CP4-RP-1336 FRev. 7	**TITLE**: Radiological Instrumentation Field Operability Tests	Page 1 of 43
DOCUMENT CATEGORY: Technical Support	**LEVEL OF USE:** Reference Level	
Check all that apply: **Commitment Stamps** ☐ **WCO** ☐ **Shared Site** ☐		
FUNCTIONAL AREA: Radiation Protection **SUBJECT MATTER AREA:** Dosimetry & Instrumentation	**SUBJECT MATTER EXPERT**: Dan Tockstein, Radiological Engineering Manager	
NUCLEAR SAFETY REVIEW DOCUMENTATION: N/A per CP3-NS-2001 6.1.1.I	**RESPONSIBLE MANAGER/OWNER**: Craig Nesshoefer, Radiation Protection Manager	
REQUIRED REVIEW DATE (or expiration date for temporary change): 02/23/2031	**EFFECTIVE DATE**: 03/02/2026	

REVISION/CHANGE LOG

Revision/ Change Letter	Description of Changes	Pages Affected	Date of Revision/ Change	Approved By (signature on file)
FR0	Initial Release by FRNP	All	10/18/2017	Documentation on File
FR1	General revision	All	9/3/2020	
FR1A	Conducted periodic review. Updated required review date.	All	6/29/2021	
FR2	Added clarification that only Program Support Group RCTs are permitted to change instrument cords. Added instructions for Ludlum Model 12-4 equipped with NRD in Section 6.1. Added Section 6.11 instructions for Ludlum Model 30-7B. Per CAPA #CA-003640, added clarification that peer reviews must be performed daily prior to instruments being used, or as soon as possible for off shift and added definition of peer review. Updated form numbers. Added Appendix B example form CP4-RP-1336-F01.	All	01/19/2022	
FR3	Minor Revisions to Sections 5.6 and 6.1.	All	5/9/2023	
FR4	Revise 6.1.32 to change CPM units	All	6/27/2023	

REVISION/CHANGE LOG				
Revision/ Change Letter	**Description of Changes**	**Pages Affected**	**Date of Revision/ Change**	**Approved By** (signature on file)
FR5	Revise per CAPA CA-004815 to delete section 6.13 guidance for gray Thermo EPDs, delete section 6.14 yellow Thermo EPDs, and delete the alarm section at top of CP4-RP-1336-F01 form. Revise section 6.3.13 through 6.3.15 for Venier check per CAPA CA-004903.	All	02/28/2024	
FR6	Delete step 5.3, 5.13. Add step 5.16. Revise step 6.3.13, 6.11.12, 6.11.13. Change Note above 6.3.23 to one 30 minute background count for Ludlum 2929/3030. Added section 6.13 for setup and checks for EPDs. Deleted CP4-RP-1336-F01 as attachment and use stand-alone form. Other minor changes.	All	03/04/2025	
FR6A	Non-intent change; corrected Step 6.10.13, 6.20.14, 6.11.12, and 6.11.13 to change units to mrem/hr.	33, 34	06/12/2025	
FR7	Revise section 6.7 on performance testing Bicron Microrem instrumentation. Added exemption for daily testing of dosimetry radiation alarm to be checked monthly. Added note for 30 min background count on 3030E using PC setting, changed limit of Teletector background to 0.1 mR/hr, general edits	All	02/23/2026	Craig Nesshoefer

TABLE OF CONTENTS

1.0 PURPOSE AND SCOPE

1.1 Purpose

The purpose of this procedure is to provide a means of assuring that a radiological instrument is operating properly and that accurate performance criteria are established for each instrument used for developing quantitative radiological data. These criteria are typically source response and background levels but may include other parameters depending on the specific instrument type and application. Performance criteria are established by the Radiological Control (RADCON) Program Support Group, following the guidance found in CP4-RP-1309, *Setup for Operability Tests of Portable Field Instruments*.

After the criteria is established, instrument users or other designated personnel must routinely test the instrument performance, relative to these criteria. On each day, with the exception of the NaI equipped Ludlum model 177 used for area alarms in dosimetry which is tested monthly, the instrument is to be used for radiological measurement, and at other times when there is question or doubt regarding the instrument's performance. One example of conditions requiring more frequent performance tests is operation of a gas-flow proportional detector that has been disconnected from the gas supply. When operated in this mode, performance tests should be conducted at least hourly. This procedure describes the process for performing and documenting these routine operational response tests for field monitoring instruments.

1.2 Scope

This procedure applies to all Paducah Deactivation and Remediation (D&R) personnel performing operability tests of portable field instruments at the Paducah Gaseous Diffusion Plant. The D&R RADCON organization has organizational ownership and maintenance responsibility for this procedure. The approval authority for this document is the Radiation Protection Manager.

2.0 REFERENCES

2.1 Use References

- CP4-RP-1309, *Setup for Operability Tests of Portable Field Instruments*
- CP5-RP-2017, *Radiation Survey Technical Basis Document*

2.2 Source References

- American National Standards Institute (ANSI) N323A-1997, *American National Standard Radiation Protection Instrumentation Test and Calibration, Portable Survey Instrument*
- CP2-RP-0002, *Radiological Control Manual*
- CP3-RP-1302, *Radioactive Source Control*
- CP3-RP-1401, *Radiation Protection Program Records*
- CP5-RP-2016, *Radiological Protection Contamination Control and Monitoring Technical Basis Document*
- CP5-RP-2022, *Radiological Protection Instrumentation Operation Technical Basis Document*

3.0 COMMITMENTS

None

4.0 RESPONSIBILITIES

Responsibilities are incorporated in Section 6.0.

5.0 GENERAL INFORMATION

5.1 Different source configurations may exist depending upon source and instrument availability or deployment. RADCON supervision must be contacted for direction when performing field operability tests in these locations.

5.2 Instruments should be response-tested on a minimum of one scale, preferably the one most likely to be used for actual field measurements.

5.3 **If** Part 1 of the daily test form (Initial Reference Response Test) indicates response tests are required for multiple scales or settings, **then** all necessary tests shall be performed. Due to the lack of convenient test sources and to avoid the potential for unnecessary radiation exposures, it may **NOT** be practical or safe to response test certain types of instruments (for example, neutron instruments) and/or upper scales on instruments for measuring high radiation levels. Daily test form blocks **NOT** used for this reason should be marked as "N/A".

5.4 Field RCTs may change batteries in field instruments, as needed.

5.5 Field instrument cords may be changed only by RADCON RCTs designated by RPPM as long as the cord length is the same as originally installed as stated on the instrument calibration label.

5.6 Part 1 of the instrument daily test forms (Initial Reference Response Test) contains the general instrument setup conditions and the acceptable performance information as established by the RCT designated by RPPM. Part 2 of the instrument daily test sheet is used to record instrument performance test results.

5.7 Following successful response and operability testing, the instrument may be used for its intended application.

5.8 **If** the response test result does **NOT** fall within the predetermined range specified, **then** the test may be repeated up to a maximum of three (3). **If** the response test results fail all three times, tag the instrument out of service using **RP-F-0026,** *DO NOT USE Equipment Out of Service*, tag.

5.9 RCT designated by RPPM should be notified of meters that are tagged out of service so they can be taken for repair and replaced.

5.10 The results of each tested scale must be documented on the appropriate daily test sheet.

5.11 An alpha background of zero should be rounded to 0.1 for calculation purposes for Ludlum Models 2224-1, 2929, and 3030E equipped with Ludlum Model 43-10-1 probes.

5.12 An alpha background of zero should be rounded to 0.2 for calculation purposes for Ludlum Models 3, 12, 2221, 2224, and 2224-1 equipped with Ludlum Model 43-5, 43-89, and 43-93 probes.

5.13 The lowest level of detection (LLD) for dose rate instruments are listed in CP5-RP-2017, *Radiation Survey Technical Basis Document*.

5.14 The use of the Model 3030E on "battery power" **MUST** be approved by RADCON management.

5.15 A determination must be made to determine if a radiation source is affecting instrument background or source response prior to performing decontamination of an instrument probe.

5.16 With the exception of instrumentation used by the shift RCT, a peer review of the instrument response daily test sheet must be completed prior to use. Due to limited shift resources, the peer review for instrumentation used by the shift RCT should be completed as soon as possible.

5.17 Response check sources should be returned to the appropriate radioactive source storage location.

6.0 INSTRUCTIONS

6.1 Performance Testing of Ludlum Model 3, 12, 12-4, 177, 2224, and 2224-1 Field Instruments

NOTE:

This section applies to Ludlum Models 3, 12, 12-4, 177, 2224, and 2224-1 equipped with Ludlum Model 43-5, 44-9, 44-10, G-5 (FIDLER), 43-89, 43-93, 44-40, 44-40-2 probes, Bicron TPGM probes, NRD, or equivalent models.

Radiological Control Technician (RCT)

6.1.1 Verify the physical integrity of the instrument.

6.1.2 Enter the date and time of the response test in the correct columns of CP4-RP-1309-F02, *Dual Instrument Daily Test*, CP4-RP-1309-F03, *Contamination Instrument Daily Test Sheet (Lud 3, 12, 2221, 177, or equivalent),* and CP4-RP-1309-F04, *Dose Rate Instrument Daily Test*.

6.1.3 Confirm that the instrument calibration has a current and legible calibration label.

6.1.4 **If** it does **NOT** have a current and legible calibration label, **then** tag the instrument out of service using RP-F-0026.

6.1.5 Verify the calibration due date shown in Part 1 of CP4-RP-1309-F02, CP4-RP-1309-F03, or CP4-RP-1309-F04*,* and the calibration due date indicated on the instrument calibration sticker are the same.

