

<b>SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT</b>  <b>ENGINEERING AND COMPLIANCE</b>  <b>APPLICATION PROCESSING AND CALCULATIONS</b>	TOTAL PAGES:	PAGE NO.:
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	447009	09/29/09
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SKC		

## PERMIT TO OPERATE

APPLICANT	Tesoro Refinery & marketing, Co.
MAILING ADDRESS	1926 E. Pacific Coast Highway Wilmington, CA 90744
EQUIPMENT LOCATION	Same as above

### Equipment Description:

#### Equipment Description:

STORAGE TANK 260001, DENATURED ETHANOL, FIXED ROOF TYPE WITH A DOUBLE SEAL INTERNAL FLOATING ROOF, 6000 BBL CAPACITY, 35'-0" DIA. X 36'-0" H.

#### 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 LIMIT THE THROUGHPUT TO NO MORE THAN 130,000 BARRELS IN ANY ONE CALENDAR MONTH.

TO COMPLY WITH THIS CONDITION, THE OPERATOR SHALL INSTALL AND MAINTAIN A(N) FLOW METER TO ACCURATELY INDICATE THE THROUGHPUT AT THE LOADING RACKS NO. 1, NO. 2, NO. 3 & NO. 4. THE FLOW MEASURING DEVICE SHALL RECORD THE THROUGHPUT TO SHOW COMPLIANCE WITH THIS CONDITION.  
[RULE 1303(b)(2)-OFFSET]

4. THE OPERATOR SHALL USE THIS EQUIPMENT IN SUCH A MANNER THAT THE HYDROCARBON CONCENTRATION BEING MONITORED, AS INDICATED BELOW, DOES NOT EXCEED 30 PERCENT OF THE LOWER EXPLOSIVE LIMIT.

THE OPERATOR SHALL MONITOR THE HYDROCARBON CONCENTRATION IN THE VAPOR SPACE USING AN EXPLOSIMETER OR EQUIVALENT DEVICE ONCE EVERY SIX MONTHS.  
[RULE 463]

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5. THE OPERATOR SHALL KEEP RECORDS, IN A MANNER APPROVED BY THE DISTRICT, FOR THE FOLLOWING PARAMETERS(S):

STORED PRODUCT, THROUGHPUT, HYDROCARBON CONCENTRATION. SUCH RECORDS SHALL BE MAINTAINED, AND SHALL BE MADE AVAILABLE TO THE EXECUTIVE OFFICER OR HIS AUTHORIZED REPRESENTATIVE UPON REQUEST.

[RULE 463]

**PERIODIC MONITORING: NONE**

**EMISSIONS AND REQUIREMENTS:**

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

VOC: RULE 463

VOC: RULE 1149

### **BACKGROUND & PROCESS DESCRIPTION**

This facility is a Title facility which is primarily a tank storage farm and bulk loading terminal consisting of various size tanks used to store various refinery products and loading racks.

This application is for an internal floating roof tank (Tank no. 2600001), currently issued a permit under G3762. The applicant proposes to increase the throughput from 79,365 barrels per month to 130,000 barrels per month of ethanol. This is due to the California gasoline reformulated gasoline requirements. No physical changes will be done to the equipment.

The application for modification of the Title V facility permit is under application no. 498754.

### **EMISSION CALCULATIONS**

The applicant would like to increase the amount of ethanol stored from 79,365 barrels/mo. to 130,000 barrels/mo.

The applicant included an emissions evaluation using EPA Tanks 4.09 program, however he did not do a detailed monthly emissions calculation so I also have performed emissions calculations use EPA Tanks 4.09 program to calculate the current and future maximum

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emissions on a month to month bases (see attachments included in this file). A summary of the emissions is shown below.

(The applicant used is proprietary Ethanol data, and I used Ethyl Alcohol built into the tanks 4.09 program and the difference in annual emissions between my calculations and the applicants calculations are approximately 4 lbs/year)

Since august is the worst case month, the emissions for August will be used to determine the monthly increase in emissions.

