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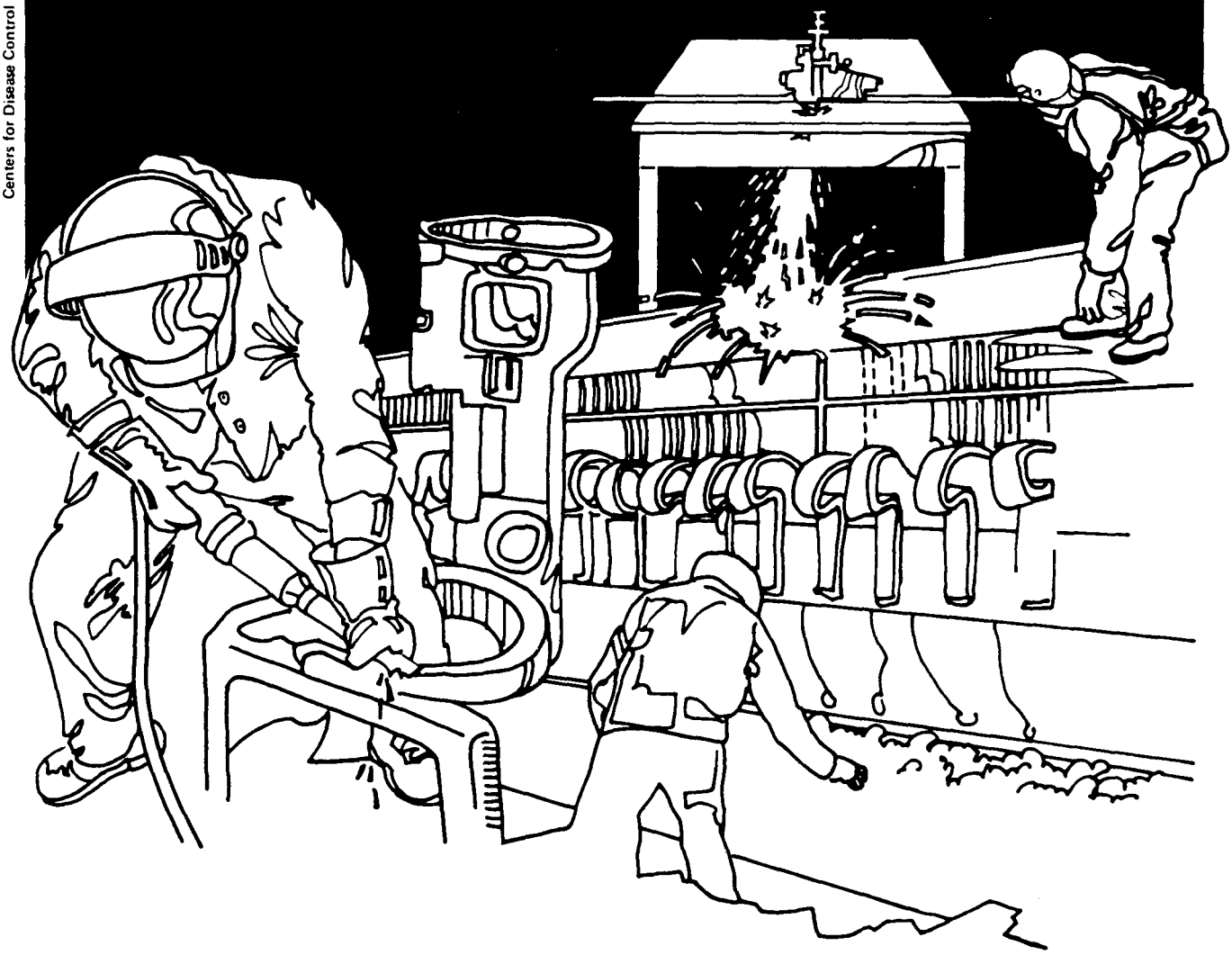

Health Hazard Evaluation Report

HETA 84-324-1526
NASSAU COUNTY HEALTH
DEPARTMENT LABORATORIES
HEMPSTEAD, NEW YORK

Region 2

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.

