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BECo Ltr. #96-054

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U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

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

Boston Edison Company Response to NRC Questions on Residual Heat Removal and Fuel Pool Cooling Intertie Piping (TAC. NO. M91524)

Attachment A to this letter provides our response to NRC request for additional information on the residual heat removal and fuel pool cooling (RHR/FPC) intertie piping. This information is based upon clarifications discussed in a telephone call on April 3, 1996, with the NRC, Boston Edison, and the NRC contractor, Idaho National Engineering Laboratory.

Attachment B to this letter provides our revised relief request, which consolidates the technical resolutions included in our February 9, 1995, and March 5, 1996, letters and Attachment A to this letter. This request supersedes the previous request for relief without condition from the second ten-year ISI interval inspections of RHR/FPC intertie piping in high radiation areas pursuant to 10 CFR 50.55a(a)(3).

for E. T. Boulette, PhD

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Attachment A: Response to NRC Questions.
Attachment B: Revised Relief Request.

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ATTACHMENT A

Response to NRC Questions

Background

In a letter dated February 9, 1995, Boston Edison Company (BECo) requested relief from inspecting certain piping welds and hangers in the RHR/FPC intertie line which are located in high radiation areas. Justification for the relief included quality and safety considerations. The letter, also, committed to install an isolation valve in the RHR/FPC intertie line during RFO#11 as an acceptable alternative to conducting code required inspections in the second ten-year ISI interval. The new isolation valve would allow the Class 2 piping section in question to be reclassified as non-code thereby eliminating the inspection requirement. In a safety evaluation report (SER) dated May 18, 1995, the NRC granted the relief contingent upon installation of the isolation valve during RFO#11. Otherwise, components in the intertie must be examined during RFO#11.

However, subsequent adoption of the 1989 Edition of ASME Code Section XI for our Third Ten-Year ISI Program (reference BECo letter #95-091 dated September 1, 1995) removed the old code requirement to inspect this piping making the valve installation alternative unnecessary. In response to NRC Request for Additional Information on our Third Ten-Year ISI Program, BECo provided plans for examination of Class 2 piping welds in pipes with less than 3/8 inch wall thickness (reference BECo letter #96-009, dated February 15, 1996). Shortly thereafter, in a letter dated March 5, 1996, BECo requested approval to rescind the commitment to install the isolation valve and forego the second ten-year ISI examinations mandated by the NRC SER. The letter, also, contained new quality and safety considerations information that superseded the technical bases in the February 9, 1995, relief request letter.

Subsequently, the NRC has responded with the following questions:

NRC Question No.1

In the NRC Safety Evaluation Report (SER) dated May 18, 1995, the licensee received relief from performing Section XI examinations on the subject residual heat removal and fuel pool cooling (RHR/FPC) systems; contingent on a proposed modification to the subject intertie line during refueling outage (RFO) #11. In a letter dated March 5, 1996, the licensee submitted a letter withdrawing its commitment to perform the aforementioned modification.

RFO#11 is currently scheduled for March 1997. As a part of the SER dated May 18, 1995, the following stipulation was given for the granting relief, "If the modification required to shift the Class boundary is not completed during the RFO#11, then the components should be examined during RFO#11." Based on the scheduled RFO#11 of March 1997, does the licensee intend to satisfy the condition stated in the SER and/or the Code requirements for the second 10-year interval?

Response

Examination of RHR/FPC intertie piping welds and hangers during RFO#11 in accordance with the 1980 Edition of the ASME Code to retroactively satisfy the Second Ten-Year ISI Program

requirement is not planned. Such an examination is not necessary since the integrity of the RHR/FPC intertie piping was assured during the Second Ten-Year ISI Program interval and as described in our March 5, 1996, letter, the safety significance of the code relief is low.

The integrity of the RHR/FPC intertie piping during the second ten-year ISI interval was assured as follows: During the first ten-year ISI interval, three welds in the RHR/FPC intertie piping were volumetrically examined with no findings. During the second ten-year ISI interval, five welds in the intertie piping were examined with no findings. In addition, ASME Section XI VT-2 leak test examination of the vertical portion of the intertie piping was completed during RFO#10 with no findings. (The horizontal portion of the intertie piping up to the 103 valve was excluded from the VT-2 examination in anticipation of proposed installation of the valve.) Based on the examination results of welds in similar intertie piping and the favorable in-service performance of the intertie piping during the first and second ten-year ISI intervals, BECo is confident that the section of intertie piping located in the high radiation area is structurally sound. Augmented examinations planned for RFO#11 (see response to NRC Question No.3) are intended to reinforce confidence in the intertie piping.

