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A. V. MORISI  
MANAGER  
NUCLEAR OPERATIONS SUPPORT DEPARTMENT

May 5, 1982

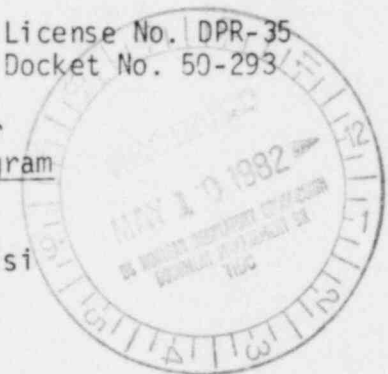
BECO. Ltr. #82-113

Mr. Domenic B. Vassallo, Chief  
Operating Reactors Branch #2  
Division of Licensing  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, D. C. 20555

License No. DPR-35  
Docket No. 50-293

Request for Additional Information for  
Pilgrim Nuclear Power Station's ISI Program

Reference a) NRC Letter dated February 22, 1982,  
Mr. D. B. Vassallo to Mr. A. V. Morisi



Dear Sir:

In response to your letter Reference a) requesting Boston Edison Company (BECO) to submit additional information concerning the Inservice Inspection Program for Pilgrim Nuclear Power Station, BECO would like to submit the following information:

1. Code Relief #2

This code relief request applies to a total of 15 pipe welds of category B-J, item B4.5, in the following systems:

Main Steam	Reactor Core Isolation Coolant
Feed Water	Core Spray
Residual Heat Removal	High Pressure Coolant Injection
Reactor Water Cleanup	

The ASME Boiler and Pressure Vessel Code, Section XI, 1974 Edition through the Summer 1975 Addenda, requires that these Class I welds be volumetrically examined. Relief is requested from volumetrically examining these 15 pipe welds because they are located in triple-flued heads and are inaccessible. At the time of design there were no examination requirements for these welds. These 15 pipe welds are part of 495 pipe welds of category B-J, item B4.5, in the above systems, and all of the other pipe welds are inspected as part of the Inservice Inspection Program.

The following additional information is requested:

- (a) Please clarify in the program table where this particular code relief is requested. For the Residual Heat Removal System, the lines as identified in Code Relief #2 description do not totally agree with the table.

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- (b) Describe the leak detection systems that would serve, and their proximity to, the areas in which these 15 pipe welds are located.
  - (c) Discuss the capability of the bellows sleeve to withstand the full dynamic effects of a longitudinal or circumferential break of the enclosed process pipe, including jet impingement, pipe whip impact, and environmental effects. If previously discussed in submittals to NRC, document by reference.
  - (d) Do any of the 15 pipe welds involve the welding of dissimilar metals?
1. Response to questions concerning Code Relief #2
- (a) The table has been corrected to reflect where the particular code relief is being requested. The tables for the Residual Heat Removal System have also been revised to agree with the code relief #2 description.
  - (b) In response to questions concerning the leakage detection system BECo is providing copies of the Final Safety Analysis Report which describes the function of the leak detection system. (Attachment 1) Included with the description are the system diagrams (Fig. 4.10-1 and Fig. 4.10-2) which depict the location of the floor and equipment drain sumps.
  - (c) In response to the question about the capability of the bellows sleeve to withstand the full dynamic effects of a longitudinal or circumferential break of the enclosed process pipe. An engineering evaluation is in progress and the results will be forwarded to your office upon completion.
  - (d) In response to the question concerning dissimilar metal welds; there are none located within these penetrations. A review of the ISI drawings will substantiate that material classification on either side of containment are similar metals.

Examples: ISI M-252 - Core spray A & B - Material classification  
10"-DC-14

- Clean-up system - Material classification  
6"-EA-12

- Residual heat removal - Material classification  
18"-DC-10

- Residual heat removal - Material classification  
20"-EL-10

In addition to your questions, BECo has also revised the table to include one main steam drain line penetration that should have been included in the original program. Also, a revised copy of the piping penetration drawing is being submitted along with the requested information.

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2. Code Relief #5

This code relief request applies to the calibration block used in the performance of ultrasonic examinations of the reactor vessel. Relief is requested from changing standards from the present unclad calibration block to clad blocks.

The following additional information is requested:

- (a) What experimental evidence will support the premise that the use of an unclad calibration does not significantly affect the validity of the examination results?
- (b) Identify in program table by Section XI category number and by Section XI item number, where this relief is requested.

2. Response to questions concerning Code Relief #5

The request for code relief concerning the use of an unclad calibration standard for the ultrasonic examinations of the reactor vessel is withdrawn by BECo.

3. Code Relief #6

This code relief request applies to the calibration blocks used in the performance of ultrasonic examinations. Relief is requested from machined notches in the calibration block.

The following additional information is requested:

- (a) Identify in program table by Section XI category number and by Section XI item number, where this relief is requested.
- (b) Discuss your capability to detect planar and near surface flaws.

3. Response to questions concerning Code Relief #6

- (a) Attachment (2), Program Table, has been marked to indicate where the code relief is being applied.
- (b) Attachment (3) is a memo prepared by Magnaflux Quality Services discussing the capability of BECo to detect planar and near surface flaws.

4. Code Exemption #1

This code exemption applies to pressure retaining welds and support components, Categories B-O, B-J, and B-K-2, pursuant to IWB-1220(b) (1) (Summer 1975 Addenda), in the following systems:

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Reactor Pressure Vessel  
Main Steam  
Reactor Recirculation  
Stand-by Liquid Control

Exemption from examination for line sizes 3-inches and under is claimed.

The following additional information is requested:

Pursuant to IWB-1220(b) (1), show that under the postulated conditions of loss of coolant from the component (for which exemption is claimed) during normal reactor operation, the reactor can be shut down and cooled down in an orderly manner assuming makeup is provided by the reactor coolant makeup system only, and the makeup system is using onsite power. If previously discussed in submittals to NRC, document by reference.

4. Response to question concerning Code Relief #1

Attachment (4) is the calculation sheets that allow for the exemption of pipe 3 inches and smaller for inspection.

We trust the above information is responsive to your needs; however, should you require any additional information please do not hesitate to contact us.

Very truly yours,

*A. Mousi*



## PNPS

**4.10 NUCLEAR SYSTEM LEAKAGE RATE LIMITS****4.10.1 Safety Objective**

Nuclear system leakage rate limits are established so that appropriate action can be taken before the integrity of the nuclear system process barrier is unduly compromised.

**4.10.2 Safety Design Bases**

The safety design bases for nuclear system leakage rate limits are as follows:

1. The nuclear system leakage rate limits shall be set so that corrective action can be taken:
  - a. Before the nuclear system process barrier is threatened with significant compromise.
  - b. Before the rate of leakage exceeds the coolant makeup capability.
  - c. Before the total leakage rate within the drywell exceeds the capability for leakage removal from the drywell.
2. Means shall be provided for the detection of leakage rates so that corrective action can be taken before the integrity of the nuclear system process barrier is unduly compromised.

**4.10.3 Description**

The leakage considered in this subsection is limited to that water and steam released from the nuclear system process barrier inside the primary containment. This released water and steam, after condensation, is collected in the drywell floor drain and/or equipment drain sumps. Nuclear system leakage inside the drywell is treated here separately from leakage elsewhere in the station because it can not be investigated locally or isolated from the reactor vessel during power operation.

Figures 4.10-1 and 4.10-2 are diagrams of the drywell leak detection system and of the drywell sumps, respectively. As shown in the figures, there are two drywell sumps. One sump, the drywell equipment drain sump, receives drainage from pump seal leak-offs, reactor vessel head flange seal leak-off, selected valve stem leak-off including recirculation loop and main steam isolation valves, and other equipment drains through directly connected drain lines. The second sump, the floor-drain-collector sump, receives leakage etc., from the drywell coolers, control rod drives, other valve stems and flanges, floor drains, and closed cooling water system drains. Collection of leakage in excess of normal background amounts is potentially indicative of a reactor coolant leak. The discharge lines from the equipment drain sump and floor drain sump to the radwaste system are provided with flow meters, pressure indicators and sample points outside of the primary containment.

Total leakage rate consists of all leakage, identified and unidentified which flows to the drywell floor drain and equipment drain sumps.

The criterion for establishing the total leakage rate limit is based on the makeup capability of the control rod drive (CRD) system. The CRD system supplies 63 gpm into the bottom of the reactor vessel using either one of the two CRD pumps. The total leakage rate limit is therefore established at 63 gpm.

The total leakage rate is set low enough to prevent overflow of the drywell sumps. The equipment drain sump (capacity 500 gallons) and the floor drain sump (capacity 500 gallons), which collect all leakage, are each drained by two 50 gpm pumps. The total leakage rate limit is therefore below the removal capacity of the two pumps in each sump. Further, it is unlikely that the total leakage would all collect in one sump.

Each pump has an alarm system and automatic pump starting sequence on rising water level, which acts as follows: At the first high water level setting ("high"), the preferred pump, (alternately selected for operation by an automatic pump selector switch) is automatically started. "On-off" lights indicate the operational status of each pump. If the water level continues to rise, a higher water level setting ("high-high") starts the second pump. A further rise in water level to the final high water level setting ("high-high-high") actuates an alarm.

