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DTE Energy

10 CFR 50.90

September 16, 2004
NRC-04-0049

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington D C 20555-0001

Reference: Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43

Subject: Proposed License Amendment Request to Revise Technical Specification Surveillance Requirement (SR) 3.7.6.1 for Turbine Bypass Valve Cycling

Pursuant to 10 CFR 50.90, Detroit Edison hereby proposes to amend the Fermi 2 Plant Operating License, Appendix A, Technical Specifications (TS) to revise the scope and the frequency of Surveillance Requirement (SR) 3.7.6.1 for verification of one complete cycle of each turbine bypass valve (TBV).

The proposed change to SR 3.7.6.1 will allow a 5% stroke rather than a complete (100%) stroke of each TBV, and will extend the surveillance frequency from 92 days to 120 days. The complete stroke verification currently required by SR 3.7.6.1 once after each entry into MODE 4 will be retained and renumbered SR 3.7.6.2. The system functional test (current SR 3.7.6.2) and the TBV response time test (current SR 3.7.6.3) will be renumbered SRs 3.7.6.3 and 3.7.6.4, respectively.

The Fermi 2 TBVs are unique in that they are the largest of the Boiling Water Reactor TBVs and they were manufactured by Alstom. The only other plants

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utilizing Alstom TBVs are the Ringhals units in Sweden. This change from full stroke testing to 5% open testing is consistent with the similar online surveillance testing performed for the Ringhals TBVs.

Enclosure 1 provides an evaluation of the proposed license amendment, including an analysis of the issue of significant hazards consideration using the standards of 10 CFR 50.92. Enclosure 2 provides a marked-up page of the existing TS to show the proposed changes. Enclosure 3 provides a typed version of the affected TS page with the proposed changes incorporated. Enclosure 4 provides a copy of the TS Bases page affected by this change, for your information.

Detroit Edison has reviewed the proposed change against the criteria of 10 CFR 51.22 for environmental considerations. The proposed change does not involve a significant hazards consideration, nor does it significantly change the types or significantly increase the amounts of effluents that may be released offsite. The proposed change does not significantly increase individual or cumulative occupational radiation exposures. Based on the foregoing, Detroit Edison concludes that the proposed change meets the criteria provided in 10 CFR 51.22(c)(9) for a categorical exclusion from the requirements for an Environmental Impact Statement or an Environmental Assessment.

Detroit Edison requests NRC approval of this license amendment by February 25, 2005, with an implementation period of within 30 days following NRC approval, in order to minimize the number of future performances of the original full open surveillance while at power.

Should you have any questions or require additional information, please contact Mr. Norman K. Peterson of my staff at (734) 586-4258.

Sincerely,

William J. O'Connor

Enclosures

cc: D. P. Beaulieu
E. R. Duncan
NRC Resident Office
Regional Administrator, Region III
Supervisor, Electric Operators,
Michigan Public Service Commission

I, WILLIAM T. O'CONNOR, JR., do hereby affirm that the foregoing statements are based on facts and circumstances which are true and accurate to the best of my knowledge and belief.

WILLIAM T. O'CONNOR, JR.
Vice President - Nuclear Generation

On this 16th day of September, 2004 before me personally appeared William T. O'Connor, Jr., being first duly sworn and says that he executed the foregoing as his free act and deed.

Notary Public

NORMAN K. PETERSON
NOTARY PUBLIC MONROE CO., MI
MY COMMISSION EXPIRES Jul 24, 2006

ENCLOSURE 1
to NRC-04-0049

REQUEST TO REVISE TECHNICAL SPECIFICATION SURVEILLANCE REQUIREMENT 3.7.6.1 AND ITS FREQUENCY

Evaluation of the Proposed License Amendment Request

Proposed Change to Technical Specification Surveillance Requirement 3.7.6.1

1.0 Description

The proposed change will revise the scope and the frequency of Surveillance Requirement (SR) 3.7.6.1 for verification of one complete cycle of each turbine bypass valve (TBV) every 92 days. The proposed change to SR 3.7.6.1 will allow a 5% stroke rather than a complete (100%) stroke of each TBV, and will extend the surveillance frequency from 92 days to 120 days. The complete stroke verification currently required by SR 3.7.6.1 once after each entry into MODE 4 will be retained and renumbered SR 3.7.6.2. The system functional test (current SR 3.7.6.2) and the TBV response time test (current SR 3.7.6.3) will be renumbered SRs 3.7.6.3 and 3.7.6.4, respectively.

