JCL

conoco

Interoffice Communication

To Jim Gabbet

From R. D. Gamblin

Date July 30, 1974

Subject Data Submission For The Foster D. Snell Study Of The Possible Economic Impact Of Alternate Standards Of VCM Worker Exposure Levels

In accordance with a request of Foster D. Snell we are submitting data to you concerning the possible economic impact of alternate standards of VCM worker exposure levels. We understand you will compile and submit this information for our plant insuring consistency among the three Conoco Plants involved in manufacturing and processing VCM.

The information included in the attached report is keyed to the Foster D. Snell Questionaire. Several items in the questionaire ask for information regarding equipment and operating requirements to meet standards below 50ppm. We find it difficult to speculate upon the effect of more restrictive standards. The plant has no means of continuously monitoring VCM ambient air ceiling levels. Such equipment is on order and when installed will give an indication of VCM ceiling levels at various plant locations. Until then we can only guess at future equipment requirements based upon the limited available data. In the attached information we have speculated on what might be required to meet a 10ppm ceiling level. Certainly these estimates should be used very cautiously. There is no firm data on which to base such estimates and these are intended only to indicate a "best feel" for the situation. Information we have now does not permit us to define a feasible operating level and the associated costs below the 25ppm level.

The following information is included in the attached report:

I. General Data

1. Plant production, Process Flow Drawing And Description
2. Plant Employee And Job Classification Data
3. Historical And Current VCM Exposure Levels
4. Results Of Monitoring And Current Operating And Maintenance Procedures

II. Engineering Controls And Work Practices

1. Cost Of Equipment Installed Or Planned To Reduce VCM Exposure And Comply With 50ppm Standard
2. Changes In Operating Or Maintenance Procedures For Reduction Of VCM Exposure And Compliance To 50ppm
3. Equipment Required To Achieve 25ppm Standard
4. Operating And Maintenance Procedures Needed To Comply With A 25ppm Standard.

5. Lowest Feasible VCM Level And Necessary Equipment To Achieve This Level.
6. Required Operating And Maintenance Procedures To Achieve The Lowest Feasible Level.
7. Comments Concerning Achievement Of A No Detectable Level.

III. Personal Protective Equipment

1. Equipment Now In Use
2. Cost Of Equipment And Operating And Maintenance Requirements
3. Equipment Cost, Operating And Maintenance Requirements To Achieve A 25ppm Ceiling And A No Detectable Unit.
4. Data On Estimated Number Of People Required To Wear Protective Equipment At Various VCM Levels

IV. Environmental And Personal Monitoring

1. Estimated Cost Of Monitoring Equipment
2. Estimated Cost Of Medical Exams
3. Information On Record Keeping

The information contained in section I should be considered to be a trade secret. This information is related to technology obtained under license and in confidence from the Stauffer Chemical Company. This technology is incorporated in our commercial plant and is also licensed by Stauffer to other companies. This technology is quite valuable and proprietary to Continental and Stauffer and we request that it be held in confidence.

R. D. Gamblin

bw

CC:
LNV-REL-RHG-RSM-CRH-DPC-RTF-EMS
DHS-DEM-JCL-JSR-CEG-GGD

B. Block II - This area is also inside of the plant's battery limits. And includes the Oxychlorination Unit, the EDC Cracking Unit and the HCl Removal Unit.

c. Offsites - This includes the tank farm area and the VCM rail tank car loading area.

d. Control Room -

e. Office -

f. Maintenance - Includes exposures levels of all maintenance workers while performing maintenance in any location within the plant.

g. Laboratory -

h. Ship Loading Dock - Includes Exposure levels of employees in the dock area during VCM ship loading.

The plant has no information concerning employee VCM exposure levels prior to March 1, 1974. The information on current VCM exposure levels is listed on Table 2.

4. Results of Monitoring and Current Operating and Maintenance Procedures -

The results of personal monitoring have already been listed.

The plant is continuing a study of ambient air concentrations throughout the process unit. The samples are obtained in evacuated glass bombs and analyzed by GLC. The summary of current results is listed on Table 3. These results apply only to area

