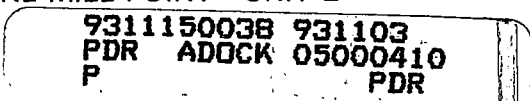


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INSTRUMENTATION

3/4.3.8

LIMITING CONDITIONS FOR OPERATION

THIS PAGE IS NOT USED

INSTRUMENTATION

BASES

MONITORING INSTRUMENTATION

3/4.3.7.8 LOOSE-PART DETECTION SYSTEM

The OPERABILITY of the loose-part detection system ensures that sufficient capability is available to detect loose metallic parts in the primary system and avoid or mitigate damage to primary system components. The allowable out-of-service times and surveillance requirements are consistent with the recommendations of RG 1.133, "Loose-Part Detection Program for the Primary System of Light-Water-Cooled Reactors," May 1981.

3/4.3.7.9 RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

The radioactive liquid effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in liquid effluents during actual or potential releases of liquid effluents. The alarm/Trip Setpoints for these instruments shall be calculated and adjusted in accordance with the methodology and parameters in the ODCM to ensure that the alarm/trip will occur before exceeding the limits of 10 CFR 20. The OPERABILITY and use of the instrumentation is consistent with the requirements of GDC 60, 63, and 64 of Appendix A to 10 CFR 50. The purpose of tank level indicating devices is to assure the detection and control of leaks that if not controlled could potentially result in the transport of radioactive materials to UNRESTRICTED AREAS.

3/4.3.7.10 RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

The radioactive gaseous effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in gaseous effluents during actual or potential releases of gaseous effluents. The alarm/Trip Setpoints for these instruments shall be calculated and adjusted in accordance with the methodology and parameters in the ODCM to ensure that the alarm/trip will occur before exceeding the limits of 10 CFR 20. The range of the noble gas is sufficiently large to envelope both normal and accident levels of noble gas recommendations of Regulatory Guide 1.97, "Instrumentation for Light Water Cooled Nuclear Power Plants to Assess Plant Conditions During and Following an Accident," December 1980 and NUREG-0737, "Clarification of the TMI Action Plan Requirements," November 1980. This instrumentation also includes provisions for monitoring and controlling the concentrations and potentially explosive gas mixtures in the offgas system. The OPERABILITY and use of this instrumentation is consistent with the requirements of GDC 60, 63, and 64 of Appendix A to 10 CFR 50.

3/4.3.8 DELETED

INSTRUMENTATION

BASES

3/4.3.9 PLANT SYSTEM ACTUATION INSTRUMENTATION

The plant systems actuation instrumentation is provided: (1) to initiate action of the feedwater system/main turbine trip system in the event of feedwater controller failure and (2) to ensure the proper operation of the service water system during normal and accident conditions. Specified surveillance intervals have been determined in accordance with GENE-770-06-1, "Bases for Changes to Surveillance Test Intervals and Allowed Out-Of-Service Times for Selected Instrumentation Technical Specification," as approved by the NRC and documented in the SER (letter to R. D. Binz IV from C. E. Rossi dated July 21, 1992). When a channel is placed in an inoperable status solely for performance of required surveillances, entry into LCO and required ACTIONS may be delayed, provided the associated function maintains Feedwater System/Main Turbine Trip System actuation capability.

ATTACHMENT B

NIAGARA MOHAWK POWER CORPORATION LICENSE NO. NPF-69 DOCKET NO. 50-410

SUPPORTING INFORMATION AND NO SIGNIFICANT HAZARDS CONSIDERATION ANALYSIS

Introduction

Niagara Mohawk Power Corporation (NMPC) hereby requests that License Condition 2.C.(4) set forth in the license and Section 3/4.3.8 of the Technical Specifications set forth in Appendix A to the license be amended. Section 3/4.3.8 describes the operability of the Turbine Overspeed Protection System and surveillance tests for turbine steam valves. License Condition 2.C.(4) requires that Niagara Mohawk submit for NRC approval a turbine system maintenance program based on the manufacturer's calculations of missile generation probabilities.

The surveillance tests set forth in Technical Specification 3/4.3.8 include weekly exercising of the Turbine Stop Valves (TSV), Turbine Control Valves (TCV), and Turbine Combined Stop and Intercept Valves (CIV). The purpose of this testing is to discover any valve malfunctions that could contribute to a turbine overspeed event causing turbine components to become high energy debris (missiles) capable of striking and damaging safety related equipment.

