EPA Air/Superfund National Technical Guidance Study Series
Models for estimating air emission rates from Superfund Remedial Actions
EPA/451/R-93/001
3.1 Air Strippers
3.1.3 Emission Model Equation

ER = C(L)(SE/100)(1.67E-5) Equation 3-1

ER = Air Emission Rate of the Contaminant (g/sec)
C = Concentration of contaminant in the influent water (mg/L)
L = Influent flow rate (L/min)
SE = Stripping Efficiency (%)
1.67E-5 = Conversion Factor from (mg/min) to (g/sec)

Units
cfm=cubic feet per minute
f = feet
g = grams
gpm = gallons per minute
hr = hour
L = liter
lb = pound
m = minute
mg = milligram
ppb = parts per billion
s = second

Convert g/s to lb/hr
g/s x lb/g x s/hr = lb/hr
lb/hr = g/s(lb/453.59g)(60x60 s/hr)
lb/hr = 7.936683 x g/s

NE Plume Extraction Well 234

Inputs			Formula Units	
Water flow	200	gpm	757.066	Lpm
Air flow	1300	cfm		
TCE Influent water	517	ppb	0.517	mg/L
Stripper efficiency	99.8	%		
1,1-DCE Influent water	10	ppb	0.01	mg/L
Stripper efficiency	100	%		

ER = C(L)(SE/100)(1.67E-5)
ER TCE = (0.517 mg/L)(757.066 Lpm)(99.8 %/100)(1.67E-5)
ER TCE = 0.006523 g/sec
ER TCE = 0 lb/hr

QED Website Estimate
0.05167 lb/hr

ER 1,1-DCE = (0.01 mg/L)(757.066 Lpm)(100 %/100)(1.67E-5)
ER 1,1-DCE = 0.000126 g/sec
ER 1,1-DCE = 0 lb/hr

QED Website Estimate
0.001 lb/hr

NE Plume Extraction Well 235

Inputs			Formula Units	
Water flow	200	gpm	757.066	Lpm
Air flow	1300	cfm		

TCE Influent water	450	ppb	0.45	mg/L
Stripper efficiency	100	%		
1,1-DCE Influent water	95	ppb	0.095	mg/L
Stripper efficiency	100	%		

ER = C(L)(SE/100)(1.67E-5)

ER TCE = (0.45 mg/L)(757.066 Lpm)(100 %/100)(1.67E-5)

ER TCE = 0.005689 g/sec

ER TCE = 0 lb/hr

QED Website Estimate
0.04498 lb/hr

ER 1,1-DCE = (0.095 mg/L)(757.066 Lpm)(100 %/100)(1.67E-5)

ER 1,1-DCE = 0.001201 g/sec

ER 1,1-DCE = 0 lb/hr

QED Website Estimate
0.00951 lb/hr

The calculated emission rates for EW234 and EW235 agree with the QED estimated emission rates.

QED Air Stripper Model ver. 2.0

1/28/2013

Site Data

Name: Clayton
Project: NE Optimization Units
Units: English
Air Temp: 55 F
Water Temp: 55 F
Stripper: EZ-Tray 24.x - Click for details
Stripper Max Flow: 250 gpm

e-mail: btc@lataky.com

Altitude: 0 ft
Flow: 200 gpm

Stripper Air Flow: 1300 cfm

Water Results

Contaminant	Influent (ppb)	Target (ppb)	4-Tray Results (ppb)	4-Tray %Removal	6-Tray Results (ppb)	6-Tray %Removal
trichloroethylene (TCE)	517	0	1.0	99.807	< 1	100.000
1,1-dichloroethylene	10	0	< 1	100.000	< 1	100.000

Air Results

Contaminant	4-Tray (ppmV)	4-Tray (lb/hr)	6-Tray (ppmV)	6-Tray (lb/hr)
trichloroethylene (TCE)	1.8949	0.05167	1.8985	0.05177
1,1-dichloroethylene	0.0498	0.00100	0.0498	0.00100

Notes

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PH-> 1-800-624-2026 or 1-734-995-2547, FX-> 1-734-995-1170. E-mail->info@qedenv.com. WEB->http://www.qedenv.com/.

The QED modeler estimates unit performance for the listed contaminants. ***Results assume -***

1. *Contaminants are in the dissolved-phase, within a water matrix*
2. *Stripper Influent air is contaminant-free*
3. *Influent liquid does not have surfactants, oil, grease, other immiscible phase(s) or other Henry's constant altering additions present, such as dissolved phase polar organic contaminants*
4. *The air stripper is operated within the given parameters listed above and as instructed in the E-Z Tray O&M manual*

Stripper performance shall meet or exceed either the required effluent concentration(s) or effluent estimates, whichever is greater, for the conditions supplied and assumes the influent concentrations of each contaminant are less than 25% solubility in water. QED makes no claim of the model's accuracy beyond the 25% solubility in water limit.

Contact Us

Fill out your contact and project information and click Send to have a QED Treatment application specialist contact you.

Name - Clayton

Company -	Company		
Phone -	Phone	**Fax -**	Fax
e-mail -	btc@lataky.com	**Project -**	NE Optimization Units

Application Notes

Send Reset

Save Data

Use the following URL to reconstruct your data form for future remodeling with changes. This URL can be saved in any text file for record keeping and later retrieval. This run's URL:

http://64.9.214.199/cgi-bin/remodel.pl?u=e&tw=55&ta=55&f=200&a=0&s=24.x&n=Clayt&e=btc@lataky.com&p=NE+Op&c=189,517;16,10;

QED Air Stripper Model ver. 2.0

1/28/2013

Site Data

Name: Clayton
Project: NE Optimization Units
Units: English
Air Temp: 55 F
Water Temp: 55 F
Stripper: EZ-Tray 24.x - Click for details
Stripper Max Flow: 250 gpm

e-mail: btc@lataky.com

Altitude: 0 ft
Flow: 200 gpm

Stripper Air Flow: 1300 cfm

Water Results

Contaminant	Influent (ppb)	Target (ppb)	4-Tray Results (ppb)	4-Tray %Removal	6-Tray Results (ppb)	6-Tray %Removal
trichloroethylene (TCE)	450	0	< 1	100.000	< 1	100.000
1,1-dichloroethylene	95	0	< 1	100.000	< 1	100.000

Air Results

Contaminant	4-Tray (ppmV)	4-Tray (lb/hr)	6-Tray (ppmV)	6-Tray (lb/hr)
trichloroethylene (TCE)	1.6494	0.04498	1.6524	0.04506
1,1-dichloroethylene	0.4727	0.00951	0.4728	0.00951

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