Given:

Current tank info

Ethyl Alcohol  
35 diameter  
252,000 gallon volume  
158.73 turnovers  
light rust  
white/white color  
good condition  
pontoon floating roof  
welded deck  
mechanical shoe primary seal  
rim mounted secondary seal

Proposed tank information

Ethyl Alcohol  
35 diameter  
252,000 gallon volume  
260 turnovers  
light rust  
white/white color  
good condition  
pontoon floating roof  
welded deck  
mechanical shoe primary seal  
rim mounted secondary seal

The monthly increase is 50,365 barrels per month,

Tanks 4.09d results located in this file.

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**Tanks Program Results**

Emissions lbs/yr	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Current	13.70	259.51	119.48	0	392.69
Future	13.70	425.07	119.48	0	558.25
Difference	0	165.56	0	0	165.56

**Daily emissions**

**Tanks Program Results for August (highest emissions month)**

	Monthly	30 Day Average	hourly
	lbs/mo	lbs/day	lbs/hr
Current	34.81	1.16	0.048
Future	48.60	1.62	0.068
Difference	13.79	0.46	0.02

The emissions increase is less than 0.5 lbs/day therefore no offsets are required for this modification.

**AIR TOXIC RISK ASSESSMENT**

Because there is 5 % gasoline in the mixture, Toxic air contaminants are in the emissions. To determine the Toxic Emissions, it will be assumed that 5 % of the emissions are gasoline emissions. In gasoline, the following toxic compounds are assumed at the following worse case concentrations.

Benzene            2%  
 MTBE              10%  
 Toluene            10%  
 Xylene             10%  
 Ethylbenzene    5%

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**Percent of gasoline indenatured ethanol**

	Percentage	hourly	daily	monthly	annual
	%	lbs/hr	lbs/day	lbs/mo	lbs/yr
gasoline	5	9.58E-04	0.023	0.161	8.395

**Percentage of toxic compound in gasoline**

	Percentage	hourly	daily	monthly	annual
benzene	2	0.000019	0.00046	0.003	0.17
MTBE	10	0.000096	0.00230	0.0161	0.84
Toluene	10	0.000096	0.00230	0.0161	0.84
Xylene	10	0.000096	0.00230	0.0161	0.84
Ethylbenzene	1.5	0.000014	0.00035	0.002	0.13

To determine the MICR, HIC and HIA, a tier 2 health risk assessment was performed and the results are shown below. See file for the attached spreadsheet.

**MICR**

$$\text{MICR} = \text{CP (mg/(kg-day))}^{-1} * \text{Q (ton/yr)} * (\text{X/Q}) * \text{AFann} * \text{MET} * \text{DBR} * \text{EVF} * 1.E-6 * \text{MP}$$

Compound	Residential	Commercial
Benzene (including benzene from gasoline)	6.53E-11	2.51E-10
Methyl tertiary-butyl ether	5.94E-12	2.29E-11
Toluene (methyl benzene)		
Xylenes (isomers and mixtures)		
Ethyl benzene	8.37E-11	3.22E-10
<b>Total</b>	<b>1.55E-10</b>	<b>5.97E-10</b>
	<b>PASS</b>	<b>PASS</b>

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**Hazard Index**

HIA = [Q(lb/hr) \* (X/Q)max] \* AF / Acute REL

HIC = [Q(ton/yr) \* (X/Q) \* MET \* MP] / Chronic REL

Target Organs	Acute	Chronic	Acute Pass/Fail	Chronic Pass/Fail
Alimentary system (liver) - AL		3.55E-07	Pass	Pass
Bones and teeth - BN			Pass	Pass
Cardiovascular system - CV			Pass	Pass
Developmental - DEV	1.71E-06	1.60E-05	Pass	Pass
Endocrine system - END		3.27E-07	Pass	Pass
Eye	1.54E-06	2.80E-08	Pass	Pass
Hematopoietic system - HEM	2.92E-07	7.40E-07	Pass	Pass
Immune system - IMM	2.92E-07		Pass	Pass
Kidney - KID		3.55E-07	Pass	Pass
Nervous system - NS	1.42E-06	1.60E-05	Pass	Pass
Reproductive system - REP	1.71E-06		Pass	Pass
Respiratory system - RES	1.54E-06	1.53E-05	Pass	Pass
Skin			Pass	Pass

For this modification, the MICR will bell less than 1 in a million, the HIC and HIA are less than 1.