The NRC was requested to grant the code relief for the second ten-year ISI interval without condition, since the integrity of the RHR/FPC intertie piping was assured during the first and second ten-year ISI intervals, and examination in accordance with the outdated code would incur unnecessary radiation exposure without compensatory benefit.

NRC Question No. 2

Maintaining the spent fuel pool with its heat removal design capacity has currently become a high visibility issue. The fuel pool cooling (FPC) system provides primary cooling for the spent fuel pool. The residual heat removal (RHR) system heat exchangers are made available to supplement the fuel pool cooling heat exchangers via the subject intertie line. Although the RHR heat exchangers may not be needed to provide secondary cooling, it is prudent to maintain surveillance on the subject line from the spent fuel pool throughout the secondary cooling system. Because the subject RHR line from the spent fuel pool may be required to supplement the spent fuel pool heat exchangers, describe the basis for the segment of pipe between the fuel pool and valve 103 being "non-class." When required to operate, this supply line carries radioactive contaminated water. As such, it should be classified as Code Class 3, as a minimum.

In addition, it appears that the primary cooling system for the spent fuel pool is non-class. Provide basis for this classification.

Response

Pilgrim Nuclear Power Station Operating License Amendment No. 155 application and information contained in the request for additional information (RAI TAC. NO. M85898) provide the description of the spent fuel pool cooling system and the capabilities for maintaining the spent fuel pool within its heat removal design capacity. Those documents also provide the basis for fuel pool cooling system classification Quality Group D (non-seismic). Amendment No. 155 was approved in June 1994.

NRC Question No.3

Based on a review of the February 9, 1995, relief request submittal, it is noted under "Quality and Safety Consideration" that the subject line was non-class during the first interval; however, three welds were volumetrically examined. It is noted that for the third interval, two augmented surface weld examinations are scheduled (reference the licensee's February 15, 1996, response to the NRC Request for Additional Information) in the intertie line. The staff recommended that volumetric examinations be performed on a weld sample. The licensee performed volumetric examinations on a sample of the subject welds during the first interval. Considering that volumetric examinations were performed previously, provide a basis for performing a surface examination only in the third interval. When will these examinations be performed in the third interval?

Response

Weld HB-10-F79 and hangers H-10-1-17SS and H-10-1-182 are scheduled to be examined during RFO#11. Weld HB-10-3003-2-2 is scheduled for examination in the third period of the current third ten-year ISI interval. These welds will be volumetrically examined following the examination requirements and acceptance standard of Examination Category C-F-2, Item No. C5.60 of ASME Section XI, 1989 Edition. This code does not require examination of these welds, since the intertie piping is 6-inch schedule 40 with less than 3/8-inch wall thickness. However, the planned examinations are intended to comply with the NRC guidance to perform augmented examinations of certain thin-wall piping excluded by the code. In addition, ASME Section XI VT-2 leak test of the intertie piping up to the 103 valve is scheduled during RFO#11.

ATTACHMENT B

Revised Relief Request: Relief from ASME, Section XI In-service Inspection Requirements Pursuant to 10 CFR 50.55a(a)(3)

[Note: The purpose of this revised relief request is to consolidate the technical resolutions in the February 9, 1995, and March 9, 1996, letters and Attachment A to this letter.]

Introduction:

The 1980 Winter Addenda of ASME Code Section XI, Articles IWC-2500 and IWF-2500 required inspection of Class 2 piping welds and supports during the second ISI interval which ended on June 30, 1995. The residual heat removal (RHR) and fuel pool cooling (FPC) intertie piping welds and supports were required to be examined during refueling outage (RFO) #10 as prescribed by ASME, Section XI.

