Southern Nuclear Operating Company
Post Office Box 1295
Birmingham, Alabama 35201
Telephone (205) 868-5131

Dave Morey
Vice President
Farley Project

Southern Nuclear Operating Company
the southern electric system

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50-364

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

Joseph M. Farley Nuclear Plant - Units 1&2
Containment Temperature Technical Specification Surveillance

Gentlemen:

During portions of the months of July and August of this year, Farley Nuclear Plant experienced very hot and humid weather conditions with below average amounts of rainfall. During this period, there were several meetings involving SNC site and corporate personnel along with the site resident inspector to discuss Technical Specification Surveillance Requirement 4.6.1.5.1 & 2 and its implementing Surveillance Test Procedure (STP). After independently monitoring containment temperatures and trends as well as examining plant drawings of temperature element locations and meeting several times with SNC personnel, the site resident inspector concluded that SNC currently meets applicable Technical Specification requirements and that there does not appear to be any significant safety concern at present. The site resident inspector's conclusions were ultimately documented in NRC Inspection Report Nos. 50-348/95-14 and 50-364/95-14 as unresolved item (URI) 50-348, 364/95-14-01, High Containment Air Temperature.

SNC hereby addresses site resident inspector conclusions, documented in the above mentioned inspection report, related to average containment temperature surveillance.

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NRC Conclusion:

SNC currently meets applicable TS requirements.

SNC Response:

SNC agrees with this conclusion.

NRC Conclusion:

STP-1.0 methodology is not realistic, and non-conservatively understates actual bulk containment air temperature.

SNC Response:

STP-1.0 methodology is realistic and conservatively represents containment temperature. The only significant source of cooling to the containment atmosphere is provided by the four containment coolers. The four containment coolers and their air intakes are located on the 155' elevation. In addition, there are four containment recirculation (Dome) fans which are provided to circulate and facilitate mixing of the air volume above 155'. These recirculation (Dome) fans take their suction from the upper region of the containment building and discharge down toward the 155' elevation where the containment cooler inlets and associated temperature elements are located. The recirculation fans, by design, create a turnover rate in the upper containment region of approximately once every 15 minutes (with 4 fans operating on fast speed). The containment air volume turnover rate through the four containment coolers is approximately once every 6.25 minutes. Based on the mixing and resulting air volume turnover rate described above, an accurate representation of containment average air temperature would be the arithmetical average of the cooler intake and discharge temperatures. The methodology used at FNP defines the containment average temperature as the arithmetical average of the two highest (out of four) cooler intake temperatures and the two lowest of the remaining temperatures. This definition would represent containment average temperature as accurately as described above if the two lowest of the remaining temperatures were measured in the containment cooler discharges. However, FNP has only one of three of the remaining temperature elements near the containment cooler discharge.

At FNP there is one temperature element in each of the four containment cooler intakes. The remaining three temperature elements that are not containment cooler intake elements, are located on the 85' elevation (TE3188 J) and on the 105' elevation (TE3188 H & I). TE3188 J is in close proximity to the discharge of the containment coolers, but neither TE3188 H or I are near the discharge. Based on this fact, both TE3188 H & I see temperatures higher than would be seen in the cooler discharges. Therefore, even though TE3188 J represents the containment cooler discharge temperature, since neither TE3188 H or I are located in the discharge of the containment cooler, the arithmetical average derived from using two out of three of these temperature elements in combination with the two highest containment cooler intake temperatures is considered conservative.

NRC Conclusion:

TE3188 J, and possibly 3188 H, are unduly influenced by localized conditions (i.e., close proximity to the outflow from containment air cooler ventilation ducts) that are not representative of bulk air temperature.

SNC Response:

A review of plant drawings indicates that TE3188 J is in close proximity to the discharge of the containment cooler. Use of the temperature indicated by this element in the arithmetical average would simply promote an accurate representation of average containment temperature. A walkdown conducted during the current Unit 1 refueling outage has confirmed that TE3188 H is not in close proximity to the discharge of the containment cooler. The review of plant drawings also indicates that these temperature elements are located similarly in both units.

NRC Conclusion:

SNC was unable to provide any technical basis for its unique method of implementing TS SR 4.6.1.5.1.

