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Chairman - RHSC

WORCESTER POLYTECHNIC INSTITUTE
HEALTH PHYSICS PROCEDURE HP-19
GAS-FLOW PROPORTIONAL COUNTER PLATEAU CHECK

1. PURPOSE:

To ensure that the voltages posted on the gas-flow proportional counter are within the operating plateau.

2. FREQUENCY:

This procedure shall be performed semi-annually.

3. MATERIALS, TOOLS, AND EQUIPMENT:

3.1. Form(s):

3.1.1. Gas Flow Proportional Counter Plateau Check

3.2. Alpha standard button source
(i.e.: Am-241)

3.3. Beta standard button source
(i.e.: C-14)

4. PRECAUTIONS:

4.1. Ensure that all health physics practices are followed throughout the survey.

4.2. Utilize the concepts of time, distance, and shielding to maintain exposure as low as reasonably acheivable.

5. INSTRUCTIONS:

5.1. Open the large grey valve on the gas tank fully.

5.2. Adjust the small regulating valve so that the gauge reads a gas pressure between 3 and 5 psi.

5.3. Record the gas pressure on the form.

5.4. Ensure that the HV button is in the off position (the button should not be depressed).

5.5. Turn on the power, then the HV.

5.6. Open the drawer to ensure that the chamber is empty. Close the drawer and turn the knob to the right to check the gas flow. Proper flow rate is approximately 2-3 bubbles/second (the knob may need to be jiggled before the bubbles start to flow).

NOTE: Never operate the Gas-Flow Proportional Counter without gas flow.

5.7. Determine the alpha plateau

5.7.1. Record the alpha radiation source selected, its reference activity, and its reference date.

5.7.2. Place the source in the chamber.

NOTE: Generally, the source is located on the bottom of the button source. Ensure that the source is facing upward.

5.7.3. Dial in the first voltage listed on the form.

5.7.4. Select a count time of 1 minute (time selector will read 0010).

5.7.5. Select a purge time of 144 seconds.

5.7.6. Depress reset.

5.7.7. Complete a count for each alpha voltage listed on the form (a purge time of 12s may be used for the successive counts).

5.8. Repeat step 6 using the beta radiation source and the beta voltages.

> **NOTE:** To promote longevity of the machine, dial down the high voltage before depressing the "Add 1000 V" button.

5.9. Make two separate graphs, one for the Alpha Data and one for the Beta Data. Plot count rate vs. voltage.

5.10. The alpha plateau should appear between 900 - 1200 V and the beta plateau should appear between 1700 - 1800 V. If a relatively flat plateau region does not appear on the graph, take additional counts using smaller voltage increments.

5.11. Replace the plateau values listed on the gas-flow proportional counter as necessary. Record the plateau voltages on the form (whether they have changed or not).

5.12. Submit the graphs and the form to the RSO for review. Compare the current results to previous results (they should be consistent).

6. RESTORATION:

None

7. REFERENCES:

7.1 Nuclear Measurements Corp. Nuclear Instrumentation Proportional Counting System NMC Model PC-5 Instruction Manual