

SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT

RULE 4623 -- STORAGE OF ORGANIC LIQUIDS

(Adopted April 11, 1991; Amended September 19, 1991; Amended December 17, 1992; Amended December 20, 2001)

1.0 Purpose

The purpose of this rule is to limit volatile organic compound (VOC) emissions from the storage of organic

2.0 Applicability

This rule applies to any tank with a design capacity of 1,100 gallons or greater used to store organic liquid with a true vapor pressure (TVP) of 0.5 psia or greater.

3.0 Definitions

3.1 Clean Produced Water: defined in Rule 1020 (Definitions).

3.2 Contact Floating Roof: a roof, located inside an internal floating roof tank, that floats on the liquid surface.

3.3 Crude Oil: petroleum extracted from the earth, which has not been processed in a refining operation.

3.4 Deck Fitting: a functional or operational device on a tank that substantially closes or seals a penetration in the deck of a floating roof.

3.5 Design Capacity: a tank's capacity as shown in the Permit to Operate, or the tank manufacturer's specifications if a tank does not have a Permit to Operate.

3.6 Emergency Standby Tanks: tanks which are not used (filled or partially filled) for more than 60 cumulative days during any 12-month period.

3.7 External Floating Roof: a tank cover in an open top tank consisting of a pan type, pontoon type, or double-deck type cover that rests upon and is supported by the organic liquid being contained. An external floating roof is equipped with closure seals to close the space between the roof edge and tank shell.

3.8 Fixed Roof Tank: a tank with a roof that is permanently affixed to the shell of the tank.

3.9 Gas Leak: a reading in excess of 10,000 ppmv, above background, on a portable hydrocarbon detection instrument that is calibrated with methane in accordance with the test method in Section 6.4.8.

- 3.10 Gas-Tight: a condition without a gas leak (defined in Section 3.9).
- 3.11 Gasoline: any petroleum distillate, petroleum distillate/alcohol blend or alcohol, having a Reid vapor pressure of four (4) psia or greater which is used as motor fuel which is commonly or commercially known or sold as gasoline.
- 3.12 Gauge Float: a device to indicate the level of the liquid within a tank. The float rests on the liquid surface inside a gauge well in the tank.
- 3.13 Gauge Hatch/Sample Well (Ports): consists of a pipe sleeve equipped with a self-closing gasketed cover (to reduce evaporative losses) and allows hand-gauging or sampling of the stored liquid. The gauge hatch/sample port is usually located beneath the gauger's platform, which is mounted on top of the tank shell. A cord may be attached to the self-closing gasketed cover so that the cover can be opened from the platform.
- 3.14 Guidepole: an anti-rotation device that is fixed to the top and bottom of a tank, passing through a well in a floating roof. A guidepole may be solid or be equipped with slots or holes for gauging purposes provided the guidepole is equipped with an appropriate sealing device that prevents openings that expose the stored liquid to the atmosphere.
- 3.15 Internal Floating Roof: a pan type, pontoon type, or double-deck type cover located inside a fixed roof tank that rests upon and is supported by the organic liquid being contained. An internal floating roof is equipped with closure seals to close the space between the roof edge and tank shell.
- 3.16 Metallic-Shoe Type (Mechanical Shoe) Seal: a metallic sheet (the shoe) that is held vertically against the vertical tank wall. The shoe is connected by braces to the floating roof and is held tightly against the wall by springs or weighted levers. A flexible coated fabric (envelope) is suspended from the shoe seal to the floating roof to form a vapor barrier over the annular space between the roof and the primary seal.
- 3.17 Noncontact Floating Roof: a roof that is located inside an internal floating roof tank that is supported on pontoons several inches above the liquid surface.
- 3.18 Organic Liquid: any liquid which contains volatile organic compounds (VOCs) including, but not limited to, crude oils and petroleum distillates.
- 3.19 Petroleum Distillate: the product of a crude oil distillation or condensation process obtained by condensing the vapors for the purpose of purification, fractionation, or the formation of new substances.

- 3.20 Pressure Vessel: a tank, reservoir, or container that is capable of maintaining working pressures sufficient to prevent organic liquid loss or VOC loss to the atmosphere at all times.
- 3.21 Resilient-Toroid-Type seal: a core of open-cell foam encapsulated in a coated fabric that is attached to a mounting on the deck perimeter, and is continuous around the floating roof circumference.
- 3.22 Rim Vent: Rim vents are used on tanks equipped with a seal design that creates a vapor pocket in the seal and rim area, such as a mechanical shoe seal. The vent is used to release excess pressure or vacuum that is present in the vapor space bounded by the primary-seal shoe, the floating roof rim, the primary seal fabric, and the liquid level. Rim vents usually consist of weighted pallets that rest on a gasketed cover.
- 3.23 Roof Drain: a drain that permits the removal of rainwater from the surface of external floating roofs. A roof drain may be a closed drainage system that carries rainwater from the surface of the floating roof to the outside of the tank, or an open drainage system consisting of an open pipe that extends a short distance below the bottom of the deck allowing rainwater to drain from the surface of the floating roof into the organic liquid contents of the tank.
- 3.24 Roof Leg: an adjustable or fixed leg that is attached to the floating roof deck to support or hold the floating roof deck at a predetermined distance off the tank bottom to prevent damage to the fittings located underneath the deck and to allow for tank cleaning or repair. For adjustable legs, the load-carrying element passes through a well or sleeve in the deck.
- 3.25 Small Producer: an operator in the business of crude oil production who:
- 3.25.1 Produces an average of less than 6000 barrels per day of crude oil from all operations within the county; and
 - 3.25.2 Does not engage in refining, transportation, or marketing of refined petroleum products.
- 3.26 Tank: any stationary storage tank, reservoir or other.
- 3.27 Tank Battery: For crude oil production facilities, a tank battery is an aggregation of two or more tanks where the tanks are located so that no one tank is more than 150 feet from another tank as measured from the closest tank edges, and the tanks are located in the same crude oil production field. For non-crude oil production facilities, a tank battery is an aggregation of two or more tanks located within the same facility, regardless of the distance of the tanks from each other.

- 3.28 True Vapor Pressure (TVP): the equilibrium partial vapor pressure exerted by an organic liquid at actual storage temperature.
- 3.29 Uncontrolled Fixed Roof Tank: a fixed roof tank that does not operate an APCO-approved vapor recovery system as specified in Section 5.6.
- 3.30 Vacuum Breaker: a device that equalizes the pressure of the vapor space across the floating roof deck as the deck is either being landed on or off its legs. A vacuum breaker consists of a well with a cover. Attached to the underside of the cover is a guided leg long enough to contact the tank bottom as the floating deck approaches. When in contact with the tank bottom, the guide leg mechanically opens the breaker by lifting the cover off the well; otherwise the cover closes the well. Because the purpose of the vacuum breaker is to allow for the free exchange of air and/or vapor, the well does not extend appreciably below the deck.
- 3.31 Visible Gap: an opening which exceeds 0.060 inch.
- 3.32 Volatile Organic Compound (VOC): defined in Rule 1020.
- 3.33 Zero Gap: no gap between the tank shell and the seal shall exceed 0.06 inch. The cumulative length of all gaps exceeding 0.02 inch shall not be more than five (5) percent of the circumference of the tank, excluding gaps less than 1.79 inches from vertical seams.
- 3.34 Zero Gap Pole Wiper Seal: a seal with no gap exceeding 0.06 inches between outer surface of the guidepole or gauge well and pole wiper seal.

