Docket Number 50-346
License Number NPF-3
Serial Number 2025
Enclosure
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APPLICATION FOR AMENDMENT

TO

FACILITY OPERATING LICENSE NUMBER NPF-3

DAVIS-BESSE NUCLEAR POWER STATION

UNIT NUMBER 1

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

The proposed changes (submitted under cover letter Serial Number 2025) concern:

Technical Specification 3/4.3.2.1, Safety Features Actuation System Instrumentation and Technical Specification 3/4.3.2.2, Steam and Feedwater Rupture Control System Instrumentation.

By: ______________________
D. C. Shelton, Vice President - Nuclear, Davis-Besse

Sworn and subscribed before me this 17th day of February.

____
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 changes to the Davis-Besse Nuclear Power Station, Unit Number 1 Operating License Number NPF-3, Appendix A, Technical Specifications, Technical Specification 3/4.3.2.1 and Technical Specification 3/4.3.2.2.

A. Time required to implement: This change is to be implemented prior to startup from the refueling outage after approval.

B. Reason for change (License Amendment Request Number 91-0013): The proposed TS changes revises some of the trip setpoints and the allowable values for the Safety Features Actuation System (SFAS) and the Steam and Feedwater Rupture Control System (SFRCS) to incorporate revised instrument string error allowances based on the methodology of the Instrument Society of America Standard, ISA S67.04. The instrument string errors were reanalyzed in order to provide consistency in the methodology used to determine the SFAS and SFRCS TS values. An increase in the containment high radiation trip is being proposed to provide sufficient margin to accommodate normal changes in background radiation.

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

SAFETY ASSESSMENT AND SIGNIFICANT HAZARDS CONSIDERATION FOR LICENSE AMENDMENT REQUEST NUMBER 91-0013

TITLE

Proposed changes to the Davis-Besse Nuclear Power Station, Unit No. 1 Operating License, Appendix A, Technical Specification Table 3.3-4, Safety Features Actuation System Instrumentation Trip Setpoints, and Table 3.3-12, Steam and Feedwater Rupture Control System Instrumentation Trip Setpoints.

DESCRIPTION

The purpose of this Safety Assessment and Significant Hazards Consideration is to review proposed changes to the Davis-Besse Nuclear Power Station Unit No. 1 Technical Specification (TS) Tables 3.3-4 and 3.3-12 to determine whether the changes adversely affect safety or constitute a significant hazards consideration. The proposed TS changes, which are a result of part of the Design Bases Reconstitution (DBR) Program at the DBNPS, are to revise the trip setpoints and the allowable values for the Safety Features Actuation System (SFAS) and the Steam and Feedwater Rupture Control System (SFRCS) in order to incorporate revised instrument string error allowances based on the Instrument Society of America's Standard ISA S67.04 methodology. The instrument string errors were reanalyzed in order to provide a consistent methodology amongst the SFAS and SFRCS TS values. Additionally, an increase in the containment high radiation trip is being proposed to provide sufficient margin to accommodate normal changes in background radiation.

SYSTEMS, COMPONENTS AND ACTIVITIES AFFECTED

The systems affected are the SFAS and SFRCS regarding the TS trip setpoints and allowable values. There are no hardware modifications involved.

SAFETY FUNCTION OF THE AFFECTED SYSTEMS, COMPONENTS AND ACTIVITIES

The safety function of the SFAS is to automatically prevent or limit fission product and energy release from the core, to isolate the containment vessel and to initiate operation of the engineered safety features equipment. The safety function of the SFRCS is to automatically detect and mitigate the effects of major upsets in the main steam (MS) and main feedwater (MFW) systems, including MS and MFW line ruptures, loss of MFW events, steam generator (SG) overfeed, and a loss of reactor coolant system (RCS) forced circulation cooling. The SFRCS detects these events through sensing and logic channels and mitigates their consequences by automatically positioning valves in the MS, MFW and auxiliary feedwater (AFW) systems with appropriate actuation signals dependent upon the initiating event.

EFFECTS ON SAFETY

When the SFAS/SFRCS TS were being developed for the DBNPS, two techniques were prevalent to account for instrument string uncertainties. The technique usually employed by the DBNPS Nuclear Steam Supply System (NSSS) supplier was to perform the accident analyses and obtain acceptable results for specific inputs and then apply instrument string uncertainties to determine the TS setpoints. In other words, the analytical setpoint preserved the safety limit and the TS preserved the analytical setpoint. The DBNPS architect/engineer (A/E), however, did not error correct the analytical setpoint to determine the TS setpoint, but rather, used an analytical setpoint which was sufficient to accommodate any instrument errors or uncertainties. This resulted in the analytical setpoint and the TS setpoint being the same value. The TS did not preserve the analytical setpoint but if the analytical setpoint was revised to include instrument errors and the accident analysis redone, the analysis would still show acceptable results. These two differing techniques are largely responsible for the inconsistencies which currently exist in TS Tables 3.3-4 and 3.3-12. Other minor differences appear to be due to the manner in which the allowable values were defined and the fact that the methods for determining string uncertainties were generally not as well defined then as they are now.

