DMAT Boiler, Kiln, Abatement Equipment NOx

Building	Source	Source Description	10^6 Cubic Feet Gas Burned per Year	Source 28 per year 10^6 Cubic Feet Gas Burned per Year
601	Source 28	Boiler #1	5.40	
		Boiler #2	5.40	
		Boiler #3	3.30	
701		Boiler #3	24.30	
		Boiler #4	24.30	
		Boiler #5	24.30	
		Boiler #6	24.30	
		Boiler #7	20.70	
		Boiler #8	20.70	
		Boiler HWB1	16.60	
		Boiler HWB2	16.60	
		Boiler HWB3	16.60	
		Boiler SB1	13.20	
		Boiler SB2	13.20	
		Boiler SB3	13.20	
		Boiler 801	10.40	252.50
	Source 46	TO 1	8.30	
		TO 2	8.30	16.60
	Source 29	RTO	15.77	15.77
801	Source 38	Kiln #1 *	100.74	
		Thermal Oxidizer #1*	21.90	
		Kiln #2	100.74	
		Thermal Oxidizer #2	21.90	245.28
		TOTAL	530.15	

* 145 lb/10^6 ft3

		Potential Nox per year	Potential Nox per hr
Source 28 Potential Emissions =	(250.50 10^6 ft3*100lb/ 10^ 6 fts) =	25,250.00	2.88
Source 46 Potential Emissions =	(16.60 10^6 ft3*100lb/ 10^ 6 fts) =	1,660.00	0.19
Source 29 Potential Emissions =	(15.77 10^6 ft3*100lb/ 10^ 6 fts) =	1,576.80	0.18
Source 38 Potential Emissions =	(122.64 10^6 ft3*145lb/ 10^ 6 fts) + (122.64 10^6 ft3*100lb/ 10^ 6 fts) =	24,528.00	2.80
	Total Potential per year =	53,014.80	6.05

POTENTIAL GAS USAGE

	Source Description	10^6 Cubic Feet Gas Burned per Year
PDC	Central Melt #1	37.28
	Central Melt #2	21.33
	Central Melt #3	48.66
	Die Cast Machine #'s 1-10	52.56
PCF	PCF Annealing Furnace #1 (PCF-0210)	13.14
	PCF Annealing Furnace #2 (PCF-0220)	13.14
PAC	PAC Annealing Furnace #1 (HAM-0001)	45.55
	PAC Annealing Furnace #2 (HAM-0002)	45.55
PHT	Burn-off Oven and Incinerator	8.19
	Carburizing Furnace #1 (PHT-0010)	17.08
	Carburizing Furnace #2 (PHT-0020)	17.08
	Carburizing Furnace #3 (PHT-0030)	17.08
	Carburizing Furnace #4 (PHT-0040)	17.08
FM	Boiler #1 (FMA-0001)	36.65
	Boiler #2 (FMA-0002)	54.98
	Boiler #3 (FMB-0008)	73.31
	TOTAL	**518.68**

25.93

ACTUAL GAS USAGE

	Plant 101, 102, 103	Plant 201	Plant 202	Plant 301	Total
1999	186.56	5.82	2.39	-	**194.77**
2000	138.40	5.63	2.17	-	**146.20**
2001	162.81	5.93	3.45	-	**172.19**
2002	179.95	2.87	4.58	0.99	**188.39**

POTENTIAL EMISSIONS

Electrical Generators
Emission Calculations

	Output (kW-hr)	Emission Factor (kg NOx/kW-hr)	Emissions (kg NOx/hr)	Emissions (lb NOx/hr)	Operation (hours/year)	NOx Emissions (lbs/yr)	NOx Emissions (tons/yr)	Diesel (gal/hr)	Diesel (gal/yr)	
Plant 601 Generator #1	400	0.018848	7.54	16.62	100	1,662	0.83	26.6	2,659.2	3.77
Plant 701 Generator #1	400	0.018848	7.54	16.62	100	1,662	0.83	26.6	2,659.2	3.77
Plant 701 Generator #2	200	0.018848	3.77	8.31	101	839	0.42	13.3	1,342.9	1.88
Engine Test Lab Generator #1	200	0.018848	3.77	8.31	100	831	0.42	13.3	1,329.6	1.88
Plant 601 Generator #2	600	0.018848	11.31	24.93	100	2,493	1.25	39.9	3,988.8	5.65
Plant 801 Generator #1	200	0.018848	3.77	8.31	100	831	0.42	13.3	1,329.6	1.88
TOTAL	**2,000**		**37.70**	**83.11**		**8,319**	**4.16**			**18.84**
										83.10545

NOx Emission Factor = (0.031 lb/hp-hr) x ((0.608 kg/kW-hr) ÷ (1 lb/hp-hr)) = 0.018848 kg NOx/kW-hr 37689.55 0.421677

NOx Emissions = (400 kW-hr) x (0.018848 kg NOx/kW-hr) = 7.54 kg NOx 18.84477 7.946409

NOx Emissions = (7.54 kg NOx) x (2.2 lbs/kg) = 16.62 lbs NOx 15892.82

NOx Emissions = (16.62 lbs NOx) x (2,000 hrs/yr) = 33,242 lbs NOx/yr 7.946409

NOx Emissions = (33,242 lbs NOx/yr) x (1 ton/2,000 lbs) = 16.62 tons NOx/yr **1.093316637**

