

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING AND COMPLIANCE DIVISION PERMIT APPLICATION EVALUATION AND CALCULATIONS	PAGES 15	PAGE 1
	APPL NO 477567,495825, 501811	DATE 10-23-09
	PROCESSED BY LLD	CHECKED BY COT

OWNER/OPERATOR:

COID: 800279

SFPP, L.P.
1100 TOWN AND COUNTRY
ORANGE, CA 92868

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EQUIPMENT LOCATION:

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CONSULTANT:

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APPLICATIONS IN THIS BATCH

A/N 477567: STORAGE TANK OR-7

A/N 495825: TV REVISION (DE MINIMUS SIGNIFICANT)

A/N 501811: RACK, UNLOADING, ETHANOL

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PERMIT TO CONSTRUCT/OPERATE

Permit No. TBD
A/N 477567

Equipment Description:

STORAGE TANK NO. OR-7, INTERNAL FLOATING ROOF, DENATURED ETHANOL, 12,000 BBL, DIAMETER: 48 FT.; HEIGHT: 40 FT; WITH A FLOATING ROOF, PAN WELDED SHELL, MECHANICAL SHOE PRIMARY SEAL, RIM-MOUNTED COMPRESSION PLATE-TYPE SECONDARY SEAL.

Conditions:

1. OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN ACCORDANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATION UNDER WHICH THIS PERMIT IS ISSUED UNLESS OTHERWISE NOTED BELOW.
[RULE 204]
2. THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITION AT ALL TIMES.
[RULE 204]
3. THE OPERATOR SHALL NOT USE THIS EQUIPMENT WITH MATERIALS HAVING A REID VAPOR PRESSURE GREATER THAN 4 UNDER ACTUAL OPERATING CONDITIONS.
[RULE 1303(b)(2) - OFFSET]
4. THE OPERATOR SHALL LIMIT THE THROUGHPUT TO NO MORE THAN 157,738 BARRELS IN ANY ONE CALENDAR MONTH.
[RULE 1303(b)(2) - OFFSET, 1401]
5. THE OPERATOR SHALL USE THIS EQUIPMENT IN SUCH A MANNER THAT THE ORGANIC VAPOR CONCENTRATION BEING MONITORED, AS INDICATED BELOW, DOES NOT EXCEED 30 PERCENT OF THE LOWER EXPLOSIVE LIMIT.
[RULE 463]
6. THE OPERATOR SHALL USE AN EXPLOSIMETER OR EQUIVALENT TO MONITOR THE VAPOR SPACE ABOVE THE INTERNAL FLOATING ROOF.
[RULE 463]
7. THE OPERATOR SHALL KEEP RECORDS, IN MANNER APPROVED BY THE DISTRICT, FOR THE FOLLOWING PARAMETER(S) OR ITEM(S):

TYPE OF LIQUID STORED
THROUGHPUT
TURNOVERS
RANGES OF TRUE VAPOR PRESSURE OF SUCH LIQUIDS
[RULE 463]

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Periodic Monitoring: NONE

Emissions and Requirements:

8. THIS EQUIPMENT IS SUBJECT TO THE APPLICABLE REQUIREMENTS OF THE FOLLOWING RULES AND REGULATIONS:

VOC: RULE 463
VOC: RULE 1149
VOC: RULE 1178

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PERMIT TO CONSTRUCT

Permit No. N/A
A/N 501811

Equipment Description:

ALTERATION OF AN EXISTING DENATURED ETHANOL UNLOADING RACK (PREVIOUSLY PERMITTED UNDER A/N 366667:P/O F73531) CONSISTING OF:

1. TWO (2) 4" TRUCK CONNECTIONS
2. TWO (2) SUBMERSIBLE PUMPS, DOUBLE MECHANICAL SEAL, 5 H.P. EACH.

BY THE REMOVAL OF:

TWO (2) SUBMERSIBLE PUMPS, DOUBLE MECHANICAL SEAL, 5 H.P. EACH.

