

JUN 26 1984

Docket File
DCS MS-016

Docket No. 50-336

Licensee: Northeast Nuclear Energy Company

Facility: Millstone Nuclear Power Station, Unit 2

SUBJECT: SUMMARY OF MEETING WITH NORTHEAST NUCLEAR ENERGY
COMPANY ON FUEL FAILURES AND CORE PERFORMANCE
CALCULATIONS FOR MILLSTONE UNIT 2

A meeting was held with Northeast Nuclear Energy Company (NNECo) on June 13, 1984.

The purpose of the meeting was to keep the staff informed of NNECo's efforts to understand the root cause of fuel failures and to discuss the calculational techniques used in core performance calculations.

Background

Millstone Unit 2 is currently in Cycle 6 operation which began in January 1984. The prior cycle saw coolant iodine levels between 2 to 5% of the Technical Specification limit of 1 Ci/gram Dose Equivalent I-131. Because Cycle 5 had iodine levels that were an order of magnitude greater than prior cycles, NNECo established a fuel pin failure investigation program, which included fuel assembly sipping, visual examinations, ultrasonic examinations, a review of plant operating history and a review of manufacturers' records.

During the outage between Cycles 5 and 6, NNECo identified 26 out of 217 fuel assemblies as containing leakers. Of the 26 assemblies, 16 came from Batch G which was fresh fuel at the beginning of Cycle 5 and was manufactured by Westinghouse. With one exception, all 26 fuel assemblies were removed from the core for Cycle 6 operation.

Handouts provided at the meeting are attached, along with a listing of meeting attendees (Enclosure 1).

Summary of Presentation

The current Cycle 6 coolant iodine levels are between 10 to 20% of the Technical Specification limit. To compare with prior cycles, some adjustment is necessary since Cycle 6 is operating with only one charging pump which provides make-up flow of around 40 gpm. All other cycles had double the make-up flow. Cycle 6 coolant iodine levels would be between 5 to 10% of Technical Specification limits if both charging pumps were operating. With this activity level, NNECo expects the same magnitude of fuel failures as seen for Cycle 5.

The failures are occurring within a 10 to 40 day time frame from the start of a cycle. Both Cycles 5 and 6 show a sharp rise in iodine activity level over this time frame with a subsequent leveling off of activity.

From the evidence examined, NNECo suspects that the failures are debris related. There was a high frequency of "non-metallic" debris sitings, but the source of the debris is unknown. The locations of the failed pins within an assembly show a preference for the outer 2 rows, although no significance was attached to this.

A presentation was also made concerning methods used to predict core performance parameters and the identification of potential areas for improvement for Cycle 7 analysis. The details of this can be found in the handouts, along with details on the leakage investigations.

Conclusions

The next outage is scheduled for mid-February 1985, at which time the entire core will be sipped. For Cycle 7 operation, NNECo plans on removing as many failed fuel assemblies as possible. It was emphasized that pressure will be exerted to remove all failed fuel assemblies from operation. NNECo also plans on replacing the leaking pins in the failed assemblies for re-insertion into the core. They will keep the staff advised of methods to be used even though the change may fall under 10 CFR 50.59 which does not require prior Commission approval.

Future plans include continued investigation into the high rate of Batch G failures.

Original signed by:

D. B. Osborne, Project Manager
Operating Reactors Branch #3
Division of Licensing

Enclosure:
As stated

ORB#3:DL
PKreutzer
6/2/84
22

ORB#3:DL
D Osborne:dd
6/26/84

ORB#3:DL
JRMiller
6/ /84
26

List of Attendees

Nuclear Regulatory Commission

Dee Osborne	DL/ORB#3
Ken Heitner	DL/ORB#3
Les Rubenstein	DSI/CPS
Larry Phillips	DSI/CPB
Richard Lobel	DSI/CPB
Marvin Dunnenfeld	DSI/CPB
Harry Balukjian	DSI/CPB
Bill Jones	IE/DEPER/EAB

Northeast Utilities

Mike Cass
Larry Clink
John Guerci

Westinghouse

Pat Docherty
Tom Nguyen
Gary Jacobs

NRC/NORTHEAST UTILITIES MEETING

JUNE 13, 1984

MILLSTONE UNIT NO. 2 FUEL PERFORMANCE AGENDA

INTRODUCTION	M. P. CASS
FUEL PERFORMANCE INVESTIGATIONS	L. J. CLINK
CYCLE 7 RELOAD ENGINEERING AND SCHEDULE	M. P. CASS
START-UP TESTING RESULTS	J. R. GUERCI
SUMMARY	J. R. GUERCI
	M. P. CASS

PURPOSE

- o PROVIDE INFORMATION ON CYCLE 5 FUEL LEAKAGE INVESTIGATIONS
- o REVIEW CYCLE 6 FUEL PERFORMANCE
- o DISCUSS CYCLE 7 LICENSING STRATEGY
- o START-UP TESTING RESULTS

BACKGROUND

2 charging
pumps
operation
80 gpm
make-up
flow

- o DURING CYCLE 5 COOLANT IODINE LEVELS EXPERIENCED WERE 2-5% OF TECHNICAL SPECIFICATIONS LIMIT OF $\leq 1 \mu\text{Ci}/\text{GM DE I-131}$

- o MET WITH NRC STAFF ON OCTOBER 12, 1983

- o MILLSTONE UNIT NO. 2 BEGAN CYCLE 6 OPERATION IN JANUARY, 1984

- o CYCLE 6 HAS EXPERIENCED SIMILAR IODINE LEVELS AS CYCLE 5

CYCLE 7 RELOAD STRATEGY

- o FINAL FUEL INVENTORY AVAILABLE DURING OUTAGE

- o MINIMIZE POTENTIAL TECHNICAL SPECIFICATION CHANGES

- o PERFORM SCOPING RELOAD ENGINEERING PRIOR TO OUTAGE

CYCLE 7 RELOAD SCHEDULE

- o SHUTDOWN SCHEDULED FOR FEBRUARY, 1985

- o FALL RELOAD LICENSING PACKAGE

- o 50.59 RELOAD SUBMITTAL (FIRST QUARTER, 1985)

- o NRC SUPPORT NECESSARY

SUMMARY

- o EVIDENCE POINTS TO DEBRIS FOR CYCLE 5 FUEL FAILURES
- o NO SAFETY CONCERNS IDENTIFIED
- o FULL CORE SIPPING AT END OF CYCLE 6 OPERATION
- o ADEQUATE FUEL INVENTORY AVATLABLE FOR CYCLE 7
- o PLAN 50.59 RELOAD PACKAGE PROVIDED DURING OUTAGE
- o NRC SUPPORT REQUESTED
- o ONGOING NU PROGRAM INVESTIGATING ROD WORTHS AND POWER DISTRIBUTION WILL MINIMIZE EFFECT UPON CYCLE 7.

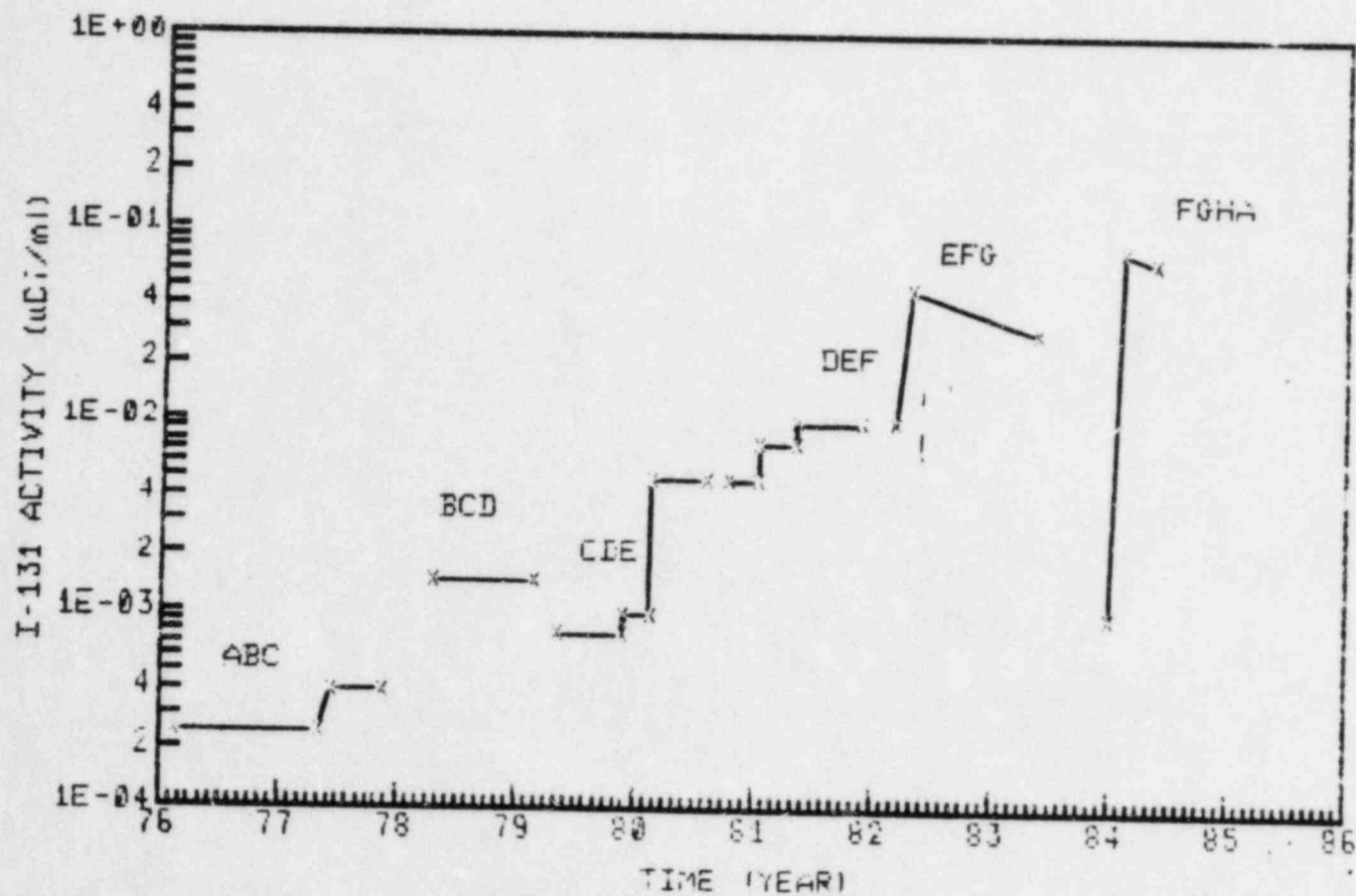
MILLSTONE UNIT 2 FUEL PERFORMANCE

- COOLANT ACTIVITY HISTORY
- CYCLE 5 FUEL FAILURE INVESTIGATION
- CYCLE 6 COOLANT ACTIVITY AND ANALYSIS
- CONCLUSIONS
- FUTURE PLANS

