UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

Report Nos.: 50-250/90-32 and 50-251/90-32

Licensee: Florida Power and Light Company
9250 West Flagler Street
Miami, FL 33102

Docket Nos.: 50-250 and 50-251 License Nos.: DPR-31 and DPR-41

Facility Name: Turkey Point 3 and 4

Inspection Conducted: October 1-5, 1990

Inspector: _____ 10/30/90
R. C. Chou Date Signed

Approved by: _____ 10/30/90
J. J. Blake, Chief Date Signed
Materials and Processes
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope:

This routine unannounced inspection was conducted in the areas of spent fuel cooling system modification, new emergency diesel generator building construction, and previous open items.

Results:

In the areas inspected, violations or deviations were not identified.

The licensee is managing the spent fuel cooling system modification properly by installation of a temporary, alternate heat removal system. A weakness was identified concerning the consistency of the various vendor's document records and quality control (QC) of vendors' support calculations.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*J. W. Brown, Site Construction Managers
*R. I. Daly, Outage Manager
*D. J. Davis, Project Manager
*R. D. Gil, Civil Engineer Manager
*K. N. Greene, JPN Civil Supervisor
*S. T. Hale, Engineering Project Manager
*K. N. Harris, Vice President
*M. P. Huba, Nuclear Lead Engineer
M. Jones, Systems Engineer
J. Kerrigan, Quality Control (QC) Mechanical Inspector
*J. E. Knorr, Quality Control (QC) Mechanical Inspector
*R. Kundalker, Project Engineer
*E. D. Lyons, Lead System Engineer
*L. W. Pearce, Plant Manager
*T. F. Plunkett, Site Vice President
*D. R. Powell, Licensing Superintendent
*R. E. Rose, Design Control Supervisor

Other licensee employees contacted during this inspection included craftsmen, engineers, operators, mechanics, technicians, and administrative personnel.

Other Organizations

J. Scurlock - Mechanical Engineer (Bethel Power Coorporation)
P. Hansen - Mechanical Engineer (Ebasco Services, Inc.)

NRC Resident Inspector

*R. Butcher, Senior Resident Inspector
*G. E. Edison, NRR Project Manager
*J. F. Williams, NRR Project Manager

*Attended exit interview

2. Spent Fuel Cooling System Modification

a. Status

Turkey Point will have a dual unit outage from November 1990 to October 1991 to rewire the two existing and two new diesel generators to the plant systems for emergency power. Florida Power and Light Company (FPL) presented "Emergency Power System Enhancement", for

implementation planning of the Dual Unit Outage, dated July 17, 1990. The Emergency Power System (EPS) Enhancement, or Upgrade, includes major modifications such as two new diesel generator buildings which include controls, equipment and piping, new load centers, new battery chargers and transformers, upgrade of existing emergency diesel generators, etc. The Spent Fuel Pool (SFP) Cooling System Modification is required before the dual unit outage per the Safety Evaluation for the dual unit outage. The spent fuel pool cooling system must have a capacity of 2,000,000 BTU/HR. During the dual unit outage, the reactors will be defueled, and the fuel stored in the spent fuel pools.

The current fuel cooling system, before modification, uses 10" diameter outlet and suction pipe for a Goulds pump with an alternate (spare) 8" diameter outlet and suction pipe for an Ingersoll-Rand pump and a 4" diameter outlet and suction pipe for a back-up pump if the alternate pump fails. The Ingersoll-Rand pump is less reliable with more problems. The licensee plans to replace the Ingersoll-Rand pump with a Goulds pump in the future since the Goulds pump is not available now. In anticipation of this potential replacement, modifications are required to the existing pump suction piping, which include, addition of isolation valves and increasing the pipe diameter from 8" to 10". The licensee is currently performing the modification on Unit 4 and Unit 3 modification will be started shortly after the Unit 4 completion.

b. Temporary (or Alternate) Cooling System

The licensee installed a temporary cooling system to ensure that the SFP temperature will not exceed 180°F during the modification. The temporary cooling system is being installed per Procedure No. TP-636, "Alternate Spent Fuel Pool Cooling System for Unit 4", dated September 26, 1990. This temporary Spent Fuel Pit Cooling System (SSFPCS) is being installed as a temporary backup for the normal SFPCS. (This system is classified as non-safety related since the licensing basis for the SFP allows boiling in the pool). This system consist of primary and secondary cooling loops which segregate contaminated spent fuel pit water and clean cooling tower water. The primary loop consists of a circulating pump, a flat plate heat exchanger, piping, and valves. The secondary cooling loop consists of heat exchanger supply and cooling tower return piping and valves, a mechanical evaporative cooling tower, and a circulating pump. The licensee tested this temporary system before the start of the SFP cooling system modification. The inspector reviewed the system in the field and considered that it is adequate.

c. Review of Documents for Modification

The following two documents were reviewed by the inspector:

- Engineering Package for Plant Control/Modifications PC/M No. 90-389, Rev. 0, Unit 4 Spent Fuel Cooling System performed by Bechtel Power Corporation, Palm Beach Gardens, Florida.

