ENCLOSURE 3

FINAL

TECHNICAL EVALUATION REPORT ON RESPONSE FROM COMMONWEALTH EDISON TO GENERIC LETTER 88-01 PERTAINING TO THE DRESDEN NUCLEAR POWER STATION, UNIT 2

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FINAL

ABSTRACT

This report contains an evaluation of the licensee (Commonwealth Edison) submittal for Dresden Nuclear Power Station, Unit 2 which was submitted in response to the NRC Generic Letter 88-01 in which Commonwealth Edison was requested to: (1) Furnish their current plans relating to piping replacement and other measures to mitigate IGSCC, inspection, repair, and leakage detection. (2) Indicate whether they plan to follow the NRC Staff positions, or propose alternative measures. Commonwealth Edison's plans are evaluated in Section 2 of this report in terms of compliance to NRC Staff positions. Section 3 contains an evaluation of an alternative position concerning a change to the Technical Specification on ISI and concerning exceptions to the NRC Staff position on leakage detection.

SUMMARY

The Licensee, Commonwealth Edison, submitted a response to the NRC Generic Letter 88-01. Commonwealth Edison's response pertaining to the austenitic stainless steel piping in the Dresden Nuclear Power Station, Unit 2 (a BWR nuclear power plant) was evaluated in terms of: (1) Their previous and planned actions to mitigate IGSCC to provide assurance of continued long-term service. (2) Their Inservice Inspection (ISI) Program. (3) Their Technical Specifications pertaining to ISI and their plans to ensure that leakage detection will be in conformance with the NRC Staff position. (4) Their plans to notify the NRC of significant flaws identified (or changes in the condition of the welds previously known to be cracked) during inspection.

Commonwealth Edison endorses 12 of the 13 NRC Staff positions which are outlined in Generic Letter 88-01. They applied exceptions to one of the NRC Staff positions, i.e, that pertaining to leakage detection.

Extensive programs of piping replacement, solution treating, stress improvement, and application of weld overlays (to repair flawed welds) have been applied at Dresden 2. Although Dresden 2 has 90 IGSCC Category D, 17 IGSCC Category F, and 6 IGSCC Category G (out of a total of 276 welds), Commonwealth Edison claims that crack initiation and growth are controlled through Hydrogen Water Chemistry (HWC). Additional stress improvement is being considered, and additional weld overlays will be applied as needed.

An augmented ISI program was initiated in 1988. All except six non-resistant welds (four of which are inaccessible for UT inspection and will be monitored visually or with acoustic emission) have been inspected. Future plans incorporate credit for HWC.

Commonwealth Edison presented an alternative position to the NRC Staff position requesting a change to the TS on ISI. This position and their exceptions on leak detection are evaluated in Section 3 of this report.

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1. INTRODUCTION

Intergranular stress corrosion cracking (IGSCC) near weldments in Boiling Water Reactor (BWR) piping has been occurring for almost 20 years. Substantial efforts in research and development have been sponsored by the BWR Owners Group for IGSCC Research, and the results of this program, along with other related work by vendors, consulting firms and confirmatory research sponsored by the NRC, have permitted the development of NRC Staff positions regarding the IGSCC problems. The technical basis for NRC Staff positions is detailed in Reference 1, and further background is provided in Reference 2.

The results of these research and development programs prompted the NRC to issue Generic Letter 88-01 (see Reference 3) requesting all licensees of BWR's and holders of construction permits to:

(1) Furnish their current plans relating to piping replacement, inspection, repair, and leakage detection.

(2) Indicate whether they:
   (a) Plan to follow the staff positions, or
   (b) Propose alternative measures.

Specifically, Generic Letter 88-01 stated that an acceptable licensee response would include the following items:

(1) Current plans regarding pipe replacement and/or other measures taken or to be taken to mitigate IGSCC and provide assurance of continued long-term piping integrity and reliability.

(2) An inservice inspection (ISI) program to be implemented at the next refueling outage for austenitic stainless steel piping.

(3) A change to the Technical Specifications to include a statement

in the section on ISI that the inservice inspection program for piping will be in conformance with the staff positions on schedule, methods and personnel.

(4) Confirmation of plans to ensure that the Technical Specification related to leakage detection will be in conformance with the Staff position on leak detection.

(5) Plans to notify the NRC, in accordance with 10CFR50.55a(o), of any flaws identified that do not meet IWB-3500 criteria of Section XI of the ASME Code for continued operation without evaluation, or a change found in the condition of the welds previously known to be cracked, and an evaluation of the flaws for continued used operation and/or repair plans.

This report contains a technical evaluation of the response which Commonwealth Edison (sometimes called CE in this report) submitted in response to the NRC Generic Letter 88-01 pertaining to the Dresden Nuclear Power Station, Unit 2 (hereafter called Dresden 2).

2. EVALUATION OF RESPONSE TO GENERIC LETTER 88-01

This evaluation consisted of a review of the response to NRC Generic Letter 88-01 of January 25, 1988 by Commonwealth Edison pertaining to Dresden 2 to determine if their performance and plans are in conformance with the NRC Staff positions or if proposed alternatives are acceptable. Proposed inspection schedules and amendments to the Technical Specification were included in the review.

2.1 Documents Evaluated

Review was conducted on the information pertaining to Dresden 2 provided by the Licensee in the following documents.

"Dresden Station Units 2 and 3, Quad Cities Station Units 1 and 2, LaSalle County Station Units 1 and 2, (Response to) Generic Letter 88-01, Docket Nos. 50-237/249, 254/265, 373/374, License DPR-35," Commonwealth Edison, One First National Plaza, Chicago, Illinois 60609, July 29, 1988.

"Dresden Station Unit 2, Additional Information on the Fall 1988 IGSCC Inspection, NRC Docket No. 50-237," Letter to NRC from Commonwealth Edison, One First National Plaza, Chicago, Illinois 60609, October 5, 1988.

"Dresden Station Unit 2, Response to Request for Additional Information on Generic Letter 88-01, NRC Docket No. 50-237," Commonwealth Edison, One First National Plaza, Chicago, Illinois 60609, December 21, 1988.

"Dresden Station Unit 2, Response to Request for Additional Information on Generic Letter 88-01, NRC Docket No. 50-237," Commonwealth Edison, One First National Plaza, Chicago, Illinois 60609, March 1, 1989.

Hereafter, in this report, this documents will be referred to as the CE Submittal No. 1, No 2, No. 3, and No 4, respectively, and collectively as the CE Submittals.

