From: Officer In Charge, Naval Medical Administrative Unit, Monterey
To: Director, Center For Inter-Disciplinary Remote Piloted Aircraft Studies, Naval Postgraduate School, 3200 Imjin Road, Hangar 507, Marina CA 93933-5101

Subj: BASELINE INDUSTRIAL HYGIENE SURVEY, CENTER FOR INTER-DISCIPLINARY REMOTE PILOTED AIRCRAFT STUDIES, NAVAL POSTGRADUATE SCHOOL, MONTEREY, REPORT 66271-10-8

Ref: (a) OPNAVINST 5100.23G, Chapter 8

Encl: (1) Industrial Hygiene Survey Report 66271-10-8

1. Per reference (a), a baseline industrial hygiene survey of the Center for Inter-Disciplinary Remote Piloted Aircraft Studies (CIRPAS), Naval Postgraduate School, Monterey, was conducted by my Industrial Hygienist from 16 to 23 September 2010. The purpose of this survey was to assess the status of occupational health hazards in the workplace, identify areas in need of improvement and provide recommended corrective actions, and develop the Exposure Monitoring Plan.

2. The outstanding cooperation and hospitality shown by Roy Woods and Paul Buczynski were highly appreciated.

3. There were no findings, and corrective actions are unnecessary.

4. If there are any changes in operations, please complete Appendix J and forward it to my Industrial Hygienist. If further consultation on this report is needed, please contact S. Eric Thurston at Commercial (831) 656-2477, email at sethurst@nps.edu.

S. E. THURSTON
By direction

Copy to:
NHL/IH
NPS S&OH Mgr
Baseline Industrial Hygiene Survey
of
Center for Inter-Disciplinary Remoted Piloted Aircraft Studies
Naval Postgraduate School, Monterey
16 to 30 September 2010

Survey Conducted by:       S. Eric Thurston,
                          Industrial Hygienist

Survey Reviewed and Approved by:  Michael J. Puckett, MPH, REHS
                          Supervisory Industrial Hygienist
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table of Contents</td>
<td>1</td>
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<td>3</td>
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<td>Appendix A, IH Exposure Assessment/Monitoring Plans</td>
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</tr>
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<td>19</td>
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<td>Appendix I, Glossary</td>
<td>20</td>
</tr>
<tr>
<td>Appendix J, Change of Operation Notification Form</td>
<td>22</td>
</tr>
</tbody>
</table>
EXECUTIVE SUMMARY

1. The 2010 baseline industrial hygiene survey of the Center for Inter-Disciplinary Remote Piloted Aircraft Studies (CIRPAS), Naval Postgraduate School, Monterey, was recently conducted to assess the occupational health portion of your NAVOSH Program. Based on the results of this survey, the department will next require a periodic survey in Calendar Year 2012 unless major changes in operations occur.

2. The organization of the report is as follows:

   • Discussion, Findings and Recommendations
   • IH Exposure Assessment/Monitoring Plans, Appendix A
   • Air Sampling Results, Appendix B
   • Measured Equipment/Process Noise Levels, Appendix C
   • Field Noise Survey Forms, Appendix D
   • Local Exhaust Ventilation Systems Evaluation, Appendix E
   • Respiratory Protection Program Matrix, Appendix F
   • Medical Surveillance Program Matrix, Appendix G
   • Training Matrix, Appendix H
   • Standardized IH Glossary, Appendix I
   • Change of Operation Notification, Appendix J

3. Survey Assessment: there were no survey findings, and corrective actions are unnecessary. The hazardous materials control program is excellent, and serves as a role model. Training necessary for personnel as a result of this survey is outlined in Appendix H of this report.

4. Overall, the occupational health portion of the department’s NAVOSH Program is Excellent.
DISCUSSION, FINDINGS, AND RECOMMENDATION

Reference: (a) OPNAVINST 5100.23G

As required by Chapter 8 of reference (a), a baseline industrial hygiene of the Center for Inter-Disciplinary Remote Piloted Aircraft Studies (CIRPAS), Naval Postgraduate School, Monterey was conducted from 16 to 30 September 2010. The primary purpose of this survey was to identify and assess exposure to occupational hazards, review the occupational health portion of the NAVOSH program, and develop the Exposure Monitoring Plan (EMP).

