



August 18, 2008

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
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Rockville, MD 20852-2738

Serial No. 08-0430
NL&OS/GAW R0
Docket Nos. 50-305
50-336/423
50-338/339
50-280/281
License Nos. DPR-43
DPR-65/NPF-49
NPF-4/7
DPR-32/37

DOMINION ENERGY KEWAUNEE, INC. (DEK)
DOMINION NUCLEAR CONNECTICUT, INC. (DNC)
VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
KEWAUNEE POWER STATION
MILLSTONE POWER STATION UNITS 2 AND 3
NORTH ANNA AND SURRY POWER STATIONS UNITS 1 AND 2
APPLICATION TO USE WEIGHTING FACTORS FOR EXTERNAL EXPOSURE

Pursuant to footnote 2 to the "Organ Dose Weighting Factors" table in 10 CFR Part 20.1003, DEK, DNC and Dominion request approval to use weighting factors for calculating external whole body dose. The application is provided as an attachment to this letter.

Specifically, DEK, DNC and Dominion request approval to apply the weighting factors specified in the consensus technical standard, American National Standards Institute, HPS N13.41-1997, "Criteria for Performing Multiple Dosimetry," to assign total effective dose equivalent (TEDE) from external sources of radiation.

As described in the application, the approved use of weighting factors would improve the assessment of occupational dose to individuals from exposure to highly non-uniform radiation fields.

The technical basis for this application is the consensus technical standard approved by the American National Standards Institute – Accredited HPS N13 Committee. The standard is practical and consistent with the organ or tissue weighting factors in 10 CFR Part 20.1003.

The NRC previously approved use of weighting factors for Florida Power & Light Company plants (St. Lucie Units 1 and 2, Turkey Point Units 3 and 4, Seabrook Station and the Duane Arnold Energy Center) in a letter dated February 28, 2007 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML00530387).

If you have any questions or require additional information, please contact Mr. Geoffrey Wertz at (804) 273-3572.

Sincerely,



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Attachment: Application to Use Weighting Factors for External Exposure

Commitments made by this letter: None

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ATTACHMENT

APPLICATION TO USE WEIGHTING FACTORS FOR EXTERNAL EXPOSURE

**DOMINION ENERGY KEWAUNEE, INC. (DEK)
DOMINION NUCLEAR CONNECTICUT, INC. (DNC)
VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
KEWAUNEE POWER STATION
MILLSTONE POWER STATION UNITS 2 AND 3
NORTH ANNA AND SURRY POWER STATION UNITS 1 AND 2**

APPLICATION TO USE WEIGHTING FACTORS FOR EXTERNAL EXPOSURE

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1.0 INTRODUCTION

1.1 PURPOSE

Pursuant to 10 CFR Part 20.1003, "Weighting factor W_T ," Dominion Energy Kewaunee, Inc. (DEK), Dominion Nuclear Connecticut, Inc. (DNC), and Virginia Electric and Power Company (Dominion), request approval to use weighting factors for calculating external whole body dose.

Specifically, DEK, DNC and Dominion request approval to use weighting factors specified in HPS N13.41 (HPS N13.41-1997, "Criteria for Performing Multiple Dosimetry," approved December 1996, American National Standards Institute, Inc.) for assessing effective dose equivalent (EDE) based on direct measurement of external exposures using personnel dosimeters. The assigned EDE is the sum of each dosimeter measurement modified by its appropriate weighting factor.

The assigned EDE will be used as a component part in the calculation of total effective dose equivalent (TEDE).

This application is not intended to seek approval to use other methods or standards that are outlined in HPS/ANSI N13.41.

1.2 REGULATORY EVALUATION

Dose limits in 10 CFR Part 20 are specified in the dose quantity TEDE. TEDE is defined in 10 CFR 20.1003 as the sum of the effective dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures).

Footnote 2, in the "Organ Dose Weighting Factors" table in 10 CFR 20.1003, permits the use of weighting factors for external exposure with prior NRC approval. DEK, DNC and Dominion seek NRC approval to use weighting factors to calculate the external exposure quantity EDE and to use in the calculation of TEDE.

