

PROPOSED

Covered Source Permit No. 0226-01-C

Application No.: 0226-01

Company: 25th Infantry Division Light and U.S. Army Hawaii

Facility Name: Schofield Barracks and Wheeler Army Air Field

Equipment Location: Schofield Barracks and Wheeler Army Air Field
Wahiawa, Oahu

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Proposed Project:

The majority of equipment at Schofield Barracks and Wheeler Army Air Field (SB/WAAF) are classified insignificant activities (Hawaii Administrative Rules (HAR) §11-60.1-82). Total potential emissions from the insignificant activities alone exceed 100 tons per year for each pollutant NO_x and CO; resulting in the facility being subject to covered source permitting. According to the HAR, the owner or operator of any insignificant activity identified in subsections 11-60.1-82(f) and (g) may begin construction, reconstruction, modification, or operation of the activity without first obtaining a covered source permit, provided the insignificant activity does not cause a noncovered stationary source to become a major source. The SB/WAAF insignificant activities were in operation before the facility was required to obtain a covered source air permit. A list of insignificant activities at SB/WAAF and potential emissions from those units is in a correspondence dated June 16, 2005, from the applicant (see Schofield Barracks & Wheeler Army Airfield Emissions Inventory). The insignificant activity category into which each unit falls and a summary of the potential to emit are shown in the **Insignificant Activities** section of this review. The environmental program manager for SB/WAAF as well as the consultant for the facility are aware of the August 2, 1996, Environmental Protection Agency Memorandum: Major Source Determinations for Military Installations under the Air Toxics, New Source Review, and Title V Operating Permit Programs of the Clean Air Act. The environmental program manager and the consultant have indicated the equipment included in this review are

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under the control of the 25th Infantry Division Light and U.S. Army Hawaii.

In addition to insignificant activities, SB/WAAF has the following equipment to be permitted, two 14.6 MMBtu/hr diesel fired boilers located at the laundry facility, a large emergency diesel engine generator (DEG) located at the wastewater treatment plant, and three Flexible Emissions Diagnostic Systems (FEDS) test stands for helicopter engine testing:

1. The applicant modeled the two 14.6 MMBtu/hr boilers and is proposing to limit fuel consumption of the two boilers to a combined total of 650,000 gallons per rolling twelve month period to ensure compliance with the ambient air quality standards.
2. The original covered source permit application lists seven large DEGs. Five of the large DEGs (located at Field Station Kunia) are now owned and operated by the Navy and the remaining two large DEGs are deemed emergency units. Although emergency DEGs are listed as an insignificant activity in the Hawaii Administrative Rules, the original application included an ambient air quality analysis for the two DEGs. As a result, the applicant proposed operating limits in the original application to ensure the DEGs would operate in compliance with the ambient air quality standards. An updated analysis of the two emergency DEGs at 500 hours of operation per year for each unit resulted in the applicant 1) demonstrating compliance with the AAQS for one emergency DEG which can be deemed insignificant and 2) requesting an operating limit of 350 hours per year for the second emergency DEG to ensure compliance with the AAQS. The emergency DEG with the 350 hour per year limit will be listed in the permit.
3. The facility is equipped with two helicopter engine test stands and one test stand for an auxiliary power unit (APU). Projected maximum emissions from the FEDS test stands are based on the applicant's predicted maximum number of tests that will be performed annually and the fuel fired per test. Projected maximum emissions are much lower than the maximum potential to emit using 8,760 hours per test stand per year. For each test performed, the permittee will be required to record the type of aircraft/engine tested or whether the APU was used, the type of fuel, and the total fuel fired during the test for each test performed. The permittee will be required to submit the total annual fuel consumption for the FEDS system to verify projected maximum emissions and to satisfy annual emissions reporting requirements.

The two 14.6 MMBtu/hr boilers, one emergency diesel engine generator, and three FEDS test stands will be listed in Attachment II, the Special Conditions section of the permit. All insignificant equipment will be subject to Attachment II - INSIG. The permittee will be required to submit an updated list of insignificant activities for Schofield Barracks and Wheeler Army Air Field on an annual basis.

