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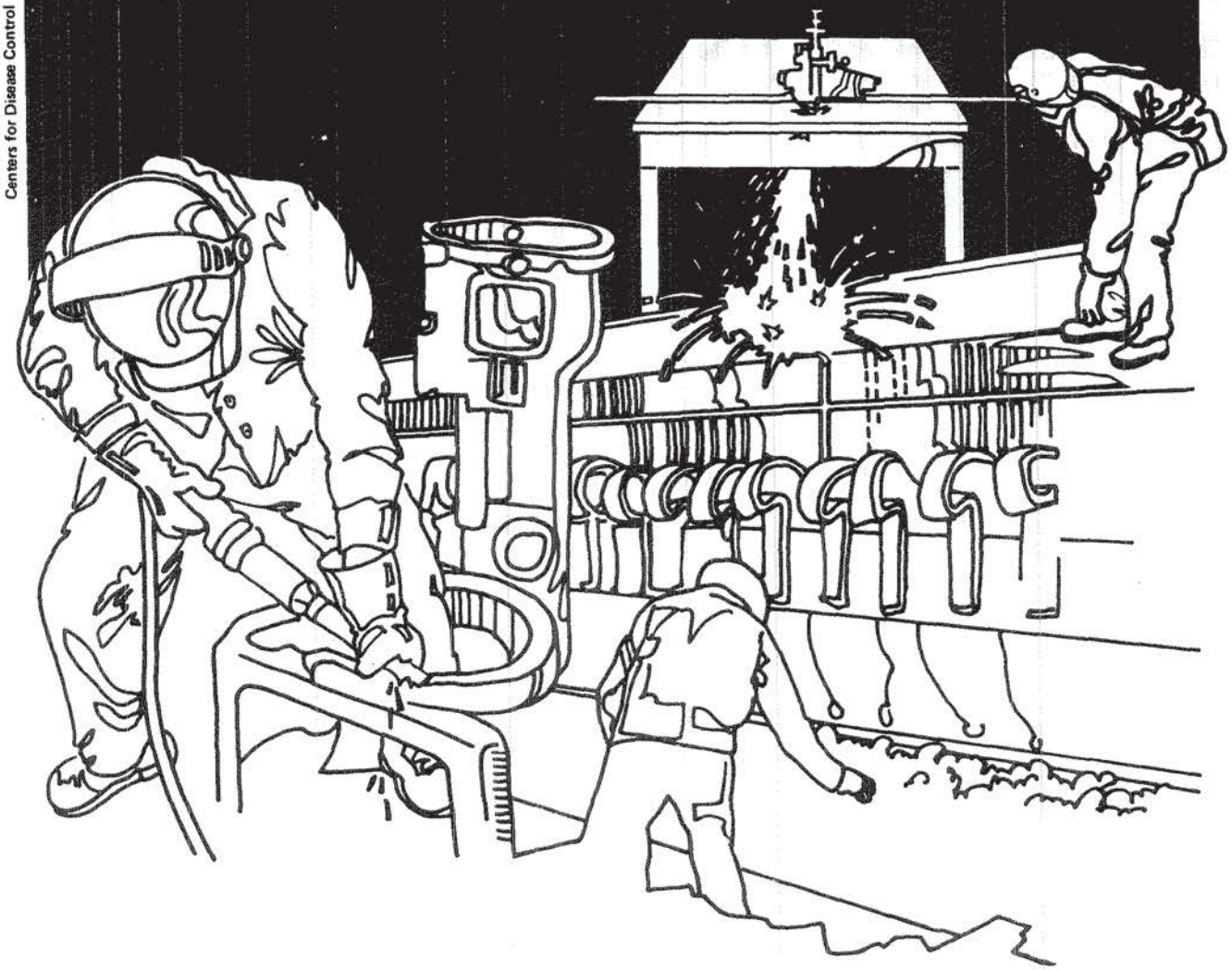