10 CFR 50.55a(a)(3) states that alternatives to the in-service inspection requirements of paragraph (g) may be used, when authorized by the NRC, if *"(i) the proposed alternatives would provide an acceptable level of quality and safety, or (ii) compliance with the specified requirements would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety ."*

Requested Relief:

Pursuant to 10 CFR 50.55a(a)(3), BECo requested relief from ASME Section XI, Articles IWC-2500 and IWF-2500 inspection requirements for the Class 2 RHR/FPC intertie piping welds and supports located in high radiation areas (see Attachment #1). Compliance with the code requirements would result in excessive radiation exposure, a contradiction to ALARA (10CFR20), without a compensating increase in the level of quality and safety.

Basis for the Requested Relief:

The 1980 Winter Addenda of ASME Section XI, Subarticles IWC-2500 and IWF-2500 required the inspection of all hangers and at least 25% of the welds in Category C-F of Table IWC-2500-1 with no restrictions on piping wall thickness. This inspection requirement included all Class 2 piping hangers and specific welds in the RHR/FPC intertie. These welds and hangers are located in high radiation areas.

The RHR/FPC intertie piping welds and supports within the second ten-year ISI interval scope and ASME Code examination requirements are shown in Attachment #1. The intertie piping is ASME Code Class 2 category up to valve 1001-103 and passes through high radiation areas. The section of intertie piping in question (i.e., between the RHR suction line and valve 103) is shown functionally on Figure 1. Figure 2 represents an expanded isometric view of this section of piping. The horizontal portion of the piping above the 74'-3" elevation is located within high radiation areas.

The second ten-year ISI interval inspections would have resulted in an exposure of approximately 7 man-rem by test personnel during the examinations as shown in Attachment #2. Thus, we sought relief from the second ten-year ISI interval due to ALARA considerations.

A relief from the Third Ten-Year ISI Program is not required since we are implementing 1989 Edition of the ASME Code which provides flexibility in the selection of welds and supports for examination.

Quality and Safety Considerations:

ISI Examination Results: The integrity of the RHR/FPC intertie piping during the second ten-year ISI interval was assured. During the first ten-year ISI interval, three welds in the RHR/FPC intertie piping were volumetrically examined with no findings. During the second ten-year ISI interval, five welds in the intertie piping were examined with no findings. In addition, ASME Section XI VT-2 leak test examination of the vertical portion of the intertie piping was completed during RFO#10 with no findings. Failure of the intertie piping was not expected because examinations of welds in similar Class 2 piping showed no signs of cracking. The intertie piping is installed with seismic restraints and hangers. No degradation in piping supports had been noted during previous ISI inspections.

Thus, based on the examination results of welds in similar piping and the favorable in-service performance of the intertie piping during the first and second ten-year ISI intervals, BECo was confident that the section of intertie piping located in the high radiation area was structurally sound.

System Considerations: The RHR/FPC intertie is branched from the shutdown cooling line that provides suction to the RHR pumps. This portion of the line is normally isolated during power operation. A manual isolation valve, 1001-103, in the intertie line separates the ASME Class 2 RHR piping from the non-code FPC piping.

Since this is low pressure, low temperature piping (except during the brief initial stages of infrequent cool downs), leaks are more likely to have resulted from weld failures that might occur instead of outright pipe failure. Such leakage would have been detectable due to an increase in floor drain volume or loss of spent fuel pool water inventory. Repairs to leaking pipe in the intertie piping would not likely have been hampered by high temperature or pressure.

Catastrophic failure of this Class 2 intertie piping was judged to be extremely improbable. However, had it occurred, loss of reactor water level would have been stopped by automatic isolation of the RHR shutdown cooling suction line (since intertie is branched out from the RHR suction line). Also, ECCS makeup systems were available to flood the vessel. Operators were trained on procedures to deal with loss of reactor water level or shutdown cooling (e.g., PNPS Procedure 2.4.25 provides for cool down upon loss of shutdown cooling). Note that postulated weld failure leading to pipe leaks or breaks in this section of piping is only of safety significance during cold shutdowns because the intertie piping is isolated during normal operation.

The RHR/FPC intertie is used for augmented fuel pool cooling without shutdown cooling (mode 2 operation PNPS Procedure 2.2.85.2). The consequences of failure of the intertie piping on the RHR side of 1001-103 valve would have been mitigated using an outage specific alternate water level makeup and decay heat removal procedure (i.e., TP 95-010, " RFO 10, Compensatory Measures"). Thus, the failure of the intertie would not have affected plant

safety. Therefore, the relief request met the requirements of 10 CFR 50.55a(a)(3)(i) in that an acceptable level of quality and safety were maintained during the second ten-year ISI interval.

