

ENVIRONMENTAL PROTECTION AGENCY

OFFICE OF ENFORCEMENT

EPA-330/2-76-001

REPORT ON

*State Implementation Plan*

*Air Pollution Inspection*

*of*

*Collier Carbon and Chemical 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  
COLLIER CARBON AND CHEMICAL COMPANY  
P.O. Box 128 Brea, California 92621  
1480 W. Anaheim Street  
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October 17, 1975

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NATIONAL ENFORCEMENT INVESTIGATIONS CENTER - Denver, Colorado  
and  
REGION IX - San Francisco, California

## CONTENTS

INTRODUCTION . . . . .	1
PROCESS DESCRIPTION . . . . .	2
POTENTIAL AIR EMISSION SOURCES AND RELATED CONTROL EQUIPMENT . . .	6
EMISSIONS DATA . . . . .	7
SUMMARY OF VIOLATIONS . . . . .	10
INSPECTION SUMMARY . . . . .	10

### APPENDIX A SELECT LAAPCD RULES

## INTRODUCTION

### Background

Collier Carbon and Chemical Company, a subsidiary of the Union Oil Company of California, is adjacent to the Union Oil refinery in Wilmington, California. Collier processes spent alkylation acid (sulfuric acid), sulfur, and hydrogen sulfide ( $H_2S$ ) gas, which are waste products from the Union Oil refinery processes. The Company produces 380 m.tons (420 tons)/day of sulfuric acid ( $H_2SO_4$ ) computed as 100% strength and 11-13 m.tons (12-14 tons)/day of ammonium sulfate ( $NH_4SO_4$ ) computed as 100% strength from these waste products.

Collier employs twelve people and operates three 8-hour shifts per day, 7 days per week, year around. Its operating periods are directly tied to those of the Union Oil refinery.

On October 17, 1975, a process inspection was conducted at Collier by NEIC personnel. The inspection was preceded by a letter to the Company on September 8, 1975, announcing NEIC's intention to inspect the facility and requesting substantial amounts of process information.

During the inspection, an examination was made of the manufacturing equipment, potential air pollution emission 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 State Implementation Plan as required by Section 110 of the Clean Air Act, as amended.

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

### Inspection Participants

Mr. Bill Bowles-Plant Manager, Collier Carbon & Chemical Co.  
Mr. Herb Marquette-Acid Supervisor, Collier Carbon & Chemical Co.  
Mr. John Powell-Los Angeles County Air Pollution Control Dist. (LAAPCD)  
Mr. Raak Veblen-State of California Air Resources Board (ARB)  
Mr. Alvin Chun-USEPA, Region IX  
Mr. Paul dePercin-USEPA, NEIC  
Dr. Wayne C. Smith-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 A] are applicable to the State Implementation Plan for this facility:

*Rule 50. Ringelmann Chart*

*Rule 51. Nuisance*

*Rule 52. Particulate Matter-Concentration*

*Rule 53.3. Sulfuric Acid Plants*

*Rule 54. Solid Particulate Matter-Weight*

*Rule 71. Carbon Monoxide*

### PROCESS DESCRIPTION

Figure 1 is a flow diagram of the sulfuric acid production facilities used by Collier. The original plant was built in 1960. A brief description of the process follows.

Hydrogen sulfide ( $H_2S$ ) gas, spent alkylation acid (sulfuric acid) sludge, and molten sulfur are received via pipeline from the adjacent Union Oil refinery. These materials are burned with air in a combustion