By observing the sump discharge flow metering instrumentation, a high level alarm can be ascribed to either failure of one or both pumps or to excessive leakage into the sump. On decreasing level, "low" level and "low-low" level switches shut-down pumps and actuate alarm if pump fails to shut-down, respectively.

As the water which has been collected in the sumps is pumped out, the discharge flow from each sump is individually metered by flow integrators. Total leakage rate is periodically calculated from these flow integrators and a record is maintained in order to detect increases in total leakage rate.

**4.10.3.1 Identified Leakage Rate**

The identified leakage rate is the sum of all component leakage collected from identified sources. In general, these sources drain to the drywell equipment drain sump which has a cover and a raised curb to prevent floor drainage from intermixing with the equipment drainage. Leakage from the reactor vessel head flange gasket is piped to a collection chamber and then to the equipment drain sump. The chamber filling time is periodically timed during station operation and the flange gasket leakage rate can be calculated. A more detailed discussion of this instrumentation is in the subsection 7.8, "Reactor Vessel Instrumentation." Most valves and the recirculation pumps in the

nuclear system inside the drywell are equipped with double seals. Leakage from these seals is piped to the equipment drain sump. The recirculation pump seals are instrumented as shown in the subsection 4.3, "Reactor Recirculation System." Main steam relief valve leakage is identified by temperature sensors in the valve discharge piping. Such leakage would collect in the suppression pool as steam leakage is condensed.

#### 4.10.3.2 Unidentified Leakage Rate

The unidentified leakage rate is the sum of all leakage collected from unidentified sources. These sources drain to the drywell floor drain sump.

A threat of significant compromise to the nuclear system process barrier exists if the barrier contains a crack which is large enough to propagate rapidly. The unidentified leakage rate is limited because of the possibility that most of the unidentified leakage rate might be emitted from a single crack in the nuclear system process barrier.

A leakage rate of 150 gpm has been conservatively calculated to be the minimum liquid leakage from a crack large enough to propagate rapidly. An allowance for reasonable leakage which does not compromise barrier integrity and is not identifiable is made for normal operation.

The unidentified leakage rate limit is established at 15 gpm which is far enough below the 150 gpm leakage rate to allow time for corrective action to be taken before the process barrier is significantly compromised.

Condensation from the drywell atmosphere occurs as the atmosphere is circulated through the drywell coolers. This condensation is collected and piped to the drywell floor drain sump. Fluid leakage from the primary pressure boundary will result in increased cooling loads on the drywell air coolers which will result in abnormal temperature measurements on the cooling units. The condensation on the coolers will increase and abnormally high condensate flows to the floor drain sump will result. Condensation on the drywell walls and structures within the primary containment will also collect in the floor drain sump. The integrated floor drain sump flow, the drywell atmosphere pressure and temperature, the drywell atmosphere humidity, and the drywell air cooler temperatures are all employed as indicators of potential leakage from the primary pressure boundary.

#### 4.10.4 Safety Evaluation

The unidentified leakage rate limit is based, with an adequate margin for contingencies, on the calculated leakage from a crack large enough to propagate rapidly. The established limit is sufficiently low so that even if the entire unidentified leakage rate were coming from a single crack in the nuclear system process barrier, corrective action could be taken before the integrity of the barrier is threatened with significant compromise.

The limit on total leakage rate is established so that in the absence of off-site a-c power and feedwater, and without using the core standby cooling systems, the leakage loss from the nuclear system could be replaced. Either one of the two CRD pumps can furnish the required makeup flow rate. The limit on total leakage also allows a reasonable margin below the discharge capability of either the floor drain or equipment drain sump pumps. Thus, the established total leakage rate allows sufficient time for corrective action to be taken before either the nuclear system coolant makeup or the drywell sump removal capabilities are exceeded.

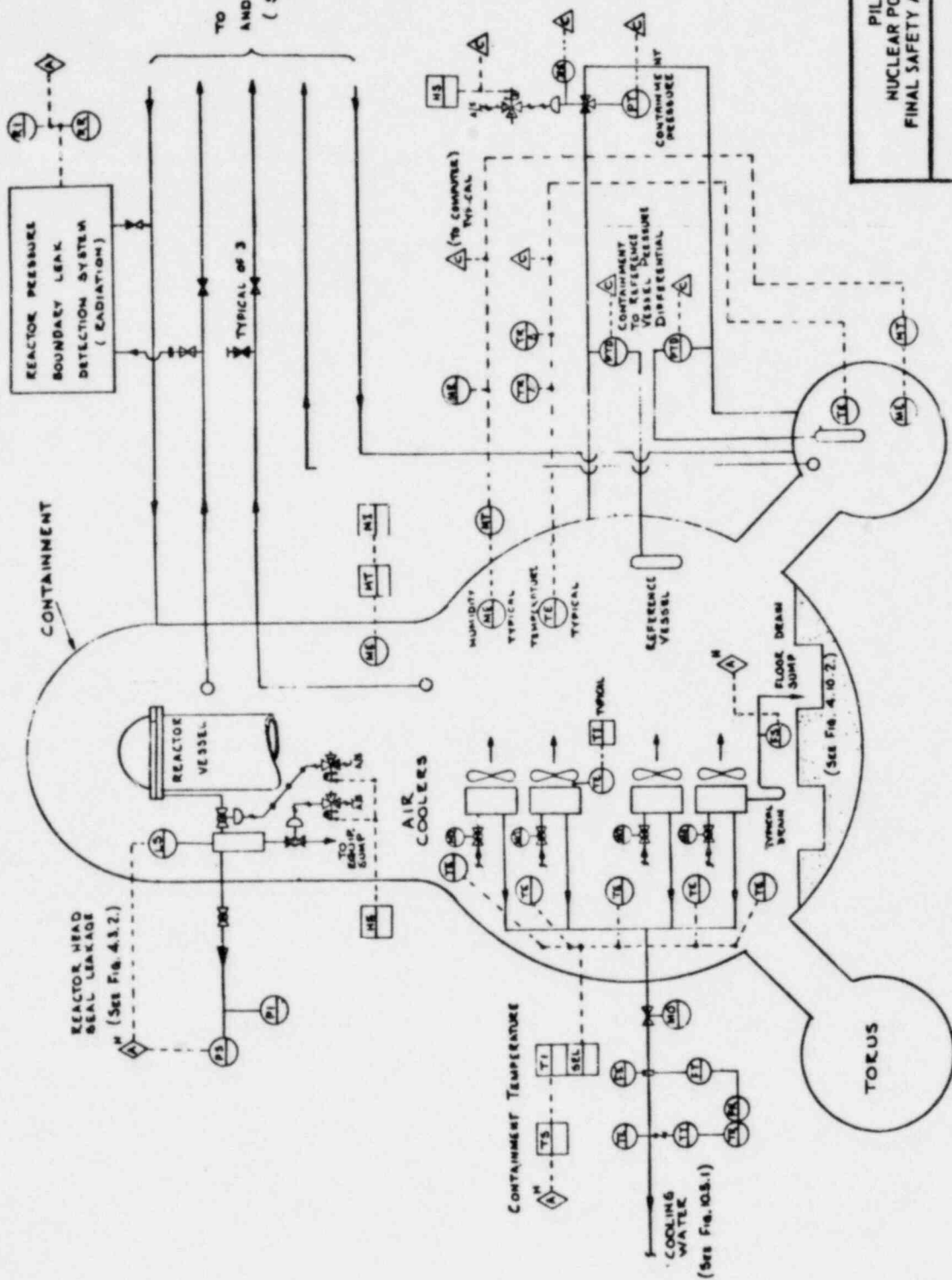
Provided in the description is a discussion of the leakage detection instrumentation. With this information it is shown that means are provided for the detection of leakage so that corrective action can be taken before the integrity of the nuclear system process barrier is unduly compromised. It is concluded that the safety design bases are met.

#### 4.10.5 Inspection and Testing

Because the sump pumps are automatically started and their operation is verified by the alarms and discharge flow instrumentation, no special inspection or testing during power operation of the station is necessary. The pumps and controls are inspected and tested during scheduled shutdowns.