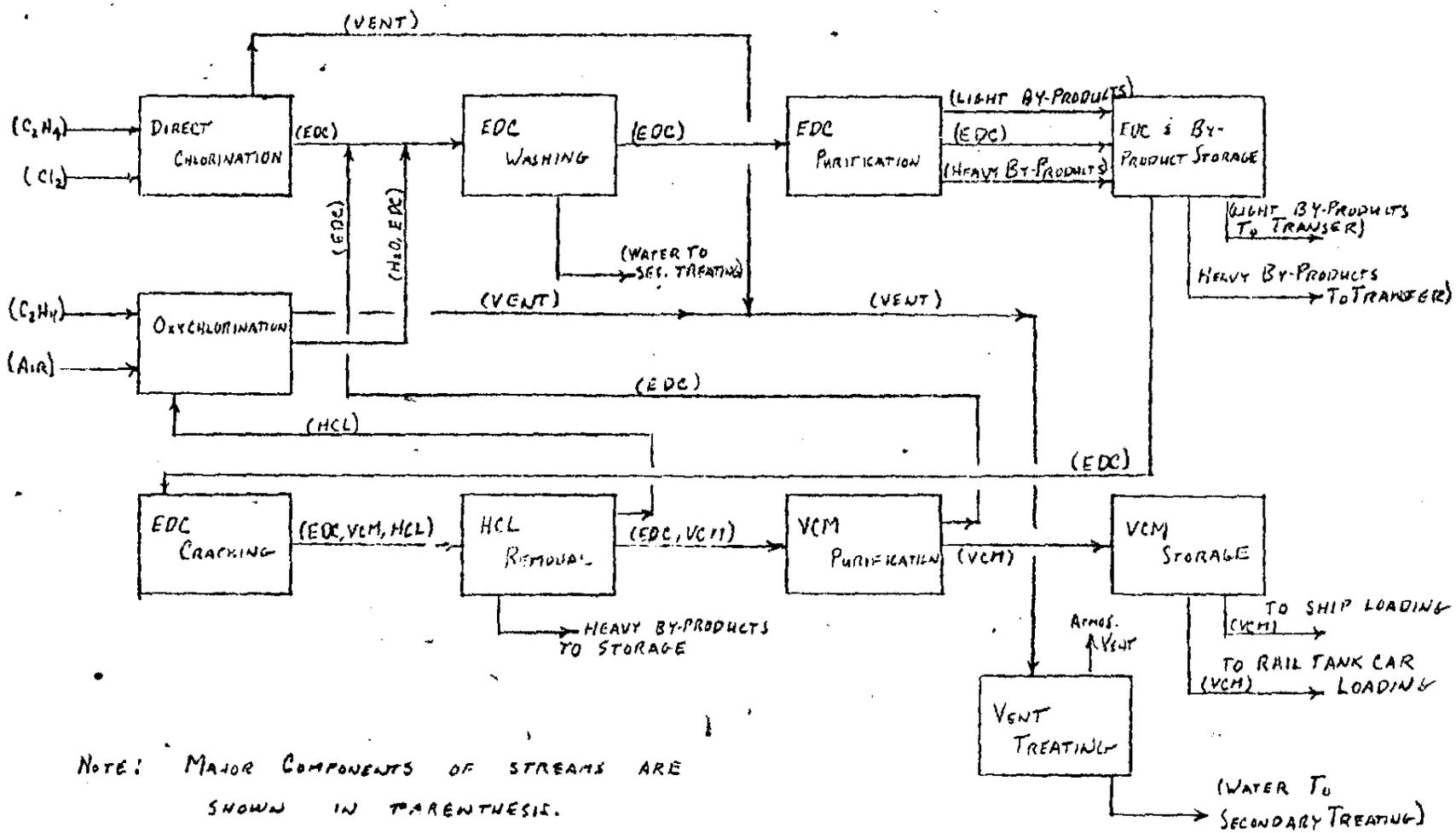
MONITORING. GLASS BOMB SAMPLES DURING SPECIFIC MAINTENANCE PROCEDURES HAVE SHOWN CONCENTRATIONS AS HIGH AS 0.5% (5000ppm). DURING THESE OPERATIONS EMPLOYEES ARE ALWAYS PROTECTED WITH FRESH AIR MASKS.

ATTACHMENT A PROVIDES INFORMATION ON OPERATING AND MAINTENANCE PROCEDURES NOW IN USE TO CONTROL EMISSIONS AND EXPOSURE OF VCM VAPOR. FRESH AIR MASKS ARE IN USE BY PLANT EMPLOYEES:

1. AT ALL TIMES DURING SHIP LOADING.
2. DURING MAINTENANCE PROCEDURES WHERE EXPOSURE IS POSSIBLE.
3. AT ALL TIMES DURING RAIL TANK CAR LOADING.
4. AT ALL TIMES DURING SAMPLING OF STREAMS CONTAINING VCM
5. AT ALL TIMES DURING OPERATING PROCEDURES WHERE VCM RELEASE IS POSSIBLE.

FIGURE 1

SIMPLIFIED PROCESS FLOW DRAWING



NOTE: MAJOR COMPONENTS OF STREAMS ARE SHOWN IN PARENTHESIS.

VVC 000002009

Foster D. Snell Study
Conoco Lake Charles VCM Plant

Brief Process Description

Ethylene and Chlorine are reacted in the liquid phase to form crude Ethylene Dichloride (EDC) in the Direct Chlorination Unit. This crude EDC is mixed with recycled EDC from the VCM Purification Unit and then processed in the EDC Washing Section. EDC produced in the Oxychlorination Unit is neutralized in the EDC Washing Unit. The total EDC stream is then transferred to the EDC Purification Unit where the neutralized EDC is fractionally distilled to first removed low boiling impurities (Light By-Products) and water and then to remove high boiling impurities (Heavy By-Products).

