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TECHNICAL EVALUATION REPORT ON  
RESPONSE FROM  
COMMONWEALTH EDISON  
TO GENERIC LETTER 38-01  
PERTAINING TO THE  
IASALLE COUNTY STATION, UNIT 2

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prepared by

Robert C. Bates  
Armand Lakner

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Viking Systems International  
2070 Wm. Pitt Way  
Pittsburgh, PA

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## ABSTRACT

This report contains an evaluation of the licensee (Commonwealth Edison) submittal for LaSalle County 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 alternatives to portions of 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 LaSalle County 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, although a provision was applied to one of those twelve (that on Crack Evaluation and Repair Criteria). They proposed alternatives to portions of the NRC position on leakage detection.

Extensive mitigating actions have been performed at LaSalle 2 resulting in 50 IGSCC Category A welds, 137 IGSCC Category B welds, and 8 IGSCC Category C welds. No IGSCC Category D, E, F, or G welds exist. Future plans include implementation of Hydrogen Water Treatment and performance of weld repairs as needed.

An ISI program proposed for LaSalle 2 conforms with the NRC Staff positions on inspection schedule, methods and personnel, and sample expansion. Specific welds to be inspected during the next two refueling outages were identified.

Generic Letter 88-01 requested a change to the Technical Specification (TS) to include a statement that the ISI program will conform with the NRC Staff position. Commonwealth Edison proposed including such a statement in the ISI Program rather than in the TS.



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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 LaSalle County Station, Unit 2 (hereafter called LaSalle 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 LaSalle 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 LaSalle 2 provided by the Licensee in the following documents:



- (1) "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.
- (2) "LaSalle County Station Units 1 and 2, (Response to) Request for Additional Information, Generic Letter 88-01," Docket Nos. 373/374, Commonwealth Edison, One First National Plaza, Chicago, Illinois 60609, June 30, 1989.

Hereafter, in this report, these documents will be referred to as Commonwealth Edison Submittals No. 1 and No. 2, respectively, and collectively, as the Commonwealth Edison Submittals.

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

Generic Letter 88-01 outlines 13 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. Table 1 of this report, which was constructed from a similar table in Commonwealth Submittal No. 2 and some additional information from Commonwealth Edison Submittal No. 1, shows Commonwealth Edison's positions on the 13 NRC Staff positions.

Note that Commonwealth Edison indicated acceptance of twelve of

Table 1

Summary of CE's Responses to Staff Positions

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

Notes:

(a) Will implement as necessary.

(b) Weld overlay to be reviewed for application to welds with flaws in excess of limits permitted by NUREG 0313, Revision 2. To date, no weld with flaw indications has been found at LaSalle 2.

(c) Accept with provision. See text for discussion.

(d) Commonwealth Edison applied exceptions to the NRC Staff position on this item. See text for discussion.



the thirteen NRC Staff positions and applied exceptions (as discussed later) to the NRC Staff positions pertaining to leakage detection. Concerning Item 8 on Crack Evaluation and Repair Criteria, Commonwealth Edison applied a provision that a favorable stress distribution arising from stress improvement would be taken into account in their calculations.

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

### 2.3.1 Current IGSCC Classifications and Summary of Materials and Mitigating Treatments

Weld-by-weld descriptions were not provided in Commonwealth Edison Submittal No. 1; however it does contain a summary of the IGSCC classifications of the welds which is shown in Table 2a of this report. Weld-by-weld descriptions are contained in Commonwealth Edison Submittal No. 2. Included are the IGSCC classification, weld identification, and mitigating treatment(s) of each weld in each of the various piping systems at LaSalle 2. Since Refueling Outage No. 2 occurred between the time that Commonwealth Edison Submittals No. 1 and No. 2 were prepared (at which time stress improvement was applied to six welds) the numbers of welds in certain IGSCC classifications changed. Table 2b, developed from the weld-by-weld descriptions contained in Commonwealth Edison Submittal No. 2, summarizes the number of welds in each of the various IGSCC classifications on a system-by-system basis after Refueling Outage No. 2. Note that, according to the Commonwealth Edison Submittal No. 2, LaSalle 2 contains a total of 195 welds that are within the scope of Generic Letter 88-01 divided as follows: 50 IGSCC Category A welds, 137 IGSCC Category B welds, and 8 IGSCC Category



