NRC INSPECTION MANUAL DI

PART 9900: TECHNICAL GUIDANCE

STS10O.TG

STANDARD TECHNICAL SPECIFICATIONS

SECTION 1.0, OPERABILITY

A. PURPOSE

To provide guidance on the definition of operable/operability as it is stated in the Standard Technical Specifications and applied to limiting conditions for operation, as provided in an NRR memorandum dated July 8, 1985.

B. BACKGROUND

The definition of operable/operability in the Standard Technical Specifications (STS as applied to a system, subsystem, train, component, or device being capable of performing its specified function(s) includes all necessary attendant instrumentation, controls, electrical power, cooling or seal water, lubrication or other auxiliary equipment also being capable of performing their related support function(s). For electrical power systems which are supplied power from the normal offsite power grid and the emergency diesel generator sets, the typical question has been whether either or both of these sources must be operable to fulfill the support system requirements with regard to the STS definition of operability.

By Generic Letter dated April 10, 1980, model technical specifications were provided to all power reactor licensees for a new technical specification to clarify the operability requirements for supporting electrical power systems. However, question continue to be posed with respect to other supporting systems on the proper interpretation of the definition of operable/operability as applied to specific systems, subsystems, trains, components, or devices.

The purpose of the following discussion is to set forth the principal criteria that facilitate a proper application of the STS definition of operable/operability as applied to systems and components which provide necessary support functions. These criteria also facilitate an understanding of the operability requirements for system and component which are explicitly stated in technical specifications.

C. DISCUSSION

1. Principal Criteria. The following are the principal criteria for technical specification operability requirements.

a. The system[(1)] operability requirements should be consistent with the safety analysis of specific design-bases events and regulatory requirements.

b. The system operability requirements, including related regulatory requirements, may be waived as a consequence of specified action statements.

c. Design-basis events are plant specific and regulatory requirements may have plant-specific considerations related to technical specification operability r

d. The system operability requirements that are based on safety analysis of specific design-basis events for one mode or condition of operation may not be the same for all modes or conditions of operation.

e. The system operability requirements extend to necessary support systems regardless of the existence or absence of support system requirements.

f. The operability of necessary support systems includes regulatory requirements. It does not include consideration of the occurrence multiple (simultaneous) design basis events.

2. Support Function. Technical specifications specify Limiting Condition for Operation (LCO) for those systems, subsystems, trains, components or devices that directly provide the capability to mitigate the consequences of design-basis events as well as generally specifying an LCO for those that indirectly provide this capability as a support function. Support functions are defined to include all necessary attendant instrumentation, controls, electrical power, cooling or seal water, lubrication or other auxiliary equipment that is required to perform a supporting function. Because the technical specifications do not directly specify a LCO for many items that perform supporting functions, a knowledge of the plant desig basis is essential to determine which support functions can affect plant operability

Since nuclear plants were not all designed and built in conformance to the same regulatory requirements, the design-basis events addressed in FSARs include differences depending on requirements which existed at the time the construction permit and/or operating license was issued. However, some new regulatory requirements have been issued that are applicable to all plants while others have limited applicability. Thus, FSARs as well as applicable regulatory requirements include information which is essential to the definition of design basis events for facility.

3. Applicable Operating Conditions. The LCOs specify operability requirements in terms of plant operating modes or conditions. For the majority of the specifications, redundant systems or components are required to be operable to ensur that the requirements of the single-failure criterion are satisfied. When a system or component is inoperable, actions are required to restore the system or component to operable status in specified time limits or to place the plant in a mode or condition for which the LCO no longer applies. The LCO requirements for some operating modes or conditions only require one rather than two redundant systems or components to be operable.

Although the operability requirements are specified in terms of operating modes or conditions, they are chosen to be consistent with the analysis of design-basis events. For many events, the analysis is limited to consideration of the power mode of operation with emphasis on full-power operation where conditions present the greatest challenge to safety limits. For some events, consideration is given to 25%-or zero-power conditions if these cases represent a more limiting condition with respect to safety limits. Often only the bounding, i.e., most limiting, conditions are presented in FSAR safety analysis.

With respect to LCO requirements for conditions or modes other than power operation, the requirements have been generally based on engineering judgment rather than specific event analysis. The ECCS is typical of those systems and components for

which the LCO requirements for operability, other than the power mode of operation, have been based on engineering judgment for events that are classified as accidents and anticipated transients.

For those design basis events for which an analysis is provided during the power mod of operation, the technical specifications do allow exceptions to the requirements o the General Design Criteria (GDC) for limited periods of time. For example systems or components are allowed to be out-of-service for testing or maintenance for specified time intervals. During such times the requirements of the single failure criterion as specified in the GDC for specific systems may not be satisfied.

For some events, particularly those due to natural phenomena such as earthquakes, floods, or storms, the safety considerations relate to the capability to shut down the plant and maintain it in a safe condition. Generally the operability requirements of systems or components are based on the modes or conditions for which these systems or components are effective to accomplish this function and may includ essentially all operating modes. Fires, missiles, and accidents at nearby locations are another group of events for which similar requirements may apply.

Design basis events are analyzed to demonstrate that a plant can be operated without undue risk to public health and safety. Other than as specified by a regulatory requirement, each design basis event is taken as an individual case and not in combination with other design basis events. For those systems for which the design criteria specify that the safety function shall be provided with either onsite or offsite power system operation assuming the other is unavailable, a situation exists where the event of a loss of offsite power is considered simultaneously with an even in which the safety function of such systems is required.

Safety-related structures, systems, and components are designed to (1) remain functional during a Safe Shutdown Earthquake (SSE), (2) ensure the integrity of the reactor coolant pressure boundary, and (3) to have the capability to shut down the reactor and maintain it in a safe condition or the capability to mitigate the consequences of accidents. However, as a design-basis event, the SSE is not assumed to occur simultaneously with postulated accidents.

D. CONCLUSION

Many systems and components perform dual-function roles with regard to accident mitigation and for events for which safe plant shutdown is required. The correct application of operability requirements for these systems and components requires additional reliance on a knowledge of design basis events. Thus, it is essential fo the proper application of the technical specifications operability requirements, to know the applicable design-basis events for a facility.

For the reactor trip and engineered safety features actuations systems, the technica specifications generally indicate specific modes or conditions for which automatic features of these systems are required to be operable. For many systems, manual initiation capabilities are provided in addition to automatic features. When the technical specifications operability requirements are stated in terms of overall system requirements, specific control features such as automatic or manual may not b specifically addressed in the operability requirements. Further, in many cases the FSAR may only address bounding analysis, typically for the power mode of operation, such that a specific design basis is not stated for other modes of operation. In such cases, it is incorrect to assume that the safety analysis assumptions for a design basis event are applicable to all other modes of operation. From the

standpoint of safety, the technical specifications set forth the limiting conditions for operation and actions which are appropriate for modes of operation other than those addressed by specific design basis events analysis or applicable regulatory requirements.

E. REFERENCE

The guidance provided in this directive was extracted from a memorandum from Dennis M. Crutchfield, Assistant Director for Safety Assessment, NRR, for H. Thompson, et al., dated July 8, 1985, subject: Technical Specification Operability Requirements. The complete memorandum is in the Document Control System (DCS microfiche #67973-003).

END

1. The term system is used here to include a subsystem, train, component or device as may be applicable to the STS operability requirements.