

COVERED SOURCE PERMIT (CSP) NO. 0113-01-C REVIEW
APPLICATION FOR RENEWAL NO. 0113-03

Applicant: Navy Region Hawaii

Equipment:

One (1) Allison 2.0 MW combustion turbine (model no. 501-K14, ID no. TG-911, max. fuel rate: 235 gal/hr of JP-5).

Location: NAVFAC Hawaii - Waiawa Water Pumping Station, Pearl City Industrial Park, Pearl City, Oahu
UTM: Zone 4 - 606,440 m east; 2,368,624 m north (Old Hawaiian Datum)

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Background:

The purpose of the facility is to provide emergency/standby power to Waiawa Water Pumping Station. The emergency/standby unit is a 2.0 MW combustion turbine (CT) fueled by JP-5 to be operated only in the event of an electrical power outage and during periods of equipment testing and maintenance. There is no air pollution control device connected to this CT. It is equipped with a non-resetting fuel meter to track fuel consumption. This facility is subject to NSPS 40 CFR 60 Subpart GG.

This permit review is based on the application dated October 12, 2006. A check for \$500 has been processed for the renewal of a non-major, non-toxic, CSP application fee.

The issuance of this permit will supersede CSP No. 0113-01-C dated November 15, 2002.

Air Pollution Controls:

The CT does not have any add-on air pollution controls. However, SO_x emissions are controlled by burning JP-5 fuel with a maximum sulfur content not to exceed 0.4% by weight. Total fuel consumption of the CT is limited to a maximum of 869,500 gal/yr in any rolling twelve (12) month period to remain below a significant increase of NO_x.

Applicable Requirements:

Hawaii Administrative Rules (HAR)

Chapter 11-59, Ambient Air Quality Standards

Chapter 11-60.1 Air Pollution Control

Subchapter 1, General Requirements

Subchapter 2, General Prohibitions

11-60.1-31 Applicability

Subchapter 5, Covered Sources

Subchapter 6, Fees for Covered Sources, Noncovered sources, and Agricultural Burning

11-60.1-111 Definitions

11-60.1-112 General Fee Provisions for Covered Sources

11-60.1-113 Application Fees for Covered Sources

11-60.1-114 Annual Fees for Covered Sources

Subchapter 8, Standards of Performance for Stationary Sources

11-60.1-161 New Source Performance Standards

Code of Federal Regulations (CFR)

40 CFR Part 60 - New Source Performance Standard (NSPS)

Subpart A - General Provisions

Subpart GG - Standards of Performance for Stationary Gas Turbines.

Non-Applicable Requirements:

Code of Federal Regulations (CFR)

40 CFR Part 52.21 - Prevention of Significant Deterioration (PSD) of Air Quality is not applicable because this facility is not a major stationary source.

40 CFR Part 60.1 – NSPS Subpart KKKK is not applicable because it did not commence construction, modification, or reconstruction after February 18, 2005.

40 CFR Part 61 - National Emission Standard for Hazardous Air Pollutants (NESHAPS) is not applicable since there is no regulation for the CT.

40 CFR Part 63 - Maximum Achievable Control Technology (MACT) is not applicable since this facility is not a major source of HAPs as stated in Subpart YYYY.

Synthetic Minor is a facility with operational limitations in order to keep potential emissions lower than major source levels (≥ 100 tpy of criteria pollutants or ≥ 10 tpy of individual or ≥ 25 tpy of a combination of HAPs). This facility would not be a major source if it were to operate continuously (8,760 hr/yr), therefore, synthetic minor does not apply (see **Table 1**).

A best available control technology (BACT) analysis is not required for this review since this is an existing source and there is no new construction or major modification.

Consolidated Emissions Reporting Rule (CERR) is not applicable because air pollutant emissions from the facility are less than reporting levels pursuant to 40 CFR 51, Subpart A (see **Table 1**).

