Entergy

Entergy Nuclear Operations, Inc.
Pilgrim Nuclear Power Station
600 Rocky Hill Road
Plymouth, MA 02360

Charles M. Dugger
Vice President - Operations

January 30, 2003

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

SUBJECT: Entergy Nuclear Operations, Inc.
Pilgrim Nuclear Power Station
Docket No. 50-293
License No. DPR-35

Request for Amendment to the Technical Specifications (TS), Jet Pump Operability Surveillance Requirements and Correction to Reference Cited in TS 4.11.C.1, Revision 1

REFERENCE: Entergy Letter No. 2.02.092, Request for Amendment to the Technical Specifications (TS), Jet Pump Operability Surveillance Requirements and Correction to Reference Cited in TS 4.11.C.1, dated, December 10, 2002.

LETTER NUMBER: 2.03.001

Dear Sir or Madam:

By the above reference, Entergy requested review and approval of changes to Pilgrim's Technical Specification (TS) 4.6.E, jet pump surveillance requirements and its Bases and a correction to a reference in TS 4.11.C.1, in accordance with 10 CFR 50.90. This letter adds Notes to the surveillance to provide clarity consistent with BWR/6 STS Surveillance requirement 3.4.3.1 (Reference 1 to Entergy letter 2.02.092) and replaces the original submittal. The added notes does not impact the no significant hazards consideration determination (10 CFR 50.92(c)) included in the submittal.

Entergy requests approval of this change by December 2003. Once approved, the amendment will be implemented within 30 days.

If you have any questions or require additional information, please contact Mr. Bryan Ford, Licensing Manager, at (508) 830-8403.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on the 30th day of January 2003.

Sincerely,

Charles M. Dugger

Enclosure: Evaluation Of The Proposed Changes - 6 pages

Attachments: 1. Proposed Technical Specification and Bases (mark-up) - 4 pages
2. List of Regulatory Commitments – 1 page

cc:

Mr. Travis Tate, Project Manager
Office of Nuclear Reactor Regulation
Mail Stop: 0-8B-1
U.S. Nuclear Regulatory Commission
1 White Flint North
11555 Rockville Pike
Rockville, MD 20852

U.S. Nuclear Regulatory Commission
Region 1
475 Allendale Road
King of Prussia, PA 19406

Senior Resident Inspector
Pilgrim Nuclear Power Station

Mr. Steve McGrail, Director
Mass. Emergency Management Agency
400 Worcester Road
P.O. Box 1496
Framingham, MA 01702

Mr. Robert Walker
Radiation Control Program
Commonwealth of Massachusetts
Exec Offices of Health & Human Services
174 Portland Street
Boston, MA 02114

ENCLOSURE

Evaluation Of The Proposed Changes

Subject: Revision to Jet Pump Surveillance Requirements and Correction to Reference Cited in TS 4.11.C.1

1. DESCRIPTION

This letter is a request to amend Operating License DPR-35 for Pilgrim Nuclear Power Station. The proposed amendment revises Technical Specification (TS) 4.6.E, jet pump surveillance requirements and its Bases, based on NUREG 1434, Standard Technical Specifications (STS), General Electric Plants, BWR/6, Revision 2 (Ref. 1) and GE SIL-330 (Ref. 2).

Pilgrim has imposed more restrictive surveillance requirements in plant procedures in accordance with STS Surveillance Requirement (SR) 3.4.3.1 and the guidance provided in GE SIL 330.

In addition to the above, Surveillance 4.11.C.1 is revised to correctly make reference to the limiting control rod pattern cited in Table 3.2.C.1, Note 5. This is an administrative change.

Entergy requests approval of this change prior to December 2003.

