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MILLER,C.L. Project Directorate I-2

SUBJECT: Forwards Proposed Amend 108 to License NPF-22,revising TS to allow continued operation of RWCU sys w/one operable high flow isolation channel for Unit 2 6th cycle of operation.

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Director of Nuclear Reactor Regulation
Attention: Mr. C. L. Miller, Project Director
Project Directorate I-2
Division of Reactor Projects
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION
PROPOSED AMENDMENT 108 TO LICENSE NO. NPF-22 :
INOPERABLE RWCU ISOLATION CHANNEL
PLA-3881 FILES A17-2/R41-2 Docket No. 50-388

References:

1. *Letter, PLA-3874, H. W. Keiser to T. T. Martin, "Request for Waiver of Compliance," dated November 17, 1992.*
2. *Letter, C. W. Hehl to H. W. Keiser, "Temporary Waiver of Compliance Related to the RWCU System Isolation Actuation Instrumentation," dated November 18, 1992.*
3. *Letter, PLA-3876, H. W. Keiser to C. L. Miller, "Extension of Waiver Request for Inoperable RWCU Isolation Channel," dated November 20, 1992.*
4. *Letter, PLA-3879, H. W. Keiser to C. L. Miller, "November 24, 1992 Waiver Request For Inoperable RWCU Isolation Channel," dated November 24, 1992.*
5. *Letter, J.A. Calvo to H.W. Keiser, "Request for Extension of Temporary of Waiver of Compliance From Technical Specification 3.3.2, Action B, For Susquehanna Steam Electric Station, Unit No. 2," dated November 25, 1992.*

Dear Mr. Miller:

The purpose of this letter is to propose a formal Technical Specification Amendment request to operate for one cycle with the Non-Regenerative Heat Exchanger Discharge High Temperature channel substituting for the inoperable 'B' RWCU High Flow isolation trip channel.

Justification for this proposal provided in Reference 4 has been supplemented as part of this proposed Technical Specification Amendment.

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DESCRIPTION OF CONDITION

A schematic of the RWCU system is attached for information (Figure 1). On 11/15/92, operators noted a significant decrease in the reading of the 'B' High Flow channel during the routine surveillance channel check. Although the associated instrument (PDIS-G33-2N044B) met the channel check acceptance criteria, an investigation was initiated. At 1120 on 11/17/92, the channel was taken out of service to determine the cause of this reading decrease and the appropriate LCO was entered. At 1310, the channel was confirmed to be inoperable, and it was concluded that the instrument could not be repaired in the time allotted by the Technical Specifications; therefore, operations shutdown and isolated the RWCU system. At 1930 hours on 11/17/92, the NRC granted a 72-hour waiver (Reference 2). RWCU was restored to service on 11/18/92. Additional attempts to restore the inoperable channel since that time have been unsuccessful. Observation of pertinent plant indications demonstrates no detectable leakage from the RWCU system. An additional waiver (Reference 5) to support preparation and subsequent NRC review and approval of this proposed Technical Specification Amendment is currently in effect.

DESCRIPTION OF PROPOSED CHANGE

This proposed amendment will allow the continued operation of the RWCU system with one OPERABLE High Flow Isolation Channel for the Unit 2 6th cycle of operation. To ensure the necessary diversity is maintained for all RWCU piping, the Non-Regenerative Heat Exchanger Discharge High Temperature channel shall be substituted for the inoperable 'B' high flow channel. Changes to the Technical Specifications include the inclusion of the Non-Regenerative Heat Exchanger Discharge High Temperature channel in Tables 3.3.2-1, 3.3.2-2, 3.3.2-3 and 4.3.2.1-1 specifying surveillance and operational parameters. Additionally, a footnote was added to Tables 3.3.2-1 and 4.3.2.1-1 identifying this required substitution for the entire Unit 2 6th cycle. See attached revised pages.

BASIS FOR DURATION OF PROPOSED CHANGE

It is requested that this proposal remain in effect for the duration of Unit 2 Cycle 6. The basis for this request is that a primary containment entry is required to investigate and repair the inoperable high flow channel. It is currently believed that the piping in the area of the flow element will have to be replaced. This effort will require a minimum of 7 to 10 days. If problems are encountered (eg. due to leaking blocking valves), complete defueling of the reactor vessel may be required to complete this repair.

For these reasons coupled with the compensatory measures provided by this proposed amendment, it is proposed that this repair not be required until the next Unit 2 Refueling and Inspection outage.

