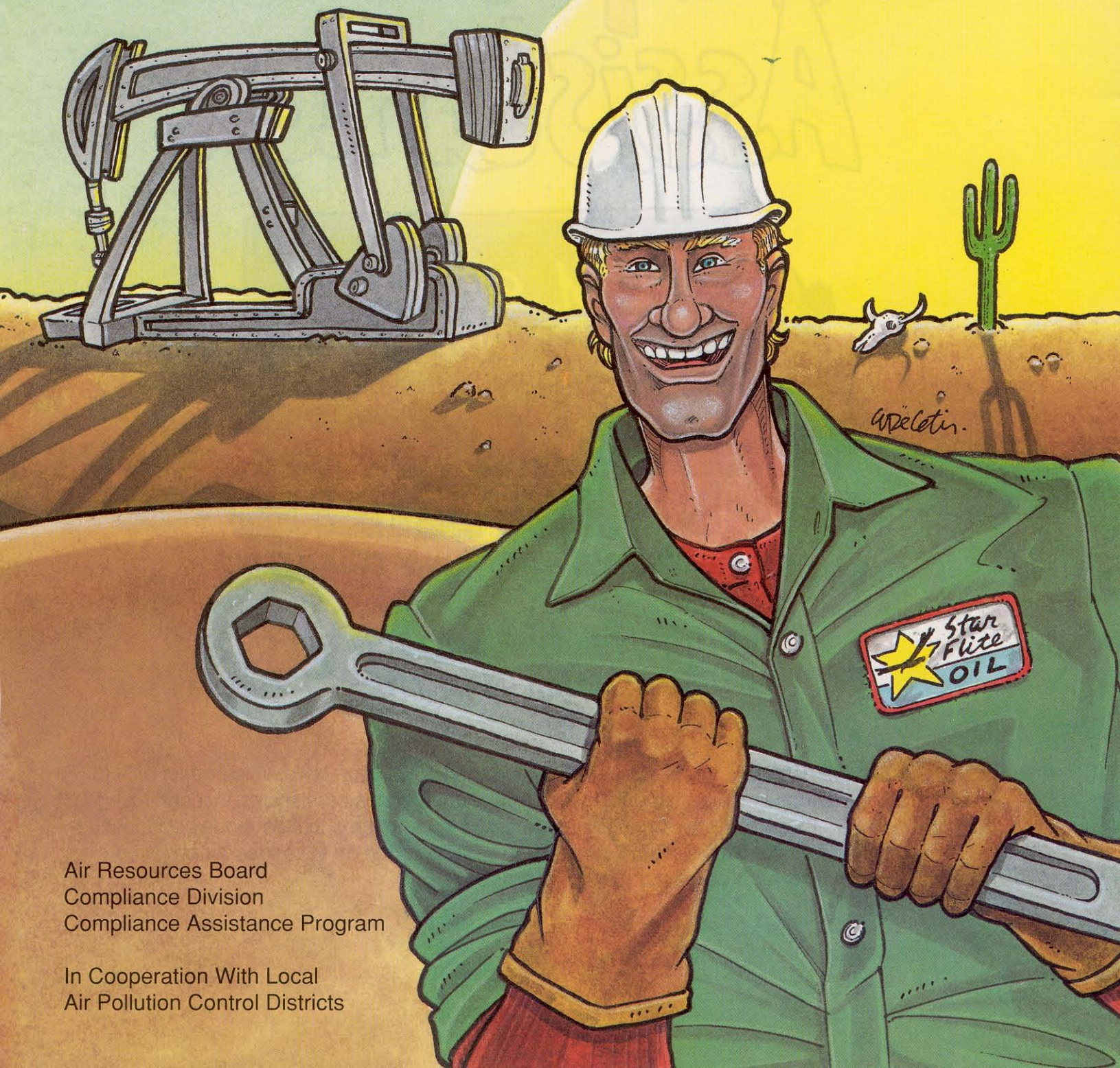
OILFIELD PRODUCTION

Self-Inspection Handbook

How to Stay in Compliance with Air Pollution Regulations



Air Resources Board
Compliance Division
Compliance Assistance Program

In Cooperation With Local
Air Pollution Control Districts

Compliance Assistance...

SELF-INSPECTIONS...

- ✔ IMPROVE WORKING CONDITIONS
- ✔ SAVE MONEY AND JOBS
- ✔ IMPROVE THE ENVIRONMENT
- ✔ REDUCE AIR POLLUTION

This handbook is designed to help you understand the air pollution laws which affect oilfield production operations in California and to help you reduce excess emissions by conducting self-inspections. Reducing emissions improves working conditions, saves money and jobs, and improves the environment. Read on and see what you can do to reduce air pollution and stay in compliance. **You can make a difference!**

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I. THE PROBLEM

A. Air Pollutant Emissions

Oilfield production operations are one of the many sources in California that cause air pollution. Yet, fortunately, oilfield operations can be conducted in a manner to increase economic benefits and reduce air pollution. Oilfield production equipment can emit sulfur compounds, hydrocarbons, carbon monoxide, nitrogen oxides and other pollutants. By conserving light hydrocarbons for sale and preventing hydrocarbon emissions to the atmosphere, economic and environmental benefits can be maximized.

Ozone, a major component of smog, is formed from hydrocarbons and nitrogen oxides emitted into the atmosphere and the energy of sunlight. Ozone is a very reactive chemical. When it forms in high concentrations in the lower atmosphere, it damages plants, the lungs of people, and the surfaces of cars and buildings.

Hydrocarbons + Nitrogen Oxides(NOx) + Sunlight = Ozone(O_3)

B. Effects of Emissions

Air pollution is a major problem in California. Some residents of the State are regularly exposed to air pollution levels that can cause nausea, headaches, dizziness and shortness of breath even in healthy adults. Young children and the elderly are very susceptible to health damage from air pollution. Air pollution, or smog, causes an estimated 330 million to 1 billion dollars a year in crop damage in California.

C. How You Can Help

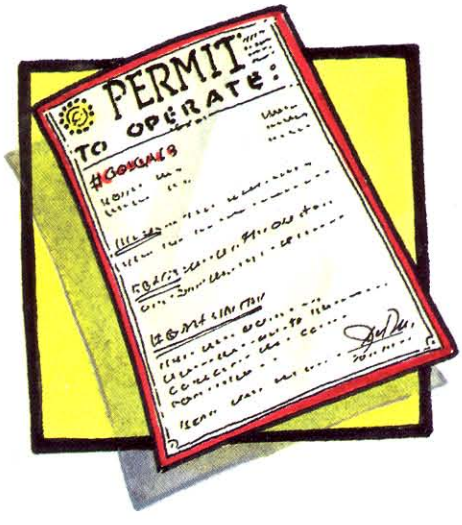
This handbook is designed to help oilfield personnel comply with air pollution laws. By following air pollution regulations you can operate more efficiently and improve the air quality in California. This handbook outlines some things you can do to reduce emissions.