A. ENGINEERING CONTROLS: Engineering controls to control exposures to hazardous stressors are limited to use of temperature-controlled soldering irons during lead-tin soldering.

B. RESPIRATORY PROTECTION PROGRAM (RPP): Operations requiring the use of respirators are not performed in this department, and personnel do not wear them on an elective basis.

C. HAZARDOUS MATERIAL CONTROL AND MANAGEMENT PROGRAM (HMCM): Use of hazardous materials by DoD civilians at this location is limited to acetone, isopropyl alcohol, 2-propanol, 2-butanol, and lead-tin solder. The program for the civilians is mingled with that for the contract mechanics who perform maintenance on the aircraft. Hazardous material inventory lists have been developed for each hazmat storage locker, and Material Safety Data Sheets (MSDSs) were available for chemical products stored and used. Each product has been assigned a unique number for cross-referencing between the inventory list and its MSDS. This program is excellent, and Roy Woods is to be congratulated on administering an excellent program, which serves as a role model.

D. HEARING CONSERVATION PROGRAM (HCP): The measured noise levels of the battery-powered screw guns (drills with screwdriver attachments) and Hoover vacuum unit used in the shop area by DoD personnel, as well as that for the battery-powered screw gun used by the RADAR systems manager, are below the Navy noise criterion level outlined in Chapter 18, paragraph 1803a of reference (a).
D. HEARING CONSERVATION PROGRAM (HCP) (continued):
The Manned Aircraft Program Manager can stand just outside the hangar door leading to the flight line during airplane run-up. The measured noise levels at this location exceed the Navy noise criterion level, and use of hearing protection needs to continue. However, his 8-hour TWA noise exposure does not exceed the Noise Occupation Exposure Limit (NOEL) outlined in Chapter 18, paragraph 1803a of reference (a), and therefore he is not required to receive annual hearing tests and does not require formal hearing conservation training.

E. PERSONAL PROTECTIVE EQUIPMENT (PPE): The following PPE is worn for protection against potential health hazards associated with workcenter operations. All PPE were found to be clean, serviceable, and properly stored except as noted below.

<table>
<thead>
<tr>
<th>PPE</th>
<th>PROCESS/PURPOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Five (thin) nitrile rubber gloves</td>
<td>Handling of chemicals products</td>
</tr>
<tr>
<td>Ear muffs or plugs</td>
<td>Observing airplane run-up</td>
</tr>
</tbody>
</table>

F. NON-IONIZING RADIATION CONTROL PROGRAM: The only source of non-ionizing radiation is the RADAR transceiver mounted on the RADAR truck. Its operating frequency is 9.3 GHz (gigahertz) and it is operated at low power (15.2 kW-kilowatts). The transceiver is registered with the Navy Western Frequency Registration Program, who has calculated the 6-minute RFR exposure, resulting in an insignificant exposure potential (designating it as an “experimental system”).

G. OCCUPATIONAL REPRODUCTIVE HAZARDS PROGRAM (ORHP):
Per reference (a), Chapter 29, reproductive hazards include:

- isopropyl alcohol for chemical cleaning of optic system surfaces
- 2-propanol used for the nebulizer device associated with one of the aircraft systems operated in the workroom
- butanol (butyl alcohol) added to the particle counter in one of the aircraft systems while work is performed with it in the workroom.
- noise when standing nearby during run-up of the aircraft
G. OCCUPATIONAL REPRODUCTIVE HAZARDS PROGRAM (ORHP) (continued):

Lead is a male and female hazard, and also presents a hazard to a developing fetus. Alcohols (including 2-propanol and butanol) present a female reproductive hazard, while noise presents a hazard to developing fetuses. As discussed in Appendix A, the exposure assessment section of this report, significant exposures to the above chemicals are not expected. Females currently do not work at this location so the reproductive hazards from exposure to noise and alcohol do not currently exist. If in the future that females do perform work at this location, they would require the same reproductive hazard training as the male workers as outlined in Appendix H of this report.

