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DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3
STARTUP TEST REPORT FOR CYCLE 13

Pursuant to Section 6.9.1.1 of the Millstone Power Station Unit 3 Technical Specifications, Dominion Nuclear Connecticut, Inc. hereby submits the enclosed Startup Test Report for Cycle 13.

If you have any questions or require additional information, please contact Mr. William D. Bartron at (860) 444-4301.

Sincerely,

A. J. Jordan
Site Vice President – Millstone

Enclosure: (1)

Commitments made in this letter: None

IE26
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ENCLOSURE

STARTUP TEST REPORT FOR CYCLE 13

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3

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1.0 SUMMARY

This report summarizes the Cycle 13 startup testing performed following the completion of the October-November 2008 refueling outage. Preparations for both the refueling outage and Cycle 13 operation included a stretch power uprate (SPU) to allow operation at a rated thermal power (RTP) level of 3650 mega-watts thermal (MWt), or an increase of approximately 7% power. The planning for the SPU included the following:

- On July 13, 2007, Dominion Nuclear Connecticut (DNC) submitted License Amendment Request Serial No. 07-0450, requesting approval to operate Millstone Power Station Unit 3 at the SPU power level of 3650 MWt. Reference [6.6]

- Plant modifications were planned to support the SPU. The modifications included items such as the following:

  - ❑ Main feedwater pump turbine replacements
  - ❑ Turbine building ventilation to provide additional cooling in the condensate pump area
  - ❑ Control room emergency ventilation automatic initiation of emergency mode (filtered pressurization) following Control Building Isolation signal
  - ❑ Modifications to the main turbine-generator instruments, controls and operating points
  - ❑ Modifications to increase the component cooling water piping design temperature between the residual heat removal system and the component cooling water heat exchanger
  - ❑ Various instrumentation and control system setpoint changes
  - ❑ Various piping support modifications
  - ❑ Installation of a Safety Injection Actuation Signal (SIAS) permissive logic that requires both a Safety Injection signal and a low reactor coolant system (RCS) pressure signal to exist before automatically opening the emergency core cooling system cold leg injection valves
  - ❑ Rescaling of various instrument loops
  - ❑ Deletion of the automatic control rod withdrawal capability

- On August 12, 2008, License Amendment No. 242 was issued to support the SPU. Reference [6.7]

2.0 INTRODUCTION

The Millstone Power Station Unit 3 Cycle 13 fuel reload was completed on November 3, 2008. The attached core map (Figure 1) shows the final core configuration. Reference [6.3] documents that Cycle 13 uses a low leakage loading pattern (L3P) consisting of 80 new Region 15 fuel assemblies, 76 Region 14 once-burned fuel assemblies, and 37 Region 13 twice-burned fuel assemblies. All 193 fuel assemblies in the Cycle 13 core are the Westinghouse 17x17 robust fuel assembly (RFA) design.

The 80 Region 15 assemblies are comprised of 56 assemblies enriched to 4.10 weight percent Uranium-235 (w/o U^{235}) and 24 assemblies enriched to 4.90 w/o U^{235}. The top and bottom regions of all fuel assemblies in the Cycle 13 core are comprised of a 6-inch annular blanket region enriched to 2.6 w/o U^{235}. Placement of the new fuel assemblies in the designated fresh fuel assembly locations was made in a random fashion in order to prevent power tilts across the core due to systematic deviations in the fresh fuel composition.

The 113 re-insert fuel assemblies were ultrasonically cleaned during the October-November 2008 refueling outage. The purpose of the ultrasonic fuel cleaning was to remove adhered crud (primarily nickel and iron-based deposits) from the surface of fuel rods that have previous core exposure in order to reduce the probability of occurrence of crud induced power shift (CIPS) in the uprated core.

Every fuel assembly in Cycle 13 contains an insert. The inserts consist of 61 rod cluster control assemblies (RCCAs) and 132 thimble plugs.

