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MFN 08-086, Supplement 14

Docket No. 52-010

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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. 126 Related to ESBWR Design Certification Application, RAI Numbers 14.3-199, 14.3-200, 14.3-201, 14.3-202, and 14.3-240**

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 NRC letter dated December 20, 2007 (Reference 1). The GEH response to RAI Numbers 14.3-199, 14.3-200, 14.3-201, 14.3-202, and 14.3-240 is addressed in Enclosure 1.

Verified DCD changes associated with this RAI response are identified in the enclosed DCD markups by enclosing the text within a black box. The marked-up pages may contain unverified changes in addition to the verified changes resulting from this RAI response. Other changes shown in the markup(s) may not be fully developed and approved for inclusion in DCD Revision 5.

If you have any questions or require additional information regarding the information provided here, please contact me.

Sincerely,

R. E. Brown for

James C. Kinsey
Vice President, ESBWR Licensing

D068
NRO

Reference:

1. MFN 07-718, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 126 Related to ESBWR Design Certification Application,* December 20, 2007

Enclosure:

1. Response to Portion of NRC Request for Additional Information Letter No. 126 Related to ESBWR Design Certification Application, RAI Numbers 14.3-199, 14.3-200, 14.3-201, 14.3-202, and 14.3-240

cc:	AE Cubbage	USNRC (with enclosure)
	GB Stramback	GEH/San Jose (with enclosure)
	RE Brown	GEH/Wilmington (with enclosure)
	DH Hinds	GEH/Wilmington (with enclosure)
	eDRF	0000-0081-5742
		NRC RAI 14.3-199
		NRC RAI 14.3-200
		NRC RAI 14.3-201
		NRC RAI 14.3-202
		NRC RAI 14.3-240

Enclosure 1

MFN 08-086 Supplement 14

*Response to Portion of NRC Request for

Additional Information Letter No. 126

Related to ESBWR Design Certification Application

RAI Numbers 14.3-199, 14.3-200, 14.3-201, 14.3-202, and 14.3-240

*Verified DCD changes associated with this RAI response are identified in the enclosed DCD markups by enclosing the text within a black box. The marked-up pages may contain unverified changes in addition to the verified changes resulting from this RAI response. Other changes shown in the markup(s) may not be fully developed and approved for inclusion in DCD Revision 5.

NRC RAI 14.3-199

NRC Summary:
ICS purge line

NRC Full Text:
DCD Tier 1, Revision 4, Section 2.4.2 ICS

Add the cross-tie valves between the ICS/PCCS pools shown in Figure 2.4.1-1 to the list of ICS Mechanical Equipment provided in Table 2.4.1-1.

GE Response

GEH noted that RAI 14.3-199 references DCD Tier 1, Revision 4, Section 2.4.2, ICS. The correct section is 2.4.1, ICS.

GEH submitted errata for DCD Revision 4 in MFN 07-645, GE-Hitachi Nuclear Energy – Changes to ESBWR Design Control Document (DCD) Tier 1 Sections, December 7, 2007. The errata for DCD Revision 4 added the correct Figure 2.4.1-1, Isolation Condenser System Schematic. The Figure 2.4.1-1 provided in the errata does not show the cross-tie valves between the IC pool subcompartments and the IC/PCC expansion pool. These are locked-open maintenance valves and do not perform a safety function. As such, they do not belong in the Tier 1 Table 2.4.1-1. They will be re-added to the drawing as dashed components to indicate the class break.

DCD Impact

Tier 1 Figure 2.4.1-1 will be updated as shown in the attached markup

NRC RAI 14.3-200

NRC Summary:
IC/PCCS

NRC Full Text:
The cross-tie valves between the ICS/PCCS pools shown in Figure 2.15.4-1 should be added to the list of PCCS Mechanical Equipment in Table 2.15.4-1.

GE Response

The cross-tie valves connecting the PCC pool subcompartments with the IC/PCC expansion pool are locked-open maintenance valves and do not perform a safety function. As such, they do not belong in Tier 1 Table 2.15.4-1. They will be changed to dashed components in Figure 2.15.4-1.

DCD Impact

DCD Tier 1, Figure 2.15.4-1 will be revised as noted in the attached markup.