- SFP Cooling System Piping Stress Analysis, Calculation No. M08-595-05, Rev. 5, performed by Bechtel Power Corporation, Palm Beach Gardens, Florida.

The Engineering Package (EP) contains information on engineering, construction, and startup/operation/maintenance. The engineering portion includes design bases, design analysis, safety evaluation, design and safety verification, affected document checklist, references, and attachments. This Engineering Package is classified as safety-related. The applicable code for this modification is the ASME Section XI Code, Division 1, 1980 Edition through 1981 Winter Addenda. The piping and associated components installed or modified by this Engineering Package shall be designed and supported in accordance with the requirements for Class I systems with seismic loads. This modification does not result in increased release rates, to the environment, of radioactivity, chemicals, biocides, or sanitary waste since the SFP can sustain heat increase (heatup rate) of 1°F/hr and the new installation of a temporary cooling system will be used to remove heat when the pool temperature reaches 125°F. The Safety Evaluation concludes that the modification to the Spent Fuel Pool Cooling System piping will have no impact on safety and will continue to maintain system pressure boundary integrity; prevent spent fuel assembly fission products from being released to the environment; and continue cooling the pool as described in the Updated Final Safety Analysis Report (UFSAR).

The construction portion includes construction scope, special instructions, equipment and material, drawing and vendor manuals, and specifications for implementation. The construction steps for this modification are: (1) prefabricate and shopweld, 10" diameter piping assemblies; (2) close the upstream valves and install a freeze seal; (3) drain the system; (4) cut and remove existing piping; (5) install 10" diameter piping (portion); (6) install 4" gate valve, install temporary supports A and B; (7) install another portion of 10" diameter pipe and 10" gate valve; (8) install permanent supports; and (9) test system. The major specifications being used for this modification includes:

- 5177-M-51, Rev. 15, Performance Specification for Field Fabrication and Installation of Piping and Field Erection of Equipment

- 5177-M-52, Rev. 6, Performance Specifications for Field Fabrication and Installation of Safety-related ANSI B31.1 Piping Systems

- 5177-M-56, Rev. 7, Performance Specification for Field Fabrication and Installation of Safety-related Pipe Supports

The Startup/Operation/Maintenance portion includes startup testing, operation, and maintenance guidelines. Startup testing should include verification of installed piping and valves pressure testing, construction testing, pump alignment, ISI testing, manually stroke valves, etc.

The SFP Cooling Piping Stress Analysis includes purpose, scope, references, method of analysis, basic data and assumptions, summary of results, body of calculation, list of appendices (computer input and output), list of stress isometrics, and other evaluation of the new revisions. The purpose of the stress calculation is to perform analysis on the SFP cooling system piping between the SFP and pumps and provide the support loads to the support design group. The analysis used the Bechtel Standard Computer Program ME101, Version 2. The maximum ratio of computed stress compared to allowable stress for the pipe is 1.0 in thermal expansion equation 14 per the latest computer run dated August 14, 1990. Therefore, the pipe analysis is acceptable and the modification is safe. After reviewing the two documents, the inspector concluded that they are adequate and acceptable.

d. Observation of Modification Work

The heat exchanger room has limited space for the modification work. At the time, the existing pipe was cut off and a 10" diameter pipe T., with 10"x8" reducer, had been welded to the existing pipe at two horizontal ends. The finished welds looked adequate. The inspector went to the Spent Fuel Pool to check pool temperature, which was 110°F, (which is below 125°F when temporary spent fuel cooling system is to be activated) and water level which was 56'-11" which is in the range of 57'-2" and 56'-10" prescribed in the Technical Specification. The inspector also went to the control room to check the records of the Unit 4 spent fuel pool water level and temperature monitoring which are required per Procedure No. TP-636, "Alternate Spent Fuel Pool Cooling System" during the spent fuel cooling system modification on October 2, 1990. The operator takes records of water level and temperature every four hours. The average water level was 56'-11¼" (from low of 56'-11" to high of 56'-11½") and temperature was 110°F (from low of 109°F to high of 111°F). The annunciator alarm for the pool temperature is set at 125°F. Therefore, the inspector considers that the licensee activities for the preparation, performance, and record keeping of this modification are adequate.

