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

Ladies and Gentlemen:

Subject: Three Mile Island, Unit 1 (TMI Unit 1)
Operating License No. DPR-50
Docket No. 50-289
Cycle 13 Startup Report

Enclosed is the Startup Report for TMI Unit 1 Cycle 13 operation. Initial criticality for Cycle 13 was achieved at 3:35 PM on October 18, 1999. Testing addressed by this report was completed on October 26, 1999 at 2:00 PM. In all cases the applicable test and Technical Specifications (TS) limits were met. This report is being submitted in accordance with TMI Unit 1 TS 6.9.1.A. No NRC response to this letter is necessary or requested.

Very Truly Yours,

John B. Cotton

John B. Cotton
Vice President, TMI Unit 1

MRK

Enclosure

cc: Administrator, NRC Region I
TMI Senior NRC Resident Inspector
TMI-1 Senior NRC Project Manager
File No. 00031

IE26

The measured differential boron worth at 532°F was 0.5% more than the predicted value. This is within the bounds of the FSAR and GPUN supplied limits of ±15%.

TABLE 1-1

SUMMARY OF ZERO POWER PHYSICS TEST RESULTS

CYCLE 13

Parameter	Acceptance Criteria	Measured Value	Deviation
Critical Boron	2130 ± 50 ppm	2134 ppm	4 ppm
NI Overlap	>1 decade	>1.28 decade	N/A
Sensible Heat	N/A	8 x 10^{-8} amps	N/A
All Rods Out Boron Concentration	2164 ± 50 ppm	2176 ppm	12 ppm
Temperature Coefficient (2154 ppm)	-0.45 pcm/°F ± 2 pcm/°F	-0.85 pcm/°F	-0.4 pcm/°F
Moderator Coefficient	<9.0 pcm/°F	+0.78 pcm/°F	N/A
Integral Rod Worths (532°F) GP 5-7	3240 pcm ± 10%	3301.8 pcm	1.9%
Group 7	901 pcm ± 15%	934 pcm	+3.7%
Group 6	853 pcm ± 15%	868.2 pcm	+1.8%
Group 5	1486 pcm ± 15%	1499.6 pcm	+0.9%
Differential Boron Worth (1923 ppm)	6.414 pcm/ppm ± 15%	6.449 pcm/ppm	+0.5%

2.0 CORE PERFORMANCE - MEASUREMENTS AT POWER - SUMMARY

This section summarizes the physics tests conducted with the reactor at power. Testing was performed at power plateaus of approximately 10, 42, 76, and 100% core thermal power. Operation in the power range began on October 19, 1999.

Gadolina is again present in the TMI-1 core as an integral burnable poison. One hundred (100) assemblies containing gadolina were reloaded from Cycle 12 and earlier. Seventy-two (72) assemblies containing gadolina were loaded fresh for Cycle 13. These assemblies require no special monitoring.

Two lead test assemblies were reloaded from Cycle 12 for their third burn. The two LTAs were manufactured by the B&W Fuel Company, now Framatone Cogema Fuels (FCF), but include a total of sixteen pins manufactured with cladding that uses zirconium alloys M4 and M5. The LTAs were monitored during power escalation testing to ensure that they were not the limiting (hottest) assemblies in the core with respect to radial power distribution power peaking.

a. Nuclear Instrumentation Calibration at Power

The power range channels were calibrated as required during the startup program based on power as determined by primary and secondary plant heat balance. These calibrations were performed due to power level, boron and/or control rod configuration changes during testing.

b. Incore Detector Testing

Tests conducted on the incore detector system demonstrated that all detectors were functioning acceptably. Symmetrical detector readings agreed within acceptable limits. The plant computer applied background, length and depletion correction factors. The backup incore recorders were operational above 80% FP.

c. Power Imbalance Detector Correlation Test

The results of the Axial Power Shaping Rod (APSR) movements performed at approximately 76% FP show that an incore versus out-of-core offset slope of 1.0 could be obtained by using gain factors ranging from 3.185 to 3.755 for the power range scaled difference amplifiers. The measured values of minimum DNBR and maximum linear heat rate for various axial core imbalances indicate that the Reactor Protection Trip Setpoints provide adequate protection to the core. Imbalance calculations using the backup recorder provide a reliable alternative to computer calculated values.

d. Core Power Distribution Verification

Core power distribution measurements were conducted at approximately 42% full power under non-equilibrium xenon conditions and at 100% full power at equilibrium xenon conditions. The maximum measured and maximum predicted radial and total peaking factors are all in good agreement. The largest positive percent difference between measured and predicted values was 4.41% for total peaking at approximately 42% FP.

This met its acceptance criterion of 6.9%. All other assemblies were also within their limits for radial and total peak.

The results of the core power distribution measurements are given in Table 4.4-1. All quadrant power tilts and axial core imbalances measured during the power distribution tests were within the Technical Specification and normal operational limits.

3.0 CORE PERFORMANCE - MEASUREMENTS AT ZERO POWER

This section presents the detailed results and evaluations of zero power physics testing. The zero power testing program included initial criticality, nuclear instrumentation overlap, reactimeter checkout, all rods out critical boron concentration, temperature coefficient measurement, control rod worths, and differential boron worth.

