Proposed Amendments to Technical Specifications - Torus Temperature Monitoring and TMI Action Plan Requirements

A. Narrative:

1. Torus Temperature Monitoring

Presently, there are two indicators (ranges: 50 to 150°F) used to display suppression pool temperature on Panel C-7. These indicators (TI-5047 and TI-5048) each receive their input signal from single RTD's, each being located 90° apart on the outer wall of the Torus. This indication of suppression pool temperature is not considered a true presentation of the pool "bulk" or T-quencher "local" temperature. The proposed system modification will provide an accurate indication of this temperature and, therefore, of the pool's ability to quench steam.

The modification incorporates the new requirement mandated by the NRC in NUREG-0661 and Reg. Guide 1.97 for providing a reasonable measure of suppression pool "bulk" and "local" temperature over the range of 30 to 230°F. The new system is completely redundant meeting single failure criteria. It derives its signal from 13 redundant, 3-wire RTD's.

Four sensors/channel are used to indicate "local" T-quencher temperatures, and along with the remaining nine sensors/channel are used for determining a bulk temperature of the pool. All these sensors are located in thermal wells on the reactor side of the Torus.

The temperature signals are transmitted back to the Control Room to Panels C179 and C180 where processing is done in order to display, record and alarm the temperature of the suppression pool. The indicators are located on the Main Control Board, C-903, and the recorders and alarms are located on the PAM panel, C170 and C171.

This system design will satisfy both NUREG-0661 and Reg. Guide 1.97, Type A variable which require normal and post accident monitoring of the suppression pool.

2. NUREG-0737 Technical Specifications

NUREG-0737, "Clarification of TMI Action Plan Requirements," identifies those items for which Technical Specifications are required, and Generic Letter No. 83-36 provides guidance on the scope of Technical Specifications which would be found acceptable by the NRC. This submittal addresses the following instrumentation:

(a) Noble Gas Effluent Monitors
(b) Sampling and Analysis of Plant Effluents
(c) Containment High - Range Radiation Monitoring
(d) Containment Pressure Monitoring
(e) Containment Water Level Monitoring

B. Reason for Change

1. Torus Temperature Monitoring

NUREG-0661 and Reg. Guide 1.97 require that a sufficient number and distribution of pool sensors be provided to measure bulk and local pool temperatures for the range of 30°F to 230°F. The presentation is to be indicated, recorded and alarmed in the Main Control Room and will be used to assist the operator to make the appropriate decisions in mitigating the consequences of an accident. This indication will also be used to confirm operation of numerous ECCS safety systems and to verify Tech. Spec. limitations.

2. TMI Action Plan Requirements

After the incident at Three Mile Island-2, the NRC requested the installation of instrumentation to aid plant personnel in a post-accident situation. In Generic Letter 83-36, dated November 1, 1983, guidance was provided for formulating appropriate technical specifications. In accordance with that request this proposed amendment is submitted to address those instruments associated with NUREG-0737 items II.F.1.1, II.F.1.2, II.F.1.3, II.F.1.4 and II.F.1.5. Item II.F.1.6 is not included because the plant modification has not been completed.

An amendment will be submitted after completion of the plant modification pertaining to II.F.1.6. Item II.B.3, Post-Accident Sampling, is also not included in this submittal for the same reason, and will be handled in like manner. Item II.B.1, RCS Vents, and item III.D.3.4, Control Room Habitability Considerations, are not included because Pilgrim does not have an isolation condenser and because reviews have indicated that toxic detectors are unnecessary.

The Limiting Condition for Operation for the various post-accident instrumentation is provided by the addition of the following instrumentation to existing Table 3.2.F:

Torus Water Level (Wide Range)

Containment Pressure,
High Range

Containment Pressure,
Low Range

Containment High
Radiation

Reactor Building Vent Monitor
Main Stack Vent Monitor
Turbine Building Vent Monitor

The test and calibration frequencies for surveilling this instrumentation is incorporated into existing Table 4.2.F.

The surveillance and LCO requirements are either based on those recommended by Generic Letter No. 83-36, or are those which currently exist for Tables 3.2.F and 4.2.F

As part of this change, Note (7) is added which states:

> "With less than the minimum number of operable instrument channels, restore the inoperable channels to operable status within 7 days or prepare and submit a special report to the Regional Director of Inspection and Enforcement within 14 days of the event outlining the action taken, the cause of the inoperability and the plans and schedule for restoring the channels to operable status."
>
> The creation of this proposed amendment also postulated to us that some of the Notes from Table 3.2.F could be made clearer. We therefore propose the following changes to clarify the meaning without altering it.

