MAR 07 1983

Docket Nos. 50-295
and 50-304

LICENSEE: Commonwealth Edison Company (CECo)

FACILITY: Zion Station, Unit Nos. 1 and 2

SUBJECT: MEETING SUMMARY - CECo PWR FUEL MANAGEMENT PROGRAM

The licensee met with the staff on February 28, 1983 to discuss the PWR neutronic methodology program proposed for use in fuel reload reviews. The licensee is seeking approval to perform the neutronics calculations in-house and, for now, to have Westinghouse continue the accident and transients analyses. The list of attendees is enclosed.

The licensee's neutronic methodology program will be formally submitted as a topical report. The meeting involved consideration for the Zion Station since it will be the first application of the licensees program.

The licensee's presentation was made from the enclosed set of viewgraphs. The discussions on adequacy of topical report content centered on the need for CECo to be more explicit on their rejection criteria for verification data. In addition, the staff would like to see more tables of data, flux map comparisons, and power distribution charts to show comparison of CECo and Westinghouse results. Overall, the licensee effort appears to be adequate.

ORIGINAL SIGNED

D. L. Wigginton, Project Manager
Operating Reactors Branch #1
Division of Licensing

Enclosures:
1. List of Attendees
2. Viewgraphs

cc w/enclosures:
See next page

OFFICE	ORB#1:DL	ORB#1:DL					
SURNAME	DWigginton	SVarga					
DATE	03/7/83:dm	03/7/83					

MEETING SUMMARY DISTRIBUTION
OPERATING REACTORS BRANCH NO. 1

Docket/Central File
NRC PDR
L PDR
NSIC
ORB#1 Rdg
J. Heltemes, AEOD
B. Grimes (Emergency Preparedness)
S. Varga
Project Manager
OELD
E. L. Jordan, DEQA:IE
J. M. Taylor, DRP:IE
ACRS-10
NRC Participants

cc: Licensee w/short cc list

Mr. D. L. Farrar
Commonwealth Edison Company

cc: Robert J. Vollen, Esquire
109 North Dearborn Street
Chicago, Illinois 60602

Dr. Cecil Lue-Hing
Director of Research and Development
Metropolitan Sanitary District
of Greater Chicago
100 East Erie Street
Chicago, Illinois 60611

Mr. Phillip P. Steptoe
Isham, Lincoln and Beale
Counselors at Law
Three First National Plaza
51st Floor
Chicago, Illinois 60602

Susan N. Sekuler, Esquire
Assistant Attorney General
Environmental Control Division
188 West Randolph Street, Suite 2315
Chicago, Illinois 60601

U. S. Nuclear Regulatory Commission
Resident Inspectors Office
105 Shiloh Blvd.
Zion, Illinois 60099

James P. Keppler
Regional Administrator - Region III
U. S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137