3.1 Initial Criticality

Initial criticality for Cycle 13 was achieved at 1535 on October 18, 1999. Reactor conditions were 532°F and 2155 psig. Control rod groups 1 through 4 were withdrawn during the heatup to 532°F. The initial reactor coolant system (RCS) boron concentration was 2587 ppm. Deboration to 2134 ppm occurred prior to the approach to criticality.

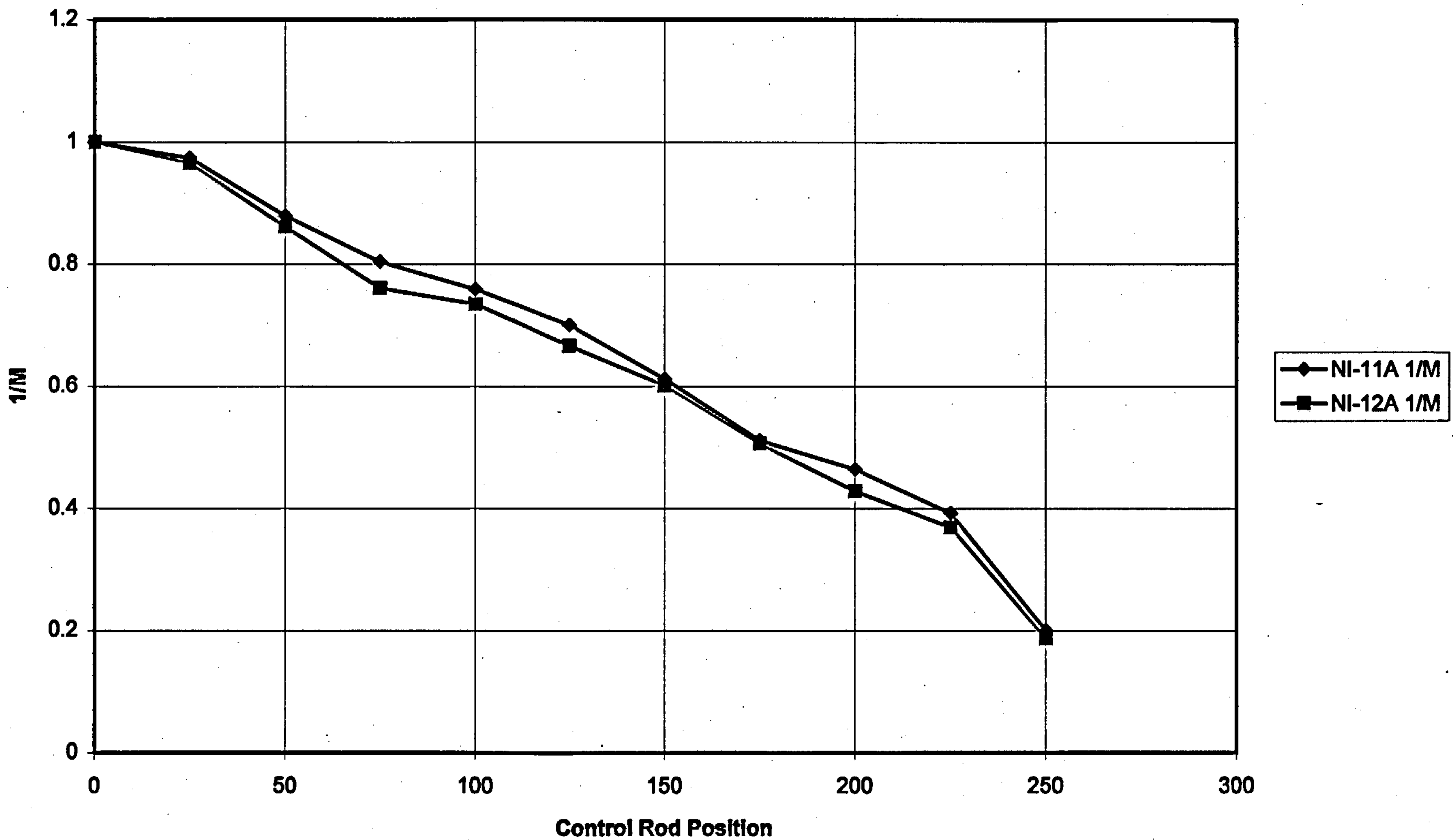
Criticality was achieved by withdrawing control rod groups 5 and 6 to 100% and control rod group 7 to 72%.

Throughout the approach to criticality, plots of inverse multiplication were maintained by two independent persons. Count rates were obtained from each source range neutron detector channel. One person used NI-11A and the other used NI-12A. Plots of inverse count rate (ICR) versus control rod position were maintained during control rod withdrawal.

The inverse count rate plots maintained during the approach to criticality are presented in Figure 3.1-1. As can be seen from the plot, the response of the source range channels during reactivity additions was very good.

In summary, initial criticality was achieved in an orderly manner. The measured critical boron concentration was within the acceptance criteria of 2130 ± 50 PPM.

