



JUL 28 2016

Mr. Michael Kandris
Pacific Ethanol Madera LLC
31470 Avenue 12
Madera, CA 93638

**Re: Proposed ATC / Certificate of Conformity (Significant Mod)
District Facility # C-4261
Project # C-1161841**

Dear Mr. Kandris:

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 solar drying of wet distillers cake and loadout into trucks.

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

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San Joaquin Valley Air Pollution Control District

Authority to Construct Application Review

Modification of Wet Distillers Cake Storage and Loadout Operation:
To Install a Wet Cake Drying Operation

Facility Name: Pacific Ethanol Madera LLC

Date: July 18, 2016

Mailing Address: 31470 Avenue 12
Madera, CA 93638

Engineer: Jesse A. Garcia
Lead Engineer: Joven Refuerzo

Contact Person: Jeff Unsinger

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Application #(s): C-4261-44-2

Project #: C-1161841

Deemed Complete: July 7, 2016

I. Proposal

Pacific Ethanol Madera LLC (PEM) has requested an Authority to Construct permit for the modification of the existing wet distillers cake (WDC) storage and loadout operation to allow the solar drying of WDC prior to loadout. PEM is also proposing to decrease the annual throughput for the storage and loadout operation from 400,000 tons-WDC to 260,000 tons-WDC and to limit the throughput for the solar drying process to 125 tons-WDC per day and 28,250 tons-WDC per year.

See Appendix A: Current Permit To Operate C-4261-44-1.

PEM has 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. PEM must apply to administratively amend their Title V permit.

II. Applicable Rules

Rule 2201	New and Modified Stationary Source Review Rule (2/18/16)
Rule 2410	Prevention of Significant Deterioration (6/16/11)
Rule 2520	Federally Mandated Operating Permits (6/21/01)
Rule 4001	New Source Performance Standards (4/14/99)
Rule 4002	National Emissions Standards for Hazardous Air Pollutants (5/20/04)
Rule 4101	Visible Emissions (2/17/05)
Rule 4102	Nuisance (12/17/92)
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 project is located 31470 Avenue 12 in Madera, California. 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

Pacific Ethanol Madera is in the business of producing ethanol from corn.

Currently, WDC is stored and handled under PTO C-4261-44. The WDC is discharged from the wet cake process operation in permit unit -43 into an existing enclosed storage area and is loaded into transport trucks within 24 hours and is then transported to be used in animal feed.

PEM is proposing to dry a portion of the existing WDC throughput using a ~5 acre concrete drying pad at the PEM stationary source. The WDC will be transferred from the existing WDC storage and loadout area and placed onto the concrete drying pad by a spreader truck to a thickness of approximately 2 inches and will remain for approximately 8 hours. The moisture content of the WDC will be reduced from approximately 70% to 10-20% (per applicant) and then will be loaded into transport trucks by a front-end loader to be used as animal feed.

V. Equipment Listing

Pre-Project Equipment Description:

C-4261-44-1: WET CAKE STORAGE AND TRUCK LOADOUT OPERATION WITH MECHANICAL CONVEYORS

Proposed Modification:

C-4261-44-2: MODIFICATION OF WET CAKE STORAGE AND TRUCK LOADOUT OPERATION WITH MECHANICAL CONVEYORS: INSTALL A WET DISTILLERS CAKE DRYING AND LOADOUT OPERATION AND DECREASE THE THROUGHPUT FOR LOADOUT FROM THE STORAGE AND TRUCK LOADOUT OPERATION TO FROM 400,000 TONS-WET CAKE/YEAR TO 260,000 TONS-WET CAKE/YEAR

Post Project Equipment Description:

C-4261-44-2: WET CAKE STORAGE, SOLAR DRYING AND TRUCK LOADOUT OPERATION WITH MECHANICAL CONVEYORS

VI. Emission Control Technology Evaluation

The wet cake storage, solar drying and truck loadout operation take place outside. The wet cake is maintained with a moisture content of greater than 6%. Therefore, per District practice, it is assumed that the handling of the wet cake will not result in the generation of PM₁₀ emissions. The wet cake emits VOC emissions as water/ethanol contained within the wet cake evaporates as it is being stored or dried and loaded out into trucks. The applicant is not proposing to control the VOC emissions generated by this operation

VII. General Calculations

A. Assumptions

- VOC is the only criteria pollutant emitted by this operation
- Pre-project throughput
 - o Daily, storage and loadout: 1,150 ton-WDC/day (current PTO)
 - o Annual, storage and loadout: 400,000 ton-WDC/year (current PTO)
- Post-project throughput
 - o Daily, storage and loadout: 1,150 ton-WDC
 - o Annual, storage and loadout: 260,000 ton-WDC
 - o Daily, drying and loadout: 125 ton-WDC
 - o Annual, drying and loadout: 28,250 ton-WDC

B. Emission Factors

$$\text{VOC EF}_{\text{storage/loadout}} = 0.0087 \text{ lb-VOC/ton-WDC (current PTO)}$$

There is no known emission factor for the solar drying of WDC; therefore, the facility provided the test results measuring the VOC emission rate from WDC over a series of 30 minute periods using a flux chamber. The summary of results from the test is included in Appendix B which results in the following emission factor as proposed by the facility:

$$\text{VOC EF}_{\text{drying/loadout}} = 0.1529 \text{ lb-VOC/ton-WDC}$$

Using the test results as an emission factor and permit limit is considered appropriate since the test results are based off of 30 minute sample times when the moisture content in the WDC is at its highest, which also means the VOC content is also at its highest. As the WDC is dried, the amount of VOCs is expected to decrease which means the VOC emission rate would decrease; however, the emission factor conservatively assumes the peak VOC emission rate (at the beginning of the drying cycle when the moisture content is highest and VOC content is highest), remains constant throughout the entire drying time. Additionally, the temperature of the flux chamber was reported as 127.4 deg F which is hotter than the average daily temperature at the site in Madera. Therefore, the emission factor is a conservative estimation and no additional margin of compliance is required.

C. Calculations

1. Pre-Project Potential to Emit (PE1)

Daily and annual PE1 are calculated using the following formula:

$$PE1 = EF1, \text{ lb-VOC/ton-WDC} \times \text{Throughput, ton-WDC/day or ton-WDC/year}$$

Storage and Loadout

$$\begin{aligned} \text{Daily PE1}_{\text{storage/loadout}} &= 0.0087 \text{ lb-VOC/ton-WDC} \times 1,150 \text{ ton-WDC/day} \\ &= 10.0 \text{ lb-VOC/day} \end{aligned}$$

$$\begin{aligned} \text{Annual PE1}_{\text{storage/loadout}} &= 0.0087 \text{ lb-VOC/ton-WDC} \times 400,000 \text{ ton-WDC/year} \\ &= 3,480 \text{ lb-VOC/year} \end{aligned}$$

Drying and Loadout

Since this is a new emissions unit, PE1 = 0 lb-VOC

2. Pre-Project Potential to Emit (PE2)

Daily and annual PE2 are calculated using the following formula:

$$PE2 = EF2, \text{ lb-VOC/ton-WDC} \times \text{Throughput, ton-WDC/day or ton-WDC/year}$$

Storage and Loadout

$$\begin{aligned} \text{Daily PE2}_{\text{storage/loadout}} &= 0.0087 \text{ lb-VOC/ton-WDC} \times 1,150 \text{ ton-WDC/day} \\ &= 10.0 \text{ lb-VOC/day} \end{aligned}$$

$$\begin{aligned} \text{Annual PE2}_{\text{storage/loadout}} &= 0.0087 \text{ lb-VOC/ton-WDC} \times 260,000 \text{ ton-WDC/year} \\ &= 2,262 \text{ lb-VOC/year} \end{aligned}$$

Drying and Loadout

$$\begin{aligned} \text{Daily PE2}_{\text{drying/loadout}} &= 0.1529 \text{ lb-VOC/ton-WDC} \times 125 \text{ ton-WDC/day} \\ &= 19.1 \text{ lb-VOC/day} \end{aligned}$$

$$\begin{aligned} \text{Annual PE2}_{\text{drying/loadout}} &= 0.1529 \text{ lb-VOC/ton-WDC} \times 28,250 \text{ ton-WDC/year} \\ &= 4,319 \text{ lb-VOC/year} \end{aligned}$$

Total PE

PE2 for C-4261-44-2			
Daily PE2	lb/day	Annual PE2	lb/year
Storage PE2, lb/day	10.0	Storage PE2, lb/year	2,262
Drying PE2, lb/day	19.1	Drying PE2, lb/year	4,319
Daily PE2, lb/day	29.1	Annual PE2, lb/year	6,581

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

Pursuant to District Rule 2201, the SSPE1 is the Potential to Emit (PE) from all units with valid Authorities to Construct (ATC) or Permits to Operate (PTO) at the Stationary Source and the quantity of Emission Reduction Credits (ERC) which have been banked

since September 19, 1991 for Actual Emissions Reductions (AER) that have occurred at the source, and which have not been used on-site.

The annual PE values for C-4261-50-4 and '-51-4 in the following table are from project C-1113132 and all the rest were taken from C-1072602 and C-1080742.