ENCLOSURE 1

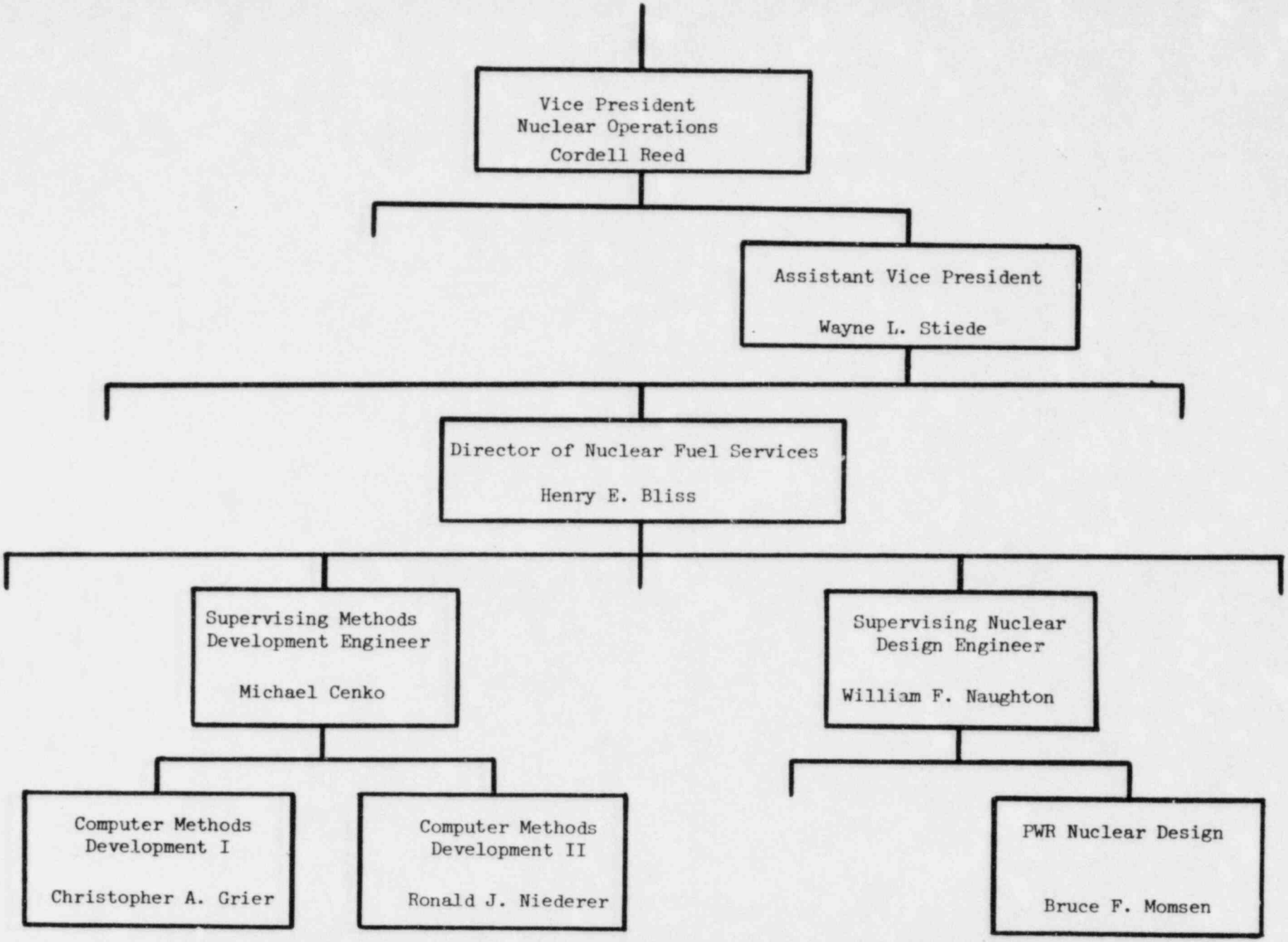
MEETING ATTENDEES

ZION FUEL MANAGEMENT

FEBRUARY 28, 1983

NAME	ORGANIZATION
D. Wigginton	NRC/ORB#1
R. Niederer	CECo - NFS
L. Lois	NRC/NRR/CPB
D. Farrar	CECo - Nuclear Licensing
F. Lentine	CECo - Nuclear Licensing
M. Cenko	CECo - NFS
L. Kopp	NRC/CPB
W. L. Brooks	NRC/CPB
B. F. Momsen	CECo - NFS
C. Grier	CECo - NFS
W. F. Naughton	CECo - NFS

ENCLOSURE 2


Vice President
Nuclear Operations
Cordell Reed
Assistant Vice President
Wayne L. Stiede
Director of Nuclear Fuel Services
Henry E. Bliss
Supervising Methods
Development Engineer
Michael Cenko
Supervising Nuclear
Design Engineer
William F. Naughton
Computer Methods
Development I
Christopher A. Grier
Computer Methods
Development II
Ronald J. Niederer
PWR Nuclear Design
Bruce F. Momsen

SCHEDULE FOR IMPLEMENTATION
OF
CECO PWR FUEL MANAGEMENT PROGRAM

EVENT	ORIGINAL DATE	REVISED DATE
CECO MEETS WITH NRC TO DISCUSS FUEL MANAGEMENT PLANS AND TOPICAL REPORT	5/81	-
CECO DESIGN TASKS COMMENCE ON ZION 1 CYCLE 8	11/81	5/82
CECO SUMMARY PRESENTATION TO NRC OF TOPICAL+ RESULTS	3/82	1/83
CECO PWR METHODOLOGY TOPICAL SUBMITTED TO NRC FOR REVIEW	3/82	5/83
CECO TOPICAL REFERENCED IN CECO RELOAD "50.59" LETTER TO NRC FOR ZION 1, CYCLE 8	1/83	7/83
NRC APPROVAL OF CECO TOPICAL	4/83	10/83

+ SPECIFICALLY, PARAMETERS BENCHMARKED, RESULTS OF BENCHMARKING, AND STATISTICAL ANALYSES WILL BE PRESENTED.

MEETING OBJECTIVES

- OBTAIN
  - NRC FEEDBACK ON ACCEPTABILITY OF CECO PROGRAM

- DISCUSS
  - CECO APPROACH (MULTIDISCIPLINED TASK FORCE)
  - CONTENTS OF CECO TOPICAL REPORT (AGENDA)

UNIQUENESS OF CECO APPROACH

- EXTENSIVE USE OF WESTINGHOUSE
  - NEUTRONIC CODES
  - DESIGN PARTICIPATION TRAINING (7 PERSON-YEARS, 5 RELOAD DESIGNS)
  - FUEL MANAGEMENT METHODOLOGY (WCAP-9272)

MEETING AGENDA

AND

TOPICAL CONTENTS

AGENDA FOR MEETING PRESENTATIONS

1.0 INTRODUCTION AND OVERVIEW

2.0 DESCRIPTION OF PWR NEUTRONIC METHODS

- 2.1 BASIC NEUTRONIC COMPUTER CODES
- 2.2 DATA PROCESSING AND LINKAGE COMPUTER CODES
- 2.3 CALCULATIONAL OVERVIEW
- 2.4 SCOPE OF ANALYSES PERFORMED

3.0 & 4.0 VERIFICATION AND CALCULATIONAL ACCURACY OF PWR NEUTRONIC METHODS

- 3.1 INTRODUCTION
- 3.2 COMPARISONS INCLUDING UNCERTAINTIES WITH PLANT OPERATION AND PHYSICS TESTS
  - 3.2.1 CORE REACTIVITY
  - 3.2.2 POWER DISTRIBUTION
  - 3.2.3 CONTROL ROD WORTH
  - 3.2.4 MODERATOR TEMPERATURE COEFFICIENT
- 3.3 COMPARISON WITH CERTAIN VENDOR RESULTS

5.0 CONCLUSIONS AND SUMMARY

ID:0664N

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5.0 CONCLUSIONS AND SUMMARY

ID:0664N

TOPICAL SECTION 2.1

DESCRIPTION OF PWR NEUTRONIC METHODS

BASIC NEUTRONIC COMPUTER CODES

WESTINGHOUSE CODE NAME	CECO CODE NAME	DESCRIPTION
FIGHT-H	FIGHT-H	FUEL TEMPERATURE
LEOPARD/CINDER	0D	MACRO - AND MICROSCOPIC FEW-GROUP CROSS SECTIONS FISSION PRODUCT CROSS SECTIONS
TURTLE	2D, 3D	TWO AND THREE-DIMENSIONAL SPATIAL FEW-GROUP DIFFUSION THEORY
PANDA	1D	ONE-DIMENSIONAL (AXIAL) FEW-GROUP DIFFUSION THEORY
PALADON	2N, 3N	TWO AND THREE-DIMENSIONAL NODAL THEORY

RJN

2/18/83

TOPICAL SECTION 2.2

DESCRIPTION OF PWR NEUTRONIC METHODS

DATA PROCESSING AND LINKAGE COMPUTER CODES

1. DATA PROCESSING AND MANAGEMENT

* COMPUTER HARDWARE - IBM

* SOFTWARE - CECO FILE MANAGEMENT SYSTEM

- TAILORED TO OUR IBM APPLICATIONS

- SOPHISTICATED DATA SECURITY

ID:0715N

RJN

2/18/83

TOPICAL SECTION 2.2
DESCRIPTION OF NEUTRONIC METHODS
DATA PROCESSING AND LINKAGE COMPUTER CODES

2. LINKAGE COMPUTER CODES

NUCLEAR ANALYSIS MODULE EXECUTION SEQUENCER

NAMES

HIGHLIGHTS OF NAMES

* ELIMINATES EXTENSIVE MANUAL DATA MANIPULATION
* DATA VALIDATION
* DEFINES PWR NEUTRONICS METHODOLOGY
  - CALCULATION FLOW
  - CONFIGURATED NEUTRONIC CODES
  - MODEL DEFAULTS

