ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT
EPA 330/2-76-005

REPORT ON

# *State Implementation Plan Air Pollution Inspection of Edgington Oil Company*

LOS ANGELES COUNTY, CALIFORNIA

NATIONAL ENFORCEMENT INVESTIGATIONS CENTER
DENVER, COLORADO
AND
REGION IX, SAN FRANCISCO, CALIFORNIA


FEBRUARY 1976

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT

# STATE IMPLEMENTATION PLAN

## INSPECTION OF

## EDGINGTON OIL COMPANY
2400 E. Artesia Blvd.
Long Beach, California 90805
213/636-2524
October 15, 1975

February 1976

NATIONAL ENFORCEMENT INVESTIGATIONS CENTER - Denver, Colorado

and

REGION IX - San Francisco, California

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## INTRODUCTION

### Background

Edgington Oil Company operates a simple petroleum refinery with a rated capacity of 4,700 $m^3$ (29,500 bbl)/day. The refinery processes 85-90% indigenous California crudes with the remainder coming from Alaska and Indonesia. It also finishes imported napthas from Venezuela and reprocesses crankcase drainings. Finished products include gasoline, jet fuels, diesel fuel, lube oil, stove oil, fuel oil and various grades of asphalts.

Edgington employs about 155 people, and operates three 8-hour shifts per day, 7 days per week, year around.

On October 15, 1975, a process inspection was conducted at this facility by NEIC personnel. The inspection was preceded by a letter to the Company on September 8, 1975 [Appendix A], announcing NEIC's intention to inspect the facility and requesting substantial amounts of process information. Subsequent to the inspection, Edgington personnel mailed the requested information to NEIC.

During the inspection, an examination was made of the refining equipment, potential air pollution sources, and air pollution control equipment. The purpose of this inspection was to evaluate the degree of compliance of this facility with the requirements of the Federally approved State Implementation Plan as required by Section 110 of the Clean Air Act, as amended.

Company personnel were very cooperative during this inspection. They supplied all EPA requested information during the inspection interview or by subsequent letter.

## Inspection Participants

Mr. David Davidson - President, Edgington

Mr. John W. Shrontz - Supervisor of Quality Control, Edgington

Mr. M. O. Carrigan - Refinery Superintendent, Edgington

Mr. Robert S. Mueller - Refinery Engineer, Edgington

Mr. Charles R. Mason - Los Angeles County Air Pollution Control District, (LAAPCD)

Mr. Paul de Percin - USEPA, NEIC

Mr. David L. Brooman - USEPA, NEIC

## Applicable Regulations

The following rules contained in the Rules and Regulations of the Los Angeles County Air Pollution Control District (LAAPCD) [detailed in Appendix B] are applicable to this facility.

*Rule 50. Ringelmann Chart*

*Rule 51. Nuisance*

*Rule 56. Storage of Petroleum Products*

*Rule 59. Effluent Oil/Water Separators*

*Rule 61. Organic Liquid Loading*

*Rule 62. Sulfur Content of Fuels*

*Rule 67. Fuel Burning Equipment*

*Rule 68.1. Fuel Burning Equipment - Combustion Contaminants*

*Rule 69. Vacuum Producing Devices or Systems*

*Rule 70. Asphalt Blowing*

*Rule 71. Carbon Monoxide*

*Rule 72. Pumps and Compressors*

*Rule 73. Safety Pressure Relief Valves*

## PROCESS DESCRIPTION

Edgington operates a relatively small, simple refinery. All crude oil and imported naptha are transported to the refinery by pipeline. Crankcase drainings are delivered to the refinery by truck. Major processes include crude desalting, atmospheric distillation, vacuum distillation, and asphalt blowing. Simplified process flow diagrams for the facility are shown in Figures 1 and 2. The following table summarizes the various unit process capacities.

| Process | Rated Capacities | |
|---|---|---|
| | ($m^3$/d) | (bbl/day) |
| Crude Unit No. 1 | 1,600 | 10,000 |
| Crude Unit No. 2 and Vacuum Unit | 3,100 | 19,500 |
| Crankcase Oil Reprocessing† | 160 | 1,000 |
| Asphalt Blowing (6 stills) | 1,300-2,200 | 8,000-14,000 |

† *Unit operated approximately 50% of the time*

## POTENTIAL SOURCES OF AIR POLLUTION EMISSIONS AND RELATED CONTROL EQUIPMENT

The major unit processes at this refinery are closed systems. Release of materials to the atmosphere is discouraged because such releases would result in loss of product. The process heaters attendant to these units and the steam boilers constitute the main emission sources.

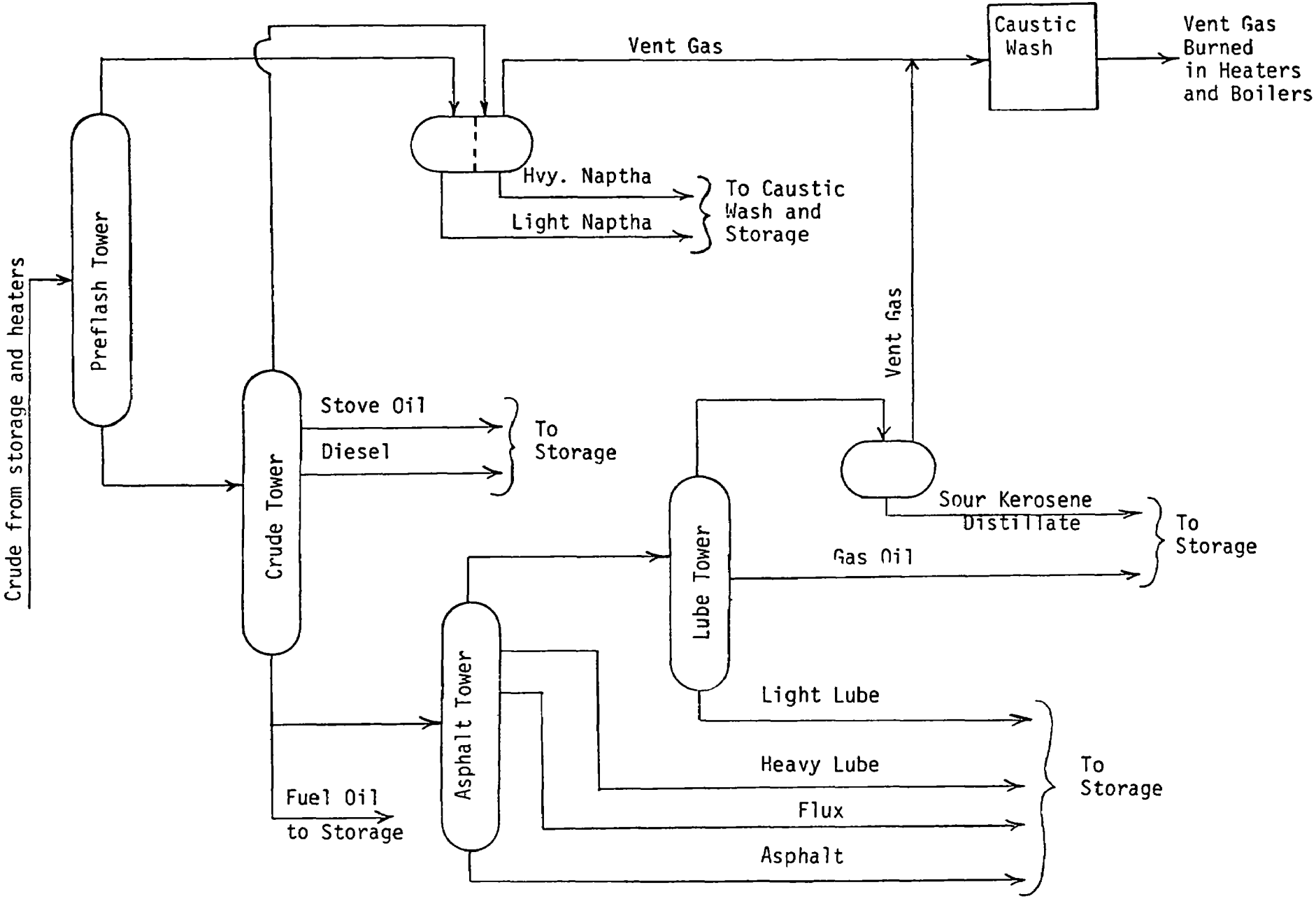


Figure 1. Simplified Process Flow Diagram - Crude Unit No. 1
Edgington Oil Company - Long Beach, California

