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February 19, 2008
RC-08-0006

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Dear Sir / Madam:

Subject: VIRGIL C. SUMMER NUCLEAR STATION (VCSNS)
DOCKET NO. 50/395
OPERATING LICENSE NO. NPF-12
APPLICATION TO USE WEIGHTING FACTORS FOR EXTERNAL
EXPOSURE

South Carolina Electric & Gas Company (SCE&G), acting for itself and as agent for South Carolina Public Service Authority, hereby requests Nuclear Regulatory Commission (NRC) approval to use weighting factors for calculating external whole body dose pursuant to footnote 2 to the "Organ Dose Weighting Factors" table in 10 CFR Part 20.1003. The application for this request is provided as Attachment I.

Specifically, SCE&G requests approval to use weighting factors specified in American National Standards Institute technical standard HPS N13.41 (HPS N13.41-1997, "Criteria for Performing Multiple Dosimetry," approved December 1996) for assessing effective dose equivalent (EDE) at VCSNS based on direct measurement of external exposures using personnel dosimeters.

As described in the application, approval would improve 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 has given approval to use weighting factors for external exposure to the Florida Power and Light Company plants (St. Lucie Units 1 and 2, Turkey Point Units 3 and 4, Seabrook Station and Duane Arnold Energy Center) in a letter dated February 28, 2007 (Agencywide Documents Access and Management System [ADAMS] Accession No. ML070530387). Additionally, the NRC has given recent approval to the Wolf Creek Generating Station in a letter dated August 23, 2007 (ADAMS Accession No. ML072220355). Also, the NRC has given similar approval to various other licensees in the past to use weighting factors for external exposures.

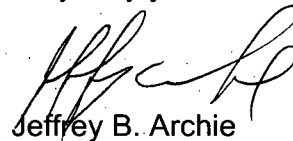
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VCSNS would like to begin using weighting factors for external exposures during the next refueling outage starting April 25, 2008. Therefore, SCE&G is requesting the approval of the subject application by April 15, 2008.

If you have any questions or require additional information, please contact Mr. Bruce L. Thompson at (803) 931-5042.

Very truly yours,



Jeffrey B. Archie

GAR/JBA/dr
Attachments

Attachment I: Application to Use Weighting Factors for External Exposure

Attachment II: List of Commitments

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ATTACHMENT I

APPLICATION TO USE WEIGHTING FACTORS FOR EXTERNAL EXPOSURE

APPLICATION TO USE WEIGHTING FACTORS FOR EXTERNAL EXPOSURE

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1.0 INTRODUCTION

1.1 PURPOSE

Pursuant to footnote 2 to the "Organ Dose Weighting Factors" table in 10 CFR Part 20.1003, VCSNS requests approval to use weighting factors for calculating external whole body dose.

Specifically, VCSNS requests approval to use weighting factors specified in American National Standards Institute technical standard HPS N13.41 (HPS N13.41-1997, "Criteria for Performing Multiple Dosimetry", approved December 1996) 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.

1.2 REGULATORY EVALUATION

Dose limits in 10 CFR Part 20 are specified in the dose quantity total effective dose equivalent (TEDE). TEDE is defined in 20.1003 as the sum of the external dose quantity called deep dose equivalent (DDE) plus the internal dose quantity called committed effective dose equivalent.

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. VCSNS seeks NRC approval to use weighting factors to calculate the external exposure quantity EDE and to use EDE in place of DDE 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 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 VCSNS's current practice, normally a chest and back dosimeter are used to measure the thorax compartment and a groin dosimeter is used to measure the abdomen compartment. The thorax compartment is then assigned the higher of the chest dosimeter and back dosimeter readings. Under certain circumstances, a single dosimeter may be used to monitor the thorax and abdomen compartments which will be called the chest compartment. If this does occur, the weighting factor would be 0.88 (summed).

2.4 DOSIMETER SELECTION AND PLACEMENT

NRC Inspection Procedure 71121.01, "Access Control to Radiologically Significant Areas" issue date 03/06/02, Section 03.04(c), "Dosimeter Selection and Placement Criteria," will be used to provide adequate criteria for monitoring the part of the body expected to receive the highest dose.

VCSNS will monitor the part of the whole body within each compartment (and/or combined compartment) that receives the highest dose. VCSNS Health Physics Procedure HPP-0411, "Monitoring Exposure with Multiple Badging", provides guidance for determining dosimeter selection and placement and will be revised consistent with that found in NRC Inspection Procedure Attachment 71121.01, dated 03/06/02. VCSNS Health Physics Procedure HPP-0517, "Multiple Whole Body and Extremity Badging Exposure Calculations", provides guidance for tracking and calculating an individual's radiation exposure and will be revised such that the EDE (when used) will be reported in place of the DDE, as discussed in NRC Regulatory Issue Summary 2004-01.

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 judged to be similar. The assigned EDE will be the sum of each DDE measurement multiplied by its appropriate compartment factor.

If an eye dosimeter is not used, 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 PRECEDENCE

The NRC has given approval to use weighting factors for external exposure to the Florida Power and Light Company plants (St. Lucie Units 1 and 2, Turkey Point Units 3 and 4, Seabrook Station and Duane Arnold Energy Center) in a letter dated February 28, 2007 (Agencywide Documents Access and Management System [ADAMS] Accession No. ML070530387). Additionally, the NRC has given recent approval to the Wolf Creek Generating Station in a letter dated August 23, 2007 (ADAMS Accession No. ML072220355). Also, the NRC has given similar approval to various other licensees in the past to use weighting factors for external exposures.

3.0 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.

VCSNS 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 NRC inspection procedures.

ATTACHMENT II

LIST OF COMMITMENTS

The following table identifies those actions committed to by VCSNS in this document. Any other statements in this submittal are provided for information purposes and are not considered regulatory commitments. Please direct any questions regarding these commitments to Mr. Bruce L. Thompson, Manager Nuclear Licensing at VCSNS, (803) 931-5042.

REGULATORY COMMITMENT	DUE DATE
VCSNS will monitor the part of the whole body within each compartment (and/or combined compartment) that receives the highest dose. VCSNS Health Physics Procedure HPP-0411, "Monitoring Exposure with Multiple Badging", provides guidance for determining dosimeter selection and placement and will be revised consistent with that found in NRC Inspection Procedure Attachment 71121.01, dated 03/06/02.	Within 90 days of NRC Approval.
VCSNS Health Physics Procedure HPP-0517, "Multiple Whole Body and Extremity Badging Exposure Calculations", provides guidance for tracking and calculating an individual's radiation exposure and will be revised such that the EDE (when used) will be reported in place of the DDE, as discussed in NRC Regulatory Issue Summary 2004-01.	Within 90 days of NRC Approval.
<p>Based on the NRC's approval of this request, VCSNS will account for dose consistent with the guidance of the standard in applicable Health Physics procedures, as follows:</p> <p>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 judged to be similar. The assigned EDE will be the sum of each DDE measurement multiplied by its appropriate compartment factor.</p> <p>If an eye dosimeter is not used, 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.</p>	Within 90 days of NRC Approval.