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**FINAL**

TECHNICAL EVALUATION REPORT ON  
RESPONSE FROM THE  
NIAGARA MOHAWK POWER CORPORATION  
TO GENERIC LETTER 88-01  
PERTAINING TO THE  
NINE MILE POINT, UNIT 2

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## ABSTRACT

This report contains an evaluation of the licensee (Niagara Mohawk Power Corporation) submittal for Nine Mile Point, Unit 2 which was submitted in response to the NRC Generic Letter 88-01 in which Niagara Mohawk 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. Niagara Mohawk's plans are evaluated in Section 2 of this report in terms of compliance to NRC Staff positions. Section 3 contains an exception that Niagara Mohawk presented concerning the requirement to limit the increase in unidentified leakage to 2 gpm.

## SUMMARY

The Licensee, Niagara Mohawk Power Corporation, submitted a response to the NRC Generic Letter 88-01. Niagara Mohawk's response pertaining to the austenitic stainless steel piping in Nine Mile Point, 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 and evaluation of such flaws.

Niagara Mohawk endorsed 12 of the 13 NRC Staff positions which are outlined in Generic Letter 88-01, although they applied provisions to those concerning Materials, Inspection Method and Personnel, and Inspection Schedules. They presented an exception to one (concerning leakage detection).

Niagara Mohawk claims that all welds except one contain conforming, IGSCC-resistant materials, and they classified these welds as IGSCC Category A. Actually, most of the welds contain non-resistant materials. No future mitigating treatments are planned.

Niagara Mohawk agreed to submit the required change to the Technical Specification on ISI, implying that they will comply with the NRC Staff position on inspections. Their planned inspection schedules comply with the NRC Staff position for the welds as they have classified them, but they are inadequate for the weld classifications that should pertain.



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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 operation and/or repair plans.

This report contains a technical evaluation of the response which Niagara Mohawk Power Corporation (called either Niagara Mohawk or NM in this report) submitted in response to the NRC Generic Letter 88-01 pertaining to the Nine Mile Point, Unit 2 (hereafter called Nine Mile 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 Niagara Mohawk 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 Nine Mile



2 provided by the Licensee in the following documents.

- (1) "Nine Mile Point, Unit 2, Docket No. 50-410, NPF-69 (Response to Generic Letter 88-01, NRC Position on IGSCC in BWR Austenitic Stainless Steel Piping)," Niagara Mohawk Power Corporation, 301 Plainfield Road, Syracuse, NY 13212, July 28, 1988.
- (2) "Nine Mile Point, Unit 2, Docket No. 50-410, NPF-69, TAC No. 69148 (Response to Request for Additional Information Concerning Generic Letter 88-01)," Niagara Mohawk Power Corporation, 301 Plainfield Road, Syracuse, NY 13212, November 1, 1989.
- (3) "Nine Mile Point, Unit 2, Docket No. 50-410, NPF-69, TAC No. 69148 (Additional Response to Request for Additional Information Concerning Generic Letter 88-01)," Niagara Mohawk Power Corporation, 301 Plainfield Road, Syracuse, NY 13212, December 14, 1989.

Hereafter, in this report, these documents will be referred to as the Niagara Mohawk Submittals No. 1, No. 2, and No. 3, respectively, and collectively as the Niagara Mohawk Submittals.

## 2.2 Review of Niagara Mohawk'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 is patterned after a similar table in Niagara Mohawk Submittal 2, contains a summary of the Niagara Mohawk positions on these items.

Note that Niagara Mohawk indicated that they endorse 12 of the 13 items, although they applied provisions to three of these items. One of the provisions is applied to materials. This provision is discussed in Section 2.3 of this report. The second provision is applied to inspection methods and personnel of inaccessible welds, and the third provision is applied to inspection schedules of certain RWCU welds. The latter two provisions are discussed in Section 2.5 of the report. Niagara Mohawk proposed an alternative position to the NRC Staff position concerning leak detection. This item is discussed in Section 3 of this report.