**EVALUATION**

**Rule 212** The proposed change in condition shall meet all criteria Rule 212 for approval. The change in condition can be expected to operate without emitting air contaminants in violation of sections 417, 41701 and 44300 of the State Health and Safety Code or in Violation of AQMD's Rules and Regulations. The project will result in an emissions increase, however it not exceed the daily maximum specified in subdivision (g) or Rule 212, and the increase in cancer risk is less than 1 in a million, and there is no school within 1000 ft. of this project.

**Rule 401 Visible Emissions**  
Visible emissions are not expected under normal operating conditions of the tank.

**Rule 402 Nuisance**  
No nuisance complaints are expected provided that the operation is conducted according to design. Compliance with 402 is expected.

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**Rule 463      **Organic Liquid Storage****

This rule applies to any above ground tank with a capacity of 19,815 gallons or greater for storing organic liquids. Domed external floating roof tanks are subject to the requirement of Rule 463 (d) – Other Performance Requirements. Compliance with Rule 463 is expected with proper record keeping and inspections.

**Regulation IX – NEW SOURCE PERFORMANCE STANDARDS**

**Subpart K      **Standards of Performance for Storage Vessels for Petroleum Liquids.****

Subparts K, Ka, and Kb impose requirements for petroleum liquids storage vessels built after June 11, 1973. This storage tank was constructed prior to this date, and since its construction, nothing has triggered that this rule will apply, therefore these regulations do not apply.

**Rule 1149      **Storage Tank Cleaning and Degassing****

This Rule has requirements for tank cleaning and degassing operations. A permit condition requires continued compliance with this rule.

**Rule 1173      **Fugitive Emissions of Volatile Organic Compounds****

This Rule specifies leak control, identification, operator inspection, maintenance, and recordkeeping requirements for valves pumps, compressors, pressure relief valves, and other components from which fugitive VOC emissions may emanate. Since this project does not involve a change to any component outside of the storage tanks, no change in fugitive VOC emissions is expected.

**Rule 1178      **Further reductions of VOC from Storage Tanks at Petroleum Refineries****

This Rule applies to facilities with VOC emissions that exceed 20 tons per year. After reviewing the 2001-2001 AER emissions, there was no year that exceeded 20 tons per year, therefore this rule does not apply.

**Rule 1303: Requirements**

**Rule 1303(a) – Best Available Control Technology**

The emissions increase by this modification will be less than 0.5 lbs/day, therefore BACT is not triggered.

**Rule 1303(b)(1) - Modeling**

Since this project results in a reduction in VOC emissions and TAC emissions, therefore, modeling is not required.

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**Rule 1303 (b)(2) – Emissions Offsets**

Since this project results in a reduction in VOC emissions and TAC emissions, therefore, modeling is not required.

**Rule 1303 (b)(4) – Facility Compliance**

Since this project results in a reduction in VOC emissions and TAC emissions, therefore, modeling is not required.

**Rule 1401 New Source Review of Carcinogenic Air Contaminants**

This rule requires permit applicants to assess the cancer risks due to the cumulative emission impacts of new/modified sources in their facility. Since the project results in a reduction in VOC emissions and TAC emissions, therefore, the project is exempt from Rule 1401 assessment.

**Regulation XVII – REGIONAL CLEAN AIR INCENTIVES MARKET (RECLAIM)**

This facility is a RECLAIM facility. Therefore, it is subject to Reg. XX. This modification does not emit RECLAIM pollutants, Nox RTC is currently 34,240 lbs.

**Reg XXX: Title V Permits**

The Title V permit has been issued for this facility, and the necessary sections will be amended with the necessary revisions under application no. 464771.

**CEQA – California Environment Quality Act.**

CEQA requires that the environmental impacts of proposed projects be evaluated and that feasible methods to reduce, avoid or eliminate identified significant adverse impacts of these projects be considered. The CEQA Applicability Form (400-CEQA) indicates that the project does not have any impacts which trigger the preparation of a CEQA document. The expected impacts of the project on the environment are not significant. Therefore a CEQA analysis is not required.

