

1980-emp

Report

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ENVIRONMENTAL HEALTH SURVEY
FOR 1980
CHLORINATED METHANES PLANT
LOUISIANA DIVISION

SUBMITTED BY: R. J. BORDELON

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CHLORINATED METHANES PLANT
INDUSTRIAL HYGIENE JOB ANALYSIS

A. INTRODUCTION

THE PLAQUEMINE, LOUISIANA CHLORINATED METHANES PLANT WAS MONITORED DURING 1980 IN A ROUTINE AND CONTINUAL SURVEY OF THE CHEMICALS AND NOISE PRESENT IN THIS BLOCK. LISTED BELOW ARE THE CHEMICALS PLUS NOISE, WITH THEIR RESPECTIVE STANDARDS:

<u>CHEMICAL</u>	<u>STANDARD (TLV)</u>
METHYL CHLORIDE	50 PPM
VINYL CHLORIDE	1 PPM
METHYLENE CHLORIDE	200 PPM
CHLOROFORM	10 PPM
CARBON TETRACHLORIDE	5 PPM
METHANOL	200 PPM
ETHYLENE DICHLORIDE	10 PPM
B-TRICHLOROETHANE	10 PPM
DIMETHYL ETHER	400 PPM
1,1,1 TRICHLOROETHANE (DEGREASER)	350 PPM
CHLORINE	3 MG/M-3
HYDROCHLORIC ACID	7 MG/M-3
SULFURIC ACID	1 MG/M-3
NOISE	85 DBA

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B. CONCLUSION FROM 1980 SURVEY

ALL EMPLOYEES IN THE CMP BLOCK WERE MONITORED USING PERSONNEL MONITORS. MOST WERE MONITORED TWO OR THREE TIMES DURING THE YEAR AND ALL JOBS WERE COVERED. AS IN THE PREVIOUS YEAR THE DATA REFLECTS THAT EMPLOYEES ARE WITHIN THE THRESHOLD LIMITS WHEN PERFORMING THEIR ROUTINE JOBS. PEOPLE ARE PROVIDED WITH AND REQUIRED TO WEAR PROPER PROTECTIVE EQUIPMENT WHEN A JOB HAS THE POTENTIAL OF EXPOSING THEM TO LEVELS WHICH MAY EXCEED THE STANDARDS. TO KEEP A CLOSER WATCH ON SUCH JOBS THERE WILL BE MORE EXCURSION SAMPLES IN THE 1981 MONITORING PROGRAM. THIS WILL HELP TO PINPOINT THE JOBS WHICH REQUIRE CLOSE ATTENTION.

THERE IS A DECLINE IN THE USE OF CHLOROTHENE TO CLEAN PUMP PARTS. IT WAS DISCOVERED THAT MUCH OF THE CLEANING CAN BE ACCOMPLISHED BY USING LOW-PRESSURE STEAM AND WATER. THE MATERIAL CONTROLLER REPORTS THAT HE IS HAVING TO ORDER FEWER DRUMS OF CHLOROTHENE THAN IN THE PAST, DESPITE THE INCREASE IN PUMP REPAIR WORK OVER PREVIOUS YEARS.

CHANGES IN THE STANDARDS FOR 1980 EFFECTING THIS PLANT ARE:

CHLORINE - CEILING LOWERED TO 1 PPM (3MG/M-3).

CARBON TETRACHLORIDE - TLV LOWERED FROM 10 PPM TO 5 PPM.

ETHYLENE DICHLORIDE - TLV LOWERED FROM 50 PPM TO 10 PPM.

NOISE - THE AVERAGE NOISE LEVEL FOR THE OT JOB WAS GREATER THAN IN PAST YEARS. THIS RESULTED FROM A SINGLE EXPOSURE READING OF 170% WHICH OCCURRED WHEN THE OPERATOR WAS VENTING DOWN M-1 FILTERS FOR APPROXIMATELY ONE HOUR PRIOR TO RECHARGING THESE FILTERS. HEARING PROTECTION WAS USED, BUT THIS HIGH READING POINTS TO A DEFINITE PROBLEM.

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C. ADDITIONAL COMMENTS

THE WASTE HEAT BOILER HAS DONE A LOT TO REDUCE THE NEED FOR VENTING THE V-800'S TO ATMOSPHERE IN ORDER TO READY THEM FOR RECHARGING. HOWEVER, THERE ARE PERIODS WHEN THE WASTE HEAT BOILER IS DOWN OR NOT OPERATING PROPERLY AND THE V-800'S HAVE TO BE VENTED TO ATMOSPHERE. THE AIR MONITORS SUPPORT EVIDENCE OF SUCH ACTIVITY.

PEOPLE HAVE DEVELOPED A GREATER AWARENESS TOWARD PROTECTION WHICH CAN BE PROVIDED BY EQUIPMENT AVAILABLE TO THEM TO REDUCE THEIR EXPOSURES TO VARIOUS CHEMICALS. THEY ARE TAKING ADVANTAGE OF THE PROTECTION AFFORDED BY NITRILE GLOVES OVER THE NEOPRENE TYPE, USE OF DUST MASKS, TYVEK COVERALLS, ETC. WE HAVE ALSO PURCHASED AN EMERGENCY WORK SUIT WHICH CAN FIT OVER A SCOTT AIR PAK TO PROVIDE COMPLETE PROTECTION TO THE INDIVIDUAL EVEN IN HEAVY SPILLS.

THE NEW CHANGE ROOM IS COMPLETE WITH A NEW SET OF LOCKERS TO COMPLY WITH GOVERNMENT REGULATIONS REQUIRING SEPARATE LOCKERS FOR WORK AND STREET CLOTHES AND THEREFORE MINIMIZE THE POSSIBILITY OF CONTAMINATING CLOTHES WORN HOME. *Document*

A NEW AND MORE RIGID RESPIRATOR POLICY IS GOING INTO EFFECT. IT WILL SPELL OUT THE CARE AND CLEANING OF THE RESPIRATORS AS WELL AS THEIR USES. ALL PERSONNEL UNDERWENT FIT-TESTING OF THE SCOTT-O-VISTA AND SCOTT AIR MASKS DURING DECEMBER 1980, THUS COMPLYING WITH GOVERNMENT REGULATIONS COVERING RESPIRATORS.