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Equipment:

Equipment Description

Description	fuel usage
<p>Two (2) 14.6 MMBtu/hr Cleaver Brooks Model CB655-350 (350 HP) Diesel Fired Boilers</p> <p>Serial number L12587 Location: Schofield Barracks Building 2802 UTM: 598,305 m E and 2,375,897 m N (NAD-83)</p> <p>Serial number L12588 Location: Schofield Barracks Building 2802 UTM: 598,310 m E and 2,375,896 m N (NAD-83)</p>	<ul style="list-style-type: none"> • fuel oil no. 2 with a maximum sulfur content of 0.05% by weight • each boiler: 104.6 gal/hr based on a fuel heating content of 140,000 Btu/gal
<p>One (1) 1400 BHP Waukesha Model L5792D Emergency Diesel Engine Generator</p> <p>Serial number 388475 Location: Wheeler Army Air Field Building 419 UTM: 599,056 m E and 2,375,146 m N (NAD-83)</p>	<ul style="list-style-type: none"> • fuel oil no. 2 with a maximum sulfur content of 0.05% by weight • 71.5 gal/hr based on a fuel heating content of 140,000 Btu/gal
<p>Three (3) Flexible Emissions Diagnostic Systems Test Stands for helicopter engine testing</p> <p>Serial number N/A Location: Wheeler Army Air Field UTM: 599,070 m E and 2,374,852 m N (NAD83)</p>	<ul style="list-style-type: none"> • JP8 fuel
<p>Various insignificant activities for details see the Insignificant Activities section of this review</p>	<ul style="list-style-type: none"> • fuel oil no. 2 with a maximum sulfur content of 0.05% by weight

Air Pollution Controls:

The boilers, diesel engine generator, and FEDS do not have add-on air pollution controls.

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
 - 11-60.1-32 Visible Emissions

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11-60.1-38	Sulfur Oxides from Fuel Combustion
11-60.1-39	Storage of Volatile Organic Compounds
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

NSPS, MACT, and NESHAPS Applicability: The equipment are not subject to 40 CFR Part 60 Standards of Performance for New Stationary Sources, 40 CFR Part 61 National Emissions Standards for Hazardous Air Pollutants, or 40 CFR Part 63 National Emission Standards for Hazardous Air Pollutants for Source Categories. The following do not apply to this facility: NSPS, NESHAPS, and MACT.

Note: 40 CFR Part 60, Subpart Dc—Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units is applicable to boilers having a capacity between 10 and 100 MMBtu/hr and which was constructed, modified, or reconstructed after June 9, 1989. The two 14.6 MMBtu/hr boilers were installed prior to the specified date.

Compliance Assurance Monitoring (CAM) Applicability: The facility is not subject to the CAM rule. To be subject to this rule an emission unit must be located at a major stationary source and be subject to an emission limitation or standard for the applicable pollutant. None of the equipment located at the facility are subject to an emission limitation or standard.

PSD Applicability: §11-60.1-133 Exemptions. (a) The requirements of sections 11-60.1-140 through 11-60.1-148 shall not apply to a major stationary source or major modification if: (1) Construction commenced on the source or modification before August 7, 1977. Regulations of 40 CFR Section 52.21 in effect before August 7, 1977, shall govern the review and permitting of any such source or modification. The majority of equipment at SB/WAAF were already in operation prior to August 7, 1977. The facility is comprised mainly of small fuel burning units operating at various locations throughout the facility. The equipment is not subject to PSD review.

BACT Applicability: A Best Available Control Technology (BACT) analysis is required for new or modified sources if the net increase in pollutant emissions exceeds significant levels as defined in HAR §11-60.1-1. This facility is an existing source with no proposed modifications; a BACT analysis is not required.

Applicability of Part 51, Subpart A, Emission Inventory Reporting Requirements - Consolidated Emissions Reporting Rule (CERR):

40 CFR Part 51, Subpart A - Emission Inventory Reporting Requirements determines the applicability of compliance emissions reporting (CER) based on the emissions of each air pollutant from the facility that emits at the CER triggering levels shown in the table below:

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Minimum Point Source Reporting Thresholds by Pollutant

pollutant	annual cycle type A sources (tpy)	three-year cycle type B sources (tpy)	facility emissions (tpy)
SO _x	≥2500	≥100	12.36
VOC	≥250	≥100	24.25
NO _x	≥2500	≥100	267.46
CO	≥2500	≥1000	219.38
Pb		≥5	<1 ^a
PM ₁₀	≥250	≥100	16.70
PM _{2.5}	≥250	≥100	16.38
Ammonia	≥250	≥100	not anticipated

^a Total potential HAP emissions are less than one ton per year.

