Commonwealth Edison Company
1400 Opus Place
Downers Grove, IL 60515

ComEd

September 15, 1995

Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attn: Document Control Desk

Subject: Additional Information regarding Commonwealth Edison Company's Supplement to Technical Specification Amendment for 3 Volt Interim Plugging Criteria for
Byron Unit 1 and Braidwood Unit 1
NRC Docket Numbers:50-454 and 50-456

Reference: D. Saccomando letter to Nuclear Regulatory Commission dated September 1, 1995, transmitting Supplement to Technical Specification Amendment for 3 Volt Interim Plugging Criteria for Byron Unit 1 and Braidwood Unit 1

As stated in the reference letter, Commonwealth Edison Company (ComEd) did commit to follow the probe wear standard as described in Generic Letter (GL)95-05 but were considering requesting relief from the Staff in this area. After performing this evaluation, ComEd decided to ask for relief consistent with that granted in the Safety Evaluation Report for Farley Units 1 and 2 dated April 7, 1995. Attached is ComEd's justification as to why approval of this request is appropriate. Please note that at this time we are only asking approval of this relief request for Braidwood Unit 1 Cycle 6 and Byron Unit 1 through Cycle 8. ComEd is requesting feedback with regard to approval of this request as soon as possible to allow for implementation of the GL 95-05 probe wear standard requirements if this request is not granted.

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If you have any questions concerning this correspondence please contact this office.

Sincerely,

Harold D. Pontious, Jr.
Nuclear Licensing Administrator

Attachment

cc: D. Lynch, Senior Project Manager-NRR
R. Assa, Braidwood Project Manager-NRR
G. Dick, Byron Project Manager-NRR
S. Ray, Senior Resident Inspector-Braidwood
H. Peterson, Senior Resident Inspector-Byron
H. Miller, Regional Administrator-RIII
Office of Nuclear Safety-IDNS

ATTACHMENT

Generic Letter 95-05 Probe Wear Alternative

Generic Letter 95-05, Voltage-Based Repair Criteria for Westinghouse Steam Generator Tubes Affected by Outside Diameter Stress Corrosion Cracking (GL 95-05), Attachment 1, Section 3.c.3 discusses the requirement for monitoring Steam Generator (SG) eddy current bobbin coil probe wear. Braidwood and Byron utilize a 0.610 inch diameter bobbin coil eddy current probe for the examination of the nominal 0.750 inch outside diameter SG tubes which have a thickness of 0.043 inches (nominal 0.664 inch inside diameter). For 0.750 inch tubing, the 0.610 inch diameter bobbin coil probe is the proper sized probe to use to support the implementation of a voltage-based Interim Plugging Criteria (IPC) per GL 95-05. The diameter of the Echoram bobbin coil probe used at Braidwood has a tolerance of +0.000 inches and -0.003 inches. The diameter of the Zetec bobbin coil probe used at Byron has a tolerance of $\pm$0.003 inches. As a bobbin coil probe goes through a SG tube during the eddy current examination, the centering of the probe in the SG tube may vary due to physical wear of the probe centering device. Questions have been raised as to the accuracy of the bobbin coil probe as the centering device wears and the centering of the probe is altered.

A wear monitoring standard has been designed to monitor bobbin coil probe wear. During the SG eddy current examination, the bobbin coil probe is periodically inserted into the wear monitoring standard. The initial (new probe) amplitude response from each of the four holes used to monitor wear is determined and compared on an individual basis with subsequent measurements. GL 95-05 requires the signal amplitudes or voltages from the individual holes must remain within 15% of their initial amplitudes for an acceptable probe wear condition. If this condition is not satisfied for all four holes, then the probe must be replaced and every SG tube inspected since the last successful calibration should be reinspected with the new calibrated probe. Commonwealth Edison (ComEd) committed to follow the GL 95-05 probe wear requirement for its 3.0 volt IPC submittal in a September 1, 1995 letter (Reference 1), and committed to follow the GL 95-05 probe wear requirement in its 1.0 volt Alternate Plugging Criteria (APC) submittal in an August 15, 1995 letter (Reference 2). In Reference 1, ComEd indicated it was reviewing the probe wear requirement. ComEd now proposes to alter this requirement for the Byron Unit 1 and Braidwood Unit 1 3.0 volt IPC submittal and for

the Braidwood Unit 1 1.0 volt APC submittal. The proposed alternate probe wear requirement would be implemented at Braidwood Unit 1 for Cycle 6 and at Byron Unit 1 through Cycle 8.

