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50-370 William B. McGuire Nuclear Station, Unit 2, Duke Powe 05000370
50-413 Catawba Nuclear Station, Unit 1, Duke Power Co. 05000413
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SUBJECT: Forwards response to Rev 1,Suppl 1 to GL 92-01, "Reactor Vessel Structural Integrity."

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DUKE POWER

November 16, 1995

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

Subject : McGuire Nuclear Station Units 1 & 2
Docket Nos. 50 -369, 370
Catawba Nuclear Station Units 1 & 2
Docket Nos. 50-413, 414
Oconee Nuclear Station Units 1, 2, & 3
Docket Nos. 50-269, 270, 287
Response to Supplement 1 of Generic Letter 92-01, Revision 1, "Reactor Vessel Structural Integrity

Gentlemen:

On May 19, 1995, the NRC issued Generic Letter (GL) 92-01, Revision 1, Supplement 1, "Reactor Vessel Structural Integrity," requiring addressees to identify, collect, and report any new data pertinent to analysis of structural integrity of their reactor pressure vessels (RPVs). It also requires an assessment of the impact of this new data on RPV integrity analyses relative to the requirements of Section 50.60 of Title 10 of the Code of Federal Regulations (10 CFR 50.60), 10 CFR 50.61, Appendices G and H to 10 CFR 50, and any potential impact on low temperature overpressure (LTOP) limits or pressure-temperature (P-T) limits.

The GL supplement required a written response within 90 days from the date of the GL to part (1) of the required information (This response was submitted to the NRC on August 16, 1995.) and within 6 months from the date of the GL, a written response to parts (2), (3), and (4) of the required information. Enclosed are the responses to GL 92-01, Revision 1, Supplement 1, for McGuire and Catawba Nuclear Stations. The response for Oconee Nuclear Station is incorporated into BAW-2257, Revision 1, submitted to the NRC by Letter dated November 1, 1995 (OG-95-1552), from the B&W Owners Group (BWOG).

Duke has concluded that there is no need to make revisions to the previously submitted evaluations concerning reactor pressure vessel integrity and that the LTOP

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and P-T limits in the Technical Specifications remain valid. These evaluations were in accordance with the requirements of 10 CFR 50.60, 10 CFR 50.61, and Appendices G and H to 10 CFR Part 50.

I declare under penalty of perjury that these statements are true and correct to the best of my knowledge.

Should you have any questions, please call Jeff Gilreath at (704) 382-3972.

Very truly yours,

M. S. Tuckman

M. S. Tuckman
Senior Vice President
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Enclosures

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ENCLOSURE 1

RESPONSE TO NRC GENERIC LETTER 92-01, REVISION 1, SUPPLEMENT 1, "REACTOR VESSEL STRUCTURAL INTEGRITY"

This enclosure provides Duke Power's response to the information requested in the Supplement to Revision 1 of Generic Letter (GL) 92-01 for McGuire Units 1 and 2.

NRC Request 1:

Provide a description of those actions taken or planned to locate all data relevant to the determination of reactor pressure vessel integrity, or an explanation of why the existing database is considered complete as previously submitted.

McGuire Unit 1

See attached response previously submitted to the NRC on August 16, 1995.

McGuire Unit 2

See attached response previously submitted to the NRC on August 16, 1995.

NRC Request 2:

Provide an assessment of any change in best-estimate chemistry based on consideration of all relevant data.

McGuire Unit 1

The McGuire Unit 1 reactor pressure vessel was manufactured by Combustion Engineering (C-E) in Chattanooga, Tennessee. The vessel was ordered by Westinghouse Electric Corporation under C-E Contract 2167. The pertinent weld wire material used to fabricate the beltline welds in McGuire Unit 1 are Linde 1092 welds, with heat numbers 21935/12008, 20291/12008 and Linde 0091 weld with heat number 83640. The best estimated chemistry to date for these welds are in Tables 1, 2, and 3, respectively.

McGuire is currently working with the CEOG RVWG to gather all pertinent data and develop best estimate chemistry for each weld heat fabricated by C-E. This work will not be completed for 21 months. Additional data generated by McGuire Unit 1, Diablo Canyon Unit 2, Calvert Cliffs Unit 1 and Pilgrim Unit 1 will continue to be evaluated by Duke Power and incorporated into its Reactor Vessel Integrity Program.

McGuire Unit 2

The McGuire Unit 2 reactor pressure vessel was manufactured by Rotterdam Dockyard Co. in the Netherlands under Westinghouse Electric Corporation Contract No. 30664. Its beltline region was fabricated from two ring forgings and contain only one circumferential weld which joins the intermediate and lower ring forgings. The weld wire (not Cu coated) used to fabricate the circumferential beltline weld was low in Cu content with medium Ni. As a result of the low Cu weld in the McGuire Unit 2 vessel, it is forging limited (heat no. 526840) for 10 CFR 50.61 RT_{PTS} at end of life (EOL), and is forging controlled for the current P-T limit curves and LTOP analysis. The calculated EOL RT_{PTS} using surveillance capsule weld data is 24°F (reference #20) which is over 250°F below the 10 CFR 50.61 screening criteria. Because of the circumferential weld's low EOL RT_{PTS} value and the vessel being forging limited, no additional information on our non-Cu coated, non-limiting beltline welds will be relevant for determining the structural integrity of the reactor vessel. However, for completeness the weld chemistry for this non-limiting beltline weld is contained in Table 4.

A review was performed on the Westinghouse Owners Group RPVDATA and the NRC RVID databases, no other forging material was found with heat number 526840. All known data for McGuire Unit 2 limiting material (Heat No. 526840) was utilized in our last submittal. Therefore, there is no change to the best estimate chemistry.

NRC Request 3:

Provide a determination of the need for use of the ratio procedure in accordance with the established Position 2.1 of Regulatory Guide 1.99, Revision 2, for those licensees that use surveillance data to provide a basis for the RPV integrity evaluation.

