APPLICATION FOR AMENDMENT

TO

FACILITY OPERATING LICENSE NUMBER NPF-3

DAVIS-BESSE NUCLEAR POWER STATION

UNIT NUMBER 1

Attached are the requested changes to the Davis-Besse Nuclear Power Station, Unit Number 1 Facility Operating License Number NPF-3. Also included is the Safety Assessment and Significant Hazards Consideration.

The proposed changes (submitted under cover letter Serial Number 2050) concern:

Technical Specifications Section 3.4.5 (Steam Generators)
Technical Specifications Bases 3/4.4.5 (Steam Generators)

By: [signature]
D. C. Shelton, Vice President,
Nuclear - Davis-Besse

Sworn and subscribed before me this 3rd day of September, 1992.

Evelyn L. Dress
Notary Public, State of Ohio

EVELYN L. DRESS
NOTARY PUBLIC, STATE OF OHIO
My Commission Expires July 28, 1994

The following information is provided to support issuance of the requested change to the Davis-Besse Nuclear Power Station, Unit 1 Operating License Number NPF-3, Appendix A, Technical Specifications 3.4.5 and Bases 3/4.4.5.

A. Time Required to Implement: This change is to be implemented within 90 days after the NRC issuance of the License Amendment.

B. Reason for Change (License Amendment Request Number 91-0019): Permit the maximum allowable steam generator (SG) level to be a variable limit based on the plant's Mode of operation and the status of the Main Feedwater Pumps and the Steam and Feedwater Rupture Control System (SFRCS), as applicable. The change will allow the plant to continue to produce full power as Steam Generator fouling occurs, while ensuring the plant response to accident conditions remains acceptable and adequate margins to safety limits are maintained.

C. Safety Assessment and Significant Hazards Consideration: See Attachment.

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Once Through Steam Generator Operation

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1.0 Introduction

The Babcock and Wilcox (B&W) Nuclear Steam Supply System (NSSS) is designed with a unique steam generator, the Once Through Steam Generator (OTSG). The purpose of the document is to provide a basic description of the OTSG and explain the fundamentals of its operation.

2.0 Steam Generator Description

The OTSG is a vertical counter flow shell and tube heat exchanger with reactor coolant on the tube-side and a secondary boiling mixture on the shell side (See Figures 1 and 2).

On the secondary side, subcooled main feedwater (MFW) is distributed through the MFW nozzles into the steam filled annulus between the shell and the tube bundle shroud. At the top of the annulus, the MFW is heated by direct contact condensation of steam which is aspirated from the tube bundle through the aspirator port in the tube bundle shroud. At 100% power, the aspirating steam is approximately 15% of the total main steam line flow. The downcomer provides the last stage of MFW preheating as the MFW is heated to the saturation temperature corresponding to the OTSG pressure in the downcomer. Some additional MFW heating is also supplied by conductive heat transfer through the tube bundle shroud.

The momentum of the downward directed MFW stream and the gravity head of the liquid in the downcomer provide the driving head for the steam generator. This head in the downcomer balances the gravity head of the boiling mixture in the tube bundle and the frictional losses in: (1) the lower downcomer (primarily the orifice plate), (2) the tube bundle (primarily at tube support plates), and (3) the aspirator port.

The water in the tube region of an OTSG can be considered to be made up of several zones. At the bottom of the tube bundle, a zone of essentially saturated liquid exists. In the boiling zone of the OTSG, a steam-water mixture of varying quality exists until a zone of totally saturated steam environment is reached. Above this zone, a region of superheated steam of increasing temperature exists. The length of the boiling zone varies depending on the power level of the reactor and the thermal-hydraulic conditions in the region. Because the length of the boiling zone changes, the length of the superheating zone also varies. This affects the amount of superheat added to the steam before it leaves the OTSG.

3.0 OTSG Level Indication

Several "levels" are measured in the steam generator. These level measurements are actually differential pressure (dP) measurements across different physical regions of the OTSG. These dPs have contributions from the mass of water and steam and the flow induced frictional losses between the level taps. The dP contribution from the mass of water and steam is commonly referred to as the collapsed liquid level. The dP contribution from flow is due to the frictional losses, primarily at the orifice plate, the tube support plates, and the tube surfaces. This flow induced dP varies with the square of the velocity of the fluid in the OTSG, which varies with plant's power level. For instance, at 100% power an indicated dP, such as the startup range discussed below, would have approximately 1/3 of its total contribution from frictional and momentum effects and 2/3 from the mass in the tube region. Whereas, at hot zero power in Mode 3, the same indicated level would result from almost entirely the mass in the tube region. Therefore the mass in the OTSG for a given dP reading is much greater in Mode 3 than in Mode 1.

The various levels measured in the OTSG are discussed below.

