3/4.3.4 TURBINE OVERSPEED PROTECTION

LIMITING CONDITION FOR OPERATION

3.3.4 At least one Turbine Overspeed Protection System shall be OPERABLE.

APPICABILITY: MODES 1, 2, and 3.

ACTION:

a. With one stop valve or one control valve per high pressure turbine steam line inoperable and/or with one intermediate stop valve or one ~~reheat~~ intercept valve per low pressure turbine steam line inoperable, restore the inoperable valve(s) to OPERABLE status within 72 hours, or close at least one valve in the affected steam line(s) or isolate the turbine from the steam supply within the next 6 hours.

b. With the above required Turbine Overspeed Protection System otherwise inoperable, within 6 hours isolate the turbine from the steam supply.

SURVEILLANCE REQUIREMENTS

4.3.4.1 The provisions of Specification 4.0.4 are not applicable.

4.3.4.2 The above required Turbine Overspeed Protection System shall be demonstrated OPERABLE:

a. At least once per 7 days by cycling each of the following valves through at least one complete cycle from the running position:

1) Four high pressure turbine stop valves, and

~~2) Four high pressure turbine governor valves, and~~

2 ~~3~~) Six low pressure combined intermediate valves.

b. At least once per 31 days by direct observation of the movement of each of the above valves and the four high pressure turbine control valves through one complete cycle from the running position.

c. At least once per 18 months by performance of a CHANNEL CALIBRATION on the Turbine Overspeed Protection Systems, and

d. At least once per 40 months by disassembling at least one of each of the above valves and performing a visual and surface inspection of valve seats, disks, and stems and verifying no unacceptable flaws or excessive corrosion. If unacceptable flaws or excessive corrosion are found, all other valves of that type shall be inspected.

ENCLOSURE 2 TO NYN - 90196

DESCRIPTION OF CHANGE

The proposed change deletes the requirement to perform a stroke test of the high pressure turbine control valves on a weekly basis. This test frequency was originally based upon the turbine manufacturer's (General Electric) recommendation, which was based upon test frequencies established for fossil-fuel turbines which typically operate at higher temperatures and pressures than nuclear plants. Operating experience at nuclear plants over the past three decades has indicated significantly lower failure rates than those from which these recommendations were derived. Based upon these findings, GE issued Technical Information Letter (TIL) No. 969, based on an overspeed reliability analysis which revises the recommended testing frequency for these valves. The new test frequency specified by this TIL is monthly testing for the control valves. This testing is specified in Surveillance Requirement 4.3.4.2b.

Additionally, editorial changes with respect to valve nomenclature have been indicated to provide consistency throughout the Technical Specification.

SAFETY EVALUATION OF PROPOSED CHANGES

New Hampshire Yankee has reviewed the proposed change in accordance with the criteria specified in 10 CFR 50.92 and has determined that the proposed change would not

1 Involve a significant increase in the probability or consequences of any accident previously evaluated. The Seabrook Station Probabilistic Safety Assessment (SSPSA) estimates the likelihood of generating turbine missiles and analyzes the most probable consequences. The result, discussed below, indicates that the contribution from turbine missiles to public risk is negligible.

The total mean annual frequency of turbine missile generation was estimated by the SSPSA to be 8.3×10^{-5}. The conditional probability of damage to structures and systems as calculated in FSAR Section 3.5.1.3 was used.

The resulting turbine missile damage frequencies for structures are listed in SSPSA Table 9.9-4. From this list, six common cause initiating events were chosen and included in the plant model for quantification. It should be noted that these are initiating event frequencies only, and not core damage/offsite release frequencies. The six scenarios are discussed below:

a&b. Steam Line Break (TMSLB) and Loss of Condenser Vacuum (TMLCV) were both conservatively assumed to occur with a conditional probability of one, given a turbine missile had been generated. These were included as initiating events in the SSPSA. However, the mean annual frequency of steam line breaks outside containment (SLBO - 6.04×10^{-3}) and loss of condenser vacuum (LCV - 0.42) from other causes totally dominate any contribution from turbine missiles (8.3×10^{-5} for TMSLB and TMLCV). Given this event, a loss of

