Commonwealth Edison
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Address Reply to: Post Office Box 767
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December 1, 1982

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

Subject: Dresden Station Unit 2
Quad Cities Station Unit 1
Response to I.E. Bulletin
82-03 (Rev. 1)
NRC Docket Nos. 50-237 and 50-254

Reference (a): R. C. DeYoung letters to All Licensees
dated October 14 and 28, 1982.

Dear Mr. Keppler:

Reference (a) transmitted I.E. Bulletin 82-03 which addresses stress corrosion cracking in thick-wall, large diameter stainless steel recirculation system piping at BWR plants. The Commonwealth Edison Company response to this bulletin for the applicable units, Dresden Unit 2 and Quad Cities Unit 1, is provided in the attachment to this letter. Note that because Quad Cities Unit 1 is nearing completion of the current refueling outage, all of the bulletin items are addressed. The Dresden 2 response only addresses bulletin item 4; the remaining information will be provided prior to startup from the spring 1983 refueling outage.

To the best of my knowledge and belief the statements contained herein and in the attachment are true and correct. In some respects these statements are not based on my personal knowledge but upon information furnished by other Commonwealth Edison employees and consultants. Such information has been reviewed in accordance with Company practice and I believe it to be reliable.

Please address any questions you may have concerning this matter to this office.

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Attachments (large drawings) sent to DPRP w/ed orig.

One (1) original copy of this letter and a copy of the attachment (minus the color coded drawings) is also being provided to the Document Control Desk as requested.

Very truly yours,

Thomas J. Rausch

Thomas J. Rausch
Nuclear Licensing Administrator

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Attachment

cc: Region III Inspector - Dresden
Region III Inspector - Quad Cities
USNRC Document Control Desk,
Washington, D.C. 20555

SUBSCRIBED and SWORN to
before me this 1st day
of December, 1982

Natalie A. Pienta
Notary Public

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ATTACHMENT

COMMONWEALTH EDISON
DRESDEN UNIT 2 AND QUAD CITIES UNIT 1
RESPONSE TO I.E. BULLETIN 82-03 REV. 1

ITEM 2: Results of Recirculation System Inspections
(Applicable to Quad Cities 1 only)

A total of 9 circumferential welds on recirculation piping were ultrasonically inspected during this 1982 refueling outage.

The results of these UT inspections are tabulated in Table R-1.

ITEM 3: Corrective Actions
(Applicable to Quad Cities 1 only)

No unresolvable indications which would require corrective actions were identified.

ITEM 4.a: Inspection Sampling Plan

4.a.1: Quad Cities 1:

Isometric drawings of Quad Cities Unit 1 recirculation system, ISI-103 sheets 1 through 4, identify all recirculation piping welds that have been examined ultrasonically during this refueling outage. These welds are circled in red with the corresponding stress rule index (SRI) value. Also identified in ISI-105 sheets 2 and 3 are the RHR system piping welds which are examined with their SRI values.

4.a.1: Dresden 2:

Attached are isometric drawings ISI-103 sheets 1, 2, and 3 which indicate the welds previously examined and the welds to be examined during the next refueling outage.

As shown in these drawings, eleven welds will be inspected in the recirculation system plus the twelve furnace sensitized safe end to piping welds, for a total of 23 welds. We are also considering inspections of large diameter welds in the shutdown cooling system and LPCI system which attaches to the recirculation system. The results of these inspections will be reported with the recirculation system results in our response to item 2 of the bulletin.

4.a.2: Sample Selection Method
(Quad Cities 1 and Dresden 2)

The weld sample selection plans employed at Quad Cities Unit 1 and to be applied to Dresden Unit 2 were focused on weld joints considered to be relatively more susceptible to intergranular stress corrosion cracking (IGSCC). Stress Rule Index (SRI) calculations were utilized as the primary input to the selection process. These calculations were performed by different organizations for the two stations and due to somewhat different methodology, the range of actual SRI numbers is lower for Quad Cities Unit 1 than for Dresden Unit 2. We have utilized the SRI numbers for relative ranking of welds by stress and not for discriminating between welds believed to be above or below some IGSCC threshold.

The carbon content of the piping material was not factored into the selection process. Presentations by General Electric indicated relatively little difference in IGSCC susceptibility for carbon contents of 0.05 percent or higher. A survey of carbon content at Dresden Unit 2 and a search at Quad Cities Unit 1 showed essentially all welds in the recirculation system to be 0.05 percent or greater carbon content.

Although I.E. Bulletin 82-03, Rev. 1 indicated "large bore" recirculation piping to be the item of interest, we have for completeness included the sampling plans for recirculation riser lines in our responses. In addition, portions of the large diameter branch lines to the recirculation system were included due to their being non-flowing and having high calcuated SRI numbers. (These branch lines were included at Quad Cites 1 as noted in Table R-3 and shown in drawings ISI-105 sheets 2 and 3 of 3; we are considering similar inspection at Dresden Unit 2). The SRI numbers for the selected welds are shown on the enclosed isometric drawings.

