WV-0143 #6(b)

UNION CARBIDE CORPORATION
TECHNICAL CENTER
SOUTH CHARLESTON, WEST VIRGINIA

UNION CARBIDE BUSINESS CONFIDENTIAL

MEMORANDUM

June 20, 1984

PLAINTIFF'S EXHIBIT
UC-3186

TO: D. E. Raines

COPY: B. H. Avashia, M.D.
A. S. Howard
C. P. Maxwell
M. L. Mills
D. R. Paugh
R. E. Peele
R. G. Rowe, M.D.

FROM: M. A. Patel

SUBJECT: Dust and Chemicals Exposure Monitoring in Insulation Shop, Building 2018

Dear Dennis:

During the months of March and April, 1984, the Technical Center Industrial Hygiene Group conducted a survey in the Insulation Shop, Building 2018, to determine the extent of employees' exposure condition to various chemicals and dust in the shop. In this survey we monitored for total and respirable dust, methylene chloride, toluene-2,4-diisocyanate (TDI), dimethylformamide (DMF), hydrogen sulfide ($H_2S$), total hydrocarbons and benzene soluble fractions of the total particulate matters (BSFTPM).

Total and respirable dust levels were measured in the shop where various insulation materials are cut. All personnel exposure monitoring was done for respirable fraction of the total dust. All area and source monitoring was done for total dust. The permissible exposure limits for respirable and total dust are 5 and 10 $mg/m^3$ respectively. Results of monitoring for dust are shown in Table I indicating very low levels of exposure to respirable and total dust. This is indicative of an effective ventilation system in the shop.

Table II shows the results of BSFTPM levels at the tar pit. The permissible exposure limit for BSFTPM is 0.150 $mg/m^3$. Results show the exposure conditions well below this limit.

Table III shows the monitoring results of methylene chloride, TDI, DMF, $H_2S$ and total hydrocarbons. The permissible exposure limits for these chemicals are 50 ppm, 0.02 ppm, 10.0 ppm, 10.0 ppm and 100 ppm respectively. The results indicate that the exposure conditions in general are well below the permissible levels. Very high levels of hydrocarbons on top of the Brulin wax container necessitates a need to communicate with employees to avoid stooping over the container to reduce the risk of excessive exposure. A



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considerable level of total hydrocarbon was recorded between the mold and the ventilation system, but not near the operator's station. This is indicative of a good hood performance for volatile hydrocarbons. Hydrogen sulfide concentrations could reach as high as 3.0 ppm at inches away from the freshly cut glass insulation material. This situation would not result in over-exposures of employees who normally work one to two feet away.

Please review all of the monitoring results with employees in your shop and if you need any assistance, please feel free to give me a call at extension 3750.

Very truly yours,

Manhar A. Patel

Manhar A. Patel

MAP:ep

Attachments (3)



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TABLE I

TOTAL AND RESPIRABLE DUST MONITORING IN INSULATION SHOP

| No. | Date | Sample Type | Employee/Location Monitored | Air Conc. mg/m$^3$ | 8-Hr. TWA mg/m$^3$ | Comments |
|---|---|---|---|---|---|---|
| 1 | 3/14/84 | Personal Respirable fraction | L. I. Mitchell Band Saw #3 | 0.34 | 0.29 | 600 pieces of foam glass cut. |
| 2 | 3/14/84 | Personal Respirable fraction | M. A. Richardson Band Saw #3 | 0.30 | 0.25 | 600 pieces of foam glass cut. |
| 3 | 3/14/84 | Source Total dust | Band Saw #3 | 0.32 | - | Above the job on the band saw. |
| 4 | 3/14/84 | Personal Respirable fraction | J. C. Hubbard Band Saw #1 | 0.61 | 0.50 | Kaylo lagging 500 pieces. Also, worked 1-1/2 hours cutting Celotemp. |
| 5 | 3/14/84 | Source Total dust | Band Saw # 1 Sampler located on side at breathing zone level | 1.12 | - | Kaylo lagging 500 pieces. Also, worked 1-1/2 hours cutting Celotemp. |
| 6 | 3/14/84 | Area Total dust | Band Saw #1 | 1.41 | - | Sampler was located 5' diagonally at breathing zone level area where material put into boxes. |
| 7 | 3/14/84 | Source Total dust | Pipe Cover Radius Saw | 0.5 | - | Foam glass was cut sampler located at breathing level. |
| 8 | 3/15/84 | Personal Respirable fraction | W. L. Alford #1 Band Saw | 0.66 | 0.59 | 56 pieces Celotemp 90 pieces Kaylo 60 pieces foam glass. |
| 9 | 3/15/84 | Personal Respirable fraction | J. D. Hayes Double radius head grinder | 0.45 | 0.40 | 66 pieces Celotemp worked 1-1/2 hours on grinder and the rest of day on stick up table. |

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TABLE I (Continued)

