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SUBJECT: Forwards response to NRC GL 92-01,Rev 1,Suppl 1, "Reactor Vessel Structural Integrity."

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PRIORITY 1 DOCUMENT

Indiana Michigan
Power Company
PO Box 16631
Columbus, OH 43216

INDIANA MICHIGAN POWER

November 20, 1995

AEP:NRC:1173F

Docket Nos.: 50-315
50-316

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

Gentlemen:

Donald C. Cook Nuclear Plant Units 1 and 2
RESPONSE TO NRC GENERIC LETTER 92-01, REV. 1, SUPPLEMENT 1
REACTOR VESSEL STRUCTURAL INTEGRITY

References: (1) Letter from Indiana Michigan Power to the NRC AEP:NRC:1173E, dated August 16, 1995
(2) Letter from Wisconsin Public Service (WPS) Corporation to the NRC, dated August 21, 1995

The Nuclear Regulatory Commission (NRC) issued Generic Letter(GL) 92-01, Revision 1, Supplement 1, "Reactor Vessel Structural Integrity" on May 19, 1995. This supplement required that addressees identify, collect, and report any new data pertinent to analysis of the structural integrity of their reactor pressure vessels (RPVs) and assess the impact of this new data on their RPV integrity analysis. Issues to be addressed included the requirements of section 50.60 of title 10 of the Code of Federal Regulation (10 CFR 50.60), 10 CFR 50.61, Appendices G and H to 10 CFR 50, (which encompass pressurized thermal shock and upper shelf energy evaluations) and the potential impact on low temperature overpressure protection limits or pressure-temperature limits.

The generic letter supplement requires licensees to provide the following information within 90 days:

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

Indiana Michigan Power responded to item (1) above in our 90 day response letter AEP:NRC:1173E dated August 16, 1995. In that letter we committed to review additional RPV material data available in various other databases as noted in reference 1 and initiate confirmatory follow-up communications with sister plant

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owners. We also committed that, upon completion of the said review, we would respond to items 2, 3, and 4 of the GL supplement within six months of the date on the supplement.

The attachment to this letter is our six month response to items 2, 3, and 4 of the GL supplement. Review of the various industry databases for Cook Nuclear Plant was completed by ATI Consulting Company and AEPSC personnel. This review identified no significant changes in the existing best-estimate chemistry data, which have been summarized in the attachment. Therefore, there are no necessary revisions to the evaluation of RPV integrity in accordance with the requirements of 10 CFR 50.60, 10 CFR 50.61, Appendix G and H to 10 CFR 50 nor impact on the LTOP or P-T limits.

Currently, some of the information from the databases is considered as interim data pending further verification. Therefore, the responses to items 2, 3, and 4 are considered our interim response, and we will continue to re-evaluate the new information for validation and notify the NRC of any significant changes should new data become available.

Sincerely,

E E Fitzpatrick

E. E. Fitzpatrick
Vice President

SWORN TO AND SUBSCRIBED BEFORE ME

THIS 20th DAY OF November 1995

Rita D Hill
Notary Public

My Commission Expires: 6-28-99

plt

Attachment

cc: A. A. Blind
G. Charnoff
H. J. Miller
NFEM Section Chief
NRC Resident Inspector - Bridgman
J. R. Padgett

ATTACHMENT TO AEP:NRC:1173F

Indiana Michigan Power Company

Donald C. Cook Nuclear Plant Units 1 and 2

Generic Letter 92-01, Revision 1, Supplement 1

Interim Report on items 2, 3 and 4

Part 2 (six month response) of the generic letter required addressees to respond to the following items within six months:

(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 reactor pressure vessel (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 10CFR50.60, 10CFR50.61, Appendices G and H to 10CFR Part 50, and any potential impact on the low temperature overpressure protection (LTOP) or pressure-temperature (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.

Responses to each of the items listed above for both units are as follows.