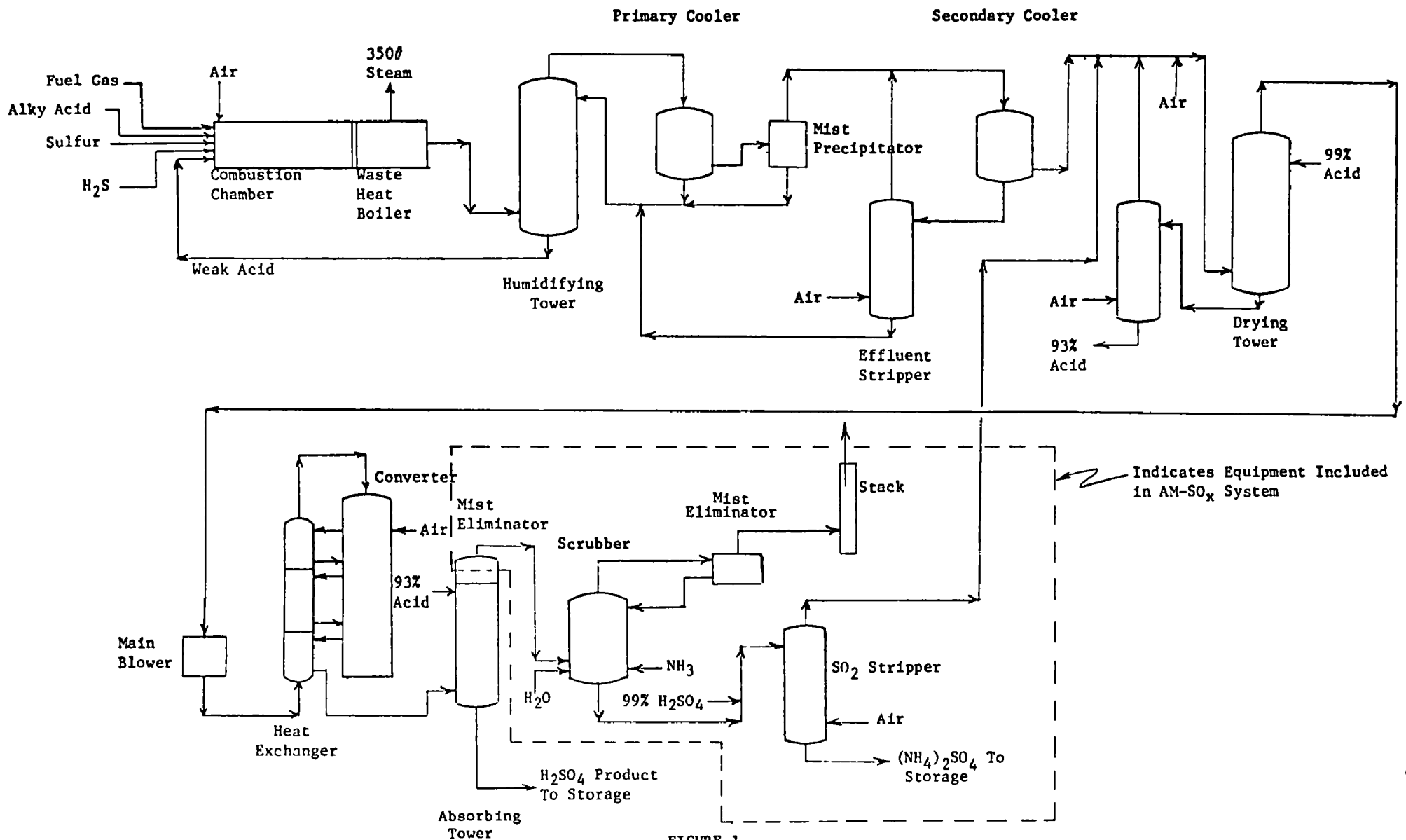


FIGURE 1  
 SCHEMATIC PROCESS DIAGRAM  
 COLLIER CARBON AND CHEMICAL CORP., LOS ANGELES, CA

chamber. Supplemental refinery fuel gas from Union Oil is used as necessary to maintain combustion of the feed materials. Approximately 137 m.tons (150 tons)/day of spent alkylation acid, 40 m.tons (40 long tons) per day of molten sulfur, and 40 m.tons (40 long tons) per day of hydrogen sulfide are burned in the combustion chamber. The Union Oil refinery is the sole source of these materials.

