GCA-TR-76-17-G

Screening Study To Determine Need For Standards Of Performance For New Sources Of Dimethyl Terephthalate And Terephthalic Acid Manufacturing

Final Report

Contract No. 68-02-1316
Task Order No. 18

Prepared For
ENVIRONMENTAL PROTECTION AGENCY
Research Triangle Park
North Carolina 27711

July 1976

GCA-TR-76-17-G

450R76105

SCREENING STUDY TO DETERMINE NEED FOR STANDARDS OF PERFORMANCE FOR NEW SOURCES OF DIMETHYL TEREPHTHALATE AND TEREPHTHALIC ACID MANUFACTURING

FINAL REPORT

by

Donald F. Durocher

Peter D. Spawn

Rebecca C. Galkiewicz

Mark I. Bornstein

GCA CORPORATION
GCA/TECHNOLOGY DIVISION
Bedford, Massachusetts

July 1976

Contract No. 68-02-1316
Task Order No. 18

EPA Project Officer

Andrew Trenholm X301

Office of Air Quality Planning and Standards
Emission Standards and Engineering Division

U.S. ENVIRONMENTAL PROTECTION AGENCY
Research Triangle Park
North Carolina 27711

This Final Report was furnished to the Environmental Protection Agency by GCA Corporation, GCA/Technology Division, Bedford, Massachusetts 01730, in fulfillment of Contract No. 68-02-1316, Task Order No. 18. The opinions, findings, and conclusions expressed are those of the authors and not necessarily those of the Environmental Protection Agency or of the cooperating agencies. Mention of company or product names is not to be considered as an endorsement by the Environmental Protection Agency.

ABSTRACT

This document examines the impact of NSPS on hydrocarbon and carbon monoxide emissions from the dimethyl terephthalate-terephthalic acid (DMT-TPA) industry. The impact of NSPS is calculated using a model developed by the Research Corporation of New England.

The best systems of emission control are determined and the effect of using these systems on all significant emission points from each DMT-TPA plant is calculated.

A listing of up-to-date emission information for each DMT-TPA plant is presented in the appendices.

CONTENTS

FIGURES

TABLES

TABLES (continued)

ACKNOWLEDGMENTS

The authors would like to acknowledge helpful discussions with Mr. Andrew Trenholm, Environmental Protection Agency (EPA), Office of Air Quality Planning and Standards, Emission Standards and Engineering Division, Raleigh-Durham, North Carolina, and Mr. Norman Surprenant of GCA Technology Division.

In addition, the authors would like to make a collective acknowledgment to: the personnel at each DMT-TPA plant, without whose cooperation this project could not have been completed; state and local air pollution control agencies for allowing GCA to use their files; and the control equipment manufacturers for helping GCA to determine the best systems of emission control.

SECTION I

THE DMT-TPA INDUSTRY

INTRODUCTION

Dimethylterephthalate (DMT) and terephthalic acid (TPA) are, together with ethylene glycol, the principal raw materials for the manufacture of polyester fibers and films. Other uses consume less than 1 percent of all DMT-TPA production.[1] In 1973, 93 percent of the DMT-TPA produced was used in polyester fibers and the bulk of the remainder in films.

DMT-TPA manufacture is an important process, ranking 21st among the 50 biggest volume producers of chemicals in the U.S. In 1975, 4.65 billion pounds of DMT-TPA were manufactured. Almost all the DMT-TPA manufactured is used domestically.[2]

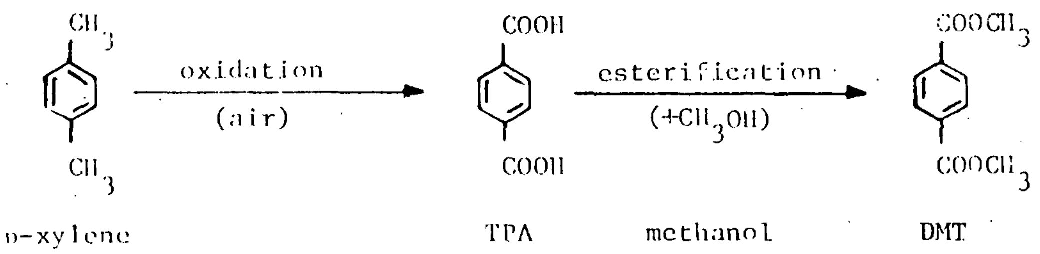
English units are used throughout this report. Table I-1 is a list of conversion factors that can be used to change the units in this report to metric units.

Table I-1. TABLE OF CONVERSION FACTORS FOR CONVERTING ENGLISH TO METRIC UNITS

Multiply	By	To obtain
Pounds	0.454	Kilograms
Tons (short)	0.907	Tons (metric)
Pounds/hour	0.007559	Kilograms/second
^{o}F	$5/9\ (^{o}F-32)$	^{o}C

MANUFACTURING

All of the DMT and TPA manufactured in the U.S. is produced from p-xylene feedstock. The p-xylene is air oxidized to form the acid or air oxidized and esterified to form the ester. The reaction is a liquid phase oxidation in which air, the oxidant, is blown through a solution of p-xylene and catalysts to form TPA. The TPA is esterified, usually with methanol, to form the ester, DMT. A simplified chemical reaction sequence is:

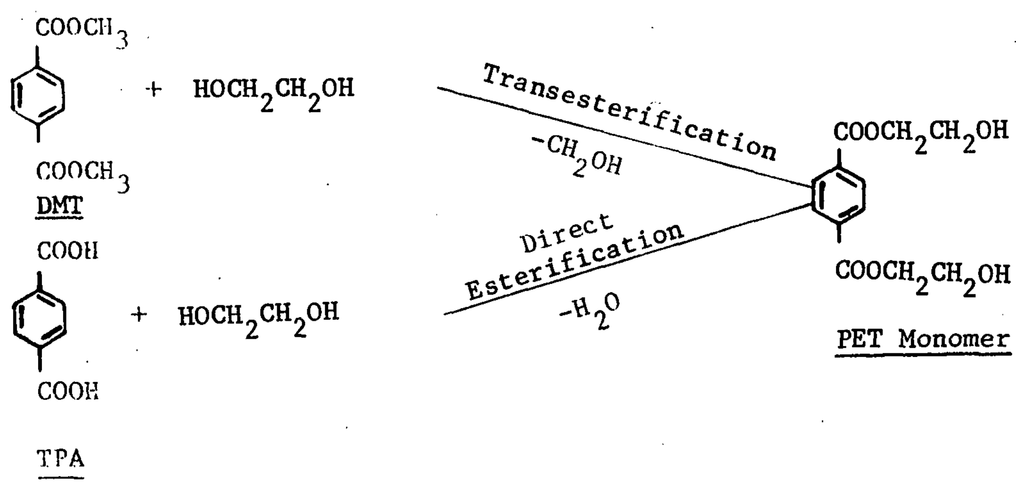


p-xylene is a liquid at room temperature. TPA and DMT are white solids at room temperature. The substitution of the -OH group on TPA by $-OCH_3$ groups to form the DMT ester is referred to as esterification.

TPA is insoluble in water and most organic solvents at room temperature whereas DMT is soluble in ether and hot methyl alcohol. TPA does not melt but sublimes at 572°F. DMT melts at 286°F and boils at 550°F. Because of these properties, TPA is usually purified by successive crystallizations whereas DMT is purified by repeated distillations. More thorough descriptions of each DMT-TPA manufacturing process are given in Section II and in References 1 and 3.

In the past, nitric acid was used to oxidize p-xylene. However, with the closing of DuPont's Old Hickory Works in Old Hickory, Tennessee in 1974, no manufacturer uses nitric acid to oxidize p-xylene. Therefore, there are no NO_x emission sources in the manufacture of DMT-TPA.

The polyester - polyethylene terephthalate (PET) - can be produced from either DMT or TPA. The preferred route is the direct esterification of TPA, as opposed to the transesterification of DMT. That is, the PET monomer is produced by:



Prior to 1963, polyethylene terephthalate was produced primarily from DMT. Since then, however, an increasingly larger proportion has been produced from purified terephalic acid (PTA). Future expansion of DMT-TPA is expected to be predominantly in PTA production.[3]

There are presently five companies in the U.S. producing DMT-TPA at six plants. Table I-2 lists these facilities, their location, their production capacity and a brief production history.

Table I-2. DMT-TPA PLANTS AND PRODUCTION CAPACITIES

Producer	Location	Process	Capacity, 10^6 lb/yr[c]				Comments
			April 1971	Jan. 1974	July 1974[a]	May 1976[b]	
Hoechst Fibers Corporation	Spartenburg, South Carolina	p-xylene oxidation - lenses technology from Hercules	(100)	(150)	(160)		
Amoco Chemicals Corporation	Joliet, Illinois	p-xylene oxidation, Amoco process	150	220	150 (100)	133	DMT production to be halted in 1976.
	Decatur, Alabama		(500)	(900)	200 (800)	1630 (240)	
	Cooper River, South Carolina						Plant is planned for construction - should be completed in 1978 with 1000 x 10^6 pound per year capacity.
E. I. DuPont de Nemours	Phoenix, North Carolina	DuPont lenses its DMT technology from Tennessee Eastman and its TPA technology from Amoco	-	(450)	(750)		
	Old Hickory, Tennessee		(250)	(250)	(300)	-	Plant closed November 1974. A 500 x 10^6 lb/yr plant should be reopening in late 1976.
	Gibbstown, New Jersey		(250)	(300)	-	-	Closed in 1974.
Tennessee Eastman	Kingsport, Tennessee	Tennessee Eastman process	(300)	(350)	(400)	(600)	
	Columbia, South Carolina						Estimated at 522 million pounds per year - see Section II.
Hercules	Burlington, New Jersey	Hercules/Imhaussen Witten process	(100)	(150)	-	-	Closed in November 1974.
	Wilmington, North Carolina		(450)	(850)	(1300)	(1300)	
	Eastover, South Carolina						An 800 x 10^6 lb/yr plant is planned, but is not yet under construction.
Mobil Chemical Company	Beaumont, Texas	-	150	-	-	-	Mobil closed its DMT-TPA plant in 1973 and sold the facility to Bellsicol Chemical. Bellsicol does not manufacture DMT-TPA (see Appendix A).

[a]Total production is DMT; equivalents = 4216 million pounds per year. From Reference 1.

[b]Total production in DMT; equivalents = 5095 million pounds per year. From this study.

[c]( ) = DMT

The consumption patterns of DMT and TPA, presented in Table I-3, show that almost all DMT-TPA produced is consumed in the production of polyethylene terepthalate - about 93 percent for polyester fibers and about 7 percent for polyester films. Less than 1 percent is used for polybutylene terephthalate resins and miscellaneous uses. Polyester fibers are used primarily in textiles (80 percent), especially apparel made of polyester double knits (63 percent). They are also used in tire cord and for other industrial uses.[1]

INDUSTRIAL TRENDS

Growth of DMT-TPA manufacturing has been tied directly to the growth of polyester since almost 100 percent of their production is consumed for the production of polyester. The remarkable growth of DMT-TPA consumption during the 1960s was due to the rapid penetration of most major textile markets by polyester fibers. The attractiveness of easy-care, durable press polyester apparel led to the general acceptance of polyester as an apparel fiber, so that, by 1973 the polyester portion of the textile fibers market was 30 to 35 percent, up from less than 5 percent in 1963. Even when a general slowing of growth in the apparel staple market occurred in the late sixties, polyester fibers continued to grow because of the success of double-knit fabrics. Sustained but slower growth of polyester fibers in woven blend fabrics and for tire cord, in addition to the popularity of double knits, resulted in an overall annual average growth rate of about 22 percent for polyester fibers, and for DMT-TPA consumption, from 1967 to 1973.[1]

During 1974 and 1975, the growth of polyester slackened. Several DMT and TPA plants were shut down in 1974 - some permanently, some for replacement of units or additional capacity. The shutdowns coincided with raw material shortages, energy price increases, and a depressed economy which had decelerated the growth of Polyester.[4,5,6] Production

Table I-3. DIMETHYL TEREPHTHALATE AND TEREPHTHALIC ACID STATUS - 1973 (MILLIONS OF POUNDS)

Production - 1973		
DMT	2,714	
Fiber-Grade TPA	900	
Total (in DMT equivalents)		3,767[a]
Domestic consumption (in DMT equivalents) - 1973		
In polyester fibers[b]	3,206	
In polyester films[c]	218	
In other uses	21	
Total		3,445
Exports - 1973[d]	168	

[a] Pounds of TPA were multiplied by 1.17 to convert to DMT equivalents.

[b] Pounds of polyester fiber produced were multiplied by a factor of 1.11 to obtain DMT equivalents.

[c] Pounds of polyester film produced were multiplied by a factor of 1.12 to obtain DMT equivalents.

[d] Reported DMT exports only.

Source: Data in this table are taken from the PRODUCING COMPANIES, PRODUCTION, CONSUMPTION, and INTERNATIONAL sections, ChemEcon Handbook, May 1975.

remained below capacity in 1975 and, in fact, was almost unchanged worldwide from 1974 to 1975.[5]

In 1976, however, both demand and production capacity increased. At the beginning of the year, a substantial inventory of benzene assured that the raw materials for DMT and TPA production would be adequate. The demand for polyester fiber is again increasing, the only fiber to be experiencing increased demand after the fiber market decline of 1974.[7] The increased production capacity, much of which was started in 1974, is scheduled to come on line in 1976. This will result in an increase in production capacity of 84 percent for DMT-TPA over 1975. TPA output alone could jump 50 percent this year.[4] Thus polyester, DMT, and TPA will experience a substantial comeback in 1976. However, growth in production is expected to show smaller gains in 1977 and 1978.[8]

Studying the planned growth of the man-made fiber industry in the world from 1976 to 1980[9] shows that Western Europe is expanding by 37 percent with Italy scheduling a 65 percent increase; Korea is expanding by 19 percent; Taiwan by 32 percent and the U.S. by 20 percent. Only Japan (zero percent) and France (10 percent) have modest expansion plans. The U.S. and France have planned their fiber expansion for supplying home markets. By 1980, fiber production in excess of domestic consumption is predicted to be 35 percent in Western Europe, 23 percent in Japan, 33 percent in Korea, 56 percent in Taiwan but only 7 percent in the U.S. Thus, competition will be fierce and it is unlikely that the U.S. will be able to export substantial amounts of fibers, including polyester, despite their cost advantages.[9] However, imports of polyester fabrics and fibers could become important.

Production of DMT and TPA depends on adequate supplies of their precursor - p-xylene - and adequate supplies of their coreactant for polyester production - ethylene glycol. Neither chemical is seen to be a limiting factor for future DMT-TPA production rates.[10] Paraxylene production increases are presently underway. Polyesters will be the major outlet for ethylene glycol in the future.

Growth of DMT-TPA production in the U.S. will follow the demand for polyester which is expected to continue to increase, though not as fast as the previous annual growth rate of 22 percent per year. Exports of DMT, TPA and polyester amounted to only about 7 percent of the DMT-TPA produced in the U. S. in 1973 and will probably continue to be minimal in the future due to surpluses on the international market.

GROWTH PROJECTIONS

Historically, the growth of DMT and TPA production has been quite rapid. The combine annual growth rate over the period 1967 to 1973 was around 23 percent, with production increasing from 1,087 to 3,767 million pounds (in DMT equivalents). For DMT production, the annual growth rate was 19.4 percent (937 to 2,714 million pounds), while for TPA, the annual growth rate was higher - 36.5 percent. The magnitude of the growth was lower, however, from 139 to 900 million pounds. From 1973 to 1974, consumption fell 1.5 percent, from 3,400 to 3,350 million pounds.[*6]

Projections of future growth of DMT and TPA vary considerably and are strongly influenced by many variables. The projedtions are summarized in Table I-4 with the time period for which they are applicable. Projections for annual growth rates range from 7.1 to 14.9 percent for DMT-TPA production. The latest growth projection of an annual growth rate of 10 to 12 percent would appear to be the most valid.[11] Producers are not yet back to full capacity production. Conversations with plant managers substantiated the projection of an annual growth rate of 10 to 12 percent

*In 1973, combined production was approximately 3,767 million pounds, whereas combined consumption was approximately 3,400 million pounds.

growth over the next several years. It appears that a softness in the polyester market and not p-xylene availability will be the limiting factor in DMT-TPA growth.[11]

Table I-4. GROWTH PROJECTIONS FOR DMT AND TPA PRODUCTION

Time period	Estimated annual change, percent	Estimated production capacity change, 10^6 lbs/year	Source	Projected capacity in 1985, 10^6 lbs/year
DMT-TPA				
1967-1973	23	1087 to 3767	Ref. 1	-
1973-1978	14.9	3000 to 6000	Ref. 12	15,863
1973-1979	8.2	3445 to 5522	Ref. 1	8,861
1975-1980	7.1	3400 to 4800	Ref. 13	6,764
1974-1985	10.0 to 12.0	3400 to 9700	Ref. 10	9,700
DMT				
1967-1973	19.4	937 to 2714	Ref. 1	-
1973-1976	9.8	2690 to 3560	Ref. 4	8,258
1972-1980	4.4	1765 to 2500	Ref. 14	3,100
TPA				
1967-1973	36.5	139 to 900	Ref. 1	-
1973-1976	18.6	900 to 1500	Ref. 4	6,964
1972-1980	19.4	700 to 2900	Ref. 14	7,038

REFERENCES

1. Frey, H.E. and S. Solder. Dimethyl Terphthalate and Terephthalic Acid. Chemical Economics Handbook. Stanford Research Institute, Menlo Park, California. Revised May 1975.

2. Chemical and Engineering News. May 10, 1976. p. 14.

3. Pervier, J.W., R.C. Barley, D.E. Field, B.M. Friedman, R.B. Morris, and W.A. Schwartz. Survey Reports on Atmospheric Emissions From the Petrochemical Industry, Volume II. Houdry Division, Air Products and Chemicals, Inc. Marcus Hook, PA. U.S. Environmental Protection Agency, Research Triangle Park, N.C. Report Number EPA-450/3-73-005-b. April 1974.

4. Chemical and Engineering News. April 8, 1974. pp. 13-14.

5. Chemical and Engineering News. February 9, 1976. p. 12.

6. Chemical Marketing Reporter. January 7, 1974. p. 33.

7. Chemical Marketing Reporter. January 5, 1976. p. 40.

8. Chemical and Engineering News. February 16, 1976. p. 14.

9. Chemical Marketing Reporter. November 24, 1975. p. 19.

10. Chemical Engineering. January 5, 1976. p. 117.

11. Chemical and Engineering News. April 26, 1976. pp. 8,9.

12. Chemical Marketing Reporter. January 15, 1974.

13. Chemical Marketing Reporter. March 6, 1972.

14. Chemical Marketing Reporter. April 17, 1972.

SECTION II

SOURCES AND TYPE OF EMISSIONS

INTRODUCTION

Only processes involving the air oxidation of p-xylene are used in the United States to produce DMT-TPA. In the past, nitric acid oxidation of p-xylene was used, but this practice ended with the closing of DuPont's Old Hickory Works Plant. Therefore, there are no emissions of nitrogen oxides from the production of DMT-TPA.

PROCESSES USED FOR THE MANUFACTURE OF DMT-TPA

Presently, there are three technologies used in the United States for the production of DMT-TPA. These are: the Hercules-Witten Process for the production of DMT; the Amoco Process for the production of TPA, and the Eastman Process for the production of DMT. Table II-1 lists the technology used by each manufacturer.

The major gaseous emissions form the production of DMT-TPA are organic and CO emissions from the p-xylene air oxidation step and the methanol recovery step. Particulate emissions from the drying, crushing, and packaging operations may also be large.

A brief discussion of each process and its associated major air emissions is provided in the following text. More complete descriptions of each process, including emissions from all emission points are given

Table II-1. TECHNOLOGIES USED BY PRODUCERS OF DMT-TPA

Producer	Location	Product	Technology	Comment
Amoco Chemicals Corporation	Joliet, Illinois	TPA	Amoco Process	DMT production halted in 1976
	Decatur, Alabama	TPA	Amoco Process	DMT production halted in 1976
	Cooper River, South Carolina	TPA	Amoco Process	Under construction
E. I. DuPont de Nemours	Phoenix, North Carolina	TPA DMT	Amoco Process Eastman Process	
	Old Hickory, Tennessee	TPA DMT	Amoco Process Eastman Process	Scheduled for reopening in 1976
Eastman Company	Kingsport, Tennessee	DMT	Eastman Process	
	Columbia, South Carolina	DMT	Eastman Process	Under construction
Hercules, Incorporated	Wilmington, North Carolina	DMT	Hercules-Witten Process	
	Eastover, South Carolina	DMT	Hercules-Witten Process	Planned for construction
Hoechst Fibers Corporation	Spartanburg, South Carolina	DMT	Hercules-Witten Process	

in Appendix A and in Reference 1. Emissions will be considered to be small if they are: (1) 10 pounds per hour or less for hydrocarbons; (2) 20 pounds per hour or less for CO; and (3) 1 pound per hour or less for particulate. These limits are arbitrary. The rationale for choosing these limits is twofold. First, the best systems of emission control are at least 95 percent efficient (see Section IV). Therefore, emissions that are less than 5 percent of the magnitude from the largest emission source at each plant (e.g., from the p-xylene oxidizer) will be considered small emission sources. The above limits account for emissions that are less than 5 percent of the magnitude of the emissions from the largest source at each plant. Second, at each DMT-TPA plant there are many stacks with emission rates below the above limits, and, because of their number, emission control devices on each stack would not be practical.

The information presented in the following text was obtained from one or more of the following sources:

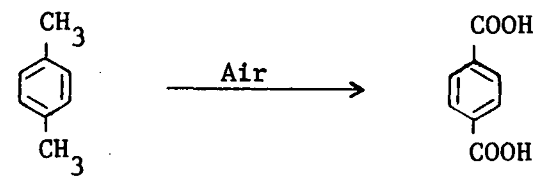
- Plant visits and discussions with operating personnel;
- Permit applications on file with the various state air pollution control agencies;
- Updates of the questionnaires used by the Houdry Division of Air Products, Inc., and completed by most DMT-TPA manufacturers in 1972.[1]

AMOCO CHEMICALS CORPORATION

Amoco has two DMT-TPA plants — one in Joliet, Illinois, and one in Decatur, Alabama. Both plants produce purified terephthalic acid (PTA) by first manufacturing a crude TPA intermediate. There is some production of DMT, but after 1976 production will be limited to PTA. The Amoco Process is used extensively for the production of fiber grade PTA.

Technology

The production of TPA is essentially a one-step process represented by:



p-xylene terephthalic acid.

In the production of crude terephthalic acid, p-xylene is diluted with glacial acetic acid, catalysts are added, and the mixture is air oxidized.

Purified terephthalic acid is crystallized from a slurry of TPA, water and other reactants. DMT is prepared in a separate step by esterifying the TPA with methanol.[1]

Emissions From the Joliet Plant

Flow diagrams for the TPA and PTA process at Amoco's Joliet Plant are given in Figures II-1 and II-2. A flow diagram of the DMT process is given in Figure II-3. The Joliet Plant has a production capacity of 133 million pounds of crude TPA per year. The DMT operation should be phased out by the end of this year.

The sources of greatest emissions from the TPA, PTA and DMT processes are listed in Table II-2. This information was obtained during a site visit to the Joliet Plant. The emission information was taken from state permit applications on file at the Joliet Plant and should represent the most up-to-date information available.

In Figure II-1 the absorber on the reactor is a tray type absorber tower. The vent header absorber is an atmospheric pressure spray tower. All other scrubbers shown in Figure II-2 and II-3 are atmospheric pressure spray towers. Further descriptions of the emission control equipment are given in Appendix A and Reference 1.

As can be seen from Table II-2, the major emissions form the Joliet DMT-TPA plant are particulates and hydrocarbons with some CO from the p-xylene oxidation step. The particulate is either TPA or DMT. The hydrocarbon emissions from the TPA and PTA units are composed of acetic acid with some methyl acetate. The source of greatest hydrocarbon emissions, the dehydration tower, has a flow rate of 148 pounds per hour of acetic acid. The major source of emissions for the DMT unit is the liquid drum, with a flow of 500 pounds per hour of dimethyl ether and 20 pounds per hour of methanol.

Emissions From the Decatur Plant

Information contained in this section was supplied by personnel at the Decatur Plant. It is the most up-to-date information available. Complete emission information for all emission points is given in Appendix A.

The Decatur Plant employs four parallel production lines to make TPA and PTA, and two parallel production lines for the production of DMT from TPA. The capacity of each production line is:

- #1 oxidation unit - 280 million pounds TPA per year
- #2 oxidation unit - 280 million pounds TPA per year
- #3 oxidation unit - 530 million pounds TPA per year
- #4 oxidation unit - 540 million pounds TPA per year
- #1 PTA unit - 180 million pounds PTA per year
- #2 PTA unit - 180 million pounds PTA per year

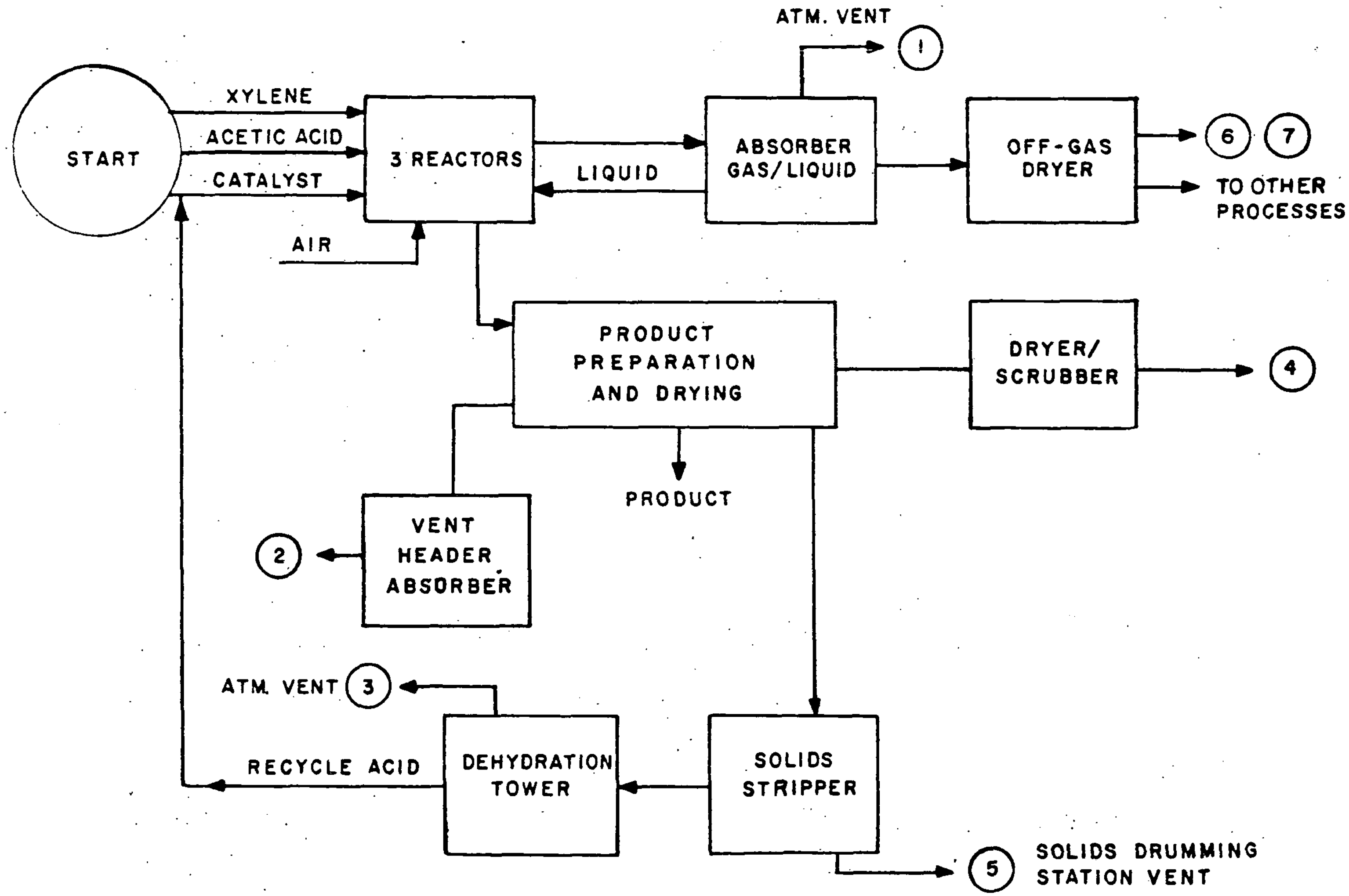


Figure II-1. Amoco's Joliet Plant terephthalic acid unit

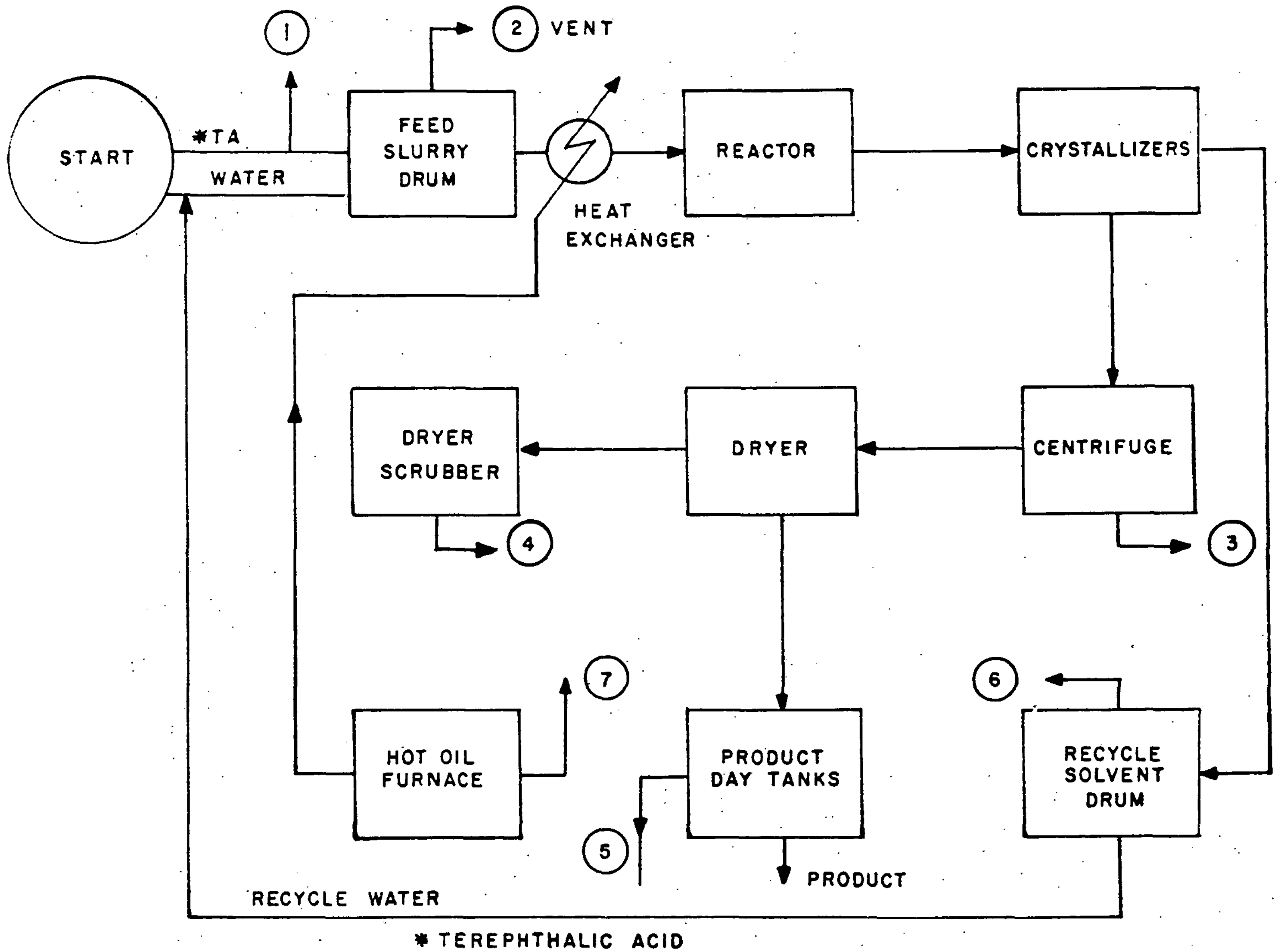


Figure II-2. Amoco's Joliet Plant purified terephthalic acid unit

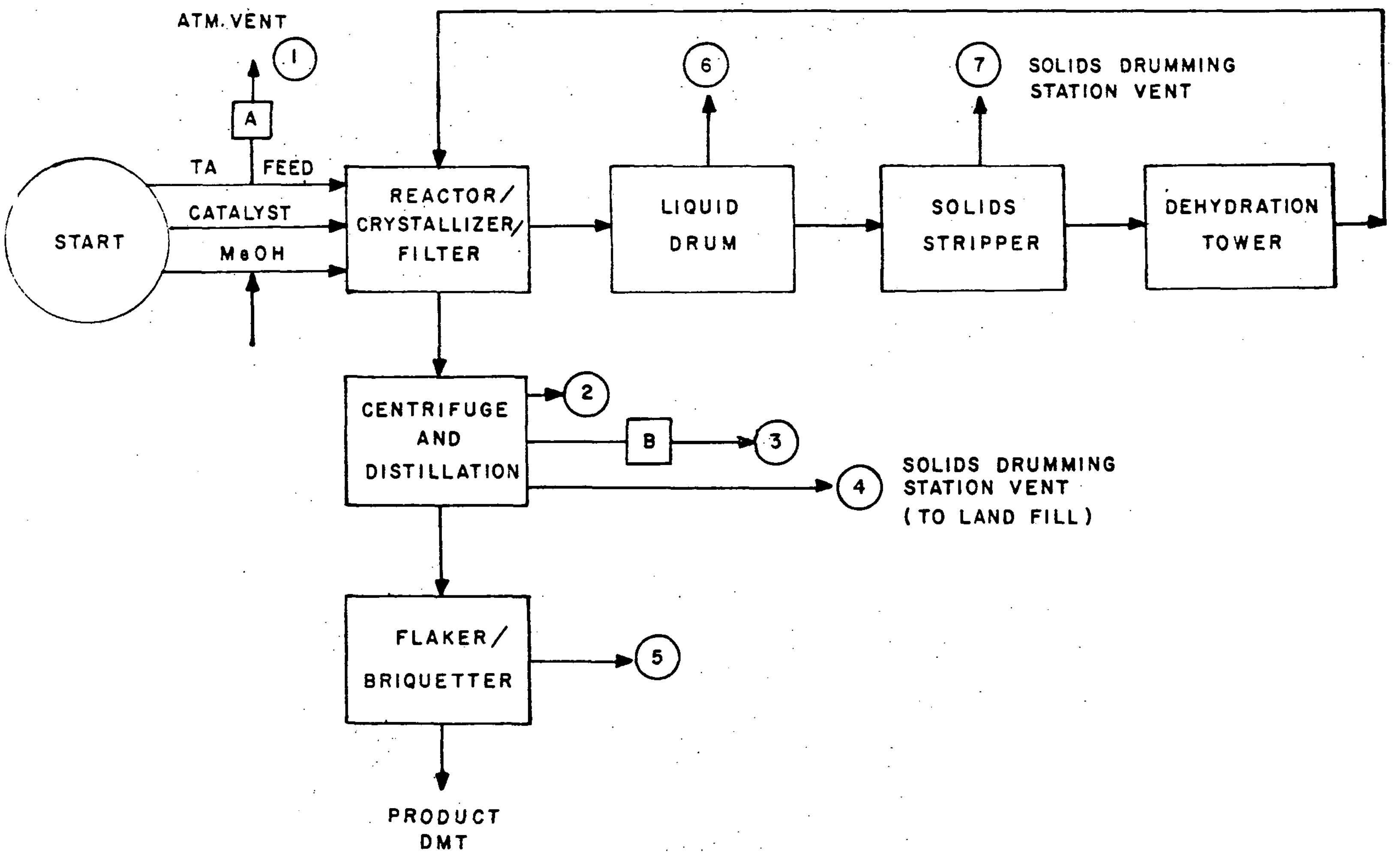


Figure II-3. Amoco's Joliet Plant dimethyl terephthalate unit

Table II-2. CURRENT EMISSION RATE FROM AMOCO'S JOLIET PLANT

Significant emission point	Gas volume, scfm[a]	Pollutant emission rate, lb/hr			Basis for measurement
		Part.	CO	HC	
TPA Unit					
1 - Reactor Absorber	-		390	62	Plant studies
3 - Dehydration Tower	-			148	Plant studies
4 - Dryer/Scrubber	-	15			Plant studies
7 - Off-gas Dryer	-			13	Plant studies
PTA Unit					
1 - TPA Stream	-	25			Plant studies
5 - Product Day Tanks	-				Plant studies
DMT Unit					
1 - TPA Feed	-	10	1.1		Plant studies
5 - Flaker/Briquetter	-	10			Plant studies
6 - Liquid Drum	-			520	Plant studies
7 - Solids Drumming Station	-	5			Plant studies

[a]- represents unavailable information.

- #3 PTA unit - 500 million pounds PTA per year
- #4 PTA unit - 500 million pounds PTA per year
- #1 DMT unit - 120 million pounds DMT per year
- #2 DMT unit - 120 million pounds DMT per year.

Flow diagrams for a typical oxidation unit, PTA unit, and DMT unit are given in Figures II-4, II-5, and II-6, respectively. Emissions from all major emission points for the Decatur Plant are listed in Table II-3.

The high pressure absorber in Figure II-4 is a valve tray scrubbing tower. The low pressure absorber is a spray tower and the dust collector is a bag filter. In Figure II-5, the crystallizer vent scrubber is a turbulent contact absorber and the dryer vent scrubber is a spray tower. The dust collectors are bag filters. These control devices are described in Appendix A.

The oxidation units, Figure II-4, employ thermal oxidizers to destroy liquid organic wastes. It should be noted that, as the size of the unit increases, hydrocarbon emissions from the absorbers on the p-xylene oxidation unit decrease. This may be the result of using more efficient scrubbers. However, as the scrubbers do not affect CO emissions, CO emissions increase slightly. A typical composition of a high pressure absorber stream is (from #1 oxidation unit): 53 pounds per hour acetic acid; 990 pounds per hour methyl acetate; and 750 pounds per hour carbon monoxide. Compositions from other emission points are primarily acetic acid and methyl acetate.

The PTA units produce only particulate emissions. The particulate is TPA.

Dimethyl ether emissions represent the major fraction of emissions from DMT units. The Decatur Plant now utilizes off gases containing dimethyl

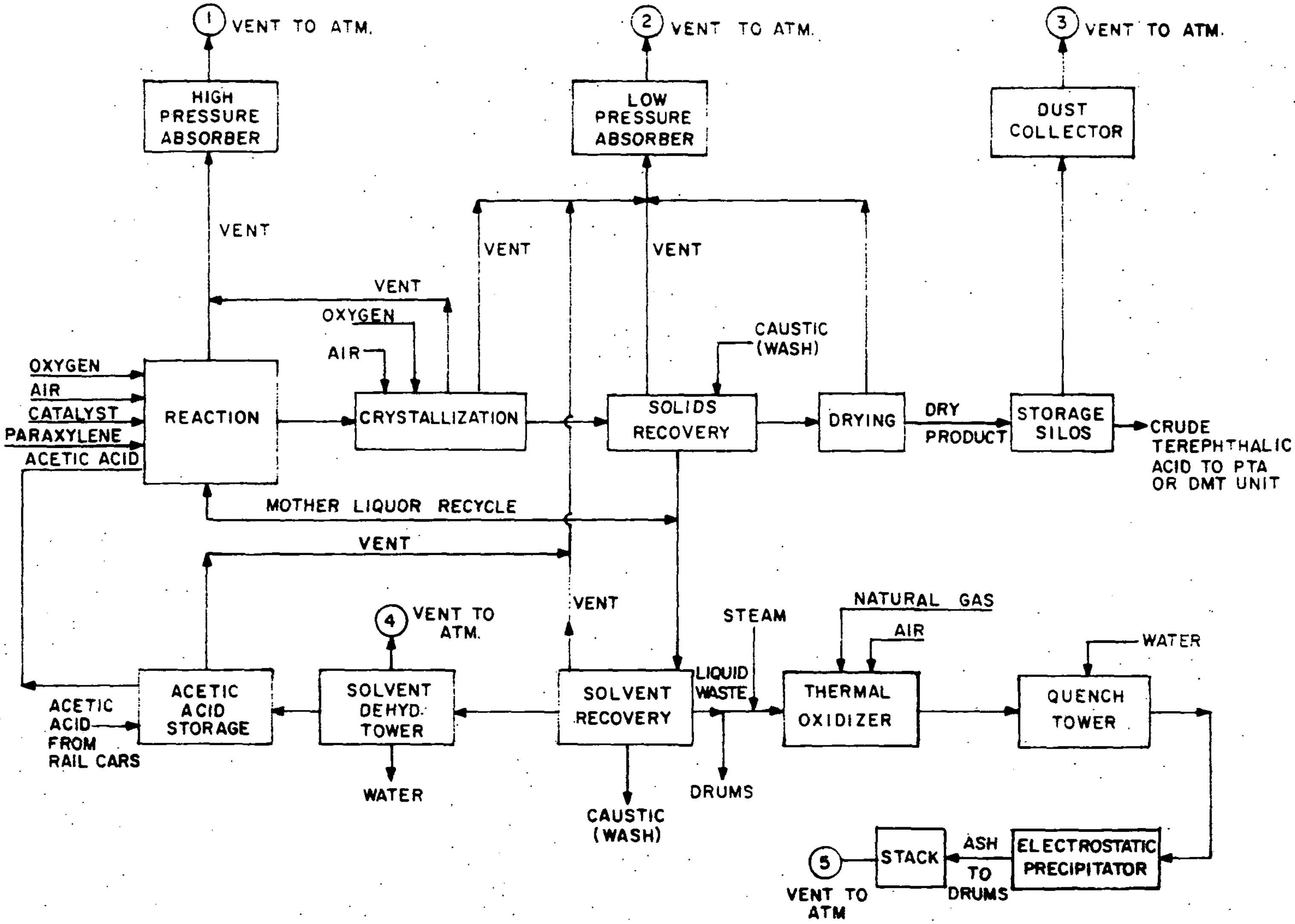


Figure II-4. Flow diagram of a typical oxidation unit at Amoco's Decatur Plant

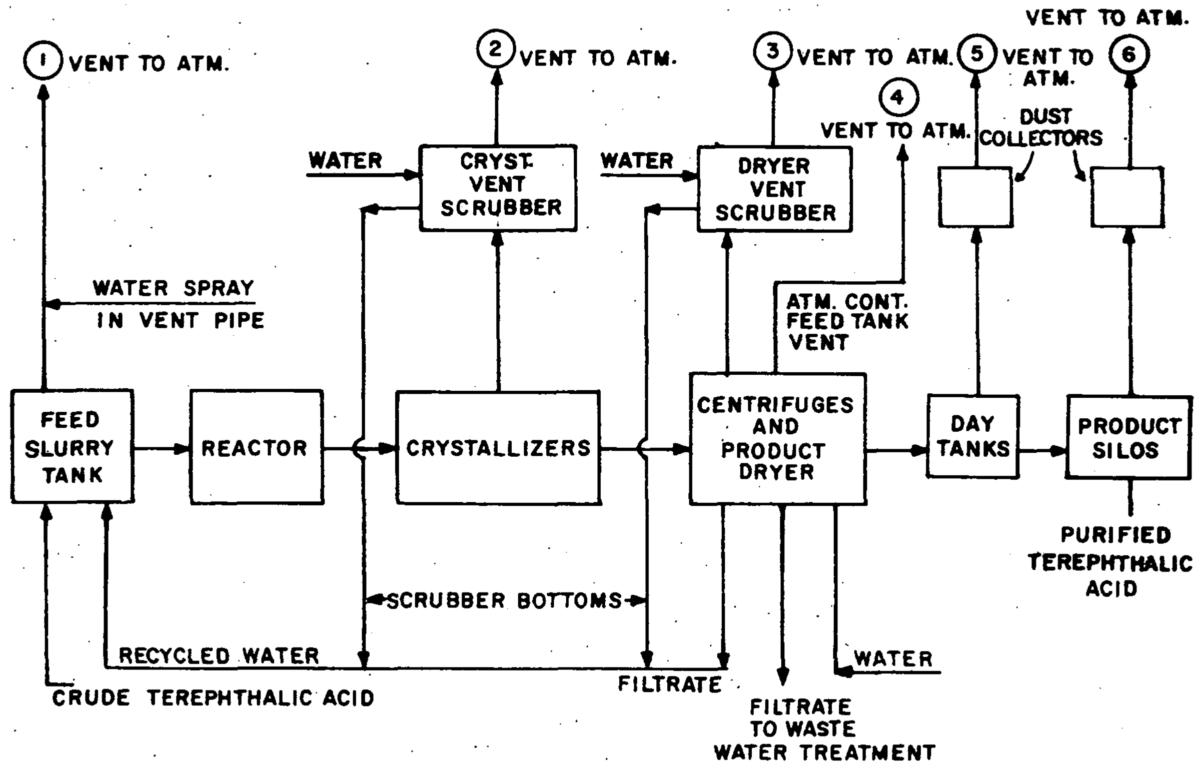


Figure II-5. Flow diagram of a typical PTA unit at Amoco's Decatur Plant

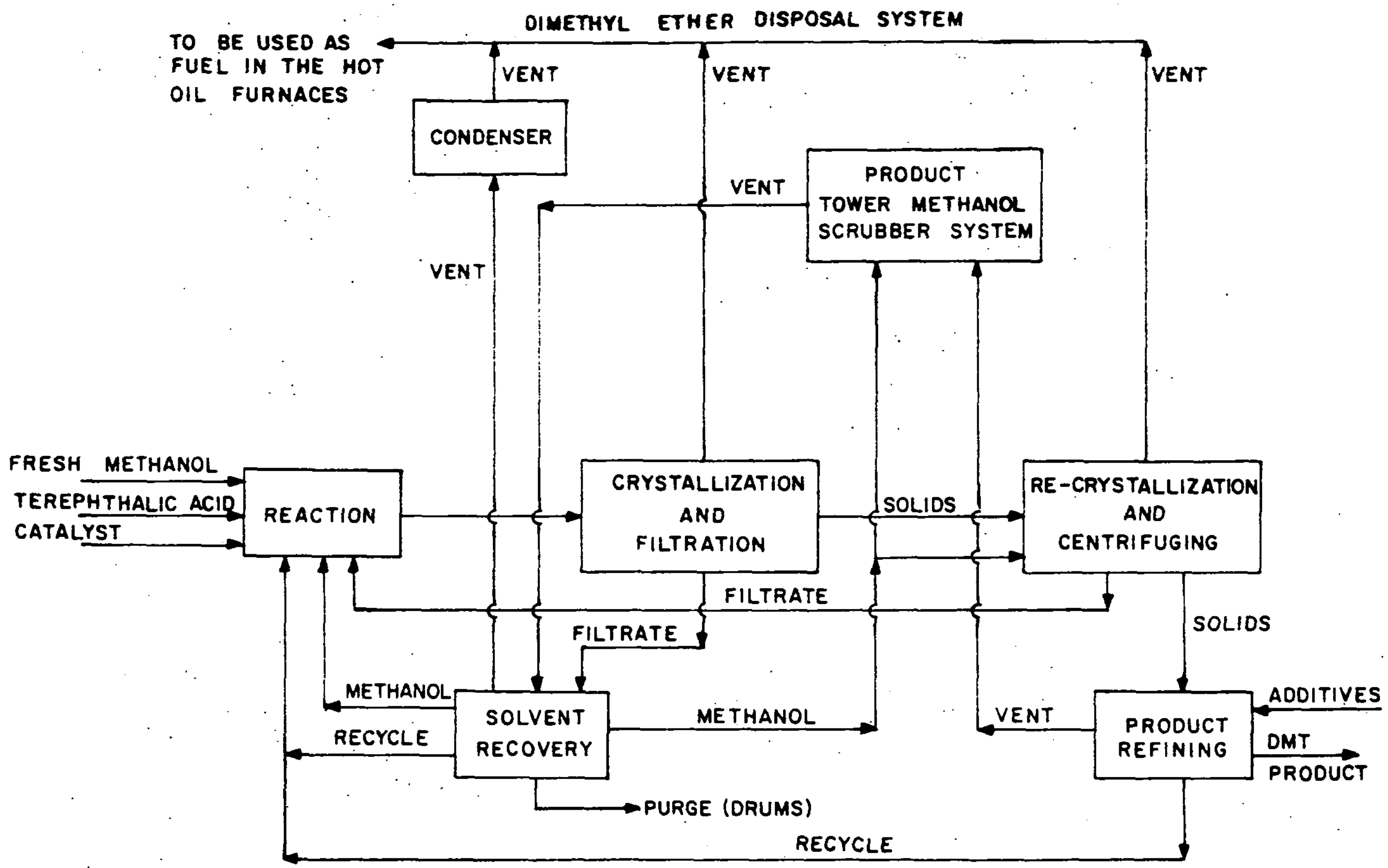


Figure II-6. Flow diagram of a typical DMT unit at Amoco's Decatur Plant

Table II-3. CURRENT EMISSION RATE FROM AMOCO'S DECATUR PLANT

Significant emission point	Gas volume, scfm	Pollutant emission rate, lb/hr			Basis for measurement
		Part.	CO	HC	
No. 1 Oxidation Unit					
1 - High pressure absorber	16,850		750	1043	Plant studies
2 - Low pressure absorber	92			51	Plant studies
4 - Dehydration tower vent	3,400			97	Plant studies
5 - Electrostatic precipitator	17,800	7	23.8	23.8	Plant studies
No. 2 Oxidation Unit					
1 - High pressure absorber	16,850		750	1043	Plant studies
2 - Low pressure absorber	92			51	Plant studies
4 - Dehydration tower vent	3,400			97	Plant studies
5 - Electrostatic precipitator	17,800	7	23.8	23.8	Plant studies
No. 3 Oxidation Unit					
1 - High pressure absorber	37,800		870	919	Plant studies
2 - Lower pressure absorber	343			42	Plant studies
4 - Dehydration tower vent	5,700			151	Plant studies
5 - Electrostatic precipitator	12,700	16	24.6	24.6	Plant studies
No. 4 Oxidation Unit					
1 - High pressure absorber	40,850		900	935	Plant studies
2 - Lower pressure absorber	340			42	Plant studies
4 - Dehydration tower vent	6,580			152	Plant studies
5 - Electrostatic precipitator	19,400	21	29.1	29.1	Plant studies
No. 1 PTA Unit					
1 - Feed slurry tank vent	46	1.3			Plant studies
2 - Crystallizer vent	12,900	11.6			Plant studies
4 - Centrifuge feed	1,100	4.7			Plant studies
No. 2 PTA Unit					
1 - Feed slurry tank vent	46	1.3			Plant studies
2 - Crystallizer vent	19,000	1.8			Plant studies
No. 3 PTA Unit					
1 - Feed slurry tank vent	110	5.0			Plant studies
2 - Crystallizer vent	22,700	9.5			Plant studies
4 - Centrifuge feed	4,650	2.3			Plant studies
No. 4 PTA Unit					
1 - Feed slurry tank vent	110	5.0			Plant studies
2 - Crystallizer vent	28,200	1.7			Plant studies

either from the DMT unit as fuel in its hot oil furnaces. The result of this practice is that there are no longer any large emission sources in the DMT units.

DuPONT

DuPont has an operational DMT plant, the Cape Fear Plant, located in Phoenix, North Carolina. DuPont will also be opening a reconstructed plant in Old Hickory, Tennessee, in late 1976.

Technology

DuPont leases TPA technology from Amoco and DMT technology from Tennessee Eastman. DuPont was visited to obtain emission information from the Cape Fear Plant, but, as they lease technology, they would give out no emission data without clearance from Amoco and Tennessee Eastman. This clearance has been obtained and emission information will be sent (see Appendix C, letter from D. F. Rapp dated June 18, 1976). When it is received, it will be forwarded to the EPA Project Manager.

Emissions From the Cape Fear Plant

The State of North Carolina has supplied limited air emission information for the Cape Fear Plant. Figure II-7 presents a simplified block flow diagram of the process, and sources of greatest emissions are listed in Table II-4. There should be little particulate emission from the Cape Fear Plant as all TPA storage and transfer operations are controlled by baghouses.

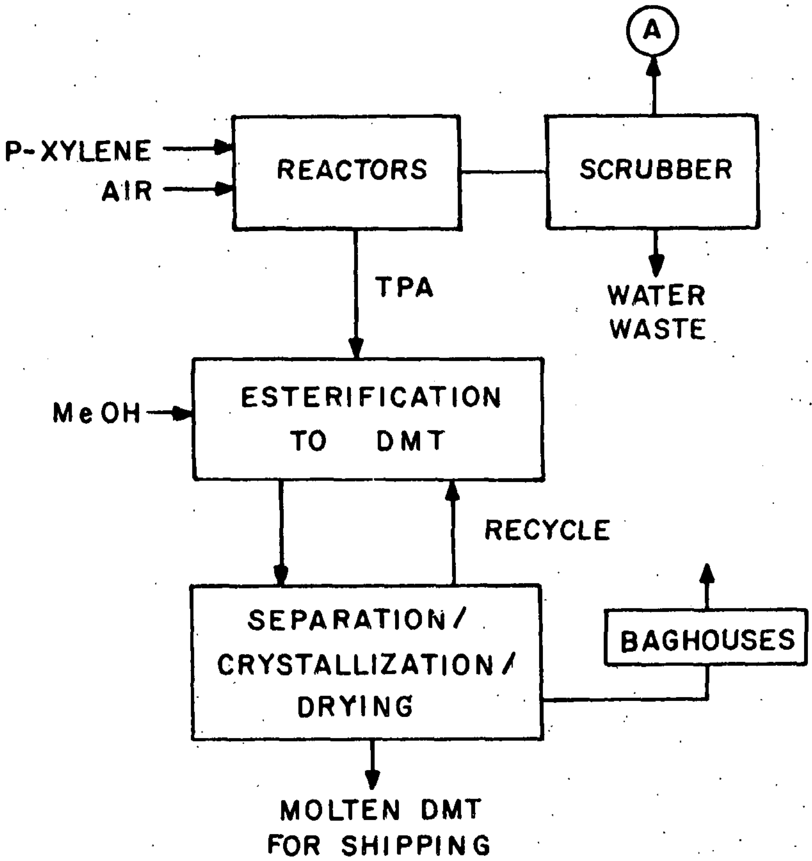


Figure II-7. Flow diagram for DuPont's Cape Fear DMT plant

Table II-4. CURRENT EMISSION LEVELS FROM DuPONT'S CAPE FEAR DMT PLANT

Significant emission point	Gas volume, scfm[a]	Pollutant emission rate, lb/hr			Basis for measurement
		Part.	CO	HC	
A - TPA reactor scrubber	-		1526	1596	(?)

[a] - represents unavailable information.

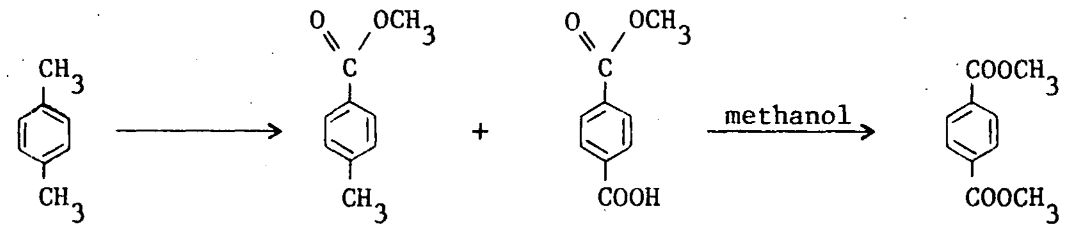
HERCULES INCORPORATED

Hercules has an operating DMT plant in Wilmington, North Carolina. In addition, Hercules will be building another DMT plant in Eastover, South Carolina, but construction is not yet started.

Technology

Hercules uses the Hercules-Witten Process to produce DMT. Most of the world production of DMT is based on this technology.

In the Hercules-Witten process, p-xylene is air oxidized to monomethyl terephthalate with the formation of some methyl toluate. The methyl toluate is recycled in the reaction. The monomethyl terephthalate is esterified with methanol to form DMT. The chemistry of the reaction is:[1]



p-xylene — methyl p-toluate — monomethyl terephthalate — dimethyl terephthalate.

Air Emissions From the Wilmington Plant

Hercules was polled by the Houdry Division of Air Products by questionnaire in 1972.[1] Hercules no longer gives out emission information to private contractors. However, it was determined during a visit to Hercules' main offices that the information on composition of emission streams contained in the Houdry report is valid.

To determine emission rates from the Hercules plant, the information in the 1972 Houdry questionnaire was scaled to reflect the increase in production capacity. A flow diagram of the Wilmington Plant is given in Figure II 8. Table II-5 lists the sources of greatest emissions. As can be seen from Table II-5, the major emission source is the p-xylene oxidation unit. Emission control equipment in use at the Wilmington Plant is described in Reference 1.

HOECHST FIBERS INTERNATIONAL

Hoechst Fibers operates a DMT plant in Spartanburg, South Carolina. Hoechst Fibers was polled in 1972 by the Houdry Division of Air Products, but their questionnaire response has remained confidential.[2] Hoechst Fibers would not release any emission information (see Appendix A).

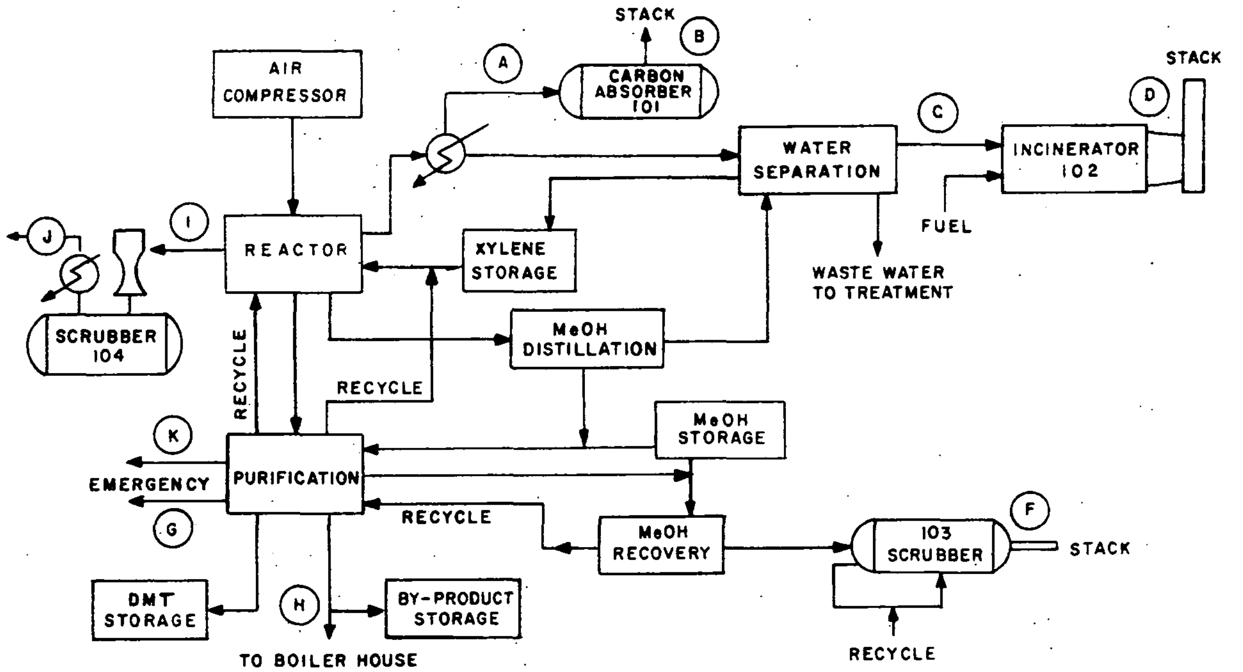


Figure II-8. Flow diagram for Hercules' Wilmington, North Carolina, DMT Plant

Table II-5. CURRENT EMISSION RATE FROM HERCULES' WILMINGTON, NORTH CAROLINA, PLANT

Significant emission point	Gas volume, scfm	Pollutant emission rate, lb/hr			Basis for measurement
		Part.	CO[a]	HC	
B - Carbon absorber	100,000		4286	1300	Materials balance
F - Methanol recovery scrubber	2,200		94	42	Laboratory analysis
J - Reactor scrubber	400			104	Calculation

[a]CO concentration is 1,000 ppm by volume.

Technology and Emissions

Hoechst Fibers leases its DMT technology from Hercules Incorporated. The air emissions from the Hoechst Fibers Plant can be estimated by scaling the air emissions from Hercules' Wilmington Plant by the difference in production capacities. Table II-6 lists the expected air emissions.

Table II-6. CURRENT EMISSION LEVELS FROM HOECHST FIBERS' SPARTANBURG, SOUTH CAROLINA, PLANT

Significant emission point	Gas volume, scfm[b]	Pollutant emission rate, lb/hr			Basis for measurement[a]
		Part.	CO	HC	
B - Carbon absorber	-		571	173	Estimate
F - Methanol recovery system	-		12.5	5.6	Estimate
J - Reactor scrubber	-			13.8	Estimate

[a]See text.

[b]- represents unavailable information.

TENNESSEE EASTMAN CORPORATION

Eastman has one operating DMT plant in Kingsport, Tennessee, and a plant under construction in Columbia, South Carolina. The capacity of the Columbia plant is not know, but is estimated at 522 million pounds per year. Eastman produces only DMT.

Technology

Very little is known about the technology used in the Eastman process. Basically, it is a two-step process involving the formation of a crude TPA intermediate and esterifying this intermediate to form DMT.[1]

To form the crude TPA, p-xylene, acetaldehyde, and acetic acid are air oxidized under conditions of moderate temperature and pressure. The TPA is then used as feedstock for the DMT unit. In the DMT unit, TPA is esterified with methanol plus the addition of a small amount of xylene. The process stream passes through several distillation columns to purify the DMT. All of the TPA manufactured is used for DMT production.

Emissions From the Kingsport Plant

Flow diagrams for the TPA and DMT units at Eastman's Kingsport Plant are given in Figures II-9 through II-13. The Kingsport Plant has a production capacity of 600 million pounds of DMT per year.

Emission information was obtained from Eastman personnel during a site visit. The latest emission information was taken from state permit forms dated June 1974. These permit forms are included in Appendix A.

Figure II-9 is a flow diagram for the TPA unit. This unit has a design capacity of 66,500 pounds of TPA per operating hour. Table II-7 lists

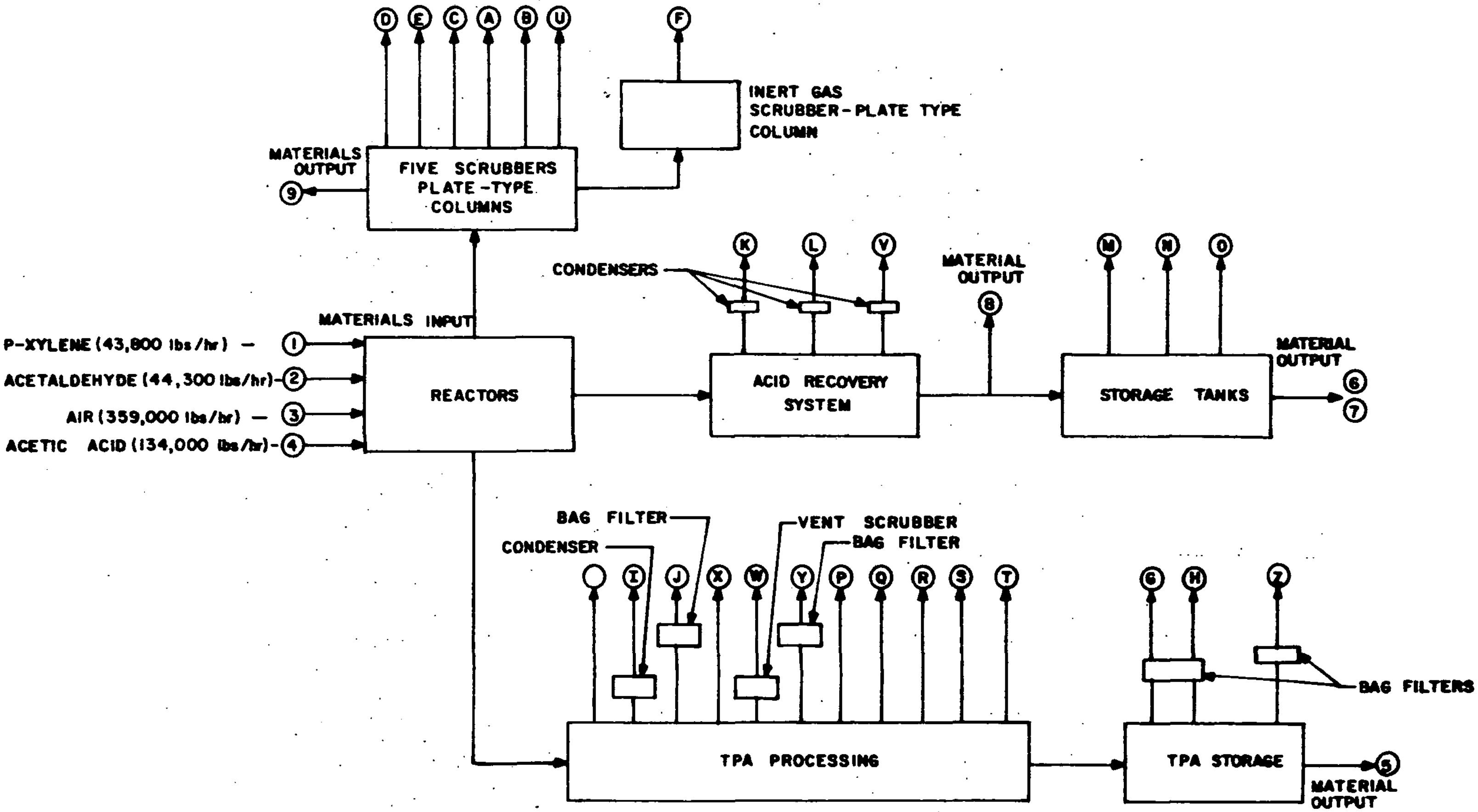
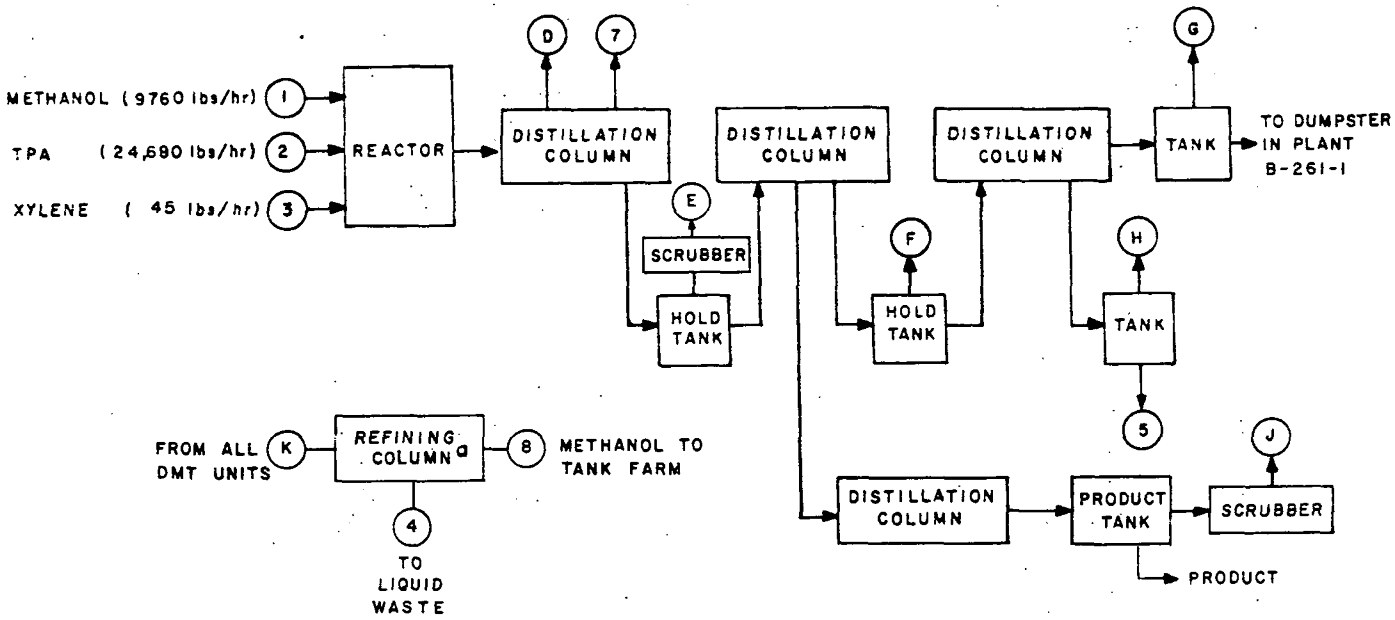


Figure II-9. Flow diagram for Tennessee Eastman's Kingsport, Tennessee, Plant



[a]SEE TEXT

Figure II-10. Flow diagram for Eastman's DMT Plant B-237A-1

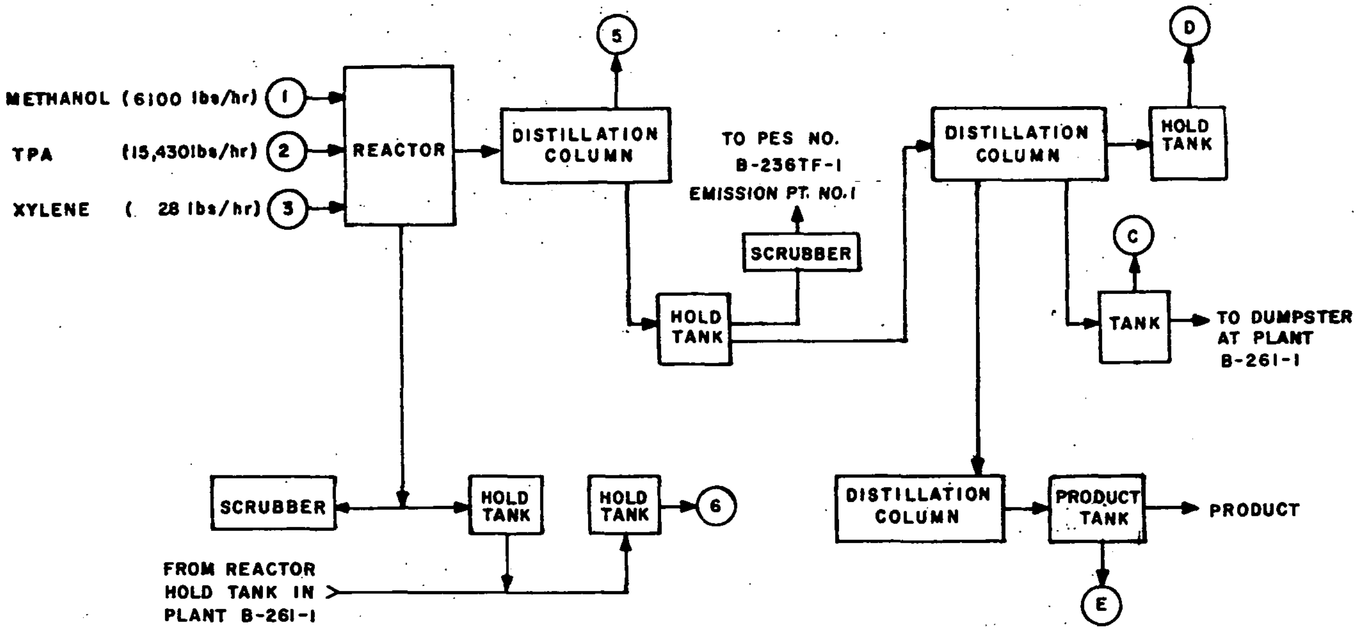


Figure II-11. Flow diagram for Eastman's DMT Plant B-237-1

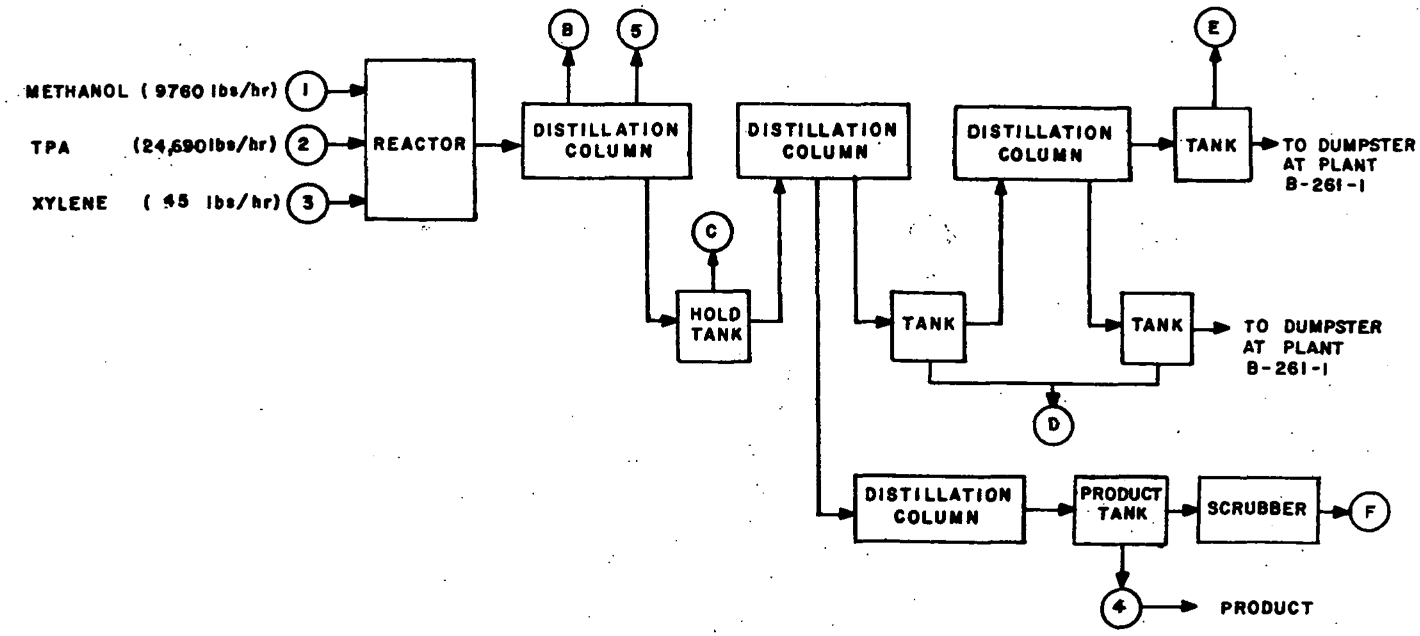


Figure II-12. Flow diagram for Eastman's DMT Plant B-261A-1

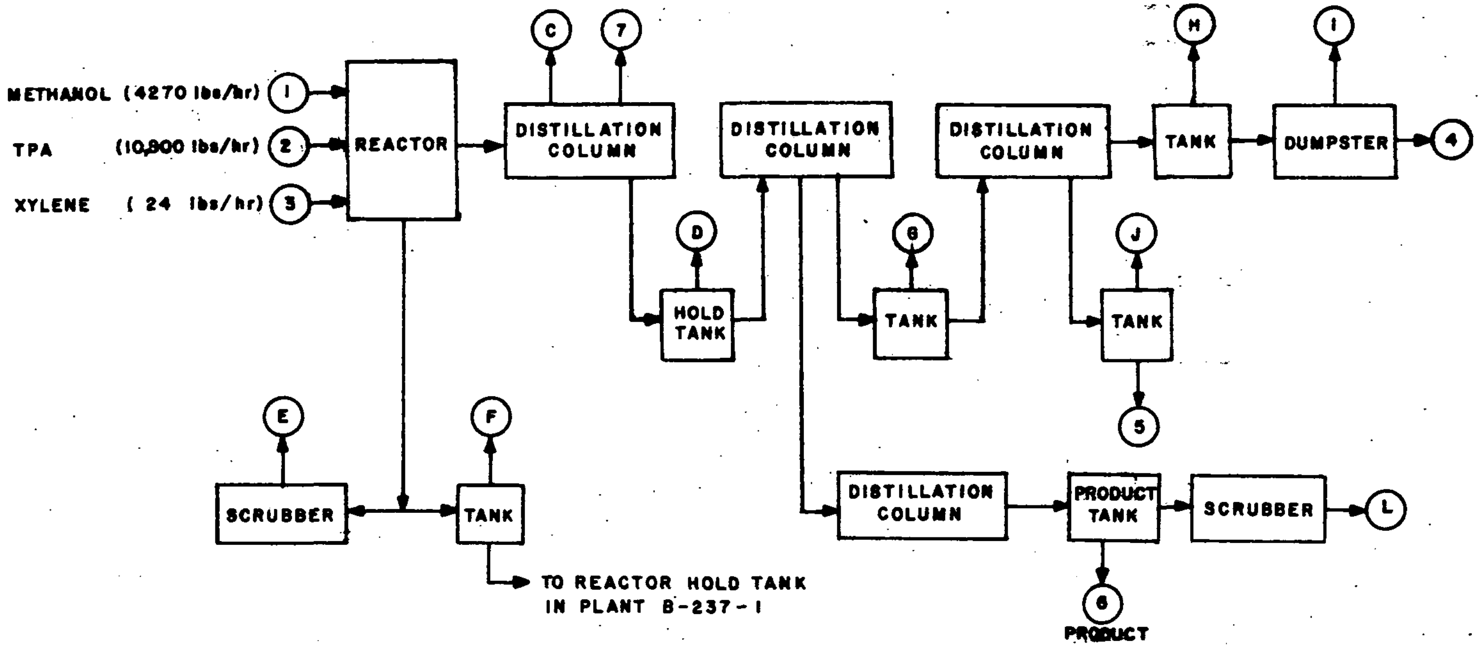


Figure II-13. Flow diagram for Eastman's DMT Plant B-261-1 all major emission sources. Emission information for all sources is contained in the permit applications in Appendix A.

Emissions from the TPA unit are primarily CO and hydrocarbons. The source of the greatest emissions is the reactor scrubber. A typical hydrocarbon emission composition is (from emission point U): 270 lb/hr methyl acetate; 10.4 lb/hr p-xylene; 0.73 lb/hr acetic acid; 84.5 lb/hr acetaldehyde; and 12 lb/hr methane.

The Kingsport facility employs four plants to produce DMT from TPA. The capacities of these plants are: Plant 237A-1, 150 million pounds per year; Plant 261A-1, 240 million pounds per year; Plant 261-1, 105 million pounds per year; and Plant 237-1, 105 million pounds per year. The combined output capacity is 600 million pounds per year.

Flow diagrams for the four plants are given in Figures II-10 through II-13. All significant emission sources are given in Table II-7. Between the TPA and DMT units there is a tank farm. Emissions from the tank farm are negligible compared to those from the processes. The refining column, shown in Figure II-10, is used to purify methanol used in the reaction. The recycled methanol is then reused as feed to the reactors. The refining column is fed from the holding tanks and the purified methanol is stored in a tank farm. Compared with the emissions from the TPA unit, emissions from the DMT unit are small. The greatest source of emissions from each DMT Plant are methanol emissions from the product tank scrubber (e.g., emission point J, Figure II-10). However, there is also a large hydrocarbon emission from the methanol refining column (point K, Figure II-10) that is composed of: acetaldehyde, 53 lb/hr; dimethyl ether, 416 lb/hr; methyl acetate, 103 lb/hr; and methanol, 29 lb/hr.

