TAC 66640 and 65713

Duquesne Light
One Oxford Centre
301 Grant Street
Pittsburgh, PA 15279

(412) 393-6000

November 10, 1987

Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Reference: Beaver Valley Power Station, Unit No. 1
Docket No. 50-334, License No. DPR-66
Inservice Inspection Relief Requests

Gentlemen:

Attached are three requests for relief from certain ASME Section XI inspection requirements for the following components:

a) Pressurizer surge line radius
b) Steam generator nozzle radii
c) Non-regenerative heat exchanger CH-E-2 (Revision 1)

The revised relief request for the non-regenerative heat exchanger CH-E-2 supersede in total the previous relief request for CH-E-1 and CH-E-2 submitted on June 16, 1987.

The relief requests provide the Code requirements, Amendment 22 inspection requirements where applicable, a basis for requesting relief and a proposed alternate examination. The Code requirements listed in the relief requests have been determined to be impractical for Beaver Valley Unit No. 1 in accordance with 10 CFR 50.55a(g)(5)(iii). Since these relief requests affect inspections which must be performed during the sixth refueling outage, which is scheduled to begin on December 11, 1987, NRC disposition of the requests is requested as soon as practical.

Attached is a check in the amount of $150.00 for payment of the application fee in accordance with 10 CFR 170.

Very truly yours,

J. D. Sieber
Vice President, Nuclear

Attachment

cc: Mr. F. I. Young, Sr. Resident Inspector (Unit 1)
Mr. J. Beall, Sr. Resident Inspector (Unit 2)
Mr. W. T. Russell, NRC Region I Administrator
Mr. P. Tam, Project Manager
Director, Safety Evaluation & Control (VEPCO)

A047
1/1
REC'D W/O CHECK

Relief Request for the Pressurizer Surge Line Nozzle Radius

Component

Pressurizer Surge Line Nozzle Radius Section (RC-TK-1, Radius 6).

Section XI Requirement (74S75)

Item B2.2 (B-D) requires the volumetric examination of all of the nozzle inside radius sections during each inspection interval.

December 4, 1979 NRC Letter (Schwencer to Dunn)

This letter allows a visual examination to be substituted for the volumetric examination.

Basis for Relief

The 1979 NRC letter acknowledged that the volumetric examination of vessel nozzles would not provide useful information because of both the thickness and geometric configuration. Instead, it allowed an internal visual examination to be substituted for the volumetric examination.

In the case of the pressurizer surge line, a thermal sleeve and a diffuser screen are installed in the nozzle (see UFSAR Section 4.2.2.2 "Pressurizer") UFSAR Figure 4.2-2 (attached) depicts the screen and shows the relationship to the pressurizer manway. These two fixtures preclude performing a visual examination of this area.

Therefore internal examination of the radius section of the surge line nozzle presents unusual difficulty and the substitution of an external visual examination would not significantly affect the level of safety (the failure of line of this size is within the bounds of the safety analysis).

Alternate Examination

The surge line nozzle will be visually examined for leakage during the performance of the system leakage examinations.