Products from the combustion chamber consist mainly of sulfur dioxide ( $\text{SO}_2$ ) with smaller quantities of water, sulfur trioxide ( $\text{SO}_3$ ), sulfuric acid mist, and ash residue. These combustion products are passed through a waste heat boiler to produce  $25 \text{ kg/cm}^2$  (350 psi) steam used elsewhere in the plant. Collier is also on a give-and-take steam tie-in to the Union Oil refinery.

From the waste heat boiler, the combustion gases are passed through a humidifying tower where they are contacted with water and/or weak acid collected in downstream coolers, strippers, and the mist precipitator. Resulting weak acid from the humidifying tower is recycled and burned in the combustion chamber.

The combustion gases which are exhausted from the humidifying tower are passed through a bank of three parallel primary coolers where a portion of the water vapor and acid mists are separated from the gases and routed to the weak acid stream.

From the primary coolers, the combustion gases pass through an electrostatic precipitator mist collector. Acid mists collected by this unit are recycled to the weak acid stream.

The exhaust gases from the mist precipitator are passed through two parallel coolers which further condense water vapor and weak acid. The condensed materials are routed to an effluent stripper unit where air is introduced to strip sulfur dioxide gas. This stripped  $\text{SO}_2$  is re-introduced into the combustion gas stream. The resulting liquid from the effluent stripper is recycled to the weak acid stream.

From the secondary coolers, the combustion gases are introduced into a drying tower, where they are scrubbed countercurrently with 99% strength sulfuric acid to remove the remaining traces of water vapor. The acid discharged from the bottom of this tower is essentially 93% strength acid. This acid is routed to a cross flow stripper unit and contacted with an air stream. The air stream strips any  $\text{SO}_2$  gas from the acid solution. The  $\text{SO}_2$  is reinjected into the combustion air stream. The 93% acid solution is stored as product or for use later in the process.

The combustion gases which exit the drying tower consist of highly purified  $\text{SO}_2$  gas. This material is drawn through a blower and introduced into the catalytic converter section of the process. A four-stage vanadium pentoxide ( $\text{V}_2\text{O}_5$ ) catalytic converter is used to convert the sulfur dioxide ( $\text{SO}_2$ ) to sulfur trioxide ( $\text{SO}_3$ ). The  $\text{SO}_3$  is then introduced into a countercurrent absorbing tower where it is scrubbed by, and absorbed into, a 93% sulfuric acid solution. The resulting 99.4% sulfuric acid is removed from the bottom of the absorbing tower and piped to product storage.

The process was operated as described above until 1974. In January 1974 a Monsanto Co. AM- $\text{SO}_x$  tail gas scrubbing system was installed to treat the off-gases from the absorbing tower. Installation of this equipment was required to meet the emission requirements of Rule 53.3 of the LAAPCD Rules and Regulations. Rule 53.3 limits emissions of sulfur compounds from sulfuric acid plants to 500 ppmv as  $\text{SO}_2$  and/or 91 kg (200 lb)/hr as  $\text{SO}_2$ .

The AM- $\text{SO}_x$  system is a proprietary system which essentially uses ammonia scrubbing of the tail gas to convert residual  $\text{SO}_2$  and  $\text{SO}_3$  to ammonium sulfate solution [Fig. 1].

Exhaust gases from the absorbing tower are passed through a mesh



mat type mist eliminator and into a scrubber unit. Here they are contacted with water and anhydrous ammonia to form an ammonium sulfite solution. Approximately 2.3 to 2.7 m.tons (2.5 to 3 tons) of anhydrous ammonia are used per day. Exhaust gases from this scrubber are discharged to a second mesh mat type mist eliminator and ultimately out an exhaust stack.