Also note, that even though Niagara Mohawk indicated an alternative position concerning materials and applied provisions to the NRC Staff position on inspection methods and inspection schedules, they indicated that they have either applied or will consider application of all of the 13 NRC Staff positions in the future.

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

Niagara Mohawk took action in response to Generic Letter 88-01 as described in the following statements in Niagara Mohawk Submittal No. 1:

"NRC Generic Letter 88-01 requires that all austenitic stainless steel piping, four inches or larger nominal diameter and

Table 1

Summary of Niagara Mohawk's Responses to Staff Positions  
Pertaining to Nine Mile 2

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

Notes:

(a) Provision applied. See text for discussion.

(b) Alternative position presented. See text for discussion.



containing reactor coolant at a temperature above 200°F during power operation, be reviewed for the augmented requirements of NUREG 0313, Rev. 2. Systems/components which exceed 200°F for extremely short periods of time (less than one percent of the total design lifetime) were not considered to meet this criteria."

"Stainless steel systems at Unit 2 with a design temperature of 200°F or greater were initially considered for review. Niagara Mohawk's evaluation determined that two systems, Reactor Coolant Recirculation (RCS) and Reactor Water Cleanup (WCS), fell within the scope of Generic Letter 88-01. The two systems were reviewed and each weldment assigned an IGSCC category as directed by the generic letter."

Niagara Mohawk Submittal No. 1 contains the following statement pertaining to the interpretation of the scope of Generic Letter 88-01 and the provision attached to their endorsement of the NRC Staff position on materials:

"Those systems that see greater than 200°F temperature for extremely short periods of time (less than 1% of the total design life of the plant) were not considered as systems which are above 200°F during power operation and consequently not included in the scope of Generic Letter 88-01."

The assignments of IGSCC categories to welds at Nine Mile 2 and their justification for those assignments are discussed in the following sections.

### 2.3.1 Summary IGSCC Classifications of Welds

Niagara Mohawk Submittal No. 1 contains the following statements pertaining to IGSCC classifications of welds at

Nine Mile 2.

"All weldments within the scope of this review were designated as IGSCC Category A with the exception of field weld RCS FW 107. This circumferential weld between resistant piping and a non-resistant cast pump casing was repaired four (4) times. We have designated this weld Category D."

Some welds contain crevices. Normally, such welds are considered non-resistant to IGSCC and should be classified as IGSCC Category G; however, Niagara Mohawk Submittal No. 2 contains the following justification from omitting them from the welds that they considered to be within the scope of Generic Letter 88-01:

"The Commission requested in their June 16, 1989 letter that welds containing crevices be classified as IGSCC Category G, included in the Inservice Inspection Plan and scheduled for inspection during the next refueling outage. Those welds which are not included in the Inspection Plan are socket type welds and are excluded because they are less than 4 inches in diameter. It is Niagara Mohawk's understanding that these welds may be excluded from the scope of Generic Letter 88-01 because they are less than 4 inches in nominal diameter."

It is implied in Niagara Mohawk Submittal No. 1 that most of the welds in the RCS and WCS systems are low carbon austenitic stainless steels materials (i.e., less than 0.035% carbon). Some welds, however, involve higher carbon contents (in the filler metal or base metal). Their reasons for the classification of these welds as IGSCC Category A are presented below.

### 2.3.2 Welds Between Non-resistant Castings and Resistant Piping

Niagara Mohawk Submittal No. 1 contains the following statement:

"NUREG 0313 Rev. 2 provides that welds between non-resistant (i.e., greater than 0.035% carbon) castings and resistant pipe may be considered as Category A if they have not been subjected to extensive repairs that may have changed the residual stress pattern. While the generic letter does not define "extensive" as used in this context, it does state that the basis for this provision is the service experience of such welds, which have proven to be relatively free of IGSCC. Since this experience is based on actual production welds where each "typical" production weld receives several repairs before meeting final acceptance criteria, we consider that welds having three or fewer repairs should be classified as not extensively repaired, and thus, Category A. Records of the number of repairs on these welds show that only one weld to a non-resistant valve body casting was subjected to extensive repairs. Based on the criteria in the generic letter, this was classified a Category D weld. All other welds between the resistant pipe and cast valves and pumps are considered Category A."