Potential emissions of NO_x from the insignificant and non-insignificant activities at Schofield Barracks/Wheeler Army Air Field exceed the minimum point source reporting threshold. The facility is potentially subject to the CERR for NO_x.

Annual Emission Reporting: As a covered source, the facility is subject to annual emissions reporting requirements.

Major source/synthetic minor source applicability: A synthetic minor is a facility that without limiting conditions, physical or operational, emits above the “major” source triggering levels as defined by HAR 11-60.1-1 for either criteria pollutant(s) or hazardous air pollutant(s). This facility is not a synthetic minor because potential emissions from the facility exceed major source triggering levels.

Insignificant Activities:

The following table presents emissions from the insignificant and non-insignificant activities at Schofield Barracks and Wheeler Army Air Field. See the Schofield Barracks & Wheeler Army Airfield Emissions Inventory document dated June 16, 2005, for a list of insignificant activities and details of emission calculations.

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Facility-Wide Pollutant Emissions

pollutant	insignificant activities (tons/yr)	non-insignificant activities (tons/yr)	all equipment (tons/yr)
PM	16.44	0.81	17.25
PM ₁₀	16.23	0.47	16.70
PM _{2.5}	16.17	0.21	16.38
SO ₂ ^a	8.19	4.17	12.36
NO _x	257.32	10.14	267.46
CO	216.94	2.44	219.38
TOC	23.63	0.62	24.25
Total HAPs	0.20	0.03	0.23

Emissions from insignificant activities alone amount to more than 100 tons of NO_x and CO each year resulting in the facility being subject to covered source permitting requirements.

Insignificant activities include:

1. LPG fired boilers

11-60.1-82(f)(3) Steam generators, steam superheaters, water boilers, or water heaters, all of which have a heat input capacity of less than five million BTU per hour, and are fired exclusively with one of the following: (A) Natural or synthetic gas; (B) Liquefied petroleum gas; or §11-60.1-82 (C) A combination of natural, synthetic, or liquefied petroleum gas.

2. Other LPG fired equipment < 1 MMBtu/hr heat input

11-60.1-82(f)(2) Other than smoke house generators and gasoline fired industrial equipment, fuel burning equipment with a heat input capacity less than one million BTU per hour, or a combination of fuel burning equipment operated simultaneously as a single unit having a total combined heat input capacity of less than one million BTU per hour.

3. Diesel fired boilers < 1 MMBtu/hr heat input

11-60.1-82(f)(2) Other than smoke house generators and gasoline fired industrial equipment, fuel burning equipment with a heat input capacity less than one million BTU per hour, or a combination of fuel burning equipment operated simultaneously as a single unit having a total combined heat input capacity of less than one million BTU per hour.

4. Emergency Diesel Engine Generators

Any storage tank, reservoir, or other container of capacity equal to or less than forty thousand gallons storing volatile organic compounds, except those storage tanks, reservoirs, or other containers subject to any standard or other requirement pursuant to

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Sections 111 and 112 of the Act.

5. Diesel engine generators < 1 MMBtu/hr heat input

11-60.1-82(f)(2) Other than smoke house generators and gasoline fired industrial equipment, fuel burning equipment with a heat input capacity less than one million BTU per hour, or a combination of fuel burning equipment operated simultaneously as a single unit having a total combined heat input capacity of less than one million BTU per hour.

6. Gasoline engines <25 hp in size

11-60.182(g)(8) Gasoline fired portable industrial equipment than 25 horsepower in size.

7. The facility also has woodworking shops equipped with a sawdust collection system and are considered an insignificant activity based on 11-60.1-82(g)(14).

The insignificant activities are subject to the Special Conditions of Attachment II - INSIG. The permittee will be required to submit an updated inventory of insignificant activities, for those equipment listed in 11-60.1-82(f), on an annual basis. The attached list of insignificant activities contains a significant number of small fuel burning equipment. All insignificant activities at Schofield Barracks/Wheeler Army Air Field under the control of the 25th Infantry Division Light and U.S. Army Hawaii, including those that may have been inadvertently left off of the attached list, shall be subject to Attachment II - INSIG.