Table 2a

Summary of IGSCC Classification of Welds  
(Prior to Refueling Outage No. 2)

System	Diameter Inches	Number of Welds Classified in Indicated IGSCC Category							Total
		A	B	C	D	E	F	G	
Recirculation									
Outlets	24	4	40	0	1	0	0	0	45
Noz-SE	24	0	2	0	0	0	0	0	2
Header	16	8	8	0	0	0	0	0	16
Risers	12	30	20	0	0	0	0	0	50
Noz-SE	12	0	10	0	0	0	0	0	10
Decon	4	6	4	0	0	0	0	2	12
Shutdown Cooling									
SDC, LPCI, LPCS,	20	0	10	0	0	0	0	1	11
HPCS, FW	12	2	23	0	0	0	0	1	26
RCIC, Spare Noz. Rx Clean Up, JPI Head Vent, CRD Cap.	4 & 6	0	20	0	1	0	0	2	23
Totals		50	137	0	2	0	0	6	195

Table 2b

Summary of IGSCC Classification of Welds  
(After Refueling Outage No. 2)

System	Diameter	Number of Welds Classified in Indicated IGSCC Category							Total
	Inches	A	B	C	D	E	F	G	
Recirculation									
Outlets	24	4	40	1	0	0	0	0	45
Noz-SE	24	0	2	0	0	0	0	0	2
Header	16	8	8	0	0	0	0	0	16
Risers	12	30	20	0	0	0	0	0	50
Noz-SE	12	0	10	0	0	0	0	0	10
Decon	4	6	4	2	0	0	0	0	12
Shutdown Cooling									
SDC, LPCI, LPCS,	20	0	10	1	0	0	0	0	11
HPCS, FW	12	2	23	1	0	0	0	0	26
RCIC, Spare Noz.	4 & 6	0	20	3	0	0	0	0	23
Rx Clean Up, JPI									
Head Vent, CRD Cap.									
Totals		50	137	8	0	0	0	0	195

C welds. No IGSCC Category D, E, F or G welds currently exist at LaSalle 2.

The mitigating treatments leading to these classifications are summarized in Table 3, and additional details concerning the mitigating treatments are discussed below.

### 2.3.2 Design and Construction Changes

Commonwealth Edison Submittal No. 1 states that initial

Table 3

#### Materials and Mitigating Treatments at LaSalle 2

IGSCC Categ	Materials			No. of Welds with Indicated Materials	No. of Weld with Indicated Treatment		
	1st Comp.	2nd Comp.	Weld		SHT	IHSI	MSIP
A	Conforming 304 SS	Conforming 304 SS	Conforming 308 SS	18	18	0	0
A	Conforming 316L SS	Conforming 316L SS	Conforming 316L SS	32	0	0	0
B	Non- Conforming	Non- Conforming	Non- Conforming	137	0	92	45
C	Non- Conforming	Non- Conforming	Non- Conforming	8	0	0	8



designs were revised to reduce the amount of IGSCC susceptible stainless steel piping. Construction practices were also changed to make the material less sensitive to IGSCC. The specific changes were not disclosed, but it is presumed that it included the use of corrosion resistant material (per NUREG 0313, Revision 2) and/or solution heat treating the 50 IGSCC Category A welds.

There is some confusion concerning the materials in 18 of the welds that are classified as IGSCC Category A. For each of these welds, Commonwealth Edison Submittal No. 2 contains the following statements under the heading "Materials", in the weld-by-weld listing of materials:

First Component: Conforming 304 S/S.

Second Component: Conforming 304 S/S.

Weld: Conforming 308 S/S.

The meaning of these statements is not clear. Types 304 stainless steel and 308 stainless steel, according to NUREG 0313, Revision 2, are not conforming materials. Commonwealth Edison may, however, used the word "conforming" in conjunction with the material type, perhaps implying that the materials used were actually Types 304L stainless steel and 308L stainless steel. In any event, the IGSCC Category A welds are correctly classified since they were solution heat treated.

The remaining 32 IGSCC Category A welds contain Type 316L stainless steel which is conforming material per NUREG 0313, Revision 2.