Table II-7. CURRENT EMISSION RATE FROM EASTMAN'S KINGSPORT PLANT

Significant emission point	Gas volume, scfm[a]	Pollutant emission rate, lb/hr Part.	CO[b]	HC	Basis for measurement
TPA Unit					
A - Reactor scrubber column	7,272		167	63.6	Measurement
B - Reactor scrubber column	7,272		167	63.6	Measurement
C - Reactor scrubber column	9,600			364.7	Estimate
D - Reactor scrubber column	2,322		53.3	20.16	Measurement
E - Reactor scrubber column	2,322		53.3	20.16	Measurement
G - TPA storage bag filter	798	1.0		2.65	Part. - Estimate HC - Measurement
I - TPA processing condenser	223			16.02	Measurement
U - Reactor scrubber column	15,000		344	377	Measurement
Z - TPA storage bag filter	786	1.5		2.65	Part. - Estimate HC - Measurement
DMT Unit B-261-1					
L - Product tank scrubber	-			9.4	Estimate
DMT Unit B-261A-1					
F - Product tank scrubber	-			18.8	Estimate
DMT Unit B-237-					
E - Product tank scrubber	-			8.2	
DMT Unit B-237A-1					
J - Product tank scrubber	-			9.4	Estimate
K - Refining column	-				Measurement

[a]- signifies unavailable information.

[b]CO concentration is 5,000 ppm by volume.

Emissions From the Columbia Plant

The Columbia, South Carolina, DMT Plant will be going on-line in 1976. The technology used in the Columbia Plant is similar to that used in the Kingsport Plant. A flow diagram of the TPA unit is given in Figure 11-14 and of the DMT unit in Figure II-15.

Emission information was obtained from the Eastman personnel in the form of new facility permit applications to the State of South Carolina. Production capacity is considered confidential; however, a rough estimate of the production capacity can be determined. It is assumed that the TPA reactor technology and the reactor scrubber are the same at both the Kingsport and Columbia Plant. As CO will not be scrubbed, TPA output from the Columbia Plant can be determined from the ratio of CO emissions of the Kingsport to the Columbia Plant - yielding a DMT production rate at the Columbia Plant of 522 million pounds per year.

Emissions from all major emission points at the Columbia Plant are given in Table II-8. The major emission stream from the DMT unit is from the methanol recovery unit. This stream is composed of: dimethyl ether, 583 lb/hr; methyl acetate, 245 lb/hr; methanol, 71 lb/hr; acetaldehyde, 71 lb/hr; and some spent catalyst. Eastman is designing a system to burn this stream in an incinerator.

FACTORS AFFECTING EMISSIONS

Hercules and Tennessee Eastman report variations in emissions during normal operation.[2] As the largest emissions are from the reactor and the methanol recovery scrubber, discussions of emission variations will be confined to these two emission points.

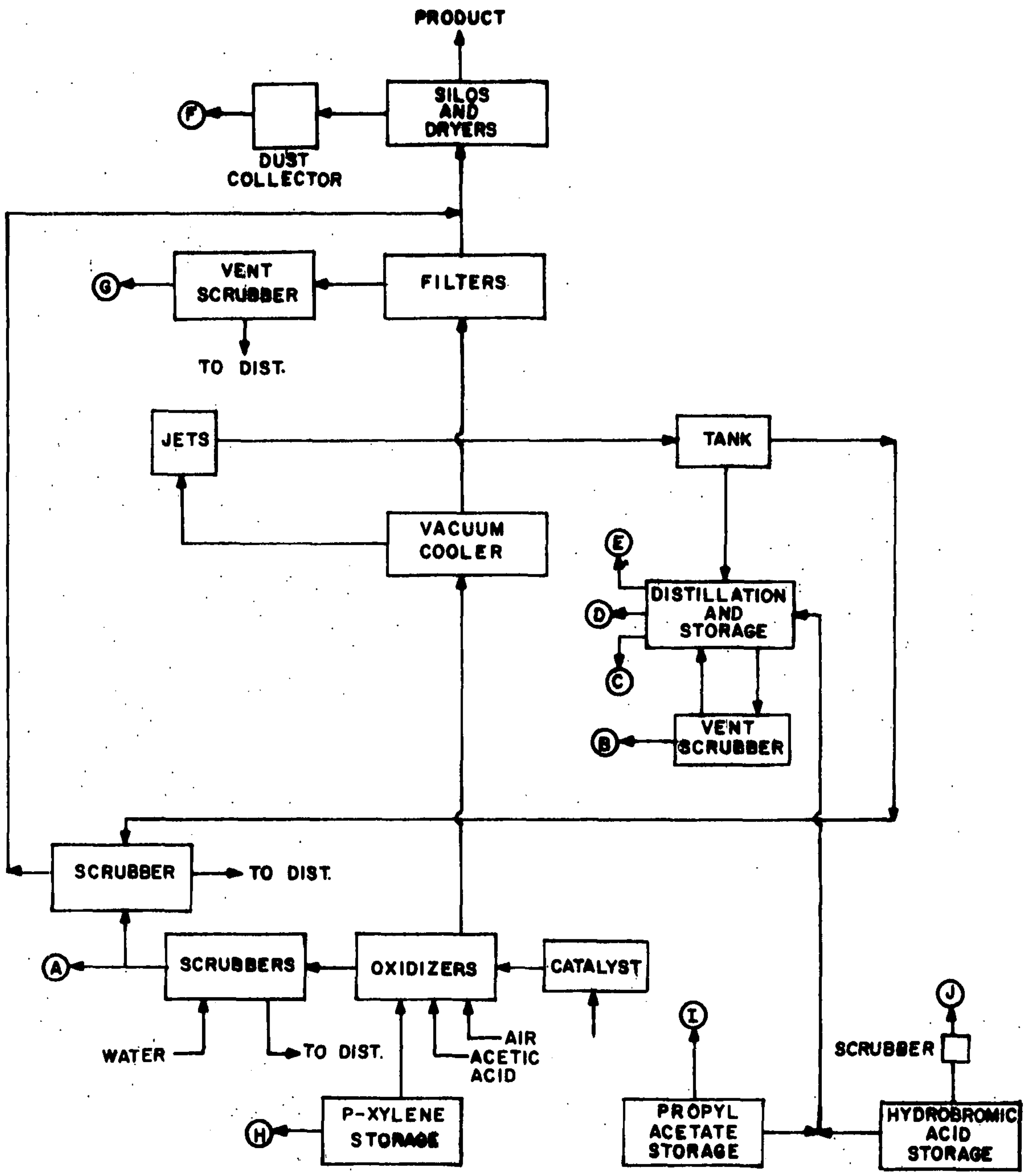


Figure II-14. Flow diagram for Eastman's Columbia, South Carolina, TPA unit

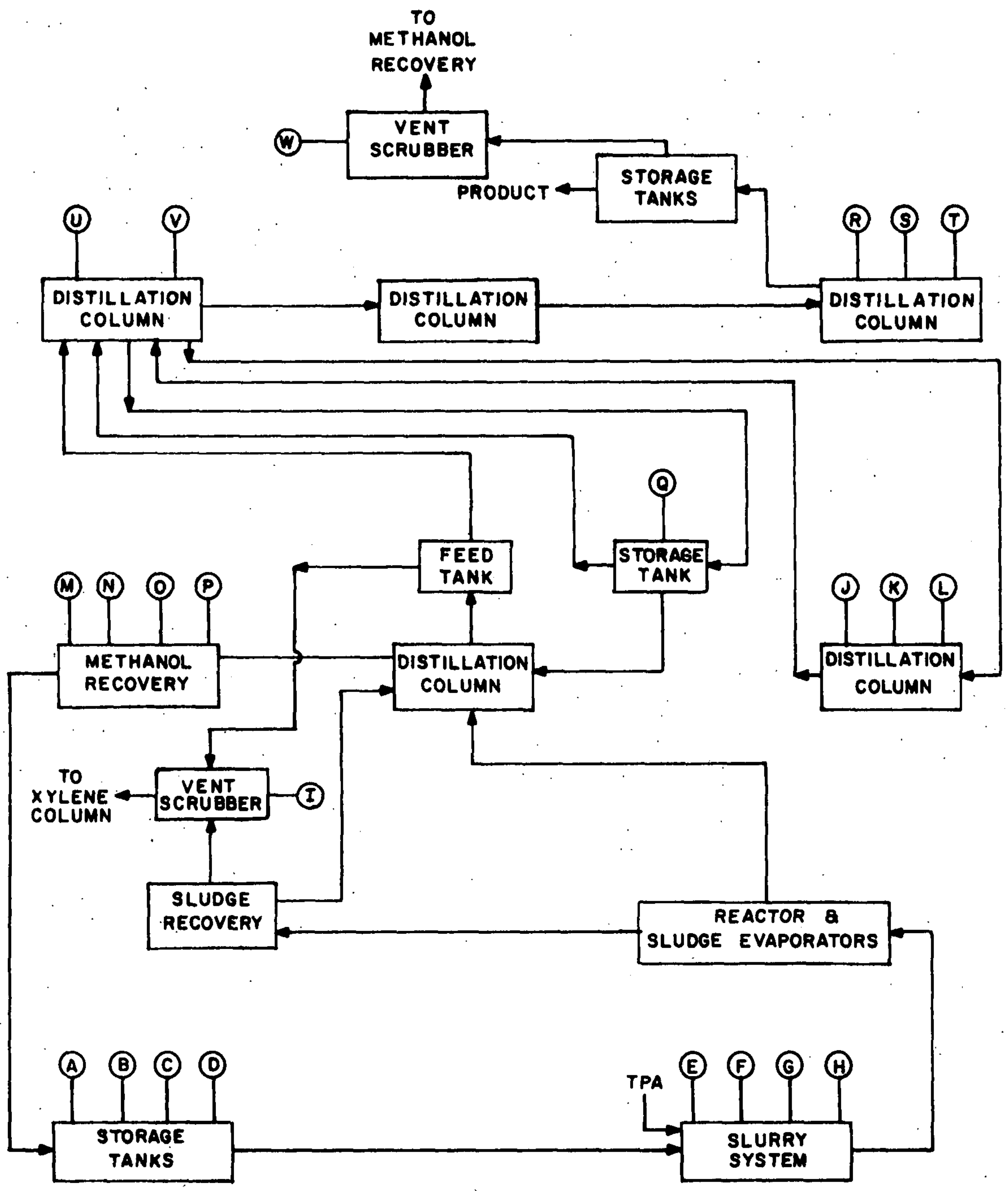


Figure II-15. Flow diagram for Eastman's Columbia, South Carolina, DMT Plant

Table II-8. CURRENT EMISSION RATE FROM EASTMAN'S COLUMBIA PLANT

Significant emission point	Gas volume, scfm[a]	Pollutant emission rate, lb/hr			Basis for measurement
		Part.	CO	HC	
TPA Unit					
A - Oxidizer scrubber vent	-		683	99	Calculation
F - Storage dust collector	-			62.5	Calculation
DMT Unit					
P - Methanol recovery vent	-			970	Calculation
W - Storage tank scrubber	-			10	Calculation

[a] - represents unavailable information.

Factors Affecting Emissions at Hercules' Wilmington Plant

Hercules reports that emissions from the reactor vary as a function of reaction rate. As the reaction proceeds, oxygen emissions decrease and CO emissions increase. During start-up and shut-down, the carbon adsorbers are bypassed. However, as the plant is operating at ~96 percent utilization, emissions from start-up and shut-down should be small.

Hercules reports that xylene emissions from the reactor average 0.08 percent of total stream flow, and can range from 0.01 to 0.5 percent. The average composition was determined for full capacity and typical adsorber performance.

Hercules reports that hydrocarbon emissions from the methanol concentrator average 0.4 percent of total stream flow, and can vary from 0.05 to 1.0 percent. Similarly, CO emissions average 1 percent but can vary from 0.5 to 1.5 percent. However, they do note that the composition is stable during normal operating conditions, indicating that using average compositions to determine yearly emission rates should give accurate results.

Factors Affecting Emissions at Tennessee Eastman's Kingsport Plant

Eastman reports that variations in composition from the p-xylene oxidizers are not significant. Hydrocarbon emissions from the refining column varied by 20 percent of the total flow during normal operation.

It appears that variations in emissions may be significant in the Hercules-Witten process, but not in the Eastman process. This could signal the need for overdesigning emission control equipment to handle the variation in composition. However, as DMT-TPA plants have a high rate of utilization (e.g., Eastman operates full time, 50 weeks a year), emissions estimates using average compositions should give an accurate representation of yearly emission rates.

REFERENCES

1. Pervier, J.W., R. C. Barley, D. E. Field, B. M. Friedman, R. B. Morris, and W. A. Schwartz. Survey Reports on Atmospheric Emissions From the Petrochemical Industry. Volume II. Houdry Division, Air Products and Chemicals, Inc. Marcus Hook, PA. U.S. Environmental Proctection Agency, Research Triangle Park, N. C. Report Number EPA-450/3-73-005-b. April 1974.
2. This information was obtained from questionnaries completed by the operating companies for the Houdry Division of Air Products, Inc., in 1972. Private communication with Andrew Trenholm, EPA Project Officer.

SECTION III

APPLICABLE BEST SYSTEMS OF EMISSION REDUCTION

INTRODUCTION

Only two pollutants, CO and hydrocarbons, are emitted from DMT-TPA plants in quantities large enough to consider the use of further emission control devices. Particulate emissions will not be of concern for two reasons: (1) only Amoco's Decatur Plant produces a particulate loading that exceeds state standards and this particulate loading is from the incinerator used to burn liquid wastes and not from the process itself; (2) most manufacturers are now using, or plan to use, the best systems of emission control (i.e., baghouses or electrostatic precipitators). Therefore, the magnitude of particulate emissions is small. For example, Eastman's Kingsport Plant has a total particulate emission rate of 2.5 pounds per hour (see Table II-7).

The only major emission point of both hydrocarbons and CO is from the p-xylene oxidizer in the TPA unit. Large emissions of just hydrocarbons come from only a limited number of emission points in each DMT-TPA plant.

Emission control via the use of different technologies is not a feasible approach. As shown in Table V-2, the difference in emission factors between each of the three DMT-TPA manufacturing technologies is small. Also, as can be seen from Table V-2, the process with the lowest emission factor for hydrocarbons (the Amoco Process), has the highest emission factor for CO and vice versa. The reason for these differences are not known. Therefore, definite conclusions cannot be reached. However, from the information that is available, it would appear that the use of control devices on each emission point and not the use of one technology in place of another would be the best approach to emission control.

EMISSION CONTROL SYSTEMS PRESENTLY IN USE

Emission Control of Carbon Monoxide

No emission control system presently in use in DMT-TPA plants is designed to reduce CO emissions.

Emission Control of Hydrocarbons

Only carbon adsorbers and scrubbers are used in DMT-TPA plants to limit hydrocarbon emissions. In the following, the efficiency and type of emission control equipment used by each facility will be identified. These devices are described further in Appendix A and in Reference 1.

Hercules' Wilmington Plant uses an activated carbon adsorber to control hydrocarbon emissions from its p-xylene reactor (see Figure II-8, emission point B). The carbon adsorber is 91 percent efficient in removing p-xylene from the reactor off gas stream.[1] In addition, a wet (water) scrubber is used after the methanol recovery device (see Figure II-8). The methanol recovery device is a condenser and the scrubber is a spray tower design. This device is 99 percent efficient in removing methanol.[1]

Amoco uses wet tower scrubbers to remove 97 percent of the acetic acid from off gases from the p-xylene oxidizer. The Decatur Plant burns organic emissions (mostly dimethyl ether) from the DMT process in its powerhouse. This system of emission control is believed to be ~100 percent efficient.

Eastman uses a series of wet (water) tray type absorbers to treat off gases from its p-xylene oxidizer (see Figure II-9, emission points A to F).[1] These devices remove almost all of the acetic acid, but no other organics from the off gas stream. Acetic acid accounts for ~80 weight percent of the organic in the gas stream.

Eastman does not treat off gases from its refining tower (see Figure II-10, emission point K). This stream consists mostly of dimethyl ether so liquid scrubbing is not a viable control technique. Eastman plans to burn this stream in an incinerator.

THE BEST SYSTEM OF EMISSION CONTROL

Thermal incinerators, flaring, and carbon adsorbers can all be used to limit hydrocarbon emissions with greater than 90 percen efficiency.[2,3] They will also limit CO emissions, but to a lesser degree.

Thermal incinerators are used by the formaldehyde manufacturing industry with stream flows and composition similar to those encountered from the p-xylene oxidation step.[4] In the formaldehyde industry, thermal incinerators achieve almost 100 percent efficiency in removing hydrocarbons. Ninety percent efficiency can be expected from flaring,[5] with efficiencies as high as 99 percent being reported for flares used at refineries.[6] Carbon adsorbers, used by Hercules on their p-xylene oxidation units are 95 percent efficient in removing hydrocarbons.[1]

For CO, CO boilers are the best system of emission control with CO removal efficiencies of greater than 99.99 percent. CO boilers will also reduce hydrocarbon emissions bypractically 100 percent.[5] There are no combustion devices presently in use by the DMT-TPA industry, therefore, it is difficult to predict equipment performance. Although capital and operating costs are high for CO boilers, they can double as steam generating units which makes their use more economical. However, it has been shown that byproduct steam credits cannot usually offset operating costs.[7]

Manufacturers of CO boilers gurantee a minimum of 95 percent efficiency for hydrocarbon and CO removal with much higher efficiencies possible (see Appendix A). A CO boiler is equivalent to carbon adsorption flaring or thermal incineration for the removal of hydrocarbons and superior to these types of control devices for the removal of CO. Therefore, a CO boiler will be considered the best system of emission control and, to be on the conservative side, 95 percent efficiency for hydrocarbon and CO removal will be assumed.

There are two classes of streams that the CO boiler will have to control:

1. A high volume (up to 100,000 scfm) low concentration stream of CO and hydrocarbons from the p-xylene oxidizer; and

2. Low volume, high concentration streams from other sections of the plant.

The CO boiler should be used with a heat recovery system to make its use more economical. As some of the low volume, high concentration streams may be above the lower explosive limit, special precautions, such as premixing with the high volume, low concentration streams may be required.

Tables III-1 to III-7 list the achievable emissions utilizing a CO boiler that is 95 percent efficient in removing CO and hydrocarbons.

Factors Affecting Emission Control Capability

The CO boiler should be constructed of such a size that it can handle the effects of plant expansions. Plant expansion will increase the flow rate from the p-xylene oxidizer and from the hydrocarbon recovery units.

As CO boilers are combustion devices, operating at too low temperatures or too high flow rates will have the greatest effect on emission control capability.

Table III-1. ACHIEVABLE EMISSION LEVELS WITH BEST CONTROL TECHNIQUES - AMOCO, JOLIET PLANT

Significant emission points	Control technique	Achievable emission levels, lb/hr	
		CO	HC
<u>TPA Unit</u>			
1 - Reactor absorber	CO boiler	19.5	3.1
3 - Dehydration tower	CO boiler		7.4
7 - Off-gas scrubber	CO boiler		0.7
<u>DMT Unit</u>			
6 - Liquid drum	CO boiler		26

Table III-2. ACHIEVABLE EMISSION LEVELS WITH BEST CONTROL TECHNIQUES - AMOCO, DECATUR PLANT

Significant emission points	Control technique	Achievable emission levels lb/hr	
		CO	HC
<u>No. Oxidation Unit</u>			
1 - High pressure absorber	CO boiler	37.5	52.2
2 - Low pressure absorber	CO boiler		2.6
4 - Dehydration tower vent	CO boiler		4.9
<u>No. 2 Oxidation Unit</u>			
1 - High pressure absorber	CO boiler	37.5	52.2
2 - Low pressure absorber	CO boiler		2.6
4 - Dehydration tower vent	CO boiler		4.9
<u>No. 3 Oxidation Unit</u>			
1 - High pressure absorber	CO boiler	43.5	46
2 - Low pressure absorber	CO boiler		2.1
4 - Dehydration tower vent	CO boiler		7.6
<u>No. 4 Oxidation Unit</u>			
1 - High pressure absorber	CO boiler	45	46.8
2 - Low pressure absorber	CO boiler		2.1
4 - Dehydration tower vent	CO boiler		7.6

[a] Emissions from the liquid waste incinerator (Figure II-4, Emission Point 5) are not included.

Table III-3. ACHIEVABLE EMISSION LEVELS WITH BEST CONTROL TECHNIQUES - DUPONT, CAPE FEAR PLANT

Significant emission points	Control technique	Achievable emission levels, lb/hr	
		CO	HC
A - TPA reactor scrubber	CO boiler	76.3	79.8

Table III-4. ACHIEVABLE EMISSION LEVELS WITH BEST CONTROL TECHNIQUES - HERCULES, WILMINGTON PLANT

Significant emission points	Control technique	Achievable emission levels, lb/hr	
		CO	HC
B - Carbon adsorber	CO boiler	214.3	65
F - Methanol recovery scrubber	CO boiler	4.7	2.1
J - Reactor scrubber	CO boiler		5.2

Table III-5. ACHIEVABLE EMISSION LEVELS WITH BEST CONTROL TECHNIQUES - HOECHST FIBERS, SPARTANBURG PLANT

Significant emission points	Control technique	Achievable emission levels, lb/hr	
		CO	HC
B - Carbon adsorber	CO boiler	28.6	8.7
F - Methanol recovery system	CO boiler	0.63	0.3
J - Reactor scrubber	CO boiler		0.7

Table III-6. ACHIEVABLE EMISSION LEVELS WITH BEST CONTROL TECHNIQUES - EASTMAN, KINGSPORT PLANT

Significant emission points[a]	Control technique	Achievable emission levels, lb/hr	
		CO	HC
TPA Unit			
A-E - Reactor scrubber colums	CO boiler	22.0	26.6
I - TPA processing condenser	CO boiler		0.8
U - Reactor scrubber column	CO boiler	17.2	18.9
DMT Unit B-261A-1			
F - Product tank scrubber	CO boiler		0.94
DMT Unit B-237A-1			
K - Refining column	CO boiler		30.1

[a]Several emission points listed in Table III-3 are not listed in this table because their uncontrolled HC emission rate is less than 10 pounds per hour.

Table III-7. ACHIEVABLE EMISSION LEVELS WITH BEST CONTROL TECHNIQUES - EASTMAN, COLUMBIA PLANT

Significant emission points	Control techniques	Achievable emission levels, lb/hr	
		CO	HC
TPA Unit			
A - Oxidizer scrubber vent	CO boiler	34.2	5.0
F - Storage dust collector	CO boiler		3.1
DMT Unit			
P - Methanol recovery vent	CO boiler		48.5
W - Storage tank scrubber	CO boiler		0.5

REFERENCES

1. Pervier, J.W., R.C. Barley, D.E. Field, B.M. Friedman, R.B. Morris, and W.A. Schwartz. Survey Reports on Atmospheric Emissions From the Petrochemical Industry, Volume II. Houdry Division, Air Products and Chemicals, Inc. Marcus Hook, PA. U.S. Environmental Protection Agency, Research Triangle Park, N.C. Report Number EPA-450/3-73-005-b. April 1974.

2. Morris, R.B., F.B. Higgins, J.A. Lee, R. Newirth, and J.W. Pervier. Engineering and Cost Study of Air Pollution Control for the Petrochemical Industry, Volume 7. Phthalic Anhydride Manufacture From Ortho-xylene. Houdry Division, Air Products and Chemicals, Inc. Marcus Hook, PA. U.S. Environmental Protection Agency, Research Triangle Park, N.C. Report Number EPA-450/3-73-006-g. July 1975.

3. Cooper, W.T., W.A. Everson, J.V. Friel, J.S. Greer, and C.A. Palladino. Hydrocarbon Pollutant Systems Study, Volume I. Stationary Sources. MSA Research Corporation. Evans City, PA. U.S. Environmental Protection Agency. Publication Number PB-219074. January 1973.

4. Morris, R.B., F.B. Higgins, J.A. Lee, R. Newirth, and J.W. Pervier. Engineering and Cost Study of Air Pollution Control for the Petrochemical Industry, Volume 5. Formaldehyde Manufacture with the Mixed Oxide Catalyst Process. Houdry Division, Air Products and Chemicals, Inc. Marcus Hook, PA. U.S. Environmental Protection Agency, Research Triangle Park, N.C. Report Number EPA-450/3-73-006-e. March 1975.

5. Morris, R.B., F.B. Higgins, J.A. Lee, R. Newirth, and J.W. Pervier. Engineering and Cost Study of Air Pollution Control for the Petrochemicals Industry, Volume 2. Acrylonitrile Manufacture. Houdry Division, Air Products and Chemicals Inc. Marcus Hook, PA. U.S. Environmental Protection Agency, Research Triangle Park, N.C. Report Number EPA-450/3-73-006-b. February 1975.

6. Klett, M.G. and J.B. Galeski. Flare Systems Study. Lockheed Missiles and Space Company. Huntsville, Alabama. U.S. Environmental Protection Agency, Research Triangle Park, N.C. Report Number EPA-600/2-76-079. March 1976.

7. Morris, R.B., F.B. Higgins, J.A. Lee, R. Newirth, and J.W. Pervier. Engineering and Cost Study of Air Pollution Control for the Petrochemicals Industry, Volume 1. Carbon Black. Houdry Division, Air Products and Chemicals, Inc. Marcus Hook, PA. U.S. Environmental Protection Agency, Research Triangle Park, N.C. Report Number EPA-450/3-73-006-a. February 1975.

SECTION IV

SUMMARY OF STATE AND LOCAL AIR POLLUTION CONTROL REGULATIONS

INTRODUCTION

All state and local laws applicable to DMT-TPA plants are listed in the following. As DMT-TPA plants do not emit SO_x or NO_x, there will be no reference to regulations for SO_x and NO_x. Pertinent sections of state and local air pollution control regulations are given in Appendix C.

There are very few state and local laws regulating emissions from DMT-TPA plants. Most states do not regulate hydrocarbon or CO emissions, but all states regulate particulate emissions. Only Illinois regulates emissions of both CO and hydrocarbons.

REGULATIONS FOR ILLINOIS (AMOCO, JOLIET PLANT)

State regulations apply for the Joliet area. Illinois has classified TPA manufacture as a petrochemical process. Amoco and others are currently contesting this classification.

Hydrocarbon Emissions

Different regulations apply to the emission of hydrocarbons depending on whether or not the TPA manufacturing process is classified as a petrochemical process. If the TPA process is not considered a petrochemical process regulations require that emissions of more than 8 pounds per hour of hydrocarbons be treated by pollution control equipment (catalytic incinerators, vapor recovery systems, etc.) that is capable of reducing organic emissions by 85 percent or more.

If TPA manufacturing is considered a petrochemical process, regulations require that no organic materials be discharged to the atmosphere in concentrations greater than 100 ppm equivalent methane.

Carbon Monoxide (CO) Emissions

The DMT-TPA industry has been classified as a petrochemical industry. As such, CO bearing waste streams must be burned in a direct flame afterburner or carbon monoxide boiler so that the resultant concentration of carbon monoxide is less than or equal to 200 ppm corrected to 50 percent excess air.

Particulate Emissions

The state of Illinois uses process weight tables to determine allowable particulate emission limits. Table IV-1 compares the allowed and actual particulate emissions from each significant emission point at the Joliet Plant. As can be seen from Table IV-1, the Joliet Plant is in compliance with the standards for the TPA and PTA unit. Process weights for the DMT unit are not known, but, as the DMT unit is being shut down, compliance is not essential.

REGULATIONS FOR TENNESSEE (EASTMAN, KINGSPORT PLANT; DUPONT, OLD HICKORY PLANT)

The DuPont Plant in Old Hickory is regulated by the Metropolitan Health Department of Nashville and Davidson Counties and should be coming on-line

Table IV-1. ALLOWABLE PARTICULATE EMISSIONS FOR AMOCO'S JOLIET DMT-TPA PLANT[a]

Significant emission point[d]	Particulate emission, lb/hr	Process weight, lb/hr	Allowable particulate emission, lb/hr
TPA unit			
4-dryer/scrubber	15	15,182[b]	15.9
PTA unit			
1-TPA stream	25	41,000	31.0
DMT unit			
1-TPA feed	10	-[c]	-[c]
5-flaker/briquetter	10	-	-
7-solids drumming station vent	5	-	-

[a]From process weight table for state of Illinois. See Appendix C.

[b]Estimate based on total TPA production.

[c]See text.

[d]See Figure II-1.

this year. The Kingsport Plant is regulated by the Tennessee Division of Air Pollution Control. There are no regulations for CO emissions from DMT-TPA plants in Tennessee.

Hydrocarbon Emissions

Regulations for hydrocarbon emissions require that new sources install and utilize the best equipment and technology for controlling organic gaseous emissions.

Particulate Emissions

Tennessee regulates particulate emissions through the use of a general process weight table. The magnitude of particulate emission is not known for DuPont's Old Hickory Plant. Particulate emissions from Eastman's Kingsport Plant are regulated by bagfilters and are well within the state standards.

REGULATIONS FOR ALABAMA (AMOCO, DECATUR PLANT)

TPA manufacture is not considered a petroleum process in Alabama.

Hydrocarbon Emissions

Alabama regulates emissions from the storage and transfer of hydrocarbons. However, there are no regulations limiting hydrocarbon emissions from the TPA process used at the Decatur Plant.

Carbon Monoxide Emissions

The state of Alabama does not regulate the emission of CO from the DMT-TPA process. For petroleum processes, the state requires that CO bearing waste streams be burned.

Particulate Emissions

Alabama's particulate emission regulations are based on a general process weight table. All significant sources of particulate emissions from the TPA process itself meet state standards. However, particulate emissions from the incinerators that are used to burn liquid wastes from the oxidation units are not in compliance with state standards (see Appendix A, letter from Paul Saywell, dated April 21, 1976). Particulate emissions from the incinerators are controlled by electrostatic precipitators. It is not known by what means Amoco will meet the state regulations on particulate emissions.

REGULATIONS FOR SOUTH CAROLINA (HOECHST FIBER'S SPARTANBURG PLANT)

South Carolina does not regulate hydrocarbon or CO emissions. It does, however, regulate particulate emissions through the use of process weight tables. As neither particulate loadings or process weights are known for the Spartanburg Plant, it is impossible to judge compliance.

REGULATIONS FOR NORTH CAROLINA (HERCULES, WILMINGTON PLANT; DUPONT, CAPE FEAR PLANT)

The state of North Carolina does not regulate the emission of carbon monoxide.

Hydrocarbon Emissions

North Carolina regulates emissions from the storage of hydrocarbons by requiring vapor emission control systems.

North Carolina regulates emissions of photochemically reactive material by requiring that most organic emissions be reduced by at least 85 percent by an appropriate control device. Hercules and DuPont employ control devices that are greater than 90 percent efficient. This regulation applies only to emission points producing organic emissions of more than 40 pounds per day.

Particulate Emissions

North Carolina regulates particulate emissions by a general process weight chart. Particulate emissions and process weights from the DuPont, Cape Fear Plant are not known. However, as the process weight chart for Illinois and North Carolina are similar and as DuPont leases its TPA technology from Amoco, and Amoco's Joliet Plant is within the particulate emission limits, it can be assumed that DuPont is within the particulate emission limits.

Hercules reports no particulate emissions nor are particulate loadings from the Wilmington Plant mentioned in any material received from the state. Therefore, it can only be assumed that both plants are in compliance with state standards.

THE EFFECT OF STATE REGULATIONS ON DMT-TPA PLANTS

As the preceding has shown, only the Amoco, Joliet Plant and Decatur Plant are in violation of any state standards.

The Joliet Plant will be in violation of state hydrocarbon and CO emission standards if the state maintains that TPA manufacture is a petrochemical process. However, these standards will be met if the best system of emission control (a CO boiler) is utilized.

The Decatur Plant could probably meet Alabama particulate emission standards if baghouses were added after the electrostatic precipitators on the incinerators. However, as the incinerators are not an integral part of the TPA process and as the total impact on using baghouses on this one plant would be small in comparison to industry wide particulate emissions, this report will not consider the effects of using the best system of emissions control on the incinerators at the Decatur Plant.

Tables IV-2 through IV-4 list the expected emission reduction for each plant when the best system of emission control is implemented. As only three different technologies will be used on future plants, expected emission reductions are only calculated for: the Eastman, Kingsport Plant; the Amoco, Decatur Plant; and the Hercules, Wilmington Plant.

Table IV-2. EMISSION REDUCTION FROM AMOCO'S DECATUR PLANT, PLANT SIZE 2140 x 10^6 lbs DMT/YEAR

Source	Control technique	Emission rate w/ best systems, lb/hr		Current control level, lb/hr		Emission reduction	
		CO	HC	CO	HC	CO	HC
Oxidation units	CO boiler	163.5	231.6	3270	4632	3107	4400

Table IV 3. EMISSION REDUCTION FROM EASTMAN'S KINGSPORT PLANT PLANT SIZE 600 x 10^6 lbs DMT/YEAR

Source	Control technique	Emission rate w/ best systems, lb/hr		Current control level, lb/hr		Emission reduction	
		CO	HC	CO	HC	CO	HC
TPA unit	CO boiler	39.2	46.3	784.6	925	745.4	878.7
DMT units	CO boiler		31		620		589

Table IV-4. EMISSION REDUCTION FROM HERCULE'S WILMINGTON PLANT PLANT SIZE 1300 x 10^6 lbs DMT/YEAR

Source	Control technique	Emission rate w/ best systems, lb/hr		Current control level lb/hr		Emission reduction	
		CO	HC	CO	HC	CO	HC
DMT production	CO boiler	219	72.3	4380	1446	4161	1374

SECTION V

ESTIMATED EMISSION REDUCTION

INTRODUCTION

In the following the impact of NSPS for hydrocarbons and CO will be calculated for the DMT-TPA industry. Model IV, developed by the Research Corporation of New England will be used.[1]

Model IV

Model IV is treated extensively in Reference 1 and will not be discussed here. Table V-1 contains a listing and definition of the parameters required for Model IV. Briefly, the following equations will be used:

$$T_S = E_S K (A - B) + E_S K (B + C) \quad (1)$$

$$T_N = E_S K (A - B) + E_N K (B + C) \quad (2)$$

$$T_{Nd} = E_{111d} K (A - B) + E_N K (B + C) \quad (3)$$

$$T_S - T_{Nd} = K (B + C) (E_S - E_{111d}) \quad (4)$$

Values of Model IV Parameters for the DMT-TPA Industry

The following presents discussions of values given each Model IV parameter.

Table V-1. PARAMETERS USED IN MODEL IV[2]

K	=	normal fractional utilization rate of existing capacity, assumed constant during time interval.
A	=	baseline year production capacity (production units/yr).
B	=	production capacity from construction and modification to replace obsolete facilities (production units/yr).
C	=	production capacity from construction and modification to increase output above baseline year capacity (production units/yr).
P_B	=	construction and modification rate to replace obsolete capacity (decimal fraction of baseline capacity/yr).
P_C	=	construction and modification rate to increase industry capacity (decimal fraction of baseline capacity/yr).
E_S	=	allowable emissions under existing regulations (mass/unit capacity).
E_N	=	allowable emissions under standards of performance (mass/unit capacity).
E_U	=	emissions with no control (mass/unit capacity).
E_{111d}	=	allowable emissions under state regulations as required by Section 111(d) of the Clean Air Act.
T_S	=	total emissions in i^{th} year under baseline year regulations (tons/yr).
T_N	=	total emissions in i^{th} year under new or revised NSPS which have been promulgated in the j^{th} year (tons/yr).
T_U	=	total emissions in i^{th} year assuming no control (tons/yr).
T_A	=	total emissions in baseline year under baseline year regulations (tons/yr).

Normal Fractional Utilization (K) - The normal fractional utilization can be calculated by dividing the production of DMT for 1975 by the production capacity of the industry. Acid production is multiplied by 1.17 to convert to equivalent DMT production. The 1975 production was 4,650 million pounds of DMT. The 1975 production capacity was estimated by averaging the known July 1974 and May 1976 production capacity. This yields a 1975 production capacity of 4,655 million pounds per year and a normal fractional utilization of 1.0. This high value of the normal fractional utilization is entirely in keeping with the fact that DMT-TPA manufacture is still a growing industry with growth attempting to match demand.

Production Capacity (A) - This value, calculated above, is 4,655 million pounds per year.

Increase in Industrial Capacity Over 1975 Capacity (P_C) - The annual growth rate between the years 1975 and 1985, was given in Section I as 11 percent.

Replacement Rate of Obsolete Capacity (P_B) - It will be assumed that the obsolescence rate for the DMT-TPA industry may be approximated from IRS depreciation guidelines.[3] This Reference suggests an asset guideline life of 11 years. As a conservative estimate, the actual life will be taken as twice this period or 22 years, yielding a simple obsolescence replacement rate of $P_B = 0.045$.

In Reference 1 a simple absolescence rate of 0.45 was calculated based on the replacement of obsolete or economically marginal plants in 1972. It can be assumed that during the recession of 1974 to 1975, most of these facilities were prematurely closed (see Table I-1). Therefore, the absolescence rate may be expected to be even smaller than 0.045.

Amoco has recently begun using titanium liners in their reactors (see Trip Report, Appendix A), which have an expected lifetime of greater than 10 years. Prior to the use of these liners the lifetime of the p-xylene reactor, the main equipment component of TPA manufacture, was a major problem. The reaction conditions used in the Amoco process (400 psi, 400°F) are the most severe of any DMT-TPA Process. Although no estimates are available on the equipment lifetimes for the Hercules-Imhaussen and Eastman Processes, they can be expected to be longer than the equipment lifetime in the Amoco Process as reaction conditions are less severe. Therefore, the original obsolescence rate of 0.045 will be used to represent a conservative estimate of the obsolescence rate.

Uncontrolled Emission Factor (EU) - As mentioned in Section II, there are only three technologies used for producing DMT-TPA: (1) the Amoco process (TPA); (2) the Eastman process (DMT); and (3) the Hercules Imhaussen/Witten process (DMT). As all other producers lease one or more of these technologies, it should be sufficient to simply calculate emission factors for a plant using each technology. In addition, as the major emission source is the p-xylene oxidation unit, emissions from producing DMT should be comparable with emissions from producing TPA. Therefore, the same emission factors will be used for both DMT and TPA production and all DMT-TPA production will be expressed in DMT equivalents.

For each technology the emissions from the p-xylene oxidizer are treated by scrubbing or carbon adsorption to recover hydrocarbons. As this operation can be considered an integral part of the process, uncontrolled emissions will be represented by waste streams leaving the recovery device. The same will hold true for the scrubber on the methanol recovery device at Hercules' Wilmington Plant (see Figure II-8). All other emission streams are uncontrolled.

Table V-2 gives the uncontrolled emission factors for Amoco's Decatur Plant, Hercules' Wilmington Plant, and Eastman's Kingsport Plant. These values were taken from Tables II-2, II-5 and II-6. To simplify calculations, production capacities will be presented in DMT equivalents (1 pound of TPA is equivalent to 1.17 pound of DMT).

The emission factor for hydrocarbons from Hercules' Wilmington Plant is low because Hercules uses a highly efficient carbon adsorber to trap p-xylene emissions. Emissions from Amoco's Decatur Plant are high because Amoco has two old production lines with inefficient scrubbers.

Approximately 50 percent of the production capacity for DMT-TPA is based on the Amoco process; 29 percent on the Hercules process; and 20 percent on the Eastman process. As no one process accounts for the majority of the manufacture of DMT-TPA, average uncontrolled emission factors will be used to calculate emissions from all DMT-TPA plants. Average emission factors are given in Table V-2.

<u>Controlled Emission Factor (E_N)</u> - As discussed in Section III, the best system of emission control for both CO and hydrocarbons is a CO boiler. A CO boiler is 95 percent efficient in removing CO and hydrocarbons. Therefore,

$$E_N^{CO} = 0.05 \times E_U^{CO} = 2.37 \text{ lb CO/ton DMT}$$

$$E_N^{HC} = 0.05 \times E_U^{HC} = 1.15 \text{ lb HC/ton DMT}$$

Table V-2. UNCONTROLLED EMISSION FACTORS FOR HYDROCARBONS AND CO

Plant	Capacity, 10^6 lb/yr DMT equivalents	Uncontrolled emissions rate, lb/hr		Emission factor, lb/ton DMT	
		HC	CO	HC	CO
Amoco, Decatur	2,131	3,270	4,632	26.88	38.08
Eastman, Kingsport	600	784.6	1,545	22.91	45.11
Hercules, Wilmington	1,300	1,446	4,380	19.48	59.03
Average emission factor				23.09	47.41

Controlled Emission Factor for Designated Pollutants ($E_{111}d$) - As CO is a "Criteria", pollutant it is not regulated under Section 111d of the Clean Air Act. Therefore, E_{111d} or (T_s-T_{nd}) is not calculated for CO emissions.

Similarly, hydrocarbons are also criteria pollutants and not regulated under Section 111d of the Clean Air Act. The organic emissions from the DMT-TPA manufacturing process are mostly acetic acid, methyl acetate or dimethyl ether. These pollutants are not hydrocarbons in the strict sense of the word (i.e., composed solely of carbon and hydrogen), however, they are often classed with hydrocarbon emissions. If they are not classed as hydrocarbons then they will be controlled as designated pollutants under Section 111d of the Clean Air Act. Therefore, both (T_S-T_n) and (T_S-T_{nd}) will be calculated for hydrocarbon emissions.

Estimated Allowable Emissions Under 1975 Regulations (E_S) - Only Illinois has a state standard for CO and hydrocarbons. Therefore, based on the fact that (1) less than 5 percent of the DMT-TPA produced is manufactured in Illinois, (2) the Illinois standard is under litigation, and (3) there are no known plans for constructing more DMT-TPA plants in Illinois, the allowable emission factor (E_S) will be set equal to the uncontrolled emission factor (E_U).

Production Capacity to Replace Obsolete Faciliteis (B) - As P_B represents a simple obsolescence rate, B is calculated by:

$$B = 10*A*\ P_B$$

and is 1.05×10^6 tons of DMT per year.

Production Capacity to Increase Output (C) - As P_C represents a compound growth rate, C is calculated by:

$$C = A \left[(1 + P_C)^{10} - 1 \right]$$

and is 4.29×10^6 tons of DMT per year.

RESULTS OF MODEL IV

Table V-3 contains the values of all parameters and the results of all calculations for Model IV. The impact of NSPS presented in Table V-3 accounts for the states requiring existing facilities to limit their hydrocarbon emissions in accordance with the NSPS (i.e., $T_S - T_{Nd}$). As such, this represents the maximum emission impact of NSPS. The impact of NSPS for CO and HC applied only to new or modified facilities is also presented in Table V-3 (i.e., $T_S - T_N$).

The emission reduction for CO presented in Table V-3 may seem substantial (120,260 tons/year), but is small compared to the manufacture of other organic chemicals. For example:[4]

Industry	1986 emission reduction for CO with best system of emission control, tons/year
DMT-TPA	120,260
Formaldehyde	386,000
Maleic anhydride	279,800
Acrylonitrile	259,000

Table V-3. PARAMETERS USED IN MODEL IV AND RESULTS OF MODEL IV

Pollutant	K	Units	E_u	$E_{111(d)}$	E_S	E_N	Growth rates, decimal/year		Industrial capacity				Emissions, 1000 tons/year				Impact, ton/year	
							P_C	P_B	Units/year	A 1975	B 1985	C 1985	T_N 1975	T_N 1985	T_S 1985	T_{Nd} 1985	$T_S - T_{Nd}$ 1985	$T_S - T_N$ 1985
Hydrocarbons	1.0	lb/ton of DMT	23.09	1.15	23.09	1.15	0.11	0.045	10^6 tons of DMT	2.33	1.05	4.29	26.89	17.84	76.43	3.81	72,620	58,590
CO	1.0	lb/ton of DMT	47.41		47.41	2.37	0.11	0.045	10^6 tons of DMT	2.33	1.05	4.29	55.23	36.67	156.93			120,260

The emission reduction expected for hydrocarbons is, on the other hand, larger than the emission reduction expected from other industries. For example:[4]

Industry	1986 emission reduction of HC with best system of emission control, tons/yr
DMT-TPA	58,590
Synthetic fibers	11,300
Polyvinyl chloride	12,000
Phthalic anhydride	17,900

If the HC emissions are regulated as designated pollutants under Section 111d of the Clean Air Act, the impact of NSPS will be even larger - 72,620 tons per year (i.e., $T_S - T_{Nd}$).

The reason for the large impact on hydrocarbon emissions is that the industry has a high growth rate, 11 percent per year. If this growth rate cannot be sustained over a period of 10 years, then the impact should be less significant.

REFERENCES

1. Hopper, T.G. and W.A. Marrone. Impact of New Source Performance Standards on 1985 National Emissions From Stationary Sources. Volume I. Final Report. The Research Corporation of New England, Wethersfield, Connecticut. U.S. Environmental Protection Agency, Research Triangle Park, N.C. EPA Contract No. 68-02-1382, Task No. 3. October 24, 1975.

2. Ibid., p. 16.

3. Tax Information on Depreciation. 1976 Edition. Department of the Treasury, Internal Revenue Service, Asset Guideline Class 28.0. Publication No. 534. p. 29.

4. Impact of New Source.., Op cit. p. 73.

SECTION VI

MODIFICATION AND RECONSTRUCTION

INTRODUCTION

There are three approaches taken to increase production capacities in the DMT-TPA industry: debottlenecking; parallel production lines; and the addition of new plants.

Debottlenecking is used to identify the production limiting piece of equipment and either modify it for larger throughput or replace it with a larger capacity unit. Every manufacturer uses debottlenecking procedures.

If an increase in production capacity is significant, the manufacturer can add parallel production lines or build a new plant. In discussions with plant managers it was determined that there is no fixed economical plant size. Rather, new plants are built as needed and sized to fit projected demands for the product.

EFFECTS ON EMISSIONS OF MODIFICATIONS AND RECONSTRUCTION

The only facility for which there is sufficient information to predict the effect of modifications and reconstruction on emissions is Amoco's Decatur Plant. The Decatur Plant employs four parallel production lines to oxidize p-xylene to TPA. The last two oxidation units have approximately twice the production capacity of the first two units (see Section II).

The most significant emission point for hydrocarbons and CO is the p-xylene oxidation reactor in which p-xylene is air oxidized to TPA and by-products such as methyl acetate. The inputs to each reactor are p-xylene, acetic acid, a catalyst mix, air, oxygen and a caustic solution. Each reactor is equipped with a high and low pressure absorber to recover p-xylene and acetic acid. These absorbers are wet (water) scrubbing devices. The only other significant emission point is the solvent dehydration tower vent. There is no emission control device on this vent. Production rates and emission rates for each oxidation unit are given in Table VI-1.

As can be seen from Table VI-1, as the production rates for the oxidation units increase, the flow rates through the units increase roughly linearly.

Hydrocarbon emissions from the dehydration tower vent increase in proportion to production rate. Hydrocarbon emissions from the high and low pressure absorbers, on the other hand, stay essentially constant with increases in production rate. This could be the result of increased efficiency of the control devices on the larger units, but the efficiencies are not known.

The emission of CO from the p-xylene oxidation unit is roughly constant with increases in production rate. As the high pressure absorber does not affect CO emissions, this can not be the result of using a more efficient control device. The reason for CO emissions remaining constant with increases in production rate is not known. However, it can be concluded that the emission of CO from the p-xylene oxidation unit depends mainly on the reactor design and is only a weak function of the throughput of the reactor. Similar information for the Hercules or Eastman processes is not available.

Table VI-1. EMISSIONS FROM OXIDATION UNITS AT AMOCO'S DECATUR DMT-TPA PLANT[a]

Oxidation unit[b]	Control device	Flow rate, scfm	Emission, lbs/hour	Production rate 10^6 lbs/year
No. 1, 2	High pressure absorber	16850	53 Acetic acid 990 Methyl acetate	280
			750 CO	
	Low pressure	92	37 Acetic acid	
			14 Methyl acetate	
	Dehydration tower vent	3400	39 Acetic acid	
			58 Methyl acetate	
No. 3	High pressure absorber	37800	63 Acetic acid 856 Methyl acetate	530
			870 CO	
	Low pressure absorber	343	21 Acetic acid 21 Methyl acetate	
	Dehydration tower vent	5700	55 Acetic acid 96 Methyl acetate	
No. 4	High pressure absorber	40850	79 Acetic acid 856 Methyl acetate	540
			900 CO	
	Low pressure	340	21 Acetic acid 21 Methyl acetate	
	Dehydration tower vent	6580	56 Acetic acid 96 Methyl acetate	

[a]Data from Appendix A.

[b]See Section II.

It is expected that hydrocarbon emissions should increase in proportion to the production rate of TPA.

From the preceding, CO emissions would appear to increase in proportion to the number of new units coming on line and do not appear to be linearly related to the increase in production rate of the DMT-TPA industry. Unfortunately, there is not enough information on the DMT-TPA manufactuing processes to make these predictions with certainty. However, as the emission impact of NSPS on CO emissions presented in Table V-3 is based on a linear increase in emissions with production rate, the calculated impact should be viewed as being too large.

APPENDIX A

SUMMARY OF EMISSION DATA

INTRODUCTION

The following sections present emission information obtained for each plant during the course of this project. Supplementary information is still to be received from DuPont's Wilmington Plant, but data available from the State of North Carolina was sufficient for the completion of this project.

Data was obtained in one or more of three ways: by site visit; by updates of the Houdry questionnaire; or from permit applications to state air pollution control agencies.

In the following, emission data is presented in its original form. Tables II-1 through II-7 were constructed from this data. Correspondence and telephone conversations required to obtain this information are summarized in Appendix C. Information on control devices is also included in Appendix A.

Where updates of the original Houdry questionnaires were used to obtain emission information, only the changes in the questionnaire are presented. As they may be helpful, flow diagrams of each process are included.

AMOCO CHEMICALS CORPORATION

Emission Information for Amoco's Joliet Plant

Amoco's Joliet Plant was visited to obtain emission information. This information was taken from the company's state permit application files. The following is a trip report for the visit to the Joliet Plant. Figures A-1 through A-3 are flow diagrams of the TPA, PTA, and DMT unit, respectively.

Trip Report

By D.F. Durocher Date April 28, 1976

Subject Meeting with Amoco personnel to gather emission information on the Joliet, Illinois and Decatur, Alabama DMT-TPA plants

Attending:

Harry M. Brennan, Coordinator - Air and Water Conservation, Manufacturing Division, Amoco Chemicals

E.V. Smith, Technical Director, Joliet Plant, Amoco

W.W. Twaddle, Plant Manager, Joliet Plant, Amoco

Robert E. Flesch, Process Engineer, Joliet Plant, Amoco

During the conversation, the following points were made:

- The Joliet facility has only one production line. The Decatur facility has four production lines.
- A new plant is being constructed on the Cooper River in South Carolina.
- Production capacity at Joliet is 133 x 10^6 pounds of crude terephthalic acid a year. The normal running time for the TPA unit is 88 percent of the year; 88 percent for the PTA unit; and 90 percent for the DMT unit.
- The following emission information is the most up-to-date information available for the TPA unit (see Figure A-1).

- Stream #1:

CO	390 lb/hr
CO_2	1,292
N_2	42,840
O_2	1,123
Acetic acid	42
H_2O	42
Methyl acetate	20

- Device A, absorber gas/liquid; inlet flow:

Total flow	47,300 lb/hr made up of:
N_2	95-98 wt. %
O_2	0-2
H_2O	0-1
Acetic acid	0-3

1000 lb/hr of makeup water is needed.

- Stream #2 (vent header absorber):

N_2	1,090 lb/hr
Acetic acid	1
H_2O	10

- Stream #3 (dehydration tower):

Acetic acid	148 lb/hr
H_2O	9,752

- Stream #4 (dryer/scrubber):

Particulate	15 lb/hr

Inlet loading is not known.

- Stream #5 (solids drumming station vent):

N_2	2,000 lb/hr
Acetic acid	2
O_2	607

- Stream #6 (gas dryer - represents small slipstream from device A):

N_2	1,160 lb/hr
O_2	23

- Stream #7 (gas dryer - represents small slipstream device A; mostly for transport of solids):

N_2	4,210 lb/hr
O_2	86
H_2O	9
Acetic acid	13

- Due to the low vapor pressure of p-xylene, the 2.2×10^6 gallon storage tank just has a vent. This emits 2.67 lb/hr of hydrocarbons (as methane). There are 28 tank turnovers per year.

- The methanol storage tanks hold 126,000 gallons each. Emissions are 0.60 lb/hr from each of four tanks. There are 26 turnovers per year for each tank.

- The acetic acid tank holds 70,000 gallons. This is a fixed-roof tank with an average emission rate of 5 lb/hr. There are 19 turnovers per year.

- The following emission information is the most up-to-date information available for the PTA unit (see Figure A-2):

  - Stream #1 (vent):

CO_2	84 lb/hr
Particulate	25
N_2	472

  - Stream #2 (vent on feed slurry):

CO_2	1 lb/hr
N_2	3
H_2O	7
Particulate	0.1

  Process weight for this stream is 41,000 lb/hr water and PTA.

  - Stream #3 (feed tank to centrifuge):

H_2O	850 lb/hr
Particulate	0.001

- Stream #4 (dryer/scrubber):

CO_2	30 lb/hr
N_2	150
H_2O	800
Particulate	0.1

- Stream #5 (product day tanks):

CO_2	135 lb/hr
N_2	780
Particulate	25

- Stream #6 - unknown
- Stream #7 (hot oil furnace):

CO_2	150 lb/hr
N_2	1,098
NO_x	7
H_2O	261

(unit is fired on natural gas).

- The following emission information is the most up-to-date information available for the DMT unit (see Figure A-3):

- Stream #1 (feed vent):

CO	1.1 lb/hr
CO_2	160
N_2	1,010
Particulate	10

- Stream #2 (steam ejector):

H_2O	698 lb/hr
Particulate	1
N_2	15
O_2	6

- Stream #3 (scrubber):

H_2O	30 lb/hr
Particulate	1

The efficiency of the scrubber is not known.

- Stream #4 (solids drumming station vent)

  Particulate 0.2 lb/hr

- Stream #5 (flaker/briquetter vent):

  Particulate 10 lb/hr

- Stream #6 (tank vent):

  MeOH 20 lb/hr

  Dimethyl ether 500

  This stream represents waste products from the DMT reaction.

- Stream #7 (solids drumming station vent):

  Particulate 5 lb/hr

- Both of Amoco's plants are phasing out DMT production. Production capacity is increased to match sales growth as the need arises. The historical trend has been to go to larger plants (e.g., Joliet is smaller than the Decatur Plant which is smaller than the Cooper River Plant). Emissions vary from plant to plant and from unit to unit within a plant (see Decatur information).

- The reactors are explosively lined with titanium and have a long (greater than 10 years) operating life.

- The metals content of PTA is very important. Amoco's PTA has less than 15 ppm trace metals and is considered extremely high quality.

- It was noted that smaller plants tend to have higher emissions. There appears to be no economical plant size.

- Production is down approximately 50 percent this year, but is expected to rise quite rapidly. A 7 to 9 percent growth rate is expected over the next several years.

- Crude TPA is stored and transferred to the DMT/PTA units by pushing with CO_2.

Amoco Chemicals Corporation
Post Office Box 941
Joliet, Illinois 60434

May 11, 1976

Mr. Donald F. Durocher
Senior Scientist
Environmental Engineering Department
GCA/Technology Division
Burlington Road
Bedford, Massachusetts 01730

Dear Don:

Attached is the emission control equipment design information you requested in your April 29, telephone conversation with Bob Flesch. All control equipment for the Terephthalic Acid, Purified Terephthalic Acid (PTA), and Dimethylterephthalate (DMT) process units is included.

If you have any questions, feel free to call me.

Yours very truly,

W. W. Twaddle

W. W. Twaddle
Plant Manager

REF/kw

attachments

JT-454-76; A32.203

AMOCO CHEMICALS CORPORATION
JOLIET PLANT

EMISSION CONTROL EQUIPMENT

TEREPHTHALIC ACID PROCESS UNIT

1. Vent Source No. 1, High Pressure Absorber

Made by:	Wyatt Metal and Boiler Works, Inc.
Design:	Absorber tower with trays
Pressure:	110-160 psig
Temperature:	110-190°F
Height:	22 feet
Diameter:	3.5 feet
Construction:	Stainless steel

2. Vent Source No. 2, Vent Header Absorber

Made by:	Wyatt Metal and Boiler Works, Inc.
Design:	Spray tower
Pressure:	Atmospheric
Temperature:	100-150°F
Height:	20 feet
Diameter:	1.5 feet
Construction:	Stainless steel

3. Vent Source No. 4, Dryer Scrubber

Made by:	Nooter Corporation
Design:	Spray tower
Pressure:	Atmospheric
Temperature:	90-130°F
Height:	22.5 feet
Diameter:	1.5 feet
Construction:	Stainless steel

PURIFIED TEREPHTHALIC ACID PROCESS UNIT (PTA)

1. Vent Source No. 4, Dryer Scrubber

Made by:	Wildman Boiler and Tank Company
Design:	Spray tower
Pressure;	Atmospheric
Temperature:	165-185°F
Height:	10 feet
Diameter	2.5 feet
Construction:	Stainless steel

DIMETHYLTEREPHTHALATE PROCESS UNIT (DMT)

1. Vent Source No. 3, Distillation Tower Ejector Exhaust Scrubber

Design:	Spray tower
Pressure:	Atmospheric
Temperature:	100-120°F
Height:	21.5 feet
Diameter:	1.7 feet
Construction:	Carbon steel

REF/kw
05/11/76

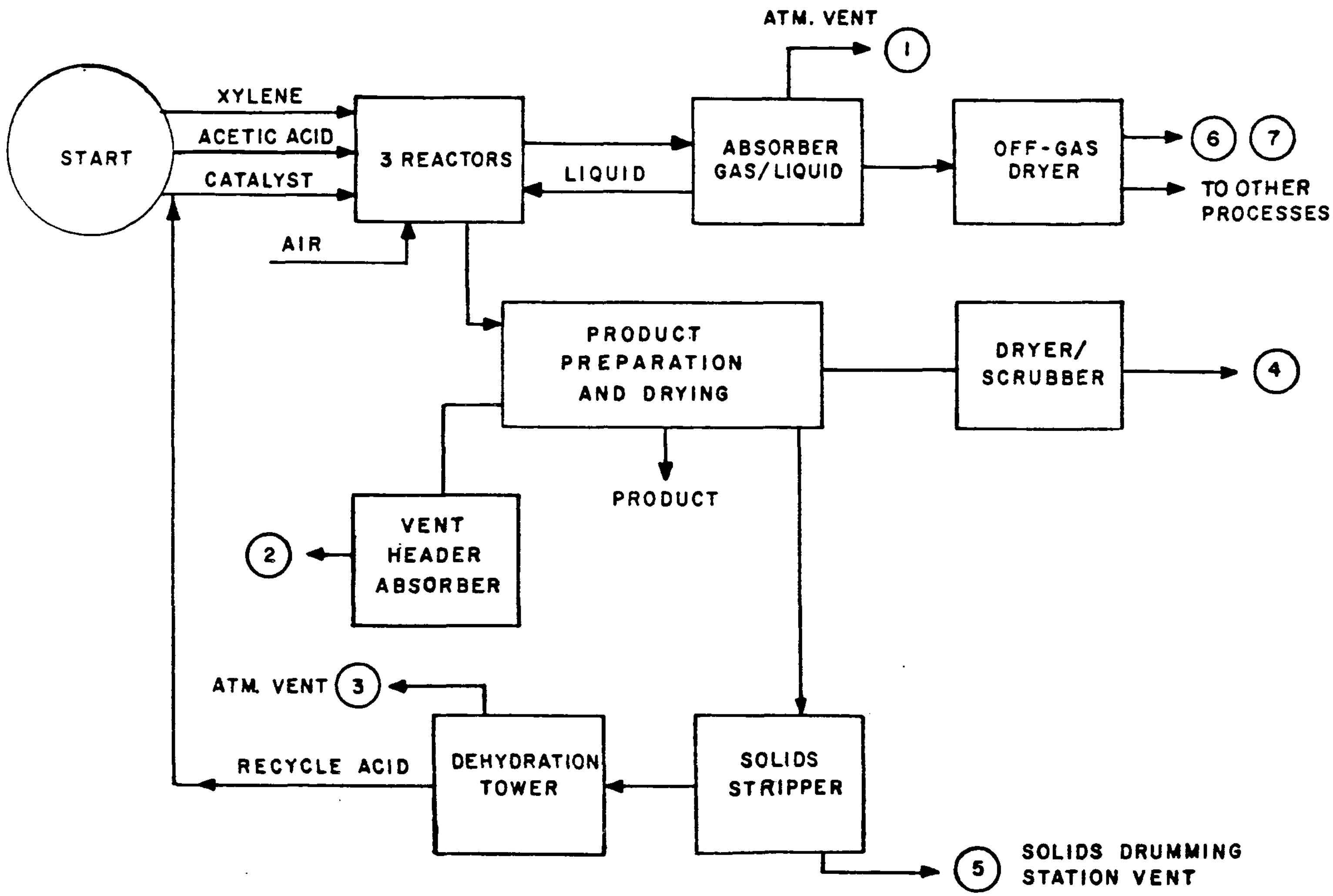


Figure A-1. Flow diagram of Amoco's TPA unit at the Joliet Plant

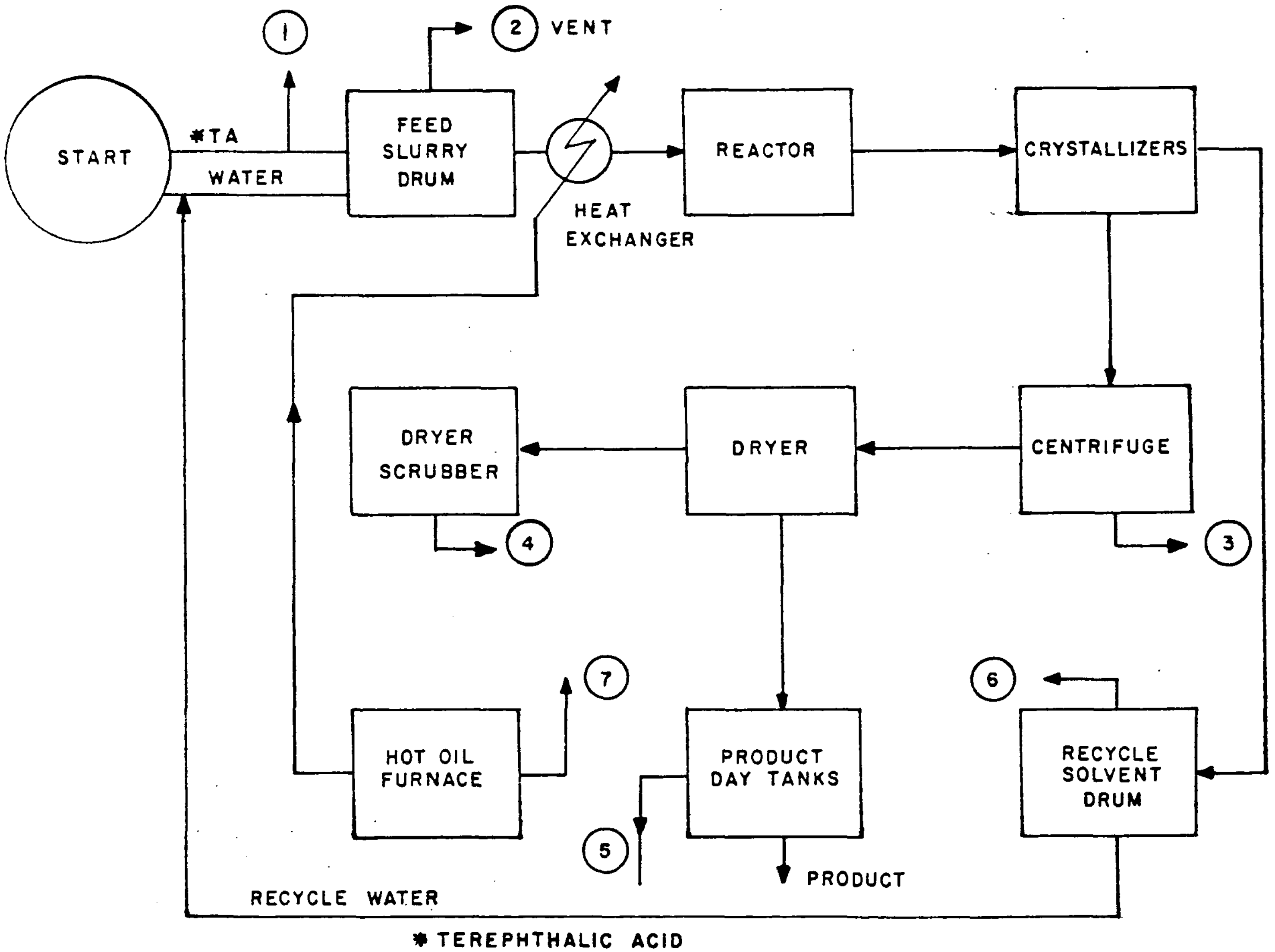


Figure A-2. Flow diagram of Amoco's PTA unit at the Joliet Plant

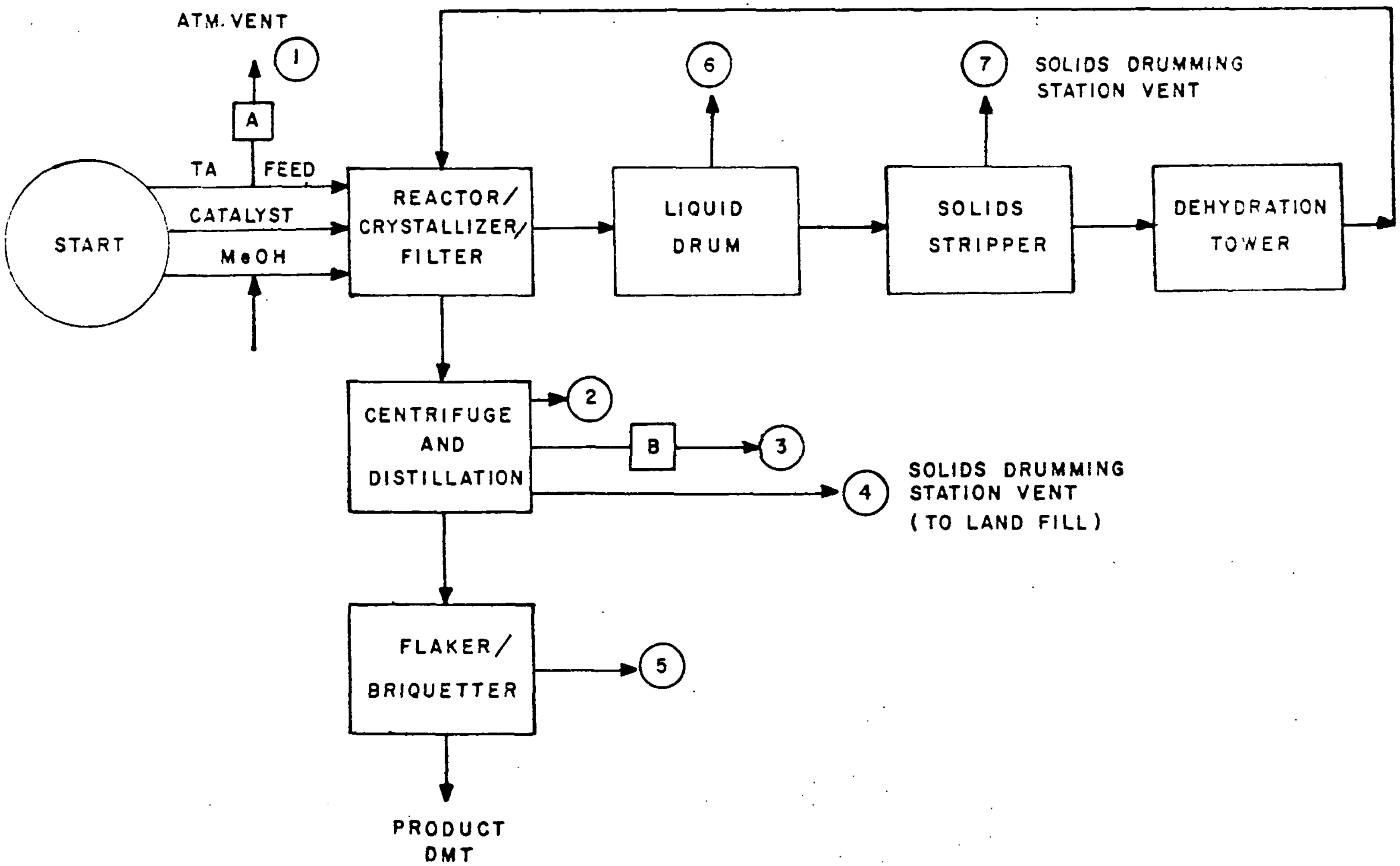


Figure A-3. Flow diagram of Amoco's DMT unit at the Joliet Plant

Emission Information From Amoco's Decatur Plant

Personnel at the Decatur Plant were asked to update the information contained in the original Houdry questionnaire. The new information was returned June 3, 1976. The data was taken from operating permit applications and represents the most up-to-date information available.

Amoco Chemicals Corporation
200 East Randolph Drive
Chicago, Illinois 60601

June 1, 1976

Dr. Donald F. Durocher
GCA/Technology Division
Burlington, Massachusetts 01730

Dear Sir:

Enclosed is the update of information concerning the air emissions from our Decatur, Alabama TA-PTA-DMT units.

These are the data from our operating permit application.

Yours very truly,

H. M. Brennan
Coordinator
Air & Water Conservation

HMB/kn

Enclosure

No. 1 Oxidation Unit - (90% operating factor)

A. Production Rate - 35,500 lb Terephthalic Acid/hr
(280 million pounds per year)

B. Process Weight Rates -

Material	Average lb/hr
Paraxylene	24,250
Acetic Acid	3,760
Catalyst Mix	69
Air	92,050
Oxygen	5,830
Caustic (50%)	776

C. Emission Points (see sketch)

(1) High Pressure Absorber - Valve Tray Scrubbing Tower
(Efficiency not known)

Vent Rate = 16,850 scfm

Temp. = 112°F Press. = Atm.

Pollutants	lb/hr
Acetic Acid	53
Methyl Acetate	990
Carbon Monoxide	750

(2) Low Pressure Absorber - Spray Tower
(Efficiency not known)

Vent Rate = 92 scfm

Temp. = 120°F Press. = Atm.

Pollutants	lb/hr
Acetic Acid	37
Methyl Acetate	14

(3) Silo Dust Collector - Bag Filer
(Efficiency not known)

Vent Rate* = 600 scfm

Temp. = 100°F Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	0.4 (design estimate)

*600 scfm is an occasional discharge. No venting occurs when the primary conveyance system (mechanical conveyer) is in operation. The backup system (pneumatic conveyor) causes the venting of 600 scfm when it is in operation.

(4) Dehydration Tower Vent - No Cleaning Device

Vent Rate = 3,400 scfm

Temp. = 215°F   Press. = Atm.

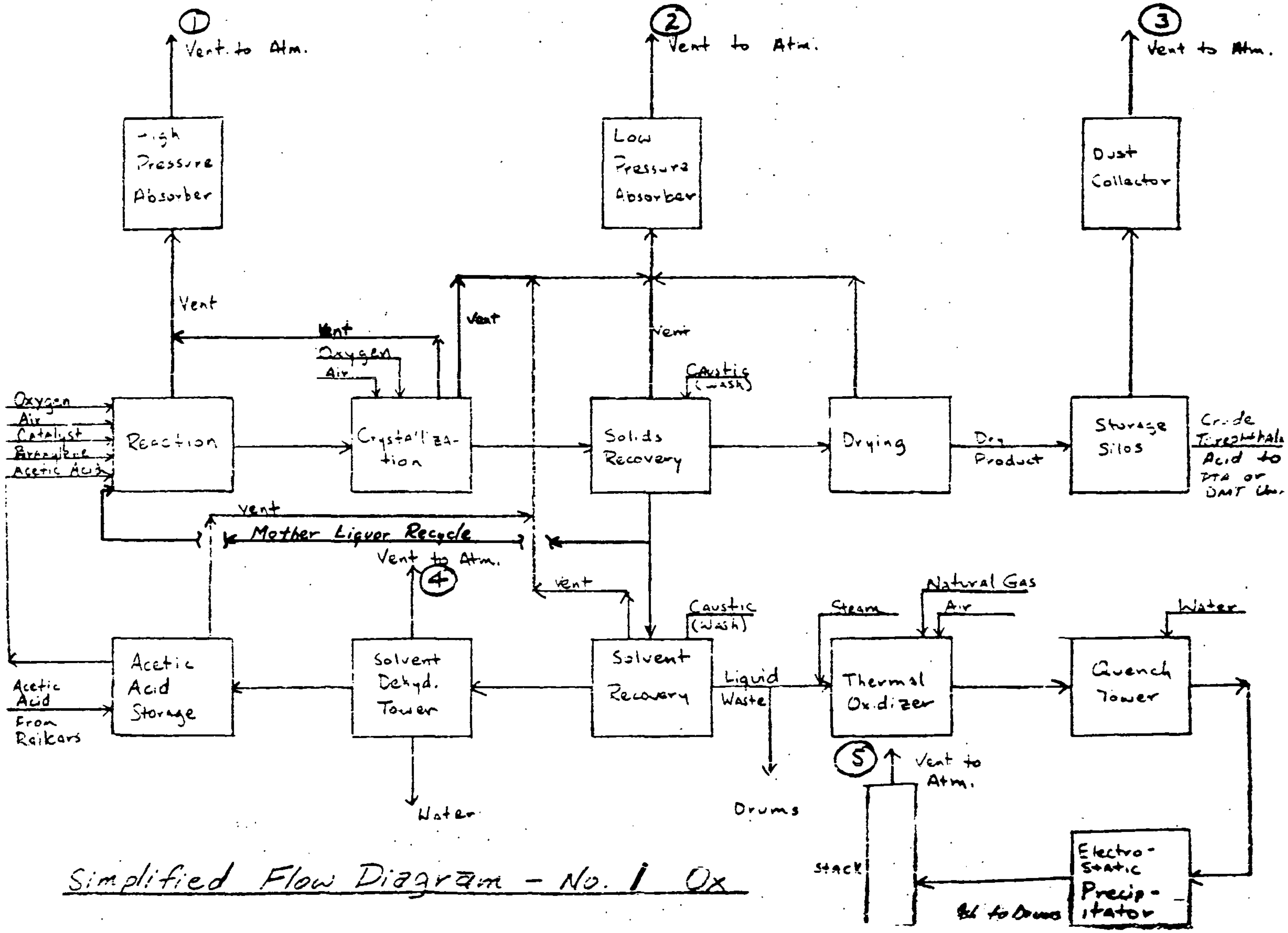
Pollutants	lb/hr
Acetic Acid	39
Methyl Acetate	58

(5) Electrostatic Precipitator (clean thermal oxidizer flue gas) - Measured eff. to be 95.7% for particulates

Vent Rate = 17,800 scfm

Temp. = 610°F   Press. = Atm.

Pollutants	lb/hr
Particulates	7.0
Carbon Monoxide	23.8
Hydrocarbons	23.8
Sulfur Oxides	0.1
Nitrogen Oxides	7.5



Simplified Flow Diagram - No. 1 Ox

No. 2 Oxidation Unit - (90% operating factor)

A. Production Rate - 35,500 lb Terephthalic Acid/hr
(280 million pounds per year)

B. Process Weight Rates -

Material	Average lb/hr
Paraxylene	24,250
Acetic Acid	3,760
Catalyst Mix	69
Air	92,050
Oxygen	5,830
Caustic (50%)	776

C. Emission Points -

(1) High Pressure Absorber - Valve Tray Scrubbing Tower
(Efficiency not known)

Vent Rate = 16,850 scfm

Temp. = 112^{o}F   Press. = Atm.

Pollutants	lb/hr
Acetic Acid	53
Methyl Acetate	990
Carbon Monoxide	750

(2) Low Pressure Absorber - Spray Tower
(Efficiency not known)

Vent Rate = 92 scfm

Temp. = 120^{o}F   Press. = Atm.

Pollutants	lb/hr
Acetic Acid	37
Methyl Acetate	14

(3) Silo Dust Collector - Bag Filter
(Efficiency not known)

Vent Rate* = 600 scfm

Temp. = 100^{o}F   Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	0.4 (design estimate)

*600 scfm is an occasional discharge. No venting occurs when the primary conveyance system (mechanical conveyor) is in operation. The backup system (pneumatic conveyor) causes the venting of 600 scfm when it is in operation.

(4) Dehydration Tower Vent - No cleaning device

Vent Rate = 3,400 scfm

Temp. = 215°F   Press. = Atm.

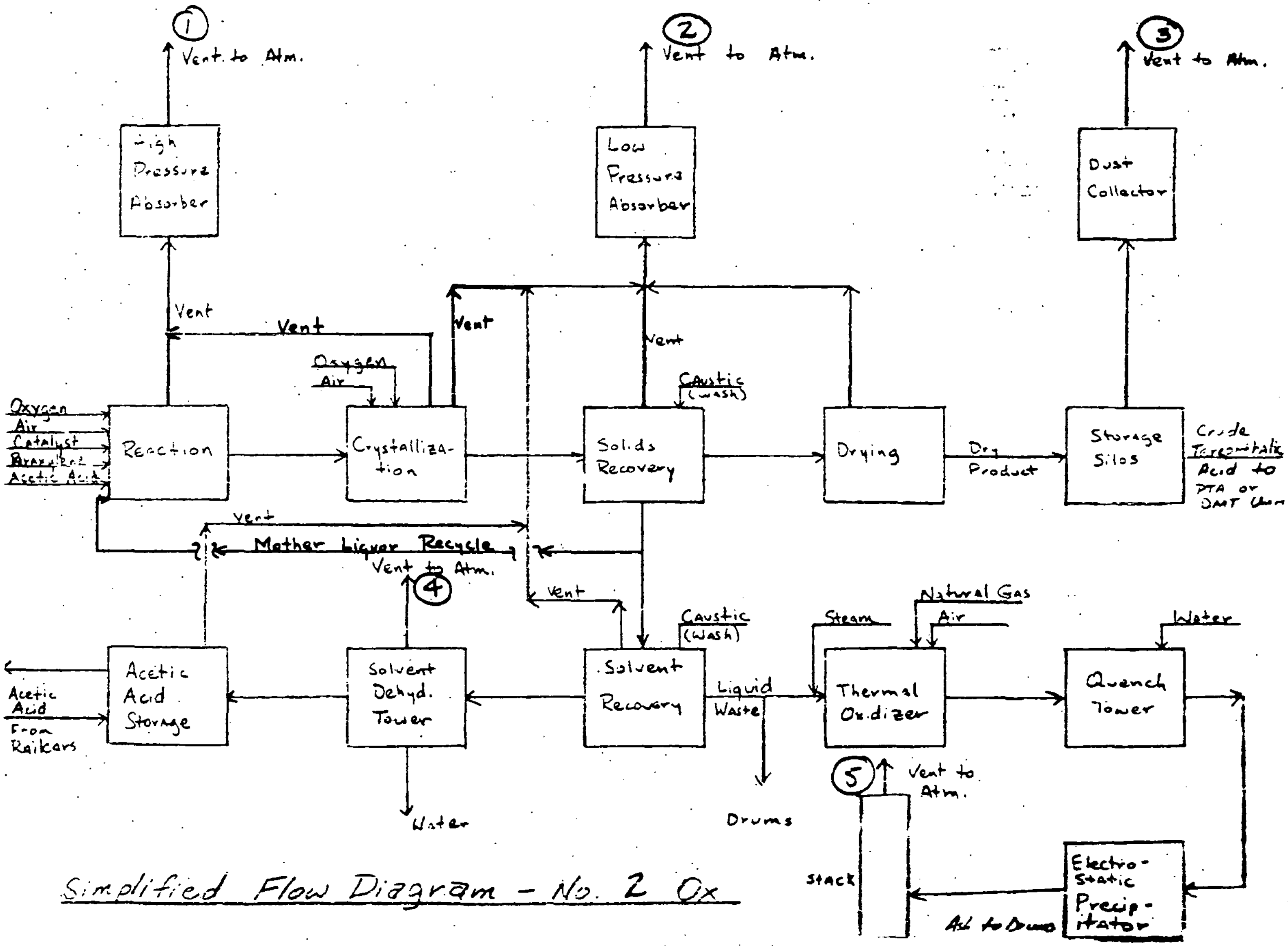
Pollutants	lb/hr
Acetic Acid	39
Methyl Acetate	58

(5) Electrostatic Precipitator (clean Thermal Oxidizer Flue Gas) - Measured eff. to be 95.7% for particulates

Vent Rate = 17,800 scfm

Temp. = 610°F   Press. = Atm.