6.1.6 **If** the calibration due dates do **NOT** match, **then:**

A. Mark a "U" in the correct box of CP4-RP-1309-F02, CP4-RP-1309-F03, or CP4-RP-1309-F04.

B. Tag the instrument out of service using RP-F-0026**.**

6.1.7 **If** the calibration due dates match, **then** mark an "S" in the correct box of CP4-RP-1309-F02, CP4-RP-1309-F03, or CP4-RP-1309-F04*,* **and** move on to the next step.

6.1.8 Confirm that the attached probe matches the instrument, as applicable, based on the calibration label or other instrument label appearing on the instrument, and on CP4-RP-1309-F02, CP4-RP-1309-F03, or CP4-RP-1309-F04.

6.1.9 **If** the probe does **NOT** match, **then:**

A. Mark a "U" in the correct box of CP4-RP-1309-F02, CP4-RP-1309-F03, or CP4-RP-1309-F04.

B. Tag the instrument out of service using RP-F-0026.

6.1.10 **If** the probe does match, **then** mark an "S" in the correct box of CP4-RP-1309-F02, CP4-RP-1309-F03, or CP4-RP-1309-F04, **and** move on to the next step.

6.1.11 Confirm that the instrument set-up conditions are correct based on guidance provided in the applicable instrumentation operating procedure and/or the manufacturer's operation manual.

6.1.12 **If** discrepancies are observed on the instrument daily test sheet, **then** remove the instrument from service **and** contact the RCT designated by RPPM.

6.1.13 Ensure the instrument response switch, if equipped, is set to "Slow".

NOTE:

Ludlum Model 177 instruments require the "BAT" button to be pressed to test the internal built in battery.

6.1.14 Turn the selector switch to the "BAT" position **and** ensure a needle response within the "BAT TEST" region of the instrument display.

6.1.15 **If** batteries are unsatisfactory, **then** replace the batteries (except Ludlum 177) **and** repeat the battery check.

6.1.16 **If** battery check is still unsatisfactory, **then** mark a "U" in the proper box of CP4-RP-1309-F02, CP4-RP-1309-F03, or CP4-RP-1309-F04, **and** tag the instrument out of service using RP-F-0026.

6.1.17 **If** batteries are satisfactory, **then** mark an "S" in the proper box of CP4-RP-1309-F02, CP4-RP-1309-F03, or CP4-RP-1309-F04, **and** move to the next step.

NOTE:

Some instrument models are equipped with a switch that must be moved to the high voltage ("HV") position to test the HV.

6.1.18 **If** equipped, **then** press and hold the HV button **and** compare the displayed voltage to the range listed in Part 1 of CP4-RP-1309-F02, CP4-RP-1309-F03, or CP4-RP-1309-F04.

6.1.19 **If** the HV is unsatisfactory, **then** mark a "U" in the proper box of CP4-RP-1309-F02, CP4-RP-1309-F03, or CP4-RP-1309-F04, **and** tag the instrument out of service using RP-F-0026.

6.1.20 **If** the HV is satisfactory, **then** mark an "S" in the proper box of CP4-RP-1309-F02, CP4-RP-1309-F03, or CP4-RP-1309-F04, **and** move to the next step.

NOTE:

Background and source response tests may be repeated a maximum of three (3) times prior to removal from service. The results of each test are documented on the instrument test form.

6.1.21 For analog instruments: Turn the selector switch to the lowest scale setting **and** allow the instrument to stabilize for thirty to forty seconds to establish a background reading.

NOTE:

For instruments equipped with dual use probes (for example, Ludlum Model 43-89 or 43-93) the background reading for alpha and beta must be recorded by switching the toggle switch to α or β.

6.1.22 For scaler-equipped instruments: Press the count button to begin a timed, one minute count.

6.1.23 Document the background reading in the correct units that pertain to the model being set up in the proper box of CP4-RP-1309-F02, CP4-RP-1309-F03, or CP4-RP-1309-F04.

6.1.24 Ensure the background does **NOT** exceed the maximum permissible background reading specified in CP4-RP-1309, *Setup for Operability Tests of Portable Field Instruments*.

6.1.25 **If** the background exceeds the maximum permissible background reading, **then** decontaminate the probe (if appropriate) **and** repeat.

6.1.26 **If** the background still exceeds the maximum permissible background reading after decontamination attempt, **then:**

A. Mark a "U" in the proper box of CP4-RP-1309-F02, CP4-RP-1309-F03, or CP4-RP-1309-F04.

B. Tag the instrument out of service using RP-F-0026.

C. Perform a survey of the instrument, when applicable (for example, high background or unresponsive instrument).

6.1.27 **If** the instrument is satisfactory, **then** mark an "S" in the proper box of CP4-RP-1309-F02, CP4-RP-1309-F03, or CP4-RP-1309-F04, **and** move to the next step.

NOTE:

The source for neutron instruments is currently located at C-415-T1. RADCON Supervision should be notified for additional guidance as necessary.

6.1.28 Obtain the appropriate source as listed in Part 1 of CP4-RP-1309-F04 in the Source Radionuclide box and Source Identification Number box.

6.1.29 For analog instruments: Place the instrument probe in the correct geometry with the source and allow the instrument to stabilize for thirty to forty seconds to establish a source response reading.

NOTE:

For instruments equipped with dual use probes (for example, Ludlum Model 43-89 or 43-93) the source reading for alpha and beta must be recorded by switching the toggle switch to α or β.

6.1.30 For scaler-equipped instruments: Place the instrument probe in the correct geometry with the source and press the count button to begin a timed, one minute count.

6.1.31 **If** the source response is out of range, **then** repeat.

6.1.32 **If** the source response is out of range, **then** document the reading in the correct units that pertain to the instrument model in the proper box of CP4-RP-1309-F02, CP4-RP-1309-F03, or CP4-RP-1309-F04, **and** mark a "U" in the proper box of CP4-RP-1309-F02, CP4-RP-1309-F03, or CP4-RP-1309-F04, **and** tag the instrument out of service using RP-F-0026.

6.1.33 **If** the source response is within the acceptable range, **then** document the reading in the correct units that pertain to the instrument model in the proper box of CP4-RP-1309-F02, CP4-RP-1309-F03, or CP4-RP-1309-F04, **and** mark an "S" in the proper box of CP4-RP-1309-F02, CP4-RP-1309-F03, or CP4-RP-1309-F04. Move to the next step.

6.1.34 Initial the instrument calendar.

6.1.35 Ensure all boxes on CP4-RP-1309-F02, CP4-RP-1309-F03, or CP4-RP-1309-F04 are properly filled **and** sign as performer.

6.1.36 Ensure completion of a peer review of the response test sheet daily prior to use, and as soon as possible for off shift.

6.1.37 Turn the instrument off **and** place the instrument into service.

6.2 Performance Testing of Ludlum Model 2221

NOTE:

This section applies to Ludlum Models 2221 equipped with Ludlum Model 43-5, 44-9, 43-89, 43-93, 44-40, 44-40-2, 44-10, 44-3, 44-17, G-5 (FIDLER) probes, Bicron TPGM probes, or equivalent models.

Radiological Control Technician (RCT)

6.2.1 Verify the physical integrity of the instrument.

6.2.2 Enter the date and time of the response test in the correct columns of CP4-RP-1309-F02, or CP4-RP-1309-F03.

6.2.3 Confirm that the instrument has a current and legible calibration label.

6.2.4 **If** it does **NOT** have a current and legible calibration label, **then** tag the instrument out of service using RP-F-0026.

6.2.5 Verify the calibration due date shown in Part 1 of CP4-RP-1309-F02, or CP4-RP-1309-F03, and the calibration due date indicated on the instrument calibration sticker are the same.

6.2.6 **If** the calibration due dates do **NOT** match, **then** tag the instrument out of service using RP-F-0026.

6.2.7 **If** the instrument is out of calibration, **then** mark a "U" in the correct box of CP4-RP-1309-F02, or CP4-RP-1309-F03, **and** tag the instrument of service using RP-F-0026.

6.2.8 **If** the instrument is in calibration, **then** mark an "S" in the correct box of CP4-RP-1309-F02, or CP4-RP-1309-F03, **and** move on to the next step.

6.2.9 Press the "BAT" button **and** ensure the reading on the display is ≥ 4.8.

6.2.10 **If** batteries are unsatisfactory (<4.8), **then** replace the batteries and repeat the battery check.

6.2.11 **If** battery check is still unsatisfactory, **then** mark a "U" in the proper box of CP4-RP-1309-F02, or CP4-RP-1309-F03, **and** tag the instrument out of service using RP-F-0026.

6.2.12 **If** batteries are satisfactory (≥ 4.8), **then** mark an "S" in the proper box of CP4-RP-1309-F02, or CP4-RP-1309-F03, **and** move to the next step.

6.2.13 Press and hold the HV button **and** compare the displayed voltage to the range listed in Part 1 of CP4-RP-1309-F02, or CP4-RP-1309-F03.

6.2.14 **If** the HV is unsatisfactory, **then** mark a "U" in the proper box of CP4-RP-1309-F02,

or CP4-RP-1309-F03, **and** tag the instrument out of service using RP-F-0026.

6.2.15 **If** the HV is satisfactory, **then** mark an "S" in the proper box of CP4-RP-1309-F02, or CP4-RP-1309-F03, **and** move to the next step.

NOTE:

Threshold is displayed in millivolts. A displayed reading of 356 equals 35.6 mV.

6.2.16 Press and hold the threshold (THR) button to test threshold **and** compare the displayed voltage to the range listed in Part 1 of CP4-RP-1309-F02, or CP4-RP-1309-F03.

6.2.17 **If** the threshold is unsatisfactory, **then** mark a "U" in the proper box of CP4-RP-1309-F02, or CP4-RP-1309-F03, **and** tag the instrument out of service using RP-F-0026.

6.2.18 **If** the threshold is satisfactory, **then** mark an "S" in the proper box of CP4-RP-1309-F02, or CP4-RP-1309-F03, **and** move to the next step.

