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 ADENSAM, E. G. BWR Project Directorate 3

SUBJECT: Submits supplemental info to 810821, 820511 & 860204 ltrs
 2. C. (B) satisfied. Plant-specific LOCA analysis indicates
 calculated peak cladding temp below MAPLHOR limits.
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 AUTHOR AFFILIATION
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 BWR Project Directorate 3
 ADAMS, E. G.
 RECIPIENT NAME
 SORESEN, G. C.
 VUTH NAME

SUBJECT: Submit supplemental info to 810851, 850511 & 850504 ftrs
 S.C. (B) entitled, Plant-specific LOCA analysis findings
 calculated peak cladding temp below MAPLHOR limits.
 Revised FSAR pages encl.

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05	1	03	1	EL D\HDS2	04	1	1	BWR FOB	5	1	1	BWR FOB	1	1	1
05	1	03	1	MIR\DRAS	04	1	1	BRADUTE, J	5	1	1	BRADUTE, J	1	1	1
05	1	03	1	RENS	04	1	1	BWR RSB	1	1	1	BWR RSB	1	1	1
05	1	03	1	ACRS	04	1	1	ADM\LFMB	5	1	1	ADM\LFMB	1	1	1
05	1	03	1	EL D\HDS2	04	1	1	MIR\DRAS	0	1	1	MIR\DRAS	1	1	1
05	1	03	1	RENS	04	1	1	REG FILE	0	1	1	REG FILE	1	1	1
05	1	03	1	ADM\LFMB	04	1	1	BWR ESB	0	1	1	BWR ESB	1	1	1
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05	1	03	1	MIR\DRAS	04	1	1	BRADUTE, J	5	1	1	BRADUTE, J	1	1	1
05	1	03	1	RENS	04	1	1	BWR RSB	1	1	1	BWR RSB	1	1	1
05	1	03	1	ACRS	04	1	1	ADM\LFMB	5	1	1	ADM\LFMB	1	1	1
05	1	03	1	EL D\HDS2	04	1	1	MIR\DRAS	0	1	1	MIR\DRAS	1	1	1
05	1	03	1	RENS	04	1	1	REG FILE	0	1	1	REG FILE	1	1	1
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05	1	03	1	MIR\DRAS	04	1	1	BRADUTE, J	5	1	1	BRADUTE, J	1	1	1
05	1	03	1	RENS	04	1	1	BWR RSB	1	1	1	BWR RSB	1	1	1
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05	1	03	1	MIR\DRAS	04	1	1	BRADUTE, J	5	1	1	BRADUTE, J	1	1	1
05	1	03	1	RENS	04	1	1	BWR RSB	1	1	1	BWR RSB	1	1	1
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05	1	03	1	RENS	04	1	1	BWR RSB	1	1	1	BWR RSB	1	1	1
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05	1	03	1	RENS	04	1	1	BWR RSB	1	1	1	BWR RSB	1	1	1
05	1	03	1	ACRS	04	1	1	ADM\LFMB	5	1	1	ADM\LFMB	1	1	1
05	1	03	1	EL D\HDS2	04	1	1	MIR\DRAS	0	1	1	MIR\DRAS	1	1	1
05	1	03	1	RENS	04	1	1	REG FILE	0	1	1	REG FILE	1	1	1
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05	1	03	1	RENS	04	1	1	BWR RSB	1	1	1	BWR RSB	1	1	1
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05	1	03	1	RENS	04	1	1	REG FILE	0	1	1	REG FILE	1	1	1
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05	1	03	1	EL D\HDS2	04	1	1	BWR FOB	5	1	1	BWR FOB	1	1	1
05	1	03	1	MIR\DRAS	04	1	1	BRADUTE, J	5	1	1	BRADUTE, J	1	1	1
05	1	03	1	RENS	04	1	1	BWR RSB	1	1	1	BWR RSB	1	1	1
05	1	03	1	ACRS	04	1	1	ADM\LFMB	5	1	1	ADM\LFMB	1	1	1
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05	1	03	1	RENS	04	1	1	REG FILE	0	1	1	REG FILE	1	1	1
05	1	03	1	ADM\LFMB	04	1	1	BWR ESB	0	1	1	BWR ESB	1	1	1
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05	1	03	1	MIR\DRAS	04	1	1	BRADUTE, J	5	1	1	BRADUTE, J	1	1	1
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05	1	03	1	EL D\HDS2	04	1	1	MIR\DRAS	0	1	1	MIR\DRAS	1	1	1
05	1	03	1	RENS	04	1	1	REG FILE	0	1	1	REG FILE	1	1	1
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05	1	03	1	RENS	04	1	1	REG FILE	0	1	1	REG FILE	1	1	1
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05	1	03	1	RENS	04	1	1	REG FILE	0	1	1	REG FILE	1	1	1
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05	1	03	1	EL D\HDS2	04	1	1	MIR\DRAS	0	1	1	MIR\DRAS	1	1	1
05	1	03	1	RENS	04	1	1	REG FILE	0	1	1	REG FILE	1	1	1
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05	1	03	1	RENS	04	1	1	BWR RSB	1	1	1	BWR RSB	1		

