San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING

JAN 04 2018

Mr. Adam Wenz
E & J Gallo Winery
18000 W River Rd
Livingston, CA 95334

**Re: Proposed ATC / Certificate of Conformity (Significant Mod)**
**Facility Number: N-1237**
**Project Number: N-1173410**

Dear Mr. Wenz:

Enclosed for your review is the District's analysis of an application for Authority to Construct for the facility identified above. You requested that a Certificate of Conformity with the procedural requirements of 40 CFR Part 70 be issued with this project. This project authorizes the installation of a new ethanol evaporator system.

After addressing all comments made during the 30-day public notice and the 45-day EPA comment periods, the District intends to issue the Authority to Construct with a Certificate 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 Authority 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: Tung Le, CARB (w/enclosure) via email
cc: Gerardo C. Rios, EPA (w/enclosure) via email
cc: Kim Burns, E & J Gallo Winery (w/enclosure) via email

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# San Joaquin Valley Air Pollution Control District

## Authority to Construct Application Review

*Installation of an Ethanol Evaporator System*

| | | | |
|---|---|---|---|
| Facility Name: | E & J Gallo Winery | Date: | January 3, 2018 |
| Mailing Address: | 18000 W. River Rd<br>Livingston, CA 95334 | Engineer: | Dustin Brown |
| | | Lead Engineer: | Jerry Sandhu |
| Contact Person: | Adam Wenz | | |
| Telephone: | (209) 394-6211 | | |
| E-Mail: | Adam.Wenz@ejgallo.com | | |
| Application #(s): | N-1237-891-0 | | |
| Project #: | N-1173410 | | |
| Deemed Complete: | November 15, 2017 | | |

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### I. Proposal

E & J Gallo Winery has requested an Authority to Construct (ATC) permit for the installation of an ethanol evaporator system consisting of shell and tube product heaters, a falling film shell and tube heat exchanger, vapor separators, product flash coolers, vapor heat exchangers, a vapor condenser, a vapor flash cooler and a cooling tower. The evaporator system is currently constructed and operated solely in permit exempt juice service at this facility. However, the facility would now like the ability to process alcohol containing products through the evaporator system. The system is subject to permit requirements while in alcohol service. Since this ethanol evaporator system was previously permit exempt, it will be treated as a new emission unit for the purposes of this project.

E & J Gallo Winery received their Title V Permit for this stationary source on June 27, 2000. This modification can be classified as a Title V significant modification pursuant to Rule 2520, Sections 3.20 and 3.29, 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 Authorities to Construct. E & J Gallo Winery must apply to administratively amend their Title V Operating Permit to include the requirements of the ATCs issued with this project.

### II. Applicable Rules

| | |
|---|---|
| Rule 2201 | New and Modified Stationary Source Review Rule (2/18/16) |
| Rule 2410 | Prevention of Significant Deterioration (6/16/11) |
| Rule 2520 | Federally Mandated Operating Permits (6/21/01) |
| Rule 4001 | New Source Performance Standards (4/14/99) |
| Rule 4002 | National Emissions Standards for Hazardous Air Pollutants (5/20/04) |
| Rule 4101 | Visible Emissions (2/17/05) |
| Rule 4102 | Nuisance (12/17/92) |

Rule 4694 Wine Fermentation and Storage Tanks (12/15/05)
CH&SC 41700 Health Risk Assessment
CH&SC 42301.6 School Notice
Public Resources Code 21000-21177: California Environmental Quality Act (CEQA)
California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387: CEQA Guidelines

## III. Project Location

This facility is located at 18000 W. River Road in Livingston, CA.

The District has verified that 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 operates a winery at this location.

This project will modify an existing evaporator process that runs grape juice making concentrate to a new process that will run grape juice with alcohol. This evaporator system is currently used for the removal of water from juice concentrate. After this project, the facility is requesting to also remove water from ethanol containing products resulting in concentrated beverage or "wine like" solutions that are alcohol reduced or alcohol free.

After the proposed modification, the evaporator will have two operational modes: 1) Non-Alcoholic juice processing and 2) Alcohol containing product processing. There are no emissions associated when the evaporator is used for non-alcoholic juice processing, therefore, when operating in mode 1, the evaporator is not subject to permit requirements. However, alcohol (ethanol) is a VOC, therefore, when operating in mode 2, the evaporator will be subject to permit requirements as VOC emissions will be potentially emitted from the evaporator atmospheric vent.

The proposed evaporator system is a Caloris Flexmode™ 4-effect steam heated evaporator with ethanol recovery and flash cooler. This system operates under vacuum conditions. The main function of the multiple effect evaporator is to boil the water/ethanol feed solution in a sequence of vessels each held at a lower pressure than the last. Because the boiling temperature of the solution decreases as pressure decreases, the vapor boiled off in one vessel can be used to heat the next and only the first vessel (at the highest pressure) requires heating with an external steam source. The multiple effects are connected in series to allow sensible heat in the condensed vapor to preheat the feed liquid to be subsequently flash vaporized within the evaporator chamber. Finally, the condensed vapors containing the water and ethanol that were removed from the feed product is condensed and recovered by passing through the evaporator vent condenser and vent cooler (see process flow diagram in Appendix A).

## V. Equipment Listing

N-1237-891-0: ETHANOL EVAPORATOR SYSTEM MADE UP OF A CALORIS COMPACT FLEXMODE DIRECT STEAM HEATED 4-EFFECT EVAPORATOR CONSISTING OF SHELL AND TUBE PRODUCT HEATERS, FALLING FILM SHELL AND TUBE HEAT EXCHANGER CALANDRIAS WITH VAPOR SEPARATORS, PRODUCT FLASH COOLERS, VAPOR HEAT EXCHANGERS, VAPOR CONDENSER, VAPOR FLASH COOLER, AND COOLING TOWER

## VI. Emission Control Technology Evaluation

There are no proposed emission control techniques for the ethanol evaporator system.

## VII. General Calculations

### A. Assumptions

- When the evaporator system is processing juices and other non-alcohol containing materials, it will remain exempt and not subject to permit requirements.
- When the evaporator system is processing materials containing ethanol/alcohol, VOC is the only pollutant of concern.
- Maximum operating schedule of the evaporator system while processing materials containing ethanol/alcohol will be 24 hours per day and 1,286 hours per year (proposed by the applicant).

### B. Emission Factors

The District currently only has one other ethanol evaporator system under permit (reference permit N-1237-600). Therefore, it is not a common operation type.

Based on a mass balance and heat exchanger efficiency calculation, the manufacturer of the proposed ethanol evaporator system, Caloris, estimates that the VOC emissions from the proposed equipment will be 4.4 lb/hour (see Appendix A). The proposed ethanol evaporator system will process a large variation of liquids with differing ethanol contents. Since there is a large variation of the liquids processed through this equipment and the fact that this type of equipment is not a common process type permitted by the District, E & J Gallo Winery has requested to build a 35% factor of safety in to the emission rate estimated by the manufacturer.

Estimated Ethanol Evaporator System VOC EF = 4.4 lb-VOC/hour
Proposed Factor of Safety = 35%

Ethanol Evaporator System VOC EF = 4.4 lb-VOC/hour x (1 + 0.35)
Ethanol Evaporator System VOC EF = 5.94 lb-VOC/hour

As a conservative estimate, the final VOC emission factor will be rounded up to 6.0 lb/hour.

Ethanol Evaporator System VOC EF = 6.0 lb-VOC/hour

## C. Calculations

### 1. Pre-Project Potential to Emit (PE1)

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

### 2. Post-Project Potential to Emit (PE2)

The PE2 values for the proposed ethanol evaporator system can be determined using the hourly VOC emission rate listed above and a worst case-operating scenario proposed by the applicant of 24 hours per day and 1,286 hours per year while processing alcohol containing materials.