McGuire Unit 1

The Chemistry Factor (CF) for the surveillance weld (using Table 1 of Reg. Guide 1.99 rev.2) is 211.2 and the CF for the average chemistry using all chemistry values is 209.6.

$$CF_{avg.} = 209.6$$
$$CF_{surv.} = 211.2$$
$$\text{Ratio} = CF_{avg.} / CF_{surv}$$
$$\text{Ratio} = 0.99$$

The above ratio of 0.99, indicates no clear evidence that the copper or nickel content of the surveillance weld differs from that of the vessel weld. Therefore, the use of the ratio procedure is not warranted.

McGuire Unit 2

The limiting material for McGuire Unit 2 is not a weld, but the intermediate shell forging 05 (Heat No. 526840). Base material does not exhibit the potential for chemistry variability as

does weld material. Position 2.1 of Regulatory Guide 1.99, Revision 2, only refers to weld material (e.g."if there is clear evidence that the copper or nickel content of the surveillance weld differs from that of the vessel weld") in reference to the ratio procedure. Therefore, the use of the ratio procedure is not warranted.

NRC Request 4:

Provide a written report providing any newly acquired data as specified above and (1) the results of any necessary revisions to the evaluation of RPV integrity in accordance with the requirements of 10 CFR 50.60, 10 CFR 50.61, Appendices G and H to 10 CFR Part 50, and any potential impact on the LTOP or P-T Limits in the technical specifications or (2) a certification that previously submitted evaluations remain valid. Revised evaluations and certifications should include consideration of Position 2.1 of Regulatory Guide 1.99, Revision 2, as applicable, and any new data.

McGuire Unit 1

Diablo Canyon Unit 2 has tested their third surveillance capsule that resulted in a lowering of the chemistry factor. Because of our integrated surveillance program with Diablo Canyon Unit 2, we will utilize this data when evaluating our reactor vessel integrity beyond the 15 effective full power years. The present submittal, utilizing two credible data points remains valid and bounding in meeting the requirements of 10 CFR 50.60, 10 CFR 50.61, Appendices G and H to 10 CFR Part 50, LTOP and P-T limits.

Duke Power has provided a written report (reference 20 & 42) to the NRC updating the 10 CFR 50.60 Appendix G Upper Shelf Energy Values (USE), Appendix H (Surveillance capsule report) and 10 CFR 50.61 pressurized thermal shock (PTS) projections using the most recent surveillance capsule data for McGuire Unit 1.

McGuire Unit 2

New P-T curves and LTOP analysis have been submitted for approval on March 29, 1995, utilizing the most recent surveillance data, for the purpose of extending the Unit 2 P-T curves to 15 EFPY. The evaluations presently being utilized in meeting the requirements of 10 CFR 50.60, 10 CFR 50.61, Appendices G and H to 10 CFR Part 50, LTOP and P-T limits remain bounding and valid.

Duke Power has provided a written report (reference 34 & 43) to the NRC updating the 10 CFR 50.60 Appendix G Upper Shelf Energy Values (USE), Appendix H (Surveillance capsule report) and 10 CFR 50.61 pressurized thermal shock (PTS) projections using the most recent surveillance capsule data for McGuire Unit 2.

TABLE 1

McGuire Unit 1 And Sister Plant Weld Information for Lower Shell Long. Seams, 3-442 A, B & C (Heat No. 21935 and 12008, Linde 1092 Flux)

Plant	Component	Data Pt. No.	Wt% Cu	Wt% Ni	Reference
McGuire 1	Lwr. Shell Long Weld				1, 2
Salem 2	Lwr. Shell Long Weld				3
C-E MML Analysis	Supplemental Test	1	**0.20**	**0.86**	4, 5
C-E MML Analysis	Supplemental Test	2	**0.22**		6
Diablo Canyon 2	Inter. Shell Long. Weld				7
Diablo Canyon 2	Upr. Shell Long. Weld				8
Diablo Canyon 2	Beltline Weld Repair	3	0.23	0.90	9, 10
Diablo Canyon 2	Beltline Weld Repair	4	0.21	0.76	9, 10
Diablo Canyon 2	Beltline Weld Repair	5	0.22	0.90	9, 10
Average Chemistry (Beltline Weld Repair)			**0.22**	**0.85**	
Diablo Canyon 2	Surveillance Weld	6	0.22	0.83	11
Diablo Canyon 2	Surveillance Weld	7	0.219	0.86	12
Diablo Canyon 2	Surveillance Weld	8	0.212	0.88	12
Diablo Canyon 2	Surveillance Weld	9	0.213	0.90	12
Diablo Canyon 2	Surveillance Weld	10	0.225	0.875	13
Diablo Canyon 2	Surveillance Weld	11	0.213	0.856	13
Diablo Canyon 2	Surveillance Weld	12	0.225	0.877	13
Diablo Canyon 2	Surveillance Weld	13	0.196	0.763	14
Diablo Canyon 2	Surveillance Weld	14	0.240	0.958	14
Diablo Canyon 2	Surveillance Weld	15	0.230	0.910	14
Surveillance Weld Average			**0.22**	**0.87**	
Overall Average			**0.22**	**0.86**	

TABLE 2

McGuire Unit 1 And Sister Plant Weld Information for Intermediate Shell Long. Seams, 2-442 A, B & C (Heat No. 20291 and 12008, Linde 1092 Flux)

