PROPOSED TECHNICAL SPECIFICATIONS PAGES

REACTOR COOLANT SYSTEM LEAKAGE DETECTION SYSTEMS

(GGNS PCOL-93/02)

REACTOR COOLANT SYSTEM

3/4.4.3 REACTOR COOLANT SYSTEM LEAKAGE

LEAKAGE DETECTION SYSTEMS

LIMITING CONDITION FOR OPERATION

3.4.3.1 The following reactor coolant system leakage detection systems shall be OPERABLE:

a. The drywell floor drain sump monitoring system,

b. One channel of either the drywell atmosphere particulate or gaseous radioactivity monitoring system, and

c. The drywell air coolers condensate flow rate monitoring system.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2 and 3.

ACTION:

Enter all applicable ACTION statements.

a. With the drywell floor drain sump monitoring system inoperable, operation may continue for up to 30 days. Note: The provisions of Specification 3.0.4 are not applicable.

b. With both the drywell atmosphere particulate and gaseous radioactivity monitoring systems inoperable, operation may continue provided grab samples of the drywell atmosphere are obtained and analyzed at least once per 12 hours.

c. With the drywell air coolers condensate flow rate monitoring system inoperable, perform a CHANNEL CHECK of the required drywell atmospheric monitoring systems once per 8 hours. Note: Not applicable when the required drywell atmospheric monitoring system is inoperable.

d. With the drywell atmosphere particulate and gaseous radioactivity monitoring systems and the drywell air cooler condensate flow rate monitoring system inoperable, operation may continue for up to 30 days. Note: The provisions of Specification 3.0.4 are not applicable.

e. With the required action and associated completion time of ACTION a, b, c or d not met, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

f. With all the required leakage detection systems inoperable, enter LCO 3.0.3.

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LEAKAGE DETECTION SYSTEMS

SURVEILLANCE REQUIREMENTS

4.4.3.1 The reactor coolant system leakage detection systems shall be demonstrated OPERABLE by:

a. Drywell atmosphere particulate and gaseous monitoring systems-performance of a CHANNEL CHECK at least once per 12 hours, a CHANNEL FUNCTIONAL TEST at least once per 31 days and a CHANNEL CALIBRATION at least once per 18 months.

b. Drywell floor drain sump level and flow monitoring system-performance of a CHANNEL FUNCTIONAL TEST at least once per 31 days and a CHANNEL CALIBRATION TEST at least once per 18 months.

c. Drywell air coolers condensate flow rate monitoring system-performance of a CHANNEL FUNCTIONAL TEST at least once per 31 days and a CHANNEL CALIBRATION at least once per 18 months.

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SURVEILLANCE REQUIREMENTS

4.4.3.2.1 The reactor coolant system leakage shall be demonstrated to be within each of the above limits once per 12 hours.

4.4.3.2.2 Each reactor coolant system pressure isolation valve specified in Table 3.4.3.2-1 shall be demonstrated OPERABLE by leak testing pursuant to Specification 4.0.5 and verifying the leakage of each valve to be within the specified limit:

a. At least once per 18 months, and

b. Prior to returning the valve to service following maintenance, repair or replacement work on the valve which could affect its leakage rate.

The provisions of Specification 4.0.4 are not applicable for entry into OPERATIONAL CONDITION 3.

4.4.3.2.3 The high/low pressure interface valves leakage pressure monitors shall be demonstrated OPERABLE with alarm and interlock setpoints per Table 3.4.3.2-2 and Table 3.4.3.2-3 by performance of a:

a. CHANNEL FUNCTIONAL TEST at least once per 31 days, and

b. CHANNEL CALIBRATION at least once per 18 months.

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3/4.4.2 SAFETY/RELIEF VALVES

The safety valve function of the safety/relief valves (SRV) operate to prevent the reactor coolant system from being pressurized above the Safety Limit of 1325 psig in accordance with the ASME Code. A total of 13 OPERABLE safety/ relief valves is required to limit reactor pressure to within ASME III allowable values for the worst case upset transient. Any combination of 6 SRVs operating in the relief mode and 7 SRVs operating in the safety mode is acceptable.

Demonstration of the safety/relief valve lift settings will occur only during shutdown and will be performed in accordance with the provisions of Specification 4.0.5.

The low-low set system ensures that safety/relief valve discharges are minimized for a second opening of these valves, following any overpressure transient. This is achieved by automatically lowering the closing setpoint of 6 valves and lowering the opening setpoint of 2 valves following the initial opening. In this way, the frequency and magnitude of the containment blowdown duty cycle is substantially reduced. Sufficient redundancy is provided for the low-low set system such that failure of any one valve to open or close at its reduced setpoint does not violate the design basis.

3/4.4.3 REACTOR COOLANT SYSTEM LEAKAGE

3/4.4.3.1 LEAKAGE DETECTION SYSTEMS

The RCS leakage detection systems required by this specification are provided to monitor and detect leakage from the reactor coolant pressure boundary. These systems provide the ability to measure leakage from fluid systems in the drywell.

GDC 30 of 10 CFR 50, Appendix A (Ref. 1), requires means for detecting and, to the extent practical, identifying the location of the source of Reactor Coolant System (RCS) leakage. Regulatory Guide 1.45 (Ref. 2) describes acceptable methods for selecting leakage detection systems.

