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Dominion®

May 15, 2008

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2378

Serial No.: 08-0248A
NLOS/MAE: R2
Docket No.: 50-423
License No.: NPF-49

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING STRETCH POWER UPRATE LICENSE AMENDMENT REQUEST
REVISED RESPONSE TO FOLLOW-UPS EEEB-08-0108 THROUGH EEEB-08-0113 TO QUESTION EEEB-07-0052

Dominion Nuclear Connecticut, Inc. (DNC) submitted a stretch power uprate license amendment request (LAR) for Millstone Power Station Unit 3 (MPS3) in letters dated July 13, 2007 (Serial Nos. 07-0450 and 07-0450A), and supplemented the submittal by letters dated September 12, 2007 (Serial No. 07-0450B), December 13, 2007 (Serial No. 07-0450C), March 5, 2008 (Serial No. 07-0450D), March 27, 2008 (Serial No. 07-0450E) and April 24, 2008 (Serial No. 07-0450F). The NRC staff forwarded requests for additional information (RAIs) in October 29, 2007, November 26, 2007, December 14, 2007, December 20, 2007 and April 23, 2008 letters. DNC responded to the RAIs in letters dated November 19, 2007 (Serial No. 07-0751), December 17, 2007 (Serial No. 07-0799), January 10, 2008 (Serial Nos. 07-0834, 07-0834A, 07-0834C, and 07-0834F), January 11, 2008 (Serial Nos. 07-0834B, 07-0834E, 07-0834G, and 07-0834H), January 14, 2008 (Serial No. 07-0834D), January 18, 2008 (Serial Nos. 07-0846, 07-0846A, 07-0846B, 07-0846C, and 07-0846D), January 31, 2008 (Serial No. 07-0834I), February 25, 2008 (Serial Nos. 07-0799A and 07-0834J), March 10, 2008 (Serial Nos. 07-0846E and 07-0846F), March 25, 2008 (Serial No. 07-0834K), April 4, 2008 (Serial No. 07-0834L) and April 29, 2008 (Serial No. 08-0248).

In a conference call on May 1, 2008, the NRC staff requested revised responses to Follow-Ups EEEB-08-0108 through EEEB-08-0113 to Question EEEB-07-0052, which had been provided in DNC's April 29, 2008 letter (Serial No. 08-0248). As requested, the attached responses provide revisions, marked with revision bars, to the April 29, 2008 responses.

The information provided by this letter does not affect the conclusions of the significant hazards consideration discussion in the December 13, 2007 DNC letter (Serial No. 07-0450C).

Should you have any questions in regard to this submittal, please contact Ms. Margaret Earle at 804-273-2768.

Sincerely,

Leslie N. Hartz
Vice President - Nuclear Support Services

COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by Leslie N. Hartz, who is Vice President - Nuclear Support Services of Dominion Nuclear Connecticut, Inc. She has affirmed before me that she is duly authorized to execute and file the foregoing document in behalf of that Company, and that the statements in the document are true to the best of her knowledge and belief.

Acknowledged before me this 15th day of May, 2008.

My Commission Expires: August 31, 2008.

Margaret B. Bennett
Notary Public

MARGARET B. BENNETT
Notary Public 354302
Commonwealth of Virginia
My Commission Expires Aug 31, 2008

Commitments made in this letter: None

Attachment

cc: U.S. Nuclear Regulatory Commission
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NRC Senior Resident Inspector
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ATTACHMENT

LICENSE AMENDMENT REQUEST

STRETCH POWER UPRATE LICENSE AMENDMENT REQUEST

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

REVISED RESPONSE TO FOLLOW-UPS

EEEB-08-0108 THROUGH EEEB-08-0113 TO QUESTION EEEB-07-0052

MILLSTONE POWER STATION UNIT 3
DOMINION NUCLEAR CONNECTICUT, INC.

Stretch Power Uprate License Amendment Request
Response To Request For Additional Information
Revised Response To Follow-Ups EEEB-08-0108 through EEEB-08-0113 To Question EEEB-07-0052

By letter dated July 13, 2007, as supplemented by additional letters, Dominion Nuclear Connecticut, Inc. (DNC), licensee of Millstone Power Station, Unit No. 3 (MPS3), submitted the application, "Dominion Nuclear Connecticut, Inc., Millstone Power Station Unit 3, License Amendment Request, Stretch Power Uprate," to the U.S. Nuclear Regulatory Commission (NRC). The proposed license amendment would allow an increase in the maximum authorized power level from 3,411 megawatts thermal (MWt) to 3,650 MWt, and make changes to the technical specifications, as necessary, to support operation at the stretch power level.

The U.S. Nuclear Regulatory Commission (NRC) staff has been reviewing the submittal and has determined that additional information is needed to complete its review.

ELECTRICAL ENGINEERING BRANCH

NRC Question EEEB-07-0052 Follow-Up (EEEB-08-0108)

In the March 25, 2008, letter, the licensee states that the analysis for the Main Steam Valve Building (MSVB) following a main steam line break (MSLB) is performed for the duration of the component's mission time. Specify the mission time and function for each of the affected components in the MSVB. Describe the effects of the increased temperature and pressure on the affected components. In addition, explain, in detail, the assumptions and methodology used to evaluate the components. Provide a comparison of the pre-stretch power uprate (SPU) and SPU environmental temperature and pressure profile. Also, provide the detailed environmental qualification (EQ) evaluations and calculations for the ASCO solenoid valves, NAMCo limit switches, Rosemount pressure transmitters, Limitorque motor-operated valves and solenoids associated with Sulzer main steam isolation valves (MSIVs) and ITT actuators.

NRC Question EEEB-07-0052 Follow-Up (EEEB-08-0109)

Provide the worst-case breaks and their impact on the EQ components for the MSVB EQ analysis.

NRC Question EEEB-07-0052 Follow-Up (EEEB-08-0110)

In the March 25, 2008, letter, the licensee states that the outside temperature (i.e. component casing temperature) of the equipment, instead of the internal temperature of the equipment, was conservatively compared with the component qualification temperature. Provide a basis for why the outside temperature is conservative for the affected EQ components.