SAFETY SIGNIFICANCE AND CONSEQUENCES OF PROPOSED REQUEST

The RWCU High Flow Isolation Trip function serves to detect and isolate leaks/breaks outside containment. Piping inside containment utilizes various methods for leak detection as discussed in FSAR Section 5.2.5 (reactor vessel water level, drywell temperature, pressure, radiation and floor drain sump level) and is unaffected by the RWCU High Flow Isolation Trip function. As specified in Reference 4, PP&L has performed a detailed evaluation of the adequacy of leak detection for the entire length of RWCU piping outside primary containment.

The results of this evaluation are summarized below (see attached Figures 1 and 2):

HV-G33-F004 Valve to FE-G33-2N035 : (Rooms II-501/502/503)	
1)	RWCU Flow - High
2)	RWCU Area Temperature - High
3)	RWCU Area Ventilation Differential Temperature - High
4)	Reactor Vessel Low-Low Water Level (Level 2)
FE-G33-2N035 to Filter Demineralizer Trains : (Rooms II-501/504-505)	
1)	RWCU Flow - High
2)	RWCU Differential Flow - High
3)	RWCU Area Temperature - High
4)	RWCU Area Ventilation Differential Temperature - High
5)	Reactor Vessel Low-Low Water Level (Level 2)
Filter Demin Trains to Regen Heat Exchangers : (Filter Demin Rooms)	
1)	RWCU Flow - High
2)	RWCU Differential Flow - High
3)	Reactor Vessel Low-Low Water Level (Level 2)
Regen Heat Exchangers (2E207) to FE-G33-2N040 : (Rooms II-501/504)	
1)	RWCU Flow - High
2)	RWCU Differential Flow - High
3)	RWCU Area Temperature - High
4)	RWCU Area Ventilation Differential Temperature - High
5)	Reactor Vessel Low-Low Water Level (Level 2)
FE-G33-2N040 to Feedwater Piping : (Clean-Up Backwash Room/Main Steam Tunnel)	
1)	RWCU Flow - High
2)	Reactor Vessel Low-Low Water Level (Level 2)

Based on the above, we have determined that the RWCU Flow-High trip function is necessary to provide diversity to detect and isolate leaks in the "FE-G33-2N040 to Feedwater Piping" section of piping. For this section, PP&L believes that it is safe to operate Susquehanna Unit 2 for Cycle 6 due to:

1. The OPERABLE 'A' trip channel, which will isolate the RWCU system. An additional calibration of the 'A' channel was performed while RWCU was isolated to ensure its OPERABILITY.

2. The Non-Regenerative heat exchangers will indicate high discharge temperature during a high flow condition. The present RWCU containment isolation logic provides an isolation signal to the RWCU F004 (outboard) valve upon reaching a high discharge temperature. As a result of a system leak bounded by the setpoint of the high flow instrument, this temperature detection will isolate the RWCU F004 valve. The OPERABLE 'A' High Flow channel provides a signal to isolate the RWCU F001 (inboard) valve. While the non-regenerative heat exchanger high discharge temperature instrument is a non-1E instrument, it is powered by a safety grade power supply. The High Flow channel has no power; it is a mechanical device. The cable associated with these instruments is physically and electrically separated.

3. An evaluation of the RWCU high energy piping was conducted for the areas protected only by the High Flow and Reactor Low Level 2 isolation functions.

   The portions of the RWCU piping system within the three areas with only High Flow Isolation protection were evaluated. The three areas are (1) rooms II-520, II-515 and II-411 (Reactor Building Pipe Tunnel area), (2) room II-520 (Cleanup Backwash Receiving Tank room), and (3) stairwell between II-515 and II-509 (Figure 2). The subject piping is 4" ASME Section III Class 2 SA-106 Grade B Seamless Carbon piping. It is therefore resistant to Intergranular Stress Corrosion Cracking (IGSCC), and does not require augmented inspection in accordance with Generic Letter 88-01.

   Using the latest NRC criteria for postulated break locations, all pipe locations within these three areas had stress levels below those requiring postulation. The NRC criteria also requires postulation of breaks at Terminal Ends regardless of stress level. These locations are the two Terminal Ends in the Reactor Building Steam Tunnel where the RWCU piping connects to the Feedwater System, and in room II-509 (Cleanup Backwash Receiving Tank Room) at a Terminal End where the pipe penetrates the wall to the stairwell. There are no postulated break locations within the stairwell since this is a straight run of pipe with no Terminal Ends.

   Some pipe locations do have stress levels which would require postulation of cracks. The stress level for crack postulation is 50% that for break postulation.