HETA 84-324-1526
NOVEMBER 1984
NASSAU COUNTY HEALTH DEPARTMENT LABORATORIES
HEMPSTEAD, N. Y.

NIOSH INVESTIGATOR:
Nicholas Fannick

I. SUMMARY

In April 1984, the Administration of the Nassau County Department of Health requested that the National Institute for Occupational Safety and Health (NIOSH) perform a health hazard evaluation at the Nassau County Health Department Laboratories, 205-209 Main Street, Hempstead, N.Y. 11550. The request was concerned with the ability of the ventilation system of the laboratories to supply an adequate amount of air to the area, the adequacy of the exhaust systems of the laboratory hoods and the advisability of providing periodic biological monitoring and vaccinations for employees who process biological samples for screening infectious diseases such as hepatitis, tuberculosis and syphilis.

A NIOSH representative visited the laboratories on May 1, June 14 and July 27, 1984 to inspect the site and to perform ventilation measurements.

The ventilation system was determined to provide a supply of air which met the recommendations of the American Society of Heating, Refrigerating and Air-Conditioning Engineers for general office occupancy in non-smoking areas. A few hoods were found to provide less than the recommended exhaust flow. The mycobacteriology laboratory was noted to be maintained under positive pressure and should be maintained under negative pressure.

With regard to the question of biological monitoring and vaccinations, the Office of Biosafety of the Center for Infectious Diseases of the Centers for Disease Control was consulted for advice on biosafety in medical laboratories. That office recommended that the procedures for monitoring workers exposed to infectious agents outlined in the CDC publication "Biosafety in Microbiological and Biomedical Laboratories" be followed.

Based on the results of the ventilation survey, it is recommended that the exhaust system for the large laboratory hood in the trace organics annex be repaired and that the ventilation system, including the hoods, in the mycobacteriology laboratory be adjusted to provide negative pressure in the laboratory.

KEYWORDS; SIC 8071 (Medical Laboratories), ventilation, biological hazards

II. INTRODUCTION

In April 1984, the Administration of the Nassau County Health Department requested that NIOSH perform a health hazard evaluation at the Health Department laboratories, 205-209 Main Street, Hempstead, Long Island, New York. The request was primarily concerned with an evaluation of the ventilation system of the facility, and also sought information about medical monitoring and vaccination of the laboratory staff who handled biological specimens of infectious material. A representative of NIOSH visited the site on May 1, June 14 and July 27, 1984 to inspect the laboratories and to perform ventilation measurements. On July 29, 1984 a letter was sent to the Director of Laboratories outlining the findings of this report.

III. BACKGROUND

The Nassau County Health Department Laboratories are quartered in two interconnected, vintage 1940, one-story buildings. About 65 persons work in the laboratories, which occupy about 80,000 square feet. The ceiling height is about 20 feet in most of the laboratories, except for a few rooms where false ceilings have been installed. The Nassau County Health Department began occupying the site in 1971. As the building was occupied, ventilation systems were added, and there are now several ventilation systems serving the building. A "system" may serve several laboratories or one small room. The rear of the east building is still unimproved, and has no supplied air ventilation.

IV. EVALUATION DESIGN AND METHODS

MEDICAL MONITORING

The Center for Infectious Diseases of the Centers for Disease Control was contacted for information about medical monitoring and innoculations of laboratory personnel potentially exposed to biologic hazards. It was recommended that the Nassau County Health Department Laboratories follow the guidelines for medical monitoring and immunization of laboratory personnel as set forth in the "Biosafety in Microbiological and Biomedical Laboratories", which was published by CDC in March of 1984. (Ref 2)

VENTILATION

There are two methods to determine the output of ventilation systems. The most accurate method is to measure the output directly using a "Flow Hood" instrument. In using this instrument, the air exiting the output grill is channeled through a hood, past detectors which measure the static pressure of the flowing air. The air flow in cubic feet per minute (cfm) is than read directly on the instrument's meter. An alternate method is to make a number of measurements of air velocity while transversing the output grill with an instrument such as a thermal anemometer or flow meter to determine the velocity of the air in feet per minute, and then averaging those measurements. The output in cfm is then calculated by multiplying the average velocity by the area of the grill.