3. The Piping systems on the New Emergency Diesel Generator Building

a. Status

This new building is to hold the two new emergency diesel generators and their associated instruments, equipment, and piping systems. This addition, or major modification, is a part of "Emergency Power System Enhancement" as stated in Paragraph 2.a. The majority of piping systems are 90 percent complete. They will be put into service at end of the year for the dual unit outage. Ebasco Services, Inc., is Architecture/Engineer for the design, Bechtel Power Corporation services is construction contractor.

b. Walkdown Reinspection

The inspector randomly selected 12 pipe supports which had previously been inspected and accepted by the licensee QC inspectors. All 12 pipe supports, in four different systems of the diesel generator coolant, exhaust, and oil, were safety-related large bore piping, ranging from 3" to 8" diameter. The walkdown reinspection was completed with assistance from a Bechtel engineer and a licensee QC mechanical inspector who is also qualified as a welding inspector. The supports were partially reinspected against detail drawings, including Change Request Notices (CRN), for configuration, identification, member size, weld sizes, component identification numbers, component sizes and settings, dimension, oxidation accumulation, maintenance, and damage/protection. The supports reinspected during the current inspection are listed below. All reinspected supports are in Unit 4 and are acceptable.

TABLE 1

WALKDOWN REINSPECTION SUPPORTS

Item Number	Support Number	Revision Number	System Description	Comments/ Discrepancies
1	H-859/5	1	Diesel Generator Coolant	
2	H-859/6	1	Diesel Generator Coolant	
3	H-861/1	2	Diesel Generator Exhaust	
4	H-868/1	1	Diesel Generator Oil	

Item Number (cont'd)	Support Number	Revision Number	System Description	Comments/ Discrepancies
5	H-868/3	1	Diesel Generator Oil	
6	H-868/4	1	Diesel Generator Oil	
7	H-868/5	1	Diesel Generator Oil	
8	H-868/6	1	Diesel Generator Oil	
9	H-868/10	1	Diesel Generator Oil	
10	H-868/17	1	Diesel Generator Oil	
11	H-869/5	1	Diesel Generator Oil	
12	H-869/6	1	Diesel Generator Oil	

c. Stress Calculation Review

The inspector randomly selected stress calculation Nos. DO-1030, Rev. 4 and DO-1053, Rev. 1 for Units 3 and 4 for review. Those two calculations were performed by Ebasco Services, Inc. Isometric Drawing No. S-5610-P-868/87-263, Rev. 4 was reviewed to confirm the computer input for those two stress calculations. The stress calculations contain: 1) purpose; 2) scope; 3) references; 4) method of analysis; 5) basic data and assumptions; 6) summary of results; 7) body of calculation; 8) list of appendices; 9) list of stress isometrics; 10) list of computer data files. American Society of Mechanical Engineers (ASME) Code Section III, 1983 Edition through Summer 1984 Addenda for stress calculation No. DO-1030 and American National Standard Institute (ANSI) Code B31.1 Power Piping for stress calculation No. DO-1053 and Ebasco "PIPESTRESS 2010" stress analysis computer program were used. The analyses for load cases include frequency analysis, thermal analysis, weight analysis, operating basis earthquake (OBE) inertia, and design basis earthquake (DBE) inertia. The acceleration values "g" were based on one percent damping curves for OBE and two percent damping curves for DBE. The inspector checked the stress input data and reviewed the stress output data. The maximum stress ratio was 0.923 for the pressure plus dead weight plus OBE load case for stress calculation No. DO-1030. The maximum stress ratio was 0.346 for the pressure plus dead weight plus DBE load case for stress calculation No. DO-1053. The calculated stresses were within the code allowables.

d. Support Calculation Review

The design calculations listed below on Table II were partially reviewed and evaluated for thoroughness, clarity, consistency, and accuracy. The calculations contained the objective, design criteria, applicable codes, applicable standards, assumptions, references, calculations, computer printout information, summary of calculation results, other pipe support drawing, and Strudl Model. The review included: computer model, computer input and output; check of displacements, member size, weld sizes and symbols, and standard component capacity.

TABLE II

SUPPORT CALCULATIONS REVIEWED

Support No.	Calculation Revision No.
H-859/5	0
H-858/5	0
H-861/1	1
H-860/1	1
H-868/1	0
H-868/3	0

e. Results

The construction of the piping systems in the field was adequate, as the detail drawing indicated, and no discrepancies were found. The inspector considered that the stress calculations and support calculations were of good quality and acceptable. However, three Architecture/ Engineer firms, Bechtel Power Corporation, Ebasco Services, Inc., and Teledyne Engineering Corporation are involved with piping system work in various areas at Turkey Point, and they have three different ways to generate and modify the stress and support calculations and transfer the support loads from the stress group to the support design group.