6.2.19 Confirm that the attached probe matches the instrument as indicated in Part 1 of CP4-RP-1309-F02, or CP4-RP-1309-F03, and on the instrument calibration label.

6.2.20 **If** the probe does **NOT** match, **then:**

A. Mark a "U" in the correct box of CP4-RP-1309-F02, or CP4-RP-1309-F03.

B. Tag the instrument out of service using RP-F-0026.

6.2.21 **If** the probe does match, **then** mark an "S" in the correct box of CP4-RP-1309-F02, or CP4-RP-1309-F03, **and** move on to the next step.

6.2.22 Confirm that the instrument set-up conditions are correct based on guidance provided in the applicable instrumentation operating procedure and/or the manufacturer's operation manual.

6.2.23 **If** discrepancies are observed on the instrument daily test sheet, **then** remove the instrument from service **and** contact the RCT who maintains instruments as designated by RPPM.

6.2.24 Ensure the instrument response switch, if equipped, is set to "Slow".

6.2.25 Ensure that the WIN switch is set to "OUT", unless otherwise directed by RADCON management.

6.2.26 Ensure the "Digital Control" is set to "Scaler".

6.2.27 Ensure the count time switch is set to 1 minute **and** press the count button to begin a timed, one minute count.

6.2.28 Document the background reading in CPM in the proper box of CP4-RP-1309-F02, or CP4-RP-1309-F03.

6.2.29 Ensure the background does **NOT** exceed the maximum permissible reading specified in CP4-RP-1309.

6.2.30 **If** the background exceeds the maximum permissible background reading, **then** decontaminate the probe (if appropriate) **and** repeat.

6.2.31 **If** the background still exceeds the maximum permissible background reading, **then** mark a "U" in the proper box of CP4-RP-1309-F02, or CP4-RP-1309-F03, **and** tag the instrument out of service using RP-F-0026.

6.2.32 **If** the background is satisfactory, **then** mark an "S" in the proper box of CP4-RP-1309-F02, or CP4-RP-1309-F03, **and** move to the next step.

6.2.33 Obtain the appropriate source as listed in Part 1 of CP4-RP-1309-F02 or CP4-RP-1309-F03 in the Source Radionuclide box and Source Identification Number box.

6.2.34 Place the instrument probe in the correct geometry with the source **and** press the count button to begin a timed, one minute count.

6.2.35 **If** the source response is out of range, **then** repeat.

6.2.36 **If** the source response is out of range, **then** document the reading in CPM in the proper box of CP4-RP-1309-F02, or CP4-RP-1309-F03 **and** mark a "U" in the proper box of CP4-RP-1309-F02, or CP4-RP-1309-F03, **and** tag the instrument out of service using RP-F-0026.

6.2.37 **If** the instrument is within the acceptable range, **then** document the reading in CPM in the proper box of CP4-RP-1309-F02, or CP4-RP-1309-F03, **and** mark a "S" in the proper box of CP4-RP-1309-F02, or CP4-RP-1309-F03,.

6.2.38 Initial the instrument calendar.

6.2.39 Ensure all boxes on CP4-RP-1309-F02, or CP4-RP-1309-F03, are properly filled **and** sign as performer.

6.2.40 Ensure completion of a peer review of the response test sheet daily prior to use, and as soon as possible for off shift.

6.2.41 Turn the instrument off **and** place the instrument into service.

6.2.42 Perform a survey of the instrument, when applicable (for example, high background or unresponsive instrument), **and** attach RP-F-0026.

6.2.43 Return the response check sources to the appropriate radioactive source storage location.

6.3 Performance Testing of Ludlum Model 2224-1, 2929, or 3030E

NOTE:

This section applies to Ludlum Models 2224-1, 2929, 3030E, or equivalent, equipped with Ludlum Model 43-10-1 alpha-beta sample counter head, or equivalent.

RCT

6.3.1 Verify the physical integrity of the instrument.

6.3.2 Enter the date and time of the response test in the correct columns of CP4-RP-1309-F02.

6.3.3 Confirm that the instrument has a current and legible calibration label.

6.3.4 **If** it does **NOT** have a current and legible calibration label, **then** tag the instrument out of service using RP-F-0026.

6.3.5 Verify the calibration due date shown in Part 1 of CP4-RP-1309-F02, *Dual Instrument Daily Test* sheet, and the calibration due date indicated on the instrument calibration sticker are the same.

6.3.6 **If** the calibration due dates do **NOT** match, **then** tag the instrument out of service using RP-F-0026.

6.3.7 **If** the instrument is out of calibration, **then** mark a "U" in the correct box of CP4-RP-1309-F02 **and** tag the instrument of service using RP-F-0026.

6.3.8 **If** the instrument is in calibration, **then** mark an "S" in the correct box of CP4-RP-1309-F02 **and** move on to the next step.

NOTE:

The Ludlum Model 3030E is equipped with an internal battery that can power the unit for approximately eight (8) hours.

To maintain the life of the internal battery, it is recommended that the instrument be constantly connected to line power with the power switch in the ON position, even when the instrument is **NOT** in use.

When the instrument is used without line power, adequate charge time must be allowed for the internal battery to recharge. At a minimum, allow one hour of charge time for each hour of use. If the battery is inadvertently allowed to fully discharge, and is left in that state, constant charging for 500 hours (three weeks) may be required for battery recovery.

6.3.9 For Ludlum Model 2224-1 only: turn the selector switch to the "BAT" position **and** ensure a needle response within the "BAT TEST" region of the instrument display.

6.3.10 For Ludlum Model 2224-1 only: **If** batteries are unsatisfactory, **then** replace the batteries **and** repeat the battery check.

6.3.11 For Ludlum Model 2224-1 only: **If** battery check is still unsatisfactory, **then** mark a "U" in the proper box of CP4-RP-1309-F02 **and** tag the instrument out of service using RP-F-0026.

6.3.12 For Ludlum Model 2224-1 only: **If** batteries are satisfactory, **then** mark as "S" in the proper box of CP4-RP-1309-F02 **and** move to the next step.

NOTE:

Per the manufacturer, the high voltage on a Ludlum Model 3030E **CANNOT** be checked by the user.

6.3.13 Insert and close sample tray prior to obtaining HV reading. Observe the HV displayed, if equipped, **and** compare to the ranges/specifications listed in Part 1 of CP4-RP-1309-F02. For Ludlum Model 2224-1 move the toggle switch to the HV position and hold to display the HV.

6.3.14 **If** the HV is unsatisfactory, **then** mark a "U" in the proper box of CP4-RP-1309-F02 **and** tag the instrument out of service using RP-F-0026.

6.3.15 Verify that the tamper indicator on the Vernier adjustment knob, if equipped, is in place and intact.

6.3.16 **If** the Vernier tamper indicator is missing or is broken, **then** mark a "U" in the proper box of CP4-RP-1309-F02 **and** tag the instrument out of service using RP-F-0026.

6.3.17 **If** the HV and/or Vernier are satisfactory, **then** mark an "S" in the proper box of CP4-RP-1309-F02 **and** move to the next step.

6.3.18 Confirm that the attached probe matches the instrument as indicated in Part 1 of CP4-RP-1309-F02 **and** on the instrument calibration label or other instrument label.

6.3.19 **If** the probe does **NOT** match, **then** mark a "U" in the correct box of CP4-RP-1309-F02, tag the instrument out of service using RP-F-0026

6.3.20 **If** the probe does match, **then** mark an "S" in the correct box of CP4-RP-1309-F02 **and** move to the next step.

6.3.21 Confirm that the instrument set-up conditions are correct based on guidance provided in the applicable instrumentation operating procedure and/or the manufacturer's operation manual.

6.3.22 **If** discrepancies are observed on the instrument daily test sheet, **then** remove the instrument from service using RP-F-0026, **and** contact the RCT who maintains instruments as designated by RPPM.

NOTE:

For the Ludlum Model 2929 and 3030E, perform one (30) minute background count.

For Ludlum Model 3030E, for 30 minute background, ensure device time selector is set to "PC".

For the Ludlum Model 2224-1, perform one (5) minute background count.

An alpha and beta/gamma background is performed simultaneously.

6.3.23 Perform a background count for the instrument.

6.3.24 Convert the background counts to CPM and document the background reading for alpha and beta/gamma in the proper box of CP4-RP-1309-F02.

6.3.25 Ensure the background readings do **NOT** exceed the maximum permissible background readings specified in CP4-RP-1309.

6.3.26 **If** either background exceeds the maximum permissible background reading, **then** decontaminate the probe (if appropriate) **and** repeat.

6.3.27 **If** either background still exceeds the maximum permissible background reading, **then** mark a "U" in the proper box of CP4-RP-1309-F02 **and** tag the instrument out of service using RP-F-0026.

6.3.28 **If** the background readings are within the acceptable range, **then** move to the next step.

NOTE:

A timed, one minute count is used for Ludlum Model 2224-1, 2929, and 3030E source response checks.

Response checks may begin with the alpha source or beta/gamma source.

6.3.29 Obtain the appropriate source as listed in Part 1 of CP4-RP-1309-F02 in the Source Radionuclide box and Source Identification Number box.

6.3.30 Place an alpha source in the sample drawer **and** press the count button to begin a timed, one minute count.

6.3.31 **If** the source response is out of range, **then** repeat the source response test.

6.3.32 **If** the source response is out of range, **then** document the reading in CPM in the proper box of CP4-RP-1309-F02 **and** mark a "U" in the proper box of CP4-RP-1309-F02 **and** tag the instrument out of service using RP-F-0026.

6.3.33 **If** the instrument is within the acceptable range, **then** document the reading in CPM in the proper box of CP4-RP-1309-F02 **and** move to the next step.

6.3.34 Place a beta/gamma source in the sample drawer **and** press the count button to begin a timed, one minute count.

6.3.35 **If** the source response is out of range, **then** repeat the source response test.

