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MFN 06-532 Supplement 1

Docket No. 52-010

November 19, 2007

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555-0001

Subject: **Response to Portion of NRC Request for Additional Information Letter No. 83– Related to ESBWR Design Certification Application – RAI Number 20.0-5/S01**

The purpose of this letter is to submit the GE Hitachi Nuclear Energy (GEH) response to the U.S. Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) sent by the Reference 1 NRC letter. GEH response to RAI Number 20.0-5 is addressed in Enclosures 1 and 2.

If you have any questions or require additional information, please contact me.

Sincerely,

Kathy Sedney for

James C. Kinsey
Vice President, ESBWR Licensing

D068
NRO

Reference:

1. MFN 06-516, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 83 Related to the ESBWR Design Certification Application*, December 7, 2006.

Enclosure:

1. MFN 06-532/S01 – Response to Portion of NRC Request for Additional Information Letter No. 83 – Related to ESBWR Design Certification Application – RAI Number 20.0-5/S01
2. MFN 06-532/S01 – Response to Portion of NRC Request for Additional Information Letter No. 83 – Related to ESBWR Design Certification Application – RAI Number 20.0-5/S01 – DCD Markup Pages

cc: AE Cubbage USNRC (with enclosure)
GB Stramback GEH/San Jose (with enclosure)
RE Brown GEH/Wilmington (with enclosure)
eDRF 0000-0062-6546/R1

ENCLOSURE 1

MFN 06-532, SUPPLEMENT 1

Response to NRC Request for

Additional Information Letter No. 83

Related to ESBWR Design Certification Application[1]

RAI Numbers 20.0-5 S01

[1] The original Response submitted under MFN 06-532 is included to provide historical continuity during review.

NRC RAI 20.0-5

Address concerns of Bulletin 80-08. In view of past weld inspection issues associated with the use of backing bars, provide the following information. Provide a description of containment welds, pressure boundary and structural, that have a weld joint design that utilizes a backing bar and requires a volumetric inspection for which the applicant will us the ultrasonic inspection method. Describe what steps will be taken to ensure that the examination techniques will reliably identify welding defects given the issues identified in Bulletin 80-08

GE Response

The issue addressed in IE Bulletin 80-08 specifically concerned problems with UT of weld joints with backing bars for weld joints in flued-head containment penetration assemblies or other penetration sleeve and process piping joints as illustrated in the Figure NE-1120-1 of Section III the ASME Code. The ESBWR does not use backing bars in weld joints for such assemblies, so the issue raised by Bulletin 80-08 is not applicable for the ESBWR.

Regarding other containment weld joints with backing bars, the 2001 Edition was revised to delete the requirement for radiography of any welds made with backing bars; the change also clarifies that welds made using backing bars shall be examined by UT or MT. Backing bars are commonly used in structural applications and ultrasonically examined without issue. The fact that the Bulletin addressed only flued-head containment penetration assemblies indicates that the concern was with a problem associated with that particular geometry

DCD Impact

No DCD changes will be made in response to this RAI.

NRC RAI 20.0-5 Supplement 1:

In GE's response to RAI 20.5, GE did not provide a clear response to the staff's original RAI question. It is still unclear if backing bars are going to be used on any of the containment penetration welds in the ESBWR design. In order for the staff to determine that the issues raised in BL 80-08 associated with ultrasonic testing of containment penetration welds using backing bars are addressed in the DCD, the staff requests that the applicant modify the DCD to state that weld joint designs for the ESBWR containment liner penetrations do not utilize backing bars. In addition, the staff notes that weld joint designs in DCD, Tier 2, Revision 3, Figures 3.8-7, 3.8-6, 3.8-8 3.8-9, 3.8-10 and 3.8-11,show that a square groove weld joint design will be used to join the flange plate to containment liner. The staff is concerned that the weld joint configuration shown in the aforementioned figures may not provide sound welds given that there is no required beveled edge on the weld joints and no indication that back grinding and welding will be performed. The staff requests that the applicant provide details as to how these welds will be performed (e.g. back grinding and welding or removable backing etc.) and the NDE that will be performed on these welds.