### 2.3.3 Stress Improvement

Note that all of the IGSCC Category B and IGSCC Category C welds (a total of 145 welds) contain non-conforming materials. Stress Improvement (SI) treatments, including both Induction Heating Stress Improvement (IHSI) and the Mechanical Stress Improvement Process (MSIP), were applied to all of those welds, and all SI treatments were followed with inspections performed by personnel from the Electric Power Research Institute (EPRI). The majority of the welds treated with SI (137 of a total of 145) were treated within two years of commercial operation so those welds are classified as IGSCC Category B. The other eight SI-treated welds are classified as IGSCC Category C since the SI treatments were applied after more than two years of commercial operation. It may be noted by comparison of Tables 2a and 2b that six of the IGSCC Category C welds were stress improved during Refueling Outage No. 2.

### 2.3.4 Previous Inspection Programs

LaSalle 2 has had two refueling outages with the following starting dates:

<u>Refueling Outage</u>	<u>Starting Date</u>
No. 1	01/87
No. 2	10/88

Commonwealth Edison Submittal No. 2 contains a weld-by-weld listing of inspection schedules and inspection results performed during those refueling outages. These schedules are summarized in Table 4. No IGSCC Category A welds were inspected during those outages, but about 75 % of the IGSCC Category B welds and all of the IGSCC Category C welds were



Table 4

## Summary of Inspection Schedules for LaSalle 2

IGSCC Categ.	No. in Categ.	No. Inspected/Scheduled During Indicated R.O.				Required by Generic Letter 88-01
		Past		Future		
		01	02	03	04	
A	50	0	0	4 (8%)	7 (14%)	25% every 10 years (at least 12% in 6 years)
B	137	64 <sup>a</sup> (47%)	19 <sup>b</sup> (14%)	16 <sup>b</sup> (12%)	0	50% every 10 years (at least 25% in 6 years)
C	8	2 (25%)	7 (88%)	3 (38%)	8 (100%)	All within the next 2 refueling cycles, then all every 10 years (at 50 % in 6 years)
D	0	-	-	-	-	All every 2 refueling cycles
E	0	-	-	-	-	50% next refueling cycle, then all every 2 refueling cycles
F	0	-	-	-	-	All every refueling outage
G	0	-	-	-	-	All next refueling cycle

## Note:

- a One of these inspections was conducted only on the I. D. surface.
- b Eight of the IGSCC Category B welds were inspected during both RF#1 and RF#2. Two of the welds scheduled for inspection during RF#3 were inspected during RF#1 and/or RF#2.

Dates for Refueling Outages are:

<u>R.O. No.</u>	<u>Beginning Date</u>	<u>R.O. No.</u>	<u>Beginning Date</u>
01	01/87	03	03/90
02	10/88	04	01/92



inspected during either Refueling Outage No. 1 or Refueling Outage No. 2 or both. Some of the inspections listed in Table 4 may have been the post-SI inspections (recall from the preceding section that all SI-treated welds received post-treatment inspections), but that was not disclosed in the Commonwealth Edison Submittals.

No IGSCC has been found during inspections, although base-metal spot indications were found in two of the welds (No. RR-2002-01A, classified as IGSCC Category B and No. RT 2003-24, classified as IGSCC Category C). Both are considered acceptable for service.

#### 2.3.5 Evaluation of Previous Mitigating Actions and Inspections

Extensive actions (following guidelines provided in Generic Letter 88-01 and NUREG 0313, Revision 2) have been taken at LaSalle 2 to mitigate IGSCC including design and construction changes and stress improvement. The result is that all welds at LaSalle 2 that are within the scope of Generic Letter 88-01 contain corrosion resistant materials and/or have been treated with either solution heat treating or stress improvement, and all welds at LaSalle 2 have been correctly classified as either IGSCC Category A, B, or C. Although some confusion exists concerning whether some of the IGSCC Category A welds contain resistant material (per NUREG 0313, Revision 2), these welds are properly classified since they were solution heat treated. Post-SI inspections were performed on all SI-treated welds by EPRI personnel, so NRC Staff requirements that post-SI inspections must be performed in order to qualify the welds for classifications of IGSCC Category B or C have been satisfied.