6.3.36 **If** the source response is out of range, **then** mark a "U" in the proper box of CP4-RP-1309-F02 **and** tag the instrument out of service using RP-F-0026.

6.3.37 **If** the instrument is within the acceptable range, **then** document the reading in CPM in the proper box of CP4-RP-1309-F02 **and** move to the next step.

6.3.38 **If** all background readings and source response tests are within range (as applicable), **then** mark an "S" in the appropriate box of CP4-RP-1309-F02 **and** move to the next step.

6.3.39 Initial the instrument calendar.

6.3.40 Ensure all boxes on CP4-RP-1309-F02 are properly filled **and** sign as performer.

6.3.41 Ensure a completion of a peer review of the response test sheet daily prior to use, and as soon as possible for off shift.

6.3.42 Turn the instrument off **and** place the instrument into service.

6.3.43 Perform a survey of the instrument, when applicable (for example, high background or unresponsive instrument), and attach RP-F-0026.

6.3.44 Return the response check sources to the appropriate radioactive source storage location.

6.4 Performance Testing of RO-20 Ion Chamber Instruments

RCT

6.4.1 Verify the physical integrity of the instrument.

6.4.2 Confirm the instrument calibration has a current and legible calibration label.

6.4.3 **If** it does **NOT** have a current and legible calibration label, **then** tag the instrument out of service using RP-F-0026.

6.4.4 Obtain the appropriate CP4-RP-1309-F04, *Dose Rate Instrument Daily Test Sheet* for the instrument.

6.4.5 Ensure the instrument information in Part 1 of CP4-RP-1309-F04 matches what is shown on the instrument (for example, serial number, location, calibration due date).

6.4.6 Enter the date and time of the response test in the correct columns of CP4-RP-1309-F04.

NOTE:

A 30-minute adjustment period should be given to RO-20 and RO-20AA instruments if it has experienced a temperature change of approximately +/- 20º F prior to performance test.

6.4.7 Turn the instrument on **and** allow it to warm up properly.

6.4.8 Turn the selector switch to the Battery 1 position **and** ensure a needle response within the green "Battery Check" arc on the display. **If not**, **then** replace batteries or mark "U" on CP4-RP-1309-F04, **and** place instrument out of service.

6.4.9 Turn the selector switch to the Battery 2 position **and** ensure a needle response within the green "Battery Check" arc on the display.

6.4.10 Turn the selector switch to the Zero position **and** rotate the adjustment knob until the instrument reads "0".

6.4.11 **If** the instrument **CANNOT** be zeroed, **then** tag the instrument out of service using RP-F-0026.

6.4.12 Turn the selector switch to its lowest scale setting.

6.4.13 Document a background reading (with window open), after allowing the instrument to stabilize for approximately twenty (20) seconds.

6.4.14 **If** the background reading is > 0.5 mR/hr, **then** mark a "U" in the proper box of CP4-RP-1309-F04 **and** tag the instrument out of service using RP-F-0026.

6.4.15 **If** the background reading is ≤ 0.5 mR/hr, **then** mark an "S" in the proper box of CP4-RP-1309-F04 **and** proceed to the next step.

6.4.16 Obtain the appropriate source as listed in Part 1 of CP4-RP-1309-F04 in the Source Radionuclide box and Source Identification Number box.

6.4.17 Open the retractable beta window.

NOTE:

Dose rate instruments are typically setup and response checked with a Sr-90 thumbwheel source, but may be setup with different sources depending upon setup location. The instructions below are written for setup locations equipped with Sr-90 thumbwheel sources. The detector is typically positioned with the dimples or plus signs lined up with the corresponding markings on a source jig

6.4.18 Ensure the selector switch is in the "5 mR/hr" position.

6.4.19 Ensure thumbwheel source is in the "0-5 mR/hr" position **and** expose the source by depressing the slide.

6.4.20 Ensure the source response as indicated on the instrument face is within the range shown in Part 1 of CP4-RP-1309-F04.

6.4.21 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.4.22 **If** the instrument is within the range indicated in Part 1 of CP4-RP-1309-F04, **then** move to the next step.

6.4.23 Rotate the selector switch to the "50 mR/hr" position.

6.4.24 Ensure thumbwheel source is in the "0-50 mR/hr" position **and** expose the source by depressing the slide.

6.4.25 Ensure the source response as indicated on the instrument face is within the range shown in Part 1 of CP4-RP-1309-F04.

6.4.26 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.4.27 **If** the instrument is within the range indicated in Part 1 of CP4-RP-1309-F04, **then** move to the next step.

6.4.28 Rotate the selector switch to the "500 mR/hr" position.

6.4.29 Ensure thumbwheel source is in the "0-500 mR/hr" position **and** expose the source by depressing the slide.

6.4.30 Ensure the source response as indicated on the instrument face is within the range shown in Part 1 of CP4-RP-1309-F04.

6.4.31 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.4.32 **If** the instrument is within the range indicated in Part 1 of CP4-RP-1309-F04, **then** move to the next step.

6.4.33 Rotate the selector switch to the "5R/hr" position.

6.4.34 Ensure thumbwheel source is in the "0-5000 mR/hr" position **and** expose the source by depressing the slide.

6.4.35 Ensure the source response as indicated on the instrument face is within the range shown in Part 1 of CP4-RP-1309-F04.

6.4.36 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.4.37 **If** the instrument is within the range indicated in Part 1 of CP4-RP-1309-F04, **then** move to the next step.

6.4.38 Rotate the selector switch to the "50 R/hr" position.

6.4.39 Ensure thumbwheel source is in the "Offscale" position **and** expose the source by depressing the slide.

6.4.40 Ensure the source response as indicated on the instrument face is within the range shown in Part 1 of CP4-RP-1309-F04.

NOTE:

Step **6.4.41** through **6.4.44** are written for setup locations equipped with Cs-137 button sources.

6.4.41 Rotate the selector switch to the "5 mR/h" position.

6.4.42 Place the instrument in the correct geometry near the source as indicated by the markings on the source jig.

6.4.43 Allow the instrument to stabilize.

6.4.44 Ensure the source response, as indicated on the instrument face, is within the range shown in Part 1 of CP4-RP-1309-F04 and move to the next step.

6.4.45 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.4.46 Close the retractable beta window.

6.4.47 Initial the instrument calendar.

6.4.48 Ensure all boxes on CP4-RP-1309-F04 are properly filled **and** sign as performer.

6.4.49 Ensure completion of a peer review of the daily response test sheet daily prior to use, and as soon as possible for off shift, on CP4-RP-1309-F04.

6.4.50 Turn the instrument off **and** place the instrument into service.

6.4.51 Return the response check sources to the appropriate radioactive source storage location.

6.5 Performance Testing of Bicron RSO-50E Ion Chamber Instruments

RCT

6.5.1 Verify the physical integrity of the instrument.

6.5.2 Confirm the instrument calibration has a current and legible calibration label. **If** it does **NOT** have a current and legible calibration label, **then** tag the instrument out of service using RP-F-0026.

6.5.3 Obtain the appropriate CP4-RP-1309-F04 for the instrument.

6.5.4 Ensure the instrument information in Part 1 of CP4-RP-1309-F04 matches what is shown on the instrument (for example, serial number, location, calibration due date).

6.5.5 Enter the date and time of the response test in the correct columns of CP4-RP-1309-F04.

NOTE:

A 30-minute adjustment period should be allowed for temperature changes of approximately 20ºF for Bicron RSO-50E instruments.

6.5.6 Turn the instrument on **and** allow it to warm up properly.

6.5.7 Turn the selector switch to the Battery position **and** ensure a needle response within the "Bat. ok" arc on the display. **If NOT**, **then** replace batteries or mark "U" on CP4-RP-1309-F04, **and** place out of service.

6.5.8 Turn the selector switch to the Zero position **and** rotate the adjustment knob until the instrument reads "0".

6.5.9 **If** the instrument **CANNOT** be zeroed, **then** tag the instrument out of service using RP-F-0026.

6.5.10 Turn the selector switch to its lowest scale setting.

6.5.11 Document a background reading (with window open) after allowing the instrument to stabilize for approximately twenty (20) seconds.

6.5.12 **If** the background reading is > 0.5 mR/hr, **then** mark a "U" in the proper box of CP4-RP-1309-F04 **and** tag the instrument out of service using RP-F-0026.

6.5.13 **If** the background reading is ≤ 0.5 mR/hr, **then** mark an "S" in the proper box of CP4-RP-1309-F04 **and** proceed to the next step.

6.5.14 Obtain the appropriate source as listed in Part 1 of CP4-RP-1309-F04 in the Source Radionuclide box and Source Identification Number box.

6.5.15 Open the retractable beta window.

NOTE:

Dose rate instruments are typically setup and response checked with a Sr-90 thumbwheel source, but may be setup with different sources depending upon setup location. The instructions below are written for setup locations equipped with Sr-90 thumbwheel sources.

6.5.16 Rotate the selector switch to the "5 mR/hr" position.

6.5.17 Ensure thumbwheel source is in the "0-5 mR/hr" position **and** expose the source by depressing the slide.

6.5.18 Ensure the source response as indicated on the instrument face is within the range shown in Part 1 of CP4-RP-1309-F04.

6.5.19 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.5.20 **If** the instrument is within the range indicated in Part 1 of CP4-RP-1309-F04, **then**

move to the next step.

6.5.21 Rotate the selector switch to the "50 mR/hr" position.

6.5.22 Ensure thumbwheel source is in the "0-50 mR/hr" position **and** expose the source by depressing the slide.

6.5.23 Ensure the source response as indicated on the instrument face is within the range shown in Part 1 of CP4-RP-1309-F04.

6.5.24 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.5.25 **If** the instrument is within the range indicated in Part 1 of CP4-RP-1309-F04, **then** move to the next step.

