San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

AUG 2 6 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-2321
Project # N-1143210

Dear Mr. Rios:

The District has received your July 12, 2016 letter regarding District Project N-1143210 for the proposed installation of 24 new 108,000 gallon wine fermentation and storage tanks at CBUS Ops Inc. dba Woodbridge Winery (Facility N-2321). 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 N-1143210. 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: Andrea Staggs, CBUS Ops Inc. (dba Woodbridge Winery) via email (Andrea.Staggs@cbrands.com)

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

Installation of 24 New 108,000 Gallon Wine Fermentation and Storage Tanks

Facility Name:	CBUS Ops Inc. (dba Woodbridge Winery)	Date:	May 26, 2016
Mailing Address:	P.O. Box 1260 Woodbridge, CA 95258	Engineer: Lead Engineer:	Ramon Norman Nick Pierce
Contact Person:	Andrea Staggs		
Telephone:	(209) 365-8188		
Mobile Phone:	(209) 200-5419		
E-Mail:	andrea.staggs@cbrands.com		
Application #(s):	N-2321-836-0, -837-0, -838-0, -839-0, -840-0, -841-0, -842-0, -843-0, -844-0, -845-0, -846-0, -847-0, -848-0, -849-0, -850-0, -851-0, -852-0, -853-0, -854-0, -855-0, -856-0, -857-0, -858-0, and -859-0		
Project #:	N-1143210		
Deemed Complete:	April 27, 2016		

I. Proposal

CBUS Ops Inc. (dba Woodbridge Winery) has requested Authority to Construct (ATC) permits for the installation of 24 new 108,000 gallon wine fermentation and storage tanks (ATC permits N-2321-836-0 through -859-0). The new tanks will be installed under an existing facility-wide limit for VOC emissions, so there will be no overall increase in VOC emissions. VOC emissions from all wine fermentation and wine storage operations at the facility will continue to be limited to no more than 1,167,178 lb-VOC/year.

CBUS Ops Inc. had previously requested ATC permits for the installation of a total of nine new wine storage tanks and 24 new wine fermentation and storage tanks under Project N-1133440. Per the facility's request, the original ATC project was split into two separate projects with Phase 1 (Project N-1133440) for the installation of seven new wine storage tanks and Phase 2, which was for the remaining 26 wine storage and fermentation tanks that the facility indicated would be installed in the spring of 2015 or later. The facility subsequently requested that Phase 2 of the project also be split to allow the projects for the two remaining wine storage tanks and 24 new wine fermentation and storage tanks to be processed separately. Therefore, per the facility's request, the overall project includes three phases: Phase 1 - Project N-1133440 for installation of seven new wine storage tanks, for which the ATC permits were issued on 6/16/2014; Phase 2 - Project N-1140986 for installation of two new wine storage tanks, for which the ATC permits were issued on 6/24/2015; and Phase 3 - Project N-1143210, the current project, for installation of 24 new wine fermentation and storage and tanks.

CBUS Ops Inc. received their Title V Permit on March 5, 2007. 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 will be satisfied prior to the issuance of the Authority to Construct. CBUS Ops Inc. must apply to administratively amend their Title V permit.

II. Applicable Rules

Rule 2201	New and Modified Stationary Source Review Rule (2/18/16)
Rule 2410	Prevention of Significant Deterioration (6/16/11)
Rule 2520	Federally Mandated Operating Permits (6/21/01)
Rule 4001	New Source Performance Standards (4/14/99)
Rule 4002	National Emissions Standards for Hazardous Air Pollutants (5/20/04)
Rule 4102	Nuisance (12/17/92)
Rule 4694	Wine Fermentation and Storage Tanks (12/15/05)
CH&SC 41700	Health Risk Assessment
CH&SC 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 5950 E Woodbridge Road, Acampo, CA. The equipment is not located within 1,000 feet of the outer boundary of a K-12 school. Therefore, the public notification requirement of California Health and Safety Code 42301.6 is not applicable to this project.

IV. Process Description

CBUS Ops Inc. produces both red and white table wines, as well as other specialty wine products, from the fermentation of grapes. During the “crush season,” typically from late August to late November, both red and white grapes are received by truck and delivered to a crusher-stemmer which serves to crush the grapes and remove the stems. In the case of red wines, the resultant juice (termed “must” and containing the grape skins, pulp and seeds) is pumped to red wine fermentation tanks for fermentation, a batch process. The red wine fermentation tanks are specifically designed to ferment the must in contact with the skins and to allow the separation of the skins and seeds from the wine after fermentation. In the case of white wines, the must is sent to screens and presses for separation of grape skins and seeds prior to fermentation. After separation of the skins and seeds, the white must is transferred to a fermentation tank. White wine fermentation can be carried out in a tank without design provisions for solids separation since the skins and seeds have already been separated.

After transfer of the must (for red or white wine) to the fermentation tank, the must is inoculated with yeast which initiates the fermentation reactions. During fermentation, the yeast metabolizes the sugar in the grape juice, converting it to ethanol and carbon dioxide (CO_2) while releasing heat. Temperature is typically controlled by refrigeration, and is maintained at 45–65 °F for white wine fermentation and 70–95 °F for red wine fermentation. The sugar content of the fermentation mass is measured in °Brix (weight %) and is typically 22–26° for unfermented grape juice, dropping to 4° or less at the end of fermentation. Finished ethanol concentration is approximately 10 to 14 percent by volume. Batch fermentation requires 3-5

days per batch for red wine and 1-2 weeks per batch for white wine. VOCs are emitted during the fermentation process along with the CO_2. The VOCs consist primarily of ethanol along with small quantities of other fermentation byproducts.

Following the completion of fermentation, white wine is transferred directly to storage tanks. Red wine is first directed to the presses for separation of solids and then routed to the storage tanks. Tanks at a winery may be used for 1) fermentation operations, during which the tank is vented to the atmosphere to release the evolved CO_2 byproduct from fermentation; 2) storage operations, during which the tank is closed to minimize contact with air and refrigerated to preserve the wine; or 3) both fermentation and storage. The wine storage and fermentation operations are considered separate emissions units. Post-fermentation operations such as cold stabilization, racking, and filtration are conducted in the tanks, resulting in a number of inter-tank transfers during the period between the end of fermentation and bottling or bulk shipment. Storage operations are conducted year-round. VOC emissions occur primarily as a result of the inter-tank transfers which are necessitated by the post fermentation operations. The tanks addressed under this project will be used only for wine storage.

V. Equipment Listing

ATC #	Equipment Description
N-2321-836-0	108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1675 WITH PRESSURE/VACUUM VALVE AND INSULATION
N-2321-837-0	108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1676 WITH PRESSURE/VACUUM VALVE AND INSULATION
N-2321-838-0	108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1677 WITH PRESSURE/VACUUM VALVE AND INSULATION
N-2321-839-0	108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1678 WITH PRESSURE/VACUUM VALVE AND INSULATION
N-2321-840-0	108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1679 WITH PRESSURE/VACUUM VALVE AND INSULATION
N-2321-841-0	108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1680 WITH PRESSURE/VACUUM VALVE AND INSULATION
N-2321-842-0	108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1681 WITH PRESSURE/VACUUM VALVE AND INSULATION
N-2321-843-0	108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1682 WITH PRESSURE/VACUUM VALVE AND INSULATION

ATC #	Equipment Description
N-2321-844-0	108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1683 WITH PRESSURE/VACUUM VALVE AND INSULATION
N-2321-845-0	108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1684 WITH PRESSURE/VACUUM VALVE AND INSULATION
N-2321-846-0	108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1685 WITH PRESSURE/VACUUM VALVE AND INSULATION
N-2321-847-0	108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1686 WITH PRESSURE/VACUUM VALVE AND INSULATION
N-2321-848-0	108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1687 WITH PRESSURE/VACUUM VALVE AND INSULATION
N-2321-849-0	108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1688 WITH PRESSURE/VACUUM VALVE AND INSULATION
N-2321-850-0	108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1689 WITH PRESSURE/VACUUM VALVE AND INSULATION
N-2321-851-0	108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1690 WITH PRESSURE/VACUUM VALVE AND INSULATION
N-2321-852-0	108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1691 WITH PRESSURE/VACUUM VALVE AND INSULATION
N-2321-853-0	108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1692 WITH PRESSURE/VACUUM VALVE AND INSULATION
N-2321-854-0	108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1693 WITH PRESSURE/VACUUM VALVE AND INSULATION
N-2321-855-0	108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1694 WITH PRESSURE/VACUUM VALVE AND INSULATION
N-2321-856-0	108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1695 WITH PRESSURE/VACUUM VALVE AND INSULATION
N-2321-857-0	108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1696 WITH PRESSURE/VACUUM VALVE AND INSULATION

ATC #	Equipment Description
N-2321-858-0	108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1697 WITH PRESSURE/VACUUM VALVE AND INSULATION
N-2321-859-0	108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1698 WITH PRESSURE/VACUUM VALVE AND INSULATION

VI. Emission Control Technology Evaluation

Wine Fermentation:

The temperature of wine fermentation is controlled to maintain an average fermentation temperature not exceeding 95 °F which avoids higher temperatures that might be damaging to the yeast cells and reduces the potential for an out-of-control fermentation reaction in the tank. Temperature control serves to minimize VOC (ethanol) emissions relative to a tank without temperature control since the potential emissions increase with fermentation temperature.

Wine Storage:

VOCs (ethanol) are emitted from wine 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 valve limits these emissions by requiring the maximum amount of variation in tank pressure before allowing the tank to vent to the atmosphere or allowing air admission to the tank.

VII. General Calculations

A. Assumptions

- VOC emissions from all wine fermentation and wine storage operations at the facility will continue to be limited to no more than 1,167,178 lb-VOC/year
- Typically, for enclosed tanks with refrigeration and/or insulation (or equivalent) and P/V valves, breathing losses from storage of wine are assumed to be negligible
- Winery tanks generally consist of two emissions units; 1) a fermentation tank emissions unit and 2) a wine storage tank emissions unit.
- Total Annual Emissions from each of the tanks will be based upon the combined total of fermentation and storage emissions

Wine Fermentation Operations:

- Daily fermentation emissions from each tank will be based upon the worst case red wine emission factor.
- Annual fermentation emissions from each tank will be limited to no more than 1,240 lb/yr, which is equivalent to a white wine fermentation throughput of 496,000 gallons per year or a red wine fermentation throughput of 200,000 gallons per year.

- The maximum number of fermentation cycles will be approximately five cycles per tank per year for white wine or approximately two cycles per tank per year for red wine

Wine Storage Operations:

- The maximum ethanol content of the wine stored in the tanks is 17% by volume (per applicant)
- Maximum storage throughput of each 108,000 gallon wine storage tank (ATC permits N-2321-836-0 through -859-0): 432,000 gal/day (four turns per day) and 5,400,000 gal/year (50 turns/year)
- Maximum daily wine tank liquid storage temperature = 77.3 °F for locations near Stockton (per District FYI-295, *Modeling of Emissions for Wine and Distilled Spirits Storage Tanks Using Tanks 4.0d* (Revised 6/12/12),included in Appendix A)
- Annual average wine tank liquid storage temperature = 61.6 °F for all tanks for locations near Stockton (per District FYI-295, included in Appendix A)

B. Emission Factors

Fermentation

The uncontrolled emissions factors for wine fermentation operations in these tanks are taken from District FYI-114, *VOC Emission Factors for Wine Fermentation and Storage Tanks* (Revised 8/10/11, included in Appendix B)*:*

Wine Type	EF (lb-VOC/1,000 gallon wine tank capacity)	EF (lb-VOC/1,000 gallon wine tank throughput)	Source
	Daily	Annual	
White	1.62	2.5	District FYI-114
Red	3.46	6.2	District FYI-114

Since all of the tanks can ferment either white or red wine, worst case emissions factors of red wine will be used to calculate the maximum daily potential to emit.

Storage

Tanks 4.09d Emissions Estimation Software will be used to calculate the post-project Potential to Emit from the wine storage operations.

C. Calculations

1. Pre-Project Potential to Emit (PE1)

Fermentation in New Tanks

Since the tanks are new emissions unit, PE1 = 0 for all pollutants for the fermentation operation in these tanks.

Storage in New Tanks

Since the tanks are new emissions unit, PE1 = 0 for all pollutants for the storage operation in these tanks.

2. Post Project Potential to Emit (PE2)

Fermentation Operations in Tanks

Daily PE2 for Fermentation
For both red and white wine the fermentation process takes longer than a day (3 to 5 days for red wine and 10 to 14 days for white wine). Therefore, a maximum of one turnover per day will be used to determine the daily potential to emit.

Because the emissions from red wine fermentation are greater than white wine fermentation, the red wine emissions will be taken as Daily PE2

Daily PE_{VOC} = Tank Capacity (gal) x EF_{Red} (lb-VOC/1,000 gal of tanks capacity)

Wine Fermentation Daily Post-Project Potential to Emit					
Permit Unit	**Tank Capacity**	**Daily EF**		**Daily PE2**	
		White	Red	White	Red
	(gallon)	(lb-VOC/1,000 gal)		(lb/day)	
N-2321-836-0	108,000	1.62	3.46	175.0	**373.7**
N-2321-837-0	108,000			175.0	**373.7**
N-2321-838-0	108,000			175.0	**373.7**
N-2321-839-0	108,000			175.0	**373.7**
N-2321-840-0	108,000			175.0	**373.7**
N-2321-841-0	108,000			175.0	**373.7**
N-2321-842-0	108,000			175.0	**373.7**
N-2321-843-0	108,000			175.0	**373.7**
N-2321-844-0	108,000			175.0	**373.7**
N-2321-845-0	108,000			175.0	**373.7**
N-2321-846-0	108,000			175.0	**373.7**
N-2321-847-0	108,000			175.0	**373.7**
N-2321-848-0	108,000			175.0	**373.7**
N-2321-849-0	108,000			175.0	**373.7**
N-2321-850-0	108,000			175.0	**373.7**
N-2321-851-0	108,000			175.0	**373.7**
N-2321-852-0	108,000			175.0	**373.7**
N-2321-853-0	108,000			175.0	**373.7**
N-2321-854-0	108,000			175.0	**373.7**
N-2321-855-0	108,000			175.0	**373.7**
N-2321-856-0	108,000			175.0	**373.7**

Wine Fermentation Daily Post-Project Potential to Emit					
Permit Unit	Tank Capacity	Daily EF		Daily PE2	
		White	Red	White	Red
	(gallon)	(lb-VOC/1,000 gal)		(lb/day)	
N-2321-857-0	108,000			175.0	**373.7**
N-2321-858-0	108,000			175.0	**373.7**
N-2321-859-0	108,000			175.0	**373.7**

Annual PE2 for Fermentation

As stated above, annual fermentation emissions from each tank will be limited to no more than 1,240 lb/yr, equivalent to a white wine fermentation throughput of 496,000 gallons per year or a red wine fermentation throughput of 200,000 gallons per year.

Annual PE_{VOC} = $Throughput_{White/Red}$ (gal/year) x $EF_{White/Red}$ (lb-VOC/1,000 gal)

Wine Fermentation Annual Post-Project Potential to Emit							
Permit Unit	Daily EF		Equivalent Annual Throughput		Annual PE2 for Each Type of Wine		Annual PE2
	White	Red	White	Red	White	Red	
	(lb-VOC/1,000 gal)		Gallons		(lb/year)		(lb/year)
N-2321-836-0	2.5	6.2	496,000	200,000	1,240	1,240	**1,240**
N-2321-837-0			496,000	200,000	1,240	1,240	**1,240**
N-2321-838-0			496,000	200,000	1,240	1,240	**1,240**
N-2321-839-0			496,000	200,000	1,240	1,240	**1,240**
N-2321-840-0			496,000	200,000	1,240	1,240	**1,240**
N-2321-841-0			496,000	200,000	1,240	1,240	**1,240**
N-2321-842-0			496,000	200,000	1,240	1,240	**1,240**
N-2321-843-0			496,000	200,000	1,240	1,240	**1,240**
N-2321-844-0			496,000	200,000	1,240	1,240	**1,240**
N-2321-845-0			496,000	200,000	1,240	1,240	**1,240**
N-2321-846-0			496,000	200,000	1,240	1,240	**1,240**
N-2321-847-0			496,000	200,000	1,240	1,240	**1,240**
N-2321-848-0			496,000	200,000	1,240	1,240	**1,240**
N-2321-849-0			496,000	200,000	1,240	1,240	**1,240**
N-2321-850-0			496,000	200,000	1,240	1,240	**1,240**
N-2321-851-0			496,000	200,000	1,240	1,240	**1,240**
N-2321-852-0			496,000	200,000	1,240	1,240	**1,240**
N-2321-853-0			496,000	200,000	1,240	1,240	**1,240**
N-2321-854-0			496,000	200,000	1,240	1,240	**1,240**
N-2321-855-0			496,000	200,000	1,240	1,240	**1,240**
N-2321-856-0			496,000	200,000	1,240	1,240	**1,240**
N-2321-857-0			496,000	200,000	1,240	1,240	**1,240**

Wine Fermentation Annual Post-Project Potential to Emit							
Permit Unit	Daily EF		Equivalent Annual Throughput		Annual PE2 for Each Type of Wine		Annual PE2
	White	Red	White	Red	White	Red	
	(lb-VOC/1,000 gal)		Gallons		(lb/year)		(lb/year)
N-2321-858-0			496,000	200,000	1,240	1,240	**1,240**
N-2321-859-0			496,000	200,000	1,240	1,240	**1,240**
Total							**29,760**

Storage Operations in Tanks

Two Tanks 4.0 runs have been performed. The daily post-project potential to emit for each tank was calculated by using a maximum daily throughput of 432,000 gallons during the month of July and dividing the emissions for the month of July by the number of days in the month. The annual post-project potential to emit for each tank was calculated using a maximum annual throughput of 5,400,000 gallons (50 turns per year). See Appendix C for the Tanks 4.0 runs for the tanks.

Wine Storage Daily and Annual Post-Project Potential to Emit					
Permit Unit	Tank Capacity	Max Daily Throughput	Max Annual Throughput	Daily PE	Annual PE
	(gallon)	(gal/day)	(gal/year)	(lb/day)	(lb/year)
N-2321-836-0	108,000	432,000	5,400,000	**112.9**	**623**
N-2321-837-0	108,000	432,000	5,400,000	**112.9**	**623**
N-2321-838-0	108,000	432,000	5,400,000	**112.9**	**623**
N-2321-839-0	108,000	432,000	5,400,000	**112.9**	**623**
N-2321-840-0	108,000	432,000	5,400,000	**112.9**	**623**
N-2321-841-0	108,000	432,000	5,400,000	**112.9**	**623**
N-2321-842-0	108,000	432,000	5,400,000	**112.9**	**623**
N-2321-843-0	108,000	432,000	5,400,000	**112.9**	**623**
N-2321-844-0	108,000	432,000	5,400,000	**112.9**	**623**
N-2321-845-0	108,000	432,000	5,400,000	**112.9**	**623**
N-2321-846-0	108,000	432,000	5,400,000	**112.9**	**623**
N-2321-847-0	108,000	432,000	5,400,000	**112.9**	**623**
N-2321-848-0	108,000	432,000	5,400,000	**112.9**	**623**
N-2321-849-0	108,000	432,000	5,400,000	**112.9**	**623**
N-2321-850-0	108,000	432,000	5,400,000	**112.9**	**623**
N-2321-851-0	108,000	432,000	5,400,000	**112.9**	**623**
N-2321-852-0	108,000	432,000	5,400,000	**112.9**	**623**
N-2321-853-0	108,000	432,000	5,400,000	**112.9**	**623**
N-2321-854-0	108,000	432,000	5,400,000	**112.9**	**623**
N-2321-855-0	108,000	432,000	5,400,000	**112.9**	**623**
N-2321-856-0	108,000	432,000	5,400,000	**112.9**	**623**
N-2321-857-0	108,000	432,000	5,400,000	**112.9**	**623**

Wine Storage Daily and Annual Post-Project Potential to Emit					
Permit Unit	**Tank Capacity**	**Max Daily Throughput**	**Max Annual Throughput**	**Daily PE**	**Annual PE**
	(gallon)	(gal/day)	(gal/year)	(lb/day)	(lb/year)
N-2321-858-0	108,000	432,000	5,400,000	**112.9**	**623**
N-2321-859-0	108,000	432,000	5,400,000	**112.9**	**623**
Total					**14,952**

Maximum Daily and Total Annual PE2 for Wine Tanks

Wine Fermentation and Storage Daily & Annual Post-Project Potential to Emit					
Permit Unit	**Tank Capacity**	**Max Daily PE**	**Annual Fermentation PE**	**Annual Storage PE**	**Total Annual PE**
	(gallon)	(lb/day)	(lb/year)	(lb/year)	(lb/year)
N-2321-836-0	108,000	**373.7**	1,240	623	**1,863**
N-2321-837-0	108,000	**373.7**	1,240	623	**1,863**
N-2321-838-0	108,000	**373.7**	1,240	623	**1,863**
N-2321-839-0	108,000	**373.7**	1,240	623	**1,863**
N-2321-840-0	108,000	**373.7**	1,240	623	**1,863**
N-2321-841-0	108,000	**373.7**	1,240	623	**1,863**
N-2321-842-0	108,000	**373.7**	1,240	623	**1,863**
N-2321-843-0	108,000	**373.7**	1,240	623	**1,863**
N-2321-844-0	108,000	**373.7**	1,240	623	**1,863**
N-2321-845-0	108,000	**373.7**	1,240	623	**1,863**
N-2321-846-0	108,000	**373.7**	1,240	623	**1,863**
N-2321-847-0	108,000	**373.7**	1,240	623	**1,863**
N-2321-848-0	108,000	**373.7**	1,240	623	**1,863**
N-2321-849-0	108,000	**373.7**	1,240	623	**1,863**
N-2321-850-0	108,000	**373.7**	1,240	623	**1,863**
N-2321-851-0	108,000	**373.7**	1,240	623	**1,863**
N-2321-852-0	108,000	**373.7**	1,240	623	**1,863**
N-2321-853-0	108,000	**373.7**	1,240	623	**1,863**
N-2321-854-0	108,000	**373.7**	1,240	623	**1,863**
N-2321-855-0	108,000	**373.7**	1,240	623	**1,863**
N-2321-856-0	108,000	**373.7**	1,240	623	**1,863**
N-2321-857-0	108,000	**373.7**	1,240	623	**1,863**
N-2321-858-0	108,000	**373.7**	1,240	623	**1,863**
N-2321-859-0	108,000	**373.7**	1,240	623	**1,863**
Total			29,760	14,952	**44,712**

The PE2 for each proposed tank is shown above. The tanks will also be subject to existing specific limiting condition (SLC) that limits VOC emissions from all wine

fermentation and wine storage operations at the facility to no more than 1,167,178 lb-VOC/year.

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

Pursuant to District Rule 2201, the SSPE1 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 (AER) that have occurred at the source, and which have not been used on-site.

The only affected pollutant that the proposed project involves is VOC emissions. Facility emissions are already above the Offset and Major Source Thresholds for VOC emissions; therefore, SSPE1 calculations are not necessary.

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

Pursuant to District Rule 2201, the SSPE2 is the PE from all units with valid ATCs or PTOs at the Stationary Source and the quantity of ERCs which have been banked since September 19, 1991 for AER that have occurred at the source, and which have not been used on-site.

The only affected pollutant that the proposed project involves is VOC emissions. Since facility emissions are already above the Offset and Major Source Thresholds for VOC emissions, SSPE2 calculations are not necessary.

5. Major Source Determination

Rule 2201 Major Source Determination:

Pursuant to District Rule 2201, a Major Source is a stationary source with a SSPE2 equal to or exceeding one or more of the following threshold values. For the purposes of determining major source status the following shall not be included:

- any ERCs associated with the stationary source
- Emissions from non-road IC engines (i.e. IC engines at a particular site at the facility for less than 12 months)
- Fugitive emissions, except for the specific source categories specified in 40 CFR 51.165

This source is an existing Major Source for VOC emissions and will remain a Major Source for VOC. No change in other pollutants are proposed or expected as a result of this project.

Rule 2410 Major Source Determination:

The facility or the equipment evaluated under this project is not listed as one of the categories specified in 40 CFR 52.21 (b)(1)(iii). Therefore the PSD Major Source threshold is 250 tons per year (tpy) for any regulated NSR pollutant.

As indicated above, this facility has an existing specific limiting condition (SLC) that limits VOC emissions from all wine fermentation and wine storage operations to 1,167,178 lb-VOC/year.

PSD Major Source Determination (tons/year)	
	VOC
Facility PE before Project Increase	583.6
PSD Major Source Thresholds	250
PSD Major Source?	**Yes**

As shown above, the facility is an existing Major Source for PSD for VOC. Therefore, the facility is an existing Major Source for PSD.

6. Baseline Emissions (BE)

The BE calculation (in lb/year) is performed pollutant-by-pollutant for each unit within the project to calculate the QNEC, and if applicable, to determine the amount of offsets required.

Pursuant to District Rule 2201, BE = PE1 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 District Rule 2201.

<u>N-2321-836-0 through -859-0: New 108,000 Gallon Wine Fermentation/Storage Tanks</u>

These new emission units are being added to the facility's existing SLC of 1,167,178 pounds of VOC per year for wine fermentation and storage operations, and the facility is not proposing any change to the existing SLC limit as a result of this project. Pursuant to District Policy APR 1420, *NSR Calculations for Units with Specific Limiting Conditions (3/12/07)*, the Baseline Emissions (BE) for units included in an SLC shall be the maximum combined emissions allowed for those units under the SLC.

Additionally, District Policy APR 1420 states that if the SLC is for a pollutant exceeding the Major Source threshold and any single unit under the SLC is not a Highly-Utilized, Fully-Offset, or Clean Emissions Units, then the sum of the actual emissions from all units in SLC will be used to determine the pre-project BE for the units in the SLC.

As established in District Project N-1142591 and the subsequent projects for all newly installed wine tanks, all of the wine tanks at this facility satisfy the requirements of achieved-in-practice Best Available Control Technology (BACT) for wine fermentation

and storage as accepted by the District during the five years immediately prior to the submission of the complete application for the project, and are thus Clean Emission Units; therefore, the pre-project BE emissions for the units in the SLC are equal to the pre-project for the units in the SLC ($BE_{SLC} = PE1_{SLC}$).

Therefore, BE for VOC from units $BE_{SLC} = PE1_{SLC}$ = 1,167,178 lb-VOC/year

7. SB 288 Major Modification

SB 288 Major Modification is defined in 40 CFR Part 51.165 as "any physical change in or change in the method of operation of a major stationary source that would result in a significant net emissions increase of any pollutant subject to regulation under the Act."

As discussed in Section I of the project evaluation, the current project for the addition of 24 new wine fermentation and storage tanks is Phase 3 of a larger project. Project N-1133440 for the installation of seven new wine storage tanks was Phase 1 of the overall project and Project N-1140986 for installation of two new 652,000 gallon wine storage tanks was Phase 2 of the overall project. Therefore, the potential to emit from Phases 1, 2, and 3 will be considered together for purposes of determining if the current project will constitute an SB 288 Major Modification or Federal Major Modification.

Tanks operating at a winery are not completely independent emissions units since various processes at the facility may serve as a bottleneck to limit overall production. Therefore, the potential annual emissions must be established with consideration of all the other associated tanks in the facility. The total potential to emit from all of the proposed new tanks ($PE2_{New}$) is therefore determined as the difference between the post project and the pre project potential emissions from the wine production operation based on the collective physical capacity of the wine tanks at the facility.

The NEI is the total of emission increases for every permit unit addressed in this project and is calculated as follows:

NEI = PE2 – BAE

Where: PE2 = the sum of all the PE2s for each permit unit in this project
BAE = for units that are fully offset, the BAE = the PE1 for every unit, otherwise, the BAE is the actual annual emissions averaged over the baseline period for every unit.

Since Phases 1, 2, and 3 of this project involve only new emissions units, and no change to the existing emission units. The BAE for these units are each equal to zero.

Based on the collective physical capacity of the wine tanks in this facility, $PE2_{NewTanks}$ for Phases 1, 2, and 3 of the project is calculated to be 138,373 pounds VOC per year. See detailed potential emissions calculations in Appendix D of this document.

NEI = $\sum(PE2)_{New}$ = 138,373 lb-VOC/yr

SB 288 Major Modification Calculation and Determination					
Pollutant	PE2 (lb/yr)	BAE (lb/yr)	NEI (lb/yr)	Threshold (lb/yr)	SB 288 Major Modification?
VOC	138,373	0	138,373	50,000	**Yes**

As demonstrated in the preceding table, this project does constitute an SB 288 Major Modification.

8. Federal Major Modification

District Rule 2201 states that a Federal Major Modification is the same as a "Major Modification" as defined in 40 CFR 51.165 and part D of Title I of the CAA.

The determination of Federal Major Modification is based on a two-step test. For the first step, only the emission *increases* are counted. Emission decreases may not cancel out the increases for this determination.

Step 1

For new emissions units, the increase in emissions is equal to the PE2 for each new unit included in this project.

As discussed above, the total combined emissions increases from the new tanks in Phase 1, 2, and Phase 3 of the project was calculated as 138,373 lb-VOC/yr, as shown in Appendix D. The project's combined total emissions increases are compared to the Federal Major Modification Thresholds in the following table.

$NEI = \sum(PE2)_{New} = 138{,}373$ lb-VOC/yr

Federal Major Modification Thresholds for Emission Increases			
Pollutant	Total Emissions Increases (lb/yr)	Threshold (lb/yr)	Federal Major Modification?
VOC	138,373	0	**Yes**

Since there is an increase in VOC emissions, this project constitutes a Federal Major Modification, and no further analysis is required.

Federal Offset quantities are calculated below.

Federal Offset Quantities:

The Federal offset quantity is only calculated only 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-2321-836-0	0	1,863	**1,863**
N-2321-837-0	0	1,863	**1,863**
N-2321-838-0	0	1,863	**1,863**
N-2321-839-0	0	1,863	**1,863**
N-2321-840-0	0	1,863	**1,863**
N-2321-841-0	0	1,863	**1,863**
N-2321-842-0	0	1,863	**1,863**
N-2321-843-0	0	1,863	**1,863**
N-2321-844-0	0	1,863	**1,863**
N-2321-845-0	0	1,863	**1,863**
N-2321-846-0	0	1,863	**1,863**
N-2321-847-0	0	1,863	**1,863**
N-2321-848-0	0	1,863	**1,863**
N-2321-849-0	0	1,863	**1,863**
N-2321-850-0	0	1,863	**1,863**
N-2321-851-0	0	1,863	**1,863**
N-2321-852-0	0	1,863	**1,863**
N-2321-853-0	0	1,863	**1,863**
N-2321-854-0	0	1,863	**1,863**
N-2321-855-0	0	1,863	**1,863**
N-2321-856-0	0	1,863	**1,863**
N-2321-857-0	0	1,863	**1,863**
N-2321-858-0	0	1,863	**1,863**
N-2321-859-0	0	1,863	**1,863**
		Net Emission Change (lb/year):	**44,712**
		Federal Offset Quantity: (NEC * 1.5)	**67,068**

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

Rule 2410 applies to any pollutant regulated under the Clean Air Act, except those for which the District has been classified nonattainment. The pollutants which must be addressed in the PSD applicability determination for sources located in the SJV and which are emitted in this project are: (See 52.21 (b) (23) definition of significant)

- NO2 (as a primary pollutant)
- SO2 (as a primary pollutant)
- CO

- PM
- PM10

I. Project Location Relative to Class 1 Area

As demonstrated in the "PSD Major Source Determination" Section above, the facility was determined to be a existing PSD Major Source. Because the project is not located within 10 km (6.2 miles) of a Class 1 area – modeling of the emission increase is not required to determine if the project is subject to the requirements of Rule 2410.

II. Project Emission Increase – Significance Determination

a. Evaluation of Calculated Post-project Potential to Emit for New or Modified Emissions Units vs PSD Significant Emission Increase Thresholds

As a screening tool, the post-project potential to emit from all new and modified units is compared to the PSD significant emission increase thresholds, and if the total potentials to emit from all new and modified units are below the applicable thresholds, no futher PSD analysis is needed.

As indicated above, the proposed wine fermentation and storage tanks in this project will be subject to the existing SLC that limits VOC emissions from all wine fermentation and storage operations at the facility to 1,167,178 lb-VOC/year. Because there is a direct relationship between the amount of VOC (assumed to be almost entirely ethanol) and the amount of CO_2 produced during wine fermentation and there will be no increase in the potential to emit for VOC under this project, there will also be no increase in the potential to emit for CO_2.

PSD Significant Emission Increase Determination: Potential to Emit (tons/year)					
	NO2	SO2	CO	PM	PM10
Total PE from New and Modified Units	0	0	0	0	0
PSD Significant Emission Increase Thresholds	40	40	100	25	15
PSD Significant Emission Increase?	N	N	N	N	N

As demonstrated above, because the post-project total potentials to emit from all new and modified emission units are below the PSD significant emission increase thresholds, this project is not subject to the requirements of Rule 2410 and no further discussion is required.

10. Quarterly Net Emissions Change (QNEC)

The QNEC is calculated solely to establish emissions that are used to complete the District's PAS emissions profile screen.

Because the proposed wine fermentation and storage tanks will be subject to the existing SLC that limits VOC emissions from all wine fermentation and wine storage operations at the facility, there will be no overall increase in potential to emit at the facility. Therefore, the QNEC is equal to 0 for each quarter for each permit unit.

VIII. Compliance

Rule 2201 New and Modified Stationary Source Review Rule

A. Best Available Control Technology (BACT)

1. BACT Applicability

BACT requirements are triggered on a pollutant-by-pollutant basis and on an emissions unit-by-emissions unit basis. Unless specifically exempted by Rule 2201, BACT shall be required for the following actions*:

a. Any new emissions unit with a potential to emit exceeding two pounds per day,
b. The relocation from one Stationary Source to another of an existing emissions unit with a potential to emit exceeding two pounds per day,
c. Modifications to an existing emissions unit with a valid Permit to Operate resulting in an AIPE exceeding two pounds per day, and/or
d. Any new or modified emissions unit, in a stationary source project, which results in an SB 288 Major Modification or a Federal Major Modification, as defined by the rule.

*Except for CO emissions from a new or modified emissions unit at a Stationary Source with an SSPE2 of less than 200,000 pounds per year of CO.

a. New emissions units – PE > 2 lb/day

As discussed in Section VII.C.2 above, the applicant is proposing to install 24 new 108,000 gallon wine fermentation and storage tanks (ATC permits N-2321-836-0 through -859-0).

Wine Fermentation in the New Tanks
The PE is greater than 2.0 lb/day for VOC from the fermentation operation in each tank. Therefore, BACT is triggered for each tank for VOC from wine fermentation.

Wine Storage in the New Tanks
The PE is greater than 2.0 lb/day for VOC from the storage operation in each tank. Therefore, BACT is triggered for each tank for VOC from wine storage.

b. Relocation of emissions units – PE > 2 lb/day

As discussed in Section I above, there are no emissions units being relocated from one stationary source to another; therefore BACT is not triggered for relocation of an emissions unit.

c. Modification of emissions units – AIPE > 2 lb/day

As discussed in Section I above, there are no modified emissions units associated with this project. Therefore, BACT is not triggered for modification of a unit.

d. SB 288/Federal Major Modification

As discussed in Sections VII.C.7 and VII.C.8 above, this project does constitute an SB 288 and/or Federal Major Modification for VOC emissions. Therefore BACT is triggered for VOC for all emissions units in the project for which there is an emissions increase.

2. BACT Guideline

BACT Guideline 5.4.14 applies to wine fermentation tanks. (See Appendix E)

BACT Guideline 5.4.13 applies to wine storage tanks. (See Appendix F)

3. Top-Down BACT Analysis

Per Permit Services Policies and Procedures for BACT, a Top-Down BACT analysis shall be performed as a part of the application review for each application subject to the BACT requirements pursuant to the District's NSR Rule.

Pursuant to the attached Top-Down BACT Analyses (see Appendixes E and F), BACT has been satisfied with the following:

Wine Fermentation

VOC: Temperature-Controlled Open Top Tank with Maximum Average Fermentation Temperature of 95 °F

Wine Storage

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

B. Offsets

1. Offset Applicability

Offset requirements shall be triggered on a pollutant by pollutant basis and shall be required if the SSPE2 equals to or exceeds the offset threshold levels in Table 4-1 of Rule 2201.

As discussed above, the facility emissions are already above the Offset and Major Source Thresholds for VOC emissions; therefore, a determination of the quantity of offsets required must be performed.

2. Quantity of Offsets Required

As seen above, the facility is an existing Major Source for VOC and the SSPE2 is greater than the offset thresholds. Therefore offset calculations will be required for this project.

The quantity of offsets in pounds per year for VOC is calculated as follows for sources with an SSPE1 greater than the offset threshold levels before implementing the project being evaluated.

Offsets Required (lb/year) = (Σ[PE2 – BE] + ICCE) x DOR, for all new or modified emissions units in the project,

Where,
PE2 = Post Project Potential to Emit, (lb/year)
BE = Baseline Emissions, (lb/year)
ICCE = Increase in Cargo Carrier Emissions, (lb/year)
DOR = Distance Offset Ratio, determined pursuant to Rule 2201

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)

There are no increases in Cargo Carrier emissions as result of this project, and the proposed new emissions units are located in the same stationary source, which result DOR = 1.0.

Offsets Required (lb/year) = Σ (PE2 – BE) x 1.0 + 0

Offsets Required (lb/year) = Σ (PE2 – BE)

The facility has an existing SLC of 1,167,178 pounds of VOC per year for wine fermentation and storage operations, and the applicant is not proposing any change to this limit as a result of this project. Pursuant to District Policy APR 1420, *NSR Calculations for Units with Specific Limiting Conditions (3/12/07)*, the quantity of ERCs for units included in an SLC shall be determined by comparing the post-project PE for the SLC to the pre-project BE for the SLC.

As discussed in Section VII.C.6 of this evaluation BE for the SLC (BE_{SLC}) = $PE1_{SLC}$ = 1,167,178 lb-VOC/yr. Therefore, the emissions increase to be offset for this project is calculated as follows:

Emissions Increase (lb/year) = $PE2_{SLC} - BE_{SLC}$

Where:

$PE2_{SLC}$ = Post-project SLC. In this project, $PE2_{SLC}$ = $PE1_{SLC}$ = 1,167,178 lb-VOC/yr

BE_{SLC} = 1,167,178 lb-VOC/yr

Therefore,

Offsets Required (lb/year) = 1,167,178 lb-VOC/year – 1,167,178 lb-VOC/year
= 0 lb-VOC/year

As demonstrated in the calculation above, the amount of offsets required is zero. Therefore, offsets will not be required for this project.

C. Public Notification

1. Applicability

Public noticing is required for:

a. New Major Sources, Federal Major Modifications, and SB 288 Major Modifications,
b. Any new emissions unit with a Potential to Emit greater than 100 pounds during any one day for any one pollutant,
c. Any project which results in the offset thresholds being surpassed, and/or
d. Any project with an SSIPE of greater than 20,000 lb/year for any pollutant.

a. New Major Sources, Federal Major Modifications, and SB 288 Major Modifications

New Major Sources are new facilities, which are also Major Sources. Since this is not a new facility, public noticing is not required for this project for New Major Source purposes.

As demonstrated in Sections VII.C.7 and VII.C.8, this project is an SB 288 and Federal Major Modification. Therefore, public noticing for SB 288 and Federal Major Modification purposes is required.

b. PE > 100 lb/day

Applications which include a new emissions unit with a PE greater than 100 pounds during any one day for any pollutant will trigger public noticing requirements.

