



DOW CHEMICAL U.S.A.

TEXAS OPERATIONS
FREEPORT, TEXAS 77541

January 30, 1990

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**OCCUPATIONAL HEALTH PROTOCOL FOR ETHYLENE DICHLORIDE/NORTH PROCESS*
AREA (EDC/NPA), A-7001; IHS FILE A70-3581-89**

The protocol which outlines the two-year Occupational Health Program for EDC/NPA is enclosed. The program provides a basic strategy for industrial hygiene monitoring, health hazards training and medical surveillance.

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OCCUPATIONAL HEALTH PROTOCOL
DOW CHEMICAL COMPANY
TEXAS OPERATIONS

PROTOCOL STATUS

X PRELIMINARY

✓ FINAL

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OCCUPATIONAL HEALTH PROTOCOL
ETHYLENE DICHLORIDE/NORTH PROCESS AREA

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INTRODUCTION

The purpose of this protocol is to establish a two-year Occupational Health Program for EDC/NPA, A-7001. The program provides a basic strategy for industrial hygiene monitoring, health hazards training and medical surveillance for employees assigned to the units.

A review of the personnel roster and chemical and physical agent inventories will be conducted annually. Revisions to the protocol will be made as necessary and the complete protocol document will be reissued on a two-year basis following the consolidated audit.

The results of industrial hygiene monitoring will be reported to employees as soon as possible after completion. A formal report will be issued when all monitoring is completed.

Medical surveillance will be reported to each participating employee. Using individual medical information and pertinent industrial hygiene data, a group analysis of the entire plant population will also be conducted and reported to supervision. If any special health concerns are identified, the physician, in cooperation with supervision and industrial hygiene will jointly review the data and communicate findings to affected plant personnel.

REVIEW OF PAST MONITORING DATA

Personal monitoring of chemical exposures has been evaluated at EDC/NPA since 1973. The most recent data was collected in 1988 and 1989. Routine personal exposures to ethylene dichloride; 1,1,1,2-tetrachloroethane; 1,1,2,2-tetrachloroethane; 1,1,2-trichloroethane; vinyl chloride and vinylidene chloride were the stresses of major concern; however, several other chlorinated organics were evaluated as well. All average 8-hr TWA exposures were less than the exposure guidelines with the exception of ethylene dichloride. A summary of the 1988-89 monitoring results are given in Tables I and II.

In 1988, the Control C Operator 8-hr TWA exposure of 3.6 ppm to ethylene dichloride exceeded the OSHA proposed Permissible Exposure Limit (PEL) of 1.0 ppm. The Control C Operator short-term exposure of 25 ppm to ethylene dichloride exceeded the OSHA proposed Short-Term Exposure Limit (STEL) of 2.0 ppm. Installation of a closed-loop sampling system was recommended to reduce employee exposure potential. Respiratory protection was made mandatory during the interim.

In 1989, the Control C Operator 8-hr TWA and short-term exposures to ethylene dichloride exceeded the OSHA PEL and STEL of 1.0 ppm and 2.0 ppm, respectively with average exposures of 1.3 ppm and 5 ppm, respectively. The closed-loop sampling systems had not been installed yet to control the exposures. Respiratory protection was worn.

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TABLE I
SUMMARY OF 8-HR TWA AVERAGE EXPOSURES TO CHEMICALS
EDC/NPA, 1988-1989

JOB CODE / CLASSIFICATION	8-HR TWA CONCENTRATIONS (ppm)								
	ALPHA-DI	EC	EDC	MECL2	1112 TETRAS	1122 TETRAS	ALPHA-TRI	VINYL	VINYLDENE
CONTROL A OPER. 16026770	ND(<0.02) (6)*	0.03 (6)	0.18 (6)	---	---	0.01 (6)	---	0.03 (6)	0.05 (6)
CONTROL C OPER. 16026790	0.03 (6)	0.81 (6)	2.3 (11)	0.03 (5)	0.01 (5)	0.01 (11)	0.01 (5)	0.03 (6)	0.11 (6)
OSHA PEL	100	150	1	50	---	0.1	10	1	1