Subsequent operational and testing milestones were completed as follows:

Initial Criticality	November 23, 2008
Low Power Physics Testing completed	November 23, 2008
Main Turbine Online	November 24, 2008
30% Power Testing completed	November 25, 2008
75% Power Testing completed	November 27, 2008
93% Power Testing completed	November 27, 2008
97% Power Testing completed	November 28, 2008
99% Power Testing completed	November 29, 2008
100% Power Testing completed	December 4, 2008

3.0 FUEL DESIGN

All of the 193 assemblies in the Cycle 13 core are of the RFA design. This fuel design differs from the previous fuel design in that it incorporates the Westinghouse protective bottom grid (P-Grid), thicker walled control rod guide tubes and instrument tube, and modifications to the mixing vane grids and intermediate flow mixer (IFM) grids. The P-Grid improves the fuel assembly's resistance to debris and thus debris related failures. The thicker walled guide and instrument tubes make the fuel assembly more resistant to bowing and twisting, thereby further reducing the possibility of an incomplete rod insertion event. The modifications to the mixing vane grids and IFMs improve the fuel assembly thermal performance and increase the margin to fuel-related design limits.

The mechanical design of the fresh Region 15 fuel assemblies is the same as the Region 14 fuel assemblies, with the exception that Region 15 incorporates the oxide-coated cladding feature for the first time in Millstone Power Station Unit 3. This new feature consists of a zirconium dioxide (ZrO_2) protective coating, covering a minimum of 4.5 inches of the bottom end of the fuel rod, including a coating over the bottom end plug, the bottom end plug weldment, and a portion of the cladding. The coating provides a hard, wear resistant, surface layer of ZrO_2 for additional debris and grid-to-rod fretting damage resistance, thereby improving fuel reliability.

The Cycle 13 core was designed for an uprated RTP condition of 3650 MWt. The previous RTP for Cycles 1 through 12 was 3411 MWt.

4.0 LOW POWER PHYSICS TESTING

The low power physics testing program for Cycle 13 was completed using the procedure in reference [6.1] based on the Westinghouse dynamic rod worth measurement (DRWM) Technique described in reference [6.4]. This program consisted of the following: control and shutdown bank worth measurements, critical boron endpoint measurements for all rods out (ARO), and ARO moderator/isothermal temperature coefficient measurements. Low power physics testing was performed at a power level below the point of nuclear heat to avoid nuclear heating reactivity feedback effects.

4.1 Critical Boron Concentration

The critical boron concentration was measured for the ARO configuration. The measured values include corrections to account for differences between the measured critical rod configuration and the ARO configuration. The review and acceptance criteria of ±500 and ±1000 percent milliRho (pcm), respectively, were met for the ARO configuration.

Summary of Boron Endpoint Results

	Measured (ppm)	Predicted (ppm)	M-P (ppm)	Acceptance Criteria (pcm)
All Rods Out (ARO)	2088	2088	0 (-2.6 pcm)	± 1000

4.2 Moderator Temperature Coefficient

Isothermal temperature coefficient (ITC) data was measured at the ARO configuration. Controlled heat-ups and cool-downs were performed and the reactivity change was measured. These measurements were corrected for ARO conditions and the averages of the corrected results are presented below. They were then compared to the design predictions and review criteria. The review criteria of ±2 pcm/degrees Fahrenheit (°F) to the predictions were met.

The ARO moderator temperature coefficient (MTC) of +0.27 pcm/°F was calculated by subtracting the design doppler temperature coefficient (-1.74 pcm/°F) from the measured ARO isothermal temperature coefficient of -1.85 pcm/°F, and adding the delta (Δ) ITC correction value of +0.38 pcm/°F (ΔITC corrects the MTC at the measurement conditions to the minimum temperature for criticality value of 551°F). The technical specification limit of MTC < +5.0 pcm/°F at ARO hot zero power (HZP) was met.

Isothermal/Moderator Temperature Coefficient Results

	Measured (pcm/°F)	Corrected Predicted (pcm/°F)	M-P (pcm/°F)	Acceptance Criteria (pcm/°F)
ARO ITC	-1.85	-2.31	+0.46	NA
ARO MTC	+0.27	NA	NA	MTC < +5.0

4.3 Control Rod Reactivity Worth Measurements

The integral reactivity worths of all RCCA control and shutdown banks were measured using the DRWM technique. The review criteria is the measured worth is ±15% or 100 pcm of the individual predicted worth, whichever is greater and sum of the measured worths is ±8% of the predicted worths. The DRWM rod worth acceptance criteria is defined as: the sum of the measured worths (M) of all banks shall be greater than or equal to 90% of the sum of their predicted worths (P).

