



**Commonwealth Edison**  
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*LLC*

August 24, 1979

Mr. James G. Keppler, Director  
Directorate of Inspection and  
Enforcement - Region III  
U.S. Nuclear Regulatory Commission  
799 Roosevelt Road  
Glen Ellyn, Illinois 60137

Subject: Zion Station Units 1 and 2  
Response to I.E. Bulletin No. 79-17,  
"Pipe Cracks In Stagnant Borated  
Water Systems At PWR Plants".  
NRC Docket Nos. 50-295 and 50-304

Reference (a): July 26, 1979 letter from J. G. Keppler  
to Byron Lee, Jr. transmitting I.E.  
Bulletin No. 79-17.

Dear Mr. Keppler:

Reference (a) required Commonwealth Edison Company to  
provide a written response to Item 1 of I.E. Bulletin No. 79-17,  
"Pipe Cracks In Stagnant Borated Water Systems At PWR Plants".  
Commonwealth Edison's response to the NRC Staff request is  
contained in Attachment 1 to this letter.

Please address any additional questions that you might  
have concerning this matter to this office.

Very truly yours,

*N. J. Naughton*

*for* Corwin Reed  
Int Vice-President

Attachment

cc: Director, Division of  
Operating Reactors

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ATTACHMENT 1

Commonwealth Edison Company's Response For Zion Station To  
Item 1 of I.E. Bulletin No. 79-17

1. Conduct a review of safety related stainless steel piping systems within 30 days of the date of this Bulletin to identify systems and portions of systems which contain stagnant oxygenated borated water. These systems typically include ECCS, decay/residual heat removal, spent fuel pool cooling, containment spray and borated water storage tank (BWST-RWST) piping.
  - (a) Provide the extent and dates of the hydrotests, visual and volumetric examinations performed per 10 CFR 50.55a (g) (Re: I.E. Circular 76-06 enclosed) of identified systems. Include a description of the non-destructive examination procedures, procedure qualifications and acceptance criteria, the sampling plan, results of the examinations and any related corrective actions taken.
  - (b) Provide a description of water chemistry controls, summary of chemistry data, any design changes and/or actions taken, such as periodic flushing or recirculation procedures to maintain required water chemistry with respect to pH, B, CL, F, O<sub>2</sub>.
  - (c) Describe the preservice NDE performed on the weld joints of identified systems. The description is to include the applicable ASME Code sections and supplements (addenda) that were followed, and the acceptance criterion.
  - (d) Facilities having previously experienced cracking in identified systems, Item 1, are requested to identify (list) the new materials utilized in repair or replacement on a system-by-system basis. If a report of this information and that requested above has been previously submitted to the NRC, please reference the specific report(s) in response to this Bulletin.

Response:

Zion Station has reviewed the safety related stainless steel piping systems and determined which lines or portions of lines contain stagnant oxygenated borated water. These lines or portions of lines which are identified in Table 1 are applicable to either Unit 1 or Unit 2. The table contains the line number and the

functional description of each line identified. Also listed is the nominal pipe diameter, pipe schedule, material specification and nominal wall thickness.

(a) Extent and Dates of NDE

The last column of Table 1 describes whether the line has been examined per 10 CFR 50.55a(g). Those lines identified as having been examined are listed in Tables 2 and 3 for Units 1 and 2 respectively. All of the lines in Table 2 were leak tested per ASME Section XI, Articles IWA-5000 and IWB-5000, on May 24, 1976, November 25, 1977, October 27, 1978 and April 2, 1979. The lines in Table 3 were similarly tested on March 22, 1977, April 7, 1978 and April 5, 1979. The results of these tests showed no evidence of through wall leakage.

Tables 2 and 3 describe the total number of welds in the identified systems and dates of visual and volumetric examinations required by ASME Section XI, Tables IWB-2500 and 2600. The examinations performed through Spring 1978 were in compliance with the 1971 Edition of the Code, up to and including the Summer 1972 Addenda. Subsequent examinations were in compliance with the 1974 Edition of the Code, up to and including the Summer 1975 Addenda.

