APS

Palo Verde Nuclear
Generating Station

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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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Washington, DC 20555-0001

Dear Sirs:

Subject: **Palo Verde Nuclear Generating Station (PVNGS)**
Units 1, 2, and 3
Docket Nos. STN 50-528/529/530
Updated Final Safety Analysis Report, Revision 10, Errata Pages

Enclosed are four errata pages for Revision 10 of the PVNGS UFSAR that are being issued to replace previously issued pages that contain minor typographical and printing errors in some copies. These pages are for direct replacement of the existing pages.

Included in this package are the original and 10 copies of the errata pages. One copy is also being provided to the NRC Region IV Office and one copy to the NRC Resident Inspector's Office at PVNGS.

No commitments are being made to the NRC by this letter.

Should you have any questions, please contact Scott A. Bauer at (623) 393-5978.

Sincerely,

Gregg R. Overbeck

GRO/AKK/RJR/rlh

Enclosure

cc: E. W. Merschoff (w/Enclosure)
M. B. Fields (w/o Enclosure)
J. H. Moorman (w/o Enclosure)

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j = The j(th) atmospheric stability class, grouped into seven classes according to Regulatory Guide 1.23

k = k(th) wind direction sector

U_i = mid point value of the i(th) wind-speed class (meter/second)

σ_{zj} = the vertical plume spread for stability class j at distance x (meter)

$DEPL_{ij}$ (x, K) = plume depletion reduction factor at distance x for the i(th) wind speed class, the j(th) stability class, and k(th) wind direction sector.

DEC_i(x) = radiodecay reduction factor at distance x for the i(th) wind speed class. Radiodecay is based on a half-life of 2.26 days per Regulatory Guide 1.111.

RF (x, k) = Terrain Adjustment Factor at downwind distance x and k(th) wind direction sector.

F_{ij} (k) = joint probability of occurrence of the i(th) wind speed class, j(th) stability class, and K(th) wind direction sector.

c = mixing volume coefficient (shape factor) in the building-wake term

D_z = building height (meters) used to compute additional atmospheric dispersion due to the building wake. For the PVNGS analysis
Dz = 58 meters (the containment building height).

Equation (4) represents the maximum additional atmospheric dispersion due to the building wake, The results of both equations are compared and the largest (most conservative) value is used. In this analysis credit is not taken for depletion, gravitational settling or dry deposition.

Table 2.3-33

PVNGS TERRAIN ADJUSTMENT FACTORS

Distance (meters)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
402	1.0	1.1	1.1	1.1	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0
805	1.0	1.1	1.2	1.1	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.3	1.2
1,207	1.2	1.2	1.3	1.2	1.3	1.4	1.2	1.2	1.1	1.2	1.2	1.3	1.2	1.2	1.4	1.4
1,609	1.4	1.4	1.4	1.3	1.4	1.5	1.4	1.3	1.1	1.2	1.4	1.7	1.6	1.4	1.5	1.7
2,414	1.6	1.6	1.5	1.3	1.4	1.4	1.4	1.3	1.1	1.2	1.6	1.7	1.6	1.5	1.7	1.7
3,219	1.8	1.6	1.5	1.4	1.4	1.4	1.4	1.3	1.2	1.3	1.7	1.7	1.8	1.6	1.8	1.9
4,023	1.8	1.6	1.5	1.3	1.4	1.4	1.3	1.3	1.3	1.3	1.6	1.9	1.8	1.5	1.9	2.0
4,828	1.7	1.6	1.5	1.2	1.3	1.3	1.2	1.3	1.4	1.5	1.6	1.9	1.5	1.6	2.0	2.1
5,633	1.8	1.6	1.5	1.2	1.2	1.2	1.2	1.3	1.5	1.5	1.8	1.9	1.5	1.6	2.0	2.2
6,437	1.8	1.5	1.5	1.1	1.0	1.2	1.2	1.3	1.5	1.5	1.8	2.0	1.5	1.6	2.0	2.1
7,242	1.6	1.5	1.4	1.0	1.0	1.0	1.1	1.3	1.6	1.6	1.7	2.0	1.5	1.6	1.9	2.0
8,047	1.6	1.4	1.4	1.0	1.0	1.0	1.0	1.2	1.5	1.6	1.7	1.8	1.5	1.5	2.0	2.0
12,070	1.3	1.2	1.2	1.0	1.0	1.0	1.0	1.1	1.3	1.3	1.4	1.4	1.3	1.3	1.5	1.5
16,093	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
24,140	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
32,187	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
40,234	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
48,280	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
56,327	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
64,374	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
72,421	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
80,467	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Source: Taken from Appendix I, Analysis, reference 27.

2.3.6 REFERENCES

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f_c = 900 - 582 = 318 psi (compression)

Locations of cracked neutral axis is:

$$kd = x = \left(\frac{900 - 582}{900}\right) 21 = 7.42 \text{ in.}$$

Self-relieved thermal moment is:

$$M_T = \frac{f_s A_s\left(d - \frac{x}{3}\right)}{12} = \frac{13970\,(1)\,(40 - 2.47)}{12} = 43{,}690\,\frac{\text{in} - \text{lb}}{\text{in}}$$

3B.9.1.5 Comparison of Results

The rebar and concrete stresses, self-relieved thermal moment, and neutral axis location obtained from the CECAP program are compared with the hand calculations in table 3B.9-1. It can be seen that the CECAP results compare favorably with the hand calculations.

3B.9.1.6 Conclusions

The difference in the stress results are largely due to the accuracy limit defined for the force iterations. Smaller errors would result with smaller accuracy limits, but the trade-off would be with longer run times. The CECAP program is verified for this type of thermal loading.

Table 3B.9-1

CECAP AND HAND CALCULATION COMPARISON - THERMAL GRADIENT

	CECAP	Hand Calculations	Percent Error
f_s	13,150 psi	13,790 psi	5.9
f_c	-331 psi	-318 psi	4.1
k_d	7.55 in.	7.42 in.	1.8
M_T	43,760 in-lb/in	43,690 in-lb/in	0.2

3B.9.2 DESCRIPTION OF VERIFICATION PROBLEMS (CECAP) - CE 987

Eleven example problems were analyzed by the CECAP program and compared to hand-calculated solutions. The problems were chosen to verify the program for various combinations of thermal and nonthermal (real) loads. A list of verification problems with short descriptions follows. More detailed descriptions of the problems and their hand calculated solutions can be found in the appendices.

CECAPVER Number	Description
1	Thermal moment
2	Thermal moment and real axial load
3	Real moment
4	Real moment and real axial load
5	Thermal moment, real moment and real axial load
6	Uniaxial tension
7	Biaxial tension