LEGEND:

EC = ETHYL CHLORIDE
EDC = ETHYLENE DICHLORIDE
MECL2 = METHYLENE CHLORIDE
1112 TETRAS = 1,1,1,2-TETRACHLOROETHANE
1122 TETRAS = 1,1,2,2-TETRACHLOROETHANE
ALPHA-TRI = 1,1,2-TRICHLOROETHANE
VINYL = VINYL CHLORIDE
VINYLDENE = VINYLDENE CHLORIDE

* Number in parentheses denotes the total number of samples.

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TABLE II
SUMMARY OF AVERAGE SHORT-TERM EXPOSURES TO CHEMICALS DURING SAMPLE CATCHING
EDC/NPA, 1988-1989

JOB CODE / CLASSIFICATION	SHORT-TERM CONCENTRATIONS (ppm)								
	ALPHA-DI	EC	EDC	MECL2	1112 TETRAS	1122 TETRAS	ALPHA-TRI	VINYL	VINYLDENE
CONTROL C OPER. 16026790	ND(<0.19) (6)	0.22 (6)	18 (13)	ND(<0.10) (5)	ND(<0.10) (5)	0.07 (11)	0.10 (5)	0.37 (6)	ND(<0.19) (6)
EXCURSION IHG	250	---	2	100	---	3	30	5	20

LEGEND:

EC = ETHYL CHLORIDE
 EDC = ETHYLENE DICHLORIDE
 MECL2 = METHYLENE CHLORIDE
 1112 TETRAS = 1,1,1,2-TETRACHLOROETHANE
 1122 TETRAS = 1,1,2,2-TETRACHLOROETHANE
 ALPHA-TRI = 1,1,2-TRICHLOROETHANE
 VINYL = VINYL CHLORIDE
 VINYLDENE = VINYLDENE CHLORIDE

* Number in parentheses denotes the total number of samples.

REVIEW OF PAST MONITORING DATA (CONT'D)

Comprehensive noise surveys were carried out in 1982 and 1988. All 8-hour TWA noise exposures were well below 50% of the OSHA allowable (See Table III below). However, 1988 area data identified many areas and/or equipment that exceeded the IHG of 90 dBA as a Ceiling. As a result, the production area of A-7001 has been designated as a hearing protection area until engineering controls can reduce the noise levels below 90 dBA. Sound muffling devices are currently being investigated to reduce bleed valve noise.

TABLE III
SUMMARY OF AVERAGE EXPOSURES TO NOISE
EDC/NPA, 1988

<u>OB CODE/ CLASSIFICATION</u>	<u>NUMBER OF SAMPLES</u>	<u>% OF OSHA ALLOWABLE</u>		<u>EQUIVALENT dBA LEVEL</u>
		<u>RANGE</u>	<u>AVERAGE</u>	
Prodn Maint Foremn	4	9.1-33.8	18.6	77.9
Instrument Techn	5	9.8-28.5	15.2	76.4
Control Operator C	5	9.2-29.8	17.2	77.3
		OSHA PEL	100.0	90.0
		ACTION LEVEL	50.0	85.0

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EVALUATION CRITERIA

Industrial hygiene monitoring is performed to determine potential exposure levels both as a daily time-weighted average (TWA) and peak or short-term exposure. The results of monitoring are compared with the recommended exposure guidelines given in Tables IV-A and IV-B. These values are based on toxicology data and industrial experience.

Threshold Limit Values (TLVs) are established by the American Conference of Governmental Industrial Hygienists (ACGIH), Industrial Hygiene Guides (IHGs) are established by Dow, and Permissible Exposure Limits (PELs) are established by the Occupational Safety and Health Administration (OSHA). They represent airborne concentrations of substances to which nearly all employees may be repeatedly exposed throughout a working lifetime without adverse effect.