NRC Question EEEB-07-0052 Follow-Up (EEEB-08-0111)

During the March 31, 2008, teleconference, the licensee stated that due to the temperature increase in the MSVB, a design change (enclosing the Limitorque motors with insulation) will be required to maintain the qualification of the motors. Describe the design change in detail and provide a detailed evaluation justifying how this new design, (enclosing the motors with insulation), does not impact the original qualification configuration of the Limitorque motors. In addition, provide a schedule for implementing the aforementioned design change.

NRC Question EEEB-07-0052 Follow-Up (EEEB-08-0112)

Do the motor-operated valves installed in the MSVB use magnesium rotors? If yes, then evaluate the impact of high temperatures on the motors due to the SPU to ensure that these motors do not experience the failure mechanism identified in Information Notice 2006-26 and industry operating experience.

NRC Question EEEB-07-0052 Follow-Up (EEEB-08-0113)

In the March 25, 2008, letter, the licensee stated that the ITT actuators are not required to mitigate the consequences of an MSLB in the MSVB. Provide the function of the ITT actuators and the impact on other components or systems if the ITT actuators fail due to MSLB in the MSVB under SPU conditions.

DNC Revised Response

Main Steam Valve Building Harsh Temperature Environment

Stretch Power Uprate (SPU) has no impact upon Main Steam Valve Building (MSVB) environmental temperatures, except for a MSVB high energy line break (HELB).

Dominion Nuclear Connecticut, INC. (DNC) has finished the electrical environmental qualification (EQ) assessment for credited electrical components located in the MSVB (described in license amendment request (LAR) Section 2.3.1.2.3.2). The potentially impacted components are: ASCO Solenoid valves, NAMCo limit switches, Rosemount pressure transmitters, Limitorque motor operated valves, Sulzer main steam line isolation valve (MSIV) solenoids, and ITT damper actuators. The DNC analysis demonstrates that existing qualification temperatures are in excess of the calculated peak post-SPU operating temperatures for these components, or it was verified that qualification or operability is not required to mitigate the MSVB HELB, including post-accident monitoring design functions.

Analysis Overview for the MSVB Harsh Temperature

The limiting MSVB environments were determined by the analysis of 56 MSVB HELB cases. Eleven break sizes of 0.05, 0.10, 0.20, 0.30, 0.40, 0.50, 0.60, 0.70, 0.80, 0.90 and 1.0 ft^2 were analyzed. The case definitions are summarized as:

a. Eleven break sizes were analyzed at 102% and 70% SPU nuclear steam supply system (NSSS) power levels to maximize the enthalpy of superheated steam releases (22 cases). The assumptions made for the cases which maximize the enthalpy of superheated steam releases are intended to cause early uncovery of the tube bundle in the shell of the steam generator, resulting in maximum enthalpy of the steam released.

b. Eleven break sizes were analyzed at 102% and 70% SPU NSSS power levels to maximize the duration of steam release and soak time (22 cases). The assumptions made for the cases which maximize hot environmental soak time are intended to maximize the duration of the transient which is primarily accomplished by increasing the mass available for release from the break.

c. Twelve cases were analyzed for the T_{avg} coastdown for the break sizes from 1.0 ft^2 to 0.5 ft^2. Each break size was analyzed for both maximum enthalpy and maximum soak time. This analysis includes an accounting for the end-of-cycle T_{avg} coastdown from 589.5°F to 571.5°F. This is of concern because the actual reactor coolant system (RCS) average temperature may be as much as 18°F cooler at the end of the fuel cycle, but the T_{avg} and ΔT reference temperatures for the overpressure delta temperature (OPΔT) and over temperature delta temperature (OTΔT) setpoints remain at the high-T_{avg} value. Therefore, the cases which trip on OPΔT are reanalyzed with new values related to the T_{avg} coastdown: nominal T_{avg}, steam temperature, pressurizer water level, and SG mass while maintaining the reference ΔT and T_{avg} used in the OTΔT and OPΔT setpoint equations.

In cases which did not result in an automatic main steam isolation (MSI) signal on OPΔT or low steam line pressure, manual initiation is modeled at 1800 seconds.

The mass and energy (M&E) releases into the MSVB were used to determine the

MSVB environments for the cases described above. In addition to the event scenarios, sensitivity studies were performed for the MSVB initial conditions of temperature, humidity and pressure. Using these results, a thermal lag analysis for the required components in the MSVB was performed to determine the peak component temperature at the time it is required to perform its design function. Consistent with current design and licensing basis, the analysis is performed for the duration of the components' mission time, which is the time period from the initiation of the HELB until the point within the event that the component is required to perform its intended design function.

A comparison of the enveloping pre- and post-SPU environmental temperature profiles is provided in Figure 1. The current EQ pressure profile envelopes post-SPU pressure profiles for all cases analyzed. Therefore there is no change to the EQ pressure profile. The enveloping EQ pressure profile is shown in Figure 2.

ASCO Solenoid Valves:

The primary function of the ASCO solenoid valves in the MSVB is to de-energize such that their respective valves change to the required safe position under a HELB environment. Once this function is complete, no further post accident functions are required.

Pre-SPU ASCO solenoid valve thermal lag analysis used a bounding environment temperature profile (i.e., 1.0 ft^2 break size, 102% NSSS power level, maximum enthalpy) and a maximum mission time of 1800 seconds. This maximum mission time bounds the MSI times for all break sizes analyzed. The analysis also assumes that the valves are energized to account for coil heat generation. The peak temperatures were determined for the solenoid coil, air gap and coil housing. The maximum post-SPU coil temperature is calculated by conservatively adding the temperature difference between the bounding pre- and post-SPU environment temperature profiles to the calculated peak pre-SPU coil temperature (See note on Figure 3). The peak temperature for pre-SPU environment temperature profile for solenoid valve qualification is 494.2°F (See Figure 3, curve labeled Tamb). The peak temperature identified in the post-SPU environment temperature profile for solenoid qualification is 562.2°F (See Figure 1, curve labeled 1.0 sqft w/max enthalpy, 102%, initial MSVB temperature of 140°F). The pre-SPU solenoid coil temperature at the maximum mission time (1800 seconds) is 377°F (See Figure 3, curve labeled Tcoil). The post-SPU peak coil temperature as identified in the note on Figure 3 is 445°F and remains below the 450°F ASCO solenoid valve qualification temperature.

<u>NAMCo Limit Switches</u>:

The function of the NAMCo limit switches is to complete the electrical circuit without a voltage drop when the contacts are closed and provide an open circuit resistance when contacts are opened, when exposed to a high energy line break (HELB) environment.