3.1 Operate Range

The operate range (OR) has a lower tap 102" above the tube sheet in the downcomer (above the orifice plate). The upper tap is in the tube region just above the aspirator port at 394" above the lower tube sheet. The OR measures the differential pressure between the taps and converts this to a percentage of the differential pressure which would exist between the taps if the entire space were filled with saturated water. Therefore, the OR is generally interpreted as a percentage by volume of the water in the downcomer above the lower tap. The OR is temperature compensated for the lower downcomer temperature. It is the only level indication which is temperature compensated. It should be noted that the indicated OR level is higher than actually exists during power operation. This is due to the net effect of both the MFW momentum and the pressure losses of the aspirating steam flow through the aspirator port.

3.2 Startup Range

The startup (SU) range has a lower tap 6" above the lower tube sheet. The upper tap is the same tap used by the OR. The SU range indicates the head of the water and steam mass and the frictional losses primarily at the tubes and tube support plates in the tube region below the aspirator port.

The SU range provides an SFRCS low level trip and input to ICS for low level limits.

3.3 Full Range

The full range shares a bottom tap with the SU range. The top tap is located 625" above the lower tube sheet. The full range is used when placing the OTSG in wet layup.

3.4 Correlation Between Ranges

It should be noted that at zero power (Mode 3) the indicated levels can be correlated relatively easily between the three different indications because the assumption of a collapsed liquid level without frictional losses is valid. At high power (high steam flow) conditions any assumed mass in the OTSG can result in a complete spectrum of indicated levels dependent on the fouling (dP) of the OTSG, which affects the frictional losses, and the condition of the MFW nozzles. Also, since the level tap locations are different and the calibration reference conditions are different, there is not a one-to-one correlation between changes in indicated levels among the three ranges for known changes in OTSG water inventory.

The above discussion explains why it is difficult to define operating limits, based solely on SU and OR indicated dPs (levels).

4.0 Steam Generator Operation

The various methods of operating the OTSG's are described below.

4.1 Plant Heatup

As the plant is heated up from MODE 5 to MODE 4 the OTSG's are required to be capable of removing heat from the RCS. In order to accomplish this plus to remove air from the main steam lines, a vacuum is typically established in the main steam system, including the steam generators.

As the RCS continues to heat up from MODE 4 to MODE 3, the OTSG level is reduced. Depending on the chemical content of the OTSG inventory, the generator may be nearly drained, refilled with pure water, and allowed to soak. The draining and refilling process continues until the desired OTSG chemistry is obtained. This also aids in removing contaminates which may have been deposited within the OTSG.

4.2 Power Operation

The OTSG level is established at "low level limits" in preparation for changing to MODE 2. This is a level controlled by procedures. The OTSG level is held constant at this level until the plant's power level is above approximately 28 percent of rated thermal power. This method of level control allows the average RCS temperature (T_{ave}) to be raised from the zero power value of 532°F to 582°F.

Once T_{ave} reaches 582°F, the OTSG level is allowed to rise as required to maintain T_{ave} at 582°F. This method of operation continues up to 100 percent rated thermal power or until a OTSG level limit is reached. It is during power operation that the chemical deposition at higher elevations in the OTSG occurs. These deposits degrade the thermal-hydraulic characteristics of the OTSG and may eventually cause the plant to become "power limited," i.e., the maximum permissible OTSG water level limit may be reached before the reactor is at 100 percent power.

4.3 Plant Cooldown

The OTSG level is allowed to decrease to the low level limit as power is reduced. At approximately 28 percent power, the OTSG level is held constant and T_{ave} is decreased to the zero power temperature of 532°F. Once the plant is in MODE 3, the OTSG level may again be elevated to dissolve as much of the impurities which were deposited during power operation as possible. This process is the same as is used during plant heatup to adjust the OTSG chemistry.

As the plant cools down, the Steam and Feedwater Rupture Control System (SFRCS) Low Pressure trip is manually bypassed so the cool down can be continued. This disables the plant's primary protection against a Main Steam Line Break or a Main Feedwater Line Break. Consequently, the proposed Technical Specification limits the plant configuration, while allowing for continued OTSG cleaning, so as to ensure that the consequences of a MSLB or MFWLB are not harmful to public health and safety.

As the plant is cooled down to MODE 4, the OTSG level may be raised up to limit the entrance of oxygen into the OTSG. This reduces the oxidation of the OTSG materials. As steam production ceases the plant cooldown is continued using the Decay Heat Removal system. When the plant enters MODE 5, the OTSG level is adjusted as required to support any planned activities.