2.2 Review of Commonwealth Edison's Responses to Staff Positions and Implementation of Those Positions.

Generic Letter 88-01 outlines thirteen NRC Staff positions pertaining to (1) materials, (2) processes, (3) water chemistry, (4) weld overlay, (5) partial replacement, (6) stress improvement of cracked weldments, (7) clamping devices, (8) crack evaluation and repair criteria, (9) inspection methods and personnel, (10) inspection schedules, (11) sample expansion, (12) leak detection,

and (13) reporting requirements. Generic Letter 88-01 states that the licensee should indicate in their submittal whether they endorse these NRC Staff positions or propose alternative positions. The CE Submittal did not specifically state acceptance or rejection of most of the thirteen NRC Staff positions, but the Commonwealth Edison positions on several of the thirteen items were implied in discussions in the CE Submittal No. 1, and additional information was provided in CE Submittal No. 4. These positions are presented in Table 1.

Note that Commonwealth Edison indicated endorsement of twelve of the thirteen NRC Staff positions and applied exceptions (as discussed later) to the NRC Staff position pertaining to leakage detection. Concerning inspection schedules: Commonwealth Edison takes credit for hydrogen water chemistry and accordingly applied reductions in the numbers of certain IGSCC Category welds to be inspected. In addition, although not indicated in Table 1, Commonwealth Edison submitted an alternative to changing the Technical Specification pertaining to Inservce Inspection.

2.3 Review of Classification of Welds, Previous Mitigating Actions, and Previous Inspections

2.3.1 Current IGSCC Classifications

Table 2 provides a summary of the IGSCC classifications of welds at Dresden 2 prior to a refueling outage which began in September, 1988. This table is based on a similar summary provided in CE Submittal No. 1. Table 3 contains a summary of IGSCC classifications following the September, 1988 refueling outage, during which numerous mitigating treatments were applied which affected the IGSCC classifications. The information in Table 3 is based on weld-by-weld list which

Table 1

Summary of CE's Responses to Staff Positions

Staff Position	CE Accepts NRC Staff Position	CE Has/Will Applied In Past	CE Has/Will Consider for Future Use
1. Materials	yes	yes	yes
2. Processes	yes	yes	yes
3. Water Chemistry	yes	yes	yes
4. Weld Overlay	yes	yes	yes
5. Partial Replacement	yes	yes	yes(a)
6. Stress Improvement of Cracked Weldments	yes	yes	yes
7. Clamping Devices	yes	no	yes
8. Crack Evaluation and Repair Criteria	yes	yes	yes
9. Inspection Method and Personnel	yes	yes	yes
10. Inspection Schedule	yes	yes	yes(b)
11. Sample Expansion	yes	NI	yes
12. Leak Detection	yes(c)	yes(c)	yes(c)
13. Reporting Requirements	yes	NI	yes

(a) System removal is being considered for some piping rather than actual replacement.

(b) Commonwealth Edison requested a 50% reduction in inspection requirements based on the use of hydrogen water chemistry. See text for discussion.

(c) Commonwealth Edison applied provisions (exceptions) to their endorsement of the NRC Staff position on this item. See text for discussion.

NI Not indicated.

Table 2

Summary of IGSCC Classification of Welds at Dresden 2
(Prior to the 1988 Refueling Outage)

System	Dia. Inch	No. of Welds of Indicated IGSCC Category A	B	C	D	E	F	G	Totals
Recirulation									
Outlets	28	2	0	0	9	0	2	18	31
Noz-SE	28	0	0	0	1	0	0	1	2
Header	22	8	0	0	7	0	0	5	20
Risers	12	0	0	0	19	7	2	12	40
Noz-S.	12	0	0	0	2	0	0	8	10
Bypass	4	9	0	0	4	0	0	15	28
RHR									
LPCI	16	0	0	0	11	0	0	14	25
SDC	16	2	0	0	5	0	0	1	8
Isolation Condensor									
Supply	14	0	0	0	11	0	0	15(a)	26
	12	0	0	0	2	0	0	11	13
Return	12	0	0	0	10	0	0	4(b)	14
Core Spray	10	6	0	0	0	0	0	0	6
Jet Pump Inst	-	0	0	0	5	0	0	5	10
RWCU	8	17	0	0	7	2		2(a)	28
N-18 A, B Nozzles	6	4	0	0	0	0	0	0	4
Head Vent	4	0	0	0	1	0	0	2	3
CRD	6	0	0	0	4	0	0	2	6
Totals		48	0	0	98	9	4	115	274

(a) Includes one inaccessible weld.
(b) Includes two inaccessible welds.

Table 3

Summary of IGSCC Classification of Welds at Dresden 2
(per CE Submittal No. 4, after 1988 Refueling Outage)

System	Number of Welds of Indicated IGSCC Catetgory Diameter	A	B	C	D	E	F	G	Totals
Recirc.	28	2	0	10	22	0	1	0	35
	22	8	0	2	6	1	1	0	18
	12	0	0	16	15	11	8	0	50
	4	7	0	0	19	0	0	2	28
RHR-LPCI-SDC	16	2	0	20	11	0	0	0	33
ISOC	14	0	0	21	4	0	0	1	26
	12	0	0	27	0	0	0	2	29
Core Spray	10	6	0	0	0	0	0	0	6
Jet Pump Int	Loops	0	0	5	5	0	0	0	10
RWCU	8	17	0	0	1	2	7	1	28
RPV Head	Noz, Vent	6	0	0	1	0	0	0	7
CRD Return	4	0	0	0	6	0	0	0	6
Totals		48	0	101	90	14	17	6	276

contains both the IGSCC classifications and justification for those classifications (i.e., material, mitigating treatments, and inspection) of each weld that is within the scope of Generic Letter 88-01. Although that weld-by-weld listing is not reproduced in this report, Appendices A and B contain greater detail than that provided in Table 3.

Note that Tables 2 and 3 are significantly different. Most of the differences are due to mitigating treatments applied during the September, 1988 refueling outage (described below), but some differences occur that cannot be attributed to such treatments. Included are:

(1) The total number of welds is listed as 274 in Table 2 and 276 in Table 3. The difference arises in the number of welds listed for certain lines in three systems as follows:

System	Number of Welds per Submittal No. 1	Number of Welds per Submittal No. 4
Recirculation		
Outlets (28" dia.)	31	33
Header (22" dia.)	20	18
Isolation Condenser		
Supply (12" dia.)	13	15

(2) Prior to the 1988 refueling outage, two welds (SPM-45-25 and SPM-45-19) in the Recirculation bypass lines were mistakenly classified as IGSCC Category A. Corrections were made following the 1988 refueling outage. The two tables reflect this difference.

