SECTION 5.0

INSTRUMENT CALIBRATION
AND
OPERATIONAL CHECK-OUT

SECTION 5.1

GENERAL INFORMATION

1.0 Purpose

To describe the general approach for calibration and operational check-out of survey instruments.

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 Procedure

3.1 Equipment

- ✔ Detectors.
- ✔ Portable instrument.
- ✔ Cable.
- ✔ Record Forms.
- ✔ Check sources.

3.2 Calibration

3.2.1 Instruments to be used for quantitative measurements are source calibrated, and the initial check-out performed, prior to each specific site survey to determine necessary correction factors and to establish operating parameters and acceptable operating criteria.

Exception: The Pressurized Ionization Chamber (PIC) is calibrated by the manufacturer biennially and when the unit is not operating within established parameters.

3.2.2 Calibration is to be performed, when possible, with standards traceable to the National Institute of Standards and Technology (NIST) or other industry recognized standards organizations.

3.2.3 Originals of calibration records are to be maintained at the Oak Ridge facilities; however, copies must accompany instruments to the survey location.

3.2.4 Instruments used only for qualitative scanning or screening purposes are to have an operational check-out performed prior to each specific site survey.

3.2.5 Instruments are calibrated and/or checked out as an instrument/detector combination and are to be used in that combination for survey activities.

3.2.6 Threshold values are determined based on manufacturer specifications and/or determination of specific characteristics and response. The values listed apply only to the instrument/detector combination referenced.

3.2.7 All equipment associated with instrument and detector operations (e.g., gas tubing, flow meters, regulators, etc.) shall be checked to assure proper working order of the complete survey system. Audio output is to be checked for consistent response with associated headphones and any necessary adapters in place.

3.3 Operational Check-Out

3.3.1 This procedure applies to all field survey instruments.

3.3.2 Operational Check-out is to be performed daily prior to the use of a survey instrument, after completion of measurements and/or scanning for the day, any time the performance of the instrument is questionable, and at mid-day when feasible. Check-out is also performed as a quality control function according to requirements as described in Section 7 of the ESSAP Quality Assurance Manual.

3.3.3 Attach the detector to the instrument.

3.3.4 Turn the instrument on and check batteries, replace or recharge (PIC only) if necessary.

3.3.5 Adjust the threshold and high voltage settings to predetermined values.

3.3.6 Background operational parameters have been established for each instrument/detector combination used for quantitative radiation measurements. (Refer to Section 4.4 for methodology).

For instrumentation used for quantitative measurement of surface activity levels, determine and record the background count rate and compare to the control chart.

For other instrumentation, determine and record (Figure B-1, B-6 or equivalent) the background count rate or exposure/dose rate. Compare to previous response limits.

3.3.7 Place the appropriate check source in contact with the designated location on the detector.

3.3.8 Determine and record the count rate on the Instrument Operational Check-out Form (Figure B-1 or equivalent).

3.3.9 Compare check source levels to the established response limits.

3.3.10 Turn the audible output on to assure its operation.

3.3.11 Changes in source responses or background rate, exceeding established acceptable limits must be reconciled before the instrument can be used.