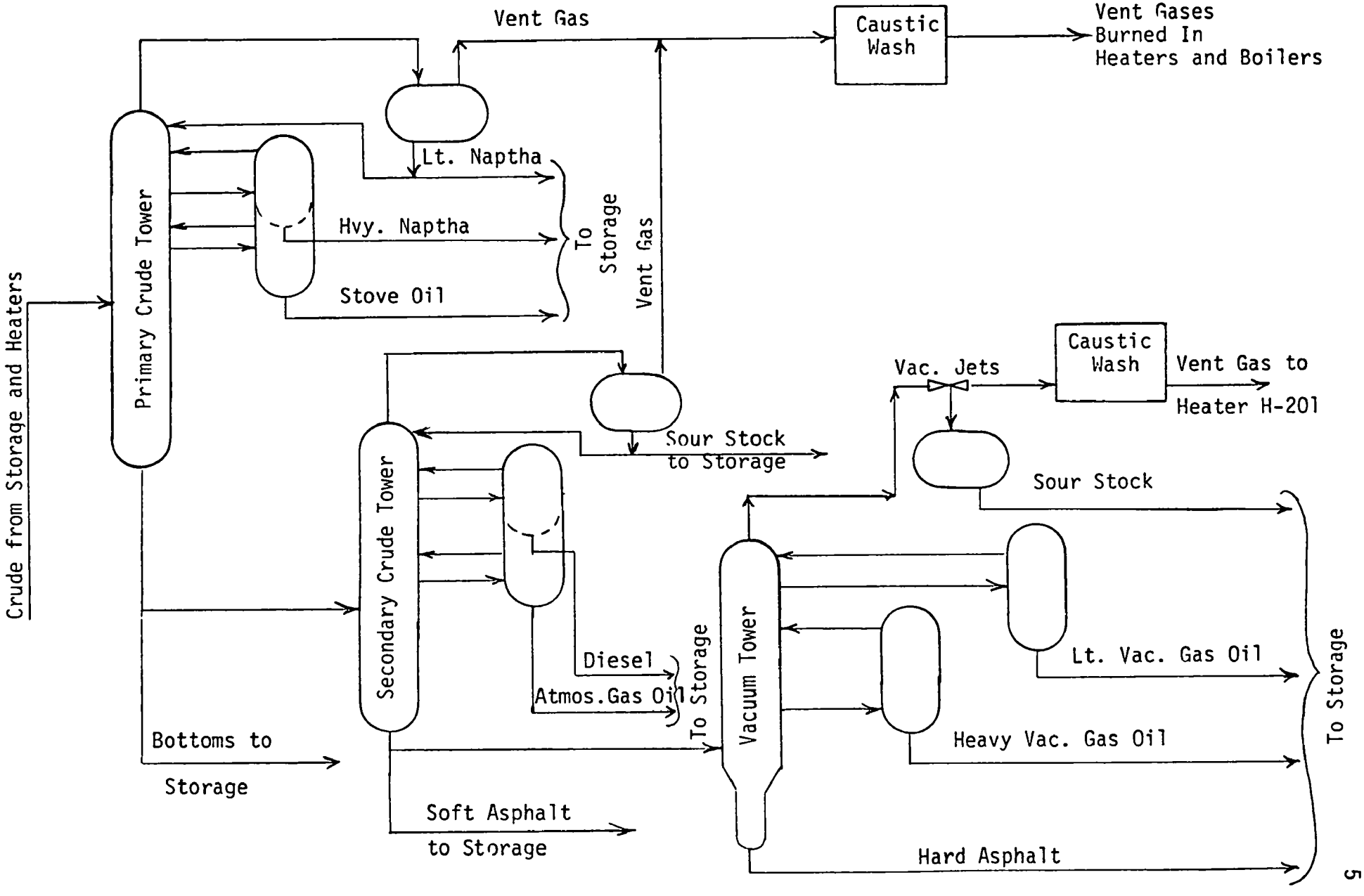


Figure 2. Simplified Process Flow Diagram - Crude Unit No. 2
Edgington Oil Company - Long Beach, California

There are also a large number of relatively small potential sources of emissions related to the operation of the refinery. Such sources include leaks from valve seals, pump seals, and pipe flanges, and evaporative losses from storage tanks and process wastewater drains. Potential sources of emissions and their related control equipment are discussed below.

## Process Heaters and Boilers

There are 13 process heaters and 5 steam boilers at this refinery ranging in size from 1.3 X $10^6$ kg cal (5 X $10^6$ Btu)/hour to 15.2 X $10^6$ kg cal (60 X $10^6$ Btu)/hour. A complete listing of these units is presented in Table 1.

All of these units can be operated on either natural gas or low sulfur fuel oil with the sole exception of Heater H-3, which is operated on natural gas only. Natural gas is purchased from Southern California Gas and has an approximate heating value of 9,340 kg cal/$m^3$ (1,050 Btu/$ft^3$) and a negligible sulfur content. Low sulfur fuel oil is also purchased for use in these units. It has an approximate heating value of 9,800 kg cal/l (148,000 Btu/gal) and an average sulfur content of 0.47% by weight.

Edgington does not have a refinery fuel gas system per se. Vent gases from the overhead accumulators on crude unit No. 1 and the receiver on the crankcase oil processing unit are piped to, and burned in, heaters H-1, H-2, H-3, and H-4 or in boilers No. 1, 2, 3 and 6. Likewise, vent gases from the overhead accumulators and vacuum jets on crude unit No. 2 are piped to, and burned in, Heaters H-101, H-102 and H-201 or the heaters and boilers listed for crude unit No. 1. All vent gases are caustic scrubbed prior to burning to control sour gases. Edgington does not monitor the quantity of vent gases burned in these units. They

*Table 1*

*LISTING OF BOILERS AND PROCESS HEATERS*
*Edgington Oil Company - Long Beach, California*

| Unit | Stack Diameter (m) | Stack Diameter (ft) | Stack Temperature (°C) | Stack Temperature (°F) | Height Above Grade (m) | Height Above Grade (ft) | Rated Heat Input ($10^6$ kg cal/hr) | Rated Heat Input ($10^6$ Btu/hr) | Stack Gas Velocity (m/sec) | Stack Gas Velocity (ft/sec) |
|---|---|---|---|---|---|---|---|---|---|---|
| Boiler #1, Boiler #2, Boiler #3 (2 stacks) | 1.2 | 4.0 | 260 | 500 | 21 | 70 | 2.1 | 8.5 | 1.7 | 5.7 |
| Boiler #6 | 1.8 | 6.0 | 260 | 500 | 23 | 75 | 2.1 | 8.5 | 0.5 | 1.8 |
| Boiler B-301 | 0.9 | 3.0 | 204 | 400 | 6 | 20 | 15.1 | 60.0 | 13.5 | 44.4 |
| H-101 Heater Unit #1 | 1.4 | 4.5 | 371 | 700 | 30 | 100 | 6.0 | 24.0 | 3.5 | 11.5 |
| CC Heater | 0.5 | 1.5 | 371 | 700 | 20 | 65 | 1.9 | 7.5 | 9.8 | 32.3 |
| Heater H-2 | 0.5 | 1.5 | 371 | 700 | 9 | 30 | 2.0 | 7.9 | 10.4 | 34.0 |
| Heater H-3† | 0.5 | 1.5 | 371 | 700 | 9 | 30 | 1.3 | 5.0 | 6.5 | 21.5 |
| Heater H-4 | 0.5 | 1.5 | 371 | 700 | 9 | 30 | 2.0 | 7.9 | 10.4 | 34.0 |
| Heater H-101 | 1.4 | 4.5 | 371 | 700 | 24 | 80 | 7.6 | 30.0 | 4.4 | 14.4 |
| Heater H-102 | 1.3 | 4.3 | 371 | 700 | 24 | 80 | 6.0 | 24.0 | 3.9 | 12.9 |
| Heater H-201 | 1.2 | 4.0 | 371 | 700 | 24 | 80 | 3.8 | 15.0 | 3.9 | 12.9 |
| West Hot Oil Heater | 1.2 | 4.0 | 315 | 600 | 17 | 55 | 2.0 | 8.0 | 2.8 | 9.1 |
| A. B. Heater South | 0.8 | 2.5 | 315 | 600 | 9 | 30 | 2.0 | 8.0 | 3.8 | 12.4 |
| A. B. Heater West | 0.6 | 2.0 | 315 | 600 | 11 | 35 | 2.0†† | 8†† | 5.4 | 17.7 |
| A. B. Heater East | 0.6 | 2.0 | 315 | 600 | 11 | 35 | 1.3†† | 5†† | 3.4 | 11.1 |
| W. E. Asphalt Heater | 0.9 | 3.0 | 315 | 600 | 21 | 70 | 2.4 | 9.5 | 2.9 | 9.4 |

† *Unit fired by gas only*
†† *Estimated volumes*

estimate the heating value of these gases to be 26,700 kg cal/$m^3$ (3,000 Btu/$ft^3$) and the sulfur content to be negligible.

Edgington is on an interruptible natural gas supply. During interruptions, units which can burn fuel oil are operated in this mode. During 1975 the natural gas interruption frequency was about 3% of the time.

Since the process heaters and steam boilers are operated on natural gas or fuel oil, none of these units are equipped with emission control devices. There are no stack gas opacity detectors and alarm systems on these units either.

Sulfur oxide emissions from these units are controlled by limiting the sulfur content of the fuels burned to comply with the LAAPCD Rule 62. Refinery fuel gas must contain less than 1.1 gm/$m^3$ (50 grains/100 $ft^3$) of sulfur compounds. Fuel oil must contain less than 0.5% by weight sulfur. The fuels are tested routinely to insure compliance.

## Internal Combustion Engines

Edgington has only one stationary internal combustion engine. It is a 5,870 kg cal/min (550 hp) Cummings V-12 diesel powered unit which consumes approximately 1,480 l (390 gal) of fuel per day. The unit is used to drive a fuel pipeline pump. There is no emission control equipment on this engine.

## Storage Tanks

There are 57 storage tanks at this facility ranging in size from 64 to 5,700 $m^3$ (400 to 36,000 bbl) and used to store a wide variety

of hydrocarbon materials. All of the tanks are of the fixed roof type. Due to the volatile nature of some of the compounds stored, the potential exists for substantial emissions of hydrocarbon vapors from these tanks. Where such a potential exists, the tanks have been equipped with conservation vents set at 5 cm (2 in) of water vacuum or pressure, or the tanks have been hard-piped to a vapor control system. With this system, vapors are collected from the tanks into a manifold and burned in boilers No. 1, 2, 3 and 6.