Unlike the thermal lag analysis for the ASCO solenoid valves, a bounding 1800-second mission time was not used for the NAMCo limit switches. Instead, the thermal lag analysis used the mission time for each specific break size that was determined in the HELB analysis (i.e., for each break size, the temperature is calculated for the period starting from break initiation until the MSI signal is received). The analysis for all break sizes used their corresponding worst case temperature profiles (i.e., 102% SPU NSSS power level, maximum enthalpy). Additionally, the 0.2 ft^2 break size was analyzed using a 70% SPU NSSS power level, and a maximum enthalpy temperature profile, which resulted in the highest peak temperature because MSI occurs much later for the 70% SPU NSSS power level case than the 102% SPU NSSS power level case. MSI for the 0.2 ft^2 HELB at 70% power case occurs at 1613 seconds. The calculation assumes an initial casing temperature of 140°F. The calculated phenolic inner casing temperature at 1613 seconds is 338°F, which remains less than the 340°F qualification temperature for the most limiting NAMCo limit switch model. Post-SPU ambient and component temperature profiles are provided in Figure 4.

The calculated temperature of 338°F provides a 2°F margin to the NAMCo qualification temperature. 10 CFR 50.49 states that margins must be applied, in the electrical equipment qualification program, to account for unquantified uncertainty, such as the effects of production variations and inaccuracies in test instruments. The Millstone Unit 3 EQ program Licensing Bases is Regulatory Guide 1.89, Rev 0, November 1974, and NUREG 0588, Rev. 1 as endorsed by Regulatory Guide 1.89, Rev. 1, June 1984. It is based on the EPRI Nuclear Power Plant Qualification Reference Manual and applies guidance provided in IEEE Standard 323-1974.

The EPRI Nuclear Power Plant Qualification Reference Manual, Section 5.8, states that the intent of margin is to account for normal variations in commercial production of equipment and reasonable errors in defining satisfactory performance. IEEE-323, Section 6.3.1.5, states that qualification type testing shall include provisions to verify that adequate margin exists to account for normal variations in commercial production of equipment and reasonable errors in defining satisfactory performance. In defining the type test, increasing levels of testing, number of test cycles, and test duration shall be considered as methods of assuring adequate margin exists.

NAMCo Test Report, QTR 105, qualified the subject limit switches for a

LOCA/HELB event using a double peak qualification test profile. The first test peak attained a temperature of greater than 360°F and then continued at 340°F for approximately 3 hours. The second test peak temperature and duration is used in the MPS3 Equipment Qualification Record (EQR) as the bases for qualification of the limit switches. The first test peak is used to address the IEEE-323 required margin, i.e., an additional test cycle, to account for conservatism where the qualification temperature margin is less than 15°F. Crediting the first test peak for the margin is a present Millstone Equipment Qualification Program practice and is not impacted by the MPS3 Stretch Power Uprate.

Figure 4 illustrates a temperature profile associated with a 0.2 ft^2 break in the break exclusion area. 1613 seconds is the latest time at which Main Steam Isolation is assumed to occur for this event. At that time, the three non-faulted steam generators are isolated and the faulted steam generator will continue to blow down through the break. Note that this is a bounding scenario that results in the MSVB area temperatures continuing to increase above the NAMCo qualification temperature. Other steam line breaks outside the break exclusion area would result in isolation of steam from the break, with subsequent reduction in building temperatures. The MSVB NAMCo limit switches subjected to the temperature rise for this bounding scenario perform one of the following functions:

1. Valve position indication via lights on the Main Control Board and/or local electrical distribution equipment, plant process computer valve position input, and valve position annunciation. Failure of these limit switches will simply result in loss, or ambiguity, of those position signals. Many of these are credited for Reg Guide 1.97 post accident monitoring, primarily for containment isolation verification. Because this environmental condition is from a MSLB in the MSVB, containment isolation is not a required function and loss of these indications will not be significant nor impact any safety function. For the other valve position indications which are related to feedwater and/or steam line isolation, the closure of the valve will be recorded in the plant process computer history file once the valve has reached its safety position, which will occur prior to reaching the NAMCo qualification temperature. Subsequent indirect indication of maintaining valve closure will be evident through monitoring of steam line pressure and steam generator level indications. These are indications only and any environmental condition related failure of these limit switches cannot result in a repositioning of these valves from their safety position.

2. Air Operated Valve (AOV) control seal-in circuits which hold the AOV's solenoid valve energized after the momentary push button opens the AOV. These limit switch contacts are normally open in their de-energized state, i.e., the limit switch internal spring opposes contact closure. Once the valves move to their fail safe position, closed, there is no credible

failure mechanism on the part of these limit switches that could cause a re-actuation of the solenoid and subsequent opening of the AOV.

3. Valve position feedback to the hydraulic controls of the Feedwater Isolation Valves (FWIVs). The limit switch position signals permit the plant operators to manually open or close the FWIVs. They perform no function in the FWIV's safety action to close upon receipt of a Feedwater Isolation signal, nor can their failure prevent the FWIV's safety action to close. Additionally, because the limit switches only act as a permissive in the control circuits, any failure of the limit switches will not cause the FWIVs to open once they have moved to their fail safe closed position.

Therefore, should any of the subject MSVB NAMCo limit switches fail as a result of being exposed to the bounding worst case MSLB postulated above, they will not prevent any safety functions from occurring, nor will their failure result in any unacceptable consequences.

<u>Rosemount Pressure Transmitters</u>:

The MSIVs isolate steam flow from the secondary side of the steam generators following a HELB. The subject pressure transmitters provide signals to the MSIVs for steam line low-pressure isolation. For a MSVB HELB, these pressure transmitters must be capable of performing their intended function under the harsh environment.

The analysis for the Rosemount pressure transmitters uses a similar approach as that of the ASCO solenoid valves. The analysis was performed using a bounding temperature profile (i.e., 1.0 ft^2 break size, 102% SPU NSSS power level, maximum enthalpy, 140°F initial temperature) and maximum mission time of 1800 seconds. Initial casing temperature of 140°F is assumed to maximize the pressure transmitter temperature. Post-SPU temperature profiles of the ambient and the pressure transmitter head are provided in Figure 5 for the 1.0 ft^2 break size. The calculated transmitter temperature at 1800 seconds is 276°F, which remains less than the 318°F qualification temperature.

