
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.: 306-8240
SRP Section: 06.02.06 - Containment Leakage Testing
Application Section: 6.2.6
Date of RAI Issue: 11/16/2015

Question No. 06.02.06-5

10 CFR Part 50, Appendix J, requires preoperational and periodical containment leakage testing in accordance with the prescriptive requirements in Option A or the performance-based requirements in Option B. DCD Tier 2, Section 6.2.6, specifies the use of Option B for Type A, B, and C containment leakage rate testing. Regulatory Guide (RG) 1.163, "Performance-Based Containment Leak-Test Program," endorses NEI-01, Revision 0 for an acceptable method for complying with Option B. NEI 94-01 references ANSI/ANS 56.8-1994.

ANSI/ANS 56.8 Section 6.3 discusses draining water from containment isolation valves (CIVs) for Type C testing and Section 3.2.5 discusses venting the downstream side of the valve for testing. These vent and drain connections are important to ensure accurate test results, but are not shown on DCD Tier 2, Figure 6.2.4-1. Please provide Figures showing the appropriate vent and drain connections for all CIVs that must be Type C tested in the DCD.

Response

DCD Tier 2 Figure 6.2.4-1 will be revised to show the appropriate vent and drain connections for all CIVs that must be Type C tested. RAI 357-8344 Question 06.02.04-9 requested similar information and, therefore, the revised Figure 6.2.4-1 will be provided as an attachment to that response.

Impact on DCD

DCD Tier 2, Figure 6.2.4-1 will be revised and submitted as part of the response to RAI 357-8344 Question 06.02.04-9 (ref. KHNP submittal MKD/NW-16-0682L).

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

There is no impact on the Technical, Topical, or Environmental Report.

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DCD Tier 2, Section 6.2.6.2 briefly discusses the Appendix J, Option B, Type B, leakage rate testing of containment penetrations and mentions Type B tests of personnel airlocks, the equipment hatch, fuel transfer tube flange and electrical penetrations. DCD Tier 2, Figure 6.2.4-1 Sheets 11 and 12 show the airlock and equipment hatch. However, they do not show any leak test connections or the seal arrangements. Please provide this information in the DCD.

In addition, DCD Tier 2, Figure 6.2.4-1 Sheet 13 provides a drawing of a typical electrical penetration assembly, but does not show any test connections. If some of the electrical penetrations to be used are not fully sealed, they may require leak test provisions. Are the penetrations fully sealed or do they use flexible seals? Are there leak test provisions? Please clarify this situation in the DCD and supply the documentation as necessary. If they are not to be subject to leak rate testing, please explain and justify.

Response

DCD Tier 2, Figure 6.2.4-1 Sheets 11 and 12 will be revised to show the leak test connections in the personnel airlock and equipment hatch, respectively.

Figure 6.2.4-1 Sheet 13 will be revised to show the aperture seals and leak test connection in the typical electrical penetration assembly. Welding and aperture seals are used for sealing of electrical penetrations and the test connection will be used for leakage rate test of electrical penetrations. Electrical penetrations shall not exceed a maximum permitted leak rate of 1×10^{-2} cc/sec of dry nitrogen at the design pressure and ambient temperature in accordance with IEEE 317.

The revised DCD Tier 2, Figure 6.2.4-1 shown in the attachment associated with this response also reflects changes as a result of the response to RAI 357-8344 Questions 06.02.04-7 and 9.

Impact on DCD

DCD Tier 2 Figure 6.2.4-1 will be revised as shown in the attachment associated with this response.

Impact on PRA

There is no impact on the PRA.