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D. MONITORING RESULTS

PERSONNEL MONITORING USING CHARCOAL ADSORPTION TUBES WAS EMPLOYED TO COVER ALL THE JOBS FOR THE FOLLOWING CHEMICALS: METHYL CHLORIDE, VINYL CHLORIDE, DIMETHYL ETHER, METHYLENE CHLORIDE, CHLOROFORM, CARBON TETRACHLORIDE, ETHYLENE DICHLORIDE, AND B-TRICHLOROETHANE. THE SAMPLES REVEALED THE FOLLOWING RESULTS, BASED ON TWA.

CHEMICAL	STAN- DARD	HIGH/JOB AVERAGE	HIGH/INDIV. SAMPLE
METHYL CHLORIDE	50	OT 2.3	EDO 7.4
VINYL CHLORIDE	1	ALL SAMPLES <0.1	ALL SAMPLES <0.1
DIMETHYL ETHER	400	ALL SAMPLES <0.1	ALL SAMPLES <0.1
METHYLENE CHLORIDE	200	EDO 1.8 LOADER 1.8	EDO 13.8
CHLOROFORM	10	EDO 0.8	EDO 4.5
CARBON TETRACHLORIDE	5	SS 0.5	EDO SS 2.5
ETHYLENE DICHLORIDE	10	ALL SAMPLES <0.1	LOADING COORD. 0.3
B-TRICHLORO- ETHANE	10	ALL SAMPLES <0.1	ALL SAMPLES <0.1

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D. MONITORING RESULTS (CONT'D)

SOME EXCURSION MONITORING WAS DONE ON CERTAIN JOBS OF SHORT DURATION WITH THE POTENTIAL OF HIGH EXPOSURE LEVELS.

(NUMBERS SHOWN ARE HIGH READINGS IN PPM)

JOB: OT CATCHING SAMPLES IN DISTILLATION AREA (10-12 MIN.)

<u>M-1</u>	<u>M-2</u>	<u>M-3</u>	<u>M-4</u>	<u>EDC</u>	<u>B-TRI</u>
12.1	0.4	1.0	36.6	2.1	0.0

JOB: MILLWRIGHT REPLACING LEAKING T-800 PUMP (22 MIN.)

<u>M-1</u>	<u>M-2</u>	<u>M-3</u>	<u>M-4</u>	<u>EDC</u>	<u>B-TRI</u>
62.2	6.4	3.1	0.0	0.0	0.0

JOB: LOADER - LOADER NOT WEARING PUMP; PUMP MOUNTED AT BREATHING ZONE LEVEL ABOVE OPEN DOME OF M-2 T/C WHILE LOADING. TEMPERATURE 72°F. (35 MIN.)

<u>M-1</u>	<u>M-2</u>	<u>M-3</u>	<u>M-4</u>	<u>EDC</u>	<u>B-TRI</u>
2.9	161.8	2.8	0.0	0.0	0.0

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D. MONITORING RESULTS (CONT'D)

AREA MONITORING WAS EMPLOYED TO CHECK FOR METHANOL AND 1,1,1 TRICHLOROETHANE (A DEGREASER USED IN THE CLEANING OF PUMP PARTS). FOR METHANOL, SAMPLES WERE COLLECTED IN SARAN BAGS AT VARIOUS POINTS THROUGHOUT THE PLANT, SAMPLE RESULTS AVERAGED, AND TWA FIGURES WERE OBTAINED BY USING THE AVERAGE TIME SPENT IN THESE AREAS FOR EACH JOB. ALL OF THE MONITORING FOR CHLOROTHENE WAS DONE IN THE WAREHOUSE WHERE IT IS USED TO CLEAN PUMP PARTS. THE HIGHEST READING WAS 7.2 PPM, WHICH WAS TAKEN CLOSE TO AN OPEN CONTAINER IN A MILLWRIGHT'S WORK AREA.

MONITORING FOR CHLORINE, HYDROCHLORIC ACID, AND SULFURIC ACID WAS CONDUCTED BY SCRUBBING AIR WITH DISTILLED WATER FOR HCL AND SULFURIC ACID, AND WITH 1.0 N NaOH FOR CHLORINE FOR 7-8 HOURS PER SAMPLE. A TOTAL OF 16 SAMPLES WERE TAKEN.

HIGHS IN PPM

CHEMICAL	STAN- DARD	HIGH/JOB AVERAGE	HIGH/AREA READING
METHANOL	200	SOT 2.2	DECKS ABOVE LEWIS U. 15.9
1,1,1 TRI- CHLOROETHANE	350	MTL. CONTRL. 2.0	WAREHOUSE ONLY 7.2
CHLORINE	1	ALL <0.01	ALL <0.01
HYDROCHLORIC ACID	5	OT 0.06	DISTILLATION, GRND. 0.94
SULFURIC ACID	.25	ALL <0.1	K-350 0.09

INDUSTRIAL HYGIENE JOB ANALYSIS
VERSUS

% OF HYGIENE STANDARD

STANDARD		100%	50-100%	25-50%	10-25%	<10%
METHYL CHLORIDE	50 PPM	-	-	-	-	14
VINYL CHLORIDE	1 PPM	-	-	-	-	14
METHYLENE CHLORIDE	200 PPM	-	-	-	-	14
CHLOROFORM	10 PPM	-	-	-	-	14
CARBON TETRACHLORIDE	5 PPM	-	-	-	1	13
METHANOL	200 PPM	-	-	-	-	14
ETHYLENE DICHLORIDE	10 PPM	-	-	-	-	14
B-TRICHLOROETHANE	10 PPM	-	-	-	-	14
DIMETHYL ETHER	400 PPM	-	-	-	-	14
1,1,1 TRICHLOROETHANE	350 PPM	-	-	-	-	14
CHLORINE	3 MG/M-3	-	-	-	-	14
HYDROCHLORIC ACID	7 MG/M-3	-	-	-	-	14
SULFURIC ACID	1 MG/M-3	-	-	-	-	14
NOISE	85 DBA	-	1	4	1	8
TOTAL		0	1	4	2	189
% OF TOTAL JOBS		0.00	0.51	2.04	1.02	96.43