4.0 Exemptions

- 4.1 The provisions of this rule shall not apply to:
 - 4.1.1 Pressure vessels.
 - 4.1.2 Gasoline storage tanks with a capacity of less than 19,800 gallons that are subject to the requirements of Rule 4621 (Gasoline Transfer Into Stationary Storage Containers, Delivery Vessels, and Bulk Plants).
 - 4.1.3 Tanks that are used for storage/processing of clean produced water, or other water that meets the VOC standard specified in the definition of “clean produced water” in Rule 1020 (Definitions).
 - 4.1.4 Tanks used in wine fermentation and for storage of resulting products, by-products, and spirits.

- 4.2 Except for complying with Sections 6.3.2, 6.3.3 and 7.3, the requirements of this rule shall not apply to:
- 4.2.1 Emergency standby tanks, in existence prior to May 1, 1979, which store exclusively petroleum distillates or crude oil. Prior to return to Emergency Standby status, the contents of each tank shall be drained to the maximum extent feasible. After a tank has been used (filled or partially filled) and draining of the tank has begun, any further filling of the tank shall constitute a separate use of the tank, and the number of days the tank is used shall be counted towards the 60 cumulative days limit specified in the definition of an emergency standby tank in Section 3.6. Fixed roof emergency standby tanks shall be equipped with a pressure-vacuum relief valve that meets the requirements of Section 5.2.
 - 4.2.2 Temporary tanks, with capacities of 21,000 gallons (500 barrels) or less, left on site for six months or less.
- 4.3 Until November 14, 2003, any tank of a small producer with a capacity of 84,000 gallons (2,000 barrels) or less, unless otherwise subject to Section 4.4, shall be exempted from this rule, except for complying with Sections 6.2.1, 6.3.6, 7.1, and 7.3, provided the daily throughput of the tank is less than 6,300 gallons (150 barrels) of crude oil, and the tank is equipped with a pressure relief device set to within ten (10) percent of the maximum allowable working pressure of the tank. On and after November 15, 2003, small producers' tanks that are not subject to Section 4.4 shall be in compliance with all the requirements of this rule.
- 4.4 Effective on and after November 15, 2003, except for complying with Sections 6.3.4 and 7.3, a small producer's tank with a throughput of 50 barrels of crude oil per day or less is exempt from the requirements of this rule. All other small producer's tanks that do not qualify for exemption under Section 4.4 shall comply with all the requirements of this rule.

5.0 Requirements

5.1 VOC Control System Requirements

5.1.1 General VOC Control System Requirements

Except for small producers who are required to comply with the VOC control system requirements in Section 5.1.2, an operator shall not place, hold, or store organic liquid in any tank unless such tank is equipped with a VOC control system identified in Table 1. The specifications for the VOC control system are described in Sections 5.2, 5.3, 5.4, 5.5, and 5.6.

Table 1 – General VOC Control System Requirements

Tank Design Capacity (Gallons)	True Vapor Pressure (TVP) of Organic Liquid		
	0.5 psia to <1.5 psia	1.5 psia to <11 psia	≥11.0 psia
1,100 to 19,800	Pressure-vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery system	Pressure-vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery system	Pressure vessel or vapor recovery system
>19,800 to 39,600	Pressure-vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery system	Internal floating roof, or external floating roof, or vapor recovery system	Pressure vessel or vapor recovery system
>39,600	Internal floating roof, or external floating roof, or vapor recovery system	Internal floating roof, or external floating roof, or vapor recovery system	Pressure vessel or vapor recovery system

5.1.2 Small Producer VOC Control System Requirements

A small producer shall not place, hold, or store crude oil in any tank unless such tank is equipped with a VOC control system identified in Table 2. For storage of any organic liquid except crude oil, a small producer shall comply with the requirements of Section 5.1.1. The specifications for the VOC control system are described in Sections 5.2, 5.3, 5.4, 5.5, and 5.6.

Table 2 – Small Producer VOC Control System Requirements for Crude Oil Storage Tanks

Tank Design Capacity (gallons)	TVP and Crude Oil Throughput	
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	0.5 psia to <11 psia and a tank throughput of >50 to <150 barrels of crude oil per day	0.5 psia to <11 psia and a tank throughput \geq 150 barrels of crude oil per day	\geq 11 psia and regardless of crude oil tank throughput
1,100 to 39,600	Pressure-vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery system	Pressure-vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery system	Pressure vessel or vapor recovery system
>39,600	Pressure-vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery system	Internal floating roof, or external floating roof, or vapor recovery system	Pressure vessel or vapor recovery system

5.2 Specifications for Pressure-Vacuum Relief Valve

The tank shall be in gas-tight condition. The pressure-vacuum relief valve shall be set to within ten (10) percent of the maximum allowable working pressure of the tank. The pressure-vacuum relief valve shall be permanently labeled with the operating pressure settings. The pressure-vacuum relief valve shall be properly installed and maintained in good operating order in accordance with the manufacturer's instructions, and shall remain in gas-tight condition except when the operating pressure exceeds the valve set pressure.

5.3 Specifications for External Floating Roof Tanks

5.3.1 An external floating roof tank shall be:

5.3.1.1 equipped with a floating roof consisting of a pan type that is installed before December 20, 2001, pontoon-type, or double-deck type cover, that rests on the surface of the liquid contents; and

5.3.1.2 equipped with a closure device between the tank shell and roof edge consisting of two seals, one above the other; the one below shall be referred to as the primary seal, and the one above shall be referred to as the secondary seal.

5.3.1.3 Effective on and after December 20, 2001, the floating roof shall be floating on the surface of the stored liquid at all times (i.e., off the roof leg supports) except during the initial fill until the roof is lifted off the leg supports and when the tank is completely emptied and subsequently refilled. The process of filling,

emptying, or refilling when the roof is resting on the leg supports shall be continuous and shall be accomplished as rapidly as possible. Whenever the operator intends to land the roof on its legs, an operator shall notify the APCO in writing at least five calendar days prior to performing the work. The tank must be in compliance with this rule before it may land on its legs. The required information to be included in the written notification as well as the recordkeeping requirements is specified in Section 6.3.7.

- 5.3.2 Seal designs shall be submitted to the APCO and shall not be installed or used unless they are approved by the APCO as meeting the criteria set forth in Sections 5.3.2.1 through 5.3.2.3 as applicable. Seal designs other than set forth in Sections 5.3.2.1 through 5.3.2.3 may be approved provided that a notice allowing the use of such design has been published in the Federal Register pursuant to CFR 40 Part 60: Subpart Kb paragraph 60.114b.