### 2.3.3 Repair Welds to Castings and Welds in Appurtenances

Niagara Mohawk Submittal No. 1 contains the following statements:

"Weld filler material with carbon contents greater than 0.035% was used, for the most part, in the fabrication of components ordered in non-low carbon grades such as



the RCS pumps and valves. Repair welds to the castings were subsequently solution annealed and, therefore, are Category A."

"However, appurtenances to the components such as vents and drains did not receive a subsequent solution heat treatment (and may also contain crevices in the form of partial penetration welds) and, therefore, would be classified Category G in accordance with the generic letter. Such welds, however, do not require Inservice Inspection (ISI) under ASME XI, except for a possible visual inspection of the component internal surfaces or a system pressure test and are not considered within the scope of Generic Letter 88-01. Therefore, no change to the ISI Program Plan is needed for these welds."

#### 2.3.4 Field Welds in the RCS with Carbon Between 0.035% and 0.040%

Niagara Mohawk Submittal No. 1 contains the following statement:

"Some filler Metal with carbon contents between 0.035% and 0.04% was also used in field welds in the RCS. There is a discrepancy between the generic letter which only permits up to 0.035% carbon, and ASME II Part CSFA 5.4 which permits the low carbon grades E308L and E316L to contain up to 0.040% carbon. NUREG 0313, Rev. 2 which forms the technical basis for the generic letter, in some cases refers to E308L and similar grades (i.e., no additional restriction on carbon content) as being adequately resistant to sensitization, and in other cases to E308L, E316L and similar grades with a maximum carbon content of 0.035% as being adequately resistant. NUREG 1061, which formulated recommendations later incorporated

into Rev. 2 of NUREG 0313, does not place any requirements on the carbon content of weld filler material other than to confirm the acceptability of E308L (no additional carbon content restrictions) for corrosion-resistant cladding of weld areas in non-resistant piping. Since the duplex structure (austenite plus delta ferrite) is the weld metal's major defense against IGSCC, the carbon limit of the SFA 5.4 material is specific and is adequate, and Niagara Mohawk considers it as being the intent of Generic Letter 88-01."

#### 2.3.5 Solution Treated, Type 316L Welds in the WCS

Niagara Mohawk Submittal No. 1 contains the following statement:

"The stainless portions of the WCS, where this system ties in with the RCS, are fabricated with 316L grades. These materials, basically 4-inch schedule 80, were not subjected to a sensitization test. They were, however, water quenched from the solution annealing temperature, which is a more positive mechanism than testing to ensure the absence of grain boundary carbide precipitation. Water quenching has been very effective, especially in low carbon grades, and water quenched material has not had any problem meeting A262-A when tested. Therefore, we consider that water quenched wrought low carbon grades of stainless steel meet the intent of Category A of Generic Letter 88-01, with or without a sensitization test.

#### 2.3.6 Table of Histories and IGSCC Classifications of Welds

Niagara Mohawk Submittal No. 2 contains a partial list of

the welds considered to be within the scope of Generic Letter 88-01, their IGSCC classifications, and weld histories. A complete list of welds is contained in Niagara Mohawk Submittal No. 3. According to those lists, all except one weld (Weld No. 64-00FWA07 which is classified as IGSCC Category D) are classified as IGSCC Category A.

Although Niagara Mohawk claims that all materials used throughout the piping that is within the scope of Generic Letter 88-01, the tables showing weld histories do not support their claim. This may be seen in the following summaries of the materials used in the various piping systems.