6.5.26 Rotate the selector switch to the "500 mR/hr" position.

6.5.27 Ensure thumbwheel source is in the "0-500 mR/hr" position **and** expose the source by depressing the slide.

6.5.28 Ensure the source response as indicated on the instrument face is within the range shown in Part 1 of CP4-RP-1309-F04.

6.5.29 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.5.30 **If** the instrument is within the range indicated in Part 1 of CP4-RP-1309-F04, **then** move to the next step.

6.5.31 Rotate the selector switch to the "5R/hr" position.

6.5.32 Ensure thumbwheel source is in the "0-5000 mR/hr" position **and** expose the source by depressing the slide.

6.5.33 Ensure the source response as indicated on the instrument face is within the range shown in Part 1 of CP4-RP-1309-F04.

6.5.34 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.5.35 **If** the instrument is within the range indicated in Part 1 of CP4-RP-1309-F04, **then** move to the next step.

6.5.36 Rotate the selector switch to the "50 R/hr" position.

6.5.37 Ensure thumbwheel source is in the "Offscale" position **and** expose the source by depressing the slide.

6.5.38 Ensure the source response as indicated on the instrument face is within the range

shown in Part 1 of CP4-RP-1309-F04.

NOTE:

Step **6.5.39** through **6.5.42** are written for setup locations equipped with Cs-137 button sources.

6.5.39 Rotate the selector switch to the "5mR/h" position.

6.5.40 Place the instrument in the correct geometry near the source as indicated by the markings on the source jig.

6.5.41 Allow the instrument to stabilize.

6.5.42 Ensure the source response, as indicated on the instrument face, is within the range shown in Part 1 of CP4-RP-1309-F04 **and** move to the next step.

6.5.43 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.5.44 **If** the instrument is within the range indicated in Part 1 of CP4-RP-1309-F04, **then** move to the next step.

6.5.45 Close the retractable beta window.

6.5.46 Return the source to its proper storage position.

6.5.47 Initial the instrument calendar.

6.5.48 Ensure all boxes on CP4-RP-1309-F04 are properly filled **and** sign as performer.

6.5.49 Ensure completion of a peer review of the daily response test daily prior to use, and as soon as possible for off shift, on CP4-RP-1309-F04.

6.5.50 Turn the instrument off **and** place the instrument into service.

6.5.51 Return the response check sources to the appropriate radioactive source storage location.

6.6 Performance Testing of Bicron RSO-5 Ion Chamber Instruments

RCT

6.6.1 Verify the physical integrity of the instrument.

6.6.2 Confirm the instrument calibration has a current and legible calibration label.

6.6.3 **If** it does **NOT** have a current and legible calibration label, **then** tag the instrument out of service using RP-F-0026.

6.6.4 Obtain the appropriate CP4-RP-1309-F04, *Dose Rate Instrument Daily Test Sheet* for the instrument.

6.6.5 Ensure the instrument information in Part 1 of CP4-RP-1309-F04 matches what is shown on the instrument (for example, serial number, location, calibration due date).

6.6.6 Enter the date and time of the response test in the correct columns of CP4-RP-1309-F04.

NOTE:

A 30-minute adjustment period should be allowed for temperature changes of approximately 20ºF for Bicron RSO-5 instruments.

6.6.7 Turn instrument on and allow it to warm up properly.

6.6.8 Turn the selector switch to the Battery position **and** ensure a needle response within the "Bat. ok" arc on the display. **If NOT**, **then** replace batteries or mark "U" on CP4-RP-1309-F04, **and** place instrument out of service.

6.6.9 Turn the selector switch to the Zero position **and** rotate the adjustment knob until the instrument reads "0".

6.6.10 **If** the instrument **CANNOT** be zeroed, **then** tag the instrument out of service using RP-F-0026.

6.6.11 Turn the selector switch to its lowest scale setting.

6.6.12 Document a background reading (with window open) after allowing the instrument to stabilize for approximately twenty (20) seconds.

6.6.13 **If** the background reading is > 0.5 mR/hr, **then** mark a "U" in the proper box of CP4-RP-1309-F04 **and** tag the instrument out of service using RP-F-0026.

6.6.14 **If** the background reading is ≤ 0.5 mR/hr, **then** mark an "S" in the proper box of CP4-RP-1309-F04 **and** proceed to the next step.

6.6.15 Obtain the appropriate source as listed in Part 1 of CP4-RP-1309-F04 in the Source Radionuclide box and Source Identification Number box.

6.6.16 Open the retractable beta window.

NOTE:

Dose rate instruments are typically setup and response checked with a Sr-90 thumbwheel source, but may be setup with different sources depending upon setup location. The instructions below are written for setup locations equipped with Sr-90 thumbwheel sources. The detector is typically positioned with the dimples or plus signs lined up with the corresponding markings on a source jig

6.6.17 Rotate the selector switch to the "5 mR/hr" position.

6.6.18 Ensure thumbwheel source is in the "0-5 mR/hr" position **and** expose the source by depressing the slide.

6.6.19 Ensure the source response as indicated on the instrument face is within the range shown in Part 1 of CP4-RP-1309-F04.

6.6.20 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.6.21 **If** the instrument is within the range indicated in Part 1 of CP4-RP-1309-F04, **then** move to the next step.

6.6.22 Rotate the selector switch to the "50 mR/hr" position.

6.6.23 Ensure thumbwheel source is in the "0-50 mR/hr" position **and** expose the source by depressing the slide.

6.6.24 Ensure the source response as indicated on the instrument face is within the range shown in Part 1 of CP4-RP-1309-F04.

6.6.25 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.6.26 **If** the instrument is within the range indicated in Part 1 of CP4-RP-1309-F04, **then** move to the next step.

6.6.27 Rotate the selector switch to the "500 mR/hr" position.

6.6.28 Ensure thumbwheel source is in the "0-500 mR/hr" position **and** expose the source by depressing the slide.

6.6.29 Ensure the source response as indicated on the instrument face is within the range shown in Part 1 of CP4-RP-1309-F04.

6.6.30 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.6.31 **If** the instrument is within the range indicated in Part 1 of CP4-RP-1309-F04, **then** move to the next step.

6.6.32 Rotate the selector switch to the "5000 mR/hr" position.

6.6.33 Ensure thumbwheel source is in the "0-5000 mR/hr" position **and** expose the source by depressing the slide.

6.6.34 Ensure the source response as indicated on the instrument face is within the range shown in Part 1 of CP4-RP-1309-F04.

NOTE:

Step **6.6.35** through **6.6.38** are written for setup locations equipped with Cs-137 button sources.

6.6.35 Rotate the selector switch to the "5 mR/h" position.

6.6.36 Place the instrument in the correct geometry near the source as indicated by the markings on the source jig.

6.6.37 Allow the instrument to stabilize.

6.6.38 Ensure the source response, as indicated on the instrument face, is within the range shown in Part 1 of CP4-RP-1309-F04 **and** move to the next step

6.6.39 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.6.40 **If** the instrument is within the range indicated in Part 1 of CP4-RP-1309-F04, **then** move to the next step.

6.6.41 Close the retractable beta window.

6.6.42 Return the source to its proper storage position.

6.6.43 Initial the instrument calendar.

6.6.44 Ensure all boxes on CP4-RP-1309-F04 are properly filled **and** sign as performer.

6.6.45 Ensure completion of a peer review of the daily response test sheet daily prior to use, and as soon as possible for off shift, on CP4-RP-1309-F04.

6.6.46 Turn the instrument off **and** place the instrument into service.

6.6.47 Return the response check sources to the appropriate radioactive source storage location.

6.7 Performance Testing of Bicron Microrem

NOTE:

Microrem instruments are typically setup and response checked using a Sr-90 thumbwheel source or Cs-137 button source.

Ensure radioactive sources are stored when obtaining a background reading on a microrem instrument.

Ensure the "+" marks on the sides of the instrument properly align with the marks on the source jigs when source checking a microrem instrument.

RCT

6.7.1 Verify the physical integrity of the instrument.

6.7.2 Confirm the instrument calibration has a current and legible calibration label.

6.7.3 **If** it does **NOT** have a current and legible calibration label, **then** tag the instrument out of service using RP-F-0026.

6.7.4 Obtain the appropriate CP4-RP-1309-F04, *Dose Rate Instrument Daily Test Sheet* for

the instrument.

6.7.5 Ensure the instrument information in Part 1 of CP4-RP-1309-F04 matches what is shown on the instrument (for example, serial number, location, calibration due date).

6.7.6 Enter the date and time of the response test in the correct columns of CP4-RP-1309-F04.

6.7.7 Turn the instrument on **and** allow it to warm up properly.

6.7.8 Turn the selector switch to the Battery position **and** ensure a needle response within the "Bat. ok" arc on the display. **If** not, **then** replace batteries or mark "U" on CP4-RP-1309-F04, and tag instrument out of service.

6.7.9 **If** battery is satisfactory, **then** enter an "S" in the correct column of CP4-RP-1309-F04. **If** unsatisfactory, **then** enter a "U" on CP4-RP-1309-F04.

6.7.10 Turn the selector switch to the HV (high voltage) position **and** ensure a needle response within the "HV ok" arc on the display.

6.7.11 **If** HV is satisfactory, **then** enter an "S" in the "H/V" column of CP4-RP-1309-F04. **If** unsatisfactory, **then** enter a "U" **and** tag the instrument out of service using RP-F-0026.

6.7.12 Turn the selector switch to its lowest scale setting (such as, "x0.1").

6.7.13 Document a background reading after allowing the instrument to stabilize for approximately twenty (20) seconds in the "Bkg" box of CP4-RP-1309-F04.

6.7.14 **If** the background reading is > 9 µR/hr, **then** ensure radioactive sources are properly stored away from the instrument **and** repeat the background reading.

6.7.15 **If** the background reading is > 9 µR/hr, **then** mark a "U" in the "Bkg" column of CP4-RP-1309-F04 **and** tag the instrument out of service using RP-F-0026.