(3) CE Submittal No. 4 lists two Head Vent welds, N8(A)

and 4A-1(A), as IGSCC Category A welds and states that these two welds contain resistant materials. CE Submittal No. 1 lists these two welds as IGSCC Category G. No explanation of this difference was provided.

Since a detailed weld-by-weld list of IGSCC classifications was provided in CE Submittal No. 4 while only a summary was provided in CE Submittal No. 1, it is presumed in the remainder of this report that the correct numbers are reflected in the list presented in CE Submittal No. 4 (summarized in Appendices A and B and Table 3) rather than that presented in CE Submittal No. 1 (Table 2).

2.3.2 Justification for IGSCC Classifications

As noted earlier, CE Submittal No. 4 also contains justification for the IGSCC classification of each weld in terms of material, mitigating treatments, and inspections. A review of these items revealed that the IGSCC classifications, as presented in CE Submittal No. 4 were correctly applied by Commonwealth Edison. The mitigating treatments are summarized in the following sections.

2.3.3 Mitigating Actions Prior to the 1988 Refueling Outage

Prior to the 1988 refueling outage, mitigating actions were taken which included: (a) partial replacement (resulting in most of the IGSCC Category A welds), (b) solution heat treating (resulting in the remainder of the IGSCC Category A welds), (c) repair of several flawed welds with standard weld overlays (resulting in IGSCC Category E welds), and (d) temporary repair of several flawed welds with non-standard overlays which are designated as leak barrier overlays

(resulting in several IGSCC Category F welds).

2.3.4 Mitigating Treatments During the 1988 Refueling Outage

CE Submittal No. 4 contains the following statements:

> "Stress Improvement was applied to 104 welds during the Fall 1988 refueling outage. Additional stress improvement will be considered in the future if permitted by outage constraints. At this time, no detailed information on future stress improvement is available."

> "Weld Overlay has been and is being used, as necessary, to reinforce welds that have flaw indications in excess of the ASME Section XI, Subsection IWB-3500 limits. Most of the weld overlay reinforcements have been applied and inspected in accordance with NUREG 0313, Revision 2. Those weld overlay reinforcements that do not conform to NUREG 0313, Revision 2 criteria on standard thickness and/or inspection will be built up to standard thickness and/or inspected in accordance with NUREG 0313, Revision during the next refueling outage (presently scheduled for the Fall of 1990).

2.3.5 Hydrogen Water Chemistry

Commonwealth Edison has applied Hydrogen Water Chemistry (HWC) at Dresden 2 since April, 1983. Prior to the use of HWC, conductivity averaged about 0.2 micromho. Since that time, according to CE Submittal No. 1, exceptionally low conductivity (averaging about 0.06 micromho) has been achieved. A table showing conductivity and dissolved oxygen during March and April, 1988 is contained in CE Submittal No. 1 which shows conductivity ranged from 0.057 to 0.066

micromho and dissolved oxygen usually ranged from 1.2 to 5.4 ppb with occasional excursions to readings in the range of 98 to 207 ppb. Additional data are contained in CE Submittal No. 2 which supports the Commonwealth Edison contention that exceptional water chemistry has been maintained.

As discussed later, ultrasonic test (UT) results revealed stability of both flawed and unflawed welds, and these excellent results are attributed to the use of hydrogen water chemistry.

2.3.6 Previous Inspection Programs

The CE Submittal No. 1 did not disclose their previous inspection schedules; however, CE Submittal No. 4 contains a list of the welds inspected in the 1983, 1984, 1986, and 1988 refueling outages. The list is not reproduced in this report, but the number of welds inspected during the 1986 and 1988 refueling outages for each of the lines in each of the systems is shown in Appendix B of this report. The inspection schedules are condensed in Appendix C which shows the number of welds inspected in each diameter piping in each of the systems at Dresden 2. Finally, Table 4 compares the number of welds of each IGSCC Category that were inspected during the 1986 and 1988 refueling outages with the requirements of Generic Letter 88-01.

Note that only six non-resistant welds at Dresden 2 have not been inspected. Two of these missed inspection because they were incorrectly classified as IGSCC Category A welds. This mistake was found only after completion of the 1988 refueling outage, and they will be inspected during the next refueling outage. The other four are inaccessible for

Table 4

Summary of Inspection Schedule for Dresden 2
for 1986 and 1988 Refueling Outage

IGSCC Categ.	No. in Categ.	No. Inspected 1986	No. Inspected 1988	Required by Generic Letter 88-01
A	48	10	3	25% every 10 years (at least 12% in 6 years)
B	0	-	-	50% every 10 years (at least 25% in 6 years)
C	101	28	101	All within the next 2 refueling cycles, then all every 10 years (at 50 % in 6 years)
D	90	43	50	All every 2 refueling cycles
E	15	10	15	50% next refueling cycle, then all every 2 refueling cycles
F	17	14	17	All every refueling outage
G[(a)]	6	0	0	All next refueling cycle

(a) Two of the IGSCC Category G welds were mistakenly classified as IGSCC Category A. The mistake was not discovered until after the 1988 refueling outage was completed. These welds will be inspected during the next refueling outage. The other four IGSCC Category G welds are inaccessible for inspection. See text for discussion of plans for these welds.

ultrasonic inspection. Plans for these welds are discussed later. The list of inspections supplied in CE Submittal No. 4 also lists inspection results on a weld-by-weld basis, although these data are not reproduced in this report. Flaws (most of which have been repaired with either standard overlays or leak barrier overlays) have been found only in the IGSCC Category E and F welds.

Both CE Submittal No. 1 and CE Submittal No. 2 maintain that stability of both flawed and unflawed welds has been achieved due to HWC. For example, CE Submittal No. 1 contains the following statement:

> "Excellent ultrasonic testing (UT) results from repeated examinations of flawed and unflawed welds, except in one case on a Reactor Water Clean Up weld, confirm the effectiveness of the HWC and of UT performed between 1983 and 1985. Note that the scanning sensitivity level of the CECo's UT procedure used in 1983 and 1984 examinations met the current EPRI recommended level for the detection of IGSCC."

Similar statements are contained in CE Submittal No. 2. In addition, this submittal provides discussions on specific welds including one weld in which a crack was found for the first time in 1988. Commonwealth Edison's conclusion concerning that weld is that the crack was present, but not detected, during earlier inspections. The implication is that it initiated prior to the implementation of HWC.