GEH Response

As stated in the original RAI response, the ESBWR does not use backing bars in the weld joints between flued-head containment penetration assemblies or other penetration sleeves and process piping. DCD Tier 2, Rev. 4, Table 3.8-5 will be revised to state this. Subsection 3.8.1.6.6 and Table 3.8-5 will also be revised to clarify that RT is used for welds without backup bars and UT or MT is used for welds with backup bars as permitted by ASME Section III, Division 2, Section CC-5521 for the containment liner welds.

The welds between the penetration flange and containment liner shown in DCD Tier 2 Figures 3.8-6, 3.8-7, 3.8-8, 3.8-9, 3.8-10, and 3.8-11 will be revised to show that they are square groove welds welded from both sides. Square groove welds are an acceptable joint configuration per ASME Code for the thickness involved. Please note that the insert plate of the penetration sleeve is tapered to match the thickness of the liner at the weld joint. Welding procedures comply with ASME Code for cleaning out the root pass of the first weld prior to applying weld metal to the second side. NDE to be performed on the welds is shown on Table 3.8-5.

DCD Impact:

DCD Tier 2 Subsection 3.8.1.6.6, Figures 3.8-6 to 3.8-11 and Table 3.8-5 will be revised in the next update as noted in the attached markups.

ENCLOSURE 2

MFN 06-532, SUPPLEMENT 1

Response to NRC Request for

Additional Information Letter No. 83

Related to ESBWR Design Certification Application

RAI Numbers 20.0-5 S01

DCD Markup Pages

3.8.1.6.3 Splices of Reinforcing Steel

Sleeves for reinforcing steel mechanical splices conform to ASTM A-513, A-519 or A-576 Grades 1008 through 1030. Certified copies of material test reports indicating chemical composition and physical properties are furnished by the manufacturer for each sleeve lot.

Placing and splicing of reinforcing bars is in accordance with Article CC-4300 and Subarticle CC-3530 of ASME Code Section III, Division 2.

3.8.1.6.4 Liner Plate and Appurtenances

The materials used in construction of the containment are in accordance with the Article CC-2500 of ASME Code Section III, Division 2, and augmented by the requirements of RG 1.136.

The materials conform to the requirements of the Articles CC-2500 through CC-2700 ASME Code Section III, Division 2. The liner plate is of the following type and grade:

Carbon Steel:	ASME SA-516 Gr.-70
Carbon Steel with Stainless Clad:	ASME SA-264 (SA-516 Gr. -70 + SA-240 tp 304L)
Stainless Steel:	ASME SA-240 Type 304L

Dimensional tolerances for the erection of the liner plate and appurtenances are detailed in the construction specifications based on the structure geometry, liner stability, concrete strength and the construction methods to be used and ASME requirements. The liner plate anchorages are designed for the loads indicated in Subsection 3.8.1.3.

3.8.1.6.5 Quality Control

Quality control procedures are established in the Construction Specification and implemented during construction and inspection. The Construction Specification covers the fabrication, furnishing, and installation of each structural item and specifies the inspection and documentation requirements to ensure that the requirements of ASME Code Section III, Division 2, and the applicable Regulatory Guides are met.

3.8.1.6.6 Welding Methods and Acceptance Criteria for Containment Vessel Liner and Appurtenances

Welding activities conform to the requirements of Section III of the ASME Code. The required nondestructive examinations and acceptance criteria are provided in Table 3.8-5.

3.8.1.7 Testing and In-service Inspection Requirements

3.8.1.7.1 Structural Integrity Pressure Test

A Structural Integrity Test (SIT) of the containment structure is performed in accordance with Article CC-6000 of ASME Code Section III, Division 2 and Regulatory Guide 1.136, after completion of the containment construction. The design pressure is 310.2 kPag (45 psig). The drywell and wetwell are tested simultaneously at a pressure of 356.8 kPag (52 psig). This is 115% of the design pressure. Next a differential pressure test of 277.5 kPad (40 psid) is conducted between the drywell and the wetwell. The drywell pressure is greater than the