Control Bank Integral Worth Results

	Measured (pcm)	Predicted (pcm)	M-P (pcm)	% Difference (M-P) / P
Control Bank A	907.5	866.9	40.6	4.7%
Control Bank B	563.9	588.2	-24.3	-4.1%
Control Bank C	793.1	771.2	21.9	2.8%
Control Bank D	642.9	610.0	32.9	5.4%
Shutdown Bank A	439.3	435.5	3.8	0.9%
Shutdown Bank B	799.8	817.9	-18.1	-2.2%
Shutdown Bank C	354.3	354.2	0.1	0.0%
Shutdown Bank D	342.6	346.6	-4.0	-1.2%
Shutdown Bank E	50.7	52.0	-1.3	-2.5%
Totals	4894.1	4842.5	51.6	1.1%

The measured results of the individual bank worths and the total control bank worth showed excellent agreement with the predicted values. All individual and total worth review criteria were met. The acceptance criteria for sum of the measured rod worths (greater than or equal to 90% of the sum of the predicted worths) was met.

5.0 POWER ASCENSION TESTING

Since the power ascension for Cycle 13 included first time operation at an uprated thermal power of 3650 MWt, the standard post-refuel power ascension test program was augmented to include additional testing/evaluations. A specific station procedure was written for the power ascension to the uprated power level. This power ascension testing procedure provided the overall sequence of required activities as well as the types of management reviews and approvals needed to continue the power ascension to the next power plateau.

Testing was performed at specified power plateaus of 30%, 50%, 75%, 93%, 97%, 99% and 100% RTP. Power changes were governed by operating procedures and fuel preconditioning guidelines.

Test activities 1 through 4 described below, are standard power ascension activities performed following all refueling outages. Items 5 through 11 describe the additional testing/evaluations performed to ensure a conservative, deliberate approach to the uprated power level of 3650 MWt.

Thermal-hydraulic parameters, nuclear parameters and related instrumentation were monitored throughout the power ascension. Data was compared to previous cycle power ascension data and engineering predictions, as required, at each test plateau to identify calibration or system problems. The major areas analyzed were:

1. Core performance evaluation: Flux mapping was performed at 30%, 74% and 100% RTP using the moveable incore detector system. The resultant peaking factors and power distribution were compared to TS limits to verify that the core was operating within its design limits. All analysis limits were met and the results are summarized in Section 5.1.
2. Nuclear instrumentation indication: Overlap data was obtained between the intermediate and power range nuclear instrumentation channels. Secondary plant heat balance calculations were performed to verify the nuclear instrumentation indications.
3. Incore/Excore Calibration: Scaling factors were calculated from flux map data using the single point calibration methodology. The nuclear instrumentation power range channels were re-scaled at 30% and 100% RTP.
4. RCS Flow: The RCS flow rate was measured at 93% and 100% RTP using a secondary calorimetric heat balance for each loop using the steam generators as the control volumes. The calculated RCS flow rate met the TS requirements and is reported in Section 5.3.
5. RCS ΔT indication: All RCS ΔT loops were initially scaled to the uprated power level of 3650 MWt using the Cycle 12 loop ΔT values (obtained at a RTP level of 3411 MWt). Data from 30%, 50%, 75% and 93% RTP met prescribed acceptance criteria. Data was evaluated at 97% RTP and the loop 3 ΔT was re-scaled.
6. RCS Temperatures: Data was obtained for the narrow range RCS loop temperatures. Evaluations for ΔT and average temperature (T_{AVG}) and reference temperature (T_{REF}) were performed. The data showed that T_{REF} required re-scaling prior to raising power to the uprated power level.

7. Turbine 1st stage pressure (T_{REF}): The initial scaling of high pressure (HP) turbine 1st stage pressure was set during the 3R12 refueling outage based on engineering calculations for expected full power HP turbine 1st stage pressure. The scaling of T_{REF} was evaluated during the power ascension and required re-scaling at 99% RTP.
8. Plant Walkdowns: At the 93%, 97%, 99% and 100% RTP testing plateaus, walkdown of selected secondary plant systems/components was performed to evaluate the overall response/stability of these systems/components. Acceptable results from these walkdowns were documented as part of the approval process to continue to increase power to the next plateau.
9. Augmented Data Collection/Evaluations: For the areas of nuclear steam supply system (NSSS), balance of plant and key control systems, selected additional monitoring points were evaluated against expected values at the testing plateaus. Acceptable results from these evaluations were documented as part of the approval process to continue to increase power to the next plateau.
10. Main Feedwater Pump Performance Testing: Due to the replacement of the turbines on the main feedwater pumps, testing of both turbine-driven main feedwater pumps was performed at 55% RTP.
11. Vibration Monitoring Walkdowns: At selected testing plateaus, walkdowns of selected secondary plant systems/components were performed to evaluate the overall response/stability in regards to piping/component vibrations. Acceptable results from these walkdowns were documented as part of the approval process to continue to increase power to the next plateau.