Figure 3.1-1
1/M vs. CRG Position



3.2 Nuclear Instrumentation Overlap

a. Purpose

Technical Specification 3.5.1.5 states that prior to operation in the intermediate nuclear instrumentation (NI) range, at least one decade of overlap between the source range NIs and the intermediate range NIs must be observed.

b. Test Method

To satisfy the above overlap requirements, core power was increased until the intermediate range channels came on scale. Detector signal response was then recorded for both the source range and intermediate range channels. This was repeated until the maximum source range value was reached.

c. Test Results

The results of the initial NI overlap data at 532°F and 2155 psig have shown a >1.28 decade overlap between the source and intermediate ranges.

d. Conclusions

The linearity, overlap and absolute output of the intermediate and source range detectors are within specifications and performing satisfactorily. There is at least a one decade overlap between the source and intermediate ranges, thus satisfying T.S. 3.5.1.5.

3.3 Reactimeter Checkout

a. Purpose

Reactivity calculations during the Cycle 13 test program were performed using the reactimeter. After initial criticality and prior to the first physics measurement, an online functional check of the reactimeter was performed to verify its accuracy for use in the test program.

b. Test Method

After initial criticality was established, the reactimeter and the reactivity calculations were started. Steady state conditions were established and a small amount of positive reactivity was inserted in the core by withdrawing control rod group 7.

RMAS software compared the reactivity calculated from the doubling times to the values calculated by the reactimeter. Measurements were taken at approximately +59, and -57 pcm.

c. Test Results

The measured values were determined to be satisfactory and showed that the reactimeter was ready for startup testing.

d. Conclusions

An on-line functional check of the reactimeter was performed after initial criticality. The measured data shows that the core reactivity measured by the reactimeter was in good agreement with the values obtained from neutron flux doubling times.

3.4 All Rods Out Critical Boron Concentration

a. Purpose

The all rods out critical boron concentration measurement was performed to obtain an accurate value for the excess reactivity loaded in the TMI Unit 1 core and to provide a basis for the verification of calculated reactivity worths. This measurement was performed at system conditions of approximately 532°F and 2155 psig.

b. Test Method

Starting from the critical condition, the Group 7 control rods were withdrawn to the full-out position. The resulting reactivity was measured with the reactimeter. The boron equivalent of this reactivity was calculated and added to the measured RCS boron concentration.

c. Test Results

The measured boron concentration with group 7 positioned at 100%WD was 2176 ppm.

d. Conclusions

The above results show that the measured boron concentration of 2176 ppm is within the acceptance criteria of 2164 ± 50 ppm.

3.5 Temperature Coefficient Measurements

a. Purpose

The moderator temperature coefficient of reactivity can be positive, depending upon the soluble boron concentration in the reactor coolant. Because of this possibility, the Technical Specifications state that the moderator temperature coefficient shall not be positive while greater than 95% FP. The moderator temperature coefficient cannot be measured directly, but it can be derived from the isothermal temperature coefficient and a known fuel temperature (Doppler) coefficient.

b. Test Method

Steady state conditions were established by maintaining reactor flux, reactor coolant pressure, turbine header pressure and core average temperature constant, with the reactor critical at approximately 10^{-9} amps on the intermediate range. Equilibrium boron concentration was established in the Reactor Coolant System, make-up tank and pressurizer to eliminate reactivity effects due to boron changes during the subsequent temperature swings. The reactivity value and the RCS average temperature was displayed on the RMAS monitor.

Once steady state conditions were established, a heatup rate was started by closing the turbine bypass valves. After the core average temperature increased by about 5°F core temperature and flux were stabilized and the process was reversed by decreasing the core average temperature by about 10°F. After core temperature and flux were stabilized, core temperature was returned to its initial value. Calculation of the temperature coefficient from the measured data was performed by dividing the change in core reactivity by the corresponding change in RCS temperature.

c. Test Results

The results of the isothermal temperature coefficient measurements are provided below. The predicted values are included for comparison.

In all cases the measured results compare favorably with the predicted values.

RCS Boron ppm	Measured ITC pcm/F	Predicted ITC pcm/F	Measured MTC pcm/F	Required MTC pcm/F
2154	-0.85	-0.45	+0.78	<+9.0

d. Conclusions

The measured values of the temperature coefficient of reactivity at 532°F, zero reactor power are within the acceptance criteria of ± 2.0 pcm/°F of the predicted value. An extrapolation of the moderator coefficient to 100%FP indicated that it was well within the limits of Technical Specifications 3.1.7.2.

3.6 Control Rod Group Worth Measurements

a. Purpose

This section provides comparison between the calculated and measured results for the control rod group worths. The location and function of each control rod group is shown in Figure 3.6-1. The grouping of the control rods shown in Figure 3.6-1 will be used throughout Cycle 13. Calculated and measured control rod group reactivity worths for the normal withdrawal sequence were determined at reactor conditions of zero power, 532°F and 2155 psi. The measured results were obtained using results of reactivity and group position from the RMAS system.

b. Test Method

Control rod group reactivity worth measurements were performed at zero power, 532°F using the boron/rod swap method. Both the differential and integral reactivity worths of control rod groups 5, 6, and 7 were determined.

The boron/rod swap method consists of establishing a deboration rate in the reactor coolant system, then compensating for the reactivity changes by inserting the control rod groups in incremental steps.

The reactivity changes that occurred during the measurements were calculated by the reactimeter. Differential rod worths were obtained from the measured reactivity worth versus the change in rod group position. The differential rod worths of each group were then summed to obtain the integral rod group worths.

c. Test Results

Control rod group reactivity worths were measured at zero power, 532°F conditions. The boron/rod swap method was used to determine differential and integral rod worths for control rod group 5 - 7 from 100% to 0% withdrawn.