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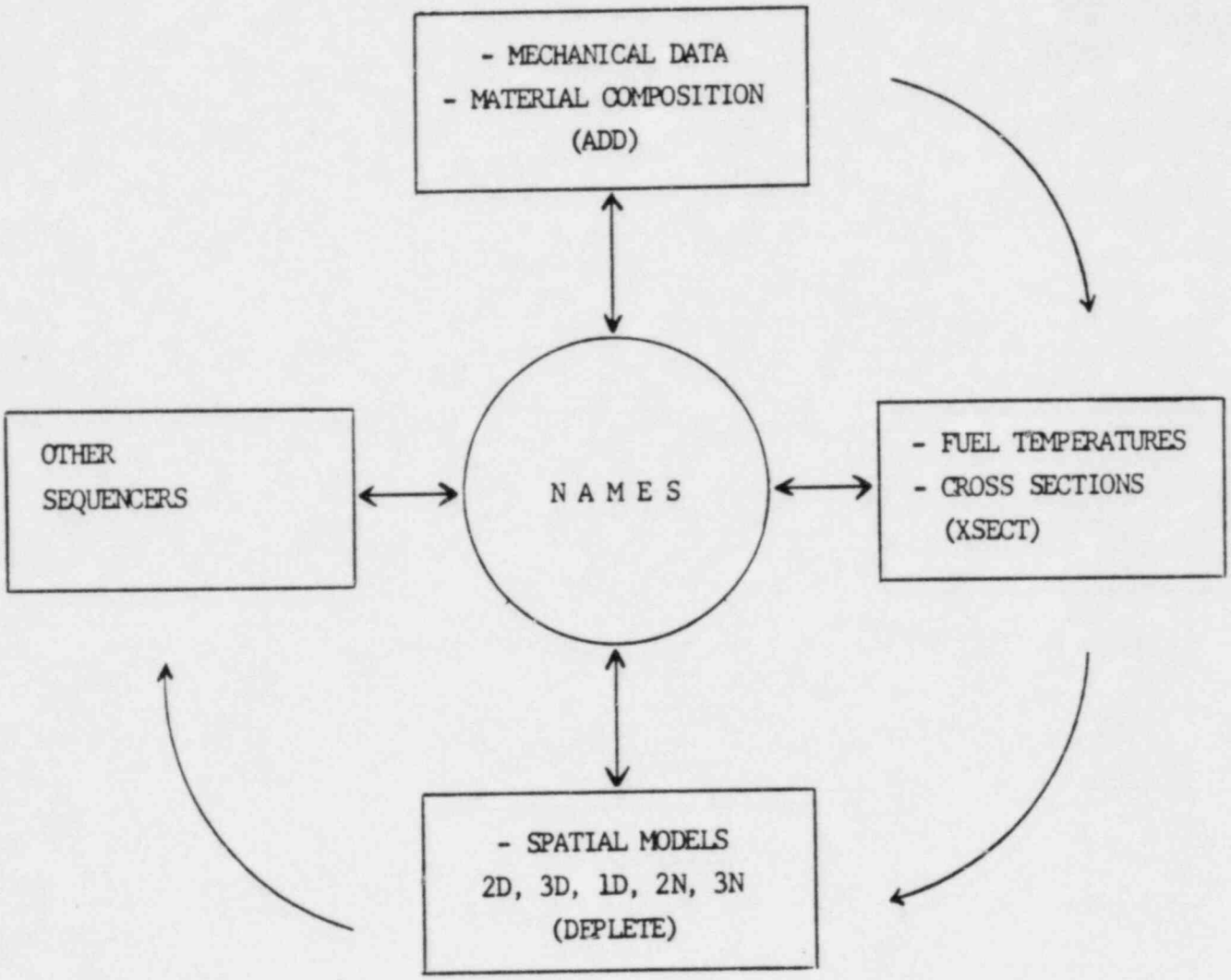
TOPICAL SECTION 2.3

DESCRIPTION OF PWR NEUTRONIC METHODS

CALCULATIONAL OVERVIEW

1. NAMES SEQUENCERS



* ALL PWR NEUTRONIC CALCULATIONS PERFORMED VIA NAMES SEQUENCERS

* FLEXIBLE RESTART CAPABILITIES

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TOPICAL SECTION 2.3
DESCRIPTION OF PWR NEUTRONIC METHODS
CALCULATIONAL OVERVIEW

2. NEUTRONIC COMPUTER CODE APPLICATIONS

CODE NAME	APPLICATION
FIGHT-H	EFFECTIVE FUEL TEMPERATURES
0D	MICRO- AND MACROSCOPIC CROSS SECTIONS, KINETICS PARAMETERS, ISOTOPICS
2D, 3D	POWER DISTRIBUTION, FUEL DEPLETION, XENON DISTRIBUTION, CORE REACTIVITY, REACTIVITY COEFFICIENTS, ROD WORTHS
1D	AXIAL POWER AND XENON DISTRIBUTIONS, DIFFERENTIAL CONTROL ROD WORTHS
2N, 3N	FULL CORE SPATIAL CALCULATIONS, SCOPING CALCULATIONS

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AGENDA FOR MEETING PRESENTATIONS

1.0 INTRODUCTION AND OVERVIEW

2.0 DESCRIPTION OF PWR NEUTRONIC METHODS

2.1 BASIC NEUTRONIC COMPUTER CODES

2.2 DATA PROCESSING AND LINKAGE COMPUTER CODES

2.3 CALCULATIONAL OVERVIEW

2.4 SCOPE OF ANALYSES PERFORMED

3.0 & 4.0 VERIFICATION AND CALCULATIONAL ACCURACY OF PWR NEUTRONIC METHODS

3.1 INTRODUCTION

3.2 COMPARISONS INCLUDING UNCERTAINTIES WITH PLANT OPERATION AND PHYSICS TESTS

3.2.1 CORE REACTIVITY
3.2.2 POWER DISTRIBUTION
3.2.3 CONTROL ROD WORTH
3.2.4 MODERATOR TEMPERATURE COEFFICIENT

3.3 COMPARISON WITH CERTAIN VENDOR RESULTS

5.0 CONCLUSIONS AND SUMMARY

ID:0664N

TOPICAL SECTION 2.4

SCOPE OF ANALYSES PERFORMED

THE BASIC NEUTRONIC COMPUTER CODES DISCUSSED IN SECTION 2.1 WILL BE EMPLOYED BY COMMONWEALTH EDISON TO PERFORM ALL NEUTRONIC ANALYSES REQUIRED FOR THE LICENSING, OPERATION, TESTING AND SURVEILLANCE OF A PWR RELOAD CYCLE.

