**APPENDIX B.1**

**RAF PROJECT SAFETY COMMITTEE**

**HAZARDOUS MATERIALS AND DEVICES**

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DO NOT WRITE IN THIS BLOCK

Project: \_\_\_DC3\_\_\_\_ Installation Period: Mar 6 – Apr 30 2012

Aircraft: \_\_\_GV\_\_\_\_ Beginning Date: \_8 May 2012\_\_

Instrument Number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Ending Date: \_30 June 2012\_

1. Instrument: CU Closed Path Laser Hygrometer (CLH-2)\_

2. Function: Measures water vapor and water resulting from evaporation of cloud particles

3. Principal Investigator: Linnea Avallone\_\_\_\_\_\_\_\_\_\_\_\_

Address: LASP, 600 UCB, Boulder, CO, 80303-0600

Telephone: 303-492-5913\_\_ 4. Instrument Operator(s): Linnea Avallone, Samuel Dorsi, Anna Luebke

5. Is this instrument commercially produced? No

6. If so, please list name and address of manufacturer:

7. Please list serial numbers of the instruments:

­­­­­­­­­­­­­­­­­­­­­­­\_ \_N/A\_\_\_\_\_\_

Please attach a copy of the manufacturer’s instruction manual for the device. If this is not possible, attach a copy of those pages of the instruction manual which describe the principles of operation, hazard warnings, safety features, and safety rules.

8. If the instrument is not commercially produced, please provide information requested below:

Designed by: \_Samuel Dorsi, Lars Kalnajs, Linnea Avallone \_\_\_\_\_\_\_\_\_\_

Organization: \_University of Colorado Boulder\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Address: \_LASP, 600 UCB, Boulder , CO 80303-0600\_\_\_\_\_\_\_\_\_\_\_

Telephone: \_303-492-5913\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Built by: \_Samuel Dorsi, Kraig Koski\_

Organization: \_LASP, University of Colorado Boulder\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Address: \_ LASP, 600 UCB, Boulder , CO 80303-0600\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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9. Describe principles of operation, hazard warnings, safety features:

The CLH-2 uses tunable diode laser spectroscopy at 1.37 um to measure the water vapor resulting from the evaporation of cloud particles. It is fed by a heated, forward-facing inlet. Potential hazards include infrared laser light and heated inlet lines. The laser light is completely enclosed within the instrument. Heaters are thermostatically controlled and fused. Overall instrument is also fused.

10. If the instrument is commercially produced, has it been modified? N/a

11. If modified, describe the modification.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**All investigators please answer the following:**

12. Does the instrument contain, use, or produce:

Radioactive materials No Compressed gases No\_\_\_\_\_

Other ionizing radiation No\_\_\_\_ Non-ionizing radiation No\_\_\_\_\_\_

Flammable liquids No Laser Yes\_\_\_

Radar No\_\_\_\_\_\_ Flammable gases No\_\_\_\_\_\_

Explosive materials No\_\_\_\_\_\_ Toxic materials No\_\_\_\_\_\_

13. If any of the categories were checked, specify the material below (for example, amount, energy levels, physical form, etc.)

Class 3B invisible laser radiation, maximum of 10mW of CW light in the near-infrared

14. Please list all other chemicals you will use on board this aircraft in your experiment.

\_\_n/a\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

15. If your experiment consumes or discharges materials, will you need to carry additional materials on board? n/a\_\_\_

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16. What and how much extra materials will you need to carry? \_\_\_\_\_N/A\_\_\_\_\_\_\_\_\_\_

17. What kind of container will you need to carry these materials? \_\_\_\_\_N/A\_\_\_\_\_\_\_\_\_

18. If the device utilizes a laser, please classify the laser according to ANSI Z 136.1-1973 (circle one).

Class: III (fully enclosed, not user serviceable)

1. If your laser will be operating at a wavelength that is not eye safe, what procedures will

be established to minimize the danger to yourself and other project participants?

The laser and its light path are completely enclosed

20. If you are using compressed gas cylinders, what is the maximum pressure expected for each cylinder type? \_n/a \_\_\_

1. Will you be re-filling any compressed gas cylinders yourself, either at JeffCO or during the field deployment?\_\_\_n/a\_\_

22. Are there any other hazards associated with the instrument itself, the required ground support equipment or the experiment which have not so far been covered in this questionnaire?

No

23. How would you describe the probability of an accident resulting from the presence and use of your instrument on board the NCAR aircraft?

Low probability

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24. How would you describe the severity of such an accident?

Nearly all possible failures of instrument components are contained by the use of fuses to isolate electrical elements.

25. What precautions will you take to decrease the probability and the severity of an accident? If any documented safety procedures from your home facility or university are available, please attach a copy of said materials to this form.

All components have been inspected and tested prior to installation on the aircraft.

\_17 February 2012\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



Date Signature of principal investigator or operator

Linnea Avallone\_\_\_\_

Printed name of principal investigator or operator

Reviewed by

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date