Pollutants	lb/hr
Particulates	7.0
Carbon Monoxide	23.8
Hydrocarbons	23.8
Sulfur Oxides	0.1
Nitorgen Oxides	7.5



Simplified Flow Diagram - No. 2 Ox

No. 3 Oxidation Unit - (90% operating factor)

A. Production Rate - 67,225 lb Terephthalic Acid/hr
(530 million pounds per year)

B. Process Weight Rates -

Material	Average lb/hr
Paraxylene	46,050
Acetic Acid	7,140
Catalyst Mix	132
Air	176,800
Oxygen	14,060
Caustic (50%)	1,150

N_2 Vent = 38,500*.792 = 30,500

Vent O_2 = 30,500*.035/.93 = 1,148

Vent = 30,500/.93 = 32,800

O_2 Rx = 46,050*1.06*379/32/60 = 9,635

Total O_2 = 9,635 + 1,148 = 10,783

Feed O_2 = 38,500*208 8,008

2,775 scfm

#/H_2O_2 = 2,775*32/379*60 = 14,060

#/N_2 Air 38,500*29/379*60 - 176,755

C. Emission Points -

(1) High Pressure Absorber - Valve Tray Scrubbing Tower
(Efficiency not known)

Vent Rate = 37,800 scfm

Temp. = 120 Press. = Atm.

Pollutants	lb/hr
Acetic Acid	63
Methyl Acetate	856
CO	870

(2) Low Pressure Absorber - Spray Tower
(Efficiency not known)

Vent Rate = 343 scfm

Temp. = 120 Press. = Atm.

Pollutant	lb/hr
Acetic Acid	21
Methyl Acetate	21

(3) Silo Dust Collector - Bag Filter
(Effiency not known)

Vent Rate = 2,000 scfm

Temp. = 225^{o}F   Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	0.1

(4) Dehydration Tower Vent - No gas cleaning device

Vent Rate = 5,700 scfm

Temp. = 214^{o}F   Press. = Atm.

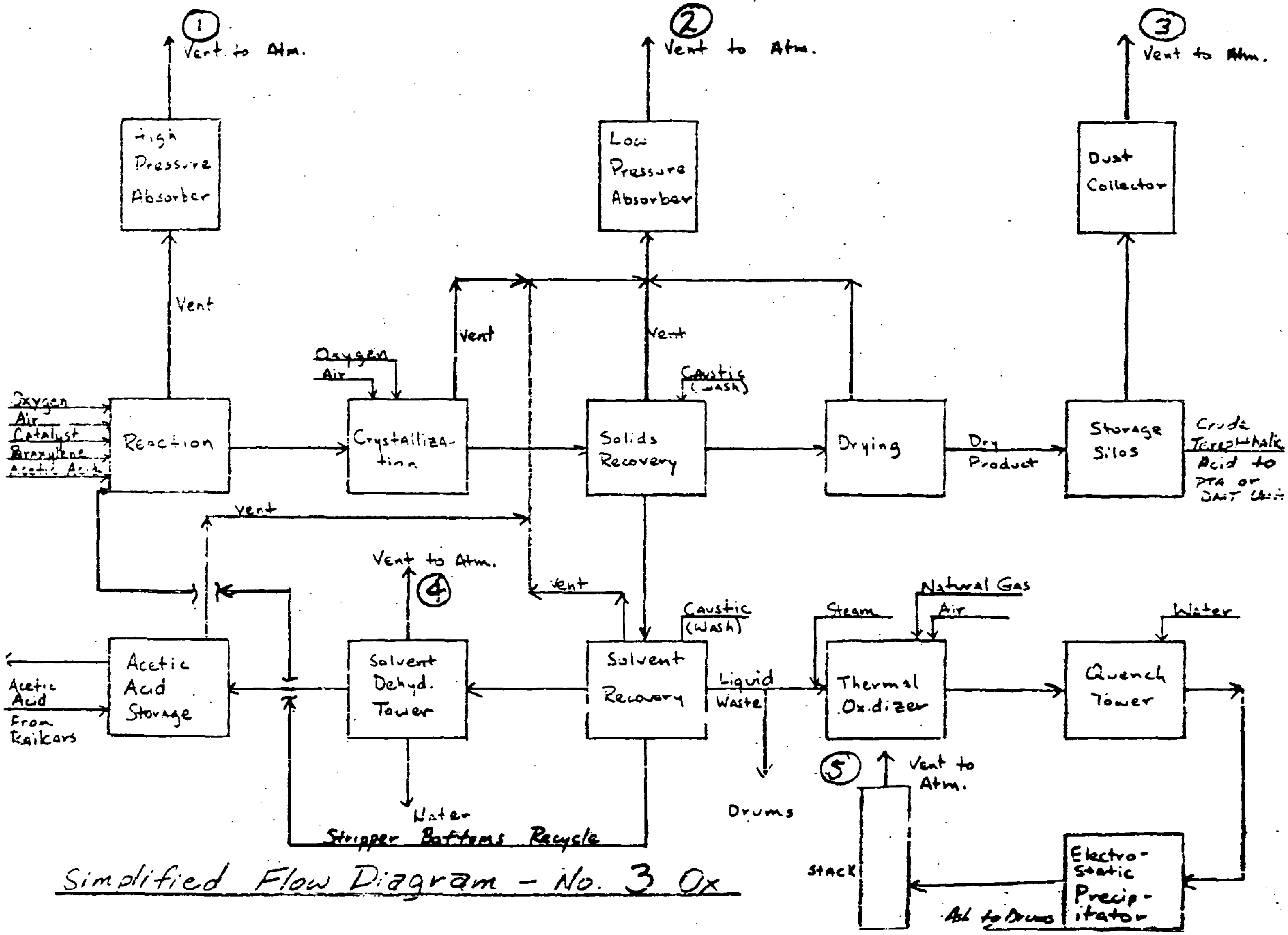
Pollutants	lb/hr
Acetic Acid	55
Methyl Acetate	96

(5) Thermal Oxidizer/ESP - Measure efficiency to be approximately 75%

Vent Rate = 12,700 scfm

Temp. = 680^{o}F   Press. = Atm.

Pollutants	lb/hr
Particulates	16
Carbon Monoxide	24.6
Hydrocarbons	24.6
Nitrogen Oxide	2.0
Sulfur Dioxide	0.1



Simplified Flow Diagram - No. 3 Ox

No. 4 Oxidation Unit - (90% operating factor)

A. Production Rate - 68,500 lb Terephthalic Acid/hr
(540 million pounds per year)

B. Process Weight Rate -

Material	Average lb/hr	
Paraxylene	46,900	(budget)
Acetic Acid	7,270	(")
Catalyst Mix	196	(")
Air	222,800	(per D.K.R.)
Oxygen	0	("
Caustic (50%)	940	(budget)

Vent N_2 = 48,491 scfm*.792 = 38,400 scfm

Vent O_2 = 38,400*.015/.94 = 612 scf

Vent = 40,851

O_2 Rx = 46,900/60/32*379*1.03 = 9,535

Enriched Air = 38,400 + 612 + 9,535 = 48,550 scfm

@ (612 + 9,538)/48,550 = .209 ($\therefore$ use air)

#/hr = 48,550*29/379*60 = 222.8M

C. Emission Points -

(1) High Pressure Absorber - Valve Tray Scrubbing Tower
(Vents from absorber & from off gas dryer purge) (Efficiency not known)

Vent Rate = 40,850 scfm

Temp. = 120 Press. = Atm.

Pollutants	lb/hr
Acetic Acid	79
Methyl Acetate	856
CO	900

(2) Low Pressur Absorber - Spray Tower
(Efficiency not known)

Vent Rate - 340 scfm

Temp. = 118 Press. = Atm.

Pollutants	lb/hr
Acetic Acid	21
Methyl Acetate	21

(3) Silo Dust Collector - Bag Filter
(Efficiency not known)

Vent Rate = 1,985 scfm

Temp. = 275°F Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	0.1

(4) Dehydration Tower Vent - no gas cleaning device

Vent Rate = 6,580 scfm

Temp. = 214°F Press. = Atm.

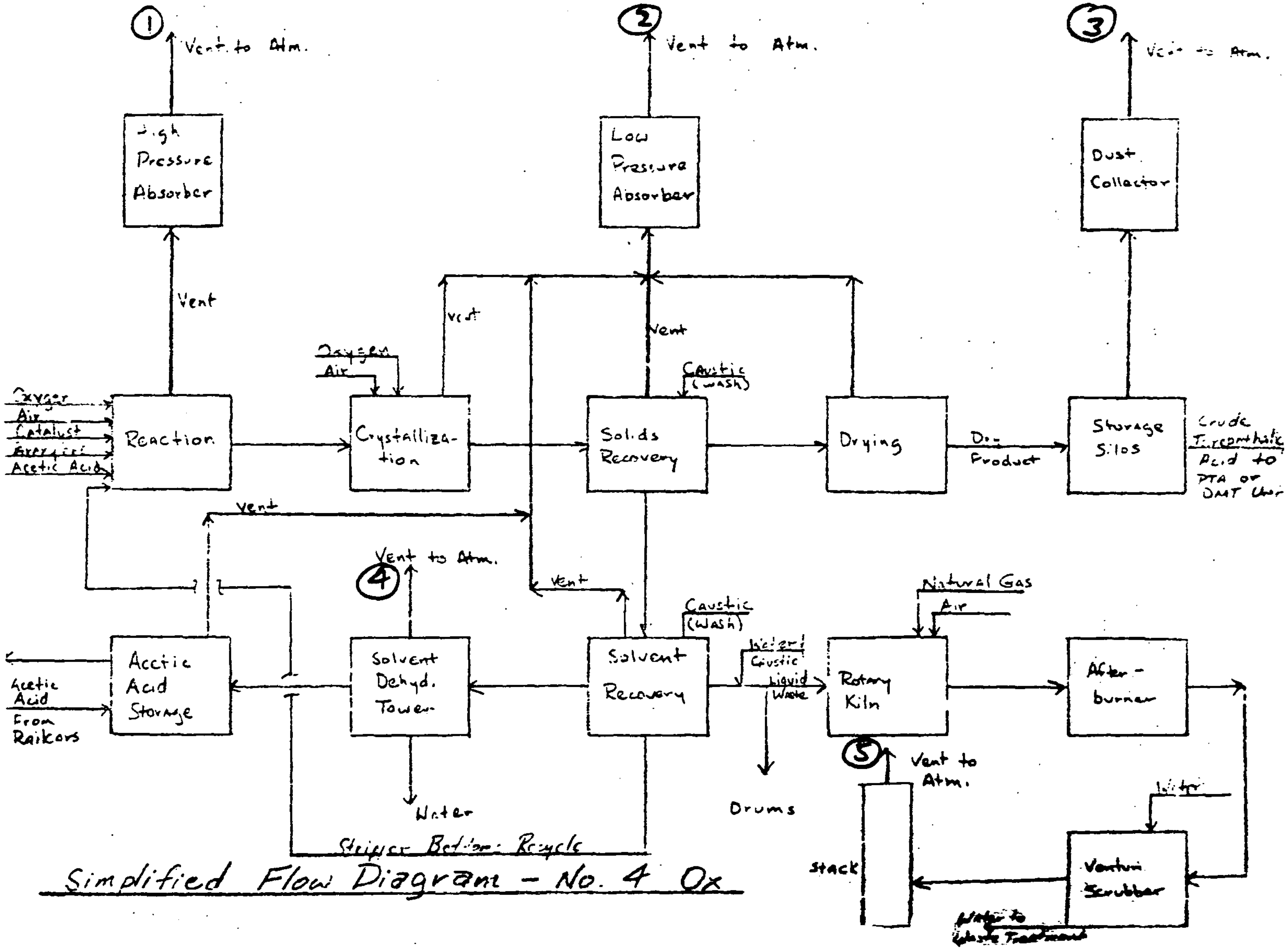
Pollutants	lb/hr
Acetic Acid	56
Methyl Acetate	96

(5) Rotary Kiln Furnace/Venturi Scrubber - Efficiency not known

Vent Rate - 19,400 scfm

Temp. = 175°F Press. = Atm.

Pollutants	lb/hr
Particulates	21
Carbon Monoxide	29.1
Hydrocarbons	29.1
Nitrogen Oxides	2.3
Sulfur Dioxide	0.1



Simplified Flow Diagram - No. 4 Ox

No. 1 PTA Unit - (90% operating factor)
(Continuous Crystallization)

A. Production Rate - 22,800 lb Purified Terephthalic Acid/hr
(180 million pounds per year)

B. Process Weight Rates -

Material	Average lb/hr
Crude Terephthalic Acid	23,540
Process Water	83,460
Hydrogen	127

C. Emission Points

(1) Feed Slurry Tank Vent - Spray in vent
(Efficiency not known)

Vent Rate = 46 scfm

Temp. = 208°F Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	1.3

(2) Crystallizer Vent Scrubber - Turbulent Contact Absorber
(Efficiency not known)

Vent Rate - 12,900

Temp. = 212 Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	11.6

(3) Dryer Vent Scrubber - Spray Tower
(Efficiency not known)

Vent Rate = 220 scfm

Temp. = 200°F Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	0.01

(4) Atmospheric Centrifuge Feed Tank Vent - No gas cleaning device

Vent Rate = 1,100 scfm

Temp. = 212°F Press. - Atm.

Pollutant	lb/hr
Terephthalic Acid	4.7

(5) *Day Tank Dust Collectors - Bag Filters
(5 day tanks each w/dust collector) (Efficiency not known)

Vent Rate = 600 scfm

Temp. = 212^{o}F Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	0.0431

(6) **Silo Dust Collectors - Bag Filters (Efficiency not known)
(3 silos each w/dust collector)

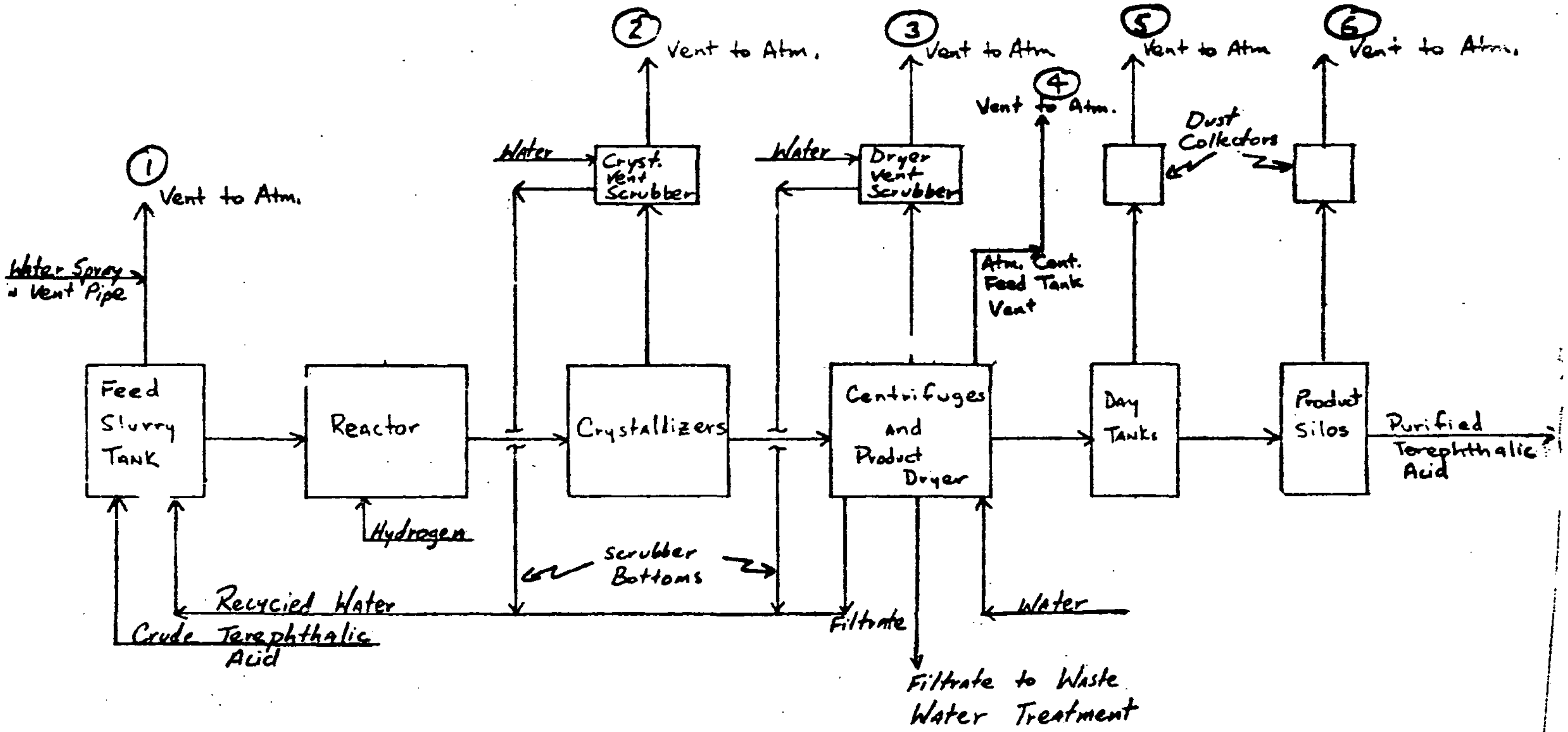
Vent Rate = 600 scfm

Temp. = 100^{o}F Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	0.0062

*Product is transferred to only one day tank at a time.

**Product is transferred to only one silo at a time, and for only 8 hours a day (1/3 of the unit's operating time).



Simplified Flow Diagram - No. 1 PTA

No. 2 PTA Unit - (90% operating factor)
(Continuous Crystallization)

A. Production Rate - 22,800 lb Purified Terephthalic Acid/hr
(180 million pounds per year)

B. Process Weight Rates -

Material	Average lb/hr
Crude Terephthalic Acid	23,540
Process Water	83,460
Hydrogen	127

C. Emission Points

(1) Feed Slurry Tank Vent - Spray in vent pipe
(Efficiency not known)

Vent Rate = 46 scfm

Temp. - 208°F Press. - Atm.

Pollutant	lb/hr
Terephthalic Acid	1.3

(2) Crystallizer Vent Scrubber - Venturi Scrubber
(Efficiency not known)

Vent Rate = 19,000

Temp. = 215°F Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	1.8

(3) Dryer Vent Scrubber - Spray Tower
(Efficiency not known)

Vent Rate = 365 scfm

Temp. = 200°F Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	0.002

(4) *Day Tank Dust Collectors - Bag Filters
(3 day tanks each with a dust collector) (Efficiency not known)

Vent Rate = 600 scfm

Temp. = 100°F Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	0.0326

*Product is transferred to only one day tank at a time.

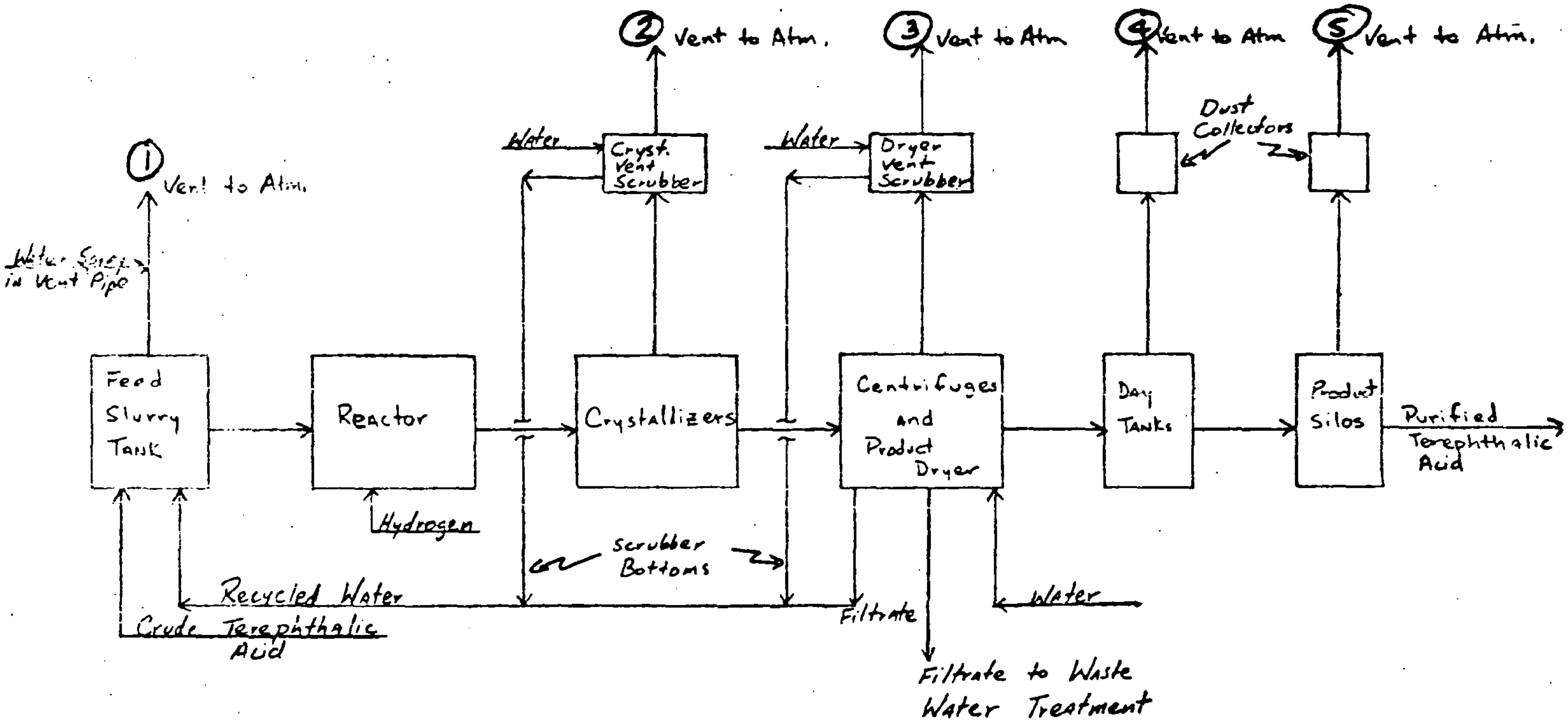
(5) *Silo Dust Collectors - Bag Filters
(3 silos each with a dust collector) (Efficiency not known)

Vent Rate = 600 scfm

Temp. = 100°F   Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	0.0311

*Product is transferred to only one silo at a time, and for only 8 hours a day (1/3 operating time of unit).



Simplified Flow Diagram - No. 2 PTA

No. 3 PTA Unit - (90% operating factor)
(Continuous Crystallization)

A. Production Rate - 63,400 lb Purified Terephthalic Acid/hr
(500 million pounds per year)

B. Process Weight Rates -

Material	lb/hr
Crude Terephthalic Acid	65,700
Water	233,000 (22% T.S.)
Hydrogen	25

C. Emission Points -

(1) Feed Slurry Vent - Water Spray in vent pipe
(Efficiency not known)

Vent Rate = 110 scfm

Temp. = 208°F   Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	5.0

(2) Crystallizer Vent Scrubber - Venturi Scrubber
(Efficiency not known)

Vent Rate = 22,700 scfm

Temp. = 218°F   Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	9.5

(3) Dryer Vent Scrubber - Spray Tower
(Efficiency not known)

Vent Rate = 1,270 scfm

Temp. = 200°F   Press. - Atm.

Pollutant	lb/hr
Terephthalic Acid	0.04

(4) Atmospheric Centrifuge Feed Tank Vent - Water Spray in vent pipe
(Efficiency not known)

Vent Rate = 4,650 scfm

Temp. = 215°F   Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	2.3

(5) Day Tank Dust Collectors - Bag Filters
(4 day tanks each with a dust collector) (Efficiency not known)

Vent Rate* = 2,630 scfm

Temp. = 100^{o}F   Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	0.1 (est.)

(6) Silo Dust Collector - Bag Filters
(8 silos each with a dust collector) (Efficiency not known)

Vent Rate** = 2,630 scfm

Temp. = 100^{o}F   Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	0.1 (est.)

(7) Mother Liquor Flash Oven Vent - no gas cleaning device
(OPEN TOP TANK - CAN'T SAMPLE)

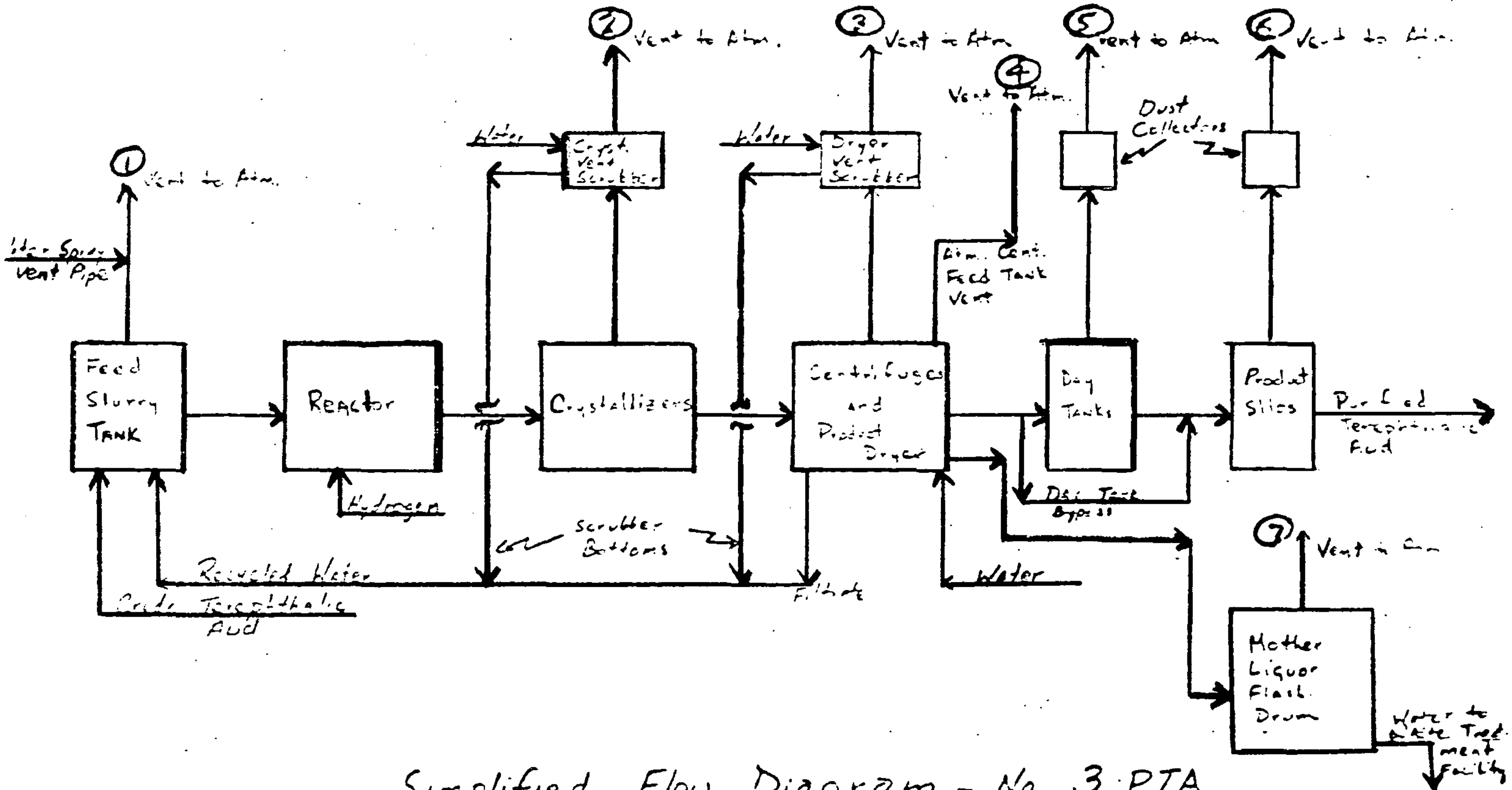
Vent Rate = 5,500 scfm

Temp. - 212^{o}F   Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	1.0 (est.)

*Dry tanks are used on an infrequent basis at No. 3 PTA. They are used mainly when off-spec product is made. It is during this time that the fluidizing rate is 2,630 scfm.

**The majority of the time, product is transferred directly to the silos from the dryer. When this occurs this fluidizing rate is continuous.



Simplified Flow Diagram - No. 3 PTA

No. 4 PTA Unit - (90% operating factor)
(Continuous Crystallization)

A. Production Rate - 63,400 lb Purified Terephthalic Acid/hr
(500 million pounds per year)

B. Process Weight Rates -

Material	lb/hr
Crude Terephthalic Acid	65,700
Water	233,000 (22% T.S.)
Hydrogen	25

C. Emission Points -

(1) Feed Slurry Vent - Water Spray in vent pipe
(Efficiency not known)

Vent Rate = 110 scfm

Temp. = 208°F   Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	5.0

(2) Crystallizer Vent Scrubber - Venturi Scrubber
(Efficiency not known)

Vent Rate = 28,200 scfm

Temp. = 219°F   Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	1.7

(3) Dryer Vent Scrubber - Venturi Scrubber
(Efficiency not known)

Vent Rate = 2,940 scfm

Temp. = 208°F   Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	0.1

(4) Atmospheric Centrifuge Feed Tank Vent - Water Spray in vent pipe
(Efficiency not known)

Vent Rate = 4,650 scfm

Temp. = 220°F   Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	0.3

(5) Day Tank Dust Collectors - Bag Filters
(2 day tanks each with a dust collector) (Efficiency not known)

Vent Rate* = 1,630 scfm

Temp. = 275^{o}F Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	0.1

(6) Silo Dust Collectors - Bag Filters
(8 silos each with a dust collector) (Efficiency not known)

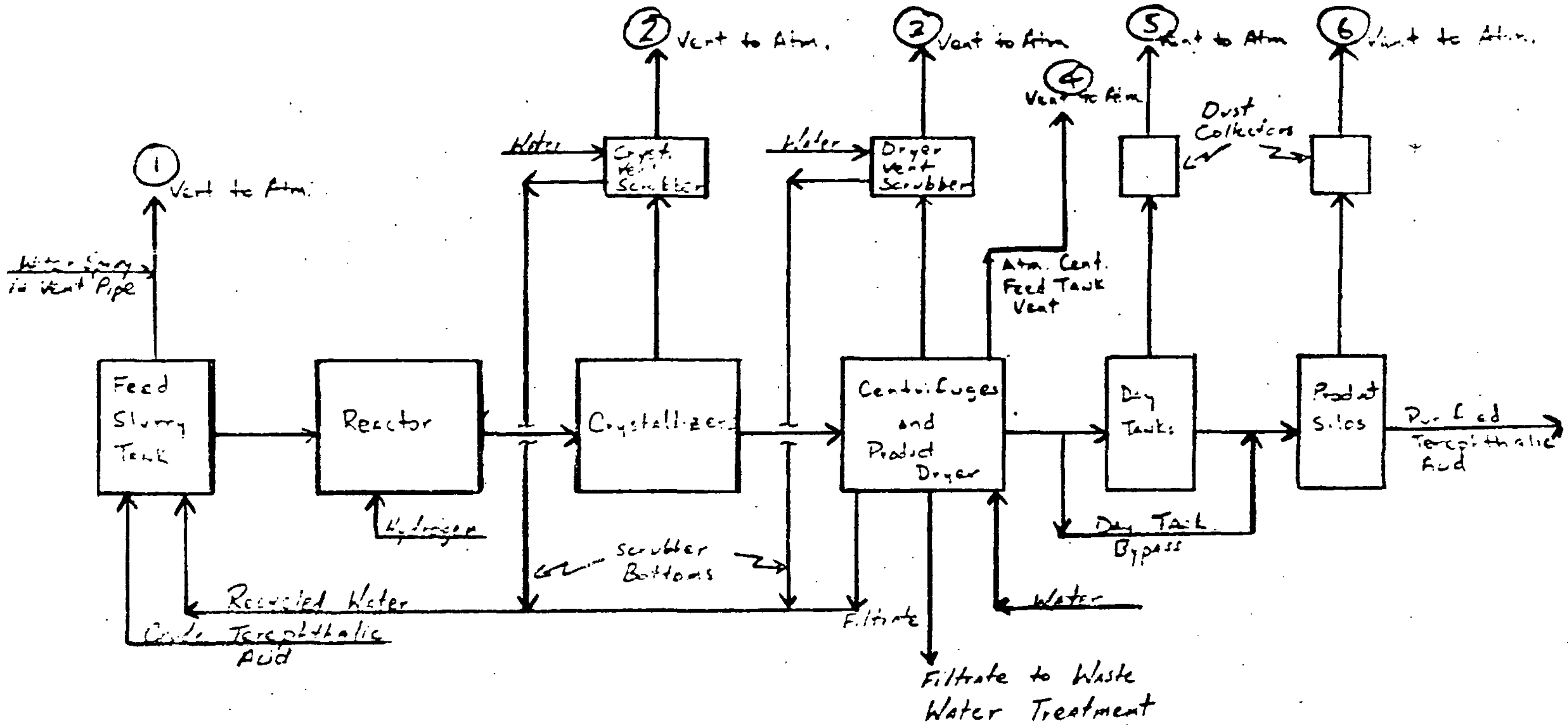
Vent Rate** = 1,630 scfm

Temp. = 275^{o}F Press. = Atm.

Pollutant	lb/hr
Terephthalic Acid	0.1

*Day Tanks are bypassed during most of the normal operating time. They are used mostly during start-up and when off-spec product is made. During these times the vent rate is 1,630 scfm.

**Product is normally transferred from the dryer to the silos, bypassing the day tanks. During this time the vent rate is contanuous at 1,630 scfm.



Simplified Flow Diagram - No. 4 PTA

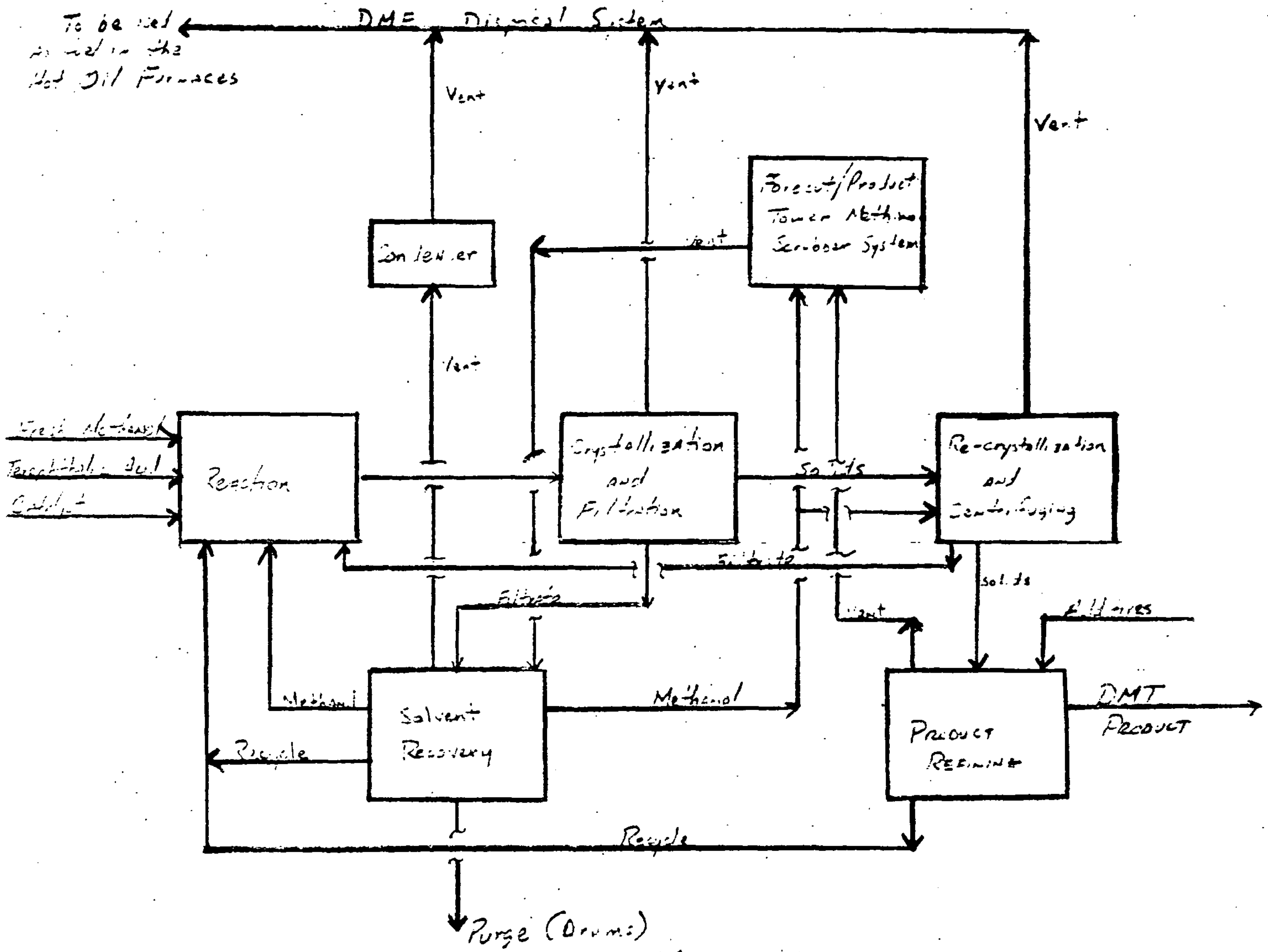
No. 1 Ester (DMT) Unit - (94% operating factor)

A. Production Rate - 14,600 lbs Dimethyl Terephthalate/hr
(120 million pounds per year)

B. Process Weight Rates -

Material	Average lb/hr
Crude Terephthalic Acid	12,800
Methanol	6,750 (0.45 consumption-budget)
Catalyst	0.51
Additives	0.26

C. Emission Points - There are no longer any points of emissions at the DMT units.



Simplified Flow Diagram - No. 1 DMT

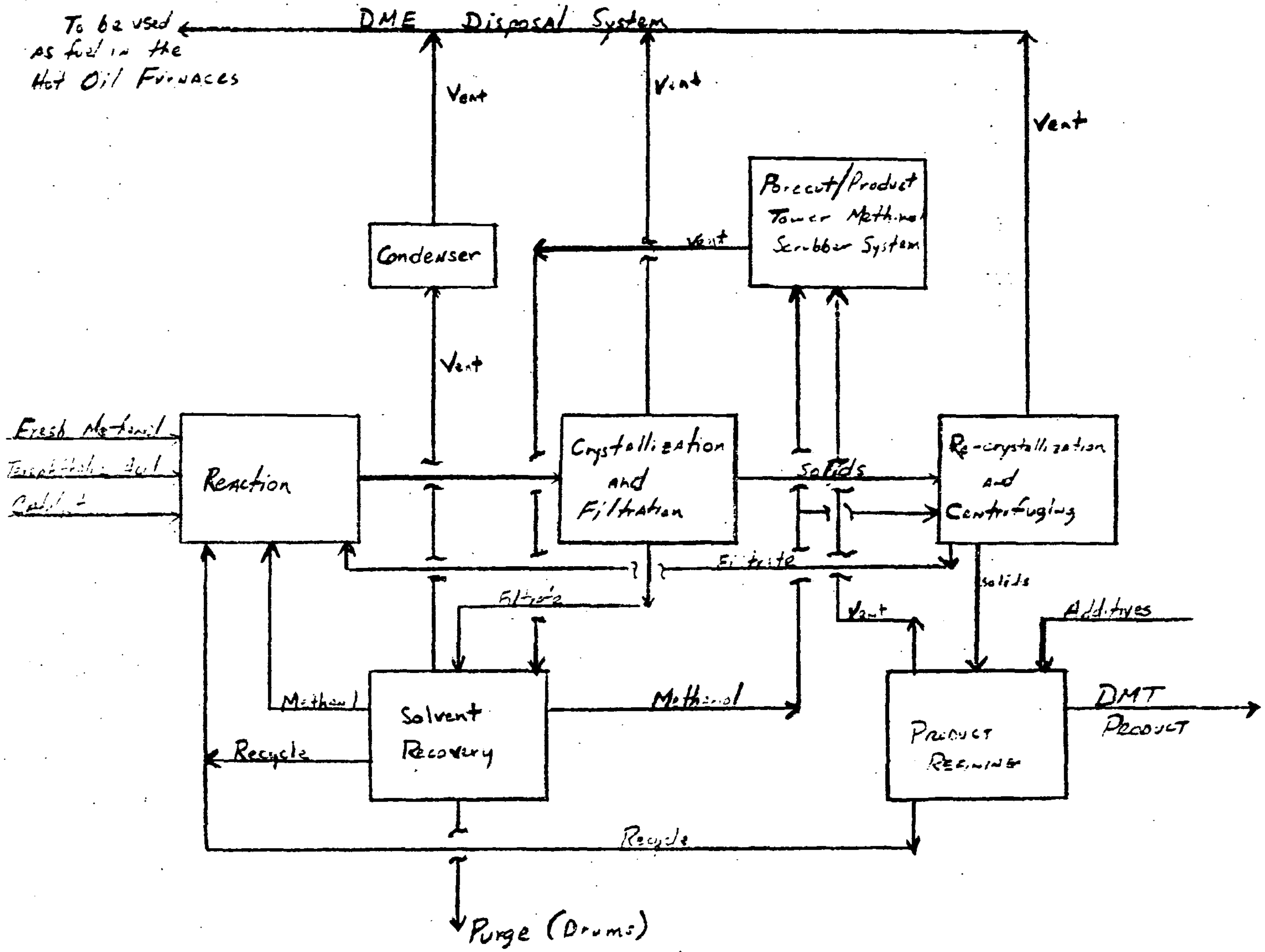
No. 2 Ester (DMT) Unit - (94% operating factor)

A. Production Rate - 14,600 lb Dimethyl Terephthalate/hr
(120 million pounds per year)

B. Process Weight Rates -

Material	Average lb/hr
Crude Terephthalic Acid	12,800
Methanol	6,750 (0.45 consumption-budget)
Catalyst	0.51
Additives	0.26

C. Emission Points - There are no longer any points of emission at the DMT units.



Simplified Flow Diagram - No. 2 DMT

Emission Information From State Agencies

Emission information was received from the State of Alabama. This information, presented in the following, was taken from permit applications filed by the Decatur Plant in 1974. The State of Illinois does not give out information contained in permit applications.

It should be noted that the information received from the State of Alabama is at odds with the information received from the Decatur Plant. For example, the CO emissions from oxidation units #1 and #2 are much lower in the state permit forms than the CO emissions data received from the Decatur Plant. In fact, the CO emission data from the state would predict a linear increase in CO emissions with production rate, while the emissions data from the Decatur Plant implies that CO emissions are independent of production rates (see Section VI). The reason for this discrepancy is not known. The newer permit data sent by the Decatur personnel will be used in this report.

when renewed (?)

BETTY W VAUGHAN M D
DISTRICT MEDICAL DIRECTOR

G W JAMES
BUSINESS ADMINISTRATOR

TRI-COUNTY DISTRICT HEALTH SERVICE

LIMESTONE
LAWRENCE
MORGAN
CULLMAN

MORGAN COUNTY HEALTH DEPARTMENT
P.O. BOX 850
DECATUR, ALABAMA 35601
TELEPHONE: 353-7021

April 21, 1976

Mr. Peter Spawn
G.C.A. - Technology Division
Burlington Road
Bedford, Massachusetts 01730

Dear Mr. Spawn:

Enclosed is a summary of emission data concerning the production of terephthalic acid in our area. Also, I have included a copy of the current Morgan County Air Pollution Control Rules and Regulations.

If you have any questions or we can be of further help please write or call Dan Seaver at (205) 353-7021.

Sincerely,

Paul E. Saywell, Jr.
District Programs Director
Division of Air Pollution Control

PES:js

Enclosures

1 P.T.A. Unit

	Particulate lbs./hr.	Process Wt. Rate lbs./hr.
Feed Slurry Tank Vent (estimate)	1.3	
*Dryer Scrubber Vent	.01	145,666 T.A. & Water
*Atmospheric Centrifuge Feed Tank Vent	4.7	105,000 T.A. & Water
*Crystallizer Scrubber Vent	11.6	79,860 T.A. & Water
Day Tank Bag Filter Vent (estimate)	.3	330,526
Silo Bag Filter Vent (estimate)	.3	
Total	18.2	

Controls

Crystallization - Wet Scrubber

Dryer Vent - Wet Scrubber

Feed Slurry Tank - Water Spray in Vent Pipe

Atmospheric Centrifuge - Water Spray in Vent Pipe

2 P.T.A. Unit

	Particulate lbs./hr.	Process Wt. Rate lbs./hr.
Feed Slurry Tank Vent (estimate)	1.3	
*Dryer Scrubber Vent	.002	97,000 T.A. & Water
*Crystallizer Vent Scrubber	1.8	104,500 T.A. & Water
Day Tank Bag Filter Vent (estimate)	.3	201,500
Silo Bag Filter Vent (estimate)	.3	
Total	3.7	

Dryer Vent - Wet Scrubber

Crystallizers - Venturi Scrubber

*Stack Test on File

3 P.T.A. Unit

	Particulate lbs./hr.	Process Wt. Rate lbs./hr.
Feed Slurry Vent (estimate)	5.0	
*Dryer Scrubber Vent	.04	265,700 T.A. & Water
*Atmospheric Centrifuge Feed Tank	3.0	274,460 T.A. & Water
*Crystallizer Scrubber Vent	21.4	356,000 T. A. & Water
Storage Tanks (estimated)	.1	
Mother Liquor Flash Drum (estimated)	1.0	
Total	30.54	

Controls

Crystallizers - Wet Scrubber

Dryer - Wet Scrubber

Atmospheric Centrifuge - Water Spray in Vent Pipe

4 P.T.A. Unit

	Particulate lbs./hr.	Process Wt. Rate lbs./hr.
Feed Slurry Vent (estimate)	5.0	
Dryer Scrubber Vent	0.1	277,000 T.A. & Water
Crystallizer Vent Scrubber	1.7	311,400 T.A. & Water
Atmospheric Centrifuge Feed Tank	.3	303,000 T.A. & Water
Storage Tank Bag Filters	.1	
Total	7.2	

Controls

Crystallizers - Wet Scrubber

Dryer - Wet Scrubber

Atmospheric Centrifuge - Water Spray in Vent Pipe

*Stack Test on File

1 Ester Unit

	Particulates lbs./hr.	Process Wt. Rate lbs./hr.
*Mother Liquor Drum Vent Condenser	.006	18,860 T.A. & Methanol

2 Ester Unit

Identical To # 1

1 Oxidation Unit 225 X 10^6 lbs./yr. crude T.A.

High Pressure Absorber (Scrubber)	Acetic Acid	282 lbs./hr.	Plant Studies
	Methyl Acetate	82 lbs./hr.	
	C.O.	460 lbs./hr.	
Low Pressure Absorber (Scrubber)	Acetic Acid	80 lbs./hr.	
	Methyl Acetate	16 lbs./hr.	
Dehydration Tower Vent	Acetic Acid	46 lbs./hr.	
	Methyl Acetate	36 lbs./hr.	
Storage Silos	T.A. Particualte	.4 lbs./hr.	
**Incinerator ESP	Particulate (Ash)	7 lbs./hr.	

2 Oxidation Unit 225 X 10^6 lbs./yr. crude T.A.

Same as # 1 except Incinerator output

**Incinerator ESP

	Particulate lbs./hr.	Process Wt.(Waste Feed Rate lbs./hr.
Before ESP	161.	3014
After ESP	6.6	1984

**Units not in compliance with current rules and regulations.
Emissions listed are the best results from numerous tests.

3 Oxidation Unit   465 X 10^6 lbs./yr. crude T.A.

High Pressure Absorber (Scrubber)	Acetic Acid	56 lbs./hr.
	Methyl Acetate	350 lbs./hr
	C.O.	1080 lbs./hr.
Low Pressure Absorber (Scrubber)	Acetic Acid	4 lbs./hr.
	Methyl Acetate	75 lbs./hr.
Dehydration Tower	Acetic Acid	18 lbs./hr.
	Methyl Acetate	75 lbs./hr.
Storage Silos	T.A. Particulate	1 lb./hr.

--Plant Studies--

**Incinerator ESP

	Particulate lbs./hr.	Process Wt.(Waste Feed Rate) lbs./hr.
Before ESP	61.6	2360
After ESP	16.1	2270

4 Oxidation Unit   515 X 10^6 lbs. crude T.A./yr.

High Pressure Absorber (Scrubber)	Acetic Acid	22 lbs./hr.
	Methyl Acetate	272 lbs./hr.
	C.O.	1090 lbs./hr.
Low Pressure Absorber (Scrubber)	Acetic Acid	2 lbs./hr.
Dehydration Tower	Acetic Acid	20 lbs./hr.
	Methyl Acetate	273 lbs./hr.
Storage Silos	T.A. Particulate	1 lb./hr.

--Plant Studies--

**Incinerator Scrubber

Particulate lbs./hr.	Process Wt.(Waste Feed Rate) lbs,/hr.
15.7	2400 lbs./hr.

**Units not in compliance with current rules and regulations. Emissions listed are the best results from numerous tests.

Paraxylene Unit 360×10^6 lbs. paraxylene/yr.

Regenerator	CO_2	5950 lbs./hr.	
Reboiler	Part.	.16 lb./hr.	Plant Estimate Natural Gas Combustion
	SO_2	.04 lb./hr.	
	NO_x	1.9 lb./hr.	
	CO	.004 lbs.	
	HC	Negligible	
Flare[1]	Particulates	.1 lb./hr.	
	SO_2	.02 lb./hr.	
	NO_x	1.1 lbs./hr.	
	CO	.002 lb./hr.	
	HC	Negligible	
Desulfurizers[2]	Sulfur	.04 lb./hr.	
Catalyst Regeneration[3]	CO^2	1500 lbs./hr.	

1. Normal emission for flare--no upset

2. Desulfurizers only discharge 575 hrs./yr.

3. Catalyst regenerations occur about three times/yr. and last for about 24 hrs./regeneration

E.I. DUPONT de NEMOURS & COMPANY

Emission Information for DuPont's Cape Fear Plant

The main offices of DuPont were visited to obtain emission information for the Cape Fear Plant in Wilmington, North Carolina. DuPont leases its DMT-TPA manufacturing technology from both Amoco and Tennessee Eastman. They have decided that they cannot give out any information concerning the Cape Fear Plant without express authorization from Amoco and Tennessee Eastman. Letters asking for this authorization are included in Appendix C. The following is a trip report for the visit to DuPont's main offices in Wilmington, Delaware.

Trip Report

By D. Durocher

Subject Meeting with DuPont personnel to gather emission information for the Cape Fear DMT-TPA Plant

Attending

J.R. Cooper - Environmental Manager, Polymer Intermediates Dept., Wilmington, Delaware

D.F. Rapp - Asst. Environmental Manager PID, Wilmington, Delaware

W.V. Osgood - Environmental Coordinator Sabine River Works, Orange, Texas

W.B. Beck - Environmental Coordinator Victoria Plant, Victoria, Texas

B.W. Hardy - Asst. Technical Superintendent Victoria Plant, Victoria, Texas

C.B. Everett - Legal Department Energy and Environment Division, Wilmington, Delaware

P.A. Palmer - Engineering Service Division
Engineering Department, Wilmington, Delaware

H.S. Elenterio - Production Manager
Nylon Intermediates Division
PID, Wilmington, Delaware

The following points were made during the discussion with DuPont personnel:

- DuPont leases its DMT technology from Tennessee Eastman Co. and its TPA technology from Amoco. As such, they are not at liberty to divulge any information without the express authorization of Eastman and DuPont. The people I should contact are:

  Dr. Robert Rosscup
  Patenting and Licensing Representative
  Standard Oil Company of Indiana
  Chicago, Illinois

  (Telephone 312-856-5944)

  and

  Mr. Robert L. Long
  Licensing Manager
  Tennessee Eastman Company
  Kingsport, Tennessee

  (Telephone 615-246-2111, Ext. 3575)

- The DuPont process is exactly the same as Amoco's and Eastman's, therefore, extrapolation of their emissions to DuPont should give accurate results.

- John Cooper said that the information that the State of North Carolina had was for the whole site, at which Dacron is also manufactured.

- It was finally decided that GCA should contact Dr. Rosscup and Mr. Long to try to free the emissions information. In any event, a letter should be sent to John Cooper outlining precisely what information will be needed.

Emission Information From State Agencies

The following information was obtained from the North Carolina Department of Natural and Economic Resources. This information was used in Section II to quantify the emissions from DuPont's Cape Fear Plant. As can be seen from the following, the absorber is 98 percent efficient in removing acetic acid from the p-xylene oxidizer off gases.

North Carolina Department of Natural & Economic Resources
JAMES E. HOLSHOUSER, JR., GOVERNOR · GEORGE W. LITTLE, SECRETARY

SOUTHEASTERN FIELD OFFICE
3143 WRIGHTSVILLE AVE.
WILMINGTON 28401
TELEPHONE 919 762-3394

May 18, 1976

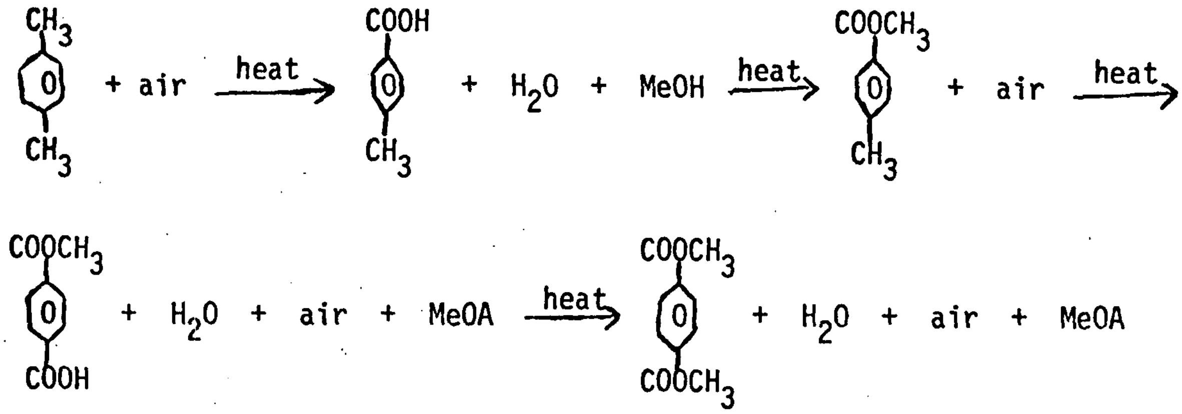
Rec'd 5/24

Mr. Peter Spann
GCA--Technology Div.
Burlington Road
Bedford, Mass. 01700

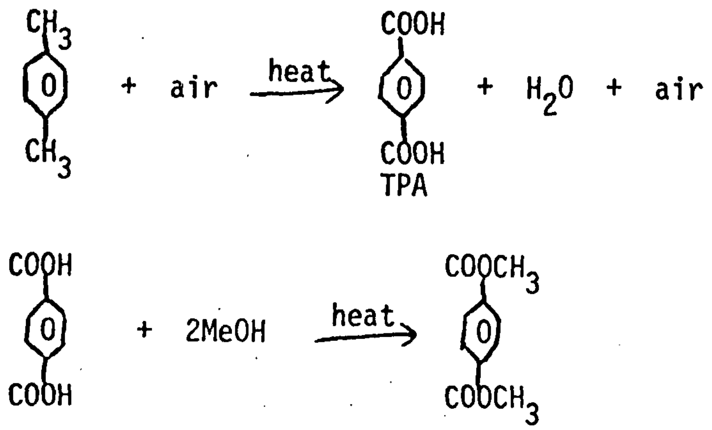
Dear Mr. Spann:

Enclosed, you will find the block diagrams for E. I. DuPont de Nemours & Co. Cape Fear Plant.

The E. I. DuPont process differs from the Hercules process in that the Hercules process produces directly dimethyl terephthalate in a single stage process whereas DuPont produces terephthalic acid and esterifies with methanol to dimethyl terephthalate. The Hercules reaction reads as follows:



whereas, DuPont's reaction reads as follows:



Catalysis are used in both processes.

If this office may be of any further help or should you have any questions regarding the material for Hercules or for the E. I. DuPont de Nemours and Co., please feel free to contact Mr. W. L. Tippitt of this office at (919) 762-3394.

Sincerely yours,

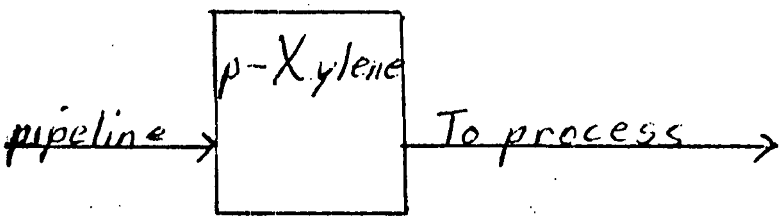
William L. Tippitt

William L. Tippitt
Environmental Engineer I

lms

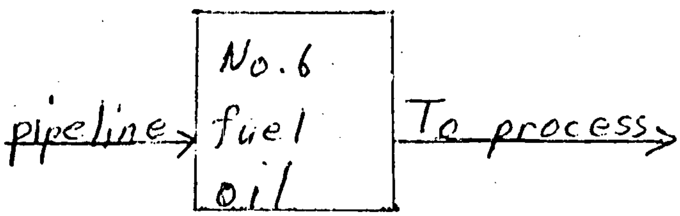
Enclosure

E. I. DuPont W. L. Tippitt



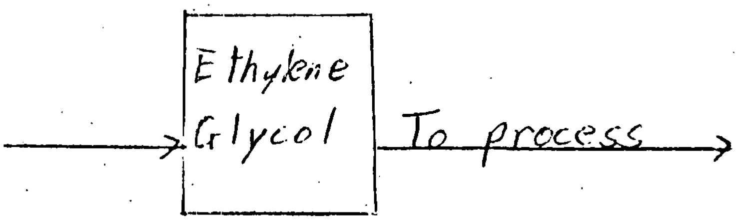
Tank farm capacity is 1,260,000 gallons
Tanks are equiped with cone roofs.
Emissions calculated from registration information is:

62,400 lbs/yr.

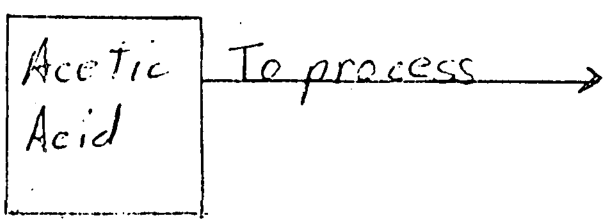


Tank farm capacity is 840,000 gallons
Tank(s) have cone roofs.
Emissions calculated from registration information is:

81,600 lbs/yr.

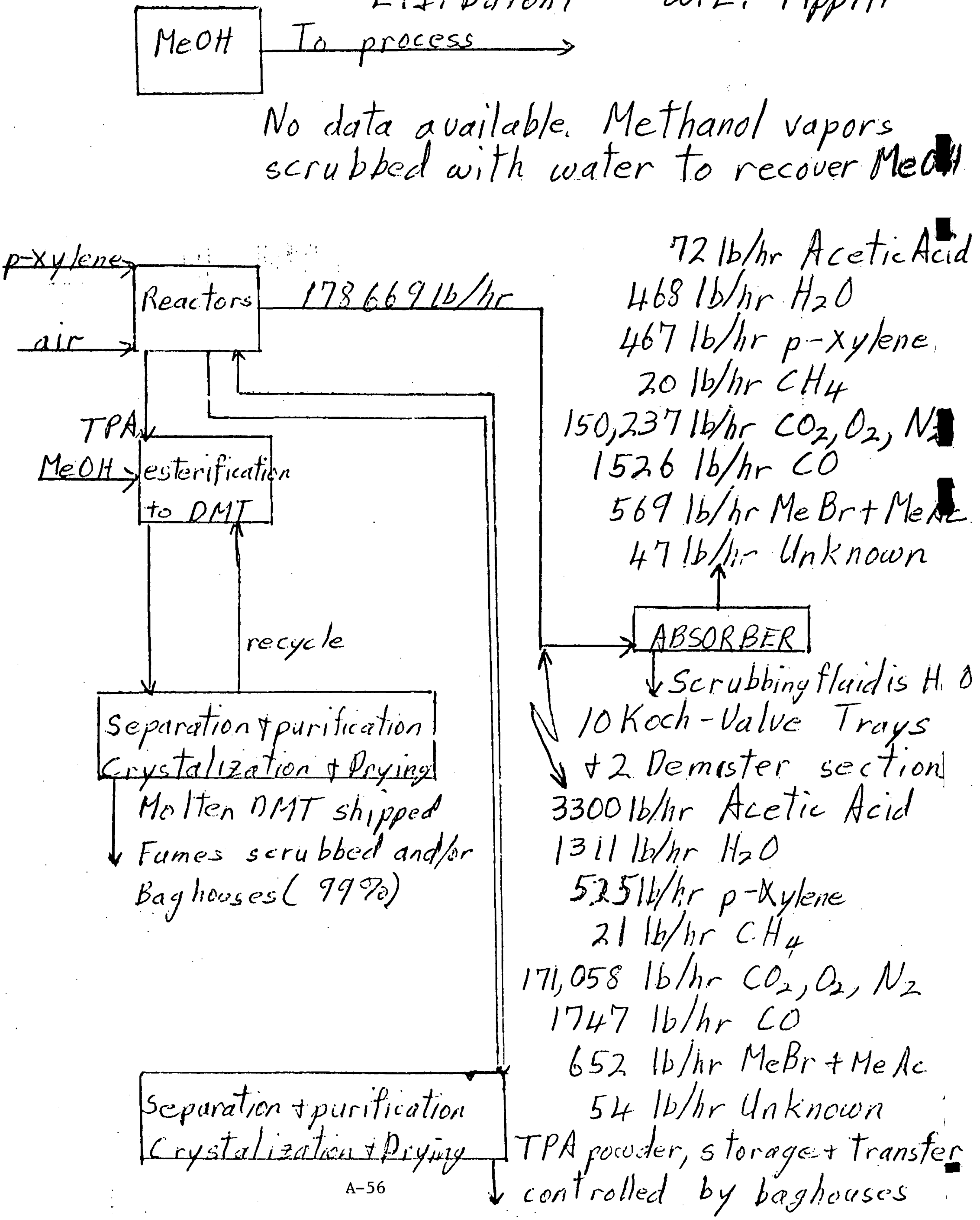


No data available.

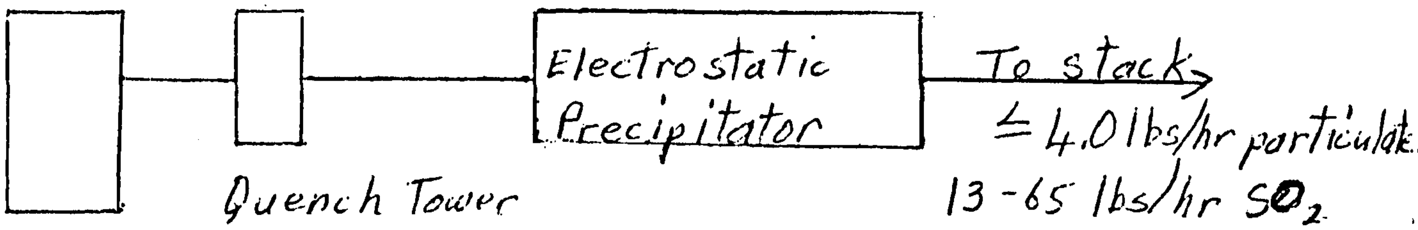


No data available. Vapors scrubbed with water.

E.I. DuPont W.L. Tippitt



E.I. DuPont W.L. Tippitt



Incinerator
Primary 2000-3200°F
Secondary 1600°F
1.9 tons/hr

HERCULES INCORPORATED

Emission Information From Hercules' Wilmington, North Carolina Plant

The main offices of Hercules were visited to obtain emission information for the Wilmington Plant. The following is a trip report of the visit to Wilmington.

Trip Report

By D.F. Durocher

Subject Trip to Wilmington, Delaware to visit Hercules

Attending

Dr. Richard A Chaddock
Environmental Coordinator
Hercules, Incorporated
Wilmington, Delaware

During the discussion the following points were made:

- Hercules has taken the position that they will no longer give out any information — especially to contractors.
- Dr. Chaddock noted that the information contained in the original Houdry questionnaire was quite good and extensive. He said that an accurate representation of the emissions could be obtained by scaling the emission data up to present capacity.
- Dr. Chaddock would not reveal the production capacity of the Wilmington Plant, but he thought that 1,300 million pounds per year was too high.
- Dr. Chaddock stated that the Eastover, South Carolina Plant is planned, but is not yet under construction. He did not know when it would be on line.

Emission information listed in Table II-3 was taken directly from the Houdry questionnaire. This data was scaled by the change in production capacities (i.e., 450 million pounds in 1972 versus 1,300 million pounds in 1976).

Emission Information From State Agencies

The following information was received from the State of North Carolina. It was useful in determining the efficiency of the carbon adsorbers for limiting hydrocarbon emissions from the p-xylene oxidation unit.

North Carolina Department of Natural & Economic Resources

JAMES E. HOLSHOUSER, JR., GOVERNOR · GEORGE W. LITTLE, SECRETARY

SOUTHEASTERN FIELD OFFICE

3143 WRIGHTSVILLE AVE.
WILMINGTON 28401
TELEPHONE 919 762-3394

May 6, 1976

Mr. Peter Spann
GCA - Technology Div.
Burlington Road
Bedford, Mass. 01700

Dear Mr. Spann:

Enclosed, you will find Permits for both Hercules and DuPont. The Permits are those directly related to the DMT process. Several Permits which relate to boilers and baghouses have not been included. Should you desire these Permits, this office will be happy to photocopy the other Permits and forward them to you. Should you have any questions regarding the Hercules, Inc. material, or suggestions on how the DuPont material that is to follow may be improved, please feel free to contact Mr. W. L. Tippitt of this office at (919) 762-3394.

Sincerely yours,

William L. Tippitt

William L. Tippitt

sks

Hercules W. L. Tippitt 6 May 1976

MeOH

To process → Methanol

Tank farm capacity is 2,000,000 gallons
Only one tank had a floating roof when
Tank Farm was registered. Now all
tanks are equipped with floating
roofs. Emissions based on information
at time of registration:

11.1 lbs/hr average
158 lbs/hr max.
71,650 lbs/yr.

p-Xylene

To process →

Tank farm capacity is 6,000,000 gallons
Cone roof tanks are present. Emissions
based on information at time of
registration:

6.1 lbs/hr average
40 lbs/hr max.
53,000 lbs/yr.

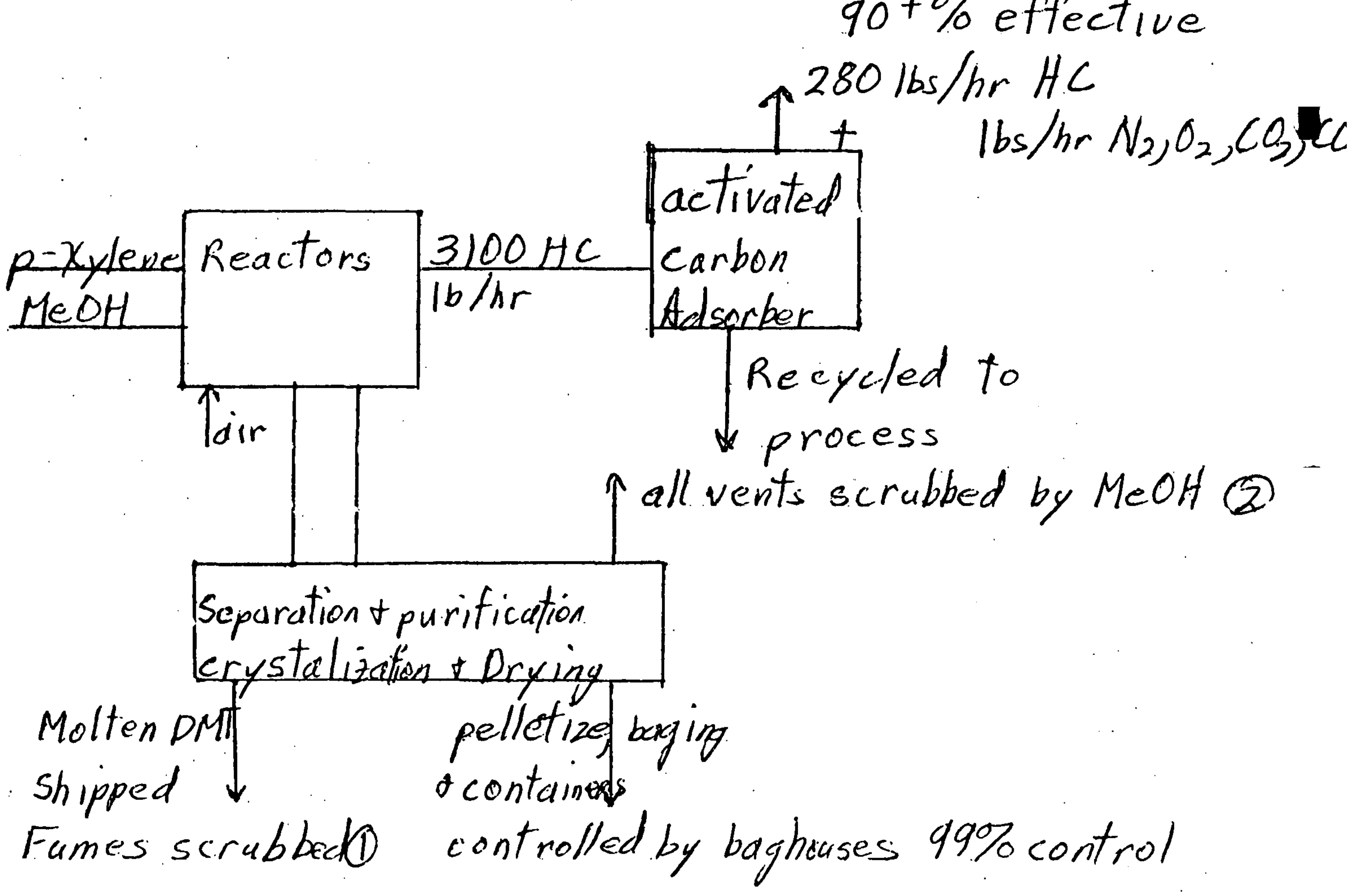
Ethylene Glycol →

No Data available. Some
quantity is used in scrubbers and
maybe in the process also.

Hercules No. 6 Fuel Oil → To process

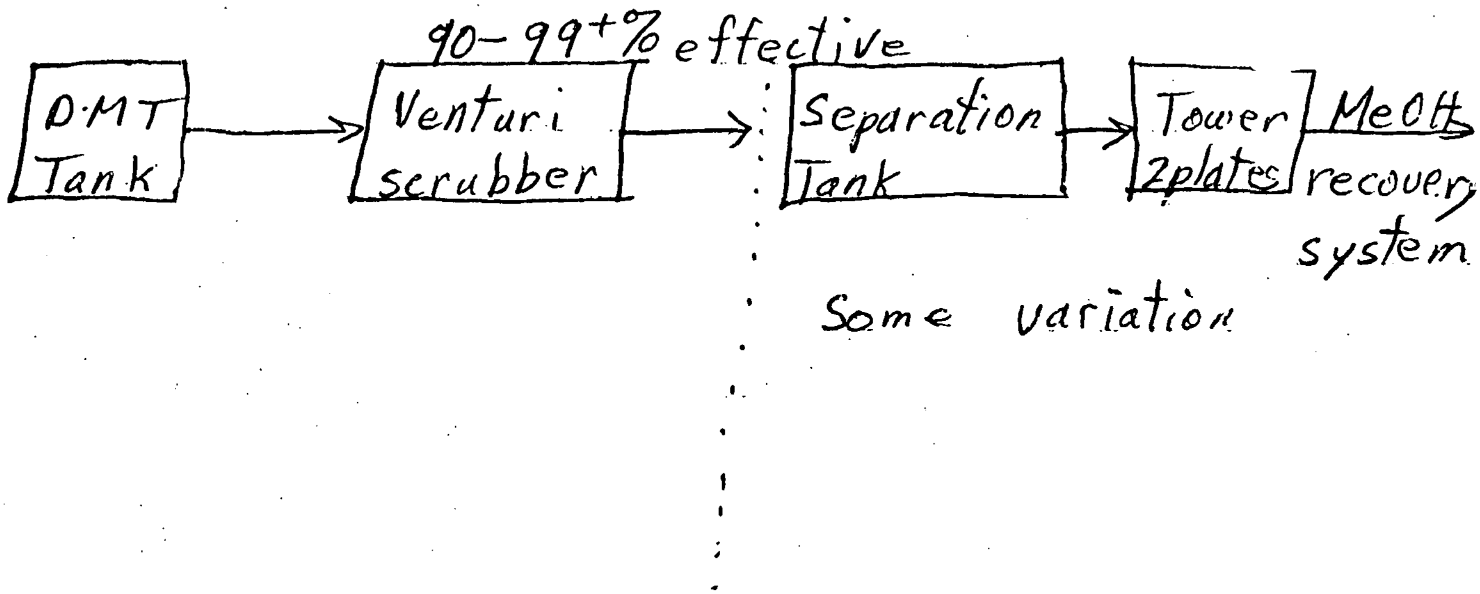
W. L. Tippitt 6 May 197

Tank farm capacity is 4,204,000 gallons.
Sulfur percentages are 2.1% and 1.4 to 1.5% in about a 1:1 mixture of oils.
0.95 lbs/hr average
6.62 lbs/hr max.
8470 lb/yr.



Hercules W. L. Tippitt 6 May 1976

1. + 2. DMT vapor and displaced air and MeOH vapors from process storage (day) tanks are handled as follows:



MeOH recovery System passes MeOH vapor from the scrubbing system is passed through a refrigeated Brine condenser and a water scrubber before the inert gas is discharged to the atmosphere
4000 lb/hr MeOH to 75 lb/hr 98 % efficiency
MeOH-water mixture distilled to recover MeOH.

TENNESSEE EASTMAN

Emission Information For Tennessee Eastman's Kingsport Plant

Eastman's Kingsport Plant was visited to obtain emission information. This information was presented as copies of permit applications the Kingsport Plant had filed with the state. The following is a trip report for the visit to the Kingsport Plant.

Trip Report

By D.F. Durocher

Subject Trip to Tennessee Eastman Co. in Kingsport, Tennessee

Attending

Neal Simons
Clean Environment Program
Tennessee Eastman Co.

C.E. Swanson
Clean Environment Program
Plant Area Member

D.Z. Elliot
DMT Departmental Superintendent

B. Robertson, TPA Departmental Superintendent

In lieu of an update of the Houdry questionnaire, copies of state permit applications for each of the DMT/TPA units for both the Kingsport Plant and the Columbia, South Carolina Plant were given to GCA. During the course of the conversation, the following points were made:

- The production capacity of the Columbia Plant is confidential. However, the permit information does give emissions.
- The technologies used at the Columbia and Kingsport Plants are similar.
- Eastman expands by debottlenecking, parallel production lines, or building new plants (e.g., the Columbia Plant). The method used depends on the size increase required. No one knew of an "economical" plant size.

- A growth projection of 10 to 12 percent may be reasonable.
- The information contained in the state permit applications is as accurate as any information that is available.
- They do not know of any variables that affect emissions in any significant way.
- Emission control equipment efficienies are given in the permit applications.

In the following, the permit information from the Kingsport Plant is reproduced. TPA is produced in a single plant which is identified in the permit applications as "Process Emission Source Number B232-1." The crude TPA is then processed into DMT in four plants labeled, B-237-1, B-237A-1, B-261-1, and B-261A-1.

Process Emission Source Number B-232-1
Page 1 of 61
Edition D

PROCESS EMISSION SOURCE COVER SHEET - APC 21

MAIL TO:

TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
CORDELL HULL BUILDING C2-212
NASHVILLE, TENNESSEE 37217

DO NOT WRITE IN THIS SPACE

COMPANY NO.
PERMIT NO.
PROCESS EMISSION SOURCE NO.
EMISSION POINT NO.
REVIEWER
DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY

2. PROCESS EMISSION SOURCE NUMBER B-232-1 3. SIC CODE 2865

4. DID CONSTRUCTION OF THIS PROCESS BEGIN ON OR BEFORE AUGUST 9, 1969? [X] YES [ ] NO ON OR BEFORE APRIL 3, 1972? YES [X]

5. GIVE A BRIEF DESCRIPTION OF THE PROCESS ALONG WITH A FLOW DIAGRAM. OPERATION CENTERS, STORAGE POINTS, MATERIAL INPUTS, MATERIAL OUTPUTS AND EMISSION POINTS SHOULD BE NOTED IN POUNDS PER OPERATING HOUR.

Terephthalic Acid (TPA) Manufacture - Buildings 233, 233A, 233B, 233C, 234, 234A, 290, 290A, 290B, 291, and 232 (Control Room) of the Acid Division

NOTE: ATTACH FLOW DIAGRAM FOR PROCESS EMISSION SOURCE CLAIMED ON SEPARATE SHEET.

6. TYPE OF PROCESS: CONTINUOUS [X] BATCH [ ] COMBINED [ ]

7. OPERATIONAL SCHEDULE OF PROCESS EMISSION SOURCE:

A. HOURS PER DAY 24
B. DAYS PER WEEK 7
C. WEEKS PER YEAR 52

D. % ANNUAL THRUPUT

DEC-FEB	MARCH-MAY	JUNE-AUGUST	SEPT-NOV
25	25	25	25

8. LIST MATERIAL INPUTS TO PROCESS EMISSION SOURCE:

NAME OF INPUT	LBS/OPERATING HOUR DESIGN CAPACITY	LBS/OPERATING HOUR ACTUAL LOADING	FLOW DIAGRAM REFERENCE
A. p-Xylene	43,800	43,800	1
B. Acetaldehyde	44,300	44,300	2
C. Air	359,000	359,000	3
D. Acetic Acid	134,000	134,000	4
E.			
F.			
G.			
TOTAL LBS/OPERATING HOUR INPUT TO PROCESS EMISSION SOURCE	581,000	581,000	

(TOTAL ROUNDED TO THREE SIGNIFICANT FIGURES)

APC - 21
REV 5/73

1-22-74 Issue.