The change in valve stroke from full open to 5% open will minimize the secondary plant transients that Fermi Unit 2 currently experiences when the valves are fully cycled for this test during power operation, and will minimize wear on the valves and the condenser internals resulting from the significant amount of steam bypassed directly to the condenser by these large valves. The Frequency change from 92 days to 120 days will allow TBV testing to be performed coincident with control rod pattern adjustments and the Technical Specification (TS) required control rod scram time testing, and will thus minimize the number of down-power evolutions necessary each cycle to perform these required activities.

Detroit Edison requests NRC approval of this license amendment by February 25, 2005, with an implementation period of within 30 days following NRC approval, in order to minimize the number of future performances of the original full open surveillance while at power.

2.0 Proposed Change

The proposed change to SR 3.7.6.1 will allow a 5% stroke rather than a complete (100%) stroke of each TBV, and will extend the surveillance frequency from 92 days to 120 days. The complete stroke verification currently required by SR 3.7.6.1 once after each entry into MODE 4 will be retained and renumbered SR 3.7.6.2. The system functional test (current SR 3.7.6.2) and the TBV response time test (current SR 3.7.6.3) will be renumbered SRs 3.7.6.3 and 3.7.6.4, respectively. The Technical Specification Bases will be revised to reflect these changes as shown in Enclosure 4.

The Fermi 2 TBVs are unique in that they are the largest of the Boiling Water Reactor TBVs (12.5% steam bypass each) and they were manufactured by Alstom in England. The only other plants utilizing similar Alstom TBVs are the Ringhals units in Sweden. This change from full stroke testing to 5% open testing is consistent with the online surveillance testing performed for the Ringhals TBVs.

3.0 Background

The Main Turbine Bypass System (MTBS) and the moisture separator reheater (MSR) are designed to control steam pressure when reactor steam generation exceeds turbine requirements during unit startups, sudden load reductions, and cool down evolutions. They allow excess steam flow from the reactor to pass to the condenser without first going through the turbine. The combined bypass capacity of the active MTBS and the passive MSR is approximately 33% of the Nuclear Steam Supply System (NSSS) rated steam flow. Sudden load reductions within the capacity of the MTBS and the MSR can be accommodated without reactor scram.

The MTBS consists of two large 18-inch (pipe inlet connection) globe-type turbine bypass valves (TBVs) connected to the 52-inch steam manifold, which is located between the main steam isolation valves and the turbine stop valves. Each of these valves is operated by a separate hydraulic unitized actuator and is capable of passing approximately 12.5% of the rated steam flow from the reactor to the condenser. The TBVs are controlled by the Main Turbine Pressure Regulator Control System. They are normally closed, with the Main Turbine Pressure Regulator Control System directing all steam flow through the turbine control valves and on to the turbine. If steam flow restriction occurs, either through turbine speed control or the load limiter, the Main Turbine Pressure Regulator Control System controls system pressure by opening the TBVs. With the TBVs open, steam flows from the 52-inch manifold through connecting piping directly to the condenser. The reheating steam flowpath to the MSR (52 inch manifold) provides an additional, passive steam flow capacity of approximately 8% of rated steam flow to mitigate a rapid pressure increase (e.g., from a turbine generator trip event).

The MTBS and MSR are assumed to function during pressurization transients, as discussed in the UFSAR, Chapter 15. Reactor vessel pressure increase and minimum critical power ratio (MCPR) decrease during such an event, are mitigated by TBV opening and MSR steamflow. An inoperable MTBS and/or MSR results in the need to impose more restrictive MCPR operating limits, as specified in the Core Operating Limits Report (COLR).

The Technical Specifications (TS) ensure operability of the MTBS through Surveillance Requirements (SR) 3.7.6.1, a simple valve stroke to demonstrate mechanical freedom of movement; SR 3.7.6.2, a check of the system response to an actuation signal (System Functional Test); and SR 3.7.6.3, a check of the system's response time (Response Time Test). Limiting Condition for Operation (LCO) 3.7.6 allows continued plant operation in the event of an inoperable MTBS (either one or both TBVs inoperable) provided the more restrictive MCPR limit is applied. These SRs and LCOs are based on those in the NRC Improved Standard Technical Specifications (NUREG 1433).