Table 1 - CERR

Pollutant	Facility Emissions (tpy)	CERR Triggering Levels (tpy)		Internal Reporting Threshold (tpy)
		1-yr Reporting Cycle (Type A Sources)	3-yr Reporting Cycle (Type B Sources)	
VOC	1.33	≥ 250	≥ 100	≥25
PM	5.55	n/a	n/a	≥25
PM ₁₀	5.55	≥ 250	≥ 100	≥25
PM _{2.5}	5.55	≥ 250	≥ 100	≥25
NO _x	39.52	≥ 2,500	≥ 100	≥25
SO _x	10.71	≥ 2,500	≥ 100	≥25
CO	28.49	≥ 2,500	≥ 1,000	≥250
HAPs (total)	0	n/a	n/a	≥5

Also, the DOH's internal policy is to sum the individual emissions sources and if the sum of an individual pollutant exceeds the threshold limits, then annual emissions reporting is required. Internal reporting does apply as shown in **Table 1**.

Compliance Assurance Monitoring (CAM) is to provide a reasonable assurance that compliance is being achieved with large emissions units that rely on air pollution control device equipment to meet an emissions limit or standard. Pursuant to 40 CFR, Part 64, for CAM to be applicable, the emissions unit must: (1) be located at a major source; (2) be subject to an emissions limit or standard; (3) use a control device to achieve compliance; (4) have potential pre-control emissions that are greater than the major source level [>100 tpy]; and (5) not otherwise be exempt from CAM. CAM is not applicable since items 1, 3, and 4 do not apply.

Insignificant Activities/Exemptions:

Per HAR 11-60.1-92(f)(1) storage tanks less than or equal to 40,000 gallons storing volatile organic compounds:

1. 5,000 gal tank storing JP-5; and
2. 500 gal tank storing diesel fuel no. 2.

Per HAR 11-60.1-92(f)(5) standby generators used exclusively to provide electricity that do not trigger covered source review:

1. 75 kW emergency generator (Unit No. DGS-1050).

Alternate Operating Scenarios:

The alternate operating scenario of replacing the CT with a temporary replacement unit if any repair work reasonably warrants removal will remain unchanged from the previous CSP.

Project Emissions:

There is no proposed change in emissions for this facility. Furthermore, the AP-42 emission factors for CTs have not changed since the previous CSP review (for HAPs). Source test

data and manufacturer's data for this particular CT are available for the criteria pollutants. Therefore, the AP-42 emission factors for the CT's criteria pollutants were disregarded.

Table 2 summarizes the criteria pollutant emissions from the CT based on a fuel consumption cap of 869,500 gal/yr and emission factors that were taken from the following sources:

CO (15.4 lb/hr) was based on actual stack performance testing of identical units at the Pearl Harbor Naval Complex (ref. 1992 stack test in file A-956).

NO_x, VOC, and PM₁₀ (21.36 lb/hr, 0.72 lb/hr, and 3.0 lb/hr) were based on manufacturer's estimates. All PM emissions were assumed to equal PM₁₀ and PM_{2.5} emissions to be conservative.

SO₂ (5.79 lb/hr) was based on a mass balance calculation assuming that all sulfur in the fuel will convert to SO₂. 0.4% by weight is the maximum sulfur content. Per AP-42 Appendix A, gasoline density is 6.17 lb/gal. Therefore, 0.4% x 6.17 lb/gal x 235 gal/hr = 5.79 lb/hr of SO₂.

Table 3 summarizes the HAPs emissions based on current AP-42 emission factors (Section 3.1, 4/00) and fuel consumption cap of 869,500 gal/yr.

**Table 2
Potential Emissions of Criteria Pollutants**

	Permitted Potential Emissions		8,760 hrs/yr
	(lb/hr)	(tpy)	(tpy)
NO _x	21.36	39.52	93.57
SO ₂	5.79	10.71	25.38
CO	15.4	28.49	67.52
VOC	0.72	1.33	3.15
PM ₁₀ /PM _{2.5}	3.0	5.55	13.15
PM	3.0	5.55	13.15

**Table 3
Potential Emissions of HAPs**

	Permitted Potential Emissions	
	(lb/hr)	(tpy)
1,3 Butadiene	5.23e-04	9.68e-04
Benzene	1.80e-03	3.33e-03
Formaldehyde	9.15e-03	1.69e-02
Naphthalene	1.14e-03	2.11e-03
PAH	1.31e-03	2.42e-03
Arsenic	3.59e-04	6.64e-04
Beryllium	1.01e-05	1.87e-05
Cadmium	1.57e-04	2.90e-04
Chromium	3.59e-04	6.64e-04
Lead	4.57e-04	8.45e-04
Manganese	2.58e-02	4.77e-02
Mercury	3.92e-05	7.25e-05
Nickel	1.50e-04	2.78e-04
Selenium	8.17e-04	1.51e-03

