Boiler Emission Calculations
No. 2 Fuel Oil Combustion - Boilers < 100 MMBtu/hr
Roane Medical Center
73-0237-01/66970

Fuel Oil Usage (gal/hr)	120
Annual Operating Hours	8,760
Weight Percent Sulfur in Fuel	0.05

Emission Calculations

Pollutant	Emission Factor (lb/1,000 gal)	Emission Rate (lb/hr)	Emission Rate (tons/year)	TPY for 48 hours
PM (Total)	3.3	0.40	1.73	
NO_X (Uncontrolled)	20	2.40	10.51	
CO	5	0.60	2.63	
SO_2	7.1	0.85	3.73	0.040896
Non-Methane TOC	0.2	0.02	0.11	

Fuel oil consumption from heat input rate

Heat Input (MMBtu/hr)	42
Heating Value (Btu/lb)	18,280
Density (lb/gal)	6.87
Usage (gal/hr)	334.4

Notes:

1. Based on AP-42 emission factors, Table 1.3-1 (September 1998).
2. Fuel oil heating value and density are from Babcock & Wilcox, *Steam: Its Generation and Use* (40 th ed.).

Boiler Emission Calculations - Small Boilers (< 100 MMBtu/hr)
Natural Gas Combustion
Roane Medical Center
73-0237-01/66970

Heat Input Rate (MMBtu/hr)	42.0
Annual Operating Hours	8,760
Low NO_X Burners?	Yes (?)

Emission Calculations

Pollutant	Emission Factor (lb/MMBtu)	Emission Rate (lb/hr)	Emission Rate (tons/year)
PM (Total)	0.0075	0.31	1.37
NO_X (Uncontrolled)	0.0980	4.12	18.04
NO_X (Low-NO_X Burners)	0.0490	2.06	9.02
CO	0.0824	3.46	15.15
SO_2	0.00059	0.02	0.11
VOC	0.00539	0.23	0.99

Notes:

1. Based on AP-42 emission factors, Tables 1.4-1 and 1.4-2 (July 1998).
2. SO_2 emission factor assumes a sulfur content of 2,000 grains/MMSCF.
3. To convert boiler horspower (outupt) to MMBtu/hr (input), multiply by 0.03446 hp/MMBtu, and correct for boiler efficiency as necessary.
4. For NO_X emissions, use the value for uncontrolled emissions unless low-NO_X burners are specified in the application.

Note: Per TAPCR 1200-3-7-.07(2) and the memo from LJH dated 4/25/05, all new fuel-burning sources and process burners are required to use low-NO_X burners (low-NOX technology may not be available for the smallest burner sizes).

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$E = 0.600 (10/Q)^{0.5566}$ for 10.0 X 106 Btu less than Q less than 250 x 106 Btu

$E= 0.600(10/42)^{0.5566}$ 0.27 lb/MMBtu

E=0.27*42= 11.34 lb/hr
E=11.34 *8760/2000= 49.7 tpy