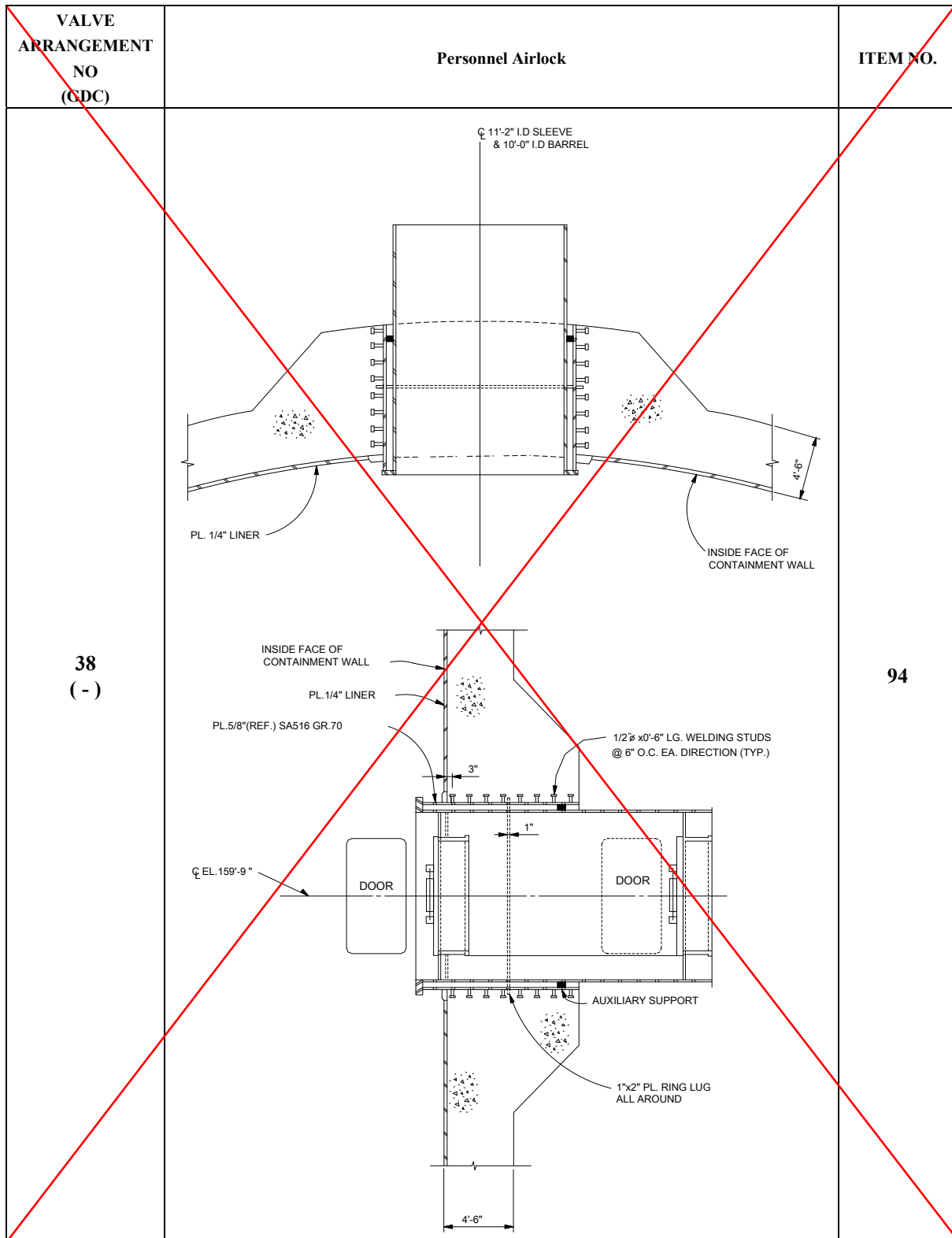
Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

There is no impact on the Technical, Topical, or Environmental Report.