The ammonium sulfite solution discharged from the scrubber unit is mixed with 99% sulfuric acid and introduced into a  $\text{SO}_2$  stripper unit. Here air is contacted with the solution to strip out any unreacted  $\text{SO}_2$ . The  $\text{SO}_2$  is returned to the combustion gas stream of the acid plant ahead of the drying tower and catalyst converter units. The 40% ammonium sulfate solution removed from the  $\text{SO}_2$  stripper is piped to storage.

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

The acid plant itself, an auxiliary process heater, and evaporative losses from storage tanks are the potential sources of air pollution emissions at Collier. Each is briefly discussed below.

##### Acid Plant

The main potential source of emissions at the acid plant is the exhaust stack from the AM- $\text{SO}_x$  tail gas treatment system. The ammonia scrubber unit is a control device which removes residual  $\text{SO}_2$  and  $\text{SO}_3$  from the catalytic converter exhaust gases. The mist eliminator downstream from the ammonia scrubber controls the emission of sulfuric acid mist.

There are no emergency relief valves on the acid plant equipment which would allow discharge of pollutants to the atmosphere. There is one vacuum seal downstream of the electrostatic precipitator which insures that excessive vacuum does not occur in the ESP, primary coolers, humidifying tower, etc. If, however, this seal opens, air is drawn into the process.

### Auxiliary Heater

There is an auxiliary heater unit attendant to the acid plant which is used strictly during startup situations. The heater is used to heat air which is passed over the vanadium pentoxide catalyst beds to preheat them after a process shutdown. The preheat furnace is used for approximately 12 to 14 hours every 18 months or so, depending on the frequency of the Union Oil Company refinery turnarounds.

The preheat furnace is a John Zink unit with a burner capacity of  $3.78 \times 10^6$  kg cal ( $15 \times 10^6$  Btu)/hr. The unit is fueled by natural gas purchased from Southern California Gas Company. It uses  $425 \text{ m}^3$  ( $15,000 \text{ ft}^3$ )/hr of natural gas with a heat content of  $9,300 \text{ kg cal/m}^3$  ( $1,050 \text{ Btu/ft}^3$ ).

There are no emission control devices on the preheat furnace.

### Storage Tanks

Table 1 lists the storage tanks in use at this facility, the commodities stored therein, the size of the tanks, and the evaporative loss control devices employed, if any. All are fixed roof tanks.

The skim oil tank listed is used to store oil-type materials which come in with the spent alkylation acid from the Union Oil refinery. The oil is skimmed from the acid, stored in this tank and sold as byproduct.

### EMISSIONS DATA

#### Source Test Data

On May 29, 1974, the LAAPCD conducted source tests on the exhaust emissions from the AM-SO<sub>x</sub> tail gas treating system (LAAPCD test No. C-2127).

*Table 1*  
 STORAGE TANK LISTING  
 COLLIER CARBON & CHEMICAL COMPANY  
 WILMINGTON, CALIFORNIA

Tank No.	Stored Commodity	Storage Capacity		Control Device
		(m <sup>3</sup> )	(gal)	
F-301	Spent Acid	640	169,248	Conservation vent <sup>+</sup>
F-302	93% H <sub>2</sub> SO <sub>4</sub>	640	169,203	None
F-303	99% H <sub>2</sub> SO <sub>4</sub> <sup>++</sup>	640	169,279	Conservation Vent
F-304	99% H <sub>2</sub> SO <sub>4</sub>	640	169,367	None
F-110	99% H <sub>2</sub> SO <sub>4</sub>	105	27,917	None
F-111	99% H <sub>2</sub> SO <sub>4</sub>	150	39,266	None
F-108	Sulfur	115	30,649	None
F-313	Sulfur	73	19,223	None
F-314	Skim Oil	15	4,000	Tied to Spent Acid Tank
F-305	H <sub>2</sub> O Storage	160	42,000	None
F-320	NH <sub>3</sub> (anhydrous)	45	12,000	Pressure Vessel
F-321	Sulfate	57	15,000	None

<sup>+</sup> Conservation vent set to open to atmosphere at approximately 7.6 cm (3 in) of water vacuum or pressure.