The purified anhydrous EDC is thermally cracked (ED) in the EDC cracking Section to form Hydrogen Chloride (HCl) and Vinyl Chloride (VCM). The HCl is isolated by distillation in the HCl Removal Section and is sent to the Oxychlorination Unit. The VCM Purification Unit then separates the vinyl chloride product and the uncracked EDC which is recycled to purification. The vinyl chloride product is transferred to storage. From storage, the vinyl product is loaded into railroad tank cars or VCM cargo ships.

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IN THE OXYCHLORINATION UNIT, HCL, OXYGEN, AS AIR, AND ETHYLENE ARE COMBINED TO FORM EDC AND WATER. THE EDC PRODUCED IN THIS UNIT IS SENT TO THE EDC WASHING SECTION.

TABLE 1

PLANT EMPLOYEE AND JOB CLASSIFICATION DATA

CONOCO LAKE CHARLES VCM PLANT

JOB CLASSIFICATION	NUMBER
PRODUCTION	
SHIFT FOREMEN	4
CHIEF OPERATOR	5
BREAKER OPERATOR	1
BOARDMAN OPERATOR	8
OUTSIDE OPERATOR	8
PUMPER LOADER	8
SUBTOTAL	34
MAINTENANCE	
SUPERVISORS AND LEADMEN	10
INSTRUMENT MEN	4
INSULATORS	3
CARPENTERS	1
BOILERMAKERS	4
ELECTRICIANS	4
WELDERS	4
MILLWRIGHTS	5
PIPEFITTERS	5
SUBTOTAL	40
SUPERVISORY AND SUPPORT	
OFFICE PERSONNEL	9
TECHNICAL STAFF	15
LABORATORY	7
WAREHOUSE	4
SUBTOTAL	35
TOTAL PERMANENT EMPLOYEES	109
OTHER	
SHIP LOADING DOCKMEN	18
TURNAROUND MAINTENANCE PERSONNEL (REQUIRED FOR 15 DAYS ONCE EVERY 8 MONTHS)	150 TO 200

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TABLE 2
CURRENT VCM EXPOSURE LEVELS (TWA)
CONOCO LAKE CHARLES VCM PLANT

AREA	VCM (PPM AVE.)	VCM (PPM RANGE)	No. DATA PTS.	MEASURING DEVICE
BLOCK I	2.0	.1 TO 15	28	(2)
BLOCK II	1.2	.1 TO 8.6	24	(2)
OFFSITES	3.5	.1 TO 66	43	(2)
CONTROL ROOM	0.7	.1 TO 9.5 (1)	56	(2)
OFFICE	1.4	.1 TO 29 (1)	52	(2)
MAINTENANCE	2.0	.1 TO 50	129	(2)
LABORATORY	4.3	.2 TO 50	42	(2)
SHIP LOADING	3.1	1.4 TO 5.5	4	(2)

(1) EMPLOYEES IN THESE AREAS ARE PERIODICALLY IN THE PROCESS UNIT.

(2) THE MEASURING DEVICE USED IS A BENDIX ENVIRONMENTAL SCIENCE DIVISION PORTISSIBLE AIR SAMPLING PUMP. THIS DEVICE IS WORN BY EMPLOYEES FOR TIME PERIODS OF 20 MINUTES TO 8 HOURS. IT DETECTS VCM BY CARBON ADSORPTION AND IS ANALYZED BY FLAME IONIZATION GLC.

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TABLE 3
CURRENT RESULTS OF VCM AREA MONITORING
CONOCO LAKE CHARLES VCM PLANT

AREA	VCM (ppm. AVE.)	VCM (ppm RANGE)	No OF DATA PTS
BLOCK I	8.6	0-119	270
BLOCK II	6.9	0-124	270
OFFSITES	15.3	0-898	260
CONTROL ROOM	1.6	0-16.2	18
OFFICE	4.9	0-21	25
MAINTENANCE	1.4	0-4.9	14
LABORATORY	3.7	0-28	23
SHIP LOADING	13.7	0-278	73

FOSTER D. SNELL STUDY

CONOCO LAKE CHARLES VCM PLANT

II. ENGINEERING CONTROLS AND WORK PRACTICES

1. COST OF EQUIPMENT INSTALLED OR PLANNED TO REDUCE VCM EXPOSURE AND COMPLY WITH 50ppm STANDARD — INFORMATION ON THE PURPOSE, INITIAL COST, OPERATING AND MAINTENANCE COSTS OF SYSTEMS THAT ARE OR WILL BE INSTALLED TO REDUCE VCM EXPOSURE ARE LISTED ON TABLE 4. NOT ALL OF THESE ITEMS ARE BEING INSTALLED TOTALLY TO COMPLY WITH THE 50ppm LEVEL. HOWEVER, ALL OF THESE ITEMS WILL BE NECESSARY TO TO REDUCE VCM AMBIENT AIR CONCENTRATIONS TO LEVELS LESS THAN 50ppm.