Daily PE2:

Daily PE2 = Emission Rate (lb-VOC/hour) x Operation (hours/day)
Daily PE2 = 6.0 lb-VOC/hour x 24 hours/day

Daily PE2 = 144.0 lb-VOC/day

Annual PE2:

Annual PE2 = Emission Rate (lb-VOC/hour) x Operation (hours/year)
Annual PE2 = 6.0 lb-VOC/hour x 1,286 hours/year

Annual PE2 = 7,716 lb-VOC/year

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

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

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

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:**

The following table summarizes recent projects at this facility that resulted in a potential VOC emission increase prior to 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-1113407 | Install 2 distilled spirit tanks | 188 |
| N-1123583 | Install 52 new wine storage tanks | 34,264 |
| N-1131615 | Install 8 wine storage tanks and 24 wine fermentation tanks | 85,064 |
| N-1132991 | Install 20 wine storage tanks | 9,596 |
| N-1133659 | Install 24 wine fermentation and 8 wine storage tanks | 85,064 |
| N-1141254 | Install 12 wine storage and fermentation tanks | 1,164 |
| N-1143437 | Install 12 wine storage tanks | 6,536 |
| N-1143697 | Install 5 wine and spirits storage tanks | 328 |
| N-1162285 | Install 95 wine storage tanks | 27,344 |
| N-1172193 | Install 8 wine storage tanks | 4,048 |
| **Total** | | **853,296** |

As indicated above, the SSPE for VOC emissions solely from their winery tank related operations prior to the proposed project is calculated to be 853,296 pounds per year, equivalent to 426.6 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 | 426.6 |
| PSD Major Source Thresholds | 250 |
| Existing PSD Major Source? | **Yes** |

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

### 6. Baseline Emissions (BE)

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

Pursuant to District Rule 2201, BE = PE1 for:

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

otherwise,

BE = Historic Actual Emissions (HAE), calculated pursuant to District Rule 2201.

Since the proposed ethanol evaporator system is a new emission unit, BE = PE1 = 0 for all pollutants.

### 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, this facility is a major source for VOC emissions; therefore, the project's PE2 is compared to the SB 288 Major Modification Thresholds in the following table in order to determine if the SB 288 Major Modification calculation is required.

| SB 288 Major Modification Thresholds | | | |
|---|---|---|---|
| **Pollutant** | **Project PE2 (lb/year)** | **Threshold (lb/year)** | **SB 288 Major Modification Calculation Required?** |
| $NO_x$ | 0 | 50,000 | No |
| $SO_x$ | 0 | 80,000 | No |
| $PM_{10}$ | 0 | 30,000 | No |
| VOC | 7,716 | 50,000 | No |

Since none of the SB 288 Major Modification Thresholds are surpassed with this project, this project does not constitute an SB 288 Major Modification.

## 8. Federal Major Modification

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

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

### Step 1

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

| Federal Major Modification Thresholds for Emission Increases | | | |
|---|---|---|---|
| **Pollutant** | **Total Emissions Increases (lb/yr)** | **Thresholds (lb/yr)** | **Federal Major Modification?** |
| $NO_x$* | 0 | 0 | No |
| VOC* | 7,716 | 0 | Yes |
| $PM_{10}$ | 0 | 30,000 | No |
| $PM_{2.5}$ | 0 | 20,000 | No |
| $SO_x$ | 0 | 80,000 | No |

*If there is any emission increases in $NO_x$ or VOC, this project is a Federal Major Modification and no further analysis is required.

Since there is an increase in VOC emissions, this project constitutes a Federal Major Modification. Federal Offset quantities are calculated below.

**Federal Offset Quantities:**

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

**VOC** **Federal Offset Ratio** **1.5:1**

| Permit No. | Actual Emissions (lb/year) | Potential Emissions (lb/year) | Emissions Change (lb/yr) |
|---|---|---|---|
| N-1237-891-0 | 0 | 7,716 | 7,716 |
| | | **Net Emission Change (lb/year):** | 7,716 |
| | | **Federal Offset Quantity: (NEC * 1.5)** | **11,574** |

**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
- $PM_{10}$

**I. Project Location Relative to Class 1 Area**

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

**II. Project Emission Increase – Significance Determination**

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

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

| PSD Significant Emission Increase Determination: Potential to Emit (tons/year) | | | | | |
|---|---|---|---|---|---|
| | $NO_2$ | $SO_2$ | CO | PM | $PM_{10}$ |
| Total PE from New and Modified Units | 0 | 0 | 0 | 0 | 0 |
| PSD Significant Emission Increase Thresholds | 40 | 40 | 100 | 25 | 15 |
| PSD Significant Emission Increase? | N | N | N | N | N |

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

### 10. Quarterly Net Emissions Change (QNEC)

The QNEC is calculated solely to establish emissions that are used to complete the District's PAS emissions profile screen. Detailed QNEC calculations are included in Appendix D.

## VIII. Compliance Determination

## Rule 2201 New and Modified Stationary Source Review Rule

### A. Best Available Control Technology (BACT)

#### 1. BACT Applicability

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

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

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

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

As seen in Section VII.C.2 above, the applicant is proposing to install a new ethanol evaporator with a PE greater than 2 lb/day for VOC emissions. Therefore, BACT is triggered for VOC emissions.

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

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

**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 Sections VII.C.7 and VII.C.8 above, this project does constitute a Federal Major Modification for VOC emissions. Therefore BACT is triggered for VOC for the emissions unit in the project for which there is an emission increase.

**2. BACT Guideline**

BACT Guideline 5.4.16 applies to ethanol evaporator systems. E & J Gallo Winery is proposing to install a new ethanol evaporator in this project. Therefore, BACT Guideline 5.4.16 is applicable to this new ethanol evaporator system (BACT Guideline 5.4.16 included in Appendix B).

**3. Top-Down BACT Analysis**

Pursuant to the attached Top-Down BACT Analysis in Appendix B, there is no achieved in practice BACT control technologies for this class and category of source and the technologically feasible control options were determined to not be cost effective. Therefore, the applicant's proposal of an uncontrolled ethanol evaporator system satisfies BACT and no further discussion is required.

## B. Offsets

**1. Offset Applicability**

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

This project only involves VOC emissions. The following table compares the post-project facility-wide annual VOC emissions in order to determine if offsets will be required for this project.

| Pollutant | SSPE2 (lb/yr) | Offset Threshold Levels (lb/yr) | Offsets Triggered? |
|---|---|---|---|
| VOC | > 20,000 | 20,000 | Yes |

## 2. Quantity of Offsets Required

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

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

Offsets Required (lb/year) = ($\Sigma$[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

As shown in Section VII.C.6 of this evaluation above, since this is a new emission unit, the BE = 0. In addition, there are no increases in cargo carrier emissions due to this project. Therefore,

Offsets Required (lb/yr) = $\Sigma$[PE2 – BE] x DOR

| VOC Offsets Required for Evaporator System without DOR | | | |
|---|---|---|---|
| Permit | Annual PE2 (lb/yr) | Annual BE (lb/yr) | Offsets Required for Project (lb/yr) |
| N-1237-891-0 | 7,716 | 0 | 7,716 |

In accordance with Rule 2201, Section 4.8.1, the DOR for NOx and VOC offsets for projects that trigger federal major modifications shall be 1.5:1. As shown in Section VII.C.8, this project triggers a federal major modification for VOC emissions. Therefore, the DOR will be 1.5:1 and the total amount of VOC ERCs that need to be withdrawn for this project is:

| VOC Offsets Required for Evaporator System with DOR | | | |
|---|---|---|---|
| Permits | Offsets Required for Project (lb/yr) | DOR | Total Offsets Required for Project with DOR (lb/yr) |
| N-1237-891-0 | 7,716 | 1.5 | 11,574 |

Calculating the appropriate quarterly emissions to be offset for the proposed ethanol evaporator system is as follows:

Quarterly Offsets Required (lb/qtr) = Total Offsets Required (lb-VOC/yr) ÷ 4 (qtr/yr)

| Quarterly VOC Offsets Required for Evaporator System | | | |
|---|---|---|---|
| Permit | Total Offsets Required (lb/yr) | Quarters/year | Total Offsets Required, per Tank (lb/qtr) |
| N-1237-891-0 | 11,574 | 4 | 2,893.5 |

As shown in the table above, the quarterly amount of offsets required for this project, when evenly distributed to each quarter, results in fractional pounds of offsets being required each quarter. Since offsets are required to be withdrawn as whole pounds, the quarterly amounts of offsets need to be adjusted to ensure the quarterly values sum to the total annual amount of offsets required.

