San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

AUG 24 2016

Mr. Gerardo Rios
Chief, Permits Office, Air Division
United States Environmental Protection Agency Region IX
75 Hawthorne Street
San Francisco, CA 94105

Re: Proposed Authority to Construct/Certificate of Conformity (Significant Mod)
District Facility # N-96
Project # N1153192

Dear Mr. Rios:

The District has received your July 13, 2016 letter regarding District Project N1153192 for the proposed installation of eight wine fermentation tanks at Bear Creek Winery (Facility N-96). In your letter, you state that, because this project received significant public comments, EPA is exercising its right to perform its 45-day review of the proposed Title V action at the conclusion of the 30-day public comment period according to the sequential review process outlined in District Rule 2520. Pursuant to your letter, the 45-day EPA review period will start on the date of receipt of the final drafts of the proposed permit, including any revisions made in response to public comments received and copies of the District's responses.

Pursuant to your request, enclosed for your review is the District's final draft analysis and draft Authority to Construct permits, including public comments and the District's response to public comments for District Project N1153192. If you have any questions, please contact Mr. Nick Peirce, Permit Services Manager, at (209) 557-6400

Sincerely,

Arnaud Marjollet
Director of Permit Services
Enclosures

cc: Craig Rous
Bear Creek Winery
11900 N Furry Rd
Lodi, CA 95240

Laura Yannayon (EPA Region 9) via email (yannayon.laura@epa.gov)

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San Joaquin Valley Air Pollution Control District
Authority to Construct
Application Review With Public Comments and District Response

Facility Name:	Bear Creek Winery	Date:	August 23, 2016
Mailing Address:	11900 N Furry Road Lodi, CA 95240	Engineer:	James Harader
		Lead Engineer:	Nick Peirce
Contact Person:	Craig Rous		
Telephone:	(209) 368-3113		
Fax:	(209) 368-3083		
Application #(s):	N-96-389-0 through '-396-0		
Project #:	N-1153192		
Deemed Complete:	November 6, 2015		

I. PROPOSAL

Bear Creek Winery is requesting Authority to Construct permits for the installation of four 160,000 gallon and four 51,000 gallon stainless steel, insulated, wine tanks (Total Volume of New Tanks: 844,000 gallons). These tanks will be used to ferment and store white and red wines.

Bear Creek Winery currently has a specific limiting condition (SLC) of 242,165 pounds of volatile organic compound (VOC) emissions per year for the fermentation and storage operations located at this facility. These added tanks will be included with the units that are subject to the 242,165 lb-VOC limit. In other words, Bear Creek Winery is not proposing to increase the SLC limit for VOC emissions.

Bear Creek Winery operates under a Title V permit. This modification can be classified as a Title V significant modification pursuant to Rule 2520, and can be processed with a Certificate of Conformity (COC). Since the facility has specifically requested that this project be processed in that manner, the 45-day EPA comment period and 30-day public notice will be satisfied prior to the issuance of the Authority to Construct. Bear Creek Winery must apply to administratively amend their Title V permit prior to operation of the new tanks.

II. APPLICABLE RULES

Rule 2201	New and Modified Stationary Source Review Rule (4/21/11)[1]
Rule 2410	Prevention of Significant Deterioration (6/16/11)
Rule 2520	Federally Mandated Operating Permits (6/21/01)

[1] This project was deemed complete prior to the 2/18/2016 amendment to Rule 2201. Therefore, the project is subject to the previous 4/21/11 version of Rule 2201.

Rule 4001 New Source Performance Standards (4/14/99)
Rule 4002 National Emissions Standards for Hazardous Air Pollutants (5/20/04)
Rule 4101 Visible Emissions (02/17/05)
Rule 4102 Nuisance (12/17/92)
Rule 4694 Wine Fermentation and Storage Tanks (12/15/05)
California Health & Safety Code 41700 (Public Nuisance)
California Health & Safety Code 42301.6 (School Notice)
Public Resources Code 21000-21177: California Environmental Quality Act (CEQA)
California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387: CEQA Guidelines

III. PROJECT LOCATION

The facility is located at 11900 N Furry Road in Lodi, California. The District has determined that this location is not within 1,000 feet of any K-12 school. Therefore, noticing for California Health & Safety Code 42301.6 is not required.

IV. PROCESS DESCRIPTION

Bear Creek Winery operates a wine fermentation and storage facility. During the 'crush season', which typically lasts from August through November, both red and white grapes are received by truck and delivered to a crusher-stemmer that crushes the grapes and removes the stems. For red wines, the resultant juice, called "must", is pumped to red wine fermentation tanks for fermentation, a batch process. The red wine fermentation tanks are specifically designed to ferment the must and to allow the separation of the skins and seeds from the wine after fermentation. For white wines, the must is sent to screens and presses for separation of grape skins and seeds prior to entering the fermentation tank. Since the skins and seed have been separated, white wine fermentation is carried out in a tank that doesn't include design provisions for solids separation.

After transfer of the must (red or white) to the fermentation tank, the must is inoculated with yeast. This initiates the fermentation reactions. The yeast metabolizes the sugars in the must, converting the sugars to ethanol and carbon dioxide (CO_2). This process is an exothermic process, thus temperature must be controlled throughout the process. Refrigeration is used to maintain a temperature of 45-65°F for white wine fermentation and 70-95°F for red wine fermentation. The sugar content of the fermenting wine is measured in °Brix (weight %) and is typically 22-26° for unfermented wine, dropping to 4° or less by the end of fermentation process. For the wines produced in the proposed tanks, the final ethanol concentration will be no greater than 20.0%. Batch fermentation requires 5 days per batch of red wine and 1-2 weeks per batch of white wine. VOCs are emitted during the fermentation process, along with CO_2. The VOCs are comprised primarily of ethanol along with some trace fermentation byproducts.

For white wine, the wine is directly transferred into storage tanks after completion of the fermentation process. For red wine, the grape skins are separated from the wine and sent to a press. The press crushes residual wine from grape skins. Both red and white wines are stored in refrigerated tanks year-round for bottling. Further VOC emissions occur as a result of the storage tank operation.

The proposed tanks will be used for both the fermentation and the storage of wine.

V. EQUIPMENT LISTING

The applicant is proposing to install 8 new wine storage and fermentation tanks. All of the proposed tanks are equipped with pressure/vacuum valves and tank insulation. Please refer to the Draft Authority to Construct permits in Appendix I for the tank equipment descriptions.

VI. EMISSION CONTROL TECHNOLOGY EVALUATION

VOCs, primarily ethanol, are emitted from wine fermentation and storage tanks as a result of both working losses (which occur when the liquid level in the tank changes) and breathing losses (expansion and contraction effects due to temperature variations). The proposed pressure/vacuum relief valve limits emissions of VOC's. Additionally, when wine storage tanks are insulated or located in a climate controlled building, breathing losses are considered to be negligible.

The tanks are equipped with temperature controls to maintain tank temperatures below levels that might be damaging to the yeast cells and reduces the potential for an out-of-control fermentation reaction in the tank. Since potential VOC emissions from the tanks increase with fermentation temperature, the use of temperature controls minimizes emissions.

VII. GENERAL CALCULATIONS

A. Assumptions

- VOC is the only pollutant emitted by the tanks.
- The maximum ethanol content of stored wine is limited to 20%.
- The daily throughput of each of the storage tanks is limited to 5 turns per day. A 100% fill factor is assumed for wine storage. (per District practice)
- The annual throughput of each of the storage tanks is limited to 25 turns per year. A 100% fill factor is assumed for wine storage. (District Project N-1133555).
- The maximum fermentation throughput for the 160,000 gallon tanks is 906,000 gallons/year. (per applicant)
- The maximum fermentation throughput for the 51,000 gallon tanks is 306,000 gallons/year. (per applicant)
- Other assumptions will be stated as they are made.

B. Emission Factors (EF)

1. Pre-Project Emission Factors (EF1)

The proposed winery tanks are new tanks; therefore, pre-project emission factors are not required.

2. Post-Project Emission Factors (EF2)

The following emission factors are applicable for these red and white wine tanks. These are based on the emission factors listed in District FYI-114, "VOC Emission Factors for Wine Fermentation and Storage Tanks (Revised 8/10/11, included in Appendix II)" and based on a maximum ethanol content of 20% by weight (proposed by applicant).

Type	Operation	EF2 (lb-VOC/1,000 gal of wine)		Source
		Daily	Annual	
White	Fermentation	1.62	2.5	District FYI -114 (See Appendix II)
	Storage	0.303	0.175	
Red	Fermentation	3.46	6.2	
	Storage	0.303	0.175	

C. Calculations

1. Pre-Project Potential to Emit (PE1)

The applicant is proposing to install new tanks. Therefore, PE1 is equal to zero for each tank.

2. Post-Project Potential to Emit (PE2)

Maximum Daily VOC emissions from fermentation of white or red wine are calculated using the following formula:

$$\text{Daily VOC}_{\text{Fermentation}} = \text{Tank Capacity (gal)} \times \text{EF}_{\text{Ferment, Daily}} \text{ (lb-VOC/1000 gal nominal tank volume)}$$

Annual VOC emissions from fermentation are calculated as follows:

$$\text{Annual VOC}_{\text{Fermentation}} = \text{Fermentation Throughput (gallons/year)} \times \text{EF}_{\text{Ferment,annual}} \text{ (lb-VOC/1000 gal)}$$

Maximum daily emissions from the storage of white or red wine is equal to the following:

$$\text{Daily } VOC_{Storage} = \text{Tank Capacity (gal)} \times 5 \text{ turnovers/day} \times EF_{Storage,\ Daily} \text{ (lb-VOC/1000 gal)}$$

Annual VOC emissions from the storage of white or red wine is equal to the following:

$$\text{Annual } VOC_{Storage} = \text{Tank Capacity (gal)} \times 25 \text{ turnovers/year} \times EF_{Storage,\ Annual} \text{ (lb-VOC/1000 gal)}$$

Permit Unit	Capacity (gallons)	Fermentation Emissions (lb/day)	Fermentation Emissions (lb/year)	Storage Emissions (lb/day)	Storage Emissions (lb/year)
N-96-389-0	160,000	553.6	5,952	242.4	700
N-96-390-0	160,000	553.6	5,952	242.4	700
N-96-391-0	160,000	553.6	5,952	242.4	700
N-96-392-0	160,000	553.6	5,952	242.4	700
N-96-393-0	51,000	176.5	1,897	77.3	223
N-96-394-0	51,000	176.5	1,897	77.3	223
N-96-395-0	51,000	176.5	1,897	77.3	223
N-96-396-0	51,000	176.5	1,897	77.3	223
Total	**844,000**	**2,920.4**	**31,396**	**1,278.8**	**3,692**

3. Pre-Project Stationary Source Potential to Emit (SSPE1)

Pursuant to Section 4.9 of District Rule 2201, SSPE1 is the Potential to Emit from all units with valid Authorities to Construct (ATC) or Permits to Operate (PTO) at the Stationary Source and the quantity of emission reduction credits (ERCs) which have been banked since September 19, 1991 for Actual Emissions Reductions (AERs) that have occurred at the source, and which have not been used on-site.

This project only involves units that emit VOC's. Therefore, SSPE1 will only be determined for VOC emissions.

Pre-Project Stationary Source Potential to Emit (SSPE1)	
Permit Numbers	**PE1 VOC (lb/yr)**
N-96-4-2 through N-96-388-0	242,165
SSPE1	**242,165**

4. Post-Project Stationary Source Potential to Emit (SSPE2)

Pursuant to Section 4.10 of District Rule 2201, the Post-Project Stationary Source Potential to Emit (SSPE2) is the Potential to Emit (PE) from all units with valid Authorities to Construct (ATC) or Permits to Operate (PTO) at the Stationary Source and the quantity of emission reduction credits (ERC) which have been banked since September 19, 1991 for Actual Emissions Reductions that have occurred at the source, and which have not been used on-site.

The facility is proposing to include the new units into their existing SLC for VOC emissions. SSPE2 is shown in the following table.

Post-Project Stationary Source Potential to Emit (SSPE2)	
Permit Numbers	**PE2 VOC (lb/yr)**
N-96-4-2 through N-96-396-0	242,165
SSPE2	**242,165**

5. Major Source Determination

Rule 2201 Major Source Determination

The following table demonstrates that this facility is an existing Major Source for VOC emissions and will continue to be a Major Source.

Pollutant	SSPE1 (lb/yr)	SSPE2 (lb/yr)	Major Source Threshold	Existing Major Source?	New Major Source?
VOC	242,165	242,165	20,000 lb/year	Yes	No

Rule 2410 Major Source Determination

The facility evaluated under this project is not listed as one of the categories specified in 40 CFR 52.21(b)(1)(i). Therefore, the following PSD Major Source thresholds are applicable.

PSD Major Source Determination (tons/year)						
	NO2	VOC	SO2	CO	PM	PM10
Estimated Facility PE before Project Increase	0.0	121.1	0.0	0.0	0.0	0.0
PSD Major Source Thresholds	250	250	250	250	250	250
PSD Major Source ? (Y/N)	N	N	N	N	N	N

As shown above, the facility is not an existing Major Source for PSD for any pollutant. Therefore, the facility is not an existing Major Source for PSD.

6. Baseline Emissions (BE)

The baseline emission (BE) calculations are performed pollutant by pollutant to determine the amount of offsets required, where necessary, when the SSPE1 is greater than the offset threshold.

BE = Pre-project Potential to Emit for:

- Any unit located at a non-Major Source,
- Any Highly-Utilized Emissions Unit, located at a Major Source,
- Any Fully-Offset Emissions Unit, located at a Major Source, or
- Any Clean Emissions Unit, Located at a Major Source.

otherwise,

BE = Historic Actual Emissions (HAE), calculated pursuant to Section 3.22.

Clean Unit Determination for Existing Tanks under SLC

This facility is a Major Source for VOC emissions. A unit is considered clean if that unit is equipped with an emission control technology that meets the requirements for achieved-in-practice BACT as accepted by the APCO during the five years immediately prior to the submission of the complete application. For a facility with an SLC, all units in the SLC must be clean in order for emission units under the SLC to be considered clean. It was determined in District Project N-1133555 that tanks N-96-4 through N-96-359 are clean. Furthermore, tanks N-96-360 through N-96-388 triggered BACT in the previous project and are also considered to be clean. Thus, all existing tanks currently under the SLC are clean emission units.

$BE_{SLC} = PE1_{SLC}$

7. SB288 Modification

Pursuant to the 2/8/11 version of the District's Draft Major Modification Policy, calculations for determining whether an SB288 modification is triggered are performed as follows for new units:

NEI = ∑(PE2 – Historical Actual Emissions)

For new units, each units potential to emit is equal to the post project potential to emit for the unit, while the historical actual emissions are equal to zero.

∑PE2 = Project Fermentation Emissions + Project Storage Emissions
∑PE2 = 31,396 lb-VOC/year + 3,692 lb-VOC/year
∑PE2 = 35,088 lb-VOC/year

$\sum$HAE = 0 lb-VOC/year

Thus,

NEI = 35,088 lb-VOC/year – 0 lb-VOC/year
NEI = 35,088 lb-VOC/year

Since the NEI is less than the SB288 Modification threshold of 50,000 lb-VOC/year, this project does not trigger an SB288 Modification.

8. Federal Major Modification

As shown in the previous section, this project will result in a net emission increase for VOC emissions that is greater than zero; therefore, this project triggers a Federal Major Modification for VOC emissions. As a result, BACT is triggered for VOC emissions for all emission units in this project and a public notice is required.

Federal Offset Quantities:

The Federal offset quantity is only calculated for the pollutants for which the project is a Federal Major Modification. The Federal offset quantity is the sum of the annual emission changes for all new and modified emission units in a project calculated as the potential to emit after the modification (PE2) minus the actual emissions (AE) during the baseline period for each emission unit times the applicable federal offset ratio. There are no special calculations performed for units covered by an SLC.

VOC **Federal Offset Ratio** **1.5**

Permit No.	Actual Emissions (lb/year)	Potential Emissions (lb/year)	Emissions Change (lb/yr)
N-96-389-0	0	6,652	6,652
N-96-390-0	0	6,652	6,652
N-96-391-0	0	6,652	6,652
N-96-392-0	0	6,652	6,652
N-96-393-0	0	2,120	2,120
N-96-394-0	0	2,120	2,120
N-96-395-0	0	2,120	2,120
N-96-396-0	0	2,120	2,120
		Net Emission Change (lb/year):	35,088
		Federal Offset Quantity: (NEC * 1.5)	52,632

9. Rule 2410 - Prevention of Significant Deterioration (PSD) Applicability Determination

Rule 2410 applies to pollutants for which the District is in attainment or for unclassified, pollutants. The pollutants addressed in the PSD applicability determination are listed as follows:

- NO2 (as a primary pollutant)
- SO2 (as a primary pollutant)
- CO
- PM
- PM10
- Greenhouses gases (GHG): CO2, N2O, CH4, HFCs, PFCs, and SF6

As determined in Section VII.D.4 of this document, this facility is not an existing PSD Major Source. Therefore, the project potential to emit from the new units is compared to the PSD major source thresholds to determine if the project is subject to the requirements of Rule 2410.

The facility has a SLC of 121.1 tons-VOC/year for wine fermentation and storage operations. The facility is not proposing any changes to this limit with the addition of the eight new tanks under this project. Thus, the project does not result in an increase in VOC emissions.

As discussed above, the facility evaluated under this project is not listed as one of the categories specified in 40 CFR 52.21 (b)(1)(i). Therefore, the following PSD Major Source thresholds are applicable.

PSD Major Source Determination: Potential to Emit (tons/year)						
	NO2	VOC	SO2	CO	PM	PM10
Total PE from New Units	0	17.5	0	0	0	0
PSD Major Source Thresholds	250	250	250	250	250	250
New PSD Major Source ? (Y/N)	N	N	N	N	N	N

As shown in the table above, the project potential to emit, by itself, does not exceed any of the PSD major source thresholds. Therefore Rule 2410 is not applicable and no further discussion is required.

10. Quarterly Net Emissions Change (QNEC)

The Quarterly Net Emissions Change is used to complete the emission profile screen for the District's PAS database. QNEC calculations are included in Appendix VIII.

VIII. COMPLIANCE DETERMINATION

Rule 2201 New and Modified Stationary Source Review Rule

A. Best Available Control Technology (BACT)

BACT requirements shall be triggered on a pollutant-by-pollutant basis and on an emissions unit-by-emissions unit basis. Unless exempted pursuant to Section 4.2, BACT shall be required for the following actions:

- Any new emissions unit or relocation from one Stationary Source to another of an existing emissions unit with a Potential to Emit (PE2) exceeding 2.0 pounds in any one day;

- Modifications to an existing emissions unit with a valid Permit to Operate resulting in an Adjusted Increase in Permitted Emissions (AIPE) exceeding 2.0 pounds in any one day;

- Any new or modified emissions unit, in a stationary source project, which results in a Major Modification, as defined in this rule.

These units only emit VOC's. Thus, BACT can only be triggered for VOC emissions. Daily emissions for each new unit is greater than 2.0 lb-VOC/day. Furthermore, this project triggers a Federal Major Modification. Thus, BACT is triggered for VOC emissions for each winery tank.

Wine Storage Tanks

BACT Guideline 5.4.13 is applicable to wine storage tanks. Pursuant to the "Top-Down BACT Analysis" in Appendix III of this document, BACT has been satisfied with the following:

VOC: Insulated tank, pressure/vacuum valve set within 10% of the maximum allowable working pressure of the tank, "gas tight" tank operation and continuous storage temperature not exceeding 75°F, achieved within 60 days of completion of fermentation.

The following conditions will be included on the Authority to Construct permits:

- *When used for wine storage, this tank shall be equipped with and operated with a pressure-vacuum relief valve, which shall operate within 10% of the maximum allowable working pressure of the tank, operate in accordance with the manufacturer's instructions, and be permanently labeled with the operating pressure settings. [District Rules 2201 and 4694]*

- *When this tank is used for wine storage, the pressure-vacuum relief valve and storage tank shall remain in a gas-tight condition, except when the operating pressure of the tank exceeds the valve set pressure. A gas-tight condition shall be determined by measuring the gas leak in accordance with the procedures in EPA Method 21. [District Rules 2201 and 4694]*

- *The temperature of the wine stored in this tank shall be maintained at or below 75 degrees Fahrenheit. The temperature of the stored wine shall be determined and recorded at least once per week. For each batch of wine, the operator shall achieve the storage temperature of 75 degrees Fahrenheit or less within 60 days after completing fermentation, and shall maintain records to show when the required storage temperature of 75 degrees Fahrenheit or less was achieved. [District Rules 2201 and 4694]*

Wine Fermentation Tanks:

BACT Guideline 5.4.14 is applicable to wine storage tanks. Pursuant to the "Top-Down BACT Analysis" in Appendix IV of this document, BACT has been satisfied with the following:

VOC: Open tank vented to the atmosphere with the average fermentation temperature not exceeding 95 °F.

The following conditions will be included on the Authority to Construct permits:

- *The average fermentation temperature of each batch of must fermented in this tank shall not exceed 95 degrees Fahrenheit, calculated as the average of all temperature measurements for the batch taken at least every 12 hours over the course of the fermentation. [District Rule 2201]*

- *For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, the average fermentation temperature and the uncontrolled fermentation emissions and any fermentation emission reductions (calculated per the emission factors given in District Rule 4694). The information shall be recorded by the tank Permit to Operate number and by wine type, stated as either red wine or white wine. [District Rules 2201 and 4694]*

B. Offsets

1. Offset Applicability

Pursuant to Section 4.5.3, offset requirements shall be triggered on a pollutant by pollutant basis and shall be required if the Post-project Stationary Source Potential to Emit (SSPE2) equals to or exceeds the offset threshold levels in Table 4-1 or Rule 2201.

Pollutant	SSPE2 (lb/yr)	Offset Thresholds (lb/yr)	Offsets Triggered?
VOC	242,165	20,000	**Yes**

2. Quantity of Offsets Required

This facility's total VOCs are above the offset threshold of 20,000 pounds per year. Therefore, offset calculations are required for this project.

Section 4.7.1 states that for pollutants with SSPE1 greater than the emission offset threshold levels, emission offsets shall be provided for all increases in Stationary Source emissions, calculated as the differences of post-project Potential to Emit (PE2) and the Baseline Emissions (BE) of all new and modified emissions units, plus all increases in Cargo Carrier emissions. Thus,

$EOQ = \Sigma(PE2 - BE) + ICCE$, where

PE2 = Post-Project Potential to Emit (lb/yr)
BE = Baseline Emissions (lb/yr)
ICCE = Increase in Cargo Carrier emissions (lb/yr)

There is no increase in Cargo Carrier emissions from this project. Additionally, this facility is subject to an SLC for VOC emissions. Thus,

$$EOQ = \Sigma(PE2_{SLC} - BE_{SLC})$$

The existing tanks, when operated in wine storage or fermentation mode, are Clean Emission Units since they meet the achieved-in-practice BACT requirements for wine storage and fermentation process. Thus, BE is set equal to PE1 for each tank.

$$EOQ = \Sigma(PE2_{SLC} - PE1_{SLC})$$

Both pre-project and post-project VOC emissions from the facility's fermentation and storage operations are limited to 242,165 pounds per year. Therefore,

$EOQ = PE2_{SLC} - PE1_{SLC}$
= 242,165 lb-VOC/yr – 242,165 lb-VOC/yr
= 0 lb-VOC/yr

Therefore, the quantity of offsets required for this project is equal to zero.

C. Public Notification

1. Applicability

Public noticing is required for:

a. Any new Major Source, which is a new facility that is also a Major Source,
b. Major Modifications,
c. Any new emissions unit with a Potential to Emit greater than 100 pounds during any one day for any one pollutant,
d. Any project which results in the offset thresholds being surpassed, and/or
e. Any project with an SSIPE of greater than 20,000 lb/year for any pollutant.

a. New Major Source

New Major Sources are new facilities, which are also Major Sources. As shown in Section VII.C.5 above, this facility is already a Major Source of VOC emissions. Therefore, this is not a New Major Source.

b. Major Modification

As demonstrated earlier, this project triggers a Federal Major Modification. Therefore, a public notice is required for these purposes.

c. New Units with PE > 100 lb/day

Each of the winery tanks has a PE greater than 100 lb/day for VOC emissions. Therefore, a public notice is triggered.

d. Offset Threshold

The following table compares the SSPE1 with the SSPE2 in order to determine if any offset thresholds have been surpassed with this project.

Offset Threshold				
Pollutant	**SSPE1 (lb/year)**	**SSPE2 (lb/year)**	**Offset Threshold**	**Offset Threshold Surpassed?**
VOC	242,165	242,165	20,000 lb/year	No

As detailed in the previous table, there were no thresholds surpassed with this project; therefore public noticing is not required for offset purposes.

e. SSIPE > 20,000 lb/year

Public notification is required for any permitting action that results in a Stationary Source Increase in Permitted Emissions (SSIPE) of more than 20,000 lb/year of any affected pollutant. According to District policy, the SSIPE is calculated as the Post Project Stationary Source Potential to Emit (SSPE2) minus the Pre-Project Stationary Source Potential to Emit (SSPE1), i.e. SSIPE = SSPE2 – SSPE1. The values for SSPE2 and SSPE1 are calculated according to Rule 2201, Sections 4.9 and 4.10, respectively. The SSIPE is compared to the SSIPE Public Notice thresholds in the following table:

Stationary Source Increase in Permitted Emissions [SSIPE] – Public Notice					
Pollutant	**SSPE2 (lb/year)**	**SSPE1 (lb/year)**	**SSIPE (lb/year)**	**SSIPE Public Notice Threshold**	**Public Notice Required?**
VOC	246,125	246,125	0	20,000 lb/year	No

As demonstrated in the table above, a public notice is not required for SSIPE greater than 20,000 lb/year.

2. Public Notice Action

As demonstrated above, a public notice is required. Therefore, a public notice will be completed prior to issuing these Authority to Construct permits.

D. Daily Emission Limits (DELs)

Daily Emissions Limitations (DELs) and other enforceable conditions are required by Section 3.15 to restrict a unit's maximum daily emissions, to a level at or below the emissions associated with the maximum design capacity. Per Sections 3.15.1 and 3.15.2, the DEL must be contained in the latest ATC and contained in or enforced by the latest PTO and enforceable, in a practicable manner, on a daily basis. DELs are also required to enforce the applicability of BACT.

Proposed Rule 2201 (DEL) Conditions:

The following conditions will be placed on each Authority to Construct permit:

- *The ethanol content of wine stored in this tank shall not exceed 20.0 percent by volume. [District Rule 2201]*
- *The fermentation throughput for this tank shall not exceed 960,000 gallons in any one year. [District Rule 2201] (For tanks with a 160,000 gallon volume)*

- *The fermentation throughput for this tank shall not exceed 306,000 gallons in any one year. [District Rule 2201] (For tanks with a 51,000 gallon volume)*

- *When this tank is used for wine storage, the daily tank throughput, in gallons, shall not exceed five times the maximum nominal tank capacity stated in the equipment description and the annual tank throughput, in gallons, shall not exceed 25 times the maximum nominal tank capacity stated in the equipment description. [District Rule 2201]*

- *The daily VOC emission rate for fermentation operations in this tank shall not exceed 3.46 lb/day per 1000 gallons. [District Rule 2201]*

- *Annual emissions from all wine fermentation and storage tanks, calculated on a 12-month rolling basis, shall not exceed 242,165 lb-VOC. [District Rule 2201]*

E. Compliance Assurance

1. Source Testing

Since, winery tank emissions are based on generally accepted emission factors, source testing is not required to demonstrate compliance.

2. Monitoring

Monitoring is not required to demonstrate compliance with Rule 2201 requirements.

3. Recordkeeping

For each storage tank, the facility will be required to keep daily throughput records, including records of filling and emptying operations, the dates of such operations, a unique identifier for each batch, the volume percent ethanol in the batch, and the volume of wine transferred, is required to be maintained along with records of the total gallons of wine contained in a tank and the maximum temperature of the stored wine.

For each batch of must fermented, the operation is required to keep records of the fermentation completion date, the total gallons of must fermented, the average fermentation temperature and the uncontrolled fermentation emissions and fermentation emission reductions (calculated per the emission factors given in District Rule 4694). The information is required to be recorded by the tank Permit to Operate number and by wine type, stated as either red wine or white wine.

In addition, separate annual records each of total red wine and total white wine produced by fermentation at this facility, based on values reported to the Alcohol and Tobacco Tax and Trade Bureau (TTB), U.S. Department of the Treasury, is required to be maintained.

These records are required to be retained on-site for a period of at least five years and made available for District inspection upon request.

4. Reporting

No reporting is required to demonstrate compliance with Rule 2201.

F. Compliance Certification

Bear Creek Winery has submitted a compliance certification. See appendix VII.

G. Alternative Siting Analysis

Section 4.15.1 of this rule requires sources for which an analysis of alternative sites, sizes, and production processes is required under Section 173 of the Federal Clean Air Act, the applicant shall prepare an analysis functionally equivalent to the requirements of Division 13, Section 21000 et. seq. of the Public Resources Code.

This proposed project will be installed at an existing winery with more than 350 existing wine processing tanks, located in a rural area of San Joaquin County. The area is a long-established grape-growing and processing region and a number of wineries are present in the immediate area. The existing facility is vertically integrated to receive bulk truck shipments of grapes, crush and press the grapes, ferment the juice to wine, and perform post fermentation processing to produce finished wine. To support these various operations the facility features a large amount of support equipment, services and structures such as raw material receiving stations, crushers, pumps and piping, filtering and refrigeration units, electric and natural gas utilities, warehouses, laboratories, shipping facilities and administration buildings.

The applicant proposes to install eight new winery tanks. The existing plant infrastructure and processing equipment including the crushing and pressing equipment are adequately sized to support operation of the proposed post project tank population. Installation of the project at an alternate site would not be practical or feasible based on:

- Since wine tanks operate synergistically in post-fermentation processing and blending, the potential production capacity of the new tanks could not be fully met by installing the new tanks at an alternate location.

- Use of an alternate project site would require installation of a complete new plant infrastructure and supporting processes and equipment to support the independent operation, thus duplicating the infrastructure already present at the existing plant. Construction of the project at an alternate site would be expected to produce a significantly greater environmental impact due to both 1) a much larger initial construction project and 2) incrementally larger on-going emissions and other impacts due to operation of redundant infrastructure and support systems as well as emissions associated with product transportation required to achieve some degree of integration with the existing facility.

H. Ambient Air Quality Analysis

An Ambient Air Quality Analysis is typically performed for projects that trigger a public notice; however, there is no Ambient Air Quality Standard for VOC emissions. This project only involves units that emit VOC; therefore, an Ambient Air Quality Analysis is not required for this project.