Alternate Operating Scenarios: The applicant does not propose any alternate operating scenarios.

Project Emissions:

The applicant is proposing to limit fuel consumption for the two boilers to a combined total of 650,000 gallons per rolling twelve month period. This represents less fuel than a single boiler operating at its maximum capacity for 8,760 hours per year, 104.6 gal/hr x 8,760 hrs/yr = 916,296 gal/yr. The following table reflects hourly emissions from the operation of a single 14.6 MMBtu/hr Cleaver Brooks boiler and annual emissions based on limiting fuel consumption to 650,000 gal/yr total.

Criteria Pollutant Emissions^a

Boilers

pollutant	emission factor one boiler (lb/1000 gal)	fuel use one boiler (gal/hr)	emission rate one boiler (lb/hr)	emission rate one boiler (g/sec)	emission rate with 650,000 gal/yr limit two boilers (tons/year)
PM	2	104.6	2.09e-01	2.64e-02	6.50e-01
PM ₁₀	1	104.6	1.05e-01	1.32e-02	3.25e-01
PM _{2.5}	0.25	104.6	2.62e-02	3.29e-03	8.13e-02
SO ₂ ^b	7.1	104.6	7.43e-01	9.36e-02	2.31
NO _x	20	104.6	2.09	2.63e-01	6.50

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pollutant	emission factor one boiler (lb/1000 gal)	fuel use one boiler (gal/hr)	emission rate one boiler (lb/hr)	emission rate one boiler (g/sec)	emission rate with 650,000 gal/yr limit two boilers (tons/year)
CO	5	104.6	5.20e-01	6.55e-02	1.62
TOC	0.252	104.6	2.64e-02	3.32e-03	8.19e-02

^a AP-42 Table 1.3-1 Criteria Pollutant Emission Factors for Fuel Oil Combustion, Boilers < 100 MMBtu Distillate Oil Fired (9/98)

AP-42 Table 1.3-3 Emission Factors for Total Organic Compounds (TOC), Methane, and Nonmethane TOC (NMTOC) from Uncontrolled Fuel Oil Combustion, Industrial Boilers Distillate Oil Fired (9/98)

AP-42 Table 1.3-6 Cumulative Particle Size Distribution and Size-Specific Emission Factors Uncontrolled Industrial Boilers Firing Distillate Oil (9/98)

^b SO₂ emission factor = 142(S)
= 142 (% by weight sulfur content)
= 142 (0.05)
= 7.1 lb/10³ gal

Hazardous Air Pollutant Emissions ^a
Boilers

pollutant	emission factor one boiler (lb/10 ³ gal)	fuel use one boiler (10 ³ gal/hr)	emission rate one boiler (lb/hr)	emission rate with 650,000 gal/yr limit two boilers (tons/year)
Polycyclic Organic Matter	3.30e-03	0.1046	3.45e-04	1.07e-03
Formaldehyde (HCOH)	6.10e-02	0.1046	6.38e-03	1.98e-02
Benzene	2.14e-04	0.1046	2.24e-05	6.96e-05
Ethylbenzene	6.36e-05	0.1046	6.65e-06	2.07e-05
Naphthalene	1.13e-03	0.1046	1.18e-04	3.67e-04
1,1,1-Trichloroethane	2.36e-04	0.1046	2.47e-05	7.67e-05
Toluene	6.20e-03	0.1046	6.49e-04	2.02e-03
o-Xylene	1.09e-04	0.1046	1.14e-05	3.54e-05
Acenaphthene	2.11e-05	0.1046	2.21e-06	6.87e-06
Acenaphthylene	2.53e-07	0.1046	2.64e-08	8.20e-08
Anthracene	1.22e-06	0.1046	1.28e-07	3.98e-07
Benz(a)anthracene	4.01e-06	0.1046	4.19e-07	1.30e-06
Benzo(b,k)fluoranthene	1.48e-06	0.1046	1.55e-07	4.82e-07
Benzo(g,h,i)perylene	2.26e-06	0.1046	2.36e-07	7.33e-07