DATA BASED ON TWA

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ENVIRONMENTAL HEALTH SURVEY

(NOISE BY JOB)

<u>JOB</u>	<u>AVG. %</u>	DOSIMETER READING (A SCALE)
TECHNICAL	09	<i>Sample # for each designation</i>
SHIFT SUPERVISOR	03	
OPERATIONS SPECIALIST	03	
SR. OPERATIONS TECHNICIAN	47	
OPERATIONS TECHNICIAN	62	
EDO SUPERVISOR	11	
EDO MILLWRIGHT	11	
EDO MISC. MAINTENANCE	28	
LOADING COORDINATOR	09	
LOADER	18	
MATERIAL CONTROLLER	07	
ENVIRONMENTALIST	03	
ASSISTANT CHEMIST	07	
INSTRUMENT TECHNICIAN	08	
FITTER AND IRONWORKER	58	
ELECTRICIAN	08	
LABORER	32	
SECRETARY	00	
COMPUTER TECHNICIAN	03	

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ENVIRONMENTAL HEALTH SURVEY

NOISE BY AREA

OCTOBER, 1980

<u>AREA</u>	<u>dba</u>
OFFICE	61
CONTROL ROOM	62
LAB	65
INSTRUMENT SHOP	61
WAREHOUSE	74-76
DISTILLATION, GROUND	84-91
DISTILLATION, UPPER	76-89
V-800'S (FILTERS)	84-85
ACID AREA	83-86
K-350 AREA	86-90
LEWIS UNIT DECK	80-103
LEVELS ABOVE LEWIS UNIT	76-93
WASTE HEAT BOILER & D-1 AREA	80-85
R-200 & R-300	83-86
E-200 & E-300 DECK	79-83
RIVER WATER PUMP AREA	82-87
CHECK TANKS (T-804's & T-806's)	79-90
CHECK TANKS (T-104's & T-101)	78-84
T/C LOAD RACK	70-72
T/T LOAD RACK (FRONT)	76
T/T LOAD RACK (BACK)	75
K-1002 (OUTSIDE CHAIN AREA)	92-98

*Central section
check noise levels in
reading room
10/10/80*

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D. MONITORING EQUIPMENT USED IN THE SURVEY

1. FOR CHEMICALS

A. PERSONNEL MONITORING

DUPONT PUMP, MODEL P-200

SIPIN PUMP, MODEL SP-1

DUPONT CONSTANT FLOW SAMPLE CALIBRATOR FOR CHECKING
FLOW RATES

B. AREA MONITORING

SCIENCE PUMP, MODEL D-200

BENDIX PUMP, MODEL C-115

2. FOR NOISE

A. PERSONNEL MONITORING

DUPONT DOSIMETER, MODEL D-100 (MODIFIED FOR 85 DBA)

DUPONT DOSIMETER, MODEL D-285

B. AREA MONITORING

EDMONT-WILSON DOSIMETER, MODEL 60-510

DOSIMETERS CALIBRATED ON DUPONT AUDIO DOSIMETER CALI-
BRATOR MODEL C-114

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ANALYTICAL EQUIPMENT AND METHODS USED IN SURVEY:

1. FOR ORGANIC VAPORS COLLECTED ON CHARCOAL AND DESORBED WITH CS-2.

INSTRUMENTS - VARIAN 3700 WITH AUTO-SAMPLER AND CDS-111 DATA SYSTEM

CONDITIONS

A. TEMPERATURES

1. INJECTOR - 150°C
2. DETECTOR - 240°C
3. COLUMN - INITIAL OF 100°C PROGRAMMED TO 130°C

B. CARRIER GAS FLOW - 25 cc/min

C. COLUMN - 20' x 1/8" OD SP-1000 (10%) ON 80/100 SUPELCOPORT

D. RANGE SETTING - 10-12

E. SAMPLE SIZE - 1.5

F. CALIBRATED WEEKLY, BLANKS PREPARED DAILY

2. FOR CHLOROTHENE IN VAPORS COLLECTED IN SARAN BAGS

INSTRUMENTS: HEWLETT PACKARD 5730A GAS CHROMATOGRAPH WITH 3390A REPORTING INTEGRATOR

CONDITIONS

A. TEMPERATURES:

1. INJECTOR - 160°C
2. DETECTOR - 310°C
3. COLUMN - INITIAL OF 180°C OPERATER ISOTHERMALLY

B. CARRIER GAS FLOW - 22 cc/min

C. COLUMN - 5' x 1/8" OD PORAPAK R 80/100

D. "A" CONTROLS

E. RANGE SETTING - 1

F. SAMPLE SIZE - 0.5cc

G. CALIBRATED WEEKLY

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3. FOR METHANOL VAPORS IN AIR

