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IN REPLY REFER TO:

6260  
G1A/057  
08 Feb 12

From: Commanding Officer, Naval Hospital, Lemoore  
To: Chairman, Meteorology Department, Naval Postgraduate  
School, Monterey, 589 Dyer Road, Monterey CA 93943

Subj: TWO-YEAR INDUSTRIAL HYGIENE SURVEY, METEOROLOGY  
DEPARTMENT, NAVAL POSTGRADUATE SCHOOL, MONTEREY

Ref: (a) OPNAVINST 5100.23G, Chapter 8

Encl: (1) Industrial Hygiene Survey Report 62271-12-1

1. Per reference (a), a two-year industrial hygiene survey of the Meteorology Department, Naval Postgraduate School, Monterey was conducted by the Naval Hospital, Lemoore, Monterey area Industrial Hygienist on 10 January 2012.
2. The cooperation and hospitality shown by Mr. Dick Lind contributed to a timely assessment of your safety and health programs. This assistance is highly appreciated.
3. **There were no Findings during the current survey and this report is forwarded for information only. Dick Lind continues to maintain the Hazardous Materials Control Program in excellent status.**
4. If there are any changes in operations, please complete Appendix I and forward it to the Industrial Hygienist. If further consultation on this report is needed, please contact the Industrial Hygienist, S. Eric Thurston at COMM 831-656-2477, e-mail sethurst@nps.edu.

W. H. CHO  
By direction

Copy to:  
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Two-Year Industrial Hygiene Survey  
Of  
**Meteorology Department**  
**Naval Postgraduate School, Monterey**  
**Report 62271-12-1**  
10 January 2012

Survey Conducted by: S. Eric Thurston,  
Industrial Hygienist

Survey Reviewed and Approved by: Michael J. Puckett, MPH, REHS  
Supervisory Industrial  
Hygienist

## TABLE OF CONTENTS

Title Page	Page 1
Table of Contents	Page 2
Executive Summary	Page 3
Discussion, Findings and Recommendations	Page 4
Appendix A, IH Exposure Assessment/Monitoring Plan	Page 7
Appendix B, Personal Exposure Monitoring Results	Page 9
Appendix C, Measured Equipment Noise Levels	Page 10
Appendix D, Local Exhaust Ventilation System Evaluation	Page 11
Appendix E, Respiratory Protection Program Matrix	Page 12
Appendix F, Medical Surveillance Program Matrix	Page 13
Appendix G, Training Matrix	Page 14
Appendix H, Glossary	Page 15
Appendix I, Change of Operation Notification Form	Page 17

**Report 62271-12-1**  
**EXECUTIVE SUMMARY**

A two-year industrial hygiene survey of the Naval Postgraduate School, Monterey, Meteorology Department was recently conducted.

**There were no deficiencies noted during this survey. The hazardous materials control program continues to be maintained in an excellent status.**

Overall, the occupational health portion of the department's NAVOSH Program is **Excellent**.

## DISCUSSION, FINDINGS, AND RECOMMENDATIONS

Reference: (a) OPNAVINST 5100.23G, Chapter 8

As required by reference (a), a two-year industrial hygiene survey was conducted on 10 January 2012 of the Meteorology Department, Naval Postgraduate School, Monterey. The primary purpose of this survey was to identify any new occupational hazards, review the occupational health portion of the department's NAVOSH program and update the Exposure Monitoring Plan.

A. ENGINEERING CONTROLS: Use of temperature-controlled soldering irons to minimize generation of lead fumes during soldering with lead-tin solder.

B. RESPIRATORY PROTECTION PROGRAM: Departmental personnel are not required to wear respirators during performance of operations, and they are not worn on an elective basis.

C. HAZARDOUS MATERIAL CONTROL AND MANAGEMENT PROGRAM: **A departmental hazardous materials inventory list is available, and a spot check indicates that MSDS's have been obtained for all chemical products stored/used. MSDS's are neatly arranged in order in back of the inventory list, which appears at the front of the MSDS binder. Particularly impressive is that containers of the same chemical product are arranged in rows in the flammable storage locker so that the contents of the front container can be completely used before a second container is opened. This practice is anticipated to minimize the number of chemical product containers that need to be stored in the locker.**

D. HEARING CONSERVATION PROGRAM: The only source of hazardous noise in past surveys was from use of the the MAE Department's bench band saw in Bldg 230. The Meteorology Department occupies no space in the reconstructed Building 230, and therefore hazardous noise exposures do not occur.