5.3.2.1 Welded Tanks with Primary Metallic-Shoe Type Seal

- 5.3.2.1.1 No gap between the tank shell and the primary seal shall exceed one and one half (1-1/2) inches. The cumulative length of all gaps between the tank shell and the primary seal greater than one-half (1/2) inch shall not exceed ten (10) percent of the circumference of the tank. The cumulative length of all primary seal gaps greater than one-eighth (1/8) inch shall not exceed 30 percent of the tank circumference. No continuous gap greater than one-eighth (1/8) inch shall exceed ten (10) percent of the tank circumference.

- 5.3.2.1.2 No gap between the tank shell and the secondary seal shall exceed one-half (1/2) inch. The cumulative length of all gaps between the tank shell and the secondary seal, greater than one-eighth (1/8) inch shall not exceed five (5) percent of the tank circumference.

- 5.3.2.1.3 Metallic-shoe-type seals shall be installed so that one end of the shoe extends into the stored liquid and the other end extends a minimum vertical distance of 24 inches above the stored liquid surface.

- 5.3.2.1.4 The geometry of the metallic-shoe type seal shall be such that the maximum gap between the shoe and the tank shell is no greater than double the gap allowed by the seal gap criteria specified in Section 5.3.2.1.1 for a

length of at least 18 inches in the vertical plane above the liquid surface.

- 5.3.2.1.5 There shall be no holes, tears, or openings in the secondary seal or in the primary seal envelope that surrounds the annular vapor space enclosed by the roof edge, seal fabric, and secondary seal.
- 5.3.2.1.6 The secondary seal shall allow easy insertion of probes up to one and one-half (1-1/2) inches in width in order to measure gaps in the primary seal.
- 5.3.2.1.7 The secondary seal shall extend from the roof to the tank shell and shall not be attached to the primary seal.

5.3.2.2 Riveted Tank with Primary Metallic-Shoe Type Seal

- 5.3.2.2.1 No gap between the tank shell and the primary seal shall exceed two and one-half (2-1/2) inches. The cumulative length of all primary seal gaps greater than one and one-half (1-1/2) inches shall be not exceed ten (10) percent of the circumference of the tank. The cumulative length of all gaps between the tank shell and the primary seal greater than one-eighth (1/8) inch shall not exceed 30 percent of the circumference of the tank. No continuous gap greater than one-eighth (1/8) inch shall exceed ten (10) percent of the tank circumference.
- 5.3.2.2.2 No gap between the tank shell and the secondary seal shall exceed one-half (1/2) inch. The cumulative length of all gaps between the tank shell and the secondary seal greater than one-eighth (1/8) inch shall not exceed five (5) percent of the tank circumference.
- 5.3.2.2.3 Metallic shoe-type seals shall be installed so that one end of the shoe extends into the stored liquid and the other end extends a minimum vertical distance of 24 inches above the stored liquid surface. The geometry of the metallic-shoe type seal shall be such that the maximum gap between the shoe and the tank shell is no greater than double the gap allowed by the seal gap criteria specified in Section 5.3.2.2.1 for a length of at least 18 inches in the vertical plane
- 5.3.2.2.4 There shall be no holes, tears, or openings in the secondary seal or in the primary seal envelope that

surrounds the annular vapor space enclosed by the roof edge, seal fabric, and secondary seal.

5.3.2.2.5 The secondary seal shall allow easy insertion of probes up to two and one-half (2-1/2) inches in width in order to measure gaps in the primary seal.

5.3.2.2.6 The secondary seal shall extend from the roof to the tank shell and shall not be attached to the primary seal.

5.3.2.3 Tanks with Primary Resilient Toroid Seal:

5.3.2.3.1 On and after November 15, 2003, the primary resilient toroid seal shall be mounted on the perimeter of the roof such that it is in contact with the tank's liquid contents at all times while the roof is floating.

5.3.2.3.2 No gap between the tank shell and the primary seal shall exceed one-half (1/2) inch. Until November 14, 2003, the cumulative length of all primary seal gaps greater than one-eighth (1/8) inch shall not exceed 30 percent of the tank circumference. On and after November 15, 2003, the cumulative length of all primary seal gaps greater than one-eighth (1/8) inch shall not exceed five (5) percent of the tank circumference. No continuous gap greater than one-eighth (1/8) inch shall exceed ten (10) percent of the tank circumference.

5.3.2.3.3 No gap between the tank shell and the secondary seal shall exceed one-half (1/2) inch. The cumulative length of all gaps between the tank shell and the secondary seal, greater than one-eighth (1/8) inch shall not exceed five (5) percent of the tank circumference.

5.3.2.3.4 There shall be no holes, tears, or openings in the secondary seal or in the primary seal envelope that surrounds the annular vapor space enclosed by the roof edge, seal fabric, and secondary seal.

5.3.2.3.5 The secondary seal shall allow easy insertion of probes up to one-half (1/2) inch in width in order to measure gaps in the primary seal.

5.3.2.3.6 The secondary seal shall extend from the roof of the tank to the shell and not be attached to the primary seal.

5.3.2.4 The following seal designs have been found to be equivalent to seals meeting the criteria set forth in Sections 5.3.2.1 through 5.3.2.3:

5.3.2.4.1 when installed and maintained with zero gap:

MANUFACTURER	MODEL
Republic Fabricators	WeatherGuard Seal

5.3.2.4.2 when installed and maintained to meet the gap criteria for primary and secondary seals set forth in Sections 5.3.2.1 through 5.3.2.3:

MANUFACTURER	MODEL
"HMT"	Dual/Multi Blade Wiper Seals

5.4 Specifications for Internal Floating Roof Tanks

5.4.1 Internal floating roof tanks shall be equipped with seals that meet the criteria set forth in Section 5.3, except for complying with the requirement specified in Section 5.3.2.1.3. For internal floating roof, the metallic-shoe type seals shall be installed so that one end of the shoe extends into the stored liquid and the other end extends a minimum vertical distance of 18 inches above the stored liquid surface.

5.4.2 The following seal designs have been found to be equivalent to seals meeting the criteria set forth in Section 5.3:

5.4.2.1 when installed and maintained with zero gap:

MANUFACTURER	MODEL
Ultraflote	Single Ultraseal

5.4.2.2 when installed and maintained to meet the gap criteria for primary and secondary seals set forth in Sections 5.3.2.1 through 5.3.2.3:

MANUFACTURER	MODEL
Ultraflote	Dual Ultraseal

Altech	Double Wiper Seal
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5.4.3 The operator shall comply with the floating roof landing requirements specified in Section 5.3.1.3.

5.5 Floating Roof Deck Fitting Requirements

5.5.1. All openings in the roof used for sampling or gauging, except pressure-vacuum valves which shall be set to within ten (10) percent of the maximum allowable working pressure of the roof, shall provide a projection below the liquid surface to prevent belching of liquid and to prevent entrained or formed organic vapor from escaping from the liquid contents of the tank and shall be equipped with a cover, seal, or lid. The cover, seal, or lid shall at all times be in a closed position, with no visible gaps and be gas-tight, except when the device or appurtenance is in use.