H. ERGONOMICS: Repetitive tasks are not performed in this department.

I. MEDICAL SURVEILLANCE PROGRAM (MSP): Personnel do not require enrollment in medical surveillance programs based on the results of this survey. However, the NPS Safety and Occupational Health Office may stipulate program enrollment based on the results of their inspections.

J. OCCUPATIONAL HEALTH-RELATED TRAINING MATRIX: Refer to 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, or as automatically prescribed by the Enterprise Safety Applications Management System (ESAMS) (currently used to satisfy OSH training requirements) for each individual user.
# APPENDIX A

## IH EXPOSURE ASSESSMENT/MONITORING PLAN

### WORKPLACE INFORMATION

<table>
<thead>
<tr>
<th>Organization:</th>
<th>Dept: Center for Inter-Disciplinary Remote Piloted Aircraft Studies (CIRPAS)</th>
<th>Work Center: ---------</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naval Postgraduate School</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location: Marina Airport, Hangar 507</td>
<td></td>
<td>Phone: 831-384-2776</td>
</tr>
<tr>
<td>Director: Professor Bob Bluth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workers: 4 staff, 1 intern</td>
<td>Male: 5</td>
<td>Female: 0</td>
</tr>
</tbody>
</table>

### Operations:

There are currently 1 turbo propeller-operated and 2 reciprocating propeller-operated aircraft in this department. All aircraft maintenance procedures are performed by private company (contracted) mechanics.

Chemical use by the DoD civilians includes:

- use of acetone, *isopropyl alcohol, and *2-propanol for cleaning of glass surfaces associated with optics systems. These solvents are applied to the glass surfaces with small Q-tips.

- addition of very small amounts of *2-propanol to the nebulizer associated with one of the systems worked on.

- addition of *butanol (*butyl alcohol) to the particle counter chamber of another system; the addition occurs through immersion of a tube connected to a vacuum pump into the chemical container.

Conducts minimal *lead-tin soldering in the workroom using solder that has integrated flux.

Battery-powered screwguns are infrequently used to tighten screws in various systems.

Uses a small vacuum to simulate an air flow rate of 50 meters per second during instrument calibration.

Personnel are nearby aircraft during runups in the hangar prior to taxiing to the runway for departure.

The RADAR Systems Program Manager operates a RF transceiver truck, where an RF transceiver is mounted on the truck’s platform bed. It is usually operated in locations away from the Monterey area, and the platform has a scissorslift which elevates the transceiver to the same height as the truck cab roof. Only the Program Manager and CIRPAS Director are present during operation of the RF transceiver. A battery-powered screw gun is also used by the RADAR Systems Program Manager on a limited basis.

* = Reproductive Hazard
IH EXPOSURE ASSESSMENT/MONITORING PLAN

WORKPLACE INFORMATION (continued)

**Organization:** Naval Postgraduate School
**Dept:** Center for Inter-Disciplinary Remote Piloted Aircraft Studies (CIRPAS)
**Work Center:** ------

<table>
<thead>
<tr>
<th>WORK TASK</th>
<th>POTENTIAL HAZARD</th>
<th>WORKERS INVOLVED</th>
<th>FREQUENCY/ DURATION</th>
<th>MONITORING RECOMMENDED?</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Solvents use</td>
<td>Acetone,*alcohols</td>
<td>2</td>
<td>2 ounces/year</td>
<td>No-EA Chem</td>
</tr>
<tr>
<td>Soldering</td>
<td>*Pb,Sn,ZnCl fumes</td>
<td>2</td>
<td>1x/mon,30 mins</td>
<td>No-EA Chem</td>
</tr>
<tr>
<td>Screw guns</td>
<td>*Noise</td>
<td>2</td>
<td>5-10 mins/day</td>
<td>No-EA Noise</td>
</tr>
<tr>
<td>Vacuum</td>
<td>*Noise</td>
<td>2</td>
<td>3-4x/yr,30 mins</td>
<td>No-EA Noise</td>
</tr>
<tr>
<td>A/C standby</td>
<td>*Noise</td>
<td>4</td>
<td>15 mins/day</td>
<td>No-EA Noise</td>
</tr>
<tr>
<td>RADAR truck</td>
<td>*Noise, RF radtn</td>
<td>2</td>
<td>Varies</td>
<td>No-EA Nse,Phys</td>
</tr>
</tbody>
</table>