E. PERSONAL PROTECTIVE EQUIPMENT (PPE): The following PPE is required for adequate protection against potential health hazards associated with departmental operations:

PPE	PROCESS/PURPOSE
Safety glasses	Lead-tin soldering and during rare use of minimal amounts of chemical products

All PPE were found to be clean, serviceable, and properly stored.

F. IONIZING/NON-IONIZING RADIATION CONTROL PROGRAMS: Not applicable. The aerosol spectrometers with enclosed class II lasers are no longer used.

G. ERGONOMICS: The only ergonomic hazard presented during past surveys involved the handling of buoys and their associated 30 and 50 pound buoy weights at the Buoy Lab. At present, this lab is dormant since the reconstructed building it was formerly house in does not include space for this department. All equipment associated with the Buoy Lab has been stored in Conex boxes at the NPS Golf Course Annex, and therefore current ergonomics hazards continue to be absent from this department.

H. OCCUPATIONAL REPRODUCTIVE HAZARDS PROGRAM:

Per reference (a), Chapter 29 reproductive hazards include:

- \*lead during soldering, and
- \*toluene during rare use of Star Brite Liquid Electrical Tape

3M Scotchkote Electrical Coating, which contains toluene, as well as \*ethanol, are stored in the Room 600 flammable storage locker but not currently used.

Lead presents a hazard to males, females, and developing fetuses, while ethanol and toluene are hazardous to developing fetuses only. As discussed in the Appendix A exposure assessment section of this report, significant exposures are not expected. Since only males handle chemical products in this department, ethanol and toluene do not present reproductive hazards.

I. MEDICAL SURVEILLANCE PROGRAM: As indicated in Appendix F of this report, medical surveillance based on industrial hygiene exposure assessment is unnecessary. However, additional surveillance may be identified separately by the NPS Safety and Occupational Health Office based on safety requirements and their inspection results .

J. TRAINING MATRIX: See Appendix G for the Training Matrix based on occupational health-related assessments conducted by the Industrial Hygienist. Additional training for safety-related hazards or requirements may be identified separately by the NPS Safety and Occupational Health Office.

**APPENDIX A**

IH EXPOSURE ASSESSMENT/MONITORING PLAN				
WORKPLACE INFORMATION				
<b>Organization:</b> Naval Postgraduate School		<b>Department:</b> Meteorology		
<b>Location:</b> Bldg 232, Rooms 600, 609		<b>Survey Point Of Contact:</b> Dick Lind		<b>Phone:</b> 831-656-3110
<b>Workers:</b> 2		<b>Male:</b> 2		<b>Female:</b> 0
<p><b>Operations:</b> Room 600 (the Balloon Room) contains equipment used for minor maintenance and setup of balloon-related equipment and systems; this room is also being used to develop software associated with experimental equipment, and to store equipment not currently in use.</p> <p>Occasional lead-tin soldering is performed but less often than during the previous survey. Radiosones are filled with helium for launching during field experiments on the roof of Spanagel Hall, but approximately half as much as during the previous survey. The only two chemical products currently in use are Star Brite Liquid Electrical Tape (which contains *toluene) for sealing sensors which are placed underwater, and various silicone pastes and sealants. *Ethanol and acetone are currently stored but not used as in the past for chemical cleaning of hardware. Most chemical products are likewise stored for possible future use.</p> <p>Room 609 was used by the department in the past as an equipment storage room and also served as a staging area for outgoing/incoming equipment for field experiments, but since the previous survey this space has been taken over by another department. All functions performed in Room 609 were moved into Room 600.</p> <p>Old Building 230, the former location of the department's Buoy Lab (where buoys were repaired for stationing and recovered buoys were stored) was razed. New Building 230 is currently occupied solely by the Physics Department Free Electron Laser (FEL) Lab. Equipment and supplies associated with the Buoy Lab continue to be stored in Conex boxes as all operations associated with this lab are still suspended as in recent years. The only functioning buoy, used to collect data, is currently in the water in the San Diego area as it has been since 2007.</p> <p><b>* = Reproductive Hazard    + = carcinogen</b></p>				
WORK TASK	POTENTIAL HAZARD	WORKERS INVOLVD	FREQUENCY/DURATION	MONITORING RECOMMENDED?
Lead-tinSolder	*Lead,tin fumes	1	10 mins/month	No- EA Chem
Fill radiosnds	Helium	1	1440 ft3/year	No- EA Chem
Star Brite	*Tol, +MeCL, slvnts	1	1 ounce/year	No- EA Chem
Silicone cmpds	Solvents	1	4 ounces/year	No- EA Chem
Battery drills	*Noise	1	1 min/day	No- EA Noise