II. AIR POLLUTION REGULATIONS

A. Authorities to Construct and Permits to Operate

Oilfield production equipment is regulated by your local air pollution control district (APCD) or your air quality management district (AQMD). Districts regulate oilfield equipment by issuing Authorities to Construct and Permits to Operate to companies using pollution generating or control equipment, and through district regulations. The Permits list equipment descriptions, operating conditions, and emissions limitations which oilfield equipment is subject to in order to reduce air pollution.

All Permits must be posted on or near the equipment to which they apply or must be readily accessible at the facility. Make sure that the current version of a Permit is posted as required. Permits issued by local districts are usually valid for one to three years and must be renewed before they expire. If you have any questions concerning Permits, contact your local air pollution control district or air quality management district. APCD and AQMD locations and phone numbers are shown on the back cover of this handbook.



Comply with Permits

B. Regulations

Each district has regulations to help reduce air pollution. Some typical district oilfield regulations include: sulfur content of fuels, wastewater separators, crude oil production sumps, storage of petroleum products in tanks, fugitive emissions of volatile organic compounds from valves and flanges, and emissions of oxides of nitrogen from combustion processes. Call your district if you need more information regarding their regulations.

The Environmental Protection Agency (EPA) has national rules for oilfield equipment in the New Source Performance Standards (NSPS). Most districts can enforce the EPA's regulations, so call your district if you need information regarding the EPA's rules.

C. Alterations of Equipment

If you need to alter equipment and/or modify any process covered by a Permit to Operate, notify your district. If permitted equipment has been changed without district approval, it will be considered a violation by your district. An Authority to Construct may be required from your district prior to construction of new equipment, or if alterations to existing equipment must be made.

You should check your oilfield equipment regularly to make sure that it is "as permitted." Make sure that oil production throughput does not exceed Permit conditions. Operating personnel should be familiar with all conditions on the Permit and verify compliance with those conditions on a regularly scheduled routine.

III. CONTROLLING EMISSIONS

A. Components of Oilfield Facilities

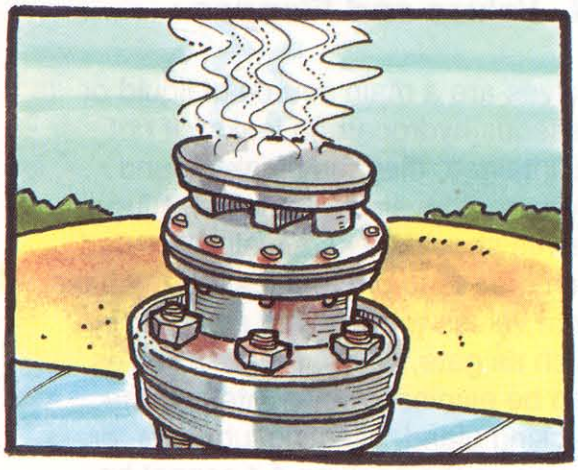
Hydrocarbon Emissions
Hydrocarbon emissions are involved in the formation of ozone which forms in the presence of sunlight. Ozone is California's biggest air pollution problem. Crude oil is made up of many different hydrocarbons. Some of them are very volatile, such as octane, while others, like asphalt, are heavy and dense and have low volatility. One of the major challenges with air pollution from oilfield production is preventing hydrocarbons that are volatile organic compounds (VOCs) from escaping into the atmosphere.

Fugitive Emission Sources
Hydrocarbons can escape from oilfield equipment through components (valves, flanges, pumps, compressors, hatches, connections, sight glasses, dump lever arms, packing seals, instrumentation, etc.) in the facility. Although the leak rate of hydrocarbons from components is usually small, the number of components in an oil field is large. The collective emissions from leaking components, which are known as fugitive emissions, may be significant if left un-checked. Emissions occur much more frequently from components carrying gaseous hydrocarbons.

Districts have limits on the allowable amount of gaseous or liquid volatile hydrocarbons that can leak from components. Contact your local district using the phone listing on the back of this handbook to find out what the gaseous and liquid hydrocarbon leak limits are from components. The best way to prevent fugitive emissions, save light products for sale, and stay in compliance with district Permits and regulations is to use a regular inspection and maintenance program on components that can leak liquid or gaseous hydrocarbons.

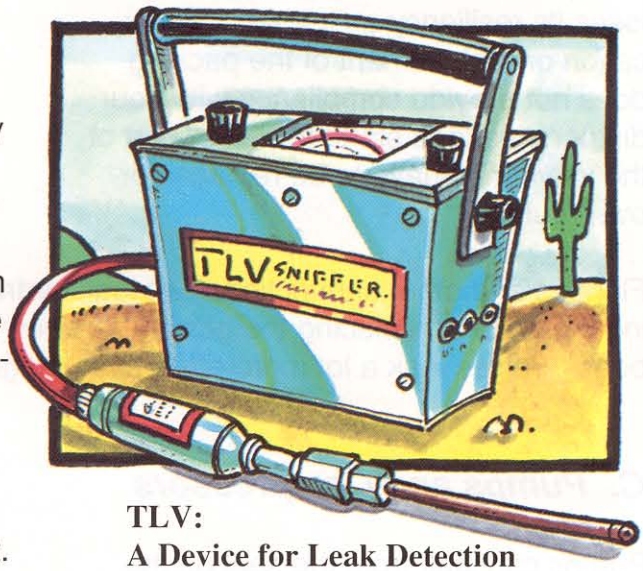
Detecting Emissions
Hydrocarbon emission leaks can be detected by using your sight, smell, and hearing senses. Looking for visible "wavy" light distortion or "heat haze" emanating from equip-

ment, similar to the distortion seen from heat waves near the ground or on a roof on a hot day, is one way to see gaseous hydrocarbon leaks. A gaseous leak may also be seen from its shadow; a shadow similar to the shadowy distortion made by a fire may be visible when there is a leak. Gaseous leaks may also be detected by applying a soap solution on a component and looking for bubbles. Strong odors of petroleum or hissing sounds may also be indications of leaks.



Visible Distortion May Mean Leaks

One of the best ways to find leaks is to use a hydrocarbon analyzer such as an OVA (organic vapor analyzer) or TLV (threshold limit value). However, the use of an analyzer can be cumbersome and time-consuming and may not be practical on a daily basis. The Air Resources Board does not endorse any particular brand of analyzer. Before you use an analyzer, make sure it is calibrated properly. When you use a hydrocarbon analyzer, block the wind from the area you are checking and subtract the background concentration measured one meter upwind of the equipment being tested.