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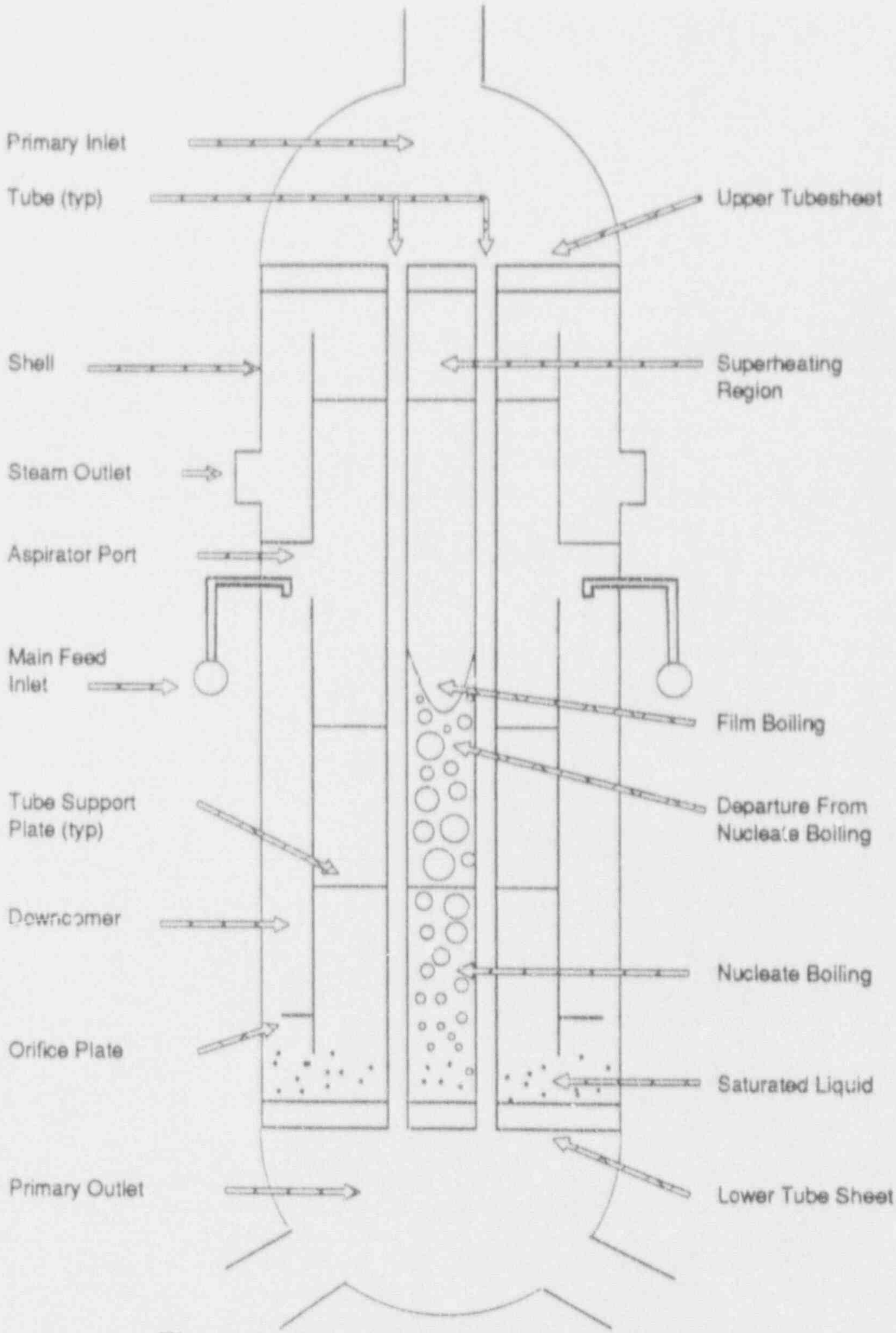