UNIT 1

RESPONSE TO ITEM 2

The reactor vessel for Cook Nuclear Plant unit 1 was fabricated by Combustion Engineering. The material property data were gathered from: a) EPRI's surveillance capsule database (PREP3), b) Westinghouse Owners Group's database (RPVDATA), c) Combustion Engineering's Report "Reactor Vessel Group Records Evaluation Program, Phase 2 for the Donald C. Cook Reactor Pressure Vessel Plates, Forgings, Welds and Cladding" (ABB-RVG), d) NRC's "Reactor Vessel Integrity Database" (RVID), and e) Oakridge National Laboratory's "Power Reactor Embrittlement Database" (PR-EDB), and were compared for the beltline materials, i.e., the base metal and

the weld metal. For the base metal (plate B4406-3), there is no data indicating variation of the chemistry. Therefore, the search focused on the vessel beltline and surveillance capsule welds for unit 1. The welds of interest are heats 1P3571, 13253/12008 and 13253.

Weld wire, heat 1P3571, exists in the circumferential weld of the unit 1 reactor vessel, which is part of the beltline material for PTS evaluation. This material exists in welds of Kewaunee, Maine Yankee, and LaSalle reactor vessels. This material also exists in the surveillance capsules at Kewaunee, Maine Yankee, and LaSalle 1 and possibly Hatch 1 surveillance capsules. Cook Nuclear Plant surveillance capsule program does not contain 1P3571 weld wire material. Using methodology previously approved by the NRC, the 1P3571 chemistry values for copper and nickel content in the unit 1 weld have historically been calculated as the average of "best-estimate" copper and nickel contents of the known sister plants.

The assessment of all relevant data for heat 1P3571 shows the average of the 62 valid chemistry measurements to be 0.264 wt% Cu and 0.748 wt% Ni. These data are shown in the attached Table 1 and are consistent with the information provided by Wisconsin Public Service (WPS) in their August 21, 1995, submittal for Kewaunee (reference 2) with small corrections noted in Table 1. The "best-estimate" chemistry for this heat in Cook Nuclear Plant unit 1 is the mean of all the measured values for copper and nickel as specified in C.1.1 of Regulatory Guide 1.99, Revision 2. The corresponding chemistry factor is 205.3 deg F, as determined from the tables in the regulatory guide. The current licensing basis "best-estimate" chemistry data for this weld heat are 0.28 wt% Cu and 0.74 wt% Ni, with a chemistry factor of 208.7 deg F. This value of 208.7 is conservative with respect to the "best-estimate" mean chemistry value of 205.3 deg F determined from all the measured data. Thus, there is no need to update the existing licensing basis values for the circumferential weld in Cook Nuclear Plant unit 1.

Southern Nuclear Operating Company (SNOC) has identified two additional data points for chemistry values of copper and nickel for weld wire 1P3571. These points are based on the analysis of the surveillance weld material from Hatch Nuclear Plant unit 1. The validity of this chemistry information and the presence of this weld wire in the Hatch reactor vessel has yet to be confirmed by SNOC. Pending validation of the Hatch 1 data, it has not been included in the calculation of average chemistry values for Cook Nuclear Plant unit 1. The "best-estimate" average copper and nickel content from Hatch 1 are 0.28 wt% Cu and 0.76 wt% Ni. After validation, if it is included into the calculations, it will not significantly change the calculated average of copper and nickel contents.

The tandem weld wire 13253/12008, which is in the lower shell axial weld of Cook Nuclear Plant unit 1 vessel, also exists in Fermi 2, Fitzpatrick, Maine Yankee, and Fort Calhoun vessels. For the tandem weld heat 13253/12008, there is only one chemistry measured data point available from a test at Wylie Labs, as shown in Table 2, with chemistries of 0.21 wt% Cu and 0.86 wt% Ni. There is no known weld qualification data or other test data available for this weld heat. The corresponding chemistry factor is 206.6 deg F as determined from the tables in Regulatory Guide 1.99, Revision 2. The current licensing basis "best-estimate" chemistry data for Cook Nuclear Plant unit 1 axial welds are 0.28 wt% Cu and 0.74 wt% Ni, with a chemistry factor of 208.7 deg F. This is conservative with respect to the "best-estimate" mean chemistry value of 206.6 deg F from the measured data. Thus, there is no need to update the existing licensing basis values for the axial welds in the Cook Nuclear Plant unit 1 vessel.