AND THE ADDITION OF:

1. ONE ETHANOL UNLOADING SKID WITH
 - A. ACCUMULATOR, 9' LONG BY 2.5' DIA. MAXIMUM
 - B. DEAERATOR, 120 GALLON CAPACITY, MAXIMUM
 - C. TWO (2) PUMPS, EACH 25 HP
2. VAPOR BALANCE SYSTEM CONNECTING ACCUMULATOR AND DEAERATOR TO TANKER TRUCK(S).

*3" DIA. CONNECTIONS
AVAILABLE
BY 10/23/09*

Conditions:

1. CONSTRUCTION AND OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN ACCORDANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATION UNDER WHICH THIS PERMIT IS ISSUED UNLESS OTHERWISE NOTED BELOW. [RULE 204]
2. THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITION AT ALL TIMES. [RULE 204]
3. DURING UNLOADING OPERATIONS, THE VAPOR BALANCE SYSTEM SHALL BE CONNECTED AND IN FULL USE SO THAT DISPLACED VAPORS FROM THE ACCUMULATOR(S) AND DEAERATOR(S) SHALL BE VENTED TO THE TRUCK(S) BEING UNLOADED. [RULE 1303(a)(1)-BACT, 1303(b)(2)-OFFSETS, 1401]

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4. THROUGHPUT OF ETHANOL TO THIS EQUIPMENT SHALL NOT EXCEED 6,624,990 GALLONS (157,738 BARRELS) IN ANY ONE CALENDAR MONTH. THE OPERATOR SHALL INSTALL AND MAINTAIN A TOTALIZING FLOWMETER TO MEASURE THE THROUGHPUT.
[RULE 1303(b)(2)-OFFSET, 1304(c)(4)-REGULATORY COMPLIANCE, 1401]

5. ALL NEW VALVES AND MAJOR COMPONENTS IN VOC SERVICE AS DEFINED IN RULE 1173, EXCEPT THOSE SPECIFICALLY EXEMPTED BY RULE 1173, SHALL BE DISTINCTLY IDENTIFIED FROM OTHER COMPONENTS THROUGH THEIR TAG NUMBER (e.g. NUMBERS ENDING IN THE LETTER "N") AND SHALL BE NOTED IN THE RECORDS.

ALL NEW FUGITIVE COMPONENTS IN VOC SERVICE, EXCEPT VALVES AND FLANGES, SHALL BE INSPECTED QUARTERLY USING EPA REFERENCE METHOD 21. ALL NEW VALVES AND FLANGES IN VOC SERVICE SHALL BE INSPECTED MONTHLY USING EPA METHOD 21.

FOR ALL NEW FUGITIVE COMPONENTS IN VOC SERVICE, ANY LEAK GREATER THAN 500 PPM, MEASURED AS METHANE, ABOVE BACKGROUND, AS MEASURED USING EPA METHOD 21, SHALL BE REPAIRED WITHIN 14 DAYS OF DETECTION. COMPONENTS SHALL BE DEFINED AS ANY VALVE, FITTING, PUMP, COMPRESSOR, PRESSURE RELIEF VALVE, DIAPHRAGM, HATCH, SIGHT-GLASS, AND METER.

IF 98.0 PERCENT OR GREATER OF THE NEW (NON-BELLOWS-SEALED) VALVES AND THE NEW FLANGE POPULATION INSPECTED IS FOUND TO LEAK GASEOUS OR LIQUID VOLATILE ORGANIC COMPOUNDS AT A RATE LESS THAN 500 PPM FOR TWO CONSECUTIVE MONTHS, THEN THE OPERATOR SHALL REVERT TO A QUARTERLY INSPECTION PROGRAM WITH THE APPROVAL OF THE DISTRICT.

THE OPERATOR SHALL REVERT FROM QUARTERLY TO MONTHLY INSPECTION PROGRAM IF LESS THAN 98.0 PERCENT OF THE NEW (NON-BELLOWS SEAL) VALVES AND THE NEW FLANGE POPULATION IS FOUND TO LEAK GASEOUS OR LIQUID VOLATLE ORGANIC COMPOUNDS AT A RATE OF LESS THAN 500 PPM.

THE OPERATOR SHALL KEEP RECORDS OF THE MONTHLY INSPECTION (AND QUARTERLY, WHERE APPLICABLE), SUBSEQUENT REPAIR, AND REINSPECTION, IN A MANNER APPROVED BY THE DISTRICT.

