

## Refinery Team Overview



## Overview

- Regulated Sources
- Compliance Activities
- Compliance Programs
- VOC Rules Applicability
- Discussion

## Refinery Team Facilities

- 9 Refineries
- >1,000,000 BBL/day
- 15 Marine Terminals
- 3 Asphalt Plants
- 4 Hydrogen Plants
- 1 Polypropylene Plant

## Major Refinery Sources

- BP Products
- Chevron Texaco
- ConocoPhillips Wilmington/Carson
- ExxonMobil
- Paramount Petroleum
- Tesoro Corporation
- Valero

## Compliance Activities

- Process Unit Inspections
- RECLAIM Audits/Inspections
- Complaint Response
- Public Nuisance Investigations
- Breakdown Investigations
- Blue Sky Audits Rule 1173/1176/463

## Rules and Regulations

- Inspections to determine compliance with:
  - Process Unit Permit Conditions
  - Title V Conditions
  - Federal Regulations 40CFR 60 & 63
  - Tank Degassing & Contaminated Soil
    - Rules 1166 & 1149
  - Self-Inspection Rule and Report Audits
    - Rules 463, 1173, 1176 and 1178
  - Rule Inspections
    - 401, 402, 430, 462, 463, 1105, 1105.1, 1118, 1123, 1142, 1158, 1173 and 1178
  - RECLAIM Rules (Regulation XX)

## VOC Rules

- SCAQMD Rule 1173
- SCAQMD Rule 1176
- SCAQMD Rule 1178
- SCAQMD Rule 463
- SCAQMD Rule 1189
- SCAQMD Rule 1118
- SCAQMD Rule 1123

## SCAQMD Rule 1173

- Control volatile organic compound leaks from components and releases from atmospheric process pressure relief devices.

## SCAQMD Rule 1173

- SCAQMD Rule 1173
  - Adopted July 7, 1989
- Rule Components
  - Leak Standards
  - Identification
  - Monitoring
  - Maintenance
  - Recordkeeping

## Rule 1173 Leak Standards

Type of Leak	Concentration
Light liquid/Gas/Vapor	50,000 ppm
Heavy Liquid	500 ppm
Heavy Liquid Pump	100 ppm
Light Liquid Leak	3 Drops per Minute
PRD based on Leak Threshold	200 ppm
Light Liquid/Gas/Vapor based on Leak Threshold	10,000 ppm

## Rule 1173 Maintenance Requirements

Type of Leak	Concentration	Time Period	Extended Time Period
Light liquid/gas/vapor	500 ppm to 10,000 ppm	7 Calendar Days	7 Calendar Days
Heavy liquid	100 ppm to 500 ppm	7 Calendar Days	7 Calendar Days
Heavy liquid	3 Drops per minute and 100 ppm to 500 ppm	7 Calendar Days	
Any Leak	10,000 ppm to 25,000 ppm	2 Calendar Days	3 Calendar Days
Any Leak	Greater than 25,000 ppm	1 Calendar Day	

## Rule 1173 Maintenance Requirements

Type of Leak	Concentration	Time Period	Extended Time Period
Atmospheric PRD	200 ppm to 25,000 ppm	2 Calendar Days	3 Calendar Days
Light Liquid	Greater than 3 drops per minute	1 Calendar Day	
Heavy Liquid	Greater than 500 ppm	1 Calendar Day	

## Rule 1173 Exemptions

- Components handling commercial natural gas.
- Components handling fluids less than 10% VOC content by weight.

## Recent Compliance History

Year	Overall Leak Rate %
2007	0.26
2008	0.80
2009	0.40
2010	0.35
2011	0.54

## Historical Component Leak Rate

Components	Component Count Since 2007	Overall Leak Rate %
Pumps	918	3.26
PRD Leaks	238	2.94
Compressor	118	1.70
Other – Site Glasses	938	1.50
Threaded Connectors	29704	0.70
Valves	40276	0.38
Flanges	24722	0.20

## Types of Valves



## Leak Inspections



## Pump LDAR Inspection



## Liquid Leaking Component



## IR Camera Inspections



## Leaking Component



## SCAQMD Rule 1176

- This rule is intended to limit volatile organic compound emissions from wastewater systems.