**RECOMMENDATIONS**

Based the information submitted and the above evaluation, it is recommended that this equipment should be issued a conditional Permit to Operate.

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

**Identification**

User Identification: tesoro ethanol 260001  
 City: Wilmington  
 State: California  
 Company: Tesoro  
 Type of Tank: Internal Floating Roof Tank  
 Description:

**Tank Dimensions**

Diameter (ft): 35.00  
 Volume (gallons): 252,000.00  
 Turnovers: 260.00  
 Self Supp. Roof? (y/n): N  
 No. of Columns: 1.00  
 Eff. Col. Diam. (ft): 0.70

**Paint Characteristics**

Internal Shell Condition: Light Rust  
 Shell Color/Shade: White/White  
 Shell Condition: Good  
 Roof Color/Shade: White/White  
 Roof Condition: Good

**Rim-Seal System**

Primary Seal: Mechanical Shoe  
 Secondary Seal: Rim-mounted

**Deck Characteristics**

Deck Fitting Category: Detail  
 Deck Type: Welded

**Deck Fitting/Status****Quantity**

Column Well (24-in. Diam.)/Pipe Col.-Sliding Cover, Gask.	1
Ladder Well (36-in. Diam.)/Sliding Cover, Gasketed	1
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1
Roof Leg (3-in. Diameter)/Adjustable, Double-Deck Roofs	6
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1
Access Hatch (24-in. Diam.)/Unbolted Cover, Gasketed	1
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1
Roof Drain (3-in. Diameter)/90% Closed	1
Slotted Guide-Pole/Sample Well/Gask. Sliding Cover, w. Float	1

Meteorological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

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

**tesoro ethanol 260001 - Internal Floating Roof Tank**  
**Wilmington, California**

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Denatured ethanol	Jan	61.79	56.79	66.79	64.33	0.6888	N/A	N/A	46.0700			46.07	Option 2: A=8.12187, B=1598.673, C=226.726
Denatured ethanol	Feb	62.78	57.67	67.88	64.33	0.7105	N/A	N/A	46.0700			46.07	Option 2: A=8.12187, B=1598.673, C=226.726
Denatured ethanol	Mar	63.78	58.57	68.99	64.33	0.7354	N/A	N/A	46.0700			46.07	Option 2: A=8.12187, B=1598.673, C=226.726
Denatured ethanol	Apr	65.70	59.89	71.51	64.33	0.7653	N/A	N/A	46.0700			46.07	Option 2: A=8.12187, B=1598.673, C=226.726
Denatured ethanol	May	67.27	61.79	72.76	64.33	0.8282	N/A	N/A	46.0700			46.07	Option 2: A=8.12187, B=1598.673, C=226.726
Denatured ethanol	Jun	68.98	63.35	74.61	64.33	0.8769	N/A	N/A	46.0700			46.07	Option 2: A=8.12187, B=1598.673, C=226.726
Denatured ethanol	Jul	71.26	65.04	77.47	64.33	0.9480	N/A	N/A	46.0700			46.07	Option 2: A=8.12187, B=1598.673, C=226.726
Denatured ethanol	Aug	71.80	65.63	77.56	64.33	0.9569	N/A	N/A	46.0700			46.07	Option 2: A=8.12187, B=1598.673, C=226.726
Denatured ethanol	Sep	70.17	64.65	75.88	64.33	0.9123	N/A	N/A	46.0700			46.07	Option 2: A=8.12187, B=1598.673, C=226.726
Denatured ethanol	Oct	67.76	62.46	73.04	64.33	0.8418	N/A	N/A	46.0700			46.07	Option 2: A=8.12187, B=1598.673, C=226.726
Denatured ethanol	Nov	64.31	59.22	69.40	64.33	0.7488	N/A	N/A	46.0700			46.07	Option 2: A=8.12187, B=1598.673, C=226.726
Denatured ethanol	Dec	61.76	56.83	66.70	64.33	0.6862	N/A	N/A	46.0700			46.07	Option 2: A=8.12187, B=1598.673, C=226.726