The weld sampling plans in general consist of the highest SRI numbers for each of the diameters of piping in the recirculation system and for portions of the large diameter branch lines. Due to radiation ALARA concerns and in the interest of distributing the sample, a few exceptions of the above were made. All of the welds selected have SRI numbers ranking at or near the nighest for the location of interest.

4.a.3: Piping Materials

Quad Cities 1
Material type, diameter (nominal), and wall thickness of inspected welds are provided in Table R-1.

Dresden 2
All pipe material is type 304
12" diameter Sch 80 with minimum wall of .585
22" diameter with minimum wall of .979
28" diameter suction with minimum walls of 1.113
28" diameter discharge with minimum wall of 1.267

4.a.4: Radiation Exposure Estimates

Quad Cities 1
The recirculation system contact dose rates are generally found to be in the 1R/hr to 3R/hr range. A conservative estimate of total occurpational radiation exposure incurred is 94.1 man-rem. The following conditions have assisted in lowering the radiation exposure of personnel involved in insulation services, weld preparation, and weld inspection.

1. The use of lead shielding (lead blankets) on inspected piping and/or nearby piping whenever possible.

2. Three welds selected for inspection did not require grinding since they had been inspected once previously. This, in effect, significantly lowered the radiation exposure incurred to weld preparation personnel.

Dresden 2
The following is the number of welds to be inspected at the next outage using Item 4a. as a basis and the estimated occupational radiation exposure projected for NDE inspectors only:

12" diameter - 4 welds - 1.2 m-rem
22" diameter - 3 welds - 2.16 m-rem
28" diameter - 4 welds - 2.88 m-rem

Totals - 11 welds - 6.24 m-rem (NDE Inspectors)

4.a.4: Radiation Exposure Estimates

Dresden 2 (Cont'd)
The estimated occupational radiation exposure projected to remove and install insulation in order to inspect the above welds is 6R. An additional 2.5 man rem is estimated to perform weld preparation, yielding a total of approximately 14.75 man-rem. This total does not include any exposure incurred in performing the twelve furnace sensitized safe end inspections which is estimated to require 12 man-rem for the NDE personnel and 60 man-rem to remove and install insulation (no weld preparation is required for these welds). Total projected exposure for recirculation weld inspection, preparation, and insulation is therefore about 86.75 man-rem.

Following are some ALARA measures that will be implemented:

a) Shielding installed when practical.

b) Use of master slave system proposed by Lambert, McGill and Thomas (NDE contractor who will be used this outage).

c) Pre-job planning.

4.b UT Summary Description
(Quad Cities 1 and Dresden 2)

The UT procedure used at Quad Cities Unit 1 and to be used at Dresden Unit 2 require that calibration sensitivity be set on side-drilled holes which provide greater sensitivity than is obtained using ASME XI Appendix III notches. Scanning is performed at a minimum of 6dB above calibration sensitivity. Evaluation and measurement is required of any indication that is 50 percent or more of the calibration level. Any indication considered to be a crack is evaluated and measured regardless of amplitude.

The calibration standards used at Quad Cities Unit 1 were all Type 304 stainless steel with the following descriptions:

Piping Diameter	Curved or Flat	Thickness
28"	Flat	1.361"
22"	Flat	1.087"
20"	Flat	0.840"
16"	Curved	0.722"
12"	Curved	0.585"

4.c Previous Recirculation System Inspection Results
(Quad Cities 1 and Dresden 2)

Dresden Unit 2 will utilize the same calibration standards for the 16" and 12" diameter piping. The 28" and 22" diameter piping examinations will utilize curved block standards as required by the ISI program for the second 10 year interval (ASME XI 1977 Edition through Summer 1979 Addenda). As previously noted, calibration will be set from side drilled holes.

The results of previous Quad Cities Unit 1 recirculation piping weld inspection are tabulated in Table R-2. The Dresden 2 previous inspections are indicated in the attached isometrics. For both units, any detected recordable indications were evaluated as geometry, and at no time was a repair deemed necessary.

Please note that welds examined earlier in the interval utilized earlier revisions of the CECo procedure. The earlier revisions were essentially the same in technique, standards and recording, and as such the results should be valid.

4.d Crack Detection Capability Evaluation
(Quad Cities 1 and Dresden 2)

The effectiveness of the Commonwealth Edison (CECo) procedure in detecting service induced intergranular stress corrosion cracking (IGSCC) was demonstrated by CECo personnel at Battelle Memorial Institute (BMI) on flawed samples from the Nine Mile Point Unit 1 plant. A sample of flawed Nine Mile Point 28" piping was utilized at Quad Cities Unit 1 and will also be utilized at Dresden Unit 2. The CECo personnel who demonstrated the UT procedure at BMI completely characterized the flaws in the weld joint. All contractor personnel performing UT examinations of large bore stainless steel piping at Quad Cities Unit 1 were required to demonstrate their ability to correctly find the flaws prior to performing examinations. CECo personnel reviewed all contractor data reports and performed resolution examinations as required. A similar qualification of contractor UT personnel will be performed at Dresden Unit 2. The diameters and thicknesses of the piping examined at Quad Cities Unit 1 and to be examined at Dresden Unit 2 are contained in section 4.a.3 of this report. The piping welds were made using counterbores and consumable inserts and generally have convex ID weld root geometries.

