APPLICATION FOR AMENDMENT

TO

FACILITY OPERATING LICENSE NO. NPF-3

FOR

DAVIS-BESSE NUCLEAR POWER STATION

UNIT NO. 1

Enclosed are forty-three (43) copies of the requested change to the Davis-Besse Nuclear Power Station Unit No. 1 Facility Operating License No. NPF-3, with the Safety Evaluation for the requested change.

This amendment request concerns License Condition 2.C.(3)(t).

By /s/ C. T. Daft
C. T. Daft, Director
Quality Assurance

For R. P. Crouse
Vice President, Nuclear

Sworn and subscribed before me this 12th day of November, 1984.

/s/ Nora Lynn Flood
Notary Public, State of Ohio
My Commission Expires 9/1/87

S E A L

Docket No. 50-346
License No. NPF-3
Serial No. 1100
November 12, 1984

Attachments

I. Changes to the Davis-Besse Nuclear Power Station Unit No. 1, Operating License No. NPF-3 License Condition.

A. Time required to Implement: This change is to be effective upon NRC approval.

B. Reason for Change (Facility Change Request 84-192).

NRC requested this License Condition to allow startup and operation utilizing the current SUFP configuration.

C. Safety Evaluation
(See Attached)

D. Significant Hazards Consideration
(See Attached)

SAFETY EVALUATION

This License Condition (2.C.(3)(t)) is being submitted to allow startup and operation, utilizing the current Startup Feedwater Pump (SUFP) configuration, of the Davis-Besse Nuclear Power Station Unit No. 1 until a new SUFP system can be installed.

The SUFP system itself performs no safety function. It is, however, used as a backup to the main and auxiliary feedwater systems for supplying water to the steam generators in case of the total loss of these two systems.

The SUFP is located in Room 238 which is the same room as one of the auxiliary feedwater pumps (AFP), pump 1-2. During the review of the high/moderate energy line break criteria as it relates to the AFW rooms, it was determined that the SUFP system can jeopardize AFP 1-2 in the event of a pipe leak or rupture.

The SUFP system is non-seismic downstream of valve FW91. The suction of the SUFP system utilizes the Deaerator or the Condensate Storage Tank (CST) as its water source. The normal source is the Deaerator. It also uses the non-seismic Turbine Plant Cooling Water (TPCW) system for pump cooling. The line from the Deaerator to the SUFP also runs through Room 237. Room 237 contains AFP 1-1. The discharge line from the SUFP is aligned to the inlet of the high pressure feedwater heaters. In the past, these systems were not valved off so as to provide immediate backup for the Main Feedwater System (MFWS) if needed.

Since this problem was identified, the SUFP system and the TPCW system in Rooms 237 & 238 have been isolated. This isolation has been accomplished by closing valve FW91 from the CST, valve FW32 from the Deaerator, valves CW196 and CW197 used for pump cooling, and valve FW106 in the discharge line.

The main concern with the location of the SUFP is the potential for pipe whip and jet impingement in Room 238 and flooding and high temperature in Room 237 or 238. The main concern with the TPCW system is the potential for flooding these rooms. These concerns will only be realized when the SUFP system is in operation, i.e., during startup and shutdown of the reactor.

During the period that the startup pump is running, the suction piping to the SUFP is a moderate energy line based on the criteria in USAR Section 3.6 which states that a line outside containment operating above 275 psig or 200°F is a moderate energy line. The discharge piping from the SUFP is a high energy line based on the USAR Section 3.6 which states that a line outside containment operating both above 275 psig and 200°F is a high energy line. If a high energy line is in service more than six hours, Section 3.6 requires that it must be analyzed for pipe rupture. The SUFP system could be in operation for as long as 72 hours for one reactor startup and shutdown cycle but can be in operation for as long as 168 hours during zero power physics testing. The total number of reactor trips in a year is conservatively assumed to be 8 times. The TPCW system

supply and return piping are neither moderate nor high energy lines but, since the lines are non-seismic, a flooding concern remains.

It has been postulated that during a seismic event the pipes would rupture in such a manner as to damage AFP 1-2 or possibly AFP 1-1 due to flooding. It has also been postulated that with a high energy pipe break the sheared pipe could damage AFP 1-2 due to jet impingement or pipe whip and would cause high temperatures and pressure in Room 238. A moderate energy pipe break could damage either AFP 1-1 or 1-2 due to flooding and high temperature in either Room 237 or 238. A rupture/break in the TPCW piping could damage either AFP 1-1 or 1-2 due to flooding in either Room 237 or 238.

A Probability Risk Assessment (PRA) study has been performed since this situation was discovered. The attached PRA justification documents that the worst case probability for a rupture/break in the SUFP and the TPCW piping causing the failure of AFP 1-2 is of the order of 3.2E-6/yr. The probability for failure of AFP 1-1 in Room 237 is smaller due to less SUFP piping in the room. The probability for failure of the AFWS due to pipe rupture/break in the SUFP and the TPCW system is documented in calculation number C-NSA-45.02-2. This probability is insignificant in light of the AFWS unavailability on the order of 1E-2/yr. for each train which was developed by EDS (now Impell) and submitted to the NRC in December, 1981.