Wine Fermentation in the New Tanks

The daily PE2 for fermentation in each of the proposed new 108,000 gallon wine tanks is compared to the daily PE Public Notice thresholds in the following table:

108,000 Gallon Wine Fermentation and Storage Tanks PE > 100 lb/day Public Notice Thresholds			
Pollutant	PE2 (lb/day)	Public Notice Threshold	Public Notice Triggered?
NO_X	0	100 lb/day	No
SO_X	0	100 lb/day	No
PM_{10}	0	100 lb/day	No
CO	0	100 lb/day	No
VOC	373.7	100 lb/day	**Yes**

Therefore, public noticing for PE > 100 lb/day purposes is required for wine fermentation in the tanks.

Wine Storage in the New Tanks

The daily PE2 for storage in each of the proposed new 108,000 gallon wine tanks is compared to the daily PE Public Notice thresholds in the following table:

108,000 Gallon Wine Fermentation and Storage Tanks PE > 100 lb/day Public Notice Thresholds			
Pollutant	PE2 (lb/day)	Public Notice Threshold	Public Notice Triggered?
NO_X	0	100 lb/day	No
SO_X	0	100 lb/day	No
PM_{10}	0	100 lb/day	No
CO	0	100 lb/day	No
VOC	112.9	100 lb/day	**Yes**

Therefore, public noticing for PE > 100 lb/day purposes is required for wine storage in the tanks.

c. Offset Threshold

The SSPE1 and SSPE2 are compared to the VOC offset threshold in the following table.

Offset Thresholds				
Pollutant	SSPE1 (lb/year)	SSPE2 (lb/year)	Offset Threshold	Public Notice Required?
VOC	> 20,000	> 20,000	20,000 lb/year	No

As detailed above, there were no thresholds surpassed with this project; therefore public noticing is not required for surpassing an offset threshold.

d. SSIPE > 20,000 lb/year

Public notification is required for any permitting action that results in a SSIPE of more than 20,000 lb/year of any affected pollutant. According to District policy, the SSIPE = SSPE2 – SSPE1. As discussed above, the proposed tanks will be installed under an existing SLC for VOC emissions, so there will be no overall increase in VOC emissions as a result of the project.

The SSIPE is compared to the SSIPE Public Notice thresholds in the following table.

SSIPE Public Notice Thresholds			
Pollutant	SSIPE (lb/year)	SSIPE Public Notice Threshold	Public Notice Required?
NO_x	0	20,000 lb/year	No
SO_x	0	20,000 lb/year	No
PM_{10}	0	20,000 lb/year	No
CO	0	20,000 lb/year	No
VOC	0	20,000 lb/year	No

As demonstrated above, the SSIPEs for all pollutants were less than 20,000 lb/year; therefore public noticing for SSIPE purposes is not required.

2. Public Notice Action

As discussed above, public noticing is required for this project for SB 288 and Federal Major Modification purposes and for VOC emissions from emissions units in excess of 100 lb/day. Therefore, public notice documents will be submitted to the California Air Resources Board (ARB) and the US Environmental Protection Agency (EPA) and a public notice will be published in a local newspaper of general circulation prior to the issuance of the ATC for this equipment.

D. Daily Emission Limits (DELs)

DELs and other enforceable conditions are required by Rule 2201 to restrict a unit's maximum daily emissions, to a level at or below the emissions associated with the maximum design capacity. 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

For the proposed wine fermentation storage tank emission units in this project, the DEL is enforced with the following conditions:

- When this tank is 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 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]

- The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201]

- 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]

- The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201]

- The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201]

In addition, in order for the applicant to be able to ensure ongoing compliance with the proposed annual VOC limit for all tanks in this project, the following conditions will be included on each of the ATC permits for the wine tanks:

- The maximum annual VOC emissions from wine fermentation in this tank, calculated on a twelve month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201]

- The annual VOC emissions from wine fermentation in this tank, calculated on a 12 month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201]

- The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201]

- Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201]

E. Compliance Assurance

1. Source Testing

Pursuant to District Policy APR 1705, source testing is not required to demonstrate compliance with Rule 2201.

2. Monitoring

No monitoring is required to demonstrate compliance with Rule 2201.

3. Recordkeeping

Recordkeeping is required to demonstrate compliance with the offsets, public notification and daily emission limit requirements of Rule 2201. Recordkeeping is also required for winery tanks pursuant to District Rule 4694, *Wine Fermentation and Storage Tanks*. For the proposed wine storage tanks, the following conditions will be listed on the permits to ensure compliance:

- For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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]

- 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]
- 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]
- 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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201]
- On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201]
- On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201]
- Records of total annual fermentation and total annual storage emissions, including calculation methods and parameters used, shall be maintained. [District Rule 2201]
- Records shall be maintained that demonstrate the date of each year's start of crush season. [District Rule 2201]
- 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]

4. Reporting

No reporting is required to demonstrate compliance with Rule 2201.

F. Ambient Air Quality Analysis (AAQA)

An AAQA shall be conducted for the purpose of determining whether a new or modified Stationary Source will cause or make worse a violation of an air quality standard. However, since this project involves only VOC and no ambient air quality standard exists for VOC, an AAQA is not required for this project.

G. Compliance Certification

Section 4.15.2 of this Rule requires the owner of a new Major Source or a new major source or a source undergoing a federal major modification to demonstrate to the satisfaction of the District that all other Major Sources owned by such person and operating in California are in compliance or are on a schedule for compliance with all applicable

emission limitations and standards. As discussed in Section VIII above, this facility is an existing source and this project does constitute a Federal Major Modification, therefore this requirement is applicable. CBUS Ops Inc.'s (dba Woodbridge Winery) compliance certification is included in Appendix G.

H. Alternate Siting Analysis

Section 4.15.1 of District Rule 2201 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.

The proposed project, which includes installation of 24 new 108,000 gallon wine fermentation and storage tanks, will occur at an existing winery with more than 700 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 surrounding 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.

As explained above, the facility proposes to install 24 new winery tanks. The existing plant infrastructure and processing equipment including the crushing and pressing equipment are adequately sized to support operation of the existing and proposed wine tanks. Installation of the project at an alternate site would not be practical or feasible based on the following:

- 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 complete new plant infrastructure and supporting processes and equipment for 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.

Rule 2410 Prevention of Significant Deterioration

The prevention of significant deterioration (PSD) program is a construction permitting program for new major stationary sources and major modifications to existing major stationary sources located in areas classified as attainment or in areas that are unclassifiable for any criteria air pollutant.

As demonstrated above, this project is not subject to the requirements of Rule 2410 due to a significant emission increase and no further discussion is required.

Rule 2520 Federally Mandated Operating Permits

This facility is subject to this Rule, and has received their Title V Operating Permit. Section 3.29 defines a significant permit modification as a "permit amendment that does not qualify as a minor permit modification or administrative amendment."

Section 3.20.5 states that a minor permit modification is a permit modification that does not meet the definition of modification as given in Section 111 or Section 112 of the Federal Clean Air Act. Since this project is a Title I modification (i.e. Federal Major Modification), the proposed project is considered to be a modification under the Federal Clean Air Act. As a result, the proposed project constitutes a Significant Modification to the Title V Permit pursuant to Section 3.29.

As discussed above, the facility has applied for a Certificate of Conformity (COC). Therefore, the facility must apply to modify their Title V permit with an administrative amendment, prior to operating with the proposed modifications. Continued compliance with this rule is expected. The facility shall not implement the changes requested until the final permit is issued.

Rule 4001 New Source Performance Standards (NSPS)

This rule incorporates certain 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 storage tank operations.

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

This rule incorporates certain 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 storage tank operations.

Rule 4102 Nuisance

Rule 4102 prohibits discharge of air contaminants which could cause injury, detriment, nuisance or annoyance to the public. Public nuisance conditions are not expected as a result of these operations provided the equipment is well maintained. Therefore, compliance with this rule is expected.

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 is the only pollutant that will be emitted by the proposed wine tanks. Ethanol is not a Toxic Air Contaminant (TAC) as defined by Section 44321 of the California Health and Safety Code. Therefore, there are no increases in HAP emissions associated with any emission units in this project, therefore a health risk assessment is not necessary and no further risk analysis is required.

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 wineries with Baseline Fermentation Emissions in excess of 10 tons-VOC/year. This facility has Baseline Fermentation Emissions in excess of 10 tons-VOC/year; therefore the tanks at the facility are subject to this rule. The storage tank provisions of this rule apply to all tanks with capacity in excess of 5,000 gallons.

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. The facility has submitted the required plan to the District and is currently satisfying the required emission reductions.

The following conditions listed on the facility-wide permit ensure compliance:

- The winery operator shall achieve required annual emissions reductions (RAER) equal to at least 35% of the winery's baseline fermentation emissions (BFE). [District Rule 4694]

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.

The following conditions will be listed on the permits for stainless steel tanks ≥ 5,000 gallons in capacity and used for storage to ensure compliance with the requirements of Section 5.2.1:

- When this tank is 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^{o} F. The following condition will be placed on the permits for stainless steel tanks ≥ 5,000 gallons in capacity and used for storage to ensure compliance with the requirements of Section 5.2.2:

- 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]

Every three years, Section 6.1 and 6.2 require facilities with fermentation operations 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 6.4.3 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.

The following conditions listed on the facility-wide permit ensure compliance:

- By December 1, 2006, and every three years thereafter, the winery operator subject to the requirements of Section 5.1 shall submit to the District a three-year compliance plan that demonstrates compliance with the applicable requirements of District Rule 4694 for each year of the applicable compliance period. The three-year compliance plan shall include all the information specified in sections 6.1.1 through 6.1.8 of the rule. [District Rule 4694, 6.1]
- By July 1, 2007, and every three years thereafter, the winery operator shall submit to the District a three-year compliance plan verification that demonstrates that the three-year compliance plan elements are in effect. The compliance plan verification shall include all the information specified in sections 6.2.1 through 6.2.5 of District Rule 4694. [District Rule 4694, 6.2]
- By February 1, 2008, and every year thereafter, the winery operator shall submit to the District an annual compliance plan demonstration that shows compliance with the

applicable requirements of District Rule 4694. The compliance plan demonstration shall include all the information specified in sections 6.3.1 through 6.3.7 of the rule. All additional Required Annual Emissions Reductions (RAER) shall be obtained by April 1 of the year of the Annual Compliance Demonstration, per section 6.3.7.2 of the rule. [District Rule 4694, 6.3]

- Operators using certified emission reductions (CER) to mitigate fermentation emissions shall perform all monitoring and recordkeeping, as established in their approved three-year compliance plan, and shall maintain all records necessary to demonstrate compliance. [District Rule 4694]

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.

The following condition will be listed on each permit to ensure on-going compliance with this section:

- 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]

Section 6.4.1 requires that records be kept for each fermentation batch. The following condition will be listed on the permits for each fermentation tank to ensure compliance:

- For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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. The following conditions will be listed on the permit for each storage tank to ensure compliance with the requirements of Section 6.4.2:

- The operator shall determine and 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]

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. The following condition listed on the facility-wide permit ensures compliance:

- Operators using Certified Emission Reductions to mitigate fermentation emissions shall perform all monitoring and recordkeeping, as established in their approved Three-Year Compliance Plan, and shall maintain all records necessary to demonstrate compliance. [District Rule 4694]

California Health & Safety Code 42301.6 (School Notice)

The District has verified that this site is not located within 1,000 feet of a school. In addition, the proposed project will not result in an increase in Toxic Air Contaminants. Therefore, pursuant to California Health and Safety Code 42301.6, a school notice is not required.

California Environmental Quality Act (CEQA)

CEQA requires each public agency to adopt objectives, criteria, and specific procedures consistent with CEQA Statutes and the CEQA Guidelines for administering its responsibilities under CEQA, including the orderly evaluation of projects and preparation of environmental documents. The District adopted its *Environmental Review Guidelines* (ERG) in 2001. The basic purposes of CEQA are to:

- Inform governmental decision-makers and the public about the potential, significant environmental effects of proposed activities;
- Identify the ways that environmental damage can be avoided or significantly reduced;
- Prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible; and
- Disclose to the public the reasons why a governmental agency approved the project in the manner the agency chose if significant environmental effects are involved.

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 a potential 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 rules and regulations is expected. Pending a successful NSR Public Noticing period, issue ATCs N-2321-836-0, -837-0, -838-0, -839-0, -840-0, -841-0, -842-0, -843-0, -844-0, -845-0, -846-0, -847-0, -848-0, -849-0, -850-0, -851-0, -852-0, -853-0, -854-0, -855-0, -856-0, -857-0, -858-0, and -859-0 subject to the permit conditions on the attached draft ATCs in Appendix H.

X. Billing Information

Annual Permit Fees			
Permit Number	Fee Schedule	Fee Description	Annual Fee
N-2321-836-0	3020-05-E	108,000 Gallon Tank	$258.00
N-2321-837-0	3020-05-E	108,000 Gallon Tank	$258.00
N-2321-838-0	3020-05-E	108,000 Gallon Tank	$258.00
N-2321-839-0	3020-05-E	108,000 Gallon Tank	$258.00
N-2321-840-0	3020-05-E	108,000 Gallon Tank	$258.00
N-2321-841-0	3020-05-E	108,000 Gallon Tank	$258.00
N-2321-842-0	3020-05-E	108,000 Gallon Tank	$258.00
N-2321-843-0	3020-05-E	108,000 Gallon Tank	$258.00
N-2321-844-0	3020-05-E	108,000 Gallon Tank	$258.00
N-2321-845-0	3020-05-E	108,000 Gallon Tank	$258.00
N-2321-846-0	3020-05-E	108,000 Gallon Tank	$258.00
N-2321-847-0	3020-05-E	108,000 Gallon Tank	$258.00
N-2321-848-0	3020-05-E	108,000 Gallon Tank	$258.00
N-2321-849-0	3020-05-E	108,000 Gallon Tank	$258.00
N-2321-850-0	3020-05-E	108,000 Gallon Tank	$258.00
N-2321-851-0	3020-05-E	108,000 Gallon Tank	$258.00
N-2321-852-0	3020-05-E	108,000 Gallon Tank	$258.00
N-2321-853-0	3020-05-E	108,000 Gallon Tank	$258.00
N-2321-854-0	3020-05-E	108,000 Gallon Tank	$258.00
N-2321-845-0	3020-05-E	108,000 Gallon Tank	$258.00
N-2321-856-0	3020-05-E	108,000 Gallon Tank	$258.00
N-2321-857-0	3020-05-E	108,000 Gallon Tank	$258.00
N-2321-858-0	3020-05-E	108,000 Gallon Tank	$258.00
N-2321-859-0	3020-05-E	108,000 Gallon Tank	$258.00

Appendixes

A: District FYI-295: Modeling of Emissions for Wine and Distilled Spirits Storage Tanks Using Tanks 4.0d
B: District FYI-114: VOC Emission Factors for Wine Fermentation and Storage Tanks
C: Tanks 4.09d Wine Storage Emissions Estimation Calculations
D: Winery Potential Emissions Increase Calculations
E: BACT Guideline 5.4.14 and Top-Down BACT Analysis for Wine Fermentation
F: BACT Guideline 5.4.13 and Top-Down BACT Analysis for Wine Storage
G: Compliance Certification
H: Draft ATC Permits
I: Public Comments and District Responses

APPENDIX A

District FYI-295 Modeling of Emissions for Wine and Distilled Spirits Storage Tanks Using Tanks 4.0d

FYI-295

SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT

DATE: August 9, 2011 (Revised 6/12/12)

TO: Permit Services Staff

FROM: Dennis Roberts

SUBJECT: Modeling of Emissions for Wine and Distilled Spirits Storage Tanks Using Tanks 4.0d

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I. OVERVIEW

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. Emissions from storage operations are estimated by modeling the tank operation using U.S. EPA Tanks 4.0 software. Emissions from fermentation operations are estimated using emission factors which have been previously developed. The emissions from each emission unit are then appropriately combined to yield the Potential to Emit for the tank (permit unit).

This document provides guidance for using Tanks 4.0d for purposes of estimating VOC emissions from vertical fixed-roof tanks storing wine, distilled spirits or any other wine and ethanol mixture. Section III is an illustrative PE calculation for a new winery tank which is permitted for both fermentation and storage. Support documentation for methods is provided in the Appendices.

II. WINE AND SPIRITS STORAGE TANKS

Emissions estimates for wine and spirits storage tanks are based on modeling the tank operation using the EPA's Tanks 4.0d software. The modeling method utilizes Tanks 4.0 software along with a data base of ethanol/water vapor-equilibrium data developed by The Wine Institute.

Storage tanks perform several functions in the winery:

- Facilitation of post-fermentation processing operations for wine such as racking, filtration, malolactic fermentation and bottling. In this role, the typical storage tank is filled and emptied several times per year and functions as a process vessel.
- Storage of wine between processing operations up to the final operation of bottling. In this role, the tank is often static and the objective is to avoid degradation of the wine by both minimizing the wine temperature and the exposure of the wine to air.
- Storage of distilled ethanol. The material is often referred to as "high proof" and is used in blending operations to fortify wine products. Some facilities may operate a distillation operation to produce brandy and or high proof and the tanks are used to store the product prior to use or shipment.

- Fermentation: Storage tanks may also be used as fermentation tanks. If a storage tank is also used for fermentation operations the fermentation emissions must be calculated separately by methods presented in this document.

Emissions from storage tanks consist of both working losses and breathing losses. The former losses occur as a result of the displacement of the vapor space of the tank into the atmosphere which occurs during tank filling operations and is primarily a function of tank throughput and the temperature and ethanol content of the wine. Breathing losses are the result of diurnal heating and cooling, caused by the effect of ambient conditions on the contents of the tank. For a well-insulated tank breathing losses are assumed to be negligible since the insulation (typically 3-4 inches polyurethane foam) significantly reduces heat gain/loss by the liquid in the tank. Installation of non-insulated tanks in a climate-controlled building is considered equivalent to insulation since the tank is isolated from solar radiation and wind effects as well as being maintained in a constant temperature environment. Thus breathing losses are considered to be negligible for this case as well.

The validity of Tanks 4.0 for emissions modeling of storage tanks is recognized by both the District and the US EPA. Although the software has been widely used by the District for modeling VOC emissions from tanks containing organic liquids such as hydrocarbons (e.g., oilfield production and storage tanks), its use for tanks which store highly non-ideal solutions such as ethanol/water mixtures requires the development of empirical vapor-equilibrium data for the specific fluid. Ethanol water mixtures do not conform to either Raoult's Law or Henry's law (except for over limited ranges of dilute ethanol concentration) and therefore the accurate estimation of vapor-equilibrium properties of these mixtures using pure component properties is complex. The alternative is the use of empirical data along with suitable interpolation formulas.

The Wine Institute has developed a data base for ethanol/water mixtures based on interpolation of empirical data given in the International Critical Tables. The data base provides information on vapor pressure and other mixture properties for the two phase binary ethanol/water mixture for all concentrations from 0.1% to 99.9% alcohol. It has been put in an Access file format suitable for input directly into the EPA Tanks 4.0d Model. The data base has been provided for use both by the District and by wineries for purposes of estimating wine storage tank emissions. This insures that storage tank emission calculations using the Tanks 4.0d model will be uniform and consistent among all parties. The basis and assumptions of the data base have been reviewed by the District and the data base was found to be both a good representation of the empirical data given in the International Critical Tables and to be in the correct format for use in Tanks 4.0d. The basis, assumptions and conventions for use of the data base are given in Appendix A.

The following discussion provides a guide to the use of Tanks 4.0d for modeling emissions from tanks containing ethanol/water mixtures. It is assumed that the reader is generally familiar with the use of Tanks 4.0 for modeling storage tanks (see the Tanks 4.0 User Manual and the EPA document "Tanks Software Frequent Questions" at http://www.epa.gov/ttnchie1/faq/tanksfaq.html for general use of the software). The following discussion will only address the specific considerations required for ethanol-water mixtures:

A. Applicability of Tanks 4.0:

1. Winery tanks are almost exclusively vertical tanks with fixed roofs. The discussion will be restricted to this type.
2. Tanks 4.0 will be typically used to calculate the Potential to Emit (PE) for one of the following storage tank scenarios:

   - Temperature controlled tank which is either insulated or located inside a climate controlled building : Applicable to all insulated wine and brandy storage tanks with an operating temperature limitation on the permit. This category may be encountered for new tank installations are not being installed under an existing Specific Limiting Condition (SLC). Certain categories of storage tanks may be operated under continuous refrigeration such that the maximum temperature may be limited to less than ambient. Establishing a maximum temperature on the permit which is less than ambient results in reduced potential emissions and reduced requirements for offsets. The combined effect of limiting the maximum temperature and the use of insulation (or installing the tank in a temperature-controlled building) results in reduced working loss emissions and zero breathing loss emissions.

   Non-temperature controlled tank which is either insulated or located inside a climate controlled building : Applicable to all insulated wine and brandy storage tanks without an operating temperature limitation on the permit. Although most wine storage operations utilize refrigeration at certain times to maintain wine quality, most tanks are utilized to perform certain post fermentation operations on the wine during which it is undesirable to chill the wine and the tank operation is therefore subject to ambient temperature. Although these tanks may be refrigerated at some point as required by wine processing requirements, since there is no temperature limit on the permit, it is conservatively assumed the bulk liquid temperature is set by ambient conditions. However, since the tank is insulated, it is assumed that the internal temperatures are relatively uniform such that liquid surface temperatures in the tank are approximately the same as the bulk liquid temperature. The result of this assumption is that the tank model only indicates working losses while breathing losses are calculated as zero. The majority of existing winery tanks which were originally permitted as in-house PTO's fall into this category.

   - Non-temperature controlled tank which is neither insulated nor located inside a climate controlled building (unheated tank): Applicable to all non-insulated wine and brandy storage tanks without an operating temperature limitation. Most wine storage operations utilize refrigeration to maintain quality. However, since there is no temperature limit on the permit it is conservatively assumed the tank temperatures are set by ambient conditions. Since the tank is not insulated, both working and breathing losses will occur. Emissions calculated in this manner could represent uncontrolled emissions for any tank since the effects of insulation and temperature control would not be considered

Note that any tank installed in a building which is not climate-controlled is conservatively to be an outdoor installation.

3. To calculate both daily and annual PE:

   - Daily PE is based on maximum daily throughput, maximum ethanol % and the maximum temperature (if stated on the permit), occurring during July (hottest average monthly temperature for the San Joaquin Valley).

   Annual PE is based on maximum annual throughput, maximum allowed annual average ethanol % and maximum temperature if stated on the permit. In lieu of average annual ethanol %, the maximum allowed ethanol % can be used, yielding a conservatively higher emission value. Annual storage operations are assumed to be averaged over the full year.

4. When a tank is used for multiple products and has a permit limit for each, e.g., wine and spirits storage, a separate model is prepared for each product and the sum of the emissions from all model runs represents the total PE for the tank.

5. In addition to PE calculations, Tanks 4.0 can be used to calculate Historical Actual Emissions (HAE) for wine storage tanks based on either the maximum permitted temperature or actual temperature as measured for each wine movement through the tank and the actual ethanol concentration for each wine movement.

B. Establish the Ethanol/Water Chemical Data Base

1. Select data base

   Before starting an emissions model for an ethanol/water tank, you must first establish access to the ethanol/water chemical data base. To access the Chemical Database for ethanol/water, start Tanks 4.0 and select "Change Data Base Locations" from the "File" menu. Select "Browse" from the pop up window for tank data base, go to G/PER/Tanks 4.0-Wine and then select the data base file "WI Rev 7.6 Tank.mdb".

2. Print a data base report for the specific mixture to be modeled

   The data base properties for the specific ethanol/water mixture to be modeled should be printed prior to starting a model run on Tanks 4.0. This has two purposes: 1) the report provides a record of the mixture properties used for the calculations and 2) the report provides the value of the average molecular weight of the vapor which will be used in the final speciation calculation for the model. To print a data report, select "Data" from the main menu and go to Data/Chemical/Export/Print.

C. Tanks 4.0 Input

After initiating a tank model, note that input is required for five different tabs: 1) *Identification, 2) Physical Characteristics, 3) Site Selection, 4) Tank Contents and 5) Monthly Calculations.*

Identification Tab: No special considerations for ethanol/water storage are required for this tab.

Physical Characteristics Tab:

- For square or rectangular tanks which are common in some wineries, input a diameter which gives an equivalent circular cross sectional area.
- For "Net Throughput" enter the proposed annual throughput in gallons per year for purposes of modeling annual PE for the tank. When modeling daily emissions, input the maximum daily throughput x 31 at this location (the model for daily emissions will assume that the maximum daily throughput occurs each day throughout July and Tanks 4.0 will directly determine monthly emissions for July on that basis. Daily PE will then be determined by dividing the July monthly emissions by the 31 days in July).
- For "Is tank heated?" select "yes" if the tank is insulated and then set the vacuum and pressure settings to zero per software recommendation. If the is not insulated, select "no" and input the pressure/vacuum settings.
- For insulated tanks, select "white/good" for both the tank walls and roof since most winery tanks are white (Note that for tanks which are insulated, the contents are assumed to be uniform in temperature and therefore the selection of the tank color and condition has no impact on the emission estimate). For non-insulated tanks, select "diffuse aluminum/good" in order to conservatively simulate a possibly unpainted stainless steel tank.
- For inputting tank roof geometries other than dome or cone, refer to the EPA FAQs document at http://www.epa.gov/ttnchie1/faq/tanksfaq.html.
- Since most wine storage operations strive to maintain the liquid height as high as possible to avoid oxygen contact with the wine, the average and maximum liquid heights may be set approximately equal to the tank wall height if no other basis is provided by the applicant (Note that if the tank is insulated, the contents are assumed to be uniform in temperature and the values for average and maximum liquid height in the tank have no impact on the emissions estimate).

Site Selection Tab:

- Select a location corresponding to the region of the facility. For San Joaquin Valley, the Tanks 4.0 data base includes only Bakersfield, Fresno and Stockton which should be adequately representative of facilities located in the District's Southern, Central and Northern Regions respectively.

Tank Contents Tab:

- For "Chemical Category of Liquid", select "Organic Liquids"
- For "Single or Multi-Component Liquid" select 'Multiple".

- For "Speciation Option" select "None". (Note that using a speciation option causes the software to calculate the emissions of individual components. It does this by assuming Raoult's law is applicable, using pure component properties – not applicable to ethanol/water mixtures).
- For "Mixture Name" select the entry from the database corresponding to the ethanol contents of the tank. For annual PE estimates, select either the allowed average annual ethanol concentration or the maximum allowed ethanol concentration, rounded to the nearest 0.1 %. For daily PE estimates, select only the maximum allowed ethanol concentration. Note that all entries in the data base are listed in the form "Wine XX.X % Vol Alcohol" although technically the maximum ethanol content for wine is 24% with higher concentration reflecting the "spirits or liquors" category. Selecting a mixture for the run will result in a pop-up window asking if you are sure you want to speciate this organic liquid – click "OK" (I'm not sure why Tanks 4.0 does this since you have previously selected "None" for the speciation question).
- Specify "Average Liquid Surface Temperature", "Minimum Liquid Surface Temperature", "Maximum Liquid Surface Temperature" and "Bulk Liquid Temperature" as follows:
    1. Temperature controlled tank which is either insulated or located inside a climate controlled building: Input the maximum allowed tank temperature for each entry (same value for all four inputs - note that due the effects of insulation, the temperature of the contents is assumed to be uniform).
    2. Non-temperature controlled tank which is either insulated or located inside a climate controlled building: It is assumed that the calculated average bulk liquid temperature (for the specific site as calculated by Tanks 4.0 for an unheated tank) is applicable for each entry (same value for all four inputs - note that due to the effects of insulation, the temperature of the contents is assumed to be uniform). To determine annual emissions for locations represented by Bakersfield input 64.4 °F for all four entries; for Fresno input 63.3 °F for all four entries; for Stockton input 61.6 °F for all four entries. To determine daily emissions for locations represented by Bakersfield input 83.1 °F for all four entries; for Fresno input 81.0 °F for all four entries; for Stockton input 77.3 °F for all four entries (the mean daily temperature for July is assumed for each location).
    3. Non-temperature controlled tank which is neither insulated nor located inside a climate controlled building (unheated tank): Since the tank will have been specified as not heated, Tanks 4.0 will calculate all temperatures based on the site selection. After selecting the appropriate site on the *Site Selection* tab, go to the *Tank Contents* tab and click the "Calculate Mixture Properties" button.
- Based on selection of the mixture, Tanks 4.0 will input the remaining information on vapor pressure and molecular weight per the data base for the selected mixture.

Monthly Calculations Tab:

- For Daily emissions models, check only July and click the "Distribute Throughput" button.
- For annual emissions models, check all months and click the "Distribute Throughput" button.

D. Run Annual PE Emissions Model Report

1. With the tank model configured for annual emissions (maximum annual throughput listed for "Net Throughput" on the "Physical Characteristics" tab and all months checked on the "Monthly Calculations" tab with the throughput evenly distributed in all months, click "Run Report".
2. Select "Detailed" for report type and "monthly" for time basis and click OK.
3. The last page of the emissions report will list the estimated annual emissions from the tank. Note that the listed values are the combined emissions for ethanol and water (not the ethanol emissions from the tank). The listed values have to be speciated to determine the daily VOC emissions.

E. Run Daily PE Emissions Model Report

1. With the tank model configured for daily emissions (31 x maximum daily throughput listed for "Net Throughput" on the "Physical Characteristics" tab and only July checked on the "Monthly Calculations" tab with the throughput all occurring in July, click "Run Report".
2. Select "Detailed" for report type and "monthly" for time basis and click OK.
3. The last page of the emissions report will list the estimated emissions from the tank for the month of July assuming the maximum daily throughput occurs each day of July. Note that the listed values are the combined emissions for ethanol and water (not the ethanol emissions from the tank). The listed values have to be converted to a daily emission basis and then speciated to determine the daily VOC emissions.

F. Speciate the Tanks 4.0 Emissions Estimates to Determine the VOC (ethanol) Emissions:

The annual emission estimate provided by the Tanks 4.0 model working + breathing loss) represents the combined loss of ethanol and water from the tank. To calculate the ethanol portion of the emissions, it is first necessary to determine the molar fraction of ethanol (y_a) in the vapor emissions from the tank. This can be calculated from the average molecular weight (AMW) of the vapor as given on the previously printed chemical data report (the AMW is also listed on page 2 of the detailed emissions report). Per the definition of AMW for a binary mixture:

$$AMW = y_a \times MW_a + (1-y_a) \times MW_w$$

Solving for the molar fraction of ethanol,

$$y_a = \frac{AMW - MW_w}{MW_a - MW_w}$$

Where,

MW_a = Molecular weight of ethanol = 46.02 lb/mole
MW_w = Molecular weight of water = 18.02/lb/mole

The ethanol emissions may then be calculated,

$$PE_{annual} = \frac{\text{Annual Tank Loss}}{AMW} \times y_a \times MW_a$$

$$PE_{daily} = \frac{\text{July Tank Loss}}{31 \text{ days} \times AMW} \times y_a \times MW_a$$

III. SAMPLE PE CALCULATION

(Combined fermentation and wine storage tank)

General Calculations

A. Assumptions

- The tank is used for both wine storage and wine fermentation.
- The tank dimensions are 15' dia x 40' H with an internal volume of 52,876 gallons.
- Maximum annual storage throughput is 5,000,000 gallons per year per the applicant.
- Maximum daily storage throughput is one tank volume at maximum fill height.
- Maximum wine production by fermentation is 150,000 gallons white wine per year.
- The tank is temperature controlled to maintain a maximum temperature of 40 °F.
- The tank is insulated.
- Maximum allowed average annual ethanol content in the tank is 12 volume percent.
- Maximum ethanol content in the tank is 16 volume percent.
- The storage tank emissions will be determined by modeling the tank with Tanks 4.0d software in conformance with the District's Policy (FYI -295) for modeling emissions from ethanol/water storage tanks.
- The emission estimates from Tanks 4.0d represent combined ethanol/water losses from the tank which must be speciated to determine the ethanol emissions.
- Annual Potential to Emit is the sum of the calculated PE for the storage operations emission unit and the calculated PE for the fermentation operations emission unit.
- Daily Potential to Emit is the greater of the calculated PE for the storage operations emission unit and the calculated PE for the fermentation operations emission unit.

- Molecular weight of ethanol = MW_a = 46.02 lb/mole
- Molecular weight of water = MW_w = 18.02 lb/mole

B. Emission Factors

Per the fermentation emission factors presented in District's FYI-114:

Wine Fermentation Emission Factors		
Emission Factor	Red Wine	White Wine
Daily PE (lb-VOC/day per 1,000 gallons tank capacity)	3.46	1.62
Annual PE (lb-VOC/year per 1,000 gallons fermentation production)	6.2	2.5

Storage tank emissions will be modeled in Tanks 4.0d and no emission factors are necessary.

C. Calculations

1. Pre-Project Potential to Emit (PE1)

Since this is a new emissions unit, PE1 = 0 for all pollutants.

2. Post Project Potential to Emit (PE2)

Storage Tank Operation

Appendix C presents the chemical data report from the District's data base for 12 volume % and 16 volume % ethanol (maximum average annual and maximum ethanol concentration respectively). As listed, the average molecular weight of the vapor from this mixture is 25.97 lb/mole for 12% ethanol and 27.47 lb/mole for 16% ethanol.

Appendix D is the Tanks 4.0 model report for the annual emissions from the tank. As indicated, maximum annual loss from the tank (E_a) is:
E_a = 234 lb/year (combined annual ethanol and water loss from the tank)

Appendix E is the Tanks 4.0 model report for determining the daily PE. As indicated, maximum daily loss from the tank (E_d) is:

E_d = 5.9 lb/day (combined annual ethanol and water loss from the tank)

The annual emission estimates provided by the Tanks 4.0 model represent the combined loss of ethanol and water from the tank. To calculate the ethanol portion of the emissions, it is first necessary to determine the molar fraction of ethanol (y_a) in the vapor emissions from the tank. This can be calculated from the average molecular weight (AMW) of the vapor as given on the previously printed chemical data report. Per the definition of AMW for a binary mixture:

$$AMW = y_a \times MW_a + (1-y_a) \times MW_w$$

Solving for the molar fraction of ethanol,

$$y_a = \frac{AMW - MW_w}{MW_a - MW_w}$$

Where,

MW_a = Molecular weight of ethanol = 46.02 lb/mole
MW_w = Molecular weight of water = 18.02/lb/mole
Therefore,

$y_a = (25.97 - 18.02)/(46.02 - 18.02) = 0.2839$ for 12% ethanol mixture

$y_a = (27.47 - 18.02)/(46.02 - 18.02) = 0.3375$ for 16% ethanol mixture

The annual PE emissions may then be calculated based on 12% ethanol,

$$PE_{annual} = \frac{E_a}{AMW} \times y_a \times MW_a$$

$$PE_{annual} = 234/25.97) \times 0.2839 \times 46.02 = 118 \text{ lb-VOC/year}$$

The daily emissions may then be calculated based on 16% ethanol,

$$PE_{daily} = \frac{E_d}{AMW} \times y_a \times 46.02$$

$$PE_{daily} = (5.9/27.47) \times 0.3375 \times 46.02 = 3.3 \text{ lb-VOC/day}$$

Fermentation Tank Emissions (white wine only)

PE_{daily} = 1.62 lb-VOC/1000 gallons capacity x 52,875 gal capacity

PE_{daily} = 85.7 lb-VOC/day

PE_{annual} = 2.5 lb-VOC/1000 gallons throughput x 150,000 gal/year throughput

PE_{annual} = 375 lb-VOC/year

Post Project Potential to Emit (PE2)						
	Storage		**Fermentation**		**Total**	
	Daily Emissions (lb/day)	Annual Emissions (lb/year)	Daily Emissions (lb/day)	Annual Emissions (lb/year)	Daily Emissions (lb/day)	Annual Emissions (lb/year)
NO_X	0	0	0	0	0	0
SO_X	0	0	0	0	0	0
PM_{10}	0	0	0	0	0	0
CO	0	0	0	0	0	0
VOC	3.3	118	85.7	375	85.7	493

APPENDIX A

ASSUMPTIONS AND METHODS FOR DEVELOPMENT OF THE TANKS 4.0D CHEMICAL DATA BASE FOR ETHANOL/WATER MIXTURES

ASSUMPTIONS AND METHODS FOR DEVELOPMENT OF THE TANKS 4.0D CHEMICAL DATA BASE FOR ETHANOL/WATER MIXTURES

1) To use Tanks 4.0d for modeling of storage tank emissions, the vapor-liquid equilibrium characteristics of the material in the tank must be defined. Since ethanol-water solutions are generally not ideal, is necessary to utilize empirical data in this regard. The Wine Institute has developed this data base using data on the partial pressure of ethanol-water solutions taken from the International Critical Table (see Attachment 1)

2) As shown in Attachment 1, experimental partial pressure data over the full range of concentrations are given at various temperatures for both ethanol and water in mmHg. Values of P_A (partial pressure of water) and P_B (partial pressure of ethanol) are listed. For purposes of the data base, nomenclature will be revised to refer to the partial pressure of water as P_w and the partial pressure of ethanol a P_a. Applying Dalton's Law of Partial Pressures, the following relationships are obtained:

   $P = P_a + P_w$

   And

   $Y_a = Pa/P$
   $Y_w = Pw/P$

   Where, "P" is the total vapor pressure of the solution and Y_a and Y_w are the mole fractions of ethanol and water in the equilibrium vapor phase respectively.

   Since the ethanol-water system is highly non-ideal, it is necessary to utilize the "vapor weight specification" option (option1) in Tanks 4.0 for purposes of inputting vapor-liquid equilibrium data. For a given ethanol-water solution (concentration), the following information must be input to the chemical data base in Tanks 4.0:

   Solution name (e.g., "12 vol % ethanol/water ")
   Average molecular weight of the liquid
   Density of the liquid, lb/gallon
   Average molecular weight of the vapor
   Vapor pressure of the liquid (psia) at 40, 50, 60, 70, 80, 90 and 100 °F.

   Specification of the above data points requires that the data given in the International Critical Tables be interpolated.

3) To perform the interpolation, the partial pressures of ethanol and water at the Tanks 4.0d standard temperatures of 40, 50, 60, 70, 80, 90 and 100 °F are first determined by interpolation of the partial pressure data (mm Hg) given in the International Critical Tables at 20 °C (68 °F) and 40 °C (104 °F) (copy attached). The interpolation method is based on taking the log of the pressure to be a linear function of 1/(T+460) when using degree Rankin or 1(T+273) when using degrees Kelvin as recommended in the International Critical Tables. For standard temperatures below 68 °F (40, 50 and 60 °F), an Excel trend function is used to perform the extrapolation based on the values interpolated for 70, 80, and 90 and 100 oF. The result of this step yields tabulated values of the partial pressure of ethanol and water

for mixture concentrations of 0, 10, 20, 30, 40, 50, 60, 70, 80, 90 and 100 weight% ethanol at each of the standard temperatures listed above.

4) The vapor pressure of each of the various mixture concentrations at the standard temperatures are then determined as the sum of the partial pressure of water and alcohol according to Dalton's Law. The result of this step yields tabulated values of the total vapor pressure of alcohol and water for mixture concentrations of 0, 10, 20, 30, 40, 50, 60, 70, 80, 90 and 100 weight % ethanol at each of the standard temperatures listed above.

5) Since the volumetric properties of ethanol-water are also highly non-ideal, the density of each of the mixtures is determined by interpolation from data given in Table No. 6 of the Gauging Manual of the Alcohol and Tobacco Tax and Trade Bureau (Attachment 2). Given the density and weight % alcohol and the vapor mole fractions (calculated as stated above per Dalton's Law), the average molecular weight of the liquid and vapor can be calculated for each of the listed concentrations. Completion of this step results in a complete set of data suitable for inputting into the "vapor weight specification" of Tanks 4.0 for mixture concentrations of 0, 10, 20, 30, 40, 50, 60, 70, 80, 90 and 100 weight%.