Currently, Note (1) states:

> "From and after the date that one of these parameters is reduced to one indication, continued operation is permissible during the succeeding thirty days unless such instrumentation is sooner made operable."

This would be changed to:

> "With less than the minimum number of instrument channels, restore the inoperable channel(s) within 30 days."

Currently, Note (2) states:

> "From and after the date that one of these parameters is not indicated in the control room, continued operation is permissible during the succeeding seven days unless such instrumentation is sooner made operable."

This will be changed to:

> "With the instrument channel(s) providing no indication to the control room, restore the indication to the control room within seven days."

Note (5) is altered by adding the word "indicators" after "parameter" in its first line. This is done because parameters are not the true subject of a limiting condition of operation, the indicators of parameters are.

The Table associated with instruments for monitoring safety/relief and safety valves is altered by removing the asterisk from the title

"Secondary Tail Pipe Temperature Thermocouple" and placing it next to the four dual element thermocouples which monitor safety/relief valve (SRV) tail pipe temperatures. The asterisk references Note (6), which is concerned with an additional restriction concerning (SRV) tail pipe temperature monitoring thermocouples. The SRV restriction does not apply to the safety valves. This change more clearly identifies which instruments are subject to Note (6) and is proposed for clarity.

Currently, Note (6) states:

> "At a minimum, the above listed (SRV) tail pipe temperature, one of the dual thermocouples, will be operable for each valve when the valves are required to be operable. If a thermocouple becomes inoperable, it shall be returned to an operable condition within 31 days or the reactor shall be placed in a shutdown mode within 24 hours."

Note (6) will be changed to state:

> "At a minimum, for thermocouples providing (SRV) tail pipe temperature, one of the dual thermocouples will be operable for each SRV when the valves are required to be operable. If a thermocouple becomes inoperable, it shall be returned to an operable condition within 31 days or the reactor shall be placed in a shutdown mode within 24 hours."

Note (6) describes the action to be taken when one of the dual thermocouples is inoperable. However, the current chart labels the thermocouples with a "B" designation, which is only one of the dual elements. To correct this contradiction, we propose to remove the "B" from the dual element (SRV) tail pipe thermocouple designation from the chart.

This change is proposed to clarify a confusing footnote and to emphasize that only those sensing devices for SRV valves are subject to Note (6).

Currently, Table 3.2.F names the parameter being indicated as "Instrument." The proposed change substitutes "Parameter" for "Instrument" because it seems more accurate a description and provides a more straight forward clarification to the Table. This a pro forma change.

C. Safety Considerations

These changes do not present an unreviewed safety question as defined in 10CFR50.59. They have been reviewed and approved by the Operations Review Committee and reviewed by the Nuclear Safety Review and Audit Committee.

D. Significant Hazards Consideration

The NRC has provided guidance concerning the application of standards for determining whether license amendments involve significant hazards considerations by providing certain examples (48FR14870). The Torus

Temperature Monitoring System is an example of an amendment which is considered not likely to involve a significant hazards consideration, and provides, "(ii) a change that constitutes an additional limitation, restriction, or control not presently included in the technical specifications: for example, a more stringent surveillance requirement," which is provided by the addition of thirteen (13) sensors to ensure a reasonable measure of suppression pool "bulk" and "local" temperature which will provide a more accurate indication of pool temperature and the pool's ability to quench steam. Proposed Technical Specifications of this nature add restrictions to address plant design changes which conform to NRC requirements.

The TMI Action Plan requirements are examples of amendments which are considered not likely to involve a significant hazards consideration, and provides, "(ii) a change that constitutes an additional limitation, restriction, or control not presently included in the technical specifications: for example, a more stringent surveillance requirement of additional instrumentation provided to assist plant personnel in a post-accident situation. Proposed Technical Specifications of this nature add restrictions to address plant design changes which conform to NRC requirements.

Based on this guidance, it has been determined that the amendment request involves no significant hazards consideration. Under the NRC's regulations in 10CFR50.92, this means that operation of the Pilgrim Nuclear Power Station in accordance with the proposed amendment would not (1) involve a significant increase in the probability or consequences of an accident previously evaluated, or (2) create the possibility of a new or different kind of accident from any accident previously evaluated, or (3) involve a significant reduction in a margin of safety.

D. Schedule of Change

These amendments will be effective upon receipt of approval by the NRC.

E. Application Fee

Pursuant to 10CFR 170.21, an application fee of $150.00 is submitted with this amendment request.