Figure 1: Once Through Steam Generator Cross Sectional Diagram

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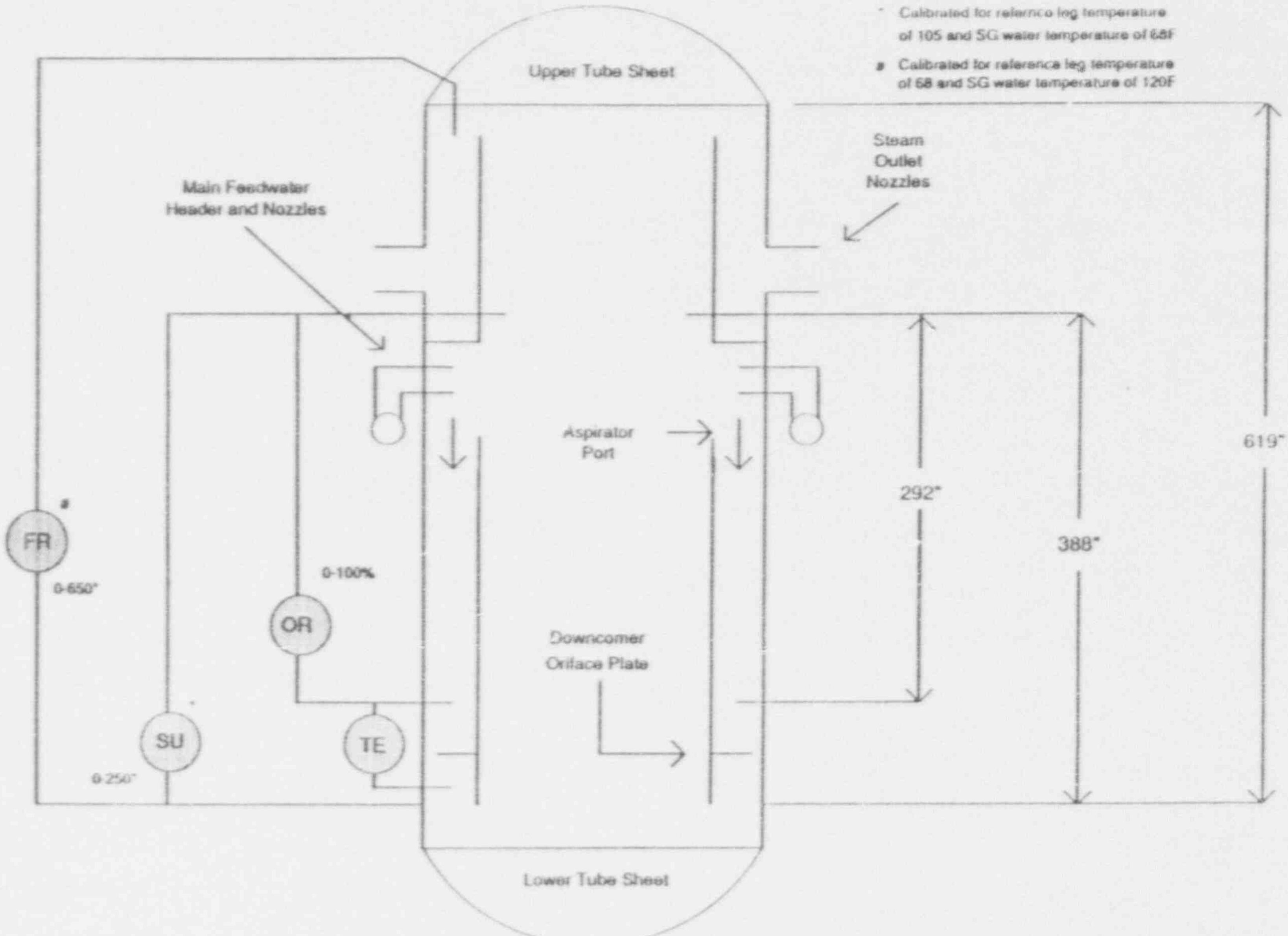

Figure 2: SG Level Instrumentation

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SAFETY ASSESSMENT AND SIGNIFICANT HAZARDS CONSIDERATION FOR LICENSE AMENDMENT REQUEST NUMBER 91-0019

Title

A proposed change to the Davis-Besse Nuclear Power Station, Unit 1 Operating License, Appendix A, Technical Specification 3.4.5, Steam Generators, and Bases 3/4.4.5, Steam Generators.

Description

The purpose of this Safety Assessment and Significant Hazards Consideration is to review a proposed change to the Davis-Besse Nuclear Power Station Unit 1 Operating License Technical Specifications to ensure the change does not have an adverse effect on safety and does not involve a significant hazards consideration. The following change to the Technical Specifications is proposed:

Revise Technical Specification (T.S.) 3.4.5 to permit the maximum allowable Steam Generator (SG) level to be a variable limit based on the plant's Mode of operation. The Operational Modes are defined in Table 1.1 of the Technical Specifications. A graph of Acceptable SG Operate Range Level versus Main Steam Superheat during Modes 1 and 2 is to be incorporated into the Technical Specifications as Figure 3.4-5. The Limiting Condition for Operation will also specify the maximum acceptable Steam Generator level when the plant is in Mode 3 based on the status of the Main Feedwater Pumps and the Steam and Feedwater Rupture Control System (SFRCS) and specify the maximum acceptable Steam Generator level when the plant is in Mode 4.

The Bases Section 3/4.4.5 of the Technical Specifications is to be updated to reflect that the SG water level limits are consistent with the initial assumptions of the analyses in the Updated Safety Analysis Report (USAR) rather than the Final Safety Analysis Report (FSAR). Examples of incapable Main Feedwater Pumps under this proposed T.S. 3.4.5 are also provided in the Bases.

This change to T.S. 3/4.4.5 is being made to allow the plant to continue to produce full power with continued SG fouling while ensuring the plant response to accident conditions is acceptable. Adequate margins to safety limits will be maintained by this change. Since the aspirator ports become flooded at approximately 97 percent Operate Range level, the change also ensures that power operation with flooded aspirator ports is strictly prohibited by always restricting the SG level to 96 percent Operate Range.

Systems, Components, and Activities Affected

The proposed change affects the maximum allowable SG level as specified in the T.S. 3.4.5 Limiting Condition for Operation (LCO) and the Basis for this LCO in Bases Section 3/4.4.5.

Safety Functions of the Affected Systems, Components, and Activities

The safety function of the Steam Generators is to convert the thermal energy of the reactor coolant into steam for use in the turbine generator, to act as a heat sink for the reactor, and to act as a RCS pressure boundary.

