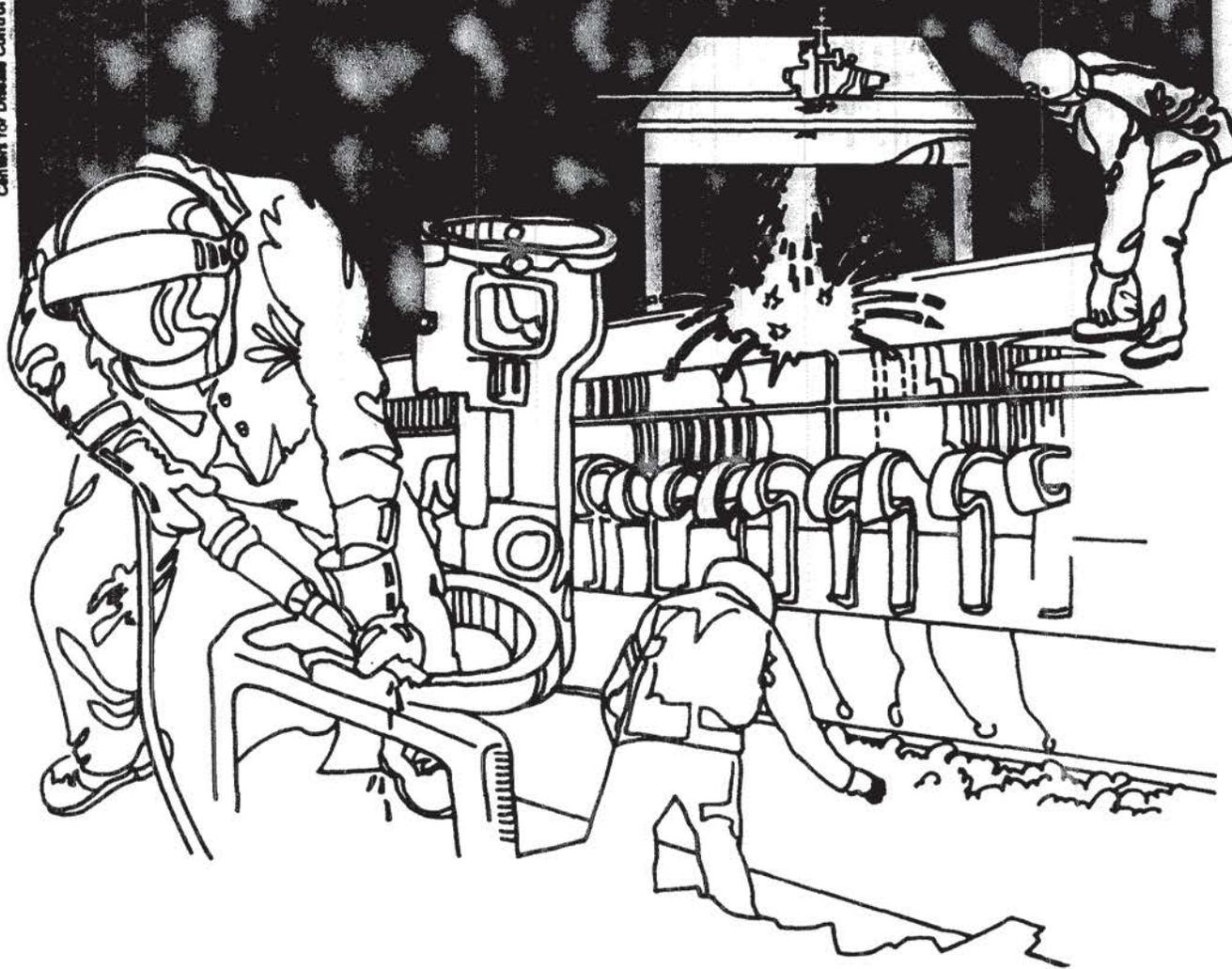


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## Health Hazard Evaluation Report

HETA 83-214-1424  
WEST VIRGINIA AIR NATIONAL GUARD  
167TH TACTICAL AIRLIFT GROUP  
MARTINSBURG, 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.