2. CHANGES IN OPERATING AND MAINTENANCE PROCEDURES FOR REDUCTION OF VCM EXPOSURE AND COMPLIANCE TO 50ppm — ALL PLANT OPERATING AND MAINTENANCE PROCEDURES ARE UNDER REVIEW TO DETERMINE IF THEY RESULT IN UNNECESSARY WORKER EXPOSURE TO VCM. SPECIFIC OPERATING AND MAINTENANCE PROCEDURES ARE DETAILED IN ATTACHMENT A. WE HAVE NO DATA AVAILABLE WHICH INDICATES THE ADDITIONAL PRODUCTION COSTS WHICH WILL RESULT FROM THESE PROCEDURES AND INSTALLATIONS. WE ANTICIPATE LENGTHED TURNAROUNDS WITH ATTENDENT PRODUCTION LOSS.

3. EQUIPMENT REQUIRED TO ACHIEVE A 25ppm STANDARD — THE PLANT FEELS THAT NO ADDITIONAL EQUIPMENT OTHER THAN THAT LISTED ON TABLE 4 WILL BE REQUIRED TO ACHIEVE A 25ppm STANDARD.

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4. OPERATING AND MAINTENANCE PROCEDURES REQUIRED TO COMPLY WITH A 25ppm STANDARD — ALTHOUGH PURGING REQUIREMENTS WOULD NECESSARILY BE MORE THROUGH AND THE USE OF FRESH AIR MASKS MORE FREQUENT AND LONGER, THE PLANT DOES NOT FEEL ADDITIONAL OR ALTERED OPERATING AND MAINTENANCE PROCEDURES WOULD BE REQUIRED FOR COMPLIANCE TO A 25ppm STANDARD. VERSUS THE 50ppm REQUIREMENT.

5. LOWEST FEASIBLE VCM LEVEL AND NECESSARY EQUIPMENT TO ACHIEVE THIS LEVEL — WE BELIEVE THE LOWEST FEASIBLE CEILING LEVEL IS 10ppm. SUBSTANTIAL PLANT REVISIONS AND MODIFICATIONS WOULD BE REQUIRED TO ACHIEVE A 10ppm CEILING LEVEL. OUR BEST ESTIMATE OF THESE CHANGES IS LISTED ON TABLE 5.

6. REQUIRED OPERATING AND MAINTENANCE PROCEDURES TO ACHIEVE THE LOWEST FEASIBLE LEVEL — THE PLANT WOULD NOT INSTITUTE ANY ADDITIONAL OPERATING OR MAINTENANCE PROCEDURES OTHER THAN THOSE ASSOCIATED WITH CHANGES IN TABLE 5. TO REACH THE LOWEST FEASIBLE (10ppm) LEVEL. IN ORDER TO PREVENT ACCIDENTAL EXPOSURE TO CONCENTRATIONS ABOVE 10ppm UNTIL THE ITEMS IN TABLE 5 ARE FUNCTIONAL, WE WOULD REQUIRE OPERATING AND MAINTENANCE PERSONNEL TO WEAR FRESH AIR BREATHING MASKS WHEN IN AN OPERATING AREA WHERE VCM EXPOSURE COULD OCCUR. AFTER THE ITEMS IN TABLE 5 ARE INSTALLED, FRESH AIR MASKS WOULD NOT BE REQUIRED UNLESS THE FIXED POINT MONITORING SYSTEM INDICATED EXCURSIONS APPROACHING 10ppm

7. COMMENTS CONCERNING ACHIEVEMENT OF A NO DETECTABLE LEVEL —

THE PLANT REQUIRES PERIODIC MAINTENANCE ON ALL PLANT EQUIPMENT. CLEARING OF PROCESS EQUIPMENT AND PIPING IS ACCOMPLISHED BY REPETATIVE PRESSURE PURGING WITH AN INERT GAS (NITROGEN). WE HAVE NOT ACHIEVED 1ppm LEVELS EVEN AFTER 25 REPETATIVE PRESSURE PURGES IN A SMALL SECTION OF PIPE.

VCM IS A COLORLESS GAS AND HAS NO DETECTABLE ODOR AT LOW CONCENTRATIONS (BELOW ~~500~~ 250 ppm). SMALL, PIN HOLE LEAKS IN EQUIPMENT, FLANGES, VALVES AND PIPING ARE EXTREMELY DEFFICULT TO DETECT AND CORRECT. IT IS NOT POSSIBLE TO PROVIDE CONTINUOUS MONITORING AT ALL POINTS, ON ALL EQUIPMENT, AT ALL TIMES SUCH THAT SMALL LEAKS AND EMISSIONS ARE IMMEDIATELY DETECTED.