APR1400 DCD TIER 2



~~Figure 6.2.4-1 Containment Isolation Valve Arrangement (11 of 13)~~

Revised

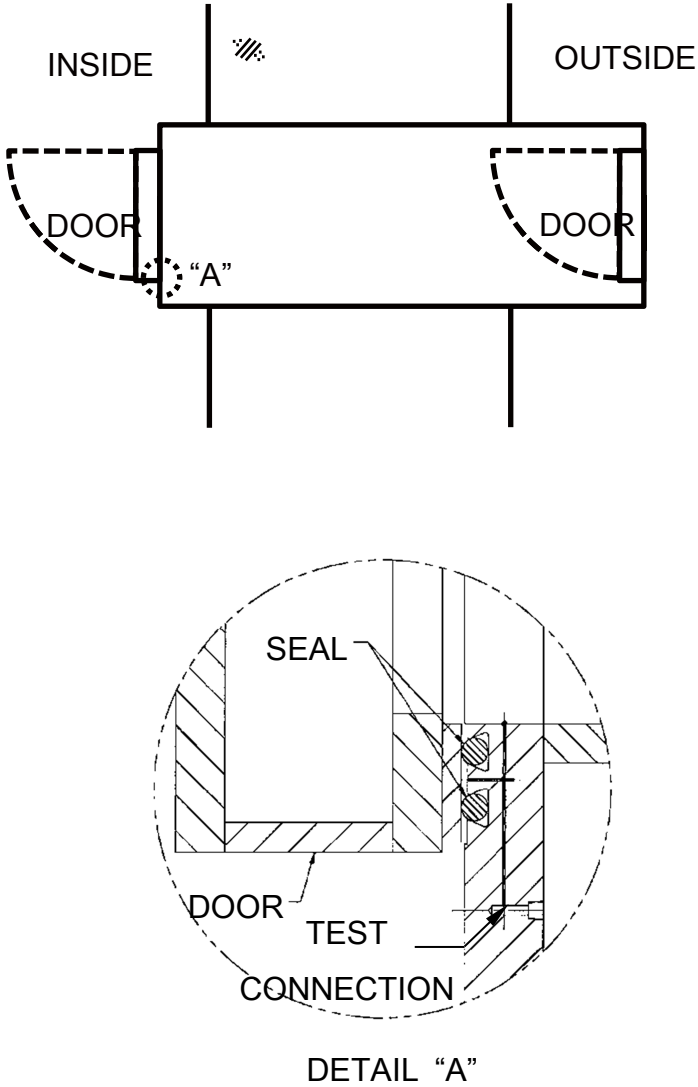
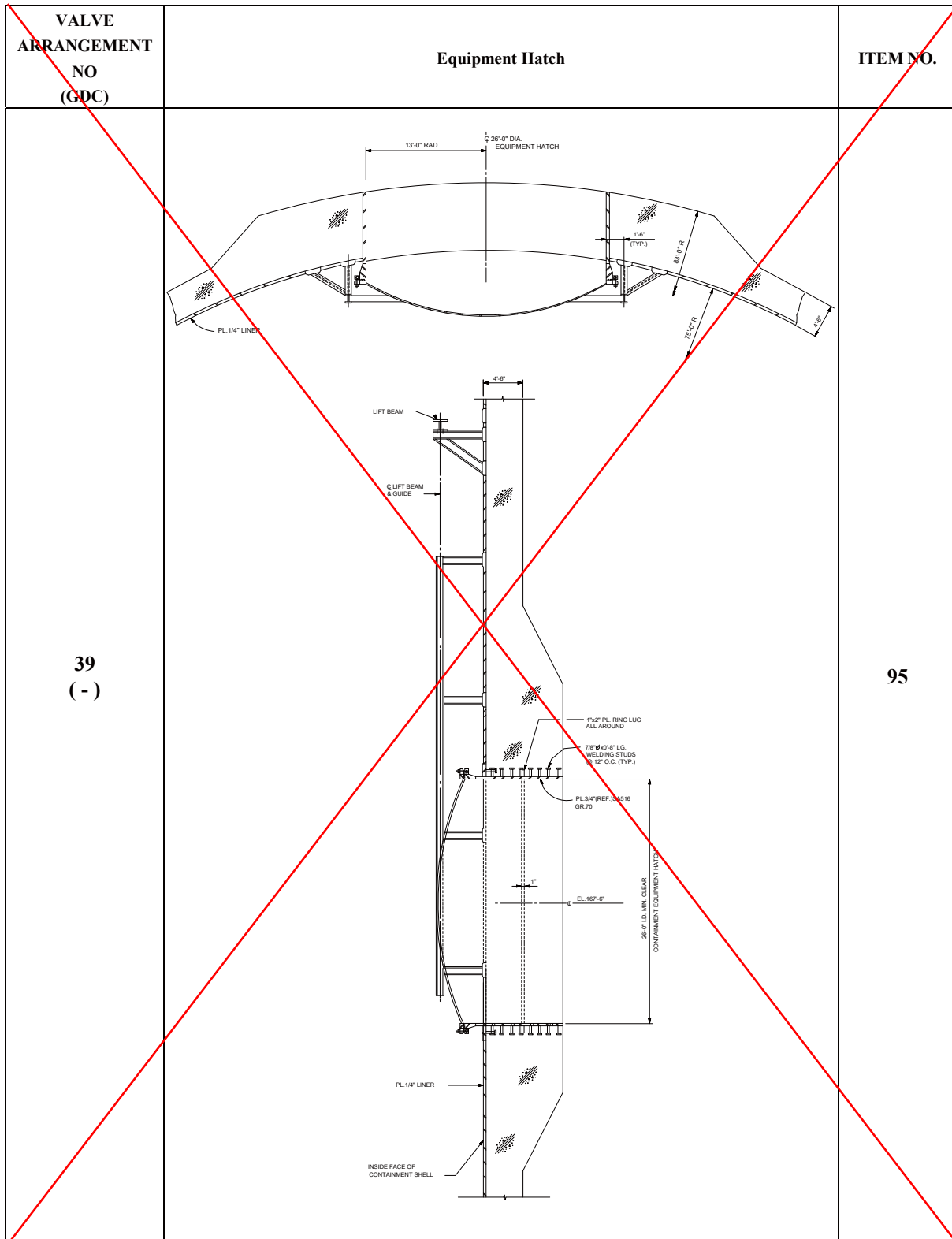
VALVE ARRANGEMENT NO (GDC)	Personnel Airlock	ITEM NO.
<p>45 (-)</p>	 <p>The diagram illustrates a Personnel Airlock system. It consists of a central rectangular chamber with two doors, one on the left labeled 'DOOR' and one on the right labeled 'DOOR'. The left side is labeled 'INSIDE' and the right side is labeled 'OUTSIDE'. A hatched area above the chamber indicates a specific material or condition. A detail view, labeled 'DETAIL "A"', shows a cross-section of the door assembly. It includes a 'SEAL' on the door, a 'TEST CONNECTION' on the door frame, and a 'DOOR' label. The detail view shows the door is closed and the test connection is located on the inner side of the door frame.</p>	<p>94</p>