The examination procedures, procedure qualifications, acceptance criteria and sampling plans were as required by the aforementioned editions of the ASME Code. The reported results of the examinations have indicated no evidence of pipe wall degradation.

(b) Water Chemistry

The lines identified in Table 1 are primarily supplied with water from the Refueling Water Storage Tanks (RWST). These tanks are vented to atmosphere and therefore are at O<sub>2</sub> saturated conditions (approx. 7.0-10.0ppm). The balance of the chemistry is typically: Boron 2100-2450ppm as H<sub>3</sub>BO<sub>4</sub>; F<sup>-</sup> 0.01 to 0.2ppm and pH 5.0-6.7. From initial plant start-up until 1977 the RWST had been experiencing slight Cl<sup>-</sup> contamination from the Containment Spray Additive System. The amounts of Cl<sup>-</sup> found in the RWST and Accumulators during that period were typically 1.0-5.0ppm. Changes to the recirculation procedure and the institution of a local flushing procedure in 1977 reduced the Cl<sup>-</sup> concentrations to a typical range of 0.30-0.50ppm.

(c) Preservice NDE

All of the welds in the lines identified in Table 1 received construction preservice NDE required by the piping design specifications. The specific testing requirements are identified in Table 4. The Code requirements for procedures, acceptance criteria and sampling plans are tabulated for each design specification and are identifiable by the line number suffix.

Additionally, all of the welds in the lines identified in Tables 2 and 3 received hydrotest, visual and ultrasonic examinations in accordance with the preservice inspection requirements of ASME Section XI, 1971 Edition, up to and including Summer 1972 Addenda.

(d) Previous Cracking Experience

Zion Station has not found any cracking on the identified systems.

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TABLE 1  
PORTIONS OF SYSTEMS IDENTIFIED  
FOR I.E. BULLETIN 79-17

Line Number	Description	Size	Schedule	Material	Wall Thickness	I.S.I. Performed
CS008-8"R1	Containment Spray Riser	8"	40S	A312-Tp304	.322"	No
CS009-8"R1	Containment Spray Riser	8"	40S	A312-Tp304	.322"	No
CS010-8"R1	Containment Spray Riser	8"	40S	A312-Tp304	.322"	No
CS051-10"R1	RWST Level Reference Leg	10"	40S	A312-Tp304	.365"	No
RC008-8"E1	R.C.S. Loop 1 Bypass	8"	140	A376-Tp316	.812"	Yes
RC046-8"E1	" " 2 Bypass	8"	140	A376-Tp316	.812"	Yes
RC113-8"E1	" " 3 "	"	"	" "	"	"
RC090-8"E1	" " 4 "	"	"	" "	"	"
RC006-10"E1	Accumulator Discharge Loop 1	10"	160	A376-Tp316	1.125"	Yes
RC040-10"E1	" " " 2 "	"	"	" "	"	"
PC080-10"E1	" " " 3 "	"	"	" "	"	"
RC072-10"E1	" " " 4 "	"	"	" "	"	"
RC007-8"E1	R.H.R. Hot Leg Return Loop 1	8"	140	A376-Tp316	.812"	Yes
SI125-8"E1	" " " Loop 2	"	"	" "	"	"
RC111-8"E1	" " " Loop 3	"	"	" "	"	"
RC083-8"E1	" " " Loop 4	"	"	" "	"	"
RC065-3"E1	Alternate Charging	3"	160	A376-Tp316	.438"	Yes
RC004-14"E1	R.H.R. Suction	14"	160	A376-Tp316	1.406"	Yes
RC155-6"E1	Pressurizer Safety (Loop Trap only)	6"	160	A376-Tp316	.719	Yes
RC156-6"E1	" " " "	6"	160	A376-Tp316	"	"
RC157-6"E1	" " " "	"	"	" "	"	"
VC100-3"E	Alternate Charging	3"	160	A376-Tp304	.438"	Partial