Mention of company names or products does not constitute endorsement by the National Institute for Occupational Safety and Health.

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WEST VIRGINIA AIR NATIONAL GUARD  
167TH TACTICAL AIRLIFT GROUP  
MARTINSBURG, WEST VIRGINIA

NIOSH INVESTIGATOR:  
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I. SUMMARY

On March 22, 1983, the National Institute for Occupational Safety and Health (NIOSH) received a request to evaluate a nuisance dust problem in the Finance Section of the West Virginia Air National Guard's 167th Tactical Airlift Group in Martinsburg, West Virginia. This finance section consists of the payroll, budget and comptroller's offices. An industrial hygiene evaluation for dust was made in each office with particular attention on the payroll office, which contained the most probable sources for exposure. These were the card punch, a decollator (removes carbons from reports), a paper shredder and a recirculating air conditioning system.

Respirable and total dust samples were taken throughout the three offices as area samples. All four of the respirable samples evaluated ranged from 0.17 to 0.34 milligrams per cubic meter ( $\text{mg}/\text{m}^3$ ) with an arithmetic mean of  $0.26 \text{ mg}/\text{m}^3$ . The four total dust samples ranged from 0.28 to  $0.32 \text{ mg}/\text{m}^3$  with an arithmetic mean of  $0.30 \text{ mg}/\text{m}^3$ . The outdoor control sample was an area respirable sample and measured  $0.34 \text{ mg}/\text{m}^3$ . Both indoor respirable and total dust samples were below the control sample and well below the federal standard of  $5 \text{ mg}/\text{m}^3$  and  $15 \text{ mg}/\text{m}^3$  respectively for nuisance particulates. Eight settled dust samples were also collected from the three offices. These samples revealed fiberglass, cellulose fibers, and woody cells in the payroll, budget and comptroller's office.

On the basis of this survey, NIOSH has determined that there are no environmental hazards in the offices. However, recommendations have been made in the body of this report for the existing air conditioning system.

KEYWORDS: SIC 9190, dust, fibrous glass.

## II. INTRODUCTION

On March 22, 1983, NIOSH received a request from the Base Civil Engineer's Office of the West Virginia Air National Guard in Martinsburg, West Virginia. The request was specifically for the finance section which encompasses offices of the Comptroller, Budget, and Payroll. The primary concern was whether the dust, which could be found throughout the offices, presented a health hazard to the personnel working in these areas and what could be done to correct the problem. The survey was conducted on April 4, 1983.

## III. BACKGROUND

The 167th Tactical Airlift Group is a part of the West Virginia Air National Guard that is based at the Eastern West Virginia Regional Airport in Martinsburg, West Virginia. This facility is manned daily by some 220-230 active duty Air National Guard personnel and approximately 900 weekend reservists. It has the responsibility for serving the Armed Forces on a worldwide scale. It is also a part of the Military Airlift Command (MAC). The 167th Airlift Group's primary mission is to transport troops and/or cargo worldwide via the C-130 cargo plane. Its secondary mission is to function as an Aero Med evacuation for ambulatory patients.

The survey was conducted in the offices of the Finance section in Hangar Building #110. This finance section employs approximately 10 people and is responsible for the personnel payroll and monies spent at the base. It is in this section where dust has been a problem from the daily build up. Surfaces can be wiped clean and have a build up 20 minutes later. At the time of the survey request, there were no medical complaints.

## IV. EVALUATION DESIGN

Ambient environmental sampling was conducted for respirable dust using a Dupont P2500 pump and an M-5 37 mm filter with a 5.0 micron (um) pore size. The filter unit consists of a two piece cassette holder mounted in a 10 mm nylon cyclone. The pump was calibrated with the filter unit at 1.7 liters per minute (lpm). The total dust samples were collected using a Dupont P2500 pump and the same filter set up minus the 10 mm cyclone. The sample configuration was calibrated at 2.0 lpm.