<sup>++</sup> Can also be used for spent acid.

The results of this test indicated particulate emissions of  $19.9 \text{ mg/m}^3$  (.0087 gr/scf) and  $0.7 \text{ kg (1.5 lb)/hr}$ . Sulfur compound emissions were found to be 270 ppmv and  $24 \text{ kg (53.3 lb)/hr}$  as  $\text{SO}_2$ .

Using the above data supplied by the LAAPCD, the emission flow rate during the test can be computed to be approximately  $570 \text{ std. m}^3/\text{min}$  (20,000 scfm). At this emission rate, Rule 52 of the LAAPCD allows a particulate concentration of  $145 \text{ mg/m}^3$  (0.0635 gr/scf). The actual particulate concentration found during the test was well below this level.

Since the acid plant production rate during the test is not known, it is not possible to determine if the  $0.7 \text{ kg (1.5 lb)/hr}$  particulate emission rate is within the allowable limits of the LAAPCD Rule 54. However, since the plant can produce  $15,900 \text{ kg (35,000 lb)/hr}$  of sulfuric acid and  $530 \text{ kg (1,170 lb)/hr}$  of ammonium sulfate, the  $0.7 \text{ kg (1.5 lb)/hr}$  particulate rate appears well below the allowable limit for normal operating periods.

The sulfur compound emissions determined during the test were well within the allowable limits of Rule 53.3 which permits 500 ppmv and  $91 \text{ kg (200 lb)/hr}$  as  $\text{SO}_2$ .

#### Continuous Monitoring Equipment

Collier has installed a DuPont Model 400 photometric continuous  $\text{SO}_2$  analyzer to monitor the exhaust emissions from the AM- $\text{SO}_x$  tail gas treatment system. Stack gases are transported through approximately 18 m (60 ft) of heat-traced teflon tubing to the analyzer which is at ground level in the process area. The analyzer is equipped with a strip chart recorder but does not have an alarm system.

### Calculated Emission Rates

The EPA publication AP-42 *Compilation of Air Pollutant Emission Factors*, Second Edition (Second Printing with Supplements 1-4) presents a thorough discussion of sulfuric acid plants, emission control equipment, and pollutant emission factors. Unfortunately, no emission factors are given for plants which incorporate AM-SO<sub>x</sub> or equivalent tail gas treatment systems. It is not possible, therefore, to compute theoretical emission rates for the Collier system.

### SUMMARY OF VIOLATIONS

A review of the LAAPCD records indicates that a citation was issued to the Company on August 26, 1969 for emissions of "noxious acids" with an opacity of 60% for 7 minutes. Collier pleaded *nolo contendere* and paid a fine of \$125.

There have been no recent citations issued to the Company. All equipment at the plant is operating under a valid LAAPCD permit.

### INSPECTION SUMMARY

At the time of this inspection, the acid plant was operating normally. A complete walkthrough inspection was made of the process. Housekeeping at the plant appeared excellent. There were no noticeable leaks or spill areas.

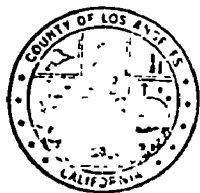
A slight detached plume was noted from the exhaust stack on the AM-SO<sub>x</sub> tail gas treating unit, but the plume was below 20% opacity.

The DuPont SO<sub>2</sub> analyzer was observed to be operating. A review of the strip chart indicated that no excursions of stack gas concentration of SO<sub>2</sub> above 500 ppmv had occurred during the past 24 hours.

**APPENDIX A**

**Select LAAPCD Rules and Regulations**

APPENDIX A



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.

**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

equipment not then completed and put into service. As to all other equipment this amendment shall be effective on January 1, 1973.