2.3.7 Evaluation of Previous Mitigating Actions and Inspections

An extensive program has been conducted at Dresden 2 so that

more than half of the welds within the scope of Generic Letter 88-01 are either IGSCC Category A, C, or E welds. More than 100 non-resistant welds remain, but all except two of the those welds have been inspected. Flaws were found in several welds. Most were repaired with either structual or leak barrier overlays. Those not yet repaired have been approved for temporary service. In addition, HWC has been effectively implemented, according to Commonwealth Edison, with the result that stability of the welds has been achieved.

2.4 Current Plans for Mitigating Actions

The CE Submittals do not list any specific plans for future mitigating actions. They do, however, indicate the following general plans:

(1) Additional stress improvement treatments are being considered, although no detailed information on future stress improvement is presently available.

(2) Weld overlays will be used as needed.

(3) System removal is being considered. A potential candidate is the CRD Return line.

2.4.1 Evaluation of Conformance to Staff Positions and Recommendation

Since extensive mitigating actions have already been applied at Dresden 2 and since the use of Hydrogen Water Chemistry will be continued, Commonwealth Edison's current plan concerning mitigating treatments are reasonable. Therefore, acceptance or Commonwealth Edison's plan is recommended.

2.5 Plans for Future Inspections

Commonwealth Edison No. 1 states that an augmented inspection program was developed and scheduled to begin during the 1988 refueling outage. The inspections conducted in the 1988 refueling outage, as outlined in Commonwealth Edison Submittal No. 4 and summarized in Table 4, confirms that the inspection program has been implemented.

2.5.1 Summary of Inspection Schedule

CE Submittal No. 1 requests a 50% reduction in the inspection schedule (compared to the schedule specified in Generic Letter 88-01) for welds in IGSCC Categories B, C, D, and E. The schedule that Commonwealth Edison followed in 1988 did not reflect such a reduction, but the request is reflected in summary of plans for future inspections in CE Submittal No. 3 (summaries of the 1990 to 1994 schdules are shown in Table 5 of this report). It should be noted that Commonwealth did not submit detailed, weld-by-weld inspection plans, although such a list was requested in the RAI. In addition, even their summary is not current because it does not reflect the changes in the IGSCC Classifications due to the mitigating treatments applied during the 1988 refueling outage.

Commonwealth Edison's request for a 50% reduction of the number of inspections of certain welds is based on credit for HWC (Hydrogen Water Chemistry). The number of IGSCC Category D, F, and G welds that benefit, as reported in CE Submittal No. 1 are shown in Table 6. CE Submittal No. 4 updates that list, but since their inspection plans are not current, the updated version is not included in this report. Note that no reductions are proposed for IGSCC Category F or IGSCC Category G, but these categories are included in

Table 5

Summary of Inspection Schedule for Dresden 2
for the 1990, 1992, and 1994 Refueling Outage[a]

IGSCC Categ.	No. in Categ.	No. Sched. for Insp. 1990	1992	1994	Required by Generic Letter 88-01
A	48	2	2	2	25% every 10 years (at least 12% in 6 years)
B	0	-	-	-	50% every 10 years (at least 25% in 6 years)
C	0	-	-	-	All within the next 2 refueling cycles, then all every 10 years (at 50 % in 6 years)
D	209	52	52	52	All every 2 refueling cycles
E	9	2	2	2	50% next refueling cycle, then all every 2 refueling cycles
F	4	4	4	4	All every refueling outage
G[b]	4	0	0	0	All next refueling cycle

(a) The number of welds in each IGSCC Category do not reflect the mitigating treatments applied during the 1988 inspections, but they do reflect inspections during that outage.

(b) The four IGSCC Category G welds shown in this table are inaccessible for inspection.

Table 6

Effect of Hydrogen Water Treatment on Welds in Dresden 2[(a)]

System	Dia. Inches	No. of Welds of Indicated IGSCC Category that do and do not Benefit from HWC							
		Categ. D		Categ. F		Categ. G-1		Categ. G-2	
		yes	no	yes	no	yes	no	yes	no
Recirulation									
Outlets	28	9	0	2	0	7	0	11	0
Noz-SE	28	1	0	0	0	1	0	0	0
Header	22	7	0	0	0	2	0	3	0
Risers	12	19	0	2	0	12	0	0	0
Noz-SE	12	2	0	0	2	8	0	0	0
Bypass	4	4	0	0	4	12	0	3	0
RHR									
LPCI	16	0	11	0	0	6	1	4	3
SDC	16	5	0	0	0	1	0	0	0
Isolation Condenser									
Supply	14	0	11	0	0	0	5	0	9
	12	0	2	0	0	0	0	0	11
Return	12	3	7	0	0	1	1	0	0
Jet Pump Inst.	12, 8, 4	5	0	0	0	5	0	0	0
RWCU	8	7	0	0	0	1	0	0	0
ad Vent	4	0	1	0	0	0	2	0	0
	6	4	0	0	0	2	0	0	0
Totals		66	32	4	0	58	9	21	23

(a) Welds that only partially benefit from HWC are included with those that do not benefit.

G-1 indicates IGSCC Category G welds that were inspected in 1983/84.

G-2 indicates IGSCC Category G welds that were inspected prior to 1983.

Although not included in the above table, Dresden 2 has four IGSCC Category G-3 welds (IGSCC Category G welds that are not accessible for inspection). Two of these welds receive benefit from HWC.

Table 6 for completeness. Also, Table 5 reflects reclassifications of the IGSCC Category G welds because of 1988 inspections of those welds. Also, note that reduced inspections are proposed for IGSCC Category E welds which benefit from HWC according to CE Submittal No. 4 but not according to CE Submittal No. 1 (the basis of Table 6).

2.5.2 Inaccessible Welds

Four IGSCC Category G welds at Dresden 2 are inaccessible for Ultrasonic Inspection (UT). These include:

Two branch pipe connections (one on the Isolation Condenser Condensate Return piping and one on the Reactor Water Clean up suction piping) which should receive the full benefit of HWC. These welds are reinforced by reinforcement saddles which strengthen the joints and reduce the stresses on the welds, but the saddles preclude the UT. Visual inspections are planned.

Two welds located inside the containment penetration assemblies (one on the Isolation Condenser Condensate Return piping and one on the Isolation Condenser Supply piping). Acoustic emission monitoring at these locations is under investigation.

2.5.3 Methods and Personnel

The augmented inspection program will be conducted using methods and personnel in conformance with the NRC Staff positions as delineated in Letter 88-01.

2.5.4 Sample Expansion

CE Submittal No. 1 states that the Sample Expansion in the augmented inspection program will conform to the NRC Staff position as delineated in Generic Letter 88-01.