IN GENERAL, THESE NEUTRONIC ANALYSES CAN BE CATEGORIZED AS FOLLOWS:

1. GENERATION OF SPECTRUM AVERAGED CROSS SECTIONS.

2. DETERMINATION OF ASSEMBLY LOADING PATTERN.

3. CALCULATION OF NEUTRONIC PARAMETERS REQUIRED FOR:

    A. SAFETY ANALYSES CONTAINED IN FSAR

    B. OPERATION, TESTING, AND SURVEILLANCE

NEUTRONIC PARAMETERS FOR SAFETY ANALYSES

THE NEUTRONIC PARAMETERS REQUIRED FOR THE SAFETY ANALYSES CONTAINED IN THE FSAR INCLUDE THE FOLLOWING*:

1. CORE REACTIVITY PARAMETERS AND COEFFICIENTS

2. CONTROL ROD WORTH PARAMETERS

3. NEUTRONIC PARAMETERS FOR SPECIFIC EVENTS

* THIS LIST OF PARAMETERS IS CONSISTENT WITH THE DISCUSSION PRESENTED IN WCAP-9272, "WESTINGHOUSE RELOAD SAFETY EVALUATION METHODOLOGY."

NEUTRONIC PARAMETERS FOR SAFETY ANALYSES (Continued)

1. CORE REACTIVITY PARAMETERS AND COEFFICIENTS	CODE(S) USED
A. MODERATOR TEMPERATURE COEFFICIENT	2D
B. FUEL TEMPERATURE (DOPPLER) COEFFICIENT	2D
C. BORON WORTH	2D
D. DELAYED NEUTRON FRACTION	0D, 2D or 2N
E. PROMPT NEUTRON LIFETIME	0D, 2D or 2N

NEUTRONIC PARAMETERS FOR SAFETY ANALYSES (Continued)

2. CONTROL ROD WORTH PARAMETERS	CODE(S) USED
A. VERIFICATION OF ROD INSERTION LIMITS (RIA)*	1D
B. TOTAL ROD WORTH	2D
C. TRIP REACTIVITY	
- MINIMUM VALUE	2N, 2D
- SHAPE	1D
D. DIFFERENTIAL ROD WORTHS	1D

* ROD INSERTION ALLOWANCE

NEUTRONIC PARAMETERS FOR SAFETY ANALYSES (Continued)

3. NEUTRONIC PARAMETERS FOR SPECIFIC EVENTS	CODE(S) USED
A. LOSS OF COOLANT ACCIDENTS	
- TOTAL CORE PEAKING FACTORS FROM CAOC* ANALYSES	1D, 2D, 3D
B. BORON DILUTION	2D
C. RCCA EVENTS	2N, 1D, 2D
D. CONTROL ROD EJECTION	1D, 2N or 2D
E. STEAMLINE BREAK	2N or 2D, 3D

* CONSTANT AXIAL OFFSET CONTROL

NEUTRONIC PARAMETERS FOR OPERATION, TESTING, AND SURVEILLANCE

THE NEUTRONIC PARAMETERS REQUIRED FOR REACTOR OPERATION, TESTING AND SURVEILLANCE (WHICH ARE NOT DISCUSSED UNDER THE SAFETY ANALYSIS AREA) INCLUDE THE FOLLOWING:

	CODE(S) USED
1. RADIAL POWER DISTRIBUTIONS	2D
2. BORON CONCENTRATIONS	2D
3. CORE AVERAGE AXIAL POWER DISTRIBUTIONS	1D
4. INTEGRAL XENON WORTHS	1D

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COMMONWEALTH EDISON'S CAPABILITY TO PERFORM THIS

SCOPE OF ANALYSES IS JUSTIFIED BY:

1. EXPERIMENTAL BENCHMARK RESULTS (PROVIDED IN SECTION 4.2)

2. ONE-ON-ONE COMPARISON TO VENDOR RESULTS (PROVIDED IN SECTION 3.3)

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3.1 INTRODUCTION

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3.2.1 CORE REACTIVITY
3.2.2 POWER DISTRIBUTION
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3.2.4 MODERATOR TEMPERATURE COEFFICIENT

3.3 COMPARISON WITH CERTAIN VENDOR RESULTS

5.0 CONCLUSIONS AND SUMMARY

ID:0664N

VERIFICATION OF PWR NEUTRONICS METHODS
AND CALCULATIONAL ACCURACY
(EXPERIMENTAL BENCHMARK)
SECTIONS 3.0 AND 4.0

EXPERIMENTAL BENCHMARK PROGRAM

* OPERATIONAL DATABASE
  - ZION UNITS 1 AND 2, CYCLES 1 THROUGH 6

* STATISTICAL METHODS
  - METHODS DEVELOPED WITH THE AID OF CONSULTANT (UAI)

* PARAMETERS BENCHMARKED
  - CRITICAL BORON CONCENTRATION VS. BURNUP
  - 2D ARO POWER DISTRIBUTION
  - BOL HZP INTEGRAL RODWORTH
  - BOL HZP ISOTHERMAL TEMPERATURE COEFFICIENT

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VERIFICATION OF PWR NEUTRONICS METHODS
AND CALCULATIONAL ACCURACY
(EXPERIMENTAL BENCHMARK)

OPERATIONAL DATABASE

* 12 CYCLES OF ZION OPERATION
  - ZION UNIT 1, CYCLES 1 THROUGH 6
  - ZION UNIT 2, CYCLES 1 THROUGH 6

* DATA FROM STARTUP PHYSICS TESTS
  - CONTROL ROD WORTHS
  - MODERATOR (ISOTHERMAL) TEMPERATURE COEFFICIENT

* DATA FROM AT POWER SURVEILLANCE TESTING
  - CORE REACTIVITY
  - POWER DISTRIBUTION

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2/10/83

VERIFICATION OF PWR NEUTRONICS METHODS
AND CALCULATIONAL ACCURACY
(EXPERIMENTAL BENCHMARK)