SSPE1 (lb/year)					
Permit	NOx	SOx	PM10	CO	VOC
C-4261-29-1	0	0	372	0	0
C-4261-30-1	0	0	7,704	0	0
C-4261-32-1	0	0	256	0	0
C-4261-33-1	0	0	840	0	0
C-4261-34-2	0	0	1,826	0	0
C-4261-35-2	0	0	1,826	0	0
C-4261-36-4	0	0	0	0	1,161
C-4261-37-6	0	0	0	0	836
C-4261-38-5	0	0	0	0	836
C-4261-39-6	0	0	0	0	837
C-4261-40-6	0	0	0	0	837
C-4261-41.4	0	0	0	0	1,161
C-4261-42-4	0	0	0	0	1,161
C-4261-43-4	0	0	0	0	1,161
C-4261-44-1	0	0	0	0	3,480
C-4261-45-2	0	0	0	0	363
C-4261-46-2	0	0	0	0	363
C-4261-47-2	0	0	0	0	310
C-4261-48-2	0	0	0	0	183
C-4261-49-5	1,095	62	166	1,840	3,932
C-4261-50-4	5,298	1,887	5,033	24,503	3,974
C-4261-51-4	5,298	1,887	5,033	24,503	3,974
C-4261-53-1	333	26	4	15	5
C-4261-54-1	0	0	3,134	0	0
C-4261-55-1	0	0	0	0	7
C-4261-56-1	0	0	0	0	310
C-4261-57-1	0	0	1,826	0	0
C-4261-58-1	0	0	3	0	0
Plant Fugitive Emissions	0	0	0	0	6,342
SSPE1	12,024	3,862	28,023	50,861	31,233

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.

SSPE2 (lb/year)					
Permit	NOx	SOx	PM10	CO	VOC
C-4261-29-1	0	0	372	0	0
C-4261-30-1	0	0	7,704	0	0
C-4261-32-1	0	0	256	0	0
C-4261-33-1	0	0	840	0	0
C-4261-34-2	0	0	1,826	0	0
C-4261-35-2	0	0	1,826	0	0
C-4261-36-4	0	0	0	0	1,161
C-4261-37-6	0	0	0	0	836
C-4261-38-5	0	0	0	0	836
C-4261-39-6	0	0	0	0	837
C-4261-40-6	0	0	0	0	837
C-4261-41-4	0	0	0	0	1,161
C-4261-42-4	0	0	0	0	1,161
C-4261-43-4	0	0	0	0	1,161
C-4261-44-2	0	0	0	0	6,581
C-4261-45-2	0	0	0	0	363
C-4261-46-2	0	0	0	0	363
C-4261-47-2	0	0	0	0	310
C-4261-48-2	0	0	0	0	183
C-4261-49-5	1,095	62	166	1,840	3,932
C-4261-50-4	5,298	1,887	5,033	24,503	3,974
C-4261-51-4	5,298	1,887	5,033	24,503	3,974
C-4261-53-1	333	26	4	15	5
C-4261-54-1	0	0	3,134	0	0
C-4261-55-1	0	0	0	0	7
C-4261-56-1	0	0	0	0	310
C-4261-57-1	0	0	1,826	0	0
C-4261-58-1	0	0	3	0	0
Plant Fugitive Emissions	0	0	0	0	6,342
SSPE2	12,024	3,862	28,023	50,861	34,334

Rule 2201 Major Source Determination:

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

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

Rule 2201 Major Source Determination (lb/year)						
	NO_x	SO_x	PM₁₀	PM_{2.5}	CO	VOC
SSPE1	12,024	3,862	28,023	28,023	50,861	31,233
SSPE2	12,024	3,862	28,023	28,023	50,861	34,334
Major Source Threshold	20,000	140,000	140,000	140,000	200,000	20,000
Major Source?	No	No	No	No	No	Yes

Note: PM2.5 assumed to be equal to PM10

As seen in the table above, the facility is an existing Major Source for VOC emissions and will remain a Major Source for VOC emissions as a result of this project.

Rule 2410 Major Source Determination:

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

PSD Major Source Determination (tons/year)						
	NO₂	VOC	SO₂	CO	PM	PM₁₀
Estimated Facility PE before Project Increase	6.0	15.6	1.9	25.4	14.0	14.0
PSD Major Source Thresholds	250	250	250	250	250	250
PSD Major Source ? (Y/N)	N	N	N	N	N	N

As shown above, the facility is not an existing PSD major source for any regulated NSR pollutant expected to be emitted at this facility.

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.

As shown in Section VII.C.5 above, the facility is not a Major Source for NO_x, SO_x, CO and PM₁₀.

Therefore BE = PE1.

a. BE VOC

Clean Emissions Unit, Located at a Major Source

Pursuant to Rule 2201, a Clean Emissions Unit is defined as an emissions unit that is "equipped with an emissions control technology with a minimum control efficiency of at least 95% or is equipped with emission control technology that meets the requirements for achieved-in-practice BACT as accepted by the APCO during the five years immediately prior to the submission of the complete application.

This existing WDC storage and loadout meets the requirements for achieved-in-practice BACT as demonstrated in Appendix C. Therefore, BE=PE1.

BE = PE1 = 3,480 lb VOC/year

7. SB 288 Major Modification

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

Since this facility is a major source for VOC, 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?
VOC	6,581	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.

Since this source is not included in the 28 specific source categories specified in 40 CFR 51.165, the increases in fugitive emissions are not included in the Federal Major Modification determination.

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.

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

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.

Pursuant to Rule 2201, the baseline period is a period of time equal to either:

- the two consecutive years of operation immediately prior to the submission date of the Complete Application; or

- at least two consecutive years within the five years immediately prior to the submission date of the Complete Application if determined by the APCO as more representative of normal source operation; or
- a shorter period of at least one year if the emissions unit has not been in operation for two years and this represents the full operational history of the emissions unit, including any replacement units; or
- zero years if an emissions unit has been in operation for less than one year (only for use when calculating AER).

Therefore, the baseline period is established as the two consecutive 12-month periods of operation immediately prior to the submission date of the application.

On July 12, 2016, the District received the throughput information for the existing WDC storage and loadout operation which was 186,083 tons/12-months and 229,071/12-months for the last two years.

As established in Section VII.C.1 above, the annual emissions can be calculated as follows:

$$\begin{aligned}
 \text{Annual HAE} &= 0.0087 \text{ lb-VOC/ton-WDC} \times [(186,083 + 229,071)/2] \text{ ton-WDC/year} \\
 &= 0.0087 \text{ lb-VOC/ton-WDC} \times 207,577 \text{ ton-WDC/year} \\
 &= 1,806 \text{ lb-VOC/year}
 \end{aligned}$$

VOC		Federal Offset Ratio	1.5
Permit No.	Actual Emissions (lb/year)	Potential Emissions (lb/year)	Emissions Change (lb/yr)
C-4261-44	1,806	6,581	4,475
Net Emission Change (lb/year):			4,475
Federal Offset Quantity: (NEC * 1.5)			7,163

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

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

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

I. Project Emissions Increase - New Major Source Determination

The post-project potentials to emit from all new and modified units are compared to the PSD major source thresholds to determine if the project constitutes a new major source subject to PSD requirements.

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

PSD Major Source Determination: Potential to Emit (tons/year)						
	NO2	VOC	SO2	CO	PM	PM10
Total PE from New and Modified Units	0	3.3	0	0	0	0
PSD Major Source threshold	250	250	250	250	250	250
New PSD Major Source?	N	N	N	N	N	N

As shown in the table above, the potential to emit for the project, by itself, does not exceed any PSD major source threshold. Therefore Rule 2410 is not applicable and no further analysis 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 F.

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 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 WDC solar drying operation with a PE greater than 2 lb/day for VOC. BACT is triggered for VOC only since the PE is greater than 2 lb/day.

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

$$\text{AIPE} = \text{PE2} - \text{HAPE}$$

Where,

AIPE = Adjusted Increase in Permitted Emissions, (lb/day)

PE2 = Post-Project Potential to Emit, (lb/day)

HAPE = Historically Adjusted Potential to Emit, (lb/day)

$$\text{HAPE} = \text{PE1} \times (\text{EF2}/\text{EF1})$$

Where,

PE1 = The emissions unit's PE prior to modification or relocation, (lb/day)

EF2 = The emissions unit's permitted emission factor for the pollutant after modification or relocation. If EF2 is greater than EF1 then EF2/EF1 shall be set to 1

EF1 = The emissions unit's permitted emission factor for the pollutant before the modification or relocation

$$\text{AIPE} = \text{PE2} - (\text{PE1} * (\text{EF2} / \text{EF1}))$$

$$\begin{aligned} \text{AIPE} &= 10.0 - (10.0 * (0.0087/0.0087)) \\ &= 10.0 - 10.0 * 1 \\ &= 0.0 \text{ lb-VOC/day} \end{aligned}$$

As demonstrated above, the AIPE is not greater than 2.0 lb/day for VOC emissions. Therefore BACT is not triggered.

d. SB 288/Federal Major Modification

As discussed in Sections 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

The District BACT clearinghouse does not include a BACT Guideline that applies to solar drying and truck loadout of WDC. Therefore a new BACT Guideline will be prepared for the proposed operation. (See Appendix D)

3. Top-Down BACT Analysis

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

Pursuant to the attached Top-Down BACT Analyses (see Appendix D), BACT has been satisfied with the following:

VOC: emissions limit of 0.1529 lb/ton

B. Offsets

1. Offset Applicability

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

The SSPE2 is compared to the offset thresholds in the following table.

