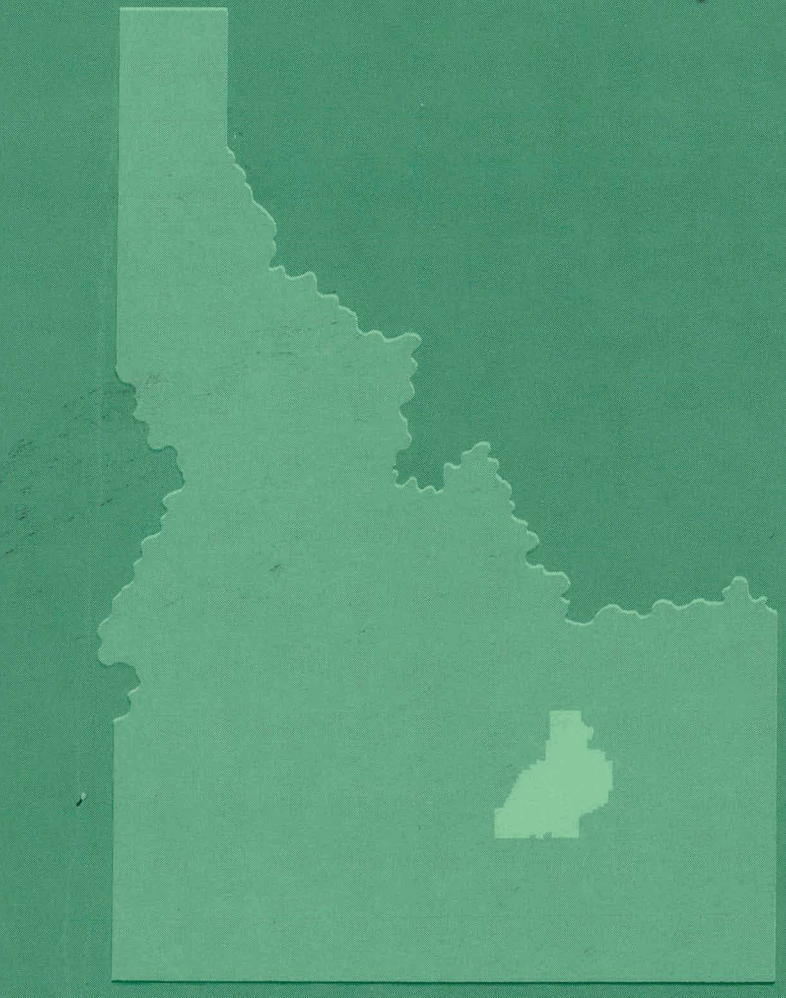
IDO-16678

MASTER

MTR FAST NEUTRON FLUX MEASUREMENTS FOR CYCLE 146

L. D. Weber
C. H. Hogg

March 20, 1962



PHILLIPS PETROLEUM COMPANY

ATOMIC ENERGY DIVISION

NATIONAL REACTOR TESTING STATION
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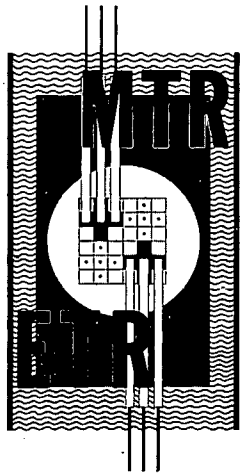

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Reactor Technology
TID-4500 (17th Ed.)

MTR FAST NEUTRON FLUX MEASUREMENTS FOR CYCLE 146

L. D. Weber
C. H. Hogg

PHILLIPS
PETROLEUM
COMPANY

Atomic Energy Division
Contract AT(10-1)-205
Idaho Operations Office
U. S. ATOMIC ENERGY COMMISSION

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MTR FAST NEUTRON FLUX MEASUREMENTS FOR CYCLE 146

by

L. D. Weber and C. H. Hogg

A B S T R A C T

The fast neutron fluxes in selected positions of the MTR were measured for Cycle 146*. The measurements were made at the beginning, throughout, and at the end of the cycle (564 MWD).

Vertical traverses for each position monitored are shown.

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* October 2 to October 24, 1960.

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MTR FAST NEUTRON FLUX MEASUREMENTS FOR CYCLE 146

by

L. D. Weber and C. H. Hogg

I. INTRODUCTION

The fast neutron fluxes in various positions of the MTR were measured for Cycle 146. The measurements were part of a complete flux measurement program described in reference 1 for Cycle 146. These measurements were made at the beginning of the cycle (0 MWD), during the cycle (394 MWD), and at the completion of the cycle (564 MWD).

The thermal flux measurements for this cycle are found in reference 1. The gamma heat generation measurements for Cycle 146 are found in reference 2.

II. EXPERIMENTAL PROCEDURES

Pure nickel wires (20 mil dia.) were irradiated as the fast flux monitor in these measurements. The induced Co^{58} gamma-ray activity from the fast neutron threshold reaction, $Ni^{58}(n,p)Co^{58}$, was counted on a gross count ionization chamber. A more complete explanation of experimental procedures and techniques can be found in references 3 and 4.

III. EXPERIMENTAL DATA

The fast neutron fluxes reported here are for neutrons greater than 1 Mev in energy. An effective cross section ($\bar{\sigma}$) of 92 mb averaged over a fission neutron spectrum was used for the threshold reaction $Ni^{58}(n,p)Co^{58}$.

A correction for the burnup of the Co^{58} isomers by thermal neutrons has been applied to the data. This correction was based on (1) the measured thermal neutron fluxes, (2) the 1650 barn cross section of the 71.3-day isomer, and (3) the 170,000 barn cross section of the 9.1-hr isomer.

Reference 4 describes the measurement of the cross sections for the Co^{58} isomers and lists corrections for burnout of the isomers in various thermal fluxes and for various irradiation times.

A cross section of 31 mb was used for the formation of the 9.1-hr isomer and 61 mb for the formation of the 71.3-day isomer.

Vertical traverses of the experimental positions monitored are arranged alphabetically by number in Appendix I.

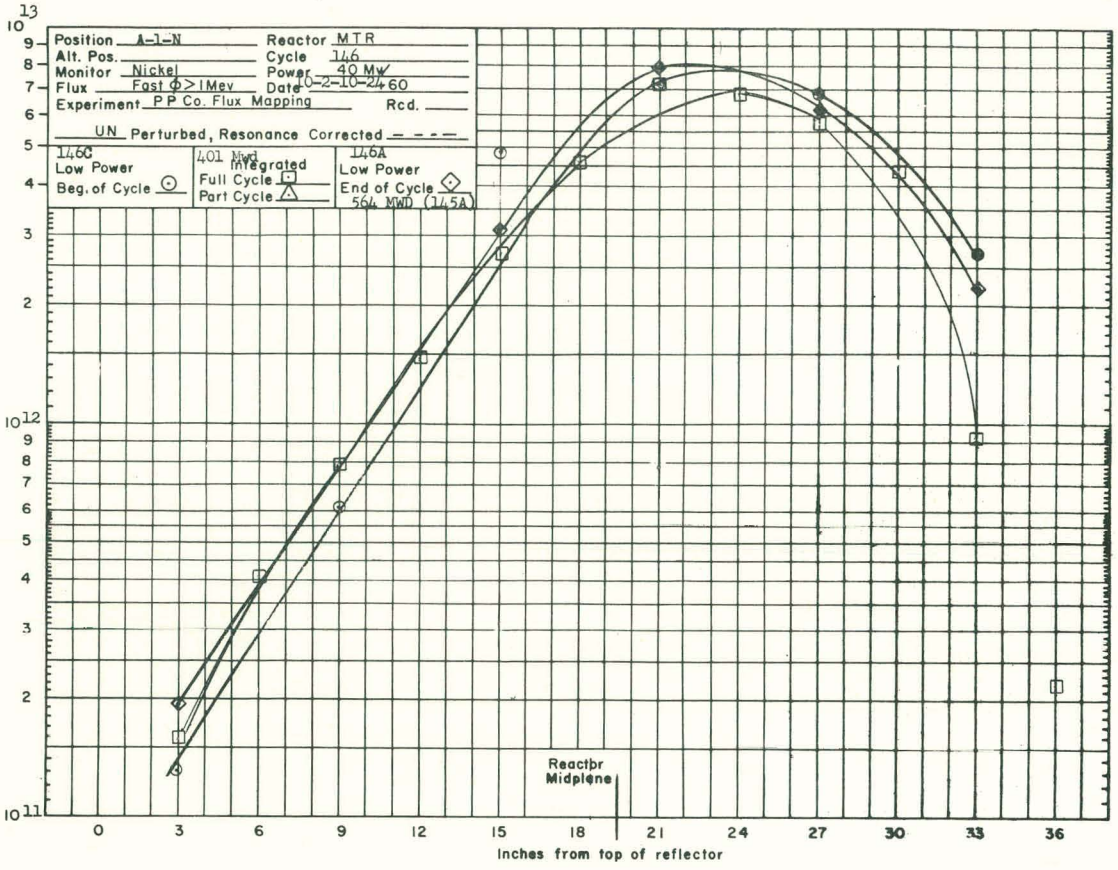
IV. REFERENCES

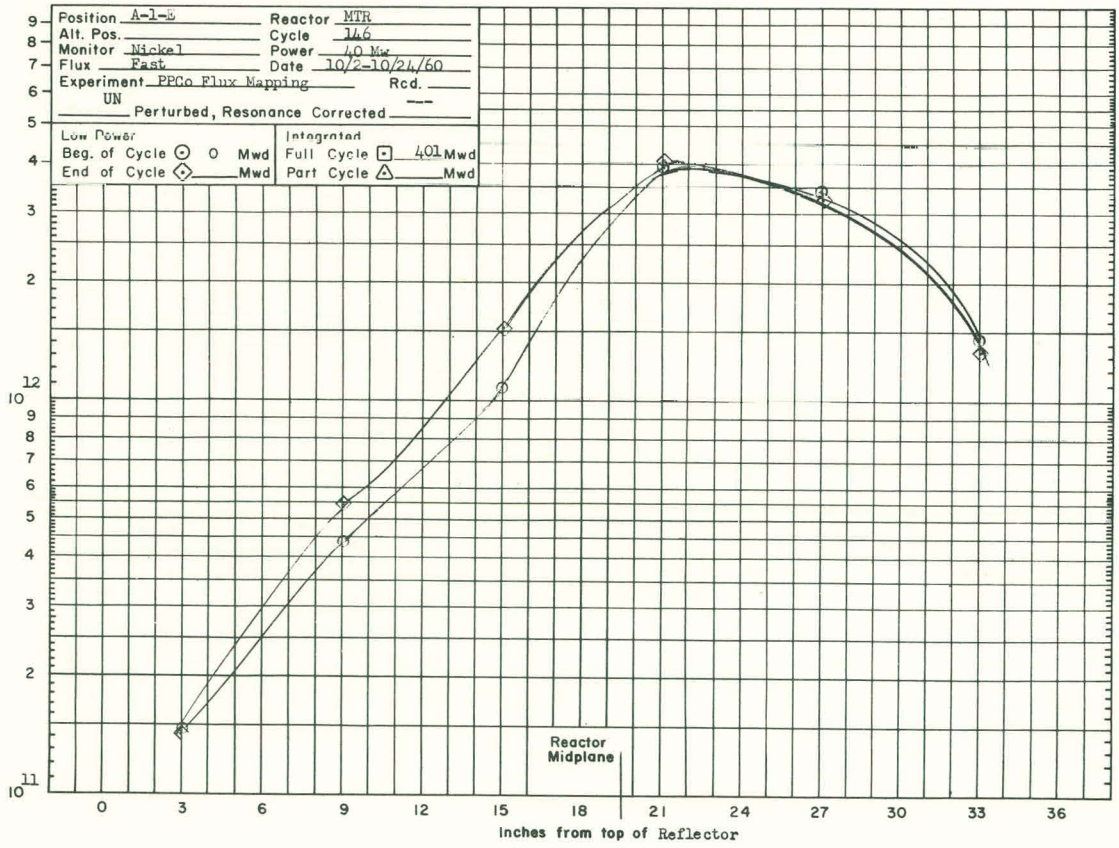
1. L. D. Weber and C. H. Hogg, MTR Thermal Neutron Flux Measurements for Cycle 146, IDO-16657 (1961).

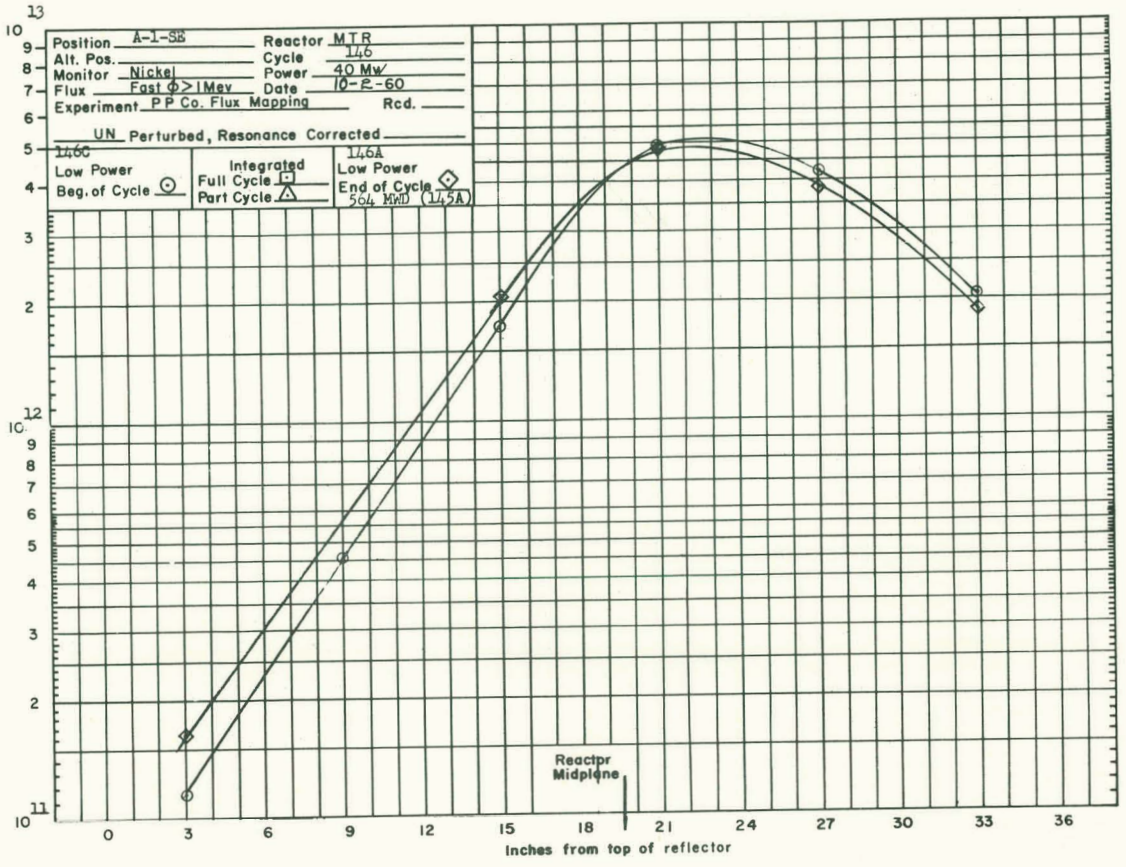
2. L. D. Weber and C. H. Hogg, MTR Gamma Heat Generation Measurements, IDO-16652 (1961).

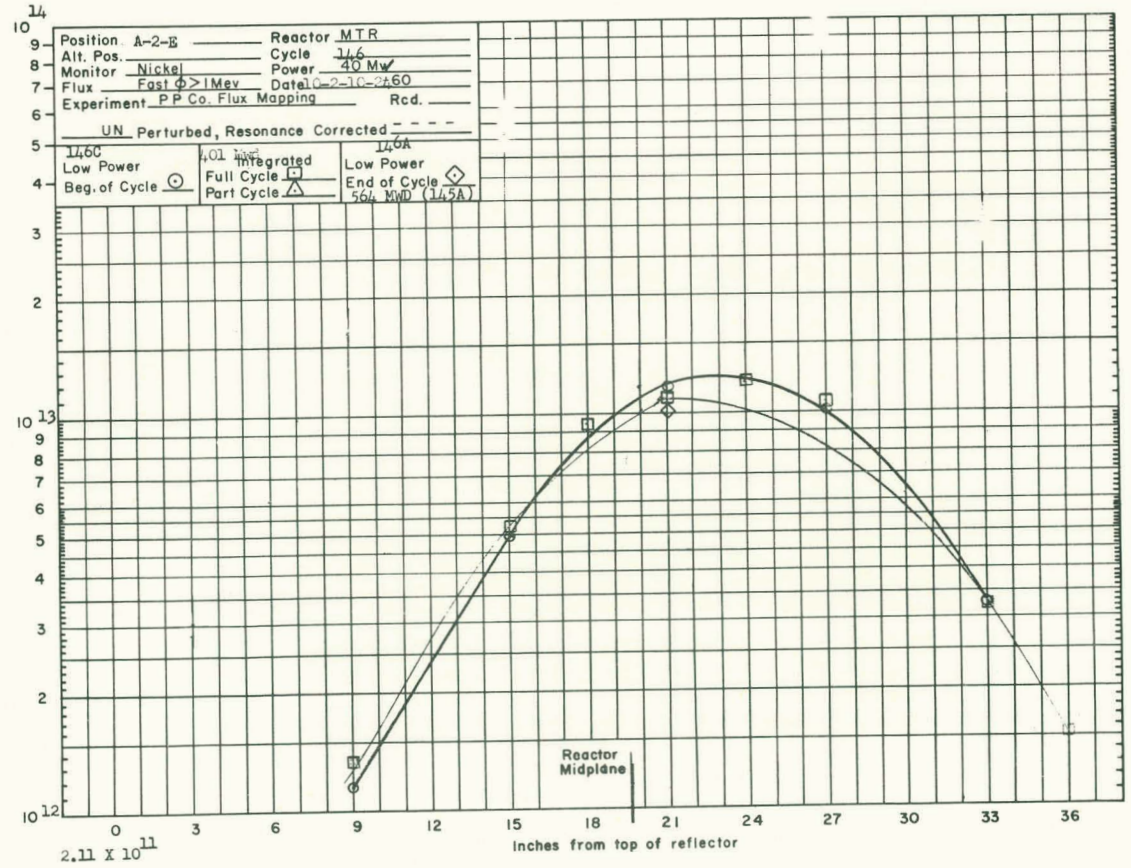
3. C. H. Hogg and L. D. Weber, ETR Fast Neutron Flux Measurements, IDO-16535 (1960).

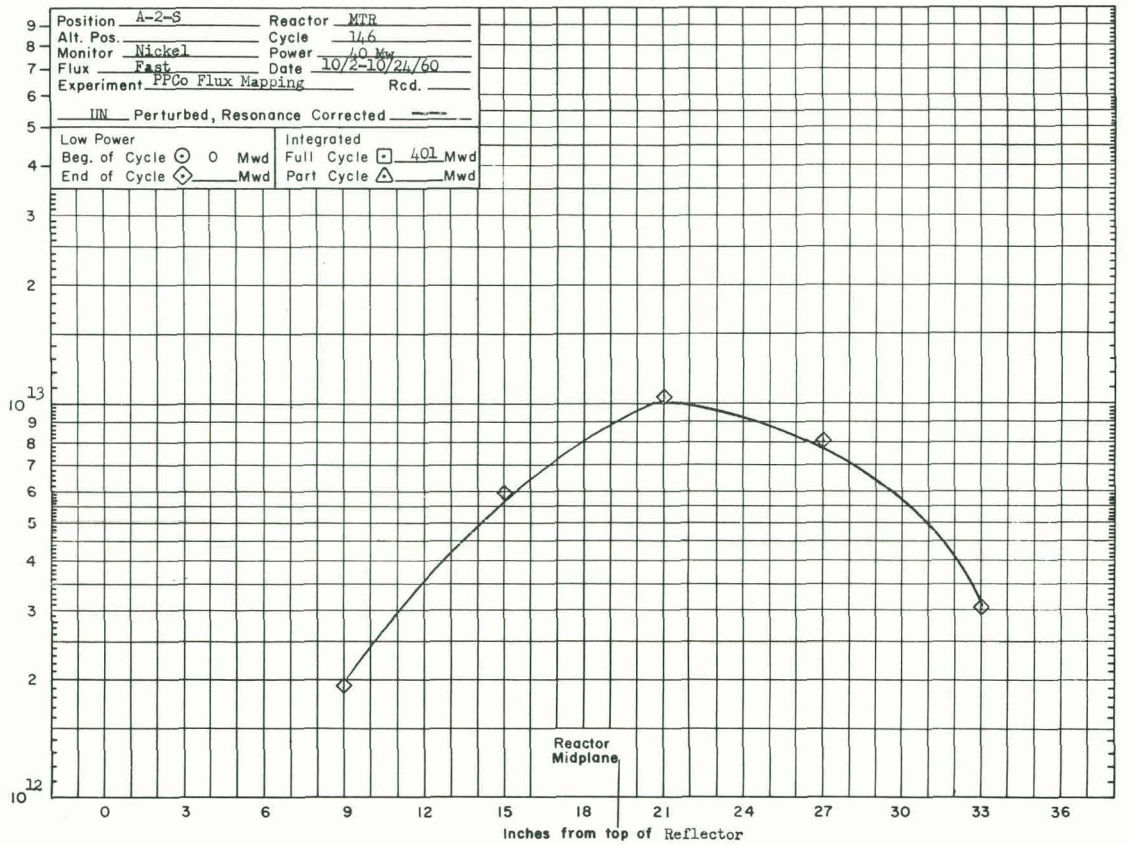
4. C. H. Hogg, L. D. Weber, and E. C. Yates, Thermal Neutron Cross Sections of Co^{58} Isomers and the Effect on Fast Flux Measurements Using Nickel, IDO-16744 (1962).

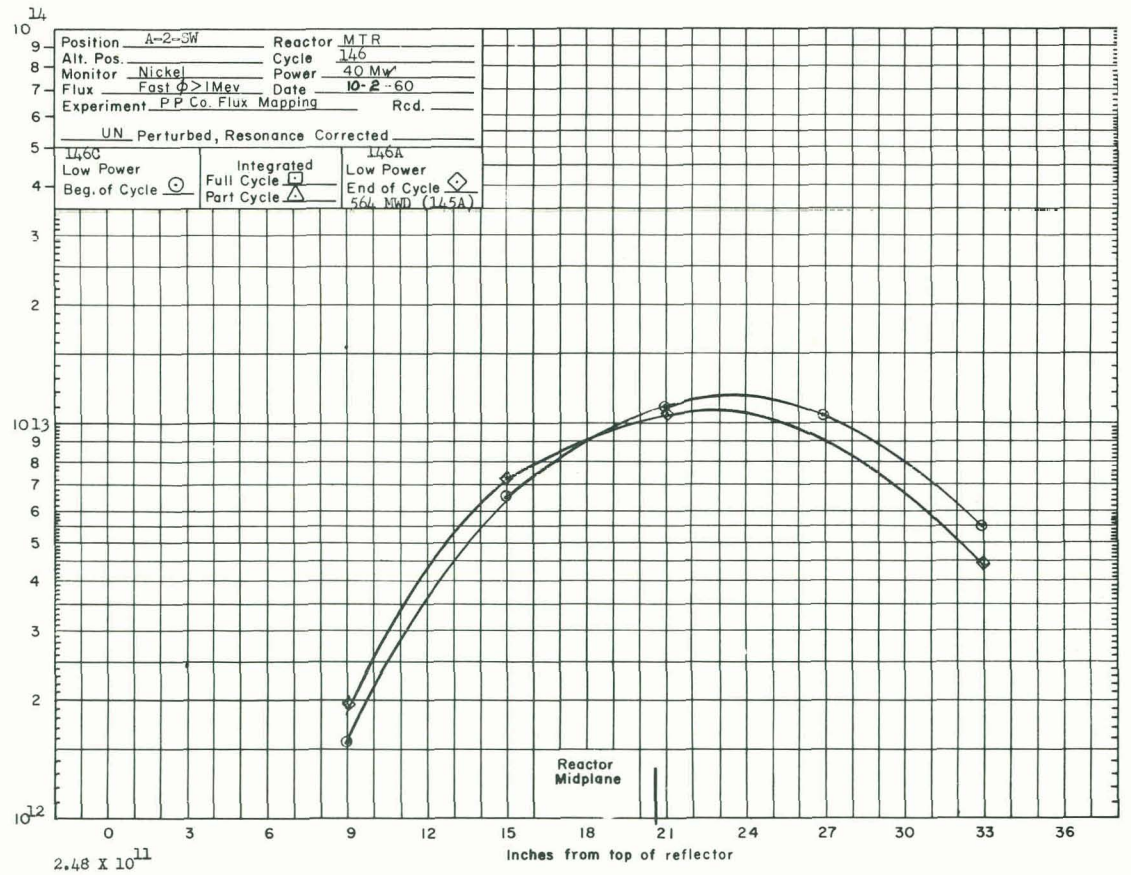

Position A-1-N
Alt. Pos.
Monitor Nickel
Flux Fast Φ>1Mev
Experiment PP Co. Flux Mapping
UN Perturbed, Resonance Corrected
Reactor MTR
Cycle 146
Power 40 MW
Date 10-2-10-2460
Rcd.
146C
Low Power
Beg. of Cycle
401 Mwd Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

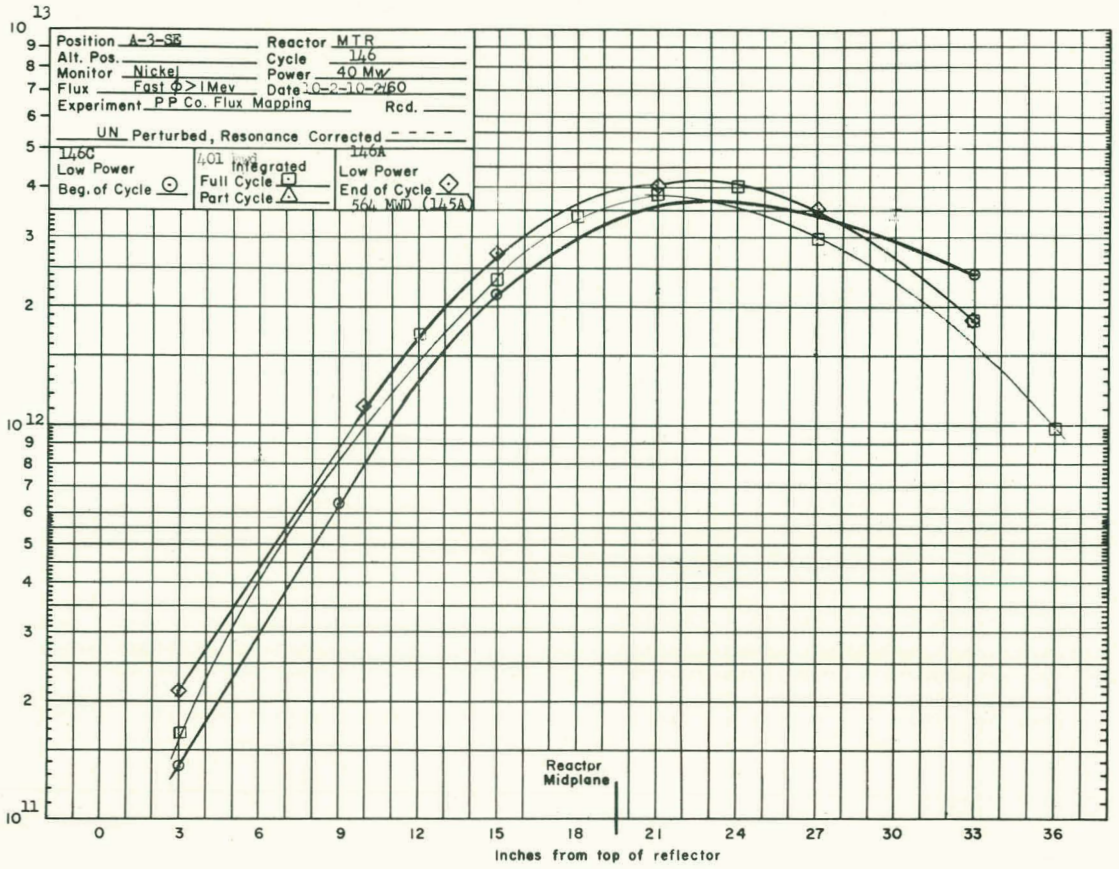

Position A-1-E
Alt. Pos.
Monitor Nickel
Flux Fast
Experiment PPCo Flux Mapping
UN
Perturbed, Resonance Corrected
Reactor MTR
Cycle 146
Power 40 Mw
Date 10/2-10/24/60
Rcd.
Low Power
Beg. of Cycle 0 Mwd
End of Cycle Mwd
Integrated
Full Cycle 401 Mwd
Part Cycle Mwd
Reactor Midplane
Inches from top of Reflector

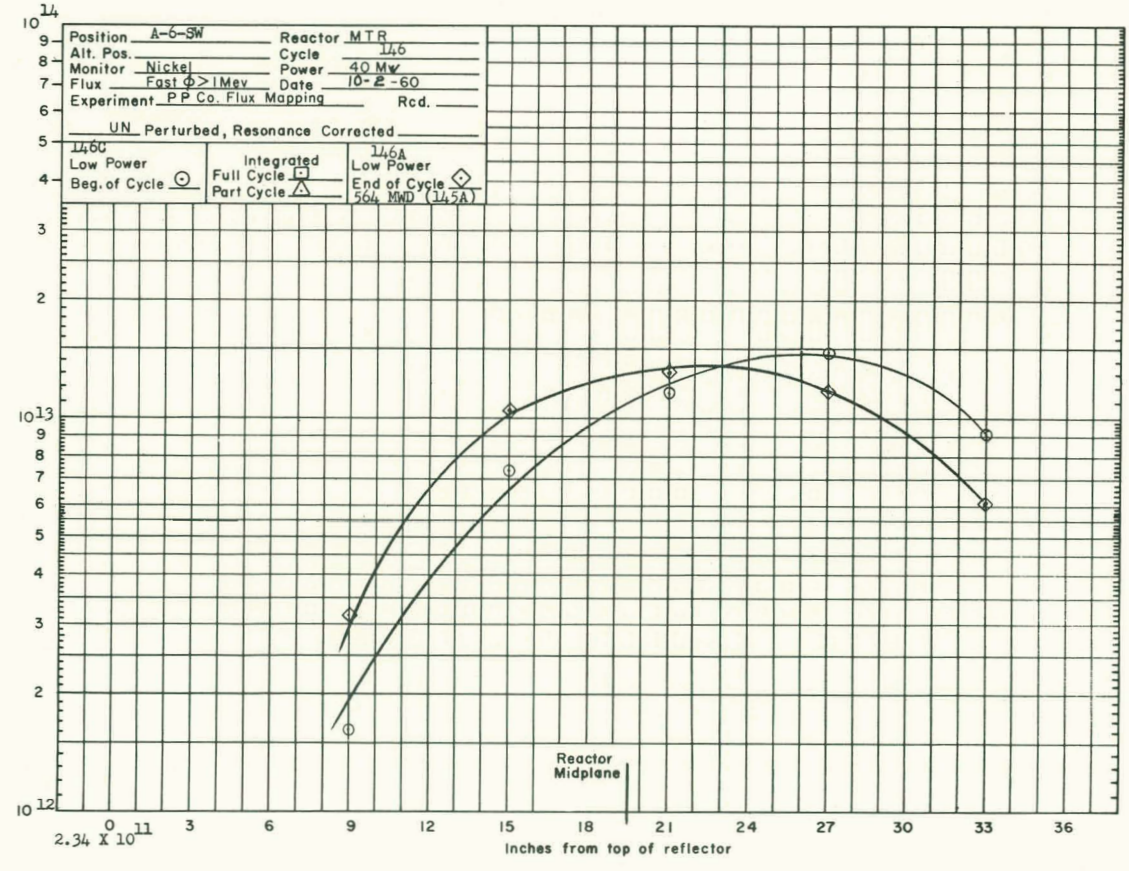

Position A-1-SE
Alt. Pos.
Monitor Nickel
Flux Fast Φ>1Mev
Experiment PP Co. Flux Mapping
Reactor MTR
Cycle 146
Power 40 Mw
Date 10-2-60
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