Although these risks to the AFWS from the SUFP system are considered insignificant, the SUFP suction and discharge piping were hydrotested in the Fall, 1984, to the original acceptance criteria (ANSI B31.1) to ensure the integrity of the SUFP suction and discharge piping. In addition, certain precautionary measures will be observed during SUFP operation, when the SUFP is not being used as a source of auxiliary feedwater. An operator shall be positioned at the AFW room area when the SUFP is operating in Modes 1 through 3. Upon indication of a pipe leak the operator will either trip the SUFP locally or contact the control room to trip the SUFP. This may not reduce the probability for a pipe break in the SUFP system, however, it will reduce significantly the impact of a SUFP system failure resulting in a AFWS failure. He would then close all SUFP isolation valves which are external to the AFW rooms. This operator action is being taken since piping leaks are expected to occur prior to any complete piping rupture. If the SUFP is being used as a source of auxiliary feedwater, specific direction appropriate to the situation will be provided to the operator by the shift supervisor.

Pursuant to the above it has been determined that the use of the SUFP system on an interim basis, until the new SUFP system is installed, does not significantly increase the probability of the loss of the AFWS.

SIGNIFICANT HAZARDS CONSIDERATION

The proposed License Condition (2.C.(3)(t)) would allow startup and operation of the Davis-Besse Nuclear Power Station Unit No. 1 utilizing the current Startup Feedwater Pump (SUFP) and also require installation of a new SUFP. This License Condition does not represent a Significant Hazard.

Toledo Edison (TED) was requested by the NRC Staff to submit a License Condition (2.C.(3)(t)) to allow startup and operation utilizing the current SUFP. This request results from TED submittal dated October 18, 1984 (Serial No. 1070) concerning NRC review of the SUFP operation and approval for interim operation until the new proposed SUFP is operable. The October 18, 1984 letter identified that SUFP system itself performs no safety function. It is, however, used as a backup to the main and auxiliary feedwater systems for supplying water to the steam generators in case of the total loss of these two systems.

The SUFP is located in Room 238 which is the same room as one of the auxiliary feedwater pumps (AFP), pump 1-2. During the review of the high/moderate energy line break criteria as it relates to the AFW rooms, it was determined that the SUFP system can jeopardize AFP pump 1-2 in the event of a pipe leak or rupture.

The SUFP system is non-seismic downstream of valve FW91. The suction of the SUFP system utilizes the Deaerator or the Condensate Storage Tank (CST) as its water source. The normal source is the Deaerator. It also uses the non-seismic Turbine Plant Cooling Water (TPCW) system for pump cooling. The line from the Deaerator to the SUFP also runs through Room 237. Room 237 contains AFP 1-1. The discharge line from the SUFP is aligned to the inlet of the high pressure feedwater heaters. In the past, these systems were not valved off so as to provide immediate backup for the Main Feedwater System (MFWS) if needed.

Since this problem was identified, the SUFP system and the TPCW system in Rooms 237 & 238 have been isolated. This isolation has been accomplished by closing valve FW91 from the CST, valve FW32 from the Deaerator, valves CW196 and CW197 used for pump cooling, and valve FW106 in the discharge line.

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energy line. If a high energy line is in service more than six hours, Section 3.6 requires that it must be analyzed for pipe rupture. The SUFP system could be in operation for as long as 72 hours for one reactor startup and shutdown cycle but can be in operation for as long as 168 hours during zero power physics testing. The total number of reactor trips in a year is conservatively assumed to be 8 times. The TPCW system supply and return piping are neither moderate nor high energy lines but, since the lines are non-seismic, a flooding concern remains.

It has been postulated that during a seismic event the pipes would rupture in such a manner as to damage AFP 1-2 or possibly AFP 1-1 due to flooding. It has also been postulated that with a high energy pipe break the sheared pipe could damage AFP 1-2 due to jet impingement or pipe whip and would cause high temperatures and pressure in Room 238. A moderate energy pipe break could damage either AFP 1-1 or 1-2 due to flooding and high temperature in either Room 237 or 238. A rupture/break in the TPCW piping could damage either AFP 1-1 or 1-2 due to flooding in either Room 237 or 238.

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Although these risks to the AFWS from the SUFP system are considered insignificant, the SUFP suction and discharge piping were hydrotested in the Fall, 1984, to the original acceptance criteria (ANSI B31.1) to ensure the integrity of the SUFP suction and discharge piping. In addition, certain precautionary measures will be observed during SUFP operation, when the SUFP is not being used as a source of auxiliary feedwater. An operator shall be positioned at AFP room area when the SUFP is operating in Modes 1 through 3. Upon indication of a pipe leak the operator will either trip the SUFP locally or contact the control room to trip the SUFP. This may not reduce the probability for a pipe break in the SUFP system, however, it will reduce significantly the impact of a SUFP system failure causing a AFWS failure. He would then close all SUFP isolation valves which are external to the AFP rooms. This operator action is being taken since piping leaks are expected to occur prior to any complete piping rupture. If the SUFP is being used as a source of auxiliary feedwater, specific direction appropriate to the situation will be provided to the operator by the shift supervisor.