The system functional test (current SR 3.7.6.2) and the response time test (current SR 3.7.6.3) are performed once every 18 months with the plant shut down. The system functional test demonstrates that, with the required initiation signals, the valves will actuate to their required positions, while the response time test ensures that this valve actuation occurs within a rate bounded by the assumptions in the appropriate safety analyses. The 18-month frequency is based on the need to perform these surveillances under shutdown conditions because of the potential for an unplanned transient if the surveillance is performed with the reactor at power. Operating experience has shown that this 18-month frequency is acceptable from a reliability standpoint. These SRs remain unaffected by this proposed change

The valve stroke test (SR 3.7.6.1), requires that each of the TBVs be tested through one complete cycle (closed to 100% open to closed) every 92 days and once after each entry into Mode 4. This is performed utilizing the unitized actuators at a reduced system hydraulic pressure of approximately 300 to 325 psi, whereas SRs 3.7.6.2 and 3.7.6.3 are conducted at full hydraulic system pressure of approximately 1,500 psi. Cycling each main turbine bypass valve through one complete cycle of full travel is not a test of the system hydraulics per se, but is intended to demonstrate that the valves are mechanically operable and that they will function when required. Surveillance Procedure 24.109.02, "Turbine Bypass Valve Operability Test," provides the procedural guidance for performing the mechanical operability testing of the valves.

Heater Drains System Description

The purpose of the Heater Drains System is to control Feedwater Heater (FWH) and Moisture Separator Reheater (MSR) drain flow to maximize overall plant efficiency. The Feedwater Heaters (FWH) are divided into 2 distinctly different sections, the high pressure extraction steam and heater drains section, and the low pressure extraction steam and heater drains section. The high pressure drain system (also known as the pump forward system) is the one that is affected by this transient. The pump forward system is in use above approximately 65% reactor power.

Feedwater Heaters 5 North and 5 South (FWH 5N(S)) receive influent from the high pressure turbine exhaust, the MSR shell side drains, the 6N(S) extraction steam drains, and several other smaller inputs. The effluent from FWH 5N(S) is routed to the Heater Drain Pump Flash Tanks, which provide the necessary net positive suction head (NPSH) for the Heater Drain Pumps.

Instrumented check valves N22F026A (B) are located in the drain lines between FWH 5N(S), and the flash tanks. Each check valve has two limit switches that detect either massive flashing in the flash tanks, or a no-flow condition in the drain line between FWH 5N(S) and the flash tanks. These limit switches initiate a reactor recirculation pump run back to approximately 60% core flow upon sensing an impending loss of the heater drain pumps at reactor power levels above 65%.

During the performance of Surveillance Procedure 24.109.02, the full stroke operation of the TBVs causes a reduction in extraction steam flow to FWH 5N(S). This drop in extraction steam flow produces a corresponding drop in FWH 5N(S) shell pressure. FWH 5N(S) are designed as de-aerating heaters with no drain cooling. Because these heaters operate close to saturation conditions, the reduction in shell pressure causes the heater drains from the 5N(S) FWH to the flash tank to flash to steam. This flashing provides an erroneous level signal to the FWH 5N(S) level control valve N22F415A(B), resulting in erroneous signals to the heater's respective normal and emergency drain line valves. The flashing initiates oscillations in the heaters, which ultimately leads to the closure of check valves N22F026A(B), a loss of heater drains alarm, and, if above 65% reactor power, a reactor recirculation pump run back to approximately 60% core flow.

Main Turbine Bypass Valve Configuration

The TBV unitized actuator configuration consists of a number of inter-linked components that produce controlled valve movement. The unitized actuator hydraulic servo ram is linked to a horizontal rod, which is connected to the vertical arm of an 'L' shaped lever crank, which is pivoted at a fulcrum pin on the lever housing. The midpoint of the vertical arm of the lever crank is connected to a horizontal closing spring spindle. The horizontal arm of the lever crank is connected to a vertical spindle which connects to the valve head.

Hydraulic pressure in the servo ram pushes the vertical arm of the lever crank in a horizontal direction, compressing the closing spring and lifting the horizontal arm of the lever crank such that the valve opens.