6.7.16 **If** the background is ≤ 9 µR/hr, **then** mark an "S" in the correct column of CP4-RP-1309-F04 **and** proceed to the next step.

6.7.17 Obtain the appropriate source as listed in Part 1 of CP4-RP-1309-F04 in the Source Radionuclide box and Source Identification Number box.

NOTE:

Step **6.7.18** through **6.7.20** are written for setup locations equipped with Sr-90 thumbwheel sources. Source jigs with poly shielding may be required.

6.7.18 Rotate the selector switch to the "x1" position.

6.7.19 Ensure thumbwheel source is in the "0-50 mR/hr" position. Expose the source by depressing the slide.

6.7.20 Ensure the source response as indicated on the instrument face is within the "Scale 2" range shown in Part 1 of CP4-RP-1309-F04 **and** move to the next step.

NOTE:

Step **6.7.21** through **6.7.23** are written for setup locations equipped with Cs-137 button sources. Source jigs may be required.

6.7.21 Rotate the selector switch to the "x1" position.

6.7.22 Place the instrument in the correct geometry near the source as indicated by the markings on the source jig.

6.7.23 Ensure the source response as indicated on the instrument face is within the "Scale 2" range shown in Part 1 of CP4-RP-1309-F04 **and** move to the next step.

6.7.24 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.7.25 **If** the instrument is within the range indicated in Part 1 of CP4-RP-1309-F04, **then** move to the next step.

6.7.26 Initial the instrument calendar.

6.7.27 Ensure all boxes on CP4-RP-1309-F04 are properly filled **and** sign as performer.

6.7.28 Ensure completion of a peer review of the daily response test daily prior to use, and as soon as possible for off shift, on CP4-RP-1309-F04.

6.7.29 Turn the instrument off **and** place the instrument into service.

6.7.30 Return the response check sources to the appropriate radioactive source storage location.

6.8 Performance Testing of Eberline/Automess Model 6112B Teletector

NOTE:

Response tests must be performed with the instrument cap removed.

RCT

6.8.1 Verify the physical integrity of the instrument.

6.8.2 Confirm the instrument calibration has a current and legible calibration label.

6.8.3 **If** it does **NOT** have a current and legible calibration label, **then** tag the instrument out of service using RP-F-0026.

6.8.4 Obtain the appropriate CP4-RP-1309-F04, *Dose Rate Instrument Daily Test Sheet* for the instrument.

6.8.5 Ensure the instrument information in Part 1 of CP4-RP-1309-F04 matches what is shown on the instrument (for example, serial number, location, calibration due date).

6.8.6 Enter the date and time of the response test in the correct columns of CP4-RP-1309-F04.

6.8.7 Turn the instrument on **and** allow it to warm up properly.

6.8.8 Turn the selector switch to the Battery position **and** ensure the needle is in the Battery line on the display. **If not**, **then** replace batteries or mark "U" on CP4-RP-1309-F04 **and** tag instrument out of service.

6.8.9 **If** battery is satisfactory, **then** enter an "S" in the correct column of CP4-RP-1309-F04.

6.8.10 **If** unsatisfactory, **then** enter a "U" on CP4-RP-1309-F04.

6.8.11 Turn the selector switch to its lowest scale setting (such as, "2 mR/hr").

6.8.12 Document a background reading after allowing the instrument to stabilize for approximately twenty (20) seconds.

6.8.13 **If** the background reading is > 0.1 mR/hr, **then** mark a "U" in the "Bkg" column of CP4-RP-1309-F04 **and** tag the instrument out of service using RP-F-0026.

6.8.14 **If** the background is ≤ 0.1 mR/hr, **then** mark an "S" in the "Bkg" column of CP4-RP-1309-F04 **and** proceed to the next step.

6.8.15 Obtain the appropriate source as listed in Part 1 of CP4-RP-1309-F04 in the Source Radionuclide box and Source Identification Number box.

NOTE:

The instructions below are written for setup locations equipped with Sr-90 thumbwheel sources utilizing an instrument and source jig.

6.8.16 Turn the selector switch to the 2mR/hr. position.

6.8.17 Ensure thumbwheel source is in the "0-5 mR/hr" position. Do **NOT** expose the source by depressing the slide.

6.8.18 Ensure the source response as indicated on the instrument face is within the "Scale 1" range shown in Part 1 of CP4-RP-1309-F04.

6.8.19 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.8.20 **If** the instrument is within the range indicated in Part 1 of CP4-RP-1309-F04, **then** move to the next step.

6.8.21 Initial the instrument calendar.

6.8.22 Ensure all boxes on CP4-RP-1309-F04 are properly filled **and** sign as performer.

6.8.23 Ensure completion of a peer review of the daily response test sheet daily prior to use, and as soon as possible for off shift, on CP4-RP-1309-F04.

6.8.24 Turn the instrument off **and** place the instrument into service.

NOTE:

The instructions below are written for setup locations equipped with Cs-137 button sources.

6.8.25 Turn the selector switch to the "2mR/hr." position.

6.8.26 Obtain the appropriate source as listed in Part 1 of CP4-RP-1309-F04 in the Source Radionuclide box and Source Identification Number box.

6.8.27 Place the end of the instrument probe directly onto the surface of the button source **and** allow the instrument to stabilize.

6.8.28 Ensure the source response as indicated on the instrument face is within the "Scale 1" range shown in Part 1 of CP4-RP-1309-F04.

6.8.29 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.8.30 **If** the instrument is within the range indicated in Part 1 of CP4-RP-1309-F04, **then** move to the next step.

6.8.31 Initial the instrument calendar.

6.8.32 Ensure all boxes on CP4-RP-1309-F04 are properly filled **and** sign as performer.

6.8.33 Ensure completion of a peer review of the daily response test sheet daily prior to use, and as soon as possible for off shift, on CP4-RP-1309-F04.

6.8.34 Turn the instrument off **and** place the instrument into service.

6.8.35 Return the response check sources to the appropriate radioactive source storage location.

6.9 Performance Testing of Automess Model 6150AD2 Teletector

NOTE:

Response tests must be performed with the instrument cap removed.

RCT

6.9.1 Verify the physical integrity of the instrument.

6.9.2 Confirm the instrument calibration has a current and legible calibration label.

6.9.3 **If** it does **NOT** have a current and legible calibration label, **then** tag the instrument out of service using RP-F-0026.

6.9.4 Obtain the appropriate CP4-RP-1309-F04, *Dose Rate Instrument Daily Test Sheet* for the instrument.

6.9.5 Ensure the instrument information in Part 1 of CP4-RP-1309-F04 matches what is shown on the instrument (for example, serial number, location, calibration due date).

6.9.6 Enter the date **and** time of the response test in the correct columns of CP4-RP-1309-F04.

6.9.7 Turn the instrument on **and** allow it to warm up properly.

NOTE:

Battery voltage will be indicated when the instrument is switched on. Using the arrow button, the "Battery Voltage and Battery Monitoring" function can be selected to view the voltage of the 9-volt battery at any time. Voltages below 5.5 volts produce a battery warning consisting of the flashing battery symbol in the upper right corner of the LCD and a continuous alarm tone.

6.9.8 **If** a low battery alarm is **NOT** indicated, **then** enter an "S" in the correct column of CP4-RP-1309-F04. **If** unsatisfactory, **then** change the batteries or enter a "U" on CP4-RP-1309-F04.

6.9.9 Document a background reading after allowing the instrument to stabilize for approximately two to eight (2-8) seconds.

6.9.10 **If** the background reading is > 0.1 mR/hr, **then** mark a "U" in the "Bkg" column of CP4-RP-1309-F04 **and** tag the instrument out of service using RP-F-0026.

6.9.11 **If** the background is ≤ 0.1 mR/hr, **then** mark an "S" in the "Bkg" column of CP4-RP-1309-F04 **and** proceed to the next step.

6.9.12 Obtain the appropriate source as listed in Part 1 of CP4-RP-1309-F04 in the Source Radionuclide box and Source Identification Number box.

NOTE:

The instructions below are written for setup locations equipped with Sr-90 thumbwheel sources.

6.9.13 Place the source in the instrument and source jig.

6.9.14 Insert the slightly extended instrument into the instrument and source jig.

6.9.15 Ensure thumbwheel source is in the "0-5 mR/hr" position **and** expose the source by depressing the slide.

6.9.16 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.9.17 **If** the instrument is within the range indicated in Part 1 of CP4-RP-1309-F04, **then** move to the next step.

6.9.18 Ensure thumbwheel source is in the "0-50 mR/hr" position **and** expose the source by depressing the slide.

6.9.19 Ensure the source response as indicated on the instrument face is within the range shown in Part 1 of CP4-RP-1309-F04.

6.9.20 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.9.21 **If** the instrument is within the range indicated in Part 1 of CP4-RP-1309-F04, **then** move to the next step.

6.9.22 Ensure thumbwheel source is in the "0-500 mR/hr" position **and** expose the source by depressing the slide.

6.9.23 Ensure the source response as indicated on the instrument face is within the range shown in Part 1 of CP4-RP-1309-F04.

6.9.24 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.9.25 **If** the instrument is within the range indicated in Part 1 of CP4-RP-1309-F04, **then** move to the next step.

6.9.26 Ensure thumbwheel source is in the "0-5000 mR/hr" position **and** expose the source by depressing the slide.

6.9.27 Ensure the source response as indicated on the instrument face is within the range shown in Part 1 of CP4-RP-1309-F04.

6.9.28 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.9.29 **If** the instrument is within the range indicated in Part 1 of CP4-RP-1309-F04, **then** move to the next step.

6.9.30 Ensure thumbwheel source is in the "Offscale" position **and** expose the source by depressing the slide.

6.9.31 Ensure the source response as indicated on the instrument face is within the range shown in Part 1 of CP4-RP-1309-F04.

