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ACCESSION NBR:9402010161 DOC.DATE: 94/01/25 NOTARIZED: NO DOCKET #
FACIL:50-250 Turkey Point Plant, Unit 3, Florida Power and Light C 05000250
50-251 Turkey Point Plant, Unit 4, Florida Power and Light C 05000251
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SUBJECT: Forwards response to request for addl info re 930521 proposed license amends to revise max containment design internal pressure from 59 to 55 psig.

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L-94-014
10 CFR 50.56
10 CFR 50.94

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

Subject: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Proposed License Amendments
Additional Information - Maximum Containment Pressure
TAC Nos. M86680 and M86681

By letter L-93-133, dated May 21, 1993, Florida Power & Light Company (FPL) submitted proposed license amendments to revise the maximum containment design internal pressure from 59 psig to 55 psig. The purpose of this letter is to provide in the attachment additional information as requested by members of the NRC staff.

If you have any questions regarding this information, please contact us.

Very truly yours

T. F. Plunkett
Vice President
Turkey Point Plant

Attachment

TFP/OIH

cc: Stewart D. Ebneter, Regional Administrator, Region II, USNRC
T. P. Johnson, Senior Resident Inspector, USNRC, Turkey Point Plant

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Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Proposed License Amendments
Additional Information - Maximum Containment Pressure

ATTACHMENT

Information Regarding
Maximum Containment Pressure Analysis

As a result of FPL's submittal of May 21, 1993, the NRC staff has identified some additional information that is required to clarify the Main Steam Line Break (MSLB) peak containment pressure analyses performed by FPL and the allowed initial containment pressure for Turkey Point Units 3 and 4.

MSLB Peak Pressure Analysis

The original licensing analysis performed for Turkey Point assumed an instantaneous mass and energy release of 187,000 lbm and 166.5 X 10^6 BTU, with no credit taken for containment safeguards. This analysis resulted in a peak containment pressure of 42 psig (Reference 1).

In 1980, NRC issued IE Bulletin 80-04, "Analysis of a PWR Main Steam Line Break with Continued Feedwater Addition." This bulletin required in part that licensees review their containment pressure response analyses to determine if the potential for containment overpressure exists as a result of the impact of continued feedwater addition to the faulted steam generator. An analysis of this event was performed by Westinghouse for FPL that indicated a peak pressure of 56.1 psig for a zero power MSLB inside containment (Reference 2). The Westinghouse Code LOFTRAN was used to develop the mass and energy releases for the MSLB and the containment code COCO was used to analyze the containment response.

The analysis performed in response to IE Bulletin 80-04 contained significant conservatism that, in one case, attempted to bound all possible conditions for steam line break. The following conservatisms were used for the IE Bulletin 80-04 analysis (Reference 2):

1. The analysis was performed at hot zero power to maximize steam generator inventory. Offsite power was assumed available so that the reactor coolant pumps (RCPs) would be available (RCPs improve heat transfer out of the primary system and increase the severity of the blowdown).

2. The main steam check valve on the faulted steam generator was assumed to fail open.

3. Conservatively high main feedwater flow such as would exist at full power operation was assumed (feedwater flow would be much lower at zero power due to plant operation using the main feedwater bypass valves).

4. Engineered Safety Features (ESF) equipment was assumed to be delayed due to failure of offsite power (inconsistent with 1 above) and only one train available due to a diesel generator failure.

5. Very high auxiliary feedwater (AFW) flows were assumed that would only be possible with an AFW flow control valve failure.

6. Containment spray flow assumed was 400 gpm, which is less than 30% of rated flow from one pump.

7. Temperature in containment was only assumed to reach 180°F for purposes of estimating emergency containment cooler (ECC) heat removal (this represents a heat removal capability of about 1/5 of design).

8. Very low containment heat sink values were assumed.

In summary, the analysis performed was exceedingly conservative and essentially assumed multiple plant equipment failures.