Unitized actuator hydraulic system pressure is approximately 2,200 psi. The valve closing spring loading, with the valve closed is approximately 19,250 pounds (manufacturers data). With the TBV in the closed position, and 970 psi steam at the 52 inch manifold, the closing steam force on the valve head is approximately 60,000 pounds. When the valve opens, the closing force reverses, to assist in opening the valve, with a force of approximately 9,300 pounds (calculation based on valve head /spindle diameter/s).

The geometry of the lever crank is such that the ratio of the vertical/horizontal arms is 2.5 to 1. When moments are applied about the fulcrum point, the calculated force necessary to open the valve is approximately 33,600 pounds, which corresponds to a servo ram pressure of approximately 940 psi. When the valve is opened 5%, neglecting the small increase in spring force, the servo ram pressure necessary to maintain the valve open is less than 300 psi. With a spring compression of 2.3 inches, and an estimated spring rate of 1,500 pounds/inch, the required hydraulic pressure necessary to maintain the valve in the fully open position increases to approximately 325 psi.

In summary, the greatest unitized actuator hydraulic force and, therefore, servo valve positioning force, is needed to lift the TBVs off of their closed seat. Once the TBVs are open under servo control, the hydraulic forces required to open them fully are greatly reduced and do not significantly change over the entire range of movement.

Historical Perspective of Surveillance 24.109.02

Performance of Surveillance Procedure 24.109.02, "Turbine Bypass Valve Operability Test," has historically proven challenging to plant operators as well as affecting severe transients in the Heater Drains System. Since 1994, Surveillance Procedure 24.109.02 has been performed sixty times. Twenty-three of these sixty surveillance tests were performed with the plant in MODE 1 and with the Heater Drains System "pumping forward". The Heater Drains System was perturbed in twenty-one of these twenty-three tests to an extent that a loss of the Heater Drains System occurred; and in two cases, resulted in recirculation pump runbacks to below 65% reactor coolant flow. Other consequences of performing this surveillance have been feedwater level transients, some resulting in extraction steam isolations.

4.0 Technical Analysis

The proposed change to SR 3.7.6.1 will allow a 5% stroke rather than a complete (100%) stroke of each TBV, and will extend the surveillance frequency from 92 days to 120 days. The complete stroke verification currently required by SR 3.7.6.1 once after each entry into MODE 4 will be retained and renumbered SR 3.7.6.2. The system functional test (current SR 3.7.6.2) and the TBV response time test (current SR 3.7.6.3) will be renumbered SRs 3.7.6.3 and 3.7.6.4, respectively.

The turbine bypass valves should operate as designed, provided the following three primary elements are met:

1) The control circuitry that provides the signal to the valves to fast open must function as designed.
2) Sufficient oil pressure to open the valves must be available.
3) The valves and the actuator linkages must be mechanically sound and free to operate.

The system functional test (current SR 3.7.6.2) and the response time test (current SR 3.7.6.3), performed once every 18 months with the plant shut down, ensure that requirements 1 and 2 are met. SR 3.7.6.1 is intended to verify the third requirement; that the valves are mechanically operable and will function when required.

Fermi's TBVs have historically performed well during the surveillance testing. In a review of all past performances of surveillance procedure 24.109.02, the surveillance has been successfully completed each time with only two exceptions. The first occurred during the Fall 1989 refueling outage rebuild of the valve when a longer stem was installed in the East TBV. The setup required to mate the valve to its associated valve actuator was not properly performed, resulting in the linkages being skewed out of their normal positions. When the valve was stroked open, the linkages moved such that they contacted a mechanical stop at approximately 88% open. No post maintenance testing was conducted (see Notice of Violation 50-341/90-007-01) following this rebuild, and this problem was not identified until reactor startup when the valve opened only 88% during performance of surveillance procedure 24.109.002. In the other instance, on November 18, 1994, the East TBV failed to open during testing following plant maintenance on the valve's unitized actuator. This surveillance test was being used as post maintenance testing (PMT) following maintenance on the East TBV unitized actuator. The cause of the valve's failure to operate was a loose pump discharge line on the unitized actuator, which was a direct result of the maintenance activity on the unitized actuator. The PMT was successful in identifying the workmanship issue. Upon rework of the line, the PMT/surveillance was completed successfully.

In conclusion, there have been no freedom of movement or mechanical linkage issues associated with these valves in the history of the plant, other than those that were a direct result of maintenance. Post maintenance testing has improved over the years, as is evident in the second situation, and is now conducted in such a manner that maintenance issues are caught immediately and rectified.