#### 4.10.6 Operational Nuclear Safe Requirements

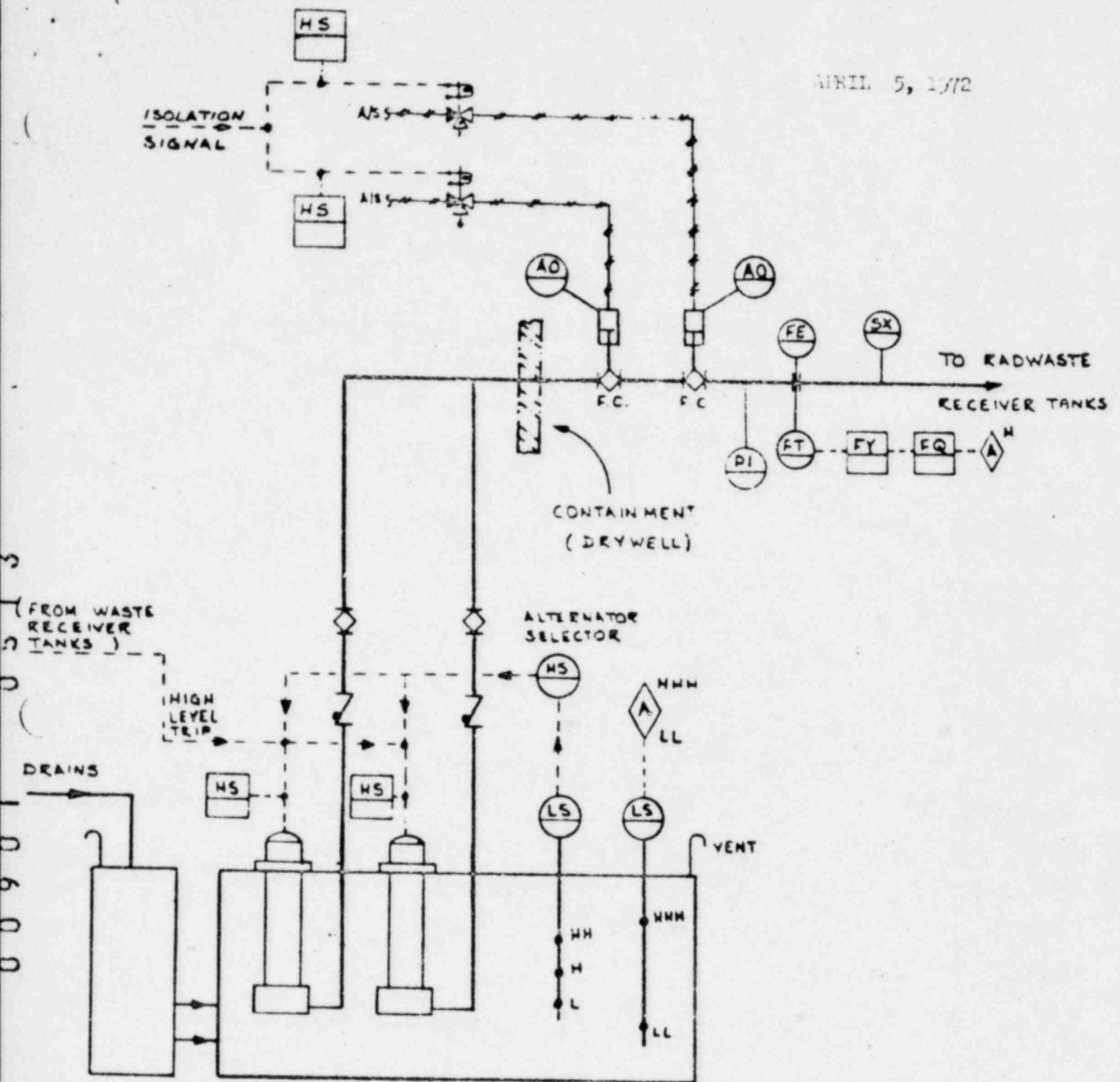
Matrix 3 of Appendix G shows a requirement for nuclear system leakage rate indications in states C, D/E and F during planned operation. This matrix entry (11) on the matrix under system 51 indicates that the leakage indications must be continuously operable in each state. The actual limits observed within the primary containment and the methods of indication are discussed in the preceding description section.



PILGRIM  
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FINAL SAFETY ANALYSIS REPORT

Drywell Leak Detection System Diagram  
FIGURE 4.10.1

APRIL 5, 1972



EQUIPMENT OR FLOOR DRAIN SUMP  
(SEE FIG. 9.2.2)

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Drywell Sumps, Diagram  
FIGURE 4.10-2

ATTACHMENT 2



INSERVICE INSPECTION PROGRAM

System: REACTOR PRESSURE VESSEL							Page 1 of 4		Rev.
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
Pressure retaining welds in reactor vessel beltline region		1	B-A	B1.1	longitudinal and circumferential welds in core region	7	volu-metric		Code Relief #6
Pressure retaining welds in vessel		1	B-B	B1.2	longitudinal and circumferential welds in shell and meridional and circumferential seam welds in bottom head and closure head	22	volu-metric		Code Relief #6
Pressure retaining welds to flange and head to flange		1	B-C	B1.3	vessel to flange and head to flange	2	volu-metric		Code Relief #6
Full penetration welds of nozzles in vessel		1	B-D	B1.4	primary nozzle to vessel welds and nozzle inside radiused section	34	volu-metric		Code Relief #6
Pressure retaining partial penetration welds in vessel		1	B-E	B1.5	vessel penetrations including control rod drive and instrumentation penetrations	187	visual (TWA 5000		Note: Inspection conducted in accordance with IWA 5000
Pressure retaining welds -									
1.) Recirculation	252	1	B-F	B1.6	nozzle to safe end welds	12	volu-metric		Code Relief #6
2.) Core Spray	242	1	B-F	B1.6	nozzle to safe end welds	2	and surface		

INSERVICE INSPECTION PROGRAM

System: REACTOR PRESSURE VESSEL							Page 2 of 4		Rev.
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
Pressure retaining welds cont'd.									Code Relief #6
3.) Main Steam (*Note 1)	252	1	B-F	B1.6	nozzle to safe end welds	4	volumetric and surface		*Note 1: These are not dissimilar metal welds, but for identification and inspection requirements will be classified as safe end welds
4.) Feedwater (*Note 1)	252	1	B-F	B1.6	nozzle to safe end welds		"		Code Relief #6
5.) C.R.D. Return	252	1	B-F	B1.6	nozzle to safe end welds	1	"		Cut & capped
6.) Jet Pump Inst.	252	1	B-F	B1.6	nozzle to safe end welds	1	"		Code Relief #6
Pressure retaining bolting 2" and larger in		1	BG-1	B1.7	reactor pressure vessel	56	volumetric		*Represents number removed  Code Relief #6  Visual examination for bushings of removed studs only.
		1	BG-1	B1.7	closure studs and nuts when removed	*	"		
		1	BG-1	B1.7	ligaments between threaded stud holes		"		
		1	BG-1	B1.7	closure washers	56	visual		
		1	BG-1	B1.7	closure bushings	12	"		

INSERVICE INSPECTION PROGRAM

System: REACTOR PRESSURE VESSEL							Page 3 of 4		Rev.
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
Pressure retaining bolting smaller than 2" in diameter (head spray)		1	BG-2	B1.11	pressure retaining	12	visual		
Vessel supports		1	B-H	B1.12	integrally welded vessel	1	volu-metric		Code Relief #6
Interior clad surfaces of reactor vessel head		1	BI-1	B1.13	closure head cladding	6	none	CR3	
Internal of vessel		1	BI-1	B1.14	vessel cladding	6	none	CR3	
Vessel interior		1	BN-1	B1.15	interior of reactor vessel		visual		
Vessel interior		1	BN-2	B1.16	integrally welded core supports and interior attachments to reactor vessel		visual		
Removable core support structures		1	BN-3	B1.17	N/A		N/A		
Pressure retaining welds in control rod drive housings		1	B-O	B1.18	Control rod drives	145	visual	EX-1	

Pilgrim Nuclear  
Power Station  
Unit - 1

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INSERVICE INSPECTION PROGRAM

System: MAIN STEAM							Page 2 of 4		Rev.
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
Loop "B" (cont'd.)	252	1	B-J	B4.5	longitudinal and circumferential pipe welds			CR2	In accessible weld in penetration
		1	B-J	B4.7	branch pipe connection welds 6" in diameter and smaller	1	surface		
		1	B-J	B4.8	socket welds	3		EX2	
		1	B-K-2	B4.10	support components	8	visual		
		1	B-M-1	B6.6	pressure retaining welds in valve bodies		N/A		
		1	B-M-2	B6.7	1) valve bodies (main steam isolation valves)	2	visual	CR7	
		1	B-G-2	B6.9	relief and safety valve, main isolation valve bolting	*	visual		*number of valves with bolting
Loop "C"	252	1	B-F	B4.1	safe end to pipe welds	1	volume- metric visual		Code Relief #6
		1	B-J	B4.5	longitudinal and circumferential pipe welds	17	volume- metric	CR6	Code Relief #6
		1	B-J	B4.5	longitudinal and circumferential pipe welds			CR2	In accessible weld in penetration



INSERVICE INSPECTION PROGRAM

System: MAIN STEAM							Page 1 of 4		Rev.
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
Loop "A"	252	1	B-F	B4.1	safe end to pipe welds	1	volu-metric visual		Code Relief #6
		1	B-J	B4.5	longitudinal and circum-ferential pipe welds	19	volu-metric	CR6	Code Relief #6
		1	B-J	B4.5	longitudinal and circum-ferential pipe welds			CR2	Inaccessible weld in penetration
		1	B-J	B4.7	branch pipe connection welds 6" in diameter and smaller	2	surf-face		
		1	B-J	B4.8	socket welds	3		EX2	
		1	B-K-2	B4.10	support components	7	visual		
		1	B-M-1	B6.6	N/A				
		1	B-M-2	B6.7	1) valve bodies (main steam isolation valves)	2	visual	CR7	
		1	B-G-2	B6.9	relief and safety valve bolting, main steam isolation valve bolting	*	visual		*number of valves with bolting
Loop "B"	252	1	B-F	B4.1	safe end to pipe welds	1	volu-metric visual		Code relief #6
		1	B-J	B4.5	longitudinal and circum-ferential pipe welds	18	volu-metric	CR6	Code relief #6