Limitorque Motor Operators:

The only motor operated valves (MOVs) that credit Limitorque operator remote operation during a MSVB HELB are valves 3MSS*MOV18A/B/C/D. These valves are used to isolate the steam generator atmospheric relief or relief bypass lines. 3MSS*MOV18A/B/C/D, are only required to perform their safety function to close for HELBs outside the break exclusion zone. Therefore, only the steam line breaks within the MSVB that are outside of the break exclusion zone (BEZ) are considered. A three inch diameter HELB is the worst case break for this analysis outside the BEZ.

The subject valve bodies contain steam during normal operation. Therefore, the analysis used initial motor casing surface temperatures that are higher than the initial ambient temperature. The analysis was performed using temperature profiles from 0.05 ft^2 and 0.1 ft^2 break sizes (double ended guillotine break for a 3-inch diameter line). Four cases for each break size were analyzed: 1) maximum enthalpy at 102% SPU NSSS power level, 2) maximum enthalpy at 70% SPU NSSS power level, 3) maximum soak time at 102% SPU NSSS power level, and 4) maximum soak time at 70% SPU NSSS power level. These cases were chosen to be bounding since they provide the temperature versus time profiles for maximum peak temperature and maximum time for exposure of the component to an elevated temperature prior to superheat and the maximum temperature at the end of the analysis time. The analysis shows that 3MSS*MOV18A/B/C/D motors require insulation to maintain the motor temperature below the qualification temperature during the MSVB HELB event. The most limiting case with insulation was determined to be the maximum soak time at 70% power, 0.05 ft^2 HELB, insulated case.

The peak MSVB environmental temperatures for all eight cases occur well within 3,600 seconds after break initiation. Therefore, the analysis was run for a period of 10,800 seconds (3 hours). Although the environment temperature drops rapidly after one hour, the analysis assumed a 240.5°F temperature for the remaining portion of the transient. In addition to the external heat flux from the harsh environment to the motor casing, the analysis assumed conductive heat flux from the valve to the motor casing. Therefore comparison of the higher casing temperature to the qualification temperature is conservative. The insulated motor casing temperature at 3 hours is 265°F, which is less than the 315°F motor qualification temperature. Post-SPU temperature profiles of the ambient and the motor casing are provided in Figure 6.

The subject motors are totally enclosed, non ventilated motors manufactured by Reliance and do not use magnesium rotors. They are qualified for 100% relative humidity.

As part of SPU project implementation, a design change will be performed to insulate the motors of the 3MSS*MOV18A/B/C/D valve operators prior to exceeding 3411 MWt. The design change will install 1.5 inch thick flexible blanket type insulation covering only the motor. The following activities support the design change process to ensure that 3MSS*MOV18A/B/C/D will perform their intended design function under SPU MSVB HELB environment.

1. An analysis will be performed showing that the motor casing temperature will be less than the motor qualification temperature following a MSLB with the insulation installed. The analysis assumes an insulation thickness of 1.5 inches having a thermal conductivity of approximately 0.326 Btu-in/hr ft^2 °F. This activity is complete.
2. The motor casing temperatures will be monitored pre- and post-modification, and compared against those calculated in the completed analysis. Enclosing the motors with insulation is expected to increase the motor temperature during normal operation and thus may impact the service life of the motor. However, based on pre-SPU casing temperature measurements, the qualified service life of the motors is not anticipated to be impacted. These motors were installed during 1998 with approximately 30 years of qualified service life still remaining. Based on the measured pre- and post-modification temperatures, any impact to the qualified service life will be incorporated into the EQ program for these motors, thus ensuring that the installed condition is applicable to the original motor qualification (i.e., the installed condition is applicable to the test condition).
3. Plant procedures will be updated such that the motors will be inspected more frequently and replaced when necessary.

In summary, with implementation of the insulation modification, 3MSS*MOV18A/B/C/D will perform their intended design function under a SPU MSVB HELB environment.

Sulzer Solenoid Valves:

The MSIVs are required to close and to remain closed upon receiving a MSI signal. The MSIVs are credited to isolate and mitigate the consequences of a HELB in the MSVB. The safety function of the Sulzer solenoid valves is to de-energize to close the MSIVs. The MSVB HELB environment resulting from the SPU conditions will result in the Sulzer solenoid valves exceeding their qualification temperature during this event. An evaluation has been performed to determine the consequences of any failure of the MSIV Sulzer solenoid valves when exposed to this MSVB HELB environment. The evaluation concluded that any electrical failure of the Sulzer solenoid valves under this event will not prevent the MSIVs from performing their design function because the identified failure modes for the solenoid valves all result in the MSIVs moving to their fail closed position thereby isolating the main steam lines. Additionally, the evaluation concluded that any electrical failure of the solenoid valves will not result in a subsequent reopening of an MSIV during the event. Therefore, the Sulzer solenoid valves are not required to be electrically qualified for the MSVB HELB temperature increase resulting from the SPU conditions.

ITT Actuators of Intake Assembly Dampers:

The ITT Actuators are part of the MSVB Ventilation System. The ventilation system provides cooling for the components in the MSVB during normal operation. Under accident conditions that generate a Safety Injection Signal (SIS), the MSVB Ventilation System is shut down (fans stopped, dampers closed) to establish the Supplementary Leak Collection and Release System (SLCRS) boundary for the MSVB. This allows SLCRS to draw a slight vacuum within the SLCRS boundary including the MSVB. SLCRS is designed for dose mitigation following an accident.

SPU does not change the MSVB peak temperature resulting from any event, except for the MSVB HELB event. For accidents outside containment, such as a MSVB HELB, the dose mitigation capability of SLCRS is not credited in the radiological consequences calculation. The release point for accidents outside the containment is the turbine building. Therefore, the radiological consequences of the HELB are not impacted by any failure of the MSVB Ventilation System to function as a SLCRS boundary. Therefore, the dose mitigation capability of SLCRS is not impacted by damper position.

The heat removal function of the MSVB Building Ventilation System is not credited in the environmental conditions calculation for the MSVB HELB. The analysis assumes all dampers and vents are closed. Therefore, failure of the dampers in either open or close position following a HELB in the MSVB has no adverse impact on the resulting environmental conditions in the MSVB. If there is no adverse impact on the environmental conditions, then there is no adverse impact on other components or systems in the MSVB.