District Rule 2410 Prevention of Significant Deterioration

The provisions of this rule shall apply to any source and the owner or operator of any source subject to any requirements under Title 40 Code of Federal Regulations (40 CFR) Part 52.21 as incorporated into this rule.

As demonstrated in Section VII.D.9 of this document, the proposed project is not subject to the requirements of Rule 2410; therefore no further discussion is required.

Rule 2520 Federally Mandated Operating Permits

Bear Creek Winery possesses a Title V permit. The proposed project is considered a Significant Modification to the Title V permit since this project triggers a Federal Major Modification under Rule 2201. Therefore, the following conditions will be listed on each permit:

- *{1830} This Authority to Construct serves as a written certificate of conformity with the procedural requirements of 40 CFR 70.7 and 70.8 and with the compliance requirements of 40 CFR 70.6(c). [District Rule 2201]*

- *{1831} Prior to operating with modifications authorized by this Authority to Construct, the facility shall submit an application to modify the Title V permit with an administrative amendment in accordance with District Rule 2520 Section 5.3.4. [District Rule 2520, 5.3.4]*

In accordance with Rule 2520, the application meets the procedural requirements of section 11.4 by including:

- A description of the change, the emissions resulting from the change, and any new applicable requirements that will apply if the change occurs and
- The source's suggested draft permit (Appendix I of this document) and
- Certification by a responsible official that the proposed modification meets the criteria for use of major permit modification procedures and a request that such procedures be used (Appendix VII of this document)

Section 5.3.4 of this rule requires the permittee shall file an application for administrative permit amendments prior to implementing the requested change except when allowed by the operational flexibility provisions of section 6.4 of this rule.

Bear Creek Winery is expected to notify the District by filing TV Form-008 upon implementing the ATCs. Therefore, compliance with the requirements of this Rule is expected.

Rule 4001 New Source Performance Standards (NSPS)

This rule incorporates NSPS from Part 60, Chapter 1, Title 40, Code of Federal Regulations (CFR); and applies to all new sources of air pollution and modifications of existing sources of air pollution listed in 40 CFR Part 60. However, no subparts of 40 CFR Part 60 apply to wine fermentation and storage tank operations.

Rule 4002 National Emission Standards for Hazardous Air Pollutants (NESHAPs)

This rule incorporates NESHAPs from Part 61, Chapter I, Subchapter C, Title 40, CFR and the NESHAPs from Part 63, Chapter I, Subchapter C, Title 40, CFR; and applies to all sources of hazardous air pollution listed in 40 CFR Part 61 or 40 CFR Part 63. However, no subparts of 40 CFR Part 61 or 40 CFR Part 63 apply to wine fermentation and storage tank operations.

Rule 4102 Nuisance

Section 4.0 prohibits discharge of air contaminants, which could cause injury, detriment, nuisance or annoyance to the public. The following condition will be placed on each permit:

- *No air contaminant shall be released into the atmosphere, which causes a public nuisance. [District Rule 4102]*

California Health & Safety Code 41700 - Health Risk Assessment

District Policy APR 1905 - Risk Management Policy for Permitting New and Modified Sources specifies that for an increase in emissions associated with a proposed new source or modification, the District perform an analysis to determine the possible impact to the nearest resident or worksite.

Ethanol (VOC) and CO_2 are not hazardous air pollutants (HAP) as defined in Section 44321 of the California Health and Safety Code. Therefore, health risk assessment is not required.

Compliance is expected with this Rule.

Rule 4694 Wine Fermentation and Storage Tanks

The purpose of this rule is to reduce emissions of volatile organic compounds (VOC) from the fermentation and bulk storage of wine, or achieve equivalent reductions from alternative emission sources. This rule is applicable to all facilities with fermentation emissions in excess of 10 tons-VOC/year. The storage tank provisions of Section 5.2 of this rule apply only to tanks with capacity in excess of 5,000 gallons and that are not constructed out of concrete or wood.

Section 5.1 requires the winery operator achieve Required Annual Emissions Reductions (RAER) equal to at least 35% of the winery's Baseline Fermentation Emissions (BFE). Per the definition of RAER in Section 3.25 of the Rule, the RAER may be achieved by any combination of Fermentation Emission Reductions (FER), Certified Emission Reductions (CER) or District Obtained Emission Reductions (DOER) as established in the facility's District-approved Rule 4694 Compliance Plan, due every three years on December 1st beginning in 2006. The facility has submitted the required plan to the District and is currently satisfying the required emission reductions in the form of Certified Emission Reductions.

Section 5.2 places specific restrictions on wine storage tanks with 5,000 gallons or more in capacity when such tanks are not constructed of wood or concrete. Section 5.2.1 requires these tanks to be equipped and operated with a pressure-vacuum relief valve meeting all of the following requirements:

- The pressure-vacuum relief valve shall operate within 10% of the maximum allowable working pressure of the tank,
- The pressure-vacuum relief valve shall operate in accordance with the manufacturer's instructions, and
- The pressure-vacuum relief valve shall be permanently labeled with the operating pressure settings.
- The pressure-vacuum relief valve and storage tank shall remain in a gas-tight condition except when the operating pressure of the tank exceeds the valve set pressure. A gas-tight condition shall be determined by measuring the gas leak in accordance with the procedures in EPA Method 21.

All of the proposed tanks are larger than 5,000 gallons and constructed out of stainless steel. Thus, the following conditions will be included on each Authority to Construct permit:

- *When used for wine storage, this tank shall be equipped with and operated with a pressure-vacuum relief valve, which shall operate within 10% of the maximum allowable working pressure of the tank, operate in accordance with the manufacturer's instructions, and be permanently labeled with the operating pressure settings. [District Rules 2201 and 4694]*

- *When this tank is used for wine storage, the pressure-vacuum relief valve and storage tank shall remain in a gas-tight condition, except when the operating pressure of the tank exceeds the valve set pressure. A gas-tight condition shall be determined by measuring the gas leak in accordance with the procedures in EPA Method 21 [District Rules 2201 and 4694]*

Section 5.2.2 requires that the temperature of the stored wine be maintained at or below 75° F.

The following condition will be included on each Authority to Construct permit:

- *The temperature of the wine stored in this tank shall be maintained at or below 75 degrees Fahrenheit. For each batch of wine, the operator shall achieve the storage temperature of 75 degrees Fahrenheit or less within 60 days after completing fermentation, and shall maintain records to show when the required storage temperature of 75 degrees Fahrenheit or less was achieved. [District Rules 2201 and 4694]*

Section 6.1 and 6.2 require the facility to submit a Three-Year Compliance Plan and a Three-Year Compliance Plan Verification respectively. Section 6.3 requires that an Annual Compliance Plan Demonstration be submitted to the District no later than February 1 of each year to show compliance with the applicable requirements of the Rule. Section 6.4 requires that records required by this rule be maintained, retained on-site for a minimum of five years, and made available to the APCO upon request. Section 6.4.3 requires that all monitoring be performed for any Certified Emission Reductions as identified in the facility's Three-Year Compliance Plan and that the records of all monitoring be maintained.

Section 6.4.1 requires that records be kept for each fermentation batch. The following condition will be included on each Authority to Construct permit:

- *For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, the average fermentation temperature and the uncontrolled fermentation emissions and fermentation emission reductions (calculated per the emission factors given in District Rule 4694). The information shall be recorded by the tank Permit to Operate number and by wine type, stated as either red wine or white wine. [District Rules 2201 and 4694]*

Section 6.4.2 requires that weekly records be kept of wine volume and temperature in each storage tank. Therefore, the following conditions will be included on each Authority to Construct permit:

- *When this tank is used for wine storage, daily throughput records, including records of filling and emptying operations, the dates of such operations, a unique identifier for each batch, the volume percent ethanol in the batch, and the volume of wine transferred, shall be maintained. [District Rules 2201 and 4694]*

- *When this tank is used for wine storage, the operator shall record, on a weekly basis, the total gallons of wine contained in the tank and the maximum temperature of the stored wine.[District Rules 2201 and 4694]*

Section 6.4.3 requires that all monitoring be performed for any Certified Emission Reductions as identified in the facility's Three-Year Compliance Plan and that the records of all monitoring be maintained.

Compliance is expected with this Rule.

California Environmental Quality Act (CEQA)

The County of San Joaquin (County) is the public agency having principal responsibility for approving the project. As such, the County served as the Lead Agency (CCR §15367). In approving the project, the Lead Agency prepared and adopted a Negative Declaration. The Lead agency filed a Notice of Determination, stating that the environmental document was adopted pursuant to the provisions of CEQA and concluding that the project would not have a significant effect on the environment.

The District is a Responsible Agency for the project because of its discretionary approval power over the project via its Permits Rule (Rule 2010) and New Source Review Rule (Rule 2201), (CCR §15381). As a Responsible Agency the District complies with CEQA by considering the environmental document prepared by the Lead Agency, and by reaching its own conclusion on whether and how to approve the project (CCR §15096).

The District has considered the Lead Agency's environmental document and finds that it adequately characterizes the project's potential impact on air quality. In addition, all feasible and cost-effective control measures to reduce potential impacts on air quality resulting from project related stationary source emissions have been applied to the project as part of BACT. Furthermore, the District has conducted an engineering evaluation of the project, this document, which demonstrates that Stationary Source emissions from the project would be reduced. Thus, the District finds that through a combination of project design elements, compliance with applicable District rules and regulations, and compliance with District air permit conditions, project specific stationary source emissions would be reduced to lessen the impacts on air quality. The District does not have authority over any of the other project impacts and has, therefore, determined that no additional findings are required (CEQA Guidelines §15096(h)).

Indemnification Agreement/Letter of Credit Determination

According to District Policy APR 2010 (CEQA Implementation Policy), when the District is the Lead or Responsible Agency for CEQA purposes, an indemnification agreement and/or letter of credit may be required. The decision to require an indemnity agreement and/or letter of credit are based on a case-by-case analysis of a particular project's potential for litigation risk, which in turn may be based on a project's potential to generate public concern, its potential for significant impacts, and the project proponent's ability to pay for the costs of litigation without a letter of credit, among other factors.

The proposed project is for an operation of public concern (fermentation tanks) in the Valley and triggers Best Available Control Technology (BACT). Therefore, the District determined that an Indemnification Agreement and Letter of Credit for the ATC project is required.

IX. RECOMMENDATION

Compliance with all applicable regulations is expected. Therefore, issuance of the ATCs is recommended upon addressing comments from the public, EPA, CARB, and the applicant.

X. BILLING INFORMATION

There is no change to the annual permit fees for the existing tanks. The new tanks billing information is summarized below.

Permit Number	Fee Schedule	Fee Description	Previous Fee Schedule
N-96-389-0 through '-392-0	3020-05-E	160,000 gallons	None
N-96-393-0 through '-396-0	3020-05-D	51,000 gallons	None

APPENDICES

Appendix I: Draft Authority to Construct permits
Appendix II: FYI 114
Appendix III: BACT Guideline 5.4.13 and Top-Down BACT Analysis
Appendix IV: BACT Guideline 5.4.14 and Top-Down BACT Analysis
Appendix V: Achieved in Practice Analysis Memo
Appendix VI: Comparison Spreadsheet Ducting/Piping Costs
Appendix VII: Compliance Certification
Appendix VIII: Quarterly Net Emissions Change Calculations
Appendix IX: Public Comments and District Response

Appendix I
Draft Authority to Construct Permits

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

DRAFT

PERMIT NO: N-96-389-0

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: BEAR CREEK WINERY
MAILING ADDRESS: 11900 N FURRY RD
LODI, CA 95240

LOCATION: 11900 N FURRY RD
LODI, CA 95240

EQUIPMENT DESCRIPTION:
160,000 GALLON STAINLESS STEEL WHITE/RED WINE FERMENTATION AND STORAGE TANK (TANK #727) WITH PRESSURE/VACUUM VALVE AND INSULATION

CONDITIONS

1. {1830} This Authority to Construct serves as a written certificate of conformity with the procedural requirements of 40 CFR 70.7 and 70.8 and with the compliance requirements of 40 CFR 70.6(c). [District Rule 2201] Federally Enforceable Through Title V Permit
2. {1831} Prior to operating with modifications authorized by this Authority to Construct, the facility shall submit an application to modify the Title V permit with an administrative amendment in accordance with District Rule 2520 Section 5.3.4. [District Rule 2520, 5.3.4] Federally Enforceable Through Title V Permit
3. The nominal tank dimensions are 25.5 feet in diameter and 40.0 feet in height with a proposed volume of 160,000 gallons. The permittee shall submit to the District the gauge volume of the tank within 30 days of the actual tank capacity measurement. [District Rule 2201] Federally Enforceable Through Title V Permit
4. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
5. The daily VOC emission rate for fermentation operations in this tanks shall not exceed 3.46 lb/day per 1000 gallons. [District Rule 2201] Federally Enforceable Through Title V Permit
6. The average fermentation temperature of each batch of must fermented in this tank shall not exceed 95 degrees Fahrenheit, calculated as the average of all temperature measurements for the batch taken at least every 12 hours over the course of the fermentation. [District Rule 2201] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (209) 557-6400 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

DRAFT

Arnaud Marjollet, Director of Permit Services
N-96-389-0 : May 20 2016 9:02AM -- HARADERJ : Joint Inspection NOT Required

7. When used for wine storage, this tank shall be equipped with and operated with a pressure-vacuum relief valve, which shall operate within 10% of the maximum allowable working pressure of the tank, operate in accordance with the manufacturer's instructions, and be permanently labeled with the operating pressure settings. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

8. When this tank is used for wine storage, the pressure-vacuum relief valve and storage tank shall remain in a gas-tight condition, except when the operating pressure of the tank exceeds the valve set pressure. A gas-tight condition shall be determined by measuring the gas leak in accordance with the procedures in EPA Method 21. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

9. The temperature of the wine stored in this tank shall be maintained at or below 75 degrees Fahrenheit. The temperature of the stored wine shall be determined and recorded at least once per week. For each batch of wine, the operator shall achieve the storage temperature of 75 degrees Fahrenheit or less within 60 days after completing fermentation, and shall maintain records to show when the required storage temperature of 75 degrees Fahrenheit or less was achieved. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

10. The ethanol content of wine stored in this tank shall not exceed 20.0 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

11. When this tank is used for wine storage, the daily tank throughput, in gallons, shall not exceed five times the maximum nominal tank capacity stated in the equipment description and the annual tank throughputs, in gallons, shall not exceed 25 times the maximum nominal tank capacity stated in the equipment description. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The fermentation throughput for this tank shall not exceed 960,000 gallons in any one year. [District Rule 2201] Federally Enforceable Through Title V Permit

13. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, the average fermentation temperature and uncontrolled fermentation emissions and fermentation emission reductions (calculated per the emission factors given in District Rule 4694). The information shall be recorded by the tank Permit to Operate number and by wine type, stated as either white wine or red wine. [District Rule 4694]

14. When this tank is used for wine storage, the operator shall record, on a weekly basis, the total gallons of wine contained in the tank and the maximum temperature of the stored wine. [District Rule 4694] Federally Enforceable Through Title V Permit

15. When this tank is used for wine storage, daily throughput records, including records of filling and emptying operations, the dates of such operations, a unique identifier for each batch, the volume percent ethanol in the batch, and the volume of wine transferred, shall be maintained. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

16. Annual emissions from all wine fermentation and storage tanks, calculated on a twelve month rolling basis, shall not exceed 242,165 lb-VOC. [District Rule 2201] Federally Enforceable Through Title V Permit

17. Total annual VOC emissions from wine fermentation operations shall be determined by the following formula: Total annual VOC emissions = (Total Annual Red Wine Production - gallons) x (6.2 lb-VOC/1,000 gallons) + (Total Annual White Wine Production - gallons) x (2.5 lb-VOC/1,000 gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

18. Records of total annual fermentation and total annual storage emissions, including calculation methods and parameters used, shall be maintained. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

19. Total annual VOC emissions from wine storage operations shall be determined as the sum of the product of the volume of wine transferred in each wine movement and the batch-specific wine storage VOC emission factor calculated using the equation specified within this permit. [District Rule 2201] Federally Enforceable Through Title V Permit

20. The batch-specific wine storage VOC emission factor (EF), in pounds of VOC per 1,000 gallons of wine throughput, shall be calculated using the following equation: EF = 1.705259 * P^1.090407, where P is the volume percent ethanol of the wine being transferred. [District Rule 2201] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

21. The permittee shall maintain the following records: red wine and white wine produced by fermentation at this facility, based on values reported to the Alcohol and Tobacco Tax and Trade Bureau (TTB), U.S. Department of the Treasury; the volume and the ethanol concentration of each wine movement; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

22. If the emissions calculated for any rolling 12-month period exceed the annual emissions limitations of this permit, in a crush season in which the start of the crush season (defined as the day on which the facility's seasonal crushing/fermentation operations commence) occurs less than 365 days after the start of the previous crush season, then no violation of the annual emissions limit for that rolling 12-month period will be deemed to have occurred so long as the calendar year emissions are below the annual emissions limitation. [District Rule 2201] Federally Enforceable Through Title V Permit

23. Records shall be maintained that demonstrate the date of each year's start of crush season. [District Rule 2201] Federally Enforceable Through Title V Permit

24. All records shall be retained on-site for a period of at least five years and made available for District inspection upon request. [District Rules 1070, 2201 and 4694] Federally Enforceable Through Title V Permit

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

DRAFT

PERMIT NO: N-96-390-0

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: BEAR CREEK WINERY
MAILING ADDRESS: 11900 N FURRY RD
LODI, CA 95240

LOCATION: 11900 N FURRY RD
LODI, CA 95240

EQUIPMENT DESCRIPTION:
160,000 GALLON STAINLESS STEEL WHITE/RED WINE FERMENTATION AND STORAGE TANK (TANK #728) WITH PRESSURE/VACUUM VALVE AND INSULATION

CONDITIONS

1. {1830} This Authority to Construct serves as a written certificate of conformity with the procedural requirements of 40 CFR 70.7 and 70.8 and with the compliance requirements of 40 CFR 70.6(c). [District Rule 2201] Federally Enforceable Through Title V Permit
2. {1831} Prior to operating with modifications authorized by this Authority to Construct, the facility shall submit an application to modify the Title V permit with an administrative amendment in accordance with District Rule 2520 Section 5.3.4. [District Rule 2520, 5.3.4] Federally Enforceable Through Title V Permit
3. The nominal tank dimensions are 25.5 feet in diameter and 40.0 feet in height with a proposed volume of 160,000 gallons. The permittee shall submit to the District the gauge volume of the tank within 30 days of the actual tank capacity measurement. [District Rule 2201] Federally Enforceable Through Title V Permit
4. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
5. The daily VOC emission rate for fermentation operations in this tanks shall not exceed 3.46 lb/day per 1000 gallons. [District Rule 2201] Federally Enforceable Through Title V Permit
6. The average fermentation temperature of each batch of must fermented in this tank shall not exceed 95 degrees Fahrenheit, calculated as the average of all temperature measurements for the batch taken at least every 12 hours over the course of the fermentation. [District Rule 2201] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (209) 557-6400 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

DRAFT

Arnaud Marjollet, Director of Permit Services
N-96-390-0 : May 20 2016 9:02AM – HARADERJ : Joint Inspection NOT Required

7. When used for wine storage, this tank shall be equipped with and operated with a pressure-vacuum relief valve, which shall operate within 10% of the maximum allowable working pressure of the tank, operate in accordance with the manufacturer's instructions, and be permanently labeled with the operating pressure settings. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

8. When this tank is used for wine storage, the pressure-vacuum relief valve and storage tank shall remain in a gas-tight condition, except when the operating pressure of the tank exceeds the valve set pressure. A gas-tight condition shall be determined by measuring the gas leak in accordance with the procedures in EPA Method 21. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

9. The temperature of the wine stored in this tank shall be maintained at or below 75 degrees Fahrenheit. The temperature of the stored wine shall be determined and recorded at least once per week. For each batch of wine, the operator shall achieve the storage temperature of 75 degrees Fahrenheit or less within 60 days after completing fermentation, and shall maintain records to show when the required storage temperature of 75 degrees Fahrenheit or less was achieved. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

10. The ethanol content of wine stored in this tank shall not exceed 20.0 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

11. When this tank is used for wine storage, the daily tank throughput, in gallons, shall not exceed five times the maximum nominal tank capacity stated in the equipment description and the annual tank throughputs, in gallons, shall not exceed 25 times the maximum nominal tank capacity stated in the equipment description. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The fermentation throughput for this tank shall not exceed 960,000 gallons in any one year. [District Rule 2201] Federally Enforceable Through Title V Permit

13. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, the average fermentation temperature and uncontrolled fermentation emissions and fermentation emission reductions (calculated per the emission factors given in District Rule 4694). The information shall be recorded by the tank Permit to Operate number and by wine type, stated as either white wine or red wine. [District Rule 4694]

14. When this tank is used for wine storage, the operator shall record, on a weekly basis, the total gallons of wine contained in the tank and the maximum temperature of the stored wine. [District Rule 4694] Federally Enforceable Through Title V Permit

15. When this tank is used for wine storage, daily throughput records, including records of filling and emptying operations, the dates of such operations, a unique identifier for each batch, the volume percent ethanol in the batch, and the volume of wine transferred, shall be maintained. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

16. Annual emissions from all wine fermentation and storage tanks, calculated on a twelve month rolling basis, shall not exceed 242,165 lb-VOC. [District Rule 2201] Federally Enforceable Through Title V Permit

17. Total annual VOC emissions from wine fermentation operations shall be determined by the following formula: Total annual VOC emissions = (Total Annual Red Wine Production - gallons) x (6.2 lb-VOC/1,000 gallons) + (Total Annual White Wine Production - gallons) x (2.5 lb-VOC/1,000 gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

18. Records of total annual fermentation and total annual storage emissions, including calculation methods and parameters used, shall be maintained. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

19. Total annual VOC emissions from wine storage operations shall be determined as the sum of the product of the volume of wine transferred in each wine movement and the batch-specific wine storage VOC emission factor calculated using the equation specified within this permit. [District Rule 2201] Federally Enforceable Through Title V Permit

20. The batch-specific wine storage VOC emission factor (EF), in pounds of VOC per 1,000 gallons of wine throughput, shall be calculated using the following equation: EF = 1.705259 * P^1.090407, where P is the volume percent ethanol of the wine being transferred. [District Rule 2201] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

21. The permittee shall maintain the following records: red wine and white wine produced by fermentation at this facility, based on values reported to the Alcohol and Tobacco Tax and Trade Bureau (TTB), U.S. Department of the Treasury; the volume and the ethanol concentration of each wine movement; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

22. If the emissions calculated for any rolling 12-month period exceed the annual emissions limitations of this permit, in a crush season in which the start of the crush season (defined as the day on which the facility's seasonal crushing/fermentation operations commence) occurs less than 365 days after the start of the previous crush season, then no violation of the annual emissions limit for that rolling 12-month period will be deemed to have occurred so long as the calendar year emissions are below the annual emissions limitation. [District Rule 2201] Federally Enforceable Through Title V Permit

23. Records shall be maintained that demonstrate the date of each year's start of crush season. [District Rule 2201] Federally Enforceable Through Title V Permit

24. All records shall be retained on-site for a period of at least five years and made available for District inspection upon request. [District Rules 1070, 2201 and 4694] Federally Enforceable Through Title V Permit

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO: N-96-391-0

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: BEAR CREEK WINERY
MAILING ADDRESS: 11900 N FURRY RD
LODI, CA 95240

LOCATION: 11900 N FURRY RD
LODI, CA 95240

EQUIPMENT DESCRIPTION:
160,000 GALLON STAINLESS STEEL WHITE/RED WINE FERMENTATION AND STORAGE TANK (TANK #730) WITH PRESSURE/VACUUM VALVE AND INSULATION

CONDITIONS

1. {1830} This Authority to Construct serves as a written certificate of conformity with the procedural requirements of 40 CFR 70.7 and 70.8 and with the compliance requirements of 40 CFR 70.6(c). [District Rule 2201] Federally Enforceable Through Title V Permit
2. {1831} Prior to operating with modifications authorized by this Authority to Construct, the facility shall submit an application to modify the Title V permit with an administrative amendment in accordance with District Rule 2520 Section 5.3.4. [District Rule 2520, 5.3.4] Federally Enforceable Through Title V Permit
3. The nominal tank dimensions are 25.5 feet in diameter and 40.0 feet in height with a proposed volume of 160,000 gallons. The permittee shall submit to the District the gauge volume of the tank within 30 days of the actual tank capacity measurement. [District Rule 2201] Federally Enforceable Through Title V Permit
4. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
5. The daily VOC emission rate for fermentation operations in this tanks shall not exceed 3.46 lb/day per 1000 gallons. [District Rule 2201] Federally Enforceable Through Title V Permit
6. The average fermentation temperature of each batch of must fermented in this tank shall not exceed 95 degrees Fahrenheit, calculated as the average of all temperature measurements for the batch taken at least every 12 hours over the course of the fermentation. [District Rule 2201] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (209) 557-6400 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

Arnaud Marjollet, Director of Permit Services
N-96-391-0 : May 20 2016 9:02AM – HARADERJ : Joint Inspection NOT Required

7. When used for wine storage, this tank shall be equipped with and operated with a pressure-vacuum relief valve, which shall operate within 10% of the maximum allowable working pressure of the tank, operate in accordance with the manufacturer's instructions, and be permanently labeled with the operating pressure settings. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

8. When this tank is used for wine storage, the pressure-vacuum relief valve and storage tank shall remain in a gas-tight condition, except when the operating pressure of the tank exceeds the valve set pressure. A gas-tight condition shall be determined by measuring the gas leak in accordance with the procedures in EPA Method 21. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

9. The temperature of the wine stored in this tank shall be maintained at or below 75 degrees Fahrenheit. The temperature of the stored wine shall be determined and recorded at least once per week. For each batch of wine, the operator shall achieve the storage temperature of 75 degrees Fahrenheit or less within 60 days after completing fermentation, and shall maintain records to show when the required storage temperature of 75 degrees Fahrenheit or less was achieved. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

10. The ethanol content of wine stored in this tank shall not exceed 20.0 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

11. When this tank is used for wine storage, the daily tank throughput, in gallons, shall not exceed five times the maximum nominal tank capacity stated in the equipment description and the annual tank throughputs, in gallons, shall not exceed 25 times the maximum nominal tank capacity stated in the equipment description. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The fermentation throughput for this tank shall not exceed 960,000 gallons in any one year. [District Rule 2201] Federally Enforceable Through Title V Permit

13. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, the average fermentation temperature and uncontrolled fermentation emissions and fermentation emission reductions (calculated per the emission factors given in District Rule 4694). The information shall be recorded by the tank Permit to Operate number and by wine type, stated as either white wine or red wine. [District Rule 4694]

14. When this tank is used for wine storage, the operator shall record, on a weekly basis, the total gallons of wine contained in the tank and the maximum temperature of the stored wine. [District Rule 4694] Federally Enforceable Through Title V Permit

15. When this tank is used for wine storage, daily throughput records, including records of filling and emptying operations, the dates of such operations, a unique identifier for each batch, the volume percent ethanol in the batch, and the volume of wine transferred, shall be maintained. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

16. Annual emissions from all wine fermentation and storage tanks, calculated on a twelve month rolling basis, shall not exceed 242,165 lb-VOC. [District Rule 2201] Federally Enforceable Through Title V Permit

17. Total annual VOC emissions from wine fermentation operations shall be determined by the following formula: Total annual VOC emissions = (Total Annual Red Wine Production - gallons) x (6.2 lb-VOC/1,000 gallons) + (Total Annual White Wine Production - gallons) x (2.5 lb-VOC/1,000 gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

18. Records of total annual fermentation and total annual storage emissions, including calculation methods and parameters used, shall be maintained. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

19. Total annual VOC emissions from wine storage operations shall be determined as the sum of the product of the volume of wine transferred in each wine movement and the batch-specific wine storage VOC emission factor calculated using the equation specified within this permit. [District Rule 2201] Federally Enforceable Through Title V Permit

20. The batch-specific wine storage VOC emission factor (EF), in pounds of VOC per 1,000 gallons of wine throughput, shall be calculated using the following equation: EF = 1.705259 * P^1.090407, where P is the volume percent ethanol of the wine being transferred. [District Rule 2201] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

21. The permittee shall maintain the following records: red wine and white wine produced by fermentation at this facility, based on values reported to the Alcohol and Tobacco Tax and Trade Bureau (TTB), U.S. Department of the Treasury; the volume and the ethanol concentration of each wine movement; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

22. If the emissions calculated for any rolling 12-month period exceed the annual emissions limitations of this permit, in a crush season in which the start of the crush season (defined as the day on which the facility's seasonal crushing/fermentation operations commence) occurs less than 365 days after the start of the previous crush season, then no violation of the annual emissions limit for that rolling 12-month period will be deemed to have occurred so long as the calendar year emissions are below the annual emissions limitation. [District Rule 2201] Federally Enforceable Through Title V Permit

23. Records shall be maintained that demonstrate the date of each year's start of crush season. [District Rule 2201] Federally Enforceable Through Title V Permit

24. All records shall be retained on-site for a period of at least five years and made available for District inspection upon request. [District Rules 1070, 2201 and 4694] Federally Enforceable Through Title V Permit

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO: N-96-392-0

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: BEAR CREEK WINERY
MAILING ADDRESS: 11900 N FURRY RD
LODI, CA 95240

LOCATION: 11900 N FURRY RD
LODI, CA 95240

EQUIPMENT DESCRIPTION:
160,000 GALLON STAINLESS STEEL WHITE/RED WINE FERMENTATION AND STORAGE TANK (TANK #731) WITH PRESSURE/VACUUM VALVE AND INSULATION

CONDITIONS

1. {1830} This Authority to Construct serves as a written certificate of conformity with the procedural requirements of 40 CFR 70.7 and 70.8 and with the compliance requirements of 40 CFR 70.6(c). [District Rule 2201] Federally Enforceable Through Title V Permit
2. {1831} Prior to operating with modifications authorized by this Authority to Construct, the facility shall submit an application to modify the Title V permit with an administrative amendment in accordance with District Rule 2520 Section 5.3.4. [District Rule 2520, 5.3.4] Federally Enforceable Through Title V Permit
3. The nominal tank dimensions are 25.5 feet in diameter and 40.0 feet in height with a proposed volume of 160,000 gallons. The permittee shall submit to the District the gauge volume of the tank within 30 days of the actual tank capacity measurement. [District Rule 2201] Federally Enforceable Through Title V Permit
4. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
5. The daily VOC emission rate for fermentation operations in this tanks shall not exceed 3.46 lb/day per 1000 gallons. [District Rule 2201] Federally Enforceable Through Title V Permit
6. The average fermentation temperature of each batch of must fermented in this tank shall not exceed 95 degrees Fahrenheit, calculated as the average of all temperature measurements for the batch taken at least every 12 hours over the course of the fermentation. [District Rule 2201] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (209) 557-6400 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