Third Ten-Year ISI Considerations: The requested relief for the third ten-year ISI interval is not required. Pilgrim is implementing the 1989 Edition of the ASME Code. The Section XI, Category C-F-2 of Table IWC-2500-1 has been revised with respect to Class 2 piping of less than 0.375 inch wall thickness. The intertie piping is M-300 Pipe Class HB (6-inch Schedule 40) with a wall thickness of 0.280 inch. The revised requirement states that only 7.5% of the welds for Class 2 pipe wall thickness $\leq$ 0.375 inch require examination. Also, Code Case N-491, Category F-A, Table 2500-1 now requires only 15% of the hangers be inspected.[1] Rather than exclude thin-wall pipe welds from the ISI Program as allowed by the revised code, the NRC has determined that a 7.5% augmented volumetric sample of thin-wall piping welds should be included in the program. This determination is included in item C of NRC letter dated December 6, 1995 (TAC. No. M93398).

Pilgrim's Third Ten-Year ISI Program includes a sample of RHR/FPC intertie hangers and welds in full compliance with the revised code selection criteria and NRC guidance. Weld HB-10-F79, and hangers H-10-1-17SS and H-10-1-182 are scheduled to be examined during RFO#11. Weld HB-10-3003-2-2 is scheduled for examination in the third period of the current third ten-year ISI interval. These welds will be volumetrically examined following the examination requirements and acceptance standard of Examination Category C-F-2, Item No. C5.60 of ASME Section XI, 1989 Edition. This code does not require examination of these welds, since the intertie piping is 6-inch schedule 40 with less than 3/8-inch wall thickness. However, the planned examinations are intended to comply with the NRC guidance to perform augmented examinations of certain thin-wall piping excluded by the code. In addition, ASME Section XI VT-2 leak test of the intertie piping up to the 103 valve is scheduled during RFO#11. Thus, compliance with the NRC guidance will be achieved during the third ten-year ISI interval, and the inspections should reinforce the bases for granting the requested relief with no conditions.

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1 *NRC has endorsed the use of Code Case N-491 in R.G. 1.147 Rev. 1 and BECo has adopted the Code Case for the Third Ten-Year ISI Program as presented in BECo letter #95-091, dated September 1, 1995.*

ATTACHMENT #1

SECOND TEN-YEAR ISI PROGRAM COMPONENT LIST
FOR RHR/FPC INTERTIE LINE

The 14 components listed below are located in high radiation areas (see Figure 2). Attachment #2 provides the estimated exposure for examination of each component.

COMPONENT ID NO.	COMPONENT DESCRIPTION	CATEGORY	ITEM NO.	EXAM METHOD
HB-10-3003-2-3	ELBOW TO PIPE	C-F	C5.11	MT
HB-10-F63	ELBOW TO PIPE	C-F	C5.11	MT
HB-10-3003-2-2	PIPE TO ELBOW	C-F	C5.11	MT
HB-10-F79	VALVE TO ELBOW	C-F	C5.11	MT
H-10-1-14SG	GUIDE	F-B	F(1-3)	VT-3
H-10-1-16SR	RESTRAINT	F-C	F(1-3)	VT-3
H-10-1-17SS	RIGID HANGER	F-B	F(1-3)	VT-3
H-10-1-182	SPRING HANGER	F-C	F(1-4)	VT-3 VT-4
H-10-1-186	SPRING HANGER	F-C	F(1-4)	VT-3 VT-4
H-10-1-187	SPRING HANGER	F-C	F(1-4)	VT-3 VT-4
H-10-1-183	SPRING SUPPORT	F-C	F(1-4)	VT-3
H-10-1-184	SPRING SUPPORT	F-C	F(1-4)	VT-3 VT-4
H-10-1-185	SPRING SUPPORT	F-C	F(1-4)	VT-3 VT-4
H-10-1-13SA	ANCHOR	F-B	F(1-3)	VT-3