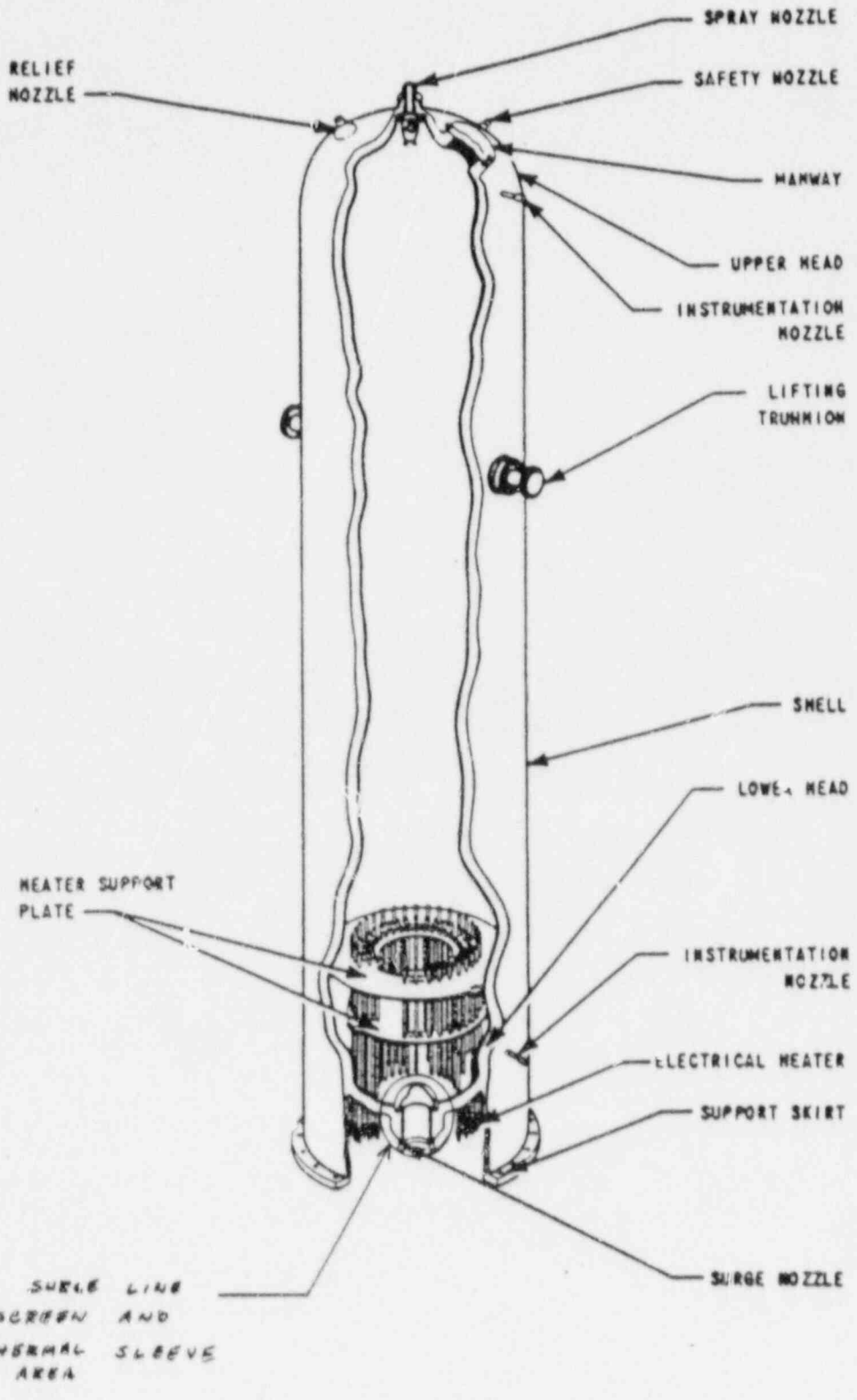


FIGURE 4.2-2
PRESSURIZER
BEAVER VALLEY POWER STATION UNIT NO. 1
UPDATED FINAL SAFETY ANALYSIS REPORT

Relief Request to Postpone
Steam Generator Nozzle Radius Examinations

Components

Steam Generator Radius Sections - Steam Generators B and C (RC-E-1B and -1C)

Section XI Requirement (74S75)

Item B3.2 (B-D) requires the volumetric examination of all of the nozzle inside radius sections during each inspection interval.

December 4, 1979 NRC Letter (Schwencer to Dunn)

This letter allows a visual examination to be substituted for the volumetric examinations of the radius section.

Relief Requested

Duquesne Light requests to defer the remaining examinations (RC-E-1B (cold leg) and RC-E-1C (both nozzles)) into the next inspection interval until the Steam Generators affected are opened for other examinations or repairs.

Basis for Relief

During the Sixth Refueling Outage, only one steam generator (RC-E-1A) will require eddy current examination. Assuming that the results of that examination are satisfactory, there should be no need to enter the primary side of either of the other two steam generators.

The radius section on RC-E-1A (both nozzles) and RC-E-1B (hot leg) were examined in June of 1983 and no abnormalities were noted.

The estimated dose to open the primary side of one steam generator is 8100 mrem (see attached dose estimate).

The steam generator inside radii (from the evidence listed above) appear to be in satisfactory condition and the estimated radiation exposure involved in opening a steam generator solely to perform the subject examinations is high. Therefore, deferring this examination until the generators are next accessible would not significantly adversely affect the public health and safety.

Alternate Examination

No alternate examination is proposed. The examinations will be performed at the next occasion when the primary side of the steam generators is opened.

STEAM GENERATOR INSPECTIONS
NOZZLE INSIDE RADIUS SECTIONS AND MANWAY CLAD PATCHES
MANREM ESTIMATE

EQUIPMENT/CUBICLE DOSE RATE PROFILE (SEE ATTACHED FIGURES)

LOCATION	RC-E-1A	RC-E-1B	RC-E-1C
•CHANNELHEAD DOSE RATES(2)			
- HOT LEG TUBESHEET	43.0 R/hr	32.0 R/hr	40.3 R/hr
@ 18" FROM TUBESHEET	48.8 R/hr	29.0 R/hr	34.0 R/hr
BOTTOM RADIUS OF CHANNELHEAD	34.0 R/hr	34.0 R/hr	27.0 R/hr
- COLD LEG TUBESHEET	43.6 R/hr	32.0 R/hr	40.3 R/hr
@18" FROM TUBESHEET	29.6 R/hr	29.0 R/hr	34.0 R/hr
BOTTOM RADIUS OF CHANNELHEAD	28.4 R/hr	27.0 R/hr	27.0 R/hr
•HOT LEG MANWAY(1)	1-1.2 R/hr	3.0 R/hr	3.5 R/hr
@1 FOOT	600 mR/hr	1.0 R/hr	250 mR/hr
@2 FOOT	400 mR/hr	400 mR/hr @3'	120 mR/hr
•COLD LEG MANWAY	1-1.2 R/hr	3.0 R/hr	4.0 R/hr
@ 1 FOOT	600 mR/hr	1.7 R/hr	300 mR/hr
@ 2 FOOT	400 mR/hr	600 mR/hr @3'	150 mR/hr @3'
•WORK PLATFORM(1)	150-250 mR/hr	100-150 mR/hr	100-120 mR/hr
•EQUIPMENT/PERSONNEL STAGING(1)	40-50 mR/hr	80-100 mR/hr	40-80 mR/hr
AREA UNDERNEATH GENERATOR			
•STAYTIME RATE UTILIZED	700 mR/min	600 mR/min	700 mR/min
FOR CHANNELHEAD JUMPERS			

(1) - ACTUAL OBSERVED DOSE RATES DURING THE FIFTH REFUELING OUTAGE - MAY, 1986.
(2) - CALCULATED DOSE RATES BASED ON TLD RESULTS DURING THE FIFTH REFUELING OUTAGE - MAY, 1986.