[RULE 1173, 1303(b)2)-OFFSET]

6. THE OPERATOR SHALL PROVIDE TO THE DISTRICT, NO LATER THAN 60 DAYS AFTER COMPLETION OF CONSTRUCTION, A RECALCULATION OF THE FUGITIVE EMISSIONS BASED ON ACTUAL COMPONENTS INSTALLED AND/OR REMOVED FROM SERVICE. THE OPERATOR SHALL ALSO PROVIDE COMPLETE, AS BUILT, PIPING AND INSTRUMENTATION DIAGRAM(S) WITH A LISTING OF ALL NON-LEAKLESS TYPE VALVES CATEGORIZED BY TAG NO. SIZE, TYPE SERVICE, OPERATING CONDITIONS (i.e. TEMPERATURE AND PRESSURE), BODY MATERIAL, APPLICATION.
[RULE 1303(b)(2)-OFFSET]

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7. RECORDS OF THROUGHPUT, TYPES OF PRODUCT STORED, AND VAPOR PRESSURE OF PRODUCT SHALL BE MAINTAINED FOR AT LEAST 5 YEARS AND MADE AVAILABLE TO DISTRICT PERSONNEL UPON REQUEST.

[RULE 462, 1401]

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Periodic Monitoring: NONE

Emissions and Requirements: NONE

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INTRODUCTION:

These applications were received as Class I as follows:

A/N 477567: STORAGE TANK OR-7 – Increase ethanol thruput to meet California mandate

A/N 495825: TV REVISION (DE MINIMUS SIGNIFICANT)

A/N 501811: RACK, UNLOADING, ETHANOL – Modification of this system by the addition of a vapor return line (from rack back to tanker truck) and the replacement of the current underground pump sleeve unloading system with a standardized skid-mounted aboveground system. (Note that an application (A/N 501632) was submitted for the vapor return line only and was “rejected” in the system since it had not been prescreened. The vapor return line will be incorporated into this newer application).

There have been no complaints, NCs or NOVs during the last two years.

There are no schools within 1000 feet of this facility.

HISTORY:

SFPP Orange operates a bulk loading/unloading station. The company receives diesel and gasoline from in-bound pipelines. Ethanol is received via tanker truck. Products are stored in tanks. The facility also has a thermal oxidizer for vapor control.

Because the SFPP terminal functions as a distribution center for petroleum products, it is also responsible for blending of petroleum products to specifications before delivery to customers. To provide this formulation service, SFPP uses inline blending of the petroleum products before the product is loaded into tanker trucks.

In order to meet an increased ethanol blending mandate of 10%, an existing tank’s ethanol thruput will be increased and an existing unloading rack’s ethanol capacity will be increased.

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These applications were submitted as follows:

A/N	Previous A/N : P/O	Equipment	Reason for application
477567	434079 : F90919 (Denatured ethanol) 82,560 bbl/mo AV30 = 0 lb/D (2) R2DAY = 0.24 lb/D (2.09) R2 = 0.01 lb/hr (0.09) R1 = 0.24 lb/hr (0.09) Yrly = 87.36 lb/yr (762.1)	Tank No. OR-7 (Internal FR)	Increase thruput to 220,833 gal/day = 157,738 bbl/mo (modification)
501811	366667 : F73531 (Unload only) Underground pump sleeve No product thruput limit on permit (assume 83,560 bbl/mo – same as Tank OR-7 premod) Crispin valve to atmosphere AV30 = 1 lb/D R2Day = 0.72 lb/D R1=R2 = 0.03 lb/hr Yrly = 262.08 lb/yr	Rack Ethanol Unloading from tanker trucks	Replace current underground pump sleeve with more efficient aboveground, skid-mounted unloading system Increase thruput to 6,625,000 gal/mo (157,738 bbl/mo). Add vapor return line (Modification)
495825	339365 (January 26, 2008 - Rev. 0)	TV Facility Permit	TV Revision (De Minimus Significant)

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A/N 477567: Tank No. OR-7 – Modification due to thruput increase

This was submitted to increase thruput to an existing internal floating roof tank that currently stores denatured ethanol. Current thruput of 82,560 bbl/mo will be increased to 157,738 bbl/mo to meet the increase 10% ethanol blending mandate by January 2010.

