



APR 28 2011

L-2011-136

10 CFR 50.90

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555-0001

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Response to NRC Request for Additional Information Regarding
Extended Power Uprate License Amendment Request No. 205 and
Quality and Vendor Issues

References:

- (1) M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2010-113), "License Amendment Request No. 205: Extended Power Uprate (EPU)," (TAC Nos. ME4907 and ME4908), Accession No. ML103560169, October 21, 2010.
- (2) Email from J. Paige (NRC) to T. Abbatiello (FPL), "Turkey Point EPU – Quality and Vendor (EQVB) Request for Additional Information - Round 1", Accession No. ML110950069, April 1, 2011.

By letter L-2010-113 dated October 21, 2010 [Reference 1], Florida Power and Light Company (FPL) requested to amend Renewed Facility Operating Licenses DPR-31 and DPR-41 and revise the Turkey Point Units 3 and 4 Technical Specifications (TS). The proposed amendment will increase each unit's licensed core power level from 2300 megawatts thermal (MWt) to 2644 MWt and revise the Renewed Facility Operating Licenses and TS to support operation at this increased core thermal power level. This represents an approximate increase of 15% and is therefore considered an extended power uprate (EPU).

By email from the U.S. Nuclear Regulatory Commission (NRC) Project Manager (PM) dated April 1, 2011 [Reference 2], additional information regarding both industry and plant-specific transient operating experience and PTN's justification for the proposed EPU testing program was requested by the NRC staff in the Quality and Vendor Branch (EQVB) to support their review of the EPU License Amendment Request (LAR). The Request for Additional Information (RAI) consisted of one (1) question regarding the proposed EPU testing program. The RAI question and the FPL response are documented in the Attachment to this letter.

In accordance with 10 CFR 50.91(b)(1), a copy of this letter is being forwarded to the State Designee of Florida.

This submittal does not alter the significant hazards consideration or environmental assessment previously submitted by FPL letter L-2010-113 [Reference 1].

This submittal contains no new commitments and no revisions to existing commitments.

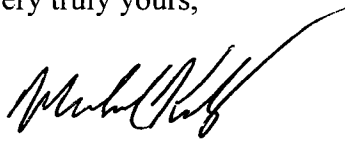
Should you have any questions regarding this submittal, please contact Mr. Robert J. Tomonto, Licensing Manager, at (305) 246-7327.

A084
NRC

I declare under penalty of perjury that the foregoing is true and correct.

Executed on April 28, 2011.

Very truly yours,

A handwritten signature in black ink, appearing to read "Michael Kiley", with a long, sweeping flourish extending to the right.

Michael Kiley
Site Vice President
Turkey Point Nuclear Plant

Attachment

cc: USNRC Regional Administrator, Region II
USNRC Project Manager, Turkey Point Nuclear Plant
USNRC Resident Inspector, Turkey Point Nuclear Plant
Mr. W. A. Passetti, Florida Department of Health

Turkey Point Units 3 and 4

RESPONSE TO NRC RAI REGARDING EPU LAR NO. 205
AND EQVB QUALITY AND VENDOR ISSUES

ATTACHMENT

Response to Request for Additional Information

The following information is provided by Florida Power and Light Company (FPL) in response to the U. S. Nuclear Regulatory Commission's (NRC) Request for Additional Information (RAI). This information was requested to support License Amendment Request (LAR) 205, Extended Power Uprate (EPU), for Turkey Point Nuclear Plant (PTN) Units 3 and 4 that was submitted to the NRC by FPL via letter (L-2010-113) dated October 21, 2010 [Reference 1].

By email from the U.S. Nuclear Regulatory Commission (NRC) Project Manager (PM) dated April 1, 2011 [Reference 2], additional information regarding both industry and plant-specific transient operating experience and PTN's justification for excluding certain transient testing from the proposed EPU testing program was requested by the NRC staff in the Quality and Vendor Branch (EQVB) to support their review of the EPU License Amendment Request (LAR). The Request for Additional Information (RAI) consisted of one question regarding the proposed EPU testing program. The RAI question and the FPL response are documented below.

EQVB-1.1 The licensee stated in the LAR that satisfactory post EPU industry operating experience has been demonstrated at greater than original power levels at two other pressurized-water reactors (PWRs) of similar design to Turkey Point (PTN). Section 2.12.1.2.2, "Background," of Attachment 4 to the LAR states, in part, that "In addition to Beaver Valley, Units 1 and 2, and the R.E. Ginna Nuclear Power Plant, PTN has benefited from industry operating experience in power uprate implementation from several industry sources, including the Institute of Nuclear Power Operations.

However, in Section 2.12.1.2.6.2, "Justification for Exception to Transient Testing," of Attachment 4, a discussion of such industry operating experience was not provided. Additionally, no discussion of any PTN plant-specific transient operating experience relative to operating events, planned and unplanned reactor trips, and overall plant transient performance was presented. Such information may be considered by the NRC staff, as discussed in Section III.C.2 of NRC Standard Review Plan 14.2.1, to support the basis for the licensee's request not to perform certain initial startup tests as part of the proposed EPU PATP. The licensee's primary basis for not performing certain transient testing as part of the proposed EPU LAR appears to rely solely on an analytical justification using LOFTRAN.