STEAM GENERATOR INSPECTIONS
NOZZLE INSIDE RADIUS SECTIONS AND MANWAY CLAD PATCHES
MANREM ESTIMATE

STEAM GENERATOR INSPECTION ESTIMATE

WORK TASKS TO PREP STEAM GENERATORS	MANREM ESTIMATE (mrem)
•REMOVE STEAM GENERATOR BOWL INSULATION	200
•REMOVE MANWAY STRONGBACKS	1500
•ERECT SCAFFOLD AND CONTAINMENT TENT	600
•REMOVE DIAPHRAGMS AND INSTALL NOZZLE COVERS	1200
•INSTALL HEPA FILTERED VENTILATION SYSTEM	500
TOTAL TO PREP ONE GENERATOR (RC-E-1B)	4000
TOTAL TO PREP TWO GENERATORS (RC-E-1B AND RC-E-1C)	(8000)
WORK TASKS TO PERFORM INSPECTIONS	
•STEAM GENERATOR NOZZLE RADIUS SECTION INSPECTION ASSUMING A 1.5 MINUTE (90 SECONDS) JUMP TIME UTILIZING A STAYTIME RATE(3) OF 600 mR/MIN FOR RC-E-1B	
HOT LEG NOZZLE	900
COLD LEG NOZZLE	900
•MANWAY CLAD PATCH EXAMINATION ASSUMING A 1.0 MINUTE (60 SECONDS) PARTIAL JUMP UTILIZING A STAYTIME RATE(3) OF 600 mR/MIN FOR RC-E-1B	600

(3) - ONCE A STAYTIME RATE IS ESTABLISHED, THAT VALUE IS USED FOR ALL CHANNELHEAD JUMPS OR PARTIAL JUMPS REGARDLESS OF WORK ACTIVITY. PLEASE NOTE ACTUAL ALLOWABLE CHANNELHEAD TIMES MUST BE PRE-AUTHORIZED FOR EACH INDIVIDUAL.

STEAM GENERATOR INSPECTIONS
NOZZLE INSIDE RADIUS SECTIONS AND MANWAY CLAD PATCHES
MANREM ESTIMATE

STEAM GENERATOR INSPECTION ESTIMATE

WORK TASKS TO PERFORM INSPECTIONS - CONTINUED	MANREM ESTIMATE (mrem)
•STEAM GENERATOR NOZZLE RADIUS SECTION INSPECTION ASSUMING A 1.5 MINUTE (90 SECONDS) JUMP TIME UTILIZING A STAYTIME RATE(3) OF 700 mR/MIN FOR RC-E-1C	
HOT LEG NOZZLE	1050
COLD LEG NOZZLE	1050
WORK TASKS TO RESTORE STEAM GENERATORS	
•REMOVE HEPA FILTERED VENTILATION SYSTEM	300
•REMOVE NOZZLE COVERS (REMOTELY)	-----
•INSTALL DIAPHRAGMS	500
•REMOVE TENT AND DECON	600
•REMOVE SCAFFOLDING TO SUPPORT MANWAY INSTALLATION	300
•REINSTALL MANWAYS AND TORQUE BOLTS	1700
•REINSTALL INSULATION	700
TOTAL TO RESTORE ONE GENERATOR (RC-E-1B)	4100
TOTAL TO RESTORE TWO GENERATORS (RC-E-1B AND RC-E-1C)	(8200)