6) A set of standard vapor pressures and other data required for input to Tanks 4.0d are then determined for all ethanol concentrations between 0 and 100% at increments of 0.1 volume percent by linear interpolation between the values previously established at 0, 10, 20, 30, 40, 50, 60, 70, 80, 90 and 100 weight% ethanol. For each intermediate concentration,

   - The density is established by linear interpolation of the data in Table 6 and the liquid mole fraction and the average molecular weight of the liquid are determined

   - The total vapor pressures of the particular mixture at the standard temperatures of 40, 50, 60, 70, 80, 90 and 100 °F are determined by linear interpolation of the vapor pressure values established for 0, 10, 20, 30, 40, 50, 60, 70, 80, 90 and 100 weight% alcohol based upon vapor mole fraction.

   - The vapor mole fraction of alcohol is determined by interpolation of the mole fraction values established (x-y values) and the average molecular weight of the vapor is calculated at each of the standard temperatures..

7) The resulting data base consists of the following for each concentration between 0 and 100% at increments of 0.1 volume percent:

Liquid density lb/gal:	As interpolated from Table 6 (Tanks 4.0d input)
Liquid average molecular weight:	As calculated for specific mixture (Tanks 4.0d input)
Standard vapor pressures:	As interpolated for specific mixture (Tanks 4.0d input)
Vapor average molecular weight:	Average value from values interpolated at each standard temperature (Tanks 4.0d input)
Mole fraction alcohol in vapor:	Average value from values interpolated at each standard temperature (required for final manual calculation of ethanol emissions))

Attachment 1 to Appendix A

Ethanol-Water Data from International Critical Tables

C_7H_{12}

Methylcyclohexene (Mix.)

B = $C_{11}H_{20}$ 1-Methyldecahydronaphthalene
P at 20° (123)

B = $C_{11}H_{20}$ 2-Methyldecahydronaphthalene
P at 20° (123)

B = $C_{12}H_{24}$ 1, 6-Dimethyldecahydronaphthalene
P at 20° (123)

B = $C_{12}H_{24}$ 2, 6-Dimethyldecahydronaphthalene
P at 20° (123)

C_7H_{14}

Methylcyclohexane

B = $C_{17}H_{34}$ 1-Methyldecahydronaphthalene
P at 20° (123)

B = $C_{11}H_{20}$ 2-Methyldecahydronaphthalene
P at 20° (123)

(b) Aqueous Systems

B = HCl, s. p. 258, 260, 301, 361
B = HBr, s. p. 258, 306, 361
B = HI, s. p. 258, 306
B = SO_3 s. p. 258, 302, 361
B = H_2SO_4 s. p. 263, 302

B = NH_3 (138); *cf.* (144)

The total vapor pressure for any composition and for any temperature between 0 and 80°C may be computed with the aid of the empirical equations

$$\theta = 1 + 0.703x_B(1 - x_B^2)$$

and

$$\pi = (x_B + 0.05)^{\frac{1}{2}}(1.34x_B - 2.93x_B^2 + 1.77x_B^3)$$

in which T is the absolute temperature of the solution of composition $100x_B$ mols % NH_3 and p is the absolute temperature at which pure liquid NH_3 (*q. v.*) has the same vapor pressure as the solution.

The partial vapor pressure of H_2O (0-80°) may be computed from the empirical relations:

$p_A = (1 - \alpha)x_A p_0$
$\alpha = 0.13x_B$ for $x_B < 0.53$
$\alpha = 0.055x_B$ for $x_B > 0.53$

p_0 = the vapor pressure of pure H_2O at the same temperature.

v. also p. 269 and 362.

B = KNO_3, s. p. 301 and 308
B = H_3PO_4, s. p. 303
B = HCN, s. p. 263 and 360

B = CH_2O Formaldehyde (64)

p_B in mm

p° \ $100x_B$	1	5	10	15	20	25	30	35
0		(0.037)	0.074	0.098	(0.120)	0.141	0.162	
20		(0.19)	0.361	0.481	0.600	0.714	(0.83)	
35	(0.13)	0.60	1.15	1.53	1.90	2.28	2.67	2.65
45		(1.30)	2.22	3.11	3.80	4.56	5.14	5.72

B = CH_2O_2 Formic acid, s. p. 364

B = CH_4O Methyl alcohol (119)
p in mm (±mm, 0.9)

$100x_B$	p_A	p_B
	30.0°	
0	54.7	0
11.90	30.2	66.1
17.85	39.6	75.6
21.07	37.2	85.2
27.31	35.8	100.6
31.06	34.9	108.5
40.1	32.8	127.7

B = CH_4O.—(*Continued*)

$100x_B$	p_A	p_B
47.09	34.8	135.6
55.8	70.9	278.7
69.2	57.8	489.4
76.8	43.8	496.6
85.9	80.1	520.9
100	0	609.2

B = $C_2H_4O_2$ Acetic acid
v. p. 308

B = C_2H_6O Ethyl alcohol
(83, 91, 118, 139); *cf.* (33, 60)

Log p_A or log p_B for any given composition is a linear function of $\frac{1}{T + 276.1}$ between any two values in the following table.

Wt. % B	p_A	p_B
	20°	
0	17.5	0.0
10	16.6	(0.7)
20	15.9	(2.6)
30	15.1	(7.1)
40	14.7	20.7
50	14.5	28.5
60	14.1	25.6
70	13.1	28.0
80	11.3	31.2
90	7.5	35.8
95	1.9	42.8
100	0.0	43.6
	40°	
0	54.3	0.0
10	51.6	25.9
20	47.6	43.5
30	46.2	54.7
40	45.6	63.5
50	44.6	69.2
60	42.0	74.5
70	40.5	82.8
80	35.9	91.8
90	24.7	103.4
95	6.5	128.0
100	0.0	134
	55°	
0	117	0.0
10	110.7	50.8
20	104.4	94.4
30	100.5	114.8
40	95.8	130.8
50	97.3	142.4
60	94.4	155.8
70	89.1	172.0
80	77.5	192.8
90	52.5	223.0
95	14.9	262.4
100	0.0	285
	75°	
0	287	0
10	276	144.0
20	261	218.8
30	254	269.2
40	245	305
50	241	335
60	235	365
70	224	405

B = C_2H_6O.—(*Continued*)

Wt. % B	p_A	p_B
80	191.4	454
90	130.8	527
98	34.7	625
100	0.0	607

B = C_3H_6O Acetone (110); *cf.* (105)
p in mm (±4)

$100x_B$	25°	30°	45°	60°
	p_A			
0.0	23	31	71	149
3.33	27	34	76	149
7.20	27	34	76	143
11.7	25	30	60	134
17.1	24	34	71	145
23.6	22	29	63	129
31.8	28	35	67	126
42.0	23	29	59	110
56.4	16	20	47	102
72.7	17	21	45	97
100	0	0	0	0
	p_B			
0.0	0	0	0	0
3.33	39	47	101	190
7.20	77	96	192	342
11.7	105	134	258	448
17.1	126	157	292	495
23.6	146	182	329	553
31.8	152	189	346	588
42.0	164	206	369	634
56.4	182	226	400	672
72.7	192	238	423	721
100	229	282	503	861

[a] For data at 35, 40, 50, 55°, *v.* (110).

B = $C_3H_6O_2$ Propionic acid
P in mm (±2) (60)

$100x_B$	7.48	39.1	49.2
P_{25}	16	17	18
P_{40}	32	61	47
P_{55}	147	143	130
P_{70}	353	355	315
P_{100}	705	760	687

For additional data, see (60).

B = $C_3H_8O_2$ Methyl acetal of 66.9°, *p* in mm (76); *cf.* (103)
v. also p. 364, 365

$100x_B$	p_A	p_B
65[a]	131	633
75	111	654
85	96	676
90	78	668
100	0	760

[a] Saturated solution.

B = C_3H_8O n-Propyl alcohol (119); *cf.* (75, 80)
v. also p. 365
p in mm (±3)

$100x_B$	p_A	p_B
	30.3°	
0	32.3	0
8.66	29.3	16.3
18.77	20.8	17.2
39.02	26.5	18.5

Attachment 2 to Appendix A

Table No. 6 of the Gauging Manual of the Alcohol and Tobacco Tax and Trade Bureau, U.S. Department of the Treasury (27 CFR Part 30)

TABLE NO. 6

SHOWING

RESPECTIVE VOLUMES OF ALCOHOL AND WATER AND THE SPECIFIC GRAVITY IN BOTH AIR AND VACUUM OF SPIRITUOUS LIQUOR

(Prepared by the National Bureau of Standards and based on information published in Bulletin of the Bureau of Standards, Vol. 8, No. 4, pages 537–574, Oct. 15, 1912)

TABLE No. 6

RESPECTIVE VOLUMES OF ALCOHOL AND WATER AND SPECIFIC GRAVITY

Proof	Alcohol	Water	Specific gravity in air	Specific gravity in vacuum
	Volumes	Volumes		
1	0.50	99.58	0.99925	0.99925
2	1.00	99.06	.99850	.99850
3	1.50	98.53	.99776	.99776
4	2.00	98.12	.99703	.99703
5	2.50	97.65	.99630	.99630
6	3.00	97.15	.99556	.99556
7	3.50	96.71	.99487	.99488
8	4.00	96.24	.99418	.99419
9	4.50	95.78	.99349	.99350
10	5.00	95.31	.99281	.99282
11	5.50	94.85	.99214	.99215
12	6.00	94.39	.99149	.99150
13	6.50	93.93	.99084	.99085
14	7.00	93.48	.99021	.99022
15	7.50	93.01	.98959	.98960
16	8.00	92.55	.98898	.98899
17	8.50	92.09	.98837	.98838
18	9.00	91.63	.98778	.98779
19	9.50	91.18	.98719	.98720
20	10.00	90.72	.98660	.98661
21	10.50	90.27	.98601	.98602
22	11.00	89.81	.98543	.98544
23	11.50	89.36	.98485	.98487
24	12.00	88.90	.98429	.98430
25	12.50	88.45	.98372	.98374
26	13.00	88.00	.98317	.98319
27	13.50	87.55	.98263	.98264
28	14.00	87.10	.98208	.98210
29	14.50	86.65	.98155	.98157
30	15.00	86.20	.98102	.98104
31	15.50	85.75	.98049	.98051
32	16.00	85.30	.97996	.97998
33	16.50	84.85	.97944	.97946
34	17.00	84.40	.97893	.97895
35	17.50	83.95	.97842	.97844
36	18.00	83.50	.97792	.97794
37	18.50	83.06	.97743	.97744
38	19.00	82.61	.97693	.97694
39	19.50	82.18	.97643	.97645
40	20.00	81.72	.97594	.97596
41	20.50	81.27	.97544	.97546
42	21.00	80.82	.97492	.97496
43	21.50	80.38	.97442	.97445
44	22.00	79.93	.97391	.97395
45	22.50	79.49	.97340	.97344
46	23.00	79.03	.97289	.97293
47	23.50	78.58	.97237	.97241
48	24.00	78.14	.97185	.97189
49	24.50	77.69	.97133	.97137
50	25.00	77.24	.97080	.97084

RESPECTIVE VOLUMES OF ALCOHOL AND WATER AND SPECIFIC GRAVITY

Proof	Alcohol	Water	Specific gravity in air	Specific gravity in vacuum
	Volume	Volume		
51	25. 50	76. 79	0. 97027	0. 97081
52	26. 00	76. 34	. 96974	. 97078
53	26. 50	75. 89	. 96920	. 96924
54	27. 00	75. 44	. 96866	. 96870
55	27. 50	74. 99	. 96811	. 96815
56	28. 00	74. 53	. 96756	. 96760
57	28. 50	74. 08	. 96700	. 96704
58	29. 00	73. 62	. 96644	. 96648
59	29. 50	73. 17	. 96587	. 96591
60	30. 00	72. 72	. 96530	. 96534
61	30. 50	72. 26	. 96471	. 96475
62	31. 00	71. 81	. 96413	. 96415
63	31. 50	71. 35	. 96353	. 96358
64	32. 00	70. 89	. 96291	. 96296
65	32. 50	70. 43	. 96229	. 96234
66	33. 00	69. 97	. 96165	. 96170
67	33. 50	69. 51	. 96101	. 96106
68	34. 00	69. 05	. 96036	. 96041
69	34. 50	68. 59	. 95970	. 95975
70	35. 00	68. 13	. 95903	. 95908
71	35. 50	67. 66	. 95835	. 95840
72	36. 00	67. 19	. 95765	. 95770
73	36. 50	66. 73	. 95695	. 95700
74	37. 00	66. 25	. 95622	. 95628
75	37. 50	65. 78	. 95551	. 95558
76	38. 00	65. 31	. 95476	. 95482
77	38. 50	64. 84	. 95402	. 95408
78	39. 00	64. 37	. 95326	. 95332
79	39. 50	63. 90	. 95250	. 95256
80	40. 00	63. 42	. 95172	. 95178
81	40. 50	62. 95	. 95094	. 95100
82	41. 00	62. 47	. 95014	. 95020
83	41. 50	61. 99	. 94934	. 94940
84	42. 00	61. 52	. 94852	. 94858
85	42. 50	61. 04	. 94770	. 94778
86	43. 00	60. 56	. 94687	. 94693
87	43. 50	60. 08	. 94603	. 94609
88	44. 00	59. 59	. 94518	. 94524
89	44. 50	59. 11	. 94431	. 94438
90	45. 00	58. 63	. 94344	. 94351
91	45. 50	58. 14	. 94256	. 94262
92	46. 00	57. 66	. 94167	. 94174
93	46. 50	57. 17	. 94077	. 94084
94	47. 00	56. 68	. 93985	. 93992
95	47. 50	56. 19	. 93894	. 93901
96	48. 00	55. 70	. 93801	. 93808
97	48. 50	55. 21	. 93707	. 93714
98	49. 00	54. 72	. 93612	. 93619
99	49. 50	54. 22	. 93516	. 93523
100	50. 00	53. 73	. 93418	. 93426

TABLE No. 6

RESPECTIVE VOLUMES OF ALCOHOL AND WATER AND SPECIFIC GRAVITY

Proof	Alcohol	Water	Specific gravity in air	Specific gravity in vacuum
	Volume	Volume		
101	50. 50	58. 24	0. 93320	0. 93325
102	51. 00	53. 74	. 93282	. 93290
103	51. 50	53. 25	. 93125	. 93131
104	52. 00	51. 75	. 93023	. 93031
105	52. 50	51. 25	. 92923	. 92931
106	53. 00	50. 75	. 92823	. 92830
107	53. 50	50. 25	. 92720	. 92726
108	54. 00	49. 75	. 92618	. 92626
109	54. 50	49. 25	. 92515	. 92523
110	55. 00	48. 75	. 92409	. 924:9
111	55. 50	48. 25	. 92305	. 92315
112	56. 00	47. 75	. 92200	. 92210
113	56. 50	47. 25	. 92095	. 92105
114	57. 00	46. 75	. 91989	. 91999
115	57. 50	46. 24	. 91882	. 91892
116	58. 00	45. 74	. 91774	. 91784
117	58. 50	45. 23	. 91665	. 91675
118	59. 00	44. 72	. 91555	. 91565
119	59. 50	44. 23	. 91444	. 91455
120	60. 00	43. 71	. 91333	. 91344
121	60. 50	43. 20	. 91221	. 91232
122	61. 00	42. 69	. 91109	. 91120
123	61. 50	42. 18	. 90996	. 91007
124	62. 00	41. 67	. 90882	. 90893
125	62. 50	41. 16	. 90768	. 90779
126	63. 00	40. 66	. 90653	. 90664
127	63. 50	40. 14	. 90538	. 90549
128	64. 00	39. 62	. 90422	. 90434
129	64. 50	39. 11	. 90306	. 90318
130	65. 00	38. 60	. 90190	. 90202
131	65. 50	38. 08	. 90073	. 90085
132	66. 00	37. 57	. 89955	. 89967
133	66. 50	37. 06	. 89836	. 89848
134	67. 00	36. 54	. 89717	. 89729
135	67. 50	36. 02	. 89597	. 89609
136	68. 00	35. 50	. 89476	. 89489
137	68. 50	34. 99	. 89355	. 89368
138	69. 00	34. 47	. 89233	. 89245
139	69. 50	33. 95	. 89109	. 89122
140	70. 00	33. 43	. 88985	. 88998
141	70. 50	32. 91	. 88862	. 88875
142	71. 00	32. 38	. 88738	. 88751
143	71. 50	31. 86	. 88612	. 88625
144	72. 00	31. 34	. 88485	. 88499
145	72. 50	30. 82	. 88358	. 88372
146	73. 00	30. 29	. 88230	. 88244
147	73. 50	29. 76	. 88102	. 88116
148	74. 00	29. 24	. 87973	. 87987
149	74. 50	28. 71	. 87841	. 87858
150	75. 00	28. 19	. 87711	. 87728

RESPECTIVE VOLUMES OF ALCOHOL AND WATER AND SPECIFIC GRAVITY

Proof	Alcohol	Water	Specific gravity in air	Specific gravity in vacuum
	Volume	Volume		
151	75. 50	27. 86	0. 87683	0. 87597
152	76. 00	27. 13	. 87450	. 87465
153	76. 50	26. 50	. 87317	. 87333
154	77. 00	25. 87	. 87184	. 87199
155	77. 50	25. 54	. 87050	. 87065
156	78. 00	24. 91	. 86916	. 86930
157	78. 50	24. 47	. 86774	. 86793
158	79. 00	23. 75	. 86641	. 86656
159	79. 50	23. 40	. 86508	. 86518
160	80. 00	22. 87	. 86364	. 86380
161	80. 50	22. 38	. 86225	. 86241
162	81. 00	21. 90	. 86084	. 86100
163	81. 50	21. 20	. 85943	. 85959
164	82. 00	20. 72	. 85801	. 85817
165	82. 50	20. 18	. 85658	. 85674
166	83. 00	19. 64	. 85515	. 85531
167	83. 50	19. 10	. 85369	. 85386
168	84. 00	18. 55	. 85222	. 85240
169	84. 50	18. 01	. 85076	. 85093
170	85. 00	17. 46	. 84927	. 84944
171	85. 50	16. 92	. 84777	. 84794
172	86. 00	16. 37	. 84625	. 84643
173	86. 50	15. 82	. 84471	. 84490
174	87. 00	15. 27	. 84317	. 84336
175	87. 50	14. 72	. 84162	. 84181
176	88. 00	14. 16	. 84006	. 84025
177	88. 50	13. 61	. 83848	. 83867
178	89. 00	13. 06	. 83688	. 83707
179	89. 50	12. 49	. 83526	. 83545
180	90. 00	11. 93	. 83362	. 83382
181	90. 50	11. 37	. 83196	. 83216
182	91. 00	10. 80	. 83029	. 83049
183	91. 50	10. 24	. 82859	. 82879
184	92. 00	9. 67	. 82685	. 82705
185	92. 50	9. 09	. 82509	. 82529
186	93. 00	8. 53	. 82330	. 82351
187	93. 50	7. 94	. 82149	. 82170
188	94. 00	7. 36	. 81963	. 81984
189	94. 50	6. 77	. 81775	. 81796
190	95. 00	6. 18	. 81582	. 81603
191	95. 50	5. 59	. 81385	. 81407
192	96. 00	4. 99	. 81184	. 81206
193	96. 50	4. 39	. 80979	. 81001
194	97. 00	3. 78	. 80770	. 80793
195	97. 50	3. 17	. 80555	. 80577
196	98. 00	2. 55	. 80333	. 80358
197	98. 50	1. 93	. 80104	. 80127
198	99. 00	1. 29	. 79866	. 79889
199	99. 40	. 56	. 79620	. 79643
200	100. 00	. 00	. 79365	. 79389

Appendix B

Chemical Data Reports

TANKS 4.0
Chemical Data Report

Chemical Name / Category	CAS	Molecular Weight: Liquid	Molecular Weight: Vapor	Density*	Vapor Pressure (psia) at Temperatures (degrees F): 40	50	60	70	80	90	100	Constants for Antoine's Equation: Line 1: degrees C / Line 2: degrees K: A	B	C	RVP (psia)	ASTM Slope
Wine (2-3 % Vol Alcohol) Organic Liquids		19.15	25.97	8.21	0.18	0.25	0.34	0.46	0.62	0.82	1.32					

TANKS 4.0
Chemical Data Report

Chemical Name / Category	CAS	Molecular Weight Liquid	Molecular Weight Vapor	Density*	Vapor Pressure (psia) at Temperature (degrees F) 40	50	60	70	80	90	100	Constants for Antoine's Equation Line 1: degrees C Line 2: degrees K A	B	C	RVP (psia)	ASTM Slope
Wine (8.0 % Vol Alcohol Organic Liquids		19.58	27.47	8.18	0.17	0.25	0.36	0.52	0.73	1.02	1.40					

Appendix C

Annual Emission Model Report

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification	
User Identification:	Annual Emissions
City:	Modesto
State:	California
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	Annual Emission Model Runs
Tank Dimensions	
Shell Height (ft):	40.00
Diameter (ft):	15.00
Liquid Height (ft) :	40.00
Avg. Liquid Height (ft):	40.00
Volume (gallons):	52,876.00
Turnovers:	94.58
Net Throughput (gal/yr):	5,000,000.00
Is Tank Heated (Y/N):	Y
Paint Characteristics	
Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition	Good
Roof Characteristics	
Type:	Cone
Height (ft)	2.00
Slope (ft/ft) (Cone Roof)	0.27
Breather Vent Settings	
Vacuum Setting (psig):	0.00
Pressure Setting (psig)	0.00

Meteorological Data used in Emissions Calculations: Stockton, California (Avg Atmospheric Pressure = 14.72 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Annual Emissions - Vertical Fixed Roof Tank
Modesto, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Wine (12.0% Vol Alcohol	Jan	48.00	40.00	48.00	48.00	0.1555	0.1555	0.1555	35.8715			18.02	Option 1: VP60 = .1555 VP70 = .2135
Wine (12.0% Vol Alcohol	Feb	48.00	40.00	48.00	48.00	0.1555	0.1555	0.1555	35.8715			18.02	Option 1: VP60 = .1555 VP70 = .2135
Wine (12.0% Vol Alcohol	Mar	48.00	40.00	48.00	48.00	0.1555	0.1555	0.1555	35.8715			18.02	Option 1: VP60 = .1555 VP70 = .2135
Wine (12.0% Vol Alcohol	Apr	48.00	40.00	48.00	48.00	0.1555	0.1555	0.1555	35.8715			18.02	Option 1: VP60 = .1555 VP70 = .2135
Wine (12.0% Vol Alcohol	May	48.00	40.00	48.00	48.00	0.1555	0.1555	0.1555	35.8715			18.02	Option 1: VP60 = .1555 VP70 = .2135
Wine (12.0% Vol Alcohol	Jun	48.00	40.00	48.00	48.00	0.1555	0.1555	0.1555	35.8715			18.02	Option 1: VP60 = .1555 VP70 = .2135
Wine (12.0% Vol Alcohol	Jul	48.00	40.00	48.00	48.00	0.1555	0.1555	0.1555	35.8715			18.02	Option 1: VP60 = .1555 VP70 = .2135
Wine (12.0% Vol Alcohol	Aug	48.00	40.00	48.00	48.00	0.1555	0.1555	0.1555	35.8715			18.02	Option 1: VP60 = .1555 VP70 = .2135
Wine (12.0% Vol Alcohol	Sep	48.00	40.00	48.00	48.00	0.1555	0.1555	0.1555	35.8715			18.02	Option 1: VP60 = .1555 VP70 = .2135
Wine (12.0% Vol Alcohol	Oct	48.00	40.00	48.00	48.00	0.1555	0.1555	0.1555	35.8715			18.02	Option 1: VP60 = .1555 VP70 = .2135
Wine (12.0% Vol Alcohol	Nov	48.00	40.00	48.00	48.00	0.1555	0.1555	0.1555	35.8715			18.02	Option 1: VP60 = .1555 VP70 = .2135
Wine (12.0% Vol Alcohol	Dec	48.00	40.00	48.00	48.00	0.1555	0.1555	0.1555	35.8715			18.02	Option 1: VP60 = .1555 VP70 = .2135

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Annual Emissions - Vertical Fixed Roof Tank
Modesto, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Standing Losses (lb):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Vapor Space Volume (cu ft):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Vapor Density (lb/cu ft):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Vapor Space Expansion Factor:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Vented Vapor Saturation Factor:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Tank Vapor Space Volume:												
Vapor Space Volume (cu ft):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Tank Diameter (ft):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Vapor Space Outage (ft):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Tank Shell Height (ft):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Average Liquid Height (ft):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Roof Outage (ft):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Roof Outage (Cone Roof)												
Roof Outage (ft):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Roof Height (ft):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Roof Slope (ft/ft):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Shell Radius (ft):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Vapor Density												
Vapor Density (lb/cu ft):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Vapor Molecular Weight (lb/lb-mole):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Daily Avg. Liquid Surface Temp. (deg. R):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Daily Average Ambient Temp. (deg. F):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Liquid Bulk Temperature (deg. R):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Tank Paint Solar Absorptance (Shell):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Tank Paint Solar Absorptance (Roof):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Daily Total Solar Insulation Factor (Btu/sqft day):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Vapor Space Expansion Factor												
Vapor Space Expansion Factor:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Daily Vapor Temperature Range (deg. R):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Daily Vapor Pressure Range (psia):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Breather Vent Press. Setting Range(psia):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Daily Avg. Liquid Surface Temp. (deg R):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Daily Min. Liquid Surface Temp. (deg R):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Daily Max. Liquid Surface Temp. (deg R):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Daily Ambient Temp. Range (deg. R):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Vapor Space Outage (ft):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Working Losses (lb):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Vapor Molecular Weight (lb/lb-mole):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Net Throughput (gal/mo.):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Annual Turnovers:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Turnover Factor:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Maximum Liquid Volume (gal):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Maximum Liquid Height (ft):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Tank Diameter (ft):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Working Loss Product Factor:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total Losses (lb):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

Annual Emissions - Vertical Fixed Roof Tank
Modesto, California

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Ethanol (2.0 % Vol Alcohol	254.23	0.00	254.23

Appendix D

Daily Emission Model Report

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification

User Identification:	Daily Emissions
City:	Modesto
State:	California
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	Daily Emission Model Runs

Tank Dimensions

Shell Height (ft):	40.00
Diameter (ft):	15.00
Liquid Height (ft) :	40.00
Avg. Liquid Height (ft):	40.00
Volume (gallons):	52,878.00
Turnovers:	1.00
Net Throughput(gal/yr):	52,878.00
Is Tank Heated (y/n):	Y

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Cone
Height (ft)	2.00
Slope (ft/ft) (Cone Roof)	0.27

Breather Vent Settings

Vacuum Settings (psig):	0.00
Pressure Settings (psig)	0.00

Meteorological Data used in Emissions Calculations: Stockton, California (Avg Atmospheric Pressure = 14.72 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Daily Emissions - Vertical Fixed Roof Tank
Modesto, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
[illegible]	Jul	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Daily Emissions - Vertical Fixed Roof Tank
Modesto, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Standing Losses (lb):							[illegible]					
Vapor Space Volume (cu ft):							[illegible]					
Vapor Density (lb/cu ft):							[illegible]					
Vapor Space Expansion Factor:							[illegible]					
Vented Vapor Saturation Factor:							[illegible]					
Tank Vapor Space Volume:												
Vapor Space Volume (cu ft):							[illegible]					
Tank Diameter (ft):							[illegible]					
Vapor Space Outage (ft):							[illegible]					
Tank Shell Height (ft):							[illegible]					
Average Liquid Height (ft):							[illegible]					
Roof Outage (ft):							[illegible]					
Roof Outage (Cone Roof):												
Roof Outage (ft):							[illegible]					
Roof Height (ft):							[illegible]					
Roof Slope (ft/ft):							[illegible]					
Shell Radius (ft):							[illegible]					
Vapor Density:												
Vapor Density (lb/cu ft):							[illegible]					
Vapor Molecular Weight (lb/lb-mole):							[illegible]					
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							[illegible]					
Daily Avg. Liquid Surface Temp. (deg. R):							[illegible]					
Daily Average Ambient Temp. (deg. F):							[illegible]					
Ideal Gas Constant R:												
(psia cuft / lb-mol-deg R):							[illegible]					
Liquid Bulk Temperature (deg. R):							[illegible]					
Tank Paint Solar Absorptance (Shell):							[illegible]					
Tank Paint Solar Absorptance (Roof):							[illegible]					
Daily Total Solar Insulation Factor (Btu/sq ft day):							[illegible]					
Vapor Space Expansion Factor:												
Vapor Space Expansion Factor:							[illegible]					
Daily Vapor Temperature Range (deg. R):							[illegible]					
Daily Vapor Pressure Range (psia):							[illegible]					
Breather Vent Press. Setting Range (psia):							[illegible]					
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							[illegible]					
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):							[illegible]					
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):							[illegible]					
Daily Avg. Liquid Surface Temp. (deg. R):							[illegible]					
Daily Min. Liquid Surface Temp. (deg. R):							[illegible]					
Daily Max. Liquid Surface Temp. (deg. R):							[illegible]					
Daily Ambient Temp. Range (deg. R):							[illegible]					
Vented Vapor Saturation Factor:												
Vented Vapor Saturation Factor:							[illegible]					
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							[illegible]					
Vapor Space Outage (ft):							[illegible]					
Working Losses (lb):							[illegible]					
Vapor Molecular Weight (lb/lb-mole):							[illegible]					
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							[illegible]					
Max Throughput (gallons):							[illegible]					
Annual Turnovers:							[illegible]					
Turnover Factor:							[illegible]					
Maximum Liquid Volume (gal):							[illegible]					
Maximum Liquid Height (ft):							[illegible]					
Tank Diameter (ft):							[illegible]					
Working Loss Product Factor:							[illegible]					
Total Losses (lb):							[illegible]					

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: July

Daily Emissions - Vertical Fixed Roof Tank
Modesto, California

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Wine (6.0 % Vol Alcohol	5.89	0.00	5.89

APPENDIX B
District FYI-114
VOC Emission Factors for Wine Fermentation and Storage Tanks

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

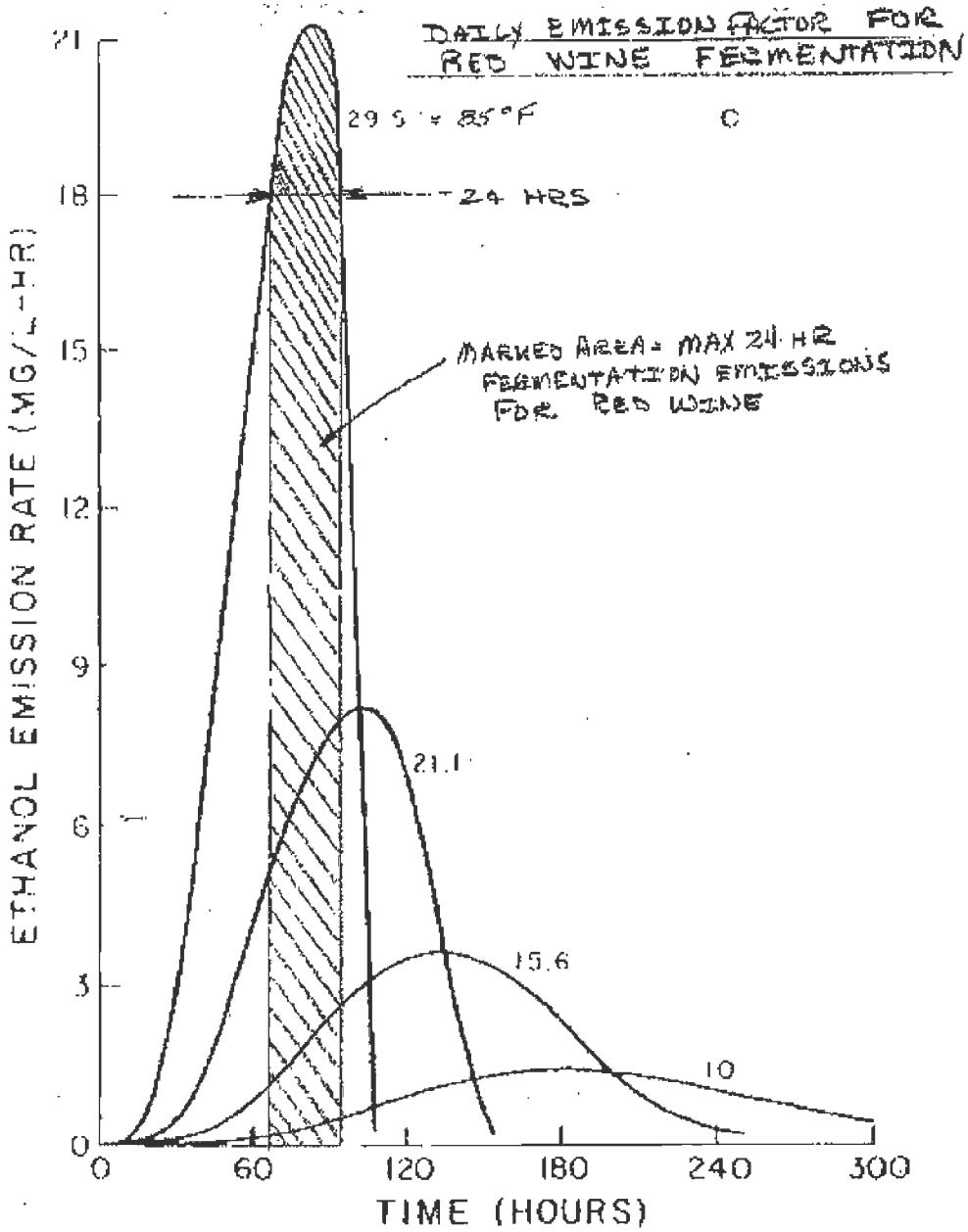

Fig. 7. The influence of fermentation temperature on a) the fermentation rate, b) the vapor phase ethanol concentration, and c) the rate of ethanol emission. (Initial sugar content of 22.5°Brix, isothermal fermentation at indicated temperature.)

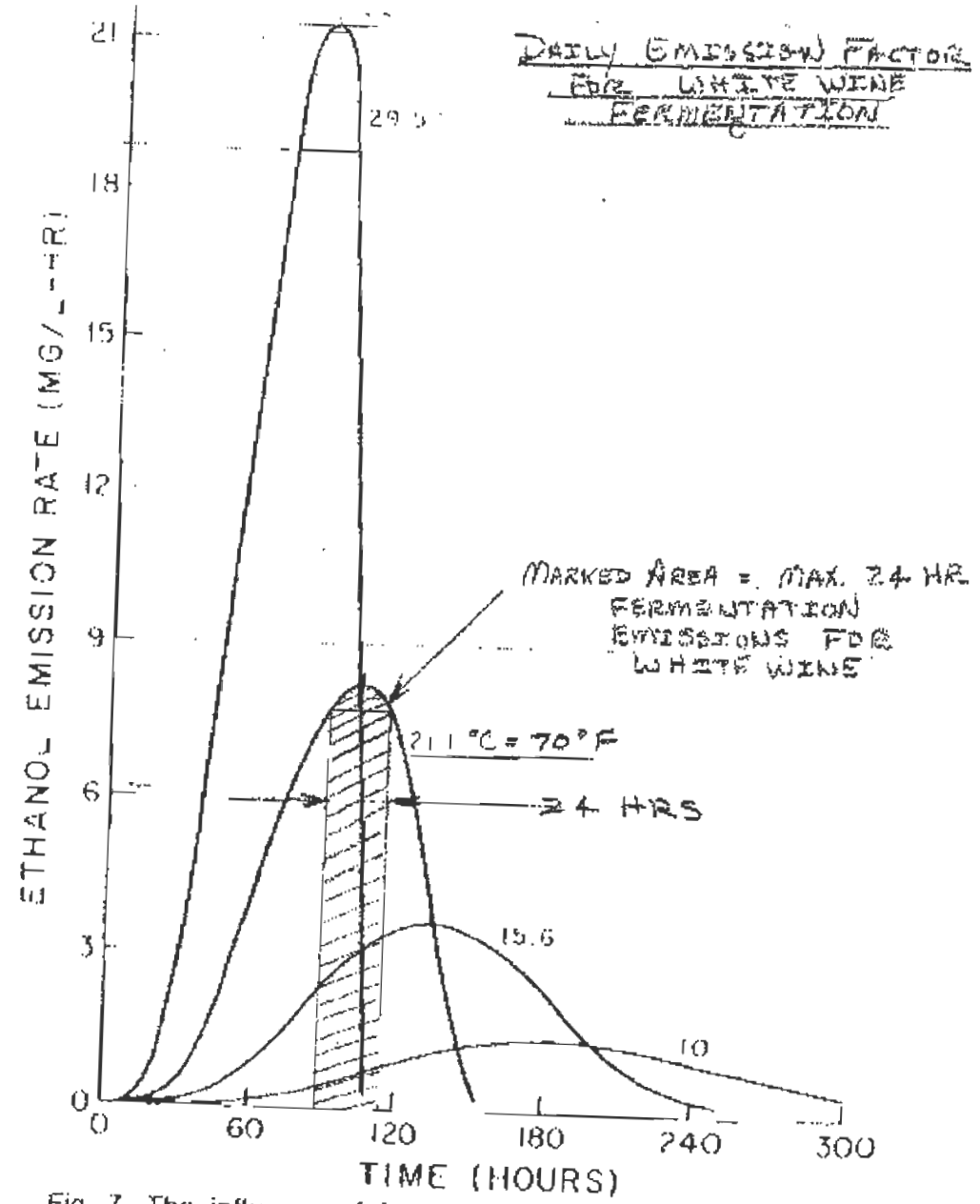

Fig. 7. The influence of fermentation temperature on a) the fermentation rate, b) the vapor phase ethanol concentration, and c) the rate of ethanol emission. (Initial sugar content of 22.5°Brix, isothermal fermentation at indicated temperature.)