TLV:
A Device for Leak Detection

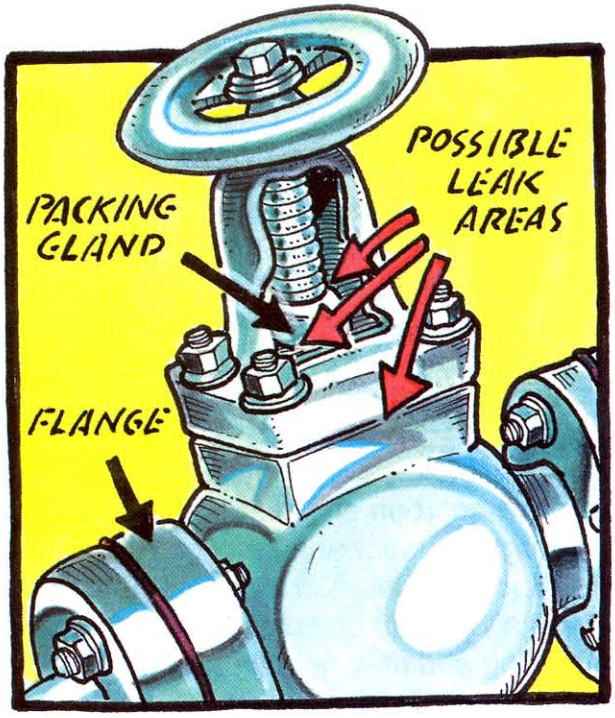
Components that leak should be tagged and eventually repaired as required by your district. The tag should have the date the leak was detected and should remain on the component until it is repaired. Your local district will allow a small percentage of leaking components. Review your district regulations to find out the percentage of allowable leaking components and the time you have to repair them.

Records

Records must be kept by the facility operator for leaking components where applicable. Items such as the name, location, date of detection, method of detection, number of components inspected, percentage of components leaking, amount of leakage and the date components are repaired to a leak free condition may need to be recorded when a self-inspection is performed. Records must be kept by your facility to prove compliance. Review your district regulations to find out what records you need to keep.

B. Valves and Flanges

Valves are a main source of liquid or gaseous hydrocarbon leaks. If not maintained, they may leak around stem and housing interfaces. Plug valves should be kept well lubricated with grease to prevent leakage. Leaks from valves with packed stem seals, such as gate, globe, and ball valves, can be eliminated by tightening the packing gland, injecting lubricant, or replacing the packing if it cannot be tightened further. Valve packing must be replaced eventually because it loses its resiliency as it ages. If lubrication or replacement of the packing does not provide compliance with your district's leakage standard, all or part of the valve may have to be replaced or overhauled.

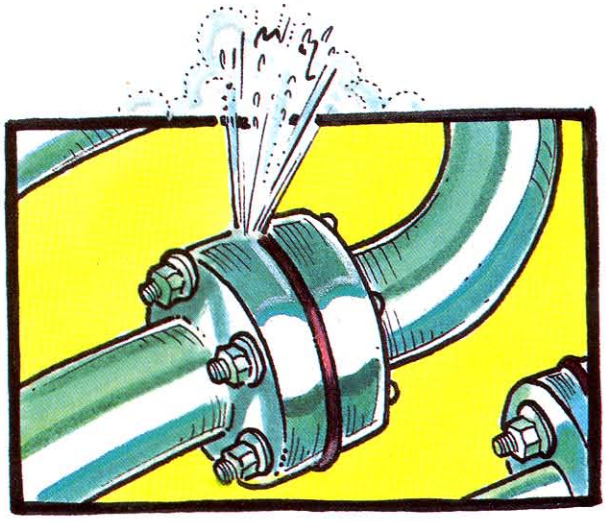


Globe Valve

Flanges and other connections can leak hydrocarbons. Leaks can be repaired by tightening the bolts or replacing the gasket between flanges. Few flanges usually leak hydrocarbons. Valves leak a lot more often than flanges.

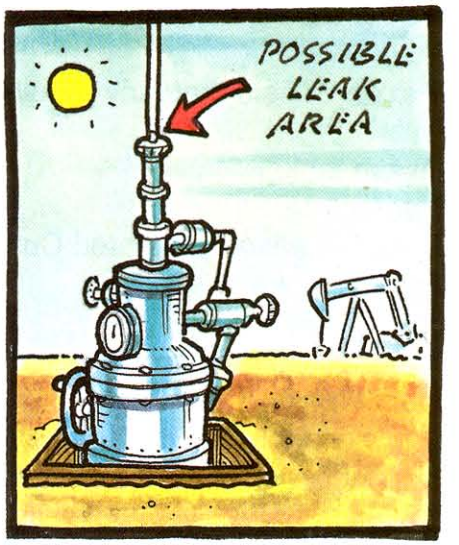
C. Pumps and Compressors

Pumps can leak from the seal on the drive shaft where the shaft penetrates the pump housing. Nearly all leaks from reciprocating pumps on well heads and other areas can be repaired by adjusting the packing gland and compressing the packing. Over-tightening the packing on well heads and other reciprocating pumps may cause packing "burn out" and premature failure. Make sure the polished rods on well heads are well lubricated to help avoid this condition. If the packing doesn't fit tightly enough around the reciprocating rod, excessive hydrocarbon leakage will result. The packing should be adjusted so that a thin film of oil remains on the



Flanges Can Leak at Gasket Interfaces

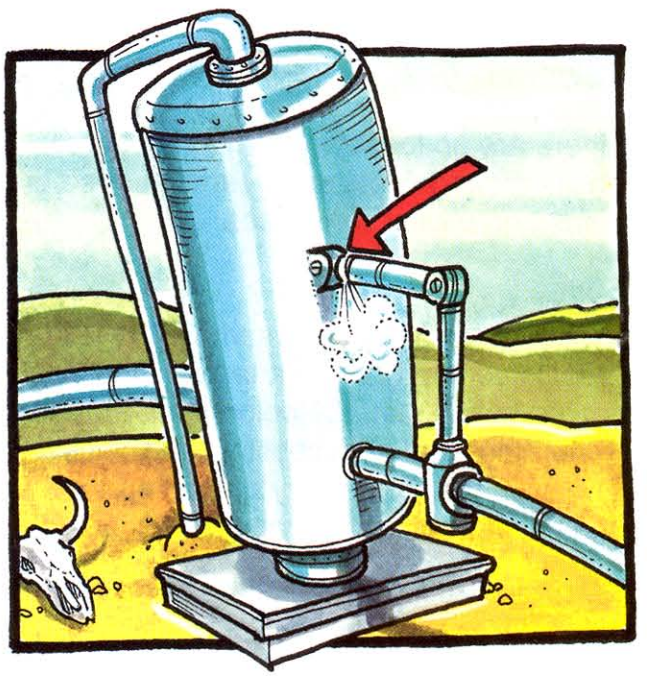
rod for lubrication and sealing between the rod and the packing. The packing will wear down over time and it must be adjusted periodically to keep a tight seal. Packing will eventually wear to a point where additional compression will not reform a seal, making replacement of the packing necessary. Mechanical seals on pumps must be properly maintained and periodically repaired or replaced to minimize leakage of gases and liquids. Seals of this type are designed to move and inherently leak. Leaks can be minimized by proper maintenance.