Various alternatives exist to incorporate a consistent instrument string error methodology. For some setpoints a new analytical setpoint has been determined. For others, where sufficient operating margin exists, a TS setpoint change is proposed. Therefore, each setpoint will be addressed. Although the magnitude of the setpoint changes are minor, the significance of this license amendment request is that the proposed setpoints have a clear, consistent design basis.

The guideline used to perform the setpoint calculations is the Instrument Society of America's Standard ISA S67.04 - 1982, "Setpoints for Nuclear Safety Related Instrumentation". This industry standard has been endorsed by the Nuclear Regulatory Commission (NRC) through Regulatory Guide 1.105, Revision 2, "Instrument Setpoints for Safety Related Instrumentation". Additional guidance for the calculations was derived from ISA S67.04 - 1987, "Setpoints for Nuclear Safety Related Instrumentation" and an ISA Recommended Practice (RP) for implementing the requirements of the standard, ISA RP67.04, Part II, "Methodologies for the Determination of Setpoints for Nuclear Safety-Related Instrumentation".

Except where noted below, the general methodology used for the uncertainty determinations can be described as follows. The square root sum of the squares (SRSS) was used to combine the instrument uncertainties and the drifts. Within the instrument uncertainties any terms which were correlated, i.e. not random, were added separately. This would define the TS setpoint. Next, the drift terms, except for the sensor, would be set to zero within the radical and the computation performed again. This would define the TS allowable value for channel functional testing. Finally, all drift terms, including the sensor, would be set to zero within the radical and the computation performed a

third time. This would define the TS allowable value for channel calibration. The calibration tolerances and the measurement and test equipment (M&TE) are not part of the TS but are combined separately to generate the field setpoints.

The SFAS will be presented first and the setpoints will be discussed in the order in which they appear in TS Table 3.3-4.

a. CONTAINMENT RADIATION - HIGH

It is proposed that the Containment Radiation - High setpoint be changed from "<2 X background" to "<4 X background."

Historical Perspective

This trip would provide containment isolation in the event of a fuel handling accident. However, no credit is taken for this trip in the DBNPS Updated Safety Analysis Report (USAR) Chapter 15 Accident Analysis. The trip also provides a second backup to the RCS low pressure trip and the containment high pressure trip. Early versions of the Final Safety Analysis Report (FSAR) had the trip setpoint at less than or equal to 25 mR/hr and an allowable value for channel functional testing and channel calibration of less than or equal to 25.2 mR/hr. In an April 4, 1977 letter to the NRC (Serial No. 255) TE documented that, due to neutron streaming inside containment, the background gamma radiation may be higher than the setpoint. The letter requested leaving the setpoint as an open item to be determined after full power testing when representative background readings could be established. Later revisions of the FSAR show the trip setpoint as it currently exists, "<2 X background" at RATED THERMAL POWER. It appears that this setpoint was mutually agreed to by TE and the NRC as being acceptable.

Following the Three Mile Island (TMI)-2 event, TMI Action Plan, Section II.E.4.2 required the licensee to include automatic closing on a high radiation signal for all systems that provide a path to the environs. The containment radiation - high trip is taken credit for to satisfy this requirement. However, this did not necessitate a change to the trip setpoint.

Basis for Proposed Setpoint

Although the voltage equivalents for background and "<2 X background" provides sufficient margin to accommodate instrument uncertainty, a value of "<4 X background at RATED THERMAL POWER" is being requested. This is being done for two reasons. The first reason is consideration of human factors aspects. The detectors involved with this setpoint not only have input to the control room SFAS, but also provide input to an indicator located in the SFAS cabinet which is checked each shift. This indicator is logarithmic from one decade to the next. An example of this is when a fixed voltage equals multiple full scales on the indicator and full scale is changed by a decade each time full scale is reached. In this example it could first require 1 volt to change the indicated reading from 0.1 mR/hr to 1 mR/hr, the decade would then change and it would take 1 volt to change the indicated reading from

1 mR/hr to 10 mR/hr and so on. However, the gradations on the indicator do not change; there are 10. Therefore, for the first decade, a change in field strength of 0.1 mR/hr causes a change of 0.1 volts and the indicator moves 1 gradation which is clearly readable. But when the last reading is 1 mR/hr and the field strength increases by the same 0.1 mR/hr, since the next decade is required, the change only causes a 0.01 volt change and a 1/10 of a gradation movement which is not readable with any degree of precision.