APPENDIX C
Tanks 4.09d Wine Storage Emissions Estimation Calculations

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	N-2321-836-0 to -859-0 (Annual)
City:	Acampo
State:	California
Company:	CBUS Ops Inc dba Woodbridge Winery
Type of Tank:	Vertical Fixed Roof Tank
Description:	Vertical Fixed Roof Tank 108,000 Gallon Stainless Steel Enclosed Top Wine Fermentation/Storage Tanks with Pressure-Vacuum Valve and Insulation (Tanks 1675 to 1698) - Annual

Tank Dimensions

Shell Height (ft):		41.00
Diameter (ft):		21.25
Liquid Height (ft) :		40.00
Avg. Liquid Height (ft):		40.00
Volume (gallons):		108,000.00
Turnovers:		50.00
Net Throughput(gal/yr):		5,400,000.00
Is Tank Heated (y/n):	Y	

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Cone	
Height (ft)		1.00
Slope (ft/ft) (Cone Roof)		0.09

Breather Vent Settings

Vacuum Settings (psig):	0.00
Pressure Settings (psig)	0.00

Meterological Data used in Emissions Calculations: Stockton, California (Avg Atmospheric Pressure = 14.72 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

N-2321-836-0 to -859-0 (Annual) - Vertical Fixed Roof Tank
Acampo, California

Mixture/Component	Month	Daily Liquid Surf Temperature (deg F) Avg	Min	Max	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg	Min.	Max	Vapor Mol Weight	Liquid Mass Fract	Vapor Mass Fract	Mol Weight	Basis for Vapor Pressure Calculations
Wine 17 0 % Vol Alcohol	Jan	61 60	61 60	61 60	61 60	0.3927	0 3927	0.3927	27.8147			19 67	Option 1: VP60 = 36745 VP70 = 52506
Wine 17 0 % Vol Alcohol	Feb	61 60	61 60	61 60	61 60	0 3927	0.3927	0 3927	27 8147			19 67	Option 1: VP60 = 36745 VP70 = 52506
Wine 17.0 % Vol Alcohol	Mar	61.60	61 60	61 60	61.60	0.3927	0.3927	0.3927	27.8147			19 67	Option 1: VP60 = 36745 VP70 = 52506
Wine 17.0 % Vol Alcohol	Apr	61 60	61.60	61 60	61 60	0 3927	0.3927	0.3927	27 8147			19 67	Option 1: VP60 = 36745 VP70 = 52506
Wine 17.0 % Vol Alcohol	May	61.60	61.60	61.60	61.60	0.3927	0.3927	0 3927	27.8147			19 67	Option 1: VP60 = 36745 VP70 = .52506
Wine 17 0 % Vol Alcohol	Jun	61 60	61 60	61.60	61.60	0.3927	0 3927	0.3927	27.8147			19.67	Option 1: VP60 = .36745 VP70 = 52506
Wine 17.0 % Vol Alcohol	Jul	61 60	61.60	61.60	61.60	0 3927	0 3927	0.3927	27.8147			19.67	Option 1: VP60 = 36745 VP70 = .52506
Wine 17 0 % Vol Alcohol	Aug	61 60	61 60	61.60	61 60	0.3927	0 3927	0 3927	27 8147			19.67	Option 1: VP60 = 36745 VP70 = 52506
Wine 17 0 % Vol Alcohol	Sep	61 60	61 60	61 60	61 60	0 3927	0.3927	0.3927	27.8147			19 67	Option 1: VP60 = .36745 VP70 = 52506
Wine 17.0 % Vol Alcohol	Oct	61.60	61 60	61 60	61 60	0 3927	0.3927	0 3927	27.8147			19 67	Option 1: VP60 = 36745 VP70 = 52506
Wine 17.0 % Vol Alcohol	Nov	61.60	61.60	61 60	61 60	0 3927	0 3927	0 3927	27.8147			19 67	Option 1: VP60 = .36745 VP70 = .52506
Wine 17.0 % Vol Alcohol	Dec	61.60	61.60	61.60	61.60	0 3927	0.3927	0 3927	27.8147			19.67	Option 1: VP60 = .36745 VP70 = .52506

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

N-2321-836-0 to -859-0 (Annual) - Vertical Fixed Roof Tank
Acampo, California

Month	January	February	March	April	May	June	July	August	September	October	November	December
Standing Losses (lb):	0 0000	0 0000	0 0000	0 0000	0 0000	0 0000	0.0000	0 0000	0.0000	0 0000	0 0000	0 0000
Vapor Space Volume (cu ft):	472 8751	472.8751	472.8751	472 8751	472 8751	472 8751	472.8751	472 8751	472 8751	472 8751	472.8751	472 8751
Vapor Density (lb/cu ft):	0 0020	0 0020	0 0020	0 0020	0 0020	0 0020	0 0020	0 0020	0 0020	0 0020	0.0020	0 0020
Vapor Space Expansion Factor:	0 0000	0 0000	0 0000	0 0000	0 0000	0 0000	0 0000	0.0000	0.0000	0 0000	0 0000	0 0000
Vented Vapor Saturation Factor:	0 9730	0 9730	0 9730	0 9730	0.9730	0 9730	0 9730	0 9730	0 9730	0.9730	0 9730	0.9730
Tank Vapor Space Volume:												
Vapor Space Volume (cu ft):	472 8751	472.8751	472.8751	472 8751	472 8751	472.8751	472 8751	472 8751	472 8751	472 8751	472 8751	472 8751
Tank Diameter (ft):	21 2500	21 2500	21 2500	21 2500	21 2500	21 2500	21 2500	21 2500	21.2500	21 2500	21 2500	21 2500
Vapor Space Outage (ft):	1 3333	1 3333	1 3333	1 3333	1.3333	1 3333	1 3333	1.3333	1.3333	1.3333	1 3333	1 3333
Tank Shell Height (ft):	41 0000	41 0000	41 0000	41 0000	41 0000	41 0000	41 0000	41 0000	41 0000	41 0000	41.0000	41.0000
Average Liquid Height (ft):	40 0000	40 0000	40 0000	40 0000	40 0000	40 0000	40 0000	40 0000	40.0000	40 0000	40.0000	40.0000
Roof Outage (ft):	0 3333	0.3333	0 3333	0 3333	0 3333	0 3333	0.3333	0 3333	0 3333	0 3333	0 3333	0.3333
Roof Outage (Cone Roof)												
Roof Outage (ft):	0 3333	0 3333	0 3333	0 3333	0 3333	0 3333	0 3333	0 3333	0.3333	0 3333	0 3333	0 3333
Roof Height (ft):	1 0000	1 0000	1.0000	1 0000	1 0000	1 0000	1 0000	1 0000	1 0000	1 0000	1 0000	1.0000
Roof Slope (ft/ft):	0 0900	0 0900	0 0900	0 0900	0 0900	0 0900	0 0900	0.0900	0 0900	0 0900	0 0900	0 0900
Shell Radius (ft):	10 6250	10.6250	10 6250	10 6250	10 6250	10 6250	10 6250	10 6250	10 6250	10 6250	10 6250	10 6250
Vapor Density												
Vapor Density (lb/cu ft):	0.0020	0 0020	0 0020	0 0020	0 0020	0 0020	0 0020	0 0020	0 0020	0 0020	0 0020	0 0020
Vapor Molecular Weight (lb/lb-mole):	27 8147	27 8147	27.8147	27 8147	27 8147	27 8147	27.8147	27 8147	27 8147	27.8147	27 8147	27 8147
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0 3927	0 3927	0 3927	0 3927	0 3927	0.3927	0 3927	0 3927	0 3927	0 3927	0 3927	0 3927
Daily Avg Liquid Surface Temp (deg. R):	521.2700	521 2700	521 2700	521 2700	521 2700	521.2700	521 2700	521 2700	521 2700	521 2700	521 2700	521.2700
Daily Average Ambient Temp. (deg F):	45.0000	50 5000	54.0500	59 3000	66 7000	73 3000	77 6500	76 8000	72 7000	64 5500	53 0500	44 9500
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10 731	10 731	10 731	10 731	10.731	10 731	10 731	10.731	10 731	10 731	10 731	10 731
Liquid Bulk Temperature (deg R):	521 2700	521 2700	521 2700	521.2700	521.2700	521.2700	521 2700	521 2700	521.2700	521 2700	521 2700	521 2700
Tank Paint Solar Absorptance (Shell):	0 1700	0 1700	0 1700	0 1700	0.1700	0 1700	0 1700	0 1700	0 1700	0 1700	0 1700	0 1700
Tank Paint Solar Absorptance (Roof):	0 1700	0 1700	0.1700	0.1700	0 1700	0 1700	0 1700	0 1700	0 1700	0 1700	0 1700	0 1700
Daily Total Solar Insulation Factor (Btu/sqft day):	597 0000	939 0000	1,458 0000	2,004 0000	2,435 0000	2,684 0000	2,688 0000	2,368.0000	1,907 0000	1,315 0000	782 0000	538 0000
Vapor Space Expansion Factor												
Vapor Space Expansion Factor:	0.0000	0.0000	0 0000	0 0000	0 0000	0 0000	0 0000	0.0000	0 0000	0 0000	0 0000	0 0000
Daily Vapor Temperature Range (deg R):	0 0000	0.0000	0 0000	0 0000	0 0000	0 0000	0 0000	0 0000	0 0000	0.0000	0.0000	0.0000
Daily Vapor Pressure Range (psia):	0 0000	0 0000	0 0000	0 0000	0 0000	0 0000	0.0000	0 0000	0 0000	0.0000	0 0000	0.0000
Breather Vent Press Setting Range(psia):	0 0000	0 0000	0 0000	0.0000	0 0000	0 0000	0 0000	0 0000	0 0000	0 0000	0 0000	0 0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.3927	0 3927	0.3927	0 3927	0 3927	0 3927	0 3927	0.3927	0 3927	0 3927	0 3927	0 3927
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0 3927	0 3927	0 3927	0 3927	0 3927	0 3927	0 3927	0 3927	0 3927	0.3927	0.3927	0 3927
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.3927	0 3927	0 3927	0.3927	0 3927	0 3927	0 3927	0.3927	0 3927	0 3927	0.3927	0 3927
Daily Avg Liquid Surface Temp (deg R):	521.2700	521 2700	521 2700	521 2700	521 2700	521 2700	521 2700	521.2700	521 2700	521 2700	521 2700	521 2700
Daily Min Liquid Surface Temp (deg R):	521.2700	521.2700	521.2700	521 2700	521 2700	521 2700	521 2700	521 2700	521 2700	521 2700	521 2700	521 2700
Daily Max Liquid Surface Temp (deg R):	521.2700	521.2700	521 2700	521 2700	521 2700	521 2700	521.2700	521 2700	521 2700	521 2700	521 2700	521 2700
Daily Ambient Temp Range (deg R):	16 0000	20 4000	22 9000	27 2000	29.8000	31.6000	33 5000	32.2000	30 4000	27 5000	20 7000	15.7000
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor:	0 9730	0 9730	0 9730	0 9730	0 9730	0 9730	0 9730	0 9730	0 9730	0 9730	0 9730	0 9730
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0 3927	0 3927	0 3927	0 3927	0 3927	0 3927	0.3927	0.3927	0 3927	0 3927	0 3927	0 3927
Vapor Space Outage (ft):	1.3333	1.3333	1 3333	1.3333	1 3333	1 3333	1 3333	1 3333	1 3333	1 3333	1 3333	1 3333

Working Losses (lb):	89 7158	89 7158	89 7158	89 7158	89 7158	89 7158	89 7158	89 7158	89 7158	89 7158	89.7158	89.7158
Vapor Molecular Weight (lb/lb-mole):	27.8147	27.8147	27 8147	27 8147	27.8147	27.8147	27 8147	27.8147	27.8147	27.8147	27 8147	27 8147
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.3927	0.3927	0 3927	0 3927	0 3927	0.3927	0 3927	0 3927	0 3927	0 3927	0.3927	0.3927
Net Throughput (gal/mo):	450,000 0000	450,000 0000	450 000 0000	450,000.0000	450,000.0000	450 000 0000	450,000 0000	450,000.0000	450,000.0000	450,000 0000	450,000.0000	450,000 0000
Annual Turnovers:	50.0000	50.0000	50 0000	50.0000	50.0000	50.0000	50.0000	50 0000	50 0000	50 0000	50 0000	50 0000
Turnover Factor:	0 7667	0 7667	0 7667	0.7667	0 7667	0 7667	0 7667	0 7667	0 7667	0 7667	0 7667	0.7667
Maximum Liquid Volume (gal):	108,000.0000	108,000 0000	108,000 0000	108,000.0000	108,000 0000	108,000.0000	108,000.0000	108,000.0000	108,000 0000	108,000.0000	108,000 0000	108,000.0000
Maximum Liquid Height (ft):	40 0000	40 0000	40 0000	40.0000	40 0000	40 0000	40.0000	40 0000	40 0000	40.0000	40 0000	40 0000
Tank Diameter (ft):	21 2500	21.2500	21 2500	21.2500	21.2500	21 2500	21 2500	21.2500	21.2500	21 2500	21.2500	21.2500
Working Loss Product Factor:	1.0000	1 0000	1 0000	1.0000	1 0000	1 0000	1.0000	1.0000	1.0000	1.0000	1 0000	1 0000
Total Losses (lb):	89 7158	89.7158	89 7158	89 7158	89 7158	89 7158	89 7158	89.7158	89 7158	89 7158	89 7158	89 7158

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

N-2321-836-0 to -859-0 (Annual) - Vertical Fixed Roof Tank
Acampo, California

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Wine 17.0 % Vol Alcohol	1,076.59	0.00	1,076.59

Annual VOC (Ethanol) Emissions

$$\frac{46.02}{27.8147} \times \frac{27.8147 - 18.02}{46.02 - 18.02} \times 1,076.59\ lb\ (VOC + H_2O)/yr = 623.1\ lb\text{-}VOC/yr$$

		Annual Emissions from Tanks		Output from Tank 4.0 total emissions no speciation						
ATC Permit #	Tank ID	% by Volume Alcohol	AMW Average	Total lb Alcohol & Water Vapor Emitted (lb/year)	Molecular Weight of Alcohol	Molecular Weight of Water	Alcohol as Molar % Total Emissions (alcohol + water vapor)	Water Vapor as Molar % Total Emissions (alcohol + water vapor)	Max Daily Alcohol Emissions (lb/yr)	lb-Water Vapor Emitted (lb/yr)
N-2321-836-0	1675	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49
N-2321-837-0	1676	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49
N-2321-838-0	1677	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49
N-2321-839-0	1678	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49
N-2321-840-0	1679	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49
N-2321-841-0	1680	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49
N-2321-842-0	1681	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49
N-2321-843-0	1682	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49
N-2321-844-0	1683	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49
N-2321-845-0	1684	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49
N-2321-846-0	1685	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49
N-2321-847-0	1686	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49
N-2321-848-0	1687	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49
N-2321-849-0	1688	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49
N-2321-850-0	1689	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49
N-2321-851-0	1690	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49
N-2321-852-0	1691	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49
N-2321-853-0	1692	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49
N-2321-854-0	1693	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49
N-2321-855-0	1694	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49
N-2321-856-0	1695	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49
N-2321-857-0	1696	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49
N-2321-858-0	1697	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49
N-2321-859-0	1698	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49
								Total lb/yr	**14,952**	
								Total Ton/yr	**7.48**	

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	N-2321-836-0 to -859-0 (Daily)
City:	Acampo
State:	California
Company:	CBUS Ops Inc dba Woodbridge Winery
Type of Tank:	Vertical Fixed Roof Tank
Description:	Vertical Fixed Roof Tank 108,000 Gallon Stainless Steel Enclosed Top Wine Fermentation/Storage Tanks with Pressure-Vacuum Valve and Insulation (Tanks 1675 to 1698) - Daily

Tank Dimensions

Shell Height (ft):		41.00
Diameter (ft):		21.25
Liquid Height (ft) :		40.00
Avg. Liquid Height (ft):		40.00
Volume (gallons):		108,000.00
Turnovers:		31.00
Net Throughput(gal/yr):		3,348,000.00
Is Tank Heated (y/n):	Y	

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Cone	
Height (ft)		1.00
Slope (ft/ft) (Cone Roof)		0.09

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Stockton, California (Avg Atmospheric Pressure = 14.72 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

N-2321-836-0 to -859-0 (Daily) - Vertical Fixed Roof Tank
Acampo, California

Mixture/Component	Month	Daily Liquid Surf Temperature (deg F) Avg.	Min	Max	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg	Min	Max	Vapor Mol Weight	Liquid Mass Fract	Vapor Mass Fract	Mol Weight	Basis for Vapor Pressure Calculations
Wine 17.0 % Vol Alcohol	Jul	77.30	77.30	77 30	77 30	0 6816	0 6816	0.6816	27.8147			19 67	Option 1: VP70 = .52506 VP80 = 73951

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

N-2321-836-0 to -859-0 (Daily) - Vertical Fixed Roof Tank
Acampo, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Standing Losses (lb):							0.0000					
Vapor Space Volume (cu ft):							472 8751					
Vapor Density (lb/cu ft):							0 0033					
Vapor Space Expansion Factor:							0.0000					
Vented Vapor Saturation Factor:							0 9540					
Tank Vapor Space Volume:												
Vapor Space Volume (cu ft):							472.8751					
Tank Diameter (ft):							21.2500					
Vapor Space Outage (ft):							1 3333					
Tank Shell Height (ft):							41.0000					
Average Liquid Height (ft):							40.0000					
Roof Outage (ft):							0.3333					
Roof Outage (Cone Roof)												
Roof Outage (ft):							0.3333					
Roof Height (ft):							1.0000					
Roof Slope (ft/ft):							0 0900					
Shell Radius (ft):							10.6250					
Vapor Density												
Vapor Density (lb/cu ft):							0.0033					
Vapor Molecular Weight (lb/lb-mole):							27 8147					
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.6816					
Daily Avg Liquid Surface Temp (deg R):							536 9700					
Daily Average Ambient Temp (deg F):							77 6500					
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):							10 731					
Liquid Bulk Temperature (deg R):							536 9700					
Tank Paint Solar Absorptance (Shell):							0 1700					
Tank Paint Solar Absorptance (Roof):							0.1700					
Daily Total Solar Insulation Factor (Btu/sqft day):							2,688 0000					
Vapor Space Expansion Factor												
Vapor Space Expansion Factor:							0 0000					
Daily Vapor Temperature Range (deg R):							0 0000					
Daily Vapor Pressure Range (psia):							0.0000					
Breather Vent Press Setting Range(psia):							0.0600					
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0 6816					
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):							0.6816					
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):							0 6816					
Daily Avg. Liquid Surface Temp. (deg R):							536.9700					
Daily Min. Liquid Surface Temp (deg R):							536.9700					
Daily Max Liquid Surface Temp. (deg R):							536 9700					
Daily Ambient Temp Range (deg. R):							33 5000					
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor:							0 9540					
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):							0 6816					
Vapor Space Outage (ft):							1 3333					

Working Losses (lb):	1,511 2810
Vapor Molecular Weight (lb/lb-mole):	27 8147
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0 6816
Net Throughput (gal/mo):	3,348,000 0000
Annual Turnovers:	31 0000
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	108,000.0000
Maximum Liquid Height (ft):	40 0000
Tank Diameter (ft):	21 2500
Working Loss Product Factor:	1 0000
Total Losses (lb):	1,511 2810

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: July

N-2321-836-0 to -859-0 (Daily) - Vertical Fixed Roof Tank
Acampo, California

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Wine 17.0 % Vol Alcohol	1,511.28	0.00	1,511.28

Max VOC (Ethanol) Emissions Per Turnover (108,000 gallon fill)

$$\frac{46.02}{27.8147} \times \frac{27.8147 - 18.02}{46.02 - 18.02} \times \frac{1,511.28 \text{ lb-VOC}}{31 \text{ turnovers}} = 28.22 \text{ lb-VOC/turnover}$$

Max VOC Emissions per day

$$28.22 \text{ lb-VOC/turnover} \times 4 \text{ turnover/day} = 112.9 \text{ lb-VOC/day}$$

	Daily Emissions from Tanks		Output from Tank 4,0 total emissions no speciation												
Tank ID	% by Volume Alcohol	AMW Average	Total lb Alcohol & Water Vapor Emitted (lb/day)	Molecular Weight of Alcohol	Molecular Weight of Water	Alcohol as Molar % Total Emissions (alcohol + water vapor)	Water Vapor as Molar % Total Emissions (alcohol + water vapor)	Max Alcohol Emissions per turnover (108,000 gal fill) (lb/turnover)	lb-Water Vapor Emitted per turnover (108,000 gal fill) (lb/turnover)	Max lb-Mols Alcohol Emitted per turnover (108,000 gal fill) (lb/turnover)	Max lb-Mols Water Vapor Emitted per turnover (108,000 gal fill) (lb/turnover)	Max storage Throughput (gal/day)	Max turnovers/108,000 gal fills per day (Fill/day)	Max Alcohol Emissions (lb/day)	lb-Water Vapor Emitted (lb/day)
1675	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
1676	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
1677	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
1678	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
1679	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
1680	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
1681	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
1682	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
1683	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
1684	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
1685	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
1686	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
1687	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
1688	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
1689	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
1690	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
1691	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
1692	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
1693	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
1694	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
1695	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
1696	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
1697	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
1698	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14

APPENDIX D
Winery Potential Emissions Increase Calculations

Winery Potential Emissions Increase Calculations

The purpose of the following calculations is solely to determine if the proposed project will trigger SB 288 Major Modification or Federal Major Modification. The increase (or difference) in emissions are calculated below using the current emission factors for wine tanks from District FYI-114. The facility has an existing specific limiting condition (SLC) that limits the total VOC emissions from all wine fermentation and storage operations at the facility to no more than 1,167,178 pounds of VOC per year for[1]. The existing SLC will not be changed with the addition of the two new wine storage tanks proposed under this project.

As discussed in Section I of the project evaluation, the current project for addition of two new 652,000 gallon wine storage tanks is Phase 2 of a larger project. Project N-1133440 for the installation of seven new wine storage tanks is Phase 1 of the overall project. Therefore, the potential to emit from both Phase 1 and Phase 2 will be considered together for purposes of determining if the current project will constitute an SB 288 Major Modification or a Federal Major Modification.

1. Potential to Emit (existing tanks)

The potential annual VOC emissions from the existing fermentation and storage operations at this winery are determined as follows:

White Wine Fermentation

$W1 = C \times D_w \times M$ (limited by crusher capacity)
$W2 = P \times D_w \times M$ (limited by pressing capacity)
$W3 = (V_{FW} \times D_w)/W_{FW}$ (limited by white fermenter volume)
$W4 = (V_T \times D_w)/R_{TW}$ (limited by overall tank processing)

Where:

- C = grape crushing capacity
  = 13,200 tons/day (per engineering evaluation N-1092377)
- D_w = days in a white wine crush season
  = 120 days
- M = amount of juice produced per ton of grapes crushed
  = 200 gal/ton
- P = pressing capacity
  = 8,400 tons/day (per engineering evaluation N-1092377)
- W_{FW} = white fermentation period
  = 10 days
- R_{TW} = total winery retention time for white wine
  = 40 days + 10 days = 50 days
- V_{FW} = total volume of white wine fermenters
  = 55,433,318 gal (per Project N-1133189)
- V_T = total winery cooperage
  = 55,504,890 gal (Project N-1133189 post-project cooperage)

[1] The calculation presented in this appendix differs from the SLC due to revised emission factors in FYI-114.

Using the above parameters,

W1 = (13,200 x 120 x 200) = 316.80×10^6 gal/year
W2 = (8,400 x 120 x 200) = 201.60×10^6 gal/year
W3 = (55,433,318 x 120) / 10 = 665.20×10^6 gal/year
W4 = (55,504,890 x 120) / 50 = 133.212×10^6 gal/year

CBUS Ops Inc. requested to install seven new wine storage tanks under Phase 1 of the project, is requesting to install two additional new wine storage tanks under Phase 2 of the project, and is requesting to install 24 new wine storage and fermentation tanks under Phase 3 of the project. These tanks will result an increase facility's storage and fermentation capacities, and no changes to the facility's crushing or pressing capacities. Therefore, crushing capacity and pressing capacity (W1 and W2) are not considered from the analysis. Only the fermenter volume and overall tank processing (W3 and W4) are compared.

W_W = W4 (lesser of W3, W4)
= 133.212×10^6 gal/year

The potential white wine fermentation emissions would be:

$PE1_{white} = E_{fw} \times W_W$

Where:
E_{fw} = white wine emission factor
= 2.5 lb-VOC/1,000 gal (per District FYI-114)

$PE1_{white}$ = (2.5 lb-VOC/1,000 gal) × (133.212×10^6 gal/yr)
= 333,030 lb-VOC/year

White Wine Storage Emissions:
Storage emissions are calculated as follows:

$PE1_{white} = E_s \times T \times W_w$

Where:
E_s = wine storage emission factor based on District FYI-114 (6/13/12). The existing tanks allow them to store up to 20% alcohol by volume. Thus, Es is equal to 0.175 lb-VOC/1,000 gal.
T = total post fermentation inter-tank transfers per batch of wine
= 8
W_w = 133.212×10^6 gal/year (determined above)

$PE1_{white}$ = (0.175 lb-VOC/1,000 gal) × (8) × (133.212×10^6 gal/year)
= 186,497 lb-VOC/year

Total PE1 for White Wine Production:

Potential emissions from 100% white wine production scenario are then determined as follows:

$PE1_{white}$ = $PE1_{white\ fermentation}$ + $PE1_{white\ storage}$
= 333,030 lb-VOC/year + 186,497 lb-VOC/year
= 519,527 lb-VOC/year

Red Wine Fermentation Emissions:

$W1 = C \times D_r \times M$ (limited by crusher capacity)
$W2 = P \times D_r \times M$ (limited by pressing capacity)
$W3 = (V_{FR} \times F \times D_r)/R_{FR}$ (limited by red fermenter volume)
$W4 = (V_T \times D_r)/R_{TS}$ (limited by overall tank processing)

Where:

- C = grape crushing capacity
  = 13,200 tons/day
- D_r = days in a red wine crush season
  = 120 days
- F = Fill factor for red wine fermentation
  = 80%
- M = amount of juice produced per ton of grapes crushed
  = 200 gal/ton
- P = pressing capacity
  = 8,400 tons/day
- R_{FR} = red fermentation period
  = 5 days
- R_{TW} = total winery retention time for white wine
  = 40 days + 5 days = 45 days
- V_{FW} = total volume of red wine fermenters
  = 55,433,318 gal
- V_T = total winery cooperage
  = 55,504,890 gal

Using the above parameters,

W1 = (13,200 x 120 x 200) = 316.80 x 10^6 gal/year
W2 = (8,400 x 120 x 200) = 201.60 x 10^6 gal/year
W3 = (55,433,318 x 0.8 x 120) / 5 = 1,064.32 x 10^6 gal/year
W4 = (55,504,890 x 120) / 45 = 148.013 x 10^6 gal/year

CBUS Ops Inc. requested to install seven new wine storage tanks under Phase 1 of the project, is requesting to install two additional new wine storage tanks under Phase 2 of the project, and is requesting to install 24 new wine storage and fermentation tanks under Phase 3 of the project. These tanks will result an increase facility's storage and fermentation capacities, and no changes to the facility's crushing or pressing capacities. Therefore, crushing capacity and pressing capacity (W1 and W2) are not considered from the analysis. Only the fermenter volume and overall tank processing (W3 and W4) are compared.

W_R = W4 (lesser of W3, W4)
= 148.013×10^6 gal/yr

The potential red wine fermentation emissions would be:

$PE1_{red} = E_{fr} \times W_R$

Where:
E_{fr} = red wine emission factor
= 6.2 lb-VOC/1,000 gal (per District FYI-114)

$PE1_{red}$ = (6.2 lb-VOC/1,000 gal) × (148.013×10^6 gal/yr)
= 917,681 lb-VOC/year

Red Wine Storage Emissions:
Storage emissions are calculated as follows:

$PE1_{red} = E_s \times T \times W_R$

Where:
E_s = wine storage emission factor based on District FYI-114 (6/13/12). The existing tanks allow them to store up to 20% alcohol by volume. Thus, Es is equal to 0.175 lb-VOC/1,000 gal.
T = total post fermentation inter-tank transfers per batch of wine
= 8
W_R = 148.013×10^6 gal/yr (determined above)

$PE1_{red}$ = (0.175 lb-VOC/1,000 gal) × (8) × (148.013×10^6 gal/yr)
= 207,218 lb-VOC/year

Total PE1 for Red Wine Production:
Potential emissions from 100% red wine production scenario are then determined as follows:

$PE1_{red}$ = $PE1_{red\ fermentation}$ + $PE1_{red\ storage}$
= 917,681 lb-VOC/year + 207,218 lb-VOC/year
= 1,124,899 lb-VOC/year

Summary:
The facility's pre-project emissions potential for fermentation and storage operations is then taken to be the greater of the white or red emissions potential determined above.

PE1 = greater of $PE1_{white}$ or $PE1_{red}$
= **1,124,899 lb-VOC/year**

2. Potential to Emit (existing tanks plus new tanks from Phases 1, 2, and 3 of the Project)

The potential annual VOC emissions from the existing fermentation and storage operations and the proposed tanks at this winery are determined as follows:

White Wine Fermentation

$W1 = C \times D_w \times M$ (limited by crusher capacity)
$W2 = P \times D_w \times M$ (limited by pressing capacity)
$W3 = (V_{FW} \times D_w)/W_{FW}$ (limited by white fermenter volume)
$W4 = (V_T \times D_w)/R_{TW}$ (limited by overall tank processing)

Where:

- C = grape crushing capacity
  = 13,200 tons/day
- D_w = days in a white wine crush season
  = 120 days
- M = amount of juice produced per ton of grapes crushed
  = 200 gal/ton
- P = pressing capacity
  = 8,400 tons/day
- W_{FW} = white fermentation period
  = 10 days
- R_{TW} = total winery retention time for white wine
  = 40 days + 10 days = 50 days
- V_{FW} = total volume of white wine fermenters
  = 58,025,318 gal
- V_T = total winery cooperage
  = 62,332,890 gal

Using the above parameters,

W1 = (13,200 x 120 x 200) = 316.80×10^6 gal/year
W2 = (8,400 x 120 x 200) = 201.60×10^6 gal/year
W3 = (58,025,318 x 120) / 10 = 696.30×10^6 gal/year
W4 = (62,332,890 x 120) / 50 = 149.60×10^6 gal/year

CBUS Ops Inc. requested to install seven new wine storage tanks under Phase 1 of the project, is requesting to install two additional new wine storage tanks under Phase 2 of the project, and is requesting to install 24 new wine storage and fermentation tanks under Phase 3 of the project. These tanks will result an increase facility's storage and fermentation capacities, and no changes to the facility's crushing or pressing capacities. Therefore, crushing capacity and pressing capacity (W1 and W2) are not considered from the analysis. Only the fermenter volume and overall tank processing (W3 and W4) are compared.

W_W = W4 (lesser of W3, W4)
= 149.60×10^6 gal/year

The potential white wine fermentation emissions would be:

$PE2_{white} = E_{fw} \times W_W$

Where:
E_{fw} = white wine emission factor
= 2.5 lb-VOC/1,000 gal (per District FYI-114)

$PE2_{white}$ = (2.5 lb-VOC/1,000 gal) × (149.60 × 10^6 gal/yr)
= 374,000 lb-VOC/year

White Wine Storage Emissions:
Storage emissions are calculated as follows:

$PE2_{white} = E_s \times T \times W_w$

Where:
E_s = wine storage emission factor based on District FYI-114 (6/13/12). The tanks are allowed to store up to 20% alcohol by volume. Thus, Es is equal to 0.175 lb-VOC/1,000 gal.
T = total post fermentation inter-tank transfers per batch of wine
= 8
W_w = 149.60 × 10^6 gal/year (determined above)

$PE2_{white}$ = (0.175 lb-VOC/1,000 gal) × (8) × (149.60 x 10^6 gal/year)
= 209,440 lb-VOC/year

Total PE2 for White Wine Production:
Potential emissions from 100% white wine production scenario are then determined as follows:

$PE2_{white}$ = $PE2_{white\ fermentation}$ + $PE2_{white\ storage}$
= 374,000 lb-VOC/year + 209,440 lb-VOC/year
= 583,440 lb-VOC/year

Red Wine Fermentation Emissions:

W1 = C × D_r × M (limited by crusher capacity)
W2 = P × D_r × M (limited by pressing capacity)
W3 = (V_{FR} × F × D_r)/R_{FR} (limited by red fermenter volume)
W4 = (V_T × D_r)/R_{TS} (limited by overall tank processing)

Where:
C = grape crushing capacity
= 13,200 tons/day
D_r = days in a red wine crush season
= 120 days
F = Fill factor for red wine fermentation
= 80%

M = amount of juice produced per ton of grapes crushed
= 200 gal/ton
P = pressing capacity
= 8,400 tons/day
R_{FR} = red fermentation period
= 5 days
R_{TW} = total winery retention time for white wine
= 40 days + 5 days = 45 days
V_{FW} = total volume of red wine fermenters
= 58,025,318 gal
V_T = total winery cooperage
= 62,332,890 gal

Using the above parameters,

W1 = (13,200 x 120 x 200) = 316.80×10^6 gal/year
W2 = (8,400 x 120 x 200) = 201.60×10^6 gal/year
W3 = (58,025,318 x 0.8 x 120) / 5 = $1,114.09 \times 10^6$ gal/year
W4 = (62,332,890 x 120) / 45 = 166.22×10^6 gal/year

CBUS Ops Inc. requested to install seven new wine storage tanks under Phase 1 of the project, is requesting to install two additional new wine storage tanks under Phase 2 of the project, and is requesting to install 24 new wine storage and fermentation tanks under Phase 3 of the project. These tanks will result an increase facility's storage and fermentation capacities, and no changes to the facility's crushing or pressing capacities. Therefore, crushing capacity and pressing capacity (W1 and W2) are not considered from the analysis. Only the fermenter volume and overall tank processing (W3 and W4) are compared.

W_R = W4 (lesser of W3, W4)
= 166.22×10^6 gal/year

The post-project potential red wine fermentation emissions would be:

$PE2_{red} = E_{fr} \times W_R$

Where:
E_{fr} = red wine emission factor
= 6.2 lb-VOC/1,000 gal (per District FYI-114)

$PE2_{red}$ = (6.2 lb-VOC/1,000 gal) × (166.22×10^6 gal/yr)
= 1,030,564 lb-VOC/year

Red Wine Storage Emissions:
Storage emissions are calculated as follows:

$PE2_{red} = E_s \times T \times W_R$

Where:
E_s = wine storage emission factor based on District FYI-114 (6/13/12). The tanks are allowed to store up to 20% alcohol by volume. Thus, Es is equal to 0.175 lb-VOC/1,000 gal.
T = total post fermentation inter-tank transfers per batch of wine
= 8
$W_R = 166.22 \times 10^6$ gal/year (determined above)

$PE2_{red}$ = (0.175 lb-VOC/1,000 gal) × (8) × (166.22×10^6 gal/yr)
= 232,708 lb-VOC/year

Total PE2 for Red Wine Production:
Potential emissions from 100% red wine production scenario are then determined as follows:

$PE2_{red}$ = $PE2_{red\ fermentation}$ + $PE2_{red\ storage}$
= 1,030,564 lb-VOC/year + 232,708 lb-VOC/year
= 1,263,272 lb-VOC/year

Summary:
The facility's post-project emissions potential for fermentation and storage operations is then taken to be the greater of the white or red emissions potential determined above.

PE2 = greater of $PE2_{white}$ or $PE2_{red}$
= **1,263,272 lb-VOC/year**

3. Potential to Emit (new tanks)

The potential emissions from new tanks would be calculated as the difference between the post project and pre project potential emissions based on physical capacity.

Potential Emissions Based on Physical Capacity of Wine Processing Equipment	
Category	Total (lb-VOC/yr)
Pre Project	1,124,899
Post Project	1,263,272
$PE2_{NewTanks}$	**138,373**

APPENDIX E
BACT Guideline 5.4.14 and
Top-Down BACT Analysis for Wine Fermentation

SJVAPCD Best Available Control Technology (BACT) Guideline 5.4.14*

Last Update 10/6/2009

Wine Fermentation Tank

Pollutant	Achieved in Practice or contained in SIP	Technologically Feasible	Alternate Basic Equipment
VOC	Temperature-Controlled Open Top Tank with Maximum Average Fermentation Temperature of 95 degrees F	1. Capture of VOCs and thermal or catalytic 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 required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

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

BACT Guideline 5.4.14

Top-Down BACT Analysis for VOCs from Wine Fermentation Operations

Step 1 - Identify All Possible Control Technologies

The SJVUAPCD BACT Clearinghouse Guideline 5.4.14 (10/6/2009) identifies the following Achieved in Practice and Technologically Feasible BACT options for wine fermentation tanks:

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

As shown 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 a re-examination of the feasibility of these technologies in this project to determine if the technologies are considered Achieved in Practice. As demonstrated in the Achieved in Practice analysis in Attachment E1, 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 (scrubber) 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 degrees 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 Acampo, CA, which has a current sales tax rate of 8%. 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% - 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: The Association for the Advancement of Cost Engineering International recommends a contingency factor of 20% for preliminary estimates and 15% for detailed estimates, while the Electric Power Research Institute recommends a contingency of 15% to 30% for preliminary estimates and 10 to 20% for detailed estimates (ftp://ftp.repec.org/opt/ReDIF/RePEc/sip/04-005.pdf). Therefore, a conservative cost contingency of 15% based on detailed estimates will be applied to the estimates given in these cost analyses. Additionally, since both the direct and indirect costs estimates have uncertainty associated with them, the contingency will be applied to both the direct and indirect costs.
- Owner's Cost is the costs to cover the project management, internal engineering and operations planning required to implement a significant new process technology of this scale in a commercial winery. The applicant has not provided any data to determine the owner's cost; therefore, as a conservative estimate, the Owner's Cost will be set equal to $0 for the purposes of this BACT analysis.
- It is expected that a winery would use programmable logic controls and data logging as well as integration of the control devices with existing digital control system for any fermentation control system installed since any backpressure created from a control system affects the solubility of CO_2 which could have adverse effects on the wine making process. The facility did not provide a cost allowance for programming for such items at this time. Therefore, the cost will be based off of the amount provided in Project C-1133347 of $10,000 per control unit to cover the expected hardware and programming of this item.
- In addition the ducting costs calculated, the facility proposed to also include "piping" costs for each control option as allowed by EPA's Control Cost Manual, Sixth Edition (EPA/452/B-02-001); however, it can reasonably be assumed that for the majority of control devices the "piping" costs are already accounted for in the ducting costs. Therefore, the District will not include "piping" cost for each control option.

Fermentation Vapor Flow Rate

Based on the kinetic model provided by the facility, the maximum CO_2 production rate emitted from each of the 108,000 gallon wine fermentation and storage tanks proposed under this project is calculated to be approximately 160.35 cfm, which results in a maximum total combined CO_2 flowrate of 3,848.4 cfm of CO_2 for all 24 tanks.

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 control device(s). Therefore, the following collection system analysis and cost estimate will be used in the cost effectiveness analysis for each control option.

Basis of Cost Information for Collection System

- The collection system consists of stainless steel 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 will be included in the cost estimate.
- 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 cheaper; 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 Attachment E2.
- Eichleay's cost estimate for ducting included the duct, fittings, bolt-up, handling, and installation. When additional costs, as allowed for in the EPA Control Cost Manual, were added onto the ducting cost estimate, the facility double counted some of the costs that Eichleay already accounted for in their estimate; therefore, the District did not allow the additional costs for foundations & supports, handling & erection, electrical, piping or painting.
- The facility provided a ducting cost estimate which included a redundant ducting system and redundant ducting isolation components to allow the emission control systems to continue to be operated in the event of a foam-over. The District determined that these redundant systems may not be necessary and the effects of a foam-over could be mitigated or minimized with smart valving and backflow preventer design integrated into the attached ducting layout designs. Therefore, redundant ducting has been removed from the cost estimate for the purposes of this top down BACT analysis.
- Generally, a minimum duct size is established at six inches diameter at each tank to provide adequate strength for spanning between supports. However, for this project the facility piping costs included estimated costs for four inch diameter piping for the tank

connections. Therefore, to be conservative four inch diameter piping will be considered for the tank connections.

- The Eichleay study did not provide costs for 4" diameter pipe. Therefore, the cost of 4" inch diameter pipe will be estimated as 2/3 the cost of 6" diameter pipe (Therefore, a cost of $41.45 ($62.17 x 4/6) will be used for the 4" diameter pipe.
- 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.
- Additionally, the facility included an inflation amount of 2.75% per year from 2005 through 2015 to adjust the Eichleay cost to present value. The District found this inflation value to be unfounded and was replaced with 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: http://www.bls.gov/data/inflation_calculator.htm.