NRC RAI 14.3-201

NRC Summary:
ICS Steam supply line flow limiter

NRC Full Text:
DCD Tier 1, Section 2.4.1, ICS, Table 2.4-1-1

ITAAC #2 for the steam supply line is deleted in DCD Revision 4. The DCD Revision 4 list of changes only states: "Deleted old item" with out any explanation. Since this flow limiter is not included in the table for Mechanical Equipment, how will the provision of the flow limiter be verified. This flow limiter is a critical assumption in the TRACG analysis and hence should be kept in the ITAAC. DCD Tier 2 does not discuss a flow limiter in the ICS condensate return line, is there one provided in the design? If so, please address the need for ITAAC.

GE Response

In DCD Tier 1 Rev. 4 Table 2.4.1-1, the IC flow restrictors fall under the scope of the IC Steam Supply Line. The condensate return line does not contain flow restrictors, because the condensate branch piping provides adequate flow limitation.

These flow areas are important parameters, and an ITAAC item will be re-added to Tier 1 Table 2.4.1-3.

DCD Impact

DCD Tier 1, Table 2.4.1-3 will be updated as shown in the attached markup.

NRC RAI 14.3-202

NRC Summary:
ICS Condensate return valve opening time

NRC Full Text:
DCD Tier 2, Section 2.4.1, ICS

In DCD Tier 2, Table 15.2-1, the time to injection valve fully open is given as 31 seconds. This valve opening time is a critical parameter in TRACG analyses and hence the condensate return valves V5 and V6 opening time should be verified in the ITAAC. Please update DCD Tier 1 accordingly.

GE Response

GEH agrees that the opening time for the ICS Condensate Return Valves, V5 and V6, is a critical parameter and needs to be verified in the ITAAC. The Acceptance Criteria for DCD Tier 1 Table 2.4.1-3, ITAAC Item 13 will be revised to specify that the opening time take no less than 7.5 seconds and no more than 31 seconds, consistent with Tier 2 Table 15.2-1.

DCD Impact

DCD Tier 1, Table 2.4.1-3 will be updated as shown in the attached markup.

NRC RAI 14.3-240

NRC Summary:
PCCS vent line submersion should to be verified by ITAAC

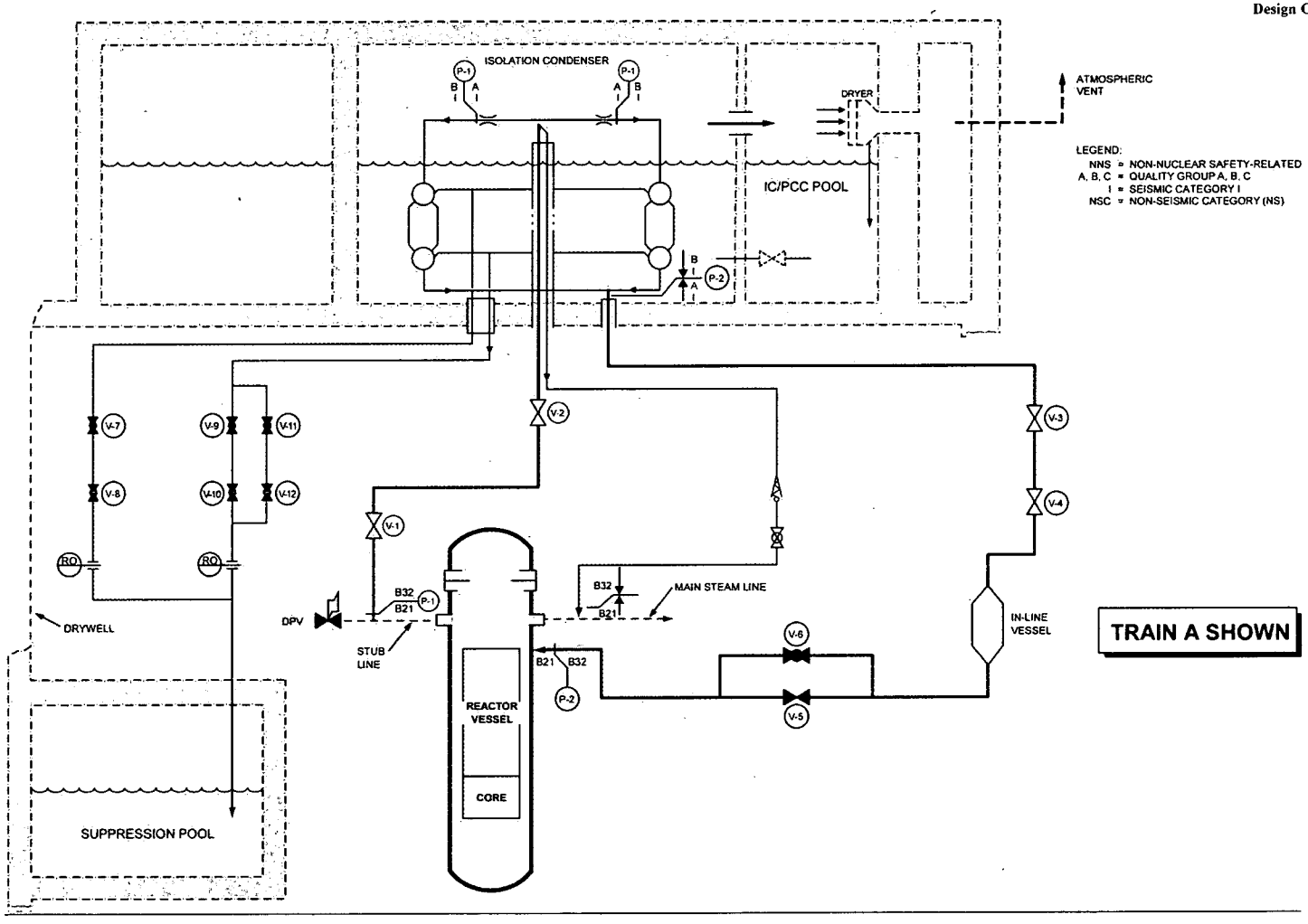
NRC Full Text:
The PCCS vent line submersion is an important dimension that affects the PCCS performance and needs to be verified. Please update DCD Tier 1, Figure 2.15.4-1 to provide this information and add an ITAAC to DCD Tier 1, Table 2.15.4-2 to verify.