2. PROPOSED CHANGES

The surveillance requirements of TS 4.6.E are revised to the following:

- Notes 1 and 2 are added in front of the surveillance as follows:
  1. Not required to be performed until 4 hours after associated recirculation loop is in operation.
  2. Not required to be performed until 24 hours after >25% Rated Thermal Power.
- Verify jet pump operability whenever the two recirculation loops have flow imbalance of 10% or more, instead of the current margin of 15%.
- A requirement that no two of three, instead of all the current three conditions specified in TS 4.6.E, occur simultaneously.
- The 4.6.E Basis is revised to incorporate the 10% flow imbalance and verification of two of three surveillance requirements.

The Surveillance 4.11.C.1 is revised to state "...a limiting control rod pattern as specified in Table 3.2.C.1 Note 5" and deleting the words "as described in the bases for Specification 3.3.B.5"

3. BACKGROUND

The current Pilgrim TS 4.6.E requires that the two recirculation loops have a flow imbalance of less than 15% when the pumps are operated at the same speed. Plant experience, as indicated in GE SIL-330, shows that the change in recirculation pump flow rate can be <15% when a jet pump mixer is displaced. Therefore, Pilgrim has adopted a more conservative recirculation flow imbalance value of 10% into plant procedures in accordance with STS SR 3.4.3.1.

Even though the current TS 4.6.E.2 and 3 conditions are adequate to detect loss of integrity as discussed in SIL-330, the current TS 4.6.E requiring simultaneous occurrence of all three conditions including the 15% flow imbalance criteria is not as conservative as existing procedural requirements. Based on the above, Pilgrim has revised the applicable procedure to incorporate a 10% flow imbalance criterion and the requirement that the simultaneous existence of two of the three conditions indicates a loss of jet pump integrity that requires a plant shut down. The proposed TS change incorporates these more restrictive conditions to ensure jet pump integrity. These conditions are in accordance with STS SR 3.4.3.1.

Prior to the License Amendment 186, Surveillance 4.11.C.1 made reference to the Bases of Specification 3.3.B.5 for limiting control rod pattern description. During Amendment 186, Specifications and Bases for TS 3/4.3, Reactivity Control, were completely revised. However, the reference included in Surveillance 4.11.C.1 was not corrected. The proposed change correctly makes reference to the existing Specification Table 3.2.C.1 Note 5.

4. TECHNICAL ANALYSIS

Jet pump operability is an explicit assumption in the design basis loss of coolant accident (LOCA) analysis. The capability of reflooding the core is dependent upon the structural integrity of the jet pumps. If the structural system fails, jet pump performance degradation could adversely affect the water level in the core during reflood phase of a LOCA, as well as assumed blowdown flow during a LOCA. The jet pumps satisfy Criterion 2 of 10 CFR 50.36(c)(2)(ii).

The surveillance requirement is designed to detect significant degradation in jet pump performance that precedes jet pump failure. The jet pump failure of concern is a complete mixer displacement due to a jet pump beam failure. Jet pump plugging is also of concern since it adds flow resistance to the recirculation loop. Significant degradation is indicated if the specified criteria in TS 4.6.E confirm unacceptable deviations from established patterns or relationships. The allowable deviations from the established patterns have been developed based on the variations experienced at plants during normal operation and with jet pump assembly failures (Reference 2).

A change in flow rate of the failed jet pump produces a change in the indicated flow rate of that pump relative to the other jet pumps in that loop. Comparison of the data with a normal relationship or pattern also provides the indication necessary to detect a failed jet pump. In addition, the jet pump flow deviation pattern derived from the diffuser to lower plenum differential pressure readings can be used to evaluate jet pump operability.

With the two recirculation pumps balanced in speed to within ± 5%, control room monitoring instruments can verify the flow rates in both recirculation loops. If the two flow rate values do not differ by more than 10%, conditions of TS 4.6.E.2 and 3 must be evaluated to verify the riser and nozzle assembly integrity. If the flow rate values do differ by 10% or more after correction for the difference in pump speeds, the requirements of TS 4.6.E.2 or 3 need to be evaluated to determine jet pump operability. Thus, the verification for 10% flow imbalance and verification of two of three conditions are more conservative than the existing TS surveillance requirements.

