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Company of Colorado

May 17, 1996
Fort St. Vrain
P-96039

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

ATTN: Mr. Michael F. Weber, Chief
Decommissioning and
Regulatory Issues Branch

Docket No. 50-267

SUBJECT: FSV Final Survey Plan, Proposals to Use In-Situ Gamma Spectroscopy to Measure Exposure Rates, and to Reduce Unnecessary Exposure Rate Measurements From Upper Walls and Overhead Surfaces

Dear Mr. Weber:

This letter requests NRC approval of two revisions to the Fort St. Vrain (FSV) Final Survey Plan, both involving measurement of exposure rates. Both of these proposed revisions are fully described in the Attachment to this letter, "FSV Final Survey Exposure Rate Measurements," and are summarized as follows:

- The first revision allows Public Service Company of Colorado (PSCo) and our decommissioning contractor, the Westinghouse Team, to utilize a method to measure exposure rates directly. This method utilizes in-situ gamma spectroscopy measurements and eliminates the need to independently establish actual background levels to demonstrate compliance with FSV's exposure rate acceptance criteria of 5 $\mu\text{R/hr}$ above background (average), and 10 $\mu\text{R/hr}$ (individual measurement).
- The second revision allows exposure rate measurements to be taken only for floors and lower wall surfaces, consistent with the guidance in Draft NUREG/CR-5849.

PSCo considers that these changes represent a reasonable survey effort that will result in a complete and accurate assessment of exposure rates due to residual contamination in the FSV facility. These changes will also result in a substantial cost savings for the FSV Final Survey effort. PSCo considers that these changes represent a sound ALARA

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approach to demonstrating satisfaction of the final release criteria for exposure rates at FSV, as described below:

Direct Exposure Rate Measurements

PSCo has discussed with the NRC on numerous occasions the complications associated with widely varying natural background levels within the FSV facility. Due largely to naturally occurring radionuclides in materials of construction and in the surrounding soil, the background exposure rate is highly variable and strongly dependent on location, materials of construction, and geometry. Background exposure rates have been found from 2 $\mu\text{R/hr}$ to 35 $\mu\text{R/hr}$ at the FSV site, and this wide variation seriously complicates the effort to demonstrate that exposure rates after decommissioning comply with the criteria of 5 $\mu\text{R/hr}$ above background (average) and 10 $\mu\text{R/hr}$ above background for individual measurements.

The current method of measuring the exposure rate above background is to select an appropriate background value, considering location and construction materials, and then subtract this value from the measured exposure rate. For locations where the selection of an appropriate background value is not straightforward, the FSV Final Survey Plan (Section 4.4.3.f) allows use of in-situ gamma spectroscopy to determine the contribution to total exposure rate from licensed materials. As explained in the Attachment, the process of performing the current exposure rate surveys is time consuming in that it results in a high number of investigations, and will require extensive use of in-situ gamma spectroscopy in addition to the current surveys being performed to measure exposure rate.

To address this problem with background exposure rates at FSV, the Scientific Ecology Group (SEG) is using an in-situ gamma spectroscopic device, the Microspec-2, manufactured by Bubble Technologies, Inc. This device provides a direct measure of the exposure rate due to licensed radioactive material, regardless of background. The Microspec was demonstrated to Messrs. David Fauver and Clayton Pittiglio of your staff during a site visit on March 19, 1996, at which time several questions were identified. In response, the Attachment describes the efforts SEG has undertaken to justify use of the Microspec, including a description of the uncertainties, identification of the assumptions, comparison of Microspec measurement results to pressurized ion chamber (PIC) measurement results, and identification of the system's minimum sensitivity.

PSCo notes that the Microspec methodology described here and in the Attachment is intended for use largely in the Reactor Building and Turbine Building areas, not including the interior of the PCRV. PCRV concrete includes europium which cannot accurately be measured by the Microspec system using the protocol currently defined, and other methodologies will have to be used. SEG is reviewing alternate applications

using the Microspec-2 or similar in-situ gamma spectroscopy systems for use in the PCRV, and this will be submitted for your review via separate correspondence.

ALARA Assessment

In addition to justifying the Microspec on its technical merits, the Attachment also addresses the potential cost savings associated with use of the Microspec for exposure rate measurements. The Microspec saves the efforts associated with determining an appropriate background exposure rate and performing additional investigations (which would likely involve use of the Microspec to establish exposure rate contribution from licensed materials). As described in Section 6 of the Attachment, the additional costs associated with the current method are estimated to be over \$404,000 above the costs of determining exposure rates directly with the Microspec, not including other costs associated with resultant schedule impacts. The additional \$404,000 required to determine exposure rates using the current methods is not reasonable, especially considering that the accuracy of the Microspec is demonstrated to be quite acceptable when compared to other measurement methods.

PSCo considers that the Microspec's direct measurement of exposure rates due to licensed material is the most effective method available from both a technical and an economic viewpoint. It has demonstrated accuracy, even in the presence of high and variable background, and results in potential savings in cost and schedule that amount to over \$404,000 at FSV.

Exposure Rate Measurements From Floors and Lower Wall Surfaces

FSV Final Survey Plan Section 4.3.3 requires that at least 30 exposure rate measurements be taken per survey unit, which includes taking exposure rate measurements one meter from ceiling surfaces and upper wall surfaces in affected areas.

PSCo proposes that exposure rate measurements only be required one meter from floors and lower wall surfaces, in accordance with the guidance provided in Draft NUREG/CR-5849, as follows:

Section 2.2 states that "In occupiable building locations, exposure rates are measured at 1 m from floor/lower wall surfaces and may be averaged over floor areas, not to exceed the size of a small office (i.e., about 10 m²)."

Section 4.2.3 states that "If gamma emitting radionuclides are among the potential contaminants, exposure rate measurements at 1 m from floor and lower wall surfaces are performed at a frequency of 1 systematic measurement per every 4 m²."

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Section 6.4.3 states that "Gamma exposure rate measurements are conducted at 1 m above the floor at systematically and randomly selected locations (Section 4.2.3) and at locations of elevated radiation, identified by area gamma scans."

In addition to justifying this change on the basis of its agreement with the regulatory guidance in Draft NUREG/CR-5849, the Attachment to this letter includes a section, "Technical Justification for Exposure Rate Measurement Requirements." This Attachment evaluates different plant configurations and determines that, as long as the removable and total surface activity SGLVs are met on the upper wall and ceiling surfaces, then the associated exposure rates will be acceptable.

PSCo requests this change from current FSV Final Survey Plan requirements to reduce the number of unnecessary survey measurements. This change involves affected surfaces, which includes the entire Reactor Building and portions of the Turbine Building, and involves a substantial survey effort. In addition, many of the ceiling and upper wall surfaces in the Reactor Building are not normally accessible (e.g., the Reactor Building ceiling is 79 feet above the refueling floor) and considerable potential risk is involved in performing exposure rate surveys.

In conclusion, PSCo considers that the changes proposed in this letter for measurement of exposure rates at FSV will ensure an accurate characterization of exposure rates, with a reasonable level of effort, in accordance with sound engineering judgement, utilizing ALARA principles. We are currently undertaking the use of the Microspec for exposure rate measurements, and would appreciate your approval as soon as practicable.

If you have any questions regarding this information, please contact Mr. M. H. Holmes at (303) 620-1701.

Sincerely,



Frederick J. Borst
Decommissioning Program Director

FJB/SWC/Attachment

cc: Regional Administrator, Region IV

Mr. Robert M. Quillin, Director
Radiation Control Division
Colorado Department of Public Health and Environment