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

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8605160207 860509
PDR ADDCK 05000397
P PDR

May 9, 1986
G02-86-417

Docket 50-397

Director of Nuclear Reactor Regulation
Attn: E. G. Adensam, Project Director
BWR Project Directorate No. 3
Division of BWR Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Ms. Adensam:

Subject: NUCLEAR PLANT NO. 2
OPERATING LICENSE NPF-21,
SATISFACTION OF LICENSE CONDITION 2.C.(8),
SUPPLEMENTAL INFORMATION

- References: 1) Letter, G02-86-125, G.C. Sorensen (SS) to E.G. Adensam (NRC), same subject, dated February 4, 1986
2) WPPSS Nuclear Project No. 2, FSAR Vol. 12, Chap. 6.3
3) Letter, H. Bernard (NRC) to G.G. Sherwood (GE), "Supplementary Acceptance of Licensing Topical Report NEDE 205-66A(P)", dated May 11, 1982
4) Letter, R.M. Pifferetti (GE) to R.L. Tedesco (NRC), "Fission Gas Release from Fuel at High Burnup", dated August 21, 1981

The purpose of this letter is to provide supplemental information as to how License Condition 2.C.(8) is satisfied. A WNP-2 plant specific LOCA analysis using approved NEDE 20566 models was performed. Results of the analysis are documented in Reference 2. The calculated peak cladding temperature (Attachment 1) during a LOCA is 1971°F occurring in medium enrichment fuel at 16534.5 MWD/MT burnup. The MAPLHGR limits presented in Attachment 1 are those used in the WNP-2 Technical Specifications. In accordance with 10CFR50.46, the allowable peak cladding temperature is 2200°F. Therefore, there is a temperature margin of 2200-1971=229°F. This temperature margin has not been applied elsewhere.

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E. G. Adensam

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SATISFACTION OF LICENSE CONDITION 2.C.(8), SUPPLEMENTAL INFORMATION

The staff's concern about GE's cladding rupture and strain models has been resolved, Reference 3. The WNP-2 plant specific LOCA analysis did use the approved cladding rupture and strain models as stated in the WNP-2 FSAR, Section 6.3.7.1. The date provided in the FSAR for reference 6.3.2 (NEDO-20566P) on page 6.3-37 is incorrect and will be changed to January 1976 in a future FSAR update.

Reference 4 addresses the impact of increased fission gas release, and its fission gas correction factors for P8X8R fuel are shown in Attachment 2. For the GE fuel (P8X8R) in the WNP-2 core, the correction factors are added to the peak cladding temperature shown in Attachment 1. Attachment 3 shows the least temperature margins to 2200°F at different exposures for all fuel types. There is always ample margin (>229°F) between the allowable and the peak cladding temperature with the fission gas correction.

It is appropriate to use the values under "PCT Increase with NRC Correction Factor" in Attachment 2 since they are realistic and conservative for application to WNP-2. The net effect of increased fission gas inventory is to increase the stored energy of the fuel. Characteristics of WNP-2 make it less sensitive to change in stored energy than the plant assumed for the referenced evaluation. Therefore, if a plant-specific calculation were performed for WNP-2, the Δ PCT would be expected to be less than the results shown in Attachment 2. There have been no changes in models or fuel designs that would cause the results reported in Reference 4 to change.

The expected peak assembly exposures for the GE fuel at the end of cycles are as follows:

<u>Cycle</u>	<u>Peak Assembly Average Exposure, MWD/MT</u>	<u>Planar Average Exposure MWD/MT</u>
2	19.0	24.7
3	23.5	30.55
4	27.0	35.10
5	30.0	39.00
6	32.5	42.25

A factor of 1.3 is used in converting the assembly average exposure to the planar average exposure. All GE fuel is expected to be discharged on or before 44000 MWD/MT planar average exposure.