Possible Leak Area for Reciprocating Pumps

Preventing leakage of hydrocarbons from compressors is very similar to preventing leakage from pumps. Reciprocating compressors may leak from blow-by past packing rings. Packing rings must be replaced when they wear down to prevent leakage of gases to the atmosphere. Mechanical seals on centrifugal compressors must also be maintained. Components must be maintained to prevent hydrocarbons from leaking into the atmosphere.

D. Oil/Gas Separation Vessels



Field Separation Vessels: Dump Lever Arm Packing May Leak

The components of separators can be a source of fugitive emissions. In modern separator designs, the dump lever arm is used to control the release of oil from a separator. The pivot on the arm has packing around it to prevent hydrocarbon emissions. Check dump lever arm packing periodically for leaks and perform periodic maintenance to keep the pivot in good condition and leak-free.

Control valves and any other components on the gas outlet line may also need periodic inspection and maintenance to prevent gaseous leaks. Beware of liquid leaks from flow control valves and components on the oil outlet line.

E. Fixed Roof Tanks

Tanks in an oil field that may require Permits from your district include:

1. Oil wash tanks
2. Oil storage tanks
3. Oil LACT (Lease Automated Custody Transfer) tanks
4. Oil gauge tanks
5. Produced water tanks
6. Produced water separator tanks
7. Portable tanks
8. Organic liquid (other than oil) tanks

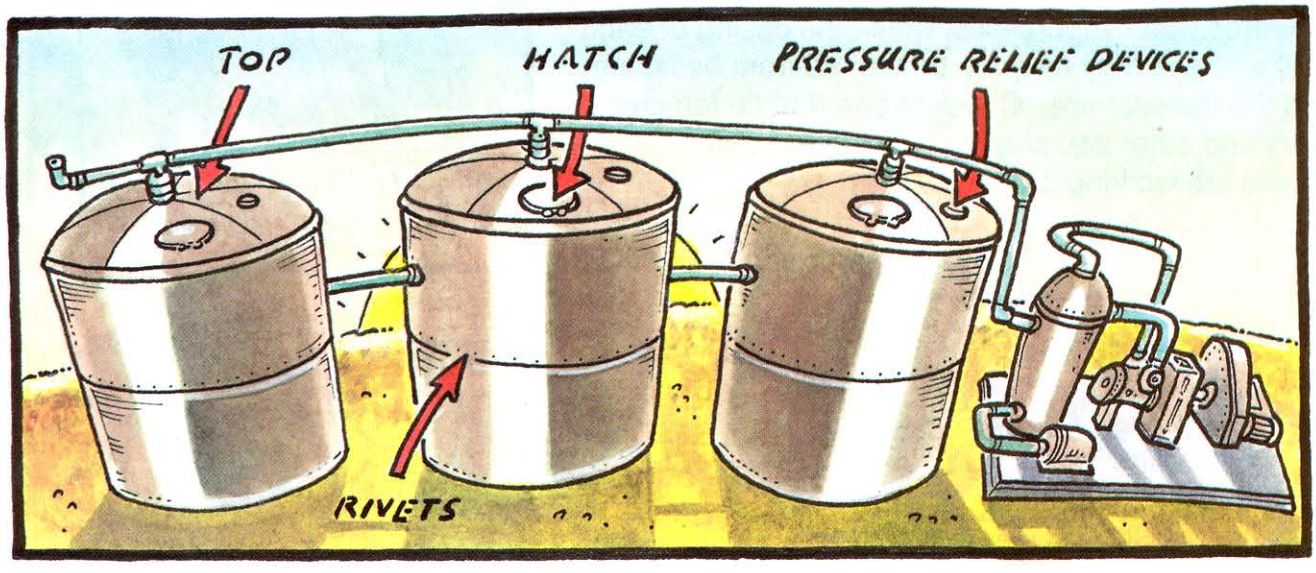
Almost any storage tank containing petroleum liquid requires a Permit to Operate. Permits to Operate may require some conditions that must be met by your tanks. Some conditions may include vapor pressure limits, average daily crude oil throughput limits, and proper operation of the vapor control system. Make sure you keep accurate records for your tanks to prove compliance with Permits to Operate and district regulations. The Permit to Operate should state what information must be recorded for each tank, and how often it must be recorded.

Notify your district before you degas or clean a tank or perform a process turnaround. Some districts may require facilities to notify them when tanks containing volatile products are cleaned. A large amount of emissions can occur during these processes.

Rivets
If a tank is riveted or bolted together, make sure there are no loose or missing rivets or bolts. Check for any wet oil, stains, or sulfur deposits around rivets and seams. Loose or missing bolts and rivets can be sources of emissions and production losses.

Hatches
Hatches on the top of each tank must be closed except during gauging, sampling or addition of chemicals. Conventional gauge hatches should vent only when a tank without vapor recovery is being filled or when a tank is heated by the sun. Discolorations around hatches or the sides of tanks are an indication of "burping" and/or excessive emissions from operational upsets. There must not be any holes in the tops of any of the tanks. The gaskets in the seams on the tops of the tanks must be well maintained and they should be vapor-tight.

Pressure Release Devices
Pressure release devices on tanks can be another source of emissions. The devices should be well maintained to prevent leaks. If a tank is not connected to a vapor recovery system, pressure release devices should vent only during the filling of a tank or from the heating of the tank by the sun. Hydrocarbons lost during these processes are also called



Areas of Emission Sources from Fixed Roof Tanks

"working losses." Be careful that volatile products or light hydrocarbons are not stored in fixed roof tanks without vapor recovery systems. Districts usually allow only heavy crude, diesel, or other heavy products to be stored in tanks without vapor recovery systems.

When a tank is equipped with vapor recovery, pressure release valves should not vent and they should be vapor-tight. Venting should only occur during breakdowns or emergencies. Conventional gauge hatches may also act as pressure release valves. Make sure you check your pressure release valves regularly for leaks.

