

Middletown Cogeneration Facility Emission Calculations

Emission Point: **P801**
MWERF-FUG
 Description: **Fugitive Emissions from BFG, Aqueous Ammonia and Ethylene Glycol Equipment**

FUGITIVE EMISSIONS

Basis:
 8760 Hours/Year
 Component count for BFG, aqueous ammonia & Closed cooling system piping
 BFG contains 23.45 wt % CO and Aqueous Ammonia is 25 wt % NH3
 Gas Management System Emission factor is 118 SCFH of BFG (Vendor).
 Closed Cooling System contains 50 wt% Ethylene Glycol solution in water

Component Category	CO				NH3			
	Component Count	Emission Factors By Service	Total Emissions		Component Count	Emission Factors By Service	Total Emissions	
			Lbs/hr	Tons/yr			Lbs/hr	Tons/yr
	Inside Battery Limit	Lbs/hr	Lbs/hr	Tons/yr	Inside Battery Limit	Lbs/hr	Lbs/hr	Tons/yr
Valve Stems Gas/Vapor	122	0.0089	0.2546	1.115	11	0.0089	0.0230	0.101
Valve Stems Light Liquid	0	0.0035	0.0000	0.000	39	0.0035	0.0320	0.140
Flanges Gas/Vapor	304	0.0029	0.2067	0.906	74	0.0029	0.0503	0.220
Flanges Light Liquid	0	0.0005	0.0000	0.000	0	0.0005	0.0000	0.000
Sampling Connections	0	0.033	0.0000	0.000	0	0.033	0.0000	0.000
Open Ended Lines	0	0.004	0.0000	0.000	3	0.004	0.0028	0.012
Relief Valves (Gas/Vapor)	10	0.2293	0.5377	2.355	4	0.2293	0.2151	0.942
Gas Management System	1	118 SCFH	1.9010	8.326				
Total	437		2.90	12.70	131		0.32	1.42

Gas Management System

CO Emissions (Lbs/hr) = 118 SCFH of BFG X 22.18 mole% CO X 28 MW = 1.9010 #/hr CO
 385.5 SCF/Lbmole X 100

Component Category	Ethylene Glycol			
	Component Count	Emission Factors By Service	Total Emissions	
			Lbs/hr	Tons/yr
	Inside Battery Limit	Lbs/hr	Lbs/hr	Tons/yr
Valve Stems Heavy Liquid	79	0.0007	0.0277	0.121
Pumps Heavy Liquid	6	0.0161	0.0483	0.212
Flanges Heavy Liquid	201	0.00007	0.0070	0.031
Sampling Connections	0	0.033	0.0000	0.000
Open Ended Lines	39	0.004	0.0780	0.342
Total	325		0.16	0.71

CO Emissions (Lbs/hr) = (Emission Factor) x (Component Count) * 0.2345 Lbs CO/Lbs Gas
 CO Emissions (Tons/yr) = (Emission Factor) x (Component Count) * 0.2345 Lbs CO/Lbs Gas * 8760 hr/yr / 2000 Lbs/Ton
 NH3 Emissions (Lbs/hr) = (Emission Factor) x (Component Count) * 0.25 wt% Ammonia
 NH3 Emissions (Tons/yr) = (Emission Factor) x (Component Count) * 0.25 wt% Ammonia * 8760 hr/yr / 2000 Lbs/Ton
 EG Emissions (Lbs/hr) = (Emission Factor) x (Component Count) * 0.5 wt% EG
 EG Emissions (Tons/yr) = (Emission Factor) x (Component Count) * 0.5 wt% EG * 8760 hr/yr / 2000 Lbs/Ton

Note:
 Emission Factors from "Air Permit Guidance for Chemical Sources: Equipment Leak Fugitives" - October 2000. Facility/Compound Specific Fugitive Emission Factors, Uncontrolled SOCMI Fugitive Emission Factors

Roadways/Parking

Middletown Cogeneration Facility - Fugitive Emissions

	Fugitives from Roads (lb/day)					Tons/yr				
	Paved		Unpaved	TOTALS		Paved		Unpaved	TOTALS	
	Nov 2006	Draft		Nov 2006	Draft	Nov 2006	Draft		Nov 2006	Draft
PM2.5	0.05	0.01	0.13	0.19	0.14	0.01	0.001	0.02	0.03	0.025
PM10	0.35	0.03	1.34	1.69	1.37	0.04	0.005	0.24	0.28	0.249
TSP	1.81	0.19	5.02	6.83	5.21	0.20	0.03	0.92	1.12	0.942

1 November 2006 is current version of AP-42 paved road calculations Chapter 13.2.1
 2 Draft is AP-42 draft proposed methods dated June 10, 2010

Road Segments

1 P-1 distance to loading dock	1,000 feet	
2 P-2 distance to parking	500 feet	
3 P-3 maintenance	2,000 feet	Assume they travel total paved area each shift
4 UP-1 maintenance	2,000 feet	Assume they travel total unpaved area each shift

Travel/Deliveries

Ammonia	1 per	2 weeks	Number per year	26
General Deliveries	3 per	1 day		260 Deliveries only 5 days per week
Maintenance	3 per	1 day		365 Assume everyday
Employees	15 per	1 day		365 Assume everyday

Assume no control for road maintenance