San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

DEC 22 2015

Mr. Dan Martin
E & J Gallo Winery
18000 W River Road
Livingston, CA 95334

Re: Proposed ATC / Certificate of Conformity (Significant Mod)
District Facility # N-1237
Project # N-1153264

Dear Mr. Martin:

Enclosed for your review is the District's analysis of an application for Authorities to Construct for the facility identified above. You requested that Certificates of Conformity with the procedural requirements of 40 CFR Part 70 be issued with this project. This project authorizes the installation of 3 wine and distilled spirits storage tanks.

After addressing all comments made during the 30-day public notice and the 45-day EPA comment periods, the District intends to issue the Authorities to Construct with Certificates of Conformity. Please submit your comments within the 30-day public comment period, as specified in the enclosed public notice. Prior to operating with modifications authorized by the Authorities to Construct, the facility must submit an application to modify the Title V permit as an administrative amendment, in accordance with District Rule 2520, Section 11.5.

If you have any questions, please contact Mr. Errol Villegas, Permit Services Manager, at (559) 230-5900.

Thank you for your cooperation in this matter.

Sincerely,

Arnaud Marjollet
Director of Permit Services

Enclosures

cc: Mike Tollstrup, CARB (w/enclosure) via email
cc: Gerardo C. Rios, EPA (w/enclosure) via email

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San Joaquin Valley Air Pollution Control District
Authority to Construct Application Review
Wine and Distilled Spirits Storage Tanks

Facility Name:	E & J Gallo Winery	Date:	December 4, 2015
Mailing Address:	18000 W River Rd	Engineer:	Jesse A. Garcia
	Livingston, CA 95334	Lead Engineer:	Joven Refuerzo
Contact Person:	Kim Burns		
Telephone:	(559) 458-2457		
Email:	Kim.Burns@ejgallo.com		
Application #(s):	N-1237-783-0, -784-0 and -785-0		
Project #:	N-1153264		
Deemed Complete:	November 4, 2015		

I. Proposal

E & J Gallo Winery has requested Authority to Construct (ATC) permits for the installation of three new wine and distilled spirit tanks. These tanks will be used for wine and distilled spirit storage only.

E & J Gallo Winery received their Title V Permit. This modification can be classified as a Title V significant modification pursuant to Rule 2520, and can be processed with a Certificate of Conformity (COC). Since the facility has specifically requested that this project be processed in that manner, the 45-day EPA comment period will be satisfied prior to the issuance of the Authority to Construct. E & J Gallo Winery must apply to administratively amend their Title V permit.

II. Applicable Rules

Rule 2201	New and Modified Stationary Source Review Rule (4/21/11)
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 4623	Storage of Organic Liquids (05/19/05)
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 18000 W River Rd in Livingston, 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

E & J Gallo Winery - Livingston produces red and white wines and distilled alcoholic beverages which are stored and processed in the subject storage tanks. These tanks may hold wine and spirits with ethanol contents up to 95% by volume for the two 6,000 gallon tanks and 24% by volume for the 20,000 gallon tank.

V. Equipment Listing

N-1237-783-0: 6,000 GALLON (NOMINAL) INSULATED STAINLESS STEEL WINE AND DISTILLED SPIRITS STORAGE TANK (TANK D603) WITH PRESSURE/VACUUM VALVE AND INSULATION

N-1237-784-0: 6,000 GALLON (NOMINAL) INSULATED STAINLESS STEEL WINE AND DISTILLED SPIRITS STORAGE TANK (TANK D604) WITH PRESSURE/VACUUM VALVE AND INSULATION

N-1237-785-0: 20,000 GALLON (NOMINAL) INSULATED STAINLESS STEEL WINE AND DISTILLED SPIRITS STORAGE TANK (TANK D604) WITH PRESSURE/VACUUM VALVE AND INSULATION

VI. Emission Control Technology Evaluation

VOCs (ethanol) are emitted from wine and spirit 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. When the storage tanks are insulated, breathing losses are considered to be negligible.

VII. General Calculations

A. Assumptions

- The proposed tanks will only be used for red and white wine and distilled spirits storage
- Typically, for enclosed tanks with refrigeration and/or insulation (or equivalent) and P/V valves, breathing losses from storage of spirits are assumed to be negligible
- Maximum daily liquid storage temperature = 81.0 °F (per FYI-295)
- Maximum annual liquid storage temperature = 63.3 °F (per FYI-295)
- Storage tank daily and annual maximum ethanol content of stored wine/spirits is:

  - 95% for the two 6,000 gallon tanks
  - 24% for the 20,000 gallon tanks
- Maximum storage throughput as proposed by applicant:

Tanks	Daily Storage (gal/day)	Annual Storage (gal/year)
N-1237-783-0	6,000	220,000
N-1237-784-0	6,000	220,000
N-1237-785-0	20,000	500,000

B. Emission Factors

Tanks 4.0 will be used to calculate the storage emissions from the new tanks.

C. Calculations

1. Pre-Project Potential to Emit (PE1)

Since these are new emissions units (storage), PE1 = 0 (all pollutants) for these tanks.

2. Post Project Potential to Emit (PE2)

The new wine and distilled spirit tanks will be used for storage only. Two Tanks 4.0 runs have been performed; one run was performed using the daily throughput times 31 and run in the month of July and then dividing the results by 31 to calculate the daily post-project potential to emit and one run using the annual throughput to calculate the annual post-project potential to emit. See Appendix A for the Tanks 4.0 runs for each tank and a summary of emissions from storage.

Tanks	Daily PE2 (lb-VOC/day)	Annual PE2 (lb-VOC/yr)
N-1237-783-0	6.9	143
N-1237-784-0	6.9	143
N-1237-785-0	8.3	114

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

Pursuant to Section 4.9 of District Rule 2201, the Pre-Project Stationary Source Potential to Emit (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 that have occurred at the source, and which have not been used on-site.

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

This project only concerns VOC emissions. This facility acknowledges that its VOC emissions are already above the Offset and Major Source Thresholds for VOC emissions; therefore, SSPE2 calculations are not necessary.

5. Major Source Determination

Rule 2201 Major Source Determination:

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:

As determined in Section VII.D.4 of this document, this facility is an existing Rule 2201 major source for VOC emissions. The following table summarizes the potential VOC emissions from previous permitting actions (non-exhaustive) for this stationary source before the proposed project.

Project Number	Proposed Permitting Actions	PE (lb-VOC/year)
N-1072605	Applying for In-house PTOs for existing wine storage and fermentation tanks	470,985
N-1110129	Install 2 wine fermentation tanks	8,432
N-1110722	Convert 7 existing grape juice tanks to wine fermentation tanks	15,680
N-1113344	Install 104 wine storage and fermentation tanks	94,430
N-1113395	Install 3 wine storage and fermentation tanks	10,173
N-1113047	Install 2 distilled spirit tanks	188
N-1113864	Install an ethanol evaporator system	7,719
N-1131615	Install 8 wine storage tanks and 24 wine fermentation tanks	85,064
Total		**692,671**

As indicated above, the SSPE for VOC emissions before the proposed project is calculated to be 692,671 pounds per year, equivalent to 346.3 tons per year.

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

PSD Major Source Determination (tons/year)	
	VOC
Facility PE before Project Increase	346.3
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 lbs/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 Section 3.7 of District 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), calculated pursuant to Section 3.22 of District Rule 2201.

Since these are new emissions unit, BE = PE1 = 0 for all pollutants for each unit.

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 VII.C.5 above, the facility is an existing Major Source for VOC; however, the project by itself would need to be a significant increase in order to trigger a Major Modification. The emissions units within this project do not have a total potential to emit which is greater than Major Modification thresholds (see table below). Therefore, the project cannot be a significant increase and the project does not constitute a Major Modification.

SB 288 Major Modification Thresholds (Existing Major Source)			
Pollutant	Project PE (lb/year)	Threshold (lb/year)	Major Modification?
VOC	400	50,000	No

8. Federal Major Modification

District Rule 2201, Section 3.17 states that Federal Major Modifications are the same as "Major Modification" as defined in 40 CFR 51.165 and part D of Title I of the CAA. SB 288 Major Modifications are not federal major modifications if they meet the criteria of the "Less-Than-Significant Emissions Increase" exclusion.

A Less-Than-Significant Emissions Increase exclusion is for an emissions increase for the project, or a Net Emissions Increase for the project (as defined in 40 CFR 51.165 (a)(2)(ii)(B) through (D), and (F)), that is not significant for a given regulated NSR pollutant, and therefore is not a federal major modification for that pollutant.

- To determine the post-project projected actual emissions from existing units, the provisions of 40 CFR 51.165 (a)(1)(xxviii) shall be used.
- To determine the pre-project baseline actual emissions, the provisions of 40 CFR 51.165 (a)(1)(xxxv)(A) through (D) shall be used.
- If the project is determined not to be a federal major modification pursuant to the provisions of 40 CFR 51.165 (a)(2)(ii)(B), but there is a reasonable possibility that the project may result in a significant emissions increase, the owner or operator shall comply with all of the provisions of 40 CFR 51.165 (a)(6) and (a)(7).
- Emissions increases calculated pursuant to this section are significant if they exceed the significance thresholds specified in the table below.

Significant Threshold (lb/year)	
Pollutant	Threshold (lb/year)
VOC	0

The Net Emissions Increases (NEI) for purposes of determination of a "Less-Than-Significant Emissions Increase" exclusion will be calculated below to determine if this project qualifies for such an exclusion.

Net Emission Increase for New Units (NEI_N)

Per 40 CFR 51.165 (a)(2)(ii)(D) for new emissions units in this project,

$NEI_N = PE2_N - BAE$

Since these are new units, BAE for these units is zero and,

$NEI_N = PE2_N$

where $PE2_N$ is the Post Project Potential to Emit for the new emissions units.

$NEI_N = PE2_N = 400$ lb-VOC/year

The NEI for this project is thus calculated as follows:

$NEI = NEI_N$
NEI = 400 lb-VOC/year

The NEI for this project will be greater than the Federal Major Modification threshold of 0 lb-VOC/year. Therefore, this project does not qualify for a "Less-Than-Significant Emissions Increase" exclusion and is thus determined to be a Federal Major Modification for VOC.

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

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

- NO2 (as a primary pollutant)
- SO2 (as a primary pollutant)
- CO
- PM
- PM10

The first step of this PSD evaluation consists of determining whether the facility is an existing PSD Major Source or not (See Section VII.C.5 of this document).

In the case the facility is an existing PSD Major Source, the second step of the PSD evaluation is to determine if the project results in a PSD significant increase.

In the case the facility is NOT an existing PSD Major Source but is an existing source, the second step of the PSD evaluation is to determine if the project, by itself, would be a PSD major source.

In the case the facility is new source, the second step of the PSD evaluation is to determine if this new facility will become a new PSD major Source as a result of the project and if so, to determine which pollutant will result in a PSD significant increase.

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 major source for PSD. Because the project

is not located within 10 km 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. Significance of Project Emission Increase Determination

a. Potential to Emit of attainment/unclassified pollutant for New or Modified Emission Units vs PSD Significant Emission Increase Thresholds

As a screening tool, the potential to emit from all new and modified units is compared to the PSD significant emission increase thresholds, and if total potential to emit from all new and modified units is below this threshold, no futher analysis will be needed.

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 project has a total potential to emit from all new and modified emission units below the PSD significant emission increase thresholds, this project is not subject to the requirements of Rule 2410 due to a significant emission increase 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. Detailed QNEC calculations are included in Appendix D.

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 for the following*:

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

The applicant is proposing to install new wine and distilled spirits storage tanks with a PE greater than 2 lb/day for VOC. Thus BACT is triggered for VOC for these emissions units.

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

There are no emissions units being relocated from one stationary source to another, hence BACT is not triggered under this category.

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.

d. SB 288/Federal Major Modification

As discussed in VII.C.8 above, this project constitutes a Federal Major Modification for VOC emissions. Therefore BACT is triggered for VOC for all emissions units in the project for which there is an emission increase.

2. BACT Guideline

BACT Guidelines 5.4.13 and 5.4.15, applies to the wine storage and distilled spirits storage tanks. [Wine Storage Tanks] and [Distilled Spirits Storage Tanks] respectively. (Appendix B)

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 Analysis (Appendix B), BACT has been satisfied with the following:

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

B. Offsets

1. Offset Applicability

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

Facility emissions are already above the Offset and Major Source Thresholds for VOC emissions; therefore, offsets are triggered.

2. Quantity of Offsets Required

As discussed 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.

Per Sections 4.7.1 and 4.7.3, 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 Section 4.8

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 due to this project. Therefore,

Offsets Required (lb/year) = Σ[PE2 – BE] x DOR

The project is a Federal Major Modification; therefore, the offset ratio for VOC is 1.5:1.

Offsets Required for Storage				
Tank Model (ATCs)	PE2 (lb-VOC/yr)	Annual BE (lb-VOC/yr)	DOR	Offsets Required (lb-VOC/yr)
N-1237-783-0	143	0	1.5	215
N-1237-784-0	143	0	1.5	215
N-1237-785-0	114	0	1.5	171
Total				601

Calculating the appropriate quarterly emissions to be offset is as follows:

Quarterly offsets required (lb/qtr) = (Annual Offsets lb-VOC/year) ÷ (4 quarters/year)

Quarterly Offset Requirements for Each Tank - VOCs				
Tank Model (ATCs)	1st Qtr (lb/qtr)	2nd Qtr (lb/qtr)	3rd Qtr (lb/qtr)	4th Qtr (lb/qtr)
N-1237-783-0	53	54	54	54
N-1237-784-0	53	54	54	54
N-1237-785-0	42	43	43	43
Total	148	151	151	151

The applicant has stated that the facility plans to use ERC certificate S-4601-1 (split from S-4160-1), S-4354-1 (split from S-3805-1), S-4442-1 (split from S-4126-1), S-4381-1, S-4480-1 (split from S-4230-1), S-4414-1, C-1229-1, C-1071-1, N-002-1 to offset the increases in VOC emissions associated with this project. The above certificate has available quarterly VOC credits as follows:

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
ERC #S-4601-1	2,107	2,106	1,527	1,407
ERC #S-4354-1	16,065	16,065	16,065	16,065
ERC #S-4442-1	7,039	7,032	7,025	7,013
ERC #S-4381-1	827	771	816	805
ERC #S-4480-1	16,946	16,904	16,875	16,857
ERC #S-4414-1	2,761	2,761	2,783	2,783
ERC #C-1229-1	8,075	8,075	8,041	8,040
ERC #C-1071-1	23	22	21	20
ERC #N-002-1	9	9	26	28

As seen above, the facility has sufficient credits to fully offset the quarterly VOC emissions increases associated with this project.