TOTAL AND RESPIRABLE DUST MONITORING IN INSULATION SHOP

| No. | Date | Sample Type | Employee/Location Monitored | Air Conc. mg/m$^3$ | 8-Hr. TWO mg/m$^3$ | Comments |
|---|---|---|---|---|---|---|
| 10 | 3/15/84 | Source Total dust | Double radius head grinder. Sampler located on top. | 0.39 | - | Sampled for 1-1/2 hours while grinder was running. |
| 11 | 3/15/84 | Source Total dust | Tar pit sampler located 5-1/2 ft. above ground or 2 ft. above tar pit on exhaust duct. | 0.51 | - | Sample was collected to determine total particulate matter. |
| 12 | 3/16/84 | Personal Respirable fraction | L. I. Mitchell Pipe cover radius saw | 0.10 | - | 100 pieces 3 ft. long new insulation material "Spoul". Sample collected for the duration of operation. |
| 13 | 3/16/84 | Personal Respirable fraction | M. A. Richardson Helped L. I. Mitchell on pipe cover radius saw. | 0.03 | - | 100 pieces 3 ft. long new insulation material "Spoul". Sample collected for the duration of operation. |
| 14 | 3/16/84 | Source Total dust | Pipe cover radius saw. At operation station at a breathing zone level. | 0.55 | - | 100 pieces 3 ft. long new insulation material "Spoul". Sample collected for the duration of operation. |
| 15 | 4/16/84 | Personal Respirable fraction | W. L. Alford Stick-up Table | 0.14 | 0.13 | Handled 260 pieces of Kaylo. |

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TABLE I (Continued)

TOTAL AND RESPIRABLE DUST MONITORING IN INSULATION SHOP

| No. | Date | Sample Type | Employee/Location Monitored | Air Conc. $mg/m^3$ | 8-Hr. TWO $mg/m^3$ | Comments |
|---|---|---|---|---|---|---|
| 16 | 4/16/84 | Area Total dust | Stick-up Table | 0.49 | - | Sampler located 3 ft. behind work area. |
| 17 | 4/16/84 | Personal Respirable fraction | J. D. Hays | 0.21 | 0.19 | Handled 260 pieces of Kaylo. |
| 18 | 4/16/84 | Source Total dust | Stick-up table, behind work area 2 ft. away and to the left of duct. | 0.13 | - | - |
| 19 | 4/16/84 | Source Total dust | Stick-up table, behind work area, 2 ft. away and to the right of duct. | 0.51 | - | - |

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TABLE II

BENZENE SOLUBLE FRACTION OF THE TOTAL PARTICULATE MATTER (BSFTPM)

Monitoring at the Tar Pit

| No. | Date | Sample Type | Employee/Location Monitored | Air Conc. $mg/m^3$ | 8-Hr. TWA $mg/m^3$ | Comments |
|---|---|---|---|---|---|---|
| 1 | 3/15/84 | Personal | L. I. Mitchell | - | .07 | Coated 124 pieces of foam glass insulation material. |
| 2 | 3/15/84 | Personal | M. A. Richardson | - | $<$.07 | Coated 124 pieces of foam glass insulation. |
| 3 | 3/15/84 | Source | On ventilation duct over tar pit at breathing level. (App. 2 ft. aboe tar pit). | $<$.05 | - | - |

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TABLE III

EXPOSURE MONITORING FOR METHYLENE CHLORIDE, TDI, DIMETHYLFORMAMIDE, HYDROGEN SULFIDE, AND TOTAL HYDROCARBONS IN INSULATION SHOP

| No. | Date | Chemical | Sample Type | Employee/Location Monitoring | Air Conc. $mg/m^3$ | 8-Hr. TWA $mg/m^3$ | Comments |
|---|---|---|---|---|---|---|---|
| 1 | 4/2/84 | Methylene chloride | Area | Foam Machine | 5.14 | - | Used to flush the line on foam machine. |
| 2 | 3/30/84 | TDI | Personal | W. L. Alford | - | .0004 | Filled feed tank and poured foams. |
| 3 | 3/30/84 | TDI | Source | Mixing head | .0004 | - | At breathing level. |
| 4 | 3/30/84 | DMF | Personal | W. L. Alford | - | < 1.0 | Cleaning parts in DMF and filling 5 gal. open top conatiner. |
| 5 | 3/30/84 | Total Hydrocarbons | Source | Top of 5 gal. can of Brulin Wax | 4000. | - | Within inches from the top. |
| 6 | 3/30/84 | Total Hydrocarbons | Personal | W. L. Alford | 2.0 | - | Wax being painted by 3" brush in front of ventilation system. |
| 7 | 3/30/84 | Total Hydrocarbons | Area | Between mold and ventilation system. | 300.0 | - | - |
| 8 | 3/19/84 | Hydrogen Sulfide | Personal | L. I. Mitchell | 1.0 | - | Spot sample while cutting 13" x 14" foam glass material on pipe cover saw. |
| 9 | 3/19/84 | Hydrogen Sulfide | Source | At the stack of 18 pieces of insulation | 3.0 | - | Spot sample at one inch away from the stack. |

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TABLE III (Continued)

EXPOSURE MONITORING FOR METHYLENE CHLORIDE, TDI, DIMETHYLFORMAMIDE, HYDROGEN SULFIDE, AND TOTAL HYDROCARBONS IN INSULATION SHOP

| No. | Date | Chemical | Sample Type | Employee/Location Monitoring | Air Conc. $mg/m^3$ | 8-Hr. TWA $mg/m^3$ | Comments |
|---|---|---|---|---|---|---|---|
| 10 | 3/19/84 | Hydrogen Sulfide | Source | Table Saw | N.D. | - | Spot sample two ft. from table saw where 18 pieces of foam glass where one inch groove was made. |
| 11 | 4/5/84 | Hydrogen Sulfide | Source | #1 Saw | N.D. | - | Levels not detected but odor of $H_2S$ present. |
| 12 | 4/5/84 | Hydrogen Sulfide | Area | #1 Saw | N.D. | - | At operator's breathing zone level. |

N.D. = Not Detected

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