STATISTICAL METHODS

* METHODS DEVELOPED WITH THE AID OF CONSULTANT (UAI)

* ASSESSMENT OF NORMALITY OF DATA DISTRIBUTION

  - BASED ON ANSI N15.15 (1974)
  - NORMALITY TESTED AT 5% LEVEL OF SIGNIFICANCE
  - W-TEST FOR SAMPLE SIZES LESS THAN 50
  - D-PRIME TEST FOR SAMPLE SIZES GREATFR THAN 50

* DETERMINATION OF 95/95 UNCERTAINTY

  - BASED ON REG. GUIDE 1.126, REV. 1 (1978)
  - METHODS FOR NORMAL AND NON-NORMAL DISTRIBUTIONS

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VERIFICATION OF PWR NEUTRONICS METHODS
AND CALCULATIONAL ACCURACY
(EXPERIMENTAL BENCHMARK)

BENCHMARK PARAMETERS

CORE REACTIVITY (CHAPTER 3 ONLY)

* FIGURE-OF-MERIT

  - MEASURED MINUS 2D PREDICTED HFP ARO CRITICAL BORON CONCENTRATION

* DATABASE

  - ZION UNIT 1, CYCLE 2 THROUGH 6

  - ZION UNIT 2, CYCLES 1 THROUGH 5 AND CYCLES 6 THROUGH 12/31/82

  - TOTAL OF 1032 POINTS INVESTIGATED

* STATISTICAL ANALYSIS

  - 10 OF 11 CYCLES EXHIBIT NORMALITY

- INDIVIDUAL CYCLE REACTIVITY BIAS	19 TO -34 PPM
- ONE-SIGMA	8 TO 12 PPM
- 95/95 UNCERTAINTIES (NO BIAS)	15 TO 24 PPM

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2/10/83

VERIFICATION OF PWR NEUTRONICS METHODS
AND CALCULATIONAL ACCURACY
(EXPERIMENTAL BENCHMARK)

BENCHMARK PARAMETERS

POWER DISTRIBUTION (CHAPTER 3 AND 4)

* FIGURES-OF-MERIT

  - MEASURED MINUS PREDICTED
    NORMALIZED REACTION RATE INTEGRALS (RRI)

  - MEASURED MINUS PREDICTED PERCENT DIFFERENCE IN
    RRI WITH FDH* $\geq$ 1.0

* DATABASE

  - TYPICAL OPERATION (25 FLUX MAPS) (CHAPTER 3)

    - ZION UNIT 1, CYCLES 1 THROUGH 5

    - ZION UNIT 2, CYCLES 1 THROUGH 4

    - RANGE OF POWER LEVELS, A.O.'S AND BURNUP

  - LIMITING OPERATION (20 FLUX MAPS) (CHAPTER 4)

    - ZION UNIT 1, CYCLES 3 THROUGH 6

    - ZION UNIT 2, CYCLES 3 THROUGH 5

    - NEAR HOT FULL POWER, RANGE OF A.O.'S AND BURNUP

* FDH IS ENTHALPY RISE HOT CHANNEL FACTOR.

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2/10/83

VERIFICATION OF PWR NEUTRONICS METHODS
AND CALCULATIONAL ACCURACY
(EXPERIMENTAL BENCHMARK)

BENCHMARK PARAMETERS

POWER DISTRIBUTION (CONTINUED)

* STATISTICAL ANALYSIS

- TYPICAL OPERATION (ALL RRI DATA)

  - 19 OF 25 MAPS EXHIBIT NORMALITY

  - COMBINED DATA

    - EXHIBITS NON-NORMALITY

    - AVERAGE ABSOLUTE VALUE OF DIFFERENCE 1.8%

    - ONE-SIGMA UNCERTAINTY 1.5%

- LIMITING OPERATION (SUBSET RRI)

  - 17 OF 20 MAPS EXHIBIT NORMALITY

  - COMBINED DATA ($F_{\Delta H} \geq 1.0$)

    - EXHIBIT NON-NORMALITY

    - ONE-SIGMA 2.2%

    - 95/95 UNCERTAINTY 3.9%

*CALCULATIONAL ACCURACY BASIS (WCAP-7308-L)

- FOR $F_{\Delta H} \geq 1.2$
  95/95 UNCERTAINTY 3.03%

ID:0714N

CAG
2/10/83

VERIFICATION OF PWR NEUTRONICS METHODS
AND CALCULATIONAL ACCURACY
(EXPERIMENTAL BENCHMARK)

BENCHMARK PARAMETERS

CONTROL ROD WORTH (CHAPTER 3 AND 4)

* FIGURE-OF-MERIT

  - MEASURED MINUS PREDICTED BORON ENDPOINT PERCENT DIFFERENCE

* DATABASE

  - BOL HZP BORON ENDPOINT MEASUREMENTS

  - CONTROL BANKS

    - ZION UNIT 1, CYCLES 1, 2, 3, 4, AND 5

    - ZION UNIT 2, CYCLES 1, 3, AND 5

  - CONTROL PLUS SHUTDOWN BANKS

    - ZION UNIT 1, CYCLES 1, 2, AND 4

    - ZION UNIT 2, CYCLES 1 AND 2

ID:0714N

CAG
2/10/83

VERIFICATION OF PWR NEUTRONICS METHODS
AND CALCULATIONAL ACCURACY
(EXPERIMENTAL BENCHMARK)

BENCHMARK PARAMETERS

CONTROL ROD WORTH (CONTINUED)

* STATISTICAL ANALYSIS

- CONTROL BANKS
  - EXHIBIT NORMALITY
  - AVERAGE DIFFERENCE 1.056%
  - ONE-SIGMA 2.552%
  - 95/95 UNCERTAINTY 7.076%
  - NUMBER OF DATA POINTS 8

- CONTROL PLUS SHUTDOWN BANKS
  - EXHIBIT NORMALITY
  - AVERAGE DIFFERENCE -3.188%
  - ONE-SIGMA 0.615%
  - 95/95 UNCERTAINTY 5.775%
  - NUMBER OF DATA POINTS 5