Table 3.8-5

Welding Activities and Weld Examination Requirements for Containment Vessel

Component	Weld Type	NDE Requirements
Steel components[1] (no concrete backing, ASME Section III, Division 1, Subsection NE)	Category A, Butt welds (Long'l)	RT[2]
	Category B, Butt welds (Circ.)	RT[2][3]
	Category C, Butt welds	RT[2]
	Category C, Nonbutt welds	UT or MT or PT
	Category D, Butt welds	RT[2]
	Category D, Nonbutt welds	UT or MT or PT
	Structural attachment welds a) Butt welds b) Nonbutt welds	 RT[2] UT or MT or PT
	Special welds, Weld metal cladding	PT
Containment liner[4] (with concrete backing, ASME Section III, Division 2, Subsection CC)	Category A, Butt welds (Long'l)	RT[5]
	Category B, Butt welds (Circ.)	RT[5]
	Category D, Butt welds	RT[5]
	Category D, Nonbutt welds	UT or MT or PT
	Categories E, F, G, J, and Full Penetration H	UT or MT or PT
	Structural attachment welds	MT or PT
	Special welds, Weld metal cladding	PT

NOTES:

(1) Welded joint locations of the Categories are shown in Figure NE-3351-1 of the ASME Section III. Welding activities and welding examinations comply with the provisions of the ASME Section III Subsection NE. Backing bars are not used in weld joints in flued-head containment penetration assemblies or other penetration sleeves and process piping

(2) When the joint detail does not permit radiographic examination, UT plus MT or PT is substituted as permitted by ASME Section III, Division 1, subarticle NE-5280.

(3) Surface examination of the root pass and completed weld is substituted in electrical penetration assemblies for RT per ASME Section III, Division 1, subarticles NE-3352.2 (b) and NE-5280.

(4) Welded joint locations of the Categories are shown in Figure CC-3831-1 of the ASME Section III. Welding activities and welding examinations comply with the provisions of the ASME Section III Subsection CC.

(5) RT is used for welds without backup bars. For welds with backup bars MT or UT is used.

LEGEND:

RT – Radiographic Examination
MT – Magnetic Particle Examination
PT – Liquid Penetrant Examination
UT – Ultrasonic Examination

