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ITSB2 - IMPROVED TECHNICAL SPECIFICATIONS BASES MANUALS UNIT 2

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# TSB

**APPROVED AMENDMENT TO THE  
UNIT 2 TECHNICAL SPECIFICATIONS BASES MANUAL  
REVISION 42**

Replace the following pages of the Technical Specifications Bases Manual with the enclosed pages. The revised pages are identified by Revision Number and contain vertical lines indicating the area of change.

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**SUSQUEHANNA STEAM ELECTRIC STATION**  
**LIST OF EFFECTIVE SECTIONS (TECHNICAL SPECIFICATIONS BASES)**

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**LIST OF EFFECTIVE SECTIONS (TECHNICAL SPECIFICATIONS BASES)**

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## **BASES**

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**LCO**  
(continued)

status. If a normally active PCIV is known to be closed and deactivated, position indication is not needed to determine status. Therefore, the position indication for valves in this state is not required to be OPERABLE.

The following list is a discussion of the specified instrument Functions listed in Table 3.3.3.1-1 in the accompanying LCO. Table B3.3.3.1-1 provides a listing of the instruments that are used to meet the operability requirements for the specific functions.

### **1. Reactor Steam Dome Pressure**

Reactor steam dome pressure is a Type A, Category 1, variable provided to support monitoring of Reactor Coolant System (RCS) integrity and to verify operation of the Emergency Core Cooling Systems (ECCS). Two independent pressure channels, consisting of three wide range control room indicators and one wide range control room recorder per channel with a range of 0 psig to 1500 psig, monitor pressure. The wide range recorders are the primary method of indication available for use by the operators during an accident, therefore, the PAM Specification deals specifically with this portion of the instrument channel.

### **2. Reactor Vessel Water Level**

Reactor vessel water level is a Type A, Category 1, variable provided to support monitoring of core cooling and to verify operation of the ECCS. A combination of three different level instrument ranges, with two independent channels each, monitor Reactor Vessel Water Level. The extended range instrumentation measures from -150 inches to 180 inches and outputs to three control room level indicators per channel. The wide range instrumentation measures from -150 inches to 60 inches and outputs to one control room recorder and three control room indicators per channel. The fuel zone range instrumentation measures from -310 inches to -110 inches and outputs to a control room recorder (one channel) and a control room indicator (one channel). These three ranges of instruments combine to provide level indication from the bottom of the Core to above the main steam line. The wide range level recorders, the fuel zone level indicator and level recorder, and one inner ring extended range level indicator per channel are the primary method of indication available for use by the operator during an accident, therefore the PAM

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**BASES**

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**LCO**

**2. Reactor Vessel Water Level (continued)**

Specification deals specifically with this portion of the instrument channel.

**3. Suppression Chamber Water Level**

Suppression chamber water level is a Type A, Category 1, variable provided to detect a breach in the reactor coolant pressure boundary (RCPB). This variable is also used to verify and provide long term surveillance of ECCS function. A combination of two different level instrument ranges, with two independent channels each, monitor Suppression chamber water level. The wide range instrumentation measures from the ECCS suction lines to approximately the top of the chamber and outputs to one control room recorder per channel. The wide range recorders are the primary method of indication available for use by the operator during an accident, therefore the PAM Specification deals specifically with this portion of the instrument channel.

**4. Primary Containment Pressure**

Primary Containment pressure is a Type A, Category 1, variable provided to detect a breach of the RCPB and to verify ECCS functions that operate to maintain RCS integrity. A combination of two different pressure instrument ranges, with two independent channels each, monitor primary containment pressure. The LOCA range measures from -15 psig to 65 psig and outputs to one control room recorder per channel. The accident range measures from 0 psig to 250 psig and outputs to one control room recorder per channel (same recorders as the LOCA range). The recorders (both ranges) are the primary method of indication available for use by the operator during an accident, therefore the PAM Specification deals specifically with this portion of the instrument channel.

**5. Primary Containment High Radiation**

Primary containment area radiation (high range) is provided to monitor the potential of significant radiation releases

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**BASES**

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**LCO**

**5. Primary Containment High Radiation (continued)**

and to provide release assessment for use by operators in determining the need to invoke site emergency plans. Two independent channels, which output to one control room recorder per channel with a range of  $10^0$  to  $1 \times 10^5$  R/hr, monitor radiation. The PAM Specification deals specifically with this portion of the instrument channel.

