777 12th Street, Third Floor

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Sacramento, CA 95814

BEST AVAILABLE CONTROL TECHNOLOGY & TOXIC BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION

DETERMINATION NO.: 121

DATE: 7/5/16

ENGINEER: Felix Trujillo, Jr.

Category/General Equip Description: Tank/Pipeline Degassing System

Equipment Specific Description: Thermal Oxidizing Unit - Portable

Equipment Size/Rating: Minor Source BACT

Previous BACT Det. No.: N/A

This BACT determination will be made for a portable thermal oxidizing unit serving a tank/pipeline at a refinery, bulk terminal or fuel storage unit.

This BACT was determined under the project for A/Cs 24526, 24527, and 24583 (PSC Industrial Outsourcing, LP).

BACT ANALYSIS

A: ACHIEVED IN PRACTICE (Rule 202, §205.1a)

The following control technologies are currently employed as BACT for tank degassing systems by the following air pollution control districts:

<table>
<tr><th>District/Agency</th><th>Best Available Control Technology (BACT)/Requirements</th></tr>
<tr><td>US EPA</td><td>
BACT
Source: EPA RACT/BACT/LAER Clearinghouse
RBLC ID CA-1048 (5/24/01)
<table>
<tr><td colspan="2">For portable tank degassing system</td></tr>
<tr><td>VOC</td><td>50 ppmvd corrected to 3% O_2 as hexane [SCAQMD]</td></tr>
<tr><td>NOx</td><td>N/A – No BACT determinations found</td></tr>
<tr><td>SOx</td><td>N/A – No BACT determinations found</td></tr>
<tr><td>PM10</td><td>N/A – No BACT determinations found</td></tr>
<tr><td>PM2.5</td><td>N/A – No BACT determinations found</td></tr>
<tr><td>CO</td><td>N/A – No BACT determinations found</td></tr>
</table>
RULE REQUIREMENTS:
None
</td></tr>
</table>

<table>
<tr><th>District/Agency</th><th>Best Available Control Technology (BACT)/Requirements</th></tr>
<tr><td>ARB</td><td>
<u>BACT</u>
Source: ARB BACT Clearinghouse
SCAQMD Permit No. 384630 (5/24/01)
Note: BACT determination published in the ARB BACT Clearinghouse is at least 13 years old.

<table>
<tr><td colspan="2">ARB BACT Clearinghouse</td></tr>
<tr><td>VOC</td><td>50 ppmvd corrected to 3% O_2 as hexane [SCAQMD]</td></tr>
<tr><td>NOx</td><td>No standard</td></tr>
<tr><td>SOx</td><td>No standard</td></tr>
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<tr><td>PM2.5</td><td>No standard</td></tr>
<tr><td>CO</td><td>No standard</td></tr>
</table>

<u>RULE REQUIREMENTS</u>:
None
</td></tr>
<tr><td>SMAQMD</td><td>
<u>BACT</u>
Source: SMAQMD BACT Clearinghouse (last updated: 3/8/16)

<table>
<tr><td colspan="2">For portable tank degassing system</td></tr>
<tr><td>VOC</td><td>No standard</td></tr>
<tr><td>NOx</td><td>No standard</td></tr>
<tr><td>SOx</td><td>No standard</td></tr>
<tr><td>PM10</td><td>No standard</td></tr>
<tr><td>PM2.5</td><td>No standard</td></tr>
<tr><td>CO</td><td>No standard</td></tr>
</table>

<u>RULE REQUIREMENTS</u>:
Rule 420 Sulfur Content of Fuels (8/13/81)
Section 301 limits the sulfur content of any gaseous fuel to 50 gr/scf, calculated as H_2S at standard conditions (equivalent to 809 ppmv as H_2S).
</td></tr>
<tr><td>South Coast AQMD</td><td>
<u>BACT</u>
Source: SCAQMD LAER/BACT Determinations
SCAQMD Permit No. 384630 (5/24/01)

<table>
<tr><td colspan="2">For portable tank degassing system</td></tr>
<tr><td>VOC</td><td>50 ppmvd corrected to 3% O_2 as hexane [SCAQMD] (A)</td></tr>
<tr><td>NOx</td><td>No standard</td></tr>
<tr><td>SOx</td><td>No standard</td></tr>
<tr><td>PM10</td><td>No standard</td></tr>
<tr><td>PM2.5</td><td>No standard</td></tr>
<tr><td>CO</td><td>No standard</td></tr>
</table>

(A) Pursuant to the evaluation for Permit No. 344630, this limit corresponds to a control efficiency of 99%.
</td></tr>
</table>

District/Agency	Best Available Control Technology (BACT)/Requirements

RULE REQUIREMENTS:

Regulation XI, Rule 1147 NOx Reductions from Miscellaneous Sources (9/9/11)
Requirements Table Rule 1147

Table 1 – NO_x Emission Limit Equipment Category(ies)	**NOx Emission Limit** PPM @ 3% O_2, dry or Pound/mmBtu heat input **Process Temperature**		
Gaseous Fuel-Fired Equipment	≤ 800° F	> 800 ° F and < 1200° F	≥ 1200 ° F
Afterburner, Degassing Unit, Remediation Unit, Thermal Oxidizer, Catalytic Oxidizer or Vapor Incinerator 1	30 ppm or 0.036 lb/mmBtu	60 ppm or 0.073 lb/mmBtu	60 ppm or 0.073 lb/mmBtu

1. Emission limit applies to burners in units fueled by 100% natural gas that are used to incinerate air toxics, VOCs, or other vapors; or to heat a unit. The emission limit applies solely when burning 100% fuel and not when the burner is incinerating air toxics, VOCs, or other vapors. The unit shall be tested or certified to meet the emission limit while fueled with natural gas.

