

1990-92 OCCUPATIONAL HEALTH PROGRAM
UNIT I/VINYL CHLORIDE, OC-101

INTRODUCTION

The following programs are included in your current Occupational Health Program. The programs are scheduled to be reviewed annually and updated on a two year basis.

- Industrial Hygiene Monitoring Program
- Hearing Conservation
- Asbestos
- Ventilation
- Ergonomics
- Heat Stress
- Medical Surveillance
- Hazard Communication
- Industrial Hygiene Education Program
- Respiratory Protection
- Protective Equipment
- Radiation
- Department Activities
- Roster and Job Descriptions (updated on a yearly basis)
- Chemical and Physical Agent Inventory (updated on a yearly basis)

These programs should be placed behind the appropriate tab in the Department Industrial Hygiene Manual.

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OCCUPATIONAL HEALTH GOALS AND PLANS
1990-92

	<u>DATE LAST COMPLETED</u>	<u>DATE DUE</u>
Industrial Hygiene Monitoring:		
Comprehensive Chemical (8-hr TWA & Excursion)	1989	1992
Shutdown Monitoring	-----	1991
Noise (Area & Personal)	1988	1991
Hexachlorobenzene Wipe Testing	-----	1991
Hearing Conservation Training (annually):	1990	1991/92
Asbestos Training (annually):	1990	1991/92
Ventilation:		
Ventilation Survey	1989	1992
Manometer Check	quarterly	
Ergonomics:		
Initial Training	-----	1991
Evaluation of Manual Lifting Activities	-----	1991
Heat Stress Training:	-----	1991
Hazard Communication:		
Review written Hazcom program	1990	1992
Review Industrial Hygiene Manual/Protocol	1990	1992
Update CPAI	1990	1991
Review MSDS's compared to CPAI	1990	1992
Health hazards training (annually)	1990	1991
New chemicals training	as needed	
Respiratory Protection:		
Fit Testing for SCBA, airline and dust mask	1990	1992
Inspections- Mouthbit	before each use and annually	
SCBA, airline, ELSA	before each use, weekly, and	
	annually by fire department	
Protective Equipment Training (biannually)	-----	1990
Radiation Inspections		
Visual (location, labels, sign)	Biannually (Feb./August)	
Wipe test, survey	Biannually (May/Nov.)	

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MONITORING PROGRAM

1. RATIONALE

Personnel monitoring was conducted during 1987-89 to evaluate employee exposures to vinyl chloride, vinylidene chloride, ethylene dichloride, ethyl chloride, 1,1,1-trichloroethane, 1,1,2-trichloroethane, and carbon tetrachloride. Eight-hour time-weighted average exposures for each monitored job classification were less than the acceptable guidelines with one exception. The Process Technicians in the loading area had average exposures to vinyl chloride of 0.97 ppm. This exceeds the OSHA Action Level of 0.50 ppm for vinyl chloride and is close to the Permissible Exposure Limit of 1 ppm. The OSHA Standard for vinyl chloride requires quarterly monitoring when employees are exposed, without regard to the use of respirators, above the action level and monthly monitoring when exposures exceed the Permissible Exposure Limit (PEL). Because the average exposure of 0.97 ppm for loading technicians is close to the OSHA PEL of 1 ppm, monthly monitoring is presently being conducted at Unit I. A new tank car sampling system was implemented in 1989 in an effort to reduce exposures. Personnel monitoring conducted after implementation of the new system indicated exposures continue to exceed the OSHA Action Level and remain close to the PEL. Additional engineering controls are being investigated. Until additional controls have been implemented and exposures have been proven to be well below the PEL, monthly monitoring will continue to be conducted of the loading technicians.

Personnel exposures to ethyl chloride, 1,1,1-trichloroethane, 1,1,2-trichloroethane, and carbon tetrachloride have all been less than 10% of their respective guidelines. With the exception of excursion monitoring during carbon tetrachloride tank truck unloading, these chemicals will not be monitored in 1990-91 unless conditions change such that exposures may significantly increase.

A comprehensive chemical survey will be conducted as part of the 1990-92 Occupational Health Program at Unit I. Chemicals evaluated will include vinyl chloride, ethylene dichloride, benzene, 1,1,2,2-tetrachloroethane, and 1,1,1,2-tetrachloroethane. The tetrachloroethanes have not previously been evaluated at Unit I. Monitoring for benzene was conducted as part of the 1989-90 protocol year, however, the data was inconclusive and the monitoring needs to be repeated. Both 8-hour time-weighted average (TWA) and short-term monitoring will be conducted.

Monitoring will also be conducted to evaluate employee exposures to vinyl chloride and ethylene dichloride during plant shut-down activities. Both 8-hour TWA and short-term monitoring will be conducted.

Texas Operations Safety Standard 0-46 (Hearing Conservation) requires that a noise survey be conducted every three years. The previous noise survey at Unit I was conducted in 1988; therefore, a comprehensive area and personal noise survey will be conducted in 1991.

Preliminary wipe testing for Hexachlorobenzene (HCB) will be conducted in selected process areas to determine if the chemical is present in significant amounts. If significant levels of HCB are found during the preliminary testing, additional process and non-process areas will be tested to determine if there is a potential for skin exposure.

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MONITORING PROGRAM (CONT.)

2. SAMPLING STRATEGY

A. 8-Hour TWA Chemical Monitoring

<u>Job Classification</u> ¹	<u>Number of Employees</u>	<u>Chemical</u> ²	<u>Number of Samples</u>
Process Technician-OXY, BPR, VD, VF, I&E	5/area	V1; EDC; 1,1,2,2; 1,1,1,2	6/area
Process Technician-DC	5	V1; EDC; 1,1,2,2; 1,1,1,2, Benzene	6/area
Process Technician & Unit Technician-LD	2	V1	4
Process Technician & Unit Technician-R	7	V1; EDC; 1,1,2,2; 1,1,1,2	6
Process Technician-Lab	2	V1; EDC; 1,1,2,2; 1,1,1,2	3
Process Technician & Unit Technician-Training	3	V1; EDC; 1,1,2,2; 1,1,1,2	3
Process Technologist	2	V1; EDC; 1,1,2,2; 1,1,1,2	3
Senior Technician	6	V1; EDC; 1,1,2,2; 1,1,1,2	6
Service Technician	1	V1; EDC; 1,1,2,2; 1,1,1,2	1
Mech. Tech. Spec., Mech. Supervisor, Mech. Technst	3	V1; EDC; 1,1,2,2; 1,1,1,2	3
Pipefitter/Contractor	1	V1; EDC; 1,1,2,2; 1,1,1,2	3

1. OXY=oxychlorination, DC=direct chlorination, BPR=by-product recovery, VD=vinyl distillation, VF=vinyl furnace, I&E=instrument & electrical, LD=loading, R=repair.
2. V1 = vinyl chloride; EDC = ethylene dichloride; 1,1,2,2 = 1,1,2,2-tetrachloroethane; 1,1,1,2 = 1,1,1,2-tetrachloroethane.