To adjust the quarterly amount of offsets required, the fractional amount of offsets required in each quarter will be summed and redistributed to each quarter based on the number of days in each quarter. The redistribution is based on Quarter 1 having 90 days, Quarter 2 having 91 days, and Quarters 3 and 4 having 92 days. Therefore, the appropriate quarterly emissions to be offset for each tank are as follows:

| Quarterly VOC Offsets Required for Evaporator System | | | | |
|---|---|---|---|---|
| Permits | Offsets Required (lb/1st qtr) | Offsets Required (lb/2nd qtr) | Offsets. Required (lb/3rd qtr) | Offsets Required (lb/4th qtr) |
| N-1237-891-0 | 2,893 | 2,893 | 2,894 | 2,894 |

The applicant has stated that the facility plans to use their primary ERC certificate S-4744-1 to offset the increases in VOC emissions associated with this project. They have also requested to list ERC Certificates C-1404-1, S-4442-1, S-4751-1, S-4769-1, S-4773-1, S-4780-1 or S-4912-1 as secondary certificates to offset the increases in VOC emissions associated with this project. The above certificates have available quarterly VOC credits as follows[1]:

[1] The available credit values listed below only show the credits available from each certificate that are not currently reserved for other ATC projects in the District's permit database.

| | 1st Quarter | 2nd Quarter | 3rd Quarter | 4th Quarter |
|---|---|---|---|---|
| ERC #S-4744-1 | 11,449 | 61,387 | 61,376 | 61,376 |
| ERC #C-1404-1 | 4,409 | 4,405 | 4,252 | 4,131 |
| ERC #S-4442-1 | 6,862 | 6,852 | 0 | 0 |
| ERC #S-4751-1 | 13,522 | 13,570 | 7,249 | 7,260 |
| ERC #S-4769-1 | 2,761 | 2,761 | 1,087 | 1,083 |
| ERC #S-4773-1 | 827 | 771 | 56 | 41 |
| ERC #S-4780-1 | 16,794 | 16,752 | 4,054 | 2,387 |
| ERC #S-4912-1 | 40,338 | 40,312 | 40,309 | 40,306 |

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

The following condition will be included on the ATC for this evaporator system:

- Prior to operating equipment under this Authority to Construct, permittee shall surrender VOC emission reduction credits for the following quantity of emissions: 1st quarter – 2,893 lb, 2nd quarter – 2,893 lb, 3rd quarter – 2,894 lb, and 4th quarter – 2,894 lb. These amounts include the applicable offset ratio specified in Rule 2201 Section 4.8 (as amended 2/18/16). [District Rule 2201]

- ERC Certificate Numbers S-4744-1, C-1404-1, S-4442-1, S-4751-1, S-4769-1, S-4773-1, S-4780-1, or S-4912-1 (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]

## C. Public Notification

### 1. Applicability

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

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

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

However, as demonstrated in Section VII.C.8 above, this project triggers a Federal Major Modification. 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 includes a new ethanol evaporator system which has daily emissions greater than 100 lb/day for VOC, therefore public noticing for PE > 100 lb/day purposes is required.

**c. Offset Threshold**

Public notification is required if the Pre-Project Stationary Source Potential to Emit (SSPE1) is increased from a level below the offset threshold to a level exceeding the emissions offset threshold, for any pollutant.

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

| 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 offset 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 SSPE1 and SSPE2 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 | >20,000 + 7,716 | >20,000 | 7,716 | 20,000 lb/year | No |

As demonstrated above, the SSIPE for VOC was 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 triggering a Federal Major Modification, a PE of greater than 100 lb/day, and a Title V Significant Permit Modification. Therefore, public notice documents will be submitted to the California Air Resources Board (CARB), EPA, and a public notice will be published in the local newspaper of general circulation prior to the issuance of the ATCs for these winery tank modifications.

## 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 this ethanol evaporator system, while processing ethanol containing materials, the DEL is stated in the form of emission rate (lb-VOC/hr) and the maximum operational time of 24 hours per day. In addition, the rolling 12-month annual VOC emission limit will be included on the ATC to assure compliance with the annual emission calculations shown above.

***Proposed Rule 2201 (DEL) Conditions:***

- VOC emission rate from the ethanol evaporator system atmospheric vent, while processing ethanol containing materials, shall not exceed either of the following limits: 6.0 lb-VOC per hour or 7,716 lb-VOC per rolling 12-month period. [District Rule 2201]

- The rolling 12-month VOC emissions shall be determined as follows: Rolling 12-Month VOC Emissions = 6.0 (lb-VOC/hour) x Hours of Operation While Processing Ethanol Containing Materials (hours/rolling 12-month period). [District Rule 2201]

## E. Compliance Assurance

### 1. Source Testing

District Policy APR 1705 establishes guidelines in determining adequate frequency of source testing for proposed equipment. However, APR 1705 does not list specific source testing requirements for ethanol evaporator systems. Section I.D states that initial source testing must be required to verify the emission factors for equipment where an applicant proposes emission factors that are new or different from those typically used for similar sources. As discussed above, an ethanol evaporator is not a common process and the applicant has proposed a new VOC emission factor. Therefore, initial source testing for VOC emissions will be required as a part of this project.

In addition, due to the amount of different materials and ethanol contents that this unit will be processing, the District will require periodic annual source testing as well. Since the unit will only operate a maximum of 1,286 hours per year, it does not seem feasible to require E & J Gallo Winery to source test this unit every single year. Therefore, the District will require this unit to follow a source testing schedule similar to boilers subject to the source testing requirements of Rule 4320. Rule 4320 requires units to source testing once every 12 months, however, if compliance is demonstrated on two consecutive annual source tests, the following test can be deferred for up to 36 months.

The following conditions will be included on the ATC to assure compliance with the testing requirements:

- Initial source testing to determine the rate of VOC at the evaporator vent to atmosphere, expressed as lb-VOC/hour, shall be conducted within 60 days after initial start-up, with the unit operating at conditions representative of normal operations. [District Rules 1081 and 2201]

- Source testing to determine the rate of VOC at the evaporator vent to atmosphere, expressed as lb-VOC/hour, shall be conducted at least once every twelve (12) months, with the unit operating at conditions representative of normal operations. After demonstrating compliance on two (2) consecutive annual source tests, the unit shall be tested not less than once every thirty-six (36) months. If the result of the 36-month source test demonstrates that the unit does not meet the applicable emission limits, the source testing frequency shall revert to at least once every twelve (12) months. [District Rules 1081 and 2201]

- Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified at least 30 days prior to any compliance source test, and a source test plan must be submitted for approval at least 15 days prior to testing. [District Rule 1081]

- Source testing to determine the rate of VOC, measured in lb-VOC per hour, shall be conducted using EPA Method 18 and 25 or 25A. Source testing shall also be conducted in accordance with EPA's Midwest Scaling Protocol for the Measurement of "VOC Mass Emissions" at Ethanol Production Facilities and/or any other testing methodology that has been previously approved by the District, CARB, and EPA. [District Rules 1081 and 2201]

- The results of each source test shall be submitted to the District within 60 days thereafter. [District Rule 1081]

**2. Monitoring**

No monitoring is required to demonstrate compliance with Rule 2201.

**3. Recordkeeping**

Recordkeeping is required to demonstrate compliance with the offset, public notification and daily emission limit requirements of Rule 2201. The following condition will be listed on the permit to operate:

- The permittee shall maintain records of the rolling 12-month VOC emission rate from the ethanol evaporator system (lb-VOC per rolling 12-month period, calculated and updated monthly). [District Rule 2201]

- All records shall be retained on site for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rules 1070 and 2201]

**4. Reporting**

No reporting is required to demonstrate compliance with Rule 2201.

## F. Ambient Air Quality Analysis (AAQA)

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 only involves increases in VOC emissions and no ambient air quality standard exists for VOC, an AAQA is not required.

### 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 project does constitute a Federal Major Modification, therefore this requirement is applicable. E & J Gallo Winery's statewide compliance certification is included in Appendix C.

### H. Alternate Siting Analysis

District Rule 2201, Section 4.15.1 requires an alternative siting analysis for any project which constitutes a New Major Source or a Federal Major Modification. As shown above, this project triggers a Federal Major Modification. Therefore, an alternative siting analysis must be performed.

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 permitting of an ethanol evaporator system, it represents only a minimal change in the winery's operation 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 hundreds of winery tanks and 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 shown in Section VII.C.9 above, this project does not result in a new PSD major source or PSD major modification. Therefore, this project is not subject to the requirements of Rule 2410 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 is not a Federal Major Modification, as defined in Rule 2201[2]. As discussed above, this project triggers a Federal Major Modification. As a result, the proposed project constitutes a Significant Modification to the Title V Permit pursuant to Section 3.29.

As discussed above, the facility has applied for a Certificate of Conformity (COC). Therefore, the facility must apply to modify their Title V permit with an administrative amendment, prior to operating with the proposed modifications. Continued compliance with this rule is expected. The facility may construct/operate under the ATCs upon submittal of the Title V administrative amendment application. The following conditions will be included on the ATC and will assure compliance with the requirements of Rule 2520:

- 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]

- 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]

**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 ethanol evaporation 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 an ethanol evaporation operations. Therefore, no further discussion is required.

[2] District Rule 2520, Section 3.20.5 actually states that a project shall not constitute a Title I modification, as defined in Rule 2201. In a previous version of Rule 2201, the term Title I modification was replaced with Federal Major Modification. However, at that time, the terminology in Rule 2520 was not updated to reflect the new Rule 2201 terms. Therefore, even though Rule 2520 references that a project triggering a Title I modification does not qualify as a Title V minor modification, it will be replaced with the term Federal Major Modification for the purposes of this project.