Capital Cost of Ductwork

As detailed in the tank layout sketches and the ductwork cost calculations included in Attachment E3, the cost for the ducting for the 24 new 108,000 gallon wine fermentation and storage tanks is summarized below:

Capital Cost of Ductwork for 24 108,000 Gallon Wine Fermentation and Storage Tanks

Main Duct to CIP and Emissions Control (18" Diameter): 80 feet x $251.38/foot = $20,110
Connection from set of tanks (1675-1678 & 1687-1690) to Junction 1 of Main Duct (10" Diameter): 40.67 feet x $144.33/foot = $5,870
Connection from set of tanks (1679-1682 & 1691-1694) to Junction 2 of Main Duct (10" Diameter): 15.63 feet x $144.33/foot = $2,256
Connection from set of tanks (1683-1686 & 1695-1698) to Junction 2 of Main Duct (10" Diameter): 73.29 feet x $144.33/foot = $10,578
Connection Junction 1 to Junction 2 of Main Duct (14" Diameter): 43.25 feet x $174.17/foot = $7,533
Connections for Each Set of Eight Tanks (3 Sets):
Main Connection, First Section (6" Diameter): 32.25 feet x $62.17/foot = $2,005
Main Connection, Second Section (8" Diameter): 28.25 feet x $103.25/foot = $2,917
Main Connection, Third Section (10" Diameter): 32.25 feet x $144.33/foot = $4,655
Connections from 8 Tanks to Duct (4" Diameter): 115.33 feet x $41.45/foot = $4,780
Subtotal for all three tank sets: 3 x ($2,005 + $2,917 + $4,655 + $4,780) = $43,071
Ducting Isolation Components for tanks:
Unit installed cost for 6 inch butterfly valve: $2,125/valve x 24 valves = $51,000
Unit installed cost one foot removable spool: $500/tank x 24 tanks = $12,000
Subtotal: $51,000 + $12,000 = $63,000
1 Knockout drum: $46,300
Ducting support allowance: $120,000

Total Ducting Capital Cost = $20,110 + $5,870 + $2,256 + $10,578 + $7,533 + $43,071 + $63,000 + $46,300 + $120,000 = **$318,718**

Capital Cost of Ductwork for 24 108,000 Gallon Wine Fermentation and Storage Tanks	
Cost Description	Cost ($)
Duct Estimate from Eichleay Study (2005)	$318,718
Adjusting factor from 2005 dollars to present month in 2016 dollars (21.93% inflation)	1.2193
Inflation adjusted duct cost	$388,613
The following cost data is taken from EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001).	
Direct Costs (DC)	
Base Equipment Costs (Ductwork) See Above	$388,613
Instrumentation (not estimated)	-
Sales Tax 3.8125%[2] of Base Equipment Costs	$14,816
Freight 5% of Base Equipment Costs	$19,431
Purchased Equipment Cost (PEC)	**$422,860**
Foundations & supports (Included in Base Equipment Costs)	-
Handling & erection (Included in Base Equipment Costs)	-
Electrical (not required)	-
Piping (not required)	-
Painting (not required)	-
Insulation 1% of PEC	$4,229
Direct installation costs	**$4,229**
Total Direct Costs	**$427,089**
Indirect Costs (IC)	
Engineering 10% of PEC	$42,286
Construction and field expenses 5% of PEC	$21,143
Contractor fees 10% of PEC	$42,286
Start-up 2% of PEC	$8,457
Performance test 1%	$4,229
Total Indirect Costs	**$118,401**
Subtotal Capital Investment (SCI) (DC + IC)	**$545,490**
Contingencies – 15% of SCI	$81,824
Total Capital Investment (TCI) (SCI + Contingency)	**$627,314**

Capital Cost for Clean-In-Place (CIP) System

A ducting system for winery tanks must have a Clean in Place (CIP) system to maintain sanitation and quality of the product. Based on information from the wine institute, the facility has provided has provided an estimated capital cost for a clean in place system of $200,000. Operation of a CIP system, using typical cleaning agents, will raise disposal and wastewater treatment costs. The relevant costs of operation of the CIP system have not been estimated.

[2] Pollution control equipment may qualify for CA tax partial exemption. The exemption rate is 4.1875%, so the reduced sales tax rate for San Joaquin County equals 3.8125% (8% - 4.1875%). http://www.boe.ca.gov/sutax/manufacturing_exemptions.htm#Purchasers

Capital Cost of Clean-In-Place (CIP) System of Ductwork for Wine Tanks	
Cost Description	Cost ($)
Cost of CIP system: $200,000	$200,000
The following cost data is taken from EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001).	
Direct Costs (DC)	
Base Equipment Costs (CIP System) See Above	$200,000
Instrumentation - 10% of Base Equipment	$20,000
Sales Tax - 3.8125% of Base Equipment	$6,620
Freight - 5% of Base Equipment	$10,000
Purchased Equipment Cost (PEC)	**$236,620**
Foundations & supports - 8% of PEC	$18,930
Handling & erection - 14% of PEC	$33,127
Electrical - 4% of PEC	$9,465
Piping – accounted for in ductwork cost	-
Painting - 1% of PEC	$2,366
Insulation - 1% of PEC	$2,366
Direct Installation Costs (DIC)	**$66,254**
Total Direct Costs (DC) (PEC + DIC)	**$302,874**
Indirect Costs (IC)	
Engineering - 10% of PEC	$23,662
Construction and field expenses - 5% of PEC	$11,831
Contractor fees - 10% of PEC	$23,662
Start-up - 2% of PEC	$4,732
Performance test - 1% of PEC	$2,366
Total Indirect Costs (IC)	**$66,253**
Subtotal Capital Investment (SCI) (DC + IC)	**$369,127**
Contingencies - 15% of SCI	$55,369
Total Capital Investment (TCI) (SCI + Contingency)	**$424,496**

Annualized Capital Costs of Ductwork and CIP System for 24 108,000 Gallon Wine Fermentation and Storage Tanks

Total capital costs = Ductwork + CIP System
= $627,314 + $424,496
= $1,051,810

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 for ducting and CIP = $1,051,810 x 0.163 = $171,445/yr

Option 1 – Collection of VOCs and control by thermal or catalytic oxidation (88% collection & control for wine fermentation)

Control by Thermal Oxidation for the proposed 24 108,000 Gallon Wine Tanks

The balanced chemical equation for combustion of ethanol is shown below.

$C_2H_5OH + 3O_2 \rightarrow 3H_2O + 2CO_2$

Fermentation Vapor Exhaust Flow Rate

Based on the kinetic model provided by the facility, the maximum CO_2 production rate emitted from each of the 108,000 gallon wine fermentation and storage tanks proposed under this project is calculated to be approximately 160.35 cfm, which results in a maximum total combined CO_2 flowrate of 3,848.4 cfm of CO_2 for all 24 tanks.

Thermal Oxidizer Capital Cost

The equipment cost for a Regenerative Thermal Oxidizer (RTO) will be based on cost estimates for control of emissions from wine tanks provided to the District by RTO suppliers. On November 13, 2015 an RTO supplier provided budgetary price estimates for RTOs for control of wine fermentation tanks for Project N-1152244, which included price estimates of $625,000 for an RTO designed to handle a maximum CO_2 flow rate of 3,091 scfm and $650,000 an RTO designed to handle a maximum CO_2 flow rate ranging from 5,152 scfm to 6,182 scfm. On January 7, 2016 a different RTO supplier, B&W MEGTEC, provided budgetary price estimates for RTOs for control of wine fermentation tanks for Project N-1142303, which included a price estimate of $333,600 for an RTO designed to handle a maximum CO_2 flow rate of 5,868 scfm, with additional estimates of $25,000 for installation and $15,000 for startup. Conservatively, the lower cost estimate provided by B&W MEGTEC will be used for this analysis. Additionally, to ensure a more conservative estimate, the lower cost estimate provided by B&W MEGTEC will be adjusted down linearly to the required CO_2 flow rate of 3,848.4 scfm using the ratio of the required flow rate to the CO_2 flow rate of 5,868 scfm, the flow rate for the RTO for which the budgetary price estimate was provided. Because of economies of scale (the larger the equipment is, the lower the cost of equipment per unit of capacity), adjusting the budgetary price estimate down linearly results in a cost estimate that will be conservatively low.

Adjusting the budgetary cost provided by B&W MEGTEC results in a conservative capital cost estimate of $218,784 for a thermal oxidizer designed to handle a CO_2 flowrate of 3,848.4 cfm from the wine tanks, as shown below:

Capitol Cost = $Cost_{base}$ x ($Capacity_{new}$/$Capacity_{base}$)
= $333,600 x (3,848.4/5,868)
= $218,784

Thermal or Catalytic Oxidation Capital Cost	
Cost Description	Cost ($)
Regenerative Thermal Oxidizer (RTO) Budgetary Pricing Proposal	$333,600
RTO Budgetary Pricing Proposal Design CO_2 Flow Rate (cfm)	5,868
RTO Design CO_2 Flow Rate (cfm) required for the Proposed Fermentation Tanks	3,848.4
Size Adjusted RTO Cost [= $333,600 x (3,848.4 cfm/5,868 cfm)]	$218,784
The following cost data is based on the EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002), Section 3.2: VOC Destruction Controls, Chapter 2: Incinerators (September 2000), Table 2.8: Capital Cost Factors for Thermal and Catalytic Incinerators	
Direct Costs (DC)	
Base Equipment Costs (Regenerative Thermal Oxidizer System) See Above	$218,784
Instrumentation 10% of Base Equipment Costs	$21,878
Sales Tax 3.8125% of Base Equipment Costs	$8,341
Freight 5% of Base Equipment Costs	$10,939
Purchased Equipment Cost (PEC)	**$259,942**
Foundations & Supports 8% of PEC	$20,795
Handling & Erection 14% of PEC	$36,392
Electrical 4% of PEC	$10,398
Piping (conservatively assumed to be included in the ducting costs given above)	-
Insulation 1% of PEC	$2,599
Painting 1% of PEC	$2,599
PLC & Programming - 1 unit x $10,000	$10,000
Direct installation costs	**$82,783**
Total Direct Costs	**$342,725**
Indirect Costs (IC)	
Engineering 10% of PEC	$25,994
Installation Costs (Information from Supplier - B&W Megtec)	$25,000
Contractor fees 10% of PEC	$25,994
Start-up (Information from Supplier - B&W Megtec)	$15,000
Initial Source Testing - 1 unit x $15,000/unit	$15,000
Owner's Cost (data not provided)	-
Total Indirect Costs	**$106,988**
Subtotal Capital Investment (SCI) (DC + IC)	**$449,713**
Contingencies - 15% of SCI	$67,457
Total Capital Investment (TCI) (DC + IC)	**$517,170**

Estimated Total Capital Investment for RTO: $517,170

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 for the RTO = $517,170 x 0.163 = $84,299/yr

Operation and Maintenance Costs

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

Gas Flow Rate for Fermentation Operations

As stated above, the maximum total combined CO_2 flowrate is 3,848.4 cfm of CO_2 for all 24 tanks. Based on the information included in the budgetary estimates provided by the RTO supplier, the maximum flowrate of CO_2 and fresh air is estimated as 3,848.4 cfm x 8,381 cfm/5,868 cfm = 5,496 cfm.

Maximum daily flow rate and auxiliary air sent to oxidizer from the 24 fermentation tanks:
(5,496 ft^3/min) x 60 min/hr x 24 hr/day = 7,914,240 ft^3/day

VOC Emissions from Fermentation Operations:

Fermentation of wine in the San Joaquin Valley primarily occurs in the months of September to November, corresponding with the fall crush season. Therefore, fermentation will be assumed to occur in the tanks for only 90 days per year. Therefore, the total of the average daily VOC emissions from fermentation in the proposed 24 tanks is calculated as follows:

29,760 lb-VOC/yr ÷ 90 days/yr = 330.7 lb-VOC/day

Heat of Combustion for waste gas stream ($-\Delta h_c$):

Heat of combustion ($-\Delta h_c$) for Ethanol = 11,800 Btu/lb (provided by RTO supplier, Adwest Technologies, for RTOs for District Project N-1153192)[3]
Total Daily VOC emissions from tanks = 330.7 lb-VOC/day
Blower flow rate = 7,914,240 ft^3/day

($-\Delta h_c$) = 330.7 lb-VOC/day x 11,800 Btu/lb ÷ 7,914,240 ft^3/day
= 0.493 Btu/ft^3

[3] The U.S. Department of Energy (DOE) Energy Efficiency and Renewable Energy (EERE) Biomass Energy Data Book, Edition 4 (September 2011), Appendix A: Lower and Higher Heating Values of Gas, Liquid and Solid Fuels (http://cta.ornl.gov/bedb/appendix_a/Lower_and_Higher_Heating_Values_of_Gas_Liquid_and_Solid_Fuels.pdf) lists a Lower Heating Value (LHV) of 11,587 Btu/lb for Ethanol; however, the slightly higher (and therefore slightly more conservative) ethanol heating value provided by Adwest Technologies will be used for this analysis)

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:

$$(-\Delta h_{cwi}) = 0.493 \text{ Btu/ft}^3 \div 0.0739 \text{ lb/ft}^3$$
$$= 6.67 \text{ Btu/lb}$$

Auxiliary Fuel Requirement

The auxiliary fuel requirement for the regenerative thermal oxidizer (RTO) will be estimated using the procedures from the EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002), Section 3.2: VOC Destruction Controls, Chapter 2 Incinerators (September 2000)[4], Appendix B: Design Procedure for Non-Recuperative Thermal Incinerators.

Pursuant to Appendix B: Design Procedure for Non-Recuperative Thermal Incinerators, the auxiliary fuel requirement for the RTO can be estimated using the following equation:

$$\rho_{af}Q_{af} = \rho_{wi}Q_{wi}\{C_{pm}[\eta\,(T_{fi} - T_{ref}) + (T_{fo} - T_{wi})] - (-\Delta h_{cwi})\} \div \{(-\Delta h_{caf}) - C_{pm}[\eta\,(T_{fi} - T_{ref}) + (T_{fo} - T_{ref})]\}$$

Where:
- ρ_{af} = density of the auxiliary fuel = 0.0408 lb/ft^3 for methane at 77°F, 1 atm
- Q_{af} = volumetric flow rate of auxiliary fuel (scfm)
- ρ_{wi} = waste gas inlet density (per EPA Air Pollution Control Cost Manual assumed to be approximately equal to air = 0.0739 lb/scf at 77°F, 1 atm)
- Q_{wi} = volumetric flow rate of inlet waste gas (scfm) = 5,496 scfm (given above)
- C_{pm} = mean heat capacity of air (per EPA Air Pollution Control Cost Manual assumed to be approximately to air = 0.255 Btu/lb-°F)
- η = energy loss from combustion chamber (fractional) (per information included in the EPA Air Pollution Control Cost Manual, the heat loss fraction for RTOs ranged from 0.002 to 0.015 (0.2 to 1.5%); η will be set at 0.01 (1%) for purposes of this analysis)
- T_{fi} = combustion temperature of the RTO = 1,600°F (The EPA Air Pollution Control Cost Manual indicates that commercial incinerators should generally be run at 1,600°F to ensure 98% destruction of non-halogenated organics)
- T_{ref} = reference temperature = 77°F, assuming ambient conditions
- T_{fo} = outlet exhaust gas temperature = 153°F (the EPA Air Pollution Control Cost Manual indicates 95% heat recovery for regenerable thermal oxidizers; therefore $T_{fo} = T_{fi} - 0.95(T_{fi} - T_{wi})$)
- T_{wi} = waste gas inlet temperature = 77°F, assuming ambient conditions
- $(-\Delta h_{cwi})$ = heat of combustion of the inlet waste gas = 6.67 Btu/lb (calculated above assuming a waste gas inlet density approximately equal to air = 0.0739 lb/scf at 77°F, 1 atm)
- $(-\Delta h_{caf})$ = heat of combustion of the auxiliary fuel = 21,502 Btu/lb for methane

[4] EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002), Section 3.2: VOC Destruction Controls, Chapter 2: Incinerators (September 2000). United States Environmental Protection Agency Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina 27711. EPA/452/B-02-001. https://www3.epa.gov/ttncatc1/dir1/cs3-2ch2.pdf

Therefore, the auxiliary fuel requirement for the RTO is estimated as follows:

$Q_{af} = (\rho_{wi}Q_{wi}\{C_{pm}[\eta(T_{fi} - T_{ref}) + (T_{fo} - T_{wi})] - (-\Delta h_{cwi})\} \div \{(-\Delta h_{caf}) - C_{pm}[\eta(T_{fi} - T_{ref}) + (T_{fo} - T_{ref})]\}) \div \rho_{af}$

$\rho_{af}Q_{af}$ = 0.0739 lb/scf x 5,496 scf/min x {0.255 Btu/lb-°F x [0.01 x (1,600°F - 77°F) + (153°F - 77°F)] - (6.67 Btu/lb)} ÷ {(21,502 Btu/lb) - 0.255 Btu/lb-°F x [0.01 x (1,600°F - 77°F) + (153°F - 77°F)]} = 0.316 lb/min

Q_{af} = 0.316 lb/min ÷ 0.0408 lb/scf = 7.7 scfm

As shown above, 7.7 scfm of natural gas auxiliary fuel is required to sustain combustion of the waste gas. In addition, the EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002), Section 3.2: VOC Destruction Controls, Chapter 2: Incinerators (September 2000) indicates that approximately 5% of the total energy input should be provided by the auxiliary fuel to stabilize the burner flame. The minimum amount of natural gas fuel required to stabilize the burner flame is calculated below.

Sensible Heat Out

= 0.0739 lb/scf x (5,496 scf/min + 7.7 scf/min) x 0.255 Btu/lb-°F x (1,600°F - 77°F)
= 157,957 Btu/min

Minimum Auxiliary Natural Gas Fuel Requirement

157,957 Btu/min x 0.05 = 7,898 Btu/min ÷ 21,502 Btu/lb-methane = 0.367 lb-methane/min
0.367 lb-methane/min ÷ 0.0408 lb-methane/scf = 9.0 scf/min

Recalculated Sensible Heat Out

= 0.0739 lb/scf x (5,496 scf/min + 9.0 scf/min) x 0.255 Btu/lb-°F x (1,600°F - 77°F)
= 157,994 Btu/min

Recalculated Minimum Auxiliary Natural Gas Fuel Requirement

157,994 Btu/min x 0.05 = 7,900 Btu/min ÷ 21,502 Btu/lb-methane = 0.367 lb-methane/min
0.367 lb-methane/min ÷ 0.0408 lb-methane/scf = 9.0 scf /min √

As calculated above, approximately 9.0 scfm of auxiliary natural gas fuel is required to stabilize the burner flame.

Fuel Costs

The cost for natural gas shall be based upon the average price of natural gas sold to "Industrial Consumers" in California for the years 2013, 2014, and 2015.[5]

2015 = $6.35 per thousand ft^3

[5] Energy Information Administration/Natural Gas; Average Price of Natural Gas Sold to Industrial Consumers by State, 2013 – 2015. http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_SCA_a.htm

2014 = $7.65 per thousand ft^3
2013 = $6.57 per thousand ft^3
Average for three years = $6.86 per thousand ft^3

As explained above, fermentation is assumed to occur in the tanks for only 90 days per year.

Fuel Cost = 9.0 ft^3/min x 60 min/hr x 24 hr/day x 90 day/year x $6.86/1,000 ft^3
= $8,002/year

Electricity Requirement

Per the EPA Air Pollution Control Cost Manual, the electricity costs are primarily associated with the fan needed to move the gas through the incinerator, which can be estimated as follows:

$$\text{Power}_{fan} = \frac{1.17 \times 10^{-4} \, Q_{wi} \, \Delta P}{\varepsilon}$$

Where
ΔP = Pressure drop across system = 4 in. H_2O (per information from the EPA Air Pollution Control Cost Manual)
ε = Efficiency for fan and motor = 0.6 (per information from the EPA Air Pollution Control Cost Manual)
Q_{wi} = 5,496.5 scfm (given above)

$$\text{Power}_{fan} = \frac{1.17 \times 10^{-4} \times 5{,}496 \text{ cfm} \times 4 \text{ in. } H_2O}{0.60}$$
= 4.3 kW

Estimated Electricity Costs for the RTO
The Energy Information Administration (EIA) website gives the following average retail prices for Industrial users of electricity in California for the years 2013, 2014, and 2015[6]:

2015 = $0.1233/kWh
2014 = $0.1234/kWh
2013 = $0.1144/kWh
Three year average = $0.1204/kWh

Electricity Cost = 4.3 kW x 24 hr/day x 90 day/year x $0.1204/kWh = $1,118/year

Annual Costs (Based on: EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002), Section 3.2: VOC Destruction Controls, Chapter 2: Incinerators (September 2000), Table 2.10 - Annual Costs for Thermal and Catalytic Incinerators Example Problem. United States Environmental Protection Agency Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina 27711. EPA/452/B-02-001)[4]

[6] Energy Information Administration/Electric Power; Average Retail Price of Electricity to Ultimate Customers by End-Use Sector, by State, 2013- 2015. http://www.eia.gov/electricity/data.cfm#sales

Thermal Oxidizer Annual Costs			
Direct Annual Costs (DAC)			
Operating Labor			
Operator	½ hr per shift	$18.50/hr x 0.5 hr/shift x 3 shift/day x 90 days/year x 1 unit	$2,498
Supervisor	15% of operator		$375
Maintenance			
Labor	½ hr per shift	$18.50/hr x 0.5 hr/shift x 3 shift/day x 90 days/year x 1 unit	$2,498
Maintenance Materials	100% of labor		$2,498
Utility			
Natural Gas			$8,002
Electricity			$1,118
Total Direct Annual Costs (DAC)			**$16,989**
Indirect Annual Cost (IAC)			
Overhead	60% of Labor Cost	0.6 x ($2,498 + $375 + $2,498 + $2,498)	$4,721
Administrative Charge	2% of TCI		$10,343
Property Taxes	1% of TCI		$5,172
Insurance	1% of TCI		$5,172
Annual Source Test	One test/year @ $15,000		$15,000
Total IAC			**$40,408**
Annual Cost (DAC + IAC)			**$57,397**

Total Annual Cost

Total Annual Cost = (Ductwork + CIP System) + Regenerative Thermal Oxidizer System + Annual Costs
= $171,445/yr + $84,299/yr + $57,397/yr
= $313,141/yr

Emission Reductions

Annual VOC Emission Reductions = PE x 0.88
= 29,760 lb-VOC/year x 0.88
= 26,189 lb-VOC/year
= 13.09 tons-VOC/year

Cost Effectiveness

Cost Effectiveness = Total Annual Cost ÷ Annual Emission Reductions

Cost Effectiveness = $313,141/year ÷ 13.09 tons-VOC/year
= $23,922/ton-VOC

The analysis demonstrates that the annualized purchase cost of the collection system ductwork, CIP system equipment, and regenerative thermal oxidizer system and the annual costs of a regenerative thermal oxidizer system result in costs that exceed the District's BACT Cost Effectiveness Threshold for VOC of $17,500/ton-VOC. Therefore this option is not cost-effective and will not be required for the fermentation operations in the 24 108,000 wine tanks proposed under this project.

Option 2 – Collection of VOCs and control by carbon adsorption (86% collection and control for wine fermentation)

Design Basis for Control by Carbon Adsorption for 24 108,000 Gallon Wine Fermentation Tanks

- Additional costs not included at this time for equipment necessary for a fully functioning control system include, but are not limited to, the cost for a tank to collect the condensed ethanol laden steam from regeneration of the carbon bed.
- 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, these disposal costs will not be included at this time.

Fermentation Vapor Exhaust Flow Rate

Based on the kinetic model provided by the facility, the maximum CO_2 production rate emitted from each of the 108,000 gallon wine fermentation and storage tanks proposed under this project is calculated to be approximately 160.35 cfm, which results in a maximum total combined CO_2 flowrate of 3,848.4 cfm of CO_2 for all 24 tanks.

Carbon Adsorption Capital Cost

The District contacted suppliers of carbon adsorption systems to obtain cost estimates for a carbon adsorption system designed to handle the total flow rate from wine fermentation tanks. One of the suppliers contacted, Drewelow Remediation Equipment, Inc., indicated that they did not have systems designed to handle the flowrates as large as required by this projects and suggested that a thermal oxidizer would be a better option. On May 16, 2016, a representative of another supplier the District had contacted, Paul Sengupta of B&W MEGTEC, called and said that the value of the ethanol that could be recovered would not justify the cost of the carbon because he said that the weight capacity of carbon for ethanol was only about 5%. He also suggested using a thermal oxidizer would be a better option. On May 18, 2016, Rebecca Alward of Calgon Carbon Corporation provided a budgetary price estimate for carbon adsorption systems for the proposed project. The budgetary price estimate was $190,000 for two Protect RO 10 carbon adsorption systems ($95,000 per unit) and included an initial carbon fill of 15,000 lb carbon for each system.

Capitol Cost for the carbon adsorption system: $190,000

A tank is needed for the steam regenerated carbon bed. Two beds will generally be needed to enable operation of one bed while the other is being regenerated.

The carbon bed operated with steam to regenerate the bed produces a water alcohol mixture. The waste stream or disposal costs have not been analyzed in this project.

Carbon Capital Costs

The budgetary price estimate provided by Rebecca Alward of Calgon Carbon Corporation included an estimated carbon usage rate of 9,000 lb per day for the proposed system. However, she indicated that using heater to increase the temperature of the gas from the fermentation tanks by 20 ºF would be able to greatly reduce the carbon usage rate to about 2,500 lb of carbon per day. The use of a duct burner would result in increased fuel costs and would also produce NO_X from combustion; however, the increased fuel costs would be offset by the reduction in the amount of carbon used. Therefore, for conservative calculations, the carbon adsorption systems will be assumed to use only 2,500 lb of carbon per day. Rebecca Alward also provided a cost of $1.35 per lb of carbon plus freight.

Assuming that the fermentation tanks will only operate 90 days per year, corresponding with the fall crush season, the annual carbon requirement for the carbon adsorption system is calculated as follows:

Carbon required = 2,500 lb/day x 90 day/year = 225,000 lb/year

Cost of Carbon required = 225,000 lb/year x $1.35/lb = $303,750

For more conservative calculations, it will be assumed that after the initial purchase of the required activated carbon, the activated carbon will be regenerated several times rather than purchased each year.

Carbon Adsorption Capital Cost		
Cost Description	Equipment Cost ($)	Carbon Cost ($)
Carbon Adsorption System Budgetary Pricing Proposal	$190,000	-
Water alcohol tank (*The tank required for the water alcohol mixture was not included in this analysis*)	-	-
Carbon Capital Cost (see above)	-	$303,750
The following cost data is based on the EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002), Section 3.1: VOC Recapture Controls, Chapter 1: Carbon Adsorbers (September 1999), Table 1.3: Capitol Cost factors for Carbon Adsorbers		
Direct Costs (DC)		
Base Equipment Costs (Regenerative Thermal Oxidizer System) & Carbon (See Above)	$190,000	$303,750
Instrumentation 10% of Base Equipment Costs	$19,000	-
Sales Tax 3.8125% of Base Equipment Costs	$7,244	$11,580
Freight 5% of Base Equipment Costs	$9,500	$15,188
Purchased Equipment Cost (PEC)	**$225,744**	**$330,518**
Foundations & Supports 8% of PEC	$18,060	-
Handling & Erection 14% of PEC	$31,604	-
Electrical 4% of PEC	$9,030	-
Piping (conservatively assumed to be included in the ducting costs given above)	-	-
Insulation 1% of PEC	$2,257	-
Painting 1% of PEC	$2,257	-
PLC & Programming - 1 unit x $10,000	$10,000	-
Direct installation costs	**$73,208**	**$0**
Total Direct Costs	**$298,952**	**$330,518**
Indirect Costs (IC)		
Engineering 10% of PEC	$22,574	-
Construction and field expenses 5% of PEC	$11,287	-
Contractor fees 10% of PEC	$22,574	-
Start-up 2% of PEC	$4,515	-
Initial Source Testing - 1 unit x $15,000/unit	$15,000	-
Owner's Cost (data not provided)	-	-
Total Indirect Costs	**$75,950**	**$0**
Subtotal Capital Investment (SCI) (DC + IC)	**$374,902**	**$330,518**
Contingencies - 15% of SCI	$56,235	-
Total Capital Investment (TCI) (DC + IC)	**$431,137**	**$330,518**

Annualized Capital Costs

Annualized Capital Investment = Initial Capital Investment x Amortization Factor

In accordance with the District BACT Policy (APR-1305), the equipment life is generally assumed to be 10 years unless it is demonstrated that an alternative equipment life is more representative of the specific operation. In the case of the carbon adsorption system, the carbon used in the system has a shorter economic life than the rest of the system. Therefore annualized cost of the carbon must be calculated separately than the rest of the system.

The EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002), Section 3.1: VOC Recapture Controls, Chapter 1: Carbon Adsorbers (September 1999)[7] 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.*"

Annualized Cost for Activated Carbon

Per the EPA Air Pollution Control Cost Manual, the annualized cost of the carbon for the adsorption system may be calculated as follows:

$CRC_C = CRF_C (1.08\ C_C + C_{Cl})$

where:

CRC_C = capitol recovery cost for the carbon ($/yr)
CRF_C = capital recovery factor for the carbon
1.08 = taxes and freight factor (1.088125 for this project)
C_C = initial cost of carbon ($)
C_{Cl} = carbon replacement labor cost ($) = $0.072/lb-carbon replaced (Per EPA Air Pollution Control Cost Manual $0.05/lb-carbon replaced in 1999 dollars adjusted to 2016 dollars based on US Department of Labor CPI Inflation calculator)

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

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

Therefore, the annualized cost of the carbon =
0.264(1.088125 x $303,750 + 225,000 lb-carbon x $0.072/lb-carbon) = $91,534/yr

Annualized Cost for the Carbon Adsorption System Hardware

The EPA Air Pollution Control Cost Manual, states, "*For adsorbers, the system lifetime is typically ten years, except for the carbon, which, as stated above, typically needs to be replaced after five years. Therefore, when figuring the system capital recovery cost, one should base it on the installed capital cost less the cost of replacing the carbon (i.e., the carbon cost plus the cost of labor necessary to replace it).*"

[7] 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

The capital cost of the carbon adsorption system included an initial fill of 30,000 lb of activated carbon (15,000 lb for each unit). Therefore the cost of this carbon will be subtracted out when annualizing the cost of the carbon adsorption system.

Per the EPA Air Pollution Control Cost Manual, the annualized cost of the carbon for the adsorption system may be calculated as follows:

$CRC_S = [TCI - (1.08\ C_C + C_{CL})]\ CRF_S$

where:

CRC_S = capital recovery cost for adsorption system ($/yr)
TCI = total capital investment ($)
1.08 = taxes and freight factor (1.088125 for this project)
C_C = initial cost of carbon ($)
C_{CI} = carbon replacement labor cost ($) = $0.072/lb-carbon replaced (Per EPA Air Pollution Control Cost Manual $0.05/lb-carbon replaced in 1999 dollars adjusted to 2016 dollars based on US Department of Labor CPI Inflation calculator)
CRF_S = capital recovery factor for the adsorption system

In accordance with District BACT Policy, assuming a system life of 10 years a 10% interest rate the capitol recovery cost for the carbon =

$$\left[\frac{0.1(1.1)^{10}}{(1.1)^{10}-1}\right] = 0.163 \text{ over 10 years at 10\% interest}$$

Therefore, the annualized cost of the carbon adsorption system (except for the carbon) = [$431,137 - (1.088125 x (30,000 lb-carbon x $1.35/lb-carbon) + 30,000 lb-carbon x $0.072/lb-carbon)] x 0.163 = $62,740

Annualized Cost of Carbon + Carbon Adsorption Equipment
$91,534/yr + $62,740/yr = $154,274/yr

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)[7].

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.

Annual Steam Costs

Annual VOC Emission Reductions = PE x 0.86
= 29,760 lb-VOC/year x 0.86
= 25,594 lb-VOC/year
= 12.80 tons-VOC/year

Per EPA Air Pollution Control Cost Manual, the steam requirement ranges from approximately 3 to 4 lbs of steam/lb of adsorbed VOC and can be calculated as follows:

$C_S = 3.50 \times 10^{-3} m_{voc} \theta_s p_S$

where:

C_S = cost of steam ($/yr)
m_{voc} = VOC inlet loading (lbs/hr)
θ_s = system operating hours (hr/yr)
p_S = steam price ($/thousand lbs)

Per the EPA Air Pollution Control Cost Manual, cost of steam can be estimated as 120% of the fuel cost ($/MMBtu).

The cost for natural gas shall be based upon the average price of natural gas sold to "Industrial Consumers" in California for the years 2013, 2014, and 2015.[5]

2015 = $6.35 per thousand ft^3
2014 = $7.65 per thousand ft^3
2013 = $6.57 per thousand ft^3
Average for three years = $6.86 per thousand ft^3

Therefore the cost of steam can be estimated as follows:

C_S = 3.50 lb-steam/lb-VOC x 25,594 lb-VOC/yr x ($6.86 x 1.20)/(1,000 lb-steam) = $737/yr

The total quantity of steam (Q_S) required is calculated as follows

Q_S = 3.50 lb-steam/lb-VOC x 25,594 lb-VOC/yr = 89,579 lb-steam/yr

Annual Cooling Water Costs

$C_{cw} = 3.43 \times C_S/p_S \times p_{cw} = 3.43 \times Q_S \times p_{cw}$

where:

C_{cw} = cooling water cost ($/yr)
p_{cw} = cooling water price ($/thousand gal) = $0.322 (Per EPA Air Pollution Control Cost Manual, if the cooling water price is unavailable, use $0.15 to $0.30/1,000 gallons cooling water in 1999 dollars; average of $0.225 adjusted to 2016 dollars based on US Department of Labor CPI Inflation calculator = $0.322)

Therefore, the cooling water cost can be estimated as follows:

C_{cw} = 3.43 gal-cooling water/lb-steam x 89,579 lb-steam/yr x $0.322/(1,000 gallons cooling water) = $99/yr

The total volume of cooling water (V_{cw}) required annually is calculated as follows

V_{cw} = 3.43 gal-cooling water/lb-steam x 89,579 lb-steam/yr = 307,256 gal-cooling water/yr

Electricity Costs

Electricity Use of System Fan

Per the EPA Air Pollution Control Cost Manual, the electricity use of the system fan can be calculated using the following equations:

$\Delta P_b/t_b = 0\ 03679\ v_b + 1.107 \times 10^{-4}\ v_b^2$

where:

$\Delta P_b/t_b$ = pressure drop through bed (inches of water/foot of carbon)
v_b = superficial bed velocity (ft/min)

$hp_{sf} = 2.50 \times 10^{-4}\ Q\ \Delta P_s$

where:

hp_{sf} = electric hp of system fan
Q = gas volumetric flow through system (acfm) (total of 3,848.4 cfm for all 24 tanks, given above)
ΔP_s = total system pressure drop = (ΔP_b + 1)

$kWh_{sf} = 0.746\ kW/hp \times hp_{sf} \times \theta_s$

where:

kWh_{sf} = Annual electricity use of system fan (kWh/yr)
θ_s = system operating hours (hr/yr)

The EPA document Carbon Adsorption for Control of VOC Emissions: Theory and Full Scale System Performance (June 1988)[8] states, "*Generally carbon adsorber bed depth range from 1.5 to 3.0 feet. A bed depth of at least 1.5 feet is used to insure that the bed is substantially deeper than the MTZ ...*"

Therefore, the carbon bed depth will conservatively be assumed to be 2 ft. The example problem in the EPA Air Pollution Control Cost Manual used a superficial bed velocity (v_b) of 75 ft/min. Using these values, the pressure drop through the carbon bed is estimated as follows:

$\Delta P_b = [0\ 03679\ (75) + 1.107 \times 10^{-4}\ (75)^2] \times 2 = 6.76$ in. water

[8] EPA Carbon Adsorption for Control of VOC Emissions: Theory and Full Scale System Performance (June 1988), Section. United States Environmental Protection Agency Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina 27711. EPA-450/3-88-012.

Assuming that the fermentation tanks will operate for 90 days per year during the crush and fermentation season, the annual time of operation of the system fan will be based on 2,160 hours (90 days x 24 hours/day).

Based on the equations given above, the annual electricity use of the system fan is estimated as follows:

kWh_{sf} = 0.746 kW/hp x [2.50 x 10^{-4} x 3,848.4 x (6.76 +1)] hp x 2,160 hr/yr = <u>12,030 kWh/yr</u>

<u>Electricity Use of Bed Drying/Cooling Fan</u>

Per the EPA Air Pollution Control Cost Manual, the electricity use of the bed drying/cooling fan during regeneration of the carbon bed is calculated in the same manner as the system fan. However, while pressure drop for the bed fan would still be ΔP_b, the gas flow and operating times of system fan and bed fan would be different. The annual electricity use of the bed fan can be estimated as follows:

kWh_{cf} = 0.746 kW/hp x (2.50 x 10^{-4} x Q_{cf} x ΔP_s) hp x θ_{cf}

where:

kWh_{cf} = annual electricity use of bed fan (kWh/yr)
Q_{cf} = gas volumetric flow through system when bed fan operates (acfm)
θ_{cf} = operating hours of bed drying/cooling fan (hr/yr)

The total volume of air provided annually (ft^3/yr) by the bed drying/cooling fan during regeneration would be equal to the following:

$V_{cf\text{-}air} = Q_{cf}$ x 60 (min/hr) x θ_{cf}

where:

$V_{cf\text{-}air}$ = total volume of air provided annually by bed fan (ft^3/yr)

Therefore, $V_{cf\text{-}air}$/(60 min/hr) = Q_{cf} x θ_{cf}; and
kWh_{cf} = 0.746 kW/hp x (2.50 x 10^{-4} x ΔP_s) hp/(ft^3-min) x $V_{cf\text{-}air}$/(60 min/hr)

The EPA Air Pollution Control Cost Manual states, "*For typical adsorber operating conditions, the drying/cooling air requirement would be 50 to 150 ft^3/lb carbon, depending on the bed moisture content, required temperature drop, and other factors.*" Taking the midpoint of this range (100 ft^3-air/lb-carbon), as shown in the EPA Air Pollution Control Cost Manual example problem, the total volume of air ($V_{cf\text{-}air}$) provided by the bed drying/cooling fan is calculated as follows:

$V_{cf\text{-}air}$ = 100 ft^3-air/lb-carbon x 225,000 lb-carbon/yr = 22,500,000 ft^3/yr

Therefore, annual electricity use of the bed fan can be estimated as follows:

kWh_{cf} = 0.746 kW/hp x (2.50 x 10^{-4} x 7.76) hp/(ft^3-min) x 22,500,000 ft^3/yr/(60 min/hr)
= <u>543 kWh/yr</u>

Electricity Use of Cooling Water Pump

Per the EPA Air Pollution Control Cost Manual, the cooling pump hp requirement can be calculated using the following equation:
$hp_{cwp} = (2.52 \times 10^{-4}\ q_{cw}\ H\ s)/\eta$

where:

hp_{cwp} = cooling water pump horsepower requirement
q_{cw} = cooling water flow (gal/min)
H = required head (nominally 100 feet of water per EPA Air Pollution Control Cost Manual Air Pollution Control Cost Manual)
s = specific gravity of fluid relative to water at 60°F
η = combined pump-motor efficiency (63% based on per EPA Air Pollution Control Cost Manual Air Pollution Control Cost Manual example problem)

The electricity use of the cooling pump can be estimated as follows:

$kWh_{cwp} = 0.746\ kW/hp \times hp_{cwp} \times \theta_{cwp}$

where:

kWh_{cwp} = annual electricity use of cooling pump (kWh/yr)
θ_{cwp} = cooling pump operating hours (hr/yr)

The total volume of cooling water pumped annually (gal/yr) by the cooling water pump would be equal to the following:

$V_{cw} = q_{cw} \times 60\ (min/hr) \times \theta_{cf}$

where:

V_{cw} = total volume of cooling water pumped annually (gal/yr) (307,256 gal-cooling water/yr, given above)

Therefore, $V_{cw}/(60\ min/hr) = q_{cw} \times \theta_{cwp}$; and
$kWh_{cwp} = 0.746\ kW/hp \times (2.52 \times 10^{-4}\ H\ s/\eta)\ hp/(gal\text{-}min) \times V_{cw}/(60\ min/hr)$

Using the values given above, kWh_{cwp} is estimated as follows:

$0.746\ kW/hp \times [(2.52 \times 10^{-4} \times 100 \times 1)/0.63]\ hp/(gal\text{-}min) \times (307{,}256\ gal/yr/(60\ min/hr)$
= 153 kWh/yr

Total Estimated Amount of Electricity used by Adsorption Carbon System (kWh/yr)
$= kWh_{sf} + kWh_{cf} + kWh_{cwp}$
= 12,030 kWh/yr + 543 kWh/yr + 153 kWh/yr = 12,726 kWh/yr

Estimated Cost of Electricity used by Adsorption Carbon System ($/yr)

As stated above, based on information from the Energy Information Administration (EIA) website[6] the three year average retail price for Industrial users of electricity in California for the years 2013, 2014, and 2015 = $0.1204/kWh.