NUREG 0800, "The Standard Review Plan," and Regulatory Guide 1.115, "Protection Against Low-Trajectory Turbine Missiles," established a maximum acceptable probability of safety related component damage by a turbine missile at $1E-7$ events/year. This probability is a function of several other probabilities including turbine failure leading to ejection of a high energy missile, the fragment missile penetrating barriers and striking essential equipment, and resultant equipment failure. For turbine units favorably oriented like Nine Mile Point Unit 2 (NMP2), the NRC staff has fixed the probability for missile penetration and equipment damage at $1E-3$ events/year, leaving the probability of turbine missile ejection (turbine reliability) as the primary variable (NUREG 1048, Supplement 6, Appendix U, "Probability of Missile Generation of General Electric Nuclear Turbines").

The methodology for calculating the turbine missile damage probability is described in General Electric Company (GE) proprietary report "Probability of Missile Generation in General Electric Nuclear Turbines," and was evaluated by the Staff in NUREG 1048, Supplement 6, Appendix U. The GE missile report also serves as the basis for the NMP2 turbine system maintenance program, which was approved by the Commission in a letter dated March 15, 1990, and provided in Section 10.2.3.6 NMP2 FSAR. Approval of the turbine system maintenance program satisfied Nine Mile Point Unit 2 License (NPF-69) Condition 2.C.(4).

Turbine missile ejection probability is affected by valve testing frequency and rotor condition, as well as other factors that could contribute to an overspeed event. Overspeed events could result from multiple failures of the normal and abnormal overspeed protection including the Electrohydraulic Control (EHC) system, the emergency overspeed trip (mechanical) at 110% of rated speed, and the backup emergency overspeed trip (electrical) at 112% of rated speed.

Proper functioning of one of the overspeed protection systems will rapidly close the Turbine Stop Valves, Turbine Control Valves and Turbine Combined Stop and Intercept Valves to prevent an overspeed event. A failure of one steam valve to close will not result in an overspeed event. With more than one steam valve failing to close, in conjunction with a generator load rejection, an overspeed condition could exist. In this situation, the Turbine Overspeed Protection System would function to prevent the event, but does not function to mitigate the consequences of the event.

The Turbine Overspeed Protection System specification was not included in NUREG 1434, "Standard Technical Specifications General Electric Plants, BWR/6." This instrumentation did not meet the criteria of providing indication of the reactor coolant pressure boundary integrity, providing an initial condition or a primary success path of a design basis accident or transient leading to fuel failures, nor being a structure that has been shown to be significant to public health and safety. Also, NUREG-1366, "Improvements to Technical Specifications Surveillance Requirements" dated December 1992 recommends technical specification changes now rather than waiting for the implementation of the new Standard Technical Specifications. The NUREG-1366 study reports that turbine valve testing is a significant contributor to reactor trips.

The NMP2 Turbine Overspeed Protection System is tested in accordance with the manufacturer's recommendations. The frequency of testing is based on calculations of turbine reliability, redundant instrumentation, favorable turbine orientation and the overall probability of a damaging turbine missile which is below the criteria of NUREG 0800, Reg. Guide 1.115, and NUREG 1048, Supplement 6, Appendix U.

Consistent with these factors, the NRC has approved Amendment 71 to Facility Operating License No. NPF-43 for the Fermi-2 Atomic Power Plant, and Amendment 60 to Facility Operating License NPF-62 for the Clinton Power Station Unit 1. Both amendments delete Specification 3/4 3.8, "Turbine Overspeed Protection System". These amendments were approved by letters dated July 23, 1991, and October 9, 1991, respectively, based upon:

- 1) multiple overspeed protection,
- 2) a favorable turbine orientation and a low acceptable risk for turbine missile damage to safety-related equipment ($< 1E-7$ /year),
- 3) testing and inspection frequencies that can be optimized in accordance with manufacturer's recommendations, and

- 4) a satisfactorily maintenance and test history of the turbine steam supply valves which must be functional to ensure the Turbine Overspeed Protection System is operable.

Niagara Mohawk implements testing and inspection frequencies in accordance with manufacturer's recommendations. An example of implementing manufacturer's recommendations is as follows.