Plant	Component	Data Pt. #	Wt% Cu	Wt% Ni	Reference
McGuire 1	Int. Shell Long Weld				15, 16, 1
Calvert Cliffs 1	Int. Shell Long Weld				7
McGuire 1	Supplemental Test	1	0.19	0.89	17
McGuire 1	Surveillance Weld	2	0.21	0.88	18
McGuire 1	Surveillance Weld	3	0.20	0.91	19
McGuire 1	Surveillance Weld	4	0.20	0.87	20, 21
McGuire 1	Surveillance Weld	5	0.19	0.85	20, 21
McGuire 1	Surveillance Weld	6	0.19	0.86	20, 21
McGuire 1 Average			**0.20**	**0.88**	
Pilgrim 1	CVN Specimen Y4A	7	0.14	0.81	22, 23
Pilgrim 1	CVN Specimen Y45	8	0.16	0.81	22, 23
Pilgrim 1	CVN Specimen Y5M	9	0.17	0.78	22, 23
Pilgrim 1	CVN Specimen Y6U	10	0.17	0.81	22, 23
Pilgrim 1	CVN Specimen Y6Y	11	0.16	0.77	22, 23
Pilgrim 1	CVN Specimen Y61	12	0.16	0.79	22, 23
Pilgrim 1	CVN Specimen Y65	13	0.17	0.80	22, 23
Pilgrim 1	CVN Specimen Y66	14	0.16	0.77	22, 23
Pilgrim 1	CVN Specimen Y4A	15	0.16	0.79	22, 23
Pilgrim 1	CVN Specimen Y4A	16	0.16	0.81	22, 23
Pilgrim 1	ID, Surveillance Weld	17	0.17	0.98	23, 24
Pilgrim 1	ID, Surveillance Weld	18	0.16	0.94	23, 24
Pilgrim 1	T/4, Surveillance Weld	19	0.16	0.96	23, 24
Pilgrim 1	T/4, Surveillance Weld	20	0.13	0.72	23, 24
Pilgrim 1	T/4, Surveillance Weld	21	0.19	0.86	23, 24
Pilgrim 1	T/2, Surveillance Weld	22	0.17	0.76	23, 24
Pilgrim 1	T/2, Surveillance Weld	23	0.16	0.79	23, 24
Pilgrim 1	3T/4, Surveillance Weld	24	0.18	0.93	23, 24
Pilgrim 1	3T/4, Surveillance Weld	25	0.17	0.95	23, 24
Pilgrim 1	3T/4, Surveillance Weld	26	0.19	0.83	23, 24
Pilgrim 1	OD, Surveillance Weld	27	0.17	0.97	23, 24
Pilgrim 1	OD, Surveillance Weld	28	0.13	0.74	23, 24
Pilrgrim 1 Average			**0.16**	**0.84**	
Overall Average			**0.18**	**0.86**	

TABLE 3

McGuire Unit 1 And Sister Plant Weld Information for Intermediate To Lower Shell Circumferential Weld, 9-442 (Heat No. 83640, Linde 0091 Flux)

Plant	Component	Data Pt. No.	Wt % Cu	Wt % Ni	Reference
Almarez 1	Surveillance Weld	1	.05	.120	25
	D-12745	2	.05	---	26
	D-23725	3	.06	.04	7
	D-14090	4	.05	---	27
McGuire 1	Int./Lwr. Shell Circ. Weld				28
Farley 2	Lwr. Shell Long. Weld				29
	Overall Average		**0.05**	**0.08**	

TABLE 4

McGuire Unit 2 And Sister Plant Weld Information for Intermediate To Lower Shell Circumferential Weld, W05 (Heat No. 895075, Grau Lo Flux)

Plant	Component	Data Pt. No.	Wt % Cu	Wt % Ni	Reference
McGuire 2	Surveillance Program	1	0.031	0.73	32
McGuire 2	Surveillance Program	2	0.03	0.66	33
McGuire 2	Surveillance Program	3	0.039	0.765	34
McGuire 2	Surveillance Program	4	0.036	0.747	34
McGuire 2	Surveillance Program	5	0.045	0.776	34
McGuire 2	**McGuire 2 Average Chemistry**		**0.036**	**0.736**	
Catawba 1	Circumferential Weld seam, R747	6	0.066	0.71	30
Catawba 1	Surveillance Program	7	0.031	0.74	30
Catawba 2	**Catawba 1 Average Chemistry**		**0.049**	**0.725**	
Watts Bar 1	Analysis performed by West.	8	**0.031**	**0.75**	35
Watts Bar 2	Analysis performed by West.	9	**0.016**	**0.69**	36
Original Mill Test	Rotterdam Weld Qual.	10	**0.05**	**0.70**	37
Original Mill Test	Rotterdam Weld Qual.	11	**0.05**	**0.74**	38
Overall Combined Average			**0.039**	**0.724**	

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1. Weld Inspection Record, Combustion Engineering Contract & Unit No. 2167, Seam No. 3-442 A, February 24, 1970.

2. Weld Inspection Record, Combustion Engineering Contract & Unit No. 2167, Seam No. 3-442 B, February 24, 1970.

3. Response to Generic Letter 92-01, Revision 1, Reactor Vessel Structural Integrity, 10CFR50.54(f), Salem Generating Station Unit Nos. 1 and 2, Public Service Electric & Gas Company, June 30, 1992.

4. Salem Units 1 & 2, Reactor Vessel Weld Data, Combustion Engineering Report Prepared for Public Service Electric & Gas Co, November 1985.

5. Welding Materials Qualifications to Requirements of ASME, Section III, Wire Heat No. 21935 & 12008, Sample No. D-7525, Combustion Engineering Metallurgical Research and Development Department, October 27, 1969.

6. Welding Materials Qualifications to Requirements of ASME, Section III, Wire Heat Nos. 21935 & 12008, Sample No. D-7278, Combustion Engineering Metallurgical Research and Development Department, August 12, 1969.

7. RPVDATA Reactor Vessel Materials Database, developed by ATI Consulting, Version 1.2, August 28, 1995.

8. Evaluation of Diablo Canyon Power Plant Reactor Vessel Materials by the NRC Pressurized Thermal Shock Screening Criteria, Pacific Gas and Electric Department of Engineering Research, Report 420-85.687, Revision 1, January 13, 1986.

