REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8303040607 DOC.DATE: 83/02/23 NOTARIZED: NO DOCKET #
FACIL:50-397 WPPSS Nuclear Project, Unit 2, Washington Public Powe 05000397
AUTH.NAME AUTHOR AFFILIATION
BOUCHEY,G.D. Washington Public Power Supply System
RECIP.NAME RECIPIENT AFFILIATION
SCHWENCER,A. Licensing Branch 2

SUBJECT: Responds to NRC Question 010.068 re secondary missile generation resulting from spalling & scabbing of concrete walls & barriers upon impact by credible plant missiles. Survey indicates no secondary missiles can be generated.

DISTRIBUTION CODE: B001S COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 2
TITLE: Licensing Submittal: PSAR/FSAR Amdts & Related Correspondence

NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	NRR/DL/ADL	1	0	NRR LB2 BC	1	0
	NRR LB2 LA	1	0	AULUCK,R. 01	1	1
INTERNAL:	ELD/HDS2	1	0	IE FILE	1	1
	IE/DEP EPDS 35	1	1	IE/DEP/EPLB 36	3	3
	NRR/DE/AEAB	1	0	NRR/DE/CEB 11	1	1
	NRR/DE/EQB 13	2	2	NRR/DE/GB 28	2	2
	NRR/DE/HGEB 30	1	1	NRR/DE/MEB 18	1	1
	NRR/DE/MTEB 17	1	1	NRR/DE/QAB 21	1	1
	NRR/DE/SAB 24	1	1	NRR/DE/SEB 25	1	1
	NRR/DHFS/HFEB40	1	1	NRR/DHFS/LQB 32	1	1
	NRR/DL/SSPB	1	0	NRR/DSI/AEB 26	1	1
	NRR/DSI/ASB	1	1	NRR/DSI/CPB 10	1	1
	NRR/DSI/CSB 09	1	1	NRR/DSI/ICSB 16	1	1
	NRR/DSI/METB 12	1	1	NRR/DSI/PSB 19	1	1
	NRR/DSI/RAB 22	1	1	NRR/DSI/RSB 23	1	1
	REG FILE 04	1	1	RGN5	3	3
	RM/DDAMI/MIB	1	0			
EXTERNAL:	ACRS 41	6	6	BNL(AMDTS ONLY)	1	1
	DMB/DSS (AMDTS)	1	1	FEMA-REP DIV 39	1	1
	LPDR 03	1	1	NRC PDR 02	1	1
	NSIC 05	1	1	NTIS	1	1

TOTAL NUMBER OF COPIES REQUIRED: LTTR 52 ENCL 45

[illegible] (DID)

[illegible] DATE: [illegible] : [illegible] [illegible]
[illegible]-597 [illegible] Licensing Project, Unit 2, Washington Public Power [illegible] 05000597
[illegible] AUTHOR AFFILIATION
[illegible] Washington Public Power Supply System
[illegible] RECIPIENT AFFILIATION
[illegible] Licensing Branch 2

[illegible]: Responds to NRC Question 010.060 re secondary missile generation resulting from spalling & scabbing of concrete walls & barriers upon impact by credible flight missiles. Survey indicates no secondary missiles can be generated.

DISTRIBUTION CODE: B001S COPIES RECEIVED:LTR __ ENCL __ SIZE:_____
TITLE: Licensing Submittal: PSAR/FSAR Amdts & Related Correspondence

NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	NRR/DL/ADL	1	0	NRR LPZ JC	1	0
	NRR LPZ LA	1	0	AULUCA,K. 01	1	1
[illegible]:	ELD/HDS2	1	0	IE FILE	1	1
	IE/DEP EPB 35	1	1	IE/DEP/EPLB 36	3	3
	NRR/DE/AEAD	1	0	NRR/DE/CEB 11	1	1
	NRR/DE/EQB 13	2	2	NRR/DE/ESB 20	2	2
	NRR/DE/MTEB 30	1	1	NRR/DE/MEB 18	1	1
	NRR/DE/PSB 17	1	1	NRR/DE/SAB 21	1	1
	NRR/DE/SGB 24	1	1	NRR/DE/SLB 25	1	1
	NRR/DHFS/HFEB40	1	1	NRR/DHFS/LQB 32	1	1
	NRR/DL/SEP	1	0	NRR/DSI/ASB 26	1	1
	NRR/DSI/ASB	1	1	NRR/DSI/CPB 10	1	1
	NRR/DSI/CSB 09	1	1	NRR/DSI/ICSB 16	1	1
	NRR/DSI/METB 12	1	1	NRR/DSI/PSB 19	1	1
	NRR/DSI/RAB 22	1	1	NRR/DSI/RSB 23	1	1
	RGN1 FILE 04	1	1	RGN5	3	3
	RGN2 FILE 01	1	0			
[illegible]:	ACRS 41	6	6	OGC/HDS3	1	1
	OGC/HDS3 (ADPTS)	1	1	REG FILE 02	1	1
	EXTERNAL 05	1	1	NRC PDR 02	1	1
	NSIC 05	1	1	NTIS	1	1