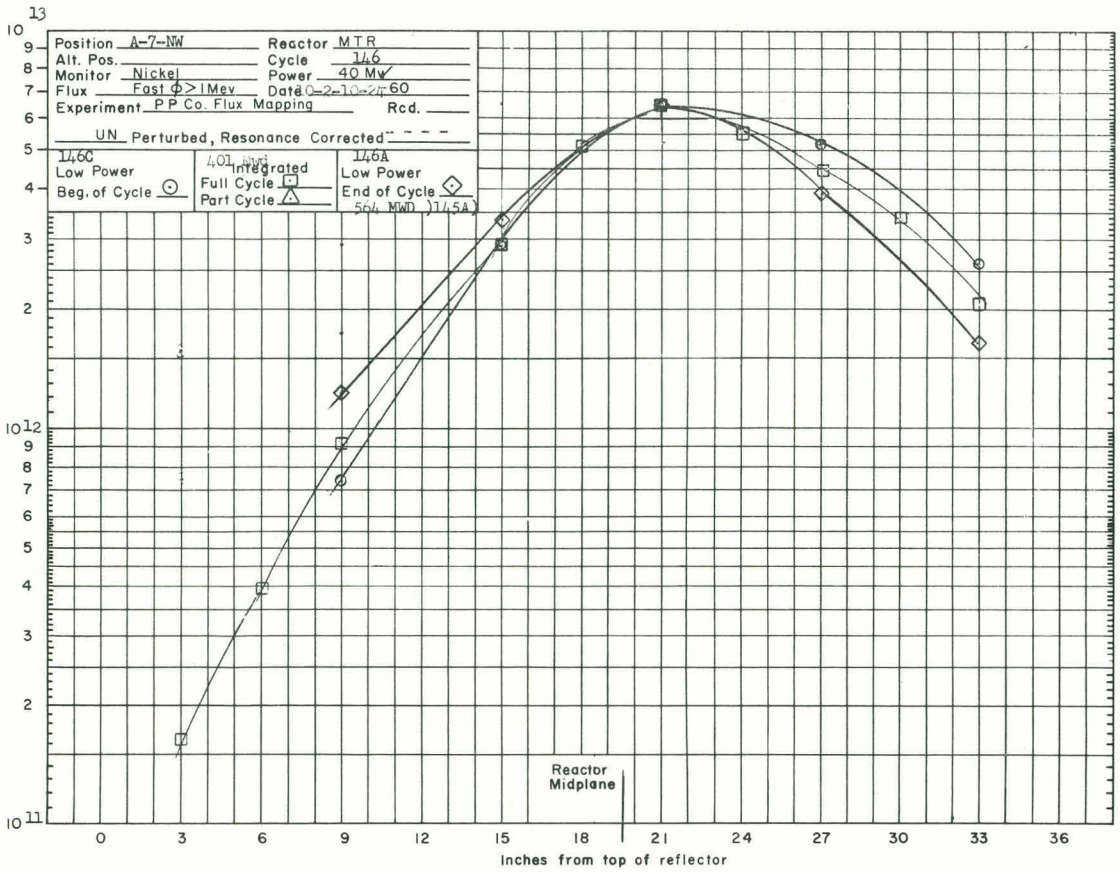

Position A-2-E
Alt. Pos.
Monitor Nickel
Flux Fast Φ>1Mev
Experiment PP Co. Flux Mapping
Reactor MTR
Cycle 146
Power 40 Mw
Date 10-2-10-2-60
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector
2.11 X 10^11

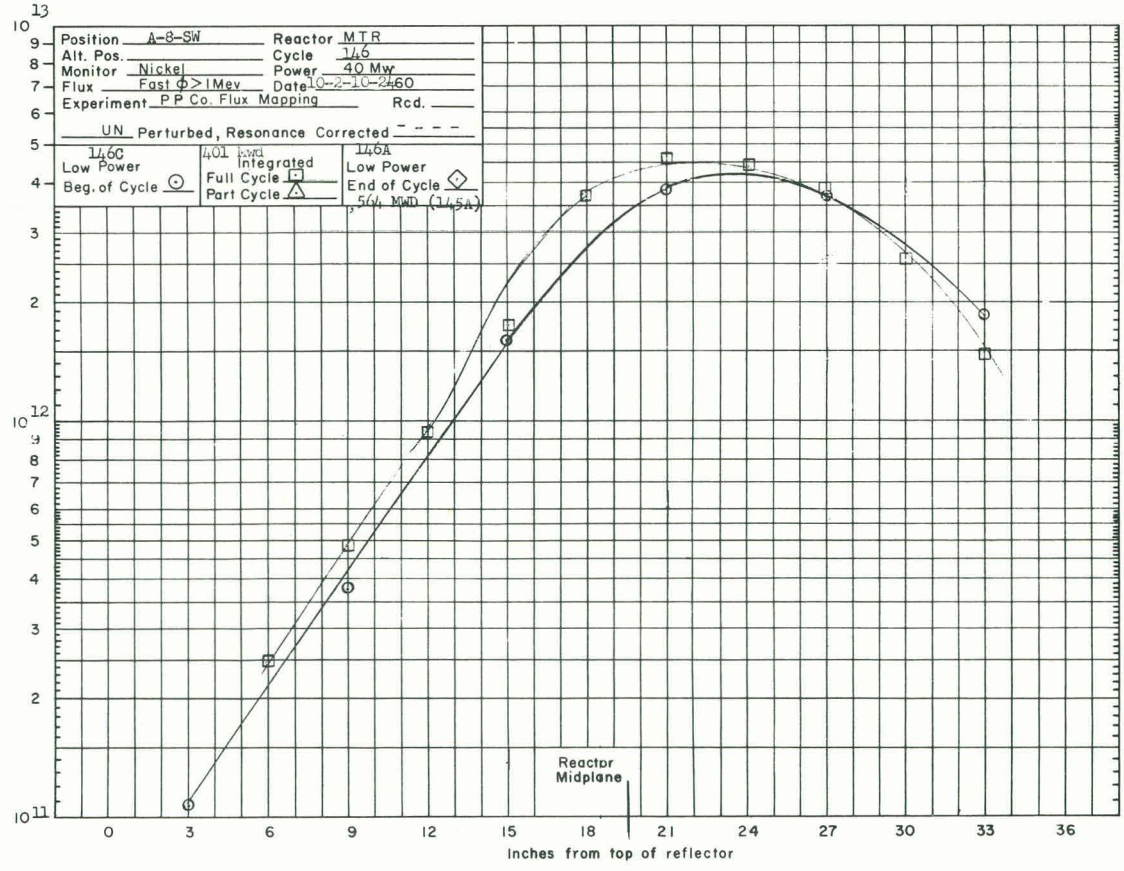

Position A-2-S
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast
Date 10/2-10/24/60
Experiment PPCo Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
Low Power
Beg. of Cycle 0 Mwd
End of Cycle Mwd
Integrated
Full Cycle 401 Mwd
Part Cycle Mwd
Reactor Midplane
Inches from top of Reflector

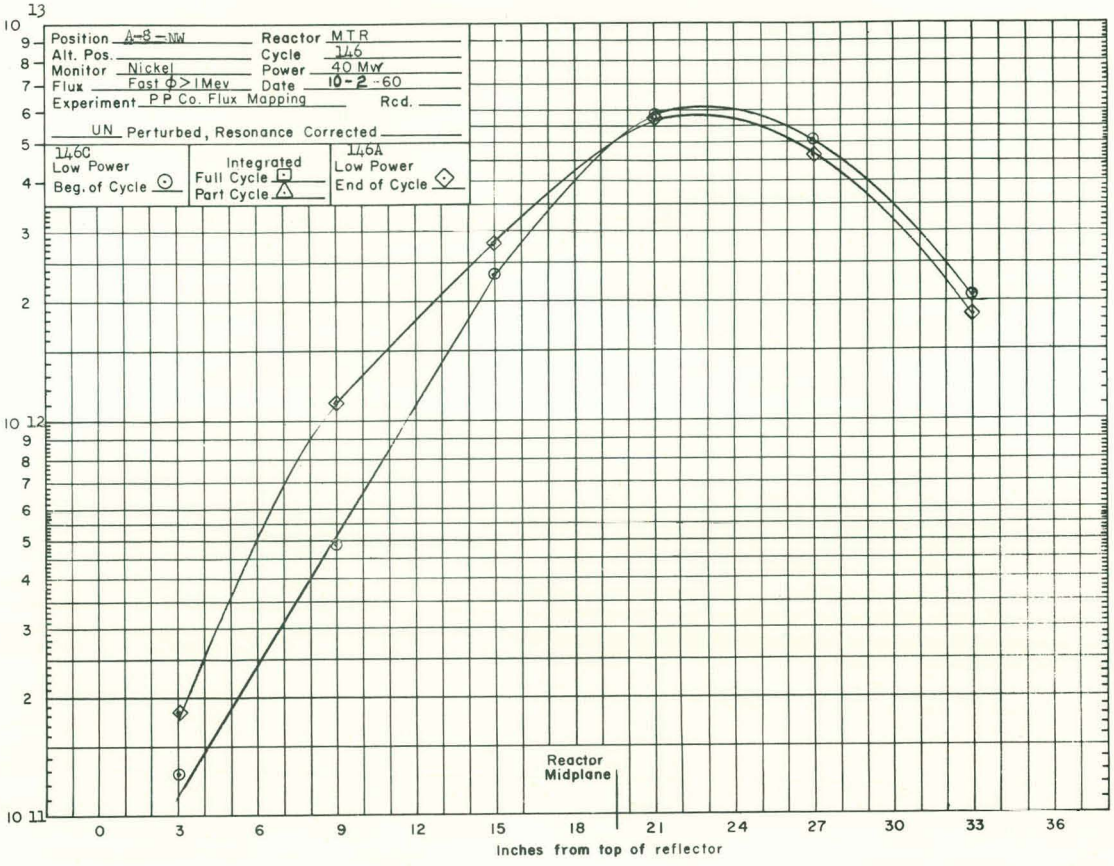

Position A-2-SW
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast Φ>1Mev
Date 10-2-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector
2.48 X 10^11

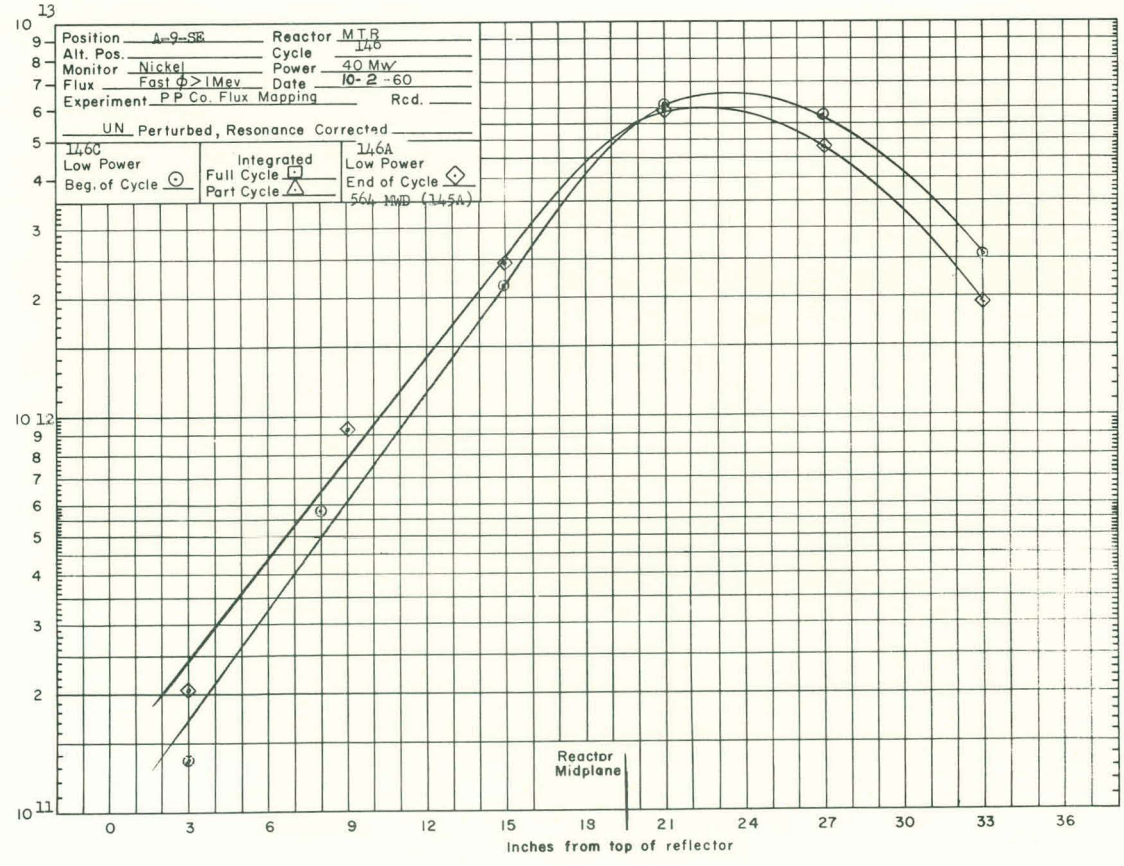

Position A-3-SE
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast Φ>1Mev
Date 10-2-10-2160
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
401
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

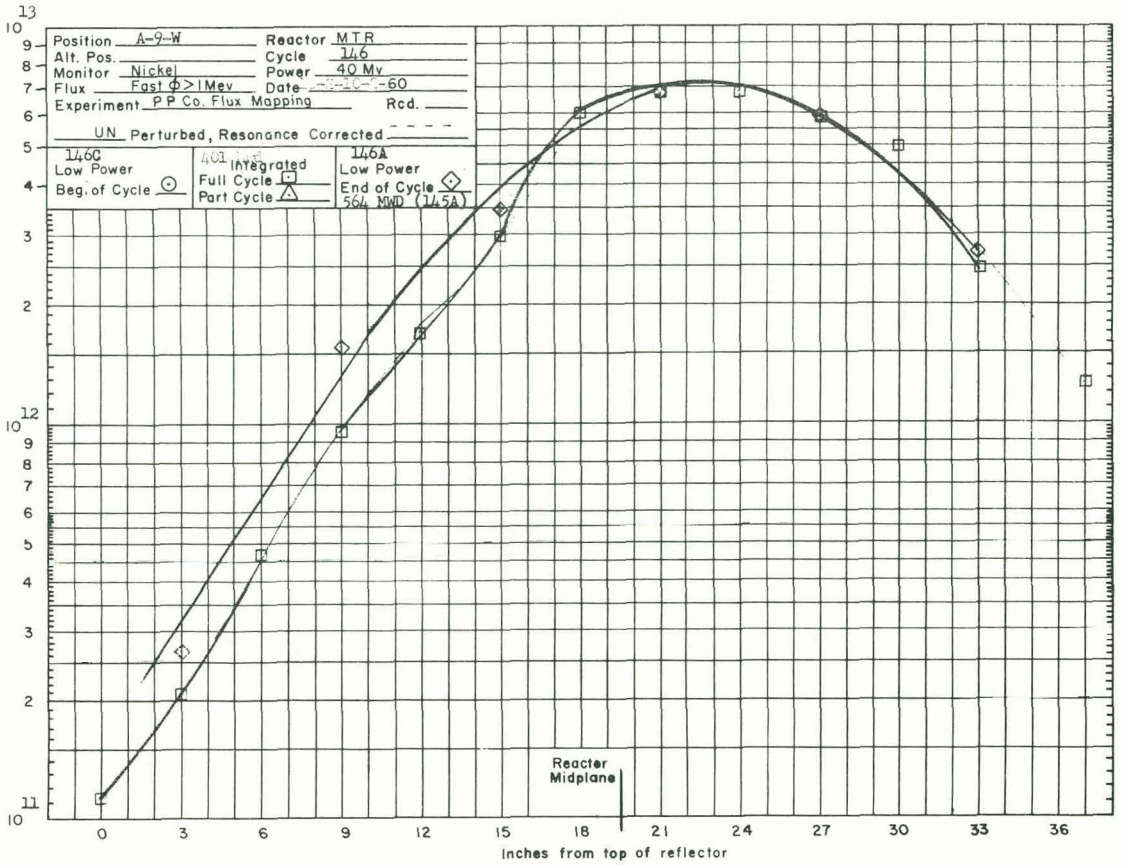

Position A-6-SW
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast Φ>1Mev
Date 10-2-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
2.34 X 10^11
Inches from top of reflector

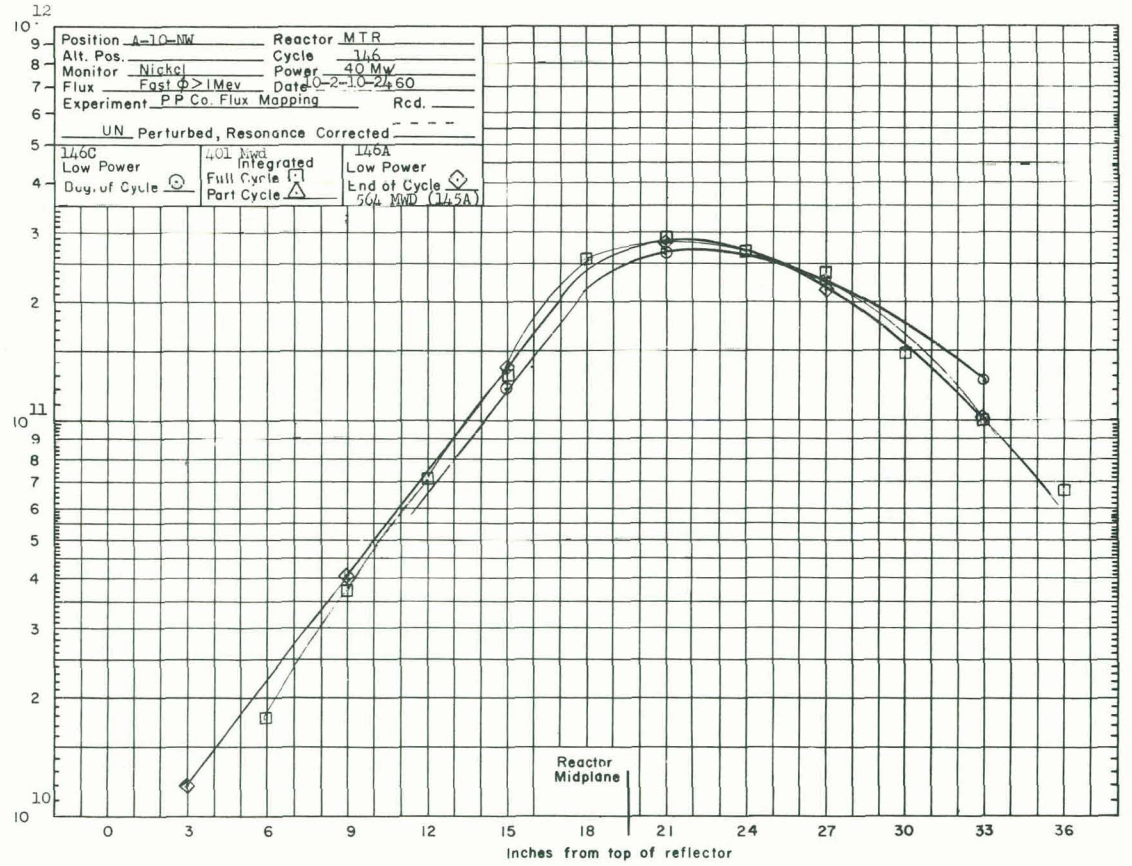

Position A-7-NW
Alt. Pos.
Monitor Nickel
Flux Fast Φ>1Mev
Experiment PP Co. Flux Mapping
Reactor MTR
Cycle 146
Power 40 Mw
Date 10-2-10-2460
Rcd.
UN Perturbed, Resonance Corrected
146C Low Power Beg. of Cycle
401 Mwd Integrated Full Cycle Part Cycle
146A Low Power End of Cycle 564 MWD (145A)
Reactor Midplane
Inches from top of reflector


Position A-8-SW
Alt. Pos.
Monitor Nickel
Flux Fast Φ>1Mev
Experiment PP Co. Flux Mapping
Reactor MTR
Cycle 146
Power 40 Mw
Date 10-2-10-2460
Rcd.
UN Perturbed, Resonance Corrected
146C Low Power Beg. of Cycle
401 Mwd Integrated Full Cycle Part Cycle
146A Low Power End of Cycle 564 MWD (145A)
Reactor Midplane
Inches from top of reflector


Position A-8-NW
Alt. Pos.
Monitor Nickel
Flux Fast Φ>1Mev
Experiment PP Co. Flux Mapping
Reactor MTR
Cycle 146
Power 40 MW
Date 10-2-60
Rcd.
UN Perturbed, Resonance Corrected
146C Low Power Beg. of Cycle
Integrated Full Cycle Part Cycle
146A Low Power End of Cycle
Reactor Midplane
Inches from top of reflector


Position A-9-SE
Alt. Pos.
Monitor Nickel
Flux Fast Φ>1Mev
Experiment PP Co. Flux Mapping
Reactor MTR
Cycle 146
Power 40 MW
Date 10-2-60
Rcd.
UN Perturbed, Resonance Corrected
146C Low Power Beg. of Cycle
Integrated Full Cycle Part Cycle
146A Low Power End of Cycle
564 MWD (146A)
Reactor Midplane
Inches from top of reflector


Position A-9-W
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast Φ>1Mev
Date 10-2-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
401 Mwd
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector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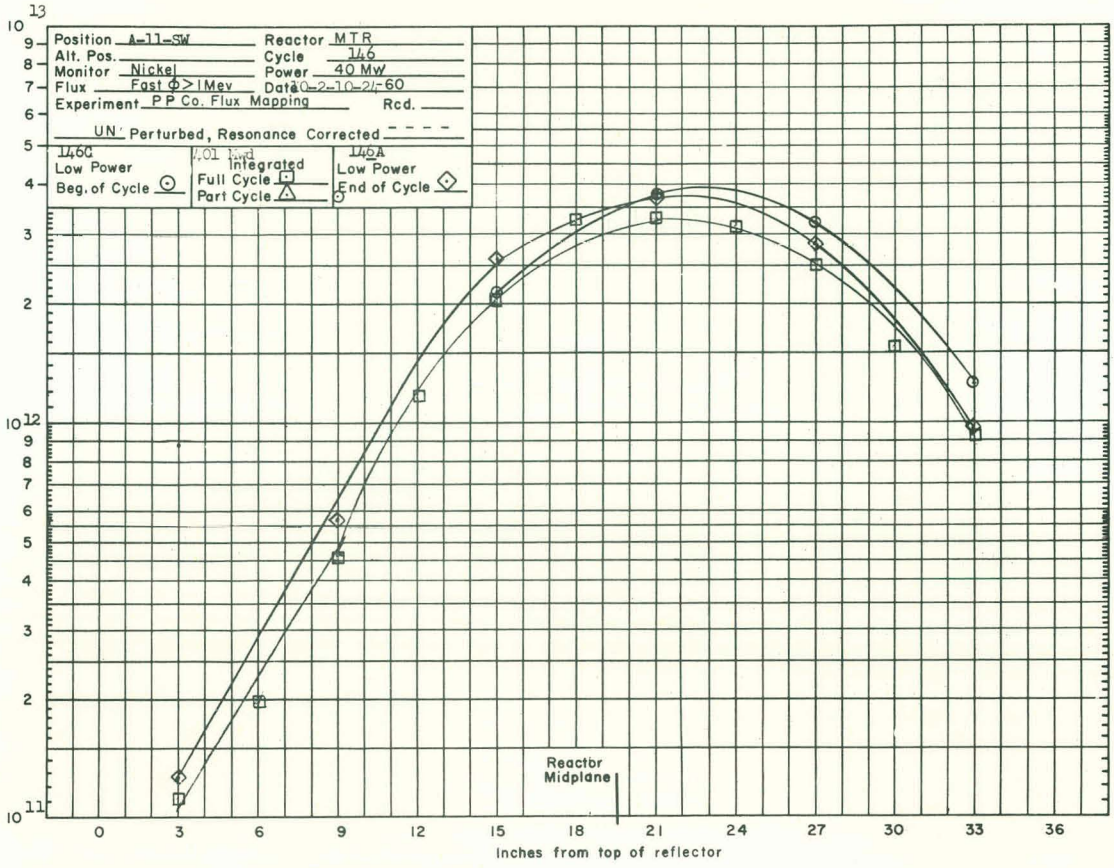
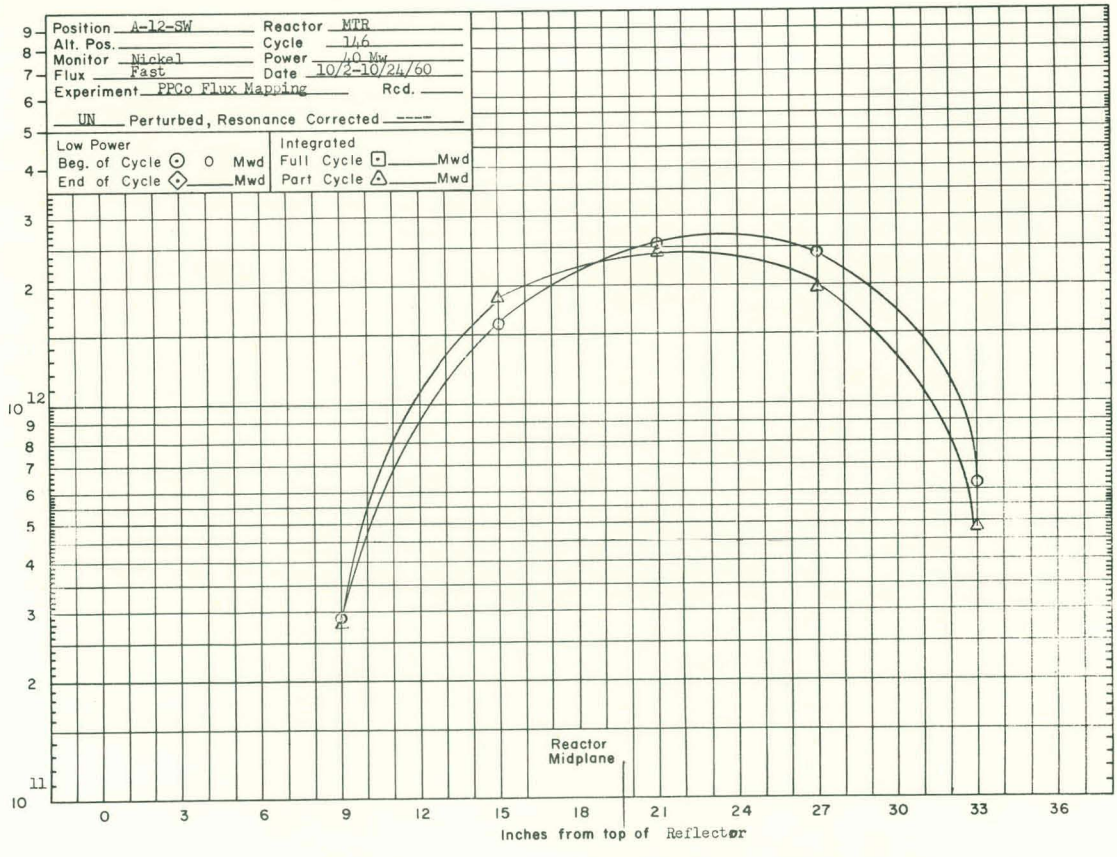
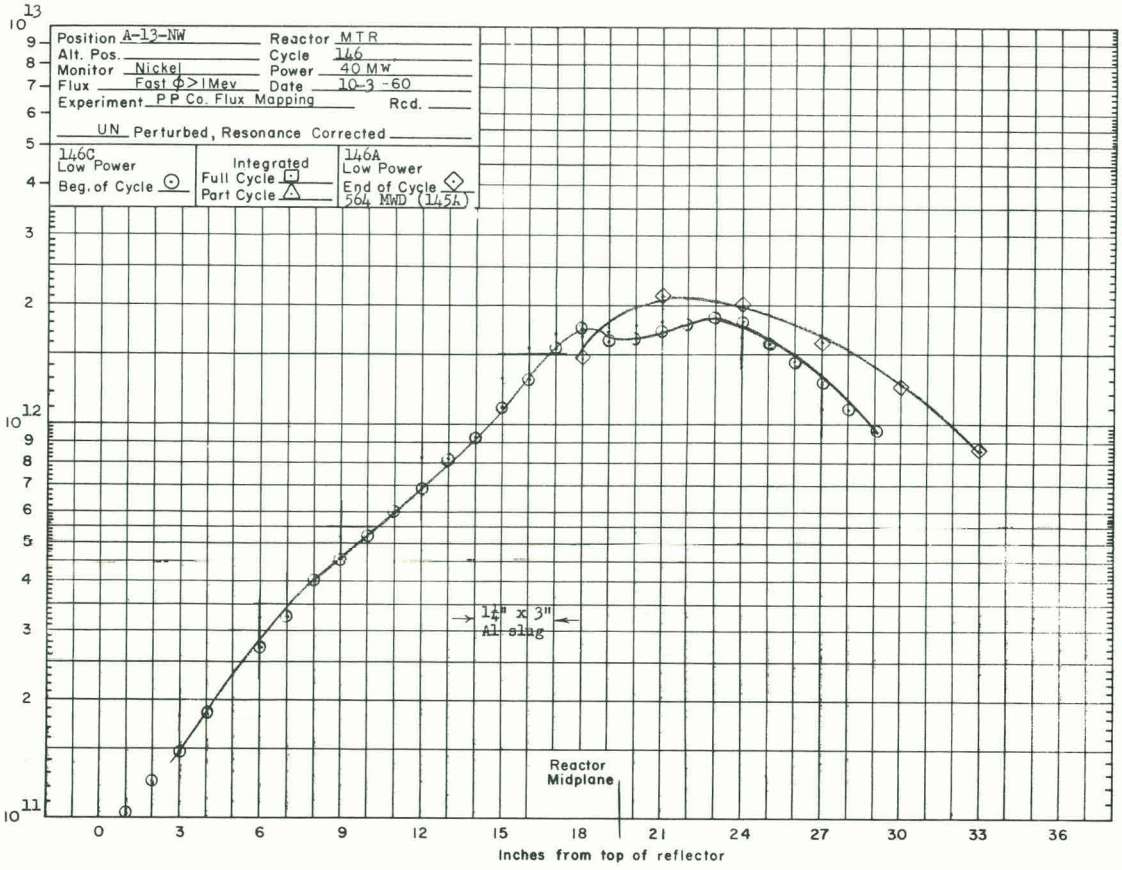
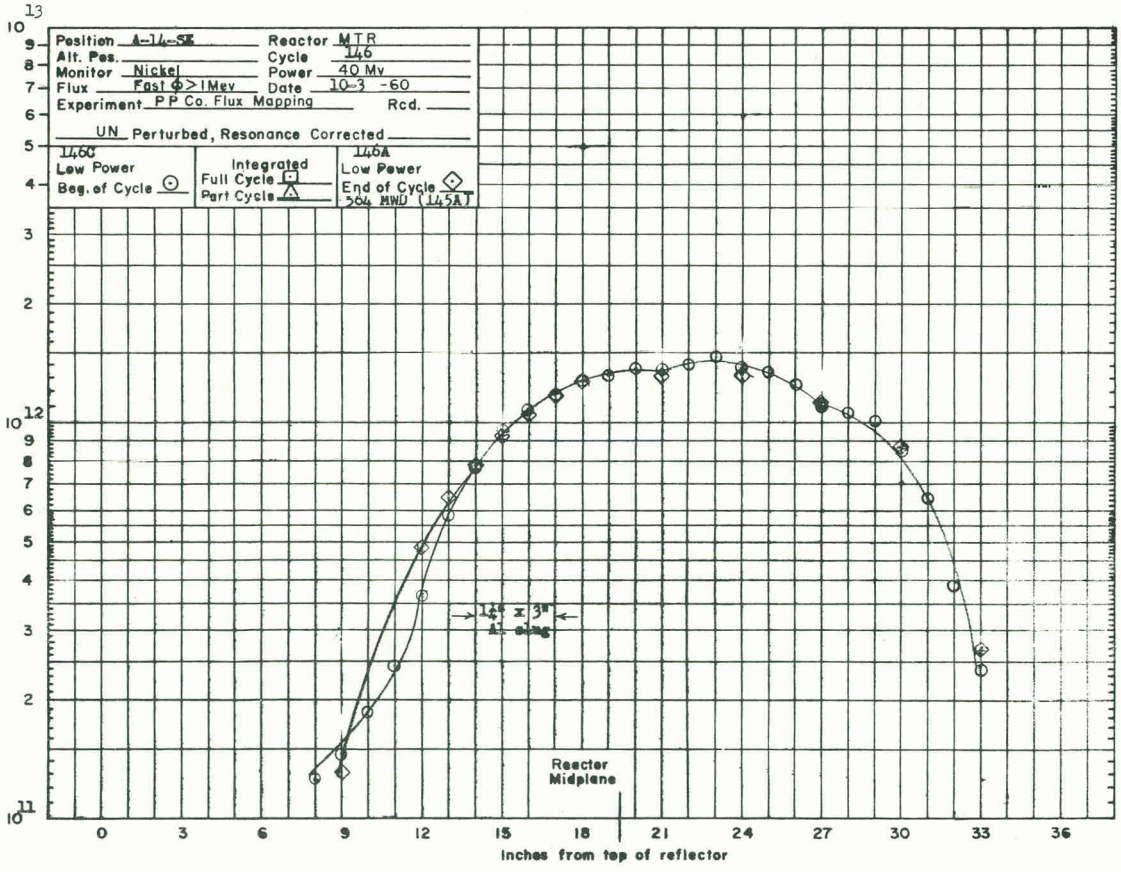
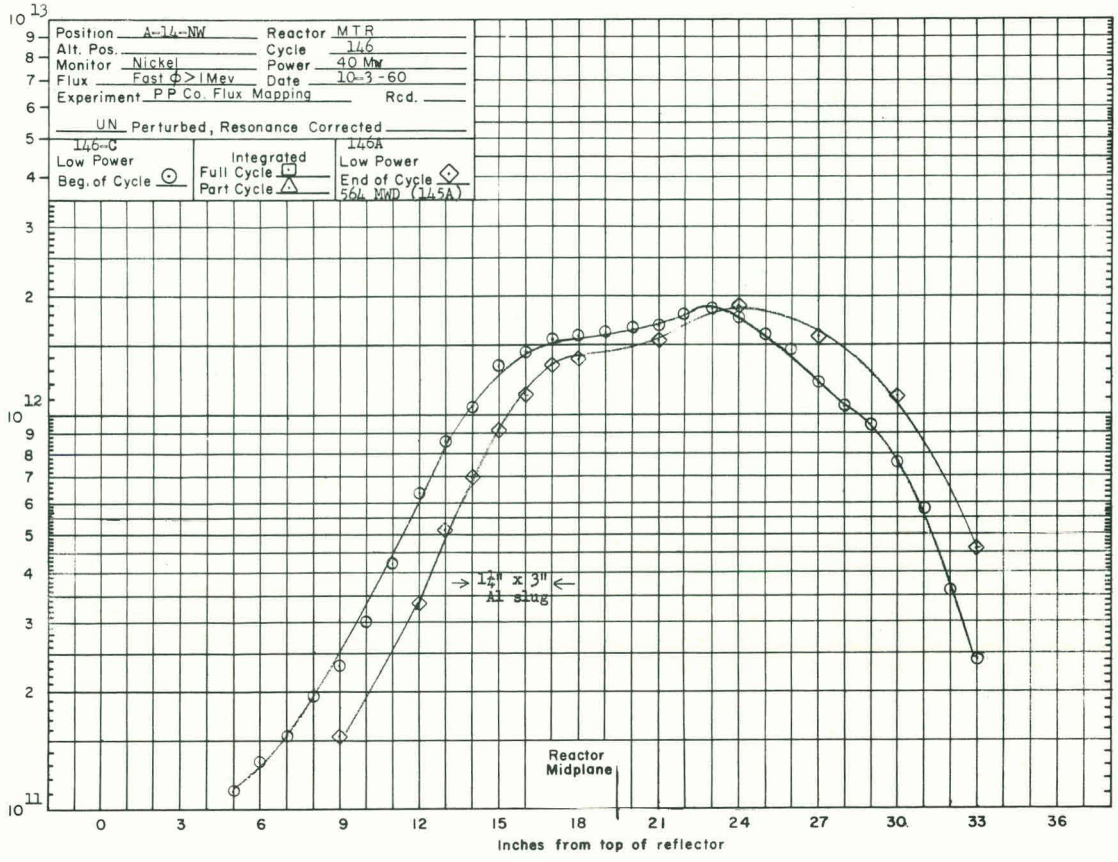
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast Φ>1Mev
Date 10-2-10-2460
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
401 Mwd
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