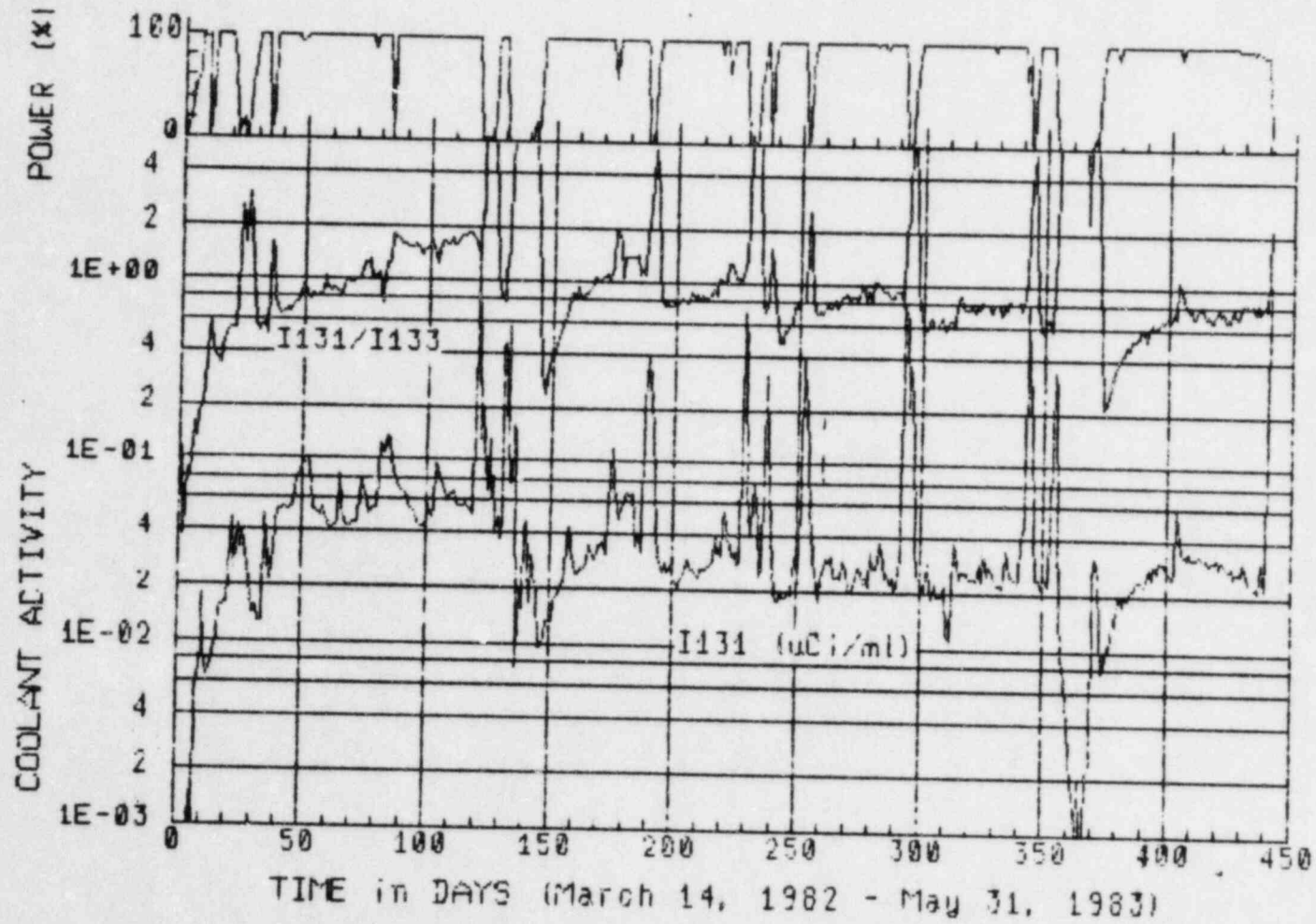
MILLSTONE UNIT 2

- ° NSSS SUPPLIER - COMBUSTION ENGINEERING
- ° LICENSED POWER LEVEL - 2700 MWT
- ° DATE OF COMMERCIAL OPERATION - DECEMBER, 1975
- ° PRESENT FUEL SUPPLIER - WESTINGHOUSE
- ° CORE CONFIGURATION
 - 217 FUEL ASSEMBLIES
 - 14 x 14 FUEL ROD ARRAY
- ° CYCLE 5 CORE
 - 144 WESTINGHOUSE FUEL ASSEMBLIES
 - 73 COMBUSTION ENGINEERING FUEL ASSEMBLIES
- ° FINISHED CYCLE 5 IN MAY, 1983
- ° CYCLE 6 CORE
 - 196 WESTINGHOUSE FUEL ASSEMBLIES
 - 21 COMBUSTION ENGINEERING FUEL ASSEMBLIES
- ° STARTED CYCLE 6 IN JANUARY, 1984

MILLSTONE II I-131 ACTIVITY
FROM INITIAL STARTUP



MILLSTONE II CYCLE 5 OPERATING DATA



MILLSTONE UNIT 2

END OF CYCLE 5 FUEL EXAMINATIONS

- INITIAL
 - FULL CORE SIPPING
 - DETAILED TV VISUALS ON ALL LEAKING ASSEMBLIES AND SOME ROD LIFTS

- PHASE I
 - APPROXIMATELY 100 ROD LIFTS
 - ROD SCRAPING
 - RETRIEVAL AND ANALYSIS OF DEBRIS
 - HIGH MAGNIFICATION TV VISUALS
 - PERISCOPE VISUALS

- PHASE 2
 - DETECTION OF LEAKING RODS WITH BROWN-BOVERI REAKTOR (BBR) ULTRASONIC DETECTION SYSTEM

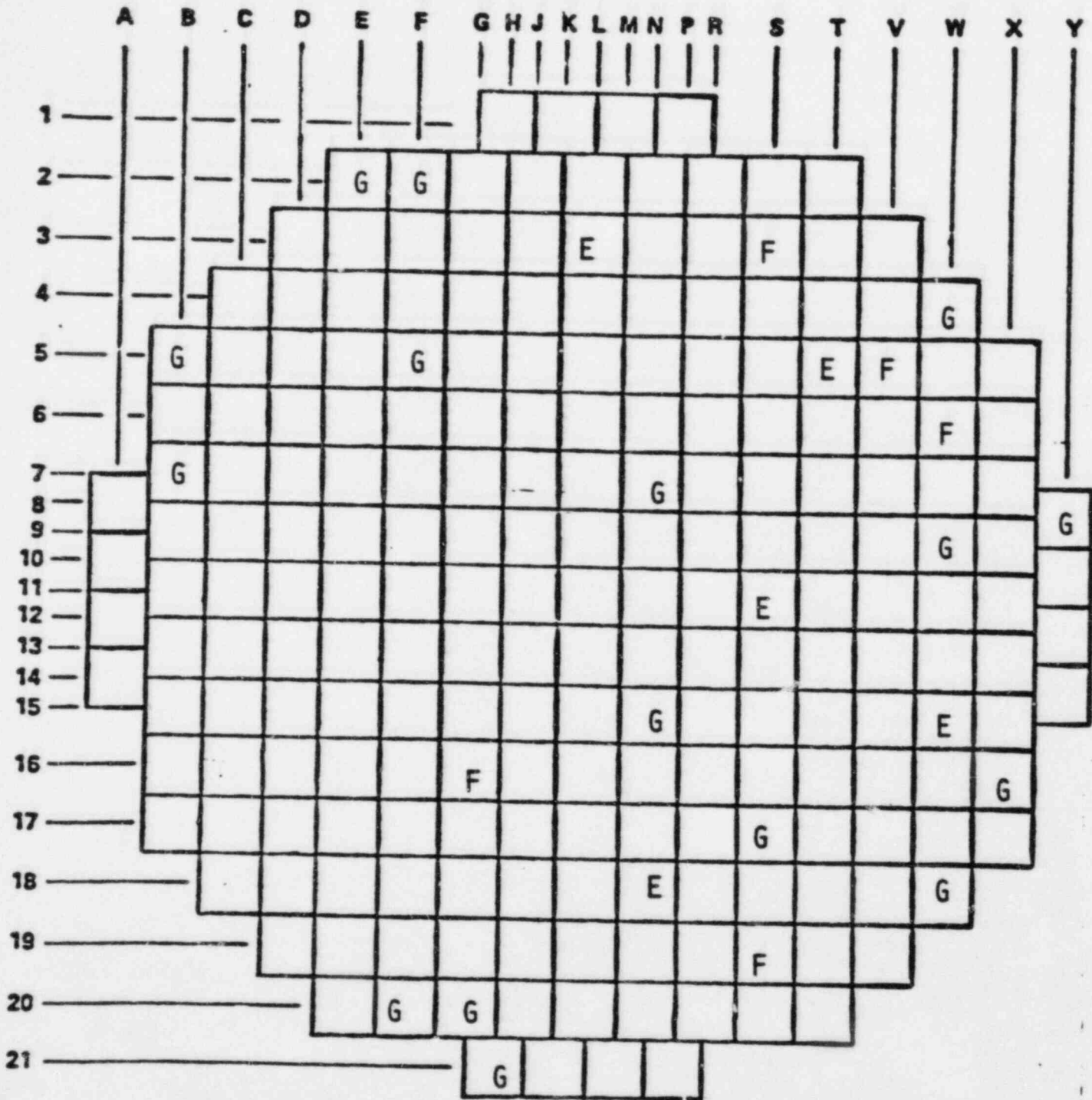
- PHASE 3
 - EXAMINATION OF FAILED FUEL RODS WITH SUPER HIGH MAGNIFICATION TV
 - ROD LIFTING AND DEPRESSING
 - ROTATION OF FIRST AND SECOND ROW RODS
 - REMOVAL OF END CAPS ON 2 FAILED RODS FOR METALLOGRAPHIC EXAMINATION