The Commission has provided examples of amendments which are not likely to involve a significant hazards consideration (48 FR 14870), such as a change that constitutes an additional limitation, restriction, or control not presently included in the technical specifications: for example, a more stringent surveillance requirement (example ii). The License Condition will require TED to isolate the piping on the SUFP and station an operator in the SUFP/AFW pump area when the SUFP is operating. Also, the License

Condition will require TED to install a SUFP and associated piping and valves external to Rooms 237 and 238 before commencing startup of Cycle 6. These conditions are not presently required of TED and constitutes an additional restriction on operation and plant modification.

Based on the above information, this amendment request would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; or 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety.

Therefore, based on the above, the requested license amendment does not present a Significant Hazard.

DAVIS-BESSE NUCLEAR POWER STATION

UNIT NO. 1

LICENSE CONDITION

2.C.(3)(t)

Toledo Edison shall operate the Startup Feedwater Pump (SUFP) System with the following operational restrictions:

1. Toledo Edison will station an operator in the Startup Feedwater Pump/Auxiliary Feedwater Pump (SUFP/AFW) area during operation of the SUFP to monitor SUFP/Turbine Plant Cooling Water (TPCW) piping status in the AFW Pump Rooms. In the event of SUFP/TPCW pipe leakage, the operator will trip the SUFP locally or notify the Control Room to trip the SUFP, and isolate the SUFP/TPCW piping.

2. Toledo Edison will isolate and maintain isolation outside the SUFP/AFW area of the SUFP suction, discharge, and turbine plant cooling water piping, when the SUFP is not in operation (Modes 1, 2, and 3).

3. Toledo Edison will install a SUFP, associated piping, and valves, to remove the hazards to the AFW pumps before commencing Cycle 6.

PRA Based Justification for Continued Operation of the SUFP System

During SUFP operation, a portion of the SUFP discharge line and the minimum recirculation line renders itself to consideration as a high energy line. Similarly, a portion of the suction piping because of use with the deaerator storage tank water requires consideration as a moderate energy line. The immediate safety impact of lack of such high/moderate energy line considerations is on the Auxiliary Feedwater System (AFWS) since the SUFP is housed in the same room as Auxiliary Feedpump (AFP) 2. A portion of the discharge and minimum recirculation lines is routed in this same room. In addition, the suction path from the deaerator runs through both AFP rooms. With SUFP in operation while taking suction from the deaerator the following lengths of pipes may pose a challenge to the AFWS in view of the high/moderate energy line breaks. Further, the non-seismic TPCW piping, in AFP rooms (as noted below) poses a potential flooding concern.

17 feet of 4" discharge line in AFP Room 2
18 feet of 1½" minimum recirculation line in AFP Room 2
27 feet of 6" suction line in AFW Room 2
27 feet of 6" suction line in AFP Room 1
62 feet of 4" TPCW line in AFP Room 1
40 feet of 4" in AFP Room 2
24 feet of ≤2" in AFP Room 2

The SUFP may be operated continuously for a period of approximately 72 hours every reactor shutdown/startup. In a year with a fuel reload, the SUFP system may be operated for as long as 168 hours continuously during zero power physics testing. Based on the expected number of reactor trips in a year (conservatively assuming ten trips per non-refueling year and eight trips in a refueling year) the maximum number of hours per year that the SUFP system would be in operation for any year is of the order of 744 hours.

The overall figure of merit for any one train of the Davis-Besse AFWS is of the order of 10^{-2} per year as deduced from the EDS (now Impell) AFWS PRA study (EDS Report No. 02-1040-0195, Revision 1) submitted to the NRC in December 1981. This implies that one train of the Davis-Besse AFWS will be unavailable with a frequency of 10^{-2} per year for all initiating events which may require availability of AFWS.

Assuming the duration of SUFP operation per year presented above, the total worst case probability of any break (whether high energy, moderate energy or seismic) in the unanalyzed piping which may challenge the availability of an AFW train is of the order of 3.2×10^{-6} per year. The worst case probability is for AFW train 2 because of significantly larger overall length of piping in this room. This evaluation conservatively assumes that any rupture of this non-seismic piping will flood the room to the extent of causing train inoperability with a probability of unit.

Since the SUFP system failure as postulated above poses a challenge to the AFW train at a frequency of 3.2×10^{-6} per year, the probability of such SUFP system ruptures/breaks leading to inoperability of an AFW train is

insignificant as compared to other failures that may render the AFW system inoperable. It is, therefore, concluded that the above issue poses a very minimal risk to the accomplishment of the safety function of the AFWS and an extremely negligible risk to public health and safety. Continued operation of the SUFP system in the mode evaluated above is, therefore, adequately justified.