Teledyne records all stress calculation and support calculations in one volume set for one isometric or one stress run without the support loads being transferred since they were not required.

Bechtel generates stress calculations and support calculations with separate document titles. They are designed by different groups, and stored in separated areas. Bechtel revises the stress calculation in its body or cover sheet and transfers the new loads to the support design group and keeps copies of the transferred loads in the stress calculations. The support design group revises the support calculation body or coversheet. The Bechtel method seems to be used by the majority of the industry.

When required to generate a new stress calculation and support calculations, Ebasco uses the same procedure that Bechtel does. But the Ebasco support design group keeps the support design loads in separated files. The evaluations of new support loads transferred from the stress group, are either filed in the body of the support calculation (if it requires the calculation to be revised), or in a separate file when the support calculation is not revised. The evaluation of a stress calculation due to field or other changes is kept in a separate file, not in the stress calculation file, if it does not required revision of the stress calculations. Therefore, Ebasco has the most complicated document file records due to the various document filing systems. The licensee may have difficulty in retrieving required documents when needed.

The licensee management, during the exit meeting, agreed to review and develop a consistent document filing systems.

4. Action on Previous Inspection Findings

(Closed) Inspector Followup Item (IFI) 50-250,251/89-29-02, Evaluation of Design Capacities of Installed Wej-It Concrete Anchor Bolts

This matter concerned the possible design capacity reduction of installed Wej-It concrete anchor bolts used in Turkey Point due to the design capacity reduction used at the Crystal River Plant. The inspector held discussions with the licensee's engineers and reviewed the Safety Evaluation Report provided. Safety Evaluation SE No. JPN-PTN-SECJ-89-113, "Operability Assessment of Pipe Supports with reduced capacity Wej-It Concrete Anchor Bolts", Rev. 2, dated June 7, 1990, was reviewed. As additional information provided on October 31, 1990, to the above Safety Evaluation Report, the total number of supports to be modified is 33 which will be implemented during the upcoming dual unit outage and the next outage. All the Final Design Equivalent Engineering Packages with support calculations completed and new drawings issued will be issued to the site by late this month. The inspector requested three Plant Control Modification (PCM) packages with the six support calculations listed in Table III for review.

The ultimate allowable loads for the new replacement Hilti Kwik Bolt II used in three of the support calculations, were found to be different than loads specified by Nuclear Engineering Department Standard, Standard No. CN-3.01, "Piping and Support Analysis Requirements, Turkey Point Units 3 and 4", Rev. 0, dated August 3, 1990. After discussion with the licensee's engineers, the inspector found that there is another approved set of ultimate allowable loads for the same Hilti Kwik Bolt II, listed in Specification No. CN-2.24, "Drilled-in Expansion Type Anchors In Concrete", Rev. 4, dated September 17, 1990. The reason for the difference is that the latter specification was revised to increase the ultimate allowable loads based on the assessment of on-site testing conducted between November 27 and December 6, 1989 at the St. Lucie and Turkey Point plants.

The three support calculations done by Teledyne Engineering Corporation, SR-668, SR-607, and SR-612, were found to have ultimate allowable loads taken from the Hilti Kwik Bolt II Catalogue, which was not authorized and uncontrolled for design allowable loads. The authorized design criteria are the standard and specification listed above.

The above problems indicate that the licensee has inconsistency in the document control for procedure or specification revisions, and a weakness in Quality Control for vendors' support calculations. The licensee agreed to review all 33 support calculations for the modification, and provide training in Vendor Quality Control. The license will also review their document revision procedures to monitor the other affected documents. This item is considered closed based on the licensee's progress and commitments stated above.

TABLE III

SUPPORT CALCULATIONS REVIEWED

Support No.	Problem No.	PCM No.	Comments/ Discrepancies
SR-668	CCW-14	90-313	Used Catalogue Values
SR-607	007	90-314	Used Catalogue Values
SR-612	007	90-314	Used Catalogue Values
SR-936	023	90-315	
SR-923A	023	90-315	
H-2	CVCS-25B	90-315	

Note: The catalogue values were higher than the on-site test values.

5. Exit Interview

The inspection scope and results were summarized on October 4, 1990, with those persons indicated in paragraph 1. But the inspection continued to October 5, 1990. The inspector described the areas inspected and discussed in detail the inspection results. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.