Offset Determination (lb/year)					
	NO_x	SO_x	PM₁₀	CO	VOC
SSPE2	12,024	3,862	28,023	50,861	34,334
Offset Thresholds	20,000	54,750	29,200	200,000	20,000
Offsets triggered?	No	No	No	No	Yes

2. Quantity of Offsets Required

As seen above, the SSPE2 is greater than the offset thresholds for VOC only. 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) = $(\Sigma[\text{PE2} - \text{BE}] + \text{ICCE}) \times \text{DOR}$, 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 = 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 = HAE

As calculated above, BE = 3,480 lb-VOC/year.

Also, there is no increases in cargo carrier emissions; therefore offsets can be determined as follows:

Offsets Required (lb/year) = $([\text{PE2} - \text{BE}] + \text{ICCE}) \times \text{DOR}$

PE2 (VOC) = 6,581 lb/year

BE (VOC) = 3,480 lb /year

ICCE = 0 lb/year

The project is a Federal Major Modification and therefore the correct offset ratio for VOCs is 1.5:1.

Assuming an offset ratio of 1.5:1, the amount of VOC ERCs that need to be withdrawn is:

Offsets Required (lb/year) = $([6,581 - 3,480] + 0) \times 1.5$
= $3,101 \times 1.5$
= 4,652 lb VOC/year

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

Quarterly offsets required (lb/qtr) = $(4,652 \text{ lb VOC/year}) \div (4 \text{ quarters/year})$
= 1,163 lb/qtr

As shown in the calculation 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.

The applicant has stated that the facility plans to use ERC certificate S-4438-1 to offset the increases in VOC emissions associated with this project. The above certificate has available quarterly VOC credits as follows:

	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
ERC #S-4438-1	2,273	2,271	2,270	2,264

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:

- {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 - 1,163 lb, 2nd quarter - 1,163 lb, 3rd quarter - 1,163 lb, and 4th quarter - 1,163 lb. These amounts include the applicable offset ratio specified in Rule 2201 Section 4.8 (as amended 2/18/16) for the ERC specified below. [District Rule 2201]
- ERC Certificate Number S-4438-1 (or a certificate split from this certificate) 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, 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 SB 288 Major Modifications

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

As demonstrated in Sections VII.C.8, this project is 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 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 SSPE1 and SSPE2 are compared to the offset thresholds in the following table.

Public Notification for Surpassing Offset Thresholds					
	NO_x	SO_x	PM₁₀	CO	VOC
SSPE1 (lb/year)	12,024	3,862	28,023	50,861	31,233
SSPE2 (lb/year)	12,024	3,862	28,023	50,861	34,334
Offset Threshold (lb/year)	20,000	54,750	29,200	200,000	20,000
Public Notice Required?	No	No	No	No	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 SSIPE of more than 20,000 lb/year of any affected pollutant. According to District policy, the SSIPE = SSPE2 – SSPE1. The SSIPE is compared to the SSIPE Public Notice thresholds in the following table.

Public Notification for SSIPE > 20,000 lb/year					
	NO_x	SO_x	PM₁₀	CO	VOC
SSPE1 (lb/year)	12,024	3,862	28,023	50,861	31,233
SSPE2 (lb/year)	12,024	3,862	28,023	50,861	34,334
SSIPE (lb/year)	0	0	0	0	3,099
SSIPE Public Notice Threshold	20,000 lb/year				
Public Notice Required?	No	No	No	No	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 being a Federal Major Modification. Therefore, public notice documents will be submitted to the California Air Resources Board (CARB) and to Environmental Protection Agency (EPA) and a public notice will be published in a local newspaper of general circulation prior to the issuance of the ATC for this operation.

D. Daily Emission Limits (DELs)

DELs and other enforceable conditions are required by Rule 2201 to restrict a unit's maximum daily emissions, to a level at or below the emissions associated with the maximum design capacity. The DEL must be contained in the latest ATC and contained in or enforced by the latest PTO and enforceable, in a practicable manner, on a daily basis. DELs are also required to enforce the applicability of BACT.

Proposed Rule 2201 (DEL) Conditions:

- The maximum amount of wet cake stored/loaded out shall not exceed either of the following limits: 1,150 ton-wet cake/day or 260,000 ton-wet cake/rolling 12-month period. [District Rule 2201]
- VOC emissions rate from the wet cake storage and truck loadout operation shall not exceed 0.0087 lb-VOC/ton-wet cake processed. [District Rule 2201]

- The maximum amount of wet cake dried and loaded out shall not exceed either of the following limits: 125 ton-wet cake/day or 28,250 ton-wet cake/rolling 12-month period. [District Rule 2201]
- VOC emissions rate from the solar drying of wet cake and loadout operation shall not exceed 0.1529 lb-VOC/ton-wet cake dried. [District Rule 2201]

E. Compliance Assurance

1. Source Testing

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

2. Monitoring

No monitoring is required to demonstrate compliance with Rule 2201.

3. Recordkeeping

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

- The permittee shall maintain daily and monthly records, in tons, of the quantity of wet cake processed through the storage and truck loadout operation. [District Rules 1070 and 2201]
- The permittee shall maintain daily and monthly records, in tons, of the quantity of wet cake processed through the solar drying and loadout operation. [District Rules 1070 and 2201]
- On a monthly basis, the rolling 12-consecutive month throughput of wet cake stored/loaded out shall be calculated and recorded by summing the throughput of wet cake stored/loaded out from the previous 12 months. [District Rules 1070 and 2201]
- On a monthly basis, the rolling 12-consecutive month throughput of wet cake dried/loaded out shall be calculated and recorded by summing the throughput of wet cake dried/loaded out from the previous 12 months. [District Rules 1070 and 2201]
- All records shall be maintained and retained on-site for a period of at least 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.

G. Compliance Certification

Section 4.15.2 of this Rule requires the owner of a new Major Source or a source undergoing a Title I Modification to demonstrate to the satisfaction of the District that all other Major Sources owned by such person and operating in California are in compliance or are on a schedule for compliance with all applicable emission limitations and standards. As discussed in Section VIII above, this facility is a new major source and this project does constitute a Title I modification, therefore this requirement is applicable. PEM's compliance certification is included in Appendix G.

H. Alternate Siting Analysis

The current project occurs at an existing facility. The applicant only proposes to install a concrete pad to solar dry the wet distiller's cake.

Since the project will provide a concrete pad to be used at the same location, 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 on a much greater scale, and would therefore result in a much greater impact.

Rule 2410 Prevention of Significant Deterioration

As shown in Section VII. C. 9. above, this project does not result in a new PSD major source or PSD major modification. No further discussion is required.

Rule 2520 Federally Mandated Operating Permits

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

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

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

District 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 wet distillers cake storage, drying, or loadout.

District Rule 4101 Visible Emissions

Per Section 5.0, 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. This unit is currently required to be in compliance with the requirements of this Rule. There are no changes expected that would affect this unit's emissions. Therefore, continued compliance is expected and the following condition will be placed on the permit:

- {15} No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]

District 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 these operations, provided the equipment is well maintained. Therefore, the following condition will be listed on the 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.

An HRA is not required for a project with a total facility prioritization score of less than one. According to the Technical Services Memo for this project (Appendix E), the total facility prioritization score including this project was greater than one. Therefore, an HRA was required to determine the short-term acute and long-term chronic exposure from this project.

The cancer risk for this project is shown below:

HRA Summary		
Unit	Cancer Risk	T-BACT Required
C-4261-44-2	0.0000657 per million	No

Discussion of T-BACT

BACT for toxic emission control (T-BACT) is required if the cancer risk exceeds one in one million. As demonstrated above, T-BACT is not required for this project because the HRA indicates that the risk is not above the District's thresholds for triggering T-BACT requirements; therefore, compliance with the District's Risk Management Policy is expected.

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

District is a Lead Agency and Project not Covered Under Cap-and-Trade

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 District's engineering evaluation (this document) demonstrates that the project would not result in an increase in project specific 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. 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. Issue Authority to Construct C-4261-44-2 subject to the permit conditions on the attached draft Authority to Construct in Appendix I.

