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INDUSTRIAL HYGIENE REPORT

GULF COAST INDUSTRIAL HYGIENE CENTER
TEXAS OPERATIONS

AN OPERATING UNIT OF THE DOW CHEMICAL COMPANY

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Title	**Baseline Monitoring Results For Ethylene Dichloride and Vinyl Chloride, Oyster Creek Unit V-Vinyl Chloride Plant, January - March 1995, Texas Operations, Freeport, Texas**
Author(s)	C. J. Anderson C.J. Anderson J. P. Jurgiel
Reviewer(s)	O. F. McDonald O.F. McDonald
Introduction	Personal baseline air monitoring was conducted for ethylene dichloride (EDC) and vinyl chloride for the process technician job classifications at Oyster Creek Unit V-Vinyl Chloride plant, OC-500. Job class averages during start-up activities ranged from ND(0.06 ppm)* to 0.13 ppm, EDC and ND(0.09 ppm) to 1.0 ppm, vinyl chloride.
Discussion	Full-shift monitoring was conducted for each of the five process technician job classifications: 1) Ecology, 2) Lab, 3) Oxychlorination, 4) Vinyl Distillation, and 5) Vinyl Furnace process technicians. All monitoring results were within exposure guidelines and action limits with the exception of one full-shift sample taken for the lab technician (1.8 ppm, vinyl chloride) while spiking butadiene into gaseous vinyl chloride standards. This procedure is non-routine and not expected to be repeated. The lab technician average during routine activities was 0.13 ppm.
Results and Conclusions	Tables 1 and 2 contain the monitoring results. The full-shift monitoring (Table 1) was representative of the full-shift exposures. Short-term monitoring (Table 2) was representative of the exposures during the tasks monitored. No respiratory protection was required by procedure or worn during any of the monitoring. There were 28 full-shift and 7 excursion samples collected. • Full-shift monitoring results for ethylene dichloride ranged from ND(0.03 ppm) to 0.07 ppm. The job classification averages ranged from ND(0.04 ppm) to 0.06 ppm, well within the exposure guideline of 1 ppm. • Excursion monitoring results for ethylene dichloride ranged from ND(0.13 ppm) to 0.25 ppm, well within the short term exposure limit (STEL) of 2 ppm. • Full-shift monitoring results for vinyl chloride ranged from ND(0.04 ppm) to 1.8 ppm. The job classification averages ranged from ND(0.06 ppm) to 0.55 ppm, well within the exposure guideline of 1 ppm. • Excursion monitoring results for vinyl chloride ranged from ND(0.20 ppm) to 0.65 ppm, well within the STEL of 5 ppm.
Recommendations	1) Review routine vinyl chloride handling procedures conducted in the lab for potential exposures. 2) Review laboratory techniques for the lab personnel.
Communication	Communicate results of this survey to all affected personnel and forward documentation to Industrial Hygiene, B-101.
Sampling and Analytical Method	The personal air monitoring sampling train for vinyl chloride and ethylene dichloride was a 1-gram charcoal tube, with a pump operated at approximately 50 ml/min for the full-shift monitoring and approximately 200 ml/min for the short-term monitoring. Pumps were calibrated before and after use. Sample tubes were labeled and delivered to the Texas Operations Industrial Hygiene Laboratory for analyses. The samples were eluted with carbon disulfide and analyzed by gas chromatography with a flame ionization detector (GC-FID).

*None Detected at the analytical detection limit indicated in parentheses

Table L. Baseline Full-Shift Personal Air Monitoring Results for Ethylene Dichloride and Vinyl Chloride During Operations of Oyster Creek Unit V-Vinyl Chloride Plant, January-March 1995, Freeport, Texas.

