UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 19, 2016

Vice President, Operations
Entergy Operations, Inc.
River Bend Station
5485 US Highway 61 North
St. Francisville, LA 70775

SUBJECT: RIVER BEND STATION, UNIT 1 – REQUEST FOR INTERPRETATION OF TECHNICAL SPECIFICATIONS (CAC NO. MF6586)

Dear Sir or Madam:

By letter dated August 4, 2015, Entergy Operations, Inc. (EOI, the licensee), in accordance with U.S. Nuclear Regulatory Commission (NRC) Inspection Manual, Technical Guidance, Chapter STSINTR, Part 9900: "Licensee Technical Specification Interpretations," requested that NRC provide a written interpretation of the Technical Specification (TS) requirements as they relate to the postulated failure of the control building heating, ventilation, and air conditioning system, and in particular, for a specified unusual configuration.

The NRC staff has completed its review and concluded, as described in the enclosed evaluation of TS interpretation, that under the situation presented in the request, EOI must follow its license, which includes TS. To determine if a given TS system is OPERABLE, EOI must apply the definition of TS definition OPERABLE/OPERBILITY. First, EOI must determine if the TS system is capable of performing its specified safety function(s). Next, EOI must determine what, if any, related support function(s) are performed by the control building chilled water system (mark number prefix "HVK" system). Last, EOI must determine if, for a given configuration, the HVK system is capable of performing its related support function(s).

If you have any questions, please contact me at 301-415-6631 or via e-mail at James.Kim@nrc.gov.

Sincerely,

James Kim, Project Manager
Plant Licensing IV-2 and Decommissioning
Transition Branch
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-458

Enclosure:
Evaluation of TS Interpretation

cc w/encl: Distribution via Listserv

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EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION REGARDING TECHNICAL SPECIFICATION INTERPRETATION ENTERGY OPERATIONS, INC. FOR RIVER BEND STATION, UNIT 1 DOCKET NO. 50-458

1.0 INTRODUCTION

By letter dated August 4, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15231A111), Entergy Operations, Inc. (EOI),[1] submitted a request for interpretation of Technical Specifications (TS) for River Bend Station, Unit 1 (RBS) in accordance with U.S. Nuclear Regulatory Commission (NRC) Inspection Manual, Part 9900: Technical Guidance, Chapter STSINTR, "Licensee Technical Specification Interpretations."

Specifically, the licensee stated, in part:

> It is requested that NRC provide a written interpretation of the TS requirements as they relate to the postulated failure of the control building heating, ventilation, and air conditioning (HVAC) system, and in particular, for the unusual configuration that is summarized in the letter to Perry station [Pickett, D. V., U.S. Nuclear Regulatory Commission, letter to Mr. Guy G. Campbell, First Energy Nuclear Operating Company, "Application of Generic Letter [GL] 80-30[2] Guidance to an Inoperable Non-Technical Specification Support Subsystem, dated April 5, 2002 (ADAMS Accession No. ML020950074) (Perry Letter)[3]]

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1 EOI is authorized to act as agent for co-licensee Entergy Louisiana, LLC, and has exclusive responsibility and control over the physical construction, operation and maintenance of the facility. License No. NPF-47, Amendment No. 189, at 1. EOI acting in this capacity is referred to as "licensee" throughout this evaluation.

2 Generic Letter (GL) 80-30, Clarification of the Term "Operable" as It Applies to Single Failure Criterion for Safety Systems Required by TS, (April 10, 1980) (*available at* http://www.nrc.gov/reading-rm/doc-collections/gen-comm/gen-letters/1980/gl80030.html) (ADAMS Legacy Library Accession Nos. 8401200196 and 8401200197). In GL 80-30, the Commission stated that "[i]t has recently come to our attention that there may be some misunderstanding regarding the use of the term OPERABLE as it applies to the single failure criterion for safety systems in power reactors. The purpose of this letter is to clarify the meaning of this term and to request licensees to take specific actions to assure that it is appropriately applied at their-facilities." GL 80-30 at 1. Thusly, in GL 80-30, the NRC requested that all licensees (1) submit proposed changes to their technical specifications, within 30 days, that incorporate the requirements of the Model Technical Specifications enclosed with GL 80-30, and (2) implement the procedures described in GL 80-30 to assure compliance with the proposed changes within 30 days thereafter. GL 80-30 at 2.