6.9.32 Ensure the source response as indicated on the instrument face is within the range shown in Part 1 of CP4-RP-1309-F04.

6.9.33 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.9.34 **If** the instrument is within the range indicated in Part 1 of CP4-RP-1309-F04, **then** move to the next step.

6.9.35 Initial the instrument calendar.

6.9.36 Ensure all boxes on CP4-RP-1309-F04 are properly filled **and** sign as performer.

6.9.37 Ensure completion of a peer review of the daily response test sheet daily prior to use, and as soon as possible for off shift, on CP4-RP-1309-F04.

6.9.38 Turn the instrument off **and** place the instrument into service.

NOTE:

The instructions below are written for setup locations equipped with Cs-137 button sources.

6.9.39 Obtain the appropriate source as listed in Part 1 of CP4-RP-1309-F04 in the Source Radionuclide box and Source Identification Number box.

6.9.40 Ensure the source response as indicated on the instrument face is within the range shown in Part 1 of CP4-RP-1309-F04.

6.9.41 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.9.42 **If** the instrument is within the range indicated in Part 1 of CP4-RP-1309-F04, **then** move to the next step.

6.9.43 Initial the instrument calendar.

6.9.44 Ensure all boxes on CP4-RP-1309-F04 are properly filled **and** sign as performer.

6.9.45 Ensure completion of a peer review of the daily response test sheet daily prior to use, and as soon as possible, on CP4-RP-1309-F04.

6.9.46 Turn the instrument off **and** place the instrument into service.

6.9.47 Return the response check sources to the appropriate radioactive source storage location.

6.10 Performance Testing of Eberline/Thermo Scientific ASP-2E Neutron Instrument

RCT

6.10.1 Verify the physical integrity of the instrument.

6.10.2 Confirm the instrument calibration has a current and legible calibration label.

6.10.3 **If** it does **NOT** have a current and legible calibration label, **then** tag the instrument out of service using RP-F-0026.

6.10.4 Obtain the appropriate CP4-RP-1309-F04, *Dose Rate Instrument Daily Test Sheet* for the instrument.

6.10.5 Ensure the instrument information in Part 1 of CP4-RP-1309-F04 matches what is shown on the instrument labels (for example, instrument serial number, probe serial number, location, calibration due date).

6.10.6 Enter the date and time of the response test in the correct columns of CP4-RP-1309-F04.

6.10.7 Turn the selector switch from the "Off" position to the "Check" position **and** allow the instrument to warm up approximately 2 minutes.

6.10.8 Ensure the correct probe serial number scrolls across the display screen of the ASP2E.

6.10.9 **If** the correct probe serial number does **NOT** scroll across the display screen, **then** tag the instrument out of service using RP-F-0026.

6.10.10 **If** battery is unsatisfactory, **then** enter an "U" in the correct column of CP4-RP-1309-F04 and tag the instrument out of service using RP-F-0026.

6.10.11 **If** battery is satisfactory, **then** enter an "S" in the correct column on CP4-RP-1309-F04 **and** move to the next step.

NOTE:

A one minute count is started by pressing the Star Key.

6.10.12 Perform a timed one-minute background reading in an area **NOT** affected by the check source by rotating the selector switch to the "Scaler" position.

6.10.13 **If** the background reading is > 0.1 mrem/hr, **then** mark a "U" in the "Bkg" column of CP4-RP-1309-F04 and tag the instrument out of service using RP-F-0026.

6.10.14 **If** the background is ≤ 0.1 mrem/hr, **then** mark an "S" in the "Bkg" column of CP4-RP-1309-F04 and proceed to the next step.

6.10.15 **If** the background is acceptable, **then** mark an "S" in the "Bkg" column of CP4-RP-1309-F04 **and** proceed to the next step.

NOTE:

Neutron source is currently located at C-415-T1. Contact RADCON Supervision for additional guidance as necessary.

6.10.16 Take the instrument to the source listed in Part 1 of CP4-RP-1309-F04 in the Source Radionuclide box and Source Identification Number box.

6.10.17 Place the instrument in the indicated location near the source **and** perform a timed one minute count.

6.10.18 Ensure the source response as indicated on the instrument face is within the range shown in Part 1 of CP4-RP-1309-F04.

6.10.19 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.10.20 **If** the instrument is within the range indicated in Part 1 of CP4-RP-1309-F04, **then** move to the next step.

6.10.21 Initial the instrument calendar.

6.10.22 Ensure all boxes on CP4-RP-1309-F04 are properly filled **and** sign as performer.

6.10.23 Ensure completion of a peer review of the daily response test sheet daily prior to use, and as soon as possible for off shift, on CP4-RP-1309-F04.

6.10.24 Turn the instrument off **and** place the instrument into service.

6.11 Performance Testing of Ludlum Model 30-7B Neutron Instruments

RCT

6.11.1 Verify the physical integrity of the instrument.

6.11.2 Confirm the instrument calibration has a current and legible calibration label.

6.11.3 **If** it does **NOT** have a current and legible calibration label, **then** tag the instrument out of service using RP-F-0026.

6.11.4 Obtain the appropriate CP4-RP-1309-F04, *Dose Rate Instrument Daily Test Sheet* for the instrument.

6.11.5 Ensure the instrument information in Part 1 of CP4-RP-1309-F04 matches what is shown on the instrument labels (for example, instrument serial number, probe serial number, location, calibration due date).

6.11.6 Enter the date and time of the response test in the correct columns of CP4-RP-1309-F04.

6.11.7 Turn the instrument on **and** allow the instrument to warm up for approximately 2 minutes.

6.11.8 Ensure the low-battery indicator is **NOT** displayed.

6.11.9 **If** low-battery indicator is displayed, **then** enter an “U” in the correct column of CP4-RP-1309-F04 **and** tag the instrument out of service using RP-F-0026.

6.11.10 **If** battery is satisfactory, **then** enter an “S” in the correct column on CP4-RP-1309-F04 **and** move to the next step.

NOTE:

A one minute count is started by pressing the MODE button two times to get to the COUNT mode.

6.11.11 With the instrument in "COUNT" mode, perform a timed one-minute background reading in an area **NOT** affected by the check source by pressing the OK button.

6.11.12 **If** the background reading is > 0.1 mrem/hr, **then** mark a "U" in the "Bkg" column of CP4-RP-1309-F04 **and** tag the instrument out of service using RP-F-0026.

6.11.13 **If** the background is ≤ 0.1 mrem/hr, **then** mark an "S" in the "Bkg" column of CP4-RP-1309-F04 and proceed to the next step.

NOTE:

Neutron source is currently located at C-415-T1. RADCON Supervision can be contacted for additional guidance, as necessary.

6.11.14 Take the instrument to the source listed in Part 1 of CP4-RP-1309-F04 in the Source Radionuclide box and Source Identification Number box.

6.11.15 Place the instrument in the indicated location near the source **and** perform a timed one minute count.

6.11.16 Ensure the source response as indicated on the instrument face is within the range shown in Part 1 of CP4-RP-1309-F04.

6.11.17 **If** the instrument is out of the range indicated in Part 1 of CP4-RP-1309-F04, **then** tag the instrument out of service using RP-F-0026.

6.11.18 **If** the instrument is within the range indicated in Part 1 of CP4-RP-1309-F04, **then** move to the next step.

6.11.19 Initial the instrument calendar.

6.11.20 Ensure all boxes on CP4-RP-1309-F04 are properly filled **and** sign as performer.

6.11.21 Ensure completion of a peer review of the daily response test sheet daily prior to use, and as soon as possible for off shift, on CP4-RP-1309-F04.

6.11.22 Turn the instrument off **and** place the instrument into service.

6.12 Performance Checks of Lapel Air Samplers

6.12.1 Verify the physical integrity of the instrument.

6.12.2 Verify the Defender 510 BIOS calibration is current on the attached calibration label.

6.12.3 **If NOT** already turned on, **then** turn on Defender 510 BIOS calibrator by pressing the power button.

NOTE:

The ▲ ▼ ► and ◄ buttons are used to toggle between options on the Defender 510 menu.

The Defender setup steps mentioned in Steps **6.12.4** through **6.12.12** are **NOT** required **when** multiple lapel air samplers are being flow checked consecutively.

The back of CP4-RP-1309-F01, *Lapel Air Sampler Daily Instrument Performance Check Sheet*, may be referenced for supplemental instructions.

6.12.4 Press ► to highlight "Setup" and press "Enter".

6.12.5 Ensure "Readings" is highlighted **and** press "Enter".

6.12.6 Ensure "Number in Average" indicates "010".

6.12.7 **If** "010" is **NOT** indicated, **then** use ◄ or ► to change the number to "010".

6.12.8 Press ▼ until "Confirm" is highlighted **and** press "Enter".

6.12.9 Press ▼ until "Measure" is highlighted **and** press "Enter".

6.12.10 Ensure units shown on Defender display are in "L/min".

6.12.11 **If** "L/min" is **NOT** shown on the Defender display, **then** notify RADCON supervision for direction.

6.12.12 **If** required, **then** press ◄ or ►until "Burst" is highlighted **and** press "Enter". The Defender 510 is now ready to collect the flow data from the pump.

6.12.13 Obtain the appropriate CP4-RP-1309-F01.

6.12.14 Ensure the instrument information in Part 1 of CP4-RP-1309-F01 matches what is shown on the instrument (for example, serial number, location, calibration due date).

6.12.15 Enter the date and time in the appropriate boxes of CP4-RP-1309-F01.

6.12.16 **If** the instrument is out of calibration, **then** mark a "U" in the correct box of CP4-RP-1309-F01 **and** tag the instrument out of service using RP-F-0026.

6.12.17 **If** the instrument is in calibration, **then** mark an "S" in the correct box of CP4-RP-1309-F01 **and** move on to the next step.

