

VIRGINIA ELECTRIC AND POWER COMPANY  
RICHMOND, VIRGINIA 23261

~~HH~~  
DARR  
Honey

05 JUN 4 P2:26

W L STEWART  
VICE PRESIDENT  
NUCLEAR OPERATIONS

July 1, 1983

Mr. James P. O'Reilly  
Regional Administrator  
Region II  
U. S. Nuclear Regulatory Commission  
101 Marietta Street, Suite 2900  
Atlanta, Georgia 30303

Serial No. 242A  
NO/WDC:acm  
Docket Nos. 50-280 /C  
50-281  
License Nos. DPR-32  
DPR-37

Dear Mr. O'Reilly:

BETA RADIATION DOSE MEASUREMENTS EVALUATION  
SURRY POWER STATION UNIT NOS. 1 AND 2

On April 11, 1983, Virginia Electric and Power Company (Vepco) received a Confirmation of Action letter (CAL-280/83-01 and CAL-281/83-01) pertaining to the Surry Power Station. Item Number 3 stated, "By July 5, 1983, complete an evaluation to resolve the discrepancy between beta radiation dose measurements made with portable survey instruments and measurements made with thermoluminescent dosimeters. Until this evaluation is completed, retain detailed survey records to provide sufficient information to adjust thermoluminescent dosimetry results, should such adjustment become necessary. Also, until the above evaluation is completed, control personnel exposure to beta radiation based on dose rate measurements made with portable survey instruments".

In order to resolve this item, Vepco developed the following action plan:

1. Empirically identify the beta spectral components;
2. Determine the response of the beta survey instrumentation (Eberline Model - RO-2A) to the identified spectra and determine a correction factor for this instrumentation;
3. Assess the beta dose to the lens of the eye as it relates to whole body dose;
4. Determine if a beta source similar to the identified station beta spectra is available;
5. Review the thermoluminescent dosimetry (TLD) beta dose algorithms with respect to the identified station spectra in order to determine if a correction factor is required;
6. Expose TLD's to a beta slab source at known distances and dose rates to determine a TLD correction factor;
7. Compare the TLD dose algorithm for Sr/Y-90 to the correction factor determined using the beta slab source.

ESPECIAL COPY

8502090582 840809  
PDR FOIA  
MAYBERR84-574 PDR

83-91

Implementation of the action plan was initiated by acquiring numerous swipes from Surry's Unit Number 2 primary system components. A Feather's analysis was performed on each swipe to determine the beta transmission. This procedure was then duplicated using swipes acquired from Unit Number 1. Both sets of data indicated a characteristic beta spectra whose major components were Co-58/60 and Cs-134/137 having an average maximum beta energy of approximately 631 keV. This maximum beta energy approximates Tl-204's maximum beta energy of 622 keV when attenuated by 20 centimeters of air. This data when compared to Eberline literature on the RO-2A indicated that a multiplication factor of 1.8 should be applied to beta survey data.

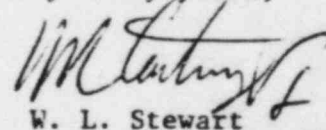
The maximum range of 631 keV betas is approximately  $225 \text{ mg/cm}^2$ . Comparing this range to the lens of the eye mass density thickness of  $300 \text{ mg/cm}^2$  indicates that there is no beta contribution to the lens of the eye dose. The dose to the lens of the eye is solely a function of the photon component of the radiation field.

Inquiries of vendors concerning commercially available Tl-204 beta slab sources indicated they are not readily available. Further inquiries indicated, however, that the University of Lowell has a Tl-204 beta slab source which can be used for irradiation of Vepco's TLD's. The results of these irradiations will be used to complete aforementioned Items 6 and 7. Discussions with the University of Lowell have revealed that the estimated time of performance of the mentioned irradiations and associated calibrations will require approximately 45 days. Subsequent analysis of the results and additional irradiations, if necessary, will also require approximately 45 days.

Therefore, it is requested that an extension of 90 days from the July 5, 1983, completion date be granted to facilitate completion of the action plan as delineated in this letter. A final response will be submitted no later than October 7, 1983.

In the interim, we will continue to comply with the provisions of the Confirmation of Action letter with regard to beta dose rate surveys.

Very truly yours,

  
W. L. Stewart

cc: Mr. Steven A. Varga  
Operating Reactors Branch No. 1  
Division of Licensing

Mr. D. J. Burke  
NRC Resident Inspector  
Surry Power Station