INSERVICE INSPECTION PROGRAM

System: MAIN STEAM							Page 3 of 4		Rev.
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
Loop "C" (cont'd)	252	1	B-J	B4.7	branch pipe connection welds 6" in diameter and smaller	2	sur-face		
		1	B-J	B4.8	socket welds	3		EX2	
		1	B-K-2	B4.10	support components	8	visual		
		1	B-M-1	B6.6	pressure retaining welds in valve bodies		N/A		
		1	B-M-2	B6.7	1) valve bodies (main steam isolation valves)	2	visual	CR7	
		1	B-G-2	B6.9	relief and safety and main steam isolation valve bolting	*	visual		*number of valves with bolting
Loop "D"	252	1	B-F	B4.1	safe end to pipe welds	1	volu-metric sur.		Code Relief #6
		1	B-J	B4.5	longitudinal and circumferential pipe welds			CR2	In accessible weld in penetration
		1	B-J	B4.7	branch pipe connection welds 6" in diameter and smaller	2	sur-face		

INSERVICE INSPECTION PROGRAM

System: MAIN STEAM							Page Page 4 of 4		Rev.
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
Loop "D" (Cont'd.)	252	1	B-J	B4.8	socket welds	3		EX2	
		1	B-K-2	B4.10	support components	9	visual		
		1	B-M-1	B6.6	pressure retaining welds in valve bodies		N/A		
		1	B-M-2	B6.7	1) valve bodies (main steam isolation valves)	2	visual	CR7	
		1	B-G-2	B6.9	relief and safety, and main steam isolation valve bolting	*	visual		*number of valves with bolting
Drain Line 3"	252	1	B-J	B4.5	longitudinal and circumferential pipe welds	11		EX1	
		1	B-J	B4.5	longitudinal and circumferential pipe weld			CR2	In accessible weld in penetration
		1	B-J	B4.8	socket welds	5		EX1	
		1	B-M-2	B6.7	valve bodies - isolation	2	visual	CR7	

INSERVICE INSPECTION PROGRAM

System: REACTOR RECIRCULATION							Page 1 of 2		Rev.
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
Loop "A"	252	1	B-J	B4.1	safe end to pipe welds	6	volu-metric sur-face		Code Relief #6
		1	B-J	B4.5	circumferential and long-itudinal pipe welds	37	volu-metric		Code Relief #6
		1	B-J	B4.6	branch pipe connection welds greater than 6" diameter	7	volu-metric		Code Relief #6
		1	B-J	B4.7	branch pipe connection welds 6" diameter and smaller	2	sur-face		
		1	B-J	B4.8	socket welds	7		EX1	
		1	B-J	B4.10	support components	15	visual		
		1	B-G-1	B5.3	pressure retaining volts	18	volu-metric		
		1	B-K-1	B5.4	integrally welded supports (pump casing)	3	volu-metric		
		1	B-K-2	B5.5	support components	3	visual		
		1	B-L-1	B5.6	pump casing welds	1		CR 10	
		1	B-M-2	B6.7	valve bodies	4	visual	CR7	

INSERVICE INSPECTION PROGRAM

System: REACTOR RECIRCULATION							Page 2 of 3		Rev.
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
Loop "B"	252	1	B-J	B4.1	safe end to pipe welds	6	volu-metric sur-face		Code Relief #6
		1	B-J	B4.5	circumferential and long-itudinal pipe welds	37	volu-metric		Code Relief #6
		1	B-J	B4.6	branch pipe connection welds exceeding 6" diameter	6	volu-metric		Code Relief #6
		1	B-J	B4.7	branch pipe connection welds 6" diameter and smaller	2	sur-face		Code Relief #6
	1	1	B-J	B4.8	socket welds	7		EX1	
		1	B-K-2	B4.10	support components	15	sur-face		
		1	B-G-1	B5.3	pressure retaining bolts	18	volu-metric		
		1	B-K-1	B5.4	integrally welded supports (pump casing)				Code Relief #6
		1	B-K-2	B5.5	support components	3	visual		
		1	B-L-1	B5.6	pump casing weld	1		CR 10	
		1	B-L-2	B5.7	pump casing	1	visual	CR8	



INSERVICE INSPECTION PROGRAM

System: REACTOR RECIRCULATION							Page 3 of 3	Rev.	
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
		1	B-M-2	B6.7	valve bodies	3	visual	CR7	

INSERVICE INSPECTION PROGRAM

System: CONTROL ROD DRIVE							Page 1 of 1		Rev.
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
6" Scram discharge headers	250 H-2 H-3	2	C-F	C2.1	circumferential butt	38	volu- metric		Code Relief #6
		2	C-F	C2.2	longitudinal pipe welds in fittings	16	volu- metric		Code Relief #6
		2	C-F	C2.3	branch pipe to pipe welds	2	volu- metric		Code Relief #6
C. R. D. Return Line	250	1	B-J	B4.5	circumferential and longitudinal pipe welds	5	volu- metric		Code Relief #6
		1	B-J	B4.7	branch pipe connection welds 6" diameter and smaller	1	sur- face		
		1	B-M-2	B6.7	Valve bodies	2		CR7 EX2	
		1	B-J	B4.8	socket welds	1	Visual		

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System: FEEDWATER							Page 1 of 2		Rev.
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Request Relief	Remarks
Loop "A" 12" diameter	252	1	B-F	B4.1	safe end to pipe welds	2	volu-metric surface		Code Relief #6
		1	B-J	B4.5	circumferential and long-itudinal pipe welds	20	volu-metric	CR6	Code Relief #6
		1	B-J	B4.6	branch pipe connection welds exceeding 6" diameter	1	volu-metric	CR6	Code Relief #6
		1	B-K-2	B4.10	support components	4	visual		
Loop "A" 18" diameter	252		B-J	B4.5	circumferential and long-itudinal pipe welds	14	volu-metric	CR6	Code Relief #6
		1	B-J	B4.5	circumferential and long-itudinal pipe welds			CR2	Inaccessible weld in penetration
		1	B-J	B4.7	branch pipe connection welds 6" in diameter and smaller	1		EX2	
		1	B-J	B4.8	socket welds	1		EX2	
		1	B-K-2	B4.10	support components	6	visual		
		1	B-M-2	B6.7	valve bodies	3	visual	CR7	

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System: FEEDWATER							Page 2 of 2		Rev.
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
Loop "B" - 12" diameter	252	1	B-F	B4.1	safe end to pipe welds	2	volu-metric and sur-face		Code Relief #6
		1	B-J	B4.5	circumferential and long-itudinal pipe welds	20	volu-metric	CR6	Code Relief #6
		1	B-J	B4.6	branch pipe connection welds exceeding 6" diameter	1	volu-metric	CR6	Code Relief #6
		1	B-K-2	B4.10	supports components	4	visual		
		1	B-J	B4.5	circumferential and long-itudinal pipe welds	16	volu-metric	CR6	Code Relief #6
		1	B-J	B4.5	circumferential and long-itudinal pipe welds			CR2	Inaccessible weld in penetration
		1	B-J	B4.6	branch pipe connection welds exceeding 6" diameter	2	volu-metric	CR6	Code Relief #6
		1	B-J	B4.8	socket welds	1		EX2	
		1	B-K-2	B4.10	support components	6	visual		
		1	B-M-2	B6.7	valve bodies	2	visual	CR7	Examine when disassembled for maintenance or repairs
Loop "B" - 18" diameter	1	1	B-J	B4.5	circumferential and long-itudinal pipe welds	16	volu-metric	CR6	Code Relief #6
		1	B-J	B4.5	circumferential and long-itudinal pipe welds			CR2	Inaccessible weld in penetration
		1	B-J	B4.6	branch pipe connection welds exceeding 6" diameter	2	volu-metric	CR6	Code Relief #6
		1	B-J	B4.8	socket welds	1		EX2	
		1	B-K-2	B4.10	support components	6	visual		
		1	B-M-2	B6.7	valve bodies	2	visual	CR7	Examine when disassembled for maintenance or repairs
		1	B-J	B4.5	circumferential and long-itudinal pipe welds	16	volu-metric	CR6	Code Relief #6
		1	B-J	B4.6	branch pipe connection welds exceeding 6" diameter	2	volu-metric	CR6	Code Relief #6
		1	B-K-2	B4.10	support components	6	visual		