Arnaud Marjollet, Director of Permit Services
N-96-392-0 : May 20 2016 9:02AM – HARADERJ : Joint Inspection NOT Required

7. When used for wine storage, this tank shall be equipped with and operated with a pressure-vacuum relief valve, which shall operate within 10% of the maximum allowable working pressure of the tank, operate in accordance with the manufacturer's instructions, and be permanently labeled with the operating pressure settings. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

8. When this tank is used for wine storage, the pressure-vacuum relief valve and storage tank shall remain in a gas-tight condition, except when the operating pressure of the tank exceeds the valve set pressure. A gas-tight condition shall be determined by measuring the gas leak in accordance with the procedures in EPA Method 21. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

9. The temperature of the wine stored in this tank shall be maintained at or below 75 degrees Fahrenheit. The temperature of the stored wine shall be determined and recorded at least once per week. For each batch of wine, the operator shall achieve the storage temperature of 75 degrees Fahrenheit or less within 60 days after completing fermentation, and shall maintain records to show when the required storage temperature of 75 degrees Fahrenheit or less was achieved. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

10. The ethanol content of wine stored in this tank shall not exceed 20.0 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

11. When this tank is used for wine storage, the daily tank throughput, in gallons, shall not exceed five times the maximum nominal tank capacity stated in the equipment description and the annual tank throughputs, in gallons, shall not exceed 25 times the maximum nominal tank capacity stated in the equipment description. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The fermentation throughput for this tank shall not exceed 960,000 gallons in any one year. [District Rule 2201] Federally Enforceable Through Title V Permit

13. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, the average fermentation temperature and uncontrolled fermentation emissions and fermentation emission reductions (calculated per the emission factors given in District Rule 4694). The information shall be recorded by the tank Permit to Operate number and by wine type, stated as either white wine or red wine. [District Rule 4694]

14. When this tank is used for wine storage, the operator shall record, on a weekly basis, the total gallons of wine contained in the tank and the maximum temperature of the stored wine. [District Rule 4694] Federally Enforceable Through Title V Permit

15. When this tank is used for wine storage, daily throughput records, including records of filling and emptying operations, the dates of such operations, a unique identifier for each batch, the volume percent ethanol in the batch, and the volume of wine transferred, shall be maintained. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

16. Annual emissions from all wine fermentation and storage tanks, calculated on a twelve month rolling basis, shall not exceed 242,165 lb-VOC. [District Rule 2201] Federally Enforceable Through Title V Permit

17. Total annual VOC emissions from wine fermentation operations shall be determined by the following formula: Total annual VOC emissions = (Total Annual Red Wine Production - gallons) x (6.2 lb-VOC/1,000 gallons) + (Total Annual White Wine Production - gallons) x (2.5 lb-VOC/1,000 gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

18. Records of total annual fermentation and total annual storage emissions, including calculation methods and parameters used, shall be maintained. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

19. Total annual VOC emissions from wine storage operations shall be determined as the sum of the product of the volume of wine transferred in each wine movement and the batch-specific wine storage VOC emission factor calculated using the equation specified within this permit. [District Rule 2201] Federally Enforceable Through Title V Permit

20. The batch-specific wine storage VOC emission factor (EF), in pounds of VOC per 1,000 gallons of wine throughput, shall be calculated using the following equation: EF = 1.705259 * P^1.090407, where P is the volume percent ethanol of the wine being transferred. [District Rule 2201] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

21. The permittee shall maintain the following records: red wine and white wine produced by fermentation at this facility, based on values reported to the Alcohol and Tobacco Tax and Trade Bureau (TTB), U.S. Department of the Treasury; the volume and the ethanol concentration of each wine movement; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

22. If the emissions calculated for any rolling 12-month period exceed the annual emissions limitations of this permit, in a crush season in which the start of the crush season (defined as the day on which the facility's seasonal crushing/fermentation operations commence) occurs less than 365 days after the start of the previous crush season, then no violation of the annual emissions limit for that rolling 12-month period will be deemed to have occurred so long as the calendar year emissions are below the annual emissions limitation. [District Rule 2201] Federally Enforceable Through Title V Permit

23. Records shall be maintained that demonstrate the date of each year's start of crush season. [District Rule 2201] Federally Enforceable Through Title V Permit

24. All records shall be retained on-site for a period of at least five years and made available for District inspection upon request. [District Rules 1070, 2201 and 4694] Federally Enforceable Through Title V Permit

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

DRAFT

PERMIT NO: N-96-393-0

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: BEAR CREEK WINERY
MAILING ADDRESS: 11900 N FURRY RD
LODI, CA 95240

LOCATION: 11900 N FURRY RD
LODI, CA 95240

EQUIPMENT DESCRIPTION:
51,000 GALLON STAINLESS STEEL WHITE/RED WINE FERMENTATION AND STORAGE TANK (TANK #736) WITH PRESSURE/VACUUM VALVE AND INSULATION

CONDITIONS

1. {1830} This Authority to Construct serves as a written certificate of conformity with the procedural requirements of 40 CFR 70.7 and 70.8 and with the compliance requirements of 40 CFR 70.6(c). [District Rule 2201] Federally Enforceable Through Title V Permit
2. {1831} Prior to operating with modifications authorized by this Authority to Construct, the facility shall submit an application to modify the Title V permit with an administrative amendment in accordance with District Rule 2520 Section 5.3.4. [District Rule 2520, 5.3.4] Federally Enforceable Through Title V Permit
3. The nominal tank dimensions are 14.5 feet in diameter and 40.0 feet in height with a proposed volume of 160,000 gallons. The permittee shall submit to the District the gauge volume of the tank within 30 days of the actual tank capacity measurement. [District Rule 2201] Federally Enforceable Through Title V Permit
4. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
5. The daily VOC emission rate for fermentation operations in this tanks shall not exceed 3.46 lb/day per 1000 gallons. [District Rule 2201] Federally Enforceable Through Title V Permit
6. The average fermentation temperature of each batch of must fermented in this tank shall not exceed 95 degrees Fahrenheit, calculated as the average of all temperature measurements for the batch taken at least every 12 hours over the course of the fermentation. [District Rule 2201] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (209) 557-6400 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

DRAFT

Arnaud Marjollet, Director of Permit Services

N-96-393-0 : May 20 2016 9:02AM – HARADERJ Joint Inspection NOT Required

7. When used for wine storage, this tank shall be equipped with and operated with a pressure-vacuum relief valve, which shall operate within 10% of the maximum allowable working pressure of the tank, operate in accordance with the manufacturer's instructions, and be permanently labeled with the operating pressure settings. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

8. When this tank is used for wine storage, the pressure-vacuum relief valve and storage tank shall remain in a gas-tight condition, except when the operating pressure of the tank exceeds the valve set pressure. A gas-tight condition shall be determined by measuring the gas leak in accordance with the procedures in EPA Method 21. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

9. The temperature of the wine stored in this tank shall be maintained at or below 75 degrees Fahrenheit. The temperature of the stored wine shall be determined and recorded at least once per week. For each batch of wine, the operator shall achieve the storage temperature of 75 degrees Fahrenheit or less within 60 days after completing fermentation, and shall maintain records to show when the required storage temperature of 75 degrees Fahrenheit or less was achieved. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

10. The ethanol content of wine stored in this tank shall not exceed 20.0 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

11. When this tank is used for wine storage, the daily tank throughput, in gallons, shall not exceed five times the maximum nominal tank capacity stated in the equipment description and the annual tank throughputs, in gallons, shall not exceed 25 times the maximum nominal tank capacity stated in the equipment description. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The fermentation throughput for this tank shall not exceed 306,000 gallons in any one year. [District Rule 2201] Federally Enforceable Through Title V Permit

13. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, the average fermentation temperature and uncontrolled fermentation emissions and fermentation emission reductions (calculated per the emission factors given in District Rule 4694). The information shall be recorded by the tank Permit to Operate number and by wine type, stated as either white wine or red wine. [District Rule 4694]

14. When this tank is used for wine storage, the operator shall record, on a weekly basis, the total gallons of wine contained in the tank and the maximum temperature of the stored wine. [District Rule 4694] Federally Enforceable Through Title V Permit

15. When this tank is used for wine storage, daily throughput records, including records of filling and emptying operations, the dates of such operations, a unique identifier for each batch, the volume percent ethanol in the batch, and the volume of wine transferred, shall be maintained. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

16. Annual emissions from all wine fermentation and storage tanks, calculated on a twelve month rolling basis, shall not exceed 242,165 lb-VOC. [District Rule 2201] Federally Enforceable Through Title V Permit

17. Total annual VOC emissions from wine fermentation operations shall be determined by the following formula: Total annual VOC emissions = (Total Annual Red Wine Production - gallons) x (6.2 lb-VOC/1,000 gallons) + (Total Annual White Wine Production - gallons) x (2.5 lb-VOC/1,000 gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

18. Records of total annual fermentation and total annual storage emissions, including calculation methods and parameters used, shall be maintained. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

19. Total annual VOC emissions from wine storage operations shall be determined as the sum of the product of the volume of wine transferred in each wine movement and the batch-specific wine storage VOC emission factor calculated using the equation specified within this permit. [District Rule 2201] Federally Enforceable Through Title V Permit

20. The batch-specific wine storage VOC emission factor (EF), in pounds of VOC per 1,000 gallons of wine throughput, shall be calculated using the following equation: EF = 1.705259 * P^1.090407, where P is the volume percent ethanol of the wine being transferred. [District Rule 2201] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

21. The permittee shall maintain the following records: red wine and white wine produced by fermentation at this facility, based on values reported to the Alcohol and Tobacco Tax and Trade Bureau (TTB), U.S. Department of the Treasury; the volume and the ethanol concentration of each wine movement; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

22. If the emissions calculated for any rolling 12-month period exceed the annual emissions limitations of this permit, in a crush season in which the start of the crush season (defined as the day on which the facility's seasonal crushing/fermentation operations commence) occurs less than 365 days after the start of the previous crush season, then no violation of the annual emissions limit for that rolling 12-month period will be deemed to have occurred so long as the calendar year emissions are below the annual emissions limitation. [District Rule 2201] Federally Enforceable Through Title V Permit

23. Records shall be maintained that demonstrate the date of each year's start of crush season. [District Rule 2201] Federally Enforceable Through Title V Permit

24. All records shall be retained on-site for a period of at least five years and made available for District inspection upon request. [District Rules 1070, 2201 and 4694] Federally Enforceable Through Title V Permit

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO: N-96-394-0

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: BEAR CREEK WINERY
MAILING ADDRESS: 11900 N FURRY RD
LODI, CA 95240

LOCATION: 11900 N FURRY RD
LODI, CA 95240

EQUIPMENT DESCRIPTION:
51,000 GALLON STAINLESS STEEL WHITE/RED WINE FERMENTATION AND STORAGE TANK (TANK #737) WITH PRESSURE/VACUUM VALVE AND INSULATION

CONDITIONS

1. {1830} This Authority to Construct serves as a written certificate of conformity with the procedural requirements of 40 CFR 70.7 and 70.8 and with the compliance requirements of 40 CFR 70.6(c). [District Rule 2201] Federally Enforceable Through Title V Permit
2. {1831} Prior to operating with modifications authorized by this Authority to Construct, the facility shall submit an application to modify the Title V permit with an administrative amendment in accordance with District Rule 2520 Section 5.3.4. [District Rule 2520, 5.3.4] Federally Enforceable Through Title V Permit
3. The nominal tank dimensions are 14.5 feet in diameter and 40.0 feet in height with a proposed volume of 160,000 gallons. The permittee shall submit to the District the gauge volume of the tank within 30 days of the actual tank capacity measurement. [District Rule 2201] Federally Enforceable Through Title V Permit
4. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
5. The daily VOC emission rate for fermentation operations in this tanks shall not exceed 3.46 lb/day per 1000 gallons. [District Rule 2201] Federally Enforceable Through Title V Permit
6. The average fermentation temperature of each batch of must fermented in this tank shall not exceed 95 degrees Fahrenheit, calculated as the average of all temperature measurements for the batch taken at least every 12 hours over the course of the fermentation. [District Rule 2201] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (209) 557-6400 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

Arnaud Marjollet, Director of Permit Services
N-96-394-0 : May 20 2016 9:02AM – HARADERJ : Joint Inspection NOT Required

7. When used for wine storage, this tank shall be equipped with and operated with a pressure-vacuum relief valve, which shall operate within 10% of the maximum allowable working pressure of the tank, operate in accordance with the manufacturer's instructions, and be permanently labeled with the operating pressure settings. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

8. When this tank is used for wine storage, the pressure-vacuum relief valve and storage tank shall remain in a gas-tight condition, except when the operating pressure of the tank exceeds the valve set pressure. A gas-tight condition shall be determined by measuring the gas leak in accordance with the procedures in EPA Method 21. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

9. The temperature of the wine stored in this tank shall be maintained at or below 75 degrees Fahrenheit. The temperature of the stored wine shall be determined and recorded at least once per week. For each batch of wine, the operator shall achieve the storage temperature of 75 degrees Fahrenheit or less within 60 days after completing fermentation, and shall maintain records to show when the required storage temperature of 75 degrees Fahrenheit or less was achieved. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

10. The ethanol content of wine stored in this tank shall not exceed 20.0 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

11. When this tank is used for wine storage, the daily tank throughput, in gallons, shall not exceed five times the maximum nominal tank capacity stated in the equipment description and the annual tank throughputs, in gallons, shall not exceed 25 times the maximum nominal tank capacity stated in the equipment description. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The fermentation throughput for this tank shall not exceed 306,000 gallons in any one year. [District Rule 2201] Federally Enforceable Through Title V Permit

13. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, the average fermentation temperature and uncontrolled fermentation emissions and fermentation emission reductions (calculated per the emission factors given in District Rule 4694). The information shall be recorded by the tank Permit to Operate number and by wine type, stated as either white wine or red wine. [District Rule 4694]

14. When this tank is used for wine storage, the operator shall record, on a weekly basis, the total gallons of wine contained in the tank and the maximum temperature of the stored wine. [District Rule 4694] Federally Enforceable Through Title V Permit

15. When this tank is used for wine storage, daily throughput records, including records of filling and emptying operations, the dates of such operations, a unique identifier for each batch, the volume percent ethanol in the batch, and the volume of wine transferred, shall be maintained. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

16. Annual emissions from all wine fermentation and storage tanks, calculated on a twelve month rolling basis, shall not exceed 242,165 lb-VOC. [District Rule 2201] Federally Enforceable Through Title V Permit

17. Total annual VOC emissions from wine fermentation operations shall be determined by the following formula: Total annual VOC emissions = (Total Annual Red Wine Production - gallons) x (6.2 lb-VOC/1,000 gallons) + (Total Annual White Wine Production - gallons) x (2.5 lb-VOC/1,000 gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

18. Records of total annual fermentation and total annual storage emissions, including calculation methods and parameters used, shall be maintained. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

19. Total annual VOC emissions from wine storage operations shall be determined as the sum of the product of the volume of wine transferred in each wine movement and the batch-specific wine storage VOC emission factor calculated using the equation specified within this permit. [District Rule 2201] Federally Enforceable Through Title V Permit

20. The batch-specific wine storage VOC emission factor (EF), in pounds of VOC per 1,000 gallons of wine throughput, shall be calculated using the following equation: EF = 1.705259 * P^1.090407, where P is the volume percent ethanol of the wine being transferred. [District Rule 2201] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

21. The permittee shall maintain the following records: red wine and white wine produced by fermentation at this facility, based on values reported to the Alcohol and Tobacco Tax and Trade Bureau (TTB), U.S. Department of the Treasury; the volume and the ethanol concentration of each wine movement; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

22. If the emissions calculated for any rolling 12-month period exceed the annual emissions limitations of this permit, in a crush season in which the start of the crush season (defined as the day on which the facility's seasonal crushing/fermentation operations commence) occurs less than 365 days after the start of the previous crush season, then no violation of the annual emissions limit for that rolling 12-month period will be deemed to have occurred so long as the calendar year emissions are below the annual emissions limitation. [District Rule 2201] Federally Enforceable Through Title V Permit

23. Records shall be maintained that demonstrate the date of each year's start of crush season. [District Rule 2201] Federally Enforceable Through Title V Permit

24. All records shall be retained on-site for a period of at least five years and made available for District inspection upon request. [District Rules 1070, 2201 and 4694] Federally Enforceable Through Title V Permit

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO: N-96-395-0

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: BEAR CREEK WINERY
MAILING ADDRESS: 11900 N FURRY RD
LODI, CA 95240

LOCATION: 11900 N FURRY RD
LODI, CA 95240

EQUIPMENT DESCRIPTION:
51,000 GALLON STAINLESS STEEL WHITE/RED WINE FERMENTATION AND STORAGE TANK (TANK #740) WITH PRESSURE/VACUUM VALVE AND INSULATION

CONDITIONS

1. {1830} This Authority to Construct serves as a written certificate of conformity with the procedural requirements of 40 CFR 70.7 and 70.8 and with the compliance requirements of 40 CFR 70.6(c). [District Rule 2201] Federally Enforceable Through Title V Permit
2. {1831} Prior to operating with modifications authorized by this Authority to Construct, the facility shall submit an application to modify the Title V permit with an administrative amendment in accordance with District Rule 2520 Section 5.3.4. [District Rule 2520, 5.3.4] Federally Enforceable Through Title V Permit
3. The nominal tank dimensions are 14.5 feet in diameter and 40.0 feet in height with a proposed volume of 160,000 gallons. The permittee shall submit to the District the gauge volume of the tank within 30 days of the actual tank capacity measurement. [District Rule 2201] Federally Enforceable Through Title V Permit
4. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
5. The daily VOC emission rate for fermentation operations in this tanks shall not exceed 3.46 lb/day per 1000 gallons. [District Rule 2201] Federally Enforceable Through Title V Permit
6. The average fermentation temperature of each batch of must fermented in this tank shall not exceed 95 degrees Fahrenheit, calculated as the average of all temperature measurements for the batch taken at least every 12 hours over the course of the fermentation. [District Rule 2201] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (209) 557-6400 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

Arnaud Marjollet, Director of Permit Services
N-96-395-0 : May 20 2016 9:02AM – HARADERJ : Joint Inspection NOT Required

7. When used for wine storage, this tank shall be equipped with and operated with a pressure-vacuum relief valve, which shall operate within 10% of the maximum allowable working pressure of the tank, operate in accordance with the manufacturer's instructions, and be permanently labeled with the operating pressure settings. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

8. When this tank is used for wine storage, the pressure-vacuum relief valve and storage tank shall remain in a gas-tight condition, except when the operating pressure of the tank exceeds the valve set pressure. A gas-tight condition shall be determined by measuring the gas leak in accordance with the procedures in EPA Method 21. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

9. The temperature of the wine stored in this tank shall be maintained at or below 75 degrees Fahrenheit. The temperature of the stored wine shall be determined and recorded at least once per week. For each batch of wine, the operator shall achieve the storage temperature of 75 degrees Fahrenheit or less within 60 days after completing fermentation, and shall maintain records to show when the required storage temperature of 75 degrees Fahrenheit or less was achieved. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

10. The ethanol content of wine stored in this tank shall not exceed 20.0 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

11. When this tank is used for wine storage, the daily tank throughput, in gallons, shall not exceed five times the maximum nominal tank capacity stated in the equipment description and the annual tank throughputs, in gallons, shall not exceed 25 times the maximum nominal tank capacity stated in the equipment description. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The fermentation throughput for this tank shall not exceed 306,000 gallons in any one year. [District Rule 2201] Federally Enforceable Through Title V Permit

13. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, the average fermentation temperature and uncontrolled fermentation emissions and fermentation emission reductions (calculated per the emission factors given in District Rule 4694). The information shall be recorded by the tank Permit to Operate number and by wine type, stated as either white wine or red wine. [District Rule 4694]

14. When this tank is used for wine storage, the operator shall record, on a weekly basis, the total gallons of wine contained in the tank and the maximum temperature of the stored wine. [District Rule 4694] Federally Enforceable Through Title V Permit

15. When this tank is used for wine storage, daily throughput records, including records of filling and emptying operations, the dates of such operations, a unique identifier for each batch, the volume percent ethanol in the batch, and the volume of wine transferred, shall be maintained. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

16. Annual emissions from all wine fermentation and storage tanks, calculated on a twelve month rolling basis, shall not exceed 242,165 lb-VOC. [District Rule 2201] Federally Enforceable Through Title V Permit

17. Total annual VOC emissions from wine fermentation operations shall be determined by the following formula: Total annual VOC emissions = (Total Annual Red Wine Production - gallons) x (6.2 lb-VOC/1,000 gallons) + (Total Annual White Wine Production - gallons) x (2.5 lb-VOC/1,000 gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

18. Records of total annual fermentation and total annual storage emissions, including calculation methods and parameters used, shall be maintained. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

19. Total annual VOC emissions from wine storage operations shall be determined as the sum of the product of the volume of wine transferred in each wine movement and the batch-specific wine storage VOC emission factor calculated using the equation specified within this permit. [District Rule 2201] Federally Enforceable Through Title V Permit

20. The batch-specific wine storage VOC emission factor (EF), in pounds of VOC per 1,000 gallons of wine throughput, shall be calculated using the following equation: EF = 1.705259 * P^1.090407, where P is the volume percent ethanol of the wine being transferred. [District Rule 2201] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

21. The permittee shall maintain the following records: red wine and white wine produced by fermentation at this facility, based on values reported to the Alcohol and Tobacco Tax and Trade Bureau (TTB), U.S. Department of the Treasury; the volume and the ethanol concentration of each wine movement; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

22. If the emissions calculated for any rolling 12-month period exceed the annual emissions limitations of this permit, in a crush season in which the start of the crush season (defined as the day on which the facility's seasonal crushing/fermentation operations commence) occurs less than 365 days after the start of the previous crush season, then no violation of the annual emissions limit for that rolling 12-month period will be deemed to have occurred so long as the calendar year emissions are below the annual emissions limitation. [District Rule 2201] Federally Enforceable Through Title V Permit

23. Records shall be maintained that demonstrate the date of each year's start of crush season. [District Rule 2201] Federally Enforceable Through Title V Permit

24. All records shall be retained on-site for a period of at least five years and made available for District inspection upon request. [District Rules 1070, 2201 and 4694] Federally Enforceable Through Title V Permit

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO: N-96-396-0

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: BEAR CREEK WINERY
MAILING ADDRESS: 11900 N FURRY RD
LODI, CA 95240

LOCATION: 11900 N FURRY RD
LODI, CA 95240

EQUIPMENT DESCRIPTION:
51,000 GALLON STAINLESS STEEL WHITE/RED WINE FERMENTATION AND STORAGE TANK (TANK #741) WITH PRESSURE/VACUUM VALVE AND INSULATION

CONDITIONS

1. {1830} This Authority to Construct serves as a written certificate of conformity with the procedural requirements of 40 CFR 70.7 and 70.8 and with the compliance requirements of 40 CFR 70.6(c). [District Rule 2201] Federally Enforceable Through Title V Permit
2. {1831} Prior to operating with modifications authorized by this Authority to Construct, the facility shall submit an application to modify the Title V permit with an administrative amendment in accordance with District Rule 2520 Section 5.3.4. [District Rule 2520, 5.3.4] Federally Enforceable Through Title V Permit
3. The nominal tank dimensions are 14.5 feet in diameter and 40.0 feet in height with a proposed volume of 160,000 gallons. The permittee shall submit to the District the gauge volume of the tank within 30 days of the actual tank capacity measurement. [District Rule 2201] Federally Enforceable Through Title V Permit
4. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
5. The daily VOC emission rate for fermentation operations in this tanks shall not exceed 3.46 lb/day per 1000 gallons. [District Rule 2201] Federally Enforceable Through Title V Permit
6. The average fermentation temperature of each batch of must fermented in this tank shall not exceed 95 degrees Fahrenheit, calculated as the average of all temperature measurements for the batch taken at least every 12 hours over the course of the fermentation. [District Rule 2201] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (209) 557-6400 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

Arnaud Marjollet, Director of Permit Services
N-96-396-0 : May 20 2016 9:02AM – HARADERJ : Joint Inspection NOT Required

7. When used for wine storage, this tank shall be equipped with and operated with a pressure-vacuum relief valve, which shall operate within 10% of the maximum allowable working pressure of the tank, operate in accordance with the manufacturer's instructions, and be permanently labeled with the operating pressure settings. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

8. When this tank is used for wine storage, the pressure-vacuum relief valve and storage tank shall remain in a gas-tight condition, except when the operating pressure of the tank exceeds the valve set pressure. A gas-tight condition shall be determined by measuring the gas leak in accordance with the procedures in EPA Method 21. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

9. The temperature of the wine stored in this tank shall be maintained at or below 75 degrees Fahrenheit. The temperature of the stored wine shall be determined and recorded at least once per week. For each batch of wine, the operator shall achieve the storage temperature of 75 degrees Fahrenheit or less within 60 days after completing fermentation, and shall maintain records to show when the required storage temperature of 75 degrees Fahrenheit or less was achieved. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

10. The ethanol content of wine stored in this tank shall not exceed 20.0 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

11. When this tank is used for wine storage, the daily tank throughput, in gallons, shall not exceed five times the maximum nominal tank capacity stated in the equipment description and the annual tank throughputs, in gallons, shall not exceed 25 times the maximum nominal tank capacity stated in the equipment description. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The fermentation throughput for this tank shall not exceed 306,000 gallons in any one year. [District Rule 2201] Federally Enforceable Through Title V Permit

13. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, the average fermentation temperature and uncontrolled fermentation emissions and fermentation emission reductions (calculated per the emission factors given in District Rule 4694). The information shall be recorded by the tank Permit to Operate number and by wine type, stated as either white wine or red wine. [District Rule 4694]

14. When this tank is used for wine storage, the operator shall record, on a weekly basis, the total gallons of wine contained in the tank and the maximum temperature of the stored wine. [District Rule 4694] Federally Enforceable Through Title V Permit

15. When this tank is used for wine storage, daily throughput records, including records of filling and emptying operations, the dates of such operations, a unique identifier for each batch, the volume percent ethanol in the batch, and the volume of wine transferred, shall be maintained. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

16. Annual emissions from all wine fermentation and storage tanks, calculated on a twelve month rolling basis, shall not exceed 242,165 lb-VOC. [District Rule 2201] Federally Enforceable Through Title V Permit

17. Total annual VOC emissions from wine fermentation operations shall be determined by the following formula: Total annual VOC emissions = (Total Annual Red Wine Production - gallons) x (6.2 lb-VOC/1,000 gallons) + (Total Annual White Wine Production - gallons) x (2.5 lb-VOC/1,000 gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

18. Records of total annual fermentation and total annual storage emissions, including calculation methods and parameters used, shall be maintained. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

19. Total annual VOC emissions from wine storage operations shall be determined as the sum of the product of the volume of wine transferred in each wine movement and the batch-specific wine storage VOC emission factor calculated using the equation specified within this permit. [District Rule 2201] Federally Enforceable Through Title V Permit

20. The batch-specific wine storage VOC emission factor (EF), in pounds of VOC per 1,000 gallons of wine throughput, shall be calculated using the following equation: EF = 1.705259 * P^1.090407, where P is the volume percent ethanol of the wine being transferred. [District Rule 2201] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

21. The permittee shall maintain the following records: red wine and white wine produced by fermentation at this facility, based on values reported to the Alcohol and Tobacco Tax and Trade Bureau (TTB), U.S. Department of the Treasury; the volume and the ethanol concentration of each wine movement; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

22. If the emissions calculated for any rolling 12-month period exceed the annual emissions limitations of this permit, in a crush season in which the start of the crush season (defined as the day on which the facility's seasonal crushing/fermentation operations commence) occurs less than 365 days after the start of the previous crush season, then no violation of the annual emissions limit for that rolling 12-month period will be deemed to have occurred so long as the calendar year emissions are below the annual emissions limitation. [District Rule 2201] Federally Enforceable Through Title V Permit

23. Records shall be maintained that demonstrate the date of each year's start of crush season. [District Rule 2201] Federally Enforceable Through Title V Permit

24. All records shall be retained on-site for a period of at least five years and made available for District inspection upon request. [District Rules 1070, 2201 and 4694] Federally Enforceable Through Title V Permit

Appendix II
FYI 114

FYI-114

SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT

DATE: March 8, 2007 (Revised 09/14/09) (Revised 8/10/11) (Revised 6/13/12)

TO: Permit Services Staff

FROM: Dennis Roberts

SUBJECT: VOC Emission Factors for Wine Fermentation and Storage Tanks

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Winery tank operations generally consist of two separate emissions units; 1) fermentation and 2) storage of wine and spirits. Any particular tank may be permitted to perform one or both of these operations. The emissions from each emission unit are appropriately combined to yield the Potential to Emit for the tank (permit unit).

Emissions from fermentation operations are estimated using emission factors which have been developed based on a recognized fermentation model and are presented herein. For wine storage operations, emissions can be determined in general by modeling the storage tank operation using the EPA's Tanks 4.0 software (modeling procedures and an ethanol/water data base have been established as described in FYI-295 (*Modeling Emissions from Wine Storage Tanks)*. However, the majority of wine storage tanks located in the District are insulated storage tanks which do not have a requirement for refrigeration (ambient storage temperature). For this classification of tank the storage emission factor, as calculated by the Tanks 4.0 model, is a function of ethanol content only. For this case the tabular emission factors presented herein are applicable (note that storage tanks which are un-insulated and/or which have NSR limits on the tank operating temperature should be estimated by the emissions modeling per FYI-295).

Wine Storage Tanks

Wine storage tanks perform two functions in the winery:

- Facilitation of post-fermentation processing operations such as racking, filtration, malolactic fermentation and bottling. In this role, the typical storage tank is filled and emptied several times per year with the wine being transferred from tank to tank. Many of these operations occur prior to chilling of the wine. Emissions from such operations are "working losses" which occur as a result of the displacement of the vapor space of the tank into the atmosphere during the filling operations. For insulated tanks (or tanks installed in a climate-controlled building), working losses are a function only of the ethanol content, the ambient temperature and the tank throughput.

- Static storage of wine between processing operations up to the final operation of bottling. In this operation, a common objective is to avoid oxidation of the wine by both minimizing the wine temperature and the exposure of the wine to air. In such cases, the wine may be maintained at a temperature below ambient, often in the range of 35-40 °F, however, since the tank cannot be always maintained at this temperature due to processing considerations, the lower temperatures are not an NSR condition on the permit . Also, the tanks are typically maintained at as high a liquid level as possible to minimize contact with oxygen. Emissions from static storage are

"breathing losses" which are the result of diurnal heating and cooling caused by the effect of daily variations in atmospheric conditions on the contents of the tank. For a well-insulated tank, equipped with a pressure/vacuum relief valve per the requirements of District Rule 4694, breathing losses are considered to be negligible since the insulation serves to maintain a relatively uniform temperature inside the tank while the pressure/vacuum valve serves to contain small internal variations, preventing escape of vapor to the atmosphere.