**Table For Rule 52**

<b>Volume Discharged-- Cubic Feet Per Minute Calculated as Dry Gas at Standard Conditions</b>	<b>Maximum Concentra- tion of Particulate Mat- ter Allowed in Dis- charged Gas-Grains Per Cubic Foot of Dry Gas at Standard Conditions</b>	<b>Volume Discharged-- Cubic Feet Per Minute Calculated as Dry Gas at Standard Conditions</b>	<b>Maximum Concentra- tion of Particulate Mat- ter Allowed in Dis- charged Gas-Grains Per Cubic Foot of Dry Gas at Standard Conditions</b>
1000 or less	0.200	20000	0.0635
1200	.187	30000	.0544
1400	.176	40000	.0487
1600	.167	50000	.0447
1800	.160	60000	.0417
2000	.153	70000	.0393
2500	.141	80000	.0374
3000	.131	100000	.0343
3500	.124	200000	.0263
4000	.118	400000	.0202
5000	.108	600000	.0173
6000	.101	800000	.0155
7000	.0949	1000000	.0142
8000	.0902	1500000	.0122
10000	.0828	2000000	.0109
15000	.0709	2500000 or more	.0100

**Rule 53. Sulfur Compounds - Concentration.**

A person shall not discharge into the atmosphere sulfur compounds, which would exist as a liquid or gas at standard conditions, exceeding in concentration at the point of discharge, 0.2 per cent by volume calculated as sulfur dioxide (SO<sub>2</sub>).

**Rule 53.1. Scavenger Plants.**

Where a separate source of air pollution is a scavenger or recovery

plant, recovering pollutants which would otherwise be emitted to the atmosphere, the Air Pollution Control Officer may grant a permit to operate where the total emission of pollutants is substantially less with the plant in operation than when closed, even though the concentration exceeds that permitted by Rule 53(a). The Air Pollution Control Officer shall report immediately in writing to the Air Pollution Control Board the granting of any such permit, together with the facts and reasons therefor.

Effective July 1, 1973, this Rule is repealed for sulfur recovery units.

Effective January 1, 1974, this Rule is repealed for sulfuric acid units.

#### **X Rule 53.2. Sulfur Recovery Units.**

A person shall not, after June 30, 1973, discharge into the atmosphere from any sulfur recovery unit producing elemental sulfur, effluent process gas containing more than:

1. 500 parts per million by volume of sulfur compounds calculated as sulfur dioxide.
2. 10 parts per million by volume of hydrogen sulfide.
3. 200 pounds per hour of sulfur compounds calculated as sulfur dioxide.

Any sulfur recovery unit having an effluent process gas discharge containing less than 10 pounds per hour of sulfur compounds calculated as sulfur dioxide may dilute to meet the provision of number (1) above.

#### **Rule 53.3. Sulfuric Acid Units.**

A person shall not, after December 31, 1973, discharge into the atmosphere from any sulfuric acid unit, effluent process gas containing more than:

1. 500 parts per million by volume of sulfur compounds calculated as sulfur dioxide.
2. 200 pounds per hour of sulfur compounds calculated as sulfur dioxide.

**Rule 54. Solid Particulate Matter - Weight.**

(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 solid particulate matter, including lead and lead compounds, in excess of the rate shown in the following table: (See Rule 54 Table)

**TABLE FOR RULE 54**

(Amended January 6, 1972)