## 2.4 Current Plans for Mitigating Actions

### 2.4.1 Summary of Plans

Commonwealth Edison's plans for future mitigating actions for LaSalle 2 consist of (1) evaluation of Hydrogen Water Treatment as a long term mitigation scheme to provide additional protection for IGSCC susceptible welds, and (2) application of weld overlay repairs as needed. Concerning the latter, Commonwealth Edison Submittal No. 1 states:

"Weld Overlay has been reviewed for application to welds that have flaw indications in excess of the limits permitted by NUREG 0313, Revision 2. To date, no flaw indications of a magnitude requiring an overlay reinforcement have been found at LaSalle Unit 2."

### 2.4.2 Evaluation of Conformance to Staff Positions and Recommendation

Since: (1) extensive mitigating actions have already been applied so that all welds at LaSalle 2 are either IGSCC Category A, B, and C welds; (2) Hydrogen Water Chemistry, if it is implemented, will further reduce the possibility of IGSCC at LaSalle 2; and (3) welds will be overlay repaired as needed, Commonwealth Edison's previous actions and current plans concerning mitigating treatments follow the guidelines of Generic Letter 88-01 and NUREG 0313, Revision 2. Therefore, acceptance of those plans is recommended.

## 2.5 Plans for Future Inspections

Commonwealth Edison Submittal No. 1 states that an augmented ISI



program will be conducted at LaSalle 2 beginning in 1988 (Refueling Outage No. 2) as outlined below.

#### 2.5.1 Summary of Inspection Schedule

Commonwealth Edison Submittal No. 1 states the following concerning inspection schedules:

"Beginning with the next refueling outage for LaSalle Unit 2 (December 1989), ASME Code class 1, 2 and 3 piping made of stainless steel that is four (04) inches or larger in nominal diameter and contains reactor coolant at a temperature above 200°F during power operation will be subjected to an augmented inspection program. This augmented inspection program will conform to the NRC staff positions on schedules, methods and personnel, and sample expansion delineated in Generic Letter 88-01."

Commonwealth Edison Submittal No. 1 also states that the number of welds to be inspected is not evenly distributed to each outage.

Commonwealth Edison Submittal No. 2 contains inspection plans for LaSalle 2 on a weld-by-weld basis for the next two refueling outages (Refueling Outages No. 3 and No. 4 scheduled to begin in 3/90 and 1/92, respectively). A summary of these schedules, showing the number of welds in each of the various IGSCC Category scheduled for inspection during each of the next two refueling outages, is shown in Table 4 of this report along with the requirements for inspection schedules as delineated in Generic Letter 88-01 and NUREG 0313, Revision 2. Recall (from Section 2.3.4) that this table also contains similar inspection schedules for the two previous refueling outages including inspection during Refueling Outage No.



2 which was the outage referred to in Commonwealth Edison Submittal No. 1 as the initial inspection of their augmented ISI program.

Note that Commonwealth Edison's plans for inspection schedules for all welds at LaSalle 2 that are within the scope of Generic Letter 88-01 comply with the NRC Staff guidelines provided in Generic Letter 88-01.

#### 2.5.2 Methods and Personnel

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

#### 2.5.3 Sample Expansion

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

#### 2.5.4 Evaluation and Recommendations

Commonwealth Edison's position and plans concerning inspection schedules, methods and personnel, and sample expansion comply with the NRC positions on those items as delineated in NUREG 0313, Revision 2 and Generic Letter 88-01. Thus, acceptance of Commonwealth Edison's plans 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 Leakage Detection in the Technical Specification

Portions of Commonwealth Edison's position on leakage detection conform with the NRC Staff position, but Commonwealth Edison offered alternative positions concerning other portions. Thus, discussion of leakage detection is deferred to Section 3, "Alternative Positions and Exceptions."

## 2.8 Plans for Notification of the NRC of Flaws

### 2.8.1 Summary of Position

Commonwealth Edison Submittal No. 1 states that the NRC will be notified (in accordance with Generic Letter 88-01) of the following conditions:

"Flaw indications exceeding the acceptance criteria of applicable Section XI, Subsection IWB-3500."

"Change found in the condition of the welds previously known to have flaw indications."

"The evaluation by the CECO Nuclear Department for the above conditions for continued operation and/or the necessary corrective action to be taken."

### 2.8.2 Evaluation and Recommendation

Commonwealth Edison plans to comply with the NRC Staff position, so it is recommended that the plans for reporting of flaws should be accepted.