Weld heat 13253 exists in the Cook Nuclear Plant unit 1 surveillance weld specimens and not in the vessel welds. Table 3 shows the measured data for weld heat 13253. Chemistry measurements are available from the Cook Nuclear Plant unit 1 and Salem 2 surveillance capsule material. These data do not have any effect on the welds in the Cook Nuclear Plant unit 1 vessel for pressurized thermal shock (PTS) evaluations.

RESPONSE TO ITEM 3

Since Cook Nuclear Plant uses the average chemistry values from all three sister plants, there is no need for ratioing the weld chemistry factor for any of the vessel belt line weld heats. Thus, there is no ratio effect for the Cook Nuclear Plant unit 1 material.

RESPONSE TO ITEM 4

The chemistry factor limits of the controlling materials submitted in earlier letters AEP:NRC:0894M dated June 22, 1990, and AEP:NRC:0561D dated August 7, 1990, bound the new chemistry factors. Therefore, there is no impact of the above evaluations on PTS, LTOP or P-T limits for Cook Nuclear Plant unit 1.

UNIT 2

RESPONSE TO ITEM 2

The reactor vessel for Cook Nuclear Plant unit 2 was fabricated by Chicago Bridge and Iron (CB&I) Company. The material property data were gathered from RVID, RPVDATA, PREP3 and PR-EDB databases and were compared for the beltline materials, i.e, the base metal and weld metal.

In reviewing all the vessel materials, the limiting material for Cook Nuclear Plant unit 2 reactor vessel is plate heat number C-5556-2; there is no data indicating variability of chemistry data in this material.

The common weld material that is present in Cook Nuclear Plant unit 2 is weld wire heat S3986, which also exists in the reactor vessel welds of Brunswick 1, Brunswick 2, Peach Bottom 2, and Quad Cities 2. Several weld qualification and supplemental tests were performed by CB&I for this heat number. Surveillance weld specimen chemistry data is available from Brunswick 1, Cook Nuclear Plant unit 2, and Trojan power plants.

The assessment of all relevant data as noted in Table 4 shows the average of the ten valid chemistry measurements to be 0.055 wt% Cu and 0.937 wt% Ni. By comparison, the copper content from the Cook Nuclear Plant unit 2 surveillance weld is exactly the same (0.055 wt%), and the nickel content of 0.97 wt% is slightly higher than this average. Although this is not the limiting vessel material, the use of the ratio procedure for these weld chemistries would produce an adjustment factor equal to 1.0, therefore, there would be no effect.

RESPONSE TO ITEM 3

The limiting beltline material for Cook Nuclear Plant unit 2 reactor vessel is the base metal plate, heat number C5556-2. There is no data indicating variability of chemistry in this material. Thus there is no ratio effect for the controlling material in Cook Nuclear Plant unit 2.

RESPONSE TO ITEM 4

The controlling material and the chemistry factor remain unchanged from the already docketed information. Therefore, there is no impact of the above evaluations on the PTS, LTOP or P-T limits for Cook Nuclear Plant unit 2.