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SATISFACTION OF LICENSE CONDITION 2.C.(8), SUPPLEMENTAL INFORMATION

Additional conservatism is applied in that no credit is taken for improved ECCS models. If such credit were taken, the margin to the PCT limit would increase by approximately 150°F - 200°F. Finally, the extreme conservatism of the models used as the basis for the WNP-2 evaluation is clearly demonstrated when compared to current state-of-the-art ECCS methods (SAFER/GESTR).

For the reasons identified above, the Supply System considers License Condition 2.C.(8) to be satisfied and the 229°F margin available to the Supply System in its entirety. Should you have any questions in this matter, please contact Mr. P. L. Powell, Manager, WNP-2 Licensing.

Very truly yours,



G. C. Sorensen, Manager
Regulatory Programs

DC/bk
Attachments

cc: JO Bradfute - NRC
C Eschels - EFSEC
JB Martin - NRC RV
E Revell - BPA
NS Reynolds - BLCP&R
NRC Site Inspector

TABLE 6.3-6

MAPLHGR, MAXIMUM LOCAL OXIDATION & PEAK CLAD
TEMPERATURE VERSUS EXPOSURE

<u>Exposure</u> <u>MWD/ST</u>	<u>Exposure</u> <u>MWD/MT</u>	<u>MAPLHGR</u> <u>KW/FT</u>	<u>P.C.T.</u> <u>DEG F</u>	<u>OXID</u> <u>FRAC</u>
<u>High Enrichment IC Fuel</u>				
200.0	220.5	11.9	1931	0.010
1,000.0	1,102.3	12.0	1930	0.009
5,000.0	5,511.5	12.1	1898	0.008
10,000.0	11,023.0	12.2	1889	0.008
15,000.0	16,534.5	12.2	1903	0.008
20,000.0	22,046.0	12.1	1896	0.008
25,000.0	27,557.5	11.6	1837	0.007
30,000.0	33,069.0	11.2	1779	0.005
35,000.0	38,580.5	10.6	1709	0.004
40,000.0	44,092.0	10.0	1651	0.003
<u>Medium Enrichment IC Fuel</u>				
200.0	220.5	12.0	1928	0.010
1,000.0	1,102.3	12.1	1932	0.010
5,000.0	5,511.5	12.7	1940	0.009
10,000.0	11,023.0	12.8	1939	0.009
15,000.0	16,534.5	12.9	1953*	0.010*
20,000.0	22,046.0	12.7	1933	0.009
25,000.0	27,557.5	11.7	1814	0.006
30,000.0	33,069.0	10.8	1706	0.004
35,000.0	38,580.5	10.0	1620	0.003
40,000.0	44,092.0	9.4	1562	0.002
<u>Natural Uranium IC Fuel</u>				
200.0	220.5	11.5	1830	0.007
1,000.0	1,102.3	11.4	1801	0.006
5,000.0	5,511.5	11.4	1760	0.005
10,000.0	11,023.0	11.5	1750	0.005
15,000.0	16,534.5	11.5	1748	0.005
20,000.0	22,046.0	11.0	1701	0.004
25,000.0	27,577.5	10.4	1642	0.003
30,000.0	33,069.0	9.7	1575	0.002
35,000.0	38,580.5	9.1	1510	0.002

ATTACHMENT 2

TABLE

GENERAL ELECTRIC ASSESSMENT OF NRC FISSION GAS CORRECTION FACTOR

<u>Plant Type</u>	<u>Fuel Type</u>	<u>Exposure (GWD/MT)</u>	<u>PCT Increase With NRC Correction Factor (°F)</u>
BWR/5	P8X8R	22	10
		28	30
		33	70
		39	130
		44	200
		50	240

ATTACHMENT 3

<u>Exposure</u> <u>MWD/MT</u>	<u>PCT</u> <u>°F</u>	<u>ΔPCT</u> <u>°F</u>	<u>Total</u> <u>°F</u>	<u>Margin to</u> <u>200°</u> <u>F</u>
220.5	1931	0	1931	269
1102.3	1932	0	1932	268
5511.5	1940	0	1940	260
11023.0	1939	0	1939	261
16534.5	1953*	0	1953*	247*
22046.0	1933	10	1943	257
27557.5	1814	30	1844	356
33069.0	1706	70	1776	424
38580.5	1620	130	1750	450
44092.0	1562	200	1762	438

*NOTE: A change in valve permissive opening logic from reactor vessel differential pressure to absolute reactor vessel pressure causes an additional 3 second delay in the 46 second LPCI/LPCS system initiation for large (rapid depressurization) line breaks used in the analysis. The results of this additional 3 second delay are extrapolated from the 46 second delay case and result in a PCT of 1971°F, representing an 18°F increase in PCT.

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