While a partial stroke would continue to show that the valves are mechanically free to operate through the more critical areas of operation (i.e., coming off the shut seat) it would not verify free movement through the valve's entire range. Therefore, to assess the impact on valve reliability of a partial stroke test at the increased interval, Alstom, the valve's original equipment manufacturer was contracted to establish and compare the probabilities of the TBVs failing to full open on demand as a result of the proposed changes to the testing requirements.

Alstom's assessment computed failure probabilities of the TBVs to fast open on demand for several different testing combinations by analyzing individual component faults and possible combinations of such faults.

Each TBV and its associated unitized actuator comprises a number of subgroups and discrete components. The bypass valve and unitized actuator subgroups are as follows:

1) The valve and actuation subgroup consists of the components which enable steam to be bypassed from the live steam header to the condenser. This subgroup is comprised of the steam valve, the servo cylinder and the accumulators.
2) The oil supply subgroup consists of the components which must be operating correctly to provide the hydraulic oil supply to open the bypass valve. This subgroup is comprised of the motor power supply, motor, pump, unloading valve, relief valve, filter, dump solenoid, depressurization solenoid and a pressure switch which continuously monitors the oil supply system for low oil pressure.
3) The control subgroup consists of the components which must be operating correctly to permit a fast open of the bypass valve to be initiated. This subgroup comprises the fast open solenoid, fast open valve, servo valve and electronic governor.

For each component a specific mode of failure, which will affect the ability of the valve to fast open, was identified and an appropriate failure rate was assigned. The failure rate values used in the study, came from generic failure rate data taken from published external and internal sources, de-rated for service conditions, and from Alstom generated failure rate data for safety critical turbine control and protection components based on generic data amended using field data from actual components. The failure modes and assigned failure rates for those components are as follows:

Valve and actuation subgroup

Component	Mode of Failure	Failure Rate (per month)
Steam valve	Full or partial seizure due to mechanical failure or accumulation of deposits or debris from steam system. Based on a 100% stroke on-load test.	7.5×10^{-4}
Steam valve	As above but with failure rate increased by a factor of 2 to reflect the use of a 5% stroke on-load test	1.5×10^{-3}
Hydraulic cylinder	Full or partial seizure due to mechanical failure or accumulation of deposits or debris from hydraulic system.	7.0×10^{-6}
Accumulator	Loss of nitrogen charge in bladder limits the bypass valve opening rate to the pump flow capacity. The accumulators are not exercised by the slow open test	4.2×10^{-3}

Oil supply subgroup

Component	Mode of Failure	Failure Rate (per month)
Motor	Failure of motor or coupling resulting in loss of drive to the pump.	5.8×10^{-3}
Pump	Failure to maintain hydraulic system pressure.	5.8×10^{-3}
Unloading valve	Failure in open position resulting in depressurization of hydraulic system.	2.6×10^{-3}
Relief valve	Failure in open position resulting in depressurization of hydraulic system.	2.6×10^{-3}
Filter	Partial blockage of filters resulting in low flow to downstream hydraulic system.	1.1×10^{-3}
De-pressurization solenoid valve	Excessive leakage or failure of depressurization solenoid valve results in depressurization of hydraulic system causing failure to open or closure of bypass valve.	1.5×10^{-4}
Dump solenoid valve	Valve spool moves to its "dump" position due to failure of solenoid coil or loss of electrical supply. Results in depressurization of hydraulic system causing failure to open or closure of bypass valve.	3.09×10^{-3}
Dump valve	Excessive leakage or failure of dump valve results in depressurization of hydraulic system causing failure to open or, if already open, closure of bypass valve.	1.5×10^{-4}
Pressure switch	Failure of pressure switch to detect depressurization of hydraulic circuit.	3.5×10^{-2}

Control subgroup

Component	Mode of Failure	Failure Rate (per month)
Fast open solenoid valve	Valve spool fails to move to "fast open" position on de-energizing solenoid coil due to mechanical seizure or accumulation of deposits in the hydraulic system. This solenoid valve is not exercised by the slow open test.	8.5×10^{-3}
Fast open valve	Valve fails to move to fast open position in response to oil signal due to mechanical seizure or accumulation of deposits in the hydraulic system. This valve is not exercised by the slow open test.	1.5×10^{-3}
Servo valve	Valve spool fails to move to "open" position on energizing solenoid coil due to coil failure, mechanical seizure or accumulation of deposits from the hydraulic system. The bypass valve will fail to hold its "open" position on re-energizing the fast open solenoid valve by the turbine governor. The servo valve is exercised by the slow open test but not by the fast open test.	2.0×10^{-3}