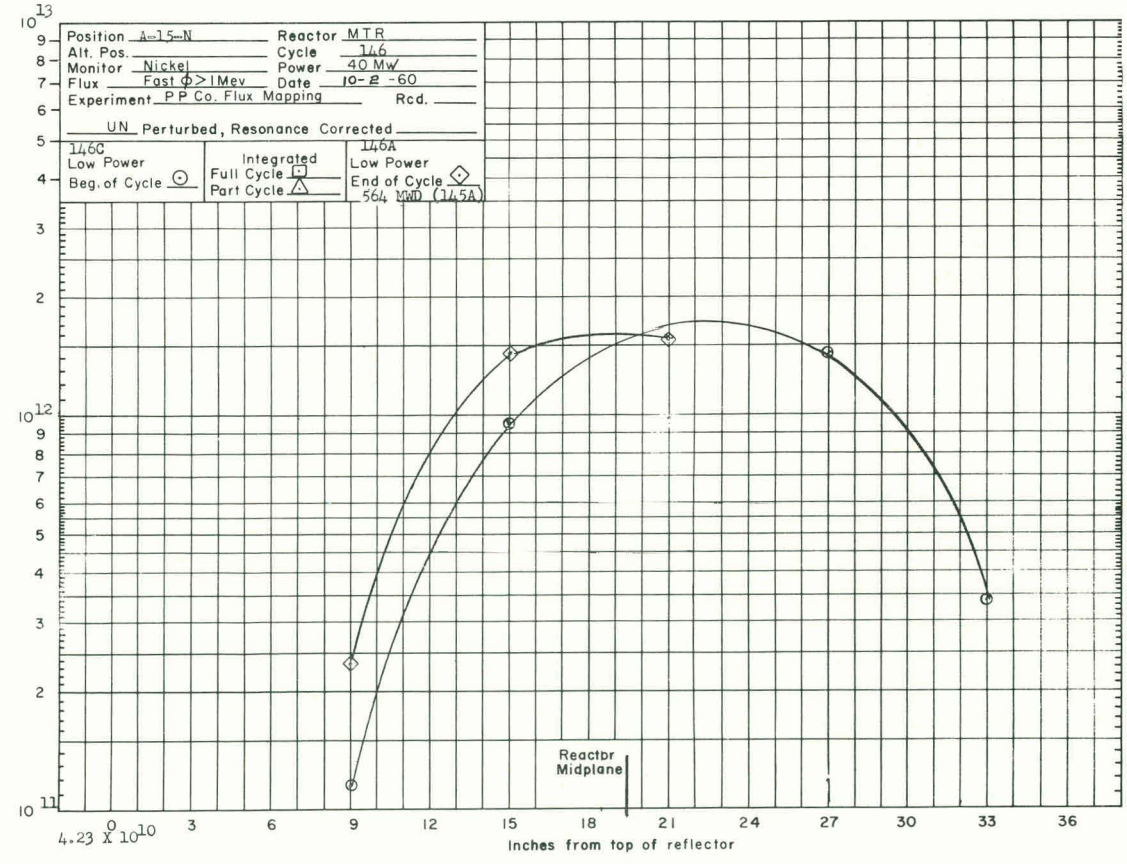

Position A-11-SW
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ>1Mev
Date 10-2-10-24-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
4.01 Mwd
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
Reactor Midplane
Inches from top of reflector


Position A-12-SW
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast
Date 10/2-10/24/60
Experiment PPCo Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
Low Power
Beg. of Cycle 0 Mwd
End of Cycle Mwd
Integrated
Full Cycle Mwd
Part Cycle Mwd
Reactor Midplane
Inches from top of Reflector


Position A-13-NW
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ>1Mev
Date 10-3 -60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C Low Power Beg. of Cycle
Integrated Full Cycle Part Cycle
146A Low Power End of Cycle 564 MWD (145A)
1¼" x 3" Al slug
Reactor Midplane
Inches from top of reflector


Position A-14-SE
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mv
Flux Fast Φ>1Mev
Date 10-3 -60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C Low Power Beg. of Cycle
Integrated Full Cycle Part Cycle
146A Low Power End of Cycle 564 MWD (145A)
1¼" x 3" Al slug
Reactor Midplane
Inches from top of reflector


Position A-14-NW
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ>1Mev
Date 10-3-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146-C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
1½" x 3" Al slug
Reactor Midplane
Inches from top of reflector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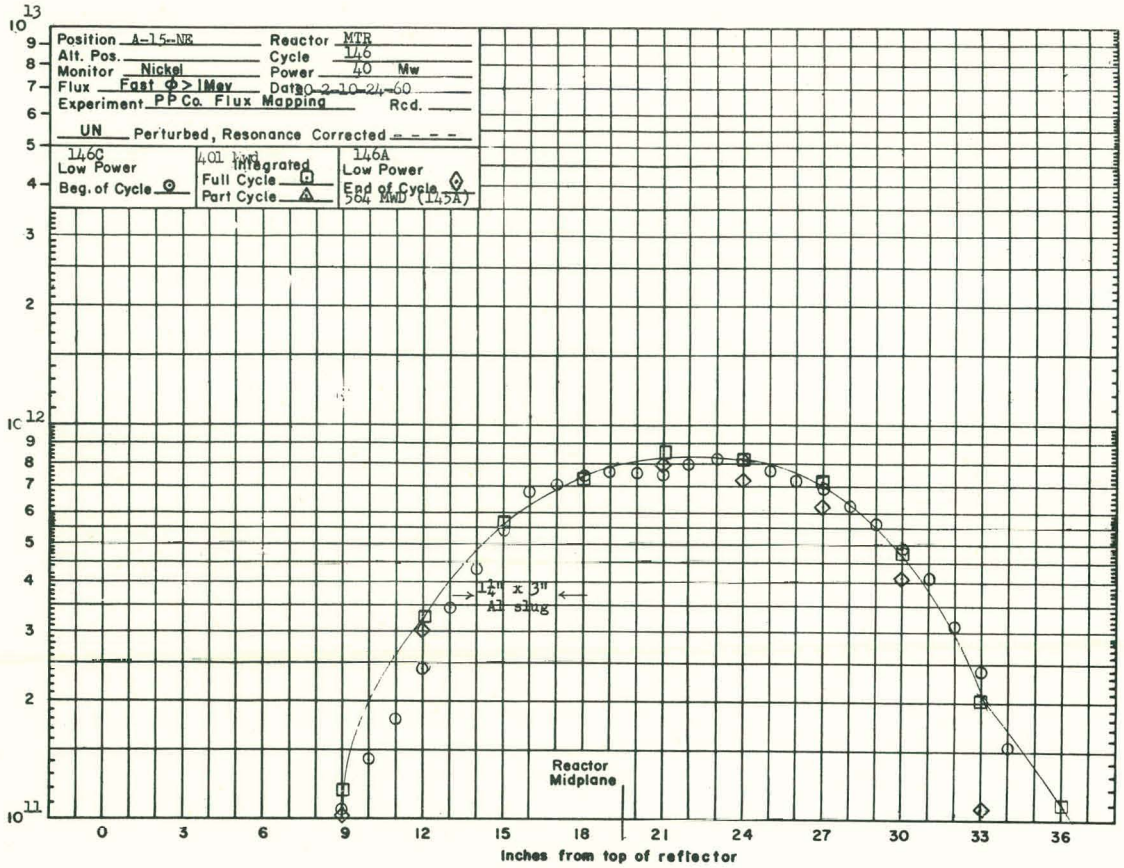
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ>1Mev
Date 10-2-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
4.23 X 10^10
Inches from top of reflector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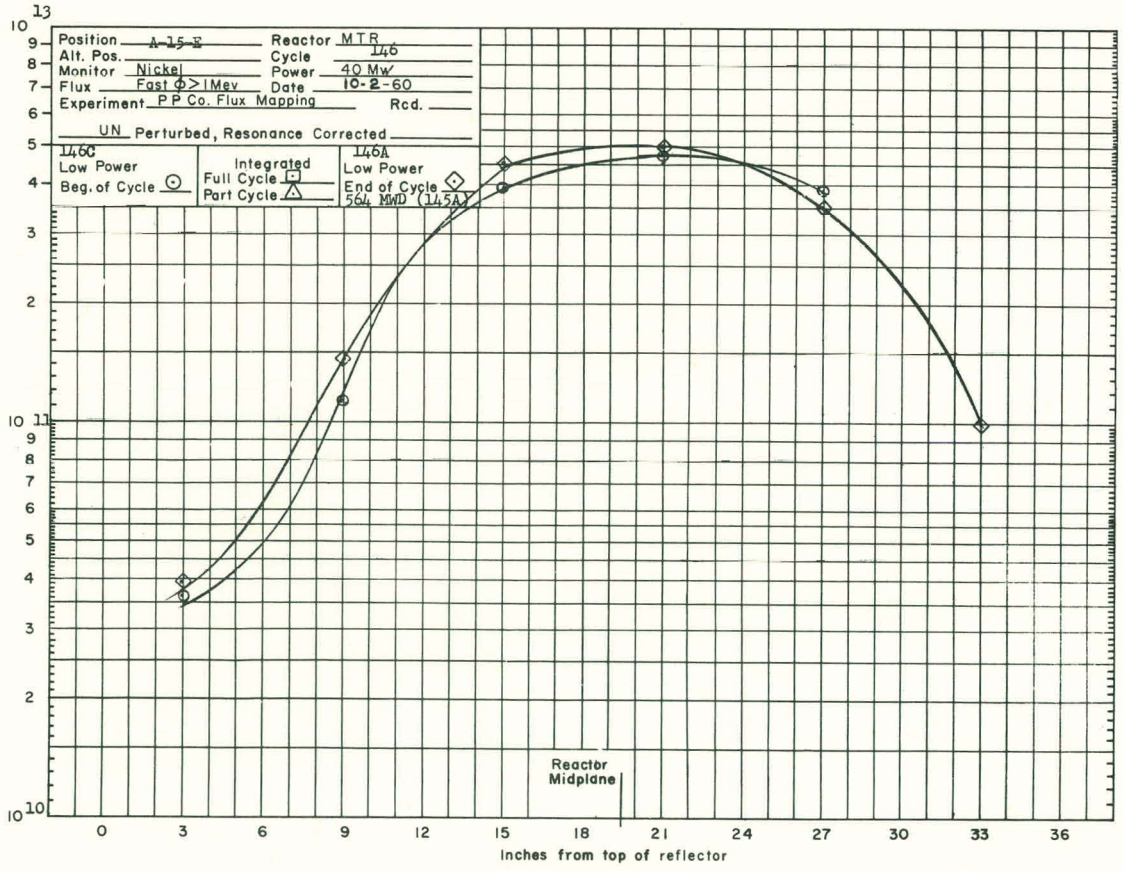
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast Φ>1Mev
Date 10-2-10-24-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C Low Power Beg. of Cycle
401 MWD
Integrated
Full Cycle
Part Cycle
146A Low Power End of Cycle
564 MWD (145A)
1¼" x 3" Al slug
Reactor Midplane
Inches from top of reflector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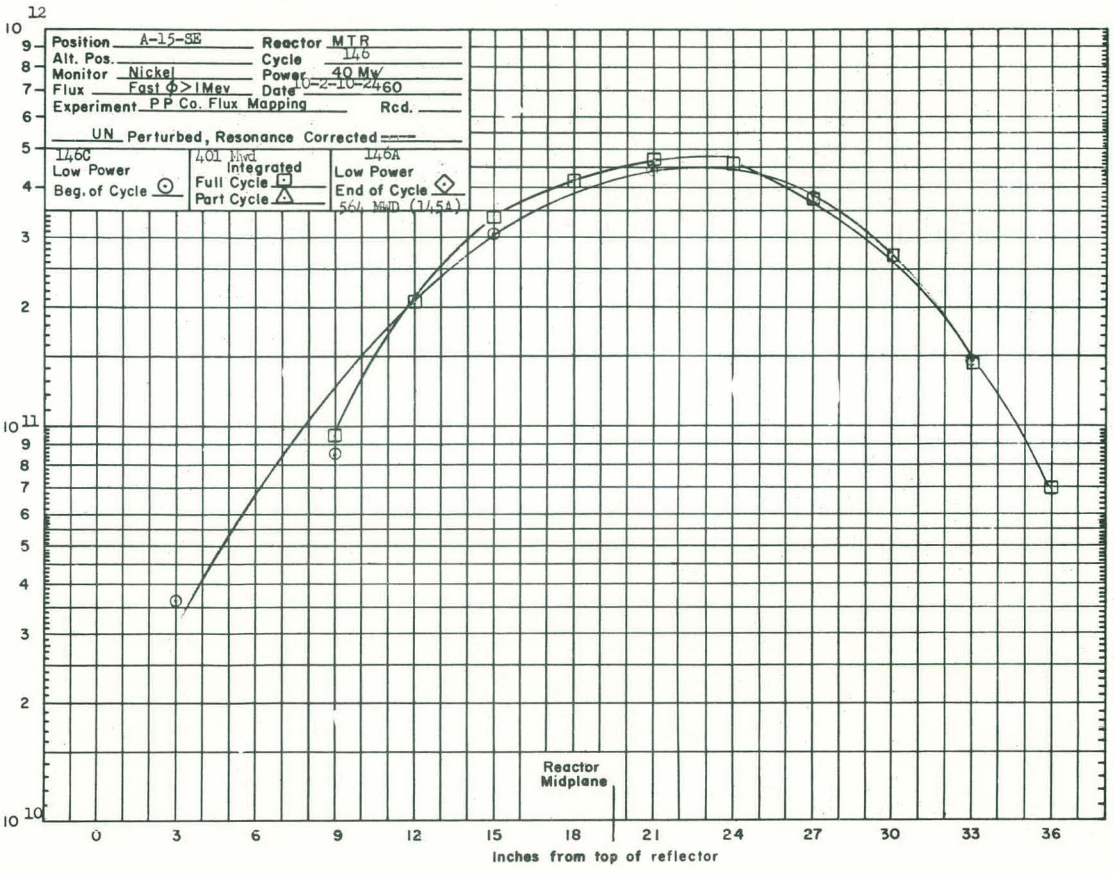
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ>1Mev
Date 10-2-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C Low Power Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A Low Power End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector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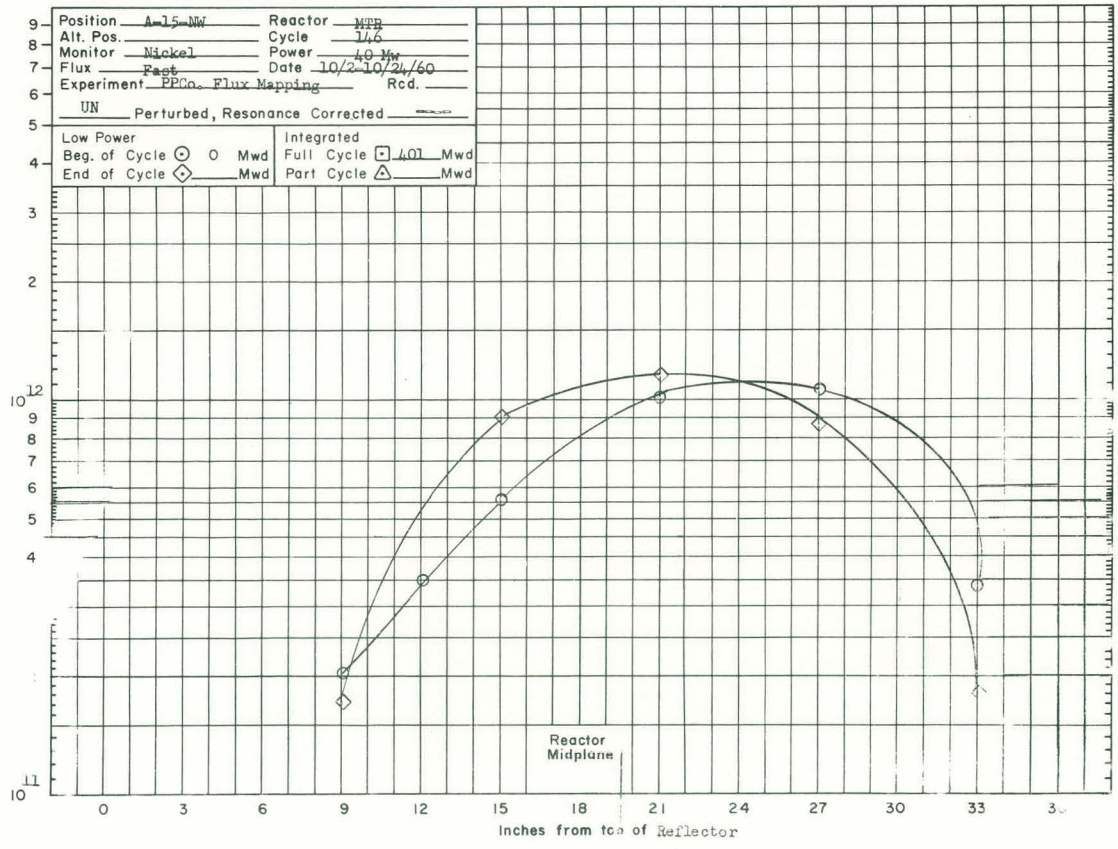
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ>1Mev
Date 10-2-10-2460
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
401 Mwd
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (14.5A)
Reactor Midplane
Inches from top of reflector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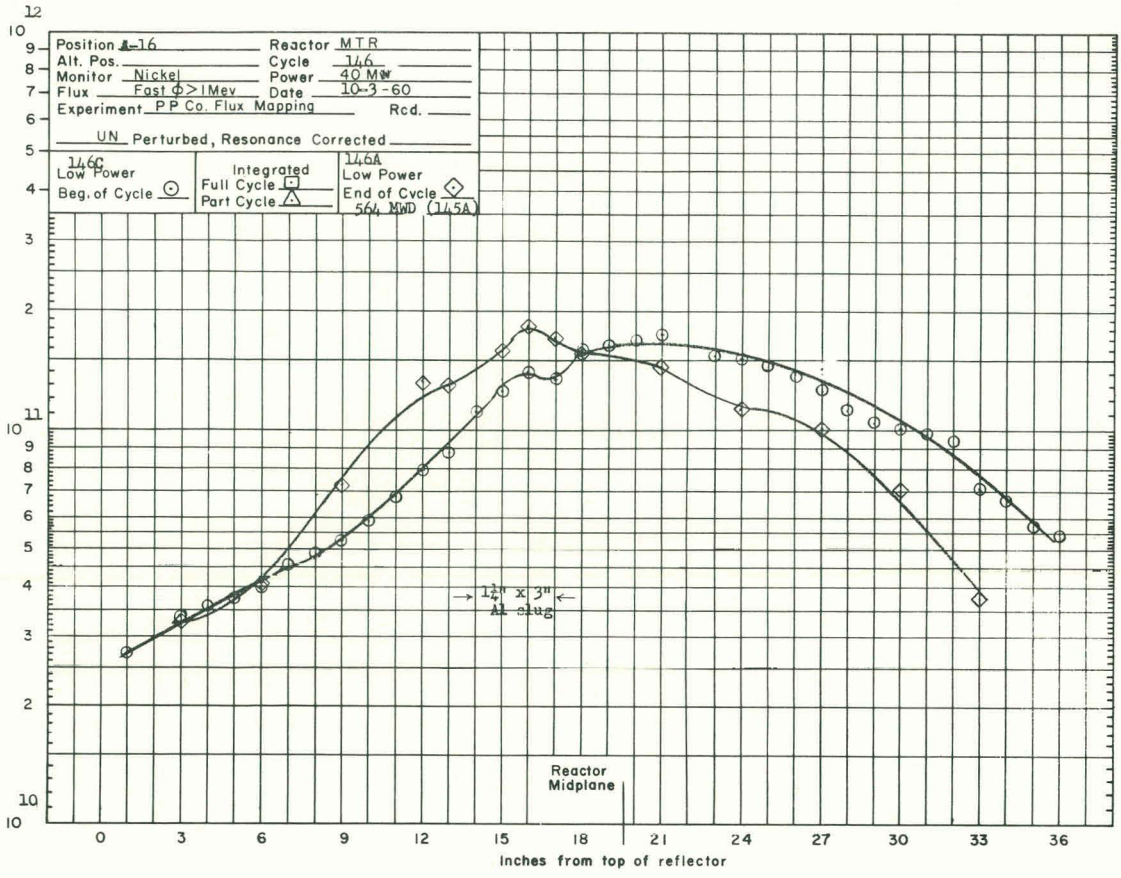
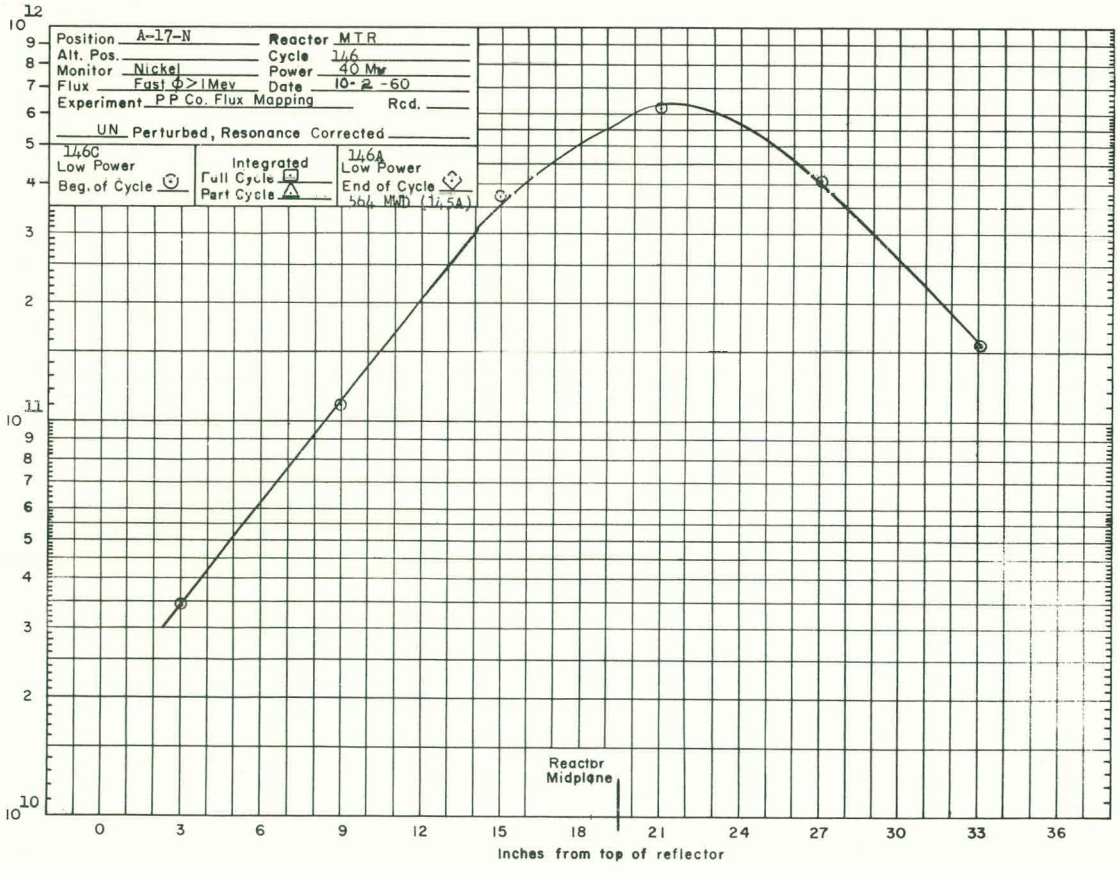
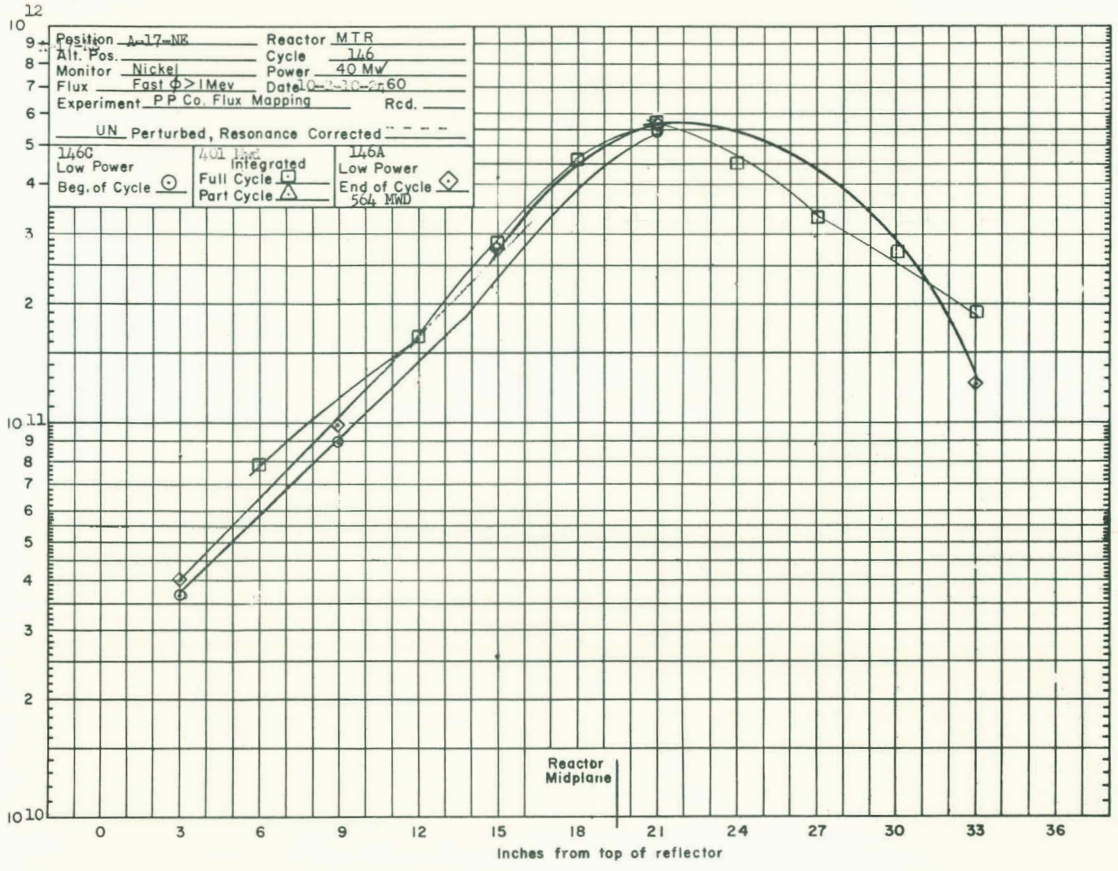
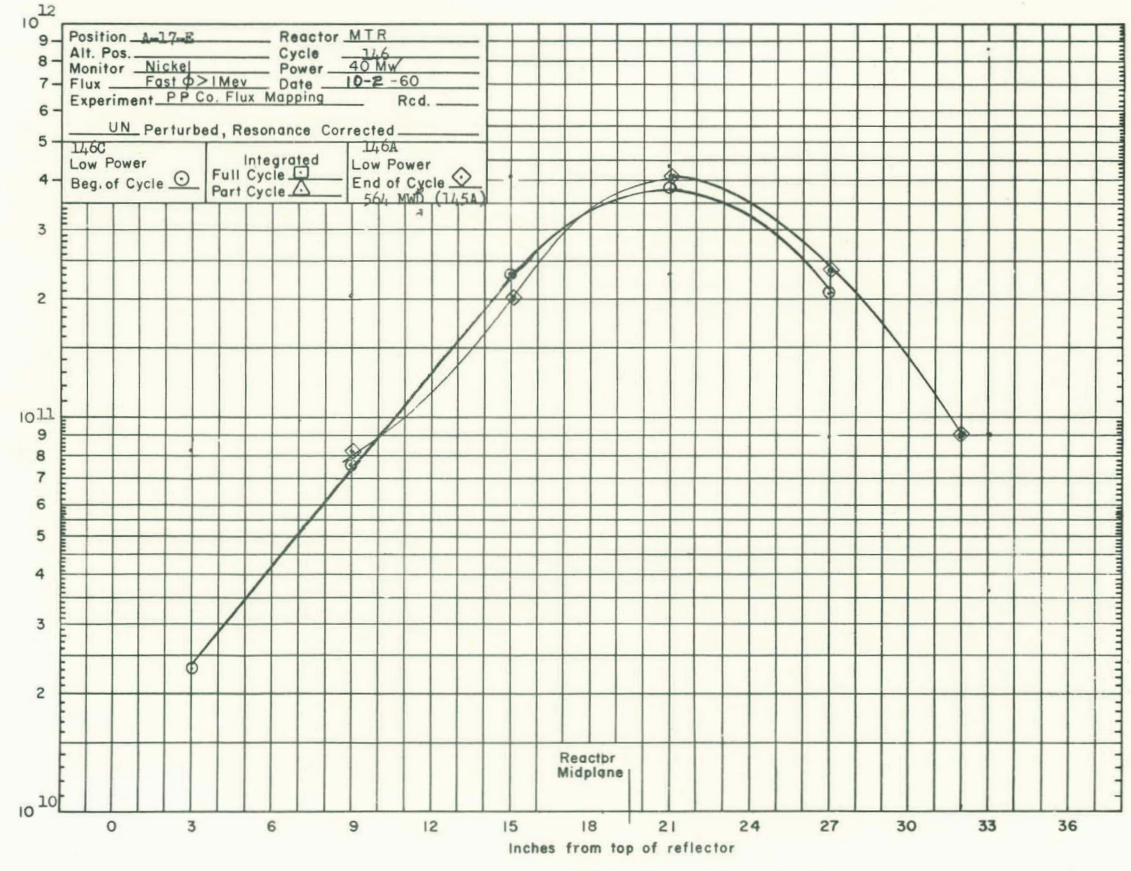
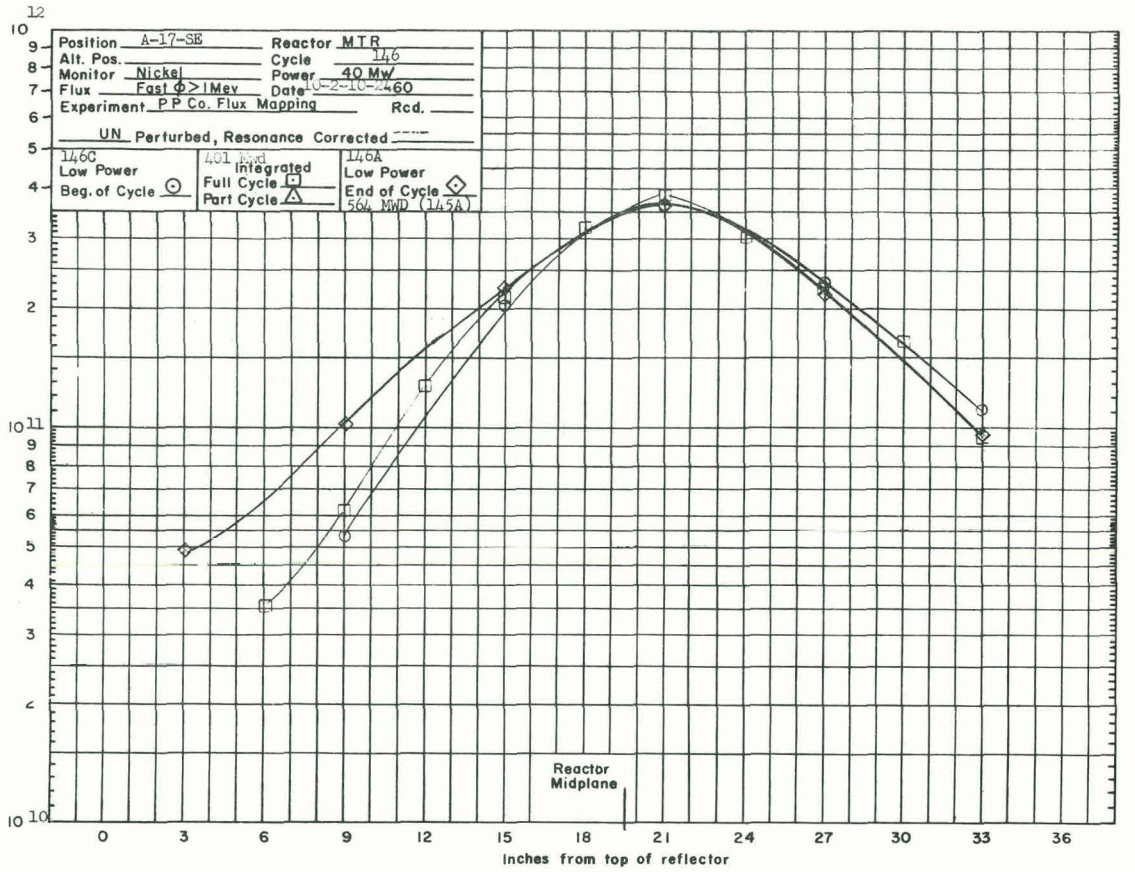
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast
Date 10/2-10/24/60
Experiment PPCo. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
Low Power
Beg. of Cycle 0 Mwd
End of Cycle Mwd
Integrated
Full Cycle 401 Mwd
Part Cycle Mwd
Reactor Midplane
Inches from top of Reflector