Conclusion

The calculated peak post-SPU operating temperatures for ASCO Solenoid valves, NAMCo limit switches, Rosemount pressure transmitters and Limitorque motor operated valves are less than their existing qualification temperatures. The Sulzer solenoid valves are not required to be electrically qualified for the MSVB HELB temperature increase resulting from the SPU conditions. The ITT actuators in the MSVB ventilation system are not required to be operable during a MSVB MSLB event.

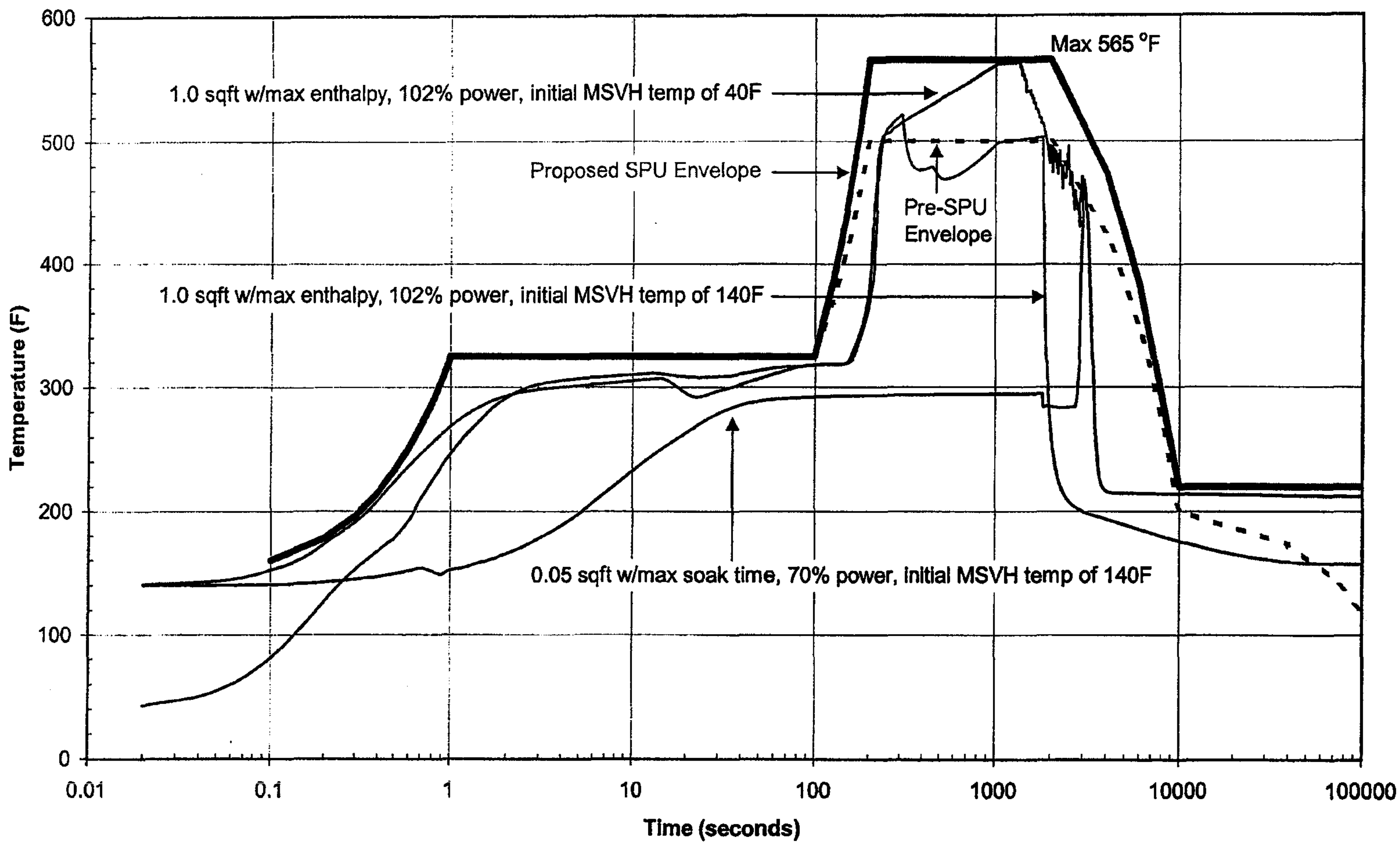
Engineered Safety Features (ESF) Building and Aux Building – Radiological Changes

The ESF EQ Zones ES-01 and ES-07, and Aux Building EQ Zones AB-19, AB-22, AB-24, and AB-31 in LAR Sections 2.3.1.2.3.3 and 2.3.1.2.3.4 were identified as requiring resolution for increased radiation levels due to SPU. The EQ zones AB-24 and AB-31 evaluation concluded the total integrated dose (TID) remains below the threshold limits for all safety related components including those that contain complementary metal oxide semiconductors or Teflon materials.

Further, plant walkdowns and design document reviews were performed for safety related equipment in EQ zones AB-19, AB-22, ES-01 and ES-07 to determine if additional equipment had to be added to the EQ program as a result of the increase in radiation levels. The plant walkdowns and design document reviews provided information on component location with respect to the gamma source term (i.e., factoring in distance from the source or location relative to penetrations) as well as the extent of beta shielding for the equipment (i.e., size and wall thickness of metal enclosures or if enclosures are open to the environment). The source term used in calculating the TID is described in LAR Section 2.3.1.2.2, Page 2.3-4. This analysis shows the component TID in EQ zones AB-19, AB-22, ES-01 and ES-07 remains below the dose threshold required for inclusion in the EEQ program (1.00E+04 Rads).