These limits apply to burners that are only fueled on 100% natural gas or propane. Burners that are fueled on 100% natural gas or propane and are used for five minutes or less to bring a unit up to operating temperature are exempt from these limits per Section (g)(3)(B). Also, these limits do not apply to burners that are fueled on process gas and supplemental gas per Section (g)(3)(E). Pursuant to Rule 1147 Section g(3)(B), pilots are also exempt from the requirements of this rule.

Regulation XI, Rule 1149 Storage Tank and Pipeline Cleaning and Degassing (5/2/08)
Section 1149(c)(1)(B) requires the VOC concentration of the degassed tanks to be reduced to less than 5,000 ppmv, measured as methane at least 1 hour after degassing has ceased. Section 1149(c)(8) requires the VOC concentration in the exhaust stream of any control device to be less than 500 ppmv, measured as methane. This is equivalent to a control device efficiency of 90%.

Rule 431.1 Sulfur Content of Gaseous Fuels (6/12/98)
Section (c)(2) limits the sulfur content of a gaseous fuel to 40 ppmv as H_2S.

<table>
<tr><th>District/Agency</th><th>Best Available Control Technology (BACT)/Requirements</th></tr>
<tr><td>San Diego County APCD</td><td>
<u>BACT</u>
<table>
<tr><td colspan="2">For portable tank degassing system</td></tr>
<tr><td>VOC</td><td>No standard</td></tr>
<tr><td>NOx</td><td>No standard</td></tr>
<tr><td>SOx</td><td>No standard</td></tr>
<tr><td>PM10</td><td>No standard</td></tr>
<tr><td>PM2.5</td><td>No standard</td></tr>
<tr><td>CO</td><td>No standard</td></tr>
</table>
<u>RULE REQUIREMENTS</u>:
Rule 62 Sulfur Content of Fuels (10/21/81)
Section (b)(1) requires any gaseous fuel to contain no more than 10 grains of sulfur compounds, calculated as hydrogen sulfide, per 100 cubic feet of dry gaseous fuel at standard conditions (equivalent to 162 ppmv as H_2S).
</td></tr>
<tr><td>Bay Area AQMD</td><td>
<u>BACT</u>
<table>
<tr><td colspan="2">For portable tank degassing system</td></tr>
<tr><td>VOC</td><td>No standard</td></tr>
<tr><td>NOx</td><td>No standard</td></tr>
<tr><td>SOx</td><td>No standard</td></tr>
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<tr><td>PM2.5</td><td>No standard</td></tr>
<tr><td>CO</td><td>No standard</td></tr>
</table>
<u>RULE REQUIREMENTS</u>:
Regulation 8 Organic Compounds Rule 5 Storage of Organic Liquids (10/18/06)
Section 328.1 Requires control devices used for tank degassing purposes to meet an abatement efficiency of at least 90% by weight and operate the degassing equipment until the concentration of organic compounds in the tank is less than 10,000 ppm expressed as methane.
</td></tr>
<tr><td>San Joaquin Valley APCD</td><td>
<u>BACT</u>
Source: SJVAPCD BACT Guideline 7.1.13 (5/24/02)
<table>
<tr><td colspan="2">For portable tank degassing system</td></tr>
<tr><td>VOC</td><td>No standard</td></tr>
<tr><td>NOx</td><td>No standard</td></tr>
<tr><td>SOx</td><td>No standard</td></tr>
<tr><td>PM10</td><td>No standard</td></tr>
<tr><td>PM2.5</td><td>No standard</td></tr>
<tr><td>CO</td><td>No standard</td></tr>
</table>
Note: SJVAPCD BACT Guideline 7.1.13 does not include any Achieved in Practice technologies. The only technology that is listed under the technologically feasible category is a 98% destruction of exhausted vapors (thermal or catalytic oxidizer or equal).
</td></tr>
</table>

<table>
<tr><td>District/Agency</td><td>Best Available Control Technology (BACT)/Requirements</td></tr>
<tr><td></td><td><u>RULE REQUIREMENTS</u>:
Rule 4623 Storage of Organic Liquids (5/19/05)
Sections 5.6.1.2 and 5.7.5.4.5 set a control efficiency requirement of 95% for control devices serving tank degassing operations. Section 5.7.5.4.1 requires the operation of the degassing equipment until the organic vapor concentration is 5,000 ppmv or less, or is 10% or less of the lower explosion limit (LEL), whichever is less.</td></tr>
<tr><td>Santa Barbara APCD</td><td><u>BACT</u>
<table><tr><td colspan="2">For portable tank degassing system</td></tr><tr><td>VOC</td><td>No standard</td></tr><tr><td>NOx</td><td>No standard</td></tr><tr><td>SOx</td><td>No standard</td></tr><tr><td>PM10</td><td>No standard</td></tr><tr><td>PM2.5</td><td>No standard</td></tr><tr><td>CO</td><td>No standard</td></tr></table>
<u>RULE REQUIREMENTS</u>:
Rule 343 Petroleum Storage Tank Degassing (12/14/93)
Section D.1. sets a control efficieny of 90% for control devices used in degassing storage tanks. Section E.2.a. sets a length of time for the venting of displaced gases into a control system base on the following equation:

$t = \frac{2.3\ V}{Q}$

Where: t = time (hours)
V = the physical volume of the headspace (cubic feet)
Q = flow rate through condenser (ft^3/hr)

Rule 311 Sulfur Content of Fuels (10/23/78)
Section B limits the sulfur conent of any gaseous fuel to 15 grains per 100 cubic feet (calculated as H_2S) at standard conditions (equaivalent to 239 ppmv as H_2S).</td></tr>
<tr><td>Ventura County APCD</td><td><u>BACT</u>
<table><tr><td colspan="2">For portable tank degassing system</td></tr><tr><td>VOC</td><td>No standard</td></tr><tr><td>NOx</td><td>No standard</td></tr><tr><td>SOx</td><td>No standard</td></tr><tr><td>PM10</td><td>No standard</td></tr><tr><td>PM2.5</td><td>No standard</td></tr><tr><td>CO</td><td>No standard</td></tr></table>
<u>RULE REQUIREMENTS</u>:
Rule 74.27 Gasoline and ROC Tank Degassing Operations (11/8/94)
Section B.1.b. sets a control efficieny of 95% for control devices used in degassing storage tanks and requires the operation of the degassing equipment until the vapor concentration in the tank is less than 10,000 ppmv, measured as methane, for at least one hour.</td></tr>
</table>

<table>
<tr><td>District/Agency</td><td>Best Available Control Technology (BACT)/Requirements</td></tr>
<tr><td></td><td>Rule 64 Sulfur Conent of Fuels (4/13/99)
Section (B)(1) limits the sulfur compounds of a gaseous fuel to 50 grains/100 scf (788 ppmv), calculated as H_2S at standard conditions.</td></tr>
<tr><td>Texas Commission on Environmental Quality</td><td><u>BACT</u>
<table><tr><td colspan="2">For portable tank degassing system</td></tr><tr><td>VOC</td><td>No standard</td></tr><tr><td>NOx</td><td>No standard</td></tr><tr><td>SOx</td><td>No standard</td></tr><tr><td>PM10</td><td>No standard</td></tr><tr><td>PM2.5</td><td>No standard</td></tr><tr><td>CO</td><td>No standard</td></tr></table>
<u>RULE REQUIREMENTS</u>:
Title 30 Environmental Quality
Part 1 Texeas Commission on Environmental Quality
Chapter 115 Control of Air Pollution from Volatile Organic Compounds

Subchapter F Miscellaneous Industrial Sources
Division 3 Degassing of Storage Tanks, Transport Vessels, and Marine Vessels (2/17/11)
Section 115.542(a)(1) sets control device efficiency of 90% for tank degassing operations. Section 115.542(b) requires the operation of the degassing equipment until the VOC concentration is less than 34,000 ppmv expressed as methane or less than 50% of the lower explosive limit (LEL).</td></tr>
</table>

The following control technologies have been identified as the most stringent, achieved in practice control technologies:

BEST CONTROL TECHNOLOGIES ACHIEVED		
Pollutant	**Standard**	**Source**
VOC	50 ppmvd @ 3% O_2 as Hexane; and 1. The operation of the thermal oxidizer shall continue until the gaseous VOC concentration within the tank/pipeline is reduced to 5,000 ppmv, measured as methane, for at least one hour after degassing operations have ceased (A). 2. The operation of the thermal oxidizer shall continue until the gaseous VOC concentration within the tank/pipeline is reduced to 5,000 ppmv or less, or is 10%	SCAQMD (BACT) SCAQMD (Rule 1149) SJVAPCD (Rule 4623)

	or less of the lower explosion limit (LEL), whichever is less (B). 3. The displaced gas shall remain vented to the control system for a length of time determined by the following relationship (C): $t = 2.3\ V/Q$ Where: t = time (hours) V = headspace volume (ft^3) Q = flowrate (ft^3/hr) 4. The operation of the thermal oxidizer shall continue until the gaseous VOC concentration within the tank/pipeline is reduced to 10,000 ppmv. 5. The operation of the thermal oxidizer shall continue until the gaseous VOC concentration within the tank/pipeline is reduced to 34,000 ppmv, measured as methane, or less than 50% of the LEL.	SBAPCD (Rule 343) BAAQMD (Regulation 8 Rule 5) TCEQ (Title 30, Part 1, Chapter 115, Subchapter F, Division 3)
NOx	Burners fired on mixture of process gas and supplemental fuel: No standard	
	Burners fired on 100% Natural gas or Propane : 1. NOx emission limit of 30 ppm at 3% O_2 for process temperatures ≤ 800 °F. 2. NOx emission limit of 60 ppm @ 3% O_2 for process temperatures of > 800 °F.	SCAQMD (Rule 1147)
SOx	40 ppmv as H_2S at inlet	SCAQMD (Rule 431.1)
PM10	No standard	
PM2.5	No standard	
CO	No standard	

(A) Items 1 - 5 are based on requirements of the degassing rules of the associated air districts/stage agencies. SMAQMD does not have a tank degassing rule or degassing requirements in District Rule 446 Storage of Petroleum Products (11-16-93). In order to ensure a safe working environment, the District will incorporate through the BACT mechanism a limit that reduces the concentration in the containers prior to venting into the atmosphere.