Reactor Recirculation System: This system contains 105 welds classified as follows: 104 IGSCC Category A welds and 1 IGSCC Category D. All 105 of the welds in this system contain low-carbon, IGSCC-resistant weld metal; however, they all contain Type 316 stainless steel (which, per Generic Letter 88-01 and NUREG 0313, Revision 2, is considered non-resistant to IGSCC) in either the upstream component, the downstream component, or both.

Residual Heat Removal System: This system contains six welds, all of which are classified as IGSCC Category A. All of the welds in this system contain low-carbon, IGSCC-resistant weld metal; however, they all contain Type 316 stainless steel (which, per Generic Letter 88-01 and NUREG 0313, Revision 2, is considered non-resistant to IGSCC) in either the upstream component, the downstream component, or both.

Reactor Pressure Vessel: This system contains a total of 38 welds, classified as IGSCC Category A, and divided as follows:



Twenty five Nozzle/Safe End welds, all of which contain Inconel 182 buttered layers. Inconel 182 is described in Generic Letter 88-01 and NUREG 0313, Revision 2 as non-resistant to IGSCC.

Eleven Safe End Extension welds, all of which contain Inconel 182 in the weld metal. Inconel 182 is described in Generic Letter 88-01 and NUREG 0313, Revision 2 as non-resistant to IGSCC.

Two Safe End Seal welds which contain conforming (IGSCC-resistant) materials.

Residual Heat Removal System: This system contains 18 welds classified as IGSCC Category A. All of these welds contain conforming (IGSCC-resistant).

#### 2.3.7 Previous Inspection Programs

Niagara Mohawk Submittal No. 2 contains a list of welds that were inspected during the 1988 Refueling Outage. According to that list, a total of 10 of the 106 welds in the Recirculation System were inspected. No flaws were reported. None of the welds in the other systems were reported to have been inspected.

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

Niagara Mohawk's reasoning pertaining to welds with crevices of diameters less than 4 inch diameter (i.e., that those welds are outside of the scope of Generic Letter 88-01) is correct since Generic Letter 88-01 and NUREG 0313, Revision 2 exclude components that are less than 4 inches in diameter.

Although Niagara Mohawk claims that 167 of the 168 welds at Nine Mile 2 are IGSCC Category A, they are incorrect in that claim. IGSCC Category A classifications are justified only for the 18 welds in the Reactor Water Cleanup system and the two Safe End Seal welds. The remaining welds contain materials that are not resistant to IGSCC, so these welds should be reclassified into non-resistant classifications (either IGSCC Category D or IGSCC Category G, depending on their inspection histories). In accordance with the information Niagara Mohawk supplied pertaining to previous inspections, only 10 of these welds have been previously inspected and classified as IGSCC Category D. The remaining non-conforming welds should be reclassified as IGSCC Category G.

#### 2.4 Current Plans for Mitigating Actions

##### 2.4.1 Niagara Mohawk's Position

Niagara Mohawk Submittal No. 1 contains the following statement concerning additional mitigation efforts:

"Niagara Mohawk has taken appropriate actions during construction of Nine Mile Point Unit 2 to mitigate IGSCC and provide assurance of continued long-term piping integrity and reliability. Therefore, we do not envision any piping replacement or other mitigation measures."

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

Although Niagara Mohawk claims to have taken adequate measures during construction to prevent IGSCC, as previously discussed,



most of the welds contain non-resistant materials. Thus, Niagara Mohawk should either provide additional mitigating measures in accordance with recommendations outlined in Generic Letter 88-01, or they should provide an improved inspection program as outlined in the following section.

## 2.5 Plans for Future Inspections

### 2.5.1 Niagara Mohawk's Position On Inspection Schedules

As indicated in Table 1, Niagara Mohawk Submittal No. 2 endorses the NRC Staff position on inspection schedules with the following provision:

"All welds are IGSCC Category A and are inspected according to ASME Section XI schedule with the exception of weld 64-00-FW A07 in the RCS system which is Category D."