The effects of High Energy Line Breaks in these areas are analyzed and found to have no impact on safety-related equipment.

4. The low probability of a break in the subject piping section coupled with failure to isolate the RWCU penetration with failure of the OPERABLE 'A' channel. PP&L has prepared a probabilistic evaluation of this case, and results indicate a 1.1E-6 probability for this event for a 15 month operating cycle. This calculation is conservative in that it did not take credit for the Non-Regenerative heat exchanger high temperature isolation, and it did assume minimum wall thickness of the piping.

Despite the low probability of such an event, the 'A' channel of the RWCU High Flow isolation trip function will remain OPERABLE to provide automatic isolation capability. In addition, various other indication is available to the operator to detect system leakage. For instance, the existing flow indication will be available to confirm the presence of a high flow condition should the high flow trip function become unreliable. For leakage into the Main Steam Tunnel, temperature increases will be experienced by the area temperature and area ventilation differential temperature instrumentation.

The above sources of indication will not provide automatic RWCU system isolation. These instruments will help alert operators to a reactor coolant leak and provide means for confirmation of such a condition. This would eventually lead operators to a manual system isolation.

For the balance of the RWCU piping, the OPERABLE leak detection channels provide sufficient redundancy and diversity to cover the range of potential leak/break scenarios evaluated in the FSAR. This includes (for two trip systems):

1. Ambient Temperature High - Capable of Detecting a 25 GPM (or larger) Leak

TSH-G33-2N600A	Pump Room
TSH-G33-2N600B	Pump Room
TSH-G33-2N600C	Heat Exchanger Room
TSH-G33-2N600D	Heat Exchanger Room
TSH-G33-2N600E	Penetration Room
TSH-G33-2N600F	Penetration Room
Instrument A or C or E will close the inboard valve. Instrument B or D or F will close the outboard valve.	

2. Differential Temperature High - Capable of Detecting a 25 GPM (or larger) Leak

TDSH-G33-2N602A	Pump Room
TDSH-G33-2N602B	Pump Room
TDSH-G33-2N602C	Heat Exchanger Room
TDSH-G33-2N602D	Heat Exchanger Room
TDSH-G33-2N602E	Penetration Room
TDSH-G33-2N602F	Penetration Room
Instrument A or C or E will close the inboard valve. Instrument B or D or F will close the outboard valve.	

3. Differential Flow High - Capable of Detecting a 60 GPM (or larger) Leak

FDSH-G33-2N603A	Closes inboard valve
FDSH-G33-2N603B	Closes outboard valve

4. Reactor Vessel Water Level Low, Low (Level 2) - Capable of Detecting Pipe Breaks Inside or Outside Containment Up to a Double-Ended Guillotine Break

LITS-B21-2N026A	Both switches must actuate to close the inboard valve
LITS-B21-2N026B	
LITS-B21-2N026C	Both switches must actuate to close the outboard valve
LITS-B21-2N026D	

Each of the above trip channels is supported by divisionalized power; each trip function has two redundant, divisionalized trip systems. These instruments cover the necessary range of potential pipe leak/break scenarios. The ambient temperature and delta temperature detection instruments are designed to detect and isolate leaks as small as 25 gpm, which are below the flow rate corresponding to critical crack size. The delta flow, and Level 2 channels will detect and isolate increasingly larger breaks, up to and including a double-ended guillotine break, as reflected above. All of these channels will detect leaks or breaks outside containment; the leak detection

capability inside primary containment is unaffected by this proposed change. Finally, the manual isolation provides a backup to allow the operator to effect the isolation in response to control room alarms if an automatic isolation does not occur.

Leak detection can be considered as a safety function with the purpose of minimizing or precluding the potential for a high energy line break (for which independent and diverse detection and isolation systems exist). FSAR Figure 5.2-10, attached, correlates leak rates to crack size up to cracks associated with unstable piping rupture for different pipe sizes and stresses. The RWCU system piping is 4 inches and 6 inches in diameter. A leak rate of 25 gpm can be seen from that Figure to be less than those leak rates associated with the onset of unstable pipe rupture.

Furthermore, the alarm response procedures identify specific actions required including observation, confirmation, isolation, and repair of leaks. Visual observation of a steam leak, rising room temperatures, rising area radiation levels, or the occurrence of a pre-isolation temperature alarm in the main control room would invoke operator action without attempting to quantify the leak rate, or waiting for the temperature to reach the isolation setpoint. Prolonged operation with any significant leak is not anticipated.