A 1ppm LEVEL OF VCM AMBIENT AIR CONCENTRATIONS WOULD REQUIRE ALL MAINTENANCE, ALL OPERATING, ALL LABORATORY AND ALL OFFICE PERSONNEL TO BE IN CONTAINED AIR BREATHING SYSTEMS AT ALL TIMES WHILE ON PLANT PROPERTY. CLEARLY, THIS IS NOT A PRACTICAL SOLUTION.

FOR THESE REASONS WE DO NOT FEEL A 1ppm CEILING LEVEL IS ATTAINABLE IN THIS PLANT.

VVC 000002017

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TABLE 4

INSTALLED AND PLANNED EQUIPMENT FOR VCM EXPOSURE REDUCTION
CONOCO LAKE CHARLES VCM PLANT

ITEM	USE	COSTS		TIMING	
		CAPITAL	O&M	PROJECT	INSTALL
1. DIP TUBE SYSTEM	DIP TUBES ARE USED TO DETERMINE TANK CAR LIQUID LEVELS. DIP TUBES WERE PREVIOUSLY OPEN TO ATMOSPHERE. THE SYSTEM WAS INSTALLED TO CONTAIN VCM.	$40,000	$4000/YR	1 MO.	3 MO.
2. VCM SAMPLING SYSTEMS	SYSTEMS ARE OR WILL BE INSTALLED AT ALL SAMPLING POINTS AT WHICH VCM IS PRESENT. THE SYSTEM WILL RECYCLE PREVIOUSLY VENTED VCM BACK TO PROCESS.	$20,000	$3000/YR	1 MO.	6 MO.
3. RAIL CAR VENT SYSTEM	SYSTEM WILL USE LOW-LEVEL REFRIGERATION TO RECOVER PREVIOUSLY VENTED VCM.	$350,000	$20,000/YR	1 YR	3 MO.
4. SHIP VENT RECOVERY	SYSTEM WILL RECOVER VCM WHICH IS NOW VENTED DURING SHIP LOADING.	$1,000,000	UNKNOWN	1 YR	3 MO.
5. DOCK VENT STACK	A TALL NEW VENT STACK WILL BE INSTALLED AT THE SHIP LOADING DOCK TO REDUCE GROUND LEVEL CONCENTRATIONS FROM MISCELLANEOUS SOURCES.	$35,000	UNKNOWN	1 MO	1 MO
6. WASH TANK FUME CONTROL	AN IN PROCESS REVISION TO REDUCE VCM EMISSION	$60,000	$3,000	1 YR	1 MO.
7. STRIPPER BOTTOMS FUME CONTROL	AN IN PROCESS REVISION TO REDUCE VCM EMISSIONS.	$65,000	$7,000	1 YR	1 MO.

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TABLE 4 (CONTINUED)

ITEM	USE	COSTS		TIMING	
		CAPITAL	O & M	PROCURE	INSTALL
8. SHIP DOCK CHANGES	MISCELLANEOUS EQUIPMENT AND SYSTEMS FOR VCM EXPOSURE CONTROL	$80,000	$8000/YR	6 MO.	2 MO.
9. TA FUME CONTAINMENT	SYSTEM TO COLLECT AND CONTAIN VCM DURING TURNAROUNDS	UNKNOWN	UNKNOWN	CMO.	2 MO.
10. TANK CAR DOME MODIFICATION	STOP AND CONTROL DOME LEAKS	$325,000	$30000/YR	3 MO.	3 MO.
11. LOADING ARM MODIFICATIONS	ELIMINATION OF SWIVEL JOINT LEAKS	25,000	$3000/YR	1 MO.	1 MO.
	TOTALS	IN EXCESS OF $2,000,000	IN EXCESS OF $78,000/YR		

NOTE: ITEMS 3 AND 4 ARE ALSO REQUIRED FOR HYDROCARBON POLLUTION CONTROL.

VAC 000002019

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TABLE 5

EQUIPMENT REQUIRED TO ACHIEVE 10ppm (LOWEST FEASIBLE CEILING)

CONOCO LAKE CHARLES UCM PLANT

ITEM	USE	COSTS	
		CAPITAL	O&M
1. L.E. TANK REFRIGERATION	CONDENSE AND RECOVER VAPORS	100,000	10,000
2. PURGE TANK REFRIGERATION	CONDENSE AND RECOVER VAPORS	100 000	10000
3. DRY TANK REFRIGERATION	CONDENSE AND RECOVER VAPORS	100 000	10000
4. WET TANK REFRIGERATION	CONDENSE AND RECOVER VAPORS	100 000	10000
5. SLURS TANK REFRIGERATION	CONDENSE AND RECOVER VAPORS	100 000	10000
6. REPLACE 15 PUMPS	CHANGE TO OTHER THAN MECH. SEALED	150,000	15,000
7. CHANGE 10 CONTROL VALVES	CHANGE TO DIAPHRAM TYPE TO CONTROL LEAKS	55,000	5,000
8. CHANGE 200 BLOCK VALVES	CHANGE TO DIAPHRAM TYPE TO CONTROL LEAKS	200,000	20,000
9. CHANGE BAUXITE & DRYER BEDS	CHANGE DESIGN TO FULL VACUUM	400,000	40,000
10. INSTALL COMPRESSOR	EVACUATE BAUXITE & DRYER BEDS	20,000	2,000
11. VENT STACK	TO BE USED TO RELEASE EVACUATED VAPORS	50,000	5,000
12. WASH WATER STRIPPER	TO STRIPPER TOWER AND VESSEL WASH WATER OF UCM	150,000	30,000