Proposed Rule 2201 (offset) Conditions:

For All Tanks:

- ERC Certificate Numbers S-4601-1, S-4354-1, S-4442-1, S-4381-1, S-4480-1, S-4414-1, C-1229-1, C-1071-1 and/or N-002-1 (or a certificate split from these certificates) shall be used to supply the required offsets, unless a revised offsetting proposal is received and approved by the District, upon which this Authority to Construct shall be reissued, administratively specifying the new offsetting proposal. Original public noticing requirements, if any, shall be duplicated prior to reissuance of this Authority to Construct. [District Rule 2201]

N-1237-783-0 and -784-0:

- {GC# 4447 - edited} Prior to operating equipment under this Authority to Construct, permittee shall surrender VOC emission reduction credits for the following quantity of emissions: 1st quarter - 53 lb, 2nd quarter - 54 lb, 3rd quarter - 54 lb, and fourth quarter - 54 lb. These amounts include the applicable offset ratio specified in Rule 2201 Section 4.8 (as amended 4/21/11) for the ERC specified below. [District Rule 2201]

N-1237-785-0:

- {GC# 4447 - edited} Prior to operating equipment under this Authority to Construct, permittee shall surrender VOC emission reduction credits for the following quantity of emissions: 1st quarter - 42 lb, 2nd quarter - 43 lb, 3rd quarter - 43 lb, and fourth quarter - 43 lb. These amounts include the applicable offset ratio specified in Rule 2201 Section 4.8 (as amended 4/21/11) for the ERC specified below. [District Rule 2201]

C. Public Notification

1. Applicability

Public noticing is required for:

a. New Major Sources, Federal Major Modifications, and SB288 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.
e. Any project which results in a Title V significant permit modification

a. New Major Sources, Federal Major Modifications, and SB288 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 VII.C.8, this project is a Federal Major Modification for VOC; therefore, public noticing for 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. As seen in Section VII.C.2 above, this project does not include a new emissions unit which has daily emissions greater than 100 lb/day for any pollutant; therefore public noticing for PE > 100 lb/day purposes is not required.

c. Offset Threshold

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

Offset Threshold				
Pollutant	SSPE1 (lb/year)	SSPE2 (lb/year)	Offset Threshold	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 offset purposes.

d. SSIPE > 20,000 lb/year

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

Stationary Source Increase in Permitted Emissions [SSIPE] – Public Notice					
Pollutant	ΣPE2 (lb/year)	ΣPE1 (lb/year)	SSIPE (lb/year)	SSIPE Public Notice Threshold	Public Notice Required?
VOC	400	0	400	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.

e. Title V Significant Permit Modification

As shown in the Discussion of Rule 2520 below, this project constitutes a Title V significant modification. Therefore, public noticing for Title V significant modifications is required for this project.

2. Public Notice Action

As discussed above, public noticing is required for this project for Federal Major Modification. Therefore, public notice documents will be submitted to the California Air Resources Board (CARB) and US Environmental Protection Agency (US EPA) and a public notice will be published in a local newspaper of general circulation prior to the issuance of the ATCs 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.

For all wine storage tank emissions units affected by this project, the DEL is stated in the form of a daily limit on tank throughput and a maximum ethanol content for wine stored in the tank.

Proposed Rule 2201 (DEL) Conditions:

N-1237-783-0 and -784-0

- The ethanol content of wine/spirits stored in this tank shall not exceed 95.0 percent by volume. [District Rule 2201]
- The maximum wine/spirits storage throughput in this tank shall not exceed 6,000 gallons per day. [District Rule 2201]
- The maximum wine/spirits storage throughput in this tank, calculated on a twelve month rolling basis, shall not exceed 220,000 gallons per year (equivalent to 143 lb-VOC/year). [District Rule 2201]

N-1237-785-0

- The ethanol content of wine/spirits stored in this tank shall not exceed 24.0 percent by volume. [District Rule 2201]
- The maximum wine/spirits storage throughput in this tank shall not exceed 20,000 gallons per day. [District Rule 2201]
- The maximum wine/spirits storage throughput in this tank, calculated on a twelve month rolling basis, shall not exceed 500,000 gallons per year (equivalent to 114 lb-VOC/year). [District Rule 2201]

For All Tanks

- 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]
- The pressure-vacuum relief valve and storage tank shall remain in a gas-tight condition, except when the operating pressure of the tank exceeds the valve set pressure. A gas-tight condition shall be determined by measuring the gas leak in accordance with the procedures in EPA Method 21. [District Rules 2201 and 4694]
- The temperature of the wine stored in this tank shall be maintained at or below 75 degrees Fahrenheit. The temperature of the stored wine shall be determined and recorded at least once per week. For each batch of wine, the operator shall achieve the storage temperature of 75 degrees Fahrenheit or less within 60 days after completing fermentation, and shall maintain records to show when the required storage temperature of 75 degrees Fahrenheit or less was achieved. [District Rules 2201 and 4694]

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. The following conditions will be placed on the permits:

- 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/spirits transferred, shall be maintained. [District Rules 1070 and 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

Section 4.14.1 of this Rule requires that an ambient air quality analysis (AAQA) 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 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 Sections VIII-Rule 2201-C.1.a and VIII-Rule 2201-C.1.b, this source is undergoing a Federal Major Modification, therefore this requirement is applicable. Included in Appendix C is the facility's compliance certification.

H. Alternative Siting Analysis

Alternative siting analysis is required for any project, which constitutes a New Major Source or a Federal Major Modification.

In addition to winery tanks, the operation of a winery requires a large number support equipment, services and structures such as raw material receiving stations, crushers, piping, filtering and refrigeration units, warehouses, laboratories, bottling and shipping facilities, and administration buildings.

Since the current project involves only a minimal increase in the winery's total tank volume and no change to any other facets of the operation, the existing site will result in the least possible impact from the project. Alternative sites would involve the relocation and/or construction of various support structures and facilities on a much greater scale, and would therefore result in a much greater impact.

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 not applied for a Certificate of Conformity (COC); therefore, the facility must apply to modify their Title V permit with a significant modification, 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 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/spirits storage tank operations.

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

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

Rule 4102 Nuisance

Rule 4102 states that no air contaminant shall be released into the atmosphere which causes a public nuisance. Public nuisance conditions are not expected as a result of the proposed operations provided the equipment is well maintained. Therefore, the following condition will be listed on each permit to ensure compliance:

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

California Health & Safety Code 41700 (Health Risk Assessment)

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

Ethanol is not a HAP 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 4623 Storage of Organic Liquids

The purpose of this rule is to limit volatile organic compound (VOC) emissions from the storage of organic liquids. This rule applies to any tank with a capacity of 1,100 gallons or greater in which any organic liquid is placed, held, or stored.

However, Section 4.1.4 provides an exemption for tanks used to store fermentation products, byproducts or spirits. The tanks in this project are storage tanks used to store wine and distilled spirits. Therefore, the requirements of this rule are not applicable to this project.

District 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 any winery fermenting wine and/or storing wine in bulk containers.

The storage tanks in this project store distilled spirits as well as wine. Therefore, the requirements of this rule are not applicable to the tanks when storing spirits. However, when storing wine, the proposed tanks are subject to this rule; therefore, the following discussion only applies when the tanks are storing wine.

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). Since the proposed tanks will be used for storage only, this section is not applicable; therefore, no further discussion is required.

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 the 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 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 5.2.1:

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

Section 5.2.2 requires that the temperature of the stored wine be maintained at or below 75° F. The following condition will be 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 Rule 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. The proposed tanks in this project are for wine storage only, and since these sections are not applicable to wine storage operations, no further discussion is required.

Section 6.4.1 requires that records be kept for each fermentation batch. These tanks are not fermenters; therefore this section does not apply.

Section 6.4.2 requires that weekly records be kept of wine volume and temperature in each storage tank. The following conditions will be placed on the permit for each storage tank to ensure compliance with the requirements of Section 6.4.2:

- 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]

Section 6.4.3 requires that all monitoring be performed for any CERs as identified in the facility's Three-Year Compliance Plan and that the records of all monitoring be maintained. Since this requirement is for operators mitigation fermentation emission and the proposed tanks are only for wine storage operations, this section is not applicable to wine tanks in this project. Therefore, no further discussion is required.

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 conditions will be placed on all permits to ensure compliance:

- 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]

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. Therefore, pursuant to California Health and Safety Code 42301.6, a school notice is not required.

California Environmental Quality ACT (CEQA)

The California Environmental Quality Act (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 San Joaquin Valley Unified Air Pollution Control District (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.
- 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 Merced (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 Mitigated 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. Furthermore, the District has conducted an engineering evaluation of the project, this document, which demonstrates that Stationary Source emissions from the project would be below the District's thresholds of significance for criteria pollutants. 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 will have a less than significant impact 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)).

IX. Recommendation

Compliance with all applicable rules and regulations is expected. Pending a successful NSR Public Noticing period, issue Authorities to Construct N-1237-783-0 through -785-0 subject to the permit conditions on the attached draft Authorities to Construct in Appendix E.

X. Billing Information

Annual Permit Fees			
Permit Number	Fee Schedule	Fee Description	Annual Fee
N-1237-783-0	3020-05-B	6,000 gallons	$98.00
N-1237-784-0	3020-05-B	6,000 gallons	$98.00
N-1237-785-0	3020-05-C	20,000 gallons	$142.00

XI. Appendices

A: Tanks 4.0 Calculations
B: BACT Guidelines and Top Down BACT Analysis
C: Compliance Certification
D: QNEC Calculations
E: Draft ATCs

Appendix A

Tanks 4.0 Calculations

N-1237			Output from Tank 4.0 total emissions no speciation			
% by Volume Alcohol	Average Ya	AMW Average	Total Pound of Emissions per Day	Total Pound of Emissions per Year	Alcohol Emissions in pounds (Max Daily	Alcohol Emissions in pounds (Max Annual)
95.0%	0.8611	42.13	227.09	152.24	6.9	143
24.0%	0.4398	30.34	386.45	170.02	8.3	114

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

Identification		
User Identification:	N-1237-783 Daily	
City:		
State:		
Company:		
Type of Tank:	Vertical Fixed Roof Tank	
Description:		
Tank Dimensions		
Shell Height (ft):		12.00
Diameter (ft):		9.00
Liquid Height (ft) :		12.00
Avg. Liquid Height (ft):		12.00
Volume (gallons):		5,710.70
Turnovers:		31.00
Net Throughput(gal/yr):		177,031.70
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)		0.22
Breather Vent Settings		
Vacuum Settings (psig):		0.00
Pressure Settings (psig)		0.00

Meterological Data used in Emissions Calculations: Fresno, California (Avg Atmospheric Pressure = 14.56 psia)

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

N-1237-783 Daily - Vertical Fixed Roof Tank

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 95.0 % Vol Alcohol	Jul	81.00	81.00	81.00	81.00	1.2788	1.2788	1.2788	42.1299			41.17	Option 1: VP70 = .89886 VP80 = 1.23462

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

N-1237-783 Daily - Vertical Fixed Roof Tank

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Standing Losses (lb):							0.0000					
Vapor Space Volume (cu ft):							21.2058					
Vapor Density (lb/cu ft):							0.0093					
Vapor Space Expansion Factor:							0.0000					
Vented Vapor Saturation Factor:							0.9779					
Tank Vapor Space Volume:												
Vapor Space Volume (cu ft):							21.2058					
Tank Diameter (ft):							9.0000					
Vapor Space Outage (ft):							0.3333					
Tank Shell Height (ft):							12.0000					
Average Liquid Height (ft):							12.0000					
Roof Outage (ft):							0.3333					
Roof Outage (Cone Roof)												
Roof Outage (ft):							0.3333					
Roof Height (ft):							1.0000					
Roof Slope (ft/ft):							0.2200					
Shell Radius (ft):							4.5000					
Vapor Density												
Vapor Density (lb/cu ft):							0.0093					
Vapor Molecular Weight (lb/lb-mole):							42.1299					
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							1.2788					
Daily Avg. Liquid Surface Temp. (deg. R):							540.6700					
Daily Average Ambient Temp. (deg. F):							81.8500					
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):							10.731					
Liquid Bulk Temperature (deg. R):							540.6700					
Tank Paint Solar Absorptance (Shell):							0.1700					
Tank Paint Solar Absorptance (Roof):							0.1700					
Daily Total Solar Insulation Factor (Btu/sqft day):							2,551.4853					
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):							0.0000					
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							1.2788					
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):							1.2788					
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):							1.2788					
Daily Avg. Liquid Surface Temp. (deg R):							540.6700					
Daily Min. Liquid Surface Temp. (deg R):							540.6700					
Daily Max. Liquid Surface Temp. (deg R):							540.6700					
Daily Ambient Temp. Range (deg. R):							33.5000					
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor:							0.9779					
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							1.2788					
Vapor Space Outage (ft):							0.3333					
Working Losses (lb):							227.0906					
Vapor Molecular Weight (lb/lb-mole):							42.1299					
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							1.2788					
Net Throughput (gal/mo.):							177,031.6986					
Annual Turnovers:							31.0000					
Turnover Factor:							1.0000					
Maximum Liquid Volume (gal):							5,710.7000					
Maximum Liquid Height (ft):							12.0000					
Tank Diameter (ft):							9.0000					
Working Loss Product Factor:							1.0000					
Total Losses (lb):							227.0906					

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

Emissions Report for: July

N-1237-783 Daily - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Wine 95.0 % Vol Alcohol	227.09	0.00	227.09

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

Identification

User Identification:	N-1237-785 Daily
City:	
State:	
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	

Tank Dimensions

Shell Height (ft):	24.00
Diameter (ft):	12.00
Liquid Height (ft) :	24.00
Avg. Liquid Height (ft):	24.00
Volume (gallons):	20,304.71
Turnovers:	31.00
Net Throughput(gal/yr):	629,446.04
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)	0.06

Breather Vent Settings

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

Meterological Data used in Emissions Calculations: Fresno, California (Avg Atmospheric Pressure = 14.56 psia)

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

N-1237-785 Daily - Vertical Fixed Roof Tank

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 23.9 % Vol Alcohol	Jul	81.00	81.00	81.00	81.00	0.8500	0.8500	0.8500	30.3355			20.45	Option 1: VP70 = .58508 VP80 = .81869

