DRAFT-ENGINEERING EVALUATION
Facility ID No. 204094
San Domenico School
1500 Butterfield Road, San Anselmo, CA 94960-1099
Application No. 739212

Background

San Domenico School is applying for an Authority to Construct (AC) for the following equipment:

S-1 Emergency Standby Natural Gas Generator
Make: Generac, Model: E25.8MSN580A4, Model Year: 2025
777 BHP, 1.024 MMBTU/hr
Equipped with an integral Non-Selective Catalytic Reduction System

Emissions Calculations

Emission factors for nitrogen oxides (NOx), precursor organic compounds (POC), and carbon monoxide (CO) were obtained from the engine manufacturer. Particulate matter ($PM_{10}/PM_{2.5}$) and sulfur dioxide (SO_2) emission factors are based on AP 42, Fifth Edition, Volume I, Chapter 3: Stationary Internal Combustion Sources, Section 3.2.4.1 Control Techniques for 4-Cycle Rich-Burn Engines and Table 3.2-3 Uncontrolled Emission Factors for 4-Stroke Rich-Burn Engines.[1] The engine will operate for emergency purposes and will be limited to a maximum of 50 hours per year for maintenance and testing.

Table 1. Hourly, Daily, and Annual Emissions from S-1

Pollutant	Emission Factor (g/hp-hr)	Hourly Emissions (lb/hr)	Maximum Daily Emissions (lb/day)	Annual Emissions (lb/yr)	Annual Emissions (TPY)
NO_x	0.01	0.0	0.4	1	0.000
POC	0.01	0.0	0.4	1	0.000
CO	0.22	0.4	9.0	19	0.009
$PM_{10}/PM_{2.5}$	0.07	0.1	2.9	6	0.003
SO_2	0.00	0.0	0.1	0	0.000

Basis:

- 777 bhp Max Rated Output
- 5862 scf/hr Max fuel use Rate = 6.155 MMBTU/hr
- NOx, POC and CO emission factors are from the engine manufacturer in Mode 2 (75% load) as agreed upon by the applicant.
- $PM_{10}/PM_{2.5}$ and SO_2 emission factors are from EPA AP-42, Table 3.2-3 Uncontrolled Emission Factors for 4-Stroke Rich-Burn Engines. The $PM_{10}/PM_{2.5}$ emission factor is the total of filterable and condensable particulates.
- Annual Emissions are based on an annual limit (50 hr/yr) for testing and maintenance.
- Max daily emissions are based on 24 hr/day since no daily limits are imposed on emergency operations.
- SO_2 Emission Factor = 5.88 E-04 lb/MMBtu; calculations assume 100% of fuel sulfur conversion with the content in CA natural gas = 10,000 gr/10^6scf.
- $PM_{10}/PM_{2.5}$ fuel input emission factor = 9.50E-03 lb/MMBtu (filterable) + 9.91E-03 lb/MMBtu (condensable) = 1.94E-02 lb/MMBtu; aerodynamic particle diameter =< 1 µm, for the purposes of filterable emissions PM_{10}= $PM_{2.5}$. These emissions are expected to be negligible but included for completeness.

Toxic Risk Screen Analysis

Pursuant to Regulation 2-5-110, a project, including all new or modified sources of toxic air contaminants (TAC) within a 3-year period, is not subject to this rule if the total project emissions are below the acute and chronic trigger levels listed in Table 2-5-1 "Toxic Air Contaminant Trigger Levels" of this regulation.

The emission factors are from the California Air Toxics Emission Factors (CATEF) and the Compilation of Air Pollutant Emissions Factor: AP-42. CATEF emission factors are preferentially chosen over AP-42 factors. If the AP-42 emission factor is based on the detection limit, the emission factor will equal 1/2 of the AP-42 emission factor.