* CALCULATION ACCURACY BASIS (FSAR) 10%

ID:0714N

CAG
2/10/83

VERIFICATION OF PWR NEUTRONICS METHODS
AND CALCULATIONAL ACCURACY
(EXPERIMENTAL BENCHMARK)

BENCHMARK PARAMETERS

MODERATOR (ISOTHERMAL) TEMPERATURE COEFFICIENT (PCM/°F) (CHAPTER 3 AND 4)

* FIGURE-OF-MERIT

  - MEASURED MINUS PREDICTED DIFFERENCE ISOTHERMAL TEMPERATURE COEFFICIENT

* DATABASE

  - HZP BOL PHYSICS TESTS
    - ZION UNIT 1, CYCLES 2 THROUGH 6
    - ZION UNIT 2, CYCLES 2 THROUGH 6
    - ARO AND RODDED CONDITIONS
    - TOTAL OF 87 DATA POINTS

* STATISTICAL ANALYSIS

  - UNIT 1 AND 2 COMBINED RESULTS
    - EXHIBITS NORMALITY
    - AVERAGE DIFFERENCE 0.157 PCM/°F
    - ONE-SIGMA 0.761 PCM/°F
    - 95/95 UNCERTAINTY 1.48 PCM/°F

* CALCULATIONAL ACCURACY BASIS (WCAP-9500)

  - 95/95 UNCERTAINTY +/- 2.0 PCM/°F

ID:0714N

CAG
2/10/83

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- 2.2 DATA PROCESSING AND LINKAGE COMPUTER CODES
- 2.3 CALCULATIONAL OVERVIEW
- 2.4 SCOPE OF ANALYSES PERFORMED

3.0 & 4.0 VERIFICATION AND CALCULATIONAL ACCURACY OF PWR NEUTRONIC METHODS

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  - 3.2.2 POWER DISTRIBUTION
  - 3.2.3 CONTROL ROD WORTH
  - 3.2.4 MODERATOR TEMPERATURE COEFFICIENT
- 3.3 COMPARISON WITH CERTAIN VENDOR RESULTS

5.0 CONCLUSIONS AND SUMMARY

ID:0664N

TOPICAL SECTION 3.3

COMPARISONS WITH CERTAIN VENDOR RESULTS

PARAMETERS TO BE ADDRESSED IN THIS SECTION ARE AS FOLLOWS:

1. DELAYED NEUTRON FRACTION

2. TRIP REACTIVITY

   - SHAPE

3. LOSS OF COOLANT ACCIDENT

   - CORE PEAKING FACTOR SHAPE FROM CAOC* ANALYSIS

4. CONTROL ROD EJECTION

   - EJECTED ROD WORTH

   - TOTAL CORE PEAKING FACTOR

A ONE-ON-ONE COMPARISON WILL BE PROVIDED BETWEEN EDISON AND WESTINGHOUSE CALCULATIONS FOR THE ABOVE RELOAD PARAMETERS FOR A TYPICAL ZION CYCLE.

* CONSTANT AXIAL OFFSET CONTROL

SECTION 3.3 PARAMETERS

PARAMETER	TYPICAL RELOAD VALUE	DIFFERENCE BETWEEN EDISON AND WESTINGHOUSE RESULTS: ACCEPTANCE CRITERIA*	DIFFERENCE BETWEEN EDISON AND WESTINGHOUSE RESULTS: ACTUAL VALUE
1. DELAYED NEUTRON FRACTION (MIN)	0.005	3%	0.6%
2. TRIP REACTIVITY - SHAPE	--	0.03% $\Delta\rho$	SEE FIGURE 3.3-1
3. LOSS OF COOLANT ACCIDENT - CORE PEAKING FACTOR (FQ) SHAPE	--	$\pm$ 2%	SEE FIGURE 3.3-2 & -3
4. CONTROL ROD EJECTION			
a. EJECTED ROD WORTH	PRESENTED ON NEXT PAGE.		
b. TOTAL CORE PEAKING FACTOR (FQ)	PRESENTED ON NEXT PAGE.		

FOR ALL COMPARISONS (PERFORMED TO DATE) THE ACTUAL DIFFERENCE BETWEEN WESTINGHOUSE AND EDISON RESULTS WAS WITHIN THE ACCEPTANCE CRITERIA ESTABLISHED PRIOR TO PERFORMING THE COMPARISON.

* ACCEPTANCE CRITERIA WERE DEVELOPED FROM:

1) EXPERIMENTAL BENCHMARK DIFFERENCES, OR
2) HISTORIC CYCLE-TO-CYCLE VARIATIONS.

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SECTION 3.3 PARAMETERS (CONTINUED)

PARAMETER	TYPICAL RELOAD VALUE	DIFFERENCE BETWEEN EDISON AND WESTINGHOUSE RESULTS: ACCEPTANCE CRITERIA	DIFFERENCE BETWEEN EDISON AND WESTINGHOUSE RESULTS: ACTUAL VALUE
4. CONTROL ROD EJECTION			
HZP-BOL			
a. EJECTED ROD WORTH	0.35%	@	@
b. TOTAL CORE PEAKING FACTOR (FQ)	10	@	@
HZP-EOL			
a. EJECTED ROD WORTH	0.45%	@	@
b. TOTAL CORE PEAKING FACTOR (FQ)	14	@	@
HFP-BOL			
a. EJECTED ROD WORTH	0.15%	@	@
b. TOTAL CORE PEAKING FACTOR (FQ)	5	@	@
HFP-EOL			
a. EJECTED ROD WORTH	0.15%	@	@
b. TOTAL CORE PEAKING FACTOR (FQ)	5	@	@

@ TO BE SUPPLIED IN TOPICAL

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FIGURE 3.3-1
TRIP REACTIVITY - SHAPE