### Rule 4101 Visible Emissions

Rule 4101 states that no person shall discharge into the atmosphere emissions of any air contaminant aggregating more than 3 minutes in any hour which is as dark as or darker than Ringelmann 1 (or 20% opacity). Visible emissions are not expected as a result of these wine storage operations. Therefore, compliance with this rule is expected. Compliance with the requirements of this rule is assured by the following condition, currently included as condition 22 on E & J Gallo Winery's facility wide permit N-1237-0-3:

- No air contaminants shall be discharged into the atmosphere for a period or periods aggregating more than 3 minutes in any one hour which is as dark or darker than Ringelmann #1 or equivalent to 20% opacity and greater, unless specifically exempted by District Rule 4101 (02/17/05). If the equipment or operation is subject to a more stringent visible emission standard as prescribed in a permit condition, the more stringent visible emission limit shall supersede this condition. [District Rule 4101]

### Rule 4102 Nuisance

Section 4.0 prohibits discharge of air contaminants, which could cause injury, detriment, nuisance or annoyance to the public. Public nuisance conditions are not expected as a result of these operations, provided the equipment is well maintained. Therefore, compliance with this rule is expected. Compliance with the requirements of this rule is ensured by the following condition, currently included as condition 41 on E & J Gallo Winery's facility wide permit N-1237-0-3:

- 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.

VOC emissions, as ethanol, is the only pollutant generated by the evaporator system in this project. 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 and a health risk assessment is not necessary. No further risk analysis is required.

### Rule 4694 Wine Fermentation and Storage Tanks

This rule applies to any winery fermenting wine and/or storing wine in bulk containers. The proposed project only involves an ethanol evaporator system and does not include any permitting actions associated with wine fermentation and/or storage tanks. Therefore, the requirements of this rule are not applicable to the proposed ethanol evaporator system.

## 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)

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

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

### Greenhouse Gas (GHG) Significance Determination

It is determined that no other agency has or will prepare an environmental review document for the project. Thus, the District is the Lead Agency for this project.

The proposed equipment in this project does not generate greenhouse gas emissions. The District therefore concludes that the project would have a less than cumulatively significant impact on global climate change.

### District CEQA Findings

The District is the Lead Agency for this project because there is no other agency with broader statutory authority over this project. The District performed an Engineering Evaluation (this document) for the proposed project and determined that the activity will occur at an existing facility and the project involves negligible expansion of the existing use. Furthermore, the District determined that the activity will not have a significant effect on the environment. Therefore, the District finds that the activity is categorically exempt from the provisions of CEQA pursuant to CEQA Guideline § 15301 (Existing Facilities), and finds that the project is exempt per the general rule that CEQA applies only to projects which have the potential for causing a significant effect on the environment (CEQA Guidelines §15061(b)(3)).

### Indemnification Agreement/Letter of Credit Determination

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

The criteria pollutant emissions and toxic air contaminant emissions associated with the proposed project are not significant, and there is minimal potential for public concern for this particular type of facility/operation. Therefore, an Indemnification Agreement and/or a Letter of Credit will not be required for this project in the absence of expressed public concern.

## IX. Recommendation

Compliance with all applicable rules and regulations is expected. Pending successful NSR Public Noticing and EPA Noticing periods, issue ATC N-1237-891-0 subject to the permit conditions on the attached draft ATC in Appendix E.

## X. Billing Information

| Annual Permit Fees | | | |
|---|---|---|---|
| **Permit Number** | **Fee Schedule** | **Fee Description** | **Annual Fee** |
| N-1237-891-0 | 3020-06 | Miscellaneous | $116 |

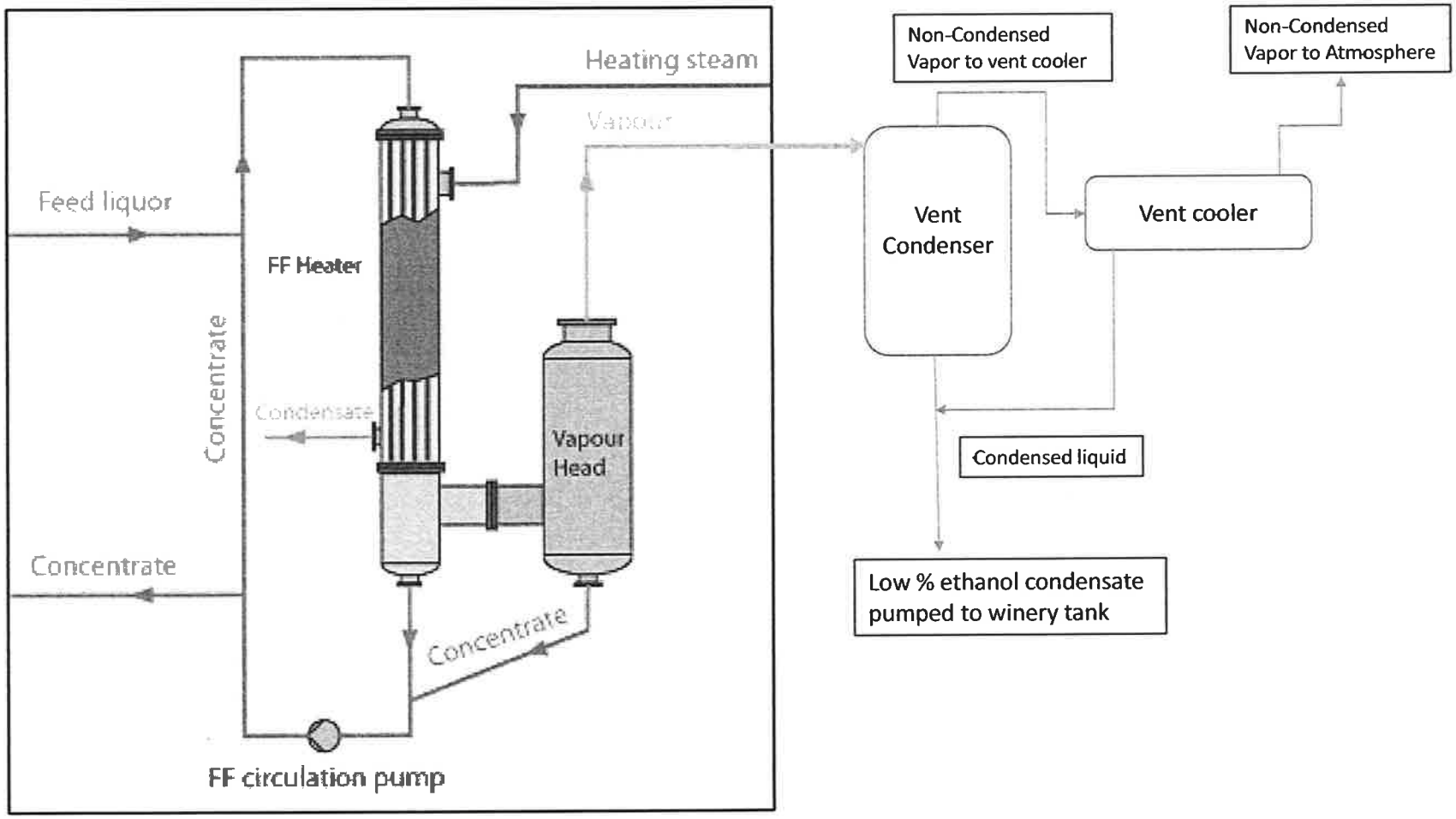
## Appendixes

A: Process Flow Diagram and Manufacturer Estimated VOC Emission Rate
B: BACT Guideline 5.4.16 and Top-Down BACT Analysis
C: E & J Gallo Winery Statewide Compliance Certification
D: Quarterly Net Emissions Change (QNEC) Calculations
E: Draft ATC N-1237-891-0

# APPENDIX A

## Process Flow Diagram and Manufacturer Estimated VOC Emission Rate

# Falling Film Evaporator Flow Diagram



# Heat Exchanger Specification

| | | | |
|---|---|---|---|
| **Customer:** | *E.&J. Gallo Winery* | **Created By:** | *CBM* |
| **Site:** | *Livingston, CA* | **Date Created:** | *3/8/14* |
| **Project:** | *4-Effect Flexmode Evaporator* | **Revised By:** | *CBM* |
| **Project No.:** | *316* | **Date Revised:** | *3/25/14* |