GE Response

This information was provided with the response to RAI 6.2-169 (MFN 08-066, January 25, 2008).

DCD Impact

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


ISOLATION CONDENSER
P-1
B
A
DRYER
ATMOSPHERIC VENT
LEGEND:
NNS = NON-NUCLEAR SAFETY-RELATED
A, B, C = QUALITY GROUP A, B, C
I = SEISMIC CATEGORY I
NSC = NON-SEISMIC CATEGORY (NS)
IC/PCC POOL
P-2
V-7
V-8
V-9
V-10
V-11
V-12
V-2
V-1
V-3
V-4
V-6
V-5
RO
DRYWELL
DPV
B32
B21
STUB LINE
MAIN STEAM LINE
REACTOR VESSEL
CORE
IN-LINE VESSEL
TRAIN A SHOWN
SUPPRESSION POOL

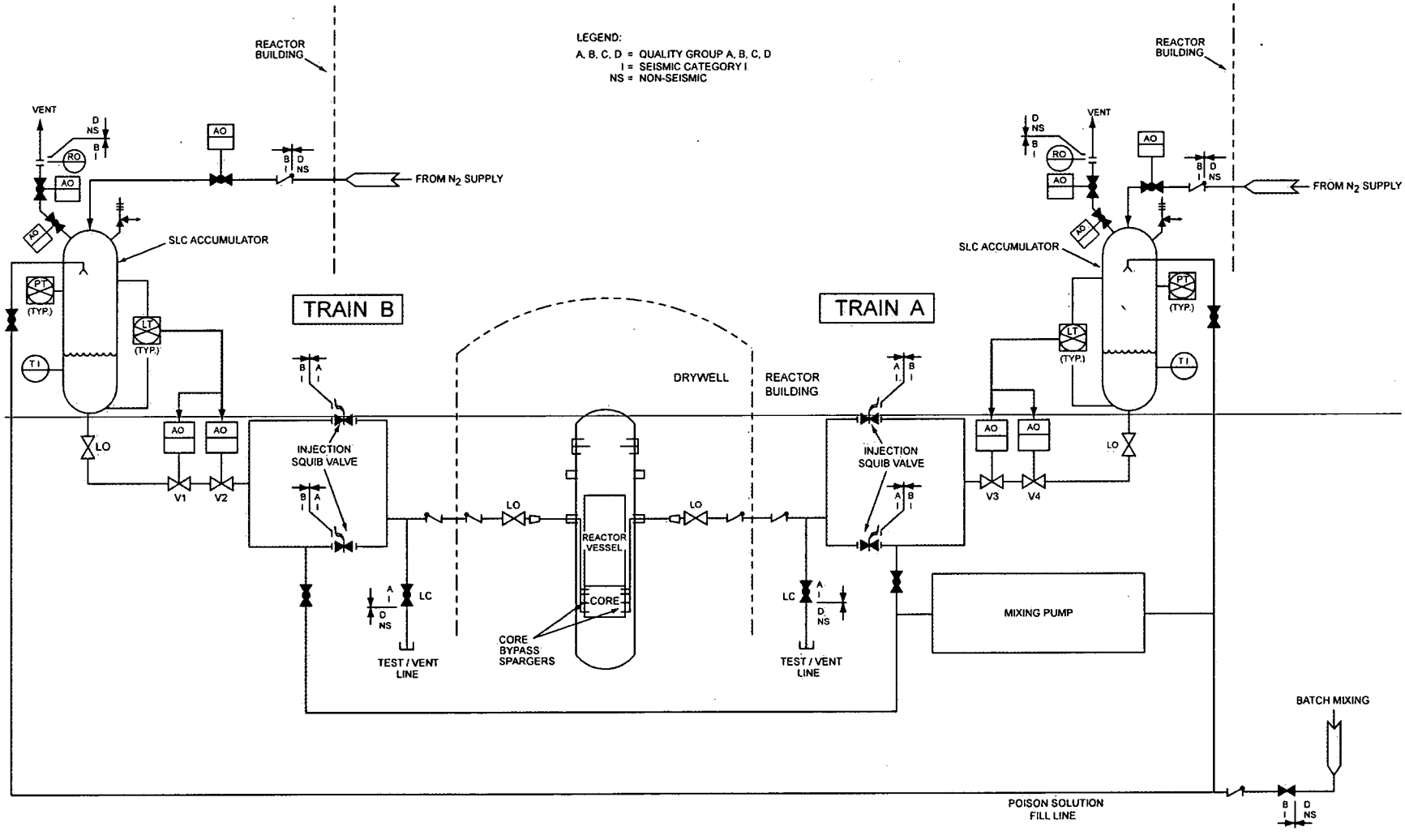
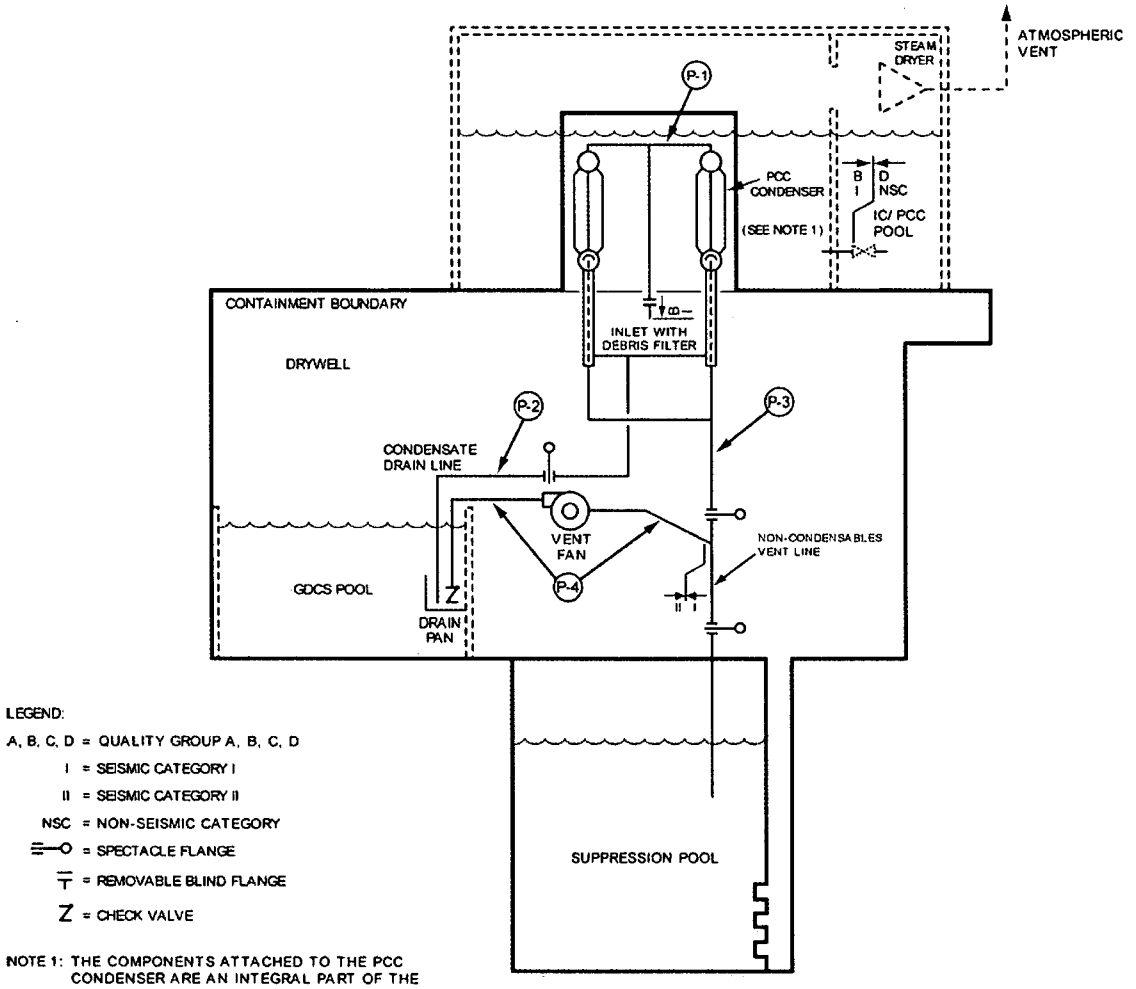