Although the indicator reading is not required for TS compliance, it is used as a first check to avoid violating the TS. This is where the existing TS can become burdensome. Ignoring uncertainties, if the background were 12 mR/hr, the setpoint is required to be less than or equal to 24 mR/hr using the current TS. The 12 mR/hr amounts to 2/10 of a gradation. When the next person reads the indication, it may be interpolated that the background is only reading 11 mR/hr. This equates to a trip setpoint of 22 mR/hr, and implies that the existing setpoint of 24 mR/hr is too high. (This scenario is also what happens when background actually does decrease as discussed below.) Therefore, a voltage check would have to be performed to determine operability. Changing the TS setpoint to a value of "less than 4 X background" would still allow the field setpoint to remain at approximately 2 X background. However, a significant reduction in background would have to occur before the field setpoint could violate the TS requirement. This would eliminate most of the sensitivity to interpolation.

The second reason for the request is to have sufficient margin to provide control room operators with a fixed value for TS compliance which is not background dependent and not routinely fuel reload dependent. The reason for maintaining a "times background" TS is so that an amendment is not required every time background changes, e.g. a low leakage verses a high leakage reactor core design. In so doing, however, the setting of the trip in anticipation of a full power background reading can lead to declaring the detectors inoperable. An example of this follows. If the anticipated background reading at full power is 10 mR/hr, the TS setpoint would be 2 X 10 mR/hr = 20 mR/hr. Ignoring instrument uncertainty for demonstration purposes, this value is now set in the field. Now, if upon reaching full power the actual background is only 9 mR/hr, since 20 mR/hr is not less than 2 X background (2 X 9 mR/hr = 18 mR/hr), the detectors would have to be declared inoperable while the revised setpoint was being implemented. Here again, a field setpoint of approximately 2 X background with a TS setpoint requirement of "<4 X background" would provide margin for background fluctuations.

The normal practice of starting with an analytical safety limit and applying instrument string uncertainties to arrive at a trip setpoint is not applicable for this setpoint since it is not analytically based. It is possible, however, to express the expected actual radiation level at time of trip in terms of the background or, more specifically, in terms of the 4 X background AT RATED THERMAL POWER proposed. In that regard, then, it can be assumed that the TS setpoint is already error corrected which is the convention in ISA S67.04.

The SFAS containment radiation monitor uncertainty calculation states that the radiation monitor "system" which includes the detector and the read-out unit has an accuracy of 10% of the measured value. Due to the fact that the same system is being used to determine background as is used to trip on background, i.e. the same uncertainty would apply, it is expected that the worst the actual radiation level would be at time of trip is approximately four times the error in the initial background plus the error in the reading at the time of trip (4 X background) or 4 X 10 percent + 4 X 10 percent, i.e., less than 5 X background at Rated Thermal Power.

Since the detectors are not taken credit for in the fuel handling accident and the TMI Action Plan calls for isolation "on a high radiation signal", where, under loss of coolant accident (LOCA) conditions these detectors would be exposed to radiation levels hundreds of times background the proposed change is considered safe by Toledo Edison.

b. CONTAINMENT PRESSURE - HIGH

It is proposed that the Containment Pressure - High setpoint be changed from 18.4 psia to 19.08 psia (4.38 psig).

Historical Perspective

The containment high pressure trip is not being utilized as a principal trip. It does serve as a diverse backup trip to the SFAS low RCS pressure trip. The Loss of Coolant Accident (LOCA) analysis originally performed to license the DBNPS used a setpoint of 4 psig. Summing 4 psig with 14.4 psi as a conversion factor between gauge and atmospheric (frequently used by the A/E and altitude dependent) yields the current TS of 18.4 psia. This is not error corrected. Following the TMI-2 event, TMI Action Plan, Section II.E.4.2, Position 5 required that the containment pressure setpoint that initiates containment isolation for nonessential penetrations be reduced to the minimum compatible with normal operating conditions. This was analyzed in 1981 by the A/E and yielded a value of 17.04 psia for the highest expected (non-accident) containment pressure and included a 1 psi margin. It is also necessary that the margin between 17.04 psia and the setpoints be large enough to accommodate all uncertainties so as to avoid spurious trips. When this value was instrument error corrected in 1981, the result was very close to the current TS. Therefore, the TS was not changed from the original value.

Basis for Proposed Setpoint

The instrument uncertainty with negative drift (drift towards normal operation) is 1.3278 psia and the calibration uncertainty using SRSS is 0.712 psia. Calibration must be included in this instance since the calculation is working backwards from normal operating conditions. (The 1981 analysis did not include calibration errors.) Summing the above with 17.04 psia yields (17.04 psia + 1.3278 psi + 0.712 psi =

19.0798 psia) 19.08 psia (rounded up) or 4.38 psig (19.08 psia - 14.7 psi where 14.7 psi is the standard conversion from atmospheric to gauge pressure and will be used by Toledo Edison throughout) for the TS setpoint.