Electricity Cost = 12,726 kWh/yr x $0.1204/kWh = $1,532/year

Operation and Maintenance Costs

Carbon Adsorption Annual Costs			
Direct Annual Costs (DAC)			
Operating Labor			
Operator	½ hr per shift	$18.50/hr x 0.5 hr/shift x 3 shift/day x 90 days/year	$2,498
Supervisor	15% of operator		$375
Maintenance			
Labor	½ hr per shift	$18.50/hr x 0.5 hr/shift x 3 shift/day x 90 days/year	$2,498
Maintenance Materials	100% of labor		$2,498
Utility			
Steam			$737
Cooling Water			$99
Electricity			$1,532
Total Direct Annual Costs (DAC)			**$10,237**
Indirect Annual Cost (IAC)			
Overhead	60% of Labor Cost	0.6 x ($2,498 + $375 + $2,498 + $2,498)	$4,721
Administrative Charge	2% of TCI[9] (equipment cost + initial carbon cost)		$14,352
Property Taxes	1% of TCI (equipment cost + initial carbon cost)		$7,176
Insurance	1% of TCI (equipment cost + initial carbon cost)		$7,176
Annual Source Test	One test/year @ $15,000		$15,000
Total IAC			**$48,425**
Annual Cost (DAC + IAC)			**$58,662**

Total Annual Cost

Total Annual Cost = (Ductwork + CIP System) + Carbon Adsorption System Cost + Annual Costs
= $171,445/yr + $154,274/yr + $58,662/yr
= $384,381/yr

Emission Reductions

Annual VOC Emission Reductions = PE x 0.86
= 29,760 lb-VOC/year x 0.86
= 25,594 lb-VOC/year
= 12.80 tons-VOC/year

[9] Because the carbon adsorption system included an initial fill of 30,000 lb of activated carbon (15,000 lb for each system), TCI is calculated as follows: $431,137 (equipment TCI) + $330,518 (carbon cost) – ($1.088125_{(\text{taxes \& freight factor})}$ x 30,000 lb-carbon x $1.35/lb-carbon) = $717,586

Cost Effectiveness

Cost Effectiveness = Total Annual Cost ÷ Annual Emission Reductions

Cost Effectiveness = $384,381/year ÷ 12.80 tons-VOC/year
= $30,030/ton-VOC

The analysis demonstrates that the annual costs of the collection system ductwork, CIP system equipment, and carbon adsorption system, result in costs that exceed the District's BACT Cost Effectiveness Threshold for VOC of $17,500/ton-VOC. Therefore this option is not cost-effective and will not be required for the fermentation operations in the 24 108,000 wine tanks proposed under this project.

Option 3 - Collection of VOCs and Control by Absorption/Scrubber (81% collection & control for wine fermentation):

Basis of Cost Information

- On March 16, 2016, the District contacted Maurice McIntosh and Ad Verkuylen of NohBell Corporation to provide NohBell Corporation an opportunity to provide cost information for a scrubber for this project. The District has not received the requested 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/tank group (installed, as proposed in Project C-1133347)
- Electric power cost = $0.1204/kWh (see BACT Analysis section above)
- The costs in addition to the base equipment costs for the wet scrubber will be estimated from the Capital Cost Factors for Gas Absorbers from the EPA Control Cost Manual.

Equipment Cost for Scrubber

As explained above, the maximum total flowrate of CO_2 emitted from each of the 108,000 gallon wine fermentation and storage tanks proposed under this project is calculated to be approximately 160.35 cfm, which results in a maximum total combined CO_2 flowrate of 3,848.4 cfm of CO_2 for all 24 tanks.

The equipment cost for a scrubber (absorption technology) will be based on cost estimates for control of emissions from wine tanks provided to the District by suppliers. On November 13, 2015, Anguil Environmental Systems provided budgetary price estimates for scrubbers for control of wine fermentation tanks for Project N-1152244, which included price estimates of $180,000 for a scrubber designed to handle a maximum CO_2 flow rate of 3,091 scfm and $220,000 for scrubbers designed to handle maximum CO_2 flow rates of 5,152 scfm and 5,337 scfm. On December 11, 2015, D. R Technology provided budgetary price estimates for scrubbers for control of wine fermentation tanks for Project N-1142303, which included a price estimate of $175,000 for a scrubber designed to handle a maximum CO_2 flow rate of 5,868 scfm. For more conservative analysis the lower scrubber cost of $175,000 provided by D. R Technology will be used for this analysis. The estimate provided by D. R Technology also

included the electrical hp rating of the scrubber fan (25 hp_e) and pump (7.5 hp_e). The electrical hp provided by D. R Technology will be used to calculate the electrical usage of the scrubber.

Gas Scrubber/Absorber Capital Costs	
Cost Description	Cost ($)
Gas Scrubber/Absorber System	$175,000
The following cost data is based on the EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002), Section 5, Chapter 1, Table 1.3: Capital Cost Factors for Gas Absorbers	
Direct Costs (DC)	
Base Equipment Costs (Gas Scrubber System) See Above	$175,000
Instrumentation 10% of Base Equipment Costs	$17,500
Sales Tax 3.8125% of Base Equipment Costs	$6,672
Freight 5% of Base Equipment Costs	$8,750
Purchased Equipment Cost (PEC)	**$207,922**
Foundations & Supports 12% of PEC	$24,951
Handling & Erection 40% of PEC	$83,169
Electrical 1% of PEC	$2,079
Piping (piping to convey emissions to scrubber included in the ducting costs given above; costs of additional piping required for the scrubber and delivery of solvent and recovery of solvent & ethanol not estimated)	-
Insulation 1% of PEC	$2,079
Painting 1% of PEC	$2,079
PLC & Programming - 1 unit x $10,000	$10,000
Recovered Ethanol Storage Tank (installed) ($40,000)	$40,000
Direct installation costs	**$164,357**
Total Direct Costs	**$372,279**
Indirect Costs (IC)	
Engineering 10% of PEC	$20,792
Construction and Field Expenses 10% of PEC	$20,792
Contractor fees 10% of PEC	$20,792
Start-up 1% of PEC	$2,079
Initial Source Testing - 1 unit x $15,000/unit	$15,000
Owner's Cost (data not provided)	-
Total Indirect Costs	**$79,455**
Subtotal Capital Investment (SCI) (DC + IC)	**$451,734**
Contingencies - 15% of SCI	$67,760
Total Capital Investment (TCI) (DC + IC)	**$519,494**

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 = $519,494 x 0.163 = $84,678

Wastewater Disposal Costs

The water scrubber will generate ethanol-laden wastewater containing 12.05 tons of ethanol annually (29,760 lb/year (uncontrolled fermentation emissions) x 0.81 = 24,106 lb/yr). Assuming a 10% solution, approximately 36,414 gallons of waste water (24,106 lb-ethanol x 1 gal/6.62 lb ÷ 0.10) will be generated annually. Per project C-1133347, an allowance of $0.08 per gallon is applied for disposal costs.

Annual disposal costs = 36,414 gallons x $0.08/gallon = $2,913

Operation and Maintenance Costs

Gas Scrubber/Absorber Annual Costs			
Direct Annual Costs (DAC)			
Operating Labor			
Operator	½ hr per shift	$18.50/hr x 0.5 hr/shift x 3 shift/day x 90 days/year x 1 unit	$2,498
Supervisor	15% of operator		$375
Operating Materials			
Solvent	Minimal Costs assumed for using water as solvent		-
Chemicals	Not Estimated		-
Wastewater Disposal			
Wastewater Disposal	36,414 gal at 10% Solution	$0.08/gal	$2,913
Maintenance			
Maintenance Labor	½ hr per shift	$18.50/hr x 0.5 hr/shift x 3 shift/day x 90 days/year x 1 unit	$2,498
Maintenance Materials	100% of maintenance labor		$2,498
Electricity			
Fan	25 hp_e	25 hp x 0.746 kW/hp x 24 hr/day x 90 day/yr x $0.1204/kWh = $4,850/yr	$4,850
Pump	7.5 hp_e	7.5 hp x 0.746 kW/hp x 24 hr/day x 90 day/yr x $0.1204/kWh = $1,455/yr	$1,455
Total Direct Annual Costs (DAC)			**$17,087**
Indirect Annual Cost (IAC)			
Overhead	60% of Labor Cost	0.6 x ($2,498 + $375 + $2,498 + $2,498)	$4,721
Administrative Charge	2% of TCI		$10,390
Property Taxes	1% of TCI		$5,195
Insurance	1% of TCI		$5,195
Annual Source Test	One test/year @ $15,000		$15,000
Total IAC			**$40,501**
Annual Cost (DAC + IAC)			**$57,588**

Total Annual Cost

Total Annual Cost = (Ductwork + CIP System) + Gas Scrubber/Absorber System Cost + Annual Costs
= $171,445/yr + $84,678/yr + $57,588/yr
= $313,711/yr

Emission Reductions

Annual VOC Emission Reductions = PE x 0.81
= 29,760 lb-VOC/year x 0.81
= 24,106 lb-VOC/year
= 12.05 tons-VOC/year

Cost Effectiveness

Cost Effectiveness = Total Annual Cost ÷ Annual Emission Reductions

Cost Effectiveness = $313,711/year ÷ 12.05 tons-VOC/year
= $26,034/ton-VOC

The analysis demonstrates that the annual costs of the collection system ductwork, CIP system equipment, and water scrubber/absorption system, result in costs that exceed the District's BACT Cost Effectiveness Threshold for VOC of $17,500/ton-VOC. Therefore this option is not cost-effective and will not be required for the fermentation operations in the 24 108,000 wine tanks proposed under this project.

Option 4 - Capture of VOCs and Condensation (81% collection & control for wine fermentation):

Design Basis

- Although the EcoPAS LLC (EcoPAS) condender (PAS) units have not been demonstrated at the scale of operation as proposed by this project, the District will conservatively assume that the equipment and cost proposed by EcoPAS will meet the duty requirements for the project.
- Additional costs which were conservatively not evaluated in the cost analysis below include, but are not limited to a Glycol chiller 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 and Terravant Winery, both located within the Santa Barbara County. Information from the Santa Barbara Cunty 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 potential value in the recovered ethanol in a future market that may be developed, there is currently no demonstrated value at this time;

therefore, 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 for Refrigerated Condenser(s)

Pricing for the PAS units will be based on project-specific pricing received from EcoPAS on March 28, 2016. The estimate provided by EcoPAS indicated that three PAS-100 refrigerated condenser units would be required to control the emissions from the proposed wine fermentation tanks.

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 requested a detailed breakdown of the cost of each component of each cost category from the vendor but has not received the requested additional information; therefore, the base equipment cost as provided by the vendor will be used in this analysis and the remaining costs associated with the installation of refrigerated condensers will be taken from other sources such as the Eichley Report and the EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001).

Condenser System Capital Cost	
Cost Description	Cost ($)
Cost of Refrigerated Condenser System (3 PAS-100 Units)	$585,000
The following cost data is based on the EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002), Section 3.1 - VOC Recapture Controls, Chapter 2 - Refrigerated Condensers (December 1995), Table 2.3	
Direct Costs (DC)	
Base Equipment Costs (Refrigerated Condenser System) See Above	$585,000
Instrumentation 10% of Base Equipment Costs	$58,500
Sales Tax 3.8125% of Base Equipment Costs	$22,303
Freight 5% of Base Equipment Costs	$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 (conservatively assumed to be included in the ducting costs given above)	-
Insulation 10% of PEC	$69,505
Painting 1% of PEC	$6,951
PLC & Programming - 1 unit x $10,000	$10,000
Direct installation costs	**$294,971**
Total Direct Costs	**$990,024**
Indirect Costs (IC)	
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
Initial Source Testing - 3 units x $15,000/unit	$45,000
Owner's Cost (data not provided)	-
Total Indirect Costs	**$232,664**
Subtotal Capital Investment (SCI) (DC + IC)	**$1,222,688**
Contingencies - 15% of SCI	$183,403
Total Capital Investment (TCI) (DC + IC)	**$1,406,091**

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 = $1,406,091 x 0.163 = $229,193

Operation and Maintenance Costs

Condensation Annual Costs			
Direct Annual Costs (DAC)			
Operating Labor			
Operator	½ hr per shift	$18.50/hr x 0.5 hr/shift x 3 shift/day x 90 days/year x 3 units	$7,493
Supervisor	15% of operator		$1,124
Maintenance			
Labor	½ hr per shift	$18.50/hr x 0.5 hr/shift x 3 shift/day x 90 days/year x 3 units	$7,493
Maintenance Materials	100% of labor		$7,493
Chiller (Glycol)			
Not estimated at this time			-
Utility (Electricity)			
Not estimated at this time			-
Total Direct Annual Costs (DAC)			**$23,603**
Indirect Annual Cost (IAC)			
Overhead	60% of Labor Cost	0.6 x ($7,493 + $1,124 + $7,493 + $7,493)	$14,162
Administrative Charge	2% of TCI		$28,123
Property Taxes	1% of TCI		$14,061
Insurance	1% of TCI		$14,061
Annual Source Test	One representative test/year @ $15,000		$15,000
Total IAC			**$85,407**
Annual Cost (DAC + IAC)			**$109,010**

Total Annual Cost

Total Annual Cost = (Ductwork + CIP System) + Condenser System Cost + Annual Costs
= $171,445/yr + $229,193/yr + $109,010/yr
= $509,648/yr

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 demonstrated.

Annual VOC Emission Reductions = PE x 0.81
= 29,760 lb-VOC/year x 0.81
= 24,106 lb-VOC/year
= 12.05 tons-VOC/year

Cost Effectiveness

Cost Effectiveness = Total Annual Cost ÷ Annual Emission Reductions

Cost Effectiveness = $509,648/year ÷ 12.05 tons-VOC/year
= $42,294/ton-VOC

The analysis demonstrates that the annual costs of the collection system ductwork, CIP system equipment, and refrigerated condenser system, result in costs that exceed the District's BACT Cost Effectiveness Threshold for VOC of $17,500/ton-VOC. Therefore this option is not cost-effective and will not be required for the fermentation operations in the 24 108,000 wine tanks proposed under this project.

Option 5 - Temperature Controlled Open Top Tank with Maximum Average Fermentation Temperature of 95 degrees 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 degrees F. These BACT requirements will be placed on the ATCs as enforceable conditions.

Attachment E1
Achieved in Practice Analysis for Wine Fermentation

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

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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.

Attachment E2
Comparison of Stainless Steel Ducting 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 $/Foot from District Cost Survey	$15.49	$30.85	$27.67	$44.13	$37.50	$33.13	$93.75	$181.70	$216.50	$189.02	$308.40	--	$193.99	--
Average $/Foot from District Cost Survey from Suppliers of Both 3" and 6"	--	$30.85	--	$57.26	--	--	--	--	--	--	--	--	--	--

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	$65.00	--	--	--	--	--	--	--	--
Weldeds Stainless Tube 304/304L (2" OD, 0.12" Wall; 3" OD, 0.12" Wall; 6", 0.12")													
Duct Size Diameter (in.)	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"
Price ($)	$109.86	$321.34	--	$628.16	--	--	--	--	--	--	--	--	--
Length (feet)	8	8	--	8	--	--	--	--	--	--	--	--	--
Price/Foot ($)	$13.73	$40.17	--	$78.52	--	--	--	--	--	--	--	--	--

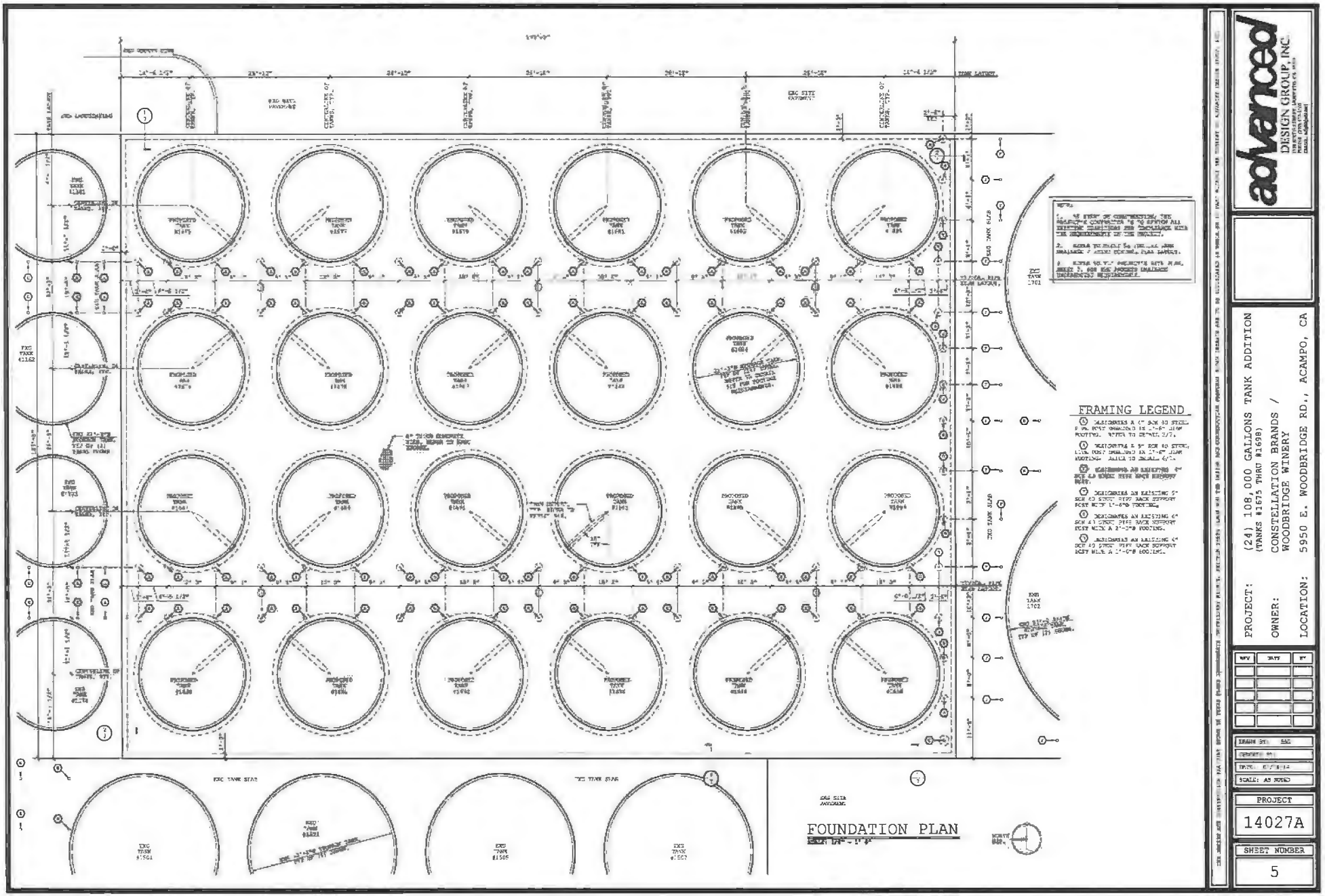
Supplier: Lone Star Supply Co **Location: Dickinson, TX**

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	--	--	--	--	--	--	--	--	--

Attachment E3
Ducting Layout Diagram and Ducting Cost Estimate



advanced DESIGN GROUP, INC.

PROJECT: (24) 108,000 GALLONS TANK ADDITION (TANKS #1675 THRU #1698)

OWNER: CONSTELLATION BRANDS / WOODBRIDGE WINERY

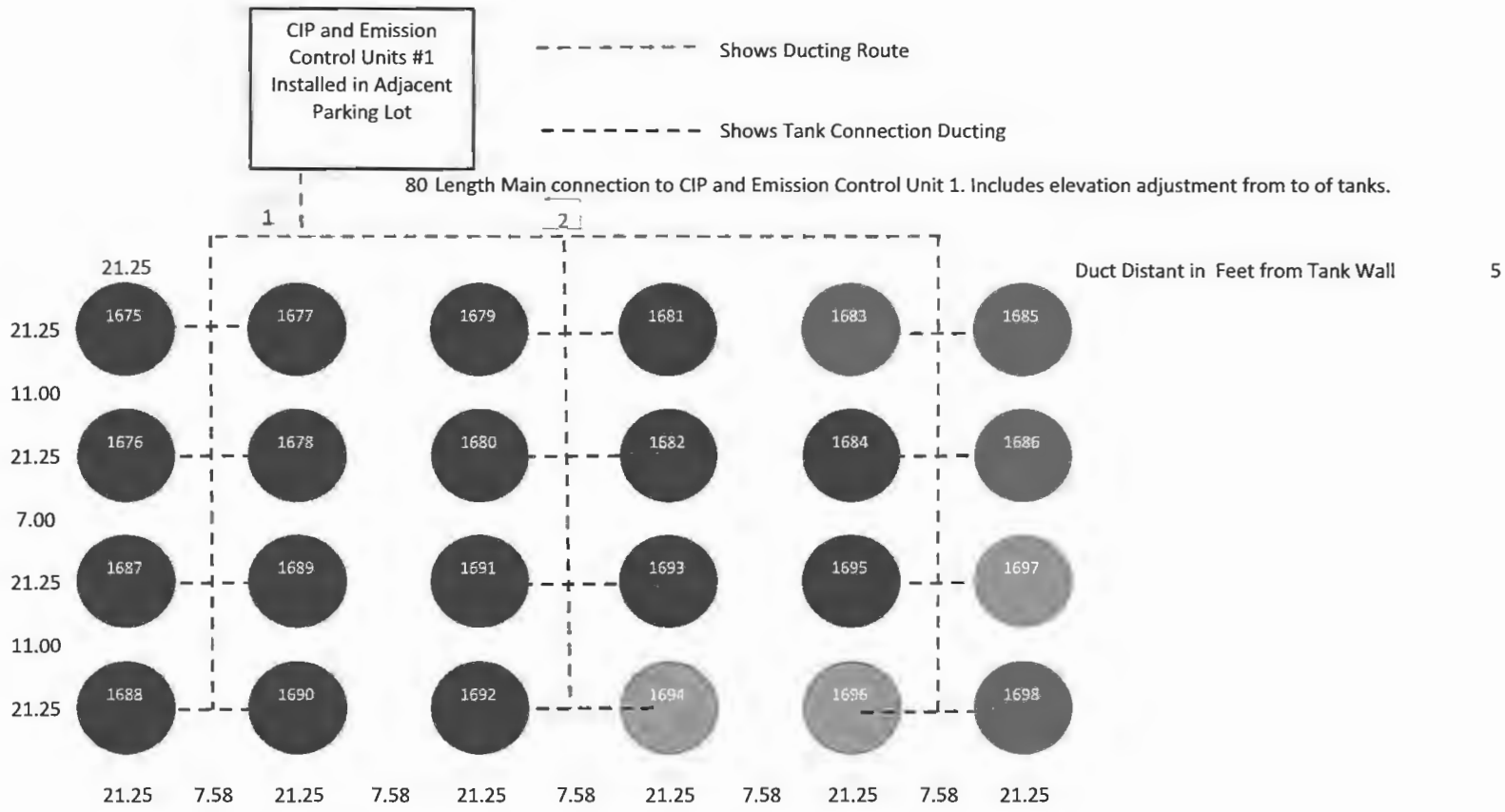
LOCATION: 5950 E. WOODBRIDGE RD., ACAMPO, CA

SCALE: AS NOTED

PROJECT 14027A

SHEET NUMBER 5

NOTE; THIS DRAWING IS PRELIMINARY, NOT FOR CONSTRUCTION.


CIP and Emission Control Units #1 Installed in Adjacent Parking Lot
Shows Ducting Route
Shows Tank Connection Ducting
80 Length Main connection to CIP and Emission Control Unit 1. Includes elevation adjustment from to of tanks.
1
2
Duct Distant in Feet from Tank Wall 5
21.25
11.00
7.00
1675
1677
1679
1681
1683
1685
1676
1678
1680
1682
1684
1686
1687
1689
1691
1693
1695
1697
1688
1690
1692
1694
1696
1698
21.25
7.58

Comments	Beginning Tank Number	Ending Tank Number	Length Between Nodes	From Tank to Main Duct Length Feet	Design Duct Velocity from Eichleay Feet/Second	Fermentation CFM at maximum CO2 rate from kinetic model	Duct size from tank to main diameter inches	Nominal Duct Size diameter in inches (See comments)	Number of Tanks feeding Ending Node	Total feet	Cost Per Foot from Eichleay (See Comments)	Cost	Comments
Tank connection to main duct 24 tanks	N/A	N/A	N/A	345 996	40	160	3.50	4.00		346	$41.45	$14,340.55	
Main Duction	1696/1698	1695/1697	32.25	N/A	40	321	4.95	6.00	2	32	$62.17	$2,005.01	
	1695/1697	1684/1686	28.25	N/A	40	641	7.00	8 00	4	28	$103.25	$2,916.87	
	1684/1686	1683/1685	32.25	N/A	40	962	8.57	10.00	6	32	$144.33	$4,654.75	
Red fermentation controls duct size so they will be adequate for white and storage gas flow rates	1683/1685	Juction 2	73.29	N/A	40	1,283	9.90	10 00	8	73	$144.33	$10,578.33	
	1692/1694	1691/1693	32.25	N/A	40	321	4.95	6.00	2	32	$62.17	$2,005.01	
	1691/1693	1680/1682	28.25	N/A	40	641	7.00	8.00	4	28	$103.25	$2,916 87	
	1680/1682	1679/1681	32.25	N/A	40	962	8.57	10.00	6	32	$144.33	$4,654.75	
	1679/1681	Juction 2	15.63	N/A	40	1,283	9.90	10.00	8	16	$144.33	$2,255.21	
	Junction 2	Junction 1	43.25	N/A	40	2,566	14.00	14.00	16	43	$174.17	$7,532.93	
	1688/1690	1687/1689	32.25	N/A	40	321	4.95	6.00	2	32	$62.17	$2,005.01	
	1687/1689	1676/1678	28.25	N/A	40	641	7.00	8.00	4	28	$103.25	$2,916.87	
	1676/1678	1675/1677	32.25	N/A	40	962	8.57	10.00	6	32	$144.33	$4,654.75	
	1675/1677	Juction 1	40.67	N/A	40	1,283	9.90	10.00	8	41	$144.33	$5,869.53	
	Junction 1	Emission Controls	80 00	N/A	40	3,848	17.15	18.00	24	80	$251.38	$20,110.22	
											Sum	$89,417	
											Redundant Main Duct for CIP on Fermenters Only	$0	
											1 Knock drums (7000 gallons) for foam overs on fermenters	$40,000	Eichleay
											Ducting Isolation Components for all tanks without redundant main (X2)	$63,000	Previous Work
											The main ducting pipe ways structural support allowance	$120,000	Allowance
											Grand Sum Total	**$312,417**	

APPENDIX F
BACT Guideline 5.4.14 and
BACT Guideline 5.4.13 and Top-Down BACT Analysis for Wine Storage

SJVAPCD 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 contained in 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 and wood (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 required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

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

BACT Guideline 5.4.13

Top-Down BACT Analysis for VOCs from Wine Storage Operations

Step 1 - Identify All Possible Control Technologies

The SJVUAPCD BACT Clearinghouse guideline 5.4.13 identifies the following Achieved in Practice and Technologically Feasible BACT options for wine storage tanks:

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. (Achieved in Practice)
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)

***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 to diurnal temperature variations. Tanks made entirely of non-conducting materials such as concrete and wood (except for fittings) are considered self-insulating.*

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 & 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

- 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 Logic Controller (PLC) cost. In District Project C-1133347, a PLC cost of $10,000 per control system was provided to the District. This cost will be used to estimate PLC costs for the currently proposed project.
- It is expected that if control systems were required to be installed on a wine fermentation *and* storage tank, that a winery would install a system capable of controlling the worst case (highest) emissions which are fermentation emissions. Therefore the ductwork, clean-in-place systems and all control systems would need to be adequately sized to control the fermentation emissions. As such, the size, cost and number of control devices necessary to control storage emissions will be the same as was determined in the fermentation top down BACT analysis in Appendix E.
- As stated above, all the cost from the fermentation analysis in Appendix E apply to this top down BACT analysis except for the annual labor, utility and maintenance costs. Fermentation is expected to only operate for 90 days out of the year whereas storage operations can occur all year round; therefore, the annual labor and maintenance will be recalculated in this Appendix accordingly.
- In determining the labor costs for the cost analyses, two shifts are assumed to be appropriate for a control system serving wine storage tanks.

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) and a clean-in-place (CIP) system to maintain sanitation and quality of the product.

As calculated in Appendix E, the total capital costs and annualized capital investment for the ducting and collection system are as follows.

Total capital costs = Ductwork + CIP System
= $627,314 + $424,496
= $1,051,810

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%

Annualized Capital Investment for ducting and CIP = $1,051,810 x 0.163 = $171,445/yr

Option 1 – Collection of VOCs and control by thermal or catalytic oxidation (98% collection & control for wine storage)

Annualized Capital Cost

As calculated in Appendix E, with a total capital investment (TCI) of $517,170, the annualized capital cost for the regenerative thermal oxidizer system = $84,299.

Operation and Maintenance Costs

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

Gas Flow Rate for Storage Operations

The facility indicates that the maximum average pumping and wine throughput flow rate for the wine tanks is 20,000 gallons per hour.

Based on the maximum average wine pumping and throughput flow rate of 20,000 gallons per hour, the time to fill each tank with108,000 gallons is calculated as follows:

108,000 gal ÷ 20,000 gal/hour = 5.4 hour x 60 min/hour = 324 min

Using the time to fill each tank with 108,000 gallons as calculated above, the exhaust flowrate (air from tank + ethanol + water vapor) when filling for storage was calculated to be 46.72 cfm for each tank and a total of 1,121 scfm for all of the proposed tanks (see Attachment F-1).

Maximum daily flow rate and auxiliary air sent to oxidizer from the 24 fermentation tanks:
(1,121 ft^3/min) x 60 min/hr x 24 hr/day = 1,614,240 ft^3/day

VOC Emissions from Storage Operations:

Maximum annual VOC emissions from the wine storage operations in the 24 tanks: 14,952 lb/yr (See Section VII.C.2 of this Evaluation). Therefore, the total average of the total daily VOC emissions from storage in the proposed 24 tanks is calculated as follows:

14,952 lb-VOC/yr ÷ 365 days/yr = 41.0 lb-VOC/day

Heat of Combustion for waste gas stream ($-\Delta h_c$):

Heat of combustion ($-\Delta h_c$) for Ethanol = 11,800 Btu/lb (provided by RTO supplier, Adwest Technologies, for RTOs for District Project N-1153192) [3]
Total Daily VOC emissions from tanks = 41.0 lb-VOC/day
Storage Exhaust flow rate = 1,614,240 ft^3/day

$$(-\Delta h_c) = 41.0 \text{ lb-VOC/day} \times 11{,}800 \text{ Btu/lb} \div 1{,}614{,}240 \text{ ft}^3\text{/day}$$
$$= 0.300 \text{ Btu/ft}^3$$

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:

$$(-\Delta h_{cwi}) = 0.300 \text{ Btu/ft}^3 \div 0.0739 \text{ lb/ft}^3$$
$$= 4.06 \text{ Btu/lb}$$

Auxiliary Fuel Requirement

The auxiliary fuel requirement for the regenerative thermal oxidizer (RTO) will be estimated using the procedures from the EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002), Section 3.2: VOC Destruction Controls, Chapter 2 Incinerators (September 2000)[10], Appendix B: Design Procedure for Non-Recuperative Thermal Incinerators.

Pursuant to Appendix B: Design Procedure for Non-Recuperative Thermal Incinerators, the auxiliary fuel requirement for the RTO can be estimated using the following equation:

$$\rho_{af}Q_{af} = \rho_{wi}Q_{wi}\{C_{pm}[\eta\,(T_{fi} - T_{ref}) + (T_{fo} - T_{wi})] - (-\Delta h_{cwi})\} \div \{(-\Delta h_{caf}) - C_{pm}[\eta\,(T_{fi} - T_{ref}) + (T_{fo} - T_{ref})]\}$$

Where: ρ_{af} = density of the auxiliary fuel = 0.0408 lb/ft^3 for methane at 77°F, 1 atm
Q_{af} = volumetric flow rate of auxiliary fuel (scfm)
ρ_{wi} = waste gas inlet density (per EPA Air Pollution Control Cost Manual assumed to be approximately equal to air = 0.0739 lb/scf at 77°F, 1 atm)
Q_{wi} = volumetric flow rate of inlet waste gas (scfm) = 1,121 scfm (given above)
C_{pm} = mean heat capacity of air (per EPA Air Pollution Control Cost Manual assumed to be approximately to air = 0.255 Btu/lb-°F)
η = energy loss from combustion chamber (fractional) (per information included in the EPA Air Pollution Control Cost Manual, the heat loss fraction for RTOs ranged from 0.002 to 0.015 (0.2 to 1.5%); η will be set at 0.01 (1%) for purposes of this analysis)
T_{fi} = combustion temperature of the RTO = 1,600°F (The EPA Air Pollution Control Cost Manual indicates that commercial incinerators should generally be run at 1,600°F to ensure 98% destruction of non-halogenated organics)

[10] EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002), Section 3.2: VOC Destruction Controls, Chapter 2: Incinerators (September 2000). United States Environmental Protection Agency Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina 27711. EPA/452/B-02-001. https://www3.epa.gov/ttncatc1/dir1/cs3-2ch2.pdf

T_{ref} = reference temperature = 77°F, assuming ambient conditions
T_{fo} = outlet exhaust gas temperature = 153°F (the EPA Air Pollution Control Cost Manual indicates 95% heat recovery for regenerable thermal oxidizers; therefore $T_{fo} = T_{fi} - 0.95(T_{fi} - T_{wi})$)
T_{wi} = waste gas inlet temperature = 77°F, assuming ambient conditions
$(-\Delta h_{cwi})$ = heat of combustion of the inlet waste gas = 4.06 Btu/lb (calculated above assuming a waste gas inlet density approximately equal to air = 0.0739 lb/scf at 77°F, 1 atm)
$(-\Delta h_{caf})$ = heat of combustion of the auxiliary fuel = 21,502 Btu/lb for methane

Therefore, the auxiliary fuel requirement for the RTO is estimated as follows:

$$Q_{af} = (\rho_{wi} Q_{wi}\{C_{pm}[\eta(T_{fi} - T_{ref}) + (T_{fo} - T_{wi})] - (-\Delta h_{cwi})\} \div \{(-\Delta h_{caf}) - C_{pm}[\eta(T_{fi} - T_{ref}) + (T_{fo} - T_{ref})]\}) \div \rho_{af}$$

$\rho_{af} Q_{af}$ = 0.0739 lb/scf x 1,121 scf/min x {0.255 Btu/lb-°F x [0.01 x (1,600°F - 77°F) + (153°F - 77°F)] - (4.06 Btu/lb)} ÷ {(21,502 Btu/lb) - 0.255 Btu/lb-°F x [0.01 x (1,600°F - 77°F) + (153°F - 77°F)]} = 0.074067 lb/min

Q_{af} = 0.074067 lb/min ÷ 0.0408 lb/scf = 1.8 scfm

As shown above, 2.1 scfm of natural gas auxiliary fuel is required to sustain combustion of the waste gas. In addition, the EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002), Section 3.2: VOC Destruction Controls, Chapter 2: Incinerators (September 2000) indicates that approximately 5% of the total energy input should be provided by the auxiliary fuel to stabilize the burner flame. The minimum amount of natural gas fuel required to stabilize the burner flame is calculated below.

Sensible Heat Out

= 0.0739 lb/scf x (1,121 scf/min + 1.8 scf/min) x 0.255 Btu/lb-°F x (1,600°F - 77°F)
= 32,225 Btu/min

Minimum Auxiliary Natural Gas Fuel Requirement

32,225 Btu/min x 0.05 = 1,611 Btu/min ÷ 21,502 Btu/lb-methane = 0.0749 lb-methane/min
0.0749 lb-methane/min ÷ 0.0408 lb-methane/scf = 1.8 scf/min √

As calculated above, approximately 1.8 scfm of auxiliary natural gas fuel is required to stabilize the burner flame.

Fuel Costs

The cost for natural gas shall be based upon the average price of natural gas sold to "Industrial Consumers" in California for the years 2013, 2014, and 2015.[11]

2015 = \$6.35 per thousand ft^3
2014 = \$7.65 per thousand ft^3
2013 = \$6.57 per thousand ft^3
Average for three years = \$6.86 per thousand ft^3

Fuel Cost = 1.8 ft^3/min x 60 min/hr x 8 hr/shift x 2 shift/day x 365 day/year x \$6.86/1,000 ft^3
= \$4,327/year

Electricity Requirement

Per the EPA Air Pollution Control Cost Manual, the electricity costs are primarily associated with the fan needed to move the gas through the incinerator, which can be estimated as follows:

$$\text{Power}_{fan} = \frac{1.17 \times 10^{-4} \, Q_{wi} \, \Delta P}{\varepsilon}$$

Where
ΔP = Pressure drop across system = 4 in. H_2O (per information from the EPA Air Pollution Control Cost Manual)
ε = Efficiency for fan and motor = 0.6 (per information from the EPA Air Pollution Control Cost Manual)
Q_{wi} = 1,121 scfm (given above)

$$\text{Power}_{fan} = \frac{1.17 \times 10^{-4} \times 1{,}121 \text{ cfm} \times 4 \text{ in. } H_2O}{0.60}$$
= 0.87 kW

Estimated Electricity Costs for the RTO
The Energy Information Administration (EIA) website gives the following average retail prices for Industrial users of electricity in California for the years 2013, 2014, and 2015[12]:
2015 = \$0.1233/kWh
2014 = \$0.1234/kWh
2013 = \$0.1144/kWh
Three year average = \$0.1204/kWh

Electricity Cost = 0.87 kW x 8 hr/shift x 2 shift/day x 365 day/year x \$0.1204/kWh = \$612/year

Annual Costs (Based on: EPA Air Pollution Control Cost Manual, Sixth Edition (January 2002), Section 3.2: VOC Destruction Controls, Chapter 2: Incinerators (September 2000), Table 2.10 -

[11] Energy Information Administration/Natural Gas; Average Price of Natural Gas Sold to Industrial Consumers by State, 2013 – 2015. http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_SCA_a.htm
[12] Energy Information Administration/Electric Power; Average Retail Price of Electricity to Ultimate Customers by End-Use Sector, by State, 2013- 2015. http://www.eia.gov/electricity/data.cfm#sales

Annual Costs for Thermal and Catalytic Incinerators Example Problem. United States Environmental Protection Agency Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina 27711. EPA/452/B-02-001)[4]

Thermal Oxidizer Annual Costs			
Direct Annual Costs (DAC)			
Operating Labor			
Operator	½ hr per shift	$18.50/hr x 0.5 hr/shift x 2 shift/day x 365 days/year x 1 unit	$6,753
Supervisor	15% of operator		$1,013
Maintenance			
Labor	½ hr per shift	$18.50/hr x 0.5 hr/shift x 2 shift/day x 365 days/year x 1 unit	$6,753
Maintenance Materials	100% of labor		$6,753
Utility			
Natural Gas			$4,327
Electricity			$612
Total Direct Annual Costs (DAC)			**$26,211**
Indirect Annual Cost (IAC)			
Overhead	60% of Labor Cost	0.6 x ($6,753 + $1,013 + $6,753 + $6,753)	$12,763
Administrative Charge	2% of TCI		$10,343
Property Taxes	1% of TCI		$5,172
Insurance	1% of TCI		$5,172
Annual Source Test	One test/year @ $15,000		$15,000
Total IAC			**$48,450**
Annual Cost (DAC + IAC)			**$74,661**

Total Annual Cost

Total Annual Cost = (Ductwork + CIP System) + Regenerative Thermal Oxidizer System + Annual Costs
= $171,445/yr + $84,299/yr + $74,661/yr
= $330,405/yr

Emission Reductions

Annual VOC Emission Reductions = PE x 0.98
= 14,952 lb-VOC/year x 0.98
= 14,300 lb-VOC/year
= 7.15 tons-VOC/year

Cost Effectiveness

Cost Effectiveness = Total Annual Cost ÷ Annual Emission Reductions

Cost Effectiveness = $330,405/year ÷ 7.15 tons-VOC/year
= $46,210/ton-VOC

The analysis demonstrates that the annualized purchase cost of the collection system ductwork, CIP system equipment, and regenerative thermal oxidizer system and the annual costs of a regenerative thermal oxidizer system result in costs that exceed the District's BACT Cost Effectiveness Threshold for VOC of $17,500/ton-VOC. Therefore this option is not cost-effective and will not be required for the storage operations in the 24 108,000 wine tanks proposed under this project.