Figure 2.4.1-1. Isolation Condenser System Schematic



TRAIN A SHOWN

TYPICAL OF TRAIN B, C, D, E & F

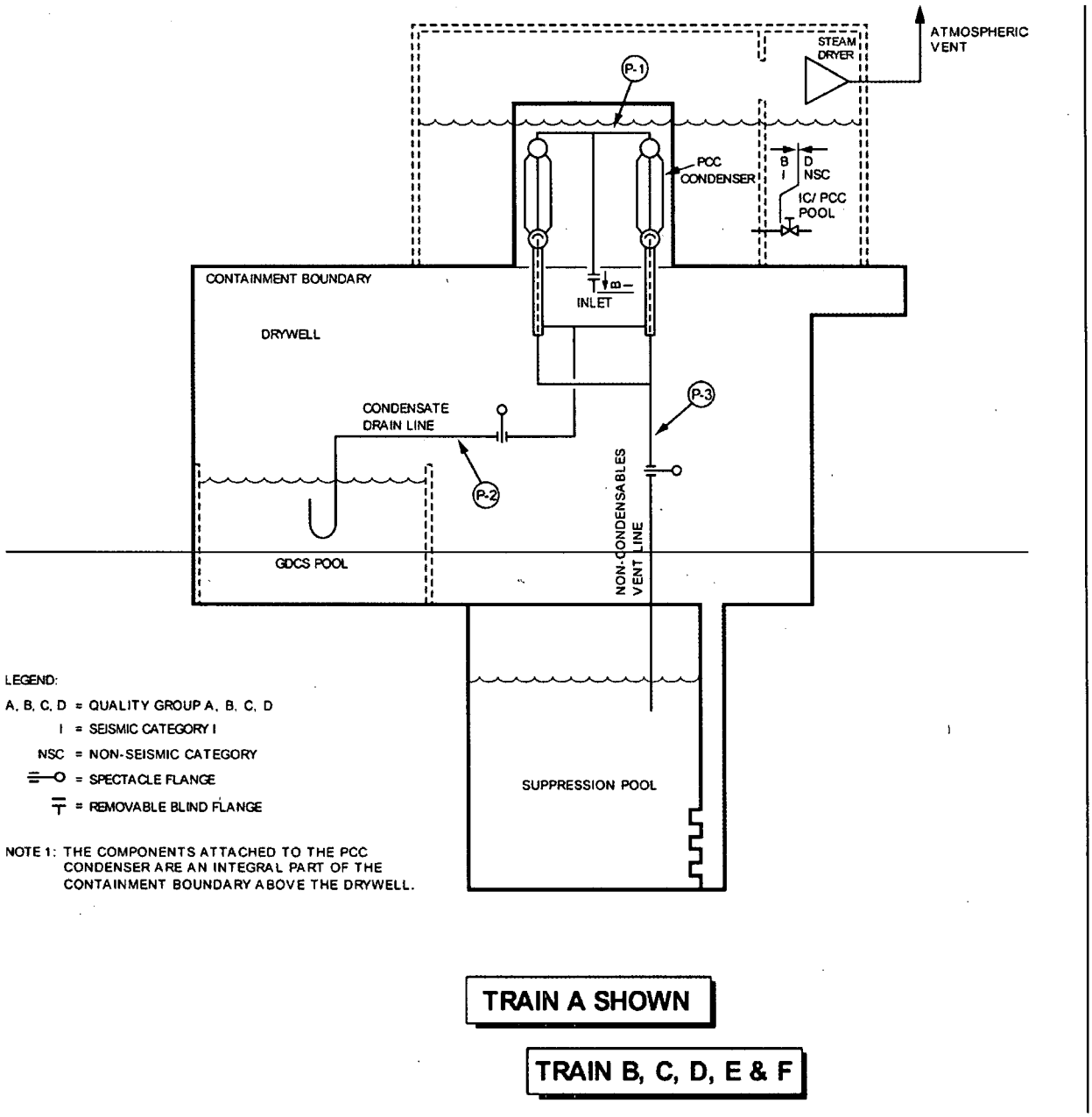


Figure 2.15.4-1. Passive Containment Cooling System Schematic

Table 2.4.1-3

ITAAC For The Isolation Condenser System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
24. The Dryer/Separator Pool and Reactor Well provide sufficient makeup water volume to the IC/PCC expansion pool to support operation of the ICS and PCCS for the first 72 hours..	a) A valve-opening test will be performed using simulated low-level water signal from the IC/PCC expansion pool. b) ~~An analysis will be performed to demonstrate the as-built Dryer/Separator Pool and Reactor Well provide sufficient makeup water volume to the IC/PCC expansion pool on a low water signal in the initial 72 hours of a LOCA.~~A physical measurement will be performed on the dimensions and water level in the IC/PCC pools, Dryer / Separator Pool, and Reactor Well to demonstrate that the required water volume is achieved.	a) Test report(s) document that the two-series, valves open on a simulated low-level water signal from the IC/PCC expansion pool. b). ~~An analysis exists and demonstrates that the as-built Dryer/Separator Pool and Reactor Well provide sufficient makeup water volume to the IC/PCC expansion pool on a low water signal in the initial 72 hours of a LOCA.~~Measurements show that the combined water volume of the IC/PCC pools, Dryer / Separator Pool, and Reactor Well is no less than 6,290 m^3 (222,000 ft^3).
25. The IC/PCC pools are safety-related and Seismic Category 1.	Inspections of the IC/PCC pools confirm that they are safety-related and Seismic Category I.	A design report of the IC/PCC pools confirm that they are safety-related and Seismic Category I.