A summary of the Edgington storage tanks, their configuration, and the materials stored within is presented in Appendix C.

## Blowdown Systems

Edgington has no flare systems. All major process units are equipped with pressure relief valves set at 3.5 $kg/cm^2$ (50 psia). The pressure relief valves are in series with rupture discs and vent to the atmosphere.

## Vacuum Jets

Exhaust gases from the vacuum jets attendant to the vacuum distillation unit are scrubbed in a caustic scrubber and then burned in process heater H-201.

## Asphalt Blowing

There are 6 asphalt blowing stills. Two stills are in operation at any time. Off-gases from the blowing operation are passed through water seal pots and incinerated in Boilers No. 1, 2, 3 and 6.

## Product Loading Racks

There are 52 spigots from which various products can be loaded into truck or rail car. Eight of the spigots used for truck loading of hot asphalt are on a vapor collection system which routes fumes to a 28 $m^3$ (1,000 $ft^3$)/minute Brink's filter. An additional 14 spigots at the asphalt pit rack and a single spigot for truck loading of roofing asphalt are tied to a vapor collection system which routes fumes to a 14 $m^3$ (500 $ft^3$)/minute Brink's filter. Nine spigots at the rail car loading rack for hot asphalt and five spigots at the west asphalt truck loading facility are tied to a 14 $m^3$ (500 $ft^3$)/minute Brink's filter system.

The remaining spigots are as follows: gasoline, 2; jet fuel, 2; gas oil, 2; diesel fuel, 1; stove oil, 1; asphalt emulsion, 3; medium cure asphalt, 2; fuel oil, 1; and heavy lube, 1. With the exception of the gasoline units, none of these spigots are on vapor control systems. The two gasoline loading spigots are on vacuum systems with the collected vapors being incinerated in boilers No. 1, 2, and 3.

Edgington has ordered vapor collection spigots for the two jet fuel units. Delivery and installation are anticipated in early 1976. Collected vapors will be incinerated in boilers No. 1, 2, and 3.

## Wastewater Treatment

Edgington's wastewater discharges amount to approximately 930 $m^3$ (245,000 gal)/day. Sources of the wastewater include cooling tower and boiler blowdown, and process wastes.

All wastewater passes through an oil/water separator which is covered. The wastewater then passes through three holding ponds in series and is ultimately discharged to the Los Angeles County Sanitation District sewers.

Skimmed oil which is recovered from the separator unit or the ponds is sent to slop storage and ultimately reprocessed in the crankcase oil treating unit.

## EMISSIONS DATA

### Source Test Data

NEIC personnel requested that Edgington supply copies of all stack tests conducted at the facility since 1972. The LAAPCD was requested to do likewise. Edgington submitted no information. The LAAPCD submitted the following information.

Test C-2043, conducted on September 20 and October 2, 1973, monitored the sulfur content of the off-gases from the sour water stripping unit and the distillation units. These gases are ultimately burned in the process heaters or boilers. The tests were conducted to determine compliance with Rule 62, Sulfur Content of Fuels. A copy of this source test is presented in Appendix D.

The results of this test indicated that the off-gases from the sour water stripper unit complied with Rule 62 since their heating value was less than 2,670 kg cal/$m^3$ (300 Btu/$ft^3$). The off-gases from the vacuum jets at the vacuum distillation unit are passed through caustic scrubbers. Hydrogen sulfide levels were below detectable limits for these gases and hence, they also complied with Rule 62.

The hydrogen sulfide in the off-gases from the two overhead collectors on atmospheric distillation unit No. 2 was found to greatly exceed the 1.1 $gm/m^3$ (50 grains/100 scf) allowable under Rule 62. The company was required to install caustic scrubbers to desulfurize these gases before they are incinerated in the process heaters and boilers. No source test data was submitted by the LAAPCD which shows the hydrogen sulfide content of these gases after installation of the scrubbers.

Test C-2203, conducted October 24, 1974, was made to determine the adequacy of the boilers as asphalt fume incinerators. The test showed that no detectable odors resulted from the boiler fireboxes and, hence, the units were in compliance with Rule 70.

## Computed Emission Rates

Theoretical emisson factors for typical emission sources found at petroleum refineries are listed in Table 9.1-1 of the EPA publication AP-42 *Compilation of Air Pollutant Emission Factors*, Second Edition (second printing with Supplements 1-4). These emission factors were used to compute the following emission rates. Emissions from hydrocarbon storage tanks have not been calculated for this report; rather, they will be included in a separate report being prepared by NEIC which will summarize storage tank emissions from all refineries in Los Angeles County.

*Boilers and Process Heaters.* As can be seen from the listing of process heaters and steam boilers shown in Table 1, all but one of these units can be fired with either natural gas or fuel oil. Theoretical emissions from these units are calculated using different factors for

each fuel type. Therefore, it can be seen that a range of emissions can exist depending on the available fuel situation. Table 2 summarizes the theoretical emissions for two possible situations: 1) all units in operation and *all* units operating on natural gas and, 2) all units in operation and natural gas curtailed so that fuel oil is being used in those units which can use fuel oil. For these calculations, the heat input figures for the units were those supplied by Edgington as rated unit capacities. Also, all units at the refinery were considered to be operating and at rated capacity, a situation which admittedly will yield maximum emissions estimations.

The process heaters and boilers are major contributors of nitrogen oxides. Depending on the fuel use pattern at the refinery, calculated nitrogen oxides emissions for these units range from 25.3 to 54.5 kg (55.6 to 119.8 lb)/hour as $NO_2$. If the refinery is on natural gas curtailment, these units are also potential sources of particulate matter, 15.6 kg (34.3 lb)/hour and sulfur oxides 59 kg (129 lb)/hour as $SO_2$.

*Other Sources.* Table 2 summarizes the calculated theoretical emission rates from other sources within the refinery. In general, AP-42 gives only hydrocarbon emission factors for these sources. The major source appears to be leakage from pipeline valves and flanges which amounts to 16 kg (34 lb)/hour.

## SUMMARY OF VIOLATIONS

A review of the LAAPCD records indicates that four violation notices have been issued to Edgington.

*Table 2*

*CALCULATED EMISSION RATES FROM VARIOUS UNIT OPERATIONS*
*EDGINGTON OIL COMPANY - LONG BEACH, CALIFORNIA*

| Emission Source | Calculated Emissions | | | | | | | | | | | | Ammonia | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Particulates | | Sulfur Oxides ($SO_2$) | | Carbon Monoxide (CO) | | Hydrocarbons | | Nitrogen Oxides ($NO_2$) | | Aldehydes | | | |
| | (kg/hr) | (lb/hr) | (kg/hr) | (lb/hr) | (kg/hr) | (lb/hr) | (kg/hr) | (lb/hr) | (kg/hr) | (lb/hr) | (kg/hr) | (lb/hr) | (kg/hr) | (lb/hr) |
| Process Heaters and Steam Boilers | | | | | | | | | | | | | | |
| Condition 1† | 2.2 | 4.8 | Neg. | | Neg. | | 3.3 | 7.3 | 25.3 | 55.6 | 0.3 | 0.7 | Neg. | |
| Condition 2†† | 15.6 | 34.3 | 59 | 129 | Neg. | | 2.7 | 5.8 | 54.5 | 119.8 | 0.5 | 1.0 | Neg. | |
| Wastewater Treatment | Neg. | | Neg. | | Neg. | | 0.9 | 1.9 | Neg. | | Neg. | | Neg. | |
| Pipeline Valves and Flanges | Neg. | | Neg. | | Neg. | | 16 | 34 | Neg. | | Neg. | | Neg. | |
| Vessel Relief Valves | Neg. | | Neg. | | Neg. | | 6 | 14 | Neg. | | Neg. | | Neg. | |
| Pump Seals | Neg. | | Neg. | | Neg. | | 9 | 21 | Neg. | | Neg. | | Neg. | |
| Compressor Seals | Neg. | | Neg. | | Neg. | | 3 | 6 | Neg. | | Neg. | | Neg. | |
| Miscellaneous | Neg. | | Neg. | | Neg. | | 6 | 12 | Neg. | | Neg. | | Neg. | |
| TOTALS††† | 15.6 | 34.3 | 59 | 129 | Neg. | | 43.6 | 94.7 | 54.5 | 119.8 | 0.5 | 1.1 | Neg. | |

† *Condition 1 is that all units are operating at rated capacity and all are fired with natural gas.*
†† *Condition 2 is that all units are operating at rated capacity, natural gas is curtailed, and all units which can utilize fuel oil are doing so.*
††† *Totals include only Condition 2; considered worst situation.*

On August 30, 1963, a violation of Rule 62, *Sulfur Content of Fuels*, was detected. Edgington was found guilty and paid a $52.50 fine.

On January 6, 1970, emissions ranging from 50-60% opacity were detected emanating from the stack serving No. 1 steam boiler, a violation of Rule 50. Edgington pleaded guilty and paid a $200 fine.

On February 20, 1973, emissions ranging from 80-90% opacity were detected emanating from the stack of a crude oil heater, another violation of Rule 50. The Company pleaded guilty and paid a fine of $65.00.

On October 14, 1973, emissions of 70% opacity were detected emanating from an open hatch of a railroad tank car which was being loaded with cutback asphalt without the vapor control system in use. Edgington pleaded guilty and paid a fine of $65.00.