[illegible]

Washington Public Power Supply System

P.O. Box 968 3000 George Washington Way Richland, Washington 99352 (509) 372-5000

February 23, 1983
G02-83-164

Docket No. 50-397

Director of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Schwencer:

Subject: NUCLEAR PROJECT NO. 2
NRC QUESTION 010.068

Reference:

a) BC-TOP-9A, Rev. 2, "Topical Report: Design of Structures for Missile Impacts", Bechtel Power Corporation, San Francisco, California, dated September 1974
b) C. Berriaud et. al., "Local Behavior of Reinforced Concrete Walls Under Hard Missile Impact", Transactions of the 4th International Conference on Structural Mechanics in Reactor Technology, Volume J (b), San Francisco, dated August 19, 1977
c) C. Berriaud, Session 38, "Impactive Load Definition and Design of Structures to Resist Tornado Turbine, High Energy System Rupture, Missile Impact, Aircraft Impact and Pipe Whip-Panel Preserations", International Seminar on Probabilistic and Extreme Load Design of Nuclear Plant Facilities, Pages 194 to 197, San Francisco, dated August 22-24, 1977

NRC Question 010.068 concerned secondary missile generation resulting from spalling and scabbing of concrete walls and barriers upon impact by credible plant missiles. A survey of our plant was completed (exclusive of the RCIC turbine) which showed that no secondary missiles could be generated by the most energetic plant primary missiles which impact on concrete barriers or walls. The survey was based on industry and staff approved analysis methods, cited in Reference (a). The calculations and results are documented in our missile analysis packages.

As noted in the response to NRC Question 010.067, the RCIC turbine missiles are under evaluation utilizing the turbine vendor's data on maximum credible missile energy. This report was received in late January and is now being used to finalize the RCIC turbine missile analysis package. A final assessment of the RCIC turbine missiles on impacted compartment walls and the ceiling structures will be included in the analysis using the appropriate Reference (a) design formulas for concrete penetration, perforation, and spalling/scabbing. The results of this analysis will be reported to you via our final response to Question 010.067.

B001

As part of our response to Question 010.068, we noted that the missile analysis paper referred to by the NRC reviewer as "CEA-EDF" was only available in French. Further literature surveys have located a summary paper (Reference (b)) and the proceedings of a seminar (Reference (c)) on the French studies of missile impacts on concrete. We reiterate that the full text of the French work, to our knowledge, is not available in the open english literature. The summary paper presented a power law relationship for determining a missiles' ability to perforate a concrete barrier. No information on secondary missiles was presented by Reference (b).

Even though the effects of secondary missiles at WNP-2 is a moot point (i.e., we've shown that these missiles are not generated at our plant), we, for heuristic reasons, tested the French formulation of CEA-EDF against the Petry equation referenced in our FSAR and detailed in Reference (a). The respective equations were applied to two missiles selected from the Standard Review Plan (SRP); the 42 m/sec, 130 kg, 6 inch schedule 40 pipe, and the 79 m/sec, 4 kg, 1 inch diameter rod. In both cases, the Petry equation conservatively predicted perforation thicknesses about twice that of the French formulation.

In summary we find that the French work is not sufficiently documented, provides no quantification on secondary missile generation, and on first examination is less conservative than the design basis used at WNP-2 for missile perforation of concrete slabs. We plan no further assessment of this French research.

The exterior walls of WNP-2's missile hardened buildings can sustain tornado missile impacts far in excess of the missile energies stipulated by SRP 3.5.1.4 for a Region III site; as is applicable for our plant location (see Regulatory Guide 1.76). However, the Supply System previously committed to the higher Spectrum A missile energies of SRP 3.5.1.4 as a design basis (i.e., the utility pole and rebar missiles as limiting cases). Utilizing the very conservative Spectrum A energies, WNP-2's exterior walls have been designed to prevent both missile penetration (i.e., perforation), and spalling/scabbing on tornado hardened surfaces. This design basis is delineated in our FSAR in Section 3.5.1.4 and missile penetration results are found in Table 3.5-5. Since tornado impacted walls at WNP-2 have been designed (Reference (a) methods) to preclude spalling or scabbing, secondary missiles are not generated.

Very truly yours,

G. D. Bouchey
Manager, Nuclear Safety and Regulatory Programs

DMB/jca

cc: R Auluck - NRC
WS Chin - BPA
A Toth - NRC Site