SNC Response:

The original technical basis has not changed since initial plant licensing. This basis is to conservatively estimate containment bulk air temperature while allowing flexibility should temperature element failure be a problem.

Averaging at least four sensors (as described above) as opposed to one or two and requiring that two of the four used be representive of the hottest available bulk air temperature was considered conservative.

Furthermore, SNC has reviewed the Containment Temperature Technical Specifications surveillance methods from several other utilities and have found that FNP STP-1.0 is not unique. This review has revealed that there are several different methods used. Some utilities have fewer Technical Specification temperature elements and use all of them to determine average containment temperature whereas others have a similar number of sensors (or more) and do not use all of them to determine average temperature.

NRC Conclusion:

Temperature element and indicator channel inaccuracies have not been considered in licensee calculations (the vendor acceptance limit for TE3187 E, F, G, and H is plus/minus four degrees; I&C indication tolerance is plus/minus two degrees).

SNC Response:

Traditional engineering convention has been that for parameters that do not provide automatic actuation of safety features, such as containment temperature, indicated temperature is assumed as actual temperature. On this basis, the nominal TS values for these parameters are often applied in accident analyses. The containment pressure/temperature analyses are relatively insensitive to the value of this parameter. Calculations have been performed to confirm this judgement. Therefore, it is unnecessary to consider such inaccuracies when measuring these temperatures. If, as a part of some future re-analyses this parameter becomes sensitive, SNC will consider the need to account for these temperature element and channel inaccuracies.

NRC Conclusion:

No margin exists between the FNP acceptance criteria, the TS limit and actual safety analysis assumptions.

SNC Response:

As stated above, except for parameters providing automatic actuation of safety features, traditional engineering convention has applied nominal TS values in accident analysis. While in many cases margin between TS values and assumed accident analysis values is desirable, it is unnecessary in this case. Margin between the FNP acceptance criteria, the TS limit and actual safety analysis assumptions is unnecessary for the following reasons: 1) the containment pressure/temperature analyses are relatively insensitive to the value of the parameter [Calculations have been performed confirming this judgement]; and 2) margin exists between the maximum expected containment temperatures and pressures and the design limits for these parameters for containment integrity protection. Therefore, such margin would be unnecessary in combination with the margin existing between the maximum expected containment temperatures and pressures and the design limits for these parameters for containment integrity protection.

NRC Conclusion:

Unit 1 and 2 bulk containment air temperature (using a straightforward, volumetric-based averaging scheme) may actually exceed the 120° F limit by a few degrees and represent a condition outside the bounds of the plant safety analysis.

SNC Response:

The existing temperature element locations and the current methodology for calculating an average containment temperature provide adequate assurance that the bulk air temperature does not exceed the 120° F limit due to:

- The rate of air turnover by the four containment coolers (approximately one containment volume every 6.25 minutes);

- The recirculation of upper regions provided by the dome recirculation system;

- The conservatism introduced from the two lowest temperature element readings, used to calculate containment average air temperature, not both being representative of cooler outlet temperatures; and,

- The inherent architectural features of containment design, which support good mixing of the atmosphere for post-accident combustible gas control measures, also assist in good mixing of the various regions within the containment.

NRC Conclusion:

Preliminary analysis by SNC indicated that an initial bulk air temperature of 125° F would have minimal impact on containment temperature and pressure following a LOCA or MSLB.

SNC Response:

As stated earlier, SNC has performed calculations which have confirmed that these analyses are relatively insensitive to the value of this parameter.

Given the above, it is SNC's position that FNP STP-1.0 methodology is: realistic, conservative, sufficiently accurate, and one of several reasonable ways to perform this surveillance. Furthermore, the NRC staff acknowledges that SNC meets applicable TS requirements and that there does not appear to be a significant safety issue. As such, it is SNC's position that no safety issue exists and that URI 50-348, 364/95-14-01 should be closed.

If you have any questions related to the above, please advise.

Respectfully submitted,
Southern Nuclear Operating Company

Dave Morey

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cc: Mr. S. D. Ebneter
Mr. B. L. Siegel
Mr. T. M. Ross