3 Enclosed with the Perry Letter was "Safety Evaluation By The Office Of Nuclear Reactor Regulation Related To Application Of Generic Letter 80-30 Guidance To An Inoperable 100 Percent Capacity Non-Technical Specification Support Subsystem, FirstEnergy Nuclear Operating Company Perry Nuclear Power Plant, Unit 1, Docket No. 50-440" (undated).

> where non-TS support systems have 100 percent capacity subsystems, each capable of supporting both trains.

For the "unusual" situation as described in the Perry Letter dated April 5, 2002, the NRC staff concluded that so long as the non-TS system was capable of providing its support function, the TS system was operable, as described in the enclosure to the Perry Letter, at 2, stating:

> In some designs, the non-TS support system has two redundant 100 percent capacity subsystems, each capable of supporting both TS trains. Loss of one support subsystem does not result in a loss of support for either train of TS equipment. Both TS trains remain operable, despite a loss of support function redundancy, because the TS definition of operability does not require a TS subsystem's necessary support function to meet the single-failure design criterion. Thus, no TS limits the duration of the non-TS support subsystem outage, even though the single-failure design requirement of the supported TS systems is not met. ....
>
> For the unusual non-TS support system design configuration described, the preceding is a clarification of the previous staff position (GL 80-30) regarding when a temporary departure from the single-failure design criterion is allowed.

The RBS control building chilled water system (HVK) consists of two redundant, closed loop chilled water trains, Division 1 and 2, respectively. Each train contains two 100-percent capacity electric motor-driven, centrifugal liquid chillers, with two 100-percent capacity chilled water recirculation pumps. The A and C chillers and pumps are powered by Division 1 power, the B and D chillers and pumps are powered by Division 2 power. RBS Updated Final Analysis Report (UFSAR), Section 9.2.10.3, states, in part that "[t]he system conforms to the single failure criterion [SFC]." NUREG-0989, "Safety Evaluation Report Related to the Operation of River Bend Station," In Section 9.4.1(4), "Control Building Chilled Water System," documented the NRC staff's finding that the HVK system meets GDC 44, "Cooling water." After NUREG-0989 was issued/published, the licensee amended the FSAR (FSAR Amendment 20) by proposing an automatic initiation scheme for the chillers to reduce electrical loading on the Division 1 and 2 EDGs. Supplement 3 of NUREG-0989 states the NRC staff reviewed the auto initiation scheme and determined it was acceptable and that the determination does not change the staff's conclusion as previously stated in the SER. The RBS TS do not contain a limiting condition for operation (LCO) for the HVK system. The HVK system provides support function(s) to structure, system and components (SSCs)[4] with LCOs in the TS. The HVK

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[4] SSC refers to the "system, subsystem, division, component, or device" as defined in the TS definition of "OPERABLE – OPERABILITY." By contrast, as used in Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.2, "Definitions," safety-related SSCs means:

> those structures, systems and components that are relied upon to remain functional during and following design basis events to assure:
>
> (1) The integrity of the reactor coolant pressure boundary
>
> (2) The capability to shut down the reactor and maintain it in a safe shutdown condition; or
>
> (3) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to the applicable guideline exposures set forth in § 50.34(a)(1) or § 100.11 of this chapter, as applicable.

system provides chilled water to the air handlers for systems such as the control room fresh air system, the control room air conditioning system, the standby switchgear room, battery rooms, inverter rooms and chiller rooms.

The licensee provided a licensing basis discussion beginning on page 3 of Attachment 1 of its submittal. The conclusion on page 6 of Attachment 1 of its submittal can be summarized into four parts: 1) In the event that one train of HVK chilled water becomes inoperable, the supported divisional equipment is operable because cooling is maintained by the redundant support division; 2) In the event of loss of one entire train of HVK, the correct application of TS requirements is that one train of control room air conditioning is inoperable and all other TS LCOs are met; 3) When one of the two redundant chillers in an HVK train is not functional, both trains of HVK are still functional; and 4) This position would apply to other non-TS support systems that have 100 percent capacity subsystems, each capable of supporting both trains.

