WV-0088 # 22

MEMORANDUM

To: Dr. T. G. Day
Mr. P. W. Gregory
Mr. N. H. Ketcham
F. E. Medford, M. D.
Mr. A. Pauley
Mr. M. E. Perry

May 17, 196

From: Fred Williams

Subject: Preliminary Air Sampling Results for Asbestos

On October 26, 1967, Mr. M. E. Perry wanted to know if the asbestos insulators were being exposed to significant quantities of asbestos dust that would be harmful to the health of personnel. He also gave me a "Caution" label which is now being placed on the shipping containers by the manufacturer.

The Threshold Limit Value (1967) for asbestos dust has been established as 5.0 million particles per cubic foot (MPPCF) of air by the American Conference of Governmental Industrial Hygienists. Even though there have been some recent comments about the hazards of the small particulates versus the long fiber asbestos, the TLV makes no statement concerning this. I understand that a statement is planned for inclusion in the near future about the hazards of one type (crocidolite), but the limits remain the same if the original sampling and analysis methods are used (impinger sampling and light field counting on microscope). Too, there have been several articles relating cancer with asbestos in a disease, mesothelioma (tumor developed from the cells in the pleura). However, there are articles that attempt to discount this occurrence. Asbestosis will occur after long exposures to excessive quantities of asbestos with symptoms: cough, dyspnea (difficult or labored breathing) substernal chest pains, decreased chest expansion, weakness, emaciation, clubbed finger tips, and curved fingernails. Individual susceptibility varies.

In order to evaluate the potential hazard to health that might be created from work with asbestos in the Technical Center, air sampling was required. We have been trying since early November 1967 to do air sampling when work was being done with a significant amount of asbestos to give reliable data. Air sampling was done April 23 and 24, 196 . However, the air samples for the 23rd were not satisfactory and required some changes in the impingers to obtain reliable sampling. A slight bend was put in the intake tube of the impingers to prevent pieces of asbestos from falling into the collecting media.

Air samples were collected in clean (as particle free as possible) impingers containing 10 milliliters distilled water. These small impingers were worn by the

insulator near his breathing zone and operated by a portable on-the-belt pump. A Greenburg-Smith impinger containing 150 milliliters distilled water was operated in the vicinity above the operation. The insulators worked up the pipe being insulated toward this sampler.

The attached sheet shows information about the air sampling and results.

The results show that excessive amounts of asbestos could have been inhaled by the insulators had they not been wearing respiratory protection. The sawing (handsaw) creates quite a bit of dust as shown by samples 1 and 4. If a power saw is used, this probably would be much higher. The fitting did not create as much problem until the insulator was reaching around previously installed asbestos. In doing so, apparently fines are rubbed off by contact and become airborne.

This was a dusty operation which justified wearing respiratory protection. When asbestos is being installed or removed and creates a dusty environ, approved respiratory protection should be worn. The person working with or near asbestos operations and his supervisor should be able to judge whether it will be dusty or not. Techniques such as wetting down the asbestos as it is being removed will reduce the dust evolved during dismantling operations. A portable high velocity exhaust vacuum (industrial vacuum cleaner) may be utilized to keep asbestos particles in air below the TLV at the sawing operation. The fitter may reduce the dustiness in his surroundings by handling the asbestos carefully and refraining from unnecessary contact with the material resulting from rubbing against, hitting together, or unusual pounding.

The long term air sample (Greenburg-Smith) showed that significant quantities of asbestos did not become airborne above the operation. When the result was calculated as a 30-minute release the findings show that a maximum of 7.1 MPPCF became airborne.

Air sampling will be done during future asbestos operations to further evaluate the conditions.

Fred Williams
Industrial Hygienist

F. Williams/ebc

# ASBESTOS AIR SAMPLING

## BUILDING 770 - LARGE SCALE FACILITY

Equipment:
- Midget impingers
- Greenburg-Smith impingers
- Distilled water
- MSA Monitaire Air Sampler Pumps
- Vacuum pump
- Bausch & Lomb Microscope (100X, light field)
- DUNN cell