LIST MATERIAL OUTPUTS FROM THIS PROCESS EMISSION SOURCE:

NAME OF OUTPUT	LBS/OPERATING HOUR DESIGN CAPACITY	LBS/OPERATING HOUR ACTUAL LOADING	FLOW DIAGRAM REFERENCE
A. Terephthalic Acid	66,500	66,500	5
B. Acetic Acid	50,600	50,600	6
C. Methyl Acetate	700	700	7
D. Water	20,000	20,000	8
E. Inert Gas	65,000	65,000	9
F.			
G.			
TOTAL LBS/OPERATING HOUR OUTPUT FROM PROCESS EMISSION SOURCE	203,000	203,000	(TOTAL ROUNDED TO THREE SIGNIFICANT FIGURES)

10. LIST AIR POLLUTION EMISSION POINTS FOR THIS PROCESS EMISSION SOURCE. ATTACH A SEPARATE "EMISSION POINT DATA" SHEET, APC-22, FOR EACH POINT.

EMISSION POINT NO. OR CODE	LBS PARTICULATE/OPERATING HOUR	FLOW DIAGRAM REFERENCE
A. A	0	A
B. B	0	B
C. C	0	C
D. D	0	D
E. E	0	E
F. F	0	F

TOTAL LBS. OF PARTICULATE EMITTED FROM PROCESS EMISSION SOURCE PER OPERATING HOUR ______________

(TOTAL ROUNDED TO TWO SIGNIFICANT FIGURES)

NOTE: ATTACH ADDITIONAL SHEETS AS REQUIRED FOR ITEMS 8, 9, AND 10.

11. J. C. Edwards DHL — June 27, 1974

SIGNATURE OF RESPONSIBLE MEMBER OF FIRM — DATE OF APPLICATION

12. TYPE OR PRINT NAME AND OFFICIAL TITLE OF PERSON SIGNING THIS FORM

NAME J. C. Edwards

TITLE Manager, Clean Environment Program

DATE JUN 27 1974 PHONE 246-2111, Ext. 244

FOR OFFICIAL USE ONLY

- [ ] PROCESS EMISSION SOURCE CLAIMED IS ACCEPTABLE.
- [ ] PROCESS EMISSION SOURCE CLAIMED IS NOT ACCEPTABLE.
- [ ] RECOMMENDED MAKE UP OF PROCESS EMISSION SOURCE ATTACHED ON SEPARATE SHEET.
- [ ] PROCESS EMISSION SOURCE IS NOT IN COMPLIANCE WITH APPLICABLE REGULATIONS.
- [ ] PROCESS WEIGHT TABLE APPLIES TO THIS PROCESS EMISSION SOURCE.
- [ ] DIFFUSION EQUATION APPLIES TO THIS PROCESS EMISSION SOURCE. [ ] TABLE I [ ] TABLE II

ALLOWABLE EMISSIONS ______________ LBS/HOUR ACTUAL EMISSIONS ______________ TONS/YEAR

FILING IS AUTHORIZED BY ______________ DATE ______________

Supplement to APC-21 Form

13. NORMAL OPERATING SCHEDULE: 8,760 HOURS PER YEAR.

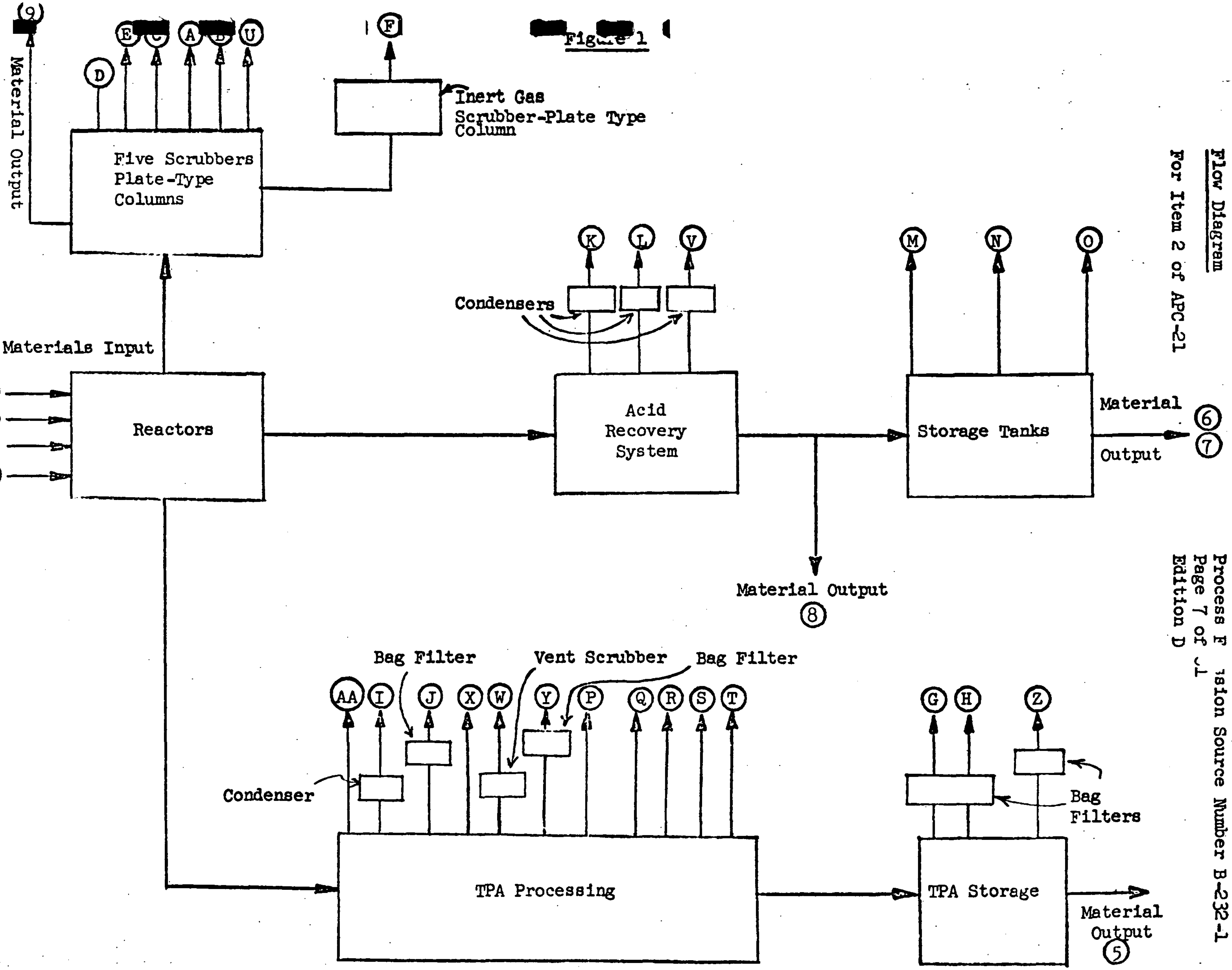
14. DATES OF ANY SCHEDULED ANNUALLY OCCURRING SHUTDOWN OF OPERATIONS None*

15n DATE (YEAR) INSTALLATION (OR PROCESS) WENT ON LINE 20% in 1962/20% in 1966 20% in 1970 20% in 1964/20% in 1967

16. ESTIMATED PERCENT INCREASE OR DECREASE IN PROCESS RATES ON A TOTAL PROCESS BASIS FOR THE 5 YEARS AFTER THE CALENDAR YEAR FOR WHICH THIS REPORT IS COMPLETED 0

*The plant as a whole is not scheduled for a shutdown during the course of a year. However, individual process components are scheduled down during the Fourth, Fifth, Eleventh, and Twelfth (April, May, October, and November) Periods of each year for cleanout.

[redacted] Fig[redacted] 1



Flow Diagram
For Item 2 of APC-21

Process F ısion Source Number B-232-1
Page 7 of .1
Edition D

1-22-74 Issue.

A-69

Attach to APC-21

Process Emission Source Number B-232-1
Page 8 of 61
Edition D

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO.
PERMIT NO. P
PROCESS EMISSION SOURCE NO.
EMISSION POINT NO.
REVIEWER
DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-232-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). A
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 84 FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 1.3 FEET.
6. SHOW NORMAL EXIT GAS TEMPERATURE 65 °F. 7. SHOW EXIT GAS VELOCITY 87.3 FT/SEC.
INDICATE PERCENT OF TIME OVER 125°F 0 %.
9. SHOW EXIT GAS VOLUME FLOW RATE 121.2 FT^3/SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 3.3 (GR./CU. FT. DRY GAS AT 70°F) AND 3.3 (GR./CU. FT. GAS AT STACK CONDITIONS)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 150 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK X U-UP, ___ D-DOWN, ___ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS	Yes	1966	002	46%
CARBON MONOXIDE				
GASEOUS FLUORIDES				

ocess Emission Source Number _ - - _ -

IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POINT YES [X] NO [ ]

IF YES, DESCRIBE: A Total Carbon Analyzer

ADDITIONAL COMMENTS:

EMISSION POINT DATA

SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	X			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE		X	5000	PPM	167	1,463,000	Analytical
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
Methyl Acetate		X	0.00012	Lb./Ft.^{3}	52.4	459,000	Analytical
Xylene		X	28	ppm	3.4	30,000	Analytical
Acetic Acid		X	0.00000007	Lb./Ft.^{3}	0.3	2,700	Analytical
Acetaldehyde		X	0.000011	Lb./Ft.^{3}	4.8	42,400	Analytical
Methane		X	145	ppm	2.7	23,400	Analytical

FOR OFFICE USE ONLY

- [ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ____________ #/hr
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ____________ AND ALLOWABLE EMISSIONS ____________
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ____________ AND ALLOWABLE EMISSIONS ____________
- [ ] CONTINUOUS MONITOR (S) FOR (1) ____________ ; (2) ____________ ; (3) ____________ RECOMMENDED.
- [ ] METHOD OF MEASUREMENT IS ACCEPTABLE.
- [ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ____________

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ____________ SULFUR DIOXIDE ____________ HYDROCARBONS ____________

CARBON MONOXIDE ____________ FLUORIDES ____________

FILING IS AUTHORIZED BY ____________ DATE ____________

Process Emission Source
Number B-232-1
Page 10 of 61
Edition D

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO.

PERMIT NO. P

PROCESS EMISSION SOURCE NO.

EMISSION POINT NO.

REVIEWER

DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-232-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). B
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 83 FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 1.3 FEET
6. SHOW NORMAL EXIT GAS TEMPERATURE 57 °F. 7. SHOW EXIT GAS VELOCITY 87.3 FT/SEC
- INDICATE PERCENT OF TIME OVER 125°F 0 %.
9. SHOW EXIT GAS VOLUME FLOW RATE 121.2 FT^3 /SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 3.3 (GR./CU. FT. DRY GAS AT 70°F) AND 3.4 (GR./CU. FT. GAS AT STACK CONDITIONS)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 145 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK X U-UP, ___ D-DOWN, ___ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS	Yes	1967	002	46%
CARBON MONOXIDE				
GASEOUS FLUORIDES				

1-22-74 Issue.

APC - 22
REV 5/73

Process Emission Source Number ___

IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POINT YES [X] NO [ ]

IF YES, DESCRIBE: A Total Carbon Analyzer

ADDITIONAL COMMENTS: ___

EMISSION POINT DATA

SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	X			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE		X	5000	PPM	167	1,463,000	Analytical
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
Methyl Acetate		X	0.00012	Lb./Ft.^{3}	52.4	459,000	Analytical
Xylene		X	28	ppm	3.4	30,000	Analytical
Acetic Acid		X	0.00000007	Lb./Ft.^{3}	0.3	2,700	Analytical
Acetaldehyde		X	0.000011	Lb./Ft.^{3}	4.8	42,400	Analytical
Methane		X	145	ppm	2.7	23,400	Analytical

FOR OFFICE USE ONLY

- [ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ___ #/hr
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ___ AND ALLOWABLE EMISSIONS ___
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ___ AND ALLOWABLE EMISSIONS ___
- [ ] CONTINUOUS MONITOR (S) FOR (1) ___; (2) ___; (3) ___ RECOMMENDED.
- [ ] METHOD OF MEASUREMENT IS ACCEPTABLE.
- [ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ___

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ___ SULFUR DIOXIDE ___ HYDROCARBONS ___

CARBON MONOXIDE ___ FLUORIDES ___

FILING IS AUTHORIZED BY ___ DATE ___

Process Emission Source
Number B-232-1
Page 12 of 61
Edition D

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO.
PERMIT NO. P
PROCESS EMISSION SOURCE NO.
EMISSION POINT NO.
REVIEWER
DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-232-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). C
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 75 FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 1.2 FEET.
6. SHOW NORMAL EXIT GAS TEMPERATURE 80 °F. 7. SHOW EXIT GAS VELOCITY 150 FT/SEC
INDICATE PERCENT OF TIME OVER 125°F 0 %.
9. SHOW EXIT GAS VOLUME FLOW RATE 160 FT^3/SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 4.7 (GR./CU. FT. DRY GAS AT 70°F) AND 4.6 (GR./CU. FT. GAS AT STACK CONDITIONS)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 90 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK X U-UP, ___ D-DOWN, ___ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS	Yes	1965	002	82%
CARBON MONOXIDE				
GASEOUS FLUORIDES				

1-22-74 Issue.

APC - 22
REV 5/73

rocess Emission Source Number B-232-1 Page 15 of --

14 IS AN EMISSION MONITORING AND RECORD... INSTRUMENT ATTACHED TO THIS EMISSION POI YES ☐ NO ☒

IF YES, DESCRIBE:

. ADDITIONAL COMMENTS:

EMISSION POINT DATA

6. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	X			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE	X			PPM			
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
Methyl Acetate		X	0.00036	Lb./Ft.^{3}	207	1,816,000	
Acetaldehyde		X	0.000076	Lb./Ft.^{3}	43.8	384,000	
p-Xylene		X	34	ppm	5.4	47,700	
Acetic Acid		X	0.00017	Lb./Ft.^{3}	99.4	870,900	
Methane		X	372	ppm	9.1	80,000	

FOR OFFICE USE ONLY

☐ PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

☐ EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ________ #/hr

☐ EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

☐ EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

☐ EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ________ AND ALLOWABLE EMISSIONS ________

☐ EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ________ AND ALLOWABLE EMISSIONS ________

☐ CONTINUOUS MONITOR (S) FOR (1) ________; (2) ________; (3) ________ RECOMMENDED.

☐ METHOD OF MEASUREMENT IS ACCEPTABLE.

☐ METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ________

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ________ SULFUR DIOXIDE ________ HYDROCARBONS ________

CARBON MONOXIDE ________ FLUORIDES ________

FILING IS AUTHORIZED BY ________ DATE ________

Process Emission Source Number B-232-1
Page 14 of 61
Edition D

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO.

PERMIT NO. P

PROCESS EMISSION SOURCE NO.

EMISSION POINT NO.

REVIEWER

DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-232-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). D
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 112 FEET
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.83 FEET.
6. SHOW NORMAL EXIT GAS TEMPERATURE 55 °F. 7. SHOW EXIT GAS VELOCITY 71 FT/SEC
8. INDICATE PERCENT OF TIME OVER 125°F 0 %.
9. SHOW EXIT GAS VOLUME FLOW RATE 38.7 FT^3 /SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 3.3 (GR./CU. FT. DRY GAS AT 70°F) AND 3.4 (GR./CU. FT. GAS AT STACK CONDITIONS)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 150 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK X U-UP, ____ D-DOWN, ____ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS	Yes	1961	002	46%
CARBON MONOXIDE				
GASEOUS FLUORIDES				

1-22-74 Issue.

APC - 22
REV 5/73

ocess Emission Source Number B-232-1 Page ____

14 IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POI YES [X] NO [ ]

IF YES, DESCRIBE: A Total Carbon Analyzer

ADDITIONAL COMMENTS: ____________________

EMISSION POINT DATA

5. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	X			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE		X	5000	PPM	53.3	447,000	Analytical
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
Methyl Acetate		X	0.00012	$Lb./Ft.^3$	16.7	147,000	Analytical
p-Xylene		X	28	ppm	1.1	9,700	Analytical
Acetic Acid		X	0.00000007	$Lb./Ft.^3$	0.01	88	Analytical
Acetaldehyde		X	0.000011	$Lb./Ft.^3$	1.5	13,000	Analytical
Methane		X	145	ppm	0.85	7,500	Analytical

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ________ #/hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ________ AND ALLOWABLE EMISSIONS ________

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ________ AND ALLOWABLE EMISSIONS ________

[ ] CONTINUOUS MONITOR (S) FOR (1) ________; (2) ________; (3) ________ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ____________________

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ________ SULFUR DIOXIDE ________ HYDROCARBONS ________

CARBON MONOXIDE ________ FLUORIDES ________

FILING IS AUTHORIZED BY ____________________ DATE ________

Process Emission Source
Number B-232-1
Page 16 of 61
Edition D

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO.

PERMIT NO. P

PROCESS EMISSION SOURCE NO.

EMISSION POINT NO.

REVIEWER

DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-232-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). E
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 112 FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.83 FEET.
6. SHOW NORMAL EXIT GAS TEMPERATURE 55 °F. 7. SHOW EXIT GAS VELOCITY 71 FT/SEC.

INDICATE PERCENT OF TIME OVER 125°F 0 %.

9. SHOW EXIT GAS VOLUME FLOW RATE 38.7 FT^3/SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 3.3 (GR./CU. FT. DRY GAS AT 70°F) AND 3.4 (GR./CU. FT. GAS AT STACK CONDITIONS)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 170 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK X U-UP, ___ D-DOWN, ___ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS	Yes	1964	002	46%
CARBON MONOXIDE				
GASEOUS FLUORIDES				

1-22-74 Issue.

APC - 22
REV 5/73

IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POI YES [X] NO [ ]

IF YES, DESCRIBE: A Total Carbon Analyzer

5. ADDITIONAL COMMENTS:

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	X			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE		X	5000	PPM	53.3	447,000	Analytical
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
Methyl Acetate		X	0.00012	$Lb./Ft.^3$	16.7	147,000	Analytical
p-Xylene		X	28	ppm	1.1	9,700	Analytical
Acetic Acid		X	0.00000007	$Lb./Ft.^3$	0.01	88	Analytical
Acetaldehyde		X	0.000011	$Lb./Ft.^3$	1.5	13,000	Analytical
Methane		X	145	ppm	0.85	7,500	Analytical

FOR OFFICE USE ONLY

- [ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ________ #/hr
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ________ AND ALLOWABLE EMISSIONS ________
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ________ AND ALLOWABLE EMISSIONS ________
- [ ] CONTINUOUS MONITOR (S) FOR (1) ________; (2) ________; (3) ________ RECOMMENDED.
- [ ] METHOD OF MEASUREMENT IS ACCEPTABLE.
- [ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ________

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ________ SULFUR DIOXIDE ________ HYDROCARBONS ________

CARBON MONOXIDE ________ FLUORIDES ________

FILING IS AUTHORIZED BY ________ DATE ________

Process Emission Source Number B-232-1
Page 18 of 61
Edition D

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO.
PERMIT NO. P
PROCESS EMISSION SOURCE NO.
EMISSION POINT NO.
REVIEWER
DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-232-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). F
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 78 FEET
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.83 FEET
6. SHOW NORMAL EXIT GAS TEMPERATURE 54 °F. 7. SHOW EXIT GAS VELOCITY 75 FT/SEC

INDICATE PERCENT OF TIME OVER 125°F 0 %.

9. SHOW EXIT GAS VOLUME FLOW RATE 41 FT^3/SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 2.3 (GR./CU. FT. DRY GAS AT 70°F) AND 2.5 (GR./CU. FT. GAS AT STACK CONDITIONS)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 145 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK X U-UP, ___ D-DOWN, ___ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS	Yes	1968	002	76%
CARBON MONOXIDE				
GASEOUS FLUORIDES				

[redacted]ocess Emission Source Number [illegible] Page [illegible]

14 IS AN EMISSION MONITORING AND RECORDI... INSTRUMENT ATTACHED TO THIS EMISSION POI. YES [ ] NO [X]

IF YES, DESCRIBE: ____________________

[redacted] ADDITIONAL COMMENTS: ____________________

EMISSION POINT DATA

SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	X			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE	X			PPM			
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
Methyl Acetate		X	0.000042	Lb./Ft.^{3}	6.15	53,300	Analytical
Acetaldehyde		X	0.000001	Lb./Ft.^{3}	0.15	1,300	Analytical
p-Xylene		X	28	ppm	0.31	2,700	Analytical
Methane		X	145	ppm	1.6	14,000	Analytical

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ________ #/hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ________ AND ALLOWABLE EMISSIONS ________

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ________ AND ALLOWABLE EMISSIONS ________

[ ] CONTINUOUS MONITOR (S) FOR (1) ________; (2) ________; (3) ________ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ____________________

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ________ SULFUR DIOXIDE ________ HYDROCARBONS ________

CARBON MONOXIDE ________ FLUORIDES ________

FILING IS AUTHORIZED BY ____________________ DATE ________

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO.

PERMIT NO. P

PROCESS EMISSION SOURCE NO.

EMISSION POINT NO.

REVIEWER

DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-232-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). G
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 64 FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.83 FEET.
6. SHOW NORMAL EXIT GAS TEMPERATURE 110 °F. 7. SHOW EXIT GAS VELOCITY 24.4 FT/SEC.
8. INDICATE PERCENT OF TIME OVER 125°F 25 %.
9. SHOW EXIT GAS VOLUME FLOW RATE 13.3 FT^3/SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 4.0 (GR./CU. FT. DRY GAS AT 70°F) AND 4.6 (GR./CU. FT. GAS AT STACK CONDITIONS)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 55 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK X U-UP, ___ D-DOWN, ___ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE	Yes	1964	016	99%
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

...cess Emission Source Number B-232-1 Page 21 of 61 Edition D

4 IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POINT? YES ☐ NO ☒

IF YES, DESCRIBE: ______________________________

5 ADDITIONAL COMMENTS: ______________________________

EMISSION POINT DATA

6 SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES		X	0.07	GRAINS/SCF AT 70° F	1.0	8,800	Estimated
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE	X			PPM			
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
Methyl Acetate		X	0.000042	$Lb./Ft.^3$	2.0	17,600	Analytical
Acetaldehyde		X	0.000001	$Lb./Ft.^3$	0.05	425	Analytical
p-Xylene		X	28	ppm	0.10	900	Analytical
Methane		X	145	ppm	0.50	4,600	Analytical

FOR OFFICE USE ONLY

☐ PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

☐ EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS __________ #/hr

☐ EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

☐ EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

☐ EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS __________ AND ALLOWABLE EMISSIONS __________

☐ EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS __________ AND ALLOWABLE EMISSIONS __________

☐ CONTINUOUS MONITOR (S) FOR (1) __________; (2) __________; (3) __________ RECOMMENDED.

☐ METHOD OF MEASUREMENT IS ACCEPTABLE.

☐ METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______________________________

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES __________ SULFUR DIOXIDE __________ HYDROCARBONS __________

CARBON MONOXIDE __________ FLUORIDES __________

...ING IS AUTHORIZED BY ______________________________ DATE __________

Supplement to APC-22

17. AIR POLLUTION CONTROL EQUIPMENT		18. AIR CONTAMINANT DATA FOR EMISSION POINT
POLLUTANT REMOVED	PERCENT DESIGN EFFICIENCY	MAXIMUM EMISSION RATE, LBS. PER HOUR
PARTICULATE	100%	1.0
SULPUR DIOXIDE		
OXIDES OF NITROGEN		
HYDROCARBONS	0%	2.65
CARBON MONOXIDE		
GASEOUS FLUORIDES		

19. AIR POLLUTION CONTROL EQUIPMENT CONDITIONS:

INLET GAS TEMPERATURE, °F 110°

INLET GAS FLOW RATE, CFM 13.3

EXIT GAS PRESSURE, PSI 14.7 psi

20. EXIT GAS FLOW RATE FROM STACK AT ACTUAL FLOW CONDITION, MAXIMUM CFM 13.3

Process Emission Source
Number B-232-1
Page 22 of 61
Edition D

STACK EMISSION POINT DATA - APC - 22

IL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO. _ _ - _ _ _ _ _ _

PERMIT NO. _ _ _ _ _ _ _ _ P

PROCESS EMISSION SOURCE NO. _ _ _ _

EMISSION POINT NO. _ _ _ _

REVIEWER _ _ _ _

DATE _ _ _ _ _ _ _ _

. COMPANY NAME TENNESSEE EASTMAN COMPANY

. PROCESS EMISSION SOURCE NUMBER B-232-1

. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). H

. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 71 FEET.

5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.83 FEET.

. SHOW NORMAL EXIT GAS TEMPERATURE 110 °F. 7. SHOW EXIT GAS VELOCITY 24 FT/SEC.

. INDICATE PERCENT OF TIME OVER 125°F 25 %.

. SHOW EXIT GAS VOLUME FLOW RATE 13.3 FT^3/SEC @ 70°F AND 1 ATMOS.

. SHOW MOISTURE CONTENT 4.0 (GR./CU. FT. DRY GAS AT 70°F) AND 4.6 (GR./CU. FT. GAS AT STACK CONDITIONS)

11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 65 FEET.

. DIRECTION OF GAS STREAM AS IT LEAVES STACK X U-UP, ____ D-DOWN, ____ H-HORIZONTAL

13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE	Yes	1966	016	99%
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

1-22-74 Issue.

APC - 22
REV 5/73

Process Emission Source Number_ ______ ______ ______

14 IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POINT. YES [ ] NO [X]

IF YES, DESCRIBE: ______

15. ADDITIONAL COMMENTS: ______

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES		X	0.07	GRAINS/SCF AT 70° F	1.0	8,800	Estimate
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE	X			PPM			
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
Methyl Acetate		X	0.000042	$Lb./Ft.^3$	2.0	17,600	Analytical
Acetaldehyde		X	0.000001	$Lb./Ft.^3$	0.05	425	Analytical
p-Xylene		X	28	ppm	0.10	900	Analytical
Methane		X	145	ppm	0.50	4,600	Analytical

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ______ #/hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] CONTINUOUS MONITOR (S) FOR (1) ______; (2) ______; (3) ______ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ______ SULFUR DIOXIDE ______ HYDROCARBONS ______

CARBON MONOXIDE ______ FLUORIDES ______

FILING IS AUTHORIZED BY ______ DATE ______

Supplement to APC-22

17. AIR POLLUTION CONTROL EQUIPMENT		18. AIR CONTAMINANT DATA FOR EMISSION POINT
POLLUTANT REMOVED	PERCENT DESIGN EFFICIENCY	MAXIMUM EMISSION RATE, LBS. PER HOUR
PARTICULATE	100%	1.0
SULPUR DIOXIDE		
OXIDES OF NITROGEN		
HYDROCARBONS	0%	3.0
CARBON MONOXIDE		
GASEOUS FLUORIDES		

19. AIR POLLUTION CONTROL EQUIPMENT CONDITIONS:

INLET GAS TEMPERATURE, °F 110°

INLET GAS FLOW RATE, CFM 13.3

EXIT GAS PRESSURE, PSI 14.7 psi

20. EXIT GAS FLOW RATE FROM STACK AT ACTUAL FLOW CONDITION, MAXIMUM CFM 13.3

Process Emission Source Number B-232-1
Page 24 of 61
Edition D

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO.

PERMIT NO. P

PROCESS EMISSION SOURCE NO.

EMISSION POINT NO.

REVIEWER

DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-232-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). I*
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 64 FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.25 FEET.
6. SHOW NORMAL EXIT GAS TEMPERATURE 70 °F. 7. SHOW EXIT GAS VELOCITY 11.0** FT/SEC
8. INDICATE PERCENT OF TIME OVER 125°F 0 %.
9. SHOW EXIT GAS VOLUME FLOW RATE 0.53** FT^3/SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 2.6 (GR./CU. FT. DRY GAS AT 70°F) AND 2.6 (GR./CU. FT. GAS AT STACK CONDITIONS)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 2 @ 110, 2 @ 130, 2 @ 155, 2 @ 185 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK ____ U-UP, X D-DOWN, ____ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS	Yes	1961 thru 1967	047	90% (Estimate)
CARBON MONOXIDE				
GASEOUS FLUORIDES				

*A total of 8 identical vents comprise this emission source.
**Figures represent flows for one individual vent only. Seven of the eight vents are in operation 24 hrs./dy. Therefore, to obtain total emissions, multiply these figures by 7.

Process Emission Source Number D-236-1 --8-

14 IS AN EMISSION MONITORING AND RECORD. INSTRUMENT ATTACHED TO THIS EMISSION POI YES [ ] NO [X]

IF YES, DESCRIBE: ______________________________

ADDITIONAL COMMENTS: All the air contaminant data listed below are for one vent only. To obtain total emissions for all vents, multiply by 7 which is the number of vents in operation at all times.

EMISSION POINT DATA

SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	X			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE	X			PPM			
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
Acetaldehyde		X	0.0000003	Lb./Ft.^{3}	0.0006*	5.3*	Analytical
Ethanol		X	0.0000006	Lb./Ft.^{3}	0.0012*	10.5*	Analytical
Methyl Acetate		X	0.000081	Lb./Ft.^{3}	0.15*	1,300*	Analytical
Acetic Acid		X	0.0011	Lb./Ft.^{3}	2.12*	18,600*	Analytical
n-Propyl Acetate		X	0.000003	Lb./Ft.^{3}	0.006*	53*	Analytical
p-Xylene		X	0.000006	Lb./Ft.^{3}	0.012*	105*	Analytical

*Flows are for one vent only.
Multiply by 7 operating vents to get total.

FOR OFFICE USE ONLY

- [ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS __________ #/hr
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS __________ AND ALLOWABLE EMISSIONS __________
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS __________ AND ALLOWABLE EMISSIONS __________
- [ ] CONTINUOUS MONITOR (S) FOR (1) __________; (2) __________; (3) __________ RECOMMENDED.
- [ ] METHOD OF MEASUREMENT IS ACCEPTABLE.
- [ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______________________________

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES __________ SULFUR DIOXIDE __________ HYDROCARBONS __________

CARBON MONOXIDE __________ FLUORIDES __________

FILING IS AUTHORIZED BY __________________ DATE __________

Process Emission Source Number B-232-1

Edition D

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO. ___-______

PERMIT NO. ________ P

PROCESS EMISSION SOURCE NO. ____

EMISSION POINT NO. ____

REVIEWER ____

DATE ________

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-232-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). J*
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 31 FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.25 FEET.
6. SHOW NORMAL EXIT GAS TEMPERATURE 115 °F. 7. SHOW EXIT GAS VELOCITY 7.7** FT/SEC.
8. INDICATE PERCENT OF TIME OVER 125°F 0 %.
9. SHOW EXIT GAS VOLUME FLOW RATE 0.38** FT^3/SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 2.3 (GR./CU. FT. DRY GAS AT 70°F) AND 2.7 (GR./CU. FT. GAS AT STACK CONDITIONS)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 2 @ 110, 2 @ 130, 2 @ 155, 2 @ 185 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK X U-UP, ____ D-DOWN, ____ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE	X	1961-1967	016	99%
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

*A total of 8 identical vents comprise this emission point.
**These figures represent the velocity and volume flow rates for one vent only. To obtain total, multiply by 7 since only seven of the eight vents are in operation at all times.

1-22-74 Issue.

APC - 22
REV 5/73

[redacted]ocess Emission Source Number B-232-1 Page [illegible] of

14 IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POI YES [ ] NO [X]

IF YES, DESCRIBE: ____________________

ADDITIONAL COMMENTS: ____________________

EMISSION POINT DATA

SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES		X	0.02	GRAINS/SCF AT 70° F	0.03*	260*	Analytical
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE	X			PPM			
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
Acetic Acid		X	0.00014	Lb./Ft.^{3}	0.19*	1,700*	Analytical
Acetone		X	0.000004	Lb./Ft.^{3}	0.005*	44*	Analytical
Methyl Acetate		X	0.000002	Lb./Ft.^{3}	0.003*	26*	Analytical
p-Xylene		X	0.000001	Lb./Ft.^{3}	0.0014*	13*	Analytical
n-Propyl Acetate		X	0.000001	Lb./Ft.^{3}	0.0014*	13*	Analytical

*Figures represent flows for one vent only. Multiply by 7 operating vents to obtain total emission.

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ________ #/hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ________ AND ALLOWABLE EMISSIONS ________

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ________ AND ALLOWABLE EMISSIONS ________

[ ] CONTINUOUS MONITOR (S) FOR (1) ________; (2) ________; (3) ________ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ____________________

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ________ SULFUR DIOXIDE ________ HYDROCARBONS ________

CARBON MONOXIDE ________ FLUORIDES ________

FILING IS AUTHORIZED BY ____________________ DATE ________

Supplement to APC-22

17. AIR POLLUTION CONTROL EQUIPMENT		18. AIR CONTAMINANT DATA FOR EMISSION POINT
POLLUTANT REMOVED	PERCENT DESIGN EFFICIENCY	MAXIMUM EMISSION RATE, LBS. PER HOUR
PARTICULATE	100%	0.03*
SULPUR DIOXIDE		
OXIDES OF NITROGEN		
HYDROCARBONS	0%	0.20*
CARBON MONOXIDE		
GASEOUS FLUORIDES		

19. AIR POLLUTION CONTROL EQUIPMENT CONDITIONS:

INLET GAS TEMPERATURE, °F 115°

INLET GAS FLOW RATE, CFM 0.38*

EXIT GAS PRESSURE, PSI 14.7 psi

20. EXIT GAS FLOW RATE FROM STACK AT ACTUAL FLOW CONDITION, MAXIMUM CFM 0.38*

*Figures represent flows for one vent only. Multiply by seven operating vents to obtain total emission.

Process Emission Source
Number B-232-1
Page 28 of 61
Edition D

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO.

PERMIT NO. P

PROCESS EMISSION SOURCE NO.

EMISSION POINT NO.

REVIEWER

DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY

PROCESS EMISSION SOURCE NUMBER B-232-1

EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). K

INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 40 FEET.

5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.33 FEET.

SHOW NORMAL EXIT GAS TEMPERATURE 80 °F. 7. SHOW EXIT GAS VELOCITY 1.9 FT/SEC.

INDICATE PERCENT OF TIME OVER 125°F 0 %.

SHOW EXIT GAS VOLUME FLOW RATE 0.17 FT^3 /SEC @ 70°F AND 1 ATMOS.

SHOW MOISTURE CONTENT 1.2 (GR./CU. FT. DRY GAS AT 70°F) AND 1.3 (GR./CU. FT. GAS AT STACK CONDITIONS)

11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 240 FEET.

DIRECTION OF GAS STREAM AS IT LEAVES STACK ______ U-UP, X D-DOWN, ______ H-HORIZONTAL

13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

-22-74 Issue.

APC - 22
REV 5/73

Process Emission Source Number_ ~ ~~- - --ₒ-

14 IS AN EMISSION MONITORING AND RECORDI... INSTRUMENT ATTACHED TO THIS EMISSION POI YES [ ] NO [X]

IF YES, DESCRIBE: ______

15. ADDITIONAL COMMENTS: Plans being formulated to install a vent condenser on this stack.

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	X			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE	X			PPM			
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
Acetaldehyde		X	0.0057	$Lb./Ft.^3$	3.5	30,800	Analytical
Methyl Acetate		X	0.0021	$Lb./Ft.^3$	1.30	11,400	Analytical
n-Propyl Acetate		X	0.00049	$Lb./Ft.^3$	0.30	2,600	Analytical
Acetic Acid		X	0.000035	$Lb./Ft.^3$	0.02	175	Analytical

FOR OFFICE USE ONLY

- [ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ______ #/hr
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______
- [ ] CONTINUOUS MONITOR (S) FOR (1) ______; (2) ______; (3) ______ RECOMMENDED.
- [ ] METHOD OF MEASUREMENT IS ACCEPTABLE.
- [ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ______ SULFUR DIOXIDE ______ HYDROCARBONS ______

CARBON MONOXIDE ______ FLUORIDES ______

FILING IS AUTHORIZED BY ______ DATE ______

Process Emission Source
Number B-232-1
Page 30 of 61
Edition D

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO.
PERMIT NO. P
PROCESS EMISSION SOURCE NO.
EMISSION POINT NO.
REVIEWER
DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-232-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). L
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 40 FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.33 FEET.
6. SHOW NORMAL EXIT GAS TEMPERATURE 85 °F. 7. SHOW EXIT GAS VELOCITY 0.19 FT/SEC.
8. INDICATE PERCENT OF TIME OVER 125°F 0 %.
9. SHOW EXIT GAS VOLUME FLOW RATE 0.02 FT^3/SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 0.38 (GR./CU. FT. DRY GAS AT 70°F) AND 0.42 (GR./CU. FT. GAS AT STACK CONDITIONS)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 180 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK ______ U-UP, X D-DOWN, ______ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

Process Emission Source Number B-252-1 Page __ of __

14 IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POI. YES [ ] NO [X]

IF YES, DESCRIBE: ____________________

15. ADDITIONAL COMMENTS: ____________________

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	X			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE	X			PPM			
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
Methyl Acetate		X	0.067	Lb./Ft.^{3}	4.1	35,600	Analytical
Acetaldehyde		X	0.24	Lb./Ft.^{3}	14	125,000	Analytical
n-Propyl Acetate		X	0.015	Lb./Ft.^{3}	0.9	7,900	Analytical

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ________ #/hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ________ AND ALLOWABLE EMISSIONS ________

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ________ AND ALLOWABLE EMISSIONS ________

[ ] CONTINUOUS MONITOR (S) FOR (1) ________; (2) ________; (3) ________ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ____________________

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ________ SULFUR DIOXIDE ________ HYDROCARBONS ________

CARBON MONOXIDE ________ FLUORIDES ________

FILING IS AUTHORIZED BY ____________________ DATE ________

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO. ___-______
PERMIT NO. _______ P
PROCESS EMISSION SOURCE NO. ____
EMISSION POINT NO. ____
REVIEWER ____
DATE ______

1. COMPANY NAME TENNESSEE EASTMAN COMPANY

[redacted] PROCESS EMISSION SOURCE NUMBER B-232-1

3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). M

[redacted] INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 27 FEET.

5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.25 FEET.

[redacted] SHOW NORMAL EXIT GAS TEMPERATURE 70 °F. 7. SHOW EXIT GAS VELOCITY 2.2 FT/SEC.

[redacted] INDICATE PERCENT OF TIME OVER 125°F 0 %.

9. SHOW EXIT GAS VOLUME FLOW RATE 0.2 FT^3 /SEC @ 70°F AND 1 ATMOS.

[redacted] SHOW MOISTURE CONTENT 2.9 (GR./CU. FT. DRY GAS AT 70°F) AND 3.2 (GR./CU. FT. GAS AT STACK CONDITIONS

11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 225 FEET.

[redacted] DIRECTION OF GAS STREAM AS IT LEAVES STACK X U-UP, ___ D-DOWN, ___ H-HORIZONTAL

13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

14. IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POINT? YES ☐ NO ☒

IF YES, DESCRIBE: __________

15. ADDITIONAL COMMENTS: __________

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	X			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE	X			PPM			
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
Acetic Acid		X	56,700	ppm	3.0	26,300	Vapor Pressure Analysis
Carbon Dioxide		X	28,350	ppm	1.5	13,150	Vapor Pressure Analysis

FOR OFFICE USE ONLY

☐ PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

☐ EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ________ #/hr

☐ EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

☐ EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

☐ EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ________ AND ALLOWABLE EMISSIONS ________

☐ EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ________ AND ALLOWABLE EMISSIONS ________

☐ CONTINUOUS MONITOR (S) FOR (1) ________; (2) ________; (3) ________ RECOMMENDED.

☐ METHOD OF MEASUREMENT IS ACCEPTABLE.

☐ METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN __________

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ________ SULFUR DIOXIDE ________ HYDROCARBONS ________

CARBON MONOXIDE ________ FLUORIDES ________

FILING IS AUTHORIZED BY ________ DATE ________

Process Emission Source
Number B-232-1
Page 34 of 61
Edition D

STACK EMISSION POINT DATA - APC - 22

DO NOT WRITE IN THIS SPACE

COMPANY NO.

PERMIT NO. P

PROCESS EMISSION SOURCE NO.

EMISSION POINT NO.

REVIEWER

DATE

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-232-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). N*
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 21 - FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.17 FEET.
6. SHOW NORMAL EXIT GAS TEMPERATURE 86 °F. 7. SHOW EXIT GAS VELOCITY 13.8** FT/SEC.
8. INDICATE PERCENT OF TIME OVER 125°F 0 %.
9. SHOW EXIT GAS VOLUME FLOW RATE 0.095** FT³ /SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 2.9 (GR./CU. FT. DRY GAS AT 70°F) AND 3.2 (GR./CU. FT. GAS AT STACK CONDITIONS)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 1 @ 155 & 1 @ 175 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK X U-UP, ______ D-DOWN, ______ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

*Two identical vents comprise this emission point.
**Figures represent flow for one vent only.

1-22-74 Issue.

APC - 22
REV 5/73

Process Emission Source Number B-232-1 Page __ of __

14 IS AN EMISSION MONITORING AND RECORD. INSTRUMENT ATTACHED TO THIS EMISSION POI YES [ ] NO [X]

IF YES, DESCRIBE: ______

15. ADDITIONAL COMMENTS: ______

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	X			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE	X			PPM			
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
Acetic Acid		X	90,500	ppm	4.8*	42,000*	Vapor Pressure Analysis

*Figures represent flow for one vent only.

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ______ #/hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] CONTINUOUS MONITOR (S) FOR (1) ______; (2) ______; (3) ______ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ______ SULFUR DIOXIDE ______ HYDROCARBONS ______

CARBON MONOXIDE ______ FLUORIDES ______

FILING IS AUTHORIZED BY ______ DATE ______

Process Emission Source
Number B-232-1
Page 36 of 61
Edition D

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO. ___
PERMIT NO. ___ P
PROCESS EMISSION SOURCE NO. ___
EMISSION POINT NO. ___
REVIEWER ___
DATE ___

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-232-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). 0
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 21 FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.25 FEET.
6. SHOW NORMAL EXIT GAS TEMPERATURE 94 °F. 7. SHOW EXIT GAS VELOCITY 2.6 FT/SEC.
8. INDICATE PERCENT OF TIME OVER 125°F 0 %.
9. SHOW EXIT GAS VOLUME FLOW RATE 0.04 FT^3 /SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 3.0 (GR./CU. FT. DRY GAS AT 70°F) AND 3.2 (GR./CU. FT. GAS AT STACK CONDITIONS)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 175 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK X U-UP, ___ D-DOWN, ___ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

1-22-74 Issue.

APC - 22
REV 5/73

Process Emission Source Number ____ Page ____ of ____

14. IS AN EMISSION MONITORING AND RECORD. INSTRUMENT ATTACHED TO THIS EMISSION POI YES [ ] NO [X]

IF YES, DESCRIBE: ____

15. ADDITIONAL COMMENTS: ____

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	X			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE	X			PPM			
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
p-Xylene		X	0.0057	Lb./Ft.^{3}	0.84	7,400	Vapor Pressure Analysis

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ____ #/hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ____ AND ALLOWABLE EMISSIONS ____

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ____ AND ALLOWABLE EMISSIONS ____

[ ] CONTINUOUS MONITOR (S) FOR (1) ____; (2) ____; (3) ____ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ____

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ____ SULFUR DIOXIDE ____ HYDROCARBONS ____

CARBON MONOXIDE ____ FLUORIDES ____

FILING IS AUTHORIZED BY ____ DATE ____

Process Emission Source
Number B-232-1

Edition D

STACK EMISSION POINT DATA - APC - 22

	DO NOT WRITE IN THIS SPACE
[redacted]IL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH DIVISION OF AIR POLLUTION CONTROL C2-212 CORDELL HULL BUILDING NASHVILLE, TENNESSEE 37219	COMPANY NO. ___ PERMIT NO. ___ P PROCESS EMISSION SOURCE NO. ___ EMISSION POINT NO. ___ REVIEWER ___ DATE ___

[redacted] COMPANY NAME TENNESSEE EASTMAN COMPANY

[redacted] PROCESS EMISSION SOURCE NUMBER B-232-1

[redacted] EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). P

[redacted] INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 61 FEET.

5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.17 FEET.

[redacted] SHOW NORMAL EXIT GAS TEMPERATURE 90 °F. 7. SHOW EXIT GAS VELOCITY 2.6 FT/SEC.

P INDICATE PERCENT OF TIME OVER 125°F 0 %.

[redacted] SHOW EXIT GAS VOLUME FLOW RATE 0.25 FT^3/SEC @ 70°F AND 1 ATMOS.

[redacted] SHOW MOISTURE CONTENT 21 (GR./CU. FT. DRY GAS AT 70°F) AND 23 (GR./CU. FT. GAS AT STACK CONDITIONS

11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 195 FEET.

[redacted] DIRECTION OF GAS STREAM AS IT LEAVES STACK X U-UP, ____ D-DOWN, ____ H-HORIZONTAL

13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

1-22-74 Issue.

APC - 22
REV 5/73

Process Emission Source Number D-252-1 Page ____

14 IS AN EMISSION MONITORING AND RECORD.... INSTRUMENT ATTACHED TO THIS EMISSION POI YES [ ] NO [X]

IF YES, DESCRIBE: ____

15. ADDITIONAL COMMENTS: ____

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	X			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE	X			PPM			
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
Methyl Acetate		X	130	ppm	0.023	200	Analytical
p-Xylene		X	82	ppm	0.021	185	Analytical
Methane		X	2120	ppm	0.081	710	Analytical

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ____ #/hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ____ AND ALLOWABLE EMISSIONS ____

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ____ AND ALLOWABLE EMISSIONS ____

[ ] CONTINUOUS MONITOR (S) FOR (1) ____; (2) ____; (3) ____ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ____

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ____ SULFUR DIOXIDE ____ HYDROCARBONS ____

CARBON MONOXIDE ____ FLUORIDES ____

FILING IS AUTHORIZED BY ____ DATE ____

Process Emission Source
Number B-232-1
Page 40 of 61
Edition D

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO.
PERMIT NO. P
PROCESS EMISSION SOURCE NO.
EMISSION POINT NO.
REVIEWER
DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY

PROCESS EMISSION SOURCE NUMBER B-232-1

EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). Q

INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 70 FEET.

5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.17 FEET.

SHOW NORMAL EXIT GAS TEMPERATURE 70 °F. 7. SHOW EXIT GAS VELOCITY 0.24 FT/SEC.

INDICATE PERCENT OF TIME OVER 125°F 0 %.

SHOW EXIT GAS VOLUME FLOW RATE 0.025 FT^3/SEC @ 70°F AND 1 ATMOS.

SHOW MOISTURE CONTENT 23 (GR./CU. FT. DRY GAS AT 70°F) AND 23 (GR./CU. FT. GAS AT STACK CONDITIONS

11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 90 FEET.

DIRECTION OF GAS STREAM AS IT LEAVES STACK ______ U-UP, X D-DOWN, ______ H-HORIZONTAL

13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

Process Emission Source Number D-C-J-C - ____ - - ____

14 IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POI YES [ ] NO [X]

IF YES, DESCRIBE: ____

15. ADDITIONAL COMMENTS: ____

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	X			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE	X			PPM			
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
Methyl Acetate		X	126	ppm	0.0022	19	Analytical
p-Xylene		X	77	ppm	0.002	18	Analytical
Methane		X	2918	ppm	0.011	96	Analytical

FOR OFFICE USE ONLY

- [ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ____ #/hr
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ____ AND ALLOWABLE EMISSIONS ____
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ____ AND ALLOWABLE EMISSIONS ____
- [ ] CONTINUOUS MONITOR (S) FOR (1) ____; (2) ____; (3) ____ RECOMMENDED.
- [ ] METHOD OF MEASUREMENT IS ACCEPTABLE.
- [ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ____

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ____ SULFUR DIOXIDE ____ HYDROCARBONS ____

CARBON MONOXIDE ____ FLUORIDES ____

FILING IS AUTHORIZED BY ____ DATE ____

Process Emission Source
Number B-232-1
Page 42 of 61
Edition D

STACK EMISSION POINT DATA - APC - 22

DO NOT WRITE IN THIS SPACE

COMPANY NO. ___ - ______

PERMIT NO. ________ P

PROCESS EMISSION SOURCE NO. ____

EMISSION POINT NO. ____

REVIEWER ____

DATE ________

IL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

COMPANY NAME TENNESSEE EASTMAN COMPANY

PROCESS EMISSION SOURCE NUMBER B-232-1

EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). R

INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 63 FEET.

5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.17 FEET.

SHOW NORMAL EXIT GAS TEMPERATURE 90 °F. 7. SHOW EXIT GAS VELOCITY 2.9 FT/SEC.

8. INDICATE PERCENT OF TIME OVER 125°F 0 %.

SHOW EXIT GAS VOLUME FLOW RATE 0.38 FT^3 /SEC @ 70°F AND 1 ATMOS.

SHOW MOISTURE CONTENT 21 (GR./CU. FT. DRY GAS AT 70°F) AND 23 (GR./CU. FT. GAS AT STACK CONDITI

11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 185 FEET.

DIRECTION OF GAS STREAM AS IT LEAVES STACK ____ U-UP, X D-DOWN, ____ H-HORIZONTAL

13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

1-22-74 Issue.

APC - 22
REV 5/73

Process Emission Source Number_ D-252-1 Page ___ -- ___

14 IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POI YES [ ] NO [X]

IF YES, DESCRIBE: ______

15. ADDITIONAL COMMENTS: ______

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	X			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE	X			PPM			
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
p-Xylene		X	5	ppm	0.002	17	Analytical
Methane		X	93	ppm	0.005	46	Analytical

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ______ #/hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] CONTINUOUS MONITOR (S) FOR (1) ______; (2) ______; (3) ______ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ______ SULFUR DIOXIDE ______ HYDROCARBONS ______

CARBON MONOXIDE ______ FLUORIDES ______

FILING IS AUTHORIZED BY ______ DATE ______

Process Emission Source
Number B-232-1
Page 44 of 61
Edition D

STACK EMISSION POINT DATA - APC - 22

[redacted]L TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO. ☐☐☐-☐☐☐☐☐☐

PERMIT NO. ☐☐☐☐☐☐☐ P

PROCESS EMISSION SOURCE NO. ☐☐☐

EMISSION POINT NO. ☐☐☐

REVIEWER ☐☐☐

DATE ☐☐☐☐☐☐

[redacted] COMPANY NAME TENNESSEE EASTMAN COMPANY

2. PROCESS EMISSION SOURCE NUMBER B-232-1

[redacted] EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). S

4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 63 FEET.

[redacted] SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.17 FEET.

[redacted] SHOW NORMAL EXIT GAS TEMPERATURE 75 °F. 7. SHOW EXIT GAS VELOCITY 2.9 FT/SEC.

8. INDICATE PERCENT OF TIME OVER 125°F 0 %.

[redacted] SHOW EXIT GAS VOLUME FLOW RATE 0.38 FT^3 /SEC @ 70°F AND 1 ATMOS.

10. SHOW MOISTURE CONTENT 21 (GR./CU. FT. DRY GAS AT 70°F) AND 23 (GR./CU. FT. GAS AT STACK CONDITIONS)

[redacted] SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 130 FEET.

[redacted] DIRECTION OF GAS STREAM AS IT LEAVES STACK ______ U-UP, ______ D-DOWN, X H-HORIZONTAL

13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

Process Emission Source Number B-232-1 Page ___ of ___

14 IS AN EMISSION MONITORING AND RECORDI. INSTRUMENT ATTACHED TO THIS EMISSION POI: YES [ ] NO [X]

IF YES, DESCRIBE: ______

15. ADDITIONAL COMMENTS: ______

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	X			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE	X			PPM			
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
p-Xylene		X	80	ppm	0.03	265	Analytical
Methane		X	6500	ppm	0.4	3500	Analytical

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ______ #/hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] CONTINUOUS MONITOR (S) FOR (1) ______; (2) ______; (3) ______ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ______ SULFUR DIOXIDE ______ HYDROCARBONS ______

CARBON MONOXIDE ______ FLUORIDES ______

FILING IS AUTHORIZED BY ______ DATE ______

Process Emission Source
Number B-232-1
Page 46 of 61
Edition D

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO. __ __ - __ __ __ __ __ __
PERMIT NO. __ __ __ __ __ __ __ P
PROCESS EMISSION SOURCE NO. __ __ __
EMISSION POINT NO. __ __ __
REVIEWER __ __ __
DATE __ __ __ __ __ __

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-232-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). T*
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 70 FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.75 x 0.92 FEET.
6. SHOW NORMAL EXIT GAS TEMPERATURE 100 °F. 7. SHOW EXIT GAS VELOCITY 36.7** FT/SEC.
8. INDICATE PERCENT OF TIME OVER 125°F 0 %.
9. SHOW EXIT GAS VOLUME FLOW RATE 25.3** FT³/SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 0.40 (GR./CU. FT. DRY GAS AT 70°F) AND 0.46 (GR./CU. FT. GAS AT STACK CONDITIONS)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 1 @ 150, 1 @ 90, 1 @ 185, 1 @ 130 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK X U-UP, ____ D-DOWN, ____ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

*A total of 4 identical vents comprise this emission source.
**Figures represent flows for one vent only.

1-22-74 Issue.

APC - 22
REV 5/73

14 IS AN EMISSION MONITORING AND RECORD INSTRUMENT ATTACHED TO THIS EMISSION POINT YES [ ] NO [X]

IF YES, DESCRIBE: ______

15. ADDITIONAL COMMENTS: ______

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	X			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE	X			PPM			
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
Acetic Acid		X	5	ppm	0.19*	1,700*	Estimate

*Figures represent flows for one vent only.

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ______ #/hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] CONTINUOUS MONITOR (S) FOR (1) ______; (2) ______; (3) ______ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ______ SULFUR DIOXIDE ______ HYDROCARBONS ______

CARBON MONOXIDE ______ FLUORIDES ______

FILING IS AUTHORIZED BY ______ DATE ______

Process Emission Source
Number B-232-1
Page 48 of 61
Edition D

STACK EMISSION POINT DATA - APC - 22

[redacted]IL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO. ___-______
PERMIT NO. _______ P
PROCESS EMISSION SOURCE NO. ____
EMISSION POINT NO. ___
REVIEWER ___
DATE ______

1. COMPANY NAME TENNESSEE EASTMAN COMPANY

[redacted]. PROCESS EMISSION SOURCE NUMBER B-232-1

3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). U

[redacted]. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 114 FEET.

5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 1.33 FEET.

[redacted]. SHOW NORMAL EXIT GAS TEMPERATURE 70 °F. 7. SHOW EXIT GAS VELOCITY 180 FT/SEC.

[redacted] INDICATE PERCENT OF TIME OVER 125°F 0 %.

[redacted]. SHOW EXIT GAS VOLUME FLOW RATE 250 FT^3 /SEC @ 70°F AND 1 ATMOS.

[redacted]. SHOW MOISTURE CONTENT 3.3 (GR./CU. FT. DRY GAS AT 70°F) AND 3.3 (GR./CU. FT. GAS AT STACK CONDITIONS)

11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 435 FEET.

[redacted]. DIRECTION OF GAS STREAM AS IT LEAVES STACK X U-UP, ______ D-DOWN, ______ H-HORIZONTAL

[redacted]. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS	Yes	1969	002	66%
CARBON MONOXIDE				
GASEOUS FLUORIDES				

1-22-74 Issue.

APC - 22
REV 5/73

14 IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POINT? YES [ ] NO [X]

IF YES, DESCRIBE: ______

15. ADDITIONAL COMMENTS: ______

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	X			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE		X	5000	PPM	344	3,012,000	Analytical
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
Methyl Acetate		X	0.0003	$Lb./Ft.^3$	270	2,365,000	Analytical
p-Xylene		X	151	ppm	10.4	91,000	Analytical
Acetic Acid		X	11	ppm	0.73	6,500	Analytical
Acetaldehyde		X	0.000094	$Lb./Ft.^3$	84.5	740,000	Analytical
Methane		X	171	ppm	12	105,000	Analytical

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ______ #/hr.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] CONTINUOUS MONITOR (S) FOR (1) ______; (2) ______; (3) ______ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ______ SULFUR DIOXIDE ______ HYDROCARBONS ______

CARBON MONOXIDE ______ FLUORIDES ______

FILING IS AUTHORIZED BY ______ DATE ______

Process Emission Source
Number B-232-1

Edition D

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO.
PERMIT NO. P
PROCESS EMISSION SOURCE NO.
EMISSION POINT NO.
REVIEWER
DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY

[redacted] PROCESS EMISSION SOURCE NUMBER B-232-1

3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). V

[redacted] INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 45 FEET.

5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.27 x 1.4 FEET.

[redacted] SHOW NORMAL EXIT GAS TEMPERATURE 65 °F. 7. SHOW EXIT GAS VELOCITY 0.28 FT/SEC.

[redacted] INDICATE PERCENT OF TIME OVER 125°F 0 %.

9. SHOW EXIT GAS VOLUME FLOW RATE 0.107 FT^3 /SEC @ 70°F AND 1 ATMOS.

[redacted] SHOW MOISTURE CONTENT 5.5 (GR./CU. FT. DRY GAS AT 70°F) AND 5.9 (GR./CU. FT. GAS AT STACK CONDIT...

11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 345 FEET.

[redacted] DIRECTION OF GAS STREAM AS IT LEAVES STACK ____ U-UP, X D-DOWN, ____ H-HORIZONTAL

[redacted] AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS	Yes	1969	047	50%
CARBON MONOXIDE				
GASEOUS FLUORIDES				

1-22-74 Issue.

APC - 22
REV 5/73

14 IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POINT? YES [ ] NO [X]

IF YES, DESCRIBE:

15. ADDITIONAL COMMENTS:

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	X			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE	X			PPM			
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
Acetaldehyde		X	0.0029	$Lb./Ft.^3$	1.1	10,000	Analytical
Methyl Acetate		X	0.0010	$Lb./Ft.^3$	0.4	3,500	Analytical
n-Propyl Acetate		X	0.00025	$Lb./Ft.^3$	0.094	800	Analytical
Acetic Acid		X	0.000018	$Lb./Ft.^3$	0.007	60	Analytical

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ______ #/hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] CONTINUOUS MONITOR (S) FOR (1) ______; (2) ______; (3) ______ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ______ SULFUR DIOXIDE ______ HYDROCARBONS ______

CARBON MONOXIDE ______ FLUORIDES ______

FILING IS AUTHORIZED BY ______ DATE ______

Process Emission Source
Number B-232-1
Page 52 of 61
Edition D

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO.
PERMIT NO. P
PROCESS EMISSION SOURCE NO.
EMISSION POINT NO.
REVIEWER
DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY

PROCESS EMISSION SOURCE NUMBER B-232-1

3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). W

INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 77 FEET.

5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.33 FEET.

SHOW NORMAL EXIT GAS TEMPERATURE 80 °F. 7. SHOW EXIT GAS VELOCITY 7.3 FT/SEC.

INDICATE PERCENT OF TIME OVER 125°F 0 %.

9. SHOW EXIT GAS VOLUME FLOW RATE 0.625 FT^3 /SEC @ 70°F AND 1 ATMOS.

SHOW MOISTURE CONTENT 33 (GR./CU. FT. DRY GAS AT 70°F) AND 36 (GR./CU. FT. GAS AT STACK CONDITIO

11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 395 FEET.

DIRECTION OF GAS STREAM AS IT LEAVES STACK ____ U-UP, ____ D-DOWN, X H-HORIZONTAL

AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS	Yes	1969	003	50%
CARBON MONOXIDE				
GASEOUS FLUORIDES				

14 IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POINT? YES [ ] NO [X]

IF YES, DESCRIBE: ____________________

15. ADDITIONAL COMMENTS: ____________________

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	X			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE	X			PPM			
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
Methyl Acetate		X	0.0004	$Lb./Ft.^3$	1.0	8,800	Analytical
Acetaldehyde		X	0.000024	$Lb./Ft.^3$	0.053	456	Analytical
Acetic Acid		X	0.000003	$Lb./Ft.^3$	0.007	60	Analytical
p-Xylene		X	0.00020	$Lb./Ft.^3$	0.45	4,000	Analytical

FOR OFFICE USE ONLY

- [ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ________ #/hr
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ________ AND ALLOWABLE EMISSIONS ________
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ________ AND ALLOWABLE EMISSIONS ________
- [ ] CONTINUOUS MONITOR (S) FOR (1) ________; (2) ________; (3) ________ RECOMMENDED.
- [ ] METHOD OF MEASUREMENT IS ACCEPTABLE.
- [ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ____________________

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ________ SULFUR DIOXIDE ________ HYDROCARBONS ________

CARBON MONOXIDE ________ FLUORIDES ________

FILING IS AUTHORIZED BY ________ DATE ________

Process Emission Source
Number B-232-1
Page 54 of 61
Edition D

STACK EMISSION POINT DATA - APC - 22

[redacted]
MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE
COMPANY NO.
PERMIT NO. P
PROCESS EMISSION SOURCE NO.
EMISSION POINT NO.
REVIEWER
DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY

[redacted] PROCESS EMISSION SOURCE NUMBER B-232-1

3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). X

[redacted] INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 82 FEET.

5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.83 FEET.

[redacted] SHOW NORMAL EXIT GAS TEMPERATURE 100 °F. 7. SHOW EXIT GAS VELOCITY 36.7 FT/SEC.

[redacted] INDICATE PERCENT OF TIME OVER 125°F 0 %.

9. SHOW EXIT GAS VOLUME FLOW RATE 20 FT^3 /SEC @ 70°F AND 1 ATMOS.

[redacted] SHOW MOISTURE CONTENT 0.42 (GR./CU. FT. DRY GAS AT 70°F) AND 0.46 (GR./CU. FT. GAS AT STACK CONDITIONS)

11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 395 FEET.

[redacted] DIRECTION OF GAS STREAM AS IT LEAVES STACK ____ U-UP, ____ D-DOWN, X H-HORIZONTAL

[redacted] AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

1-22-74 Issue.

APC - 22
REV 5/73

14 IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POINT? YES [ ] NO [X]

IF YES, DESCRIBE: ______

15. ADDITIONAL COMMENTS: ______

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	X			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE	X			PPM			
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
Acetic Acid		X	500	ppm	0.15*	1,300*	Estimate

*Figures based on 480 total operating hours per year.

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ______ #/hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] CONTINUOUS MONITOR (S) FOR (1) ______; (2) ______; (3) ______ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ______ SULFUR DIOXIDE ______ HYDROCARBONS ______

CARBON MONOXIDE ______ FLUORIDES ______

FILING IS AUTHORIZED BY DATE ______

STACK EMISSION POINT DATA - APC - 22

[redacted]L TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO. [ ]

PERMIT NO. [ ] P

PROCESS EMISSION SOURCE NO. [ ]

EMISSION POINT NO. [ ]

REVIEWER [ ]

DATE [ ]

1. COMPANY NAME TENNESSEE EASTMAN COMPANY

[redacted] PROCESS EMISSION SOURCE NUMBER B-232-1

3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). Y*

[redacted] INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 32 FEET.

5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.25 FEET.

[redacted] SHOW NORMAL EXIT GAS TEMPERATURE 115 °F. 7. SHOW EXIT GAS VELOCITY 7.7** FT/SEC.

8. INDICATE PERCENT OF TIME OVER 125°F 0 %.

[redacted] SHOW EXIT GAS VOLUME FLOW RATE 0.38** FT^3/SEC @ 70°F AND 1 ATMOS.

[redacted] SHOW MOISTURE CONTENT 2.31 (GR./CU. FT. DRY GAS AT 70°F) AND 2.65 (GR./CU. FT. GAS AT STACK CONDITIONS)

11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 1 @ 350 & 1 @ 380 FEET.

[redacted] DIRECTION OF GAS STREAM AS IT LEAVES STACK ____ U-UP, ____ D-DOWN, X H-HORIZONTAL

13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE	Yes	1969	016	99%
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

*Two identical vents comprise this emission point.
**Figures represent flows for one vent only.

[redacted]-22-74 Issue.

APC - 22
REV 5/73

14 IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POINT? YES [ ] NO [X]

IF YES, DESCRIBE: ______

15. ADDITIONAL COMMENTS: ______

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES		X	0.02	GRAINS/SCF AT 70° F	0.03	263	Analytical
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE	X			PPM			
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
Acetic Acid		X	0.00014	Lb./Ft.^{3}	0.19*	1,700*	Analytical
Acetone		X	0.000004	Lb./Ft.^{3}	0.005*	44*	Analytical
Methyl Acetate		X	0.000002	Lb./Ft.^{3}	0.003*	26*	Analytical
p-Xylene		X	0.000001	Lb./Ft.^{3}	0.0014*	13*	Analytical
n-Propyl Acetate		X	0.000001	Lb./Ft.^{3}	0.0014*	13*	Analytical

*Figures represent flows for one vent only.

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ______ #/hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] CONTINUOUS MONITOR (S) FOR (1) ______; (2) ______; (3) ______ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ______ SULFUR DIOXIDE ______ HYDROCARBONS ______

CARBON MONOXIDE ______ FLUORIDES ______

DATE

Supplement to APC-22

17. AIR POLLUTION CONTROL EQUIPMENT		18. AIR CONTAMINANT DATA FOR EMISSION POINT
POLLUTANT REMOVED	PERCENT DESIGN EFFICIENCY	MAXIMUM EMISSION RATE, LBS. PER HOUR
PARTICULATE	100%	0.03*
SULPUR DIOXIDE		
OXIDES OF NITROGEN		
HYDROCARBONS	0%	0.20*
CARBON MONOXIDE		
GASEOUS FLUORIDES		

19. AIR POLLUTION CONTROL EQUIPMENT CONDITIONS:

INLET GAS TEMPERATURE, ^{o}F 115°

INLET GAS FLOW RATE, CFM 0.38*

EXIT GAS PRESSURE, PSI 14.7 psi

20. EXIT GAS FLOW RATE FROM STACK AT ACTUAL FLOW CONDITION, MAXIMUM CFM 0.38*

*Figures represent flows for one vent only. Multiply by Two operating vents to obtain total emission.

Process Emission Source
Number B-232-1
Page 58 of 61
Edition D

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO.

PERMIT NO. P

PROCESS EMISSION SOURCE NO.

EMISSION POINT NO.

REVIEWER

DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-232-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). Z
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 71 FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 1.0 FEET
6. SHOW NORMAL EXIT GAS TEMPERATURE 115 °F. 7. SHOW EXIT GAS VELOCITY 16.7 FT/SEC
8. INDICATE PERCENT OF TIME OVER 125°F 0 %.
9. SHOW EXIT GAS VOLUME FLOW RATE 13.1 FT^3/SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 4.0 (GR./CU. FT. DRY GAS AT 70°F) AND 4.6 (GR./CU. FT. GAS AT STACK CONDITIONS)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 345 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK ____ U-UP, ____ D-DOWN, X H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE	Yes	1969	016	97.1%
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

1-22-74 Issue.

APC - 22
REV 5/73

P[redacted]cess Emission Source Number B-232-1 Page 59 of [illegible] [illegible]

14 IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POINT? YES ☐ NO ☒

IF YES, DESCRIBE: ______

1[redacted] ADDITIONAL COMMENTS: ______

EMISSION POINT DATA

SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES		X	.23	GRAINS/SCF AT 70° F	1.5	13,200	Estimate
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE	X			PPM			
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
Methyl Acetate		X	0.000042	Lb./Ft.^{3}	2.0	17,500	Analytical
Acetaldehyde		X	0.000001	Lb./Ft.^{3}	0.05	440	Analytical
p-Xylene		X	28	ppm	0.1	885	Analytical
Methane		X	145	ppm	0.5	4,500	Analytical

FOR OFFICE USE ONLY

☐ PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

☐ EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ______ #/hr

☐ EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

☐ EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

☐ EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

☐ EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

☐ CONTINUOUS MONITOR (S) FOR (1) ______; (2) ______; (3) ______ RECOMMENDED.

☐ METHOD OF MEASUREMENT IS ACCEPTABLE.

☐ METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ______ SULFUR DIOXIDE ______ HYDROCARBONS ______

CARBON MONOXIDE ______ FLUORIDES ______

FILING IS AUTHORIZED BY DATE ______

Supplement to APC-22

17. AIR POLLUTION CONTROL EQUIPMENT		18. AIR CONTAMINANT DATA FOR EMISSION POINT
POLLUTANT REMOVED	PERCENT DESIGN EFFICIENCY	MAXIMUM EMISSION RATE, LBS. PER HOUR
PARTICULATE	100%	3.0
SULPUR DIOXIDE		
OXIDES OF NITROGEN		
HYDROCARBONS	0%	2.65
CARBON MONOXIDE		
GASEOUS FLUORIDES		

19. AIR POLLUTION CONTROL EQUIPMENT CONDITIONS:

INLET GAS TEMPERATURE, °F 115°

INLET GAS FLOW RATE, CFM 13.1

EXIT GAS PRESSURE, PSI 14.7

20. EXIT GAS FLOW RATE FROM STACK AT ACTUAL FLOW CONDITION, MAXIMUM CFM 13.1

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO. ___
PERMIT NO. ___ P
PROCESS EMISSION SOURCE NO. ___
EMISSION POINT NO. ___
REVIEWER ___
DATE ___

1. COMPANY NAME TENNESSEE EASTMAN COMPANY

[redacted] PROCESS EMISSION SOURCE NUMBER B-232-1

3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). AA

[redacted] INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 9 FEET.

5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.25 FEET.

[redacted] SHOW NORMAL EXIT GAS TEMPERATURE 105 °F. 7. SHOW EXIT GAS VELOCITY 15.3 FT/SEC.

[redacted] INDICATE PERCENT OF TIME OVER 125°F 0 %.

[redacted] SHOW EXIT GAS VOLUME FLOW RATE 0.75 FT^3/SEC @ 70°F AND 1 ATMOS.

[redacted] SHOW MOISTURE CONTENT 20 (GR./CU. FT. DRY GAS AT 70°F) AND 23 (GR./CU. FT. GAS AT STACK CONDITIONS)

11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 370 FEET.

[redacted] DIRECTION OF GAS STREAM AS IT LEAVES STACK ___ U-UP, ___ D-DOWN, X H-HORIZONTAL

[redacted] AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

1-22-74 Issue.

APC - 22
REV 5/73

Process Emission Source Number B-232-1 Page 01 of Edition

14 IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POINT? YES [ ] NO [X]

IF YES, DESCRIBE: ______

15. ADDITIONAL COMMENTS: ______

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	X			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	X			PPM			
OXIDES OF NITROGEN	X			PPM			
CARBON MONOXIDE	X			PPM			
GASEOUS FLUORIDES	X			PPM			
OTHERS (NAME CHEMICAL)							
Acetaldehyde		X	0.000013	$Lb./Ft.^3$	0.034	300	Analytical
Methyl Acetate		X	0.000009	$Lb./Ft.^3$	0.025	220	Analytical
Acetic Acid		X	0.000003	$Lb./Ft.^3$	0.008	70	Analytical
p-Xylene		X	0.00003	$Lb./Ft.^3$	0.08	700	Analytical

FOR OFFICE USE ONLY

- [ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ______ #/hr
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______
- [ ] CONTINUOUS MONITOR (S) FOR (1) ______; (2) ______; (3) ______ RECOMMENDED.
- [ ] METHOD OF MEASUREMENT IS ACCEPTABLE.
- [ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ______ SULFUR DIOXIDE ______ HYDROCARBONS ______

CARBON MONOXIDE ______ FLUORIDES ______

FILING IS AUTHORIZED BY ______ DATE ______

POLLUTION REDUCTION DEVICES OR METHODS

000	No Control Equipment
001	Wet Scrubber - High Efficiency
002	Wet Scrubber - Medium Efficiency
003	Wet Scrubber - Low Efficiency
004	Gravity Collector - High Efficiency
005	Gravity Collector - Medium Efficiency
006	Gravity Collector - Low Efficiency
007	Centrifugal Collector - High Efficiency
008	Centrifugal Collector - Medium Efficiency
009	Centrifugal Collector - Low Efficiency
010	Electrostatic Precipitator - High Efficiency
011	Electrostatic Precipitator - Medium Efficiency
012	Electrostatic Precipitator - Low Efficiency
013	Gas Scrubber
014	Mist Eliminator - High Velocity
015	Mist Eliminator - Low Velocity
016	Fabric Filter - High Temperature
017	Fabric Filter - Medium Temperature
018	Fabric Filter - Low Temperature
019	Catalytic Afterburner
020	Catalytic Afterburner with Heat Exchanger
021	Direct Flame Afterburner
022	Direct Flame Afterburner with Heat Exchange
023	Flaring
027	Eliminate Coal Combustion
028	Eliminate Coal and Residual Fuel Oil Combustion
029	Change all Fuel Use to Natural Gas
039	Catalytic Oxidation - Flue Gas Desulfurization
040	Alkalized Alumina
041	Dry Limestone Injection
042	Wet Limestone Injection
043	Sulfuric Acid Plant - Contact Process
044	Sulfuric Acid Plant - Double Contact Process
045	Sulfur Plant
047	Vapor Recovery System (including condensers, hooding, and other enclosures)
048	Activated Carbon Adsorption
049	Liquid Filtration System
100	Wet Supperssion System

If the system has several pieces of connected equipment, indicate the sequence by, for example, 0008/011; 80%/90%

Process Emission Source
Number B-237-1
Page 1a of 13
Edition 5

PERMIT APPLICATION - APC 20

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
CORDELL HULL BUILDING C2-212
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE	
COMPANY NO.	
AQCR	AGENCY CODE
NEDS COUNTY CODE	
PERMIT NO.	
PROCESS EMISSION SOURCE NO.	
EMISSION POINT NO.	
CITY CODE	UTM ZONE
EW COORD.	
NS COORD.	
SIC CODE	
REVIEWER	
DATE	

1. PERMIT TO BE ISSUED TO:

TENNESSEE EASTMAN COMPANY

2. MAILING ADDRESS

P. O. Box 511
Kingsport, Tennessee 37662

3. ADDRESS AT WHICH SOURCE IS TO BE OPERATED:

Same as above.

4. TYPE OF ORGANIZATION: CORPORATION [X]

EMISSION SOURCE NUMBER B-237-1

6. STANDARD INDUSTRIAL CLASSIFICATION OF CO. 2 8 1 5

7. BRIEF DESCRIPTION OF EMISSION SOURCE FOR WHICH PERMIT IS DESIRED: Dimethyl terephthalate plant No. 1

8. LATITUDE AND LONGITUDE OF AIR CONTAMINANT SOURCE 36° 31' 24"N 82° 32' 15"W

9. COST OF MODIFICATION $ ________ COST OF AIR POLLUTION CONTROL EQUIPMENT $ ________

10. IF THIS AIR CONTAMINANT SOURCE HAS A PREVIOUS WRITTEN PERMIT GIVE NAME OF CORPORATION, COMPANY OR INDIVIDUAL OWNER THAT OPERATED THIS SOURCE AND STATE PREVIOUS TENNESSEE DIVISION OF AIR POLLUTION CONTROL PERMIT NUMBER, IF KNOWN.

NAME TENNESSEE EASTMAN COMPANY PERMIT NUMBER ________

11. PRESENT STATUS OF AIR CONTAMINANT SOURCE (CHECK AND COMPLETE APPLICABLE ITEMS)

[ ] PERMIT TO CONSTRUCT REQUESTED - Est. Starting Date ________ Est. Completion Date ________

[X] CONSTRUCTION COMPLETED - Date Dec. 1971 [ ] PERMIT TO OPERATE REQUESTED

[ ] TRANSFER OF LOCATION - Est. Date ________ [ ] AIR CONTAMINANT SOURCE HAS NOT BEEN ALTERED

12. J C Edwards — SIGNATURE OF RESPONSIBLE MEMBER OF FIRM

OCT 14 1974 — DATE OF APPLICATION

13. TYPE OR PRINT NAME AND OFFICIAL TITLE OF PERSON SIGNING THIS APPLICATION

NAME J. C. Edwards

TITLE Manager, Clean Environment Program

PHONE 246-2111, Extension 2444

1-22-74 Issue.

APC - 20 REV 4/73

PROCESS EMISSION SOURCE COVER SHEET - APC 21

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
CORDELL HULL BUILDING C2-212
NASHVILLE, TENNESSEE 37217

DO NOT WRITE IN THIS SPACE

COMPANY NO.

PERMIT NO.

PROCESS EMISSION SOURCE NO.

EMISSION POINT NO.

REVIEWER

DATE

COMPANY NAME TENNESSEE EASTMAN COMPANY

2. PROCESS EMISSION SOURCE NUMBER B-237-1 3. SIC CODE 2815

DID CONSTRUCTION OF THIS PROCESS BEGIN ON OR BEFORE AUGUST 9, 1969? [X] YES [ ] NO ON OR BEFORE APRIL 3, 1972? YES [X] NO [ ]

GIVE A BRIEF DESCRIPTION OF THE PROCESS ALONG WITH A FLOW DIAGRAM. OPERATION CENTERS, STORAGE POINTS, MATERIAL INPUTS, MATERIAL OUTPUTS AND EMISSION POINTS SHOULD BE NOTED IN POUNDS PER OPERATING HOUR.

Terephthalic acid and methanol are reacted to produce dimethyl terephthalate. The remainder of the process is distillation to remove impurities.

NOTE: ATTACH FLOW DIAGRAM FOR PROCESS EMISSION SOURCE CLAIMED ON SEPARATE SHEET.

TYPE OF PROCESS: CONTINUOUS [X] BATCH [ ] COMBINED [ ]

7. OPERATIONAL SCHEDULE OF PROCESS EMISSION SOURCE:

A. HOURS PER DAY 24
B. DAYS PER WEEK 7
C. WEEKS PER YEAR 50

D. % ANNUAL THRUPUT

DEC-FEB	MARCH-MAY	JUNE-AUGUST	SEPT-NOV
25	25	25	25

LIST MATERIAL INPUTS TO PROCESS EMISSION SOURCE:

NAME OF INPUT	LBS/OPERATING HOUR DESIGN CAPACITY	LBS/OPERATING HOUR ACTUAL LOADING	FLOW DIAGRAM REFERENCE
A. Methanol	6100	6100	1
B. Terephthalic Acid	15,430	15,430	2
C. Xylene	28	28	3
D.			
E.			
F.			
G.			
TOTAL LBS/OPERATING HOUR INPUT TO PROCESS EMISSION SOURCE	21,600	21,600	

(TOTAL ROUNDED TO THREE SIGNIFICANT FIGURES)

APC - 21
REV 5/73

9. LIST MATERIAL OUTPUTS FROM THIS PROCESS EMISSION SOURCE:

NAME OF OUTPUT	LBS/OPERATING HOUR		FLOW DIAGRAM REFERENCE
	DESIGN CAPACITY	ACTUAL LOADING	
A. Dimethyl Terephthalate	17,800	17,800	4
B. Water	3010	3010	5
C. Sludge	230	230	6
D.			
E.			
F.			
G.			
TOTAL LBS/OPERATING HOUR OUTPUT FROM PROCESS EMISSION SOURCE	21,000	21,000	(TOTAL ROUNDED TO THREE SIGNIFICANT FIGURES)

10. LIST AIR POLLUTION EMISSION POINTS FOR THIS PROCESS EMISSION SOURCE. ATTACH A SEPARATE "EMISSION POINT DATA" SHEET, APC-22, FOR EACH POINT.

EMISSION POINT NO. OR CODE	LBS PARTICULATE/OPERATING HOUR	FLOW DIAGRAM REFERENCE
A.		
B. B	.015	B
C. D	0	D
D.		
E.		
F.		

TOTAL LBS. OF PARTICULATE EMITTED FROM PROCESS EMISSION SOURCE PER OPERATING HOUR .015 (TOTAL ROUNDED TO TWO SIGNIFICANT FIGURES)

NOTE: ATTACH ADDITIONAL SHEETS AS REQUIRED FOR ITEMS 8, 9, AND 10.