The NRC staff's response to the licensee's request is contained in the following sections and is specific to the RBS TS.

2.0 REGULATORY EVALUATION

A potential nuclear power plant licensee is required by 10 CFR 50.34 to submit a preliminary safety analysis report (PSAR) as part of the application for a construction permit, and a final safety analysis report (FSAR) as part of the application for an operating license. Pursuant to 10 CFR 50.34(a)(3), the PSAR includes the preliminary design of the facility including the principal design criteria for the facility. Appendix A to 10 CFR Part 50, General Design Criteria for Nuclear Power Plants, establishes minimum requirements for the principal design criteria for water-cooled nuclear power plants similar in design and location to plants for which construction permits have previously been issued by the Commission. As required by 10 CFR 50.34(b), the FSAR shall include information that describes the facility, presents the design bases and the limits on its operation, and presents a safety analysis of the structures, systems, and components and of the facility as a whole. If an operating license is issued by the Commission, then the licensee is required by 10 CFR 50.71(e) periodically to update the FSAR to assure that the information included in FSAR contains the latest information developed, including the effects of all changes made in the facility or procedures as described in the FSAR, all safety analyses and evaluations performed by the licensee either in support of approved license amendments or in support of conclusions that changes did not require a license amendment, and all analyses of new safety issues performed by or on behalf of the applicant or licensee at Commission request. The updated information shall be appropriately located within the updated FSAR (i.e., the UFSAR). Per 10 CFR 50.71(e)(4), updates must be filed annually or six months after each refueling outage provided the interval between successive updates does not exceed 24 months, and must reflect all changes up to a maximum of six months prior to the date of filling.

Pursuant to 10 CFR 50.36(c), technical specifications will include items in specified categories, including: (1) Safety limits and limiting safety system settings, (2) Limiting conditions for operation, (3) Surveillance requirements, (4) Design features, and (5) Administrative controls.

Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.36(a)(1) states:

> Each applicant for a license authorizing operation of a ... utilization facility shall include in his application proposed technical specifications in accordance with the requirements of [10 CFR 50.36]. A summary statement of the bases or reasons for such specifications, other than those covering administrative controls, shall also be included in the application, but shall not become part of the technical specifications.[5]

If an operating license is issued by the Commission, then, per 10 CFR 50.36(b), the operating license will include technical specifications. As stated in 10 CFR 50.36(b) "The technical specifications will be derived from the analyses and evaluation included in the safety analysis report, and amendments thereto, submitted pursuant to § 50.34. The Commission may include such additional technical specifications as the Commission finds appropriate."

Thus, the contents of the bases and of the TS are derived from the analyses and evaluation included in the PSAR and FSAR.

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[5] In its Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors, 58 Fed. Reg. 39,132 (July 22, 1993), the Commission stated the following expectations on bases:

> Each LCO, Action, and Surveillance Requirement should have supporting Bases. The Bases should at a minimum address the following questions and cite references to appropriate licensing documentation (e.g., FSAR, Topical Report) to support the Bases.
>
> 1. What is the justification for the Technical Specification, i.e., which Policy Statement criterion requires it to be in the Technical Specifications?
>
> 2. What are the Bases for each LCO, i.e., why was it determined to be the lowest functional capability or performance level for the system or component in question necessary for safe operation of the facility and, what are the reasons for the Applicability of the LCO?
>
> 3. What are the Bases for each Action, i.e., why should this remedial action be taken if the associated LCO cannot be met; how does this Action relate to other Actions associated with the LCO; and what justifies continued operation of the system or component at the reduced state from the state specified in the LCO for the allowed time period?
>
> 4. What are the Bases for each Safety Limit?
>
> 5. What are the Bases for each Surveillance Requirement and Surveillance Frequency; i.e., what specific functional requirement is the surveillance designed to verify? Why is this surveillance necessary at the specified frequency to assure that the system or component function is maintained, that facility operation will be within the Safety Limits, and that the LCO will be met?

58 Fed. Reg. at 39,138.

Section 50.36(c)(2)(i) of 10 CFR states, in part:

> Limiting conditions for operation are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When a limiting condition for operation of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications until the condition can be met.