Surface samples were collected from three offices using clear, transparent tape which was then placed onto a clean glass slide for examination using polarized light microscopy.

V. EVALUATION CRITERIA

Environmental standards and criteria considered applicable to this evaluation are shown below. These criteria and standards were established at levels to protect the health of workers occupationally exposed to a substance on an 8 or 10 hour day, 40 hour per week basis over a normal working lifetime. NIOSH maintains that the worker be protected by the standard or recommended levels that afford him the greatest degree of protection. The primary sources of environmental evaluation criteria considered in this report are:

A. Environmental

- a) Current American Conference of Governmental Industrial Hygienists (ACGIH) 1982 Threshold Limit Values (TLVs)<sup>(R)</sup> with supporting documentation, <sup>(1)</sup>
- b) Occupational Safety and Health Administration Standards (OSHA), 29CFR 1910, Nov. 1978. <sup>(2)</sup>

<u>Substance</u>	<u>ACGIH</u> (a)	<u>OSHA</u> (b)
Respirable Dust	5 mg/m <sup>3</sup>	5 mg/m <sup>3</sup>
Total Dust	10 mg/m <sup>3</sup> *	15 mg/m <sup>3</sup>

NOTE: \*For those nuisance particulates containing less than 1% quartz.

B. Health Effects

While the levels monitored for respirable and total dust do not represent a health hazard, the following is being summarized to explain their effects upon the body. Additionally, fiberglass was found on most surfaces in every office and will also be addressed.

Respirable Dust<sup>(3)</sup>

This type of dust is capable of reaching the non-ciliated, alveolar regions of the lung and because of its size, which most often is less than 5 microns, may accumulate. If these dusts are toxic or irritating, tissue reaction may occur.

Total Dust

This type of sample collects dust in the ranges of 1-30 microns. Those particles greater than 5 microns are usually deposited in the nose, throat and upper airways. Particles trapped in this nasopharyngeal area normally elicit irritations with acute symptoms of runny noses, tearing, sore throats, chest tightness and/or coughing. In most cases, these symptoms will dissipate upon removal from dust.

### Fibrous Glass(4)

Fiberglass is a manufactured fiber in which the fiber-forming substance is glass. Pragmatically, a "fiber" has been defined as a particle with a length-to-diameter ratio of 3 to 1 or greater, and a length of at least 10 microns. With smaller fibers there is less definite health effect information, but there is greater potential for deposition deep within the lung.

## VI. RESULTS AND DISCUSSION

Table I summarizes the sampling results. Four area respirable dust samples were collected in the Finance section. Gravimetrically, particulate concentrations ranged from 0.17 to 0.34 mg/m<sup>3</sup> with a mean of 0.26 mg/m<sup>3</sup>. An outdoor sample was taken for comparison. This was collected on a compressor five feet from entrance to the payroll office.

Four area total dust samples were collected in the Finance section. Gravimetrically, these samples ranged from 0.28 to 0.32 mg/m<sup>3</sup> with a mean of 0.30 mg/m<sup>3</sup>. These concentrations are well below the federal standard for nuisance dust.

Settled dust samples were collected in all three of the offices in an attempt to determine a source of the nuisance particulate. The samples revealed that fiberglass (3.5-10 microns), cellulose fibers and woody cells were present and common to all of the offices. Of these, the fiberglass is most probably coming from the thermal insulation lining the interior of the ventilation duct of the air conditioning system. The fiberglass lining the ducts is aged and has begun to shed fibers into the environment.