9. Evaluation of Diablo Canyon Units 1 and 2 Reactor Vessel Beltline Weld Chemistry, Westinghouse Electric Corp., WCAP-10472, September 1983.

10. WCAP-10755, "Diablo Canyon Unit 2 Flux Reduction Program for Reactor Vessel Integrity Phase 1," R.L. Turner, et al., Westinghouse Electric Corp., July 1995.

11. Pacific Gas and Electric Company Diablo Canyon Unit No. 2 Reactor Vessel Radiation Surveillance Program, Westinghouse Electric Corp., WCAP-8783, December 1976.

12. Analysis of Capsule U from the Pacific Gas and Electric Company Diablo Canyon Unit 2 Reactor Vessel Radiation Surveillance Program, Westinghouse Electric Corp., WCAP-11851, May 1988.

13. Analysis of Capsule X from the Pacific Gas & Electric Company Diablo Canyon Unit 2 Reactor Vessel Radiation Surveillance Program, Westinghouse Electric Corp., WCAP-12811, December 1990.

14. WCAP-14363, "Analysis of Capsule Y from the Pacific Gas and Electric Company Diablo Canyon Unit 2 Reactor Vessel Radiation Surveillance Program," E. Terek, et al., May 1995.

15. Weld Inspection Record, Combustion Engineering Contract & Unit No. 2167, Seam No. 2-442 B, April 22, 1969.

16. Weld Inspection Record, Combustion Engineering Contract & Unit No. 2167, Seam No. 2-442 C, April 22, 1969.

17. "Chemical Analysis of Weld Metal Specimens for Baltimore Gas & Electric Company," Wylie Laboratories Report No. 40602-04, July 27, 1989.

18. Duke Power Company William B. McGuire Unit No. 1 Reactor Vessel Surveillance Program, Westinghouse Electric Corp., WCAP-9195, November 1977.

19. Analysis of Capsule U from the Duke Power Company McGuire Unit 1 Reactor Vessel Radiation Surveillance Program, Westinghouse Electric Corp., WCAP-10786, February 1985.

20. Evaluation of Pressurized Thermal Shock for McGuire Unit 1, Westinghouse Electric Corp., WCAP-13948, May 1994.

21. Westinghouse Electric Corporation Nuclear Service Division CMT - Analytical Laboratory, Waltz Mill Site, Analytical Request #15211, Alloy Analysis - Steel, Duke Power Company McGuire Nuclear Plant Unit 1, Lawrence Kardos, November 15, 1993.

22. Perrin, J.S., et al., "Evaluation of Mechanical Properties of Unirradiated Specimens from Pilgrim Unit No. 1, "Battelle Columbus Laboratories, October 1979.

23. "Reactor Vessel Weld Metal Chemical Composition Variability Study for Baltimore Gas & Electric Company," B&W Nuclear Technologies, BAW-2220, June 1995.

24. "Pilgrim Surveillance Program Weld Documentation", Combustion Engineering, Report No. B-PENG-ER-002, February 1994.

25. Weld Inspection Record, Combustion Engineering Contract & Unit No. 2167, Seam No. 9-442, September 17, 1972.

26. Central Nuclear de Almarez, Almarez Unit No. 1 Reactor Vessel Radiation Surveillance Program, Westinghouse Electric Corp., WCAP-8819, December 1976.

27. Welding Materials Qualifications to Requirements of ASME, Section III, Wire Heat No. 83640, Sample No. D-12745, Combustion Engineering Metallurgical Research and Development Department, August 17, 1972.

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29. Welding Materials Qualifications to Requirements of ASME, Section III, Wire Heat No. 83640, Sample No. D-14090, Combustion Engineering Metallurgical Research and Development Department, January 30, 1973.

30. WCAP-13763, "Evaluation of Pressurized Thermal Shock For Catawba Unit 1", P.A. Peter, dated August 1993. Submitted to the NRC by letter dated August 12, 1993.

31. WCAP-11527, "Analysis of Capsule Z from the Duke Power Company Catawba Unit 1, Reactor Vessel Radiation Surveillance Program", S. E. Yanichko, et al., June 1987

32. WCAP-9489, "Duke Power Company William B. McGuire Unit No. 2 Reactor Vessel Radiation Surveillance Program", K. Koyama and J. A. Davidson, May 1979.

33. WCAP-11029, "Analysis of Capsule V from the Duke Power Company McGuire Unit 2 Reactor Vessel Radiation Surveillance Program", S. E. Yanichko, et al., January 1986.

34. WCAP-13516, "Analysis of Capsule U from the Duke Power Company McGuire Unit 2 Reactor Vessel Radiation Surveillance Program", J. M. Chicots, et al., October 1992.

35. WCAP-9298 Rev. 1, "Tennessee Valley Authority Watts Bar Unit No. 1 Reactor Vessel Radiation Surveillance Program", J. M. Chicots, at al, April 1993.

36. WCAP-9455, "Tennessee Valley Authority Watts Bar Unit No. 2 Reactor Vessel Radiation Surveillance Program", J. A. Davidson, at al, March 1979

37. Rotterdam Order No. 92104, "Test Report of Welding Materials", Lab No. R.747.

38. Rotterdam, "Test Report of Welding Materials", Date: Feb. 5, 1973, Lab No. S.736.

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40. Analysis of Capsule X from the Duke Power Company McGuire Unit 1 Reactor Vessel Radiation Surveillance Program, Westinghouse Electric Corp., WCAP-12354, August 1989.

41. Evaluation of Diablo Canyon Units 1 and 2 Reactor Vessel Beltline Weld Chemistry, Westinghouse Electric Corp., WCAP-10472, September 1983.