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

N-1237-785 Daily - Vertical Fixed Roof Tank

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Standing Losses (lb):							0.0000					
Vapor Space Volume (cu ft):							37.6991					
Vapor Density (lb/cu ft):							0.0044					
Vapor Space Expansion Factor:							0.0000					
Vented Vapor Saturation Factor:							0.9852					
Tank Vapor Space Volume:												
Vapor Space Volume (cu ft):							37.6991					
Tank Diameter (ft):							12.0000					
Vapor Space Outage (ft):							0.3333					
Tank Shell Height (ft):							24.0000					
Average Liquid Height (ft):							24.0000					
Roof Outage (ft):							0.3333					
Roof Outage (Cone Roof)												
Roof Outage (ft):							0.3333					
Roof Height (ft):							1.0000					
Roof Slope (ft/ft):							0.0600					
Shell Radius (ft):							6.0000					
Vapor Density												
Vapor Density (lb/cu ft):							0.0044					
Vapor Molecular Weight (lb/lb-mole):							30.3355					
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.8500					
Daily Avg. Liquid Surface Temp. (deg. R):							540.6700					
Daily Average Ambient Temp. (deg. F):							81.8500					
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):							10.731					
Liquid Bulk Temperature (deg. R):							540.6700					
Tank Paint Solar Absorptance (Shell):							0.1700					
Tank Paint Solar Absorptance (Roof):							0.1700					
Daily Total Solar Insulation Factor (Btu/sqft day):							2,551.4853					
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):							0.0000					
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.8500					
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):							0.8500					
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):							0.8500					
Daily Avg. Liquid Surface Temp. (deg R):							540.6700					
Daily Min. Liquid Surface Temp. (deg R):							540.6700					
Daily Max. Liquid Surface Temp. (deg R):							540.6700					
Daily Ambient Temp. Range (deg. R):							33.5000					
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor:							0.9852					
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.8500					
Vapor Space Outage (ft):							0.3333					
Working Losses (lb):							386.4538					
Vapor Molecular Weight (lb/lb-mole):							30.3355					
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.8500					
Net Throughput (gal/mo.):							629,446.0385					
Annual Turnovers:							31.0000					
Turnover Factor:							1.0000					
Maximum Liquid Volume (gal):							20,304.7110					
Maximum Liquid Height (ft):							24.0000					
Tank Diameter (ft):							12.0000					
Working Loss Product Factor:							1.0000					
Total Losses (lb):							386.4538					

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

Emissions Report for: July

N-1237-785 Daily - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Wine 23.9 % Vol Alcohol	386.45	0.00	386.45

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

Identification

User Identification:	Livingston D-603 Annual
City:	Fresno
State:	California
Company:	E and J Gallo Winery
Type of Tank:	Vertical Fixed Roof Tank
Description:	Stainless Steel 6,000 gallon tank with insulation. Installed at Livingston

Tank Dimensions

Shell Height (ft):	12.00
Diameter (ft):	9.00
Liquid Height (ft) :	12.00
Avg. Liquid Height (ft):	12.00
Volume (gallons):	5,710.70
Turnovers:	38.52
Net Throughput(gal/yr):	220,000.00
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)	0.00
Slope (ft/ft) (Cone Roof)	0.06

Breather Vent Settings

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

Meterological Data used in Emissions Calculations: Fresno, California (Avg Atmospheric Pressure = 14.56 psia)

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

Livingston D-603 Annual - Vertical Fixed Roof Tank
Fresno, 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 95.0 % Vol Alcohol	Jan	63.30	63.30	63.30	63.30	0.7297	0.7297	0.7297	42.1299			41.17	Option 1: VP60 = .64637 VP70 = .89886
Wine 95.0 % Vol Alcohol	Feb	63.30	63.30	63.30	63.30	0.7297	0.7297	0.7297	42.1299			41.17	Option 1: VP60 = .64637 VP70 = .89886
Wine 95.0 % Vol Alcohol	Mar	63.30	63.30	63.30	63.30	0.7297	0.7297	0.7297	42.1299			41.17	Option 1: VP60 = .64637 VP70 = .89886
Wine 95.0 % Vol Alcohol	Apr	63.30	63.30	63.30	63.30	0.7297	0.7297	0.7297	42.1299			41.17	Option 1: VP60 = .64637 VP70 = .89886
Wine 95.0 % Vol Alcohol	May	63.30	63.30	63.30	63.30	0.7297	0.7297	0.7297	42.1299			41.17	Option 1: VP60 = .64637 VP70 = .89886
Wine 95.0 % Vol Alcohol	Jun	63.30	63.30	63.30	63.30	0.7297	0.7297	0.7297	42.1299			41.17	Option 1: VP60 = .64637 VP70 = .89886
Wine 95.0 % Vol Alcohol	Jul	63.30	63.30	63.30	63.30	0.7297	0.7297	0.7297	42.1299			41.17	Option 1: VP60 = .64637 VP70 = .89886
Wine 95.0 % Vol Alcohol	Aug	63.30	63.30	63.30	63.30	0.7297	0.7297	0.7297	42.1299			41.17	Option 1: VP60 = .64637 VP70 = .89886
Wine 95.0 % Vol Alcohol	Sep	63.30	63.30	63.30	63.30	0.7297	0.7297	0.7297	42.1299			41.17	Option 1: VP60 = .64637 VP70 = .89886
Wine 95.0 % Vol Alcohol	Oct	63.30	63.30	63.30	63.30	0.7297	0.7297	0.7297	42.1299			41.17	Option 1: VP60 = .64637 VP70 = .89886
Wine 95.0 % Vol Alcohol	Nov	63.30	63.30	63.30	63.30	0.7297	0.7297	0.7297	42.1299			41.17	Option 1: VP60 = .64637 VP70 = .89886
Wine 95.0 % Vol Alcohol	Dec	63.30	63.30	63.30	63.30	0.7297	0.7297	0.7297	42.1299			41.17	Option 1: VP60 = .64637 VP70 = .89886

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

Livingston D-603 Annual - Vertical Fixed Roof Tank
Fresno, 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):	5.9641	5.9641	5.9641	5.9641	5.9641	5.9641	5.9641	5.9641	5.9641	5.9641	5.9641	5.9641
Vapor Density (lb/cu ft):	0.0055	0.0055	0.0055	0.0055	0.0055	0.0055	0.0055	0.0055	0.0055	0.0055	0.0055	0.0055
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:	0.9864	0.9864	0.9864	0.9864	0.9864	0.9864	0.9864	0.9864	0.9864	0.9864	0.9864	0.9864
Tank Vapor Space Volume:												
Vapor Space Volume (cu ft):	5.9641	5.9641	5.9641	5.9641	5.9641	5.9641	5.9641	5.9641	5.9641	5.9641	5.9641	5.9641
Tank Diameter (ft):	9.0000	9.0000	9.0000	9.0000	9.0000	9.0000	9.0000	9.0000	9.0000	9.0000	9.0000	9.0000
Vapor Space Outage (ft):	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938
Tank Shell Height (ft):	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000
Average Liquid Height (ft):	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000
Roof Outage (ft):	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938
Roof Outage (Cone Roof)												
Roof Outage (ft):	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938
Roof Height (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Roof Slope (ft/ft):	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625
Shell Radius (ft):	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000
Vapor Density												
Vapor Density (lb/cu ft):	0.0055	0.0055	0.0055	0.0055	0.0055	0.0055	0.0055	0.0055	0.0055	0.0055	0.0055	0.0055
Vapor Molecular Weight (lb/lb-mole):	42.1299	42.1299	42.1299	42.1299	42.1299	42.1299	42.1299	42.1299	42.1299	42.1299	42.1299	42.1299
Vapor Pressure at Daily Average Liquid Surface Temperature (psia)	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297
Daily Avg. Liquid Surface Temp. (deg. R):	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700
Daily Average Ambient Temp. (deg. F):	45.7500	51.1000	55.0000	61.2000	68.9500	76.5500	81.8500	80.2500	74.4500	65.2000	53.6000	45.4000
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):	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700
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 Insolation Factor (Btu/sqft day):	668.1709	1,022.2439	1,488.6306	1,992.7729	2,390.9467	2,566.7143	2,551.4653	2,279.5850	1,860.7666	1,369.9719	851.5527	592.3431
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):	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia)	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297
Daily Avg. Liquid Surface Temp. (deg R):	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700
Daily Min. Liquid Surface Temp. (deg R):	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700
Daily Max. Liquid Surface Temp. (deg R):	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700
Daily Ambient Temp. Range (deg. R):	16.7000	21.2000	23.2000	27.8000	30.5000	32.3000	33.5000	32.9000	31.3000	29.0000	22.2000	16.6000
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor:	0.9864	0.9864	0.9864	0.9864	0.9864	0.9864	0.9864	0.9864	0.9864	0.9864	0.9864	0.9864
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297
Vapor Space Outage (ft):	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938	0.0938
Working Losses (lb):	12.6863	12.6863	12.6863	12.6863	12.6863	12.6863	12.6863	12.6863	12.6863	12.6863	12.6863	12.6863
Vapor Molecular Weight (lb/lb-mole):	42.1299	42.1299	42.1299	42.1299	42.1299	42.1299	42.1299	42.1299	42.1299	42.1299	42.1299	42.1299
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297	0.7297
Net Throughput (gal/mo.):	18,333.3333	18,333.3333	18,333.3333	18,333.3333	18,333.3333	18,333.3333	18,333.3333	18,333.3333	18,333.3333	18,333.3333	18,333.3333	18,333.3333
Annual Turnovers:	38.5242	38.5242	38.5242	38.5242	38.5242	38.5242	38.5242	38.5242	38.5242	38.5242	38.5242	38.5242
Turnover Factor:	0.9454	0.9454	0.9454	0.9454	0.9454	0.9454	0.9454	0.9454	0.9454	0.9454	0.9454	0.9454
Maximum Liquid Volume (gal):	5,710.7000	5,710.7000	5,710.7000	5,710.7000	5,710.7000	5,710.7000	5,710.7000	5,710.7000	5,710.7000	5,710.7000	5,710.7000	5,710.7000
Maximum Liquid Height (ft):	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000
Tank Diameter (ft):	9.0000	9.0000	9.0000	9.0000	9.0000	9.0000	9.0000	9.0000	9.0000	9.0000	9.0000	9.0000
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):	12.6863	12.6863	12.6863	12.6863	12.6863	12.6863	12.6863	12.6863	12.6863	12.6863	12.6863	12.6863

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

Livingston D-603 Annual - Vertical Fixed Roof Tank
Fresno, California

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Wine 95.0 % Vol Alcohol	152.24	0.00	152.24

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

Identification

User Identification:	Livingston D-201 Annual
City:	Fresno
State:	California
Company:	E and J Gallo Winery
Type of Tank:	Vertical Fixed Roof Tank
Description:	Stainless Steel 20,000 gallon tank with insulation. Installed at Livingston

Tank Dimensions

Shell Height (ft):	24.00
Diameter (ft):	12.00
Liquid Height (ft) :	24.00
Avg. Liquid Height (ft):	24.00
Volume (gallons):	20,000.00
Turnovers:	24.62
Net Throughput(gal/yr):	500,000.00
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)	0.00
Slope (ft/ft) (Cone Roof)	0.06

Breather Vent Settings

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

Meterological Data used in Emissions Calculations: Fresno, California (Avg Atmospheric Pressure = 14.56 psia)

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

Livingston D-201 Annual - Vertical Fixed Roof Tank
Fresno, 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 Frac.	Vapor Mass Frac.	Mol. Weight	Basis for Vapor Pressure Calculations
Wine 24.0 % Vol Alcohol	Jan	63.30	63.30	63.30	63.30	0.4702	0.4702	0.4702	30.3738			29.46	Option 1: VP60 = .41318 VP70 = .58599
Wine 24.0 % Vol Alcohol	Feb	63.30	63.30	63.30	63.30	0.4702	0.4702	0.4702	30.3738			29.46	Option 1: VP60 = .41318 VP70 = .58599
Wine 24.0 % Vol Alcohol	Mar	63.30	63.30	63.30	63.30	0.4702	0.4702	0.4702	30.3738			29.46	Option 1: VP60 = .41318 VP70 = .58599
Wine 24.0 % Vol Alcohol	Apr	63.30	63.30	63.30	63.30	0.4702	0.4702	0.4702	30.3738			29.46	Option 1: VP60 = .41318 VP70 = .58599
Wine 24.0 % Vol Alcohol	May	63.30	63.30	63.30	63.30	0.4702	0.4702	0.4702	30.3738			29.46	Option 1: VP60 = .41318 VP70 = .58599
Wine 24.0 % Vol Alcohol	Jun	63.30	63.30	63.30	63.30	0.4702	0.4702	0.4702	30.3738			29.46	Option 1: VP60 = .41318 VP70 = .58599
Wine 24.0 % Vol Alcohol	Jul	63.30	63.30	63.30	63.30	0.4702	0.4702	0.4702	30.3738			29.46	Option 1: VP60 = .41318 VP70 = .58599
Wine 24.0 % Vol Alcohol	Aug	63.30	63.30	63.30	63.30	0.4702	0.4702	0.4702	30.3738			29.46	Option 1: VP60 = .41318 VP70 = .58599
Wine 24.0 % Vol Alcohol	Sep	63.30	63.30	63.30	63.30	0.4702	0.4702	0.4702	30.3738			29.46	Option 1: VP60 = .41318 VP70 = .58599
Wine 24.0 % Vol Alcohol	Oct	63.30	63.30	63.30	63.30	0.4702	0.4702	0.4702	30.3738			29.46	Option 1: VP60 = .41318 VP70 = .58599
Wine 24.0 % Vol Alcohol	Nov	63.30	63.30	63.30	63.30	0.4702	0.4702	0.4702	30.3738			29.46	Option 1: VP60 = .41318 VP70 = .58599
Wine 24.0 % Vol Alcohol	Dec	63.30	63.30	63.30	63.30	0.4702	0.4702	0.4702	30.3738			29.46	Option 1: VP60 = .41318 VP70 = .58599