Emergency Feedwater (2.7×10^{-4}) and subsequent failure of the Startup Feed Pump, and Feed and Bleed Cooling are required to result in a core damage event. The resultant core damage frequency is less than 2.2×10^{-8}.

c. Control Room (TMCR) impact was chosen as the most critical location that can be hit by a turbine missile with relatively high frequency and serious consequences. The mean annual frequency of this initiating event (control building impact) is 3.98×10^{-7}. Most major functions needed to mitigate the effects of the steam line break (which is assumed to occur with a conditional probability of one) are conservatively assumed to be lost without operator recovery as a result of the damage to the Control Room. However, this is an insignificant contribution to core damage frequency and public risk because it is two orders of magnitude less frequent than other scenarios with the same damage.

d. A large LOCA (TMLL) initiating event with a mean frequency of 7.44×10^{-8} (containment impact) was included in the SSPSA. If the missile were to penetrate, damage to multiple systems is not expected due to the spatial arrangement of systems. The bounding scenario is assumed to be one or two steam generators are damaged leading to a large LOCA, a loss of containment isolation and failure of a containment spray train. This scenario is also assumed to occur coincident with an independent failure of one high pressure or low pressure injection train. Another train of low pressure injection must fail to result in core damage, resulting in a mean annual frequency of core damage with containment bypass less than 10^{-8}. Again, this is an insignificant contribution to core damage frequency and public risk.

e. Condensate Storage Tank (TMCST) impact in addition to steam line break and loss of condenser vacuum was included as an initiating event with a mean annual frequency of 6.09×10^{-8}. Again, core damage frequency is dominated by other events with loss of emergency feedwater.

f. Loss of Primary Component Cooling (TMPCC) water system due to Primary Auxiliary Building impact was included with a mean annual frequency of 1.27×10^{-8}. This is an insignificant contribution to core damage frequency and loss of PCC.

These probabilities compare with realistic assessments of degraded cores of modern PWRs in the range of 10^{-5} to 10^{-4} per year. Given the conservative analysis in the FSAR and SSPSA the probability of core damage from turbine missiles is judged to not substantially contribute to public risk.

2. Create the possibility of a new or different kind of accident from any previously evaluated. The analyses presented in FSAR Section 15.1 and 15.2 bound the two possible failure mechanisms which exist for the high pressure turbine control valves (ie., the possibility of a control valve not closing in conjunction with a stop valve not closing, or spurious control valve closure). The extension of the testing frequency from weekly to monthly does not create a new failure mechanism; therefore, the possibility of a new or different kind of accident is not created.

3. Involve a significant reduction in a margin of safety. Margin of safety as it relates to the protection of safety related structures, systems and components from turbine missiles is measured in terms of the probability of radiological consequences exceeding 10CFR100 limits. FSAR Section 3.5.1.3 specifies the acceptance criteria and analytical results for the probability that a turbine missile is generated and strikes a safety-related area which may lead to consequences exceeding 10 CFR 100 limits. Additionally, the Seabrook Station Probabilistic Safety Assessment (SSPSA) quantifies turbine missile damage frequencies for several common cause initiating events. From the SSPSA, the total contribution of turbine missiles to mean annual core damage frequency is 4×10^{-7} (TMCR) or less. Six of the common cause initiating events were included in the SSPSA plant model for quantification of core damage and offsite release frequencies. The SSPSA analysis demonstrates that the probability of core damage from turbine missiles provides negligible contribution to public risk. The SSPSA turbine missile generation estimates are based on statistical and analytical data which show a relatively small contribution by overspeed failures versus failures at operating speed; therefore, damage frequencies would be further reduced if only turbine missiles generated as a result of overspeed were considered. Given that the generation of turbine missiles is not very sensitive to changes in control system reliability, the extension of the testing frequency for the high pressure turbine control valves does not significantly increase turbine missile damage frequencies and therefore does not result in a significant decrease in the margin of safety.

Additionally, based on engineering judgement, a slight improvement in safety will be realized by extending the high pressure turbine control valve testing interval. The decreased frequency of plant power changes and testing that could cause an inadvertent plant trip will result in less frequent challenges to safety related equipment.