VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

March 25, 2002

United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Serial No. 02-154
NL&OS/GDM R2
Docket No. 50-280
50-281
License No. DPR-32
DPR-37

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
ASME SECTION XI INSERVICE INSPECTION PROGRAM
REVISED RELIEF REQUESTS SR-023 AND SR-029

Surry Power Station Units 1 and 2 are presently in their third ten-year inservice inspection interval, and examinations are conducted in accordance with the requirements of the 1989 Edition of the ASME Section XI Code. Pursuant to ASME Section XI requirements, the welds on the regenerative heat exchanger in the Chemical and Volume Control System require examination. These examinations have been determined to be a hardship without a compensating increase in safety based on: 1) the geometry of the welds which preclude full coverage (Unit 2 only), and 2) the excessive personnel dose required to perform these examinations.

In a letter dated May 16, 2001 (Serial No. 01-198), Virginia Electric and Power Company (Dominion) requested relief from performing the ASME Section XI examinations on the welds of the regenerative heat exchangers for Surry Units 1 and 2. In the relief requests attached to that letter, it was noted that significant dose would be received by personnel completing the inspections of the regenerative heat exchangers for each unit. Furthermore, geometric restrictions associated with the Unit 2 regenerative heat exchanger would severely limit the amount of meaningful information that could be obtained by examination concerning its condition. Therefore, relief requests SR-023 and SR-029 for Surry Units 1 and 2, respectively, were proposed to eliminate the Code-required examinations on the regenerative heat exchangers.

During NRC review of the subject relief requests, the reviewer expressed reservations about the inclusion of the regenerative heat exchanger supports in the list of components for which relief was being requested. Consequently, in subsequent discussions with the Surry NRC Project Manager, Dominion agreed to 1) revise the relief requests to delete the regenerative heat exchanger supports from the list of components for which relief was being requested in each of the relief requests, and 2) include a statement in the Alternate Requirements section of the relief requests stating

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that VT-3 examinations of the supports would continue to be performed. These two actions are consistent with the previously approved North Anna Unit 2 relief request NDE-046. In addition, the Category B-J welds were removed from the Surry Unit 2 relief request, since these welds are included in the NRC approved Risk-Informed ISI Program for Unit 2. The attached revised relief requests SR-023 and SR-029 for Surry Units 1 and 2, respectively, reflect these changes and supercede the relief requests provided in the May 16, 2001 submittal.

Also, the proposed Unit 2 relief request SR-029 will, when approved, supercede the currently approved SR-010 and its associated conditions. As noted in our original submittal, relief request SR-010, which also addressed certain relief from Code-required examinations of the Surry Unit 2 regenerative heat exchanger, was previously approved by the NRC staff in a letter dated August 30, 1995.

Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), relief is requested from certain ASME Section XI Code examination requirements associated with the regenerative heat exchangers. Relief requests SR-023 and SR-029 are provided in Attachments 1 and 2 for Surry Units 1 and 2, respectively. Similar ASME Code relief was requested by the Joseph M. Farley Nuclear Plant and approved by the NRC in a letter dated November 16, 1998 (TAC NO. MA3449), and as noted above, North Anna Power Station Unit 2 also requested elimination of the Code required examinations for the regenerative heat exchanger in relief request NDE-046 which was approved by the NRC in a letter dated March 26, 2001 (TAC NO. MB0750).

The attached relief requests for Surry Units 1 and 2 have been approved by the Station Nuclear Safety and Operating Committee. If you have questions or require additional information, please contact us.

Very truly yours,

Leslie Hartz
Vice President - Nuclear Engineering

Attachments

Commitments made in this letter: None

cc: U. S. Nuclear Regulatory Commission
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Attachment 1

Relief Request SR-023
Regenerative Heat Exchanger (1-CH-E-3)

Dominion
Surry Power Station Unit 1

RELIEF REQUEST SR-023
SURRY POWER STATION UNIT 1

I. IDENTIFICATION OF COMPONENTS

System: Chemical and Volume Control (CH)
Component: Regenerative Heat Exchanger (1-CH-E-3)
Drawing: 11448-WMKS-CH-E-3

Welds	Description	Code Item#	Class
1-01	circumferential head weld	C1.20	2
1-04	circumferential head weld	C1.20	2
1-06	circumferential head weld	C1.20	2
1-07	circumferential head weld	C1.20	2
1-09	circumferential head weld	C1.20	2
1-10	circumferential head weld	C1.20	2
1-02	tubesheet to shell weld	C1.30	2
1-03	tubesheet to shell weld	C1.30	2
1-05	tubesheet to shell weld	C1.30	2
1-08	tubesheet to shell weld	C1.30	2
1-11	tubesheet to shell weld	C1.30	2

II. IMPRACTICAL CODE REQUIREMENTS

Examination Category C-A requires that volumetric examinations be performed as indicated by the Code item numbers above.

