, sections 302.3 BARCT for Compression Ignition Engines, apply to all non-emergency engines.
South Coast Air Quality Management District (SCAQMD)	Regulation 1470: Requirements for Stationary Diesel-Fueled ICE and other Compression Ignitions Engines https://www.aqmd.gov/docs/default-source/rule-book/reg-xiv/rule-1470.pdf?sfvrsn=83b1d61_8	NOx	All new Stationary Emergency Diesel-Fueled CI must meet the requirements in Table 2. NMHC+NO_X HP > 750 (kW > 560) 4.8 g/bhp-hr
San Diego County Air Pollution Control District (SDCAPCD)	Rule 69.4.1: Stationary Reciprocating Internal Combustion Engines https://www.sdapcd.org/content/dam/sdapcd/documents/rules/current-rules/Rule-69.4.1.pdf	NO_X	0.5 g/bhp-hr (non-emergency certified engines using diesel fuel, bhp ≥ 750)
San Joaquin Valley Air Pollution Control District (SJVUAPCD)	Rule 4702: Internal Combustion Engines https://ww2.valleyair.org/media/arbl5kha/final-rule-4702.pdf	Certified EPA Certified Tier 3 or Tier 4 Engine (all pollutants)	Meet Certified Compression-Ignited Engine Standard in effect at time of installation.

California Air District BACT Guidelines

A review of California Air District's latest determinations was conducted to identify those districts that have updated their guidelines addressing NO_x emissions from Non-Emergency Diesel Engines.

Table A-3 includes the rules within those air districts that are relevant to emergency engines, specifically, fire pumps. Some guidelines or determinations were not considered, as they are exclusively for emergency or agricultural engines.

Table A-3. *California Air District BACT Guidelines Applicable to Non-Emergency Diesel Engines.*

Agency	Source Category	Document	Power Rating (bhp)	Pollutant	Emission Limit (g/hp-hr)	Typical Technology
San Joaquin Valley Air Pollution Control District (SJVAPCD)	JVAPCD Best Available Control Technology (BACT) Guideline 3.3.16 https://www.valleyair.org/media/dcmoi51w/approved-proactive-revision-of-bact-guidelines-3316.pdf	Best Available Control Technology (BACT) Requirements for Ag Stationary Compression-Ignited IC Engine. Date: March 20, 2025	>50	NOx	EPA Tier 4 Final certification level or equivalent for the applicable horsepower range.	Selective Catalytic Reduction (SCR)
San Diego County Air Pollution Control District (SDCAPCD)	Internal Combustion Engine, Piston type, Non-Emergency & No cogeneration (Diesel) https://www.sdapcd.org/content/dam/sdapcd/documents/permits/SDAPCD-BACT-Guidance.pdf	New Source Review Requirements for Best Available Control Technology (BACT) Date: November 2023	>50	NOx	Latest EPA Tier Certification for the horsepower range	Certified Engine / California Clean diesel fuel and Selective Catalytic Reduction (SCR) - 90 % reduction.
Notes: 1) BACT guidelines applicable to emergency and agricultural diesel engines were found but did not apply to Non-Emergency Diesel Engines. 2) SDCAPCD guidelines are not available for engines larger than 750 bhp, however, the 200 – 750 bhp category is the closest to the engines proposed in AN692090. 3) Bay Area Air District BACT guidelines were not included in this table since they are available in Table A-1.						

All guidelines presented above that apply to Non-Emergency Diesel Engines meet the EPA/CARB Tier 4 emission standards.

CARB BACT Clearinghouse

A review of the CARB BACT Clearinghouse resulted in the following determinations for controlling NO_X, emissions from Non-Emergency Diesel Engines.

Table A-4. *BACT Determinations from other California Air for Non-Emergency Diesel Engines.*