B. Job Task Monitoring

<u>Job Task</u>	<u>Area</u>	<u>Chemical</u>	<u>Number of Samples</u>
Process Sampling	All areas	V1; EDC; 1,1,2,2; 1,1,1,2	3/area
Process Sampling	DC	Benzene	3
Filter Changing	DC	EDC	3
Breaking into vessels/ pipes	All areas	V1; EDC; 1,1,2,2; 1,1,1,2	As many as practical
Tank Truck unloading, sampling/analysis	VF	CCL4	3

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MONITORING PROGRAM (CONT.)

C. Shutdown Monitoring

Both 8-hour TWA and short term monitoring will be conducted during plant shutdown activities. The number of samples and tasks to be evaluated will be determined during a pre-shutdown meeting.

D. Noise Monitoring

<u>Job Classification</u>	<u>Number of Employees</u>	<u>Number of Samples</u>
Process Technician-OXY,DC BPR, VD, VF, I&E	5/area	6/area
Process Technician/ Unit Technician-LD	2	4
Process Technician/ Unit Technician-R	7	8
Process Technician-Lab	2	3
Process Technician/ Unit Technician-Training	3	4
Process Technologist	2	4
Senior Technician	6	6
Service Technician	1	3
Mech. Tech. Spec., Mech. Supervisor, Mech. Technst	3	4
Pipefitter/Contractor	1	3

E. Wipe Testing

<u>Area</u>	<u># of Samples</u>
D-25, T-20, R-140, D-36, D-24, D-254	2/Area

3. SAMPLING METHODS

Sampling for vinyl chloride, ethylene dichloride, 1,1,2,2-tetrachloroethane, 1,1,1,2-tetrachloroethane, and benzene will be conducted using 1 gram charcoal tubes and air sampling pumps. Pumps will be calibrated both before and after use at 50 cc/min for 8-hour TWA samples and 200 cc/min for excursion samples (as outlined in DLI-IHM-83-25A). Analysis will be performed by the Industrial Hygiene Laboratory.

Personal noise levels will be measured using Quest noise dosimeters (Model M-7B) and area noise levels will be measured using a Quest noise level meter (Model 215). All dosimeters and meters will be calibrated both before and after use.

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MONITORING PROGRAM (CONT.)

Wipe testing for HCB will be conducted with Whatman #2 filter paper, 5.5 cm diameter. Approximately 100 cm² of surface area will be wiped in a cross-hatched format with as much pressure as can be applied without tearing the paper. The filter will be placed in a clean labeled glass vial and sealed immediately after sampling. Gloves will be worn while sampling and changed frequently between samples to avoid cross contamination. Filters will be analyzed by Analytical Services.

4. QUALITY CONTROL AND EQUIPMENT

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 other samples for analysis
- 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.
- d. Participation in Dow's Analytical Proficiency Testing (APT) Program.

5. EVALUATION CRITERIA

<u>Material</u>	<u>Industrial Hygiene Guide</u>	<u>Excursion Guide</u>	<u>Source</u>
Vinyl Chloride	1 ppm	5 ppm-STEL	OSHA-PEL
Ethylene Dichloride	1 ppm	2 ppm-STEL	OSHA-PEL
1,1,2,2-tetrachloroethane	0.1 ppm	----	Dow IHG
1,1,1,2-tetrachloroethane	----	----	----
Benzene	1 ppm	5 ppm-STEL	
Noise	85 dBA-TWA	90 dBA-Ceiling	Dow
Hexachlorobenzene	300 ng/100 cm ²		

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REVIEW OF PAST MONITORING DATA

A. CHEMICAL REPORTS:

TABLE I
SUMMARY OF 8-HOUR TIME WEIGHTED AVERAGE EXPOSURES, 1987-88¹

JOB CLASS/CODE	# of SAMPLES	CONCENTRATION (PPM) ^{2,3,4}					
		V1		V2		EDC	
		RANGE	AVE	RANGE	AVE	RANGE	AVE
Process Technician:							
Oxychlorination/ 12700580OX	3	ND-0.06	0.03	ND-0.04	0.03	0.20-0.29	0.25
Direct Chlorination/ 12700580DC	3	ND-0.10	0.07	ND-0.03	0.02	1.1-4.3	2.4
By-Product Recovery/ 12700580BP	3	0.02-0.21	0.08	ND	ND	0.32-1.2	0.73
Vinyl Distillation/ 12700580VD	3	0.02-0.76	0.30	ND	ND	0.52-3.5	0.73
Vinyl Furnace/ 12700480VF	3	ND-0.05	0.03	ND	ND	0.12-1.3	0.71
Loading/ 12700780LO	8	ND-15	0.53	ND-0.58	0.03	ND	ND
Repair/ 12700580R	7	ND-0.37	0.11	0.02-0.20	0.05	ND-5.3	1.6
IHG			1		1		1

1. Reference: Hicks, D. D., Evaluation of Exposures to Chlorinated Hydrocarbons, Noise, Asbestos, and Welding Fumes at the Vinyl Chloride Plant, Unit I, Oyster Creek Site, Texas Operations, 1987-88, IHS File OC1-3138CNA.
2. V1 = vinyl chloride, V2 = vinylidene chloride, EDC = ethylene dichloride.
3. Ethyl chloride, 1,1,1-trichloroethane, and 1,1,2-tichloroethane were also monitored however, all samples were less than 5% of their respective IHG's.
4. ND = non-detectable; Detection limits are as follows: V1= 0.02 ppm; V2 = 0.03 ppm; EDC = 0.02 ppm.

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REVIEW OF PAST MONITORING (CONT.)