Table 1 presents emission factors for wine and spirits storage in ambient temperature tanks (non-refrigerated), equipped with insulation and/or located in a climate-controlled building. The tabular values have been developed using the District's emissions modeling procedure for wine and spirits tanks (see FYI-295). As shown, different emission factors are presented for tanks located in the three different regions of the District based upon higher ambient temperatures in the southern part of the Central Valley. All factors represent working losses only since breathing losses are considered negligible as discussed above. Emission factors for concentrations not listed in Table 1 may be interpolated from the table.

Table 1: Emission Factors for Wine and Spirits Storage Tanks by Region in the San Joaquin Valley
lb-VOC per 1,000 gallons of throughput

Applicability:	1. Vertical Fixed-Roof tank, insulated or located in climate-controlled building 2. Ambient temperature storage					
	Southern Region		Central Region		Northern Region	
Vol %	Annual	Daily	Annual	Daily	Annual	Daily
2	0.016	0.029	0.015	0.027	0.014	0.024
4	0.033	0.062	0.032	0.057	0.030	0.051
6	0.052	0.099	0.050	0.092	0.047	0.081
8	0.074	0.141	0.071	0.130	0.067	0.116
10	0.098	0.187	0.094	0.173	0.088	0.154
12	0.125	0.239	0.120	0.221	0.112	0.196
14	0.143	0.273	0.137	0.252	0.128	0.223
16	0.159	0.302	0.153	0.280	0.143	0.248
18	0.176	0.334	0.169	0.310	0.159	0.275
20	0.195	0.368	0.187	0.341	0.175	0.303
22	0.215	0.404	0.207	0.375	0.194	0.333
24	0.237	0.443	0.227	0.412	0.213	0.366
26	0.251	0.470	0.242	0.436	0.227	0.388
28	0.264	0.494	0.254	0.458	0.238	0.408
30	0.278	0.518	0.267	0.481	0.251	0.428
32	0.293	0.544	0.281	0.506	0.264	0.450
34	0.308	0.572	0.296	0.531	0.278	0.473
36	0.324	0.600	0.312	0.559	0.293	0.498
38	0.335	0.620	0.323	0.577	0.303	0.514
40	0.347	0.640	0.334	0.595	0.313	0.530
42	0.358	0.660	0.345	0.614	0.324	0.546
44	0.371	0.681	0.357	0.634	0.335	0.565
46	0.384	0.703	0.370	0.655	0.348	0.584
48	0.396	0.724	0.381	0.674	0.359	0.602
50	0.405	0.738	0.390	0.688	0.367	0.615
52	0.415	0.754	0.400	0.703	0.376	0.628
54	0.425	0.770	0.410	0.718	0.386	0.642
56	0.436	0.788	0.420	0.734	0.396	0.657
58	0.447	0.805	0.431	0.751	0.406	0.673
60	0.455	0.818	0.438	0.764	0.413	0.684
62	0.462	0.832	0.446	0.777	0.420	0.695
64	0.471	0.847	0.454	0.790	0.427	0.708
66	0.479	0.863	0.462	0.805	0.435	0.721
68	0.489	0.879	0.471	0.820	0.443	0.735
70	0.497	0.896	0.479	0.836	0.451	0.748
72	0.507	0.914	0.488	0.853	0.460	0.763
74	0.517	0.933	0.498	0.871	0.468	0.779
76	0.527	0.954	0.508	0.890	0.478	0.796
78	0.539	0.976	0.519	0.910	0.489	0.814
80	0.552	1.000	0.531	0.932	0.500	0.833
82	0.566	1.025	0.545	0.955	0.513	0.855
84	0.581	1.052	0.559	0.981	0.526	0.877
86	0.598	1.083	0.576	1.010	0.542	0.903
88	0.617	1.120	0.595	1.044	0.559	0.934
90	0.639	1.161	0.616	1.082	0.579	0.967
92	0.663	1.206	0.639	1.124	0.601	1.004
94	0.694	1.261	0.669	1.175	0.629	1.050
96	0.742	1.339	0.715	1.249	0.673	1.118
98	0.786	1.409	0.757	1.315	0.714	1.179
100	0.838	1.534	0.807	1.437	0.762	1.278

For purposes of calculating actual annual emissions, the annual data in Table 1 have been curve-fitted based on an equation of the form $E_f = ap^2 + bp + c$, where p = vol% ethanol (e.g., 20% = 0.20). The constants for the equation are as follows:

Constants for Emission Factor Correlation $E_f = ap^2 + bp + c$ p = volume percentage ethanol			
Southern Region			
Concentration Range	**a**	**b**	**c**
0 to 24%	-0.45139	1.0958	0
>24 to 66%	-0.47357	1.0088	0.019486
>66% to 92%	1.5279	-1.7467	0.97149
>92% to 100%	6.7857	-10.819	4.8713
Central Region			
Concentration Range	**a**	**b**	**c**
0 to 24%	-0.45139	1.0542	0
>24 to 66%	-0.45117	0.96968	0.018554
>66% to 92%	1.5254	-1.7662	0.96812
>92% to 100%	6.4286	-10.223	4.6016
Northern Region			
Concentration Range	**a**	**b**	**c**
0 to 24%	-0.38194	0.97917	0
>24 to 66%	-0.42159	0.91316	0.016237
>66% to 92%	1.3799	-1.5774	0.87906
>92% to 100%	6.6071	-10.651	4.8061

The mathematical correlation for concentrations up to 24% provides a slightly conservative estimate of the emission factor relative to the data in Table 1 based on smoothing the impact of the linear interpolation process employed in development of the ethanol/water data base used for modeling wine tank emissions in EPA Tanks 4.0. Mathematical correlations for concentrations greater than 24% are based on a least square analysis of the data in Table 1.

Use of Table I and correlations to estimate emissions insulated wine storage tank subject to ambient temperature is demonstrated by the following examples:

Example 1 (wine storage tank with daily and annual throughput limits and maximum ethanol content) – estimate the potential to emit for an insulated 100,000 gallon nominal capacity steel storage tank to store wine with maximum concentration of 14 vol% ethanol . Maximum daily throughput is one tank turn or 100,000 gallons/day. Maximum annual throughput will be 600,000 gallons per year. The tank will be installed in a facility located in the Southern Region.

For a storage tank located in the Southern Region and handling up to 14% ethanol, the annual emission factor is 0.143 lb-VOC/1000 gallons throughput and the daily emission factor is 0.273 lb-VOC/1000 gallons throughput.

Daily PE = 100,000 gallons/day x 0.273 lb-VOC/1000 gallons = 27.3 lb-VOC/day

Annual PE = 600,000 gallons/year x 0.143 lb-VOC/1000 gallons = 86 lb-VOC/year

DEL conditions for this example would be:

- *Ethanol content of wine in this tank shall not exceed 14.0 percent by volume. [District Rule 2201]*
- *Tank throughput shall not exceed either of the following limits: 100,000 gallons in any one day or 600,000 gallons per year. [District Rule 2201]*

Example 2 (wine and spirits storage tank subject to a daily throughput limit and an SLC limit on annual emissions)– – estimate the potential to emit for an insulated 100,000 gallon nominal capacity steel storage tank to store spirits with maximum concentration of 80 vol% ethanol. Maximum allowed annual emissions for the tanks in the SLC are 10,000 lb/year. Maximum daily throughput is one tank turn or 100,000 gallons/day. The tank will be installed in a facility located in the Northern Region.

For a storage tank located in the Northern Region and handling up to 80% ethanol, the daily emission factor is 0.833 lb-VOC/1000 gallons throughput. Since the annual emissions are constrained by the SLC, an annual emission factor is not needed for the PE calculation but will be placed on the permit for purposes of demonstrating annual compliance on an ongoing basis. Since the ethanol concentration can vary from 0% to 80%, three separate correlation equations are required to cover the potential range:

For concentration p = 0 – 24%: $E_f = ap^2 + bp + c$

a = -0.38194
b = 0.97917
c = 0

For concentration p = 24% < p < 66%: $E_f = ap^2 + bp + c$

a = -0.42159
b = 0.91316
c = 0.016237

For concentration p = 66% < p < 80%: $E_f = ap^2 + bp + c$

a = 1.3799
b = -1.5774
c = 0.87906

Daily PE = 100,000 gallons/day x 0.833 lb-VOC/1000 gallons = 83.3 lb-VOC/day

DEL conditions for this example would be:

- *Ethanol content of wine or spirits in this tank shall not exceed 80.0 percent by volume. [District Rule 2201]*
- *Tank throughput shall not exceed 100,000 gallons in any one day. [District Rule 2201]*
- *Combined annual VOC emissions from all wine storage operations under permit units X-XXXX-XXX through X-XXXX-XXX shall not exceed 10,000 pounds per year. [District Rule 2201]*
- *Combined annual VOC emissions from wine storage operations under permit units X-XXXX-XXX through X-XXXX-XXX shall be determined as the sum of the emissions for each individual wine movement based on the volume transferred in each wine movement and the batch-specific wine storage emission factor calculated using the equation(s) specified within this permit. [District Rule 2201]*
- *The annual VOC wine storage emission factor for each wine or spirits ethanol content shall be calculated using the following equation: EF = a * P^2 + b*P + c; where EF is the VOC emission factor in pounds of VOC per 1000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume %,* a = -0.38194, b = 0.97917 and c = 0. *For concentrations greater than 24 volume % up to and including 66 volume% ,* a = -0.42159, b = 0.91316 and c = 0.016237. *For concentrations greater than 66 volume % up to and including 80 volume %,* a = 1.3799, b = -1.5774 and c = 0.87906. *[District Rule 2201]*

Wine Fermentation Tanks

During the wine fermentation process, sugar in the grape juice reacts with yeast to form alcohol (ethanol) and carbon dioxide (CO_2) gas. Ethanol is emitted into the atmosphere through evaporation. According to Williams and Boulton[1], the only important mechanism for ethanol loss is equilibrium evaporation into the escaping CO_2 stream. The physical entrainment of ethanol droplets in the CO_2 gas is insignificant in modern enclosed fermentation vessels. These researchers' model indicates that as fermentation temperature increases, ethanol loss increases exponentially. Since red wines are fermented at significantly higher temperatures than white wine, a different emission factor is required for each case.

Annual Fermentation Emission Factors

The California Air Resources Board (CARB) has established annual emission factors for fermentation of both red and white wines, based on the computer model developed by Williams and Boulton. The emission factors were developed for purposes of emission

[1] L.A. Williams and R. Boulton, Modeling and Prediction of Evaporative Ethanol Loss During Wine Fermentation, American Journal of Enology and Vitriculture, 32:234-242, (1983).

inventory estimation and represent a typical wine fermentation operation based on average fermentation temperatures and average initial sugar concentrations (°Brix) and are presented in Emissions Inventory Procedural Manual, Section 5.1, Air Resources Board, 1997. These factors have been adopted by the District in Rule 4694, *Wine Fermentation and Storage Tanks*. The established factors are as follows:

Red Wine Fermentation:	6.2 lb-VOC/1000 gallons fermented per year (78 °F fermentation temperature, 21.8 °Brix)
White Wine Fermentation:	2.5 lb-VOC/1000 gallons fermented per year (58 °F fermentation temperature, 20.4 °Brix)

Daily Fermentation Emission Factors

The District has developed factors for daily Potential to Emit using the previously-referenced research by Williams and Boulton (see Appendix A). To ensure the factors represent true Potential to Emit, the daily emission factors were developed based on typical maximum fermentation temperatures and starting sugar concentrations rather than average values:

Red Wine Fermentation:	3.46 lb-VOC/1000 gallons tank capacity per day (85 °F fermentation temperature, 22.5 °Brix)
White Wine Fermentation:	1.62 lb-VOC/1000 gallons tank capacity per day (70 °F fermentation temperature, 22.5 °Brix)

Example 3 (fermentation tank) - estimate the daily and annual potential to emit for a 200,000 gallon nominal capacity fermentation tank to exclusively ferment red wine. Maximum fermentation throughput will be 900,000 gallons red wine per year. The tank will not be used for storage.

Daily $PE_{fermentation}$ = 3.46 lb-VOC/day per 1000 gallons nominal tank capacity x 200 Mgal nominal

Daily $PE_{fermentation}$ = 692.1 lb/day

Daily PE = Daily $PE_{fermentation}$ = 692.1 lb/day

Annual PE = 6.2 lb-VOC per 1000 gallons fermented x 900 Mgal/year = 5,580 lb-VOC/yr

Example 5 (fermentation and storage tank) - estimate the daily and annual potential to emit for a 100,000 gallon nominal capacity fermentation tank to ferment red wine. Maximum fermentation throughput will be 450,000 gallons red wine per year. The tank will also be used for storage identical with example 1:

In this case,

Daily PE = the larger of either Daily $PE_{fermentation}$ or Daily $PE_{storage}$

And.

Annual PE = Annual $PE_{fermentation}$ + Annual $PE_{storage}$

Calculating the Daily PE:

Daily $PE_{fermentation}$ = 3.46 lb-VOC/day per 1000 gallons nominal tank capacity x 100 Mgal nominal

Daily $PE_{fermentation}$ = 346.0 lb-VOC/day

From example 1,

Daily $PE_{storage}$ = 27.3 lb-VOC/day

Therefore,

Daily PE = 346.0 lb/day

Calculating the Annual PE:

Annual $PE_{fermentation}$ = 6.2 lb-VOC per 1000 gallons fermented x 450 Mgal/year = 2,790 lb-VOC/yr

From example 1,

Annual $PE_{storage}$ = 97 lb-VOC/year

Therefore,

Annual PE = 2,790 + 97 = 2,887 lb/year

Appendix A

Daily Emission Factor for Wine Fermentation

Appendix A

The emission factor for daily PE is based on the following:

- Estimation of maximum daily fermentation emissions is based on Figure 7 from the Williams and Boulton work referenced in the body of this document.
- Maximum red wine fermentation temperature is assumed to be 85 °F.
- Maximum white wine fermentation temperature is assumed to be 70 °F.
- Maximum working capacity of a red wine fermenter is 80% of tank maximum capacity.
- Maximum working capacity of a white wine fermenter is 95% of tank maximum capacity.

Figure 7 from Williams and Boulton indicates the ethanol emission rate (mg per hour per liter of wine) versus time for various fermentation temperatures. The total emissions in mg per liter of wine for any time period is the area under the curve. Thus, for any given temperature, figure 7 can be graphically integrated over the 24 hour period during which maximum emissions occur. A copy of figure 7 is attached which indicates the integration interval for red wine (85 °F) and for white wine (70 °F). Results of integration of Figure 7 are presented in the following table:

Graphical Integration Results to Determine Daily Fermentation Emission Factor from Figure 7 of Williams and Boulton

	Red Wine	White Wine
Maximum 24 hour Emissions (mg/liter of wine per day)	518.6	203.9
Maximum 24 hour Emissions (1b/1000 gallons of wine per day)	4.33	1.70
Maximum Batch Size (% of Tank Capacity)	80%	95%
Daily Emission Factor (lb/1000 gallons tank capacity per day)	3.46	1.62

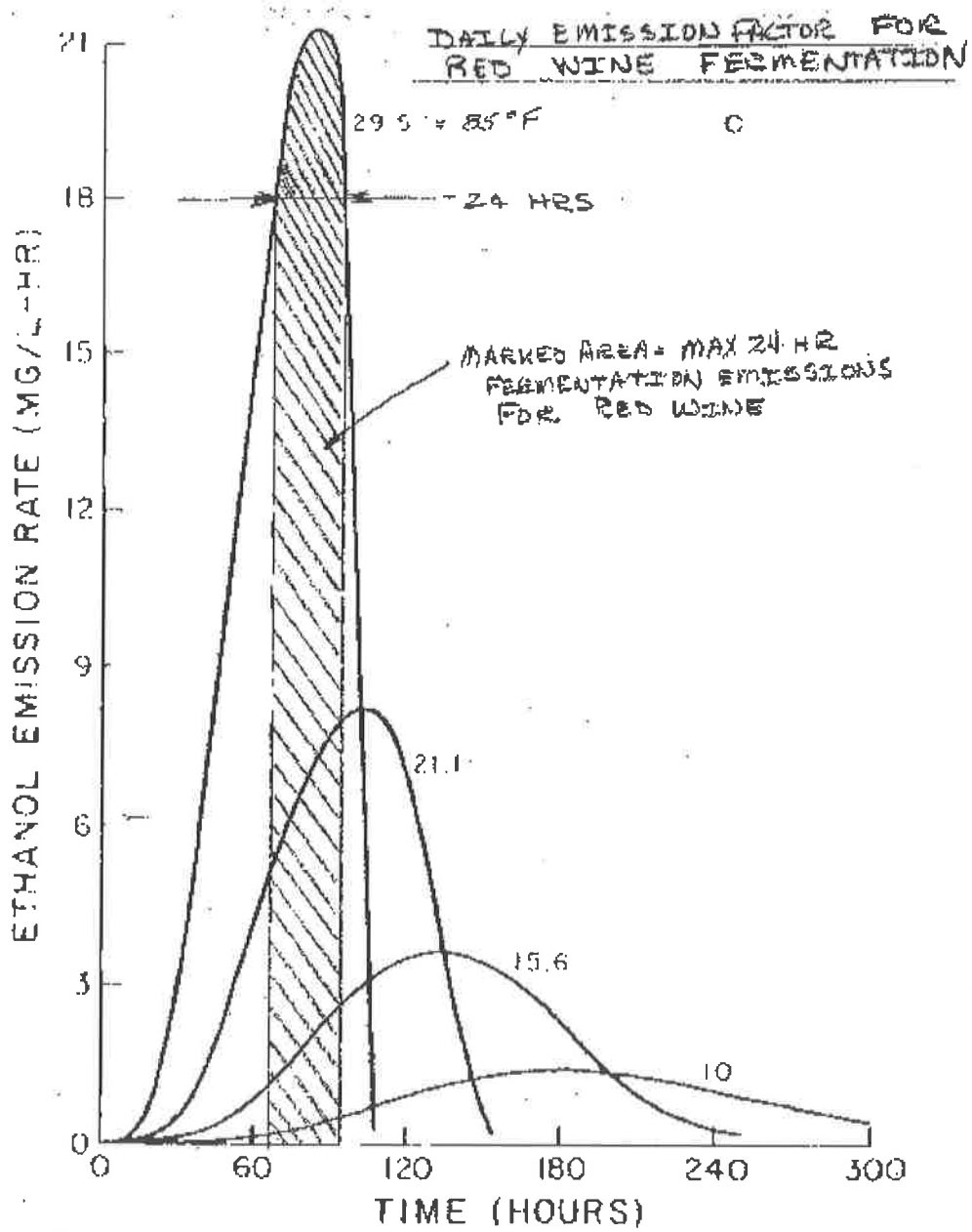

Fig. 7. The influence of fermentation temperature on a) the fermentation rate, b) the vapor phase ethanol concentration, and c) the rate of ethanol emission. (Initial sugar content of 22.5°Brix, isothermal fermentation at indicated temperature.)

Appendix A

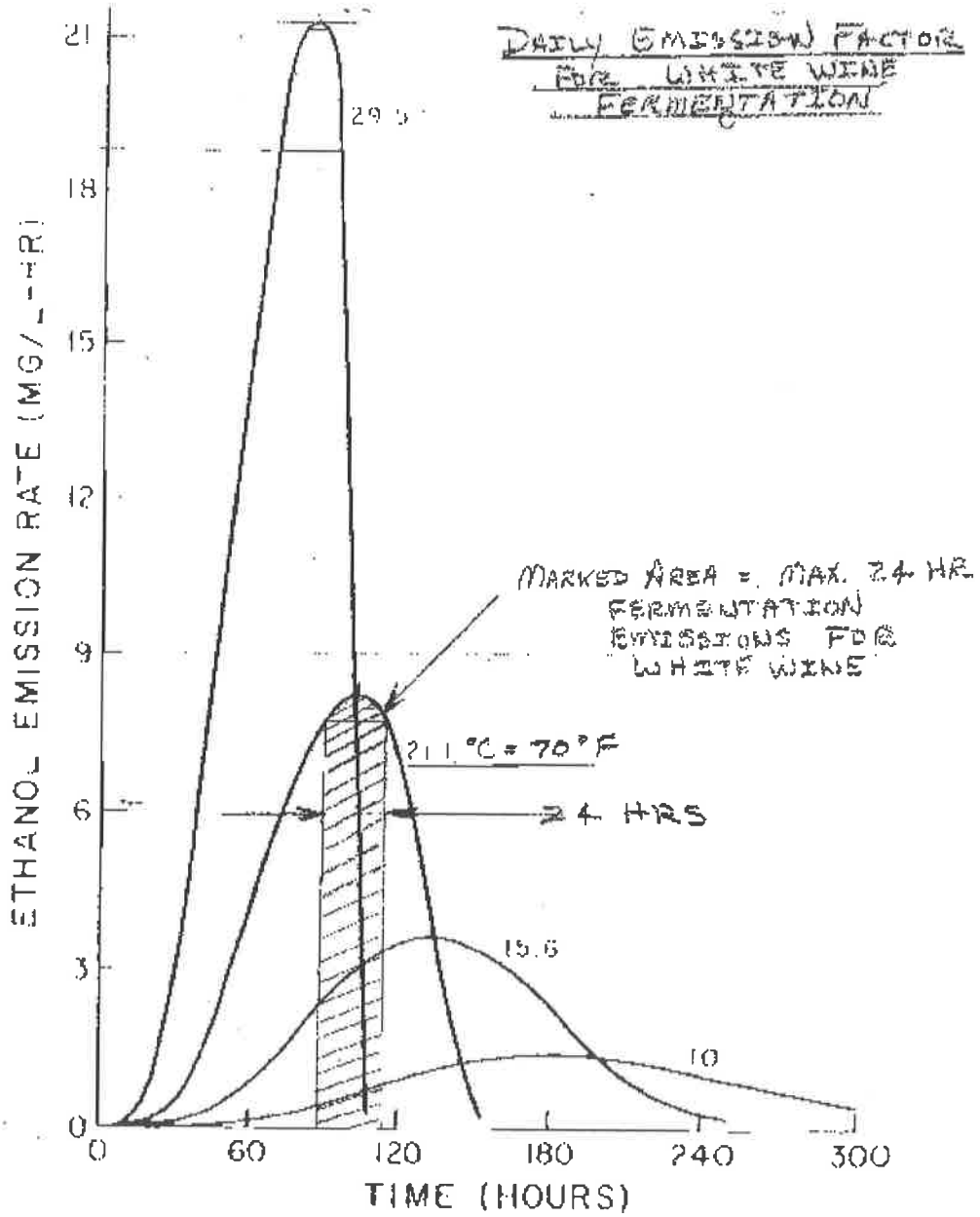

Fig. 7. The influence of fermentation temperature on a) the fermentation rate, b) the vapor phase ethanol concentration, and c) the rate of ethanol emission. (Initial sugar content of 22.5°Brix, isothermal fermentation at indicated temperature.)

Appendix III
BACT Guideline 5.4.13 and Top-Down BACT Analysis (Storage)

Per » B A C T » Bact Guideline.asp?category Level1=5&category Level2=4&category Level3=13&last Update=9 » 26 :

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Best Available Control Technology (BACT) Guideline 5.4.13
Last Update: 9/26/2011

Wine Storage Tank - Non-Wood Material**

Pollutant	Achieved in Practice or in the SIP	Technologically Feasible	Alternate Basic Equipment
VOC	1. Insulation or Equivalent***, Pressure Vacuum Relief Valve (PVRV) set within 10% of the maximum allowable working pressure of the tank; "gas-tight" tank operation; and continuous storage temperature not exceeding 75 degrees F, achieved within 60 days of completion of fermentation.	1. Capture of VOCs and thermal or catalytic oxidation or equivalent (98% control) 2. Capture of VOCs and carbon adsorption or equivalent (95% control) 3. Capture of VOCs and absorption or equivalent (90% control) 4. Capture of VOCs and condensation or equivalent (70% control)	

***This guideline is applicable to a wine storage tank that is not constructed out of wooden materials. ***Tanks made of heat-conducting materials such as stainless steel may be insulated or stored indoors (in a completely enclosed building, except for vents, doors and other essential openings) to limit exposure ot diurnal temperature variations. Tanks made entirely of non-conducting materials such as concrete (except for fittings) are considered self-insulating.*

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 requried 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. For background information, see Permit Specific BACT Determinations on Details Page.

Top-Down BACT Analysis for Fermentation VOCs from Wine Storage Operations

Step 1 - Identify All Possible Control Technologies

The SJVUAPCD BACT Clearinghouse guideline 5.4.13 identifies the following control equipment options for VOC emissions.

1) Insulation or Equivalent, Pressure Vacuum Relief Valve (PVRV) set within 10% of the maximum allowable working pressure of the tank; "gas-tight" tank operation; and continuous storage temperature not exceeding 75 degrees F, achieved within 60 days of completion of fermentation.
2) Capture of VOCs and thermal or catalytic oxidation or equivalent (98% control)
3) Capture of VOCs and carbon adsorption or equivalent (95% control)
4) Capture of VOCs and absorption or equivalent (90% control)
5) Capture of VOCs and condensation or equivalent (70% control)

Step 2 - Eliminate Technologically Infeasible Options

None of the above listed technologies are technologically infeasible.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

Rank by Control Effectiveness		
Rank	Control	Overall Capture and Control Efficiency
1	Capture of VOCs and thermal or catalytic oxidation or equivalent	98%(*)
2	Capture of VOCs and carbon adsorption or equivalent	95%
3	Capture of VOCs and absorption or equivalent	90%
4	Capture of VOCs and condensation or equivalent	70%
5	Insulation or Equivalent, Pressure Vacuum Relief Valve (PVRV) set within 10% of the maximum allowable working pressure of the tank; "gas-tight" tank operation; and continuous storage temperature not exceeding 75 degrees F, achieved within 60 days of completion of fermentation.	Baseline (Achieved-in-Practice)

(*) Following recent District practice, thermal and catalytic oxidation will be ranked together.

Step 4 - Cost Effectiveness Analysis

A cost effective analysis must be performed for all control options that have not been determined to be achieved in practice in the list from Step 3 above, in the order of their ranking, to determine the cost effective option with the lowest emissions.

District BACT Policy APR 1305 establishes annual cost thresholds for imposed control based upon the amount of pollutants reduced by the controls. If the cost of control is at or below the threshold, it is considered a cost effective control. If the cost exceeds the threshold, it is not cost effective and the control is not required. Per District BACT Policy, the maximum cost limit for VOC reduction is $17,500 per ton of VOC emissions reduced.

BACT Analysis Assumptions – All Control Options

- Sales Tax: This facility is located in Lodi, CA, which has a current sales tax rate of 8.0%. However, pollution control equipment qualifies for a partial tax exemption in California. According to the following link, the tax exemption rate is 4.1875%, http://www.boe.ca.gov/sutax/manufacturing_exemptions.htm#Purchasers . Therefore, the sales tax rate used in this analysis will be set equal to 3.8125% (8.0% - 4.1875%).
- Project Contingency: For detailed estimates, the Association for the Advancement of Cost Engineering International recommends a contingency factor of 15%, while the Electric Power Research Institute recommends a contingency of 10% to 20% (ftp://ftp.repec.org/opt/ReDIF/RePEc/sip/04-005.pdf). Therefore, a cost contingency of 15% will be applied to the detailed estimates provided in these cost analyses. Additionally, since both the direct and indirect costs are detailed estimates and both of these categories of costs have uncertainty associated with them, the contingency will be applied to both the direct and indirect costs.
- The cost of project management, internal engineering operations planning required to implement a new control technology in a commercial winery will be included in each cost analysis as the owner's cost. In District project-1133347, an owners cost of $100,000 was assumed for an installation of 12 wine fermentations/storage tanks with a combined total capacity of 4,200,000 million gallons. This current project has a combined total capacity of 844,000 gallons. The owners cost will be conservatively assumed to have a linear relationship with the total capacity of the tanks being installed. An owner's cost of $20,095 ($100,000 x 844,000 gallons ÷ 4,200,000 gallons) will be used for the following cost analyses.
- In order to capture storage emissions from wine storage tanks, it is necessary to enclose the tanks and duct the captured vapors to the control device. An increase in back pressure can result from enclosing the control device and adding the duct work and control system. Increases in back pressure to the tanks causes additional CO_2 absorption into the wine, resulting in the possibility of an effervescent reaction and a foam over event. To proactively prevent catastrophic events like foam overs, it is necessary to monitor back pressure and temperature of the tanks and take immediate action if the back pressure rises to critical levels that suggest a foam over is about to occur. The cost of the equipment to monitor the pressure and temperature are included in the Programming Controller Logic (PCL) cost. In

District Project C-1133347, a PCL cost of $10,000 per control system was provided to the District. This cost will be used to estimate PCL costs for the currently proposed project.

- In determining the labor costs for the cost analyses, two shifts is assumed to be appropriate for a control system serving wine storage tanks.
- Although this analysis is for storage operations only, it is assumed that the winery would size the ductwork and system to also address fermentation emissions since the proposed tanks may also be used for fermentation which emits VOC's at a higher rate. It wouldn't be logical to undersize the system and to only utilize the control system for storage emissions, which represent only a small portion of the overall emissions from fermentation/storage tanks.

Maximum Vapor Flow Rate

Based on the kinetic model provided by the facility, maximum CO_2 production rate for each fermentation tank group is summarized as follows:

Tank IDs	Permits	Tank Group	Nominal Tank Capacities (gallons)	Max CO_2 Flowrate for Entire Tank Group (scfm)	Max CO_2 + Fresh Air Flowrate for Entire Tank Group (scfm)
727, 728, 730, and 731	N-96-389 through '-392	1	160,000 each	3,308	4,631
736, 737, 740, and 741	N-96-393 through '-396	2	51,000 each	1,054	1,476
Total				4,362	6,107

Uncontrolled Storage Emissions

Currently, industry standard is the use insulated tanks with a pressure vacuum relief valve and a continuous storage temperature not exceeding 75 degrees F. Storage emissions, using this level of control are estimated to be 0.175 lb/1000 gallons (annual average) of wine stored. The following table shows the industry standard emissions for each tank associated with this project:

Permit Unit	Capacity (gallons)	Storage Turnovers Per Year	Storage Emissions (lb/year)
N-96-389-0 (Tank 727)	160,000	25	700
N-96-390-0 (Tank 728)	160,000	25	700
N-96-391-0 (Tank 730)	160,000	25	700
N-96-392-0 (Tank 731)	160,000	25	700
N-96-393-0 (Tank 736)	51,000	25	223
N-96-394-0 (Tank 737)	51,000	25	223
N-96-395-0 (Tank 740)	51,000	25	223
N-96-396-0 (Tank 741)	51,000	25	223
Total	**844,000**	**N/A**	**3,692**

Collection System Capital Investment (based on ductwork and clean-in-place system)

A common feature of all technically feasible options is that they require installation of a collection system for delivering the VOCs from the tanks to the common control device(s).