## INSPECTION SUMMARY

At the time of this inspection, all major process units were in operation with the exception of the crankcase oil rerun unit. All process units, storage vessels, potential emission points, and pollution control devices in use at the refinery were observed during the inspection. No visible emissions were detected from any of the process heaters or steam boilers.

Housekeeping at this facility was about average for a refinery which produces asphalt. No major spill areas or leaks were noted throughout the inspection.

The vent pipes on several asphalt storage tanks extend down the side of the tanks into 210 l (55 gal) drums. These drums are intended

to be filled with water to form a seal against vapors which may escape from the tanks through the conservation vents. It was noted that several of these drums were empty, an apparent maintenance problem. No fumes were noted escaping from these vent pipes, however.

# Appendix A

## NEIC INFORMATION REQUEST LETTER TO EDGINGTON OIL COMPANY

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT
NATIONAL FIELD INVESTIGATIONS CENTER—DENVER
BUILDING 53, BOX 25227, DENVER FEDERAL CENTER
DENVER, COLORADO 80225
September 8, 1975

Dear

Pursuant to the authority contained in Section 114 of the Clean Air Act, as amended, representatives of the EPA will conduct, within the next year, inspections of the operations to ascertain compliance with the Federally approved California State Implementation Plan.

Representatives from the Environmental Protection Agency will observe the facility's process operations, inspect monitoring and laboratory equipment and analytical methods, review source test data, examine appropriate records, etc. A process and air pollution flow diagram or a blueprint of the facility and production information should be available for the EPA personnel at the start of the inspections.

Detailed information about air pollution sources will be discussed during these inspections. Attached is a partial list of the information that will be needed in order to complete these inspections. We would appreciate it if you could inform the appropriate company personnel about the forthcoming inspections so that the necessary information will be readily available and the inspection can be expedited.

If you have any questions concerning these inspections, please feel free to contact Arnold Den, Chief, Air Investigations Section, Region IX, San Francisco, at 415/556-8752.

A representative of the EPA (Dr. Wayne Smith or Mr. David Brooman, 303/234-4658) will contact you within the next 30 days concerning this visit.

Sincerely,

Thomas P. Gallagher
Director

Attachments

A. Refinery Capacity in Barrels/Day

B. Furnaces, Boilers and Process Heaters (for each furnace boiler and heater)

1. Rated capacity in $10^6$ BTU/hr heat input.
2. Maximum capacity as per cent of rated capacity.
3. For oil fired units:

   a. Rated capacity in gals/hr or $10^3$ bbl/hr.
   b. Heating value in BTU's/gal.
   c. Per cent sulfur and ash in oil by wt.
   d. Specific gravity of oil.
   e. Firing pattern (atomization, etc. for furnaces).

4. For gas fired units:

   a. Rated capacity in $10^3$ SCF/hr.
   b. Type of gas burned (list principal constituents in % by weight).
   c. Density lb/SCF.
   d. Heating value of gas in BTU's/SCF.
   e. Sulfur content of gas in % S by vol and grains/SCF.

5. Type(s) of control equipment and collection efficiency(s) (design and actual).
6. Pressure drop (inches of water) across collection devices(s).
7. Elevation above grade of stack outlets and other discharge points.
8. Identification of stacks equipped with recording monitors for determining opacities of stack effluents.
9. Existing stack test data. The full test reports describing methods used, test data, calculations, test results and process weights should be available.
10. Inside diameters of each stack (ft).
11. Temperature of effluent gas stream from each stack (°F).
12. Exit velocity of each stack effluent (ft/sec).

C. Incinerators: (For each incinerator)

1. Rated capacity in $10^6$ BTU's/hr; include auxiliary burners separately.
2. Auxiliary burner fuels:
   oil - $10^3$ bbl/hr and specific gravity.
   gas - $10^3$ SCF/hr and density in lb/SCF.
   other - (describe) - lbs/hr (Heating value of each fuel).

3. Maximum capacity as per cent of rated capacity for auxiliary burners.
4. Sulfur and ash content of fuel as % by weight for auxiliary burners.
5. Type of material incinerated.
6. Rated capacity for material incinerated in lb/hr.
7. Sulfur and ash content of material incinerated as % by weight.
8. Heating value of material incinerated.
9. The gas flow rate reported at dry standard conditions (DSCFH).
10. Type(s) of control equipment and collection efficiency(s) (design and actual).
11. Pressure drop (inches of water) across collection device(s).
12. Elevation above grade of stack outlets and other discharge points (ft).
13. Identification of stacks equipped with recording monitors for determining opacities of stack effluents.
14. Existing stack test data. Data should include the full test reports describing methods used, test data, calculations, test results and process weights.
15. Inside diameter of each stack (ft).
16. Exit velocity of each stack effluent (ft/sec.).
17. Temperature of effluent gas stream from each stack in °F.

D. Catalytic Cracking Units, Coker Units: (For each unit)

1. Rated capacity - $10^6$ BTU/hr and indicate the type of unit such as PCC, Coker, etc.
2. Maximum capacity as per cent of rated capacity.
3. Type of feed-stock used and barrels of fresh feed used per yr.
4. Sulfur content of feed-stock (% by weight).
5. Types of control equipment and collection efficiency(s) (design and actual).
6. Pressure drop (inches of water) across collection devices(s).
7. Elevation above grade of stack outlets and other discharge points (ft).
8. Identification of stacks equipped with recording monitors for determining opacities of stack effluents.
9. Existing stack test data. Data should include the full test reports describing methods used, test data, calculations, test results and process weights.
10. Inside diameter of each stack (ft).
11. Exit velocity of each stack effluent (ft/sec).
12. Total flow through unit in $10^3$ bbl/hr and ton/hr.
13. Temperature of effluent gas stream from each stack in °F.
14. Indicate disposition of waste gas stream, i.e., burned in afterburner, etc.

15. Average hours of operation per month and average monthly catalyst makeup for the catalytic cracking units.
16. Indicate date of installation or latest modification.

E. Blowdown Systems:

1. Indicate type and efficiency of each air pollution control device.

F. Flares: (For each flare)

1. Type
2. Height and diameter of stack (ft).
3. Velocity of stack effluent (ft/sec).
4. Temperature of gas effluent (°F).
5. Rated capacity $10^6$ BTU/hr and tons/hr (of flared material).
6. Amount of material flared and percent of time material being flared.
7. Maximum capacity as per cent of rated capacity.
8. Type of flare ignition device at top of stack.
9. Sulfur content of flared input (% by wt).
10. Where material comes from that is burned in flare.

G. Storage Vessels: (For each vessel)

1. Indicate type of tank (fixed roof, floating roof, vapor recovery, etc.)
2. Give storage capacity of each tank in $10^3$ gallons or barrels.
3. Indicate type of material stored in each tank (crude oil, gasoline, finished petroleum product) and give annual average true vapor pressure (TVP) and seasonal maximum for actual storage condition of product stored in lbs/sq. in. absolute.
4. State tank diameter (ft).
5. Indicate if tank is equipped with submerged fill pipe.
6. Indicate if the tank is a pressure tank capable of maintaining working pressure sufficient at all times to prevent vapor or gas loss to the atmosphere.
7. State type of air pollution control equipment on each tank, i.e., conservation vent, vapor recovery system, etc.
8. Indicate average and seasonal maximum temperature of each tank.
9. Indicate date of installation or latest modifications.
10. Indicate if tank is used for multiple product storage.

H. Wastewater Treatment Systems:

1. Indicate gallons of waste water discharged daily.
2. Indicate source of such drains (process discharged).

3. Indicate type and efficiency of each air pollution control device and any existing test data indicating actual emissions. Data should include the full test reports describing methods used, test data, calculations, test results and process weight.

I. Internal Combustion Engines: (Stationary)

1. Type of engine.
2. Amount of fuel burned per day.
3. Type of fuel.

J. Vacuum Jets and/or Barometric Condensers

1. Indicate type and efficiency of each air pollution control device.
2. Indicate disposition of exhaust gases (eg. To afterburners, fireboxes, etc.).

K. Loading Rack Vapor Recovery:

1. Actual product throughput in $10^3$ gallons per day and year.
2. Type of material loaded.
3. Type of vapor recovery system and rated collection efficiency.
4. Existing test data. The full test reports describing methods used, test data, calculations and test results should be submitted.

L. Submit schematic diagrams showing stacks and their respective process associations and control equipment.

M. List any other significant (25 tons/yr. potential uncontrolled emission) sources of particulates, sulfur dioxide, carbon monoxide, oxides of nitrogen, and hydrocarbons not covered by Items B-L. Include:

1. Type of process and rated capacity.
2. Type of material processed.
3. Types of collection equipment and collection efficiency(s) (design and actual).
4. Pressure drop (inches of water) across collection devices.
5. Existing stack test data applicable to current operating conditions. The full test reports describing methods used, test data, calculations, test results and process weights should be submitted.

# Appendix B

## SELECT LAAPCD RULES

APPENDIX B

County of Los Angeles
Air Pollution Control District

# Rules and Regulations

# IV

# Prohibitions

√ **Rule 50. Ringelmann Chart.**

(Effective January 6, 1972 for any source not completed and put into service. Effective for all sources on January 1, 1973.)

A person shall not discharge into the atmosphere from any single source of emission whatsoever any air contaminant for a period or periods aggregating more than three minutes in any one hour which is.

a. As dark or darker in shade as that designated No. 1 on the Ringelmann Chart, as published by the United States Bureau of Mines, or

b. Of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in subsection (a) of this Rule.