Alstom's study evaluated several different testing conditions to assess the effects of revising the surveillance requirements on the valve failure probability. The case studies of interest are; (1) the current full stroke operational test performed every 92 days with the functional and response time tests performed every 18 months, and (2) the proposed partial (5%) stroke operational test performed every 120 days with functional and response time testing remaining unchanged, at 18 months.

The results of this sensitivity study showed that the increase in failure probability that one TBV would fail to fast open due to the proposed testing change is conservatively estimated to be 0.40 percent. This small increase of less than one half of one percent is due to the increase in the testing interval by one third (from 92 days to 120 days), and to an assumed doubling of the failure rate from 7.5 E-04 to 1.5 E-03 failures/month for the steam valves themselves. The doubling is based solely on engineering judgement, because no empirical data exists for this particular failure mode on these valves.

The Fermi 2 TBVs are fairly unique, with only Ringhals Units 1 and 2 in Sweden having similar Alstom steam bypass valves. The Ringhals TBVs are currently tested using a slow open test to 5 percent open every 3 months, combined with functional and time response testing every 18 months, similar to what we are proposing in this amendment request, with the exception that we are proposing to extend the frequency of the 5% slow open test from every 92 days (3 months) to every 120 days. Ringhals' TBV failure history as reported by Alstom is that, "there have been no technical failures or maintenance problems associated with bypass valve mechanical components." The Ringhals' units have been in operation since 1975. Fermi's surveillance history has also shown these valves to be extremely reliable, and all available data indicates that the proposed testing change will not alter this.

Ringhals' inspection and maintenance intervals for the bypass valves are nominally 20 years, whereas, Fermi currently performs periodic valve disassembly and inspection every 6 years. The sensitivity study performed by Alstom did not consider Fermi's more frequent maintenance and monitoring practices and their impact on valve reliability. This more frequent inspection and preventative maintenance scheduling, including the monitoring of unitized actuator oil repressurization times, provides Fermi with valuable data as to the relative health of the unitized actuator oil system and should provide early indication of potential problems within the system.

In conjunction with Technical Specification required surveillance testing, TBV system performance is maintained by a monitoring regime. Continuous monitoring of unitized actuator (UA) oil pressures, temperatures and levels, oil filter differential pressure, as well as power supply fault and valve misposition indication provides alarm annunciation in the Main Control Room to alert Operators to abnormal conditions. Shiftly walkdowns by Operations personnel and monthly walkdowns by the System Engineer of the TBV UAs, monitor the physical condition of accessible components such as hoses, fittings, linkages, etc. Quarterly monitoring of UA repressurization times provides trend data to evaluate UA oil pump performance.

Regularly scheduled maintenance is performed on the TBVs, their respective UAs and valve linkages to ensure continuing high reliability. Complete valve disassembly and inspection of valve internals and a detailed inspection of the valve linkage is performed every 4 refueling outages. TBV Unitized Actuators are changed out with rebuilt units every other outage. For those outages where the UA is not replaced, the oil pump motor, filter and strainer are replaced along with a draining and replacement of the oil. Valve position and control loops are calibrated every outage.

Post maintenance testing for the valve disassembly preventative maintenance involves performance of SRs 3.7.6.1, 3.7.6.2, and 3.7.6.3 (i.e., the valve operability surveillance, the functional test and the response time test). Position indication and valve control calibrations, as well as the UA replacements and/or maintenance utilize the valve operability test (SR 3.7.6.1) as post maintenance testing.

Therefore, the proposed change to S.R. 3.7.6.1 from full stroke testing to 5% stroke testing, and from 92 days to 120 days produces only a minimal increase in the failure probability of a TBV during each cycle, that is outweighed by the elimination of the adverse impacts of full stroke testing during power operation. The Alstom sensitivity study, combined with actual industry experience at Ringhals 1 and 2, show that a partial stroke test at 120 days in place of a complete cycle at 92 days will be sufficient to ensure that the valves remain mechanically operable throughout the operating cycle.