The integral reactivity worths for control rod groups 5 through 7 are presented in Figures 3.6-2 through 3.6-4.

These curves were obtained by integrating the measured differential worth curves.

Figure 3.6-1
Control Rod Locations and Group Descriptions for TMI-1 Cycle 12

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A															
B						1		6		1					
C					3		5		5		3				
D				7		8		7		8		7			
E			3		5		4		4		5		3		
F		1		8		6		2		6		8		1	
G			5		4		2		2		4		5		
H		6		7		2		7		2		7		6	
K			5		4		2		2		4		5		
L		1		8		6		2		6		8		1	
M			3		5		4		4		5		3		
N				7		8		7		8		7			
O					3		5		5		3				
P						1		6		1					
R															

X Group Number

Group Number	Number of Control Rods in the Group	Control Rod Function
1	8	Safety
2	8	Safety
3	8	Safety
4	8	Safety
5	12	Control
6	8	Control
7	9	Control
8	8	APSRA

Figure 3.6-2
Integral Worth for CRG-5

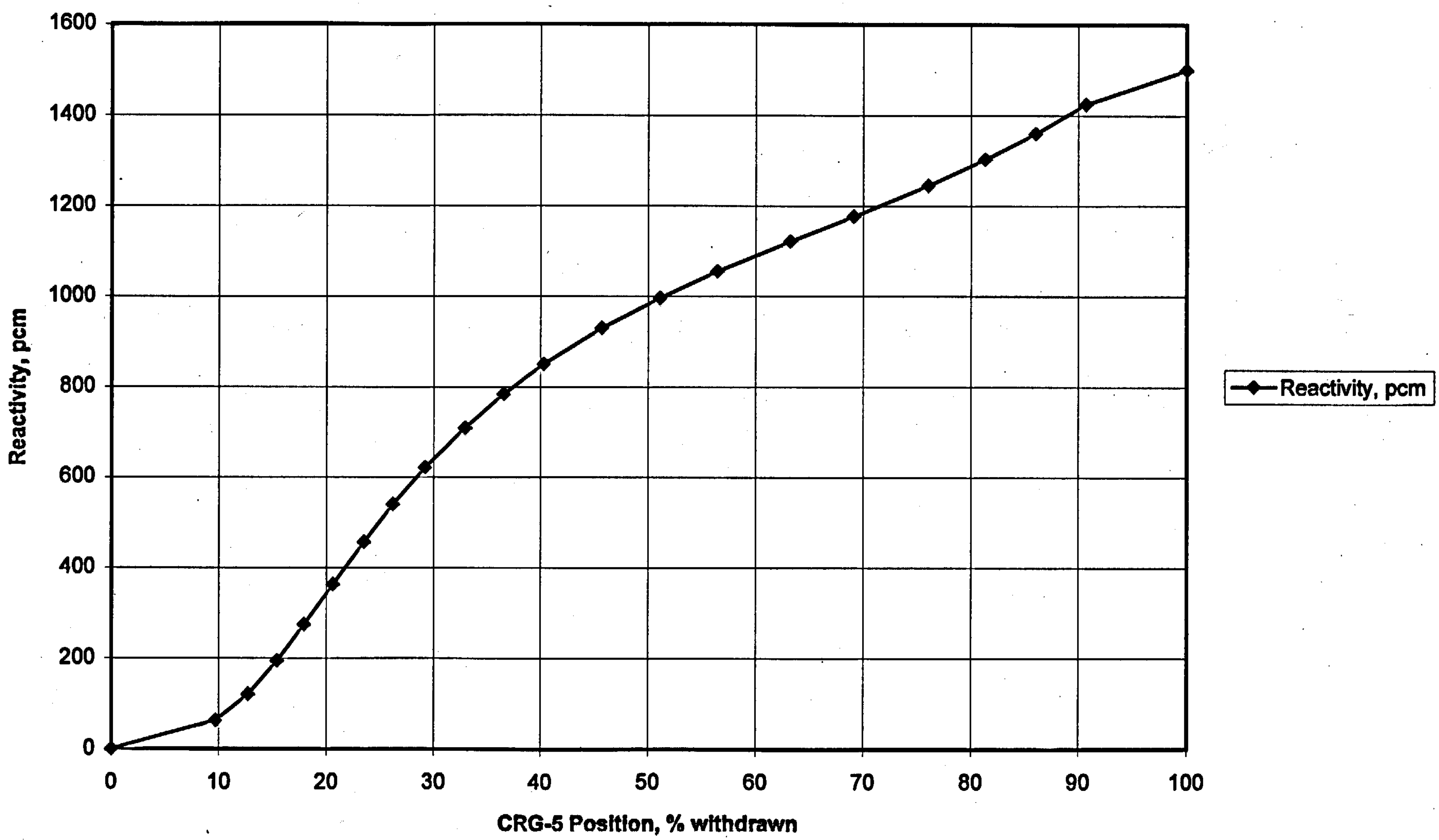


Figure 3.6-3
Integral Worth for CRG-6

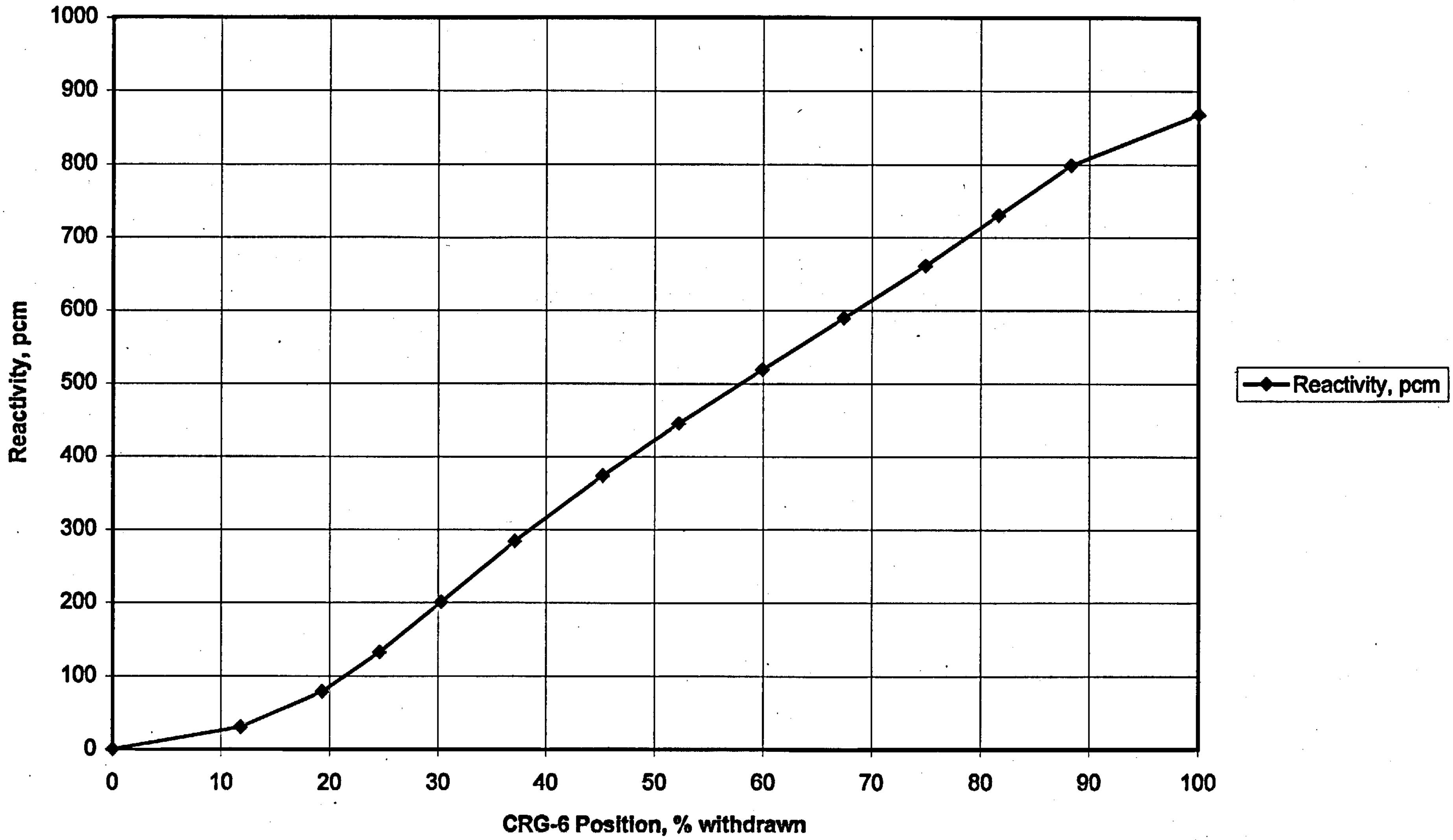


Figure 3.6-4
Integral Worth for CRG-7

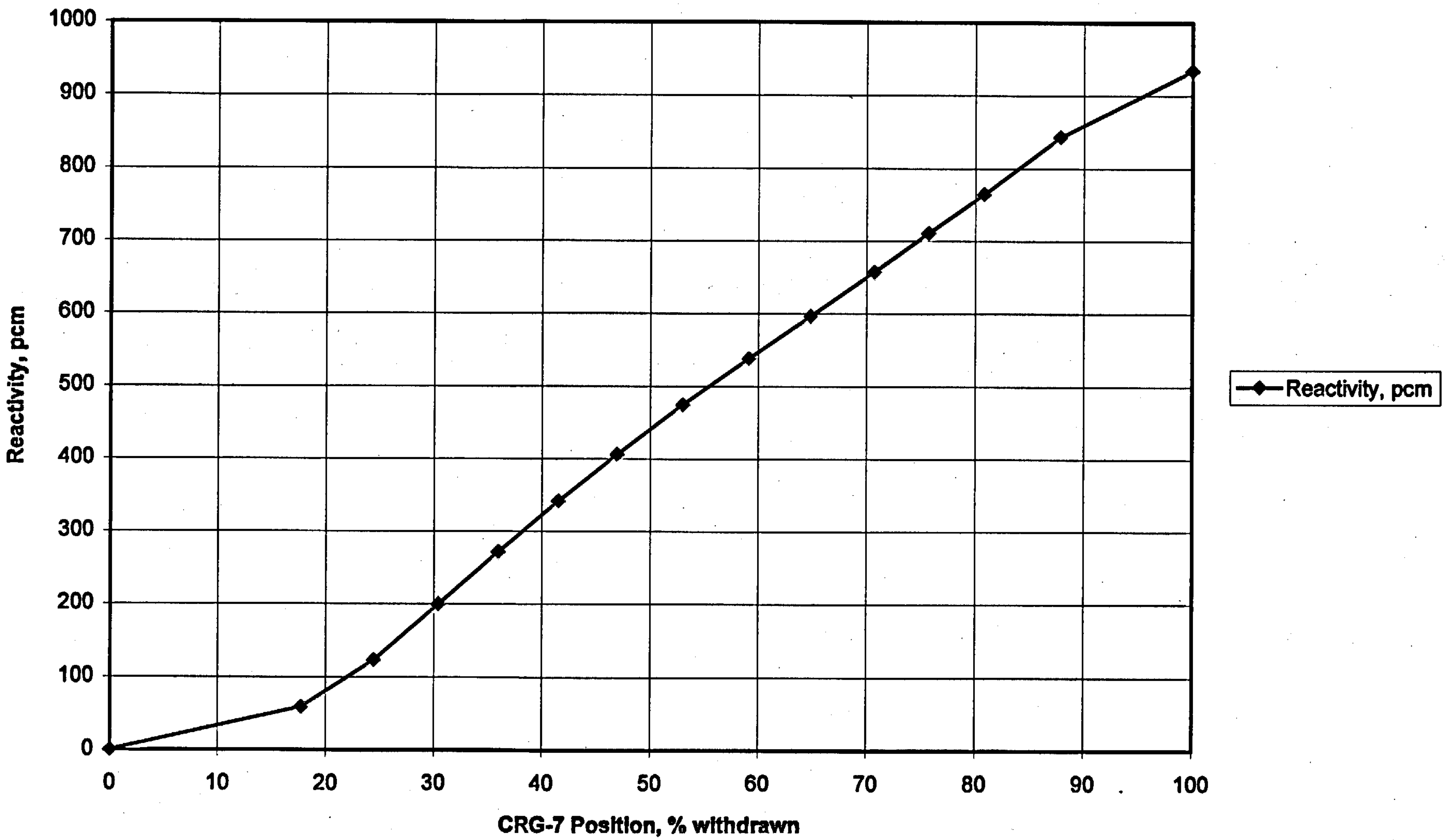


Table 3.6-1 provides a comparison between the predicted and measured results for the rod worth measurements. The results show good agreement between the measured and predicted rod group worths. The maximum deviation between measured and predicted worths for a group was +3.7%.

d. Conclusions

Differential and integral control rod group reactivity worths were measured using the boron/rod swap method. The measured results at zero power, 532°F indicate good agreement with the predicted group worths.