Ultrasonic testing of low pressure turbine rotors B and C (LPB and LPC) during the Refuel Outage 2 (RO2) revealed cracks in the sixth stage (L-1 stage) wheels on the turbine end of the rotors. The exact size of these cracks could not be established by ultrasonic testing. GE (turbine vendor) established that these "unmeasurable" cracks could vary in size from 0.00" to 0.55" with an average value of 0.25".

Although the NMP2 turbine rotors met the NRC criteria from the standpoint of unacceptable damage from turbine missiles, there was a risk of wheel burst because the assigned crack size of 0.25" exceeded the critical crack size of 0.22" for the wheel material. GE recommended removal of the sixth stage wheels on rotors B and C, establishing turbine pre-warming as a prerequisite to starting the machine, and inspecting rotor LPA during Refuel Outage 3 (RO3) (rotor LPA had better material properties than LPB and LPC).

Implementing the above recommendations demonstrated Niagara Mohawk's commitment to keep turbine missile damage probabilities acceptably low by implementing manufacturer's test and inspection requirements.

In fact, removal of the sixth stage wheels, based on vendor (GE) recommendations was considered prudent by NMPC although a separate evaluation (performed by NDE/Fracture Mechanics Analysis) indicated these wheels to be acceptable for continued service for at least one additional cycle.

Niagara Mohawk herein applies to delete Technical Specification 3/4.3.8. With approval, the current requirements for weekly steam valve testing will be relocated to Section 10.2.2.2 "Turbine Overspeed Protection" of the Updated Safety Analysis Report (USAR) with the provision that any change in turbine steam valve test intervals must be implemented in accordance with the manufacturer's plant specific recommendations including calculations of turbine missile damage probability.

General Electric (GE), in cooperation with the Boiling Water Reactor Owners' Group (BWROG), is re-evaluating the turbine steam valve surveillance test intervals recommended in Technical Information Letter (TIL) 969. GE is using the methodology approved in NUREG 1048, Supplement 6, Appendix U, but factoring in more recent nuclear power plant turbine steam valve reliability and maintenance data. The GE Turbine Report is scheduled for submittal to the NRC by Fall 1993. Assuming NRC review and approval, a TIL 969 revision specifying recommendations for turbine steam valve surveillance test intervals is expected to be issued to applicable plants.

Description of Change

Niagara Mohawk hereby proposes that Section 3/4.3.8, "Turbine Overspeed Protection System" be deleted in its entirety and License Condition 2.C.(4) be updated to indicate satisfactorily completion of the license condition.

Evaluation

The NMP2 turbine generator has several sets of steam valves to control turbine speed during normal operation, and protect it from overspeed during abnormal operations. These valves are high pressure Turbine Control Valves (TCV), high pressure Turbine Stop Valves (TSV), and Turbine Combined Stop and Intercept Valves (CIV) all of which are controlled during normal operation by the Electrohydraulic Control (EHC) System.

The Turbine Overspeed Protection System consists of separate mechanical and electrical sensing mechanisms capable of initiating fast closure of the same steam valves during abnormal conditions. A mechanical trip device serves as an overspeed trip mechanism at 110% of rated speed, while an electrical trip device, called the backup overspeed trip, provides additional overspeed protection at 112% of rated speed. The backup overspeed trip also provides a way to test the overspeed trips during operation while maintaining at least one redundant overspeed trip device in service.

The NMP2 Technical Specifications, in Section 3/4.3.8, currently prescribe operability and surveillance requirements for the steam valves to ensure operability of their overspeed protection function. The purpose of the overspeed protection is to minimize the possible generation of turbine fragment missiles.

A favorable turbine orientation as it exists at NMP2, with the center of the reactor building placed on a line extended through the longest axis of the turbine generator, minimizes the possible impact of a turbine fragment on safety related equipment.

In addition to redundant overspeed protection and favorable turbine orientation, turbine missile probability is further suppressed by preventative maintenance, testing, and inspections. These maintenance, testing, and inspection activities are procedurally controlled and conducted in accordance with an approved turbine system maintenance program based upon the manufacturer's recommendations.

Based upon the above, Niagara Mohawk hereby proposes deletion of the Turbine Overspeed Protection System Technical Specification.