(B) Based on the SCAQMD Rule 1149 Staff Report page 7 (http://www.aqmd.gov/home/governing-board/agendas-minutes, 4/08), the 5,000 ppm vapor concentration translates to a ten percent LEL already met by many degassing operations. SCAQMD Rule 1149 page 4 states that if a tank is taken out of service for maintenance, repair or removal, the California Code of Regulations title 8 Section 5157 prohibits entry into a hazardous atmosphere which includes flammable gas, vapor or mist in excess of 10 percent of its lower LEL. Therefore, according to the Rule 1149 staff report the 5,000 ppm concentration and 10% LEL are equivalent.

(C) SCAQMD Rule 1149 was amended on 4/08 to remove this requirement from the rule and was replaced with the 5,000 ppm vapor concentration requirement. According to the 4/08 staff report, the 5,000 ppm concentration limit is more conservative. The time requirement equations assumes that the storage tanks contains no product or sludge when the degassing begins. The 5,000 ppm vapor

concentration limit will better capture emissions from sludge and product residual remaining in the tanks, since it will take longer to achieve the 5,000 ppm concentration than the time calculated by the time equation. The vapor concentration standard will capture the majority of emissions created by product residual and sludge.

B. TECHNOLOGICALLY FEASIBLE AND COST EFFECTIVE (Rule 202, §205.1.b.):

Technologically Feasible Alternatives:
Any alternative basic equipment, fuel, process, emission control device or technique, singly or in combination, determined to be technologically feasible by the Air Pollution Control Officer.

The table below shows the technologically feasible alternatives identified as capable of reducing emissions beyond the levels determined to be "Achieved in Practice" as per Rule 202, §205.1.a.

VOC	Use of natural gas or LPG as supplemental fuel
NOx	Burners fired on mixture of process gas and supplemental fuel: 1. Use of natural gas or propane as supplemental fuel for process temperatures ≤ 800 °F. 2. Low NOx burner with emission limit of 60 ppm @ 3% O_2 for process temperatures of > 800 °F.
SOx	Use of natural gas or LPG as supplemental fuel
PM10	Use of natural gas or LPG as supplemental fuel
PM2.5	Use of natural gas or LPG as supplemental fuel
CO	Use of natural gas or LPG as supplemental fuel

Cost Effective Determination:
After identifying the technologically feasible control options, a cost analysis is performed to take into consideration economic impacts for all technologically feasible controls identified.

Maximum Cost per Ton of Air Pollutants Controlled

1. A control technology is considered to be cost-effective if the cost of controlling one ton of that air pollutant is less than the limits specified below:

Pollutant	Maximum Cost ($/ton)
ROG	17,500
NO_X	24,500
PM_{10}	11,400
SO_X	18,300
CO	TBD if BACT triggered

Cost Effectiveness Analysis Summary

Low-NOx Burner:
If the applicant is proposing the use of a low NOx burner, which has been deemed as achieved in practice. Therefore, pursuant to the District's BACT policy a cost effectiveness analysis is not required.

C. SELECTION OF BACT:

BACT for all other pollutants will be to require the use of natural gas or LPG as supplemental fuel because it will maintain pollutants at their current levels and no other technologically feasible alternatives were identified.

BACT FOR PORTABLE TANK/PIPELINE DEGASSING SYSTEM		
Pollutant	**Standard**	**Source**
VOC	50 ppmvd @ 3% O_2 as Hexane; the operation of the thermal oxidizer shall continue until the gaseous VOC concentration within the tank/pipeline is reduced to 5,000 ppmv, measured as methane, for at least one hour after degassing operations have ceased.	SCAQMD (BACT)
NOx	Burners fired on mixture of process gas and supplemental fuel: 1. Use of natural gas or propane as supplemental fuel for process temperatures ≤ 800 °F. 2. NOx emission limit of 60 ppm @ 3% O_2 for process temperatures of > 800 °F. (A)	Proposed by applicant as technologically feasible
	Burners fired on 100% Natural gas or Propane: 3. NOx emission limit of 30 ppm at 3% O_2 for process temperatures ≤ 800 °F. 4. NOx emission limit of 60 ppm @ 3% O_2 for process temperatures of > 800 °F.	SCAQMD (Rule 1147) (achieved in practice)
SOx	Use of natural gas or propane as supplemental fuel; 40 ppmv as H_2S at inlet	Proposed by applicant as technologically feasible, SCAQMD (Rule 431.1)
PM10	Use of natural gas or propane as supplemental fuel	Proposed by applicant as technologically feasible
PM2.5	Use of natural gas or propane as supplemental fuel	Proposed by applicant as technologically feasible
CO	Use of natural gas or propane as supplemental fuel	Proposed by applicant as technologically feasible

(A) The facility has source tested these units at the South Coast AQMD while operating on propane and process gas fuel mixture and have met this emission limit.