3.7 Differential Boron Worth

a. Purpose

Soluble poison in the form of dissolved boric acid is added to the moderator to provide additional reactivity control beyond that available from the control rods, burnable poison rod assemblies, and integral burnable poisons. The primary function of the soluble poison control system is to control the excess reactivity of the fuel throughout each core life cycle. The differential reactivity worth of the boric acid was measured during the zero power test.

b. Test Method

Measurements of the differential boron worth at 532°F were performed in conjunction with the control rod worth measurements. The control rod worths were measured by the boron swap technique in which a deboration rate was established and the control rods were inserted to compensate for the changing core reactivity. The reactimeter was used to provide a continuous reactivity calculation throughout the measurement. The differential boron worth was then determined by summing the incremental reactivity values measured during the rod worth measurements over a known boron concentration range. The average differential boron worth is the measured change in reactivity divided by the change in boron concentration.

c. Test Results

Measurements of the soluble boron differential worth were completed at the zero power condition of 532°F. The measured boron worth was 6.449 pcm/ppmB at an average boron concentration of 1923 ppmB. This corresponds to a 0.5% deviation, which is well within the predicted value of 6.414 pcm/ppmB ± 15%.

d. Conclusions

The measured results for the soluble poison differential worth at 532°F was within 15% of the predicted differential worth.

TABLE 3.6-1

COMPARISON OF PREDICTED VS MEASURED ROD WORTHS

Control Rod Group	Measured Worth, pcm	Predicted Worth, pcm	Percent Difference
5	1499.6	1486 ± 15%	+0.9%
6	868.2	853 ± 15%	+1.8%
7	934	901 ± 15%	+3.7%
5 –7	3301.8	3240 ± 10%	+1.9%

4.0 CORE PERFORMANCE – MEASUREMENTS AT POWER

This section presents the results of the physics measurements that were conducted with the reactor at power. Testing was conducted at power plateaus of approximately 10%, 42%, 76%, and 100% of 2568 megawatts core thermal power, as determined from primary and secondary heat balance measurements. Operation in the power range began on October 19, 1999.

Periodic measurements and calibrations were performed on the plant nuclear instrumentation during the escalation to full power. The four power range detector channels were calibrated based upon primary and secondary plant heat balance measurements. Testing of the incore nuclear instrumentation was performed to ensure that all detectors were functioning properly and that the detector inputs were processed correctly by the plant computer. Core axial imbalance determined from the incore instrumentation system was used to calibrate the out of core detector imbalance indication.