TABLE 3.2.F
SURVEILLANCE INSTRUMENTATION

Minimum # of Operable Instrument Channels	Instrument #	Parameter	Type Indication and Range	Notes
2	640-29A & B	Reactor Water Level	Indicator 0-60"	(1) (2) (3)
2	640-25A & B	Reactor Pressure	Indicator 0-1200, psig	(1) (2) (3)
2	TRU-9044 TRU-9045	Drywell Pressure	Recorder 0-80 psia	(1) (2) (3)
2	TRU-9044 TI-9019	Drywell Temperature	Recorder, Indicator 0-400°F	(1) (2) (3)
2	TRU-9045 TI-9018	Suppression Chamber Air Temperature	Recorder, Indicator 0-400°F	(1) (2) (3)
2	LR-5038 LR-5049	Suppression Chamber Water Level	Recorder 0-32"	(1) (2) (3)
1	NA	Control Rod Position	28 Volt Indicating Lights	(1) (2) (3) (4)
1	NA	Neutron Monitoring	SRM, IRM, LPRM 0 to 100% power	
2	TI-5021-01A TRU-5021-01A	Suppression Chamber Water Temperature	Dual Indicator/ Multipoint Recorder 30-230°F (Bulk/Local)	(4) (7) (2) (3)
	TI-5022-01B TRU-5022-01B	Suppression Chamber Water Temperature	Dual Indicator/ Multipoint Recorder 30-230°F (Bulk/Local)	(4) (7) (2) (3)
1	PI-5021	Drywell/Torus Diff. Pressure	Indicator -.25→3.0 psig	(1) (2) (3) (4)
1	PI-5067A PI-5067B	Drywell Pressure Torus Pressure	Indicator -.25→3.0 psig Indicator -1.0→+2.0 psig	(1) (2) (3) (4)

TABLE 3.2.F (Cont'd)
SURVEILLANCE INSTRUMENTATION

Minimum # of Operable Instrument Channels	Instrument #	Parameter	Type Indication and Range	Notes
1/Valve	a) Primary or b) Backup (5)	Safety/Relief Valve Position	a) Acoustic monitor b) Thermocouple	(5)
1/Valve	a) Primary or b) Backup (5)	Safety Valve Position Indicator	a) Acoustic monitor b) Thermocouple	(5)
1/Valve	See Note (6)	Tail Pipe Temperature Indication	Thermocouple	(6)
2	LI 1001-604A LR 1001-604A	Torus Water Level (Wide Range)	Indicator/Multipoint Recorder 0-300"H_2O	(4) (7) (2) (3)
	LI 1001-604B LR 1001-604B	Torus Water Level (Wide Range)	Indicator/Multipoint Recorder 0-300"H_2O	(4) (7) (2) (3)
2	PI 1001-600A PR 1001-600A	Containment Pressure, (High Range)	Indicator/Multipoint Recorder 0-225 psig	(4) (7) (2) (3)
	PI 1001-600B PR 1001-600B	Containment Pressure, (High Range)	Indicator/Multipoint Recorder 0-225 psig	(4) (7) (2) (3)
2	PI 1001-601A PR 1001-600A	Containment Pressure, (Low Range)	Indicator/Multipoint Recorder -5 to 5 psig	(4) (7) (2) (3)
	PI 1001-601B PR 1001-600B	Containment Pressure, (Low Range)	Indicator/Multipoint Recorder -5 to 5 psig	(4) (7) (2) (3)
1	RIT 1001-606A RIT 1001-606B RR 1001-606A RR 1001-606B	Containment High Radiation (Drywell)	Monitor/Multipoint Recorder 1 to $1x10^7$ R/hr	(4) (7)
1	RIT 1001-607A RIT 1001-607B RR 1001-606A RR 1001-606B	Containment High Radiation (Torus)	Monitor/Multipoint Recorder 1 to $1x10^7$ R/hr	(4) (7)

TABLE 3.2.F (Cont'd)
SURVEILLANCE INSTRUMENTATION

Minimum # of Operable Instrument Channels	Instrument #	Parameter	Type Indication and Range	Notes
1	RI 1001-607 RR 1001-608	Reactor Building Vent	Indicator/Multipoint Recorder 10^{-1} to 10^{4} R/hr	(4) (7)
1	RI 1001-608 RR 1001-608	Main Stack Vent	Indicator/Multipoint Recorder 10^{-1} to 10^{4} R/hr	(4) (7)
1	RI 1001-610 RR 1001-608	Turbine Building Vent	Indicator/Multipoint Recorder 10^{-1} to 10^{4}R/hr	(4) (7)

Notes for Table 3.2.F

(1) With less than the minimum number of instrument channels, restore the inoperable channel(s) within 30 days.

