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TSB1 - TECHNICAL SPECIFICATION BASES UNIT 1 MANUAL

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CATEGORY: DOCUMENTS TYPE: TSB1

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NRR

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REMOVE: REV:3

ADD: REV: 4

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SSSES MANUAL

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Manual Title: TECHNICAL SPECIFICATION BASES UNIT 1 MANUAL

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B 3.6 CONTAINMENT SYSTEMS

B 3.6.3.2 Drywell Air Flow System

BASES

BACKGROUND The Drywell Cooling fans in low speed ensure a uniformly mixed post accident primary containment atmosphere (Ref. 1), thereby minimizing the potential for local hydrogen burns due to a pocket of hydrogen above the flammable concentration.

The Drywell Cooling fans are an Engineered Safety Feature and are designed to withstand a loss of coolant accident (LOCA) in post accident environments without loss of function. The system consists of three required pairs of fans with each pair consisting of two independent fans. The three required Drywell Cooling fan pairs are as follows:

- a. Drywell Unit Cooler fans 1V414A/1V414B;
- b. Drywell Unit Cooler fans 1V416A/1V416B;
- c. Recirculation fan 1V418A/1V418B.

The fans are initiated manually since flammability limits would not be reached until several days after a LOCA. Each fan in a pair is powered from a separate emergency power supply. Since one fan in each pair can provide 100% of the mixing requirements, the system will provide its design function with a worst case single active failure.

**APPLICABLE
SAFETY
ANALYSES**

The Drywell Cooling fans provide the capability for reducing the local hydrogen concentration to approximately the bulk average concentration following a Design Basis Accident (DBA).

Reference 2 no longer defines a design basis hydrogen source term and therefore no design basis calculates hydrogen generation as a function of time. See Reference 3 for a detailed discussion for hydrogen generation.

Although natural circulation phenomena reduces the gradient concentration differences in containment, a containment mixing system provides further means of preventing local hydrogen gas buildups in containment post-accident.

The Drywell Cooling fans satisfy Criterion 3 of the NRC Policy Statement. (Ref. 4)

BASES

LCO

Three required Drywell Cooling fan pairs must be OPERABLE in low speed to ensure operation of at least one fan in each of the required pairs in the event of a worst case single active failure. The three required Drywell Cooling fan pairs are as follows:

- a. Drywell Unit Cooler fans 1V414A/1V414B;
- b. Drywell Unit Cooler fans 1V416A/1V416B;
- c. Recirculation fan 1V418A/1V418B.

Operation with at least one fan in each required pair provides the capability of controlling the bulk hydrogen concentration in primary containment without exceeding the flammability limit.

APPLICABILITY

In MODES 1 and 2, the three Drywell Cooling fan pairs ensure the capability to prevent localized hydrogen concentrations above the flammability limit of 4.0 v/o in drywell, assuming a worst case single active failure.

In MODE 3, both the hydrogen production rate and the total hydrogen produced after a LOCA would be less than that calculated for the DBA LOCA. Also, because of the limited time in this MODE, the probability of an accident requiring the Drywell Cooling fans is low. Therefore, the Drywell Cooling fans are not required in MODE 3.

In MODES 4 and 5, the probability and consequences of a LOCA are reduced due to the pressure and temperature limitations in these MODES. Therefore, the Drywell Cooling fans are not required in these MODES.

BASES

ACTIONS

A.1

With one required Drywell Cooling fan in one or more pairs inoperable, the inoperable fan must be restored to OPERABLE status within 30 days. In this Condition, the remaining OPERABLE fan is adequate to perform the hydrogen mixing function. However, the overall reliability is reduced because a single failure in the OPERABLE fan could result in reduced hydrogen mixing capability. The 30 day Completion Time is based on the availability of the second fan, the low probability of the occurrence of a LOCA that would generate hydrogen in amounts capable of exceeding the flammability limit and the amount of time available after the event for operator action to prevent exceeding this limit.

B.1 and B. 2

With two required Drywell Cooling fans in one or more pairs inoperable, the ability to perform the hydrogen control function via alternate capabilities must be verified by administrative means within 1 hour. The alternate hydrogen control capabilities are provided by the containment nitrogen purge system. The 1 hour Completion Time allows a reasonable period of time to verify that a loss of hydrogen control function does not exist. In addition, the alternate hydrogen control system capability must be verified once per 12 hours thereafter to ensure its continued availability. Both the initial verification and all subsequent verifications may be performed as an administrative check by examining logs or other information to determine the availability of the alternate hydrogen control system. It does not mean to perform the Surveillances needed to demonstrate OPERABILITY of the alternate hydrogen control system. If the ability to perform the hydrogen control function is maintained, continued operation is permitted with two Drywell Cooling fans in one or more pairs inoperable for up to 7 days. Seven days is a reasonable time to allow two Drywell Cooling fans in one or more pairs to be inoperable because the hydrogen control function is maintained and because of the low probability of the occurrence of a LOCA that would generate hydrogen in amounts capable of exceeding the flammability limit.

C.1

If any Required Action and associated Completion Time cannot be met, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours. The allowed Completion Time of 12 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.6.3.2.1

Operating each required Drywell Cooling fan in low speed from the control room for ≥ 15 minutes ensures that each subsystem is OPERABLE and that all associated controls are functioning properly. Since required fans are operated at high speed during normal operations this SR ensures the low speed motor circuits operate. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

REFERENCES

1. FSAR 9.4.5
 2. Regulatory Guide 1.7, Revision 3.
 3. FSAR, Section 6.2.5.
 4. Final Policy Statement on Technical Specifications Improvements, July 22, 1993 (58 FR 39132).
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