CINTICHEM HEALTH PHYSICS PROCEDURES

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ROUTINE SOURCE CHECK FOR HPGe COUNTING SYSTEMS | PAGE 1 OF 2 | HP-M-37

A. PURPOSE

To provide instruction in carrying out the routine source check on the HPGe systems This check is to help ensure validity of data generated on these systems. This is done by verifying the keV per channel (energy calibration), the activity of a known standard (efficiency calibration) and the shape of the detected peaks (Full Width of Half Maximum [FWHM]).

B. DISCUSSION

The Liquid Nitrogen (LN) Dewar for the HPGe systems are topped off twice per week This provides an opportune time to perform a routine source check of the systems.

Control charts are kept for keV/channel and calculated activity of a known standard The standard currently in use is source number 352-60-1A from Isotope Product Laboratories, Burbank California. This is a one liter marinelli standard containing 1.0178 grams of NIST source material SRM 4276C-35 (Sb-125, Eu-154, Eu-155) hereafter referred to as the P-3 standard.

C. PROCEDURE

The minimum frequency that this source check is to be performed is every time that a HPGe LN dewar is topped off.

1. Wait at least 30 minutes after filling the LN dewar.

2. Remove the plastic bag cover from the crystal, place the spacer and P-3 standard on the crystal.

3. Count the P-3 std for 900 seconds and analyze it using the STDMIX.LIB library back decaying to 1200 hours 9/1/88.

4. Enter the activities of the Sb-124, Sb-125 and Eu-154 into the appropriate control charts, from the Summary of Nuclides section of the report.

   Enter the peak channel numbers for the 123.1 keV, 723.3 keV, and 1274.5 keV peaks into the appropriate control charts, from the identified peak summary section of the report.

   Also, enter the FWHM from the last column of the identified peak summary for the 123.1, 723.3 and 1274.5 KeV peaks into the appropriate control charts.

5. If any value falls within the warning range notify senior technical staff.

   If any value falls outside of the control limit do not put the detector in question back into service!

6. If one or more of the control charted data points fall outside the control limit ONE (1) attempt is to be made by the technicians to bring them back into acceptance. This involves performing an auto pole zero as detailed below:

   a. Leave the P-3 standard on the detector.

   b. Type Alt-S, ENTER then Alt-L, ENTER.

   c. Type ↑ to scroll up to the Auto PZ entry and type ENTER.

   d. Wait 30 minutes and rerun the P-3 standard.

   e. If one or more data points still falls outside of the control limit do not continue to use the detector. Label the shield as "Out of Service" and notify senior technical staff of the situation.

Any detector exceeding a control limit will be kept out of service until it can be brought back into limits.

A new set of control charts must be started at each new calibration with the P-3 standard.

Refer to HP-M 54 for required frequencies for source checks and the details of how the warning range and control limits are determined.