Pre-Submittal Meeting
Main Steam Isolation Valve (MSIV) Actuators

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Braidwood and Byron Stations

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Exelon Generation

Agenda

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- Background
- MSIV Hydraulic Actuator System Configuration
- Overview of Proposed License Amendment
- Relevant Precedent
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Introductions

- NRC
- Exelon

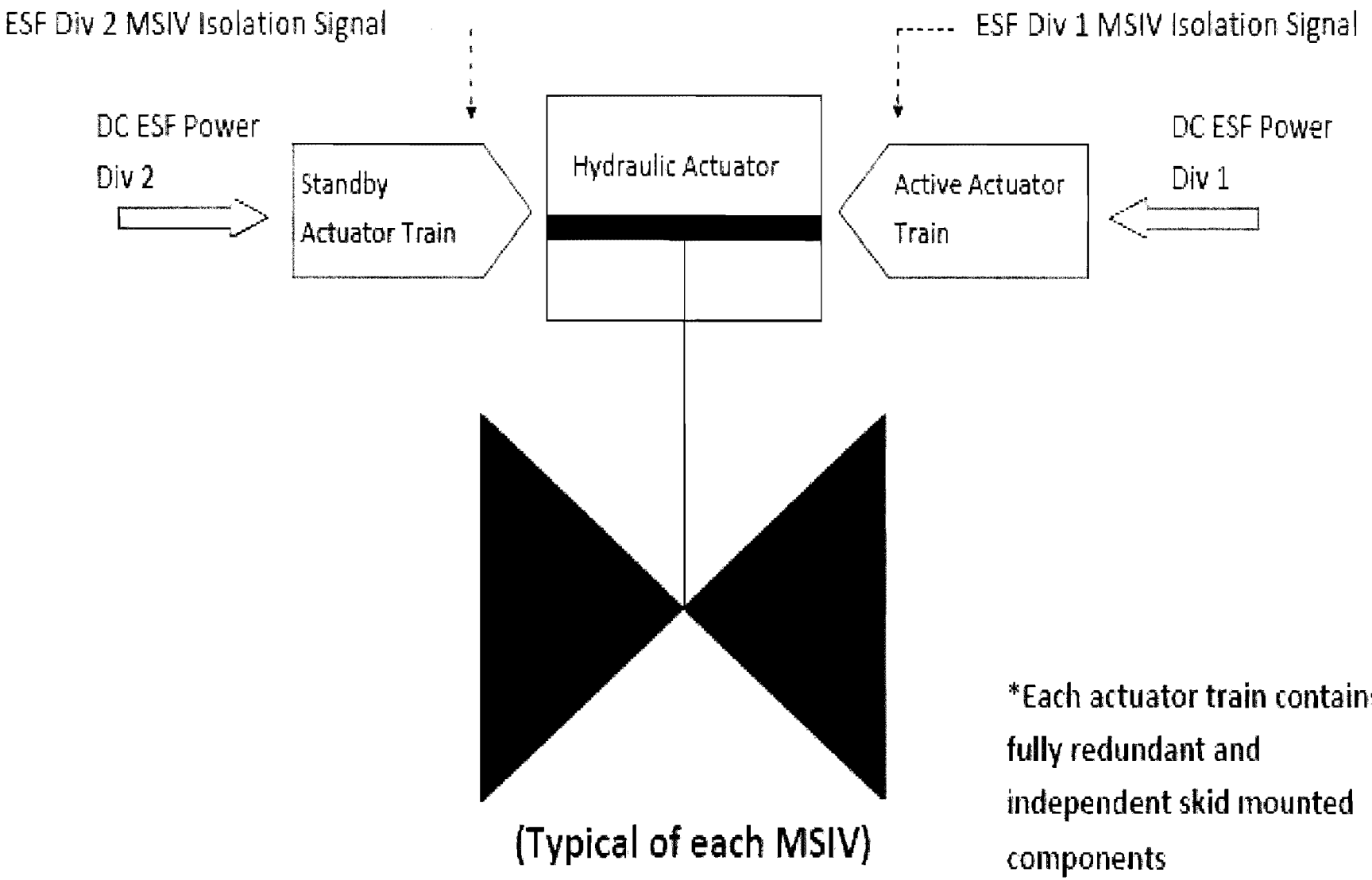
Background

- NRC Memorandum dated October 19, 2006, interpreted that Technical Specifications (TS) Surveillance Requirement (SR) 3.7.2.2 requires both actuator trains for a single Main Steam Isolation Valve (MSIV) to be tested (ML061730396)
- The NRC staff interpretation results in declaring a MSIV inoperable when one actuator train is inoperable
- The existing TS Section 3.7.2, "Main Steam Isolation Valves (MSIVs)," Completion Time of 8 hours for an inoperable MSIV due to an inoperable actuator train is not commensurate with the safety significance of the condition
- New Conditions, Required Actions, and Completion Times for inoperable actuator train(s) are being proposed

MSIV Hydraulic Actuator System Configuration

- MSIV Hydraulic Actuator system is designed to provide a rapid closure in the event of an emergency
- MSIV Hydraulic Actuator system has independent and redundant "Active" train and "Standby" train actuator components
  - Actuator is capable of performing its fast closure function with either one of the two trains
- Each actuator train is powered from a separate Engineered Safety Features (ESF) division that is actuated by a separate and independent MSIV main steam line isolation signals
- An actuator train does not include the analog channels or protection system actuation logic and actuation relays that provide inputs to the valve actuator trains

MSIV Hydraulic Actuator System Configuration



*Each actuator train contains fully redundant and independent skid mounted components

Overview of Proposed License Amendment Request

- Currently, TS 3.7.2 does not specifically reflect the current plant design of two independent actuator trains for one MSIV

- Revise TS Section 3.7.2, Main Steam Isolation Valves (MSIVs):
  - Incorporate the MSIV actuator trains into the Limiting Condition for Operation (LCO) and provide associated Conditions and Required Actions to address inoperable MSIV actuator trains
  - Revise SR 3.7.7.2 to identify that MSIV actuator trains are to be tested in accordance with the SR

Overview of Proposed License Amendment Request

- Inoperability of one of the two actuator trains associated with an MSIV does not by itself make the valve incapable of closing since the remaining OPERABLE actuator train can alone effect valve closure on demand
- Declaring an MSIV inoperable and entering the Condition(s) and Required Action(s) for an inoperable MSIV due only to an inoperable actuator train, is unnecessarily restrictive
- The proposed Completion Times for inoperable MSIV actuator trains are:
  - Consistent with other TS
  - Based on a hierarchy of Conditions such that shorter Completion Times would be specified for increasingly degraded conditions
  - Address inoperable MSIV actuator trains in various configurations

Overview of Proposed License Amendment Request

- Conditions addressing inoperable actuator trains would be specified first in TS 3.7.2 before the Conditions currently in place for addressing MSIVs inoperability
- The proposed changes are as follows:
  - LCO 3.7.2 to include the actuator trains in the LCO
    - LCO 3.7.2 to state: "Four MSIVs and their associated actuator trains shall be OPERABLE."
  - New Conditions A through E to address inoperable MSIV actuator trains in various configurations
  - Existing Conditions that address inoperable MSIVs are relabeled to become Conditions F through I

Overview of Proposed License Amendment Request

- The proposed new Conditions specifically for the actuator trains would address various degrees or combinations of inoperable actuator trains
- The proposed Completion Times are based on engineering judgment and consistency with other TS
- Condition A: one actuator train inoperable for a single MSIV
  - Proposed Required Action would restore the inoperable actuator train to OPERABLE status within 7 days
  - Proposed Completion Time accounts design redundancy, reasonable time for repairs, and low probability of a design basis accident occurring during this period
- Condition B: two MSIV actuator trains inoperable for different MSIVs (i.e., one actuator train inoperable for each of two MSIVs) such that the actuator trains are not in the same ESF division.
  - Proposed Required Action would restore at least one actuator train to OPERABLE status within 72 hours

Overview of Proposed License Amendment Request

- Condition B (continued):
  - Proposed Completion Time accounts dual-redundant actuator train design for each of the affected MSIVs
- Condition C: two MSIV actuator trains are inoperable for different MSIVs and the inoperable actuator trains are both in the same ESF division
  - Proposed Required Action would require restoring at least one actuator train to OPERABLE status within 24 hours
  - Proposed Completion Time:
    - Accounts for only one actuator train per valve is permitted to be inoperable (for two MSIVs) so the remaining OPERABLE actuator train on each affected MSIV can close the valve on demand
    - Consistent with Condition G of TS 3.3.2 applicable to Function 4.b (Steam Line Isolation – Automatic Actuation Logic and Actuation Relays) which requires 24 hours for restoring one actuator train to OPERABLE status

Overview of Proposed License Amendment Request

- Condition D: both actuator trains for one MSIV are inoperable
  - Proposed Required Action would require immediately declaring the affected MSIV inoperable
  - Proposed Completion Time is appropriate since having both actuator trains inoperable would constitute the affected MSIV incapable of closing on demand
- Condition E: three or more MSIV actuator trains inoperable, or Required Action and Completion Time of Conditions A, B, or C can not be met
  - Proposed Required Action would require immediately declaring each affected MSIV inoperable
  - Proposed Completion Time is for the Conditions and Required Actions of the inoperable MSIVs to be entered and is consistent with other TS and the format of the Improved Standard Technical Specifications (NUREG-1431)

Overview of Proposed License Amendment Request

- SR 3.7.2.2 is revised to clearly identify that the MSIV actuator trains are required to be tested in accordance with the SR
  - SR 3.7.2.2 to state: "Verify each actuator train actuates the MSIV to the isolation position of an actual or simulated actuation signal."

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One MSIV actuator train inoperable.	A.1	Restore MSIV actuator train to OPERABLE status.	7 days
B. Two MSIV actuator trains inoperable on different MSIVs and in different separation groups.	B.1	Restore one MSIV actuator train to OPERABLE status.	72 hours
C. Two MSIV actuator trains inoperable on different MSIVs in the same separation group.	C.1	Restore one MSIV actuator train to OPERABLE status.	24 hours
D. Two MSIV actuator trains inoperable on the same MSIV.	D.1	Declare the affected MSIV inoperable.	Immediately
E. Three or more MSIV actuator trains inoperable. OR Required Action and associated Completion Time of Condition A, B, or C not met.	E.1	Declare each affected MSIV inoperable.	Immediately

Relevant Precedent

- The NRC has approved similar license amendment requests to revise TS for main steam isolation valves actuator trains as follows:
  - Callaway Plant, June 16, 2006 (ADAMS Accession Number ML0608101690)
  - Wolf Creek Generating Station, November 7, 2006 (ADAMS Accession Number ML062610085)
  - Palo Verde Nuclear Generating Station, November 17, 2006 (ADAMS Accession Number ML063110505)

PRA Input

- PRA evaluation will be provided similar to those provided in the Callaway Plant, Wolf Creek Generating Station, and Palo Verde Nuclear Generating Station LAR submittals
  - LAR not risk-informed submittal
  - PRA evaluation results will be for information only
- PRA evaluation is not used to establish the proposed Completion Times (for proposed Conditions A, B, and C), instead PRA evaluation will be performed to evaluate and bound the risk associated with the proposed Completion Times for the inoperable MSIV actuator trains
- PRA evaluation will be used to gauge the acceptability of the proposed Completion Times that were developed based on engineering judgment and consistency with other TS

PRA Input

- PRA evaluation acceptance criteria:
  - Derived from Regulatory Guides 1.174 and 1.177
  - Not include Regulatory Guide 1.200 requirements
- PRA evaluation results submitted as information only will be for the following risk metrics:
  - ΔCDF
  - ΔLERF
  - ICCDP
  - ICLERP
- PRA information provided will be for the Full Power Internal Events model only

PRA Input

- External Events PRA information will not be included in the evaluation:
  - MSIV Closure is only applicable to:
    - Steam Generator Tube Ruptures
    - Main Steam/Feedline Breaks
  - Steam Generator Tube Ruptures and Main Steam/Feedline Breaks are not significant contributors to external event risk

Questions/Discussions