

SECTION 5.9

BICRON MICRO-REM METER CHECK-OUT

1.0 Purpose

To describe the procedure for operational check-out of the Bicron micro-rem ($\mu\text{rem/h}$) and the Bicron ($\mu\text{rem/h}$) extended detector meters.

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 Bicron micro-rem meter is used for exposure rate measurements and the cross calibration of other gamma measuring instruments. Calibration of this equipment is done on a biennial basis by the manufacturer and/or, on a more frequent basis through the ORISE Professional Training Program (PTP).

4.0 Procedure

4.1 Equipment

- ✓ Bicron micro-rem meter or Bicron micro-rem extended detector meter.
- ✓ Record Forms.
- ✓ Check Source.

4.2 Initial Operational Check-Out

- 4.2.1 Turn Bicron ($\mu\text{rem/h}$) meter control switch to batteries (bat) position. The needle reading should be within "bat.ok" region. If the reading falls outside the acceptable region replace the batteries.

NOTE: If the instrument is not responding correctly, i.e., reproducibility, and the battery response is less than or equal to 150 on the analog scale then replace batteries.

- 4.2.2 Turn the Bicron ($\mu\text{rem/h}$) meter control switch to high voltage (HV). The needle reading should fall into the predetermined “HV ok” region.

NOTE: If the reading is outside predetermined “HV ok” region, remove the instrument from service until repairs can be made.

- 4.2.3 Turn the Bicron ($\mu\text{rem/h}$) meter control switch to one of 5 different positions (X0.1 through X1000). Typically, the switch position for background determinations should be at X0.1.
- 4.2.4 Allow the Bicron ($\mu\text{rem/h}$) meter to stabilize for approximately 15 to 30 seconds. Determine the average background rate by collecting 10 instantaneous readings and calculating the average. Record the average background rate on the first data line of the PIC/Bicron Tracking Form (Figure B-24 or equivalent).
- 4.2.5 Record the acceptable background response limits as the actual lowest and highest of the 10 readings obtained for the average background determination on the PIC/Bicron Tracking Form (Figure B-24 or equivalent).
- 4.2.6 Place the instrument-specific gamma check source (stored within the instrument case) at the front of the detector.

NOTE: It is very important in determining the check source range that the position of the check source to detector be the same each time. For the box type meter (without the extended detector), place the check source at the predetermined location at the front of the instrument. The location is marked as an x within a circle. For the extended detector meter, keep the protective cap on, and place the check source at the center of the detector by gently depressing the protective cap with the source.

Determine the average gross dose rate by collecting 10 instantaneous readings and calculating the average. Determine the average net dose rate by subtracting the average background rate. Record both the gross and net dose rate average values on the PIC/Bicron Tracking Form (Figure B-24 or equivalent). Also, determine and record the $\pm 10\%$ variation of the check source count rate as the source response limits.

Record the source check # on the Tracking Form.

4.3 Pre-Survey Check-out

4.3.1 Transfer the acceptable background and net check source response limits from the PIC/Bicron Tracking Form to the PIC/Bicron Field Check-out Form (Figure B-6 or equivalent).

4.3.2 Turn Bicron ($\mu\text{rem/h}$) meter control switch to batteries (bat) position. The needle reading should be within "bat.ok" region. If the reading falls outside the acceptable region replace the batteries.

NOTE: If the instrument is not responding correctly, i.e., reproducibility, and the battery response is less than or equal to 150 on the analog scale then replace batteries.

4.3.3 Turn the Bicron ($\mu\text{rem/h}$) meter control switch to high voltage (HV). The needle reading should fall into the predetermined "HV ok" region.

NOTE: If the reading is outside predetermined "HV ok" region, remove the instrument from service until repairs can be made.

4.3.4 Turn the Bicron ($\mu\text{rem/h}$) meter control switch to one of 5 different positions (X0.1 through X1000). Typically, the switch position for background determinations should be at X0.1.

4.3.5 Allow the Bicron ($\mu\text{rem/h}$) meter to stabilize for approximately 15 to 30 seconds. Determine the average background rate by collecting 10 instantaneous readings and calculating the average. Record the average background dose rate on the next available line on the PIC/Bicron Tracking Form (Figure B-24 or equivalent) and in the first data line of the PIC/Bicron Field Check-out Form (Figure B-6 or equivalent).

4.3.6 Place the instrument-specific gamma check source (stored within the instrument case) at the front of the detector.

NOTE: It is very important in determining the check source response that the position of the check source to detector be the same each time. For the box type meter (without the extended detector), place the check source at the predetermined location at the front of the instrument. The location is marked as an x within a circle. For the extended detector meter keep the protective cap on and place the check source at the center of the detector by gently depressing the protective cap with the source.

Collect 10 instantaneous readings, calculate the average and record the average gross and net dose rates (gross dose rate-background dose rate) on the first data line of the PIC/Bicron Field Check-out Form and on the next available line of the PIC/Bircon Tracking Form. Compare the check source dose rate to the source response limits.

NOTE: This check source and the PIC/Bicron Field Check-out Form is to accompany the instrument to the field survey site.

4.4 Field Operational Check-out

Perform steps 4.3.1 through 4.3.6, record information only on the PIC/Bicron Field Check-out Form.