AutoRAE II – AUTOMATIC TEST & CALIBRATION SYSTEM
STANDARD OPERATING PROCEDURE (SOP)
INTERNAL DOCUMENT

CONTENTS

A. PURPOSE

University of California, Riverside (UCR) Facilities Services (FS) personnel may use a 4-gas meter for confined space entry use or for use where toxic exposure concerns are present. The AutoRAE II Automatic Test & Calibration System (AutoRAE II) Standard Operating Procedure (SOP) is intended to provide general instruction on operating the AutoRAE II to bump test and calibrate four-gas monitors.

B. 4 GAS FIELD USE INSTRUMENT

FS Central Plant maintains the 4 gas meter instruments and their associated parameters are summarized in Table 1 below.

IAQ/Odor Parameters	4-Gas Meter (QRAE 3) 
CO	✓
H_2S	✓
O_2	✓
LEL	✓

IAQ/Odor Parameters: CO = Carbon Monoxide, H_2S = Hydrogen Sulfide, O_2 = Oxygen, LEL = Lower Explosive Limit (Flammable Gases),

C. AUTORAE II INSTRUMENT BUMP TESTING AND CALIBRATION

The AutoRAE II is equipped with 2 cradles, which house the 4 gas instruments outlined in Table 1 above.

Image 1: A typical AutoRAE II configuration (order differs from the FS AutoRAE II).

Positioning Instrument on the AutoRAE II. As shown in Image 1, the instruments are positioned face down in their respective cradles. To set up an instrument for bump testing/calibration:

(i) The instrument must first be turned on and set to "Communications Mode".
   a. Communications Mode is accessed by clicking the right-most instrument button repeatedly to cycle through the screen options.

(ii) The instrument cradle must be unlocked and opened by pressing the red lever at the top of the cradle. Once the cradle is unlocked, the instrument is positioned face down and the top portion of the cradle is pushed downward until an audible click is heard.

AutoRAE II Bump Test and Calibration Instructions. Ensure that the instrument is turned on, Communications Mode is activated, and that it is appropriately positioned in its respective cradle. After which:

(i) Allow some time for the instrument to warm up. When ready for bump testing/calibration, the AutoRAE II digital display will change the instrument status from "Warm Up" to "Ready".

(ii) Simply click the "BUMP" or "CAL" buttons on the instrument cradle to perform a bump test or calibration, respectively. The AutoRAE II digital display will indicate a progress bar during bump testing/calibration, and "Pass" upon completion.
   a. Note that bump testing must be performed before using the instrument in the field.
   b. If the instrument fails the bump test, it will automatically attempt to calibrate.

Extracting Last Calibration Test Date. The last calibration test date can be extracted using one of two methods:

(i) When the instrument is initially turned on, it will cycle through several screens, one of which will indicate the last calibrate date.

(ii) Using the AutoRAE II digital display, scroll to the desired instrument and select “More Info.”, then “Calibration Report”.

a. If no calibration date is available, remove the instrument from the AutoRAE II, power the instrument off then back on, and note the calibration date upon instrument start up.

Removing Instrument from AutoRAE II. To remove an instrument from the AutoRAE II:

(i) Do not attempt to remove an instrument during bump testing/calibration.

(ii) The cradle must first be unlocked and opened by pressing the red lever at the top of the cradle.

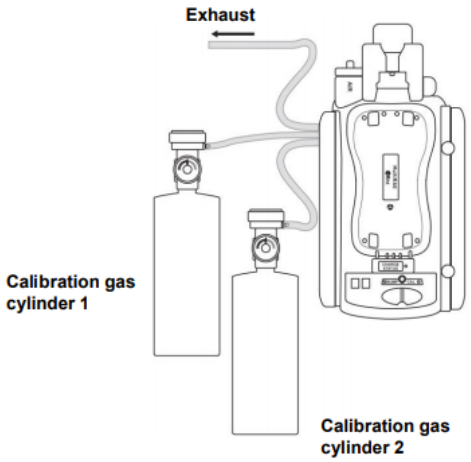
(iii) If the instrument is bump tested/calibrated and ready for use, allow the instrument to adjust to ambient outdoor conditions for approximately 5 – 10 minutes prior to using in the field.

D. AUTORAE II TROUBLESHOOTING

Failing Bump/Calibration Test.

(i) **Inspect Calibration Gases**. If the bump test and calibration attempt fail, ensure that the calibration gas tubing is appropriately connected to the gas inlet, which is configured for set up with multi-gas (50ppm CO, 10ppm H_2S, 18% O_2, and 50% LEL CH_4). Additionally, inspect the gas cylinder gauges to ensure that the cylinders are not empty.

a. If the calibration gas cylinder(s) is empty, first disconnect the AutoRAE II tubing from the empty cylinder. Within a fume hood (or well ventilated area), detach the flow regulator from the empty calibration gas cylinder and attach it to a new unexpired calibration gas cylinder (available upon request to EH&S). After which, reconnect the new calibration gas cylinder to the AutoRAE II; inspect the tubing and ensure it is snugly connected into the correct port.



(ii) Ensure that the appropriate bump test/calibration steps were completed in the correct order (additional details in Section C):

a. The instrument is turned on

b. Communications Mode is activated

c. The instrument is appropriately positioned in its respective cradle

d. The instrument has warmed up

General Equipment Glitches.

(i) Uncommonly, the AutoRAE II may experience technical issues, such as an unresponsive display. Power the AutoRAE II off and back on using the power switch located on the left side of the AutoRAE II control/display.