Vapor Control System

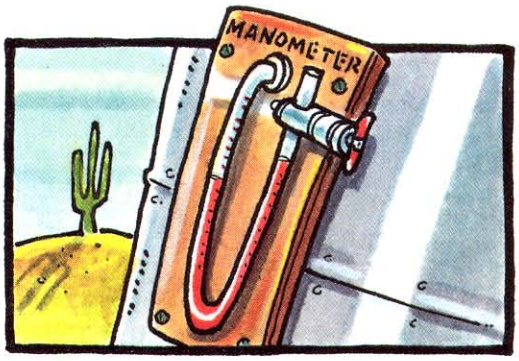
Some tanks may have vapor control systems or gas gathering systems unless they contain a product with a vapor pressure and hydrogen sulfide content below district limitations. The vapor control system must meet the hydrocarbon leak limit in your district. Seams, joints, piping, valves and fittings in the tank vapor control systems cannot leak more than the allowable hydrocarbon limit.

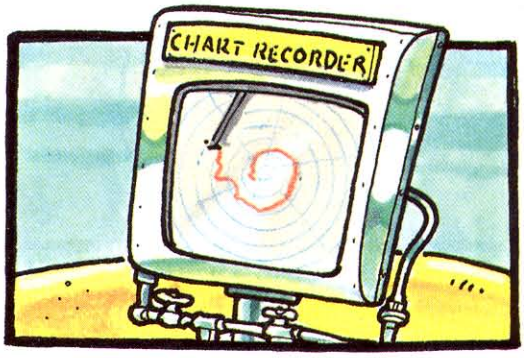
Checking vapor recovery system components for leaks and good operation must be done on a regular basis as required. If a vapor recovery system for a tank battery is equipped with a manometer, check it regularly to verify it has the correct pressure. When your tank vapor recovery is equipped with a chart recorder, make sure that the pressure has not exceeded the rated pressure or the PV valve set point. If the tank vapor recovery is equipped with a compressor, check that it works properly and doesn't leak any hydrocarbon vapors.

Oil wells using a steam drive, fireflood, or other oil reservoir heating process should be connected to a casing vapor recovery system. Heating oil in the reservoir evaporates more

hydrocarbons, increasing the probability of hydrocarbon emissions and the rate of production losses. Hydrocarbon vapors exist within the casing of each oil well and they must be prevented from escaping to the atmosphere. Check to see that fin fan coolers and other equipment in casing vapor recovery units are working properly.

Check local district tank rules and Permit conditions for specific requirements.

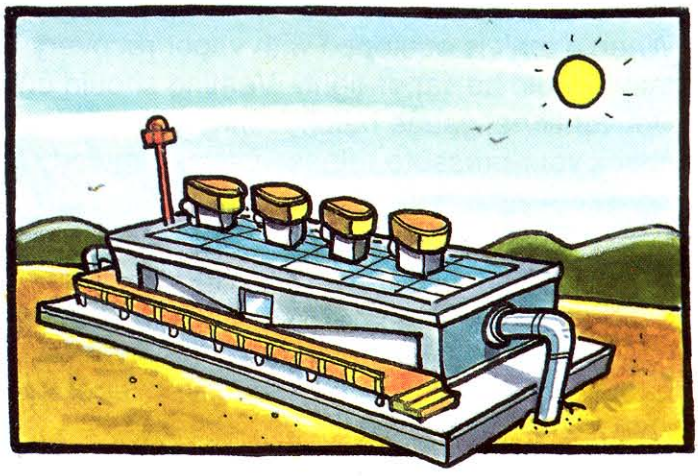




Check Tank Pressure Regularly

F. Oil/Water Separators

Controlling hydrocarbon emissions from separators may be required by your district. The separator should have a closed leakproof system to eliminate hydrocarbon emissions. Separators with fixed covers may require vapor recovery systems. Separators with floating covers must meet district gap limits. All hatches must be closed. All sight glasses and openings must be sealed properly. Make sure you keep accurate inspection and maintenance records for separators.



Oil/Water Separators: Beware of Vapor Leaks and Liquid Leaks

G. Sumps and Pits

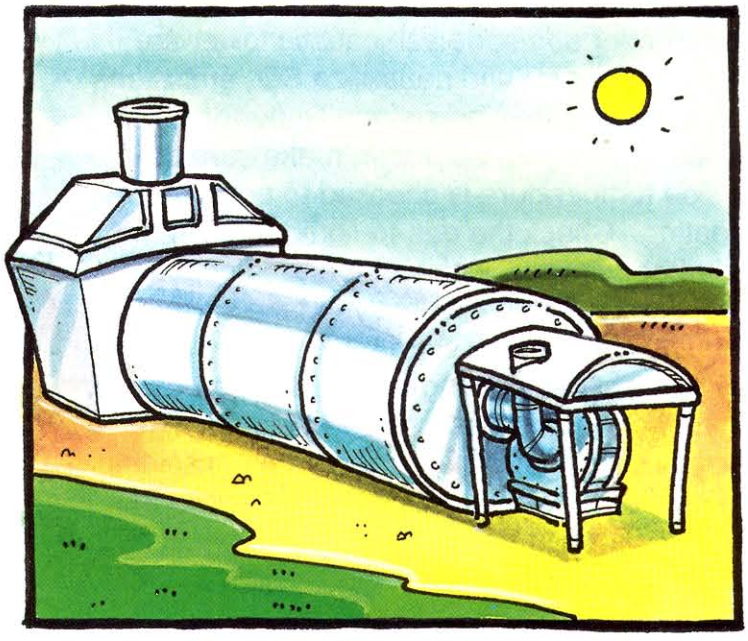
Sumps and pits may be subject to district rules or Permits unless they are used for a short period of time, used exclusively for heavy oil, or if they are small. Your district regulations will illustrate the limitations. Some districts may require covers that are impermeable to VOCs, and totally isolate the sump from the atmosphere.

H. Fired Equipment

Fired equipment (steam generators, heater treaters, fire boxes etc.) is mainly regulated by controlling nitrogen oxides (NOx), sulfur oxides (SOx), smoke (visible emissions), and carbon monoxide emissions.

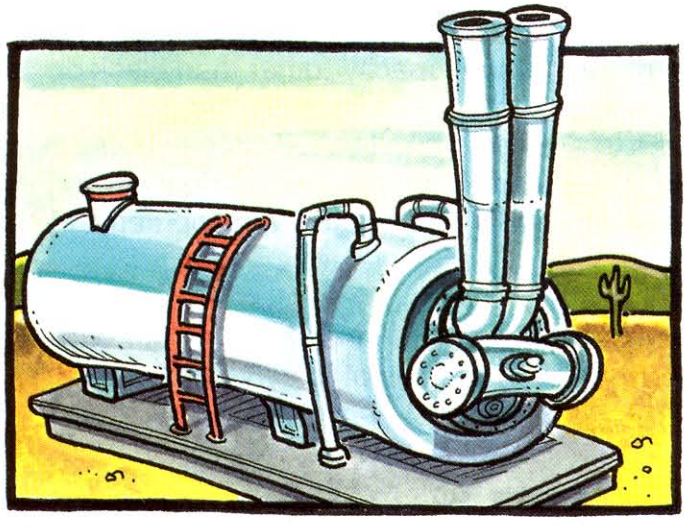
NOx and SOx

NOx emissions can usually be reduced by lowering the combustion temperature or reducing the oxygen in the combustion process. Low NOx burners, flue gas recirculation (FGR), selective catalytic reduction (SCR), and selective noncatalytic reduction (SNCR) are some typical systems used with steam generators and heaters to reduce NOx emissions. Check the injection rates for ammonia, water, or other substances that are injected in these systems. Check that flue gas is not bypassing any control devices or leaking out of ducting.