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pollutant	emission factor one boiler (lb/10 ³ gal)	fuel use one boiler (10 ³ gal/hr)	emission rate one boiler (lb/hr)	emission rate with 650,000 gal/yr limit two boilers (tons/year)
Chrysene	2.38e-06	0.1046	2.49e-07	7.74e-07
Dibenzo(a,h)anthracene	1.67e-06	0.1046	1.75e-07	5.44e-07
Fluoranthene	4.84e-06	0.1046	5.06e-07	1.57e-06
Fluorene	4.47e-06	0.1046	4.68e-07	1.45e-06
Indo(1,2,3-cd) pyrene	2.14e-06	0.1046	2.24e-07	6.96e-07
Phenanthrene	1.05e-05	0.1046	1.10e-06	3.42e-06
Pyrene	4.25e-06	0.1046	4.45e-07	1.38e-06
OCDD	3.10e-09	0.1046	3.24e-10	1.01e-09
Total			7.56e-03	2.35e-02

^a AP-42 Table 1.3-8 Emission Factors for Nitrous Oxide (N₂O), Polycyclic Organic Matter (POM), and Formaldehyde (HCOH) from Fuel Oil Combustion, Distillate Oil Fired (9/98)

AP-42 Table 1.3-9 Emission Factors for Speciated Organic Compounds from Fuel Oil Combustion (9/98) (data for residual oil fired boilers)

HAP Trace Element Emissions ^a
Boilers

pollutant	emission factor one boiler (lb/10 ¹² Btu)	heat input one boiler (10 ¹² Btu/hr)	emissions rate one boiler (lb/hr)	emission rate with 650,000 gal/yr limit two boilers (tons/yr)
As	4	1.46e-05	5.86e-05	1.82e-04
Be	3	1.46e-05	4.39e-05	1.36e-04
Cd	3	1.46e-05	4.39e-05	1.36e-04
Cr	3	1.46e-05	4.39e-05	1.36e-04
Pb	9	1.46e-05	1.31e-04	4.07e-04
Hg	3	1.46e-05	4.39e-05	1.36e-04
Mn	6	1.46e-05	8.79e-05	2.73e-04
Ni	3	1.46e-05	4.39e-05	1.36e-04
Se	15	1.46e-05	2.20e-04	6.83e-04
Total				2.22e-03

^a AP-42 Table 1.3-10 Emission Factors for Trace Elements from Distillate Fuel Oil Combustion Sources (9/98)

Emissions from the Waukesha 1400 HP emergency diesel engine generator:

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Criteria Pollutant Emissions
Diesel Engine Generator

pollutant	emission factor (lb/MMBtu)	fuel use (gal/hr)	heat input (MMBtu/hr)	emission rate (lb/hr)	emission rate (g/sec)	emission rate with 350 hr/yr limit (tons/yr)
PM ^a	0.0697	71.5	10	0.698	8.79e-02	1.22e-01
PM ₁₀ ^a	0.0573	71.5	10	0.573	7.22e-02	1.00e-01
PM _{2.5} ^a	0.0479	71.5	10	0.479	6.04e-02	8.38e-02
SO ₂ ^b	---	71.5	10	0.505	6.36e-02	8.84e-02
NO _x ^c	0.309	71.5	10	3.09	3.89e-01	5.41e-01
CO ^c	0.46	71.5	10	4.60	5.80e-01	8.05e-01
TOC ^c	0.309	71.5	10	3.09	3.89e-01	5.41e-01

^a AP-42 Table 3.4-2. Particulate and Particle-Sizing Emission Factors for Large Uncontrolled Stationary Diesel Engines

^b SO₂ lb/hr = 71.5 gal/hr x 7.05 lb/gal x 0.0005 x 2

^c Manufacturer's emission rates:
 NO_x lb/MMBtu = [(10 gr/bhp-hrx1400 bhp-hr)÷(453.6 gr/lb)]÷(0.14 MMBtu/gal x 71.5 gal/hr)
 CO lb/MMBtu = [(1.5 gr/bph-hrx1400 bhp-hr)÷(453.6 gr/lb)] ÷(0.14 MMBtu/gal x 71.5 gal/hr)
 HC lb/MMBtu = [(1 gr/bhp-hr x1400 bhp-hr)÷(453.6 gr/lb)] ÷(0.14 MMBtu/gal x 71.5 gal/hr)