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

Livingston D-201 Annual - Vertical Fixed Roof Tank
Fresno, 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):	14.1372	14.1372	14.1372	14.1372	14.1372	14.1372	14.1372	14.1372	14.1372	14.1372	14.1372	14.1372
Vapor Density (lb/cu ft):	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025
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:	0.9969	0.9969	0.9969	0.9969	0.9969	0.9969	0.9969	0.9969	0.9969	0.9969	0.9969	0.9969
Tank Vapor Space Volume:												
Vapor Space Volume (cu ft):	14.1372	14.1372	14.1372	14.1372	14.1372	14.1372	14.1372	14.1372	14.1372	14.1372	14.1372	14.1372
Tank Diameter (ft):	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000
Vapor Space Outage (ft):	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250
Tank Shell Height (ft):	24.0000	24.0000	24.0000	24.0000	24.0000	24.0000	24.0000	24.0000	24.0000	24.0000	24.0000	24.0000
Average Liquid Height (ft):	24.0000	24.0000	24.0000	24.0000	24.0000	24.0000	24.0000	24.0000	24.0000	24.0000	24.0000	24.0000
Roof Outage (ft):	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250
Roof Outage (Cone Roof)												
Roof Outage (ft):	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250
Roof Height (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Roof Slope (ft/ft):	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625
Shell Radius (ft):	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
Vapor Density												
Vapor Density (lb/cu ft):	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025
Vapor Molecular Weight (lb/lb-mole):	30.3738	30.3738	30.3738	30.3738	30.3738	30.3738	30.3738	30.3738	30.3738	30.3738	30.3738	30.3738
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702
Daily Avg. Liquid Surface Temp. (deg. R)	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700
Daily Average Ambient Temp. (deg. F)	45.7500	51.1000	55.9000	61.2000	66.9500	76.5500	81.8500	80.2500	74.4500	65.2000	53.6000	45.4000
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):	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700
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):	668.1706	1,022.2439	1,468.6308	1,992.7726	2,360.9467	2,566.7143	2,551.4653	2,279.5850	1,850.7858	1,359.8718	851.5527	592.3431
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)	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702
Daily Avg. Liquid Surface Temp. (deg R):	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700
Daily Min. Liquid Surface Temp. (deg R):	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700
Daily Max. Liquid Surface Temp. (deg R):	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700	522.9700
Daily Ambient Temp. Range (deg. R):	16.7000	21.2000	23.2000	27.8000	30.5000	32.3000	33.5000	32.9000	31.3000	29.0000	22.2000	16.6000
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor:	0.9969	0.9969	0.9969	0.9969	0.9969	0.9969	0.9969	0.9969	0.9969	0.9969	0.9969	0.9969
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702
Vapor Space Outage (ft):	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250	0.1250
Working Losses (lb):	14.1686	14.1686	14.1686	14.1686	14.1686	14.1686	14.1686	14.1686	14.1686	14.1686	14.1686	14.1686
Vapor Molecular Weight (lb/lb-mole)	30.3738	30.3738	30.3738	30.3738	30.3738	30.3738	30.3738	30.3738	30.3738	30.3738	30.3738	30.3738
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702	0.4702
Net Throughput (gal/mo.):	41,666.6667	41,666.6667	41,666.6667	41,666.6667	41,666.6667	41,666.6667	41,666.6667	41,666.6667	41,666.6667	41,666.6667	41,666.6667	41,666.6667
Annual Turnovers:	24.6248	24.6248	24.6248	24.6248	24.6248	24.6248	24.6248	24.6248	24.6248	24.6248	24.6248	24.6248
Turnover 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
Maximum Liquid Volume (gal):	20,000.0000	20,000.0000	20,000.0000	20,000.0000	20,000.0000	20,000.0000	20,000.0000	20,000.0000	20,000.0000	20,000.0000	20,000.0000	20,000.0000
Maximum Liquid Height (ft):	24.0000	24.0000	24.0000	24.0000	24.0000	24.0000	24.0000	24.0000	24.0000	24.0000	24.0000	24.0000
Tank Diameter (ft):	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000
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):	14.1686	14.1686	14.1686	14.1686	14.1686	14.1686	14.1686	14.1686	14.1686	14.1686	14.1686	14.1686

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

Livingston D-201 Annual - Vertical Fixed Roof Tank
Fresno, California

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Wine 24 0 % Vol Alcohol	170.02	0.00	170.02

Appendix B

BACT Guidelines and Top Down BACT Analysis

San Joaquin Valley
Unified Air Pollution Control District

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

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

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

Top Down BACT Analysis for Wine Storage VOC Emissions

Step 1 - Identify All Possible Control Technologies

The SJVUAPCD BACT Clearinghouse guideline 5.4.13, identifies achieved in practice BACT for wine storage tanks as follows:

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.
   ***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.*

The SJVUAPCD BACT Clearinghouse guideline 5.4.13, identifies technologically feasible BACT for wine storage tanks as follows:

2) Capture of VOCs and thermal or catalytic oxidation or equivalent (98% control)
3) Capture of VOCs and carbon adsorption or equivalent (95% control)
4) Capture of VOCs and absorption or equivalent (90% control)
5) Capture of VOCs and condensation or equivalent (70% control)

Step 2 - Eliminate Technologically Infeasible Options

None of the above listed technologies are technologically infeasible.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

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

Step 4 - Cost Effectiveness Analysis

A cost-effective analysis is performed for control technologies which is more effective than meeting the requirements of option 1 (achieved-in-practice BACT), as proposed by the facility.

Collection System Capital Investment (based on ductwork):
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.

The following cost information was provided by the facility, and the bases of the cost information include:

- The costs for the ductwork and the required clean-in-place 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 collection system consists of stainless steel place ductwork (stainless steel is required due to food grade product status) with isolation valving, connecting the tanks to a common manifold system which ducts the combined vent to the common control device. The cost of dampers and isolation valving, installed in the ductwork, will be included in the cost estimate
- A minimum duct size is established at six inches diameter at each tank to provide adequate strength for spanning between supports.
- One of the major concerns of a manifold duct system is microorganisms spoiling the product, and transferring from one tank to another. It is possible to completely ruin a tank of one special type of highest proof distilled spirit if a few hundred gallons of medium grade distilled spirit were back fed through the duct. 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.

Per applicant, the overall estimated capital investment for the ductwork, knockout drums, and ducting isolation components is $26,000 for this common collection system. See detail ductwork layout and cost breakdown in Attachment I of this analysis.

The following cost data is taken from EPA Control Cost Manual, Sixth Edition (EPA/452/B 02-001)

Ductwork	
Cost Description	Cost ($)
Duct Estimate from Eichleay Study 2005 Data	$26,000
Adjusting factor from 2005 dollars to 2015 dollars (2.75% inflation/year)	1.38
Inflation adjusted duct cost	$35,880
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	$35,880
Instrumentation 10%	$3,588
Sales Tax 3.3125%[1]	$1,189
Freight 5%	$1,794
Purchased equipment cost	**$42,451**
Foundations & supports 8%	$3,396
Handling & erection 14%	$5,943
Electrical 4%	$1,698
Piping 2%	$ 849
Painting 1%	$ 425
Insulation 1%	$ 425
Direct installation costs	**$12,736**
Total Direct Costs	**$55,187**
Indirect Costs (IC)	
Engineering 10%	$4,245
Construction and field expenses 5%	$2,123
Contractor fees 10%	$4,245
Start-up 2%	$ 849
Performance test 1%	$ 425
Contingencies 3%	$1,274
Total Indirect Costs	**$13,161**
Total Capital Investment (TCI) (DC + IC)	**$68,348**

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 Ductwork = $68,348 x 0.163 = $11,141

[1] Pollution control equipment is qualify for CA tax partial exemption, and the exemption rate is 4.1875%, so the reduced sales tax rate is equal 3.3125% (7.500% - 4.1875%). http://www.boe.ca.gov/sutax/manufacturing_exemptions.htm#Purchasers

Clean-In-Place (CIP) System

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

Clean-In-Place (CIP) System	
Cost Description	Cost ($)
Current cost of CIP system[2]	$10,000
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	$10,000
Instrumentation 10%	$1,000
Sales Tax 3.3125%	$ 331
Freight 5%	$ 500
Purchased equipment cost	**$11,831**
Foundations & supports 8%	$ 946
Handling & erection 14%	$1,656
Electrical 4%	$ 473
Piping 2%	$ 237
Painting 1%	$ 118
Insulation 1%	$ 118
Direct installation costs	**$3,548**
Total Direct Costs	**$15,379**
Indirect Costs (IC)	
Engineering 10%	$1,183
Construction and field expenses 5%	$ 592
Contractor fees 10%	$1,183
Start-up 2%	$ 237
Performance test 1%	$ 118
Contingencies 3%	$ 355
Total Indirect Costs	**$3,668**
Total Capital Investment (TCI) (DC + IC)	**$19,047**

Annualized Capital Investment = Initial Capital Investment x Amortization Factor

Annualized Capital Investment for one CIP System = $19,047 x 0.163 = $3,105

[2] An Allowance of $200,000 for a CIP system should be included in the evaluation for a standard tank farm. A ducting system on a tank farm must have that kind of system to maintain sanitation and quality of the product. Because these tanks are storage only, very small and only 3 tanks in the project; the estimate was reduced to $10,000.

Option 1 - Capture of VOCs & thermal/catalytic oxidation or equivalent (overall capture & control efficiency of 98%)

The total capital investment cost and installation costs including freight for a Regenerative Thermal Oxidizer (RTO) used in this evaluation are based on the cost information provided by Adwest Technologies, Inc on September 24, 2014 for an RTO handling 537 scfm, which was the smallest system they could provide. The potential flow rate from the tanks proposed in this project is 6 scfm (see Attachment II), equivalent to approximately 1.1% of 537 scfm.

Generally, when estimating costs from a known value, the rule of six-tenths is used to account for economy of scale. However, since the control device required for this project is smaller than the control device in the base project, the cost for the control device in this project will be scaled linearly. Scaling linearly results in lower capital cost and lower cost effectiveness. Therefore, the capital and installation costs provided in the cost estimate will be adjusted by a factor of 0.01 for purposes of this analysis.

Thermal or Catalytic Oxidation	
Cost Description	Cost ($)
Size adjusted Regenerative Thermal Oxidizer cost [145,500 x (0.01)]	$1,455
The following cost data is taken from EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001).	
Direct Costs (DC)	
Base Equipment Costs (Regenerative Thermal Oxidizer System) See Above	$1,455
Freight and Startup [22,900 x (0.01)]	$229
Sales Tax 3.3125%	$ 48
Purchased equipment cost	**$1,732**
Foundations & supports 8%	$ 139
Handling & erection 14%	$ 242
Electrical 4%	$ 69
Piping 2%	$ 35
Painting 1%	$ 17
Insulation 1%	$ 17
Direct installation costs	**$ 519**
Total Direct Costs	**$2,251**
Indirect Costs (IC)	
Engineering 10%	$ 173
Construction and field expenses 5%	$ 87
Contractor fees 10%	$ 173
Start-up (included above)	-
Performance test 1%	$ 17
Contingencies 3%	$ 52
Total Indirect Costs	**$ 502**
Total Capital Investment (TCI) (DC + IC)	**$2,753**

Annualized Capital Investment = Initial Capital Investment x Amortization Factor

Annualized Capital Investment for two CIP Systems = $2,753 x 0.163 = $449

Operation and Maintenance Costs

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

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

heat of combustion -dHc	= 20,276 Btu/lb
Daily VOC emissions rate	= 21.9 lb/day
Blower flow rate	= 6 scfm
	= 8,640 ft^3/day

-dh(c) = 21.9 lb/day x 20,276 Btu/lb / 8,640 ft^3/day
= 51.4 Btu/ft^3

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

-dh(c) = 3.71 Btu/ft^3 / 0.0739 lb/ft^3
= 50.2 Btu/lb

Fuel Flow Requirement

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

Where

Pw	=	0.0739 lb/ft^3
Cp	=	0.255 Btu/lb-°F
Qw	=	6 scfm
-dh(m)	=	21,502 Btu/lb for methane
Tr	=	77°F assume ambient conditions
P(ef)	=	0.0408 lb/ft^3 m, methane at 77°F, 1 atm
Tf	=	1600°F
Tw	=	1150°F
-dh(c)	=	50.2 Btu/lb

$$Q = \frac{0.0739*6*\{0.255*[1.1*1,600-1,150-0.1*77]-50.2\}}{0.0408*[21,502 - 1.1*0.255*(1,600 - 77)]}$$
= 45.8 ÷ 861 = 0.05 ft^3/min

Fuel Costs

The cost for natural gas shall be based upon the average price of natural gas sold to "Commercial Consumers" in California for the years 2011, 2012, 2013 and 2014.[3]

2014 = \$9.05/thousand ft^3 total monthly average
2013 = \$7.81/thousand ft^3 total monthly average
2012 = \$7.05/thousand ft^3 total monthly average
2011 = \$8.29/thousand ft^3 total monthly average
Average for three years = \$8.05/thousand ft^3 total monthly average

Fuel Cost = 0.05 cfm x 60 min/day x 365 day/year x \$8.05 /1000 ft^3
= \$9/year

Electricity Requirement

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

Where
ΔP = Pressure drop Across system = 10 in. H_2O
$\in$ = Efficiency for fan and motor = 0.6
Qw = 6,200 scfm

$$\text{Power}_{fan} = \frac{1.17*10^{-4}\ *6\ cfm*1.5*\ 10\ in.\ H_2O}{0.60*0.90}$$
= 0.02 kW

Electricity Costs

Average cost of electricity to commercial users in California [4]:
2014 = \$0.1567
2013 = \$0.1420
2012 = \$0.1341
2011 = \$0.1305
AVG = \$0.1409

Electricity Cost = 0.02 kW x 1 hour/day x 365 days/year x \$0.1409/kWh = \$1/year

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[3] Energy Information Administration/Natural Gas; Average Price of Natural Gas Sold to Commercial Consumers by State, 2011 – 2015: http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_SCA_a.htm

[4] Energy Information Administration/Electric Power; Average Retail Price of Electricity to Ultimate Customers by End-Use Sector, by State, 2011 – 2012: http://www.eia.gov/electricity/data/browser/#/topic/7?agg=0,1&geo=g&endsec=vg&linechart=ELEC.PRICE.US-ALL.A~ELEC.PRICE.US-RES.A~ELEC.PRICE.US-COM.A~ELEC.PRICE.US-IND.A&columnchart=ELEC.PRICE.US-ALL.A~ELEC.PRICE.US-RES.A~ELEC.PRICE.US-COM.A~ELEC.PRICE.US-IND.A&map=ELEC.PRICE.US-COM.A&freq=A&start=2001&end=2014&ctype=map&ltype=pin&rtype=s&pin=&rse=0&maptype=0

Total Operating and Maintenance Costs

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)[5]

Annual Costs			
Direct Annual Cost (DC)			
Operating Labor			
Operator	0.5 hr/shift	$18.5/hr x 0.5 hr/shift x 1.5 shift/day x 365 day/yr	$5,064
Supervisor	15% of operator		$760
Maintenance			
Labor	0.5 hr/shift	$18.5/hr x 0.5 hr/shift x 1.5 shift/day x 365 day/yr	$5,064
Maintenance	100% of labor		$5,064
Utility			
Natural Gas			$9
Electricity			$1
Total DC			**$15,962**
Indirect Annual Cost (IC)			
Overhead	60% of Labor Cost	0.6 x ($5,064 + $760 + $5,064)	$6,533
Administrative	2% TCI		$1,102
Property Taxes	1% TCI		$551
Insurance	1% TCI		$551
Total IC			**$8,737**
Annual Cost (DC + IC)			**$24,699**

Total Annual Cost = (Ductwork + CIP System) + RTO + Annual Costs
= $(11,141 + 3,105) + $449 + $24,699
= $39,394

Annual Emission Reduction = Uncontrolled Emissions x 0.98
= 400 lb-VOC/year x 0.98 x ton/2,000 lb
= 0.20 tons-VOC/year

Cost Effectiveness = $39,394/year ÷ 0.20 tons-VOC/year
= $196,970/ton-VOC

[5] http://epa.gov/ttn/catc/dir1/cs3-2ch2.pdf

The cost of VOC reductions for this control system is more than the threshold limit of $17,500/ton. Therefore, the capture and oxidation control system is not cost-effective for this installation.