Steam Generators:
Little or No Visible Emissions and Comply with NOx, SOx Limits

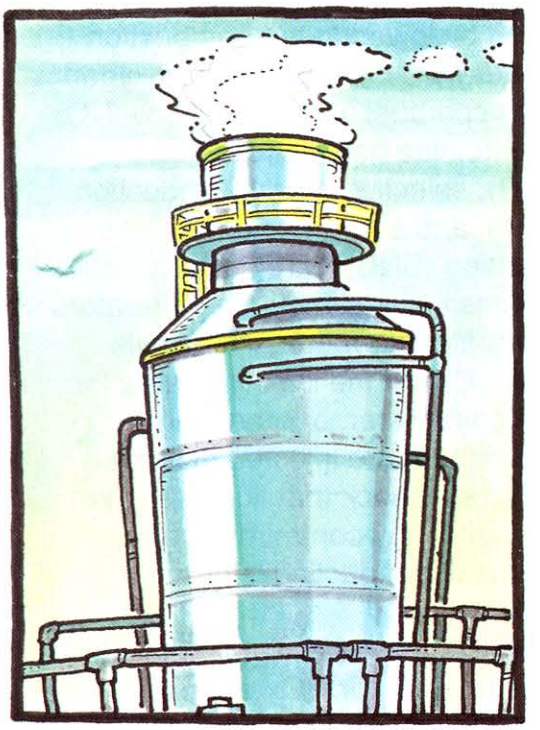
Natural gas-fired equipment may need controls for NOx emissions. If field gas or fuel oil is used, controls for NOx and SOx emissions may be required. Check the oil injection pressure or flow rate. If heavy crude is being used as a fuel it must be pre-heated to prevent smoke and "gumming-up" of equipment. If a Permit states the type of fuels that can be used, make sure that you are using a complying one.



Heater Treaters:
Little or No Smoke Allowed to be Emitted. Comply with NOx, SOx Limits

If fired equipment has chart recorders, verify that the amount of air in the combustion process or the flue gas recirculation rate being printed on chart recorders is within the allowable limit on your Permit to Operate. If the stack of the equipment is equipped with a continuous emission monitor (CEM), check that it is working properly and that the NOx and/or SOx emissions comply with your Permit or district regulations. Many steam generators, heaters and other equipment do not have continuous emission monitors, so periodic source tests may have to be conducted to determine the emissions.

Scrubbers
A scrubber and soda ash caustic tower are used to capture and neutralize SO_2 emissions from fuels containing sulfur. To perform an inspection of your scrubber, make sure the inside temperature is checked to prevent overheating. Check the gas-to-liquid ratio so the scrubber won't fill with water and to ensure that it will operate efficiently. Make sure the input solution to the scrubber has the correct pH. Verify that ducting leading to scrubbers or other control devices is not leaking any flue gas. There should be no lingering emissions near allowable district limitations beyond the steam plume of the scrubber.



Scrubbers:
No Illegal Visible Emissions
Beyond Steam Plume

Carbon Monoxide Emissions
Your district also has limits for carbon monoxide (CO) emissions from steam generators and other fired equipment. Carbon monoxide standards can generally be met by avoiding fuel-rich conditions in the combustor. Carbon monoxide standards are usually much easier to meet than NOx standards.

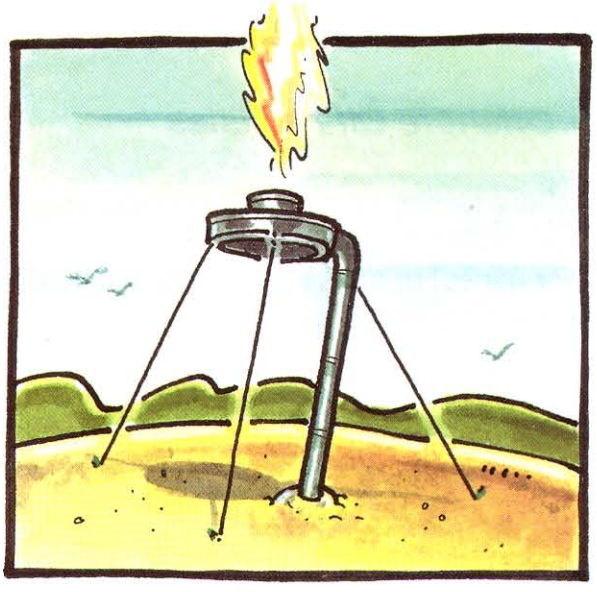
Smoke (Visible Emissions)
Fired equipment is allowed to emit little or no smoke. The Ringelmann Chart (measures black or gray smoke, see Definitions Section) or the percent opacity (other than black or gray smoke) is used to determine the compliance of visible emissions. The California Health and Safety Code limits visible emissions to a Ringelmann two for three minutes in one hour, but many districts use a more restrictive limit of Ringelmann one. If smoke is continuously being emitted from a stack, there may be a problem with the equipment.

Equipment Exempt From Regulations
Steam generators or heater treaters that have small outputs (Btu) may be exempt from district regulations. Check to see if your equipment must be regulated by your district.

I. Flares

Flares are used at oilfield production facilities to burn excess gases or they may be used at a tank battery or a loading rack for the vapor recovery system. Flares may also be used to burn gases during upsets to prevent direct release of raw gases to the atmosphere. Facilities that recover natural gas with their oil may flare it when their compressors break down

or when they must be taken out of service. Other than the flame coming out of a flaring device, no visible emissions equal to or greater than Ringelmann one are allowed from flares in most districts. Make sure the pilot is lit, or, if the equipment has an automatic pilot, check that it is operating properly, or stacking of the waste gas will occur. Some districts may have more stringent regulations related to allowable visible emissions. Newer flares subject to New Source Performance Standards, Code of Federal Regulations (NSPS 40 CFR 60) cannot have any visible emissions except for the flame (see U.S. EPA Method 22). Check your local district regulations to see if you are subject to more restrictive visible emission standards.