OSHA recently adopted most of the guidelines set by the ACGIH. Employers are required to be in compliance with the new limits by September 1, 1989, using any combination of engineering controls, work practices and personal protective equipment. Whenever feasible, engineering controls must be in place by December 31, 1992.

A Short-Term Exposure Limit (STEL) is defined as a 15-minute time-weighted average exposure which should not be exceeded at any time during a work day even if the 8-hour time-weighted average is below the TLV.

The Skin (S) notation refers to the potential contribution to the overall exposure by absorption through the skin including mucous membranes and eyes, either by airborne or more particularly, by direct skin contact with the substance. Repeated or prolonged contact with most organic liquids will result in drying of the skin which enhances a chemical's skin absorption properties. Skin contact should be avoided

A Ceiling (C) is defined as a concentration that should not be exceeded at any time during a work day even if the 8-hour time-weighted average is below the TLV.

A Dow Biological Limit Guide (BLG) represents the amount of contaminant in a worker's exhaled air, urine, blood or other appropriate biological specimen that may not be exceeded. The contaminant can be the contaminant itself, a metabolite or a biochemical change brought on by the introduction of the contaminant into the body.

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**TABLE IV-A
CHEMICAL AGENT EXPOSURE GUIDELINES**

<u>CHEMICAL AGENT</u>	<u>8-HOUR TWA (PPM)</u>	<u>STEL (PPM)</u>	<u>SOURCE</u>
Ethyl Chloride	1000	---	OSHA
Ethylene Dichloride	1	2	OSHA*
Hexachlorobenzene	150 ppb blood	---	DOW
	300 ng/cm ²	---	DOW **
1,1,2-Trichloroethane	10 S	---	OSHA
1,1,1,2-Tetrachloroethane	---	---	---
1,1,2,2-Tetrachloroethane	0.1 S	---	DOW
Vinyl Chloride	1	5	OSHA
Vinylidene Chloride	1	---	OSHA

* Must be in compliance with the OSHA PEL and STEL by 09/01/89.

** Surface cleanliness guide for wipe tests

**TABLE IV-B
PHYSICAL AGENT EXPOSURE GUIDELINES**

<u>PHYSICAL AGENTS</u>	<u>GUIDELINES</u>	<u>SOURCE</u>
Noise	90 dBA C	DOW IHG
	85 dBA (8-Hr TWA)	OSHA Action Level
	90 dBA (8-Hr TWA)	OSHA PEL

The Dow Industrial Hygiene Guide is a 90 dBA Ceiling. It requires that employees wear hearing protection when exposed to continuous, intermittent or impact/impulse noise exceeding 90 dBA. Whenever exposures exceed the OSHA PEL, feasible engineering and administrative controls are required to reduce exposures. The OSHA Action Level of 85 dBA as an 8-hr TWA requires a Hearing Conservation Program. Annual audiometric testing, education and training, and other requirements are included in the program. In addition, Texas Operations Safety Standard 0-46 requires the use of hearing protection by all employees whenever the noise dose exceeds 85 dBA as an 8-hr TWA. Further details on the program are located in the "Texas Operations Hearing Conservation Program Guidelines" (1/88)

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APPENDIX SUMMARY

The surveillance program for EDC/NPA is outlined in Appendix A.

The industrial hygiene education program is described in Appendix B. Chemical and physical agents with the greatest exposure potential will be reviewed.

The medical surveillance plan for the unit is outlined in Appendix C.

Appendix D outlines the goals and plans for 1990 and 1991. The plans include all aspects of the industrial hygiene program.

The updated list of chemical and physical agents, personnel roster, job descriptions and process descriptions are presented in Appendices E, F, G and H.