Figure 1: Pre- and Post-SPU Environmental Temperature Profiles

MP-3 MSVH HELB SPU Temperature Envelope



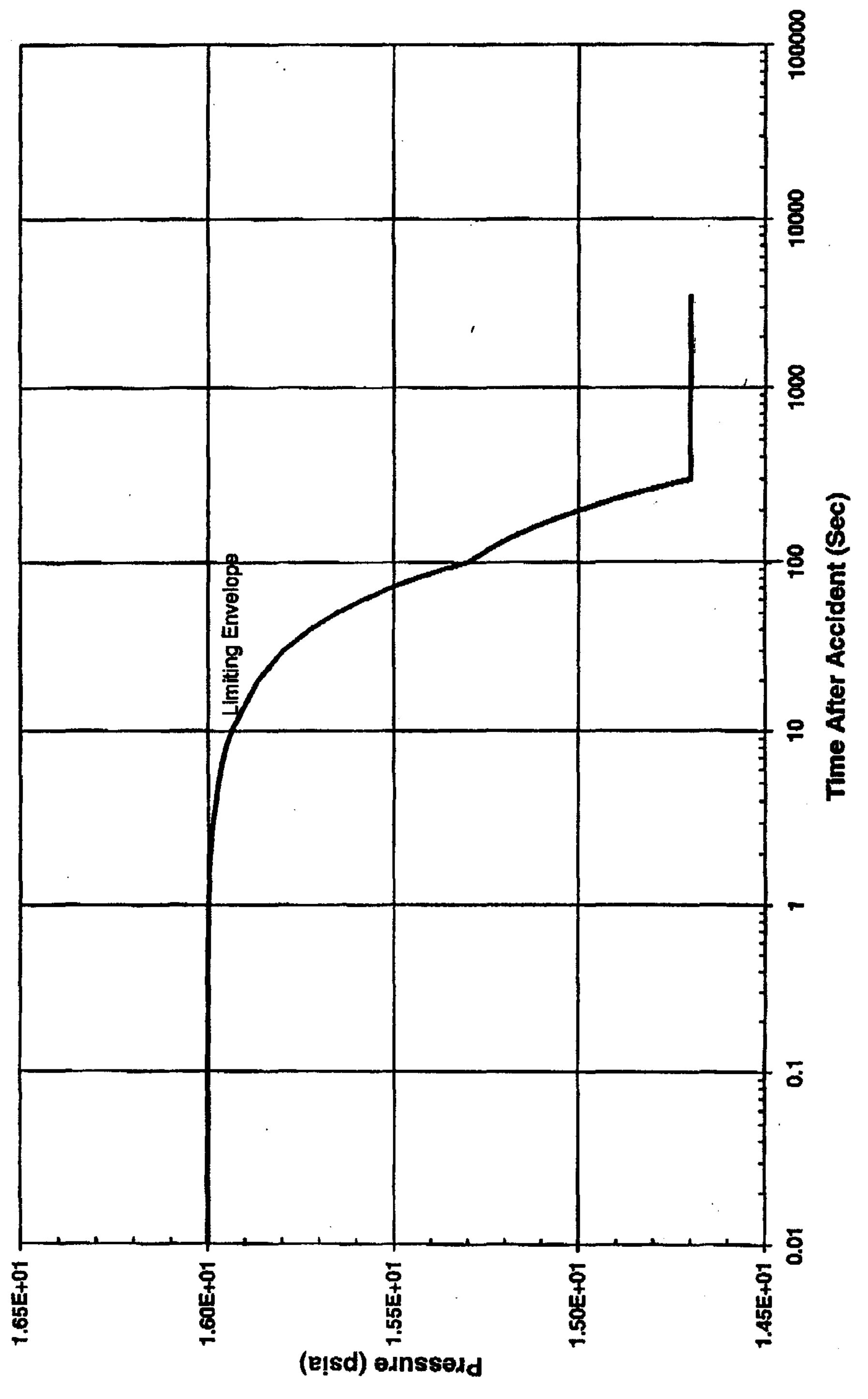


Figure 2: EQ Pressure Profile Envelope

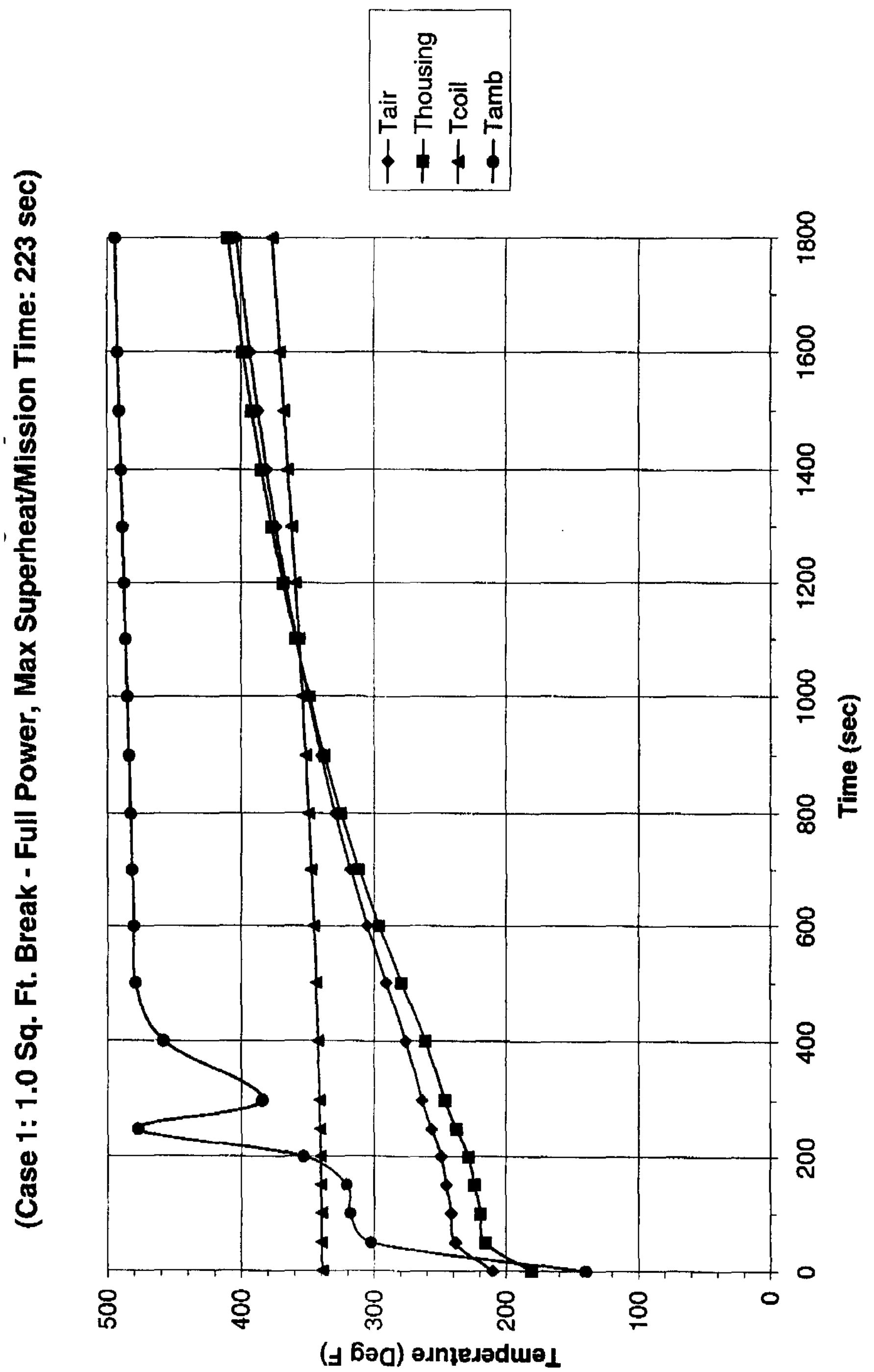


Figure 3: Pre-SPU Temperature Profiles for ASCO Solenoid Valves

Note: post-SPU peak coil temperature = pre-SPU peak coil temperature + temperature difference between bounding pre- and post-SPU environmental profiles

= 377°F + (562.2°F – 494.2°F) = 377°F + 68°F = 445°F

(Namco Limit Switch Thermal Lag)