Pre Mod: From A/N 434079 engineering evaluation/TANKS printout OR-7 PTE Proposed (RVP 4 Revised 010807).

Post Mod: TANKS 4.0.9d printout (dated 12/14/07 titled "OR-07 Ethanol, Orange – Proposed Throughput Increase) with denatured ethanol (TANKS Ethanol RVP = 4 psia) show the annual emissions total ROG (annual) = 935.08 lb/yr.

$$\begin{aligned} \text{ROG (R2)}(\text{annual}) &= 935.08 \text{ lb/yr} \\ *1/360 &= 2.60 \text{ lb/day (30-day)} \\ *1/24 &= 0.108 \text{ lb/hr} \end{aligned}$$

Pre Mod	Post Mod	Increase
0.088 lb/hr	0.108 lb/hr	+ 0.02 lb/hr
2.12 lb/day (30 day)	2.60 lb/day (30 day)	+ 0.48 lb/day
762.10 lb/yr	935.08 lb/yr	+ 172.98 lb/yr

Toxic Air Contaminants (TACs)

VOC emissions emitting from petroleum product storage tanks normally include certain amounts of TACs depending on the products stored. The worst case scenario is ethanol denatured with 5% gasoline. Using USEPA TANKS model run with 95% ethanol/5% gasoline, results show that 21% of the vapor is from the gasoline portion. Thus, assuming maximum toxic weight fractions, the table below shows the TAC mass emissions for the tank.

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TAC emissions lb/yr = wt.% * (935.08 lb/yr of VOC)* 21% gasoline vapor content

TAC Emissions from Storage Tank

TAC	Wt.% in Gasoline Vapor	Emissions, lbs/yr	Emissions, lb/hr
Benzene	0.9	1.77	0.0002
Ethyl benzene	0.10	0.196	0.000022
n-Hexane	1.6	3.14	3.59E-4
Toluene	1.3	2.55	2.91E-4
Xylenes	0.5	0.982	1.12E-4
Naphthalene	0.05	0.098	1.12E-5

In accordance with the procedures prescribed in the District's Risk Assessment Procedures for Rules 1401 and 212, a Tier 2 Screening Modeling was performed (see Excel Spreadsheet Tier 2 Screening Risk Assessment).

Assume: Volume Source
 Urban Option
 Residential/school = 1000 m. (From Prev. A/N 366667 et al)
 Commercial = 88 m (from prev. A/N 366667 et al)
 Tank Dimensions: H = 40 ft. = 12.2 m.(height of tank)
 Diam. = 48 ft = 14.6 m.
 Area base = 1808.6 sq. ft.

The results indicate that the MICR for the residential receptor is 1.82E-09 and for the worker is 2.76E-08. Thus, the MICR is less one in one million and each chronic and acute index is also well below the threshold limit of 1.0.

Note that this is the post mod "total" risk, which is more conservative than the "increased" risk due to the increased thruput.

Rules:

402: Nuisance is not expected

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- 463: Tank has primary and secondary seals and is expected to comply with this rule.
1149: Tank degassing and cleaning operations will comply with this rule.
1178: This internal floating roof tank will continue to comply with applicable requirements of this rule.

Reg 13: There is an emission increase of 0.48 lb/day of ROG.
BACT/LAER: Since the increase is less than one pound per day, BACT is not triggered with this modification. However, based on previous BACT requirement at time of construction in 2000, this tank already has Cat A primary and secondary seals and is compliant with R463. Continued compliance expected.
Offsets: Since emission increase is 0.48 pounds of ROG, no offsets are required.
Facility Compliance: There have been no NOV's or NC's during the last three years

1401: A Tier 2 HRA shows that the risk from the operation of this tank is less than one in a million and HIA and HIC are less than one.