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APPENDIX A

SURVEILLANCE PROGRAM

1. RATIONALE

In 1990, wipe testing will be conducted for hexachlorobenzene to determine if this compound is present in the EDC/NPA process areas and if it has been tracked into the nearby buildings, maintenance shops, etc. Also, short-term monitoring will be conducted for ethyl chloride; ethylene dichloride; 1,1,2-trichloroethane; 1,1,1,2-tetrachloroethane; 1,1,2,2-tetrachloroethane; vinyl chloride and vinylidene chloride during line and vessel opening activities.

In 1991, personal and area noise monitoring will be conducted as required by Safety Standard 0-46 which requires a noise survey every three years. The last noise survey was in 1988. The survey will also ensure the effectiveness of the noise controls.

In 1991 (if the closed-loop sampling systems are installed by this date), the following chemicals will be monitored for eight-hour TWA and short-term exposures: ethyl chloride; ethylene dichloride; 1,1,2-trichloroethane; 1,1,1,2-tetrachloroethane; 1,1,2,2-tetrachloroethane; vinyl chloride and vinylidene chloride. The monitoring will be done to ensure the effectiveness of the closed-loop sampling systems.

2. SAMPLING STRATEGY

1990 SHORT-TERM MONITORING

<u>JOB CLASSIFICATION</u>	<u>JOB TASKS</u>	<u>AGENTS</u>	<u>NUMBER OF SAMPLES</u>
Control C Oper. Prod Maint Foreman Foreman	Line clearing Vessel opening	Ethyl chloride Ethylene dichloride 1,1,2-Trichloroethane 1,1,1,2-Tetrachloroethane 1,1,2,2-Tetrachloroethane Vinyl chloride Vinylidene chloride	*

* Number of samples collected depends upon job size, job frequency and number of personnel involved.

APPENDIX A (CONT'D)

1991 8-HOUR TWA MONITORING

<u>JOB CLASSIFICATION</u>	<u>JOB TASKS</u>	<u>AGENT</u>	<u>NUMBER OF SAMPLES</u>
Prodn. Maint. Foreman	Routine	Noise	4
Control A Operator	Routine	Noise	4
Control C Operator	Routine	Noise	6
Instrument Techn.	Routine	Noise	4

AFTER CLOSED LOOP SAMPLING SYSTEM INSTALLED

8-HOUR TWA MONITORING

<u>JOB CLASSIFICATION</u>	<u>JOB TASKS</u>	<u>AGENTS</u>	<u>NO. OF SAMPLES PER JOB CLASS</u>
Control A Operator	Routine	Ethyl chloride	4 - 6
Control C Operator		Ethylene dichloride	
Instrument Techn.		1,1,2-Trichloroethane	
		1,1,1,2-Tetrachloroethane	
		1,1,2,2-Tetrachloroethane	
		Vinyl chloride	
		Vinylidene chloride	

SHORT-TERM MONITORING

<u>JOB CLASSIFICATION</u>	<u>JOB TASKS</u>	<u>AGENTS</u>	<u>NUMBER OF SAMPLES</u>
Control C Oper.	Sample Catching	Ethyl chloride	6
		Ethylene dichloride	
		1,1,2-Trichloroethane	
		1,1,1,2-Tetrachloroethane	
		1,1,2,2-Tetrachloroethane	
		Vinyl chloride	
		Vinylidene chloride	

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3. METHODOLOGY

Eight-hour TWA samples of ethyl chloride; ethylene dichloride; 1,1,1,2-tetrachlorethane; 1,1,2,2-tetrachloroethane; 1,1,2 - trichloroethane and vinyl chloride will be collected on 1 gram charcoal tubes using calibrated personal sampler pumps (approx. 50 cc/minute) to draw known volumes of air through the tubes. The charcoal is desorbed with carbon disulfide and analyzed on a FID gas chromatograph. The front and back sections of the charcoal tubes will be analyzed to detect any breakthrough. Short-term samples of these chemicals will be collected by the same method. However, the personal sampler pumps will be calibrated to an approximate flow rate of 200 cc/minute. The samples will be analyzed according to Dow Method HEH-IHM-83-25A.