Table 2. Toxic Air Contaminant Review for Engine

Compound	Emission Factor (lb/MMBtu)	Basis	Hourly Emission Rate (lb/hr)	Acute Trigger Level (lb/hr)	Annual Emission Rate (lb/yr)	Chronic Trigger Level (lb/yr)	Exceeds Acute or Chronic Trigger Level?
1,1,2,2-Tetrachloroethane	2.53E-05	AP-42	1.6E-04	None	7.8E-03	1.40E+00	No
1,1,2-Trichloroethane	7.65E-06	AP-42	9.4E-05	None	4.7E-03	5.00E+00	No
1,1-Dichloroethane	5.65E-06	AP-42	7.0E-05	None	3.5E-03	5.00E+01	No
1,3-Butadiene	1.02E-04	CATEF	6.1E-04	1.50E+00	3.0E-02	4.80E-01	No
Acetaldehyde	8.66E-04	CATEF	5.2E-03	1.00E+00	2.6E-01	2.90E+01	No
Acrolein	5.36E-04	CATEF	3.2E-03	5.50E-03	1.6E-01	1.40E+01	No
Benzene (no control)	1.87E-03	CATEF	1.1E-02	6.00E-02	5.6E-01	2.90E+00	No
Carbon Tetrachloride	8.85E-06	AP-42	1.1E-04	4.20E+00	5.4E-03	1.90E+00	No
Chlorobenzene	6.45E-06	AP-42	7.9E-05	None	4.0E-03	3.90E+04	No
Chloroform	6.85E-06	AP-42	8.4E-05	3.30E-01	4.2E-03	1.50E+01	No
Ethylbenzene	1.14E-05	CATEF	6.8E-05	None	3.4E-03	3.30E+01	No
Ethylene Dibromide	1.07E-05	AP-42	1.3E-04	None	6.6E-03	1.10E+00	No
Formaldehyde (no control)	2.30E-03	CATEF	1.4E-02	1.20E-01	6.9E-01	1.40E+01	No
Methanol	3.06E-03	AP-42	1.9E-02	6.20E+01	9.4E-01	1.50E+05	No
Methylene Chloride	4.12E-05	AP-42	2.5E-04	3.10E+01	1.3E-02	8.20E+01	No
Naphthalene	7.50E-05	CATEF	4.5E-04	None	2.2E-02	2.40E+00	No
PAH	2.12E-07	CATEF	1.1E-06	None	5.3E-05	3.30E-03	No
Propylene	1.57E-02	CATEF	9.4E-02	None	4.7E+00	1.20E+05	No
Styrene	5.95E-06	AP-42	7.3E-05	4.60E+01	3.7E-03	3.50E+04	No
Toluene	1.05E-03	CATEF	6.3E-03	8.20E+01	3.1E-01	1.20E+04	No
Vinyl Chloride	3.59E-06	AP-42	4.4E-05	4.00E+02	2.2E-03	1.10E+00	No
Xylene (total)	6.45E-04	CATEF	3.9E-03	4.90E+01	1.9E-01	2.70E+04	No

Basis:

- Abatement efficiency by integral catalyst is assumed to be 50% by weight for each TAC above and has been applied to the emission calculations in Table 2 above.

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The project does not exceed any acute or chronic trigger level and there are not any related projects in the last five years. Therefore, the project is not subject to the requirements of Regulation 2-5-110.

Best Available Control Technology (BACT)

Pursuant to Regulation 2-2-301, Best Available Control Technology (BACT) shall apply to new or modified sources with a Potential to Emit equal to or greater than 10 lb per highest day of the pollutants in Table 1.

BACT is not triggered for any pollutant since the maximum daily emission of each pollutant does not exceed 10 lb/day.

Plant Cumulative Emissions

Table 3 summarizes the cumulative increase in criteria pollutant emissions that will result from the operation of S-1.

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

Pollutant	Existing Emissions Post 4/5/91 (ton/yr)	Application Emissions (ton/yr)	Cumulative Emissions (ton/yr)
NO_x	0.000	0.000	0.000
POC	0.000	0.003	0.003
CO	0.000	0.009	0.009
$PM_{10}/PM_{2.5}$	0.000	0.003	0.003
SO_2	0.000	0.000	0.000

Offsets

Per Regulation 2-2-302, offsets must be provided for any new or modified source at a facility that has the potential to emit (PTE) more than 10 tons/yr of POC or NO_x and 100 tons for particulate matter and SO_2. The PTE for emergency-use engines will include the hours allowed for testing and maintenance, as well as an assumed 100 hours per year for emergencies.

Table 4. Potential to Emit for Plant# 204094

Pollutant	Existing Annual Emissions (ton/yr)	Application Annual Emission (ton/yr)	Facility Annual Emissions (ton/yr)	Offset Requirement (ton/yr)	Offset Required?
NO_x	0.000	0.001	0.001	10	No
POC	0.000	0.010	0.010	10	No
CO	0.000	0.028	0.028	-	N/A
$PM_{10}/PM_{2.5}$	0.000	0.009	0.009	100	No
SO_2	0.000	0.000	0.000	100	No

Based on the emission calculations in Table 4, offsets are not required for this application.