The existing Limiting Condition for Operation for the Steam Generators ensures that the Steam Generators have sufficient inventory to remove heat from the Reactor Coolant System (RCS) and to limit the amount of inventory to be consistent with the assumptions made in the Final Safety Analysis Report (FSAR).

The Bases Section of the Technical Specifications provides the technical bases upon which the Technical Specification requirements are formed. This ensures that the design bases of the plant is preserved.

Effects On Safety

The proposed change has been evaluated for its effect on the containment's integrity for accidents inside containment, the effects of accidents on Auxiliary Building environments, the reactivity and core cooling effects for all accidents, and the radiological consequences for all accidents. The proposed Mode 1,2, and 3 limits are more restrictive than the current limit of 348 inches. A discussion of each area is provided below.

The minimum SG inventory Limiting Condition for Operation, Action requirements, and SG inventory related Surveillance Requirements are to remain the same as those currently found in the existing Technical Specification 3/4.4.5.

A. Effects on Safety of LCO Change

1. Containment Integrity

The proposed change has no effect on the containment's integrity. Chapter 6.2, Containment Systems, and Chapter 15.4.4, Steam Line Break, of the USAR, present the analysis of a Main Steam Line Break (MSLB) inside containment. The analysis assumed that the reactor was initially operating at 102 percent rated thermal power. Toledo Edison has evaluated the mass and energy released to the containment for the various SG levels permitted by the proposed change. For the levels permitted by proposed Figure 3.4-5 in Modes 1 and 2, the total mass in the faulted SG is less than the 62,500 lbm in the stated USAR analyses assumptions. The mass of water in the SG at 0°F Superheat is based on the calculated height of a pool of water with no boiling occurring. The mass of water at higher levels of superheat are based on calculations performed by Babcock and Wilcox in support of the development of the B&W Revised Standard Technical Specification, Topical Report BAW 2076, issued in April, 1989.

In Mode 3, the SG inventory is limited to 50 inches Startup Range if a Main Feedwater Pump is capable of supplying water to the SG and the SFRCS Low Pressure Trip is bypassed. This limits the amount of energy available for release to the containment to less than that released during a MSLB at 100% full power.

When the SFRCS Low Pressure Trip is protecting the plant or once the possible feedwater flow to the SG is limited to that available from the Motor Driven Feedwater Pump (MDFP), the mass to be permitted in the SG may be increased until the Operate Range SG level indicates 96 percent. Toledo Edison has completed analyses which demonstrate that the total mass and energy released to the containment by this mass of water and ten minutes of continued feed from the MDFP (the worst single failure) is less than the mass and energy released by the MSLB analyzed in the USAR. It is concluded that the containment pressure and temperature response will be bounded by the USAR results. Therefore, containment integrity will not be more severely challenged.

Since the water in the SG has such a low specific enthalpy when the plant is in Mode 4, there is no need to limit the SG inventory, with respect to containment integrity reasons. However, a maximum limit is specified to ensure the SG's remain capable of decay heat removal while in Mode 4 by maintaining a steam flow path (e.g., to the Atmospheric Vent Valves).

2. Environmental Effects of Breaks Outside Containment

Several pipe breaks outside of containment have been evaluated to determine the impact on the environmental qualification profiles for equipment important to safety which could be exposed to a harsh environment. The effects of the proposed change on each break is discussed below.

2.1 Main Steam Line Break

In Modes 1 and 2, the water inventory in the SG will be limited to the mass assumed in the Main Steam Line Break (MSLB) analysis which supports USAR Section 3.6.2.7.1.4, Main Steam to the Turbine Generator. Consequently, the plant response is bounded by the USAR results in Modes 1 and 2.

In Mode 3, the SG inventory is limited to less than 50 inches Startup Range level while a Main Feedwater Pump is operating with the SFRCS Low Pressure trip bypassed. This limits the amount of energy available for release during a MSLB to less than that released during a MSLB from full power. This ensures that the environmental conditions are bounded by the values reported in USAR Section 3.6.2.7.1.4.

While the SFRCS Low Pressure trip is protecting the plant or once the plant is in Mode 3 with no Main Feedwater Pumps feeding the SG's, the proposed Limiting Condition for Operation will permit Operate Range levels up to 96 percent. Analyses completed by

Toledo Edison have determined that the mass and energy release from the faulted SG are bounded by the analysis referenced by USAR Section 3.6.2.7.1.4, when the above conditions are met. Therefore, the environmental effects of the Mode 3 MSLB break with elevated SG levels are concluded to be no more severe than the Mode 1 MSLB case.

When the plant is in Mode 4, the water in the SG has a low specific enthalpy. Consequently, it is concluded that the environmental conditions following a MSLB would be bounded by the USAR analyses, regardless of the initial inventory of the SG. However, the proposed Limiting Condition For Operation has an upper limit on SG level in Mode 4 to ensure the SG's remain capable of decay heat removal by maintaining a steam flow path (e.g., to the Atmospheric Vent Valves).