The remedial actions available to the licensee are the REQUIRED ACTIONS in the licensee's TS associated with the described CONDITIONS found in each TS ACTIONS table.

The rules of usage for the RBS TS are contained in Section 1.0, "USE AND APPLICATION." The licensee's definition of OPERABLE – OPERABILITY is in TS Section 1.1, "Definitions," and it states:

> A system, subsystem, division, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, division, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).

The RBS TS LCO 3.0.2 states:

> Upon discovery of a failure to meet an LCO, the Required Actions of the associated Conditions shall be met, except as provided in LCO 3.0.5 and LCO 3.0.6.
>
> If the LCO is met or is no longer applicable prior to expiration of the specified Completion Time(s), completion of the Required Action(s) is not required, unless otherwise stated.

The RBS TS LCO 3.0.6 contains the requirements for situations when a supported system LCO is not met solely due to a support system LCO not being met:

> When a supported system LCO is not met solely due to a support system LCO not being met, the Conditions and Required Actions associated with this supported system are not required to be entered. Only the support system LCO ACTIONS are required to be entered. This is an exception to LCO 3.0.2 for the supported system. In this event, additional evaluations and limitations may be required in accordance with Specification 5.5.10, "Safety Function Determination Program (SFDP)." If a loss of safety function is determined to exist by this program, the appropriate Conditions and Required Actions of the LCO in which the loss of safety function exists are required to be entered.
>
> When a support system's Required Action directs a supported system to be declared inoperable or directs entry into Conditions and Required Actions for a

> supported system, the applicable Conditions and Required Actions shall be entered in accordance with LCO 3.0.2.

TS LCO 3.0.6 doesn't address a situation where the support system lacks an associated LCO.

Appendix A to 10 CFR Part 50, General Design Criteria for Nuclear Power Plants, *Criterion 44—Cooling water*, states:

> A system to transfer heat from structures, systems, and components important to safety, to an ultimate heat sink shall be provided. The system safety function shall be to transfer the combined heat load of these structures, systems, and components under normal operating and accident conditions.
>
> Suitable redundancy in components and features, and suitable interconnections, leak detection, and isolation capabilities shall be provided to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available) the system safety function can be accomplished, assuming a single failure.

Inspection Manual Chapter (IMC) 0326, "Operability Determinations & Functionality Assessments for Conditions Adverse to Quality or Safety" (ADAMS Accession No. ML15328A099) contains guidance to NRC inspectors to assist their review of licensee determinations of operability and resolution of degraded or nonconforming conditions. While the IMC is only guidance, most licensees model their program for operability determinations and functionality assessments on this document.

Section 02.01.b and Attachment 2, "Scope of an Operability Determination as it Relates to the Scope of a Functionality Assessment," of IMC 0326 describe and illustrate how SSCs not explicitly required to be operable by TS (i.e., non-TS support equipment), are within scope of the operability determination process.

Section 03.05, "Functional – Functionality," of IMC 0326 states:

> Functionality is an attribute of an SSC(s) that is not controlled by TS. An SSC not controlled by TS is functional or has functionality when it is capable of performing its function(s) as set forth in the CLB [Current Licensing Basis]. These CLB function(s) may include the capability to perform a necessary and related support function for an SSC(s) controlled by TS.

Section 04.04.b.(3) of IMC 0326 states:

> The operability requirements for an SSC encompass all necessary support systems (per the TS definition of operability) regardless of whether the TS explicitly specify operability requirements for the support functions.

IMC 0326 Appendix C, "Specific Operablility Issues" contains a discussion of the relationship between the general design criteria (GDC) and the TS in Section C.01, a discussion of single

failures in Section C.02, and a discussion of support systems not described in TS in Section C.10.

Section C.01 of IMC 0326 states, in part:

> Failure to meet GDC, as described in the licensing basis (e.g., nonconformance with the CLB for protection against flooding, seismic events, tornadoes) should be treated as a nonconforming condition and is an entry point for an operability determination if the nonconforming condition calls into question the ability of SSCs to perform their specified safety function(s) or necessary and related support function(s). (Emphasis added).

