SMAQMD BACT CLEARINGHOUSE

CATEGORY: **GROUNDWATER REMEDIATION**

BACT Size: SMALL EMITTER (<10 LB/DAY) AND MIN **AIR STRIPPING SYSTEM**

BACT Determination Number:	86	**BACT Determination Date:**	**11/17/2014**

Equipment Information

Permit Number: N/A -- Generic BACT Determination
Equipment Description: AIR STRIPPING SYSTEM
Unit Size/Rating/Capacity: Groundwater remediation with VOC <10 lb/day
Equipment Location:

BACT Determination Information

ROCs	**Standard:**	9.9 lb/day and %control based on influent
	Technology Description:	Catalytic Oxidizers, Thermal Oxidizers, Carbon Adsorption, or IC Engines that achieve the control efficiency requirements stated below
	Basis:	Achieved in Pactice
NOx	**Standard:**	
	Technology Description:	For thermal oxidizers: natural gas or propane fuel and good combustion practices
	Basis:	Achieved in Pactice
SOx	**Standard:**	
	Technology Description:	For thermal oxidizers: natural gas or propane fuel and good combustion practices
	Basis:	Achieved in Pactice
PM10	**Standard:**	
	Technology Description:	For thermal oxidizers: natural gas or propane fuel and good combustion practices
	Basis:	Achieved in Pactice
PM2.5	**Standard:**	
	Technology Description:	For thermal oxidizers: natural gas or propane fuel and good combustion practices
	Basis:	Achieved in Pactice
CO	**Standard:**	
	Technology Description:	For thermal oxidizers: natural gas or propane fuel and good combustion practices
	Basis:	Achieved in Pactice
LEAD	**Standard:**	
	Technology Description:	
	Basis:	

Comments: For Effluent VOC Concentrations <= 10 ppmv, no required % control efficiency
For Influent VOC Concentrations >= 2,000 ppmv, at least 98.5% control efficiency required
For Influent VOC Concentrations >= 200 ppmv and < 2,000 ppmv, at least 97% control efficiency required
For Influent VOC Concentrations < 200 ppmv at least 90% control efficiency required

District Contact: Michelle Joe Phone No.: (916) 874 - 4853 email: mjoe@airquality.org

777 12th Street, Third Floor

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Sacramento, CA 95814

BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION

DETERMINATION NO.: 86

DATE: November 14, 2014

ENGINEER: Michelle Joe

Category/General Equip Description: Groundwater Remediation

Equipment Specific Description: Air Stripping System

Equipment Size/Rating: Small Emitter (< 10 lb/day) and Minor Source BACT

Previous BACT Det. No.: #33, 34, 35, & 36

This BACT determination will update Determination #33, 34, 35, & 36 which was made on April 5, 2012 for Groundwater Remediation – Air Stripping System.

BACT ANALYSIS

Step 1: Identify All Control Technologies

The following control technologies are currently employed as BACT for Groundwater Remediation – Air Stripping System by the following BACT Clearinghouses:

<table>
<tr><th>BACT Clearinghouse</th><th>(A)</th><th>Best Available Control Technology (BACT)</th></tr>
<tr><td>SMAQMD</td><td>AP
AP
AP
AP</td><td>For VOC:
1. Catalytic Oxidizers
2. Thermal Oxidizers
3. Carbon Adsorption
4. IC Engines
Each subject to the following VOC control efficiencies and maximum emission limit:
<table>
<tr><th>For VOC Concentration at Influent of Control Device (ppmv):</th><th>For VOC Concentration at Effluent of Control Device (ppmv):</th><th>Required VOC Control Efficiency</th><th>Maximum Effluent VOC Daily Limit</th></tr>
<tr><td>N/A</td><td>≤10 ppmv</td><td>None</td><td rowspan="4">9.9 lb/day</td></tr>
<tr><td>≥2,000 ppmv</td><td>N/A</td><td>≥98.5%</td></tr>
<tr><td>≥200 ppmv to <2,000 ppmv</td><td>N/A</td><td>≥97%</td></tr>
<tr><td><200 ppmv</td><td>N/A</td><td>≥90%</td></tr>
</table></td></tr>
</table>

BACT Clearinghouse	(A)	Best Available Control Technology (BACT)
EPA RBLC	---	For VOC: A BACT standard has not been established.
CARB	---	For VOC: A BACT standard has not been established.
South Coast AQMD	AP AP AP	For VOC: 1. Carbon Adsorber 2. Thermal Oxidizer 3. Catalytic Oxidizer
Bay Area AQMD	AP	For VOC: Two or more activated carbon canisters in series, thermal oxidizer or catalytic oxidizer to achieve: ≤10 ppmv at outlet of control device; or ≥98.5% capture/destruction efficiency if inlet VOC ≥2000 ppmv; or ≥97% capture/destruction efficiency if inlet VOC ≥200 to <2000 ppmv; or ≥90% capture/destruction efficiency if inlet VOC <200 ppmv.
San Joaquin Valley APCD	TF TF TF	For VOC: 1. Thermal/Catalytic Oxidizer – 95% control 2. Incineration in IC Engine – 95% control 3. Carbon Adsorption – 95% control

(A) AP = Achieved in Practice, TF = Technologically Feasible

The following control technologies have been identified:

For VOC:
1. Catalytic Oxidizers
2. Thermal Oxidizers
3. Carbon Adsorption
4. IC Engines

For NOx:
For Thermal Oxidizers: natural gas or propane fuel and good combustion practices

For SOx:
For Thermal Oxidizers: natural gas or propane fuel and good combustion practices

For PM10:
For Thermal Oxidizers: natural gas or propane fuel and good combustion practices

For PM2.5:
For Thermal Oxidizers: natural gas or propane fuel and good combustion practices

For CO:
For Thermal Oxidizers: natural gas or propane fuel and good combustion practices

For Lead:
For Thermal Oxidizers: natural gas or propane fuel and good combustion practices

Step 2: Eliminate Technologically Infeasible Options

All identified technologies are feasible.

Step 3: Rank Remaining Control Technologies by Control Effectiveness

1. Catalytic Oxidizers – 90% to 98.5% control efficiency
2. Thermal Oxidizers – 90% to 98.5% control efficiency
3. Carbon Adsorption – 90% to 98.5% control efficiency
4. IC Engines – 90% to 98.5% control efficiency

All control technologies are equally effective at controlling VOCs. SMAQMD has identified BACT as the use of catalytic oxidizers, thermal oxidizers, carbon adsorption systems, or IC engines that achieve a control efficiency dependent on the inlet VOC concentration described in Step 1 For soil vapor extraction systems that use thermal oxidizers, either natural gas or propane and good combustion practices shall be required as BACT for NOx, SOx, PM10, PM2.5, CO, and Lead since it has been achieved in practice.

Therefore, the most effective control technology identified in Step 3 is the use of catalytic oxidizers, thermal oxidizers (which use natural gas or propane fuel and good combustion practices), carbon adsorption systems, or IC engines that achieve a control efficiency dependent on the inlet VOC concentration described in Step 1.

Step 4: Select BACT

BACT for the control of VOC emissions from Groundwater Remediation – Air Stripping System is the use of catalytic oxidizers, thermal oxidizers (which use natural gas or propane fuel and good combustion practices), carbon adsorption systems, or IC engines that achieve a control efficiency dependent on the inlet VOC concentration described in Step 1.

REVIEWED BY: _____ **DATE:** 12-1-14

APPROVED BY: _____ **DATE:** 12-15-14