<b>Process Weight Per Hour— Pounds Per Hour</b>	<b>Maximum Discharge Rate Allowed for Solid Particulate Matter (Aggregate Discharged From All Points of Process)—Pounds Per Hour</b>	<b>Process Weight Per Hour— Pounds Per Hour</b>	<b>Maximum Discharge Rate Allowed for Solid Particulate Matter (Aggregate Discharged From All Points of Process)—Pounds Per Hour</b>
250 or less	1.00	12000	10.4
300	1.12	14000	10.8
350	1.23	16000	11.2
400	1.34	18000	11.5
450	1.44	20000	11.8
500	1.54	25000	12.4
600	1.73	30000	13.0
700	1.90	35000	13.5
800	2.07	40000	13.9
900	2.22	45000	14.3
1000	2.38	50000	14.7
1200	2.66	60000	15.3
1400	2.93	70000	15.9
1600	3.19	80000	16.4
1800	3.43	90000	16.9
2000	3.66	100000	17.3
2500	4.21	120000	18.1
3000	4.72	140000	18.8
3500	5.19	160000	19.4
4000	5.64	180000	19.9
4500	6.07	200000	20.4
5000	6.49	250000	21.6
5500	6.89	300000	22.5
6000	7.27	350000	23.4
6500	7.64	400000	24.1
7000	8.00	450000	24.8
7500	8.36	500000	25.4
8000	8.70	600000	26.6
8500	9.04	700000	27.6
9000	9.36	800000	28.4
9500	9.68	900000	29.3
10000	10.00	1000000 or more	30.0

Where the process weight per hour falls between figures listed in the table, the exact weight of permitted discharge shall be determined by linear interpolation.

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

This amendment shall be effective on 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 January 1, 1973.

**Rule 55. Exceptions.**

The provisions of Rule 50 do not apply to:

a. Smoke from fires set by or permitted by any public officer if such fire is set or permission given in the performance of the official duty of such officer, and such fire in the opinion of such officer is necessary:

1. For the purpose of the prevention of a fire hazard which cannot be abated by any other means, or
2. The instruction of public employees in the methods of fighting fire.

b. Smoke from fires set pursuant to permit on property used for industrial purposes for the purpose of instruction of employees in methods of fighting fire.

c. Agricultural operations in the growing of crops, or raising of fowls or animals.

d. The use of an orchard or citrus grove heater which does not produce unconsumed solid carbonaceous matter at a rate in excess of one(1) gram per minute.

e. The use of other equipment in agricultural operations in the growing of crops, or raising of fowls or animals.

**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<sub>2</sub>) 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

52

COLLIER CARBON AND CHEMICAL COMPANY

SUMMARY AND CONCLUSIONS

Collier Carbon and Chemical Company operates a 380 m tons (420 tons)/day sulfuric acid plant at this facility. Raw materials for the process are spent alkylation acid, molten sulfur, and hydrogen sulfide gas, which are all waste products from the adjacent Union Oil Company refinery. Sulfuric acid is produced by the contact process.

Collier has recently installed a Monsanto Company AM-SO<sub>x</sub> tail gas treatment plant to treat the exhaust gases from the sulfuric acid plant. Approximately 11-13 m. tons (12-14 tons)/day of ammonium sulfate result from this process.

On October 17, 1975, NEIC conducted an air pollution related inspection at this facility. Substantial amounts of process and air pollution control equipment information were requested of, and received from, Collier. 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 Collier.

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

1. The AM-SO<sub>x</sub> tail gas treatment unit appeared to be operating satisfactorily during the inspection. A slight detached plume was noted from its exhaust stack, but the plume was below 20% opacity. The DuPont continuous SO<sub>2</sub> analyzer strip chart showed that no SO<sub>2</sub> concentrations higher than 500 ppmv had occurred in the exhaust gases during the previous 24 hours.

2. Stack tests conducted by the LAAPCD during May 1974, indicated that the AM-SO<sub>x</sub> system exhaust complied with Rule 54. SO<sub>2</sub> concentrations monitored during this test were 270 ppmv.
3. All equipment at the plant is operating under a valid LAAPCD permit.
4. Housekeeping at the plant was excellent.

#### RECOMMENDATIONS

The DuPont continuous SO<sub>2</sub> analyzer should be equipped with an alarm system which will alert the operator to malfunctions which cause the stack gas SO<sub>2</sub> concentration to approach 500 ppmv.