Figure 6.2.4-1 Containment Isolation Valve Arrangement (11 of 13)

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~~Figure 6.2.4-1 Containment Isolation Valve Arrangement (12 of 13)~~

Revised

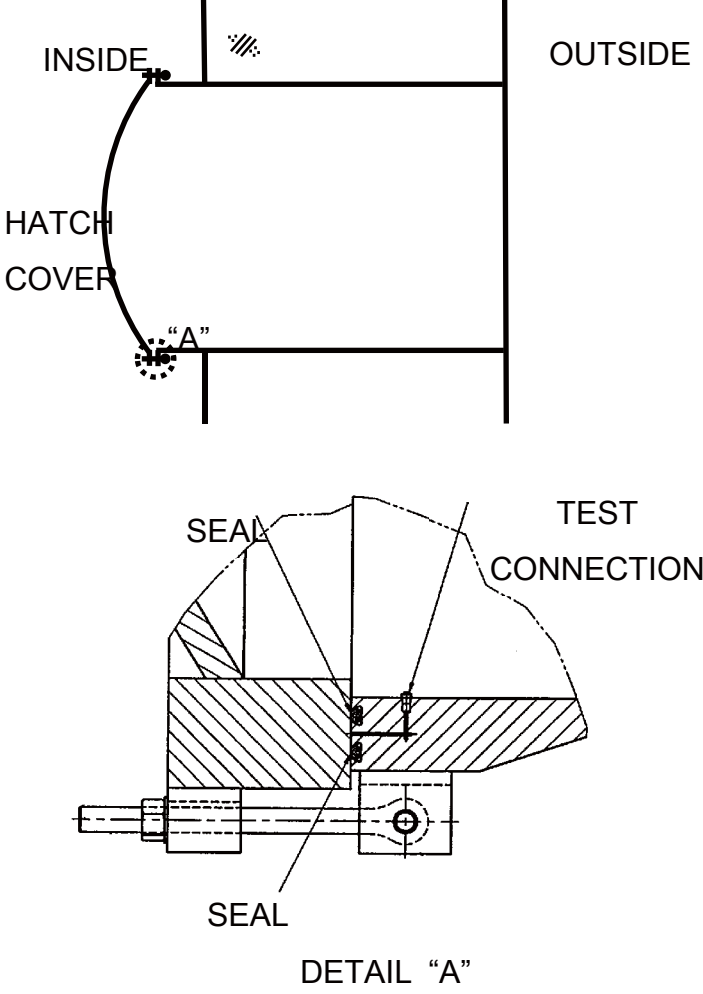
VALVE ARRANGEMENT NO (GDC)	Equipment Hatch	ITEM NO.
<p>46 (-)</p>	 <p>The diagram illustrates the valve arrangement for an equipment hatch. The top portion shows a cross-section of the hatch with a curved cover on the left side labeled 'HATCH COVER'. The interior is labeled 'INSIDE' and the exterior is labeled 'OUTSIDE'. A detail callout 'A' is located at the bottom of the hatch cover. Below this, 'DETAIL A' provides a magnified view of the hatch cover's edge, showing a 'SEAL' and a 'TEST CONNECTION'.</p>	<p>95</p>