III. BASIS FOR RELIEF

Background

The regenerative heat exchanger (1-CH-E-3) provides preheat for the normal charging water flowing into the reactor coolant system (RCS). The preheat is derived from normal letdown water coming from the RCS. Charging and letdown constitute the normal chemical and volume control within the RCS. The heat exchanger itself is actually three heat exchangers or sub-vessels in series interconnected with piping. Therefore, examinations are limited to one of the heat exchangers as allowed by the Code for multiple vessels of similar design and function. (Table IWC-2500-1, Category C-A, Note (3), Reference: Figure SR-023-1.) The lower heat exchanger has historically been chosen for examination to preclude the need for scaffolding and thus minimize personnel dose.

The heat exchanger has an outside shell diameter of 9.25 inches. The shells were manufactured with ASTM A213 TP 304 stainless steel material. The heat exchanger is ASME Class 2. The nozzles are 3 inch schedule 160 of similar material and are exempt from examination by IWC-1222(a) for components of 4 inch nominal pipe size (NPS) and smaller.

The purpose of this relief request is to eliminate Category C-A weld examinations on the regenerative heat exchanger.

Dose Considerations

A dose evaluation has been conducted on each activity associated with the examinations of the lower regenerative heat exchanger vessel. The lower vessel was chosen to minimize dose in that scaffolding is not required. Table SR-023-1 gives the personnel dose expected from these activities. A personnel dose of 3.072 man-rem is estimated to complete the required examinations over the interval. This estimate assumes optimum inspection and preparation times and should be considered conservatively low. If difficulties are encountered a corresponding increase in dose would be expected. Shielding is not considered practical since the source of radiation is the component receiving the examinations.

Significant Leakage Considerations

As previously noted, the inlet and outlet piping for this Class 2 Regenerative Heat Exchanger is 3 inch NPS. Therefore, a crack or defect in the heat exchanger shell could not produce a leak greater than that allowed by the corresponding 3 inch inlet or outlet piping. To produce a leak greater than that produced by a 4 inch line would require multiple shell and/or tube failures in the group of three heat exchangers, which is not considered a credible inservice failure. Therefore, the intent of the ASME Section XI Code 4 inch exemption is maintained.

Conclusion

The radiation exposure expended to perform the discussed examinations would result in a hardship without a compensating increase in the level of quality and safety. We believe the intent of the ASME Section XI Code would be maintained in the Surry ISI program considering the NPS 4 inch and less exemption for Class 2 vessels, piping, pumps and valves. Considering the alternative requirements discussed in Section IV, relief from the Code required examinations on the regenerative heat exchanger is requested per the provisions of 10CFR 50.55a(a)(3)(ii).

Furthermore, similar relief requests for the elimination of the Code required examinations for regenerative heat exchangers were previously submitted for the Joseph M. Farley Nuclear Plant and North Anna Power Station Unit 2. Both the Farley and North Anna Unit 2 relief requests were approved by the NRC in letters dated November 16, 1998 (TAC NO. MA3449) and March 26, 2001 (TAC NO. MB0750), respectively.