**NOTE:** **Flows and temperatures are fixed process conditions unless** **boxed** **in**

## Heat Exchanger VX

Description: Vent Cooler

| | | | | | |
|---|---|---|---|---|---|
| **Heated Side IN** | | Chilled Water | **Cooled Side IN** | Vent Stream | |
| Rate | Lb/h | ? | Sulphur Dioxide Gas | Lb/h | 172 |
| Temperature | °F | 39.2 | Ethanol Vapor | Lb/h | 61.7 |
| Total Solids | % | 0.0% | Water Vapor | Lb/h | 11 |
| Specific Heat | Btu/Lb-F | 1.00 | Temperature | °F | 122.0 |
| Enthalpy IN | Btu/Lb | 7.2 | Pressure | psia | 14.7 |
| **Heated Side OUT** | | | | | |
| Rate | Lb/h | ? | **Cooled Side OUT - Gas** | | |
| Temperature | °F | 77.0 | Sulphur Dioxide Gas | Lb/h | 172 |
| Total Solids | % | 0.0% | Ethanol Vapor | Lb/h | 4.4 |
| Specific Heat | Btu/Lb-F | 1.00 | Water Vapor | Lb/h | 0 |
| Enthalpy OUT | Btu/Lb | 44.9 | Temperature | °F | 50.0 |
| Heat Transfered | Btu/h | ? | **Cooled Side OUT - Condensate** | | |
| | | | Ethanol | Lb/h | 57.3 |
| | | | Water | Lb/h | 11 |
| | | | Temperature | °F | 50.0 |
| Hot Approach Temperature | °F | 45.0 | | | |
| Cold Approach Temperature | °F | 10.8 | | | |
| ΔTlm | °F | 24.0 | | | |

# APPENDIX B

## BACT Guideline 5.4.16 and Top-Down BACT Analysis

# San Joaquin Valley
# Unified Air Pollution Control District

## Best Available Control Technology (BACT) Guideline 5.4.16*

Last Update: 04/18/2012

## Ethanol Evaporator System

| Pollutant | Achieved in Practice or contained in the SIP | Technologically Feasible | Alternate Basic Equipment |
|---|---|---|---|
| VOC | | 1. Capture of VOCs and refrigerated condensation or equivalent (99% control)<br><br>2. Capture of VOCs and thermal or catalytic oxidation or equivalent (>95% control)<br><br>3. Capture of VOCs and refrigerated absorption or equivalent (95% control) | |

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

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

# Top Down BACT Analysis for VOCs from Wine Storage Operations

## Step 1 - Identify All Possible Control Technologies

SJVUAPCD BACT Clearinghouse guideline 5.4.16 does not identify any achieved in practice BACT control technologies for ethanol evaporators.

SJVUAPCD BACT Clearinghouse guideline 5.4.16 identifies technologically feasible BACT for ethanol evaporator systems as follows:

1) Capture of VOCs and refrigerated condensation or equivalent (99% control)
2) Capture of VOCs and thermal or catalytic oxidation or equivalent (>95% control)
3) Capture of VOCs and refrigerated adsorption or equivalent (95% control)

SJVUAPCD BACT Clearinghouse guideline 5.4.16 does not identify any alternate basic equipment control alternatives.

## Step 2 - Eliminate Technologically Infeasible Options

None of the control technologies listed in Step 1 above 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 refrigerated condensation or equivalent | 99% |
| 2 | Capture of VOCs and thermal or catalytic oxidation or equivalent | >95% |
| 3 | Capture of VOCs and refrigerated adsorption or equivalent | 95% |

## Step 4 - Cost Effectiveness Analysis

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

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

BACT Analysis Assumptions – All Control Options

- Sales Tax: This facility is located in Livingston, CA, which has a current sales tax rate of 7.75%. However, pollution control equipment qualifies for a partial tax exemption in California. According to the following link, the tax exemption rate is 3.9375%, https://www.cdtfa.ca.gov/industry/manufacturing-exemptions.htm. Therefore, the sales tax rate used in this analysis will be set equal to 3.8125% (7.75% - 3.9375%).
- Project Contingency: For detailed estimates, the Association for the Advancement of Cost Engineering International recommends a contingency factor of 15%, while the Electric Power Research Institute recommends a contingency of 10% to 20% (ftp://ftp.repec.org/opt/ReDIF/RePEc/sip/04-005.pdf). Therefore, a cost contingency of 15% will be applied to the detailed estimates provided in these cost analyses. Additionally, since both the direct and indirect costs are detailed estimates and both of these categories of costs have uncertainty associated with them, the contingency will be applied to both the direct and indirect costs.
- In determining the labor costs for the cost analyses, three shifts is assumed to be appropriate for a control system serving an ethanol evaporator system since the emission rate is expected to vary depending on the ethanol content of the input product being processed at any given time.
- The ethanol evaporator system is not currently served by any control devices or systems. Therefore, it vents directly to the atmosphere. If the facility was required to install one of the control technologies referenced in this top-down BACT analysis, ducting will need to be installed. As a conservative estimate, E & J Gallo Winery has provided a base capital cost of $10,000 for the exhaust path ductwork.

Maximum Vapor Flow Rate

Based on the kinetic model provided by the facility, the maximum exhaust flow rate for the proposed ethanol evaporator system is as follows:

Estimated Exhaust Flow Rate = 79 scfm

Uncontrolled VOC Emissions

E & J Gallo Winery is proposing to install a new ethanol evaporator system within this project that is not served by any control devices or technologies. Therefore, for the purposes of this cost effectiveness analysis, the uncontrolled VOC emissions will be set equal to the total VOC emissions calculated in Section VII.C.2 of this document above.

Uncontrolled VOC PE = 7,716 lb-VOC/year

Capital Cost Clean-In-Place (CIP) System

The vent line from the proposed ethanol evaporator system will be connected to the evaporator product recovery collection system. The product recovered from the evaporator is used to create other wine related products at the facility that are prepared for human consumption. Therefore, a clean-in-place (CIP) system will be required to prevent contamination of product from potential unclean ducting surfaces.

A base capital equipment cost of $200,000 for clean in place system serving a winery tank group with an estimated airflow rate of 184 scfm was utilized in past permitting projects by the District.

As shown above, the airflow rate of from the proposed ethanol evaporator system in this project is smaller than 184 cfm. In order to estimate the capital cost of the CIP system needed for this ethanol evaporator system, the cost value referenced above will need to be scaled. To be conservative, the cost will not be scaled linearly but instead, the cost will be adjusted down to the required flow rates using the 6/10 power rule[3]. The 6/10 power rule is a way to account for economies of scale (the larger the equipment is, the lower the cost of equipment per unit of capacity[4]) and is considered generally accurate to within ± 20%. To account for the accuracy within ± 20% and to address EPA's concern with using this scaling method as expressed in their comments made on previous District project N-1133555, the District will conservatively use a modified 6/10 power rule and adjust the scaled cost down by 20%. The modified 6/10 power rule calculation for this CIP system is shown below and results in the following estimated capitol cost for a CIP system designed to handle and airflow rate of 79 cfm:

Capitol Cost $= Cost_{base} \times [(Capacity_{new}/Capacity_{base})^{0.6}] \times (1 - 0.2)_{Accuracy\ Adjustment}$
$= \$200,000 \times [(79/184)^{0.6}] \times 0.8$
$= \$96,340$

[3] See the following websites for additional information: http://www.pdhonline.org/courses/g127/g127content.pdf
[4] http://faculty.ksu.edu.sa/5556/Documents/Chapter%205.ppt

| CIP System Capital Cost for Ductwork | |
|---|---|
| Cost Description | Cost ($) |
| Current cost of CIP system | $96,340 |
| The following cost data is taken from EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001). | |
| **Direct Costs** | |
| Base Equipment Costs (CIP System) See Above | $96,340 |
| Instrumentation - 10% of base equipment | $9,634 |
| Sales Tax - 3.8125% of base equipment | $3,673 |
| Freight - 5% of base equipment | $4,817 |
| **Purchased equipment cost (PEC)** | **$114,464** |
| Foundations & supports - 8% of PEC | $9,157 |
| Handling & erection - 14% of PEC | $16,025 |
| Electrical - 4% of PEC | $4,579 |
| Piping – 2% of PEC | $2,289 |
| Painting - 1% of PEC | $1,145 |
| Insulation - 1% of PEC | $1,145 |
| **Direct Installation Costs (DIC)** | **$34,340** |
| **Total Direct Costs (DC) (PEC + DIC)** | **$148,804** |
| **Indirect Costs** | |
| Engineering - 10% of PEC | $11,446 |
| Construction and field expenses - 5% of PEC | $5,723 |
| Contractor fees - 10% of PEC | $11,446 |
| Start-up - 2% of PEC | $2,289 |
| Performance test - 1% of PEC | $1,145 |
| **Total Indirect Costs (IC)** | **$32,049** |
| **Subtotal Capital Investment (SCI) (DC + IC)** | **$180,853** |
| Contingencies - 15% of SCI | $27,128 |
| **Total Capital Investment (TCI) (SCI + Contingency)** | **$207,981** |

Annualized Capital Costs

Annualized Capital Investment = Initial Capital Investment x Amortization Factor

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

Therefore,

Total Collection System Annualized Capital Investment = $207,981 x 0.163

Total Collection System Annualized Capital Investment = $33,901

Operation of a CIP system, using typical cleaning agents, will raise disposal and wastewater treatment costs. These costs would most likely add significant value to the overall CIP system cost. However, as a conservative estimate, the annual operating costs of the CIP system have not been estimated at this time and will not be included in this top down BACT analysis.