Since positive drift is also possible, including the positive drift in the above instrument uncertainty term (1.3278 + 0.005 = 1.3328) the allowable for channel functional becomes (17.04 psia + 1.3328 psi + 0.712 psi = 19.0848 psia) 19.09 psia (rounded up) or 4.39 psig. Similarly, including all drifts (sensor and instrument string) in the above uncertainty term (1.3278 + 0.0578 = 0.1.3856), the allowable for channel calibration becomes (17.04 psia + 1.3856 psi + 0.712 psi = 19.1376 psia) 19.14 psia (rounded up) or 4.44 psig. The slight increase compared to the current TS is due to the explicit inclusion of the calibration uncertainty.

c. CONTAINMENT PRESSURE - HIGH-HIGH

It is proposed that the Containment Pressure - High-High setpoint be changed from 38.4 psia to 40.93 psia (26.23 psig).

Historical Perspective

This trip setpoint is constrained in both directions. The lower bound for the trip is to set it high enough so as to not be activated on a main steam line break (MSLB). The analysis performed in 1973 by the A/E used a MSLB containment pressure of 20 psig, 4 psig to avoid initiation and 14.4 psi to convert to atmospheric. This yields 38.4 psia, the current TS Setpoint. Due to reanalysis of the MSLB, Updated Safety Analysis Report (USAR), Revision 0 page 15.4-29 gives the containment pressure increase due to a MSLB as 21.4 psig. Applying the 14.4 psi, the value from the USAR yields 35.8 psia. This value provides no margin and is not corrected for instrument uncertainties.

The upper bound for this trip is set by the containment vessel design. The analysis for determining peak pressure due to LOCA was reanalyzed in 1988 and incorporated in USAR Revision 9. This analysis used an analytical trip setpoint of 38.4 psia (the current TS) with an 80 second delay for spray initiation.

Basis for Proposed Setpoint

Since instrument uncertainties need to be included, a new containment analysis was performed by Toledo Edison using the latest approved version of COPATTA, "Containment Vessel Pressure-Temperature History Program". Although just error correcting 38.4 psia to determine a new analytical setpoint would have been acceptable, it was also desirable to regain the 4 psi margin to avoid spray initiation, discussed above, provided the results of the containment analysis remain acceptable. Therefore, using the 35.8 psia plus a 4 psi margin, the resulting 39.8 psia was increased to an analytical setpoint of 42.26 psia which was then input to COPATTA. The containment air cooler start trip setpoint was also increased to 19.5 psia for this analysis.

The results of the COPATTA analysis showed virtually no change in the containment pressure and temperature response. The peak pressure changed from 35.908 psig to 35.911 psig and the peak temperature from 259.931°F to 259.942°F which is negligible. This was the anticipated response due to the nature of the transient as summarized below.

The design basis loss-of-coolant accident is used to establish the limiting containment response. Following the break there is a rapid blowdown of the RCS. This in turn causes an increase in temperature and pressure of the containment atmosphere. During this phase of the transient, the vapor/gases in containment are dominating the pressure/temperature response. The temperature response of the internals, i.e., the heat sink and internal structures, are lagging due to the lower heat transfer coefficients. As the blowdown phase of the transient ends, the internals begin to dominate the response. During this phase of the transient, since the internals are at a lower temperature, the containment atmosphere will be condensing. The end of blowdown and the condensation, i.e. the heating of the internals, dominates and terminates the pressure increase. Containment spray during this time has little effect. As the internals and the atmosphere tend toward equilibrium, if containment spray was not initiated, reactor decay heat would cause the containment temperature/pressure to increase again. The proposed change to the setpoint still has containment spray initiating during the time when condensing heat transfer dominates so that the second rise is essentially unchanged. Based on the above, the proposed change is considered safe and of insignificant impact on the containment analysis or the environmental qualification program.

Having determined that 42.26 psia is acceptable as the analytical setpoint, the TS can be revised accordingly. First, this value is instrument error corrected. This yields the TS channel calibration allowable value (42.26 psia - 1.270 psi) of 40.99 psia or 26.29 psig. Reducing the 42.26 psia to include sensor drift (42.26 psia - 1.3232 psi) results in 40.94 psia or 26.24 psig (rounded up) as the channel functional test allowable value. Reducing the 42.26 psia to include all drift (42.26 psia - 1.3278 psi) results in 40.93 psia (truncated) or 26.23 psig for the TS setpoint.

d. RCS PRESSURE - LOW

It is proposed that the RCS Pressure - Low setpoint be changed from 1620.75 psig to 1546.20 psig.