D. SELECTION OF T-BACT:

The toxics at issue with this technology are VOCs. The control of VOCs through meeting the BACT standard will also control toxics found in the VOCs. Therefore, the BACT VOC controls are also the T-BACT controls. .

REVIEWED BY: _____ **DATE:** _____

APPROVED BY: _____ **DATE:** _____

Attachment A

Review of BACT Determinations published by Other Agencies

San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 7.1.9*

Last Update 3/19/1999

Petroleum Production - Mobile Degassing Operation for Storage Tank with low H2S content, using a Thermal Oxidizer as a control device

Pollutant	Achieved in Practice or contained in the SIP	Technologically Feasible	Alternate Basic Equipment
VOC		98% or greater control efficiency with 1. Thermal Oxidizer, 2. Catalytic Oxidizer, or 3. Carbon Adsorption System.	

BACT is the most stringent control technique for the emissions unit and class of source. Control techniques that are not achieved in practice or contained in s a state implementation plan must be cost effective as well as feasible. Economic analysis to demonstrate cost effectiveness is required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

***This is a Summary Page for this Class of Source**

Section I: AQMD BACT Determinations

Application No.: 384630

Equipment Category – Tank Degassing System

1. GENERAL INFORMATION			DATE: 3/1/2003
A. MANUFACTURER:			
B. TYPE:		C. MODEL:	
D. STYLE: Vacuum line and blowers			
E. APPLICABLE AQMD REGULATION XI RULES: 1149			
F. COST: $ (2000)	SOURCE OF COST DATA:		
G. OPERATING SCHEDULE: 24 HRS/DAY	7 DAYS/WK	WKS/YR	

2. EQUIPMENT INFORMATION		APP. NO.: 384630
A. FUNCTION: Portable tank degassing system.		
B. SIZE/DIMENSION/CAPACITY: 2500 scfm max. air pull rate.		
C. BLOWERS:	D. TOTAL FLOW RATE: 2500 scfm	
E. MATERIAL STORED/PROCESSED/HANDLED: air plus tank vapors		
F. THROUGHPUT/PROCESS RATE/USAGE RATE: 2500 scfm max.		

3. COMPANY INFORMATION			APP. NO.: 384630
A. NAME: Envent Corp.			B. SIC CODE: 8711
C. ADDRESS: 2187 Walnut Ave.			
CITY: Signal Hill	STATE: CA	ZIP: 90806	
D. CONTACT PERSON: Thomas L. Kerscher		E. PHONE NO.: 562-997-9465	

4. PERMIT INFORMATION			APP. NO.: 384630
A. AGENCY: SCAQMD		B. APPLICATION TYPE: new construction	
C. AGENCY CONTACT PERSON: Hui Sung Choe		D. PHONE NO.: 909-396-2259	
E. PERMIT TO CONSTRUCT/OPERATE INFORMATION:	P/C NO.: F39976	ISSUANCE DATE: 5/24/2001	
☐ CHECK IF NO P/C	P/O NO.: F39976	ISSUANCE DATE: 5/24/2001	
F. START-UP DATE: June 2001			

Other equipment form date 8/17/2000

5. EMISSION INFORMATION

APP. NO.: 384630

A. PERMIT

A1. PERMIT LIMIT: Restricted to degassing of tanks containing non-chlorinated petroleum hydrocarbon vapors, with exception of trace (<0.1 ppm) chlorinated hydrocarbons. VOC at outlet not to exceed 50 ppmv as hexane (measured hourly). Temperature at outlet of oxidizer to be at least 1400F in thermal mode, 600F in catalytic mode. Benzene at outlet not to exceed (ppmv limits based on distance, in meters, to nearest receptor): 25<50 .03, 50<75 .06, 75<100 0.11, 100<150 0.18, 150<200 0.28, 200<500 0.65, 500 or more 3.4. Minimum degassing time = 2.3 x V/Q, where V=tank volume and Q= volumetric suction rate (Rule 1149).

A2. BACT/LAER DETERMINATION: Permit limits on VOC and oxidizer temperatures

A3. BASIS OF THE BACT DETERMINATION: The VOC concentration limit is consistent with 5000 ppm max. vapor concentration in the tank and 99.9% destruction efficiency, with a factor of 10 margin. The 99.9% destruction efficiency was based on AQMD's knowledge of similer oxidizers used in soil vapor recovery systems.