2.5.5 Evaluation and Recommendations

Concerning HWC, Generic Letter 88-01 states:

> "Staff criteria for evaluating the effectiveness of water chemistry improvements are under development, and will be available prior to general use of the HWC option. If fully effective HWC is maintained, a factor of two in reduction of inspection frequency may be justified for IGSCC Categories B, C, D, and E weldments."

Since the NRC Staff must make the determination of whether or not fully effective HWC is being maintained at Dresden 2, approval for the proposed reduction of inspection frequencies must await the NRC Staff determination. Meanwhile, until that determination is made, the following recommendations are made:

> Tentative rejection of the proposed 50% reduction of required inspections.

> Commonwealth Edison should revise their inspection plans to tentatively reflect the full requirements of Generic Letter 88-01.

Since Commonwealth Edison plans to follow the guidelines of Generic Letter 88-01 concerning inaccessible welds, inspection methods and personnel, and sample expansion,

acceptance of their plans concerning these aspects of their Inservice Inspection (ISI) program is recommended.

2.6 Changes in the Technical Specification Concerning ISI

Commonwealth Edison proposed an alternative position to the NRC Staff position concerning a change to the Technical Specification. This alternative position is discussed in Section 3 of this report.

2.7 Confirmation of Leak Detection in the Technical Specification

Commonwealth Edison plans to revise the Dresden 2 Technical Specification pertaining to leakage to be in conformance with the NRC Staff position with certain exceptions which are discussed in Section 3 of this report.

2.8 Plans for Notification of the NRC of Flaws

CE Submittal No. 1 states:

"The Nuclear Regulatory Commission will be notified of the following conditions identified during the course of examinaiton in accordance with Generic Letter 88-01: (1) Flaw indications exceeding the acceptance criteria of applicable Section XI, Subsection IWB-3500. (2) Change found in the condition of the welds previously known to have flaw indications. (3) The evaluation by the CECo Engineering Department for the above conditions for continued operation and/or the necessary corrective action to be taken."

"Notification will be made by the CECo Nuclear Licensing

Department to the appropriate NRR project manager

2.8.1 Evaluation and Recommendation

Commonwealth Edison's position complies with the NRC Staff position, so acceptance of their position is recommended.

3. ALTERNATIVE POSITIONS AND EXCEPTIONS

3.1 Alternative Position Concerning ISI in the Technical Specification

3.1.1 Commonwealth Edison's Position

CE Submittal No. 1 states that since the Station is currently reviewing and revising the Technical Specifications under the Dresden Station Improvement Program - Technical Specification Action Plan, that a statement insuring compliance with the ISI provisions of Generic Letter 88-01 will be included in the Dresden 2 ISI program.

3.1.2 Evaluation and Recommendation

Generic Letter 88-01 discloses that the Inservice Inspection and Testing Sections may be removed from the Technical Specifications (TS) and included in the ISI Program in the future. Despite this consideration, the NRC Staff included a requirement in Generic Letter 88-01 to change the TS to include a statement that the on ISI program will conform with the NRC Staff position on inspection. Thus rejection of the Commonwealth Edison position is recommended, and the Technical Specification for Dresden 2 should be changed to include the required statement on ISI.

3.2 Exceptions Concerning Leak Detection

3.2.1 Commonwealth Edison's Position

The following exceptions to the NRC Staff positions concerning leakage detection are stated in CE Submittal No. 1 pertaining to Dresden 2. They noted that these exceptions are needed to avoid unnecessary plant modifications or unnecessary restrictive plant operating conditions.

(1) "Individual identified leakage is not flow-metered, but all identified leakage is collected and conducted to a separate collection system from unidentified leakage. Total identified leakage is monitored via the drywell equipment drain sump pump discharge flow totalizer meter."

(2) "Sump operability is defined by the station as the ability to measure reactor coolant leakage rather than strictly depending on the operability of a leakage measurement instrument. Since only one channel exists for unidentified leakage monitoring, strict compliance with the staff positions will not occur."

(3) "The increase in unidentified leakage shall be 2 gpm over the previous 24 hour average. The 24 hour average will preclude shutdown due to variations in measured coolant leakage between 4 hour intervals."

3.2.2 Evaluation and Recommendation

Although Commonwealth Edison states that sump operability is defined as the ability to measure reactor coolant leakage,

they do not identify any methods of measurement other than a monitoring instrument. Thus, rejection of Provision 2 is recommended, and requirements concerning operability of measurement instruments like those required in Generic Letter 88-01 should be added to the Technical Specification.

Provision 3 is not as restrictive as that required by Generic Letter 88-01; thus, rejection of this provision is also recommended, and the Technical Specification should be changed in line with Generic Letter 88-01 which requires: "Plant shutdown should be initiated for inspection and corrective action when, within any period of 24 hours or less, any leakage detection system indicates an increase in rate of unidentified leakage in excess of 2 gpm or its equivalent."

Provision 1 is reasonable so acceptance of this provision is recommended.

4. CONCLUSIONS AND RECOMMENDATIONS

Concerning the thirteen NRC Staff positions as delineated in Generic Letter 88-01: Commonwealth Edison endorses twelve of the thirteen NRC Staff positions (i.e., those pertaining to materials, processes, water chemistry, weld overlay, partial replacement, stress improvement of cracked weldments, clamping devices, crack evaluation and repair criteria, inspection methods and personnel, inspection schedule, sample expansion, and reporting requirements). They presented exceptions to one of the positions (i.e., that pertaining to leakage detection).

Dresden 2 contains 48 IGSCC Category A welds as the result of piping replacement and piping solution treating. In addition, Dresden 2 contains 101 IGSCC Category B welds (treated with MSIP), 14 IGSCC Category E welds (flawed welds which were repaired with full structural

overlays), 17 IGSCC Category F welds (some with non-standard overlays). Ninety-six non-resistant welds remain, although 90 of these have been inspected, and six (four of which are inaccessible for UT inspections) have not. No specific plans exist for additional mitigating treatments, although additional stress improvement treatments are being considered, weld overlays will be applied as needed, and hydrogen water chemistry has been implemented for several years.

An inservice inspection program (ISI) has been developed for Dresden 2 which complies with the requirements of Generic Letter 88-01 pertaining to schedule, methods and personnel, and plans for reporting flaws, providing that a credit for HWC (allowing a 50% reduction of the number of required inspections of certain welds) is allowed. However, only a summary of the planned schedules for future refueling outages was presented by Commonwealth Edison for Dresden 2, and that summary was not current inasmuch as it did not reflect changes of IGSCC classifications of welds treated with MSIP.

Since guidelines for judging the effectiveness of HWC are not contained in Generic Letter 88-01 or NUREG 0313, Revision 2, the decision of the effectiveness of HWC at Dresden 2 must be judged by the NRC Staff.