Section C.02 of IMC 0326 states:

> A single failure is defined as follows in 10 CFR Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants.
>
> > A single failure means an occurrence which results in the loss of capability of a component to perform its intended safety functions. Multiple failures resulting from a single occurrence are considered to be a single failure.
>
> Appendix A contains GDC for SSCs that perform major safety functions. Many of the GDC, for example GDC 17, 21, 34, 35, 38, 41, and 44, contain a statement similar to the following:
>
> > Suitable redundancy in components and features and suitable interconnections, leak detection, isolation and containment capabilities shall be provided to assure that for onsite electrical power system operation (assuming offsite power is not available) and for offsite electrical power system operation (assuming onsite power is not available) the system safety function can be accomplished assuming a single failure.
>
> Therefore, if these provisions are incorporated into the licensing basis the capability to withstand a single failure in fluid or electrical systems becomes a plant-specific design requirement ensuring that a single failure does not result in a loss of the capability of the system to perform its specified safety function or necessary and related functions. Where the licensing basis does not require redundancy, the single failure guidance herein does not apply. A single SSC cannot deliver redundant functions.
>
> Any nonconformance with a GDC incorporated in the licensing basis by which the capability of an SSC to withstand a single failure is compromised should be treated as a degraded or nonconforming condition. As with any degraded or nonconforming condition, the technical guidance in this document is applicable. (Emphasis added)

Section C.10, "Support System Operability," of IMC 0326 states, in part:

> The definition of operability assumes that an SSC described in TS can perform its specified safety function when all necessary support systems are capable of performing their related support functions. Each licensee must understand which support systems are necessary to ensure operability of supported TS systems.

RBS UFSAR, Section 9.2.10.3, states, in part that "[t]he system conforms to the single failure criterion." NUREG-0989, "Safety Evaluation Report Related to the Operation of River Bend Station," In Section 9.4.1(4), "Control Building Chilled Water System," documented the NRC staff's finding that the HVK system meets GDC 44, "Cooling water." After NUREG-0989 was issued/published, the licensee amended the FSAR (FSAR amendment 20) by proposing an automatic initiation scheme for the chillers to reduce electrical loading on the Division 1 and 2 EDGs. Supplement 3 of NUREG-0989 states the staff reviewed the auto initiation scheme and determined it was acceptable and that the determination does not change the staff's conclusion as previously stated in the SER. Therefore the staff believes the single failure criterion is incorporated into the licensing basis of the HVK system and when the capability of the HVK system to withstand a single failure is compromised, it should be treated as a degraded or nonconforming condition.

3.0 TECHNICAL EVALUATION

The NRC staff reviewed the licensee's request and written justification for its current treatment of non-TS support equipment. We also reviewed NUREG-1434, "Standard Technical Specifications, General Electric BWR [Boiling-Water Reactor]/6 Plants," Revision 4 (ADAMS Accession No. ML12104A195) and the TS of the other BWR/6 plants. Neither the STS nor TS for other BWR/6 plants contain LCOs for chillers. While the NRC staff review included a review of documents other than those specific to RBS, this evaluation is specific to RBS.

In response to the licensee's licensing basis related to the HVK chilled water system discussion beginning on page 3 of Attachment 1 of the licensee's submittal, Section 3.1 of the NRC staff's evaluation focuses on the application of the exception to LCO 3.0.2 provided by LCO 3.0.6.

In response to the conclusion on page 6 of Attachment 1 of the licensee's submittal in which the licensee concludes the operability of supported systems based on several configurations of the HVK chillers, Section 3.2 of the NRC staff's evaluation explains the staff's view of the proper treatment of non-TS support equipment.

3.1 Application of LCO 3.0.6

On November 30, 1993 the licensee for RBS submitted a license amendment request (LAR) to improve the RBS TS through implementation of guidance in NUREG-1434, Revision 0 (ADAMS Legacy Library Accession Number 9312130216). In the LAR the licensee proposed, among other things, to add LCO 3.0.6. The licensee provided a discussion for the addition of LCO 3.0.6 on pages 2 and 3 of Attachment 1B to the request.

In response to the licensee's request, by letter dated July 20, 1995, the NRC issued Amendment No. 81 (ADAMS Accession No. ML021610732) to Facility Operating License No. NPF-47 for RBS. The amendment replaced the RBS TS with a set based on NUREG-1434,

September 1992. A copy of the safety evaluation (SE) was also included with the amendment (ADAMS Legacy Library Accession No. 9508010174). The NRC staff's discussion of the addition of LCO 3.0.6 is on page 14 of the SE.