X. Billing Information

Annual Permit Fees			
Permit Number	Fee Schedule	Fee Description	Annual Fee
C-4261-44-2	3020-01-B	32.5 total electric hp	\$129.00

Appendixes

- A: Current PTO
- B: Source Test Summary
- C. Achieved in Practice Analysis
- D. New BACT Determination for Wet Distillers Cake Solar Drying
- E. RMR Summary
- F. QNEC Calculations
- G. Statewide Compliance Certification
- H. Compliance Certification
- I. Draft ATC

APPENDIX A

Current PTO

San Joaquin Valley Air Pollution Control District

PERMIT UNIT: C-4261-44-1

EXPIRATION DATE: 11/30/2017

EQUIPMENT DESCRIPTION:

WET CAKE STORAGE AND TRUCK LOADOUT OPERATION WITH MECHANICAL CONVEYORS

PERMIT UNIT REQUIREMENTS

1. All equipment shall be maintained in good operating condition and shall be operated in a manner to minimize emissions of air contaminants into the atmosphere. [District Rule 2201] Federally Enforceable Through Title V Permit
2. No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101] Federally Enforceable Through Title V Permit
3. The maximum amount of wet cake processed shall not exceed either of the following limits: 1,150 ton-wet cake/day or 400,000 ton-wet cake/year. [District Rule 2201] Federally Enforceable Through Title V Permit
4. VOC emissions rate from the wet cake storage and truck loadout operation shall not exceed 0.0087 lb-VOC/ton-wet cake processed. [District Rule 2201] Federally Enforceable Through Title V Permit
5. Initial source testing to demonstrate compliance with the VOC emissions from the wet cake storage pile(s) shall be conducted within 120 days after initial start-up, with equipment in operational condition. [District Rule 2201] Federally Enforceable Through Title V Permit
6. 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. [District Rule 1081] Federally Enforceable Through Title V Permit
7. A source test plan shall be submitted for approval by the Permit Services Division and the Compliance Division at least 30 days prior to testing. The source test plan shall also include a description of how the conditions that will be used during the source test have been determined to be representative of the highest possible VOC emissions from the wet cake storage pile(s). [District Rules 1081 and 2201] Federally Enforceable Through Title V Permit
8. VOC emissions from the wet cake storage pile(s) shall be measured using EPA Method 204 and 204D. If it is determined that EPA Method 204 and 204D cannot be used to measure the VOC emissions from the wet cake storage piles, the VOC emissions shall be measured using SCAQMD methods 25.3, 1.1, 1.2, 2.1, 2.2, 2.3, 3.1 and 4.1, or any other test method as approved by the District. [District Rules 1081 and 2201] Federally Enforceable Through Title V Permit
9. 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
10. During source testing, permittee shall maintain records of the amount of wet cake stored in the pile(s) tested (tons), or the size (ft³) and density (lb/ft³) of the wet cake pile(s) tested. [District Rule 2201] Federally Enforceable Through Title V Permit
11. The permittee shall maintain daily and annual records, in tons, of the quantity of wet cake processed through this storage and truck loadout operation. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit
12. 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 Rule 1070] Federally Enforceable Through Title V Permit

These terms and conditions are part of the Facility-wide Permit to Operate.

APPENDIX B

Source Test Summary

**Flux Chamber Emissions
Pacific Ethanol Madera - Wet Cake
Flux Chamber Test Locations**

Test No.:	2-A	2-B	Average
Date:	6/2/16	6/2/16	6/2/16
Time:	1402-1432	1402-1432	--
Location on Pile:	Top	Top	--
Barometric Pressure, in Hg	29.90	29.90	29.90
Reference Temperature, °F:	68	68	68
Run Time, min	30	30	30
Flux Chamber			
Area, square feet	1.396	1.396	1.396
Flow rate, lpm as air	5.0	5.0	5.0
Temperature, °F:	127.4	127.4	127.4
Static Pressure, in H ₂ O	0.01	0.01	0.01
VOC Concentration, ppm volume dry:			
NMOC as Methane	29.1	28.8	29.0
Methanol	1.55	1.52	1.54
Ethanol	9.02	8.84	8.93
Absolute Pressure, inHg	29.90	29.90	29.90
Flow Rate, cfm as air	10.60	10.60	10.60
Flow Rate, scfh as N ₂	9.07	9.07	9.07
Surface area, square feet	185,130	185,130	185,130
Number of Drying Days per year	226	226	226
Annual Tonnage	28,250	28,250	28,250
Midwest Scaling Protocol Molecular Weight:	26.422	26.422	26.422
NMOC as VOC			
lb/hr-ft ² :	1.30E-05	1.28E-05	1.29E-05
lb/hr:	2.40	2.37	2.39
lb/yr:	4,339	4,294	4,316
lb/ton:	0.154	0.152	0.153
Methanol as VOC			
lb/hr-ft ² :	6.90E-07	6.77E-07	6.84E-07
lb/hr:	0.128	0.125	0.127
lb/yr:	231	227	229
lb/ton:	0.00818	0.00802	0.00810
Ethanol as VOC			
lb/hr-ft ² :	8.04E-06	7.88E-06	7.96E-06
lb/hr:	1.49	1.46	1.47
lb/yr:	2,690	2,636	2,663
lb/ton:	0.0952	0.0933	0.0943

APPENDIX C

Achieved in Practice Analysis

In order to make a determination if the existing operation met BACT within the past years, a new Achieved in Practice BACT analysis is required and is performed below.

Achieved in Practice BACT Analysis:

The Environmental Protection Agency (EPA), California Air Resources Board (CARB), San Diego County Air Pollution Control District (SDCAPCD), South Coast Air Quality Management District (SCAQMD), and Bay Area Air Quality Management District (BAAQMD) BACT clearinghouses were reviewed to determine potential control technologies for this class and category of operation, but no other BACT guidelines for wet cake storage and truck loadout operations at ethanol production facilities were found.

The SJVAPCD permit database was also searched for possible facilities within this class and category of operation. Other than the subject facility, two other operating facilities have a wet cake storage and truck loadout operation. Pacific Ethanol Stockton, (N-7365) and Calgren Renewable Fuels (S-4214) each operate in a similar method as the subject facility with no controls other than having the wet cake first processed through a solids separator (centrifuge systems).

Facility	Operation	Controls
Pacific Ethanol Madera Facility ID C-4261	Wet Cake Storage and Truck Loadout	Solids separation prior to uncontrolled storage – located outside on cement pad
Pacific Ethanol Madera Facility ID C-4261	Wet Cake Storage and Truck Loadout	Solids separation prior to uncontrolled storage – located outside on cement pad
Calgren Renewable Fuels ID S-4214	Wet Cake Storage and Truck Loadout	Solids separation prior to uncontrolled storage – located outside on/in bunker

In addition, other facilities were found outside of the San Joaquin Valley that produce ethanol and operate a wet cake storage and truck loadout operation; therefore, the regulating agencies were contacted to determine if any of the regulated facilities have controls on their wet cake storage and truck loadout. The agencies contacted are summarized in the table below with Iowa, Nebraska, Illinois and Minnesota being the top 4 ethanol producing states respectively as of January 2016 per the Renewable Fuels Association:

Agency	Contact	Operations in Question	Controls/Comments
Iowa Department of Natural Resources – Construction Permits	Priyanka Painuly (515) 725-9546	Wet Cake Storage and Truck Loadout	Solids separation prior to uncontrolled storage – located on cement pad in open air buildings
Nebraska Department of Environmental Quality	Matt Williams (402) 471-8400	Wet Cake Storage and Truck Loadout	Solids separation prior to uncontrolled storage – located on cement pad in open air buildings
Illinois Environmental Protection Agency – Air Quality	Minesh Pattel (217) 782-3391	Wet Cake Storage and Truck Loadout	Solids separation prior to uncontrolled storage – located on cement pad in open air buildings
Minnesota Pollution Control Agency – Business Assistance	Hien Le (651) 757-2519	Wet Cake Storage and Truck Loadout	Contact stated he would pass information along to someone to answer my questions; however, my call was never returned
Kansas Department of Health and Environment	Will Stone (785) 296-6427	Wet Cake Storage and Truck Loadout	Most ethanol plants are not permitted and the ones that are would have permit exempt wet cake storage and loadout
Wisconsin	Don C. Faith III (608) 267-3135	Wet Cake Storage and Truck Loadout	Solids separation prior to uncontrolled storage – located on cement pad in open air buildings

Therefore, the use of a wet cake solids separation device prior to uncontrolled storage and loadout operation has been determined to be achieved in practice for this class and category of operation.

APPENDIX D

New BACT Determination for Wet Distiller's Cake Solar Drying

Proposed Pages for the BACT Clearinghouse

**San Joaquin Valley
Unified Air Pollution Control District
Best Available Control Technology (BACT) Guideline 4.12.x**

Emission unit: Solar Drying of Wet Distillers Cake

Industry Type: Ethanol Production from Corn Fermentation

Equipment Rating: All

Last Update: July 18, 2016

Pollutant	Achieved in Practice or contained in SIP	Technologically Feasible	Alternate Basic Equipment
VOC		1) VOC Capture with an enclosure that has a face velocity across any opening of 50 ft/min and 98% control efficiency – Incineration or equal 2) VOC capture with an enclosure that has a face velocity across any opening of 50 ft/min and 95% control efficiency – Carbon Adsorption, Wet Scrubber or equal 3) Use of wet distillers cake only from solids separator – to achieve an emission limit of 0.1529 lb/ton of material dried	

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 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 - Permit Specific BACT Determinations on Next Page(s)**

**San Joaquin Valley
Unified Air Pollution Control District**

Best Available Control Technology (BACT) Guideline 4.12.x

Emission unit: Solar Drying of Wet Distillers Cake Equipment Rating: All

Facility: Pacific Ethanol Madera, LLC

References: C-4261-44-2

Location: 31470 Avenue 12, Madera

Determination: July 18, 2016

Pollutant	BACT Requirements
VOC	Use of wet distillers cake only from solids separator – to achieve an emission limit of 0.1529 lb/ton of material dried

BACT Status:

- Achieved in practice Small Emitter T-BACT
- Technologically feasible BACT
- At the time of this determination achieved in practice BACT was equivalent to technologically feasible BACT
- Contained in EPA approved SIP
- The following technologically feasible options were not cost effective:
 1. VOC capture and thermal/catalytic incineration
 2. VOC capture and carbon adsorption
 3. VOC capture and wet scrubber
- Alternate Basic Equipment
- The following alternate basic equipment was not cost effective:

BACT CLEARINGHOUSE

--Submission Form--

Category

Source Category	Solar Drying of Wet Distillers Cake	
SIC Code	2869	View SIC Code List
NAICS Code	325193	View NAICS Code List

Emission Unit Information

Manufacturer	N/A
Type	N/A
Model	N/A
Equipment Description	Solar Drying of Wet Distillers Cake
Capacity/Dimensions	All
Fuel Type	N/A
Multiple Fuel Types	N/A
Operating Schedule	24 hrs/day, 7 days/week, 8,760 hours/year
Function of Equipment	Dry wet distillers cake to meet customer's specifications instead of loading out the product wet.

