APPENDIX B.
RAF PROJECT SAFETY COMMITTEE
HAZARDOUS MATERIALS AND DEVICES

DO NOT WRITE IN THIS BLOCK			
Project:	___NOMADSS___	Installation Period:	8 Apr – 22 May 2013
Aircraft:	____C-130_____	Beginning Date:	__1 Jun 2013_____
Instrument Number:	_____	Ending Date:	__15 Jul 2013_____

1. Instrument: _____HOxCIMS_____
2. Function: _____measure OH, H_2SO_4, HO_2, RO_2_____
3. Principal Investigator:_____Chris Cantrell, Lee Mauldin_____
   Address: _____311 UCB, University of Colorado, Boulder 80309___
   Telephone: _____303-947-7466_____
4. Instrument Operator(s): Chris, Lee, and a yet to be named student
5. Is this instrument commercially produced? ___No_____
6. If so, please list name and address of manufacturer:
   NA
7. Please list serial number of the instrument:
   NA_____

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: Fred Eisele
   Organization: NCAR, retired_____
   Address: 3090 Center Green Dr., Boulder, 80301_____
   Telephone: NA_____
   Built by: NASA Wallops_____
   Organization: NASA_____
   Address: Wallops Island Research Facility, Virginia_____

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9. Describe principles of operation, hazard warnings, safety features:
Reagent gases are added to sampled ambient air (0.5% SO2/N2, 1.5% NO/N2, 4.0% SO2/N2). After chemical reaction, the air is exposed to a mixture of HNO3 in air that has passed over an Americium-241 radioactive source. The NO3- ions react to product HSO4- ions that enter the vacuum system and are mass separated and counted. The gas regulators are contained in diversion boxes that dump the gas overboard in the event of regulator failure. NO and SO2 detectors have audible alarms in case of leak.

10. If the instrument is commercially produced, has it been modified? ___NA_____

11. If modified, describe the modification.
NA

All investigators please answer the following:

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

Radioactive materials	___X__	Compressed gases	___X__
Other ionizing radiation	_____	Non-ionizing radiation	_____
Flammable liquids	_____	Laser	_____
Radar	_____	Flammable gases	___X__
Explosive materials	_____	Toxic materials	_____

13. If any of the categories were checked, specify the material below (for example, amount, energy levels, physical form, etc.).
2 – Americium-241 radioactive sources (200 uCi and 600 uCi); compressed N2 (size AL), O2 (size AL), 0.5% SO2/N2 (size CL), 1.5% NO/N2 (size CL), 4.0% SO2/N2 (size AL), propane (2 – size D)

14. Please list all other chemicals you will use on board this aircraft in your experiment.
The HO2 calibrator uses H2 (lecture bottle) and CH4 (lecture bottle), but does not actually reside on the aircraft; liquid HNO3 (2 ml)

15. If your experiment consumes or discharges materials, will you need to carry additional materials on board? No

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16. What and how much extra materials will you need to carry?
NA

17. What kind of container will you need to carry these materials?
NA

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

Class: I II III IV

19. 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?
NA_____please attached a separate document covering this question_____

20. If you are using compressed gas cylinders, what is the maximum pressure expected for each cylinder type?
N2, O2, air: 2000 psi; 0.5% SO2/N2: 1500 psi; 1.5% NO/N2: 1500 psi; 4.0% SO2/N2 1000 psi; propane: 110 psi (liquid)_____

21. Will you be re-filling any compressed gas cylinders yourself, either at JeffCO or during the field deployment?
No_____

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?
The overall instrument is heavy and may require help in moving it. There are high voltage supplies for the detectors.

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

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

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 compressed gases have proper regulators. NO/N2, SO2/N2, and propane have diversion boxes. High voltages contained within sealed boxes. Fans have guards. All gas lines will be leak checked when installed.

_13 March 2013__
Date

C. A. Cantrell
Signature of principal investigator or operator

__Christopher Cantrell_____
Printed name of principal investigator or operator

Reviewed by

Date