**IH EXPOSURE ASSESSMENT (EA)**

**NOISE:** The measured noise levels of the screw guns, small vacuum, and RF truck transceiver are below the Navy noise criterion level of 84 dBA. The measured noise levels of personnel while observing aircraft idling are above the Navy noise criterion level, but their calculated 8-hour TWA exposures are below the NOEL. Therefore, noise dosimetry does not need to be conducted.

**PHYSICAL AGENTS:** RFR from operation of the RADAR transceiver mounted on the RADAR truck bed operates at a frequency is 9.3 GHz and it is operated at lower power (15.2 kW). The transceiver is registered with the Navy Western Frequency Registration Program, who has calculated the 8-minute RFR exposures, resulting in an insignificant exposure potential (designating it as an “experimental system.”)

**CHEMICALS:** Exposures to chemicals, including acetone, *isopropyl alcohol, and butanol are unlikely to exceed the MSLs and OELS based on intermittent, brief duration and minimal usage.

*Lead, tin, and zinc chloride exposures during soldering and concurrent use of soldering flux are unlikely to exceed the MSAL and PEL for lead, and the MSALs and OELs for tin and zinc chloride fumes, based on monitoring data of similar operations performed elsewhere and brief duration of exposure, and use of-temperature-controlled soldering irons (which limit generation of lead fumes).

**PERSONAL PROTECTIVE EQUIPMENT (PPE):** High Five thin nitrile rubber gloves during handling of chemicals.
- Ear muffs when standing nearby operating aircraft.

**RESPIRATORY PROTECTION:** Not required and not worn on elective basis during operations listed above.

* = reproductive hazard
### IH EXPOSURE ASSESSMENT/MONITORING PLAN

#### WORKPLACE INFORMATION (continued)

<table>
<thead>
<tr>
<th>Organization</th>
<th>Dept: Center for Inter-Disciplinary Remote Piloted Aircraft Studies (CIRPAS)</th>
<th>Work Center: ------</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naval Postgraduate School</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### IH EXPOSURE ASSESSMENT (EA) (continued)

**ENGINEERING CONTROLS:** Use of temperature-controlled soldering irons during lead-tin soldering.

#### MONITORING PLAN

<table>
<thead>
<tr>
<th>POTENTIAL HAZARD</th>
<th>NUMBER OF MEASUREMENTS</th>
<th>METHOD OF MEASUREMENT 1</th>
<th>METHOD OF MEASUREMENT 2</th>
<th>FREQUENCY (per year)</th>
<th>MAN-HOURS (per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Use the following codes: not applicable.

**Signature:** Signed/
S. Eric Thurston, Industrial Hygienist

**Date:** 23 September 2010
Air sampling of processes is not necessary at the current time.
## APPENDIX C
### MEASURED EQUIPMENT NOISE LEVELS

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>SOURCE</th>
<th>READING</th>
<th>HAZARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workroom</td>
<td>Small Hoover vacuum</td>
<td>69 dBA</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Makita Model 6226D screwgun</td>
<td>70 dBA</td>
<td>N/A</td>
</tr>
<tr>
<td>RADAR</td>
<td>Dewalt Model DCD940 screwgun</td>
<td>81 dBA</td>
<td>N/A</td>
</tr>
<tr>
<td>Truck</td>
<td>RADAR transceiver operation</td>
<td>79 dBA</td>
<td>N/A</td>
</tr>
<tr>
<td>Outside</td>
<td>Observing idling aircraft</td>
<td>89 dBA</td>
<td>Not measured</td>
</tr>
<tr>
<td>Hangar</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flight Line Door</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**APPENDIX D**