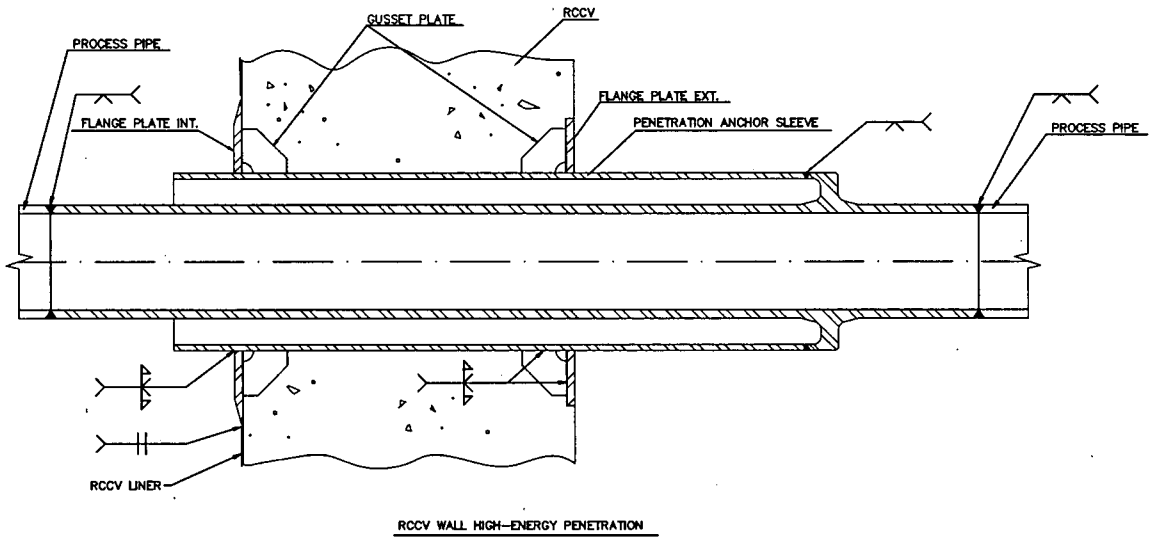

Figure 3.8-6. RCCV Wall High-Energy Penetration

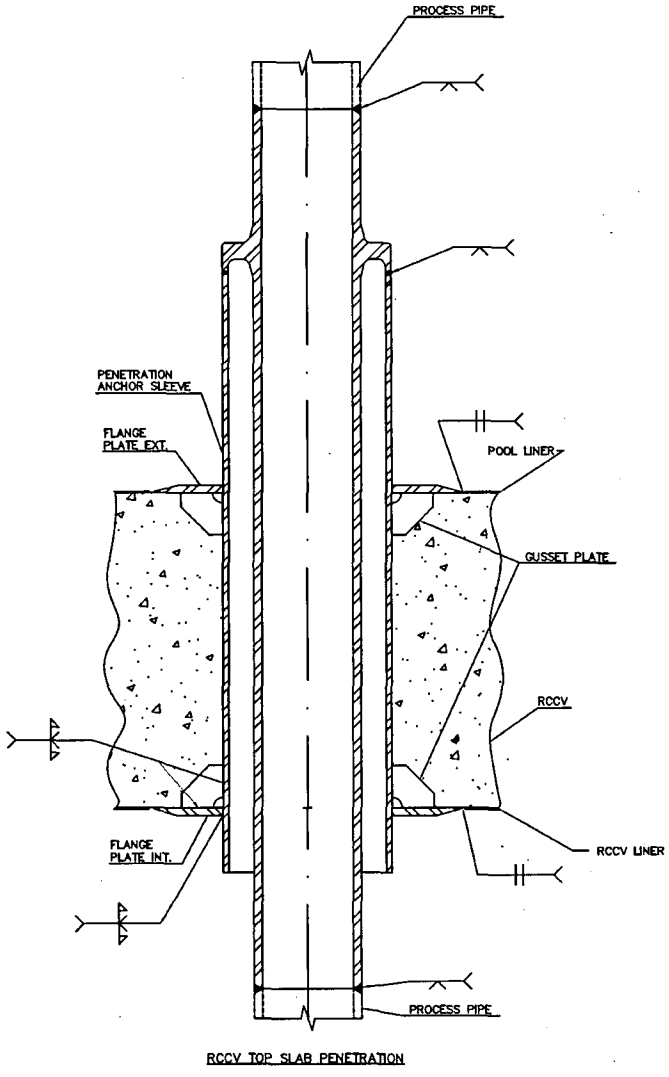

Figure 3.8-7. RCCV Top Slab Penetration