Option 2 – Collection of VOCs and control by carbon adsorption (95% collection and control for wine storage)

Annualized Capital Cost

As calculated in Appendix B, with a total capital investment (TCI) of $717,586 (for the system and initial carbon required)[9], the annualized capital cost for the carbon adsorption system = $154,274.

For more conservative calculations, it will be assumed that after the initial purchase of the required activated carbon, the activated carbon will be regenerated several times rather than purchased each year.

Fermentation Vapor Exhaust Flow Rate

Based on the facility's maximum average pumping and wine throughput rate of 20,000 gallons per hour, the exhaust flowrate (air from tank + ethanol + water vapor) when filling for storage was calculated to be 46.72 cfm for each tank and a total of 1,121 scfm for all of the proposed tanks (see Attachment F-1).

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)[7].

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.

Annual VOC Reductions

Annual VOC Emission Reductions = PE x 0.95
= 14,952 lb-VOC/year x 0.95
= 14,204 lb-VOC/year
= 7.10 tons-VOC/year

Annual Steam Costs

Per EPA Air Pollution Control Cost Manual, the steam requirement ranges from approximately 3 to 4 lbs of steam/lb of adsorbed VOC and can be calculated as follows:

$C_S = 3.50 \times 10^{-3} m_{voc} \theta_s p_S$

where:

C_S = cost of steam ($/yr)
m_{voc} = VOC inlet loading (lbs/hr)
θ_s = system operating hours (hr/yr)
p_S = steam price ($/thousand lbs)

Per the EPA Air Pollution Control Cost Manual, cost of steam can be estimated as 120% of the fuel cost ($/MMBtu).

The cost for natural gas shall be based upon the average price of natural gas sold to "Industrial Consumers" in California for the years 2013, 2014, and 2015.[5]

2015 = $6.35 per thousand ft^3
2014 = $7.65 per thousand ft^3
2013 = $6.57 per thousand ft^3
Average for three years = $6.86 per thousand ft^3

Therefore the cost of steam can be estimated as follows:

C_S = 3.50 lb-steam/lb-VOC x 14,204 lb-VOC/yr x ($6.86 x 1.20)/(1,000 lb-steam) = $409/yr

The total quantity of steam (Q_S) required is calculated as follows

Q_S = 3.50 lb-steam/lb-VOC x 14,204 lb-VOC/yr = 49,714 lb-steam/yr

Annual Cooling Water Costs

$C_{cw} = 3.43 \times C_S/p_S \times p_{cw} = 3.43 \times Q_S \times p_{cw}$

where:

C_{cw} = cooling water cost ($/yr)
p_{cw} = cooling water price ($/thousand gal) = $0.322 (Per EPA Air Pollution Control Cost Manual, if the cooling water price is unavailable, use $0.15 to $0.30/1,000 gallons cooling water in 1999 dollars; average of $0.225 adjusted to 2016 dollars based on US Department of Labor CPI Inflation calculator = $0.322)

Therefore, the cooling water cost can be estimated as follows:

C_{cw} = 3.43 gal-cooling water/lb-steam x 49,714 lb-steam/yr x $0.322/(1,000 gallons cooling water) = $55/yr

The total volume of cooling water (V_{cw}) required annually is calculated as follows

V_{cw} = 3.43 gal-cooling water/lb-steam x 49,714 lb-steam/yr = 170,519 gal-cooling water/yr

Electricity Costs

Electricity Use of System Fan

Per the EPA Air Pollution Control Cost Manual, the electricity use of the system fan can be calculated using the following equations:

$\Delta P_b/t_b = 0\ 03679\ v_b + 1.107 \times 10^{-4}\ v_b^2$

where:

$\Delta P_b/t_b$ = pressure drop through bed (inches of water/foot of carbon)
v_b = superficial bed velocity (ft/min)

$hp_{sf} = 2.50 \times 10^{-4}\ Q\ \Delta P_s$

where:

hp_{sf} = electric hp of system fan
Q = gas volumetric flow through system (acfm) (total of 1,121 cfm for all 24 tanks, given above)
ΔP_s = total system pressure drop = (ΔP_b + 1)

$kWh_{sf} = 0.746\ kW/hp \times hp_{sf} \times \theta_s$

where:

kWh_{sf} = Annual electricity use of system fan (kWh/yr)
θ_s = system operating hours (hr/yr)

The EPA document Carbon Adsorption for Control of VOC Emissions: Theory and Full Scale System Performance (June 1988)[13] states, "*Generally carbon adsorber bed depth range from 1.5 to 3.0 feet. A bed depth of at least 1.5 feet is used to insure that the bed is substantially deeper than the MTZ ...*"

Therefore, the carbon bed depth will conservatively be assumed to be 2 ft. The example problem in the EPA Air Pollution Control Cost Manual used a superficial bed velocity (v_b) of 75 ft/min. Using these values, the pressure drop through the carbon bed is estimated as follows:

$\Delta P_b = [0\ 03679\ (75) + 1.107 \times 10^{-4}\ (75)^2] \times 2 = 6.76$ in. water

[13] EPA Carbon Adsorption for Control of VOC Emissions: Theory and Full Scale System Performance (June 1988), Section. United States Environmental Protection Agency Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina 27711. EPA-450/3-88-012.

It will be assumed that the storage tanks will operate for 2 shifts per day for 365 days per year. Therefore, the annual time of operation of the system fan will be based on 5,840 hours (8 hr/shift x 2 shift/day x 365 day/year)

Based on the equations given above, the annual electricity use of the system fan is estimated as follows:

kWh_{sf} = 0.746 kW/hp x [2.50 x 10^{-4} x 1,121 x (6.76 +1)] hp x 5,840 hr/yr = 9,475 kWh/yr

Electricity Use of Bed Drying/Cooling Fan

Per the EPA Air Pollution Control Cost Manual, the electricity use of the bed drying/cooling fan during regeneration of the carbon bed is calculated in the same manner as the system fan. However, while pressure drop for the bed fan would still be ΔP_b, the gas flow and operating times of system fan and bed fan would be different. The annual electricity use of the bed fan can be estimated as follows:

kWh_{cf} = 0.746 kW/hp x (2.50 x 10^{-4} x Q_{cf} x ΔP_s) hp x θ_{cf}

where:

kWh_{cf} = annual electricity use of bed fan (kWh/yr)
Q_{cf} = gas volumetric flow through system when bed fan operates (acfm)
θ_{cf} = operating hours of bed drying/cooling fan (hr/yr)

The total volume of air provided annually (ft^3/yr) by the bed drying/cooling fan during regeneration would be equal to the following:

$V_{cf\text{-}air} = Q_{cf}$ x 60 (min/hr) x θ_{cf}

where:

$V_{cf\text{-}air}$ = total volume of air provided annually by bed fan (ft^3/yr)

Therefore, $V_{cf\text{-}air}$/(60 min/hr) = Q_{cf} x θ_{cf}; and
kWh_{cf} = 0.746 kW/hp x (2.50 x 10^{-4} x ΔP_s) hp/(ft^3-min) x $V_{cf\text{-}air}$/(60 min/hr)

The EPA Air Pollution Control Cost Manual states, "*For typical adsorber operating conditions, the drying/cooling air requirement would be 50 to 150 ft^3/lb carbon, depending on the bed moisture content, required temperature drop, and other factors.*" The midpoint of this range (100 ft^3-air/lb-carbon) can be used to calculate the total volume of air required, as shown in the EPA Air Pollution Control Cost Manual example problem. The total amount of carbon required by the storage operations will be estimated based on the ratio of VOCs controlled by the storage operations in comparison to the fermentation operations. Therefore, the total volume of air ($V_{cf\text{-}air}$) provided by the bed drying/cooling fan is calculated as follows:

$V_{cf\text{-}air}$ = 100 ft^3-air/lb-carbon x 225,000 lb-carbon/yr = 22,500,000 ft^3/yr x (14,952 lb-VOC/year x 0.95)/(29,760 lb-VOC/year x 0.86) = 12,487,458 ft^3/yr

Therefore, annual electricity use of the bed fan can be estimated as follows:

kWh_{cf} = 0.746 kW/hp x (2.50 x 10^{-4} x 7.76) hp/(ft^3-min) x 12,487,458 ft^3/yr/(60 min/hr)
= 301 kWh/yr

Electricity Use of Cooling Water Pump

Per the EPA Air Pollution Control Cost Manual, the cooling pump hp requirement can be calculated using the following equation:
$hp_{cwp} = (2.52 \times 10^{-4}\ q_{cw}\ H\ s)/\eta$

where:

- hp_{cwp} = cooling water pump horsepower requirement
- q_{cw} = cooling water flow (gal/min)
- H = required head (nominally 100 feet of water per EPA Air Pollution Control Cost Manual Air Pollution Control Cost Manual)
- s = specific gravity of fluid relative to water at 60°F
- η = combined pump-motor efficiency (63% based on per EPA Air Pollution Control Cost Manual Air Pollution Control Cost Manual example problem)

The electricity use of the cooling pump can be estimated as follows:

$kWh_{cwp} = 0.746\ kW/hp \times hp_{cwp} \times \theta_{cwp}$

where:

- kWh_{cwp} = annual electricity use of cooling pump (kWh/yr)
- θ_{cwp} = cooling pump operating hours (hr/yr)

The total volume of cooling water pumped annually (gal/yr) by the cooling water pump would be equal to the following:

$V_{cw} = q_{cw} \times 60\ (min/hr) \times \theta_{cf}$

where:

- V_{cw} = total volume of cooling water pumped annually (gal/yr) (170,519 gal-cooling water/yr, given above)

Therefore, $V_{cw}/(60\ min/hr) = q_{cw} \times \theta_{cwp}$; and
$kWh_{cwp} = 0.746\ kW/hp \times (2.52 \times 10^{-4}\ H\ s/\eta)\ hp/(gal\text{-}min) \times V_{cw}/(60\ min/hr)$

Using the values given above, kWh_{cwp} is estimated as follows:
0.746 kW/hp x [(2.52 x 10^{-4} x 100 x 1)/0.63] hp/(gal-min) x (170,519 gal/yr/(60 min/hr)
= 85 kWh/yr

Total Estimated Amount of Electricity used by Adsorption Carbon System (kWh/yr)
= kWh_{sf} + kWh_{cf} + kWh_{cwp}
= 9,475 kWh/yr + 301 kWh/yr + 85 kWh/yr = 9,861 kWh/yr

Cost of Electricity used by Adsorption Carbon System ($/yr)

As stated above, based on information from the Energy Information Administration (EIA) website[6] the three year average retail price for Industrial users of electricity in California for the years 2013, 2014, and 2015 = $0.1204/kWh.

Electricity Cost = 9,861 kWh/yr x $0.1204/kWh = $1,187/year

Operation and Maintenance Costs

Carbon Adsorption Annual Costs			
Direct Annual Costs (DAC)			
Operating Labor			
Operator	½ hr per shift	$18.50/hr x 0.5 hr/shift x 2 shift/day x 365 days/year	$6,753
Supervisor	15% of operator		$1,013
Maintenance			
Labor	½ hr per shift	$18.50/hr x 0.5 hr/shift x 2 shift/day x 365 days/year	$6,753
Maintenance Materials	100% of labor		$6,753
Utility			
Steam			$409
Cooling Water			$55
Electricity			$1,187
Total Direct Annual Costs (DAC)			**$22,923**
Indirect Annual Cost (IAC)			
Overhead	60% of Labor Cost	0.6 x ($6,753 + $1,013 + $6,753 + $6,753)	$12,763
Administrative Charge	2% of TCI[9] (equipment cost + initial carbon cost)		$14,352
Property Taxes	1% of TCI (equipment cost + initial carbon cost)		$7,176
Insurance	1% of TCI (equipment cost + initial carbon cost)		$7,176
Annual Source Test	One test/year @ $15,000		$15,000
Total IAC			**$56,467**
Annual Cost (DAC + IAC)			**$79,390**

Total Annual Cost

Total Annual Cost = (Ductwork + CIP System) + Carbon Adsorption System Cost + Annual Costs
= $171,445/yr + $154,274/yr + $79,390/yr
= $405,109/yr

Emission Reductions

Annual VOC Emission Reductions = PE x 0.95
= 14,952 lb-VOC/year x 0.95
= 14,204 lb-VOC/year
= 7.10 tons-VOC/year

Cost Effectiveness

Cost Effectiveness = Total Annual Cost ÷ Annual Emission Reductions

Cost Effectiveness = $405,109/year ÷ 7.10 tons-VOC/year
= $57,058/ton-VOC

The analysis demonstrates that the annual costs of the collection system ductwork, CIP system equipment, and carbon adsorption system, result in costs that exceed the District's BACT Cost Effectiveness Threshold for VOC of $17,500/ton-VOC. Therefore this option is not cost-effective and will not be required for the storage operations in the 24 108,000 wine tanks proposed under this project.

Option 3 - Collection of VOCs and Control by Absorption/Scrubber (90% collection & control for wine storage)

Basis of Cost Information

As explained in the BACT analysis for wine fermentation operations in Appendix E, on March 16, 2016, the District contacted Maurice McIntosh and Ad Verkuylen of NohBell Corporation to provide NohBell Corporation an opportunity to provide cost information for a scrubber for this project. However, the District has not received the requested cost information from NohBell Corporation. Therefore, cost estimates from NohBell Corporation will not be included as a part of this BACT analysis.

In addition, during a March 16, 2016 conference call with Maurice McIntosh and Ad Verkuylen of NohBell Corporation, the District specifically asked if NohBell Corporation was interested in providing cost information for scrubbers to control emissions from wine storage or just wanted to focus on scrubbers to control emissions from wine fermentation. The representatives of NohBell Corporation did not indicate any interest in providing cost information for scrubbers to control emissions from wine storage and said that because of the significantly lower emissions from wine storage, it was unlikely that the scrubbers to control emissions from wine storage would be cost-effective.

Annualized Capital Cost

As calculated in Appendix E, with a total capital investment (TCI) of $519,494, the annualized capital cost for the scrubber system = $84,678.

Wastewater Disposal Costs

The water scrubber will generate ethanol-laden wastewater containing 6.73 tons of ethanol annually (14,952 lb/year (uncontrolled wine storage emissions) x 0.90 = 13,457 lb/yr). Assuming a 10% solution, approximately 20,328 gallons of waste water (13,457 lb-ethanol x 1 gal/6.62 lb ÷ 0.10) will be generated annually. Per project C-1133347, an allowance of $0.08 per gallon is applied for disposal costs.

Annual disposal costs = 20,328 gallons x $0.08/gallon = $1,626

Operation and Maintenance Costs

Gas Scrubber/Absorber Annual Costs			
Direct Annual Costs (DAC)			
Operating Labor			
Operator	½ hr per shift	$18.50/hr x 0.5 hr/shift x 2 shift/day x 365 days/year x 1 unit	$6,753
Supervisor	15% of operator		$1,013
Operating Materials			
Solvent	Minimal Costs assumed for using water as solvent		-
Chemicals	Not Estimated		-
Wastewater Disposal			
Wastewater Disposal	20,328 gal at 10% Solution	$0.08/gal	$1,626
Maintenance			
Maintenance Labor	½ hr per shift	$18.50/hr x 0.5 hr/shift x 2 shift/day x 365 days/year x 1 unit	$6,753
Maintenance Materials	100% of maintenance labor		$6,753
Electricity			
Fan	25 hp_e	25 hp x 0.746 kW/hp 8 hr/shift x 2 shift/day x 365 days/year x $0.1204/kWh = $13,113/yr	$13,113
Pump	7.5 hp_e	7.5 hp x 0.746 kW/hp x 8 hr/shift x 2 shift/day x 365 days/year x $0.1204/kWh = $1,455/yr	$3,934
Total Direct Annual Costs (DAC)			**$39,945**
Indirect Annual Cost (IAC)			
Overhead	60% of Labor Cost	00.6 x ($6,753 + $1,013 + $6,753 + $6,753)	$12,763
Administrative Charge	2% of TCI		$10,390
Property Taxes	1% of TCI		$5,195
Insurance	1% of TCI		$5,195
Annual Source Test	One test/year @ $15,000		$15,000
Total IAC			**$48,543**
Annual Cost (DAC + IAC)			**$88,488**

Total Annual Cost

Total Annual Cost = (Ductwork + CIP System) + Gas Scrubber/Absorber System Cost + Annual Costs
= $171,445/yr + $84,678/yr + $88,488/yr
= $344,611/yr

Emission Reductions

Annual VOC Emission Reductions = PE x 0.90
= 14,952 lb-VOC/year x 0.90
= 13,457 lb-VOC/year
= 6.73 tons-VOC/year

Cost Effectiveness

Cost Effectiveness = Total Annual Cost ÷ Annual Emission Reductions

Cost Effectiveness = $344,611/year ÷ 6.73 tons-VOC/year
= $51,205/ton-VOC

The analysis demonstrates that the annual costs of the collection system ductwork, CIP system equipment, and water scrubber/absorption system, result in costs that exceed the District's BACT Cost Effectiveness Threshold for VOC of $17,500/ton-VOC. Therefore this option is not cost-effective and will not be required for the storage operations in the 24 108,000 wine tanks proposed under this project.

Option 4 - Capture of VOCs with condensation (70% collection & control for wine storage)

Equipment Cost Refrigerated Condenser

Pricing for the PAS units will be based on project-specific pricing received from EcoPAS on March 28, 2016. The estimate provided by EcoPAS indicated that three PAS-100 refrigerated condenser units would be required to control the fermentation emissions from the proposed wine tanks.

In addition, the District also specifically asked Patrick Thompson of EcoPAS if EcoPAS was interested in providing cost information for scrubbers to control emissions from tanks used only for wine storage or just wanted to focus on emissions from wine fermentation. The Patrick Thompson indicated that EcoPAS was only interested providing cost information for condensers to control emissions from wine fermentation because it would not be cost effective to emissions control from tanks used only for wine storage as the emissions are significantly less than from fermentation.

Annualized Cost

As calculated in Appendix E, with a total capital investment (TCI) of $1,406,091 the annualized capital cost for the scrubber system = $229,193.

Operation and Maintenance Costs

Condensation Annual Costs			
Direct Annual Costs (DAC)			
Operating Labor			
Operator	½ hr per shift	$18.50/hr x 0.5 hr/shift x 2 shift/day x 365 days/year x 3 units	$20,258
Supervisor	15% of operator		$3,039
Maintenance			
Labor	½ hr per shift	$18.50/hr x 0.5 hr/shift x 2 shift/day x 365 days/year x 3 units	$20,258
Maintenance Materials	100% of labor		$20,258
Chiller (Glycol)			
Not estimated at this time			-
Utility (Electricity)			
Not estimated at this time			-
Total Direct Annual Costs (DAC)			**$63,813**
Indirect Annual Cost (IAC)			
Overhead	60% of Labor Cost	0.6 x ($20,258+ $3,039 + $20,258 + $20,258)	$38,288
Administrative Charge	2% of TCI		$28,123
Property Taxes	1% of TCI		$14,061
Insurance	1% of TCI		$14,061
Annual Source Test	One representative test/year @ $15,000		$15,000
Total IAC			**$109,533**
Annual Cost (DAC + IAC)			**$173,346**

Total Annual Cost

Total Annual Cost = (Ductwork + CIP System) + Condenser System Cost + Annual Costs
= $171,445/yr + $229,193/yr + $173,346/yr
= $573,984/yr

Emission Reductions

Annual VOC Emission Reductions = PE x 0.70
= 14,952 lb-VOC/year x 0.70
= 10,466 lb-VOC/year
= 5.23 tons-VOC/year

Cost Effectiveness

Cost Effectiveness = Total Annual Cost ÷ Annual Emission Reductions

Cost Effectiveness = $573,984/year ÷ 5.23 tons-VOC/year
= $109,748/ton-VOC

The analysis demonstrates that the annual costs of the collection system ductwork, CIP system equipment, and refrigerated condenser system, result in costs that exceed the District's BACT Cost Effectiveness Threshold for VOC of $17,500/ton-VOC. Therefore this option is not cost-effective and will not be required for the storage operations in the 24 108,000 wine tanks proposed under this project.

Option 5 - Insulation, PVRV, "Gas-Tight" Tank Operation, and Storage Temperature not Exceeding 75 deg 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 1, insulated tank, pressure/vacuum valve set within 10% of the maximum allowable working pressure of the tank, "gas tight" tank operation and achieve and maintain a continuous storage temperature not exceeding 75^{o}F within 60 days of completion of fermentation. These BACT requirements will be placed on the ATC as enforceable conditions.

Attachment F1
to the BACT Analysis for Wine Storage
Flowrate from Wine Storage Tanks

Wine Storage Tanks

Description				Units
The working volume of the tank is (in gallons)			108,000	Gallons
The idea gas law applies PV= NRT				
P equals the absolute atmosphere pressure			1.00	Atm
N equals the number of Lb-moles of the vapor space gas				Lb-Moles
V = the volume				Cubic Feet
T = the absolute temperature in Degrees Rankine			520.0	Deg R
				Atm x Cubic foot/Deg R x
R= Gas Law Constant			0.73	LB-mole
Density of Dry Air at 60 Deg F			0.08	Lb/cubic foot
Molecular Weight of N2			28.01	
Molecular Weight of O2			31.99	
Molecular Weight of Alcohol			46.02	
Molecular Weight of Water			18.02	
Percent of Air that is N2 Source Hand Book Chemistry and Physics			0.78	
Percent of Air that is O2 Source Hand Book Chemistry and Physics			0.21	
Molecular Weight of Air			28.58	
Moles of air displaced assuming air does not dissolve into the wine.			38.11	Lb-moles
AMW (Yellow cells information for the storage emissions tab)			27.815	
Molar Fraction Alcohol in Vapor			0.3698	
Daily Maximum Emissions in Pounds/Day of alcohol			28.2	
Weight of water exiting tank from Tank 4.0 model			20.54	Lb's
Weight of alcohol exiting tank from Tank 4.0 model			28.22	Lb's
Moles of alcohol exiting the tank from Tanks 4.0 model			0.61	Lb-moles
Moles of water exiting the tank from Tanks 4.0 model			1.14	Lb-moles
Total number of moles leaving the tank			39.86	
Cubic feet of gas leaving the tank per ideal gas law			15,135.89	Cubic feet
The tank is filled in 3.4 hours or			324.00	Minutes
			47	CFM
Gas composition on a molar bases				
	Air		0.9560	%
	Water		0.0286	%
	Alcohol		0.0154	%
		Sum	1.0000	
Gas composition on a weight bases				
	Air		0.9572	%
	Water		0.0180	%
	Alcohol		0.0248	%
		Sum	1.0000	

349	GPM
8,386	Total GPM into the tank farm

1) The gas flow rate (shown in the brown cells) is for one tank at a maximum fill rate. It is assumed that one tank can be filled in a 6 hour period and emptied in a 6 hour period. Each turn fills the tank to its maximum working volume and then empties it. The process can be repeated the every two days.

2) It is assume the emission control equipment would only be needed in the filling process. The estimated flow rate of the pumps is shown below. A typical pumps runs at about 100 TDH and is about 65 to 70% efficient, and if pumping distances are short may move down the curve to pump more at a lower TDH.

3 There will be only one main duct since we believe the pumping could be stopped while the main duct is cleaned. A CIP system is included for this project. It is assumed that 6 tanks could be filling at one time.

# of Pumps	Design GPM into Tank Farm	Combined CFM
24.0	8,386	1,121.18

1) Assume Ideal Gas at Atm pressure

2) The Tanks 4.0 daily emission value is based on turning the tank up to 4 times every day during the month of July. During the emptying process zero emissions are emitted.

Source Hand Book of Chemistry and Physics 91 Edition Air Properties

Deg F	Deg K	Density of Air at 280 of Air KG/ Cubic Meter	Density at 300 Deg K of Air KG/ Cubic Meter	Density at 288.7 Deg K or 60 Deg F	Density at 60 Deg F in Lb per cubic foot	Cubic Meter/Cubic Foot	Pound/Kg
60.000	288.706	1.25	1.16	1.21	0.08	0.03	2.20

		Daily Emissions from Tanks		Output from Tank 4.0 total emissions no speciation											
ATC Permit #	Tank ID	% by Volume Alcohol	AMW Average	Total lb Alcohol & Water Vapor Emitted (lb/day)	Molecular Weight of Alcohol	Molecular Weight of Water	Alcohol as Molar % Total Emissions (alcohol + water vapor)	Water Vapor as Molar % Total Emissions (alcohol + water vapor)	Max Alcohol Emissions per turnover (108,000 gal fill) (lb/turnover)	lb-Water Vapor Emitted per turnover (108,000 gal fill) (lb/turnover)	Max lb-Mols Alcohol Emitted per turnover (108,000 gal fill) (lb/turnover)	Max lb-Mols Water Vapor Emitted per turnover (108,000 gal fill) (lb/turnover)	Max Storage Throughput (gal/day)	Max turnovers/108,000 gal fills per day (Fill/day)	Max Alcohol Emissions (lb/day)	lb-Water Vapor Emitted (lb/day)
N-2321-836-0	1675	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
N-2321-837-0	1676	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
N-2321-838-0	1677	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
N-2321-839-0	1678	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
N-2321-840-0	1679	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
N-2321-841-0	1680	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
N-2321-842-0	1681	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
N-2321-843-0	1682	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
N-2321-844-0	1683	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
N-2321-845-0	1684	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
N-2321-846-0	1685	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
N-2321-847-0	1686	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
N-2321-848-0	1687	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
N-2321-849-0	1688	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
N-2321-850-0	1689	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
N-2321-851-0	1690	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
N-2321-852-0	1691	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
N-2321-853-0	1692	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
N-2321-854-0	1693	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
N-2321-855-0	1694	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
N-2321-856-0	1695	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
N-2321-857-0	1696	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
N-2321-858-0	1697	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14
N-2321-859-0	1698	17.0%	27.8147	48.75	46.02	18.02	34.98%	65.02%	28.22	20.54	0.613	1.140	432,000	4.0	112.9	82.14

		Annual Emissions from Tanks		Output from Tank 4.0 total emissions no speciation								
ATC Permit #	Tank ID	% by Volume Alcohol	AMW Average	Total lb Alcohol & Water Vapor Emitted (lb/year)	Molecular Weight of Alcohol	Molecular Weight of Water	Alcohol as Molar % Total Emissions (alcohol + water vapor)	Water Vapor as Molar % Total Emissions (alcohol + water vapor)	Max Daily Alcohol Emissions (lb/yr)	lb-Water Vapor Emitted (lb/yr)	Max lb-Mols Alcohol Emitted (lb-mol/yr)	Max lb-Mols Water Vapor Emitted (lb-mol/yr)
N-2321-836-0	1675	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49	13.538	25.166
N-2321-837-0	1676	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49	13.538	25.166
N-2321-838-0	1677	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49	13.538	25.166
N-2321-839-0	1678	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49	13.538	25.166
N-2321-840-0	1679	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49	13.538	25.166
N-2321-841-0	1680	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49	13.538	25.166
N-2321-842-0	1681	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49	13.538	25.166
N-2321-843-0	1682	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49	13.538	25.166
N-2321-844-0	1683	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49	13.538	25.166
N-2321-845-0	1684	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49	13.538	25.166
N-2321-846-0	1685	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49	13.538	25.166
N-2321-847-0	1686	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49	13.538	25.166
N-2321-848-0	1687	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49	13.538	25.166
N-2321-849-0	1688	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49	13.538	25.166
N-2321-850-0	1689	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49	13.538	25.166
N-2321-851-0	1690	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49	13.538	25.166
N-2321-852-0	1691	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49	13.538	25.166
N-2321-853-0	1692	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49	13.538	25.166
N-2321-854-0	1693	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49	13.538	25.166
N-2321-855-0	1694	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49	13.538	25.166
N-2321-856-0	1695	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49	13.538	25.166
N-2321-857-0	1696	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49	13.538	25.166
N-2321-858-0	1697	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49	13.538	25.166
N-2321-859-0	1698	17.0%	27.8147	1,076.59	46.02	18.02	34.98%	65.02%	623	453.49	13.538	25.166
								Total lb/yr	14,952			
								Total Ton/yr	7.48			

APPENDIX G
Compliance Certification

San Joaquin Valley
Air Pollution Control District

TITLE V COMPLIANCE CERTIFICATION FORM

Received
OCT 21 2013
SJVUAPCD

I. TYPE OF PERMIT ACTION (Check appropriate box)

(4) 650K GAL AND (20) 108,000 gallon SS tanks

[ ] ADMIN. MODIFICATION [X] MINOR. MODIFICATION [ ] SIGNIFICANT MODIFICATION

COMPANY NAME: CBUS Ops Inc.(DBA Woodbridge Winery)	FACILITY ID: N – 2321
1. Type of Organization: [X] Corporation [ ] Sole Ownership [ ] Government [ ] Partnership [ ] Utility	
2. Owner's Name: CONSTELLATION BRANDS U.S. OPERATIONS INC.	
3. Agent to the Owner: JOSH SCHULZE	

II. COMPLIANCE CERTIFICATION (Read each statement carefully and initial each circle for confirmation):

Based on information and belief formed after reasonable inquiry, the source identified in this application will continue to comply with the applicable federal requirement(s) which the source is in compliance as identified in the Compliance Plan.

Based on information and belief formed after reasonable inquiry, the source identified in this application will comply with applicable federal requirement(s) that will become effective during the permit term as identified in the Compliance Plan, on a timely basis.

Based on information and belief formed after reasonable inquiry, the source identified in this application is not in compliance at the time of permit issuance with the applicable federal requirement(s),as identified in the Compliance Plan, and I have attached a compliance schedule.

Corrected information will be provided to the District when I become aware that incorrect or incomplete information has been submitted.

Based on information and belief formed after reasonable inquiry, information and statements in the submitted application package, including all accompanying reports, and required certifications are true accurate and complete.

I declare, under penalty of perjury under the laws of the state of California, that the forgoing is correct and true:

Signature of Responsible Official

10/4/13
Date

JOSH SCHULZE

Name of Responsible Official (please print)

GENERAL MANAGER

Title of Responsible Official (please print)

Mailing Address: Central Regional Office * 1990 Gettysburg Avenue * Fresno, California 93726-0244 * (559) 230-5900 * FAX (559) 230-6061

APPENDIX H
Draft ATC Permits

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO: N-2321-836-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: CBUS OPS INC (DBA WOODBRIDGE WINERY)
MAILING ADDRESS: P O BOX 1260
WOODBRIDGE, CA 95258-1260

LOCATION: 5950 E WOODBRIDGE ROAD
ACAMPO, CA 95220

EQUIPMENT DESCRIPTION:
108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1675 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. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. When this tank is 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
5. 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

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-2321-836-0 : Jun 1 2016 2:51PM -- NORMANR : Joint Inspection NOT Required

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

7. The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201] Federally Enforceable Through Title V Permit

8. The maximum annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201] Federally Enforceable Through Title V Permit

9. The annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

10. 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

11. The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve-month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201] Federally Enforceable Through Title V Permit

13. The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201] Federally Enforceable Through Title V Permit

14. Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201] Federally Enforceable Through Title V Permit

15. Total annual VOC emissions from wine storage operations may be determined using the total annual wine throughput and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the annual wine throughput; or using the throughputs for different batches of wine and batch-specific storage emissions factors, calculated using the equation(s) specified within this permit, based on the ethanol content of each batch. [District Rule 2201] Federally Enforceable Through Title V Permit

16. Total annual VOC emissions from wine storage operations shall be determined either 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; or as the emissions for total annual wine movements and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the total annual wine movements. [District Rule 2201] Federally Enforceable Through Title V Permit

17. The annual VOC wine storage emission factor for each wine 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 1,000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume % (when the ethanol content of wine is 20 volume %, P is equivalent to 0.20), a = -0.38194, b = 0.97917 and c = 0. [District Rule 2201] Federally Enforceable Through Title V Permit

18. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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 Rule District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

19. The operator shall determine and 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

20. 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

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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

22. On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201] Federally Enforceable Through Title V Permit

23. On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201] Federally Enforceable Through Title V Permit

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

25. {4660} 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

26. {4661} 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

27. 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-2321-837-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: CBUS OPS INC (DBA WOODBRIDGE WINERY)
MAILING ADDRESS: P O BOX 1260
WOODBRIDGE, CA 95258-1260

LOCATION: 5950 E WOODBRIDGE ROAD
ACAMPO, CA 95220

EQUIPMENT DESCRIPTION:
108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1676 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. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. When this tank is 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
5. 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

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-2321-837-0 : Jun 1 2016 2:51PM -- NORMANR Joint Inspection NOT Required

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

7. The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201] Federally Enforceable Through Title V Permit

8. The maximum annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201] Federally Enforceable Through Title V Permit

9. The annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

10. 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

11. The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve-month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201] Federally Enforceable Through Title V Permit

13. The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201] Federally Enforceable Through Title V Permit

14. Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201] Federally Enforceable Through Title V Permit

15. Total annual VOC emissions from wine storage operations may be determined using the total annual wine throughput and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the annual wine throughput; or using the throughputs for different batches of wine and batch-specific storage emissions factors, calculated using the equation(s) specified within this permit, based on the ethanol content of each batch. [District Rule 2201] Federally Enforceable Through Title V Permit

16. Total annual VOC emissions from wine storage operations shall be determined either 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; or as the emissions for total annual wine movements and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the total annual wine movements. [District Rule 2201] Federally Enforceable Through Title V Permit

17. The annual VOC wine storage emission factor for each wine 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 1,000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume % (when the ethanol content of wine is 20 volume %, P is equivalent to 0.20), a = -0.38194, b = 0.97917 and c = 0. [District Rule 2201] Federally Enforceable Through Title V Permit

18. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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 Rule District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

19. The operator shall determine and 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

20. 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

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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

22. On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201] Federally Enforceable Through Title V Permit

23. On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201] Federally Enforceable Through Title V Permit

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

25. {4660} 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

26. {4661} 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

27. 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-2321-838-0

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: CBUS OPS INC (DBA WOODBRIDGE WINERY)
MAILING ADDRESS: P O BOX 1260
WOODBRIDGE, CA 95258-1260

LOCATION: 5950 E WOODBRIDGE ROAD
ACAMPO, CA 95220

EQUIPMENT DESCRIPTION:
108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1677 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. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. When this tank is 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
5. 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

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-2321-838-0 : Jun 1 2016 2:51PM – NORMANR Joint Inspection NOT Required

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

7. The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201] Federally Enforceable Through Title V Permit

8. The maximum annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201] Federally Enforceable Through Title V Permit

9. The annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

10. 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

11. The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve-month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201] Federally Enforceable Through Title V Permit

13. The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201] Federally Enforceable Through Title V Permit

14. Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201] Federally Enforceable Through Title V Permit

15. Total annual VOC emissions from wine storage operations may be determined using the total annual wine throughput and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the annual wine throughput; or using the throughputs for different batches of wine and batch-specific storage emissions factors, calculated using the equation(s) specified within this permit, based on the ethanol content of each batch. [District Rule 2201] Federally Enforceable Through Title V Permit

16. Total annual VOC emissions from wine storage operations shall be determined either 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; or as the emissions for total annual wine movements and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the total annual wine movements. [District Rule 2201] Federally Enforceable Through Title V Permit

17. The annual VOC wine storage emission factor for each wine 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 1,000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume % (when the ethanol content of wine is 20 volume %, P is equivalent to 0.20), a = -0.38194, b = 0.97917 and c = 0. [District Rule 2201] Federally Enforceable Through Title V Permit

18. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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 Rule District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

19. The operator shall determine and 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

20. 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

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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

22. On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201] Federally Enforceable Through Title V Permit

23. On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201] Federally Enforceable Through Title V Permit

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

25. {4660} 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

26. {4661} 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

27. 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-2321-839-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: CBUS OPS INC (DBA WOODBRIDGE WINERY)
MAILING ADDRESS: P O BOX 1260
WOODBRIDGE, CA 95258-1260

LOCATION: 5950 E WOODBRIDGE ROAD
ACAMPO, CA 95220

EQUIPMENT DESCRIPTION:
108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1678 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. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. When this tank is 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
5. 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

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-2321-839-0 : Jun 1 2016 2:51PM – NORMANR : Joint Inspection NOT Required

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

7. The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201] Federally Enforceable Through Title V Permit

8. The maximum annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201] Federally Enforceable Through Title V Permit

9. The annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

10. 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

11. The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve-month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201] Federally Enforceable Through Title V Permit

13. The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201] Federally Enforceable Through Title V Permit

14. Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201] Federally Enforceable Through Title V Permit

15. Total annual VOC emissions from wine storage operations may be determined using the total annual wine throughput and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the annual wine throughput; or using the throughputs for different batches of wine and batch-specific storage emissions factors, calculated using the equation(s) specified within this permit, based on the ethanol content of each batch. [District Rule 2201] Federally Enforceable Through Title V Permit

16. Total annual VOC emissions from wine storage operations shall be determined either 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; or as the emissions for total annual wine movements and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the total annual wine movements. [District Rule 2201] Federally Enforceable Through Title V Permit

17. The annual VOC wine storage emission factor for each wine 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 1,000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume % (when the ethanol content of wine is 20 volume %, P is equivalent to 0.20), a = -0.38194, b = 0.97917 and c = 0. [District Rule 2201] Federally Enforceable Through Title V Permit

18. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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 Rule District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

19. The operator shall determine and 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

20. 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

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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

22. On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201] Federally Enforceable Through Title V Permit

23. On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201] Federally Enforceable Through Title V Permit

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

25. {4660} 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

26. {4661} 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

27. 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-2321-840-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: CBUS OPS INC (DBA WOODBRIDGE WINERY)
MAILING ADDRESS: P O BOX 1260
WOODBRIDGE, CA 95258-1260

LOCATION: 5950 E WOODBRIDGE ROAD
ACAMPO, CA 95220

EQUIPMENT DESCRIPTION:
108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1679 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. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. When this tank is 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
5. 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