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					CONCENTRATION, ppm (v/v)*				
					ETHYLENE DICHLORIDE		VINYL CHLORIDE		
Sample Number	Master Number	Date	Sampling Period	Volume (liters)	Sampled TWA	Full-Shift TWA **	Sampled TWA	Full-Shift TWA **	Comment (Tasks other than routine duties)
ECOLOGY PROCESS TECHNICIAN - 12 Hour shift									
13631	206667	1/24/95	7:30 - 17:35	32.5	ND(0.06)	ND(0.05)	ND(0.10)	ND(0.08)	Swapping flows & transfer products/Neut. V-436/Treating water
13639	98659	2/7/95	6:40 - 17:16	36.2	ND(0.05)	ND(0.05)	ND(0.09)	ND(0.08)	Lined up V-438/Checked analyzers
13652	202434	2/9-10/95	18:10 - 5:50	37.3	ND(0.05)	ND(0.05)	ND(0.08)	ND(0.08)	Swap HCl Valves & rounds at unit 1
13658	98833	2/21/95	6:44 17:51	34.2	ND(0.03)	ND(0.03)	ND(0.05)	ND(0.04)	Worked on Throx
13666	206667	2/23-24/95	18:25 - 5:45	35.2	ND(0.03)	ND(0.03)	ND(0.04)	ND(0.04)	Heat tracing work on D412/ Wash down area
13669	98659	3/1-2/95	18:14 - 5:45	40.2	0.04	0.04	ND(0.04)	ND(0.04)	Changed valve in V. D. area/ Pulled pipe
					AVERAGE	ND(0.04)		ND(0.06)	
LAB TECHNICIAN - 8-Hour shift									
13637	99574	1/26/95	7:20 - 15:20	26.2	ND(0.08)	ND(0.08)	0.18	0.18	Unit 1/Daily Cal. checks/Loading rack/ Made vinyl stds.
13647	99574	2/9/95	7:20 - 15:14	26.7	ND(0.07)	ND(0.07)	1.83	1.81	Maint. on vinyl analyzer/Made vinyl stds./spiking butadiene
13663	145250	2/23/95	7:23 - 15:50	29.3	ND(0.03)	ND(0.04)	0.09	0.10	Caught freon vent samples & ran in lab
13664	99574	2/23/95	7:45 - 15:30	25.7	ND(0.04)	ND(0.04)	0.11	0.10	Ran vinyl/EDC stds. & samples/Ran RCI stds.
					AVERAGE	ND(0.06)		0.55	
OXYCHLORINATION PROCESS TECHNICIAN - 12-Hour shift									
13629	93698	1/24/95	7:25 - 17:36	35.2	ND(0.06)	ND(0.05)	ND(0.09)	ND(0.08)	Replaced gasket on #300 steamline
13640	95465	2/7/95	6:45 - 17:29	34.8	ND(0.06)	ND(0.05)	ND(0.09)	ND(0.08)	None
13653	249485	2/9-10/95	18:19 - 5:50	36.6	ND(0.05)	ND(0.05)	ND(0.09)	ND(0.08)	None
13657	206802	2/21/95	6:44 - 17:40	33.9	ND(0.03)	ND(0.03)	ND(0.05)	ND(0.04)	T-111/T-112/D-114/T-140/Lab/Reactors
13665	93698	2/23-24/95	18:25 - 5:50	37.4	ND(0.03)	ND(0.03)	ND(0.04)	ND(0.04)	Removed valves from Ecology
13671	141057	3/1-2/95	18:18 - 5:45	38.3	0.05	0.04	ND(0.04)	ND(0.04)	Degas area
					AVERAGE	ND(0.04)		0.10	
VINYL DISTILLATION PROCESS TECHNICIAN-12-Hour shift									
13630	249469	1/24/95	7:25 - 17:37	35.8	ND(0.06)	ND(0.05)	0.30	0.25	Checked on EDC leak
13643	138834	2/7-8/95	18:19 - 5:50	37.7	ND(0.05)	ND(0.05)	0.12	0.12	None
13646	246754	2/9/95	6:37 - 17:47	38.0	ND(0.05)	ND(0.05)	0.12	0.11	Cleared P-261B
13656	249462	2/21/95	6:44 - 17:40	34.7	ND(0.03)	ND(0.03)	0.07	0.06	None
13667	249469	2/23-24/95	18:25 - 5:50	35.2	ND(0.03)	ND(0.03)	ND(0.04)	ND(0.04)	None
13670	95221	3/1-2/95	18:15 - 5:45	34.3	0.05	0.05	ND(0.05)	ND(0.04)	Cleared pump/Changed PSV
					AVERAGE	ND(0.04)		0.10	
VINYL FURNACE PROCESS TECHNICIAN-12-Hour shift									
13635	95956	1/24-25/95	18:30 - 6:00	41.0	ND(0.05)	ND(0.05)	ND(0.08)	ND(0.07)	None
13636	89858	1/26/95	6:40 - 17:09	34.7	ND(0.06)	ND(0.05)	ND(0.09)	ND(0.08)	Worked on burners
13642	90508	2/7-8/95	18:23 - ?	-	-	-	-	-	Pump failed
13645	97416	2/9/95	6:37 - 17:47	36.8	ND(0.05)	ND(0.05)	0.15	0.14	None
13660	89858	2/21-22/95	18:33 - 5:48	37.3	0.07	0.07	ND(0.04)	ND(0.04)	Worked on EDC purge pump/Cleared V-2
13661	202353	2/23/95	6:55 - 17:45	33.5	0.08	0.07	0.19	0.17	Dumped EDC waste jugs in lab
13672	95956	3/1-2/95	18:23 - 5:45	36.5	0.05	0.04	ND(0.04)	ND(0.04)	
					AVERAGE	0.06		0.09	

