Response to

Request for Additional Information No. 20, Supplement 2 Revision 0

7/28/2008
U.S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 09.05.01 - Fire Protection Program
Application Section: 9.5.1
SFPT Branch

Question 09.05.01-8:

Smoke, hot gases and fire suppressant migration between redundant trains – SECYs-93-087/90-016 include the criteria that the design should ensure that smoke, hot gases, or fire suppressant will not migrate into other fire areas to the extent that safe shutdown could be adversely affected. Provide a description of the plant features that will provide this assurance, including acceptance criteria for fire barrier penetration seals, as well as the use and qualification of smoke dampers. The EPR FSAR should verify that fire dampers that do not close on smoke detection will not be relied upon to prevent the migration of smoke from one redundant train area to another. Also describe how the fire hazards analysis will evaluate the potential for the migration of smoke, hot gases or fire suppressant to prevent safe shutdown, including any impact on the ability to access a fire area for manual suppression or, in the case of a control room evacuation, any impact on the ability to access and operate the remote shutdown panel. The EPR FSAR allows for the use of portable smoke exhaust fan systems. The EPR FSAR should add a COL information item to establish provisions for manual smoke control by manual actions of the fire brigade for all plant areas. Basis: SECYs-93-087/90-016

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SECY 93-087 and SECY 90-016 limit the need to control smoke, hot gas and fire suppressant migration between plant areas where such migration could adversely affect the operation of redundant safe shutdown (SSD) equipment and components. A smoke effects analysis will be performed as part of ITAAC closure to determine these plant areas and confirm that SECY 93-087 and SECY 90-016 objectives are satisfied. The analysis will consider the location of redundant SSD equipment and components, proximity of fire area boundaries, ventilation system operation, potential effluent types and quantities resulting from a fire, potential effluent migration paths, and the sensitivity of redundant SSD equipment and components to potential effluents.

It is expected that for most areas of the plant, standard fire barriers and associated components (e.g., fire doors, fire dampers and penetration seals) will provide the primary means to prevent migration of smoke, hot gas and fire suppressant between fire areas. Fire doors and dampers will be qualified in accordance with NPFA 80 and UL 555, respectively. Penetration seals in fire barriers will be qualified for an F-rating equivalent to the hourly fire rating of the associated barrier. Penetration seal F-ratings will be determined by testing in accordance with the requirements of ASTM E814, UL 1479 or IEEE Std. 634.

Where more robust fire barriers are deemed necessary to achieve SECY 93-087 and SECY 90-016 objectives, enhanced fire barrier features will be used as necessary to control smoke, hot gas and fire suppressant migration. Enhanced fire barrier features may include smoke doors and smoke dampers to limit smoke propagation. Smoke doors will be qualified in accordance with NFPA 105. Ventilation penetrations in enhanced fire barriers will be protected by combination fire/smoke rated dampers or by fire rated dampers and separate smoke control dampers. Smoke dampers and combination fire/smoke dampers will be qualified in accordance with UL Standards 555 and 555S, as applicable. Smoke dampers and combination fire/smoke dampers in enhanced fire barriers that are relied upon to control effluent migration will either close on smoke detection or will be closed via operator actions from the Control Room in response to an alarm from the fire detection system.

In the event of a Control Room evacuation, passage from the Control Room to the Remote Shutdown Panel is via the stairwells and interconnecting passageway, which are protected by the smoke confinement system (SCS). Per U.S. EPR FSAR Tier 2, Section 9.5.1.2.1 Ventilation System Design Considerations, the SCS access and egress pathways are maintained at higher pressure than adjacent areas to minimize smoke infiltration during a fire.

The following actions have been taken in lieu of "adding a COL information item to establish provisions for manual smoke control by manual actions of the fire brigade for all plant areas."

> U.S. EPR FSAR Tier 1, Table 2.1.1-7—Nuclear Island Inspections, Tests, Analyses, and Acceptance Criteria, Table 2.1.2-1—EPGB Separation for Internal Hazards and Table 2.1.2.2—Emergency Power Generating Building Inspections, Tests, Analyses and Acceptance Criteria will be revised to provide additional details pertaining to barriers associated with smoke migration. The revised ITAACs will confirm that barriers that separate redundant divisions are capable of limiting smoke migration to the extent that safe shutdown is not adversely affected as required by SECY-93-087 and SECY 90-016.

The U.S. EPR FSAR allows for the use of portable smoke exhaust fan systems. U.S. EPR FSAR Tier 2, Section 9.5.1.6.2 identifies that the fire protection engineer has responsibility for prefire planning. Prefire plans will address smoke control/removal on a fire area by fire area basis. U.S. EPR FSAR Tier 2, Section 9.5.1.6.3 contains the requirements for fire brigade members to be trained in the use fire fighting equipment, including ventilation equipment. U.S. EPR FSAR Tier 2, Section 9.5.1.6.4 contains the requirements for fire brigade members to conduct drills, which include assessing each fire brigade member's knowledge and use of fire fighting equipment, including ventilation equipment. Each member of the fire brigade is equipped with a complete set of fire protection gear and the fire brigade has access to portable smoke removal equipment. Therefore, adequate provisions for manual smoke control by manual actions of the fire brigade exist for all plant areas.

FSAR Impact:

U.S. EPR FSAR Tier 1, Table 2.1.1-7, Table 2.1.2-1 and Table 2.1.2-2, will be revised as described in the response and as indicated on the enclosed markups.