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

**tesoro ethanol 260001 - Internal Floating Roof Tank**  
**Wilmington, California**

Month	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	0.9641	0.9983	1.0342	1.1063	1.1684	1.2393	1.3403	1.3562	1.2911	1.1883	1.0536	0.9633
Seal Factor A (lb-mole/ft-yr):	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Value of Vapor Pressure Function:	0.0120	0.0124	0.0128	0.0137	0.0145	0.0154	0.0168	0.0168	0.0160	0.0147	0.0131	0.0119
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.6968	0.7105	0.7354	0.7863	0.8282	0.8769	0.9460	0.9569	0.9123	0.8418	0.7488	0.6862
Tank Diameter (ft):	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000
Vapor Molecular Weight (lb/lb-mole):	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Withdrawal Losses (lb):	35.4226	35.4226	35.4226	35.4226	35.4226	35.4226	35.4226	35.4226	35.4226	35.4226	35.4226	35.4226
Number of Columns:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Effective Column Diameter (ft):	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000
Net Throughput (gal/mo.):	5,480,000.0000	5,480,000.0000	5,480,000.0000	5,480,000.0000	5,480,000.0000	5,480,000.0000	5,480,000.0000	5,480,000.0000	5,460,000.0000	5,480,000.0000	5,460,000.0000	5,460,000.0000
Shell Clingage Factor (tbl/1000 sqft):	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
Average Organic Liquid Density (lb/gal):	8.6100	8.6100	8.6100	8.6100	8.6100	8.6100	8.6100	8.6100	8.6100	8.6100	8.6100	8.6100
Tank Diameter (ft):	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000
Deck Fitting Losses (lb):	8.4059	8.7042	9.0172	9.6456	10.1975	10.8059	11.6865	11.8251	11.2587	10.3807	9.1880	8.3988
Value of Vapor Pressure Function:	0.0120	0.0124	0.0128	0.0137	0.0145	0.0154	0.0168	0.0168	0.0160	0.0147	0.0131	0.0119
Vapor Molecular Weight (lb/lb-mole):	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Tot. Roof Fitting Loss Fact. (lb-mole/yr):	183.1000	183.1000	183.1000	183.1000	183.1000	183.1000	183.1000	183.1000	183.1000	183.1000	183.1000	183.1000
Deck Seam Losses (lb):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length Factor(ft/sqft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tank Diameter (ft):	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000
Vapor Molecular Weight (lb/lb-mole):	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total Losses (lb):	44.7925	45.1250	45.4740	46.1744	46.7784	47.4678	48.4494	48.6039	47.9703	46.9716	45.6621	44.7846

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors		m	Losses(lb)
		KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))		
Column Well (24-in. Diam.)/Pipe Col./Sliding Cover, Gask.	1	25.00	0.00	0.00	18.3256
Ladder Well (36-in. Diam.)/Sliding Cover, Gasketed	1	56.00	0.00	0.00	36.5693
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1	0.71	0.10	1.00	0.4836
Roof Leg (3-in. Diameter)/Adjustable, Double-Deck Roofs	6	0.82	0.53	0.14	3.2129
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.84	4.0487
Sample Pipe or Well (24-in. Diam.)/5ft Fabric Seal 10% Open	1	12.00	0.00	0.00	7.8363
Access Hatch (24-in. Diam.)/Unbolted Cover, Gasketed	1	31.00	5.20	1.30	20.2437
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1	14.00	5.40	1.10	9.1423
Gauge-Hatch/Sample Well (6-in. Diam.)/Weighted Mech. Actuation, Gask.	1	0.47	0.02	0.97	0.3069
Roof Drain (3-in. Diameter)/90% Closed	1	1.80	0.14	1.10	1.1754
Slotted Guide-Pole/Sample Well/Gask. Sliding Cover, w. Float	1	31.00	36.00	2.00	20.2437

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

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

**tesoro ethanol 260001 - Internal Floating Roof Tank**  
**Wilmington, California**

Components	Losses(lbs)				Total Emissions
	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	
Denatured ethanol	13.70	425.07	119.48	0.00	558.25