5.1 Power Distribution, Power Peaking and Tilt Measurements

The core power distribution was measured through the performance of a series of flux maps during the power ascension as specified in reference [6.2]. The results from the flux maps were used to verify compliance with the power distribution TSs.

A low power flux map, at approximately 30% RTP, was performed to determine if any gross neutron flux abnormalities existed. At the 30% RTP plateau flux map, data necessary to perform an excore to incore calibration via the single point methodology was obtained. Per TS Surveillance 4.3.1.1, Table 4.3-1, Functional Unit 2, Note 6, a flux map at approximately 100% RTP was performed for an excore to incore calibration. The 100% RTP map also verified core power distributions were within the design limits.

A summary of the measured axial flux difference (AFD) and incore tilt for the flux maps performed during the power ascension is provided below. Additional tables provide comparisons of the most limiting measured heat flux hot channel factor (F_Q) and nuclear enthalpy rise hot channel factor ($F_{\Delta}h$), including uncertainties, to their respective limits from each of the flux maps performed during the power ascension. The most limiting F_Q reported is based on minimum margin to the steady state limit that varies as a function of core height.

As can be seen from the data presented, all TS limits were met and no abnormalities in core power distribution were observed during power ascension.

Summary of Measured Axial Flux Difference and Incore Tilt

Power (%RTP)	Burnup (MWD/MTU)	Rod Position (steps)	AFD (%)	Incore Tilt
30.8	9.4	216	4.366	1.0049
74.0	45.9	216	2.478	1.0038
99.9	275.0	216	-0.767	1.0047

Comparison of Measured F_Q to F_Q^{RTP} Limit

Power (%RTP)	Burnup (MWD/MTU)	Measured F_Q	F_Q^{RTP} steady state limit	Margin to Transient Limit
30.8	9.4	N/A	N/A	N/A
74.0	45.9	1.785	3.514	33.9 %
99.9	275.0	1.853	2.603	13.4 %

Comparison of Measured $F_{\Delta}h$ to $F_{\Delta}h$ Limit

Power (%RTP)	Burnup (MWD/MTU)	$F_{\Delta}h$	$F_{\Delta}h$ Limit
30.8	9.4	1.485	1.916
74.0	45.9	1.453	1.711
99.9	275.0	1.440	1.587

Presented in Figures 2, 3 and 4 are measured power distribution maps showing percent difference from the predicted power for the 30%, 74% and 100% RTP plateaus. From these data it can be seen that there is good agreement between the measured and predicted assembly powers.

5.2 Boron Measurements

Hot full power ARO boron concentration measurements were performed after reaching equilibrium conditions. The measured ARO, hot full power, equilibrium xenon, boron concentration was 1429 ppm with a predicted value of 1411 ppm. The predicted to measured difference was +108 pcm which met the acceptance criteria of ± 1000 pcm.

5.3 Reactor Coolant System Flow Measurement

The RCS flow rate was determined using a secondary calorimetric heat balance for each loop using the steam generators as the control volumes. The following parameters were measured:

- RCS pressure
- Hot leg temperatures
- Cold leg temperatures
- Feedwater temperatures
- Feedwater flow rates
- Feedwater pressure
- Steam generator pressure

Steam generator blowdown was not isolated during the data acquisition period.

Per TS Surveillance 4.2.3.1.3, the RCS flow was measured within 24 hours after exceeding 90% RTP. The measured flow at approximately 93% RTP was 401,606 gallons per minute (gpm) with a minimum required flow of 379,200 gpm. The RCS flow measurement was re-performed after reaching 100% RTP. The measured flow at 100% power was 402,113 gpm with a minimum required flow of 379,200 gpm. All TS limits were met.