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New Source Performance Standards

The New Source Performance Standard (NSPS) in 40 CFR 60, Subpart JJJJ apply because the engine will be installed after January 1, 2011. The engine will comply with the following limits in Table 1 for emergency spark-ignited engines greater 130 hp:

Pollutant	S-1 Abated Emission Factor	NSPS Standard
NO_x	0.01 g/bhp-hr	2.0 g/bhp-hr
CO	0.22 g/bhp-hr	4.0 g/bhp-hr
VOC	0.01 g/bhp-hr	1.0 g/bhp-hr

As the information above shows, S-1 is in compliance with these NSPS emission requirements.

National Emission Standards for Hazardous Air Pollutants (NESHAP)

This engine will be operated at a hazardous air pollutant (HAP) area source. Therefore, the engine will be subject to the Reciprocating Internal Combustion Engine (RICE) National Emission Standards for Hazardous Air Pollutants (NESHAP) (40 CFR Part 63, Subpart ZZZZ) because it is a new source and installed after 2007. A new RICE at an area source that is subject to 40 CFR Part 60, Subpart JJJJ, has no further requirements under 40 CFR Part 63, Subpart ZZZZ pursuant to 40 CFR Part 63.6590(c). Therefore, S-1 complies with the NESHAP by meeting the requirements under 40 CFR Part 60, Subpart JJJJ.

Statement of Compliance

Section 6-1-310 (Total Suspended Particulate (TSP))

Concentration Limits:

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.

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 8.14 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: 3186 acfm = 48158.2 dscf/hr
Engine Maximum Exhaust Temperature: 1380 F
Water (H2O) Content (%): 12.5%
PM_{10} abatement for Engine: N/A
Engine PM_{10} emissions: 2508.8 gr/hr
TSP Concentration for Engine: 0.05 gr/dscf

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

Regulation 9-1

Regulation 9-1-301 (*Inorganic Gaseous Pollutants: Sulfur Dioxide for Limitations on Ground Level Concentrations*). From Regulation 9-1-301, the ground level concentrations of SO_2 will not exceed 0.5 ppm continuously for 3 consecutive minutes or 0.25 ppm averaged over 60 consecutive minutes, or 0.05 ppm averaged over 24 hours.

Regulation 9-8

S-1 is an emergency standby generator; from Regulation 9, Rule 8 (*NOx and CO from Stationary Internal Combustion Engines*), Section 110.5 (*Emergency Standby Engines*), S-1 is exempt from the requirements of Regulations 9-8-301 (*Emission Limits on Fossil Derived Fuel Gas*), 9-8-302 (*Emission Limits on Waste Derived Fuel Gas*), 9-8-303 (*Emissions Limits – Delayed Compliance, Existing Spark-Ignited Engines, 51 to 250 bhp or Model Year 1996 or Later*), 9-8-304 (*Emission Limits – Compression-Ignited Engines*), 9-8-305 (*Emission Limits – Delayed Compliance, Existing Compression-Ignited Engines, Model Year 1996 or Later*), 9-8-501 (*Initial Demonstration of Compliance*) and 9-8-503 (*Quarterly Demonstration of Compliance*).

Allowable operating hours and the corresponding record keeping in Regulations 9-8-330 (*Emergency Standby Engines, Hours of Operation*) or Regulation 9-8-331 (Essential Public Service, Hours of Operation) and 9-8-530 (*Emergency Standby Engines, Monitoring and Recordkeeping*) will be included in the Permit Conditions below.

Regulation 2-1 CEQA Review

This permit application is not subject to the California Environmental Quality Act (CEQA) because the Air District's evaluation is a ministerial action (Public Resources Code Section 21080(b)(1) and CEQA Guidelines Section 15268(a)) conducted using the fixed standards and objective measurements in the Air District's rules and regulations.

Regulation 2-1 Public Notice Requirements

The proposed equipment is not located within an Overburdened Community as defined in Regulation 2-1-243 and required a refined HRA. However, it will operate within the installations of the San Domenico School located at 1500 Butterfield Road, San Anselmo, CA 94960-1099, Therefore, the facility is subject to the public notice requirements in section 2-1-412.

