Commonwealth Edison
One First National Plaza, Chicago, Illinois
Address Reply to: Post Office Box 767
Chicago, Illinois 60690

September 17, 1984

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Dresden Station Unit 2
Stainless Steel Piping Inspection
and Repair Plan During Next Refueling
Outage Starting October 1, 1984
NRC Docket No. 237

Reference (a): D. M. Crutchfield letter to D. L. Farrar dated April 7, 1983.

(b): D. G. Eisenhut letter to All Licensees dated April 19, 1984 (Generic Letter 84-11).

(c): B. Rybak letter to H. R. Denton dated June 4, 1984.

Dear Mr. Denton:

Reference (a) mandated that Commonwealth Edison submit its plan for inspection and/or modification of the recirculation and other piping systems prior to Unit 2's next refueling outage scheduled to begin in October, 1984. This letter contains our response.

First, we will address our pipe replacement plans. Dresden Unit 2 is participating in a long term program with EPRI in evaluating hydrogen water chemistry and its effects on mitigating IGSCC in piping systems.

This program runs for three refueling cycles; Unit 2 will complete the first cycle this October. Our plans are not to replace any piping prior to the completion of this program in order not to jeopardize this important research project. At the completion of this project, we will determine our future plans for Unit 2.

The following is the plan for inspection and repair of stainless steel piping in the Dresden Unit 2 during the refueling outage.

1. It is not planned to apply Induction Heating Stress Improvement (IHSI) to any welds during the outage. With hydrogen water chemistry being applied, Commonwealth Edison does not want to potentially obscure its benefits at Unit 2 with the use of IHSI.

A001
1/1

2. The weld examination plan is provided in the included table titled "Augmented ISI," and meets the general intent of Generic Letter 84-11. The table provides a listing of the nonconforming systems and welds by piping diameter. The total sample for each listing is the sum of the welds in the "examined previously" and "not previously examined" categories which were established from Generic Letter 84-11 guidance.

   The only variation from the reinspection program in Generic Letter 84-11 is with the 4" recirculation bypass lines where 20 of 23 nonconforming welds were examined in 1983. The three unexamined welds are weldolet branch connections to the 28" piping; these welds will not be examined in 1984. These connections from our experience have not exhibited a susceptibility to intergranular stress corrosion cracking (IGSCC). We consider the extensive 1983 sample with no indications of IGSCC being found, to have demonstrated the integrity of the bypass lines, and that the intent of 84-11 has been met. Four of the 20 welds examined in 1983 will be reexamined in 1984.

   Generic Letter 84-11 recognizes that the risk of IGSCC is increased for temperatures above 200°F. The welds selected for examination from the non-flowing branch lines have generally been biased to the highest temperature portions of these lines. The Safe End-to-nozzle welds in the Recirculation Inlet and Outlet piping will be treated as sub-categories separate from the other welds in those piping runs.

3. In addition to the Generic Letter 84-11 examination requirements, Commonwealth Edison has had a policy of examining the furnace sensitized safe ends (FSSE) on Dresden Unit 2 each refueling outage. The fourteen FSSE's (10-12" risers, 2-28" outlets, and 2-4" jet pump instrumentation) were <u>all</u> examined during the Spring 1983 outage using examiners qualified to Bulletin 82-03 requirements. The examination included the entire volume of each safe end, the attachment welds, and for the 12" riser inlets, the internal thermal sleeve attachment weld.

   Hydrogen water chemistry (HWC) has been in effect at Dresden Unit 2 during the last operating cycle. Laboratory and test loop data have shown HWC to be effective in preventing initiation of cracks and in arresting existing cracks. The demonstrated integrity of the FSSE's at the last outage coupled with HWC forms a basis for a reduced examination sample of the FSSE's.

   The proposed sampling plan provides UT examination of 2 recirculation inlet, 1 recirculation outlet, and 2 jet pump instrumentation safe ends. Thus, 5 of the 14 FSSE's on Dresden Unit 2 (sample percentage of 36 percent) would be examined along with the attachment welds. The examination of 2 recirculation inlet and 1 recirculation outlet nozzle to safe end welds is in agreement with the recommendations of

the BWR Owner's Group regarding the concern with cracking of the nozzle weld butter. The examination of the attachment welds of each jet pump instrumentation safe end will provide data on the integrity of these joints where cracking has recently been found on other BWR units.

Ultrasonic examination of the recirculation inlet and outlet safe ends requires the opening of doors in the biological shield with high radiation exposure consequences. The overall radiation exposure estimate is 3.5 man-rem per safe end examination. The proposed sampling of 2 inlet and 1 outlet safe ends and attachment welds as compared to the total of 12 of these safe ends results in a radiation dose savings of 31.5 man-rem.