Health Hazard Evaluation Report

HETA 83-106-1311
WEST VIRGINIA GEOLOGICAL
AND ECONOMIC SURVEY
MORGANTOWN, WEST VIRGINIA

PREFACE

The Hazard Evaluations and Technical Assistance Branch of NIOSH conducts field investigations of possible health hazards in the workplace. These investigations are conducted under the authority of Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6) which authorizes the Secretary of Health and Human Services, following a written request from any employer or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

The Hazard Evaluations and Technical Assistance Branch also provides, upon request, medical, nursing, and industrial hygiene technical and consultative assistance (TA) to Federal, state, and local agencies; labor; industry and other groups or individuals to control occupational health hazards and to prevent related trauma and disease.

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MAY 1983
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NIOSH INVESTIGATOR:
L. Piacitelli, I.H.

I. SUMMARY

On January 6, 1983, the National Institute for Occupational Safety and Health (NIOSH) received a call from an employee of the West Virginia Geological and Economic Survey, Morgantown, West Virginia, to analyze some insulation material that was being removed from a hot water heating system. A walk-through survey the same day showed that most of the material had been removed.

Samples were collected and analyzed. Both Amosite and Chrysotile asbestos were present in the insulation. On January 7th, six air samples were collected, all were below the Occupational Safety and Health (OSHA) standard of 2 fibers/cc, one sample was above the NIOSH recommended standard of 0.1 fiber cc.

KEYWORDS: SIC 9611, asbestos insulation, office building

II. MATERIALS AND METHODS

Bulk samples of the insulation were collected. The samples were analyzed by polarized light microscopy.

Six air samples were collected on 37 mm AA cellulose filters in open face cassettes using sampling pumps calibrated at 1 CFM. The samples were counted per NIOSH analytical method, P&CAM 239.(1)

III. HEALTH EVALUATION CRITERIA

In the fall of 1979, a NIOSH-OSHA committee was formed to review the scientific information concerning asbestos-related disease. Relevant excerpts are provided below:(2)

1. Asbestos is defined to be chrysotile, crocidolite, and fibrous cummingtonite-grunerite including amosite, fibrous tremolite, fibrous actinolite, and fibrous anthophyllite. The fibrosity of the above minerals is ascertained on a microscopic level with fibers defined to be particles with length to width ratio of 3 to 1 or larger.

2. Animal studies demonstrate that all commercial forms and several non-commercial forms of asbestos produce pulmonary fibrosis, mesothelioma and lung neoplasms.

3. A variety of factors have demonstrated that the current OSHA standard of 2 fibers/cc is grossly inadequate to protect workers from asbestos-related disease. They propose establishing the lowest level of exposure detectable using phase contrast microscopy (0.1 fibers/cc 5 m in length) as the permissible 8 hour average exposure limit.

4. Available data show that the lower the exposure, the lower the risk of developing asbestosis and cancer. Excessive cancer risks however, have been demonstrated at all fiber concentrations studied to date. Evaluation of all available human data provides no evidence for a threshold or "safe" level of asbestos exposure. Accordingly, the committee recommends that worker exposures must be controlled to the maximum extent possible.

IV. RESULTS

The bulk samples of insulation from the hot water heating system contained asbestos, including the hot water pipes carrying heat to the individual offices. Also, the remaining ducts to the air handler are insulated with material containing asbestos. The spackled ceiling in the lobby also contains asbestos. Neither the plain wall board (Room 128) nor the decorative wall board (Room 104) contains asbestos.

One air sample collected in the boiler room was 0.14 fibers/cc which is above the NIOSH recommended standard of 0.1 fibers/cc.

V. RECOMMENDATIONS

1. The deteriorating spackled ceiling in the lobby entrance should be removed in accordance with OSHA and the Environmental Protection Agency (EPA) Regulations. The OSHA regulations are contained in the Code of Federal Regulations, Title 29, Part 1910.(29 CFR 1910) The EPA regulations are contained in 40 CFR 61. Asbestos stripping procedures are outlined in Appendix 1.[3,4]

2. The permissible respirator to be worn when stripping or working with asbestos is dependent on the concentration of asbestos fibers generated. The OSHA respiratory protection criteria for asbestos is listed in Appendix 2.[5] The respirator filters used by the maintenance men are not approved for use with asbestos. Approved filters that would fit the facepieces in use are American Optical R-30 and R-57-A. The R-57-A is a high efficiency filter providing greater protection than the R-30.