MILLSTONE UNIT 2 FUEL ASSEMBLY FAILURE SUMMARY

LEAKING ASSEMBLIES IDENTIFIED BY SIPPING AT EOC 5

- ° BATCH G - 16 OF 72
- ° BATCH F - 5 OF 72
- ° BATCH E - 5 OF 72
- ° BATCH B - 0 OF 1

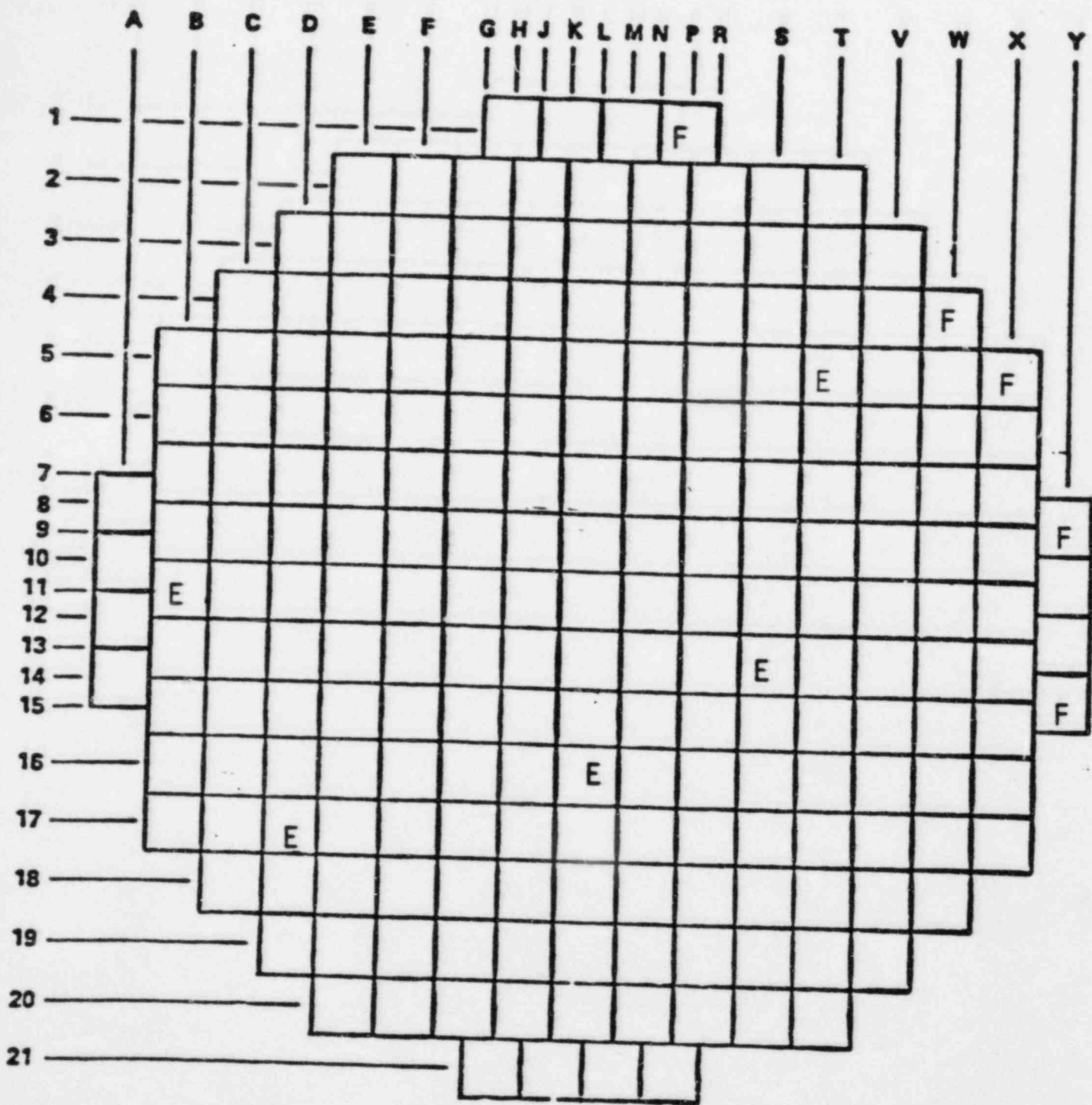
MILLSTONE UNIT 2
FUEL CYCLE 5



LEAKING FUEL ASSEMBLIES
 E - TWICE BURNED CE
 F - ONCE BURNED W
 G - FRESH W

MILLSTONE UNIT 2

FUEL CYCLE 4



LEAKING FUEL ASSEMBLIES
 BATCH F - FRESH FUEL (W)
 BATCH E - ONCE BURNED (CE)

RESULTS OF INITIAL AND PHASE I EXAMS

- HIGH FREQUENCY OF "NON-METALLIC" DEBRIS SITINGS
 - ELEMENTAL CONTENT CONSISTENT WITH OXIDIZED CARBON STEEL
- HIGH FREQUENCY OF "WHITE" PATCHES IN UPPER GIRTH WELD
 - SCRAPING INDICATES A VERY SHALLOW AND ADHERENT LAYER
- HIGH FREQUENCY OF "WHITE" PATCHES/DEPOSITS BEHIND GRIDS, SOME AT GRID SPRING CONTACT POINTS
 - SCRAPING INDICATES A VERY SHALLOW AND ADHERENT LAYER
- 1 GRID SPRING TO ROD FRETTING FAILURE
 - ROD LIFTS INDICATE THIS IS AN ISOLATED CASE
- MANY "WHITE" RINGS IN SEAL WELD REGION
- RODS GENERALLY HAVE A GOOD APPEARANCE; SMALL AMOUNT OF CRUD; NO EVIDENCE OF EXPOSED FUEL
- SOME HYDRIDE PATCHES AND BLISTERS

RESULTS OF PHASE 2 EXAMS

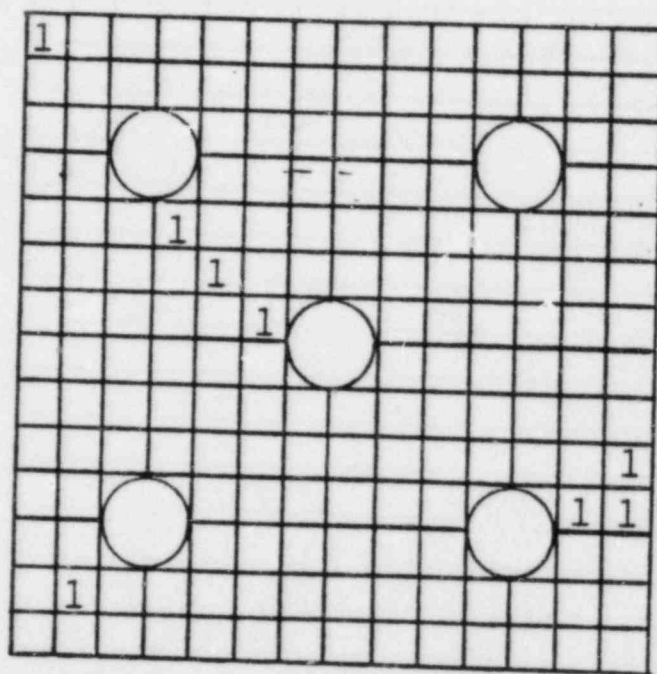
DISTRIBUTION OF FAILED FUEL RODS

<u>BATCH</u>	<u>TOTAL FAILED ASSEMBLIES</u>	<u>FAILED RODS</u>	<u>FAILED ASSEMBLIES</u>	<u>FAILED RODS PER ASSEMBLY</u>
E	5	5	5	1 (3 1ST ROW, 1 2ND ROD, 1 INTERIOR)
F	5	8	3	1 (3 INTERIOR)
			1	2 (1 1ST ROW, 1 2ND ROW)
			1	3 (2 1ST ROW, 1 2ND ROW; GROUP)
G	16	17	2	BBR INCONCLUSIVE
			11	1 (5 1ST ROW, 4 2ND ROW, 2 INTERIOR)
			3	2 (4 2ND ROW, 2 INTERIOR; 1 PAIR)