Wipe testing of surfaces for hexachlorobenzene will be performed using 35 mm Whatman #1 filters. A disposable polyethylene glove will be worn and discarded for each sample. Flat surfaces such as table tops and floors will be wiped using a template with an exposed area of 100 square centimeters. Other surfaces such as door handles, phones and process control knobs, where the template cannot be used, will be completely wiped. After wiping, the filter is folded and placed in a 3 dram vial. Analysis will be performed by extracting with 10 ml of n-hexane and determining the total micrograms present using electron gas chromatography. Proper procedures for a wipe testing program are outlined in Industrial Hygiene Reference Procedure IHP-403.

Personnel monitoring for noise will be conducted using Quest Model M-7B noise dosimeters which will be calibrated before and after each use with a Quest Model CA-32 sound calibrator. The area noise survey will be conducted using a Quest Model 215 sound level meter which will be calibrated before and after each use with a Quest Model CA-32 sound calibrator.

4. QUALITY CONTROL

Routine quality control procedures shall be an integral part of the sampling and analysis procedures and functions. These shall include:

- a. Routinely introduced sampling of blanks and spikes (known content) along with the other samples for analyses.
- b. Routine checking, calibrating, and maintaining in good working order all equipment and instruments. Air sampling pumps will be calibrated both before and after use.
- c. Routine checking of procedures and results.

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APPENDIX B

INDUSTRIAL HYGIENE EDUCATION PROGRAM

The Industrial Hygiene Education Program is designed to inform workers of the chemical and physical agents in the workplace which may have an adverse effect on the health of the employee. It is believed that an understanding of the hazards of the chemical and physical agents will reinforce their safe handling by the workers.

The annual health hazards training will focus on the following key physical agents:

1990:

Ethylene dichloride
Hexachlorobenzene
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Vinyl chloride
Vinylidene chloride
Ferrozine

1991:

1,1-Dichloroethane
Ethyl chloride
Ethylene dichloride
Hexachloroethane
Noise
Perchloroethylene

The education program will include presentations by department supervision and/or Industrial Hygiene Services reviewing the toxicities of the key physical agents in the block and include discussions about specific job procedures for tasks with a potential for employee exposure and the control methods in use.

Industrial Hygiene will assist EDC/NPA in developing a written personal protective equipment program during 1990. The respiratory protection program will also be reviewed and revised as necessary.

The Industrial Hygiene Manual contains information about the effects of overexposures to each chemical in the plant. It must be kept in an area that is readily accessible to all plant personnel. All personnel should be reminded of the location of the manual.

Participation in the Industrial Hygiene Education Program should be documented. The training documentation form is in the Training Guideline section of the plant Industrial Hygiene Manual. It is important to briefly describe the program's content and to obtain the signature of employees in attendance. When the annual training is complete, forward the original form(s) to Industrial Hygiene Services, B-101, for inclusion in the plant's compliance file (75-year retention).

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APPENDIX C

MEDICAL SURVEILLANCE PLAN

All employees in the Ethylene Dichloride Department (EDC/NPA) are offered a Periodic Core Examination every two years. Participation in the periodic examination program is voluntary. The examination consists of a health history questionnaire, blood and urine tests, physical measurements (height, weight, and blood pressure), and breathing, hearing, and vision tests. Chest x-rays, electrocardiograms, hemocult (blood in the stool), and glaucoma tests are offered on an age-related schedule.