Dresden 2 contains six IGSCC Category G welds. Two of these were not scheduled for inspections during the last refueling outage because they were incorrectly classified as IGSCC Category A welds. They will be inspected during the next refueling outage. The other four are inaccessible for UT inspection. Currently, visual monitoring is planned for two and acoustic emission monitoring is planned for the other two.

Commonwealth Edison declined to change the Technical Specification on ISI. Rather they proposed to include such a statement in the Inservice Inspection Program. Such action was specifically rejected in Generic Letter 88-01.

Commonwealth Edison also applied exceptions to the NRC Staff position requesting a change in the Technical Specification for Dresden 2 pertaining to leakage detection because they claim that such a change would impose unnecessarily restrictive plant operating conditions. In particular: (1) They do not flow meter individual identified leakage. (2) They stated that sump operability is defined as the ability to measure reactor coolant (but they did not provide descriptions of alternate leakage measurements methods) rather than stability depending on the operability of a leakage measurement instrument. (3) Plant shut down for excessive unidentified leakage would be based on an increase of 2 gpm over the average of the previous 24 hours rather than over any 24 hour period or less as required by Generic Letter 88-01.

As a result of this technical evaluation, the following recommendations are made.

(1) Acceptance of Commonwealth Edison's classifications of welds as presented in CE Submittal No. 4 (their reply to the Request for Additional Information dated March 1, 1989).

(2) Tentative rejection of Commonwealth Edison's inspection plans, pending a decision by the NRC Staff concerning the effectiveness of hydrogen water treatment at Dresden 2.

(3) Commonwealth Edison should revise its inspection plans to reflect the current IGSCC classifications of welds, and those schedules should reflect the total requirements of Generic Letter 88-01 (rather than applying credit for HWC) until such time as the NRC Staff renders a decision concerning the effectiveness of HWC.

(4) Acceptance of Commonwealth Edison's plan for visual and acoustic emission monitoring of the inaccessible welds.

(5) Rejection of Commonwealth Edison's position concerning changes to the Technical Specification on ISI. Commonwealth Edison should add the required statement to the Technical Specification on ISI.

(6) Rejection of the exception pertaining to plant shut down due to inoperable monitoring instruments, since Commonwealth Edison did not present alternate methods of leakage measurement. Commonwealth Edison should amend their Technical Specification accordingly.

(7) Commonwealth should modify the Technical Specification to reflect requirements of Generic Letter 88-01 concerning an increase of unidentified leakage of 2 gpm as decribed in Sectiok 3.2.2 of this report.

(8) Acceptance of the remaining portions of the Commonwealth Edison Submittals pertaining to Dresden 2.

5. REFERENCES

1. "Technical report on Material Selection and Processing Guidelines for BWR Coolant Pressure Boundary Piping," NUREG 0313, Revision 2, U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, January, 1988.

2. "Investigation and Evaluation of Stress-Corrosion Cracking in Piping of Light Water Reactor Plants," NUREG 0531, U. S. Nuclear Regulatory Commission, February, 1979.

3. "NRC Position on IGSCC in BWR Austenitic Stainless Steel Piping," Generic Letter 88-01, U.S. Nuclear Regulatory Commission, January 25, 1988.

Appendix A

Summary of IGSCC Classification of Welds at Dresden 2

System	Line	Number of Welds of Indicated IGSCC Category A	B	C	D	E	F	G	Total
Recirc.	2-0202A-28"	1		5	5				11
	2-0201A-28"				6		1		7
	2-0202B-28"	1		2	7				10
	2-0201B-28"			3	4				7
	Total	2	0	10	22	0	1	0	35
	2-0201A-22"	4		1	2	1			8
	2-0201 -22"			1	1				2
	2-0201B-22"	4			3		1		8
	Total	8	0	2	6	1	1	0	18
	2-0201C-12"			1	2	1	1		5
	2-0201D-12"			2	1		2		5
	2-0201E-12"				3	1	1		5
	2-0201F-12"			2	1	2			5
	2-0201G-12"			2	1	2			5
	2-0201H-12"			2	1	2			5
	2-0201J-12"			2	1	1	1		5
	2-0201K-12"				4		1		5
	2-0201L-12"			3			2		5
	2-0201M-12"			2	1	2			5
	Total	0	0	16	15	11	8	0	50
	2-0203A-4"	4			9			1	14
	2-0203B-4"	3			10			1	14
	Total	7	0	0	19	0	0	2	28
RHR-LPCI-SDC	2-1506-16"			11	2				13
	2-1519-16"			9	3				12
	2-1001A-16"	1			2				3
	2-1001B-16"	1			4				5
	Total	2	0	20	11	0	0	0	33

Appendix A (continued)

System	Line	Number of Welds of Indicated IGSCC Catetgory A	B	C	D	E	F	G	Total
ISOC	2-1302-14"			21	4			1	26
	Total	0	0	21	4	0	0	1	26
	2-1302A-12"			8					8
	2-1302B-12"			7					7
	2-1303-12"			12				2	14
	Total	0	0	27	0	0	0	2	29
Core Spray	2-1403-10"	3							3
	2-1404-10"	3							3
	Total	6	0	0	0	0	0	0	6
Jet Pump Int	A Loop				5				5
	B Loop			5					5
	Total	0	0	5	5	0	0	0	10
RWCU	2-1201-8"	11			1	2	7	1	22
	2-1202-8"	6							6
	Total	17	0	0	1	2	7	1	28
RPV Head	N18A Noz	2							2
	N18B Noz	2							2
	Head Vent	2			1				3
	Total	6	0	0	1	0	0	0	7
CRD Return	2-0388-4"				6				6
	Total	0	0	0	6	0	0	0	6

Appendix B

Summary of Inspection Schedules at Dresden 2

System	Line	IGSCC Categ	No. of Welds	No. Inspected in 1986	No. Inspected in 1988
Recirc.	2-0202A-28"	A	1	0	0
	2-0201A-28"		0	-	-
	2-0202B-28"		1	0	0
	2-0201B-28"		0	-	-
	Total		2	0	0
	2-0201A-22"	A	4	2	0
	2-0201 -22"		0	-	-
	2-0201B-22"		4	2	0
	Total		8	4	0
	2-0201C-12"	A	0	-	-
	2-0201D-12"		0	-	-
	2-0201E-12"		0	-	-
	2-0201F-12"		0	-	-
	2-0201G-12"		0	-	-
	2-0201H-12"		0	-	-
	2-0201J-12"		0	-	-
	2-0201K-12"		0	-	-
	2-0201L-12"		0	-	-
	2-0201M-12"		0	-	-
	Total		0	-	-
	2-0203A-4"	A	4	0	0
	2-0203B-4"		3	0	0
	Total		7	0	0
RHR-LPCI-SDC	2-1506-16"	A	0	-	-
	2-1519-16"		0	-	-
	2-1001A-16"		1	0	0
	2-1001B-16"		1	0	0
	Total		2	0	0