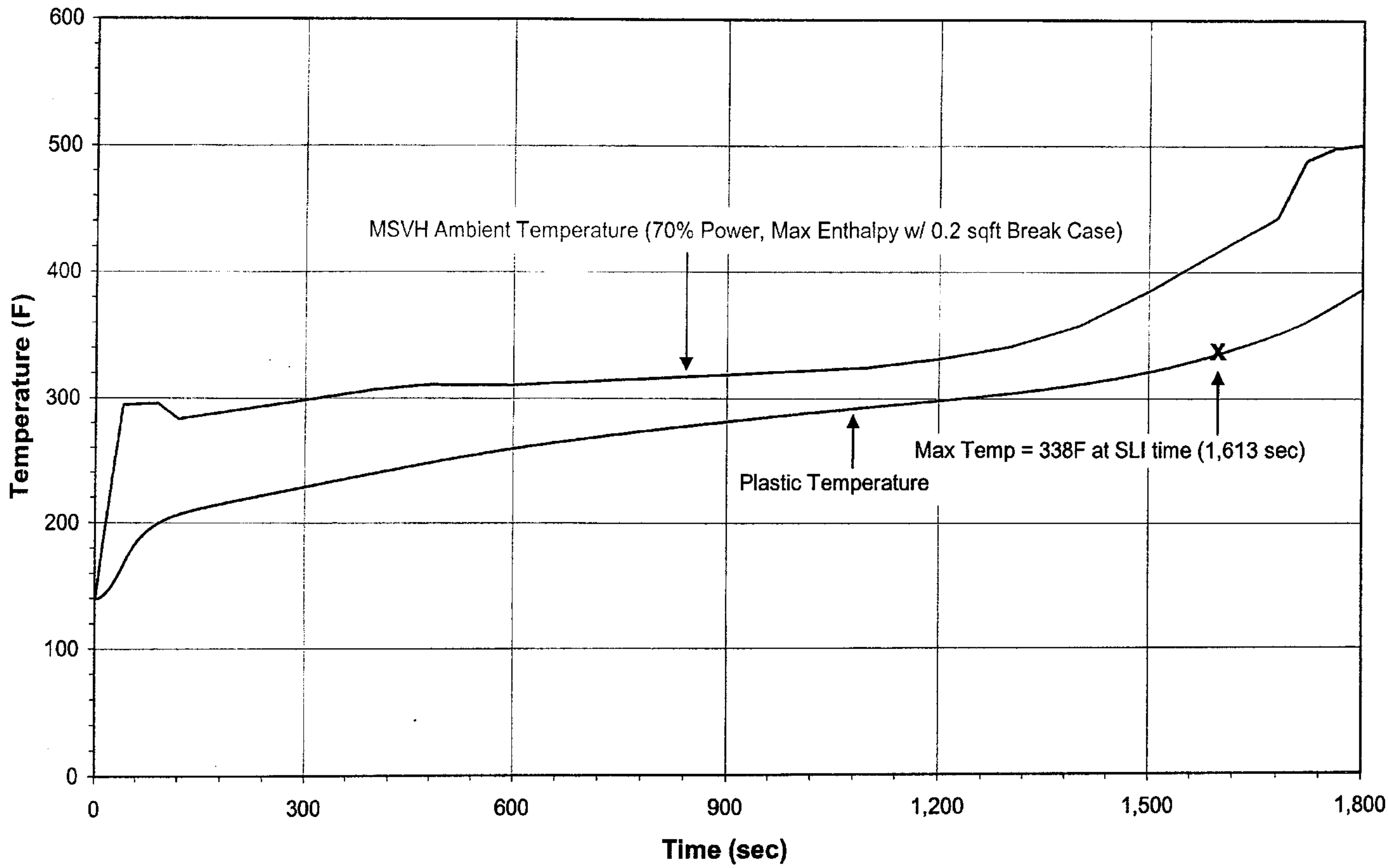


Figure 4: Post-SPU Namco Limit Switch Temperature Profiles

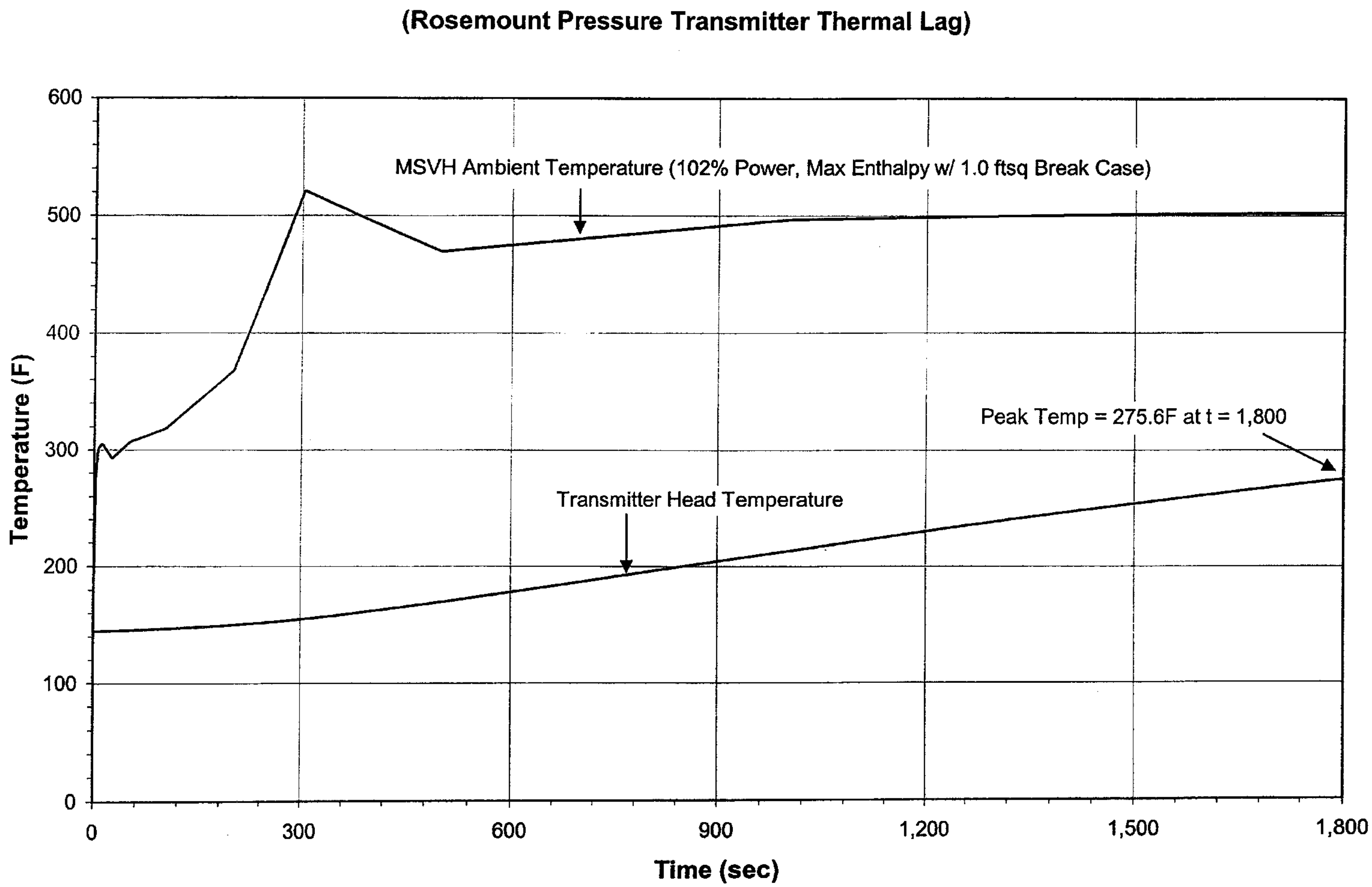


