

Request for Additional Information No. 61 (970,977), Revision 0

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U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 07.04 - Safe Shutdown Systems
SRP Section: 07.05 - Information Systems Important to Safety
Application Section: FSAR Ch 7
ICE1 Branch

QUESTIONS

07.04-1

Do the safe shutdown functions of the controls and systems listed in DC FSAR, Section 7.4.1.2.1 through 7.4.1.2.13 involve features or operating modes that are unique to their safe shutdown functions and if so how do you demonstrate compliance to 10 CFR 50.55a(h) criteria listed in NUREG-0800, SRP Section 7.4?

DC FSAR, Tier 2 Section 7.4.1.1 states, "Engineered safety features (ESF) are used to achieve and maintain safe shutdown. The actuation of the ESF is performed by the protection system (PS). The I&C that perform ESF actuation are described in Section 7.3. The safety automation system (SAS) automatically controls the safety-related systems once those systems are actuated by the PS. The SAS provides manual and grouped commands execution initiated from either the safety information and control system (SICS) or the process information and control system (PICS)."

It is unclear whether these "manual and grouped commands" executed from the SICS or PICS are unique to safe shutdown functions or used in a way not fully detailed in Sections 7.2 and 7.3 of the DC FSAR.

07.04-2

Demonstrate how the safe shutdown system design meets the requirements of 10 CFR 50.34(f)(2)(xx), "Power for Pressurizer Level Indication and Controls for Pressurizer Relief and Block Valves," or equivalent TMI action plan requirements imposed by Generic Letters.

DC FSAR, Tier 2 Section 7.4.2 does not address this requirement as required by NURG-0800, SRP Section 7.4.

07.04-3

Provide information to demonstrate how the safe shutdown I&C design meets 10 CFR 50, Appendix A GDC 2 & 4 in accordance with the acceptance criteria of Section 7.4 of NUREG-0800.

DC FSAR, Tier 2 Section 7.4. Section 7.4.1.1, "I&C Systems Associated with Safe Shutdown," identifies the following as systems used for safe shutdown; protection system (PS), safety automation system (SAS), safety information and control system (SICS), process information and control system (PICS) and the process automation system (PAS). DC FSAR, Section 7.4.2.1, "Conformance to General Design Criteria" identifies conformance to GDC 2 and 4. DC FSAR, Section 7.1 Table 7.1-2 lists GDC 2 and 4 as not applicable to PAS and PICS.

07.04-4

Demonstrate how the remote shutdown station design provides the capability for (1) prompt, hot shutdown of the reactor, including necessary I&C to maintain the unit in a safe condition during hot shutdown, and (2) with a potential capability for subsequent cold shutdown of the reactor through the use of suitable procedures, meeting the requirements of GDC 19. DCD FSAR, Section 7.4.1.3.4 references a "safe shutdown state."

07.04-5

DC FSAR, Section 7.4 states the definition of safe shutdown (is) different depending on the scenario. Define safe shutdown for each of the given three scenarios provided in Section 7.4 in accordance with GDC 19. Also, identify the equipment and process of achieving safe shutdown for the three scenarios.

07.04-6

Is the equipment in the remote shutdown station designed to the same standards as the corresponding equipment in the main control room to meet our guidance given in SRP Section 7.4? If not, to what standard is the remote shutdown equipment designed?

07.04-7

Provide information to demonstrate how the safe shutdown I&C design meets 10 CFR 50, Appendix A, GDC 34, 35 and 38 in accordance with the acceptance criteria of Section 7.4 of NUREG-0800.

DC FSAR, Tier 2, Section 7.4.2.1, "Conformance to General Design Criteria," identifies conformance to GDC 34. However, DC FSAR, Tier 2, Table 7.1-2, lists GDC 34, 35, and 38 as not applicable to PAS and PICS.

07.04-8

DC FSAR, Tier 2, Section 7.4.1.3, lists the main feedwater system and the chemical and volume control system as additional systems to the ESF systems listed in Section 7.4.1.2 for post-fire safe shutdown. Is the fuel pool cooling system described in Section 7.4.1.3.3 to be included as a post-fire safe shutdown system?

07.04-9

Which is the credited system for safe shutdown PICS/PAS or SICS/SAS? What are the differences in the two, in particular their capabilities and qualification, and how will that affect performing safe shutdown from either system. Demonstrate how the credited system meets the requirements for safe shutdown and how it addresses the NRC's acceptance criteria. If PICS/PAS are not credited for safe shutdown, but used as the primary system for safe shutdown actions, demonstrate how operators will be alerted to various hardware and software failures within PICS/PAS in order to use SICS/SAS.

DC FSAR, Tier 2, Section 7.4.1.1, "I&C Systems Associated with Safe Shutdown," identifies the following as systems used for safe shutdown; protection system (PS), safety automation system (SAS), safety information and control system (SICS), process information and control system (PICS) and the process automation system (PAS).

07.05-1

Provide information to demonstrate how the design addresses 10 CFR 50.55a(h) in accordance with the acceptance criteria of Section 7.5 of NUREG-0800. For accident-monitoring instrumentation isolated from the protection system, the applicable requirements of 10 CFR 50.55a (h) for IEEE Std. 603-1991 are Clause 5.6.3, "Independence between Safety Systems and Other Systems," and Clause 6.3, "Interaction between the Sense and Command Features and Other Systems."

DC-FSAR Sections 7.1 and 7.5.1.2, specify the use of the non-safety-related process information and control system (PICS) as the primary component of the accident monitoring system. DC-FSAR Table 7.1-2 identifies that 10 CFR 50.55a (h) is not applicable to PICS because it is non-safety-related.

07.05-2

Address the compliance to 10 CFR 50.34(f)(2)(xii), regarding auxiliary feedwater system flow indication for the accident monitoring instrumentation in accordance with the acceptance criteria of Section 7.5 of NUREG-0800.

Section 7.5.2.1.1 of the DC-FSAR indicates compliance. This section states, "Emergency feedwater flow to each steam generator (SG) is provided in the main control room." Which system does this requirement apply to (PICS or SICS)? Table 7.1-2 of the DC-FSAR indicates that the regulation does not apply to the process information and control system (PICS) the primary component of the accident monitoring system and is applicable to SICS.

07.05-3

Provide a complete list of post accident monitoring instrumentation with PAM variable type and ITAAC to verify variables meet the guidance of Regulatory Guide (RG) 1.97.

RG 1.97 and IEEE Std. 497-2002 require seismic qualification for Type A, B, C and D variables. Section 7.5.2.2.1 of the DC-FSAR describes a methodology for selecting the

final list of accident monitoring variables in accordance with RG 1.97 instead of defining the variables. The staff requires this issue to be resolved in order to conclude that 10 CFR 50, Appendix A, GDC 2 requirements have been met.

07.05-4

Provide a complete list of post accident monitoring (PAM) instrumentation with PAM variable type and ITAAC to verify variables meet the guidance of Regulatory Guide 1.97.

Revision 4 of Regulatory Guide 1.97, accident monitoring equipment identified as Type A, B, or C in accordance with that guide should be environmentally qualified as required by 10 CFR 50.49. Type D variables should be environmentally qualified for the particular accident's postulated environment at the installed location in accordance with the plant's licensing basis. The staff requires this issue to be resolved in order to conclude that 10 CFR 50, Appendix A, GDC 4 requirements have been met.

07.05-5

Provide a complete list of post accident monitoring instrumentation with PAM variable type and ITAAC to verify variables in accordance with Revision 4 of Regulatory Guide 1.97, accident monitoring equipment and IEEE 497 Section 5, performance criteria.

Section 7.5.2.2.1 of the DC-FSAR describes a methodology for selecting the final list of accident monitoring variables instead of defining the variables.

07.05-6

Provide information to demonstrate how the design meets 10 CFR 50, Appendix A, General Design Criterion (GDC) 24, Separation of protection and control systems in accordance with the acceptance criteria of Section 7.5 of NUREG-0800 and IEEE 497-2002.

DC-FSAR Sections 7.1, 7.5.1.1, 7.5.1.2, 7.5.1.3 and 7.5.1.4 specify the use of the non-safety-related process information and control system (PICS) as the primary component of the accident monitoring system, bypass and inoperable status indication, annunciator system and the SPDS, ERF and ERDS information systems. DC-FSAR Table 7.1-2 identifies 10 CFR 50, Appendix A, GDC 24 as not applicable to PICS because it is non-safety-related. However, DC-FSAR Section 7.1.1.3.2 states that the PICS is used to control both safety-related and non-safety related process systems. The interface between non-safety-related and safety-related requires that independence and separation be addressed.

07.05-7

Which system PICS or SICS is the credited system for accident monitoring instrumentation?

DC FSAR, Tier 2 Sections 7.1 and 7.5.1.2, specify the use of the non-safety-related process information and control system (PICS) as the primary component of the accident monitoring system. The primary operator interface in the MCR for displaying

all PAM variables is the non-safety-related PICS. If the PICS is not available, the safety-related SICS is used.

07.05-8

Which system PICS or SICS is the credited system for annunciator system? What are the limited backup annunciation functions of SICS?

DC-FSAR Sections 7.1 and 7.5.1.1, specify the use of the non-safety-related process information and control system (PICS) as the primary annunciator system. The safety information and control system (SICS) provides some limited backup annunciation functions if PICS is unavailable.