Ambient Air Quality Assessment:

Since there is no change in the equipment nor emissions, a new ambient air quality assessment (AAQA) was not conducted. The Navy conducted an AAQA using the BEELINE Software version of the U.S. EPA Industrial Source Complex Short Term 3 model (ISCST3), to determine source compliance with Federal and State ambient air quality standards (AAQS). The model, methodology and assumptions employed by the Navy in the AAQA have been determined to be consistent with State and Federal guidelines. For details, please refer to the CSP review for application no. 0113-01.

Table 4 presents the potential to emit/allowable emission rates and stack parameters for the CT used in the AAQA. The derivation of SO₂, NO_x, CO, and PM₁₀ emission rates were previously discussed in the **Project Emissions** section.

The predicted concentrations presented in **Table 5** assumed that annual operations will be continuous (conservative) and 75% of NO_x will be converted to NO₂. Based on these assumptions, the facility should comply with State and Federal AAQS for SO₂, NO₂, CO, and PM₁₀. Pb and H₂S were assumed to be negligible.

**Table 4
Source Emission Rates and Stack Parameters for Air Modeling**

Source		Emission Rates				Stack Parameters			
Equipment	Stack No.	SO ₂ (g/s)	NO _x (g/s)	CO (g/s)	PM ₁₀ (g/s)	Height (m)	Temp. (K)	Velocity (m/s)	Diameter (m)
Turbine PD #629	1	0.728	2.687	1.937	0.377	2.6	789	27.36	1.10

**Table 5
Predicted Ambient Air Quality Impacts**

Air Pollutant	Averaging Time	Impact (µg/m ³)	Background (µg/m ³)	Total Impact (µg/m ³)	Air Standard (µg/m ³)	Percent Standard	Impact Location (R,Θ)
SO ₂	3-Hour	240.9	287.1	528	1300	41%	89,262
	24-Hour	102.34	94.1	196	365	54%	104,249
	Annual	33.08	5.4	38	80	48%	119,231
NO ₂	Annual	51.98	6.2	58	70	83%	141,240
CO	1-Hour	926.5	2599.2	3526	10000	35%	98,352
	8-Hour	269.9	533.0	803	5000	16%	98,352
PM ₁₀	24-Hour	39.8	58.3	98	150	65%	141,240
	Annual	9.7	22.8	33	50	65%	141,240
Pb	Calendar Quarter			0	1.5	0%	
H ₂ S	1-Hour			0	35	0%	

Note:

1. Annual emissions are based on a worst case 1-hr emission rate. No credit was taken for the annual fuel limitations.
2. Pb and H₂S emissions were assumed to be negligible.
3. (R,Θ) = meters, degrees.
4. Background concentrations are taken from Campbell Industrial Park.
5. An ARM factor of 75% was used for NO_x concentrations.

PROPOSED

Significant Permit Conditions:

1. This facility is subject to NSPS, 40 CFR 60 Subpart GG.
2. The 2.0 MW combustion turbine shall be fired only on JP-5 fuel with a maximum sulfur content not to exceed 0.4% by weight.
3. The permittee shall monitor sulfur content of the fuel being fired in the turbine in accordance with 40 CFR 60, Subpart GG.
4. The annual fuel limit is 869,500 gal/yr of JP-5 aviation fuel in any rolling twelve-month period.
5. Alternate scenario to install a temporary equal or lesser unit in the event that the original unit is inoperable.

Other Issues/Conditions:

1. This facility is exempt from NO_x standards since this is an emergency gas turbine for use other than a garrison facility per 40 CFR 60 Subpart GG, 60.332(g).
2. This facility is exempt from SO₂ testing since the sulfur content of the fuel will be far below 0.8% by weight per 40 CFR 60 Subpart GG, 60.333.

Conclusion and Recommendation:

In conclusion, it is the Department of Health's preliminary determination that the facility will comply with all State and Federal laws, rules, regulations, and standards with regards to air pollution. This determination is based on the application submitted by the U.S. Navy. Therefore, a renewal to a CSP for the U.S. Navy, subject to the above permit conditions, 30-day public comment period, and 45-day EPA review period is recommended.