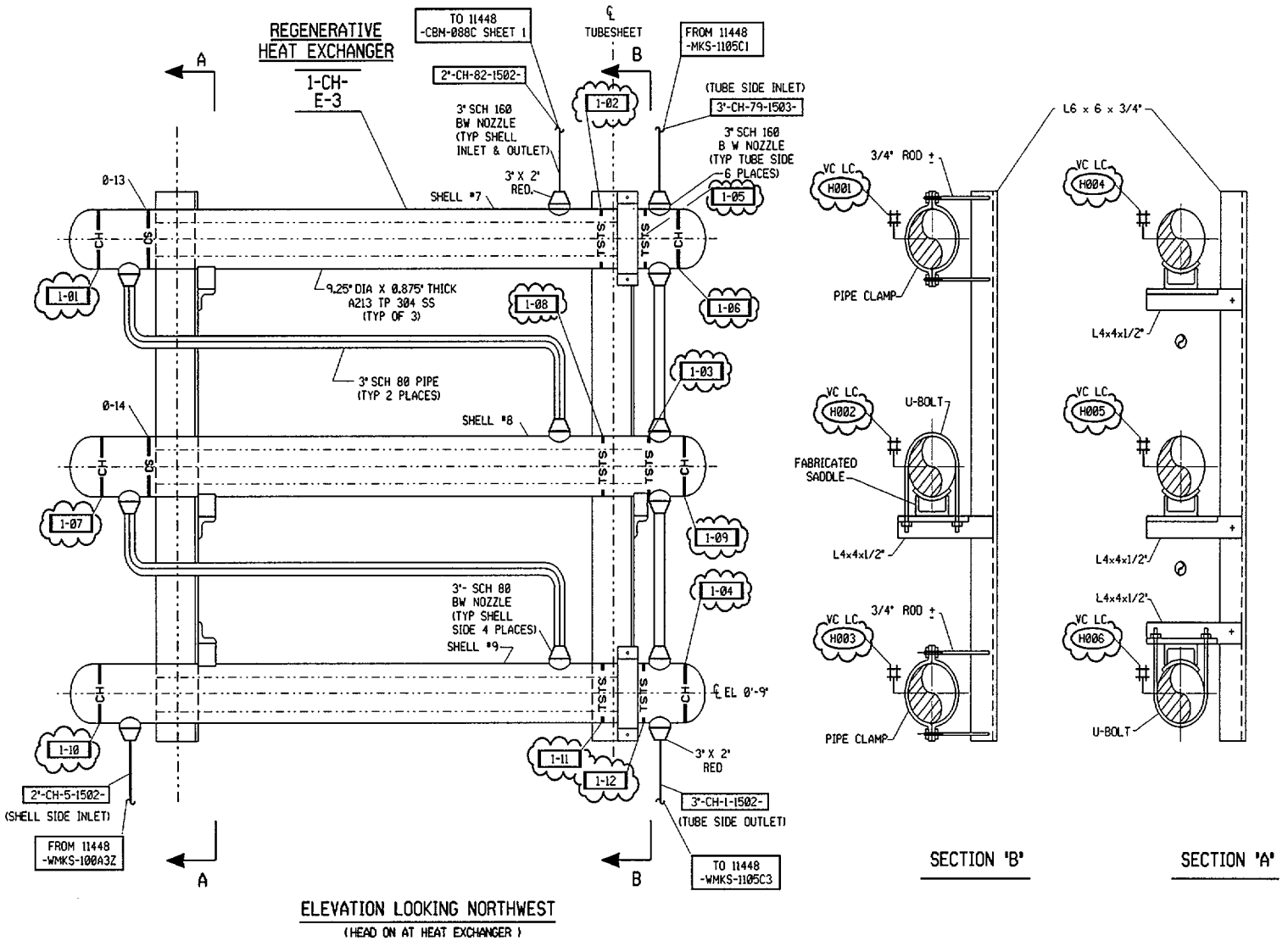
IV. ALTERNATE REQUIREMENTS

Technical Specifications require that the RCS leak rate be limited to 1 gallon per minute unidentified leakage. This value is calculated periodically in accordance with Technical Specification requirements. Additionally, the containment atmosphere particulate radioactivity is monitored periodically per Technical Specifications requirements. As a result, new leakage is rapidly identified and located during operation. Leakage identified from these components can be easily isolated by upstream valves that can be operated from the control room. The letdown valves also receive an automatic control signal to close on inventory loss based on pressurizer level.

Furthermore, the heat exchanger will continue to receive a periodic pressure test in accordance with IWC 2500, category C-H, and IWC 5000. The heat exchanger supports will continue to receive VT-3 examinations in accordance with Code Case N-491, Table 2500-1.