Historical Perspective

This trip is used to provide protection for small break LOCA (SBLOCA) and MSLB. SBLOCA for the 0.04 square foot break was reanalyzed by the NSSS supplier using a low pressure trip of 1585 psia. A revision of the MSLB reanalysis justified a value of 1515 psia. Page 7-91 of the FSAR indicates the accuracy of this trip as 2.03% of a 2500 psig range. Therefore, 1585 psia + 2.03% * 2500 psi = 1635.75 psia.

Using 15 psi as the conversion from atmospheric to gauge (frequently used by the NSSS supplier for conservatism) gives 1635.75 psia - 15 psi = 1620.75 psig, which is the current TS setpoint. The current TS also provides a 5 psi allowable margin for drift.

Basis for Proposed Setpoint

During the DBR for this trip, various analytical setpoints were identified for different safety analyses (1465, 1515 and 1585 psia). The majority of the analytical setpoints were 1515 psia.

In order to provide a more consistent design basis, the NSSS supplier was tasked with determining whether an analytical trip of 1515 psia could be justified for those analyses which used a 1585 psia trip value. Following a review of pertinent safety, LOCA and best estimate analyses, it was determined that only two analyses incorporated setpoints of 1585 psia. The two analyses impacted by the reduction to 1515 psia were the 0.04 square foot SBLOCA and the letdown line break.

The 0.04 square foot SBLOCA impacted was originally performed to address NRC questions concerning NUREG - 0737. The effect of lowering the trip to 1515 psia is a slight delay in the actuation of high pressure injection (HPI) and a slightly lower core collapsed liquid level. Based on the NSSS supplier task noted above, an additional 7.7 seconds are required for the RCS to reach 1515 psia. After accounting for the mass the HPI delivered during the 7.7 seconds, the reduction in core liquid level was determined to be 1.33 inches. This amounts to a reduction in the minimum core collapsed liquid level from 10.07 feet to 9.96 feet. The NSSS supplier has determined that the collapsed liquid level must fall below 8.5 feet before core uncovery is predicted and peak clad temperature (PCT) excursions occur. Therefore, the reduction in core liquid level due to the reduced SFAS low pressure trip setpoint of 1515 psia is safe and will not yield PCT excursions.

The letdown line break event described in USAR Section 15.4.5 was revised in 1988 to incorporate a reduction in the low pressure reactor protection system (RPS) trip from 1985 psia to 1900 psig. This analysis has since been revised to isolate the line break 15 seconds after the low pressure SFAS trip. Therefore, a reduction in the SFAS trip results in delaying isolation causing an additional mass and energy release. (Note: the isolation delay due to SFAS RCS pressure - low trip is only applicable to the USAR Chapter 15 accident analysis and associated radiological consequences (discussed below) and not to the USAR Chapter 3 high energy line break (HELB) analysis since the letdown cooler outlet temperature switches are credited for mitigation of this event.) The additional depressurization time required to reach 1515 psia verses 1585 psia was determined to be 45.51 seconds. The additional mass and energy release associated with the time delay was determined to be 7,104 lbm and 3,054,720 BTU respectively.

Using the information described above, a radiation dose calculation was performed to determine the increase in doses at the exclusion area boundary (EAB) and the low population zone (LPZ) due to the proposed

change. The following table summarizes the results of the dose calculation performed in 1988 and the new radiation doses associated with an SFAS RCS pressure low trip analytical setpoint of 1515 psia.

OFF SITE DOSES

	EAB(REM)		LPZ(REM)	
	OLD	NEW	OLD	NEW
THYROID	3.52	4.83	0.18	0.25
WHOLE BODY	0.03	0.04	0.002	0.002
SKIN	0.02	0.03	0.001	0.001

CONTROL ROOM DOSES

	OLD	NEW
THYROID	10.8	14.9
WHOLE BODY	0.1	0.1
SKIN	0.07	0.09

As the table shows, the doses are higher than those previously reported due to the longer blowdown time. However, these results satisfy the NRC Standard Review Plan Section 15.6.2 acceptance criteria that doses be well below 10% of 10CFR100 guideline values and, therefore, this change is considered safe by Toledo Edison.

Using 1515 psia as the analytical setpoint, the TS trip setpoint and allowable value is determined as follows based on the instrument string uncertainties.

The instrument string uncertainty not including drift was calculated to be 42.998 psi. Therefore, the TS allowable value for channel calibration is 1515 psia + 42.998 psi or 1558 psia (rounded up) or 1543.30 psig. The instrument string error including just sensor drift was calculated to be 45.696 psi. Therefore, the TS allowable for functional testing is 1515 psia + 45.696 = 1560.696 psia rounded to 1560.7 psia or 1546.00 psig. The instrument string uncertainty including drift was calculated to be 45.82 psi. Therefore, the TS trip setpoint is 1515 psia + 45.82 psi or 1560.82 psia rounded to 1560.90 psia or 1546.20 psig.

e. RCS PRESSURE - LOW-LOW

It is proposed that the RCS Pressure - Low-Low setpoint be changed from 420.75 psig to 430.90 psia (416.20 psig).