5.0 Regulatory Safety Analysis

No Significant Hazards Consideration

In accordance with 10 CFR 50.92, Detroit Edison has made a determination that the proposed amendment involves no significant hazards consideration. The proposed revision to the frequency of Technical Specification Surveillance Requirement (SR) 3.7.6.1, does not involve a significant hazards consideration for the following reasons:

1. The proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

The proposed change to Technical Specification Surveillance Requirement (SR) 3.7.6.1 will allow a 5% stroke rather than a complete (100%) stroke of each turbine bypass valve (TBV), and will extend the surveillance frequency from 92 days to 120 days. The requirement to verify one complete cycle of each TBV once after each entry into MODE 4 will be retained.

The proposed testing requirements will provide a level of assurance, equivalent to that which now exists, that the TBVs will remain operable throughout the operating cycle, and that they will be able to perform their intended safety function if called upon to do so. Additionally, the reduction in the potential for plant transients that can result from the current testing requirements, will more than offset the small increase (less than one half of one percent) in TBV failure probability per cycle with the proposed testing regime. Thus the proposed changes will not significantly increase the probability of an accident previously evaluated.

Fermi 2 is analyzed for the increase in reactor pressure transient events with the assumption that the Main Turbine Bypass System (MTBS) is out-of-service. Feedwater Controller Failure Upscale represents the most limiting event in this analytical category, and provides the basis for the Minimum Critical Power Ratio (MCPR) operating limits that are applicable when the MTBS is out of service. Because the proposed testing requirements do not alter the assumptions for any of the increase in pressure transient events, the radiological consequences of an accident previously evaluated are not increased.

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

2. The proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

The proposed change does not significantly affect the assumed performance of the TBVs, nor does it affect any other plant systems, structures, or components. In fact, these changes reduce the possibility of secondary plant transients and the potential for recirculation pump runbacks during the performance of this SR while at power. The proposed changes do not install any new plant equipment, nor is installed plant equipment being operated in a new or different manner. The proposed changes in test frequency and methodology will continue to ensure that the TBVs remain capable of performing their intended safety function. Therefore, this proposed change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed change does not involve a significant reduction in the margin of safety.

The proposed change will modify the scope and the frequency of the quarterly full stroke test of the TBVs. The operability requirements and functional characteristics of the TBVs remain unchanged. The proposed change to S.R. 3.7.6.1 from full stroke testing to 5% stroke testing, and from 92 days to 120 days has been evaluated to produce only a minimal increase in the failure probability of a TBV during each cycle (less than one half of one percent). This failure probability increase is outweighed by the reduction in the potential for plant transients resulting from full stroke testing during power operation. Both Alstom's sensitivity study, and actual industry experience at Ringhals Units 1 and 2 have shown that a partial stroke test will ensure that the valves remain mechanically operable throughout the operating cycle. The Alstom study further shows that a partial stroke test at 120 days, rather than at 92 days, will ensure that the valves remain mechanically operable throughout the operating cycle. Additionally, retaining the requirement to full stroke test each TBV once after each entry into MODE 4 will continue to verify that the valves are mechanically operable prior to their first use following each startup from MODE 4. The TBV response times are used in determining the effect on the MCPR. The surveillance test that ensures the MTBS meets the system's response time limits (SR 3.7.6.3) is not affected by these proposed changes and will continue to be performed at its current 18 month frequency. Therefore, this proposed change will not involve a significant reduction in a margin of safety.

Based on this analysis, Detroit Edison has determined that the proposed license amendment does not involve a significant hazards consideration.

6.0 Environmental Considerations

Detroit Edison has reviewed the proposed change against the criteria of 10 CFR 51.22 for environmental considerations. The proposed change does not involve a significant hazards consideration, nor does it significantly change the types or significantly increase the amounts of effluents that may be released offsite. The proposed change does not significantly increase individual or cumulative occupational radiation exposures. Based on the foregoing, Detroit Edison concludes that the proposed change meets the criteria provided in 10 CFR 51.22(c)(9) for a categorical exclusion from the requirements for an Environmental Impact Statement or an Environmental Assessment.