This amendment shall be effective on the date of its adoption for any source of emission not then completed and put into service. As to all other sources of emission this amendment shall be effective on January 1, 1973.

√ **Rule 51. Nuisance.**

A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health or safety of any such persons or the public or which cause or have a natural tendency to cause injury or damage to business or property.

X **Rule 52., Particulate Matter - Concentration.**

(Effective January 6, 1972 for any equipment not completed and put into service. Effective for all equipment on January 1, 1973.)

A person shall not discharge into the atmosphere from any source particulate matter in excess of the concentration shown in the following table: (See Rule 52 Table)

Where the volume discharged falls between figures listed in the table, the exact concentration permitted to be discharged shall be determined by linear interpolation.

The provisions of this rule shall not apply to emissions resulting from the combustion of liquid or gaseous fuels in steam generators or gas turbines.

For the purposes of this rule "particulate matter" includes any material which would become particulate matter if cooled to standard conditions.

This amendment shall be effective on the date of its adoption for any

## Rule 56. Storage of Petroleum Products.

A person shall not place, store or hold in any stationary tank, reservoir or other container of more than 40,000 gallons capacity any gasoline or any petroleum distillate having a vapor pressure of 1.5 pounds per square inch absolute or greater under actual storage conditions, unless such tank, reservoir or other container is a pressure tank maintaining working pressures sufficient at all times to prevent hydrocarbon vapor or gas loss to the atmosphere, or is designed and equipped with one of the following vapor loss control devices, properly installed, in good working order and in operation:

a. A floating roof, consisting of a pontoon type or double-deck type roof, resting on the surface of the liquid contents and equipped with a closure seal, or seals, to close the space between the roof edge and tank wall. The control equipment provided for in this paragraph shall not be used if the gasoline or petroleum distillate has a vapor pressure of 11.0 pounds per square inch absolute or greater under actual storage conditions. All tank gauging and sampling devices shall be gas-tight except when gauging or sampling is taking place.

b. A vapor recovery system, consisting of a vapor gathering system capable of collecting the hydrocarbon vapors and gases discharged and a vapor disposal system capable of processing such hydrocarbon vapors and gases so as to prevent their emission to the atmosphere and with all tank gauging and sampling devices gas-tight except when gauging or sampling is taking place.

c. Other equipment of equal efficiency, provided such equipment is submitted to and approved by the Air Pollution Control Officer.

**Rule 59. Effluent Oil Water Separators.**

(Effective June 29, 1971 for any equipment not completed and put into service. Effective for all equipment after July 1, 1972)

A person shall not use any compartment of any vessel or device operated for the recovery of oil from effluent water which recovers 200 gallons a day or more of any petroleum products from any equipment which processes, refines, stores or handles hydrocarbons with a Reid vapor pressure of 0.5 pound or greater, unless such compartment is equipped with one of the following vapor loss control devices, except when gauging or sampling is taking place:

a. A solid cover with all openings sealed and totally enclosing the liquid contents of that compartment.

b. A floating pontoon or double-deck type cover, equipped with closure seals to enclose any space between the cover's edge and compartment wall.

c. A vapor recovery system, which reduces the emission of all hydrocarbon vapors and gases into the atmosphere by at least 90 per cent by weight.

d. Other equipment of an efficiency equal to or greater than a, b, or c, if approved by the Air Pollution Control Officer.

This rule shall not apply to any oil-effluent water separator used exclusively in conjunction with the production of crude oil, if the water fraction of the oil-water effluent entering the separator contains less than 5 parts per million hydrogen sulfide, organic sulfides, or a combination thereof.

This amendment shall be effective at the date of its adoption for any equipment not then completed and put into service. As to all other equipment this amendment shall be effective on July 1, 1972.

**Rule 60. Circumvention.**

A person shall not build, erect, install, or use any article, machine, equipment or other contrivance, the use of which, without resulting in a reduction in the total release of air contaminants to the atmosphere, reduces or conceals an emission which would otherwise constitute a violation of Division 20, Chapter 2 of the Health and Safety Code of the State of California or of these Rules and Regulations. This Rule shall not apply to cases in which the only violation involved is of Section 24243 of the Health and Safety Code of the State of California, or of Rule 51 of these Rules and Regulations.

**Rule 61. Organic Liquid Loading.**

(Effective June 29, 1971 for any equipment not completed and put into service. Effective for all equipment after July 1, 1972)

A person shall not load organic liquids having a vapor pressure of 1.5 psia or greater under actual loading conditions into any tank truck, trailer, or railroad tank car from any loading facility unless the loading facility is equipped with a vapor collection and disposal system or its equivalent approved by the Air Pollution Control Officer.

Loading shall be accomplished in such a manner that all displaced vapor and air will be vented only to the vapor collection system. Measures shall be taken to prevent liquid drainage from the loading device when it is not in use or to accomplish complete drainage before the loading device is disconnected.

The vapor disposal portion of the vapor collection and disposal system shall consist of one of the following:

a. An absorber system or condensation system which processes all vapors and recovers at least 90 per cent by weight of the organic vapors and gases from the equipment being controlled.

b. A vapor handling system which directs all vapors to a fuel gas system.

c. Other equipment of an efficiency equal to or greater than a or b if approved by the Air Pollution Control Officer.

This rule shall apply only to the loading of organic liquids having a

vapor pressure of 1.5 psia or greater under actual loading conditions at a facility from which at least 20,000 gallons of such organic liquids are loaded in any one day.

"Loading facility", for the purpose of this rule, shall mean any aggregation or combination of organic liquid loading equipment which is both (1) possessed by one person, and (2) located so that all the organic liquid loading outlets for such aggregation or combination of loading equipment can be encompassed within any circle of 300 feet in diameter.

This amendment shall be effective at the date of its adoption for any equipment not then completed and put into service. As to all other equipment this amendment shall be effective on July 1, 1972.

√ Rule 62. Sulfur Contents of Fuels.

A person shall not burn within the Los Angeles Basin at any time between May 1 and September 30, both dates inclusive, during the calendar year 1959, and each year thereafter between April 15 and November 15, both inclusive, of the same calendar year, any gaseous fuel containing sulfur compounds in excess of 50 grains per 100 cubic feet of gaseous fuel, calculated as hydrogen sulfide at standard conditions, or any liquid fuel or solid fuel having a sulfur content in excess of 0.5 per cent by weight.

The provisions of this rule shall not apply to:

a. The burning of sulfur, hydrogen sulfide, acid sludge or other sulfur compounds in the manufacturing of sulfur or sulfur compounds.

b. The incinerating of waste gases provided that the gross heating value of such gases is less than 300 British Thermal Units per cubic foot at standard conditions and the fuel used to incinerate such waste gases does not contain sulfur or sulfur compounds in excess of the amount specified in this rule.

c. The use of solid fuels in any metallurgical process.

d. The use of fuels where the gaseous products of combustion are used as raw materials for other processes.

e. The use of liquid or solid fuel to propel or test any vehicle, aircraft, missile, locomotive, boat or ship.

f. The use of liquid fuel whenever the supply of gaseous fuel, the burning of which is permitted by this rule, is not physically available to the user due to accident, act of God, act of war, act of the public enemy, or failure of the supplier.

Rule 62.1 Sulfur Contents of Fuels.

a. A person shall not burn within the Los Angeles Basin at any time between the days of November 16 of any year and April 14 of the next succeeding calendar year, both dates inclusive, any fuel described in the first paragraph of Rule 62 of these Rules and Regulations.

b. The provisions of this Rule do not apply to:

1. Any use of fuel described in Subsections a,b,c,d,e, and f of said Rule 62 under the conditions and for the uses set forth in said Subsections.

2. The use of liquid fuel during a period for which the supplier of gaseous fuel, the burning of which is not prohibited by this Rule, interrupts the delivery of gaseous fuel to the user.

c. Every holder of, and every applicant for a permit to operate fuel-burning equipment under these Rules and Regulations shall notify the Air Pollution Control Officer in the manner and form prescribed by him, of each interruption in and resumption of delivery of gaseous fuel to his equipment.

Rule 62.2 Sulfur Contents of Fuels.

Notwithstanding the provisions of Section (f) of Rule 62 or any pro-

vision of said section as incorporated into Rule 62.1 or any provision of Subsection (2) of Section b of Rule 62.1, a person shall not burn within the Los Angeles Basin any liquid fuel or solid fuel having a sulfur content in excess of 0.5 per cent by weight.

It shall not be a violation of this rule to burn such fuel for a period of not to exceed three calendar days (and in addition for that period of time necessary for the Hearing Board to render a decision, provided that an application for a variance is promptly filed) when other fuel which complies with this Rule is not used due to accident, strike, sabotage, or act of God.

X Rule 63. Gasoline Specifications.

a. A person shall not, after June 30, 1960, sell or supply for use within the District as a fuel for motor vehicles as defined by the Vehicle Code of the State of California, gasoline having a degree of unsaturation greater than that indicated by a Bromine Number of 30 as determined by ASTM Method D1159-57T modified by omission of the mercuric chloride catalyst.

b. For the purpose of this rule, the term "gasoline" means any petroleum distillate having a Reid vapor pressure of more than four pounds.

X Rule 64. Reduction of Animal Matter.