The major physics measurements performed during power escalation and at full power consisted of obtaining detailed radial and axial core power distribution measurements. Also, during power escalation, nuclear instrument response was determined for several core axial imbalances. Values of minimum DNBR and maximum linear heat rate were monitored throughout the test program to ensure that core thermal limits would not be exceeded.

4.1 Nuclear Instrumentation Calibration at Power

a. Purpose

The purpose of the Nuclear Instrumentation Calibration at Power was to calibrate the power range nuclear instrumentation indication to be no less than 2% FP of the reactor thermal power as determined by a heat balance and to within ± 2.5% incore axial offset as determined by the incore monitoring system.

b. Test Method

As required during power escalation, the top and bottom linear amplifier gains were adjusted to maintain power range nuclear instrumentation indication to be not less than 2% of the power calculated by a heat balance.

When directed by the controlling procedure for physics testing, the high flux trip bistable setpoint was adjusted. The major settings during power escalation are given below:

Nominal Test Plateau, %FP	Nominal Bistable Setpoint, %FP
40	50
80	90
100	105.1*

*Normal full power setpoint

c. Test Results

An analysis of test results indicated that changes in Reactor Coolant System boron and xenon buildup or burnout affected the power as observed by the nuclear instrumentation. This was expected since the power range nuclear instrumentation measures reactor neutron leakage which is directly related to the above changes in system conditions. Each time that it was necessary to calibrate the power range nuclear instrumentation, the acceptance criteria of calibration to be no less than 2.0% FP of the heat balance power was met without any difficulty. Also, each time it was necessary to calibrate the power range nuclear instrumentation, the ± 2.5% axial offset criteria as determined by the incore monitoring system was also met when required.

The high flux trip bistable was adjusted to a nominal setpoint of 50, 90 and 105.1% FP prior to escalation of power to nominal plateaus of 40, 80 and 100% FP, respectively.

d. Conclusions

The power range channels were calibrated based on heat balance power several times during the startup program. These calibrations were required due to power level, boron, and/or control rod configuration changes during the program. Acceptance criteria for nuclear instrumentation calibration at power were met in all instances.

4.2 Incore Detector Testing

a. Purpose

Self-powered neutron detectors (incore detector system) monitor the core power density within the core and their outputs are monitored and processed by the plant computer to provide accurate readings of relative neutron flux.

Tests conducted on the incore detector system were performed to:

(1) Verify that the output from each detector and its response to increasing reactor power was as expected.

(2) Verify that the background, length and depletion corrections applied by the plant computer are correct.

(3) To measure the degree of azimuthal symmetry of the neutron flux.

b. Test Method

The response of the incore detectors versus power level was determined and a comparison of the symmetrical detector outputs made at steady state reactor power of approximately 10, 42, 76, and 100%FP.

Using the corrected SPND maps, calculations were performed to determine the detector current to average detector current values per assembly for each incore detector versus axial positions.

At approximately 76% FP, SP-1301-5.3, Incore Neutron Detectors-Monthly Check, was performed to calibrate the backup recorder detectors to their incore depletion value.

c. Conclusions

Incore detector testing during power escalation demonstrated that all detectors were functioning as expected. Symmetrical detector readings agreed within acceptable limits and the computer applied correction factors are accurate. The backup incore recorders were calibrated and were operational above 80% FP.

4.3 Power Imbalance Detector Correlation Test

a. Purpose

The Power Imbalance Detector Correlation Test has four objectives:

1. To determine the relationship between the core power distribution as measured by the out-of-core detectors and the incore instruments.

2. To demonstrate axial power shaping control using the Axial Power Shaping Rods (APSRs).

3. To verify the adequacy and accuracy of backup imbalance calculations as done in AP 1203-7, "Hand Calculation for Quadrant Power Tilt and Core Power Imbalance."

4. To determine the core maximum linear heat rate and minimum DNBR at various power imbalances.

b. Test Method

This test was conducted at about 76% FP to determine the relationship between the core axial imbalance as indicated by the incore detectors and the out-of-core detectors. Based upon this correlation, it could be verified that the minimum DNBR and maximum linear heat rate limits would not be exceeded by operating within the flux/delta flux/flow envelope set in the Reactor Protection System.

CRG-8 was moved to establish the various imbalances. The integrated control system (ICS) automatically compensated for reactivity changes by repositioning CRG-7 to maintain a constant power level. The RCS boron concentration was adjusted to obtain additional imbalance data. Again, the ICS compensated for the boron change by inserting CRG-7 to maintain constant power.

c. Test Results

The relationship between the ICD and OCD offset was determined at about 76% FP by changing axial imbalance through adjustment of the APSRs, boron concentration, and resulting Group 7 control rod position. The average slope measured on the four out-of-core detectors was 1.028. The lowest slope was 0.95 for NI-7. The scaled difference amplifier gain was changed so that each detector would respond with a slope of 1.0.

A comparison of the incore detector (ICD) offset versus the out-of-core (OCD) detector offset obtained for each NI channel is shown in Table 4.3-1.

Core power distribution measurements were taken at the most positive and negative imbalances at 76% FP. The values of minimum DNBR and worst case MLHR were compared to the acceptance criteria.

Backup offset calculations using AP 1203-7 agree with the computer calculated offset. Table 4.3-2 lists the computer calculated offset as well as offsets obtained using the incore detector backup recorders.

d. Conclusions

Backup imbalance calculations performed in accordance with AP 1203-7 provide an acceptable alternate method to computer calculated values of imbalance.