The woody cells and cellulose fibers found are coming from the card punch and decollator. These nuisance particulates are picked up by the air handling system and then distributed throughout the offices, when on. This system was not on at the time of the survey, but due to the movement of personnel, air infiltration<sup>(5)</sup> (doors, leaks) and some ceiling tile missing in some offices, these particulates were found throughout the offices. The false ceiling above the offices is used as the return and with the ceiling tile missing, any collected material there is being re-suspended in the air and settling in the offices. When the air conditioning unit is turned on and ceiling tile replaced, an efficient, but inexpensive air filter should be used to filter out these particulates.

## VII. RECOMMENDATIONS

The following recommendations are being made to improve comfort and aesthetics:

### A. Ventilation

- 1) Remove the present fiberglass lining the duct and replace, internally or externally, with a fiberglass lining which is coated or impregnated to prevent fiber shedding.
- 2) Supply enough outdoor air to the existing system to meet the current indoor air quality requirements for occupied office spaces. Currently, this is 5 cubic feet per minute (cfm) per person for non-smoking offices and 20 cfm per person for smoking offices.<sup>(5)</sup>
- 3) Provide an efficient air filter for the nuisance particulates and have a scheduled maintenance inspection for filter replacement.

### B. General

- 1) Replace the ceiling tile which was removed in the Budget Office. The area above this ceiling is used as a return and with these tiles missing, nuisance particulates will settle out in this and other offices.
- 2) Thought should be given to relocating the shredder, card punch and decollator to one room and using local exhaust ventilation to remove those nuisance particulates which are generated. A portable exhaust similar to those used in welding operations could be utilized and turned on when equipment is operating.

## VIII. REFERENCES

1. American Conference of Governmental Industrial Hygienists, Threshold Limit Values (TLVs)<sup>(R)</sup>, 1982.
2. General Industry, Occupational Safety and Health Administration Standards, 29 CFR, 1910.1000, 1978.
3. Doull, John and Louis J. Casarett (1980), Toxicology, The Respiratory System, MacMillan Publishing Co., New York, pg 246-273.
4. Criteria for a Recommended Standard for Occupational Exposure to Fibrous Glass, NIOSH, Publication 77-152, April 1977.
5. "Ventilation for Acceptable Indoor Air Quality", ASHRAE Standard 62-81, American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 1981.

IX. AUTHORSHIP AND ACKNOWLEDGEMENTS

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X. DISTRIBUTION AND AVAILABILITY

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. Bill B. Burkhardt, Capt., WVANG
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.

Table I

Environmental Data  
West Virginia Air National Guard  
167th Tactical Airlift Group  
Martinsburg, West Virginia

<u>Sample #</u>	<u>Location</u>	<u>Type Sample</u> <sup>(A)</sup>	<u>Concentration Results</u> <sup>(B)</sup>	<u>TWA</u> <sup>(C)</sup>
1	Payroll Office	R,A	.34	.15
2	Payroll Office	R,A	.17	.07
3	Payroll Office	T,A	.30	.13
4	Payroll Office	T,A	.32	.12
5	Budget Office	R,A	.33	.15
6	Budget Office	T,A	.28	.13
7	Comptroller's Ofc.	R,A	.21	.09
8	Comptroller's Ofc.	T,A	.31	.13
9	Outside Compressor	R,A	.34	.09
10	Video Display Terminal (Screen)	S	CF,FG	
11	Video Display Terminal (Back)	S	SD	
12	Diffuser (Budget)	S	CF,FG	
13	Pipe Insulation (Comptroller)	S	FG	
14	Pipe Insulation (Comptroller)	S	FG	
15	Diffuser (Center of Room-Comptroller)	S	CF,FG	
16	Decollator (Payroll)	S	CF,FG,WC	
17	Card Punch (Payroll)	S	CF,FG,WC	

## NOTE:

(A) R(respirable), A(area), T(total), S(surface).

(B) Dust sample results are reported in milligrams per cubic meter ( $\text{mg}/\text{m}^3$ ). CF(cellulose fiber), FG(fiberglass), SD(settled dust), WC(woody cells).

(C) Time weighted average.