Duke Power
A Duke Energy Company

W. R. McCollum, Jr.
Vice President

Duke Power
Oconee Nuclear Site
7800 Rochester Highway
Seneca, SC 29672
(864) 885-3107 OFFICE
(864) 885-3564 FAX

July 26, 2000

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, and –287
Oconee Units 1, 2, and 3
Response to Request for Additional Information
Proposed Revision to Technical Specifications
Technical Specification Change Request No. 99-01

Reference: Letter, D. E. LaBarge (USNRC) to M. S. Tuckman (Duke), "Re: Request for Additional Information," dated July 12, 2000

By letter dated April 26, 1999, Duke Energy Corporation (Duke) submitted a License Amendment Request (LAR) to the Oconee Nuclear Station (ONS) Technical Specifications (TS) concerning Steam Generator (SG) tube loads following a Main Steam Line Break (MSLB). Duke provided supplemental information concerning this request by letter dated May 15, 2000. The attachment to this letter provides responses to the above referenced request for additional information concerning the operator response times to trip reactor coolant pumps and to isolate emergency feedwater flow following a main steam line break. This Technical Specification change request is not based on new or changed operator actions. Instead, this request conservatively uses previously approved operator actions in the analysis supporting this change.

On July 18, 2000, Duke submitted TS Change Request (TSCR) 99-10 that, in part, requested approval of modifications to reduce reliance on operator actions associated with isolation of feedwater following a MSLB. The operator actions to isolate emergency feedwater to a faulted SG described in TSCR 99-01 and this response to request for additional information would be eliminated on approval and implementation of the TSCR 99-10 modifications.

Questions concerning this submittal should be directed to Robert Douglas at (864) 885-3073.

Very truly yours,

W. R. McCollum, Jr., Site Vice President
Oconee Nuclear Site

Attachment

A001

xc w/attachments:

L. A. Reyes
U. S. Nuclear Regulatory Commission
Regional Administrator, Region II
Atlanta Federal Center
61 Forsyth St., SW, Suite 23T85
Atlanta, GA 30303

D. E. LaBarge
NRC Senior Project Manager (ONS)
U. S. Nuclear Regulatory Commission
Mail Stop O-14H25
Washington, DC 20555-0001

M. E. Shannon
Senior Resident Inspector (ONS)
U. S. Nuclear Regulatory Commission
Oconee Nuclear Site

R. Autry, Director
Division of Radioactive Waste Management
Bureau of Land & Waste Management
Department of Health & Environmental Control
2600 Bull Street
Columbia, SC 29201

AFFIDAVIT

W. R. McCollum, Jr., being duly sworn, states that he is Site Vice President of Duke Energy Corporation; that he is authorized on the part of said corporation to sign and file with the Nuclear Regulatory Commission this revision to the Oconee Nuclear Station License Nos. DPR-38, DPR-47, and DPR-55; and that all statements and matters set forth therein are true and correct to the best of his knowledge.

W. R. McCollum, Jr., Site Vice President

Subscribed and sworn to me: July 26, 2000
Date

Notary Public: Robert C. Douglas

My Commission Expires: August 13, 2009
Date

SEAL

xcc: M. K. Nazar
J. S. Forbes
W. W. Foster
T. D. Curtis
B. G. Davenport
L. E. Nicholson
M. T. Cash
C. J. Thomas
L. F. Vaughn
NSRB
ELL
Document Control
W. M. Sample
B. B. Lowery, Jr.
L. J. Azzarello
C. A. Little
T. A. Coutu
B&W Regulatory Working Group
A. D. Park
G. B. Swindlehurst
J. S. Warren
J. M Sawyer

Attachment
Response to Request for Additional Information
Oconee Nuclear Station
Technical Specification Change Request 99-01

Question 1:

The Safety Evaluations (SE) of May 29, 1986, and March 15, 1988, were related to a small break loss of coolant accident (SBLOCA) and included operator actions to trip the reactor coolant pumps (RCPs). The B&W Owner's Group SE endorsed Draft ANSI Standard N660 for operator actions. That draft was finalized and published as ANSI/ANS-58.8-1984, "Time Response Design Criteria for Safety Related Operator Actions," and was revised in 1994. Please explain why a new application, main steam line break (MSLB), should not be reviewed against the published industry standard.