Figure 5:Post- SPU Rosemount Pressure Transmitter Temperature Profiles

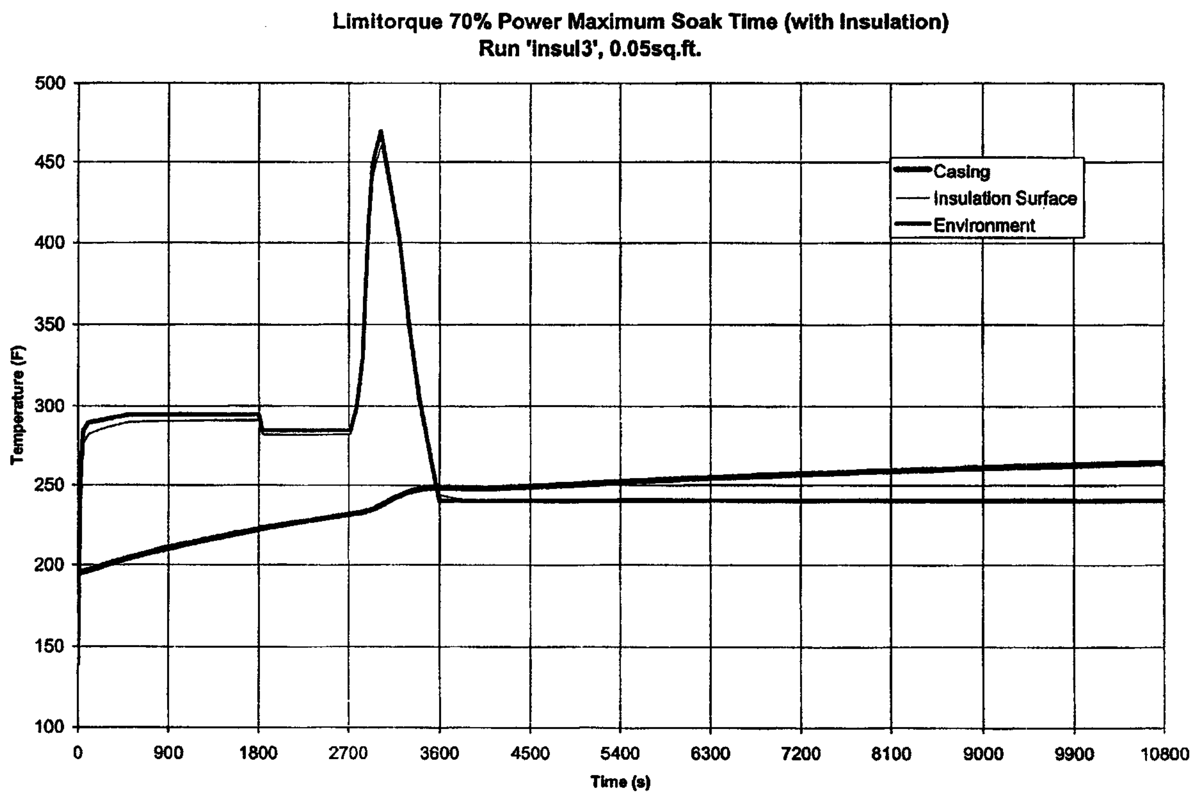


Figure 6: Post-SPU Limitorque Motor Temperature Profiles (with insulation)