Option 2 - Capture of VOCs and carbon adsorption or equivalent (overall capture & control efficiency of 95%)

Carbon containment hardware including an inline filter, blower, exhaust silencer and air to air heat exchanger for a 50 cfm system was quoted as $20,000 to $25,000 by David Drewelow of Drewelow Remediation Equipment, Inc on February 3, 2015. To be conservative, the District will use $20,000 as the cost for the carbon containment hardware.

The potential flow rate from the tanks proposed in this project is 6 scfm (see Attachment II), equivalent to approximately 12% of 50 scfm.

Generally, when estimating costs from a known value, the rule of six-tenths is used to account for economy of scale. However, since the control device required for this project is smaller than the control device in the base project, the cost for the control device in this project will be scaled linearly. Scaling linearly results in lower capital cost and lower cost effectiveness. Therefore, the capital and installation costs provided in the cost estimate will be adjusted by a factor of 0.12 for purposes of this analysis.

Carbon Capital Cost

Annual Emission Reduction = Storage Emissions x 0.86
= 400 lb-VOC/year x 0.86
= 344 lb-VOC/year

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

Carbon required = 344 lbs-VOC/year x 1/0.20
= 1,720 lb carbon

David Drewelow also provided a cost of $1.25/lb of carbon which does not include any delivery or servicing fees. Therefore, carbon capital cost = $1.25/lb x 1,720 lb carbon = $2,150

Carbon Adsorption	
Cost Description	Cost ($)
Carbon Adsorption cost ($20,000 x 0.12)	$2,400
Water alcohol tank cost ($5,000 x 0.12)	$600
Carbon Adsorption + water alcohol tank cost	$3,000
Carbon Capital Cost (see above)	$2,150
The following cost data is taken from EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001).	
Direct Costs (DC)	
Base Equipment Costs (Carbon Adsorption System + Carbon) See Above	$5,150
Instrumentation 10%	$ 515
Sales Tax 3.3125%	$ 135
Freight 5%	$ 258
Purchased equipment cost	**$6,058**
Foundations & supports 8%	$ 485
Handling & erection 14%	$ 848
Electrical 4%	$ 242
Piping 2%	$ 121
Painting 1%	$ 61
Insulation 1%	$ 61
Direct installation costs	**$1,818**
Total Direct Costs	**$7,876**
Indirect Costs (IC)	
Engineering 10%	$ 606
Construction and field expenses 5%	$ 303
Contractor fees 10%	$ 606
Start-up 2%	$ 121
Performance test 1%	$ 61
Contingencies 3%	$ 182
Total Indirect Costs	**$1,879**
Total Capital Investment (TCI) (DC + IC)	**$9,755**

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 = $9,755 x 0.163 = $1,590

Total Annual Cost = Carbon Adsorption System + (Ductwork + CIP System)
= $1,590 + $(11,141 + 3,105)
= $15,836

Annual Emission Reduction = Uncontrolled Emissions x 0.86
= 400 lb-VOC/year x 0.86 x ton/2,000 lb
= 0.17 tons-VOC/year

Cost Effectiveness = $15,836/year ÷ 0.17 tons-VOC/year
= $93,153/ton-VOC

The cost of VOC reductions for this control system is more than the threshold limit of $17,500/ton. Therefore, the capture and carbon adsorption control system is not cost-effective for this installation.

Option 3 - Capture of VOCs and absorption or equivalent (overall capture & control efficiency of 90%)

The total capital investment costs and operating costs for an absorption system used in this evaluation are based on the information given in District project N-1133659. The scrubber under project N-1133659 was evaluated for the control of 84,864 pounds of VOC emissions. The potential VOC emissions from this project are 400 pounds, equivalent to approximately 0.5% of the emissions evaluated for control under project N-1133659.

Generally, when estimating costs from a known value, the rule of six-tenths is used to account for economy of scale. However, since the control device required for this project is smaller than the control device in the base project, the cost for the control device in this project will be scaled linearly. Scaling linearly results in lower capital cost and lower cost effectiveness. Therefore, the capital and installation costs provided in the cost estimate will be adjusted by a factor of 0.005 for purposes of this analysis.

Capital Cost for each Water Scrubber unit is as follows: Reactor and Portable Pumping Skids are $60,000 and $7,500 respectively. The total capital cost for all units is $1,215,000 controlling 84,864 lbs-VOC. Therefore, the total capital cost for an equivalent system for this project is estimated to be $6,075.

Scrubber	
Cost Description	Cost ($)
Refrigerated Scrubber System	$6,075
The following cost data is taken from EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001).	
Direct Costs (DC)	
Base Equipment Costs (Scrubber System) See Above	$6,075
Instrumentation ($2,000 per unit, assume 1 unit)	$2,000
Sales Tax 3.3125%	$ 201
Freight (included)	-
Purchased equipment cost	**$8,276**
Foundations & supports (not required)	-
Handling & erection 2%	$ 166
Electrical 1%	$ 83
Piping 1%	$ 83
Painting (not required)	-
Insulation (not required)	-
PLC & Programming	$10,000[6]
Recovered Ethanol Storage Tank (installed)	$5,000
Direct installation costs	**$15,332**
Total Direct Costs (TDC)	**$23,608**
Indirect Costs (IC)	
Engineering (5% of TDC)	$1,180
Construction and field expenses (2% of TDC)	$ 472
Permits (Building Department) (Allowance)	$10,000
Contractor fees (2% of TDC)	$ 472
Start-up (1% of TDC)	$ 236
Source Testing (1 unit x $15,000/unit)	$15,000
Owner's Cost (Allowance)	$5,556[7]
Total Indirect Costs	**$32,916**
Subtotal Capital Investment (SCI)	**$56,524**
Project Contingency (20% of SCI)	$11,305
Total Capital Investment (TCI) (DC + IC)	**$67,829**

[6] From project N-1133659 for 18 units, PLC & Programming = $180,000 (or $10,000/unit)
[7] From project N-1133659 for 18 units, Owner's Cost = $100,000 (or $5,556/unit)

Annualized Capital Investment = Initial Capital Investment x Amortization Factor

Annualized Capital Investment = $67,829 x 0.163 = $11,056.

Wastewater Disposal Costs

The water scrubber will generate ethanol-laden wastewater containing 0.18 tons (360 lbs) of ethanol annually (400 lb/year (uncontrolled emissions) x 0.90 ÷ 2000). Assuming a 10% solution, approximately 544 gallons of waste water (360 lb-ethanol x 1 gal/6.62 lb ÷ 0.10) will be generated annually. Based on information from NohBell Corporation, an allowance of $0.08 per gallon is applied for disposal costs.

Annual disposal costs = 544 gallons x $0.08/gallon = $44

Annual Costs

Annual Costs			
Direct Annual Cost (DC)			
Operating Labor			
Operator	0.5 hr/shift	$18.50/hr x 0.5 hr/shift x 1.5 shift/day x 365 days/year	$5,064
Supervisor	15% of operator		$760
Maintenance			
Labor	1% of TCI		$678
Wastewater Disposal			
	10% Solution = 446 gal	$0.08/gal	$44
Utility			
Electricity	1 unit x 2.5 hp x 0.746 kW/hp x 8,760 hr/yr = 681 kWh/yr	$0.1409/kWh	$96
Total DC			**$6,642**
Indirect Annual Cost (IC)			
Overhead	60% of Labor Cost	0.6 x ($5,064 + $760 + $678)	$3,901
Administrative	2% TCI		$1,357
Property Taxes	1% TCI		$678
Insurance	1% TCI		$678
Annual Source Test	One representative test/year @		$15,000
Total IC			**$21,614**
Annual Cost (DC + IC)			**$28,256**

Total Annual Cost = (Ductwork + CIP System)+ Absorption System + Operating Costs
= $(11,141 + 3,105) + $11,056 + $28,256
= $53,558

Annual Emission Reduction = Uncontrolled Emissions x 0.90
= 400 lb-VOC/year x 0.90 x ton/2,000 lb
= 0.18 tons-VOC/year

Cost Effectiveness = $53,558/year ÷ 0.18 tons-VOC/year
= $297,546/ton-VOC

The cost of VOC reductions of this control system is more than the threshold limit of $17,500/ton. Therefore, the absorption control system is not cost-effective for this installation.

Option 4 – Capture of VOCs and condensation or equivalent (overall capture & control efficiency of 70%)

The total capital investment costs and operating costs for condensation system used in this evaluation are based on the information given in District project N-1133659. Similar assumption in option 3 discussed above applies; the capital cost given in project N-1133659 will be adjusted by a factor of 0.5% for purposes of this analysis. In addition, no value will be given for the ethanol that is recovered from the condensation system since the recovered ethanol has not been conclusively demonstrated to have a value in practice and could actually result in additional costs for disposal.

Generally, when estimating costs from a known value, the rule of six-tenths is used to account for economy of scale. However, since the control device required for this project is smaller than the control device in the base project, the cost for the control device in this project will be scaled linearly. Scaling linearly results in lower capital cost and lower cost effectiveness. Therefore, the capital and installation costs provided in the cost estimate will be adjusted by a factor of 0.005 for purposes of this analysis.

The total capital cost provided in project N-1133659 is $1,901,272 for 4 units controlling 84,864 lbs-VOC. Therefore, the total capital cost for an equivalent system for this project is estimated to be $9,506.

Condensation	
Cost Description	Cost ($)
Cost of Refrigerated Condenser system (1 PAS Unit)	$9,506
The following cost data is taken from EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001).	
Direct Costs (DC)	
Base Equipment Costs (Condenser) See Above	$9,506
Instrumentation (included)	-
Sales Tax (included)	-
Freight (included)	-
Purchased equipment cost	**$9,506**
Labor (estimated from project N-1133659)	$326
Installation Expense (estimated from project N-1133659)	$237
Subcontracts (estimated from project N-1133659)	$72
PLC/Programming	$45,000[8]
Direct installation costs	**$45,635**
Total Direct Costs (TDC)	**$55,141**
Indirect Costs (IC)	
Engineering (5% of TDC)	$2,757
Permits (Building Department) (Allowance)	$2,500[9]
Initial Source Testing ($15,000/unit)	$15,000
Owner's Cost (Allowance)	$5,556
Total Indirect Cost	**$25,813**
Subtotal Capital Investment (SCI)	**$80,954**
Project Contingency (20% of SCI)	$16,191
Total Capital Investment (TCI) (DC + IC + Contingency)	**$161,908**

Annualized Capital Investment = Initial Capital Investment x Amortization Factor

Annualized Capital Investment = $161,908 x 0.163 = $26,391.

[8] From project N-1133659 for 4 units, PLC & Programming = $180,000 (or $45,000/unit)
[9] From project N-1133659 for 4 units, Permits = $10,000 (or $2,500/unit)

Annual Costs

Annual Costs			
Direct Annual Cost (DC)			
Operating Labor			
Operator	0.5 hr/shift	$18.50/hr x 0.5 hr/shift x 1.5	$5,064
Supervisor	15% of operator		$760
Maintenance			
Labor	1% of TCI		$1,619
Chiller (Glycol)			
	400 lb/year (uncontrolled storage emissions) x 0.90 ÷ 2000	$270/ton EtOH	$49
Utility			
			$0
Total DC			**$7,492**
Indirect Annual Cost (IC)			
Overhead	60% of Labor Cost	0.6 x ($5,064 + $760 + $1,619)	$4,466
Administrative	2% TCI		$3,238
Property Taxes	1% TCI		$1,619
Insurance	1% TCI		$1,619
Annual Source Test	One representative test/year @ $15,000		$15,000
Total IC			**$25,942**
Annual Cost (DC + IC)			**$33,434**

Total Annual Cost = (Ductwork + CIP Systems) + Condensation System + Operating Costs
= $(11,141 + 3,105) + $26,391 + $33,434
= $74,071

Annual Emission Reduction = Uncontrolled Emissions x 0.70
= 400 lb-VOC/year x 0.70 x ton/2,000 lb
= 0.14 tons-VOC/year

Cost Effectiveness = $74,071/year ÷ 0.14 tons-VOC/year
= $529,079/ton-VOC

The cost of VOC reductions of this control system is more than the threshold limit of $17,500/ton. Therefore, the condensation control system is not cost-effective for this installation.

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°F within 60 days of completion of fermentation. These BACT requirements will be placed on the ATC as enforceable conditions.

San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 5.4.15*

Last Update: 11/2/2011

Distilled Spirits Storage Tank

Pollutant	Achieved in Practice or contained in the SIP	Technologically Feasible	Alternate Basic Equipment
VOC	Insulation or Equivalent**, Pressure Vacuum Relief Valve (PVRV) set within 10% of the maximum allowable working pressure of the tank; "gas-tight" tank operation	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 adsorption or equivalent (90% control); 4) Refrigerated Storage (70% control)	

** Tank 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.

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**

Top Down BACT Analysis for Distilled Spirits Storage VOC Emissions

Step 1 - Identify All Possible Control Technologies

The SJVUAPCD BACT Clearinghouse guideline 5.4.15, identifies achieved in practice BACT for distilled spirits storage tanks as follows:

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.
   ***Tanks 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.*

The SJVUAPCD BACT Clearinghouse guideline 5.4.15, 4th quarter 2013, identifies technologically feasible BACT for distilled spirits storage tanks as follows:

2) Refrigerated storage (70% control)
3) Capture of VOCs and absorption or equivalent (90% control)
4) Capture of VOCs and carbon adsorption or equivalent (95% control)
5) Capture of VOCs and thermal or catalytic oxidation or equivalent (98% control)

Step 2 - Eliminate Technologically Infeasible Options

None of the above listed technologies are technologically infeasible.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

Rank by Control Effectiveness		
Rank	Control	Overall Capture and Control Efficiency
1	Capture of VOCs and thermal or catalytic oxidation or equivalent	98%
2	Capture of VOCs and carbon adsorption or equivalent	95%
3	Capture of VOCs and absorption or equivalent	90%
4	Capture of VOCs and refrigerated storage	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.	Baseline (Achieved-in-Practice)

Step 4 - Cost Effectiveness Analysis

A cost-effective analysis is performed for control technologies which is more effective than meeting the requirements of option 1 (achieved-in-practice BACT), as proposed by the facility.

Collection System Capital Investment (based on ductwork):
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.