11. J. C. Edwards/DHL — SIGNATURE OF RESPONSIBLE MEMBER OF FIRM   June 27, 1974 — DATE OF APPLICATION

12. TYPE OR PRINT NAME AND OFFICIAL TITLE OF PERSON SIGNING THIS FORM

NAME J. C. Edwards

TITLE Manager, Clean Environment Program

DATE JUN 27 1974   PHONE 246-2111, Ext. 2444

FOR OFFICIAL USE ONLY

- [ ] PROCESS EMISSION SOURCE CLAIMED IS ACCEPTABLE.
- [ ] PROCESS EMISSION SOURCE CLAIMED IS NOT ACCEPTABLE.
- [ ] RECOMMENDED MAKE UP OF PROCESS EMISSION SOURCE ATTACHED ON SEPARATE SHEET.
- [ ] PROCESS EMISSION SOURCE IS NOT IN COMPLIANCE WITH APPLICABLE REGULATIONS.
- [ ] PROCESS WEIGHT TABLE APPLIES TO THIS PROCESS EMISSION SOURCE.
- [ ] DIFFUSION EQUATION APPLIES TO THIS PROCESS EMISSION SOURCE. [ ] TABLE I [ ] TABLE II

ALLOWABLE EMISSIONS ________ LBS/HOUR   ACTUAL EMISSIONS ________ TONS/YEAR

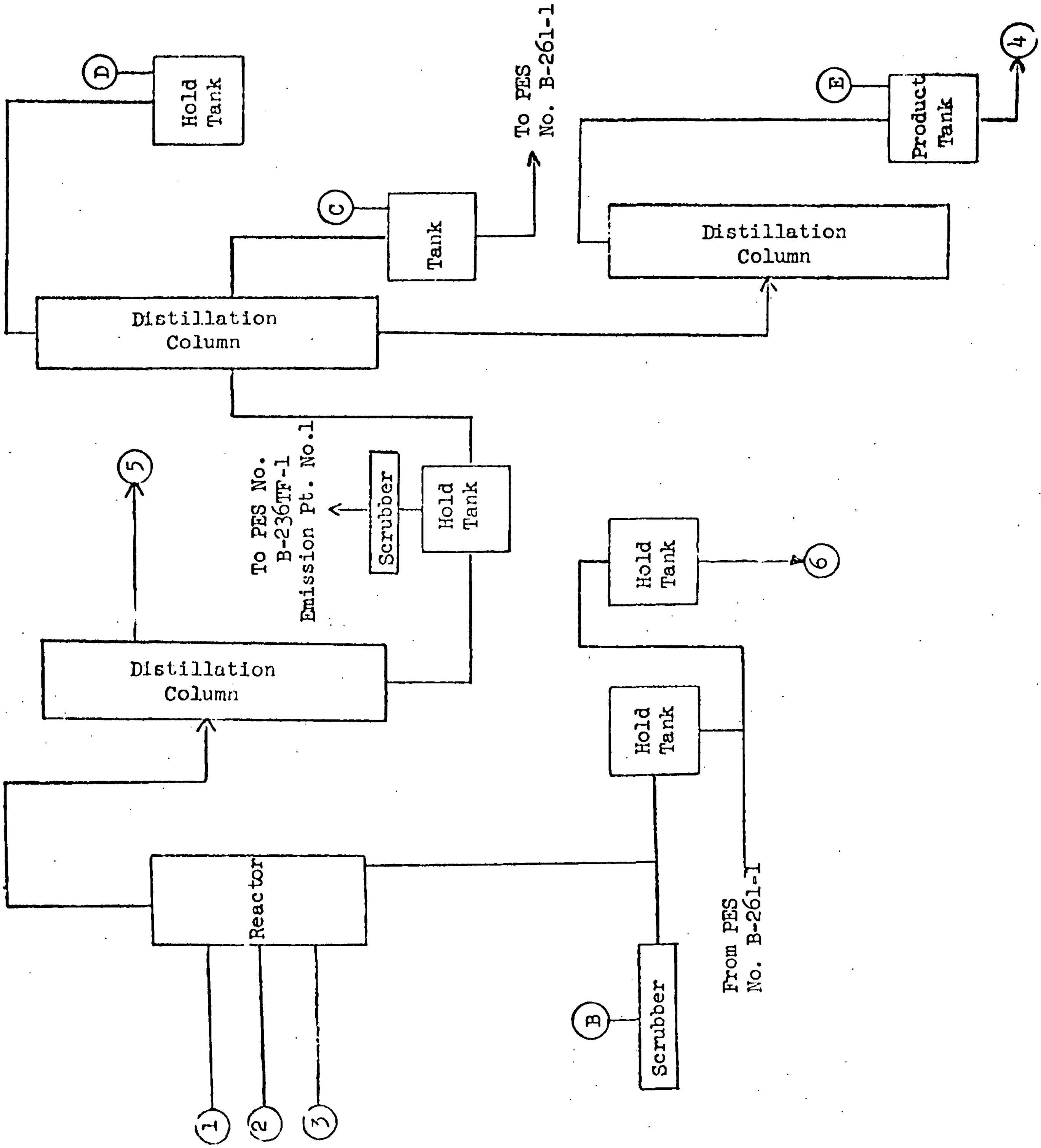
FILING IS AUTHORIZED BY ________ DATE ________

APC - 21 REV. 5/73

Flow Diagram

For Item 5 of APC-21

Process Emission Source
Number B-237-1
Page 3 of 13
Edition B



1-22-74 Issue.

Attach to APC-21

Process Emission Source
Number B-237-1
Page 3a of 13
Edition B

Supplement to APC-21 Form

13. NORMAL OPERATING SCHEDULE: 8400 HOURS PER YEAR.

14. DATES OF ANY SCHEDULED ANNUALLY OCCURRING SHUTDOWN OF OPERATIONS July 1975 - 2 wee

15. DATE (YEAR) INSTALLATION (OR PROCESS) WENT ON LINE 1971

16. ESTIMATED PERCENT INCREASE OR DECREASE IN PROCESS RATES ON A TOTAL PROCESS BASIS FOR THE 5 YEARS AFTER THE CALENDAR YEAR FOR WHICH THIS REPORT IS COMPLETED 0%

STACK EMISSION POINT DATA - APC - 22

MA[redacted] TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH DIVISION OF AIR POLLUTION CONTROL C2-212 CORDELL HULL BUILDING NASHVILLE, TENNESSEE 37219	DO NOT WRITE IN THIS SPACE COMPANY NO. PERMIT NO. P PROCESS EMISSION SOURCE NO. EMISSION POINT NO. REVIEWER DATE

1[redacted] COMPANY NAME TENNESSEE EASTMAN COMPANY

2. PROCESS EMISSION SOURCE NUMBER B-237-1

3[redacted] EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). B

4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 8 FEET.

5[redacted] SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP .75 FEET.

6[redacted] SHOW NORMAL EXIT GAS TEMPERATURE 100 °F. 7. SHOW EXIT GAS VELOCITY 7.6 FT/SEC.

8. INDICATE PERCENT OF TIME OVER 125°F 25 %.

9[redacted] SHOW EXIT GAS VOLUME FLOW RATE 33 FT^3 /SEC @ 70°F AND 1 ATMOS.

0. SHOW MOISTURE CONTENT 0 (GR./CU. FT. DRY GAS AT 70°F) AND 0 (GR./CU. FT. GAS AT STACK CONDITIONS)

1[redacted] SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 630 FEET.

2[redacted] DIRECTION OF GAS STREAM AS IT LEAVES STACK U U-UP, ______ D-DOWN, ______ H-HORIZONTAL

3. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE	yes	1969	001	99%
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

1-22-74 Issue.

APC - 22
REV 5/73

Process Emission Source Number B-237-1 Page 5 of 13 Edition

14 IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POINT. YES [ ] NO [X]

IF YES, DESCRIBE: ____

15. ADDITIONAL COMMENTS: ____

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES		✓	.001	GRAINS/SCF AT 70° F	.015	146	Calculation
SULFUR DIOXIDE	✓			PPM			
OXIDES OF NITROGEN	✓			PPM			
CARBON MONOXIDE	✓			PPM			
GASEOUS FLUORIDES	✓			PPM			
OTHERS (NAME CHEMICAL)							

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ____ #/hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ____ AND ALLOWABLE EMISSIONS ____

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ____ AND ALLOWABLE EMISSIONS ____

[ ] CONTINUOUS MONITOR (S) FOR (1) ____; (2) ____; (3) ____ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ____

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ____ SULFUR DIOXIDE ____ HYDROCARBONS ____

CARBON MONOXIDE ____ FLUORIDES ____

FILING IS AUTHORIZED BY ____ DATE ____

Supplement to APC-22

17. AIR POLLUTION CONTROL EQUIPMENT		18. AIR CONTAMINANT DATA FOR EMISSION POINT
POLLUTANT REMOVED	PERCENT DESIGN EFFICIENCY	MAXIMUM EMISSION RATE, LBS. PER HOUR
PARTICULATE	99.0	.13
SULPUR DIOXIDE		
OXIDES OF NITROGEN		
HYDROCARBONS		
CARBON MONOXIDE		
GASEOUS FLUORIDES		

19. AIR POLLUTION CONTROL EQUIPMENT CONDITIONS:

INLET GAS TEMPERATURE, ^{o}F 120

INLET GAS FLOW RATE, CFM 2160

EXIT GAS PRESSURE, PSI .11

20. EXIT GAS FLOW RATE FROM STACK AT ACTUAL FLOW CONDITION, MAXIMUM CFM 2090

Process Emission Source
Number B-237-1
Page 6 of 13
Edition B

Storage Tank Summary

TENNESSEE DEPARTMENT OF PUBLIC HEALTH
MAIL TO: DIVISION OF AIR POLLUTION CONTROL
CORDELL HULL BUILDING C2-212
NASHVILLE, TENNESSEE 37219

ONE COPY OF THIS FORM MUST BE FILLED OUT COMPLETELY FOR EACH TANK AND MUST ACCOMPANY THE APPLICATION FOR PERMIT, APC-20.

1. TENNESSEE EASTMAN COMPANY

2. TANK LOCATION: B-237, 1st floor — LATITUDE 36° 31' 23"N — LONGITUDE 82° 32' 15"W

3. TANK IDENTIFICATION (NUMBER OR NAME): QB-52 (Vent C)

4. TANK CAPACITY: BARRELS ____ GALLONS 1325

5. TANK DIMENSIONS: DIAMETER 5 ft. HEIGHT 8 ft. LENGTH ____ WIDTH ____

6. TANK SHAPE: CYLINDRICAL [X] SPHERICAL [ ] OTHER SHAPE [ ] DESCRIBE ____

7. TANK MATERIALS OF CONSTRUCTION: STEEL [X] WOOD [ ] OTHER [ ] SPECIFY ____

8. TANK PAINT: CHALKING WHITE [ ] LIGHT GREY OR BLUE [ ] ALUMINUM [X] DARK COLOR OR NO PAINT [ ]

9. TANK CONDITION: GOOD [X] FAIR [ ] POOR [ ]

10. TANK STATUS: NEW CONSTRUCTION [ ] ALTERATION [ ] Not Applicable

11. TYPE OF TANK: FIXED ROOF [X] PRESSURE [ ] INTERNALLY HEATED [ ]
UNDERGROUND [ ] FLOATING ROOF [ ] OPEN TOP [ ] INSULATED [X] OTHER [ ]
(CHECK ALL APPLICABLE)

12. IF TANK IS TO HAVE FLOATING ROOF, SUPPLY THE FOLLOWING INFORMATION:
TYPE OF ROOF: DOUBLE DECK [ ] PONTOON [ ] OTHER [ ] DESCRIBE ____
TYPE OF SEAL: SINGLE [ ] DOUBLE [ ] OTHER [ ] DESCRIBE ____
TYPE OF SHELL CONSTRUCTION: RIVETED [ ] WELDED [ ] OTHER [ ] DESCRIBE ____

13. IF TANK IS TO HAVE ANY OTHER TYPE OF ROOF OR COVER (OR NONE AT ALL), DESCRIBE:

14. VENT VALVE DATA: INDICATE TYPE, NUMBER, SETTINGS AND VAPOR DISPOSAL:

	NUMBER	PRESSURE SETTING	VACUUM SETTING	DISCHARGING TO: (CHECK) ATMOSPHERE	VAPOR CONTROL	FLARE
COMBINATION	PSV-QB-059	3.5" W.C.	1/2 oz.	✓		
PRESSURE						
VACUUM						
[illegible]						

15. NAME ALL LIQUIDS, VAPORS, GASES OR MIXTURES OF SUCH MATERIALS TO BE STORED IN THIS TANK:
AVERAGE MOLECULAR WEIGHT 162.2
COMPOSITION (%) 35% Dimethyl terephthalate
50% Methyl paratoluate
13.5% Methyl benzoate
1.5% Methyl paraformyl benzoate
DENSITY: 8.5 LBS/GAL.

16. TEMPERATURES AT WHICH THE ABOVE LISTED MATERIALS ARE TO BE STORED IN THIS TANK:
(NORMAL AVERAGE DAILY MINIMUM AND MAXIMUM TEMPERATURES)

MINIMUM TEMPERATURE 290 °F A-138 MAXIMUM TEMPERATURE 310 °F

APC-2

Process Emission Source
Number B-237-1
Page 7 of 13
Edition B

17. SPECIAL VAPOR CONTROLLING ICES:

[X] CONSERVATION VENT OR RELIEF VALVE.

[ ] CONDENSER,
AVERAGE EXIT GAS TEMPERATURE FROM CONDENSER, ________ °F.

[ ] SCRUBBER,
AVERAGE ORGANIC CONCENTRATION IN OUTLET SCRUBBER GAS, ________ LBS/FT³.

[ ] OTHER THAN ABOVE,
EXPLAIN ________.

18. OPERATIONAL DATA:

[X] CONTINUOUS FILLING AND DISCHARGING,
AVERAGE DAILY LEVEL FLUCTUATION, 14 INCHES (FOR VERTICAL CYLINDRICAL TANKS).
AVERAGE DAILY VOLUME FLUCTUATION, ________ CU. FT. (FOR HORIZONTAL CYLINDRICAL AND SPHERICAL TANKS).

[ ] BATCH FILLING,
AVERAGE NUMBER OF GALLONS PER FILLING, ________.
AVERAGE NUMBER OF FILLS PER YEAR, ________.

19. OPERATIONAL DATA:
MAXIMUM FILLING RATE: ________ BARRELS PER HOUR (OR) 480 GAL. PER HOUR
AVERAGE OUTAGE: (AVER. DISTANCE FROM TOP OF TANK TO LIQUID SURFACE) 6 FT.
AVERAGE THROUGHPUT: ________ BARRELS PER HOUR (OR) ________ GAL. PER DAY.
TANK TURNOVERS PER YEAR: ________

20. IF MATERIAL STORED IS A PETROLEUM PRODUCT OR ANY OTHER TYPE OF ORGANIC MATERIAL, SUPPLY THE FOLLOWING INFORMATION FOR EACH MATERIAL: ATTACH ADDITIONAL SHEETS, IF NECESSARY.
VAPOR PRESSURE: See Attachment LBS. REID (OR) ________ LBS. PER SQ. IN.
ABSOLUTE AT ________ °F INITIAL BOILING POINT: ________ °F

21. IF MATERIAL STORED IS A SOLUTION, SUPPLY THE FOLLOWING INFORMATION:
NAME OF SOLVENT: ________ NAME OF MATERIAL DISSOLVED: ________
CONCENTRATION OF MATERIAL DISSOLVED: ________ % BY WEIGHT (OR) ________ % BY VOLUME (OR) ________ LBS/GALLON

22. IF MATERIAL STORED IS A GAS OR A LIQUIFIED GAS WHICH IS NOT A PETROLEUM PRODUCT, SUPPLY THE FOLLOWING INFORMATION:
IDENTIFY THE MATERIAL: ________
PRESSURE AT WHICH MATERIAL IS STORED: ________ LBS. PER SQ. IN. GAGE AT ________ °F

23. ESTIMATED VAPOR LOSS .10 TONS/YEAR

THE ABOVE INFORMATION IS SUBMITTED TO DESCRIBE THE USE OF THE TANK FOR WHICH APPLICATION FOR PERMIT IS BEING MADE ON THE ACCOMPANYING FORM

SIGNATURE OF RESPONSIBLE MEMBER OF FIRM: J. C. Edwards /gk7 June 27, 1974

TYPE OR PRINT NAME AND OFFICIAL TITLE OF PERSON SIGNING THIS DATA FORM.
NAME: J. C. Edwards PHONE: 246-2111, Ext. 2444
TITLE. Manager, Clean Environment Program

DO NOT WRITE BELOW THIS LINE

COMMENTS:

REVIEWER

DATE

DO NOT WRITE IN THIS SPACE
AIR QUALITY REGION
AGENCY CODE
PERMIT NO.
REGISTRATION NO.
PROCESS EMISSION SOURCE NO.
EMISSION POINT NO. –
UTM ZONE (IF USED)
EW COORD.
NS COORD.
SIC CODE

AVERAGE DAILY LOSS TO ATMOSPHERE

ATTACHMENT NO. 1

No. 20

Material	V.P. @ 300°F (PSIA)	Boiling Point (°F)
Dimethyl terephthalate	14.72	545
Methyl paratoluate	14.82	420
Methyl benzoate	14.96	388
Methyl paraformyl benzoate	14.72	500

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO.
PERMIT NO. P
PROCESS EMISSION SOURCE NO.
EMISSION POINT NO.
REVIEWER
DATE

COMPANY NAME TENNESSEE EASTMAN COMPANY

PROCESS EMISSION SOURCE NUMBER B-237-1

EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). D

INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 20 FEET.

SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP .33 FEET.

SHOW NORMAL EXIT GAS TEMPERATURE 153 °F. 7. SHOW EXIT GAS VELOCITY .0067 FT/SEC.

INDICATE PERCENT OF TIME OVER 125°F 100 %.

9. SHOW EXIT GAS VOLUME FLOW RATE .00057 FT^3/SEC @ 70°F AND 1 ATMOS.

10. SHOW MOISTURE CONTENT 0 (GR./CU. FT. DRY GAS AT 70°F) AND 0 (GR./CU. FT. GAS AT STACK CONDITIONS)

11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 565 FEET.

12. DIRECTION OF GAS STREAM AS IT LEAVES STACK ____ U-UP, D D-DOWN, ____ H-HORIZONTAL

13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

1-22-74 Issue.

APC - 22
REV 5/73

4 IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POINT YES [ ] NO [X]

IF YES, DESCRIBE: ____________________

15. ADDITIONAL COMMENTS: ____________________

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	✓			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	✓			PPM			
OXIDES OF NITROGEN	✓			PPM			
CARBON MONOXIDE	✓			PPM			
GASEOUS FLUORIDES	✓			PPM			
OTHERS (NAME CHEMICAL)							
Methyl Paratoluate		✓	0.0005	lbs/ft^3	.001	12	Calculation
Methyl Benzoate		✓	0.001	lbs/ft^3	.002	16	Calculation
Xylene		✓	0.0008	lbs/ft^3	.0016	14	Calculation
Nitrogen		✓	0.08	lbs/ft^3	.174	1523	Calculation

FOR OFFICE USE ONLY

- [ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ________
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ________ AND ALLOWABLE EMISSIONS ________
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ________ AND ALLOWABLE EMISSIONS ________
- [ ] CONTINUOUS MONITOR (S) FOR (1) ________; (2) ________; (3) ________ RECOMMENDED.
- [ ] METHOD OF MEASUREMENT IS ACCEPTABLE.
- [ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ____________________

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ________ SULFUR DIOXIDE ________ HYDROCARBONS ________

CARBON MONOXIDE ________ FLUORIDES ________

Process Emission Source
Number B-237-1

Edition B

Storage Tank Summary

TENNESSEE DEPARTMENT OF PUBLIC HEALTH
IL TO: DIVISION OF AIR POLLUTION CONTROL
CORDELL HULL BUILDING C2-212
NASHVILLE, TENNESSEE 37219

ONE COPY OF THIS FORM MUST BE FILLED OUT COMPLETELY FOR EACH TANK AND MUST ACCOMPANY THE APPLICATION FOR PERMIT, APC-20.

1. TENNESSEE EASTMAN COMPANY

2. TANK LOCATION: B-237, 1st floor — LATITUDE 36° 31' 23" N — LONGITUDE 82° 32' 16" W

3. TANK IDENTIFICATION (NUMBER OR NAME): QC-51 (Vent E)

4. TANK CAPACITY: BARRELS ____ GALLONS 17,812

5. TANK DIMENSIONS: DIAMETER 14 ft. HEIGHT 14 ft. LENGTH ____ WIDTH ____

6. TANK SHAPE: CYLINDRICAL [X] SPHERICAL [ ] OTHER SHAPE [ ] DESCRIBE ____

7. TANK MATERIALS OF CONSTRUCTION: STEEL [X] WOOD [ ] OTHER [ ] SPECIFY ____

8. TANK PAINT: CHALKING WHITE [ ] LIGHT GREY OR BLUE [ ] ALUMINUM [X] DARK COLOR OR NO PAINT [ ]

9. TANK CONDITION: GOOD [X] FAIR [ ] POOR [ ]

10. TANK STATUS: NEW CONSTRUCTION [ ] ALTERATION [ ] Not Applicable

11. TYPE OF TANK: FIXED ROOF [X] PRESSURE [ ] INTERNALLY HEATED [ ]
UNDERGROUND [ ] FLOATING ROOF [ ] OPEN TOP [ ] INSULATED [X] OTHER [ ]
(CHECK ALL APPLICABLE)

12. IF TANK IS TO HAVE FLOATING ROOF, SUPPLY THE FOLLOWING INFORMATION:
TYPE OF ROOF: DOUBLE DECK [ ] PONTOON [ ] OTHER [ ] DESCRIBE ____
TYPE OF SEAL: SINGLE [ ] DOUBLE [ ] OTHER [ ] DESCRIBE ____
TYPE OF SHELL CONSTRUCTION: RIVETED [ ] WELDED [ ] OTHER [ ] DESCRIBE ____

13. IF TANK IS TO HAVE ANY OTHER TYPE OF ROOF OR COVER (OR NONE AT ALL), DESCRIBE:

14. VENT VALVE DATA: INDICATE TYPE, NUMBER, SETTINGS AND VAPOR DISPOSAL:

	NUMBER	PRESSURE SETTING	VACUUM SETTING	DISCHARGING TO: (CHECK) ATMOSPHERE	VAPOR CONTROL	FLARE
COMBINATION	PSV-QC-072	3" W.C.	1/2 oz.	✓		
PRESSURE						
VACUUM						
NONE						

15. NAME ALL LIQUIDS, VAPORS, GASES OR MIXTURES OF SUCH MATERIALS TO BE STORED IN THIS TANK:
AVERAGE MOLECULAR WEIGHT 194 — COMPOSITION (%) 99.95% Dimethyl terephthalate, .05% Methanol
DENSITY: 8.5 LBS/GAL.

16. TEMPERATURES AT WHICH THE ABOVE LISTED MATERIALS ARE TO BE STORED IN THIS TANK:
(NORMAL AVERAGE DAILY MINIMUM AND MAXIMUM TEMPERATURES)
MINIMUM TEMPERATURE 310 °F A-143 MAXIMUM TEMPERATURE 329 °F

Process Emission Sour
Number B-237-1
Page 12 of 13
Edition B

17. SPECIAL VAPOR CONTROLLING DEVICES:

[X] CONSERVATION VENT OR RELIEF VALVE.

[ ] CONDENSER,
AVERAGE EXIT GAS TEMPERATURE FROM CONDENSER, ________ °F.

[ ] SCRUBBER,
AVERAGE ORGANIC CONCENTRATION IN OUTLET SCRUBBER GAS, ________ LBS/FT³.

[ ] OTHER THAN ABOVE,
EXPLAIN ________________________________.

18. OPERATIONAL DATA:

[X] CONTINUOUS FILLING AND DISCHARGING,
AVERAGE DAILY LEVEL FLUCTUATION, 0 INCHES (FOR VERTICAL CYLINDRICAL TANKS).
AVERAGE DAILY VOLUME FLUCTUATION, ________ CU. FT. (FOR HORIZONTAL CYLINDRICAL AND SPHERICAL TANKS).

[ ] BATCH FILLING,
AVERAGE NUMBER OF GALLONS PER FILLING, ________.
AVERAGE NUMBER OF FILLS PER YEAR, ________.

19. OPERATIONAL DATA:
MAXIMUM FILLING RATE: ________ BARRELS PER HOUR (OR) 8820 GAL. PER HOUR
AVERAGE OUTAGE: (AVER. DISTANCE FROM TOP OF TANK TO LIQUID SURFACE) 14 FT.
AVERAGE THROUGHPUT: ________ BARRELS PER HOUR (OR) ________ GAL. PER DAY
TANK TURNOVERS PER YEAR: ________

20. IF MATERIAL STORED IS A PETROLEUM PRODUCT OR ANY OTHER TYPE OF ORGANIC MATERIAL, SUPPLY THE FOLLOWING INFORMATION FOR EACH MATERIAL: ATTACH ADDITIONAL SHEETS, IF NECESSARY.
SEE ATTACHMENT
VAPOR ~~PRESSURE~~ ________ LBS. REID (OR) Dimethyl Terephthalate 15.08 Methanol 29.4 LBS. PER SQ. IN.
ABSOLUTE AT 320 °F INITIAL BOILING POINT: DMT 545 Methanol 144 °F

21. IF MATERIAL STORED IS A SOLUTION, SUPPLY THE FOLLOWING INFORMATION:
NAME OF SOLVENT: ________ NAME OF MATERIAL DISSOLVED: ________
CONCENTRATION OF MATERIAL DISSOLVED: ________ % BY WEIGHT (OR) ________ % BY VOLUME (OR) ________ LBS/GALLON

22. IF MATERIAL STORED IS A GAS OR A LIQUIFIED GAS WHICH IS NOT A PETROLEUM PRODUCT, SUPPLY THE FOLLOWING INFORMATION:
IDENTIFY THE MATERIAL: ________
PRESSURE AT WHICH MATERIAL IS STORED: ________ LBS. PER SQ. IN. GAGE AT ________ °F

23. ESTIMATED VAPOR LOSS 36 TONS/YEAR

THE ABOVE INFORMATION IS SUBMITTED TO DESCRIBE THE USE OF THE TANK FOR WHICH APPLICATION FOR PERMIT IS BEING MADE ON THE ACCOMPANYING FORM

SIGNATURE OF RESPONSIBLE MEMBER OF FIRM: J. C. EDWARDS JHL June 27, 1974

TYPE OR PRINT NAME AND OFFICIAL TITLE OF PERSON SIGNING THIS DATA FORM.
NAME: J. C. Edwards PHONE: 246-2111, Ext. 2444
TITLE. Manager, Clean Environment Program

DO NOT WRITE BELOW THIS LINE

COMMENTS:

REVIEWER ________

DATE ________

DO NOT WRITE IN THIS SPACE
AIR QUALITY REGION
AGENCY CODE
PERMIT NO.
REGISTRATION NO.
PROCESS EMISSION SOURCE NO.
EMISSION POINT NO. -
UTM ZONE (IF USED)
EW COORD.
NS COORD.
SIC CODE

Process Emission Source
Number B-237A-1
Page 1 of 18
Edition B

PERMIT APPLICATION - APC 20

MAIL TO:

TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
CORDELL HULL BUILDING C2-212
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE	
COMPANY NO.	
AQCR	AGENCY CODE
NEDS COUNTY CODE	
PERMIT NO.	
PROCESS EMISSION SOURCE NO.	
EMISSION POINT NO.	-
CITY CODE	UTM ZONE
EW COORD.	
NS COORD.	
SIC CODE	
REVIEWER	
DATE	

1. PERMIT TO BE ISSUED TO:

TENNESSEE EASTMAN COMPANY

2. MAILING ADDRESS

P. O. Box 511
Kingsport, Tennessee 37662

3. ADDRESS AT WHICH SOURCE IS TO BE OPERATED:

Same as above.

4. TYPE OF ORGANIZATION: CORPORATION [x]

5. EMISSION SOURCE NUMBER B-237A-1 6. STANDARD INDUSTRIAL CLASSIFICATION OF CO. 2 8 1 5

7. BRIEF DESCRIPTION OF EMISSION SOURCE FOR WHICH PERMIT IS DESIRED: Dimethyl terephthalate plant No. 2

8. LATITUDE AND LONGITUDE OF AIR CONTAMINANT SOURCE 36° 31' 24"N 82° 32' 14"W

9. COST OF MODIFICATION $ ______ COST OF AIR POLLUTION CONTROL EQUIPMENT $ ______

10. IF THIS AIR CONTAMINANT SOURCE HAS A PREVIOUS WRITTEN PERMIT GIVE NAME OF CORPORATION, COMPANY OR INDIVIDUAL OWNER THAT OPERATED THIS SOURCE AND STATE PREVIOUS TENNESSEE DIVISION OF AIR POLLUTION CONTROL PERMIT NUMBER, IF KNOWN.

NAME TENNESSEE EASTMAN COMPANY PERMIT NUMBER ______

11. PRESENT STATUS OF AIR CONTAMINANT SOURCE (CHECK AND COMPLETE APPLICABLE ITEMS)

[ ] PERMIT TO CONSTRUCT REQUESTED - Est. Starting Date ______ Est. Completion Date ______

[X] CONSTRUCTION COMPLETED - Date 1965 [ ] PERMIT TO OPERATE REQUESTED

[ ] TRANSFER OF LOCATION - Est. Date ______ [ ] AIR CONTAMINANT SOURCE HAS NOT BEEN ALTERED

12. J C Edwards Jr — JUL 25 1974

SIGNATURE OF RESPONSIBLE MEMBER OF FIRM — DATE OF APPLICATION

13. TYPE OR PRINT NAME AND OFFICIAL TITLE OF PERSON SIGNING THIS APPLICATION

NAME J. C. Edwards

TITLE Manager, Clean Environment Program

PHONE 246-2111, Extension 2444

PROCESS EMISSION SOURCE COVER SHEET - APC 21

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
CORDELL HULL BUILDING C2-212
NASHVILLE, TENNESSEE 37217

DO NOT WRITE IN THIS SPACE

COMPANY NO.

PERMIT NO.

PROCESS EMISSION SOURCE NO.

EMISSION POINT NO.

REVIEWER

DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-237A-1 3. SIC CODE 2815
4. DID CONSTRUCTION OF THIS PROCESS BEGIN ON OR BEFORE AUGUST 9, 1969? [X] YES [ ] NO ON OR BEFORE APRIL 3, 1972? [X] YES
5. GIVE A BRIEF DESCRIPTION OF THE PROCESS ALONG WITH A FLOW DIAGRAM. OPERATION CENTERS, STORAGE POINTS, MATERIAL INPUTS, MATERIAL OUTPUTS AND EMISSION POINTS SHOULD BE NOTED IN POUNDS PER OPERATING HOUR.

Terephthalic acid and methanol are reacted to produce dimethyl terephthalate. The remainder of the process is distillation to remove impurities.

NOTE: ATTACH FLOW DIAGRAM FOR PROCESS EMISSION SOURCE CLAIMED ON SEPARATE SHEET.

6. TYPE OF PROCESS: CONTINUOUS [X] BATCH [ ] COMBINED [ ]
7. OPERATIONAL SCHEDULE OF PROCESS EMISSION SOURCE:
   - A. HOURS PER DAY 24
   - B. DAYS PER WEEK 7
   - C. WEEKS PER YEAR 50
   - D. % ANNUAL THRUPUT

DEC-FEB	MARCH-MAY	JUNE-AUGUST	SEPT-NOV
25	25	25	25

8. LIST MATERIAL INPUTS TO PROCESS EMISSION SOURCE:

NAME OF INPUT	LBS/OPERATING HOUR DESIGN CAPACITY	LBS/OPERATING HOUR ACTUAL LOADING	FLOW DIAGRAM REFERENCE
A. Methanol	4270	4270	1
B. Terephthalic Acid	10,800	10,800	2
C. Xylene	24	24	3
D. Crude Methanol Feed	90,000	90,000	4
E.			
F.			
G.			
TOTAL LBS/OPERATING HOUR INPUT TO PROCESS EMISSION SOURCE	105,000	105,000	

(TOTAL ROUNDED TO THREE SIGNIFICANT FIGURES)

APC - 21
REV 5/73

9. LIST MATERIAL OUTPUTS FROM THIS PROCESS EMISSION SOURCE:

NAME OF OUTPUT	LBS/OPERATING HOUR		FLOW DIAGRAM REFERENCE
	DESIGN CAPACITY	ACTUAL LOADING	
A. Methyl paraformyl benzoate	77	77	5
B. Dimethyl Terephthalate	12,500	12,500	6
C. Water	2100	2100	7
D. Methanol	89,400	89,400	8
E.			
F.			
G.			
TOTAL LBS/OPERATING HOUR OUTPUT FROM PROCESS EMISSION SOURCE	104,000	104,000	(TOTAL ROUNDED TO THREE SIGNIFICANT FIGURES)

10. LIST AIR POLLUTION EMISSION POINTS FOR THIS PROCESS EMISSION SOURCE. ATTACH A SEPARATE "EMISSION POINT DATA" SHEET, APC-22, FOR EACH POINT.

EMISSION POINT NO. OR CODE	LBS PARTICULATE/OPERATING HOUR	FLOW DIAGRAM REFERENCE
A. D*,E,G,K	0	D*,E,G,K
B. J	0	J
C.		
D.		
E.		
F.		

TOTAL LBS. OF PARTICULATE EMITTED FROM PROCESS EMISSION SOURCE PER OPERATING HOUR 0
(TOTAL ROUNDED TO TWO SIGNIFICANT FIGURES)

NOTE: ATTACH ADDITIONAL SHEETS AS REQUIRED FOR ITEMS 8, 9, AND 10.

*Already registered

11. J.C. Edwards /OWL — June 27, 1974
SIGNATURE OF RESPONSIBLE MEMBER OF FIRM — DATE OF APPLICATION

12. TYPE OR PRINT NAME AND OFFICIAL TITLE OF PERSON SIGNING THIS FORM

NAME J. C. Edwards

TITLE Manager, Clean Environment Program

DATE JUN 27 1974 PHONE 246-2111, Ext. 2444

FOR OFFICIAL USE ONLY

☐ PROCESS EMISSION SOURCE CLAIMED IS ACCEPTABLE.

☐ PROCESS EMISSION SOURCE CLAIMED IS NOT ACCEPTABLE.

☐ RECOMMENDED MAKE UP OF PROCESS EMISSION SOURCE ATTACHED ON SEPARATE SHEET.

☐ PROCESS EMISSION SOURCE IS NOT IN COMPLIANCE WITH APPLICABLE REGULATIONS.

☐ PROCESS WEIGHT TABLE APPLIES TO THIS PROCESS EMISSION SOURCE.

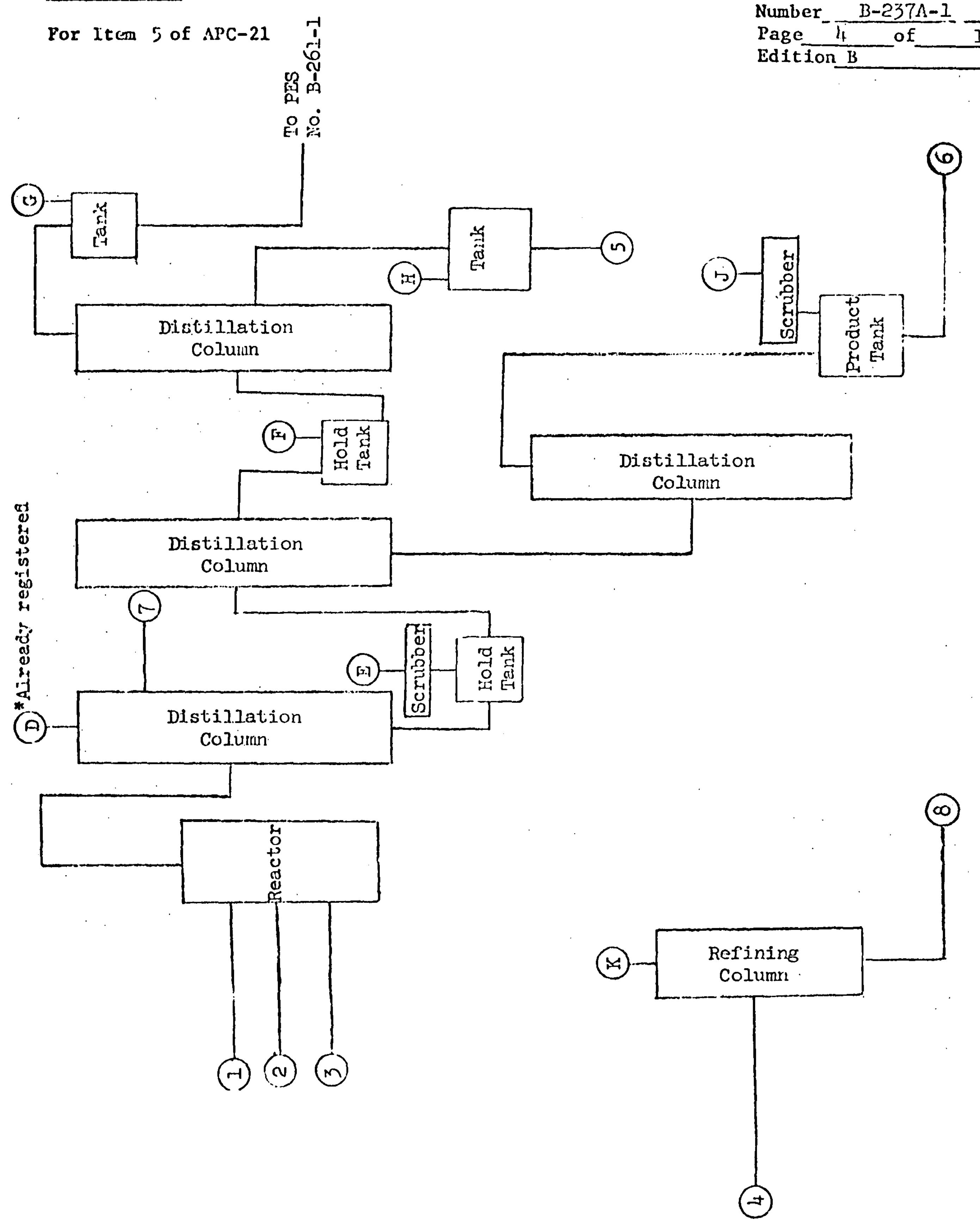
☐ DIFFUSION EQUATION APPLIES TO THIS PROCESS EMISSION SOURCE. ☐ TABLE I ☐ TABLE II

ALLOWABLE EMISSIONS ______ LBS/HOUR ACTUAL EMISSIONS ______ TONS/YEAR

FILING IS AUTHORIZED BY ______ DATE ______

Flow Diagram

For Item 5 of APC-21



1-22-74 Issue

Attach to APC-21

Process Emission Source
Number B-237A-1
Page 5 of 18
Edition B

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO. __ __ - __ __ __ __ __ __
PERMIT NO. __ __ __ __ __ __ __ P -
PROCESS EMISSION SOURCE NO. __ __ __ __
EMISSION POINT NO. __ __ __ __
REVIEWER __ __ __ __
DATE __ __ __ __ __ __

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-237A-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). E
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 48 FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP .25 FEET.
6. SHOW NORMAL EXIT GAS TEMPERATURE 68 °F. 7. SHOW EXIT GAS VELOCITY .099 FT/SEC.
8. INDICATE PERCENT OF TIME OVER 125°F 0 %.
9. SHOW EXIT GAS VOLUME FLOW RATE .0049 FT^3 /SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 0 (GR./CU. FT. DRY GAS AT 70°F) AND 0 (GR./CU. FT. GAS AT STACK CONDITIONS)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 460 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK ____ U-UP, D D-DOWN, ____ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE	✓	1970	.001	100%
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

22-74 Issue.

APC - 22
REV 5/73

Process Emission Source Number B-237A-1 Page 5 of 18 Edition 5

14 IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POINT? YES [ ] NO [X]

IF YES, DESCRIBE: ______

15. ADDITIONAL COMMENTS: ______

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	✓			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	✓			PPM			
OXIDES OF NITROGEN	✓			PPM			
CARBON MONOXIDE		✓	4496	PPM	.00017	12.3	Calculation
GASEOUS FLUORIDES	✓			PPM			
OTHERS (NAME CHEMICAL)							
Xylene		✓	.002	lbs/ft^3	.034	286	Calculation
Inert Gas		✓	.084	lbs/ft^3	1.48	2438	Calculation

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ______ #/hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] CONTINUOUS MONITOR (S) FOR (1) ______; (2) ______; (3) ______ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ______ SULFUR DIOXIDE ______ HYDROCARBONS ______

CARBON MONOXIDE ______ FLUORIDES ______

FILING IS AUTHORIZED BY ______ DATE ______

Storage Tank Summary

TENNESSEE DEPARTMENT OF PUBLIC HEALTH
MAIL TO: DIVISION OF AIR POLLUTION CONTROL
CORDELL HULL BUILDING C2-212
NASHVILLE, TENNESSEE 37219

ONE COPY OF THIS FORM MUST BE FILLED OUT COMPLETELY FOR EACH TANK AND MUST ACCOMPANY THE APPLICATION FOR PERMIT, APC-20.

1. TENNESSEE EASTMAN COMPANY

2. TANK LOCATION: B-237A, 1st floor — LATITUDE 36° 31' 24" N — LONGITUDE 82° 32' 14" W

3. TANK IDENTIFICATION (NUMBER OR NAME): TB-52 (Vent F)

4. TANK CAPACITY: BARRELS ____ GALLONS 3600

5. TANK DIMENSIONS: DIAMETER 8 ft. HEIGHT 8 ft. LENGTH ____ WIDTH ____

6. TANK SHAPE: CYLINDRICAL [X] SPHERICAL [ ] OTHER SHAPE [ ] DESCRIBE ____

7. TANK MATERIALS OF CONSTRUCTION: STEEL [X] WOOD [ ] OTHER [ ] SPECIFY ____

8. TANK PAINT: CHALKING WHITE [ ] LIGHT GREY OR BLUE [ ] ALUMINUM [X] DARK COLOR OR NO PAINT [ ]

9. TANK CONDITION: GOOD [X] FAIR [ ] POOR [ ]

10. TANK STATUS: NEW CONSTRUCTION [ ] ALTERATION [ ] Not Applicable

11. TYPE OF TANK: FIXED ROOF [X] PRESSURE [ ] INTERNALLY HEATED [ ]
UNDERGROUND [ ] FLOATING ROOF [ ] OPEN TOP [ ] INSULATED [X] OTHER [ ]
(CHECK ALL APPLICABLE)

12. IF TANK IS TO HAVE FLOATING ROOF, SUPPLY THE FOLLOWING INFORMATION:
TYPE OF ROOF: DOUBLE DECK [ ] PONTOON [ ] OTHER [ ] DESCRIBE ____
TYPE OF SEAL: SINGLE [ ] DOUBLE [ ] OTHER [ ] DESCRIBE ____
TYPE OF SHELL CONSTRUCTION: RIVETED [ ] WELDED [ ] OTHER [ ] DESCRIBE ____

13. IF TANK IS TO HAVE ANY OTHER TYPE OF ROOF OR COVER (OR NONE AT ALL), DESCRIBE:

14. VENT VALVE DATA: INDICATE TYPE, NUMBER, SETTINGS AND VAPOR DISPOSAL:

	NUMBER	PRESSURE SETTING	VACUUM SETTING	DISCHARGING TO: (CHECK) ATMOSPHERE	VAPOR CONTROL	FLARE
COMBINATION	PSV-TB-25A	3" W.C.	1/2 oz.	✓		
PRESSURE						
VACUUM						
OPEN						

15. NAME ALL LIQUIDS, VAPORS, GASES OR MIXTURES OF SUCH MATERIALS TO BE STORED IN THIS TANK:
AVERAGE MOLECULAR WEIGHT 161
COMPOSITION (%) 30% Dimethyl terephthalate
58% Methyl paratoluate
10.5% Methyl benzoate
1.5% Methyl paraformyl benzoate
DENSITY: 8.5 LBS/GAL.

16. TEMPERATURES AT WHICH THE ABOVE LISTED MATERIALS ARE TO BE STORED IN THIS TANK:
(NORMAL AVERAGE DAILY MINIMUM AND MAXIMUM TEMPERATURES)
MINIMUM TEMPERATURE 290 °F MAXIMUM TEMPERATURE 310 °F

Process Emission Sourc
Number B-237A-1
Page 8 of 1
Edition B

17. SPECIAL VAPOR CONTROLLING DEVICES:

[X] CONSERVATION VENT OR RELIEF VALVE.

[ ] CONDENSER,
AVERAGE EXIT GAS TEMPERATURE FROM CONDENSER, ________ °F.

[ ] SCRUBBER,
AVERAGE ORGANIC CONCENTRATION IN OUTLET SCRUBBER GAS, ________ LBS/FT³.

[ ] OTHER THAN ABOVE,
EXPLAIN ________________________________.

18. OPERATIONAL DATA:

[X] CONTINUOUS FILLING AND DISCHARGING,
AVERAGE DAILY LEVEL FLUCTUATION, 3.5 INCHES (FOR VERTICAL CYLINDRICAL TANKS).
AVERAGE DAILY VOLUME FLUCTUATION, ________ CU. FT. (FOR HORIZONTAL CYLINDRICAL AND SPHERICAL TANKS).

[ ] BATCH FILLING,
AVERAGE NUMBER OF GALLONS PER FILLING, ________.
AVERAGE NUMBER OF FILLS PER YEAR, ________.

19. OPERATIONAL DATA:
MAXIMUM FILLING RATE: ________ BARRELS PER HOUR (OR) 630 GAL. PER HOUR

AVERAGE OUTAGE: (AVER. DISTANCE FROM TOP OF TANK TO LIQUID SURFACE) 6 FT.

AVERAGE THROUGHPUT: ________ BARRELS PER HOUR (OR) ________ GAL. PER DAY

TANK TURNOVERS PER YEAR: ________

20. IF MATERIAL STORED IS A PETROLEUM PRODUCT OR ANY OTHER TYPE OF ORGANIC MATERIAL, SUPPLY THE FOLLOWING INFORMATION FOR EACH MATERIAL: ATTACH ADDITIONAL SHEETS, IF NECESSARY
SEE ATTACHMENT

VAPOR PRESSURE: ________ LBS. REID (OR) ________ LBS. PER SQ. IN.

ABSOLUTE AT ________ °F INITIAL BOILING POINT: ________ °F

21. IF MATERIAL STORED IS A SOLUTION, SUPPLY THE FOLLOWING INFORMATION:

NAME OF SOLVENT: ________ NAME OF MATERIAL DISSOLVED: ________

CONCENTRATION OF
MATERIAL DISSOLVED: ________ % BY WEIGHT (OR) ________ % BY VOLUME (OR) ________ LBS/GALLON

22. IF MATERIAL STORED IS A GAS OR A LIQUIFIED GAS WHICH IS NOT A PETROLEUM PRODUCT, SUPPLY THE FOLLOWING INFORMATION:
IDENTIFY THE MATERIAL: ________

PRESSURE AT WHICH MATERIAL IS STORED: ________ LBS. PER SQ. IN. GAGE AT ________ °F

23. ESTIMATED VAPOR LOSS .057 TONS/YEAR

THE ABOVE INFORMATION IS SUBMITTED TO DESCRIBE THE USE OF THE TANK FOR WHICH APPLICATION FOR PERMIT IS BEING MADE ON THE ACCOMPANYING FORM

SIGNATURE OF RESPONSIBLE MEMBER OF FIRM: J. C. Edwards ged June 27, 1974

TYPE OR PRINT NAME AND OFFICIAL TITLE OF PERSON SIGNING THIS DATA FORM. NAME: J. C. Edwards / PHONE: 246-2111, Ext. 2444

TITLE. Manager, Clean Environment Program

DO NOT WRITE BELOW THIS LINE

COMMENTS:

REVIEWER ________

DATE ________

DO NOT WRITE IN THIS SPACE

AIR QUALITY REGION [| |]

AGENCY CODE. [| |]

PERMIT NO. [| | | | |]

REGISTRATION NO. [| | | | |]

PROCESS EMISSION SOURCE NO. [| |]

EMISSION POINT NO. [| |]-[| |]

UTM ZONE (IF USED) [|]

EW COORD. [| | | | |]

NS COORD. [| | | | |]

SIC CODE [| | |]

AVERAGE DAILY LOSS TO ATMOSPHERE ________

APC-27

ATTACHMENT I

No. 20

Material	V.P. @ 300°F (PSIA)	Boiling Point (°F)
Dimethyl terephthalate	14.72	545
Methyl paratoluate	14.82	420
Methyl benzoate	14.96	388
Methyl paraformyl benzoate	14.72	500

Process Emission Source
Number B-237A-1
Page 10 of 18
Edition B

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO.
PERMIT NO. P
PROCESS EMISSION SOURCE NO.
EMISSION POINT NO.
REVIEWER
DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-237A-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). G
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 50 FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.5 FEET.
6. SHOW NORMAL EXIT GAS TEMPERATURE 239 °F. 7. SHOW EXIT GAS VELOCITY .001 FT/SEC.
8. INDICATE PERCENT OF TIME OVER 125°F 100 %.
9. SHOW EXIT GAS VOLUME FLOW RATE .00021 FT^3 /SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 0 (GR./CU. FT. DRY GAS AT 70°F) AND 0 (GR./CU. FT. GAS AT STACK CONDITIONS)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 390 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK ______ U-UP, D D-DOWN, ______ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

1-22-74 Issue.

APC - 22
REV 5/73

Process Emission Source Number B-237A-1 Page 11 of 18 Edition D

14. IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POINT? YES [ ] NO [X]

IF YES, DESCRIBE: ______________________

15. ADDITIONAL COMMENTS: ______________________

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	✓			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	✓			PPM			
OXIDES OF NITROGEN	✓			PPM			
CARBON MONOXIDE		✓	3950	PPM	.0003	2.49	Calculation
GASEOUS FLUORIDES	✓			PPM			
OTHERS (NAME CHEMICAL)							
Methyl paratoluate		✓	.008	lbs/ft^3	.0058	49	Calculation
Methyl benzoate		✓	.009	lbs/ft^3	.0067	56	Calculation
Xylene		✓	.004	lbs/ft^3	.0033	28	Calculation
Inert Gas		✓	.078	lbs/ft^3	.0592	497	Calculation

FOR OFFICE USE ONLY

- [ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ________ #/hr
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ________ AND ALLOWABLE EMISSIONS ________
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ________ AND ALLOWABLE EMISSIONS ________
- [ ] CONTINUOUS MONITOR (S) FOR (1) ________; (2) ________; (3) ________ RECOMMENDED.
- [ ] METHOD OF MEASUREMENT IS ACCEPTABLE.
- [ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______________________

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ________ SULFUR DIOXIDE ________ HYDROCARBONS ________

CARBON MONOXIDE ________ FLUORIDES ________

FILING IS AUTHORIZED BY ________ DATE ________

Storage Tank Summary

TENNESSEE DEPARTMENT OF PUBLIC HEALTH
MAIL TO: DIVISION OF AIR POLLUTION CONTROL
CORDELL HULL BUILDING C2-212
NASHVILLE, TENNESSEE 37219

ONE COPY OF THIS FORM MUST BE FILLED OUT COMPLETELY FOR EACH TANK AND MUST ACCOMPANY THE APPLICATION FOR PERMIT, APC-20.

1. TENNESSEE EASTMAN COMPANY

2. TANK LOCATION: B-237A, 2nd floor — LATITUDE 36° 31' 23"N — LONGITUDE 82° 32' 14"W

3. TANK IDENTIFICATION (NUMBER OR NAME): TD-51 (Vent H)

4. TANK CAPACITY: BARRELS ____ GALLONS 415

5. TANK DIMENSIONS: DIAMETER 4 ft. HEIGHT 4 ft. LENGTH ____ WIDTH ____

6. TANK SHAPE: CYLINDRICAL [X] SPHERICAL [ ] OTHER SHAPE [ ] DESCRIBE ____

7. TANK MATERIALS OF CONSTRUCTION: STEEL [X] WOOD [ ] OTHER [ ] SPECIFY ____

8. TANK PAINT: CHALKING WHITE [ ] LIGHT GREY OR BLUE [ ] ALUMINUM [X] DARK COLOR OR NO PAINT [ ]

9. TANK CONDITION: GOOD [X] FAIR [ ] POOR [ ]

10. TANK STATUS: NEW CONSTRUCTION [ ] ALTERATION [ ] Not Applicable

11. TYPE OF TANK: FIXED ROOF [X] PRESSURE [ ] INTERNALLY HEATED [ ] UNDERGROUND [ ] FLOATING ROOF [ ] OPEN TOP [ ] INSULATED [X] OTHER [ ]
(CHECK ALL APPLICABLE)

12. IF TANK IS TO HAVE FLOATING ROOF, SUPPLY THE FOLLOWING INFORMATION:
TYPE OF ROOF: DOUBLE DECK [ ] PONTOON [ ] OTHER [ ] DESCRIBE ____
TYPE OF SEAL: SINGLE [ ] DOUBLE [ ] OTHER [ ] DESCRIBE ____
TYPE OF SHELL CONSTRUCTION: RIVETED [ ] WELDED [ ] OTHER [ ] DESCRIBE ____

13. IF TANK IS TO HAVE ANY OTHER TYPE OF ROOF OR COVER (OR NONE AT ALL), DESCRIBE:

14. VENT VALVE DATA: INDICATE TYPE, NUMBER, SETTINGS AND VAPOR DISPOSAL:

	NUMBER	PRESSURE SETTING	VACUUM SETTING	DISCHARGING TO: (CHECK) ATMOSPHERE	VAPOR CONTROL	FLARE
COMBINATION	PSV-TD-94	6" W.C.	1/2 oz.	✓		
PRESSURE						
VACUM						
OPEN						

15. NAME ALL LIQUIDS, VAPORS, GASES OR MIXTURES OF SUCH MATERIALS TO BE STORED IN THIS TANK:
AVERAGE MOLECULAR WEIGHT 163
DENSITY: 8.5 LBS/GAL.
COMPOSITION (%)
70% Methyl paraformyl benzoate
15% Methyl paratoluate
10% Dimethyl terephthalate
2.5% Methyl benzoate
2.5% Methyl 4-methoxy methyl benzo

16. TEMPERATURES AT WHICH THE ABOVE LISTED MATERIALS ARE TO BE STORED IN THIS TANK:
(NORMAL AVERAGE DAILY MINIMUM AND MAXIMUM TEMPERATURES)

MINIMUM TEMPERATURE 320 °F MAXIMUM TEMPERATURE 330 °F

APC-

17. SPECIAL VAPOR CONTROLLING VICES:

[X] CONSERVATION VENT OR RELIEF VALVE.

[ ] CONDENSER,
AVERAGE EXIT GAS TEMPERATURE FROM CONDENSER, ________ °F.

[ ] SCRUBBER,
AVERAGE ORGANIC CONCENTRATION IN OUTLET SCRUBBER GAS, ________ LBS/FT³.

[ ] OTHER THAN ABOVE,
EXPLAIN ________.

18. OPERATIONAL DATA:

[ ] CONTINUOUS FILLING AND DISCHARGING,
AVERAGE DAILY LEVEL FLUCTUATION, ________ INCHES (FOR VERTICAL CYLINDRICAL TANKS).
AVERAGE DAILY VOLUME FLUCTUATION, ________ CU. FT. (FOR HORIZONTAL CYLINDRICAL AND SPHERICAL TANKS).

[X] BATCH FILLING,
AVERAGE NUMBER OF GALLONS PER FILLING, 235.
AVERAGE NUMBER OF FILLS PER YEAR, 350.

19. OPERATIONAL DATA:
MAXIMUM FILLING RATE: ________ BARRELS PER HOUR (OR) 15 GAL. PER HOUR

AVERAGE OUTAGE: (AVER. DISTANCE FROM TOP OF TANK TO LIQUID SURFACE) 3 FT.

AVERAGE THROUGHPUT: ________ BARRELS PER HOUR (OR) ________ GAL. PER DAY

TANK TURNOVERS PER YEAR: ________

20. IF MATERIAL STORED IS A PETROLEUM PRODUCT OR ANY OTHER TYPE OF ORGANIC MATERIAL, SUPPLY THE FOLLOWING INFORMATION FOR EACH MATERIAL: ATTACH ADDITIONAL SHEETS, IF NECESSARY.
SEE ATTACHMENT
VAPOR PRESSURE: ________ LBS. REID (OR) ________ LBS. PER SQ. IN.

ABSOLUTE AT ________ °F INITIAL BOILING POINT: ________ °F

21. IF MATERIAL STORED IS A SOLUTION, SUPPLY THE FOLLOWING INFORMATION:

NAME OF SOLVENT: ________ NAME OF MATERIAL DISSOLVED: ________

CONCENTRATION OF MATERIAL DISSOLVED: ________ % BY WEIGHT (OR) ________ % BY VOLUME (OR) ________ LBS/GALLON.

22. IF MATERIAL STORED IS A GAS OR A LIQUIFIED GAS WHICH IS NOT A PETROLEUM PRODUCT, SUPPLY THE FOLLOWING INFORMATION:
IDENTIFY THE MATERIAL: ________

PRESSURE AT WHICH MATERIAL IS STORED: ________ LBS. PER SQ. IN. GAGE AT ________ °F

23. ESTIMATED VAPOR LOSS .23 TONS/YEAR

THE ABOVE INFORMATION IS SUBMITTED TO DESCRIBE THE USE OF THE TANK FOR WHICH APPLICATION FOR PERMIT IS BEING MADE ON THE ACCOMPANYING FORM

SIGNATURE OF RESPONSIBLE MEMBER OF FIRM: J. C. Edwards/ [illegible] June 27, 1974
TYPE OR PRINT NAME AND OFFICIAL TITLE OF PERSON SIGNING THIS DATA FORM. NAME: J. C. Edwards PHONE: 246-2111, Ext. 2444

TITLE. Manager, Clean Environment Program

DO NOT WRITE BELOW THIS LINE

COMMENTS:

REVIEWER ________

DATE ________

DO NOT WRITE IN THIS SPACE

AIR QUALITY REGION [| |]

AGENCY CODE [| |]

PERMIT NO. [| | | | |]

REGISTRATION NO. [| | | | |]

PROCESS EMISSION SOURCE NO. [| |]

EMISSION POINT NO. [| |] - [| |]

UTM ZONE (IF USED) [|]

EW COORD. [| | | | | |]

NS COORD. [| | | | | |]

SIC CODE [| | |]

AVERAGE DAILY LOSS TO ATMOSPHERE ________

APC-27

ATTACHMENT I

No. 20

Material	V.P. @ 330°F (PSIA)	Boiling Point (°F)
Methyl paraformyl benzoate	14.74	500
Methyl paratoluate	14.92	420
Methyl benzoate	15.10	388
Dimethyl terephthalate	14.73	545
Methyl 4-methoxy methyl benzoate	15.10	395

Process Emission Source
Number B-237A-1
Page 15 of 18
Edition B

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO.

PERMIT NO. P

PROCESS EMISSION SOURCE NO.

EMISSION POINT NO.

REVIEWER

DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-237A-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). J
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 40 FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP .25 FEET.
6. SHOW NORMAL EXIT GAS TEMPERATURE 100 °F. 7. SHOW EXIT GAS VELOCITY 1.96 FT/SEC.
8. INDICATE PERCENT OF TIME OVER 125°F 0 %.
9. SHOW EXIT GAS VOLUME FLOW RATE .096 FT^3 /SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 0 (GR./CU. FT. DRY GAS AT 70°F) AND 0 (GR./CU. FT. GAS AT STACK CONDITIONS)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 390 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK ___ U-UP, D D-DOWN, ___ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE	yes	1974	001	100%
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

Process Emission Source Number B-237A-1 Page 16 of 18 Edition B

14 IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION PO. YES [ ] NO [X]

IF YES, DESCRIBE: ______

15. ADDITIONAL COMMENTS: ______

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	✓			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	✓			PPM			
OXIDES OF NITROGEN	✓			PPM			
CARBON MONOXIDE	✓			PPM			
GASEOUS FLUORIDES	✓			PPM			
OTHERS (NAME CHEMICAL)							
Nitrogen		✓	0.058	lb./ft.^{3}	20	168,000	Flow meter
Methanol		✓	0.027	lb./ft.^{3}	9.4	79,000	Calculation from vapor press. data.

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ______ #/hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] CONTINUOUS MONITOR (S) FOR (1) ______; (2) ______; (3) ______ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ______ SULFUR DIOXIDE ______ HYDROCARBONS ______

CARBON MONOXIDE ______ FLUORIDES ______

FILING IS AUTHORIZED BY ______ DATE ______

Process Emission Source
Number B-237A-1
Page 17 of 18
Edition B

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO. ___-______

PERMIT NO. _______ P

PROCESS EMISSION SOURCE NO. ____

EMISSION POINT NO. ____

REVIEWER ____

DATE ______

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-237A-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). K
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 100 FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP .25 FEET.
6. SHOW NORMAL EXIT GAS TEMPERATURE 77 °F. 7. SHOW EXIT GAS VELOCITY 25.07 FT/SEC.
8. INDICATE PERCENT OF TIME OVER 125°F 0 %.
9. SHOW EXIT GAS VOLUME FLOW RATE 1.23 FT^3 /SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 0 (GR./CU. FT. DRY GAS AT 70°F) AND 0 (GR./CU. FT. GAS AT STACK CONDITIONS)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 390 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK ______ U-UP, D D-DOWN, ______ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

Process Emission Source Number B-237A-1 Page 18 of 18 Edition B

14 IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION PO. YES [ ] NO [X]

IF YES, DESCRIBE:

15. ADDITIONAL COMMENTS: The old number for this vent was 8-B.

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	✓			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	✓			PPM			
OXIDES OF NITROGEN	✓			PPM			
CARBON MONOXIDE	✓			PPM			
GASEOUS FLUORIDES	✓			PPM			
OTHERS (NAME CHEMICAL)							
Acetaldehyde		✓	.012	lbs/ft^3	53	464,000	Metered & Analyzed
Dimethyl ether		✓	.094	lbs/ft^3	416	3,657,000	Metered & Analyzed
Methyl acetate		✓	.023	lbs/ft^3	103	903,000	Metered & Analyzed
Methanol		✓	.007	lbs/ft^3	29	253,000	Metered & Analyzed

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ______ #/hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] CONTINUOUS MONITOR (S) FOR (1) ______; (2) ______; (3) ______ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ______ SULFUR DIOXIDE ______ HYDROCARBONS ______

CARBON MONOXIDE ______ FLUORIDES ______

FILING IS AUTHORIZED BY ______ DATE ______

Process Emission Source
Number B-261-1
Page 1 of 22
Edition B

PERMIT APPLICATION - APC 20

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
CORDELL HULL BUILDING C2-212
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO. ___ - ______

AQCR ___ AGENCY CODE ___

NEDS COUNTY CODE ____

PERMIT NO. ________ __

PROCESS EMISSION SOURCE NO. ____

EMISSION POINT NO. ___ - ___

CITY CODE ____ UTM ZONE __

EW COORD. ____ __

NS COORD. _____ __

SIC CODE ____

REVIEWER ___

DATE ______

1. PERMIT TO BE ISSUED TO:

TENNESSEE EASTMAN COMPANY

2. MAILING ADDRESS

P. O. Box 511
Kingsport, Tennessee 37662

3. ADDRESS AT WHICH SOURCE IS TO BE OPERATED:

Same as above.

4. TYPE OF ORGANIZATION: CORPORATION [X]

5. EMISSION SOURCE NUMBER B-261-1 6. STANDARD INDUSTRIAL CLASSIFICATION OF CO. 2 8 1 5

7. BRIEF DESCRIPTION OF EMISSION SOURCE FOR WHICH PERMIT IS DESIRED: Dimethyl terephthalate plant No. 3

8. LATITUDE AND LONGITUDE OF AIR CONTAMINANT SOURCE 36° 31' 22"N 82° 32' 14"W

9. COST OF MODIFICATION $ ________ COST OF AIR POLLUTION CONTROL EQUIPMENT $ ________

10. IF THIS AIR CONTAMINANT SOURCE HAS A PREVIOUS WRITTEN PERMIT GIVE NAME OF CORPORATION, COMPANY OR INDIVIDUAL OWNER THAT OPERATED THIS SOURCE AND STATE PREVIOUS TENNESSEE DIVISION OF AIR POLLUTION CONTROL PERMIT NUMBER, IF KNOWN.

NAME TENNESSEE EASTMAN COMPANY PERMIT NUMBER ________

11. PRESENT STATUS OF AIR CONTAMINANT SOURCE (CHECK AND COMPLETE APPLICABLE ITEMS)

[ ] PERMIT TO CONSTRUCT REQUESTED - Est. Starting Date ________ Est. Completion Date ________

[X] CONSTRUCTION COMPLETED - Date 1966 [ ] PERMIT TO OPERATE REQUESTED

[ ] TRANSFER OF LOCATION - Est. Date ________ [ ] AIR CONTAMINANT SOURCE HAS NOT BEEN ALTERED

12. J C Edwards JUL 25 1974
SIGNATURE OF RESPONSIBLE MEMBER OF FIRM DATE OF APPLICATION

13. TYPE OR PRINT NAME AND OFFICIAL TITLE OF PERSON SIGNING THIS APPLICATION

NAME J. C. Edwards

TITLE Manager, Clean Environment Program

PHONE 246-2111, Extension 2444

PROCESS EMISSION SOURCE COVER SHEET - APC 21

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
CORDELL HULL BUILDING C2-212
NASHVILLE, TENNESSEE 37217

DO NOT WRITE IN THIS SPACE

COMPANY NO.
PERMIT NO.
PROCESS EMISSION SOURCE NO.
EMISSION POINT NO.
REVIEWER
DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-261-1 3. SIC CODE 2815
4. DID CONSTRUCTION OF THIS PROCESS BEGIN ON OR BEFORE AUGUST 9, 1969? [X] YES [ ] NO ON OR BEFORE APRIL 3, 1972? [X] YES [ ]
5. GIVE A BRIEF DESCRIPTION OF THE PROCESS ALONG WITH A FLOW DIAGRAM. OPERATION CENTERS, STORAGE POINTS, MATERIAL INPUTS, MATERIAL OUTPUTS AND EMISSION POINTS SHOULD BE NOTED IN POUNDS PER OPERATING HOUR.

Terephthalic acid and methanol are reacted to produce dimethyl terephthalate. The remainder of the process is distillation to remove impurities.

NOTE: ATTACH FLOW DIAGRAM FOR PROCESS EMISSION SOURCE CLAIMED ON SEPARATE SHEET.

6. TYPE OF PROCESS: CONTINUOUS [X] BATCH [ ] COMBINED [ ]
7. OPERATIONAL SCHEDULE OF PROCESS EMISSION SOURCE:
   A. HOURS PER DAY 24
   B. DAYS PER WEEK 168
   C. WEEKS PER YEAR 50
   D. % ANNUAL THRUPUT

DEC-FEB	MARCH-MAY	JUNE-AUGUST	SEPT-NOV
25	25	25	25

8. LIST MATERIAL INPUTS TO PROCESS EMISSION SOURCE:

NAME OF INPUT	LBS/OPERATING HOUR		FLOW DIAGRAM REFERENCE
	DESIGN CAPACITY	ACTUAL LOADING	
A. Methanol	4270	4270	1
B. Terephthalic Acid	10,800	10,800	2
C. Xylene	24	24	3
D.			
E.			
F.			
G.			
TOTAL LBS/OPERATING HOUR INPUT TO PROCESS EMISSION SOURCE	15,100	15,100	

(TOTAL ROUNDED TO THREE SIGNIFICANT FIGURES)

Process Emission Source
Number B-261-1

Edition B

9. LIST MATERIAL OUTPUTS FROM THIS PROCESS EMISSION SOURCE:

NAME OF OUTPUT	LBS/OPERATING HOUR		FLOW DIAGRAM REFERENCE
	DESIGN CAPACITY	ACTUAL LOADING	
A. Methyl paratoluate	230	230	4
B. Methyl paraformyl benzoate	365	365	5
C. Dimethyl terephthalate	12,500	12,500	6
D. Water	2100	2100	7
E.			
F.			
G.			
TOTAL LBS/OPERATING HOUR OUTPUT FROM PROCESS EMISSION SOURCE	15,200	15,200	(TOTAL ROUNDED TO THREE SIGNIFICANT FIGURES)

10. LIST AIR POLLUTION EMISSION POINTS FOR THIS PROCESS EMISSION SOURCE. ATTACH A SEPARATE "EMISSION POINT DATA" SHEET, APC-22, FOR EACH POINT.

EMISSION POINT NO. OR CODE	LBS PARTICULATE/OPERATING HOUR	FLOW DIAGRAM REFERENCE
A. C*,D,F,H,I	0	C*,D,F,H,I
B. E	.004	E
C. L	0	L
D.		
E.		
F.		

TOTAL LBS. OF PARTICULATE EMITTED FROM PROCESS EMISSION SOURCE PER OPERATING HOUR .004
(TOTAL ROUNDED TO TWO SIGNIFICANT FIGURES)

NOTE: ATTACH ADDITIONAL SHEETS AS REQUIRED FOR ITEMS 8, 9, AND 10.

*Submitted July, 1970 as Vent 4-B.

11. J. C. Edwards / [illegible] — SIGNATURE OF RESPONSIBLE MEMBER OF FIRM
June 27, 1974 — DATE OF APPLICATION

12. TYPE OR PRINT NAME AND OFFICIAL TITLE OF PERSON SIGNING THIS FORM

NAME J. C. Edwards

TITLE Manager, Clean Environment Program

DATE JUN 27 1974 PHONE 246-2111, Ext. 2444

FOR OFFICIAL USE ONLY

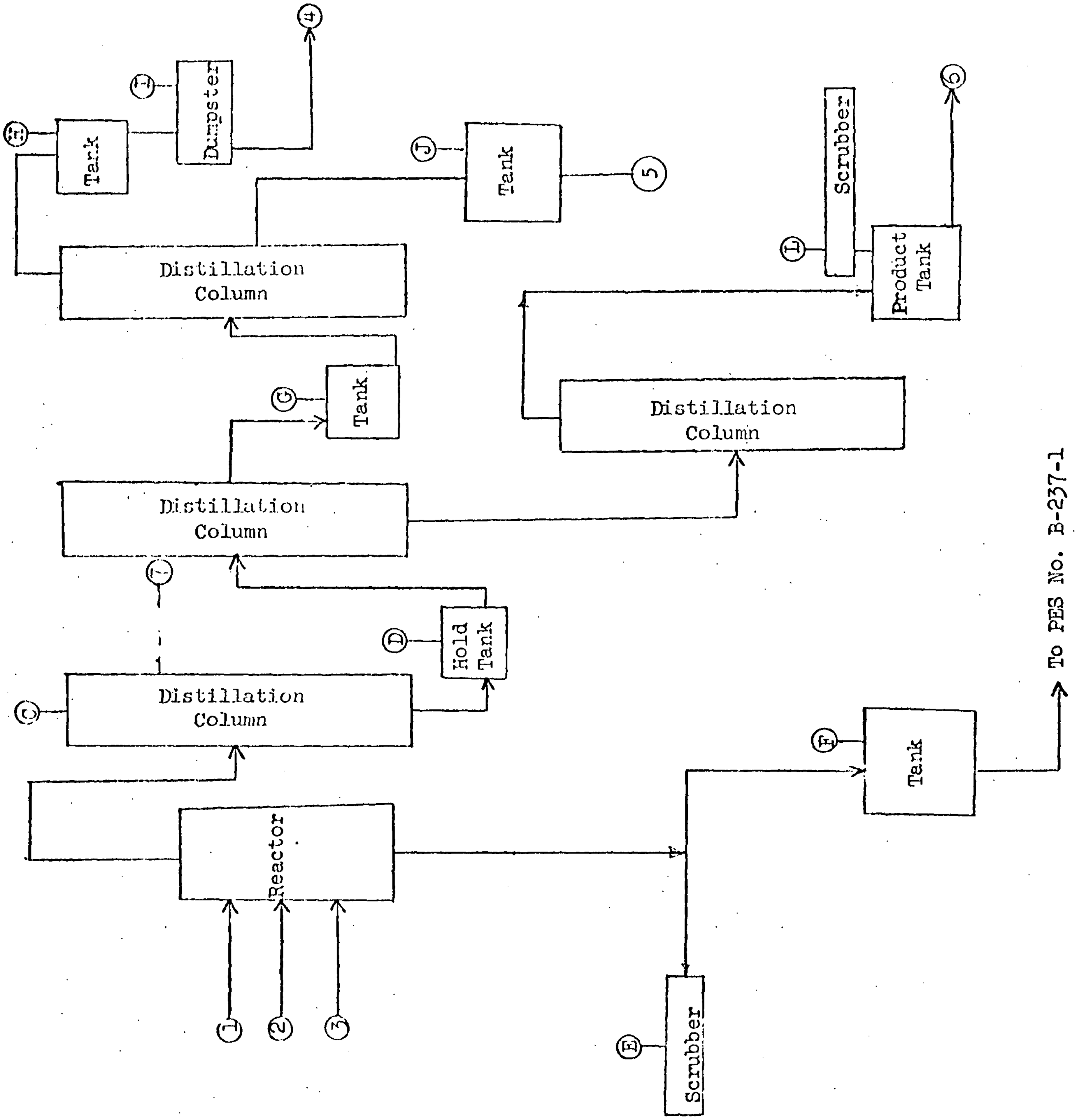
- [ ] PROCESS EMISSION SOURCE CLAIMED IS ACCEPTABLE.
- [ ] PROCESS EMISSION SOURCE CLAIMED IS NOT ACCEPTABLE.
- [ ] RECOMMENDED MAKE UP OF PROCESS EMISSION SOURCE ATTACHED ON SEPARATE SHEET.
- [ ] PROCESS EMISSION SOURCE IS NOT IN COMPLIANCE WITH APPLICABLE REGULATIONS.
- [ ] PROCESS WEIGHT TABLE APPLIES TO THIS PROCESS EMISSION SOURCE.
- [ ] DIFFUSION EQUATION APPLIES TO THIS PROCESS EMISSION SOURCE. [ ] TABLE I [ ] TABLE II

ALLOWABLE EMISSIONS ____ LBS/HOUR ACTUAL EMISSIONS ____ TONS/YEAR

FILING IS AUTHORIZED BY ____ DATE ____

Flow Diagram

For Item 5 of APC-21



Supplement to APC-21 Form

13. NORMAL OPERATING SCHEDULE: 8400 HOURS PER YEAR.

14. DATES OF ANY SCHEDULED ANNUALLY OCCURRING SHUTDOWN OF OPERATIONS None

15. DATE (YEAR) INSTALLATION (OR PROCESS) WENT ON LINE 1966

16. ESTIMATED PERCENT INCREASE OR DECREASE IN PROCESS RATES ON A TOTAL PROCESS BASIS FOR THE 5 YEARS AFTER THE CALENDAR YEAR FOR WHICH THIS REPORT IS COMPLETED 0%

Process Emission Source Number B-261-1
Page 5 of 22
Edition B

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO. ___

PERMIT NO. ___ P

PROCESS EMISSION SOURCE NO. ___

EMISSION POINT NO. ___

REVIEWER ___

DATE ___

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-261-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). D
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 37 FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP .25 FEET.
6. SHOW NORMAL EXIT GAS TEMPERATURE 185 °F. 7. SHOW EXIT GAS VELOCITY .108 FT/SEC.
8. INDICATE PERCENT OF TIME OVER 125°F 100 %.
SHOW EXIT GAS VOLUME FLOW RATE .0053 FT^3/SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 0 (GR./CU. FT. DRY GAS AT 70°F) AND 0 (GR./CU. FT. GAS AT STACK CONDITIONS)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 610 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK ___ U-UP, D D-DOWN, ___ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

Process Emission Source Number B-261-1 Page 6 of 22 Edition B

14. IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POINT? YES [ ] NO [X]

IF YES, DESCRIBE: ______

15. ADDITIONAL COMMENTS: ______

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	✓			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	✓			PPM			
OXIDES OF NITROGEN	✓			PPM			
CARBON MONOXIDE		✓	2956	PPM	.007	57	Calculation
GASEOUS FLUORIDES	✓			PPM			
OTHERS (NAME CHEMICAL)							
Xylene		✓	.002	lbs/ft^3	0.44	7875	Calculation
Inert Gas		✓	.071	lbs/ft^3	1.36	11,410	Calculation

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ______ #/hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] CONTINUOUS MONITOR (S) FOR (1) ______; (2) ______; (3) ______ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ______ SULFUR DIOXIDE ______ HYDROCARBONS ______

CARBON MONOXIDE ______ FLUORIDES ______

FILING IS AUTHORIZED BY DATE ______

Process Emission Source Number B-261-1
Page 7 of 22
Edition B

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO.
PERMIT NO. P
PROCESS EMISSION SOURCE NO.
EMISSION POINT NO.
REVIEWER
DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-261-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). E
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 5 FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 1 FEET.
6. SHOW NORMAL EXIT GAS TEMPERATURE 100 °F. 7. SHOW EXIT GAS VELOCITY 42 FT/SEC.
8. INDICATE PERCENT OF TIME OVER 125°F 3 %.
9. SHOW EXIT GAS VOLUME FLOW RATE 33 FT^3 /SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 0 (GR./CU. FT. DRY GAS AT 70°F) AND 0 (GR./CU. FT. GAS AT STACK CONDITIONS)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 630 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK U U-UP, D-DOWN, H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE	yes	1969	001	99%
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

Process Emission Source Number B-261-1 Page 8 of 22 Edition D

1[redacted] IS AN EMISSION MONITORING AND RECORDI... INSTRUMENT ATTACHED TO THIS EMISSION POI. YES [ ] NO [X]

IF YES, DESCRIBE: ______________________________

15. ADDITIONAL COMMENTS: ______________________________

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES		✓	.0002	GRAINS/SCF AT 70° F	.004	37	Calculation
SULFUR DIOXIDE	✓			PPM			
OXIDES OF NITROGEN	✓			PPM			
CARBON MONOXIDE	✓			PPM			
GASEOUS FLUORIDES	✓			PPM			
OTHERS (NAME CHEMICAL)							

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ________ #/hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ________ AND ALLOWABLE EMISSIONS ________

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ________ AND ALLOWABLE EMISSIONS ________

[ ] CONTINUOUS MONITOR (S) FOR (1) ________; (2) ________; (3) ________ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______________________________

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ________ SULFUR DIOXIDE ________ HYDROCARBONS ________

CARBON MONOXIDE ________ FLUORIDES ________

DATE ________

Supplement to APC-22

17. AIR POLLUTION CONTROL EQUIPMENT		18. AIR CONTAMINANT DATA FOR EMISSION POINT
POLLUTANT REMOVED	PERCENT DESIGN EFFICIENCY	MAXIMUM EMISSION RATE, LBS. PER HOUR
PARTICULATE	99.0	.004
SULPUR DIOXIDE		
OXIDES OF NITROGEN		
HYDROCARBONS		
CARBON MONOXIDE		
GASEOUS FLUORIDES		

19. AIR POLLUTION CONTROL EQUIPMENT CONDITIONS:

INLET GAS TEMPERATURE, ^{o}F 120

INLET GAS FLOW RATE, CFM 2160

EXIT GAS PRESSURE, PSI .11

20. EXIT GAS FLOW RATE FROM STACK AT ACTUAL FLOW CONDITION, MAXIMUM CFM 2090

Process Emission Source
Number B-261-1
Page 9 of 22
Edition B

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO.
PERMIT NO. P
PROCESS EMISSION SOURCE NO.
EMISSION POINT NO.
REVIEWER
DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-261-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). F
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 35 FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.17 FEET.
6. SHOW NORMAL EXIT GAS TEMPERATURE 176 °F. 7. SHOW EXIT GAS VELOCITY .019 FT/SEC.
8. INDICATE PERCENT OF TIME OVER 125°F 100 %.
9. SHOW EXIT GAS VOLUME FLOW RATE .00044 FT^3 /SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 0 (GR./CU. FT. DRY GAS AT 70°F) AND 0 (GR./CU. FT. GAS AT STACK CONDITI
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 610 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK ______ U-UP, D D-DOWN, ______ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

14. IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POINT? YES [ ] NO [X]

IF YES, DESCRIBE: ______

15. ADDITIONAL COMMENTS: ______

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	✓			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	✓			PPM			
OXIDES OF NITROGEN	✓			PPM			
CARBON MONOXIDE	✓			PPM			
GASEOUS FLUORIDES	✓			PPM			
OTHERS (NAME CHEMICAL)							
Xylene		✓	.038	lbs/ft^3	.06	523	Calculatio
Nitrogen		✓	.076	lbs/ft^3	.12	989	Calculatio

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ______ hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] CONTINUOUS MONITOR (S) FOR (1) ______; (2) ______; (3) ______ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ______ SULFUR DIOXIDE ______ HYDROCARBONS ______

CARBON MONOXIDE ______ FLUORIDES ______

DATE

THE GREAT SEAL OF THE STATE OF TENNESSEE XVI AGRICULTURE COMMERCE 1796

Process Emission Source
Number B-261-1
Page 11 of 22
Edition B

Storage Tank Summary

TENNESSEE DEPARTMENT OF PUBLIC HEALTH
MAIL TO: DIVISION OF AIR POLLUTION CONTROL
CORDELL HULL BUILDING C2-212
NASHVILLE, TENNESSEE 37219

ONE COPY OF THIS FORM MUST BE FILLED OUT COMPLETELY FOR EACH TANK AND MUST ACCOMPANY THE APPLICATION FOR PERMIT, APC-20.

