New Hampshire Department of Environmental Services

29 Hazen Drive Concord, NH 03302-0095
Phone: 603-271-0905 Fax: 603-271-7053

ENGINEERING CALCULATION SHEET
AIR RESOURCES DIVISION

PROJECT NAME:	**Dartmouth Hitchcock Medical Center, Lebanon, NH** **Title V Operating Permit (Renewal)** **SIC Code: 8062**	**ENGINEER: Padmaja Baru**	
		DATE: July 2, 2004	**Page 1 of 4**

DATE APPLICATION RECEIVED: September 30, 2003 (Application # FY04-0134)

FACILITY DESCRIPTION

The Dartmouth-Hitchcock Medical Center (DHMC), a 1.3 million square foot health-care facility includes the Mary Hitchcock Memorial Hospital, the Hitchcock Clinic (Lebanon site), and the Dartmouth Medical School (Lebanon site). The three facilities share the same infrastructure, including three boilers and four emergency generators. These devices are operated by the Hospital on behalf of all three organizations, with operating permit requirements being administered by the Hospital's Facilities Management office. The facility is a major source for sulfur dioxide and is therefore required to obtain a Title V Operating Permit.

PROJECT DESCRIPTION

The purpose here is to renew the facility's Title V operating permit. Old permit TV-OP-011 expired on March 31, 2004. DHMC filed a complete Title V renewal application on September 30, 2003 and has been granted application shield on October 6, 2003 in accordance with Env-A 609.07. This permit covers the following devices:

ID	Description
EU01	Cleaver Brooks Boiler #1 (47 MMBTU/hr of heat input)
EU02	Cleaver Brooks Boiler #2 (47 MMBTU/hr of heat input)
EU03	Cleaver Brooks Boiler #3 (47 MMBTU/hr of heat input)
EU04	1809 HP Diesel fired Emergency Generator #1
EU05	1809 HP Diesel fired Emergency Generator #2
EU06	1809 HP Diesel fired Emergency Generator #3
EU07	1809 HP Diesel fired Emergency Generator #4

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EMISSION CALCULATIONS

Boilers 1, 2 & 3, each rated at 47 MMBTU/hr (EU01, EU02 & EU03)

Pollutant	AP-42 Emission factor	Emission rate for **each** boiler	Emission rate for **3 boilers combined**	Potential to emit	
	No. 6 fuel oil	(at 313 gal/hr)	(at 15,000 gal/day)	3,000,000 gal/yr for **3 boilers combined**	(8760 hours/yr, for **each** boiler)
	lb/1000 gal	lb/hr	lbs/day	tons/yr	tons/yr
TSP	12.43	3.89	186.45	18.65	17.04
PM_{10}	10.68	3.34	160.20	16.02	14.64
SO_2	157	49.14	2355.00	235.50	215.24
NOx	55	17.22	825.00	82.50	75.40
CO	5	1.57	75.00	7.50	6.85
VOCs	0.28	0.09	4.20	0.42	0.38

Each boiler is rated at 47 MMBTU/hr.
Daily limit = 15,000 gal/yr of #6 fuel oil for 3 boilers combined; Daily limit is required to meet the standard for SO_2 (TP-B-xxx)
Annual limit = 3,000,000 gallons/yr for three boilers combined (from old operating permits PO-B-1700, 1701 & 1702)
Heating value of #6 fuel oil = 150,000 BTU/gal
Max. sulfur % by weight in #6 fuel oil = 1%

(Increasing the limit on daily fuel oil usage is not subject to NSR. Annual limit remains the same as before.)

Emergency Generators (EU04 - EU07, 1809 HP each)

Pollutant	AP-42 Emission factor (for Large Stationary Internal Combustion Engines > 600 HP)	Emission rate for **each** emergency generator	Potential emissions for **each** emergency generator
		(based on max. flow rate of 91.6 gal/hr of diesel)	(based on 500 hours/yr)
	lb/1000 gal	lb/hr	TPY
TSP	8.5	0.78	0.19
SO_2	55.36	5.07	1.27
NOx	438.5	40.17	10.04
CO	116.50	10.67	2.67
VOCs	11.2	1.03	0.26

- Each emergency generator is rated at 1809 HP
- Max. fuel flow rate = 91.6 gal/hr of diesel

SUMMARY OF CHANGES

1. Removal of Ethylene oxide sterilizers.
2. Permit the use of #2 fuel oil in the boilers. Daily limit for #2 fuel oil usage is not required to comply with NAAQS.