Agency	Source Category	Document	Power Rating (bhp)	Pollutant	Emission Limit (g/hp-hr)	Typical Technology
South Coast Air Quality Management District (SCAQMD)	Portable, Compression Ignition https://ww2.arb.ca.gov/sites/default/files/classic/technology-clearinghouse/bact/BACTID884.pdf	SCAQMD BACT Determination Application No.: 594294 Description: Portable, compression ignition naturally aspirated with SCR, oxidation catalyst, and ammonia oxidation catalyst. Date: February 1, 2019	123.4	NOx	2.5	Certified Engine / Selective Catalytic Reduction (SCR) System
San Joaquin Valley Air Pollution Control District (SJVAPCD)	JVAPCD Best Available Control Technology (BACT) Guideline 3.3.16 https://www.valleyair.org/media/dcmoi51w/approved-proactive-revision-of-bact-guidelines-3316.pdf	Best Available Control Technology (BACT) Requirements for Ag Stationary Compression-Ignited IC Engine. Date: March 20, 2025	>50	NOx	EPA Tier 4 Final certification level or equivalent for the applicable horsepower range.	Selective Catalytic Reduction (SCR)
San Diego County Air Pollution Control District (SDCAPCD)	Internal Combustion Engine, Piston type, Non-Emergency & No cogeneration (Diesel) https://www.sdapcd.org/content/dam/sdapcd/documents/permits/SDAPCD-BACT-Guidance.pdf	New Source Review Requirements for Best Available Control Technology (BACT) Date: November 2023	200 - 750	NOx	Latest EPA Tier Certification for the horsepower range	Certified Engine / California Clean diesel fuel and Selective Catalytic Reduction (SCR) - 90 % reduction.

Notes:

4) BACT guidelines applicable to emergency and agricultural diesel engines were found but did not apply to Non-Emergency Diesel Engines.
5) SDCAPCD guidelines are not available for engines larger than 750 bhp, however, the 200 – 750 bhp category is the closest to the engines proposed in AN692090.

6) Other Air Districts list BACT guidelines and determinations for emergency engines, agricultural engines, and similar equipment; the most stringent requirements are meeting the EPA Tier 4 emission standards at the applicable horsepower range. Since this equipment may be used for Non-Emergency purposes as well, a couple of determinations for emergency or agricultural engines have been included in Table A-4.

U.S. EPA RACT/LAER/BACT Clearinghouse

The RBLC yielded multiple results for Non-Emergency Diesel Engines. The contents of the table below comprise the most stringent limits derived from the Clearinghouse results, dating back to January 1, 1970. Engines were filtered out of the results based on the following qualifications: Non-Emergency Diesel Engines and diesel fuel. If the engine required add-on controls, such as selective catalytic reduction (SCR), non-selective catalytic reduction (NSCR), or oxidation catalysts, source testing was required to verify that emission limits were achievable.

Table A-5. *EPA RACT/LAER/BACT Determinations for NO_X, Emissions from Non-Emergency Diesel Engines.*

RBLC ID	Date	Company / Facility	Permit No.	Equipment	Power Rating (HP)	Pollutant	Technology / Measure	Emission Limit
AK-0030	10/20/2002	City of Unalaska	9625-AA003	Internal Combustion Engines (Entire Facility) (6)	400 - 1650	NOX	Limit hours of operation, add aftercoolers.	--
AK-0031	6/26/1996	City of St. Paul Power Plant	1 9625-AA004	Diesel Generators (6)	400 - 1475	NOX	The manufacturer's inherent NOX design features a turbocharger with aftercooling.	--
AK-0040	07/27/1994	Cominco Alaska Inc. Red Dog Mine	9332-AA003	Electrical Diesel Generators (3)	872	NOX	Emission limits.	23.7 lb/hr
AK-0085	8/16/2022	Alaska Gasline Development Corp.	AQ1524CPT01	Black Start Generator	4060	NOX	Good combustion practices, limit operation to 500 hours per year.	3.3 g/bhp-hr 22.01 lb/hr
IA-0072	3/17/2005	Guardian Industries	23-02-013	Diesel Generator	2346	NOX	Standard emission limit 10.9 g/bhp-hr.	56.4 lb/hr and 146 hours per year
LA-0122	3/17/2025	International Paper – Mansfield Mill	PSD-LA-93 (M-6)	Diesel Generator (3)	130 ------- 1475 ------- 587	NOX	Preventative maintenance.	4 lb/hr and 2.8 TPY ------- 34 lb/hr and 23 TPY ------- 18 lb/hr and 12.7 TPY
LA-0146	5/10/2000	Shell Chemical Company – Geismar Plant	PSD-LA-647	Diesel Generator	1450	NOX	Ultra-low NOx burner.	0.15 lb/hr and 0.6 TPY
VA-0302	10/1/2007	Ingeco Wholesale Power, LLC	52154	Diesel Generator	1450	NOX	Less than 140°F air cooling.	54.79 lb/hr / 240 TPY
WI-0207	8/16/2005	ACE Ethanol, LLC (Stanley)	03-DCF-184	IC Engine Diesel Generator	1850	NOX	Limit hours of operation and emissions.	53 lb/hr and 13.0 g/bhp-hr

Notes:

1) AK-0085 engine is certified to the EPA Tier 4 Final emissions standards. Therefore, according to https://ww2.arb.ca.gov/resources/documents/non-road-diesel-engine-certification-tier-chart NO_X emissions can be as low as 0.5 g/bhp-hr.