Basis of Cost Information for Collection System:

- The costs for the ductwork and the required clean-in-place (CIP) system are based on information from the 2005 Eichleay Study. The 2005 Eichleay study was used in development of District Rule 4694 Wine Fermentation and Storage Tanks and includes substantial information on the costs and details of the potential application of VOC controls to wineries and addresses many of the technical issues of the general site specific factors for wineries.

- The District performed a cost survey of stainless steel ducting/piping and found that the values stated in the Eichleay report including the cost of inflation (applied as stated below) were less expensive; therefore, as a conservative estimate, the District will use the cost of ducting/piping from the Eichleay report which will include ducting, fittings, bolt up, handle, and install. A summary of the ducting/piping cost survey is included in Appendix VI.

- Eichleay's cost estimate for ducting included the duct, fittings, bolt up, handle and install; therefore, the District did not allow the additional costs for foundations & supports, handling & erection, electrical, piping or painting, as allowed by the EPA Cost Manual.

- The collection system consists of stainless steel place ductwork (stainless steel is required due to food grade product status) with isolation valving, connecting the tanks to a common manifold system which ducts the combined vent to the common control device. The cost of dampers and isolation valving, installed in the ductwork, will be included in the cost estimate.

- A minimum duct size is established at six inches diameter at each tank to provide adequate strength for spanning between supports.

- One of the major concerns of a manifold duct system is microorganisms spoiling the product, and transferring from one tank to another. It is necessary to design into the system a positive disconnect of the ducting system when the tanks are not being filled. There are a number of ways this can be done. In this case, an automatic butterfly valve with a physical spool to disconnect the tank from the duct will be utilized.

- The ducting/piping costs quoted in the Eichleay study are from 2005 and must be adjusted to reflect 2016 prices. An overall inflation amount of 21.93% which was taken from the United States Department of Labor, Bureau of Labor Statistics, Consumer Price Index (CPI) Inflation Calculator and applied to the ducting/piping costs to determine the current 2016 prices: http://www.bls.gov/data/inflation_calculator.htm.

Capital Cost of Ductwork

This facility includes two groups of four tanks. The capital cost for ductwork from each tank group is estimated below:

Tank Group 1:

Connection from tank to main duct = 4 tanks x 25 feet (6" duct) x $62.17/foot = $6,217
Main duct for fermenters = 100' (12" duct) x $143.83/foot = $14,383
Unit installed cost for 6 inch butterfly valve = $2,125/valve x 4 valves x 1 system = $8,500
Unit installed cost one foot removable spool = $500/tank x 4 tanks x 1 system = $2,000
1 Knockout drum = $46,300
Duct support allowance = $4,000/tank x 4 tanks = $16,000

Total for Group 1 = $6,217 + $14,383 + $8,500 + $2,000 + $46,300 + $16,000
= $93,400

Tank Group 2:

Connection from tank to main duct = 4 tanks x 25 feet (6" duct) x $62.17/foot = $6,217
Main duct for fermenters = 100' (12" duct) x $143.83/foot = $14,383
Unit installed cost for 6 inch butterfly valve = $2,125/valve x 4 valves x 1 system = $8,500
Unit installed cost one foot removable spool = $500/tank x 4 tanks x 1 system = $2,000
1 Knockout drum = $46,300
Duct support allowance = $4,000/tank x 4 tanks = $16,000

Total for Group 1 = $6,217 + $14,383 + $8,500 + $2,000 + $46,300 + $16,000
= $93,400

Total Capital Cost for All Tank Groups:

The total capital cost of the ductwork for all five tank groups is summarized in the table below:

Tank Group	Total Ducting Cost Including Support Allowance
1	$93,400
2	$93,400
Total	$186,800

Capital Cost of Ductwork for Wine Storage Tanks	
Cost Description	Cost ($)
Combined Duct Estimate for all Tank Groups	$186,800
Adjusting factor for inflation from 2005 dollars to 2015 dollars (21.93% total increase)	1.2193
Inflation adjusted duct cost	$227,765
The following cost data is taken from EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001).	
Direct Costs	
Base Equipment Costs (Ductwork) See Above	$227,765
Instrumentation (not required)	-
Sales Tax - 3.8125% of base equipment	$8,684
Freight - 5% of base equipment	$11,388
Purchased equipment cost (PEC)	**$247,837**
Foundations & supports 8% (allowance already included in cost estimate)	-
Handling & erection 14% (already included in Eichleay cost estimate)	-
Electrical 4% (not required)	-
Piping 2% (not required)	-
Painting 1% (not required)	-
Insulation 1% of PEC	$2,478
Direct Installation Costs (DIC)	**$2,478**
Total Direct Costs (DC) (PEC + DIC)	**$250,315**
Indirect Costs	
Engineering - 10% of PEC	$24,784
Construction and field expenses - 5% of PEC	$12,392
Contractor Fees - 10% of PEC	$24,784
Start-up - 2% of PEC	$4,957
Performance Test - 1% of PEC	$2,478
Total Indirect Costs (IC)	**$69,395**
Total Direct and Indirect Costs (DC + IC)	**$319,710**
Contingency (C) - 15% of (DC + IC)	**$47,967**
Total Capital Investment (TCI) (DC + IC + C)	**$367,667**

Capital Cost Clean-In-Place (CIP) System

A ducting system on a tank farm must have this system to maintain sanitation and quality of the product. The cost of operation of the CIP system has not been estimated. Operation of a CIP system, using typical cleaning agents, will raise disposal and wastewater treatment costs. Most likely, these costs will be significant.

The wine institute has provided an estimated capital cost for a clean in place system of $200,000 for 16 tanks. Only eight tanks will be installed in this project; therefore, a capital cost of $100,000 is assumed.

Capital Cost of Clean-In-Place (CIP) System of Ductwork for Wine StorageTanks	
Cost Description	Cost ($)
Current cost of CIP system	$100,000
The following cost data is taken from EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001).	
Direct Costs	
Base Equipment Costs (CIP System) See Above	$100,000
Instrumentation - 10% of base equipment	$10,000
Sales Tax - 3.8125% of base equipment	$3,813
Freight - 5% of base equipment	$5,000
Purchased equipment cost (PEC)	**$118,813**
Foundations & supports - 8% of PEC	$9,505
Handling & erection - 14% of PEC	$16,634
Electrical - 4% of PEC	$4,753
Piping – (included in CIP system cost)	-
Painting - 1% of PEC	$1,188
Insulation - 1% of PEC	$1,188
Direct Installation Costs (DIC)	**$33,268**
Total Direct Costs (DC) (PEC + DIC)	**$152,081**
Indirect Costs	
Engineering - 10% of PEC	$11,881
Construction and field expenses - 5% of PEC	$5,941
Contractor fees - 10% of PEC	$11,881
Start-up - 2% of PEC	$2,376
Performance test - 1% of PEC	$1,188
Total Indirect Costs (IC)	**$33,267**
Total Direct and Indirect Costs (DC + IC)	**$185,348**
Contingency (C) - 15% of (DC + IC)	**$27,802**
Total Capital Investment (TCI) (DC + IC)	**$213,150**

Annualized Capital Costs

Total capital costs = Ductwork + CIP System
= $367,667 + $213,150
= $580,817

Annualized Capital Investment = Initial Capital Investment x Amortization Factor

Amortization Factor = $\left[\frac{0.1(1.1)^{10}}{(1.1)^{10}-1}\right]$ = 0.163 per District policy, amortizing over 10 years at 10%

Therefore,

Total Collection System Annualized Capital Investment = $580,817 x 0.163

Total Collection System Annualized Capital Investment = $94,673

Option 1 - Collection of VOCs and control by thermal or catalytic oxidation (98% collection & control):

Thermal or Catalytic Oxidizer Capital Cost

Adwest Technologies Inc. provided capital cost estimates for use of its regenerative thermal oxidizers for this project. Two oxidizers would be required for this project.

Control Unit	Tank Group	Equipment Price
Oxidizer #1	1	$200,840
Oxidizer #2	2	$150,000
	Total	**$350,840**

Control Unit	Tank Group	RTO Installation Price
Oxidizer #1	1	$38,000
Oxidizer #2	2	$34,670
	Total	**$72,670**

Thermal or Catalytic Oxidation	
Cost Description	Cost ($)
Regenerative Thermal Oxidizer cost (two units)	$350,840
Basic Installation of RTO (includes handling and erection)	$72,670
The following cost analysis follows the control cost estimate procedure from the EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001).	
Direct Costs (DC)	
Base Equipment Costs (Regenerative Thermal Oxidizer System) See Above	**$423,510**
Instrumentation (10% of Base Equipment Cost)	$42,351
Sales Tax - 3.8125% of base equipment	$16,146
Freight 5% (included in cost of RTO)	-
Purchased equipment cost (PEC)	**$482,007**
Foundations & supports (8% of PEC)	$38,561
Handling & erection (14% of PEC)	$67,481
Electrical (4% of PEC)	$19,280
Piping (Included in Ductwork/Piping Costs)	-
Painting (1% of PEC)	$4,820
Insulation (1% of PEC)	$4,820
PCL/Programming Cost (2 units x $10,000/control unit)	$20,000
Direct installation costs	**$154,962**
Total Direct Costs	**$636,969**
Indirect Costs (IC)	
Engineering (10% of PEC)	$48,201
Construction and field expenses (5% of PEC)	$24,100
Contractor fees (10% of PEC)	$48,201
Start-up (2% of PEC)	$9,640
Performance test (2 units x $15,000/unit)	$30,000
Owner's Cost	$20,905
Total Indirect Costs	**$181,047**
Total Direct and Indirect Costs (DC + IC)	**$818,016**
Contingency (C) - 15% of (DC + IC)	**$122,702**
Total Capital Investment (TCI) (DC + IC + C)	**$940,718**

Annualized Capital Costs

Annualized Capital Investment = Initial Capital Investment x Amortization Factor

Amortization Factor = $\left[\frac{0.1(1.1)^{10}}{(1.1)^{10}-1}\right]$ = 0.163 per District policy, amortizing over 10 years at 10%

Therefore,

Annualized Capital Investment = $940,718 x 0.163 = $153,337/year

Operation and Maintenance Costs

The Direct annual costs include labor (operating, supervisory, and maintenance), maintenance materials, electricity, and fuel.

Heat of Combustion for waste gas stream -dh(c):

heat of combustion -dHc = 11,800 Btu/lb (per thermal oxidizer manufacturer)
Max Daily VOC emissions rate = 2,920.4 lb/day
Blower flow rate = 6,107 CFM (based on kinetic model, with oxygen)
= 8,794,080 ft^3/day

-dh(c) = 2,920.4 lb/day x 11,800 Btu/lb ÷ 8,794,080 ft^3/day
= 3.92 Btu/ft^3

Assuming the waste gas is principally air, with a molecular weight of 28.97 and a corresponding density of 0.0739 lb/scf, the heat of combustion per pound of incoming waste gas is:

-dh(c) = 3.92 Btu/ft^3 ÷ 0.0739 lb/ft^3
= 53.0 Btu/lb

Fuel Flow Requirement

$$Q(fuel) = \frac{Pw*Qw*\{Cp*[1.1Tf-Tw-0.1Tr]-[-dh(c)]\}}{\rho(af) * [-dh(m) - 1.1\ Cp * (Tf - Tr)]}$$

Where

Pw	=	0.0739 lb/ft^3
Cp	=	0.255 Btu/lb-°F
Qw	=	6,107 scfm
-dh(m)	=	11,800 Btu/lb for ethanol
Tr	=	77°F (per EPA Cost Manual)
ρ(af)	=	0.0408 lb/ft^3, methane at 77°F, 1 atm
Tf	=	1600°F
Tw	=	1,525°F
-dh(c)	=	53.0 Btu/lb

$$Q = \frac{0.0739*6,107*\{0.255*[1.1*1,600-1,525-0.1*77]-53.0\}}{0.0408*[11,800 - 1.1*0.255*(1,600 - 77)]}$$

= 2,239 ÷ 464 = 4.8 ft^3/min

Fuel Costs

The cost for natural gas shall be based upon the average price of natural gas sold to "Commercial Consumers" in California for the years 2013, 2014 and 2015.[2]

2015 = \$7.98/thousand ft^3 total monthly average
2014 = \$9.05/thousand ft^3 total monthly average
2013 = \$7.81/thousand ft^3 total monthly average
Average for three years = \$8.28/thousand ft^3 total monthly average

Fuel Cost = 4.8 cfm x 1440 min/day x 365 day/year x \$8.28/1000 ft^3
= \$20,889/year

Electricity Requirement

$$\text{Power}_{fan} = \frac{1.17*10^{-4}\ Qw*\ \Delta P}{\in}$$

Where

ΔP = Pressure drop Across system = 4 in. H_2O
$\in$ = Efficiency for fan and motor = 0.6
Qw = 6,107 scfm

$$\text{Power}_{fan} = \frac{1.17*10^{-4} * 6{,}107\ \text{cfm} * 4\ \text{in. } H_2O}{0.60}$$

= 4.8 kW

Electricity Costs

Average cost of electricity to commercial users in California[3]

2015 Average = \$0.1579/kWh

Electricity Cost = 4.8 kW x 24 hours/day x 365 days/year x \$0.1579/kWh = \$6,639/year

[2] Energy Information Administration/Natural Gas; Average Price of Natural Gas Sold to Commercial Consumers by State, 2010 – 2015: http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_SCA_a.htm
[3] Energy Information Administration/Electric Power; Average Retail Price of Electricity to Ultimate Customers by End-Use Sector, by State, 2015
http://www.eia.gov/electricity/data/browser/#/topic/7?agg=0,1&geo=000000000004&endsec=vg&freq=A&start=2001&end=2015&ctype=linechart&ltype=pin&rtype=s&maptype=0&rse=0&pin=

Total Operating and Maintenance Costs

Annual Cost (Data from: Annual Costs for Thermal and Catalytic Incinerators, Table 3.10 – OAQPS Control Cost Manual, Fourth Edition)

Annual Cost			
Operator	0.5 h/shift	$18.5/h x 0.5 h x 365 days/yr x 2 units x 2 shifts/day	$13,505
Supervisor	15% of operator		$2,026
Maintenance			
Labor	0.5 h/shift	$18.5/h x 0.5 h x 365 days/yr x 2 units x 2 shifts/day	$13,505
Material	100% of labor		$13,505
Utility			
Natural Gas			$20,889
Electricity			$6,639
Indirect Annual Cost (IC)			
Overhead	60% of Labor Costs	0.6 x ($13,505 + $2,026 + $13,505)	$17,422
Administrative Charge	2% TCI		$18,814
Property Taxes	1% TCI		$9,407
Insurance	1% TCI		$9,407
Annual Source Test	One representative test/year @ $15,000		$15,000
Total Annual Cost			**$140,119**

Total Annual Cost

Total Annual Cost = Regenerative Thermal Oxidizer System + Annual Cost
+ Ducting/Piping/CIP
= $153,337 + $140,119 + 94,673
= $388,129

Emission Reductions

Annual Emission Reduction =Storage Emissions x 0.98
= 3,692 lb-VOC/year x 0.98
= 3,618 lb-VOC/year
= 1.8 tons-VOC/year

Cost Effectiveness

Cost Effectiveness = Total Annual Cost ÷ Annual Emission Reductions

Cost Effectiveness = $388,129/year ÷ 1.8 tons-VOC/year
= $215,627/ton-VOC

The analysis demonstrates that the annualized purchase cost of the regenerative thermal oxidizer system, the collection system ductwork and CIP equipment, and annual costs alone results in a cost effectiveness which exceeds the District's Guideline, of $17,500/ton-VOC. Therefore this option is not cost-effective and will not be considered for this project.

Option 2 - Collection of VOCs and control by carbon adsorption (95% collection and control):

Design Basis

- Since the District could not obtain costs for the following items, costs for these items haven't been included in this cost analysis. However, these items are necessary to operate the control equipment; therefore, these costs will be included for District projects where costs have been provided by the applicant/equipment manufacturer.
    - The cost for a tank to collect the condensed ethanol laden steam from regeneration of the carbon bed.
    - Annual steam costs required to regenerate the carbon beds.
    - Annual cooling water costs required to condense the ethanol laden steam from regeneration of the carbon beds and the condenser equipment.
    - Electricity costs of system fans, bed drying/cooling fans and cooling water pumps.
- Ethanol laden water is a byproduct produced when the carbon is regenerated with steam and the ethanol laden steam is condensed. The collected ethanol laden water will need to be disposed of and can be a significant cost; however, conservatively, the costs will not be included at this time.

Capital Cost for Carbon Adsorption Equipment

As mentioned in the BACT analysis for District Project N-1143697, on February 3, 2015 David Drewelow of Drewelow Remediation Equipment, Inc. provided a cost estimate of $80,000 to $85,000 for a 1,000 cfm carbon containment system, including a gas/liquid separator, an inline filter, blower, exhaust silencer and air to air heat exchanger. The following costs for carbon adsorption are based on this quote, using the 6/10ths rule and applying a factor of 80% to ensure that the results of the use of the 6/10ths rule are conservative.

$$\text{Cost}_{\text{Proposed System}} = 0.8 \times \text{Cost}_{\text{Quoted System}} \left(\frac{\text{CFM}_{\text{Proposed System}}}{\text{CFM}_{\text{Quoted System}}} \right)^{0.6}$$

Tank Group	CFM Rating	Cost
1	1,476	$85,893
2	4,631	$170,574
Total		$256,467

Capital Cost for Carbon for System

Annual Emission Reduction = Storage Emissions x 0.95
= 3,692 lb-VOC/year x 0.95
= 3,507 lb-VOC/year

Assume a working bed capacity of 20% for carbon (weight of vapor per weight of carbon)

Carbon required = 3,507 lb-VOC/year x 1/0.20
= 17,535 lb carbon

David Drewelow also provided a cost of $1.25/lb of carbon which does not include any delivery or servicing fees.

Annual carbon cost = $1.25/lb x 17,535 lb carbon = $21,919

Carbon Adsorption Capital Cost		
Cost Description	Equipment Cost ($)	Carbon Cost ($)
Carbon Adsorption System Cost	$256,467	-
Water alcohol tank cost (not included)	-	-
Carbon Capital Cost (see above)	-	$21,919
The following cost data is based on the EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002) (EPA/452/B-02-001).		
Direct Costs		
Base Equipment Costs (Carbon Adsorption System + Water Alcohol Tank + Carbon) See Above	$256,647	$21,919
Instrumentation - 10% of base equipment	$25,647	-
Sales Tax - 3.8125 of base equipment	$9,784	$836
Freight - 5% of base equipment	$12,823	$1,096
Purchased Equipment Cost (PEC)	**$304,901**	**$23,851**
Foundations & supports - 8% of PEC	$24,392	-
Handling & erection - 14% of PEC	$42,686	-
Electrical - 4% of PEC	$12,196	-
Piping – (Included in Piping/Ducting)	-	-
Painting - 1% of PEC	$3,049	-
Insulation - 1% of PEC	$3,049	-
PCL/Programming Cost (2 units x $10,000/control unit)	$20,000	
Direct installation costs	**$105,372**	**$0**
Total Direct Costs (DC)	**$410,273**	**$23,851**
Indirect Costs		
Engineering - 10% of PEC	$30,490	-
Construction and field expenses - 5% of PEC	$15,245	-
Contractor fees - 10% of PEC	$30,490	-
Start-up - 2% of PEC	$6,098	-
Initial Source Testing - 2 units x $15,000/unit	$30,000	-
Owner's Cost	$20,095	
Total Indirect Costs (IC)	**$132,418**	**$0**
Total Direct and Indirect Costs (DC + IC)	**$542,691**	**23,851**
Contingency (C) - 15% of (DC + IC)	**$81,404**	**-**
Total Capital Investment (TCI) (DC + IC + C)	**$624,095**	**$23,851**

Annualized Capital Cost for Carbon Adsorption Equipment

Annualized Capital Investment = Initial Capital Investment x Amortization Factor

Amortization Factor = $\left[\frac{0.1(1.1)^{10}}{(1.1)^{10}-1}\right]$ = 0.163 per District policy, amortizing over 10 years at 10%

Therefore,

Annualized Capital Investment (Carbon System Equipment) = $624,095 x 0.163 = $101,728

Annualized Cost for Carbon

The EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002), Section 3.1: VOC Recapture Controls, Chapter 1: Carbon Adsorbers (September 1999)[4] states, "*A typical life for the carbon is five years. However, if the inlet contains VOCs that are very difficult to desorb, tend to polymerize, or react with other constituents, a shorter carbon lifetime— perhaps as low as two years—would be likely.*"

Assuming the maximum carbon life of five years and a 10% interest rate the capitol recovery cost for the carbon =

$\left[\frac{0.1(1.1)^{5}}{(1.1)^{5}-1}\right]$ = 0.264 over 5 years at 10% interest

Therefore,

Annualized Capital Investment for Carbon for System = $23,851 x 0.264 = $6,297

Annualized Cost of Carbon Adsorption Equipment + Annualized Cost of Carbon for System

Annualized Capital Cost for Carbon Adsorption System = $101,728 + $6,297 = $108,025

[4] EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002), Section 3.1: VOC Recapture Controls, Chapter 1: Carbon Adsorbers (September 1999). United States Environmental Protection Agency Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina 27711, EPA/452/B-02-001, http://epa.gov/ttn/catc/dir1/cs3-1ch1.pdf.

Total Operation and Maintenance Costs

The annual operation and maintenance costs for the carbon adsorption system are based on the information given in the EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002), Section 3.1: VOC Recapture Controls, Chapter 1: Carbon Adsorbers (September 1999). No value will be given for the ethanol that may be potentially recovered since this ethanol could actually result in additional disposal costs, which will also not be quantified in this analysis.

Carbon Adsorption Annual Costs			
Direct Annual Cost (DAC)			
Operating Labor			
Operator	0.5 hr/shift	$18.50/hr x 0.5 hr/shift x 2 shift/day x 365 days/year x 2 units	$13,505
Supervisor	15% of operator		$2,026
Maintenance			
Labor	0.5 h/shift	$18.50/hr x 0.5 hr/shift x 2 shift/day x 365 days/year x 2 units	$13,505
Maintenance	100% of labor		$13,505
Utility			
Natural Gas from Steam Production (not included)			-
Electricity (not included)			-
Total DAC			**$42,541**
Indirect Annual Cost (IAC)			
Overhead	60% of Labor Cost	0.6 x ($13,505 + $2,026 + $13,505)	$17,422
Administrative	2% of TCI		$12,482
Property Taxes	1% of TCI		$6,241
Insurance	1% of TCI		$6,241
Annual Source Test	One representative test/year @ $15,000		$15,000
Total IAC			**$57,386**
Annual Cost (DAC + IAC)			**$99,927**

Total Annual Cost for Carbon Adsorption

Total Annual Cost = Carbon Adsorption Capital Cost + Annual Operating Cost + Ducting/Piping/CIP
= $108,025 + $99,927 + $94,673
= $302,625

Emission Reductions

Annual Emission Reduction = Storage Emissions x 0.95
= 3,692 lb-VOC/year x 0.0.95
= 3,507 lb-VOC/year
= 1.8 tons-VOC/year

Cost Effectiveness

Cost Effectiveness = Total Annual Cost ÷ Annual Emission Reductions

Cost Effectiveness = $302,625/year ÷ 1.8 tons-VOC/year
= $168,125/ton-VOC

The analysis demonstrates that the annualized purchase cost of the carbon adsorption system, the operating cost, and the collection system ductwork and equipment alone results in a cost effectiveness which exceeds the District's Guideline of $17,500/ton-VOC. Therefore this option is not cost-effective and will not be considered for this project.

Option 3 - Collection of VOCs and control by absorption/scrubber (90% collection & control):

Design Basis

- The District contacted Maurice McIntosh and Ad Verkuylen of NohBell Corporation on March 16, 2016 to allow NohBell Corporation an opportunity to provide cost information for this project. The District did not receive updated cost information from NohBell Corporation; therefore, cost estimates from NohBell Corporation will not be included as a part of this BACT analysis.
- Recovered ethanol storage tank = $40,000 (installed, as proposed in Project C-1133347)
- Connected electrical load for each unit is 2.5 horsepower which is assumed to operate continuously for 90 days.
- Electric power cost = $0.1579/kWh (see regenerative thermal oxidizer Top Down BACT Analysis section above)
- Since the EPA Control Cost Manual does not contain a section for wet scrubbers controlling VOCs, conservatively, the costs in addition to the base equipment costs, will be estimated from the Wet Scrubbers for Particulate Matter control from the EPA Control Cost Manual.

Equipment Cost Scrubber

The following costs are based on estimates for scrubber costs provided by Anguil Environmental in November, 2015.

Control Unit	Tank Group	Anguil Environmental Equipment Budget Price
1	1	$180,000
2	2	$120,000
Total:		$300,000

Scrubber Capital Cost	
Cost Description	Cost ($)
Scrubber System (Two units)	$300,000
The following cost data is taken from EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001).	
Direct Costs	
Base Equipment Costs (Scrubber System) See Above	$300,000
Instrumentation - 10% of base equipment	$30,000
Sales Tax - 3.8125 of base equipment	$11,438
Freight - 5% of base equipment	$15,000
Purchased Equipment Cost (PEC)	**$356,438**
Foundations & supports – 6% of PEC	$21,386
Handling & erection - 40% of PEC	$142,575
Electrical - 1% of PEC	$3,564
Piping (Included in Ductwork/Piping Costs)	-
Painting - 1% of PEC	$3,564
Insulation - 3% of PEC	$10,693
PCL/Programming Cost (2 units x $10,000/control unit)	$20,000
Recovered Ethanol Storage Tank (installed) ($40,000 x 2 tank groups)	$80,000
Direct Installation Costs (DIC)	**$281,782**
Direct Costs (DC) (PEC + DIC)	**$638,220**
Indirect Costs	
Engineering - 10% of PEC	$35,644
Construction and field expenses - 10% of PEC	$35,644
Contractor fees - 10% of PEC	$35,644
Start-up - 1% of PEC	$3,564
Initial Source Testing – 2 units x $15,000/unit	$30,000
Owner's Cost	$20,095
Indirect Costs (IC)	**$160,591**
Total Direct and Indirect Costs (DC + IC)	**$798,811**
Contingency (C) - 15% of (DC + IC)	**$119,822**
Total Capital Investment (TCI) (DC + IC + C)	**$918,633**

Annualized Capital Costs

Annualized Capital Investment = Initial Capital Investment x Amortization Factor

Amortization Factor = $\left[\frac{0.1(1.1)^{10}}{(1.1)^{10}-1}\right]$ = 0.163, amortizing over 10 years at 10%

Therefore,

Annualized Capital Investment = $918,633 x 0.163 = $149,737

Wastewater Disposal Costs

Additionally, the water scrubber will generate ethanol-laden wastewater containing 1.66 tons-ethanol annually (3,692 lb/year (uncontrolled fermentation emissions) x 0.9 ÷ 2000). Assuming a 10% solution, approximately 5,015 gallons of waste water (1.66 ton-ethanol x 2000 lb/ton x gal/6.62 lb ÷ 0.10) will be generated annually. Per District Project N-1133347, an allowance of $0.08 per gallon is applied for disposal costs.

Annual disposal costs = 5,015 gallons x $0.08/gallon = $401

Total Operation and Maintenance Costs

Scrubber Annual Costs			
Direct Annual Cost (DAC)			
Operating Labor			
Operator	0.5 hr/day x 2 units x 365 days x 2 shifts/day = 730	$18.50/h	$13,505
Supervisor	15% of operator		$2,026
Maintenance			
Labor	0.5 hr/day x 2 units x 365 days x 2 shifts/day = 730	$18.5/h	$13,505
Wastewater Disposal			
	10% Solution = 5,015 gal	$0.08/gal	$401
Utility			
Electricity	2 units x 2.5 hp x 0.746 kW/hp x 8,760 hr/yr = 32,675 kWh/yr	$0.1579/kWh	$5,159
Total DAC			**$34,596**
Indirect Annual Cost (IAC)			
Overhead	60% of Labor Cost	0.6 x ($13,505 + $2,026 + $13,505)	$17,422
Administrative Charge	2% of TCI		$18,373
Property Taxes	1% of TCI		$9,186
Insurance	1% of TCI		$9,186
Annual Source Test	One representative test/year @ $15,000		$15,000
Total IAC			**$69,167**
Annual Cost (DAC + IAC)			**$95,660**

Total Annual Cost = Scrubber Capital Cost + Annual Operating Cost + Ducting/Piping/CIP
= $149,737 + $103,763 + $94,673
= $348,173

Emission Reductions

The District's BACT Guideline identifies an overall collection and control efficiency of 90% for absorption systems.

Annual Emission Reduction = Uncontrolled Fermentation Emissions x 0.9
= 3,692 lb-VOC/year x 0.9
= 3,323 lb-VOC/year
= 1.7 tons-VOC/year

Cost Effectiveness

Cost Effectiveness = Total Annual Cost ÷ Annual Emission Reductions

Cost Effectiveness = $348,173/year ÷ 1.7 tons-VOC/year
= $204,808/ton-VOC

The analysis demonstrates that the annualized purchase cost of the water scrubber and annual costs alone results in a cost effectiveness which exceeds the District's Guideline of $17,500/ton-VOC. Therefore this option is not cost-effective and will not be considered for this project.

Option 4 - Capture of VOCs and condensation (70% collection & control):

Design Basis

- Although the EcoPAS units have not been demonstrated at the scale of operation as proposed by this project, the District will conservatively assume that the proposed equipment and equipment cost proposed by EcoPAS will meet the duty requirements for the project.
- A glycol chiller would be required for this operation; however, a cost to modify the winery chilling system was not provided. Therefore, the final cost analysis does not include the cost of a glycol chiller, which would be required to operate the system
- This control technology recovers ethanol which potentially requires additional cost to dispose of. The District currently knows of two winery facilities that recover ethanol: Central Coast Wine Services in and Terravant Winery, both within Santa Barbara County. Information from the Santa Barbara County APCD indicates that neither facility generates any revenue from the recovered ethanol. Central Coast Wine Services sends their recovered ethanol to a facility in San Luis Obispo that refines the recovered ethanol into motor vehicle fuels and Terravant Winery utilizes a UV system to destroy the ethanol. Although EcoPAS claims that there is value in the recovered ethanol in a future market that may be developed; the District will conservatively assume that there is no cost required to dispose/treat the recovered ethanol nor is there a value in the recovered ethanol.

Equipment Cost Refrigerated Condenser

Pricing for the EcoPAS units will be based on project specific pricing received from EcoPAS LLC on March 28, 2016. According to the cost estimate provided, three PAS-100 condensers would be required to control emissions from the proposed tanks in this project.