Response:

Operator action to trip the reactor coolant pumps upon loss of subcooled margin was added as part of Oconee's action plan to address issues brought about by the 1979 TMI-2 accident. This action was added for mitigating SBLOCA events, and a time of two minutes is currently credited for SBLOCA analyses. Subcooled margin will also be lost very quickly for large main steam line break (MSLB) events. As such, the operators will also trip the reactor coolant pumps during a MSLB per the emergency procedure. For the MSLB event, tripping the RCPs at two minutes is conservative in that the calculated tube loads are maximized. This operator action is not a credit, but is instead a penalty.

Prior to the assumed two minute RCP trip, forced circulation in the primary system initially hastens the cooldown of the primary coolant due to the blowdown of the faulted steam generator (SG). After this initial cooldown, a loss of forced circulation then results in longer residence times for the cold water in the SG tubes. This causes the SG tubes to cool to a greater extent, which increases the temperature difference between the tubes and the SG shell, thereby increasing the tube loading. Tripping of the RCPs also stops the addition of RCP pump heat, which is also conservative for maximizing the cooldown, although this is a smaller effect. Therefore, the RCP trip at two minutes following the loss of subcooled margin that is required for SBLOCA mitigation results in a conservative prediction of the MLSB tube-to-shell temperature differences. Operators will trip the RCPs during a large MLSB event, and assuming this time to be two minutes is a conservative assumption for the tube loads calculation.

Question 2:

Were the operator actions to isolate emergency feedwater (EFW) flow during a MSLB event (December 7,1998 SE) reviewed against ANSI/ANS 58.8?

Response:

No, this time was not reviewed against ANSI/ANS 58.8. The assumed ten minute operator action to isolate EFW to a faulted SG is an established time critical operator action, and is referenced in the current licensing basis. By letter dated July 15, 1997, Duke submitted TS Change Request 95-03 proposing a technical specification for the MSLB detection and feedwater isolation circuit. When a MLSB event is detected, this circuitry isolates main feedwater, trips the main feedwater pumps, and blocks the auto-start of (or trips) the turbine-driven emergency feedwater pump. The justification for this technical specification change emphasized the need for operator action to isolate flow from the motor-driven emergency feedwater pump to the faulted SG in the event of a MSLB inside containment, thereby avoiding potential containment overpressurization. This ten minute response time to isolate motor-driven EFW during a MSLB event is an established time critical operator action, and is reflected in the last sentence of Section 6.2.1.4.4 of the Oconee UFSAR. Since the operators are trained to perform this action within ten minutes, this time was not reviewed against ANSI/ANS 58.8.

Question 3:

Describe the differences (environmental conditions, control room alarms and indications, secondary operator tasks, etc.) between a SBLOCA and a MSLB.

Response:

Although there are differences in how the SBLOCA and MSLB appear to the operators, it is probably more relevant to consider the similarities between these two events when attempting to justify the operator action time in question. Both the SBLOCA and large MSLB events result in a depressurization of the primary system. This will lead to a loss of subcooled margin. Consequently, the depressurization will also result in actuation of engineered safeguards (high pressure injection) for both events. Due to the rapid loss of subcooled margin, operators are instructed to promptly trip the reactor coolant pumps for both events as long as the reactor is not at power. Operators trip the RCPs upon recognition of a loss of subcooled margin, and not upon the recognition or diagnosis of a SBLOCA event. For the SBLOCA event, tripping the RCPs limits the primary inventory loss to acceptable values. However, for the MSLB tube loads calculation, tripping the RCPs is not a benefit, as described in the response to question 1 above. With the primary system significantly overcooled, a loss of forced circulation results in longer residence times for the primary inventory in the SG tubes. This allows the SG tubes to cool to a greater extent, which increases the temperature difference between the tubes and the SG shell, thereby increasing the tube loading. Therefore, while there are differences between a SBLOCA and a MSLB, the similarity in the loss of subcooled margin will result in the operators securing the RCPs for both events.