RBLC ID	Date	Company / Facility	Permit No.	Equipment	Power Rating (HP)	Pollutant	Technology / Measure	Emission Limit
2) Application No. 692090 hourly NOx emissions are 0.46 pounds with an emission factor of 0.26 g/bhp-hr. 3) According to the federal and CARB non-road engine emission standards chart, the engines in Application No. 692090 are in the greater of 750 bhp and equal to or less than 1270 bhp category. Therefore, findings outside the category will not be considered for the achieved-in-practice determination.								

A review of the Bay Area Air District's internal database from January 1, 1999, until November 15, 2025, results include engines with model years as old as 1973; several engines older than 1999 were reviewed but omitted from this document since these are considered either a Loss of Exemption or do not even meet the EPA Tier 4 emission standards. Engines were filtered out of the results based on the following qualifications: excluding emergency standby use, direct-driven pumps, portable engines, including "prime" or non-emergency generators, and fuel. Engines such as fire pump engines and emergency engines have been omitted. If the engine required add-on controls such as selective catalytic reduction (SCR), non-selective catalytic reduction (NSCR), or oxidation catalysts, source testing was required to verify that emission limits were achievable. The lowest emissions for NO_x and the most stringent requirements are listed below.

Table A-6. *Internal Air District applications with the most stringent technology for NO_X, from Non-Emergency Diesel Engines.*

Facility ID	Date	Company / Facility	Permit No.	Equipment	Power Rating (HP)	Pollutant	Technology / Measure	Emission Limit
8930	8/30/2022	State of California, Department of Water Resources	30608	Prime Diesel Generator 2018 Perkins Model: 2506C-E15TAG3	762	NO_X	Meeting the EPA Tier 4 final emission standards. Add a Selective Catalytic Reduction (SCR) system.	0.59 lb/hr 0.5 g/hp-hr
10	7/31/2019	Chevron Products[2]	29919	Prime Diesel Generator 2019 Cummins Inc. Model: QSB7-G9	314	NO_X	BACT was not triggered; however, this engine meets the EPA Tier 4 final emission standards for the appropriate size and power output.	0.1 lb/hr 0.15 g/hp-hr
24187	2/18/2019	Shimmick/Danny's Joint Venture[2]	29364	Prime Diesel Generator (two identical) 2017 John Deere, Model: 6090HFG06	437	NO_X	BACT was not triggered; however, this engine meets the EPA Tier 4 final emission standards for the appropriate size and power output.	0.07 lb/hr 0.08 g/hp-hr
1810	11/3/2017	Sonoma State University	28871	Prime Diesel Generator 2017 Volvo Penta, Model: TAD1672VE	700	NO_X	A limit in NO_X emission factor for BACT avoidance has been established.	0.4 lb/hr 0.24[3] g/hp-hr
Notes: 1) Among the 32 applications found in the internal Air District database, these are the most relevant. Other applications are not included in this table since the information could not be corroborated or are not comparable to the project proposed in application number 692090. 2) Applications number 29919, 29364 and 28871 are not comparable in power rating to the project proposed in application number 692090. 3) The emission factor was set to keep daily emissions under 9 pounds per day as agreed upon by the applicant. This emission factor has been proven in compliance via source test. 4) According to the federal and CARB non-road engine emission standards chart, the engines in Application No. 692090 are in the greater of 750 bhp and equal to or less than 1270 bhp category. Therefore, findings outside the category will not be considered for the achieved-in-practice determination.								

Most Stringent Achieved-In-Practice Determinations

After comparing the determinations listed in **Tables A-1** through **A-6** and removing engines that do not correspond to the size category of the engines in Application No. 692090 (power output of 750 bhp or more) the most stringent determination is provided in **Table A-7** below.