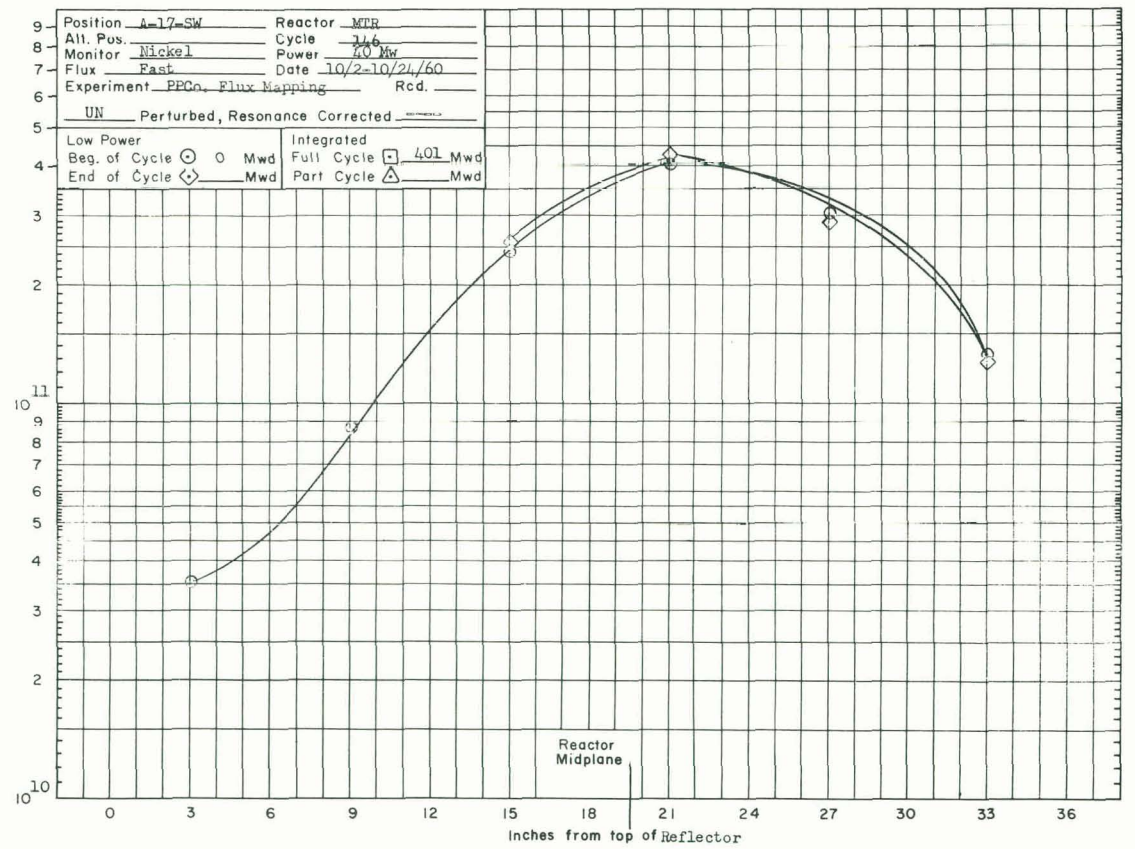

Position A-16
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ>1Mev
Date 10-3-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
1½" x 3" Al plug
Reactor Midplane
Inches from top of reflector

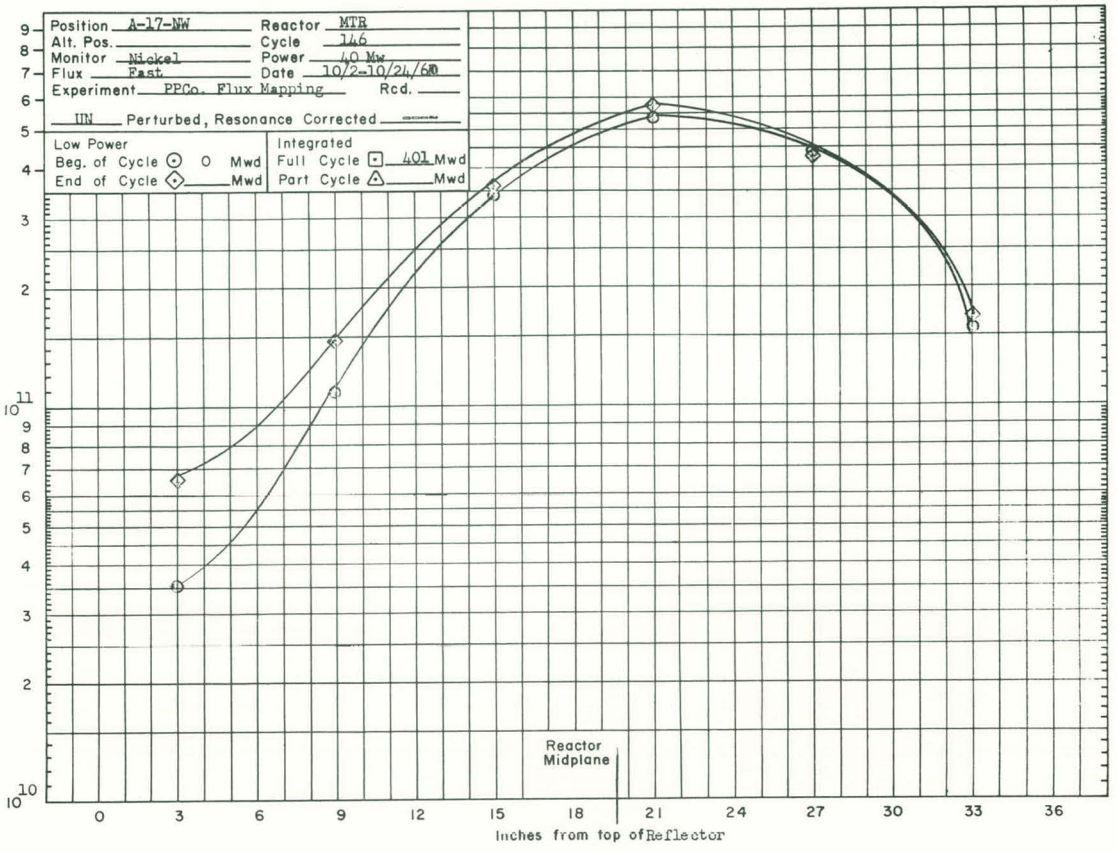

Position A-17-N
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ>1Mev
Date 10-2-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

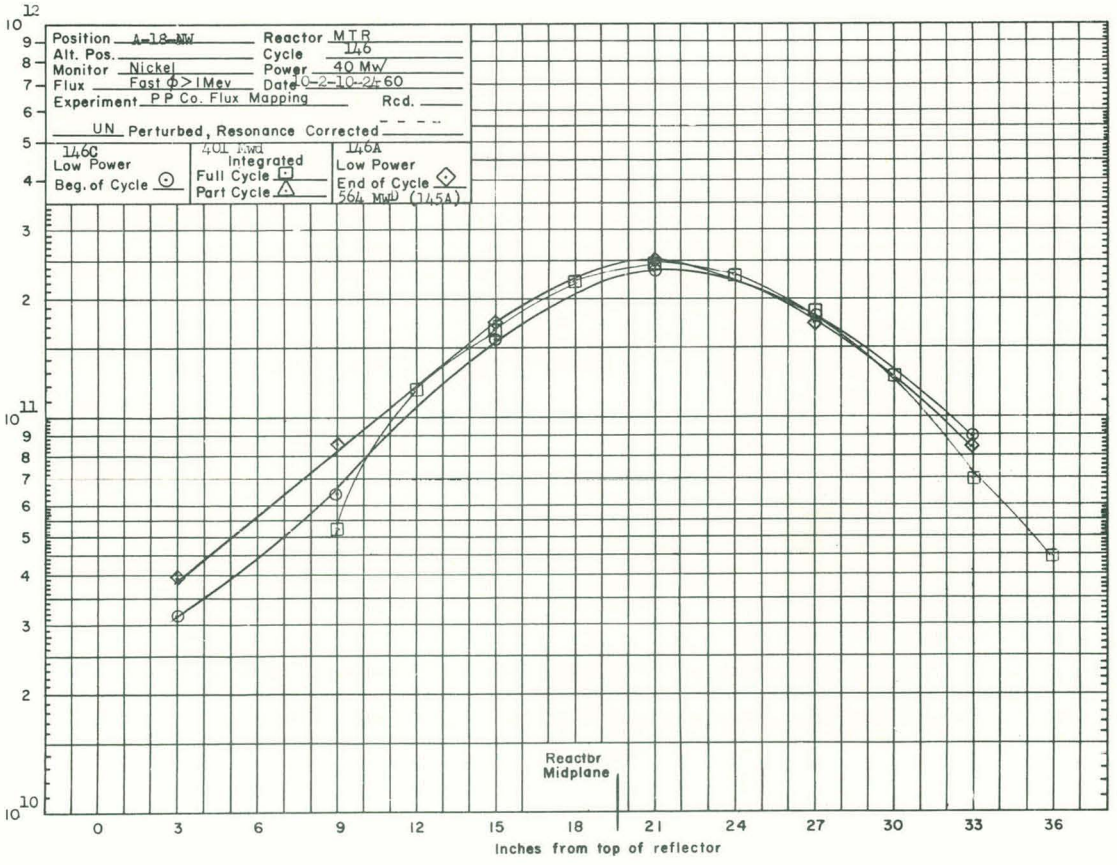

Position A-17-NE
Alt. Pos.
Monitor Nickel
Flux Fast Φ>1Mev
Experiment PP Co. Flux Mapping
Reactor MTR
Cycle 146
Power 40 MW
Date 10-1-10-2-60
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD
Reactor Midplane
Inches from top of reflector

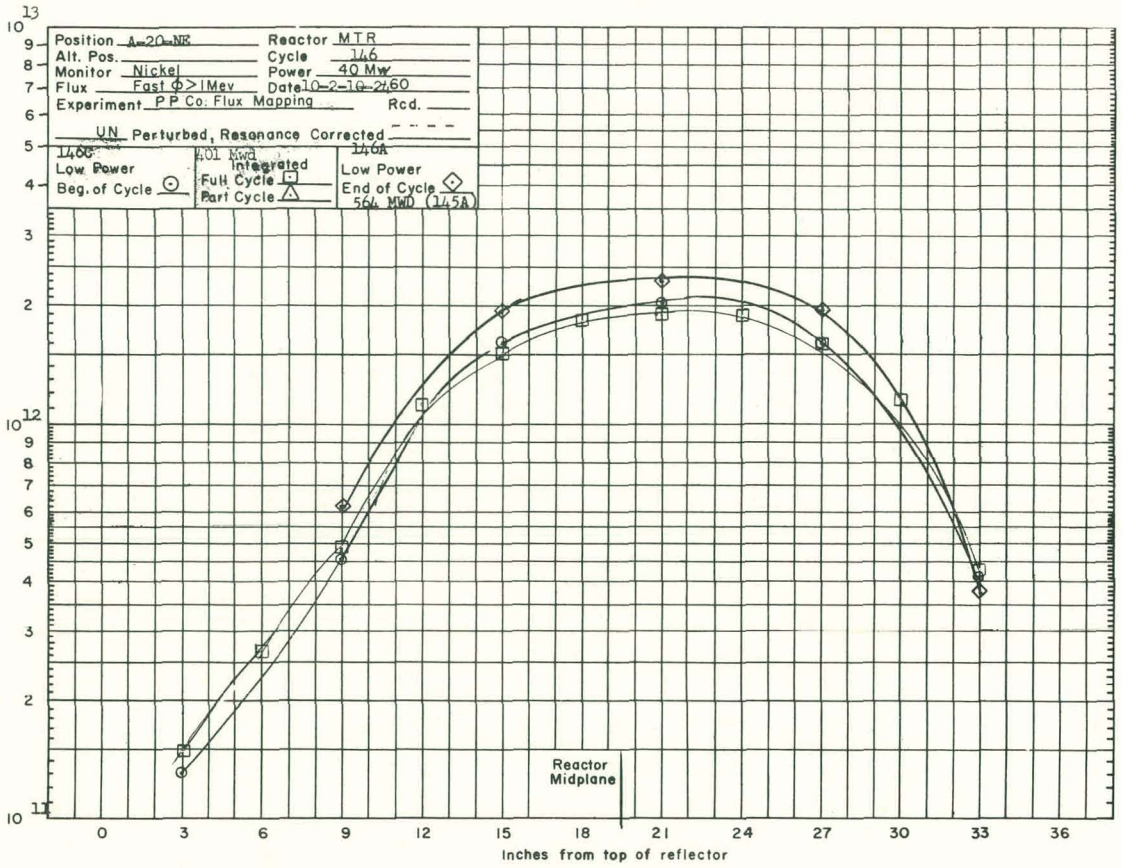

Position A-17-E
Alt. Pos.
Monitor Nickel
Flux Fast Φ>1Mev
Experiment PP Co. Flux Mapping
Reactor MTR
Cycle 146
Power 40 MW
Date 10-2-60
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

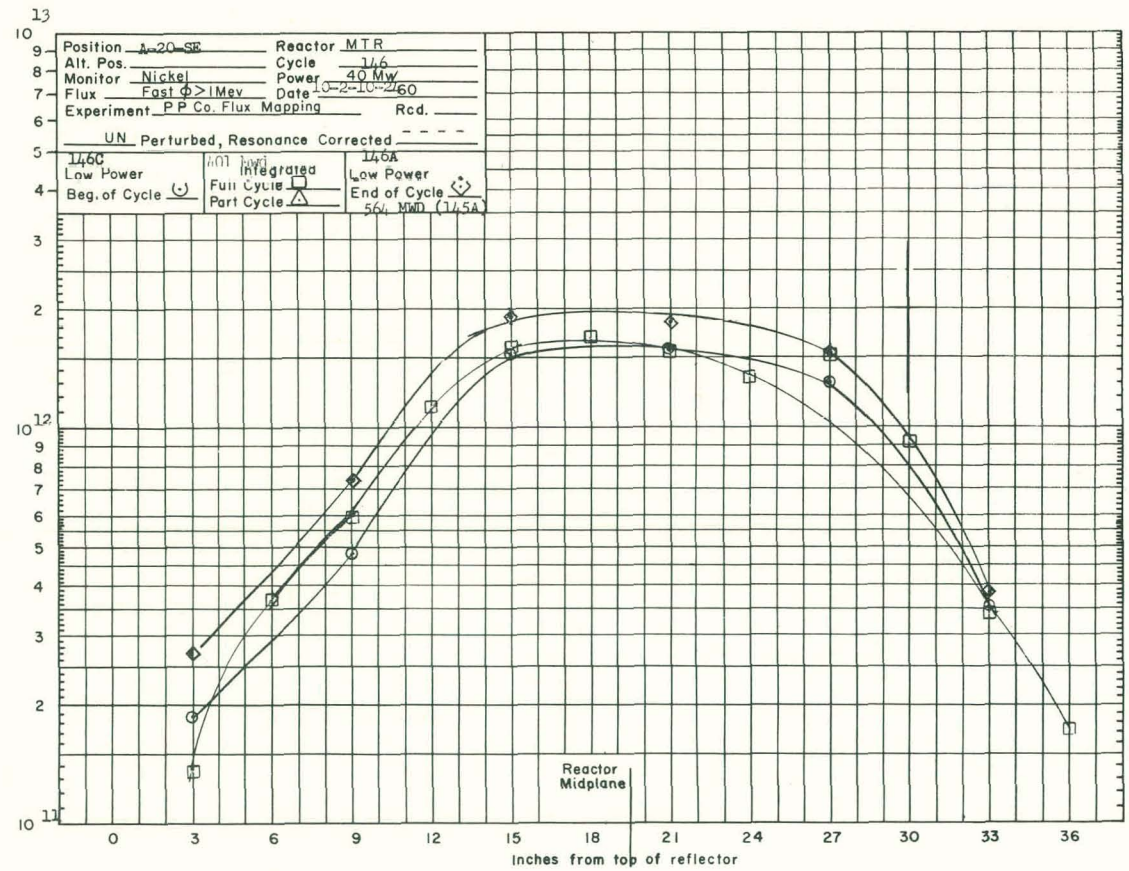

Position A-17-SE
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ>1Mev
Date 10-2-10-24-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
401 Mwd
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

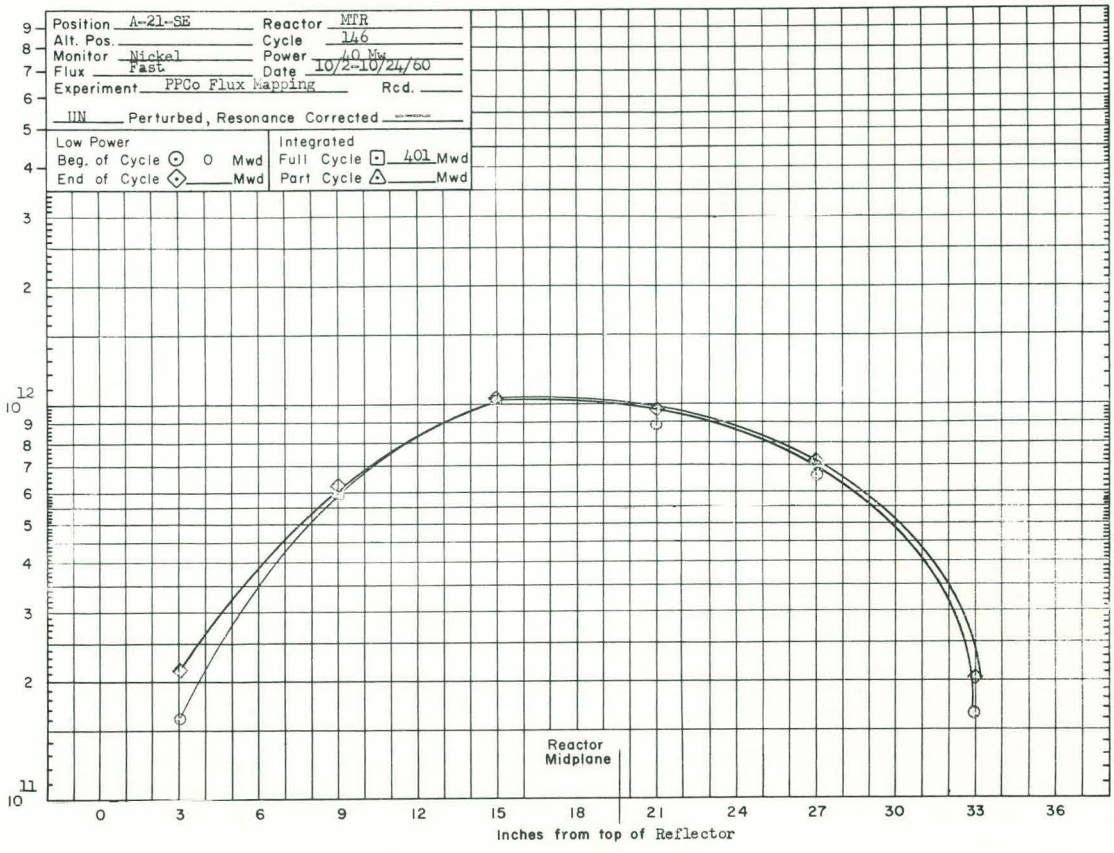

Position A-17-SW
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast
Date 10/2-10/24/60
Experiment PPCo. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
Low Power
Beg. of Cycle 0 Mwd
End of Cycle Mwd
Integrated
Full Cycle 401 Mwd
Part Cycle Mwd
Reactor Midplane
Inches from top of Reflector

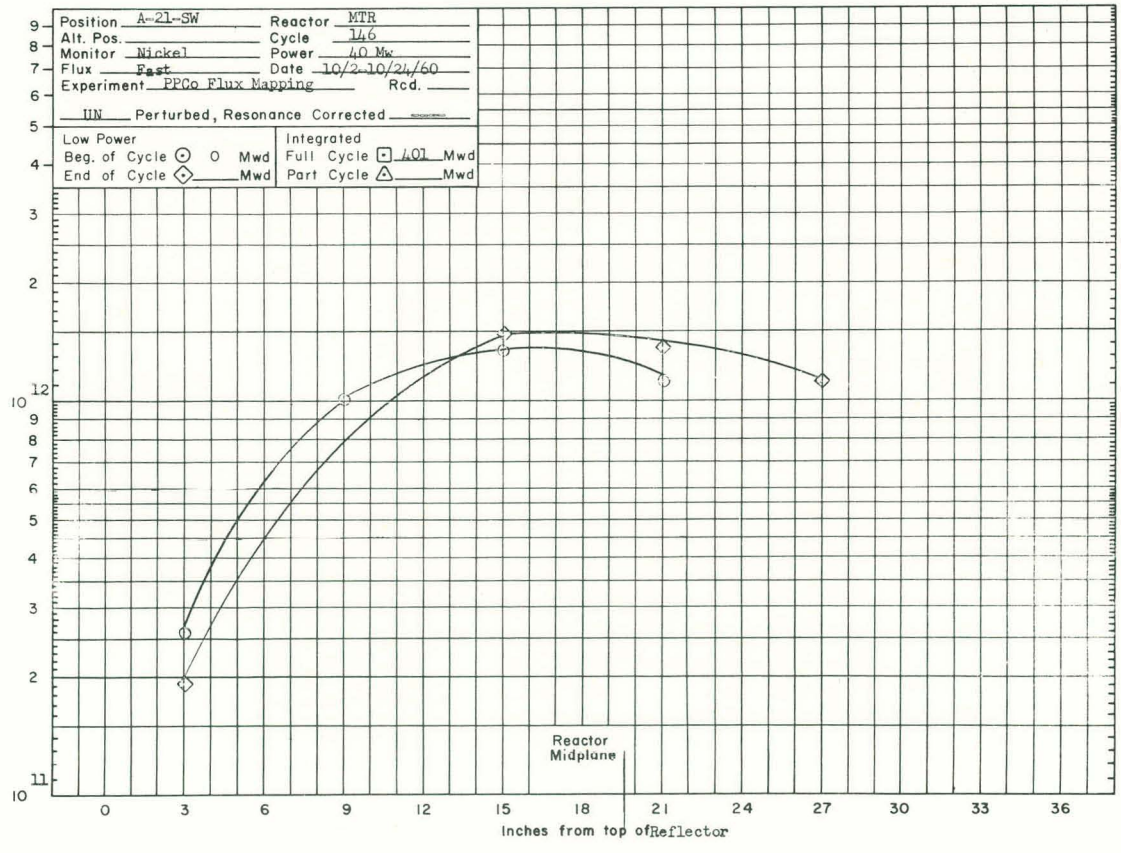

Position A-17-NW
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast
Date 10/2-10/24/60
Experiment PPCo. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
Low Power
Beg. of Cycle 0 Mwd
End of Cycle Mwd
Integrated
Full Cycle 401 Mwd
Part Cycle Mwd
Reactor Midplane
Inches from top of Reflector

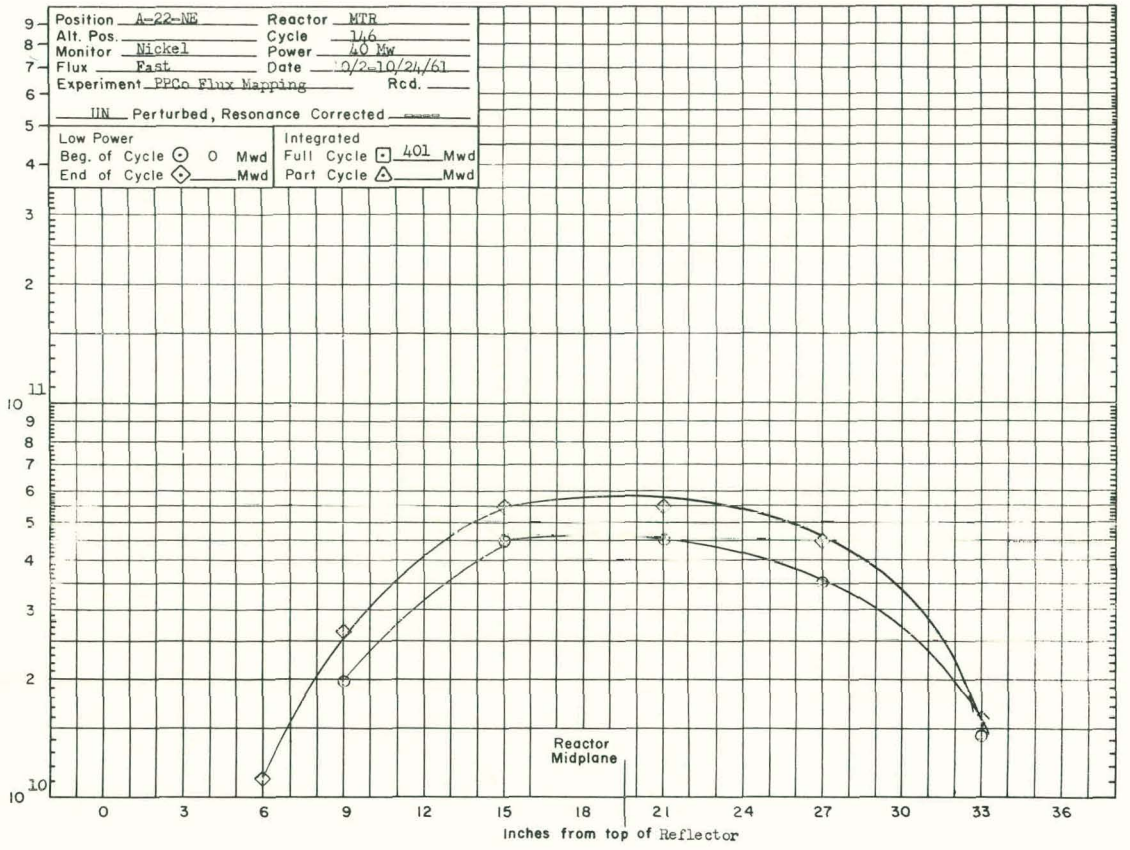

Position A-18-NW
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ>1Mev
Date 10-2-10-24-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
401 Mwd
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

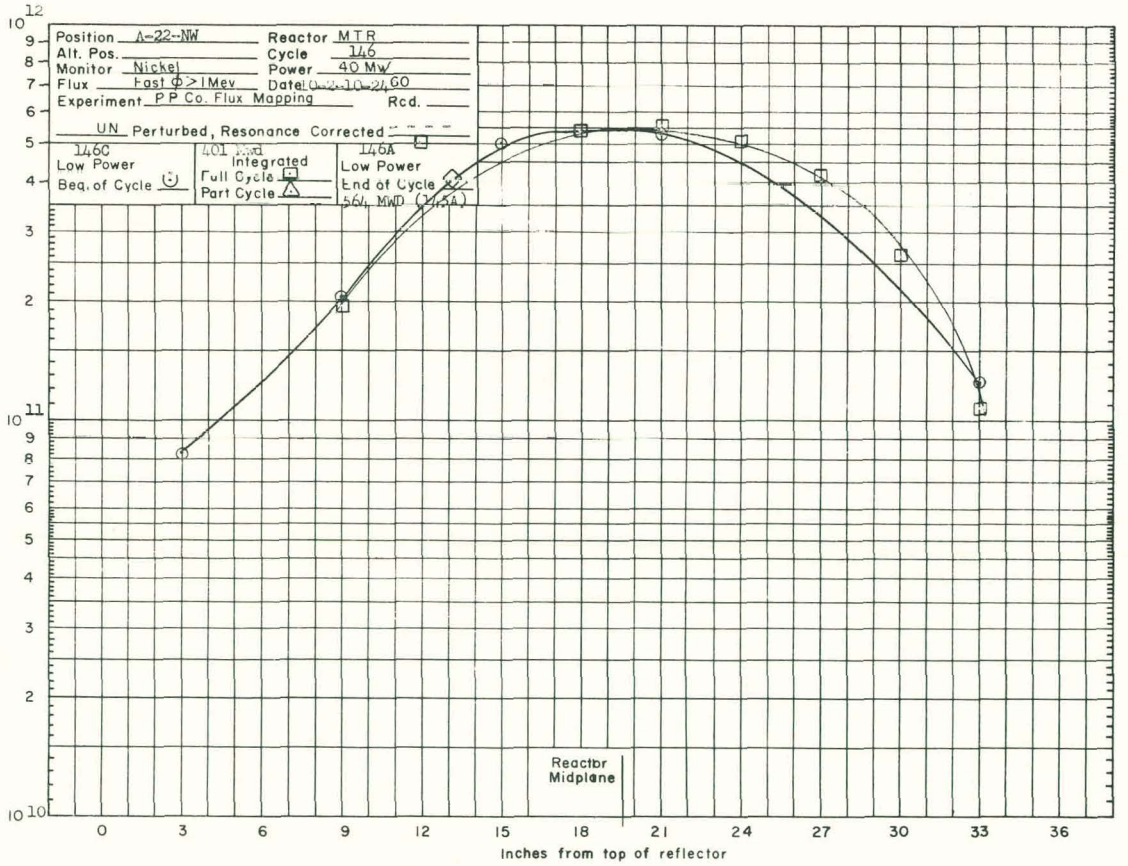

Position A-20-NE
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast Φ>1Mev
Date 10-2-16-2,60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
401 Mwd Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

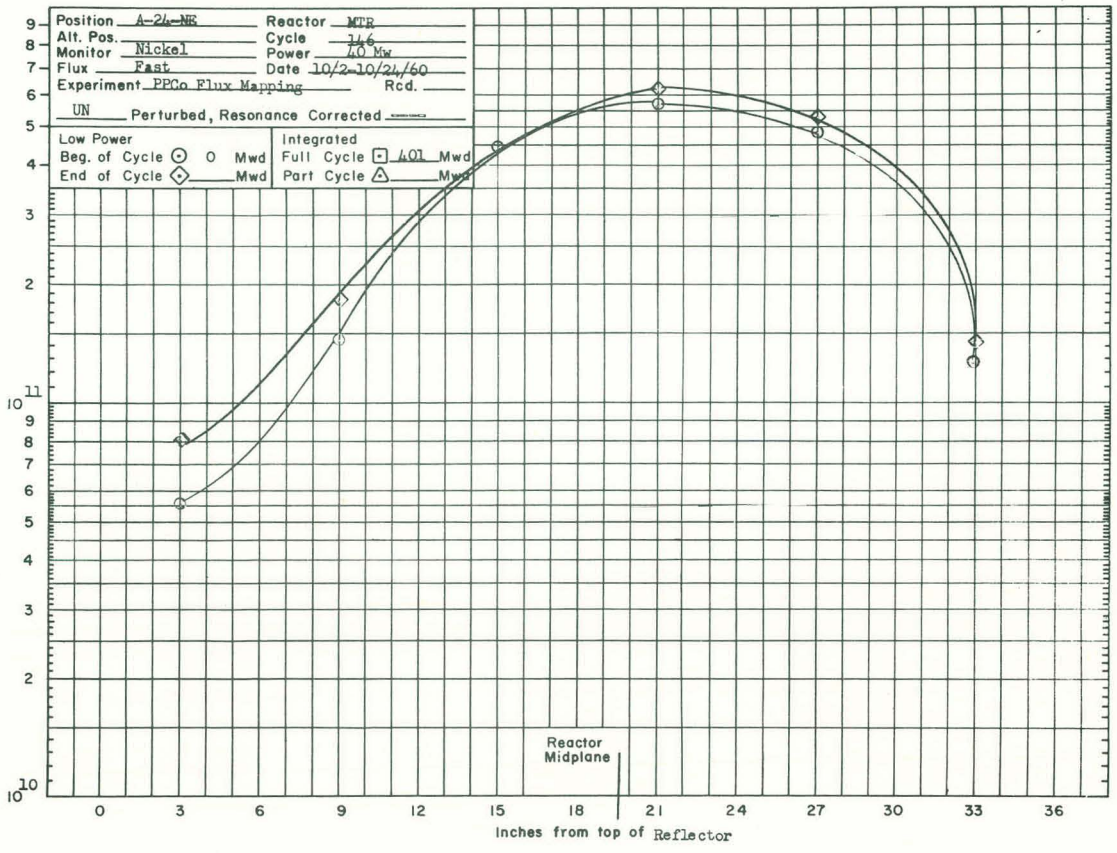

Position A-20-SE
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast Φ>1Mev
Date 10-2-16-2,60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
401 Mwd Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