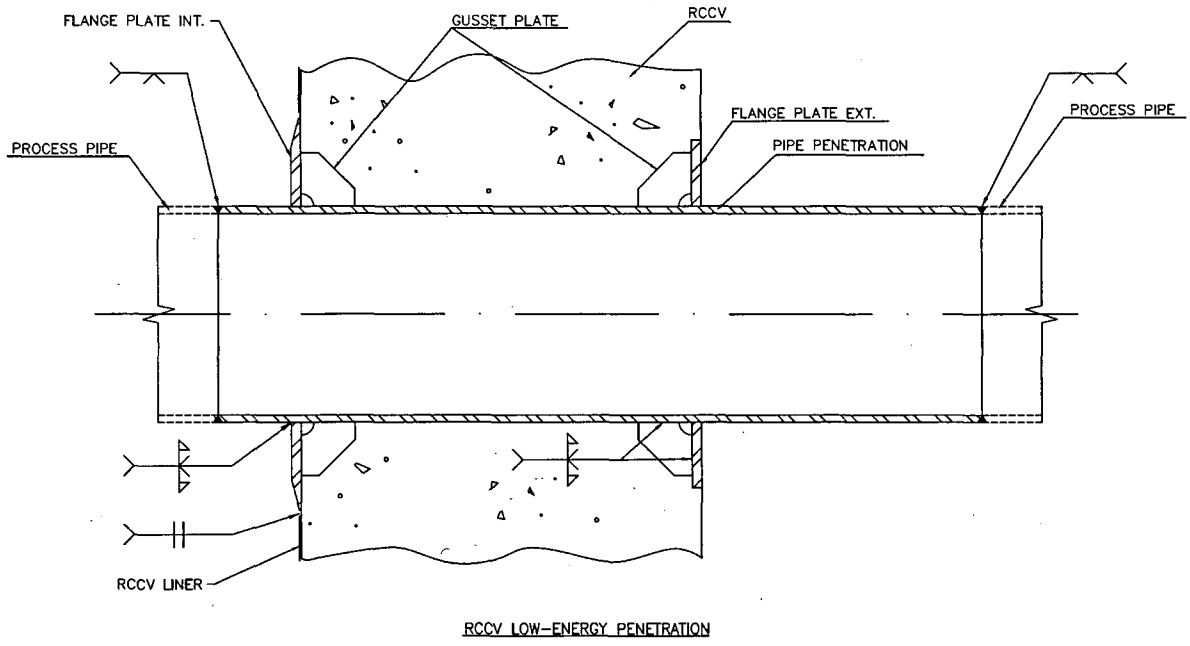

Figure 3.8-8. RCCV Low-Energy Penetration

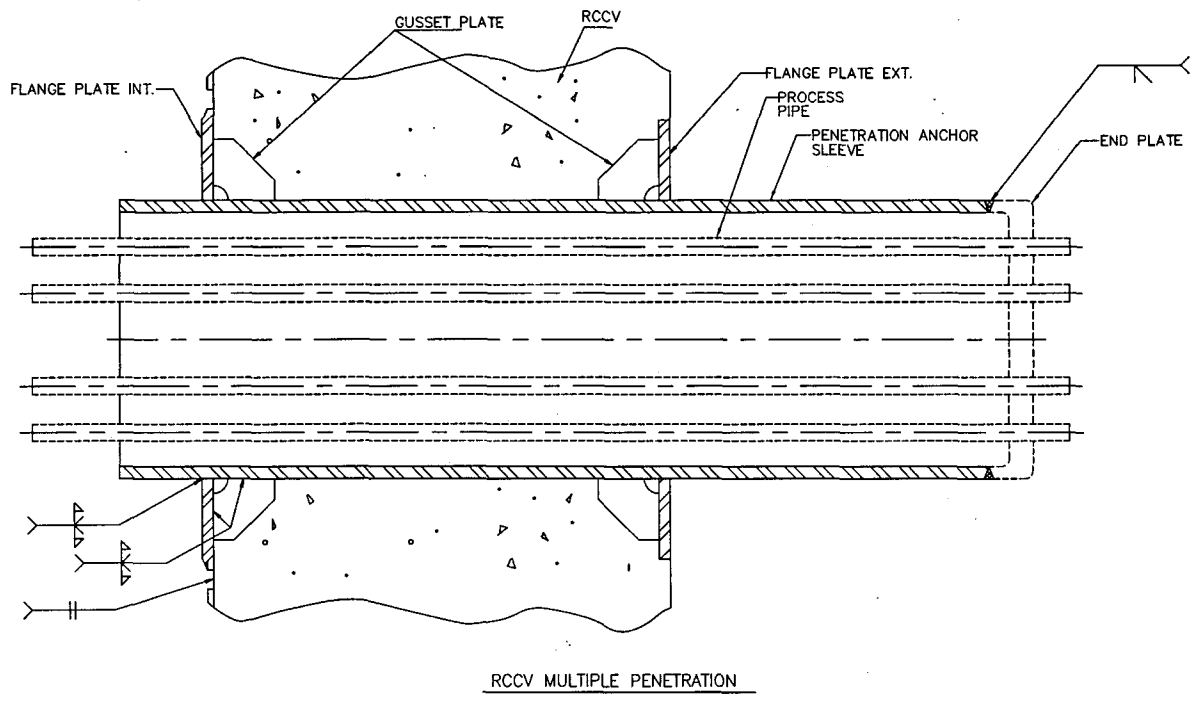

Figure 3.8-9. RCCV Multiple Penetration

