

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.: 46-7879
SRP Section: 07.06 – Interlock Systems Important to Safety
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Question No. 07.06-1

Clarify what signals go through the main control room (MCR)/remote shutdown room (RSR) master transfer switches (MTS).

10 CFR Part 50, Appendix A, General Design Criterion (GDC) 19, "Control room," and NUREG-0800, SRP, Section 7.4, require, in part, that equipment at appropriate locations outside the control room shall be provided and should be capable of operating independently of (i.e., without interaction with) the equipment in the main control room. FSAR Tier 2, Figures 7.6-1A, B, C and 7.6-2 show control from both main control room (MCR) and remote shutdown room (RSR), but do not reflect the signals going through the MCR/RSR Master Transfer Switches described in FSAR Tier 2, Section 7.7.1.2. FSAR Tier 2, Figure 7.6-3, does not show any control from RSR, but the status of valves goes to both MCR and RSR. FSAR Tier 2, Section 7.6.2.1.k states "Instrumentation and control systems for the all interlock systems important to safety except SCS suction line relief valve interlock in the MCR are designed in conformance with GDC 19 to be maintained in a safe condition under accident conditions (see Figures 7.6-1A through 7.6-3)." Clarify in FSAR Tier 2, Figures 7.6-1A, B, C and 7.6-2 where the signals go through the MCR/RSR Master Transfer Switches. Also, clarify in what portion of the I&C safety system the interlock logic resides. Clarify in FSAR Tier 2, Figure 7.6-3 whether the CCW Supply and Return Header Isolation Valves are controlled from both MCR and RSR and provide a description of why the status is needed in both MCR/RSR and if those signals need to go through the MCR/RSR MTS.

Response

When MCR/RSR master transfer switch (MTS) is activated in the MCR, signals for non-safety control and safety control are transferred from the MCR to the RSR. The soft control for non-safety components is implemented on the information flat panel display (IFPD) interfaced with

the P-CCS and the PCS. The engineered safety features-component control system (ESF-CCS) soft control module (ESCM) on the operator console generates component control signals in safety division as well as engineered safety features (ESF) components.

The RSR transfer of ESCM control from MCR to RSR is accomplished in the control channel gate (CCG) by the local MTS and remote MTS. When the MCR/RSR transfer switches are activated, control is switched to the RSR and all ESCM signals from the MCR are disabled, and ESCM signals from the RSC are enabled by the CCG. Then, the ESF-CCS loop controller (LC) receives a local or field interlock signal as well as enabled ESCM data from the CCG. The LC receives only one ESCM signal of the inputs, either from the MCR or RSC.

DCD Tier 2, Figures 7.6-1A, B, C and 7.6-2 show that the signals from the MCR/RSR hand switches are functionally combined with an OR gate.

The transfer of control between the MCR and the RSR is implemented and controlled as per the typical interface diagrams of the MCR/RSR MTS provided in Figures 7.4-1 and 7.4-3.

The safety-related interlocks are implemented in the ESF-CCS controllers. This is described in the DCD Tier 2, section 7.6.1.4. The signal path for the surge tank interlock is from local level transmitters to the ESF-CCS loop controller for control of these valves and by the time when MCR/RSR transfer switches are activated the controls, alarms, and indications are transmitted.

The status of the CCW supply and return header isolation valves is provided to the MCR and RSR. The transferring signals from MCR to RSR through MCR/RSR master transfer switch are described in the DCD Tier 2, section 7.4.1.

For APR1400, the human system interface (HSI) design of the remote shutdown room (RSR) is the same as the MCR HSI design to provide reasonable assurance that the HSI design effectively supports the operator and minimizes operator errors.

According to this approach, the remote shutdown console (RSC) will provide the same controls, alarms, and indications as the MCR operator console in the MCR. Thus, the RSC provides safety and non-safety controls and indications for the plant normal and abnormal conditions.

Impact on DCD

There is no impact on the DCD.

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 any Technical, Topical, or Environmental Reports.