1. TENNESSEE EASTMAN COMPANY

2. TANK LOCATION: B-261, 1st floor — LATITUDE 36° 31' 21"N — LONGITUDE 82° 32' 14"W

3. TANK IDENTIFICATION (NUMBER OR NAME): DB-52 (Vent G)

4. TANK CAPACITY: BARRELS ____ GALLONS 3600

5. TANK DIMENSIONS: DIAMETER 8 ft. HEIGHT 8 ft. LENGTH ____ WIDTH ____

6. TANK SHAPE: CYLINDRICAL [X] SPHERICAL [ ] OTHER SHAPE [ ] DESCRIBE ____

7. TANK MATERIALS OF CONSTRUCTION: STEEL [X] WOOD [ ] OTHER [ ] SPECIFY ____

8. TANK PAINT: CHALKING WHITE [ ] LIGHT GREY OR BLUE [ ] ALUMINUM [X] DARK COLOR OR NO PAINT [ ]

9. TANK CONDITION: GOOD [X] FAIR [ ] POOR [ ]

10. TANK STATUS: NEW CONSTRUCTION [ ] ALTERATION [ ] Not Applicable

11. TYPE OF TANK: FIXED ROOF [X] PRESSURE [ ] INTERNALLY HEATED [ ] UNDERGROUND [ ] FLOATING ROOF [ ] OPEN TOP [ ] INSULATED [X] OTHER [ ] (CHECK ALL APPLICABLE)

12. IF TANK IS TO HAVE FLOATING ROOF, SUPPLY THE FOLLOWING INFORMATION:

TYPE OF ROOF: DOUBLE DECK [ ] PONTOON [ ] OTHER [ ] DESCRIBE ____

TYPE OF SEAL: SINGLE [ ] DOUBLE [ ] OTHER [ ] DESCRIBE ____

TYPE OF SHELL CONSTRUCTION: RIVETED [ ] WELDED [ ] OTHER [ ] DESCRIBE ____

13. IF TANK IS TO HAVE ANY OTHER TYPE OF ROOF OR COVER (OR NONE AT ALL), DESCRIBE:

14. VENT VALVE DATA: INDICATE TYPE, NUMBER, SETTINGS AND VAPOR DISPOSAL:

	NUMBER	PRESSURE SETTING	VACUUM SETTING	DISCHARGING TO: (CHECK) ATMOSPHERE	VAPOR CONTROL	FLARE
COMBINATION	PSV-DB-054	3" W.C.	1/2 oz.	✓		
PRESSURE	(Same vent	used for DB	-51 tank)			
VACUM						
OPEN						

15. NAME ALL LIQUIDS, VAPORS, GASES OR MIXTURES OF SUCH MATERIALS TO BE STORED IN THIS TANK:

AVERAGE MOLECULAR WEIGHT 165

DENSITY: 8.5 LBS/GAL.

COMPOSITION (%):
40% Dimethyl terephthalate
40% Methyl paratoluate
18.5% Methyl benzoate
1.5% Methyl paraformyl benzoate

16. TEMPERATURES AT WHICH THE ABOVE LISTED MATERIALS ARE TO BE STORED IN THIS TANK: (NORMAL AVERAGE DAILY MINIMUM AND MAXIMUM TEMPERATURES)

MINIMUM TEMPERATURE 290 °F MAXIMUM TEMPERATURE 310 °F

17. SPECIAL VAPOR CONTROLLING 'ICES:

Process Emission Source
Number B-261-1
Page 12 of 22
Edition B

[X] CONSERVATION VENT OR RELIEF VALVE.

[ ] CONDENSER,
AVERAGE EXIT GAS TEMPERATURE FROM CONDENSER, ________ °F.

[ ] SCRUBBER,
AVERAGE ORGANIC CONCENTRATION IN OUTLET SCRUBBER GAS, ________ LBS/FT³.

[ ] OTHER THAN ABOVE,
EXPLAIN ________________________________.

18. OPERATIONAL DATA:

[X] CONTINUOUS FILLING AND DISCHARGING,
AVERAGE DAILY LEVEL FLUCTUATION, 3.5 INCHES (FOR VERTICAL CYLINDRICAL TANKS).
AVERAGE DAILY VOLUME FLUCTUATION, ________ CU. FT. (FOR HORIZONTAL CYLINDRICAL AND SPHERICAL TANKS).

[ ] BATCH FILLING,
AVERAGE NUMBER OF GALLONS PER FILLING, ________.
AVERAGE NUMBER OF FILLS PER YEAR, ________.

19. OPERATIONAL DATA:
MAXIMUM FILLING RATE: ________ BARRELS PER HOUR (OR) 320 GAL. PER HOUR

AVERAGE OUTAGE: (AVER. DISTANCE FROM TOP OF TANK TO LIQUID SURFACE) 6 FT.

AVERAGE THROUGHPUT: ________ BARRELS PER HOUR (OR) ________ GAL. PER DAY

TANK TURNOVERS PER YEAR: ________

20. IF MATERIAL STORED IS A PETROLEUM PRODUCT OR ANY OTHER TYPE OF ORGANIC MATERIAL, SUPPLY THE FOLLOWING INFORMATION FOR EACH MATERIAL: ATTACH ADDITIONAL SHEETS, IF NECESSARY.
SEE ATTACHMENT

VAPOR PRESSURE: ________ LBS. REID (OR) ________ LBS. PER SQ. IN.

ABSOLUTE AT ________ °F INITIAL BOILING POINT: ________ °F

21. IF MATERIAL STORED IS A SOLUTION, SUPPLY THE FOLLOWING INFORMATION:

NAME OF SOLVENT: ________ NAME OF MATERIAL DISSOLVED: ________

CONCENTRATION OF MATERIAL DISSOLVED: ________ % BY WEIGHT (OR) ________ % BY VOLUME (OR) ________ LBS/GALLON

22. IF MATERIAL STORED IS A GAS OR A LIQUIFIED GAS WHICH IS NOT A PETROLEUM PRODUCT, SUPPLY THE FOLLOWING INFORMATION:
IDENTIFY THE MATERIAL: ________

PRESSURE AT WHICH MATERIAL IS STORED: ________ LBS. PER SQ. IN. GAGE AT ________ °F

23. ESTIMATED VAPOR LOSS .055 TONS/YEAR

THE ABOVE INFORMATION IS SUBMITTED TO DESCRIBE THE USE OF THE TANK FOR WHICH APPLICATION FOR PERMIT IS BEING MADE ON THE ACCOMPANYING FORM

SIGNATURE OF RESPONSIBLE MEMBER OF FIRM: J. C. Edwards June 27, 197

TYPE OR PRINT NAME AND OFFICIAL TITLE OF PERSON SIGNING THIS DATA FORM. NAME: J. C. Edwards PHONE: 246-2111, Ext. 24

TITLE. Manager, Clean Environment Program

DO NOT WRITE BELOW THIS LINE

COMMENTS:

REVIEWER ________

DATE ________

DO NOT WRITE IN THIS SPACE

AIR QUALITY REGION

AGENCY CODE

PERMIT NO.

REGISTRATION NO.

PROCESS EMISSION SOURCE NO.

EMISSION POINT NO. -

UTM ZONE (IF USED)

EW COORD.

NS COORD.

SIC CODE

AVERAGE DAILY LOSS TO ATMOSPHERE

ATTACHMENT I

No. 20

Material	V.P. @ 300°F (PSIA)	Boiling Point (°F)
Dimethyl terephthalate	14.72	545
Methyl paratoluate	14.82	420
Methyl benzoate	14.96	388
Methyl paraformyl benzoate	14.72	500

Process Emission Source Number B-261-1
Page 14 of 22
Edition B

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO.
PERMIT NO. P
PROCESS EMISSION SOURCE NO.
EMISSION POINT NO.
REVIEWER
DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-261-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). H
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 12 FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP .5 FEET.
6. SHOW NORMAL EXIT GAS TEMPERATURE 239 °F. 7. SHOW EXIT GAS VELOCITY .0053 FT/SEC.
8. INDICATE PERCENT OF TIME OVER 125°F 100 %.
9. SHOW EXIT GAS VOLUME FLOW RATE .0010 FT^3/SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 0 (GR./CU. FT. DRY GAS AT 70°F) AND 0 (GR./CU. FT. GAS AT STACK COND
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 520 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK ____ U-UP, D D-DOWN, ____ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

1-22-74 Issue.

APC - 22
REV 5/73

Process Emission Source Number B-261-1 Page 15 of 22 Edition B

14. IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POINT? YES [ ] NO [X]

IF YES, DESCRIBE: ______

15. ADDITIONAL COMMENTS: ______

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	✓			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	✓			PPM			
OXIDES OF NITROGEN	✓			PPM			
CARBON MONOXIDE		✓	3958	PPM	.0015	12.5	Calculation
GASEOUS FLUORIDES	✓			PPM			
OTHERS (NAME CHEMICAL)							
Methyl paratoluate		✓	.008	lbs/ft^3	.029	242	Calculation
Methyl benzoate		✓	.009	lbs/ft^3	.033	280	Calculation
Xylene		✓	.005	lbs/ft^3	.017	144	Calculation
Inert Gas		✓	.083	lbs/ft^3	.30	2480	Calculation

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ______ #/hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] CONTINUOUS MONITOR (S) FOR (1) ______; (2) ______; (3) ______ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ______ SULFUR DIOXIDE ______ HYDROCARBONS ______

CARBON MONOXIDE ______ FLUORIDES ______

FILING IS AUTHORIZED BY DATE

Process Emission Source Number B-261-1
Page 16 of 22
Edition B

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO.
PERMIT NO. P
PROCESS EMISSION SOURCE NO.
EMISSION POINT NO.
REVIEWER
DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-261-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). I
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 10 FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP .167 FEET.
6. SHOW NORMAL EXIT GAS TEMPERATURE 175 °F. 7. SHOW EXIT GAS VELOCITY .066 FT/SEC.
8. INDICATE PERCENT OF TIME OVER 125°F 100 %.
9. SHOW EXIT GAS VOLUME FLOW RATE .0014 FT^3 /SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 0 (GR./CU. FT. DRY GAS AT 70°F) AND 0 (GR./CU. FT. GAS AT STACK COND.)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 525 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK ____ U-UP, D D-DOWN, ____ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

1-22-74 Issue.

APC - 22
REV 5/73

Process Emission Source Number B-261-1 Page 17 of 22 Edition B

14 IS AN EMISSION MONITORING AND RE... ...DING INSTRUMENT ATTACHED TO THIS EMISSION ...INT? YES [ ] NO [X]

IF YES, DESCRIBE:

15. ADDITIONAL COMMENTS:

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	✓			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	✓			PPM			
OXIDES OF NITROGEN	✓			PPM			
CARBON MONOXIDE		✓	4060	PPM	.002	17.9	Calculatio...
GASEOUS FLUORIDES	✓			PPM			
OTHERS (NAME CHEMICAL)							
Methyl Paratoluate		✓	.008	lbs/ft^3	.041	340	Calculatio...
Methyl Benzoate		✓	.009	lbs/ft^3	.046	392	Calculatio...
Xylene		✓	.005	lbs/ft^3	.024	200	Calculatio...
Inert Gas		✓	.083	lbs/ft^3	.42	3478	Calculation

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ________ #/hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ________ AND ALLOWABLE EMISSIONS ________

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ________ AND ALLOWABLE EMISSIONS ________

[ ] CONTINUOUS MONITOR (S) FOR (1) ________; (2) ________; (3) ________ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ________ SULFUR DIOXIDE ________ HYDROCARBONS ________

CARBON MONOXIDE ________ FLUORIDES ________

...ING IS AUTHORIZED BY

DATE

Process Emission Source
Number B-261-1
Page 18 of 22 [redacted]
Edition B

Storage Tank Summary

TENNESSEE DEPARTMENT OF PUBLIC HEALTH
MAIL TO: DIVISION OF AIR POLLUTION CONTROL
CORDELL HULL BUILDING C2-212
NASHVILLE, TENNESSEE 37219

ONE COPY OF THIS FORM MUST BE FILLED OUT COMPLETELY FOR EACH TANK AND MUST ACCOMPANY THE APPLICATION FOR PERMIT, APC-20.

1. TENNESSEE EASTMAN COMPANY

2. TANK LOCATION: B-261, 1st floor — LATITUDE 36° 31' 21"N — LONGITUDE 82° 32' 14"W

3. TANK IDENTIFICATION (NUMBER OR NAME): DD-51 (Vent J)

4. TANK CAPACITY: BARRELS ____ GALLONS 415

5. TANK DIMENSIONS: DIAMETER 4 ft. HEIGHT 4 ft. LENGTH ____ WIDTH ____

6. TANK SHAPE: CYLINDRICAL [X] SPHERICAL [ ] OTHER SHAPE [ ] DESCRIBE

7. TANK MATERIALS OF CONSTRUCTION: STEEL [X] WOOD [ ] OTHER [ ] SPECIFY

8. TANK PAINT: CHALKING WHITE [ ] LIGHT GREY OR BLUE [ ] ALUMINUM [X] DARK COLOR OR NO PAINT [ ]

9. TANK CONDITION: GOOD [X] FAIR [ ] POOR [ ]

10. TANK STATUS: NEW CONSTRUCTION [ ] ALTERATION [ ] Not Applicable

11. TYPE OF TANK: FIXED ROOF [X] PRESSURE [ ] INTERNALLY HEATED [ ]
UNDERGROUND [ ] FLOATING ROOF [ ] OPEN TOP [ ] INSULATED [X] OTHER [ ]
(CHECK ALL APPLICABLE)

12. IF TANK IS TO HAVE FLOATING ROOF, SUPPLY THE FOLLOWING INFORMATION:
TYPE OF ROOF: DOUBLE DECK [ ] PONTOON [ ] OTHER [ ] DESCRIBE ____
TYPE OF SEAL: SINGLE [ ] DOUBLE [ ] OTHER [ ] DESCRIBE ____
TYPE OF SHELL CONSTRUCTION: RIVETED [ ] WELDED [ ] OTHER [ ] DESCRIBE ____

13. IF TANK IS TO HAVE ANY OTHER TYPE OF ROOF OR COVER (OR NONE AT ALL), DESCRIBE:

14. VENT VALVE DATA: INDICATE TYPE, NUMBER, SETTINGS AND VAPOR DISPOSAL:

	NUMBER	PRESSURE SETTING	VACUUM SETTING	DISCHARGING TO: ATMOSPHERE	VAPOR CONTROL	(CHECK) FLARE
COMBINATION	PSV-DB-054	6" W.C.	1/2 oz.	✓		
PRESSURE	(Same vent used for DB-52 tank)					
VACUUM						
OPEN						

15. NAME ALL LIQUIDS, VAPORS, GASES OR MIXTURES OF SUCH MATERIALS TO BE STORED IN THIS TANK:
AVERAGE MOLECULAR WEIGHT 163 — COMPOSITION (%)
70% Methyl paraformyl benzoate
15% Methyl paratoluate
2.5% Methyl benzoate
10% Dimethyl terephthalate
2.5% Methyl 4-methoxy methyl benzo[redacted]te
DENSITY: 8.5 LBS/GAL.

16. TEMPERATURES AT WHICH THE ABOVE LISTED MATERIALS ARE TO BE STORED IN THIS TANK: (NORMAL AVERAGE DAILY MINIMUM AND MAXIMUM TEMPERATURES)

MINIMUM TEMPERATURE 320 °F — MAXIMUM TEMPERATURE 330 °F

A[redacted]

17. SPECIAL VAPOR CONTROLLIN(VICES:

Process Emission Source
Number B-261-1
Page 19 of 22
Edition B

[X] CONSERVATION VENT OR RELIEF VALVE.

[ ] CONDENSER,
AVERAGE EXIT GAS TEMPERATURE FROM CONDENSER, ________ °F.

[ ] SCRUBBER,
AVERAGE ORGANIC CONCENTRATION IN OUTLET SCRUBBER GAS, ________ LBS/FT^3.

[ ] OTHER THAN ABOVE,
EXPLAIN ________.

18. OPERATIONAL DATA:

[ ] CONTINUOUS FILLING AND DISCHARGING,
AVERAGE DAILY LEVEL FLUCTUATION, ________ INCHES (FOR VERTICAL CYLINDRICAL TANKS).
AVERAGE DAILY VOLUME FLUCTUATION, ________ CU. FT. (FOR HORIZONTAL CYLINDRICAL AND SPHERICAL TANKS).

[X] BATCH FILLING,
AVERAGE NUMBER OF GALLONS PER FILLING, 195.
AVERAGE NUMBER OF FILLS PER YEAR, 420.

19. OPERATIONAL DATA:
MAXIMUM FILLING RATE: ________ BARRELS PER HOUR (OR) 23 GAL. PER HOUR

AVERAGE OUTAGE: (AVER. DISTANCE FROM TOP OF TANK TO LIQUID SURFACE) 3 1/2 FT.

AVERAGE THROUGHPUT: ________ BARRELS PER HOUR (OR) ________ GAL. PER DAY

TANK TURNOVERS PER YEAR: ________

20. IF MATERIAL STORED IS A PETROLEUM PRODUCT OR ANY OTHER TYPE OF ORGANIC MATERIAL, SUPPLY THE FOLLOWING INFORMATION FOR EACH MATERIAL: ATTACH ADDITIONAL SHEETS, IF NECESSARY.
SEE ATTACHMENT
VAPOR PRESSURE: ________ LBS. REID (OR) ________ LBS. PER SQ. IN.

ABSOLUTE AT ________ °F INITIAL BOILING POINT: ________ °F

21. IF MATERIAL STORED IS A SOLUTION, SUPPLY THE FOLLOWING INFORMATION:

NAME OF SOLVENT: ________ NAME OF MATERIAL DISSOLVED: ________

CONCENTRATION OF
MATERIAL DISSOLVED: ________ % BY WEIGHT (OR) ________ % BY VOLUME (OR) ________ LBS/GALLON

22. IF MATERIAL STORED IS A GAS OR A LIQUIFIED GAS WHICH IS NOT A PETROLEUM PRODUCT, SUPPLY THE FOLLOWING INFORMATION:
IDENTIFY THE MATERIAL: ________

PRESSURE AT WHICH MATERIAL IS STORED: ________ LBS. PER SQ. IN. GAGE AT ________ °F

23. ESTIMATED VAPOR LOSS .32 TONS/YEAR

THE ABOVE INFORMATION IS SUBMITTED TO DESCRIBE THE USE OF THE TANK FOR WHICH APPLICATION FOR PERMIT IS BEING MADE ON THE ACCOMPANYING FORM

SIGNATURE OF RESPONSIBLE MEMBER OF FIRM: J. C. EDWARDS JNL June 27, 197[illegible]

TYPE OR PRINT NAME AND OFFICIAL TITLE OF PERSON SIGNING THIS DATA FORM.
NAME: J. C. Edwards PHONE 246-2111, Ext. 24[illegible]

TITLE. Manager, Clean Environment Program

DO NOT WRITE BELOW THIS LINE

COMMENTS:

REVIEWER ________

DATE ________

DO NOT WRITE IN THIS SPACE

AIR QUALITY REGION
AGENCY CODE
PERMIT NO.
REGISTRATION NO.
PROCESS EMISSION SOURCE NO.
EMISSION POINT NO. -
UTM ZONE (IF USED)
EW COORD.
NS COORD.
SIC CODE

AVERAGE DAILY LOSS TO ATMOSPHERE ________

ATTACHMENT I

No. 20

Material	V.P. @ 330°F (PSIA)	Boiling Point (°F)
Methyl paraformyl benzoate	14.74	500
Methyl paratoluate	14.92	420
Methyl benzoate	15.10	388
Dimethyl terephthalate	14.73	545
Methyl 4-methoxy methyl benzoate	15.10	395

Process Emission Source
Number B-261-1
Page 21 of 22
Edition B

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO. -
PERMIT NO. P
PROCESS EMISSION SOURCE NO.
EMISSION POINT NO.
REVIEWER
DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-261-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). L
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 40 FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP .25 FEET.
6. SHOW NORMAL EXIT GAS TEMPERATURE 100 °F. 7. SHOW EXIT GAS VELOCITY 1.96 FT/SEC.
8. INDICATE PERCENT OF TIME OVER 125°F 0 %.
9. SHOW EXIT GAS VOLUME FLOW RATE .096 FT^3/SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 0 (GR./CU. FT. DRY GAS AT 70°F) AND 0 (GR./CU. FT. GAS AT STACK CONDITIONS)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 550 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK ______ U-UP, D D-DOWN, ______ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE	yes	1974	001	100%
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

-22-74 Issue.

APC - 22
REV 5/73

Process Emission Source Number B-261-1 Page 22 of 22 Edition B

14 IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POINT? YES [ ] NO [X]

IF YES, DESCRIBE: ______

15. ADDITIONAL COMMENTS: ______

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	✓			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	✓			PPM			
OXIDES OF NITROGEN	✓			PPM			
CARBON MONOXIDE	✓			PPM			
GASEOUS FLUORIDES	✓			PPM			
OTHERS (NAME CHEMICAL)							
Nitrogen		✓	0.058	lb./ft.^{3}	20	168,000	Flow meter
Methanol		✓	0.027	lb./ft.^{3}	9.4	79,000	Calculation from vapor press. data.

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ______ #/HR

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] CONTINUOUS MONITOR (S) FOR (1) ______; (2) ______; (3) ______ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ______ SULFUR DIOXIDE ______ HYDROCARBONS ______

CARBON MONOXIDE ______ FLUORIDES ______

Process Emission Source
Number B-261A-1
Page 1 of 16
Edition B

PERMIT APPLICATION - APC 20

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
CORDELL HULL BUILDING C2-212
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE	
COMPANY NO.	
AQCR	
AGENCY CODE	
NEDS COUNTY CODE	
PERMIT NO.	
PROCESS EMISSION SOURCE NO.	
EMISSION POINT NO.	
CITY CODE	
UTM ZONE	
EW COORD.	
NS COORD.	
SIC CODE	
REVIEWER	
DATE	

1. PERMIT TO BE ISSUED TO:

TENNESSEE EASTMAN COMPANY

2. MAILING ADDRESS

P. O. Box 511
Kingsport, Tennessee 37662

ADDRESS AT WHICH SOURCE IS TO BE OPERATED:

Same as above.

TYPE OF ORGANIZATION: CORPORATION [x]

5. EMISSION SOURCE NUMBER B-261A-1 6. STANDARD INDUSTRIAL CLASSIFICATION OF CO. 2 8 1 5

BRIEF DESCRIPTION OF EMISSION SOURCE FOR WHICH PERMIT IS DESIRED: Dimethyl terephthalate plant No. 4

LATITUDE AND LONGITUDE OF AIR CONTAMINANT SOURCE 36° 31' 23"N 82° 32' 12"W

9. COST OF MODIFICATION $ ______ COST OF AIR POLLUTION CONTROL EQUIPMENT $ ______

10. IF THIS AIR CONTAMINANT SOURCE HAS A PREVIOUS WRITTEN PERMIT GIVE NAME OF CORPORATION, COMPANY OR INDIVIDUAL OWNER THAT OPERATED THIS SOURCE AND STATE PREVIOUS TENNESSEE DIVISION OF AIR POLLUTION CONTROL PERMIT NUMBER, IF KNOWN.

NAME TENNESSEE EASTMAN COMPANY PERMIT NUMBER ______

11. PRESENT STATUS OF AIR CONTAMINANT SOURCE (CHECK AND COMPLETE APPLICABLE ITEMS)

[ ] PERMIT TO CONSTRUCT REQUESTED - Est. Starting Date ______ Est. Completion Date ______

[X] CONSTRUCTION COMPLETED - Date 1967 [ ] PERMIT TO OPERATE REQUESTED

[ ] TRANSFER OF LOCATION - Est. Date ______ [ ] AIR CONTAMINANT SOURCE HAS NOT BEEN ALTERED

12. SIGNATURE OF RESPONSIBLE MEMBER OF FIRM — JUL 25 1974 DATE OF APPLICATION

13. TYPE OR PRINT NAME AND OFFICIAL TITLE OF PERSON SIGNING THIS APPLICATION

NAME J. C. Edwards

TITLE Manager, Clean Environment Program

PHONE 246-2111, Extension 2444

PROCESS EMISSION SOURCE COVER SHEET - APC 21

MAIL TO:
TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
CORDELL HULL BUILDING C2-212
NASHVILLE, TENNESSEE 37217

DO NOT WRITE IN THIS SPACE

COMPANY NO.

PERMIT NO.

PROCESS EMISSION SOURCE NO.

EMISSION POINT NO.

REVIEWER

DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-261A-1 3. SIC CODE 2815
4. DID CONSTRUCTION OF THIS PROCESS BEGIN ON OR BEFORE AUGUST 9, 1969? [X] YES [ ] NO ON OR BEFORE APRIL 3, 1972? [X] YES [ ]
5. GIVE A BRIEF DESCRIPTION OF THE PROCESS ALONG WITH A FLOW DIAGRAM. OPERATION CENTERS, STORAGE POINTS, MATERIAL INPUTS, MATERIAL OUTPUTS AND EMISSION POINTS SHOULD BE NOTED IN POUNDS PER OPERATING HOUR.

Terephthalic acid and methanol are reacted to produce dimethyl terephthalate. The remainder of the process is distillation to remove impurities.

NOTE: ATTACH FLOW DIAGRAM FOR PROCESS EMISSION SOURCE CLAIMED ON SEPARATE SHEET.

6. TYPE OF PROCESS: CONTINUOUS [X] BATCH [ ] COMBINED [ ]

7. OPERATIONAL SCHEDULE OF PROCESS EMISSION SOURCE:

A. HOURS PER DAY 24
B. DAYS PER WEEK 7
C. WEEKS PER YEAR 50

D. % ANNUAL THRUPUT

DEC-FEB	MARCH-MAY	JUNE-AUGUST	SEPT-NOV
25	25	25	25

8. LIST MATERIAL INPUTS TO PROCESS EMISSION SOURCE:

NAME OF INPUT	LBS/OPERATING HOUR DESIGN CAPACITY	LBS/OPERATING HOUR ACTUAL LOADING	FLOW DIAGRAM REFERENCE
A. Methanol	9760	9760	1
B. Terephthalic Acid	24,690	24,690	2
C. Xylene	45	45	3
D.			
E.			
F.			
G.			
TOTAL LBS/OPERATING HOUR INPUT TO PROCESS EMISSION SOURCE	34,500	34,500	

(TOTAL ROUNDED TO THREE SIGNIFICANT FIGURES)

9. LIST MATERIAL OUTPUTS FROM THIS PROCESS EMISSION SOURCE:

NAME OF OUTPUT	LBS/OPERATING HOUR DESIGN CAPACITY	LBS/OPERATING HOUR ACTUAL LOADING	FLOW DIAGRAM REFERENCE
A. Dimethyl Terephthalate	28,500	28,500	4
B. Water	5420	5420	5
C.			
D.			
E.			
F.			
G.			
TOTAL LBS/OPERATING HOUR OUTPUT FROM PROCESS EMISSION SOURCE	33,900	33,900	(TOTAL ROUNDED TO THREE SIGNIFICANT FIGURES)

10. LIST AIR POLLUTION EMISSION POINTS FOR THIS PROCESS EMISSION SOURCE. ATTACH A SEPARATE "EMISSION POINT DATA" SHEET, APC-22, FOR EACH POINT.

EMISSION POINT NO. OR CODE	LBS PARTICULATE/OPERATING HOUR	FLOW DIAGRAM REFERENCE
A.		
B. B*	0	B
C. C	0	C
D. E	0	E
E. F	0	F
F.		

TOTAL LBS. OF PARTICULATE EMITTED FROM PROCESS EMISSION SOURCE PER OPERATING HOUR 0 (TOTAL ROUNDED TO TWO SIGNIFICANT FIGURES)

NOTE: ATTACH ADDITIONAL SHEETS AS REQUIRED FOR ITEMS 8, 9, AND 10.

*Submitted July, 1970, as Vent 5-B.

11. J. C. Edwards /Oil L — SIGNATURE OF RESPONSIBLE MEMBER OF FIRM — June 27, 1974 — DATE OF APPLICATION

12. TYPE OR PRINT NAME AND OFFICIAL TITLE OF PERSON SIGNING THIS FORM

NAME J. C. Edwards

TITLE Manager, Clean Environment Program

DATE JUN 27 1974 PHONE 246-2111, Ext. 2444

FOR OFFICIAL USE ONLY

- [ ] PROCESS EMISSION SOURCE CLAIMED IS ACCEPTABLE.
- [ ] PROCESS EMISSION SOURCE CLAIMED IS NOT ACCEPTABLE.
- [ ] RECOMMENDED MAKE UP OF PROCESS EMISSION SOURCE ATTACHED ON SEPARATE SHEET.
- [ ] PROCESS EMISSION SOURCE IS NOT IN COMPLIANCE WITH APPLICABLE REGULATIONS.
- [ ] PROCESS WEIGHT TABLE APPLIES TO THIS PROCESS EMISSION SOURCE.
- [ ] DIFFUSION EQUATION APPLIES TO THIS PROCESS EMISSION SOURCE. [ ] TABLE I [ ] TABLE II

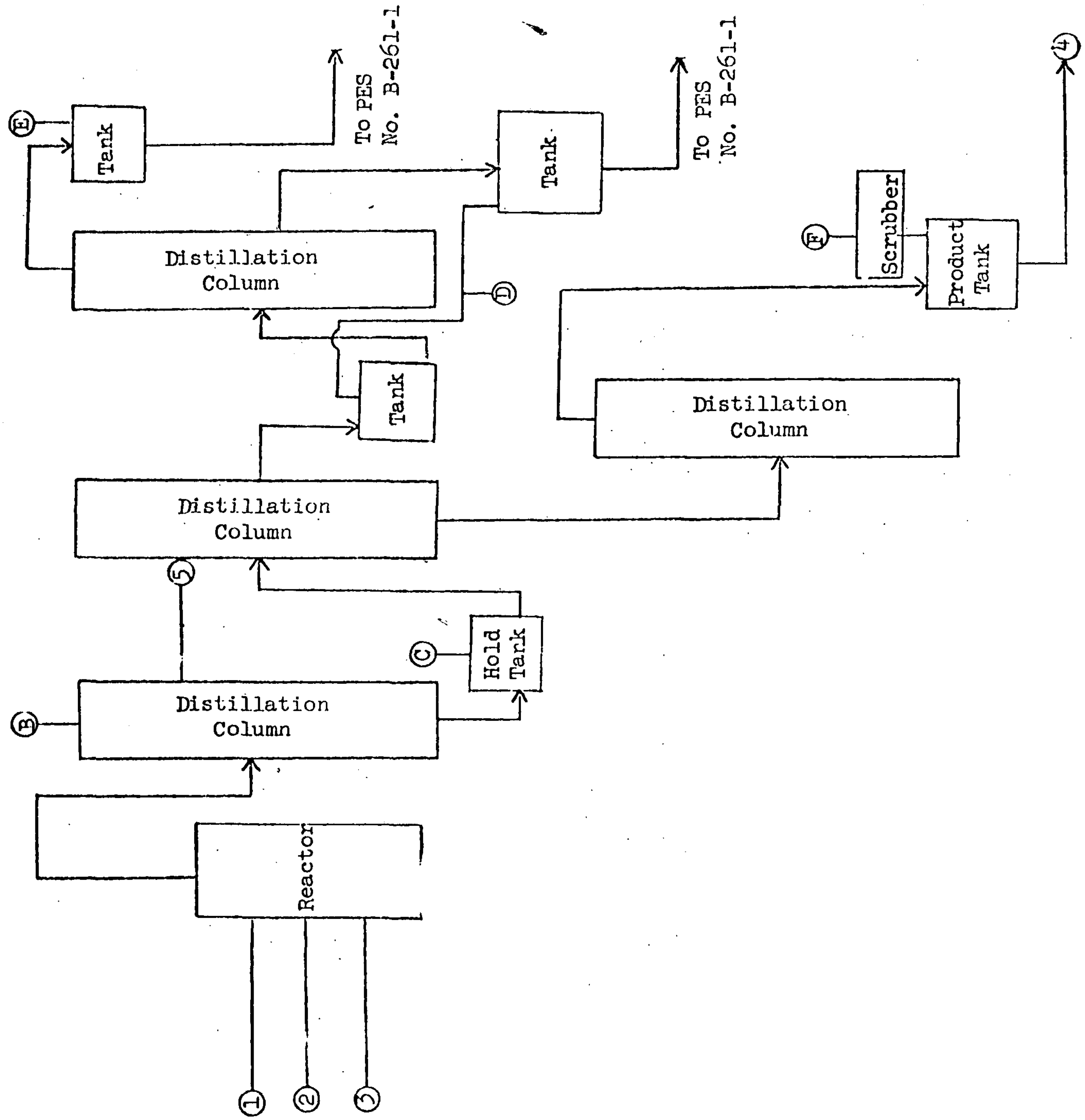
ALLOWABLE EMISSIONS ______ LBS/HOUR ACTUAL EMISSIONS ______ TONS/YEAR

FILING IS AUTHORIZED BY ______ DATE ______

Flow Diagram

For Item 5 of APC-21

Process Emission Source
Number B-261A-1
Page 4 of 16
Edition B



Process Emission Source
Number B-261A-1
Page 5 of 16
Edition B

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO.

PERMIT NO. P

PROCESS EMISSION SOURCE NO.

EMISSION POINT NO.

REVIEWER

DATE

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-261A-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). C
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 30 FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP .33 FEET.
6. SHOW NORMAL EXIT GAS TEMPERATURE 203 °F. 7. SHOW EXIT GAS VELOCITY .096 FT/SEC.
8. INDICATE PERCENT OF TIME OVER 125°F 100 %.
9. SHOW EXIT GAS VOLUME FLOW RATE .0082 FT^3 /SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 0 (GR./CU. FT. DRY GAS AT 70°F) AND 0 (GR./CU. FT. GAS AT STACK CONDITIONS)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 465 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK ___ U-UP, D D-DOWN, ___ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

14 IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POINT? YES [ ] NO [X]

IF YES, DESCRIBE: ______

15. ADDITIONAL COMMENTS: ______

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	✓			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	✓			PPM			
OXIDES OF NITROGEN	✓			PPM			
CARBON MONOXIDE		✓	2468	PPM	.0097	81.4	Calculation
GASEOUS FLUORIDES	✓			PPM			
OTHERS (NAME CHEMICAL)							
Xylene		✓	.067	lbs/ft^3	1.99	16,700	Calculation
Inert Gas		✓	.066	lbs/ft^3	1.94	16,280	Calculation

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ______ #/hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] CONTINUOUS MONITOR (S) FOR (1) ______; (2) ______; (3) ______ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ______ SULFUR DIOXIDE ______ HYDROCARBONS ______

CARBON MONOXIDE ______ FLUORIDES ______

Storage Tank Summary

TENNESSEE DEPARTMENT OF PUBLIC HEALTH
MAIL TO: DIVISION OF AIR POLLUTION CONTROL
CORDELL HULL BUILDING C2-212
NASHVILLE, TENNESSEE 37219

ONE COPY OF THIS FORM MUST BE FILLED OUT COMPLETELY FOR EACH TANK AND MUST ACCOMPANY THE APPLICATION FOR PERMIT, APC-20.

1. TENNESSEE EASTMAN COMPANY

2. TANK LOCATION: B-261A, 2nd floor — LATITUDE 36° 31' 22"N — LONGITUDE 82° 32' 13"W

3. TANK IDENTIFICATION (NUMBER OR NAME): FB-52 (Vent D)

4. TANK CAPACITY: BARRELS ____ GALLONS 7094

5. TANK DIMENSIONS: DIAMETER 9 1/2 ft. HEIGHT 11 1/2 ft. LENGTH ____ WIDTH ____

6. TANK SHAPE: CYLINDRICAL [X] SPHERICAL [ ] OTHER SHAPE [ ] DESCRIBE ____

7. TANK MATERIALS OF CONSTRUCTION: STEEL [X] WOOD [ ] OTHER [ ] SPECIFY ____

8. TANK PAINT: CHALKING WHITE [ ] LIGHT GREY OR BLUE [ ] ALUMINUM [X] DARK COLOR OR NO PAINT [ ]

9. TANK CONDITION: GOOD [X] FAIR [ ] POOR [ ]

10. TANK STATUS: NEW CONSTRUCTION [ ] ALTERATION [ ] Not Applicable

11. TYPE OF TANK: FIXED ROOF [X] PRESSURE [ ] INTERNALLY HEATED [ ]
UNDERGROUND [ ] FLOATING ROOF [ ] OPEN TOP [ ] INSULATED [X] OTHER [ ]
(CHECK ALL APPLICABLE)

12. IF TANK IS TO HAVE FLOATING ROOF, SUPPLY THE FOLLOWING INFORMATION:
TYPE OF ROOF: DOUBLE DECK [ ] PONTOON [ ] OTHER [ ] DESCRIBE ____
TYPE OF SEAL: SINGLE [ ] DOUBLE [ ] OTHER [ ] DESCRIBE ____
TYPE OF SHELL CONSTRUCTION: RIVETED [ ] WELDED [ ] OTHER [ ] DESCRIBE ____

13. IF TANK IS TO HAVE ANY OTHER TYPE OF ROOF OR COVER (OR NONE AT ALL), DESCRIBE:

14. VENT VALVE DATA: INDICATE TYPE, NUMBER, SETTINGS AND VAPOR DISPOSAL:

	NUMBER	PRESSURE SETTING	VACUUM SETTING	DISCHARGING TO: (CHECK) ATMOSPHERE	VAPOR CONTROL	FLARE
COMBINATION	PSV-FB-054	6" W.C.	1/2 oz.	✓		
PRESSURE	(Same vent	used for FD-51 tank)				
VACUM						
OPEN						

15. NAME ALL LIQUIDS, VAPORS, GASES OR MIXTURES OF SUCH MATERIALS TO BE STORED IN THIS TANK:
AVERAGE MOLECULAR WEIGHT 153 — COMPOSITION (%)
20% Dimethyl terephthalate
57% Methyl paratoluate
21.5% Methyl benzoate
1.5% Methyl paraformyl benzoate
DENSITY: 8.5 LBS/GAL.

16. TEMPERATURES AT WHICH THE ABOVE LISTED MATERIALS ARE TO BE STORED IN THIS TANK: (NORMAL AVERAGE DAILY MINIMUM AND MAXIMUM TEMPERATURES)
MINIMUM TEMPERATURE 290 °F MAXIMUM TEMPERATURE 310 °F

Process Emission Source Number B-261A-1
Page 8 of 16
Edition B

17. SPECIAL VAPOR CONTROLLING DEVICES:

[X] CONSERVATION VENT OR RELIEF VALVE.

[ ] CONDENSER,
AVERAGE EXIT GAS TEMPERATURE FROM CONDENSER, ________ °F.

[ ] SCRUBBER,
AVERAGE ORGANIC CONCENTRATION IN OUTLET SCRUBBER GAS, ________ LBS/FT³.

[ ] OTHER THAN ABOVE,
EXPLAIN ________.

18. OPERATIONAL DATA:

[X] CONTINUOUS FILLING AND DISCHARGING,
AVERAGE DAILY LEVEL FLUCTUATION, 7 INCHES (FOR VERTICAL CYLINDRICAL TANKS).
AVERAGE DAILY VOLUME FLUCTUATION, ________ CU. FT. (FOR HORIZONTAL CYLINDRICAL AND SPHERICAL TANKS).

[ ] BATCH FILLING,
AVERAGE NUMBER OF GALLONS PER FILLING, ________.
AVERAGE NUMBER OF FILLS PER YEAR, ________.

19. OPERATIONAL DATA:
MAXIMUM FILLING RATE: ________ BARRELS PER HOUR (OR) 2000 GAL. PER HOUR
AVERAGE OUTAGE: (AVER. DISTANCE FROM TOP OF TANK TO LIQUID SURFACE) 9 FT.
AVERAGE THROUGHPUT: ________ BARRELS PER HOUR (OR) ________ GAL. PER DAY
TANK TURNOVERS PER YEAR: ________

20. IF MATERIAL STORED IS A PETROLEUM PRODUCT OR ANY OTHER TYPE OF ORGANIC MATERIAL, SUPPLY THE FOLLOWING INFORMATION FOR EACH MATERIAL: ATTACH ADDITIONAL SHEETS, IF NECESSARY.
SEE ATTACHMENT
VAPOR PRESSURE: ________ LBS. REID (OR) ________ LBS. PER SQ. IN.
ABSOLUTE AT ________ °F INITIAL BOILING POINT: ________ °F

21. IF MATERIAL STORED IS A SOLUTION, SUPPLY THE FOLLOWING INFORMATION:
NAME OF SOLVENT: ________ NAME OF MATERIAL DISSOLVED: ________
CONCENTRATION OF MATERIAL DISSOLVED: ________ % BY WEIGHT (OR) ________ % BY VOLUME (OR) ________ LBS/GALLON

22. IF MATERIAL STORED IS A GAS OR A LIQUIFIED GAS WHICH IS NOT A PETROLEUM PRODUCT, SUPPLY THE FOLLOWING INFORMATION:
IDENTIFY THE MATERIAL: ________
PRESSURE AT WHICH MATERIAL IS STORED: ________ LBS. PER SQ. IN. GAGE AT ________ °F

23. ESTIMATED VAPOR LOSS .23 TONS/YEAR

THE ABOVE INFORMATION IS SUBMITTED TO DESCRIBE THE USE OF THE TANK FOR WHICH APPLICATION FOR PERMIT IS BEING MADE ON THE ACCOMPANYING FORM

SIGNATURE OF RESPONSIBLE MEMBER OF FIRM: J. C. Edwards /gat June 27, 1974

TYPE OR PRINT NAME AND OFFICIAL TITLE OF PERSON SIGNING THIS DATA FORM.
NAME: J. C. Edwards PHONE: 246-2111, Ext. 2444
TITLE. Manager, Clean Environment Program

DO NOT WRITE BELOW THIS LINE

COMMENTS:

REVIEWER

DATE

DO NOT WRITE IN THIS SPACE
AIR QUALITY REGION
AGENCY CODE
PERMIT NO.
REGISTRATION NO.
PROCESS EMISSION SOURCE NO.
EMISSION POINT NO. -
UTM ZONE (IF USED)
EW COORD.
NS COORD.
SIC CODE

AVERAGE DAILY LOSS TO ATMOSPHERE

APC-27

ATTACHMENT I

No. 20

Material	V.P. @ 300°F (PSIA)	Boiling Point (°F)
Dimethyl terephthalate	14.72	545
Methyl paratoluate	14.82	420
Methyl benzoate	14.96	388
Methyl paraformyl benzoate	14.72	500

Storage Tank Summary

TENNESSEE DEPARTMENT OF PUBLIC HEALTH
MAIL TO: DIVISION OF AIR POLLUTION CONTROL
CORDELL HULL BUILDING C2-212
NASHVILLE, TENNESSEE 37219

ONE COPY OF THIS FORM MUST BE FILLED OUT COMPLETELY FOR EACH TANK AND MUST ACCOMPANY THE APPLICATION FOR PERMIT, APC-20.

1. TENNESSEE EASTMAN COMPANY

2. TANK LOCATION: B-261A, 3rd floor — LATITUDE (° ' "): 36 31 22N — LONGITUDE (° ' "): 82 32 13W

3. TANK IDENTIFICATION (NUMBER OR NAME): FD-51 (Vent D)

4. TANK CAPACITY: BARRELS ____ GALLONS 920

5. TANK DIMENSIONS: DIAMETER 5 ft. HEIGHT 5 1/4 ft. LENGTH ____ WIDTH ____

6. TANK SHAPE: CYLINDRICAL [X] SPHERICAL [ ] OTHER SHAPE [ ] DESCRIBE ____

7. TANK MATERIALS OF CONSTRUCTION: STEEL [X] WOOD [ ] OTHER [ ] SPECIFY ____

8. TANK PAINT: CHALKING WHITE [ ] LIGHT GREY OR BLUE [ ] ALUMINUM [X] DARK COLOR OR NO PAINT [ ]

9. TANK CONDITION: GOOD [X] FAIR [ ] POOR [ ]

10. TANK STATUS: NEW CONSTRUCTION [ ] ALTERATION [ ] Not Applicable

11. TYPE OF TANK: FIXED ROOF [X] PRESSURE [ ] INTERNALLY HEATED [ ]
UNDERGROUND [ ] FLOATING ROOF [ ] OPEN TOP [ ] INSULATED [X] OTHER [ ]
(CHECK ALL APPLICABLE)

12. IF TANK IS TO HAVE FLOATING ROOF, SUPPLY THE FOLLOWING INFORMATION:
TYPE OF ROOF: DOUBLE DECK [ ] PONTOON [ ] OTHER [ ] DESCRIBE ____
TYPE OF SEAL: SINGLE [ ] DOUBLE [ ] OTHER [ ] DESCRIBE ____
TYPE OF SHELL CONSTRUCTION: RIVETED [ ] WELDED [ ] OTHER [ ] DESCRIBE ____

13. IF TANK IS TO HAVE ANY OTHER TYPE OF ROOF OR COVER (OR NONE AT ALL), DESCRIBE:

14. VENT VALVE DATA: INDICATE TYPE, NUMBER, SETTINGS AND VAPOR DISPOSAL:

	NUMBER	PRESSURE SETTING	VACUUM SETTING	DISCHARGING TO: (CHECK) ATMOSPHERE	VAPOR CONTROL	FLARE
COMBINATION	PSV-FB-054	6" W.C.	1/2 oz.	✓		
PRESSURE	(Same vent	used for FB	-52 tank)			
VACUUM						
OPEN						

15. NAME ALL LIQUIDS, VAPORS, GASES OR MIXTURES OF SUCH MATERIALS TO BE STORED IN THIS TANK:
AVERAGE MOLECULAR WEIGHT 163
COMPOSITION (%)
70% Methyl paraformyl benzoate
15% Methyl paratoluate
10% Dimethyl terephthalate
2.5% Methyl benzoate
2.5% Methyl 4-methoxy methyl benzoate
DENSITY: 8.5 LBS/GAL.

16. TEMPERATURES AT WHICH THE ABOVE LISTED MATERIALS ARE TO BE STORED IN THIS TANK: (NORMAL AVERAGE DAILY MINIMUM AND MAXIMUM TEMPERATURES)
MINIMUM TEMPERATURE 320 °F MAXIMUM TEMPERATURE 330 °F

APC-2

17. SPECIAL VAPOR CONTROLLING DEVICES:

[X] CONSERVATION VENT OR RELIEF VALVE.

[ ] CONDENSER,
AVERAGE EXIT GAS TEMPERATURE FROM CONDENSER, ________°F.

[ ] SCRUBBER,
AVERAGE ORGANIC CONCENTRATION IN OUTLET SCRUBBER GAS, ________LBS/FT³.

[ ] OTHER THAN ABOVE,
EXPLAIN ________.

18. OPERATIONAL DATA:

[ ] CONTINUOUS FILLING AND DISCHARGING,
AVERAGE DAILY LEVEL FLUCTUATION, ________INCHES (FOR VERTICAL CYLINDRICAL TANKS).
AVERAGE DAILY VOLUME FLUCTUATION, ________CU. FT. (FOR HORIZONTAL CYLINDRICAL AND SPHERICAL TANKS).

[X] BATCH FILLING,
AVERAGE NUMBER OF GALLONS PER FILLING, 270.
AVERAGE NUMBER OF FILLS PER YEAR, 1050.

19. OPERATIONAL DATA:
MAXIMUM FILLING RATE: ________BARRELS PER HOUR (OR) 50 GAL. PER HOUR

AVERAGE OUTAGE: (AVER. DISTANCE FROM TOP OF TANK TO LIQUID SURFACE) 4.9 FT.

AVERAGE THROUGHPUT: ________BARRELS PER HOUR (OR) ________GAL. PER DAY

TANK TURNOVERS PER YEAR: ________

20. IF MATERIAL STORED IS A PETROLEUM PRODUCT OR ANY OTHER TYPE OF ORGANIC MATERIAL, SUPPLY THE FOLLOWING INFORMATION FOR EACH MATERIAL: ATTACH ADDITIONAL SHEETS, IF NECESSARY.
SEE ATTACHMENT
VAPOR PRESSURE: ________LBS. REID (OR) ________LBS. PER SQ. IN.

ABSOLUTE AT ________°F INITIAL BOILING POINT: ________°F

21. IF MATERIAL STORED IS A SOLUTION, SUPPLY THE FOLLOWING INFORMATION:

NAME OF SOLVENT: ________ NAME OF MATERIAL DISSOLVED: ________

CONCENTRATION OF MATERIAL DISSOLVED: ________% BY WEIGHT (OR) ________% BY VOLUME (OR) ________LBS/GALLON

22. IF MATERIAL STORED IS A GAS OR A LIQUIFIED GAS WHICH IS NOT A PETROLEUM PRODUCT, SUPPLY THE FOLLOWING INFORMATION:
IDENTIFY THE MATERIAL: ________

PRESSURE AT WHICH MATERIAL IS STORED: ________LBS. PER SQ. IN. GAGE AT________°F

23. ESTIMATED VAPOR LOSS .58 TONS/YEAR

THE ABOVE INFORMATION IS SUBMITTED TO DESCRIBE THE USE OF THE TANK FOR WHICH APPLICATION FOR PERMIT IS BEING MADE ON THE ACCOMPANYING FORM

SIGNATURE OF RESPONSIBLE MEMBER OF FIRM: J. C. EDWARDS June 27, 1974

TYPE OR PRINT NAME AND OFFICIAL TITLE OF PERSON SIGNING THIS DATA FORM.
NAME: J. C. Edwards PHONE: 246-2111, Ext. 2444

TITLE. Manager, Clean Environment Program

DO NOT WRITE BELOW THIS LINE

COMMENTS:

REVIEWER ________

DATE ________

DO NOT WRITE IN THIS SPACE

AIR QUALITY REGION
AGENCY CODE
PERMIT NO.
REGISTRATION NO.
PROCESS EMISSION SOURCE NO.
EMISSION POINT NO. —
UTM ZONE (IF USED)
EW COORD.
NS COORD.
SIC CODE

AVERAGE DAILY LOSS TO ATMOSPHERE ________

ATTACHMENT I

No. 20

Material	V.P. @ 330°F (PSIA)	Boiling Point (°F)
Methyl paraformyl benzoate	14.74	500
Methyl paratoluate	14.92	420
Methyl benzoate	15.10	388
Dimethyl terephthalate	14.73	545
Methyl 4-methoxy methyl benzoate	15.10	395

Process Emission Source
Number B-261A-1
Page 13 of 16
Edition B

STACK EMISSION POINT DATA - APC - 22

MAIL TO:
TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO. ___-_______
PERMIT NO. ________ P
PROCESS EMISSION SOURCE NO. ____
EMISSION POINT NO. ____
REVIEWER ____
DATE ______

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-261A-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). E
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 15 FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP 0.33 FEET.
6. SHOW NORMAL EXIT GAS TEMPERATURE 239 °F. 7. SHOW EXIT GAS VELOCITY .0025 FT/SEC.
8. INDICATE PERCENT OF TIME OVER 125°F 100 %.
9. SHOW EXIT GAS VOLUME FLOW RATE .00021 FT^3 /SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 0 (GR./CU. FT. DRY GAS AT 70°F) AND 0 (GR./CU. FT. GAS AT STACK CONDITIONS)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 460 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK ______ U-UP, D D-DOWN, ______ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE				
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

1-[redacted]-74 Issue.

APC - 22
REV 5/73

14 IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POINT. YES [ ] NO [X]

IF YES, DESCRIBE:

15. ADDITIONAL COMMENTS:

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	✓			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	✓			PPM			
OXIDES OF NITROGEN	✓			PPM			
CARBON MONOXIDE		✓	4000	PPM	.0003	2.49	Analysis & Calculation
GASEOUS FLUORIDES	✓			PPM			
OTHERS (NAME CHEMICAL)							
Methyl paratoluate		✓	.008	lbs/ft^3	0.0058	49	Calculation
Methyl benzoate		✓	.009	lbs/ft^3	0.0067	56	Calculation
Xylene		✓	.004	lbs/ft^3	0.0033	28	Calculation
Inert Gas		✓	.078	lbs/ft^3	0.0592	497	Calculation

FOR OFFICE USE ONLY

- [ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ______ #/hr.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______
- [ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______
- [ ] CONTINUOUS MONITOR (S) FOR (1) ______; (2) ______; (3) ______ RECOMMENDED.
- [ ] METHOD OF MEASUREMENT IS ACCEPTABLE.
- [ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ______ SULFUR DIOXIDE ______ HYDROCARBONS ______

CARBON MONOXIDE ______ FLUORIDES ______

FILING IS AUTHORIZED BY ______ DATE ______

Process Emission Source Number B-261A-1
Page 15 of 16
Edition B

STACK EMISSION POINT DATA - APC - 22

MAIL TO: TENNESSEE DEPARTMENT OF PUBLIC HEALTH
DIVISION OF AIR POLLUTION CONTROL
C2-212 CORDELL HULL BUILDING
NASHVILLE, TENNESSEE 37219

DO NOT WRITE IN THIS SPACE

COMPANY NO. ___ - ___
PERMIT NO. ___ P
PROCESS EMISSION SOURCE NO. ___
EMISSION POINT NO. ___
REVIEWER ___
DATE ___

1. COMPANY NAME TENNESSEE EASTMAN COMPANY
2. PROCESS EMISSION SOURCE NUMBER B-261A-1
3. EMISSION POINT NUMBER OR CODE (AS SHOWN ON PROCESS EMISSION SOURCE COVER SHEET). F
4. INDICATE STACK OR RELEASE POINT HEIGHT ABOVE GRADE 40 FEET.
5. SHOW INSIDE DIAMETER OF STACK OR RELEASE MECHANISM AT TOP .25 FEET.
6. SHOW NORMAL EXIT GAS TEMPERATURE 100 °F. 7. SHOW EXIT GAS VELOCITY 3.92 FT/SEC.
8. INDICATE PERCENT OF TIME OVER 125°F 0 %.
9. SHOW EXIT GAS VOLUME FLOW RATE .192 FT^3 /SEC @ 70°F AND 1 ATMOS.
10. SHOW MOISTURE CONTENT 0 (GR./CU. FT. DRY GAS AT 70°F) AND 0 (GR./CU. FT. GAS AT STACK CONDITION)
11. SHOW DISTANCE FROM RELEASE POINT TO NEAREST PROPERTY LINE 420 FEET.
12. DIRECTION OF GAS STREAM AS IT LEAVES STACK ___ U-UP, D D-DOWN, ___ H-HORIZONTAL
13. AIR POLLUTION CONTROL EQUIPMENT

	AIR CONTAMINANT CONTROLLED	YEAR INSTALLED	TYPE[1]	EFFICIENCY
PARTICULATE	yes	1974	001	100%
SULFUR DIOXIDE				
OXIDES OF NITROGEN				
HYDROCARBONS				
CARBON MONOXIDE				
GASEOUS FLUORIDES				

22-74 Issue.

APC - 22
REV 5/73

Process Emission Source Number B-201A-1

14 IS AN EMISSION MONITORING AND RECORDING INSTRUMENT ATTACHED TO THIS EMISSION POINT? YES [ ] NO [X]

IF YES, DESCRIBE: ______

15. ADDITIONAL COMMENTS: ______

EMISSION POINT DATA

16. SHOW AIR CONTAMINANT DATA FOR THIS EMISSION POINT:

POLLUTANT	ABSENT	PRESENT	CONCENTRATION		AVERAGE EMISSIONS		METHOD OF MEASUREMENT
			QUANTITY	UNITS	LBS/HR.	LBS/YEAR	
PARTICULATES	✓			GRAINS/SCF AT 70° F			
SULFUR DIOXIDE	✓			PPM			
OXIDES OF NITROGEN	✓			PPM			
CARBON MONOXIDE	✓			PPM			
GASEOUS FLUORIDES	✓			PPM			
OTHERS (NAME CHEMICAL)							
Nitrogen		✓	0.058	$lb./ft.^3$	40	336,000	Flow meter
Methanol		✓	0.027	$lb./ft.^3$	18.8	158,000	Calculation from vapor press. data.

FOR OFFICE USE ONLY

[ ] PROCESS WEIGHT TABLE APPLIES TO THIS EMISSION POINT.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH APPLICABLE PARTICULATE REGULATION. ALLOWABLE EMISSIONS ______ #/hr

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 2000 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH SULFUR DIOXIDE EMISSION STANDARD OF 500 PPM.

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] EMISSION POINT IS NOT IN COMPLIANCE WITH GASEOUS EMISSION STANDARD. IDENTIFY GAS ______ AND ALLOWABLE EMISSIONS ______

[ ] CONTINUOUS MONITOR (S) FOR (1) ______; (2) ______; (3) ______ RECOMMENDED.

[ ] METHOD OF MEASUREMENT IS ACCEPTABLE.

[ ] METHOD OF MEASUREMENT IS NOT ACCEPTABLE.

EXPLAIN ______

ALLOWABLE EMISSIONS (TONS/YEAR)

PARTICULATES ______ SULFUR DIOXIDE ______ HYDROCARBONS ______

CARBON MONOXIDE ______ FLUORIDES ______

FILING IS AUTHORIZED BY ______ DATE ______

Emission Information For Eastman's Columbia South Carolina Plant

The following permit application to the State of South Carolina lists all emissions from the Columbia Plant. This source is referred to as "Process Emission Source Number B-17M01."

SOUTH CAROLINA POLLUTION CONTROL AUTHORITY
DIVISION OF AIR POLLUTION CONTROL
PERMIT APPLICATION
PROCESS OPERATION
SUPPLEMENTARY INFORMATION

PERMIT NO.

Process Emission Source Number B-17M01
Page 1 of 10
Edition A

1. NAME OF FIRM Carolina Eastman Company
2. LOCATION OF PLANT Columbia, South Carolina
3. BRIEF DESCRIPTION OF PROCESS (attach flow diagram) Manufacture of Dimethyl Terephthalate (DMT)

4. PROCESS WEIGHTS:

A. Raw Materials:	Rate (lbs/day)	B. Products:	Rate (lbs/day)

NOTE: Please indicate units on Rate (lbs./hr.,etc.)

5. EMISSIONS TO ATMOSPHERE
A. Particulate:

Material Emitted	Total Rate (Indicate units) (lbs/day) Uncont	Controlled	Type of Control Device	Stack Height (feet)	Stack Inside Dia. ft or in	Stack Temp. oF	Stack Velocity ft / sec
I. Vent J							
Methyl Paratoluate		7.1	Conservation Vent	58	3"	338	0.08
Methyl Benzoate		7.2					
Methyl-p-Formal Benzoate		0.1					
Dimethyl Terephthalate		2.0					
II. Vent K							
Methyl Paratoluate		3.3	Conservation Vent	37	3"	275	0.08
Methyl Benzoate		4.4					
III. Vent L							
Methyl Paratoluate		2.2	Conservation Vent	25	4"	369	0.03
Methyl Benzoate		0.6					
Methyl-p-Formal Benzoate		4.3					
Dimethyl Terephthalate		0.3					

B. Please indicate size distribution for each particulate emission:

Stack	wt.% >60μ	wt.% 60μ-10μ	wt.% >0.5μ
I. Vent J	5%	85%	10%
II. Vent K		70%	30%
III Vent L	1%	69%	30%
IV.			
V.			
VI.			
VII.			
VIII.			

Process Emission Source
Number B-17M01
Page 2 of 10
Edition A

[redacted] Gaseous:

Gaseous Material Emitted	Total Rate (Indicate units) (lbs/day) Uncont	Controlled	Type of Control Device	Stack Height (Feet)	Stack Inside Dia. ft or in	Stack Temp. °F	Stack Velocity ft / sec
I. Vent A							
Methyl Alcohol		43	Conservation Vent	37	4"	104	0.23
[redacted]-Methyl-1, 3-Dioxolane		0.6					
[redacted]-Butanol		0.1					
Inert Gas		81					
[redacted]. Vent B							
Methyl Alcohol		42	Conservation Vent	37	4"	104	0.20
Inert Gas		71					
III. Vent C							
Methyl Alcohol		34	Conservation Vent	35	4"	104	0.02
[redacted]-Xylene		0.1					
[redacted]nert Gas		58					
IV. Vent D							
[redacted]ethyl Alcohol		0.6	Conservation Vent	35	3"	104	0.01
Inert Gas		1.0					
[redacted]. Vent E							
[redacted]ethyl Alcohol		6.8	Conservation Vent	23	3"	104	0.06
o-Xylene		0.01					
[redacted]nert Gas		12					
VI. Vent F							
Methyl Alcohol		6.8	Conservation Vent	23	3"	104	0.06
[redacted]-Xylene		0.01					
[redacted]nert Gas		12					
[redacted]II. Vent G							
[redacted]ethyl Alcohol		14	Conservation Vent	23	3"	104	0.12
o-Xylene		0.01					
Inert Gas		24					
[redacted]III. Vent H							
Methyl Alcohol		14	Conservation Vent	23	3"	104	0.12
[redacted]-Xylene		0.01					
[redacted]nert Gas		24.0					
IX. Vent I CC.30							
[redacted]-Xylene		28	Vent Scrubber	84	6"	131	0.16
[redacted]itrogen		171					
[redacted]. Vent J*							
[redacted]-Xylene		5.6	Conservation Vent	58	3"	338	0.08
Inert Gas		13					

Process Emission Source
Number B-17M01
Page 3 of 10
Edition A

C. Gaseous:

Gaseous Material Emitted	Total Rate (Indicate units) (lbs/day) Uncont	Controlled	Type of Control Device	Stack Height (Feet)	Stack Inside Dia. ft or in	Stack Temp. °F	Stack Velocity ft / sec
XI. Vent K*							
o-Xylene		8.7	Conservation Vent	37	3"	275	0.09
Inert Gas		16					
XII. Vent L*							
Inert Gas		8.2	Conservation Vent	25	4"	369	0.03
*Particulate Emission							
XIII. Vent M							
Methyl Alcohol		71	Conservation Vent	35	6"	104	0.17
2-Methyl-1, 3-Dioxolane		0.9					
n-Butanol		0.01					
Inert Gas		220					
XIV. Vent N							
Dimethyl Ether		0.5	Conservation Vent	35	12"	104	0.02
Methyl Alcohol		28					
2-Methyl-1, 3-Dioxolane		0.04					
o-Xylene		0.03					
Acetaldehyde		0.06					
Methyl Acetate		0.5					
Inert Gas		49					
XV. Vent O							
Methyl Acetate		0.04	Conservation Vent	35	4"	104	0.09
Methyl Alcohol		2.3					
2-Methyl-1, 3-Dioxolane		0.01					
o-Xylene		0.01					
Inert Gas		45					
XVI. Vent P							
Dimethyl Ether		14,000	A system is being designed to introduce this stream to an incinerator system for burning instead of discharging to atmosphere				
Methyl Acetate		5,900					
Methyl Alcohol		1,700					
Acetaldehyde		1,700					
RBr		52					
Inert Gas		216					
XVII. Vent Q							
o-Xylene		2.5	Conservation Vent	35	8"	104	0.02
Inert Gas		34					

Number B-17M01
Page 4 of 10
Edition A

[redacted]aseous

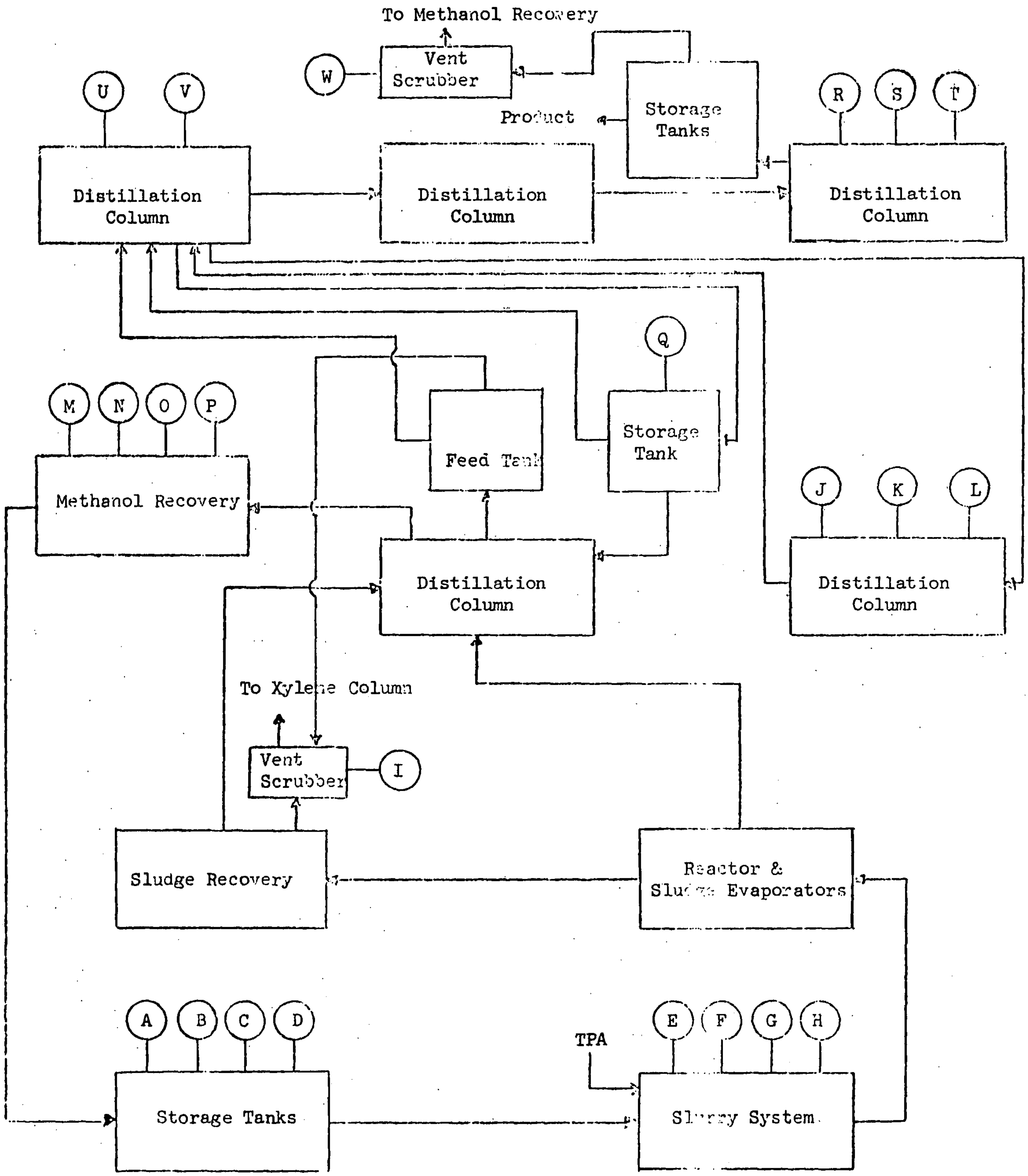
Gaseous Material Emitted	Total Rate (Indicate units) (lbs/day) Uncont	Controlled	Type of Control Device	Stack Height (Feet)	Stack Inside Dia. ft or in	Stack Temp. OF	Stack Velocity ft / sec
XV[redacted]II. Vent R							
Me[redacted]hyl Alcohol		0.6	Conservation Vent	58	2"	104	0.01
Inert Gas		1.0					
XI[redacted]. Vent S							
Methyl Alcohol		0.5	Conservation Vent	57	2"	104	0.01
Inert Gas		0.8					
X[redacted] Vent T							
Methyl Alcohol		0.1	Conservation Vent	57	2"	104	0.01
[redacted]rt Gas		0.2					
XXI. Vent U							
o-Xylene		0.01	Conservation Vent	32	3"	122	0.01
[redacted]rt Gas		2.4					
X[redacted]II. Vent V							
[redacted]Xylene		0.01	Conservation Vent	32	8"	122	0.01
Inert Gas		2.4					
[redacted]							
XXIII. Vent W							
Methyl Alcohol		240	Vent Scrubber ~~Conservation Vent~~	21	2"	90	6.7
[redacted]trogen CA-31		660					

A-207

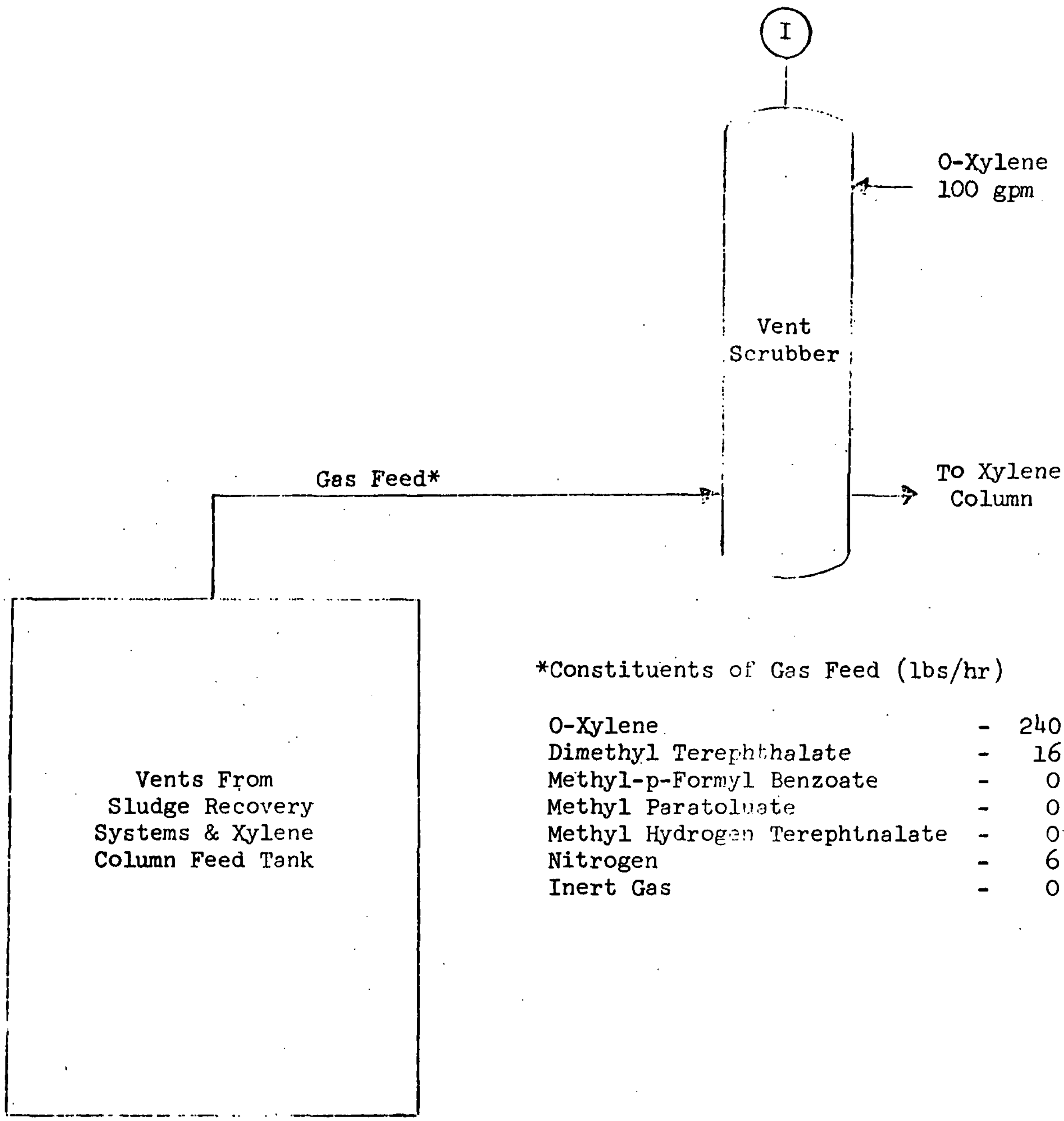
[redacted]ill emissions comply with state regulations? Yes

[redacted]ignature of Responsible Person or Company Official [signature] Manager, CEC Date 5/2/7[illegible]

Carolina Eastman Company
Dimethyl Terephthalate Flow Diagram



Carolina Eastman Company
Dimethyl Terephthalate Manufacture

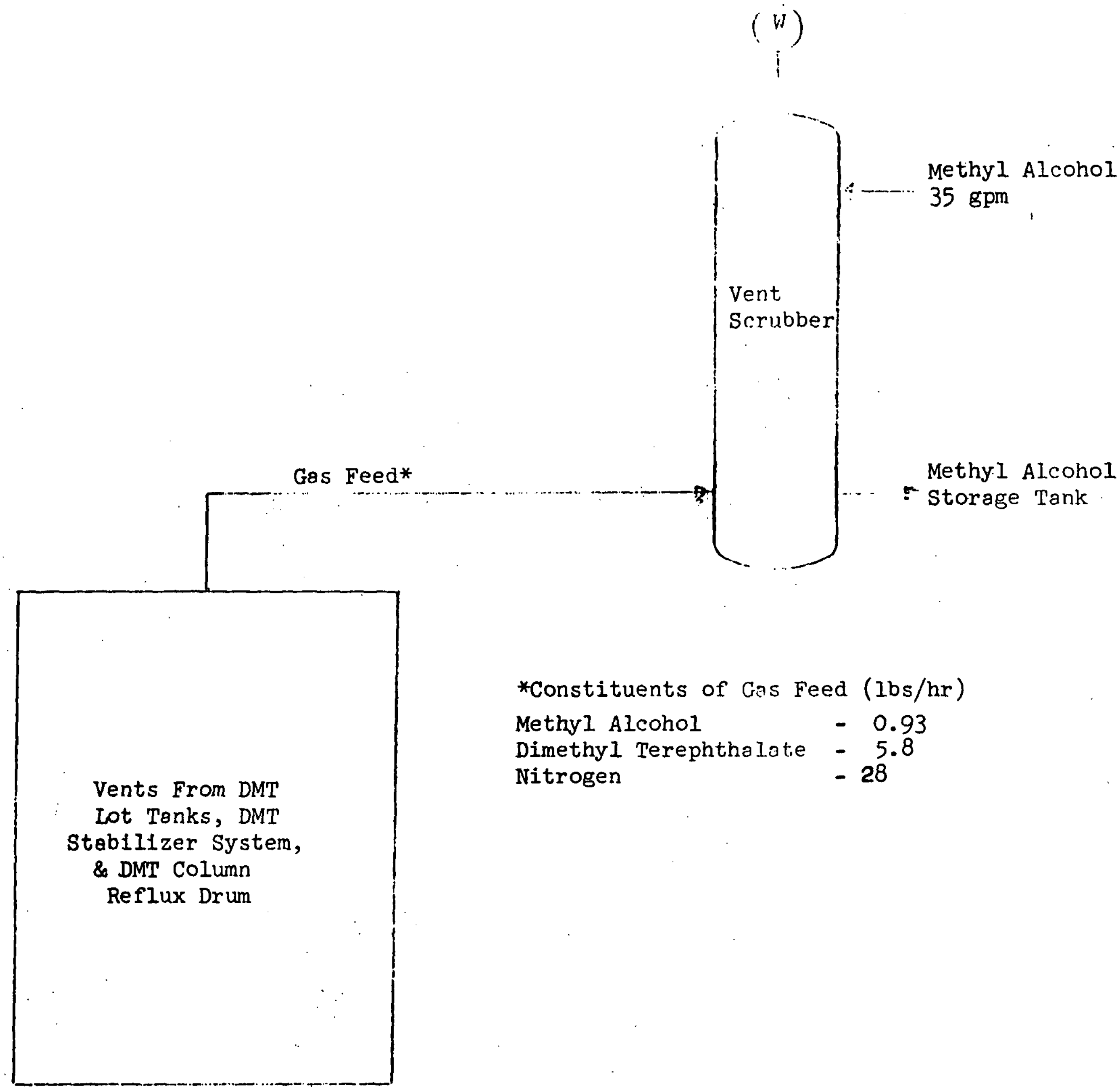


*Constituents of Gas Feed (lbs/hr)

O-Xylene	-	240
Dimethyl Terephthalate	-	16
Methyl-p-Formyl Benzoate	-	0.01
Methyl Paratoluate	-	0.02
Methyl Hydrogen Terephthalate	-	0.40
Nitrogen	-	6.80
Inert Gas	-	0.33

Schematic of the Proposed Sludge Recovery System & Xylene Column Feed Tank Vent Scrubber

Carolina Eastman Company
Dimethyl Terephthalate Manufacture



*Constituents of Gas Feed (lbs/hr)

Methyl Alcohol	- 0.93
Dimethyl Terephthalate	- 5.8
Nitrogen	- 28

Schematic of the Proposed DMT Lot Tank, Stabilizer System, & DMT Column Reflux Drum Vent Scrubber

REPORTS AND CORRESPONDENCE WITH CONTROL DEVICE MANUFACTURERS

The following summarizes all telephone conversations, letters and responses from air pollution control device manufacturers. The information is presented in chronological order for simplicity. This information is supplemented by the references used in Section III. Where the "Person Contacted" line is left blank, it is because the source wished to remain anonymous. A key to stream identification numbers mentioned in these conversations are contained in the letter to Mr. Brewer of Air Correction Division, UOP.

By and large the response from control device manufacturers was poor. Much information that was promised was not sent. However, from literature information and conversations with plant personnel, the best system of hydrocarbon and CO emission control appears to be a CO boiler.

TELEPHONE CONVERSATION

PERSON CONTACTED Romuald Michalek DATE 3/29/76
ORGANIZATION Englehard Industries
GCA PERSONNEL Mark Bornstein

DISCUSSION SUMMARY

Mr. Michalek was contacted about an article which recently appeared in "Pollution Eng.". Several NO_x control processes are discussed and I inquired about obtaining additional information. I was informed that additional data are not readily available; however, if I requested information for a specific waste stream, Engelhard Industries would make a recommendation concerning the type of control equipment that would be most feasible. Compositions and flow rates for several representative waste streams from the DMT-TPA were sent.

TELEPHONE CONVERSATION

PERSON CONTACTED Jerry Brewer DATE 5/3/76

ORGANIZATION UOP

GCA PERSONNEL Mark Bornstein

DISCUSSION SUMMARY

Air Correction was recontacted for the purpose of determining the status of their evaluation of the control systems for both adipic acid and DMT control devices. Mr. Brewer informed me that they will start working on the project this week and that GCA should receive the data in 2 or 3 weeks. (This information had not been received by the end of the task.)