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Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
RHR "in" - LPCI-LOOP "A" from MO 1001-29A to 28" main recirc. disch. Loop A	241 C-6	1	B-J	B4.5	circumferential and longitudinal welds	14	volu-metric	CR6	Code Relief #6
		1	B-J	B4.5	circumferential and longitudinal welds			CR2	Inaccessible weld in penetration
		1	B-J	B4.8	socket welds	7		EX2	
		1	B-K-2	B4.10	support components	5	visual		
		1	B-M-2	B6.7	valve bodies	3	visual	CR7	
RHR "in" - LPCI-LOOP "B" from MO 1001-29B to 28" main recirc. disch. Loop B	241 C-4	1	B-J	B4.5	circumferential and longitudinal welds	17	volu-metric	CR6	Code Relief #6
		1	B-J	B4.5	circumferential and longitudinal			CR2	Inaccessible weld in penetration
		1	B-J	B4.8	socket welds	7		EX2	
		1	B-K-2	B4.10	support components	5	visual		
RHR Heat Exchangers	241 A-7 and A-3	2	C-A	C1.1	circumferential butt welds (vessel to flange)	8	volu-metric	CR6	Code Relief #6
		2	C-B	C1.1	nozzle to vessel welds	4	volu-metric	CR6	Code Relief #6
		2	C-C	C1.3	integrally welded supports	8	surface		
		2	C-D	C1.4	pressure retaining bolts	64	none	CR9	Note: visual inspection of bolts will be conducted during hydro
"A" Pump discharge (12")	241 A-6	2	C-G	C2.1	Circumferential butt welds	12	volu-metric	CR6	Code Relief #6
		2	C-G	C2.2	longitudinal weld joints in pipe fittings	1	volu-metric	CR6	Code Relief #6
		2	C-G	C2.3	branch pipe to pipe welds	0	volu-metric		
		2	C-E-2	C2.6	support components	2	visual		



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Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
"C" pump discharge (12")	241 B-4	2	C-G	C2.1	circumferential butt welds	12	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal weld joints in pipe fittings	1	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe welds	0	volu-metric		
		2	C-E-2	C2.6	support components	2	visual		
"B" pump disch. (12")	241 A-4	2	C-G	C2.1	circumferential butt welds	12	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal pipe welds in-fitting	1	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe welds	0	volu-metric		
		2	C-E-2	C2.6	support components	2	visual		
"D" pump disch. (12")  16" to E-207A	241 B-4	2	C-G	C2.1	circumferential butt welds	12	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal pipe welds in-fitting	1	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe welds	0	volu-metric		
		2	C-E-2	C2.6	support components	2	visual		
	241 B-6	2	C-G	C2.1	circumferential butt welds	11	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal pipe welds in fittings	1	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe welds	0	volu-metric		Code Relief #6
		2	C-E-2	C2.6	support components	2	visual		

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Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
16" to E-207B	241 B-4	2	C-G	C2.1	circumferential butt welds	12	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal pipe welds in fittings	1	volu-metric		
		2	C-G	C2.3	branch pipe to pipe welds	0	volu-metric		
		2	C-E-2	C2.6	support components	3	visual		
16" From E-207A	241 B-6	2	C-G	C2.1	circumferential butt welds	4	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal weld joints in fittings	1	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe welds	1	volu-metric		Code Relief #6
		2	C-E-2	C2.6	support components	0	visual		
16" From E-207B	241 B-4	2	C-G	C2.1	circumferential butt welds	4	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal weld joints in fittings	1	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe welds	1	volu-metric		Code Relief #6
		2	C-E-2	C2.6	support components	1	visual		
18" "A" Loop discharge	241 M-3 to A-2	2	C-G	C2.1	circumferential butt welds	28	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal pipe welds in fittings	3	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe welds	3	volu-metric		Code Relief #6
		2	C-E-2	C2.6	support components	13	visual		

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Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
18" "B" Loop discharge in to MO-1001-29A	241 M-3 to A-2	2	C-G	C2.1	circumferential butt welds	29	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal pipe welds in fittings	3	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe welds	3	volu-metric		Code Relief #6
		2	C-E-2	C2.6	support components	10	visual		
"A" Suction	241 B-6	2	C-G	C2.1	circumferential butt welds	24		EX3	
		2	C-G	C2.2	longitudinal pipe welds in fittings	5		EX3	
		2	C-G	C2.3	branch pipe to pipe welds	0		EX3	
		2	C-E-2	C2.6	support components	9		EX3	
"C" Suction	241 A-6	2	C-G	C2.1	circumferential butt welds	21		EX3	
		2	C-G	C2.2	longitudinal pipe welds in fitting	3		EX3	
		2	C-G	C2.3	branch pipe to pipe welds	0		EX3	
		2	C-E-2	C2.6	support components	6		EX3	
"B" Suction	241 A-4	2	C-G	C2.1	circumferential butt welds	21		EX3	
		2	C-G	C2.2	longitudinal pipe welds in fittings	4		EX3	
		2	C-G	C2.3	branch pipe to pipe welds	0		EX3	
		2	C-E-2	C2.6	support components	6		EX3	

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Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
"D" suction	241 B-4	2	C-G	C2.1	circumferential butt welds	25		EX3	
		2	C-G	C2.2	longitudinal pipe welds in fittings	6		EX3	
		2	C-G	C2.3	branch pipe to pipe welds	0		EX3	
		2	C-E-2	C2.6	support components	9		EX3	
18" from "A" suction to 20" X 18" reducer	241 B-5 and A-6	2	C-G	C2.1	circumferential butt welds	6	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal pipe welds in fittings	3	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe welds	1	volu-metric		Code Relief #6
		2	C-E-2	C2.6	support components	2	visual		
20" suction cross connection to Loop "B" from Loop "A" 20" X 18" reducer	241 B-5 A-5	2	C-G	C2.1	circumferential butt welds	34	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal pipe welds in fittings	15	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe welds	0	volu-metric		
		2	C-E-2	C2.6	support components	20	visual		
18" from "C" suction to branch connection	241 B-5	2	C-G	C2.1	circumferential butt welds	4	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal pipe welds in fitting	3	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe welds	2	volu-metric		Code Relief #6
		2	C-E-2	C2.6	support components	2	visual		

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Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
18" from "B" suction to branch connection	241 A-5	2	C-G	C2.1	circumferential butt welds	4	volu-		Code Relief #6
		2	C-G	C2.2	longitudinal pipe welds in fitting	3	metric volu-		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe welds	2	metric volu-		Code Relief #6
		2	C-E-2	C2.6	support components	2	visual		
18" from "D" suction to 20" X 18" reducer	241 A-5	2	C-G	C2.1	circumferential butt welds	6	volu-		Code Relief #6
		2	C-G	C2.2	longitudinal pipe welds in fitting	3	metric volu-		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe welds	1	metric volu-		Code Relief #6
		2	C-E-2	C2.6	support components	2	visual		
4" flushing line "A" suction to N29K	241 A-5	2	C-G	C2.1	circumferential butt welds	6		EX4	
		2	C-G	C2.2	longitudinal pipe welds in fittings	2		EX4	
		2	C-G	C2.3	branch pipe to pipe welds	1		EX4	
4" flushing line "C" suction to N29K	241 B-5	2	C-G	C2.1	circumferential butt welds	2		EX4	
		2	C-G	C2.2	longitudinal pipe welds in fittings	2		EX4	
		2	C-G	C2.3	branch pipe to pipe welds	1		EX4	



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Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
4" flushing line "B" suction to N29K	241 A-5	2	C-G	C2.1	circumferential butt welds	2		EX4	
		2	C-G	C2.2	longitudinal pipe welds in fittings	2		EX4	
		2	C-G	C2.3	branch pipe to pipe welds	1		EX4	
4" flushing line "D" suction to N29K	241 B-5	2	C-G	C2.1	circumferential butt welds	2		EX4	
		2	C-G	C2.2	longitudinal pipe welds in fittings	2		EX4	
		2	C-G	C2.3	branch pipe to pipe welds	1		EX4	
"RHR" "OUT" from mo-1001-47 to suction cross connection	241 C-5	2	C-G	C2.1	circumferential butt welds	3	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal pipe welds in fittings	2	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe welds	1	volu-metric		Code Relief #6
		2	C-E-2	C2.6	support components	2	visual		Code Relief #6
10" containment spray loop "A"	241 D-4 C-3 C-4	2	C-G	C2.1	circumferential butt welds	20	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal pipe welds in fittings	10	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe welds	0	volu-metric		
		2	C-E-2	C2.6	support components	7	visual		



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Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
10" containment spray loop "B"	241	2	C-G	C2.1	circumferential butt welds	31	volu-metric	CR6	Code Relief #6
		2	C-G	C2.2	longitudinal pipe welds in fittings	15	volu-metric	CR6	Code Relief #6
		2	C-G	C2.3	branch pipe to pipe welds	0	volu-metric		
		2	C-E-2	C2.6	support components	14	visual		
4" head spray nozzle flange from MO-1001-60	241 D-6	2	C-G	C2.1	circumferential butt welds	33		EX4	
		2	C-G	C2.2	longitudinal pipe welds in fittings	18		EX4	
		2	C-G	C2.3	branch pipe to pipe welds	1		EX4	
		2	C-E-2	C2.6	support components	21		EX4	
		2	C-D	C2.4	pressure retaining bolting			EX4	
4" head spray nozzle flange from MO-1001-60	241 D-6	1	B-J	B4.5	circumferential and longitudinal pipe welds	42	volu-metric	CR6	Code Relief #6
		1	B-J	B4.5	circumferential and longitudinal pipe welds	1		CR2	Inaccessible weld in penetration
		1	B-K-2	B4.10	support components	4	visual		
		1	B-M-2	B6.7	valve bodies	3	visual	CR7	
		1	B-G-2	B4.12	pressure retaining bolting	16	visual surface		
RHR "out" to MO-1001-47	241 C-5	1	B-J	B4.5	circumferential and longitudinal pipe welds	34	volu-metric	CR6	Code Relief #6
		1	B-J	B4.5	circumferential and longitudinal pipe welds			CR2	Inaccessible weld in penetration
		1	B-K-2	B4.10	support components	4	visual		
		1	B-M-2	B6.7	valve bodies	3	visual	CR7	