GL 95-05 allows alternates to this probe wear requirement as long as the alternate provides equivalent detection and sizing of indications and is consistent with the tube integrity analyses discussed in Section 2 of GL 95-05, subject to NRC approval. The NRC has accepted, on a one cycle basis, an alternate probe wear requirement that was implemented at Braidwood Unit 1 and Byron Unit 1 in the most recent SG inspection outages. This alternate was accepted in place of the requirement of Draft Generic Letter 94-XX, "Voltage-Based Repair Criteria for the Repair of Westinghouse Steam Generator Tubes Affected by Outside Diameter Stress Corrosion Cracking." ComEd proposes to use this same probe wear requirement that was accepted as an alternate to the Draft Generic Letter 94-XX for application of a 3.0 volt IPC at Byron and Braidwood or a 1.0 volt APC at Braidwood.

The proposed alternate probe wear requirement specifies that if a probe is found to be out of specification (greater than 15%), all tubes that had indications within X% of the repair limit that were inspected since the last successful calibration shall be reinspected with a new calibrated probe. X% is defined as the percent deviation from the reference standard minus the 15% allowed deviation i.e., if a probe is found 17% out of tolerance (greater than the 15% requirement), then 17% - 15% = 2%. In this case, all indications in the SG tubes inspected since the last successful calibration that are within 2% of the repair limits would be reinspected with a new calibrated probe.

The past acceptance by the NRC of this alternate probe wear requirement for an IPC and data presented to the NRC by Westinghouse during the public comment meetings for the Draft Generic Letter 94-XX demonstrates that this alternate provides an equivalent detection and sizing of indications and is consistent with tube integrity analyses discussed in Section 2 of GL 95-05. The Westinghouse data used a 0.720 inch probe to inspect nominal 0.875 inch tubes (Fill Factor of 86.3%). This is comparable to the fill factor (84.4%) that is obtained from the use of the 0.610 inch bobbin coil probe in a 0.750 inch tube with a 0.043 inch wall thickness. The Westinghouse data shows that 100% of the indications greater than 0.75 volts are detected in SG tubes inspected with bobbin coil probes that exceed the 15% probe wear requirement. Therefore, all indications near to and greater than the lowest voltage-based repair limits identified in the Reference 1 or Reference 2, i.e., 1.0 volt, should be

detectable by a probe that is worn past the 15% limit. The Westinghouse data also showed that the probes worn past the 15% limit still exceeded 90% probability of detection at 90% confidence as required in Appendix H of the EPRI PWR SG Examination Guidelines, EPRI NP-6201, for probe qualifications. This data demonstrates that this alternate probe wear requirement is equivalent in detection to the GL 95-05 probe wear requirement.

The disposition of indications that would not be reinspected due to a failed probe wear criteria is not affected. Indications that are not within X% of the repair limit and are below the lower repair limits are still assured to be less than the lower repair limit and therefore, can remain in service. Indications that are not within X% of the repair limit and are above the lower repair limit will still be required to be inspected by Rotating Pancake Coil (RPC) and dispositioned based on the results of the RPC. Indications within X% of the repair limits will be reinspected by a new calibrated probe with acceptable wear measurements to determine the actual voltage value of the indication and to determine the requirements for further inspection by RPC. Repair of these indications will be based on the results of the new calibrated probe. The Westinghouse data showed that the average difference in size recorded between that indicated by the worn probe versus a good probe was 0.037 volts with a standard deviation of 0.14 volts. This data demonstrates that the alternate probe wear requirement is essentially equivalent in sizing to the GL 95-05 required probe wear requirement. The effect on voltage growth measurement is negligible.