5.5.2 Effective on and after November 15, 2003, the operator shall meet the requirements of Sections 5.5.2.1 through 5.5.2.4.

5.5.2.1 Requirements for Internal Floating Roof Deck Fittings

5.5.2.1.1 Each opening in a non-contact internal floating roof except for automatic bleeder vents (vacuum breaker vents) and rim space vents shall provide a projection below the liquid surface.

5.5.2.1.2 Each opening in the internal floating roof except for leg sleeves, automatic bleeder vents, rim space vents, column wells, ladder wells, sample wells, and stub drains shall be equipped with a cover, or a lid shall be maintained in a closed position at all times (i.e., no visible gap) except when the device is in use. The cover or lid shall be equipped with a gasket. Covers on each access hatch and automatic gauge float well shall be bolted in place except when they are in use.

5.5.2.1.3 Automatic bleeder vents shall be equipped with a gasket and shall be closed at all times when the roof is floating except when the roof is being floated off or is being landed on the leg roof supports.

5.5.2.1.4 Rim vents shall be equipped with a gasket and shall be set to open only when the internal floating roof is not floating or at the manufacturer's recommended setting.

5.5.2.1.5 Each penetration of the internal floating roof for the purpose of sampling shall be a sample well. The well shall have a slit fabric cover that covers at least 90 percent of the opening. The fabric cover must be impermeable.

5.5.2.1.6 Each penetration of the internal floating roof that allows for passage of a column supporting the fixed roof shall have a flexible fabric sleeve seal or a gasketed sliding cover. The fabric sleeve must be impermeable.

5.5.2.2 Requirements for External Floating Roof Deck Fittings

5.5.2.2.1 Except for automatic bleeder vents and rim vents and pressure vacuum relief vents, each opening in a non-contact external floating roof shall provide a projection below the liquid surface.

5.5.2.2.2 Except for automatic bleeder vents and rim vents, roof drains, and leg sleeves, each opening in the roof shall be equipped with a gasketed cover, seal, or lid that shall be maintained in a closed position at all times (i.e., no visible gap) except when in actual use.

5.5.2.2.3 Automatic bleeder vents shall be equipped with a gasket and shall be closed at all times when the roof is floating except when the roof is being floated off or is being landed on the roof leg supports.

5.5.2.2.4 Rim vents shall be equipped with a gasket and shall be set to open when the roof is being floated off the roof leg supports or at the manufacturer's recommended setting.

5.5.2.2.5 Each emergency roof drain shall be provided with a slotted membrane fabric cover that covers at least 90 percent of the area of the opening. The fabric cover must be impermeable if the liquid is drained into the contents of the tanks.

5.5.2.2.6 External floating roof legs shall be equipped with vapor socks or vapor barriers in order to maintain a gas-tight condition so as to prevent VOC emissions from escaping through the roof leg opening.

5.5.2.3 Solid Guidepole

Solid sampling or gauging wells, and similar fixed projections through a floating roof such as an anti-rotational pipe, shall meet the following requirements:

- 5.5.2.3.1 The well shall provide a projection below the liquid surface.
- 5.5.2.3.2 The well shall be equipped with a pole wiper and a gasketed cover, seal or lid which shall be in a closed position at all times (i.e., no visible gap) except when the well is in use.
- 5.5.2.3.3 The gap between the pole wiper and the guidepole shall be added to the gaps measured to determine compliance with the secondary seal requirement, and in no case shall exceed one-half (1/2) inch.

5.5.2.4 Slotted Guidepole

Slotted sampling or gauging wells shall meet the following requirements:

- 5.5.2.4.1 The well shall provide a projection below the liquid surface.
- 5.5.2.4.2 The well on external floating roof shall be equipped with the following: a sliding cover, a well gasket, a pole sleeve, a pole wiper, and an internal float and float wiper designed to minimize the gap between the float and the well, and provided the gap shall not exceed one-eighth (1/8) inch; or shall be equipped with a well gasket, a zero gap pole wiper seal and a pole sleeve that projects below the liquid surface.
- 5.5.2.4.3 The gap between the pole wiper and the guidepole shall be added to the gaps measured to determine compliance with the secondary seal requirement, and in no case shall exceed one-eighth (1/8) inch.

5.6 Specifications for Vapor Recovery Systems

- 5.6.1 Fixed roof tanks shall be fully enclosed and shall be maintained in a gas-tight condition. An APCO-approved vapor recovery system shall consist of a closed vent system that collects all VOCs from the storage tank and a VOC control device. The vapor recovery system shall be maintained in a

gas-tight condition. The VOC control device shall be one of the following: a vapor return or condensation system that connects to a gas pipeline distribution system that meets the requirements specified in Section 6.4.6; or a VOC destruction device that reduces the inlet VOC emissions by at least 95 percent by weight as determined by the test method specified in Sections and 6.4.7.

5.6.2 Any tank gauging or sampling device on a tank vented to the vapor recovery system shall be equipped with a gas-tight cover which shall be closed at all times except during gauging or sampling.

5.6.3 All piping, valves, and fittings shall be constructed and maintained in a gas-tight condition.

5.7 Voluntary Tank Preventive Inspection and Maintenance, and Tank Interior Cleaning Program

Effective on and after December 20, 2001, only operators who elect to participate in the voluntary tank preventive inspection and maintenance, and tank interior cleaning program (program) shall be allowed to use the provisions specified in Tables 3 to 6. To participate in this program, the operator shall comply with the requirements of Sections 5.7.1 through 5.7.4.

5.7.1 Submit a letter to the APCO prior to conducting inspections, maintenance, and cleaning of tanks. The letter shall contain a list of each tank that will be subject to this program. The list shall include the tank identification number and location, and/or Permit to Operate numbers.

5.7.2 Keep in their facility at all times a copy of the letter sent to the APCO and maintain the records of annual tank inspections, maintenance, and cleaning to document the participation in the program.

5.7.3 The absence of a copy of the letter and/or failure to maintain appropriate tank inspection records shall be deemed as a non-participation in the program, and therefore the operator will not be eligible to use the provisions specified in Tables 3 to 6. Those who have not voluntarily participated in the program but are found to be using the provisions of Tables 3 to 6 shall be deemed to be in violation of this rule.

5.7.4 Operators who elect to participate in this program but who fail to comply with all of the requirements specified in Tables 3 to 6 shall be deemed to be a violation of the provisions of this rule.