As discussed below, in addition to computer modeling and analyses, PTN's transient operating experience and industry operating experience at similar PWR power uprates demonstrate that structures, systems and components (SSCs) will perform satisfactorily at EPU conditions and support the exceptions taken to transient testing in LR Section 2.12.1.

Initial Plant Startup and Subsequent Modifications Including EPU

Transient testing, including trips from various power levels, ramp load changes at 10%, step load changes at various power levels, large load reductions to 50%, load cycle tests, and natural circulation tests were performed during the initial startup of both PTN units as further described in LR Section 2.12.1. Specific tests

included the following:

- +/-10% step load change at low power (30%)
- +/-10% step load change at high power (80%)
- 50% load reduction from 100% power
- 20% load reduction from 70 % power
- Load Cycle Tests
- Natural Circulation Test (7% Nuclear Heat and Partial Cooldown)

Performance of plant controls demonstrated during plant startup and enhanced by upgrades in control systems installed and proven over the years of plant operation are expected to continue to operate reliably at EPU conditions. A recent example of a modification to the plant control systems is the digital controls improvement to the atmospheric dump valves which improves system reliability. Existing programs for the monitoring and testing of plant equipment will ensure continued plant reliability and performance during transient conditions.

Additional control modifications will be installed and tested at a component level prior to uprate implementation (e.g., new digital feedwater heater level controls, digital turbine EHC controls and replacements to the feedwater regulating valve trim and actuators). The modifications and implementation of the revised control system setpoints are expected to mitigate transients at least or more effectively as those in the original plant. Plant modifications will be subjected to post modification tests. Repeating specific original plant startup tests would place unnecessary stress and cycling on unit equipment. Performing these tests would not confirm any new or significant aspect of performance at EPU conditions not already demonstrated through analysis, operating experience, or routine plant operations. The risk of performing such tests should, therefore, not be incurred.

Post Transient Reviews (Recent Operating Experience)

Recent operating experience at PTN demonstrates the satisfactory performance of SSCs during a reactor trip.

In November 2010, Unit 3 tripped as the result of a required manual reactor scram when reactor power was greater than 60% with less than three available circulating water pumps. In September 2010, Unit 4 tripped as the result of an automatic scram from 100% reactor power. In both instances, the operating crew successfully utilized existing operating procedures to address the plant trip. As expected, the auxiliary feedwater (AFW) pumps automatically started when steam generator narrow range levels decreased below 10% narrow range. During the transients the rod control system, turbine control, reactor coolant system pressure control, electrical distribution control, and the AFW system all responded as required. The performance of the two units during their respective trips remained within acceptance criteria.

EPU Power Ascension Test Plan

Power ascension testing at PTN will follow a similar approach to that utilized at other plants, such as Beaver Valley and Ginna, which have undergone an EPU. Lessons learned from those plants will be incorporated into the test plan.

The power ascension test plan will contain the following elements to ensure that all testing is performed in a carefully controlled and deliberate manner:

- Hold points at various power levels for monitoring, testing, and data acquisition
- Slow and deliberate power increases
- Evaluation of data against pre-established acceptance criteria at key hold points with abort criteria clearly established
- Clear direction on required actions should the data fail to meet the acceptance criteria, including placing the plant in a known safe and acceptable operating configuration
- Management approval to commence with power ascension and testing at various power plateaus

Individual components will be tested to ensure they are meeting their design requirements and expected performance. Control systems will be calibrated and tested throughout power ascension to ensure the individual system and integrated response is as expected.

Functional testing will be performed to demonstrate the hydraulic interactions between the condensate and feedwater pumps and the modified feedwater control valves. The impact of the higher feedwater flow and the associated increased piping pressure loss will also be evaluated. Individual control systems, such as steam generator level control and feedwater heater level control will be optimized for the new conditions as required. The proposed tests will identify unanticipated adverse system interactions and allow them to be corrected in a timely fashion prior to operation at 100% EPU power conditions.

As described in the discussion of industry operating experience below, the Turkey Point Units 3 and 4 EPU approach to the power ascension testing program has been used at several power uprates where it has demonstrated that the plant response following the uprate continues to be as expected and within the design basis. The post-modification testing component of the power ascension testing will demonstrate continued reliable and predictable performance of plant controls including those upgraded as a result of EPU. The EPU upgrades involve replacement of existing equipment with more reliable equipment with no significant changes to how the integrated controls systems respond to plant transients. Accordingly, subjecting the plant to additional transient or dynamic testing is not necessary or desirable.

The PTN testing approach will ensure plant systems and equipment will operate within design limits without necessitating large transient testing. This is consistent with the current operating philosophy of minimizing the challenges to the operating plant and operations staff.

Industry Operating Experience

PTN benefitted from the power ascension testing at the R.E. Ginna Nuclear Power Plant (Ginna) where several transient tests were performed, and shown to confirm analytical predictions and setpoint studies. The Ginna uprate of about 17% was similar to the PTN uprate of about 15%. The Ginna transient tests were

performed at an initial power level of 30% and at full EPU power. Ginna test results were within the pre-established acceptance criteria.