The exception to LCO 3.0.2 allowed by LCO 3.0.6 can only be applied in a situation where both a supporting and supported system have LCOs in TS and the supported system is rendered inoperable by the inoperable support system. The explicit language in LCO 3.0.6, "When a supported system LCO is not met solely due to a support system LCO not being met...," creates this restriction (emphasis added). In both the licensee's November 30, 1993, LAR and the NRC staff's July 20, 1995, SE discussions of LCO 3.0.6, the exception to LCO 3.0.2 allowed by LCO 3.0.6 is not proposed or intended to be extended to SSCs without a TS LCO. Therefore, in 1995, when LCO 3.0.6 was added to the RBS TS, it was with the understanding that LCO 3.0.6 could not be applied to situations where TS LCOs are not met due to loss of support from non-TS support equipment. No docketed requests for a material change to LCO 3.0.6 have been received since Amendment No. 81 was issued. No material changes to LCO 3.0.6 have been issued to the licensee since Amendment No.81 was issued. The docketed amendment request and Amendment No. 81 establish the CLB for RBS TS LCO 3.0.6.

On April 5, 2002 the NRC staff sent a letter (Perry Letter) to FirstEnergy Nuclear Operating Company (ADAMS Accession No. ML020950074) due to concerns about the conduct of on-line maintenance on the ventilation system at Perry. The letter discussed the application of GL 80-30 guidance to non-TS support systems at Perry. The licensee's position is that the Perry Letter is considered generic and applicable to all plants and is not limited to Perry. In the August 4, 2015 request for TS interpretation, EOI partially-quoted the Enclosure to the Perry Letter, as justification for its position that entering TS Conditions for equipment supported by the HVK is not necessary when one train of HVK becomes nonfunctional, provided the other HVK train is functional, because the remaining support and supported equipment is capable of removing 100 percent of the heat load for the supported equipment in both divisions.

On page 4 of Attachment 1 of its submittal, EOI stated that in September 2010 it used portions of the Enclosure to the Perry Letter, as a technical basis to revise the Bases of LCO 3.0.6 using a 10 CFR 50.59, "Changes, tests, and experiments," evaluation. The licensee did not request prior NRC approval of the change. Per 50.36(a)(1), the Bases shall not become part of the TS. RBS TS LCO 3.0.6, has not been changed since issuance of Amendment No. 81, which established LCO 3.0.6 and its associated restrictions on use. That is, the exception to LCO 3.0.2 allowed by LCO 3.0.6 cannot be extended to the case where a SSC with a TS LCO is rendered inoperable by the lack of support function from a non-TS support SSC.

3.2 Non-TS support equipment

The text in the definition of operability does not list all requirements that must be met for SSCs that support TS SSCs to make a determination of operability for the supported TS SSC.

IMC 0326, Appendix C.1, "Relationship between the General Design Criteria (GDC) and the Technical Specifications," and C.2, "Single Failures," contain guidance on considering plant-specific design requirements when assessing operability.

SECY-77-439, "Single Failure Criterion," dated August 17, 1977 (ADAMS Accession No. ML060260236) contains an Information Report regarding the SFC. The second paragraph of the Information Report (emphasis added) states:

> The Single Failure Criterion, as a design and analysis tool, has the direct objective of promoting reliability through the enforced provision of redundancy in those systems which must perform a safety-related function. Simply stated, application of the Single Failure Criterion requires that a system which is designed to perform a defined safety function must be capable of meeting its objectives assuming the failure of any major component within the system or in an associated system which supports its operation.

The TS will be derived from the analyses and evaluation included in the safety analysis report, and amendments thereto, submitted pursuant to 10 CFR 50.34, "contents of applications; technical information." The Commission may include such additional TS as the Commission finds appropriate. When an accident analysis assumes that a function will be performed, the design of the equipment credited with performing the function generally cannot be vulnerable to a single failure. A TS requirement stipulating at least two independent, redundant and operable systems is typically specified for these cases to translate such design requirements to operational requirements. This arrangement preserves the SFC and the assumptions in the accident analysis.