*NO CORRELATION IDENTIFIED ON LOCATION OF FAILED RODS (E.G., PERIPHERAL VS. INTERIOR; LOCATION RELATIVE TO WATER HOLES)

LOCATION OF FAILED FUEL RODS

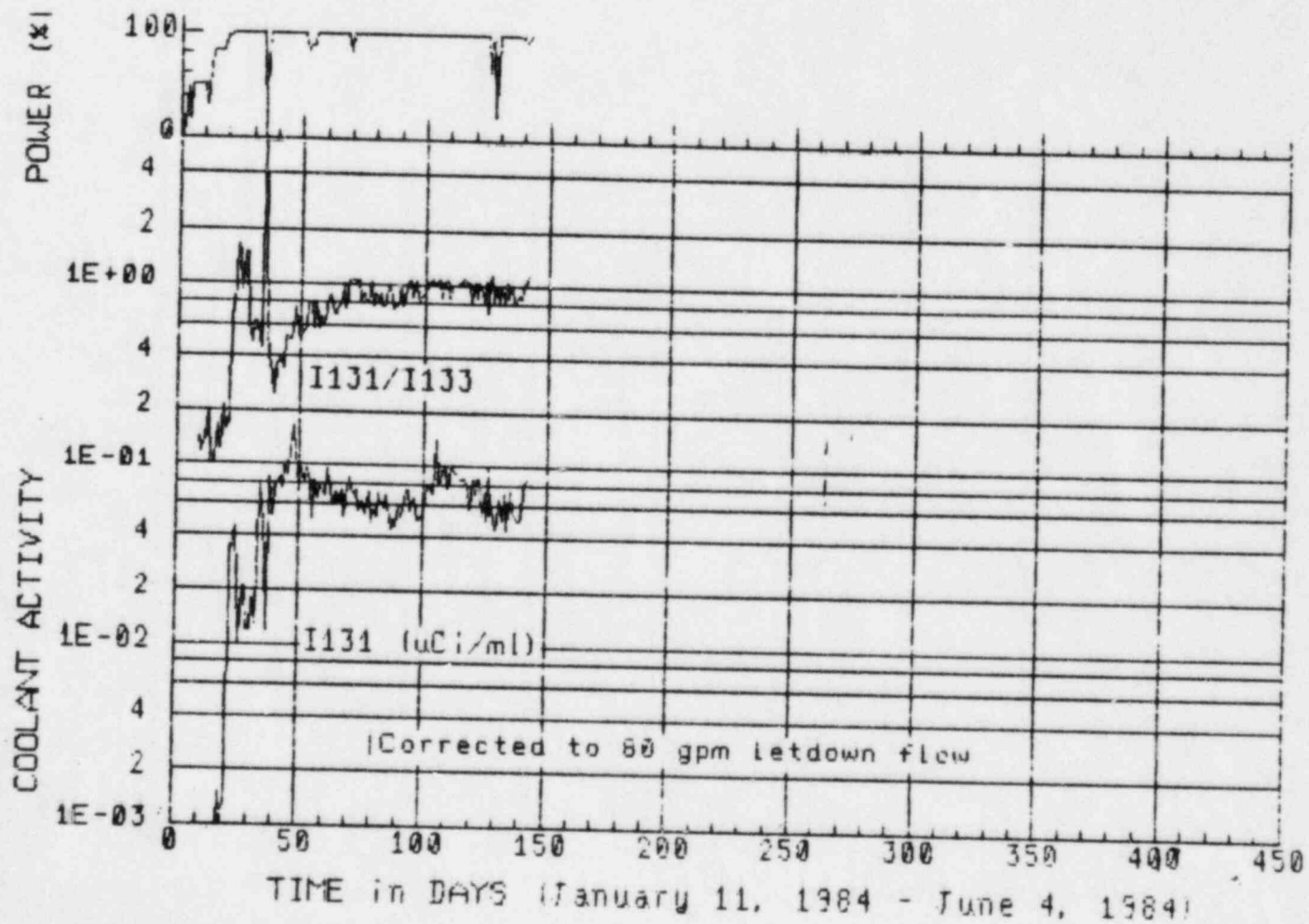
BATCH F



RESULTS OF PHASE 3 EXAMINATIONS

<u>ROW</u>	<u>NO. OF RODS</u>	<u>SIGNIFICANT OBSERVATIONS</u>
1	4	DEBRIS FRET HOLES
	1	GRID SPRING FRET HOLE
	2	NOTHING OBSERVED
	2	END CAPS REMOVED, BUT NOT YET EXAMINED
2	2	DEBRIS FRET HOLES
	1	DEBRIS UNDER 1st GRID; DEBRIS WEAR MARK ON ADJACENT ROD
	1	MISSING END CAP, DEBRIS WEAR MARK (2 ADJACENT RODS WITH DEBRIS FRET HOLES)
	2	DEBRIS WEAR MARKS
	1	DEBRIS WEAR MARK; PLUME AND BULGED IN HEAT AFFECTED ZONE
	1	NOTHING OBSERVED; POSSIBLE DEBRIS FRET HOLE IN ADJACENT ROD
	2	WELDS CRACKED AND BULGED IN HEAT AFFECTED ZONE
	1	NOTHING OBSERVED
INTERIOR	6	HIGH FREQUENCY OF REFLECTIVE RINGS AND PATCHES IN SEAL AND GIRTH WELD AREAS; THIS FEATURE ALSO OBSERVED IN 1st AND 2nd ROW RODS AND NON-FAILED RODS
1	1	NOT EXAMINED

MILLSTONE II CYCLE 6 OPERATING DATA



CYCLE 6 COOLANT ACTIVITY DATA

- TIMING OF RISE IN I-131 AND I RATIO SIMILAR TO CYCLE 5
- LEVEL OF I-131 SIMILAR TO CYCLE 5, SUGGESTING A SIMILAR NUMBER OF FAILURES
- MAGNITUDE OF I RATIO SIMILAR TO CYCLE 5, SUGGESTING SIMILAR DEFECT SIZES
- INSUFFICIENT CESIUM RATIO DATA TO DETERMINE BURNUP OF FAILED FUEL

CONCLUSIONS

- ° COOLANT IODINE LEVELS LOW RELATIVE TO TECH SPEC LIMITS
- ° DATA FROM CYCLES 5 AND 6 INDICATE FAILURES OCCUR EARLY AND ARE NOT PROGRESSIVE
- ° DOMINANT FAILURE MECHANISM DURING CYCLE 5 WAS DEBRIS FRETTING
- ° FAILURE MECHANISM AND BURNUP OF FAILED FUEL UNKNOWN FOR CYCLE 6
- ° NUMBER OF FUEL FAILURES IN CYCLE 6 APPEARS SIMILAR TO CYCLE 5

FUTURE PLANS

- ° INVESTIGATE PREFERENCE FOR FAILURES IN BATCH G
 - STATISTICAL DISTRIBUTION OF DEBRIS IN CORE
 - AUTOCLAVED VS. NON-AUTOCLAVED CLADDING WEAR RATES

- ° PURSUE POSSIBLE WELD DEFECT PROBLEM
 - METALLOGRAPHIC EXAMINATION OF 2 IRRADIATED END CAPS

- ° RE-EXAMINE MANUFACTURING RECORDS FOR INTERIOR RODS AND RODS WHICH ARE NOT CONFIRMED DEBRIS FAILURES
 - PELLET HYDROGEN
 - CLADDING LOTS
 - REWORK CODES
 - PELLET LOTS
 - NO SIGNIFICANT CORRELATIONS FOUND THUS FAR

- ° FULL CORE SIPPING AT END OF CYCLE 6

RELOAD STRATEGY

- MINIMIZE IMPACT OF FAILED FUEL UPON RELOAD ENGINEERING
- ENSURE ADEQUATE FUEL INVENTORY AVAILABLE
- RECONSTITUTION OF PRIOR FAILED FUEL

FUEL INVENTORY

CYCLE 7

PRESENTLY IN CORE

<u>REGION</u>	<u># CYCLES DEPLETED</u>	<u># ASSEMBLIES</u>
H	1	88
G	2	52

NEW FUEL

<u>REGION</u>	<u># ASSEMBLIES</u>
J	72

PRESENTLY IN FUEL POOL

<u>REGION</u>	<u># CYCLES DEPLETED</u>	<u># ASSEMBLIES</u>
A	1 (CYCLE 1)	24
G	1	5
G*	1	15
F	2	10
F*	2	6

*AVAILABLE THROUGH RECONSTITUTION

FUEL INVENTORY

TOTALS

<u>TYPE</u>	<u># OF ASSEMBLIES</u>	
	<u>AVAILABLE</u>	<u>TYPICAL INVENTORY*</u>
FRESH	72	72
ONCE BURNED	108	72
TWICE-BURNED (INCLUDES REGION A)	92	73
	<u>272</u>	<u>217</u>

