



DOW CHEMICAL U.S.A.

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PCK*

INTRODUCTION

The HCBP area was monitored to determine what potential exposure levels existed for short duration high exposure level conditions.

DISCUSSION

The potentially high exposure levels obtained greatly emphasize the need for wearing proper protective equipment and following safe handling procedures until engineering measures can be implemented to solve these problems.

Employees entering the HCBP area to change filters, recharge the system, perform maintenance on equipment, or to clean up and wash down the area must wear a supplied air mask, rubber boots, slicker suit and rubber gloves (NITRILE pioneer stan-solv® AF - 18 recommended). Operators passing through to inspect the area or to make routine rounds should wear a mouthbit respirator with an acid gas - organic vapor canister as a minimum precaution. The safe handling procedures for HCBP should be discussed with each new employee before entering the work area and reviewed with the experienced operations on an annual basis.

SAMPLING METHOD

Samples were collected from operators "breathing zones" by attaching a dual section glass tube containing Porapak Q to the operator's lapel. (the front or sampling section of the tube contained 100 milligrams while the breakthrough section contained 50 milligrams)

Sample pumps employed to draw the air through the sample tubes were calibrated by means of a wet test meter.

ANALYTICAL

Collected samples were desorbed with 10 mls hexane and injected into a gas chromatograph equipped with a 10 foot length 13% Dexsil 300 column. The preset conditions were an oven setting of 240°C and a detection



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temperature of 250°C. A blank tube was analyzed to check the purity of the Porapak Q.

Results were given in nanograms (wt.) and converted to parts per billion (by volume) using the following formula:

$$\frac{\text{(total nanograms detected in sample)} \times \text{(1 mole occupies 24.4 liters volume)}}{\text{Nanograms} \times \text{X} \times \text{.95} \times \text{X} \times \text{24.4 liters/mole}} = \text{ppb (V)}$$

(molecular wt) (charcoal adsorption efficiency) (liters of air sampled)

RESULTS

All six samples indicate exposure levels were excessive. The highest level, obtained from a 30 minute sample, recorded 4674 ppb (V) which is approximately 465 times greater than the allowable limit! The remaining samples were in excess of the allowable limit or TLV of 10 ppb (V) (See Data sheet on following page)

RECOMMENDATIONS

The extremely high potential exposure levels make it mandatory that strict safe operating procedures are closely followed. Supervision must be held responsible to insure that these instructions are strictly adhered to.

The present job procedures should be critically reviewed to make any feasible improvements and efforts should be made to correct current problems by engineering improvements.

Protective equipment such as the slicker suits and fresh air supply masks should be stored away from the work area to insure that contamination is held to a minimum.

Empty drums should be disposed of as quickly as possible and housekeeping should be carefully maintained to eliminate any unnecessary exposures.

The area should be monitored on a quarterly basis to determine if conditions are improving..

Education concerning the hazards associated with HCBP should again be reviewed with employees so that they will better understand the precautions necessary when handling HCBP.

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MONITORING RESULTS

SAMPLE #	DATE	SAMPLE DESCRIPTION	SAMPLING TIME	FLOW RATE	PPb (V)
919-4	7-24-78	Area sample collected SW of HCBP pumps (downwind) approximately 5 feet from base of AT-210. Winds were out of SE at 5 mph.	10:15 - 13:10 (175 min)	60 cc/min	64.1
919-7	7-20-78	Operator (S.O.T.) changing HCBP filters. (Operator accidentally dropped old filter while changing and spilled approximately one pint of liquid HCBP. Protective equipment was worn by operator.	22:15 - 22:40 (25 min)	140 cc/min	343.0 ✓
919-11	8-29-78	Operator (S.O.T.) adding HCBP to system from 55 gallon drums (2 drums were added) operator wearing rubber boots, slicker suits, gloves and fresh air supply mask. Wind out of SSW at 3-5 mph.	12:30 - 13:15 (45 min)	101 cc/min	86.9
919-12	8-27-78	Operator (S.O.T.) changed out HCBP filters approximately 1 1/2 pints of HCBP was trapped in the filter can which spilled. Operator wore rubber gloves, rubber boots, slicker suit and fresh air supply mask. Wind was out of SE at 14 mph.	22:15 - 22:45 (30 min)	100 cc/min	156.7 ✓
919-13	8-30-78	Operator (S.O.T.) liquifaction and "train" operator was cleaning up and washing down area. Some HCBP was "stirred up" while washing area down (to the sump) wind was out of NE at 5 mph.	00:15 - 01:45 (90 min)	101 cc/min	967.9
919-14	8-30-78	Operator (S.O.T.) changing out HCBP filters and repairing a leak on the filter. Operator wore all protective equipment. Wind was out of NE at 5 mph.	16:00 - 16:30 (30 min)	100 cc/min	4673.6 ✓

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