RELIEF REQUEST SR-023

SURRY UNIT 1 REGENERATIVE HEAT EXCHANGER (1-CH-E-3)
FIGURE SR-023-1



RELIEF REQUEST SR-023

SURRY UNIT 1 REGENERATIVE HEAT EXCHANGER (1-CH-E-3)
MAN-REM ESTIMATE FOR THE LOWER HEAT EXCHANGER
TABLE SR-023-1

Work Task	Job Site Man-Hrs	Dose Rates Rem/Hr	Estimated Man-Rem
Remove/install insulation	1.8	0.800	1.440
Remove/install shielding	0.25	0.800	0.200
Remove/install clamp	2.0	0.500	1.000
Weld prep	0.14	0.500	0.070
HP coverage	1.5	0.015	0.022
Circumferential head welds 1-04, 1-10	0.50	0.500	0.250
Tube sheet to shell Welds 1-11, 1-12	0.18	0.500	0.090

Total – 3.072 Man-Rem

Attachment 2

Relief Request SR-029
Regenerative Heat Exchanger (2-CH-E-3)

Dominion
Surry Power Station Unit 2

RELIEF REQUEST SR-029
SURRY POWER STATION UNIT 2

I. IDENTIFICATION OF COMPONENTS

System: Chemical and Volume Control (CH)
Component: Regenerative Heat Exchanger (2-CH-E-3)
Drawing: 11548-WMKS-CH-E-3

Welds	Description	Code Item#	Class
1-04	circumferential head weld	B2.51	1
1-17	circumferential head weld	B2.51	1
1-19	circumferential head weld	B2.51	1
1-03	tubesheet to shell weld	B2.80	1
1-18	tubesheet to shell weld	B2.80	1
1-22	tubesheet to shell weld	B2.80	1
1-06	nozzle to vessel weld	B3.150	1
1-08	nozzle to vessel weld	B3.150	1
1-09	nozzle to vessel weld	B3.150	1
1-11	nozzle to vessel weld	B3.150	1
1-13	nozzle to vessel weld	B3.150	1
1-15	nozzle to vessel weld	B3.150	1
NIR-06	nozzle inside radius	B3.160	1
NIR-08	nozzle inside radius	B3.160	1
NIR-09	nozzle inside radius	B3.160	1
NIR-11	nozzle inside radius	B3.160	1
NIR-13	nozzle inside radius	B3.160	1
NIR-15	nozzle inside radius	B3.160	1
1-01	circumferential head weld	C1.20	2
1-21	circumferential head weld	C1.20	2
1-24	circumferential head weld	C1.20	2
1-02	tubesheet to shell weld	C1.30	2
1-20	tubesheet to shell weld	C1.30	2
1-23	tubesheet to shell weld	C1.30	2

II. IMPRACTICAL CODE REQUIREMENTS

Examination Categories B-B, B-D and C-A require that volumetric examinations be performed as indicated by the Code item numbers above.

III. BASIS FOR RELIEF

Background

The regenerative heat exchanger (2-CH-E-3) provides preheat for the normal charging water flowing into the reactor coolant system (RCS). The preheat is derived from normal letdown water coming from the RCS. Charging and letdown constitute the normal chemical and volume control within the RCS. The heat exchanger itself is actually three heat exchangers or sub-vessels in series interconnected with piping. Therefore, examinations are limited to one of the heat exchangers as allowed by the Code for multiple vessels of similar design and function. (Table IWB-2500-1, Category B-B, Note (1) and Table IWC-2500-1, Category C-A, Note (3), Reference: Figure SR-029-1.) The lower heat exchanger has historically been chosen for examination to preclude the need for scaffolding and thus minimize personnel dose.

The heat exchanger has an outside shell diameter of 9.25 inches. The shells were manufactured with ASTM A213 TP 304 stainless steel material. The nozzles are 3 inch schedule 160 of similar material. The charging or tube side of the heat exchanger is classified ASME Class 1. The classification of the letdown (shell) side of the heat exchanger is ASME Class 2. All Class 1 nozzles are required to be examined, and the examinations are not limited to one heat exchanger.

The purpose of this relief request is to eliminate Category B-B, B-D and C-A examinations on the regenerative heat exchanger.