Table 3 Fixed Roof Tank Preventive Inspection and Maintenance

Emission Minimization for Components Serving Organic Liquid Storage Tanks			
Components	Maintenance Schedule	Emission Minimization	Additional Requirements
<ol style="list-style-type: none"> 1. Hatch 2. Tank seals and seams 3. Cable Seals 4. Piping components directly affixed to the tank and within five feet of the tank, including but not limited to: <ul style="list-style-type: none"> -Valves -Flanges -Connectors 	<ol style="list-style-type: none"> 1. Conduct annual inspections with maintenance and repair of components. 2. Conduct visual inspections and inspections using a portable hydrocarbon detection instrument conducted in accordance with EPA Method 21. 3. Visually or ultrasonically inspect as appropriate, the external shells and roofs of uninsulated tanks for integrity annually. 	<ol style="list-style-type: none"> 1. Liquid Leak Repair leaking components that have a liquid leak rate of ≥ 30 drops per minute, within 8 hours after detection. Repair leaking components that have a liquid leak rate of ≥ 3 to < 30 drops per minute within 24 hours after detection. 2. Gas leak Comply with the following requirements to repair leaking components that have a gas leak $> 10,000$ ppmv (measured in accordance with EPA Method 21 by a portable hydrocarbon detection instrument that is calibrated with methane): <ol style="list-style-type: none"> a. Eliminate or minimize the leak within 8 hours after detection; and b. If the leak can not be eliminated, then minimize the leak to the lowest possible level within 8 hours after detection by using best maintenance practices; and c. Eliminate the leak within 48 hours after detection; and d. In no event that the total time to minimize and eliminate the leak shall exceed 56 hours after detection. 3. If a component type for a given tank is found to leak during an annual inspection, then conduct quarterly inspections of that component type on the tank or tank system for four consecutive quarters. If a component type is found to have no leak after four consecutive quarterly inspections, then revert to annual inspections. 	<ol style="list-style-type: none"> 1. For leaking components, immediately affix a tag and maintain records of liquid leak and gas leak detection readings, date/time leak was discovered, and date/time the component was repaired to a leak-free condition. 2. Leaking components that have been discovered by the operator which have been immediately tagged and repaired within the deadlines specified in the Emissions Minimization requirements, shall not constitute a violation of this rule. However, leaking components discovered during inspections by District staff that were not previously identified and/or tagged by the operator, and/or any leaks that were not repaired within deadlines specified in the Emissions Minimization requirements, shall constitute a violation of this rule. 3. Any component found to be leaking on two consecutive annual inspections is in violation of this rule, even if it is under the voluntary inspection and maintenance program.

Table 4 External Floating Roof Tank Preventive Inspection and Maintenance

Emission Minimization for Components Serving Organic Liquid Storage Tanks			
Components	Maintenance Schedule	Emission Minimization	Additional Requirements
<p>1. Piping Components (valves, flanges, and connectors) directly affixed to the tank and within five feet of the tank.</p>	<p>1. Conduct annual inspections with maintenance and repair of components.</p> <p>2. Conduct visual inspections and inspections using a portable hydrocarbon detection instrument conducted in accordance with EPA Method 21.</p> <p>3. Visually or ultrasonically inspect as appropriate, the external shells and roofs of uninsulated tanks for integrity annually.</p>	<p>1. Liquid Leak Repair leaking components that have a liquid leak rate of ≥ 30 drops per minute within 8 hours after detection. Repair leaking components that have a liquid leak rate of ≥ 3 to < 30 drops per minute within 24 hours after detection.</p> <p>2. Gas leak Comply with the following requirements to repair leaking components that have a gas leak $> 10,000$ ppmv (measured in accordance with EPA Method 21 by a portable hydrocarbon detection instrument that is calibrated with methane):</p> <ul style="list-style-type: none"> a. Eliminate or minimize the leak within 8 hours after detection; and b. If the leak can not be eliminated, then minimize the leak to the lowest possible level within 8 hours after detection by using best maintenance practices; and c. Eliminate the leak within 48 hours after detection; and d. In no event that the total time to minimize and eliminate the leak shall exceed 56 hours after detection. <p>3. If a component type for a given tank is found to leak during annual inspection, then conduct quarterly inspections on the tank or tank system for four consecutive quarters. If a component type is found to have no leak after four consecutive quarterly inspections, then revert to annual inspections.</p>	<p>1. For leaking components, immediately affix a tag and maintain records of liquid leak and gas leak detection readings, date/time leak was discovered, and date/time the component was repaired to a leak-free condition.</p> <p>2. Leaking components that have been discovered by the operator which have been immediately tagged and repaired within the deadlines specified in the Emissions Minimization requirements, shall not constitute a violation of this rule. However, leaking components discovered during inspections by District staff that were not previously identified and/or tagged by the operator, and/or any leaks that were not repaired within deadlines specified in the Emissions Minimization requirements, shall constitute a violation of this rule.</p> <p>3. Any component found to be leaking on two consecutive annual inspections is in violation of this rule, even if it is under the voluntary inspection and maintenance program.</p>

Table 5 Internal Floating Roof Preventive Inspection Maintenance

Emission Minimization for Components Serving Organic Liquid Storage Tanks			
Components	Maintenance Schedule	Emission Minimization	Additional Requirements
1. Piping Components (valves, flanges, and connectors) directly affixed to the tank and within five feet of the tank.	<ol style="list-style-type: none"> 1. Conduct annual inspections with maintenance and repair of components. 2. Conduct visual inspections and inspections using a portable hydrocarbon detection instrument conducted in accordance with EPA Method 21. 3. Externally inspect uninsulated tanks, tank shells, and roofs for integrity annually. 	<ol style="list-style-type: none"> 1. Liquid Leak Repair leaking components that have a liquid leak rate of ≥ 30 drops per minute, within 8 hours after detection. Repair leaking components that have a liquid leak rate of ≥ 3 to < 30 drops per minute within 24 hours after detection. 2. Gas leak Comply with the following requirements to repair leaking components that have a gas leak $> 10,000$ ppmv (measured in accordance with EPA Method 21 by a portable hydrocarbon detection instrument that is calibrated with methane): <ol style="list-style-type: none"> a. Eliminate or minimize the leak within 8 hours after detection; and b. If the leak can not be eliminated, then minimize the leak to the lowest possible level within 8 hours after detection by using best maintenance practices; and c. Eliminate the leak within 48 hours after detection; and d. In no event that the total time to minimize and eliminate the leak shall exceed 56 hours after detection. 3. If a component type for a given tank is found to leak during annual inspection, then conduct quarterly inspections on the tank or tank system for four consecutive quarters. If a component type is found to have no leak after four consecutive quarterly inspections, then revert to annual inspections. 	<ol style="list-style-type: none"> 1. For leaking components, immediately affix a tag and maintain records of liquid leak and gas leak detection readings, date/time leak was discovered, and date/time the component was repaired to a leak-free condition. 2. Leaking components that have been discovered by the operator which have been immediately tagged and repaired within the deadlines specified in the Emissions Minimization requirements, shall not constitute a violation of this rule. However, leaking components discovered during inspections by District staff that were not previously identified and/or tagged by the operator, and/or any leaks that were not repaired within deadlines specified in the Emissions Minimization requirements, shall constitute a violation of this rule. 3. Any component found to be leaking on two consecutive annual inspections is in violation of this rule, even if it is under the voluntary inspection and maintenance program.