ATTACHMENT #2, Sheet 1 of 3

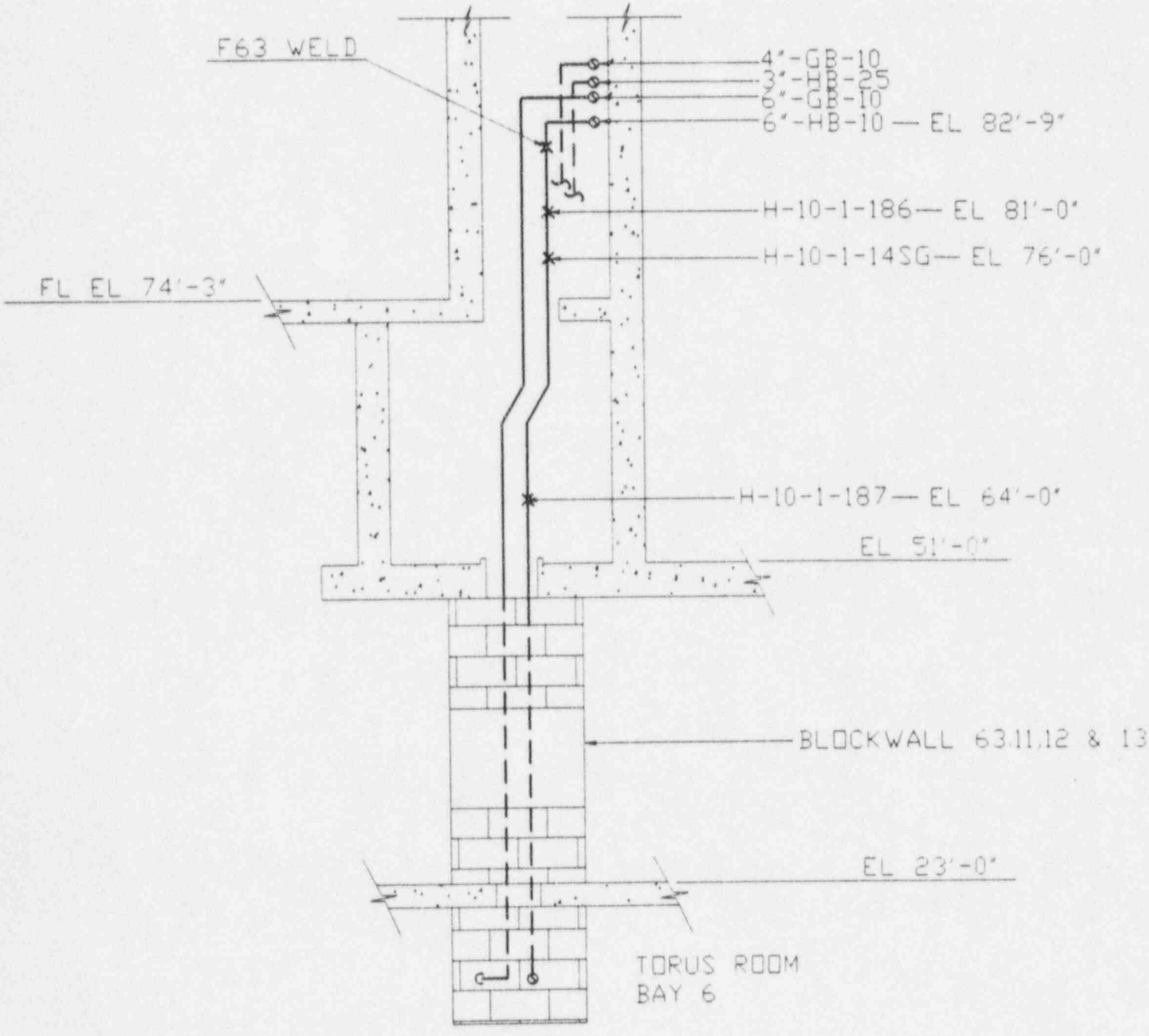
ESTIMATED MAN-REM EXPOSURE
FOR ISI OF RHR/FPC INTERTIE WELDS AND SUPPORTS

LOCATION	NO. OF COMPONENTS	EXPOSURE/EXAM
Clean-up Demin Vault, B*	1 Weld	2.70
FP Pump Room	3 Welds	1.70
Clean-up Demin Vault, (A+B)	4 Supports	0.80
FP Pump Room	3 Supports	0.075
FP Filter Room	1 Support	0.005
BWRT Room	1 Support	1.125
Pipe Chase, ele. 23'	1 Support (inaccessible)	