Geometric Restrictions

The nozzle-to-vessel welds and nozzle inside radius sections for this vessel were not designed for ultrasonic examination from the outside diameter of the vessel. The small diameter of the vessel and nozzles prevents a meaningful ultrasonic examination of these components. The joint design of the nozzle weld specifies a 3 inch schedule 160 weldolet joined to a 9.25 inch O.D. x 0.875 inch thick vessel. The configuration of the weldolet precludes axial ultrasonic examination from the nozzle side and circumferential examination in either direction. This limits volumetric examination to a single axial scan from the vessel side of the nozzle. It is our opinion that a meaningful ultrasonic examination cannot be performed on the weld or inner radius with a single axial scan, due to the small diameter of the vessel and weldolet. Further, the change in dihedral around the joint results in a corresponding change in the ultrasonic beam angle, which makes position measurements unreliable. It would also be necessary to extend the beam path to at least two full Vee paths, which would further complicate this examination. These limitations would substantially diminish our ability to discriminate flaw indications from the geometry existing around the joint. The

configuration also precludes placement of film on the outside diameter for radiography, and the inside surfaces are inaccessible.

Dose Considerations

A dose evaluation has been conducted on each activity associated with the examinations for the entire regenerative heat exchanger. Table SR-029-1 provides the personnel dose expected from these activities. A personnel dose of 11.968 man-rem is estimated to complete these examinations over the interval. This estimate utilizes dose savings by limiting the circumferential head and tubesheet to shell welds to the lower heat exchanger as allowed by the Code. Optimum inspection and preparation times were assumed. However, if difficulties are encountered, a corresponding increase in dose would be expected. Shielding is not considered practical since the source of radiation is the component receiving the examinations.

Conclusion

If the Code required examinations were performed, the geometric restrictions would severely limit the amount of meaningful information that could be obtained concerning the condition of the heat exchanger. Therefore, the significant personnel dose involved with performing the examinations would result in a hardship without a compensating increase in the level of quality and safety. Considering the alternative requirements discussed in Section IV, relief from the Code required examinations on the regenerative heat exchanger is requested pursuant to the provisions of 10CFR 50.55a(a)(3)(ii).

Furthermore, similar relief requests for the elimination of the Code required examinations for regenerative heat exchangers were previously submitted for the Joseph M. Farley Nuclear Plant and North Anna Power Station Unit 2. Both the Farley and North Anna Unit 2 relief requests were approved by the NRC in letters dated November 16, 1998 (TAC NO. MA3449) and March 26, 2001 (TAC NO. MB0750), respectively.