HAP Emissions^a
Diesel Engine Generator

pollutant	emission factor (lb/MMBtu)	fuel use (gal/hr)	heat input (MMBtu/hr)	emission rate (lb/hr)	emission rate with 350 hr/yr limit (tons/yr)
Acetaldehyde	2.52e-05	71.5	10	2.52e-04	4.41e-05
Acrolein	7.88e-06	71.5	10	7.88e-05	1.38e-05
Benzene	7.76e-04	71.5	10	7.76e-03	1.36e-03
Formaldehyde	7.89e-05	71.5	10	7.89e-04	1.38e-04
Toluene	2.81e-04	71.5	10	2.81e-03	4.92e-04
Xylene	1.93e-04	71.5	10	1.93e-03	3.38e-04
Total PAH	2.12e-04	71.5	10	2.12e-03	3.71e-04
					2.76e-03

^a Table 3.4-3. Speciated Organic Compound Emission Factors for Large Uncontrolled Stationary Diesel Engines (10/96)

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Table 3.4-4. PAH Emission Factors for Large Uncontrolled Stationary Diesel Engines
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Emissions from Flexible Emissions Diagnostic System (FEDS) Test Stands
(see attached table for details of the calculation)

pollutant	maximum projected tons per year ^a	maximum potential tons per year ^{b, c}
NO _x	3.10e00	217
CO	1.16e-02	8.13e-01
SO ₂	1.78e00	124
PM	4.23e-02	3
VOC	1.45e-03	1.01e-01
Pb	4.94e-05	3.45e-03
total HAP	4.54e-03	3.17e-01

- ^a Maximum projected emissions are based on:
 CH47 8,760 hrs/yr ÷ 4 hrs/test x lbs pollutant/test
 UH60 8,760 hrs/yr ÷ 3 hrs/test x lbs pollutant/test
 APU 8,760 hrs/yr ÷ 4 hrs/test x lbs pollutant/test

See September 9 and 20, 2005, emails for test durations and APU usage. The permittee will be required to submit the total quantity of fuel fired by the FEDS system on an annual basis.

- ^b Maximum potential emissions are based on using the three test stands for 8,760 hours per year.
- ^c AP-42 Section 3.1 Stationary Gas Turbines (4/00), Table 3.1-1 Emission Factors for Nitrogen Oxides and Carbon Monoxide from Stationary Gas Turbines, Table 3.1-2a Emission Factors for Criteria Pollutants and Greenhouse Gases from Stationary Gas Turbines, Table 3.1-4 Emission Factors for Hazardous Air Pollutants from Distillate Oil-Fired Stationary Gas Turbines, and Table 3.1-5 Emission Factors for Metallic Hazardous Air Pollutants from Distillate Oil-Fired Stationary Gas Turbines.

Potential Emissions

Two Boilers, One Diesel Engine Generator, Flexible Emissions Diagnostic System Test Stands

pollutant	tons/yr
PM	0.81
PM ₁₀	0.47
PM _{2.5}	0.21
SO ₂	4.17
NO _x	10.14
CO	2.44
TOC	0.62
total HAP	0.03

- ^a Includes operational limits for the boilers and diesel engine generator and is based on maximum projected emissions from the FEDS test stands.

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See the **Insignificant Activities** section of this review for potential to emit from insignificant activities.

Air Quality Assessment:

An ambient air quality impact assessment was performed for the two boilers and the diesel engine generator using ISCST3. Assumptions used in the modeling analysis follow:

- State of Hawaii scaling factor of 0.20 for the annual averaging period
- Scaling factors of 0.9 for the 3-hour, 0.7 for the 8-hour, and 0.4 for the 24-hour averaging period.
- Rural dispersion parameters
- Screening meteorology

Background Air Quality Data:

The application process for existing sources with no modifications does not require the addition of background air quality monitoring data to predicted impacts. Although Schofield Barracks/Wheeler Army Air Field is an existing source with no proposed modifications, the permittee has added background air quality data to predicted impacts from the boilers and diesel engine generator. Air quality data is from the Kapolei monitoring station for 2004.

Terrain and Receptor Placement

The equipment is located on flat terrain, with impacts occurring on flat terrain. Receptors are spaced at 30 meter intervals.

Potential downwash effects:

The EPA Building Profile Input Program (BPIP) was used to determine for each 10-degree increment of wind direction, which building or combination of buildings is the dominant downwash structure relative to the stack to be modeled. Direction specific dimensions resulting from the BPIP program are entered into the model.