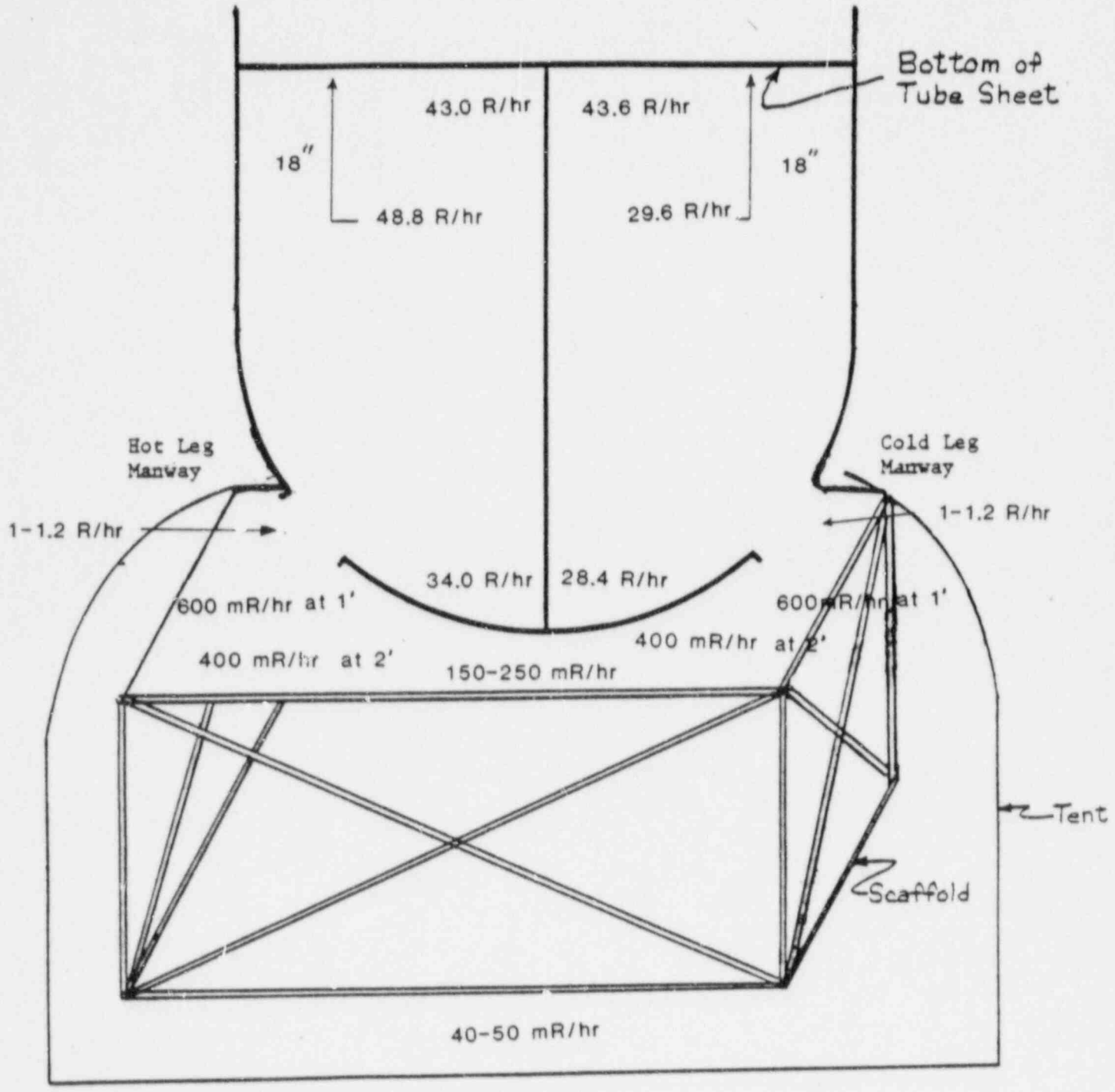
(3) - ONCE A STAYTIME RATE IS ESTABLISHED, THAT VALUE IS USED FOR ALL CHANNELHEAD JUMPS OR PARTIAL JUMPS REGARDLESS OF WORK ACTIVITY. PLEASE NOTE ACTUAL ALLOWABLE CHANNELHEAD TIMES MUST BE PRE-AUTHORIZED FOR EACH INDIVIDUAL.

