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July 7, 1982

Docket Nos. 50-277
50-278

Mr. Darrell G. Eisenhut, Director
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: NUREG-0737, Item II.B.2, Plant Shielding Evaluation - Peach Bottom Atomic Power Station

Dear Mr. Eisenhut:

This letter provides additional information regarding our previously submitted shielding studies for the Peach Bottom Atomic Power Station. The studies were required by NUREG-0578, TMI-2 Lessons Learned Task Force Recommendations, and NUREG-0737, Post-TMI Requirements, to determine accessibility to vital areas following an accident.

In our submittal dated January 8, 1981, (S. L. Daltroff, Philadelphia Electric Company to D. G. Eisenhut, NRC), the results of the control room habitability study, required by NUREG-0737, Item III.D.3.4, were presented covering toxic chemical releases and radiation doses to the control room. Item III.D.3.4 recommends that the study be based on the criteria presented in Standard Review Plan (SRP) 6.4, Habitability Systems. One exception to the criteria is addressed later in this letter.

In our submittal of January 30, 1980, (S. L. Daltroff, Philadelphia Electric Company to H. R. Denton), the results of a

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shielding study, required by NUREG-0578, Item 2.1.6, were presented identifying radiation doses in vital areas, including the Technical Support Center. Subsequently, NUREG-0696, Functional Criteria for Emergency Response Facilities, was issued. NUREG-0696 recommends that the Technical Support Center (TSC) and the Emergency Operations Facility (EOF) personnel be protected from radiological hazards, including direct radiation of airborne contaminants under accident conditions to the same degree as control room personnel. This infers that the guidelines of SRP 6.4 should also be considered in the shielding study for the TSC and EOF.

Consequently, as a result of the guidance provided by NUREG-0696, the scope of the Peach Bottom shielding study has been expanded to include dose assessment of the EOF during accident conditions. Table 1 summaries the integrated doses, physical data, and dispersion factors determined by the revised Peach Bottom shielding study for the control room, TSC, and EOF. The information presented below provides identification of methodologies and assumptions used in the Peach Bottom shielding study that may be inconsistent with some of the NRC guidance. We believe these methodologies and assumptions provide a more realistic, but still conservative, analysis of post accident dose levels as described below:

1. NUREG-0737 shielding evaluation criteria requires any leakage from the main steam isolation valves (MSIV) to be added to the containment leakage and Engineered Safety Feature leakage following a LOCA. The Peach Bottom shielding study assumes that the MSIV leakage and all other bypass leak paths (leaks bypassing the standby gas treatment system) are included in the primary containment leakage rate of 0.5% per day. The dose calculations assumes 29% of the containment leakage rate is due to the bypass leakage rate. The remaining 71% of the primary containment leakage is assumed to mix with the secondary containment atmosphere and is released to the environment through the Standby Gas Treatment System filters.

2. Credit has been taken for plateout and holdup of iodine within steam lines and turbine/condenser complex for MSIV leakage. The removal rate for iodine due to plateout is based on methodology given in NUREG/CR-0009, section 5.1.2. The NRC has indicated that post-LOCA airborne dose calculations taking credit for more realistic assumptions for non-ESF systems are appropriate for older operating BWRs in accordance with a conversation held with the NRC Accident Analysis Branch.

3. Atmosphere dispersion factors, (X/Q) are based on Halitsky methodology and a value of K2 = 2, instead of Murphy methodology which SRP 6.4 suggests as an interim position. The Murphy methodology could not be applied because the Murphy Methodology is based upon roundtype containments whereas the Peach Bottom containment is a rectangular reactor enclosure.

Should you have any questions regarding this matter, please do not hesitate to contact us.

Very truly yours,

Enclosure

cc: C. J. Cowgill
Site Inspector

Table 1

A - 180 Day Total Integrated Doses (TID) For 180 Day With SRP 6.4 Occupancy Factors

	Thyroid (REM)	Total Whole Body*				Skin REM
		Bypass (REM)	Secondary Containment Cloud Shine (REM)	Equipment of Piping Shine (REM)	Plume Shine (REM)	
Unit 2&3 Control Room	2.7×10^{-1}	2.0×10^{-3}	6.45×10^{-3}	2.13×10^{-3}	1.3×10^{-3}	4.5×10^{-2}
Technical Support Center El 141' (PB Unit 1)	3.2×10^{-1}	1.1×10^{-3}	1.3	N/A	1.5	4.9×10^{-2}
Emergency Operations Facility El. 116' & 128'-6"	3.2×10^{-1}	8.4×10^{-4}	1.3	N/A	1.5	4.9×10^{-2}

* Total whole body dose = Bypass + Sec. Cont. cloud shine + Equipment/Pipe Shine + plume shine.

B - Physical Data Utilized In Calculation

Data for Control Room/ TSC/EOF/Unfiltered Areas:	Control Room	TSC	EOF
A. Volume (ft^3)	1.76×10^5	1.0×10^5	4.0×10^4
B. Filtered intake (cfm)	3,000	1,000	1,000
C. Efficiency of Charcoal Absorber (%)	95	95	95
D. Efficiency of HEPA (%)	99.9	99.9	99.9
E. Unfiltered Inleakage (cfm)	10	10	10
F. Recirculation Flow Rate	0.0	2,000	2,000

C - Dispersion Data (sec/m3):

A. CR - Building Wake
X/Q for Time Intervals

	Ground	Elevated
(1) 0-8 hrs	1.01 x 10-3	2.4 x 10-6
(2) 8-24 hrs	5.95 x 10-4	9.0 x 10-7
(3) 1-4 days	3.79 x 10-4	1.1 x 10-7
(4) 4-30 days	1.67 x 10-4	5.0 x 10-9

B. TSC/EOF:

(1) 0-8 hrs	1.0 x 10-3	2.4 x 10-6
(2) 8-24 hrs	7.3 x 10-4	9.0 x 10-7
(3) 1-4 days	3.5 x 10-4	1.1 x 10-7
(4) 4-30 days	1.2 x 10-4	5.0 x 10-9

C. Unfiltered Areas

(1) 0-8 hrs	1.0 x 10-3	2.4 x 10-6
(2) 8-24 hrs	7.3 x 10-4	9.0 x 10-7
(3) 1-4 days	3.5 x 10-4	1.1 x 10-7
(4) 4-30 days	1.2 x 10-4	5.0 x 10-9