A person shall not operate or use any article, machine, equipment or other contrivance for the reduction of animal matter unless all gases, vapors and gas-entrained effluents from such an article, machine, equipment or other contrivance are:

a. Incinerated at temperatures of not less than 1200 degrees Fahrenheit for a period of not less than 0.3 second, or

b. Processed in such a manner determined by the Air Pollution

X Rule 66.1. Architectural Coatings.

a. A person shall not sell or offer for sale for use in Los Angeles County, in containers of one quart capacity or larger, any architectural coating containing photochemically reactive solvent, as defined in Rule 66(k).

b. A person shall not employ, apply, evaporate or dry in Los Angeles County any architectural coating, purchased in containers of one quart capacity or larger, containing photochemically reactive solvent, as defined in Rule 66(k).

c. A person shall not thin or dilute any architectural coating with a photochemically reactive solvent, as defined in Rule 66(k).

d. For the purposes of this rule, an architectural coating is defined as a coating used for residential or commercial buildings and their appurtenances; or industrial buildings.

X Rule 66.2.Disposal and Evaporation of Solvents

A person shall not during any one day dispose of a total of more than 1½ gallons of any photochemically reactive solvent, as defined in Rule 66(k), or of any material containing more than 1½ gallons of any such photochemically reactive solvent by any means which will permit the evaporation of such solvent into the atmosphere.

√ Rule 67. Fuel Burning Equipment.

A person shall not build, erect, install or expand any non-mobile fuel burning equipment unit unless the discharge into the atmosphere of contaminants will not and does not exceed any one or more of the following rates:

1. 200 pounds per hour of sulfur compounds, calculated as sulfur

dioxide ($SO_2$);

2. 140 pounds per hour of nitrogen oxides, calculated as nitrogen dioxide ($NO_2$);
3. 10 pounds per hour of combustion contaminants as defined in Rule 2m and derived from the fuel.

For the purpose of this rule, a fuel burning equipment unit shall be comprised of the minimum number of boilers, furnaces, jet engines or other fuel burning equipment, the simultaneous operations of which are required for the production of useful heat or power.

Fuel burning equipment serving primarily as air pollution control equipment by using a combustion process to destroy air contaminants shall be exempt from the provisions of this rule.

Nothing in this rule shall be construed as preventing the maintenance or preventing the alteration or modification of an existing fuel burning equipment unit which will reduce its mass rate of air contaminant emissions.

X **Rule 68.** Fuel Burning Equipment -- Oxides of Nitrogen.

A person shall not discharge into the atmosphere from any non-mobile fuel burning article, machine, equipment or other contrivance, having a maximum heat input rate of more than 1775 million British Thermal Units (BTU) per hour (gross), flue gas having a concentration of nitrogen oxides, calculated as nitrogen dioxide ($NO_2$) at 3 per cent oxygen, in excess of that shown in the following table:

NITROGEN OXIDES - PARTS PER MILLION PARTS OF FLUE GAS

| FUEL | EFFECTIVE DATE | |
|---|---|---|
| | DECEMBER 31, 1971 | DECEMBER 31, 1974 |
| Gas | 225 | 125 |
| Liquid or Solid | 325 | 225 |

Rule 68.1. Fuel Burning Equipment - Combustion Contaminants.

A person shall not discharge into the atmosphere combustion contaminants exceeding in concentration at the point of discharge, 0.3 grain per cubic foot of gas calculated to 12 per cent of carbon dioxide ($CO_2$) at standard conditions.

Rule 69. Vacuum Producing Devices or Systems.

A person shall not discharge into the atmosphere more than 3 pounds of organic materials in any one hour from any vacuum producing devices or systems including hot wells and accumulators, unless said discharge has been reduced by at least 90 per cent.

This rule shall be effective at the date of its adoption for any equipment not then completed and put into service. As to all other equipment this rule shall be effective on July 1, 1972.

Rule 70. Asphalt Air Blowing.

A person shall not operate or use any article, machine, equipment or other contrivance for the air blowing of asphalt unless all gases, vapors and gas-entrained effluents from such an article, machine, equipment or other contrivance are

a. Incinerated at temperatures of not less than 1400 degrees Fahrenheit for a period of not less than 0 3 second, or

b. Processed in such a manner determined by the Air Pollution Control Officer to be equally, or more, effective for the purpose of air pollution control than (a) above.

This rule shall be effective at the date of its adoption for any equipment not then completed and put into service. As to all other equipment this rule shall be effective on July 1, 1972.

Rule 71. Carbon Monoxide.

A person shall not, after December 31, 1971, discharge into the atmosphere carbon monoxide (CO) in concentrations exceeding 0.2 per cent by volume measured on a dry basis.

The provisions of this rule shall not apply to emissions from internal

combustion engines

Rule 72. Pumps and Compressors.

A person shall not, after July 1, 1973, use any pump or compressor handling organic materials having a Reid Vapor Pressure of 1 5 pounds or greater unless such pump or compressor is equipped with a mechanical seal or other device of equal or greater efficiency approved by the Air Pollution Control Officer

The provisions of this rule shall not apply to any pump or compressor which has a driver of less than one (1) horsepower motor or equivalent rated energy or to any pump or compressor operating at temperatures in excess of 500°F.

Rule 73. Safety Pressure Relief Valves.

A person shall not, after July 1, 1973, use any safety pressure relief valve on any equipment handling organic materials above 15 pounds per square inch absolute pressure unless the safety pressure relief valve is vented to a vapor recovery or disposal system, protected by a rupture disc, or is maintained by an inspection system approved by the Air Pollution Control Officer

The provisions of this rule shall not apply to any safety pressure relief valve of one (1) inch pipe size or less.

# Appendix C
# STORAGE TANK LISTING

TABLE NO. 2

TANKS

| TANK NUMBER | CAPACITY $10^3$ BBL. | PRODUCT | ANNUAL AVG. TRUE VAP.PRESS. & MAX. VAP.PRESS. | TANK DIAMETER (FEET) | POLLUTION CONTROL | TANK TEMP. AVG./MAX. | MULTIPLE PRODUCT | DATE INSTALLED OR MODIFIED |
|---|---|---|---|---|---|---|---|---|
| 36001 | 36.0 | ASPHALT | ø | 73'-0" | 2" $H_2O$ | 390/420 | NO | 1973 |
| 36002 | 36.0 | ASPHALT | ø | 73'-0" | 2" $H_2O$ | 390/420 | NO | 1973 |
| 36003 | 36.0 | ASPHALT | ø | 73'-0" | 2" $H_2O$ | 390/420 | NO | 1973 |
| 30003 | 30.0 | CRUDE * | 1.0 AVG/1.2 MAX | 70'-0" | ø | * 100/110 | NO | 1958 |
| 30004 | 30.0 | CRUDE * | 1.0 AVG/1.2 MAX | 70'-0" | ø | * 100/110 | NO | 1959 |
| 30005 | 30.0 | ASPHALT | ø | 67'-0" | 2" $H_2O$ | 390/420 | NO | 1959 |
| 30006 | 30.0 | CRUDE/FUEL OIL | ø | 67'-0" | VAP/REC | 110/120-120/140 | YES | 1962 |
| 30007 | 30.0 | JET FUEL | 1.0 AVG/1.5 MAX | 67'-0" | VAP/REC | AMB | NO | 1962 |
| 30008 | 30.0 | GASOIL | ø | 67'-0" | VAP/REC | 110/120 | NO | 1962 |
| 12001 | 12.0 | ASPHALT | ø | 42'-6" | 2" $H_2O$ | 390/420 | NO | 1965 |
| 12002 | 12.0 | ASPHALT | ø | 42'-6" | 2" $H_2O$ | 390/420 | NO | 1965 |
| 12003 | 12.0 | ASPHALT | ø | 42'-6" | 2" $H_2O$ | 390/420 | NO | 1965 |
| 12005 | 12.0 | DIESEL | ø | 42'-6" | ø | 110/120 | NO | 1962 |
| 12006 | 12.0 | GASOIL | ø | 42'-6" | ø | 105/115 | NO | 1963 |
| 12007 | 12.0 | NAPHTHA | 1.0 AVG/1.5 MAX | 42'-6" | VAP/REC | AMB | NO | 1963 |
| 12008 | 12.0 | JET FUEL | 1.0 AVG/1.5 MAX | 42'-6" | VAP/REC | AMB | NO | 1962 |
| 12009 | 12.0 | JET FUEL/STOVE OIL | 2.7 AVG/3.0 MAX | 42'-6" | VAP/REC | AMB | YES | 1962 |
| 6303 | 6.3 | RAW DRAIN OIL | 0.1 AVG/0.2 MAX | 33'-6" | 2" $H_2O$ | 140/150 | NO | 1970 |
| 6304 | 6.3 | SLOP OIL | 0.2 AVG/0.3 MAX | 33'-6" | ø | 175/200 | NO | 1970 |
| 6305 | 6.3 | HEAVY LUBE | ø | 38'-0" | VAP/REC | 150/180 | NO | 1970 |
| 6001 | 6.0 | SLOP OIL | 0.3 AVG/0.5 MAX | 32'-0" | 2" $H_2O$ | 175/200 | NO | 1959 |
| 6002 | 6.0 | DRAIN OIL | 0.1 AVG/0.2 MAX | 32'-0" | 2" $H_2O$ | 110/130 | NO | 1959 |
| 6006 | 6.0 | ASPHALT | ø | 32'-0" | 2" $H_2O$ | 390/420 | NO | 1967 |
| 5002 | 5.0 | GASOLINE | 6.0 AVG/7.0 MAX | 38'-0" | VAP/REC | AMB | NO | 1946 |
| 5003 | 5.0 | ASPHALT | ø | 38'-0" | 2" $H_2O$ | 390/420 | NO | 1946 |
| 5004 | 5.0 | GASOLINE | 6.0 AVG/7.0 MAX | 39'-6" | VAP/REC | AMB | NO | 1946 |
| 4001 | 4.0 | FUEL OIL/HIGH FLASH LUBE | ø | 31'-0" | ø | 130/180-190/250 | YES | 1944 |
| 4002 | 4.0 | HIGH FLASH LUBE | ø | 31'-0" | ø | 190/250 | NO | 1944 |
| 3001 | 3.0 | HIGH FLASH LUBE | ø | 26'-6" | ø | 190/250 | NO | 1966 |
| 2201 | 2.2 | DIESEL | ø | 26'-0" | VAP/REC | 70/115 | NO | 1948 |

* UPGRADED 2/2/76

TABLE NO. 2 (con't.)