STEAM GENERATOR INSPECTIONS
NOZZLE INSIDE RADIUS SECTIONS AND MANWAY CLAD PATCHES
MANREM ESTIMATE

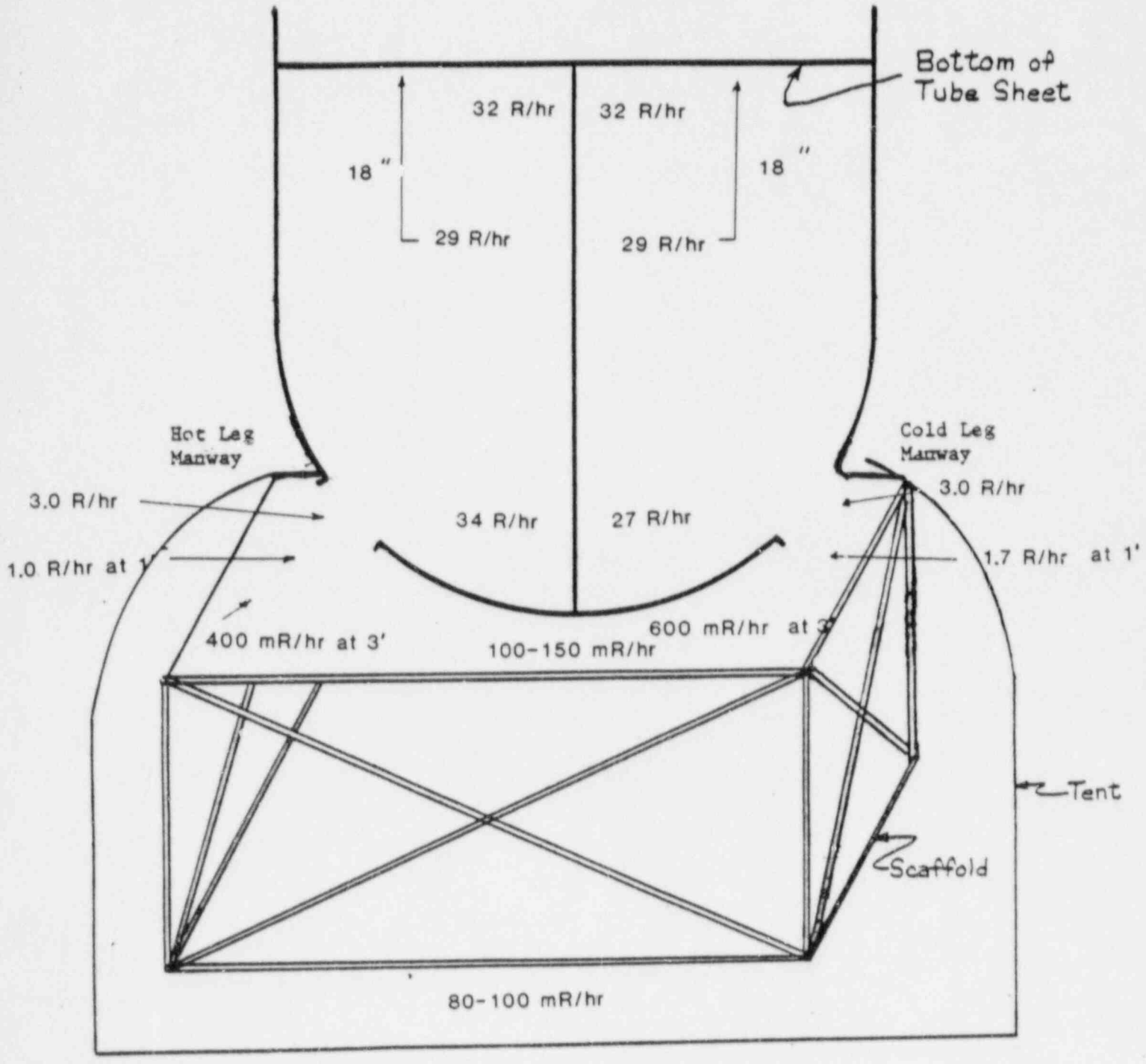
STEAM GENERATOR INSPECTION ESTIMATE

WORK TASKS SUMMARY	MANREM ESTIMATE (mrem)
•WORK TASKS TO PREP STEAM GENERATOR(S)	
RC-E-1B	4000
RC-E-1B AND RC-E-1C	(8000)
•WORK TASKS TO PERFORM INSPECTIONS	
RC-E-1B	2400
RC-E-1B AND RC-E-1C	(4500)
•WORK TASKS TO RESTORE STEAM GENERATOR(S)	
RC-E-1B	4100
RC-E-1B AND RC-E-1C	(8200)
TOTAL ESTIMATED EXPOSURE FOR ONE GENERATOR	10500
TOTAL ESTIMATED EXPOSURE FOR TWO GENERATORS	20700

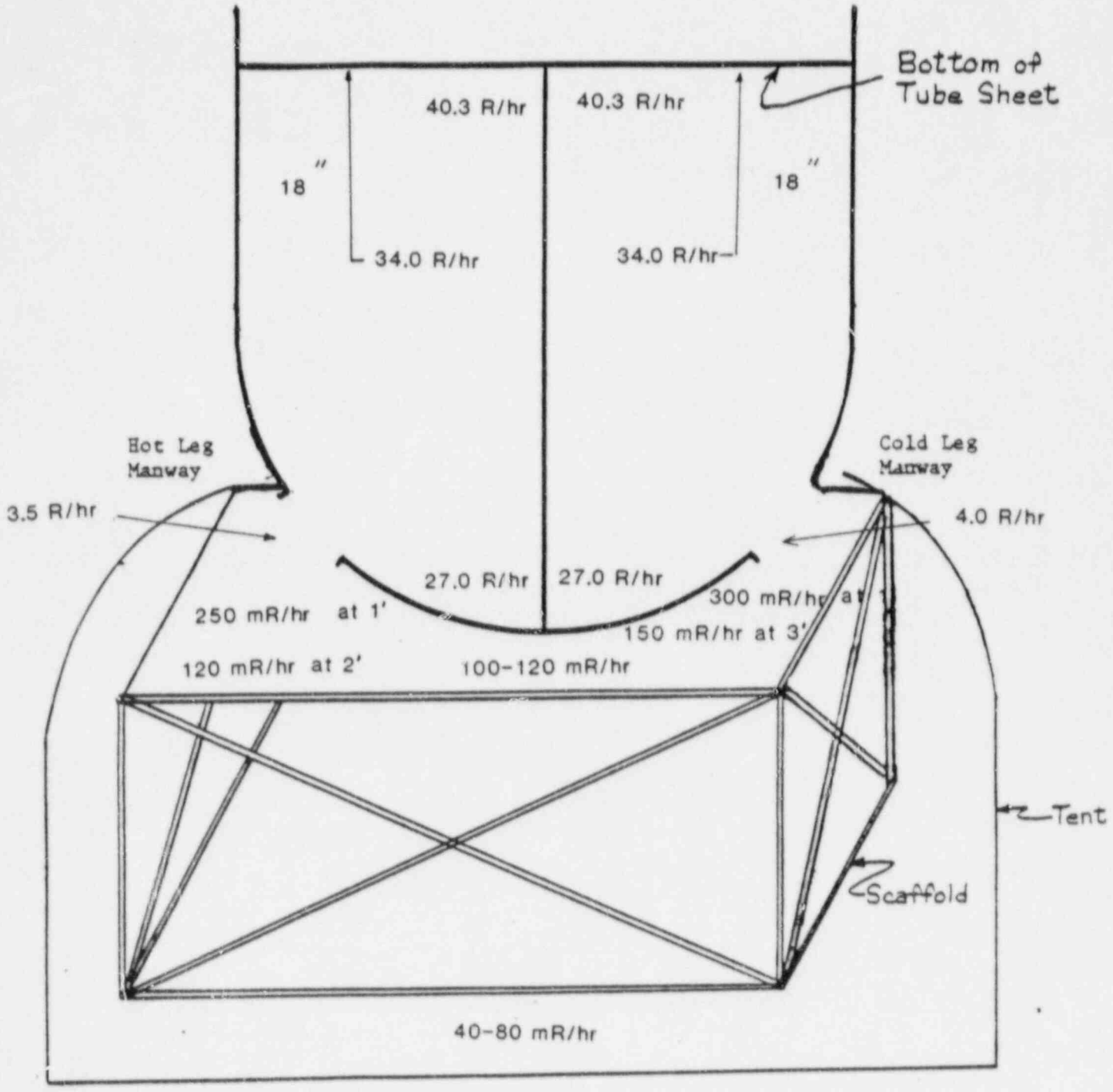
BASED ON HISTORICAL DATA FROM PREVIOUS OUTAGE EDDYCURRENT INSPECTIONS, APPROXIMATELY 40% OF THE TOTAL DOSE EXPENDITURE IS ATTRIBUTED TO PREPARATION AND THE SUBSEQUENT RESTORATION OF THE GENERATOR. THE REMAINING 60% EXPOSURE EXPENDITURE IS ATTRIBUTED TO EDDYCURRENT EQUIPMENT SET-UP, PROBE AND EQUIPMENT REPAIRS, EQUIPMENT TRANSFERS FROM HOT LEG TO COLD LEG MANWAYS, AND SUBSEQUENT PLUGGING ACTIVITIES. PLEASE NOTE NO EXPOSURE ESTIMATE IS PROVIDED FOR RC-E-1A SINCE THIS GENERATOR WILL BE OPENED DURING THE 6R OUTAGE FOR INSPECTION AND POSSIBLE TUBE EXPANSION.