**IH EXPOSURE ASSESSMENT/MONITORING PLAN**

**WORKPLACE INFORMATION**

<b>Organization:</b> Naval Postgraduate School	<b>Department:</b> Meteorology
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**IH EXPOSURE ASSESSMENT (EA)**

**NOISE\*:** The measured noise levels of battery-powered drills used in other departments do not exceed the Navy noise criterion level of 84 dBA.

**CHEMICALS:** \*Lead and tin fume levels generated during lead-tin soldering are unlikely to exceed the AL and PEL (for lead) and MSAL and OEL (for tin) based on monitoring data of similar operations using temperature-controlled soldering irons and brief duration.

Helium concentrations are not expected to approach asphyxiation levels because the balloons are filled outdoor, where outdoor air would dilute any leakage.

Exposure to chemicals, including solvents, present in other chemical products are unlikely to exceed the MSALs and OELs based on very minimal usage. Previous monitoring data collected in the NPS Physics Department on 30 October 2002 during similar use of Star Brite Liquid Electrical Tape indicates that \*toluene exposure is below both the MSAL and OEL, and +methylene chloride exposure is far below both the MSAL and PEL-STEL.

**ENGINEERING CONTROLS:** Temperature-controlled soldering gun used to minimize generation of airborne \*lead fumes.

**PERSONAL PROTECTIVE EQUIPMENT (PPE):** Safety glasses during soldering and use of chemical products.

**RESPIRATORY PROTECTION PROGRAM (RPP):** Procedures performed in this department do not require the use of respirators, and they are not worn on an elective basis.

**\* = Reproductive Hazard    + = carcinogen**

**MONITORING PLAN**

POTENTIAL HAZARD	NUMBER OF MEASUREMENTS	METHOD OF MEASUREMENT <b>1</b>	METHOD OF MEASUREMENT <b>2</b>	FREQUENCY (per year)	MAN-HOURS (per year)
None					

Use the following codes: not applicable.

Signature: <b>Signed/</b> S. Eric Thurston, Industrial Hygienist	Date: XXXXXX 2012
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**APPENDIX B**  
**PERSONAL EXPOSURE MONITORING RESULTS**

Since 1999, industrial hygiene personal exposure monitoring in this department has not been required, and none was performed during this survey.

**APPENDIX C**  
**MEASURED EQUIPMENT NOISE LEVELS**

Personnel in this department do not currently operate and are not exposed to noise-hazardous equipment or sources.

**APPENDIX D  
LOCAL EXHAUST VENTILATION  
SYSTEM EVALUATION**

No local exhaust ventilation systems are present in departmental spaces.

**APPENDIX E**  
**RESPIRATORY PROTECTION PROGRAM MATRIX**

Respirators are not required or worn on an elective basis during any procedures performed by departmental personnel.

**APPENDIX F**  
**MEDICAL SURVEILLANCE PROGRAM MATRIX**

Enrollment in medical surveillance programs based on industrial hygiene exposure assessment is unnecessary. However, enrollment in programs may be stipulated by the NPS Safety and Occupational Health Office based on the results of their inspections and safety-related requirements.

**APPENDIX G  
TRAINING MATRIX**

COMMAND: Naval Postgraduate School, Monterey DATE: XXX 2012  
DEPARTMENT: Meteorology

PROCESS	ESAMS TRAINING MODULE
Lead-tin soldering	Lead Awareness (322), Occupational Reproductive Hazard Awareness (1242)
Star Brite Liquid Electrical Tape	Occupational Reproductive Hazard Awareness (1242)
Hazardous Materials Users	*HAZCOM Intial Training (1169)
Supervisors of Hazardous Materials Users	HAZCOM Training For Supervisors (1058) *

All training is required annually except as noted.

\*Per Chapter 6, Appendix 6-B of OPNAVINST 5100.23 personnel also need to receive documented initial training covering their work center's MSDSs, with MSDS training repeated whenever new chemical products are introduced into the workplace.

Completion of additional training modules may be prescribed by the NPS Safety and Occupational Health Office or automatically prescribed by the Enterprise Safety Applications and Management System (ESAMS) when the user logs onto his or her account.