Total= 6.82 Rem/ISI Interval ~ 7 man-rem

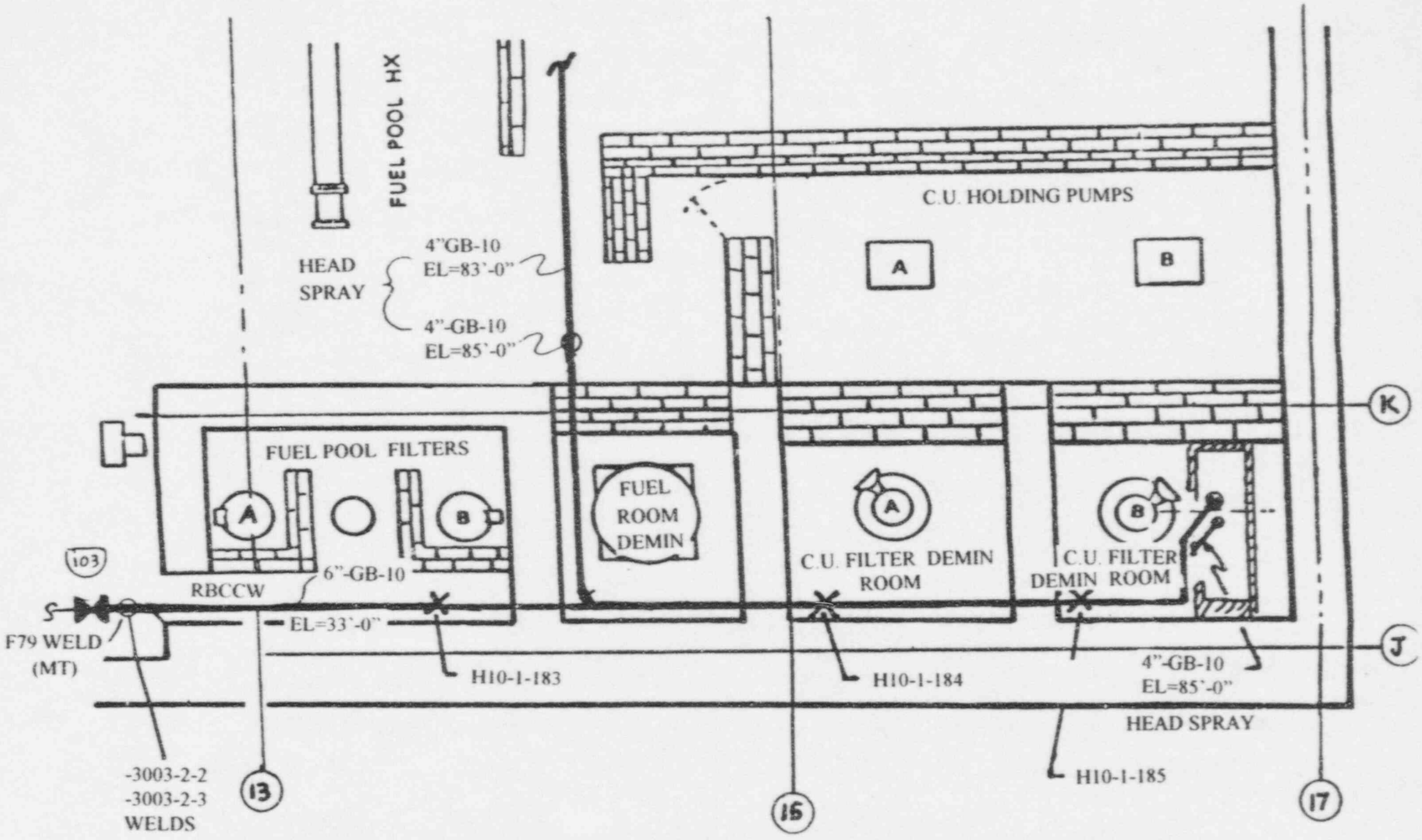
Notes:* Scaffolding required, estimate based on staging for inspection.