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

**Identification**

User Identification: tesoro ethanol 260001  
 City: Wilmington  
 State: California  
 Company: Tesoro  
 Type of Tank: Internal Floating Roof Tank  
 Description:

**Tank Dimensions**

Diameter (ft): 35.00  
 Volume (gallons): 252,000.00  
 Turnovers: 158.73  
 Self Supp. Roof? (y/n): N  
 No. of Columns: 1.00  
 Eff. Col. Diam. (ft): 0.70

**Paint Characteristics**

Internal Shell Condition: Light Rust  
 Shell Color/Shade: White/White  
 Shell Condition: Good  
 Roof Color/Shade: White/White  
 Roof Condition: Good

**Rim-Seal System**

Primary Seal: Mechanical Shoe  
 Secondary Seal: Rim-mounted

**Deck Characteristics**

Deck Fitting Category: Detail  
 Deck Type: Welded

**Deck Fitting/Status****Quantity**

Column Well (24-in. Diam.)/Pipe Col.-Sliding Cover, Gask.	1
Ladder Well (36-in. Diam.)/Sliding Cover, Gasketed	1
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1
Roof Leg (3-in. Diameter)/Adjustable, Double-Deck Roofs	6
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1
Access Hatch (24-in. Diam.)/Unbolted Cover, Gasketed	1
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1
Roof Drain (3-in. Diameter)/90% Closed	1
Slotted Guide-Pole/Sample Well/Gask. Sliding Cover, w. Float	1

Meteorological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

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

**tesoro ethanol 260001 - Internal Floating Roof Tank**  
**Wilmington, California**

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Denatured ethanol	Jan	61.79	56.79	66.79	64.33	0.6868	N/A	N/A	46.0700			46.07	Option 2: A=8.12187, B=1598.673, C=226.726
Denatured ethanol	Feb	62.78	57.67	67.88	64.33	0.7105	N/A	N/A	46.0700			46.07	Option 2: A=8.12187, B=1598.673, C=226.726
Denatured ethanol	Mar	63.78	58.57	68.89	64.33	0.7354	N/A	N/A	46.0700			46.07	Option 2: A=8.12187, B=1598.673, C=226.726
Denatured ethanol	Apr	65.70	59.88	71.51	64.33	0.7853	N/A	N/A	46.0700			46.07	Option 2: A=8.12187, B=1598.673, C=226.726
Denatured ethanol	May	67.27	61.79	72.76	64.33	0.8282	N/A	N/A	46.0700			46.07	Option 2: A=8.12187, B=1598.673, C=226.726
Denatured ethanol	Jun	68.98	63.35	74.61	64.33	0.8789	N/A	N/A	46.0700			46.07	Option 2: A=8.12187, B=1598.673, C=226.726
Denatured ethanol	Jul	71.28	65.04	77.47	64.33	0.9460	N/A	N/A	46.0700			46.07	Option 2: A=8.12187, B=1598.673, C=226.726
Denatured ethanol	Aug	71.60	65.63	77.58	64.33	0.9569	N/A	N/A	46.0700			46.07	Option 2: A=8.12187, B=1598.673, C=226.726
Denatured ethanol	Sep	70.17	64.65	75.68	64.33	0.9123	N/A	N/A	46.0700			46.07	Option 2: A=8.12187, B=1598.673, C=226.726
Denatured ethanol	Oct	67.76	62.48	73.04	64.33	0.8418	N/A	N/A	46.0700			46.07	Option 2: A=8.12187, B=1598.673, C=226.726
Denatured ethanol	Nov	64.31	59.22	69.40	64.33	0.7488	N/A	N/A	46.0700			46.07	Option 2: A=8.12187, B=1598.673, C=226.726
Denatured ethanol	Dec	61.76	58.83	66.70	64.33	0.6862	N/A	N/A	46.0700			46.07	Option 2: A=8.12187, B=1598.673, C=226.726

