

ATTACHMENT I

Summary Report of Preliminary Ultrasonic Examinations on Byron Unit 2 Steam Generators and Pressurizer

I. INTRODUCTION

Commonwealth Edison contracted with EBASCO Services, Inc. to perform a preliminary preservice inspection of the Byron Unit 2 steam generators and pressurizer. The techniques, personnel, and equipment used were in accordance with Section XI and Section V requirements of the ASME Code. Westinghouse was requested to perform a third-party review, analysis, and evaluation of the data from the Unit 2 inspection.

II. PRELIMINARY PRESERVICE INSPECTION

EBASCO Services, Inc. performed the preliminary preservice inspection examinations in accordance with the 1977 Edition of the ASME Code with addenda through the Summer, 1978 Addenda. Welds were examined using 0° straight beam, 45° angle beam, and 60° angle beam transducers. At the request of Commonwealth Edison, a conservative 40% DAC reporting level was employed in lieu of 50% DAC level required by ASME Section XI.

At the conclusion of the inspection, EBASCO recorded 45 indications that required further evaluation. These indications are listed in the attached table. The indications are scattered throughout the various welds in all four steam generators and the pressurizer.

III. WESTINGHOUSE EVALUATION OF ORIGINAL TEST DATA

When evaluating the original test data, 32 of the 45 reported indications had actual a/t values which exceeded allowable a/t values when sizing to the Code required 50% DAC level. Eleven indications were found to be acceptable either because the maximum amplitude did not reach 50% DAC required to establish sizes or the actual a/t value was less than the Code allowable a/t value when sizing to 50% DAC levels. The data from two indications was confusing and required additional examinations and evaluation.

When analyzing the test data, it was noted that almost all indications are located near the inside diameter surface. This is very similar to what was observed during the preservice inspection of the Byron Unit 1 steam generators and pressurizer. Subsequently, a series of supplemental radiographic, ultrasonic, and visual examinations confirmed the similarity of the Unit 1 and 2 indications.

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During the repair of the Byron Unit 1 steam generators, two full thickness plugs were removed for detailed metallurgical evaluation of the defects. It was concluded that the discontinuities were caused by the presence of trapped slag inclusions. The average ultrasonically-predicted length was 2.5 times greater than the actual length and the average ultrasonically-predicted through-wall dimension was 6.5 times greater than the actual through-wall dimension.

Because of the similarity of the test data from Units 1 and 2, we believe the cause and nature of the indications from the two units are similar. However, we recognized that there will be a need to obtain samples from Unit 2 for detailed metallurgical analysis to confirm the indications are due to entrapped slag and that the sizing is being exaggerated due to the close proximity to the inside diameter surface.

If it can be shown that the indications in Unit 2 are being oversized to the same extent as was shown in the Unit 1 plugs, we believe a correction factor should be applied to the ultrasonically-predicted sizes before making Section XI acceptance evaluations. If, when analyzing the original data, a conservative correction factor (based on the actual flaw sizes in the Byron Unit 1 plugs) of 70% of the predicted length and 25% of the predicted through-wall dimension were used to determine actual sizes, 34 of the original 45 indications are acceptable, nine indications are unacceptable, and two indications required further testing.

IV. SUPPLEMENTAL EXAMINATIONS

All of the previously discussed evaluations were made based on the original test data only. In an effort to obtain supporting information for use in making a final evaluation of marginal or questionable indications, re-examinations were performed by EBASCO under Westinghouse supervision. These re-examinations included ultrasonic tests from the outside diameter surfaces and visual, ultrasonic, magnetic particle, and radiographic tests from the inside diameter surface when access to the I.D. surface was possible.

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Based on the evaluation of both the original test data and the supplemental examinations data, it was concluded that 40 indications meet Code acceptance criteria when using the 70% of predicted length and 25% of predicted through-wall sizing correction factors. Five indications did not meet the Code acceptance standards when using sizing correction factors. These five indications are:

<u>Indication No.</u>	<u>Steam Generator</u>	<u>Weld Seam*</u>	<u>Location</u>
1	2095	SGC02	110" CCW**
2	2096	SGC05	212-3/4" CW
3	2097	SGC02	107-1/4" CW**
4	2097	SGC06	139-1/4" CW
5	2098	SGC06	40-5/8" CCW

* Weld Seams are numbered sequentially from SGC01 through SGC08 from bottom to top of vessel.