**Option 1 - Collection of VOCs and Control by Refrigerated Condensation (99% control efficiency):**

A base capital equipment cost of $132,000 for a refrigerated condenser control system serving a winery tank group with an estimated airflow rate of 276 scfm was provided by EcoPAS under project N-1162653 on October 14, 2016.

As shown above, the airflow rate of the control system needed to control the VOC emissions from the proposed ethanol evaporator system in this project is smaller than 276 cfm. In order to estimate the capital cost of the refrigerated condenser needed for this ethanol evaporator system, the cost value referenced above will need to be scaled. To be conservative, the cost will not be scaled linearly but instead, the cost will be adjusted down to the required flow rate using the 6/10 power rule. The 6/10 power rule is a way to account for economies of scale (the larger the equipment is, the lower the cost of equipment per unit of capacity) and is considered generally accurate to within ± 20%. To account for the accuracy within ± 20% and to address EPA's concern with using this scaling method as expressed in their comments made on previous District project N-1133555, the District will conservatively use a modified 6/10 power rule and adjust the scaled cost down by 20%. The modified 6/10 power rule calculation for this control system is shown below and results in the following estimated capitol cost for a refrigerated condensation system designed to handle an airflow rate of 79 cfm:

Capitol Cost $= Cost_{base} \times [(Capacity_{new}/Capacity_{base})^{0.6}] \times (1 - 0.2)_{Accuracy\ Adjustment}$
$= \$132,000 \times [(79/276)^{0.6}] \times 0.8$
$= \$49,853$

Total Capital Cost = Capital Cost Refrigerated Condenser + Ducting

Total Capital Cost = $49,583 + $10,000

| Refrigerated Condensation System Capital Cost | |
|---|---|
| Cost Description | Cost ($) |
| Base Refrigerated Condensation Cost | $59,853 |
| The following cost data is taken from EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001). | |
| **Direct Costs** | |
| Base Equipment Costs for Refrigerated Condensation System (see above) | $59,853 |
| Instrumentation - 10% of base equipment | $5,985 |
| Sales Tax - 3.8125 of base equipment | $2,282 |
| Freight - 5% of base equipment | $2,993 |
| **Purchased equipment cost (PEC)** | **$71,113** |
| Foundations & supports - 8% of PEC | $5,689 |
| Handling & erection - 14% of PEC | $9,956 |
| Electrical - 4% of PEC | $2,845 |
| Piping – 2% of PEC | $1,422 |
| Painting - 1% of PEC | $711 |
| Insulation - 1% of PEC | $711 |
| **Direct installation costs** | **$21,334** |
| **Total Direct Costs (DC)** | **$92,447** |
| **Indirect Costs** | |
| Engineering - 10% of PEC | $7,111 |
| Construction and Field Expenses – 5% of PEC | $3,556 |
| Contractor fees - 10% of PEC | $7,111 |
| Start-up – 2% of PEC | $1,422 |
| Initial Source Testing - 1 unit x $15,000/unit | $15,000 |
| **Total Indirect Costs (IC)** | **$34,200** |
| **Subtotal Capital Investment (SCI) (DC + IC)** | **$126,647** |
| Contingencies – 15% of SCI | $18,997 |
| **Total Capital Investment (TCI) (SCI + Contingency)** | **$145,644** |

Annualized Capital Costs

Annualized Capital Investment = Initial Capital Investment x Amortization Factor

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

Therefore,

Annualized Capital Investment = $145,644 x 0.163 = $23,740

Total Operation and Maintenance Costs

| Condensation Annual Operating Costs | | | |
|---|---|---|---|
| **Direct Annual Cost (DAC)** | | | |
| **Operating Labor** | | | |
| Operator | 0.5 hr/shift | $18.50/hr x 0.5 hr/shift x 3 shift/day x 53.5 days/year | $1,485 |
| Supervisor | 15% of operator | | $223 |
| **Maintenance** | | | |
| Labor | 0.5 h/shift | $18.50/hr x 0.5 hr/shift x 3 shift/day x 53.5 days/year x | $1,485 |
| Maintenance | 100% of labor | | $1,485 |
| **Chiller (Glycol)** | | | |
| Not included at this time | | | - |
| **Utility (Electricity)** | | | |
| Not included at this time | | | - |
| **Total DAC** | | | **$4,678** |
| **Indirect Annual Cost (IAC)** | | | |
| Overhead | 60% of Labor Cost | 0.6 x ($1,485 + $223 + $1,485 + $1,485) | $2,807 |
| Administrative | 2% of TCI | | $2,912 |
| Property Taxes | 1% of TCI | | $1,456 |
| Insurance | 1% of TCI | | $1,456 |
| Source Testing | One Test/ 3 Years = $15,000/3 | | $5,000 |
| **Total IAC** | | | **$13,631** |
| **Annual Cost (DAC + IAC)** | | | **$18,309** |

Total Annual Cost

Total Annual Cost = Annualized Condensation System Cost + Annual Operating and Maintenance Costs + Annualized CIP System Cost
= $23,740 + $18,309 + $33,901
= $75,950

Emission Reductions

Annual Emission Reduction = Uncontrolled Emissions x 0.99
= 7,716 lb-VOC/year x 0.99
= 7,639 lb-VOC/year
= 3.82 tons-VOC/year

Cost Effectiveness

Cost Effectiveness = Total Annual Cost ÷ Annual Emission Reductions

Cost Effectiveness = $75,950/year ÷ 3.82 tons-VOC/year
= $19,882/ton-VOC

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

**Option 2 - Collection of VOCs and Control by Thermal or Catalytic Oxidation (>95% control efficiency):**

A total capital investment cost of $383,640 for a Regenerative Thermal Oxidizer (RTO) serving ethanol vapors from a winery tank group with an airflow rate of 5,734 scfm was provided by B&W Megtec under project N-1142303 (project finalized on 12/15/16).

As shown above, the airflow rate of the control system needed to control the VOC emissions from the proposed ethanol evaporator system in this project is smaller than 1,000 cfm. In order to estimate the capital cost of the RTO needed for this ethanol evaporator system, the cost value referenced above will need to be scaled. To be conservative, the cost will not be scaled linearly but instead, the cost will be adjusted down to the required flow rate using the 6/10 power rule. The 6/10 power rule is a way to account for economies of scale (the larger the equipment is, the lower the cost of equipment per unit of capacity) and is considered generally accurate to within ± 20%. To account for the accuracy within ± 20% and to address EPA's concern with using this scaling method as expressed in their comments made on previous District project N-1133555, the District will conservatively use a modified 6/10 power rule and adjust the scaled cost down by 20%. The modified 6/10 power rule calculation for this control system is shown below and results in the following estimated capitol cost for a thermal/catalytic oxidizer system designed to handle an airflow rate of 79 cfm:

Capitol Cost $= Cost_{base} \times [(Capacity_{new}/Capacity_{base})^{0.6}] \times (1 - 0.2)_{Accuracy\ Adjustment}$
$= \$383,640 \times [(79/5,734)^{0.6}] \times 0.8$
$= \$23,470$

In addition, liquid can damage a thermal oxidizer or force it to work less efficiently. Therefore, a liquid knockout drum will be required in the exhaust ducting. Pursuant to information provided by E & J Gallo Winery for this project, it is estimated that that liquid knockout drum will cost $40,000. As a conservative estimate, it will be assumed that the knockout drum will cost no more than the estimated capital cost of the thermal oxidizer. Therefore, the cost of the liquid knockout drum will be set equal to $23,470 for the purposes of this analysis.