April 1, 1976

Mr. Jerold Brewer
Air Correction Division UOP
Tokeneke Road
Darien, Connecticut 06820

Dear Mr. Brewer:

As per our telephone conversation on Wednesday, March 31, 1976, I am enclosing data for several streams from the processing of adipic acid and dimethylterephthalate. Physical parameters as well as any additional data or chemical makeup is being provided.

It is my understanding that you will provide me with information concerning the most practical way of controlling these streams for NO_x and/or hydrocarbon emissions. Methods that will be considered are: scrubbing, adsorption, catalytic reduction and thermal incineration. A brief economic evaluation, if feasible, will also be included.

I sincerely appreciate your taking the time to answer my questions on Wednesday. I am looking forward to obtaining the above system evaluation as well as any additional data that IGI might have.

Sincerely,

Mark Bornstein

Mark Bornstein

B:nc
Enc.

ROA BEDFORD, MASSACHUSETTS 01730 / PHONE: 617-275-9000

Stream I D 10-1-D

flow rate	- 240 lbs/hr
Temp	- 78°F
Pressure	- atm

Composition ± 10%

Methyl acetate	7.6%	all gases
Acetic acid	3.8%	
Propyl acetate	0.25%	
Acetaldehyde	12.3%	
Inert gas	76.05%	

Stream I D - 10-2 - A

flow rate	- 900 SCFM
Temp	- 225°F
Pressure	- 250 psig

Composition	wt %	
Methyl acetate	0.8	all gases
P-xylene	.05	
MEK	.10	
H_2O	.08	
Acetic acid	.38	
Oxygen	2.0	
CO_2	27.8	
N_2	69.5	

Stream I D - 10-2-E

flow rate	- 34,000 SCFM
Temp	- 285°F
Pressure	- atm

Composition	wt %	
Acetic acid	.006	
Benzoic acid	0.614	
Paratoluic acid	0.005	
Paracarboxyl benzaldehyde	0.001	
CO_2	0.199	all gases
CO	0.015	
H_2O	98.832	
H_2	.036	
hydrogen impurities	.29	

Stream I.D. 10-4-A

flow rate	-	50,000 SCFM
Temp	-	95°F
Pressure	-	5 psig

Composition

p-xylene	0.5 -1.5%	
H_2O	1.6 - 4.5%	
N_2		
O_2	93.0 - 97.3%	all gases
CO_2		
CO	0.6 - 1.0%	

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Williams DATE 5/3/76

ORGANIZATION Englehard Industries

GCA PERSONNEL Mark Bornstein

DISCUSSION SUMMARY

Englehard Industries was recontacted for the purpose of determining the status of their evaluation of the control systems for both adipic acid and DMT. Mr. Williams informed me that they were proceeding with the evaluation and we should be receiving the data in 2 or 3 weeks. (This information had not been received by the end of the task.)

TELEPHONE CONVERSATION

PERSON CONTACTED ________ DATE 5/14/76

ORGANIZATION ________

GCA PERSONNEL R. Cass

DISCUSSION SUMMARY

Conversation with manufacturers of carbon adsorption units for hydrocarbon control. The manufacturer was given the composition of stream 10-I-A. At the low concentration of hydrocarbons in stream 10-I-A, the manufacturer recommended the use of a pilot plant to determine removal efficiency. If each component was alone in the stream at approximately 2 percent concentration, then up to 95 percent removal efficiency could be expected. The carbon absorption unit will not affect the CO concentration. The manufacturer felt that trying to quote an efficiency on this low a concentration for this particular mixture of hydrocarbons would be a disservice to us. (This information had not been received by the end of the task.)

GCA/TECHNOLOGY DIVISION

May 14, 1976

Mr. Ron Kent
Oxy-Catalyst, Inc.
East Biddle Street
West Chester, Pennsylvania 19380

Dear Mr. Kent:

I spoke to you today concerning the control of NO_x and HC emissions from the manufacture of adipic acid and dimethylterephthalate. I have included two typical process streams and would like the following information for your thermal oxidation, catalytic oxidation and carbon absorption units:

a) removal efficiency of NO_x and HC

b) maximum concentration of NO_x or HC that can be handled and the removal efficiency at maximum concentration

c) minimum concentration of NO_x or HC that can be handled and the removal efficiency at minimum concentration

d) any potential problems of poisoning the catalyst in the catalytic oxidation unit

e) in the case of NO_x removal, will the presence of up to 3% cyclohexane affect the control device

I appreciate your interest and cooperation.

Sincerely,

Reed Cass

RC:nc

streams 10-1-A and 5-2-C

[illegible]INGTON ROAD, BEDFORD, MASSACHUSETTS 01730 / PHONE 617 275 9000

GCA/TECHNOLOGY DIVISION

May 17, 1976

Mr. De Muynk
American Norit Co., Inc.
6301 Glidden Way
Jacksonville, Florida 32208

Dear Mr. De Muynk:

I spoke to you today concerning the control of HC emissions from the manufacture of dimethylterephthalate. I have included a typical process stream and would like the following information for an activated carbon absorption unit:

a) removal efficiency of HC

b) maximum concentration of HC that can be handled and the removal efficiency at maximum concentration

c) minimum concentration of HC that can be handled and the removal efficiency at minimum concentration

I appreciate your interest and cooperation.

Sincerely,

Reed Cass

RC:nc
Enc.

BURLINGTON ROAD, BEDFORD, MASSACHUSETTS 01730 / PHONE: 617-275-9000

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Himmelburger DATE 5/24/76

ORGANIZATION Trane-Thermal Co.

GCA PERSONNEL R. Cass

DISCUSSION SUMMARY

Mr. Himmelburger was informed of the properties of stream I.D., 10-1-A and asked about the removal of the HC's by incineration. He said that it was possible to remove 99.9 percent of the HC's and that some CO would be removed. He said that due to the large air volume flow rate and the low concentration of HC;s, it may not be practical to use incineration. To heat 1 pound of air to 1800^{o}F to incinerate requires 180 M Btu/hr. If the air going in is preheated by the heated discharge from the incineration, fuel use may get down to 50 M Btu/hr. This comes out to approximately 130 gal/hr of fuel. If the heated gas from the incinerator can be used to generate steam for use in the plant, it may be practical.

TELEPHONE CONVERSATION

PERSON CONTACTED ______ DATE 5/24/76

ORGANIZATION ______

GCA PERSONNEL R. Cass

DISCUSSION SUMMARY

The following is a conversation with a scrubber manufacturer.

The manufacturer was given the flow rate and composition of stream 10-1-A. He said that the hydrocarbons could be scrubbed if the right solvent is used. The efficiency would be related to how much a company is willing to invest. The cost is logarithmically related to the efficiency. He said that a high pressure stream (like 10-1-A) would be easy to scrub because of the additional driving force. A scrubber, however, would probably not be feasible on a cost basis.

TELEPHONE CONVERSATION

PERSON CONTACTED ______________ DATE 5/24/76

ORGANIZATION ______________

GCA PERSONNEL R. Cass

DISCUSSION SUMMARY

The following is the response from a manufacturer of catalytic incinerators.

The manufacturer stated that 90 percent removal efficiency of HC can be expected with a catalytic unit and 95 percent with a thermal unit. There is no potential problem for poisoning the catalyst with stream 10-1-A. The presence of HC will reduce the fuel needed. With these streams, special gas handling steps may be required as the concentration of CO and HC may be above the explosive limit.

TELEPHONE CONVERSATION

PERSON CONTACTED Bill Kiss DATE 5/25/76

ORGANIZATION COMBUSTION ENGINEERING

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

Mr. Kiss assured me that CE could handle removal of HC and CO in a CO boiler, but he couldn't talk to me as he only dealt with international affairs. He referred me to the Boston office of CE.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Klimas DATE 5/25/76

ORGANIZATION Combustion Engineering, Boston

GCA PERSONNEL R. Spawn

DISCUSSION SUMMARY

Mr. Klimas said, "As a rule, we don't make CO boilers; your needs and our equipment are two different things. We can't help."

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Snyder DATE 5/26/76

ORGANIZATION Combustion Engineering/Connecticut

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

Mr. Snyder assured me that CE produced CO boilers. Again I was referred to the Boston office.

TELEPHONE CONVERSATION

PERSON CONTACTED Joe Santry DATE 5/27/76

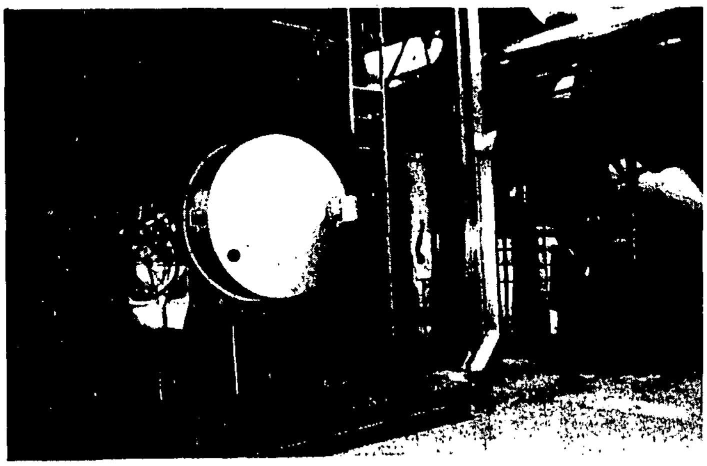
ORGANIZATION Combustion Engineering/Boston

GCA PERSONNEL P. Spawn

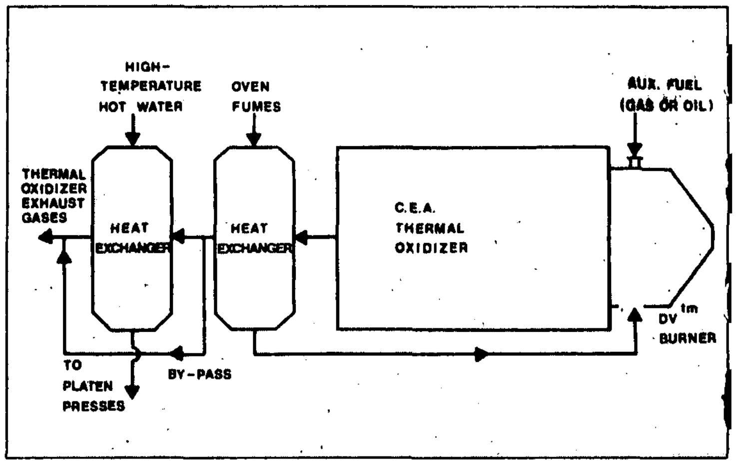
DISCUSSION SUMMARY

Mr. Santry said that they make a CO boiler but only for very large stream flows (100,000's of scfm). Furthermore, they have no incinerator this small. He couldn't think of any company that could help.

CEA Heat-Recovery Systems Reduce Cost of Burning Air Pollutants



Burner ends of two CEA thermal oxidizers which consume oven solvent fumes at Ferrozell Ges. Sachs & Co. near Munich, Germany.



Simplified schematic of CEA fume-oxidizer/heat-recovery system.

Two CEA pollution-control/heat-recovery systems utilize heat generated in burning solvent fumes to: (1) pre-heat the fumes prior to combustion, and (2) heat high-temperature hot water used to heat platen presses. This waste heat reclamation substantially reduces fume combustion costs.

Fumes from five ovens are burned in two CEA thermal oxidizers, each with accompanying heat-recovery equipment. Prior to entering an oxidizer, fumes pass through a heat exchanger where they are heated by oxidizer exhaust gases from approximately 220F to approximately 790F. By pre-heating the incoming fumes, oxidizer fuel costs are reduced roughly 52 percent.

Exhaust gases then pass through a second heat exchanger which is tied into an existing high-temperature hot water heating system having its own hot water generator. The high-temperature hot water heats platen presses and ovens. By utilizing oxidizer exhaust gases to partially heat the hot water, generator fuel requirements were reduced some 80 percent.

Utilization of oxidizer exhaust gases to pre-heat fumes and to heat high-temperature hot water greatly reduces fuel costs, and the cost of operating the pollution-control system becomes only a fraction of what it would be otherwise.

The installation is at Ferrozell Ges. Sachs & Co. near Munich, Germany. It is patterned after two similar CEA installations in the U.S. Ferrozell manufactures industrial laminates used largely by the electronics industry. In drying and curing resin-impregnated web material which is later formed into laminates, evaporated solvents and particulate matter are carried away in oven exhaust gases. Phenolic emissions are particularly odorous and were the cause of endless neighborhood complaints.

Since installation of the CEA system, odors have ceased and exhaust gases contain less than 50 ppm of unburned hydrocarbons and less than 2 ppm of phenol.

Each oxidizer handles up to 23,540 scfm. High-temperature hot water temperature is controlled by a sensor/damper system which regulates flow of exhaust gases through the heat exchanger and heat exchanger by-pass to maintain the high-temperature hot water at the desired temperature.

TELEPHONE CONVERSATION

PERSON CONTACTED ?? DATE 5/27/76

ORGANIZATION Babcock-Wilcox

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

GCA staff suggested contacting these people for information on CO boilers or incinerators. No one in the office, including boiler and air pollution control sections, nor had any information on these devices.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Tom Polinski, Regional Mgr. DATE 6/3/76

ORGANIZATION CEA

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

Given the following waste stream:

Q = 32,150 scfm

T = 116^{o}F

p - 1 Atm.

Acetic Acid 0.07% by wt.
Methyl Acetate 0.21% by wt.
Dimethyl Ether, $\leq$ 0.10% by wt.

CO 0.65%
N_2 99.07%

A thermal oxidizer would have no problem combusting > 95 percent of the HC and the CO. 100 percent efficiency wouldn't be achieved, but HC and CO removals would approach this level. Since the unit would be operated at low excess air rates, formation of additional CO is minimized.

Since this stream is primarily inert, quantities of auxiliary fuel will be required. Thus, heat recovery is advisable via waste heat steam, hot water, or air-to-air recovery systems.

A ballpark cost figure for the burner, furnace, and fuel train controls is $70,000; this is exclusive of heat recovery systems.

APPENDIX B

LIST OF CONTACTS

MANUFACTURERS OF DMT-TPA

American Hoechst

Mr. Charles Powell (Principal contact)
Hoechst Fibers Industries
P.O. Box 5887
Spartanburg, S.C. 29301

Mr. Zeeler
Safety Coordinator
Hoechst Fibers Industries
Spartanburg, S.C.
201-685-2813

Mr. Coal
Environmental Manager
Hoechst Fibers Industries
Spartanburg, S.C.
201-685-2813

Mr. Robert Monihan
Chief Plant Engineer
Hoechst Fibers Industries
P.O. Box 5887
Spartanburg, S.C. 29301
803-579-5750

Amoco

Mr. Harry Brennan (Principal contact)
Coordinator of Air and Water Conservation
Amoco Chemical Corp.
200 East Randolph Drive
Chicago, Illinois 60601
312-856-3434

Mr. J.D. Reed
Plant Manager
Amoco Chemical Corp.
Decatur, Alabama
203-355-2520

Mr. E.V. Smith
Technical Director
Amoco Chemical Corp.
Joliet, Illinois
815-462-2221 Ext. 205

Dr. Robert Rosscup
Patent and License Representative
Amoco, Standard Oil Corp. of Indiana
Chicago, Illinois
312-856-5944

DuPont

Mr. W.R. Chalker (Principal contact)
Principal Consultant, Environmental Quality
Engineering Department
E.I. DuPont de Nemours & Company, Inc.
1354 Louviers Building
Wilmington, Delaware 19898
302-366-2870

Mr. John R. Cooper
Environmental Manager
Intermediates Division, Polymer Intermediates Department
E.I. DuPont de Nemours & Company, Inc.
1007 Market Street
Wilmington, Delaware 19898
302-744-3788

Mr. Philip A. Palmer
Senior Engineer, Engineering Service Division
E.I. DuPont de Nemours & Company, Inc.
Wilmington, Delaware 19898
302-266-3858

Tennessee Eastman

Mr. James C. Edwards (Principal contact)
Manager, Clean Environment Program
Tennessee Eastman Company
P.O. Box 511
Kingsport, Tennessee 37660
615-246-2111 Ext. 2444

Mr. W.M. Crawford
Tennessee Eastman Company
P.O. Box 511
Kingsport, Tennessee 37660
615-246-2111 Ext. 3401

Mr. Robert Long
Licensing Manager
Tennessee Eastman Company
P.O. Box 511
Kingsport, Tennessee 37660
615-246-2111 Ext. 3575

Mr. Neil Simmons
Tennessee Eastman Company
P.O. Box 511
Kingsport, Tennessee 37660
615-246-2111

Hercules, Incorporated

Dr. Richard A. Chaddock (Principal contact)
Environmental Coordinator
Hercules, Incorporated
910 Market Street
Wilmington, Delaware 19899
302-575-7625

Mr. John Humphrey
Environmental Coordinator
Hercules, Incorporated
Wilmington, North Carolina
919-763-9841

Misc.

Mr. Marvin Fannon
Bellsicol Company
Beaumont, Texas
713-722-8061

Mr. Morgan Jones
Environmental Officer
Corporate Engineering Section
Bellsicol Company
Beaumont, Texas
713-722-8061 Ext. 325

STATE AIR CONTROL BOARDS

Alabama

Mr. Gene Saywell (Principal contact)
Air Pollution Control Director
Tri County District Health Service
Decatur, Alabama
205-353-7021

Mr. James W. Cooper
Director, Alabama Air Pollution Control Commission
Decatur, Alabama
205-832-6770

Mr. Herbert Theumer
Public Health Engineer
Tri County District Health Service
Decatur, Alabama
205-353-7021

Mr. Seever
Tri County District Health Service
Air Pollution Control Program
Decatur, Alabama
205-353-7021

Illinois

Mr. Marshal Monarch (Principal contact)
Air Resources Analysis Section
Illinois EPA
Springfield, Illinois 62706
217-782-1830

Mr. Miles Zamco
Acting Director, Division of Air Pollution Control
Illinois EPA
Springfield, Illinois 62706
217-782-7326

Mr. G.J. Reddy
Superintendent, Transportation Planning
Illinois EPA
Springfield, Illinois 62706
217-782-5811

Mr. Deasi
Permit Section, Division of Air Pollution Control
Illinois EPA
Springfield, Illinois 62706
217-782-3003

Mr. Joe Ancel
Director, Environmental Protection
Will County Health Department
Illinois
815-729-8495

Dr. Chester Snell
Permit Section, Division of Air Pollution Control
Illinois EPA
Springfield, Illinois
217-782-2113

Mr. Lovett
Field Operations Section
Illinois EPA
Chicago, Illinois
312-345-9780

Mr. DuMill
Clerk, Illinois Pollution Control Board
Chicago, Illinois
312-793-3620

Mr. C.B. Willard
Regional Manager
Illinois Environmental Protection Agency
1701 First Avenue
Maywood, Illinois 60153

Mr. Keith J. Conklin
Manager, Permit Section
Division of Air Pollution Control
Illinois EPA
Springfield, Illinois
217-782-2113

Dr. Richard Wadden
Assistant Professor
University of Illinois
312-996-8855

North Carolina

Mr. John Romans (Principal contact)
Field Services Coordinator
Division of Environmental Management
Raleigh, North Carolina
919-829-4740

Mr. W.E. Knight
Acting Director
Division of Environmental Management
P.O. Box 27687
Raleigh, North Carolina 27611

Mr. Michael Sewell
Plans and Review Section of Permit Division
North Carolina Division of Environmental Management
Wilmington, North Carolina
919-829-4740

Mr. Andrew Carlton
Regional Engineer
North Carolina Division of Environmental Management
Wilmington, North Carolina
919-762-3394

Mr. Bill Tippit
North Carolina Division of Environmental Management
Wilmington, North Carolina
919-762-3394

South Carolina

Mr. W.G. Crosby (Principal contact)
Chief, Bureau of Air Quality Control
South Carolina Department of Health and Environmental Control
Columbia, South Carolina 29201

Tennessee

Mr. McInnis (Principal contact)
Tennessee Division of Air Pollution Control
Nashville, Tennessee
615-741-3931

Mr. John Walton
Assistant Director
Tennessee Division of Air Pollution Control
301 Seventh Avenue, Rm. 250
Nashville, Tennessee 37219
615-741-3931

Mr. Paul Bontrager
Director, Air Pollution Control Division
Metropolitan Health Department
Nashville, Tennessee
615-327-9313, Ext. 293

MANUFACTURERS OF CONTROL EQUIPMENT

Mr. Jerold Brewer
Air Correction Division, UOP
Tokeneke Road
Darien, Connecticut 06820
203-655-8711

Mr. Himmelburger
Trane-Thermal Co.
Brook Road
Conshohocker, PA

Mr. Romuald Michalek
Engelhard Industries
113 Astor Street
Newark, NJ 07114
201-589-5000

Mr. Williams
Engelhard Industries
2655 U.S. Route 22
Union, NJ 07083

Mr. Ron Kent
Oxy-Catalyst, Inc.
East Biddle Street
West Chester, PA 19380

Mr. DeMuynk
American Norit Co., Inc.
6301 Glidden Way
Jacksonville, Florida 32208

T. Bettinger
Thermo Process Systems Group
Surface Combustion, Division of Midland-Ross Corp.
2375 Dorr Street
P.O. Box 907
Toledo, Ohio

Mr. Bill Kiss
Combustion Engineering
Stanford, Connecticut
203-688-1911

Mr. Klimas
Combustion Engineering
Boston, Massachusetts
617-426-6650

Mr. Snyder
Combustion Engineering
Stanford, Connecticut
203-688-1911

Mr. Joe Santry
Combustion Engineering
Boston, Massachusetts
617-426-6650

Mr. Tom Polinski
Regional Manager
CEA Combustion, Inc.
Stanford, Connecticut
203-359-1320

APPENDIX C

REPORTS AND CORRESPONDENCE

INTRODUCTION

Included in this appendix are copies of all letters and telephone summaries. Correspondence with DMT-TPA manufacturers is broken down by manufacturer. Correspondence with state air pollution control agencies is categorized by state and pertinent sections of state emission regulations are included.

REPORTS AND CORRESPONDENCE WITH DMT-TPA MANUFACTURERS

Amoco Chemicals Corporation

The following contacts were made with personnel at Amoco to set up a plant visit to the Joliet Plant and to have personnel at the Decatur Plant update emission information in the Houdry questionnaire. A summary of the plant visit and information from the Decatur Plant are included in Appendix A.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. J.D. Reed DATE 4/5/76

ORGANIZATION Amoco

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

Mr. Reed said that he couldn't help us until we go through their corporate offices. The man I should call is Mr. Harry R. Brennan of the Chicago Office. Tel. # 312-856-3434.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. H. Brennan DATE 4/5/76

ORGANIZATION Amoco

GCA PERSONNEL D.F. Durocher

DISCUSSION

I asked Mr. Brennan if we could visit the Joliet Plant and have the Decatur Plant update their questionnaire. He said that Amoco's policy used to be to help the EPA and contractors working for the EPA, but that they no longer like to do so. However, he did say to send him the cover letter and a copy of the questionnaire and he would see what he could do. His address is:

Mr. Harry Brennan
Coordinator of Air and Water Conservation
200 East Randolph Drive
Chicago, Illinois 60601
Mail Code 42-03

GCA/TECHNOLOGY DIVISION

April 8,1976

Mr. Harry Brennan
Co-ordinator of Air and Water Conservation
Amoco Chemical Corporation
200 East Randolph Drive, Mail Code 42-03
Chocago, Illinois

Dear Mr. Brennan:

As a follow up to our telephone conversation of April 2,1976, this letter is a formal request for emission information from Amoco Chemical's Decatur, Alabama dimethyl teraphthalate and teraphthalic acid (DMT-TPA) manufacturing plant and a request for a site visit to gather similar information from Amoco's Joliet, Illinois DMT-TPA plant.

GCA/Technology Division is under contract to the EPA to update basic background information on DMT-TPA plants. The results of this study will be used as part of the EPA Emission Standards and Engineering Division's assessment of numerous industries for the purpose of establishing priorities for setting new source performance standards (NSPS).

The purpose of this project is to use updated information to estimate the expected reduction of atmospheric emissions from DMT-TPA plants when NSPS are applied. The title of this study is "Screening Study to Determine Need for Standards of Performance for New Sources of Dimethyl Teraphthalate and Teraphthalic Acid Manufacturing." These NSPS will not be set as part of this study, but will be based on data collected during this study. The project is scheduled to be completed by June 9,1976.

The Amoco Chemical DMT-TPA plant in Decatur, Alabama, had been previously polled by questionnaire for information of the type we require by the Houdry Division of Air Products and Chemicals, Inc. under the auspices of the EPA. The EPA Project Officer was Leslie B. Evans. The questionnaire was returned to the EPA in the fall of 1972. The results were incorporated into a report titled, Survey Reports of Atmospheric Emissions from the Petrochemical Industry, Volume II (EPA-450/3-73-005b), published January, 1974. For your convenience, a copy of the completed questionnaire is attached. Much of the type of information that we need was supplied in this questionnaire, but the information must be updated.

GCA feels that the most efficient way to obtain this information would be if the original Houdry questionnaire for the Decatur, Alabama plant could be updated and if the GCA Project Manager (Dr. Donald Durocher) could visit the Joliet, Illinois plant to obtain similar emission information from plant personnel. I have enclosed a letter of intent stating the reasons for a plant visit and the information that would be needed. Authorization for this project can be obtained from the EPA Project Officer, Mr. Andrew Trenholm. Mr. Trenholm's address is given in the enclosed letter. If you would like, Mr. Trenholm can provide you with a formal letter of authorization from the EPA for GCA.

BURLINGTON ROAD, BEDFORD, MASSACHUSETTS 01730 / PHONE: 617-275-9000

I am looking forward to Amoco's response to our request and would appreciate any assistance that you could give us in this matter. If you have any questions or comments, please feel free to contact either me or Mr. Trenholm.

Sincerely,

Dr. Donald F. Durocher
Senior Scientist

Enc.
DFD:nc

GCA/TECHNOLOGY DIVISION

April 8, 1976

Amoco Chemicals Corporation
Chicago, Illinois

Gentlemen:

This letter is a request for information on air emissions from Amoco's Decatur, Alabama and Joliet, Illinois DMT-TPA plants. GCA would like to obtain this information by having plant personnel at the Decatur, Alabama plant update a previous emissions questionnaire and by a site visit to the Joliet, Illinois plant.

GCA/Technology Division is under contract to the EPA to update basic background information onDMT-TPA plants. The results of this study will be used as part of the EPA Emission Standards and Engineering Division's assessment of numerous industries for the purpose of establishing priorities for setting new source performance standards (NSPS) which are defined in Section 111 of the Clean Air Act.

The purpose of this project is to use updated information to estimate the expected reduction of atmospheric emissions from DMT - TPA plants when NSPS are applied. The title of this study is "Screening Study to Determine Need for Standards of Performance for New Sources of Dimethyl Teraphthalate and Teraphthalic Acid Manufacturing." These NSPS will <u>not</u> be set as part of this study, but will be based on data collected during this study. This project is scheduled to be completed by June 9, 1976. The EPA Project Officer is Mr. Andrew Trenholm of the Emission Standards and Engineering Division of the EPA.

The Decatur Plant of Amoco Chemical had been previously polled by questionnaire for information of the type we require by the Houdry Division of Air Products and Chemicals, Inc. under the auspices of the EPA. The EPA Project Officer was Leslie B. Evans. The questionnaire was returned to the EPA by Mr. J. D. Reed, Plant Manager, in the fall of 1972. The results were incorporated into a report titled, <u>Survey Reports of Atmospheric Emissions from the Petrochemical Industry, Volume II</u> (EPA-450/3-73-005b), published January, 1974. For your convenience, a copy of the completed questionnaire is attached.

Much of the type of information that we need was supplied by this questionnaire, but the information must be updated. Also, as the Joliet, Illinois facility was not polled, similar information on this plant must be collected.

The information that we would like to obtain is summarized below:

1. The quantities and compositions of emissions from all atmospheric emission points. A block process flow diagram for the plant would be very helpful. GCA realizes that process stream data may be proprietary. In the absence of actual measurements of the atmospheric emissions, mass balance calculations would be sufficient;

BURLINGTON ROAD, BEDFORD, MASSACHUSETTS 01730 / PHONE: 617-275-9000

2. The types of control equipment or methods of process control used by the plant to reduce atmospheric emissions. If at all possible, installation and operating costs for control equipment would be desired. The economics of control would provide basic supplemental information for determining the best system of emission reduction. Mass flow balances around the control device would be useful.

   In addition, GCA must delineate all parameters affecting the mass flow rate of emissions (e.g. non-normal operating conditions, reactor vent dumps, season of the year, etc.);

(Information of the type outlined in Points 1 and 2 was contained in the Houdry Division questionnaire. Therefore, updating this information would be straightforward.)

3. Finally, as NSPS are applicable to facilities that are modified in such a way as to increase the mass rate of emissions, GCA will have to identify how DMT-TPA plants increase production rates or otherwise modernize facilities. The key point here is to quantitatively describe the effects of expansion and modernization techniques on the mass rate of emission. This last point was not covered in the Houdry Division report. However, we feel that this type of information can readily be gained in conversation with plant managers.

We are interested in the Decatur Plant because it is one of the largest producers of DMT-TPA. As the Decatur plant has increased its production capacity from 500 to over 2000 million pounds of DMT-TPA over the past four years, a study of this facility would serve as an excellent example of how DMT-TPA plants increase their output capacity and the effects of this increase on air emissions.

GCA has three options open to it in the acquisition of data for this project:

Option 1 - Only literature data can be used. This approach is unsatisfactory as there is little data available in the open literature, and that which is available is several years old. This approach includes gathering information from state and local regulatory agencies. However, as this information is often dated or unavailable, the most feasible approach is to collect the information from the producing company;

Option 2 - New industrial questionnaires, similar to the Houdry Division questionnaire and applicable under Section 114 of the Clean Air Act, can be sent out through the EPA. GCA would not like to use this approach for three reasons.

1. the turn around time for a letter is long compared with the duration of the project,
2. questionnaires are not flexible and cannot easily be changed to reflect the situation,
3. questionnaires are generally considered an imposition on the plant manager's time.

Option 3 - the GCA Project Manager, Dr. Donald Durocher, can visit the Joliet Plant to collect the information from plant personnel. In the case of a facility that has previously filled out a questionnaire for the Houdry Division of Air Products, it would be most efficient if the questionnaire were updated.

This is the course that GCA hopes to pursue. This option would allow for a rapid transfer of information and would insure a good understanding of the DMT-TPA plant processes and, therefore, an accurate presentation of the results.

As the duration of this project is short, an appointment to visit your plant sometime in April or early May would be quite appealing. I am looking forward to your response to this request. If you have any questions on this request,please contact me or Mr. Andrew Trenholm. Mr. Trenholm's address is below:

Mr. Andrew Trenholm
EPA-Office of Air Quality and Planning
Emission Standards and Engineering Division
Research Triangle Park - Mail Drop #13
Research Triangle Park, North Carolina 27711

Tel. 919-688-8145, Ext. 301

Thank you.

Sincerely,

Dr. Donald F. Durocher
Senior Scientist

GCA/Technology Division
Burlington Road
Bedford, Mass. 01730

Tel. 617-275-9000, Ext. 352

DFD:nc
Enc.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. H. Brennan DATE 4/15/76

ORGANIZATION Amoco

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

Both the Joliet and Decatur Plants are not going to make DMT anymore, but are concentrating on TPA production. Their foreign plants will be making DMT. He has told all customers that DMT production will be stopping in the near future.

The Decatur Plant will update the questionnaire and send it back to us. I asked him if they could send it back by May 1. He said he'd try.

We should visit the Joliet Plant. I should contact

Jean Smith
Technical Director
Joliet Plant
815-462-2221 Ext. 205

They will update all the information contained in the Houdry report. Also, they will give us a block flow diagram, total capacity, but not production figures and tell us in general how much production there is. He will supply all emission information. There were questions in the Illinois questionnaire that could be used to calculate yields, and that is why the questionnaire is confidential. They specifically instructed the Illinois APC Board not to give out confidential information or any information if they don't need to.

We will be able to get the efficiency of control equipment. He said there haven't been many changes in the plant since 1972.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. E.V. Smith DATE 4/15/76

ORGANIZATION Amoco

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

Mr. Smith said that he will supply us with a block flow diagram. Emission information will be taken from permits. They are not up-to-date, but the emissions haven't changed.

Will be expecting a visit at 9:00 a.m. on April 27th. Directions were given.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. H. Brennan DATE 4/20/76

ORGANIZATION Amoco

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

Mr. Brennan noted that the Houdry report didn't cover the TPA purification. He wanted to know if I wanted information from this part of the process. I said that I did. He would send it with the report from the Decatur Plant. Also, the people at Joliet Plant will be calling to see if we want similar information.

He said that he will be at the Joliet Plant when I visit it.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. H. Brennan DATE 4/13/76

ORGANIZATION Amoco

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

Mr. Brennan said that he had compiled all data on emissions from the Alabama Plant and had sent it down to Alabama for verification. However, they had been doing debottlenecking and the data was not up to date. They are now bringing the information up to date and will send us the new data in 2 weeks.

I told him about our trip to DuPont and the fact that we need Rosscup's permission to get the DuPont data. He said that Rosscup had OK'd the Houdry report data and had also given him the OK to give us the information from the Joliet Plant and the Decatur Plant.

TELEPHONE CONVERSATION

PERSON CONTACTED Dr. Robert Rosscup DATE 5/17/76

ORGANIZATION Amoco

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

I told Dr. Rosscup our problem. He said that he saw no problem with getting data. Art Gilbert from the Patents and Licensing Department of DuPont had already been in contact with him to tell him I might be calling. Dr. Rosscup's address is 200 East Randolph Drive, 60601, Mail Code 1906.

He said to contact our man in DuPont, John Cooper and have him contact Art Gilbert and he would set everything up over phone with Dr. Rosscup.

He saw no problem. Suitable arrangements will be made through him. However, I should send Dr. Rosscup a letter and mention our conversation with him and point out that the information that we want is not confidential and that we have received the same information from Harry Brennan at Amoco. We should also point out the information that we want. He said that he will OK our information requests.

E.I. DuPont de Nemours

The following contacts were made with personnel at DuPont to arrange a meeting to gather emissions information. A summary of the meeting is included in Appendix A.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. W.R. Chalker DATE 3/25/76

ORGANIZATION E.I. DuPont de Nemours

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

Mr. Chalker said that we would have to go through channels to gain any kind of information. He did say that a site visit, especially since time is limited would be the best bet. The best approach for this is to write him a letter summarizing what we need to know and the time schedule involved. This will speed things up as he will be able to show this directly to all concerned parties; especially the Wilmington Office, which must clear all information and be disseminated.

Mr. Chalker can't give us permission to visit the plant. This will have to come from the Wilmington Office. Letter should explicitly state what we hope to accomplish and the information that we seek. The fact that NSPS are going to be set should be stressed, as it will drive home the urgency of the matter, and validate the request for information. This letter should be sent out immediately. We should also state why a personal visit is requested. Everything should be explicitly spelled out but should also be concise.

Mr. Chalker also suggested that we contact state agencies to determine what new equipment may have been installed in these plants (at least where a permit is required). He didn't see a need to contact the Project Officer at this time.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. W.R. Chalker DATE 4/5/76

ORGANIZATION E.I. DuPont de Nemours

GCA PERSONNEL D. F. Durocher

DISCUSSION SUMMARY

Mr. Chalker had received our request for a visit to the adipic acid plants, but he hadn't yet had a chance to act on it. He said that he would start it through channels, tomorrow at the latest.

He said that I should send him a similar letter and questionnaire for a visit to the DMT-TPA Plant. He did, however, mention that we are asking for a lot of information, and he didn't know how much we would be able to obtain.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. W. R. Chalker DATE 4/15/76

ORGANIZATION E.I. DuPont de Nemours

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

One problem is that they are leasing technology from Amoco and Eastman. Dr. Cooper of their department (Departmental Pollution Coordinator) has filed a report with their legal staff to see where they stand. We will certainly be able to get the information that was in the Houdry report, but they are not sure what information we would be able to get from the plant managers on anything else. If there are any problems he will call us.

He would also like me to bring the information from Texas, just so they can check to see what is being given out.

April 9, 1976

Mr. W. R. Chalker
Principal Consultant, Environmental Quality
E.I. DuPont de Nemours & Company, Inc.
1354 Louviers Building
Wilmington, Delaware 19898

Dear Mr. Chalker:

GCA/Technology Division is under contract to the EPA to update basic background information on dimethyl teraphthalate and teraphthalic acid (DMT-TPA) manufacturing plants. The results of this study will be used as part of the EPA Emission Standards and Engineering Division's assessment of numerous industries for the purpose of establishing priorities for setting new source performance standards (NSPS).

The purpose of this project is to use updated information to estimate the expected reduction of atmospheric emissions from DMT-TPA plants when NSPS are applied. The title of this study is "Screening Study to Determine Need for Standards of Performance for New Sources of Dimethyl Teraphthalate and Teraphthalic Acid Manufacturing." These NSPS will not be set as part of this study, but will be based on data collected during this study. The project is scheduled to be completed by June 9, 1976.

The defunct DMT-TPA plant in Old Hickory, Tennessee, had been previously polled by questionnaire for information of the type we require by the Houdry Division of Air Products and Chemicals, Inc. under the auspices of the EPA. The EPA Project Officer was Leslie B. Evans. The questionnaire was returned to the EPA on September 7,1972. The results were incorporated into a report titled, Survey Reports of Atmospheric Emissions from the Petrochemical Industry, Volume II (EPA-450/3-73-005b), published January, 1974. For your convenience, a copy of the completed questionnaire is attached. Much of the type of information that we need from the Wilmington, North Carolina plant is contained in this questionnaire.

As part of this study, I would like to visit and gather information from the personnel at the Wilmington, North Carolina plant. I have enclosed a letter stating the reasons for a plant visit and the information that would be needed.

I am looking forward to DuPont's response to our request and would appreciate any assistance that you could give us in this matter. If you have any questions or comments, please feel free to contact either me or the EPA Project Officer, Mr. Andrew Trenholm. Mr. Trenholm's address is in the enclosed letter.

Sincerely,

Dr. Donald F. Durocher
Senior Scientist

Enc.
DFD:nc

BURLINGTON ROAD, BEDFORD, MASSACHUSETTS 01730 / PHONE: 617-275-9000

GCA/TECHNOLOGY DIVISION

April 9, 1976

E.I. DuPont de Nemours & Company, Inc.
Wilmington, Delaware

Gentlemen:

This letter is a request to visit DuPont's DMT-TPA plant in Wilmington, North Carolina. The purpose of this visit will be to gather information on atmospheric emissions, emission control systems, and methods employed to expand a DMT-TPA plant's output capacity.

GCA/Technology Division is under contract to the EPA to update basic background information on DMT-TPA plants. The results of this study will be used as part of the EPA Emission Standards and Engineering Division's assessment of numerous industries for the purpose of establishing priorities for setting new source performance standards (NSPS) which are defined in Section 111 of the Clean Air Act.

The purpose of this project is to use updated information to estimate the expected reduction of atmospheric emissions from DMT-TPA plants when NSPS are applied. The title of this study is "Screening Study to Determine Need for Standards of Performance for New Sources of Dimethyl Teraphthalate and Teraphthalic Acid Manufacturing." These NSPS will not be set as part of this study, but will be based on data collected during this study. This project is scheduled to be completed by June 9, 1976. The EPA Project Officer is Mr. Andrew Trenholm of the Emission Standards and Engineering Division of the EPA.

The information that we would like to obtain is summarized below:

1. The types of control equipment or methods of process control used by the plant to reduce atmospheric emissions. If at all possible, installation and operating costs for control equipment would be desired. The economics of control would provide basis supplemental information for determining the best system of emission reduction. Mass flow balances around the control device would be useful information.

2. The quantities and compositions of emissions from all atmospheric emission points. A process flow diagram for the plant would be very helpful. GCA realizes that process stream data may be proprietary. In the absence of actual measurements of the atmospheric emissions, mass balance calculations would be sufficient;

   In addition, GCA must delineate all parameters affecting the mass flow rate of emissions (e.g. non-normal operating conditions, reactor vent dumps, season of the year, etc.);

3. Finally, as NSPS are applicable to facilities that are modified in such a way as to increase the mass rate of emissions, GCA will have to identify how DMT-TPA plants increase production rates or otherwise modernize facilities. The key point here is to

BURLINGTON ROAD, BEDFORD, MASSACHUSETTS 01730 / PHONE: 617-275-9000

quantitatively describe the effects of expansion and modernization techniques on the mass rate of emission. We feel that this type of information can readily be gained in conversation with plant managers.

GCA has three options open to it in the acquisition of data for this project:

Option 1 - Only literature data can be used. This approach is unsatisfactory as there is little data available in the open literature, and that which is available is several years old;

Option 2 - Industrial questionnaires applicable under Section 114 of the Clean Air Act, can be sent out through the EPA. GCA would not like to use this approach for three reasons:

1. the turn around time for a letter is long compared with the duration of the project,
2. questionnaires are not flexible and cannot easily be changed to reflect the situation,
3. questionnaires are generally considered an imposition on the plant manager's time.

Option 3 - the GCA Project Manager, Dr. Donald Durocher, can visit the DMT-TPA plant to collect the information from plant personnel. This is the course that GCA hopes to pursue. This option would allow for a rapid transfer of information and would insure a good understanding of the DMT-TPA plant processes and, therefore, an accurate presentation of the results.

As the duration of this project is short, an appointment to visit your plant sometime in April or early May would be quite appealing. I am looking forward to your response to this request. If you have any questions on this request, please contact me or Mr. Andrew Trenholm. Mr. Trenholm's address is below:

Mr. Andrew Trenholm
EPA - Office of Air Quality and Planning
Emission Standards and Engineering Division
Research Triangle Park - Mail Drop #13
Research Triangle Park, North Carolina 27711

Tel. 919-688-8146, Ext. 301

Thank you.

Sincerely,

Dr. Donald F. Durocher
Senior Scientist

GCA/Technology Division
Burlington Road
Bedford, Mass. 01730

DFD:nc

Tel. 617-275-9000, Ext. 352

DU PONT
ESTABLISHED 1802
E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED
WILMINGTON, DELAWARE 19898

ENGINEERING DEPARTMENT
LOUVIERS BUILDING

April 15, 1976

Dr. Donald F. Durocher
GCA/Technology Division
Burlington Road
Bedford, MA 01730

Dear Don:

Confirming our conversation today, we will expect your visit to Wilmington on May 18, 1976, at 9:00 am in Room D-1100 (second floor of the Du Pont Building). This is located in center city adjacent to the Hotel Du Pont. The easiest access would be the entrance on Orange Street between Tenth and Eleventh Streets. If you were delayed, the phone to this Room is 774-8765.

We will discuss updating the Houdry report on adipic acid plant air emissions relative to your contract with EPA. At that time or before, we can let you know our position on your request for information on the DMT/TPA processes which I pointed out we are a licensee.

Undoubtedly, the subject of confidentiality will come up and how this is covered in your contract with EPA. It might be of value to have a copy available. You mentioned that you had received from the Texas Air Control Board permit applications for Du Pont adipic acid operations. We would be highly interested in seeing copy of what TACB furnished you. With other EPA contractors, to whom we have furnished information, we have had an opportunity to review their draft reports. This has proven of benefit to both parties. I hope we would have this opportunity in your studies also.

If I can be of further help, please call me on (302) 366-2870.

Sincerely,

W R Chalker

W. R. Chalker
Principal Consultant
Environmental Engineering

WRC:kmt

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. B. Chalker DATE 4/21/76

ORGANIZATION DuPont

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

Bill said meeting would be held the 12th instead of the 18th because all the people will be out for a meeting that day anyway. Bill will not be there, but he will give me the name of a different liaison man.

I explained our data requirements again, and told him of the fact that I wish no confidential information. He was interested in the Model IV calculation and I told him that I would send him a copy of this model for him to look over. He still sees a little problem with the data from DMT-TPA plants, as they lease their technology from Amoco and Tennessee Eastman. However, since we only need emission data he thinks that he can get around it.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. John R. Cooper DATE 5/19/76

ORGANIZATION DuPont

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

I told Mr. Cooper that I had contacted Dr. Rosscup and that he said to contact Art Gilbert at DuPont to set everything up. Mr. Cooper said that they would take it from there. He said that they had already sent a copy of my letter to Art Gilbert. I also told him that I had sent a letter to Mr. Long of T.E. and would be sending one to Dr. Rosscup. (The emission information had not been received by the end of the task.)

GCA/TECHNOLOGY DIVISION

May 14, 1976

Mr. John R. Cooper, Environmental Manager
Intermediates Division, Polymer Intermediates Department
E.I. DuPont de Nemours & Company, Inc.
1007 Market Street
Wilmington, Delaware 19898

Dear Bill:

I enjoyed our meeting on Wednesday and am looking forward to the emission information on the Victoria Plant.

I have been unsuccessful in reaching both Dr. Rosscup and Mr. Long. In any event, a summary of the information we would like to obtain from DuPont's Wilmington, N.C. DMT-TPA plant is listed below:

- a block process flow diamgram of the DMT-TPA facility;
- the quantity and composition of all air emissions from the terephthalic acid unit;
- the quantity and composition of all air emissions from the purified terephthalic acid unit. Air emissions from the hot oil furnace are not required;
- the quantity and composition of all air emissions from the purified DMT unit;
- the means by which the above data was determined (i.e. design estimate, materials balance, actual sampling and analysis);
- the efficiency and design characteristics of all emission control devices.

Any assistance that you can give us in gathering this information will be greatly appreciated. I will be in touch after contacting Dr. Rosscup and Mr. Long.

Sincerely,

Dr. Donald F. Durocher
Senior Scientist

DFD:nc

BURLINGTON ROAD, BEDFORD, MASSACHUSETTS 01730 / PHONE: 617-275-9000

PI-1176

E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED
WILMINGTON, DELAWARE 19898

POLYMER INTERMEDIATES DEPARTMENT

June 18, 1976

Dr. Donald F. Durocher
Senior Scientist
GCA/Technology Division
Burlington Road
Bedford, Massachusetts 01730

Dear Dr. Durocher:

Request for Air Emissions Data
Adipic Acid
Re: Letter Durocher to Cooper May 18, 1976
Letter Durocher to Cooper May 14, 1976

Attached is the information requested on the Orange, Texas cyclohexane oxidation plant. Also attached are the pages you were lacking from the 1973 adipic acid inventory report for Victoria. Information on the Victoria cyclohexane oxidation plant is currently not available.

Information requested on our TPA and DMT plants has not been received from our plants to date. Will forward upon receipt.

E. I. du Pont de Nemours & Co.
Polymer Intermediates Department

D. F. Rapp

D. F. Rapp
Departmental Engineer's Office

DFR/smh
Enclosure

Hercules

The following contacts were made with personnel at Hercules to obtain emission information. A summary of a discussion held at the Hercules main office in Wilmington, Delaware is given in Appendix A.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. John Humphrey DATE 4/2/76

ORGANIZATION Hercules Incorporated

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

F. T. Parkinson is no longer the plant manager. Mr. Humphrey acts as the environmental coordinator for the plant.

Mr. Humphrey said that the best way to proceed would be to send a cover letter to either the Director of Operations, the Plant Manager, or the Environmental Coordinator. Finally, he said to send the cover letter, letter of intent and a copy of the Houdry questionnaire to:

Dr. Richard A. Chaddock
Environmental Coordinator
Hercules Incorporated
910 Market Street
Wilmington, Delaware 19899

This would be the most direct route and probably the most efficient.

Only the Wilmington Plant is presently operating. The steam boilers are fired with No. 6 fuel oil. North Carolina recently modified all of their regulations to conform to the Federal Regulations. They just issued a FPDES permit to Wilmington.

All new equipment goes through a permit application stage. This has to be renewed every 3 to 5 years. It is periodically updated.

GCA/TECHNOLOGY DIVISION

April 5, 1976

Dr. Richard A. Chaddock
Environmental Co-ordinator
910 Market Street
Hercules, Incorporated
Wilmington, Delaware 19899

Dear Dr. Chaddock:

GCA/Technology Division is under contract to the EPA to update basic background information on dimethyl teraphthalate and teraphthalic acid (DMT-TPA) manufacturing plants. The results of this study will be used as part of the EPA Emission Standards and Engineering Division's assessment of numerous industries for the purpose of establishing priorities for setting new source performance standards (NSPS).

The purpose of this project is to use updated information to estimate the expected reduction of atmospheric emissions from DMT-TPA plants when NSPS are applied. The title of this study is "Screening Study to Determine Need for Standards of Performance for New Sources of Dimethyl Teraphthalate and Teraphthalic Acid Manufacturing." These NSPS will not be set as part of this study, but will be based on data collected during this study. The project is scheduled to be completed by June 9, 1976.

The Hanover Plant in Wilmington, North Carolina had been previously polled by questionnaire for information of the type we require by the Houdry Division of Air Products and Chemicals, Inc. under the auspices of the EPA. The EPA Project Officer was Leslie B. Evans. The questionnaire was returned to the EPA on September 7, 1972. The results were incorporated into a report titled, "Survey Reports of Atmospheric Emissions from the Petrochemical Industry, Volume II (EPA-450/3-73-005b), published January, 1974. For your convenience, a copy of the completed questionnaire is attached. Much of the type of information that we need was supplied by this questionnaire, but the information must be updated.

As part of this study, I would like to visit and gather information from the personnel at the Hanover plant. In a telephone conversation on April 2, 1976, Mr. John Humphrey, Environmental Co-ordinator of the Hanover Plant, said that I should discuss this with you. I have enclosed a letter stating the reasons for a plant visit and the information that would be needed. I will be contacting you at the end of the week to further explain the goals of this project.

I am looking forward to Hercules' response to our request and would appreciate any assistance that you could give us in this matter. If you have any questions or comments, please feel free to contact either me or the EPA Project Officer, Mr. Andrew Trenholm. Mr. Trenholm's address is in the enclosed letter.

Sincerely,

Dr. Donald F. Durocher

Dr. Donald F. Durocher
Senior Scientist

DFD:nc
Enc.

BURLINGTON ROAD, BEDFORD, MASSACHUSETTS 01730 / PHONE: 617-275-9000

GCA/TECHNOLOGY DIVISION

April 5, 1976

Hercules, Incorporated
Wilmington, Delaware

Gentlemen:

This letter is a request to visit Hercules' DMT-TPA plant in Wilmington, North Carolina. The purpose of this visit will be to gather information on atmospheric emissions, emission control systems, and methods employed to expand a DMT-TPA plant's output capacity.

GCA/Technology is under contract to the EPA to update basic background information on DMT-TPA plants. The results of this study will be used as part of the EPA Emission Standards and Engineering Division's assessment of numerous industries for the purpose of establishing priorities for setting new source performance standards (NSPS) which are defined in Section 111 of the Clean Air Act.

The purpose of this project is to use updated information to estimate the expected reduction of atmospheric emissions from ~~adipic acid~~ plants when NSPS are applied. The title of this study is "Screening Study to Determine Need for Standards of Performance for New Sources of Dimethyl Teraphthalate and Teraphthalic Acid Manufacturing." These NSPS will <u>not</u> be set as part of this study, but will be based on data collected during this study. This project is scheduled to be completed by June 9, 1976. The EPA Project Officer is Mr. Andrew Trenholm of the Emission Standards and Engineering Division of the EPA.

The Hanover Plant of Hercules, Inc. in Wilmington, North Carolina, had been previously polled by questionnaire for information of the type we require by the Houdry Division of Air Products and Chemicals, Inc. under the auspices of the EPA. The EPA Project Officer was Leslie B. Evans. The questionnaire was returned to the EPA by Mr. F.T. Parkinson, Plant Manager, on September 7, 1972. The results were incorporated into a report titled, "<u>Survey Reports of Atmospheric Emissions from the Petrochemical Industry, Volume II</u> (EPA-450/3-73-005b), published Jan., 1974. For your convenience, a copy of the completed questionnaire is attached.

Much of the type of information that we need was supplied by this questionnaire, but the information must be updated. The information that we would like to obtain is summarized below:

1. The quantities and compositions of emissions from all atmospheric emission points. A process flow diagram for the plant would be very helpful. GCA realizes that process stream data may be proprietary. In the absence of actual measurements of the atmospheric emissions, mass balance calculations would be sufficient;

2. The types of control equipment or methods of process control used by the plant to reduce atmospheric emissions. If at all possible, installation and operating costs for control equipment would be desired. The economics of control would provide basic supplemental information for determining the best system of emission reduction. Mass flow balances around the control device would be useful information.

BURLINGTON ROAD, BEDFORD, MASSACHUSETTS 01730 / PHONE: 617-275-9000

In addition, GCA must delineate all parameters affecting the mass flow rate of emissions (e.g. non-normal operating conditions, reactor vent dumps, season of the year, etc.);

(Information of the type outlined in Points 1 and 2 was contained in the Houdry Division questionnaire). Therefore, updating this information would be straightforward)

3. Finally, as NSPS are applicable to facilities that are modified in such a way as to increase the mass rate of emissions, GCA will have to identify how DMT-TPA plants increase production rates or otherwise modernize facilities. The key point here is to quantitatively describe the effects of expansion and modernization techniques on the mass rate of emission. This last point was not covered in the Houdry Division Report. However, we feel that this type of information can readily be gained in conversation with plant managers.

We are interested in the Hanover Plant because it is one of the largest producers of DMT-TPA. As the Hanover plant has increased its production capacity from 450 to over 130C million pounds of DMT-TPA over the past four years, a study of this facility would serve as an excellent example of how DMT-TPA plants increase their output capacity and the effects of this increase on air emissions.

GCA has three options open to it in the acquisition of data for this project:

Option 1 - Only literature data can be used. This approach is unsatisfactory as there is little data available in the open literature, and that which is available is several years old;

Option 2 - Industrial questionnaires, similar to the Houdry Division questionnaire and applicable under Section 114 of the Clean Air Act, can be sent out through the EPA. GCA would not like to use this approach for three reasons:

1. the turn around time for a letter is long compared with the duration of the project,
2. questionnaires are not flexible and cannot easily be changed to reflect the situation,
3. questionnaires are generally considered an imposition on the plant manager's time.

Option 3 - the GCA Project Manager, Dr. Donald Durocher, can visit the Hanover Plant to collect the information from plant personnel. This is the course that GCA hopes to pursue. This option would allow for a rapid transfer of information and would insure a good understanding of the Hanover Plant processes and, therefore, an accurate presentation of the results.

As the duration of this project is short, an appointment to visit your plant sometime in April or early May would be quite appealing. I am looking forward to your response to this request. If you have any questions on this request, please contact me or Mr. Andrew Trenholm. Mr. Trenholm's address is below:

Mr. Andrew Trenholm
EPA-Office of Air Quality and Planning
Emission Standards and Engineering Division
Research Triangle Park - Mail Drop #13
Research Triangle Park, North Carolina 27711

Tel. 919-688-8145, Ext. 301

Thank you.

Sincerely,

Dr. Donald F. Durocher

Dr. Donald F. Durocher
Senior Scientist

GCA/Technology Division
Burlington Road
Bedford, Mass. 01730

Tel. 617-275-9000, Ext. 352

DFD:nc
Enc.

TELEPHONE CONVERSATION

PERSON CONTACTED Dr. R. Chaddock DATE 4/20/76

ORGANIZATION Hercules Incorporated

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

Dr. Chaddock was on vacation for 2 weeks and will be back on the 4th of May. Then he will be going on business trips for the next several days.

I spoke to his secretary, Pat Kougan. She found my letter and will contact Dr. Chaddock. He will call me by phone to set up a plant visit.

TELEPHONE CONVERSATION

PERSON CONTACTED Dr. R. Chaddock DATE 4/21/76

ORGANIZATION Hercules Incorporated

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

Pat Kougan talked to Dr. Chaddock. He will only be available from the 16th of May on. He suggested that I visit him at the main offices, as plant site visits are being discouraged because there are so many contractors asking for data.

I asked Pat to inform me if he wouldn't give me air emission data on my visit. She said that all that data is stored at the main building, and we would probably get it.

Trip has been set up for 8:30 on May 17.

Hoechst Fibers Corporation

The following contacts were made with personnel at Hoechst Fibers to arrange a meeting to gather emission information from the Spartanburg Plant. As Hoechst Fibers decided that all emission data is confidential, this meeting was never held.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Zeeler DATE 4/8/76

ORGANIZATION American Hoechst

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

Mr. Zeeler was not available. I explained what we needed to his secretary. She said she would have Mr. Zeeler call me back.

TELEPHONE CONVERSATION

PERSONE CONTACTED Mr. Zeeler DATE 4/29/76

ORGANIZATION American Hoechst

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

Mr. Zeeler switched me to Mr. Coal.

Mr. Coal is the environmental manager for the whole company. I explained our project to him and he said that we could get all this data from the plant. He said to contact

Mr. Bob Monihan
Chief Engineer
P.O. Box 5887
Spartanburg, S.C. 29301

He said that they should give us all information. He also said that a letter of intent should be directed to Mr. Monihan.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Charles Powell DATE 4/30/76

ORGANIZATION Hoechst Fibers Corporation

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

The reason for the confidentiality of the Houdry report was because the process was leased from Hercules. They are not at liberty to release any information.

There have been no major changes since the Houdry report. They are a small outfit and are slightly below economical size.

They are getting together information on air emissions for the state. It would be best if I visited them to collect the information in the latter part of May. Therefore, I should send him a cover letter and letter of intent and call back in 2 weeks. Should state in letter that this is the most efficient way to do this. Send letter to:

Hoechst Fibers Industries
Attn: Mr. Charles L. Powell
P.O. Box 5887
Spartanburg, S.C. 29301

30 April 1976

Mr. C. L. Powell
Hoechst Fibers Industries
P. O. Box 5887
Spartanburg, South Carolina 29301

Dear Mr. Powell:

GCA/Technology Division is under contract to the EPA to update basic background information on atmospheric emissions and emission control equipment from dimethyl terephthalate and terephthalic acid (DMT-TPA) manufacturing plants. The results of this study will be used as part of the EPA Emission Standards and Engineering Division's assessment of numerous industries for the purpose of establishing priorities for setting new source performance standards (NSPS).

The purpose of this project is to use updated information to estimate the expected reduction of atmospheric emissions from DMT-TPA plants when NSPS are applied. The title of this study is "Screening Study to Determine Need for Standards of Performance for New Sources of Dimethyl Terephthalate and Terephthalic Acid Manufacturing." These NSPS will not be set as part of this study, but will be based on data collected during this study. The project is scheduled to be completed by June 9, 1976.

As part of this study, I would like to visit and gather information from the personnel at the Spartanburg, South Carolina plant. I have enclosed a letter of intent stating the reasons for a plant visit and the information that would be needed.

I am looking forward to your response to our request and would appreciate any assistance that you could give us in this matter. If you have any questions or comments, please feel free to contact either me or the EPA Project Officer, Mr. Andrew Trenholm. Mr. Trenholm's address is in the enclosed letter.

Sincerely,

Dr. Donald F. Durocher
Senior Scientist

DFD:jaf
Enclosure

BURLINGTON ROAD, BEDFORD, MASSACHUSETTS 01730 / PHONE: 617-275-9000

GCA/TECHNOLOGY DIVISION

30 April 1976

Hoechst Fibers International
Spartanburg, South Carolina 29301

Gentlemen:

This letter is a request to visit Hoechst's DMT-TPA plant in Spartanburg, South Carolina. The purpose of this visit will be to gather information on atmospheric emissions, emission control systems, and methods employed to expand a DMT-TPA plant's output capacity.

GCA/Technology Division is under contract to the EPA to update basic background information on DMT-TPA plants. The results of this study will be used as part of the EPA Emission Standards and Engineering Division's assessment of numerous industries for the purpose of establishing priorities for setting new source performance standards (NSPS) which are defined in Section 111 of the Clean Air Act.

The purpose of this project is to use updated information to estimate the expected reduction of atmospheric emissions from DMT-TPA plants when NSPS are applied. The title of this study is "Screening Study to Determine Need for Standards of Performance for New Sources of Dimethyl Terephthalate and Terephthalic Acid Manufacturing." These NSPS will <u>not</u> be set as part of this study, but will be based on data collected during this study. This project is scheduled to be completed by June 9, 1976. The EPA Project Officer is Mr. Andrew Trenholm of the Emission Standards and Engineering Division of the EPA.

The information that we would like to obtain is summarized below:

1. Design, operating and emission information for control systems used by the plant to reduce atmospheric emissions. If at all possible, installation and operating costs for control equipment would be desired. The economics of control would provide basic supplemental information for determining the best system of emission reduction. Mass flow balances around the control device would be useful information.

2. The quantities and compositions of emissions from all atmospheric emission points. We are concerned with emissions from the total process; i.e., from the storage of p-xylene to the storage of the purified DMT or TPA product. A block process flow diagram for the plant would be very helpful. GCA realizes that process stream data may be proprietary. In the absence of actual measurements of the atmospheric emissions, mass balance calculations would be sufficient.

B[illegible]INGTON ROAD, BEDFORD, MASSACHUSETTS 01730 / PHONE: 617-275-9000

In addition, GCA must delineate all parameters affecting the mass flow rate of emissions (e.g., non-normal operating conditions, reactor vent dumps, season of the year, etc.).

3. Finally, as NSPS are applicable to facilities that are modified in such a way as to increase the mass rate of emissions, GCA will have to identify how DMT-TPA plants increase production rates or otherwise modernize facilities. The key point here is to quantitatively describe the effects of expansion and modernization techniques on the mass rate of emission. We feel that this type of information can readily be gained in conversation with plant managers.

GCA has three options open to it in the acquisition of data for this project:

Option 1 — Only literature data can be used. This approach is unsatisfactory as there is little data available in the open literature, and that which is available is several years old.

Option 2 — Industrial questionnaires applicable under Section 114 of the Clean Air Act, can be sent out through the EPA. GCA would not like to use this approach for three reasons:

1. the turn around time for a letter is long compared with the duration of the project,
2. questionnaires are not flexible and cannot easily be changed to reflect the situation,
3. questionnaires are generally considered an imposition on the plant manager's time.

Option 3 — The GCA Project Manager, Dr. Donald Durocher, can visit the DMT-TPA plant to collect the information from plant personnel. This is the course that GCA hopes to pursue. This option would allow for a rapid transfer of information and would ensure a good understanding of the DMT-TPA plant processes and, therefore, an accurate presentation of the results.

As the duration of this project is short, an appointment to visit your plant sometime in late May would be quite appealing. I am looking forward to your response to this request. If you have any questions on this request, please contact me or Mr. Andrew Trenholm. Mr. Trenholm's address is below:

Mr. Andrew Trenholm
EPA — Office of Air Quality and Planning
Emission Standards and Engineering Division
Research Triangle Park - Mail Drop #13
Research Triangle Park, North Carolina 27711

Telephone: 919-688-8146, Extension 301.

Thank you.

Sincerely,

Dr. Donald F. Durocher
Senior Scientist

GCA/Technology Division
Burlington Road
Bedford, Mass. 01730

Telephone: 617-275-9000, Ext. 352

DFD:jaf

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Charles Powell DATE 5/14/76

ORGANIZATION Hoechst Fibers Corporation

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

Mr. Powell had shown the letter of intent to his superiors. They are waiting for the official go-ahead from their main office. He thinks everything should be all right and he will contact me when he gets official notification.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Charles Powell DATE

ORGANIZATION Hoechst Fibers Corporation

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

Charles called and said that the corporate offices came to the conclusion that since Hercules didn't allow us to see their facility they couldn't allow us to see Hoechst Fibers facility. I told him that I would see Hercules' old data and scale it down for Hoechst. He said nothing so I assumed he didn't have any better suggestions.

TREVIRA

May 26, 1976

Dr. Donald F. Durocher
Senior Scientist
GCA/Technology Division
Burlington Road
Bedford, Mass. 01730

Dear Dr. Durocher:

Regarding your request to visit our plant to gather information on air emissions from the DMT manufacturing process, we regret that a visit cannot be permitted because of our contract agreement with Hercules.

Very truly yours,

HOECHST FIBERS INDUSTRIES
R. T. Monaghan, Chief Engineer

C. L. Powell

C. L. Powell
Environmental Engineer

CLP/msp

Mobil Chemical Company

The following contacts were made with Mobil to determine if they were still making DMT-TPA. Mobil no longer makes DMT-TPA.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Brenner DATE 4/2/76

ORGANIZATION Mobil Chemical

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

Mr. Brenner, who signed the Houdry questionnaire is stationed in Houston now.

Spoke to Pat Gilley, Secretary to Mr. Huff, the head of olefins and aromatics plant. She said Mobil sold all interest in DMT-TPA production to Bellsicol. Didn't know if this was a subsidiary of any large company. They do product DMT. Should get in touch with Marvin Fannin, head of the plant.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Morgan Jones DATE

ORGANIZATION Bellsicol

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

Mr. Jones wasn't in so I spoke to Scott Merchant. He said that they converted the facilities bought from Mobil to other products and that they do not make any DMT-TPA. This was confirmed by Paul Kelly, Process Engineer for the plant.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. M. Fannin DATE 4/2/76

ORGANIZATION Bellsicol

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

Mr. Fannin was out of town for a few days. I spoke to his secretary and she told me that Mr. Gene Wiggin was the manufacturing manager for the plant. The Bellsicol Company is a subsidiary of Northwest Industries. They do make DMT, but done't make any TPA.

She said that it would be best to try to contact Mr. Morgan Jones, Environmental Officer, Corporate Engineering Section. His extension is 325.

Tennessee Eastman Company

The following contacts were made with personnel at Tennessee Eastman to set up a plant visit to the Kingsport Plant. A summary of the plant visit is given in Appendix A.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. J. C. Edwards DATE 4/2/76

ORGANIZATION Tennessee Eastman

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

Our program of attack sounded all right to Mr. Edwards. However, he will need explicit authorization from the EPA. It will be all right for us to enclose the Project Officer's name and then have Edwards call him.

Mr. Edwards suggested that it would be easier to get emission data from a questionnaire update, but that since we wanted to know how plants expand, perhaps a site visit would be better. He said to enclose a copy of the questionnaire in the letter of intent.

In addition, he said that DMT production and emissions depends on the technology used, and the location of the plant (city versus rural). Emissions are always governed by state regulations. We should put in the letter that he should direct his responses to me.

GCA/TECHNOLOGY DIVISION

April 5, 1976

Mr. James C. Edwards
Manager, Clean Environment Program
Tennessee Eastman Company
P. O. Box 511
Kingsport, Tennessee 37660

Dear Mr. Edwards:

As a follow up to our telephone conversation of April 2, 1976, this letter is a formal request for emission information from Tennessee Eastman's dimethyl teraphthalate and teraphthalic acid (DMT-TPA) manufacturing plant and a request for a site visit to the DMT-TPA plant in Kingsport, Tennessee.

GCA/Technology Division is under contract to the EPA to update basic background information on DMT-TPA plants. The results of this study will be used as part of the EPA Emission Standards and Engineering Division's assessment of numerous industries for the purpose of establishing priorities for setting new source performance standards (NSPS).

The purpose of this project is to use updated information to estimate the expected reduction of atmospheric emissions from DMT-TPA plants when NSPS are applied. The title of this study is "Screening Study to Determine Need for Standards of Performance for New Sources of Dimethyl Teraphthalate and Teraphthalic Acid Manufacturing." These NSPS will not be set as part of this study, but will be based on data collected during this study. The project is scheduled to be completed by June 9, 1976.

The Tennessee Eastman DMT-TPA plant in Kingsport, Tennessee had been previously polled by questionnaire for information of the type we require by the Houdry Division of Air Products and Chemicals, Inc. under the auspices of the EPA. The EPA Project Officer was Leslie B. Evans. The questionnaire was returned to the EPA on August 30, 1972. The results were incorporated into a report titled, "Survey Reports of Atmospheric Emissions from the Petrochemical Industry, Volume II (EPA-450/3-73-005b), published January, 1974. For your convenience, copies of the completed questionnaire are attached. Much of the type of information that we need was supplied in these questionnaires, but the information must be updated.

As part of this study, I would like to visit and gather information from the personnel at the Kingsport plant. I have enclosed a letter of intent stating the reasons for a plant visit and the information that would be needed. Authorization for this project can be obtained from the EPA Project Officer, Mr. Andrew Trenholm. Mr. Trenholm's address is given in the enclosed letter.

I am looking forward to Tennessee Eastman's response to our request and would appreciate any assistance that you could give us in this matter. If you have any questions or comments, please feel free to contact either mr or Mr. Trenholm.

Sincerely,

Dr. D. F. Durocher

Dr. Donald F. Durocher
Senior Scientist

DFD:nc
Enc.

URLINGTON ROAD, BEDFORD, MASSACHUSETTS 01730 / PHONE: 617-275-9000

GCA/TECHNOLOGY DIVISION

April 15, 1976

Tennessee Eastman Company
Kingsport, Tennessee

Gentlemen:

This letter is a request to visit Tennessee Eastman's DMT-TPA plant in ~~Wilmington, North Carolina~~ Kingsport, Tenn. The purpose of this visit will be to gather information on atmospheric emissions, emission control systems, and methods employed to expand a DMT-TPA plant's output capacity.

GCA/Technology Division is under contract to the EPA to update basic background information on DMT-TPA plants. The results of this study will be used as part of the EPA Emission Standards and Engineering Division's assessment of numerous industries for the purpose of establishing priorities for setting new source performance standards (NSPS) which are defined in Section 111 of the Clean Air Act.

The purpose of this project is to use updated information to estimate the expected reduction of atmospheric emissions from DMT-TPA plants when NSPS are applied. The title of this study is "Screening Study to Determine Need for Standards of Performance for New Sources of Dimethyl Teraphthalate and Teraphthalic Acid Manufacturing." These NSPS will <u>not</u> be set as part of this study, but will be based on data collected during this study. This project is scheduled to be completed by June 9, 1976. The EPA Project Officer is Mr. Andrew Trenholm of the Emission Standards and Engineering Division of the EPA.

The Tennessee Eastman Company DMT-TPA plant in ~~Wilmington, North Carolina~~ Kingsport, Tenn., has been previously polled by questionnaire for information of the type we require by the Houdry Division of Air Products and Chemicals, Inc., under the auspices of the EPA. The EPA Project Officer was Leslie B. Evans. The questionnaire was returned to the EPA by Mr. James C. Edwards on August 30, 1972. The results were incorporated into a report titled, <u>Survey Reports of Atmospheric Emissions from the Petrochemical Industry, Volume II</u> (EPA-450/3-73-005b), published January 1974. For your convenience, a copy of the completed questionnaire is attached.

Much of the type of information that we need was supplied by this questionnaire, but the information must be updated. The information that we would like to obtain is summarized below:

1. The types of control equipment or methods of process control used by the plant to reduce atmospheric emissions. If at all possible, installation and operating costs for control equipment would be desired. The economics of control would provide basic supplemental information for determining the best system of emission reduction. Mass flow balances around the control device would be useful information.

BURLINGTON ROAD, BEDFORD, MASSACHUSETTS 01730 / PHONE: 617-275-9000

2. The quantities and compositions of emissions from all atmospheric emission points. A process flow diagram for the plant would be very helpful. GCA realizes that process stream data may be proprietary. In the absence of actual measurements of the atmospheric emissions, mass balance calculations would be sufficient.

   In addition, GCA must delineate all parameters affecting the mass flow rate of emissions (e.g., non-normal operating conditions, reactor vent dumps, season of the year, etc.).

(Information of the type outlined in Points 1 and 2 was contained in the Houdry Division questionnaire. Therefore, updating this information would be straightforward.)

3. Finally, as NSPS are applicable to facilities that are modified in such a way as to increase the mass rate of emissions, GCA will have to identify how DMT-TPA plants increase production rates or otherwise modernize facilities. The key point here is to quantitatively describe the effects of expansion and modernization techniques on the mass rate of emission. This last point was not covered in the Houdry Division Report. However, we feel that this type of information can readily be gained in conversation with plant managers.

GCA has three options open to it in the acquisition of data for this project:

Option 1 — Only literature data can be used. This approach is unsatisfactory as there is little data available in the open literature, and that which is available is several years old.

Option 2 — Industrial questionnaires, similar to the Houdry Division questionnaire and applicable under Section 114 of the Clean Air Act, can be sent out through the EPA. GCA would not like to use this approach for three reasons:

1. the turn-around time for a letter is long compared with the duration of the project,
2. questionnaires are not flexible and cannot easily be changed to reflect the situation,
3. questionnaires are generally considered an imposition on the plant manager's time.

Option 3 — The GCA Project Manager, Dr. Donald Durocher, can visit the Kingsport ~~Wilmington~~ plant to collect the information from plant personnel. This is the course that GCA hopes to pursue. This option would allow for a rapid transfer of information and would ensure a good understanding of the Wilmington plant processes and, therefore, an accurate presentation of the results.

As the duration of this project is short, an appointment to visit your plant sometime in April or early May would be quite appealing. I am looking forward to your response to this request. If you have any questions on this request, please contact me or Mr. Andrew Trenholm. Mr. Trenholm's address is below:

Mr. Andrew Trenholm
EPA — Office of Air Quality and Planning
Emission Standards and Engineering Division
Research Triangle Park - Mail Drop #13
Research Triangle Park, North Carolina 27711

Tel: (919) 688-8146, Ext. 301.

Thank you.

Sincerely,

Donald Durocher

Dr. Donald F. Durocher
Senior Scientist

GCA/Technology Division
Burlington Road
Bedford, Mass. 01730

Tel: (617) 275-9000, Ext. 352

DFD:jaf
Enclosure

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. J.C. Edwards DATE 5/20/76

ORGANIZATION Tennessee Eastman

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

Jim had not yet read our letter, but he will read it now and respond to it either in writing or by phone. He sees no problem. Also, in the letter I said that the plant was in Wilmington, N.C., when it is in Kingsport, Tenn.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. W. M. Crawford DATE 4/28/76

ORGANIZATION Tennessee Eastman

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

Jim Edwards has assigned Bill Crawford to cover this. He has discussed our request with the operating people. They have looked over the Houdry questionnaire and said that they won't be able to give us information until June.

Cost figures are by and large unobtainable in a shorter time period. He said that there have been very few emission estimates made after 1972.

For DMT they have retained their existing facilities and added on new buildings and equipment. For TPA they have added on additonal units.

I suggested that we use the old Houdry information for older units and go through emission permits for the newer units. He said that that sounded like a good idea, and we set up a tentative meeting date for the 27th of May. He will discuss this with the plant personnel. I told him that I would send him a copy of Model IV.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. W.M. Crawford DATE 5/21/76

ORGANIZATION Tennessee Eastman

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

Bill said that I would be dealing with Niel Simmons. I talked to Niel. He said that the 27th was all right but that he would check back with me. I should come into the Tri Cities Airport and stay at the Cammera Inn. We will meet at 9:00 a.m.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Robert Long DATE 5/14/76

ORGANIZATION Tennessee Eastman

GCA PERSONNEL D.F. Durocher

DISCUSSION SUMMARY

Mr. Long said that he would have to know what information we needed and what information DuPont is willing to give. They will then clear the information for publication. In essence DuPont can only give as much information as Tennessee Eastman is willing to give.

He said that I should send him a letter outlining the type of information that we require and he will see what he can do.

GCA/TECHNOLOGY DIVISION

May 1, 1976

Mr. W. M. Crawford
Tennessee Eastman Company
P.O. Box 511
Kingsport, Tennessee 37660

Dear Bill,

I have enclosed a copy of the Model IV calculations that we will be performing with the data that is gathered from DMT-TPA plants. This model was included in the report, Impact of New Source Performance Standards on 1985 National Emissions from Stationary Sources, Volume I that was prepared for the EPA by the Research Corporation of New England.

I am looking forward to meeting with the Eastman personnel on May 27. If you have any questions on the use of Model IV please feel free to call.

Sincerely,

Don Durocher

Donald Durocher

BURLINGTON ROAD, BEDFORD, MASSACHUSETTS 01730 / PHONE: 617-275-9000

GCA/TECHNOLOGY DIVISION

May 17, 1976

Mr. Robert L. Long,
Licensing Manager
Tennessee Eastman Company
P. O. Box 511
Kingsport, Tennessee 37660

Dear Mr. Long:

This is a follow up letter to our telephone conversation of May 17.

GCA/Technology Division is under contract to the EPA to update basic background information on air emissions from dimethyl teraphthalate and teraphthalic acid (DMT-TPA) manufacturing plants. The results of this study will be used as part of the EPA Emission Standards and Engineering Division's assessment of numerous industries for the purpose of establishing priorities for setting new source performance standards (NSPS).

The purpose of this project is to use updated information to estimate the expected reduction of atmospheric emissions from DMT-TPA plants when NSPS are applied. The title of this study is "Screening Study to Determine Need for Standards of Performance for New Sources of Dimethyl Teraphthalate and Teraphthalic Acid Manufacturing." These NSPS will <u>not</u> be set as part of this study, but will be based on data collected during this study. The project is scheduled to be completed by June 9, 1976. The EPA Project Officer is Mr. Andrew Trenholm of the Emission Standards and Engineering Division of the EPA. Mr. Trenholm's address is included at the end of this letter.

I have been visiting each manufacturer to obtain air emission information for the DMT-TPA industry. On May 12 I visited Mr. John R. Cooper, Polymer Intermediates Department of E.I. DuPont to obtain air emission data for their Wilmington, N.C. plant. He stated that, as DuPont leases its DMT technology from Tennessee Eastman, he could not release any information on air emissions from the process without your express authorization.

Specifically, the information we are seeking is:

- a block process flow diagram of the DMT facility;
- the quantity and composition of all air emissions from the purified DMT unit;
- the means by which the above data was determined (i.e. design estimate, materials balance, actual sampling and analysis);
- the type, efficiency and design characteristics of all emission control devices, used in the DMT facility.

To the best of my knowledge none of this information is proprietary. I have been in contact with James E. Edwards and W.M. Crawford of Tennessee Eastman and will be visiting them May 27 to gather similar information on air emissions from Tennessee Eastman's DMT-TPA plant in Kingsport, Tennessee.

BURLINGTON ROAD, BEDFORD, MASSACHUSETTS 01730 / PHONE 617 275-9000

If possible, could you authorize John Cooper to give us the air emission information for the DMT process from DuPont's Wilmington, North Carolina plant? I am looking forward to your reply and would appreciate any assistance you could give me in this matter.

Sincerely,

Donald F. Durocher

Dr. Donald F. Durocher
Senior Scientist

DFD:nc

Mr. Andrew Trenholm
EPA - Office of Air Quality and Planning
Emission Standards and Engineering Division
Research Triangle Park - Mail Drop #13
Research Triangle Park, North Carolina 27711

Tel. 919-688-8146, ext. 371

TENNESSEE EASTMAN COMPANY
A Division of Eastman Kodak Company
KINGSPORT, TENNESSEE 37662 • 615 246-2111

June 3, 1976

Dr. A. D. Gilbert
E. I. du Pont de Nemours
Wilmington, Delaware 19898

Dear Dr. Gilbert:

I have attached a copy of a letter dated May 17, 1976, from GCA/Technology Division requesting Eastman to authorize the disclosure of information for the DMT process licensed from Eastman and operated by Du Pont in Wilmington, North Carolina.

We hereby authorize Du Pont to disclose information on this process which it deems appropriate in answer to this request and similar requests originating with Government regulatory agencies. It is understood that, in establishing the extent of the disclosure, Du Pont will be guided by the same practices which it uses when disclosing to Government regulatory agencies its own information of a similar nature.