3. The insulation covering the hot water pipes can remain as long as the insulation is kept in good condition and the pipes are not exposed in the offices. Precautions must be taken to reduce or eliminate the risk of asbestos exposure when the pipes are worked on. Appendix 3 contains guidelines to be followed when the insulation is disturbed.[3,4]

VI. REFERENCES

1. NIOSH Manual of Analytical Methods. Vol. 1, DHEW (NIOSH) Publication No. 77-157-A, 1977

2. Workplace Exposure to Asbestos. DHHS (NIOSH) Publication No. 81-103, 1980.

3. Asbestos Containing Materials in School Buildings: A Guidance Document, Part 1, EPA-450/2-78-014.

4. Michaels, L. Chissick, S.: Asbestos, Properties, Applications and Hazards. Vol 1, John Wiley & Sons, 1979.

5. Code of Federal Regulations, Title 29, Part 1910.100.

VII. AUTHORSHIP AND ACKNOWLEDGEMENTS

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VIII. DISTRIBUTION AND AVAILABILITY OF REPORT

Copies of this report are currently available upon request from NIOSH, Division of Standards Development and Technology Transfer, 4676 Columbia Parkway, Cincinnati, Ohio 45226. After 90 days, the report will be available through the National Technical Information Service (NTIS), 5285 Port Royal, Springfield, Virginia 22161. Information regarding its availability through NTIS can be obtained from NIOSH Publications Office at the Cincinnati address. Copies of this report have been sent to:

1. West Virginia Geological and Economic Survey
2. NIOSH Regional Office III

For the purpose of informing affected employees, copies of this report shall be posted by the employer in a prominent place accessible to the employees for a period of 30 calendar days.

APPENDIX 1

ASBESTOS STRIPPING PROCEDURES

1. Notify EPA of intention to remove, demolish or renovate asbestos at least 20 days prior to commencement (40 CFR 61-11(d).

2. Survey the job and draw up an operational plan considering:

   a) The means for sealing off the work area.

   b) Method of transporting asbestos waste from the work area, through the barriers to transportation.

   c) Identify locations and provisions for change of rooms, toilet, and showering facilities.

   d) Choice of protective equipment.

   e) Contamination control procedures.

   f) Identification of sanitary land fill approved for asbestos disposal.

   g) Ventilation openings, drains, etc., to be sealed or filtered.

   h) Water and electrical services.

   i) Monitoring facilities and frequency of sampling.

   j) Identification of the equipment to be covered/removed.

   k) Provisions for maintenance.

   1) Security system.

3. Air sampling to determine background fiber levels.

4. Begin operation by removing designated equipment. Cover remaining equipment and hard to clean surfaces with PVC or polyethylene sheet. Seal openings, such as windows, doors, ventilation systems, etc.

5. Seal off the area with PVC or polyethelene sheet. Overlap joints and heat seal or tape. If the area to be stripped is large, it should be compartmentalized. Access into the work zone must be through an air lock system which may be incorporated into the changing and washing facilities. The work area should be kept below atmospheric pressure with an exhaust fan equipped with an absolute filter. Floors should also be covered.

6. The barrier, air lock system should be constructed so that the worker passes from the work zone into successively cleaner areas, e.g., work zone to vacuum area to asbestos clothing change room to shower room to personal clothing change room to external unrestricted area.

7. Asbestos removal: Water spraying with respraying as required if dust occurs during removal of the material by dislodgement and scraping. The water should be ammended with a wetting agent. Dry stripping requires EPA approval. (40 CFR 61.22(d)(ii).

8. Air sampling inside and outside the work zone should be conducted to insure that the barriers are effective and to confirm the suitability of the respirators.