6.0 <u>REFERENCES</u>

6.1 SP 31008, Rev. 003-03, "Low Power Physics Testing (ICCE)"

6.2 SPROC OPS08-3-03, Rev. 000-01, "Implementation of Power Uprate to 3650 MW Rated Thermal Power (ICCE)"

6.3 MP-24-NF-NDR13, Rev. 000, "Nuclear Design and Core Physics Characteristics of the Millstone Generating Station Unit 3, Cycle 13"

6.4 WCAP-13360-P-A, Revision 1, "Westinghouse Dynamic Rod Worth Measurement Technique"

6.5 NEU-08-77, Letter from D. L. Rogosky (Westinghouse) to Robert Borchert, "Dominion Nuclear Connecticut Millstone Unit 3 Transmittal of LPPT/DRWM Final Report," dated December 16, 2008.

6.6 Serial No. 07-0450, Letter from G.T. Bischof (Dominion) to U.S. Nuclear Regulatory Commission, "Dominion Nuclear Connecticut, Inc., Millstone Power Station Unit 3, License Amendment Request Stretch Power Uprate," dated July 13, 2007.

6.7 Letter from J.G. Lamb (USNRC) to D.A. Christian (Dominion), "Millstone Power Station, Unit No. 3 – Issuance of Amendment Re: Stretch Power Uprate (TAC No. MD6070)," dated August 12, 2008.

7.0 FIGURES

FIGURE 1
CORE LOADING PATTERN
MILLSTONE UNIT 3 - CYCLE 13

	R	P	N	M	L	K	J	H	G	F	E	D	C	B	A
1					13B N58	13B N45	13B N71	13B N48	13B N72	13B N40	13B N50				
2			13B N54	14B P43	15B R67	15B R58	15A R03	15A R06	15A R08	15B R60	15B R70	14B P48	13B N62		
3		13B N59	15A R14	15B R72	15A R19	14B P54	15A R31	14A P30	15A R34	14B P49	15A R44	15B R78	15A R15	13B N68	
4		14B P41	15B R79	14B P37	14A P02	14A P15	14A P06	15A R45	14A P08	14A P20	14A P33	14B P38	15B R66	14B P47	
5	13B N53	15B R80	15A R18	14A P14	15A R53	14B P68	15A R24	14A P23	15A R39	14B P60	15A R40	14A P04	15A R36	15B R68	13B N57
6	13B N43	15B R61	14B P52	14A P31	14B P61	15A R37	14B P65	15A R30	14B P58	15A R33	14B P59	14A P35	14B P51	15B R62	13B N42
7	13B N64	15A R02	15A R17	14A P09	15A R43	14B P71	14A P27	14B P75	14A P18	14B P72	15A R29	14A P10	15A R26	15A R16	13B N65
8	13B N51	15A R04	14A P19	15A R50	14A P36	15A R48	14B P67	13A N09	14B P70	15A R42	14A P22	15A R56	14A P24	15A R11	13B N52
9	13B N66	15A R12	15A R41	14A P11	15A R38	14B P62	14A P16	14B P64	14A P13	14B P73	15A R47	14A P05	15A R25	15A R09	13B N67
10	13B N38	15B R63	14B P50	14A P17	14B P74	15A R52	14B P57	15A R23	14B P76	15A R32	14B P66	14A P29	14B P56	15B R57	13B N44
11	13B N60	15B R75	15A R46	14A P01	15A R35	14B P63	15A R49	14A P21	15A R51	14B P69	15A R55	14A P34	15A R20	15B R76	13B N49
12		14B P46	15B R73	14B P39	14A P32	14A P28	14A P12	15A R54	14A P07	14A P25	14A P03	14B P40	15B R74	14B P45	
13		13B N70	15A R10	15B R69	15A R21	14B P53	15A R27	14A P26	15A R22	14B P55	15A R28	15B R71	15A R05	13B N69	
14			13B N73	14B P44	15B R65	15B R64	15A R07	15A R01	15A R13	15B R59	15B R77	14B P42	13B N55		
15					13B N46	13B N39	13B N61	13B N47	13B N56	13B N41	13B N63				