The following cost information was provided by the facility, and the bases of the cost information include:

- The costs for the ductwork and the required clean-in-place 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 collection system consists of stainless steel place ductwork (stainless steel is required due to food grade product status) with isolation valving, connecting the tanks to a common manifold system which ducts the combined vent to the common control device. The cost of dampers and isolation valving, installed in the ductwork, will be included in the cost estimate
- A minimum duct size is established at six inches diameter at each tank to provide adequate strength for spanning between supports.
- One of the major concerns of a manifold duct system is microorganisms spoiling the product, and transferring from one tank to another. It is possible to completely ruin a tank of one special type of highest proof distilled spirit if a few hundred gallons of medium grade distilled spirit were back fed through the duct. 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.

Per applicant, the overall estimated capital investment for the ductwork, knockout drums, and ducting isolation components is $26,000 for this common collection system. See detail ductwork layout and cost breakdown in Attachment I.

The following cost data is taken from EPA Control Cost Manual, Sixth Edition (EPA/452/B 02-001)

Ductwork	
Cost Description	Cost ($)
Duct Estimate from Eichleay Study 2005 Data	$26,000
Adjusting factor from 2005 dollars to 2015 dollars (2.75% inflation/year)	1.38
Inflation adjusted duct cost	$35,880
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	$35,880
Instrumentation 10%	$3,588
Sales Tax 3.3125%[10]	$1,189
Freight 5%	$1,794
Purchased equipment cost	**$42,451**
Foundations & supports 8%	$3,396
Handling & erection 14%	$5,943
Electrical 4%	$1,698
Piping 2%	$ 849
Painting 1%	$ 425
Insulation 1%	$ 425
Direct installation costs	**$12,736**
Total Direct Costs	**$55,187**
Indirect Costs (IC)	
Engineering 10%	$4,245
Construction and field expenses 5%	$2,123
Contractor fees 10%	$4,245
Start-up 2%	$ 849
Performance test 1%	$ 425
Contingencies 3%	$1,274
Total Indirect Costs	**$13,161**
Total Capital Investment (TCI) (DC + IC)	**$68,348**

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 Ductwork = $68,348 x 0.163 = $11,141

[10] Pollution control equipment is qualify for CA tax partial exemption, and the exemption rate is 4.1875%, so the reduced sales tax rate is equal 3.3125% (7.500% - 4.1875%). http://www.boe.ca.gov/sutax/manufacturing_exemptions.htm#Purchasers

Clean-In-Place (CIP) System

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

Clean-In-Place (CIP) System	
Cost Description	Cost ($)
Current cost of CIP system[11]	$10,000
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	$10,000
Instrumentation 10%	$1,000
Sales Tax 3.3125%	$ 331
Freight 5%	$ 500
Purchased equipment cost	**$11,831**
Foundations & supports 8%	$ 946
Handling & erection 14%	$1,656
Electrical 4%	$ 473
Piping 2%	$ 237
Painting 1%	$ 118
Insulation 1%	$ 118
Direct installation costs	**$3,548**
Total Direct Costs	**$15,379**
Indirect Costs (IC)	
Engineering 10%	$1,183
Construction and field expenses 5%	$ 592
Contractor fees 10%	$1,183
Start-up 2%	$ 237
Performance test 1%	$ 118
Contingencies 3%	$ 355
Total Indirect Costs	**$3,668**
Total Capital Investment (TCI) (DC + IC)	**$19,047**

Annualized Capital Investment = Initial Capital Investment x Amortization Factor

Annualized Capital Investment for one CIP System = $19,047 x 0.163 = $3,105

[11] An Allowance of $200,000 for a CIP system should be included in the evaluation for a standard tank farm. A ducting system on a tank farm must have that kind of system to maintain sanitation and quality of the product. Because these tanks are storage only, very small and only 3 tanks in the project; the estimate was reduced to $10,000.

Option 1 - Capture of VOCs & thermal/catalytic oxidation or equivalent (overall capture & control efficiency of 98%)

The total capital investment cost and installation costs including freight for a Regenerative Thermal Oxidizer (RTO) used in this evaluation are based on the cost information provided by Adwest Technologies, Inc on September 24, 2014 for an RTO handling 537 scfm, which was the smallest system they could provide. The potential flow rate from the tanks proposed in this project is 6 scfm (see Attachment II of Appendix B), equivalent to approximately 1.1% of 537 scfm.

Generally, when estimating costs from a known value, the rule of six-tenths is used to account for economy of scale. However, since the control device required for this project is smaller than the control device in the base project, the cost for the control device in this project will be scaled linearly. Scaling linearly results in lower capital cost and lower cost effectiveness. Therefore, the capital and installation costs provided in the cost estimate will be adjusted by a factor of 0.01 for purposes of this analysis.

Thermal or Catalytic Oxidation	
Cost Description	Cost ($)
Size adjusted Regenerative Thermal Oxidizer cost [145,500 x (0.01)]	$1,455
The following cost data is taken from EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001).	
Direct Costs (DC)	
Base Equipment Costs (Regenerative Thermal Oxidizer System) See Above	$1,455
Freight and Startup [22,900 x (0.01)]	$229
Sales Tax 3.3125%	$ 48
Purchased equipment cost	**$1,732**
Foundations & supports 8%	$ 139
Handling & erection 14%	$ 242
Electrical 4%	$ 69
Piping 2%	$ 35
Painting 1%	$ 17
Insulation 1%	$ 17
Direct installation costs	**$ 519**
Total Direct Costs	**$2,251**
Indirect Costs (IC)	
Engineering 10%	$ 173
Construction and field expenses 5%	$ 87
Contractor fees 10%	$ 173
Start-up (included above)	-
Performance test 1%	$ 17
Contingencies 3%	$ 52
Total Indirect Costs	**$ 502**
Total Capital Investment (TCI) (DC + IC)	**$2,753**

Annualized Capital Investment = Initial Capital Investment x Amortization Factor

Annualized Capital Investment for two CIP Systems = $2,753 x 0.163 = $449

Operation and Maintenance Costs

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

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

heat of combustion -dHc	= 20,276 Btu/lb
Daily VOC emissions rate	= 21.9 lb/day
Blower flow rate	= 6 scfm
	= 8,640 ft^3/day

-dh(c) = 21.9 lb/day x 20,276 Btu/lb / 8,640 ft^3/day
= 51.4 Btu/ft^3

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

-dh(c) = 3.71 Btu/ft^3 / 0.0739 lb/ft^3
= 50.2 Btu/lb

Fuel Flow Requirement

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

Where

Pw	=	0.0739 lb/ft^3
Cp	=	0.255 Btu/lb-°F
Qw	=	52 scfm
-dh(m)	=	21,502 Btu/lb for methane
Tr	=	77°F assume ambient conditions
P(ef)	=	0.0408 lb/ft^3 m, methane at 77°F, 1 atm
Tf	=	1600°F
Tw	=	1150°F
-dh(c)	=	50.2 Btu/lb

$$Q = \frac{0.0739*6*\{0.255*[1.1*1,600-1,150-0.1*77]-50.2\}}{0.0408*[21,502 - 1.1*0.255*(1,600 - 77)]}$$
= 45.8 ÷ 861 = 0.05 ft^3/min

Fuel Costs

The cost for natural gas shall be based upon the average price of natural gas sold to "Commercial Consumers" in California for the years 2011, 2012, 2013 and 2014.[12]

2014 = \$9.05/thousand ft^3 total monthly average
2013 = \$7.81/thousand ft^3 total monthly average
2012 = \$7.05/thousand ft^3 total monthly average
2011 = \$8.29/thousand ft^3 total monthly average
Average for three years = \$8.05/thousand ft^3 total monthly average

Fuel Cost = 0.05 cfm x 60 min/day x 365 day/year x \$8.05 /1000 ft^3
= \$9/year

Electricity Requirement

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

Where
ΔP = Pressure drop Across system = 10 in. H_2O
$\in$ = Efficiency for fan and motor = 0.6
Qw = 6,200 scfm

$$\text{Power}_{fan} = \frac{1.17*10^{-4}\ *6\ cfm*1.5*\ 10\ in.\ H_2O}{0.60*0.90}$$
= 0.02 kW

Electricity Costs

Average cost of electricity to commercial users in California [13]:
2014 = \$0.1567
2013 = \$0.1420
2012 = \$0.1341
2011 = \$0.1305
AVG = \$0.1409

Electricity Cost = 0.02 kW x 1 hour/day x 365 days/year x \$0.1409/kWh = \$1/year

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12 Energy Information Administration/Natural Gas; Average Price of Natural Gas Sold to Commercial Consumers by State, 2011 – 2015: http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_SCA_a.htm

13 Energy Information Administration/Electric Power; Average Retail Price of Electricity to Ultimate Customers by End-Use Sector, by State, 2011 – 2012: http://www.eia.gov/electricity/data/browser/#/topic/7?agg=0,1&geo=g&endsec=vg&linechart=ELEC.PRICE.US-ALL.A~ELEC.PRICE.US-RES.A~ELEC.PRICE.US-COM.A~ELEC.PRICE.US-IND.A&columnchart=ELEC.PRICE.US-ALL.A~ELEC.PRICE.US-RES.A~ELEC.PRICE.US-COM.A~ELEC.PRICE.US-IND.A&map=ELEC.PRICE.US-COM.A&freq=A&start=2001&end=2014&ctype=map&ltype=pin&rtype=s&pin=&rse=0&maptype=0

Total Operating and Maintenance Costs

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)[14]

Annual Costs			
Direct Annual Cost (DC)			
Operating Labor			
Operator	0.5 hr/shift	$18.5/hr x 0.5 hr/shift x 1.5 shift/day x 365 day/yr	$5,064
Supervisor	15% of operator		$760
Maintenance			
Labor	0.5 h/shift	$18.5/hr x 0.5 hr/shift x 1.5 shift/day x 365 day/yr	$5,064
Maintenance	100% of labor		$5,064
Utility			
Natural Gas			$9
Electricity			$1
Total DC			**$15,962**
Indirect Annual Cost (IC)			
Overhead	60% of Labor Cost	0.6 x ($5,064 + $760 + $5,064)	$6,533
Administrative	2% TCI		$1,102
Property Taxes	1% TCI		$551
Insurance	1% TCI		$551
Total IC			**$8,737**
Annual Cost (DC + IC)			**$24,699**

Total Annual Cost = (Ductwork + CIP System) + RTO + Annual Costs
= $(11,141 + 3,105) + $449 + $24,914
= $39,394

Annual Emission Reduction = Uncontrolled Emissions x 0.98
= 400 lb-VOC/year x 0.98 x ton/2,000 lb
= 0.20 tons-VOC/year

Cost Effectiveness = $39,394/year ÷ 0.20 tons-VOC/year
= $196,970/ton-VOC

[14] http://epa.gov/ttn/catc/dir1/cs3-2ch2.pdf

The cost of VOC reductions for this control system is more than the threshold limit of $17,500/ton. Therefore, the capture and oxidation control system is not cost-effective for this installation.

Option 2 - Capture of VOCs and carbon adsorption or equivalent (overall capture & control efficiency of 95%)

Carbon containment hardware including an inline filter, blower, exhaust silencer and air to air heat exchanger for a 50 cfm system was quoted as $20,000 to $25,000 by David Drewelow of Drewelow Remediation Equipment, Inc on February 3, 2015. To be conservative, the District will use $20,000 as the cost for the carbon containment hardware.

The potential flow rate from the tanks proposed in this project is 6 scfm (see Attachment II), equivalent to approximately 12% of 50 scfm.

Generally, when estimating costs from a known value, the rule of six-tenths is used to account for economy of scale. However, since the control device required for this project is smaller than the control device in the base project, the cost for the control device in this project will be scaled linearly. Scaling linearly results in lower capital cost and lower cost effectiveness. Therefore, the capital and installation costs provided in the cost estimate will be adjusted by a factor of 0.12 for purposes of this analysis.

Carbon Capital Cost

Annual Emission Reduction = Storage Emissions x 0.86
= 400 lb-VOC/year x 0.86
= 344 lb-VOC/year

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

Carbon required = 344 lbs-VOC/year x 1/0.20
= 1,720 lb carbon

David Drewelow also provided a cost of $1.25/lb of carbon which does not include any delivery or servicing fees. Therefore, carbon capital cost = $1.25/lb x 1,720 lb carbon = $2,150

Carbon Adsorption	
Cost Description	Cost ($)
Carbon Adsorption cost ($20,000 x 0.12)	$2,400
Water alcohol tank cost ($5,000 x 0.12)	$600
Carbon Adsorption + water alcohol tank cost	$3,000
Carbon Capital Cost (see above)	$2,150
The following cost data is taken from EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001).	
Direct Costs (DC)	
Base Equipment Costs (Carbon Adsorption System + Carbon) See Above	$5,150
Instrumentation 10%	$ 515
Sales Tax 3.3125%	$ 135
Freight 5%	$ 258
Purchased equipment cost	**$6,058**
Foundations & supports 8%	$ 485
Handling & erection 14%	$ 848
Electrical 4%	$ 242
Piping 2%	$ 121
Painting 1%	$ 61
Insulation 1%	$ 61
Direct installation costs	**$1,818**
Total Direct Costs	**$7,876**
Indirect Costs (IC)	
Engineering 10%	$ 606
Construction and field expenses 5%	$ 303
Contractor fees 10%	$ 606
Start-up 2%	$ 121
Performance test 1%	$ 61
Contingencies 3%	$ 182
Total Indirect Costs	**$1,879**
Total Capital Investment (TCI) (DC + IC)	**$9,755**

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 = $9,755 x 0.163 = $1,590

Total Annual Cost = Carbon Adsorption System + (Ductwork + CIP System)
= $1,590 + $(11,141 + 3,105)
= $15,836

Annual Emission Reduction = Uncontrolled Emissions x 0.86
= 400 lb-VOC/year x 0.86 x ton/2,000 lb
= 0.17 tons-VOC/year

Cost Effectiveness = $15,836/year ÷ 0.17 tons-VOC/year
= $93,153/ton-VOC

The cost of VOC reductions for this control system is more than the threshold limit of $17,500/ton. Therefore, the capture and carbon adsorption control system is not cost-effective for this installation.

Option 3 - Capture of VOCs and absorption or equivalent (overall capture & control efficiency of 90%)

The total capital investment costs and operating costs for an absorption system used in this evaluation are based on the information given in District project N-1133659. The scrubber under project N-1133659 was evaluated for the control of 84,864 pounds of VOC emissions. The potential VOC emissions from this project are 400 pounds, equivalent to approximately 0.5% of the emissions evaluated for control under project N-1133659.

Generally, when estimating costs from a known value, the rule of six-tenths is used to account for economy of scale. However, since the control device required for this project is smaller than the control device in the base project, the cost for the control device in this project will be scaled linearly. Scaling linearly results in lower capital cost and lower cost effectiveness. Therefore, the capital and installation costs provided in the cost estimate will be adjusted by a factor of 0.005 for purposes of this analysis.