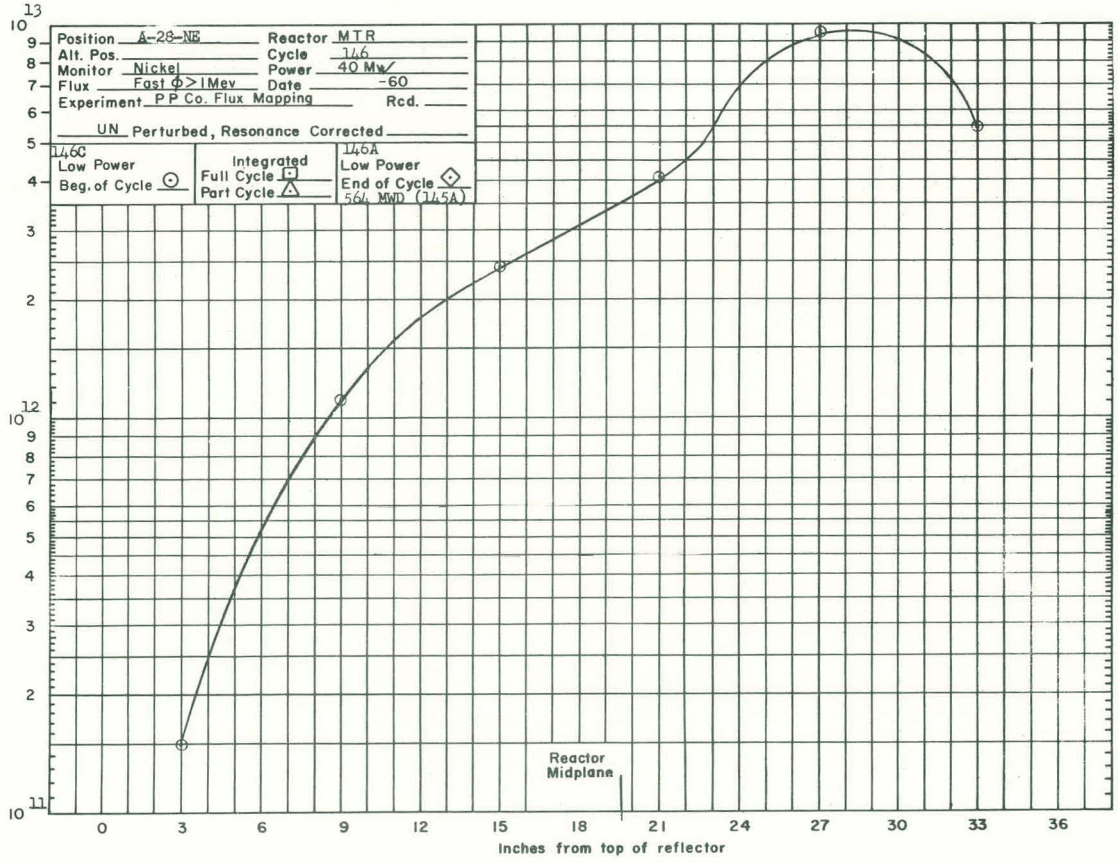

Position A-21-SE
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast
Date 10/2-10/24/60
Experiment PPCo Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
Low Power
Beg. of Cycle ⊙ 0 Mwd
End of Cycle ◇ Mwd
Integrated
Full Cycle ⊡ 401 Mwd
Part Cycle △ Mwd
Reactor Midplane
0 3 6 9 12 15 18 21 24 27 30 33 36
Inches from top of Reflector

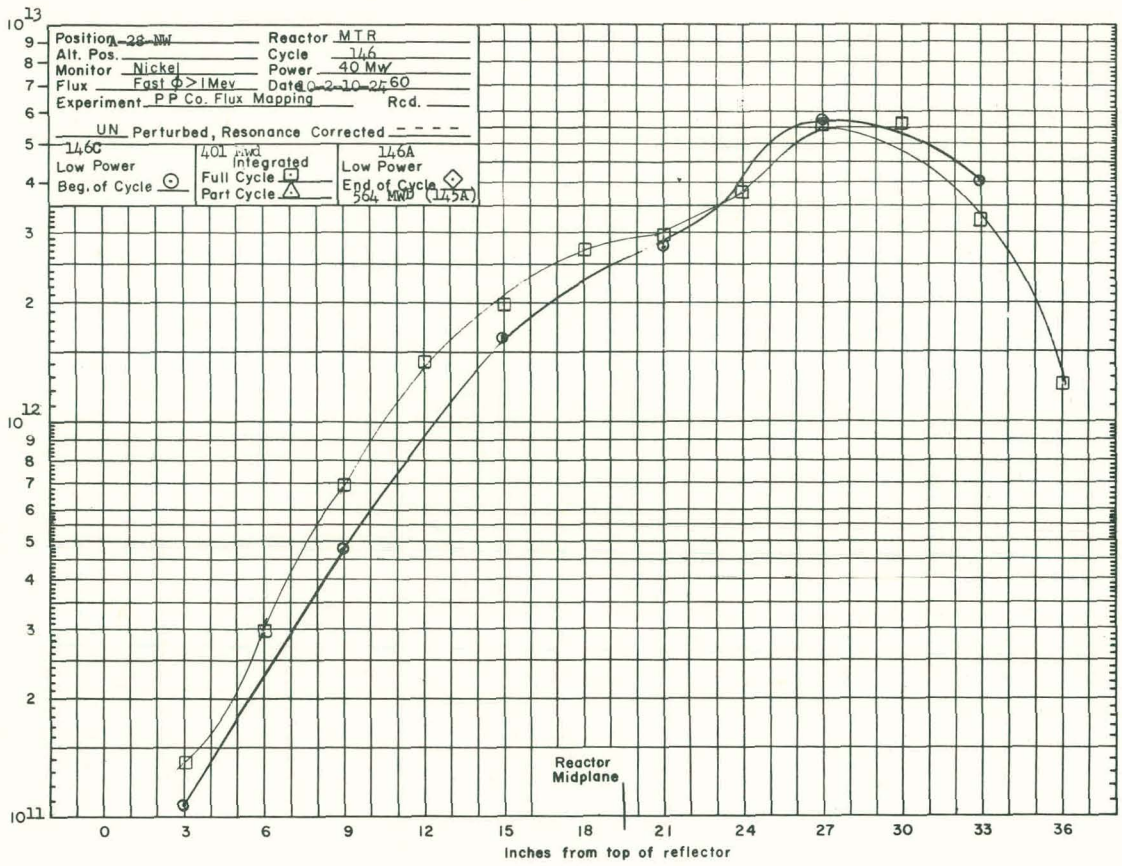

Position A-21-SW
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast
Date 10/2-10/24/60
Experiment PPCo Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
Low Power
Beg. of Cycle ⊙ 0 Mwd
End of Cycle ◇ Mwd
Integrated
Full Cycle ⊡ 401 Mwd
Part Cycle △ Mwd
Reactor Midplane
0 3 6 9 12 15 18 21 24 27 30 33 36
Inches from top of Reflector

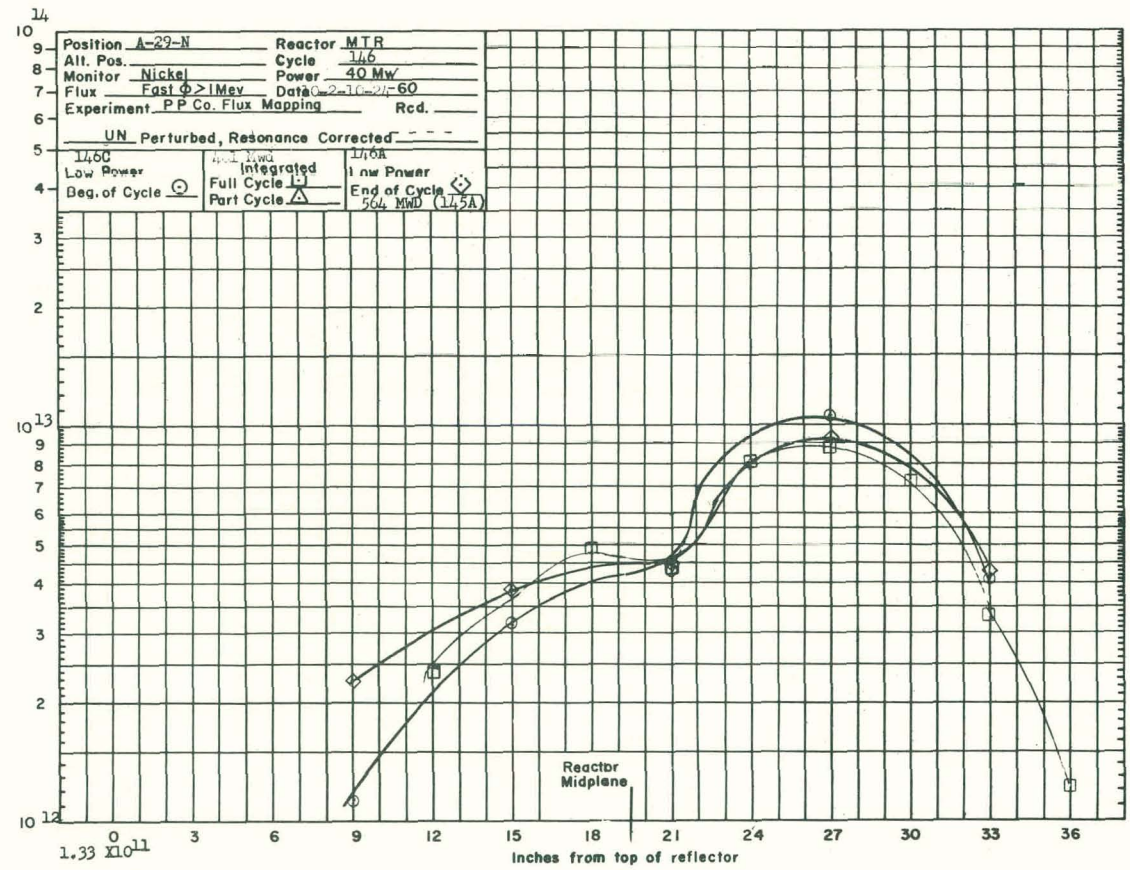

Position A-22-NE
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast
Date 9/2-10/24/61
Experiment PPCo Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
Low Power
Beg. of Cycle 0 Mwd
End of Cycle Mwd
Integrated
Full Cycle 401 Mwd
Part Cycle Mwd
Reactor Midplane
Inches from top of Reflector

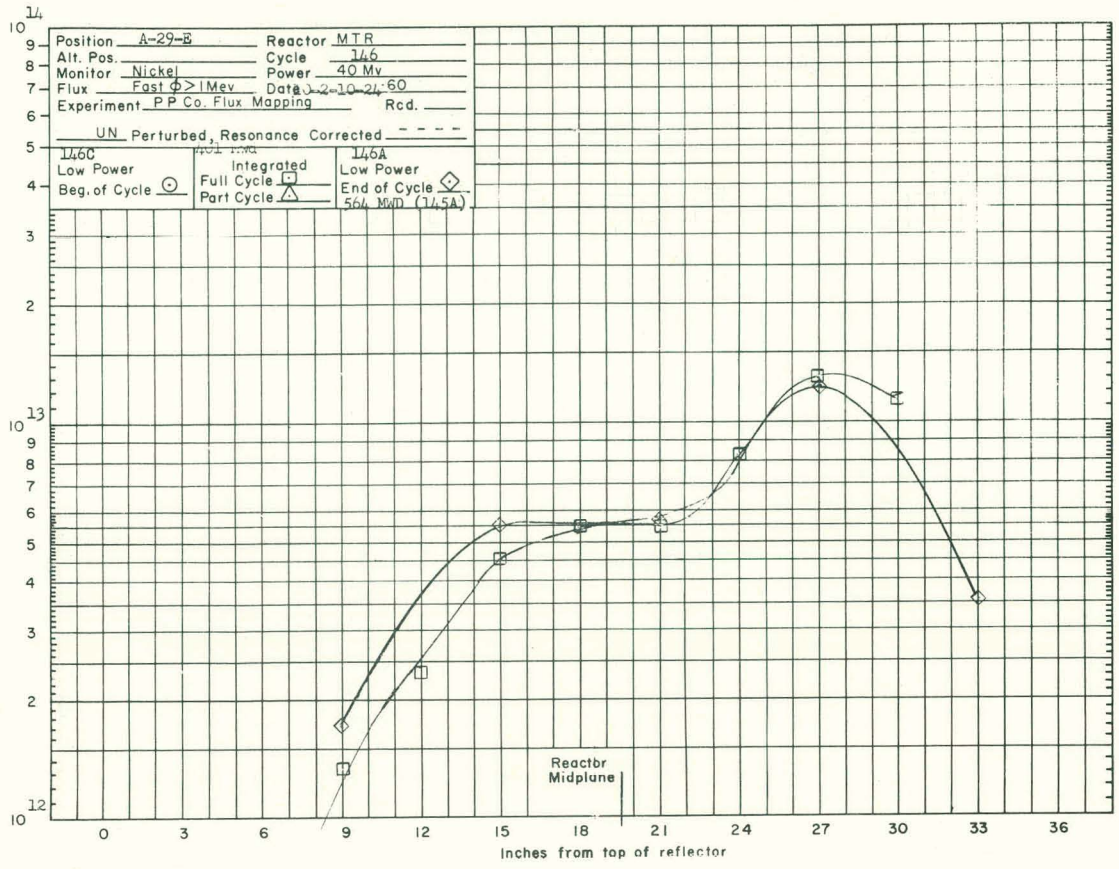

Position A-22-NW
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast Φ > 1 Mev
Date 10-2-10-24-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
401 Mwd
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (146A)
Reactor Midplane
Inches from top of reflector

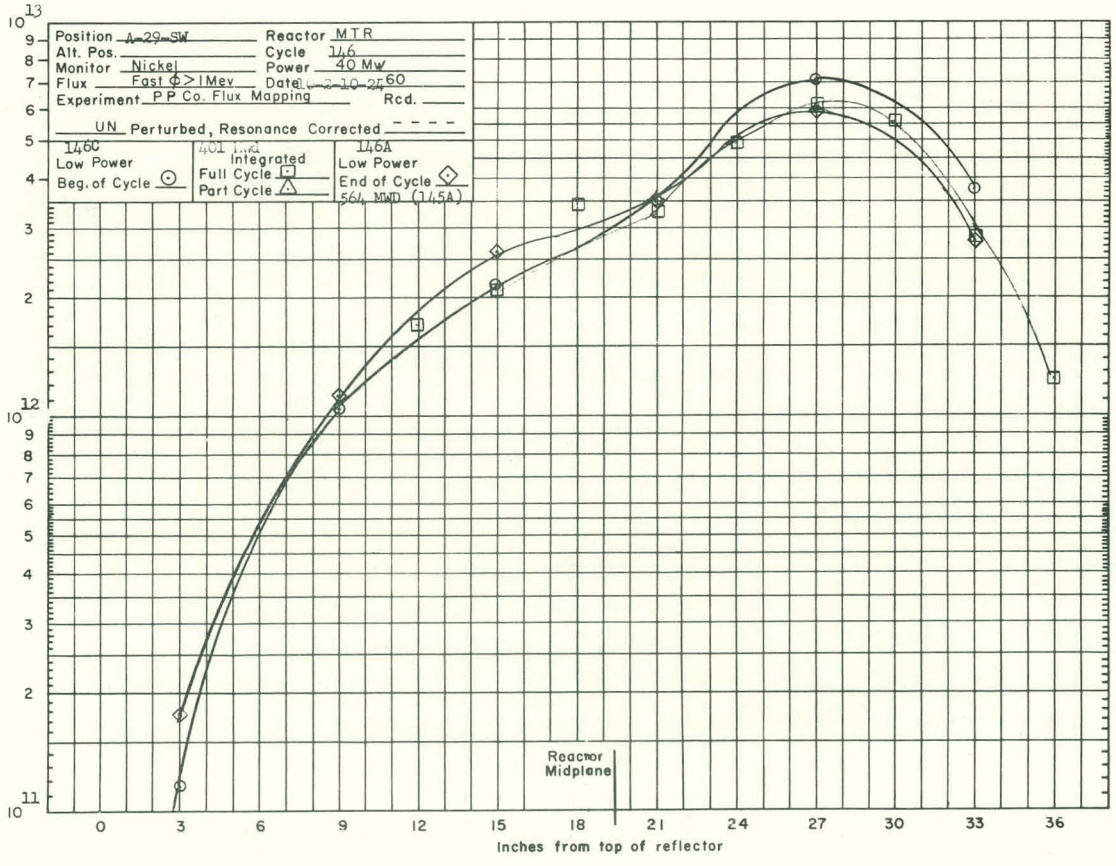

Position A-24-NE
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast
Date 10/2-10/24/60
Experiment PPCo Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
Low Power
Beg. of Cycle 0 Mwd
End of Cycle Mwd
Integrated
Full Cycle 401 Mwd
Part Cycle Mwd
Reactor Midplane
Inches from top of Reflector

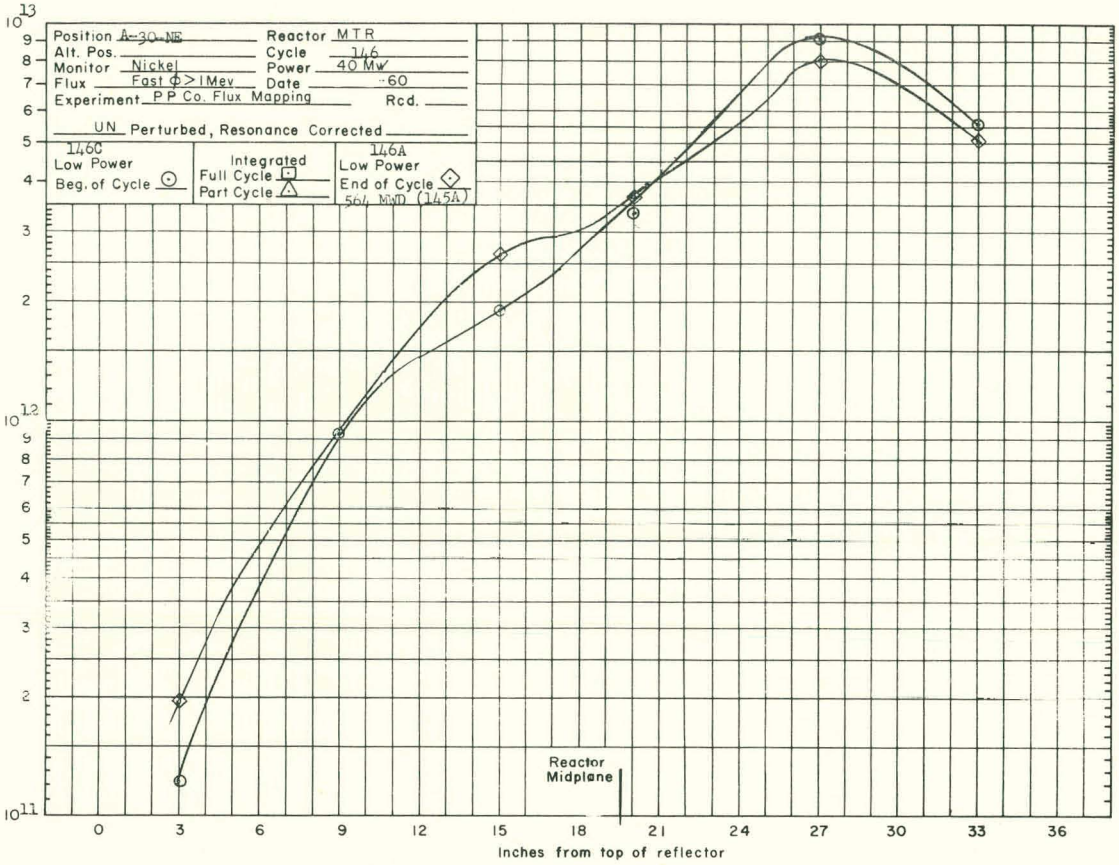

Position A-28-NE
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast Φ>1Mev
Date -60
Experiment P P Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

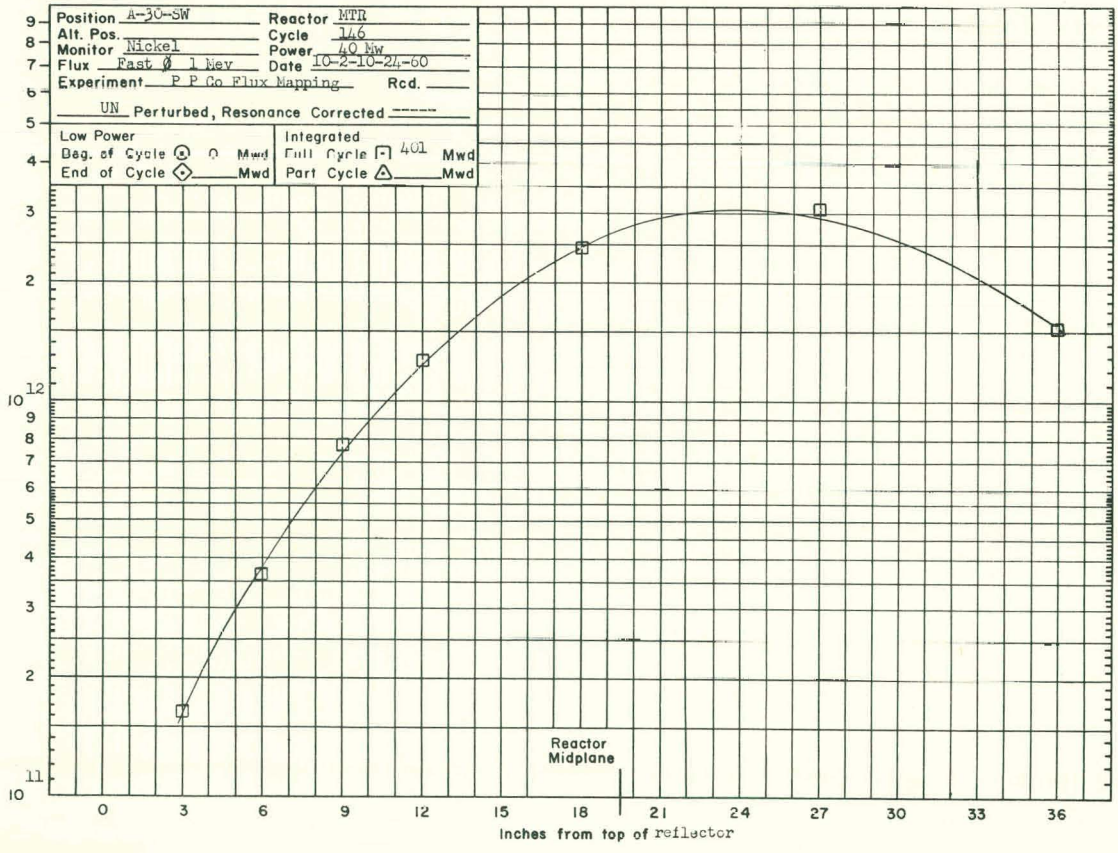

Position A-28-NW
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ > 1Mev
Date 10-2-10-2460
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
401 Mwd
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

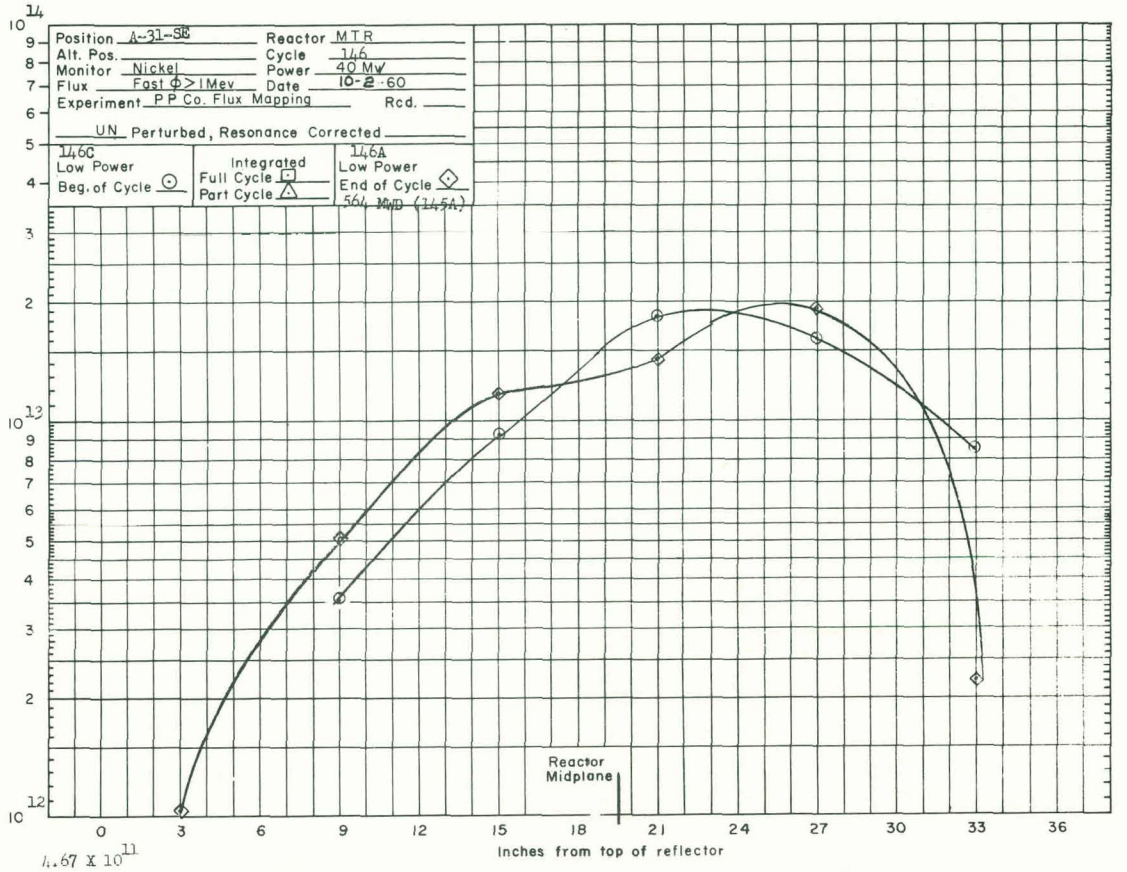

Position A-29-N
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ > 1Mev
Date 10-2-10-2460
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
401 Mwd
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
1.33 X10^11
Inches from top of reflector

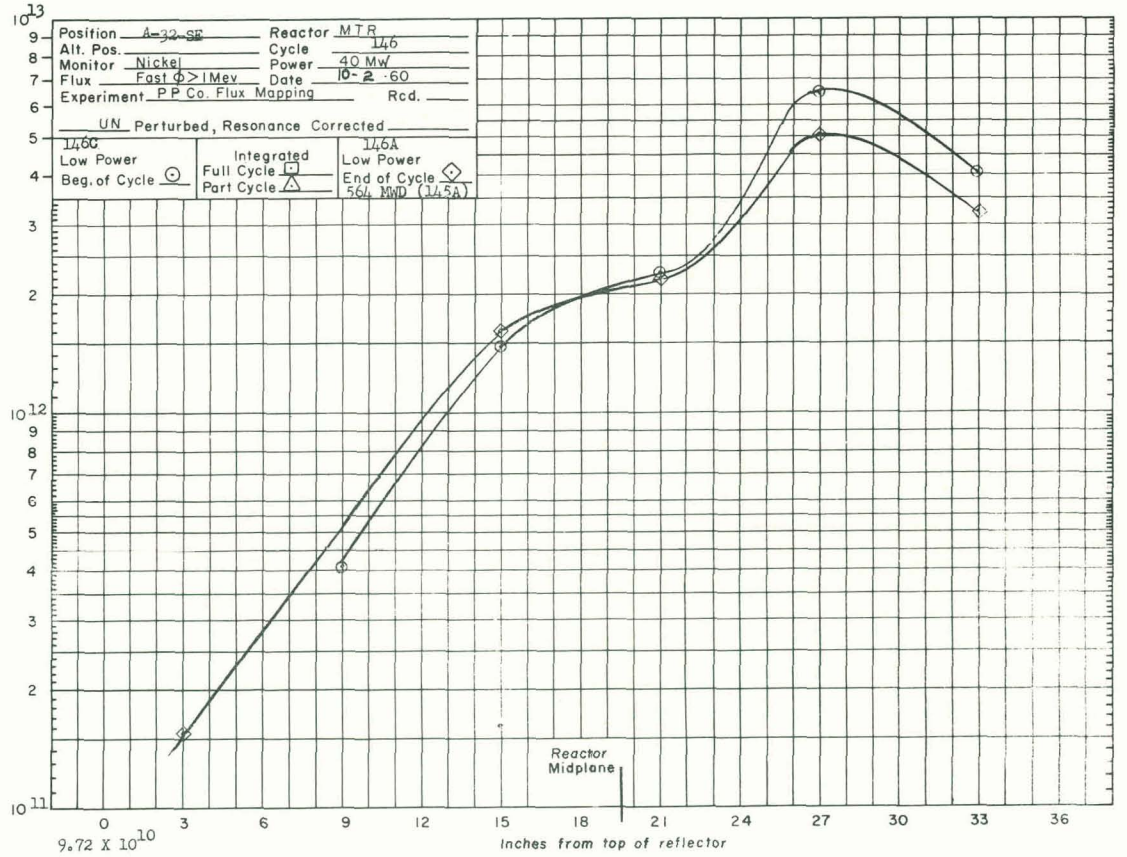

Position A-29-E
Alt. Pos.
Monitor Nickel
Flux Fast Φ>1Mev
Experiment PP Co. Flux Mapping
Reactor MTR
Cycle 146
Power 40 Mw
Date 1-2-10-24-60
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
401 Int'd
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

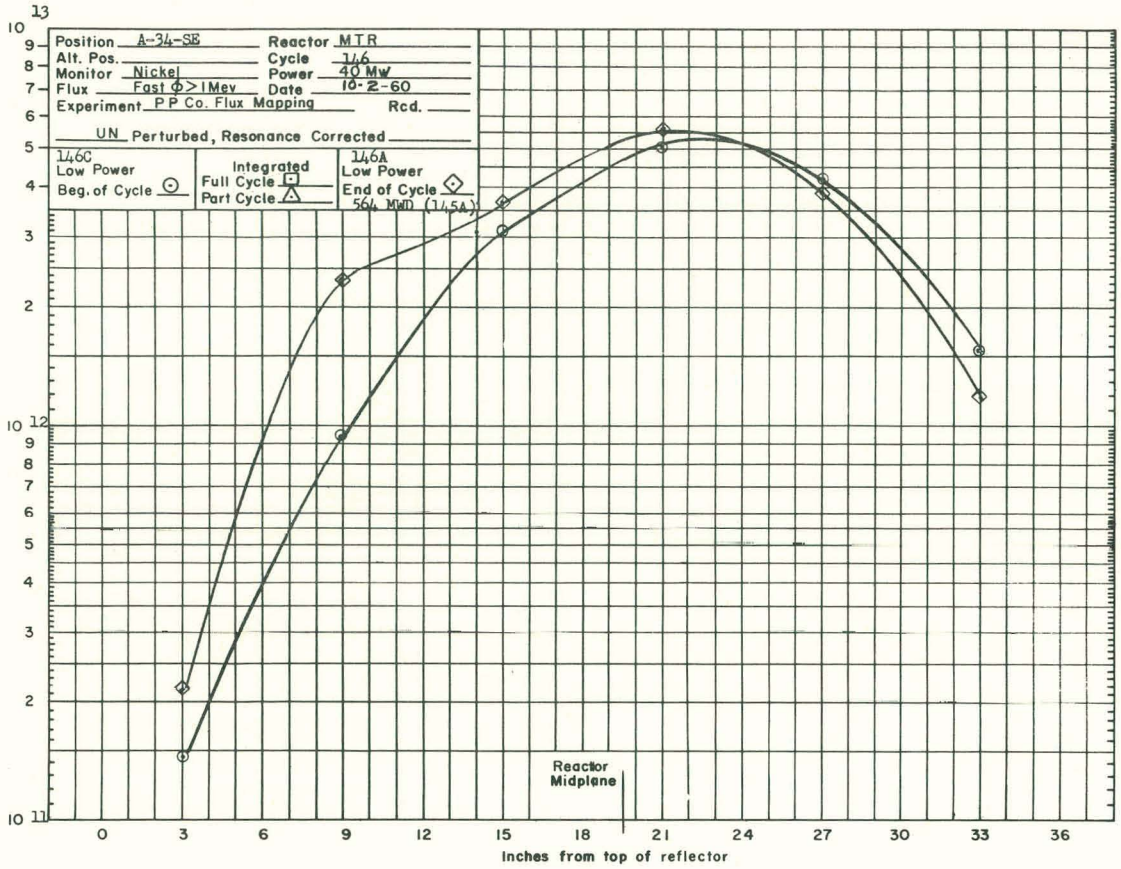

Position A-29-SW
Alt. Pos.
Monitor Nickel
Flux Fast Φ>1Mev
Experiment PP Co. Flux Mapping
Reactor MTR
Cycle 146
Power 40 Mw
Date 1-2-10-25-60
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
401 Int'd
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

