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July 30, 1985

Mr. William J. Adam, Ph. D.
Materials Licensing Section
U.S. Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Dear Mr. Adam:

The following information required for renewal of NRC License Number 14-11978-01 is submitted as requested by your letter of July 12, 1985, Control No. 79355.

Reference paragraph 1, discription of duties and responsibilities of Radiation Protection Officer. The duties of the Radiation Protection Officer are to:

1. Ensure that the Radioactive material contained in the calibrator will be used only by those individuals specifically listed as users by this license or by individuals under their direct supervision.

2. Ensure that all users wear personal monitoring devices (film badges or TLDS).

3. Ensure that the Radioactive material is properly secured against unauthorized removal at all times and that the building is locked when not in use.

4. Ensure that routine inspection leak tests and survey of the area are conducted.

5. Assure that the radiation exposure to users and the general public do not exceed those prescribed by the regulations.

6. Ensure that the terms and conditions of the license are complied with, and that all required records are maintained.

7. Immediately halt any activity judged to be a threat to health, safety, the environment or a violation of conditions of the license or the regulations.

8. Keep current the emergency plan and assure notification of proper authorities in the event of fire or any other emergency that would or may cause a release of radioactive materials.

Reference paragraph 2, Step-by-step procedures for operation of the calibrator.

1. Calibration of the CDV 715 and 717 Survey Meter.

a. Perform operability check and zero the meter.

b. Secure the instrument into the appropriate fixture.

c. Use the alignment jig to align the fixture-adapter socket with the instrument's sensitivity potentiometers.

d. Set range changer fixture in place.

e. Place the instrument in the exposure chamber and attach the fixture-adapter socket to the fixture adapter.

f. Check meter zero reading. If necessary, re-zero.

g. Connect flex cable of range changer fixture to remote-control station.

h. close the chamber door.

i. With the RANGE SELECT control, change the instrument range to X100.

j. Rotate the RADIATION-LEVEL SELECTOR wheel to the 400 R/hr position (X100 RANGE ADJUST indicator, ON).

k. Push in and rotate the RANGE ADJUST knob opposite the lighted indicator to adjust the meter reading to the normal 400 R/hr or to the most precise exposure rate that may be specified.

l. Repeat steps J and K to adjust X10, X1 and XO.1 ranges for radiation levels of 40 R/hr, 4 R/hr and 0.4 R/hr.

m. Rotate the SELECTOR wheel to SAFE position (SAFE indicator, ON). Make sure that the RANGE ADJUST control knobs are all fully retracted.

n. Open the chamber door.

o. Disconnect the flex cable from the remote station and remove the instrument from the chamber.

p. At the end of calibration, lock the calibrator if it is left unattended.

2. Calibration of the CD V-720 Survey or other meter using the universal-fixture.

a. Prepare universal fixture to center the chamber in the radiation beam.

b. Perform instrument operability checks.

c. Place the instrument on the universal fixture and check that the meter reading is zero. If necessary, re-zero the instrument.

d. Connect the flex cable of the range changer fixture to the remote control station in the exposure chamber.

e. Close the chamber door.

f. Turn the RANGE SELECT control to set the instrument on the X100 range.

g. Rotate the RADIATION-LEVEL SELECTOR wheel to the 400 R/hr position (X100 RANGE ADJUST indicator, ON).

h. Record the meter reading.

i. Repeat steps F and H for the X10 and X1 range.

j. Rotate SELECTOR wheel to the SAFE position (SAFE indicator, ON).

k. Open the chamber door.

l. Disconnect the flex cable from the remote station and remove the instrument from the chamber.

m. Set instrument on the X100 range.

n. Rotate the ZERO control knob until the meter indicates the scale value recorded for exposure to the 400 R/hr intensity level (Survey meter on X100 range).

o. Adjust the X100 sensitivity potentiometer until the meter reading is a nominal 400 R/hr or the most precise exposure rate that may be specified.

p. Repeat stems M,N and O for the X10 and X1 scale range.

q. Zero the meter.

r. Repeat steps C through H to assure meter readings are within +/- 2 scale divisions of the desired valutes.

s. At the end of calibration, lock the calibrator if it is to be left unattended.

3. Method for converting instrument reading to activity in microcuries for leak test samples.

a. A cesium 137 beta gamma check source is used to determine the efficiency of the scaler. The present activity of the check source is calculated by using a table of decay correction factor for cesium 137.

EXAMPLE

Beta Activity at Calibration: 3.552×10^4 dpm

Data of Calculation: October, 1966

Difference in time between original calibration date and present date (time t): 18.75 years

Decay factor for time t (from table): .649

Activity at calibration (dpm) x decay factor = present activity (dpm)

(3.552×10^4 dpm) x (.649) = 2.3052×10^4 dpm

b. The efficiency of the scaler can then be determined by dividing the actual counts per minute by the present check source activity.

EXAMPLE

$$\text{Efficiency} = \frac{\text{net counts}}{\text{Check source present activity}} = \frac{(3534 \text{ cpm})}{(23052 \text{ dpm})}$$

Efficiency = 15.3%

c. The net counts per minute are found by subtracting the background counts per minute from the gross counts per minute. The net counts per minute are divided by the efficiency of the scaler to determine the net disinigration per minute. The net the milrocuries of removable contamination.

EXAMPLE

Scaler: Name: LUDLUM Model Number: 2200

Operating voltage: 875 Background: 12 cpm

Counting time: 5 Minutes Efficiency: 15.3%

Area Wipe Tested:	(1) Total Count (5 Min)	(2) Gross cpm	(3) Net cpm	(4) dpm	(5) uci
Source Confinement Cylinder	1000	200	188	1228	.00055

Column 2: Column (1) / 5 Minutes
Column 3: Column (2) - Background cpm
Column 4: Column (3) / Efficiency
Column 5: Column (4) / 2.33×10^6

JAMES E. PHIPPS
Radiological Maintenance Officer

JP/jy