6.12.18 Press the power button to turn on the lapel air sampler.

6.12.19 Connect Defender hose to lapel air sampler.

6.12.20 For Buck LP-7 and LP-12 samplers: Press ▼ ("Exit") to access the next menu and press ▲ ("Run") to begin sample flow.

6.12.21 For Buck Basic-12 and VSS-12 samplers: Press "Enter/Off" to begin sample flow.

6.12.22 Document the average flow rate reading, after ten (10) readings, in the correct box of CP4-RP-1309-F01.

6.12.23 Compare the obtained average flow rate reading to the "Acceptable Range" shown in Part 1 of CP4-RP-1309-F01. **If** unsatisfactory, **then** mark a "U" in the correct box of CP4-RP-1309-F01 **and** tag the instrument out of service using RP-F-0026.

6.12.24 **If** the obtained average flow rate reading is within the "Acceptable Range" shown in Part 1 of CP4-RP-1309-F01, **then** mark an "S" in the correct box of CP4-RP-1309-F01 **and** move to the next step.

6.12.25 For Buck Basic-12 and/or VSS-12, **if** the battery is <75%, **then** mark a "U" in the correct box of CP4-RP-1309-F01 **and** tag the instrument out of service using RP-F-0026.

6.12.26 For Buck 12 and/or VSS-12, **if** the battery is ≥75%, **then** mark an "S" in the correct box of CP4-RP-1309-F01 **and** move to the next step.

6.12.27 For Buck LP-7 and/or LP-12, **if** the battery indicator shows less than three bars, **then** mark a "U" in the correct box of CP4-RP-1309-F01 **and** tag the instrument out of service using RP-F-0026.

6.12.28 For Buck LP-7 and/or LP-12, **if** the battery indicator shows three or more bars, **then** mark an "S" in the correct box of CP4-RP-1309-F01 **and** move to the next step.

6.12.29 Turn the lapel air sampler off.

6.12.30 Initial the instrument calendar.

6.12.31 Ensure all boxes on CP4-RP-1309-F01 are properly filled **and** sign as performer.

6.12.32 Ensure completion of a peer review of the daily response test sheet daily prior to use, and as soon as possible for off shift.

6.12.33 Turn the instrument off **and** place the instrument into service.

6.13 Setup and Performance Check Yellow Clip Mirion DMC 3000 Electronic Personal Dosimeters (EPDs)

NOTE:

Configuration of EPDs are performed in steps **6.13.1** through **6.13.14**. Verification of the configuration checks of EPDs are performed in steps **6.13.15** through **6.13.26**. Zero and change EPD modes are performed in steps **6.13.27** through **6.13.48**. Battery changes of EPDs are performed in steps **6.13.49** through **6.13.61**.

Radiological Engineer

6.13.1 Ensure reader is connected to computer.

6.13.2 **If NOT** already open, **then** open *DMCUser*™ to perform configuration.

6.13.3 Place EPD on reader to ensure communication.

6.13.4 Ensure EPD is in "PAUSE" mode.

6.13.5 **If** EPDs are **NOT** in "PAUSE", **then** select "Go to Pause" button.

6.13.6 Select "Batch Configuration" tab.

6.13.7 Ensure "Go to run mode after process" is selected or checked.

6.13.8 Press "Select File" button **and** select desired batch file to be written to the EPD.

6.13.9 Select "Start".

NOTE:

The lower left hand corner of DMCUser™ computer screen will display "Dosimeter configured, please remove dosimeter…" when configuration is complete.

6.13.10 **When** configuration is complete, **then** remove EPD from reader **and** document configuration is complete on CP3-RP-1327-F01, *Mirion Electronic Personal Dosimeter Configuration*

6.13.11 Place another EPD on reader **and** repeat as necessary to configure additional EPDs.

6.13.12 Select "Stop" when all EPDs have been configured with the predefined parameters.

6.13.13 Close *DMCUser*™ when appropriate.

6.13.14 Maintain completed CP3-RP-1327-F01.

CAUTION:

Configuration can be changed with this feature of the software so caution is advised.

6.13.15 Do **NOT** alter **or** change data in fields.

6.13.16 Ensure physical integrity of EPD.

6.13.17 Confirm EPD has a current **and** legible calibration label.

6.13.18 **If** EPD does **NOT** have a current and legible calibration label, **then** tag EPD out of service using RP-F-0026.

6.13.19 Ensure reader is connected to computer.

6.13.20 **If NOT** already open, **then** open *DMCUser*™.

6.13.21 Place EPD on reader to ensure communication.

6.13.22 Select "Parameters" tab.

6.13.23 Select "Read Parameters" to observe the configuration currently on the EPD.

6.13.24 **When** configuration is confirmed, **then** remove EPD.

6.13.25 **If** desired, **then** place another EPD on reader **and** select "Read Parameters".

6.13.26 Close *DMCUser*™ when appropriate.

6.13.27 Ensure physical integrity of EPD.

6.13.28 Confirm EPD has a current **and** legible calibration label.

6.13.29 **If** EPD does **NOT** have a current **and** legible calibration label, **then** tag EPD out of service using RP-F-0026.

6.13.30 Ensure reader is connected to computer.

6.13.31 **If NOT** already open, **then** open *DMCUser*™.

6.13.32 Select "Batch In/Out" tab.

NOTE:

EPDs must be put in "PAUSE" mode before they can be zeroed. "PAUSE" will be displayed on EPD screen when EPD is in "PAUSE" mode.

6.13.33 Place EPD on reader to ensure communication.

6.13.34 **If** EPD is already in "PAUSE" mode, **then** proceed to Step **6.13.41.**

6.13.35 **If** EPD is **NOT** already in "PAUSE" mode, **then** perform Steps **6.13.36** through **6.13.40**.

6.13.36 Ensure "Auto confirm Out" is checked or selected.

6.13.37 Select "Start".

6.13.38 **When** message at bottom left of screen indicates "Dosimeter processed", "Dosimeter processed, please remove dosimeter…" or "Dosimeter already processed, remove dosimeter" **then** remove EPD from reader.

6.13.39 Place another EPD on reader **and** repeat Step **6.13.38** as necessary to place additional EPDs in 'PAUSE" mode.

6.13.40 Select "Stop" when desired EPDs have been placed in "PAUSE" mode.

6.13.41 Place EPD on reader to ensure communication.

6.13.42 Select or check "Auto confirm In".

6.13.43 Select "Start".

6.13.44 **When** message at bottom left of screen indicates "Dosimeter processed", "Dosimeter processed, please remove dosimeter…" or "Dosimeter already processed, remove dosimeter" is displayed, **then** remove EPD from reader.

6.13.45 Place another EPD on reader **and** repeat as necessary to zero out additional EPDs.

6.13.46 Select "Stop" when desired EPDs have been zeroed out.

6.13.47 Close *DMCUser*™ when appropriate.

6.13.48 Ensure final state of EPD is in measurement or run mode **and** is displaying "#.#" mrem or "# mrem/h" prior to returning EPD to deployment location for field use.

RCT

NOTE:

When common operations are performed on multiple EPDs (for example, battery changes), it is **NOT** required to list the common operation multiple times on CP4-RP-1336-F01, *Electronic Personal Dosimeter Setup Sheet*.

6.13.49 Document calibration due date on CP4-RP-1336-F01.

NOTE:

A standard alkaline (1.5 V) AAA battery has a life of approximately 2,500 hours while EPD is in "continuous run, without excessive alarm". The DMC 3000™ will warn the user when the battery needs to be replaced. Battery changes should be performed quarterly but may be changed more frequently based upon use.

6.13.50 Ensure physical integrity of EPD.

6.13.51 Confirm EPD has a current **and** legible calibration label.

6.13.52 **If** EPD does **NOT** have a current **and** legible calibration label, **then** tag EPD out of service using RP-F-0026.

6.13.53 **If** battery change is required, **then** loosen two screws on the battery cover with a number 8 Torx screwdriver.

6.13.54 Rotate **and** remove battery cover.

6.13.55 Remove **and** dispose of battery.

6.13.56 Install new battery.

6.13.57 Engage battery cover bottom side first **and** rotate closed.

6.13.58 Hand tighten the screws, taking care to **NOT** strip screw holes.

6.13.59 Document EPD serial number **and** battery change in "Comments" section of CP4-RP-1336-F01.

6.13.60 Sign **and** date form.

6.13.61 Provide completed CP4-RP-1336-F01 to RADCON supervision for review.

Radiological Control Supervisor

6.13.62 Review **and** sign completed CP4-RP-1336-F01.

7.0 RECORDS

7.1 Records Generated

The following records may be generated by this procedure:

- RP-F-0026, *DO NOT USE Equipment Out of Service tag*
- CP4-RP-1336-F01, *Electronic Personal Dosimeter Setup Sheet*

Forms are to be completed according to CP3-OP-0024, *Forms Control*.

7.2 Records Disposition

The records are to be maintained according to CP3-RP-1401, *Radiation Protection Program Records* and CP3-RD-0010, *Records Management Process.*

Appendix A – Acronyms/Definitions

ACRONYMS

ANSI – American National Standards Institute

CPM – Counts per Minute

D&R – Deactivation and Remediation

EPD – Electronic Personal Dosimeter

HV – High voltage

LLD – Lowest level of detection

MDC – minimum detectable concentration

PGDP –Paducah Gaseous Diffusion Plant

RADCON – Radiological Control

RCT – Radiological Control Technician

THR – Threshold

DEFINITIONS

Peer review – Specifically for the purpose of this procedure, a peer review is the act of verifying that:

- all applicable instrument checks have been recorded as being performed,
- all applicable checks have been recorded "S" (satisfactory), **and**
- recorded data is within the specified range (as applicable).

This review takes advantage of a fresh set of eyes **and** ensures that unseen errors in daily response checks are caught **prior to** an instrument being used to perform radiological surveys.

Refer to CP2-RP-0002, *Radiological Control Manual* for additional definitions.