Historical Perspective

Currently, the low-low pressure trip setpoint is not explicitly taken credit for in the safety analyses. Functionally, the trip does initiate low pressure injection (LPI) and is required. In the LBLOCA analysis LPI is initiated concurrently with HPI. Due to the rapid

depressurization of the RCS and since it is more conservative to assume a loss of offsite power (LOOP) concurrent with the LOCA (because it causes a loss of RCPs/forced flow), while the emergency diesel generator (EDG) start and sequencing are occurring, the RCS pressure has already dropped below the trip setpoints for HPI and LPI. Therefore, since starting of the pumps cannot occur until EDG start and sequencing are complete, any LPI setpoint reached during that period is acceptable. (Containment Pressure - High serves as a backup trip.) Therefore, the TS trip setpoint value is nominal and is not based on any specific safety limits or analytical value.

Without an analytically based value, the following technique was used to incorporate standard string error methodology.

Basis for Proposed Setpoint

Using the historical perspective for the RCS Pressure - Low, which is analytically based, as a guideline, the current RCS Pressure - Low-Low TS setpoint can be used to generate an assumed analytical setpoint. First, 15 psi is added to the current TS setpoint to convert to atmospheric. Next, the FSAR value of 2.03% of a 2500 psig range is subtracted to account for the uncertainties. This results in an analytical setpoint of (420.75 + 15 - 2.03% * 2500)=385 psia.

Using the 385 psia as the analysis setpoint, a revised TS setpoint and allowable value can be generated using the ISA S67.04 methodology. The instrument string uncertainty not including drift was calcula[illegible] be 42.998 psi. Therefore, the TS allowable value for channel c[illegible] n is 385 psia + 42.998 psi or 428 psia (rounded up) or 413.30 p[illegible] e instrument string uncertainty including all drift was calculated [illegible] be 45.82 psi. Therefore, the TS trip setpoint is 385 psia + 45.82 ps[illegible] = 430.9 psia (rounded up) or 416.20 psig. The instrument string uncertainty including just sensor drift is 45.696 psi. Therefore, the TS allowable value for functional testing is 385 psia + 45.696 psi = 430.7 psia (rounded up) or 416.00 psig.

f. BWST LEVEL

It is proposed that the BWST Level setpoint be changed from greater than or equal to 89.5 and less than or equal to 100.5 inches to greater than or equal to 95.59 and less than or equal to 105.28 inches.

Historic Perspective

This trip is an interlock which provides a permissive output to enable the manual transfer of LPI and containment spray pump suction from the borated water storage tank (BWST) to the containment emergency sump on low level in the BWST. It is also used to prevent a premature manual transfer to protect these pumps from cavitation due to lack of proper net positive suction head.

The TS setpoint and allowable value for the borated water storage tank (BWST) were changed in 1983 under License Amendment Number 58 (Log Number 1279) in response to Toledo Edison's submittal dated October 14, 1982 (Serial 862). The uncertainty analysis used in the submittal was based on a Bechtel calculation dated January 6, 1981. The calculation used summation of error terms for the analysis versus SRSS. The resulting instrument uncertainty including drift was 13.5 inches and the drift component was 1.2 inches. The submittal also used 114 and 76 inches as the highest and lowest (respectively) actual level that the interlock trip is allowed to occur. (The lowest value is in itself a function of the uncertainties: setpoint tolerance + drift + inaccuracy including drift all times two to account for plus and minus = (4.3 + 1.2 + 13.5) x 2 = 38. Therefore, 114 - 38 = 76.) Therefore, the current TS setpoint was determined to be less than or equal to 114 - 13.5 and greater than or equal to 76 + 13.5 or greater than or equal to 89.5 and less than or equal to 100.5 inches and the allowable differed by the 1.2 inch drift component.

Basis for proposed setpoint

The only change for the proposed TS is the incorporation of ISA S67.04 methodology. The revised instrument uncertainty including drift is 8.72 inches (rounded up), the uncertainty including just sensor drift is 8.64 inches (rounded up) and the uncertainty without drift is 8.16 inches (rounded up). The lowest actual value was calculated to be 86.87 inches. Using these values, the revised TS setpoint is greater than or equal to 86.87 + 8.72 = 95.59 and less than or equal to 114 - 8.72 = 105.28 inches of water, the allowable value for functional testing is greater than or equal to 86.87 + 8.64 = 95.51 and less than or equal to 114 -8.64 = 105.36 inches and the allowable value for channel calibration is greater than or equal to 86.87 + 8.16 = 95.03 (rounded up) and less than or equal to 114 - 8.16 = 105.84 (rounded down) inches.