42. Analysis of Capsule V Specimens and Dosimeters and Analysis of Capsule Z Dosimeters from the Duke Power Company McGuire Unit 1 Reactor Vessel Radiation Surveillance Program, Westinghouse Electric Corp., WCAP- 13949, February 1994.

43. WCAP-13518, "Evaluation of Pressurized Thermal Shock For McGuire Unit 2", J. M. Chicots, dated October 1992.

ENCLOSURE 2

RESPONSE TO NRC GENERIC LETTER 92-01, REVISION 1, SUPPLEMENT 1, "REACTOR VESSEL STRUCTURAL INTEGRITY"

This enclosure provides Duke Power Company's (DPC) response to the information requested in the Supplement to Revision 1 of Generic Letter (GL) 92-01 for Catawba Units 1 and 2.

NRC Request 1:

Provide a description of those actions taken or planned to locate all data relevant to the determination of reactor pressure vessel integrity, or an explanation of why the existing database is considered complete as previously submitted.

Catawba Unit 1

See attached response previously submitted to the NRC on August 16, 1995.

Catawba Unit 2

See attached response previously submitted to the NRC on August 16, 1995.

NRC Request 2:

Provide an assessment of any change in best-estimate chemistry based on consideration of all relevant data.

Catawba Unit 1

The Catawba Unit 1 reactor pressure vessel was manufactured by Rotterdam Dockyard Co., under Westinghouse Electric Corporation Contract No. 30743. The beltline region was fabricated from two ring forgings and contains only one circumferential weld which joins the intermediate and lower ring forgings. The weld wire (not Cu coated) used to fabricate the circumferential beltline welds is low in Cu content with medium Ni. As a result of the low Cu weld, Catawba Unit 1, is forging (heat No. 411343) limited for 10 CFR 50.61 RT_{PTS} at end of life (EOL) and is forging controlled for the current P-T limit curves and LTOP analysis. The calculated EOL RT_{PTS} using surveillance capsule weld data is 24°F (reference #1), which is over 250°F below the 10 CFR 50.61 screening criteria.

A review was performed of the Westinghouse Owners Group RPVDATA and the NRC RVID databases, no other forging material was found with heat number 411343. All known data for Catawba Unit 1 limiting material (Heat No. 411343) was utilized in our last submittal. Therefore, there is no change to the best estimate chemistry.

WCAP-13763, "Evaluation of Pressurized Thermal Shock For Catawba Unit 1, P.A. Peter, dated August 1993, is our most recent submittal containing our best-estimate chemistry values. It was submitted to the NRC by letter dated August 12, 1993 for Catawba Unit 1.

For completeness purpose only, Table 1 contains all known data for Catawba Unit 1 non-limiting beltline weld material.

Catawba Unit 2

The Catawba Unit 2 reactor pressure vessel was manufactured by C-E in Chattanooga, Tennessee. The vessel was ordered by Westinghouse Electric Corporation under C-E Contract 8871. The weld wire (not Cu coated) used to fabricate the beltline welds was low in Cu and Ni content. As a result of the low Cu/Ni weld in the Catawba Unit 2 vessel, it is plate limited for 10 CFR 50.61 RT_{PTS} at EOL and is plate controlled for the current P-T limit curves and LTOP analysis. The most limiting weld material calculated EOL RT_{PTS} using surveillance capsule data is 4.5°F (reference #3) which is over 250°F below the 10 CFR 50.61 screening criteria. With these low EOL RT_{PTS} values and plate limited critical material, no additional information on our non-Cu coated non-limiting beltline welds will be relevant for determining the structural integrity of the reactor vessel since it is controlled by the plate properties.

WCAP-13874, "Evaluation of Pressurized Thermal Shock For Catawba Unit 2, P.A. Peter, dated February 1994, is the most recent submittal containing our best-estimate chemistry values for Catawba Unit 2. It was submitted to the NRC by letter dated March 2, 1994.

NRC Request 3:

Provide a determination of the need for use of the ratio procedure in accordance with the established Position 2.1 of Regulatory Guide 1.99, Revision 2, for those licensees that use surveillance data to provide a basis for the RPV integrity evaluation.

Catawba Unit 1

The limiting material for Catawba Unit 1 is not a weld, but the intermediate shell forging 05 (heat No. 411343). Base material does not exhibit the potential for chemistry variability as does weld material. Position 2.1 of Regulatory Guide 1.99, Revision 2, only refers to weld material (e.g."if there is clear evidence that the copper or nickel content of the surveillance weld differs from that of the vessel weld") in reference to the ratio procedure. Therefore, the use of the ratio procedure is not warranted.

Catawba Unit 2

The limiting material for Catawba Unit 2 is not a weld, but the intermediate shell B8605-2. Base material does not exhibit the potential for chemistry variability as does weld material. Position 2.1 of Regulatory Guide 1.99, Revision 2, only refers to weld material in reference to the ratio procedure. Therefore, the use of the ratio procedure is not warranted.

NRC Request 4:

Provide a written report providing any newly acquired data as specified above and (1) the results of any necessary revisions to the evaluation of RPV integrity in accordance with the requirements of 10 CFR 50.60, 10 CFR 50.61, Appendices G and H to 10 CFR Part 50, and any potential impact on the LTOP or P-T Limits in the technical specifications or (2) a certification that previously submitted evaluations remain valid. Revised evaluations and certifications should include consideration of Position 2.1 of Regulatory Guide 1.99, Revision 2, as applicable, and any new data.

Catawba Unit 1

Presently the P-T curves used in Catawba's Tech. Spec. are bounding 10 EFPY curves developed by using the limiting plate material from the Catawba Unit 2 (which bounds Unit 1) vessel. New curves have been generated using the most recent surveillance data for the purpose of extending the Unit 1 P-T curves to 15 EFPY. These curves will be submitted at the appropriate time for the utilization of such curves. The previously submitted evaluations presently utilized in meeting the requirements of 10 CFR 50.60, 10 CFR 50.61, Appendices G and H to 10 CFR Part 50, LTOP and P-T limits remain valid.