TABLE 2
SUMMARY OF 8-HOUR TIME WEIGHTED AVERAGE EXPOSURES, 1989¹

JOB CLASS/CODE	# of SAMPLES	CONCENTRATION (PPM) ^{2,3}			
		VINYL CHLORIDE		ETHYLENE DICHLORIDE	
		RANGE	AVE	RANGE	AVE
Process Technician:					
Oxychlorination/ 12700580OX	4	ND	ND	ND-0.07	0.06
Direct Chlorination/ 12700580DC	7	ND-0.19	0.10	ND-0.44	0.25
Vinyl Distillation/ 12700580/VD	7	ND-1.1	0.40	0.05-0.24	0.11
Vinyl Furnace/ 12700580VF	4	ND-0.16	0.09	ND-0.31	0.18
By-Product Recovery/ 12700580BPR	4	ND-0.14	0.09	0.04-0.30	0.14
Loading/ 12700580LO	10	0.47-1.6	0.94	ND	ND
Repair/ 12700580R	4	ND-0.24	0.17	ND-0.54	0.36
Contractor/Utility Man	2	0.07-0.10	0.09	0.26-3.2	1.7
IHG			1		1

1. Reference: Blue, M. A, Evaluation of Employee Exposures to Chlorinated Hydrocarbons at the Unit I/ Vinyl Chloride Plant, Oyster Creek, 1989, IHS File OC-3138-89C.
2. Ethyl chloride, 1,1,1-trichloroethane, 1,1,2-trichloroethane, and carbon tetrachloride were also monitored however all samples were less than 5% of their respective IHG's
3. ND = non-detectable; detection limits are as follows: vinyl chloride = 0.07 ppm; ethylene dichloride = 0.04 ppm

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REVIEW OF PAST MONITORING (CONT.)

B. NOISE REPORTS:

TABLE 3A
SUMMARY OF 12-HOUR TWA NOISE EXPOSURES, 1988

JOB CLASS/ JOB CODE	# OF SAMPES	% OF OSHA ALLOWABLE RANGE	AVE.
Process Technician ¹ :			
Direct Chlorination/ 12700580DC	5	19-65	31
Byproduct Recovery/ 12700580BP	5	15-50	28
Oxychlorination/ 12700580OX	5	25-100	54
Vinyl Furnaces/ 12700580VIF	4	12-82	43
OSHA PEL			100
OSHA Action Level			50

1. The job classification of Senior Technician/12700004 is included with Process Technician results.

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REVIEW OF PAST MONITORING (CONT.)

TABLE 3B
SUMMARY OF 8-HOUR TWA NOISE EXPOSURES, 1988

JOB CLASS/ JOB CODE	# OF SAMPES	% OF OSHA ALLOWABLE RANGE AVE.	
Process Technician¹:			
Vinyl Distillation/ 12700580VD	5	25-100	64
Repair/ 12700580R	4	5-12	8
Contractors:			
Electrician/ 18700000C	6	7-25	18
Pipefitter/ 20910120C ²	5	16-113	50
OSHA PEL			100
OSHA Action Level			50

1. The job classification of Senior Technician/12700004 is included with Process Technician results.
2. The job classifications of Utility Man/1811314OC and Foreman/01600000C are included in these results.

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HEARING CONSERVATION PROGRAM

1. JOB CLASSIFICATIONS IN A HEARING CONSERVATION PROGRAM

The date of the last noise survey was February, 1988. The survey included both area noise levels and personal job exposure evaluations. The following job classifications had exposure potential greater than 85 decibels as an eight hour TWA. Employees within these job classifications are to have an annual audiogram, required annual training, and mandatory hearing protection.

1. Process Technicians/Oxychlorination
2. Process Technicians/Vinyl Distillation
3. Contractor Pipefitter/Utility Men

2. TRAINING

Training must be conducted annually.

3. HEARING PROTECTION AREAS

The following areas are designated as required hearing protection areas since they are at or above 90 dBA. These areas are posted with signs requiring hearing protection.

1. C-103 & 104 compressor
2. C-340 compressor
3. Cooling tower pump area (P-311, 312, & 313)
4. T-2 area
5. FTB-400 area
6. Area between D-204 & C-204
7. C-30 compressor area
8. Area between R-1 & T-2
9. Oxy R-100 & R-101
10. Area between F-202 & F-203 re-heater
11. P-200 area
12. Phase II area
13. Trackmobile, when operating
14. Maintenance shop, when equipment is operating
15. Yard dog towmotor, when operating

The following areas are designated as hearing protection areas for both plug and muffs since they are at or above 105 dBA. These areas are posted with signs requiring both plugs and muffs.

P-500 hurricane pump, when operating

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HEARING CONSERVATION PROGRAM (CONT.)

4. HEARING PROTECTION TYPES

Hearing protection devices utilized at this department need to have a NRR rating over 19 dBA. Some of the devices available in the plant are:

<u>DEVICE</u>	<u>NOISE REDUCTION RATING (NRR)</u>
E.A.R. plugs	35 dBA
Bilsom Universal Ear Muffs UF-1	23-25 dBA

Other devices are available through plant supervision or the Occupational Health Department.

5. NOISE ABATEMENT PLAN

Engineering Noise Control Plans for Unit I are as follows:

<u>AREA</u>	<u>NOISE CONTROL OPTION</u>
Vinyl Distillation (D-302 & 303)	Insulate during 1991 shut-down
Vinyl Furnace (Compressor C-350)	Isolate, insulate, check internal silencer mechanism on muffler, add silencer

Any new equipment or changes to the process, will be evaluated for noise and when feasible, engineered to keep noise levels below 85 dBA. Contact your Industrial Hygienist.

Temporary jobs that have equipment with noise levels at or above 90 dBA require temporary signs and mandatory use of hearing protection anytime the equipment is in operation. This includes such areas as sandblasting, hydroblasting, use of portable air compressors and hand tools.

6. NEXT REVIEW DATE: October 31, 1992

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ASBESTOS PROGRAM

1. INVENTORY

Asbestos is contained in this block in the following forms :

insulation gaskets transite pump packing

An inventory of all asbestos containing materials and their respective locations is attached. The inventory must be maintained until the materials have been removed. Labeling of asbestos is by block signs located at entrances to the block.