90°

0°

LEGEND

R ID	Region Identifier Fuel Assembly Identifier

REGION	ASSEMBLIES	ENRICHMENT
13A	1	4.00
13B	36	4.95
14A	36	4.70
14B	40	4.95
15A	56	4.10
15B	24	4.90

FIGURE 2
INCORE Power Distribution - 30%
MILLSTONE UNIT 3 - CYCLE 13

	R	P	N	M	L	K	J	H	G	F	E	D	C	B	A
1					0.279 -2.4	0.370 -2.1	0.358 -1.9	0.346 -1.4	0.358 -2.2	0.369 -2.6	0.278 -2.5				
2			0.294 -3.3	0.657 -3.0	0.973 -2.6	1.212 -2.0	1.067 -1.7	1.020 -1.4	1.072 -1.0	1.233 -0.6	0.999 -0.7	0.676 -0.6	0.302 -0.7		
3		0.296 -2.6	0.866 -2.7	1.209 -2.7	1.154 -2.7	1.198 -2.6	1.155 -1.8	1.086 -1.5	1.161 -0.9	1.249 1.1	1.201 0.2	1.241 -0.6	0.883 -0.8	0.301 -1.0	
4		0.663 -2.5	1.218 -2.4	1.310 -1.1	1.189 0.3	1.155 0.3	1.113 -1.4	1.143 -0.7	1.130 -0.2	1.174 1.5	1.208 0.8	1.332 0.5	1.238 -0.4	0.674 -0.4	
5	0.281 -1.4	0.994 -1.2	1.185 -1.2	1.195 -0.3	1.253 1.1	1.269 1.3	1.215 0.8	1.168 0.4	1.223 0.6	1.280 1.7	1.263 1.9	1.198 1.0	1.181 -0.4	0.995 -0.4	0.284 -0.7
6	0.375 -1.1	1.244 0.3	1.249 1.1	1.166 0.8	1.272 1.0	1.280 1.7	1.284 2.4	1.260 1.9	1.286 2.2	1.286 2.2	1.286 2.6	1.159 0.6	1.226 -0.3	1.234 -0.2	0.374 -1.1
7	0.363 -0.8	1.077 -0.6	1.169 -0.2	1.138 0.5	1.236 1.6	1.286 2.2	1.222 2.3	1.283 2.1	1.229 2.8	1.294 3.2	1.230 2.1	1.127 -0.2	1.171 -0.4	1.081 -0.4	0.363 -0.5
8	0.348 -0.9	1.020 -1.4	1.090 -1.2	1.153 0.2	1.181 1.5	1.262 2.1	1.283 2.1	1.160 2.8	1.301 3.6	1.272 2.9	1.184 1.8	1.153 0.2	1.100 -0.3	1.029 -0.6	0.348 -0.9
9	0.361 -1.1	1.070 -1.4	1.154 -1.9	1.137 0.7	1.230 2.1	1.280 2.1	1.220 2.1	1.292 2.9	1.239 3.7	1.295 2.9	1.236 1.6	1.143 1.0	1.176 0.4	1.075 -0.7	0.362 -1.1
10	0.367 -2.9	1.205 -2.6	1.213 -1.4	1.163 1.0	1.265 1.0	1.276 1.4	1.281 1.8	1.266 2.4	1.286 2.6	1.285 2.1	1.279 1.6	1.177 1.7	1.268 2.6	1.217 -1.9	0.371 -2.1
11	0.275 -3.8	0.959 -4.0	1.185 -0.1	1.197 0.9	1.252 1.0	1.279 1.6	1.236 1.6	1.176 1.1	1.211 0.5	1.259 0.5	1.250 0.9	1.211 1.1	1.213 1.2	0.982 -2.4	0.279 -2.1
12		0.658 -2.8	1.221 -1.8	1.312 -1.0	1.201 0.3	1.161 0.3	1.133 0.1	1.145 -0.5	1.124 -0.4	1.157 0.4	1.190 0.3	1.330 0.4	1.234 -1.1	0.664 -2.4	
13		0.295 -3.0	0.866 -2.7	1.221 -2.2	1.200 0.1	1.233 -0.2	1.162 -0.8	1.088 -1.4	1.157 -1.6	1.216 -1.1	1.169 -1.4	1.234 -0.7	0.878 -1.3	0.297 -2.3	
14			0.296 -2.6	0.661 -2.8	0.977 -2.9	1.212 -2.3	1.060 -2.1	1.011 -2.3	1.058 -2.5	1.208 -2.3	0.979 -2.0	0.667 -1.5	0.298 -2.0		
15					0.273 -4.2	0.367 -3.2	0.358 -2.2	0.343 -2.3	0.355 -2.7	0.368 -2.6	0.280 -2.1				