Appendix B (continued)

System	Line	IGSCC Categ	No. of Welds	No. Inspected in 1986	No. Inspected in 1988
ISCO	2-1302-14"	A	0	-	-
	Total	A	0	-	-
	2-1302A-12"		0	-	-
	2-1302B-12"		0	-	-
	2-1303 -12"		0	-	-
	Total		0	-	-
Core Spray	2-1403 -10"	A	3	0	0
	2-1404 -10"		3	0	0
	Total		6	0	0
Jet Pump Int	A Loop	A	0	-	-
	B Loop		0	-	-
	Total		0	-	-
RWCU	2-1201 -8"	A	11	2	0
	2-1202 -8"		6	1	0
	Total		17	3	0
RPV Head	N18A Noz	A	2	1	1
	N18B Noz		2	1	1
	Head Vent		2	1	1
	Total		6	3	3
CRD Return	2-0388 -4"	A	0	-	-
	Total		0	-	-

Appendix B (continued)

System	Line	IGSCC Categ	No. of Welds	No. Inspected in 1986	No. Inspected in 1988
Recirc.	2-0202A-28"	C	5	0	5
	2-0201A-28"		0	-	-
	2-0202B-28"		2	0	2
	2-0201B-28"		3	-	3
	Total		10	0	10
	2-0201A-22"	C	1	0	1
	2-0201 -22"		1	0	1
	2-0201B-22"		0	-	-
	Total		2	0	2
	2-0201C-12"	C	1	0	1
	2-0201D-12"		2	0	2
	2-0201E-12"		0	-	-
	2-0201F-12"		2	0	2
	2-0201G-12"		2	0	2
	2-0201H-12"		2	0	2
	2-0201J-12"		2	0	2
	2-0201K-12"		0	0	-
	2-0201L-12"		3	0	3
	2-0201M-12"		2	0	2
	Total		16	0	16
	2-0203A-4"	C	0	-	-
	2-0203B-4"		0	-	-
	Total		0	-	-
RHR-LPCI-SDC	2-1506-16"	C	11	7	11
	2-1519-16"		9	2	9
	2-1001A-16"		0	-	-
	2-1001B-16"		0	-	-
	Total		20	9	20

Appendix B (continued)

System	Line	IGSCC Categ	No. of Welds	No. Inspected in 1986	No. Inspected in 1988
ISCO	2-1302-14"	C	21	9	21
	Total		21	9	21
	2-1302A-12"	C	8	2	8
	2-1302B-12"		7	0	7
	2-1303 -12"		12	10	12
	Total		27	12	27
Core Spray	2-1403 -10"	C	0	-	-
	2-1404 -10"		0	-	-
	Total		0	-	-
Jet Pump Int	A Loop	C	0	-	-
	B Loop		5	0	5
	Total		5	0	5
RWCU	2-1201 -8"	C	0	-	-
	2-1202 -8"		0	-	-
	Total		0	-	-
RPV Head	N18A Noz	C	0	-	-
	N18B Noz		0	-	-
	Head Vent		0	-	-
	Total		0	-	-
CRD Return	2-0388 -4"	C	0	-	-
	Total		0	-	-

Appendix B (continued)

System	Line	IGSCC Categ	No. of Welds	No. Inspected in 1986	No. Inspected in 1988
Recirc.	2-0202A-28"	D	5	2	3
	2-0201A-28"		6	6	0
	2-0202B-28"		7	4	4
	2-0201B-28"		4	0	4
	Total		22	12	11
	2-0201A-22"	D	2	2	0
	2-0201 -22"		1	0	1
	2-0201B-22"		3	3	0
	Total		6	5	1
	2-0201C-12"	D	2	2	2
	2-0201D-12"		1	1	1
	2-0201E-12"		3	1	3
	2-0201F-12"		1	1	1
	2-0201G-12"		1	1	1
	2-0201H-12"		1	1	1
	2-0201J-12"		1	1	1
	2-0201K-12"		4	4	4
	2-0201L-12"		0	-	-
	2-0201M-12"		1	1	1
	Total		15	13	15
	2-0203A-4"	D	9	2	8
	2-0203B-4"		10	2	8
	Total		19	4	16
RHR-LPCI-SDC	2-1506-16"	D	2	2	2
	2-1519-16"		3	0	3
	2-1001A-16"		2	2	0
	2-1001B-16"		4	3	1
	Total		11	7	6

Appendix B (continued)

System	Line	IGSCC Categ	No. of Welds	No. Inspected in 1986	No. Inspected in 1988
ISCO	2-1302-14"	D	4	2	4
	Total		4	2	4
	2-1302A-12"	D	0	-	-
	2-1302B-12"		0	-	-
	2-1303 -12"		0	-	-
	Total		0	-	-
Core Spray	2-1403 -10"	D	0	-	-
	2-1404 -10"		0	-	-
	Total		0	-	-
Jet Pump Int	A Loop	D	5	5	0
	B Loop		0	-	-
	Total		5	5	0
RWCU	2-1201 -8"	D	1	1	1
	2-1202 -8"		0	-	-
	Total		1	1	1
RPV Head	N18A Noz	D	0	-	-
	N18B Noz		0	-	-
	Head Vent		1	0	1
	Total		1	0	1
CRD Return	2-0388 -4"	D	6	4	2
	Total		6	4	2

Appendix B (continued)

System	Line	IGSCC Categ	No. of Welds	No. Inspected in 1986	No. Inspected in 1988
Recirc.	2-0202A-28"	E	0	-	-
	2-0201A-28"		0	-	-
	2-0202B-28"		0	-	-
	2-0201B-28"		0	-	-
	Total		0	-	-
	2-0201A-22"	E	1	1	1
	2-0201 -22"		0	-	-
	2-0201B-22"		0	-	-
	Total		1	1	1
	2-0201C-12"	E	1	1	1
	2-0201D-12"		0	-	-
	2-0201E-12"		1	1	1
	2-0201F-12"		2	1	2
	2-0201G-12"		2	0	2
	2-0201H-12"		2	2	2
	2-0201J-12"		1	1	1
	2-0201K-12"		0	-	-
	2-0201L-12"		0	-	-
	2-0201M-12"		2	1	2
	Total		11	7	11
	2-0203A-4"	E	0	-	-
	2-0203B-4"		0	-	-
	Total		0	-	-
RHR-LPCI-SDC	2-1506-16"	E	0	-	-
	2-1519-16"		0	-	-
	2-1001A-16"		0	-	-
	2-1001B-16"		0	-	-
	Total		0	-	-