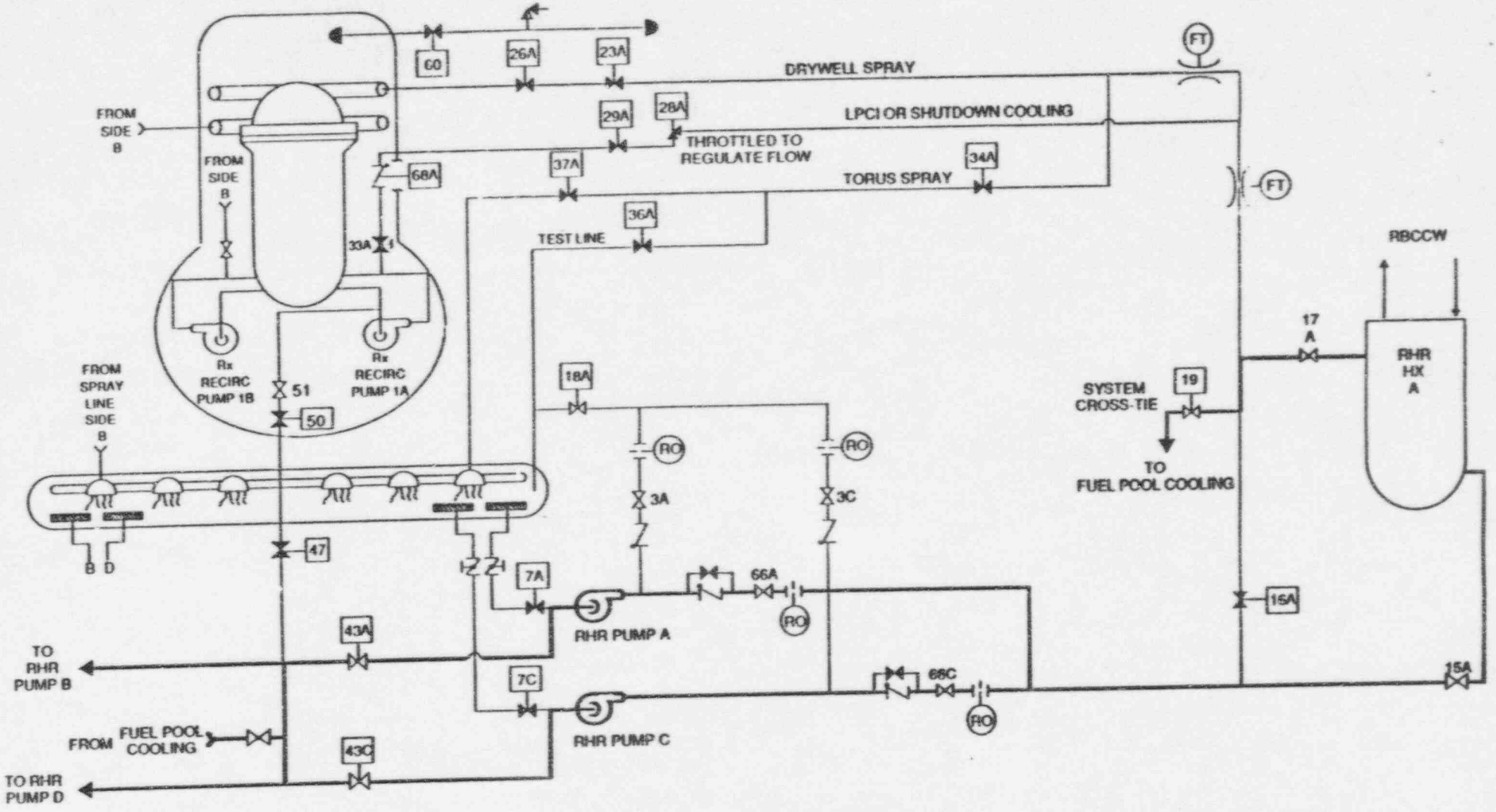
Attachment #2, Sheet 2



REACTOR BLDG. FLOOR EL. 74'-0"
FUEL POOL FILTERS AND DEMINS

ATTACHMENT #2 SHEET 3