Measured Power
% Difference (M-P)/P

Measured Location

FIGURE 3
INCORE Power Distribution - 74%
MILLSTONE UNIT 3 - CYCLE 13

	R	P	N	M	L	K	J	H	G	F	E	D	C	B	A
1					0.288 -1.7	0.380 -1.6	0.372 -1.3	0.361 -1.1	0.373 -1.3	0.381 -1.6	0.287 -1.7				
2			0.299 -3.5	0.656 -3.2	0.971 -1.7	1.198 -1.5	1.072 -1.2	1.031 -1.0	1.077 -0.6	1.216 -0.2	0.988 -0.5	0.673 -1.2	0.306 -1.6		
3		0.303 -2.6	0.860 -2.6	1.181 -2.9	1.150 -1.8	1.198 -1.8	1.161 -1.4	1.099 -1.3	1.164 -0.8	1.235 0.9	1.180 -0.2	1.207 -1.1	0.871 -1.4	0.305 -1.6	
4		0.666 -2.2	1.194 -2.1	1.273 -1.3	1.175 -0.3	1.152 -0.3	1.125 -1.5	1.154 -0.9	1.140 -0.4	1.170 0.9	1.194 0.4	1.293 0.2	1.207 -0.7	0.674 -0.6	
5	0.289 -1.0	0.985 -0.8	1.169 -1.1	1.183 -0.5	1.239 0.5	1.264 0.6	1.221 0.4	1.180 0.1	1.227 0.1	1.274 1.0	1.249 1.3	1.188 0.8	1.170 -0.1	0.988 0.0	0.292 -0.3
6	0.386 -0.3	1.225 0.6	1.237 1.1	1.166 0.5	1.270 0.6	1.274 1.1	1.285 1.7	1.262 1.4	1.287 1.6	1.279 1.5	1.280 1.9	1.161 0.5	1.219 -0.1	1.216 0.0	0.385 -0.3
7	0.376 -0.5	1.079 -0.4	1.172 -0.1	1.150 0.4	1.242 1.3	1.286 1.5	1.226 1.5	1.287 1.6	1.236 2.3	1.296 2.6	1.237 1.7	1.142 0.0	1.179 0.1	1.088 0.3	0.378 0.3
8	0.363 -0.5	1.030 -1.1	1.105 -0.7	1.167 0.2	1.195 1.4	1.263 1.5	1.284 1.3	1.162 1.9	1.302 2.8	1.273 2.3	1.197 1.5	1.168 0.3	1.116 0.3	1.043 0.2	0.365 0.0
9	0.375 -0.5	1.075 -0.9	1.162 -1.4	1.148 0.5	1.238 1.8	1.283 1.6	1.223 1.2	1.291 1.9	1.242 2.8	1.296 2.3	1.244 1.5	1.155 0.9	1.183 0.9	1.085 0.2	0.377 -0.3
10	0.378 -2.1	1.195 -1.7	1.212 -0.7	1.161 0.5	1.263 0.6	1.272 1.0	1.281 1.1	1.264 1.6	1.283 1.6	1.280 1.6	1.280 1.4	1.177 1.5	1.256 2.6	1.208 -0.8	0.383 -1.0
11	0.284 -3.1	0.958 -3.0	1.162 -0.8	1.184 0.4	1.239 0.5	1.273 0.9	1.237 0.9	1.187 0.7	1.218 0.2	1.261 0.4	1.248 1.2	1.205 1.3	1.201 1.6	0.985 -0.8	0.289 -1.0
12		0.664 -2.1	1.201 -1.2	1.275 -1.2	1.182 -0.6	1.154 -0.5	1.141 -0.3	1.158 -0.6	1.137 -0.4	1.159 0.3	1.186 0.6	1.300 0.8	1.215 -0.4	0.671 -1.5	
13		0.304 -1.9	0.867 -1.8	1.198 -1.8	1.174 -0.7	1.217 -0.6	1.164 -0.8	1.103 -0.9	1.164 -1.2	1.210 -0.8	1.163 -0.7	1.216 0.0	0.877 -0.7	0.305 -1.9	
14			0.304 -2.3	0.665 -2.3	0.969 -2.4	1.195 -1.9	1.069 -1.3	1.027 -1.3	1.068 -1.6	1.195 -1.7	0.975 -1.3	0.673 -0.7	0.306 -1.3		
15					0.282 -3.4	0.378 -2.3	0.373 -1.3	0.361 -1.1	0.371 -1.6	0.379 -1.8	0.289 -1.4				