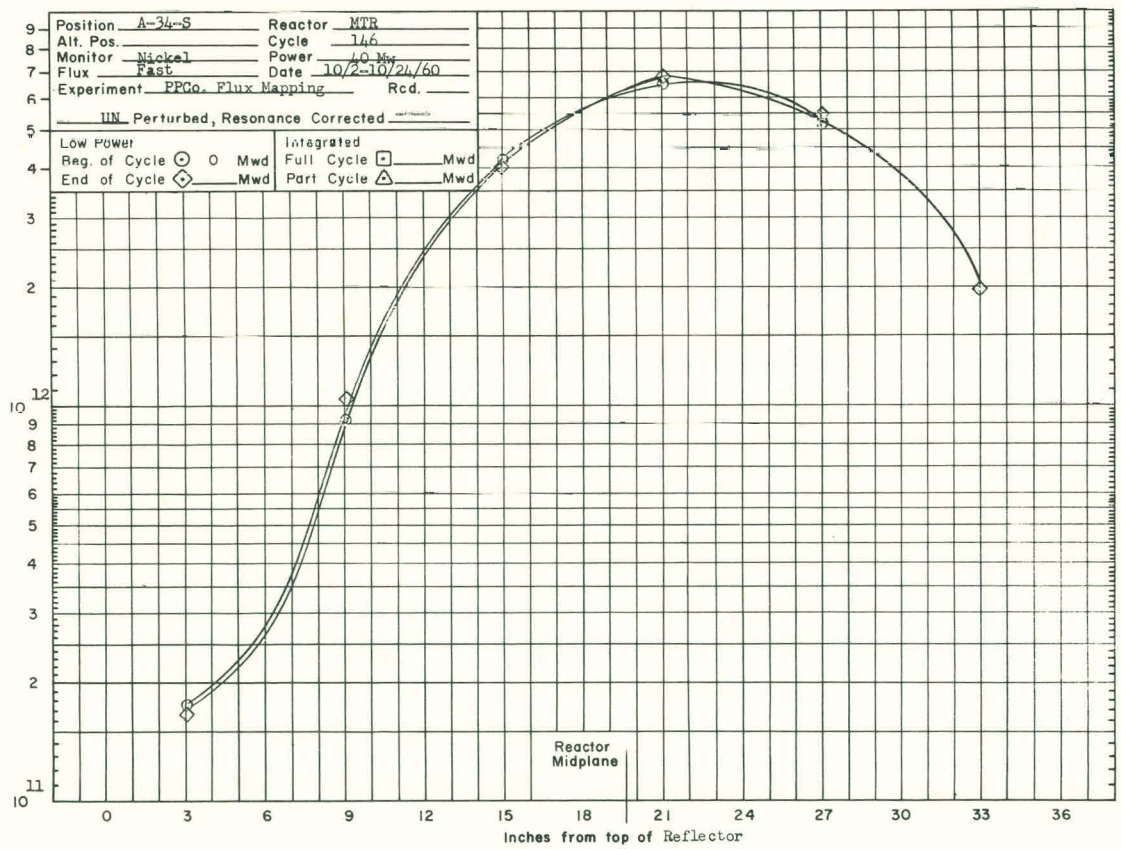

Position A-30-NE
Alt. Pos.
Monitor Nickel
Flux Fast Φ>1Mev
Experiment P P Co. Flux Mapping
Reactor MTR
Cycle 146
Power 40 Mw
Date -60
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

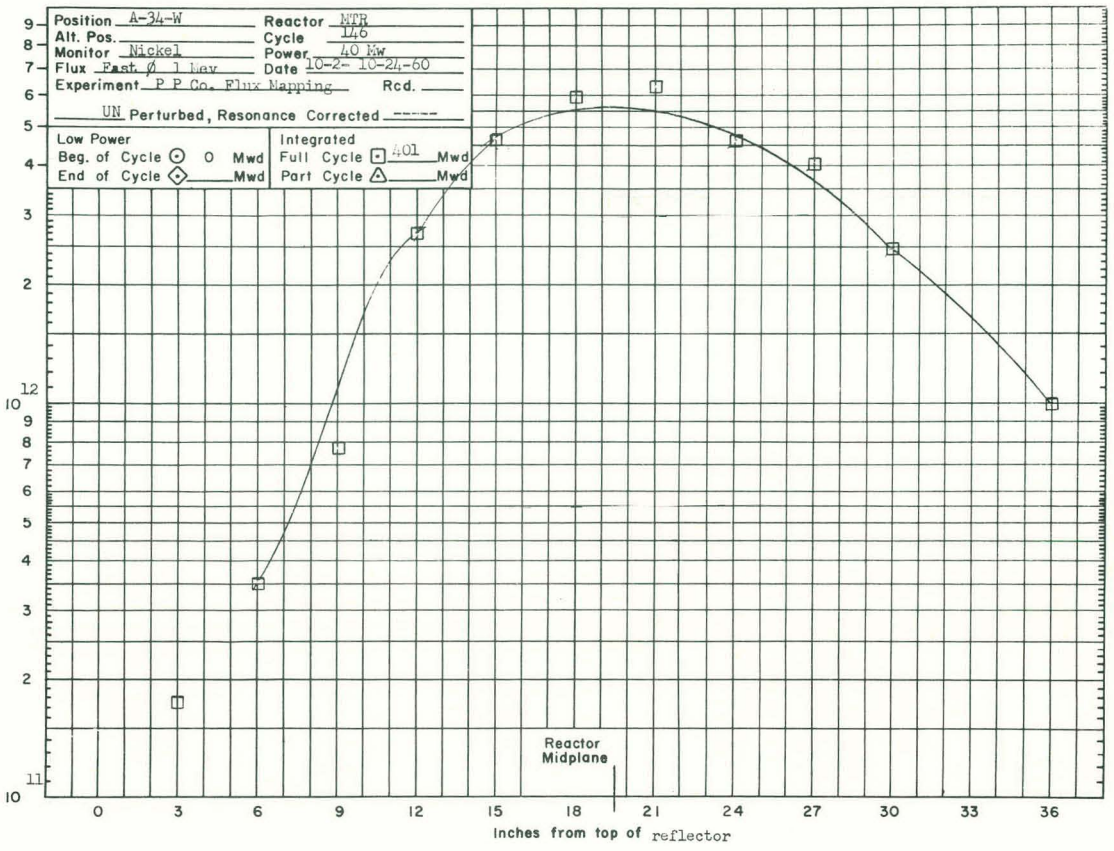

Position A-30-SW
Alt. Pos.
Monitor Nickel
Flux Fast Ø 1 Mev
Experiment P P Co Flux Mapping
Reactor MTR
Cycle 146
Power 40 Mw
Date 10-2-10-24-60
Rcd.
UN Perturbed, Resonance Corrected
Low Power
Beg. of Cycle 0 Mwd
End of Cycle Mwd
Integrated
Full Cycle 401 Mwd
Part Cycle Mwd
Reactor Midplane
Inches from top of reflector

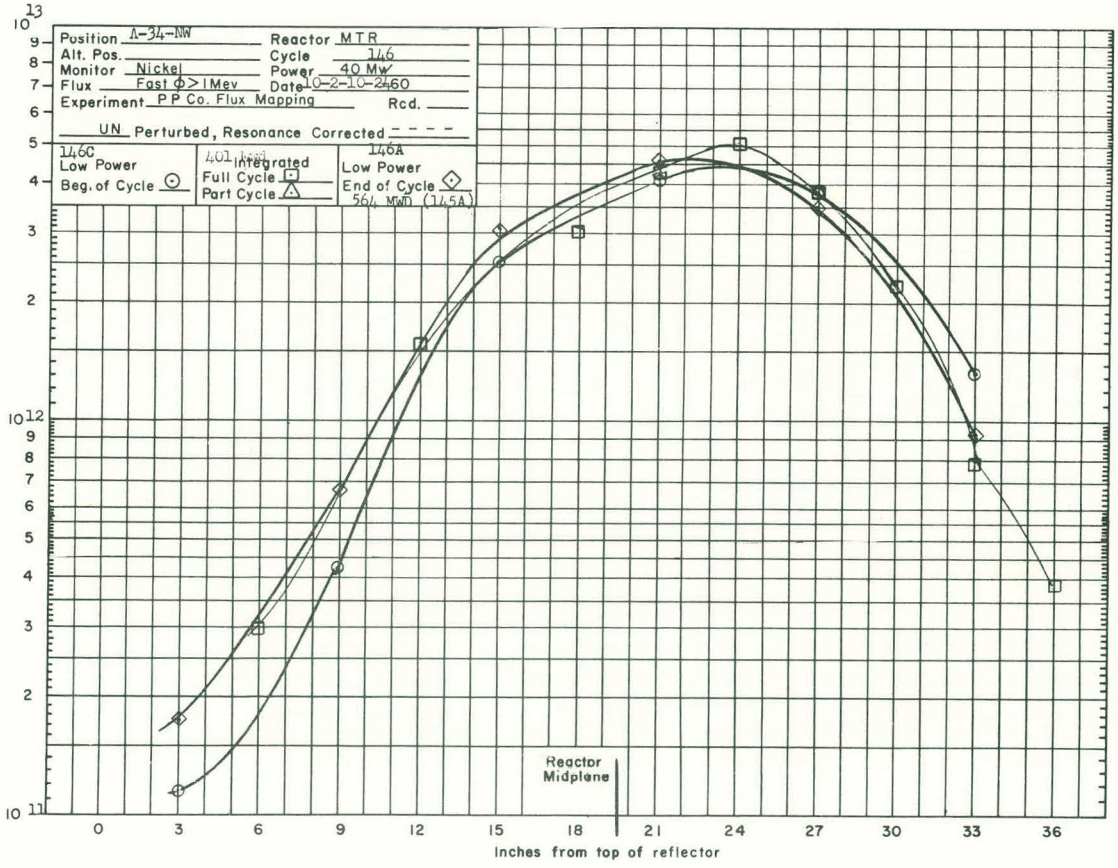

Position A-31-SE
Alt. Pos.
Monitor Nickel
Flux Fast Φ>1Mev
Experiment PP Co. Flux Mapping
Reactor MTR
Cycle 146
Power 40 MW
Date 10-2-60
Rcd.
UN Perturbed, Resonance Corrected
146C Low Power Beg. of Cycle
Integrated Full Cycle Part Cycle
146A Low Power End of Cycle 564 MWD (145A)
Reactor Midplane
Inches from top of reflector
4.67 X 10^11

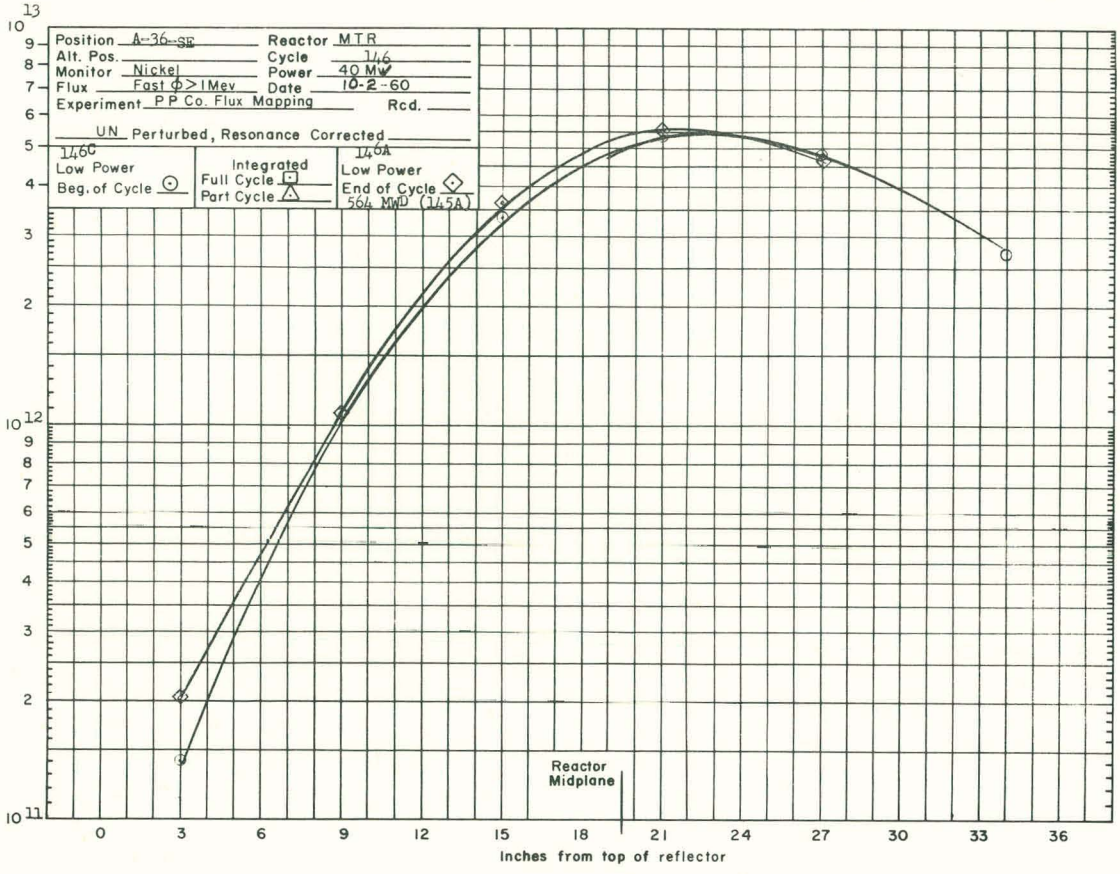

Position A-32-SE
Alt. Pos.
Monitor Nickel
Flux Fast Φ>1Mev
Experiment PP Co. Flux Mapping
Reactor MTR
Cycle 146
Power 40 MW
Date 10-2-60
Rcd.
UN Perturbed, Resonance Corrected
146C Low Power Beg. of Cycle
Integrated Full Cycle Part Cycle
146A Low Power End of Cycle 564 MWD (145A)
Reactor Midplane
Inches from top of reflector
9.72 X 10^10

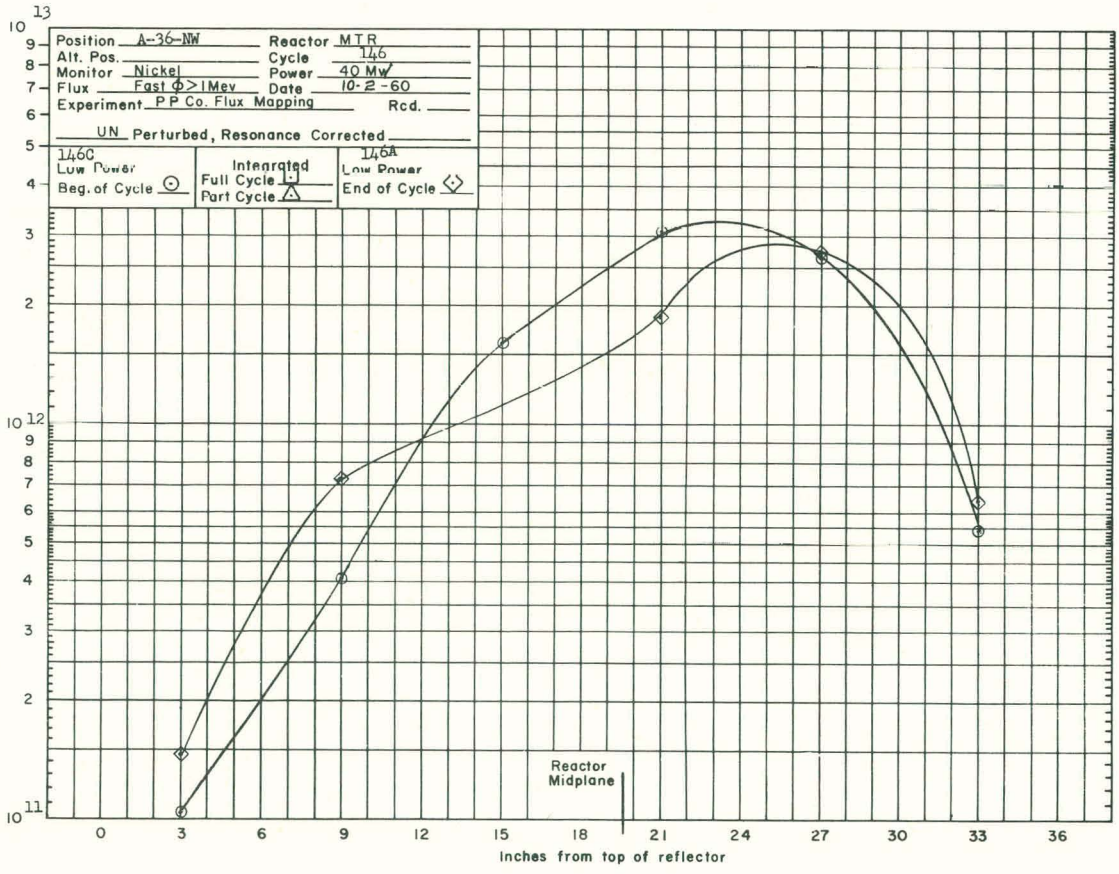

Position A-34-SE
Alt. Pos.
Monitor Nickel
Flux Fast Φ>1Mev
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
Reactor MTR
Cycle 146
Power 40 Mw
Date 10-2-60
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

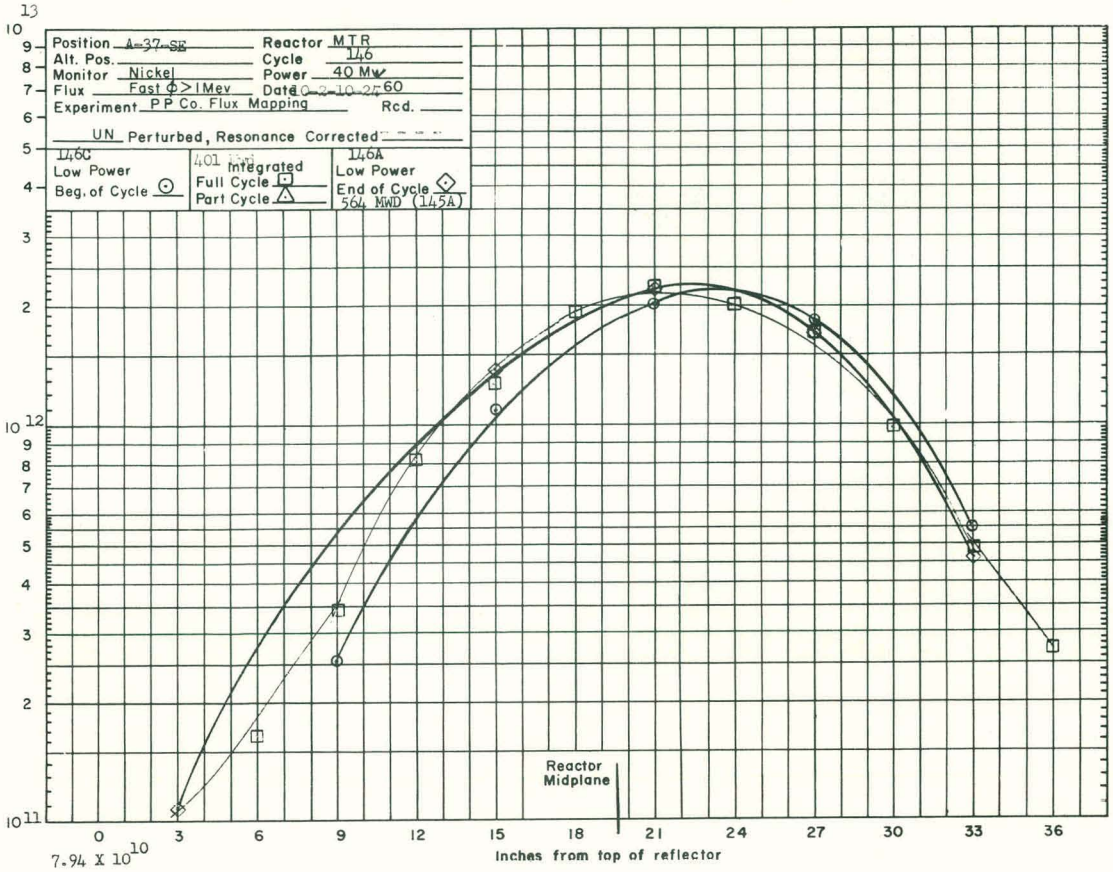

Position A-34-S
Alt. Pos.
Monitor Nickel
Flux Fast
Experiment PPCo. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
Reactor MTR
Cycle 146
Power 40 Mw
Date 10/2-10/24/60
Low Power
Beg. of Cycle 0 Mwd
End of Cycle Mwd
Integrated
Full Cycle Mwd
Part Cycle Mwd
Reactor Midplane
Inches from top of Reflector

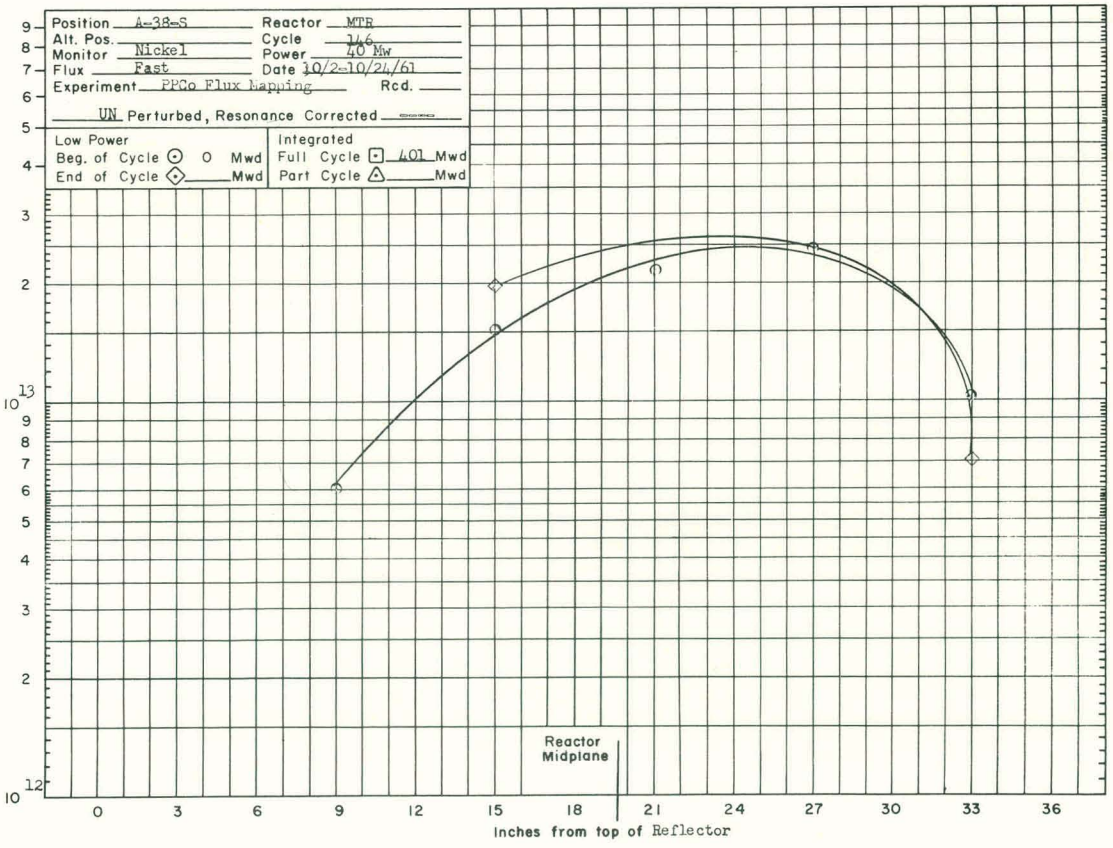

Position A-34-W
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ 1 Mev
Date 10-2- 10-24-60
Experiment P P Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
Low Power
Beg. of Cycle 0 Mwd
End of Cycle Mwd
Integrated
Full Cycle 401 Mwd
Part Cycle Mwd
Reactor Midplane
Inches from top of reflector

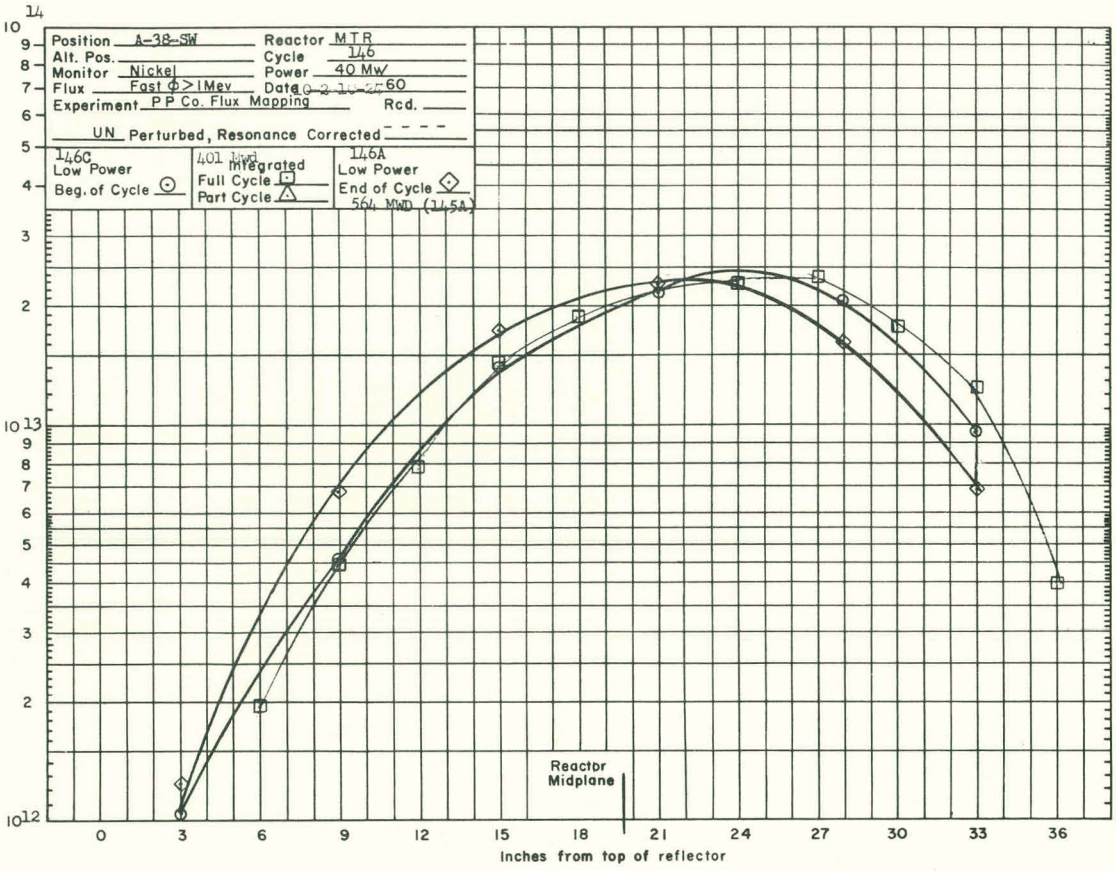

Position A-34-NW
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ>1Mev
Date 10-2-10-2460
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
401 Mwd
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

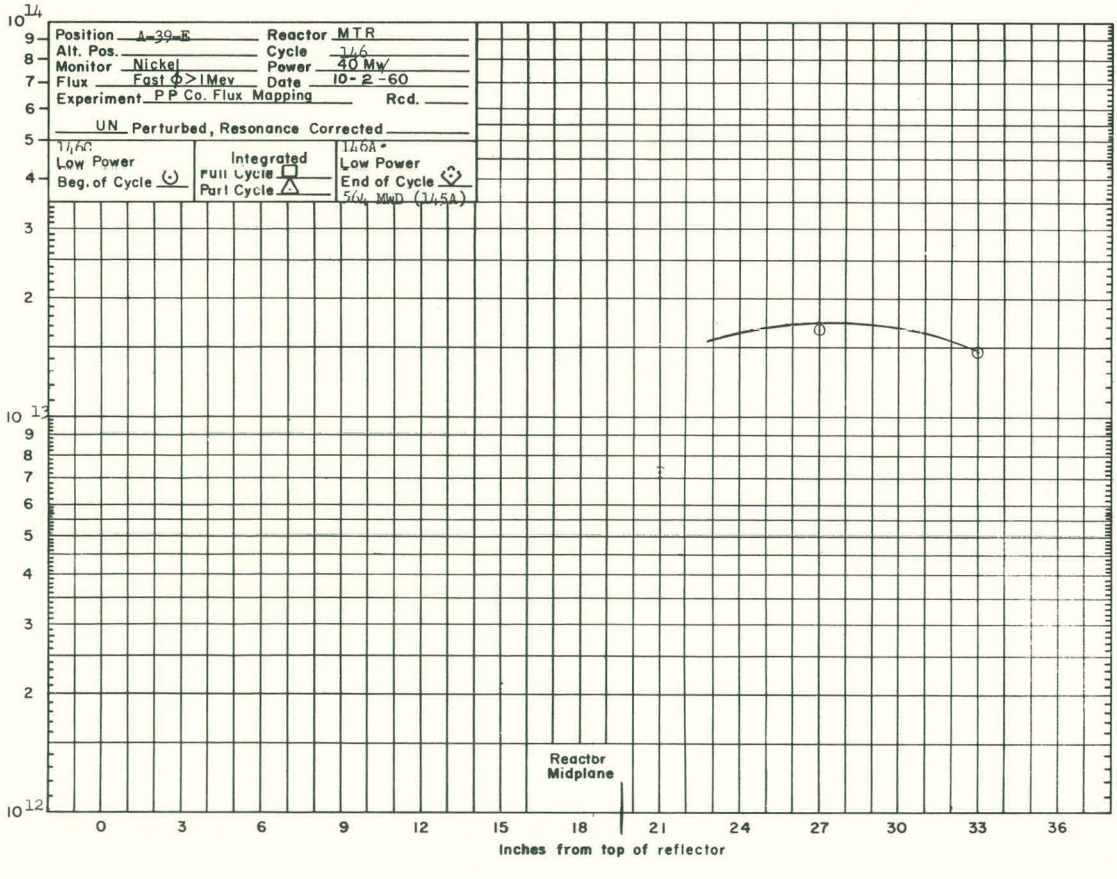

Position A-36-SE
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ>1Mev
Date 10-2-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

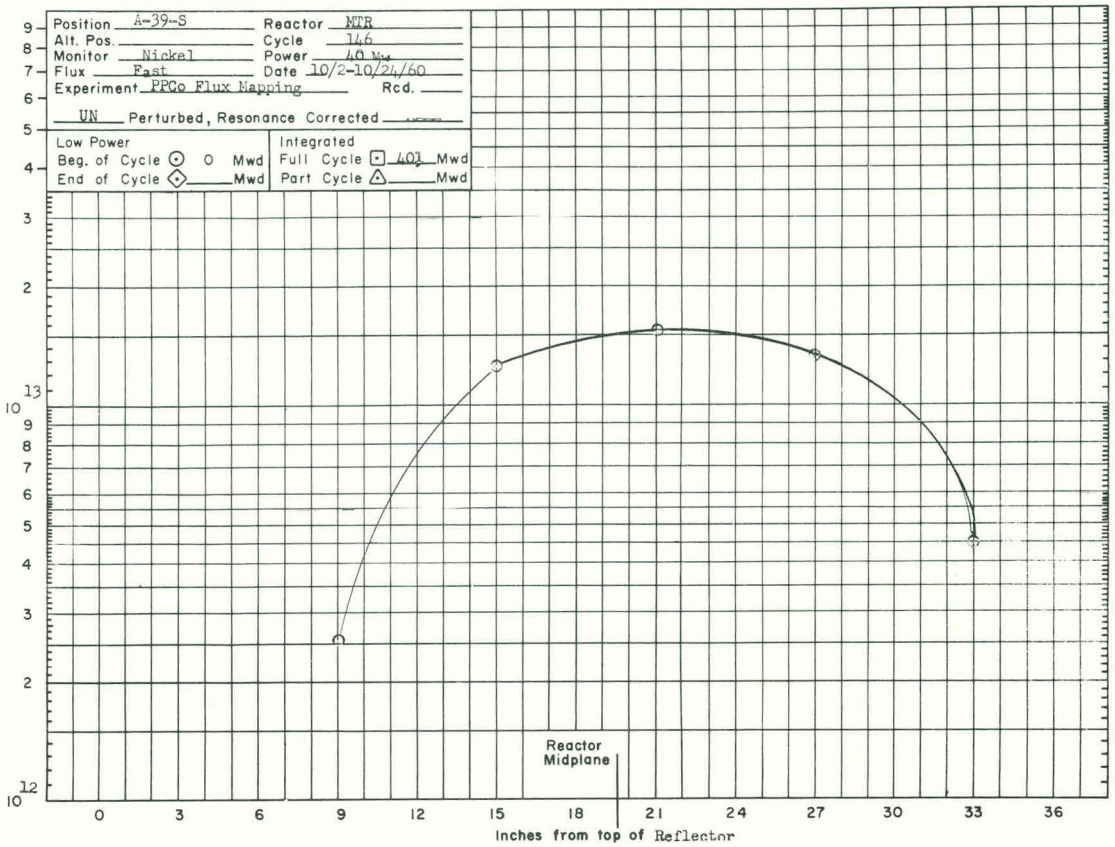

Position A-36-NW
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ>1Mev
Date 10-2-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
Reactor Midplane
Inches from top of reflector

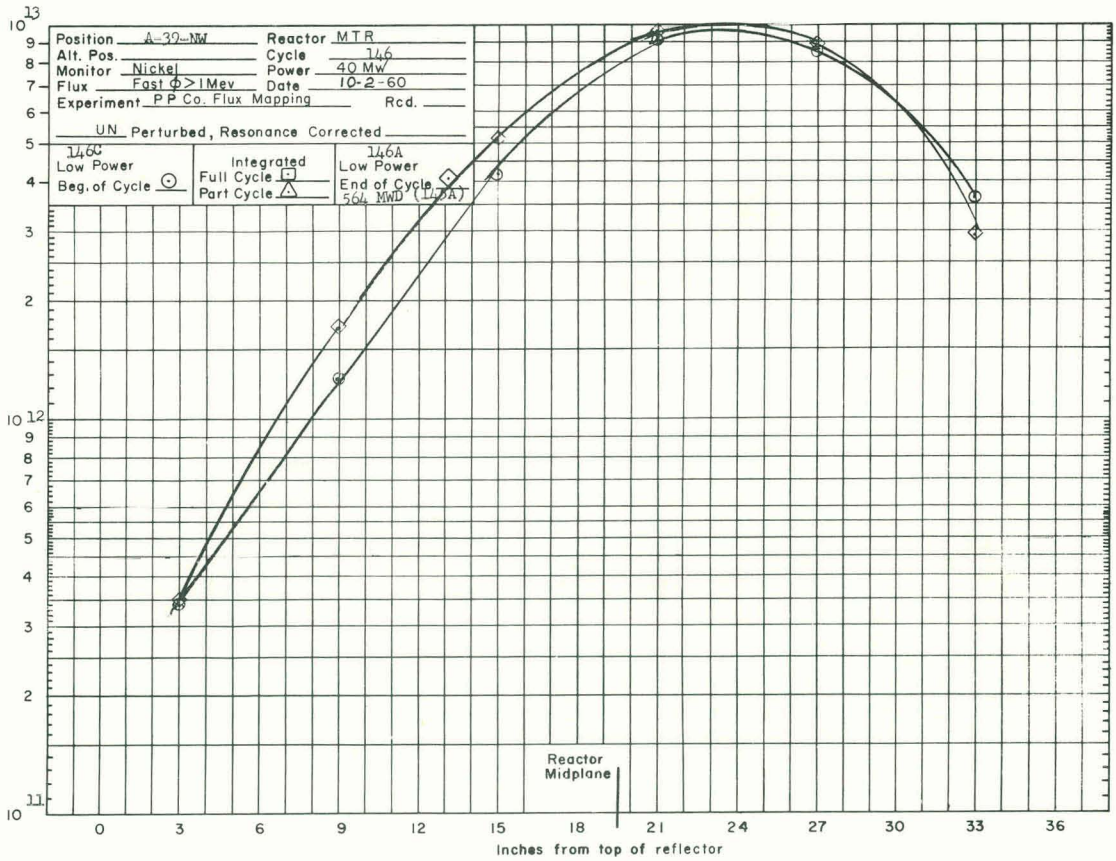

Position A-37-SE
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast Φ>1Mev
Date 10-2-10-25-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
7.94 X 10^10
Inches from top of reflector