Facility/District Information

Facility Name	Pacific Ethanol Madera, LLC
Facility County	Madera
Facility Zip Code	93637
District Contact	Arnaud Marjollet, San Joaquin Valley Air Pollution District
District Contact Phone	(559) 230-5900
District Contact E-mail	Arnaud.marjollet@valleyair.org

Project/Permit Information

Application or Permit Number	C-4261-44-2	
New Construction/Modification	New	
ATC Date (mm-dd-yyyy)		Example: 03-29-2001
PTO Date (mm-dd-yyyy)		
Startup Date (mm-dd-yyyy)		
Technology Status		
Source Test Available		

BACT Information

Pollutant Limit(s) and Control Method(s) – Please include proper units

NOx	Limit: Control Method Type: Control Method Description:	Units:	Averaging Time:
CO	Limit: Control Method Type: BACT not triggered Control Method Description:	Units:	Averaging Time:
VOC	Limit: 0.1529 Control Method Type: Use of wet distillers cake that has been processed through a solids separator (centrifuge) Control Method Description: same	Units: lb/ton of material dried	Averaging Time:
PM	Limit: Control Method Type: BACT not triggered Control Method Description:	Units:	Averaging Time:
PM 2.5	Limit: Control Method Type: BACT not triggered Control Method Description:	Units:	Averaging Time:
PM 10	Limit: Control Method Type: BACT not triggered Control Method Description:	Units:	Averaging Time:
SOx	Limit: Control Method Type: BACT Not Triggered Control Method Description:	Units:	Averaging Time:
Pb	Limit: Control Method Type: Control Method Description:	Units:	Averaging Time:
Other	Limit: Control Method Type: Control Method Description:	Units:	Averaging Time:

BACT ANALYSIS

Facility Name: Pacific Ethanol Madera, LLC

Date: July 18, 2016

Mailing Address: 31470 Avenue 12,
Madera, CA 93638

Contact Person: Michael Kandris

Telephone: (916) 403-2124

Application #: C-4261-44-2

Project #: C-1161841

I. PROPOSAL:

Pacific Ethanol Madera, LLC (PEM) is proposing to install a concrete pad for the proposed operation of drying wet distillers cake (WDC) prior to loading out in order to meet customer's specifications. Although the applicant wants to dry the WDC, they do not want to use a natural gas-fired dryer, as is typical among ethanol producers, as one of the facility's main purposes is to produce and market low-carbon renewable fuels; therefore, the consumption of one fuel (natural gas) to produce another fuel (ethanol), when not necessary, is counter-productive to their goal.

II. PROJECT LOCATION

The proposed project will be located at 31470 Avenue 12 in Madera, CA.

III. EQUIPMENT LISTING

C-4261-44-2: WET CAKE STORAGE, SOLAR DRYING AND TRUCK LOADOUT OPERATION WITH MECHANICAL CONVEYORS

IV. PROCESS DESCRIPTION

PEM typically receives WDC from the existing centrifuge system (C-4261-43) where excess liquid is removed from this co-product. After being processed in the centrifuge system, the WDC is transferred via an enclosed conveyor system into the storage and truck loadout area that is located outside. The concrete slab is approximately 100' L x 100' W. At this point, the WDC has the consistency of really wet oatmeal. Due to its consistency, the WDC storage pile will never achieve a height greater than five feet. Due to the nature of how the WDC is processed and because of the slight ethanol content, typically, WDC will not be stored at the facility for more than 24 hours; otherwise, the WDC will begin to decompose.

Instead of storing the WDC until loadout, PEM is proposing to dry a portion of the existing WDC throughput using a ~5 acre concrete drying pad at the PEM stationary source. The WDC will be transferred from the existing WDC storage and loadout area and placed onto the concrete drying pad by a spreader truck to a thickness of approximately 2 inches and will remain for approximately 8 hours. The moisture content of the WDC will be reduced from approximately 70% to 10-20% (per applicant) and then will be loaded into transport trucks by a front-end loader to be used as animal feed.

V. EMISSION CONTROL TECHNOLOGY EVALUATION

A. BACT Applicability:

District Rule 2201 Section 4.1 states that 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, and/or
- c) Modifications to an existing emissions unit with a valid Permit to Operate resulting in an AIPE exceeding two pounds per day.
- d) When a Major Modification is triggered for a modification project at a facility that is a Major Source.

Section 4.2 states that BACT is not triggered for CO emissions if the facility's post project Stationary Source Potential to Emit (SSPE2) is less than 200,000 lb of CO per year.

For the new emissions unit, the PE2 is greater than 2.0 lb/day for VOC. Thus, the units trigger BACT for VOC emissions.

B. BACT Policy:

Per District Policy APR 1305, Section IX, "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 for source categories or classes covered in the BACT Clearinghouse, relevant information under each of the following steps may be simply cited from the Clearinghouse without further analysis".

The District's BACT Clearinghouse was surveyed to determine if an existing BACT guideline was applicable for this class and category of operation. No BACT guidelines were found that cover solar drying of wet distillers cake. Therefore, pursuant to the District's BACT policy, a Top-Down BACT analysis will be performed for inclusion of a new determination in the District's BACT Clearinghouse.

The Environmental Protection Agency (EPA), California Air Resources Board (CARB), San Diego County Air Pollution Control District (SDCAPCD), South Coast Air Quality Management District (SCAQMD), Bay Area Air Quality Management District (BAAQMD) and the San Joaquin Valley Air Pollution Control District (SJVAPCD) BACT clearinghouses were reviewed to determine potential control technologies for this class and category of operation, but no BACT guidelines for power oxidizers were found.

The SJVAPCD permit database was also searched for possible facilities within this class and category of operation. No facilities were found with active permits to operate (PTO's) that operate a solar drying of WDC.

C. Top-Down BACT Analysis for Permit Unit C-4261-44-2 for VOC Emissions:

Achieved in Practice Analysis

The Environmental Protection Agency (EPA), California Air Resources Board (CARB), San Diego County Air Pollution Control District (SDCAPCD), South Coast Air Quality Management District (SCAQMD), and Bay Area Air Quality Management District (BAAQMD) BACT clearinghouses were reviewed to determine potential control technologies for this class and category of operation, but no other BACT guidelines for solar drying of WDC operations at ethanol production facilities were found.

The SJVAPCD permit database was also searched for possible facilities within this class and category of operation and no other facilities were found to have a solar drying of WDC operation.

In addition, other facilities were found outside of the San Joaquin Valley that produce ethanol and operate a wet cake storage and truck loadout operation; therefore, the regulating agencies were contacted to determine if any of the regulated facilities have a solar drying of WDC operation and if so, what controls were installed. The agencies contacted are summarized in the table below with Iowa, Nebraska, Illinois and Minnesota being the top 4 ethanol producing states respectively as of January 2016 per the Renewable Fuels Association:

Agency	Contact	Operations in Question	Controls/Comments
Iowa Department of Natural Resources – Construction Permits	Priyanka Painuly (515) 725-9546	Solar Drying of WDC	Wet cake operations are exempt under their “small unit” exemption and all dry in natural gas dryers. No facilities solar dry on concrete pad.
Nebraska Department of Environmental Quality	Matt Williams (402) 471-8400	Solar Drying of WDC	No facilities solar dry on concrete pad d.
Illinois Environmental Protection Agency – Air Quality	Minesh Pattel (217) 782-3391	Solar Drying of WDC	No BACT exists because all operations are non-major sources and BACT is only required on major sources. No facilities solar dry on concrete pad.
Minnesota Pollution Control Agency – Business Assistance	Hien Le (651) 757-2519	Solar Drying of WDC	Contact stated he would pass information along to someone to answer my questions on 7/13/16; however, my call was never returned
Kansas Department of Health and Environment	Will Stone (785) 296-6427	Solar Drying of WDC	Most ethanol plants are not permitted.
Wisconsin	Don C. Faith III (608) 267-3135	Solar Drying of WDC	Wet cake will not dry before it begins to spoil in WI. Facilities only produce wet cake in small quantities for local clients only. No facilities solar dry on concrete pad.

