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March 4, 1998

REPLY TO
ATTENTION OF:

Formerly Utilized Sites Remedial Action Program Project Office

Mr. Larry Erickson
Missouri Department of Natural Resources
Division of Environmental Quality
P. O. Box 176
Jefferson City, MO 65102-0176

SUBJECT: HISS 1997 RADON FLUX MONITORING RESULTS TRANSMITTAL

Dear Mr. Erickson:

In response to your letter dated December 16, 1997, regarding MDNR comments on the subject correspondence, the following information is being provided.

- 1) *Will this test be done yearly? If not, then how will compliance with subpart Q be demonstrated?*

Current plans are to continue monitoring for radon flux on an annual basis.

- 2) *What general environmental surveillance activities are done for radon at HISS?*

Radon is continuously monitored by detectors placed along the fenceline at HISS and collected and analyzed on a semi-annual basis.

- 3) *Who are the results reported to and when, if environmental surveillance is done for radon at HISS?*

The radon results are reported annually in the HISS Environmental Surveillance Technical Memorandum (FSTM), issued to all county, state, and federal agencies providing oversight at HISS.

- 4) *Was the charcoal canisters placed at 10 meter intervals or 7.6 meter intervals?*

The canisters are placed at approximately 7.6 meter intervals. Due to the approximate nature of the intervals, the transmittal letter rounded the measurement to one significant digit.

- 5) *Provide some general information on the Germanium detector, i.e., model, manufacturer, operating procedures, etc.*

The manufacturer of the Germanium detector used to analyze the radon flux canisters is EG&G ORTEC and model number is GEM-40190-P. A comprehensive description of the Germanium detector and how it works can be found in Chapter 7 - Detectors of *the Basic Radiation Protection Technology*,

3rd Edition by Daniel A. Gollnick. A brief explanation extracted from the analytical laboratory's (ThermoNuTech) operating procedures (QAP-011, Rev. 1, June 1994) follows:

"Germanium detectors used for the detection of gamma-rays are actually semiconductor diodes having P-I-N (Positive-Intrinsic-Negative) structure in which the intrinsic (I) region is sensitive to ionizing radiation, particularly x-rays and gamma-rays. Under the reverse bias applied, an electric field extends across the intrinsic or depleted region. When gamma-rays interact with the material within the depleted region of the detector, charge carriers (holes and electrons) are produced and are swept by the electric field to the P (positive) and N (negative) electrodes. This charge, which is proportional to the energy deposited in the detector by the incident gamma-ray, is converted into a voltage pulse by an integral charge sensitive preamplifier.

The signal is then amplified and sent to an Analog-to-Digital-Converter (ADC) where the signal is converted from an analog signal to a digital signal, which can be interpreted by the central VAX computer. The digital signal is then sent to the Acquisition Interface Module (AIM) where the pulse is entered into a spectral channel corresponding to a particular gamma-ray energy. The data is also sent to a central VAX computer, where the spectral data is stored and visually displayed. When acquisition is completed, the VAX computer quantifies the events recorded in each channel of the sample spectrum. The peaks of the spectrum, characteristic of both a particular radionuclide(s) and the quantity of the radionuclide present in the sample, are identified by a comparison to a nuclide library stored on disk."

6) *What type of maintenance program is being implemented for the cover of the HISS piles?*

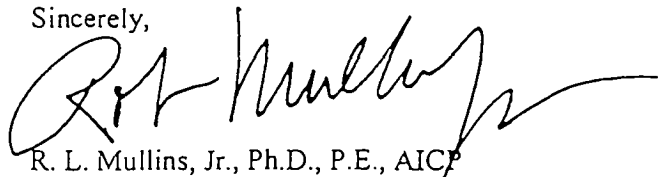
The covers at HISS are inspected annually and any necessary repairs are made as required.

7) *Sampling was done after this compliance testing was done so will another test be done? This question is based on the fact that sampling required placing many holes in the cover and then patching and re-sealing of the cover.*

The next radon flux measurement is currently scheduled to take place in July of 1998. In addition, radon is continuously monitored along the fenceline and the detectors are collected and analyzed semi-annually.

If you have any questions, please contact me at the FUSRAP Project Office by calling (314) 524-6857.

Sincerely,



R. L. Mullins, Jr., Ph.D., P.E., AICP
FUSRAP Program Manager

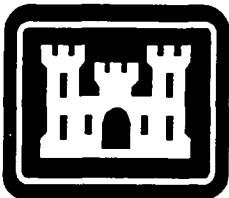
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Formerly Utilized Sites Remedial Action Program (FUSRAP)

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