The NMP2 Updated Safety Analysis Report (USAR), in Section 3.5.1.3, analyzed the probability of turbine missile damage to safety related components. Considered in the analysis is the turbine orientation and the potential generation of low and high trajectory missiles. Turbine missile damage probability was based on the probabilities of missile generation, the turbine missile striking a barrier, and the missile penetrating a barrier. In NUREG 1047, "Safety Evaluation Related to the Operation of the Nine Mile Point Nuclear Station, Unit 2," the Staff concluded that this turbine missile damage overall probability was

indeed less than one in ten million each year ($< 1E-7/\text{year}$), but nevertheless, required Niagara Mohawk to develop and submit a turbine system maintenance program based upon manufacturer's recommendations by October 31, 1989.

By letter dated March 15, 1990, the Commission approved the Nine Mile Point Nuclear Station Unit 2 Turbine Maintenance System Program (License Condition 2.C.(4) commitment) based upon the GE proprietary report "Probability of Missile Generation in General Electric Nuclear Turbines." This report had been reviewed by the NRC with findings documented in Appendix U to Supplement 6 of NUREG 1048. The NRC staff recommended a generic method to meet the criteria of NUREG 0800, "The Standard Review Plan," and RG 1.115 "Protection Against Low-Trajectory Turbine Missiles," for an acceptable risk from the turbine missile event.

The turbine steam valve surveillance test requirements based on manufacturer's recommendations will be contained in Section 10.2.2.2 of the USAR and will establish controls comparable to the surveillance requirements in the Technical Specifications (TS). Further, the NMP2 procedures which implement the program and direct the testing of the steam valves are controlled documents and any deviations from the USAR are controlled by the NMP2 10CFR50.59 program.

Relocating the TS requirement for overspeed protection will appropriately allow Niagara Mohawk to perform testing and inspections of the system at frequencies based upon the manufacturer's recommendations and operational experience. Following current manufacturer recommendations will assure unnecessary challenges to plant safety equipment and to personnel, are minimized.

Also, the maintenance and test history of the TCVs, TSVs, and CIVs to this point has yielded good results, as predicted.

Stress corrosion cracking was observed and evaluated on two low pressure turbine rotors during Refuel Outage 2 (R02) during implementation of our turbine system maintenance program. The resulting corrective actions were based on the manufacturer's recommendations and calculations of missile generation probabilities (using the approved methodology of NUREG 1048, Supplement 6, Appendix U). The corrective actions included implementing turbine pre-warming prior to each start of the machine, and removing the affected buckets and wheels from the two rotors. These corrective actions maintained a six year rotor inspection interval for two low pressure rotors and the turbine missile damage overall probability below the criteria of NUREG 0800 and Reg. Guide 1.115.

Implementing these corrective actions demonstrated Niagara Mohawk Power Corporation's commitment to implementing the manufacturer's recommendations regarding testing and inspections to keep turbine missile damage overall probabilities acceptably low.

Conclusion

Niagara Mohawk's approved turbine system maintenance program, applicable implementing procedures, and periodic turbine steam valve surveillance test requirements that will be

described in the USAR are sufficient controls to ensure that the overall probability of a turbine missile disrupting the operation of safety related equipment remains below the regulatory threshold described in NUREG 0800, Reg. Guide 1.115, and NUREG 1048, Supplement 6, Appendix U. The favorable orientation, redundant overspeed protection, preventative maintenance, including testing and inspection per manufacturer's recommendations, and unapplicability in NUREG-1434, "Standard Technical Specifications General Electric Plants, BWR/6" led the Staff to conclude that Section 3/4.3.8, "Turbine Overspeed Protection System", can be deleted from Facility Operating Licenses NPF-43 and NPF-62. Furthermore, NUREG-1366, "Improvements to Technical Specification Surveillance Requirements" recommends implementing this change now rather than waiting for implementation of the new Technical Standard Specifications. Accordingly, Niagara Mohawk proposes to amend the Technical Specifications for Nine Mile Point Unit 2 by deleting Section 3/4.3.8, "Turbine Overspeed Protection System."

In summary, Niagara Mohawk's petition for deletion of TS 3/4.3.8 is based upon:

- 1) Turbine protection from excessive overspeed by multiple systems;
- 2) Favorable orientation and a low probability of missile ejection that yield a very low probability of damage to safety related equipment, certainly less than NUREG 0800 value of acceptable risk;
- 3) Optimization of testing and inspection frequencies in accordance with manufacturer's recommendations; and
- 4) A satisfactorily maintenance and test history of the steam valves, and recommended manufacturer's corrective actions following rotor inspections have been implemented to ensure the calculations of missile generation and overall damage probabilities remain below the NUREG 0800 and RG 1.115 values.