2. INSPECTION SCHEDULE

Asbestos containing materials will be inspected every 6 months by Elmer Moltz (Senior Technician/Repair) for signs of deterioration. If deterioration is found the material will be repaired or removed. In the event removal is required insulation services will be contacted for assistance. Removal and disposal will be according to appropriate procedures as outlined in the Texas Operations Asbestos Handbook (TOAH).

Questions may arise at the time of removal of insulation or at the time of the 6 month inspection as to whether a particular piece of equipment contains asbestos or not. If this situation arises, the material will be sampled and sent to analytical services to be analyzed.

3. TRAINING

The following job classifications are identified as having potential to handle asbestos containing materials and should be trained according to Section III of the TOAH.

Process Technician Unit Technician Senior Technician

All individuals in the above job classifications will be trained before initial assignment and annually thereafter. Training will be documented and forwarded to Industrial Hygiene Services for inclusion in the plant's Industrial Hygiene files.

4. RESPIRATOR CERTIFICATION

For those jobs that require a respirator, an approved respirator will be chosen and mandatory medical certification and fit tests completed before initiation of the job. If exposure exceeds the Action Level (0.1 f/cc), the employee must be fit tested semi-annually and have annual medical examinations. Currently there are no employees at Unit I that require medical surveillance.

5. PROCEDURES

Written procedures have been developed for the handling of asbestos materials during the performance of maintenance, demolition, and renovation activities to be conducted at the facility. The procedures are located in the Repair Office.

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ASBESTOS PROGRAM (CONT.)

6. ASBESTOS ABATEMENT PLANS

All forms of asbestos containing materials are being phased out as replacement is warranted.

7. NEXT REVIEW DATE: October 31, 1992

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VENTILATION PROGRAM

1. PROGRAM DESCRIPTION

The Unit I ventilation system includes as follows:

ID Number	Location	Last Survey	Next Survey	Average Velocity
OC10101	OC-101	3/89	3/92	139
OC10102	OC-101	3/89	3/92	130
OC10103	OC-101	3/89	3/92	111
OC10104	OC-101	3/89	3/92	112
OC10105	OC-101	Demolished		
OC10106	OC-101	3/89	3/92	117
OC10107	OC-101	3/89	3/92	135
OC10108	OC-101	3/89	3/92	144
OC10901	OC-109	7/90	7/93	110
OC10902	OC-109	7/90	7/93	111

The hoods are equipped with make-up air and are separately ducted to the outside.

2. OPERATING CRITERIA

A. Periodic Performance Evaluation and Maintenance Programs

-Administered by Industrial Hygiene Services and lab personnel at Unit I.

B. Laboratory Fume Hood Performance Criteria

-Utilize marked static pressure manometers to provide direct readouts and fall under the quarterly inspection guidelines.

3. DOCUMENTATION

The Industrial Hygiene Contact for Unit I is responsible for maintaining documentation on hood surveys and inspections.

5. NEXT REVIEW DATE: October 31, 1992

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1990-92 OCCUPATIONAL HEALTH PROGRAM
UNIT I/VINYL CHLORIDE, OC-101**ERGONOMICS PROGRAM****1. INTRODUCTION**

The plant ergonomics program is dependent on the work situation and other specific factors which contribute to musculoskeletal injuries. Physical stressors and other activities which can contribute to musculoskeletal injuries include manual lifting, repetitive motion/forceful exertions, or excessive vibration. Identification of these factors is the basic responsibility of the assigned plant ergonomics contact with assistance from the plant Industrial Hygienist.

2. MANUAL LIFTING ACTIVITIES

<u>Job Activity</u>	<u>Frequency</u>	<u>Weight</u>
1. Recharging W-261 caustic pots	Biennially	50 lb
2. Repacking/recharging W-2's & W-7's	Biennially	50 lb
3. Adding iron chloride to D-8	Quarterly	35 lb fiberpacks

3. REPETITIVE MOTION/FORCEFUL EXERTIONS

none identified

4. POWER TOOL USE

Power tools use in Unit I include hand drills, portable grinders, impact wrenches, a drill press, and pipe threaders. The frequency and duration of use for each varies depending on the nature of the job.

5. TRAINING

Basic training on the identification of ergonomics factors is recommended for all block employees on a periodic basis.

6. NEXT REVIEW DATE: October 31, 1992

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RESPIRATORY PROTECTION PROGRAM

1. INTRODUCTION

Information regarding Dow respiratory protection programs is located in Safety Standard O-45 and the Texas Operations Respiratory Protection Manual (RPM). The RPM addresses selection, use, fit testing, medical approval, training, maintenance, records, administration and recommended respirators. Responsibilities for employees, supervisors, industrial hygiene, fire departments and Occupational Health are detailed in the RPM.

2. TYPES OF RESPIRATORS USED

<u>Respirator Type</u>	<u>Cartridges Filter. Canisters</u>	<u>Sources of Breathing Air</u>
AOR9722 Mouthbit	OVAG (R722)	NA
Survivair 9811-22	NA	Cylinder
Scottovista #801548-04 Full face	NA	Cylinder
ELSA 5 min. Pack	NA	5 min. air tank
Survivair 30 min. SCBA XL-30		
Model 9838-9 or Mark I Model 9845-2	NA	30 min. air tank
Survivair 5 min. SCBA Pack 9881-22	NA	5 min. air tank
3M 8710 Dust Mask	NA	NA

OVAG - NIOSH approved for Organic Vapors and Acid Gases

Industrial Hygiene is contacted whenever a new respirator is selected.

3. RESPIRATORY USE CATEGORIES

<u>Job Classification</u>	<u>User Category</u>	<u>Resp. Types Used</u>	<u>Individually Issued</u>
Office Personnel (Engineers, Unit manager, etc)	Escape Only	MP	MP
Secretaries	Escape Only	MP, ELSA	MP
Lab Personnel	Escape Only	MP	MP
Process Technician/Process Supervisor	Routine/Emergency	All available in block	MP

MP = AOR9722 Mouthbit

Routine/Emergency users are fit tested and medically approved biennially.

Respirator training is conducted by:

<u>Respirator Type</u>	<u>Trainer</u>	<u>Frequency</u>
MP	Plant Rep	Annually
All except MP	Industrial Hygiene	Annually

Visitors, contractors and employees are required to carry an escape respirator on their person while in block process areas. The escape respirator is an AOR 9722 MP.

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RESPIRATORY PROTECTION PROGRAM (CONT.)