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-2321-840-0 : Jun 1 2010 2:51PM – NORMANR : Joint Inspection NOT Required

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

7. The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201] Federally Enforceable Through Title V Permit

8. The maximum annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201] Federally Enforceable Through Title V Permit

9. The annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

10. 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

11. The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve-month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201] Federally Enforceable Through Title V Permit

13. The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201] Federally Enforceable Through Title V Permit

14. Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201] Federally Enforceable Through Title V Permit

15. Total annual VOC emissions from wine storage operations may be determined using the total annual wine throughput and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the annual wine throughput; or using the throughputs for different batches of wine and batch-specific storage emissions factors, calculated using the equation(s) specified within this permit, based on the ethanol content of each batch. [District Rule 2201] Federally Enforceable Through Title V Permit

16. Total annual VOC emissions from wine storage operations shall be determined either 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; or as the emissions for total annual wine movements and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the total annual wine movements. [District Rule 2201] Federally Enforceable Through Title V Permit

17. The annual VOC wine storage emission factor for each wine 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 1,000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume % (when the ethanol content of wine is 20 volume %, P is equivalent to 0.20), a = -0.38194, b = 0.97917 and c = 0. [District Rule 2201] Federally Enforceable Through Title V Permit

18. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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 Rule District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

19. The operator shall determine and 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

20. 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

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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

22. On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201] Federally Enforceable Through Title V Permit

23. On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201] Federally Enforceable Through Title V Permit

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

25. {4660} 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

26. {4661} 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

27. 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-2321-841-0

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: CBUS OPS INC (DBA WOODBRIDGE WINERY)
MAILING ADDRESS: P O BOX 1260
WOODBRIDGE, CA 95258-1260

LOCATION: 5950 E WOODBRIDGE ROAD
ACAMPO, CA 95220

EQUIPMENT DESCRIPTION:
108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1680 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. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. When this tank is 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
5. 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

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-2321-841-0 : Jun 1 2016 2:51PM – NORMANR : Joint Inspection NOT Required

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

7. The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201] Federally Enforceable Through Title V Permit

8. The maximum annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201] Federally Enforceable Through Title V Permit

9. The annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

10. 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

11. The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve-month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201] Federally Enforceable Through Title V Permit

13. The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201] Federally Enforceable Through Title V Permit

14. Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201] Federally Enforceable Through Title V Permit

15. Total annual VOC emissions from wine storage operations may be determined using the total annual wine throughput and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the annual wine throughput; or using the throughputs for different batches of wine and batch-specific storage emissions factors, calculated using the equation(s) specified within this permit, based on the ethanol content of each batch. [District Rule 2201] Federally Enforceable Through Title V Permit

16. Total annual VOC emissions from wine storage operations shall be determined either 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; or as the emissions for total annual wine movements and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the total annual wine movements. [District Rule 2201] Federally Enforceable Through Title V Permit

17. The annual VOC wine storage emission factor for each wine 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 1,000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume % (when the ethanol content of wine is 20 volume %, P is equivalent to 0.20), a = -0.38194, b = 0.97917 and c = 0. [District Rule 2201] Federally Enforceable Through Title V Permit

18. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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 Rule District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

19. The operator shall determine and 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

20. 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

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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

22. On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201] Federally Enforceable Through Title V Permit

23. On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201] Federally Enforceable Through Title V Permit

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

25. {4660} 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

26. {4661} 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

27. 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-2321-842-0

ISSUANCE DATE: DRAFT

DRAFT

LEGAL OWNER OR OPERATOR: CBUS OPS INC (DBA WOODBRIDGE WINERY)
MAILING ADDRESS: P O BOX 1260
WOODBRIDGE, CA 95258-1260

LOCATION: 5950 E WOODBRIDGE ROAD
ACAMPO, CA 95220

EQUIPMENT DESCRIPTION:
108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1681 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. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. When this tank is 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
5. 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

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

Northern Regional Office • 4800 Enterprise Way • Modesto, CA 95356-8718 • (209) 557-6400 • Fax (209) 557-6475

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

7. The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201] Federally Enforceable Through Title V Permit

8. The maximum annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201] Federally Enforceable Through Title V Permit

9. The annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

10. 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

11. The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve-month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201] Federally Enforceable Through Title V Permit

13. The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201] Federally Enforceable Through Title V Permit

14. Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201] Federally Enforceable Through Title V Permit

15. Total annual VOC emissions from wine storage operations may be determined using the total annual wine throughput and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the annual wine throughput; or using the throughputs for different batches of wine and batch-specific storage emissions factors, calculated using the equation(s) specified within this permit, based on the ethanol content of each batch. [District Rule 2201] Federally Enforceable Through Title V Permit

16. Total annual VOC emissions from wine storage operations shall be determined either 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; or as the emissions for total annual wine movements and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the total annual wine movements. [District Rule 2201] Federally Enforceable Through Title V Permit

17. The annual VOC wine storage emission factor for each wine 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 1,000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume % (when the ethanol content of wine is 20 volume %, P is equivalent to 0.20), a = -0.38194, b = 0.97917 and c = 0. [District Rule 2201] Federally Enforceable Through Title V Permit

18. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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 Rule District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

19. The operator shall determine and 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

20. 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

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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

22. On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201] Federally Enforceable Through Title V Permit

23. On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201] Federally Enforceable Through Title V Permit

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

25. {4660} 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

26. {4661} 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

27. 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-2321-843-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: CBUS OPS INC (DBA WOODBRIDGE WINERY)
MAILING ADDRESS: P O BOX 1260
WOODBRIDGE, CA 95258-1260

LOCATION: 5950 E WOODBRIDGE ROAD
ACAMPO, CA 95220

EQUIPMENT DESCRIPTION:
108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1682 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. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. When this tank is 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
5. 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

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-2321-843-0 : Jun 1 2016 2:51PM -- NORMANR : Joint Inspection NOT Required

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

7. The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201] Federally Enforceable Through Title V Permit

8. The maximum annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201] Federally Enforceable Through Title V Permit

9. The annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

10. 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

11. The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve-month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201] Federally Enforceable Through Title V Permit

13. The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201] Federally Enforceable Through Title V Permit

14. Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201] Federally Enforceable Through Title V Permit

15. Total annual VOC emissions from wine storage operations may be determined using the total annual wine throughput and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the annual wine throughput; or using the throughputs for different batches of wine and batch-specific storage emissions factors, calculated using the equation(s) specified within this permit, based on the ethanol content of each batch. [District Rule 2201] Federally Enforceable Through Title V Permit

16. Total annual VOC emissions from wine storage operations shall be determined either 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; or as the emissions for total annual wine movements and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the total annual wine movements. [District Rule 2201] Federally Enforceable Through Title V Permit

17. The annual VOC wine storage emission factor for each wine 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 1,000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume % (when the ethanol content of wine is 20 volume %, P is equivalent to 0.20), a = -0.38194, b = 0.97917 and c = 0. [District Rule 2201] Federally Enforceable Through Title V Permit

18. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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 Rule District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

19. The operator shall determine and 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

20. 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

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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

22. On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201] Federally Enforceable Through Title V Permit

23. On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201] Federally Enforceable Through Title V Permit

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

25. {4660} 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

26. {4661} 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

27. 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-2321-844-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: CBUS OPS INC (DBA WOODBRIDGE WINERY)
MAILING ADDRESS: P O BOX 1260
WOODBRIDGE, CA 95258-1260

LOCATION: 5950 E WOODBRIDGE ROAD
ACAMPO, CA 95220

EQUIPMENT DESCRIPTION:
108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1683 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. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. When this tank is 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
5. 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

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-2321-844-0 Jun 1 2016 2:51PM – NORMANR : Joint Inspection NOT Required

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

7. The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201] Federally Enforceable Through Title V Permit

8. The maximum annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201] Federally Enforceable Through Title V Permit

9. The annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

10. 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

11. The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve-month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201] Federally Enforceable Through Title V Permit

13. The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201] Federally Enforceable Through Title V Permit

14. Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201] Federally Enforceable Through Title V Permit

15. Total annual VOC emissions from wine storage operations may be determined using the total annual wine throughput and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the annual wine throughput; or using the throughputs for different batches of wine and batch-specific storage emissions factors, calculated using the equation(s) specified within this permit, based on the ethanol content of each batch. [District Rule 2201] Federally Enforceable Through Title V Permit

16. Total annual VOC emissions from wine storage operations shall be determined either 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; or as the emissions for total annual wine movements and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the total annual wine movements. [District Rule 2201] Federally Enforceable Through Title V Permit

17. The annual VOC wine storage emission factor for each wine 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 1,000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume % (when the ethanol content of wine is 20 volume %, P is equivalent to 0.20), a = -0.38194, b = 0.97917 and c = 0. [District Rule 2201] Federally Enforceable Through Title V Permit

18. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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 Rule District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

19. The operator shall determine and 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

20. 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

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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

22. On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201] Federally Enforceable Through Title V Permit

23. On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201] Federally Enforceable Through Title V Permit

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

25. {4660} 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

26. {4661} 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

27. 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-2321-845-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: CBUS OPS INC (DBA WOODBRIDGE WINERY)
MAILING ADDRESS: P O BOX 1260
WOODBRIDGE, CA 95258-1260

LOCATION: 5950 E WOODBRIDGE ROAD
ACAMPO, CA 95220

EQUIPMENT DESCRIPTION:
108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1684 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. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. When this tank is 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
5. 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

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-2321-845-0 : Jun 1 2016 2:51PM -- NORMANR : Joint Inspection NOT Required

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

7. The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201] Federally Enforceable Through Title V Permit

8. The maximum annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201] Federally Enforceable Through Title V Permit

9. The annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

10. 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

11. The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve-month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201] Federally Enforceable Through Title V Permit

13. The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201] Federally Enforceable Through Title V Permit

14. Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201] Federally Enforceable Through Title V Permit

15. Total annual VOC emissions from wine storage operations may be determined using the total annual wine throughput and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the annual wine throughput; or using the throughputs for different batches of wine and batch-specific storage emissions factors, calculated using the equation(s) specified within this permit, based on the ethanol content of each batch. [District Rule 2201] Federally Enforceable Through Title V Permit

16. Total annual VOC emissions from wine storage operations shall be determined either 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; or as the emissions for total annual wine movements and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the total annual wine movements. [District Rule 2201] Federally Enforceable Through Title V Permit

17. The annual VOC wine storage emission factor for each wine 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 1,000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume % (when the ethanol content of wine is 20 volume %, P is equivalent to 0.20), a = -0.38194, b = 0.97917 and c = 0. [District Rule 2201] Federally Enforceable Through Title V Permit

18. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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 Rule District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

19. The operator shall determine and 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

20. 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

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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

22. On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201] Federally Enforceable Through Title V Permit

23. On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201] Federally Enforceable Through Title V Permit

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

25. {4660} 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

26. {4661} 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

27. 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-2321-846-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: CBUS OPS INC (DBA WOODBRIDGE WINERY)
MAILING ADDRESS: P O BOX 1260
WOODBRIDGE, CA 95258-1260

LOCATION: 5950 E WOODBRIDGE ROAD
ACAMPO, CA 95220

EQUIPMENT DESCRIPTION:
108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1685 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. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. When this tank is 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
5. 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

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-2321-846-0 Jun 1 2016 2:51PM -- NORMANR : Joint Inspection NOT Required

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

7. The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201] Federally Enforceable Through Title V Permit

8. The maximum annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201] Federally Enforceable Through Title V Permit

9. The annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

10. 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

11. The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve-month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201] Federally Enforceable Through Title V Permit

13. The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201] Federally Enforceable Through Title V Permit

14. Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201] Federally Enforceable Through Title V Permit

15. Total annual VOC emissions from wine storage operations may be determined using the total annual wine throughput and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the annual wine throughput; or using the throughputs for different batches of wine and batch-specific storage emissions factors, calculated using the equation(s) specified within this permit, based on the ethanol content of each batch. [District Rule 2201] Federally Enforceable Through Title V Permit

16. Total annual VOC emissions from wine storage operations shall be determined either 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; or as the emissions for total annual wine movements and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the total annual wine movements. [District Rule 2201] Federally Enforceable Through Title V Permit

17. The annual VOC wine storage emission factor for each wine 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 1,000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume % (when the ethanol content of wine is 20 volume %, P is equivalent to 0.20), a = -0.38194, b = 0.97917 and c = 0. [District Rule 2201] Federally Enforceable Through Title V Permit

18. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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 Rule District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

19. The operator shall determine and 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

20. 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

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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

22. On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201] Federally Enforceable Through Title V Permit

23. On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201] Federally Enforceable Through Title V Permit

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

25. {4660} 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

26. {4661} 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

27. 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-2321-847-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: CBUS OPS INC (DBA WOODBRIDGE WINERY)
MAILING ADDRESS: P O BOX 1260
WOODBRIDGE, CA 95258-1260

LOCATION: 5950 E WOODBRIDGE ROAD
ACAMPO, CA 95220

EQUIPMENT DESCRIPTION:
108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1686 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. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. When this tank is 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
5. 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

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-2321-847-0 : Jun 1 2016 2:51PM -- NORMANR : Joint Inspection NOT Required

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

7. The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201] Federally Enforceable Through Title V Permit

8. The maximum annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201] Federally Enforceable Through Title V Permit

9. The annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

10. 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

11. The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve-month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201] Federally Enforceable Through Title V Permit

13. The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201] Federally Enforceable Through Title V Permit

14. Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201] Federally Enforceable Through Title V Permit

15. Total annual VOC emissions from wine storage operations may be determined using the total annual wine throughput and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the annual wine throughput; or using the throughputs for different batches of wine and batch-specific storage emissions factors, calculated using the equation(s) specified within this permit, based on the ethanol content of each batch. [District Rule 2201] Federally Enforceable Through Title V Permit

16. Total annual VOC emissions from wine storage operations shall be determined either 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; or as the emissions for total annual wine movements and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the total annual wine movements. [District Rule 2201] Federally Enforceable Through Title V Permit

17. The annual VOC wine storage emission factor for each wine 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 1,000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume % (when the ethanol content of wine is 20 volume %, P is equivalent to 0.20), a = -0.38194, b = 0.97917 and c = 0. [District Rule 2201] Federally Enforceable Through Title V Permit

18. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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 Rule District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

19. The operator shall determine and 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

20. 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

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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

22. On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201] Federally Enforceable Through Title V Permit

23. On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201] Federally Enforceable Through Title V Permit

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

25. {4660} 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

26. {4661} 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

27. 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-2321-848-0

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: CBUS OPS INC (DBA WOODBRIDGE WINERY)
MAILING ADDRESS: P O BOX 1260
WOODBRIDGE, CA 95258-1260

LOCATION: 5950 E WOODBRIDGE ROAD
ACAMPO, CA 95220

EQUIPMENT DESCRIPTION:
108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1687 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. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. When this tank is 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
5. 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

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

Northern Regional Office • 4800 Enterprise Way • Modesto, CA 95356-8718 • (209) 557-6400 • Fax (209) 557-6475

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

7. The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201] Federally Enforceable Through Title V Permit

8. The maximum annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201] Federally Enforceable Through Title V Permit

9. The annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

10. 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

11. The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve-month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201] Federally Enforceable Through Title V Permit

13. The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201] Federally Enforceable Through Title V Permit

14. Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201] Federally Enforceable Through Title V Permit

15. Total annual VOC emissions from wine storage operations may be determined using the total annual wine throughput and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the annual wine throughput; or using the throughputs for different batches of wine and batch-specific storage emissions factors, calculated using the equation(s) specified within this permit, based on the ethanol content of each batch. [District Rule 2201] Federally Enforceable Through Title V Permit

16. Total annual VOC emissions from wine storage operations shall be determined either 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; or as the emissions for total annual wine movements and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the total annual wine movements. [District Rule 2201] Federally Enforceable Through Title V Permit

17. The annual VOC wine storage emission factor for each wine 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 1,000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume % (when the ethanol content of wine is 20 volume %, P is equivalent to 0.20), a = -0.38194, b = 0.97917 and c = 0. [District Rule 2201] Federally Enforceable Through Title V Permit

18. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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 Rule District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

19. The operator shall determine and 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

20. 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

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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

22. On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201] Federally Enforceable Through Title V Permit

23. On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201] Federally Enforceable Through Title V Permit

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

25. {4660} 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

26. {4661} 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

27. 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-2321-849-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: CBUS OPS INC (DBA WOODBRIDGE WINERY)
MAILING ADDRESS: P O BOX 1260
WOODBRIDGE, CA 95258-1260

LOCATION: 5950 E WOODBRIDGE ROAD
ACAMPO, CA 95220

EQUIPMENT DESCRIPTION:
108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1688 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. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. When this tank is 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
5. 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

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-2321-849-0 : Jun 1 2015 2:51PM – NORMANR : Joint Inspection NOT Required

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

7. The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201] Federally Enforceable Through Title V Permit

8. The maximum annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201] Federally Enforceable Through Title V Permit

9. The annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

10. 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

11. The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve-month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201] Federally Enforceable Through Title V Permit

13. The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201] Federally Enforceable Through Title V Permit

14. Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201] Federally Enforceable Through Title V Permit

15. Total annual VOC emissions from wine storage operations may be determined using the total annual wine throughput and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the annual wine throughput; or using the throughputs for different batches of wine and batch-specific storage emissions factors, calculated using the equation(s) specified within this permit, based on the ethanol content of each batch. [District Rule 2201] Federally Enforceable Through Title V Permit

16. Total annual VOC emissions from wine storage operations shall be determined either 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; or as the emissions for total annual wine movements and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the total annual wine movements. [District Rule 2201] Federally Enforceable Through Title V Permit

17. The annual VOC wine storage emission factor for each wine 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 1,000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume % (when the ethanol content of wine is 20 volume %, P is equivalent to 0.20), a = -0.38194, b = 0.97917 and c = 0. [District Rule 2201] Federally Enforceable Through Title V Permit

18. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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 Rule District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

19. The operator shall determine and 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

20. 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

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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

22. On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201] Federally Enforceable Through Title V Permit

23. On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201] Federally Enforceable Through Title V Permit

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

25. {4660} 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

26. {4661} 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

27. 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-2321-850-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: CBUS OPS INC (DBA WOODBRIDGE WINERY)
MAILING ADDRESS: P O BOX 1260
WOODBRIDGE, CA 95258-1260

LOCATION: 5950 E WOODBRIDGE ROAD
ACAMPO, CA 95220

EQUIPMENT DESCRIPTION:
108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1689 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. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. When this tank is 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
5. 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

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-2321-850-0 Jun 1 2018 2:51PM – NORMANR : Joint Inspection NOT Required

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

7. The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201] Federally Enforceable Through Title V Permit

8. The maximum annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201] Federally Enforceable Through Title V Permit

9. The annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

10. 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

11. The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve-month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201] Federally Enforceable Through Title V Permit

13. The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201] Federally Enforceable Through Title V Permit

14. Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201] Federally Enforceable Through Title V Permit

15. Total annual VOC emissions from wine storage operations may be determined using the total annual wine throughput and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the annual wine throughput; or using the throughputs for different batches of wine and batch-specific storage emissions factors, calculated using the equation(s) specified within this permit, based on the ethanol content of each batch. [District Rule 2201] Federally Enforceable Through Title V Permit

16. Total annual VOC emissions from wine storage operations shall be determined either 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; or as the emissions for total annual wine movements and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the total annual wine movements. [District Rule 2201] Federally Enforceable Through Title V Permit

17. The annual VOC wine storage emission factor for each wine 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 1,000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume % (when the ethanol content of wine is 20 volume %, P is equivalent to 0.20), a = -0.38194, b = 0.97917 and c = 0. [District Rule 2201] Federally Enforceable Through Title V Permit

18. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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 Rule District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

19. The operator shall determine and 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

20. 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

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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

22. On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201] Federally Enforceable Through Title V Permit

23. On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201] Federally Enforceable Through Title V Permit

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

25. {4660} 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

26. {4661} 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

27. 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-2321-851-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: CBUS OPS INC (DBA WOODBRIDGE WINERY)
MAILING ADDRESS: P O BOX 1260
WOODBRIDGE, CA 95258-1260

LOCATION: 5950 E WOODBRIDGE ROAD
ACAMPO, CA 95220

EQUIPMENT DESCRIPTION:
108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1690 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. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. When this tank is 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
5. 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

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-2321-851-0 : Jun 1 2018 2:51PM -- NORMANR : Joint Inspection NOT Required

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
7. The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201] Federally Enforceable Through Title V Permit
8. The maximum annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201] Federally Enforceable Through Title V Permit
9. The annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201] Federally Enforceable Through Title V Permit
10. 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
11. The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve-month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit
12. The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201] Federally Enforceable Through Title V Permit
13. The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201] Federally Enforceable Through Title V Permit
14. Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201] Federally Enforceable Through Title V Permit
15. Total annual VOC emissions from wine storage operations may be determined using the total annual wine throughput and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the annual wine throughput; or using the throughputs for different batches of wine and batch-specific storage emissions factors, calculated using the equation(s) specified within this permit, based on the ethanol content of each batch. [District Rule 2201] Federally Enforceable Through Title V Permit
16. Total annual VOC emissions from wine storage operations shall be determined either 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; or as the emissions for total annual wine movements and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the total annual wine movements. [District Rule 2201] Federally Enforceable Through Title V Permit
17. The annual VOC wine storage emission factor for each wine 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 1,000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume % (when the ethanol content of wine is 20 volume %, P is equivalent to 0.20), a = -0.38194, b = 0.97917 and c = 0. [District Rule 2201] Federally Enforceable Through Title V Permit
18. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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 Rule District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

19. The operator shall determine and 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

20. 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

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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

22. On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201] Federally Enforceable Through Title V Permit

23. On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201] Federally Enforceable Through Title V Permit

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

25. {4660} 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

26. {4661} 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

27. 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-2321-852-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: CBUS OPS INC (DBA WOODBRIDGE WINERY)
MAILING ADDRESS: P O BOX 1260
WOODBRIDGE, CA 95258-1260

LOCATION: 5950 E WOODBRIDGE ROAD
ACAMPO, CA 95220

EQUIPMENT DESCRIPTION:
108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1691 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. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. When this tank is 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
5. 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

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-2321-852-0 Jun 1 2016 2:51PM NORMANR : Joint Inspection NOT Required

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

7. The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201] Federally Enforceable Through Title V Permit

8. The maximum annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201] Federally Enforceable Through Title V Permit

9. The annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

10. 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

11. The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve-month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201] Federally Enforceable Through Title V Permit

13. The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201] Federally Enforceable Through Title V Permit

14. Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201] Federally Enforceable Through Title V Permit

15. Total annual VOC emissions from wine storage operations may be determined using the total annual wine throughput and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the annual wine throughput; or using the throughputs for different batches of wine and batch-specific storage emissions factors, calculated using the equation(s) specified within this permit, based on the ethanol content of each batch. [District Rule 2201] Federally Enforceable Through Title V Permit

16. Total annual VOC emissions from wine storage operations shall be determined either 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; or as the emissions for total annual wine movements and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the total annual wine movements. [District Rule 2201] Federally Enforceable Through Title V Permit

17. The annual VOC wine storage emission factor for each wine 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 1,000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume % (when the ethanol content of wine is 20 volume %, P is equivalent to 0.20), a = -0.38194, b = 0.97917 and c = 0. [District Rule 2201] Federally Enforceable Through Title V Permit

18. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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 Rule District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

19. The operator shall determine and 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

20. 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

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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

22. On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201] Federally Enforceable Through Title V Permit

23. On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201] Federally Enforceable Through Title V Permit

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

25. {4660} 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

26. {4661} 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

27. 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-2321-853-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: CBUS OPS INC (DBA WOODBRIDGE WINERY)
MAILING ADDRESS: P O BOX 1260
WOODBRIDGE, CA 95258-1260

LOCATION: 5950 E WOODBRIDGE ROAD
ACAMPO, CA 95220

EQUIPMENT DESCRIPTION:
108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1692 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. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. When this tank is 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
5. 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

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-2321-853-0 : Jun 1 2016 2:51PM – NORMANR : Joint Inspection NOT Required

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

7. The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201] Federally Enforceable Through Title V Permit

8. The maximum annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201] Federally Enforceable Through Title V Permit

9. The annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

10. 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

11. The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve-month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201] Federally Enforceable Through Title V Permit

13. The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201] Federally Enforceable Through Title V Permit

14. Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201] Federally Enforceable Through Title V Permit

15. Total annual VOC emissions from wine storage operations may be determined using the total annual wine throughput and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the annual wine throughput; or using the throughputs for different batches of wine and batch-specific storage emissions factors, calculated using the equation(s) specified within this permit, based on the ethanol content of each batch. [District Rule 2201] Federally Enforceable Through Title V Permit

16. Total annual VOC emissions from wine storage operations shall be determined either 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; or as the emissions for total annual wine movements and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the total annual wine movements. [District Rule 2201] Federally Enforceable Through Title V Permit

17. The annual VOC wine storage emission factor for each wine 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 1,000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume % (when the ethanol content of wine is 20 volume %, P is equivalent to 0.20), a = -0.38194, b = 0.97917 and c = 0. [District Rule 2201] Federally Enforceable Through Title V Permit

18. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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 Rule District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

19. The operator shall determine and 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

20. 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

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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

22. On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201] Federally Enforceable Through Title V Permit

23. On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201] Federally Enforceable Through Title V Permit

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

25. {4660} 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

26. {4661} 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

27. 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-2321-854-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: CBUS OPS INC (DBA WOODBRIDGE WINERY)
MAILING ADDRESS: P O BOX 1260
WOODBRIDGE, CA 95258-1260

LOCATION: 5950 E WOODBRIDGE ROAD
ACAMPO, CA 95220

EQUIPMENT DESCRIPTION:
108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1693 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. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. When this tank is 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
5. 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

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-2321-854-0 Jun 1 2010 2:51PM – NORMANR Joint Inspection NOT Required

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

7. The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201] Federally Enforceable Through Title V Permit

8. The maximum annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201] Federally Enforceable Through Title V Permit

9. The annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

10. 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

11. The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve-month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201] Federally Enforceable Through Title V Permit

13. The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201] Federally Enforceable Through Title V Permit

14. Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201] Federally Enforceable Through Title V Permit

15. Total annual VOC emissions from wine storage operations may be determined using the total annual wine throughput and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the annual wine throughput; or using the throughputs for different batches of wine and batch-specific storage emissions factors, calculated using the equation(s) specified within this permit, based on the ethanol content of each batch. [District Rule 2201] Federally Enforceable Through Title V Permit

16. Total annual VOC emissions from wine storage operations shall be determined either 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; or as the emissions for total annual wine movements and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the total annual wine movements. [District Rule 2201] Federally Enforceable Through Title V Permit

17. The annual VOC wine storage emission factor for each wine 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 1,000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume % (when the ethanol content of wine is 20 volume %, P is equivalent to 0.20), a = -0.38194, b = 0.97917 and c = 0. [District Rule 2201] Federally Enforceable Through Title V Permit

18. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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 Rule District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

19. The operator shall determine and 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

20. 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

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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

22. On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201] Federally Enforceable Through Title V Permit

23. On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201] Federally Enforceable Through Title V Permit

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

25. {4660} 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

26. {4661} 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

27. 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-2321-855-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: CBUS OPS INC (DBA WOODBRIDGE WINERY)
MAILING ADDRESS: P O BOX 1260
WOODBRIDGE, CA 95258-1260

LOCATION: 5950 E WOODBRIDGE ROAD
ACAMPO, CA 95220

EQUIPMENT DESCRIPTION:
108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1694 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. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. When this tank is 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
5. 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

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-2321-855-0 : Jun 1 2016 2:51PM -- NORMANR : Joint Inspection NOT Required

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

7. The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201] Federally Enforceable Through Title V Permit

8. The maximum annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201] Federally Enforceable Through Title V Permit

9. The annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

10. 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

11. The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve-month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201] Federally Enforceable Through Title V Permit

13. The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201] Federally Enforceable Through Title V Permit

14. Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201] Federally Enforceable Through Title V Permit

15. Total annual VOC emissions from wine storage operations may be determined using the total annual wine throughput and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the annual wine throughput; or using the throughputs for different batches of wine and batch-specific storage emissions factors, calculated using the equation(s) specified within this permit, based on the ethanol content of each batch. [District Rule 2201] Federally Enforceable Through Title V Permit

16. Total annual VOC emissions from wine storage operations shall be determined either 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; or as the emissions for total annual wine movements and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the total annual wine movements. [District Rule 2201] Federally Enforceable Through Title V Permit

17. The annual VOC wine storage emission factor for each wine 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 1,000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume % (when the ethanol content of wine is 20 volume %, P is equivalent to 0.20), a = -0.38194, b = 0.97917 and c = 0. [District Rule 2201] Federally Enforceable Through Title V Permit

18. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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 Rule District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

19. The operator shall determine and 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

20. 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

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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

22. On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201] Federally Enforceable Through Title V Permit

23. On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201] Federally Enforceable Through Title V Permit

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

25. {4660} 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

26. {4661} 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

27. 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-2321-856-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: CBUS OPS INC (DBA WOODBRIDGE WINERY)
MAILING ADDRESS: P O BOX 1260
WOODBRIDGE, CA 95258-1260

LOCATION: 5950 E WOODBRIDGE ROAD
ACAMPO, CA 95220

EQUIPMENT DESCRIPTION:
108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1695 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. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. When this tank is 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
5. 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

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-2321-856-0 : Jun 1 2016 2:51PM -- NORMANR : Joint Inspection NOT Required

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

7. The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201] Federally Enforceable Through Title V Permit

8. The maximum annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201] Federally Enforceable Through Title V Permit

9. The annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

10. 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

11. The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve-month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201] Federally Enforceable Through Title V Permit

13. The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201] Federally Enforceable Through Title V Permit

14. Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201] Federally Enforceable Through Title V Permit

15. Total annual VOC emissions from wine storage operations may be determined using the total annual wine throughput and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the annual wine throughput; or using the throughputs for different batches of wine and batch-specific storage emissions factors, calculated using the equation(s) specified within this permit, based on the ethanol content of each batch. [District Rule 2201] Federally Enforceable Through Title V Permit

16. Total annual VOC emissions from wine storage operations shall be determined either 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; or as the emissions for total annual wine movements and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the total annual wine movements. [District Rule 2201] Federally Enforceable Through Title V Permit

17. The annual VOC wine storage emission factor for each wine 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 1,000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume % (when the ethanol content of wine is 20 volume %, P is equivalent to 0.20), a = -0.38194, b = 0.97917 and c = 0. [District Rule 2201] Federally Enforceable Through Title V Permit

18. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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 Rule District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

19. The operator shall determine and 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

20. 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

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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

22. On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201] Federally Enforceable Through Title V Permit

23. On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201] Federally Enforceable Through Title V Permit

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

25. {4660} 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

26. {4661} 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

27. 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-2321-857-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: CBUS OPS INC (DBA WOODBRIDGE WINERY)
MAILING ADDRESS: P O BOX 1260
WOODBRIDGE, CA 95258-1260

LOCATION: 5950 E WOODBRIDGE ROAD
ACAMPO, CA 95220

EQUIPMENT DESCRIPTION:
108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1696 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. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. When this tank is 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
5. 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

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-2321-857-0 Jun 1 2018 2:51PM -- NORMANR : Joint Inspection NOT Required

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

7. The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201] Federally Enforceable Through Title V Permit

8. The maximum annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201] Federally Enforceable Through Title V Permit

9. The annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

10. 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

11. The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve-month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201] Federally Enforceable Through Title V Permit

13. The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201] Federally Enforceable Through Title V Permit

14. Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201] Federally Enforceable Through Title V Permit

15. Total annual VOC emissions from wine storage operations may be determined using the total annual wine throughput and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the annual wine throughput; or using the throughputs for different batches of wine and batch-specific storage emissions factors, calculated using the equation(s) specified within this permit, based on the ethanol content of each batch. [District Rule 2201] Federally Enforceable Through Title V Permit

16. Total annual VOC emissions from wine storage operations shall be determined either 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; or as the emissions for total annual wine movements and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the total annual wine movements. [District Rule 2201] Federally Enforceable Through Title V Permit

17. The annual VOC wine storage emission factor for each wine 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 1,000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume % (when the ethanol content of wine is 20 volume %, P is equivalent to 0.20), a = -0.38194, b = 0.97917 and c = 0. [District Rule 2201] Federally Enforceable Through Title V Permit

18. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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 Rule District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

19. The operator shall determine and 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

20. 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

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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

22. On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201] Federally Enforceable Through Title V Permit

23. On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201] Federally Enforceable Through Title V Permit

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

25. {4660} 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

26. {4661} 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

27. 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-2321-858-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: CBUS OPS INC (DBA WOODBRIDGE WINERY)
MAILING ADDRESS: P O BOX 1260
WOODBRIDGE, CA 95258-1260

LOCATION: 5950 E WOODBRIDGE ROAD
ACAMPO, CA 95220

EQUIPMENT DESCRIPTION:
108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1697 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. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. When this tank is 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
5. 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

CONDITIONS CONTINUE ON NEXT PAGE

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Seyed Sadredin, Executive Director / APCO

DRAFT

Arnaud Marjollet, Director of Permit Services

Northern Regional Office • 4800 Enterprise Way • Modesto, CA 95356-8718 • (209) 557-6400 • Fax (209) 557-6475

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

7. The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201] Federally Enforceable Through Title V Permit

8. The maximum annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201] Federally Enforceable Through Title V Permit

9. The annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

10. 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

11. The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve-month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201] Federally Enforceable Through Title V Permit

13. The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201] Federally Enforceable Through Title V Permit

14. Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201] Federally Enforceable Through Title V Permit

15. Total annual VOC emissions from wine storage operations may be determined using the total annual wine throughput and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the annual wine throughput; or using the throughputs for different batches of wine and batch-specific storage emissions factors, calculated using the equation(s) specified within this permit, based on the ethanol content of each batch. [District Rule 2201] Federally Enforceable Through Title V Permit

16. Total annual VOC emissions from wine storage operations shall be determined either 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; or as the emissions for total annual wine movements and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the total annual wine movements. [District Rule 2201] Federally Enforceable Through Title V Permit

17. The annual VOC wine storage emission factor for each wine 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 1,000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume % (when the ethanol content of wine is 20 volume %, P is equivalent to 0.20), a = -0.38194, b = 0.97917 and c = 0. [District Rule 2201] Federally Enforceable Through Title V Permit

18. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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 Rule District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

19. The operator shall determine and 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

20. 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

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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

22. On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201] Federally Enforceable Through Title V Permit

23. On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201] Federally Enforceable Through Title V Permit

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

25. {4660} 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

26. {4661} 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

27. 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-2321-859-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: CBUS OPS INC (DBA WOODBRIDGE WINERY)
MAILING ADDRESS: P O BOX 1260
WOODBRIDGE, CA 95258-1260

LOCATION: 5950 E WOODBRIDGE ROAD
ACAMPO, CA 95220

EQUIPMENT DESCRIPTION:
108,000 GALLON STAINLESS STEEL ENCLOSED TOP WINE FERMENTATION AND STORAGE TANK 1698 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. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. When this tank is 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
5. 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

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-2321-859-0 Jun 1 2018 2:51PM -- NORMANR : Joint Inspection NOT Required

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

7. The daily VOC emissions from fermentation operations in this tank shall not exceed 3.46 lb per 1,000 gallons of tank capacity. [District Rule 2201] Federally Enforceable Through Title V Permit

8. The maximum annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall not exceed 1,240 lb-VOC per year (equivalent to a maximum annual white wine fermentation throughput of 496,000 gallons per year or a maximum annual red wine fermentation throughput of 200,000 gallons per year). [District Rule 2201] Federally Enforceable Through Title V Permit

9. The annual VOC emissions from wine fermentation in this tank, calculated on a 12-month rolling basis, shall be determined by the following formula: Annual Fermentation VOC emissions = 2.5 lb-VOC/1,000 gallons x Annual White Wine Production (in gallons) + 6.2 lb-VOC/1,000 gallons x Annual Red Wine Production (in gallons). [District Rule 2201] Federally Enforceable Through Title V Permit

10. 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

11. The weighted annual average ethanol content of wine stored in this tank, calculated on a twelve-month rolling basis, shall not exceed 17 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The daily throughput, in gallons, of wine stored in this tank shall not exceed 432,000 gallons per day (equivalent to four times the maximum nominal tank capacity stated in the equipment description). [District Rule 2201] Federally Enforceable Through Title V Permit

13. The maximum annual wine storage throughput in this tank, calculated on a twelve (12) month rolling basis, shall not exceed 5,400,000 gallons per year. [District Rule 2201] Federally Enforceable Through Title V Permit

14. Total annual VOC emissions from all wine fermentation and wine storage operations at this facility shall not exceed 1,167,178 lb/year, calculated on a twelve (12) month rolling basis. [District Rule 2201] Federally Enforceable Through Title V Permit

15. Total annual VOC emissions from wine storage operations may be determined using the total annual wine throughput and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the annual wine throughput; or using the throughputs for different batches of wine and batch-specific storage emissions factors, calculated using the equation(s) specified within this permit, based on the ethanol content of each batch. [District Rule 2201] Federally Enforceable Through Title V Permit

16. Total annual VOC emissions from wine storage operations shall be determined either 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; or as the emissions for total annual wine movements and a single storage emissions factor, calculated using the equation(s) specified within this permit, based on the average ethanol content of the total annual wine movements. [District Rule 2201] Federally Enforceable Through Title V Permit

17. The annual VOC wine storage emission factor for each wine 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 1,000 gallons of wine throughput; and P is the volume percent ethanol of the wine being transferred. For concentrations up to and including 24 volume % (when the ethanol content of wine is 20 volume %, P is equivalent to 0.20), a = -0.38194, b = 0.97917 and c = 0. [District Rule 2201] Federally Enforceable Through Title V Permit

18. For each batch of must fermented in this tank, the operator shall record the fermentation completion date, the total gallons of must fermented, and the average fermentation temperature. 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 Rule District Rules 2201 and 4694] Federally Enforceable Through Title V Permit

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19. The operator shall determine and 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

20. 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

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; the calculated 12 month rolling wine ethanol content and throughput rate for fermentation and storage operations; and the calculated 12 month rolling VOC emission rate (lb-VOC per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

22. On a monthly basis, the permittee shall calculate and record the VOC emissions, in pounds, from the wine fermentation and storage operations in this tank. [District Rule 2201] Federally Enforceable Through Title V Permit

23. On a monthly basis, the permittee shall calculate and record the total facility-wide wine fermentation and storage VOC emissions, in pounds, for the rolling 12-month period. The facility-wide wine fermentation and storage VOC emissions shall be calculated by summing the VOC emissions from the previous 12 months from every permitted wine tank at this facility. [District Rule 2201] Federally Enforceable Through Title V Permit

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

25. {4660} 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

26. {4661} 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

27. 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 I
Public Comments and District Responses

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 E, Attachment E1 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 control system is $166,024, while the project estimate is $1,872,901 (a factor of 11.3 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 12, 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 on 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).

District Response to EcoPAS Comment #3

EcoPAS is welcome to pursue and coordinate such a partnership with the wine industry in the Central Valley, and the District would be a willing and interested party to a cooperative effort. The data obtained from such an experiment would be very useful for future evaluations of the control technology, its compatibility with winery operations, and the potential for the service-type relationship described above. However, New Source Review does not provide any mechanism that would allow the District to compel the wine industry to participate in such a partnership.

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. Because the emission controls analyzed are not cost-effective and therefore cannot be required by the District, the decision regarding whether installing controls would minimize legal risk is a business decision to be made by the winery.

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 and permit issuance 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.