The advantage of the direct reading method is that it is quick and accurate. The disadvantage is that the instrumentation requires an unobstructed distance of about 3.5 feet in front of the output grill, and there is a limitation in the size of the grills which can be measured. The advantage of the transverse method is that measurements can be made in relatively tight areas. The disadvantages are that the method is time consuming and somewhat subjective.

Because of the locations, sizes and the obstructions of the different input grills, it was necessary to use both methods to determine the total air input in the laboratories.

V. EVALUATION CRITERIA

There is no Federally mandated standard for the amount of ventilation to be supplied to office areas or laboratories. The American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) is a consensus group of professional ventilation engineers. ASHRAE has recommended (Ref 1) that a minimum of 7 cubic feet per minute (cfm) of fresh, outdoor air per person be supplied to office areas where smoking is not permitted and that a minimum of 20 cfm of fresh, outdoor air per person be supplied to office areas where smoking is permitted. As smoking is allowed only in a few designated areas of the building, the non-smoking recommendation of 7 cfm applies in this situation.

ASHRAE, the American Chemical Society and many other consensus groups recommend that a face velocity of 100 linear feet per minute be maintained through laboratory hoods which are used in conjunction with non-toxic chemicals. A face velocity of 150 linear feet per minute is recommended with the use of more hazardous chemicals. The publication "Biosafety in Microbiological and Biomedical Laboratories" recommends specific types of safety cabinets (hoods) for use with potentially infectious specimens in laboratories, such as the Nassau County laboratory.

VI. RESULTS

Table I presents the results of the ventilation survey. In general, the amount of air supplied to the work areas of the laboratories met the ASHRAE recommendation for non-smoking areas.

The exhaust system for the large hood in the trace organics annex was not operable when surveyed. It is believed that the motor burned out just prior to the survey. The ventilation system for the bacteriology laboratory was found to be under slightly positive pressure. This ventilation system for this laboratory is designed to maintain the laboratory under negative pressure. In this area of the building, the air returns to the air conditioners through the corridors. The force of the air returning to the air conditioners counteracts the negative pressure in the bacteriology laboratory and produces a positive pressure in the laboratory. If the air conditioners are turned off, the laboratory returns to conditions of negative pressure. The safety cabinets in the bacteriology laboratory maintained a negative air flow of less than the 75 linear feet per minute recommended in "Biosafety in Microbiological and Biomedical Laboratories".

The amount of air supplied to the clinical immunology and virus serology laboratories met the ASHRAE recommendations. The temperature in these areas was about 75 degrees Fahrenheit while the temperature in the other areas of the building was about 70 degrees Fahrenheit. These laboratories are about 30 feet by 30 feet with 12 foot ceilings, and the total area of these laboratories apparently cannot be cooled to the same degree as the other sections of the building because they receive a relatively limited amount of air (260 cfm and 310 cfm) per unit volume.

No air was supplied to the office of the Director of Environmental Health. Apparently the grill has been blocked on his request.

VII. RECOMMENDATIONS

NIOSH recommends that the exhaust system for the large hood in the trace organic annex be repaired. The ventilation system in the area of the bacteriology laboratory should be adjusted so that the bacteriology laboratory is maintained under negative pressure at all times. The exhaust ventilation of the safety cabinets should be adjusted to maintain an exhaust air flow of at least 75 linear feet per minute.

Any questions concerning biosafety and medical screening of laboratory personnel which are not addressed in "Biosafety in Microbiological and Biomedical Laboratories" can be referred to the Office of Biosafety at the Centers for Disease Control, Building 4, Room 232, 1600 Clifton Road, NE, Atlanta, Georgia 30333, telephone number 404-329-3883.