*THIS REPRESENTS THE NUMBER OF ASSEMBLIES UNDER
EQUILIBRIUM LOADING CONDITIONS

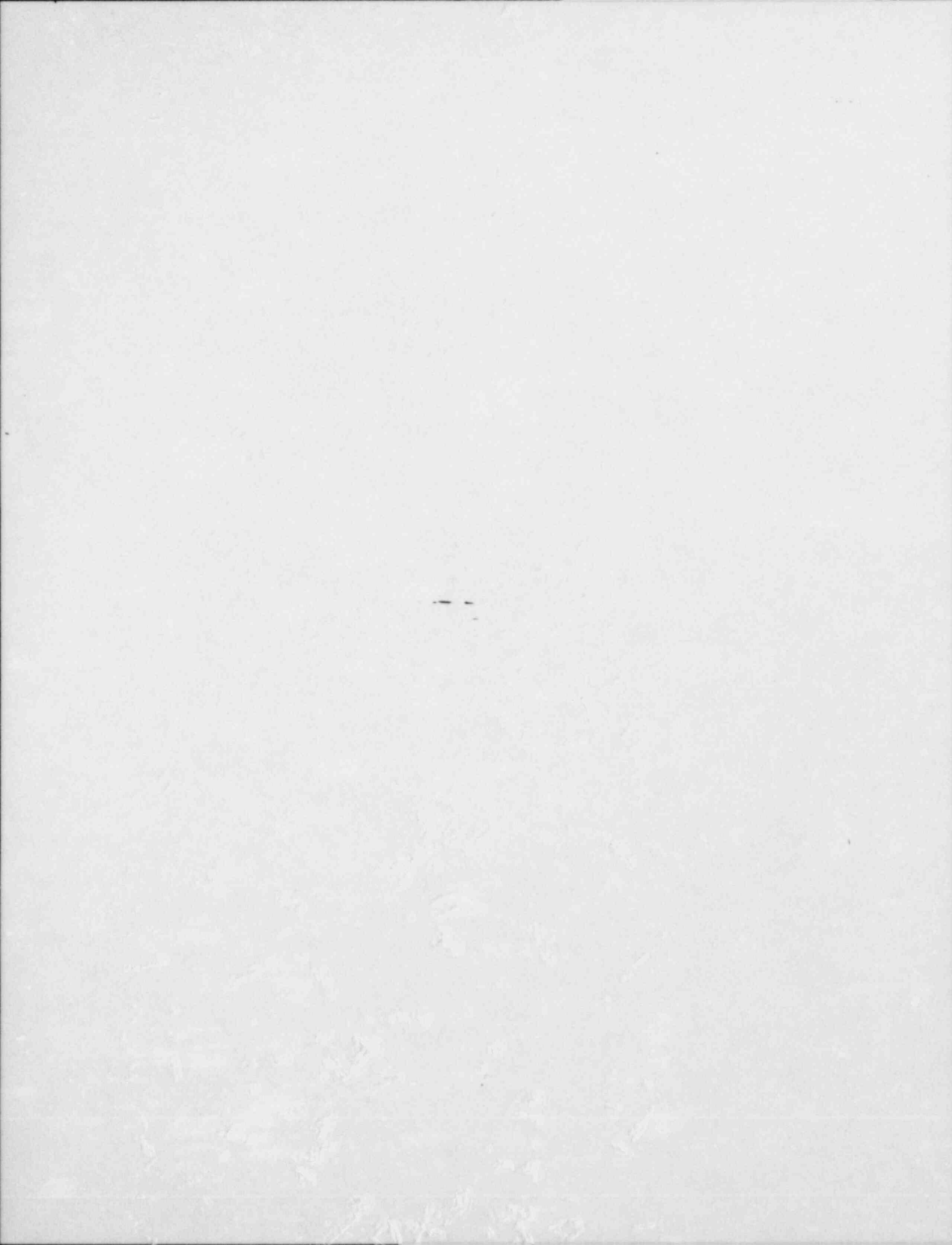
SCOPING ANALYSES

- IDENTIFY POSSIBLE LOADING PATTERNS
- EVALUATION OF KEY PHYSICS PARAMETERS
- IDENTIFICATION OF POTENTIAL CHANGES TO TECHNICAL SPECIFICATIONS

REACTOR PHYSICS EVALUATION

INDEPENDENT REVIEW OF PREDICTED PERFORMANCE

REVIEW OF MEASUREMENT TECHNIQUES



PURPOSE

- EVALUATION OF CEA BANK WORTH OUTSIDE OF ACCEPTANCE CRITERIA
- EVALUATION OF LARGER THAN EXPECTED FXY
- IDENTIFY POTENTIAL AREAS OF IMPROVEMENT (EITHER ANALYTICAL OR MEASUREMENT RELATED)
- GAIN UNDERSTANDING TO MINIMIZE EFFECTS ON CYCLE 7

CYCLE 6 HISTORY

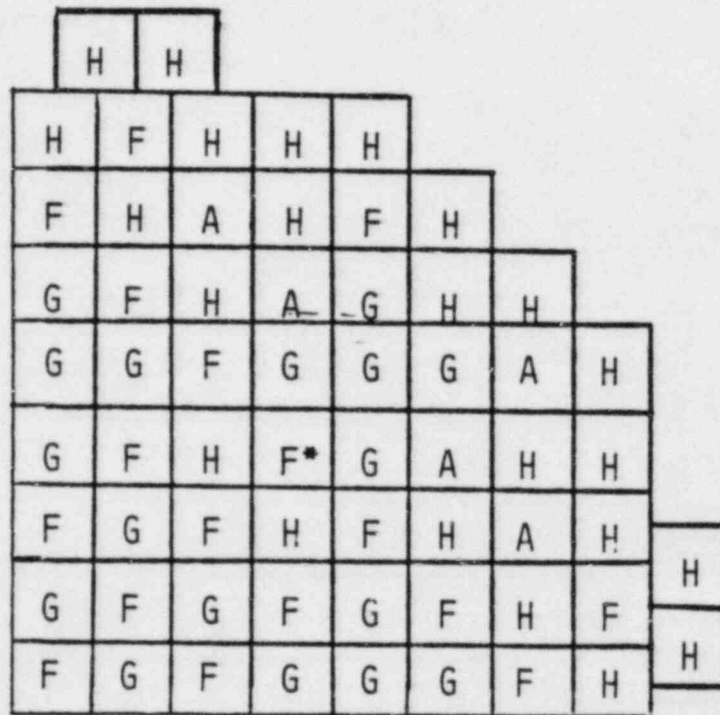
- PREMATURELY DISCHARGED FUEL
- UNUSUAL FUEL INVENTORY
- SLIGHTLY ASYMMETRIC CORE LOADING
- NON-TYPICAL POWER DISTRIBUTION

- required
to use Batch A
fuel (20)

MILLSTONE UNIT 2

CYCLE 6

FUEL LOADING



<u>REGION</u>	<u># CYCLES BURNED</u>	<u># ASSEMBLIES</u>
A	1 (CYCLE 1)	20
F	2	56
G	1	52
H	0	88
*B	1 (CYCLE 1)	1

NU ANALYTICAL EFFORT

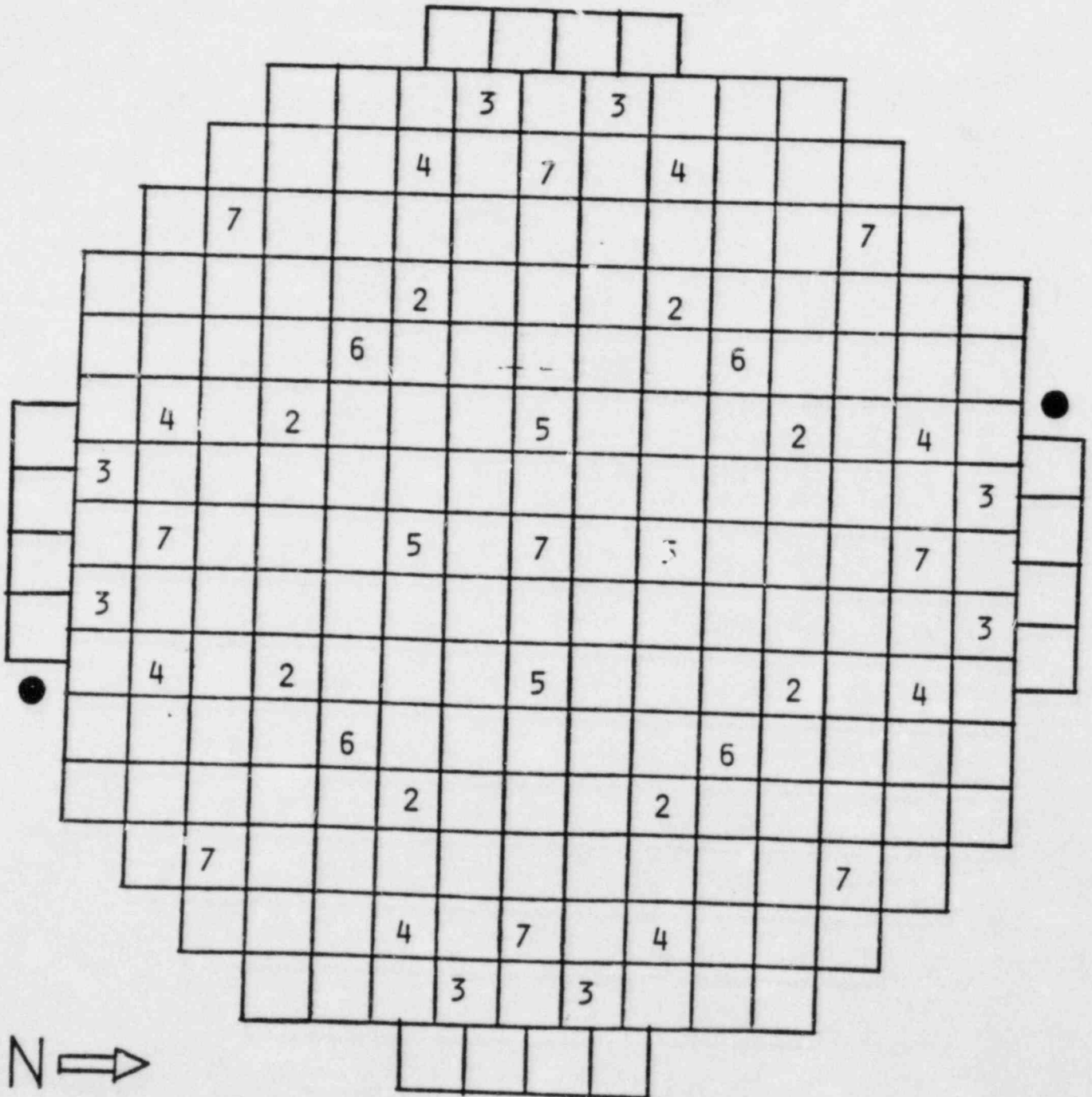
- INDEPENDENT PREDICTION OF CORE PERFORMANCE
- PREDICTIONS WERE GENERATED WITH 3-DIMENSIONAL, COARSE MESH ADVANCED NODAL CODE IN QUARTER CORE GEOMETRY
- USE OF WELL ESTABLISHED METHODS AND CYCLE SPECIFIC MODELING ASSUMPTIONS