The Dow Medical Surveillance Requirement (MSR) program is also voluntary and is supplemental to the Periodic Core Examination Program. MSR examinations are targeted to detect health effects attributable to specific agents or work requirements. However, except for limited instances where actual tissue levels of a substance are determined (biological monitoring), most tests are non-specific indicators of organ function or injury. A MSR does not exist for all chemicals or physical agents. Where an MSR does exist only those job classifications with a Priority Rating of 1 or 2 must be included in the program. There are a few Medical Surveillance Requirements based on plant/department assignment or previous exposure potential. MSR tests and frequencies are different for each material. All OSHA-regulated chemicals or physical agents have Dow Medical Surveillance Requirements which conform to the OSHA Standard. Individuals whose potential exposures meet or exceed the Action Level are included in the MSR program and must be offered examinations as specified in the Standard. On occasion other employees whose potential exposures are less than the Action Level may be placed on the Dow MSR. These two groups will be clearly differentiated.

Review of the current Chemical and Physical Agent Inventory reveals that no chemicals with a Dow MSR have a Priority Rating of 1 or 2. Ethylene dichloride does have a Priority Rating of 2 for the Control C Operators. However, under the Dow MSR system there is no additional testing required. Review of the 1988 Noise Survey shows that the eight-hour time-weighted average exposures to noise are all below 85 decibels on the A-scale and therefore there are no job classifications that must be included in the Hearing Conservation Program. All employees in the Ethylene Dichloride Department will continue to be offered the Periodic Core Examination.

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APPENDIX D
OCCUPATIONAL HEALTH GOALS AND PLANS

	DUE DATES	
	<u>1990</u>	<u>1991</u>
Industrial Hygiene Surveillance Program:		
1. Complete sampling program	08/90	08/91
2. Communicate results to employees	10/90	10/91
Industrial Hygiene Education Program:		
1. Update CPAIs	11/90	11/91
2. Review MSDSs compared to CPAIs	11/90	11/91
3. Conduct annual health hazards training	12/90	12/91
4. Conduct new chemicals training	as needed	
Respiratory Protection Program:		
1. Review written respirator program	03/90	03/91
2. Conduct training for mouthbit	---	06/91
3. Conduct training for half-face	06/90	06/91
4. Conduct training for full-face	06/90	06/91
5. Conduct training of SCBAs/Airlines	06/90	06/91
6. Conduct inspections of mouthbit	10/90	10/91
7. Conduct inspections of half-face	10/90	10/91
8. Conduct inspections of full-face	10/90	10/91
9. Conduct inspections of airlines	10/90	10/91
10. Conduct inspections SCBAs	- monthly -	
Hearing Conservation Program:		
1. Conduct noise survey	---	08/91
2. Employee training on how to use hearing protection and noise	---	09/91
Personal Protective Equipment Program:		
1. Develop protective equipment program	05/90	---
2. Review protective equipment program	---	05/91
3. Conduct employee training on proper PPE use	11/90	10/91
Asbestos:		
1. Conduct inspection for asbestos-containing materials	11/90	---

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9-JAN-90

INDUSTRIAL HYGIENE CHEMICAL USAGE BY PLANT
PLANT NAME - EDC NPA (58800)

CHEM DR#	CHEMICAL NAME	USE CODE	USE NAME
			MISCELLANEOUS
			LABORATORY CHEMICALS
			BY-PRODUCTS
			BY-PRODUCTS
			MISCELLANEOUS
			BY-PRODUCTS
			BY-PRODUCTS
			PRODUCTS
			MISCELLANEOUS
			BY-PRODUCTS
			RAW MATERIALS
			BY-PRODUCTS
			BY-PRODUCTS
			BY-PRODUCTS
			BY-PRODUCTS
			BY-PRODUCTS
			LABORATORY CHEMICALS
			BY-PRODUCTS
			MISCELLANEOUS
			BY-PRODUCTS
			BY-PRODUCTS
			RAW MATERIALS
			LABORATORY CHEMICALS
			BY-PRODUCTS
			BY-PRODUCTS
			BY-PRODUCTS
			LABORATORY CHEMICALS
			MISCELLANEOUS
			LABORATORY CHEMICALS
			LABORATORY CHEMICALS
			LABORATORY CHEMICALS
			LABORATORY CHEMICALS
			MISCELLANEOUS
			MISCELLANEOUS
			LABORATORY CHEMICALS
			BY-PRODUCTS
			BY-PRODUCTS
			MISCELLANEOUS
			WATER TREATMENT CHEMICALS
			HEAT TRANSFER AGENTS
			MISCELLANEOUS
			MISCELLANEOUS
			MISCELLANEOUS
			MISCELLANEOUS
			LABORATORY CHEMICALS
			LABORATORY CHEMICALS
			RAW MATERIALS
			LABORATORY CHEMICALS
			LABORATORY CHEMICALS
			PHYSICAL AGENTS
			PHYSICAL AGENTS
			LABORATORY CHEMICALS
			LABORATORY CHEMICALS