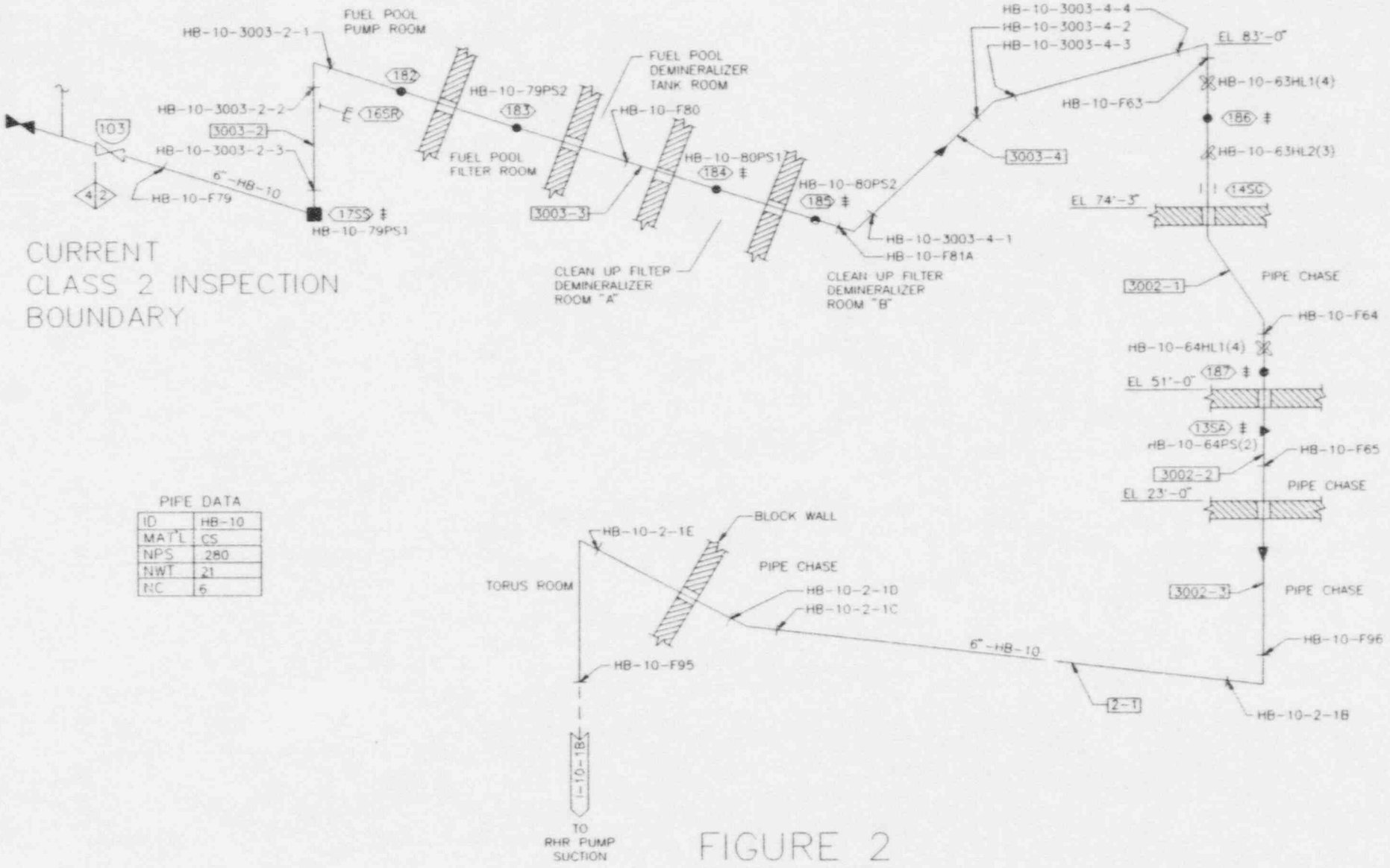




FUEL POOL COOLING ASSIST

FIGURE 1

TP-6
7412210g



CURRENT
CLASS 2 INSPECTION
BOUNDARY

PIPE DATA

ID	HB-10
MAT'L	CS
NPS	280
NWT	21
NC	6

FIGURE 2