ROD WORTHS

- CYCLE 6 ROD WORTH COMPARISONS SIMILAR TO PREVIOUS CYCLES (BANK 4 SLIGHTLY OUTSIDE OF ACCEPTANCE CRITERIA)
- BORON ENDPOINTS FOR INTEGRAL WORTH (CEA 7-2) PROVIDE SAME AGREEMENT AS PREVIOUSLY OBSERVED
- NU MODELING OF HIGHER ORDER ISOTOPE DECAY YIELDS IMPROVEMENT IN THE WORTHS OF CEA BANKS 4 AND 5 (TOTAL INTEGRAL WORTH REMAINS THE SAME)
- NU CALCULATIONS VERIFY ADEQUACY OF WESTINGHOUSE METHODS

MILLSTONE UNIT 2

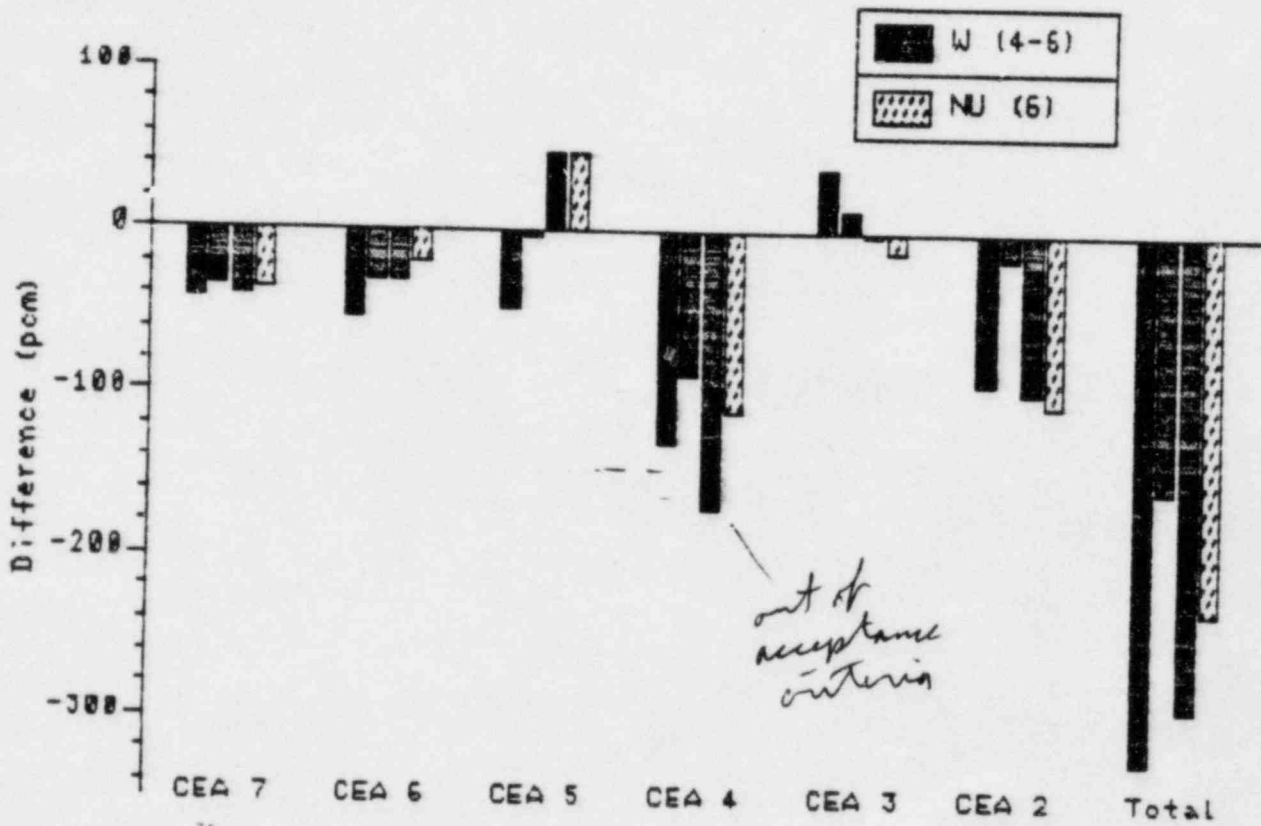
LOCATION OF CONTROL BANKS 7-2



N →

● EXCORE DETECTOR LOCATION

BOC- 4-6, HZP, BANK ROD WORTH COMPARISONS
 BETWEEN VENDOR PREDICTIONS AND MP2 MEASUREMENTS



ROD WORTH AND BORON
ENDPOINT COMPARISONS

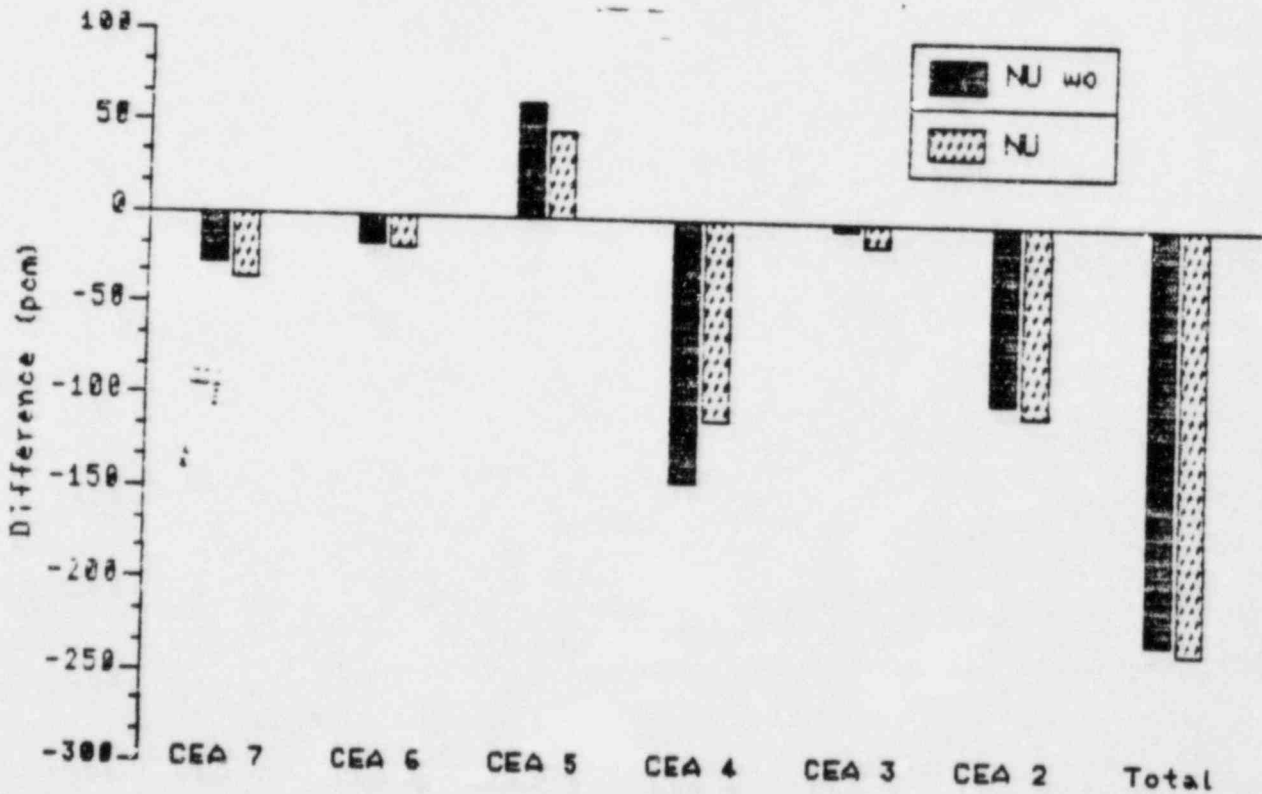
<u>CYCLE 4</u>						
	<u>W</u>		<u>MEASURED</u>	<u>PERCENT DIFF.</u>		
INTEGRAL BANK WORTH (PCM)	4455*		4132*	- 7.3		
DELTA BORON (PPM)	416		402	- 3.4		
<u>CYCLE 5</u>						
	<u>W</u>		<u>MEASURED</u>	<u>PERCENT DIFF.</u>		
INTEGRAL BANK WORTH (PCM)	4030		3873	- 3.9		
DELTA BORON (PPM)	384		366	- 4.7		
<u>CYCLE 6</u>						
	<u>W</u>	<u>NU</u>	<u>MEASURED</u>	<u>PERCENT DIFF.</u>		
				<u>W</u>	<u>NU</u>	
INTEGRAL BANK WORTH (PCM)	4061	4002	3770	- 7.2	- 5.8	
DELTA BORON (PPM)	380	386	364	- 4.2	- 5.7	