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EDC NPA PLANT (58800)
PERSONNEL ROSTER AS OF 12-18-89

NAME	MASTER	JOB CODE/SUF	JOB CLASSIFICATION -- ASSIGNMENT
		01600000	
		FOREMAN	
		01632700	
		PRODN MAINT FOREMAN	
		16026770	
		CONTROL OPERATOR A	
		16026770	
		CONTROL OPERATOR A	
		16026770	
		CONTROL OPERATOR A	
		16026770	
		CONTROL OPERATOR A	
		16026770	
		CONTROL OPERATOR A	
		16026790	
		CONTROL OPERATOR C	
		16026790	
		CONTROL OPERATOR C	
		16026790	
		CONTROL OPERATOR C	
		16026790	
		CONTROL OPERATOR C	
		16209680	
		CLERK TYPIST	

ADDITIONS TO PLANT ROSTER

NAME	MASTER	JOB CODE/SUF	ORIGINAL JOB CLASSIFICATION -- DEPART. ASSIGNMENT
		01200000	57335
		SUPERVISOR	
		18700004	59000
		SR ELECTRICIAN	
		12704054	59000
		SR INST TECHNICIAN	

* NO POTENTIAL FOR EXPOSURE DURING NORMAL OPERATING CONDITIONS. NO CPAI REQUIRED
> PLANT PERSONNEL NO LONGER WORKS IN THIS DEPARTMENT

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APPENDIX G
JOB DESCRIPTIONS

PLANT SUPERINTENDENT

The job is primarily administrative with the individual spending 80% to 90% of the time in offices or control rooms. Remaining time is spent in production areas as an observer or supervisor. Non-routine situations require close inspection of damaged or leaking equipment and operation of process equipment.

MAINTENANCE/PRODUCTION FOREMAN AND FOREMAN

Approximately 40% of work time is performed from office. Maintenance job supervision in production areas and dealing with open process systems requires 40% of work time. Remaining 20% involves direct supervision of outside operations including spill cleanup, clearing of process equipment and operation of process equipment.

CONTROL A OPERATOR

Control room operation involves 95% of work time. Remaining 5% involves handling small process samples and performing chromatographic analysis inside the laboratory area.

CONTROL C OPERATOR

Outside operation work involves 85% of available time. Work includes sampling, draining equipment, piping line-up, starting/stopping process pumps and plant clean-up. Remaining time is spent in laboratory area performing analysis on process samples. Lab area includes approved fume hoods.

SENIOR ELECTRICIAN

Responsible for all electrical work in the A-7000 block. Fifty percent of the time is spent in the plant. The remaining time is spent in office and work shop areas. This employee currently reports to Chlorinated Ethanes Products (CEP) Maintenance management.

SENIOR INSTRUMENT TECHNICIAN

Repairs and troubleshoots process analytical equipment and other instruments. Approximately 60% - 70% of the time is spent in the plant process areas and the remaining time is spent in the instrument shop. This employee currently reports to CEP Maintenance management.

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APPENDIX H
PROCESS DESCRIPTION

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figure 1

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