**FIELD NOISE SURVEY FORMS**

**INDUSTRIAL HYGIENE NOISE SURVEY FORM**

<table>
<thead>
<tr>
<th>Date: 16 Sep 10</th>
<th>IH UIC: 39162</th>
<th>Activity: Naval Postgraduate School, Monterey, CIRPAS Dept</th>
</tr>
</thead>
<tbody>
<tr>
<td>UIC: <em>62771</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shop Location:</td>
<td>Marina Airport, Hangar 507 Shop Code/Name: Workroom</td>
<td></td>
</tr>
<tr>
<td>Area Posted:</td>
<td>Yes ( Single or Double)</td>
<td>X No</td>
</tr>
<tr>
<td>Hearing Protection In Use:</td>
<td>Yes</td>
<td>X No</td>
</tr>
</tbody>
</table>

**Sound Level Meter Results**

<table>
<thead>
<tr>
<th>Item #</th>
<th>#1</th>
<th>#2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source Description</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hoover Model C2094 Vacuum</td>
<td>Makita Model 6226D Battery-Powered Screwgun</td>
<td></td>
</tr>
<tr>
<td>Machine#/USN#</td>
<td></td>
<td></td>
</tr>
<tr>
<td>050200087706</td>
<td>0148304K</td>
<td></td>
</tr>
<tr>
<td>Noise Pattern:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C = Continuous</td>
<td>IN = Intermittent</td>
<td>IM = Impulse/Impact</td>
</tr>
<tr>
<td>XC</td>
<td>IN</td>
<td>IM</td>
</tr>
<tr>
<td>Noise Source Labeled</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>XNo</td>
<td>XNo</td>
<td></td>
</tr>
<tr>
<td>Noise Radius (ft)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Meter Response</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F = Fast</td>
<td>S = Slow</td>
<td>I = Impulse/Impact</td>
</tr>
<tr>
<td>F</td>
<td>XS</td>
<td>I</td>
</tr>
<tr>
<td>Results</td>
<td></td>
<td></td>
</tr>
<tr>
<td>68 dBA</td>
<td>70 dBA</td>
<td></td>
</tr>
</tbody>
</table>

Comments: The noise levels of both items are below the Navy noise criterion level of 84 dBA. No corrective action is necessary.
**INDUSTRIAL HYGIENE NOISE SURVEY FORM**

Date: 16 Sep 10  IH UIC: 39162  Activity: Naval Postgraduate School, Monterey, CIRPAS Dept

UIC: 62771

Shop Location: Marina Airport, Hangar 507 Shop Code/Name: RF Truck

Area Posted: □ Yes ( □ Single or □ Double)  X No

Hearing Protection In Use: □ Yes  X No

### Sound Level Meter Results

<table>
<thead>
<tr>
<th>Item #</th>
<th>Source Description</th>
<th>Machine#/USN#</th>
<th>Noise Pattern:</th>
<th>Noise Source Labeled</th>
<th>Noise Radius (ft)</th>
<th>Meter Response</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| #1       | Dewalt Model DCD940 Battery-Powered Screwgun | 875414 | XC | Yes | N/A | F | 81 dBA |
| #2       | Edge of platform of RADAR transceiver during operation | N/A  | XC | Yes | N/A | XS | 79 dBA |