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The following table presents the emission rates and stack parameters used in the ambient air quality analysis.

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)
Boiler S/N L12587	1	9.36e-02	2.63e-01	6.55e-02	1.32e-02	9.96	461	7.47	0.6096
Boiler S/N L12587 capped stack parameters						8.13	461	0.001	52.68
Boiler S/N L12588	2	9.36e-02	2.63e-01	6.55e-02	1.32e-02	9.96	461	7.47	0.6096
Boiler S/N L12588 capped stack parameters						8.13	461	0.001	52.68
Waukesha DEG	3	6.36e-02	3.89e-01	5.90e-01	7.22e-02	3.252	633	74.7	0.254
Waukesha DEG horizontal stack parameters						3.252	633	0.001	69.42

The stack parameters were adjusted following U.S. EPA guidance for capped and horizontal stacks.

- 1) The stack exit velocity (V_s) is set equal to $0.001 \text{ m/s} = V_s'$
- 2) Stack diameter (d_s) is adjusted using the equation

$$d_s' = 31.6 \times d_s \times (V_s)^{0.5}$$

note: $(1/0.001)^{1/2} = 31.6$

- 3) The capped stack is adjusted by decreasing the height of the stack by 3 diameters in the model.

The boilers are located approximately 1,000 meters from the diesel engine generator. The highest *combined impact* concentration from the operation of all three units is less than the highest individual concentrations from the two boilers or the diesel engine generator. This review compares the ambient impacts from 1) the two boilers to the AAQS and 2) the diesel engine generator to the AAQS.

The analysis for the boilers shows two scenarios, the highest combined impact from the two boilers and the highest impact from one boiler (the boiler with the greatest individual impact) firing the entire 650,000 gallons per year fuel limit.

PROPOSED

Results of the Ambient Air Quality Impact Analysis Highest Concentration: Combined Impact from Two Boilers

The highest concentration from the combined impact of the two boilers is located at:
598,320 m E; 2,375,930 m E (NAD-83)

Air Pollutant	Averaging Period	Scaling Factor	fuel limit reduction factor ^a	1-hr model concentration (µg/m ³)	Background (µg/m ³)	Total Impact (µg/m ³)	State ^b Ambient Air Standard (µg/m ³)	Percent Standard
PM ₁₀	24-Hours	0.4	1	34	53	67	150	45
	Annual	0.2	0.36	34	13	15	50	30
SO _x	3-Hour	0.9	1	239	17	232	1,300	18
	24-hour	0.4	1	239	7	103	365	28
	Annual	0.2	0.36	239	1	18	80	23
NO _x ^c	Annual	0.2	0.36	672	9	45	70	65
CO	1-Hour	1.0	1	167	2,394	2,561	10,000	26
	8-hours	0.7	1	167	983	1,100	5,000	22

^a Fuel limit reduction factor is based on a 650,000 gal/yr limit for the two boilers combined. Each boiler is capable of firing 104.6 gal/hr maximum:

$$104.6 \text{ gal/hr} \times 2 \text{ boilers} \times 8,760 \text{ hrs/yr} = 1,832,592 \text{ gal/yr}$$

$$650,000 \text{ gal/yr} \div 1,832,592 \text{ gal/yr} = 0.36$$

^b State Ambient Air Quality Standards are more stringent than the National Ambient Air Quality Standards.

^c EPA Tier 1 factor of 75%.

Results of the Ambient Air Quality Impact Analysis Highest Concentration: Impact from One Boiler

The highest concentration from the impact of one boiler burning 650,000 gal/yr is located at:
598,320 m E; 2,375,870 m N (NAD-83)

Air Pollutant	Averaging Period	Scaling Factor	fuel limit reduction factor ^a	1-hr model concentration (µg/m ³)	Background (µg/m ³)	Total Impact (µg/m ³)	State ^b Ambient Air Standard (µg/m ³)	Percent Standard
PM ₁₀	24-Hours	0.4	1	26	53	63	150	42
	Annual	0.2	0.71	26	13	17	50	34
SO _x	3-Hour	0.9	1	183	17	182	1,300	14
	24-hour	0.4	1	183	7	80	365	22
	Annual	0.2	0.71	183	1	27	80	34
NO _x ^c	Annual	0.2	0.71	513	9	64	70	91
CO	1-Hour	1.0	1	128	2,394	2,522	10,000	25
	8-hours	0.7	1	128	983	1,073	5,000	22