This completes the discussion of the SFAS. Based on the foregoing discussions for each affected SFAS functional unit Toledo Edison considers the proposed changes to be safe. The SFRCS will be addressed next and the setpoints will be discussed in the order in which they appear in TS Table 3.3-12.

1. STEAM LINE PRESSURE - LOW

It is proposed that the Steam Line Pressure - Low setpoint be changed from 591.6 psig to 597.70 psig.

Historical Perspective

This trip provides protection for the steam line break event. The TS trip setpoint and the allowable value have not been changed since the DBNPS was licensed. The analytical trip setpoint originally used in the FLASH computer code was 600 psia (FSAR Section 15.4.4). When 600 psia is converted to gauge, there is a small conservative difference (600 psia - 14.4 psi = 585.6 psig versus 586.6 allowable) between the analytical value and the allowable value. This difference could not be

accounted for, but is too small to accommodate instrument uncertainties using ISA S67.04 methodology. Additionally, the 5 psi difference between the TS setpoint and the allowable value (591.6 & 586.6 psig) is larger than required to account for drift. Finally, from a 1977 Bechtel memorandum, a field setpoint of 612 psig was to be used. This is approximately 20 psi conservative. Based on the above, it appears that the instrument uncertainties were being accounted for in the field setpoint and the allowable value.

Alternatively, as was discussed for the SFAS, the setpoints currently in the TS are conservative enough that including the instrument errors and redoing the analysis would still yield acceptable results.

The logic channels of the SFRCS are made up of solid state components. Therefore, the system response time for this trip is virtually instantaneous. Recent analyses of steam line breaks performed by NSSS supplier using the approved TRAP2 computer code indicate that the SFRCS low pressure analytical setpoint was reached in 0.17 seconds. Using the 754.7 psia minimum initial steam line pressure, the depressurization equates to 910 psi/sec. Therefore, even if instrument error did amount to 20 psi, the response time would only change by 0.022 seconds which is not significant for this event.

Basis for Proposed Setpoint

The proposed change to the TS is based on an instrument string error calculation. Using 600 psia as the analytical setpoint, after converting to gauge (600 psia - 14.7 psi = 585.3 psig), the TS trip setpoint is determined to be 597.7 psig (585.3 psig + 12.40 psi (calculated string error including drift rounded up)). Upon eliminating the drift component, which for this trip is all attributed to the sensor, the TS allowable value for channel calibration becomes 596.65 psig (585.3 psig + 11.35 psi (calculated string error without drift rounded up)). The allowable for the functional test is the same as the TS setpoint since no drift is attributed to the remainder of the string.

2. STEAM GENERATOR LEVEL - LOW

This trip setpoint was changed under License Amendment Number 118 (Log Number 2731). This calculation was prepared in 1988 using ISA S67.04 methodology. Therefore, this setpoint is not being changed. However, for consistency the values are revised to two decimal places.

3. STEAM GENERATOR FEEDWATER DIFFERENTIAL PRESSURE - HIGH

It is proposed that the Steam Generator Feedwater Differential Pressure - High setpoint be changed from 197.6 psid to 187.10 psid.

Historical Perspective

This trip was designed to provide protection for the feedwater line break event and a diverse backup for the loss of main feedwater pump (MFP) trip. The analytical setpoint used in the original TRAP2

analysis performed in 1973 was 200 psid. The 200 psid setpoint was not explicitly coded into the model, but was assumed to occur almost instantaneously after the break. However, for analysis purposes it was assumed that the signal actually occurred after approximately 1 second due to instrument delays. The main feedwater/steam generator differential pressure signal actually has an intentional 1/2 second time delay to prevent spurious trips.

Here again, as with the steam line pressure - low, the conservative time responses used in the model would be enough to account for instrument uncertainties. Additionally, some error corrections which could not be reproduced have been applied to the setpoint and allowable values with an additional 20 psi applied to the field setpoint.

Basis for proposed setpoint

The proposed change to the TS is based on instrument string error calculation. The analytical setpoint remains at 200 psid. The calculated string error including drift was 12.84 psi (rounded up). This results in a TS setpoint of (200 psid - 12.84 psi) 187.10 psid (truncated). The string error not including drift was 8.1 psi (rounded up). Therefore, the allowable for channel calibration value becomes (200 psid - 8.1 psi) 191.90 psid. (The allowable for channel functional test equals the TS setpoint since the drift for the remainder of the string is insignificant.)

4. REACTOR COOLANT PUMPS - LOSS OF

It is proposed that the Reactor Coolant Pumps - Loss Of setpoint be changed from a high less than or equal to 1384.6 amps and low greater than or equal to 106.5 amps to a high less than or equal to 1403.84 amps and low greater than or equal to 102.42 amps.