Appendix B (continued)

System	Line	IGSCC Categ	No. of Welds	No. Inspected in 1986	[illegible]
ISCO	2-1302-14"	E	0	-	-
	Total		0	-	-
	2-1302A-12"	E	0	-	-
	2-1302B-12"		0	-	-
	2-1303 -12"		0	-	-
	Total		0	-	-
Core Spray	2-1403 -10"	E	0	-	-
	2-1404 -10"		0	-	-
	Total		0	-	-
Jet Pump Int	A Loop	E	0	-	-
	B Loop		0	-	-
	Total		0	-	-
RWCU	2-1201 -8"	E	2	2	2
	2-1202 -8"		0	-	-
	Total		2	2	2
RPV Head	N18A Noz	E	0	-	-
	N18B Noz		0	-	-
	Head Vent		0	-	-
	Total		0	-	-
CRD Return	2-0388 -4"	E	0	-	-
	Total		0	-	-

Appendix B (continued)

System	Line	IGSCC Categ	No. of Welds	No. Inspected in 1986	No. Inspected in 1988
Recirc.	2-0202A-28"	F	0	-	-
	2-0201A-28"		1	1	1
	2-0202B-28"		0	-	-
	2-0201B-28"		0	-	-
	Total		1	1	1
	2-0201A-22"	F	0	-	-
	2-0201 -22"		0	-	-
	2-0201B-22"		1	0	1
	Total		1	0	1
	2-0201C-12"	F	1	1	1
	2-0201D-12"		2	2	2
	2-0201E-12"		1	1	1
	2-0201F-12"		0	-	-
	2-0201G-12"		0	-	-
	2-0201H-12"		0	-	-
	2-0201J-12"		1	1	1
	2-0201K-12"		1	1	1
	2-0201L-12"		2	1	2
	2-0201M-12"		0	-	-
	Total		8	6	8
	2-0203A-4"	F	0	-	-
	2-0203B-4"		0	-	-
	Total		0	-	-
RHR-LPCI-SDC	2-1506-16"	F	0	-	-
	2-1519-16"		0	-	-
	2-1001A-16"		0	-	-
	2-1001B-16"		0	-	-
	Total		0	-	-

Appendix B (continued)

System	Line	IGSCC Categ	No. of Welds	No. Inspected in 1986	No. Inspected in 1988
ISCO	2-1302-14"	F	0	-	-
	Total		0	-	-
	2-1302A-12"	F	0	-	-
	2-1302B-12"		0	-	-
	2-1303 -12"		0	-	-
	Total		0	-	-
Core Spray	2-1403 -10"	F	0	-	-
	2-1404 -10"		0	-	-
	Total		0	-	-
Jet Pump Int	A Loop	F	0	-	-
	B Loop		0	-	-
	Total		0	-	-
RWCU	2-1201 -8"	F	7	7	/
	2-1202 -8"		0	-	-
	Total		7	7	7
RPV Head	N18A Noz	F	0	-	-
	N18B Noz		0	-	-
	Head Vent		0	-	-
	Total		0	-	-
CRD Return	2-0388 -4"	F	0	-	-
	Total		0	-	-

Appendix C

Summary of Inspection Schedules at Dresden 2

System	Diameter Inch	IGSCC Categ	No. of Welds	No. Inspected in 1986	No. Inspected in 1988
Recirc.	28	A	2	0	0
	22	A	8	4	0
	?	A	0	-	-
	4	A	7	0	0
RHR-LPCI-SDC	16	A	2	0	0
ISCO	14	A	0	-	-
	12		0	-	-
Core Spray	10	A	6	0	0
Jet Pump Int	-	A	0	-	-
RWCU	8	A	17	3	0
RPV Head	-	A	6	3	3
CRD Return	4	A	0	-	-
Total			48	10	3

Appendix C (continued)

System	Diameter Inch	IGSCC Categ	No. of Welds	No. Inspected in 1986	No. Inspected in 1988
Recirc.	28	C	10	0	10
	22	C	2	0	2
	12	C	16	0	16
	4	C	0	-	-
RHR-LPCI-SDC	16	C	20	9	20
ISCO	14	C	21	9	21
	12		27	12	27
Core Spray	10	C	0	-	-
Jet Pump Int	-	C	5	0	5
RWCU	8	C	0	-	-
RPV Head	-	C	0	-	-
CRD Return	4	C	0	-	-
Total			101	28	101

Appendix C (continued)

System	Diameter Inch	IGSCC Categ	No. of Welds	No. Inspected in 1986	No. Inspected in 1988
Recirc.	28	D	22	12	11
	22	D	6	5	2
	12	D	15	13	15
	4	D	19	4	16
RHR-LPCI-SDC	16	D	11	7	6
ISCO	14	D	4	2	4
	12		0	-	-
Core Spray	10	D	0	-	-
Jet Pump Int	-	D	5	5	0
RWCU	8	D	1	1	1
RPV Head	-	D	1	0	1
CRD Return	4	D	6	4	2
Total			90	43	50

Appendix C (continued)

System	Diameter Inch	IGSCC Categ	No. of Welds	No. Inspected in 1986	No. Inspected in 1988
Recirc.	28	E	0	-	-
	22	E	1	1	1
	12	E	11	7	11
	4	E	0	-	-
RHR-LPCI-SDC	16	E	0	-	-
ISCO	14	E	0	-	-
	12		0	-	-
Core Spray	10	E	0	-	-
Jet Pump Int	-	E	0	-	-
RWCU	8	E	2	2	2
RPV Head	-	E	0	0	-
CRD Return	4	E	0	-	-
Total			15	10	15

Appendix C (continued)

System	Diameter Inch	IGSCC Categ	No. of Welds	No. Inspected in 1986	No. Inspected in 1988
Recirc.	28	F	1	1	1
	22	F	1	0	1
	12	F	8	6	8
	4	F	0	-	-
RHR-LPCI-SDC	16	F	0	-	-
ISCO	14	F	0	-	-
	12		0	-	-
Core Spray	10	F	0	-	-
Jet Pump Int	-	F	0	-	-
RWCU	8	F	7	7	7
RPV Head	-	F	0	-	-
CRD Return	4	F	0	-	-
Total			17	14	17