4. USE SITUATIONS

<u>Respirator Type/Filter</u>	<u>Chemical of Concern</u>	<u>Use Situation</u>	<u>Filter Change-out</u>
Mouthbit	chlorine, HCL	escape only	biannually or after use
Survivair airline/ Scottovista airline	Chlorinated Hydrocarbons Chlorine, HCL	Line or equipment opening that cannot be cleared < acceptable guidelines	NA
ELSA	All chemicals	Escape	NA
Survivair 30 min. SCBA	All chemicals	Emergency response	NA
Survivair 5 min. SCBA	All chemicals	Escape	NA
Dust mask	Silica, alumina- copper chloride, Gunit dust	Sandblasting, catalyst addition, furnace refractory repair	NA

5. RESPIRATOR CLEANING STATIONS

The cleaning station is located in the Safety Supply room. After each use respirators are cleaned with soap and water and disinfected with a spray antiseptic or by wiping with antiseptic towelette. Before storage, respirators are dried with paper towels or allowed to air dry.

Contaminated respirators and cartridges which cannot be decontaminated must be disposed of as chemical waste in accordance with applicable environmental standards.

6. RESPIRATOR STORAGE

<u>Respirator</u>	<u>Storage Location</u>
MP	Offices or personal lockers
ELSA	Cabinets in process area and computer room
	Racks in offices
SCBA (30 min.)	Cabinets throughout plant
SCBA (5 min.)	Cabinets in control room
Airline masks	Storage cabinet in supply room or personal lockers
Dust masks	Safety supply room

Except for the mouthpiece respirator, all respirators must be stored in secondary containers such as a plastic bag or storage box. A plastic cap is sufficient for the MP respirator. Spare parts for the disposable MP are stored in the safety supply room. All other equipment must be sent to the Fire Department for repair.

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UNIT I/VINYL CHLORIDE, OC-101

RESPIRATORY PROTECTION PROGRAM (CONT.)

7. INSPECTION SCHEDULE

<u>Respirator</u>	<u>Frequency</u>	<u>By</u>	<u>Documentation Retained By</u>
Survivair Airline/ Scottovista Airline	Before each use	User	none
	Weekly	Plant Rep	Plant Rep
	Annually	Fire Department	Fire Dept.
ELSA	Before each use	Owner	none
	Weekly	Plant Rep	Plant Rep
	Annually	Fire Department	Fire Dept.
Survivair 30 Min. SCBA	Before each use	Owner	none
	Weekly	Plant Rep	Plant Rep
	Annually	Fire Department	Fire Dept.
Survivair 5 min. SCBA	Before each use	Owner	none
	Weekly	Plant Rep	Plant Rep
	Annually	Fire Department	Fire Dept.
MP	Before each use	Owner	none
	Annually	Owner	Plant Rep

8. BREATHING AIR COMPRESSOR

This block has no breathing air compressors, the only source is from bottles which have been pre-checked for oxygen content and markings.

9. DOCUMENTATION

Documentation of inspections, fit testing, and training are maintained by the plant safety contact. Original signatures on training are sent to the plant industrial hygienist at B-101 for placement in the plant's 75 year compliance file. The Unit Manager and the Occupational Health Department maintain the medical approval list on file.

10. NEXT REVIEW DATE: October 31, 1992

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1990-92 OCCUPATIONAL HEALTH PROGRAM
UNIT I/VINYL CHLORIDE, OC-101**HEAT STRESS PROGRAM****1. HEAT STRESS INVENTORY**

The plant heat stress program is dependent upon the work situation and other specific factors which would generate excessive heat for the employee. The two factors to be considered are environmental temperatures and heat build-up due to the activity level of the employee. Based on previous heat stress studies, work/task evaluations, hot process operations and/or use of personal protective equipment such as impermeable suits, the following are identified as potential heat stress problems:

Outside manual labor with or without chemical protective clothing

2. TRAINING

The following job classifications are identified as having potential for heat stress and should be trained in the recognition, prevention and treatment of heat stress:

1. Process Technician 2. Unit Technician 3. Senior Technician

Heat stress training has not previously been conducted. A training program is being developed for 1991.

3. HEAT STRESS ABATEMENT

The following drinking fluids are available for fluid replacement:

1. Water 2. Gatorade

The following checked personal protective equipment for the prevention of heat stress is available at this plant:

1. Ice vests

Recommended work practices for reduction of heat stress include:

1. Fluid replacement 2. Self-paced work 3. Scheduling 4. Acclimation

4. WORK REST SCHEDULE

The heat stress prevention work/rest schedule for jobs requiring impermeable clothing is as follows:

<u>Temperature (°F)</u>	<u>Maximum Stay Time (min.)</u>	<u>Minimum Rest Time (min.)</u>
72 - 79	40	20
80 - 87	30	30
88 - ?	20	40

5. NEXT REVIEW DATE: October 31, 1992

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UNIT I/VINYL CHLORIDE, OC-101

HEALTH SURVEILLANCE PLAN

1. HEALTH SURVEILLANCE

All employees are offered core examinations every two years.

2. MEDICAL SURVEILLANCE REQUIREMENTS

The following job classifications are included in the MSR programs as identified below:

<u>Job Classification</u>	<u>MSR</u>	<u>Tests</u>	<u>Test Frequency</u>
Process Technician	Noise	Audiogram	Annual
	Vinyl Chloride	Health history, physical measurements, blood chemistries, (hepatic), hands on physical	
	Vinyl Chloride (10 + years)	same as above	Semi-annual
Unit Technician	same as above	same as above	same as above

3. DOCUMENTATION

Results are reported individually and in group format to area supervision.

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1990-92 OCCUPATIONAL HEALTH PROGRAM
UNIT I/VINYL CHLORIDE, OC-101

INDUSTRIAL HYGIENE EDUCATION PROGRAM

1. INTRODUCTION

Training will be documented using the forms located in the "Training Guidelines" section of the facility's Industrial Hygiene Manual. Copies of the training records will be stored in the Industrial Hygiene Manual until the time of the next regularly scheduled Occupational Health Plant Program review. The original documentation will be sent to Industrial Hygiene Services at B-101 for filing in the plant compliance files.