INSTRUMENTS - VARIAN 3700 WITH CDS-111 DATA SYSTEM

CONDITIONS

A. TEMPERATURES

1. INJECTOR - 150°C
2. DETECTOR - 240°C
3. COLUMN - 150°C OPERATED ISOTHERMALLY

B. CARRIER GAS FLOW - 42 CC/MIN

C. COLUMN - 3' x 1/8" OD PORAPAK N, 80/100

D. RANGE SETTING - 10-12

E. SAMPLE SIZE - 0.5 CC DRAWN FROM SARAN BAG SAMPLE

F. CALIBRATED WEEKLY

4. FOR SEPARATION OF VINYL CHLORIDE FROM METHYL CHLORIDE

INSTRUMENTS - HEWLETT PACKARD 5730A GAS CHROMATOGRAPH WITH
3380A REPORTING INTEGRATOR

CONDITIONS

A. TEMPERATURES

1. INJECTOR - 160°C
2. DETECTOR - 310°C
3. COLUMN - 180°C OPERATED ISOTHERMALLY

B. CARRIER GAS FLOW - 22 CC/MIN

C. COLUMN - 5' x 1/8" OD PORAPAK R, 80/100 MESH

D. "A" CONTROLS

E. RANGE SETTING - 1

F. SAMPLE SIZE - 1.4 ML

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EMPLOYEE EXPOSURE SUMMARY

QUARTER _____ YEAR 1980

FILLED IN BY _____

PLANT CMPBLOCK 46

STRESS

Methylene ChlorideMINIMAL DETECTABLE
LIMIT AND UNIT0.1 ppm~~0001-5849~~ TLV = 200 ppm/vol

NO.	JOB CLASS	AREA/ TASK	PERSONNEL					AREA				EXCURSION			
			*PT. EQ.	TWA BASIS	NO. SAMPLES	AVG.	HIGH	SAMPLE DURATION	NO. SAMPLES	AVG.	HIGH	EXCUR. DURATION	NO. SAMPLES	AVG.	HIGH
01	OTT		-	8 hr	-	-	-								
02	OT		1,2,3,5		3	1.0	2.1					0.2 hr	2	0.3	0.4
03	SOT		1,2,3,5		5	0.3	0.8								
04	OS		1,2,3,5		5	<0.1	<0.1								
05	SS		1,2,3,5		6	0.2	0.8								
06	EDO		1,2,3,4,5		10	1.8	13.8					0.4 to 2.5 hr	3	2.1	6.4
07	Chemist LAB		1,2,5		4	0.2	0.6								
08	TECH		1,2,5		6	0.1	0.4								
09	CLER.		-		5	<0.1	0.3								
10	INSTR		1,2,5		4	0.1	0.4								
11	LABORER		1,2,3,5		4	<0.1	0.2								
12	SUMMER		-		-	-	-								
13	CONT MAINT		1,2,3,4,5		7	<0.1	<0.1								
14	NON-OS SPEC.		-		-	-	-								
15	SECUR.		-		-	-	-								
16	MATL CONT		1,5		2	0.8	1.5								
30	LOADING Coordinator		1,2,4,5		7	1.6	6.9					0.6 hr	2	130.1	161.8
18	T/C CLNG		-		-	-	-								
19	MGRS/NON- OP. CONT		-		-	-	-								
20	AREA SAMP (NO JC)		-		-	-	-								

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* PROTECTIVE EQUIPMENT: (1) Mouthbit (2) Full Face (3) Half or Dust Face (4) Air Supply (5) Hearing Protection

FILLED IN BY _____

PLANT CMP BLOCK 46 STRESS Dichloride LIMIT AND UNIT 0.1 ppm
0001-8531
TLV = 5 ppm v

NO.	JOB CLASS	AREA/TASK	PERSONNEL					AREA				EXCURSION			
			*PT. EQ.	TWA BASIS	NO. SAMPLES	AVG.	HIGH	SAMPLE DURATION	NO. SAMPLES	AVG.	HIGH	EXCUR. DURATION	NO. SAMPLES	AVG.	HIGH
01	OTT		-	8 hr	-	-	-								
02	OT		1,2,3,5		3	<0.1	0.1	X				X 0.2 hr	2	1.5	2.1
03	SOT		1,2,3,5		5	<0.1	<0.1	X							
04	OS		1,2,3,5		5	<0.1	0.1	X							
05	SS		1,2,3,5		6	<0.1	0.1	X							
06	EDO		1,2,3,4,5		10	<0.1	<0.1	X				X 0.4 to 2.5 hr	3	<0.1	<0.1
07	LAB		1,2,5		4	<0.1	0.1	/							
08	TECH		1,2,5		6	<0.1	0.1	/							
09	CLER.		-		5	<0.1	<0.1	/							
10	INSTR		1,2,5		4	<0.1	<0.1	/							
11	LABORER		1,2,3,5		4	<0.1	<0.1	/							
12	SUMMER		-		-	<0.1	<0.1	X							
13	CONT MAINT		1,2,3,4,5		7	<0.1	<0.1	X							
14	NON-OS SPEC.		-		-	-	-								
15	SECUR.		-		-	-	-								
16	MATL CONT		1,5		2	<0.1	<0.1	X							
30 17	LOADING		1,2,4,5		7	<0.1	0.3	X				X 0.6 hr	2	<0.1	<0.1
18	T/C CLNG		-		-	-	-								
19	MGRS/NON-OR C.I.T.		1,2,3,4,5		2	<0.1	<0.1								
20	AREA SAMP (NO JC)		-		-	-	-								

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* PROTECTIVE EQUIPMENT: (1) Mouthbit (2) Full Face (3) Half or Dust Face (4) Air Supply (5) Hearing Protection

EMPLOYEE EXPOSURE SUMMARY

QUARTER _____ YEAR 1960

FILLED IN BY _____

PLANT CMP BLOCK 46 STRESS Chloroform MINIMAL DETECTABLE
LIMIT AND UNIT 0.1 ppm
0002-8609 TLV = 10 ppm(V)