NOTE: WE HAVE NOT COSTED OUT EQUIPMENT FOR PROCUREMENT TIME. A MINIMUM TIME TO OBTAIN ENGINEER AND INSTALL THESE ITEMS WOULD BE IN EXCESS OF 2.5 YEARS.

VVC 000002020

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FOSTER D. SNELL STUDY

CONOCO LAKE CHARLES VCM PLANT

III. PERSONAL PROTECTIVE EQUIPMENT

1. EQUIPMENT NOW IN USE —

WHENEVER PLANT EMPLOYEES ARE DOING JOBS WHICH POTENTIALLY COULD RESULT IN VCM EXPOSURE, THEY ARE REQUIRED TO WEAR TYPE C CONTINUOUS OR DEMAND FRESH AIR MASKS. AT THE PRESENT TIME THE PLANT USES BOTTLED AIR ALTHOUGH A IN-PLANT BREATHING AIR SYSTEM IS PLANNED FOR INSTALLATION USING AN EXISTING AIR COMPRESSOR. THE PLANT HAS AVAILABLE PROTECTIVE CLOTHING FOR USE ON JOBS WHERE CONTACT WITH VCM IS A DANGER.

2. COST OF EQUIPMENT AND OPERATING AND MAINTENANCE REQUIREMENTS —

THE COSTS OF THE SYSTEMS AND DEVICES NOW IN USE AND PLANNED ARE LISTED ON TABLE 6.

3. EQUIPMENT COST OPERATING AND MAINTENANCE COSTS TO ACHIEVE A 25 ppm CEILING AND A NO DETECTABLE LIMIT.

A ROUGH ESTIMATE OF THE ADDITIONAL COSTS IS:

25 ppm — $5,000 CAPITAL & $8000/YR

10 ppm — $20,000 CAPITAL & $30,000/YR

No. DETECTABLE — $75,000 CAPITAL & $20,000/YR

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4. DATA ON ESTIMATED NUMBER OF PEOPLE REQUIRED TO WEAR PROTECTIVE EQUIPMENT AT VARIOUS VCM LEVELS

LEVEL	No. OF PEOPLE	TYPES OF JOBS	WEARING TIME
50ppm	2	TANK CAR LOADING	4 HRS./DAY
	5	MAINTENANCE	2 HRS./DAY
	6	SHIP LOADING	8 HRS./DAY (Log Wash
	7	OPERATING (SAMPLES ECT)	2 HRS./DAY
25ppm	(SIMILAR AS ABOVE)		

	IMMEDIATE	AFTER TABLES ITEMS		
10ppm	8 - 4 HRS/DAY	2 - 4 HRS/DAY	OPERATING	—
	12 - 8 HRS/DAY	4 - 2 HRS/DAY	MAINTENANCE	—
	2 - 5 HRS/DAY	—	LABORATORY	—
	18 - 8 HR/DAY	6 - 8 HRS/DAY	SHIP LOADING	1 DAY A WEEK
N. DEFECT.	34		OPERATING	8 HRS/DAY
	40		MAINTENANCE	8 HRS/DAY
	35		SUPV & SUPPORT	8 HRS/DAY
	18		SHIP LOADING	8 HRS/DAY (1 DAY/WE

WEARING OF AIR MASKS IS UN-COMFORTABLE, EVEN FOR A SHORT PERIOD. WEARING THIS EQUIPMENT ON AN EVERYDAY BASIS FOR EIGHT HOURS A DAY WOULD BE UNBEARABLE. HIGH EMPLOYEE DISATISFACTION AND TURNOVER WOULD RESULT.

BECAUSE OF THE AIR HOSES, CONNECTIONS, ECT. CONTINUOUS WEARING OF AIR MASKS IN THE AREA OF ROTATING EQUIPMENT PRESENTS A REAL AND SEVERE SAFETY HAZARD.