Historical Perspective

The SFRCS requires the reactor coolant pump monitors (RCPMs) to detect the loss of power to all four reactor coolant pumps (RCPs). This function is provided to initiate auxiliary feedwater and establish natural circulation. Additionally, the RCPMs are designed to detect a RCP locked rotor or a loss of motor load (broken shaft or dropped impeller). Although the RCPMs are not part of the reactor protection system (RPS), the status of the RCPs is also supplied to the RPS for the power/number of pumps running trip. The locked rotor and the loss of motor load were used to establish the present TS setpoints. A Bechtel calculation was performed in 1977. The calculation used a locked rotor "safety limit" of 1560 amps for the overcurrent setpoint determination and a loss of motor load "safety limit" of 91 amps for the undercurrent setpoint determination. In this analysis the circuit consists of a 600:5 current transformer with a 10% accuracy, a 1 mADC/5

Amps AC transducer with a 0.005 mA accuracy, a 5 kOHM resistor with a 1 % accuracy and a dual - alarm card with a 0.02 Volt accuracy. Therefore, the error corrected voltages produced are:

{[(1560 amps x 5/600 -10%) x 1mA/5A -0.005mA] x 5kOHM} -1% -0.02 volts= 11.538 volts
and
{[(91 amps x 5/600 +10%) x 1mA/5A +0.005mA] x 5kOHM} +1% +0.02 volts=0.8878 volts

To convert the error corrected voltages to an equivalent current, the same equation is used but in reverse and without the error terms. Therefore,

current x 5/600 x 1mA/5A x 5OHM/1 = volts
current x 1/120 x OHM = volts
or current = 120 volts/OHM

The TS limits are then:
overcurrent = 11.538 x 120 = 1384.6 AMPS
undercurrent = 0.8878 x 120 = 106.5 AMPS
which are the current TS limits.

Basis for Proposed Setpoint

The "safety limits" are not altered for the proposed TS setpoints. The proposed change is based on the instrument string error calculation. Aside from using SRSS methodology, the differences in the analyses are given below. The previous analysis only used an uncertainty of 0.005 mA for the transducer. The new calculation used an accuracy of 0.5% of span and a temperature effect of 0.75% of calibrated span or 3 AMPS and 4.5 AMPS respectively. Since the dual alarm card setpoints are set using the input current, any tolerance in the 5kOHM dropping resistor is automatically included when the setpoints are adjusted. In other words, the 1% tolerance used previously is calibrated out and is, therefore, not included in the new calculation. The dual alarm card was changed to include accuracy, voltage effects and temperature effects of 0.5%, 0.2% and 0.5% of calibrated span respectively. The new calculation also included a drift component for the dual alarm card of 3 AMPS. Therefore, the revised uncertainty for the undercurrent setpoints including drift, was determined to be 11.413 AMPS and 11.158 AMPS without drift. The revised uncertainty for the overcurrent setpoint, including drift, was determined to be 156.152 AMPS and 156.134 AMPS without drift. The proposed TS limits are (91.+11.413) 102.42 AMPS (rounded up) for the undercurrent setpoint and (1560-156.152) 1403.84 AMPS (truncated) for the overcurrent setpoint. Since all the drift is for the dual alarm card, the allowable values for the channel functional test and channel calibration are the same. The allowables are (91+11.158) 102.16 AMPS (rounded up) for the undercurrent and (1560-156.134) 1403.86 (truncated) for the overcurrent.

Based on the forgoing discussion of the proposed trip setpoints for each SFRCS functional unit, Toledo Edison considers the proposed changes to be safe.

SIGNIFICANT HAZARDS CONSIDERATION

The Nuclear Regulatory Commission has provided standards in 10 CFR 50.92(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 has 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 these changes would:

1a) Not involve a significant increase in the probability of an accident previously evaluated because there are no design modifications or hardware changes proposed.

1b) Not involve a significant increase in the consequences of an accident previously evaluated because the slight increase due to a letdown line break event as a result of changing the RCS pressure - low setpoint still satisfies the NRC Standard Review Plan Section 15.6.2 acceptance criteria that doses be well below 10% of 10CFR100 guideline values. The remaining setpoint changes do not increase the radiological consequences.

2a) Not create the possibility of a new kind of accident from any accident previously evaluated because there are no design modifications or hardware changes proposed to the plant.

2b) Not create the possibility of a different kind of accident from any accident previously evaluated because there are no design modifications or hardware changes proposed to the plant.

3) Not involve a significant reduction in a margin of safety as defined in the basis for any Technical Specification because the proposed change establishes an error analysis which has been shown to adequately preserve the margin of safety.

CONCLUSION

On the basis of the above, Toledo Edison has determined that the License Amendment Request 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.