TABLE R-1 RECIRC WELDS EXAMINED THIS OUTAGE (Fall 1982)

Weld Identification	Weld Configuration	Material Specification	Nom. Diam.	Wall Thickness	Inspection Results
02BS-FG	TEE/ Valve	A403-304 A351-CF8M	28"	1.113 Min	* OD Geometry - finger dampened ID Root Geometry - 20% D.A.C. Indications confirmed by CECo
02BS-F7	Valve/ Pipe	A351-CF8M A358-304	28"	1.113 Min	* ID Root Geometry - noted for 360° at higher gain Indications confirmed by CECo
02A-S9	Pipe/ CAP	A358-304 A403-304	22"	1.048 Min	* OD Geometry - finger dampened ID Root Geometry - noted for 360° Indications confirmed by CECo
02B-F5	Cross/ Pipe	A403-304 A358-304	22"	1.048 Min	* No recordable indications
02G-F2	SE/ Pipe	SA376-316 A358-304	12"	0.817 Min 0.585 Min	
02F-F2	↓	↓	↓	↓	
02E-F2					
02L-F2					* O.D. Geometry
02BS-F2	SE/ Elbow	SA376-316 A403-304	28"	1.831 Min 1.267 Min	* ID Geometry - noted for 360° intermittently ID Geometry - mismatch This weld was examined using L.M.T.s procedure UT-10 and CECo's procedure NDT-C-2, Rev. 12. (Rev. 7)

TABLE R-2 RECIRC WELDS EXAMINED IN PREVIOUS OUTAGES

Weld Identification	Size	Inspect. Date	Procedure	Results
02AS-S1 NOZ-SE	28"	May 74	C-2 Rev. 4	No recordable indications
02AS-F2 SE-P		May 74	C-2 Rev. 4	No recordable indications
02BS-F2 SE-P		Jan 79	C-2 Rev. 10	I.D. Geometry
02BS-F6 TEE-V		Feb 76	C-2 Rev. 10	No recordable indications
02BS-F7 V-P		Feb 76	C-2 Rev. 10	I.D. Root & Counterbore Geometry
02BS-S9 P-E		Feb 76	C-2 Rev. 10	I.D. Root
02A-F1 V-P	22"	Feb 76	C-2 Rev. 10	No recordable indications
02-F1 P-V		Feb 76	C-2 Rev. 10	No recordable indications
02-F2 P-V		Feb 76	C-2 Rev. 10	No recordable indications
02C-F2 SE-P	12"	May 74	C-2 Rev. 4	No recordable indications
02D-F2 SE-P		May 74	C-2 Rev. 4	No recordable indications
02G-S3 P-E		Feb 76	C-2 Rev. 10	I.D. Counterbore & OD Crown Configuration
02G-S4 E-P		Feb 76	C-2 Rev. 10	I.D. Root & Counterbore
02G-F6 P-Sweep		Feb 76	C-2 Rev. 10	No recordable indications
02K-F2 SE-P		Jan 79	C-2 Rev. 10	No recordable indications
02C-F1 NOZ-SE		May 74	C-2 Rev. 4	No recordable indications
02D-F1 NOZ-SE		May 74	C-2 Rev. 4	No recordable indications

TABLE R-3 INSPECTION RESULTS OF RHRS PIPING (LPCI AND SHUTDOWN COOLING)

Weld Inspection	Wall Configuration	ASTM. Mate Specification	Nom. Size	Wall Thickness	Inspection Results
10S-F1	TEE/Pipe	A403-WP304 A358-TP304	20"	0.840 Min	No recordable indications
10S-F5	Pipe/Valve	A358-TP304 A351-CF8M	20"		I.D. Geometry - 360° intermittent counterbore geometry.
10S-F6	Valve/Pipe	A351-CF8M A358-TP304	20"		I.D. Geometry - 360° intermittent counterbore geometry
10AD-F1	TEE/Pipe	A403-WP304 A358-TP304	16"	0.722 Min	No recordable indications
10AD-F4	Elbow/Valve	A403-WP304 A351-CF8M	16"		No recordable indications
10AD-F5	Valve/Pipe	A351-CF8M A358-TP304	16"		ID Root Geometry - 360° intermittent
10AD-F13	Valve/Pipe	A351-CF8M A358-TP304	16"		No recordable indications
10BD-F1	TEE/Pipe	A403-WP304 A358-TP304	16"		No recordable indications
10BD-F5	Elbow/Valve	A403-WP304 A351-CF8M	16"		No recordable indications