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Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
Loop "A" 12" line to torus test line	241 C-6 C-7	2	C-G	C2.1	circumferential butt welds	28		EX3	
		2	C-G	C2.2	longitudinal weld joints	10		EX3	
		2	C-G	C2.3	branch pipe to pipe weld	2		EX3	
		2	C-E-2	C2.6	support components	9		EX3	
Loop "A" 6" line to torus spray	241 C-6 C-7	2	C-G	C2.1	circumferential butt welds	17		EX3	
		2	C-G	C2.2	longitudinal weld joints	8		EX3	
		2	C-E-2	C2.6	support components	5		EX3	
Loop "B" 12" line to torus test line	241 C-6 C-7	2	C-G	C2.1	circumferential butt welds	25		EX3	
		2	C-G	C2.2	longitudinal weld joints	9		EX3	
		2	C-G	C2.3	branch pipe to pipe weld	1		EX3	
		2	C-E-1	C2.6	support components	6		EX3	
Loop "B" 6" line to torus spray		2	C-G	C2.1	circumferential butt welds	11		EX3	
		2	C-G	C2.2	longitudinal weld joints	5		EX3	
		2	C-G	C2.3	branch pipe to pipe weld	1		EX3	
		2	C-E-2	C2.6	support components	2		EX3	

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Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
18" tie line Loop "A" to Loop "B"	241 B-3 to B-7	2	C-G	C2.1	circumferential butt welds	29	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal weld joints	7	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe welds	1	volu-metric		Code Relief #6
		2	C-E-2	C2.6	support components	6	visual		
6" fuel pool connection from 18" tie line to N26	241 B-4	2	C-G	C2.1	circumferential butt welds	23	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal weld joints in fittings	13	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe weld	1	volu-metric		Code Relief #6
		2	C-E-2	C2.6	support components	15	visual		
4" chemwaste receiver line to MO-1001-32	241 B-4	2	C-G	C2.1	circumferential butt welds	3		EX4	
		2	C-G	C2.2	longitudinal weld joints	1		EX4	
		2	C-G	C2.3	branch pipe to pipe weld	1		EX4	
		2	C-E-2	C2.6	support components	1		EX4	

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Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
6" Line from RHR "out" to fuel pool N29	241	2	C-G	C2.1	circumferential butt welds	20	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal weld joints in fittings	10	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe weld	1	volu-metric		Code Relief #6
		2	C-E-2	C2.6	support components	9	visual		
6" torus make-up from condensate to AO-8000	241 C-3	2	C-G	C2.1	circumferential butt welds	7		EX3	
		2	C-G	C2.2	longitudinal weld joints	2	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe weld	1	volu-metric		Code Relief #6
18" Service water to discharge cross connection	M-241 H-5	2	C-G	C2.1	circumferential butt welds	34	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal weld joints in fitting	19	volu-metric		Code Relief #6
		2	C-E-2	C2.6	support components	11	visual		

## INSERVICE INSPECTION PROGRAM

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Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
16" heat exchanger line discharge loop "A" (E 207A)	241 B-7	2	C-G	C2.1	circumferential butt welds	5	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal weld joints	1	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe weld	1	volu-metric		Code Relief #6
16" heat exchanger line discharge loop "B" (E-207B)		2	C-G	C2.1	circumferential butt welds	5	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal pipe welds	1	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe weld	1	volu-metric		Code Relief #6
Loop "A" 12" line to torus test line	241 C-6 C-7	2	C-G	C2.1	circumferential butt welds	28		EX3	
		2	C-G	C2.2	longitudinal weld joints	10		EX3	
		2	C-G	C2.3	branch pipe to pipe weld	2		EX3	
		2	C-E-2	C2.6	support components	9		EX3	
Loop "A" 6" line to torus spray	241 C-6 C-7	2	C-G	C2.1	circumferential butt welds	17		EX3	
		2	C-G	C2.2	longitudinal weld joints	8		EX3	
		2	C-E-2	C2.6	support components	5		EX3	



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System: RESIDUAL HEAT REMOVAL							Page 13 of 14		Rev.
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
Loop "B" 12" line to torus test line	241 C-6 C-7	2	C-G	C2.1	circumferential butt welds	25		EX3	
		2	C-G	C2.2	longitudinal weld joints	9		EX3	
		2	C-G	C2.3	branch pipe to pipe weld	1		EX3	
		2	C-E-1	C2.6	support components	6		EX3	
Loop "B" 6" line to torus spray	241 C-6 C-7	2	C-G	C2.1	circumferential butt welds	11		EX3	
		2	C-G	C2.2	longitudinal weld joints	5		EX3	
		2	C-G	C2.3	branch pipe to pipe weld	1		EX3	
		2	C-E-2	C2.6	support components	2		EX3	
18" tie line Loop "A" to Loop "B"	241 B-3 to B-7	2	C-G	C2.1	circumferential butt welds	33	volu- metric		Code Relief #6
		2	C-G	C2.2	longitudinal weld joints	7	volu- metric		Code Relief #6
		2	C-E-2	C2.6	support components	6	visual		
6" fuel pool connection from 18" tie line to N26	241 B-4	2	C-G	C2.1	circumferential butt welds	24	volu- metric		Code Relief #6
		2	C-G	C2.2	longitudinal weld joints in fittings	13	volu- metric		Code Relief #6



INSERVICE INSPECTION PROGRAM

System: RESIDUAL HEAT REMOVAL							Page 14 of 14		Rev.
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
6" fuel pool connection from 18" tie line to N26  (continued)		2	C-G	C2.3	branch pipe to pipe weld	1	volu-metric		Code Relief #6
		2	C-E-2	C2.6	support components	15	visual		
4" chemwaste receiver line to MO-1001-32	241 B-4	2	C-G	C2.1	circumferential butt welds	3		EX4	
		2	C-G	C2.2	longitudinal weld joints	1		EX4	
		2	C-G	C2.3	branch pipe to pipe weld	1		EX4	
		2	C-E-2	C2.6	support components	1		EX4	
6" line from RHR "out" to fuel pool N29	241 B-5	2	C-G	C2.1	circumferential butt welds	21	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal weld joints in fittings	10	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe weld	1	volu-metric		Code Relief #6
		2	C-E-2	C2.6	support components	9	visual		
6" torus make-up from condensate to AO-8000	241 C-3	2	C-G	C2.1	circumferential butt welds	7		EX3	
		2	C-G	C2.2	longitudinal weld joints in fittings	2	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe weld	1	volu-metric		Code Relief #6

INSERVICE INSPECTION PROGRAM

System: REACTOR WATER CLEAN-UP							Page 1 of 1		Rev.
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
Reactor water clean-up water in from MO-1201-80 (4" to 6" line)	247 D-4 to D-7	1	B-J	B4.5	circumferential and longitudinal pipe welds	42	volume	CR6	Code Relief #6
		1	B-J	B4.7	branch pipe connection welds 6" diameter and smaller	1	surface		
		1	B-K-2	B4.10	support components	8	visual		
		1	B-M-2	B4.7	valve bodies	3	visual	CR7	
Reactor water clean-up "out" to 1201-5 (6" line)	247	1	B-J	B4.5	circumferential and longitudinal pipe welds	39	volume	CR6	Code Relief #6
		1	B-J	B4.5	circumferential and longitudinal pipe welds			CR2	Inaccessible weld in penetration
		1	B-J	B4.7	branch pipe connection welds 6" diameter and smaller	1	surface		
		1	B-K-2	B4.10	support components	2	visual		
		1	B-M-2	B6.7	valve bodies	3	visual	CR7	

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System: REACTOR CORE ISOLATION COOLANT							Page 1 of 2		Rev. 1
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
Steam supply line main steam line "C" to 1301-17	245 C-6 C-7	1	B-J	B4.5	circumferential and longitudinal pipe welds	25	volu-metric	CR6	Code Relief #6
		1	B-J	B4.5	circumferential and longitudinal pipe welds			CR2	Inaccessible weld in penetration
		1	B-J	B4.7	branch pipe connections 6" and smaller	1	sur-face		
		1	B-K-2	B4.10	support components	2	visual		
Pump discharge from 1301-49 to reactor water clean-up (4" line)	245 C-5	1	B-J	B4.5	circumferential and longitudinal pipe welds	18	volu-metric	CR6	Code Relief #6
		1	B-J	B4.7	branch pipe connections smaller than 6"	1	volu-metric	CR6	Code Relief #6
		1	B-K-2	B4.10	support components	2	visual		
Turbine exhaust - from 1301-64 to torus (8")	245 B-5 A-5	2	C-G	C2.1	circumferential butt welds	4	volu-metric	CR6	Code Relief #6
		2	C-G	C2.2	longitudinal pipe welds in fittings	1	volu-metric	CR6	Code Relief #6
		2	C-E-2	C2.6	support components	1	visual		

