

**DRAFT
ENGINEERING EVALUATION REPORT
TAMALPAIS UNION HIGH SCHOOL DISTRICT (REDWOOD HIGH SCHOOL)
PLANT NUMBER 19699
APPLICATION NUMBER 21108**

Background:

On behalf of Tamalpais Union High School District (TUHSD), Advanced Energy Systems, Inc. (ADS) has applied to obtain an Authority to Construct and a Permit to Operate the following equipment at Redwood High School in Larkspur, CA:

S-2 Cogeneration System, ENI-0085 RNSOI, GM 8.1L, 122 hp, 632 cu.in., natural gas fired, abated by A-2.

A-2 3-Way catalyst (NSCR), Johnson Matthey Banditto, CXX8.

Emission Calculations:

S-2

Emissions are calculated on the basis of the emission factors, engine rating (hp or BTU/hr), and operating hours (8760 hrs/yr).

Emission factors (after abatement w/catalyst) are taken from manufacturers data for NO_x, CO, and POC. Emission factor for PM₁₀ are taken from AP-42. Toxics emissions are calculated using California Air Toxics Emission Factors for IC engine fired with natural gas. Refer to the attached tables for calculated emissions.

Emission Factors:

PM₁₀ = 0.01941 lb/MMBTU
CO = 0.6 g/bhp-hr
NO_x = 0.15 g/bhp-hr
POC (HC) = 0.15 g/bhp-hr

Emission Summary (from attached table):

PM₁₀ = 0.091 TPY
CO = 0.71 TPY
NO_x = 0.18 TPY
POC = 0.18 TPY
Sulfur Dioxide (SO₂) = Negligible.

PLANT CUMULATIVE INCREASE:

PM₁₀ = 0.091 tpy
CO = 0.71 tpy
NO_x = 0.18 tpy
POC = 0.18 tpy

TOXICS EMISSIONS AND RISK SCREENING ANALYSIS:

Toxic air contaminants including carcinogens are generated by the combustion of natural gas and will be emitted during the operation of the engine. Emissions of a few toxic compounds will exceed the toxic trigger levels given in the Table 2-5.1 of Regulation 2-5, and therefore a toxic risk screening analysis is required.

Results from the risk screening assessment indicate that the maximum increased cancer risk is 0.8 in a million and the chronic hazard index is 0.045. For students who attend Redwood High School, the increased maximum cancer risk is 0.6 in a million and the chronic hazardous index is 0.041. The maximum acute (1-hour) hazardous index is 0.004.

An authority to construct an emergency diesel generator-set was issued on 2/23/10. The maximum increased cancer risk was 5.3 in a million and the chronic hazardous index was 0.0038. The increased cancer risk to students was negligible since the generator-set will not be operated for non-emergency use when the school is in session.

Since the proposed project for cogeneration system is commencing in a time frame of less than two years from the permitting of the diesel generator-set, the risk from both projects are combined. The combined maximum increased cancer risk is 6.1 in a million, and the chronic hazard index is 0.0488. For students, the combined maximum cancer risk is 0.6 in a million and the chronic hazard index is 0.041.

These health risk values meet the criteria for acceptable levels established in Regulation 2, Rule 5

Statement of Compliance:

The engine is expected to comply with the requirements of Regulation 9-8-301, emission limits for NO_x (56 ppmv @15% oxygen), and CO (2000 ppmv @15% oxygen).

The engine is expected to comply with the requirements of Regulation 9-1-301, Limitation on Ground Level Concentrations of 0.5 ppm of SO₂. SO₂ emissions from natural gas combustion are negligible.

S-1 is subject to Regulation 6, Rule 1 ("Particulate and Visible Emissions"). This engine is not expected to produce visible emissions or fallout in violation of this regulation and they will be assumed to be in compliance with Regulation 6, Rule 1.

Regulation 10 - New Source Performance Standard, and Regulation 11 - Hazardous Pollutants requirements are not triggered.

This application is considered to be ministerial under the District's proposed CEQA guidelines (Regulation 2-1-311) and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emission factors in accordance with Permit Handbook Chapter 2.3.2.

BACT requirements of Regulation 2-2-301 are not triggered for NO_x, CO, POC, SO₂, and PM₁₀ emissions less than 10 lb/day.

Offset requirements of Regulation 2-2-302 are not triggered for NOx and POC emissions less than 10 tpy.

PSD, NSPS, and NESHAPS do not apply.

The project is located on a high school premises (Redwood High School), and is therefore subject to the public notification requirements of Reg. 2-1-412. A public notice was distributed on **To be determined** to the parents and guardians of students enrolled at schools located within ¼ mile, and all addresses within 1000 feet of the proposed source. The comment period ended **To be determined** and **To be determined** comments were received. The comments and District responses are summarized below:

To be determined

Permit Conditions

S-2, Cogeneration System:

1. The owner/operator shall fire S-2 with natural gas or equivalent only. [basis: cumulative increase]
2. The owner/operator shall abate emissions from S-2 by A-2, a 3-way catalyst at all times it is operated. [basis: cumulative increase]
3. NOx emissions shall not exceed 0.15 g/hp-hr. [basis: cumulative increase]
4. CO emissions shall not exceed 0.6 g/hp-hr. [basis: cumulative increase]
5. POC emissions shall not exceed 0.15 g/hp-hr. [basis: cumulative increase]
6. The owner/operator shall perform a District approved source test within 30 days of the start-up to demonstrate compliance with conditions #3, #4, and #5. The source test section of the District shall be contacted to get the approval of the source test procedures, and shall be informed of the source test date at least 7-days in advance. A copy of the source test report shall be submitted to the District within 30 days of the test date. [basis: cumulative increase]
7. S-2 shall be equipped with a fuel flow meter, which records fuel usage. [basis: Record keeping]
8. The owner/operator shall maintain the monthly fuel usage records in a District-approved log for at least 2 years and shall make it available to the District staff upon request: [basis: Record keeping]

Recommendations:

It is recommended that an Authority to Construct shall be issued to Tamalpais Union High School District for the source described in the background section of this report.

Exemptions:

None.

By: Dharam Singh
Air Quality Engineer
DATE: 3/2/10