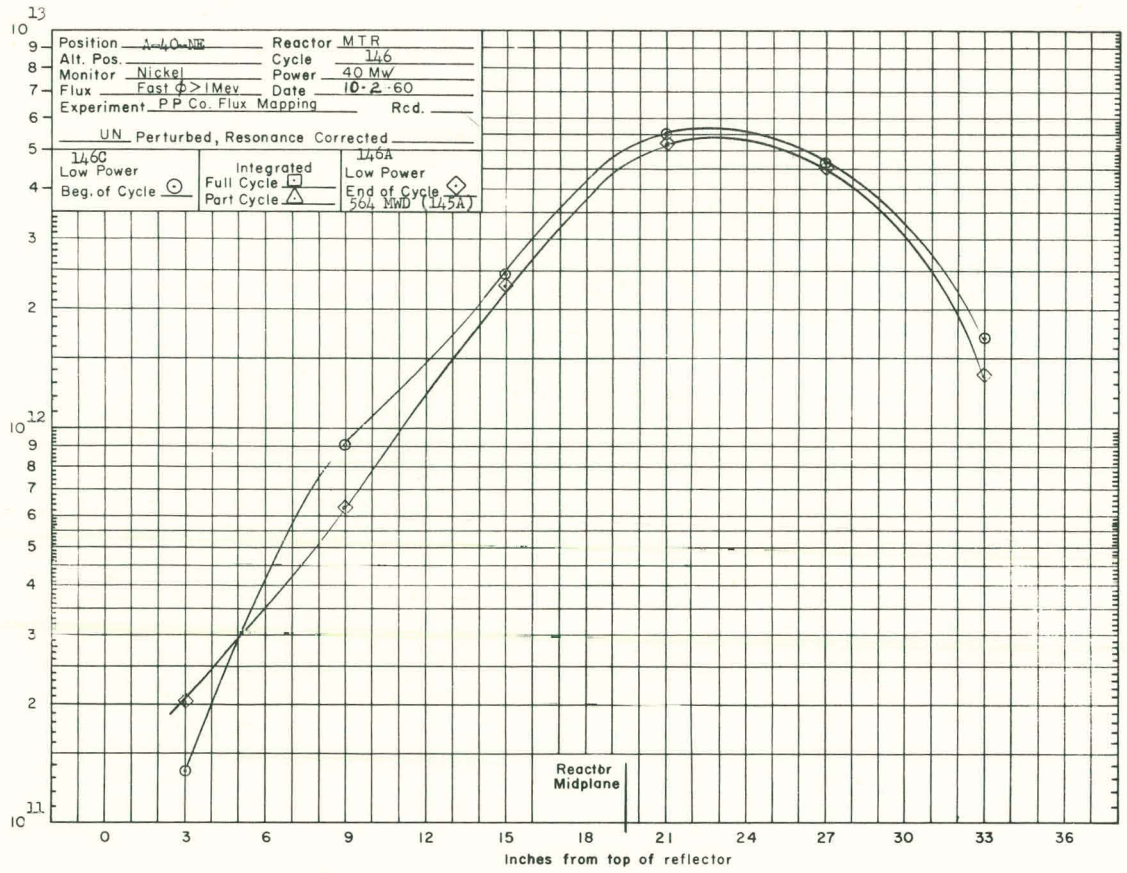

Position A-38-S
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast
Date 10/2-10/24/61
Experiment PPCo Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
Low Power
Beg. of Cycle 0 Mwd
End of Cycle Mwd
Integrated
Full Cycle 401 Mwd
Part Cycle Mwd
Reactor Midplane
Inches from top of Reflector

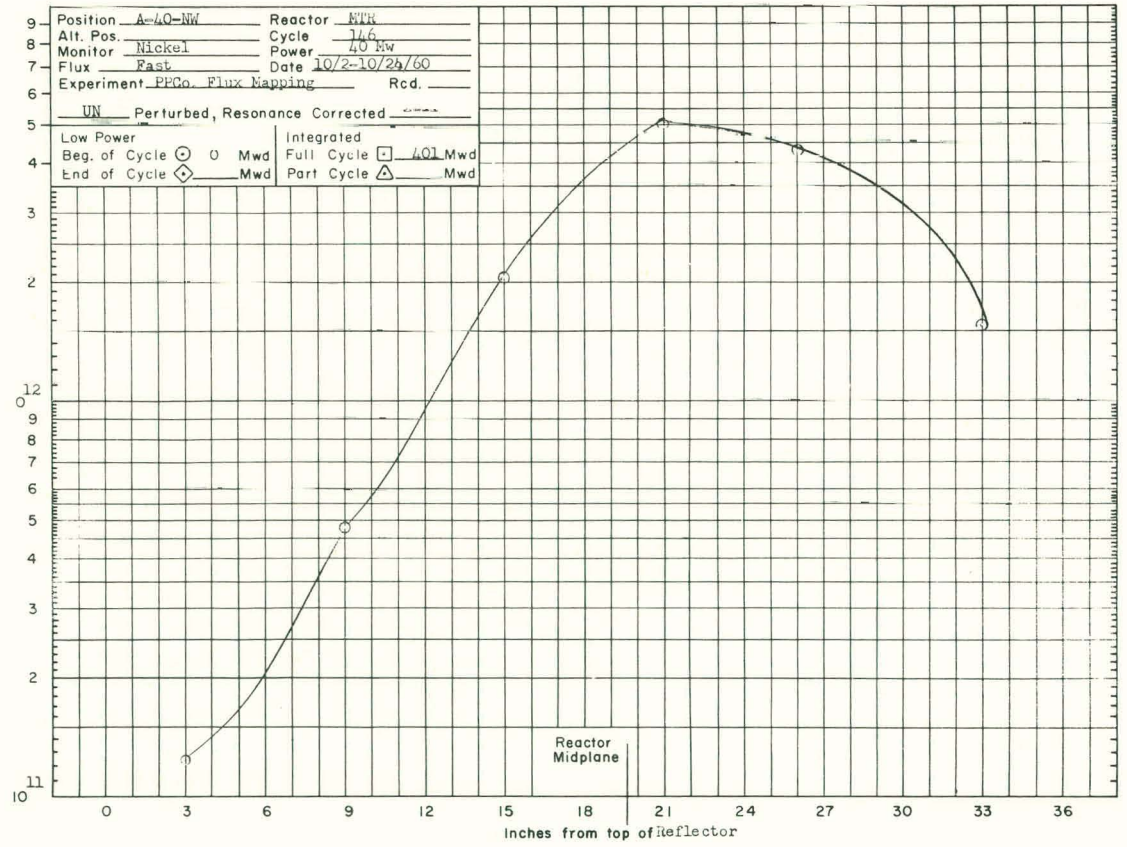

Position A-38-SW
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ>1Mev
Date 10-2-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
401 MWD Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

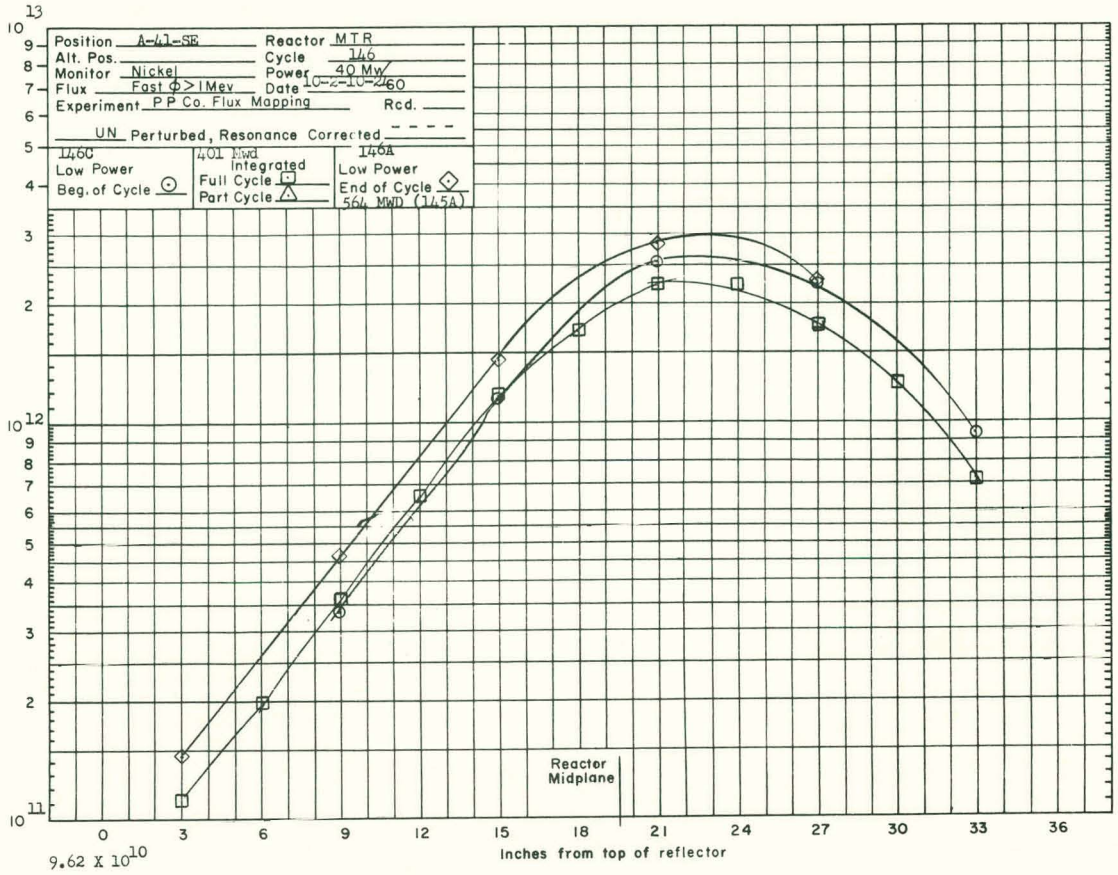

Position A-39-E
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ>1Mev
Date 10-2-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

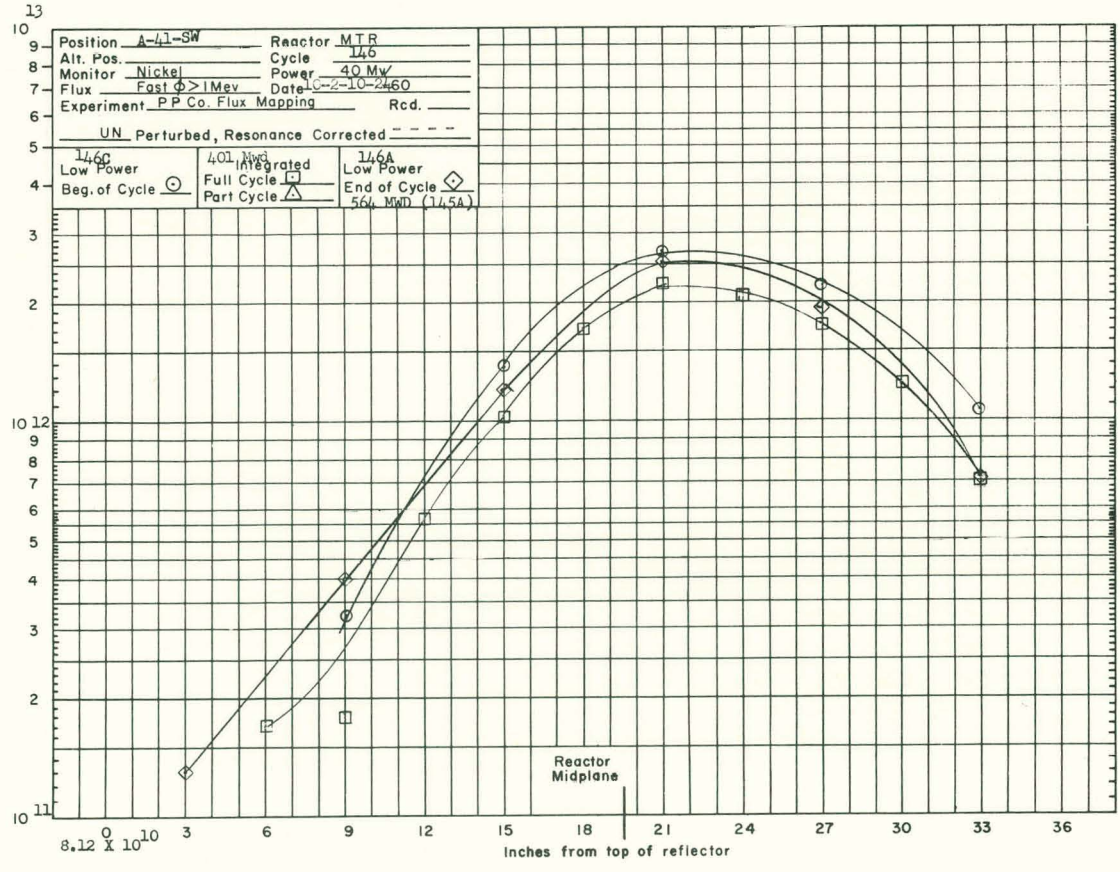

Position A-39-S
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast
Date 10/2-10/24/60
Experiment PPCo Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
Low Power
Beg. of Cycle ⊙ 0 Mwd
End of Cycle ◇ Mwd
Integrated
Full Cycle ⊡ 402 Mwd
Part Cycle △ Mwd
Reactor Midplane
Inches from top of Reflector

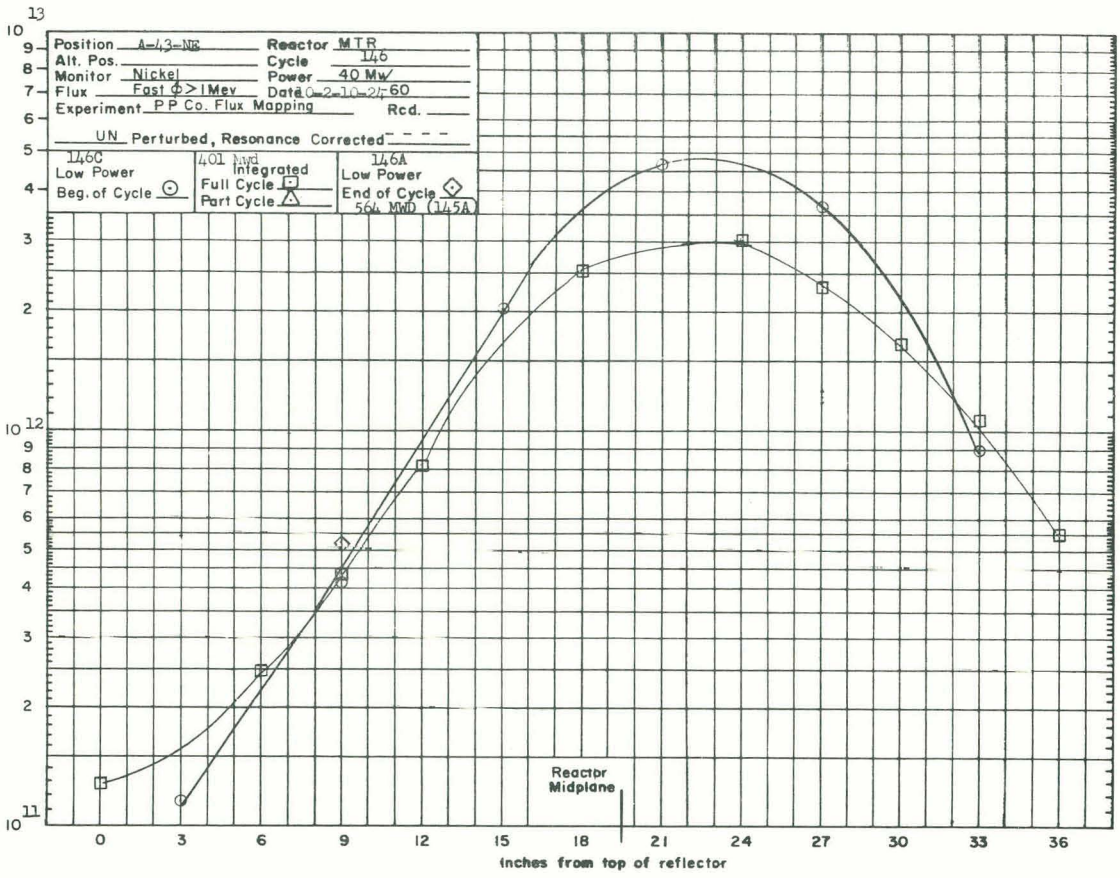

Position A-39-NW
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ>1Mev
Date 10-2-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle ⊙
Integrated
Full Cycle ⊡
Part Cycle △
146A
Low Power
End of Cycle ◇
564 MWD (146A)
Reactor Midplane
Inches from top of reflector

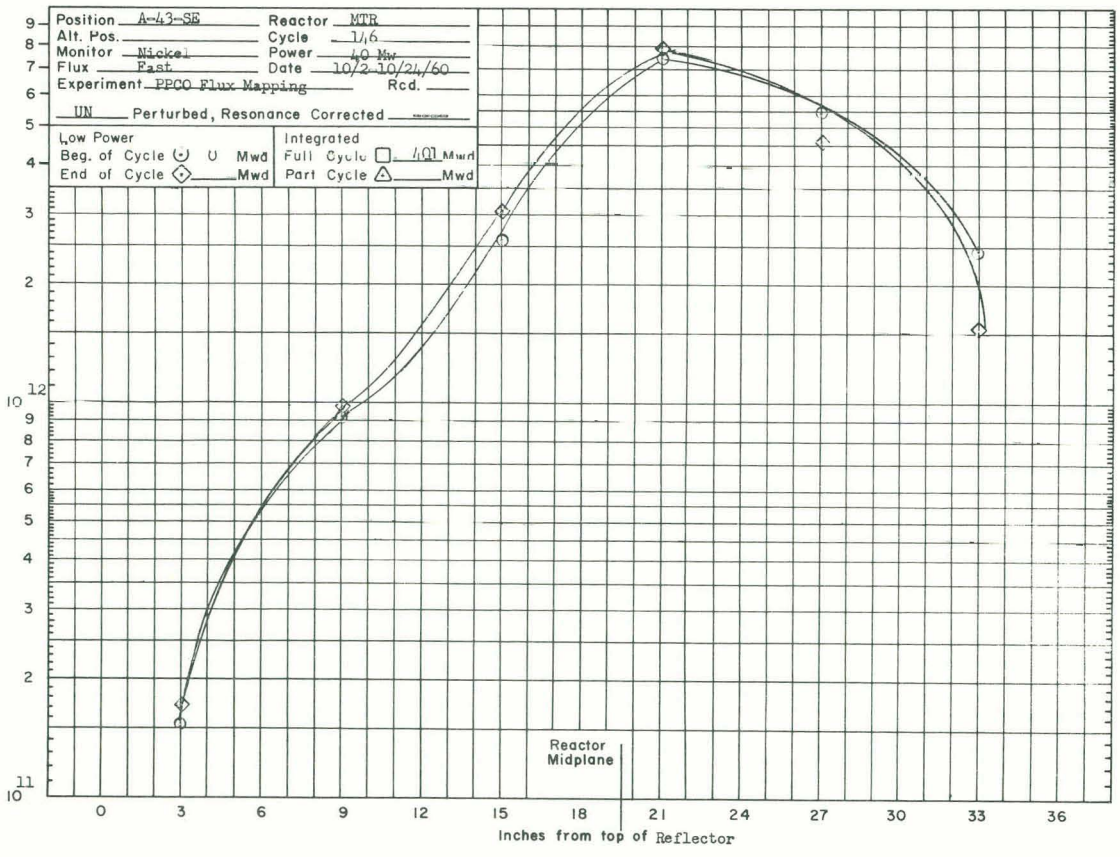

Position A-40-NE
Alt. Pos.
Monitor Nickel
Flux Fast Φ>1Mev
Experiment PP Co. Flux Mapping
Reactor MTR
Cycle 146
Power 40 MW
Date 10-2-60
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

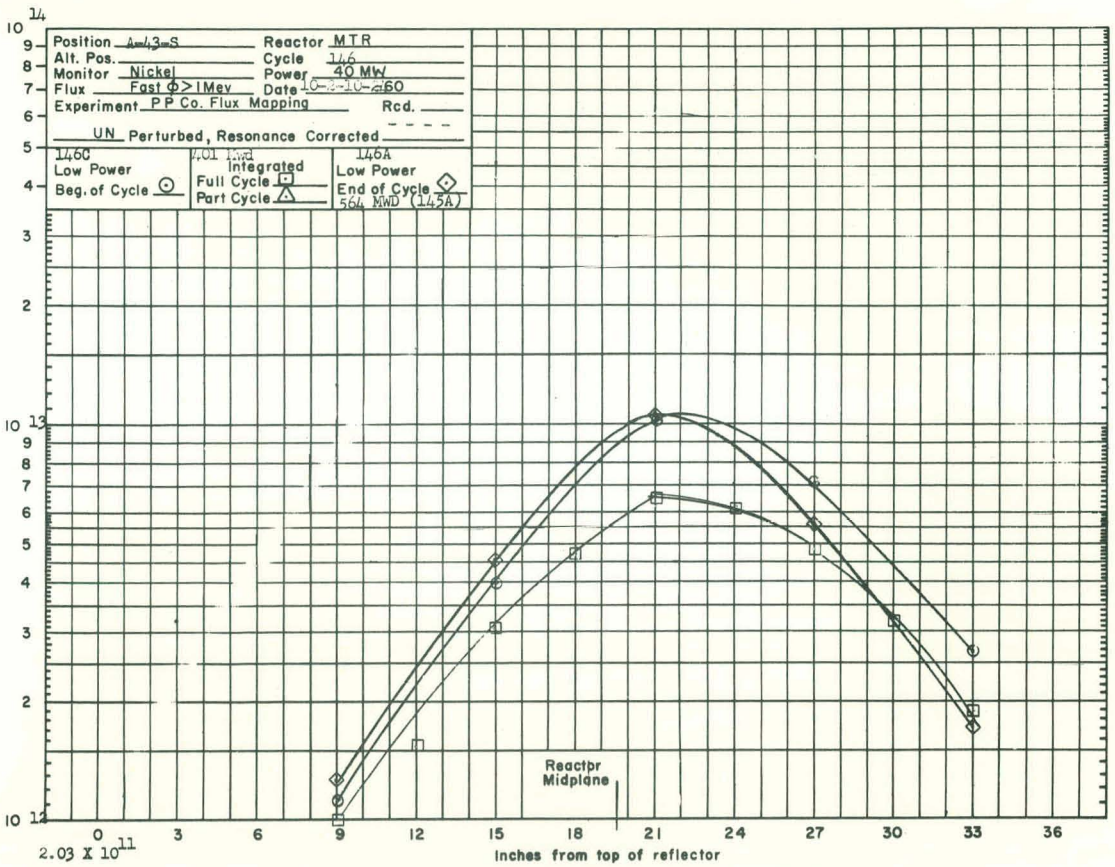

Position A-40-NW
Alt. Pos.
Monitor Nickel
Flux Fast
Experiment PPCo. Flux Mapping
Reactor MTR
Cycle 146
Power 40 Mw
Date 10/2-10/24/60
Rcd.
UN Perturbed, Resonance Corrected
Low Power
Beg. of Cycle 0 Mwd
End of Cycle Mwd
Integrated
Full Cycle 401 Mwd
Part Cycle Mwd
Reactor Midplane
Inches from top of Reflector

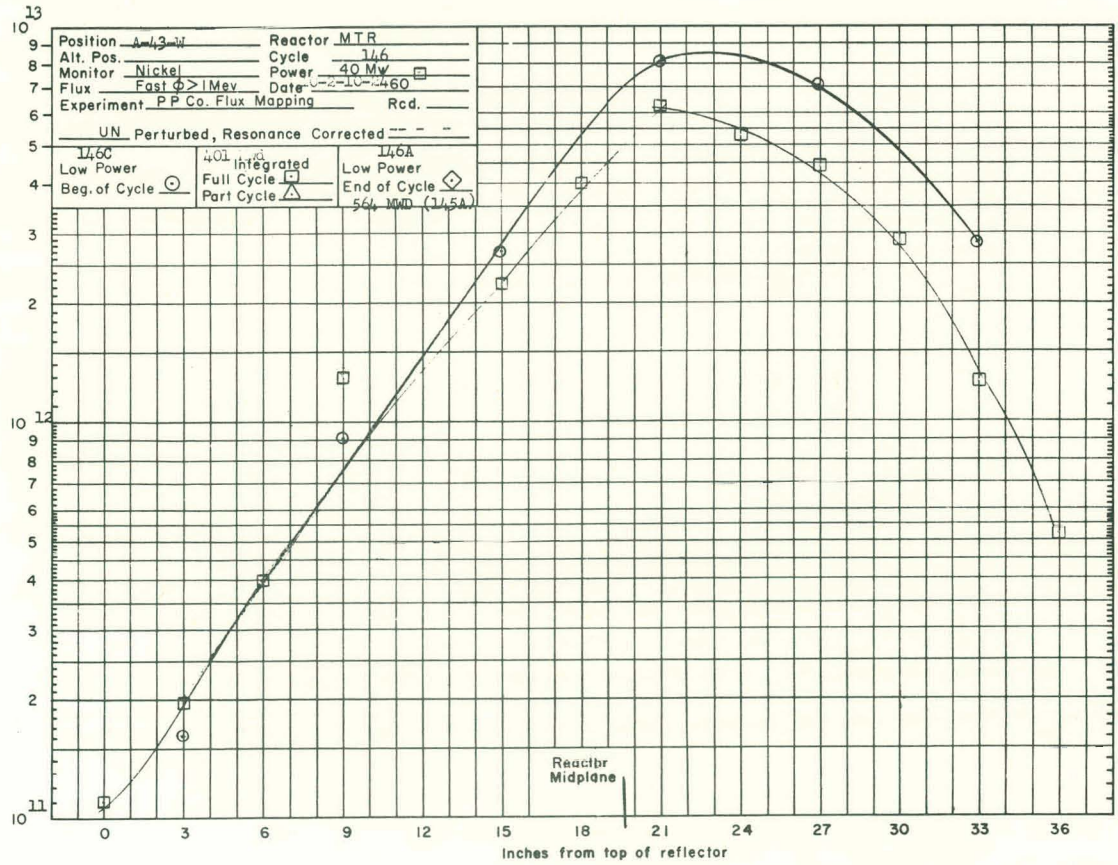

Position A-41-SE
Alt. Pos.
Monitor Nickel
Flux Fast Φ>1Mev
Experiment PP Co. Flux Mapping
Reactor MTR
Cycle 146
Power 40 Mw
Date 10-2-10-2460
Rcd.
UN Perturbed, Resonance Corrected
146C Low Power Beg. of Cycle
401 Mwd Integrated Full Cycle Part Cycle
146A Low Power End of Cycle 564 MWD (145A)
Reactor Midplane
9.62 X 10^10
Inches from top of reflector

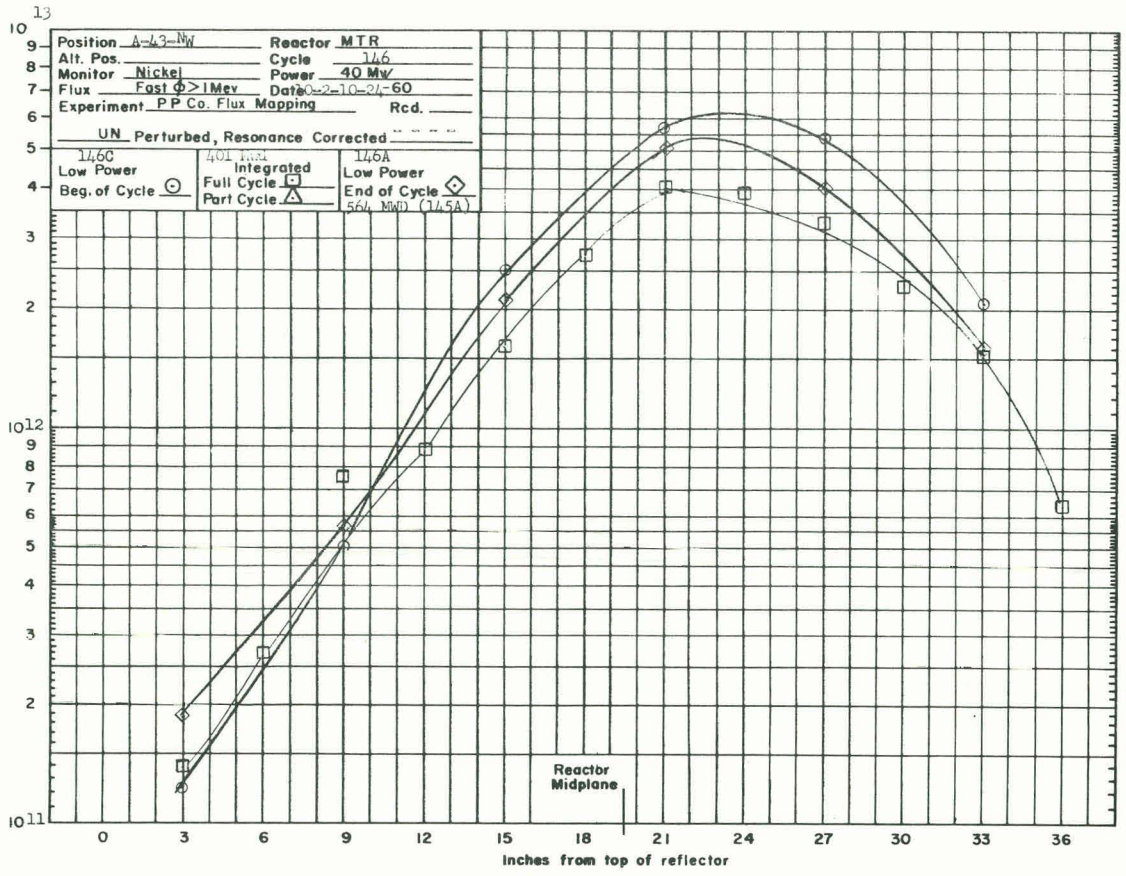

Position A-41-SW
Alt. Pos.
Monitor Nickel
Flux Fast Φ>1Mev
Experiment PP Co. Flux Mapping
Reactor MTR
Cycle 146
Power 40 Mw
Date 10-2-10-2460
Rcd.
UN Perturbed, Resonance Corrected
146C Low Power Beg. of Cycle
401 Mwd Integrated Full Cycle Part Cycle
146A Low Power End of Cycle 564 MWD (145A)
Reactor Midplane
8.12 X 10^10
Inches from top of reflector

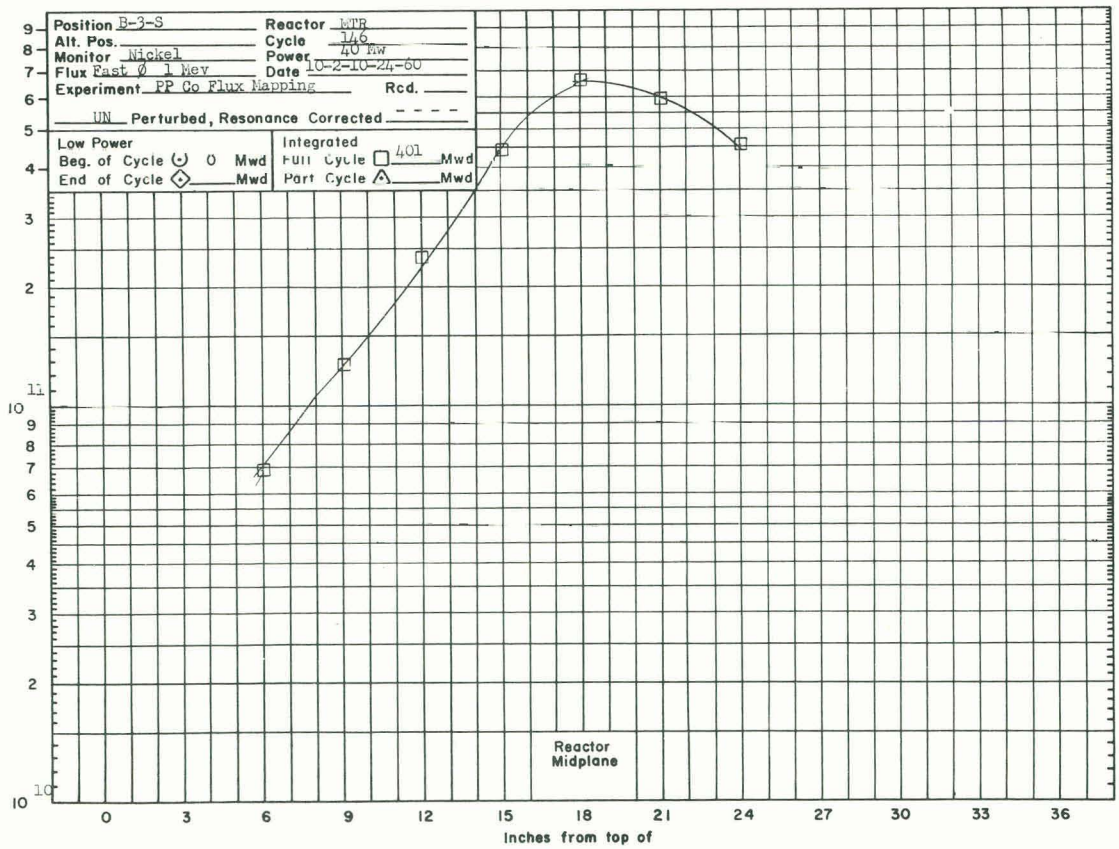

Position A-43-NE
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ>1Mev
Date 10-2-10-24-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
401 Mwd
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
inches from top of reflector