It should also be noted that many state agencies stated that although no one is currently solar drying WDC on a concrete pad, it did not even really seem feasible as the local weather would not allow it. Some states have warm summer days, but also experience high humidity and unpredictable/frequent thunderstorms or other states have cooler summer days with very cold winters; neither of those types of weather conditions present favorable and reliable weather for drying outdoors.

Therefore, nothing has been found to be achieved in practice.

Step 1 - Identify all control technologies

As shown above, no control technologies were found serving WDC solar drying and truck loadout operations. However, the following control technologies are commonly used as control technologies for operations that generate VOC emissions:

- VOC Capture and Thermal/Catalytic Incineration
(Existing SJVAPCD BACT Guidelines 4.9.2, 4.9.5, 4.12.6 & 4.12.7)
- VOC Capture and Carbon Adsorption
(Existing SJVAPCD BACT Guidelines 4.9.2 & 4.9.5)
- VOC Capture and Wet Scrubber
(Existing SJVAPCD BACT Guideline 4.12.4)
- VOC Capture with Negatively Aerated Static Pile with Control Device (Technology Transfer)
(Existing SJVAPCD BACT Guideline 6.4.7)

Step 2 - Eliminate Technologically Infeasible Options

Aerated static piles are piles of material (usually material to be composted) placed on perforated piping embedded into the concrete/asphaltic concrete floor designed to push or pull low pressure, high volume air through the piles to uniformly aerate the pile. In the case of composting, the aeration aides in temperature management of the composted material; however, as would be used in proposed solar drying of WDC operation, a negatively aerated system could potentially be used as the capture device of VOCs in lieu of a structure over the drying area.

This option is being eliminated as technologically infeasible since the basis of operation is that it is to be used on material that is porous (e.g. composting material amended with bulking agents to add structure to the material to aid in uniform aeration to maintain an aerobic system) to be able to move air through the pile. The WDC starts out with approximately 70% moisture content and has the consistency of wet oatmeal, and when dried it has approximately 10-20% moisture content. No bulking agent is used or can be used as it would change the desired finished product of dried WDC or more commonly known within the industry as distiller's dried grains and solubles (DDGS). Due to the high moisture content and nature of the WDC (very dense "mash"), pulling air uniformly through the material would be difficult and would hinder capturing of VOC. Moreover, due to high solids, such a system will plug up frequently and require periodic cleaning of the piping arrangement that will halt its continuous operation. Therefore, this option is being eliminated as technologically infeasible.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

Control Effectiveness Determination:

Capture of VOC Emissions from Outdoor Cement Slab:

The applicant has stated that the WDC solar drying and truck loadout operation takes place outdoors on a cement slab that is approximately 5 acres. In order to capture the VOC emissions that are released by the WDC solar drying and truck loadout operation, it

will be assumed that the cement slab would need to be enclosed in some type of permanent total enclosure (PTE).

Per the Industrial Ventilation Manual, 23rd Edition, Page 3-6, Table 3-1, the minimum velocity required across any given cross sectional area of an enclosure to achieve 100% capture of the pollutant(s) in question shall be 50 feet per minute for pollutants emitted with practically no velocity into quiet air. VOC emissions are released to the atmosphere from the WDC solar drying and truck loadout operation by evaporation. Therefore, it will be assumed for this analysis that the emissions are released into the atmosphere with little or no velocity. Since VOC emissions are released into the atmosphere with little or no velocity, the velocity required across any open face of the enclosure, in order to achieve 100% capture efficiency, will be 50 feet per minute.

Information provided by the applicant for this project indicates that if the WDC solar drying and truck loadout area were to be enclosed, the open face would be 381'10" W x 20' H to allow for the loadout trucks to enter and exit the enclosure. However, as was used in the analysis in Project C-1061750 for the original permitting of the wet cake storage and loadout operation, two roll up doors with dimensions of 15'W x 15'H would be required in an enclosure to allow the loadout trucks to enter and exit the building; therefore, conservatively those same assumptions will be used in this project. The airflow required to achieve 100% capture for one roll up door is determined as follows:

$$Q \text{ (cfm)} = 50 \text{ cfm/sq. ft.} \times W \text{ (feet)} \times H \text{ (feet)}$$

$$Q \text{ (cfm)} = 50 \text{ cfm/sq. ft.} \times 15' \times 15'$$

$$Q = 11,250 \text{ cfm}$$

This is the minimum airflow required to provide a face velocity of 50 fpm across one of the roll up doors. In order to provide a minimum face velocity of 50 fpm across both roll up doors that would be required for this operation, the minimum airflow required to achieve 100% capture would need to be higher. Therefore, as a conservative estimate, the cost analysis for this project will be performed using the airflow required to achieve 100% capture from only one roll up door. It will also be assumed that the enclosure required for this operation will not have any other openings that remain open during normal operation.

Thermal/Catalytic Incineration:

Pursuant to past SJVAPCD best available control technology (BACT) determinations, the typical control efficiency for VOC emissions when utilizing a thermal/catalytic incinerator is 98%.

Carbon Adsorption:

Pursuant to past SJVAPCD best available control technology (BACT) determinations, the typical control efficiency for VOC emissions when utilizing a carbon adsorption system is 95%.

Wet Scrubber:

Pursuant to past SJVAPCD best available control technology (BACT) determinations, the typical control efficiency for VOC emissions when utilizing a wet scrubber system is 95%.

Uncontrolled using WDC from Solids Separator:

This option is assumed to have no control efficiency for VOC emissions.

Control Technology Ranking:

Control Technology	Control Efficiency	Achieved in Practice
VOC Capture and Thermal/Catalytic Incineration	98.0%	No
VOC Capture and Carbon Adsorption	95.0%	No
VOC Capture and Wet Scrubber	95.0%	No
Uncontrolled using WDC from Solids Separator	0%	No

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 Policy establishes annual cost thresholds for imposed control based upon the amount of pollutants abated by the controls. If the cost of control is at or below 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 reduced.

Industry Standard Determination:

There is no known emission factor for the solar drying and loadout of WDC as the proposed operation is a first of its kind; therefore, the facility provided the test results measuring the VOC emission rate from WDC over a series of 30 minute periods using a flux chamber. The summary of results from the test is included in Appendix B which results in the following emission factor as proposed by the facility:

$$\text{VOC EF}_{\text{drying/loadout}} = 0.1529 \text{ lb-VOC/ton-WDC}$$

Using the test results as an emission factor and permit limit is considered appropriate since the test results are based off of 30 minute sample times when the moisture content in the WDC is at its highest, which also means the VOC content is also at its highest. As the WDC is dried, the amount of VOCs is expected to decrease which means the VOC emission rate would decrease; however, the emission factor

conservatively assumes the peak VOC emission rate (at the beginning of the drying cycle when the moisture content is highest and VOC content is highest), remains constant throughout the entire drying time. Additionally, the temperature of the flux chamber was reported as 127.4 deg F which is hotter than the average daily temperature at the site in Madera. Therefore, the emission factor is a conservative estimation and no additional margin of compliance is required.

Design Parameters:

As stated above, minimum air flow required = 11,250 cfm.

The applicant has also proposed to process a maximum throughput of 28,250 tons of WDC per year.

The cost analysis for this class and category of operation should include the annualized capital cost of the permanent total enclosure (PTE) used to capture the VOC emissions, the annualized capital cost of the control technology and the operation and maintenance costs associated with each of these pieces of equipment. If it can be shown that the annualized capital costs of the control technologies, by themselves, make each option from Step 3 above, not cost effective, then the annualized capital and operation and maintenance costs of the PTE and the operation and maintenance costs of the incineration and wet scrubber devices will not be included in the following calculations.

1. Capture and Thermal/Catalytic Incineration

Capital Cost

The capital cost of an incineration unit for a design air flow rate for 8,702 cfm, as provided by Anguil on November 13, 2015 for their Model 100 in Project N-1152244 is \$650,000. Although this control device is smaller than what is actually required for the proposed project, it will conservatively be used for this cost estimate.