STEAM GENERATOR (A) B C



STEAM GENERATOR A (B) C



STEAM GENERATOR A B (C)

Relief Request for Vessel Welds
on the
Non-Regenerative Heat Exchanger (CH-E-2)
(Revision 1)

Component:

Non-Regenerative Heat Exchanger (CH-E-2)

Section XI Requirement (74S75):

Table IWC-2600, Item C1.1, Category C-A, pressure-retaining welds in pressure vessels, requires that a minimum of five percent (5%) of each circumferential weld, uniformly distributed among three areas around the vessel circumference, be volumetrically examined each interval.

Relief Requested:

This requests the substitution of a visual leakage examination for the required 1.4" volumetric examination of two welds (to complete the first ISI interval).

Basis for Relief:

Radiation fields in the area of the Non-Regenerative Heat Exchanger (CH-E-2) are high [300-500 milliREM per hour (mr/hr) in the immediate working area with hot spots of 7 REM per hour (R/hr)]. (These were measured during the 1986 refueling outage and subsequent surveys have shown no decrease). The manrem estimate to prepare, inspect, and reinsulate the heat exchanger is projected to be 18 Rem. This estimate is based on working space dose rates and estimated work durations as noted on the attached manrem estimate. This estimate represents an optimum work schedule and any difficulties encountered would increase the dose. A drawing is attached showing the radiation survey results.

Previous examinations have not detected degradation of these welds. These welds were examined in 1980 and 1982 with no indications. This leaves 1.4" of each of the two head welds to be examined by the end of the interval to meet the ASME Code requirements.

The proposed (alternative) visual examination for leakage is a more effective examination for monitoring the integrity of the components than the Code required examination. The required examinations are of limited value because component geometry limits the volumetric examination of both welds to one side only. The endcap-to-vessel weld (Weld #1) cannot be examined from the endcap side and the flange-to-vessel weld (Weld #2) cannot be examined from the flange side. These restrictions make it virtually impossible to obtain meaningful results from the volumetric examination of these welds. Additionally, the nozzles and supports limit the examination from the vessel side. The affected welds are double-V butt welds in 0.625", SA-240 (Type 304) stainless steel in a vessel head of 27" outside diameter. Drawing 8700-ISI-CHE2 is attached for information.

Because these welds are subject to routine monitoring during plant operation, weld degradation sufficient to cause a through-wall leak would be detected in a timely manner. There are several mechanisms to detect such leakage.

a. The control room operators perform Operating Surveillance Test (OST) 1.6.2 "Reactor Coolant System Water Inventory Balance" every three (3) days when the plant is operating at steady state conditions. Leakage through the subject welds would be detected by this OST.

b. The inventory in the liquid waste system is logged daily (log L3-11). Since leakage from these welds would be collected by the liquid waste system and would be apparent in this inventory. The inventory is reviewed daily by the Shift Supervisor and weekly by the Site Radwaste Coordinator.

c. Monthly, the Radiological Control Department personnel enter the cubicle to perform radiation surveys. Slight leakage (less than that detectable by OST 1.6.2 or the liquid waste inventory) would be detected during this survey.

d. OST 1.48.2 "High Energy Line and ECCS Inspection" is performed quarterly. This visually examines accessible high energy lines outside of containment for degradation of welds on high energy systems (CH-E-2 is included).

The component is readily isolable should a leak occur. The heat exchanger is has double-valve isolation from the primary system (LCV-CH-460A & B) and is automatically isolated on a pressurizer low level signal. It could be easily isolated by the control room operators should one of the welds be discovered to be leaking.

The radiological impact of a weld failure is not large.

NOTE: Inservice inspection is intended to verify continued integrity of the pressure boundary. It is not intended or expected to prevent or preclude the need for repair activity. The following is offered only as a comparison of manrem estimates.

This heat exchanger operates at 310 psi, 290° inlet, 115° outlet. Even if a failure were to occur on the inlet side, only approximately 8% of the water would flash to steam (assuming an isentropic process and neglecting velocity). Should either of these welds fail and begin to leak, the leakage would be contained within the cubicle by the sill at the entryway. Leaking fluid would be collected by the floor drain system. The manrem estimate for the decontamination of the cubicle is 13.6 Rem. This estimate is based on working space dose rates and estimated work durations as noted on the attached manrem estimate.

NOTE: The dose estimate for examination is higher than that for decontamination primarily because of the surface preparation required to perform the ultrasonic examination (which would be performed as part of the repair in the case of a weld failure).

