Plymouth County Correctional Facility Potential To Emit HAP Summary

Natural Gas Usage:	PTE HAP tons/yr
65 RTUs HAP	0.006444701
(2) 2 MMBtu Water Heaters	1.59E-03
(2) 3.2 MMBtu Water Heaters	2.54E-03
Standby Generators	
(2) CAT 3512 diesel	0.98870184
Tons/yr Total	0.999271149
GEM unit using boiler (tons/yr)	3.16E-03
PCCF with GEM (tons/yr)	1.00E+00

HAP Emission Estimates	NG Heating Value	1020 Btu/scft		
Source Description and qty.			1 hr input 10^6 scf of gas	8760 hr input 10^6 scf of gas
Roof top units 65 - 15 ton units - 250 Mbh heat			0.000245098	2.147058824
2 MMBtu water heater			0.001960784	17.17647059
3.2 MMBtu Water heater			0.003137255	27.48235294
GEM Gasifier (130 CFM syngas)			0.0078	68.328

Pollutant	Emission Factor (lb/10$_6$ scf)	Emission Factor Rating	1 Roof Top Unit emission potential lb/yr	one 2MMBTU water heater emission potential lb/yr	one 3.2 MMBtu water heater emission potential lb/yr	1 GEM (w/ 2MMBtu boiler) Emission potential lb/yr
2-Methylnaphthalene[b, c]	2.40E-05	D	0.00005	4.12E-04	6.60E-04	1.64E-03
3-Methylchloranthrene[b, c]	1.80E-06	E	0.00000	3.09E-05	4.95E-05	1.23E-04
7,12-Dimethylbenz(a)anthracene[b,c]	1.60E-05	E	0.00003	2.75E-04	4.40E-04	1.09E-03
Acenaphthene[b,c]	1.80E-06	E	0.00000	3.09E-05	4.95E-05	1.23E-04
Acenaphthylene[b,c]	1.80E-06	E	0.00000	3.09E-05	4.95E-05	1.23E-04
Anthracene[b,c]	2.40E-06	E	0.00001	4.12E-05	6.60E-05	1.64E-04
Benz(a)anthracene[b,c]	1.80E-06	E	0.00000	3.09E-05	4.95E-05	1.23E-04
Benzene[b]	2.10E-03	B	0.00451	3.61E-02	5.77E-02	1.43E-01
Benzo(a)pyrene[b,c]	1.20E-06	E	0.00000	2.06E-05	3.30E-05	8.20E-05
Benzo(b)fluoranthene[b,c]	1.80E-06	E	0.00000	3.09E-05	4.95E-05	1.23E-04
Benzo(g,h,i)perylene[b,c]	1.20E-06	E	0.00000	2.06E-05	3.30E-05	8.20E-05
Benzo(k)fluoranthene[b,c]	1.80E-06	E	0.00000	3.09E-05	4.95E-05	1.23E-04
Butane	2.10E+00	E				
Chrysene[b,c]	1.80E-06	E	0.00000	3.09E-05	4.95E-05	1.23E-04
Dibenzo(a,h)anthracene[b,c]	1.20E-06	E	0.00000	2.06E-05	3.30E-05	8.20E-05
Dichlorobenzene[b]	1.20E-03	E	0.00258	2.06E-02	3.30E-02	8.20E-02
Ethane	3.10E+00	E				
Fluoranthene[b,c]	3.00E-06	E	0.00001	5.15E-05	8.24E-05	2.05E-04
Fluorene[b,c]	2.80E-06	E	0.00001	4.81E-05	7.70E-05	1.91E-04
Formaldehyde[b]	7.50E-02	B	0.16103	1.29E+00	2.06E+00	5.12E+00
Hexane	1.80E+00	E				
Indeno(1,2,3-cd)pyrene[b,c]	1.80E-06	E	0.00000	3.09E-05	4.95E-05	1.23E-04
Naphthalene[b]	6.10E-04	E	0.00131	1.05E-02	1.68E-02	4.17E-02
Pentane	2.60E+00	E				
Phenanathrene[b,c]	1.70E-05	D	0.00004	2.92E-04	4.67E-04	1.16E-03
Propane[, c]	1.60E+00	E				
Pyrene b	5.00E-06	E	0.00001	8.59E-05	1.37E-04	3.42E-04
Tolueneb	3.40E-03	C	0.00730	5.84E-02	9.34E-02	2.32E-01
Metals						
Pollutant	Emission Factor (lb/10$_6$ scf)	Emission Factor Rating				
Arsenic[b]	2.00E-04	E	0.00043	3.44E-03	5.50E-03	1.37E-02
Barium	4.40E-03	D	0.00945	7.56E-02	1.21E-01	3.01E-01
Beryllium[b]	1.20E-05	E	0.00003	2.06E-04	3.30E-04	8.20E-04
Cadmium[b]	1.10E-03	D	0.00236	1.89E-02	3.02E-02	7.52E-02
Chromium[b]	1.40E-03	D	0.00301	2.40E-02	3.85E-02	9.57E-02
Cobalt[b]	8.40E-05	D	0.00018	1.44E-03	2.31E-03	5.74E-03
Copper	8.50E-04	C				
Manganese[b]	3.80E-04	D	0.00082	6.53E-03	1.04E-02	2.60E-02
Mercury[b]	2.60E-04	D	0.00056	4.47E-03	7.15E-03	1.78E-02
Molybdenum	1.10E-03	D				
Nickel[b]	2.10E-03	C	0.00451	3.61E-02	5.77E-02	1.43E-01
Selenium[b]	2.40E-05	E	0.00005	4.12E-04	6.60E-04	1.64E-03
Vanadium	2.30E-03	D				
Zinc	2.90E-02	E				
		lb HAP/yr	0.19830	1.59E+00	2.54E+00	6.31E+00
		ton HAP/yr	9.91492E-05	7.93E-04	1.27E-03	3.16E-03
		65 RTUs HAP (ton/yr)	0.006444701			
		(2) 2 MMBtu Water Heaters (tons/yr)		1.59E-03		
		(2) 3.2 MMBtu Water Heaters (tons/yr)			2.54E-03	
GEM boiler HAP Estimates are based upon 130 cfm natural gas because AP-42 does not contain emission factors for syngas		GEM w/ boiler (tons/yr)				3.16E-03
		Total Potential HAPs from natural gas for existing facility (tons/year)			0.01057	
		Total Potential HAPs for existing facility with a GEM Gasifier (tons/year)			0.01372	