* REEVALUATED RESULTS

**BOC-6, HZP, BANK ROD WORTH COMPARISONS
BETWEEN NU PREDICTIONS AND MP2 MEASUREMENTS
WITH AND WITHOUT PU-241 DECAY CORRECTIONS**

Bank	NU wo (pcm)	NU (pcm)	MP2 (pcm)	Diff. (pcm)	% Diff.	Diff. (pcm)	% Diff.
7	643	681	615	-28	-4.4	-36	-5.5
6	312	315	297	-15	-4.8	-18	-5.7
5	263	277	325	62	23.6	48	17.3
4	1054	1020	910	-144	-13.7	-110	-10.8
3	616	624	612	-4	-.6	-12	-1.9
2	1108	1115	1011	-97	-8.8	-104	-9.3
Tot.	3996	4002	3770	-226	-5.7	-232	-5.8

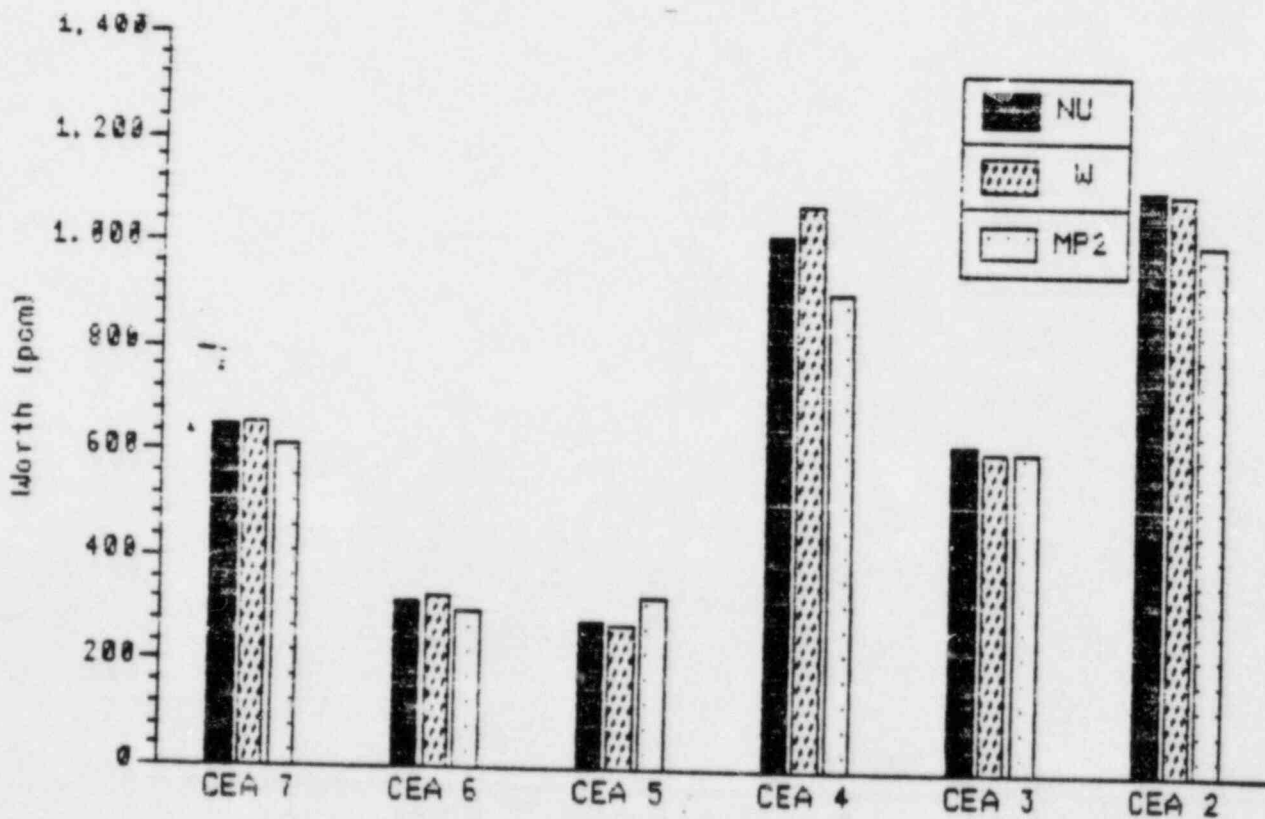
The individual bank acceptance criteria is either 100 pcm or 15 %.
The total bank acceptance criteria is 10 %.



**BOC-6, HZP, BANK ROD WORTH COMPARISONS
BETWEEN NU PREDICTIONS AND MP2 MEASUREMENTS
WITH AND WITHOUT PU-241 DECAY CORRECTIONS**

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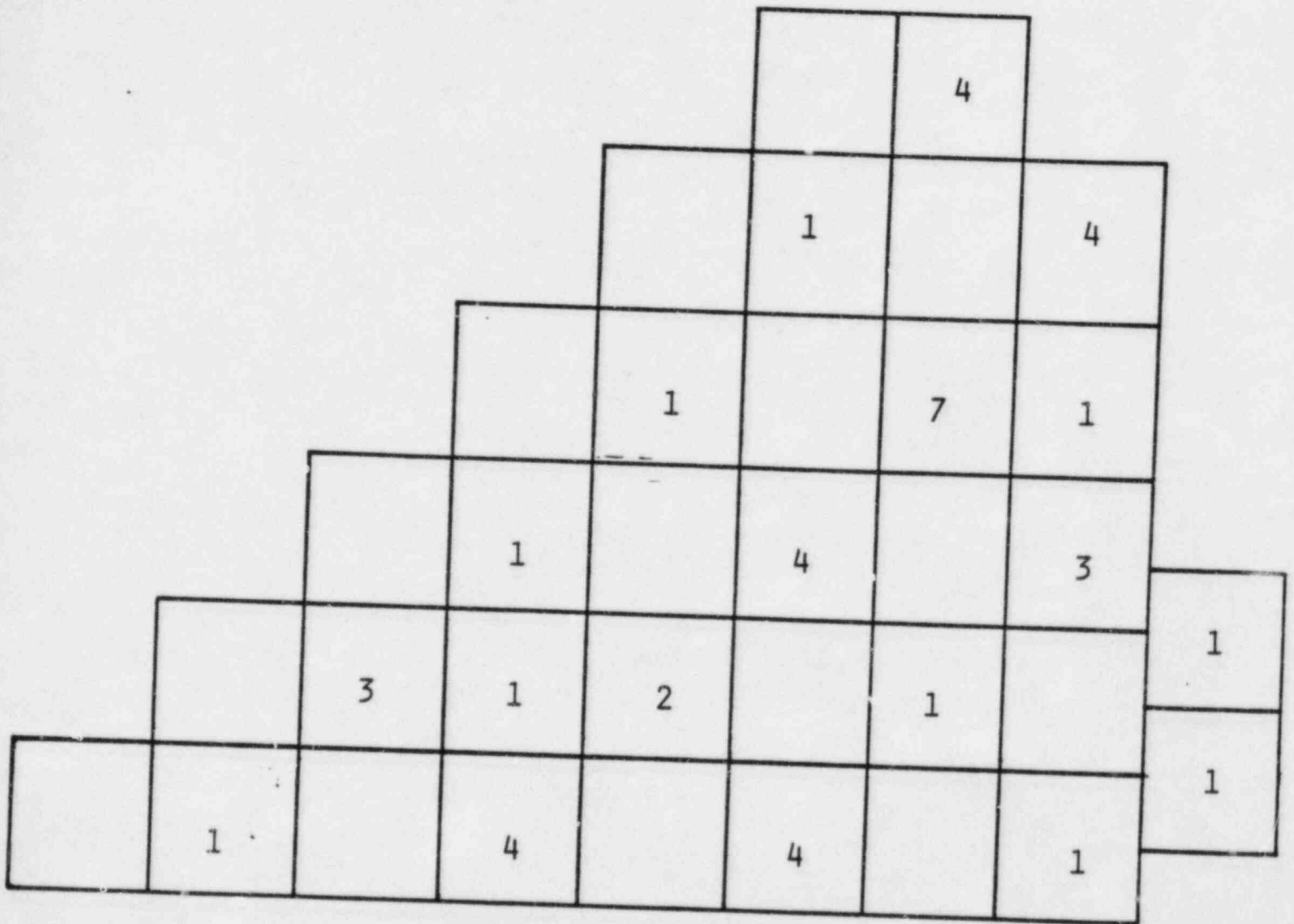


POWER DISTRIBUTIONS

- NON-SYMMETRIC POWER DISTRIBUTIONS DUE TO REMOVAL OF FAILED FUEL
- DISCREPANCY IN F_{xy} LARGER THAN EXPECTED
- REVIEW OF INSTRUMENTATION SYSTEM-INCORE DETECTOR LAYOUT AND EFFECT OF FAILED DETECTOR SEGMENTS
- NU ANALYTICAL EFFORT TO ADDRESS POWER DISTRIBUTIONS

