COMBUSTION EQUIPMENT
APPLICATION FORM
CONTINUED

Section 7 - Requested Emission Limits

Pollutant	**Potential to Emit (pounds/hour*)**	**Potential to Emit (tons/year)**	**Calculation (including reference) on Which Emissions Information is Based (attach supporting information if necessary)**
Total Particulate Matter (PM)	**0.47**	**0.119**	**See Appendix 6.**
Particulates as PM_{10}	**0.47**	**0.119**	**See Appendix 6.**
Sulfur Dioxide	**0.44**	**0.111**	**See Appendix 6.**
Carbon Monoxide	**1.45**	**0.363**	**See Appendix 6.**
Oxides of Nitrogen	**6.75**	**1.687**	**See Appendix 6.**
Volatile Organic Compounds	**0.55**	**0.138**	**See Appendix 6.**
Lead	**-**	**-**	
Hydrogen Sulfide	**-**	**-**	
Hazardous Air Pollutants (Specify Each Pollutant[1])			
Total HAPs	**9.9E-3**	**0.002**	**See Appendix 6.**
Other Regulated Pollutants (Specify[2])			
N/A			

*Note: Alternative emissions limitations (e.g., lb/MMBtu, ppm, grains/dscf) may be requested by the applicant. If alternative emissions limitations are requested, please clearly describe the units in column 2 of Section 5 above.
[1]A list of Hazardous Air Pollutants is contained in Attachment 4.
[2]Other Regulated Pollutants include any Class I or Class II substance subject to a standard adopted pursuant to 42 U.S.C. SS 7671-8671q, inclusive

TABLE 1

FACILITY-WIDE (STATIONARY SOURCE) POTENTIAL TO EMIT POUNDS/HOUR AND TONS/YEAR

Pollutant	Potential to Emit (pounds/hour)	Potential to Emit (tons/year)
Total Particulate Matter (PM)	**36.73**	**158.88**
Particulates as PM_{10}	**36.73**	**158.88**
Sulfur Dioxide	**8.56**	**35.67**
Carbon Monoxide	**35.33**	**152.68**
Oxides of Nitrogen	**27.61**	**95.49**
Volatile Organic Compounds	**34.43**	**149.66**
Lead		
Hazardous Air Pollutants (Specify Each Pollutant)		
Formaldehyde	**2.10**	**<10**
Total HAPs*	**4.91**	**<25**
Other Regulated Pollutants (Specify)		
NH_3	**18.20**	**79.66**

***All other single HAP emissions are less than the formaldehyde pound-per-hour and ton-per-year rates.**

AIR SCIENCES INC. DENVER • PORTLAND	CALCULATIONS	PROJECT TITLE: Western 102 Power Project	BY: K. Lewis	
		PROJECT NO: 59-60-2	PAGE: 3	OF: 6
		SUBJECT: Wartsila Plant Emissions	DATE: October 18, 2012	

EMERGENCY EQUIPMENT

Emer. Diesel Generator (EDG)	125 kW	170 hp	9,000 BTU/hp-hr	1.53 MMBtu/hr
			(assumed worst case efficiency)	0.137 MMBtu/gal
				11 gal/hr

TABLE 6.3: EMERGENCY EQUIPMENT EMISSION CALCULATIONS

Non-HAPs Pollutant	Factor[a] lb/hp-hr	Factor[a] lb/MMBtu	lb/hr	Potential[b] to Emit ton/yr	Emissions for Modeling[c] Hourly lb/hr	Daily lb/day	Annual ton/yr
NO_x	3.10E-02	4.41	6.75	1.687			0.016
CO	6.68E-03	0.95	1.45	0.363	0.568		
PM	2.20E-03	0.31	0.47	0.119		0.187	0.0011
VOC	2.51E-03	0.36	0.55	0.138			
SO_2	2.05E-03	0.29	0.44	0.111	0.174	0.1743	0.00105

HAPs Pollutant	Factor[a] lb/MMBtu	lb/hr	Potential[b] to Emit ton/yr
1,3-Butadiene	< 3.91E-05	6.0E-05	1.5E-05
Acetaldehyde	7.67E-04	1.2E-03	2.9E-04
Acrolein	< 9.25E-05	1.4E-04	3.5E-05
Benzene	9.33E-04	1.4E-03	3.6E-04
Formaldehyde	1.18E-03	1.8E-03	4.5E-04
PAH	1.68E-04	2.6E-04	6.4E-05
Propylene	2.58E-03	3.9E-03	9.9E-04
Toluene	4.09E-04	6.3E-04	1.6E-04
Xylenes	2.85E-04	4.4E-04	1.1E-04
TOTAL		9.9E-03	0.002

[a] AP-42 Tables 3.3-1 and 3.3-2, 10/96

[b] Potential emissions of the emergency engines are based on 500 hours per year in accordance with U.S. EPA's September 6, 1995, memorandum, "Calculating Potential to Emit (PTE) for Emergency Generators."

[c] Maximum emissions for modeling are based on maintenance operation emissions only (30 minutes per month). In the event of emergency operation of the EDG, the Wartsila units will be offline.

Sample Calculations

Short-Term (Daily) and Long-Term (Annual) Emissions for PM_{10} and NO_x Modeling

PM Daily Emissions

$$\frac{2.20E\text{-}03\ \text{lb}}{\text{hp-hr}} \cdot \frac{0.5\ \text{hr}}{\text{day}} \cdot 170\ \text{hp} = \frac{0.187\ \text{lb}}{\text{day}}$$

NOx Annual Emissions

$$\frac{0.031\ \text{lb}}{\text{hp-hr}} \cdot \frac{0.5\ \text{hr}}{\text{mo}} \cdot 170\ \text{hp} \cdot \frac{12\ \text{mo}}{\text{yr}} \cdot \frac{1\ \text{ton}}{2{,}000\ \text{lb}} = \frac{0.016\ \text{ton}}{\text{yr}}$$

Annual Potential to Emit (PTE) Emissions

$$\frac{0.031\ \text{lb}}{\text{hp-hr}} \cdot \frac{500\ \text{hr}^{*}}{\text{yr}} \cdot 170\ \text{hp} \cdot \frac{1\ \text{ton}}{2{,}000\ \text{lb}} = \frac{1.318\ \text{ton}}{\text{yr}}$$

* Potential emissions of the emergency engines are based on 500 hours per year in accordance with U.S. EPA's September 6, 1995, memorandum, "Calculating Potential to Emit (PTE) for Emergency Generators".

FACILITY-WIDE PTE

TABLE 6.4: FACILITY-WIDE PTE

Pollutant	Wartsila Generator ton/yr	EDG ton/yr	Facility -Wide PTE ton/yr	Major Source Threshold ton/yr
NO_x	93.80	1.69	95.49	250
CO	152.32	0.36	152.68	250
PM	158.76	0.12	158.88	250
VOC	149.52	0.14	149.66	250
SO_2	35.56	0.11	35.67	250
NH_3	79.66	-	79.66	250
Formaldehyde	9.94	0.0005	9.94	10
Total HAPs	22.40	0.0025	22.40	25

TABLE 6.5: FACILITY-WIDE MAXIMUM HOURLY EMISSIONS

Pollutant	Wartsila Generators lb/hr	EDG lb/hr	Facility-Wide Maximum lb/hr
NO_x	20.86	6.75	27.61
CO	33.88	1.45	35.33
PM	36.26	0.47	36.73
VOC	33.88	0.55	34.43
SO_2	8.12	0.44	8.56
NH_3	18.20	-	18.20
Formaldehyde	2.10	0.0018	2.10
Total HAPs	4.90	0.010	4.91