40CFR60 Kb: Per SFPP, tank was installed in 1965 for diesel service. With the change in R219, A/N 194586 was submitted in 1989 for fixed roof, diesel tank. A/N 366756 was submitted in 2000 for change to ethanol service and to install floating roof with primary and secondary seals. From what information was available in files, there was no emission increase due to this modification. A/N 434079 was submitted to increase thruput with less than one pound per day increase and no capital expenditure associated with the increase. This application also increases thruput with a less than one pound per day increase without a capital expenditure. Per 40CFR60.14(c), this modification does not trigger Kb.

Title V: This permit will be issued as a DeMinimus revision to the existing Title V Permit (previously under A/N 339365) after a 45-day EPA review period.

RECOMMENDATION:

A Permit to Operate is recommended with the attached conditions.

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A/N 501811: Unloading Rack, Denatured Ethanol

This application was submitted 9/02/09 to modify an existing permit (A/N 366667:P/O F73531) to replace current pump sleeve with more efficient aboveground unloading system, add vapor return line from accumulator and deaerator to tanker trucks, and increase ethanol unloading thruput from 3,467,520 gal/mo (83,560 bbl/mo) to 6,624,990 gal/mo (157,738 bbl/mo). Note that there is no "thruput limit" on the current rack permit. However, since there is only Tank OR-7 available for ethanol storage, we can assume the same thruput.

Emissions from the modification come from fugitive components and from vapors emitted during the initial fill events.

During a fill event, VOC emissions are generated during the evacuation of vapors from the product accumulator and air eliminator/deaerator. Denatured ethanol arrives via tanker truck and is unloaded through one of the skid mounted systems. Each tanker truck is assumed to have a capacity of 8400 gallons and up to five compartments. Generally, two compartments are emptied simultaneously (which equals 2.5 "events"), but emissions will be conservatively based on four "events". Emissions generated during an "event" corresponds to the evacuation of the volume of the vapors in the product accumulator and the air eliminator.

The product accumulator is a horizontal piece of equipment approximately 9 feet long with a diameter of 2.5 feet with ellipsoidal heads. This results in a total vapor space volume of 148 gallons assuming a six inch product level. A 6-8 inch product level is necessary to assure the pump is protected as unloading is initiated.

The air eliminator has a capacity of 120 gallons with an effectively volume of 67 gallons. Since the vapor space vacated includes the volume above the top of the effective volume, 90% of the 120 gallons, or 108 gallons, was used to be conservative.

The total volume vacated per event is 148 + 108 or 256 gallons. At a monthly throughput of 6,625,000 gallons, there are 789 tanker truck deliveries per month. At 4 events per tanker, there are 3156 events per month. The total "volume of vapors" evacuated (or "displaced") is 3156 events * 256 gal = 807,936 gal/mo.

Assume that the vapors displaced (807,936 gal/mo) during unloading is equivalent to 807,936 gal/mo of ethanol loaded. The emissions resulting from this vapor displacement can be determined using a "loading" equation.

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Bulk Loading Losses: VOC emissions from loading petroleum products into tank trucks can be calculated by using the equation in EPA AP-42, 5.2:

$$L = 12.46 \text{ SPM/T}$$

- Where:
- L = VOC emissions in lbs/1000 gal loaded
 - M = Molecular wt. of vapor, 48 lb/lb-mole (from KMLT submittal Aug 2009 pg 5)
 - P = True VP, 2.37 psia @68 deg. (from KMLT submittal Aug 2009 pg 5)
 - T = 528 deg R (68 F + 460)(from KMLT submittal Aug 2009 pg 5)
 - S = Saturation factor, 1.0 (submerged fill, ded. vapor balance, Table 5.2-1,AP-42)

For uncontrolled, L = 2.685 lb/1000 gal loaded

$$\begin{aligned}
 \text{PostR1(ROG-unload)} &= 2.685 \text{ lb/1000 gal} * 807,936 \text{ gal/mo} * 1/30 \\
 &= 72.3 \text{ lb/day, 30-day} \\
 &= 26031.7 \text{ lb/yr} \\
 &= 13.0 \text{ tpy} \\
 &= 2.97 \text{ lb/hr}
 \end{aligned}$$