THIS PLANT OPERATES AS A CONTINUOUS PROCESS. AS SUCH THE PRODUCTIVITY

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EFFECTS OF THE VARIOUS LEVELS BASED UPON PLANT OUTPUT WOULD BE MINIMAL. AN ESTIMATE OF THE EFFECTS IS:

Level	% Reduction Loss
50 ppm	1.0%
25 ppm	1.0%
10 ppm	2.0%
No Detectable	Not Applicable

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Table 6
Cost Of Personal Protective Equipment
Conoco Lake Charles VCM Plant

Item	Capital	O&M
1. Current Breath Air		
a) Breathing Bottle Trailers	$3000	—
b) Breathing Air Bottles	6,300/yr	
c) Air Mask's	2,500	
d) Hose	250	
	$4750 + $6300/yr	$1000/yr
2. Planned Breathing Air System		
a) Air Header & Compressor Revisions	$100,000	$6000/yr
b) Air Masks	$10,000	$1000/yr
c) Hose	$1,500	$200/yr
	$111,500	$7200/yr
3. Miscellaneous Items (Coveralls Gloves, ect)	~~$1000/yr~~	$5000/yr

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TABLE 7A

COST OF MONITORING EQUIPMENT
CONOCO LAKE CHARLES VCM PLANT

ITEM	COSTS		TIMING
	CAPITAL	O&M	
BENDIX DOSIMETERS	$3600	$400	NOW AVAILABLE
LAB GAS CHROMATOGRAPH	$10000	$31000	NOW AVAILABLE
CENTURY ANALYZER	$3600	$300	NOW AVAILABLE
GC INTEGRATOR	$5000	$500	NOW AVAILABLE
10 POINT MONITORS (2)	$40000	$4000	6 MO.

FOSTER D. SNELL STUDY
CONOCO LAKE CHARLES VCM PLANT

III. ENVIRONMENTAL AND PERSONAL MONITORING

1. ESTIMATED COST OF MONITORING EQUIPMENT — THIS INFORMATION IS SUMMARIZED ON TABLE 7.

2. ESTIMATED COSTS OF EXAMS — THE PLANT ESTIMATES THE COST OF MEDICAL EXAMS FOR EMPLOYEES IS ABOUT $15,000 PER YEAR. THIS IS AN APPROXIMATE COST OF $130 PER YEAR PER EMPLOYEE AND DOES NOT INCLUDE TIME AND COSTS OF THE COMPANIES CORPORATE MEDICAL DIVISION AND THEIR RECORD KEEPING COSTS.

3. INFORMATION ON RECORD KEEPING — ALL DATA ON PERSONAL MONITORING DOSIMETERS, PLANT AREA DATA, ECT ARE KEPT BY THE PLANT LABORATORY AND UPDATED AS REQUIRED. THIS DATA IS AVAILABLE FOR EMPLOYEES UPON REQUEST AS STIPULATED BY THE STANDARDS. ESTIMATED COST OF THIS RECORDKEEPING IS $1500 / YEAR.

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CONTINENTAL VCM

SAFETY AND HEALTH MANUAL

OPERATING PROCEDURE

SUBJECT:	No. STD-G-10
	Effective Date: 5-31-74
Vinyl Chloride Operations Safety Procedure	Supersedes:
	Page 1 of 4 Pages
	Approved By: R. D. Gamblin
	Title: Plant Manager

Reference: Safety & Health Policy, Sec. 80; OSHA 1910.934 Effective 4/5/75

A. PURPOSE

To develop safety and health procedure for employees exposed to vinyl chloride in concentration in excess of 50 ppm during loading of vinyl chloride tank cars, vinyl sampling and other operations in the plant.

B. SCOPE

These requirements, unless otherwise specified, apply to all plant personnel, temporary and permanent, working in those areas defined by management as being potentially harmful due to the exposure to excessive vinyl chloride concentrations.

C. GENERAL

1) VCM Controlled Tasks

The following tasks in the plant will require special work practices and/or restrictions in performance of your normal duties.

a) VCM Sampling
b) VCM Tank Car Loading
c) VCM Wet Lab Analyses
d) VCM Vessel Clearing
e) Disassembly of VCM Lines or Process Chemicals Containing VCM
f) Blowdown of Miscellaneous Instrumentation Used in VCM Service

2) Safe Work Permits

All tasks described in paragraph C.1 d, e and f above, including all other

maintenance tasks where potential exposure of VCM exists, shall be required to have a safe work permit issued prior to actual work. The work permit will be issued only after the Shift Foreman or chief operator has adequately assured that personnel potentially exposed to vinyl chloride concentrations in excess of 50 ppm are adequately protected/supplied with the Scott or Survivair full face, air supplied respirators with breathing air or the Scott self-contained breathing apparatus available in the plant. This requirement applies for all tank, column or vessel entry, disconnecting lines, blinding flanges, and disassembly of any other process equipment where potentially harmful vinyl chloride gases may be breathed.

3) Vinyl Chloride Testing

Lab technicians and chief operators shall be trained in the proper operations and interpretation of applicable instrumentation to determine vinyl chloride concentrations.

4) Employee Work Areas

a) Employees not assigned breathing air masks and equipment while working in a vinyl chloride concentrated area shall not be allowed to enter the area without adequate breathing air equipment supplied by approved breathing air.

b) Work areas in excess of 50 ppm vinyl chloride will be roped off and appropriate signs posted to identify restricted areas. Only employees with adequate breathing air equipment supplied by breathing air will be allowed to enter the restricted area. Maintenance will be responsible to construct and post signs as required.

c) Each employee work area having vinyl chloride concentrations in excess of 50 ppm will be provided with applicable breathing air cylinders, regulators, and air hoses. "Compressed Air" cylinders shall not be used in place of "Breathing Air" bottles.