Table 6 Tank Interior Cleaning

Tank Cleaning Emissions Minimization Procedures for Tanks Storing Organic Liquids		
Sludge Handling	Emissions Minimization	Additional Requirements
<p>1. Sludge from tanks with a TVP of ≥ 1.5 psia needs to be VOC vapor controlled to 95%.</p>	<p>For Fixed Roof Tanks:</p> <ol style="list-style-type: none"> 1. Operate PV valve and vapor recovery system (if equipped) during emptying, filling, and flushing. 2. During filling and purging, no vapor leakage is allowed (except for PV valve venting on tanks not required to have a vapor recovery system). 3. Drain all liquid from the tank to the maximum extent feasible prior to opening the tank. 4. For tanks with a TVP of 0.5 psia to < 1.5 psia, prior to venting the tanks, operate required vapor recovery system for at least two hours after all the liquid in the tank has been drained. 5. For tanks with a TVP ≥ 1.5 psia, degas the tank, without venting the vapors into the atmosphere (e.g., through a vapor control device/vapor recovery system) using one of the following procedures: <ol style="list-style-type: none"> a. Prior to venting the tank to the atmosphere, operate the tank vapor recovery system/vapor control device for at least 24 hours such that it collects the tank vapors; or b. Liquid displacement, conducted using a liquid with a TVP less than 0.5 psia, or conducted by floating the oil pad off a crude oil tank by restricting the outflow of water, such that 90% of the tank volume is displaced; or c. Vent the tank to a vapor control device/vapor recovery system until the vapor concentration is less than 10% of the lower explosive limit (LEL) or 5,000 ppmv whichever is less; or d. Vent the tank to a vapor control device/vapor recovery system for a length of time determined by the following relationship: $t = \frac{2.3V}{Q}$ <p>Where: t = time V = tank volume (cubic feet) Q = flow rate through the vapor control device/vapor recovery system</p> <p>Where Q is determined using appropriate engineering calculations.</p> <p>For Floating Roof Tanks:</p> <ol style="list-style-type: none"> 1. The process of emptying or refilling the tank when the roof is resting on the leg supports shall be continuous and shall be accomplished as rapidly as possible. 2. When emptying the tank the roof shall be positioned at the lowest level of the leg supports that will allow adequate space between the roof and the floor of the tank to perform cleaning operations. 3. Drain all liquid from the tank to the maximum extent possible prior to opening the tank. 4. Visually inspect and perform required maintenance prior to placing the tank back into service. 	<ol style="list-style-type: none"> 1. Maintain records of tank cleaning activities including start and completion dates/times of cleaning, methods of cleaning (steam, diesel, solvents with an initial boiling point of greater than 302⁰F, solvents with a vapor pressure of less than 0.5 psia, or solvents with 50 grams/liter VOC content or less. 2. Steam cleaning shall be allowed at locations where wastewater treatment facilities are limited or during December through March.

6.0 Administrative Requirements

6.1 Inspection of Floating Roof Tanks

- 6.1.1 The operator of external floating roof tanks shall make the primary seal envelope available for unobstructed inspection by the APCO on an annual basis at locations selected along its circumference at random by the APCO. In the case of riveted tanks with toroid-type seals, a minimum of eight (8) locations shall be made available; in all other cases, a minimum of four (4) locations shall be made available. If the APCO suspects a violation may exist the APCO may require such further unobstructed inspection of the primary seal as may be necessary to determine the seal condition for its entire circumference.
- 6.1.2 By June 20, 2002, the operator of floating roof tanks shall submit a tank inspection plan to the APCO for approval. The plan shall include an inventory of the tanks subject to this rule and a tank inspection schedule. A copy of the operator's tank safety procedures shall be made available to the APCO upon request. The tank inventory shall include tank's identification number, Permit to Operate number, maximum tank design capacity, dimensions of tank (height and diameter), organic liquid stored, type of primary and secondary seal, type of floating roof (internal or external floating roof), construction date of tank, and location of tank. Any revision to a previously approved tank inspection schedule shall be submitted to the APCO for approval prior to conducting an inspection.
- 6.1.3 Effective on and after November 15, 2003, an operator of floating roof tanks shall comply with the following requirements:

6.1.3.1 External Floating Roof Tank Inspection

- 6.1.3.1.1 Inspect all floating tanks at least once every 12 months to determine compliance with the requirements of this rule. The actual gap measurements of the floating roof primary and secondary seals shall be recorded. The inspection results shall be submitted to the APCO as specified in Section 6.3.5.
- 6.1.3.1.2 Inspect the primary and secondary seals for compliance with the requirements of this rule every time a tank is emptied or degassed. Actual gap measurements shall be performed when the liquid level is static but not more than 24 hours after the tank roof is refloated.

6.1.3.2 Internal Floating Roof Tank Inspection

6.1.3.2.1 For newly constructed, repaired, or rebuilt internal floating roof tanks, visually inspect the internal floating roof and its appurtenant parts, fittings, etc., and measure the gaps of the primary seal and/or secondary seal prior to filling the tank. If there are holes, tears, or other openings in the primary seal, the secondary seal, or the seal fabric or defects in the internal floating roof or its appurtenant parts, components, fittings, etc., the operator shall repair the defects before filling the tank.

6.1.3.2.2 Visually inspect, through the manholes, roof hatches, or other openings on the fixed roof, the internal floating roof and its appurtenant parts, fittings, etc., and the primary seal and/or secondary seal at least once every 12 months after the tank is initially filled with an organic liquid. There should be no visible organic liquid on the roof, tank walls, or anywhere. Other than the gap criteria specified by this rule, no holes, tears, or other openings are allowed that would permit the escape of vapors. Any defects found are violations of this rule.

6.3.2.2.3 Conduct actual gap measurements of the primary seal and/or secondary seal at least once every 60 months.

6.2 TVP and API Gravity Testing of Stored Organic Liquid in Uncontrolled Fixed Roof Tanks

Sections 6.2.1 and 6.2.2 shall not apply to tanks that store organic liquids listed in Appendix A exclusively, provided the storage temperature indicated in Appendix A is not exceeded at any time. An operator shall comply with Section 6.3.6 if the information in Appendix A is used to demonstrate the TVP and/or API gravity of the stored liquid.