Table A-7. *Most Stringent Achieved-In-Practice Determinations for Non-Emergency Diesel Engines.*

Pollutant	Achieved-in-Practice Emission Limit	Typical Technology	Source
NO_x	EPA/CARB Tier 4 certified engine for NO_x at the applicable horsepower rating.	EPA/CARB Tier 4 certified engine or the addition of a Selective Catalytic Reduction (SCR) system to meet the standard.	Bay Area Air District

It is essential to note that BACT for diesel engines, although specific, often relies on emissions standards or tiers for establishing new determinations. This approach integrates several factors, including the horsepower rating capacity, model year, and the diverse purposes of diesel engines.

This perspective allows for a more nuanced and practical approach to emission control. Accordingly, the applicable EPA/CARB Tier 4 final nonroad diesel engine emission standards[1] for NO_x at the applicable horsepower rating will be designated as the Achieved-in-Practice emission limit.

Table A-8. *Most Stringent Achieved-In-Practice Determinations for Non-Emergency Diesel Engines for AN692090.*

Pollutant	Achieved-in-Practice Emission Limit (g/hp-hr)	Typical Technology	Source
NO_x	0.5	EPA/CARB Tier 4 certified Engine - CARB ATCM standard for NO_x at the applicable horsepower rating	Bay Area Air District

Notes:

1) EPA Tier 4 nonroad diesel engine emission standards, (g/bhp-hr*)*

Engine Power	**NOx**
750 ≤ bhp< 1207	**0.5**

Technologically Feasible and Cost Effective (BACT 1)

Although Regulation 2, Rule 2 does not include a definition for cost-effectiveness, Section 2-2-414 requires the Air District to publish and periodically update a BACT Workbook, and that BACT will be determined using the workbook as a guidance document.

Section 1 of the BACT Workbook includes a maximum cost guideline for NO_x emissions of $17,500 per ton of emissions reduced.

The following control technologies and mitigation measures have been found technologically feasible for abating pollutant emissions from emergency diesel engines:

Table A-9. *Typical control technologies and mitigation measures are technologically feasible for reducing NO_x emissions from internal combustion engines.*

Pollutant	
NO_X	• Engine ignition timing retard (achievable NO_x reduction 20 to 30 percent), and • Selective Catalytic Reduction (achievable NO_x reduction of 90 percent)

Maximum annualized costs and maximum installed costs for an emissions reduction with an efficiency of 90% by weight can be calculated from the cost-effectiveness threshold and cost equation methodology listed in the Air District's BACT Workbook (see **Table A-10** for results).

Table A-10. *Comparison of Unabated Emissions to Technologically Feasible NO_x Emissions – AN692090*

Source	Source Description	Pollutant	Emission Factor (g/hp-hr)	Proposed Emissions Reduction (%)	Annual Emissions (tons/year)		
					Proposed project (Integral SCR)	*With 85% reduction of the current tier standard for NOx*	*Difference*
S-32105/ S-32106	Non-Emergency Diesel Generator	NO_x	0.26	85	0.297	0.091	-0.097

Table A-11. *Maximum Annualized Costs for Technologically Feasible Levels of NO_x Emissions - AN692090*

Source	Source Description	Pollutant	Emissions Reductions (tons/year)	Maximum Annualized Costs [(1)]
S-32105/S-32106	Non-Emergency Diesel Generator 796 bhp.	NO_X	0.097	$1,697.50

Notes:
1) The values listed represent the maximum annualized costs associated with the relevant emissions reduction for the reduction to be considered cost-effective.
2) 85% reduction of the current tier standard for NOx translates to an emission factor of 0.08 g/bhp-hr. Reduced emissions were calculated using the current project hours of operation (1300 hr/year) and engine size (796 bhp) combined with the reduced emission factor (0.08 g/bhp-hr).
3) Maximum annualized costs are obtained by multiplying abated annual emissions (TPY) by the cost-effectiveness threshold ($/ton).

All NO_X controls are expected to exceed maximum annualized costs. Therefore, requiring more stringent controls than those achieved in practice is deemed not cost-effective.

BACT Determination

Achieved-in-practice BACT applies to the most effective emission control device already in use or the most stringent emission limit achieved in the field for the type and capacity of equipment comprising the source under review and operating under similar conditions. Achieved-in-practice is required regardless of cost.

Meeting the NOX emission limit of **Table A-7** has been achieved. As requiring more stringent emission limit than what has been deemed achieved-in-practice is not considered effective, BACT for this project has been determined to be meeting the emission limit in **Table A-7**.