Total Capital Cost = Thermal Oxidizer Cost + Knockout Drum Cost + Ducting Costs

Total Capital Cost = $23,470 + $23,470 + $10,000

| **Thermal Oxidation Capital Cost** | |
|---|---|
| Cost Description | Cost ($) |
| Base Regenerative Thermal Oxidizer System Cost | $56,940 |
| The following cost data is taken from EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001). | |
| **Direct Costs** | |
| Base Equipment Costs for Regenerative Thermal Oxidizer System (see above) | $56,940 |
| Instrumentation - 10% of base equipment | $5,694 |
| Sales Tax - 3.8125% of base equipment | $2,171 |
| Freight - 5% of base equipment | $2,847 |
| **Purchased equipment cost (PEC)** | **$67,652** |
| Foundations & supports - 8% of PEC | $5,412 |
| Handling & erection - 14% of PEC | $9,471 |
| Electrical - 4% of PEC | $2,706 |
| Piping – 2% of PEC | $1,353 |
| Painting - 1% of PEC | $ 677 |
| Insulation - 1% of PEC | $ 677 |
| **Direct installation costs** | **$20,296** |
| **Total Direct Costs (DC)** | **$87,948** |
| **Indirect Costs** | |
| Engineering - 10% of PEC | $6,765 |
| Construction and Field Expenses – 5% of PEC | $3,383 |
| Contractor fees - 10% of PEC | $6,765 |
| Start-up – 2% of PEC | $1,353 |
| Initial Source Testing - 1 unit x $15,000/unit | $15,000 |
| **Total Indirect Costs (IC)** | **$33,266** |
| **Subtotal Capital Investment (SCI) (DC + IC)** | **$121,214** |
| Contingencies – 15% of SCI | $18,182 |
| **Total Capital Investment (TCI) (SCI + Contingency)** | **$139,396** |

Annualized Capital Costs

Annualized Capital Investment = Initial Capital Investment x Amortization Factor

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

Therefore,

Annualized Capital Investment = $139,396 x 0.163 = $22,722

Operation and Maintenance Costs

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

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

heat of combustion -dHc = 11,800 Btu/lb for ethanol
Daily VOC emissions rate = 144.0 lb/day
Blower flow rate = 79 scfm
= 113,760 $ft^3$/day

-dh(c) = 144.0 lb/day x 11,800 Btu/lb ÷ 113,760 $ft^3$/day
= 14.94 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) = 14.94 Btu/$ft^3$ ÷ 0.0739 lb/$ft^3$
= 202.17 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 = 79 scfm
-dh(m) = 11,800 Btu/lb for ethanol
Tr = 77°F assume ambient conditions
P(ef) = 0.0408 lb/$ft^3$, methane at 77°F, 1 atm
Tf = 1,600°F
Tw = 1,525°F
-dh(c) = 202.17 Btu/lb

$$Q = \frac{0.0739*79*\{0.255*[1.1*1,600-1,525-0.1*77] - 202.17\}}{0.0408*[11,800 - 1.1*0.255*(1,600 - 77)]}$$

= -831.6 ÷ 464 = -1.79 $ft^3$/min

Since the fuel flow requirement results in a negative number, the RTO will be able to sustain sufficient temperature solely from the combustion of the waste gas (ethanol); therefore, no supplemental fuel will be required and there are no additional cost required for supplemental fuel.

Electricity Requirement

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

Where

$\Delta P$ = Pressure drop Across system = 4 in. $H_2O$
$\in$ = Efficiency for fan and motor = 0.6
Qw = 79 scfm

$$\text{Power}_{fan} = \frac{1.17*10^{-4}\ *79\ cfm*\ 4\ in.\ H_2O}{0.60}$$

$$= 0.0616\ kW$$

Electricity Costs

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

Current Average Commercial Electricity Rate in Merced = $0.102/kWh

Electricity Cost = 0.0616 kW x 1,286 hours/year x $0.102/kWh = $8/year

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)[6].

[5] https://www.electricitylocal.com/states/california/merced.
[6] http://epa.gov/ttn/catc/dir1/cs3-2ch2.pdf.

| Thermal Oxidizer Annual Operating Costs | | | |
|---|---|---|---|
| **Direct Annual Cost (DAC)** | | | |
| **Operating Labor** | | | |
| Operator | 0.5 hr/shift | $18.50/hr x 0.5 hr/shift x 3 shift/day x 53.5 days/year | $1,485 |
| Supervisor | 15% of operator | | $223 |
| **Maintenance** | | | |
| Labor | 0.5 h/shift | $18.50/hr x 0.5 hr/shift x 3 shift/day x 53.5 days/year | $1,485 |
| Maintenance | 100% of labor | | $1,485 |
| **Utility** | | | |
| Natural Gas | not included (see calculation above) | | $0 |
| Electricity | see calculation above | | $8 |
| **Total DAC** | | | **$4,686** |
| **Indirect Annual Cost (IAC)** | | | |
| Overhead | 60% of Labor Cost | 0.6 x ($1,485 + $223 + $1,485 + $1,485) | $2,807 |
| Administrative | 2% of TCI | | $2,788 |
| Property Taxes | 1% of TCI | | $1,394 |
| Insurance | 1% of TCI | | $1,394 |
| Source Testing | One representative test/ 3 years = $15,000/3 | | $5,000 |
| **Total IAC** | | | **$13,383** |
| **Annual Operating Cost (DAC + IAC)** | | | **$18,069** |

Total Annual Cost

Total Annual Cost = Annualized Regenerative Thermal Oxidizer System Cost + Annual Operating and Maintenance Costs + Annual CIP System Cost
= $22,722 + $18,069 + $33,901
= $74,692

Emission Reductions

Annual Emission Reduction = Uncontrolled Emissions x 0.96
= 7,716 lb-VOC/year x 0.96
= 7,407 lb-VOC/year
= 3.70 tons-VOC/year

Cost Effectiveness

Cost Effectiveness = Total Annual Cost ÷ Annual Emission Reductions

Cost Effectiveness = $74,692/year ÷ 3.70 tons-VOC/year
= $20,187/ton-VOC

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

**Option 3 - Collection of VOCs and control by refrigerated adsorption (95% control efficiency):**

Based on the original top-down BACT analysis performed when BACT guideline 5.6.14 was created, adsorption can be achieved with a scrubber. A base capital equipment cost of $69,500 for a scrubber control system serving a winery tank group with an estimated airflow rate of 276 scfm was provided by NohBell under project N-1162653 on October 20, 2016.

As shown above, the airflow rate of the control system needed to control the VOC emissions from the proposed ethanol evaporator system in this project is smaller than 5,868 cfm. In order to estimate the capital cost of the scrubber needed for this ethanol evaporator system, the cost value referenced above will need to be scaled. To be conservative, the cost will not be scaled linearly but instead, the cost will be adjusted down to the required flow rate using the 6/10 power rule. The 6/10 power rule is a way to account for economies of scale (the larger the equipment is, the lower the cost of equipment per unit of capacity) and is considered generally accurate to within ± 20%. To account for the accuracy within ± 20% and to address EPA's concern with using this scaling method as expressed in their comments made on previous District project N-1133555, the District will conservatively use a modified 6/10 power rule and adjust the scaled cost down by 20%. The modified 6/10 power rule calculation for this control system is shown below and results in the following estimated capitol cost for a carbon adsorption system designed to handle an airflow rate of 79 cfm:

Capitol Cost $= Cost_{base} \times [(Capacity_{new}/Capacity_{base})^{0.6}] \times (1 - 0.2)_{Accuracy\ Adjustment}$
$= \$69,500 \times [(79/276)^{0.6}] \times 0.8$
$= \$26,249$

Operation of the scrubber will also require a spent water collection tank. A 10,000 gallon collection tank has enough capacity to allow a full truck load of material to be transported and some free board. Pursuant to information provided by E & J Gallo Winery for this project, it is estimated that a 10,000 gallon tank will cost $20,000.