NORMALIZED RCCA REACTIVITY WORTH
VERSUS
ROD POSITION

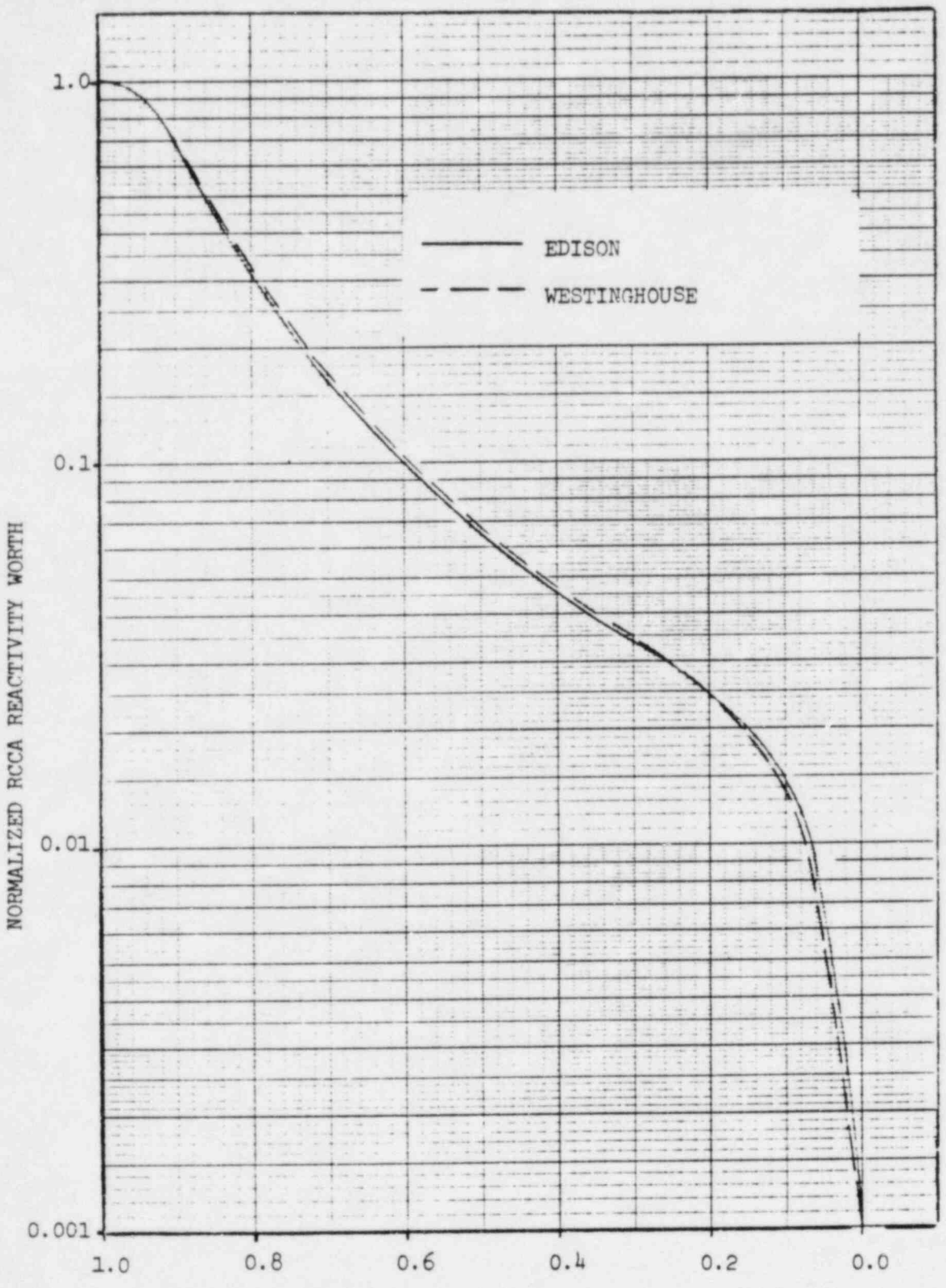


FIGURE 3.3-2

CAOC ANALYSIS

PEAK LOCAL POWER
VERSUS
CORE HEIGHT

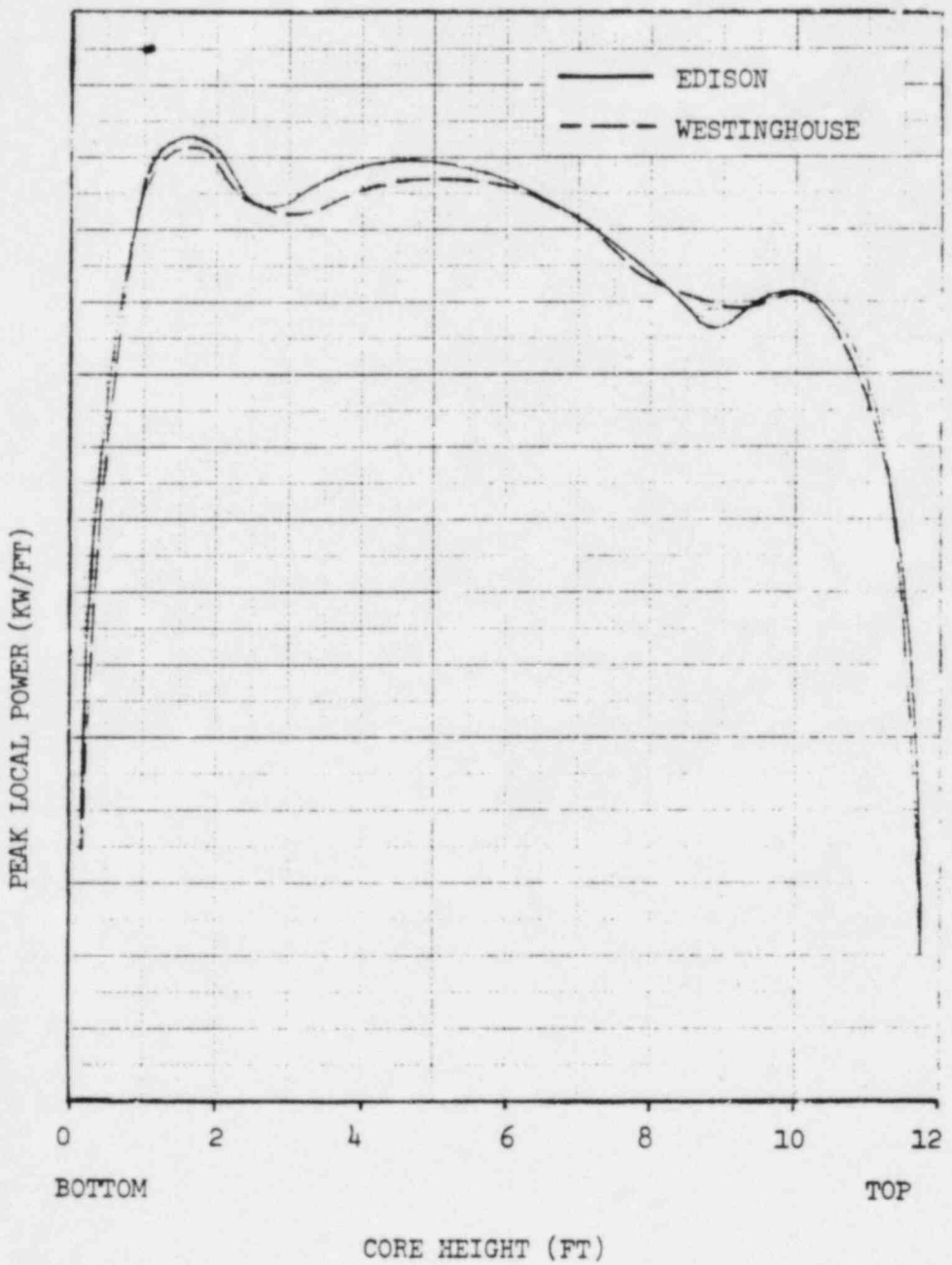
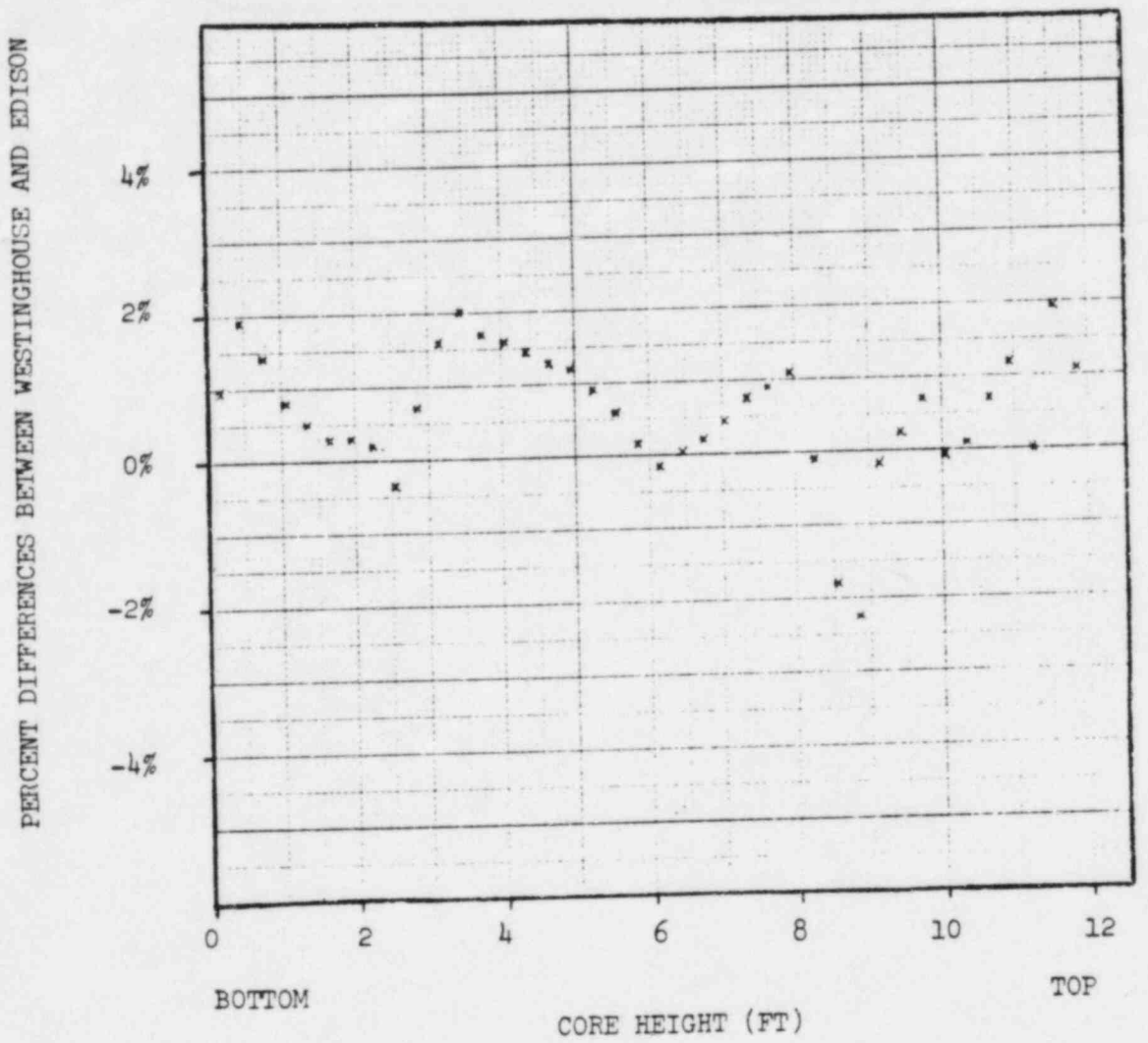


FIGURE 3.3-3

CAOC ANALYSIS

PEAK LOCAL POWER - PERCENT DIFFERENCE (E-W)
VERSUS
CORE HEIGHT



AGENDA FOR MEETING PRESENTATIONS

1.0 INTRODUCTION AND OVERVIEW

2.0 DESCRIPTION OF PWR NEUTRONIC METHODS

- 2.1 BASIC NEUTRONIC COMPUTER CODES
- 2.2 DATA PROCESSING AND LINKAGE COMPUTER CODES
- 2.3 CALCULATIONAL OVERVIEW
- 2.4 SCOPE OF ANALYSES PERFORMED

3.0 & 4.0 VERIFICATION AND CALCULATIONAL ACCURACY OF PWR NEUTRONIC METHODS

- 3.1 INTRODUCTION
- 3.2 COMPARISONS INCLUDING UNCERTAINTIES WITH PLANT OPERATION AND PHYSICS TESTS
  - 3.2.1 CORE REACTIVITY
  - 3.2.2 POWER DISTRIBUTION
  - 3.2.3 CONTROL ROD WORTH
  - 3.2.4 MODERATOR TEMPERATURE COEFFICIENT
- 3.3 COMPARISON WITH CERTAIN VENDOR RESULTS

5.0 CONCLUSIONS AND SUMMARY

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