INDUSTRIAL HYGIENE REPORT

GULF COAST INDUSTRIAL HYGIENE CENTER
TEXAS OPERATIONS

AN OPERATING UNIT OF THE DOW CHEMICAL COMPANY

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Title

Personal Monitoring Results For Ethylenediamine (EDA), Diethylenetriamine (DETA), and Triethylenetetramine (TETA), at Ethyleneamines, A-3800 Block, Freeport, Texas, June 1995

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Introduction

In June 1995, Industrial Hygiene Services conducted personal, full-shift monitoring of Ethylenediamine (EDA), Diethylenetriamine (DETA), and Triethylenetetramine (TETA), at Ethyleneamines, A-3800 Block. This survey was conducted to re-establish baseline levels and to collect data for the Dow Global DETA Study.

Background

From 1983 through 1992, a number of personal, full-shift EDA, DETA, and TETA samples were collected for various operations and maintenance job assignments at Ethyleneamines (IH Compliance Files, Ethyleneamines).

Results of fifty-nine EDA samples ranged from 0.002 to 0.67 ppm as an eight-hour time-weighted average (TWA). Results of thirty-three DETA samples ranged from 0.007 to 0.1 ppm as an eight-hour TWA. Results of four TETA samples ranged from 0.01 to 0.2 ppm as an eight-hour TWA. Personal exposures for the three substances were all below recognized occupational exposure guidelines.

Discussion

Twenty-six full-shift samples were collected for seven job classifications. These classifications were: 1) Boilermaker, 2) Control B Operators, 3) Coverer, 4) I&E, 5) Loader, 6) Machinist, and 7) Pipefitter. Monitoring was conducted during routine tasks. No respiratory protection was worn during these job tasks.

Results and Conclusions

The following conclusions were based on conditions that existed on the days of this survey. Changes in equipment, procedures, or other conditions that affect exposures could alter or invalidate these conclusions.

- Twenty-six personal, full-shift samples were collected during normal activities at Ethyleneamines (Table 1).
- Average job assignment exposures to EDA ranged from ND(0.0001) to 0.0447 ppm for Control B Operators.
- Average job assignment exposures to DETA ranged from "none detected" (ND) at the sample limit of detection (0.0009) to ND(0.0022) ppm.
- Average job assignment exposures to TETA ranged from ND (0.0001) to ND(0.0002) ppm.
- All samples were well below the respective OSHA Permissible Exposure Limits (PEL).

Recommendations

None

Communication

Communicate results of this survey to all affected personnel and forward documentation to Industrial Hygiene, B-101.

Sampling and Analytical Method

The sampling train for EDA, DETA, and TETA was a 120 mg tube containing XAD-2 resin coated with 10% NITC, and a pump operated at approximately 100 mL/min. Pumps were calibrated before and after use. Samples were eluted with Dimethylformamide and analyzed by liquid chromatograph/ultraviolet detection (NIOSH Method # 2540).

Table 1: Full-Shift Personal Air Monitoring Results for Ethylenediamine (EDA), Diethylenetriamine (DETA), Triethylenetetramine (TETA), at Ethyleneamines, A-3800, Freeport, Texas, June 1995.