Comments: The noise levels of the screwgun and transceiver are below the Navy noise criterion level of 84 dBA. No corrective action is necessary.
<table>
<thead>
<tr>
<th>SOUND LEVEL METER</th>
<th>MICROPHONE</th>
<th>CALIBRATOR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mfg:</strong> SIMPSON</td>
<td><strong>Mfg:</strong> SIMPSON</td>
<td><strong>Mfg:</strong> SIMPSON</td>
</tr>
<tr>
<td><strong>Model:</strong> 886-2</td>
<td><strong>Serial #: 007336</strong></td>
<td><strong>Model:</strong> 890-2</td>
</tr>
<tr>
<td><strong>Last Electro-acoustic Cal Date:</strong> 28 Jun 10</td>
<td><strong>Next Electro-acoustic Cal Date:</strong> 28 Jun 11</td>
<td><strong>Last Electro-acoustic Cal Date:</strong> 28 Jun 10</td>
</tr>
<tr>
<td><strong>Pre Cal Date:</strong> 16 September 2010</td>
<td><strong>Post Cal Date:</strong> 16 September 2010</td>
<td></td>
</tr>
<tr>
<td><strong>Field Calibration OK:</strong> Yes</td>
<td><strong>Field Calibrated By:</strong> Eric Thurston</td>
<td></td>
</tr>
<tr>
<td><strong>Measurements Obtained:</strong> Indoors</td>
<td><strong>Wind Screen:</strong> Used</td>
<td></td>
</tr>
<tr>
<td><strong>Sampler:</strong> Eric Thurston</td>
<td><strong>Date Completed:</strong> 16 September 2010</td>
<td></td>
</tr>
<tr>
<td><strong>Reviewing IH:</strong> Michael J. Puckett</td>
<td><strong>Date Reviewed:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Data Entered By:</strong> Eric Thurston</td>
<td><strong>Date Entered:</strong> 16 September 2010</td>
<td></td>
</tr>
</tbody>
</table>
**INDUSTRIAL HYGIENE NOISE SURVEY FORM**

Date: 23 Sep 10  IH UIC: 39162  Activity: Naval Postgraduate School, UIC: 62771 Monterey, CIRPAS Dept

Shop Location: Marina Airport, Hangar 507 Shop Code/Name: ----

Area Posted: Yes ( Single or Double)  No

Hearing Protection In Use: Yes  No

<table>
<thead>
<tr>
<th>Item #</th>
<th>#1</th>
<th>#2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source Description</td>
<td>Airplane 762256 UV-18A idling</td>
<td>Same but powering up</td>
</tr>
<tr>
<td>Machine#/USN#</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Noise Pattern: C = Continuous IN = Intermittent IM = Impulse/Impact</td>
<td>XC IN IM</td>
<td>XC IN IM</td>
</tr>
<tr>
<td>Noise Source Labeled</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Noise Radius (ft)</td>
<td>Not measured</td>
<td>Not measured</td>
</tr>
<tr>
<td>Meter Response F = Fast S = Slow I = Impulse/Impact</td>
<td>F XS I</td>
<td>F XS I</td>
</tr>
<tr>
<td>Results</td>
<td>86 dBA</td>
<td>89 dBA</td>
</tr>
</tbody>
</table>

Comments: Measurements taken on outside of hangar door leading to flight line where the DoD worker stands. The measured noise levels exceed the Navy criterion level, and use of hearing protection needs to continue.
<table>
<thead>
<tr>
<th>Sound Level Meter</th>
<th>Microphone</th>
<th>Calibrator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mfg: SIMPSON</td>
<td>Mfg: SIMPSON</td>
<td>Mfg: SIMPSON</td>
</tr>
<tr>
<td>Model: 886-2</td>
<td>Serial #: 007336</td>
<td>Model: 30394</td>
</tr>
<tr>
<td>Last Electro-acoustic Cal Date: 28 Jun 10</td>
<td>Next Electro-acoustic Cal Date: 28 Jun 11</td>
<td>Last Electro-acoustic Cal Date: 28 Jun 10</td>
</tr>
</tbody>
</table>

Field Calibration: Pre Cal Date: ___ 23 September 2010 ___
Post Cal Date: ___ 23 September 2010 ___

Field Calibration OK: X Yes [ ] No
Field Calibrated By: Eric Thurston

Measurements Obtained: [ ] Indoors X Outdoors
Wind Screen: X Used [ ] Not Used

Sampler: Eric Thurston Date Completed: ___ 23 September 2010 ___
Reviewing IH: Michael J. Puckett Date Reviewed: ________
Data Entered By: Eric Thurston Date Entered: ___ 23 September 2010 ___
Local exhaust ventilation systems are not present at the surveyed location.
Respirators are not required and are not worn on an elective basis during departmental operations.
Based on the industrial hygiene exposure assessments conducted during this survey, medical surveillance is unnecessary.
APPENDIX H
OCCUPATIONAL HEALTH-RELATED TRAINING MATRIX