** Sample to be removed for metallurgical evaluation.

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SUMMARY OF BYRON UNIT 2 STEAM GENERATOR/PRESSURIZER PRELIMINARY PSI EVALUATION

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Component	Weld Seam	Location	Unacceptable Indication In Original Exam.		70% UT Length 25% UT Thru Wall		Reexamination from O.D.				Westinghouse Recommendation	
							Full Size		Reduce Size (70% L, 25% TW)			
			Actual	a/t Allow. a/t	Actual	a/t Allow. a/t	Actual	a/t Allow. a/t	Actual	a/t Allow. a/t		
SG 2095	SGC-02	110" CW	0.216 0.166 0.041	0.037 0.037 0.034	0.042 0.033 *	0.030 0.031 *	0.138 0.034 ---	0.037 0.023 ---	0.034 0.008 ---	0.027 0.022 ---	Repair	
SG 2095	SGC-02	108 1/2" CW	0.048	0.047	*	*	---	---	---	---	No repair	
SG 2095	SGC-02	109 1/2" CW	Max. ampl. = 26% DAC - No sizing dimensions at 50% DAC						---	---	---	No repair
SG 2095	SGC-02	131 1/2" CW	No sizing dimensions at 50% DAC.						---	---	---	No repair
SG 2095	SGC-02	224 5/8" CW	0.144 0.128 0.144 0.081	0.037 0.037 0.037 0.037	0.033 0.030 0.028 0.020	0.027 0.027 0.037 0.027	0.047 0.081 --- ---	0.037 0.037 --- ---	0.012 0.020 --- ---	0.023 0.024 --- ---	No repair	
SG 2095	SGC-05	88" CW	0.075 0.085	0.024 0.037	0.015 0.016	0.020 0.023	--- ---	--- ---	--- ---	--- ---	No repair	
SG 2095	SGC-05	48" CW	0.075 0.075	0.028 0.029	0.017 0.014	0.021 0.021	--- ---	--- ---	--- ---	--- ---	No repair	
SG 2095	SGC-06	110 1/2" CW	0.153 0.153 0.190	0.037 0.037 0.037	0.033 0.033 0.039	0.037 0.037 0.037	0.113 0.105 ---	0.037 0.037 ---	0.028 0.025 ---	0.029 0.036 ---	No repair	
SG 2096	SGC-03	20 5/8" CW	0.067 0.087	0.039 0.060	* *	* *	--- ---	--- ---	--- ---	--- ---	No repair	
SG 2096	SGC-03	36 3/4" CW	No unacceptable indications								No repair	
SG 2096	SGC-05	127" CW	0.084	0.049	0.022	0.025	---	---	---	---	No repair	

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Component	Weld Seam	Location	Unacceptable Indication In Original Exam.		70% UT Length 2% UT Thru Wall		Reexamination from O.D.				Westinghouse Recommendation
			Actual	a/t Allow. a/t	Actual	a/t Allow. a/t	Full Size		Reduce Size (70%, 25% TW)		
							Actual	a/t Allow. a/t	Actual	a/t Allow. a/t	
SG 2096	SGC-05	190 3/4" CW	0.088	0.037	0.022	0.032	---	---	---	---	No repair
			0.075	0.037	0.018	0.027	---	---	---	---	
SG 2096	SGC-05	212 3/4" CW	0.091	0.037	0.016	0.024	0.025	0.032	0.003	0.027	Repair
			0.090	0.037	0.023	0.028	0.106	0.037	0.026	0.025	
			0.140	0.037	0.035	0.027	0.106	0.037	0.026	0.024	
			0.064	0.032	0.016	0.022	---	---	---	---	
SG 2096	SGC-06	54 7/8" CW	0.075	0.037	0.018	0.036	---	---	---	---	No repair
			0.058	0.037	*	*	---	---	---	---	
			0.128	0.037	0.032	0.037	---	---	---	---	
			0.100	0.037	0.025	0.036	---	---	---	---	
SG 2096	SGC-06	229" CW	0.088	0.037	0.022	0.025		0.037	0.015	0.023	No repair
			0.125	0.037	0.031	0.029					
SG 2096	SGC-08	132 1/4" CW	Max. ampl. = 48% DAC - No sizing dimensions at 50% DAC					---	---	---	No repair
SG 2097	SGC-01	207 3/8" CW	0.040	0.037	*	*	---	---	---	---	No repair
			0.064	0.037	*	*	---	---	---	---	
SG 2097	SGC-02	107 1/4" CW	0.042	0.030	*	*	0.064	0.028	0.015	0.021	Repair
			0.094	0.037	0.0236	0.023	0.079	0.037	0.020	0.023	
			0.094	0.037	0.0236	0.030	0.148	0.037	0.036	0.029	
			0.073	0.032	0.018	0.023	---	---	---	---	
			0.048	0.030	*	*	---	---	---	---	
SG 2097	SGC-02	219 1/4" CW	0.110	0.037	0.028	0.030	---	---	---	---	No repair
			0.094	0.037	0.024	0.026	---	---	---	---	
SG 2097	SGC-02	217" CW	0.110	0.037	0.028	0.031	---	---	---	---	No repair