TANKS

| TANK NUMBER | CAPACITY $10^3$ BBL. | PRODUCT | ANNUAL AVG. TRUE VAP.PRESS. & MAX. VAP.PRESS. | TANK DIAMETER (FEET) | POLLUTION CONTROL | TANK TEMP. AVG./MAX. | MULTIPLE PRODUCT | DATE INSTALLED OR MODIFIED |
|---|---|---|---|---|---|---|---|---|
| 2202 | 2.2 | STOVE OIL | ø | 26'-0" | ø | 70/100 | NO | 1948 |
| 2203 | 2.2 | CUT BACK ASPHALT | ø | 30'-0" | 2" $H_2O$ | 225/310 | NO | 1948 |
| 2204 | 2.2 | CUT BACK ASPHALT | ø | 30'-0" | 2" $H_2O$ | 225/310 | NO | 1948 |
| 2001 | 6.3 | ASPHALT | ø | 33'-6" | 2" $H_2O$ | 380/450 | NO | 1968 |
| 2002 | 6.3 | ASPHALT | ø | 33'-6" | 2" $H_2O$ | 380/450 | NO | 1968 |
| 1801 | 1.8 | ASPHALT | ø | 27'-0" | 2" $H_2O$ | 300/375 | NO | 2948 |
| 1802 | 1.8 | ASPHALT | ø | 27'-0" | 2" $H_2O$ | 300/375 | NO | 1948 |
| 1506 | 1.1 | HEAVY GASOIL | ø | 20'-0" | 2" $H_2O$ | 150/200 | NO | 1952 |
| 1507 | 1.5 | CUT BACK ASPHALT | ø | 21'-6" | 2" $H_2O$ | 225/300 | NO | 1966 |
| 1508 | 1.5 | CUT BACK ASPHALT | ø | 21'-6" | 2" $H_2O$ | 225/300 | NO | 1966 |
| 1509 | 1.5 | WELL WATER | ø | 18'-0" | ø | AMB | NO | 1942 |
| 1510 | 1.5 | EFFLUENT WATER | ø | 18'-0" | ø | 130/175 | NO | 1942 |
| 1511 | 1.5 | CC TOPS | 1.0 AVG/1.3 MAX | 18'-0" | ø | 70/100 | NO | 1942 |
| 1513 | 1.5 | SPENT CAUSTIC | ø | 18'-0" | ø | 100/130 | NO | 1942 |
| 1101 | 1.1 | ROOFING ASPHALT | ø | 15'-6" | 2" $H_2O$ | 350/470 | NO | 1948 |
| 1102 | 1.1 | ROOFING ASPHALT | ø | 15'-6" | 2" $H_2O$ | 350/470 | NO | 1948 |
| 1103 | 1.1 | ROOFING ASPHALT | ø | 19'-0" | 2" $H_2O$ | 450/500 | NO | 1959 |
| 1104 | 1.1 | ROOFING ASPHALT | ø | 19'-0" | 2" $H_2O$ | 450/500 | NO | 1959 |
| 1105 | 1.1 | ROOFING ASPHALT | ø | 19'-0" | 2" $H_2O$ | 420/460 | NO | 1960 |
| 1106 | 1.1 | ASPHALT | ø | 19'-0" | 2" $H_2O$ | 420/460 | NO | 1960 |
| 1107 | 1.1 | ASPHALT | ø | 19'-0" | 2" $H_2O$ | 390/420 | NO | 1959 |
| 1108 | 1.1 | HEAVY LUBE | ø | 19'-0" | 2" $H_2O$ | 120/135 | NO | 1959 |
| 1001 | 1.0 | FUEL OIL | ø | 21'-6" | ø | 170/180 | NO | 1942 |
| 451 | .4 | CUT BACK ASPHALT | ø | 10'-0" | 2" $H_2O$ | 225/275 | NO | 1967 |
| 452 | .4 | CUT BACK ASPHALT | ø | 10'-0" | 2" $H_2O$ | 225/275 | NO | 1967 |
| 453 | .4 | CUT BACK ASPHALT | ø | 10'-0" | 2" $H_2O$ | 225/275 | NO | 1967 |
| 454 | .4 | CUT BACK ASPHALT | ø | 10'-0" | 2" $H_2O$ | 225/275 | NO | 1967 |

# Appendix D
# SOURCE TESTS RESULTS

AIR POLLUTION CONTROL DISTRICT

434 SOUTH SAN PEDRO STREET, LOS ANGELES, CALIF. 90013 - MADISON 9-4711 / COUNTY OF LOS ANGELES



TESTS
CONDUCTED AT

EDGINGTON OIL COMPANY
2400 EAST ARTESIA BOULEVARD
LONG BEACH, CALIFORNIA 90805

ON

~~SEPTEMBER 20 AND~~ OCTOBER 2, 1973

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REPORT
ON THE

# COMPOSITION OF OFF-GASES FROM THE SOUR WATER STRIPPING UNIT AND DISTILLATION UNITS AT A PETROLEUM REFINERY (CRUDE UNIT NO. 2)

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BY

Andrew J. Wilson — Supervising Air Pollution Engineer II
Maurice A. Ballas — Senior Air Pollution Engineer

TEAM NO. 4
SOURCE TESTING SECTION
REPORT NO. C-2043

Eric E. Lemke — Director of Engineering
Howard DeVorkin — Supervising Air Pollution Engineer III

ISSUED:
NOV 30 1973

AIR POLLUTION CONTROL DISTRICT - COUNTY OF LOS ANGELES

Test No. C-2043


Sept.-20 and
Oct. 2, 1975

INTRODUCTION

Upon the request of Mr. H. E. Chatfield, Supervising Engineer I, Refinery Unit, a source test program was conducted at the Edgington Oil Co. Refinery on Crude Unit No. 2 located at 2400 East Artesia Boulevard, Long Beach, California. The purpose of the tests was to (1) determine $H_2S$ concentrations and heating values of off-gases from overhead Accumulators D-102 and D-103 of the Atmospheric Distillation Unit, (2) to determine $H_2S$ concentration of the non-condensible gases from vacuum ejectors of the Crude Vacuum Distillation Unit scrubber outlet (point D-402), and (3) to determine $H_2S$ and $NH_3$ concentrations and heating values of off-gases from Vessels D-301 and D-302 of the Sour Water Stripping Unit.

The tests were conducted on ~~September 20~~ and October 2 by Andrew Wilson, Maurice Ballas, Michael Gudlow, Michael Berlant, and (on September 20) Jim Reese of the Source Testing Section. Mr. Matt Misiak of the Refinery Unit was present on both test days and his recorded observations are appended to this report. Test arrangements were made through Mr. Jim Carrigan, Superintendant of Edgington Oil Company.

The standards employed for the test evaluation were compliance with two provisions of Rule 62; namely, (1) determination whether the off-gases had a heating value of 300 BTU/SCF or greater, and (2) determination of the sulfur compounds in the off-gases, calculated as hydrogen sulfide, whether in excess of 50 grains/100 SCF.

PROCESS AND EQUIPMENT DESCRIPTION

Crude oil is heated in the primary tower of the Atmospheric Crude Oil Distillation Unit. The gases from the top of this tower are condensed in an overhead (O.H.) condenser. The knock-out pot for this condenser is designated Accumulator No. D-102. This accumulator has an auxiliary natural gas supply which was closed during the respective source test. The off-gases from this pot were sampled; the station designation is D-102. The condensate from this pot is separated into fractions by settling -- the water is sent to the sour water stripper, the hydrocarbons returned to the tower.

The bottoms from the primary tower are heated and pumped to the secondary crude tower. The off-gases from this tower are processed in a similar manner to that described above for the primary tower. The auxiliary natural gas supply was also off during the test. This accumulator is designated D-103.

The bottoms from the secondary tower are heated and pumped to the vacuum distillation tower of the Vacuum Crude Oil Distillation Unit. The gases from the top of this tower are removed by a vacuum ejector-condenser system. The off gases from this system are vented to a caustic scrubber, designated D-402. The off-gases from the scrubber were sampled (station D-402). The knock-out pot from the condenser (D-201) has a vent pipe for off-gases; however, it was closed during the test (and has always been closed according to the plant operator).

All of the sour water from the various processes of Crude Unit No. 2 are pumped to the sour water stripper. The gases from the top of the stripper are cooled in an overhead condenser. The condensate is collected in a knockout drum, designated D-302, with the liquid draining into an accumulator, designated D-301. Since the off gases from the knockout drum and the accumulator had separate piping which did not join, individual samples were taken of each stream (station D-302 and station D-301).