Each SSC that provides a necessary support function to TS SSCs has a unique set of requirements that must be met to determine whether or not the SSC is providing the necessary support function. As stated in IMC 0326, Appendix C, Section C.10, "Support System Operability," each licensee must understand which support systems are necessary to ensure operability of supported TS systems. The definition of operability alone is not broad enough to literally list all these requirements. A careful examination of a SSC's design and licensing basis is required to determine which set of requirements must be met to determine whether or not the SSC is providing the necessary support function.

The definition of OPERABLE – OPERABILITY in the RBS TS Section 1.1, "Definitions," states:

> A system, subsystem, division, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, division, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).

To determine which systems, subsystems, divisions, components, or devices might have their operability affected by the HVK system, one first must determine if the HVK system is required for the system, subsystem, division, component, or device to perform its specified safety function(s). If the answer is "no," then the TS system's OPERABILITY isn't affected by definition.

However, if the answer is "yes," then one must determine (1) what "related support function(s)" must be performed by the HVK system, and (2) if the HVK system is, for a given HVK system configuration, "capable of performing" the related support function(s).

Under the situation hypothesized by regarding the single-failure scenario, it is true that NUREG-0989, Section 9.4.1(4), "*Control Building Chilled Water System* documented the NRC staff's finding that the HVK system meets GDC 44. This issue is addressed in Appendix C to IMC-0326:

> Required actions and completion times of the TS illustrate the relationship between the GDC and the TS. For example, the GDC may require redundancy of function for safety systems. This is normally accomplished by incorporating at least two redundant trains into the design of the safety systems. The TS typically allows a facility to continue to operate for a specified time with only one train of a two-train safety system operable. In that case, the GDC are met because the system design provides the necessary redundancy. The TS permit the operation of the system with only a single train based on an evaluation of the protection provided by the unique system lineup for the specified period. Not all GDC that are included in the CLB are explicitly identified in TS. However, those that are not explicitly identified may still need to be considered when either determining or establishing the basis for operability of TS SSCs.

Thus, combining the definition of OPERABILITY with the guidance in Appendix C to IMC-0326, it is incumbent upon the licensee to consider, the functionality of "necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s)" "that are not explicitly identified [in this case, the HVK System] ... when either determining or establishing the basis for operability of TS SSCs."

Given the discussions above, the NRC staff determined that: 1) In the event that one train of HVK chilled water becomes nonfunctional, the supported divisional equipment could potentially be rendered inoperable because the SFC is no longer maintained. Recall from Section 2.0 of this evaluation, the NRC staff believes the SFC is incorporated into the licensing basis of the HVK system. 2) In the event of loss of one entire train of HVK, the correct application of TS requirements is that the impact of the lack of HVK support function on the operability of all TS equipment requiring HVK system support should be determined. 3) When one of the two redundant chillers in an HVK train is not functional, both trains of HVK may still be functional with respect to meeting the SFC. 4) Whether or not this would apply to other non-TS support systems that have 100 percent capacity subsystems, each capable of supporting both trains, would depend on a careful examination of the SSC's design and licensing basis to determine which set of requirements must be met to determine whether or not the SSC is providing the necessary support function. A licensee program or process for operability determination and functionality assessment similar to IMC 0326 could be used as guidance for such examinations.

4.0 CONCLUSION

Under the situation hypothesized by EOI, the licensee must follow its license, which includes TS. To determine if a given TS systems is OPERABLE, EOI must apply the definition of TS definition OPERABLE/OPERBILITY. First, EOI must determine if the TS system is capable of performing its specified safety function(s). Next, EOI must determine what, if any, related support function(s) are performed by the HVK system. Last, EOI must determine if, for a given configuration, the HVK system is capable of performing its related support function(s). The referenced sections of IMC-0326 discussed in Section 2.0 and 3.0 of this evaluation contain information for future use when support systems become nonfunctional.

Principal Contributor: M. Hamm

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If you have any questions, please contact me at 301-415-6631 or via e-mail at James.Kim@gmail.com.

Sincerely,

/RA/

James Kim, Project Manager
Plant Licensing IV-2 and Decommissioning
Transition Branch
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-458

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Evaluation of TS Interpretation

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