Leakage detection systems for the RCS are provided to alert the operators when leakage rates above normal background levels are detected and also to supply quantitative measurement of leakage rates. Systems for separating the leakage of an identified source from an unidentified source are necessary to provide prompt and quantitative information to the operators to permit them to take immediate corrective action. Each of the leakage detection systems inside the drywell is designed with the capability of detecting leakage less than the established leakage rate limits and providing an appropriate alarm of excess leakage in the control room.

A control room alarm allows the operators to evaluate the significance of the indicated leakage and, if necessary, shut down the reactor for further investigation and corrective action. The allowed leakage rates are well below

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3/4.4.3.1 LEAKAGE DETECTION SYSTEMS (Continued)

the rates predicted for critical crack sizes. Therefore, these actions provide adequate response before a significant break in the reactor coolant pressure boundary can occur.

The drywell floor drain sump monitoring system is required to quantify UNIDENTIFIED LEAKAGE from the RCS. With this system inoperable, RCS UNIDENTIFIED and total leakage must continue to be determined every 12 hours per TS 3/4.4.3.1 to ensure adequate monitoring of the reactor coolant pressure boundary. Manual leak rate measurements are acceptable (e.g. measuring the differences in sump level or manually pumping the sump) while the floor drain sump is being restored, provided the accuracy and inspectability of these alternatives are demonstrated to be suitable. The other monitoring systems provide early alarms to the operators so closer examination of other detection systems will be made to determine the extent of any corrective action that may be required. The drywell atmospheric activity monitor and the drywell air cooler condensate flow rate monitor will provide indications of changes in leakage. The 30 day completion time of required ACTION "a" is based on other leakage detection systems that are still available. ACTION "a" is modified by a Note that states the provisions of 3.0.4 are not applicable. As a result, a MODE change is allowed when the drywell floor drain sump monitoring system is inoperable. This allowance is provided because other instrumentation is available to monitor RCS leakage.

With both gaseous and particulate drywell atmospheric monitoring channels inoperable, periodic leakage information is provided by taking and analyzing grab samples of the containment atmosphere every 12 hours. Provided a sample is obtained and analyzed every 12 hours, the plant may continue operation since at lease one other form of drywell leakage detection (i.e. air cooler condensate flow rate monitor) is available. The 12 hour interval provides periodic information that is adequate to detect leakage.

With the required drywell air cooler condensate flow rate monitoring system inoperable, a CHANNEL CHECK is performed on the required drywell atmospheric monitoring system at a more frequent interval than the routine surveillance. The 8 hour interval provides periodic information of activity in the drywell that is adequate to detect leakage and recognizes that other forms of leakage detection are available. However, ACTION "c" is modified by a Note that allows this action to be not applicable if the required drywell atmospheric monitoring system is inoperable. This is consistent with TS 4.0.3 — Surveillances are not required to be performed on inoperable equipment.

With both the gaseous and particulate drywell atmospheric monitor channels and the drywell air cooler condensate flow rate monitor inoperable, the only means of detecting UNIDENTIFIED LEAKAGE is the drywell floor drain sump monitoring system. This condition does not provide the required diverse means of leakage detection. ACTION "d" requires restoring either of the inoperable monitors to OPERABLE status in 30 days to regain the intended leakage detection diversity. The 30 day completion time ensures the plant will not be operated in

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a degraded configuration for a lengthy time period. The required action is modified by a Note that states the provisions of 3.0.4 are not applicable. As a result, a MODE change is allowed when both the gaseous and particulate drywell monitoring channels and air cooler condensate flow rate monitor are inoperable.

If any required ACTION(S) cannot be met within the associated completion time, 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 and to MODE 4 within 36 hours. The allowed times are reasonable, based on operating experience, to reach the required plant conditions in an orderly manner and without challenging plant systems.

With all required monitoring systems INOPERABLE, no required automatic means of monitoring leakage are available, and immediate plant shutdown in accordance with LCO 3.0.3 is required.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 30.
2. Regulatory Guide 1.45, May 1973.
3. GGNS UFSAR, Sections 5.2.5 and 7.6.2.4.2.1.

3/4.4.3.2 OPERATIONAL LEAKAGE

The allowable leakage rates from the reactor coolant system have been based on the predicted and experimentally observed behavior of cracks in pipes. The normally expected background leakage due to equipment design and the detection capability of the instrumentation for determining system leakage was also considered. The evidence obtained from experiments suggests that for leakage somewhat greater than that specified for UNIDENTIFIED LEAKAGE the probability is small that the imperfection or crack associated with such leakage would grow rapidly. However, in all cases, if the leakage rates exceed the values specified or the leakage is located and known to be PRESSURE BOUNDARY LEAKAGE, the reactor will be shut down to allow further investigation and corrective action. Service sensitive reactor coolant system Type 304 and 316 austenitic stainless steel piping, i.e., those that are subject to high stress or that contain relatively stagnant, intermittent, or low flow fluids, requires additional surveillance and leakage limits.

The Surveillance requirements for RCS leakage typically utilize sump level and flow rate instrumentation to quantify actual leakage rates. However, any method may be used to quantify leakage within the guidelines of Regulatory Guide 1.45.

The Surveillance Requirements for RCS pressure isolation valves provide added assurance of valve integrity, thereby reducing the probability of gross valve failure and consequent intersystem LOCA. Leakage from the RCS pressure isolation valves is IDENTIFIED LEAKAGE and will be considered as a portion of the allowed limit.