Question 4:

Should you plan to take exception to the time criteria of ANSI/ANS-58.8, it is necessary to justify the exception by developing operator action times based on a task analysis and an independent data base. Please provide the justification for this exception for both tripping the RCPs and isolating EFW flow. If these issues were addressed in the earlier submittals (1988, 1998), please provide those parts as background.

Response:

As discussed in the response to questions 1 and 3 above, operator action to trip the RCPs is not a benefit, but is instead a penalty to the MSLB tube loads calculation. The RCPs are required to be tripped within two minutes of the loss of subcooled margin to mitigate the SBLOCA event. For the MSLB event, subcooled margin is quickly lost after the initiation of the event. Tripping the RCPs at two minutes allows for forced circulation in the primary system that hastens the cooldown of the primary coolant due to the blowdown of the faulted steam generator (SG). With the primary system significantly overcooled, a loss of forced circulation then results in longer residence times for the primary inventory in the SG tubes. This allows the SG tubes to cool to a greater extent, which increases the temperature difference between the tubes and the SG shell, thereby increasing the tube loading. Since the operator action to secure the RCPs is a penalty for the MSLB tube loads analysis, an exception to ANSI/ANS-58.8 is not appropriate, since having the operators perform the action is a conservative assumption.

The assumed ten-minute time for operator action to isolate EFW to a faulted SG for the MSLB event is an already established time critical operator action, and is referenced in the current Oconee licensing basis. By letter dated July 15, 1997, Duke submitted TS Change Request 95-03 proposing a technical specification for the MSLB detection and a feedwater isolation circuit. The justification for this technical specification change emphasized the need for operator action to isolate the motor-driven emergency feedwater to the SGs in the event of a MSLB inside containment, thereby avoiding potential containment overpressurization. This ten-minute response time to isolate motor-driven EFW during a MSLB event is an established time critical operator action. It is also reflected in the Oconee UFSAR in the last sentence of Section 6.2.1.4.4. Since this action is already established, and the operators are trained to perform the action within ten minutes, an exception to ANSI/ANS-58.8 already exists, and it is not necessary to justify the exception again.

Question 5:

Describe the number and type of operator manipulations needed to trip the reactor coolant pumps and to isolate EFW flow to the affected steam generator.

Response:

The number and type of operator actions needed to trip the RCPs and isolate motor-driven EFW flow to the affected SG during a MSLB event are described below as well as other items describing plant response. All indications and components operated are located within the control room horseshoe area within approximately 10 to 12 feet of each other.

In the event of a MSLB and the subsequent reactor and main turbine trips, operators identify the affected SG(s) and take the following actions:

1. Motor-driven EFW pump secured on affected SG(s). This involves rotating a 4-position switch (OFF/AUTO 1/AUTO 2/RUN) from AUTO 2 to OFF. This secures motor-driven EFW.
2. Both trains of the MSLB circuit initiated (2 pushbuttons) even though circuit initiation is automatic.
3. Both MFW pump turbines verified tripped. The MSLB circuit automatically trips the pumps, but if on, one switch per MFWPT rotated to TRIP stops the pump.
4. Close EFW flow control valve on the affected SG(s). If MD EFW pump failed to secure, this secures flow.
   a. Depressing one pushbutton per train to select manual
   b. Verify demand knobs rotated to 0% (normally at 0%)
5. If at any time subcooled margin reaches 0 °F, and reactor power is less than 1%, the RCPs are tripped.
   a. Subcooled margin is monitored on safety grade displays.
   b. One switch per RCP rotated to TRIP position (4 total).