In addition, as indicated in Section 2.2 of this report, Commonwealth Edison applied a provision to its endorsement of the NRC Staff position concerning Crack Characterization and Repair Criteria. The provision applied is that a favorable stress distribution arising from stress improvement would be taken into account in their calculations. This is an acceptable approach, so acceptance of this provision is recommended.

## 3. ALTERNATIVE POSITIONS

### 3.1 Alternative Position Concerning ISI in the Technical Specification

#### 3.1.1 Commonwealth Edison's Position

It is the position of the Commonwealth Edison that it is not appropriate to change the Technical Specifications to include statements in the section on ISI that inservice inspection programs for piping will be in conformance with the staff positions on schedule, methods and personnel. Rather, it is more appropriate to pursue changes to the station's Inservice Inspection Program to include statements indicating conformance to Generic Letter 88-01. Their reasons are quoted below from the Commonwealth Edison Submittal.

(1) "The amendment would unnecessarily clutter the



technical specifications with information not appropriate for immediate operator reference."

- (2) "The amendment does not meet the screening criteria for determining which regulatory requirements and operating restrictions should be retained in the standard technical specifications and ultimately in the plant technical specifications, as given in the Interim Policy Statement on Technical Specification Improvements, 52FR3788, February 6, 1987."
- (3) "As the industry and the NRC gain more insight into the causes of, and methods for prevention of IGSCC, the requirements in this area will be changing. Therefore, addition of a reference to the generic letter in the technical specifications would require that the technical specifications be updated as the requirements in this area evolve."

### 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 and included in the Inservice Inspection Program in the future (as proposed by Commonwealth Edison). Despite this consideration, the NRC Staff, specifically included a requirement in Generic Letter 88-01 to change the Technical Specification to include a statement that the section on ISI will conform with the NRC Staff position on schedule, methods and personnel, and sample expansion. Thus, rejection of the Commonwealth Edison position is recommended. Commonwealth Edison should change the Technical Specification on ISI as required by Generic Letter 88-01.

### 3.2 CE's Position Concerning Leakage Detection

Table 5, constructed from information provided in a similar table in Commonwealth Edison Submittal No. 2, summarizes Commonwealth Edison's position on leakage requirements in the Technical Specification. Note that they indicated acceptance of portions of the requirements outlined in Generic Letter 88-01, stated that two requirements are not applicable, and proposed alternative positions to the remainder of the requirements. They stated in Commonwealth Edison Submittal No. 1 that the alternative positions are needed to avoid unnecessary plant modifications or unnecessary restrictive plant operating conditions. Additional discussion is provided below on each requirement.

#### 3.2.1 Conformance with Regulatory Guide 1.45

Generic Letter 83-01 states that leakage detection systems should be in conformance with Position C of Regulatory Guide 1.45 or as otherwise previously approved by the NRC.

Commonwealth Edison Submittal No. 2 states the following:

"Section 5.2.5 of the LaSalle County Station Safety Evaluation Report (NUREG 0515) provides an outline of the leak detection system. The conclusion reached in the SER was that the system provides reasonable assurance that small leaks across the reactor coolant pressure boundary, can be detected, as required by Criterion 30 of the General Design Criteria and Regulatory Guide 1.45."

Elsewhere in both Commonwealth Edison Submittals, statements are made that the Technical Specifications on leakage detection conform with Regulatory Guide 1.45. See, for example, the statement quoted in Section 2.3.4 of this report



Table 5

## Licensee Positions on Leakage Detection

<u>Position</u>	<u>Already Contained in TS</u>	<u>TS will be Changed to Include</u>	<u>Alternate<sup>(a)</sup> Position Proposed</u>
1. Conforms with Position C of Regulatory Guide 1.45	no	-	yes
2. Plant shutdown should be initiated when:			
(a) within any period of 24 hours or less, an increase is indicated in the rate of unidentified leakage in excess of 2 gpm, or	no	-	yes
(b) the total unidentified leakage attains a rate of 5 gpm.	yes	-	-
3. Leakage monitored at four hour intervals or less.	Not applicable. See text for discussion.		
4. Unidentified leakage includes all except:			
(a) leakage into closed systems, or	-	-	yes
(b) leakage into the containment atmosphere from sources that are located, do not interfere with monitoring systems, or not from throughwall crack.	yes		
5. Provisions for shutdown within 24 hours due to inoperable measurement instruments in plants with Category D, E, F, or G welds.	Not applicable. See text for discussion.		