6.2.1 Initial TVP and API Gravity Testing

6.2.1.1 An operator shall conduct an initial TVP testing of each uncontrolled fixed roof tank. In lieu of testing each uncontrolled fixed roof tank, an operator may conduct a TVP testing of a representative tank provided the requirements of Sections 6.2.1.1.1 through 6.2.1.1.5 are met. The TVP testing shall be completed by the compliance deadline specified in Section 7.1. The operator shall submit the records of TVP and/or API gravity testing to the APCO as specified in Section 6.3.6. The operator shall be in full compliance with the rule by the deadline specified in Section 7.1

- 6.2.1.1.1 The selection of representative, uncontrolled fixed roof tanks is submitted in writing to the APCO, and written approval is granted by the APCO prior to conducting the test.
 - 6.2.1.1.2 One uncontrolled fixed roof tank represents some or all of the tanks in a tank battery (defined in Section 3.27).
 - 6.2.1.1.3 For crude oil production facilities, the representative uncontrolled fixed roof tank shall be the first line tank (or tanks) in a tank battery that is first receiving the produced fluids (mixture of oil, water, and gases) from the crude oil production wells.
 - 6.2.1.1.4 The stored organic liquid in each of the represented tanks is the same and came from the same source.
 - 6.2.1.1.5 The TVP and storage temperature of the stored organic liquid of the representative tank to be tested are the same or higher than those of the tanks it is to represent.
- 6.2.1.2 The TVP testing shall be conducted at actual storage temperature of the organic liquid in the tank. If the tank stores crude oil or petroleum distillates, the operator shall also conduct an API gravity testing.
- 6.2.1.4 In lieu of complying with Sections 6.2.1.1 and 6.2.1.2, an operator shall submit a complete application for an Authority to Construct to install and operate on each uncontrolled fixed roof tank the appropriate VOC control system specified in Section 5.1. The operator shall be in full compliance with the rule by the deadline specified in Section 7.1.

6.2.2 Periodic TVP and API Gravity Testing

Effective on and after November 15, 2003, an operator shall conduct a TVP testing of each uncontrolled fixed roof tank at least once every 24 months during summer (July – September), and/or whenever there is a change in the source or type of organic liquid stored in each tank. In lieu of testing each uncontrolled fixed roof tank, an operator may conduct a TVP testing of a representative tank provided the requirements of Sections 6.2.1.1.1 through 6.2.1.1.5 are met. The operator shall also comply with Section 6.2.1.2. The operator shall submit the records of TVP and/or API

gravity testing to the APCO as specified in Section 6.3.6. The operator shall be in full compliance with the rule by the deadline specified in Section 7.1.

6.3 Recordkeeping

An operator shall maintain accurate records required by this rule for a period of five years. Records shall be made available to the APCO upon request, except for certain records that need to be submitted as specified in the respective sections below.

- 6.3.1 An operator whose tanks are subject to the requirements of this rule shall keep an accurate record of each organic liquid stored in each tank, including its storage temperature, TVP, and API gravity. The requirement of 6.3.1 shall not apply to crude oil fixed tanks equipped with a vapor recovery system, external floating roof tanks, or internal floating roof tanks that meet the requirements of this rule.
- 6.3.2 An operator whose emergency standby tanks are required to comply with Section 4.2.1 shall maintain records showing date(s) the organic liquid is first introduced into each tank, and date(s) each tank is fully drained. Such records shall be submitted to the APCO 60 days prior to permit renewal.
- 6.3.3 An operator whose tanks are required to comply with Section 4.2.2 shall maintain records showing the tank capacity and duration of time that the tank is used.
- 6.3.4 Small producers shall maintain monthly records of average daily crude oil production to determine compliance with Section 3.25, and shall submit such information to the APCO 30 days prior to the expiration date indicated in the Permit to Operate. The monthly crude oil production records required by the California Division of Oil, Gas, and Geothermal Resources may be used to comply with the above requirement. Small producers shall also maintain monthly records of the average daily crude oil throughput of each tank to demonstrate compliance with Sections 4.3, 4.4, and/or 5.1.2.
- 6.3.5 An operator shall submit the reports of the floating roof tank inspections conducted in accordance with the requirements of Section 6.1 to the APCO within five calendar days after the completion of the inspection only for those tanks that failed to meet the applicable requirements of Sections 5.2 through 5.5. The inspection report for tanks that have been determined to be in compliance with the requirements of Sections 5.2 through 5.5 need not be submitted to the APCO, but the inspection report shall be kept on-site and shall be made available upon request by the APCO. The inspection report shall contain all necessary information to demonstrate compliance with the provisions of this rule, including the following:

- 6.3.5.1 Date of inspection and names and titles of company personnel doing the inspection.
 - 6.3.5.2 Tank identification numbers and Permits to Operate (PTO) number.
 - 6.3.5.3 Measurements of the gaps between the tank shell and primary and secondary seals.
 - 6.3.5.4 Gas-tight status of tanks and floating roof deck fittings. Records of gas-tight status shall include the vapor concentration values measured in parts per million by volume (ppmv).
 - 6.3.5.5 Data, supported by calculations, demonstrating compliance with the requirements specified in Sections 5.3, 5.4, 5.5.2.3.3, 5.5.2.4.2, and 5.5.2.4.3 of this rule.
 - 6.3.5.6 Any corrective actions or repairs performed on the tank in order to comply with this rule and the date such actions were taken.
- 6.3.6 An operator shall submit the records of TVP and API gravity testing conducted in accordance with the requirements of Section 6.2 to the APCO within 45 days after the date of testing. The record shall include the tank identification number, Permit to Operate number, type of stored organic liquid, TVP and API gravity of the stored organic liquid, test methods used, and a copy of the test results. An operator who uses the information in Appendix A to demonstrate the TVP and/or API gravity of the stored organic liquid shall submit information to the APCO within 45 days after the date that the type of organic liquid stored in the tank has been determined.
- 6.3.7 An operator shall maintain the records of the external floating roof or internal floating roof landing activities that are performed pursuant to Sections 5.3.1.3 and 5.4.3. The records shall include information on the TVP, API gravity, and type of organic liquid stored in the tank, the purpose of landing the roof on its legs, the date of roof landing, duration the roof was on its legs, the level or height at which the tank roof was set to land on its legs, and the lowest liquid level in the tank. The operator shall keep the records at the facility (or on-site) for a period of five years. The records shall be made available to the APCO upon request.

6.4 Test Methods

- 6.4.1 Analysis of halogenated exempt compounds shall be by ARB Method 432.
- 6.4.2 The API gravity of crude oil or petroleum distillate shall be determined by using ASTM Method D 287-92 (2000) e1 "Standard Test Method for API Gravity of Crude Petroleum and Petroleum Products (Hydrometer Method). Sampling for API gravity shall be performed in accordance with ASTM Method D 4057-95 "Standard Practices for Manual Sampling of Petroleum and Petroleum Products".
- 6.4.3 Except for crude oil subject to Section 6.4.4, the TVP of any organic liquid shall be determined by measuring the Reid Vapor Pressure (RVP) using ASTM D 323-94 (Test Method for Vapor Pressure for Petroleum Products), and converting the RVP to TVP at the tank's maximum organic liquid storage temperature. The conversion of RVP to TVP shall be done in accordance with the procedures in Appendix B. Appendix B is an excerpt from the oil and gas section of "California Air Resources Boards (ARB) Technical Guidance Document to the Criteria and Guidelines Regulation for AB 2588", dated August 1989. As an alternative to using ASTM D 323-94, the TVP of crude oil with an API gravity range of greater than 20° up to 30° may be determined by using other equivalent test methods approved by APCO, ARB and EPA.
- 6.4.4 The latest version of the Lawrence Berkeley National Laboratory "Test Method for Vapor Pressure of Reactive Organic Compounds in Heavy Crude Oil Using Gas Chromatograph", as approved by ARB and EPA, shall be used to determine the TVP of crude oil with an API gravity of 20° or less, or for any API gravity that is specified in this test method.
- 6.4.5 An operator may use the information in Appendix A to determine the TVP of the stored organic liquid in a tank provided the storage temperature listed in Appendix A is not exceeded at any time.
- 6.4.6 Control efficiency, as used in Section 5.6.1, shall be determined by a comparison of controlled emissions to those emissions which would occur from a fixed or cone roof tank in the same product service without a vapor control system. Emissions shall be determined based on tank emission factors in EPA Publication AP-42, component counts for fugitive emissions sources, recognized emission factors for fugitive emission sources and the efficiency of any VOC destruction device.
- 6.4.7 The efficiency of any VOC destruction device, measured and calculated as carbon, shall be determined by 40 CFR 60, Appendix A, Method 25, except when the outlet concentration must be below 50 ppm in order to meet the standard, in which case Method 25a may be used, and analysis of