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

**tesoro ethanol 260001 - Internal Floating Roof Tank**  
**Wilmington, California**

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb)	0.9641	0.9983	1.0342	1.1083	1.1684	1.2393	1.3403	1.3562	1.2911	1.1883	1.0536	0.9633
Seal Factor A (lb-mole/ft-yr)	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
Seal Factor B (lb-mole/ft-yr (mph) <sup>n</sup> )	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Value of Vapor Pressure Function	0.0120	0.0124	0.0128	0.0137	0.0145	0.0154	0.0168	0.0168	0.0168	0.0168	0.0147	0.0119
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.6868	0.7105	0.7354	0.7853	0.8282	0.8789	0.9460	0.9588	0.9123	0.8418	0.7488	0.6862
Tank Diameter (ft)	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000
Vapor Molecular Weight (lb/lb-mole)	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700
Product Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Withdrawal Losses (lb)	21.6255	21.6255	21.6255	21.6255	21.6255	21.6255	21.6255	21.6255	21.6255	21.6255	21.6255	21.6255
Number of Columns:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Effective Column Diameter (ft)	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000
Nel Throughput (gal/mo.):	3,333,330.0000	3,333,330.0000	3,333,330.0000	3,333,330.0000	3,333,330.0000	3,333,330.0000	3,333,330.0000	3,333,330.0000	3,333,330.0000	3,333,330.0000	3,333,330.0000	3,333,330.0000
Shell Clingage Factor (bbl/1000 sqft)	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
Average Organic Liquid Density (lb/gal)	6.6100	6.6100	6.6100	6.6100	6.6100	6.6100	6.6100	6.6100	6.6100	6.6100	6.6100	6.6100
Tank Diameter (ft)	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000
Deck Fitting Losses (lb)	8.4059	8.7042	9.0172	9.6456	10.1875	10.8058	11.6865	11.8251	11.2567	10.3607	9.1680	8.3988
Value of Vapor Pressure Function:	0.0120	0.0124	0.0128	0.0137	0.0145	0.0154	0.0168	0.0168	0.0168	0.0147	0.0119	0.0119
Vapor Molecular Weight (lb/lb-mole):	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Tot. Roof Fitting Loss Fact (lb-mole/yr)	183.1000	183.1000	183.1000	183.1000	183.1000	183.1000	183.1000	183.1000	183.1000	183.1000	183.1000	183.1000
Deck Seam Losses (lb)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length (ft)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length Factor (ft/sqft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tank Diameter (ft)	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000	35.0000
Vapor Molecular Weight (lb/lb-mole):	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700	46.0700
Product Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
<b>Total Losses (lb)</b>	<b>30.9955</b>	<b>31.3279</b>	<b>31.6769</b>	<b>32.3773</b>	<b>32.9814</b>	<b>33.6708</b>	<b>34.6523</b>	<b>34.8068</b>	<b>34.1733</b>	<b>33.1745</b>	<b>31.8650</b>	<b>30.9875</b>

Roof Fitting/Status	Quantity	KFa (lb-mole/yr)	Roof Fitting Loss Factors KFa (lb-mole/(yr mph <sup>n</sup> ))	m	Losses (lb)
Column Well (24-in. Diam.)/Pipe Col./Sliding Cover, Gask	1	25.00	0.00	0.00	16.3256
Ladder Well (36-in. Diam.)/Sliding Cover, Gasketed	1	56.00	0.00	0.00	38.5893
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1	0.71	0.10	1.00	0.4636
Roof Leg (3-in. Diameter)/Adjustable, Double-Deck Roofs	6	0.82	0.53	0.14	3.2129
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	4.0487
Sample Pipe or Well (24-in. Diam.)/Silt Fabric Seal 10% Open	1	12.00	0.00	0.00	7.8363
Access Hatch (24-in. Diam.)/Unbolted Cover, Gasketed	1	31.00	5.20	1.30	20.2437
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1	14.00	5.40	1.10	9.1423
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask	1	0.47	0.02	0.97	0.3069
Roof Drain (3-in. Diameter)/80% Closed	1	1.60	0.14	1.10	1.1754
Slotted Guide-Pole/Sample Well/Gask. Sliding Cover, w. Float	1	31.00	36.00	2.00	20.2437

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

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

**tesoro ethanol 260001 - Internal Floating Roof Tank**  
**Wilmington, California**

Components	Losses(lbs)				Total Emissions
	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	
Denatured ethanol	13.70	259.51	119.48	0.00	392.69