Capital Cost for each Water Scrubber unit is as follows: Reactor and Portable Pumping Skids are $60,000 and $7,500 respectively. The total capital cost for all units is $1,215,000 controlling 84,864 lbs-VOC. Therefore, the total capital cost for an equivalent system for this project is estimated to be $6,075.

Scrubber	
Cost Description	Cost ($)
Refrigerated Scrubber System	$6,075
The following cost data is taken from EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001).	
Direct Costs (DC)	
Base Equipment Costs (Scrubber System) See Above	$6,075
Instrumentation ($2,000 per unit, assume 1 unit)	$2,000
Sales Tax 3.3125%	$ 201
Freight (included)	-
Purchased equipment cost	**$8,276**
Foundations & supports (not required)	-
Handling & erection 2%	$ 166
Electrical 1%	$ 83
Piping 1%	$ 83
Painting (not required)	-
Insulation (not required)	-
PLC & Programming	$10,000[15]
Recovered Ethanol Storage Tank (installed)	$5,000
Direct installation costs	**$15,332**
Total Direct Costs (TDC)	**$23,608**
Indirect Costs (IC)	
Engineering (5% of TDC)	$1,180
Construction and field expenses (2% of TDC)	$ 472
Permits (Building Department) (Allowance)	$10,000
Contractor fees (2% of TDC)	$ 472
Start-up (1% of TDC)	$ 236
Source Testing (1 unit x $15,000/unit)	$15,000
Owner's Cost (Allowance)	$5,556[16]
Total Indirect Costs	**$32,916**
Subtotal Capital Investment (SCI)	**$56,524**
Project Contingency (20% of SCI)	$11,305
Total Capital Investment (TCI) (DC + IC)	**$67,829**

[15] From project N-1133659 for 18 units, PLC & Programming = $180,000 (or $10,000/unit)
[16] From project N-1133659 for 18 units, Owner's Cost = $100,000 (or $5,556/unit)

Annualized Capital Investment = Initial Capital Investment x Amortization Factor

Annualized Capital Investment = $67,829 x 0.163 = $11,056.

Wastewater Disposal Costs

The water scrubber will generate ethanol-laden wastewater containing 0.18 tons (360 lbs) of ethanol annually (400 lb/year (uncontrolled emissions) x 0.90 ÷ 2000). Assuming a 10% solution, approximately 544 gallons of waste water (360 lb-ethanol x 1 gal/6.62 lb ÷ 0.10) will be generated annually. Based on information from NohBell Corporation, an allowance of $0.08 per gallon is applied for disposal costs.

Annual disposal costs = 544 gallons x $0.08/gallon = $44

Annual Costs

Annual Costs			
Direct Annual Cost (DC)			
Operating Labor			
Operator	0.5 hr/shift	$18.50/hr x 0.5 hr/shift x 1.5 shift/day x 365 days/year	$5,064
Supervisor	15% of operator		$760
Maintenance			
Labor	1% of TCI		$678
Wastewater Disposal			
	10% Solution = 446 gal	$0.08/gal	$44
Utility			
Electricity	1 unit x 2.5 hp x 0.746 kW/hp x 8,760 hr/yr = 681 kWh/yr	$0.1409/kWh	$96
Total DC			**$6,642**
Indirect Annual Cost (IC)			
Overhead	60% of Labor Cost	0.6 x ($5,064 + $760 + $678)	$3,901
Administrative	2% TCI		$1,357
Property Taxes	1% TCI		$678
Insurance	1% TCI		$678
Annual Source Test	One representative test/year @		$15,000
Total IC			**$21,614**
Annual Cost (DC + IC)			**$28,256**

Total Annual Cost = (Ductwork + CIP System)+ Absorption System + Operating Costs
= $(11,141 + 3,105) + $11,056 + $28,256
= $53,558

Annual Emission Reduction = Uncontrolled Emissions x 0.90
= 400 lb-VOC/year x 0.90 x ton/2,000 lb
= 0.18 tons-VOC/year

Cost Effectiveness = $53,558/year ÷ 0.18 tons-VOC/year
= $297,546/ton-VOC

The cost of VOC reductions of this control system is more than the threshold limit of $17,500/ton. Therefore, the absorption control system is not cost-effective for this installation.

Option 4 – Refrigerated Storage at 40 °F (overall capture & control efficiency of 70%)

Design Basis

- A common refrigeration system will be installed for the three tanks.
- The refrigeration system will be a packaged single-stage vapor-compression system.
- Minimum refrigeration capacity will allow cooling the twelve tanks from 75 °F to 40 °F once the product enters the tanks. As shown in Attachment II of Appendix B, the filling rate for these tanks is assumed to be 43 gpm for filling the tanks in 1 hour each simultaneously.

Based on a specific heat capacity of 1.0 Btu/lb-°F and cooling one tank from 75 °F to 40 °F, the capacity required for the refrigeration system would be:

Refrigeration Capacity = 43 gal/min x 8.34 lb/gal x 1.0 Btu/lb-°F x (75 °F – 40 °F)
x 60 min/hr x 1 ton-hr refrigeration/12,000 Btu

Refrigeration Capacity = 62.8 tons

Capital Cost

The EPA Air Pollution Control Manual, Section 3, Chapter 2, Figure 2.5, provides costs for single stage vapor compression systems up to 100 tons capacity at a condensation temperature of 40 °F. Conservatively, using the purchase price for a 60 ton unit yields:

Refrigeration System Cost = $100,000

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 = $100,000 x 0.163 = $16,309

Annual Emission Reduction = Uncontrolled Emissions x 0.70
= 400 lb-VOC/year x 0.70 x ton/2,000 lb

= 0.14 tons-VOC/year

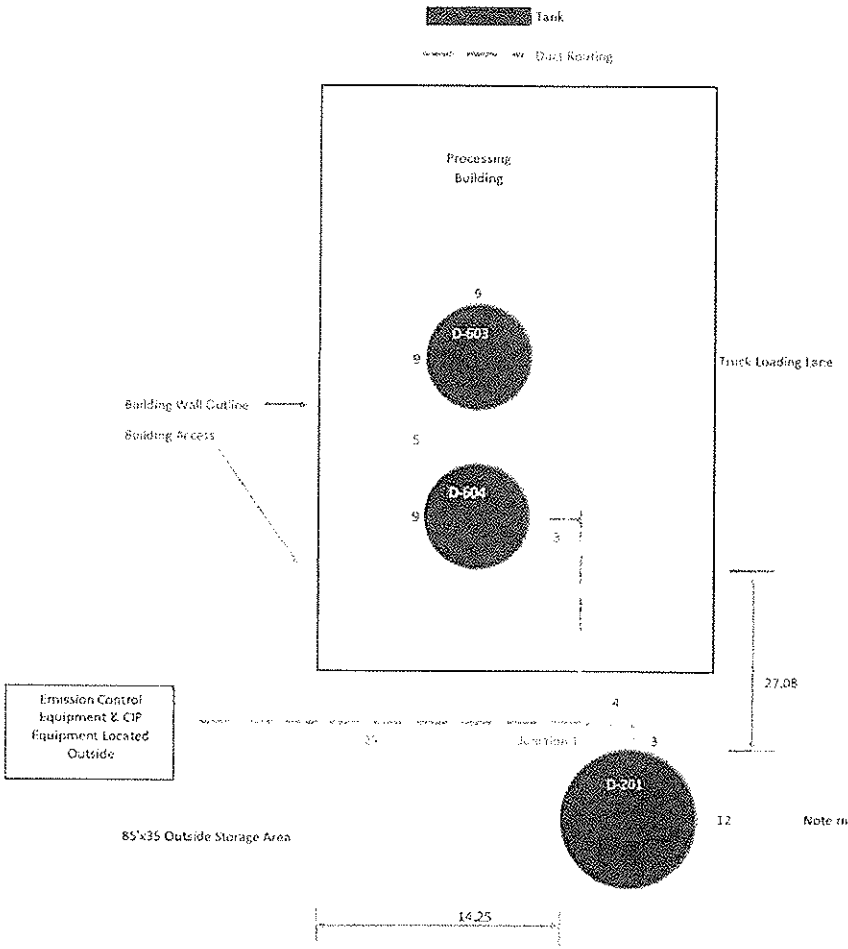
Cost Effectiveness = $16,309/year ÷ 0.14 tons-VOC/year
= $116,493/ton-VOC

The analysis demonstrates that the annualized purchase cost of the required condenser alone results in a cost effectiveness which exceeds the District's Guideline of $17,500/ton-VOC.

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. These BACT requirements will be placed on the ATC as enforceable conditions.

Attachment I



It is assumed the emission controls and the CIP equipment can be located far enough from tank D-202 to reduce the need for explosion proof electrical equipment, and modify other considerations that are needed to handle an explosive compound. Reduce does not mean completely eliminate. The safety considerations needed for this project can not be determined until a through safety review is completed

For example the electrical classification may be changed from Class I to Class II to reduce cost by keeping the CIP and emission control equipment at some distance from the tank.

It is assume than due to the alcohol concentration of 24% to 95% that an allowance of $10,000 is sufficient to take care of these issues. This cost can be further refined when the surrounding environment for this project is completely reviewed

The $10,000 is included in the duct costing file.

Note main duct height is set 12 feet from the floor

	Tank Farm Nominal Size	From	To	Gas Flow CFM	From Tank to Main Duct Length Feet	Design Duct Velocity from Eichleay Feet/Second	Nominal Duct Size diameter in inches	Standard Size of pipe	Number of Tanks to Connect	Total Feet	Cost Per Foot from Eichleay	Cost	Comments
Connection to main duct D-601	20,000	Tank Center	Main Duct	3.1	25	40	0.49	6.00	1	25	$61.00	$1,525.00	Adjusted to 3 inch See below
Connection to main duct D-603	6,000	Tank Center	Main Duct	1.5	7.5	40	0.34	6.00	1	7.5	$61.00	$457.50	Adjusted to 3 inch See below
Connection to main duct D-604	6,000	Tank Center	Main Duct	1.5	7.5	40	0.34	6.00	1	7.5	$61.00	$457.50	Adjusted to 3 inch See below
		D-603	D-604	1.5	14	40	0.34	6.00	1	14	$61.00	$854.00	Adjusted to 3 inch See below
		D-604	Junction 1	3.0	28.58	40	0.48	6.00	1	28.58	$61.00	$1,743.38	Adjusted to 4 inch See below
		Junction 1	Emission Controls	6.1	25	40	0.68	6.00	1	25	$61.00	$1,525.00	Adjusted to 3 inch See below

Eichleay's value for a knock out drum was $46,300. Because these tanks are small the drum is envisioned to be about a 1000 gallons. A budget of $5,000 is used. The ducting is sized at 6 inch which is the smallest we have pricing. A 3 inch would be acceptable. As a result the ducting pipe pricing is reduced by 50%. We have reduced the duct spools and connection valves by the same amount. The 50% was chosen based on the ratio of the surface area of a 3 inch duct to a 6 inch duct. This reduces the amount of material and the linear lengths of weld to be run by about 50%

Adjusted for 3 Inch Ducting	
Tank Ducting SS Tubing	$3,281
Knock Out Drum	$5,000
Structural Support Allowance	$6,000
Butterfly valves at duct connection to tank	$1,063
1 foot removable spool	$250
Allowance for Explosion Safety Concerns	$10,000
Ducting cost	$26,000

1) One of the major concerns of a manifold duct system is inadvertently transferring fluids from one tank to another

2) For this reason it is necessary to design into the system a positive disconnect of the ducting system when the tanks is not being filled. There are a number of ways this can be done, but for illustration purposes we took a very brief look at a automatic butterfly valve with a physical spool to disconnect the tank from the duct.

3) It should be pointed out that no design work has been done, and this should be considered a conceptual estimate

It is assumed the emission controls and the GP equipment can be located far enough from the tanks to reduce the need for explosion proof electrical equipment, and modify other considerations that are needed to handle an explosive compound. Reduce does not mean completely eliminate. The safety considerations needed for this project can not be determined until a through safety review is completed

For example the electrical classification may be changed from Class I to Class II to reduce cost by keeping the GP and emission control equipment at some distance from the tank.

It is assume than due to the alcohol concentration of 24 to 95% that an allowance of $10,000 is sufficient to take care of these issues. This cost can be further refined when the surrounding environment for this project is completely reviewed

The $10,000 is included in the duct costing file

Attachment II

		Tank D-201	Tank D-503	Tank D-504
	Gallons	20,000	6,000	6,000
	Molecular Weight of Air	28.96	28.96	28.96
Lb.-moles	Moles of air displaced assuming air does not dissolve into the wine	2.06	2.12	2.12
	AMW (Yellow cells information for the storage emissions tab)	30.37	42.13	42.13
	Ya	0.4412	0.8611	0.8611
	Daily Maximum Emissions for Tanks 4.0 Model in Pounds/Day of water and alcohol	9.93	8.61	8.61
Lb.'s	Weight of water exiting tank from Tank 4.0 model	3.29	0.51	0.51
Lb.'s	Weight of alcohol exiting tank from Tank 4.0 model	6.64	8.10	8.10
Lb.-moles	Moles of alcohol exiting the tank from Tanks 4.0 model	0.14	0.18	0.18
Lb.-moles	Moles of water exiting the tank from Tanks 4.0 model	0.18	0.03	0.03
	Total number of moles leaving the tank	2.38	2.32	2.32

See Condensation Calculation File	Estimate Heat Load for Rule of Thumb Calculation			
	Air Only 80 to 40 Deg F			
Btu/# mole-Deg F	Cp Air Molar	7.00	7.00	7.00
	Temperature Differential Deg F	40.00	40.00	40.00
	Heat to Remove for air	1,976.65	592.99	592.99
	Pound Moles of alcohol	0.14	0.18	0.18
	Pound Moles of Water Leaving the Tank	0.18	0.03	0.03
	Total Pound Moles Leaving	0.33	0.20	0.20

The molar enthalpy at 80 degree F of 100% alcohol vapor is 19,309.20 BTU/# mole. The enthalpy at 40 degrees F of 100% alcohol liquid is 207.31 BTU/#-mole. Assume that the vapor is a 100% alcohol therefor the heat to be removed on a molar bases is 19309.20-207.31=19,101.9 BTU/#-mole.