**6. Primary Containment Isolation Valve (PCIV) Position**

PCIV position is provided for verification of containment integrity. In the case of PCIV position, the important information is the isolation status of the containment penetration. The LCO requires a channel of valve position indication in the control room to be OPERABLE for an active PCIV in a containment penetration flow path; i.e., two total channels of PCIV position indication for a penetration flow path with two active valves. For containment penetrations with only one active PCIV having control room indication, Note (b) requires a single channel of valve position indication to be OPERABLE. This is sufficient to redundantly verify the isolation status of each isolable penetration via indicated status of the active valve, as applicable, and prior knowledge of passive valve or system boundary status. If a penetration flow path is isolated, position indication for the PCIV(s) in the associated penetration flow path is not needed to determine status. Therefore, the position indication for valves in an isolated penetration flow path is not required to be OPERABLE. Those valves which require position indication are specified in Table B 3.6.1.3-1. Furthermore, the loss of position indication does not necessarily result in the PCIV being inoperable.

The PCIV position PAM instrumentation consists of position switches unique to PCIVs, associated wiring and control room indicating lamps (not necessarily unique to a PCIV) for active PCIVs (check valves and manual valves are not required to have position indication). Therefore, the PAM Specification deals specifically with these instrument channels.

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**BASES**

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**LCO**  
(continued)

**7. Neutron Flux**

Wide range neutron flux is a Category I variable provided to verify reactor shutdown. The Neutron Monitoring System Average Power Range Monitors (APRM) which consist of 6 channels that output to four control room recorders (one for channels A and C, one for channels B and D, one for channel E and one for channel F) provide reliable neutron flux measurement from 0% to 125% of full power. The PAM function for neutron flux is satisfied by any one channel of APRMs in each division (channels A,C, E comprise division one, channels B,D,F comprise division two). The PAM Specification deals specifically with this portion of the instrument channel.

The Neutron Monitoring System (NMS) was evaluated against the criteria established in General Electric NEDO-31558A to ensure its acceptability for post-accident monitoring. NEDO-31558A provides alternate criteria for the NMS to meet the post-accident monitoring guidance of Regulatory Guide 1.97. Based on the evaluation, the NMS was found to meet the criteria established in NEDO-31558A. The APRM sub-function of the NMS is used to provide the Neutron Flux monitoring identified in TS 3.3.3.1 (Ref. 5 and 6).

**8. Containment Hydrogen and Oxygen Analyzers**

The drywell and suppression chamber hydrogen and oxygen concentrations are Type A, Category 1, variables. Two independent gas analyzers monitor hydrogen and oxygen concentration to detect unsafe combustible gas levels in primary containment. The analyzers are capable of determining hydrogen concentration in the range of 0 to 30% by volume and oxygen concentration in the range of 0 to 10% by volume, and each provide control room indication and output to a control room recorder. Each gas analyzer must be capable of sampling either the drywell or the suppression chamber. The recorders are the primary method of indication available for use by the operator during an accident, therefore the PAM Specification deals specifically with this portion of the instrument channel. The gas analyzer piping is provided with heat tracing to reduce the buildup of condensation in the system. H<sub>2</sub>O<sub>2</sub> Analyzers can be considered OPERABLE for accident monitoring (TS 3.3.3.1) for up to 100 days with their heat tracing INOPERABLE.

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## **BASES**

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**LCO**  
(continued)

### **9. Drywell Atmosphere Temperature**

Drywell atmosphere temperature is a Category I variable provided to verify RCS and containment integrity and to verify the effectiveness of ECCS actions taken to prevent containment breach. Two independent temperature channels, consisting of two control room recorders per channel with a range of 40 to 440 degrees F, monitor temperature. The PAM Specification deals specifically with the inner ring temperature recorder portion of the instrument channel.

### **10. Suppression Chamber Water Temperature**

Suppression Chamber water temperature is a Type A, Category 1, variable provided to detect a condition that could potentially lead to containment breach and to verify the effectiveness of ECCS actions taken to prevent containment breach. The suppression chamber water temperature instrumentation allows operators to detect trends in suppression chamber water temperature in sufficient time to take action to prevent steam quenching vibrations in the suppression pool. Two channels are required to be OPERABLE. Each channel consists of eight sensors of which a minimum of four sensors (one sensor in each quadrant) must be OPERABLE to consider a channel OPERABLE. The outputs for the temperature sensors are displayed on two independent indicators in the control room and recorded on the monitoring units located in the control room on a back panel. The temperature indicators are the primary method of indication available for use by the operator during an accident, therefore the PAM Specification deals specifically with this portion of the instrument channel.

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## **APPLICABILITY**

The PAM instrumentation LCO is applicable in MODES 1 and 2. These variables are related to the diagnosis and preplanned actions required to mitigate DBAs. The applicable DBAs are assumed to occur in MODES 1 and 2. In MODES 3, 4, and 5, plant conditions are such that the likelihood of an event that would require PAM instrumentation is extremely low; therefore, PAM instrumentation is not required to be OPERABLE in these MODES.

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