The off-gases from the above five stations are vented to boilers where they are incinerated without further processing.

SAMPLING PROCEDURES AND ANALYSIS

Hydrogen Sulfide

Hydrogen sulfude was collected by means of an impinger train as shown on page 20 consisting of: two impingers in series containing 100 ml each of a zinc carbonate slurry (prepared in accordance with American Petroleum Institute Method 713-57) followed by a dry impinger, an impinger containing 100 ml of standard iodine solution to absorb any $H_2S$ that was not collected by the $ZnCO_3$ impingers (and also to act as an indicator to signal when the $ZnCO_3$ impingers were saturated), and finally by a dry impinger with a thermometer.

The trains were purged with ambient air after the sampling was completed. The hydrogen sulfide in the $ZnCO_3$ impingers was determined by iodine titration and added to the amount of $H_2S$ found in the iodine impinger as determined by back titration.

The total sample volume is the sum of the water condensed in the impingers, the volume of $H_2S$ absorbed, the volume of $NH_3$, if any (as determined by another train), plus the measured volume of gases through the meter.

Moisture

Total moisture in the sample is the sum of the water condensed in the impingers plus the water vapor that passed through the meter, assuming saturation at the last impinger temperature.

Ammonia

Ammonia was determined by use of an acid impinger train as shown on page 21. The ammonia is absorbed in the HCl impingers and determined by use of Nessler Reagent.

The NaOH impinger which follows the HCl impingers was used to absorb acid gases in order to protect source testing personnel and equipment.

The total sample volume is the sum of the water condensed in the impingers, the volume of $NH_3$ absorbed, the volume of acid gases absorbed (as determined by Orsat and calculated as shown on page 9 ), and the volume of gases measured by the meter.

Acid Gases

The samples were collected in Tedlar bags and analyzed for acid gases ($CO_2$, $H_2S$) with an Orsat analyzer.

Organics

The gas samples were drawn through a "Hallcosorb" tube and collected in evacuated two-liter flasks. The "Hallcosorb" absorbs all acid gases. The flask samples were analyzed for organics by TCA (Total Combustion Analyzer) which reported the carbon content as equivalent % $CO_2$ on a dry, acid gas-free basis.

Heating Value

The gross heating value was determined by calculating the volume of $H_2S$, $NH_3$, and organics, expressed as $CO_2$, contained per standard cubic foot of each sample; multiplying each component by its gross heating value ($H_2S$ by 647 BTU/SCF, $NH_3$ by 441 BTU/SCF, and organics expressed as $CO_2$ by 900 BTU/SCF), and totaling these results. Calculations are shown on page 11.

TEST CRITIQUE

Heating Value

Due to lack of sufficient laboratory personnel, the organics were run by TCA

instead of G.C. (Gas Chromatography), consequently results for total organics are expressed as equivalent $CO_2$ only. In calculating heating value, it was necessary to assume an average BTU per SCF of carbon as equivalent $CO_2$. The value used was 900 BTU/SCF. This assumes that most of the organics were from the lighter end of the paraffin series. Actual values for various hydrocarbons are presented in the table below:

| Compound | BTU/SCF ÷ No. of carbon atoms | = | BTU/equiv. SCF $CO_2$ |
|---|---|---|---|
| Methane | 1013 | 1 | = 1013 |
| Ethane | 1792 | 2 | = 896 |
| Propane | 2590 | 3 | = 863 |
| Butanes (Avg) | 3367 | 4 | = 842 |
| Pentanes (Avg) | 4004 | 5 | = 801 |
| Hexanes (Avg) | 4728 | 6 | = 788 |

Station D-402

The $H_2S$ concentration at point D-402 was considered to be nil as no $H_2S$ was found in the Zn $CO_3$ impingers for this station. Following the Zn $CO_3$ impingers was an impinger containing 100 ml of standard $I_2$ solution (see diagram on page 21). The reduction of iodine was equivalent to 0.12% $H_2S$ as determined by the back-titration. However, since no $H_2S$ was found in the leading Zn $CO_3$ impingers, and no elemental sulfur was found in the $I_2$ solution, it was assumed that the reduction of $I_2$ in this case was caused by the evolution of iodine by too rapid a rate of sampling, or reduction by material other than $H_2S$ in the sample.

General

It was assumed, at conditions existing at the sampling points involved, that both $H_2S$ and $NH_3$ were in the gasous uncombined state.

The samples were not collected simultaneously since different amounts of time were required to complete the sampling at each station, and only one train could be run at a time at each station.

TEST RESULTS

The test results are summarized on page 6. It should be noted that emissions from points D-102 and D-103 fail to comply with limitations of Rule 62 with respect to sulfur content and heating value of the gases being discharged to the boilers.

Test No. C-2043



TEST EVALUATION

A small amount of the iodine absorbing/indicator solution may have been volatized. Since the loss in iodine (determined by backtitration) is assumed to be caused by the $H_2S$ reducing the $I^0$ to $I^-$, and the subsequent production of elemental sulfur, the values reported for the $H_2S$ emission may be slightly high.

Fortunately, for stations D-301 and D-302, where the possible errors could be as high as 25% and 10% respectively, the heating values were below 300 BTU/SCF and Rule 62 did not apply.

For station D-102 and D-103 the possible errors are less than 3%. The $H_2S$ content at these stations is so high that an authority to construct probably would not have been issued if this data were known before this test.

APPROVED _____

ew:11-29-73

AIR POLLUTION CONTROL DISTRICT - COUNTY OF LOS ANGELES

Test No. C-2043


~~Sept. 20 and~~
Oct. 2, 1973

SUMMARY OF DATA AND RESULTS

| Sampling point and location | % $H_2O$ (Wet Basis) | % $H_2S$ (Wet Basis) | % $H_2S$ (Dry Basis) | Grains $H_2S$ Per 100 SCF (Wet Basis) | % $NH_3$ (Wet Basis) | % Acid Gases (Dry Basis) (By Orsat) | Organics as % $CO_2$ on dry acid free-basis | Gross Heating Value BTU/SCF (Wet Basis) |
|---|---|---|---|---|---|---|---|---|
| Off-gases from O.H. Accumulator D-102, Atmospheric Unit | 23.9 | 7.18 | 9.43 | 4530 | NR | 22.0 | 208 | 1157 (a) |
| Off-gases from O.H. Accumulator D-103 Atmospheric Unit | 16.7 | 5.61 | 6.73 | 3520 | NR | 16.8 | 112 | 735 (a) |
| Vacuum Ejectors-Crude Vaccuum Dist. Unit Scrubber Outlet, D-402 | 2.8 | ND | ND | ND | NR | NR | NR | NR |
| Vessel D-301, Sour Water Accumulator | 2.5 | 0.104 | 0.106 | 65 | ND | 6.4 | 32.3 | 266 |
| Vessel D-302, O.H. Knock-Out Pot | 91.0 | 2.4 | 26.7 | 1500 | 2.3 | 74.0 | 34.3 | 33 |

NOTE: (a) Rule 62 limits $H_2S$ concentrations to 50 grains/100 SCF when gross heating value exceeds 300 BTU/SCF

ND = None Detected
NR = Not Requested

5D

EDGINGTON OIL COMPANY
Long Beach, California

## SUMMARY AND CONCLUSIONS

Edgington Oil Company operates a 4,700 $m^3$ (29,500 bbl)/day, simple petroleum refinery at Long Beach, California. An air pollution related inspection was conducted at this facility by NEIC personnel on October 15, 1975. Substantial amounts of process and air pollution control equipment information was requested of, and received from, Edgington. The Los Angeles County Air Pollution Control District (LAAPCD) was requested to supply information pertaining to stack testing conducted at this facility and any violation notices issued to Edgington.

The following conclusions were derived based on the inspection and information obtained:

1. No visible emissions (which exceeded the 20% opacity limitations of LAAPCD Rule 50) were noted from any process units.

2. General housekeeping appeared about average for a refinery which produces asphalt.

3. Based on calculations using approved EPA emission factors, the process heaters and steam boilers at this facility appear to be significant sources of nitrogen dioxide. There are no LAAPCD regulations which apply to these units.

4. The results of the LAAPCD source test C-2203 indicate that the use of boilers No. 1, 2, 3, and 6 as fume incinerators for the asphalt-blowing off-gases complies with the LAAPCD Rule 70.

5. There is no current source test data available from the LAAPCD on the off-gases from the caustic scrubbers installed post-1973 to treat the off-gases from the overhead accumulator of atmospheric distillation unit No. 2. It is not known therefore whether these off-gases comply with LAAPCD Rule 62, Sulfur Content of Fuels.

6. Edgington currently operates a jet fuel loading rack without a vapor recovery system. The vapor recovery equipment for this rack has been ordered and installation is anticipated in early 1976.

## RECOMMENDATIONS

1. Edgington should notify the Director, Enforcement Division, Region IX and the Enforcement Division of the LAAPCD when installation of the vapor recovery spigots for the existing jet fuel loading rack is completed.

2. Edgington should improve their maintenance schedule to insure that the water seal drums on the asphalt storage tanks are kept filled with water.

3. Edgington should conduct source tests on the off-gases from the caustic scrubbers on atmospheric distillation unit No. 2's overhead accumulator. The results of these tests should be forwarded to the Enforcement Division, LAAPCD and the Director, Enforcement Division, Region IX, USEPA.