Minimum DNBR and Maximum Linear Heat Rate parameters were well within Technical Specifications limitations.

TABLE 4.3-1

INCORE OFFSET VS. OUT-OF-CORE OFFSET

Incore Offset, %	Out-of-Core Offset, %			
	NI-5	NI-6	NI-7	NI-8
24.73	26.89	24.27	22.48	22.76
17.63	19.38	17.95	17.05	16.63
13.65	15.41	13.75	12.95	12.86
10.19	10.23	10.77	9.01	10.07
-9.46	-11.57	-11.70	-9.58	-10.83
-14.65	-16.74	-16.67	-14.01	-15.46

TABLE 4.3-2

FULL INCORE OFFSET VS BACKUP RECORDER OFFSET

Full Incore Offset, %	Backup Recorder Offset, %
24.73	17.16
17.63	12.68
13.65	10.36
-14.65	-9.81

4.4 Core Power Distribution Verification

a. Purpose

To measure the core power distributions during the power escalation and at 100 percent full power to verify that the core axial imbalance, quadrant power tilt, maximum linear heat rate and minimum DNBR do not exceed their specified limits. Also, to compare the measured and predicted power distributions.

b. Test Method

Core power distribution measurements were performed at approximately 42%FP during the power escalation and at 100% full power under steady state conditions. To provide the best comparison between measured and predicted results, three-dimensional equilibrium xenon conditions were established for the full power test. Data collected for the measurements consisted of power distribution information at 364 core locations from the incore detector system. The worst case core thermal conditions were calculated using this data. The measured data was compared with calculated predictions.

c. Test Results

The acceptance criteria for power distribution require that all new fuel be within limits for radial and total peaking. Eighth core symmetric locations L-14 and N-13 were analyzed with slightly higher radial and total peak limits compared to the rest of the core. Also, the RMS of the differences between measured and predicted HFP radial peaks for all fuel (eighth core) should be less than 0.05.

A summary of the cases studied in this report is given in Table 4.4-1 which gives the core power level, control rod pattern, cycle burnup, boron concentration, axial imbalance, maximum quadrant tilt, minimum DNBR, maximum LHR and power peaking data for each measurement. Note that the radial and total peak data is not necessarily for the maximum peaks in the core, but for the locations with the largest difference between the predicted and measured data for new fuel. Data for the two classes of radial peak and total peak limits are shown. The highest Worst Case MLHR was 12.42 kw/ft at 100% FP which is well below the maximum limit of 20.5 kw/ft. The lowest minimum DNBR value was 2.85 at 100% FP which is well above the minimum limit.

The quadrant power tilt and axial imbalance values measured were all within the allowable limits. Table 4.4-1 also gives a comparison between the maximum calculated and predicted radial and total peaks for an eighth core power distribution.

d. Conclusions

Core power distribution measurements were conducted at approximately 42% and 100% full power. Comparison of measured and predicted results show good agreement. The largest difference between the maximum measured and maximum predicted peak value was 4.41% for total peaking at approximately 42% FP for location N-13. This met its acceptance criterion of <9.6%. All fuel locations met their acceptance criteria.

The measured values of DNBR and MLHR were all within the allowable limits. All quadrant power tilts and axial core imbalances measured during the power distribution test were within the Technical Specifications and normal operational limits.

TABLE 4.4-1

CORE POWER DISTRIBUTION RESULTS

Power Plateau	Escalation 42%	Steady State 100%
Date	20 October 1999	25 October 1999
Actual Power (%FP)	42.39	99.8
CRG 1-5 (%WD)	100	100
CRG 6 (%WD)	92	100
CRG 7 (%WD)	12.5	92.4
CRG 8 (%WD)	30.3	30.3
Cycle Burnup (EFPD)	0.09	4.82
Boron Concentration (ppm)	1849	1547
Imbalance (%)	-0.33	0.91
Maximum Tilt (%)	2.58	1.55
MDNBR	6.71	2.85
Worst Case MLHR (kW/ft)	5.93	12.42
Maximum Radial Peak Difference, New Fuel		
Location (L-14/N-13 class)	L-14	N-13
Measured Peak	1.195	1.066
Predicted Peak	1.177	1.037
Difference (%)	1.53	2.8
Acceptance Criterion (%)	≤6.9	≤6.9
Location (other than L-14/N-13)	K-14	K-14
Measured Peak	1.306	1.4
Predicted Peak	1.285	1.208
Difference (%)	1.67	1.191
Acceptance Criterion (%)	≤4.8	≤4.8
Maximum Total Peak Difference, New Fuel		
Location (L-14/N-13 class)	N-13	N-13
Measured Peak	1.059	1.212
Predicted Peak	1.014	1.217
Difference (%)	4.41	-0.4
Acceptance Criterion (%)	≤9.6	≤9.6
Location (other than L-14/N-13)	H-9	H-9
Measured Peak	1.361	1.352
Predicted Peak	1.35	1.371
Difference (%)	0.83	-1.4
Acceptance Criterion (%)	≤7.5	≤7.5
Eighth-Core RMS of Absolute Differences for Radial Peaks, All Fuel		
Measured	N/A	0.042
Acceptance Criterion	N/A	≤0.05