D. RESPIRATORY PROTECTION, USE AND CARE

1) Breathing air masks, regulator and belt assembly will be issued to individual employees for their use when exposed to high concentrations of vinyl chloride. Employees not issued this equipment on a permanent basis may obtain them from the Maintenance tool room for that shift.

2) The Scott or Survivair masks, including the applicable regulator and harness assembly, in the plant meet the Federal regulations for type C continuous flow

or pressure demand air supplied respirator. (See Figure I)

3) Breathing air masks, etc. used by employees not permanently assigned masks shall be returned to the maintenance tool room. The masks will then be cleaned and disinfected after each use by the warehouse operations Dept.

4) Breathing air masks, etc. permanently issued to each employee shall be cleaned and disinfected daily.

5) Masks or lines that malfunction or become damaged shall be returned to the Maintenance tool room for repair and a functional mask re-issued.

6) Oxygen shall not be used with air-supplied respirators (masks).

7) The quality of air used by the employee shall be of high purity and meet Grade D requirements. Breathing air cylinders shall be examined regularly during use to assure adequate air supply is available for the job. Cylinders shall be replaced when the cylinder pressure drops below 500 psi.

8) Air line couplings shall be incompatible with outlets for other gas systems in the plant to avoid inadvertent cross-contamination.

9) Breathing air masks, when worn, shall provide a good seal and fit properly. Harmful gases and vapors may enter a face mask not having a good seal around the employee's face; such conditions are beards, long sideburns, the absence of one or both dentures and glasses. Spectacle kits will be provided to those employees who normally wear prescription glasses through the tool room when required to wear breathing air masks.

10) Breathing air respirators shall be worn with the appropriate belt assembly provided. The harness assembly will assure proper regulator and air line location during use. (SEE FIGURE I)

11) Breathing air mask usage care and protection shall conform to the respiratory safety standards found in standard STD-G-1.

FIGURE 1

SCOTT AIR-PAK

RESPIRATOR, SUPPLIED AIR DEMA
AND CONTINUOUS FLOW
With Full face Scottoramic Mask
802230-00(WITH HANSEN FITTING)
802230-01(WITH SCHRADER FITTING)

SCOTT DEMAND RESPIRATOR with Scottoramic® Mask

...provides complete respiratory protection against gases, dust, heat and fumes

DESCRIPTION

The Scott Supplied-Air Respirator, P/N 802230, is a full face Demand Respirator with constant flow capabilities. It is used for respiratory protection in hazardous atmospheres where eye and face protection is also required. Assembly includes limitless vision Scottoramic Mask with chin-mounted stainless steel regulator, hose assembly, harness assembly and supply hose.

The Scott Demand Respirator provides improved breathing protection and comfort. The Scottoramic Mask has (based on years of proven performance) earned the reputation of being superior in reliability and service. The Mask-Mounted Regulator (also a service-proved assembly) provides air on demand (as required) or on a continuous flow basis. The latter is achieved by manually adjusting the Continuous Flow Regulator Knob. Air is supplied through a small diameter, flexibl neoprene hose secured over the shoulder, held snugly across wearer's back and clipped to the belt at the right hip. The ends of th hose are pinch-proofed with steel-spring windings.

Hose couples with a Hansen or Schrader fitting (see "Available Models" on overleaf) to either plant air line (using Scott Filter Control Assembly P/N 15412-00) or to standard 220 or 300 cu-ft air cylinders (using Scott Pressure Reducing Regulator P/N 800258-00).

EXTRA COMFORT

Scott leadership in Mask and Regulator design has produced this compact, lightweight, combination which has given such comfor and assurance that wearers feel safe and completely free to work normally.

Tests have shown that this unit is more comfortable to wear over long periods of time than breathing tube models. Eliminatio of the large conventional breathing tube gives the wearer more freedom to move his head and permits him to perform close-up ope ations without restriction. When desirable, a continuous flow of cool air can be introduced into the mask, contributing refreshir comfort in hot or humid atmospheres. All these features help to increase efficiency and to improve production capabilities.

APPLICATION

The Scott Supplied-Air Respirator provides safety for extended work periods in particulate-laden, slightly toxic or oxygen deficient atmospheres from which the wearer can readily emerge. It is used for welding, metalizing, processing and handling toxic materials, effecting repairs, and other tasks which are performed in disagreeable or dangerous atmospheres.

SPECIAL APPROVALS:
Bureau of Mines No. BM-198-36 for type C Respirator (when air is supplied through 25 to 250 ft. of approved Scott Hose, P/N 30010 or 30020, at 50 to 150 PSIG and when used with approved Scott Harness Assy., (P/N 26025-01).

VVC 000002030

Go for safety, first...go SCOTT