Date: April 24, 1968
Time: 950 a.m. - 3:25 p.m.
Collected by: R. O. Midkiff
Analyzed by: R. O. Midkiff

| Sample Number | Sampling Time, min. | Flow Rate, lpm | Net Count <10μ | Net Count 10μ - 50μ | Net Count <10μ - 50μ | MPPCF <10μ | MPPCF 10μ-50μ | MPPCF <10μ-50μ | Sampler Worn by | Operation & Location |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 21 (on-off) | 1.7 | 509 | 25.4 | 534.4 | 13.6 | 0.77 | 14.4 | | Cutting; ground level |
| 2 | 22 | 1.7 | 140 | 4.0 | 144 | 4.0 | 0.12 | 4.1 | | Fitting; pipe perpendicular to floor |
| 3 | 20 | 1.7 | 620 | 160 | 780 | 18.8 | 4.9 | 23.7 | | Fitting; large pieces than previously; reaching around the asbestos (hugging) |
| 4 | 20 (cont.) | 1.7 | 500 | 19.4 | 519.4 | 15.8 | 0.6 | 16.4 | | Cutting; ground level |
| 5 | 335 9:50 a.m. - 3:25 p.m. | 5 | 66 | 2.2 | 68.2 | 0.63 | 0.02 | 0.65 | Greenburg-Smith impinger | General Air; midpoint of column (approx. 9' from floor) 18 inches from column. No apparent up-draft in facility. |

UCC 006855

4/24/68

# Asbestos Air Samples

| Employee | Activity | <10μ MPPCF | 10-50μ MPPCF | |
|---|---|---|---|---|
| | Cutting (Sawing) | 13.6 | 0.77 | |
| | Fitting | 4.0 | 0.12 | |
| | Fitting | 18.8 | 4.9 | Reaching Around Pipe (Hugging) |
| | Cutting | 15.8 | 0.6 | |
| Atmospheric (Environs) | | 0.63 | 0.02 | Above workers as they worked up the pipe. |

TLV - 5.0 MPPCF

Asbestos 4/24/68

| No | Time | Lpm | Person | Activity | Sample liquid Vol (m/s) | Air Vol. (L.) | Air, ft³ |
|---|---|---|---|---|---|---|---|
| 1 | 21 min (on-off) | 1.7 | | Cutting | 9.5 | 35.7 | 1.26 |
| 2 | 22 min. | 1.7 | | Filling | 9.5 | 37.4 | 1.32 |
| 3 | 20 min. | 1.7 | | Filling | 9.1 | 34.0 | 1.20 |
| 4 | 20 min (cont.) | 1.7 | | Cutting | 9.5 | 34.0 | 1.20 |
| Greenburg-Smith 9:50 AM → 3:25 PM | | 5 | located approx. mid point of Col. (9'+) being insulated, 18" from Col. | | 142 | 1675 | 59.1 |

Samples taken on 4-24-68, at east end of Bldg. 770

The samples taken on 4-23-68 were not used. Large particles appeared in the Personal samples. The greenburg-smith sample was mistakenly run with inlets sealed off during most of the run.

Top an enclosed area - No apparent draft upward.

Asbestos

4/24/68

| Sample No. | Total Counts | Avg. Ct. (Blank Corrected) <10μ Net | Avg. Ct. (Blank Corrected) 10μ-50μ Net | dil. | Corrected ct. <10μ | Corrected ct. 10-50μ |
|---|---|---|---|---|---|---|
| 1 | 154-10 = | 144 | 7.2 | 8.5/30 | 509 | 25.4 |
| 2 | 150-10 = | 140 | 4 | — | 140 | 4 |
| 3 | 72-10 = | 62 | 1.6 | 1/100 | 620 | 160 |
| 4 | 152-10 = | 142 | 5.5 | 8.5/30 | 500 | 19.4 |
| G.S. | 76-10 = | 66 | 2.2 | — | 66 | 2.2 |
| Blank | | 10 | 0 | | | |

Asbestos

4/24/68

| | < 10μ | MPPCF | 10 - 50μ | MPPCF |
|---|---|---|---|---|
| 1 | $\frac{504 \times 4 \times 10^3 \times 9.5}{1.26 \times 1 \times 10^6}$ | = 13.6 | $\frac{25.4 \times 4 \times 10^3 \times 9.5}{1.26 \times 1 \times 10^6}$ | = 0.77 |
| 2 | $\frac{140 \times 4 \times 10^3 \times 9.5}{1.32 \times 1 \times 10^6}$ | = 4.0 | $\frac{4 \times ---}{---}$ | = 0.12 |
| 3 | $\frac{620 \times 4 \times 10^3 \times 9.1}{1.20 \times 1 \times 10^6}$ | = 18.8 | $\frac{160 \times ---}{---}$ | = 4.9 |
| 4 | $\frac{500 \times 4 \times 10^3 \times 9.1}{1.20 \times 1 \times 10^6}$ | = 15.8 | $\frac{19.4 \times ---}{---}$ | = 0.6 |
| G.S. | $\frac{66 \times 4 \times 10^3 \times 142}{59.1 \times 1 \times 10^6}$ | = ~~.63~~ | $\frac{2.2 \times ---}{---}$ | = ~~.02~~ |