2.2 Main Feedwater Line Break

The Mode 1 and 2 inventory limits of proposed Figure 3.4-5 will ensure that the analysis for a Main Feedwater Line Break referenced by USAR Section 3.6.2.7.1.6, Main Feedwater System, are still met.

The SG Level is limited to 50 inches Startup Range level when a Main Feedwater Pump is capable of feeding the SG in Mode 3 and the SFRCS Low Pressure Trip is bypassed. This limits the amount of energy which would be released during a Mode 3 Main Feedwater Line Break to a value lower than would be released during a Main Feedwater Line Break from full power. This ensures the environmental conditions are bounded by the results reported in USAR Section 3.6.2.7.1.6.

While the SFRCS Low Pressure trip is not bypassed or once the possible feedwater flow to a SG is limited to that available from the MDFP, regardless of the SFRCS status, the SG level is permitted to be as high as 96 percent Operate Range in Mode 3. Toledo Edison has completed calculations which demonstrate that the energy released in the event of a Main Feedwater Line Break, with the Mode 3 Steam Generator inventory at 96 percent, is less than the energy release discussed in the analysis referenced by the USAR. The calculations assumed that feedwater to the SG, supplied by the MDFP, continued for ten minutes. This represented the worst case single failure. Consequently, the peak temperatures and pressures which would occur remain bounded by the existing USAR results.

In Mode 4, the energy content of the SG inventory is very low. Therefore, the effects of a Main Feed Water Line Break are deemed negligible with any inventory in the SG's. Consequently, upper SG inventory limit in Mode 4 is specified only to ensure the SG's remain capable of decay heat removal by maintaining a steam flow path (e.g., to the Atmospheric Vent Valves).

2.3 Main Steam to the Auxiliary Feed Pump Turbines

The USAR Section 3.6.2.7.1.5, Main Steam to the Auxiliary Feed Pump Turbines, presents the evaluation of a 2-1/2 inch line and a 6 inch line break in the Main Steam to Auxiliary Feedwater Pump Turbine pipes while at 100 percent power. The referenced analyses for both breaks have assumed that full power operation continues for 10 minutes before plant operators take manual action to mitigate the event. This would result in 3.5×10^4 lbm of full power temperature and pressure steam being released for the 2 1/2 inch line break and 2.17×10^5 lbm of steam being released from the 6 inch line break during the 10 minute interval with no operator action.

In Modes 1 and 2, the proposed Figure 3.4-5 limits the SG to an inventory less than that assumed in the analyses referenced by USAR Section 3.6.2.7.1.5. This ensures the total blowdown mass and energy is bounded by the USAR reported results.

The SG level is limited to 50 inches Startup Range while the plant is in Mode 3 with either Main Feedwater Pump capable of supplying water to the SG and the SFRCS Low Pressure trip is bypassed. This limits the amount of energy which would be released during this accident to less than would be released by the same accident starting from Full Power conditions. This ensures that the environmental conditions are bounded by the results reported in USAR Section 3.6.1.7.1.5.

When the plant is in Mode 3 with the MDFP supplying the SG's or with the SFRCS Low Pressure Trip active, the environmental effects of these breaks are judged to be no more severe than the cases currently presented in the USAR. While the initial mass of water in the SG may be larger than was assumed released in the analysis referenced by USAR Section 3.6.2.7.1.5, the energy content of the steam exiting the break is always lower at any given time in the transient because the transient begins in Mode 3 rather than staying at full power for ten minutes. Also, the SG pressure starts falling immediately in the Mode 3 case, whereas the pressure stays constant for 10 minutes in USAR referenced analysis. This results in lower flow rates out the break for the Mode 3 case.

When the plant is in Mode 4, the energy content of the SG is very low so that it is judged that the effects of a Main Steam to Auxiliary Feedwater Pumps Line Break are bounded by the USAR referenced case, regardless of the SG inventory in Mode 4. Therefore, an upper limit is specified in Mode 4 only to ensure the SG's remain capable of decay heat removal by maintaining a steam flow path (e.g., to the Atmospheric Vent Valves).

2.4 Steam Generator Blowdown System Break

USAR Section 3.6.2.7.1.15, Steam Generator Blowdown System, presents an evaluation of the effects of a Steam Generator Blowdown Line Break in Mode 1. The analysis referenced by the USAR assumed

30 minutes of full power operation occur prior to plant operators taking action to mitigate the break. The extended period of continued power operation was assumed because it would be difficult for the control room operators to diagnose this small break. This is because the Main Feedwater Pumps can provide sufficient feedwater flow to compensate for the break, so that the SG level and pressure would not be affected. This would result in over 3 x 10^5 lbm of normal SG operating temperature water being discharged out the break.

The proposed Mode 1 and 2 limits of Figure 3.4-5 ensure that the SG inventory assumption made in the analysis referenced by the USAR is met.