VIII. REFERENCES

1. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. ASHRAE handbook--fundimentals. Atlanta, GA: ASHRAE, 1981.

2. Centers for Disease Control/National Institutes of Health. Biosafety in microbiological and biomedical laboratories. Atlanta, GA: Public Health Service, 1984. (HHS publication no. (CDC) 84-8395)

IX. ACKNOWLEDGEMENT AND AUTHORSHIP

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X. 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 Road, Springfield, VA 22161. Information concerning its availability through NTIS can be obtained from the NIOSH Publications Office at the Cincinnati address.

Copies of this report have been sent to:

1. The Nassau County Department of Health Laboratories
2. The Nassau County Department of Health
3. OSHA, Region II
4. NIOSH, Region II
5. The New York State Department of Health

TABLE I

VENTILATION SURVEY

NASSAU COUNTY DEPARTMENT OF HEALTH
LABORATORIES
209 Main Street
Hempstead, N.Y. 11550

LOCATION	QUANTITY OF AIR (Cubic Feet per Minute)	
Immunofluorescence	640	in
& GC Bacteriology	120	in
HOOD	0	(burned out motor)
Glassware & Media	100	out
	0	---
	0	---
	1000	out
	180	in
	540	in
	150	in
	370	in
Glassware Annex	70	in
	50	in
HOOD	350	out
Autoclave and Waste Disposal	100	in
	140	in
	130	in
	1400	out
Trace Organics	200	in
	0	---
	270	out
	210	in
	170	in
	340	in
	380	out
	xxx	obstructed
HOOD	100	out

TABLE I (CONTINUED)

LOCATION	QUANTITY OF AIR (Cubic Feet per Minute)	
Trace Organics Annex		
SMALL HOOD	100	out
LARGE HOOD	0	(burned out)
Air Pollution/Trace Organics	400	in
	550	in
	1100	in
	1400	in
	1400	in
	1100	in
	550	in
	400	in
	1500	in
HOOD	700	out
Instrument Room	180	out
	xxx	(obstructed)
Unused Room	100	out
	0	---
	xxx	(obstructed)
Director's Office	150	in
General Office	1800	in
	900	in
	900	in
Library	100	in
	100	in
Data Processing	340	out
	450	in
	380	out
Annex	180	in
	50	out
Office near Reception	360	in
	230	out