In the event of a failed jet pump nozzle (or riser), the affected jet pump diffuser differential pressure signal would be reduced because the backflow would be less than the normal forward flow. If the jet pump ΔP indications are within 10% of established jet pump ΔP characteristics, jet pump nozzle and riser integrity have been established. If the indicated jet pump ΔP varies from the established jet pump characteristics by more than 10%, indicated core flow will be compared to the core flow derived from loop flow measurements. If the difference between measured and derived core flow rate is 10% or more, a failed jet pump nozzle (or riser) is indicated and the plant shall be shut down for repairs.

The surveillance is modified by two Notes to provide clarity. Note 1 allows the surveillance not to be performed until 4 hours after associated recirculation loop is in operation, since these checks can only be performed during the jet pump operation. The 4 hours is an acceptable time to establish conditions appropriate for data collection and evaluation. Note 2 allows the surveillance not to be performed when thermal power is ≤ 25% of Rated Thermal Power. This note is needed since, during low flow conditions, jet pump noise approaches the threshold response of the associated flow instrumentation and precludes the collection of repeatable and meaningful data. The 24-hour frequency has been shown by operating experience to be timely for detecting jet pump degradation and is consistent with the surveillance frequency for recirculation loop operability verification.

The proposed TS change is more conservative than the current requirements and is in accordance with the STS SR 3.4.3.1 to ensure jet pump integrity.

The proposed change in Surveillance 4.11.C.1 corrects an incorrect reference, with no change in requirements.

5. REGULATORY SAFETY ANALYSIS

5.1 No Significant Hazards Consideration

Entergy Nuclear Operations, Inc. (Entergy) proposes changes to Technical Specification (TS) 4.6.E Jet Pumps surveillance requirements to impose more restrictive surveillance requirements to ensure jet pump integrity. This proposed change is in accordance with NUREG 1434, Standard Technical Specifications, General Electric Plants, BWR 6, Revision 2. In addition, the proposed change corrects an incorrect reference included in Surveillance 4.11.C.1, with no changes to the Specification or Bases. Entergy has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of Amendment," as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No

The proposed Pilgrim TS 4.6.E imposes more restrictive surveillance requirements in accordance with the Standard Technical Specifications (STS) surveillance requirement 3.4.3.1 to ensure jet pump integrity during startup and run modes. The more restrictive conditions are: the recirculation loops have a flow imbalance of less than 10%, instead of the current 15%, when the pumps are operated at the same speed, and the occurrence of two of three conditions, instead of the simultaneous occurrence of all three conditions currently specified in TS 4.6.E for jet pump integrity.

The proposed surveillance requirements ensure safe operation of the plant during startup and run modes. The requirements are not accident precursors. The proposed change that corrects a reference in Surveillance 4.11.C.1 is an administrative change with no impact on safety. These changes do not create accident conditions or increase the probability of previously evaluated accidents. The proposed changes provide additional assurance that the assumptions (i.e., jet pump integrity) are met. Therefore, the probability or the consequences of an accident previously evaluated are not significantly increased.

2. Does the proposed change create the possibility of a new or different kind of accident for any accident previously evaluated?

   Response: No

   The proposed changes do not involve a change to the plant design or a new mode of equipment operation. As a result, the proposed changes do not affect parameters or conditions that could contribute to the initiation of any new or different kind of accident. Therefore, these proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the change involve a significant reduction in a margin of safety?

   Response: No

   The proposed surveillance requirements increase the margin of safety by providing additional assurance of jet pump integrity. The proposed change to correctly reference the existing Specification is administrative in nature. Therefore, the proposed changes do not involve a significant reduction in the margin of safety.

Based on the above, Entergy concludes that this proposed license amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly a finding of "no significant hazards consideration" is justified.