halogenated exempt compounds shall be analyzed by EPA Method 18 or ARB Method 422 "Determination of Volatile Organic Compounds in Emission from Stationary Sources".

6.4.8 A gas-tight condition shall be determined by measuring the gas leak in accordance with the procedures in EPA Method 21.

7.0 Compliance Schedule

- 7.1. By (six months after rule amendments adoption date), complete the initial TVP and/or API gravity testing requirements of Section 6.2.1, and submit the testing results to the APCO. By November 15, 2003, fixed roof tanks in existence prior to December 20, 2001 that are in compliance with the previous requirements of the rule as adopted on December 17, 1992, shall be brought into compliance with this rule as adopted on December 20, 2001. By July 1, 1994, all other fixed roof tanks in existence prior to December 20, 2001 should have been brought into compliance with the rule as adopted on December 17, 1992.
- 7.2 Any tank subject to the requirements of this rule that is installed or constructed on and after December 20, 2001, shall be in full compliance with this rule upon initial operation, and thereafter.
- 7.3 Any tank that is exempted under Section 4.0 that becomes subject to the VOC control system requirements of this rule through the loss of exemption status, shall be in full compliance with this rule on the date the exemption status is lost.

Appendix A
STORAGE TEMPERATURE VERSUS VAPOR PRESSURE

ORGANIC LIQUID	Reference Properties		Maximum Temp °F Not to Exceed	
	Gravity (°API)	Initial Boiling Point (°F)	0.5 (psia)	1.5 (psia)
Middle Distillates				
Kerosene	42.5	350	195	250
Diesel	36.4	372	230	290
Gas Oil	26.2	390	249	310
Stove Oil	23	421	275	340
Jet Fuels				
JP-1	43.1	330	165	230
JP-3	54.7	110	---	25
JP-4	51.5	150	20	68
JP-5	39.6	355	205	260
JP-7	44-50	360	205	260
Fuel Oil				
No. 1	42.5	350	195	250
No. 2	36.4	372	230	290
No. 3	26.2	390	249	310
No. 4	23	421	275	340
No. 5	19.9	560	380	465
Residual	19.27	---	405	---
No. 6	16.2	625	450	---
Asphalt				
60-100 pen.	---	---	490	550
120-150 pen.	---	---	450	500
200-300 pen.	---	---	360	420

Appendix A (Continued)

STORAGE TEMPERATURE VERSUS VAPOR PRESSURE

Organic Liquid	Reference Properties			Maximum Temperature (°F) Not to Exceed	
	Density (lb/gal)	Gravity °API	Initial Boiling Point (°F)	0.5 psia	1.5 psia
Acetone	6.6	47	133	---	35
Acrylonitrile	6.8	41.8	173	30	62
Benzene	7.4	27.7	176	34	70
Carbon Disulfide	10.6	22.1	116	---	10
Carbon Tetrachloride	13.4	---	170	20	63
Chloroform	12.5	---	142	---	40
Cyclohexane	6.5	49.7	177	30	65
1,2 Dichloroethane	10.5	---	180	35	75
Ethyl Acetate	7.5	23.6	171	38	70
Ethyl Alcohol	6.6	47.0	173	55	85
Isopropyl Alcohol	6.6	47.0	181	62	95
Methyl Alcohol	6.6	47.0	148	30	62
Methyl Ethyl Ketone	6.7	44.3	175	30	70
Toluene	7.3	30	231	75	120
Styrene	7.5		293	128	167
Vinyl Acetate	7.8	19.6	163	30	65

Appendix B

California Air Resources Board Technical Guidance
to the Criteria and Guidelines Regulation for AB 2588
(Partial Excerpt from pages 102, 103 and 104)

True Vapor Pressure (TVP)

RVP is the absolute pressure of volatile crude oil and nonviscous petroleum liquids. Numerically, the relationship between TVP, RVP and temperature can be expressed by the following equation:

$$\text{TVP} = (\text{RVP}) e^{[C_0(\text{IRTEMP} - \text{ITEMP})]}$$

Where: C_0 = Constant dependent upon the value of RVP

$$\text{ITEMP} = (1/559.69^\circ\text{R})$$

$$\text{IRTEMP} = (1/(\text{T}_s + 459.69^\circ\text{R}))$$

T_s = Temperature of the stored fluid in $^\circ\text{F}$

The value of the constant term C_0 depends upon the given value of RVP.

Values of C_0 for different RVP numbers are tabulated in Table C-3. It should be noted, however, that an error was discovered in the API nomograph calculated values of TVP so that the RVP was not equal to TVP at 100 $^\circ\text{F}$ as was expected given the general definition of RVP. Using linear regression techniques, correction factors (C_F) were developed and should be added to the calculated values of TVP in order to obtain reasonable TVP numbers. The relationship between the three values is given as follows:

$$\text{Corrected TVP} = \text{Calculated TVP} + C_F$$

The correction factor was found to be dependent upon RVP according to the following equations:

If RVP < 3,

$$C_F = (0.04) \times (\text{RVP}) + 0.1$$

If RVP > 3,

$$C_F = e^{[2.3452061 \log(\text{RVP}) - 4.132622]}$$

Appendix B (Continued)

Table C-3 VALUES OF C_0 FOR DIFFERENT RVP NUMBERS

RVP	C _o
0<RVP<2	-6622.5
2<RVP<3	-6439.2
RVP = 3	-6255.9
3<RVP<4	-6212.1
RVP = 4	-6169.2
4<RVP<5	-6177.9
RVP = 5	-6186.5
5<RVP<6	-6220.4
RVP = 6	-6254.3
6<RVP<7	-6182.1
RVP = 7	-6109.8
7<RVP<8	-6238.9
RVP = 8	-6367.9
8<RVP<9	-6477.5
RVP = 9	-6587.9
9<RVP<10	-6910.5
RVP = 10	-7234.0
10<RVP<15	-8178.0
RVP > 15	-9123.2

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