Assume 95% vapor balance efficiency

$$\begin{aligned}
 L(R2) &= (2.685 \text{ lb/1000 gal loaded})(1-0.95) \\
 &= 0.134 \text{ lbs/1000gals loaded}
 \end{aligned}$$

$$\begin{aligned}
 \text{PostR2(ROG-unload)} &= 0.134 \text{ lb/1000 gal} * 807,936 \text{ gal/mo} * 1/30 \\
 &= 3.62 \text{ lb/day, 30-day} \\
 &= 1299.2 \text{ lb/yr} \\
 &= 0.65 \text{ tpy} \\
 &= 0.15 \text{ lb/hr}
 \end{aligned}$$

Fugitives:

Based on fugitive count on spreadsheet submitted with email dated September 29, 2009 fugitive emissions is increase is 0.28 lb/day (at 500 ppm). A permit condition will be added to limit the new components to 500 ppm. PreMod fugitive count from A/N 366667.

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Emissions Summary:

POST MOD	R1 (ROG)		R2 (ROG)	
	Lb/hr	Lb/day	Lb/hr	Lb/day
Ethanol	2.97	71.3	0.15	3.6
Fugitives	0.038	0.91	0.038	0.91
Post Mod Total	3.01	72.21	0.19	4.51
30-day avg				4.57

PREMOD Emissions: In A/N 366667, only fugitives were calculated. This is incorrect, as there are emissions due to vapor displacement during initial fill events.

Using the same methodology as above, the existing pump sleeve has an effective volume of 94 gallons. The existing thruput on Tank OR-7 is 3,467,520 gallons per month. Dividing this thruput by 8400 gallons per truck results in 413 trucks per month or 2065 events per month at 5 compartments per truck.

Emissions are based on the number of events per month (2065) times the evacuated volume (94 gallons) and the Loading Factor as determined above:

For uncontrolled, L = 2.685 lb/1000 gal loaded

$$\begin{aligned}
 \text{PreR1(ROG-unload)} &= 2.685 \text{ lb/1000 gal} * (2065 * 94) \text{ gal/mo} \\
 &= 521.19 \text{ lb/mo} \\
 &= 6254.2 \text{ lb/yr} \\
 &= 17.1 \text{ lb/day} \\
 &= 0.71 \text{ lb/hr}
 \end{aligned}$$

There is no vapor balance, so R1 = R2:

$$\begin{aligned}
 \text{PreR1} = \text{PreR2(ROGtot)} &= \text{unloading} + \text{fugitives} \\
 &= 17.1 + 0.63 \text{ lb/day} \\
 &= 17.7 \text{ lb/day} \\
 &= 0.74 \text{ lb/hr} \\
 &= 6460.5 \text{ lb/yr} \\
 &= 18.0 \text{ lb/day (30-day)}
 \end{aligned}$$

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Change in emissions: PostMod - PreMod
4.57 lb/day – 18.0 lb/day
-13.4 lb/day (decrease)

(Replacing the old pump sleeve with the newer skid mounted system with vapor balance results in less emissions, even after the thruput increase)

EVALUATION:

Rules:

- 401: No visible emissions are expected.
- 402: No nuisance is expected with proper operational procedures and mitigation measures.
- 462: This rule is not applicable since the rule applies to "loading" and this equipment is UNLOADING ethanol.
- 1173: This facility is expected to comply with the requirements of this rule. New fugitive components will be limited to 500 ppm.

Reg 13:BACT: There is an increase of ROG of 54 lb/day (for rack before vapor balance) with this modification. Thus, BACT applies. BACT for this unloading rack is vapor balance for ROG control. There is an emission increase of less than one pound per day of ROG from fugitives. Thus BACT for fugitives is not triggered.

Offsets: PostMod controlled emissions are 5 lb/day. This is a decrease from the PreMod emissions of 18 lb/day. No offsets required.

Modeling: Not required for ROG.

- 1401: Since there is an emission decrease, there is also a risk decrease. This modification is exempt from 1401.

Title V: This permit will be issued as a revision (DeMinimus Significant) to the existing Title V Permit (under A/N 339365) after a 45-day EPA review period.

This project will meet all District Rules and Regulations. It is recommended that a Permit to Construct be granted subject to the attached conditions.