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United States Department of the Interior

GEOLOGICAL SURVEY
Water Resources Division
5 Aerial Way
Syosset, New York 11791
(516) 938-8830

31-13026-01

April 1, 1985

Mr. J. Bruce Carrico
Material Licensing Branch
Division of Fuel Cycle and Material Safety
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Re: Your letter of March 8, 1985

Reference: Mail Control Number 17992; Radioactive Materials License Renewal
United States Department of the Interior, Geological Survey

Dear Mr. Carrico:

Pursuant to your letter, below please find listed Mr. Panetta's protocols for survey meter calibration and leak test analysis:

Survey Meter Calibration Procedure

Radioactive sources used--1mg, 10mg Radium-226, Radium Chemical Company 25mCi Cs-137 Nuclear Associates MICRAD Sources. Both sources traceable to NBS via vendor, typical accuracy plus or minus 3%. Sources are checked via well type ionization chamber radionuclide calibrator and their exposure rates in free air determined via Keithley 35020 and Farmer 0.6cc Ion Chamber calibrated by Memorial-SKI Regional Calibration Center, a licensed and certified facility.

These sources are 1cm active length and are utilized in such a manner that no reading is taken at a distance closer than 20 cm from source to center line of detection volume. These survey meters are calibrated on a yearly basis to within plus or minus 10% of the true value at 1/3 and 2/3 full scale deflection of each range. A calibration sheet sample (enclosed) is supplied with each instrument. The source(s) are set up on a free air range in a precision holder such that they exist 4 feet above a concrete slab and range distances are set up and measured using the Keithley System previously

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Radioactive sources used--continued...

mentioned to determine the exposure rates at these points. Thereafter, the instruments are turned on at a shielded area and allowed to equilibrate. The instruments are introduced into the radiation field at these known points and the data recorded. If necessary, adjustments to the calibration pots are made to insure that the instrument is within plus or minus 10% of these exposure rates. If not within 10%, the electrical repair and/or modification is performed to bring the system within limits. These sources as utilized are stored in lead shielded containers and only introduced into the field when used. The sequence of calibration begins at the furthestmost point in the field and migrates inward toward the source and obviously an increasing exposure rate to determine instrument response. A "bury" test at source contact is performed to insure that the instrument will not indicate low exposure levels in very high off scale exposure rates. Personnel performing these tests are monitored pursuant to the requirements of New York State Law. All personnel leave the exposure field area when not taking data.

Sealed Source Leak Testing Procedures

All sealed sources and devices are wiped with Nu-con smears treated with a surfactant to remove and retain surface contamination. If allowed, the wipes constitute a minimum of 100 square centimeters of the source device system. Wipes are performed on the device, shutter, and environs. These wipes are counted in a 2-1/4" X 2-1/4" sodium iodide (Tl) scintillation counter in a cap shield coupled to a Picker single channel analyzer system. This detection system is calibrated with New England Nuclear Rod Sources whose activity is traceable to NBS. The analyzer is gated for the appropriate radionuclide being measured (Cs-137--662keV, Am-241--61keV). An efficiency value is determined via a ten minute count and a background taken for thirty minutes. This data is recorded. This instrument is capable of measuring less than 0.0005 microcuries of the aforementioned radionuclides, which is a factor of 10 greater in sensitivity than the removable activity limit of 0.005 microcuries (11,100 d/m). All wipes are counted for a thirty minute period and converted to counts per minute. The previously determined background is subtracted yielding net counts per minute which is converted to d/m via the efficiency value previously determined and thereafter converted to microcuries via 2.22×10^6 d/m/uCi. Typically activity levels are equivalent to background. The data is formally documented and reported.

To: Mr. J. Bruce Carrico

Page 3

April 1, 1985

Training and Experience

Mr. Panetta has 22 years of experience including Brookhaven National Laboratory, Grumman Aerospace Corporation as Assistant Radiation Safety Officer (the largest individual licensee in New York State), as Radiation Safety Officer for Nuclear Associates for eight years, and as the Radiation Physicist for numerous hospitals and institutions in New York State. His resume was forwarded to you previously. Mr. Panetta has calibrated over this period of time thousands of survey instruments and wipe tested many thousands of sealed sources of all types.

If you require any additional information, please do not hesitate to contact me.

For the Subdistrict Chief:

Sincerely,

A handwritten signature in cursive script, appearing to read "Anthony A. Gialmo".

Anthony A. Gialmo
Hydrologic Technician

AAG:jp
Encl.

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PATRICK F. PANETTA, M.S.
Radiological Physics

CALIBRATION CERTIFICATE

We hereby certify that the instrument has been calibrated as shown and is in accordance with the specifications set forth for this model by the manufacturer of the instrument.

Name:

Order No.:

Manufacturer of Instrument:

Type and Model No.:

Serial No.:

Calibration Data

Calibration Source Used: Ra-226

	<u>TRUE FIELD</u> mR/hr	<u>RESPONSE</u> mR/hr	<u>% ERROR</u>
RANGE X 0.1	_____	_____	_____
RANGE X 1.0	_____	_____	_____
RANGE X 10	_____	_____	_____
RANGE X 100	_____	_____	_____
RANGE X 1000	_____	_____	_____

Cal. By: _____

Date of Cal.: _____

Next Cal. Due: _____