VERMONT YANKEE
NUCLEAR POWER CORPORATION

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July 24, 2002
BVY 02-52

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

References:
(a) Letter, VYNPC to USNRC, "Technical Specification Proposed Change No. 250, Scram and Isolation Valve Closure Functions of the Main Steam Line Radiation Monitors," BVY 02-18, March 19, 2002.
(b) Letter, VYNPC to USNRC, "Technical Specification Proposed Change No. 250, Supplement No. 1, Scram and Isolation Valve Closure Functions of the Main Steam Line Radiation Monitors," BVY 02-41, June 4, 2002
(c) Letter, VYNPC to USNRC, "Technical Specification Proposed Change No. 250, Scram and Isolation Valve Closure Functions of the Main Steam Line Radiation Monitors – Additional Information," BVY 02-49, July 16, 2002

Subject: **Vermont Yankee Nuclear Power Station**
License No. DPR-28 (Docket No. 50-271)
Technical Specification Proposed Change No. 250
Scram and Isolation Valve Closure Functions
of the Main Steam Line Radiation Monitors –
Additional Information No. 2

By letter dated March 19, 2002 [Reference (a)] and supplemented by letter dated June 4, 2002 [Reference (b)], Vermont Yankee (VY) proposed to amend its Facility Operating License, DPR-28 by eliminating the reactor scram and main steam isolation valve closure requirements associated with the main steam line radiation monitors (MSLRMs) and modifying other requirements related to MSLRM trip functions. Additional information in this regard was provided by Reference (c). The information provided herewith supplements References (a) through (c) and responds to questions posed by NRC staff during a telephone conference conducted on July 11, 2002.

If you have any questions on this transmittal, please contact Mr. Gautam Sen at (802) 258-4111.

Sincerely,

VERMONT YANKEE NUCLEAR POWER CORPORATION

Robert J. Wanczyk
Director of Safety & Regulatory Affairs

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STATE OF VERMONT)
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WINDHAM COUNTY)

Then personally appeared before me, Robert J. Wanczyk, who, being duly sworn, did state that he is Director of Safety & Regulatory Affairs of Vermont Yankee Nuclear Power Corporation, that he is duly authorized to execute and file the foregoing document in the name and on the behalf of Vermont Yankee Nuclear Power Corporation, and that the statements therein are true to the best of his knowledge and belief.

SALLY A. SANDSTRUM NOTARY PUBLIC WINDHAM COUNTY, VERMONT

Sally A. Sandstrum

Sally A. Sandstrum, Notary Public
My Commission Expires February 10, 2003

Attachment

cc: USNRC Region 1 Administrator (Attachment without CD-ROM)
USNRC Resident Inspector – VYNPS (Attachment without CD-ROM)
USNRC Project Manager – VYNPS (Attachment with CD-ROM)
Vermont Department of Public Service (Attachment without CD-ROM)

Docket No. 50-271
BVY 02-52

Attachment

Vermont Yankee Nuclear Power Station

Proposed Technical Specification Change No. 250

Scram and Isolation Valve Closure Functions of the
Main Steam Line Radiation Monitors

Additional Information No. 2

RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION
Vermont Yankee Proposed Change No. 250

Question 2[1]

The atmospheric dispersion factor (χ/Q) values for the exclusion area boundary (EAB) you used in your evaluation are $1.7x10^{-3}$ s/m^3 for a turbine building release and $2.0x10^{-4}$ s/m^3 for a release from the stack. These values do not appear to be documented in the FSAR. Are these values the same as were used in the FSAR section 14.9 control rod drop accident (CRDA) dose analysis or are they newly calculated for this amendment request?

a. If these values have been previously approved by the NRC staff, please provide a reference to this approval.

b. If these χ/Qs are new values, please provide a description of the analysis, the calculation inputs and assumptions, and the meteorological data used to determine these values.

Response

General

The EAB χ/Qs were generated previously for use in other analyses, but are not documented in the UFSAR. A description of the analysis, calculation inputs and assumptions follows. The meteorological data used are based on calendar year 1989. Five years (1989-1993) of meteorological data collected at the Vermont Yankee site are included in the accompanying CD-ROM in ARCON-96 format.

Turbine Building Releases

The EAB dispersion factor for turbine building releases ($1.7x10^{-3}$ sec/m^3) was based on one year's worth of hourly meteorological data collected on-site (1989). The analyses were carried out through use of the Framatome ANP DE&S computer code SKIRON-II, which implements the methodology of Regulatory Guide 1.145 for the 0-2 hr χ/Q value. The design input and assumptions are summarized in Table 2. The critical receptor was determined to be in the SSE sector (χ/Q = $1.69x10^{-3}$ sec/m^3). The overall-site (χ/Q) value was $1.15x10^{-3}$ sec/m^3, and is bounded by that for the critical sector.

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[1] Note: VYNPC letter to USNRC, "Technical Specification Proposed Change No. 250, Scram and Isolation Valve Closure Functions of the Main Steam Line Radiation Monitors – Additional Information," BVY 02-49, July 16, 2002, provided responses to Questions 1 and 3.

RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION
Vermont Yankee Proposed Change No. 250

Table 2
Design Input and Assumptions for Atmospheric Dispersion Factor Calculation for Turbine Building Releases

Seq.	DESCRIPTION	VALUE
1	Release height	Ground level
2	Building cross-sectional area for building wake effects	954.2 m^2
3	Building height (for building wake effects)	21.3 m
4	Minimum wind speed acceptable as valid observation	0.268 m/sec
5	Plume rise and terrain heights	Not applicable
6	Average depth of limited mixing layer (for plume reflection)	950 m
7	Receptor distances (minimum distance from the turbine building to the site area boundary for gaseous effluents within a 45-degree sector centered on the compass direction of interest, per Sec. C.1.2 of Reg. Guide 1.145):	
	Downwind sector: N	439.1 m
	NNE	436.9 m
	NE	436.9 m
	ENE	474.9 m
	E	474.9 m
	ESE	448.1 m
	SE	457.0 m
	SSE	483.9 m
	S	233.0 m
	SSW	188.2 m
	SW	183.7 m
	WSW	183.7 m
	W	192.7 m
	WNW	206.1 m
	NW	268.8 m
	NNW	537.7 m
8	Recirculation correction	Not considered
9	Meteorological data base	Hourly site data, for 1989[(a)]

(a) The hourly meteorological database is included in the enclosed CD-ROM, in ARCON-96 format, namely: Julian date, hour of day, lower-level wind direction (degrees from true N), lower-level wind speed (tenths of mph), stability class (1-7, for Pasquill A-G), upper-level wind direction, and upper-level wind speed. Also included in the CD-ROM are the hourly data for four consecutive years after 1989.

The stability class in the CD-ROM was based on the temperature difference between the middle (200-ft) and lower (35-ft) instrument levels on the meteorological tower. As such, it is only suitable for ground-level and vent releases, but not suitable for use with the upper-level wind direction and wind speed in the CD[2]. The upper-level instrument height is 297 ft.

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[2] ANSI/ANS-2.5/1984, "American Nuclear Standard for Determining Meteorological Information at Nuclear Power Sites," Sec. 4.

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Main Stack Releases

The dispersion factor for stack releases (2.0×10^{-4} s/m^3) corresponds to fumigation conditions, as described in Reg. Guide 1.145, Sec. C.1.3.2.a. This value is documented in Vermont Yankee's analysis, along with other values for various time intervals following the fumigation condition.

The pertinent equation for a fumigation condition [which leads to a uniform vertical concentration between the prevailing inversion layer (typically assumed to be at the release height) and the ground] is as follows (Reg. Guide 1.145, Eq. 5):

$$(\chi/Q)_{fumigation} = [\,(2\,\pi)^{0.5}\, u\ \ \sigma_y\, h_e\,]^{-1} \qquad (1)$$

where u is the wind speed (m/sec), representative of the fumigation layer of depth h_e, and σ_y is the lateral plume standard deviation (m), representative of the layer at the distance of interest, for moderately stable atmospheric conditions (Pasquill stability F).

The wind speed is typically assigned the conservative value of 2 m/sec for h_e of about 100 m, and the lateral plume standard deviation for stability F is defined as[3]:

$$\sigma_y = 0.0722\, D^{0.9031} \qquad (2)$$

where D (m) is the distance from the release point to the receptor of interest.

Site-specific values for VY are as follows:

Stack height (h_s)	= 93.9 m
Nearest distance to the EAB (D)	= 253 m
Terrain height (h_t) at EAB location	= 2.4 m

Hence,

$h_e = h_s - h_t = 93.9 - 2.4 = 91.5$ m (effective stack/plume height)

$\sigma_y = 0.0722\,(253)^{0.9031} = 10.7$ m

$(\chi/Q)_{fumigation} = [\,(2\,\pi)^{0.5}\, 2 * 10.7 * 91.5\,]^{-1} = 2.04\text{E-}04$ (sec/m^3)

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[3] E. C. Eimutis and M. G. Konicek, "Derivation of Continuous Functions for the Lateral and Vertical Dispersion Coefficients," Atmospheric Environment, Vol. 6, pp. 859-863 (1972)

Vermont Yankee Meteorological Data
1989 – 1993

CD ROM 01638.00.2029-CD01

Included in this CD are hourly meteorological data collected on site at Vermont Yankee, during the years 1989-1993. The database is in ARCON-96 format, namely:

Julian date,
Hour of day,
Lower-level wind direction (degrees from true N),
Lower-level wind speed (tenths of mph),
Stability class (1 through 7, for Pasquill stabilities A - G),
Upper-level wind direction, and
Upper-level wind speed.

It is noted that the stability class in the database was based on the temperature difference between the middle (200-ft) and lower (35-ft) instrument levels on the meteorological tower. As such, it is only suitable for ground-level and vent releases, but not suitable for use with the upper-level wind direction and wind speed in the data base.

For any questions, please feel free to contact:

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