In Mode 3, with a Main Feedwater Pump capable of supplying water to the SG's and the SFRCS Low Pressure trip bypassed. the SG inventory is limited to less than 50 inches Startup Range level. This limits the energy which could be released to a value below the full power condition. This ensures that the resulting environmental conditions are bounded by the results reported in USAR Section 3.6.2.7.1.15.

If the plant is in Mode 3, with no Main Feedwater Pump capable of supplying water to the SG's or with a Main Feedwater Pump running with the SFRCS Low Pressure trip active, the SG inventory will be permitted to be as high as 96 percent on the Operate Range instrument. This condition is judged to be bounded by the USAR analyses because of the same effects discussed in the section on the Main Steam to Auxiliary Feedwater Pump Turbine line break.

Also, because break flow exceeds MDFP capacity (initially), the SG level and pressure will decrease and alert operators of the problem prior to the 30 minutes of continued blowdown which was postulated for the Mode 1 analysis. This would result in faster operator response to mitigate the accident. If the Main Feedwater (MFW) pumps are supplying feedwater to the SG with the SFRCS Low Pressure trip active, the SG will quickly be isolated by the SFRCS. This would occur since there is very reduced heat input from the RCS in Mode 3, so that the SG pressure would decrease rapidly.

When the plant is in Mode 4, the specific enthalpy of the SG inventory is very low. Consequently, it is concluded that the effects of a Steam Generator Blowdown Line Break in Mode 4 with any SG inventory would be bounded by the USAR analyses. Therefore, the proposed upper SG inventory limit in Mode 4 is only to ensure the SG's remain capable of decay heat removal by maintaining a steam flow path (e.g., to the Atmospheric Vent Valves).

3.0 Reactivity and Core Cooling Effects

A MSLB results in a rapid overcooling of the RCS, which adds positive reactivity to the reactor due to the negative temperature coefficient. In order to prevent the reactor from becoming critical, adequate shutdown margin must be maintained. Toledo

Edison has evaluated the RCS cooldown associated with a MSLB while in Mode 3 with the SG inventory at 96 percent on the Operate Range and the Motor Driven Feedwater Pump supplying feedwater to the SG and the SFRCS Low Pressure Trip bypassed. This plant condition bounds all other Mode 3 scenarios except the case of the Main Feedwater Pumps supplying the SG's with the SFRCS Low Pressure trip bypassed. The conditions permitted by the proposed Technical Specification for that plant condition have also been evaluated for cooldown effects.

The cooldown calculations have included conservative assumptions which result in overestimating the RCS cooldown. It was assumed that the RCS cooled down to the feedwater temperature or that no decay heat from the reactor is added to the RCS, the worst case single failure occurs which results in continued feeding of the SG for ten minutes, and all of the faulted SG inventory and feedwater flashes to steam due to heat transferred from the RCS.

Administrative control requirements will be established to ensure that there is adequate shutdown margin to prevent the reactor from becoming critical during any Mode 3 MSLB. The administrative controls include determining the boron concentration required to compensate for the calculated cooldown and procedural requirements to establish the necessary boron concentration in the RCS prior to raising the SG level above the low level limits. These controls ensure that the acceptance criteria of USAR Section 15.4.4, Steam Line Break, are met for MSLBs in Mode 3 with elevated SG levels.

When the plant is in Mode 4, the SG's can only induce a very limited cooldown of the RCS following any secondary line breaks. Therefore, no reactivity requirements beyond the Technical Specification definition of Mode 4 are necessary. In addition, no specific Feedwater Pump requirements are needed for the same reason. The maximum SG inventory limit is provided to ensure the SG's remain capable of decay heat removal while in Mode 4 by maintaining a steam flow path (e.g., to the Atmospheric Vent Valves).

With respect to the Departure from Nucleate Boiling Ratio (DNBR), the results of the analyses reported in USAR Section 15.4.4.2.3, Results of Analysis, remain valid. Under the proposed change, the mass of water in the SG's will remain consistent with the USAR assumptions in Modes 1 and 2. When the plant is in Modes 3 or 4, the reactor's heat flux is so low that departure from nucleate boiling cannot occur even if the RCS pressure was reduced to saturation, so the amount of secondary inventory in the SG has no effect on the DNBR. Consequently, the proposed change has no effect on keeping the reactor fuel adequately cooled.

4.0 Radiological Consequences

Of the accidents analyzed in USAR Chapter 15, Accident Analysis, only two have radiological consequences which are potentially affected by an increased SG inventory. These are a Steam Generator Tube Rupture and a Steam Line Break. Each is evaluated below.