Measured Power
% Difference (M-P)/P

Measured Location

FIGURE 4
INCORE Power Distribution - 100%
MILLSTONE UNIT 3 - CYCLE 13

	R	P	N	M	L	K	J	H	G	F	E	D	C	B	A
1					0.296 -0.7	0.387 -1.3	0.379 -1.6	0.367 -1.6	0.378 -1.8	0.384 -2.0	0.290 -2.4				
2			0.303 -3.8	0.657 -3.7	0.983 -0.7	1.197 -1.2	1.078 -1.3	1.037 -1.3	1.075 -1.4	1.197 -1.4	0.978 -1.7	0.670 -2.0	0.308 -2.2		
3		0.307 -2.5	0.861 -2.7	1.169 -3.5	1.162 -0.7	1.205 -0.7	1.170 -1.2	1.105 -1.3	1.165 -1.2	1.207 -0.8	1.163 -1.4	1.190 -2.1	0.866 -2.1	0.308 -2.2	
4		0.670 -2.0	1.186 -2.4	1.258 -1.5	1.177 0.4	1.156 0.5	1.130 -1.2	1.168 -0.5	1.140 -0.5	1.162 0.7	1.177 -0.4	1.279 0.2	1.197 -1.2	0.677 -0.7	
5	0.293 -1.3	0.982 -1.3	1.164 -1.4	1.173 -0.8	1.246 1.1	1.267 1.4	1.232 1.0	1.188 0.7	1.237 0.7	1.273 1.4	1.251 1.5	1.186 1.2	1.168 -0.2	0.988 -0.2	0.294 -1.3
6	0.387 -1.3	1.209 -0.4	1.231 1.2	1.166 1.0	1.275 1.6	1.282 1.7	1.286 2.5	1.269 2.1	1.288 2.3	1.285 2.0	1.280 2.4	1.155 0.4	1.206 -0.6	1.205 -0.6	0.387 -1.3
7	0.381 -1.0	1.081 -0.8	1.182 0.3	1.156 0.9	1.255 2.1	1.286 2.1	1.222 2.2	1.280 2.2	1.236 3.3	1.301 3.7	1.251 2.5	1.141 -0.3	1.179 -0.4	1.086 -0.5	0.383 -0.5
8	0.370 -0.8	1.038 -1.2	1.114 -0.4	1.184 0.9	1.206 2.2	1.268 2.0	1.276 1.8	1.156 2.4	1.298 3.6	1.282 3.1	1.208 2.4	1.177 0.3	1.118 -0.1	1.048 -0.3	0.373 0.0
9	0.380 -1.3	1.078 -1.3	1.166 -1.5	1.150 0.5	1.239 1.6	1.276 1.7	1.216 1.7	1.281 2.2	1.240 3.7	1.297 3.0	1.258 2.4	1.162 1.4	1.192 1.1	1.088 -0.2	0.384 -0.3
10	0.382 -2.6	1.182 -2.5	1.197 -1.3	1.152 0.2	1.253 0.2	1.270 0.8	1.280 1.7	1.269 2.1	1.284 2.3	1.283 1.8	1.280 2.0	1.178 2.1	1.260 3.5	1.201 -1.1	0.388 -1.0
11	0.287 -3.7	0.953 -3.7	1.163 -0.6	1.173 0.1	1.234 0.2	1.265 0.8	1.245 1.3	1.196 1.4	1.233 1.1	1.261 0.9	1.246 1.1	1.197 1.3	1.198 1.5	0.983 -1.2	0.293 -1.3
12		0.662 -2.9	1.183 -2.3	1.255 -1.7	1.172 -0.8	1.147 -0.6	1.145 -0.1	1.174 0.0	1.145 0.1	1.160 0.9	1.174 0.2	1.279 0.2	1.200 -1.2	0.673 -1.6	
13		0.306 -2.9	0.861 -2.7	1.182 -2.7	1.167 -1.1	1.207 -0.8	1.170 -0.8	1.111 -0.7	1.169 -1.3	1.201 -1.0	1.155 -1.3	1.207 -0.3	0.877 -0.9	0.308 -2.2	
14			0.306 -2.9	0.664 -2.9	0.963 -3.2	1.186 -2.3	1.075 -1.4	1.037 -1.3	1.069 -2.1	1.177 -2.9	0.974 -1.6	0.680 -0.3	0.311 -1.3		
15					0.285 -4.0	0.383 -2.3	0.381 -1.0	0.369 -1.1	0.376 -2.3	0.380 -3.1	0.293 -1.7				

Measured Power
% Difference (M-P)/P

Measured Location