2. TRAINING PLANS - CHEMICALS

The Industrial Hygiene Education Program will focus on the following key agents for 1990/1992:

1991

Vinyl Chloride
Ethylene Dichloride
Benzene
Hydrogen Chloride
1,1,2,2-Tetrachloroethane
Sodium Hydroxide

1992

Vinyl Chloride
Ethylene Dichloride
Benzene
Chloroform
Carbon Tetrachloride

3. RESPIRATORY PROTECTION TRAINING

Unit I will follow the guidelines defined in the Plant's written respirator program (located in the Industrial Hygiene Manual). Annual training is required.

4. CHEMICAL SURVEY RESULTS

A report of the results of sampling conducted in accordance with this protocol will be written and communicated individually and in a group session.

5. HAZARD COMMUNICATION TRAINING

All new employees shall review and document with signatures:

- hazard communication videos (2)
- the facility's hazard communication program
- health hazard information for all materials with Priority Rating of 3 (see CPAI or Appendix F)
- health hazard information for the key agents listed above

See Section II.2. of Hazcom for other training requirements.

Any temporary employees shall review and document: b,c,d.

6. ASBESTOS TRAINING

All personnel who work in Unit I must receive initial training. Personnel who handle asbestos must receive annual training. Consult the Texas Operations Asbestos Handbook for training requirements.

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UNIT I/VINYL CHLORIDE, OC-101

INDUSTRIAL HYGIENE EDUCATION PROGRAM (CONT.)

7. NOISE TRAINING

Noise training for Unit I is required on an annual basis as some job classifications are on the Hearing Conservation Program. Refer to Safety Standard O-46 and the Hearing Conservation Manual for training requirements.

8. NEW CHEMICAL TRAINING

Per HAZCOM all employees to be potentially exposed to a new chemical must be trained on the hazards of that chemical and the approved protective equipment. Signed documentation is required at the time of this training, to include MSDS, TIME sheet, or hazard data used.

9. RADIATION TRAINING

Per the Radioactive Material license issued to Texas Operations, all persons working in areas with radioactive sources are to be trained on (one time, documented):

- a. the hazards of radiation
- b. signs and labelling requirements
- c. emergency procedures
- d. inspection requirements
- e. personnel monitoring (if required)
- f. approved procedures (use, close-out, transport, etc.)

10. HEAT STRESS TRAINING

Personnel performing jobs (eg. chemical suit in the summer) that may lead to heat stress are to be trained on heat stress avoidance procedures. This training is recommended for new employees and on a periodic basis for experienced employees. Training should be documented.

11. PROTECTIVE EQUIPMENT TRAINING

Per 29 CFR 1910.132 protective equipment shall be provided, used and maintained for employees with potential of exposure to environmental or process hazards. Personnel are to be trained on the proper use of applicable protective equipment upon initial assignment, after major job changes, and periodically. Consult the Texas Operations Personal Protective Equipment Program Manual for training guidelines.

12. VENTILATION SYSTEM TRAINING

Personnel that use ventilation systems (incl. hoods, dust and chemical ventilators) are to be trained in the use, maintenance and documentation requirements. Hood requirements are covered in Safety Ref. 7.

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UNIT I/VINYL CHLORIDE, OC-101

INDUSTRIAL HYGIENE EDUCATION PROGRAM (CONT.)

13. HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE

Training must enable the employees to perform their job in a safe and healthful manner so as not to endanger themselves or others. Training topics include respiratory protection, hazard communication, health hazards training, protective equipment, safety standards/references, job procedures, RCRA, hearing conservation, eye protection, emergency procedures and unit specific rules.

All new employees must receive at least 24 hours of initial training. Current employees do not need the 24 hours of initial training if equivalency can be proved. Certificates of training must be issued to all employees. Eight hours of refresher training is required on an annual basis.

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1990-92 OCCUPATIONAL HEALTH PROGRAM
UNIT I/VINYL CHLORIDE, OC-101

PERSONAL PROTECTIVE EQUIPMENT PROGRAM

1. INTRODUCTION:

Information regarding the Texas Operations personal protective equipment (PPE) program is located in the Texas Operations PPE Program Manual. The manual addresses program administration, approval procedures, testing requirements, selection, use and maintenance, decontamination, laundering, training, records, and program evaluation. Responsibilities for employees, supervisors, industrial hygien , safety, purchasing, the Texas Operations Protective Equipment Team, and the Texas Operations Protective Equipment Supplier Partnership Team are detailed in the manual.

2. SELECTION:

See Table 1 for a listing of approved PPE for the Unit I/Vinyl Chloride plant. PPE selection was based upon the health and safety hazards associated with the site or job tasks. All PPE has been reviewed by the Unit I Industrial Hygienist and Safety Director and has been approved for use by the Texas Operations Protective Equipment Team.

3. TRAINING:

Training on user responsibilities, PPE inspection, use, donning, doffing, decontamination, limitations and the location of the Unit I/Vinyl Chloride PPE program is conducted for Dow employees and long-term contractors upon initial assignment and biennially thereafter. This training is documented. Visitors are informed of and provided the minimum PPE required in the Unit I/Vinyl Chloride plant.

4. INSPECTION:

All PPE items must be inspected visually before, during and after use for signs of deterioration, defects, damage, etc. However, the PPE items listed below shall be inspected according to the following minimum frequency and specific test protocol:

<u>PPE Item</u>	<u>Test Method</u>	<u>Frequency</u>	<u>By</u>
Totally encapsulated suits (Maintenance activities)	Visual Inspection	Biannually	Dept Rep
Chemical protective gloves (high hazard operations)	Air test method	Each use	User
Electrical rubber gloves	High voltage test Air test method	Biannually Each use	Elec Shop User
Electrical rubber blankets	High voltage test	Biannually	Elec Shop

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UNIT I/VINYL CHLORIDE, OC-101

PERSONAL PROTECTIVE EQUIPMENT PROGRAM (CONT.)

5. DECONTAMINATION AND DISPOSAL:

The Unit I/Vinyl Chloride decontamination stations are located in the following locations:

Safety shower tail hoses throughout the process area

After each use where PPE has been contaminated by hazardous substances, users of the contaminated PPE shall use one of the above listed decontamination stations and clean their PPE by rinsing with copious quantities of potable water. Before storage, the PPE is air dried. Contaminated PPE which cannot be decontaminated must be disposed of as chemical waste in accordance with applicable environmental standards.

6. MAINTENANCE:

No clothing or chemical protective suits are repaired in this department. Defective or damaged equipment is discarded.