COMMAND: Naval Postgraduate School, Monterey DATE: September 2010
DEPARTMENT: Center for Inter-Disciplinary Remote Piloted Aircraft Studies (CIRPAS)

<table>
<thead>
<tr>
<th>PROCESS</th>
<th>ESAMS TRAINING MODULE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of alcohols</td>
<td>PPE (Initial Only) 1398, Occupational Reproductive Awareness (1242)</td>
</tr>
<tr>
<td>Lead-tin soldering</td>
<td>Lead Awareness (322), Occupational Reproductive Awareness (1242)</td>
</tr>
<tr>
<td>Hazardous Materials Users</td>
<td>HAZCOM Initial Training (1169)*</td>
</tr>
<tr>
<td>Supervisors of Hazardous Materials Users</td>
<td>HAZCOM Training For Supervisors (1058)*</td>
</tr>
</tbody>
</table>

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.
<table>
<thead>
<tr>
<th>TERM</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL</td>
<td>Action Level - Normally half of PEL. Exposure level at which air sampling, employee training, and medical surveillance are required.</td>
</tr>
<tr>
<td>ACGIH</td>
<td>American Conference of Government Industrial Hygienist</td>
</tr>
<tr>
<td>AC/HR</td>
<td>Air Changes Per Hour</td>
</tr>
<tr>
<td>ANSI</td>
<td>American National Standards Institute</td>
</tr>
<tr>
<td>AQS</td>
<td>Air Quality Standard</td>
</tr>
<tr>
<td>ASHRAE</td>
<td>American Society of Heating, Refrigeration, and Air Conditioning Engineers</td>
</tr>
<tr>
<td>ASTC</td>
<td>Aviation Survival Training Center</td>
</tr>
<tr>
<td>C</td>
<td>Ceiling - Toxic material exposure level which cannot be exceeded for any length of time.</td>
</tr>
<tr>
<td>CFM</td>
<td>Cubic Feet Per Minute</td>
</tr>
<tr>
<td>CFR</td>
<td>Code of Federal Regulation</td>
</tr>
<tr>
<td>EL</td>
<td>Excursion Limit - Concentration limit which cannot be exceeded at any time.</td>
</tr>
<tr>
<td>EAMP</td>
<td>Exposure Assessment/Monitoring Program. A program to evaluate workplace health hazards through surveys and exposure measurement.</td>
</tr>
<tr>
<td>EPA</td>
<td>Environmental Protection Agency</td>
</tr>
<tr>
<td>ERT</td>
<td>Emergency Reclamation Team</td>
</tr>
<tr>
<td>FC</td>
<td>Footcandles</td>
</tr>
<tr>
<td>F/CC</td>
<td>Fibers Per Cubic Centimeter. A means for expressing airborne asbestos fiber concentrations.</td>
</tr>
<tr>
<td>FeA</td>
<td>Field Area</td>
</tr>
<tr>
<td>FiA</td>
<td>Filter Area</td>
</tr>
<tr>
<td>FPM</td>
<td>Feet Per Minute</td>
</tr>
<tr>
<td>FT3</td>
<td>Cubic Feet</td>
</tr>
<tr>
<td>HDI</td>
<td>Hexamethylene Diisocyanate</td>
</tr>
<tr>
<td>HEPA</td>
<td>High Efficiency Particulate Air</td>
</tr>
<tr>
<td>HM</td>
<td>Hazardous Material</td>
</tr>
<tr>
<td>HMC&amp;M</td>
<td>Hazardous Material Control and Management</td>
</tr>
<tr>
<td>HW</td>
<td>Hazardous Waste</td>
</tr>
<tr>
<td>IES</td>
<td>Illumination Engineering Society</td>
</tr>
<tr>
<td>IH</td>
<td>Industrial Hygiene</td>
</tr>
<tr>
<td>L</td>
<td>Liter</td>
</tr>
<tr>
<td>LPM</td>
<td>Liters Per Minute</td>
</tr>
<tr>
<td>LOD</td>
<td>Limit of Detection</td>
</tr>
<tr>
<td>LOQ</td>
<td>Limit of Quantitation</td>
</tr>
<tr>
<td>MG/M3</td>
<td>Milligram Per Cubic Meter of air. A means of expressing concentrations of dust and metal fumes in the air.</td>
</tr>
</tbody>
</table>
### APPENDIX I
GLOSSARY (continued)