Niagara Mohawk Submittal No. 1 contains the following statement pertaining to inspection of the one weld that is classified as IGSCC Category D:

"The Inservice Inspection program will be revised to require more frequent examinations of field weld RCS FW A07."

"It will be scheduled for augmented examination during the first refueling outage and every second refueling outage thereafter."

Niagara Mohawk Submittal No. 2 contains a list of the welds that are scheduled for inspection during the next several



refueling outages. The number of inspections planned for the welds classified as IGSCC Category A are summarized in Table 2 of this report.

### 2.5.2 Inaccessible Welds

Niagara Mohawk Submittal No. 3 lists a number of welds (all currently classified as IGSCC Category A) that are partially inaccessible for inspection as shown in Table 3 of this report. These include 12 welds in the Reactor Recirculation System, one weld in the Residual Heat Removal System, and all 25 nozzle/safe end welds in the Reactor Pressure Vessel. The accessibility of welds not scheduled for inspection has not been determined.

Niagara Mohawk did not provide any alternate plans for inspection of welds that are partially inaccessible even though the extent of examination for some of those welds is 25% or less.

### 2.5.3 Methods and Personnel

As indicated in table 1 of this report, Niagara Mohawk endorses the NRC Staff position on inspection methods and personnel with a provision. That provision is stated in Niagara Mohawk Submittal No. 2 as follows:

"Reactor Pressure Vessel internal weld attachments are visually inspected in accordance with ASME Section XI."

Niagara Mohawk Submittal No. 1 states the following:

"The examination techniques and personnel qualification methods used for the volumetric examinations will be

Table 2

Summary of Inspections Planned for Welds Classified  
as IGSCC Category A at Nine Mile 2

System	No. of Categ A Welds	No. of Welds Scheduled for Inspection During Indicated Refueling Outage					Total
		1990 RO	1992 RO	1994 RO	1996 RO	1998 RO	
RCS	105	6	5	7	3	3	24
RHS	6	2	0	1	1	0	4
RPV	38	14	2	11	0	11	38
WSC	18	1	1	1	1	0	4
Total	167	10	23	8	5	14	70

Abbreviations:

- RCS - Reactor Recirculation System
- RHS - Residual Heat Removal System
- RPV - Reactor Pressure Vessel
- WSC - Reactor Water Cleanup System

Required by Generic Letter 88-01:

Inspect 25% every 10 years (at least 12% in 6 years).



Table 3

Inaccessible Relief Requests at Nine Mile 2<sup>(a)</sup>

Weld No.	Inspected/Scheduled		Relief Request	Extent Examined
	1988 R.O.	Future		
64-00-FWA05		X	RR-IWB-6	Elbow side only
64-00-FWA06		X	RR-IWB-6	100% with overlay limitations
64-00-FWA17		X	RR-IWB-10	25%
64-00-FWA21		X	RR-IWB-10	25%
64-00-FWA24	X	X	RR-IWB-6	Pipe side only
64-00-FWB01	X	X	RR-IWB-6	Pipe side only
64-00-FWB08		X	RR-IWB-6	Elbow side only
64-00-FWB12		X	RR-IWB-6	Pipe side only
64-00-SW03	X		RR-IWB-6	Pipe side only
64-00-SW12				Pipe side only
64-00-SW17	X	X	RR-IWB-6	Pipe side only
64-00-SW51	X	X	RR-IWB-6	79%
66-55-FW001		X	RR-IWB-6	Pipe side only
All 25 Nozzle/ Safe End Welds in RPV		X	RR-IWB-9	(see note b)

Notes:

- (a) Accessibility has not been determined for welds which were selected for inspection.
- (b) Extent for two nozzle/safe end welds is 100% with overlay interference. Extent for other nozzle/safe end welds ranges from about 22% to nearly 100%.



qualified in accordance with the NDE Coordination Plan through the EPRI NDE Center in Charlotte, North Carolina. Niagara Mohawk does not intend to use any alternate plans, such as ASME Code Case N-409, at this time."