Yours very truly,

Robert L. Long

Robert L. Long
Manager, Licensing

bs

Enclosure

cc: Dr. D. F. Durocher
GCA/Technology Division
Burlington Road
Bedford, Massachusetts 01730

REPORTS AND CORRESPONDENCE WITH STATE AIR POLLUTION CONTROL AUTHORITIES

Alabama

The following contacts were made for the purpose of obtaining state regulations and permit applications for DMT-TPA plants in the State of Alabama.

Telephone Summaries and Letters

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. James W. Cooper DATE 3/31/76

ORGANIZATION Alabama Air Pollution Control Commission

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

The local agency that has jurisdiction over the Amoco TPA plant in Decatur, Alabama is:

Tri-County District Health Service
Air Pollution Control Program
Decatur, Alabama

The director of the program is Mr. Gene Gaywell, at 205-353-7021.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Gene Saywell DATE 3/31/76

ORGANIZATION Air Pollution Control Program, Tri-County District Health Service, Decatur, Ala.

DISCUSSION SUMMARY

Mr. Saywell was quite knowledgable about the Amoco TPA plant in Decatur, Alabama. Many (professional) people feel that this plant is the most complex air pollution source in the state. There are several names for TPA — TPA, TA, and PTA — purified terephthalic acid. The state and Amoco use the latter — PTA.

There are four basic plant processes at the Amoco TPA plant.

1. Aromatics converted to para-xylene
2. p-xylene to crude TPA
3. Purification to PTA
4. Formation of a dimethyl ester.

The plant is rapidly expanding and production is now about twice the 1972 levels. When the fifth p-xylene oxidation unit is completed, total plant capacity will be 2 billion lb/yr.

Permit emission data is available and will be put together and sent. There are 50 separate permits (20 boilers in plant). The data on CO-HC-NO_x emissions are engineering estimates, made by Amoco or their consultant. Mr. Saywell has found some estimates to be considerably lower than actual emissions. (The estimates in question were for the esterification units.)

Amoco is required to perform stack tests with the APC office overseeing the process. However, the sampling program is only for particulates and SO_2 and hasn't really begun yet as they are concentrating on getting the plant in compliance. State agency does stack testing to evaluate violations or perform research.

Another aspect of major concern to Mr. Saywell's office is high particulate emissions from incineration of the large quantities of molten solid waste generated. The strict incinerator particulate limits of 0.2 lb/100 lb charged are exceeded. Currently, there are concerns over whether or not incinerator standards should apply to this disposal method. The incinerator is equipped with electrostatic precipitator. He was unsure of what standards would apply to a NO_x catalytic incinerator.

Regulations: No CO limits - the section on "petroleum processes" does not apply to TPA from para-xylene. No HC regulations on emissions (only in Mobile County), but there are controls on storage, transfer, etc. No specific regulations for para-xylene. NO_x limits for nitric acid and coke plants only. Particulate emissions controlled by process weight table in original Air Law (1971). Process weight calculation includes all raw ingredients including water.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. H. Theumer DATE 4/1/76

ORGANIZATION Tri County District Health Service

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

Apparently, Decatur and Tri County District are separate organizations. While they are following the state A.P. regulations, several points should be noted:

1. Section 6.2, Volatile Organics Loading regulations are not applicable simply because there are no facilities that large.
2. Mr. Theumer was unaware of the existence of any water separation facilities which would be controlled by Section 6.3.
3. Regulation 6.1, storage of organics, is applied in Decatur.
4. According to Mr. Theumer, Sections 6.6 and 6.6.9, organic and photochemically reactive solvents, apply to solvent manufacture and would not apply to the Decatur TPA plant. I'll confirm this with Tri County District A.P.C. Director, Gene Saywell.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Seever DATE 4/15/76

ORGANIZATION Air Pollution Control Program, Tri County District Health Service, Decatur, Ala.

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

Mr. Gene Saywell, County A.P.C. Director, asked Mr. Seever to compile the information. Mr. Seever called us to verify what was needed.

The Tri County (Amoco PTA is in Morgan County) regulations are the same as the state's, except for emission standards for HC. Alabama is currently regulating particulates and SO_x, and not worrying about others. HC regulations on the books are never enforced, to his knowledge. He will send us county regulations.

He seemed interested, will search out files and send us available emission and plant data — available emission tests are only for particulates and SO_x. Other data for HC-CO may be available, but information may be from Amoco's calculations as opposed to stack sampling.

Expect information early next week - 4/19.

Illinois

The following contacts were made for the purpose of obtaining state regulations and permit applications for DMT-TPA plants in the State of Illinois.

Telephone Summaries and Letters

TELPHONE CONVERSATION

PERSON CONTACTED Mr. Miles Zamco DATE 3/30/76

ORGANIZATION Division of Air Pollution Control, Illinois EPA

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

The Amoco TPA plant in Joliet has a confidential permit so no informations is available to us. Mr. Zamco suggested contacting Mr. Marshal Monarch, Air Resources Analysis Section, for specific questions regarding standards (217-782-1830).

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Marshal Monarch DATE 3/30/76

ORGANIZATION Air Resources Analysis Section, Illinois EPA

EPA PERSONNEL P. Spawn

DISCUSSION SUMMARY

He'll send a copy of the air pollution regulations. Currently there are some NO_x limits, CO limits of 200 ppm and HC limits of 8 lb/hr for photochemically reactive matter. Raw material input to Amoco plant in Joliet includes aromatics; most aromatics are photochemically reactive so the HC standard probably applies. There are specific standards for particulates for catalytic regneration processes.

Presently, Amoco is involved with hearings regarding their proposal to reduce or dispense with CO emission limits. Apparently, some plants (including this one) cannot meet the 200 ppm standard. Several other Amoco plants in the state manufacture chemicals of a similar nature and classification as TPA.

There are no regulations specifically for TPA manufacture. There is a local air pollution agency in Joliet, but he didn't think they had much authority.

While the emission permit is confidential, emission data may be available from the proceedings of the hearings for the initial permit which are availabel at the State Air Control Board in Chicago.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Marshal Monarch DATE 3/30/76

ORGANIZATION Air Resources Analysis Section, Illinois EPA

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

Hearings will be held in April regarding CO limits.

Illinois EPA has considered TPA manufacture as a petrochemical process, applying the 200 ppm standard. Amoco is contesting this, saying that the partial oxidation involved in TPA manufacture isn't a true petrochemical process and should have different CO regulations.

Monarch's department considers the HC emission regulations applicable to TPA but hasn't current knowledge. For this, contact Dr. John Reed, Permits Section, 217-782-0088.

For particulates, new sources, such as additional process units, must meet new source standards, Section 203a. In addition, the total emissions from the new units plus the old must be less than Section 203b.

Each operation in the process — boilers, reactors, and incinerators — must abide by regulations applicable to that particular process. Total emissions, from all operations, is not of concern unless ambient air standards are exceeded.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. G.J. Reddy DATE 4/2/76

ORGANIZATION Transportation Planning, Illinois EPA

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

Mr. Reddy wasn't completely familiar with all regulations, but informed me of the following:

FOR PARTICULATE EMISSION:

Fuel burning standards apply to boiler

Incinerator standards apply to incinerator

Process standards apply to overall process, exclusive of the boiler and incinerator portions of plant

Permit information is available from:

Mr. Desai - 217-782-3003

Stationary source standards information is available from:

Mr. Marshal Monarch 217-782-0800

(spoke with Mr. Monarch previously)

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Desai DATE 4/2/76

ORGANIZATION Permit Section, Illinois EPA

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

He said that information on production rates and increases in production is confidential!

He also said that TPA manufacture is considered a petrochemical process, thus, the regulations specific to petrochemicals (CO, HC) apply. CO emissions are governed by fuel burning regulations for boilers and the petrochemical standard (200 ppm) for the rest of the plant.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Joe Ancel DATE 4/6/76

ORGANIZATION Illinois EPA

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

This county office doesn't deal with industrial air pollution. Their office has no emission data for the Amoco TPA plant in Joliet. For emission data, suggested contacting Keith Conklin, Il. EPA Permit Section, 217-782-2113.

For monitoring and emission data, try

C.C. Willard, Manager
Field Operations Section
312-345-9780

TELEPHONE CONVERSATION

PERSON CONTACTED Dr. Chester Snell DATE 4/5/76

ORGANIZATION Illinois EPA

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

An afterburner for combustion of HC would be regulated by process emission standards. TPA is considered a petrochemical process. For actual organic emissions, Sections 205f and 205g(1)c apply; however, 205g(1)c is much stricter and is the governing regulation.

He will pull the files and see if any emission data is available.

TELEPHONE CONVERSATION

PERSON CONTACTED Dr. Chester Snell DATE 4/6/76

ORGANIZATION Division of Air Pollution Control, Illinois EPA

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

Dr. Snell looked at the permit on file for the Amoco TPA plant in Joliet. He gave the following information:

There are two TPA manufacturing units

	TPA production	Average particle emission	Permissible emissions
#1	13,000 lb/hr	17 lb/hr	40.8 lb/hr
#2	15,200 lb/hr	17.7 lb/hr	44.1 lb/hr

No other emissions are listed on this permit which is dated May 1973. No hydrocarbon emissions listed; however, the Illinois EPA wasn't as fussy about HC in 1973 as they are in 1976. He said there are no other emission data in the permit section.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Lovell DATE 4/7/76

ORGANIZATION Rield Operations Section, Illinois EPA

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

This office has emission data, but there is some question as to distribution of information. He suggested requesting information, by letter, stating precisely what is desired:

To: Mr. C.B. Willard
Regional Manager
Illinois EPA
1701 First Ave.
Maywood, Illinois 60153
312-345-9780

Mr. Lovell felt they could give us the information.

Information on hearings can be obtained from Mr. DuMill, Clerk, Illinois Pollution Control Board, Chicago, Illinois, 312-793-3620.

Apparently, Amoco has had some trouble over confidentiality of emission and process data, and they are somewhat concerned over its release. Thus, the request should be in writing.

April 7, 1976

Mr. C. B. Willard
Regional Manager
Illinois Environmental Protection Agency
1701 First Avenue
Maywood, Illinois 60153

Dear Mr. Willard:

GCA/Technology Division is under contract with the EPA to update basic background information on dimethyl terephthalate (DMT) and terephthalic acid (TPA) manufacturing plants. The results of this survey will be used as basic data when the EPA sets new source performance standards for NO_x emissions from the DMT-TPA industry. The EPA Project Officer is Andrew Trenholm. His address is given below. The title of the project is "Screening Study to Determine Need for Standards of Performance for New Sources of Dimethyl Terephthalate and Terephthalic Acid Manufacturing."

As part of this study, we must contact state air pollution agencies to delineate all applicable state and local air pollution emission control regulations. For each plant we need to identify all atmospheric emission sources and the quantities and composition of all air waste streams. Also, air pollution control devices must be tabulated.

GCA is aware that Amoco's emission permit is confidential. However, Mr. Lovett of the Field Services Section suggested that emission data for this plant would be available to us upon written request. Therefore, could you please send us such emission data as available.

We thank you for your time and are looking forward to your response.

Sincerely,

Donald F. Durocher
Senior Scientist
Ext. 352

Mr. Andrew Trenholm
EPA - Office of Air Quality and Planning
Emission Standards and Engineering Division
RTP- Mail Drop #13
Research Triangle Park, N.C. 27711

Tel. 919-688-8146, Ext. 301

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. DuMill DATE 4/8/76

ORGANIZATION Illinois EPA

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

Illinois doesn't hold hearings prior to granting emission permist except for a "permit denial appeal." Mr. DuMill had no recollection of such a hearing for Amoco and TPA — he felt he'd remember "such an unusual process."

There may be emission data in the transcripts of the rule making proceedings, which preceded the original Air Act, 1970-71. Witnesses from Amoco or trade associations may have introduced emission data as an exhibit (evidence). These transcripts are in Mr. DuMill's office and can be examined. He doesn't have the staff to search it out.

Further information on the 1970-71 hearings might be provided by Dr. Richard Wadden, Assistant Professor, University of Illinois, 312-996-8855. Dr. Wadden was a technical assistant for the Pollution Control Board; he attended all of these hearings and may recollect if any data was presented by Amoco.

Illinois
Environmental Protection
Agency

Richard H. Briceland, Director

2200 Churchill Road, Springfield, Illinois 62706

Telephone: 312/345-9780
Address Reply To:
Suite 1205
1701 First Avenue
Maywood, Illinois 60153

April 21, 1976

Mr. Donald F. Durocher
Senior Scientist
GCA/Technology Division
Burlington Road
Bedford, Massachusetts 01730

Dear Mr. Durocher:

Your request for data from Amoco's confidential permit has been forwarded to Keith Conklin, Environmental Protection Agency, DAPC Permits, 2200 Churchill Road, Springfield, Illinois, 62706. He will be happy to respond to the extent he is able.

Good luck in your study.

Very truly yours,

C.B. Willard

C.B. WILLARD
Regional Manager

CBW:dd

cc: Region II Files

Illinois
Environmental Protection Agency
Richard H. Briceland, Director
2200 Churchill Road, Springfield, Illinois 62706
Telephone: 217/782-2113

May 12, 1976

Mr. Donald F. Durocher
Senior Scientist
GCA/Technology Division
Burlington Road
Bedford, Massachusetts 01730

Dear Mr. Durocher:

This is in response to your letter of April 7, 1976 to Mr. C. B. Willard requesting information concerning emissions from Amoco Chemical Company plant. As you state, most of the Amoco Chemical Company files are confidential and the Agency is not at liberty to disclose information contained in such files to the Federal EPA or to any contractor of the Federal EPA. You are welcome to review the non-confidential files of the Amoco facility at this office.

Very truly yours,

Keith J. Conklin

Keith J. Conklin, P.E.
Manager, Permit Section
Division of Air Pollution Control

KJC:ljl

North Carolina

The following contacts were made for the purpose of obtaining state regualtions and permit applications for DMT-TPA plants in the State of North Carolina.

Telephone Summaries and Letters

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. John Romans DATE 3/29/76

ORGANIZATION Division of Environmental Management, North Carolina

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

A copy of the permit for the Hercules plant in Wilmington, N.C. is available upon written request from Mr. W.E. Knight, Acting Director, Division of Environmental Management, P.O. Box 27687, Raleigh, N.C. 27611. Sent request 3/31/76.

According to John Romans, there is little data on permit. No CO data is available since CO is not regulated. Confidential data could be released to EPA of RTP or Region IV, before given to a contractor. We could possibly get such data from EPA. However, Romans has little data on plant emissions. He suggested talking to Hercules, as they have been quite cooperative. If a plant visit is proposed, Mr. Romans offered his services for making arrangements, citing his department's "good rapport" with Hercules.

The current air regulations are the same as the original "North Carolina Water & Air Resources Act" of 1971 except for the ambient SO_x standard. There are no CO regulations and no local agencies.

GCA/TECHNOLOGY DIVISION

March 30, 1976

Mr. W. E. Knight, Acting Director
Division of Environmental Management
P. O. Box 27687
Raleigh, North Carolina 27611

Dear Mr. Knight:

GCA/Technology Division is under contract with the EPA to update basic background information on dimethyl terephthalate (DMT) and terephthalic acid (TPA) manufacturing plants. The results of this survey will be used as basic data when the EPA sets new source performance standards for NO_2 emissions from the DMT-TPA industry. The EPA Project Officer is Andrew Trenholm. His address is given below. The title of the project is "Screening Study to Determine Need for Standards of Performance for New Sources of Dimethyl Terephthalate and Terephthalic Acid Manufacturing."

As part of this study, we must contact state air pollution agencies to delineate all applicable state and local air pollution emission control regulations. For each plant we need to identify all atmospheric emission sources and the quantities and composition of all air waste streams. Also, air pollution control devices must be tabulated.

Mr. John Romans indicated that your division has very little data on the Hercules DMT plant in Wilmington, North Carolina. However, as we must examine all possible data sources, could you please send us a copy of the Wilmington plant's emission permit, or any additional emission data that may be available from your office. In addition, could you please tell us the status of the Hercules DMT plant in Burlington, North Carolina? Please send us a current copy of North Carolina's air pollution regulations as they will be quite helpful.

We thank you for your time and are looking forward to your response.

Sincerely,

Peter Spawn

Peter Spawn
Environmental Engineer

Mr. Andrew Trenholm
Environmental Engineer
EPA-Office of Air Quality and Planning
Emission Standards and Engineering Division
RTP-Mail Drop #13
Research Triangle Park, N.C. 27711

Tel. 919-688-8146, Ext. 301

BURLINGTON ROAD, BEDFORD, MASSACHUSETTS 01730 / PHONE: 617-275-9000

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Mike Sewell DATE 4/7/76

ORGANIZATION North Carolina Division of Environmental Management

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

He confirmed the existence of DuPont and Hercules in Wilmington; he will check on the Hercules Plant in Burlington.

The letter we sent requesting emission data has to go to several people and then to Mr. Sewell. He hasn't seen it, but will check on it.

He was unsure of which process — air or nitric acid — was used in these plants. He offered to find out and return the call today.

Mr. James McColman is the Chief of the Air Quality Section at the same phone number.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Mike Sewell DATE 4/7/76

ORGANIZATION North Carolina Division of Environmental Management

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

Mr. Sewell could find no information or mention of a Hercules DMT plant in Burlington, N.C. He will continue looking. There are several sources for emission data; he is checking these and will call back.

He found information on Hercules and DuPont DMT plants in Wilmington, N.C., but information was sketchy with no emission data. There was no record of nitric acid as input to either plant. He mentioned ethylene glycol and TPA and when he spoke of raw material input to the Hercules DMT plant. Since these compounds are used for the polyester production and not DMT, there was some confusion. He will keep looking and call us back.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Andrew Carlton DATE 4/21/76

ORGANIZATION North Carolina Division of Air Pollution Control

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

After consultation with John Romans at the main office, Mr. Carlton indicated he would send us the available emission data for the DuPone and Hercules DMT plants in Wilmington, N.C. (Note: We sent a letter to W.E. Knight requesting this information and he referred us to Mr. Carlton.) We expect the information in a week.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Mike Sewell DATE 4/21/76

ORGANIZATION North Carolina Division of Environmental Management

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

Our letter to W.E. Knight requesting emission data has been found. They referred us to the Regional Engineer for data.

Andy Carlton
919-762-3394
(Wilmington, North Carolina)

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Mike Sewell DATE 4/21/76

ORGANIZATION North Carolina Division of Environmental Management

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

The hydrocarbon emission limit for photochemically reactive compounds is definitely applicable to DMT plants in Wilmington - 40 lb/day or 85 percent reduction, whichever is larger. This limit applies to the total plant site, not individual processes or equipment.

He hasn't seen our letter to W.E. Knight, requesting permit and emission data - he will check and I'll call back again today.

Metropolitan Government of Nashville and Davidson County

J. M. DISTOWISH, M.D.
DIRECTOR OF HEALTH

BUREAU OF ENVIRONMENTAL CONTROL
George L. Hansel, Director

METROPOLITAN HEALTH DEPARTMENT
311 23rd AVENUE, NORTH
NASHVILLE, TENNESSEE 37203
(615) 327-9313

April 22, 1976

Mr. Peter Spawn
GCA Technical Division
Burlington Road
Bedford, Massachusetts 01730

Dear Mr. Spawn:

In accordance with your request, following is a survey of the emissions from the E. I. Dupont de Nemours & Company, Incorporated's Old Hickory DMT production facility:

Processes	Emissions (#/Hr)
1. Manufacturing of Terephthalic Acid	5.3 (Particulate) 1,000 (Carbon Monoxide) 750 (Hydrocarbon) 80 (Other Acetic Acid Stora[illegible])
2. Manufacturing of Dimethyl Terephthalate	36 (Hydrocarbon)
3. Purification of crude Dimethyl Terephthalate	59 (Hydrocarbon)
4. Storage of Dimethyl Terephthalate	20 (Hydrocarbon)
5. Acetic Acid Storage	1 (Hydrocarbon)

These emissions are estimates, since this plant is not yet in operation. Dupont will also have a process weight incinerator at this facility. The emissions from this source are presently unknown; however, we have been assured that the incinerator will meet the allowable emission standards for an incinerator.

If there are any questions concerning this information, feel free to contact me.

Very truly yours,

Paul J Bontrager

Paul J Bontrager, P. E.
Director, Pollution Control

PJB/jl

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. William Knight DATE 4/29/76

ORGANIZATION North Carolina Division of Air Pollution Control

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

Our request for emission data filtered to Mr. Tippitt. Permits are available, but the main source of data is in his office files. He was very knowledgable about the Hercules and DuPont DMT plants in Wilmington, and can give emission data as detailed as leaks from various valves. I explained what we are doing and what information would be helpful. He'll compile the information and send by the second week in May.

I also discussed confidentiality of information and stressed that we wanted public information and nothing that would hinder relations or offend industries. Actual production rates are available but are trade secrets.

The main emission sources are the air oxidation (para-xylene) units since the following operations involve product handling and purification.

EPA visitors had been given a hard time at the plants. They obtained relatively little information. Mr. Tippitt offered his services and capabilities to obtain information not available to an "outsider."

South Carolina

The following contacts were made for the purpose of obtaining state regulations and permit applications for DMT-TPA plants in the State of South Carolina.

Telephone Summaries and Letters

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. W.G. Crosby DATE 4/5/76

ORGANIZATION Department of Health and Environmental Control

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

Mr. Crosby promised to send copies of state laws. The permit applications only list calculated values of SO_x and particulate loadings. Therefore, he won't send any permit information.

There are no regulations for HC, NO_x, and CO for the State of South Carolina.

Tennessee

The following contacts were made for the purpose of obtaining state regulations and permit applications for the DMT-TPA plants in the State of Tennessee.

Telephone Summaries and Letters

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. John Walton DATE

ORGANIZATION Tennessee Division of Air Pollution Control

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

There is no local agency for Kingsport in Sullivan County. Information on permits can be obtained from Gerald McInnis Monday - he is in the same office.

There is a large file of information on the Tennessee Eastman Plant. There are no regulations specifically for DMT/TPA plants. There are no HC regulations in state, except for new or modified sources, in which case Chapter 7 of original law applies.

New regulations for SO_2 and particulates have been adopted by Tennessee, but not yet approved by EPA. Sullivan County has been reclassified as Class III; the 1,000 ppm SO_x limit now applies to process emissions. A new clause in the regulations places "new incinerators and thermal oxidizers" in a process category for the regulation.

New regulations have also been adopted for particulates. Tennessee Eastman has opted for the diffusion equation method of standard setting. He will send SO_x regulations immediately, and the other regulations when available from printer.

NO_x and CO standards were not discussed. I will talk with Mr. McInnis in the permit second on Monday.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. McInnis DATE 3/30/76

ORGANIZATION Tennessee Division of Air Pollution Control

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

Mr. McInnis was quite helpful. He will send us copies of permits and other data on the Tennessee Eastman Plant in Kingsport, Tenn. There is no real NO_x problem at this plant; however, there are problems with the opacity of particulate emission low particulate count, but high opacity.

The DuPont Plant in Old Hickory increased production about 2 years ago. (Note: See conversation with Mr. Bontrager of the local agency.) Its permit is in the Davidson County local agency office. There are problems at this plant with NO_x - it is emitted periodically as a visible cloud or plume at which time the regulations are enforced. Periodic monitoring and emission reports are not required.

There are new standards for particulates and SO_x but no regulations on NO_x. He will send us a copy of the regulations and their current status.

Angela Samuelson, a liaison officer between the state and local offices, can refer us to someone at the Davidson County office. We can also call Paul Bontrager, the Director, at 615-327-9313, Ext. 215.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Bontrager DATE 3/30/76

ORGANIZATION Metropolitan Health Dept. of Nashville and Davidson Counties

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

The DuPont DMT Plant in Old Hickory, Tennessee has been closed for 1½ years. A new plant is under construction at the same site and will be on line in 6 to 8 months. Mr. Bontrager has a 2-inch thick operating permit for the new (?) plant and will send us copies of the emission data summary - there are 20 emission points, each of which is discussed. The plant has (will have?) an incinerator with electrostatic precipitator for liquid waste disposal. Incinerator particulate standards apply here. An afterburner process, as in the destruction of NO_x, is governed by process particulate emission standards.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. Bontrager DATE 4/16/76

ORGANIZATION Metropolitan Health Dept. of Nashville and Davidson Counties

DISCUSSION SUMMARY

Emission data for the new DuPont DMT Plant in Old Hickory, Tenn. hasn't been compiled. Mr. Bontrager requested the EPA contract number and project title and said he will get to it as soon as possible.

TELPHONE CONVERSATION

PERSON CONTACTED Mr. McInnis DATE 4/20/76

ORGANIZATION Tennessee Division of Air Pollution Control

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

I called Mr. McInnis to see if he had sent us emission and permit data for the Tennessee Eastman DMT Plant; he hadn't.

Regulations are still out of pring; he will send them when available. Basically, for gaseous pollutants, McInnis said Tennessee is requiring "best available control" technology. Also, for new sources, the state is adopting the federal NSPS.

Though he said data would be on its way and will send regulations when available, this is questionable. I suggest calling again in a week or so.

TELEPHONE CONVERSATION

PERSON CONTACTED Mr. McInnis DATE 5/5/76

ORGANIZATION Tennessee Division of Air Pollution Control

GCA PERSONNEL P. Spawn

DISCUSSION SUMMARY

I called to determine the state of the emission data for the Tennessee Eastman DMT Plant. This data, plus reprinted state regulations, will be sent shortly.

Summary of Regulations for Alabama

The following sections of Alabama's State regulations are applicable to DMT-TPA plants. These regulations were taken from the Environmental Reporter, State Air Laws, 5-253, and were last amended January 31, 1975. The Amoco Decatur Plant is in Morgan County.

Particulate Emissions

4.4 Process Industries – General.

4.4.1 Class 1 Counties: No person shall cause or permit the emission of particulate matter in any one hour from any source in a Class 1 county in excess of the amount shown in Table 4-2 for the process weight per hour allocated to such source. For sources in Class 1 counties, interpolation of the data in Table 4-2 for the process weight per hour values up to 60,000 lbs/hr shall be accomplished by use of the equation:

$$E = 3.59\ P^{0.62} \qquad P \leq 30 \text{ tons/hr}$$

and interpolation and exterpolation of the data for process weight per hour values equal to or in excess of 60,000 lbs/hr shall be accomplished by use of the equation:

$$E = 17.31\ P^{0.16} \quad P \geqq 30 \text{ tons/hr}$$

where:

E = Emissions in pounds per hour

P = Process weight per hour in tons per hour.

4.4.3 Where the nature of any process or operation or the design of any equipment is such as to permit more than one interpretation of this Part, the interpretation that results in the minimum value for allowable emission shall apply.

4.4.4 For purposes of this Part, the total process weight from all similar process units at a plant or premises shall be used for determining the maximum allowable emission of particulate matter that passes through a stack or stacks.

4.4.5 New sources subject to this Part emitting particulate matter shall be subject to the rules and regulations for Class 1 counties, Section 4.4.1, regardless of their location.

"Particulate Matter" shall mean finely divided material, except uncombined water which is a liquid or solid at standard conditions of temperature at 70 degrees F and pressure at 14.7 pounds per square inch absolute.

"Process" shall mean any action, operation, or treatment of materials, including handling and storage thereof, which may cause discharge of an air contaminant, or contaminants, into the atmosphere, but excluding fuel burning and refuse burning.

"Process Weight" shall mean the total weight in pounds of all materials introduced into any specific process which may cause any discharge into the atmosphere.

"Process Weight Per Hour" shall mean the total weight of all materials introduced into any specific process that may cause any discharge of particulate matter. Solid fuels charged will be considered as part of the process weight, but liquid and gaseous fuels and combustion air will not. For a cyclical or batch operation, the process weight per hour will be derived by dividing the total process weight by the number of hours in one complete operation from the beginning of any given process to the completion thereof, excluding any time during which the equipment is idle. For a continuous operation, the process weight per hour will be derived by dividing the process weight for a typical period of time by that time period.

TABLE 4-2 ALLOWABLE PARTICULATE MATTER EMISSION BASED ON PROCESS WEIGHT RATE

Process Weight Rate (lb/hr)	Allowable Emission Rate (lb/hr) Class 1 County
100	0.56
500	1.52
1,000	2.34
5,000	6.33
10,000	9.76
20,000	14.97
60,000	29.83
80,000	31.23
120,000	33.33
160,000	34.90
200,000	36.17
1,000,000	46.79

CHAPTER 6 – CONTROL OF HYDROCARBON EMISSIONS

6.1 Storage of Volatile Organic Materials.

6.1.1 No person shall place, store, or hold in any stationary tank reservoir or other container of more than 60,000 gallons capacity any volatile organic compounds unless such tank, reservoir, or other container is a pressure tank capable of maintaining working pressures sufficient at all times to prevent vapor or gas loss to the atmosphere or is designed, and equipped with one of the following vapor loss control devices:

(a) A floating roof, consisting of a pontoon type, double deck type roof or internal floating cover, which will rest on the surface of the liquid contents and be equipped with a closure seal or seals to close the space between the roof edge and tank wall. This control equipment shall not be permitted if the volatile organic compounds have a vapor pressure of 11.0 pounds per square inch absolute (568 mm.Hg) or greater under actual storage conditions. All tank gauging or sampling devices shall be gas-tight except when tank gauging or sampling is taking place.

(b) A vapor recovery system, consisting of a vapor gathering system capable of collecting the volatile organic compound vapors and gases discharged and a vapor disposal system capable of processing such volatile organic 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 or means of equal efficiency for purposes of air pollution control as may be approved by the Director.

(d) No person shall place, store, or hold in any new stationary storage vessel more than 1,000-gallon capacity any volatile organic compound unless such vessel is equipped with a permanent submerged fill pipe or is a pressure tank as described in paragraph (a) above, or is fitted with a system as described in paragraph (b) above. Existing stationary storage vessels shall employ portable submerged fill pipes or be equipped with permanent submerged fill pipes.

6.1.2 This Part shall not apply to crude petroleum produced, separated, treated or stored in the field.

6.2 Volatile Organic Materials Loading Facilities.

6.2.1 No person shall load any volatile organic compounds into any tank, truck or trailer from any terminal or bulk storage facility handling more than 50,000 gallons per day unless such terminal or facility is equipped with a vapor collection and disposal system, or its equivalent, properly installed, in good working order, or has in operation a loading system which will result in a 95 per cent submerged fill either with a submerged fill pipe or by loading from the bottom.

6.2.2 No person shall load any volatile organic compounds into any tank, truck, or trailer having a capacity in excess of 200 gallons, unless such loading facility is equipped as set forth in Paragraph 6.2.1. Where the vapor collection and disposal system is utilized, the loading arm shall be equipped with a vapor collection adaptor, pneumatic, hydraulic, or other mechanical means which will provide a vapor-tight seal between the adaptor and the hatch. A means shall be provided to prevent liquid organic compounds drainage from the loading device when it is removed from the hatch of any tank, truck or trailer. When loading is effected through means other than the hatches, all loading lines shall be equipped with fittings which make vapor-tight connections and which close automatically when disconnected.

6.2.3 This Part shall not apply to crude petroleum produced, separated, treated or stored in the field.

6.3 Volatile Organic Compound Water Separation.

6.3.1 No person shall use any compartment of any single or multiple compartment volatile organic compound water separation which receives effluent water containing 1,000 gallons a day or more of any volatile organic compound from processing, refining, treating, storing, or handling volatile organic compounds unless such compartment is equipped with one of the following vapor loss control devices, properly installed, in good working order, and in operation.

(a) A container having all openings sealed and totally enclosing the liquid contents. All gauging and sampling devices shall be gas-tight except when gauging or sampling is taking place.

(b) A container equipped with a floating roof, consisting of a pontoon type, double deck type roof, or internal floating cover, which will rest on the surface of the contents and be equipped with a closure seal or seals to close the space between the roof edge and container wall. All gauging and sampling devices shall be gas-tight except when gauging or sampling is taking place.

(c) A container equipped with 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 container gauging and sampling devices gas-tight except when gauging or sampling is taking place.

(d) A container having other equipment of equal efficiency for purposes of air pollution control as may be approved by the Director.

Carbon Monoxide Emissions (TPA manufacture is not considered a petroleum process in Alabama)

CHAPTER 9

CONTROL OF CARBON MONOXIDE EMISSIONS

9.1 No person shall emit the carbon monoxide gases generated during the operation of a grey iron cupola, blast furnace, or basic oxygen steel furnace unless they are burned at 1,300°F for 0.3 seconds or greater in a direct-flame afterburner or equivalent device equipped with an indicating pyrometer which is positioned in the working area at the operator's eye level.

9.2 No person shall emit a carbon monoxide waste gas stream from any catalyst regeneration of a petroleum cracking system, petroleum fluid coker, or other petroleum process into the atmosphere, unless the waste gas stream is burned at 1,300°F for 0.3 seconds or greater in a direct-flame afterburner or boiler equipped with an indicating pyrometer which is positioned in the working area at the operator's eye level.

Summary of Regulations for Illinois

The following sections of Illinois' State regulations are applicable to DMT-TPA plants. These regulations were taken from:

State of Illinois
Air Pollution Control Regulations
Printed by Environmental Protection Agency

January 1973

Particulate Emissions

Rule 203: Particulate Emission Standards and Limitations.

(a) Particulate Emission Standards and Limitations for New Process Emission Sources.

Except as further provided in this Rule 203, no person shall cause or allow the emission of particulate matter into the atmosphere in any one hour period from any new process emission source which, either alone or in combination with the emission of particulate matter from all other similar new process emission sources at a plant or premises, exceeds the allowable emission rates specified in Table 2.1 and in Figure 2.1.

Table 2.1

Standards for New Process Emission Sources

Process Weight Rate Pounds Per Hour	Process Weight Rate Tons Per Hour	Allowable Emission Rate Pounds Per Hour
100	0.05	0.55
200	0.10	0.77
400	0.20	1.10
600	0.30	1.35
800	0.40	1.58
1,000	0.50	1.75
1,500	0.75	2.40
2,000	1.00	2.60
4,000	2.00	3.70
6,000	3.00	4.60
8,000	4.00	5.35
10,000	5.00	6.00
20,000	10.00	8.70
30,000	15.00	10.80
40,000	20.00	12.50
50,000	25.00	14.00

Process Weight Rate Pounds Per Hour	Process Weight Rate Tons Per Hour	Allowable Emission Rate Pounds Per Hour
60,000	30.00	15.60
70,000	35.00	17.00
80,000	40.00	18.20
90,000	45.00	19.20
100,000	50.00	20.50
200,000	100.00	29.50
300,000	150.00	37.00
400,000	200.00	43.00
500,000	250.00	48.50
600,000	300.00	53.00
700,000	350.00	58.00
800,000	400.00	62.00
900,000	450.00	66.00
1,000,000	500.00	67.00

Interpolated and extrapolated (up to process weight rates of 450 tons per hour) values of the data in Table 2.1 shall be determined by using the equation:

$$E = 2.54\ (P)^{0.534}$$

where: E = allowable emission rate in pounds per hour;

and P = process weight rate in tons per hour.

Interpolated and extrapolated values of the data of Table 2.1 for process weight greater or equal to 450 tons per hour shall be determined using the equation:

$$E = 24.8\ (P)^{0.16}$$

where: E = allowable emission rate in pounds per hour.

and P = process weight rate in tons per hour.

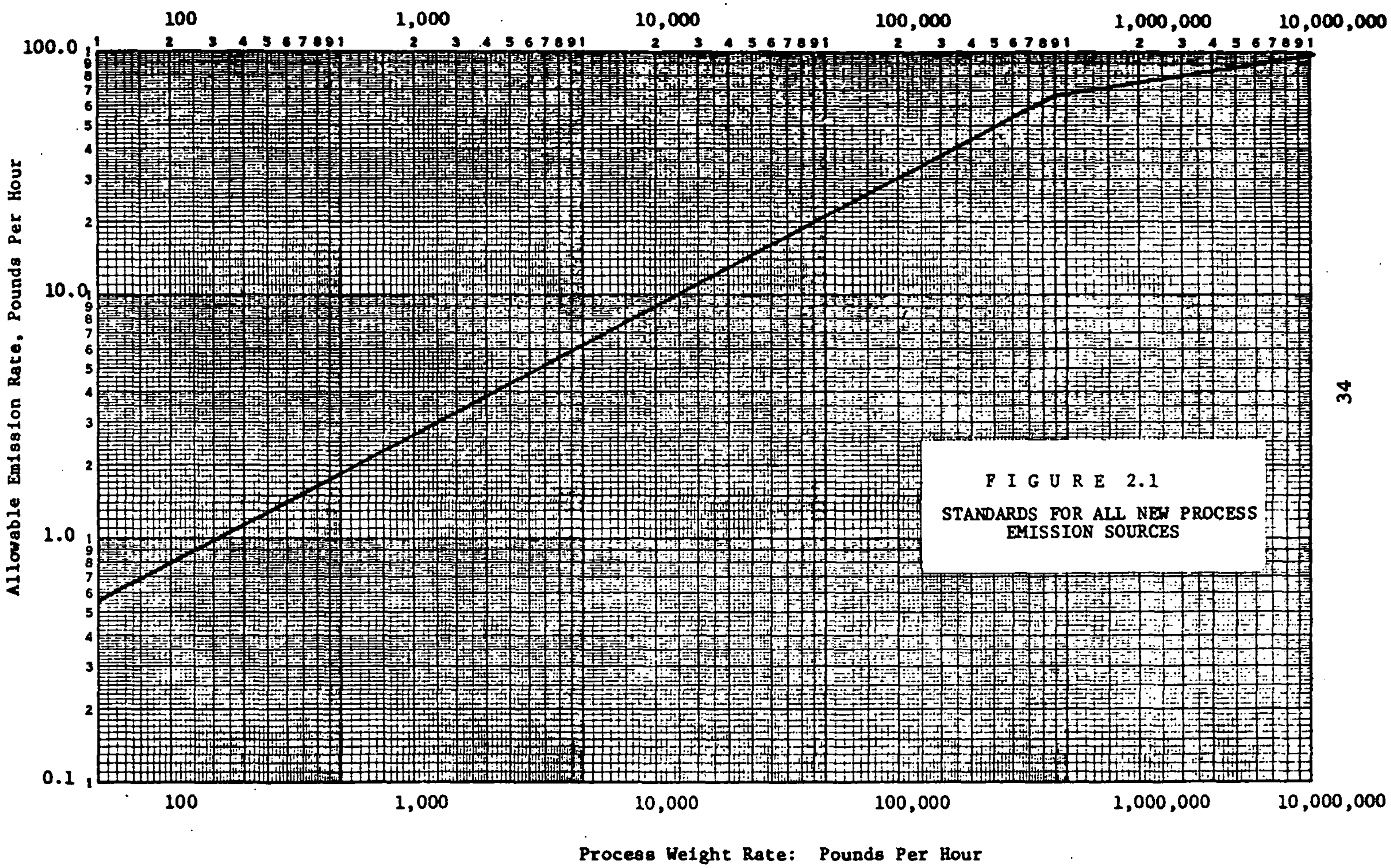


FIGURE 2.1

STANDARDS FOR ALL NEW PROCESS EMISSION SOURCES

DEFINITIONS:

Existing Emission Source: any emission source, the construction or modification of which has commenced prior to the effective date of this Chapter.

Existing Air Pollution Control Equipment: any air pollution control equipment, the construction or modification of which has commenced prior to the effective date of this Chapter.

New Air Pollution Control Equipment: any air pollution control equipment, the construction or modification of which is commenced on or after the effective date of this Chapter.

New Emission Source: any emission source, the construction or modification of which is commenced on or after the effective date of this Chapter.

Modification: any physical change in, or change in the method of operation, of an emission source or of air pollution control equipment which increases the amount of any specified air contaminant emitted by such source or equipment or which results in the emission of any specified air contaminant not previously emitted. It shall be presumed that an increase in the use of raw materials, the time of operation, or the rate of production will change the amount of any specified air contaminant emitted. Notwithstanding any other provisions of this definition, for purposes of permits issued pursuant to Rule 103, the Agency may specify conditions under which an emission source or air pollution control equipment may be operated without causing a modification as herein defined, and normal cyclical variations, before the date operating permits are required, shall not be considered modifications.

Process: Any stationary emission source other than a fuel combustion emission source or an incinerator.

Process Weight Rate: The actual weight or engineering approximation thereof of all materials except liquid and gaseous fuels and combustion air, introduced into any process per hour. For a cyclical or batch operation, the process weight rate shall be determined by dividing such actual weight or engineering approximation thereof by the number of hours of operation excluding any time during which the equipment is idle. For continuous processes, the process weight rate shall be determined by dividing such actual weight or engineering approximation thereof by the number of hours in one complete operation, excluding any time during which the equipment is idle.

(b) Particulate Emission Standards and Limitations for Existing Process Emission Sources.

Except as further provided in this Rule 203, no person shall cause or allow the emission of particulate matter into the atmosphere in any one hour period from any existing process emission source which, either alone or in combination with the emission of particulate matter from all other similar new or existing process emission sources at a plant or premises, exceeds the allowable emission rates specified in Table 2.2 and in Figure 2.2.

Table 2.2

Standards for Existing Process Emission Sources

Process Weight Rate Pounds Per Hour	Process Weight Rate Tons Per Hour	Allowable Emission Rate Pounds per Hour
100	0.05	0.55
200	0.10	0.87
400	0.20	1.40
600	0.30	1.83
800	0.40	2.22
1,000	0.50	2.58
1,500	0.75	3.38
2,000	1.00	4.10
4,000	2.00	6.52
6,000	3.00	8.56
8,000	4.00	10.40
10,000	5.00	12.00
20,000	10.00	19.20
30,000	15.00	25.20
40,000	20.00	30.50
50,000	25.00	35.40

Process Weight Rate Pounds Per Hour	Process Weight Rate Tons Per Hour	Allowable Emission Rate Pounds Per Hour
60,000	30.00	40.00
70,000	35.00	41.30
80,000	40.00	42.50
90,000	45.00	43.60
100,000	50.00	44.60
200,000	100.00	51.20
300,000	150.00	55.40
400,000	200.00	58.60
500,000	250.00	61.00
600,000	300.00	63.10
700,000	350.00	64.90
800,000	400.00	66.20
900,000	450.00	67.70
1,000,000	500.00	69.00

Interpolated and extrapolated values of the data in Table 2.2 for process weight rates up to 30 tons per hour shall be determined by using the equation:

$$E = 4.10 \ (P)^{0.67}$$

and interpolated and extrapolated values of the data for process weight rates in excess of 30 tons per hour shall be determined by using the equation:

$$E = \left[55.0 \ (P)^{0.11}\right] - 40.0$$

where: E = allowable emission rate in pounds per hour,

and P = process weight rate in tons per hour.

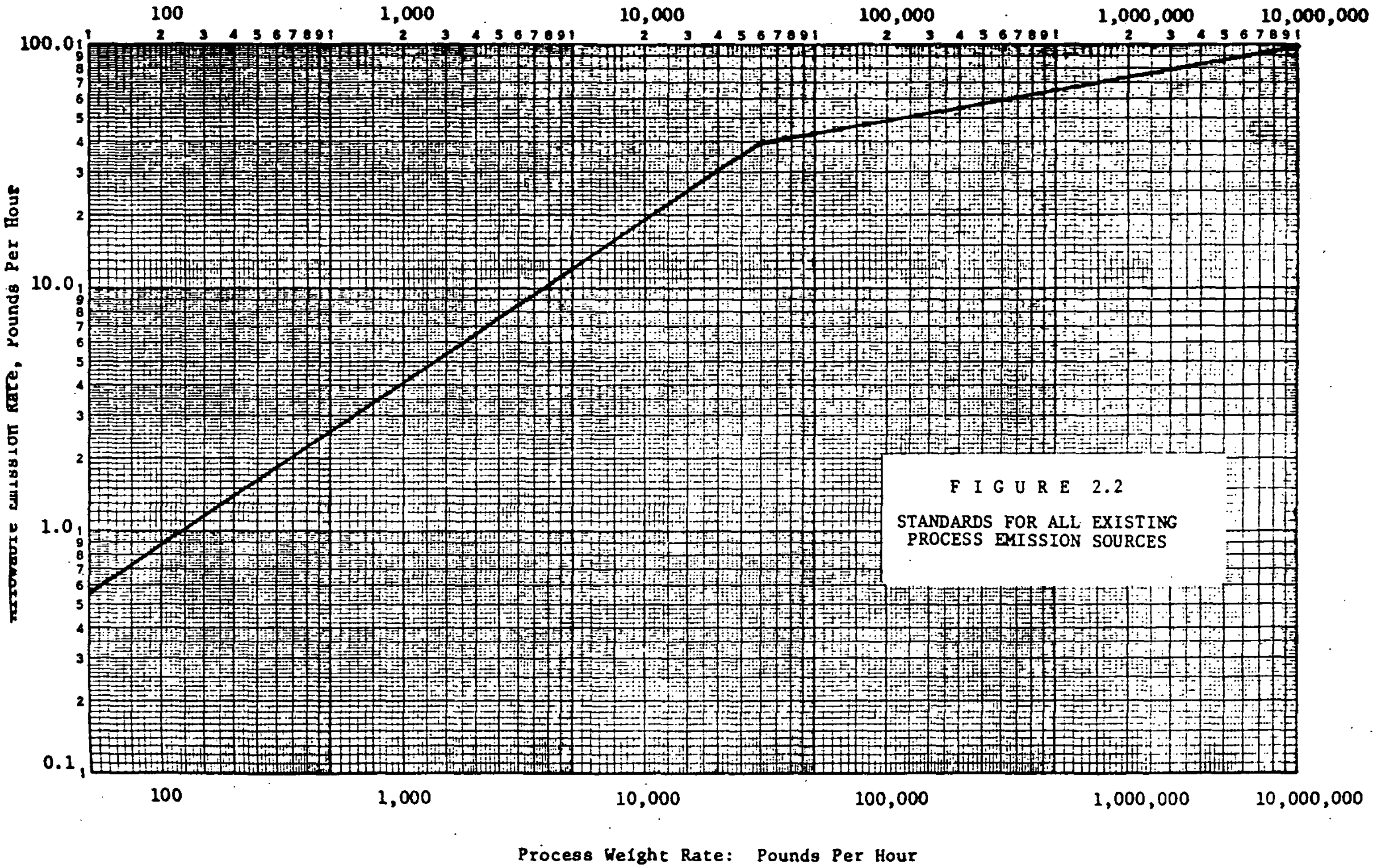


FIGURE 2.2

STANDARDS FOR ALL EXISTING PROCESS EMISSION SOURCES

(c) Compliance by Existing Process Emission Sources. Except as otherwise provided in this Rule 203, every existing process emission source that is not in compliance with paragraph (b) of this Rule 203 as of the effective date of Part 2 of this Chapter, shall comply with paragraph (a) of this Rule 203, unless both the following conditions are met:

(1) The source is in compliance, as of the effective date of Part 2 of this Chapter, with the terms and conditions of a variance granted by the Pollution Control Board, or, within sixty (60) days of the effective date of this Chapter, the source is the subject of a variance petition filed with the Pollution Control Board, which variance is subsequently granted by the Board; and,

(2) As of the effective date of Part 2 of this Chapter, construction has commenced on equipment or modifications sufficient to achieve compliance with paragraph (b) of this Rule 203.

(d) Exceptions to Rules 203(a), 203(b) and 203(c).

(1) Catalyst Regenerators of Fluidized Catalytic Converters. Rules 203(a), 203(b) and 203(c) shall not apply to catalyst regenerators of fluidized catalytic converters. No person shall cause or allow the emission rate from new and existing catalyst regenerators of fluidized catalytic converters to exceed in any one hour period the rate determined using the following equations:

$$E = 4.10\ (P)^{0.67}$$ for P less than or equal to 30 tons per hour.

$$E = \left[55.0\ (P)^{0.11}\right] - 40$$ for P greater than 30 tons per hour.

where,

E = allowable emission rate in pounds per hour.

P = catalyst recycle rate, including the amount of fresh catalyst added, in tons per hour.

Rule 206: Carbon Monoxide Emission Standards and Limitations.

(a) Fuel Combustion Emission Sources With Actual Heat Input Greater Than 10 Million Btu Per Hour. No person shall cause or allow the emission of carbon monoxide into the atmosphere from any fuel combustion emission source with actual heat input greater than 10 million btu per hour to exceed 200 ppm, corrected to 50 per cent excess air.

(b) Incinerators. No person shall cause or allow the emission of carbon monoxide into the atmosphere from any incinerator to exceed 500 ppm, corrected to 50 per cent excess air. Exception: This Rule 206(b) shall not apply to existing incinerators burning less than 2000 pounds of refuse per hour which are in compliance with Rule 203 (e)(3).

(c) Petroleum and Petrochemical Processes. No person shall cause or allow the emission of a carbon monoxide waste gas stream into the atmosphere from a petroleum or petrochemical process unless such waste gas stream is burned in a direct flame afterburner or carbon monoxide boiler so that the resulting concentration of carbon monoxide in such waste gas stream is less than or equal to 200 ppm corrected to 50 per cent excess air, or such waste gas stream is controlled by other equivalent air pollution control equipment approved by the Agency according to the provisions of Part 1 of this Chapter.

Rule 205: Organic Material Emission Standards and Limitations.

(a) Storage. No person shall cause or allow the storage of any volatile organic material in any stationary tank, reservoir or other container of more than 40,000 gallons capacity unless such tank, reservoir or other container:

(1) is a pressure tank capable of withstanding the vapor pressure of such materials, so as to prevent vapor or gas loss to the atmosphere at all times; or,

(2) is designed and equipped with one of the following vapor loss control devices:

(A) A floating roof which rests on the surface of the volatile organic material and is equipped with a closure seal or seals to close the space between the roof edge and the tank wall. Such floating roof shall not be permitted if the volatile organic material has a vapor pressure of 12.5 pounds per square inch absolute or greater at 70°F. No person shall cause or allow the emission of air contaminants into the atmosphere from any gauging or sampling devices attached to such tanks, except during sampling.

(B) A vapor recovery system consisting of:

(i) a vapor gathering system capable of collecting 85% or more of the uncontrolled volatile organic material that would be otherwise emitted to the atmosphere; and,

(ii) a vapor disposal system capable of processing such volatile organic material so as to prevent their emission to the atmosphere. No person shall cause or allow the emission of air contaminants into the atmosphere from any gauging or sampling devices attached to such tank, reservoir or other container except during sampling.

(C) Other equipment or means of equal efficiency approved by the Agency according to the provisions of Part 1 of this Chapter 3;

DEFINITION

Organic Material: Any chemical compound of carbon including diluents and thinners which are liquids at standard conditions and which are used as dissolvers, viscosity reducers or cleaning agents. but excluding methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbonic acid, metallic carbide, metallic carbonates, and ammonium carbonate.

Organic Vapor: Gaseous phase of an organic material or a mixture of organic materials present in the atmosphere.

(b) Loading. ORGANICS

(1) "No person shall cause or allow the discharge of more than 8 pounds per hour of organic material into the atmosphere during the loading of any organic material from the aggregate loading pipes of any loading facility have a throughput of greater than 40,000 gallons per day into any railroad tank car, tank truck or trailer unless such loading facility is equipped with submerged loading pipes or a device that is equally effective in controlling emissions and is approved by the Agency according to the provisions of Part I of this Chapter."

(2) No person shall cause or allow the loading of any organic material into any stationary tank having a storage capacity of greater than 250 gallons, unless such tank is equipped with a permanent submerged loading pipe or an equivalent device approved by the Agency according to the provisions of Part 1 of this Chapter, or unless such tank is a pressure tank as described in Rule 205(z)(1) or is fitted with a recovery system as described in Rule 205(a)(2)(B).

(3) Exception: If no odor nuisance exists the limitations of subparagraph (b) of this Rule 204 shall only apply to volatile organic material.

(c) Organic Material-Water Separation.

(1) No person shall use any single or multiple compartment effluent water separator which receives effluent water containing 200 gallons a day or more of organic material from any equipment processing, refining, treating, storing, or handling organic material unless such effluent water separator is equipped with air pollution control equipment capable of reducing by 85 per cent or more the uncontrolled organic material emitted to the atmosphere.

Exception: If no odor nuisance exists the limitations of this Rule 205(c)(1) shall only apply to volatile organic material.

DEFINITION

Submerged Loading Pipe: Any loading pipe the discharge opening of which is entirely submerged when the liquid level of six inches above the bottom of the tank. When applied to a tank which is loaded from the side, any loading pipe the discharge of which is entirely submerged when the liquid level is 18 inches or two times the loading pipe diameter, whichever is greater, above the bottom of the tqnk. This definition shall also apply to any loading pipe which is continuously submerged during loading operations.

Effluent Water Separator: Any tank, box, sump, or other apparatus in which any organic material floating on or entrained or contained in water entering such tank, box, sump, or other apparatus is physically separated and removed from such water prior to outfall, drainage, or recovery of such water.

Splash Loading: A method of loading a tank, railroad tank car, tank truck or trailer by use of other than a submerged loading pipe.

(d) Pumps and Compressors. No person shall cause or allow the discharge of more than two cubic inches of liquid volatile organic material into the atmosphere from any pump or compressor in any 15 minute period at standard conditions.

(f) Use of Organic Material. No person shall cause or allow the discharge of more than 8 pounds per hour of organic material into the atmosphere from any emission source, except as provided in paragraphs (f)(1) and (f)(2) of this Rule 205 and the following: Exception: If no odor nuisance exists the limitation of this Rule 205(f) shall apply only to photochemically reactive material.

(1) Alerantive Standard. Emissions of organic material in excess of those permitted by Rule 205(f) are allowable if such emissions are controlled by one of the following methods:

(A) flame, thermal or catalytic incineration so as neither to reduce such emissions to 10 ppm equivalent methane (molecular weight 16) or less, or to convert 85 per cent of the hydrocarbons to carbon dioxide and water; or,

(B) a vapor recovery system which adsorbs and/or absorbs and/or condenses at least 85 per cent of the total uncontrolled organic material that would otherwise be emitted to the atmosphere; or,

(C) any other air pollution control equipment approved by the Agency capable of reducing by 85 percent or more the uncontrolled organic material that would be otherwise emitted to the atmosphere.

DEFINITION

Photochemically Reactive Material: Any organic material with an aggregate of more than 20 per cent of its total volume composed of the chemical compounds classified below or the composition of which exceeds any of the following individual percentage composition limitations:

(1) A combination of hydrocarbons, alcohols, aldehydes, esters, either or ketones having an olefinic or cyclo-olefinic type of unsaturation: 5 per cent. This definition does not apply to perchloroethylene or trichloroethylene.

(2) A combination of aromatic compounds with eight or more carbon atoms to the molecule except ethylbenzene: 8 per cent.

(3) A combination of ethylbenzene, ketones having branched hydrocarbon structures or toluene: 20 per cent.

Whenever any photochemically reactive material or any constituent of any organic material may be classified from its chemical structure into more than one of the above groups of organic materials numbered (1), (2), (3), it shall be considered as a member of the most reactive group, that is, that group having the least allowable per cent of the total organic materials.

(g) Waste Gas Disposal.

(1) Petroleum Refinery and Petrochemical Manufacturing Process Emissions. No person shall cause or allow the discharge of organic materials into the atmosphere from:

(A) any catalyst regenerator of a petroleum cracking system; or,

(B) any petroleum fluid coker; or,

(C) any other waste gas stream from any petroleum or petrochemical manufacturing process; in excess of 100 ppm equivalent methane molecular weight 16.0.

(2) Vapor Blowdown. No person shall cause or allow the emission of organic material into the atmosphere from any vapor blowdown system or any safety relief valve, except such safety relief valves not capable of causing an excessive release, unless such emission is controlled:

(A) to 10 ppm equivalent methane (moleuclar weight 16.0) or less; or,

(B) by combustion in a smokeless flare; or,

(C) by other air pollution control equipment approved by the Agency according to the provisions of Part 1 of this Chapter.

DEFINITION

Unregulated Safety Relief Valve: A safety relief valve which cannot be actuated by a means other than high pressure in the pipe or vessel which it protects.

Volatile Organic Material: Any organic material which has a vapor pressure of 2.5 pounds per square inch absolute (psia) or greater at 70^{o}.

Smokeless Flare: A combustion unit and the stack to which it is affixed in which organic material achieves combustion by burning in the atmosphere such that the smoke or other particulate matter emitted to the atmosphere from such combustion does not have an appearance, density, or shade darker than No. 1 of the Ringelmann Chart.

Stack: A flue or conduit, free-standing or with exhaust port above the roof of the building on which it is mounted, by which air contaminants are emitted into the atmosphere.

Standard Conditions: A temperature of $70^{o}F$ and a pressure of 14.7 pounds per square inch absolute (psia).

(3) Sets of Unregulated Safety Relief Valves Capable of Causing Excessive Releases. Rule 205(g)(2) shall not apply to any set of unregulated safety relief valves capable of causing excessive releases, provided that the owner or operator thereof, by October 1, 1972, provides the Agency with the following.

(A) an historical record of each such set (or, if such records are unavailable, of similar sets which, by virtue of operation under similar circumstances, may reasonably be presumed to have the same or greater frequency of excessive releases) for a three-year period immediately preceding October 1, 1972, indicating:

(i) dates on which excessive releases occurred from each such set; and,

(ii) duration in minutes of each such excessive release; and;

(iii) quantities (in pounds) of mercaptans and/or hydrogen sulfide emitted into the atmosphere during each such excessive release.

(B) proof, using such three-year historical records, that no excessive release is likely to occur from any such set either alone or in combination with such excessive releases from other sets owned or operated by the same person and located within a ten-mile radius from the center point of any such set, more frequently than 3 times in any 12 month period; and

(C) accurate maintenance records pursuant to the requirements of paragraph (g)(3)(A) of this Rule 205 of this Chapter; and

(D) proof, at three-year intervals, using such three-year historical records, that such set conforms to the requirement of paragraph (g)(3)(C) of this Rule 205.

(h) Emissions During Clean-up Operations and Organic Material Disposal. Emissions of organic material released during clean-up operations and disposal shall be included with other emissions of organic material from the related emission source or air pollution control equipment determining total emissions.

Summary of Regulations for North Carolina

The following sections of North Carolina's State regualtions are applicable to DMT-TPA plants. These regulations were taken from the Environmental Reporter, State Air Laws, 5-217, and were last updated March 21, 1974.

Particulate Emissions

2.30 *Control and Prohibition of Particulate Emissions From Miscellaneous Industrial Processes*

No person shall cause, suffer, allow, or permit particulate matter caused by industrial processes for which no other emission control standards are applicable to be discharged from any stack or chimney into the atmosphere in excess of the rates shown in Table I.

Process weight per hour means the total weight of all materials introduced into any specific process that may cause any emission of particulate matter Solid fuels charged are considered as part of the process weight, but liquid and gaseous fuels and combustion air are not. For a cyclical or batch operation, the process weight per hour is derived by dividing the total process weight by the number of hours in one complete operation from the beginning of any given process to the completion thereof, excluding any time during which the equipment is idle. For a continuous operation, the process weight per hour is derived by dividing the process weight for a typical period of time.

ALLOWABLE RATE OF EMISSION BASED ON ACTUAL PROCESS WEIGHT RATE

Process Weight Rate Lb/Hr	Process Weight Rate Ton/Hr	Rate of Emission Lb/Hr	Process Weight Rate Lb/Hr	Process Weight Rate Tons/Hr	Rate of Emission Lb/Hr
100	0.05	0.551	16,000	8	16.5
200	0.10	0.877	18,000	9	17.9
400	0.20	1.40	20,000	10	19.2
600	0.30	1.83	30,000	15	25.2
800	0.40	2.22	40,000	20	30.5
1,000	0.50	2.58	50,000	25	35.4
1,500	0.75	3.38	60,000	30	40.0
2,000	1.00	4.10	70,000	35	41.3
2,500	1.25	4.76	80,000	40	42.5
3,000	1.50	5.38	90,000	45	43.6
3,500	1.75	5.96	100,000	50	44.6
4,000	2.00	6.52	120,000	60	46.3
5,000	2.50	7.58	140,000	70	47.8
6,000	3.00	8.56	160,000	80	49.0
7,000	3.50	9.49	200,000	100	51.2
8,000	4.00	10.4	1,000,000	500	69.0
9,000	4.50	11.2	2,000,000	1,000	77.6
10,000	5.00	12.0	6,000,000	3,000	92.7
12,000	6.00	13.6			

2.31 This standard shall be effective from and after July 1, 1971.

Interpolation of the data in this table for process weight rates up to 60,000 lb/hr shall be accomplished by use of the equation $E = 4.10\ P^{0.67}$, and interpolation and extrapolation of the data for process weight rates in excess of 60,000 lb/hr shall be accomplished by use of the equation:

$E = (55.0\ P^{0.11}) - 40$ Where E = Rate of Emission in lb/hr and

P = Process Weight rate in tons/hr.

2.60 *Control of Hydrocarbon Emissions From Stationary Sources*

No person shall place, store or hold in any stationary tank, reservoir or other container of more than 50,000 gallons capacity any liquid compound containing carbon and hydrogen or containing carbon and hydrogen in combination with any other element which has 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 capable of maintaining working pressures sufficient at all times to prevent vapor or gas loss to the atomsphere or is designed and equipped with one of the following vapor loss control devices:

(a) A floating pontoon or double deck type cover equipped with closure seals to enclose any space between the cover's edge and compartment wall. This control equipment shall not be permitted if the compound is a photochemically reactive material having a vapor pressure of 11.0 pounds per square inch absolute or greater under actual storage conditions. All tank gauging or sampling devices shall be gas-tight except when tank gauging or sampling is taking place.

(b) A vapor recovery system which reduces the emission of organic materials into the atmosphere by at least 90 percent by weight. All tank gauging or sampling devices shall be gas-tight except when tank gauging or sampling is taking place.

(c) Other equipment or means of equal efficiency for purposes of air pollution control as may be approved by the Board.

2.61 No person shall load in any one day more than 20,000 gallons of any volatile organic compound into any tank-truck, trailer, or railroad tank car from any loading facility unless such loading incorporates the use of submerged loading through boom loaders that extend down into the compartment being loaded or by other methods acceptable to the Board.

2.62 No person shall discharge at any one site more than 40 pounds of organic material into the atmosphere in any one day, from any article, machine, equipment, or other contrivance used for employing, applying, evaporating or drying any photochemically reactive material or substance containing such solvent unless said discharge has been reduced by 85 percent. Such photochemically reactive solvents include any solvent with an aggregate of more than 20 percent of its total volume composed of the chemical compounds classified below or which exceeds any of the following percentage composition limitations, referred to the total volume of the solvent.

(a) A combination of hydrocarbons, alcohols, aldehydes, esters, ethers, or ketones, having an olefinic or cyclo-olefinic type of unsaturation: 5 percent;

(b) A combination of aromatic hydrocarbons with eight (8) or more carbon atoms to the molecule except ethylbenzene: 8 percent;

(c) A combination of ethylbenzene, ketones having branched hydrocarbon structure, trichloroethylene or toluene: 20 percent.

Whenever any organic solvent or any constituent of any organic solvent may be classified from its chemical structure into more than one of the above groups of organic compounds, it shall be considered as a member of the most reactive chemical group, that is, that group having the least allowable percent of the total volume of solvents.

2.63 This regulation shall be effective from and after July 1, 1972.

Section III – *Ambient Air Quality Standards*

1.0 *Purpose*

It is the purpose of the following ambient air quality standards to establish certain maximum limits on parameters of air quality considered desirable for the preservation and enhancement of the quality of the State's air resources. Furthermore, it shall be the objective of the Board, consistent with the North Carolina Air Pollution Control Law, to prevent significant deterioration in ambient air quality in any substantial portion of the State where existing air quality is better than the standards. An atmosphere in which these standards are not exceeded should provide for the protection of the public health, plant and animal life and property.

Ground level concentration of pollutants will be determined by sampling at fixed locations in areas beyond the premises on which a source is located. The standards are applicable at each such sampling location in the State.

1.10 *Sulfur Dioxide*

The ambient air quality standards for sulfur oxides measured as sulfur dioxide are:

(a) 60 micrograms per cubic meter annual arithmetic mean.

(b) 260 micrograms per cubic meter maximum 24-hour concentration not to be exceeded more than once per year.

(c) 1300 micrograms per cubic meter maximum 3-hour concentration not to be exceeded more than once per year.

1.11 *Sampling and Analysis*

Sampling and analysis shall be in accordance with procedures published on April 30, 1971, in the Federal Register, Volume 36, No. 84.

1.20 *Suspended Particulates*

The ambient air quality standards for suspended particulate matter are:

(a) 60 micrograms per cubic meter annual geometric mean.

(b) 150 micrograms per cubic meter maximum 24-hour concentration not to be exceeded more than once per year.

1.21 *Sampling and Analysis*

Sampling and analysis shall be in accordance with procedures published on April 30, 1971, in the Federal Register, Volume 36, No. 84.

1.30 *Carbon Monoxide*

The ambient air quality standards for carbon monoxide are:

(a) 10 milligrams per cubic meter maximum 8-hour concentration not to be exceeded more than once per year.

(b) 40 milligrams per cubic meter maximum 1-hour concentration not to be exceeded more than once per year.

1.31 *Sampling and Analysis*

Sampling and analysis shall be in accordance with procedures published on April 30, 1971, in the Federal Register, Volume 36, No. 84.

1.40 *Photochemical Oxidants*

The ambient air quality standards for photochemical oxidants measured and corrected for interferences due to nitrogen oxides and sulfur dioxide is:

(a) 160 micrograms per cubic meter maximum 1-hour concentration not to be exceeded more than once per year.

1.41 *Sampling and Analysis*

Sampling and analysis shall be in accordance with procedures published on April 30, 1971, in the Federal Register, Volume 36, No. 84.

1.50 *Hydrocarbons*

The ambient air quality standard for hydrocarbons measured and corrected for methane is:

(a) 160 micrograms per cubic meter maximum 3-hour concentration (6:00 to 9:00 a.m.) not to be exceeded more than once per year. This standard is a guide for use in devising plans to achieve oxidant standards.

1.51 *Sampling and Analysis*

Sampling and analysis shall be in accordance with procedures published on April 30, 1971, in the Federal Register, Volume 36, No. 84.

1.60 *Nitrogen Dioxide*

The ambient air quality standards for nitrogen dioxide are:

(a) 250 micrograms per cubic meter maximum 24-hour concentration not to be exceeded more than once per year.

(b) 100 micrograms per cubic meter annual arithmetic mean.

1.61 *Sampling and Analysis*

Sampling and analysis shall be in accordance with procedures published on April 30, 1971, in the Federal Register, Volume 36, No. 84.

Summary of Regulations for South Carolina

The following sections of South Carolina's State regulations are applicable to DMT-TPA plants. These regulations were taken from Regulation EC-2, adopted by S.C. Board of Health and Environmental Control on March 25, 1975 and filed with the Secretary of State on March 26, 1975. These regulations are available from:

South Carolina Department of Health
and Environmental Control
SIMS Building
Columbia, South Carolina 29201

Particulate Emissions

SECTION VII

OTHER PROCESS INDUSTRIES

A. The particulate emissions from all other process industries shall be limited to the rate specified in Table A for the process weight rate allocated to such process, and modified using the effect factors of Table B.

B. Interpolation of the data in this table for process weights up to 30 tons per hour shall be accomplished by use of the equation:

$$E - 4.10\ P^{0.67}$$

And interpolation and extrapolation of the data for process weight rates greater than 30 tons per hour shall be accomplished by using the equation:

$$E = 55.0\ P^{0.11} - 40$$

where E = the allowable emission rate in pounds per hour, and P = process weight rate in tons per hour.

TABLE A

ALLOWABLE RATE OF EMISSION BASED ON PROCESS WEIGHT RATE

PROCESS WEIGHT RATE (Tons/Hour)	RATE OF EMISSION (Pounds/Hour)	PROCESS WEIGHT RATE (Tons/Hour)	RATE OF EMISSION (Pounds/Hour)
0.05	0.551	8	16.5
0.10	0.877	9	17.9
0.20	1.40	10	19.2
0.30	1.83	15	25.2
0.40	2.22	20	30.5
0.50	2.58	25	35.4
0.75	3.38	30	40.0
1.00	4.10	35	41.3
1.25	4.76	40	42.5
1.50	5.38	45	43.6
1.75	5.96	50	44.6
2.00	6.52	60	46.3
2.50	7.58	70	47.8
3.00	8.56	80	49.0
3.50	9.49	100	51.2
4.00	10.4	500	69.0
4.50	11.2	1,000	77.6
5.00	12.0	3,000	92.7

DEFINITION

Process Weight - The total weight of all materials introduced into a source operation, including solid fuels, but excluding liquids and gases used solely as fuels, and excluding air introduced for combustion and other purposes.

Process Weight Rate - A rate established as follows:

(a) For continuous or long-run steady-state source operations, the total process weight for the entire period of continuous operation or for a typical portion thereof, divided by the number of hours of such period or portion thereof.

(b) For cyclical or batch unit operations, or unit processes, the total process weight for a period that covers a complete operation or an integral number of cycles, divided by the hours of actual process operation during such a period.

Where the nature of any process or operation or the design of any equipment is such as to permit more than one interpretation of this definition, the interpretation that results in the minimum value for allowable emission shall apply.

Summary of Regulations for Tennessee

The following sections of Tennessee's state regulations are applicable to DMT-TPA plants. These regulations were taken from Tennessee Air Pollution Control Regulations available from,

Air Pollution Control Board
727 Cordell Hull Building
Nashville, Tennessee 37219

Particulate Emissions

CHAPTER VII

PROCESS EMISSION STANDARDS

SECTION 1 -- GENERAL PROCESS PARTICULATE EMISSION STANDARDS

A. No person shall cause, suffer, allow or permit particulate emissions in excess of the standards in this Chapter.

B. In any county where one or more sources are emitting particulates at rates in conformity with applicable maximum allowable emission rates and the ambient air quality standard for particulate matter is being exceeded, the Board shall be responsible for setting an appropriate emission standard for each source contributing to the particulate matter in the ambient air of the county, at such value as the Board may consider necessary to achieve the desired air quality.

C. The owner or operator of an existing process emission source proposing to make a modification of this source or to rebuild or to replace it shall only take such action if it will result in the source meeting the maximum allowable particulate emission standard for a new process emission source.

SECTION 2 -- CHOICE OF PARTICULATE EMISSION STANDARDS - EXISTING PROCESSES

A. For any process emission source operating within the State of Tennessee, which was in operation or under construction prior to August 9, 1969, the allowable emission standard shall be obtained from either the diffusion equations presented in Section 2 (c) below or the process weight table presented in Section 2 (D) below. The owner or operator of such a process emission source shall make known, in writing, to the Technical Secretary by July 1, 1972, his choice of emission standard. If no choice is so indicated, the Technical Secretary shall designate the emission standard of Section 2 (D) below as the applicable standard. The emission standard chosen, either by the owner or operator or by the Technical Secretary, must be attained on or before August 9, 1973.

B. For any process emission source operating within the State of Tennessee, construction of which began on or after August 9, 1969, and before the effective date of these regulations, the allowable emission standard shall be the diffusion equations presented in Section 2 (C) below. This standard must have been attained at the time such process emission source first commenced operation. The owner or operator of such a source shall make known in writing to the Technical Secretary by July 1, 1972, whether he wishes to continue under the diffusion equations standard or to switch to the process weight table standard presented in Section 2 (D). If no choice is so indicated, the Technical Secretary shall designate the emission standard of Section 2 (D) below as the applicable standard. If the process weight table standard is chosen by such owner or operator or by the Technical Secretary, then such owner or operator shall have until August 9, 1973, to convert fully to the process weight table standard. It is expressly stipulated that in the interim period such a process emission source shall continue to observe the diffusion equations standard originally applicable.

C. For those owners or operators of process emission sources who elect to have their process emissions regulated by diffusion equations, the maximum allowable particulate emissions from such sources shall be determined by the procedures defined in (1) ,(2) and (3) below.

1. Stack gas exit temperature less than 100° F (See Note)

$$Q = 3.02 \times 10^{-4} V_s h_s^2 \left[\frac{d_s}{h_s}\right]^{0.71}$$

2. Stack gas exit temperature of 125° F or greater (See Note)

   a. Stacks less than 500 feet

   $$Q = 0.2h_s \quad [Q_T \times 0.02 \times (T_s - 60)]^{0.25}$$

   b. Stacks 500 feet and greater

   $$Q = 0.3h_s \quad [Q_T \times 0.02 \times (T_s - 60)]^{0.25}$$

3. For stack gas exit temperatures from 100° F to 124° F calculate allowable emission as in 1 and either 2a or 2b depending upon stack height (using T_s of 125° F) and make linear interpolation based upon actual stack gas exit temperature.

   The terms of the preceding equations shall have the following meaning and units:

   - d_s - inside diameter or equivalent diameter of stack tip in feet
   - h_s - stack height in feet (Vertical distance above grade directly below tip of stack)
   - Q - maximum allowable emission rate in pounds per hour
   - Q_T - volume rate of stack gas flow in cubic feet per second calculated to 60°F
   - T_s - temperature of stack gases at stack tip in $^{\circ}$F
   - V_s - velocity of stack gases at stack tip in feet per second

Note: In determining applicability of equations in this subsection based upon exit gas temperature the actual exit gas temperature must equal or exceed the stated temperature during ninety (90) percent or more of the operating time.

D. For those owners or operators of process emission sources who elect to have their process emissions regulated by the Process Weight Table, the maximum allowable particulate emissions from a process emission source shall be determined by Table 1.

E. Whichever standard is chosen, all sources at the same facility must be regulated by that standard.

SECTION 3 -- NEW PROCESSES

The allowable emission level of particulate matter from any process emission source beginning operation on or after the effective date of this regulation shall be determined by Table 2.

SECTION 4 -- LIMITING ALLOWABLE EMISSIONS

A. Irrespective of the maximum allowable emission as determined by any of the preceding equations or Process Weight Tables in this Chapter, the concentration of particulate process emissions shall not be required to be less than 0.02 grain per cubic foot of stack gases corrected to 70° F and 1 atmosphere unless a lesser concentration is found by the Board to be necessary.

B. Irrespective of the maximum allowable emission as determined by any of the preceding equations or Process Weight Tables in this Chapter the maximum allowable concentration of particulate process emissions shall be 0.25 grains per cubic foot of stack gases corrected to 70° F and 1 atmosphere. This shall be achieved by all air contaminant sources on or before August 9, 1973. Air contaminant sources constructed after August 9, 1969, shall meet the above emission standard when they commence operation.

SECTION 5 -- SPECIFIC PROCESS EMISSION STANDARDS

The emission limits set forth in Sections 2,3, or 4 will apply unless a specific process emission standard for a specifically designated type of process emission source is contained in a subsequent Section of this Chapter.

Table 1. EXISTING PROCESS EMISSION SOURCES ALLOWABLE RATE OF EMISSION BASED ON PROCESS WEIGHT RATE[a]

Process weight rate		Rate of emission	Process weight rate		Rate of emission
lb/hr	tons/hr	lb/hr	lb/hr	tons/hr	lb/hr
100	0.05	0.551	16,000	8.00	16.5
200	0.10	0.877	18,000	9.00	17.9
400	0.20	1.40	20,000	10.	19.2
600	0.30	1.83	30,000	15.	25.2
800	0.40	2.22	40,000	20.	30.5
1,000	0.50	2.58	50,000	25.	35.4
1,500	0.75	3.38	60,000	30.	40.0
2,000	1.00	4.10	70,000	35.	41.3
2,500	1.25	4.76	80,000	40.	42.5
3,000	1.50	5.38	90,000	45.	43.6
3,500	1.75	5.96	100,000	50.	44.6
4,000	2.00	6.52	120,000	60.	46.3
5,000	2.50	7.58	140,000	70.	47.8
6,000	3.00	8.56	160,000	80.	49.0
7,000	3.50	9.49	200,000	100.	51.2
8,000	4.00	10.4	1,000,000	500.	69.0
9,000	4.50	11.2	2,000,000	1,000.	77.6
10,000	5.00	12.0	6,000,000	3,000.	92.7
12,000	6.00	13.6			

[a]Interpolation of the data in this table for process weight rates up to 60,000 lb/hr shall be accomplished by use of the equation $E = 4.10\ P^{0.67}$ and interpolation and extrapolation of the data for process weight rates in excess of 60,000 lb/hr shall be accomplished by use of the equation:

$E = 55.0\ P^{0.11} - 40$, where E = rate of emission in lb/hr and P = process weight rate in tons/hr.

Table 2. NEW PROCESS EMISSION SOURCES ALLOWABLE RATE OF EMISSION BASED ON PROCESS WEIGHT RATE[a]

Process weight rate		Rate of emission	Process weight rate		Rate of emission
lb/hr	tons/hr	lb/hr	lb/hr	tons/hr	lb/hr
50	0.025	0.03	16,000	8.00	13.0
100	0.05	0.55	18,000	9.00	14.0
200	0.10	0.86	20,000	10.	15.0
400	0.20	1.32			
600	0.30	1.70	30,000	15.	19.2
800	0.40	2.03	40,000	20.	23.0
1,000	0.50	2.34	50,000	25.	26.4
1,500	0.75	3.00	60,000	30.	29.6
2,000	1.00	3.59	70,000	35.	30.6
2,500	1.25	4.12	80,000	40.	31.2
3,000	1.50	4.62	90,000	45.	31.8
3,500	1.75	5.08	100,000	50.	32.4
4,000	2.00	5.52	120,000	60.	33.3
5,000	2.50	6.34	140,000	70.	34.2
6,000	3.00	7.09	160,000	80.	34.9
7,000	3.50	7.81	200,000	100.	36.1
8,000	4.00	8.5	1,000,000	500.	46.7
9,000	4.50	9.1			
10,000	5.00	9.7			
12,000	6.00	10.9			

[a]Interpolation of the data in Table 2 for the process weight rates up to 60,000 lbs/hr shall be accomplished by the use of the equation:

$$E = 3.59\ P^{0.62} \quad P \leq 30 \text{ tons/hr}$$

and interpolation and extrapolation of the data for process weight rates in excess of 60,000 lbs/hr shall be accomplished by use of the equation:

$$E = 17.31\ P^{0.16} \quad P > 30 \text{ tons/hr}$$

Where: E = emissions in pounds per hour
P = process weighr rate in tons per hour

Section 3 - - Standards

Table 1. TENNESSEE AMBIENT AIR QUALITY STANDARDS FOR SUSPENDED PARTICULATES SULFUR DIOXIDE, CARBON MONOXIDE, PHOTOCHEMICAL OXIDANTS, NONMETHANE HYDROCARBONS AND NITROGEN DIOXIDE

Contaminants	Primary Standard			Secondary Standard		
	Concentration ug/m^3	Concentration ppm by vol.	Average Interval	Concentration ug/m^3	Concentration ppm by vol.	Average Interval
Suspended Particulates	75 260	-- --	AGM 24 hr.	60 150	-- --	AGM 24 hr.
Sulfur Dioxide	80 365	0.03 0.14	AAM 24 hr.	60 364 1300	0.02 0.139 0.5	AAM 24 hr. 3 hr.
Carbon Monoxide	10,000 40,000	9.0 35.0	8 hr. 1 hr.	10,000 40,000	9.0 35.0	8 hr. 1 hr.
Photo-Chemical Oxidant	160	0.08	1 hr.	160	0.08	1 hr.
Hydro-Carbons (non-methane)	160	0.24	3 hr. a.m.	160	0.24	3 hr. a.m.
Nitrogen Dioxide	100	0.05	AAM	100	0.05	AAM

Note:
1. All values other than annual values are maximum concentrations not to be exceeded more than once per year.
2. PPM values are approximate only.
3. All concentrations relate to air at standard conditions of 25°C temperature and 760 millimeters of mercury pressure.
4. ug/m^3 - micrograms per cubic meter .
5. AGM - Annual geometric mean.
6. AAM - Annual arithmetic mean.