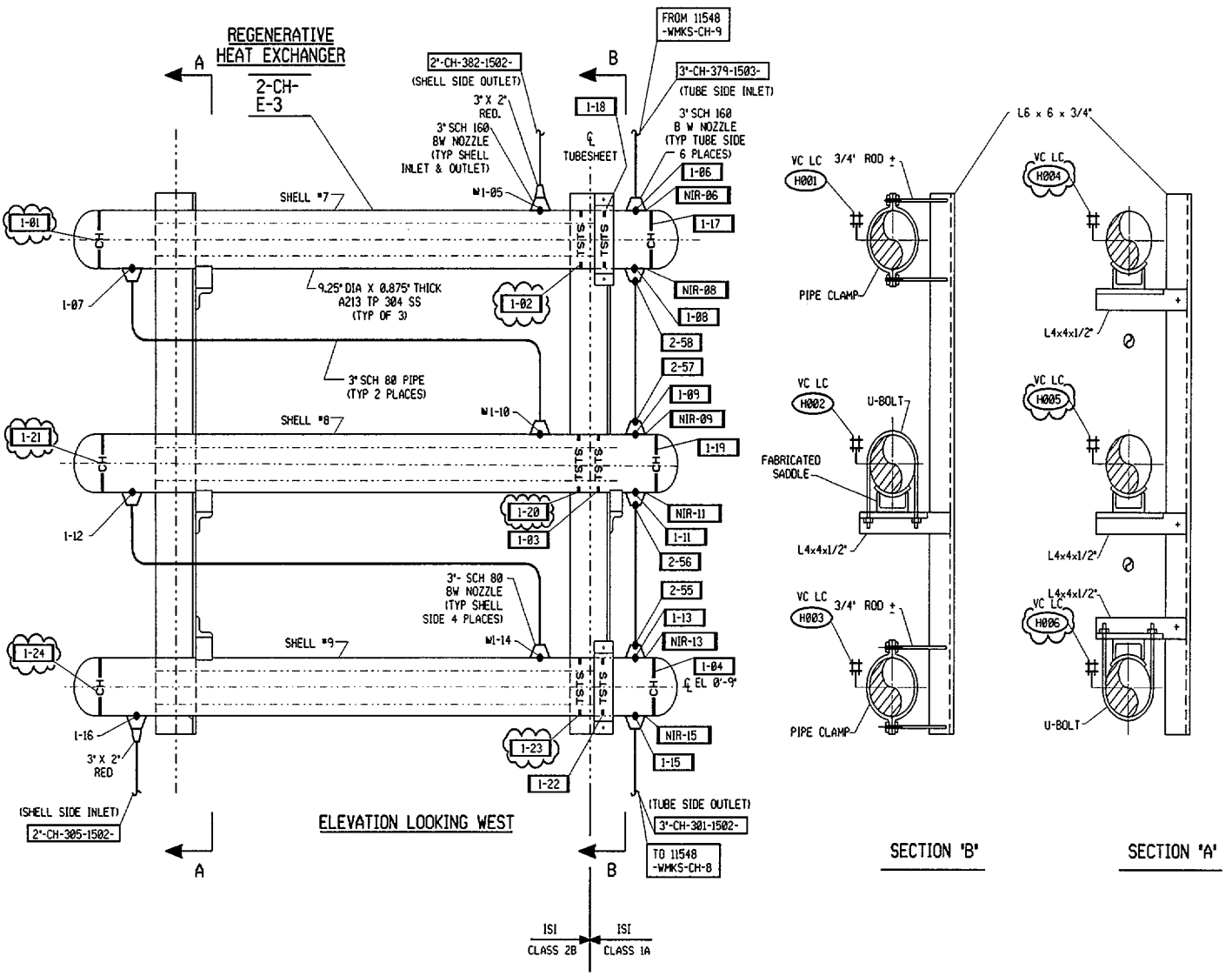
IV. ALTERNATE REQUIREMENTS

Technical Specifications require that the RCS leak rate be limited to 1 gallon per minute unidentified leakage. This value is calculated periodically in accordance with Technical Specification requirements. Additionally, the containment atmosphere particulate radioactivity is monitored periodically per Technical Specification requirements. As a result, new leakage is rapidly identified and located during operation. Leakage identified from these components can be easily isolated by upstream valves with manual operation from within the control room. The letdown valves also receive an automatic control signal to close on inventory loss based on pressurizer level.

Furthermore, the Class 1 side of the regenerative heat exchanger receives a system leakage test prior to start up after each refueling outage. During this system leakage test the components receive a visual (VT-2) examination. The Class 2 side of the heat exchanger will continue to receive a periodic pressure test in accordance with IWC 2500, category C-H and IWC 5000. The heat exchanger supports will continue to receive VT-3 examinations in accordance with Code Case N-491, Table 2500-1.

RELIEF REQUEST SR-029

SURRY UNIT 2 REGENERATIVE HEAT EXCHANGER (2-CH-E-3)
FIGURE SR-029-1



RELIEF REQUEST SR-029

SURRY UNIT 2 REGENERATIVE HEAT EXCHANGER (2-CH-E-3)
MAN-REM ESTIMATE FOR THE ENTIRE HEAT EXCHANGER
TABLE SR-029-1

Work Task	Job Site Man-hours	Dose Rates Rem/Hr	Estimated Man-Rem	Est. Man-Rem/Interval 16/24 welds required
Insulation removal/installation	5.3	0.800	4.240	4.240
Install/remove shielding	0.25	0.800	0.200	0.200
Install/remove scaffolding	2	0.800	1.600	1.600
Remove/Install clamp	2	0.500	1.000	1.000
Weld prep	1.25	0.500	0.625	0.446
HP coverage	6.25	0.015	0.094	0.067
Nozzle-to-vessel welds 1-06, 1-08,1-09,1-11,1-13,1-15	3	0.800	2.400	2.400
Nozzle-to-inside radius NIR-06, NIR-08, NIR-09, NIR-11, NIR-13, NIR-15	2.25	0.800	1.800	1.800
Circumferential head welds Class 1: 1-04, 1-17, 1-19 Class 2: 1-01, 1-21, 1-24	0.75	0.500	0.375	0.125
Tube sheet to shell welds Class 1: 1-03, 1-18, 1-22 Class 2: 1-02, 1-20, 1-23	0.54	0.500	0.270	0.090

Total – 11.968 Man-Rem/Interval