Summary of Properties for Weld Wire Heat No. 1P3571

Compilation of Measured Chemistries from all Data Sources

Heat No.	Flux Type	Flux Lot	Pct. Cu	Pct. Ni	Source	Reference
1P3571	Linde 1092	3958	0.4	0.82	CE,WQ M1.42	C-E 78-12 RSP
1P3571	Linde 1092	3958	0.37	0.75	CE,WQ M1.43	C-E 78-12 RSP
1P3571	Linde 1092	3958	0.18	0.74	KWE,SC "P"	WCAP-13257
1P3571	Linde 1092	3958	0.19	0.73	KWE,SC "P"	WCAP-13257
1P3571	Linde 1092	3958	0.35	0.74	KWE,SC "P"	WCAP-13257
1P3571	Linde 1092	3958	0.17	0.72	KWE,SC "P"	WCAP-13257
1P3571	Linde 1092	3958	0.066	0.736	KWE,SC "R"	WCAP-13257
1P3571	Linde 1092	3958	0.207	0.769	KWE,SC "R"	WCAP-13257
1P3571	Linde 1092	3958	0.214	0.816	KWE,SC "V"	WCAP-13257
1P3571	Linde 1092	3958	0.434	0.8	KWE,SC "V"	WCAP-13257
1P3571	Linde 1092	3958	0.2	0.77	KWE,SC Unirr.	WCAP-8107
1P3571	Linde 1092	3958	0.15	0.54	KWE,Supp. "P"	WPS, 8/21/95
1P3571	Linde 1092	3958	0.19	0.71	KWE,Supp. "P"	WPS, 8/21/95
1P3571	Linde 1092	3958	0.19	0.67	KWE,Supp. "P"	WPS, 8/21/95
1P3571	Linde 1092	3958	0.34	0.72	KWE,Supp. "R"	WPS, 8/21/95
1P3571	Linde 1092	3958	0.17	0.64	KWE,Supp. "R"	WPS, 8/21/95
1P3571	Linde 1092	3958	0.18	0.67	KWE,Supp. "R"	WPS, 8/21/95
1P3571	Linde 1092	3958	0.186	0.689	KWE,Supp. "S"	WPS, 8/21/95
1P3571	Linde 1092	3958	0.196	0.803	KWE,Supp. "S"	WPS, 8/21/95
1P3571	Linde 1092	3958	0.209	0.795	KWE,Supp. "S"	WPS, 8/21/95
1P3571	Linde 1092	3958	0.223	0.871	KWE,Supp. "S"	WPS, 8/21/95
1P3571	Linde 1092	3958	0.2	0.7	KWE,Supp. "V"	WPS, 8/21/95

RPVDATA *developed by* **ATI Consulting**

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Note: WQ = Weld Qualification, SC = Surveillance Capsule, Supp. = Supplemental Test, Surv. = Surveillance Matl.

Table 1 (cont.)

Heat No.	Flux Type	Flux Lot	Pct. Cu	Pct. Ni	Source	Reference
1P3571	Linde 1092	3958	0.19	0.67	KWE,Supp. "V"	WPS, 8/21/95
1P3571	Linde 1092	3958	0.17	0.61	KWE,Supp. "V"	WPS, 8/21/95
1P3571	Linde 1092	3958	0.17	0.51	KWE,Supp. "V"	WPS, 8/21/95
1P3571	Linde 1092	3958	0.22	0.73	KWE,Surv. Test	WPS, 8/21/95
1P3571	Linde 1092	3958	0.43	0.78	KWE,Surv. Test	WPS, 8/21/95
1P3571	Linde 1092	3958	0.24	0.74	KWE,Surv. Test	WPS, 8/21/95
1P3571	Linde 1092	3958	0.22	0.8	KWE,Surv. Test	WPS, 8/21/95
1P3571	Linde 1092	3958	0.23	0.79	KWE,Surv. Test	WPS, 8/21/95
1P3571	Linde 1092	3958	0.2	0.75	LS1,SC 443	GE-NE-A166-1294-R1
1P3571	Linde 1092	3958	0.22	0.75	LS1,SC 444	GE-NE-A166-1294-R1
1P3571	Linde 1092	3958	0.22	0.79	LS1,SC 447	GE-NE-A166-1294-R1
1P3571	Linde 1092	3958	0.2	0.76	LS1,SC 44A	GE-NE-A166-1294-R1
1P3571	Linde 1092	3958	0.22	0.83	LS1,SC 44F	GE-NE-A166-1294-R1
1P3571	Linde 1092	3958	0.2	0.74	LS1,SC 44LD	GE-NE-A166-1294-R1
1P3571	Linde 1092	3958	0.22	0.73	LS1,SC 44M	GE-NE-A166-1294-R1
1P3571	Linde 1092	3958	0.2	0.73	LS1,SC 44U	GE-NE-A166-1294-R1
1P3571	Linde 1092	3958	0.22	0.8	LS1,SC 45D	GE-NE-A166-1294-R1
1P3571	Linde 1092	3958	0.23	0.82	LS1,SC 45E	GE-NE-A166-1294-R1
1P3571	Linde 1092	3958	0.21	0.8	LS1,SC 45K	GE-NE-A166-1294-R1
1P3571	Linde 1092	3958	0.21	0.8	LS1,SC 45M	GE-NE-A166-1294-R1
1P3571	Linde 1092	3958	0.21	0.78	LS1,SC Unirr.	WPS, 8/21/95
1P3571	Linde 1092	3958	0.37	0.8	MY, Supp. C04-01	WPS, 8/21/95
1P3571	Linde 1092	3958	0.35	0.76	MY, Supp. C04-02	WPS, 8/21/95
1P3571	Linde 1092	3958	0.34	0.73 *	MY, Supp. C04-03	WPS, 8/21/95