(a) See text for discussions concerning alternate proposals.



(from Commonwealth Edison Submittal No. 1).

### 3.2.2 CE's Position on Requirements for Unidentified Leakage

Generic Letter 88-01 requires that plant shutdown should be initiated when, within any period of 24 hours or less, any leakage detection system indicates an increase in the rate of unidentified leakage in excess of 2 gpm or its equivalent, or when the total unidentified leakage attains a rate of 5 gpm or equivalent, whichever occurs first. The Commonwealth Edison Submittals state that the Technical Specifications are currently in conformance with the 5 gpm requirement, but pertaining to the requirement concerning an increase in the rate of unidentified leakage in excess of 2 gpm, Commonwealth Edison Submittal No. 1 states:

"The sump fill-up rate is monitored continuously by chart recorder, and an alarm sounds each time the sump pump starts. The sump pump discharge flowmeter totalizer is recorded shiftly, and the leakage rate is determined. LaSalle Unit 2 has only two Category E welds which have been stable over the 2nd cycle. It is the station's opinion that addition of the 2 gpm requirement to their technical specification would not provide a significant increase in the level of plant safety."

### 3.2.3 CE's Position on Frequency of Leakage Monitoring

Generic Letter 88-01 states that for sump level monitoring systems with fixed-measurement-interval methods, the level should be monitored at approximately 4-hour intervals or less. Commonwealth Edison's position on this item is that it is not applicable because they do not use the fixed-measurement-interval method.

#### 3.2.4 CE's Position on Definition of Unidentified Leakage

Generic Letter 82-01, defines unidentified leakage as:

- (a) Leakage into closed systems, such as pump seal or valve packing leaks that are captured, flow metered, and conducted to a sump or collection tank, or
- (b) leakage into the containment atmosphere from sources that are both specifically located and known either not to interfere with the operations of unidentified leakage monitoring systems or not to be from a throughwall crack in the piping within the reactor coolant pressure boundary.

As shown in Table 5, the LaSalle 2 Technical Specification currently conforms with Item (b). The Commonwealth Edison Submittals both contain similar statements pertaining to Item (a). The one quoted below is from Commonwealth Edison Submittal No. 1.

"The technical specification definition for identified/unidentified leakage is in compliance with the definition suggested in the generic letter, except where in paragraph 2a of the staff position, it states that identified leakage which is captured is to be flow metered and conducted to a collection tank. The LaSalle technical specifications do not require this leakage to be flow metered. Strict compliance with this provision might require plant modifications to allow metering of all individual identified leakage paths. Total leakage is monitored via the drywell equipment drain sump pump discharge flow totalizer meter. Readings from this totalizer are taken shiftly and the total identified

leakage is determined from these readings. The sump fill-up rate is monitored continuously on a control room chart recorder. Since the LaSalle technical specifications are currently in compliance with Regulatory Guide 1.45, May, 1973, and the standard technical specifications, the station does not intend to pursue an amendment in this area."

#### 3.2.5 Operability of Leakage Monitoring Instruments

For plants operating with any IGSCC Category D, E, F, or G welds, Generic Letter 88-01 requires that at least one of the leakage measurement instruments associated with each sump shall be operable. It further requires that the outage time for inoperable instruments shall be limited to 24 hours or that shutdown shall be immediately initiated.

Commonwealth Edison stated that this requirement is not applicable since LaSalle 2 does not have any IGSCC Category D, E, F, or G welds.

#### 3.2.6 Evaluation and Recommendation

Some confusion exists concerning whether the Technical Specification on leakage detection conforms with Regulatory Guide 1.45, but in view of their statement (quoted in Section 2.3.4 of this report) that they do conform and since the safety evaluation report states that leaks across the reactor coolant pressure boundary can be detected as required by Regulatory Guide 1.45, acceptance of Commonwealth Edison's position on this item is recommended.



Although Commonwealth Edison's approach to monitoring leakage (as described in Section 3.2.2 of this report) is excellent, they should still add the requested requirement pertaining to an increase in excess of 2 gpm requirement which was included in Generic Letter 88-01 after careful consideration by the NRC Staff concerning the added level of plant safety.

