



March 23, 2016  
L-2016-058

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  
Licensee Qualification for Performing  
Dynamic Rod Worth Measurement Analysis

Florida Power & Light Company (FPL) intends to use Westinghouse supplied methods to perform physics calculations in support of Dynamic Rod worth Measurement (DRWM) for low power physics testing of Turkey Point Units 3 and 4. This testing will take place in April or May 2016. The Safety Evaluation Report issued by the NRC for WCAP-13360-P-A, Revision 1, "Westinghouse Dynamic Rod Worth Measurement Technique," contains the requirements to provide the NRC with confirmation that the competencies to perform DRWM design calculations will be demonstrated. Enclosures 1 and 2 demonstrate that these criteria have been met for Turkey Point Units 3 and 4. Documentation of training, qualification, and benchmark calculations is available for review from FPL, Juno Beach Headquarters – Nuclear Fuels Department.

This letter contains no new regulatory commitments and no revisions to existing regulatory commitments.

If you have any questions or require additional information, please contact Mr. Mitch Guth, Licensing Manager, at 305-246-6998.

Sincerely,

A handwritten signature in black ink, appearing to read 'T. Summers', with a long horizontal line extending to the right.

Thomas Summers  
Site Vice President  
Turkey Point Nuclear Plant

Enclosures

cc: Regional Administrator, Region II, USNRC  
Senior Resident Inspector, USNRC, Turkey Point Plant

ADD  
NRR

**FLORIDA POWER & LIGHT COMPANY  
TURKEY POINT UNITS 3 AND 4  
DEMONSTRATION OF THE ABILITY TO PERFORM COMPUTATIONS TO SUPPORT  
DYNAMIC ROD WORTH MEASUREMENTS**

**INTRODUCTION**

Westinghouse performed the initial application of Dynamic Rod Worth Measurement (DRWM) at Turkey Point on December 2, 2015 (Unit 3 Cycle 28). Florida Power & Light Company (FPL) intends to perform the analytical computations necessary to support DRWM.

Enclosure 2 contains approved NRC criteria needed to be met in order to perform computations to support DRWM. Successfully meeting these criteria constitutes inherent NRC approval to use DRWM in Low Power Physics testing (LPPT). This report demonstrates that these criteria have been met.

FPL personnel who will perform computations to support DRWM have experience performing the computations for Seabrook Station and Point Beach Nuclear Plant. Written procedures are in place on how to set up input, understand and interpret output results, understand applications and limitations, and perform analyses in compliance with the procedures provided by Westinghouse.

Cross sections to support DRWM computations are obtained from the PHOENIX-P lattice physics code (Reference 2). The flux solutions for these computations are obtained from the ANC code (Reference 3). NRC review and approval of these codes and the procedures by which FPL uses these codes is contained in Reference 4. Application of these codes and procedures (including the Westinghouse DRWM procedure) is controlled by the FPL quality assurance program defined in Reference 1. This quality assurance program meets the requirements of 10 CFR 50 Appendix B.

**RESULTS**

Table 1 compares the predicted rod worths based on Westinghouse and FPL generated constants. Table 2 compares the rod worths measured using the DRWM technique using Westinghouse and FPL analytical data to support the measured data.

**Table 1. Westinghouse Predicted Values  
vs. FPL Predicted Values**

Bank	Predicted		Difference	
	W	FPL	pcm	%
	pcm	pcm		
CA	1131.8	1131.8	0.0	0.00
CB	357.1	357.1	0.0	0.00
CC	1315.7	1315.7	0.0	0.00
CD	713.1	713.1	0.0	0.00
SA	889.2	889.2	0.0	0.00
SB	1152.0	1152.0	0.0	0.00
Total	5558.9	5558.9	0.0	0.00

**Table 2. Westinghouse Measured Values  
vs. FPL Measured Values**

Bank	Measured		Difference	
	W	FPL	pcm	%
	pcm	pcm		
CA	1130.2	1130.2	0.0	0.00
CB	364.6	364.5	0.1	0.03
CC	1385.2	1385.1	0.1	0.01
CD	707.4	707.4	0.0	0.00
SA	869.5	869.5	0.0	0.00
SB	1185.6	1185.5	0.1	0.01
Total	5642.5	5642.2	0.3	0.01

## DISCUSSION OF RESULTS

Table 1, comparing Westinghouse and FPL predicted results, shows a maximum difference of 0 pcm, or 0.0%.

Comparing measured results based on Westinghouse and FPL supported analytical data, it can be seen from Table 2 that the maximum difference in the measured worth of any bank is 0.1 pcm (Banks CB, CC, and SB), or 0.03% (Bank CB). The maximum difference in the measured total worth is 0.3 pcm or 0.01%.

## CONCLUSIONS

Based on the results, FPL has concluded that the review criteria in the document in Enclosure 2 have been met; therefore, FPL has demonstrated the qualification to perform their own analytical computations to support DRWM tests for future LPPT. The first application of FPL analytical computations to support DRWM for LPPT at Turkey Point will occur with the startup of Turkey Point Unit 4 Cycle 29, expected to take place in April or May 2016. As Turkey Point Units 3 and 4 are similar in design, these conclusions are valid for both units.

## REFERENCES

1. NextEra Energy Quality Assurance Topical Report (FPL-1), as updated.
2. Westinghouse Topical Report, "Qualification of the PHOENIX-P/ANC Nuclear Design System for Pressurized Water Reactor Cores," WCAP-11596-P-A, Jun 1988.
3. Westinghouse Topical Report, "ANC – A Westinghouse Advanced Nodal Code," WCAP-10965-P-A, Sep 1986.
4. Westinghouse Topical Report, "Westinghouse Reload Safety Evaluation Methodology," WCAP-9272-P-A, Jul 1985.

