

SECTION 5.8

PRESSURIZED IONIZATION CHAMBER CALIBRATION AND CHECK-OUT

1.0 Purpose

To describe the procedure for operational check-out of the Model RSS-112 pressurized ionization chambers (PIC).

2.0 Responsibilities

- The site coordinator is responsible for assuring that this procedure is implemented.
- Survey team personnel are responsible for following this procedure.

3.0 General

The pressurized ionization chamber (PIC) is used for exposure rate measurements and, at times, as a secondary standard for cross calibration of other gamma measuring instruments. Calibration of this equipment is therefore done by the manufacturer. Recalibration is done biennially or any time repairs of the instrument are required.

Immediately following calibration by the manufacturer, the initial operational check-out is performed on the PIC according to steps 4.2 or 5.2.

4.0 Procedure For The Model RSS-112 PIC

4.1 Equipment

- ✓ Pressurized ionization chamber (PIC)
- ✓ Electronics package
- ✓ Connecting cables
- ✓ Tripod
- ✓ Check source

4.2 Initial Operational Check-Out

- 4.2.1 Place the pressurized ion chamber (PIC) on the tripod and extend the legs of the tripod to where the center of the detection chamber is 1 m above the floor.

4.2.2 Connect the PIC to the electronics package using the cable supplied with the unit.

4.2.3 Turn on the Power switch (located on the rear) to the zero position.

4.2.3.1 Within about 3 seconds the LCD should display the **MAIN MENU**.

4.2.3.2 In about 12-15 seconds the **CURRENT DATA/DOSE INTEGRATOR** screen should appear on the LCD display. If this screen does not appear, press on the display arrows to return to the **MAIN MENU**. Select **CURRENT DATA**, select **DATA STATUS**, and the current **DATA/DOSE INTEGRATOR** screen should appear on the LCD.

4.2.3.3 The reading must be $<1 \mu\text{R/h}$ for acceptable operation.

NOTE: If the reading is not $<1 \mu\text{R/h}$, adjust the setting using the potentiometer located on the PIC near the cable connection.

4.2.4 Set the PIC at the desired location and allow the unit to stabilize. The unit should be stabilized within five minutes.

4.2.5 Battery Check

4.2.5.1 Exit **CURRENT DATA** mode by pressing any arrow key under the LCD display.

4.2.5.2 Select **UNIT TEST** from the **MAIN MENU**.

4.2.5.3 Select **MORE** until **SYSTEM STATUS** appears.

4.2.5.4 Select **SYSTEM STATUS**.

4.2.5.5 Record the battery status as a percentage of the measured versus the known, i.e., $309\text{V}/300\text{V}=1.03\%$, on PIC FORM or equivalent.

4.2.5.6 Select **CONT**.
Select **MORE** until **EXIT** appears.

4.2.5.7 Select **EXIT** to return to **MAIN MENU**.

NOTE: It takes about 3-10 seconds to automatically return to **CURRENT DATA/DOSE INTEGRATOR** screen.

4.2.6 Turn the switch (located on the rear) to **READ**.

NOTE: Allow about 1 minute to stabilize

4.2.7 Press **RESET INTEGRATOR** key to start Dose Integrator

Acquire background readings until a stable average $\mu\text{R/h}$ is obtained. Record the average reading as displayed on the **CURRENT DATA/DOSE INTEGRATOR** screen in $\mu\text{R/h}$ on the first data line of the PIC/Bicron Tracking Form, Figure B-24, or equivalent.

NOTE: New Data becomes available every five seconds on the **CURRENT DATA/DOSE INTEGRATOR** screen in $\mu\text{R/h}$.

4.2.8 Source Check

4.2.8.1 Obtain Cs-137 check source and place on the top center of the PIC.

4.2.8.2 Allow about one minute to stabilize.

4.2.8.3 Press **RESET INTEGRATOR** key.

4.2.8.4 Acquire check source readings until a stable average $\mu\text{R/h}$ is obtained. Record the average reading displayed on the **CURRENT DATA/DOSE INTEGRATOR** screen in $\mu\text{R/h}$ on the PIC Tracking Form (Figure B-24 or equivalent). Establish response limits as $\pm 10\%$ of the net value and record on the same form.

4.2.9 If the large number display of **DOSE RATE** is wanted

4.2.9.1 Exit **CURRENT DATA** screen to **MAIN MENU** by pressing arrow under **EXIT**.

4.2.9.2 Select **CURRENT DATA**.

4.2.9.3 Select **DOSE RATE** and the large number display will come on with date and time. **RETURN TO THE MAIN MENU BEFORE SHUTTING DOWN THE PIC.**

4.2.9.4 To return to the **MAIN MENU**, press any arrow.

4.2.9.5 Select **CURRENT DATA**

4.2.9.6 Select **DATA STATUS**

NOTE: The presence of the "*" in the upper right corner shows either a radiation alarm or system failure (i.e., low battery [12V], etc.). To determine the cause of the indication "*" perform steps 4.2.5.2 through 4.2.5.4 and read the displayed error message.

4.3 Pre-survey Check-Out

- 4.3.1 Transfer the acceptable net check source response limits from the PIC Tracking Form to the PIC Field Check-out Form (Figure B-6 or equivalent).
- 4.3.2 Perform steps 4.2.1 through 4.2.7, recording the background readings on the PIC Field Check-out Form.
- 4.3.3 Perform step 4.2.8, recording the average reading on the PIC Field Check-out Form.
- 4.3.4 Compare the net check source exposure rate to the acceptable net response limit. If the response is within the response limits, record the information for the gross and net measurements on the first line of the PIC Field Check-out Form (the line marked "ORAU DATA"), and on the next available line of the PIC Tracking Form. If the net exposure rate does not fall within the acceptable range limits, remove the PIC from service until repairs can be made.

NOTE: The PIC Field Check-out Form accompanies the instrument to the field survey site.

4.4 Field Operational Check-Out

Perform steps 4.3.2 through 4.3.4, record the information only on the PIC/Bicon Field Check-out Form.