In addition to the base equipment cost (as referred to as CapEx by EcoPAS), EcoPAS provided additional cost for stainless steel ducting, installation cost (which includes hoses, capture vessels, pressure release valves, instrumentation, freight, taxes, and engineering) and annual cost (which includes both direct and indirect costs, labor, testing, maintenance, overhead and administration). The District has requested a detailed breakdown and reference of the cost of each component of each cost category from the vendor but has yet to receive the additional information; therefore, the base equipment cost will be used as provided by the vendor and remaining costs associated with the installation of refrigerated condensers will be taken from the Eichlay Report and the EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001).

Condensation Capital Cost	
Cost Description	Cost ($)
Cost of Refrigerated Condenser system (3 PAS-100 Units)	$585,000
The following cost data is taken from EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001).	
Direct Costs	
Base Equipment Costs (Condenser) See Above	$585,000
Instrumentation - 10% of base equipment	$58,500
Sales Tax - 3.8125% of base equipment	$22,303
Freight - 5% of base equipment	$29,250
Purchased equipment cost (PEC)	**$695,053**
Foundations & supports - 14% of PEC	$97,307
Handling & erection - 8% of PEC	$55,604
Electrical - 8% of PEC	$55,604
Piping – (Included in Piping/Ducting)	-
Painting - 1% of PEC	$6,951
Insulation - 10% of PEC	$69,505
PCL/Programming Cost (3 units x $10,000/control unit)	$30,000
Direct Installation Costs (DIC)	**$314,971**
Total Direct Costs (DC) (PEC + DIC)	**1,010,024**
Indirect Costs	
Engineering - 10% of PEC	$69,505
Construction and field expenses - 5% of PEC	$34,753
Contractor fees - 10% of PEC	$69,505
Start-up - 2% of PEC	$13,901
Source Testing - 3 units x $15,000/unit	$45,000
Owner's Cost	$20,095
Total Indirect Costs (IC)	**$252,759**
Total Direct and Indirect Costs (DC + IC)	**$1,262,783**
Contingency (C) - 15% of (DC + IC)	**$189,417**
Total Capital Investment (TCI) (DC + IC + C)	**$1,452,200**

Annualized Capital Costs

Annualized Capital Investment = Initial Capital Investment x Amortization Factor

Amortization Factor = $\left[\frac{0.1(1.1)^{10}}{(1.1)^{10}-1}\right]$ = 0.163, amortizing over 10 years at 10%

Therefore,

Annualized Capital Investment = $1,452,200 x 0.163 = $236,709

Total Operation and Maintenance Costs

Condensation Annual Costs			
Direct Annual Cost (DAC)			
Operating Labor			
Operator	0.5 hr/shift x 2 shifts/day x 3 units x 365 days = 1,095 hr/year	$18.50/h	$20,258
Supervisor	15% of operator		$3,039
Maintenance			
Labor	0.5 hr/shift x 2 shifts/day x 3 units x 365 days = 1,095 hr/year	$18.50/h	$20,258
Chiller (Glycol)			
Not included at this time			-
Utility			
Electricity	Not included at this time		$0
Total DAC			**$43,555**
Indirect Annual Cost (IAC)			
Overhead	60% of Labor Cost	0.6 x ($20,258 + $3,039 + $20,258)	$26,133
Administrative	2% of TCI		$29,044
Property Taxes	1% of TCI		$14,522
Insurance	1% of TCI		$14,522
Annual Source	One representative test/year @ $15,000		$15,000
Total IAC			**$99,221**
Annual Cost (DAC + IAC)			**$142,776**

Total Annual Cost = Condenser Capital Cost + Annual Operating Cost + Ducting/Piping
= $236,709 + $142,776 + $94,673
= $474,158

Emission Reductions

EcoPAS has indicated the PAS unit is capable of achieving a capture and control efficiency of 90%. However, the District's current BACT Guideline identifies a combined capture and control efficiency of 70% for condensation technology. The capture and control efficiency of 70% will be used in this analysis.

Annual Emission Reduction = Uncontrolled Storage Emissions x 0.7
= 3,692 lb-VOC/year x 0.7
= 2,584 lb-VOC/year
= 1.3 tons-VOC/year

Cost Effectiveness

Cost Effectiveness = Total Annual Cost ÷ Annual Emission Reductions

Cost Effectiveness = $474,158/year ÷ 1.3 tons-VOC/year
= $364,737/ton-VOC

The analysis demonstrates that the annualized purchase cost of the refrigerated condenser system and annual costs alone results in a cost effectiveness which exceeds the District's Guideline of $17,500/ton-VOC. Therefore this option is not cost-effective and will not be considered for this project.

Option 5 - Insulation or Equivalent, Pressure Vacuum Relief Valve (PVRV) set within 10% of the maximum allowable working pressure of the tank; "gas-tight" tank operation; and continuous storage temperature not exceeding 75 degrees F, achieved within 60 days of completion of Fermentation

The only remaining control option in step 3 above has been deemed AIP for this class and category of source and per the District BACT policy is required regardless of the cost. Therefore, a cost effectiveness analysis is not required.

Step 5 – Select BACT

All identified feasible options with control efficiencies higher than the option proposed by the facility have been shown to not be cost effective. The facility has proposed Option 5, which is:

Insulation or Equivalent, Pressure Vacuum Relief Valve (PVRV) set within 10% of the maximum allowable working pressure of the tank; "gas-tight" tank operation; and continuous storage temperature not exceeding 75 degrees F, achieved within 60 days of completion of fermentation

Appendix IV
BACT Guideline 5.4.14 and Top-Down BACT Analysis (Fermentation)

Per » B A C T » Bact Guideline.asp?category Level1=5&category Level2=4&category Level3=14&last Update=10 » 6 :

Back

Best Available Control Technology (BACT) Guideline 5.4.14
Last Update: 10/6/2009

Wine Fermentation Tank

Pollutant	Achieved in Practice or in the SIP	Technologically Feasible	Alternate Basic Equipment
VOC	Temperature-Controlled Open Top Tank with Maximum Average Fermentation Temperature of 95 deg F	1. Capture of VOCs and Thermal Oxidation or Equivalent (88% control) 2. Capture of VOCs and Carbon Adsorption or Equivalent (86% control) 3. Capture of VOCs and Absorption or Equivalent (81% control) 4. Capture of VOCs and Condensation or Equivalent (81% control)	

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 requried 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. For background information, see Permit Specific BACT Determinations on Details Page.

Top-Down BACT Analysis for Fermentation Operations

Step 1 - Identify all control technologies

SJVUAPCD BACT Clearinghouse guideline 5.4.14 identifies the following control options for wine fermentation tanks as follows:

1) Capture of VOCs and thermal oxidation or equivalent (88% Overall Capture and Control) – Technologically Feasible
2) Capture of VOCs and carbon adsorption or equivalent (86% Overall Capture and Control) – Technologically Feasible
3) Capture of VOCs and absorption or equivalent (81% Overall Capture and Control) – Technologically Feasible
4) Capture of VOCs and condensation or equivalent (81% Overall Capture and Control) – Technologically Feasible
5) Temperature-Controlled Open Top Tank with Maximum Average Fermentation Temperature of 95 deg F – Achieved in Practice

As mentioned above, BACT guideline 5.4.14 (10/6/2009) lists both absorption (scrubber) and condensation systems as technologically feasible options for the control of VOC emission from wine fermentation operations. Since 2009, there has been substantial development of these two control technologies, prompting the District to perform an analysis to determine whether these technologies can now be considered Achieved in Practice. As demonstrated in the Achieved in Practice analysis in Appendix V, these technologies do not yet meet the criteria to be considered as Achieved in Practice. Therefore, the technologies will be considered technologically feasible and a cost analysis will be performed for these technologies.

Step 2 - Eliminate Technologically Infeasible Options

None of the above listed technologies are technologically infeasible.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

Rank by Control Effectiveness		
Rank	Control	Overall Capture and Control Efficiency(*)
1	Capture of VOCs and thermal or catalytic oxidation or equivalent	88%(**)
2	Capture of VOCs and carbon adsorption or equivalent	86%
3	Capture of VOCs and absorption or equivalent	81%
4	Capture of VOCs and condensation or equivalent	81%
5	Temperature-Controlled Open Top Tank with Maximum Average Fermentation Temperature of 95 deg F	Baseline (Achieved-in-Practice)

(*) Capture efficiency (90%) x removal efficiency for control device.
(**) Following recent District practice, thermal and catalytic oxidation will be ranked together.

Step 4 - Cost Effectiveness Analysis

A cost effective analysis must be performed for all control options that have not been determined to be achieved in practice in the list from Step 3 above, in the order of their ranking, to determine the cost effective option with the lowest emissions.

District BACT Policy APR 1305 establishes annual cost thresholds for imposed control based upon the amount of pollutants reduced by the controls. If the cost of control is at or below the threshold, it is considered a cost effective control. If the cost exceeds the threshold, it is not cost effective and the control is not required. Per District BACT Policy, the maximum cost limit for VOC reduction is $17,500 per ton of VOC emissions reduced.

BACT Analysis Assumptions – All Control Options

- Sales Tax: This facility is located in Lodi, CA, which has a current sales tax rate of 8.0%. However, pollution control equipment qualifies for a partial tax exemption in California. According to the following link, the tax exemption rate is 4.1875%, http://www.boe.ca.gov/sutax/manufacturing_exemptions.htm#Purchasers . Therefore, the sales tax rate used in this analysis will be set equal to 3.8125% (8.0% - 4.1875%).
- Due to the unsteady state operation of fermentation tanks, initial source testing is expected to be a significant technical operation with significant expense, conducted over the fermentation cycle rather than the typical three 30-minute steady state measurements. An additional cost of $15,000 per control unit will be assumed for initial source testing.
- Annual source testing will also be required. It is assumed that only one representative control unit will require testing each year. An annual charge of $15,000 will be included.
- Project Contingency: For detailed estimates, the Association for the Advancement of Cost Engineering International recommends a contingency factor of 15%, while the Electric Power Research Institute recommends a contingency of 10% to 20% (ftp://ftp.repec.org/opt/ReDIF/RePEc/sip/04-005.pdf). Therefore, a cost contingency of 15% will be applied to the detailed estimates provided in these cost analyses. Additionally, since both the direct and indirect costs are detailed estimates and both of these categories of costs have uncertainty associated with them, the contingency will be applied to both the direct and indirect costs.
- The cost of project management, internal engineering operations planning required to implement a new control technology in a commercial winery will be included in each cost analysis as the owner's cost. In District project-1133347, an owners cost of $100,000 was assumed for an installation of 12 wine fermentations/storage tanks with a combined total capacity of 4,200,000 million gallons. This current project has a combined total capacity of 844,000 gallons. The owners cost will be conservatively assumed to have a linear relationship with the total capacity of the tanks being installed. An owner's cost of $20,095 ($100,000 x 844,000 gallons ÷ 4,200,000 gallons) will be used for the following cost analyses.

- In order to capture storage emissions from wine storage tanks, it is necessary to enclose the tanks and duct the captured vapors to the control device. An increase in back pressure can result from enclosing the control device and adding the duct work and control system. Increases in back pressure to the tanks causes additional CO_2 absorption into the wine, resulting in the possibility of an effervescent reaction and a foam over event. To proactively prevent catastrophic events like foam overs, it is necessary to monitor back pressure and temperature of the tanks and take immediate action if the back pressure rises to critical levels that suggest a foam over is about to occur. The cost of the equipment to monitor the pressure and temperature are included in the Programming Controller Logic (PCL) cost. In District Project C-1133347, a PCL cost of $10,000 per control system was provided to the District. This cost will be used to estimate PCL costs for the currently proposed project.
- In determining the labor costs for the cost analyses, three shifts is assumed to be appropriate for a control system wine fermentation tanks, since the emission rate from fermentation varies more and is less stable than the emission rate from wine storage.

Maximum Vapor Flow Rate

Based on the kinetic model provided by the facility, maximum CO_2 production rate for each fermentation tank group is summarized as follows:

Tank IDs	Permits	Tank Group	Nominal Tank Capacities (gallons)	Max CO_2 Flowrate for Entire Tank Group (scfm)	Max CO_2 + Fresh Air Flowrate for Entire Tank Group (scfm)
727, 728, 730, and 731	N-96-389 through '-392	1	160,000 each	3,308	4,631
736, 737, 740, and 741	N-96-393 through '-396	2	51,000 each	1,054	1,476
Total				4,362	6,107

Uncontrolled Fermentation Emissions

Currently, industry standard is the use of temperature controlled open top tanks with a maximum average fermentation temperature of 95°F. Fermentation emissions, using this level of control are estimated to be 6.2 lb/1000 gallons of wine fermented. The following shows the industry standard emissions for each tank associated with this project:

Permit Unit	Capacity (gallons)	Fermentation Cycles per year	Fermentation Emissions (lb/year)
N-96-389-0 (Tank 727)	160,000	6	5,952
N-96-390-0 (Tank 728)	160,000	6	5,952
N-96-391-0 (Tank 730)	160,000	6	5,952
N-96-392-0 (Tank 731)	160,000	6	5,952
N-96-393-0 (Tank 736)	51,000	6	1,897
N-96-394-0 (Tank 737)	51,000	6	1,897
N-96-395-0 (Tank 740)	51,000	6	1,897
N-96-396-0 (Tank 741)	51,000	6	1,897
Total	**844,000**	**N/A**	**31,396**

Collection System Capital Investment (based on ductwork and clean-in-place system)

A common feature of all technically feasible options is that they require installation of a collection system for delivering the VOCs from the tanks to the common control device(s).

Basis of Cost Information for Collection System:

- The costs for the ductwork and the required clean-in-place (CIP) system are based on information from the 2005 Eichleay Study. The 2005 Eichleay study was used in development of District Rule 4694 Wine Fermentation and Storage Tanks and includes substantial information on the costs and details of the potential application of VOC controls to wineries and addresses many of the technical issues of the general site specific factors for wineries.

- The District performed a cost survey of stainless steel ducting/piping and found that the values stated in the Eichleay report including the cost of inflation (applied as stated below) were less expensive; therefore, as a conservative estimate, the District will use the cost of ducting/piping from the Eichleay report which will include ducting, fittings, bolt up, handle, and install. A summary of the ducting/piping cost survey is included in Appendix VI.

- Eichleay's cost estimate for ducting included the duct, fittings, bolt up, handle and install; therefore, the District did not allow the additional costs for foundations & supports, handling & erection, electrical, piping or painting, as allowed by the EPA Cost Manual.

- The collection system consists of stainless steel place ductwork (stainless steel is required due to food grade product status) with isolation valving, connecting the tanks to a common manifold system which ducts the combined vent to the common control device. The cost of dampers and isolation valving, installed in the ductwork, will be included in the cost estimate.

- A minimum duct size is established at six inches diameter at each tank to provide adequate strength for spanning between supports.

- One of the major concerns of a manifold duct system is microorganisms spoiling the product, and transferring from one tank to another. It is necessary to design into the system a positive disconnect of the ducting system when the tanks are not being filled. There are a number of ways this can be done. In this case, an automatic butterfly valve with a physical spool to disconnect the tank from the duct will be utilized.

- The ducting/piping costs quoted in the Eichleay study are from 2005 and must be adjusted to reflect 2016 prices. An overall inflation amount of 21.93% which was taken from the United States Department of Labor, Bureau of Labor Statistics, Consumer Price Index (CPI) Inflation Calculator and applied to the ducting/piping costs to determine the current 2016 prices: http://www.bls.gov/data/inflation_calculator.htm.

Capital Cost of Ductwork

This facility includes two groups of four tanks. The capital cost for ductwork from each tank group is estimated below:

Tank Group 1:

Connection from tank to main duct = 4 tanks x 25 feet (6" duct) x $62.17/foot = $6,217
Main duct for fermenters = 100' (12" duct) x $143.83/foot = $14,383
Unit installed cost for 6 inch butterfly valve = $2,125/valve x 4 valves x 1 system = $8,500
Unit installed cost one foot removable spool = $500/tank x 4 tanks x 1 system = $2,000
1 Knockout drum = $46,300
Duct support allowance = $4,000/tank x 4 tanks = $16,000

Total for Group 1 = $6,217 + $14,383 + $8,500 + $2,000 + $46,300 + $16,000
= $93,400

Tank Group 2:

Connection from tank to main duct = 4 tanks x 25 feet (6" duct) x $62.17/foot = $6,217
Main duct for fermenters = 100' (12" duct) x $143.83/foot = $14,383
Unit installed cost for 6 inch butterfly valve = $2,125/valve x 4 valves x 1 system = $8,500
Unit installed cost one foot removable spool = $500/tank x 4 tanks x 1 system = $2,000
1 Knockout drum = $46,300
Duct support allowance = $4,000/tank x 4 tanks = $16,000

Total for Group 1 = $6,217 + $14,383 + $8,500 + $2,000 + $46,300 + $16,000
= $93,400

Total Capital Cost for All Tank Groups:

The total capital cost of the ductwork for all five tank groups is summarized in the table below:

Tank Group	Total Ducting Cost Including Support Allowance
1	$93,400
2	$93,400
Total	$186,800

Capital Cost of Ductwork for Wine Fermentation Tanks	
Cost Description	Cost ($)
Combined Duct Estimate for all Tank Groups	$186,800
Adjusting factor for inflation from 2005 dollars to 2015 dollars (21.93% total increase)	1.2193
Inflation adjusted duct cost	$227,765
The following cost data is taken from EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001).	
Direct Costs	
Base Equipment Costs (Ductwork) See Above	$227,765
Instrumentation (not required)	-
Sales Tax - 3.8125% of base equipment	$8,684
Freight - 5% of base equipment	$11,388
Purchased equipment cost (PEC)	**$247,837**
Foundations & supports 8% (allowance already included in cost estimate)	-
Handling & erection 14% (already included in Eichleay cost estimate)	-
Electrical 4% (not required)	-
Piping 2% (not required)	-
Painting 1% (not required)	-
Insulation 1% of PEC	$2,478
Direct Installation Costs (DIC)	**$2,478**
Total Direct Costs (DC) (PEC + DIC)	**$250,315**
Indirect Costs	
Engineering - 10% of PEC	$24,784
Construction and field expenses - 5% of PEC	$12,392
Contractor Fees - 10% of PEC	$24,784
Start-up - 2% of PEC	$4,957
Performance Test - 1% of PEC	$2,478
Total Indirect Costs (IC)	**$69,395**
Total Direct and Indirect Costs (DC + IC)	**$319,710**
Contingency (C) - 15% of (DC + IC)	**$47,967**
Total Capital Investment (TCI) (DC + IC + C)	**$367,667**

Capital Cost Clean-In-Place (CIP) System

A ducting system on a tank farm must have this system to maintain sanitation and quality of the product. The cost of operation of the CIP system has not been estimated. Operation of a CIP system, using typical cleaning agents, will raise disposal and wastewater treatment costs. Most likely, these costs will be significant.

The wine institute has provided an estimated capital cost for a clean in place system of $200,000 for 16 tanks. Only eight tanks will be installed in this project; therefore, a capital cost of $100,000 is assumed.

Capital Cost of Clean-In-Place (CIP) System of Ductwork for Wine Fermentation Tanks	
Cost Description	Cost ($)
Current cost of CIP system	$100,000
The following cost data is taken from EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001).	
Direct Costs	
Base Equipment Costs (CIP System) See Above	$100,000
Instrumentation - 10% of base equipment	$10,000
Sales Tax - 3.8125% of base equipment	$3,813
Freight - 5% of base equipment	$5,000
Purchased equipment cost (PEC)	**$118,813**
Foundations & supports - 8% of PEC	$9,505
Handling & erection - 14% of PEC	$16,634
Electrical - 4% of PEC	$4,753
Piping – (included in CIP system cost)	-
Painting - 1% of PEC	$1,188
Insulation - 1% of PEC	$1,188
Direct Installation Costs (DIC)	**$33,268**
Total Direct Costs (DC) (PEC + DIC)	**$152,081**
Indirect Costs	
Engineering - 10% of PEC	$11,881
Construction and field expenses - 5% of PEC	$5,941
Contractor fees - 10% of PEC	$11,881
Start-up - 2% of PEC	$2,376
Performance test - 1% of PEC	$1,188
Total Indirect Costs (IC)	**$33,267**
Total Direct and Indirect Costs (DC + IC)	**$185,348**
Contingency (C) - 15% of (DC + IC)	**$27,082**
Total Capital Investment (TCI) (DC + IC +C)	**$213,150**

Annualized Capital Costs

Total capital costs = Ductwork + CIP System
= $367,667 + $213,150
= $580,817

Annualized Capital Investment = Initial Capital Investment x Amortization Factor

Amortization Factor = $\left[\frac{0.1(1.1)^{10}}{(1.1)^{10}-1}\right]$ = 0.163 per District policy, amortizing over 10 years at 10%

Therefore,

Total Collection System Annualized Capital Investment = $580,817 x 0.163

Total Collection System Annualized Capital Investment = $94,673

Option 1 - Collection of VOCs and control by thermal or catalytic oxidation (88% collection & control):

Thermal or Catalytic Oxidizer Capital Cost

Adwest Technologies Inc. provided capital cost estimates for use of its regenerative thermal oxidizers for this project. Two oxidizers would be required for this project.

Control Unit	Tank Group	Equipment Price
Oxidizer #1	1	$200,840
Oxidizer #2	2	$150,000
	Total	**$350,840**

Control Unit	Tank Group	RTO Installation Price
Oxidizer #1	1	$38,000
Oxidizer #2	2	$34,670
	Total	**$72,670**

Thermal or Catalytic Oxidation	
Cost Description	Cost ($)
Regenerative Thermal Oxidizer cost (two units)	$350,840
Basic Installation of RTO (includes handling and erection)	$72,670
The following cost analysis follows the control cost estimate procedure from the EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001).	
Direct Costs (DC)	
Base Equipment Costs (Regenerative Thermal Oxidizer System) See Above	**$423,510**
Instrumentation (10% of Base Equipment Cost)	$42,351
Sales Tax (8% of Base Equipment Cost, San Joaquin County)	$16,146
Freight 5% (included in cost of RTO)	-
Purchased equipment cost (PEC)	**$482,007**
Foundations & supports (8% of PEC)	$38,561
Handling & erection (14% of PEC)	$67,481
Electrical (4% of PEC)	$19,280
Piping (Included in Ductwork/Piping Costs)	-
Painting (1% of PEC)	$4,820
Insulation (1% of PEC)	$4,820
PCL/Programming Cost (2 units x $10,000/control unit)	$20,000
Direct installation costs	**$154,962**
Total Direct Costs	**$636,969**
Indirect Costs (IC)	
Engineering (10% of PEC)	$48,201
Construction and field expenses (5% of PEC)	$24,100
Contractor fees (10% of PEC)	$48,201
Start-up (2% of PEC)	$9,640
Performance test (2 units x $15,000/unit)	$30,000
Owner's Cost	$20,905
Total Indirect Costs	**$181,047**
Total Direct and Indirect Costs (DC + IC)	**$818,016**
Contingency (C) - 15% of (DC + IC)	**$122,702**
Total Capital Investment (TCI) (DC + IC + C)	**$940,718**

Annualized Capital Costs

Annualized Capital Investment = Initial Capital Investment x Amortization Factor

Amortization Factor = $\left[\frac{0.1(1.1)^{10}}{(1.1)^{10}-1}\right]$ = 0.163 per District policy, amortizing over 10 years at 10%

Therefore,

Annualized Capital Investment = $940,718 x 0.163 = $153,337/year

Operation and Maintenance Costs

The Direct annual costs include labor (operating, supervisory, and maintenance), maintenance materials, electricity, and fuel.

Heat of Combustion for waste gas stream -dh(c):

heat of combustion -dHc = 11,800 Btu/lb
Daily VOC emissions rate = 2,920.4 lb/day
Blower flow rate = 6,107 CFM (based on kinetic model, with oxygen)
= 8,794,080 ft^3/day

-dh(c) = 2,920.4 lb/day x 11,800 Btu/lb ÷ 8,794,080 ft^3/day
= 3.92 Btu/ft^3

Assuming the waste gas is principally air, with a molecular weight of 28.97 and a corresponding density of 0.0739 lb/scf, the heat of combustion per pound of incoming waste gas is:

-dh(c) = 3.92 Btu/ft^3 ÷ 0.0739 lb/ft^3
= 53.0 Btu/lb

Fuel Flow Requirement

$$Q(fuel) = \frac{Pw*Qw*\{Cp*[1.1Tf-Tw-0.1Tr]-[-dh(c)]\}}{\rho(af) * [-dh(m) - 1.1\ Cp * (Tf - Tr)]}$$

Where
Pw = 0.0739 lb/ft^3
Cp = 0.255 Btu/lb-°F
Qw = 6,107 scfm
-dh(m) = 11,800 Btu/lb for ethanol
Tr = 77°F (per EPA Cost Manual)
ρ(af) = 0.0408 lb/ft^3, methane at 77°F, 1 atm
Tf = 1600°F
Tw = 1,525°F
-dh(c) = 53.0 Btu/lb

$$Q = \frac{0.0739*6,107*\{0.255*[1.1*1,600-1,525-0.1*77]-53.0\}}{0.0408*[11,800 - 1.1*0.255*(1,600 - 77)]}$$

= 2,239 ÷ 464 = 4.8 ft^3/min

Fuel Costs

The cost for natural gas shall be based upon the average price of natural gas sold to "Commercial Consumers" in California for the years 2013, 2014 and 2015.[4]

2015 = \$7.98/thousand ft^3 total monthly average
2014 = \$9.05/thousand ft^3 total monthly average
2013 = \$7.81/thousand ft^3 total monthly average
Average for three years = \$8.28/thousand ft^3 total monthly average

Fuel Cost = 4.8 cfm x 1440 min/day x 90 day/year x \$8.28/1000 ft^3
= \$5,151/year

Electricity Requirement

$$\text{Power}_{fan} = \frac{1.17*10^{-4}\ Qw*\ \Delta P}{\in}$$

Where

ΔP = Pressure drop Across system = 4 in. H_2O
$\in$ = Efficiency for fan and motor = 0.6
Qw = 6,107 scfm

$$\text{Power}_{fan} = \frac{1.17*10^{-4}\ *6{,}107\ \text{cfm}*\ 4\ \text{in. } H_2O}{0.60}$$

= 4.8 kW

Electricity Costs

Average cost of electricity to commercial users in California[5]

2015 Average = \$0.1579/kWh

Electricity Cost = 4.8 kW x 24 hours/day x 90 days/year x \$0.1579/kWh = \$1,637/year

[4] Energy Information Administration/Natural Gas; Average Price of Natural Gas Sold to Commercial Consumers by State, 2010 – 2015: http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_SCA_a.htm
[5] Energy Information Administration/Electric Power; Average Retail Price of Electricity to Ultimate Customers by End-Use Sector, by State, 2015
http://www.eia.gov/electricity/data/browser/#/topic/7?agg=0,1&geo=000000000004&endsec=vg&freq=A&start=2001&end=2015&ctype=linechart&ltype=pin&rtype=s&maptype=0&rse=0&pin=

Total Operating and Maintenance Costs

Annual Cost (Data from: Annual Costs for Thermal and Catalytic Incinerators, Table 3.10 – OAQPS Control Cost Manual, Fourth Edition)

Annual Cost			
Operator	0.5 h/shift	$18.5/h x 0.5 h x 90 days/yr x 2 units x 3 shifts/day	$4,995
Supervisor	15% of operator		$749
Maintenance			
Labor	0.5 h/shift	$18.5/h x 0.5 h x 90 days/yr x 2 units x 3 shifts/day	$4,995
Material	100% of labor		$4,995
Utility			
Natural Gas			$5,151
Electricity			$1,637
Indirect Annual Cost (IC)			
Overhead	60% of Labor Costs	0.6 x ($4,995+$749+$4,995)	$6,443
Administrative Charge	2% TCI		$18,814
Property Taxes	1% TCI		$9,407
Insurance	1% TCI		$9,407
Annual Source Test	One representative test/year @ $15,000		$15,000
Total Annual Cost			**$81,593**

Total Annual Cost

Total Annual Cost = Regenerative Thermal Oxidizer System + Annual Cost + Ducting/Piping/CIP

= $153,337 + $81,593 + 94,673

= $329,603

Emission Reductions

Annual Emission Reduction = Fermentation Emissions x 0.88

= 31,396 lb-VOC/year x 0.88

= 27,628 lb-VOC/year

= 13.8 tons-VOC/year

Cost Effectiveness

Cost Effectiveness = Total Annual Cost ÷ Annual Emission Reductions

Cost Effectiveness = $329,603/year ÷ 13.8 tons-VOC/year

= $23,884/ton-VOC

The analysis demonstrates that the annualized purchase cost of the regenerative thermal oxidizer system, the collection system ductwork and CIP equipment, and annual costs alone results in a cost effectiveness which exceeds the District's Guideline, of $17,500/ton-VOC. Therefore this option is not cost-effective and will not be considered for this project.

Option 2 - Collection of VOCs and control by carbon adsorption (86% collection and control):

Design Basis

- Since the District could not obtain costs for the following items, costs for these items haven't been included in this cost analysis. However, these items are necessary to operate the control equipment; therefore, these costs will be included for District projects where costs have been provided by the applicant/equipment manufacturer.
    - The cost for a tank to collect the condensed ethanol laden steam from regeneration of the carbon bed.
    - Annual steam costs required to regenerate the carbon beds.
    - Annual cooling water costs required to condense the ethanol laden steam from regeneration of the carbon beds and the condenser equipment.
    - Electricity costs of system fans, bed drying/cooling fans and cooling water pumps.
- Ethanol laden water is a byproduct produced when the carbon is regenerated with steam and the ethanol laden steam is condensed. The collected ethanol laden water will need to be disposed of and can be a significant cost; however, conservatively, the costs will not be included at this time.

Capital Cost for Carbon Adsorption Equipment

As mentioned in the BACT analysis for District Project N-1143697, on February 3, 2015 David Drewelow of Drewelow Remediation Equipment, Inc. provided a cost estimate of $80,000 to $85,000 for a 1,000 cfm carbon containment system, including a gas/liquid separator, an inline filter, blower, exhaust silencer and air to air heat exchanger. The following costs for carbon adsorption are based on this quote, using the 6/10ths rule and applying a factor of 80% to ensure that the results of the use of the 6/10ths rule are conservative.

$$\text{Cost}_{\text{Proposed System}} = 0.8 \times \text{Cost}_{\text{Quoted System}} \left(\frac{\text{CFM}_{\text{Proposed System}}}{\text{CFM}_{\text{Quoted System}}} \right)^{0.6}$$

Tank Group	CFM Rating	Cost
1	1,476	$85,893
2	4,631	$170,574
Total		$256,467

Capital Cost for Carbon for System

Annual Emission Reduction = Fermentation Emissions x 0.86
= 31,396 lb-VOC/year x 0.86
= 27,001 lb-VOC/year

Assume a working bed capacity of 20% for carbon (weight of vapor per weight of carbon)

Carbon required = 27,001 lb-VOC/year x 1/0.20
= $135,005 lb carbon

David Drewelow also provided a cost of $1.25/lb of carbon which does not include any delivery or servicing fees.