Sample Number	Master Number	Date	Time (min)	Volume (Liters)	EDA Full-shift TWA (ppm)	DETA Full-shift TWA (ppm)	TETA Full-shift TWA (ppm)
BOILERMAKER							
14304	140511	6/5/95	510	51.31	ND (0.0001)	ND (0.0009)	ND (0.0001)
14309	132567	6/6/95	480	27.50	0.0007	ND (0.0017)	ND (0.0002)
14331	142750	6/14/95	460	48.16	ND (0.0001)	ND (0.0010)	ND (0.0001)
		Job Assignment Average			**0.0003**	**ND (0.0012)**	**ND (0.0001)**
CONTROL B OPERATOR							
14302	244737	6/5/95	460	44.11	ND (0.0001)	ND (0.0011)	ND (0.0001)
14318	245340	6/7/95	475	47.93	0.0447	ND (0.0010)	ND (0.0001)
14323	098816	6/7/95	435	41.54	0.0169	ND (0.0011)	ND (0.0001)
14325	245332	6/12/95	405	40.58	0.1343	0.0019	ND (0.0001)
14330	240735	6/14/95	465	44.97	0.0011	ND (0.0011)	ND (0.0001)
		Job Assignment Average			**0.0394**	**0.0012**	**ND (0.0001)**
COVERER							
14303	132567	6/5/95	510	52.33	ND (0.0001)	ND (0.0009)	ND (0.0001)
14312	131889	6/6/95	475	25.08	ND (0.0002)	ND (0.0019)	ND (0.0002)
14319	136795	6/7/95	455	46.23	ND (0.0001)	ND (0.0010)	ND (0.0001)
		Job Assignment Average			**ND (0.0001)**	**ND (0.0013)**	**ND (0.0001)**
I & E							
14314	137900	6/6/95	440	23.67	ND (0.0002)	ND (0.0020)	ND (0.0002)
14327	137554	6/12/95	440	47.48	ND (0.0001)	ND (0.0010)	ND (0.0001)
14329	089763	6/13/95	432	44.45	ND (0.0001)	ND (0.0011)	ND (0.0001)
		Job Assignment Average			**ND (0.0001)**	**ND (0.0014)**	**ND (0.0001)**
LOADER							
14307	143362	6/5/95	495	50.24	ND (0.0001)	ND (0.0009)	ND (0.0001)
14313	099876	6/6/95	430	21.16	ND (0.0002)	ND (0.0022)	ND (0.0002)
14322	142345	6/7/95	450	40.86	ND (0.0001)	ND (0.0012)	ND (0.0001)
14326	139095	6/12/95	435	45.89	0.0019	ND (0.0010)	ND (0.0001)
14328	099876	6/13/95	420	41.24	ND (0.0001)	ND (0.0011)	ND (0.0001)
14334	139095	6/14/95	450	47.21	ND (0.0001)	ND (0.0010)	ND (0.0001)
		Job Assignment Average			**0.0004**	**ND (0.0012)**	**ND (0.0001)**
		OSHA Permissible Exposure Limits			**10**	**1**	**NE**

Continued on next page

ND = None detected at the sample limit of detection given in parentheses
NE = None established

Table 1 (Continued): Full-Shift Personal Air Monitoring Results for Ethylenediamine (EDA), Diethylenetriamine (DETA), Triethylenetetramine (TETA), at Ethyleneamines, A-3800, Freeport, Texas, June 1995.

Sample Number	Master Number	Date	Time (min)	Volume (Liters)	EDA Full-shift TWA (ppm)	DETA Full-shift TWA (ppm)	TETA Full-shift TWA (ppm)
MACHINIST							
14305	014511	6/5/95	505	50.45	ND (0.0001)	ND (0.0009)	ND (0.0001)
14310	240413	6/6/95	485	26.68	ND (0.0002)	ND (0.0018)	ND (0.0002)
14320	097414	6/7/95	455	45.77	ND (0.0001)	ND (0.0010)	ND (0.0001)
		Job Assignment Average			**ND (0.0001)**	**ND (0.0012)**	**ND (0.0001)**
PIPEFITTER							
14306	137435	6/5/95	498	48.85	ND (0.0001)	ND (0.0010)	ND (0.0001)
14311	133806	6/6/95	485	28.23	ND (0.0001)	ND (0.0017)	ND (0.0002)
14321	136768	6/7/95	455	47.68	ND (0.0001)	ND (0.0010)	ND (0.0001)
		Job Assignment Average			**ND (0.0001)**	**ND (0.0012)**	**ND (0.0001)**
		OSHA Permissible Exposure Limits			**10**	**1**	**NE**

ND = None detected at the sample limit of detection given in parentheses
NE = None established

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