Figure 6.2.4-1 Containment Isolation Valve Arrangement (12 of 13)

APR1400 DCD TIER 2

VALVE ARRANGEMENT NO (GDC)	Typical Electrical Penetration Assembly	ITEM NO.
<p>40 (-)</p>		<p>96~161</p>

~~Figure 6.2.4-1 Containment Isolation Valve Arrangement (13 of 13)~~

Revised

VALVE ARRANGEMENT NO (GDC)	Typical Electrical Penetration Assembly	ITEM NO.
<p>47 (-)</p>		<p>96~161</p>

Figure 6.2.4-1 Containment Isolation Valve Arrangement (13 of 13)

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Application Section: 6.2.6
Date of RAI Issue: 11/16/2015

Question No. 06.02.06-9

10 CFR Part 50, Appendix J, requires preoperational and periodic containment leakage rate testing in accordance with the prescriptive requirements in Option A or the performance-based requirements in Option B. DCD Tier 2, Section 6.2.6, specifies the use of Appendix J, Option B for Type A, B, and C containment leakage rate testing. SRP Section 6.2.6 states that all containment penetrations requiring Type B test and all containment isolation valves requiring a Type C test should be listed in the test program. The program should identify any penetration not requiring leakage rate testing and the reason for not requiring a test should be stated.

DCD Table 6.2.4-1 "List of Containment Penetration and System Isolation Positions", and Figure 6.2.4-1 "Containment Isolation Valve Arrangement" indicate item numbers and does not show any penetration numbers associated with containment isolation valves and electrical penetrations. Table 6.2.4-1 also does not list spare penetrations or penetrations that will be used in the CILRT to facilitate controlled pressurization and depressurization of the containment using temporary air compressors and dryers indicated in DCD Section 6.2.6.1.

Provide information where the item numbers in Table 6.2.4-1 are linked to all penetration numbers in the DCD. Justify if there are spare penetrations and not listed. Provide information indicating penetrations that will be used in the CILRT for temporary air compressors to facilitate controlled pressurization and depressurization.

Response

Penetration numbers associated with containment isolation valves and electrical penetrations will be added to DCD Tier 2, Table 6.2.4-1. Spare penetrations (item nos. 165 to 177) and penetrations that will be used in the CILRT (item nos. 162-164) will be also added to DCD Table 6.2.4-1.

Changes to DCD Table 6.2.4-1 were also requested in RAI 357-8344 Question 06.02.04-11. To be inclusive of all changes to Table 6.2.4-1, the associated markups will be provided in response to RAI 357-8344 Question 06.02.04-11.

Impact on DCD

DCD Tier 2, Table 6.2.4-1 will be revised in response to RAI 357-8344 Question 06.02.04-11 (ref. KHNP submittal MKD/NW-16-0682L).

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

There is no impact on the Technical, Topical, or Environmental Report.