9. The asbestos stripped should be caught and not allowed to fall to the floor, if possible. Asbestos should be bagged and labeled according to OSHA regulations using 6 mil or heavier plastic bags. The use of 55 gallon drums is strongly recommended as a secondary containment for the bags. Material should not be allowed to accumulate and none should be left unbarrelled at the end of the day. Bags and drums must be wiped down before removal.

10. All of the surfaces should be washed down or vacuumed after stripping and removal is completed. Work should progress from the top to the bottom.

11. It is virtually impossible to remove all of the asbestos and once the stripping is completed, but before the barriers are removed, the surfaces should be coated with a sealant. An emulsion type paint is acceptable.

12. Air sampling should be performed before removal of the barriers and thereafter over an extended period of time to insure that effective control has been provided.

13. Dismantle the barriers and dispose in a landfill.

Concentrations in multiples of permissible exposure limits	Facepiece Pressure	Permissible respirators
5 X	-	Single use dust*
	-	Quarter-mask dust
10 X	-	Half mask dust
	-	Half- or quarter mask, fume
	-	Half- or quarter mask, high-efficiency
	-	Half-mask supplied air
50 X	-	Full facepiece, high-efficiency
	-	Full facepiece, supplied air
	-	Self-contained breathing apparatus (SCBA)
1,000 X	+	Powered, high-efficiency, all enclosures
	+	Half-mask, supplied air, Type C positive pressure, demand mode
2,000 X	+	Supplied air with full facepiece hood, helmet or suit, Type C positive pressure, demand mode
10,000 X	+	Full facepiece, SCBA
	+	Full facepiece supplied air and auxiliary self-contained air supply
Emergency entry into unknown concentrations or firefighting	+	Full facepiece SCBA
Escape only 1/	+	Any SCBA
	-	Any self rescuer

1/ In an atmosphere which is immediately dangerous to life or health.

NOTES: 1. Half-mask and quarter-mask respirators should not be used if the particulate matter causes eye irritation at the use concentrations.

2. Full facepiece supplied-air respirators should not be used in any atmosphere which is immediately dangerous to life or health unless it is equipped with an auxiliary air supply which can be operated in the positive pressure.

Source: "Respirator Protection Factors," E. Hyatt. Los Alamos Scientific Laboratory Publication LA - 6084-MS, January, 1976.

* On the issue of asbestos, the Institute wishes to state that although asbestos can produce fibrosis, this effect pales in significance in comparison to the known human and animal carcinogenicity of this fibrous material. It is not our position that single-use dust respirators will provide adequate protection against the cancer causing potential of asbestos. In light of the present knowledge concerning the carcinogenicity of asbestos, the listing of asbestos as an example of a "fibrosis-producing dust" in Section 11.130(h) can only be viewed as misleading. In the document entitled "Workplace Exposure to Asbestos: Review and Recommendations," the Institute concluded that "there is no asbestos exposure level below which clinical effects do not occur; significant disease can occur following very short (1 day to three months) exposure periods; worker exposures to asbestos must be controlled to the maximum extent possible; and human occupational exposures to all commercial asbestos fiber types have been associated with high rates of lung cancer and mesothelioma."

APPENDIX 3

GUIDELINES FOR REDUCING ASBESTOS EXPOSURE

1. The ventilation system should be turned off and remain off until the work is completed and the area has been cleaned.

2. Whenever asbestos containing material must be handled, an approved respirator should be worn.

3. Make sure that only those persons who are necessary for the job are in the area.

4. Place a plastic drop cloth below the work area.

5. Spray the asbestos containing material with water before it is disturbed.

6. Put all the asbestos removed into a heavy plastic bag, label it and send to a landfill approved for asbestos disposal.

7. After the job is completed, clean all the ladders and tools used with a wet cloth.

8. Roll up the dropcloth carefully and put it in a plastic bag. Discard the bag.

9. Clean the floor below the work area with a wet mop.

10. Put the mop head and the cloth used to clean the ladders in a plastic bag while they are still wet, seal the bag, and discard it.

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