7. LAUNDERING:

There is no on site laundry at Unit I. Cotton gloves and Nomex suits are cleaned at Brazoria Laundry.

Material Safety Data Sheets are sent to Brazoria Laundry when it is suspected that the clothing items sent may be contaminated.

8. STORAGE:

The following lists where PPE is stored when not in use:

- a. OC-101 change room
- b. Loading area control center
- c. Lockers in OC-101 repair area
- d. New PPE is stored in the Safety Supply room in OC-101

9. PROGRAM EVALUATION:

This program shall be evaluated biennially or whenever there are major job or process changes that require a re-evaluation of the PPE currently in use.

NEXT REVIEW DATE: October 31, 1992

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1990-92 OCCUPATIONAL HEALTH PROGRAM
UNIT I/VINYL CHLORIDE, OC-101**TABLE 1**
UNIT I/VINYL CHLORIDE PPE INVENTORY, 1990

The following lists the approved PPE for the Unit I/Vinyl Chloride plant. Unit I written job procedures indicate when and which PPE items must be worn for specific job tasks.

A. HAND PROTECTION

1. Edmont #29-865 neoprene rubber gloves
2. Pioneer AF-18 nitrile gloves
3. North #E214B dielectric natural rubber gloves
4. Scooba #JPS 10B Cotton Gloves

B. FOOT AND LEG PROTECTION

1. Servus 22114 and 21629 natural rubber boots
2. Lehigh #1149 dielectric natural rubber boots

C. EYE, FACE AND HEAD PROTECTION

1. Jackson 24-40 Faceshield for welders
2. MSA Hard Hat
3. Sideshields
 - American Optical
4. Chemical goggles
 - Allsafe #211-10R

D. BODY PROTECTION

1. Nomex III coverall
2. Nomex III Switchman Flash Suits

E. RESPIRATORY PROTECTION

1. Self-Contained Breathing Apparatus
 - Survivair 30 min. SCBA XL-30, Model 9838-9 or Mark I Model 9845-2
 - Survivair 5 min. SCBA Pack 9881-22
2. Airline Respirators
 - Survivair 9811-22
3. Half-Mask Respirator
 - none
4. Dust Mask
 - 3M 8710
5. Escape Respirator
 - AO Mouthpiece R9722 with organic vapor/acid gas cartridge
 - ELSA 5 min. Pack

F. HEARING PROTECTION

1. Carboflex # 600 Sound Ban (NRR=22)
2. E-A-R Foam Ear Plugs (NRR=29)
3. Wilson Ear Muffs

G. FALL/RESCUE PROTECTION

1. RTC 430 Body Harness
3. RTC 252 Lanyard

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1990-92 OCCUPATIONAL HEALTH PROGRAM
UNIT I/VINYL CHLORIDE, OC-101

RADIATION PROGRAM

1. RADIOACTIVE SOURCES

Radioactive sources currently in use at Unit I are as follows:

Source Number	Isotope	Activity (mCi)	Location
0743	Cesium 137	200	Acid to V-60
0744	Cesium 137	100	Acid to Unit II
0745	Cesium 137	100	T-111 bottoms
0746	Cesium 137	100	T-400 bottoms
0747	Cesium 137	200	T-116 bottoms
0748	Cesium 137	200	T-110 bottoms
0749	Nickel 63	8	Varian 3700 GC
0792	Cesium 137	100	D-35
0793	Cesium 137	100	D-35

2. TRAINING:

In accordance with the Texas Radiation Control Act and Texas Department of Health, only trained personnel are allowed to handle or operate devices with radioactive material. Training should be done by a qualified person and documented, with the original documentation forwarded to the radiation compliance files.

At Unit I the following personnel have been trained:

3. INSPECTIONS:

A semi-annual inventory check is required in February and August in which the location, labels, sign, and condition are inspected. In May and November, in addition to the above, the posting, a wipe test, leak test, shutter check, shielding and source condition are also inspected and documented. Dale Green (Environmental Supervisor) is responsible for conducting the inspections.

The GM radiation meter used for surveys at Unit I is located in _____ office and is in the annual meter calibration program.

4. SOURCE REMOVAL:

Sources are not to be removed from the work area or worked on without notifying the Radiation Safety Officer.

5. EMERGENCY NOTIFICATION:

In case of emergency, the Radiation Safety Officer or his back-up should be notified as soon as possible.

6. NEXT REVIEW DATE: October 31, 1992

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DEPARTMENT ACTIVITIES

Direct Chlorination:

Oxychlorination:

Vinyl Furnaces:

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1990-92 OCCUPATIONAL HEALTH PROGRAM
UNIT I/VINYL CHLORIDE, OC-101

DEPARTMENT ACTIVITIES (CONT.)

Vinyl Distillation:

By-Product Recovery:

Repair:

Lab:

Loading:

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Unit 1 Flow Diagram

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1990-92 OCCUPATIONAL HEALTH PROGRAM
UNIT I/VINYL CHLORIDE, OC-101

JOB DESCRIPTIONS

Unit Manager, Unit Secretary, Sr. Clerk Typist:

The probability of personnel in these job classifications of experiencing a significant exposure to chemical and physical stresses in the plant is low as the majority of their time is spent in office areas.

Process Technician - oxychlorination, vinyl distillation, vinyl furnaces, direct chlorination:

Technicians in these areas are responsible for operating and maintaining the process streams in their respective areas. Duties include field and control center operation of these systems, minor maintenance when needed, and the collection and processing of routine lab samples from their respective areas. Estimated time distribution while in process is 10% labwork, 30% in the control center, and 60% in the field. Twenty percent annually of the Technician's time (2 weeks out of every ten) is spent as a Maintenance Technician in Repair.

Process Technician - Control:

The Control Center Technician is responsible for control center operations and communications from within the control room. He assists other Process Technicians in controlling, troubleshooting, and emergency operation of respective areas. 100% of the Control Center Technicians time is spent in the control room.

Process Technician, Unit Technician - Loading:

The Loading Technicians are responsible off-loading vinyl chloride tank cars, maintaining appropriate VCM supplies to customers, and minor maintenance as required. All VCM samples from the storage spheres and tank cars are caught and analyzed by the Loading Technicians. Estimated time distribution is 10% lab work, 25% on the loading racks, 50% on other field activities, and 15% in offices.