Total Capital Cost = Capital Cost Adsorption/Scrubber + Spent Water Tank + Ducting

Total Capital Cost = $26,249 + $20,000+ $10,000

| Adsorption/Scrubber System Capital Cost | |
|---|---|
| Cost Description | Cost ($) |
| Base Scrubber System Cost | $56,249 |
| The following cost data is taken from EPA Control Cost Manual, Sixth Edition (EPA/452/B-02-001). | |
| **Direct Costs** | |
| Base Equipment Costs for Scrubber System (see above) | $56,249 |
| Instrumentation - 10% of base equipment | $5,625 |
| Sales Tax - 3.8125% of base equipment | $2,144 |
| Freight - 5% of base equipment | $2,812 |
| **Purchased equipment cost (PEC)** | **$66,830** |
| Foundations & supports - 8% of PEC | $5,346 |
| Handling & erection - 14% of PEC | $9,356 |
| Electrical - 4% of PEC | $2,673 |
| Piping – 2% of PEC | $1,337 |
| Painting - 1% of PEC | $ 668 |
| Insulation - 1% of PEC | $ 668 |
| **Direct installation costs** | **$20,048** |
| **Total Direct Costs (DC)** | **$86,878** |
| **Indirect Costs** | |
| Engineering - 10% of PEC | $6,683 |
| Construction and Field Expenses – 5% of PEC | $3,342 |
| Contractor fees - 10% of PEC | $6,683 |
| Start-up – 2% of PEC | $1,337 |
| Initial Source Testing - 1 unit x $15,000/unit | $15,000 |
| **Total Indirect Costs (IC)** | **$33,045** |
| **Subtotal Capital Investment (SCI) (DC + IC)** | **$119,923** |
| Contingencies – 15% of SCI | $17,988 |
| **Total Capital Investment (TCI) (SCI + Contingency)** | **$137,911** |

Annualized Capital Costs

Annualized Capital Investment = Initial Capital Investment x Amortization Factor

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

Therefore,

Annualized Capital Investment = $137,911 x 0.163 = $22,479

Total Operation and Maintenance Costs

| Adsorption/Scrubber Annual Operating Costs | | | |
|---|---|---|---|
| **Direct Annual Cost (DAC)** | | | |
| **Operating Labor** | | | |
| Operator | 0.5 hr/shift | $18.50/hr x 0.5 hr/shift x 3 shift/day x 53.5 days/year | $1,485 |
| Supervisor | 15% of operator | | $223 |
| **Maintenance** | | | |
| Labor | 0.5 h/shift | $18.50/hr x 0.5 hr/shift x 3 shift/day x 90 days/year x 5 units | $1,485 |
| Maintenance | 100% of labor | | $1,485 |
| **Wastewater Disposal** | | | |
| | Not Included at this Time | | $0 |
| **Utility** | | | |
| Electricity | Not Included at this time | | $0 |
| **Total DAC** | | | **$4,678** |
| **Indirect Annual Cost (IAC)** | | | |
| Overhead | 60% of Labor Cost | 0.6 x ($1,485 + $223 + $1,45 + $1,485) | $2,807 |
| Administrative | 2% of TCI | | $2,758 |
| Property Taxes | 1% of TCI | | $1,379 |
| Insurance | 1% of TCI | | $1,379 |
| Annual Source Test | One Source Test/Year @ $15,000 | | $5,000 |
| **Total IAC** | | | **$13,323** |
| **Annual Cost (DAC + IAC)** | | | **$18,001** |

Total Annual Cost = Scrubber Capital Cost + Annual Operating Cost + Annual CIP System Cost

= $22,479 + $18,001 + $33,901
= $74,381

Emission Reductions

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

Annual Emission Reduction = Uncontrolled Fermentation Emissions x 0.81
= 7,716 lb-VOC/year x 0.95
= 7,330 lb-VOC/year
= 3.67 tons-VOC/year

Cost Effectiveness

Cost Effectiveness = Total Annual Cost ÷ Annual Emission Reductions

Cost Effectiveness = $74,381/year ÷ 3.67 tons-VOC/year
= $20,267/ton-VOC

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

**Step 5 – Select BACT**

All identified technologically feasible options for this class and category of source have been shown to not be cost effective. In addition, there are no established achieved in practice control alternatives for an ethanol evaporator system. Therefore, the BACT requirements for VOC emissions will be satisfied for the purposes of this project.

# APPENDIX C

## E & J Gallo Winery Statewide Compliance Certification

N-1237

E&J Gallo Winery-Livingston

Project: Process Wine Using Existing Caloris Evaporator

District Permitting Engineer: Mr. Dustin Brown

Compliance Certification Statement

For Federal Major Permit Modifications

Compliance with District Rule 2201, Section 4.15.2

"I certify under penalty of law that all major stationary sources (Title V facilities) operated under my control in California are compliant with all applicable air emissions limitations and standards. The facilities included in this certification statement include the following: E&J Gallo Winery-Fresno (includes San Joaquin Valley Concentrates); E&J Gallo Winery-Livingston; E&J Gallo Winery-Modesto (includes Spirits facility) and Gallo Glass."

Chris Savage /jp

10/31/17

Mr. Chris Savage

Sr. Director of Global Environmental Affairs

Date

# APPENDIX D

## Quarterly Net Emissions Change (QNEC) Calculations

**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.1 in the evaluation above, quarterly PE2 and quarterly PE1 can be calculated as follows:

$PE2_{quarterly}$ = $PE2_{annual}$ ÷ 4 quarters/year
= 7,716 lb/year ÷ 4 qtr/year
= 1,929 lb-VOC/qtr

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

| Quarterly NEC [QNEC] | | | |
|---|---|---|---|
| **Pollutant** | **PE2 (lb/qtr)** | **PE1 (lb/qtr)** | **QNEC (lb/qtr)** |
| $NO_X$ | 0 | 0 | 0 |
| $SO_X$ | 0 | 0 | 0 |
| $PM_{10}$ | 0 | 0 | 0 |
| CO | 0 | 0 | 0 |
| VOC | 1,929 | 0 | 1,929 |

# APPENDIX E

Draft ATC N-1237-891-0

# San Joaquin Valley
# Air Pollution Control District

# AUTHORITY TO CONSTRUCT

DRAFT

**PERMIT NO:** N-1237-891-0

**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:**
ETHANOL EVAPORATOR SYSTEM MADE UP OF A CALORIS COMPACT FLEXMODE DIRECT STEAM HEATED 4-EFFECT EVAPORATOR CONSISTING OF SHELL AND TUBE PRODUCT HEATERS, FALLING FILM SHELL AND TUBE HEAT EXCHANGER CALANDRIAS WITH VAPOR SEPARATORS, PRODUCT FLASH COOLERS, VAPOR HEAT EXCHANGERS, VAPOR CONDENSER, VAPOR FLASH COOLER, AND COOLING TOWER

## 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 - 2,893 lb, 2nd quarter - 2,893 lb, 3rd quarter - 2,894 lb, and 4th quarter - 2,894 lb. These amounts include the applicable offset ratio specified in Rule 2201 Section 4.8 (as amended 2/18/16). [District Rule 2201] Federally Enforceable Through Title V Permit
4. ERC Certificate Numbers S-4744-1, C-1404-1, S-4442-1, S-4751-1, S-4769-1, S-4773-1, S-4780-1, or S-4912-1 (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

DRAFT

Arnaud Marjollet, Director of Permit Services
N-1237-891-0 Jan 3 2018 2:30PM -- BROWND Joint Inspection NOT Required

5. VOC emission rate from the ethanol evaporator system atmospheric vent, while processing ethanol containing materials, shall not exceed either of the following limits: 6.0 lb-VOC per hour or 7,716 lb-VOC per rolling 12-month period. [District Rule 2201] Federally Enforceable Through Title V Permit
6. The rolling 12-month VOC emissions shall be determined as follows: Rolling 12-Month VOC Emissions = 6.0 (lb-VOC/hour) x Hours of Operation While Processing Ethanol Containing Materials (hours/rolling 12-month period). [District Rule 2201] Federally Enforceable Through Title V Permit
7. Initial source testing to determine the rate of VOC at the evaporator vent to atmosphere, expressed as lb-VOC/hour, shall be conducted within 60 days after initial start-up, with the unit operating at conditions representative of normal operations. [District Rules 1081 and 2201] Federally Enforceable Through Title V Permit
8. Source testing to determine the rate of VOC at the evaporator vent to atmosphere, expressed as lb-VOC/hour, shall be conducted at least once every twelve (12) months, with the unit operating at conditions representative of normal operations. After demonstrating compliance on two (2) consecutive annual source tests, the unit shall be tested not less than once every thirty-six (36) months. If the result of the 36-month source test demonstrates that the unit does not meet the applicable emission limits, the source testing frequency shall revert to at least once every twelve (12) months. [District Rules 1081 and 2201] Federally Enforceable Through Title V Permit
9. Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified at least 30 days prior to any compliance source test, and a source test plan must be submitted for approval at least 15 days prior to testing. [District Rule 1081] Federally Enforceable Through Title V Permit
10. Source testing to determine the rate of VOC, measured in lb-VOC per hour, shall be conducted using EPA Method 18 and 25 or 25A. Source testing shall also be conducted in accordance with EPA's Midwest Scaling Protocol for the Measurement of "VOC Mass Emissions" at Ethanol Production Facilities and/or any other testing methodology that has been previously approved by the District, CARB, and EPA. [District Rules 1081 and 2201] Federally Enforceable Through Title V Permit
11. The results of each source test shall be submitted to the District within 60 days thereafter. [District Rule 1081] Federally Enforceable Through Title V Permit
12. The permittee shall maintain records of the rolling 12-month VOC emission rate from the ethanol evaporator system (lb-VOC per rolling 12-month period, calculated and updated monthly). [District Rule 2201] Federally Enforceable Through Title V Permit
13. All records shall be retained on site for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit