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DESCRIPTION: REPORTABILITY EVALUATION FOR
CARD 99-13518 EDG 11 - SLC "B"

C/3

Reportability Evaluation for CARD 99-13518

Summary

On May 5, 1999, EDG 11 was out of service with Standby Liquid Control System (SLCS 'B') equipment powered from the opposite division also declared inoperable. The breaker for SLCS 'B' had been tagged open to permit repairs to the continuity circuits for the SLCS explosive actuated valves. The NRC resident inspectors questioned the plant being in this condition in view of the requirement of Technical Specification (TS) Action 3.8.1.1.c. With one EDG inoperable, TS Action 3.8.1.1.c requires verification of the operability of all "required" equipment powered by the opposite division.

This condition did not constitute a condition prohibited by TS. The basis for this position is twofold.

1. SLCS is not a required system in the context of Action 3.8.1.1.c. SLCS is a unique system. SLCS is not credited in the mitigation of any design basis accident or transient, as opposed to other TS systems such as ECCS systems for which the TS Action 3.8.1.1.c verification is required.

2. SLCS is a manually actuated system. Under the conditions associated with this event, SLCS 'B' was capable of prompt manual restoration. Consequently, SLCS 'B' could have been considered operable.

"Required" within the Scope of TS Action 3.8.1.1.c

SLCS is an unique system. SLCS is the secondary reactivity control system required to satisfy 10 CFR 50, Appendix A GDC 26, *Reactivity control system redundancy and capability*. It is also required by 10 CFR 50.62, the ATWS rule. Two objectives are delineated for the SLCS in the bases for TS 3.1.5, Standby Liquid Control System. One objective is to provide backup capability for bringing the reactor from full power to a cold, Xenon-free shutdown, assuming that the withdrawn control rods remain fixed in the rated power pattern. The second objective of the SLC System is to meet the requirement of the ATWS Rule, specifically 10 CFR 50.62 paragraph (c)(4) which states that, in part: "Each boiling water reactor must have standby liquid control system (SLCS) with a minimum flow capacity and boron content equivalent in control capacity to 86 gallons per minute of 13 weight percent sodium pentaborate solution.

- SLCS is not credited in the mitigation of any design basis accident or transient. In BWRs primary automatic ATWS protection is provided by Alternate Rod Insertion (ARI) and the Recirculation Pump Trip (RPT). SLCS was not required to be automatically actuated. ATWS is not a design basis transient.

- SLCS was not designed as a safety-related system; however, 10 CFR 50.62, requires SLCS to perform its function in a reliable manner. Although it was not designated as safety-related, it is essentially maintained as such at Fermi. Standby power is a design

feature provided for SLCS as discussed in the which states that SLCS "is required to be operable in the event of a station power failure." Accordingly, SLCS pumps, valves, and controls are powered from the standby ac power supply. While the power supplies are oriented to redundant SLCS components, SLCS is not treated as a divisionalized system. Operating, surveillance, and maintenance procedures are not divisionalized. SLCS outages are scheduled during non-divisional work weeks. SLCS is not modeled as a divisionalized system in the Fermi PSA. The Fermi Regulatory Guide 1.47, Bypassed and Inoperable Status Indication for Nuclear Power Plant Safety Systems, has only one status indicator of SLCS, whereas divisionalized safety systems have one for each division.

10 CFR 50, Appendix A, General Design Criteria, Criterion 17, *Electric power systems*, delineates the requirements for on-site and off-site electrical power systems. GDC 17 requires both an on-site and off-site power distribution system to permit functioning structures, systems, and components important to safety, assuming either the on-site or off-site system is unavailable. GDC 17 further defines the two required safety functions supported by the electric power system: 1) protection of specified acceptable fuel design limits and the reactor coolant pressure boundary during anticipated operational occurrences; and, 2) assurance of core cooling and containment integrity during postulated accidents. Both of these functions relate to design basis accidents and transients. In contrast, for beyond design basis ATWS events, 10 CFR 50.62 requires SLCS to be designed to perform its function in a reliable manner. Regulatory Guide 1.93, Availability of Electric Power Sources, provides guidance on TS allowed out of service times for electric power systems required by GDC 17. RG 1.93 frames its discussion in terms of mitigation of design basis accidents and transients.

Technical Specifications Action 3.8.1.1.c states:

c. With one or both diesel generators in one of the above required onsite A.C. electrical power divisions inoperable, in addition to ACTION b, above, verify within 2 hours that all required systems, subsystems, trains, components and devices that depend on the remaining onsite A.C. electrical power division as a source of emergency power are also OPERABLE; otherwise, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

A footnote on Action 3.8.1.1.c exempts the primary containment oxygen monitoring instrumentation subject to TS 3.3.7.5 from this requirement.

The bases for TS 3.8.1 indicates that "required" means more than merely being subject to a TS LCO. A "required" system must also be considered a "critical" system where a loss of offsite power under the conditions prohibited by TS Action 3.8.1.1.c would result in a complete loss of a safety function. The bases for TS 3.8.1 states:

> When one diesel generator is inoperable, there is an additional ACTION requirement to verify that all required systems, subsystems, trains, components

and devices, that depend on the remaining OPERABLE diesel generator as a source of emergency power, are also OPERABLE. This requirement is intended to provide assurance that a loss of offsite power event will not result in a complete loss of safety function of critical systems during the period one of the diesel generators is inoperable.

- 10 CFR 50.36, *Technical Specifications*, establishes requirements for technical specifications and establishes specific criteria which define the required scope and content of the technical specifications. The criteria provide some insight as to what constitutes a "critical system." 10 CFR 50.36(c)(2)(ii) requires that technical specifications limiting conditions for operation be established for items meeting any of the following criteria:

Criterion 1. Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.

Criterion 2. A process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

Criterion 3. A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to a fission product barrier.

Criterion 4. A structure, system, or component which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.

These criteria were developed by the NRC and industry during the mid-1980's as part of the Technical Specifications Improvement Project (TSIP). The first three criteria first appeared in the NRC Proposed Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors, published in the Federal Register on February 6, 1987 (52FR3788). The proposed policy statement recognized that the SLCS would not satisfy any of the three criteria for inclusion in Technical Specifications. Of particular note is Criterion 3. SLCS is not part of the primary success path for any design basis accident or transient. Nor is SLCS on the primary success path for beyond design basis ATWS events. In an ATWS event, SLCS would be initiated if the primary path, RPT and ARI, were unsuccessful. However, the proposed policy statement identified SLCS, Reactor Core Isolation Cooling, Residual Heat Removal, and the Recirculation Pump Trip as systems which operating experience and probabilistic risk assessment have generally shown to be important to the public health and safety, a basis similar to the current Criterion 4. The final Policy Statement was published on July 22, 1993 (58FR39132). The final Policy Statement included the current Criterion 4.

All of the systems that are on the primary success path in the mitigation of design basis accidents and transients satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii). This includes the on-site and off-site A.C. sources required by GDC 17 under TS 3.8.1.1, as well as the systems necessary to mitigate design basis accidents and transients. SLCS is a Criterion 4 system. Furthermore, even if SLCS were considered to be a Criterion 3 system (suppose ATWS was considered a design basis transient), SLCS would not be on the primary success path for mitigation of an ATWS event.

- The background discussion relating to the evolution of Criterion 4 indicates that it is intended to include systems that "operating experience and probabalistic risk assessment have generally shown to be important to public health and safety." It is noteworthy that the Fermi plant specific PSA and Configuration Risk Management Program mandated by TS 3.8.1.1, shows that removal of the entire SLCS in conjunction with an EDG is a low risk evolution. The PSA models SLCS as a whole, that is not divisionalized. This is consistent with scheduling of maintenance for SLCS and the structure of SLCS related procedures.

The Improved Technical Specifications and associated basis further amplify the significance of Criterion 3 versus Criterion 4 in defining critical or required systems in the context of TS 3.8.1.1. ITS LCO 3.8.1 Action A.2 is analogous the TS Action 3.8.1.1.c in the current TS. The ITS bases for LCO 3.8.1 reiterates the fact that the TS requirements are related to mitigation of design basis accidents and transients. It follows that the required features that must be verified under ITS LCO 3.8.1 Action A.2 (and current TS Action 3.8.1.1.c) comprise the Criterion 3 systems included in TS. SLCS does not rise to the level of systems required by Criterion 3, which require verification under TS Action 3.8.1.1.c when an EDG is out-of-service.