NO.	JOB CLASS	AREA/TASK	PERSONNEL					AREA				EXCURSION			
			*PT. EQ.	TWA BASIS	NO. SAMPLES	AVG.	HIGH	SAMPLE DURATION	NO. SAMPLES	AVG.	HIGH	EXCUR. DURATION	NO. SAMPLES	AVG.	HIGH
01	OTT		-	8 hr	✓	✓	✓								
02	OT		1,2,3,5		3	0.6	1.0	\				0.2 hr	2	0.7	1.0
03	SOT		1,2,3,5		5	0.3	0.5	\							
04	OS		1,2,3,5		5	0.2	0.3	\							
05	SS		1,2,3,5		6	0.2	0.4	\							
06	EDO		1,2,3,4,5		10	0.8	4.5	\				0.4 to 2.5 hr	3	1.5	3.1
07	Chemist		1,2,5		4	0.3	0.6	\							
08	TECH		1,2,5		6	0.2	0.3	\							
09	CLER.		-		5	0.2	0.3	\							
10	INSTR		1,2,5		4	0.2	0.3	\							
11	LABORER		1,2,3,5		4	0.2	0.4	\							
12	SUMMER		-		-	-	-								
13	CONT MAINT		1,2,3,4,5		7	0.2	0.4	\							
14	NON-OS SPEC.		-		-	-	-								
15	SECUR.		-		-	-	-								
16	MATL CONT		1,5		2	0.1	0.2	\							
30	LOADING.		1,2,4,5		7	0.5	1.9	\				0.6 hr	2	2.7	2.8
18	T/C CLING		-		-	-	-								
19	MGRS/NON-OP C.N.T.		-		2	0.2	0.3	-							
20	AREA SAMP (NO JC)		-		-	-	-								

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* PROTECTIVE EQUIPMENT: (1) Mouthbit (2) Full Face (3) Half or Dust Face (4) Air Supply (5) Hearing Protection

FILLED IN BY _____

PLANT

CMP

BLOCK

46

STRESS

Carbon
tetrachlorideMINIMAL DETECTABLE
LIMIT AND UNIT4th 1980
0.1 ppm

0002-3654

TLV = 10 ppm (V)

NO.	JOB CLASS	AREA/TASK	PERSONNEL					AREA				EXCURSION			
			*PT. EQ.	TWA BASIS	NO. SAMPLES	AVG.	HIGH	SAMPLE DURATION	NO. SAMPLES	AVG.	HIGH	EXCUR. DURATION	NO. SAMPLES	AVG.	HIGH
01	OTT		-	8hr	-	<	<								
02	OT		1,2,3,5		3	<0.1	<0.1	X				X 0.2 hr	2	19.3	36.6
03	SOT		1,2,3,5		5	0.1	0.4	X							
04	OS		1,2,3,5		5	<0.1	<0.1	X							
05	SS		1,2,3,5		6	0.5	2.53	X							
06	EDO		1,2,3,5		10	<0.1	<0.1	X				X 0.2 to 2.5 hr	3	<0.1	<0.1
28	Chemist		1,2,5		4	0.2	0.8	X							
26	TECH		1,2,5		6	<0.1	<0.1	X							
09	CLER.		-		5	<0.1	<0.1	X							
10	INSTR		1,2,5		4	<0.1	<0.1	X							
11	LABORER		1,2,3,5		4	<0.1	<0.1	X							
12	SUMMER		-		-	-	-	X							
13	CONT MAINT		1,2,3,4,5		7	<0.1	<0.1	X							
14	NON-OS SPEC.		-		-	-	-								
15	SECUR.		-		-	-	-								
16	MATL CONT		1,5		2	<0.1	<0.1	X							
30	LOADING		1,2,4,5		7	0.2	1.36	X				X 0.6 hr	2	<0.1	<0.1
18	T/C CLNG		-		-	-	-								
19	AREA SAMP (NO JC)		-		-	-	-								

DO 101955
CONFIDENTIAL

* PROTECTIVE EQUIPMENT: (1) Mouthbit (2) Full Face (3) Half or Dust Face (4) Air Supply (5) Hearing Protection

EMPLOYEE EXPOSURE SUMMARY

QUARTER _____ YEAR 1960

FILLED IN BY _____

 PLANT CMP BLOCK 46 STRESS B-trichloroethane MINIMAL DETECTABLE LIMIT AND UNIT 0.1 ppm
0002-3687 ✓ TLV = 10 ppm (✓)

NO.	JOB CLASS	AREA/TASK	PERSONNEL					AREA				EXCURSION			
			*PT. EQ.	TWA BASIS	NO. SAMPLES	AVG.	HIGH	SAMPLE DURATION	NO. SAMPLES	AVG.	HIGH	EXCUR. DURATION	NO. SAMPLES	AVG.	HIGH
01	OTT		-	8 hr	-	-	-								
02	OT		1,2,3,5		3	<0.1	<0.1	✓				0.2 hr	2	<0.1	<0.1
03	SOT		1,2,3,5		5	<0.1	<0.1	✓							
04	OS		1,2,3,5		5	<0.1	<0.1	✓							
05	SS		1,2,3,5		6	<0.1	<0.1	✓							
06	EDO		1,2,3,4,5		10	<0.1	<0.1	✓				0.4 to 2.5 hr	3	<0.1	<0.1
28	Chemist		1,2,5		4	<0.1	<0.1	✓							
26	TECH		1,2,5		6	<0.1	<0.1	✓							
09	CLER.		-		5	<0.1	<0.1	✓							
10	INSTR		1,2,5		4	<0.1	<0.1	✓							
11	LABORER		1,2,3,5		4	<0.1	<0.1	✓							
12	SUMMER		-		-	-	-								
13	CONT MAINT		1,2,3,4,5		7	<0.1	<0.1	✓							
14	NON-OS SPEC.		-		-	-	-								
15	SECUR.		-		-	-	-								
16	MATL CONT		1,5		2	<0.1	<0.1	✓							
30	LOADING Coordinator		1,2,4,5		7	<0.1	<0.1	✓				0.6 hr	2	<0.1	<0.1
18	T/C CLNG		-		-	-	-								
19	MGRS. NON-OP		-		-	-	-								
20	AREA SAMP (NO JC)		-	✓	-	-	-								