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System: REACTOR CORE ISOLATION COOLANT							Page 2 of 2		Rev. 1
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
Pump suction from torus to MO-1301-26 (6" line)	245 A-6	2	C-G	C2.1	circumferential butt welds	9		EX3	
	A-5	2	C-G	C2.2	longitudinal pipe welds in fittings	2		EX3	
		2	C-E-2	C2.6	support components	2		EX3	
Steam supply line from main steam line "C" to 1301-17	245 C-5	1	B-M-2	B6.7	Valve bodies	2	visual	CR7	
Pump discharge from 1301-49 to reactor water clean-up (4")	245 C-5	1	B-M-2	B6.7	Valve bodies	2	visual	CR7	

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System: CORE SPRAY							Page 1 of 3		Rev.
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
Loop "A" 10" from MO-1400-25A to reactor	242 C-6 C-7	1	B-J	B4.5	circumferential and longitudinal pipe welds	25	volu-metric	CR6	Code Relief #6
		1	B-J	B4.5	circumferential and longitudinal pipe welds			CR2	Inaccessible weld in penetration
		1	B-K-2	B4.10	support components	3	visual		
		1	B-F	B4.1	safe end to pipe and dissimilar metal welds	3	volu-metric surf.	CR6	Code Relief #6
Loop "B" - 10" from MO-1400-25B to reactor	242 C-6 C-7	1	B-J	B4.5	circumferential and longitudinal pipe welds	27	volu-metric	CR6	Code Relief #6
		1	B-J	B4.5	circumferential and longitudinal pipe welds			CR2	Inaccessible weld in penetration
		1	B-K-2	B4.10	support components	3	visual		
		1	B-F	B4.1	safe end to pipe and dissimilar metal welds	3	volu-metric surf.		
"A" in to MO-1400-25A from pump 215A	242	2	C-G	C2.1	circumferential butt welds	38	volu-metric	CR6	Code Relief #6
		2	C-G	C2.2	longitudinal weld joints in fittings	17	volu-metric	CR6	Code Relief #6
		2	C-D	C2.4	pressure retaining bolting			CR9	
		2	C-E-2	C2.6	support components	11	visual		



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System: CORE SPRAY							Page 2 of 3		Rev.
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
"B" in to MO-1400-25B	242 B-4 C-4 C-5 C-6	2	C-G	C2.1	circumferential butt welds	30	volu- metric		Code Relief #6
		2	C-G	C2.2	longitudinal weld joints in fittings	11	volu- metric		Code Relief #6
		2	C-D	C2.4	pressure retaining bolt- ing			CR9	
		2	C-E-2	C2.6	support components	9	visual		
Loop "A" - MO-1400-25A, AO-9A, 1400-6A	C-6 C-7	1	B-M-2	B6.7	valve bodies	3		CR7	
Loop "B" - MO-1400-25B, AO-9B, 1400-6B	C-6 C-7	1	B-M-2	B4.7	valve bodies	3		CR7	
Loop "A" torus to pump 215A-18" line	242 B-5	2	C-G	C2.1	circumferential butt welds	18		EX3	
		2	C-G	C2.2	longitudinal weld joints in fittings	5		EX3	
		2	C-E-2	C2.6	support components	5		EX3	
Loop "B" torus to pump 215B - 18" line	242	2	C-G	C2.1	circumferential butt welds	18		EX3	
		2	C-G	C2.2	longitudinal weld joints in fittings	6		EX3	
		2	C-E-2	C2.6	support components	5		EX3	



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System: CORE SPRAY							Page 3 of 3		Rev.
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
12" line to condensate storage from 18" suction to valve 29K-Loop A	242 B-5	2	C-G	C2.1	circumferential butt welds	1		EX3	
		2	C-G	C2.3	branch pipe to pipe weld	1		EX3	
12" to condensate storage to valve 29K from 18" suction Loop "B"	242 A-3	2	C-G	C2.1	circumferential butt weld	1		EX3	
		2	C-G	C2.3	branch pipe to pipe weld	1		EX3	
6" test line to RHR test line from Loop "A" discharge	242 C-5 B-5 B-6	2	C-G	C2.1	circumferential butt welds	13	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal weld joints in fittings	2	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe weld joints	2	volu-metric		Code Relief #6
		2	C-E-2	C2.6	support components	1	visual		
6" test line to RHR test line from Loop "B" discharge	242 C-5 B-5 B-6	2	C-G	C2.1	circumferential butt welds	13	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal weld joints in fittings	2	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe weld joints	2	volu-metric		Code Relief #6

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System: HIGH PRESSURE COOLANT INJECTION							Page 1 of 3		Rev. 1
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
14" line to feedwater Loop "B" - water in from MO-2301-8	243 B-6	1	B-J	B4.5	circumferential and longitudinal pipe welds	23	volu-metric	CR6	Code Relief #6
		1	B-J	B4.6	branch pipe to pipe weld	1	volu-metric	CR6	Code Relief #6
		1	B-K-2	B4.10	support components	6	visual		
		1	B-M-2	B6.7	valve bodies	2	visual	CR7	
10" steam supply line from main steam line "D" to MO-2301-5	243 C-6	1	B-J	B4.5	circumferential and longitudinal pipe welds	23	volu-metric	CR6	Code Relief #6
		1	B-J	B4.5	circumferential and longitudinal pipe welds			CR2	Inaccessible weld in penetration
		1	B-J	B4.6	branch pipe to pipe weld		volu-metric	CR6	Code Relief #6
		1	B-K-2	B4.10	support components		visual		
		1	B-M-2	B6.7	valve bodies		visual	CR7	
10" steam supply to turbine from MO-2301-5	243 C-3 C-5 C-4 B-3	2	C-F	C2.1	circumferential butt welds	30	volu-metric	CR6	Code Relief #6
		2	C-F	C2.2	longitudinal pipe welds in fittings	12	volu-metric	CR6	Code Relief #6
		2	C-F	C2.3	branch pipe to pipe weld	1	volu-metric	CR6	Code Relief #6
		2	C-E-2	C2.6	support components	8	visual		

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System: HIGH PRESSURE COOLANT INJECTION							Page 2 of 3		Rev. 1
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
20" Turbine exhaust	243 B-4 to B-7	2	C-F	C2.1	circumferential butt welds	36	volu-metric		Code Relief #6
		2	C-F	C2.2	longitudinal pipe welds	12	volu-metric		Code Relief #6
		2	C-F	C2.3	branch pipe to pipe weld	2	volu-metric		Code Relief #6
		2	C-E-2	C2.6	support components	7	visual		
Water in from pump to 2301-8	243 B-5 B-6	2	C-G	C2.1	circumferential butt welds	33	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal pipe welds in fitting	15	volu-metric		Code Relief #6
		2	C-D	C2.4	pressure retaining bolts	18	visual surface		
		2	C-E-2	C2.6	support components	11	visual		
Suction from torus to Pump P-205	243 A-5 to A-7 B-5 C-4 C-5	2	C-F	C2.1	circumferential butt welds	29		EX3	
		2	C-F	C2.2	longitudinal pipe welds in fitting	10		EX3	
		2	C-D	C2.4	pressure retaining bolts	16		EX3	
		2	C-E-2	C2.6	support components	5		EX3	

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System: HIGH PRESSURE COOLANT INJECTION							Page 3 of 3		Rev. 1
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
Condensate storage to suction branch connection from MO-2301-6	243 C-4	2	C-F	C2.1	circumferential butt welds	12		EX3	
		2	C-F	C2.2	longitudinal pipe welds in fittings	5		EX3	
		2	C-F	C2.3	branch pipe to pipe weld	1		EX3	
		2	C-E-2	C2.6	support components	4		EX3	
4" from water "in" RHR test line	243 B-5 A-5	2	C-F	C2.1	circumferential butt welds	22		EX3	
		2	C-F	C2.3	branch pipe to pipe weld	2		EX3	
		2	C-E-2	C2.6	support components	5		EX3	
10" from 2301-10 (RCIC test line-to "HPCI" water "in"	243 C-G	2	C-G	C2.1	circumferential butt welds	10	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal pipe welds in fittings	4	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe weld	1	volu-metric		Code Relief #6
		2	C-D	C2.4	pressure retaining bolting	16	visual surface		
		2	C-E-2	C2.6	support components	3	visual		

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System: CONTAINMENT ATMOSPHERIC CONTROL SYSTEM							Page 1 of 2		Rev.
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
4" Nitrogen Purge supply line	M-227 D-2	2	C-G	C2.1	circumferential butt welds	17	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal weld joints in fittings	11	volu-metric		Code Relief #6
		2	C-G	C2.3	branch pipe to pipe welds	1	volu-metric		Code Relief #6
		2	C-E-2	C2.6	support components	6	visual		
Drywell Purge Air to Penetration X-25	M-227	2	C-G	C2.1	circumferential butt welds	4	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal weld joints in fittings	2	volu-metric		Code Relief #6
		2	C-G	C2.6	support components		visual		
Drywell Purge Air to Penetration	M-227	2	C-G	C2.1	circumferential butt welds	10	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal weld joints in fittings	4	volu-metric		Code Relief #6
		2	C-E-2	C2.6	support components	1	visual		



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System: CONTAINMENT ATMOSPHERIC CONTROL SYSTEM							Page 2 of 2		Rev.
Line or Component Description	P&ID and Co-ord.	Class	Section XI Category	Section XI Item Number	Item Description	No. of Items	Exam Method	Relief Request	Remarks
20" Lone to torus penetration X-205	M-227 C-2 C-3 C-4	2	C-G	C2.1	circumferential butt welds	10	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal weld joints in fittings	4	volu-metric		Code Relief #6
		2	C-E-2	C2.6	support components	1	visual		
20" line to torus penetration	M-227 D-6 D-7 C-6 C-7	2	C-G	C2.1	circumferential butt welds	16	volu-metric		Code Relief #6
		2	C-G	C2.2	longitudinal weld joints in fittings	4	volu-metric		Code Relief #6
		2	C-E-2	C2.6	support components	2	visual		

ATTACHMENT 3

# MAGNAFLUX

## Quality Services

To: F. N. Famulari  
Date: March 17, 1982

RE: Docket No. 50-293  
Request for additional information  
Paragraph 3 Code Relief #6 (b)

Ultrasonic examinations at Pilgrim Nuclear Power Station have been conducted using side drilled holes to form the Distance Amplitude Correction Curve during the first inspection interval. During this interval, there has been one documented unacceptable indication (weld 3-I-3, CRD Re-route). Radiographic investigation confirmed the presence of the unacceptable planar flaw.