RPVDATA *developed by* ATI Consulting

Note: WQ = Weld Qualification, SC = Surveillance Capsule, Supp. = Supplemental Test, Surv. = Surveillance Matl.

Heat No.	Flux Type	Flux Lot	Pct. Cu	Pct. Ni	Source	Reference
1P3571	Linde 1092	3958	0.33	0.78	MY, Supp. C04-04	WPS, 8/21/95
1P3571	Linde 1092	3958	0.33	0.77	MY, Supp. C04-05	WPS, 8/21/95
1P3571	Linde 1092	3958	0.31	0.78	MY, Supp. C04-07	WPS, 8/21/95
1P3571	Linde 1092	3958	0.32	0.78	MY, Supp. C04-08	WPS, 8/21/95
1P3571	Linde 1092	3958	0.32	0.78	MY, Supp. C04-09	WPS, 8/21/95
1P3571	Linde 1092	3958	0.32	0.78	MY, Supp. C04-10	WPS, 8/21/95
1P3571	Linde 1092	3958	0.3	0.76	MY, Supp. C04-11	WPS, 8/21/95
1P3571	Linde 1092	3958	0.38	0.8	MY, Supp. C04-13	WPS, 8/21/95
1P3571	Linde 1092	3958	0.53	0.81	MY, Supp. C04-14	WPS, 8/21/95
1P3571	Linde 1092	3958	0.52	0.8	MY, Supp. C04-15	WPS, 8/21/95
1P3571	Linde 1092	3958	0.432	0.745	MY,SC 253 deg	WCAP-12819
1P3571	Linde 1092	3958	0.356	0.728	MY,SC 253 deg	WCAP-12819
1P3571	Linde 1092	3958	0.25	0.66	MY,SC 263 deg	BCL-585-21
1P3571	Linde 1092	3958	0.33	0.705 **	MY,SC 263 deg	BCL-585-21
1P3571	Linde 1092	3958	0.25	0.7	MY,SC 263 deg	BCL-585-21
1P3571	Linde 1092	3958	0.36	0.78	MY,SC Unirr.	CR-75-269
			Avg. Cu = 0.264	Avg. Ni = 0.748		

Note: * denotes corrections to the values submitted by Wisconsin Public Service Corp.
1) nickel content was changed from 0.78 to 0.73 wt%
** 2) nickel content was changed from 0.70 to 0.705 wt%
*** 3) one entry with Cu = 0.33, Ni = 0.71 for surveillance capsule 263° was deleted as it was a duplicate entry.
CE = Combustion Engineering, KWE = Kewaunee, LS1 = LaSalle 1, MY = Maine Yankee
WCAP = Westinghouse Report, WPS = Wisconsin Public Service Corp.,
GE-NE-A166-1294-R1 = GE Nuclear Report, BCL = Battelle Columbus Labs Report
CR-75-269 = Effects Technology Capsule Report