B. CONTROL TECHNOLOGY

B1. MANUFACTURER/SUPPLIER: Envent

B2. TYPE: Thermal oxidizer and catalytic oxidizer, Model EMTOS 2500

B3. DESCRIPTION: Natural gas or LPG fired with EPCON Model 3-DF-2500-H-T Low Nox Burner

B4. CONTROL EQUIPMENT PERMIT APPLICATION DATA: P/C NO.: F39976 ISSUANCE DATE: 5/24/2001
P/O NO.: F39976 ISSUANCE DATE: 5/24/2001

B5. WASTE AIR FLOW TO CONTROL EQUIPMENT: FLOW RATE: 2500 scfm
ACTUAL CONTAMINANT LOADING: BLOWER HP:

B6. WARRANTY:

B7. PRIMARY POLLUTANTS: VOC

B8. SECONDARY POLLUTANTS: NOx, CO

B9. SPACE REQUIREMENT:

B10. LIMITATIONS: B11. UNUSED

B12. OPERATING HISTORY: The owner reports that the system has been used on 5 or 6 tanks to date, and the 50 ppmv VOC limit has been met in all cases.

B13. UNUSED B14. UNUSED

C. CONTROL EQUIPMENT COSTS

C1. CAPITAL COST: ☐ CHECK IF INSTALLATION COST IS INCLUDED IN CAPITAL COST
EQUIPMENT: $ INSTALLATION: $ (2000) SOURCE OF COST DATA:

C2. ANNUAL OPERATING COST: $ (2000) SOURCE OF COST DATA:

D. DEMONSTRATION OF COMPLIANCE

D1. STAFF PERMFORMING FIELD EVALUATION:
ENGINEER'S NAME: INSPECTOR'S NAME: DATE:

D2. COMPLIANCE DEMONSTRATION:

5. EMISSION INFORMATION

APP. NO.: 384630

D3. VARIANCE: NO. OF VARIANCES: 0 DATES:
CAUSES:

D4. VIOLATION: NO. OF VIOLATIONS: None since this P/C date DATES:
CAUSES:

D5. MAINTENANCE REQUIREMENTS: D6. UNUSED

D7. SOURCE TEST/PERFORMANCE DATA RESULTS AND ANALYSIS:
DATE OF SOURCE TEST: CAPTURE EFFICIENCY:
DESTRUCTION EFFICIENCY: OVERALL EFFICEINCY:
SOURCE TEST/PERFORMANCE DATA:
OPERATING CONDITIONS:
TEST METHODS:

6. COMMENTS

APP. NO.: 384630

TBACT was considered to be use of a thermal oxidizer. The original date of this listing was 12/18/01. An administrative change (A/N 405426, AQMD Permit reissued 9/6/2002) was added 3/1/2003, changing name of oxidizer manufacturer from EPCON to ENVENT..

http://cfpub.epa.gov/rblc/index.cfm?action=PermitDetail.ProcessInfo&facility_id=26108&PROCESS_ID=104329
Last updated on 9/14/2015

Technology Transfer Network

Clean Air Technology Center | Air Toxics | Radiation | TTN Web | Technology Transfer Network | Clean Air Technology Center
RACT/BACT/LAER Clearinghouse | RBLC Basic Search | RBLC Search Results | Process Information - Details

Process Information - Details

For information about the pollutants related to this process, click on the specific pollutant in the list below.

RBLC Home | New Search | Search Results | Facility Information | Process List | Process Information

Help

FINAL

RBLC ID: CA-1048
Corporate/Company: ENVENT CORP
Facility Name: ENVENT CORP
Process: TANK DEGASSING SYSTEM

Primary Fuel: NATURAL GAS
Throughput:
Process Code: 99.999

Pollutant Information - List of Pollutants

Help

Pollutant	Primary Emission Limit	Basis	Verified
Hexane	50.0000 PPMVD	BACT-PSD	UNKNOWN

Process Notes:

Pollutant Information

Click on the Process Information button to see more information about the process associated with this pollutant.
Or click on the Process List button to return to the list of processes.

RBLC Home | New Search | Search Results | Facility Information | Process List | Process Information | Pollutant Information

Help

FINAL

RBLC ID: CA-1048
Corporate/Company: ENVENT CORP
Facility Name: ENVENT CORP
Process: TANK DEGASSING SYSTEM

Pollutant: Hexane **CAS Number:** 110-54-3

Pollutant Group(s): Hazardous Air Pollutants (HAP), Organic Compounds (all), Volatile Organic Compounds (VOC),

Substance Registry System: Hexane

Pollution Prevention/Add-on Control Equipment/Both/No Controls Feasible: A

P2/Add-on Description: THERMAL OXIDIZER AND CATALYTIC OXIDIZER

Test Method:	Unspecified	EPA/OAR Methods | All Other Methods
Percent Efficiency:	0	
Compliance Verified:	Unknown	
EMISSION LIMITS:		
Case-by-Case Basis:	BACT-PSD	
Other Applicable Requirements:	N/A	
Other Factors Influence Decision:	Unknown	
Emission Limit 1:	50.0000 PPMVD	
Emission Limit 2:	0	
Standard Emission Limit:	0	
COST DATA:		
Cost Verified?	No	
Dollar Year Used in Cost Estimates:	2005	
Cost Effectiveness:	0 $/ton	
Incremental Cost Effectiveness:	0 $/ton	
Pollutant Notes:		

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COMPREHENSIVE REPORT
Report Date:09/14/2015