Review date: 09/07/07
Reviewed by: CL

PROPOSED

^a Fuel limit reduction factor is based on a 650,000 gal/yr limit for the two boilers combined. This scenario assumes one of the boilers (the boiler having the greatest impact on the ambient air) burns all of the 650,000 gal/yr. Each boiler is capable of firing 104.6 gal/hr maximum:

$$104.6 \text{ gal/hr} \times 8,760 \text{ hrs/yr} = 916,296 \text{ gal/yr}$$

$$650,000 \text{ gal/yr} \div 916,296 \text{ gal/yr} = 0.71$$

^b State Ambient Air Quality Standards are more stringent than the National Ambient Air Quality Standards.

^c EPA Tier 1 factor of 75%.

**Results of the Ambient Air Quality Impact Analysis
Diesel Engine Generator**

Air Pollutant	Averaging Period	Scaling Factor	hour limit reduction factor	1-hr model concentration (µg/m ³)	Background (µg/m ³)	Total Impact (µg/m ³)	State ^a Ambient Air Standard (µg/m ³)	Percent Standard
PM ₁₀	24-Hours	0.4	1	183	53	126	150	84
	Annual	0.2	0.04	183	13	15	50	30
SO _x	3-Hour	0.9	1	163	17	164	1,300	13
	24-hour	0.4	1	163	7	72	365	20
	Annual	0.2	0.04	163	1	2	80	3
NO _x ^b	Annual	0.2	0.04	9,759	9	68	70	97
CO	1-Hour	1.0	1	1,484	2394	3,878	10,000	39
	8-hours	0.7	1	1,484	983	2,022	5,000	40

^a State Ambient Air Quality Standards are more stringent than the National Ambient Air Quality Standards.

^b EPA Tier 1 factor of 75%.

The analysis demonstrates compliance with the ambient air quality standards.

Significant Permit Conditions:

Attachment II of the Special Conditions of the permit:

Condition B.2. The total quantity of fuel fired in the two boilers shall not exceed a combined total of 650,000 gallons in any rolling twelve (12) month period.

Discussion: The permittee has proposed the limit to ensure compliance with the ambient air quality standards.

Condition B.3. The diesel engine generator shall not be operated for more that 350 hours per rolling twelve (12) month period.

Discussion: The permittee has proposed the limit to ensure compliance with the ambient air quality standards.

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PROPOSED

Condition B.1. The boilers and diesel engine generator shall only be fired on diesel no. 2 with a maximum sulfur content not to exceed 0.05% by weight.

Discussion: The permittee is currently firing fuel with a sulfur content not exceeding 0.05% by weight.

Attachment II - INSIG of the Special Conditions of the permit:

Condition D.1. The permittee shall submit, **on an annual basis**, a list of all insignificant activities (as defined in Hawaii Administrative Rules §11-60.1-82(f)) located at Schofield Barracks and Wheeler Army Air Field. On the list, the permittee shall also highlight the existence of any new or not previously listed insignificant activities. The list of insignificant activities is due **within sixty (60) days following the end of each calendar year**.

Discussion: The facility has a large number of insignificant activities. The condition allows the Department to identify the addition of any insignificant equipment at the facility.

Conclusion:

Criteria pollutant emissions of NO_x and CO from the Schofield Barracks/Wheeler Army Air Field equipment (including those identified as insignificant activities) have the potential to emit greater than 100 tons per year; resulting in the facility being subject to covered source permitting. The insignificant activities are subject to the conditions of Attachment II - INSIG - Special Conditions. The equipment listed in Attachment II - Special Conditions include two 14.6 MMBtu/hr no. 2 fired boilers, one 1400 bhp emergency diesel engine generator, and three Flexible Emissions Diagnostic System (FEDS) test stands. The permittee has proposed operating limits for the boilers and diesel engine generator to ensure compliance with the ambient air quality standards. The permit includes recordkeeping and reporting requirements for the FEDS test stands to monitor actual emissions from the activity.

Issuance of the covered source permit is recommended based on the review of the information provided by the applicant and subject to the permit conditions, thirty day public comment period and forty-five day EPA review.

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