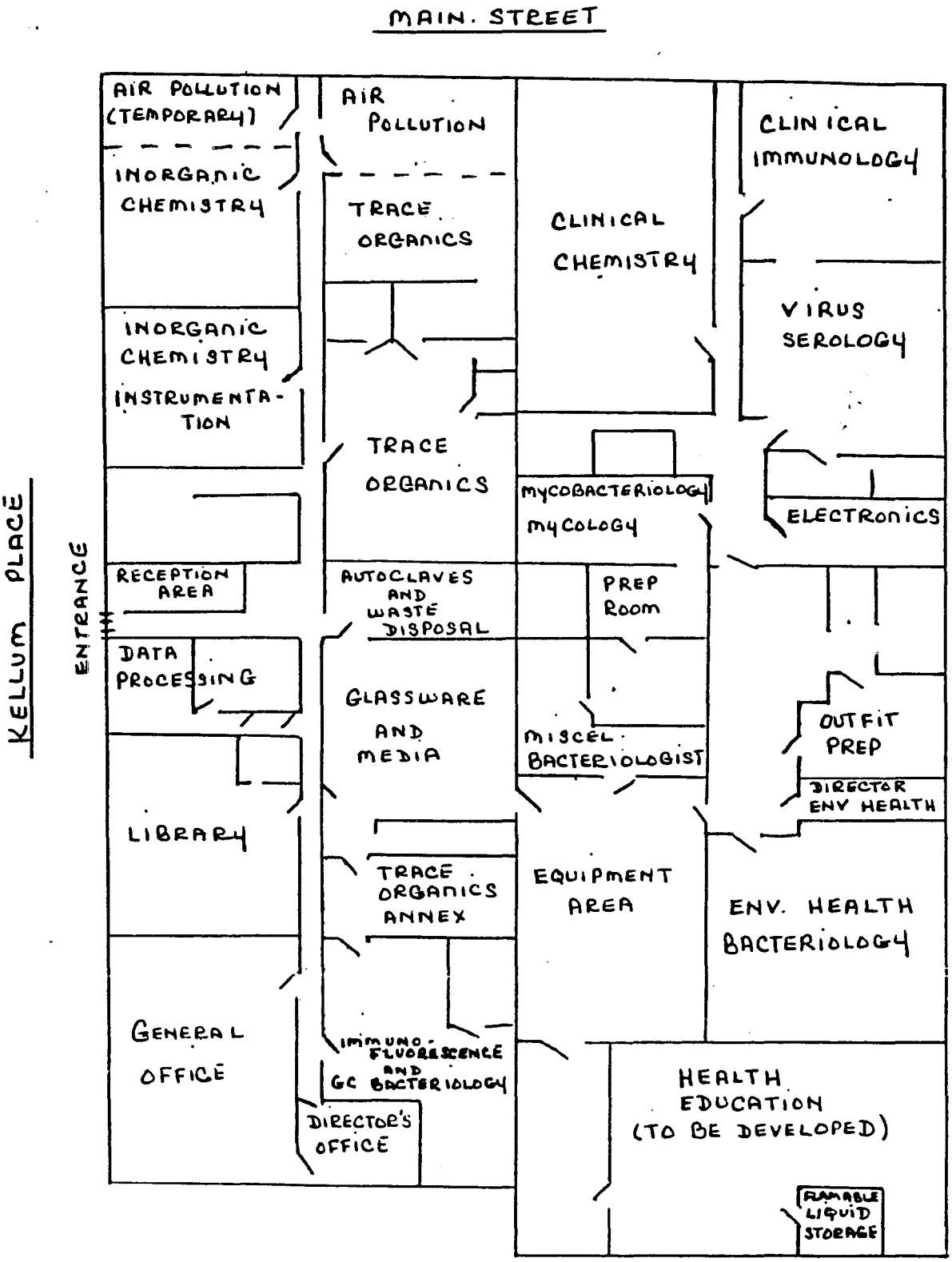
TABLE I (CONTINUED)

LOCATION	QUANTITY OF AIR (Cubic Feet per Minute)	
Inorganic Instrumentation	700	in
	1400	in
	1500	in
	xxx	(obstructed)
HOOD	150	out
EVAPORATION HOOD	50	out
EVAPORATION HOOD	50	out
Inorganic Chemistry	1400	in
	1400	in
	1250	in
	840	in
Equipment Storage Area	280	in
	170	in
	0	---
Miscellaneous Bacteriology	80	in
	250	in
	360	in
	180	out (thru-wall return)
Enterics	140	in
	420	out (thru-wall return)
	150	out (thru-wall return)
Preparation	100	in
Mycology/mycobacteriology	300	in
	100	out
GLOVE BOX	100-150	out
T B HOOD	30-40	out
Unused Area	100	out
	60	out
Clinical Chemistry	240	in
	100	out (thru-wall return)
	250	in
	xxx	(obstructed)

TABLE I (CONTINUED)

LOCATION	QUANTITY OF AIR (Cubic Feet per Minute)	
Clinical Immunology	260	in
	0	xxx
	0	xxx (thru-wall return)
Virus Serology	310	in
Virus Serology Annex	100	in
Hall	3600	out
Electronics Room	100	in
Outfit Preparation	260	in
Director of Environmental Health	0	---
Environmental Health Bacteriology	150	in
	170	in
	120	in
	140	in
Health Education	to be developed	

NASSAU COUNTY DEPARTMENT OF HEALTH - LABORATORIES



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