Annual carbon cost = $1.25/lb x 135,005 lb carbon = $168,756

Carbon Adsorption Capital Cost		
Cost Description	Equipment Cost ($)	Carbon Cost ($)
Carbon Adsorption System Cost	$256,467	-
Water alcohol tank cost (not included)	-	-
Carbon Capital Cost (see above)	-	$168,756
The following cost data is based on the EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002) (EPA/452/B-02-001).		
Direct Costs		
Base Equipment Costs (Carbon Adsorption System + Water Alcohol Tank + Carbon) See Above	$256,647	$168,756
Instrumentation - 10% of base equipment	$51,000	-
Sales Tax - 3.8125 of base equipment	$9,784	$6,434
Freight - 5% of base equipment	$12,823	$322
Purchased Equipment Cost (PEC)	**$304,901**	**$175,512**
Foundations & supports - 8% of PEC	$24,392	-
Handling & erection - 14% of PEC	$42,686	-
Electrical - 4% of PEC	$12,196	-
Piping – (Included in Piping/Ducting)	-	-
Painting - 1% of PEC	$3,049	-
Insulation - 1% of PEC	$3,049	-
PCL/Programming Cost (2 units x $10,000/control unit)	$20,000	
Direct installation costs	**$105,372**	**$0**
Total Direct Costs (DC)	**$410,273**	**$175,512**
Indirect Costs		
Engineering - 10% of PEC	$30,490	-
Construction and field expenses - 5% of PEC	$15,245	-
Contractor fees - 10% of PEC	$30,490	-
Start-up - 2% of PEC	$6,098	-
Initial Source Testing - 2 units x $15,000/unit	$30,000	-
Owner's Cost	$20,095	
Total Indirect Costs (IC)	**$132,418**	**$0**
Total Direct and Indirect Costs (DC + IC)	**$542,691**	**-**
Contingency (C) - 15% of (DC + IC)	**$81,404**	**-**
Total Capital Investment (TCI) (DC + IC + C)	**$624,095**	**$175,512**

Annualized Capital Cost for Carbon Adsorption Equipment

Annualized Capital Investment = Initial Capital Investment x Amortization Factor

Amortization Factor = $\left[\frac{0.1(1.1)^{10}}{(1.1)^{10}-1}\right]$ = 0.163 per District policy, amortizing over 10 years at 10%

Therefore,

Annualized Capital Investment (Carbon System Equipment) = $624,095 x 0.163 = $101,727

Annualized Cost for Carbon

The EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002), Section 3.1: VOC Recapture Controls, Chapter 1: Carbon Adsorbers (September 1999)[4] states, "*A typical life for the carbon is five years. However, if the inlet contains VOCs that are very difficult to desorb, tend to polymerize, or react with other constituents, a shorter carbon lifetime— perhaps as low as two years—would be likely.*"

Assuming the maximum carbon life of five years and a 10% interest rate the capitol recovery cost for the carbon =

$\left[\frac{0.1(1.1)^{5}}{(1.1)^{5}-1}\right]$ = 0.264 over 5 years at 10% interest

Therefore,

Annualized Capital Investment for Carbon for System = $175,512 x 0.264 = $46,335

Annualized Cost of Carbon Adsorption Equipment + Annualized Cost of Carbon for System

Annualized Capital Cost for Carbon Adsorption System = $101,727 + $46,335 = $148,062

Total Operation and Maintenance Costs

The annual operation and maintenance costs for the carbon adsorption system are based on the information given in the EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002), Section 3.1: VOC Recapture Controls, Chapter 1: Carbon Adsorbers (September 1999). No value will be given for the ethanol that may be potentially recovered since this ethanol could actually result in additional disposal costs, which will also not be quantified in this analysis.

[4] EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002), Section 3.1: VOC Recapture Controls, Chapter 1: Carbon Adsorbers (September 1999). United States Environmental Protection Agency Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina 27711, EPA/452/B-02-001, http://epa.gov/ttn/catc/dir1/cs3-1ch1.pdf.

Carbon Adsorption Annual Costs			
Direct Annual Cost (DAC)			
Operating Labor			
Operator	0.5 hr/shift	$18.50/hr x 0.5 hr/shift x 3 shift/day x 90 days/year x 2 units	$4,995
Supervisor	15% of operator		$749
Maintenance			
Labor	0.5 h/shift	$18.50/hr x 0.5 hr/shift x 3 shift/day x 90 days/year x 2 units	$4,995
Maintenance	100% of labor		$4,995
Utility			
Natural Gas from Steam Production (not included)			-
Electricity (not included)			-
Total DAC			**$15,734**
Indirect Annual Cost (IAC)			
Overhead	60% of Labor Cost	0.6 x ($4,995 + $749 + $4,995)	$6,443
Administrative	2% of TCI		$12,482
Property Taxes	1% of TCI		$6,241
Insurance	1% of TCI		$6,241
Annual Source Test	One representative test/year @ $15,000		$15,000
Total IAC			**$46,407**
Annual Cost (DAC + IAC)			**$62,141**

Total Annual Cost for Carbon Adsorption

Total Annual Cost = Carbon Adsorption Capital Cost + Annual Operating Cost + Ducting/Piping
= $148,062 +$62,141 + $94,673
= $304,876

Emission Reductions

Annual Emission Reduction = Fermentation Emissions x 0.86
= 31,396 lb-VOC/year x 0.86
= 27,001 lb-VOC/year
= 13.5 tons-VOC/year

Cost Effectiveness

Cost Effectiveness = Total Annual Cost ÷ Annual Emission Reductions

Cost Effectiveness = $304,876 /year ÷ 13.5 tons-VOC/year
= $22,583/ton-VOC

The analysis demonstrates that the annualized purchase cost of the carbon adsorption system and collection system ductwork and CIP equipment alone results in a cost effectiveness which exceeds the District's Guideline of $17,500/ton-VOC. Therefore this option is not cost-effective and will not be considered for this project.

Option 3 - Collection of VOCs and control by absorption/scrubber (81% collection & control):

Design Basis

- The District contacted Maurice McIntosh and Ad Verkuylen of NohBell Corporation on March 16, 2016 to allow NohBell Corporation an opportunity to provide cost information for this project. The District did not receive updated cost information from NohBell Corporation; therefore, cost estimates from NohBell Corporation will not be included as a part of this BACT analysis.
- Recovered ethanol storage tank = $40,000 (installed, as proposed in Project C-1133347)
- Connected electrical load for each unit is 2.5 horsepower which is assumed to operate continuously for 90 days.
- Electric power cost = $0.1579/kWh (see regenerative thermal oxidizer Top Down BACT Analysis section above)
- Since the EPA Control Cost Manual does not contain a section for wet scrubbers controlling VOCs, conservatively, the costs in addition to the base equipment costs, will be estimated from the Wet Scrubbers for Particulate Matter control from the EPA Control Cost Manual.

Equipment Cost Scrubber

The following costs are based on estimates for scrubber costs provided by Anguil Environmental in November, 2015.

Control Unit	Tank Group	Anguil Environmental Equipment Budget Price
1	1	$180,000
2	2	$120,000
Total:		$300,000

Scrubber Capital Cost	
Cost Description	Cost ($)
Scrubber System (Two units)	$300,000
The following cost data is taken from EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001).	
Direct Costs	
Base Equipment Costs (Scrubber System) See Above	$300,000
Instrumentation - 10% of base equipment	$30,000
Sales Tax - 3.8125 of base equipment	$11,438
Freight - 5% of base equipment	$15,000
Purchased Equipment Cost (PEC)	**$356,438**
Foundations & supports – 6% of PEC	$21,386
Handling & erection - 40% of PEC	$142,575
Electrical - 1% of PEC	$3,564
Piping (Included in Ductwork/Piping Costs)	-
Painting - 1% of PEC	$3,564
Insulation - 3% of PEC	$10,693
PCL/Programming Cost (2 units x $10,000/control unit)	$20,000
Recovered Ethanol Storage Tank (installed) ($40,000 x 2 tank groups)	$80,000
Direct Installation Costs (DIC)	**$281,782**
Direct Costs (DC) (PEC + DIC)	**$638,220**
Indirect Costs	
Engineering - 10% of PEC	$35,644
Construction and field expenses - 10% of PEC	$35,644
Contractor fees - 10% of PEC	$35,644
Start-up - 1% of PEC	$3,564
Initial Source Testing – 2 units x $15,000/unit	$30,000
Owner's Cost	$20,095
Indirect Costs (IC)	**$160,591**
Total Direct and Indirect Costs (DC + IC)	**$798,811**
Contingency (C) - 15% of (DC + IC)	**$119,822**
Total Capital Investment (TCI) (DC + IC + C)	**$918,633**

Annualized Capital Costs

Annualized Capital Investment = Initial Capital Investment x Amortization Factor

Amortization Factor = $\left[\frac{0.1(1.1)^{10}}{(1.1)^{10}-1}\right]$ = 0.163, amortizing over 10 years at 10%

Therefore,

Annualized Capital Investment = $918,633 x 0.163 = $149,737

Wastewater Disposal Costs

Additionally, the water scrubber will generate ethanol-laden wastewater containing 12.72 tons-ethanol annually (31,396 lb/year (uncontrolled fermentation emissions) x 0.81 ÷ 2000). Assuming a 10% solution, approximately 38,429 gallons of waste water (12.72 ton-ethanol x 2000 lb/ton x gal/6.62 lb ÷ 0.10) will be generated annually. Per District Project N-1133347, an allowance of $0.08 per gallon is applied for disposal costs.

Annual disposal costs = 38,429 gallons x $0.08/gallon = $3,074

Total Operation and Maintenance Costs

Scrubber Annual Costs			
Direct Annual Cost (DAC)			
Operating Labor			
Operator	0.5 hr/day x 2 units x 90 days x 3 shifts/day = 270hr/year	$18.50/h	$4,995
Supervisor	15% of operator		$749
Maintenance			
Labor	0.5 hr/day x 2 units x 90 days x 3 shifts/day = 270hr/year	$18.5/h	$4,995
Wastewater Disposal			
	10% Solution = 38,429 gal	$0.08/gal	$3,074
Utility			
Electricity	2 units x 2.5 hp x 0.746 kW/hp x 2,160 hr/yr = 8,057 kWh/yr	$0.1579/kWh	$1,272
Total DAC			**$15,085**
Indirect Annual Cost (IAC)			
Overhead	60% of Labor Cost	0.6 x ($4,995+$749 + $4,995)	$6,443
Administrative Charge	2% of TCI		$18,373
Property Taxes	1% of TCI		$9,186
Insurance	1% of TCI		$9,186
Annual Source Test	One representative test/year @ $15,000		$15,000
Total IAC			**$58,188**
Annual Cost (DAC + IAC)			**$73,273**

Total Annual Cost = Scrubber Capital Cost + Annual Operating Cost + Ducting/Piping
= $149,737 + $73,273 + $94,673
= $317,683

Emission Reductions

The District's BACT Guideline identifies an overall collection and control efficiency of 81% for absorption systems.

Annual Emission Reduction = Uncontrolled Fermentation Emissions x 0.81
= 31,396 lb-VOC/year x 0.81
= 25,431 lb-VOC/year
= 12.7 tons-VOC/year

Cost Effectiveness

Cost Effectiveness = Total Annual Cost ÷ Annual Emission Reductions

Cost Effectiveness = $317,683/year ÷ 12.7 tons-VOC/year
= $25,014/ton-VOC

The analysis demonstrates that the annualized purchase cost of the water scrubber and annual costs alone results in a cost effectiveness which exceeds the District's Guideline of $17,500/ton-VOC. Therefore this option is not cost-effective and will not be considered for this project.

Option 4 - Capture of VOCs and condensation (81% collection & control):

Design Basis

- Although the EcoPAS units have not been demonstrated at the scale of operation as proposed by this project, the District will conservatively assume that the proposed equipment and equipment cost proposed by EcoPAS will meet the duty requirements for the project.
- A glycol chiller would be required for this operation; however, a cost to modify the winery chilling system was not provided. Therefore, the final cost analysis does not include the cost of a glycol chiller, which would be required to operate the system
- This control technology recovers ethanol which potentially requires additional cost to dispose of. The District currently knows of two winery facilities that recover ethanol: Central Coast Wine Services in and Terravant Winery, both within Santa Barbara County. Information from the Santa Barbara County APCD indicates that neither facility generates any revenue from the recovered ethanol. Central Coast Wine Services sends their recovered ethanol to a facility in San Luis Obispo that refines the recovered ethanol into motor vehicle fuels and Terravant Winery utilizes a UV system to destroy the ethanol. Although EcoPAS claims that there is value in the recovered ethanol in a future market that may be developed; the District will conservatively assume that there is no cost required to dispose/treat the recovered ethanol nor is there a value in the recovered ethanol.

Equipment Cost Refrigerated Condenser

Pricing for the EcoPAS units will be based on project specific pricing received from EcoPAS LLC on March 28, 2016. According to the cost estimate provided, three PAS-100 condensers would be required to control emissions from the proposed tanks in this project.

In addition to the base equipment cost (as referred to as CapEx by EcoPAS), EcoPAS provided additional cost for stainless steel ducting, installation cost (which includes hoses, capture vessels, pressure release valves, instrumentation, freight, taxes, and engineering) and annual cost (which includes both direct and indirect costs, labor, testing, maintenance, overhead and administration). The District has requested a detailed breakdown and reference of the cost of each component of each cost category from the vendor but has yet to receive the additional information; therefore, the base equipment cost will be used as provided by the vendor and remaining costs associated with the installation of refrigerated condensers will be taken from the Eichlay Report and the EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001).

Condensation Capital Cost	
Cost Description	Cost ($)
Cost of Refrigerated Condenser system (3 PAS Units)	$585,000
The following cost data is taken from EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001).	
Direct Costs	
Base Equipment Costs (Condenser) See Above	$585,000
Instrumentation - 10% of base equipment	$58,500
Sales Tax - 3.8125% of base equipment	$22,303
Freight - 5% of base equipment	$29,250
Purchased equipment cost (PEC)	**$695,053**
Foundations & supports - 14% of PEC	$97,307
Handling & erection - 8% of PEC	$55,604
Electrical - 8% of PEC	$55,604
Piping – (Included in Piping/Ducting)	-
Painting - 1% of PEC	$6,951
Insulation - 10% of PEC	$69,505
PCL/Programming Cost (3 units x $10,000/control unit)	$30,000
Direct Installation Costs (DIC)	**$314,971**
Total Direct Costs (DC) (PEC + DIC)	**$1,010,024**
Indirect Costs	
Engineering - 10% of PEC	$69,505
Construction and field expenses - 5% of PEC	$34,753
Contractor fees - 10% of PEC	$69,505
Start-up - 2% of PEC	$13,901
Source Testing - 3 units x $15,000/unit	$45,000
Owner's Cost	$20,095
Total Indirect Costs (IC)	**$252,759**
Total Direct and Indirect Costs (DC + IC)	**$1,262,783**
Contingency (C) - 15% of (DC + IC)	**$189,417**
Total Capital Investment (TCI) (DC + IC)	**$1,452,200**

Annualized Capital Costs

Annualized Capital Investment = Initial Capital Investment x Amortization Factor

Amortization Factor = $\left[\frac{0.1(1.1)^{10}}{(1.1)^{10}-1}\right]$ = 0.163, amortizing over 10 years at 10%

Therefore,

Annualized Capital Investment = $1,452,200 x 0.163 = $236,709

Total Operation and Maintenance Costs

Condensation Annual Costs			
Direct Annual Cost (DAC)			
Operating Labor			
Operator	0.5 hr/shift x 3 shifts/day x 3 units x 90 days = 405 hr/year	$18.50/h	$7,493
Supervisor	15% of operator		$1,124
Maintenance			
Labor	0.5 hr/shift x 3 shifts/day x 3 units x 90 days = 405 hr/year	$18.50/h	$7,493
Chiller (Glycol)			
Not included at this time			-
Utility			
Electricity	Not included at this time		$0
Total DAC			**$16,110**
Indirect Annual Cost (IAC)			
Overhead	60% of Labor Cost	0.6 x ($7,493 + $1,124 + $7,493)	$9,666
Administrative	2% of TCI		$29,044
Property Taxes	1% of TCI		$14,522
Insurance	1% of TCI		$14,522
Annual Source	One representative test/year @ $15,000		$15,000
Total IAC			**$82,754**
Annual Cost (DAC + IAC)			**$98,864**

Total Annual Cost = Condenser Capital Cost + Annual Operating Cost + Ducting/Piping/CIP
= $236,709 + $98,864+ $94,673
= $430,246

Emission Reductions

EcoPAS has indicated the PAS unit is capable of achieving a capture and control efficiency of 90%. However, the District's current BACT Guideline identifies a combined capture and control efficiency of 81% for condensation technology. The capture and control efficiency of 81% will be used in this analysis as the value of 90% has yet to be shown to be feasible.

Annual Emission Reduction = Uncontrolled Fermentation Emissions x 0.81
= 31,396 lb-VOC/year x 0.81
= 25,431 lb-VOC/year
= 12.7 tons-VOC/year

Cost Effectiveness

Cost Effectiveness = Total Annual Cost ÷ Annual Emission Reductions

Cost Effectiveness = $430,246/year ÷ 12.7 tons-VOC/year
= $33,878/ton-VOC

The analysis demonstrates that the annualized purchase cost of the refrigerated condenser system and annual costs alone results in a cost effectiveness which exceeds the District's Guideline of $17,500/ton-VOC. Therefore this option is not cost-effective and will not be considered for this project.

Option 5 - Temperature Controlled Open Top Tank with Maximum Average Fermentation Temperature of 95 deg F):

The only remaining control option in step 3 above has been deemed AIP for this class and category of source and per the District BACT policy is required regardless of the cost. Therefore, a cost effectiveness analysis is not required.

Step 5 – Select BACT

All identified feasible options with control efficiencies higher than the option proposed by the facility have been shown to not be cost effective. The facility has proposed Option 5, temperature-controlled open top tank with maximum average fermentation temperature of 95 deg F. These BACT requirements will be placed on the permits as enforceable conditions.

Appendix V
Achieved in Practice Analysis Memo

SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT MEMO

DATE: February 9, 2015 (Revised May 9, 2016)

TO: Dave Warner, Deputy APCO

FROM: Nick Peirce, Permit Services Manager
James Harader, Senior Air Quality Engineer
Jag Kahlon, Air Quality Engineer

SUBJECT: Achieved in Practice Analysis for Emission Control Technologies Used to Control VOC Emissions from Wine Fermentation Tanks

Introduction

The purpose of this analysis is to determine whether there is any control technologies that can be considered to be Achieved in Practice BACT for controlling fermentation VOC emissions from wine fermentation tanks. If determined to be achieved in practice, the San Joaquin Valley Air Pollution Control District (District) would require the use of such technology for wine fermentation tanks when BACT is triggered, without any consideration of the cost effectiveness of the control technology. The District's achieved in practice BACT is functionally equivalent to Federal EPA's Lowest Achievable Emission Rate requirements outlined in Federal Non-Attainment NSR documents.

LAER

The emission control requirement for new Major Sources and Federal Major Modifications in non-attainment areas is that the emission units meet the lowest achievable emission rate (LAER). LAER is the most stringent emission limitation from either of the following:

1. The most stringent emission limitation contained in the implementation plan of any State for such class and category of source; or
2. The most stringent emission limitation achieved in practice by such class or category of source.

In no event can the LAER requirement be less stringent than Federal New Source Performance Standards (NSPS), if there is an NSPS applicable to the type of source being evaluated.

In the case of wine fermentation tanks, the District did not identify any SIP that would require the use of add-on control systems. Therefore, add-on control

systems can only be required as LAER for wine fermentation if they are determined to be achieved in practice for the source category.

Achieved in Practice Criteria

The term "achieved in practice" appears to be subject to interpretation since it is not defined in the federal statutes or regulations. As a result, there are few objective regulatory criteria to constrain the form of an achieved in practice determination. The following discussion outlines the achieved in practice criteria that is used by the District for determining LAER.

In a February 28, 1989 memorandum titled "Guidance on Determining Lowest Achievable Emission Rate (LAER), EPA provided the following guidance concerning the economic feasibility of LAER:

> *Traditionally, little weight has been given to economics in LAER determinations, and this continues to be the case. The extract in your memorandum from the record of the House and Senate discussion of the Clean Air Act (Act) contains the sentence:*
>
> > *"If the cost of a given control strategy is so great that a new major source could not be built or operated, then such a control would not be achievable and could not be required by the Administrator."*
>
> *We interpret this statement in the record to be used in a generic sense. That is, that no new plants could be built in that industry if emission limits were based on levels achievable only with the subject control technology. However, if some other plant in the same (or comparable) industry uses that control technology, then such use constitutes de facto evidence that the economic cost to the industry of that technology control is not prohibitive. Thus, for a new source in that same industry, LAER costs should be considered only to the degree that they reflect unusual circumstances which, in some manner, differentiate the cost of control for that source from the costs of control for the rest of that industry. These unusual circumstances should be thoroughly analyzed to ensure that they really do represent compelling reasons for not requiring a level of control that similar sources are using. Therefore, when discussing costs, applicants should compare the cost of control for the proposed source to the costs for source(s) already using that level of control.*

The statement *"If some other plant in the same (or comparable) industry uses that control technology, then such use constitutes de facto evidence that the*

economic cost to the industry of that technology control is not prohibitive" is only true if the plant using that control technology purchased or leased that control technology. Scenarios where the purchase/lease of the control technology was subsidized with grant money, or where the plant allowed the control vendor to operate and test their equipment on-site without actually purchasing/leasing the control technology do not constitute evidence that the economic cost to the industry due to use of that technology control is not prohibitive. Therefore, the District's historical position is that a control technology must have been purchased or leased by the plant in order for that installation of the control technology to be considered as achieved in practice.

EPA Region IX has previously stated that the successful operation of a new control technology for six months constitutes achieved in practice. This position was established in an August 25, 1997 letter from David Howekamp of US EPA Region IX to Moshen Nazemi of South Coast Air Quality Management District. This guidance is reflected in the South Coast Air Quality Management District's BACT Policy, which includes the following criteria for determining whether a control technology is achieved in practice:

> *Reliability: All control technologies must have been installed and operated reliably for at least six months. If the operator did not require the basic equipment to operate daily, then the equipment must have at least 183 cumulative days of operation. During this period, the basic equipment must have operated: 1) at a minimum of 50% design capacity; or 2) in a manner that is typical of the equipment in order to provide an expectation of continued reliability of the control technology.*

For wine fermentation tanks, the District has taken the position that successful operation of a control device for one full fermentation season is satisfactory for qualifying a control as achieved in practice. The requirement of one full fermentation season is considerably more conservative than the 6-month requirement, since the fermentation season typically lasts only two to three months.

The term "successful operation" is not tightly defined. The District considers the following when determining whether a control technology has been successfully operated for achieved in practice BACT determinations:

1. Was the control technology operated in the same manner that would be required by the District if the control technology was required for BACT?
2. How reliable has the control technology been over the life of its use?
3. Has the control technology been verified to perform effectively over the range of operation expected for that type of equipment? Was the effectiveness verified by performance test(s), when possible, or using other performance data?

Other typical considerations that the District considers when making an achieved in practice BACT determination include:

1. Is the control technology commercially available from at least one vendor?
2. On what class and category of source has the control technology been demonstrated?

In summary, the following criteria are used for determining whether a control technology is achieved in practice for wine fermentation:

1. Did the plant using the control technology purchase/lease the equipment? Was that purchase/lease subsidized?
2. Was the control technology operated for at least one fermentation season?
3. Was the control technology operated in the same manner that would be required by the District for BACT purposes?
4. How reliable has the control technology been during its use at the plant?
5. Has the control technology been verified to perform effectively over the range of operation expected for that type of equipment? Was the effectiveness verified by performance test(s), when possible, or other performance data?
6. Is the control technology commercially available from at least one vendor?
7. On what class and category of source has the control technology been demonstrated?

Achieved in Practice Analysis for Known Installations of Wine Fermentation Control Technologies

The following is an analysis of each known installation of an emission control technology to control VOC emissions from wine fermentation tanks and whether that installation can be considered achieved in practice.

Terravant Wine Company (2008 – Current)

Terravant Wine Company submitted an Authority to Construct application for a wine processing facility to the Santa Barbara County Air Pollution Control District (SBCAPCD) on September 20, 2007. The application was deemed complete on October 19, 2007. The fermentation tanks triggered BACT; however, the SBCAPCD evaluation determined BACT to be infeasible. However, this project also triggered offsets and Terravant Wine Company electively proposed to install a packed bed water scrubber with UV/hydrogen peroxide controls to control VOC emissions from the wine fermentation tanks. Proposing the control would reduce VOC emissions to a level below the SBCAPCD offset threshold. The control technology is only required to run sufficiently to reduce emissions to stay below the offset threshold – it is not required to be operated all of the time, as is BACT-required equipment.

The packed bed water scrubber was installed in 2008 and began operation in 2008, with a 95% control efficiency requirement on the Authority to Construct permit. However, in 2008, the unit failed to meet the 95% control efficiency requirement. Prior to the 2009 season, Terravant Wine Company was issued a revised Authority to Construct permit that reduced the control efficiency requirement to 75%. However, the unit has not been able to consistently demonstrate compliance with the 75% control efficiency requirement. The effectiveness of the packed bed scrubber has varied considerably over its life, and has been measured to be as low as 49% control efficiency. During discussions, SBCAPCD staff indicated that this facility has been issued a Notice of Violation for non-compliance with their permitted emission limits and they would not recommend that any wineries use this control technology for the control of fermentation tank emissions, as it has proven to be unreliable. Finally, the control technology used by Terravant Winery is custom designed, and is not a commercially available off-the-shelf type of unit.

The packed bed scrubber technology does not meet the achieved in practice criteria since this control technology has not been operating in compliance with its permit requirements, its effectiveness is highly variable, and the control technology is not commercially available.

EcoPAS, LLC (2009)

EcoPAS conducted testing of their passive alcohol system, which is consendation-based emission control system, at a winery located within the San Luis Obispo County Air Pollution Control District. The purpose of this installation was to conduct full-scale testing of the passive alcohol system on red wine fermentation tanks. The District was unable to verify whether the winery purchased the system.

Since the District could not verify that the winery purchased the control system, this installation doesn't meet the first criteria listed to be considered as achieved in practice. Furthermore, the unit was operated for experimental testing of the control device. In the District's experience, during experimental testing/trial runs, a control technology does not typically operate in the same manner as would be required by BACT, so the District has not historically considered experimental test/trial installations to constitute achieved in practice BACT.

Central Coast Wine Services (2009)

In 2009, Santa Barbara County Air Pollution Control District (SBCAPCD) determined that Central Coast Wine Services (CCWS) was operating without a permit. They required CCWS to submit an application for an Authority to Construct such that the winery would be in compliance with SBCAPCD Rules and Regulations. Based on the emission estimates for the facility, the facility was triggering Best Available Control Technology Requirements and Offsets. At that time, the SBCAPCD determined that BACT, while technologically feasible, was not cost effective. SBCAPCD issued an Authority to Construct/Permit to Operate on June 5, 2009 for the winery.

CCWS was allowed to exceed the offset thresholds during the fall 2009 harvest season in order to test potential control technologies. Three companies were invited to participate in testing of prototype emission control equipment, but only NohBell Corporation elected to install and test fugitive ethanol control equipment.

NohBell Corporation engineered and tested a full scale NoMoVo 1.0 system on a 50 ton tank at the CCWS plant. NoMoVo documents describe the equipment as successful, with full scale trials proceeding. After the 2009 season, NoMoVo documents indicate that CCWS decided to move the plant and equipment.

This installation does not meet the requirements to be considered achieved in practice. First, the facility does not appear to have purchased/leased the control system, nor did they intend to continue operating the system. This is evident by their decision to discontinue use of the system in the following year. Second, no data has been submitted to the District to demonstrate that the unit was continuously operated in the same manner that the District would require the system to operate if it were considered achieved in practice BACT. The purpose of this installation was to perform initial testing and trial runs of the control technology. In the District's experience, during experimental testing/trial runs, a control technology does not typically operate in the same manner as would be required by BACT, so the District has not historically considered experimental test/trial installations to constitute achieved in practice BACT. Furthermore, the type of records necessary to demonstrate continuous operation of the system was not required by the SBCAPCD permit. Finally, the SBCAPCD permit did not include testing requirements to sufficiently demonstrate the effectiveness of the system.

Kendall Jackson Oakville (2010)

Kendall Jackson Winery belongs to Jackson Family Wines Inc (JFW), and is located in Oakville, California. This winery is in Bay Area Air Quality Management District (BAAQMD). BAAQMD does not require permits for wine fermentation or storage operations. Their Regulation 2, Rule 1, 117.9 and 117.10 has exemptions for wine storage and fermentation operations.

In 2010, NohBell installed a NoMoVo 2.0 system at the Kendall Jackson Winery. The system was connected to a 10,000 gallon fermentation tank and operated on a trial basis during the 2010 crush season. Pursuant to Brian Kosi, Winemaker at Kedall-Jackson Oakville, JFW never purchased the NoMoVo technology. The NoMoVo slurry was treated by the facilities on-site wastewater treatment system.

This installation does not meet the requirements of achieved in practice BACT. First, the system was never owned/leased by the winery. Secondly, the unit was operated for the purposes of testing/trial runs to evaluate the control technology. In the District's experience, during experimental testing/trial runs, a control technology does not typically operate in the same manner as would be required by BACT, so the District has not historically considered experimental test/trial installations to constitute achieved in practice BACT. Furthermore, BAAQMD does not have any record of source tests occurring during the 2010 crush season; therefore, the effectiveness for this installation was not established.

Kendall Jackson Oakville (2011-2013)

In its 2010 clean air plan, the BAAQMD included a further study measure (FSM 14 – Winery Fermentation) to examine whether ethanol emissions from Bay Area wine production could be cost-effectively reduced. On 9/26/11, the BAAQMD signed a Research Sponsorship Agreement (Contract No. 2011-126) with NohBell to help develop its technology to capture volatile organic compounds emitted by wine fermentation tanks at Kendall Jackson Oakville. The contract states that *"District (BAAQMD) wishes to support NohBell's effort to demonstrate the technology at JFW winery and wishes to verify the function and cost-effectiveness of the technology and acquire data to help DISTRICT (BAAQMD) determine whether the equipment could be cost effectively employed more widely in the wine industry".* NoMoVo submitted a project budget estimate of $118,750 for its NoMoVo 2.0 upgrades, pump upgrades, and related work at the plant. The BAAQMD contract promised $50,000 towards this effort, to be paid in installments directly to NohBell Corporation. Furthermore, Brian Kosi of Kendall-Jackson Oakville confirmed that the facility never purchased the NoMoVo system from NohBell and confirmed that the system has been removed from the site by NohBell.