<table>
<thead>
<tr>
<th>TERM</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSAL</td>
<td>Medical Surveillance Action Level. Concentration of air contaminant at which medical surveillance examinations must be provided to exposed personnel.</td>
</tr>
<tr>
<td>MSDS</td>
<td>Material Safety Data Sheet. A form used by manufacturers to communicate to users the chemical and physical properties of their products.</td>
</tr>
<tr>
<td>MSM</td>
<td>Medical Surveillance Matrix</td>
</tr>
<tr>
<td>NAVOSH</td>
<td>Navy Occupational Safety and Health</td>
</tr>
<tr>
<td>NEHC</td>
<td>Navy Environmental Health Center</td>
</tr>
<tr>
<td>NIOSH</td>
<td>National Institute of Occupational Safety and Health</td>
</tr>
<tr>
<td>OEL</td>
<td>Occupational Exposure Limit</td>
</tr>
<tr>
<td>OH/PM</td>
<td>Occupational Health/Preventive Medicine</td>
</tr>
<tr>
<td>OSHA</td>
<td>Occupational Safety and Health Administration</td>
</tr>
<tr>
<td>OV</td>
<td>Organic Vapor</td>
</tr>
<tr>
<td>PPE</td>
<td>Personal Protective Equipment</td>
</tr>
<tr>
<td>PPM</td>
<td>Parts Per Million. A means of expressing the concentration of gases and vapors in the air.</td>
</tr>
<tr>
<td>PSI</td>
<td>Pounds Per Square Inch</td>
</tr>
<tr>
<td>RF</td>
<td>Radio Frequency</td>
</tr>
<tr>
<td>SOP</td>
<td>Standard Operating Procedure</td>
</tr>
<tr>
<td>SQFT</td>
<td>Square Feet</td>
</tr>
<tr>
<td>STEL</td>
<td>Short Term Exposure Limit. A 15 minute time weighted average exposure which should not be exceeded at anytime during a workday.</td>
</tr>
<tr>
<td>STRESSOR</td>
<td>Potential hazard (e.g. Noise, Chemicals, Dusts, etc.)</td>
</tr>
<tr>
<td>TLV</td>
<td>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.</td>
</tr>
<tr>
<td>TWA</td>
<td>Time Weighted Average. A method of averaging varying concentrations over a specified period of time, usually 8 hours.</td>
</tr>
<tr>
<td>UG</td>
<td>Microgram</td>
</tr>
<tr>
<td>VOL</td>
<td>Volume</td>
</tr>
<tr>
<td>&gt;</td>
<td>Greater Than</td>
</tr>
<tr>
<td>&lt;</td>
<td>Less Than</td>
</tr>
</tbody>
</table>
APPENDIX J
CHANGE OF OPERATION NOTIFICATION

Please use this form to notify the Industrial Hygienist of any changes to operations conducted by your department. The notification form needs to be completed and e-mailed to sethurst@nps.edu.

POINT OF CONTACT:
TELEPHONE: E-MAIL ADDRESS:

BLDG: COMMAND/DEPT: NPS CIRPAS

WORK AREA: ROOM NUMBER(S):

SURVEY REPORT: 62771-10-8

INSTRUCTIONS TO FOREMAN/SUPERVISOR:

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

a. New operations are performed  b. New chemical products
   c. Increase in major chemical usage  d. New equipment is used
   e. Exposure frequency/time change  f. A change in exhaust ventilation

List any changes below.

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

Date forwarded: _____________