Further data supporting the use of the alternate probe wear requirement is presented in Table 1 and Table 2. This data was collected during the last SG eddy current examination at Braidwood Unit 1 (A1M05 in March 1995) and used the alternate probe wear requirement discussed above. Table 1 lists the reels that failed the probe wear 15% criteria, lists the range of indications that need to be reinspected with a calibrated probe, and lists the percent out of tolerance for each of the four indications that were out of tolerance. Table 2 lists the tubes that were reinspected due to failed probe wear, and lists "Worn Probe Voltage" and the "Good Probe Voltage." If a tube contained an indication that needs to be reinspected, the whole tube was reinspected. As an example, the A SG, Row 10 Column 76 had an indication at the 3H TSP that was required to be reinspected. Other indications at the 7H and 8H TSPs were also reinspected. The column labeled "Wear Delta V" is the difference between the "Worn Probe Voltage" vs. the "Good Probe Voltage" for indications that were required to be reinspected due to the probe wear criteria. The column

labeled "Non-Wear Delta V" is the difference between the "Worn Probe Voltage" vs. the "Good Probe Voltage" for indications that were not required to be reinspected due to the probe wear criteria. This data is similar to the data presented by Westinghouse for the indications that had to be reinspected due to probe wear failure. No indications greater than 0.51 volts were missed by the worn probe as compared to the new calibrated probe, and the average difference in size for the "Wear Delta V" column was 0.030 volts with a standard deviation of 0.095. The average difference in size for the "Non-Wear Delta V" column was 0.011 volts with a standard deviation of 0.162. These average differences in size support a negligible impact on voltage growth.

References

1. Letter from D. Saccomando to the U.S. Nuclear Regulator Commission dated September 1, 1995, Application for Amendment to Facility Operation Licenses: Byron Nuclear Power Station, Units 1 and 2, NPF-37/66; NRC Docket Nos. 50-454/455; Braidwood Nuclear Power Station, Units 1 and 2, NPF-72/77; NRC Docket Nos. 50-456/457.

2. Letter from D. Saccomando to the U.S. Nuclear Regulator Commission dated August 15, 1995, Application for Amendment to Facility Operation Licenses: Braidwood Nuclear Power Station, Units 1 and 2, NPF-72/77; NRC Docket Nos. 50-456/457.

Table 1: A1M05 Failed Probes Due to Wear

		Reinspect		% Out	
		From	To	of Tolerance	Comments
A	24	0.97	1.03	-17.6	
A	46	0.93	1.07	21.6	
A	46	0.97	1.03	-17.9	0.93-1.07 bounding
A	58	0.99	1.01	16.5	
A	60	1.00	1.00	15.2	No Retests - 0.94-1.06 bounding
A	60	0.94	1.06	20.5	No Retests
A	62	0.97	1.03	18.0	
A	88	0.97	1.03	17.9	No Retests
A	88	0.98	1.02	-16.8	No Retests - 0.97-1.02 bounding
A	94	1.00	1.00	15.3	No Retests
A	104	0.99	1.01	16.4	
A	104	1.00	1.00	15.0	0.99-1.01 bounding
B	26	0.99	1.01	-15.7	No Retests
B	46	0.40	1.60	-75.3	0.27-1.73 bounding
B	46	0.48	1.52	-67.3	0.27-1.73 bounding
B	46	0.45	1.55	-70.5	0.27-1.73 bounding
B	46	0.27	1.73	-88.5	
B	60	0.97	1.03	-18.3	
B	86	1.00	1.00	-15.1	No Retests
B	88	0.93	1.07	-21.6	No Retests
B	88	0.99	1.01	-15.8	No Retests - 0.93-1.07 bounding
C	14	0.99	1.01	15.7	
D	30	0.99	1.01	15.9	
D	34	0.97	1.03	-17.9	
D	36	0.91	1.09	24.1	
D	60	0.96	1.04	-19.3	
D	70	0.97	1.03	18.3	No Retests
D	76	0.97	1.03	-17.9	No Retests
D	86	0.94	1.06	20.9	
D	88	0.96	1.04	-18.9	No Retests
D	98	0.41	1.59	73.6	
D	98	0.97	1.03	-18.4	0.41-1.59 bounding