Facility Information

RBLC ID:	CA-1048 (final)	**Date Determination Last Updated:**	11/04/2005
Corporate/Company Name:	ENVENT CORP	**Permit Number:**	384630
Facility Name:	ENVENT CORP	**Permit Date:**	05/24/2001 (actual)
Facility Contact:		**FRS Number:**	NOT FOUND
Facility Description:		**SIC Code:**	
Permit Type:	A: New/Greenfield Facility	**NAICS Code:**	812990
Permit URL:			
EPA Region:	9	**COUNTRY:**	USA
Facility County:	LOS ANGELES		
Facility State:	CA		
Facility ZIP Code:	90806		
Permit Issued By:	SOUTH COAST AQMD, CA (Agency Name) MR. AL BAEZ(Agency Contact) (909)396-2516 abaez@aqmd.gov		
Other Agency Contact Info:	SOUTH COAST AQMD, MARTIN KAY, 909-396-3115, MKAY@AQMD.GOV		
Permit Notes:	CARB ID: 651.0, OPERATING PERMIT DATE: 05-24-2001, STARTUP DATE: 06-01-2001 NEW CONSTR MODIFICATION: NEW CONSTRUCTION TECH STATUS: BACT DETERMINATION NO SOURCE TEST AVAILABLE		

Process/Pollutant Information

PROCESS NAME: TANK DEGASSING SYSTEM

Process Type: 99.999 (Other Miscellaneous Sources)

Primary Fuel: NATURAL GAS

Throughput:

Process Notes:

POLLUTANT NAME: Hexane

CAS Number: 110-54-3

Test Method: Unspecified

Pollutant Group(s): (Hazardous Air Pollutants (HAP) , Organic Compounds (all) , Volatile Organic Compounds (VOC))

Emission Limit 1: 50.0000 PPMVD

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: N/A

Control Method: (A) THERMAL OXIDIZER AND CATALYTIC OXIDIZER

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes:

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California Environmental Protection Agency
Air Resources Board

BACT Determination Detail

Category

Source Category:	Tank Degassing System
SIC Code	
NAICS Code	81299

Emission Unit Information

Manufacturer:	Epcon
Type:	
Model:	EMTOS 2500
Equipment Description:	2500 scfm max. air pull rate
Capacity / Dimentions	

Fuel Type	Natural Gas
Multiple Fuel Types	Or LPG fired
Operating Schedule (hours/day)/(days/week)/ (weeks/year)e	Variable (24/7/)
Function of Equipment	Portable tank degassing system
VOC Limit	50
VOC Limit Units	ppmv as hexane
VOC Average Time	
VOC Control Method	
VOC Control Method Desc	Thermal Oxidizer and catalytic oxidizer
VOC Percent Control Efficiency	
VOC Cost Effectiveness (%/ton)	
VOC Incremental Cost Effectiveness (%/ton)	
VOC Cost Verified (Y/N)	

VOC Dollar Year

Project / Permit Information

Application/Permit No.:	384630
Application Completeness Date:	
New Construction/Modification:	New Construction
ATC Date:	05-24-2001
PTO Date:	05-24-2001
Startup Date:	06-01-2001
Technology Status:	BACT Determination
Source Test Available:	No
Source Test Results:	

Facility / District Information

Facility Name:	Envent Corp

Facility Zip Code:	90806
Facility County:	Los Angeles
District Name:	South Coast AQMD
District Contact:	Martin Kay
Contact Phone No.:	909-396-3115
Contact E-Mail:	mkay@aqmd.gov

Notes

Notes:

Report Error In Determination

Attachment B

SCAQMD Source Test Results

Revised Table 4-1
VC-301 Summary of Detailed Results
Temperature Set Point 1500 °F
PSC Industrial Outsourcing

Test Number		Run 1 Outlet		Run 2 Outlet		Run 3 Outlet	Run 1 Inlet	Run 2 Inlet	Run 3 Inlet		Exhaust
Date		1/10/14		1/10/14		1/10/14	1/10/14	1/10/14	1/10/14		Average
Run Time		1130-1230		1439-1539		1629-1729	1130-1230	1439-1539	1629-1729		
O_2, % volume dry		14.0		13.9		13.8	20.9	20.9	20.9		**13.9**
O_2, % volume wet		13.1		13.0		13.0	20.6	20.7	20.7		**13.0**
CO_2, % volume dry		4.4		4.5		4.5	0.05	0.05	0.05		**4.5**
CO_2, % volume wet		4.1		4.2		4.2	0.0	0.0	0.0		**4.2**
NO_X, ppm volume dry		6.3		4.6		5.0					**5.3**
NO_X, ppm volume wet		5.9		4.3		4.7					**5.0**
NO_X, ppmvd @ 3% O_2		16.2		11.8		12.6					**13.6**
NO_X, lb/hr as NO_2		0.24		0.17		0.20					**0.2**
NO_X, lb/day as NO_2		5.76		4.15		4.79					**4.9**
NO_X, lb/MMBtu as NO_2		0.02		0.01		0.02					**0.0**
CO, ppm volume dry		23.91		13.2		18.0					**18.4**
CO, ppm volume wet		22.3		12.4		16.9					**17.2**
CO, ppmvd @ 3% O_2		61.8		33.8		45.6					**47.0**
CO, lb/hr		0.56		0.30		0.44					**0.4**
CO, lb/day		13.34		7.21		10.52					**10.4**
CO, lb/MMBtu		0.05		0.02		0.03					**0.0**
VOC, ppm volume dry as C	<	6.42	<	6.41	<	6.40	67,958	65,764	67,275	<	**6.4**
VOC, ppm volume wet as C	<	6.00	<	6.00	<	6.00	67,023	65,061	66,477	<	**6.0**
VOC, ppm volume wet as Propane	<	2.0	<	2.0	<	2.0	22,341	21,687	22,159	<	**2.0**
VOC, lb/hr as C	<	0.0642	<	0.0627	<	0.0671	288	283	281	<	**0.06**
VOC, lb/day as C	<	1.540	<	1.506	<	1.610	6,913	6,794	6,743	<	**1.55**
% DE VOC, lb/hr as C		99.98		99.98		99.98					**99.98**
% DE VOC, lb/day as C		99.98		99.98		99.98					**99.98**
Vol flow rate (Qsd) dscfm - pitot		5,331		5,223		5,589	2,261	2,296	2,233		**5,381**
Firing Rate MMBtu/Hr - pitot		**12.175**		**12.042**		**13.008**					**12.4**