**APPENDIX H  
GLOSSARY**

TERM	MEANING
AL	Action Level - Normally half of PEL. Exposure level at which air sampling, employee training, and medical surveillance are required.
ACGIH	American Conference of Government Industrial Hygienist
AC/HR	Air Changes Per Hour
ANSI	American National Standards Institute
AQS	Air Quality Standard
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
ASTC	Aviation Survival Training Center
C	Ceiling - Toxic material exposure level which cannot be exceeded for any length of time.
CFM	Cubic Feet Per Minute
CFR	Code of Federal Regulation
EL	Excursion Limit - Concentration limit which cannot be exceeded at any time.
EAMP	Exposure Assessment/Monitoring Program. A program to evaluate workplace health hazards through surveys and exposure measurement.
EPA	Environmental Protection Agency
ERT	Emergency Reclamation Team
FC	Footcandles
F/CC	Fibers Per Cubic Centimeter. A means for expressing airborne asbestos fiber concentrations.
FeA	Field Area
FiA	Filter Area
FPM	Feet Per Minute
FT3	Cubic Feet
HDI	Hexamethylene Diisocyanate
HEPA	High Efficiency Particulate Air
HM	Hazardous Material
HMC&M	Hazardous Material Control and Management
HW	Hazardous Waste
IES	Illumination Engineering Society
IH	Industrial Hygiene
L	Liter
LPM	Liters Per Minute
LOD	Limit of Detection
LOQ	Limit of Quantitation

**APPENDIX H (continued)**

MG/M3	Milligram Per Cubic Meter of air. A means of expressing concentrations of dust and metal fumes in the air.
MSAL	Medical Surveillance Action Level. Concentration of air contaminant at which medical surveillance examinations must be provided to exposed personnel.
MSDS	Material Safety Data Sheet. A form used by manufacturers to communicate to users the chemical and physical properties of their products.
MSM	Medical Surveillance Matrix
NAVOSH	Navy Occupational Safety and Health
NEHC	Navy Environmental Health Center
NIOSH	National Institute of Occupational Safety and Health
OEL	Occupational Exposure Limit
OH/PM	Occupational Health/Preventive Medicine
OSHA	Occupational Safety and Health Administration
OV	Organic Vapor
PPE	Personal Protective Equipment
PPM	Parts Per Million. A means of expressing the concentration of gases and vapors in the air.
PSI	Pounds Per Square Inch
RF	Radio Frequency
SOP	Standard Operating Procedure
SQFT	Square Feet
STEL	Short Term Exposure Limit. A 15 minute time weighted average exposure which should not be exceeded at anytime during a workday.
STRESSOR	Potential hazard (e.g. Noise, Chemicals, Dusts, etc.)
TLV	Threshold Limit Value. Established by ACGIH as levels of airborne contaminants or physical hazards under which it is believed workers may be exposed on a daily basis without adverse effect.
TWA	Time Weighted Average. A method of averaging varying concentrations over a specified period of time, usually 8 hours.
UG	Microgram
VOL	Volume
>	Greater Than
<	Less Than

**APPENDIX I  
CHANGE OF OPERATION NOTIFICATION**

Please use this form to notify the Industrial Hygienist of any changes to operations. This form needs to be completed and e-mailed to S. Eric Thurston, Industrial Hygienist, at [sethurst@nps.edu](mailto:sethurst@nps.edu).

POINT OF CONTACT:

TELEPHONE:

E-MAIL ADDRESS:

BLDG/ROOM #:

COMMAND/DEPARTMENT/SHOP:

NPS Meteorology

INSTRUCTIONS:

The routine industrial hygiene survey process evaluates potential hazards to employees based on existing operations at the time of the survey. When operations change, the potential hazards can also change, and these new conditions need to be evaluated. Please notify the Industrial Hygienist if any of the following occur:

- a. New operations with suspected health hazards are performed
- b. New chemical products are used (please attach a brief list and only the page(s) of associated MSDS's listing the product's manufacturer, product name, and the chemical ingredients)
- c. An increase in major chemical usage
- d. New equipment with potential noise hazards is used
- e. Other new equipment posing suspected or known health hazards, such as lasers, is used
- e. Exposure frequency and time changes of operations with potential or known health hazards
- f. A change in local exhaust ventilation systems

List any changes below.

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Date forwarded: \_\_\_\_\_