26. Each ICS flow path is constrained to a maximum flow area at transitions between Class 1 piping from containment to Class 2 piping outside containment in order to limit flow in the event of a break.	Inspection will be performed to confirm that the flow area at these transition locations is limited.	Inspection reports document that each steam supply branch line contains a flow limiter which is no greater than 76.2 mm (3") in diameter, and that the condensate branch lines are no greater than 101.6 mm (4") in diameter.

Table 2.4.1-3

ITAAC For The Isolation Condenser System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
13. Each condensate return valve (V-5 and V-6) shown on Figure 2.4.1-1 will open to initiate the ICS.	Opening and/or closing tests of valves will be conducted under pre-operational differential pressure, fluid flow and temperature conditions.	Test reports document that each condensate return valve opensing time is no less than 7.5 seconds and no greater than 31 seconds under pre-operational differential pressure, fluid flow, and temperature conditions ~~to initiate the IC system~~.
14. The normally open ICS isolation valves (V-1, V-2, V-3 and V-4) in the steam supply and condensate return lines close automatically on receipt of high vent line radiation from the Process Radiation Monitoring System (PRMS).	An isolation valve closure test will be performed using simulated signals.	Test report(s) document that the ICS isolation valves close upon receipt of signals from the PRMS.
15. The normally open ICS isolation valves (V-1, V-2, V-3 and V-4) in the steam supply and condensate return lines close automatically on receipt of signals from the LD&IS.	An isolation valve closure test will be performed using simulated signals.	Test report(s) document that the ICS isolation valves close upon receipt of signals from the LD&IS.