Permit Conditions

Permit Condition No. 23107 for S-1

1. Operating time for reliability related activities is limited to 50 hours per year per engine.
(Basis: Regulation 9-8-330.3)

2. The owner/operator shall operate the stationary emergency standby engine only for the following

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purposes: to mitigate emergency conditions, for emission testing to demonstrate compliance with a District, State or Federal emission limit, or for reliability related activities (maintenance and other testing but excluding emission testing). Operating while mitigating emergency conditions or while emission testing to show compliance with District, state, or Federal emission limits is not limited. (Basis: Regulation 9-8-330)

3. The owner/operator shall operate each emergency standby engine(s) only when a non-resettable totalizing meter (with a minimum display capability of 9,999 hours) that measures the hours of operation for the engine is installed, operated and properly maintained. (Basis: Regulation 9-8-530)

4. The owner/operator shall not operate the natural gas fired engine unless it is abated with an integral or add-on three-way catalyst, or other approved abatement device. (Basis: Cumulative Increase)

5. Records: The owner/operator shall maintain the following monthly records in a District approved log for at least 24 months from the date of entry (60 months if the facility has been issued a Title V Major Facility Review Permit or a Synthetic Minor Operating Permit). Log entries shall be retained on site, either at a central location or at the engine's location, and made immediately available to the District staff upon request.

a. Hours of operation for reliability related activities (maintenance and testing).
b. Hours of operation for emission testing.
c. Hours of operation (emergency).
d. For each emergency, the nature of the emergency condition.
e. Fuel usage or operating hours for engine.

(Basis: Regulations 9-8-502 and 9-8-530)

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, because the proposed source is located within 1000 ft of two K-12 grade schools with

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more than 12 students, it triggers the public notification requirements of Regulation 2-1-412. Once public comments are received 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 final action on the issuance of an Authority to Construct and/or a Permit to Operate for the following equipment:

S-1 Emergency Standby Natural Gas Generator
Make: Generac, Model: E25.8MSN580A4, Model Year: 2025
777 BHP, 1.024 MMBTU/hr
Equipped with an integral Non-Selective Catalytic Reduction System

Isis Virrueta
Senior Air Quality Engineer
April 2026

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Attachment 1

Table 1 to Subpart JJJJ of Part 60—NO_X, CO, and VOC Emission Standards for Stationary Non-Emergency SI Engines ≥100 HP (Except Gasoline and Rich Burn LPG), Stationary SI Landfill/Digester Gas Engines, and Stationary Emergency Engines >25 HP

Engine type and fuel	Maximum engine power	Manufacture date	Emission standards[a]					
			g/HP-hr			ppmvd at 15% O_2		
			NO_X	CO	VOC[d]	NO_X	CO	VOC[d]
Non-Emergency SI Natural Gas[b] and Non-Emergency SI Lean Burn LPG[b]	100≤HP<500	7/1/2008	2.0	4.0	1.0	160	540	86
		1/1/2011	1.0	2.0	0.7	82	270	60
Non-Emergency SI Lean Burn Natural Gas and LPG	500≤HP<1,350	1/1/2008	2.0	4.0	1.0	160	540	86
		7/1/2010	1.0	2.0	0.7	82	270	60
Non-Emergency SI Natural Gas and Non-Emergency SI Lean Burn LPG (except lean burn 500≤HP<1,350)	HP≥500	7/1/2007	2.0	4.0	1.0	160	540	86
	HP≥500	7/1/2010	1.0	2.0	0.7	82	270	60
Landfill/Digester Gas (except lean burn 500≤HP<1,350)	HP<500	7/1/2008	3.0	5.0	1.0	220	610	80
		1/1/2011	2.0	5.0	1.0	150	610	80
	HP≥500	7/1/2007	3.0	5.0	1.0	220	610	80
		7/1/2010	2.0	5.0	1.0	150	610	80
Landfill/Digester Gas Lean Burn	500≤HP<1,350	1/1/2008	3.0	5.0	1.0	220	610	80
		7/1/2010	2.0	5.0	1.0	150	610	80
Emergency	25<HP<130	1/1/2009	[c] 10	387	N/A	N/A	N/A	N/A
	HP≥130		2.0	4.0	1.0	160	540	86

[a] Owners and operators of stationary non-certified SI engines may choose to comply with the emission standards in units of either g/HP-hr or ppmvd at 15 percent O_2.

[b] Owners and operators of new or reconstructed non-emergency lean burn SI stationary engines with a site rating of greater than or equal to 250 brake HP located at a major source that are meeting the requirements of 40 CFR part 63, subpart ZZZZ, Table 2a do not have to comply with the CO emission standards of Table 1 of this subpart.

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