Specific Gravity$_{\text{Diesel Fuel}}$ = 0.88

Diesel Fuel = (16.62 lbs NOx/hr) ÷ [(19,300 BTU/lb) x (1 MMBTU/1,000,000 BTU) x (4.41 lb NOx/MMBTU) = 195.28 lbs diesel fuel/hr

Diesel Fuel = (195.28 lbs diesel fuel/hr) x (1 gallon/8.345 lbs) x (0.88) = 26.6 gallons diesel fuel/hr

		MBH					
		Min	Max	Max CFH	CF/yr max	Max 10^6 CF	
FMI-0003	SB #7	750	2500	2363	20699433	20.7	701 ph1 steam boilers. Operate max 8 months/year.
FMI-0004	SB #8	750	2500	2363	20699433	20.7	
FMI-0005	HWB#3	1919	2940	2779	24342533	24.3	701 ph1 hot water boilers. Minimum one unit in standby (winter). Two units in standby (non winter)
FMI-0006	HWB#4	1767	2940	2779	24342533	24.3	
FMI-0044	HWB#5	733	2930	2769	24259735	24.3	
FMI-0046	HWB#6	733	2930	2769	24259735	24.3	
FM801-0127	SB	0	1260	1191	10432514	10.4	801 steam boiler. Maximum allowable input per nameplate data: 1,260,000 btu/hr
FMC-0003	Boiler 1	0	650	614	5381853	5.4	601 heating hot water
FMC-0004	Boiler 2	0	650	614	5381853	5.4	
FMC-0005	Boiler 3	0	400	378	3311901	3.3	601 domestic hot water
FMI-1004	HWB1	80	2000	1890	16559538	16.6	701 ph3 hot water boilers. One unit minimum in standby.
FMI-1005	HWB2	80	2000	1890	16559538	16.6	
FMI-1006	HWB3	80	2000	1890	16559538	16.6	
FML-0003	HWB1	0	300	284	2483932	2.5	504 heating hot water Maximum allowable input per nameplate data: 300,000 btu/hr
FML-0004	HWB2	0	300	284	2483932	2.5	
FMI-1084	SB1	650	1600	1512	13247637	13.2	701 ph3 steam boilers. Operate max 8 months/year. One unit in standby.
FMI-1085	SB2	650	1600	1512	13247637	13.2	
FMI-1086	SB3	650	1600	1512	13247637	13.2	

NG btu Average FY18 1. 58

			Emission Factors			Potential Emissions per Year			Potential Emissions per Year			
		Potential 10^6 Cubic Feet Gas Burned per Year	Pollutant/10^6 Cubic Feet Gas Bur			Pollutant/ 10^6 Cubic Feet Gas Bur			Lb Pollutant per Hour			
			Filterable PM	Condensible PM	SO2	Filterable PM	Condensible PM	SO2	Total PM	SO2	SO2	Source
FMI-0003	SB#7	20.7	5.7	1.9	0.6	118	39	12	0.01796	0.00142		
FMI-0004	SB#8	20.7	5.7	1.9	0.6	118	39	12	0.01796	0.00142		
FMI-0005	HWB#3	24.3	5.7	1.9	0.6	139	46	15	0.02108	0.00166		
FMI-0006	HWB#4	24.3	5.7	1.9	0.6	139	46	15	0.02108	0.00166		
FMI-0044	HWB#5	24.3	5.7	1.9	0.6	139	46	15	0.02108	0.00166		
FMI-0046	HWB#6	24.3	5.7	1.9	0.6	139	46	15	0.02108	0.00166		
FM801-01	SB	10.4	5.7	1.9	0.6	59	20	6	0.00902	0.00071		
FMC-0003	Boiler 1	5.4	5.7	1.9	0.6	31	10	3	0.00468	0.00037	0.01729	28
FMC-0004	Boiler 2	5.4	5.7	1.9	0.6	31	10	3	0.00468	0.00037		
FMC-0005	Boiler 3	3.3	5.7	1.9	0.6	19	6	2	0.00286	0.00023		
FMI-1004	HWB1	16.6	5.7	1.9	0.6	95	32	10	0.01440	0.00114		
FMI-1005	HWB2	16.6	5.7	1.9	0.6	95	32	10	0.01440	0.00114		
FMI-1006	HWB3	16.6	5.7	1.9	0.6	95	32	10	0.01440	0.00114		
FMI-1084	SB1	13.2	5.7	1.9	0.6	75	25	8	0.01145	0.00090		
FMI-1085	SB2	13.2	5.7	1.9	0.6	75	25	8	0.01145	0.00090		
FMI-1086	SB3	13.2	5.7	1.9	0.6	75	25	8	0.01145	0.00090		
Kiln1		100.7	5.7	1.9	0.6	574	191	60	0.08740	0.00690		
TO 1		21.9	5.7	1.9	0.6	125	42	13	0.01900	0.00150	0.01680	38
Kiln 2		100.7	5.7	1.9	0.6	574	191	60	0.08740	0.00690		
TO 2		21.9	5.7	1.9	0.6	125	42	13	0.01900	0.00150		
RTO		15.8	5.7	1.9	0.6	90	30	9	0.01368	0.00108	0.00108	29
FBC TO 1		8.3	5.7	1.9	0.6	47	16	5	0.00720	0.00057	0.00114	46
FBC TO2		8.3	5.7	1.9	0.6	47	16	5	0.00720	0.00057		
				Total Pounds Pollutant =		**1,439**	**1,007**	**318**	**0.45995**	**0.03631**		
				Total Tons Pollutant =		**0.7**	**0.5**	**0.2**				