7.0 References:

1. "Enrico Fermi Bypass Valves On Load Test Study", RE 5360DSC5001, Alstom, June 2004

ENCLOSURE 2
to NRC-04-0049

REQUEST TO REVISE TECHNICAL SPECIFICATION SURVEILLANCE REQUIREMENT 3.7.6.1 AND ITS FREQUENCY

Marked-Up Page

3.7-17

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.6.1	Verify ~~one complete cycle of~~ each main turbine bypass valve~~s~~ opens at least 5%.	~~92~~ 120 days ~~AND~~
Add: SR 3.7.6.2	Verify one complete cycle of each main turbine bypass valve.	Once after each entry into MODE 4
SR 3.7.6.~~2~~ 3	Perform a system functional test.	18 months
SR 3.7.6.~~3~~ 4	Verify the TURBINE BYPASS SYSTEM RESPONSE TIME is within limits.	18 months

ENCLOSURE 3
to NRC-04-0049

REQUEST TO REVISE TECHNICAL SPECIFICATION SURVEILLANCE REQUIREMENT 3.7.6.1 AND ITS FREQUENCY

Typed Page

3.7-17

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.6.1	Verify each main turbine bypass valve opens at least 5%.	120 days
SR 3.7.6.2	Verify one complete cycle of each main turbine bypass valve.	Once after each entry into MODE 4
SR 3.7.6.3	Perform a system functional test.	18 months
SR 3.7.6.4	Verify the TURBINE BYPASS SYSTEM RESPONSE TIME is within limits.	18 months

ENCLOSURE 4
to NRC-04-0049

REQUEST TO REVISE TECHNICAL SPECIFICATION
SURVEILLANCE REQUIREMENT 3.7.6.1 AND ITS FREQUENCY

Bases Mark Up
(for information only)

B 3.7.6-3
B 3.7.6-4

BASES

ACTIONS (continued)

specified in the COLR, are not applied, the assumptions of the design basis transient analysis may not be met. Under such circumstances, prompt action should be taken to restore the Main Turbine Bypass System and Moisture Separator Reheater to OPERABLE status or adjust the MCPR limits accordingly. The 2 hour Completion Time is reasonable, based on the time to complete the Required Action and the low probability of an event occurring during this period requiring the Main Turbine Bypass System and/or Moisture Separator Reheater.

B.1

If the Main Turbine Bypass System and Moisture Separator Reheater cannot be restored to OPERABLE status or the MCPR limits for an inoperable Main Turbine Bypass System and/or Moisture Separator Reheater are not applied, THERMAL POWER must be reduced to < 25% RTP. As discussed in the Applicability section, operation at < 25% RTP results in sufficient margin to the required limits, and the Main Turbine Bypass System and Moisture Separator Reheater are not required to protect fuel integrity during rapid pressurization transients. The 4 hour Completion Time is reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.6.1 (and SR 3.7.6.2)

Cycling each main turbine bypass valve through ~~one complete cycle~~ (at least 5%) of full travel demonstrates that the valves are mechanically OPERABLE and will function when required. The ~~92~~ (120) day Frequency is based on engineering judgment, is consistent with the procedural controls governing valve operation, and ensures correct valve positions. Operating experience has shown that these components usually pass the SR when performed at the 92 day Frequency(, and a sensitivity study shows that they will pass the SR when performed at the 120 day Frequency). Therefore, the Frequency is acceptable from a reliability standpoint. ~~This~~ SR (3.7.6.2, which cycles each main turbine bypass valve through one complete cycle of full travel,) is ~~also~~ performed after each entry into MODE 4, since this will not affect operating conditions, and will provide added assurance of valve OPERABILITY.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.6.2 ← (3)

The Main Turbine Bypass System and Moisture Separator Reheater are required to actuate automatically to perform its design function. This SR demonstrates that, with the required system initiation signals, the valves will actuate to their required position. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and because of the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown the 18 month Frequency, which is based on the refueling cycle, is acceptable from a reliability standpoint.

SR 3.7.6.3 ← (4)

This SR ensures that the TURBINE BYPASS SYSTEM RESPONSE TIME is in compliance with the assumptions of the appropriate safety analysis. The response time limits are specified in the Technical Requirements Manual. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and because of the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown the 18 month Frequency, which is based on the refueling cycle, is acceptable from a reliability standpoint.

REFERENCES

1. UFSAR, Section 7.7.1.4.
2. UFSAR, Chapter 15.