Summary of Properties for Weld Wire Heat No. 13253/12008

Compilation of Measured Chemistries from all Data Sources

Heat No.	Flux Type	Flux Lot	Pct. Cu	Pct. Ni	Source	Reference
13253/12008	Linde 1092	3791			CE,WQ	C-E 78-12 RSP
13253/12008	Linde 1092	3774			CE,WQ	C-E 78-12 RSP
13253/12008	Linde 1092	3714			CE,WQ	C-E 78-12 RSP
13253/12008	Linde 1092		0.21	0.86	Wylie Labs	
			Avg. Cu = 0.21	Avg. Ni = 0.86		

Note: WQ = Weld Qualification, CE = Combustion Engineering

Summary of Properties for Weld Wire Heat No. 13253

Compilation of Measured Chemistries from all Data Sources

Heat No.	Flux Type	Flux Lot	Pct. Cu	Pct. Ni	Source	Reference
13253	Linde 1092	3774			CE,WQ	C-E 78-12 RSP
13253	Linde 1092	3833			CE,WQ	C-E 78-12 RSP
13253	Linde 1092	3724			CE,WQ	C-E 78-12 RSP
13253	Linde 1092	3791			CE,WQ	C-E 78-12 RSP
13253	Linde 1092	3791	0.27	0.74	CK1,SC	WCAP-8047
13253	Linde 1092	3774	0.23	0.71	SA2,SC	WCAP-8824
13253	Linde 1092	3833	0.267	0.728	SA2,SC	WCAP-13366
13253	Linde 1092	3833	0.244	0.734	SA2,SC	WCAP-13366
13253	Linde 1092	3833	0.247	0.728	SA2,SC	WCAP-13366
13253	Linde 1092	3774	0.283	0.732	SA2,SC	WCAP-11554
			Avg. Cu = 0.257	Avg. Ni = 0.729		

Note: WQ = Weld Qualification, SC = Surveillance Capsule, CE = Combustion Engineering
CK1 = D. C. Cook 1, SA2 = Salem 2, WCAP = Westinghouse Report

Summary of Properties for Weld Wire Heat No. S3986

Compilation of Measured Chemistries from all Data Sources

Heat No.	Flux Type	Flux Lot	Pct. Cu	Pct. Ni	Source	Reference
S3986	Linde 124		0.055	0.96	BW1, SC	SR-BNP1-1005-001
S3986	Linde 124		0.051	0.98	BW1, SC	SR-BNP1-1005-001
S3986	Linde 124	0934	0.06	0.81	CB&I CTR #337	CP&L Letter
S3986	Linde 124	0934	0.06	0.9	CB&I CTR #337C	CP&L Letter
S3986	Linde 124	0934	0.05	0.96	CB&I CTR PT#200(S)	CP&L Letter
S3986	Linde 124	0934	0.06	0.97	CB&I CTR PT#200(T)	CP&L Letter
S3986	Linde 124	0934	0.05	0.92	CB&I CTR PT200A	CP&L Letter
S3986	Linde 124	0934	0.055	0.97	CK2,SC	WCAP-8512
S3986	Linde 124	0934	0.051	0.93	TRO,SC	WCAP-8426
S3986	Linde 124	0934	0.06	0.97	TRO,SC	WCAP-10861

Avg. Cu = 0.055 Avg. Ni = 0.937

Note: SC = Surveillance Capsule, CB&I = Chicago Bridge & Iron, CTR = Certified Test Report
BW1 = Brunswick 1, CK2 = D. C. Cook 2, TRO = Trojan, CP&L = Carolina Power & Light Co.
SR-BNP1-1005-001 = GE Nuclear Report, WCAP = Westinghouse Report