In a similar manner to Ginna, any control setpoint changes at PTN are to be validated through calibration prior to plant startup.

Load Swing Tests at Ginna

From an initial power level of 30%, a 10% load decrease at 1%/minute was initiated. After the unit became stable and data recorded, a 10% load increase at the same rate was initiated. The following was noted from the successful completion of this test:

- No reactor trip
- No power-operated relief valve (PORV) actuation
- No main steam safety valve opening

Average reactor coolant temperature (T_{avg}), pressurizer level, pressurizer pressure and steam generator levels all remained within established acceptance criteria for the transient. Only steam generator pressure fell below the acceptance value, which was considered acceptable because pressure was at the low end of the band at the beginning of the test, and steam pressure is often low during startup from refueling. This condition had no effect on test results.

After reaching 100% power, two ramp load change tests were performed. A 3% down and up, followed by a 10% down and up; both performed using a similar procedure with similar acceptance criteria to that used for the 30% test. The acceptance criteria were met satisfactorily in both tests. Initial steady-state and transient response data were recorded that included reactor power, T_{avg} , pressurizer pressure and level, and steam generator pressure and level. The load swing tests verified that pressurizer pressure and level control, rod control, average reactor coolant temperature, steam generator level control, feedwater flow, condensate system pressure and turbine controls all functioned properly and consistent with the analyses.

Turbine Trip Test at Ginna

A manual turbine trip from 30% was performed. The test exercised control systems including rod control, steam dump control, pressurizer level and pressure control, and steam generator water level control. The test was preceded by preparations that included calibration checks and post-modification testing of control systems. The manner in which the control systems responded to the power and temperature mismatch as a result of the turbine trip were verified, including the ability of the control systems to achieve stable plant conditions in an acceptable range. Acceptance criteria, including a demonstration that the plant dynamic response was stable and converged on a range that supports safe operation at low power, and the following specific criteria were met:

- No reactor trip
- No power-operated relief valve actuation

- No main steam safety valve opening
- Turbine stop valves closed
- Steam dump valves operated to control steam pressure
- T_{avg} remained in acceptable band and stabilized at the appropriate value
- Pressurizer pressure and pressurizer level remained in acceptable band
- Main feedwater regulating valves restored steam generator levels to programmed range
- Reactor power decreased to 14%; operators were able to place rod control in manual and control power between 10 - 15%

Immediately following a turbine trip, steam dump controls were confirmed to be operating. T_{avg} was confirmed to remain within the acceptable range and stabilized at the appropriate value. Satisfactory completion of the Ginna turbine trip test fulfilled the purpose of the pressurizer level control test, pressurizer pressure control test, and steam dump tests performed during original plant startup testing.

The Ginna transient testing experience in conjunction with the PTN specific operating experience, and the results of predictions of plant response at EPU conditions support the request not to perform certain transient tests, including tests of the steam dump control system, plant trips, load swings, and load reductions. As stated in Attachment 4 of PTN EPU LAR, Section 2.12.1.2.6, no new thermal-hydraulic phenomena are introduced by either the physical modifications or the changes in operating conditions and no new system dependencies or interactions are being introduced by the physical modifications and changes. Therefore, performing these tests would not confirm any new or significant aspect of performance at EPU conditions not already demonstrated through analysis, operating experience, or routine plant operations and the risk of performing such tests should not be incurred.

Results of tests performed at Beaver Valley Units 1 and 2, three-loop Westinghouse plants similar to PTN, also demonstrated that the plant response remained within the pre-established acceptance criteria. At Beaver Valley, power was uprated from 2689 MWt to 2900 MWt (~7.9% increase).

The power ascension testing at the Beaver Valley units was conducted in a controlled manner in two stages, monitoring required parameters to expected ranges and acceptance criteria. Various parameters were assigned levels of significance to aid in determining the appropriate response if a parameter differs from expectations. The test plan was approved by plant management and implemented prior to power ascension.

The testing program required that plant data be recorded at various hold points during power ascension, including at approximately 95% of pre-EPU and at EPU power. The data acquired at the pre-EPU power level of 2770 MWt was used as a "baseline" to predict operating values at the EPU power level of 2900 MWt and to benchmark plant performance after various EPU related modifications were

implemented. Power was then increased to an intermediate power level of 2830 MWt and further held while data was taken to assure that the unit was safe for power ascension to the EPU power level of 2900 MWt. Throughout the power ascension critical parameters were monitored and benchmarked against pre-established acceptance criteria to confirm that the measured values agreed well with the predicted values and continued to remain within the pre-established test acceptance criteria. Results of tests performed at Beaver Valley Units 1 and 2 demonstrated that the plant response remained within the pre-established acceptance criteria at EPU. The Beaver Valley results are a strong indicator of those expected at PTN for the increase to EPU.

References

1. M. Kiley (FPL) to U.S. Nuclear Regulatory Commission (L-2010-113), "License Amendment Request No. 205: Extended Power Uprate (EPU)," (TAC Nos. ME4907 and ME4908), Accession No. ML103560169, October 21, 2010.
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