#### 2.5.4 Sample Expansion

Niagara Mohawk Submittal No. 1 states the following:

"If one or more cracked welds in IGSCC categories are detected, we will expand the sample examined in accordance with the staff position stated in the generic letter."

#### 2.5.5 Evaluation and Recommendations

Niagara Mohawk's inspection plans for the one weld that they classified as IGSCC Category D comply with the NRC Staff position for inspections of IGSCC Category D. Furthermore, as can be noted from Table 2, Niagara Mohawk's planned inspection schedules for welds that they have classified as IGSCC Category A comply with the requirements of Generic Letter 88-01 for IGSCC Category A welds. However, as previously discussed, most of the welds that have been classified as IGSCC Category A contain materials that are not resistant to IGSCC so they should be reclassified to either IGSCC Category D or IGSCC Category G, depending upon their inspection histories. Furthermore, the inspection plans should be revised to reflect the requirements of Generic Letter 88-01 for welds of those IGSCC classifications.

Concerning accessibility for ultrasonic examination, Niagara Mohawk should rate accessibility of all welds that are recommended for reclassification to IGSCC Category D or IGSCC Category G. In addition, they should plan additional inspection

methods such as visual inspection for those welds with limited accessibility (less than about 50%).

Acceptance of Niagara Mohawk's positions concerning: (a) inspection schedule for weld RCS FW A07, (b) methods and personnel, and (c) sample expansion is recommended since Niagara Mohawk's positions on these items comply with the NRC Staff position.

## 2.0 Changes in the Technical Specification Concerning ISI

### 2.6.1 Niagara Mohawk's Position

Niagara Mohawk Submittal No. 1 contains the following statement:

"Under separate cover, we are submitting an application to amend the technical specifications to incorporate the requirements of the generic letter."

### 2.6.2 Evaluation and Recommendation

Since Niagara Mohawk committed to submitting a change to the Technical Specification on ISI in accordance with the NRC Staff position, tentative acceptance of their position is recommended, pending actual receipt of that submittal.

## 2.7 Confirmation of Leak Detection in the Technical Specification

Discussion concerning leakage detection is deferred to Section 3, "Exceptions to NRC Staff Positions" of this report since Niagara



Mohawk presented an exception to a portion of the requirements concerning leakage detection.

## 2.8 Plans for Notification of the NRC of Flaws

### 2.8.1 Niagara Mohawk's Position

Niagara Mohawk Submittal No. 1 contains the following statement:

"Niagara Mohawk will notify the Commission of any flaws identified that exceed the acceptance criteria of ASME Section XI, subsection IWB-3500. This notification will include our justification for continued operation and/or our repair plans."

### 2.8.2 Evaluation and Recommendations

Niagara Mohawk plans to comply with the NRC Staff position concerning reporting of flaws, so acceptance of their plans for reporting of flaws is recommended. Furthermore, Niagara Mohawk indicated (as shown in Table 1 of this report) that they endorse and plan to utilize the NRC Staff position concerning Crack Evaluation and Repair Criteria, so acceptance of their position on this item is recommended.

## 3. ALTERNATIVE POSITION

### 3.1 Alternative Position Concerning Leak Detection in the Technical Specification

Niagara Mohawk Submittal No. 1 contains the following statement



concerning the requirement that the Technical Specification on leakage detection should be in conformance with the NRC Staff position.

"Plant Technical Specifications Section 4.3.2 related to leak detection conforms to the staff position stated in the generic letter to the extent practical. The 2 gpm increase in unidentified leakage was not included in the initial Technical Specifications when they were issued, and there is no need to revise the Plant Technical Specifications since there is only one service sensitive austenitic stainless steel piping weld inside the primary containment."

Niagara Mohawk Submittal No. 2 adds the following statements concerning Niagara Mohawk's alternative position on leakage detection.