Technically, requirements for frequency of leakage monitoring delineated in Generic Letter 88-01 are not applicable to LaSalle 2 because that plant does not monitor with the fixed-measurement-interval method. Nevertheless it is recommended that leakage should be determined at LaSalle 2 at a comparable frequency (i.e., approximately every four hours or less) using flow measurements.

Commonwealth Edison's position pertaining to the definition of unidentified leakage is in compliance with portion (b) of the definition provided in Generic Letter 88-01. Thus, acceptance of Commonwealth Edison's position on this item is recommended.

Commonwealth Edison's position pertaining to requirements for operability of monitoring instruments is in conformance with the NRC Staff position since they do not have any IGSCC Category D, E, F, or G welds. Thus, acceptance of their position 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), however, they applied the provision that a favorable stress distribution would be considered in applying the method for crack evaluation and repair criteria. They proposed alternative positions to portions of the NRC Staff position on leakage detection.

Commonwealth Edison has applied design and construction changes and stress improvement treatments. As a result, no IGSCC Category D, E, F, or G welds exist at LaSalle 2. All welds within the scope of Generic Letter 88-01 are either IGSCC Category A, B, or C welds. A weld-by-weld list of the IGSCC classifications and mitigating treatments of specific welds was provided, which show that their IGSCC classifications conform with guidelines provided by Generic Letter 88-01. Since all welds have either been replaced or received mitigating treatments (or both), no additional mitigating treatments are planned except to apply repairs (by weld overlay or other approved method) as needed. However, Hydrogen Water Treatment is currently under evaluation as a long term mitigation effort.

Inspection schedules, methods and personnel, and sample expansion will conform with guidelines provided in NUREG 0313, Revision 2 and Generic Letter 88-01, according to statements in the Commonwealth Edison Submittals. Weld-by-weld inspection schedules from previous inspections and plans for the next two refueling outages (numbers 3 and 4) confirm that Commonwealth Edison's planned ISI program conforms with the NRC Staff position on scheduling.

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 stated that leakage detection systems at LaSalle 2 are in conformance with Regulatory Guide 1.45 and that requirements in the Technical Specifications for plant shut down in the event of unidentified leakage in excess of 5 gpm are in conformance with the NRC Staff position.

Commonwealth Edison also stated that they do not use fixed-measurement-interval method for sump level monitoring, implying that they are exempt from the four hour monitoring requirement. They should, however, determine leakage (at approximately four hour intervals or less) using other approaches such as calculations from flow measurements.

Commonwealth Edison's position pertaining to the definition of unidentified leakage is in compliance with portion 2(b) of the definition provided in Generic Letter 88-01.

Requirements for operability of monitoring instruments, applicable to plants operating with IGSCC Category D, E, F, or G welds, is not applicable because no such welds are present in LaSalle 2.

Commonwealth Edison applied an exception (and proposed an alternative position position) to the one of the leakage requirements outlined in Generic Letter 88-01. Specifically, they declined to change the Technical Specification to include a requirement for plant shut down when the increase in unidentified leakage exceeds 2 gpm, claiming that such a requirement would not increase the level of safety. This claim pertaining to safety is in disagreement with considerations by the NRC Staff in the formulation of the Staff position.

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



- (1) Acceptance of Commonwealth Edison's Classification of welds into the various IGSCC categories since they comply with NRC Staff guidelines.
- (2) Acceptance of Commonwealth Edison's plan for mitigating IGSCC since all welds have been replaced or treated (or both) in accordance with NRC Staff guidelines.
- (3) Acceptance of Commonwealth Edison's inspection plans for future inspections.
- (4) Rejection of Commonwealth Edison's position concerning changes to the Technical Specification on ISI. Commonwealth Edison should change the LaSalle 2 Technical Specification on ISI to contain the statement required by Generic Letter 88-01.
- (5) Rejection of the exception pertaining to plant shut when the increase in unidentified leakage exceeds 2 gpm. Commonwealth Edison should add the requirement to the Technical Specification in accordance with guidelines provided in Generic Letter 8801.
- (6) Rejection of Commonwealth Edison's position concerning frequency of sump level monitoring. Commonwealth Edison should add the requirement to the Technical Specification that leakage should be determined at approximately four hour intervals or less.
- (7) Acceptance of the remaining portions of the Commonwealth Edison Submittal.

## 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.