	Heat to Remove to condense alcohol/water BTU per one #-mole of vapor	19,101.90	19,101.90	19,101.90
	Heat to remove in head space to condense	6,244.73	3,902.21	3,902.21
	Total Heat to Remove	8,221.36	4,495.20	4,495.20
	Minutes to Remove the Heat	906.58	579.44	579.44
	BTU's per hour	544.11	465.47	465.47
	Tons of Refrigeration for one Tank	0.0453	0.0388	0.0388
	Number of Tanks Filling	1.0000	1.0000	1.0000
	Total Tons of Refrigeration	0.0453	0.0388	0.0388
	Cubic Feet Per Minute	3.0928	1.5213	1.5213
	Tons/Cubic feet per minute	0.0147	0.0255	0.0255

Sum 0.1229

This is an estimate of the heat needed to be removed for complete condensation. It removes water, and alcohol from the air vapor stream. There are many temperature values and alcohol levels in the tank. The values presented are good for a typical alcohol storage tank and typical of most situations. It is a good for estimating refrigeration load and costs, but an actual design may want to look at different mixture profiles. The heat losses from the process to the surrounding environment have not been calculated. Therefore the tons of refrigeration needed may be low. Ice formation may be considered to improve alcohol removal. This is not included in the calculations.

Appendix C

Compliance Certification

San Joaquin Valley
Unified Air Pollution Control District

TITLE V MODIFICATION - COMPLIANCE CERTIFICATION FORM

I. TYPE OF PERMIT ACTION (Check appropriate box)

[X] Federal Major Permit MODIFICATION
[] MINOR PERMIT MODIFICATION
[] ADMINISTRATIVE AMENDMENT

COMPANY NAME: E&J Gallo Winery - Livingston	FACILITY ID N-1237
1. Type of Organization:[x] Corporation [ ] Sole Ownership [ ] Government [ ] Partnership [ ] Utility	
2. Owner's Name: E&J Gallo Winery-Livingston	
3. Agent to the Owner: Mr. Dan Martin	

II. **COMPLIANCE CERTIFICATION** (Read each statement carefully and initial all circles for confirmation):

Based on information and belief formed after reasonable inquiry, the equipment identified in this application will continue to comply with the applicable federal requirement(s).

Based on information and belief formed after reasonable inquiry, the equipment identified in this application will comply with applicable federal requirement(s) that will become effective during the permit term, on a timely basis.

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

10/15/15
Date

Mr. Dan Martin
Name of Responsible Official (please print)

Plant Manager- Livingston Winery
Title of Responsible Official (please print)

Mailing Address: Central Regional Office * 1990 E. Gettysburg Avenue * Fresno, California 93726-0244 * (559) 230-5900 * FAX (559) 230-6061

Appendix D

Quarterly Net Emissions Change (QNEC)

Quarterly Net Emissions Change (QNEC)

The Quarterly Net Emissions Change is used to complete the emission profile screen for the District's PAS database. The QNEC shall be calculated as follows:

QNEC = PE2 - PE1, where:

QNEC = Quarterly Net Emissions Change for each emissions unit, lb/qtr.
PE2 = Post Project Potential to Emit for each emissions unit, lb/qtr.
PE1 = Pre-Project Potential to Emit for each emissions unit, lb/qtr.

Using the values in Sections VII.C.2 and VII.C.6 in the evaluation above, quarterly PE2 and quarterly PE1 can be calculated as follows:

$PE2_{quarterly}$ = $PE2_{annual}$ ÷ 4 quarters/year
= 83 lb/year ÷ 4 qtr/year
= 20.75 lb-VOC/qtr

$PE1_{quarterly}$ = $PE1_{annual}$ ÷ 4 quarters/year
= 0 lb/year ÷ 4 qtr/year
= 0 lb-VOC/qtr

Quarterly NEC [QNEC] for N-1237-776-0 and -777-0			
	PE2 (lb/qtr)	PE1 (lb/qtr)	QNEC (lb/qtr)
VOC	35.75	0	35.75

Quarterly NEC [QNEC] for N-1237-778-0 through -780-0			
	PE2 (lb/qtr)	PE1 (lb/qtr)	QNEC (lb/qtr)
VOC	28.5	0	28.5

Appendix E

Draft ATCs

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO: N-1237-783-0

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: E & J GALLO WINERY
MAILING ADDRESS: ATTN: EHS MANAGER
18000 W RIVER RD
LIVINGSTON, CA 95334

LOCATION: 18000 W RIVER RD
LIVINGSTON, CA 95334

EQUIPMENT DESCRIPTION:
6,000 GALLON NOMINAL INSULATED STAINLESS STEEL WINE AND DISTILLED SPIRITS STORAGE TANK (TANK D603) 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. Prior to operating equipment under this Authority to Construct, permittee shall surrender VOC emission reduction credits for the following quantity of emissions: 1st quarter - 53 lb, 2nd quarter - 54 lb, 3rd quarter - 54 lb, and fourth quarter - 54 lb. These amounts include the applicable offset ratio specified in Rule 2201 Section 4.8 (as amended 4/21/11). [District Rule 2201] Federally Enforceable Through Title V Permit
4. ERC Certificate Numbers S-4601-1, S-4354-1, S-4442-1, S-4381-1, S-4381-1, S-4480-1, S-4414-1, C-1229-1 and/or N-002-1(or a certificate split from these certificates) shall be used to supply the required offsets, unless a revised offsetting proposal is received and approved by the District, upon which this Authority to Construct shall be reissued, administratively specifying the new offsetting proposal. Original public noticing requirements, if any, shall be duplicated prior to reissuance of this Authority to Construct. [District Rule 2201] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

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

Seyed Sadredin, Executive Director / APCO

Arnaud Marjollet, Director of Permit Services
N-1237-783-0 , Dec 4 2015 7:36AM -- GARCIAJ Joint Inspection NOT Required

5. The nominal tank dimensions are 9.00 feet in diameter and 12 feet in height with a proposed volume of 6,000 gallons. The permittee shall submit to the District the gauge volume of the tank within 30 days of the actual tank capacity measurement. [District Rule 2201]
6. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
7. This tank shall be equipped with and operated with a pressure-vacuum relief valve, which shall operate within 10% of the maximum allowable working pressure of the tank, operate in accordance with the manufacturer's instructions, and be permanently labeled with the operating pressure settings. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit
8. The pressure-vacuum relief valve and storage tank shall remain in a gas-tight condition, except when the operating pressure of the tank exceeds the valve set pressure. A gas-tight condition shall be determined by measuring the gas leak in accordance with the procedures in EPA Method 21. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit
9. The temperature of the wine stored in this tank shall be maintained at or below 75 degrees Fahrenheit. The temperature of the stored wine shall be determined and recorded at least once per week. For each batch of wine, the operator shall achieve the storage temperature of 75 degrees Fahrenheit or less within 60 days after completing fermentation, and shall maintain records to show when the required storage temperature of 75 degrees Fahrenheit or less was achieved. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit
10. The ethanol content of wine/spirits stored in this tank shall not exceed 95.0 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit
11. The maximum wine/spirits storage throughput in this tank shall not exceed 6,000 gallons per day. [District Rule 2201] Federally Enforceable Through Title V Permit
12. The maximum wine/spirits storage throughput in this tank, calculated on a twelve month rolling basis, shall not exceed 220,000 gallons per year (equivalent to 143 lb-VOC/year). [District Rule 2201] Federally Enforceable Through Title V Permit
13. 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
14. 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/spirits transferred, shall be maintained. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit
15. The operator shall maintain records of the calculated 12 month rolling wine ethanol content and storage and fermentation throughput rate (ethanol percentage by volume and gallons per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit
16. If the throughput or ethanol content calculated for any rolling 12-month period exceeds the annual throughput or ethanol content 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 throughput or ethanol content limits for that rolling 12-month period will be deemed to have occurred so long as the calendar year throughput and ethanol content are below the annual throughput and ethanol content limitations. [District Rule 2201] Federally Enforceable Through Title V Permit
17. 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
18. All records shall be retained on-site for a period of at least five years and made available for District inspection upon request. [District Rule 1070] Federally Enforceable Through Title V Permit

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO: N-1237-784-0

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: E & J GALLO WINERY
MAILING ADDRESS: ATTN: EHS MANAGER
18000 W RIVER RD
LIVINGSTON, CA 95334

LOCATION: 18000 W RIVER RD
LIVINGSTON, CA 95334

EQUIPMENT DESCRIPTION:
6,000 GALLON NOMINAL INSULATED STAINLESS STEEL WINE AND DISTILLED SPIRITS STORAGE TANK (D604) 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. Prior to operating equipment under this Authority to Construct, permittee shall surrender VOC emission reduction credits for the following quantity of emissions: 1st quarter - 53 lb, 2nd quarter - 54 lb, 3rd quarter - 54 lb, and fourth quarter - 54 lb. These amounts include the applicable offset ratio specified in Rule 2201 Section 4.8 (as amended 4/21/11). [District Rule 2201] Federally Enforceable Through Title V Permit
4. ERC Certificate Numbers S-4601-1, S-4354-1, S-4442-1, S-4381-1, S-4381-1, S-4480-1, S-4414-1, C-1229-1 and/or N-002-1(or a certificate split from these certificates) shall be used to supply the required offsets, unless a revised offsetting proposal is received and approved by the District, upon which this Authority to Construct shall be reissued, administratively specifying the new offsetting proposal. Original public noticing requirements, if any, shall be duplicated prior to reissuance of this Authority to Construct. [District Rule 2201] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

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

Seyed Sadredin, Executive Director / APCO

Arnaud Marjollet, Director of Permit Services
N-1237-784-0 : Dec 4 2015 7:36AM -- GARCIAJ Joint Inspection NOT Required

5. The nominal tank dimensions are 9.00 feet in diameter and 12 feet in height with a proposed volume of 6,000 gallons. The permittee shall submit to the District the gauge volume of the tank within 30 days of the actual tank capacity measurement. [District Rule 2201]
6. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
7. This tank shall be equipped with and operated with a pressure-vacuum relief valve, which shall operate within 10% of the maximum allowable working pressure of the tank, operate in accordance with the manufacturer's instructions, and be permanently labeled with the operating pressure settings. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit
8. The pressure-vacuum relief valve and storage tank shall remain in a gas-tight condition, except when the operating pressure of the tank exceeds the valve set pressure. A gas-tight condition shall be determined by measuring the gas leak in accordance with the procedures in EPA Method 21. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit
9. The temperature of the wine stored in this tank shall be maintained at or below 75 degrees Fahrenheit. The temperature of the stored wine shall be determined and recorded at least once per week. For each batch of wine, the operator shall achieve the storage temperature of 75 degrees Fahrenheit or less within 60 days after completing fermentation, and shall maintain records to show when the required storage temperature of 75 degrees Fahrenheit or less was achieved. [District Rules 2201 and 4694] Federally Enforceable Through Title V Permit
10. The ethanol content of wine/spirits stored in this tank shall not exceed 95.0 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit
11. The maximum wine/spirits storage throughput in this tank shall not exceed 6,000 gallons per day. [District Rule 2201] Federally Enforceable Through Title V Permit
12. The maximum wine/spirits storage throughput in this tank, calculated on a twelve month rolling basis, shall not exceed 220,000 gallons per year (equivalent to 143 lb-VOC/year). [District Rule 2201] Federally Enforceable Through Title V Permit
13. 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
14. 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/spirits transferred, shall be maintained. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit
15. The operator shall maintain records of the calculated 12 month rolling wine ethanol content and storage and fermentation throughput rate (ethanol percentage by volume and gallons per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit
16. If the throughput or ethanol content calculated for any rolling 12-month period exceeds the annual throughput or ethanol content 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 throughput or ethanol content limits for that rolling 12-month period will be deemed to have occurred so long as the calendar year throughput and ethanol content are below the annual throughput and ethanol content limitations. [District Rule 2201] Federally Enforceable Through Title V Permit
17. 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
18. All records shall be retained on-site for a period of at least five years and made available for District inspection upon request. [District Rule 1070] Federally Enforceable Through Title V Permit

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO: N-1237-785-0

ISSUANCE DATE: DRAFT

LEGAL OWNER OR OPERATOR: E & J GALLO WINERY
MAILING ADDRESS: ATTN: EHS MANAGER
18000 W RIVER RD
LIVINGSTON, CA 95334

LOCATION: 18000 W RIVER RD
LIVINGSTON, CA 95334

EQUIPMENT DESCRIPTION:
20,000 GALLON NOMINAL INSULATED STAINLESS STEEL WINE AND DISTILLED SPIRITS STORAGE TANK (D201) 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. Prior to operating equipment under this Authority to Construct, permittee shall surrender VOC emission reduction credits for the following quantity of emissions: 1st quarter - 42 lb, 2nd quarter - 43 lb, 3rd quarter - 43 lb, and fourth quarter - 43 lb. These amounts include the applicable offset ratio specified in Rule 2201 Section 4.8 (as amended 4/21/11) for the ERC specified below. [District Rule 2201] Federally Enforceable Through Title V Permit
4. ERC Certificate Numbers S-4601-1, S-4354-1, S-4442-1, S-4381-1, S-4381-1, S-4480-1, S-4414-1, C-1229-1 and/or N-002-1(or a certificate split from these certificates) shall be used to supply the required offsets, unless a revised offsetting proposal is received and approved by the District, upon which this Authority to Construct shall be reissued, administratively specifying the new offsetting proposal. Original public noticing requirements, if any, shall be duplicated prior to reissuance of this Authority to Construct. [District Rule 2201] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

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

Seyed Sadredin, Executive Director / APCO

Arnaud Marjollet, Director of Permit Services
N-1237-785-0 : Dec 4 2015 7:42AM -- GARCIAJ : Joint Inspection NOT Required

5. The nominal tank dimensions are 12.00 feet in diameter and 24 feet in height with a proposed volume of 20,000 gallons. The permittee shall submit to the District the gauge volume of the tank within 30 days of the actual tank capacity measurement. [District Rule 2201]

6. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]

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

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

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

10. The ethanol content of wine/spirits stored in this tank shall not exceed 24.0 percent by volume. [District Rule 2201] Federally Enforceable Through Title V Permit

11. The maximum wine/spirits storage throughput in this tank shall not exceed 20,000 gallons per day. [District Rule 2201] Federally Enforceable Through Title V Permit

12. The maximum wine/spirits storage throughput in this tank, calculated on a twelve month rolling basis, shall not exceed 500,000 gallons per year (equivalent to 114 lb-VOC/year). [District Rule 2201] Federally Enforceable Through Title V Permit

13. 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

14. 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/spirits transferred, shall be maintained. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

15. The operator shall maintain records of the calculated 12 month rolling wine ethanol content and storage and fermentation throughput rate (ethanol percentage by volume and gallons per 12 month rolling period, calculated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit

16. If the throughput or ethanol content calculated for any rolling 12-month period exceeds the annual throughput or ethanol content 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 throughput or ethanol content limits for that rolling 12-month period will be deemed to have occurred so long as the calendar year throughput and ethanol content are below the annual throughput and ethanol content limitations. [District Rule 2201] Federally Enforceable Through Title V Permit

17. 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

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