Flares:
Little or No Visible Emissions Allowed
Comply with Sulfur Emissions Limit

If the waste gas being burned by flaring units is sour, sulfur dioxide emission problems could occur. Sour waste gases may have to be scrubbed before being flared to comply with sulfur dioxide emission standards.

J. Internal Combustion Engines

Make sure the fuel you use in internal combustion engines is accepted by your district or complies with your Permit. Your district limits the amount of sulfur that can exist in fuels for stationary internal combustion engines. Fuel with a high sulfur content will create a large amount of sulfur compounds in an engine's exhaust. Do not allow internal combustion engines to run too rich because you may violate your district's carbon monoxide emission standard. Check the coolant levels, belts, air cleaners, and catalytic converters. Verify that any control devices listed on your Permit are installed on the engines and are working. Periodic inspection and maintenance is the best way to stay in compliance.

Engine Records

Keep accurate records for your internal combustion engines to prove compliance with district Permits to Operate and district regulations. Records of engine use, fuel type, fuel usage, and the air-fuel ratio used in combustion may need to be recorded.

The California Air Resources Board has other information available regarding internal combustion engines, including the Stationary Internal Combustion Engines Technical Manual and pamphlet and the Fuel Specifications Technical Manual. You may acquire these materials by calling your district or the California Air Resources Board at the phone numbers on the back of this handbook.

K. Offshore Oil Facilities

Onshore California air pollution regulations also apply to offshore facilities in California waters within three miles of the coastline. Controlling NOx emissions from oil platforms is a major aspect of emission control because of the internal combustion engines used in offshore oilfield operations.

Emissions of NOx from backup engines, crane engines, drilling engines, gas turbines, marine vessels, and other internal combustion engines may have to meet Permit requirements and comply with district emission standards. Visible emissions from engine exhausts should be less than Ringelmann one or 20% opacity.

Hydrocarbon Emissions
Preventing hydrocarbon emissions from offshore facilities is very similar to preventing them from onshore facilities. All the components (valves, flanges, pumps, compressors, sight glasses, dump lever arms, packing seals, instrumentation, etc.) on offshore oil platforms must be well maintained and checked regularly for leaks. Surge tanks containing crude oil should be connected to vapor recovery systems that are vapor-tight. Records for gaseous and liquid leaks should be kept including the component name, location, type, date of detection, level of leak (ppm or drops per minute), date component repaired, and method of detection.

IV. VIOLATIONS

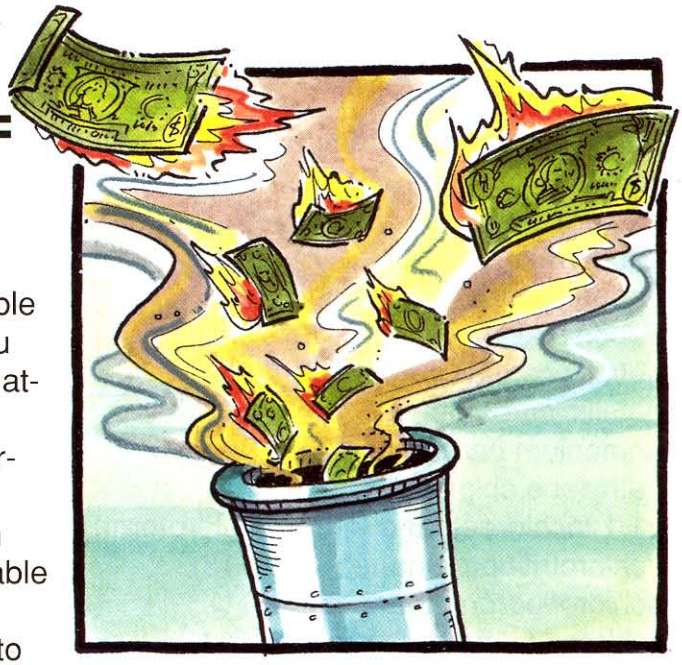
A. Notice of Violation

When equipment is not in compliance with air pollution regulations, an inspector may issue a Notice of Violation (NOV) to the company that owns or operates the equipment. Make sure that the equipment causing the violation is repaired as soon as possible. If you are not sure about how to handle an NOV, contact your local district.

B. Costs

Violations of air quality regulations are very costly. The maximum penalty for not complying with air quality regulations is $50,000 per day of violation. Furthermore, production downtime from a violation may also increase costs. Complying with air quality regulations results in efficiently operating equipment and a cleaner environment for everyone.

Violations =



C. Breakdowns and Variances

If a violation occurs because of an unavoidable breakdown of equipment in an operation, you may be able to avoid being penalized for violating air pollution regulations. A source with a breakdown must take immediate steps to correct the equipment malfunction as quickly as possible. If a source finds that a malfunction cannot be repaired within the district's allowable duration of a breakdown, usually the source may file for an emergency variance in order to avoid enforcement action.

Most variance or breakdown procedures within local APCDs require that operators promptly notify the district within an hour of the breakdown. If a breakdown is caused by human error or poor maintenance it may still be considered a violation by your local APCD. Make sure that you are familiar with the breakdown or variance procedures in your district.

V. DEFINITIONS

1. Carbon Monoxide (CO) - A pollutant that is a product of incomplete combustion.

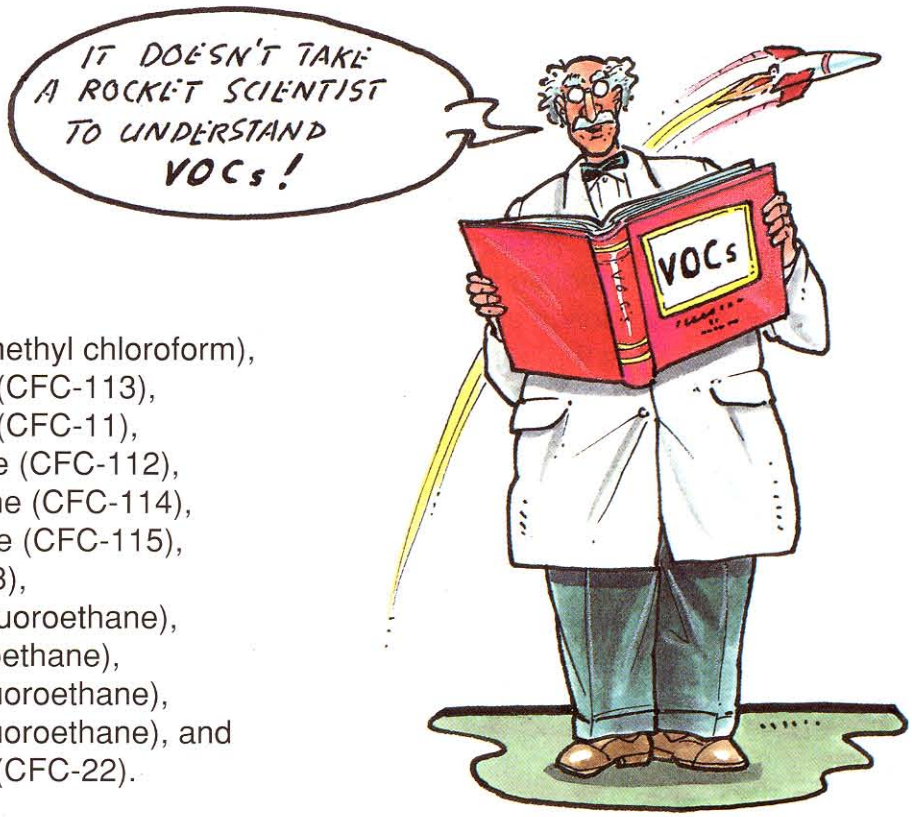
2. Ozone (O_3) - A reactive pollutant that forms in the lower atmosphere from hydrocarbons, nitrogen oxides, and sunlight.