## SCAQMD Rule 1176

- SCAQMD Rule 1176
  - Adopted November 3, 1989
- Rule Components
  - Identification Requirements
  - Operation and Control Requirements
  - Inspection, Monitoring and Maintenance
  - Recordkeeping, Reporting and Verification

## Control Requirements

- Sumps and Wastewater Separators
- Sewer Lines
- Process Drains
- Junction Boxes
- Air Pollution Control Devices

## Inspection, Monitoring and Maintenance

- Wastewater separator and associated closed vent system
  - Monthly
- Non- Emitting DSCs
  - Semi-Annual
- Inaccessible DSCs
  - Annually
  - Applicability for LDAR

## Recordkeeping, Reporting and Verification

- Recordkeeping
  - Records maintained for two years
- Reporting
  - Notification 60 days for modification
  - Quarterly and Semi-Annual Requirements

## Testing Methods

- EPA Method 21
  - VOC field measurements
  - Total Hydrocarbons
- EPA Method 25
  - Methane and Non-Methane Hydrocarbons

## Rule 1176 Exemptions

- Industrial wastewater system.
- VOC content less than 5 mg/liter.
- Equipment for rain water, storm runoff or non-contact water.
- Components subject and exempt under Rule 1173.

## Wastewater Inspections



## Sump Inspections



## Wastewater Drains



## Wastewater Inspections





## SCAQMD Rule 1178

- This rule is intended to reduce volatile organic compounds from storage tanks at petroleum facilities.

## Refinery 1178 Tank



## Tank Emissions



## Requirements

- External Floating Roof Tanks
- Domed External Floating Roof Tanks
- Internal Floating Roof Tanks
- Fixed Roof Tanks

## General Requirements

- Inspection Requirements
- Vapor Tight Conditions
  - 500 ppm VOC
- Domed External Floating Roof
  - LEL shall be less than 30%
- Maintenance Requirements
- Reporting Requirements

## Tank Inspections



## Emissions External Floating Roof



## SCAQMD Rule 463

- This rule is intended to reduce volatile organic compounds from above ground storage tanks
  - Organic liquids
    - Greater than 19,815 gallons
  - Gasoline
    - Between 251 and 19,815 gallons

## Requirements

- Tank Roof Requirements – Rule Product
  - External Floating Roof
    - Self Inspection Monitoring
  - Internal Floating Type Cover
    - LEL – less than 30%
  - Fixed Roof
    - Vapor Tight Covers
    - Leak Limit 1,000 ppm VOC

## SCAQMD Rule 1118

- This rule is intended to reduce SO<sub>2</sub> emissions from refinery and related flaring operations.

## Flare Emissions



## Components

- Requirements
- Performance Targets
- Flare Minimization Plan
- Flare Monitoring and Recording Plan
- Operational Monitoring and Recording
- Recordkeeping
- Notification and Reporting
- Testing and Monitoring

## Requirements

- Pilot Flame
- Smokeless Flares
- Notification Based on Thresholds
  - 100 pounds VOC
  - 500 pounds of sulfur dioxide
  - 500,000 standard cubic feet of vent gas
- Continuous Monitoring
- Quarterly Reports

## SOx Emission Targets

Year	SOx (Tons/Million Barrels of Crude)
2006	1.5
2008	1.0
2010	0.7
2012	0.5

## SCAQMD Rule 1149

- This rule applies to the cleaning and degassing of a stationary tank, reservoir, or other container storing or last used for volatile organic compounds.

## Rule Components

- Requirements
  - Control Methods
- Test Methods
- Exemptions

## Capacity and Vapor Pressure

Capacity (Gallons)	Vapor Pressure (RVP)
500	3.9 psia
26,420	2.6 psia
100,000	0.5 psia

## Requirements

- Liquid Balancing
- Control Emissions less than 5,000 ppm
- Floating Roof Tank less 5,000 ppm
- Pipeline VOC less 5,000 ppm
- Control Devices
  - 500 ppm VOC as Methane
- Vacuum Trucks
  - 500 ppm VOC as Methane

## Vacuum Trucks



## VOC Control



## SCAQMD Rule 1189

- This purpose of the rule is to reduce volatile organic compounds from hydrogen plant process vents.

## Requirements

- Total VOC emissions from all process vents combined are less than 2.5 pounds per million cubic feet of hydrogen produced or
- Total VOC content in the process condensate is reduced at least 80 % from the baseline levels.
- Annual Source Tests

## Typical VOC Emissions

Hydrogen Unit	Report VOC per million cubic feet of Hydrogen Produced	Average Annual Hourly Hydrogen Production MMSCFH
1	0.282	1.29
2	0.09	68.75
3	0.95	61.60
4	0.61	61.60
5	0.32	1.42
6	1.44	3.42

## SCAQMD Rule 1123

- This rule applies to refinery process turnarounds.
- Requirements
  - Depressurize any vessel containing VOC
  - Submit Plan

## The End

