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AUTH.NAME AUTHOR AFFILIATION
PLUNKETT,T.F. Florida Power & Light Co.
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SUBJECT: Forwards info re final status of chimney repairs & status of each recommendation in NRC 921014 ltr.

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MAY 28 1993

L-93-147

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

Gentlemen:

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Turkey Point Units 1 and 2 Chimneys

By letter dated October 14, 1992, the staff provided recommendations pertaining to Turkey Point Fossil Units 1 and 2 chimneys. In response to the staff's recommendations, Florida Power and Light Company (FPL) provided an interim status by letter L-92-327, dated December 2, 1992. Enclosed is the final status of the Units 1 and 2 chimneys' repairs and the status of each of the recommendations.

Should there be any questions about this submittal, please contact us.

Very truly yours,

T. F. Plunkett by R. J. Pearce

T. F. Plunkett
Vice President
Turkey Point Nuclear

TFP/RJT/rt

Attachment

cc: S. D. Ebneter, Regional Administrator, Region II, USNRC
R. C. Butcher, Senior Resident Inspector, USNRC, Turkey Point

A001 1/1

FPL TURKEY POINT UNITS 3 AND 4
RESPONSE TO NRC RECOMMENDATIONS CONCERNING
THE FOSSIL UNITS 1 AND 2 CHIMNEYS

In the summary of the September 22, 1992 meeting held at Turkey Point between Florida Power and Light Company (FPL) and the NRC on the subject of the Units 1 and 2 chimney evaluation, the NRC recommended some follow-up inspections and monitoring. A status of the repair effort to the Units 1 and 2 chimneys is provided as well as a response to the NRC recommendations.

Status - Turkey Point Units 1 and 2 Chimneys

The Unit 1 chimney windscreen was rebuilt to the original height of approximately 400 ft., using the slip form method. The existing Unit 2 chimney was reinforced with concrete sheath up to approximately 14 ft. from the top. This sheath was placed against the outside face of the existing chimney using the jump form method. The thickness of the sheath ranges from 24 inches at the base to 10 inches at the top. The new Unit 1 windscreen and Unit 2 sheath are reinforced concrete structures with vertical and hoop reinforcement provided on both the exterior and interior faces. The reinforcement quantities and detailing were selected to resist the higher loads required to satisfy the load requirements for Class I structures, per the Turkey Point Units 3 and 4 Updated Final Safety Analysis Report (UFSAR). The installation of hoop reinforcement on both faces also precludes the formation of the type of vertical cracks found in the original chimneys. The existing chimney foundations and soil were checked and found to be acceptable for accommodating the new loads.

The NRC recommendations pertained specifically to the Turkey Point Fossil Unit 2 chimney only.

NRC Recommendation (a):

Develop a surveillance plan for a periodic inspection/survey of the Unit 2 stack to monitor any future stack inclination or stiffness degradation as can be observed by natural frequency changes. This effort can be terminated upon completion of the reconstruction of the Unit 2 stack.

Response

The measurement of natural frequencies is discussed under the response to recommendation (b). In order to satisfy the request for monitoring of stack inclination, a tiltmeter was installed on the chimney wall approximately 394 ft. above the ground. The tiltmeter chosen is a highly accurate device which uses electrolytic tilt transducers to reference biaxial angular movement to the unchanging vertical gravity vector.

Tiltmeter readings were taken on a monthly basis, starting on November 5, 1992. These readings were taken continuously for approximately one hour. The ranges of motion recorded during each data gathering period (highest minus lowest) were consistent with those recorded during the previous periods (Lowest range was 0.012 degrees on December 1, 1992 and highest range was 0.028 degrees on November 5, 1992). During the periods between December 1 - 9, 1992, between January 15 - 23, 1993, and between March 9 - 16, 1993, the tiltmeter was set to record one reading per hour, automatically. The data obtained from these readings showed a cycle of motion which was mainly

affected by changes in the temperatures affecting the chimney. A review of these motion cycles showed no trends indicative of structural degradation.

The final set of readings was taken on March 16, 1993. No additional readings were scheduled beyond this date, because the chimney reinforcing was completed on March 30, 1993.

NRC Recommendation (b):

Verify natural frequencies from measurement of free vibration. This effort can be terminated upon commencement of the reconstruction of the Unit 2 stack.

Response

Dynamic characteristics tests were performed at the Unit 2 chimney on October 13, 1992, and November 16, 1992, using servo accelerometers located at the 390 ft. and 260 ft. chimney elevations. Both tests yielded identical fundamental mode frequencies. The frequencies recorded were 0.61 Hz for the first mode and 1.6 Hz for the second mode. These frequencies corresponded well with the bounding values used in the analysis of the Unit 2 chimney in its damaged condition. The exact agreement between the frequencies recorded in the first test and those recorded in the second test indicated that no structural degradation of the chimney was taking place.

NRC Recommendation (c):

Verify orientation, distribution and thickness of cracks due to thermal stress at essentially identical stacks at other facilities operated by the licensee.

Response

The FPL Cape Canaveral Units 1 & 2 chimneys are essentially identical to the Turkey Point Unit 2 chimney. These chimneys were inspected on October 12, 1992. The inspection identified vertical cracks on both the interior and exterior surfaces, which were similar in orientation and distribution to those identified at the Turkey Point Unit 2 chimney. The crack widths were greater at Turkey Point, and no horizontal cracking was identified at Cape Canaveral. These differences are attributed to the fact that the Cape Canaveral site has not been subjected to hurricane wind loads near the magnitude experienced at Turkey Point during Hurricane Andrew. Accordingly, less severe crack conditions are expected. The inspection results were consistent with the assumptions used in the structural evaluations conducted for the Turkey Point Unit 2 chimney.