Annualized Capital Cost

Pursuant to the District BACT Policy APR 1305, Section X, the installation cost will be spread over the expected life of the thermal/catalytic incinerator which is estimated at 10 years and using the capital recovery equation (Section X.A.1). A 10% interest rate is assumed in the equation and the assumption will be made that the equation has no salvage value at the end of the ten-year cycle.

$$A = [P * i(1+i)^n]/[(1+i)^n - 1]$$

Where: A = Annual Cost
P = Present Value
I = Interest Rate (10%)
N = Equipment Life (10 years)

$$A = [\$650,000 * 0.1 * (1.1)^{10}]/[(1.1)^{10} - 1]$$
$$= \$105,950/\text{year}$$

Total Annual Cost

Total Annual Cost = **\$105,950/year**

VOC Emission Reduction

Assuming that the PTE captures 100% of the VOC emissions from the WDC solar drying and truck loadout operation and the thermal/catalytic incinerator controls those VOC emissions with an efficiency of 98%, the amount of VOC emissions reduced can be set equal to the following:

$$\begin{aligned}\text{VOC Reductions} &= \text{Emission Factor VOC PE (lb/year)} \times \text{CE (\%)} \\ \text{VOC Reductions} &= 0.1529 \text{ lb-VOC/ton-WDC processed} \times 28,250 \text{ ton WDC} \\ &\quad \text{processed/year} \times 0.98 \\ \text{VOC Reductions} &= 4,233 \text{ lb/year}\end{aligned}$$

Cost of VOC Emission Reduction

$$\begin{aligned}\text{Cost of reductions} &= (\$105,950/\text{yr}) \div (4,233 \text{ lb/yr}) \times (1 \text{ ton}/2000 \text{ lb}) \\ &= \mathbf{\$50,059/\text{ton of VOC reduced}}\end{aligned}$$

As shown above, the cost of the thermal/catalytic incineration unit, by itself, is greater than the \$17,500/ton cost effectiveness threshold for VOC emissions. Evaluating the cost of the PTE and the annual operating and maintenance cost will only increase the annualized cost of this control option and make it even less cost effective. Therefore, the cost of the PTE and the annual operating and maintenance cost will not be included in the cost analysis for this top down BACT analysis.

The cost of VOC reduction utilizing capture and thermal/catalytic incineration would be greater than the \$17,500/ton cost effectiveness threshold. The equipment is therefore not cost effective and is being removed from consideration at this time.

2. Capture and Carbon Adsorption

Carbon adsorption occurs when air containing VOC's is blown through a carbon unit and the VOC's are adsorbed onto the surface of the cracks in the activated carbon particles.

Capital Cost

The capital cost of a portable adsorber for a design air flow rate for 10,000 cfm, as provided by Calgon Carbon Corporation on May 18, 2016 for their Model Protect RO-10 in Project N-1143210 is \$95,000. Although this control device is smaller than what is actually required for the proposed project, it will conservatively be used for this cost estimate.

Annualized Capital Cost

Pursuant to the District BACT Policy APR 1305, Section X, the installation cost will be spread over the expected life of the carbon adsorption system which is estimated at 10 years and using the capital recovery equation (Section X.A.1). A 10% interest rate is assumed in the equation and the assumption will be made that the equation has no salvage value at the end of the ten-year cycle.

$$A = [P * i(I+1)^n]/[(I+1)^n - 1]$$

Where: A = Annual Cost
P = Present Value
I = Interest Rate (10%)
N = Equipment Life (10 years)

$$A = [\$95,000 * 0.1 * (1.1)^{10}]/[(1.1)^{10} - 1]$$
$$= \$15,485/\text{year}$$

Operation and Maintenance Costs

Two main areas of cost are the cost of the device itself, and the operating cost of the carbon adsorption system.

Since carbon can adsorb 20% of its weight in VOC's, and the control efficiency of carbon adsorption is 95%, the total amount of carbon required per year can be determined as follows:

$$\begin{aligned} \text{Carbon required} &= \text{Emission Factor VOC PE (lb/year)} \times 0.95 \times 1 \text{ lb-Carbon}/0.2 \text{ lb-VOC} \\ &= 0.1529 \text{ lb-VOC/ton-WDC processed} \times 28,250 \text{ ton WDC} \\ &\quad \text{processed/year} \times 0.95 \times 1 \text{ lb-carbon} \div 0.2 \text{ lb-VOC} \\ &= 4,319 \text{ lb-VOC/yr} \times 0.95 \times 1 \text{ lb-carbon} \div 0.2 \text{ lb-VOC} \\ &= 20,515 \text{ lb-carbon/yr} \end{aligned}$$

As provided by Calgon Carbon Corporation, the cost of carbon = \$1.35/lb plus freight.

$$\text{Cost of carbon} = 20,515 \text{ lb-carbon/yr} \times \$1.35/\text{lb} = \$27,695/\text{year}$$

Total Annual Cost

$$\begin{aligned} \text{Total Annual Cost} &= \text{Annualized Capital Cost} + \text{Operation and Maintenance Costs} \\ &= \$15,485/\text{year} + \$27,695/\text{year} \\ &= \mathbf{\$43,180/\text{year}} \end{aligned}$$

VOC Emission Reduction

Assuming that the enclosure captures 100% of the VOC emissions from the WDC solar drying and truck loadout operation and the carbon adsorption system controls those VOC emissions with an efficiency of 95%, the amount of VOC emissions reduced can be set equal to the following:

VOC Reductions = Emission Factor VOC PE (lb/year) x CE (%)
VOC Reductions = 4,319 lb/year x 0.95
VOC Reductions = 4,103 lb/year

Cost of VOC Emission Reduction

Cost of reductions = (\$43,180/yr) ÷ (4,103 lb/yr) x (1 ton/2000 lb)
= **\$21,048/ton of VOC reduced**

As shown above, the cost of purchasing the carbon adsorption system and the carbon that would need to be installed is greater than the \$17,500/ton cost effectiveness threshold for VOC emissions. Evaluating the cost of the annual operating and maintenance cost in addition to the carbon cost itself will only increase the annualized cost of this control option and make it even less cost effective. Therefore, the cost of the PTE and the annual operating and maintenance cost will not be included in the cost analysis for this top down BACT analysis.

The cost of VOC reduction utilizing capture and carbon adsorption would be greater than the \$17,500/ton cost effectiveness threshold. The equipment is therefore not cost effective and is being removed from consideration at this time.

3. Capture and Wet Scrubber

Capital Cost

The capital cost of a wet scrubber unit for a design air flow rate for 8,702 cfm, as provided by Anguil on November 13, 2015 for their Model SPT-54-192 in Project N-1152244 is \$230,000. Although this control device is smaller than what is actually required for the proposed project, it will conservatively be used for this cost estimate.

Annualized Capital Cost

Pursuant to the District BACT Policy APR 1305, Section X, the installation cost will be spread over the expected life of the wet scrubber which is estimated at 10 years and using the capital recovery equation (Section X.A.1). A 10% interest rate is assumed in the equation and the assumption will be made that the equation has no salvage value at the end of the ten-year cycle.

$$A = [P * i(1+i)^n]/[(1+i)^n - 1]$$

Where: A = Annual Cost
P = Present Value
I = Interest Rate (10%)
N = Equipment Life (10 years)

$$A = [\$230,000 * 0.1 * (1.1)^{10}]/[(1.1)^{10} - 1]$$
$$= \$37,490/\text{year}$$

Total Annual Cost

Total Annual Cost = **\$37,490/year**

VOC Emission Reduction

Assuming that the enclosure captures 100% of the VOC emissions from the WDC solar drying and truck loadout operation and the wet scrubber controls those VOC emissions with an efficiency of 95%, the amount of VOC emissions reduced can be set equal to the following:

$$\begin{aligned}\text{VOC Reductions} &= \text{Emission Factor VOC PE (lb/year)} \times \text{CE (\%)} \\ \text{VOC Reductions} &= 0.1529 \text{ lb-VOC/ton-WDC processed} \times 28,250 \text{ ton WDC} \\ &\quad \text{processed/year} \times 0.95 \\ \text{VOC Reductions} &= 4,103 \text{ lb/year}\end{aligned}$$

Cost of VOC Emission Reduction

$$\begin{aligned}\text{Cost of reductions} &= (\$37,490/\text{yr}) \div (4,103 \text{ lb/yr}) \times (1 \text{ ton}/2000 \text{ lb}) \\ &= \mathbf{\$18,274/\text{ton of VOC reduced}}\end{aligned}$$

As shown above, the cost of the wet scrubber unit, by itself, is greater than the \$17,500/ton cost effectiveness threshold for VOC emissions. Evaluating the cost of the PTE and the annual operating and maintenance cost will only increase the annualized cost of this control option and make it even less cost effective. Therefore, the cost of the PTE and the annual operating and maintenance cost will not be included in the cost analysis for this top down BACT analysis.

The cost of VOC reduction utilizing capture and a wet scrubber would be greater than the \$17,500/ton cost effectiveness threshold. The equipment is therefore not cost effective and is being removed from consideration at this time.

4. Use of wet distillers cake only from solids separator to achieve an emission limit of 0.1529 lb/ton of material dried

Since the applicant is proposing this option, no cost analysis is required.

Step 5 - Select BACT

The applicant is proposing to install an uncontrolled WDC solar drying and truck loadout operation using the wet distillers cake from the solids separator (centrifuge) with an emission limit of 0.1529 lb/ton of material dried. As shown above, there are no achieved in practice control technologies for this class and category of operation and the remaining control technologies were not found to be cost effective. Therefore, all of the BACT requirements for VOC emissions will be met.

APPENDIX E

RMR Summary

San Joaquin Valley Air Pollution Control District Risk Management Review

To: Robert Gilles – Permit Services
 From: Cheryl Lawler – Technical Services
 Date: July 6, 2016
 Facility Name: Pacific Ethanol Madera LLC
 Location: 31470 Avenue 12, Madera
 Application #(s): C-4261-44-2
 Project #: C-1161841

A. RMR SUMMARY

RMR Summary			
Categories	Wet Distillers Cake Drying Operation (Unit 44-2)	Project Totals	Facility Totals
Prioritization Score	0.01	0.01	>1.0
Acute Hazard Index	0.02	0.02	0.99 ¹
Chronic Hazard Index	0.00	0.00	0.25
Maximum Individual Cancer Risk	6.57E-11	6.57E-11	5.47E-06
T-BACT Required?	No		
Special Permit Requirements?	No		

¹The Acute Hazard Index has reached its facilitywide maximum allowed limit. No future projects are allowed without first revisiting previously run projects.