DO 101956
CONFIDENTIAL

* PROTECTIVE EQUIPMENT: (1) Mouthbit (2) Full Face (3) Half or Dust Face (4) Air Supply (5) Hearing Protection

EMPLOYEE EXPOSURE SUMMARY

QUARTER _____ YEAR 1960

FILLED IN BY _____

PLANT CMP BLOCK 46 STRESS Dimethyl Ether MINIMAL DETECTABLE LIMIT AND UNIT 0.1 ppm

0005-5481 / TLV = 450 ppm(v)

NO.	JOB CLASS	AREA/TASK	PERSONNEL					AREA				EXCURSION			
			*PT. EQ.	TWA BASIS	NO. SAMPLES	AVG.	HIGH	SAMPLE DURATION	NO. SAMPLES	AVG.	HIGH	EXCUR. DURATION	NO. SAMPLES	AVG.	HIGH
01	OTT		-	8 hr	5	<	<								
02	OT		1,2,3,5		3	<0.1	<0.1	X				X 0.2 hr	2	<0.1	<0.1
03	SOT		1,2,3,5		5	<0.1	<0.1	X							
04	OS		1,2,3,5		5	<0.1	<0.1	X							
05	SS		1,2,3,5		6	<0.1	<0.1	X							
06	EDO		1,2,3,4,5		10	<0.1	<0.1	X				X 0.4 to 2.5 hr	3	<0.1	<0.1
07	Chemist LAB		1,2,5		4	<0.1	<0.1	X							
08	TECH		1,2,5		6	<0.1	<0.1	X							
09	CLER.		-		5	<0.1	<0.1	X							
10	INSTR		1,2,5		4	<0.1	<0.1	X							
11	LABORER		1,2,3,5		4	<0.1	<0.1	X							
12	SUMMER		-		-	-	-								
13	CONT MAINT		1,2,3,4,5		7	<0.1	<0.1	X							
14	NON-OS SPEC.		-		-	-	-								
15	SECUR.		-		-	-	-								
16	MATL CONT		1,5		2	<0.1	<0.1	X							
30	LOADING		1,2,4,5		7	<0.1	<0.1	X				X 0.6 hr	2	<0.1	<0.1
18	T/C CLNG		-		-	-	-								
19	MGRS/NOX OR					<0.1	<0.1								
20	AREA SAMP (NO JC)		-		-	-	-								

DO 101957
CONFIDENTIAL

* PROTECTIVE EQUIPMENT: (1) Mouthbit (2) Full Face (3) Half or Dust Face (4) Air Supply (5) Hearing Protection

EMPLOYEE EXPOSURE SUMMARY

FILLED IN BY _____

QUARTER _____ YEAR 1965

PLANT

CMP

BLOCK

46

STRESS

Vinyl Chloride

MINIMAL DETECTABLE
LIMIT AND UNIT

0.01 ppmv

01/4-1986

TLV = 1 ppm(v)

NO.	JOB CLASS	AREA/TASK	PERSONNEL					AREA				EXCURSION			
			*PT. EQ.	TWA BASIS	NO. SAMPLES	AVG.	HIGH	SAMPLE DURATION	NO. SAMPLES	AVG.	HIGH	EXCUR. DURATION	NO. SAMPLES	AVG.	HIGH
01	OTT		-	<u>8 hr</u>	-	-	-								
02	OT		1,2,3,5		3	<0.01	<0.01	X				0.2 hr	2	<0.01	<0.01
03	SOT		1,2,3,5		5	<0.01	<0.01	X							
04	OS		1,2,3,5		5	<0.01	<0.01	X							
05	SS		1,2,3,5		6	<0.01	<0.01	X							
06	EDO		1,2,3,4,5		10	<0.01	<0.01	X				0.4 to 2.5 hr	3	<0.01	<0.01
28	Chemist		1,2,5		4	<0.01	<0.01	X							
26	TECH		1,2,5		6	<0.01	<0.01	X							
09	CLER.		-		5	<0.01	<0.01	X							
10	INSTR		1,2,5		4	<0.01	<0.01	X							
11	LABORER		1,2,3,5		4	<0.01	<0.01	X							
12	SUMMER		-		-	-	-								
13	CONT MAINT		1,2,3,4,5		7	<0.01	<0.01	X							
14	NON-OS SPEC.		-		-	-	-								
15	SECUR.		-		-	-	-								
16	MATL CONT		1,5		2	<0.01	<0.01	X							
30	LOADING		1,2,4,5		7	<0.01	<0.01	X				0.6 hr	2	<0.01	<0.01
18	T/C CLNG		-		-	-	-								
14	NGHS/NON-OS					<0.01	<0.01								
20	AREA SAMP (NO JC)		-		-	-	-								

DO 101958
CONFIDENTIAL

* PROTECTIVE EQUIPMENT: (1) Mouthbit (2) Full Face (3) Half or Dust Face (4) Air Supply (5) Hearing Protection

PLANT 0111 BLOCK 70 STRESS 1000 LIMIT AND UNIT 1 10 of 85 d.u.
4999-0006 4th Quarter 1980

NO.	JOB CLASS	AREA/TASK	PERSONNEL					AREA				EXCURSION			
			*PT. EQ.	TWA BASIS	NO. SAMPLES	AVG.	HIGH	SAMPLE DURATION	NO. SAMPLES	AVG.	HIGH	EXCUR. DURATION	NO. SAMPLES	AVG.	HIGH
01	OTT		-	B-m	-	-	-								
02	OT		5		6	62	170	X							
03	SOT		5		4	47	101	X							
04	OS		5		6	03	07	X							
05	SS		5		5	06	20	X							
06	EDO		5		7	26	46	X							
07	LAB		5		4	05	11	X							
08	TECH		5		4	09	12	X							
09	CLER.		-		1	02	03	X 2)							
10	INSTR		5		5	08	16	X							
11	LABORER		5		3	32	55	X							
12	SUMMER		-		-	-	-								
13	CONT MAINT		5		6	41	75	X							
14	NON-OS SPEC.		-		-	-	-								
15	SECUR.		-		-	-	-								
16	MATL CONT		5		2	07	07	X							
30	LOADING		5		5	12	26	X							
18	T/C CLNG		-		-	-	-								
19	MGRS/NON-OT		-		-	-	-								
20	AREA SAMP (NO JC)		-		-	-	-								