"The Staff position on leak detection identifies a requirement that plant shutdown should be initiated for inspection and corrective action in the event of an increase of 2 gallons per minute in unidentified drywell leakage within a 24 hour period. The Unit 2 Technical Specifications do not contain this requirement, but this was determined to be acceptable under the Generic Letter 88-01 clause 'or as previously approved by the NRC.'" The statement 'practical' in our response was meant to point out the difference from the Staff position on leak detection."

"Unit 2 has corrosion resistant material throughout the susceptible systems. Consequently, its Technical Specification, although not in full conformance with Regulatory Guide 1.45 as stated in Generic Letter 88-01, was reviewed and approved as acceptable by the Commission."

### 3.2 Evaluation and Recommendations

Niagara Mohawk's position concerning conformance with Position C of Regulatory Guide 1.45 is unacceptable. Niagara Mohawk did not provide a detailed comparison of their Technical Specification concerning leakage detection and Position C of Regulatory Guide 1.45. Niagara Mohawk will need to provide such a comparison for evaluation by the NRC Staff.

In addition, as previously mentioned, Nine Mile 2, contrary to Niagara Mohawk's claim does not contain corrosion resistant materials in nearly all of the welds. The NRC Staff, in formulating the requirements that should be included in the Technical Specifications concerning leakage detection, recognized that some BWR nuclear power plants would contain all (or nearly all) IGSCC Category A welds. Furthermore, prior approval of the Technical Specifications does not constitute exemption from this requirement. Thus, rejection of Niagara Mohawk's position of not incorporating a leakage requirement concerning the limiting rate of increase of unidentified leakage (as stated in Generic Letter 83-01) in the Nine Mile 2 Technical Specifications is recommended.

In addition, Niagara Mohawk did not supply a response when requested in a Request for Additional Information (RAI) to state whether or not they comply with other portions of the NRC Staff positions on the following items:

- (1) The limit of the total unidentified leakage of 5 gpm.
- (2) The definition (or description) of unidentified leakage.
- (3) The frequency of leakage monitoring.
- (4) The operability of leakage monitoring devices.



However, based on a review of the Technical Specifications of Nine Mile 2, the following items were found to be unacceptable:

- (1) The primary containment drywell floor drain tank and equipment drain tank fill rate is monitored at least once per 12 hours rather than every four hours or less as required in Generic Letter 88-01.
- (2) The requirements for operability of leakage monitoring instruments do not meet the requirements delineated in Generic Letter 88-01 for plants operating with welds classified as Category D, Category E, Category F, or Category G.

It is recommended that Niagara Mohawk amend the Nine Mile 2 Technical Specification on leakage detection to include the Generic Letter 88-01 leakage detection requirements as discussed above.

#### 4. CONCLUSIONS AND RECOMMENDATIONS

Niagara Mohawk endorses 9 of the 13 NRC Staff positions without provisions (i.e., those pertaining to Processes, Water Chemistry, Weld Overlay, Partial Replacement, Stress Improvement of Cracked Weldments, Clamping Devices, Crack Evaluation and Repair Criteria, Sample Expansion, and Reporting Requirements). They also endorse those pertaining to Materials, Inspection Method and Personnel, and Inspection Schedules, although they applied provisions to these items. The provisions applied to these items are acceptable except that they have incorrectly classified most welds as IGSCC Category A. Niagara Mohawk presented an alternative position to that of the NRC Staff concerning the item on leakage detection.

A list of welds that are within the scope of Generic Letter 88-01 is



contained in Niagara Mohawk Submittals No. 2 and No. 3 which give IGSCC classifications assigned to welds, weld histories (including material used for components and welds in the piping systems), and inspection schedules. All except one of the welds at Nine Mile 2 are classified as IGSCC Category A welds, in part, because Niagara Mohawk claims that IGSCC-resistant materials were used during construction. The one exception is a weld classified as IGSCC Category D. However, the list of materials shows that most of the welds in the austenitic piping system actually contain materials such as Type 316 stainless steel or Inconel 182 that are not resistant to corrosion. These welds, therefore, are mistakenly classified as IGSCC Category A and should be reclassified into non-conforming categories.