Table 2: Braidwood Unit 1 A1M05 Probe Wear Data

SG	Bad Reel	Row	Col	Loc	Worn Probe Voltage	Good Probe Voltage	Good Reel	Wear Delta V	Non-Wear Delta V	% Difference
A	24	7	31	5H	1.02	0.79	102	0.23		29.1
A	46	18	49	5H	0.99	1.02	102	-0.03		-2.9
A	58	43	70	3H	1.01	1.07	104	-0.06		-5.6
A	62	28	76	3H	1.00	1.07	104	-0.07		-6.5
A	62	10	76	3H	0.99	1.00	108	-0.01		-1.0
A	104	10	76	3H	1.01	1.00	108	0.01		1.0
A	104	10	76	7H	0.74	0.61	108		0.13	
A	104	10	76	8H	0.41	0.73	108		-0.32	
B	46	29	60	3H	0.39	0.40	104	-0.01		-2.5
B	60	45	81	5H	1.03	1.04	106	-0.01		-1.0
								0.00		
C	14	11	22	3H	0.99	1.01	100	-0.02		-2.0
C	14	11	22	5H	0.79	0.79	100		0.00	0.0
C	14	11	22	7H	0.45	0.53	100		-0.08	
D	30	35	38	5H	0.99	0.76	92	0.23		30.3
D	30	35	38	9H	NDD	0.38	92			
D	34	38	40	5H	0.98	0.96	32	0.02		2.1
D	34	33	41	3H	1.02	1.01	92	0.01		1.0
D	34	33	41	5H	0.85	1.03	92		-0.18	
D	34	33	41	7H	0.79	0.83	92		-0.04	
D	34	33	41	9H	NDD	0.36	92			
D	36	33	42	3H	1.02	1.01	92	0.01		1.0
D	36	33	42	5H	1.17	1.35	92		-0.18	
D	36	33	42	8H	0.79	0.55	92		0.24	
D	36	28	43	3H	1.06	1.06	92	0.00		0.0
D	36	28	43	5H	NDD	0.51	92			
D	36	28	43	7H	NDD	0.27	92			
D	36	19	44	3H	0.95	1.08	92	-0.13		-12.0
D	60	9	73	8H	0.96	0.76	92	0.20		26.3
D	60	9	73	7H	0.72	0.73	92		-0.01	
D	60	9	73	3H	NDD	0.33	92			
D	86	16	101	3H	0.97	0.89	105	0.08		9.0
D	86	16	101	5H	1.76	1.61	105		0.15	
D	86	16	101	7H	0.68	NDD	105			
D	86	13	100	3H	0.64	0.82	94		-0.18	0.0
D	86	13	100	7H	NDD	0.38	94			
D	86	12	98	3H	0.80	0.97	94		-0.17	0.0
D	86	14	93	3H	1.09	0.72	94		0.37	0.0
D	86	13	91	3H	1.08	1.02	94		0.06	0.0
D	86	13	91	5H	1.54	1.44	94		0.10	
D	86	13	91	8H	0.75	0.77	94		-0.02	
D	86	13	91	9H	0.79	0.78	94		0.01	
D	86	14	89	5H	1.11	1.01	94		0.10	0.0
D	86	9	90	3H	0.97	INR	86			
D	86	7	95	5H	1.18	1.04	94		0.14	0.0
D	86	7	97	7H	1.00	0.91	94	0.09		9.9
D	86	7	97	3H	1.38	1.37	94		0.01	
D	86	7	97	5H	1.11	1.00	94		0.11	
D	98	41	74	7H	0.49	0.44	62	0.05		11.4
							Average	0.030	0.011	
							Std. Dev.	0.095	0.162	