The proposed alternative examination can be performed for a small fraction of the exposure resulting from the Code required examination. Since the examiner would be subject to the radiation field for only a few minutes and could perform the examination without being as close to the 7 R/hr hot-spot as for an ultrasonic examination, the resulting dose is expected to be less than 100 millirem (mr).

Therefore, the proposed alternative examination reduces the exposure associated with weld examination and still provide an acceptable level of quality and safety.

Alternate Examination:

Visual examination for leakage during the performance of the system leakage examinations. This is augmented by radwaste monitoring, radiation surveys, and OST 1.6.2 and OST 1.48.2.

CH-E-2 INSPECTIONS
LETDOWN CUBICLE 722' PAB
MAREM ESTIMATE

EQUIPMENT/CUBICLE DOSE RATE PROFILE

CH-E-2 NON-REGENERATIVE LETDOWN HEAT EXCHANGER
WELD LOCATION #2 - 300-500 mR/hr GENERAL AREA
INLET AND OUTLET PIPING - 100-200 mR/hr GENERAL AREA
WELD LOCATION #1 - 500 mR/hr GENERAL AREA
FLANGE BOLTING - 100-150 mR/hr GENERAL AREA
BOTTOM BELL OF HEAT EXCHANGER - 7 R/hr (HOT SPOT)
LETDOWN CUBICLE (722' PAB) BENEATH HEAT EXCHANGERS - 80-100 mR/hr GENERAL AREA

WORK TASK	NUMBER OF INDIVIDUALS AND JOB CLASSIFICATIONS		ANTICIPATED TIME IN RADIATION FIELD (HRS)		EXPOSURE RATE (mR/hr)**		ESTIMATED EXPOSURE (mR)
INSTALL SCAFFOLDING	(2) CARPENTERS	x	(6)	x	(80 to 100) (90)	=	1,080
REMOVE INSULATION	(2) INSULATORS	x	(2)	x	(200 to 500) (300)	=	1,200
WELD PREPPING	(2) PIPEFITTERS						
	CH-E-2 *						
	WELD #1	x	(2)	x	(500)	=	2,000
	WELD #2	x	(2)	x	(200 to 500) (500)	=	2,000
WELD INSPECTION	(2) INSPECTORS						
	CH-E-2 *						
	WELD #1	x	(.5)	x	(500)	=	500
	WELD #2	x	(.5)	x	(200 to 500) (500)	=	500
REINSTALL INSULATION	(2) INSULATORS	x	(10)	x	(200 to 500)	=	10,000
REMOVE SCAFFOLDING	(2) CARPENTERS	x	(4)	x	(80 to 100) (90)	=	720
					TOTAL ESTIMATE	=	18,000 mR

* See Attached Diagram
** Working Space Dose Rates

DECONTAMINATION AND REPAIR
OF A POSTULATED WELD FAILURE
ON CH-E-2 LETDOWN CUBICLE 722' PAB
MANREM ESTIMATE

EQUIPMENT/CUBICLE DOSERATE PROFILE

CH-E-1 SEAL WATER HEAT EXCHANGER
WELD LOCATION #1 - 100 mR/hr GENERAL AREA
WELD LOCATION #2 - 50 mR/hr GENERAL AREA
FLANGE BOLTING - 40-50 mR/hr GENERAL AREA
INLET AND OUTLET PIPING - 50 mR/hr GENERAL AREA
BOTTOM BELL OF HEAT EXCHANGER - 2-3 R/hr (HOT SPOT)

CH-E-2 NON-REGENERATIVE LETDOWN HEAT EXCHANGER
WELD LOCATION #1 - 500 mR/hr GENERAL AREA
WELD LOCATION #2 - 300-500 mR/hr GENERAL AREA
FLANGE BOLTING - 100-150 mR/hr GENERAL AREA
INLET AND OUTLET PIPING - 100-200 mR/hr GENERAL AREA
BOTTOM BELL OF HEAT EXCHANGER - 7 R/hr (HOT SPOT)

LETDOWN CUBICLE (722' PAB) BENEATH HEAT EXCHANGERS - 80-100 mR/hr GENERAL AREA

(SPECIAL REQUIREMENTS)

1. THE AREAS FOR DECONTAMINATION WILL BE LIMITED TO THE IMMEDIATE CUBICLE AND AFFECTED COMPONENTS. THE DECONTAMINATION AND THE COLLECTION OF RESIDUAL WATER WITHIN THE CUBICLE CAN BE ACCOMPLISHED IN A TIMELY MANNER BY USE OF STANDARD DECONTAMINATION METHODS. HOWEVER, DECONTAMINATION OF THE HEAT EXCHANGER ENDBELL WILL REQUIRE THE REMOVAL OF THE LAGGING AND THE ERECTION OF SCAFFOLDING SINCE THE ENDBELL IS APPROXIMATELY 7'-8' UP FROM THE FLOOR. IT IS HIGHLY UNLIKELY THAT SHOULD ONE OF THE WELDS FAIL THAT THE FAILURE WOULD BE SO GREAT AS TO CAUSE A BURST OF THE LAGGING AND SPRAYING DOWN ADJACENT COMPONENTS. THEREFORE, DECONNING OF ADJACENT COMPONENTS SHOULD BE MINIMAL.

2. DEPENDING ON THE SIZE AND CONFIGURATION OF THE WELD FAILURE, CONSIDERABLE EFFORT WILL BE NECESSARY TO DECON THE REPAIR AREA TO ACCEPTABLE CONTAMINATION LEVELS. THIS MAY REQUIRE THE REMOVAL OF INTERFERING OBSTRUCTIONS SUCH AS SUPPORT BEAMS, CONDUIT, ETC.