4.1 Steam Generator Tube Rupture

The consequences of a Steam Generator Tube Rupture (SGTR) are presented in USAR Section 15.4.2, Steam Generator Tube Rupture. This analysis assumed that all the fission products contained in the RCS inventory which transfers to the secondary side of the steam generator are directly released to the environment until the RCS has been depressurized below the lowest Main Steam Safety Valve (MSSV) lift pressure. An increased inventory in the steam generator does not affect the time required to depressurize the RCS to this pressure. This is because the amount of time required to reduce the RCS pressure to below the lowest MSSV setpoint only depends on the initial conditions of the RCS (which are at worst case conditions in the USAR analysis) and the energy removal rate of the secondary side of the steam generator, which is not affected by this proposed change. Therefore, the total mass and radioactive contamination released are independent of the initial SG inventory. Consequently, the proposed increased inventory does not affect the results presented in the USAR.

4.2 Steam Line Break

The radiological consequences of a Steam Line Break are presented in USAR Section 15.4.4, Main Steam Line Break. The USAR states that for breaks of pipes smaller than the Main Steam pipe, the consequences are bounded by the Main Steam Line Break (MSLB) analysis. This remains true, since the MSLB releases the entire inventory of the SG. Smaller line breaks may not release the entire inventory.

The assumptions used in the USAR radiological evaluation include a 1 gpm tube leak in the faulted SG and that all the activity in the SG inventory, the feedwater, and leaked RCS inventory are released to the environment. Toledo Edison has calculated the radiological consequences of a MSLB with a SG inventory of 96 percent Operate Range level. The results are presented in Table 1. While the thyroid doses are higher than the analysis presented in the USAR, they are clearly below the NRC acceptance criteria included in the Davis-Besse Operating License Safety Evaluation Report, NUREG-0136, Section 15.3. Therefore, it is concluded that the higher values do not represent a significant increase in the consequences of the accident. The primary reason for the increased thyroid dose is that the new calculation assumed that the SG was stagnant for two hours, with a 1 gpm RCS tube leak, prior to the break occurring. This reflects the desired method of removing chemical impurities and deposits from the SG's. The calculated whole body doses have decreased from the values reported in the USAR due to changes in the dose factors for the analyzed isotopes.

B. Effects on Safety of Bases Change

The proposed change to the Bases Section 3/4.4.5 revises the text of the Bases to show that the design basis of the level requirements is in the USAR. The original assumptions of the FSAR are included in the USAR, so that there is no loss of information regarding the permissible SG water levels. Examples of incapable Main Feedwater Pumps are also proposed in this revised Bases text and have no adverse effects on safety.

C. Conclusion of Effects on Safety

Based on the above discussion, it is concluded that the proposed change to T.S. 3/4.4.5 and its Bases does not have an adverse effect on safety.

SIGNIFICANT HAZARDS CONSIDERATION

The Nuclear Regulatory Commission has provided standards in 10CFR50.92(c) for determining whether a significant hazard exists due to a proposed amendment to an Operating License for a facility. A proposed amendment involves no significant hazards consideration if operation of the facility in accordance with the proposed changes would: (1) Not involve a significant increase in the probability or consequences of an accident previously evaluated; (2) Not create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) Not involve a significant reduction in a margin of safety. Toledo Edison had reviewed the proposed change and determined that a significant hazards consideration does not exist because operation of the Davis-Besse Nuclear Power Station, Unit 1 in accordance with this change would:

1a. Not involve a significant increase in the probability of an accident previously evaluated because the inventory contained in the Steam Generator does not affect the probability of experiencing any accident initiator.

1b. Not involve a significant increase in the consequences of an accident previously evaluated because the consequences of the proposed change have been determined to be within the acceptance criteria for previously evaluated accident analyses.

2a. Not create the possibility of a new kind of accident from any accident previously evaluated because no new failure modes are being introduced, and therefore no new accident scenarios can be postulated.

2b. Not create the possibility of a different kind of accident from any accident previously evaluated because no new failure modes are being introduced, and therefore no different accident scenarios can be postulated.

3. Not involve a significant reduction in a margin of safety since the original accident analysis acceptance criteria are still met.

Conclusion

Based on the above, Toledo Edison has determined that this License Amendment Request has no adverse effect on safety and does not involve a significant hazards consideration. As this License Amendment Request concerns a proposed change to the Technical Specifications that must be reviewed by the Nuclear Regulatory Commission, this License Amendment Request does not constitute an unreviewed safety question.

Attachment

Attached is the proposed marked-up change to the Operating License.

Table 1:

Offsite Dose Consequences of a Main Steam Line Break

Event	Plant Condition/ Documentation	Location Time	Thyroid Dose (REM)	Whole Body Dose (REM)
MSLB (New Limiting Event)	Mode 3, Elevated Inventory/ Toledo Edison Calculation	Site Boundary 2 Hr.	0.951	0.003
		LPZ/30Day	0.063	0.0002
MSLB (Current Limiting Event)	Mode 1, 100% Power/USAR Section 15.4.4	Site Boundary 2 Hr.	0.79	0.007
		LPZ/30 Day	0.041	0.0003
MSLB (NRC Acceptance Criteria)	Mode 1, 100% Power SER 15.3 Analysis	Site Boundary 2 Hr.	<1.0	<1.0
		LPZ/30 Day	--	--