2.0 TECHNICAL JUSTIFICATION

2.1 IMPROVED ASSESSMENT OF DOSE

In uniform radiation fields, the dosimeter used to measure whole body dose is worn on the chest. The dosimeter measures radiation exposure using an operational dose quantity called deep dose equivalent (DDE).

When the radiation field is highly non-uniform, either the chest dosimeter is moved to the part of the whole body expected to receive the highest dose or additional dosimeters are worn so that the highest whole body dose can be measured.

Difficulties arise because the annual occupational dose limit is based on the stochastic risk from whole body exposure, which is related to the dose quantity EDE. While the use of DDE as a surrogate quantity to approximate EDE works well in uniform radiation fields, in highly non-uniform radiation fields, a more accurate estimate of EDE is needed to improve the assessment of occupational dose.

2.2 COMPARTMENT FACTORS

HPS N13.41 provides a method for assessing EDE based on measurements of DDE at specific areas of the body called "compartments" and applying appropriate weighting factors called "compartment factors." A compartment factor "relates the fractional risk to the organs underlying the measurement location to the total risk from uniform irradiation of the whole body."

HPS N13.41, Appendix A describes how the 10 CFR Part 20 organ or tissue weighting factors are apportioned to each "compartment" based on the associated underlying organs and tissues. The resulting compartment factors used to calculate EDE are listed below:

HPS N13.41 COMPARTMENT FACTORS

Compartment Name	Compartment Factor
Head and neck	0.10
Thorax, above the diaphragm	0.38
Abdomen, including the pelvis	0.50
Upper right arm	0.005
Upper left arm	0.005
Right thigh	0.005
Left thigh	0.005

2.3 CHEST COMPARTMENT

Consistent with DEK, DNC and Dominion's current practice, a single chest dosimeter will measure the dose to both the thorax and abdomen compartments. The combined compartments will be called the chest compartment. To ensure that the calculation of EDE (external) is conservative, DEK, DNC and Dominion will measure the dose to the highest portion of the thorax and abdomen and place the dosimeter at that location.

2.4 DOSIMETER SELECTION AND PLACEMENT

A national voluntary laboratory accreditation program (NVLAP) accredited dosimeter will be worn at each compartment or composite compartment at the highest exposed area. The dosimeter will be the same as previously used for multiple badge locations in dose gradients and, therefore, not pose any new challenges concerning angular dependence.

The criteria for the use of multiple whole body dosimetry will remain the same as defined in station procedures. The criteria are consistent with the guidance found in INPO 05-008, "Guidelines for Radiological Protection at Nuclear Power Stations."

2.5 DOSE ASSIGNMENT

The DDE for each compartment will be determined from dosimeters worn at that location. When no dosimeter is worn at a particular compartment, DDE will be determined from the dosimeter positioned where the exposure is similar. The assigned EDE will be the sum of each DDE measurement multiplied by its appropriate compartment factor.

The assigned lens dose equivalent (LDE) will be the higher of the head or chest dosimeters. The assigned shallow dose equivalent (SDE) will be the highest of any whole body dosimeter.

2.6 CONCLUSION

Accurate assessment of occupational dose from external sources of radiation in highly non-uniform radiation fields requires a method for assessing EDE. NRC approval of this application will improve the accuracy of licensee assessment of occupational dose.

DEK, DNC and Dominion will assess EDE based on the consensus technical standard, HPS N13.41. This standard was approved by the American National Standards Institute – Accredited HPS N13 Committee on 20 June 1996. At the time of balloting, the HPS N13 Committee membership included representatives from the Nuclear

Regulatory Commission and the National Council on Radiation Protection and Measurements.

The HPS N13.41 consensus technical standard has previously been approved for use by the NRC for evaluating occupational dose to medical personnel wearing lead aprons in Regulatory Issue Summary 2002-06, "Evaluation Occupational Dose for Individuals Exposed to NRC-Licensed Material and Medical X-Rays," dated April 16, 2002.

The proposed method will monitor the part of the whole body expected to receive the highest dose using the criteria for dosimeter selection and placement found in current station procedures.