Duke Power has provided a written report (reference 1 & 2) to the NRC updating the 10 CFR 50.60 Appendix G Upper Shelf Energy Values (USE), Appendix H (Surveillance capsule report) and 10 CFR 50.61 pressurized thermal shock (PTS) projections using the most recent surveillance capsule data for Catawba Unit 1.

Catawba Unit 2

Presently the P-T curves used in Catawba Tech. Spec. are bounding 10 EFPY curves developed by using the limiting plate material from the Catawba Unit 2 vessel. New curves have been generated using the most recent surveillance data for the purpose of extending the Unit 2 P-T curves to 15 EFPY. These curves will be submitted at the appropriate time for the utilization of such curves. The previously submitted evaluations presently utilized in meeting the requirements of 10 CFR 50.60, 10 CFR 50.61, Appendices G and H to 10 CFR Part 50, LTOP and P-T limits remain valid.

Duke Power has provided a written report (reference 3 & 4) to the NRC updating the 10 CFR 50.60 Appendix G Upper Shelf Energy Values (USE), Appendix H (Surveillance capsule report) and 10 CFR 50.61 pressurized thermal shock (PTS) projections using the most recent surveillance capsule data for Catawba Unit 2.

TABLE 1

Catawba Unit 1 And Sister Plant Weld Information for Intermediate To Lower Shell Circumferential Weld, 9-442 (Heat No. 895075, Grau Lo Flux)

Plant	Component	Data Pt. No.	Wt % Cu	Wt % Ni	Reference
Catawba 1	Circumferential Weld seam, R747	1	0.066	0.71	1
Catawba 1	Surveillance Program	2	0.031	0.74	1, 5
Catawba 1	**Catawba 1 Average Chemistry**		**0.049**	**0.725**	
McGuire 2	Surveillance Program	3	0.031	0.73	6
McGuire 2	Surveillance Program	4	0.03	0.66	7
McGuire 2	Surveillance Program	5	0.39	0.765	8
McGuire 2	Surveillance Program	6	0.36	0.747	8
McGuire 2	Surveillance Program	7	0.45	0.776	8
McGuire 2	**McGuire 2 Average Chemistry**		**0.036**	**0.736**	
Watts Bar 1	Analysis preformed by West.	8	**0.031**	**0.75**	9
Watts Bar 2	Analysis preformed by West.	9	**0.016**	**0.69**	10
Original Mill Test	Rotterdam Weld Qual.	10	**0.05**	**0.70**	11
Original Mill Test	Rotterdam Weld Qual.	11	**0.05**	**0.74**	12
Overall Combined Average			**0.039**	**0.724**	

TABLE 2

Catawba Unit 2 Beltline Weld Material (Heat No. 83648, Linde 0091 Flux)

Plant	Component	Data Pt. No.	Wt % Cu	Wt % Ni	Reference
Catawba 2	Surveillance Program	1	0.040	0.140	3, 13
Catawba 2	Surveillance Program	2	0.036	0.140	3, 13
Catawba 2	Surveillance Program	3	0.051	0.180	3, 14
CE Original Weld Cert.	Job Number D32255		0.040		3, 15
Overall Combined Average			**0.042**	**0.153**	

REFERENCES

1. WCAP-13763, "Evaluation of Pressurized Thermal Shock For Catawba Unit 1", P.A. Peter, dated August 1993. Submitted to the NRC by letter dated August 12, 1993.

2. WCAP-13720, "Analysis of Capsule Y from the Duke Power Company Catawba Unit 1, Reactor Vessel Radiation Surveillance Program", J.M. Chicots, S. L. Anderson, A. Madeyski, P. A. Peter dated June 1993. Submitted to the NRC by letter dated August 12, 1993.

3. WCAP-13874, "Evaluation of Pressurized Thermal Shock For Catawba Unit 2", P.A. Peter, dated February 1994. Submitted to the NRC by letter dated March 2, 1994.

4. WCAP-13875, "Analysis of Capsule X From the Duke Power Company Catawba Unit 2 Reactor Vessel Radiation Surveillance Program", E. Terek, S. L. Zawalick, A. Madeyski, P.A. Peter, dated February 1994. Submitted to the NRC by letter dated March 2, 1994.

5. WCAP-11527, "Analysis of Capsule Z from the Duke Power Company Catawba Unit 1, Reactor Vessel Radiation Surveillance Program", S. E. Yanichko, et al., June 1987

6. WCAP-9489, "Duke Power Company William B. McGuire Unit No. 2 Reactor Vessel Radiation Surveillance Program", K. Koyama and J. A. Davidson, May 1979.

7. WCAP-11029, "Analysis of Capsule V from the Duke Power Company McGuire Unit 2, Reactor Vessel Radiation Surveillance Program", S. E. Yanichko, et al., January 1986.

8. WCAP-13516, "Analysis of Capsule U from the Duke Power Company McGuire Unit 2 Reactor Vessel Radiation Surveillance Program", J. M. Chicots, et al., October 1992.

9. WCAP-9298 Rev. 1, "Tennessee Valley Authority Watts Bar Unit No. 1 Reactor Vessel Radiation Surveillance Program", J. M. Chicots, at al, April 1993.

10. WCAP-9455, "Tennessee Valley Authority Watts Bar Unit No. 2 Reactor Vessel Radiation Surveillance Program", J. A. Davidson, at al, March 1979

11. Rotterdam Order No. 92104, "Test Report of Welding Materials", Lab No. R.747.

12. Rotterdam, "Test Report of Welding Materials", Date: Feb. 5, 1973, Lab No. S.736.

13. WCAP-10868, "Duke Power Company Catawba Unit No. 2 Reactor Vessel Radiation Surveillance Program", L. R. Singer, November 1985.