Standby Generator information

(2) CAT 3512 diesel	Diesel Engine input (MMbtu/hr)	10.5	
	Hours of operation/yr *	300	* Generators installed as stand-by/emergency generators IAW 310 CMR 7.00, maximum 300 hrs of use/yr
Pollutant	Emission Factor (Fuel Input) (lb/MMBtu)		
Benzene b	0.000933	2.93895	
Toluene b	0.000409	1.28835	
Xylenes b	0.000285	0.89775	
Propylene	0.00258	Non-listed HAP	
1,3-Butadiene b,c	0.0000391	0.123165	
Formaldehyde b	0.00118	3.717	
Acetaldehyde b	0.000767	2.41605	
Acrolein b	0.0000925	0.291375	
PM-10 *	0.31	976.5	
Polycyclic aromatic hydrocarbons (PAH)	----------		
Naphthalene b	8.48 E-05		
Acenaphthylene	<5.06 E-06		
Acenaphthene	<1.42 E-06		
Fluorene	2.92 E-05		
Phenanthrene	2.94 E-05		
Anthracene	1.87 E-06		
Fluoranthene	7.61 E-06		
Pyrene	4.78 E-06		
Benzo(a)anthracene	1.68 E-06		
Chrysene	3.53 E-07		
Benzo(b)fluoranthene	<9.91 E-08		
Benzo(k)fluoranthene	<1.55 E-07		
Benzo(a)pyrene	<1.88 E-07		
Indeno(1,2,3-cd)pyrene	<3.75 E-07		
Dibenz(a,h)anthracene	<5.83 E-07		
Benzo(g,h,l)perylene	<4.89 E-07		
TOTAL PAH	0.000168	0.5292	
Total HAP (lb/year)	lb/yr	988.70184	
Total HAP (Tons/year)	Tons/yr	0.49435092	
HAP emissions calculated for a single generator	Two Generators onsite	0.98870184	Total potential HAP emission tons/yr

*	All of the PM-10 effluent is assumed to be HAP metals because there are no HAP metals in the AP-42 emission factors.