* PROTECTIVE EQUIPMENT: (1) Mouthbit (2) Full Face (3) Half or Dust Face (4) Air Supply (5) Hearing Protection

DO 101959
 CONFIDENTIAL

EMPLOYEE EXPOSURE SUMMARY

QUARTER _____ YEAR 1980

FILLED IN BY _____

 PLANT CMP BLOCK 46 STRESS 1,1,1 Trichloroethane MINIMAL DETECTABLE LIMIT AND UNIT 0.1 ppmv
9999-0215

NO.	JOB CLASS	AREA/TASK	PERSONNEL					AREA				EXCURSION			
			*PT. EQ.	TWA BASIS	NO. SAMPLES	AVG.	HIGH	SAMPLE DURATION	NO. SAMPLES	AVG.	HIGH	EXCUR. DURATION	NO. SAMPLES	AVG.	HIGH
01	OTT							15 min	15	-	-				
02	OT									0.1	7.2	X			
03	SOT									0.3	7.2	X			
04	OS									0.1	7.2	X			
05	SS									0.2	7.2	X			
06	EDO									1.1	7.2	X			
07	LAB									<0.1	7.2	X			
08	TECH									0.1	7.2	X			
09	CLER.									<0.1	<0.1	X			
10	INSTR									<0.1	7.2	X			
11	LABORER									0.5	7.2	X			
12	SUMMER									-	-				
13	CONT MAINT									0.9	7.2	X			
14	NON-OS SPEC.									-	-				
15	SECUR.									-	-				
16	MATL CONT									2.0	7.2	X			
17	LOADING									<0.1	7.2	X			
18	T/C CLNG									-	-				
19	MGRS/NON-OP									<0.1	<0.1	X			
20	AREA SAMP (NO JC)									-	-				

DO 101960
CONFIDENTIAL

* PROTECTIVE EQUIPMENT: (1) Mouthbit (2) Full Face (3) Half or Dust Face (4) Air Supply (5) Hearing Protection

EMPLOYEE EXPOSURE SUMMARY

QUARTER _____ YEAR 1960

FILLED IN BY _____

PLANT C M P BLOCK 46 STRESS Methanol MINIMAL DETECTABLE LIMIT AND UNIT 0.1 ppm
0002-3938

TLV = 200 ppm(V)

NO.	JOB CLASS	AREA/TASK	PERSONNEL					AREA				EXCURSION			
			*PT. EQ.	TWA BASIS	NO. SAMPLES	AVG.	HIGH	SAMPLE DURATION	NO. SAMPLES	AVG.	HIGH	EXCUR. DURATION	NO. SAMPLES	AVG.	HIGH
01	OTT		-					15 min.	138	-	-				
02	OT		1,2,3,5							2.0	12.7	X			
03	SOT		1,3,3,5							2.2	15.9	X			
04	OS		1,2,3,5							0.7	12.7	X			
05	SS		1,2,3,5							1.3	15.9	X			
06	EDO		1,2,3,4,5							2.1	15.9	X			
07	LAB		1,2,5							1.1	15.9	X			
08	TECH		1,2,5							0.7	15.9	X			
09	CLER.		-							0.1	3.2	X			
10	INSTR		1,2,5							1.5	15.9	X			
11	LABORER		1,2,3,5							1.3	15.9	X			
12	SUMMER		-							-	-				
13	CONT MAINT		1,2,3,4,5							2.1	15.9	X			
14	NON-OS SPEC.		-							-	-				
15	SECUR.		-							-	-				
16	MATL CONT		1,5							0.5	12.2	X			
17	LOADING		1,2,4,5							1.2	4.8	X			
18	T/C CLNG		-							-	-				
19	MGRS/NON-OP C.A.T.		-							0.1	1.1	X			
20	AREA SAMP (NO JC)		-							-	-				

DO 101961
CONFIDENTIAL

* PROTECTIVE EQUIPMENT: (1) Mouthbit (2) Full Face (3) Half or Dust Face (4) Air Supply (5) Hearing Protection

EMPLOYEE EXPOSURE SUMMARY

QUARTER _____ YEAR 1966

FILLED IN BY _____

PLANT

CMP

BLOCK

46

STRESS

Hydrochloric
Acid
0004-3845MINIMAL DETECTABLE
LIMIT AND UNIT0.01 mg/m³

		PERSONNEL						AREA				EXCURSION			
NO.	JOB CLASS	AREA/ TASK	*PT. EQ.	TWA BASIS	NO. SAMPLES	AVG.	HIGH	SAMPLE DURATION	NO. SAMPLES	AVG.	HIGH	EXCUR. DURATION	NO. SAMPLES	AVG.	HIGH
01	OTT							7-8 hrs	16	-	-				
02	OT									0.06	1.32	X			
03	SOT									0.03	1.32	X			
04	OS									0.01	1.32	X			
05	SS									0.03	1.32	X			
06	EDO									0.05	1.32	X			
07	LAB									0.01	1.32	X			
08	TECH									0.01	1.32	X			
09	CLER.									<0.01	<0.01	X			
10	INSTR									0.03	1.32	X			
11	LABORER									0.03	1.32	X			
12	SUMMER									-	-	X			
13	CONT MAINT									0.04	1.32	X			
14	NON-OS SPEC.									-	-				
15	SECUR.									-	-				
16	MATL CONT									<0.01	1.32	X			
17	LOADING									<0.01	<0.01	X			
18	T/C CLNG									-	-				
19	MGRS/NON- OP									<0.01	<0.01	X			
20	AREA SAMP (NO JC)									-	-				