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TABLE 1 (Cont'd)  
PORTIONS OF SYSTEMS IDENTIFIED  
FOR I.E. BULLETIN 79-17

Line Number	Description	Size	Schedule	Material	Wall Thickness	I.S.I. Performed
VC121-8"AA	Charging Pump Suction - RWST	8"	40S	A312-Tp304	.322"	No
VC122-8"AA	" " "	"	"	" "	"	"
VC094-8"AA	" " " -RHR	"	"	" "	"	"
SI001-8"L	RHR to Cont. Spray Header	8"	40S	A312-Tp316	.322	No
SI002-8"L	" " "	"	"	" "	"	"
RH003-8"L	RHR Hot Leg Return	8"	40S	A312-Tp316	.322	No
RH004-8"L	" " "	"	"	" "	"	"
RH005-8"L	" " "	"	"	" "	"	"
RH006-12"L	" " "	12"	40S	A312-Tp316	.375	No
RH006-12"E	" " "	12"	160	A376-Tp316	1.312	No
PH043-8"E	RHR Hot Leg Return Loop 1	8"	160	A376-Tp316	.906	Partial
SI023-8"E	" " " 1	"	"	" "	"	"
PH044-8"E	" " " 3	"	"	" "	"	"
SI024-3"E	" " " 3	"	"	A376-Tp316	"	"
SF023-3"AA	RWST to Refuel Water Pur. Pump	3"	40S	A312-Tp304	.216"	No
DT032-3"AA	" " "	3"	"	" "	"	"
SI090-3"E	B.I.T. to Cold Leg Inj.	3"	160	A376-Tp304	.438"	Partial
SI075-4"E	Charging Pumps to B.I.T.	4"	120	A376-Tp316	.438	No
SI076-4"E	" " "	"	"	A376-Tp316	"	"
SI077-4"E	" " "	"	120	A376-Tp316	"	"
SI003-8"L	RHR to RWST	8"	40S	A312-Tp316	.322	No
SI071-8"AA	RWST to Charging Pumps	8"	40S	A312-Tp304	.322	No
SI073-8"AA	RWST to Charging Pumps	8"	40S	" "	"	"
SI074-8"AA	RWST to Charging Pumps	8"	40S	" " "	"	"

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TABLE 1 (Cont'd)  
PORTIONS OF SYSTEMS IDENTIFIED  
FOR I.E. BULLETIN 79-17

Line Number	Description	Size	Schedule	Material	Wall Thickness	I.S.I. Performed
SI099-4"G	S.I. Pump B Discharge	4"	80S	A312-Tp304	.377"	No
SI100-4"G	S.I. Pump A "	"	"	A312-Tp304	"	"
SI099-4"E	S.I. Pump B to Hot Legs	4"	120	A376-Tp316	.438"	"
SI104-4"E	S.I. A " "	"	120	A376-Tp316	"	No
SI128-4"G	S.I. Pumps to Cold Legs	4"	80S	A312-Tp304	.377"	No
SI128-4"E	" " "	4"	120	A376-Tp316	.438	"
SI036-10"E	Accumulator to Loop 1	10"	160	A376-Tp316	1.125	Partial
SI034-10"E	" " 2	"	"	" "	"	"
SI032-10E	" " 3	"	"	" "	"	"
SI030-10"E	" " 4	"	"	" "	"	"
SI036-10"L	Accumulator to Loop 1	10"	40S	A312-Tp316	.365	No
SI034-10"L	" " 2	"	"	" "	"	"
SI032-10"L	" " 3	"	"	" "	"	"
SI030-10"L	" " 4	"	"	" "	"	"
SI006-12"AA	RWST to RHR	12"	40S	A312-Tp304	.375	No
SI007-18"AA	Recirc. Sump to RHR	18"	Std.	A358-C1.1-Tp 304	.375	No
SI008-18"AA	" " "	"	"	" "	"	"
SI007-18"L	" " "	"	40	A358-C1.1-Tp 316	.562	"
SI008-18"L	" " "	"	40	" "	"	"