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However, annual fuel oil usage (#2,#6 or both) is limited to 3 million gallons for all the three boilers combined.

3. Increase the amount of #6 fuel oil usage in the three boilers (TP-B-xx).
4. New permit adds new monitoring requirements (items 4 & 5 of Table 5 of Title V permit) of Env-A 800 (new rule).

ADDITIONAL CONDITIONS

1. Pursuant to Env-A 404.01, annual sulfur dioxide emissions from each Class B major source, except as provided by Env-A 405.02, shall have an average calendar year emission rate not to exceed 1.6 pounds of sulfur dioxide per million BTU input which is 75 percent of the baseline average emission rate for Class B major sources.
2. The maximum fuel usage shall be limited to 15,000 gallons of #6 fuel oil containing no more than 1.0% sulfur by weight over any consecutive 24-hour period and 3,000,000 gallons of #6 fuel oil during any consecutive 12-month period.
3. The three boilers are also permitted to burn #2 fuel oil with a maximum sulfur content of 0.4% by weight.

REVIEW OF REGULATIONS

NSPS N/A

The three boilers (rated at 47 MMBTU/hr each) are not subject to subpart Dc [*Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units* (with 10 MMBTU/hr < heat input < 100 MMBTU/hr) for which construction, modification, or reconstruction is commenced after June 9, 1989] because the construction contract was executed on October 31, 1988 (see facility's letter dated 1/15/1991). According to 40 CFR 60, Section 60.2 *Definitions*, **Commenced** means, with respect to the definition of new source in section 111(a)(2) of the Act, that an owner or operator has undertaken a continuous program of construction or modification or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or modification.

[Interesting note: Installation of boilers was not subject to NSR pursuant to 40 CFR 52.21 (i)(4)(vi)]

NESHAP N/A
Title V Yes; Major for SO_2
40 CFR 64 CAM rule is not applicable;

CAM rule applies to Title V sources that operate emission units with pre-controlled potential emissions at or above the major source thresholds that rely on control devices to comply with applicable requirements. This facility does not operate any control device.

Env-A 300 AAQS; Source in compliance. See modeling memos dated 10/8/2003 & 6/15/2004.
Env-A 400 Acid Deposition Control Program
Env-A 609 Title V Permits
Env-A 700 Permit Fee System
Env-A 800 Testing & Monitoring Procedures
Env-A 900 Owner/Operator Obligations
Env-A 1211 NOx RACT

Facility is subject to Env-A 1211.05 *Emission Standards for Industrial Boilers* & Env-A 1211.11 *Emission Standards and Control Options for Emergency Generators.*

Please note that DHMC is exempt from Env-A 1211.11(d)(1). In May 1995, DHMC provided documentation to DES showing that the generator engines emit more than 100 ppm of CO, corrected to 15% O_2, prior to retarding the timing. (Env-A 1211.11(d)(1) requires owner/operator to set and maintain the ignition timing of the engine 4 degrees retarded relative to standard timing, provided that the ignition timing shall not be retarded beyond the point that the CO concentration increases beyond 100 ppmvd, corrected 15% O_2, etc.) Hence, DES exempted DHMC from the requirement of Env-A 1211.11(d)(1). See DES' letter dated 6/11/1997 to the facility. The emergency generators are however required to meet Env-A 1211.11(b), (d)(2)-(5), (e), (f) & (g).

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Env-A 1400 RTAPs; Facility is compliance. Only RTAP emitted from the facility is nitrous oxide (CAS # 10024-97-2), which is routinely used at the hospital as part of various surgical procedures.
Env-A 1600 Fuel specifications
Env-A 2000 Fuel burning devices

INSIGNIFICANT ACTIVITIES

	Insignificant Emission Unit	Location
1.	Furnace/boiler; Max operating rate is 768,000 BTU/hr for each. #2 oil with a maximum sulfur content of 1% by weight.	DHART Helicopter Building
2.	Furnace/boiler; Max operating rate is 98,000 BTU/hr for each. #2 oil with a maximum sulfur content of 1% by weight.	Grounds Maintenance Building
3.	Furnace/boiler; Max operating rate is 480,000 BTU/hr for each. #2 oil with a maximum sulfur content of 1% by weight.	DHMC Day care

SUMMARY AND CONCLUSIONS

In summary, the operations as applied for will be capable of meeting all regulations and standards for air quality. Title V Operating Permit shall therefore be renewed.