Based on the above, operation with the RWCU high flow isolation trip channel inoperable is not a significant degradation in the safety margin associated with RWCU isolation for one cycle.

COMPENSATORY ACTIONS

In support of this Technical Specification Amendment request:

1. PP&L has confirmed OPERABILITY of the 'A' high flow isolation trip channel and of all other RWCU isolation trip functions, and that no detectable leakage from the RWCU system exists, based on pertinent plant indications.

2. Technical Specification surveillances are being performed on the Non-Regenerative heat exchanger high temperature isolation channel to maintain its reliability during Unit 2 Cycle 6 operation. The frequency for the CHANNEL CALIBRATION is conservatively proposed to be Quarterly rather than Refueling, which is the frequency for the high flow channel. This channel is required to be OPERABLE for the duration of the Unit 2 Cycle 6 and is proposed to be added to the Unit 2 Technical Specifications for that period. All required Technical Specification Surveillances have been satisfactorily completed.

3. Additional guidance is also being provided to operations personnel to ensure heightened awareness of this condition.

NO SIGNIFICANT HAZARDS CONSIDERATIONS

1. This request does not involve a significant increase in the probability or consequences of an accident previously evaluated. The RWCU piping is carbon steel and is therefore resistant to IGSCC. For one operating cycle, the probability of a RWCU line break coincident with a failure to isolate the RWCU containment penetration in the section of piping which depends on it for diversity has been determined to be very low (1.1 E-6). For the balance of the RWCU piping, operation without the inoperable RWCU high flow trip channel does not increase the probability of containment isolation malfunction as analyzed in the Susquehanna IPE. With regard to consequences, other redundant and diverse means of break detection are available, and have been determined to be adequate to cover the range of potential break scenarios evaluated in the FSAR. For the section of RWCU piping that is dependent on high flow for diversity, the combined protection of the OPERABLE 'A' channel, the compensatory actions, and the Level 2 isolation will ensure that the consequences are bounded by previous FSAR evaluations. A specific evaluation concluded that radiological consequences for RWCU pipe breaks outside of containment are within the bounds of the FSAR analysis for Main Steamline Breaks outside of containment.

2. This request does not create the possibility of a new or different kind of accident from any accident previously evaluated. Inoperability of an isolation channel can only affect the probability or consequences of analyzed events (a leak/break with subsequent failure to isolate). It cannot create a new event.

3. The proposed change does not involve a significant reduction in a margin of safety. For the reasons described in 1 above, the 'B" high flow trip channel can be inoperable for one cycle of operation. Adequate diversity to operate the Susquehanna units has been determined to exist in the remaining OPERABLE trip channels and those channels have been determined to cover the complete range of analyzed break scenarios required. The exception is the section of piping which depends on the High Flow function for diversity. The probability of a line break of this piping coincident with a failure to isolate has been found to be sufficiently low for one cycle. Given this low probability and the one for one replacement of the inoperable high flow channel with the non-regenerative heat exchanger discharge high temperature channel which effectively provides the same leak detection capabilities, an acceptable level of RWCU isolation reliability continues to exist, and a significant reduction in safety margin will not occur.

ENVIRONMENTAL CONSEQUENCES

No environmental consequences that have not been previously evaluated are anticipated, because the remaining OPERABLE RWCU isolation channels combined with the Compensatory Actions have been shown to be adequate to protect the validity of the existing affected FSAR analyses.

CONCLUSION

Susquehanna SES Unit 2 can be safely operated with the 'B' RWCU high flow isolation trip channel inoperable for one cycle, and is currently operating under a waiver. This replacement channel will provide effectively the same leak detection capabilities as the inoperable high flow channel. It will be required to meet the proposed Technical Specification requirements during Unit 2 Cycle 6 in order to provide increased assurance of its reliability. PP&L is therefore requesting that this Technical Specification Amendment request be effective upon approval for the duration of Unit 2 Cycle 6.

The NRC staff has asked numerous questions during the several telecons that have been held on this subject. In order to assure that satisfactory answers have been provided via this submittal, PP&L requests that a technical meeting be held after initial NRC review. Any supplemental information required will be provided in an expedited manner.

Any questions on this proposal should be directed to Mr. J.M. Kenny at (215) 774-7904.

Very truly yours,

J. T. Kauffman

Attachment

cc: NRC Document Control Desk (original)
Mr. R. J. Clark, NRC Sr. Project Manager
Mr. G. S. Barber, NRC Sr. Resident Inspector
Mr. W. P. Dornsife, PA DER