For 2011, NohBell Corporation planned to conduct trials of the upgraded NoMoVo 2.0 system on 10 fermentation tanks. Six to eight trials were anticipated, operating on 4-6 day cycles. The trial runs were scheduled to be primarily conducted while fermenting red wines. The District was unable to obtain operational data for the 2012 and 2013 fermentation seasons for this equipment. Following the 2013 crush season, the equipment was removed and transferred to Constellation Wines in Monterey, CA.

This installation does not pass the first criteria of LAER, since the facility never owned the system and since the installation and operation of the control technology by NohBell was subsidized by a Research Sponsorship Agreement with BAAQMD. Furthermore, operation of the control technology at this facility was for trials/testing of the effectiveness of the control technology. In the District's experience, during experimental testing/trial runs, a control technology does not typically operate in the same manner as would be required by BACT, so the District has not historically considered experimental test/trial installations to constitute achieved in practice BACT. Finally, the unit was removed, which indicates that this wasn't intended as a permanent installation. For these reasons, the District does not consider this installation to be achieved in practice.

J. Lohr Vineyard and Winery (2013)

NohBell Corporation has indicated that they operated a NoMoVo system at J. Lohr Winery in Paso Robles during 2013 crush season. The District contacted J. Lohr Winery to obtain more information regarding this installation. J. Lohr Winery personnel stated that they considered this to be a pilot type testing operation. J. Lohr Winery did not purchase or lease the system. The unit operated during the 2013 crush season on fermentation tanks that were processing red wine. After the 2013 crush season, the system was removed and no longer operates at this site. San Luis Obispo Air Pollution Control District (SLOAPCD) had no knowledge that this unit was installed at this winery and no Authority to Construct or permit exemption was issued for this equipment.

This installation does not pass the first criteria of LAER, since the facility never purchased/leased the equipment. Furthermore, operation of the control technology at this facility was for trials/testing of the effectiveness of the control technology at this facility. In the District's experience, during experimental testing/trial runs, a control technology does not typically operate in the same manner as would be required by BACT, so the District has not historically considered experimental test/trial installations to constitute achieved in practice BACT. Finally, the unit was removed, which indicates that this wasn't intended as a permanent installation. For these reasons, the District does not consider this installation to be achieved in practice.

Constellation Winery dba Gonzales Winery (2013)

During the 2013 crush season, a NoMoVo unit was installed on a 39,000 gallon fermentation tank at Constellation Brands U.S. Operations, Inc. dba Gonzales Winery in Monterey, CA. The control technology was installed and operated as a "pilot operation". Monterey Bay Unified Air Pollution Control District (MBUAPCD) compliance staff noticed the NoMoVo unit operating on-site without authorization from MBUAPCD and issued a notice of violation. Gonzales Winery submitted an Authority to Construct application; however, prior to processing that application, the facility notified MBUAPCD that the equipment had been removed from the site. The equipment operated at the site for a partial season for pilot testing purposes. MBUAPCD could not verify whether Gonzales Winery purchased or leased the equipment.

The District was unable to verify whether Gonzales Winery purchased or leased the NoMoVo unit. Furthermore, operation of the control technology at this facility was for trials/testing of the effectiveness of the control technology at this facility. In the District's experience, during experimental testing/trial runs, a control technology does not typically operate in the same manner as would be required by BACT, so the District has not historically considered experimental test/trial installations to constitute achieved in practice BACT. Finally, the unit was removed, which indicates that this wasn't intended as a permanent installation. For these reasons, the District does not consider this installation to be achieved in practice.

Vinwood Cellars Kenwood (2013)

The District has found documents indicating that a NoMoVo system was installed on four 15,000 gallon fermentation tanks at Vinwood Cellars Kenwood in Sonoma county, and the system was operated during the 2013 season. District staff attempted to contact Vinwood Cellars; however, the staff at Vinwood Cellars was unable to verify information for this installation. BAAQMD had no knowledge of this installation, as they do not require permits for wine tanks, so they were unable to verify this installation. Furthermore, since this installation was not subject to permit requirements, BAAQMD has no operational history or test data for this site. While BAAQMD administered source tests at Kendall Jackson Oakville winery, they have no records of any source testing of the NoMoVo system at Vinwood Cellars Kenwood.

This installation has not met the requirements of achieved in practice. First, it has yet to be confirmed that the winery actually purchased the NoMoVo system. Second, BAAQMD has no test records to verify the effectiveness of the NoMoVo system at this site. Finally, the operational history of the unit at this site is not available to determine whether it was operated in the same manner as a unit would be if it were installed as BACT.

Central Coast Wine Services (2013)

On August 5, 2013, CCWS electively applied to install a NoMoVo wine emission capture and control system to control ethanol emissions from fermentation activities at their wine center. The existing fermentation tanks at the facility ranged in capacity from 350 gallons to 20,887 gallons. On September 23, 2013, a final ATC (ATC 14257) was issued for the installation of the NoMoVo system, and the unit began operation in September 27, 2013. The installation of this unit allowed CCWS to increase daily wine fermentation while remaining under their existing daily and annual facility-wide VOC emission limits. A Permit to Operate (PTO 14257) was issued on December 13, 2013.

PTO 14257 states: "*The NoMoVo system is optional and may be used at CCWS' discretion".* Thus, the permit does not require continuous operation of the NoMoVo system. The NoMoVo system is portable. The system can be attached to four or five fermentation tanks at a time via flexible hoses. The facility is allowed to move the NoMoVo system around, as desired, to capture emissions from the tanks where fermentation is taking place. However, there is no requirement to keep the NoMoVo system attached to a tank and operate it for the full fermentation cycle of that tank. Thus, the District was unable to confirm that the unit was operated in the continuous manner that would be required if the District considered NoMoVo to be achieved in practice BACT.

SBCAPCD PTO 14257 does not include a control efficiency requirement, does not include any source testing requirements to verify the control effectiveness of the control system. The effectiveness of the control has only been estimated using the density change of the NoMoVo slurry to estimate the quantity of ethanol capture, and using a theoretical calculation of the quantity of ethanol that would be emitted if the tanks were uncontrolled. Inlet and outlet air quality testing has not been performed for this particular installation.

Finally, the disposal of the NoMoVo slurry is an important consideration when determining the effectiveness of the control system. If the slurry is disposed of in a manner that re-emits the ethanol into the atmosphere, then the effectiveness of the control is diminished. Until August 2014, the CCWS facility disposed of the NoMoVo slurry in their on-site wastewater treatment facility. On August 21, 2014, SBCAPCD sent a letter to CCWS informing them that they have concerns over the treatment of the NoMoVo slurry. Specifically, SBAPCD was concerned about the potential for stripping of ethanol to the atmosphere during the on-site waste water treatment process. The SBCAPCD letter states "*In conclusion, after August 29, 2014, the District will not recognize emission reductions claimed based on the use of any of your NoMoVo systems (existing or new) at the facility until CCWS has a District-approved on-site or off-site ethanol disposal method in place*". On August 27th, 2014, SBCAPCD approved the disposal of the NoMoVo slurry at Southern California Waste Water, an off-site facility in Santa Paula, California. In November, 2014, a vacuum truck carrying toxic chemicals from an unrelated facility exploded spreading about 1200 gallons of chemical waste including sulfuric acid and highly combustible organic peroxide. Since that incident, Southern California Waste Water has discontinued the acceptance of waste from all of their clients, so this disposal option is no longer available for the waste generated by CCWS.

The waste is now shipped to a distillery, which distills the ethanol and converts it into vehicle fuel. SBCAPCD has yet to approve the disposal of the NoMoVo slurry to the on-site wastewater facility. Consequently, the overall effectiveness of the system, including any ethanol re-emitted into the atmosphere during disposal, has yet to be sufficiently determined.

Since the control technology has not been demonstrated to operate in a manner that would be required by BACT and the overall effectiveness of the control technology has yet to be sufficiently determined, the District does not consider this installation to be achieved in practice.

Central Coast Wine Services (2014/2015)

In 2014, CCWS submitted an Authority to Construct application for the installation of 40 new tanks, ranging in capacity from 7,407 gallons to 20,628 gallons. The proposal triggered BACT. CCWS decided to forego the normal BACT Analysis, and electively proposed to install six NoMoVo systems to control VOC emissions from the tanks, when the tanks were fermenting wine. A final ATC, (ATC 14350) was issued on July 28, 2014 and the tanks were installed for the 2014 season.

Unlike the previous installations of NoMoVo at this facility, the ATC requires use of the NoMoVo system on these tanks while fermentation is taking place, the permit requires a minimum capture and control efficiency, and the permit requires source testing to verify the effectiveness of the NoMoVo system. However, these tanks have yet to be used for fermentation and the effectiveness has yet to be determined for this installation of the NoMoVo system. An email from Richard Mather of CCWS to David Harris of SBCAPCD, dated September 16, 2014, states:

> *We won't be using the new tanks for fermentation this year, but since our ATC permit only gives us until August 1, 2015 to fulfill the source test plan, we will need to conduct the test this fall before our last fermentation. It would be highly unlikely that we would be conducting fermentation next year before August 1. Since harvest is progressing rapidly, we probably only have several weeks of fermentation left this year.*

Prior to the 2015 season, CCWS received another Authority to Construct for the 40 new tanks that allowed the use of either NoMoVo or EcoPAS control systems. The new Authority to Construct continued to require inlet/outlet testing of the control system. However, that Authority to Construct was later cancelled due to both technology vendors objecting to perform the required source tests to demonstrate the control efficiency of their respective systems. Rather, CCWS was issued a new ATC allowing only 10 of the 40 tanks to be used for fermentation, and limiting

fermentation to white wine only. With those changes to the permits, BACT was no longer triggered and the requirement to demonstrate the actual control efficiency was removed from the permits. Additionally, the use of the NoMoVo or EcoPAS control systems was no longer required; rather, the permit allowed for optional use on the 10 tanks that are allowed to ferment white wine.

The refusal of the control vendors to demonstrate the actual control efficiency raises significant questions and concerns over the vendors' control efficiency claims. The Valley Air District cannot, in good faith, require controls which the vendors refuse to validate. The District's concern is that, if the vendors of this technology are aware that claims of the control efficiency are potentially overstated, but they also know that EPA is about to require their technology to be installed on a widespread basis, they gain no advantage by demonstrating their actual control efficiency. Since the effectiveness was yet again not demonstrated in 2015, and for the reasons stated in the 2013 evaluation of the use of controls at CCWS, the criteria of Achieved in Practice have yet to be satisfied for these installations.

Conclusion

For the reasons listed in the above discussions of each control installation, none of the installations have met all of the criteria necessary for the control technology to be considered as achieved in practice BACT or federal LAER.

Appendix VI
Comparison Spreadsheet Ducting/Piping Costs

Ducting/Piping Cost Comparison

Duct Size Diameter (in.)	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	28"
Eichleay - Ducting/Piping Only $/Foot	--	--	--	$23.17	$38.59	$54.00	$62.00	$65.50	$69.00	$86.00	$92.00	$99.00	$106.00	$119.00
Eichleay - Ducting/Piping Only $/Foot Including 21.93% for Inflation	--	--	--	$28.25	$47.05	$65.84	$75.60	$79.86	$84.13	$104.86	$112.18	$120.71	$129.25	$145.10
Average of District Cost Survey in $/Foot	$15.49	$30.85	$27.67	$44.13	$37.50	$33.13	$93.75	$181.70	$216.50	$189.02	$308.40	--	$193.99	--

Ducting/Piping Costs based on Eichleay Report

Note: Minimum of 6" Diameter for Structural Support														
Duct Size Diameter (in.)	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	28"
Ducting/Piping Only $/Foot	--	--	--	$23.17	$38.59	$54.00	$62.00	$65.50	$69.00	$86.00	$92.00	$99.00	$106.00	$119.00
Ducting + Fittings, Bolt Up, Handling, & Install $/Foot	--	--	--	$62.17	$103.25	$144.33	$143.83	$174.17	$204.52	$251.38	$309.38	$306.44	$397.67	$476.73
Ducting + Fittings, Bolt Up, Handling, & Install $/Foot	--	--	--	$62.17	$103.25	$144.33	$143.83	$174.17	$204.52	$251.38	$309.38	$306.44	$397.67	$476.73

Supplier: Grainger (http://www.grainger.com) **Location: Fresno, CA and Ceres, CA**

Schedule 10													
Duct Size Diameter (in.)	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"
Price ($)	$229.50	$387.75	$587.50	--	--	--	--		--	--	--	--	--
Length (feet)	10	10	10	--	--	--	--		--	--	--	--	--
Price/Foot ($)	$22.95	$38.78	$58.75	--	--	--	--		--	--	--	--	--

Supplier: Stockton Pipe and & Supply Inc (http://www.stocktonpipe.net) **Location: Stockton, CA**

Note: Sizes over 12" Diameter need to be ordered from Mill													
0.109" thickness tube or Schedule 10 Pipe													
Duct Size Diameter (in.)	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"
Price ($)	--	--	--	--	--	$700.00	$840.00	--	--	--	--	--	$3,159.60
Length (feet)	--	--	--	--	--	20	20	--	--	--	--	--	20
Price/Foot ($)	--	--	--	--	--	$35.00	$42.00	--	--	--	--	--	$157.98

Supplier: Valley Iron Inc (http://www.stocktonpipe.net) **Location: Fresno, CA**

Note: Sch 10 T-304 20'													
Schedule 10 Pipe													
Duct Size Diameter (in.)	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"
Length (feet)	--	--	20	20	20	20	--	--	--	--	--	--	--
Price/Foot ($)	--	--	$10.75	$16.90	$26.00	$33.90	--	--	--	--	--	--	--

Supplier: Del Paso Pipe & Steel Inc. (http://www.delpasopipeandsteel.com/) **Location: Sacramento, CA**

Schedule 5/10 Pipe:													
Duct Size Diameter (in.)	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"
Price Quote: $9/lb												--	
Estimated Price/Foot	--	--	--	--	--	--	$217.00	$250.00	$286.00	$322.00	$432.00	--	--
												--	

Supplier: Hayward Pipe & Supply Co. Inc (http://www.haywardpipe.com/) **Location: Hayward, CA**

Note: large diamter pipe ships from Texas, FREIGHT NOT QUOTED - Additional Shipping Costs apply													
Schedule 10 Pipe													
Duct Size Diameter (in.)	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"
Price ($)	--	--	--	--	--	--	$1,540.00	$2,268.00	$2,940.00	$3,276.00	$3,696.00	--	--
Length (feet)	--	--	--	--	--	--	20	20	20	20	20	--	--
Price/Foot ($)	--	--	--	--	--	--	$77.00	$113.40	$147.00	$163.80	$184.80	--	--

Supplier: OnlineMetals.com (http://www.onlinemetals.com/) **Location: Nearest Warehouse - Los Angeles, CA**

Schedule 10 Pipe													
Duct Size Diameter (in.)	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"
Price ($)	$78.28	$108.97	$160.34	$288.00	$520.00	--	--	--	--	--	--	--	--
Length (feet)	8	8	8	8	8	--	--	--	--	--	--	--	--
Price/Foot ($)	$9.79	$13.62	$20.04	$36.00	$65.00	--	--	--	--	--	--	--	--
Welded Stainless Tube 304/304L (2" OD, 0.12" Wall; 3" OD, 0.12" Wall; 6", 0.12")													
Duct Size Diameter (in.)	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"
Price ($)	$109.86	$321.34	--	$628.16	--	--	--	--	--	--	--	--	--
Length (feet)	8	8	--	8	--	--	--	--	--	--	--	--	--
Price/Foot ($)	$13.73	$40.17	--	$78.52	--	--	--	--	--	--	--	--	--

Supplier: Lone Star Supply Co **Location: Dickinson, TX**

Note: Additional shipping costs													
Schedule 10 Welded Pipe													
Duct Size Diameter (in.)	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"
Price/Foot ($)	--	--	$16.45	$19.60	$21.50	$30.50	$39.00	--	--	$81.25	--	--	$230.00
												--	

Supplier: Global Technology and Engineering **Location: Excelsior Springs, MO**

Note: Additional shipping Costs													
11 Gauge Tubing													
Duct Size Diameter (in.)	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"
Price ($)	--	--	$226.58	$487.40	--	--	--	--	--	--	--	--	--
Length (feet)	--	--	7	7	--	--	--	--	--	--	--	--	--
Price/Foot ($)	--	--	$32.37	$69.63	--	--	--	--	--	--	--	--	--

All suppliers	$30.85	$44.13	70%	
Only suppliers that have both 3" and 6"	$30.85	$57.26	54%	33.50034

Appendix VII
Compliance Certification

N-96
Bear Creek Winery
Compliance Certification Statement
For Federal Major Permit Modifications
Compliance with District Rule 2201, Section 4.15.2

I certify under penalty of law that all major stationary sources (Title V facilities) operated under my control in California are compliant with all applicable air emissions limitations and standards.

Craig Rous
(Signature)

Date: 11/02/15

Craig Rous
(Name)

Director of Operations
(Title)

Appendix VIII
Quarterly Net Emissions Change Calculations

Quarterly Net Emissions Change Calculations

For the purposes of this project,

$QNEC = (PE2_{SLC} - BE_{SLC}) \div 4$

As shown in Section VII.C.5, BE is equal to PE1 for all pollutants. Therefore, the equation for QNEC reduces to:

$QNEC = (PE2_{SLC} - PE1_{SLC}) \div 4$

The applicant did not propose any changes to the VOC SLC for this project. Therefore, $PE2_{SLC}$ is equal to $PE1_{SLC}$.

Thus, QNEC is equal to zero for each unit.

Appendix IX
Public Comments and District Response

Public Comments and District Responses

EcoPAS Comment #1:

The EPA has stated that multiple control technologies have been achieved in practice for this category of source, and therefore any valid ATC must comply with a determination of lowest achievable emissions rate (LAER).

District Response to EcoPAS Comment #1:

While we agree that these installations must comply with LAER (equivalent to the District's BACT), we disagree that multiple control technologies have been Achieved in Practice for this category of source. The District performed a detailed analysis for each of the existing and past installations of a control technology used to control fermentation emissions from wine tanks and determined that none of those installations meet all of the necessary criteria to be considered Achieved in Practice. A copy of the District's analysis, entitled "Achieved in Practice Memo", was included in Appendix V of the application review in the preliminary notice package and provides further details regarding the District's determination.

EcoPAS Comment #2:

The proposed project's cost analysis is vastly divergent from ours. For example, our estimate of total installation costs of this relatively small control system is $186,931, while the project estimate is 1,546,881 (a factor of 8.3 times higher).

Additionally, the proposed ATC states that the District requested a detailed breakdown of the cost of each component of each cost category from the vendor but has not received the requested information. We apologize for this misunderstanding. After receiving revised and expanded documentation from EcoPAS on March 28th, District engineers informed us in writing that they had no further questions, but would contact us if they had any unanswered questions. From the proposed ATC, we now understand that the District required further details on how specific costs were allocated to each category. (Attached Table with breakdown of costs)

District Response to EcoPAS Comment #2

As explained in meetings between Patrick Thompson and District staff on March 21 in Modesto and March 22 in Fresno, the District requires a detailed, itemized cost breakdown in order to fully evaluate the cost effectiveness of the installation and operation of the PAS-100 condenser(s), and also to determine the appropriate cost values for each category. Most of the costs used in the District's analysis were obtained from EPA's Air Pollution Control Cost Manual, Sixth Edition (EPA/452/B-02-001).

The District has reviewed the revised itemized cost estimate that EcoPAS submitted within their July 1, 2016 comment letter, and observed that all of the itemized costs provided by EcoPAS were significantly lower than those either obtained from EPA's Air Pollution Control Cost Manual or than those the District could independently verify.

The District notes that there are several reasons for the differences between EcoPAS's cost estimate and the District's cost estimate.

1. The itemized cost estimate submitted by EcoPAS assumes that the installation of their control technology would not result in any costs for engineering, construction and field expenses, start-up, painting, insulation, maintenance, overhead, property taxes, and insurance. While EcoPAS provided no justification for their assumption of no cost for these items, the costs used by the District for these categories were obtained directly from EPA's Air Pollution Control Cost Manual. Without adequate justification for why the costs for these categories should be set equal to zero, and having been provided no valid and justified alternative cost estimates for these categories, the District believes it is reasonable and appropriate to include the costs for these categories obtained from EPA's Air Pollution Control Cost Manual.

2. The itemized cost estimate submitted by EcoPAS included costs for instrumentation, freight, foundation and supports, handling and erection, electrical, contractor fees and administration, all of which are significantly lower than the District's estimated the costs for these categories, which were obtained from EPA's Air Pollution Control Cost Manual. Since EcoPAS provided no justification for why their costs are so much lower than the expected norm provided by the EPA Air Pollution Control Cost Manual, the District believes that the EPA Air Pollution Control Cost Manual remains the best source of costs for these categories.

3. The itemized cost estimate submitted by EcoPAS assumes that the installation of new, never-before-used emission control equipment, which may require a facility to significantly alter its traditional wine making processes will not result in any production-related costs to the owner, and EcoPAS provides no allowances for a contingency fund. Furthermore, EcoPAS provided no justification for these assumptions. The District believes the inclusion of an owner's cost is appropriate; therefore, the District included the owner's cost in its cost analysis, as it has in past cost analyses for wine fermentation tanks. Additionally, the District believes it is necessary and appropriate to include a cost for contingencies. This is especially true considering that this would be the first installation of this control technology at a large winery, and would likely require significant redesign of wine fermentation tanks as well as the manner in which ingredients are added and recirculated in the fermentation tanks. Furthermore, the contingency cost utilized in the District's application review was based on reasonable estimates published by the Association for the Advancement of Cost Engineering International and the Electric Power Research Institute. Therefore, the District believes it is reasonable and appropriate to include these costs in its analysis.

4. The itemized cost estimate submitted by EcoPAS includes cost estimates for PLC Programming and source testing that are lower than the District's estimates. The District estimates were based on information previously submitted by the wine industry. Again, EcoPAS provided no justification or reference for their cost numbers. On the other hand, the large wineries in the Central Valley commonly use PCL controllers as well as extensive process instrumentation for all of their process operations, and they routinely conduct source testing on several of their emission units, so the District believes the wine industry is in the best position to provide reasonable estimates of costs for PLC programming and source testing. Therefore, the District utilized the cost estimates provided by the wine industry for these categories.

5. The EcoPAS cost estimate for stainless steel ducting is significantly lower than the District's cost estimate. While EcoPAS provided no justification for their supplied cost numbers, it should be noted that the District independently contacted several local stainless steel ducting vendors to inform our investigations into the actual costs for various sized, food grade stainless steel ducting and then compared the results with those obtained from the Eichleay Report, which was used the development of District Rule 4694. This comparison revealed that the use of inflation-adjusted costs from the Eichleay Report is appropriate (and lower than costs resulting from the District's own investigations) for estimating the cost of stainless steel duct work for this application. Specifically, the District's cost estimate was based on the length and size of ductwork necessary to duct vapors from the tanks to the control devices, the number of valves necessary to connect each tank to the piping manifold, and the inflation-adjusted stainless steel ducting costs per linear foot provided by the Eichleay Report (2005).

   One potential explanation for the difference in cost would be the proposed location of the control devices. Clearly, the farther a control device is located from the tank farm, the longer the duct runs must be, which increases ducting costs. While it can result in longer duct runs, large wineries such as those in the Central Valley generally prefer to centrally locate equipment as much as possible to increase operational efficiency. Centrally locating control equipment may also be necessary in some instances, as locating the control equipment as close to the tanks as possible might interfere with normal operation of the wine making processes, impede personnel and vehicle traffic, pose additional safety hazards, etc. For this specific project, the control equipment was assumed to be located as close to the tank farm as practicable given the winery's layout, minimizing the length of the duct runs as much as possible; therefore, the location of the control equipment isn't a likely explanation for difference in the District's ducting cost estimate versus EcoPAS's ducting cost estimate. Nevertheless, since EcoPAS provided no justification for their ducting cost numbers, the District believes the ducting costs used for this specific project are reasonable and appropriate.

6. Finally, the EcoPAS cost estimate assumes that a clean-in-place system is not necessary for this application since CO_2 and EtOH vapors act as a natural cleaning agent and the lack of oxygen and nutrients contribute to the inherent system cleanliness. However, CO_2 and EtOH vapors cannot adequately clean the emission control ductwork if there is an unexpected transient fermentation event (e.g. a foam-over), which have occurred at wineries with large tanks permitted within the District. In the event of a foam-over, the emission control ductwork would not only be contaminated with fermenting wine; the emission control ductwork would also be contaminated with grape skins and other solid materials that could clog the ductwork. The solid materials must be physically removed from the emission control ductwork and the ductwork properly sanitized prior to bringing the tanks back into operation; otherwise, the materials in the ductwork could potentially contaminate the product in the wine tanks or even plug the ductwork.

   Without a clean-in-place system, the ductwork would need to be disassembled, removed, cleaned, and then reinstalled. This would significantly increase the time required to bring the tanks and the emission control system serving the tanks back to an operational status following a foam-over event. The inclusion of a clean-in-place system ensures that the emission control equipment is in operation as often as possible, thus minimizing uncontrolled emissions to the atmosphere. For these reasons, the District believes it is both reasonable and appropriate to utilize a clean-in-place system for any emission control installation at a large winery and has therefore included the cost for such a system in its cost estimate.

Based on the data available to the District, the District has determined that the use of a condensation system is not cost effective for this project.

EcoPAS Comment #3:

EcoPAS is willing to install and support a control system at our expense, with the applicant paying only for tons of VOCs actually captured.

a. EcoPAS is willing to fund a District study, using an objective 3rd-party engineering firm with wine industry experience, to determine reasonable installation and operation costs.
b. EcoPAS is willing to provide a guarantee of cost effectiveness. We will guarantee that total $/ton is less than the District's threshold, and be directly liable if actual costs exceed the unbiased engineering firm's estimates
c. Applicant may also share in byproduct revenues (if so desired).

EcoPAS Comment #4

The author is curious if this (Indemnification Agreement and Letter of Credit) is a common permit requirement? At first glance, it gives the impression that the District is concerned this ATC issuance will generate CEQA liability, and therefore is requiring applicant to bear legal responsibility. Would actual controls eliminate the need for indemnification and letter of credit?

District Response to EcoPAS Comment #4

The District requires indemnification from applicants when specific permitting proposals have an elevated potential for litigation. The decision to require an indemnification agreement and letter of credit is a case-by-case risk management decision, based on the particulars of each permitting proposal.

EcoPAS Comment #5:

The recently adopted plan for Ozone attainment states that "...the District commits to amend Rule 4694 to include additional requirements to further reduce emissions from wine fermentation processes as appropriate by December 31, 2018." Each year we get only one chance (the late-summer early-fall crush) to evaluate fermentation emissions control technologies. We submit that this new source review and proposed permit is an excellent opportunity for industry and regulators to work together to further validate actual economic feasibility of implementing real emission control technologies.

District Response to EcoPAS Comment #5

Comment noted. The District looks forward to working with all interested parties during the referenced rule development processes.

NOTE: While the following additional comments from EcoPAS were received after the 30-day public comment period had concluded for this project and were not specifically directed towards this project, the District's response to these additional comments has been proactively included within this project evaluation.

EcoPAS Comment #6:

Our experience is that the CO2 and EtOH vapor act as a natural cleaning agent, and that CIP systems are an unnecessary expense. The EtOH vapor % is comparable to solvent systems, and the lack of oxygen and nutrients further adds to the inherent system cleanliness. This is experience is supported by end-of-crush test results from a full season of operation without CIP. However, if the applicant desires the expense of a CIP system, we are eager to consider the integration of such a system. Preliminary estimates of a suitable CIP system are well below $1M. As an optional item not necessary for the safe operation of the PAS, a CIP should not be part of the cost-effectiveness analysis.

District Response to EcoPAS Comment #6:

Please refer to the District Response to EcoPAS Comment #2, Item 6 above for the District's response to this comment.

EcoPAS Comment #7:

Our estimates assume some variant of a service model under which EcoPAS would:

- Enter into a long-term agreement to provide capture service at cost/ton below the district's threshold of cost effectiveness.
- Bear *all* operational costs (direct, indirect, operation, and maintenance)
- Bear liability for any operation mishaps or damages
- Share revenues from captured aromatic condensate (up to and exceeding the cost/ton of the emissions).

Under this model, we have left line items as zero that would be included in our costs. These include painting, insulation, engineering, construction, startup, owner's cost, contingency, operating costs, property taxes, and insurance, and should include sales tax and freight (left in for comparison purposes). We apologize for the challenges in comparing our cost estimates to the format used by the District, and would only ask in the future to be involved more fully in the District's cost analysis.

District Response to Comment #7:

Please refer to the District Response to EcoPAS Comments #2 and #3 above. Specifically, the District expects the facility will incur significant engineering, construction, start up, owner's cost,

contingency costs, operating costs, property taxes, and insurance costs for this installation. Furthermore, New Source Review does not provide any mechanism that would allow the District to compel the wine industry to participate in such a service model partnership.

EcoPAS Comment #8:

A variety of methods have been used to apply the various EPA cost estimation methodologies to condensers. For this analysis, the District appears to use the most expensive possible method, arriving at a Total Capital Investment (TCI) of ~2.4X purchased equipment cost (PEC). The EPA Manual states that "For packaged systems, total capital investment = 1.15PEC" (EPA AIR POLLUTION CONTROL COST MANUAL, Sixth Edition, Section 3.1, VOC Recapture Controls, page 2-23). Our actual estimate is that TCI for this project is ~1.2PEC, higher than the suggested EPA factor, but far lower than the District's estimate. It is also common to use much longer useful life spans and lower cost of money estimates, but this is mostly a function of actual desire to adopt controls.

District Response to EcoPAS Comment #8:

The District considers a "packaged system" to be one where the technology in question is commonly used in the industry. The PAS-100 system has never been utilized at a large winery of this nature. Given the uncertainties associated with the use of this technology, the District believes that use of such a system would necessarily require a custom installation, and that the cost factors from EPA's Air Pollution Control Cost Manual used in the analysis provided in the preliminary notice are appropriate.

Furthermore, the District believes the use of a system cost estimate of 1.15PEC would highly underestimate the costs. The District's research leads us to believe that the contingency cost alone is at least 0.15PEC for this type of installation, leaving zero dollars for foundation & supports, handling and erection, electrical, insulation, painting, engineering, construction and field expenses, contractor fees, start-up, and initial performance testing.