Considering the demonstrated integrity of the furnace sensitized safe ends from the last inspection, the effectiveness of hydrogen water chemistry in preventing cracks, and responsibility to ALARA principles, we consider the proposed furnace sensitized safe end sample to satisfy concerns over the integrity of FSSE's and minimize radiation exposure.

If cracks are detected within the inspected sample of a specific piping system and size, the inspection will be extended in accordance with IWB 2430 of AMSE Code Section XI. However, if the detected cracks are minimal both in number and size we may elect to request relief from Section XI inspection expansion requirements.

4. The NDE contractors performing UT inspection will be Lambert, MacGill and Thomas (LMT) and Universal Testing Laboratories (UTL) - Kraft Werke Union (KWU). The Level II and III UT personnel performing evaluations of crack indicatins were qualified at the EPRI NDE Center by successfully performing the practical (83-02) examination. Level I and II UT personnel performing scanning duties will be trained by the contractor on site. Results of the contractor examinations will be provided to CECo. NDE personnel for review and ultimate resolution. These CECo personnel were qualified by the practical (83-02) examination at the NDE Center. Advanced techniques will be used in the final evaluation of all circumferential crack indications to determine whether they are indeed cracks and, if so, what is their depth and length.

5. Each crack indication will be evaluated to determine whether any repair is necessary.

   All axial crack indications will be repaired using a "leak barrier" weld overlay design. This is due in part to the uncertainties associated with sizing of axial flaws and the desire to avoid any unnecessary leakage.

On the long circumferential flaw indications, that is, greater than 10% in depth and with circumferential extent equal to or longer than 120 degrees, a weld overlay repair will be applied. The design for such a weld overlay will be based on NRC accepted criteria employed at CECo's other units, i.e., the overlay thickness which is a function of the crack depth, crack length, and the applied stresses on the weld joint will be sufficient to provide full IWB-3640 code margins. A ratio of twice the flaw size measured by ultrasonic inspection to the allowable flaw size will be used to determine the weld overlay thickness.

For all circumferential flaw indications greater than 10% in depth but less than 120°F in length, a flawed pipe analysis will be performed in accordance with the methodology previously used on Dresden Unit 3 and Quad Cities Units 1 and 2. Since Dresden Unit 2 is employing hydrogen water chemistry controls, the expected crack growth rates due to IGSCC are extremely low. To account for this, crack growth will be calculated based on 10% of the crack growth used for previous analysis at Quad Cities. The crack evaluation and repair criteria will meet the requirements of ASME Section XI (IWB-3640) and will be consistent with those accepted by the NRC in their safety evaluation for the Quad Cities Unit 1.

Examination of any new overlays will be per Item 5 of Reference (c).

If you have any further questions regarding this matter, please contact this office.

One signed original and forty (40) copies of this transmittal are provided for your use.

Very truly yours,

B. Rybak

B. Rybak
Nuclear Licensing Adminstrator

lm

cc: NRC Resident Inspector - Dresden
R. Gilbert - NRR

Attachments

9193N

AUGMENTED ISI

DRESDEN UNIT 2 FALL 1984

SYSTEM	TOTAL WELDS	EXAMINED 1983	WELD SAMPLE – FALL 1984 EXAMINED PREVIOUSLY	NOT PREV EXAMINED	TOTAL
Recirculation					
Risers (12")	40	35[3]	7[1]	5	12[1]
SE/Nozzle	10	10	2	0	2
Outlets (28")	31	6[2]	2[2]	5	7[2]
SE/Nozzle	2	2	1	0	1
Header (22")	18	6	2	4	6
Bypass (4")	23	20	4	0	4
Residual Heat Removal					
LPCI/SDC (16")	42	4	2	8	10
SDC (14")	4	0	0	2[4]	2[4]
Reactor Water Clean Up					
6"	2	0	0	1[5]	1[5]
8"	26	4	2	5	7
10"	5	0	0	4	4
CRD Return – (4")	6	1	1	4	5
Head Vent – (4")	3	0	0	3	3
Isolation Condensor					
Supply (14")	16	0	0	4	4
Return (12")	13	2	2	4	6
Jet Pump Inst.	10	4	4	6	10
	251	94	29	55	84

1 – Includes 2 unrepaired cracked welds.

2 – Includes 1 unrepaired cracked weld.

3 – Includes 2 unrepaired and 7 repaired cracked welds.

4 – Two inaccessible welds (saddle reinforcements).

5 – One inaccessible weld (saddle reinforcement).