**FLORIDA POWER & LIGHT COMPANY  
TURKEY POINT UNITS 3 AND 4  
CRITERIA FOR A UTILITY PERFORMING DYNAMIC ROD WORTH MEASUREMENT  
COMPUTATIONS**

In order for a utility to perform their own physics calculations to support the use of the Dynamic Rod Worth Measurement (DRWM) technique during Low Power Physics Testing (LPPT), the following five criteria must be met. Compliance with the five criteria demonstrates a utility's qualification and constitutes inherent NRC approval to use DRWM in their LPPT. To document its qualification, the utility must send the NRC a notification of compliance with the criteria and the date of the intended first application of the codes to determine the DRWM physics constants for LPPT.

**Criterion 1: Eligibility of Codes for DRWM Computations**

**Only lattice physics codes and methods which have received prior NRC review and approval are eligible to be used in determining the physics constants to be used in DRWM. The NRC review ensures that the codes being used for the DRWM computations were developed under a qualified QA program and were properly benchmarked and verified.**

PHOENIX-P (Reference 2) and Advanced Nodal Code (ANC) (Reference 3) packages, previously approved by the NRC, will be used by FPL in calculating DRWM constants.

**Criterion 2: Application of Procedures to DRWM Computations**

**In a manner consistent with the procedures obtained from Westinghouse, the utility analyses shall be performed in conformance with in-house application procedures which ensure that the use of the methods is consistent with the Westinghouse approved application of the DRWM methodology.**

FPL in-house procedures are based on and are consistent with the Westinghouse approved application of the DRWM methodology.

**Criterion 3: Training and Qualification of Utility Personnel**

**The first application of DRWM for LPPT will be performed by Westinghouse. This will ensure that DRWM is applicable to the specific plant, provide utility personnel with training in the DRWM technique and be used to meet Criterion 4 – Comparison Calculations for the DRWM Technique. The first application of DRWM for LPPT by Westinghouse will be applicable for all of the same plant type at the plant site of application. If the fuel vendor should change subsequent to the first application, a second application by Westinghouse is not required.**

**Utilities shall establish and implement a training program to ensure that each qualified user of the DRWM methodology has a good working knowledge of the codes and methods used for DRWM. This training shall include the ability to set up input decks, understand and interpret the output results, understand applications and limitations, and to perform analyses in compliance with the procedures provided by Westinghouse.**

Westinghouse performed the first application for Turkey Point Nuclear Plant in December 2015. FPL personnel have experience performing DRWM calculations for Seabrook and Point Beach. The standard for developing DRWM constants for Turkey Point includes a sample input and a sample output specific to Turkey Point (used in the benchmarking calculation for Turkey Point Unit 3 Cycle 28).

Enclosure 1 provides the benchmark data generated by FPL personnel demonstrating the ability to perform calculations in support of DRWM using Westinghouse procedures. FPL personnel will perform cycle specific DRWM calculations consistent with Westinghouse procedures and will be required to maintain their qualifications under the FPL training program.

#### **Criterion 4: Comparison Calculations for the DRWM Technique**

**Prior to the first application by a utility using their own methods to perform physics calculations in support of DRWM for LPPT, the utility will demonstrate its ability to use the methods supplied by Westinghouse by comparing its calculated results with the analyses and results obtained by Westinghouse during the first, or subsequent, application(s) of DRWM at the utility's plant. These comparisons must be documented in a report which is part of the utility's QA records. Any significant differences between the calculations and the comparison data must be discussed in the report. As a minimum, the following parameters should be compared to the supplier of the DRWM methodology calculations, and should agree within the given acceptable deviation:**

<u>Parameter</u>	<u>Acceptable Deviation</u>
Calculated Bank Worth	±2% or ±25 pcm
Calculated Total Worth of All Banks	±2%
Measured Bank Worth Obtained for First Application	±2% or ±25 pcm
Measured Total Worth Obtained for First Application	±2%

The comparison calculations for the application of DRWM methodology showed results with deviations well within the above acceptance criteria (see Enclosure 1). The calculations are prepared and maintained as QA records under the FPL Quality Assurance Program.

#### **Criterion 5: Quality Assurance and Change Control**

**All calculations for DRWM by a utility using the Westinghouse methodology which has been approved by the NRC shall be conducted under the control of a quality**

**assurance program which meets the requirements of 10 CFR 50, Appendix B. The utility QA program will also include the following:**

- a) A provision for implementing changes in the methods and procedures being used for DRWM.**
- b) A provision for informing Westinghouse of any problems or errors discovered while using the DRWM methods or procedures.**

The FPL Quality Assurance Program that governs the design, procurement, modification, and operation of nuclear power plants (Reference 1) meets the requirements of 10 CFR 50 Appendix B. This QA Program includes provisions for implementing changes as necessary and reporting to Westinghouse any errors identified during the use of the DRWM methodology. Westinghouse has a requirement to inform utilities that have taken a Technology Transfer on DRWM of changes to the process as part of their QA procedures regarding Technology Transfer.

#### **REFERENCES**

1. NextEra Energy Quality Assurance Topical Report (FPL-1), as updated.
2. Westinghouse Topical Report, "Qualification of the PHOENIX-P/ANC Nuclear Design System for Pressurized Water Reactor Cores," WCAP-11596-P-A, Jun 1988.
3. Westinghouse Topical Report, "ANC – A Westinghouse Advanced Nodal Code," WCAP-10965-P-A, Sep 1986.