Process Technician - By-product Recovery:

The BPR Technician operates and maintains the plant's waste disposal systems. These include a thermal oxidizer, a waste incinerator, waste water, and ethyl chloride systems. Responsibilities include field and control center operation of these systems, minor maintenance, and sampling/analysis of lab samples from the BPR area. 20% annually of the BPR Technicians time is spent as a maintenance technician in repair. Estimated time distribution while in process is 10% lab work, 25% in the control center, and 45% in the field.

Process Technician - Laboratory:

The Lab Technician operates and maintains all of the plant's on-stream analytical equipment, manual sample collection loops, and in-house lab equipment. Lab Technicians also provide production support by way of special analysis for process development, trains operations personnel on lab procedures, and maintains the lab inventory. Estimated time distribution is 65% lab work, 15% in the office, and 20% in the field.

Process Technician - Instrument & Electrical, I&E Technician:

The I&E Technician installs, calibrates, maintains and repairs the plant's process instrumentation and electrical equipment. Estimated time distribution is difficult due to the varying natures of particular tasks, but an average would be 40% in the field, 20% in the control center and electrical panel rooms, and 40% in the I&E shops and offices.

Process Technician, Unit Technician - Training:

These job classifications are responsible for coordinating and updating all phases of the plant's employee training program, both on the job and classroom sessions. Estimated time distribution is 50% in the field and 50% in the office.

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UNIT I/VINYL CHLORIDE, OC-101

JOB DESCRIPTIONS (CONT.)

Senior Technician:

Sr. Technicians rotate between areas and serve as lead workers for the Process Technicians. Responsibilities are the same as the Process Technicians in any one area in addition to the training of new technicians. The time distribution is roughly the same as the Process Technicians.

Process Technician, Unit Technician - Repair:

The Repair Technician participates in all phases of the plant's maintenance activities including pipefitting, exchanger work, mechanical and rotational equipment, vessel and tower repair, and general plant maintenance. Estimated time distribution is 50% in the shop and 50% in the field for rotational equipment personnel. For other functions the time distribution is approximately 90% field and 10% in the shop.

Service Technician:

The Service Technician is responsible for maintenance of Unit I's motorized equipment including vehicles, disposing of hazardous wastes, and occasionally works in the repair group. Estimated time distribution is 80% of the time in the shop and process areas and 20% as a repair technician.

Process Supervisor, Manufacturing Supervisor, Environmental Supervisor, Instrument and Electrical Supervisor, Production Supervisor, Sr. Production Engineer, Process Engineer, Process Specialist, Engineer:

The potential for exposure to chemicals in the process area is minimal for these job classifications. Estimated time distribution is 10% in the process areas and 90% in office areas/control room.

Lab Supervisor, Sr. Process Chemical Specialist, Analytical Technologist:

These job classifications are involved in all aspects of the Unit I laboratories including on-stream analytical instrumentation, process development, analytical methodology, and supervision. Estimated time distribution is 5% in the field, 45% in the lab, and 50% in the office.

Mechanical Supervisor, Mechanical Technologist:

These job classifications are involved in the coordination of maintenance activities and construction projects. Estimated time distribution is 30% in the field and 70% in the shop and office areas.

Mechanical Tech. Specialist:

Supervises the repair and preventative maintenance of all pumps at Unit I, orders new mechanical equipment, and manages the EPIC equipment system. Estimated time distribution is 40% of the time in the field and 60% of the time in the office.

Purchasing Tech. Specialist:

The Purchasing Tech Specialist is responsible for ordering parts, supplies, and equipment for plant maintenance and addition projects. He also maintains the inventory of stock, tools, parts and equipment used in routine plant activities. Estimated time distribution is 100% in the spare parts room and warehouse.

Contractors:

A significant amount of maintenance activities in the plant are performed by contractors in various capacities including welding, pipefitting, carpentry, insulation, painting, and electrical work. Estimated time distribution varies depending on the nature of the work.

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1990-92 OCCUPATIONAL HEALTH PROGRAM
UNIT I/VINYL CHLORIDE, OC-101

OSHA SPECIAL REGULATIONS

Unit I is directly affected by OSHA special regulations 29 CFR 1910.1017: Vinyl Chloride, 29 CFR 1910.1028: Benzene, 29 CFR 1910.1001: Asbestos, 29 CFR 1910.95: Occupation Noise Exposure and 29 CFR 1910.120: Hazardous Waste Operations and Emergency Response (HAZWOPER). A copy of each of these standards is located in the plant's Industrial Hygiene Manual. Key elements of the standards include:

A. Vinyl Chloride, Benzene, and Asbestos

1. exposure monitoring requirements
2. respiratory protection and personal protective equipment
3. medical surveillance
4. information and training

A review of the past monitoring data, the plant's respiratory protection and protective equipment policies, and Hazard Communication and training program, has confirmed Unit I to be in compliance with the requirements outlined in the Vinyl Chloride and Asbestos standards. There are three initial requirements the plant must complete to be in compliance with the Benzene standard. They are as follows:

1. Initial personal monitoring, both 8-hour TWA and excursion, must be conducted to evaluate employee exposures to benzene.
2. Initial training of the existing Dow employees and Contractors must be conducted as outlined in the standard.
3. Benzene training should be included as part of the Unit I orientation program.

There are periodic monitoring requirements depending on the initial monitoring results. In addition, monitoring needs to be conducted whenever there is a process or procedural change which may result in new or additional exposures and after a cleanup of a spill or repair of a leak, rupture or other breakdown.

B. Noise

1. exposure monitoring requirements
2. audiometric testing requirements
3. hearing protection requirements
4. training requirements

A review of the hearing conservation program at Unit I has confirmed the plant to be in compliance with the requirements outlined in the Noise standard.

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UNIT I/VINYL CHLORIDE, OC-101

OSHA SPECIAL REGULATIONS (CONT.)

C. HAZWOPER

There are eight key elements to this standard:

1. provide a written safety and health program
2. provide and hazard communication program
3. implement a medical surveillance program
4. implement a protective equipment decontamination program
5. implement new technology as it becomes available
6. provide procedures for container handling
7. conduct employee training
8. provide emergency response plans

This protocol, Unit I's written job procedures, Dow Safety Standards, the written hazard communication program, Dow medical (health surveillance) programs, RCRA permit and Dow shipping procedures, training programs, and emergency response plans effectively meet the above requirements.

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