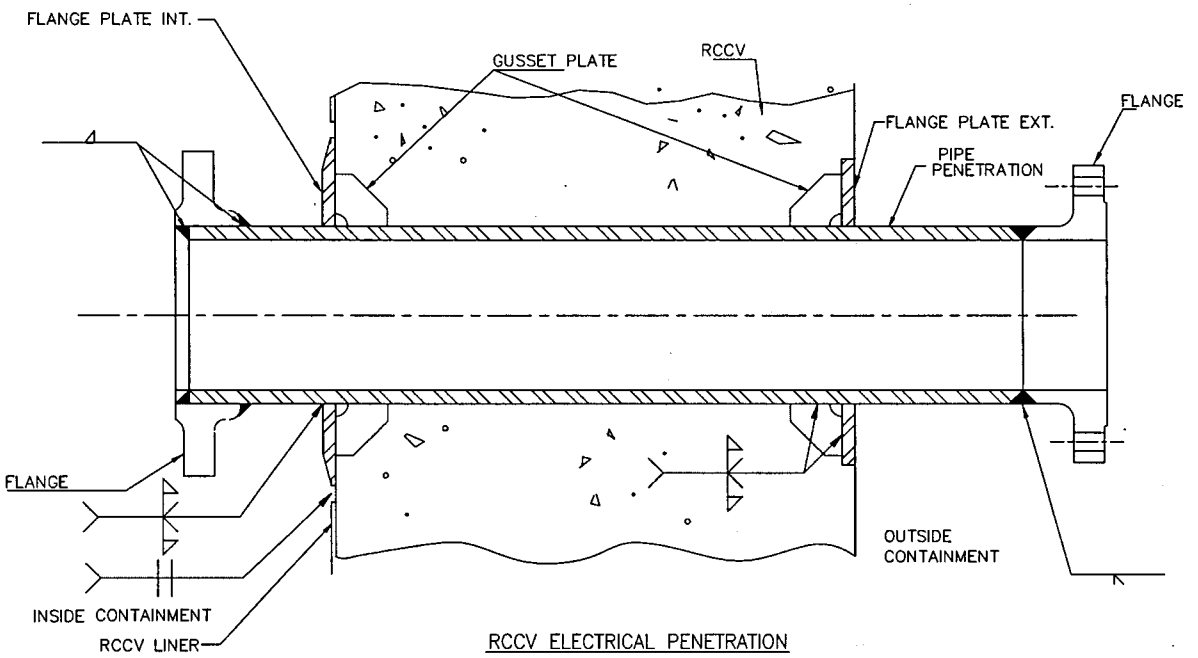

Figure 3.8-10. RCCV Electrical Penetration

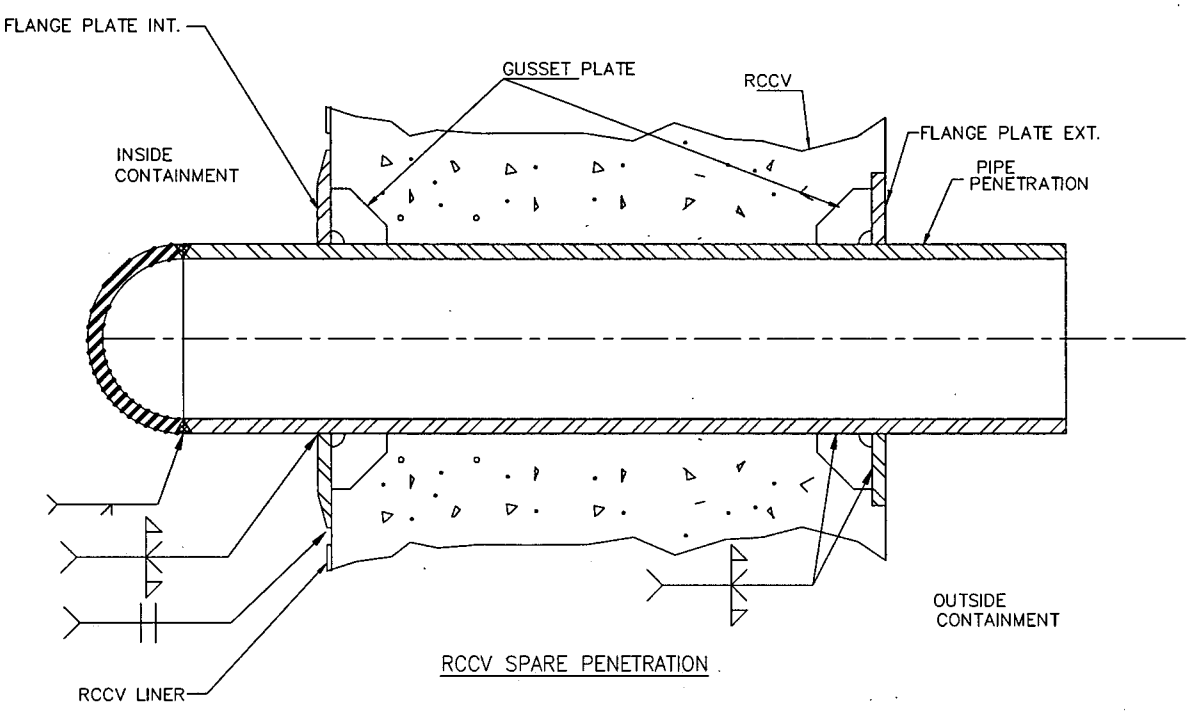

Figure 3.8-11. RCCV Spare Penetration