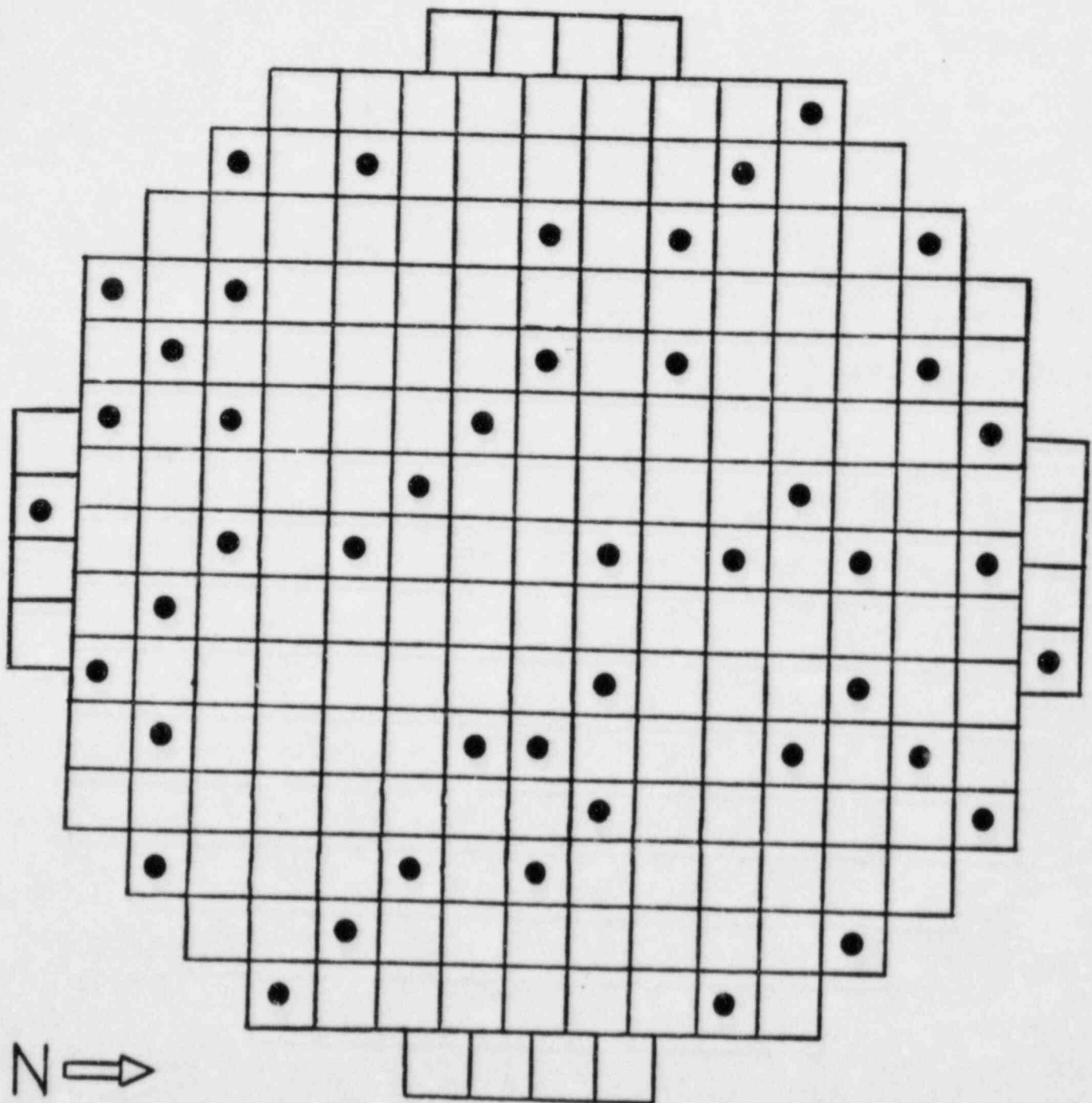
MILLSTONE UNIT 2 OCTANT

X - NUMBER OF INSTRUMENTS
IN OCTANT LOCATION



INCORE INSTRUMENTATION LOCATIONS

MILLSTONE UNIT 2
INCORE INSTRUMENTATION LAYOUT



POWER DISTRIBUTION ANALYTICAL EFFORT

- OBSERVED DISCREPANCY IN POWER DISTRIBUTION HAS IMPROVED WITH CORE BURNUP
- NU MODELING OF HIGHER ORDER ISOTOPE DECAY YIELDS SMALL SHIFT IN POWER TO CENTRAL CORE DESIGN
- POWER DISTRIBUTIONS INDICATE SIMILAR BEHAVIOR BETWEEN TWO METHODS

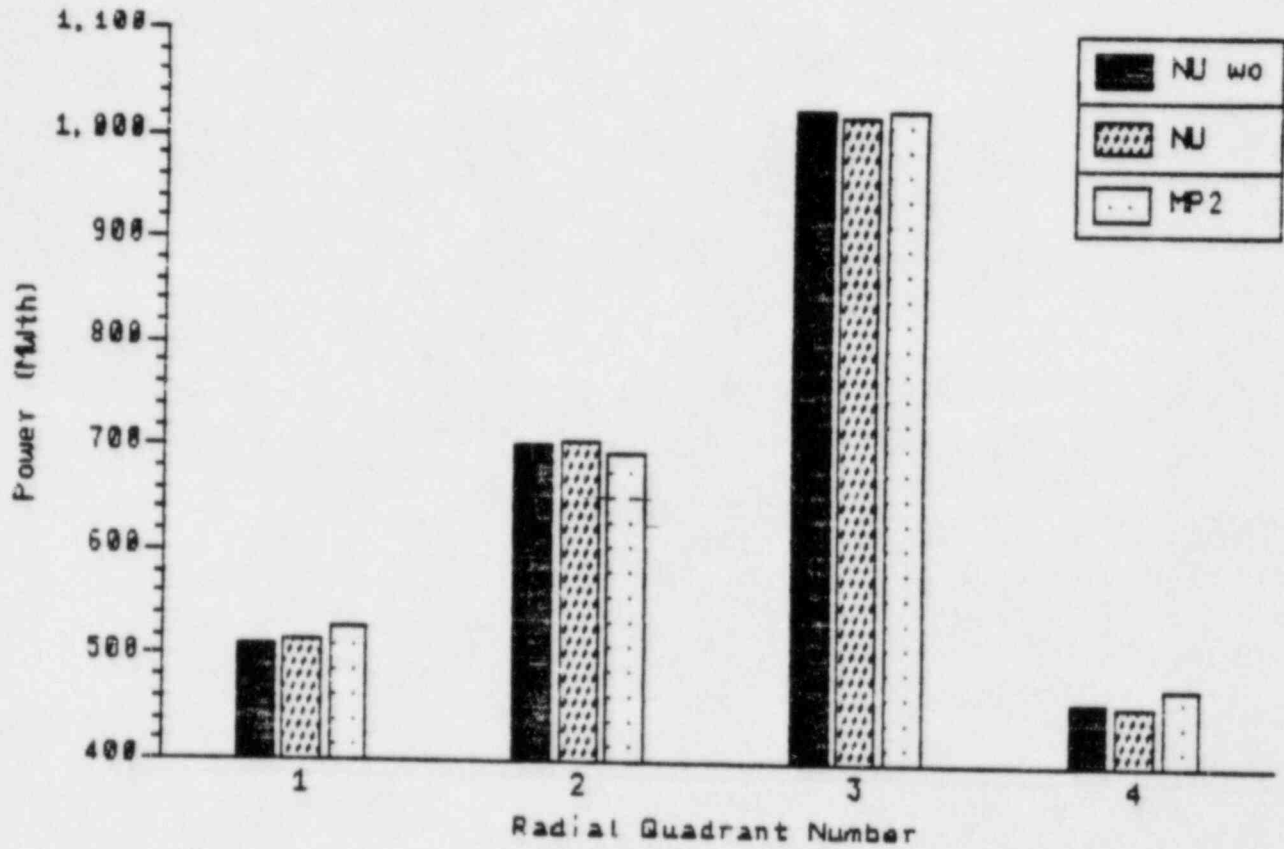
MILLSTONE UNIT 2

QUADRANT RADIAL POWER ZONES

ZONES 1 THROUGH 4

		4	4						
3	3	4	4	4					
3	3	3	3	3	4				
2	2	3	3	3	3	4			
2	2	2	2	3	3	3	4		
1	1	2	2	2	3	3	4		
1	1	1	2	2	3	3	4	4	
1	1	1	1	2	2	3	3	4	
1	1	1	1	2	2	3	3	4	

BOC-6, HFP, 500 MWD/MT RADIAL QUADRANT
POWER DISTRIBUTION COMPARISON BETWEEN PREDICTIONS
AND MEASUREMENTS



ON-GOING INVESTIGATION

ANALYTICAL

- ° EVALUATION OF BATCH A FUEL CHARACTERISTICS
- ° CONTINUING REVIEW OF SPECIFIC MILLSTONE UNIT 2 MODELING INPUTS

ON-GOING INVESTIGATIONS

INSTRUMENTATION SYSTEMS

- RECOGNIZE DISTRIBUTION OF INCORE DETECTOR LAYOUT
IN CENTRAL CORE REGION
- EVALUATE ROD WORTH MEASUREMENT TECHNIQUE FOR
SLIGHTLY ASYMMETRIC CORE

SUMMARY

- NU SPENT CONSIDERABLE RESOURCES TO INDEPENDENTLY INVESTIGATE ROD WORTHS AND POWER DISTRIBUTIONS FOR CYCLE 6
- INDEPENDENT RESULTS CONFIRM ADEQUACY OF WESTINGHOUSE ANALYTICAL METHODS FOR MILLSTONE UNIT 2
- OBSERVED DISCREPANCIES MAY BE DUE TO A NUMBER OF SMALL EFFECTS
- ON-GOING PROGRAM HAS RESULTED IN A PARTIAL UNDERSTANDING OF OBSERVATIONS
- ON-GOING PROGRAM WILL MINIMIZE EFFECT UPON CYCLE 7

MEETING SUMMARY DISTRIBUTION

Licensee: Northeast Nuclear Energy Company

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Docket File
NRC PDR
L PDR
ORB#3 Rdg
ORB#3 Summary File
JRMiller
PMKreutzer
Project Manager
OELD
ELJordan
JMTaylor
ACRS-10
NRC Participants