6. ENVIRONMENTAL CONSIDERATIONS

The proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant change in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.2(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

7. REFERENCES

1. NUREG 1434, Standard Technical Specifications for General Electric Plants, BWR/6, Section 3.4.3, Revision 2.

2. General Electric Service Information Letter No. 330, " Jet Pump Beam Cracks", dated June 9, 1980.

ATTACHMENT 1

Proposed Technical Specification and Bases (mark-up) - 4 pages

TS Page 3/4.6-7

TS Bases Page B3/4.6-9

Insert to B3/4.6-9

TS Page 3/4.11-2

MARKUP.PDF

LIMITING CONDITIONS FOR OPERATION

3.6 PRIMARY SYSTEM BOUNDARY (Cont)

D. Safety Relief Valves (Con't)

4. Any safety relief valve whose discharge pipe temperature exceeds 212°F for 24 hours or more shall be removed at the next cold shutdown of 72 hours or more, tested in the as-found condition, and recalibrated as necessary prior to reinstallation. Power operation shall not continue beyond 90 days from the initial discovery of discharge pipe temperatures in excess of 212°F for more than 24 hours without prior NRC approval of the engineering evaluation delineated in 3.6.D.3.

5. The limiting conditions of operation for the instrumentation that monitors tail pipe temperature are given in Table 3.2-F.

E. Jet Pumps

1. Whenever the reactor is in the startup or run modes, all jet pumps shall be operable. If it is determined that a jet pump is inoperable, an orderly shutdown shall be initiated and the reactor shall be in a Cold Shutdown Condition within 24 hours.

SURVEILLANCE REQUIREMENTS

4.6 PRIMARY SYSTEM BOUNDARY (Cont)

NOTES

1. *Not required to be performed until 4 hours after the associated recirculation loop is in operation.*

2. *Not required to be performed until 24 hours after >25% Rated Thermal Power.*

E. Jet Pumps

Whenever there is recirculation flow with the reactor in the startup or run modes, jet pump operability shall be checked daily by verifying that the following conditions ~~do not~~ occur simultaneously. no two of

1. The two recirculation loops have a flow imbalance of ~~15%~~ or more when the pumps are operated at the same speed. 10%

2. The indicated value of core flow rate varies from the value derived from loop flow measurements by more than 10%.

3. The diffuser to lower plenum differential pressure reading on an individual jet pump varies from established jet pump delta P characteristics by more than 10%.

BASES:

3/4.6 PRIMARY SYSTEM BOUNDARY (Cont)

E. Jet Pumps

Failure of a jet pump nozzle assembly hold down mechanism, nozzle assembly and/or riser, would increase the cross-sectional flow area for blowdown following the design basis double-ended recirculation line break. Therefore, if a failure occurred, repairs must be made.

A nozzle riser failure could cause the coincident failure of a jet pump body; however, because of the lack of any substantial stress in the jet pump body, the converse is not possible. Therefore, failure of a jet pump body cannot occur without the failure of the nozzle riser.

The following factors form the basis for the surveillance requirements:

A break in a jet pump decreases the flow resistance characteristic of the external piping loop causing the recirculation pump to operate at a higher flow condition when compared to previous operation.

The change in flow rate of the failed jet pump produces a change in the indicated flow rate of that pump relative to the other jet pumps in that loop. Comparison of the data with a normal relationship or pattern provides the indication necessary to detect a failed jet pump.

INSERT A

The jet pump flow deviation pattern derived from the diffuser to lower plenum differential pressure readings will also be used to evaluate jet pump operability.

The jet pump operability detection technique is as follows. With the two recirculation pumps balanced in speed to within ± 5%, the flow rates in both recirculation loops will be verified by Control Room monitoring instruments. If the two flow rate values do not differ by more than ~~15%~~ 10%, riser and nozzle assembly integrity has been verified. If they do differ by ~~15%~~ 10% or more after correction for the difference in pump speeds, the diffuser to lower plenum differential pressure of all jet pumps will be compared to established jet pump ΔP characteristics. In the event of a failed jet pump nozzle (or riser), the affected jet pump diffuser differential pressure signal would be reduced because the backflow would be less than the normal forward flow. If the jet pump ΔP indications are within 10% of established jet pump ΔP characteristics, jet pump nozzle and riser integrity have been established. If the indicated jet pump ΔP varies from the established jet pump characteristics by more than 10%, indicated core flow will be compared to the core flow derived from loop flow measurements. If the difference between measured and derived core flow rate is 10% or more, a failed jet pump nozzle (or riser) is indicated and the plant shall be shut down for repairs. If the potential blowdown flow area is increased, the system resistance to the recirculation pump is also reduced; hence, the affected drive pump will "run out" to a substantially higher flow rate (approximately 115% to 120% for a single nozzle failure). If the two loops are balanced in flow at the same pump speed, the resistance characteristics cannot have changed.