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TABLE 2  
PORTIONS OF SYSTEMS IDENTIFIED  
FOR I.E. BULLETIN 79-17  
INSPECTED PER 10CFR50.55a(g)

ZION UNIT 1

Line Number	Total Number of Welds	Visual and Volumetric Examinations			
		Number	Date	Number	Date
RC008-8"E1	7				
RC046-8"E1	7				
RC113-8"E1	7				
RC090-8"E1	7	3	Spring 1976		
RC006-10"E1	7				
RC040-10"E1	5				
RC080-10"E1	5				
RC072-10"E1	5				
RC007-8"E1	7	1	Spring 1976	5	Fall 1978
SI125-8"E1	19	3	Spring 1976		
RC111-8"E1	17			5	Fall 1978
RC083-8"E1	8				
PC065-3"E1	9	4	Spring 1976		
RC004-14"E1	5				
RC155-6"E1	3			1	Fall 1978
RC156-6"E1	3	1	Spring 1976	1	Fall 1978
RC157-6"E1	3				
VC100-3"E	1				
PH043-8"E	8			1	Fall 1978
SI023-8"E					
PH044-8"E	34	3	Spring 1976		
SI-24-8"E					
SI090-3"E	22				
SI036-10"E	10				
SI034-10"E	9				
SI032-10"E	11				
SI030-10E	13	5	Spring 1976	5	Fall 1978

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TABLE 3  
 PORTIONS OF SYSTEMS IDENTIFIED  
 FOR I.E. BULLETIN 79-17  
 INSPECTED PER 10CFR50-55a(g)

ZION UNIT 2

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Line Number	Total Number of Welds	Visual and Volumetric Examinations			
		Number	Date	Number	Date
RC008-8"E1	7				
RC046-8"E1	7				
RC113-8"E1	7				
RC090-8"E1	6				
RC006-10"E1	7	4	Spring 1977		
RC040-10"E1	7				
RC080-10"E1	6				
RC072-10"E1	6				
RC007-8"E1	7				
SI125-8"E1	19				
RC111-8"E1	16			5	Spring 1979
RC083-8"E1	8				
RC065-3"E1	9				
RC004-14"E1	5				
RC155-6"E1	3				
RC156-6"E1	3				
RC157-6"E1	3	3	Spring 1977		
VC100-3"E	1				
RH043-8"E	7			1	Spring 1979
SI023-8"E				4	Spring 1979
RH044-8"E	35	6	Spring 1977		
SI024-8"E					
SI090-3"E	18			3	Spring 1979
SI036-10"E	12				
SI034-10"E	9				
SI032-10"E	10				
SI030-10"E	13				

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TABLE 4  
 CONSTRUCTION NDE REQUIREMENTS  
 FOR PORTIONS OF SYSTEMS  
 IDENTIFIED FOR I.E. BULLETIN 79-17

Piping Design Table (Line Number Suffix)	Radiography Requirement	Dye-Penetrant Requirement (Root pass and final weld)
E	Par. PW-51 of ASME Section I	Appendix VIII of ASME Section VIII
E1	N-624.2 and N-624.3 of ASME Section III plus Code Core 1443	N-627.2 and N-627.3 of ASME Section III
G	Par. PW-51 of ASME Section I	Appendix VIII of ASME Section VIII
L	Par. UW-51 of ASME Section VIII	Appendix VIII of ASME Section VIII
R-1	Par. PW-51 of ASME Section I	Appendix VIII of ASME Section VIII
AA	Par. PW-51 of ASME Section I (10% sample of weld with greater than 0.251 in. wall thickness.)	Appendix VIII of ASME Section VIII (Root pass on 6 in. and larger dia. and final weld on all welds.)

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