14. WCAP-11941, "Analysis of Capsule Z from the Duke Power Company Catawba Unit No. 2 Reactor Vessel Radiation Surveillance Program", S. E. Yanichko, September 1988.

15. Letter from Combustion Engineering, Inc. to Westinghouse, "Core Region Weld Materials Contract 161053/8871 & 161054/8971", M. C. Herder, dated April 8, 1974 and Combustion Engineering Metallurgical Research and Development Department - Chattanooga, Welding Material Qualification to requirements of ASME Section III, Job Number D3225, project Number 960009, December 12, 1972.

ATTACHMENT

Duke Power Company
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DUKE POWER

August 16, 1995

U. S. Nuclear Regulatory Commission
Washington, DC 20555

Attention: Document Control Desk

Subject: McGuire Nuclear Station Units 1 & 2
Docket Nos. 50-369, 370
Catawba Nuclear Station Units 1 & 2
Docket Nos. 50-413, 414
Oconee Nuclear Station, Units 1, 2, & 3
Docket Nos. 50-269, 270, 287
Response to Supplement 1 of Generic Letter 92-01, Revision 1,
"Reactor Vessel Structural Integrity"

Gentlemen:

On May 19, 1995, the NRC issued Generic Letter (GL) 92-01, Revision 1, Supplement 1, "Reactor Vessel Structural Integrity," requiring addressees to identify, collect, and report any new data pertinent to analysis of structural integrity of their reactor pressure vessels (RPVs). It also requires an assessment of the impact of this new data on RPV integrity analyses relative to the requirements of Section 50.60 of Title 10 of the Code of Federal Regulations (10 CFR 50.60), 10 CFR 50.61, Appendices G and H to 10 CFR 50, and any potential impact on low temperature overpressure (LTOP) limits or pressure-temperature (P-T) limits.

The Generic Letter supplement requires that addressees provide the following information by August 17, 1995:

(1) a description of those actions taken or planned to locate all data relevant to the determination of reactor pressure vessel integrity, or an explanation of why the existing database is considered complete as previously submitted.

The Supplement also requires the following information to be provided by November 20, 1995:

(2) an assessment of any change in best-estimate chemistry based on consideration of all relevant data;

(3) a determination of the need for use of the ratio procedure in accordance with the established Position 2.1 of Regulatory Guide 1.99, Revision 2, for those licensees that use surveillance data to provide a basis for the RPV integrity evaluation; and

(4) a written report providing any newly acquired data as specified above and (1) the results of any necessary revisions to the evaluation of RPV integrity in accordance with the requirements of 10 CFR 50.60, 10 CFR 50.61, Appendices G and H to 10 CFR Part 50, and any potential impact on the LTOP or P-T Limits in the technical specifications or (2) a certification that previously submitted evaluations remain valid. Revised evaluations and certifications should include consideration of Position 2.1 of Regulatory Guide 1.99, Revision 2, as applicable, and any new data.

This letter provides Duke Power Company's response to Requirement (1) for Oconee Units 1, 2 and 3, McGuire Units 1 and 2, and Catawba Units 1 and 2. Responses to requirements (2), (3), and (4) will be provided by November 20, 1995.

Duke Power's on going Reactor Vessel Integrity Program has always sought to account for all relevant data which may be associated with any of their reactor vessels. Duke Power is involved with three separately approved reactor vessel integrated surveillance programs (BWOG-RVWG, Diablo Canyon Unit 2 and Calvert Cliffs Unit 1). Duke Power is working with members of the BWOG, WOG and CEOG-RVWG to address reactor vessel integrity issues. Duke Power is also a part of NEI's newly formed "Reactor Pressure Vessel (RPV) Integrity Data Task force". It is Duke Power's intent to always maintain reactor vessel integrity by utilizing the most current data or by performing evaluations to assure all programs and calculations meet 10 CFR 50.60, 10 CFR 50.61, Appendices G and H to 10 CFR Part 50, and any potential impact on the LTOP or P-T limits.

Combustion Engineering Owners Group (CEOG) Reactor Vessel Working Group

The CEOG has formed the Reactor Vessel Working Group (RVWG) to address the issue of weld chemistry variability for C-E fabricated reactor vessel welds. This funded task will focus on compiling data from original fabrication records, research data files and log books compiled by C-E and other NSSS suppliers and utilities. The relevant data will be used to determine a best estimate chemistry for each weld heat fabricated by C-E. Duke Power has funded this project which is expected to take 18 months to compile all potentially relevant data and an additional 6 months to assess the significance of the new data (Reference CEOG-95-390, July 27, 1995 letter to the NRC).

Westinghouse Owners Group (WOG) RPVDATA Database:

The WOG Materials Subcommittee has compiled a database, called RPVDATA, of information relevant to reactor vessel integrity . The information included in the database is from original fabrication records, reactor vessel surveillance program testing, and other supplemental testing. The information incorporated in the database is from docketed GL92-01 responses and previous EPRI databases on reactor vessel integrity. Duke Power is reviewing this database to determine if it contains additional data relevant to the determination of reactor vessel integrity for all Duke Power nuclear units.

B&W Owners Group's (BWOG) Reactor Vessel Working Group

Duke Power Company has been a member of this group since its initial formation in 1977. The BWOG has been acquiring and documenting data relevant to the integrity of all Linde 80 reactor vessel weldments and base metals contained within its member plant RPVs since its formation. Duke Power will continue to work with the BWOG to address reactor vessel integrity issues for Oconee.