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Component	Weld Seam	Location	Unacceptable		70% UT Length		Reexamination from O.D.				Westinghouse Recommendation
			Indication In		25%		Full Size		Reduce Size		
			Original Exam.		UT Thru Wall				(70%L, 25% TW)		
			Actual	a/t Allow. a/t	Actual	a/t Allow. a/t	Actual	a/t Allow. a/t	Actual	a/t Allow. a/t	
SG 2097	SGC-06	118 1/2" CW	Reflectors appear to be due to I.D. Geometry								No repair
SG 2098	SGC-02	10 1/8" CW	0.041	0.031	*	*	---	---	---	---	No repair
			0.057	0.041	*	*	---	---	---	---	
SG 2098	SGC-02	11 7/8" CW	No sizing dimensions at 50% DAC								No repair
SG 2098	SGC-02	11 1/8" CW	No sizing dimensions at 50% DAC								No repair
SG 2098	SGC-06	40 5/8" CW	0.128	0.026	0.032	0.022	0.075	0.037	0.19	0.022	Repair
			0.045	0.034	*	*	0.0325	0.032	0.008	0.028	
			0.108	0.032	0.027	0.022	0.155	0.037	0.040	0.037	
			0.081	0.036	*	*	0.060	0.037	0.015	0.025	
			0.293	0.037	0.048	0.028	---	---	---	---	
			0.063	0.037	*	*	---	---	---	---	
SG 2098	SGC-06	40" CW	No unacceptable indications								No repair
SG 2098	SGC-06	134 3/4" CW	0.049	0.047	*	*	---	---	---	---	No repair
SG 2098	SGC-06	129" CW	No unacceptable indications								No repair
SG 2098	SGC-03	39 1/2" CW	0.041	0.030	*	*	---	---	---	---	No repair
			0.041	0.030	*	*	---	---	---	---	
Pres 1741	PL-01	7" to 17" below PC-07	No unacceptable indications								No repair
Pres 1741	PL-02	15 5/8" from PC-02	0.151	0.037	0.026	0.027	---	---	---	---	No repair
			0.109	0.037	0.0274	0.0278	---	---	---	---	
Pres 1741	PC-03	75 1/2" CW	0.061	0.037	0.015	0.023	---	---	---	---	No repair
			0.039	0.037	*	*	---	---	---	---	

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			Indication In		25%		Full Size		Reduce Size		
			Original Exam.		UT Thru Wall				(70% L, 25% TW)		
			Actual	a/t Allow. a/t	Actual	a/t Allow. a/t	Actual	a/t Allow. a/t	Actual	a/t Allow. a/t	
Pres 1741	PC-04	5 1/4" CW	0.060	0.037	*	*	---	---	---	---	No repair
			0.081	0.037	0.020	0.022	---	---	---	---	
			0.070	0.037	*	*	---	---	---	---	
			0.067	0.028	0.017	0.022	---	---	---	---	
			0.067	0.037	0.029	*	---	---	---	---	
Pres 1741	PC-04	142" CW	0.232	0.037	0.047	0.037	0.084	0.072	0.020	0.036	No repair
			0.275	0.037	0.046	0.037	---	---	---	---	

* Actual a/t was less than allowable a/t when using 70% UT Length and 50% UT thru wall dimensions.

ATTACHMENT II