U.S. EPR Final Safety Analysis Report Markups

Table 2.1.1-7—Nuclear Island Inspections, Tests, Analyses, and Acceptance Criteria (~~5~~6 Sheets)

Commitment Wording		Inspection, Test or Analysis	Acceptance Criteria
4.1	The NI site grade level is located at elevation 0' 0" as indicated on Figures 2.1.1-7, 2.1.1-8, 2.1.1-9 and 2.1.1-10	An inspection of the as-installed NI site grade level will be performed.	The as-installed NI site grade level is located at elevation 0' 0" as indicated on Figures 2.1.1-7, 2.1.1-8, 2.1.1-9, and 2.1.1-10.
4.2	The NI structures are seismic Category I and are constructed to withstand design basis loads as specified in Section 2.1.1, without loss of structural integrity.	A verification inspection of the NI structures design analysis versus construction records will be performed.	NI structures conform to the approved design and will withstand the design basis loads specified in Section 2.1.1, without loss of structural integrity.
4.3	The RCB as described in Section 2.1.1, and its penetrations as described in Section 3.5, Containment Isolation, retain their pressure boundary integrity associated with the RCB design pressure	A hydrostatic or pressure test will be performed on the components required by the ASME Code Section III to be tested.	Components identified in Table 3.5.1-1 as ASME Code Section III, conform with the requirements of the ASME Code Section III, Division 2, Section CC-6410.
4.4	The as-installed basic configuration of the NI structures, as described in Section 2.1.1 and Table 2.1.1-1, separates the four SBs and separates the FB from other NI structures so that the impact of internal hazards is contained in the SB or FB of hazard origination.	(a) An inspection of the as-installed basic configuration of the NI structures will be performed. (b) Analyses will be performed. 09.05.01-8 (c) Inspection of barriers, doors, dampers and	(a) The as-installed basic configuration of the NI structures provides separation as described in Table 2.1.1-1. (b) Completion of analysis that indicates barriers, doors, dampers, and penetrations that separate the four SBs and that separates the FB from other NI structures have a minimum 3-hour fire rating and mitigate the propagation of smoke to the extent that safe shutdown is not adversely affected. (c) The as-built configuration of barriers, doors, dampers

Table 2.1.2–1—EPGB Separation for Internal Hazards

From Room(s) [KKS]	To Room(s) [KKS]	Door	Wall	Slab	Elevation(s)
2UBP01 001 2UBP02 001	1UBP01 001 ~~1UBP01 003~~ 1UBP02 001		X		0’ 0” to 51’ 6”
2UBP01 003	2UBP01 001 2UBP02 001		X		0’ 0” to 51’ 6”
1UBP01 003	1UBP01 001 ~~1UBP01 003~~ 1UBP02 001		X		0’ 0” to 51’ 6”
4UBP01 001 4UBP02 001	3UBP01 001 ~~3UBP01 003~~ 3UBP02 001		X		0’ 0” to 51’ 6”
4UBP01 003	4UBP01001 4UBP02 001		X		0’ 0” to 51’ 6”
3UBP01 003	3UBP01 001 ~~3UBP01 003~~ 3UBP02 001		X		0’ 0” to 51’ 6”
1UBP01 002	2UBP01 002		X		0’ 0” to 20’ 0”
3UBP01 002	4UBP01 002		X		0’ 0” to 20’ 0”
1UBP03 001 1UBP03 002	2UBP03 001 2UBP03 002		X		51’ 6” to 68’ 0”
3UBP03 001 3UBP03 002	4UBP03 001 4UBP03 002		X		51’ 6” to 68’ 0”

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Table 2.1.2–2—Emergency Power Generating Building Inspections, Tests, Analyses, and Acceptance Criteria (2 Pages)

Commitment Wording		Inspection, Test or Analysis	Acceptance Criteria
2.1	The as-installed location of the EPGBs is as described in Section 2.1.2 and as shown on Figure 2.1.2-1.	An inspection of the EPGBs will be performed.	The as-installed location of the EPGBs is as shown on Figure 2.1.2-1.
3.1	Physical separation of the as-installed EPGBs is as described in Section 2.1.2 and as shown on Figure 2.1.2-1.	An inspection of the EPGBs will be performed.	The as-installed EPGBs are separated by the NI complex as shown on Figure 2.1.2-1.
4.1	The EPGBs as-installed site grade level, as described in Section 2.1.2, is at elevation 0'-0" as indicated on Figures 2.1.2-2 and 2.1.2-3.	An inspection of EPGBs site grade level will be performed.	The as-installed EPGBs site grade level is at elevation 0' 0" as indicated on Figures 2.1.2-2 and 2.1.2-3.
4.2	As described in Section 2.1.2, and Table 2.1.2-1, the as-installed configuration of the EPGBs provides for internal hazards barriers.	(a) An inspection of the EPGBs will be performed.	(a) The as-installed configuration of the EPGBs provides internal hazards barriers as described in Table 2.1.2-1.
		(b) An analysis will be performed.	(b) Completion of analysis that indicates that barriers, doors, dampers, and penetrations identified in Table 2.1.2-1 have a minimum 3-hour fire rating and mitigate the propagation of smoke to the extent that safe shutdown is not adversely affected.
		(c) Inspection of any doors, dampers and penetrations through the barriers listed in Table 2.1.2-1.	(c) The as-built configuration of any doors, dampers, and penetrations through the barriers listed in Table 2.1.2-1 agrees with construction drawings.

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