Oconee Units 1, 2, and 3

The Oconee vessels were designed and fabricated by Babcock & Wilcox (B&W). Since 1977 Oconee has managed its reactor vessel integrity program through an integrated program with all other operating 177-Fuel Assembly (FA) B&W plants. This integrated program has been managed through the BWOG RVWG which consists of five B&W plant utilities, five Westinghouse plant utilities (B&W fabricated reactor vessels), and B&W Nuclear Technologies. The activities of these eleven participants establish and maintain a program to demonstrate reactor vessel integrity. This program has successfully responded to regulatory concerns through an integrated system of analysis, testing, and communication. Capsules currently being irradiated in operating plants are providing the necessary data to support the operation through extended life.

Oconee's response to requirement (1) of GL 92-01 Rev. 1, Suppl. 1 is incorporated into BAW-2257 "Response to Part (1) of Generic Letter 92-01, Revision 1, Supplement 1", dated July 1995 submitted to the NRC by letter on August 1, 1995 (OG-95-1527) from the BWOG.

McGuire Unit 1

The McGuire Unit 1 reactor pressure vessel was manufactured by Combustion Engineering (C-E) in Chattanooga, Tennessee. The vessel was ordered by Westinghouse Electric Corporation under C-E Contract 2167. Therefore, pertinent data is available through both Westinghouse and ABB/C-E.

McGuire has been proactive in addressing reactor vessel integrity issues by seeking out all relevant data. Through the use of EPRI and WOG databases, McGuire identified several "sister" plants that may have pertinent data relevant to the McGuire Unit 1 Reactor Vessel Integrity Program. It was decided to integrate our Reactor Vessel Surveillance Program with two of these "sister" plants (Diablo Canyon Unit 2 & Calvert Cliffs Unit 1) to facilitate sharing and use of data. Both programs have been approved by the NRC.

McGuire is currently working with the CEOG RVWG to gather all pertinent data and develop best estimate chemistry for each weld heat fabricated by C-E. This work will not be completed for 24 months. Additional data generated by McGuire Unit 1, Diablo Canyon Unit 2 and Calvert Cliffs Unit 1 will continue to be evaluated by Duke Power and incorporated into its Reactor Vessel Integrity Program.

WCAP-13948, "Evaluation of Pressurized Thermal Shock For McGuire Unit 1, P.A. Peter was submitted to the NRC by letter dated March 17, 1994 and is McGuires Unit 1 current best-estimate chemistry values.

McGuire Unit 2 and Catawba Unit 1

The McGuire Unit 2 reactor pressure vessel was manufactured by Rotterdam Dockyard Co. in the Netherlands under Westinghouse Electric Corporation Contract No. 30664. The Catawba Unit 1 reactor pressure vessel was also manufactured by Rotterdam Dockyard Co. under Westinghouse Electric Corporation Contract No. 30743. These vessels were built in the early 70's and are similar in design. Their beltline regions were both fabricated from two ring forgings and contain only one circumferential weld which joins the intermediate and lower ring forgings. The weld wire (not Cu coated) used to fabricate the circumferential beltline welds in both vessels was low in Cu content with medium Ni. As a result of the low Cu weld in both the McGuire Unit 2 and Catawba Unit 1 vessels, they are forging limited for 10 CFR 50.61 RT_{PTS} at end of life (EOL) and are forging controlled for the current P-T limit curves and LTOP analysis. The most limiting weld material calculated EOL RT_{PTS} using surveillance capsule data is 24°F which is over 200°F below the 10CFR50.61 screening criteria. With these low EOL RT_{PTS} values and forging limited critical material, no additional information on our non-Cu coated non-limiting beltline welds will be relevant for determining the structural integrity of the reactor vessel since it is controlled by the forging properties.

WCAP-13518, "Evaluation of Pressurized Thermal Shock For McGuire Unit 2, J.M. Chicots, dated October 1992 and WCAP-13763, "Evaluation of Pressurized Thermal Shock For Catawba Unit 1, P.A. Peter, dated August 1993 are our most recent submittals containing our best-estimate chemistry values. They were submitted to the NRC by letter dated Jan 27, 1993 for McGuire Unit 2 and August 12, 1993 for Catawba Unit 1.

Catawba Unit 2

The Catawba Unit 2 reactor pressure vessel was manufactured by C-E in Chattanooga, Tennessee. The vessel was ordered by Westinghouse Electric Corporation under C-E Contract 8871. The weld wire (not Cu coated) used to fabricate the beltline welds was low in Cu and Ni content. .As a result of the low Cu/Ni weld in the Catawba Unit 2 vessel, it is plate limited for 10 CFR 50.61 RT_{PTS} at EOL and is plate controlled for the current P-T limit curves and LTOP analysis. The most limiting weld material calculated EOL RT_{PTS} using surveillance capsule data is 4.5°F which is over 200°F below the 10CFR50.61 screening criteria. With these low EOL RT_{PTS} values and plate limited critical material, no additional information on our non-Cu coated non-limiting beltline welds will be relevant for determining the structural integrity of the reactor vessel since it is controlled by the plate properties.

WCAP-13874, "Evaluation of Pressurized Thermal Shock For Catawba Unit 2, P.A. Peter, dated February 1994 is the most recent submittal containing our best-estimate chemistry values for Catawba Unit 2. It was submitted to the NRC by letter dated March 2, 1994.

Summary

Duke Power Company has undertaken many initiatives to ensure that all data relevant to the determination of reactor vessel integrity for the Oconee, McGuire and Catawba vessels are available and considered. This work will continue through the life of our Reactor Vessel Integrity Program. It is our belief that the most current relevant chemistry data has been submitted to the NRC in our latest PTS submittals. As new data becomes available Duke Power Company will assess its relevance/significance to the integrity of the Oconee, McGuire, and Catawba vessels. Newly acquired data will be incorporated into our Reactor Vessel Integrity Program, and submittals made when appropriate.

I declare under penalty of perjury that these statements are true and correct to the best of my knowledge.

Should you have any questions or require any additional information regarding this submittal, please contact Allison Young, Corporate Licensing at 704-382-3154.

Very truly yours,

M. S. Tuckman

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