

Middletown Cogeneration Facility Emission Calculations

Emission Point:	P002
Operating Scenario	MWERF-3
Description:	Cooling Tower Evaporation and Drift

Physical Characteristics:	Height of Stack above grade =	Maximum	45	ft
	Diameter of Stack =		30	ft
Inputs shaded in Green	Stack Gas Exit Temperature =		95	F
	Operating Hours =		8,760	hours/year

Emission data:	Makeup Water TDS =	300	ppm - Max of 17 samples (based on 429 umhos conductivity)
	Cooling Tower Cycles =	11	Max (Normal will be 9 cycles)
Inputs shaded in Green	Recirculation Rate =	35,928,720	lb/hr - (61,300 gpm expected - 71,800 gpm max)
	Drift % =	0.0005	% - Vendor

Average Emission Rate Calculations:

$$\begin{aligned}
 \text{PM}_{\text{fil}} \text{ (lb/hr)} &= 300 \text{ ppm-TDS} \times 11 \text{ cycles} \times 0.0005 \text{ \% Drift} \times 35,928,720 \text{ recirc. rate} / 1,000,000 \text{ ppm/lb} = \mathbf{0.59 \text{ lb/hr - PM}_{\text{fil}}} \\
 \text{PM}_{\text{fil}} \text{ (tpy)} &= 0.59 \text{ lb/hr} \times 8,760 \text{ hr/yr} / 2,000 \text{ lb/ton} = \mathbf{2.60 \text{ tpy - PM}_{\text{fil}}} \\
 \text{PM}_{\text{tot}} \text{ (lb/hr)} &= \mathbf{0.59 \text{ lb/hr - PM}_{\text{tot}}} \quad \text{assume PM}_{\text{tot}} \text{ is PM}_{\text{fil}} \\
 \text{PM}_{\text{tot}} \text{ (tpy)} &= \mathbf{2.60 \text{ tpy - PM}_{\text{tot}}} \quad \text{assume PM}_{\text{tot}} \text{ is PM}_{\text{fil}}
 \end{aligned}$$