(2) With the instrument channel(s) providing no indication to the control room, restore the indication to the control room within seven days.

(3) If the requirements of notes (1) or (2) cannot be met, an orderly shutdown shall be initiated and the reactor shall be in the Cold Shutdown Condition with 24 hours.

(4) These surveillance instruments are considered to be redundant to each other.

(5) At a minimum, the primary or back-up* parameter indicators shall be operable for each valve when the valves are required to be operable. With both primary and backup* instrument channels inoperable either return one (1) channel to operable status within 31 days or be in a shutdown mode within 24 hours.

The following instruments are associated with the safety/relief and safety valves:

Valve	Primary Acoustic Monitor	Secondary Tail Pipe Temperature Thermocouple
203-3A	ZT-203-3A	TE6271 *
203-3B	ZT-203-3B	TE6272 *
203-3C	ZT-203-3C	TE6273 *
203-3D	ZT-203-3D	TE6276 *
203-4A	ZT-203-4A	TE6274-B
203-4B	ZT-203-4B	TE6275-B

* See Note (6)

(6) At a minimum, for thermocouples providing SRV tail pipe temperature, one of the dual thermocouples will be operable for each SRV when the valves are required to be operable. If a thermocouple becomes inoperable, it shall be returned to an operable condition within 31 days or the reactor shall be placed in a shutdown mode within 24 hours.

(7) With less than the minimum number of operable instrument channels, restore the inoperable channels to operable status within 7 days or prepare and submit a special report to the Regional Director of Inspection and Enforcement within 14 days of the event outlining the action taken, the cause of the inoperability and the plans and schedule for restoring the channels to operable status.

TABLE 4.2.F (Cont.)

MINIMUM TEST AND CALIBRATION FREQUENCY FOR SURVEILLANCE INSTRUMENTATION

Instrument Channel	Calibration Frequency	Instrument Check
13) Torus Water Level (Wide Range)	Each refueling outage	Once every 30 days
14) Containment Pressure	Each refueling outage	Once every 30 days
15) Containment High Radiation	Each refueling outage	Once every 30 days
16) Reactor Building Vent Radiation Monitor	Each refueling outage	Once every 30 days
17) Main Stack Vent Radiation Monitor	Each refueling outage	Once every 30 days
18) Turbine Building Vent Radiation Monitor	Each refueling outage	Once every 30 days

LIMITING CONDITIONS FOR OPERATION

3.7 CONTAINMENT SYSTEMS

Applicability:

Applies to the operating status of the primary and secondary containment systems.

Objective:

To assure the integrity of the primary and secondary containment systems.

Specification:

A. Primary Containment

1. At any time that the nuclear system is pressurized above atmospheric pressure or work is being done which has the potential to drain the vessel, the pressure suppression pool water volume and temperature shall be maintained within the following limits except as specified in 3.7.A.2 and 3.7.A.3.

   a. Minimum water volume - 84,000 ft^3

   b. Maximum water volume - 94,000 ft^3

   c. Maximum suppression pool bulk temperature during normal continuous power operation shall be $\leq 80^{\circ}F$, except as specified in 3.7.A.1.e.

   d. Maxumum suppression pool bulk temperature during RCIC, HPCI or ADS operation shall be $\leq 90^{\circ}F$, except as specified in 3.7.A.1.e.

   e. In order to continue reactor power operation, the suppression chamber pool bulk temperature must be reduced to $\leq 80^{\circ}F$ within 24 hours.

   f. If the suppression pool bulk temperature exceeds the limits of Specification 3.7.A.1.d, RCIC, HPCI or ADS testing shall be terminated and suppression pool cooling shall be initiated.

   g. If the suppression pool bulk temperature during reactor power operation exceeds $110^{\circ}F$, the reactor shall be scrammed.

Amendment No.

SURVEILLANCE REQUIREMENTS

4.7 CONTAINMENT SYSTEMS

Applicability:

Applies to the primary and secondary containment integrity.

Objective:

To verify the integrity of the primary and secondary containment.

Specification:

A. Primary Containment

1. a. The suppression chamber water level and temperature shall be checked once per day.

   b. Whenever there is indication of relief valve operation or testing which adds heat to the suppression pool, the pool temperature shall be continually monitored and also observed and logged every 5 minutes until the heat addition is terminated.

   c. Whenever there is indication of relief valve operation with the bulk temperature of the suppression pool reaching $160^{\circ}F$ or more and the primary coolant system pressure greater than 200 psig, an external visual examination of the suppression chamber shall be conducted before resuming power operation.

   d. Whenever there is indication of relief valve operation with the local temperature of the suppression pool T-quencher reaching $200^{\circ}F$ or more, an external visual examination of the suppression chamber shall be conducted before resuming power operation.

   e. A visual inspection of the suppresion chamber interior, including water line regions, shall be made at each major refueling outage.