Follow-up work on the MSLB peak containment pressure analysis was performed by Westinghouse for FPL in 1989 and is described in WCAP-12262 (Reference 3). The study performed in WCAP-12262, while overall using conservative methods and assumptions, in certain areas used "best-estimate" type assumptions. Notably, instrument errors assumed in this study were typically smaller than would be used in an FSAR type analysis. A spectrum of cases were run using different plant power levels, break sizes, and single failure assumptions. From this report, it was clear that the limiting event was a zero power main steam line break with offsite power available and a failure of the main steam check valve, with a peak pressure of 45.1 psig. The primary reason for the significant reduction in pressure between WCAP-12262 and the analysis performed for IE Bulletin 80-04 is that only a single failure was assumed for each transient in WCAP-12262, rather than the equivalent of multiple failures as was assumed for IE Bulletin 80-04.

Because the analyses performed in WCAP-12262 used some assumptions that were not as conservative as a licensing basis analysis, the limiting transient reported in WCAP-12262 was recompiled and rerun with licensing basis assumptions in 1993. Larger instrument errors were assumed than in the WCAP-12262 analysis. The assumptions for this zero power transient were also re-examined. As a result of this re-review, credit was taken for operation of the plant using the main feedwater bypass valves at zero power rather than operation using the main feedwater valves, as was assumed in WCAP-12262. This resulted in a less severe main feedwater addition for the later case. In addition, WCAP-12262 assumed Main Steam isolation valve (MSIV)

operation in 15 seconds rather than 5 seconds which was used in the recent re-analysis. More rapid isolation of the MSIV, which is consistent with the Technical Specifications, results in less mass addition from the unfaulted steam generators until main steam isolation, and therefore lower peak pressures. These two input assumption changes, feedwater addition and MSIV isolation time, tend to dominate the containment response relative to the other more conservative assumptions that were taken for the 1993 re-analysis case. Based on the results of this Westinghouse analysis (Reference 4), which is considered conservative with respect to the design and licensing bases for Turkey Point, the peak containment pressure that will be reflected in the FSAR for MSLB will be 42.8 psig.

Bases for Initial Containment Pressure

Additionally, FPL is changing the basis for initial containment pressure allowed by the license. Based on generic work performed in Bechtel Topical Report BN-TOP-3 Rev 4 (Reference 5), FPL concluded that a three psig increase in initial containment pressure would result in less than a four psig increase in peak containment pressure for a loss-of-coolant accident. The work performed in the topical report was for a 3700 MW_t PWR releasing 425.6 million BTU into a 2.48 million cubic foot dry containment of the same design as Turkey Point. Available containment heat sinks are on the order of 200,000 square feet, containment spray flow is 2850 gpm, and emergency containment cooler capacity is 266 million BTU/hr. Comparing these parameters to Turkey Point shows that the PWR analyzed is essentially a scaled up version of Turkey Point, with all parameters between 40 to 60% larger than for Turkey Point. The only significant exception to this relates to the containment heat sinks. The Turkey Point containment heat sinks documented in the FSAR show more surface area than was assumed in the Bechtel Topical Report. Another exception relates to the emergency cooler and containment spray capacities which are about twice the capacity of Turkey Point. Since heat sinks tend to be more important for heat removal early in the accident where peak pressures occur, this deviation is considered to be important only to long term cooling and not to peak pressure response. For the reference plant in the topical report, a five psig increase in initial containment pressure resulted in a peak containment pressure increase of only about one psig. Accordingly, FPL's statement that a three psig increase in initial containment pressure will not result in greater than a four psig increase in peak containment pressure is considered conservative. Therefore, if the containment were initially at three psig and a design basis loss-of-coolant accident were to occur, peak containment pressure would not exceed 54 psig, which is less than the design pressure of 55 psig.

References

1. Original Turkey Point Final Safety Analysis Report, Rev. 19 dated November 15, 1971.

2. Turkey Point Updated Final Safety Analysis Report, Rev. 11, November 1993.

3. WCAP-12262, "Analysis of Containment Response Following a Main Steam Line Break for Turkey Point Units 3 and 4," August 1989.

4. Westinghouse letter 93-JB-GL-5091, "Revised MSLB Containment Integrity Licensing Basis Analysis," dated May 18, 1993.

5. Bechtel Topical Report BN-TOP-3, "Performance and Sizing of Dry Pressure Containments," Rev. 4, March 1983.