<u>SLCS B was Capable of Performing its Specified Functions</u>

SLCS is a manually actuated system which is credited with two backup functions as described above and in the bases for TS 3.1.5. SLCS "B" was removed from service under LCO 99-0197 because of the loss of the continuity indication for the squib "B" circuit. An Engineering Functional Analysis subsequently determined that operability was unaffected in this configuration. At 1830 hrs on 5/4/99, the MCC position for SLCS "B" was tagged out to provide personnel protection for corrective maintenance on the SLCS "B" continuity circuit. This occurred during the same time that EDG 11 was out-of-service. EDG 11 would provide standby power for SLCS "A." No work was performed on SLCS "B" that would have prevented SLCS "B" from being restored by simple manual action of restoring the breaker at the MCC. The fundamental difference in this configuration is that activation of SLCS "B" in a loss-of-offsite power scenario would require an additional manual action outside the control room at the MCC. Restoration of the breaker for SLCS "B" under non-emergency circumstances took 17 minutes on 5/5/99 when NRC questioned the situation with EDG 11 and SLCS "B" both inoperable. Indications are that SLCS "B" could have been restored in significantly less

time had an emergency existed necessitating its activation. Since SLCS is a manually actuated system, the additional manual action in an accessible area outside the control room would not have prevented SLCS 'B' from performing its specified function.

Generic Letter 91-18 (NRC Inspection Manual Part 9900, Operable/Operability: Ensuring the Functional Capability of a System or Component) provides guidance on determining operability for degraded and non-conforming conditions. Although, this guidance was not applied at the time the SLCS "B" breaker was opened, it can be applied retrospectively to assess whether or not a condition prohibited by TS actually existed. The central focus of this guidance is whether or not SLCS "B" was capable of performing its intended functions.

As discussed above, two functions are attributed to SLCS. The first relates to the GDC 26 function of providing a redundant reactivity control system, the primary function for SLCS described in the UFSAR. As discussed in the UFSAR, this function is not time critical. The second function relates to the 10 CFR 50.62 ATWS rule requirements for SLCS. No plant specific ATWS analysis is presented in the UFSAR. The ATWS rule prescribes overall functional requirements for SLCS based on generic analysis of ATWS events. The UFSAR to references General Electric topical reports (primarily NEDE-24222, December 1979) relating to ATWS.

The generic ATWS evaluation assumes the beyond design basis failure of the RPS to initiate a reactor trip in conjunction with the anticipated operational occurrences described in the UFSAR. The primary success path for ATWS is the automatic Recirculation Pump Trip (RPT) and Alternate Rod Insertion (ARI). The generic evaluation indicates that RPT results in a immediate substantial reduction in power into the 20-30% range. ARI provides a diverse method from RPS for initiating control rod insertion. SLCS would only be necessary if ARI was unsuccessful. The generic evaluation conservatively assumes ARI failure and relies on the backup SLCS. The generic evaluation assumes that SLCS is initiated at two minutes into the ATWS event. The reactor becomes subcritical in less than fifteen minutes.

For the situation considered in this CARD, the relevant ATWS transient involves a loss-of-offsite power. The LOOP results in closure of MSIVs and loss of the condenser as a heat sink. In this scenario all of the heat generated by the reactor is deposited in the suppression pool, resulting in suppression pool heat up and containment pressurization. The effect of having the SLCS "B" breaker open at the MCC would be to delay SLCS initiation by up to about 15 minutes. A simple energy balance on the containment indicates that the containment design pressure would not be exceeded assuming a 15 minute delay in initiating SLCS. The containment emergency pressurization limit should not be exceeded for and ATWS event. The energy balance assumes that all of the steam relieved into the suppression pool is condensed and that the pool mass increase associated with the condensed steam is negligible. No credit is taken for suppression pool cooling. It is expected that a more rigorous analysis would continue to support the conclusion that the containment pressurization limit would not be exceeded and that SLCS "B" was

capable of performing its specified function for ATWS mitigation, and could have been considered operable.