B. RMR REPORT

I. Project Description

Technical Services received a request on July 1, 2016, to perform an Ambient Air Quality Analysis and Risk Management Review for a wet distillers cake drying operation. Because the only criteria pollutant emissions are VOCs, which are not analyzed as part of the Ambient Air Quality Analysis, this analysis was not required or performed.

II. Analysis

Toxic emissions for this project were calculated using DENCO Test Results for Wetcake emissions, and input into the San Joaquin Valley APCD's Hazard Assessment and Reporting Program (SHARP). In accordance with the District's Risk Management Policy for Permitting New and Modified Sources (APR 1905, May 28, 2015), risks from the proposed project's toxic emissions were prioritized using the procedures in the 1990 CAPCOA Facility Prioritization Guidelines. The prioritization score for the facility is greater than 1.0 (see RMR Summary Table). Therefore, a refined health risk assessment was required. The AERMOD model was used, with the parameters outlined below and meteorological data for 2009-2011

from Madera to determine the dispersion factors (i.e., the predicted concentration or X divided by the normalized source strength or Q) for a receptor grid. These dispersion factors were input into the SHARP Program, which then used the Air Dispersion Modeling and Risk Tool (ADMRT) of the Hot Spots Analysis and Reporting Program Version 2 (HARP 2) to calculate the chronic and acute hazard indices and the carcinogenic risk for the project.

The following parameters were used for the review:

Analysis Parameters Unit 44-2			
Source Type	Area	Location Type	Rural
X-Length (m)	215	Closest Receptor (m)	457
Y-Length (m)	116	Type of Receptor	Business
Release Height (m)	0	Pollutant Type	VOC
Wet Cake Process Rate (tons)	15.6 hr		

III. Conclusion

The acute and chronic indices are below 1.0 and the cancer risk factor associated with the project is less than 1.0 in a million. **In accordance with the District's Risk Management Policy, the project is approved without Toxic Best Available Control Technology (T-BACT).**

These conclusions are based on the data provided by the applicant and the project engineer. Therefore, this analysis is valid only as long as the proposed data and parameters do not change.

IV. Attachments

- A. RMR Request Form & Attachments
- B. Emissions Speciation Worksheet
- C. Prioritization
- D. Facility Summary

APPENDIX F
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.6 in the evaluation above, quarterly PE2 and quarterly PE1 can be calculated as follows:

$PE2_{quarterly} = PE2_{annual} \div 4 \text{ quarters/year}$

$PE1_{quarterly} = PE1_{annual} \div 4 \text{ quarters/year}$

Quarterly NEC [QNEC]			
	PE2 (lb/qtr)	PE1 (lb/qtr)	QNEC (lb/qtr)
NO _x	0.00	0.00	0.00
SO _x	0.00	0.00	0.00
PM ₁₀	0.00	0.00	0.00
CO	0.00	0.00	0.00
VOC	1,645.25	870.00	775.25

APPENDIX G

Statewide Compliance Certification

July 15, 2016

Mr. Errol Villegas and Mr. Jesse Garcia
San Joaquin Valley Air Pollution Control District
1990 E. Gettysburg Avenue
Fresno, CA 93726

Subject: Compliance Statement for Pacific Ethanol Madera, LLC (C-4261)

Dear Mr. Villegas and Mr. Garcia:

In accordance with Rule 2201, Section 4.15, "Additional Requirements for New Major Sources and Federal Major Modifications," Pacific Ethanol Madera, LLC is pleased to provide this compliance statement regarding its ATC application for the installation of a solar drying pad.

All major stationary sources in California owned or operated by Pacific Ethanol Madera, LLC and Pacific Ethanol Stockton, LLC, or by any entity controlling, controlled by or under common control with Pacific Ethanol Madera, LLC and Pacific Ethanol Stockton, LLC, and which are subject to emission limitations, are in compliance or on a schedule for compliance with all applicable emission limitations and standards. These sources include one of more of the following facilities:

Facility #1: Pacific Ethanol Madera, LLC, 31470 Avenue 12, Madera, CA 93638

Facility #2: Pacific Ethanol Stockton, LLC, 3028 Navy Drive, Stockton, CA 95206

Based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate and complete.

Sincerely,



Mike Kandris,
Chief Operating Officer
Pacific Ethanol Madera, LLC

APPENDIX H

Compliance Certification



San Joaquin Valley Unified Air Pollution Control District



TITLE V MODIFICATION - COMPLIANCE CERTIFICATION FORM

I. TYPE OF PERMIT ACTION (Check appropriate box)

- SIGNIFICANT PERMIT MODIFICATION ADMINISTRATIVE
 MINOR PERMIT MODIFICATION AMENDMENT

COMPANY NAME: Pacific Ethanol Madera, LLC	FACILITY ID: C- 4261
1. Type of Organization: <input checked="" type="checkbox"/> Corporation <input type="checkbox"/> Sole Ownership <input type="checkbox"/> Government <input type="checkbox"/> Partnership <input type="checkbox"/> Utility	
2. Owner's Name: Pacific Ethanol Madera, LLC	
3. Agent to the Owner: Michael Kandris	

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

- MK 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).
- MK 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.
- MK Corrected information will be provided to the District when I become aware that incorrect or incomplete information has been submitted.
- MK 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:

Michael Kandris

Signature of Responsible Official

June 28, 2016

Date

Michael Kandris

Name of Responsible Official (please print)

Chief Operations Officer (COO)

Title of Responsible Official (please print)

APPENDIX I

Draft ATC

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

ISSUANCE DATE: DRAFT
DRAFT

PERMIT NO: C-4261-44-2

LEGAL OWNER OR OPERATOR: PACIFIC ETHANOL MADERA LLC
MAILING ADDRESS: 400 CAPITOL MALL, SUITE 2060
SACRAMENTO, CA 95814

LOCATION: 31470 AVENUE 12
MADERA, CA 93637

EQUIPMENT DESCRIPTION:

MODIFICATION OF WET CAKE STORAGE AND TRUCK LOADOUT OPERATION WITH MECHANICAL CONVEYORS:
INSTALL A WET DISTILLERS CAKE DRYING AND LOADOUT OPERATION AND DECREASE THE THROUGHPUT FOR
LOADOUT FROM THE STORAGE AND TRUCK LOADOUT OPERATION TO FROM 400,000 TONS-WET CAKE/YEAR
TO 260,000 TONS-WET CAKE/YEAR

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 - 1,163 lb, 2nd quarter - 1,163 lb, 3rd quarter - 1,163 lb, and 4th quarter - 1,163 lb. These amounts include the applicable offset ratio specified in Rule 2201 Section 4.8 (as amended 2/18/16) for the ERC specified below. [District Rule 2201] Federally Enforceable Through Title V Permit
4. ERC Certificate Number S-4438-1 (or a certificate split from this certificate) 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 (559) 230-5950 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

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Arnaud Marjollet, Director of Permit Services
C-4261-44-2 Jul 19 2016 2:18PM - GARCIAJ Joint Inspection NOT Required

5. All equipment shall be maintained in good operating condition and shall be operated in a manner to minimize emissions of air contaminants into the atmosphere. [District Rule 2201] Federally Enforceable Through Title V Permit
6. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
7. No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101] Federally Enforceable Through Title V Permit
8. The maximum amount of wet cake stored/loaded out shall not exceed either of the following limits: 1,150 ton-wet cake/day or 260,000 ton-wet cake/rolling 12-month period. [District Rule 2201] Federally Enforceable Through Title V Permit
9. VOC emissions rate from the wet cake storage and truck loadout operation shall not exceed 0.0087 lb-VOC/ton-wet cake processed. [District Rule 2201] Federally Enforceable Through Title V Permit
10. The maximum amount of wet cake dried and loaded out shall not exceed either of the following limits: 125 ton-wet cake/day or 28,250 ton-wet cake/rolling 12-month period. [District Rule 2201] Federally Enforceable Through Title V Permit
11. VOC emissions rate from the solar drying of wet cake and loadout operation shall not exceed 0.1529 lb-VOC/ton-wet cake dried. [District Rule 2201] Federally Enforceable Through Title V Permit
12. The permittee shall maintain daily and annual records, in tons, of the quantity of wet cake processed through the storage and truck loadout operation. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit
13. The permittee shall maintain daily and monthly records, in tons, of the quantity of wet cake processed through the solar drying and loadout operation. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit
14. On a monthly basis, the rolling 12-consecutive month throughput of wet cake stored/loaded out shall be calculated and recorded by summing the throughput of wet cake stored/loaded out from the previous 12 months. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit
15. On a monthly basis, the rolling 12-consecutive month throughput of wet cake dried/loaded out shall be calculated and recorded by summing the throughput of wet cake dried/loaded out from the previous 12 months. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit
16. 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

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