INSERT A to TS Bases page B3/4.6-9

The surveillance is modified by two Notes. Note 1 allows the surveillance not to be performed until 4 hours after the associated recirculation loop is in operation, since these checks can only be performed during the jet pump operation. The 4 hours is an acceptable time to establish conditions appropriate for data collection and evaluation. Note 2 allows the surveillance not to be performed when thermal power is ≤ 25% of Rated Thermal Power. During low flow conditions, jet pump noise approaches the threshold response of the associated flow instrumentation and precludes the collection of repeatable and meaningful data. The 24-hour frequency has been shown by operating experience to be timely for detecting jet pump degradation and is consistent with the surveillance frequency for recirculation loop operability verification.

The surveillance requires verification of jet pump operability on a daily basis by verifying two of the three following conditions do not occur simultaneously: 1) the recirculation loops have a flow imbalance of less than 10% when the pumps are operated at the same speed, 2) the variation in the indicated core flow rate and the loop flow rate is less than 10%, and 3) the diffuser to lower plenum differential pressure reading on an individual jet pump is less than 10%.

LIMITING CONDITIONS FOR OPERATION

3.11 REACTOR FUEL ASSEMBLY (Cont)

B. Linear Heat Generation Rate (LHGR)

During reactor power operation, the LHGR shall not exceed the limits specified in the CORE OPERATING LIMITS REPORT.

If at any time during operation it is determined by normal surveillance that the limiting value for LHGR is being exceeded, action shall be initiated within 15 minutes to restore operation to within the prescribed limits. If the LHGR is not returned to within the prescribed limits within two (2) hours, the reactor shall be brought to the Cold Shutdown condition within 36 hours. Surveillance and corresponding action shall continue until reactor operation is within the prescribed limits.

C. Minimum Critical Power Ratio (MCPR)

1. During power operation MCPR shall be ≥ the MCPR operating limit specified in the Core Operating Limits Report. If at any time during operation it is determined by normal surveillance that the limiting value for MCPR is being exceeded, action shall be initiated within 15 minutes to restore operation to within the prescribed limits. If the steady state MCPR is not returned to within the prescribed limits within two (2) hours, the reactor shall be brought to the Cold Shutdown condition within 36 hours. Surveillance and corresponding action shall continue until reactor operation is within the prescribed limits.

SURVEILLANCE REQUIREMENTS

4.11 REACTOR FUEL ASSEMBLY (Cont)

B. Linear Heat Generation Rate (LHGR)

The LHGR as a function of core height shall be checked daily during reactor operation at ≥ 25% rated thermal power.

C. Minimum Critical Power Ratio (MCPR)

1. MCPR shall be determined daily during reactor power operation at > 25% rated thermal power and following any change in power level or distribution that would cause operation with a limiting control rod pattern as ~~described in the bases for Specification 3.3.B.5.~~

2. The value of τ in Specification 3.11.C.2. shall be equal to 1.0 unless determined from the result of surveillance testing of Specification 4.3.C as follows:

a) τ is defined as

$$\tau = \frac{\tau_{ave} - \tau_B}{1.252 - \tau_B}$$

Specified in Table 3.2.C-1 Note 5

ATTACHMENT 2

List of Regulatory Commitments

List of Regulatory Commitments

The following table identifies those actions committed to by Entergy Nuclear Operations, Inc. in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

REGULATORY COMMITMENT	DUE DATE
None.	