More on Check Sources

by Beth Hall and Rollie Cantu

From time to time, we get phone calls from end users of LMI instruments who have questions about check sources that are optional accessories with our instruments. (The exception to the "optional" part is that a check source is standard equipment with gate monitor systems.)

Many of you are familiar with check sources, what they are and how they are used; however, for those of you who are not, a short explanation may be in order.

A check source is "a radioactive source, not necessarily calibrated, which is used to confirm the continuing satisfactory operation of an instrument" (ANSI N323-1978: American National Standard Radiation Protection Instrumentation Test and Calibration). ANSI N323-1978 calls this confirmation a "periodic performance test" and ANSI N323A-1997 calls it a "source response check" which falls into the category of "functional checks." For the sake of clarity, we will refer to it herein as a source response check.

The most common check source sent with LMI instruments, as an option, is a Cs-137 source of approximately 1 microcurie in activity. The source is currently labeled on one side with a unique serial number, date of manufacture and caution statement. LMI refers to this side as the "label side." The opposite side is labeled with the radioisotope name and activity and has a "dot" on it.

When a check source is purchased with a new instrument, it is often positioned in a holder that is mounted on the side of the instrument. This attachment of the check source to the instrument prevents misplacement of the check source assigned to the instrument and allows for convenient source response checks. (However, it should be noted that a check source may be purchased without the holder. It currently sells for $50.)

As one might expect, and as ANSI N322-1978 alludes in referring to a "reproducible manner," the geometry of the check source/detector arrangement during a source response check is important to reproducibility of the reading. This is especially true if the check source is placed in contact with the detector.

It is the policy of LMI to state the geometry used when a source response check reading is referenced on a certificate of calibration. The following example, that of a Model 2241-2 purchased with a Model 44-7 detector and a check source mounted in a holder, illustrates typical language:

> "Cs137 check source s/n 1234 is ≈1 μCi reads ≈ 35.3 mR/hr with window end of 44-7 probe placed against check source holder with source holder door in the open position and model 2241-2 set to Det. (1) and ratemeter position (model 2241-2 – check source holder with 44-7)"

In the case of a check source purchased without a source holder, the following example is typical:

> "Cs137 check source s/n 1234 is ≈ 1 μCi reads ≈200 μR/hr with label side of check source placed against dimple at meter end of model 19 case. (model 19 and loose check source)"

When a customer receives a new LMI instrument, we recommend that the end user duplicate the check source reading stated on the certificate of calibration and also on the instrument calibration sticker, using the geometry explained on the certificate. That will establish clearly how the source response check should be performed for subsequent checks. If it is not possible to reproduce the reference reading, please notify us.

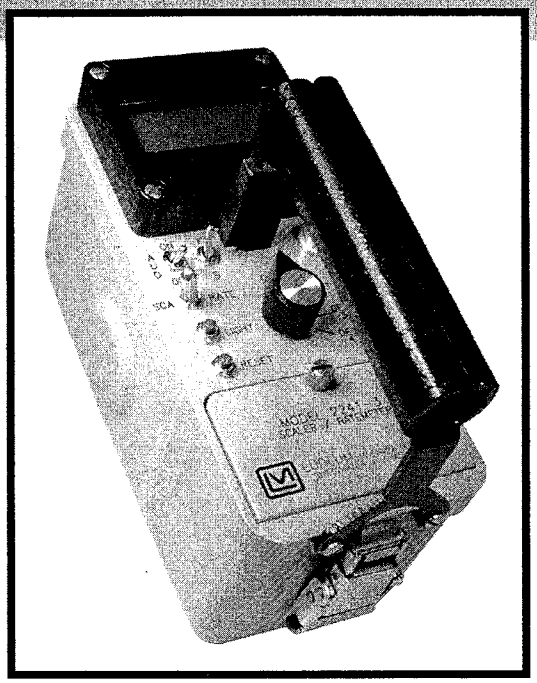
As noted on the certificate of calibration sent with each LMI instrument, LMI calibrations conform to ANSI N323-1978. In keeping with the standard, we recommend its specifications of the source response check as stated in section 4.6 Periodic

(Continued on page 4)

The LUDLUM Report

Model 2241-3

Digital Ratemeter/Scaler



The Model 2241-3 is a Microprocessor based digital ratemeter with built in scaler that is specially designed to utilize up to 4 different detectors, each with independent calibrations. The display is auto ranging, and backlit for easy use in dark areas. With the built in versatility this unit is useful in many different settings including the laboratory, and hazardous response applications.

INDICATED USE General purpose survey, gross counting with multiple detectors

COMPATIBLE DETECTORS G-M, proportional, scintillation

CONTROL SWITCH A 5 position rotating switch to allow for quick change between four detector setups

HIGH VOLTAGE Four independent controls; each adjustable from 200 - 2500 volts

DISCRIMINATOR A single setting adjustable from 2 - 100 mV

OVERLOAD Indicated by OVERLOAD on display (*adjustable depending on detector selected*)

BATTERY LIFE Typically 200 hours with alkaline batteries (*low battery indicated on display*)

SIZE 6.5"(16.5cm)H X 3.5"(8.9cm)W X 8.5"(21.6cm)L

WEIGHT 3.5 lbs (1.6kg) including batteries

The LUDLUM Report

FROM THE TRENCHES

CHECK SOURCES

(Continued from page 2)

Performance Test:

"...If at any time the instrument response to the check source differs from the reference reading by more than ± 20 percent, the instrument shall be returned to the calibration facility for calibration or for maintenance, repair, and recalibration, as required."

Cs-137 check sources supplied to LMI are designed for one side of the source to have a greater emission rate than the other, allowing beta radiation to be detected. Normally, this "hot" side is the label side. Infrequently, however, the side with the "dot" (opposite the label side) produces a greater source count than the label side. Standard practice at LMI is to mount the check source with the label side facing out of the holder. However, if a customer requests a certain preference; as for example, a gamma-only orientation, the source will be tested to determine which side has the smaller emission rate and mounted in the holder accordingly.

Source holders may be purchased with or without the check source. Check sources other than Cs-137 are also available. If you are interested in purchasing any of these products, please call for current prices.

Cs-137 check source, approximately 1 μCi in activity P/N 01-5196
Holder Assembly for above source P/N 4062-166

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☐ FORWARD ORDER EXPIRED
☐ ATTEMPTED NOT KNOWN
☐ NOT DELIVERABLE AS ADDRESSED
☐ MOVED LEFT NO FORWARD
☐ REFUSED

Dennis O'Brien
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