3. IN ORDER TO REDUCE THE RADIATION LEVELS ON THE WORK PLATFORM, A LEAD SHIELD PIG WOULD HAVE TO BE FABRICATED AND CRIBBED UP UNDER THE ENDBELL TO REDUCE THE DOSERATE ATTRIBUTED TO THE ENDBELL PROTRUSIONS. (SEE ATTACHED FIGURE.)

4. RESPIRATORY EQUIPMENT WILL MOST LIKELY BE REQUIRED TO PERFORM THE WELD REPAIR WELDING.

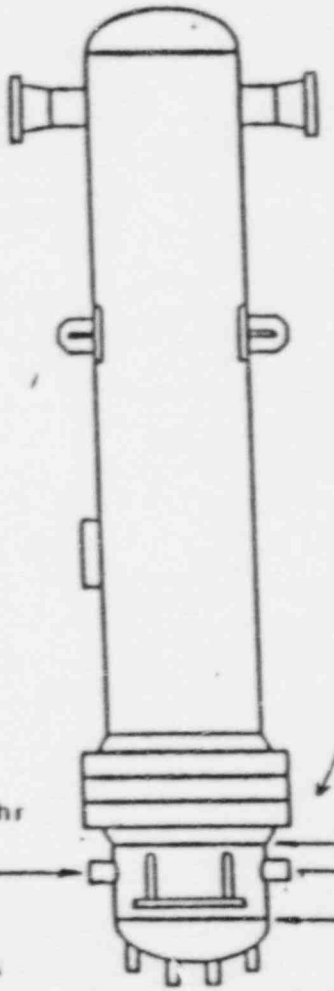
DECONTAMINATION AND REPAIR
OF A POSTULATED WELD FAILURE
ON CH-E-2 LETDOWN CUBICLE 722' PAB
MANREM ESTIMATE (CONT'D.)

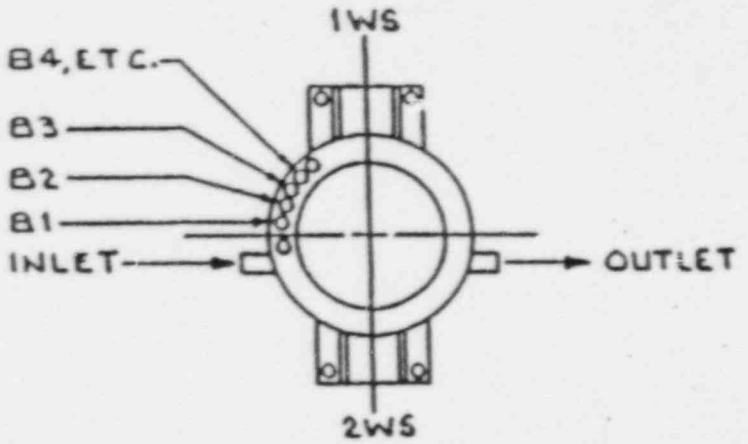
WORK TASK	NUMBER OF INDIVIDUALS AND JOB CLASSIFICATIONS		ANTICIPATED TIME IN RADIATION FIELD (hrs)		EXPOSURE RATE (mR/hr)**		ESTIMATED EXPOSURE (mR)
INITIAL DECON (CUBICLE)	(2) LABORERS	x	(4)	x	(80 to 100) (90)	=	720
INSTALL SCAFFOLDING	(2) CARPENTERS	x	(6)	x	(80 to 100) (90)	=	1,080
REMOVE INSULATION	(2) INSULATORS	x	(2)	x	(200 to 500) (300)	=	1,080
INSTALL SHIELD ON END BELL	(2) LABORERS	x	(1)	x	(200 to 500) (300)	=	2,400
DECON REPAIR AREA	(2) LABORERS	x	(4)	x	(200 to 500) (300)	=	2,400
WELD PREP AND REPAIR	(1) PIPEFITTER (1) WELDER	x	(12)	x	(200 to 500) (300)	=	7,200
WELD INSPECTION	(2) INSPECTORS						
	CH-E-2 *						
	WELD #1	x	(1)	x	(500)	=	1000
	WELD #2	x	(1)	x	(200 to 500) (500)	=	1000
REMOVE SHIELD	(2) LABORERS	x	(1)	x	(200 to 500) (300)	=	600
REINSTALL INSULATION	(2) INSULATORS	x	(10)	x	(200 to 500)	=	10,000
REMOVE SCAFFOLDING	(2) CARPENTERS	x	(4)	x	(80 to 100) (90)	=	720

WELD REPAIR & INSPECTION = 14,600 mR
DECONTAMINATION & PREP WORK = 13,600

TOTAL ESTIMATE = 28,200 mR

* SEE ATTACHED DIAGRAMS
** WORKING SPACE DOSE RATES





ZERO REFERENCE CENTERLINE OF INLET NOZELE

100-150 mR/hr GENERAL AREA

100-200 mR/hr

300-500 mR/hr GENERAL AREA

INLET
2" (TYP.)

WELD # 2
OUTLET
WELD # 1

500 mR/hr GENERAL AREA

GENERAL AREA

7 R/hr (HOT SPOTS)

NON REGENERATIVE LETDOWN
HEAT EXCHANGER
(CH-E-2)

LETDOWN CUBICLE

80-100 mR/hr