3. Nitrogen oxides (NOx, usually NO and NO_2) - Pollutants that result from combustion with atmospheric air at high temperatures.

4. Ringelmann Chart - A gray to black smoke scale published by the United States Bureau of Mines ranging from 0 to 5, where "5" is black smoke with 100% opacity, "4" is 80% opacity, "3" is 60% opacity, "2" is 40% opacity, and "1" is 20% opacity. Ringelmann values are read by a trained observer with the sun behind him for three minutes in one hour right where black smoke rises out of a stack. White or colored smoke is measured by percent opacity, 20% being the limit in most districts. The Air Resources Board certifies industry and district personnel for reading visible emissions. Call (916) 322-8272 if you want to enroll in the certification class.

5. Vapor Pressure - The pressure exerted by a vapor that is in equilibrium with its liquid state. For volatile products it is usually expressed in psi at a temperature of 100 °F.

6. Volatile Organic Compound (VOC) - Any compound with at least one carbon atom, except:
methane,
carbon monoxide,
carbon dioxide,
carbonic acid,
metallic carbides,
metallic carbonates,
ammonium carbonate,
methylene chloride,
1,1,1 trichloroethane (methyl chloroform),
trichlorotrifluoroethane (CFC-113),
trichlorofluoromethane (CFC-11),
dichlorodifluoromethane (CFC-112),
dichlorotetrafluoroethane (CFC-114),
chloropentafluoroethane (CFC-115),
trifluoromethane (FC-23),
HCFC-123 (dichlorotrifluoroethane),
HCFC-134a (tetrafluoroethane),
HCFC-141b (dichlorofluoroethane),
HCFC-142b (chlorodifluoroethane), and
chlorodifluoromethane (CFC-22).



The exact listing of compounds may vary. Some districts use the terms "precursor" or "reactive organic compounds" to denote VOC. As a note, some of these compounds may be destructive to upper atmospheric ozone.

VI. SELF-INSPECTION CHECKLIST

On the following two pages a self-inspection checklist is included to serve only as an idea for your own checklist to inspect some of the equipment found on an oil field. Facility operators should contact their local air pollution control district for specific requirements regarding regulations.

SELF-INSPECTION CHECKLIST

Item	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Check:
Components (valves, flanges, pumps, dump lever arms, etc.)								Look for liquid leaks, gaseous leaks and mists.
								Keep accurate records of leak checking and repair dates.
Tanks (fixed roof)								Vapor pressure, throughput, etc. within limits on Permit.
								Keep records (throughput, contents, vapor pressure, etc.).
								No holes in the tops of the tanks.
								Hatches closed (unless gauging or sampling)
Tanks with vapor recovery								Pressure relief valves under vapor-tight conditions.
								Vapor recovery system vapor tight and working properly.
								Tank pressure within proper limits.
Oil/Water Separators								Hatches closed. Fixed covers sealed. Gaps in floating cover OK. Vapor control system OK.
Fired Equipment								Continuous emission monitors for NOx and SOx emissions OK.
								No visible emissions of Ringelmann 1 or higher.
								Air-fuel ratio or air flow rate for combustion within proper limits.
								Keep fuel and source test records to prove compliance.
								Complying fuel being used for combustion.
								No flue gas leaking from ducts or bypassing control equipment.
								Injection of ammonia, water etc. for SCR within proper limits.
								For oil fired devices: oil pressure or flow rate OK; SOx emissions OK.

(Continued next page)

SELF-INSPECTION CHECKLIST
(continued)

Item	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Check:
Scrubbers								Temperature, gas-to-liquid ratio, and pH within proper limits.
								No lingering visible emissions beyond steam plume.
Flares								No visible emissions.
								Keep records showing time used and amount of waste gas burned.
Casing vapor recovery units								Entire system gas-tight; equipment working according to Permit requirements.
Internal combustion engines and gas turbines								Make sure engines comply with NOx emission limit.
								No visible emissions equal to or greater than Ringelmann 1.
								Sulfur content of fuel does not exceed district rules or Permit.
								Fuel used for combustion is allowed by Permit to Operate.
								Keep records of engine use, fuel, and air-fuel ratio if necessary to prove compliance.
								Belts, air cleaner, coolant level, catalytic converter OK.

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Need More Information?

Air Resources Board (800) 952-5588 **District: _____**

Multi-County Districts

1 - Bay Area (415) 749-5000
2 - Feather River (530) 634-7659
3 - Great Basin (760) 872-8211
4 - Monterey Bay (831) 647-9411
5 - North Coast (707) 443-3093
6 - Northern Sierra (530) 274-9360
7 - South Coast (909) 396-2000
8 - Yolo-Solano (530) 757-3650
9 - San Joaquin Valley (559) 230-6000

County Districts

Amador (209) 257-0112
Antelope Valley (661) 723-8070
Butte (530) 891-2882
Calaveras (209) 754-6504
Colusa (530) 458-0590
El Dorado (530) 621-6662
Glenn (530) 934-6500
Imperial (760) 482-4606
Kern (661) 862-5250
Lake (707) 263-7000
Lassen (530) 251-8110
Mariposa (209) 966-2220
Mendocino (707) 463-4354
Modoc (530) 233-6419
Mojave Desert (760) 245-1661
No. Sonoma (707) 433-5911
Placer (530) 889-7130
Sacramento (916) 874-4800
San Diego (858) 650-4700
San Luis Obispo (805) 781-4247
Santa Barbara (805) 961-8800
Shasta (530) 225-5789
Siskiyou (530) 841-4029
Tehama (530) 527-3717
Tuolumne (209) 533-5693
Ventura (805) 645-1400

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