An informational ultrasonic examination, utilizing the side-drilled hole calibration, of the Class 2 Core Spray modification detected an unacceptable condition in one of the welds. Radiographic investigation again confirmed the presence of the unacceptable planar flaw.

In addition, all Level II and Level III ultrasonic technicians utilized in manual ultrasonic examination of piping are trained on the EPRI IGSCC reference blocks before performing any examinations at Pilgrim Nuclear Power Station.

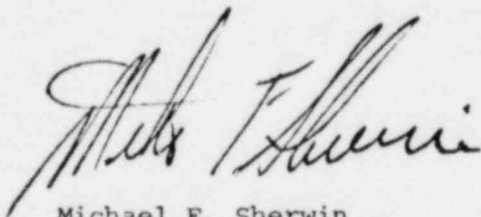
The ultrasonic procedure for volumetric examination of piping welds at Pilgrim Nuclear Power Station for piping thickness 1 inch and less uses the 6/8 node side-drilled hole as the primary reference. When the DAC curve is established on side-drilled holes, the amplitude response from a Code 4/8 node (I.D.) notch is greater than the primary reference of the side drilled hole. This comparison shows that the side-drilled hole calibration is more sensitive for the half-node examination of piping welds in this thickness range.

For pipe wall thicknesses over 1 inch in thickness and greater, the procedure establishes primary reference at the 5/8 node. This exceeds the ASME Code, Section V requirement of 3/8 node. When the DAC curve is established on side-drilled holes, the amplitude response from a code 4/8 node (I.D.) notch is greater than the primary reference. This comparison shows that the side-drilled hole calibration is more sensitive when calibrated in this manner.

F. N. Famulari  
March 17, 1982  
Page 2

Magnaflux Quality Services (formerly Peabody Testing) has performed examinations utilizing this procedure during the 1977, 1980, and 1981 refueling outages.

Based on the additional operator training, elevated sensitivity levels, and the demonstrated ability to detect unacceptable conditions, we feel that this Code Relief Request is justified. Additionally, a pre-service/in-service comparison of data shows no significant change in indication amplitudes or linear extent in the manual examinations of Pilgrim Nuclear Power Station piping welds.

A handwritten signature in cursive script, appearing to read "Mike Sherwin".

Michael F. Sherwin  
Quality Assurance Engineer

MFS/lak

**nutech**

San Jose, California

Project Pilgrim Unit 1 (BOS-01) File No. 87.701.0004  
 Owner Boston Edison Company  
 Client Boston Edison Company

**PURPOSE:** Determine the line size(s) which can be excluded from ISI Class 1 surface and volumetric examination in accordance with ASME Section XI, 1974 Edition thru Summer 1975 Addenda, Article IWB-1220(b)(1).

(b) Components may be exempted from examination (see IWB-1220(c)) if any of the following conditions are met:

(1) Under the postulated conditions of loss of coolant from the component during normal reactor operation, the reactor can be shut down and cooled down in an orderly manner assuming makeup system<sup>5</sup> only. However, in no instance may the size exemption be more than 3 in. nominal pipe size.

<sup>5</sup>Normal makeup system are those systems that have the capability to maintain reactor coolant inventory under the respective conditions of startup, hot standby, operation or cooldown, using onsite power.

(1) Exclusion inside diameter in inches, water =  $D_w = \frac{\sqrt{M}}{17.8}$

(2) Exclusion inside diameter in inches, steam =  $D_s = 2D_w$

(3) M = Total make-up flow rate in gallons of water per minute (gpm) @ 70°F

Equations (1), (2), and (3) are taken from G.E. document 22A2750, Page 7.

RCIC flow = 400 gpm

CRD flow = 49 gpm

(CRD Cooling Water Flow)

Condensate Transfer/Feedwater flow = 1500 gpm

$$D_w = \frac{\sqrt{400 + 49 + 1500}}{17.8} = 2.48 \text{ inches}$$

$$D_s = 2D_w = 2(2.48) = 4.96 \text{ inches}$$

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Prepared By/Date	J.M. Clance 3/31/82					of	1
Checked By/Date	J.P. Dwyer 3/31/82						

### 3.3.2 ISI Code. IS 121. Exclusions from System Boundary.

3.3.2.1 ISI Code. Paragraphs (a) and (b) including note 1 on page 3. GE-54FSD defines the words "reactor coolant makeup system" and "normal make-up system" as the same system. This system includes the feedwater pumps, condensate/feedwater transfer pumps, control rod drive pumps, and reactor core isolation cooling system pumps. "On-site power" is defined as electric power normally available on site during normal operation including: startup, hot standby, operation, cool-down or shut down of the plant. This includes power available from outside lines.

3.3.2.2 Using the make-up capability as described above it is possible to calculate the size of liquid and steam lines which are excluded from volumetric examination. Liquid lines are defined as those which penetrate the reactor pressure vessel (RPV) below the normal water level and steam lines as those which penetrate the RPV above the normal water level. Water flow rates from a liquid line break are taken as 8100 pounds/sec/ft<sup>2</sup> at 1000 psi. Steam flow rates from a steam line break are taken as 2000 pounds/sec/ft<sup>2</sup> at 1000 psi. Make-up water weighs 8.33 pounds per gallon at 70°F. On this basis the exclusion diameters are as follow:

$$\text{Exclusion inside diameter in inches, water} = D_W = \frac{\sqrt{M}}{17.8}$$

$$\text{Exclusion inside diameter in inches, steam} = D_S = 2 D_W$$

Where:

M = Total normal make-up flow rate in gallons of water per minute (gpm)

Combined flow rates from the Reactor Core Isolation Cooling System, the Control Rod Drive System and the Feedwater System are used to determine normal make-up capability. The condensate/feedwater transfer pump capacity or gravity feed capacity rather than feedwater pump capacity is used to make this analysis because the hotwell volume is limited to a few minutes of feedwater pump operation at maximum flow and the hotwell volume may be less than required to bring the RPV down to atmospheric pressure at maximum or smaller flows. Condensate storage water supplied by the condensate/feedwater transfer pump or by gravity flow will be required to maintain feedwater pump suction head in the hotwell in this case. Table 3.3.2.2 shows normal make-up rates for the CRD and RCIC systems. Condensate/feedwater transfer rates will have to be determined for each plant. As an example for a 133 plant, assuming 1000 gpm condensate/feedwater transfer capacity.

$$D_W = \frac{\sqrt{72 + 700 - 1000}}{17.8} = 2.35 \text{ inches diameter}$$

$$D_S = 2 \times 2.35 = 4.72 \text{ inches diameter}$$

Note that the exclusion diameter applies to the source of the leakage fluid. In the example, a 10 inch pipe attached to a 2 inch pipe below the normal water line would be excluded.



TABLE 3.3.2.2

Typical Normal Make-Up Capacity

Vessel ID (Inches)	CPD Flow (gpm)	RSIC Flow (gpm)
183	44	500
201	53	500
218	61	600
239	72	700
251	78	800

3.3.3 Further discussion of the ISI code for Class I components are found in Tables A, B, and C in Appendix A.

3.4 Class 2 Components. (Based on May 1973 draft of 1974 ISI Code)

3.4.1 ISI Code. TWC 1209. System Boundary: Typically Group B components in the data sheet Figure 1.1 are subject to Class 2 inspection rules and the boundaries for Group B define the boundaries for Class 2.

3.4.2 ISI Code. TWC 1222. Components within the system boundaries exempted from volumetric inspection.

3.4.2.1 The design pressure of the component is less than 275 psig or the design temperature is less than 200°F. Note: AEC Regulatory Guide 1.51 (May 1973) excludes components only where the design pressure is less than 275 psig and the design temperature is less than 200°F.

3.4.2.2 Components which do not function during normal reactor operation.

3.4.2.3 Components which perform an emergency core cooling function, and the fluid chemistry is controlled by periodic sampling and tests.

3.4.2.4 Component whose size is  $\leq 4$  inch or less nominal pipe diameter.