Accordingly, we conclude that there is reasonable assurance that approval of the proposed change, deleting TS 3/4.3.8, "Turbine Overspeed Protection System" and updating License Condition 2.C.(4) will not endanger the public health and safety.

No Significant Hazards Considerations Analysis

10 CFR 50.91 requires that at the time a licensee requests an amendment, it must provide to the Commission its analysis, using the standards in Section 50.92, about the issue of no significant hazards consideration. Therefore, in accordance with 10 CFR 50.92, the following analysis has been performed:

The operation of Nine Mile Point Unit 2, in accordance with the proposed amendment, will not involve a significant increase in the probability or consequences of an accident previously evaluated.

With the approval of this Amendment, preventative maintenance, testing, and inspections of the Turbine Overspeed Protection System will remain governed by an approved turbine system maintenance program, described in the USAR. To maintain turbine system reliability, controlled procedures are in place implementing manufacturer's recommendations. In evaluating the turbine system maintenance program (NRC approved by letter dated March 15, 1990 which satisfied License Condition 2.C.(4)) the Staff found the overall probability of generating a turbine missile at Nine Mile Point Unit 2 to be less than one in ten thousand ($< 1E-4$) events per year. This probability, when combined with a $1E-3$ probability (NUREG 1048, Supplement 6, Appendix U) for missile impact and essential system damage, yields an overall probability of less than one in ten million ($< 1E-7$) events per year. Less than one in ten million ($< 1E-7$) events per year is an acceptably low probability according to the criteria of NUREG 0800 and agrees with the initial staff finding in NUREG 1048. Consequently, the probability of a previously evaluated turbine missile accident will not increase.

The purpose of the Turbine Overspeed Protection System is prevention of an overspeed event, the precursor to a potential turbine fragment missile. Since the purpose of this system is preventative, it serves no function to mitigate any accident previously evaluated and thus does not affect the consequences of any analyzed accident.

Updating License Condition 2.C.(4) is administrative in nature and does not involve a significant increase in the probability or consequences of an accident previously evaluated.

Accordingly, the proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated.

The operation of Nine Mile Point Unit 2, in accordance with the proposed amendment, will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Accidents which include rapid Turbine Stop Valve closure as a response to some initiating event are not relevant to this discussion since in those instances the valves respond as designed.

The relevant accident resulting from a failure of the Turbine Overspeed Protection System is a turbine fragment missile as evaluated in Section 3.5.1.3 of the Nine Mile Point Unit 2 Updated Safety Analysis Report. Approval of this amendment would not change the operational characteristics of surveillance tests and would impose no new testing requirements, but rather relocate testing requirements from Technical Specifications to the USAR. Updating License Condition 2.C.(4) is administrative in nature and does not alter intent of any requirements. Therefore, approval of this amendment to delete Specification 3/4.3.8 and to update the License Condition 2.C.(4) signifying NRC approval would not create the possibility of a new or different kind of accident from the turbine missile accident previously evaluated.

The operation of Nine Mile Point Unit 2, in accordance with the proposed amendment, will not involve a significant reduction in a margin of safety.

With the approval of this Amendment, Niagara Mohawk remains committed to the manufacturer's turbine reliability program. This turbine reliability program calculates the same maximum permissible probability for generation of a turbine missile as previously evaluated. This turbine missile generation probability, when combined with a favorable turbine orientation, results in the same, acceptably low, overall probability of turbine missile damage to essential systems and does not involve a reduction in the margin of safety.

Further, the approval of this Amendment will allow Niagara Mohawk to optimize the performance of testing and inspections in accordance with the manufacturer's recommendations and operational experience. Implementing the manufacturer's recommendations may lead to a reduced frequency of certain steam valve surveillance tests and a corresponding reduced probability of challenges to plant equipment and personnel, thereby enhancing the margin of safety. Updating License Condition 2.C.(4) is administrative in nature and does not alter intent of any requirements.

The deletion of Technical Specification 3/4.3.8 and associated bases and an update signifying satisfaction of the License Condition 2.C.(4) will not, therefore, decrease the margin of safety.