LIMITING CONDITIONS FOR OPERATION

3.7 CONTAINMENT SYSTEMS (Cont'd)

h. During reactor isolation conditions, the reactor pressure vessel shall be depressurized to less than 200 psig at normal cool down rates if the pool bulk temperature reaches 120°F.

i. Differential pressure between the drywell and suppression chamber shall be maintained at equal to or greater than 1.17 psid, except as specified in j and k.

j. The differential pressure shall be established within 24 hours of placing the reactor in the run mode following a shutdown. The differential pressure may be reduced to less than 1.17 psid 24 hours prior to a scheduled shutdown.

k. The differential pressure may be reduced to less than 1.17 psid for a maximum of four (4) hours for maintenance activities on the differential pressure control system and during required operability testing of the HPCI system, the relief valves, the RCIC system and the drywell-suppression chamber vacuum breakers.

l. If the specifications of Item i, above, cannot be met, and the differential pressure cannot be restored within the subsequent six (6) hour period, an orderly shutdown shall be initiated and the reactor shall be in a cold shutdown condition in twenty-four (24) hours.

m. Suppression chamber water level shall be maintained between -6 to -3 inches on torus level instrument which corresponds to a downcomer submergence of 3.00 and 3.25 feet respectively.

SURVEILLANCE REQUIREMENTS

4.7 CONTAINMENT SYSTEMS (Cont'd)

f. The pressure differential between the drywell and suppression chamber shall be recorded at least once each shift when the differential pressure is required.

g. Suppression chamber water level shall be recorded at least once each shift when the differential pressure is required.

BASES:

3.7.A & 4.7.A Primary Containment

The integrity of the primary containment and operation of the core standby cooling system in combination limit the off-site doses to values less than those suggested in 10 CFR 100 in the event of a break in the primary system piping. Thus, containment integrity is specified whenever the potential for violation of the primary reactor system integrity exists. Concern about such a violation exists whenever the reactor is critical and above atmospheric pressure. An exception is made to this requirement during initial core loading and while the low power test program is being conducted and ready access to the reactor vessel is required. There will be no pressure on the system at this time, thus greatly reducing the chances of a pipe break. The reactor may be taken critical during this period; however, restrictive operating procedures will be in effect again to minimize the probability of an accident occurring. Procedures and the Rod Worth Minimizer would limit control worth such that a rod drop would not result in any fuel damage. In building and standby gas treatment system, which shall be operational during this time, offer a sufficient barrier to keep off-site doses well below 10 CFR 100 limits.

The pressure suppression pool water provides the heat sink for the reactor primary system energy release following a postulated rupture of the system. The pressure suppression chamber water volume must absorb the associated decay and structural sensible heat released during primary system blowdown from 1035 psig. Since all of the gases in the drywell are purged into the pressure supression chamber air space during a loss-of-coolant accident, the pressure resulting from isothermal compression plus the vapor pressure of the liquid must not exceed 62 psig, the suppression chamber maximum pressure. The design volume of the suppression chamber (water and air) was obtained by considering that the total volume of reactor coolant to be condensed is discharged to the suppression chamber and that the drywell volume is purged to the suppression chamber.

Using the minimum or maximum water volumes given in the specification, containment pressure during the design basis accident is approximately 45 psig which is below the maximum of 62 psig. Maximum water volume of 94,000 ft^3 results in a downcomer submergency of 4'-0" and the minimum volume of 84,000 ft^3 results in a submergence approximately 12-inches less. Mark I Containment Long Term Program Quarter Scale Test Facility (QATF) testing at a downcomer submergency of 3.25 feet and 1.17 psi wetwell to dry well pressure differential shows a significant suppression chamber load reduction and Long Term Program analysis and modifications are based on the above submergence and ΔP.

Should it be necessary to drain the suppression chamber, provision will be made to maintain those requirements as described in Section 3.5.F BASES of this Technical Specification.

Experimental data indicates that excessive steam condensing loads can be avoided if the peak local temperature of the pressure suppression pool is maintained below 200°F during any period of relief-valve operation with sonic conditions at the discharge exit. Analysis has been performed to verify that the local pool temperature will stay below 200°F and the bulk pool temperature will stay below 160°F for all SRV transients. Specifications have been placed on the envelope of reactor operating conditions so that the reactor can be depressurized in a timely manner to avoid the regime of potentially high pressure suppression chamber loadings.