OCCUPATIONAL EXPOSURE LIMIT

• OSHA PEL — *Full-shift TWA* — *1 ppm* — *1 ppm*

*None Detected at the analytical detection limit indicated in parentheses.

**Full-Shift Extrapolation assuming no exposure for time not monitored

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Table 2. Baseline Excursion Personal Air Monitoring Results for Ethylene Dichloride and Vinyl Chloride During Operations of Oyster Creek Unit V-Vinyl Chloride Plant, January-March 1995, Freeport, Texas.

					CONCENTRATION, ppm (v/v)*				
					ETHYLENE DICHLORIDE		VINYL CHLORIDE		
Sample Number	Master Number	Date	Sampling Period	Volume (liters)	Sampled TWA	TASK TWA	Sampled TWA	TASK TWA	Comment
13632	93698	1/24/95	8:05 - 9:01	11.7	ND(0.17)	ND(0.17)	ND(0.27)	ND(0.27)	Oxy Tech (see 13629) caught/ran samples
13638	89858	1/26/95	9:10 - 9:40	6.0	ND(0.33)	ND(0.33)	ND(0.52)	ND(0.52)	Vinyl Pur. Tech (see 13636) ran samples
13641	98659	2/7/95	7:09 - 7:42	6.8	ND(0.29)	ND(0.29)	ND(0.46)	ND(0.46)	Ecology Tech (see 13639) caught samples
13649	246754	2/8/95	7:36 - 8:27	10.3	ND(0.19)	ND(0.19)	ND(0.30)	ND(0.30)	Vinyl Dist. Tech (see 13646) caught/ran samples
13650	246754	2/9/95	15:25 - 16:03	7.7	ND(0.26)	ND(0.26)	ND(0.41)	ND(0.41)	Vinyl Dist. Tech (see 13646) caught/ran samples
13659	206802	2/21/95	7:25 - 8:03	7.8	ND(0.13)	ND(0.13)	ND(0.20)	ND(0.20)	Oxy Tech (see 13657) caught/ran samples
13662	207353	2/23/95	7:12 - 7:55	9.0	0.25	0.25	0.65	0.65	Vinyl Pur. Tech (see 13661) ran samples
					AVERAGE	0.23		0.4	

OCCUPATIONAL EXPOSURE LIMIT

- OSHA PEL — 15-STEL: 2 ppm — 5 ppm

*None Detected at the analytical detection limit indicated in parentheses.

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Distribution List

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C. K. Browdy, B-101
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K. D. West, OC-1120
*W. M. Wood, OC-501
Texas Compliance File, B-101

*Person responsible for the communications and recommendations follow-up.