DO 101962
CONFIDENTIAL

* PROTECTIVE EQUIPMENT: (1) Mouthbit (2) Full Face (3) Half or Dust Face (4) Air Supply (5) Hearing Protection

EMPLOYEE EXPOSURE SUMMARY

QUARTER _____ YEAR 1960

FILLED IN BY _____

 PLANT CMP BLOCK 46 STRESS Chlorine MINIMAL DETECTABLE LIMIT AND UNIT 0.001 mg/m³
0006-7834

NO.	JOB CLASS	AREA/TASK	PERSONNEL					AREA				EXCURSION			
			*PT. EQ.	TWA BASIS	NO. SAMPLES	AVG.	HIGH	SAMPLE DURATION	NO. SAMPLES	AVG.	HIGH	EXCUR. DURATION	NO. SAMPLES	AVG.	HIGH
01	OTT							7-8 hr	16	-	-				
02	OT									<0.001	0.008	✓			
03	SOT									<0.001	0.008	✓			
04	OS									<0.001	0.008	✓			
05	SS									<0.001	0.008	✓			
06	EDO									<0.001	0.008	✓			
07	LAB									<0.001	0.008	✓			
08	TECH									<0.001	0.008	✓			
09	CLER.									<0.001	<0.001	✓			
10	INSTR									<0.001	0.008	✓			
11	LABORER									<0.001	0.008	✓			
12	SUMMER									-	-				
13	CONT MAINT									<0.001	0.008	✓			
14	NON-OS SPEC.									-	-				
15	SECUR.									-	-				
16	MATL CONT									<0.001	0.008	✓			
17	LOADING									<0.001	0.008	✓			
18	T/C CLNG									-	-				
19	MGRS/NON-OP									<0.001	<0.001	✓			
20	AREA SAMP (NO JC)									-	-				

DO 101963
CONFIDENTIAL

* PROTECTIVE EQUIPMENT: (1) Mouthbit (2) Full Face (3) Half or Dust Face (4) Air Supply (5) Hearing Protection

CMP

Sulfuric Acid
0009-3583

DATE AND UNIT

0.1 mg/m

0009-3585

PERSONNEL								AREA				EXCURSION			
NO.	JOB CLASS	AREA/TASK	*PT. EQ.	TWA BASIS	NO. SAMPLES	AVG.	HIGH	SAMPLE DURATION	NO. SAMPLES	AVG.	HIGH	EXCUR. DURATION	NO. SAMPLES	AVG.	HIGH
01	OTT							7-8 hrs	16	-	-				
02	OT									<0.1	0.37	X			
03	SOT									<0.1	0.37	X			
04	OS									<0.1	0.37	X			
05	SS									<0.1	0.37	X			
06	EDO									<0.1	0.37	X			
07	LAB									<0.1	0.37	X			
08	TECH									<0.1	0.37	X			
09	CLER.									<0.1	<0.1	X			
10	INSTR									<0.1	0.37	X			
11	LABORER									<0.1	0.37	X			
12	SUMMER									-	-				
13	CONT MAINT									<0.1	0.37	X			
14	NON-OS SPEC.									-	-				
15	SECUR.									-	-				
16	MATL CONT									<0.1	0.37	X			
17	LOADING									<0.1	<0.1	X			
18	T/C CLNG									-	-				
19	MGRS/NON-OP									<0.1	<0.1	X			
20	AREA SAMP (NO JC)									-	-				

* PROTECTIVE EQUIPMENT: (1) Mouthbit (2) Full Face (3) Half or Dust Face (4) Air Supply (5) Hearing Protection

DO 101964
CONFIDENTIAL

EMPLOYEE EXPOSURE SUMMARY

QUARTER _____ YEAR 1980

FILLED IN BY _____

PLANT

CMP

BLOCK

46

STRESS

Methyl
ChlorideMINIMAL DETECTABLE
LIMIT AND UNIT0.1 ppm

NO.	JOB CLASS	AREA/ TASK	PERSONNEL					AREA				EXCURSION			
			*PT. EQ.	TWA BASIS	NO. SAMPLES	AVG.	HIGH	SAMPLE DURATION	NO. SAMPLES	AVG.	HIGH	EXCUR. DURATION	NO. SAMPLES	AVG.	HIGH
01	OTT		-		-	-	-								
02	OT		1,2,3,5		3	2.3	3.5	X				X 0.2 hr	2	8.8	12.1
03	SOT		1,2,3,5		5	0.8	3.3	✓							
04	OS		1,2,3,5		5	0.2	0.3	✓							
05	SS		1,2,3,5		6	0.3	0.6	✓							
06	EDO		1,2,3,4,5		10	1.0	7.4	✓				X 0.4 to 2.5 hr	3	21.3	62.2
07	LAB		1,2,5		4	0.5	0.6	X							
08	TECH		1,2,5		6	0.2	0.7	X							
09	CLER.		-		3	<0.1	0.1								
10	INSTR		1,2,5		4	0.5	1.4	X							
11	LABORER		1,2,3,5		4	0.1	0.4	X							
12	SUMMER		-		-	-	-								
13	CONT MAINT		1,2,3,4,5		7	0.2	0.7	X							
14	NON-OS SPEC.		-		-	-	-								
15	SECUR.		-		-	-	-								
16	MATL CONT		1,5		2	0.2	0.3	X							
17	LOADING		1,2,4,5		7	1.5	5.0	X				X 0.6 hr	2	2.3	2.9
18	T/C CLNG		-				-								
19	MGRS/NON- OP C.A.T.		-		2	0.4	0.6								
20	AREA SAMP (NO JC)		-				-								

DO 101965
CONFIDENTIAL

* PROTECTIVE EQUIPMENT: (1) Mouthbit (2) Full Face (3) Half or Dust Face (4) Air Supply (5) Hearing Protection