Revised Table 4-1
VC-303 Summary of Detailed Results
Temperature Set Point 1500 °F
PSC Industrial Outsourcing

Test Number		Run 1 Outlet		Run 2 Outlet		Run 3 Outlet	Run 1 Inlet	Run 2 Inlet	Run 3 Inlet		Exhaust
Date		1/13/14		1/13/14		1/13/14	1/13/14	1/13/14	1/13/14		Average
Run Time		1311-1411		1532-1632		1719-1819	1311-1411	1532-1632	1719-1819		
O_2, % volume dry		14.3		14.2		14.2	20.9	20.9	20.9		**14.2**
O_2, % volume wet		13.4		13.4		13.4	20.5	20.7	20.7		**13.4**
CO_2, % volume dry		4.2		4.3		4.3	0.05	0.05	0.05		**4.3**
CO_2, % volume wet		4.0		4.0		4.0	0.0	0.0	0.0		**4.0**
NO_X, ppm volume dry		16.0		17.2		14.3					**15.8**
NO_X, ppm volume wet		15.0		16.2		13.5					**14.9**
NO_X, ppmvd @ 3% O_2		43.1		46.1		38.4					**42.5**
NO_X, lb/hr as NO_2		0.38		0.42		0.36					**0.4**
NO_X, lb/day as NO_2		9.10		10.13		8.54					**9.3**
NO_X, lb/MMBtu as NO_2		0.05		0.06		0.05					**0.052**
CO, ppm volume dry		28.26		19.6		29.4					**25.8**
CO, ppm volume wet		26.6		18.4		27.7					**24.2**
CO, ppmvd @ 3% O_2		76.2		52.5		78.8					**69.2**
CO, lb/hr		0.41		0.29		0.44					**0.4**
CO, lb/day		9.79		7.02		10.68					**9.2**
CO, lb/MMBtu		0.06		0.04		0.06					**0.051**
VOC, ppm volume dry as C	<	6.38	<	6.38	<	6.36	72,682	71,950	72,968	<	**6.4**
VOC, ppm volume wet as C	<	6.00	<	6.00	<	6.00	71,375	71,316	72,231	<	**6.0**
VOC, ppm volume wet as Propane	<	2.0	<	2.0	<	2.0	23,792	23,772	24,077	<	**2.0**
VOC, lb/hr as C	<	0.0395	<	0.0408	<	0.0413	160	153	160	<	**0.041**
VOC, lb/day as C	<	0.949	<	0.980	<	0.991	3,840	3,681	3,836	<	**0.973**
% DE VOC, lb/hr as C		99.98		99.97		99.97	NA	NA	NA		**99.97**
% DE VOC, lb/day as C		99.98		99.97		99.97	NA	NA	NA		**99.97**
Vol flow rate (Qsd) dscfm - pitot		3,313		3,421		3,470	1,177	1,140	1,171		**3,401**
Firing Rate MMBtu/Hr - pitot		**7.249**		**7.539**		**7.637**					**7.48**

Attachment C

Conversion from gr/100 scf to ppmv

Conversion from gr/100 scf to ppmv

Molecular Wt. for H_2S = 34 lb/lb-mole
District Standard Conditions are: Temp = 68 °F (SMAQMD, VCAPCD), Pressure = 14.7 psia
= 60 °F (SBACPD)
Molar Specific Volume of a gas at 68 °F = T * R/P
= [(459.6 + 68 °F) * (10.7316 ft^3 * psi/°R * lb- mol)]/14.7 psi
=385.2 scf/lb-mole

ppmv as H_2S = 50 gr H_2S/100 scf x (10^6 scf fuel/MM scf fuel) x (lb H_2S/7000 gr H_2S) x (385.2 scf H_2S/lb-moleH_2S)/(34 lb H_2S/lb-mole H_2S)
= 809 ppmv as H_2S