Inspection plans for one IGSCC Category D weld conform with the NRC Staff position on inspection of such welds. In addition, their inspection plans for welds classified as IGSCC Category A would be acceptable if those welds were correctly classified. However, since those welds are incorrectly classified, their inspection plans are not acceptable per requirements of Generic Letter 88-01.

Niagara Mohawk stated that they would comply with the NRC Staff position requiring a change in the Technical Specification on ISI including inspection schedules, methods and personnel, and sample expansion. They stated that an amendment to the Technical Specification on ISI would be submitted under separate cover.

Niagara Mohawk's position concerning conformance with Position C of Regulatory Guide 1.45 was found unacceptable, and they will need to provide the NRC Staff with a detailed comparison between Regulatory Guide 1.45 and the Nine Mile 2 leakage detection system for evaluation.

Niagara Mohawk did not provide detailed information in their RAI response concerning some of NRC Staff positions on leakage detection requirements. However, Niagara Mohawk claims that the Technical

Specification for Nine Mile 2 is already in compliance with the NRC Staff position on leakage detection as delineated in Generic Letter 88-01 to the extent that it is practical. In addition, Niagara Mohawk stated that they do not need to comply with the Generic Letter 88-01 requirement concerning limiting the increase in unidentified leakage to 2 gpm because their Nine Mile 2 Technical Specifications have received prior approval from the NRC Staff and that it is not necessary since they only have one susceptible weld. The staff reviewed the Nine Mile 2 Technical Specifications and found that Niagara Mohawk will need to amend the Nine Mile 2 Technical Specifications to include the following Generic Letter 88-01 requirements: (1) That plant shutdown should be initiated when the rate of increase of unidentified leakage during any 24 hour period or less reaches 2 gpm. (2) Frequency of leakage monitoring. (3) Operability of leakage monitoring devices.

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

- (1) Rejection of Niagara Mohawk's classification of welds in the Reactor Recirculation System, the Residual Heat Removal System, and the Reactor Pressure Vessel which have been classified as IGSCC Category A System even though they contain non-resistant materials such as Type 316 stainless steel and Inconel 182. Niagara Mohawk should reclassify those welds as IGSCC Category D or IGSCC Category G, depending on their inspection histories
- (2) Rejection of Niagara Mohawk's inspection plans for the welds that have been incorrectly classified. Niagara Mohawk should revise its inspection plans in accordance with the requirements for inspection of Generic Letter 88-01 for IGSCC Category D and IGSCC Category G welds.
- (3) Acceptance of Niagara Mohawk's IGSCC inspection plans for the



welds that contain resistant materials (as discussed in Section 2.3.6 of this report).

- (4) Acceptance of Niagara Mohawk's position on planned inspections of weld RCS FW A07 (classified as IGSCC Category D) and their positions on inspection methods and personnel, sample expansion, and reporting requirements.
- (5) Tentative acceptance of Niagara Mohawk's position on changing the Technical Specification concerning ISI, pending receipt and evaluation of the promised supplemental submittal.
- (6) Rejection of Niagara Mohawk's position concerning limiting the rate of increase of unidentified leakage to 2 gpm. Niagara Mohawk also needs to address frequency of leakage monitoring and operability of leakage monitoring devices as discussed previously. In addition, they need to amend the Nine Mile 2 Technical Specifications to include the Generic Letter 88-01 leakage detection requirements.
- (7) Rejection of Niagara Mohawk's position concerning conformance with Position C of Regulatory Guide 1.45. They need to provide a comparison between Regulatory Guide 1.45 and the Nine Mile 2 leakage detection requirements.
- (8) Acceptance of the remaining portions of the Niagara Mohawk Submittals.



## 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.