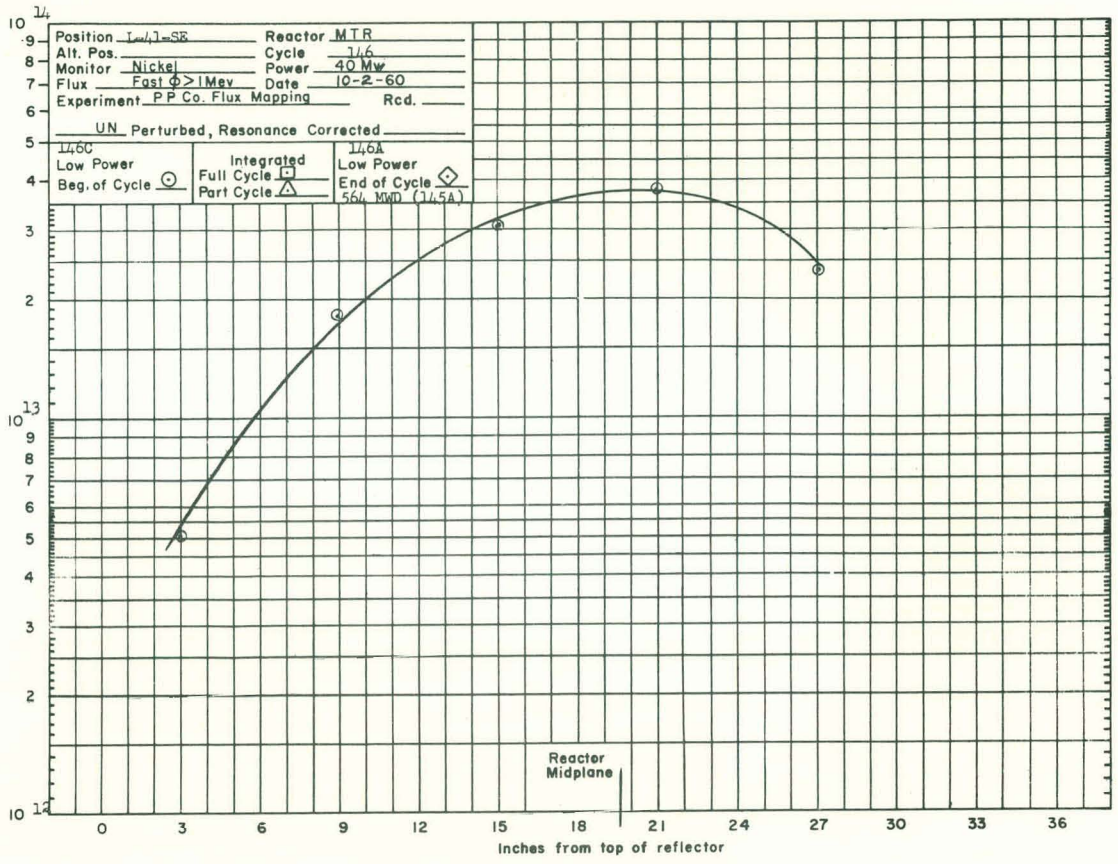

Position A-43-SE
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast
Date 10/2-10/24/60
Experiment PPCO Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
Low Power
Beg. of Cycle 0 Mwd
End of Cycle Mwd
Integrated
Full Cycle 401 Mwd
Part Cycle Mwd
Reactor Midplane
Inches from top of Reflector

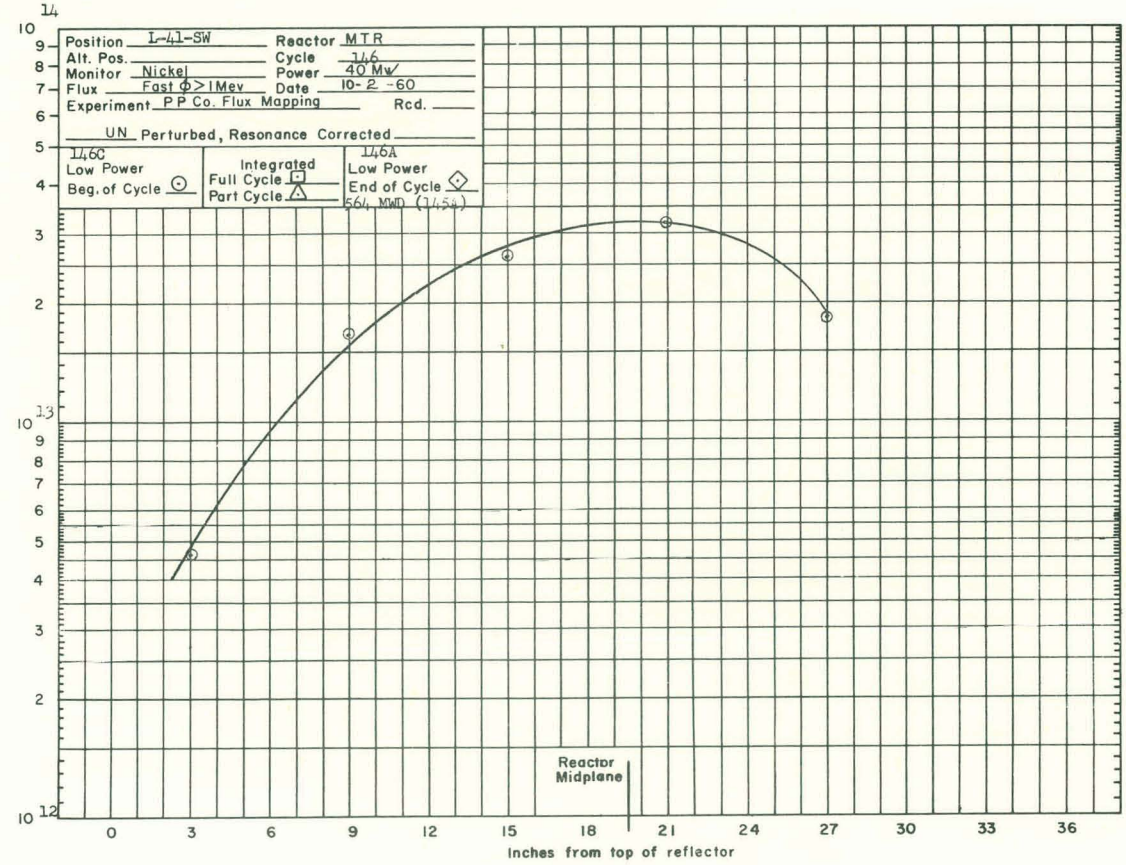

Position A-43-S
Alt. Pos.
Monitor Nickel
Flux Fast Φ>1Mev
Experiment PP Co. Flux Mapping
Reactor MTR
Cycle 146
Power 40 MW
Date 10-2-10-1960
Rcd.
UN Perturbed, Resonance Corrected
1460 Low Power Beg. of Cycle
401 Integrated Full Cycle Part Cycle
146A Low Power End of Cycle 564 MWD (145A)
Reactor Midplane
2.03 X 10^11
Inches from top of reflector

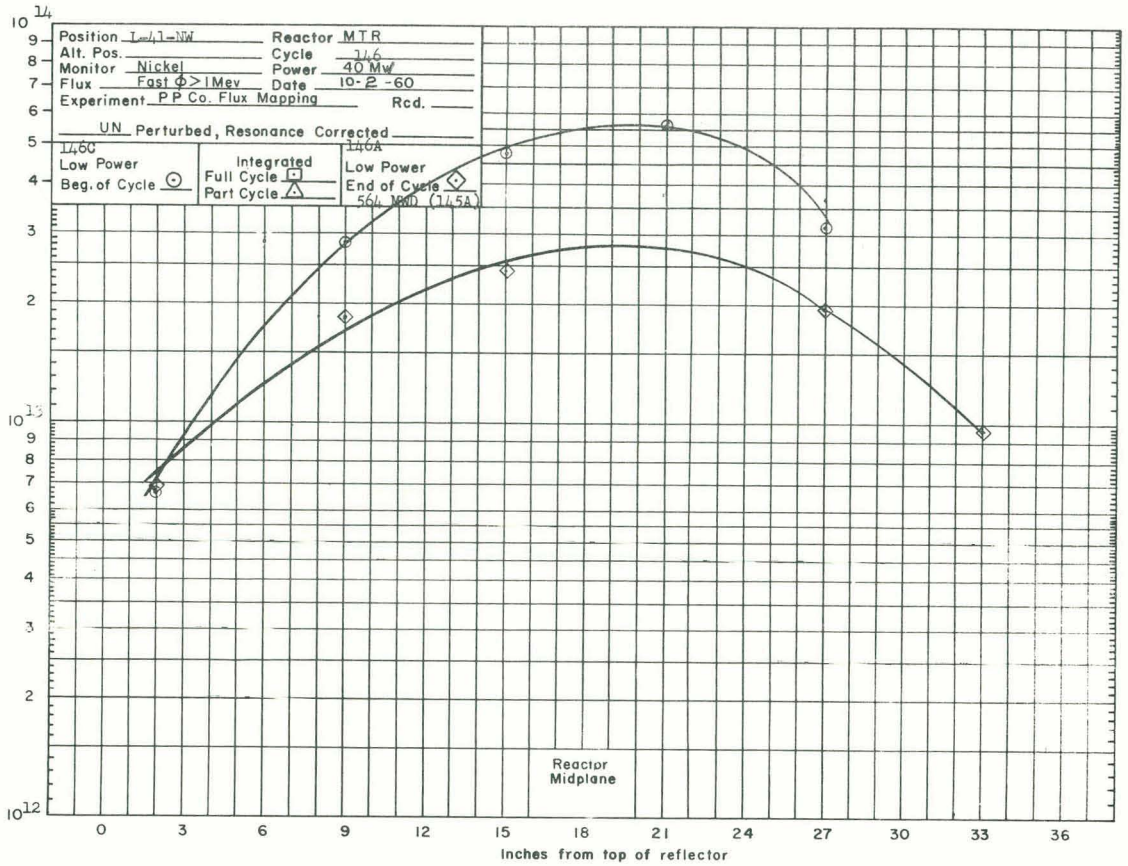

Position A-43-W
Alt. Pos.
Monitor Nickel
Flux Fast Φ>1Mev
Experiment PP Co. Flux Mapping
Reactor MTR
Cycle 146
Power 40 MW
Date 10-2-10-1960
Rcd.
UN Perturbed, Resonance Corrected
1460 Low Power Beg. of Cycle
401 Integrated Full Cycle Part Cycle
146A Low Power End of Cycle 564 MWD (145A)
Reactor Midplane
Inches from top of reflector

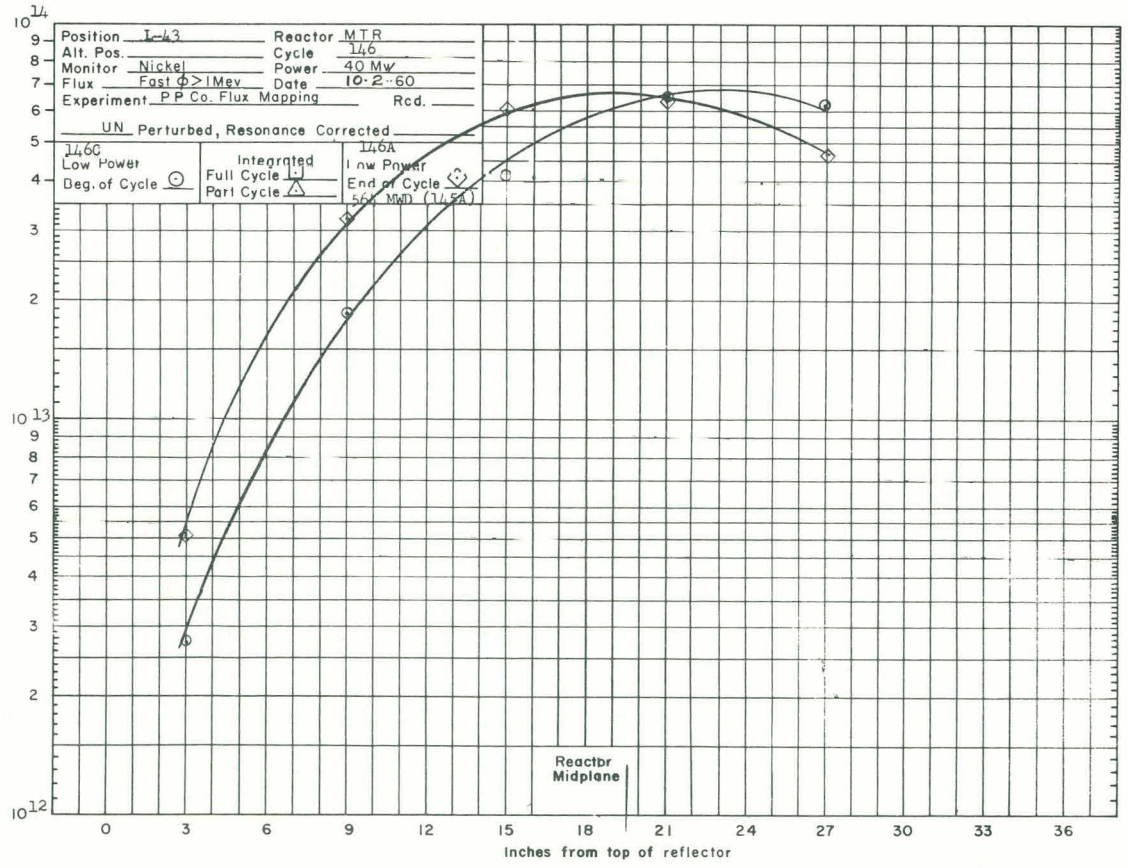

Position A-43-NW
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ>1Mev
Date 10-2-10-24-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
401 Mwd
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

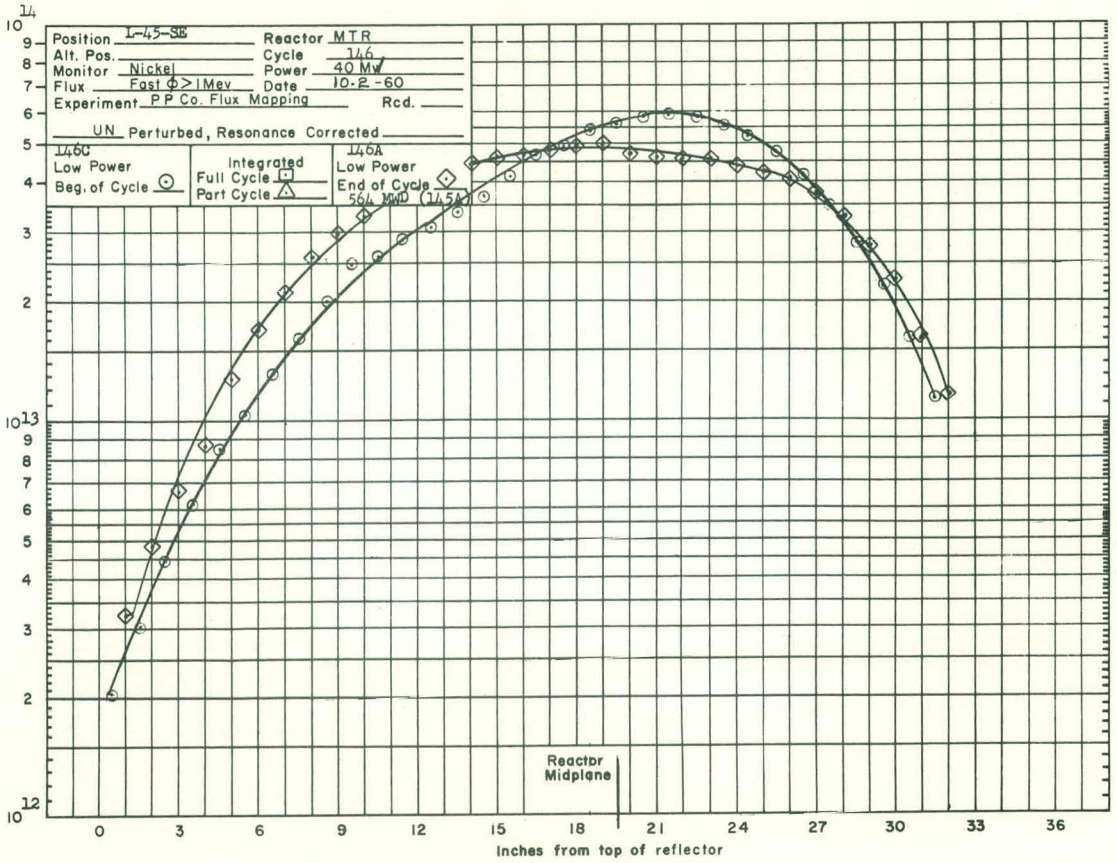

Position B-3-S
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast Ø 1 Mev
Date 10-2-10-24-60
Experiment PP Co Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
Low Power
Beg. of Cycle 0 Mwd
End of Cycle Mwd
Integrated
Full Cycle 401 Mwd
Part Cycle Mwd
Reactor Midplane
Inches from top of

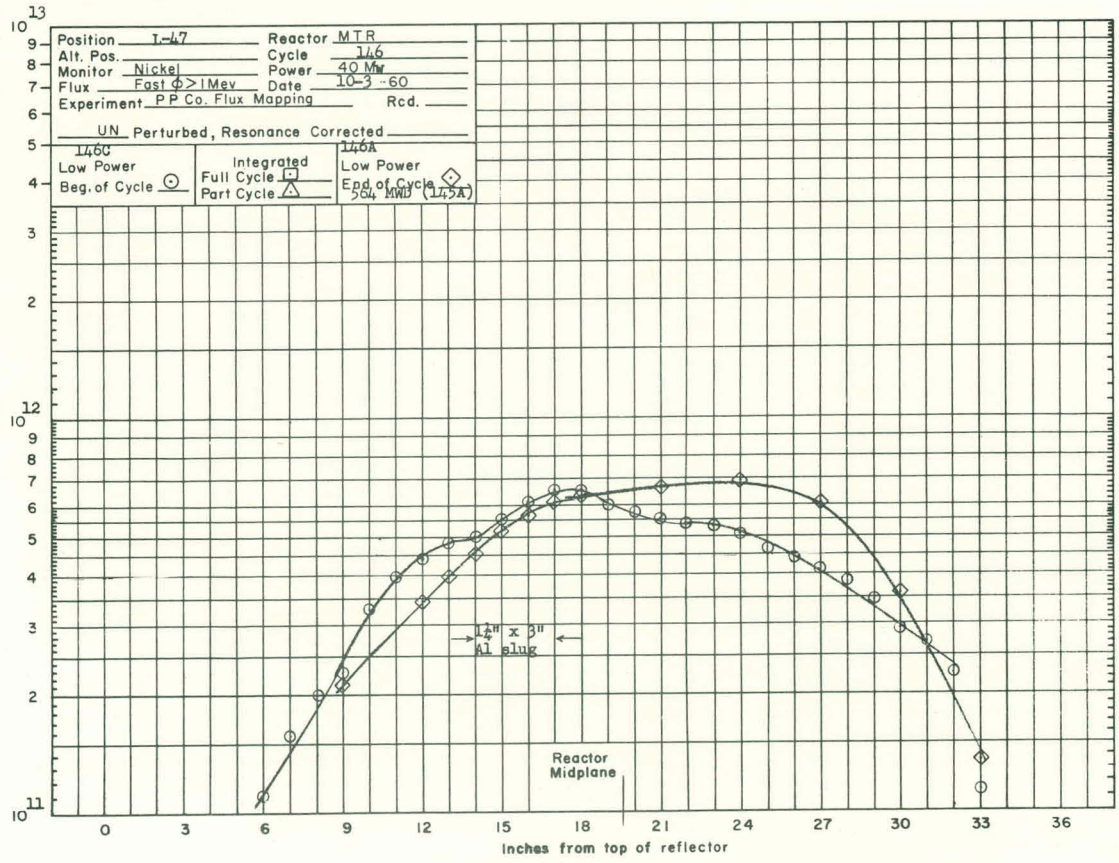

Position L-41-SE
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast Φ>1Mev
Date 10-2-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

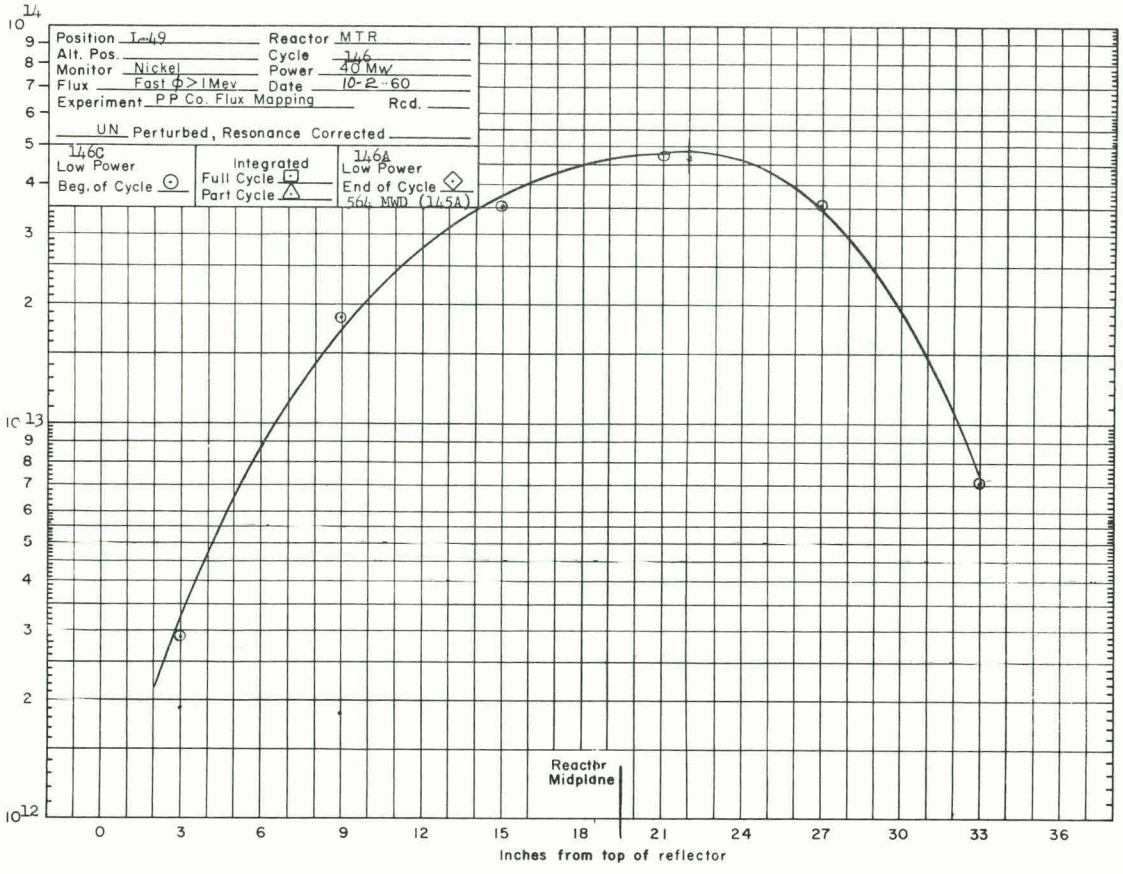

Position L-41-SW
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast Φ>1Mev
Date 10-2-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

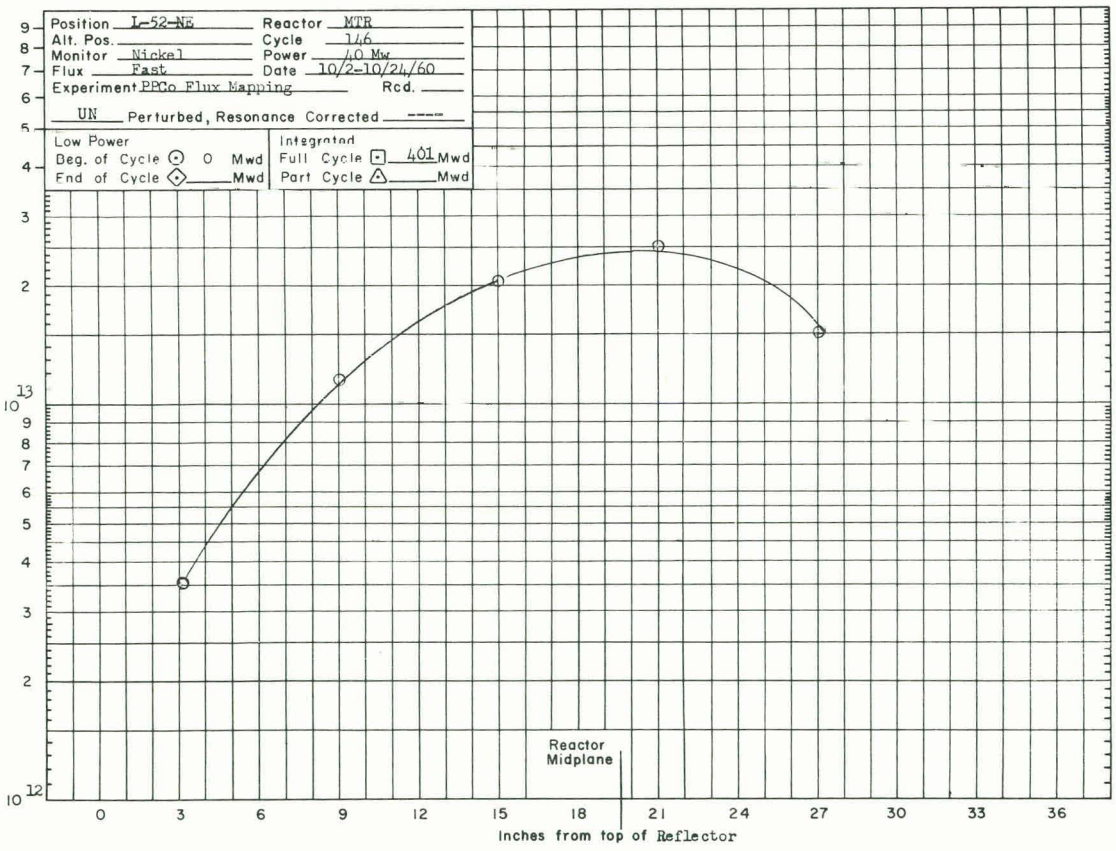

Position L-41-NW
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ>1Mev
Date 10-2-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

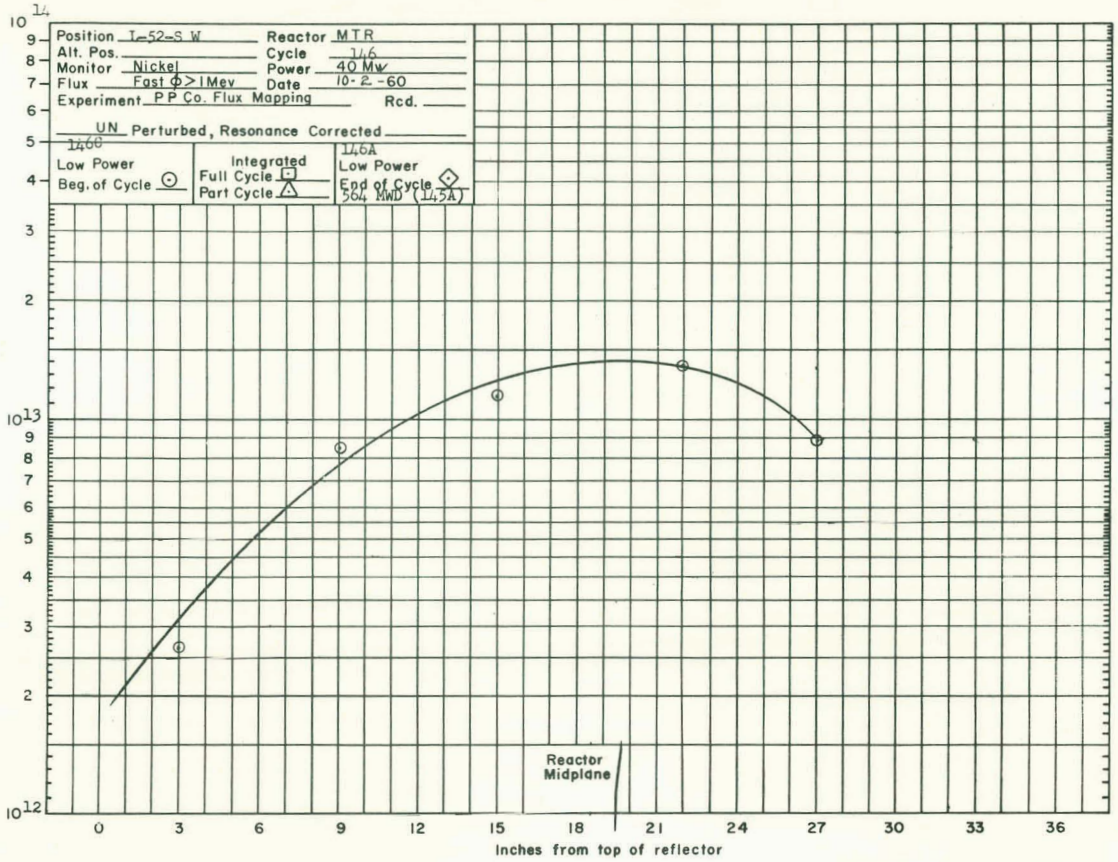

Position L-43
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ>1Mev
Date 10-2-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

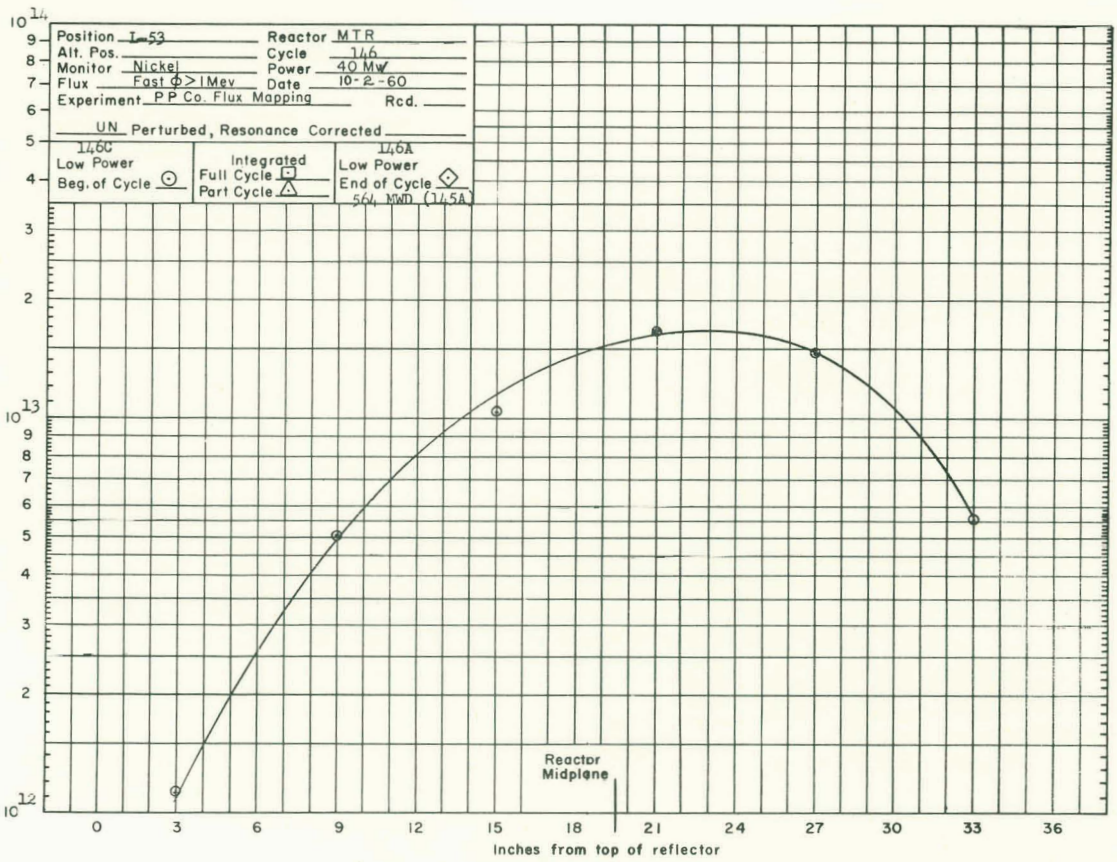

Position I-45-SE
Alt. Pos.
Monitor Nickel
Flux Fast Φ>1Mev
Experiment PP Co. Flux Mapping
Reactor MTR
Cycle 146
Power 40 Mw
Date 10-2-60
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

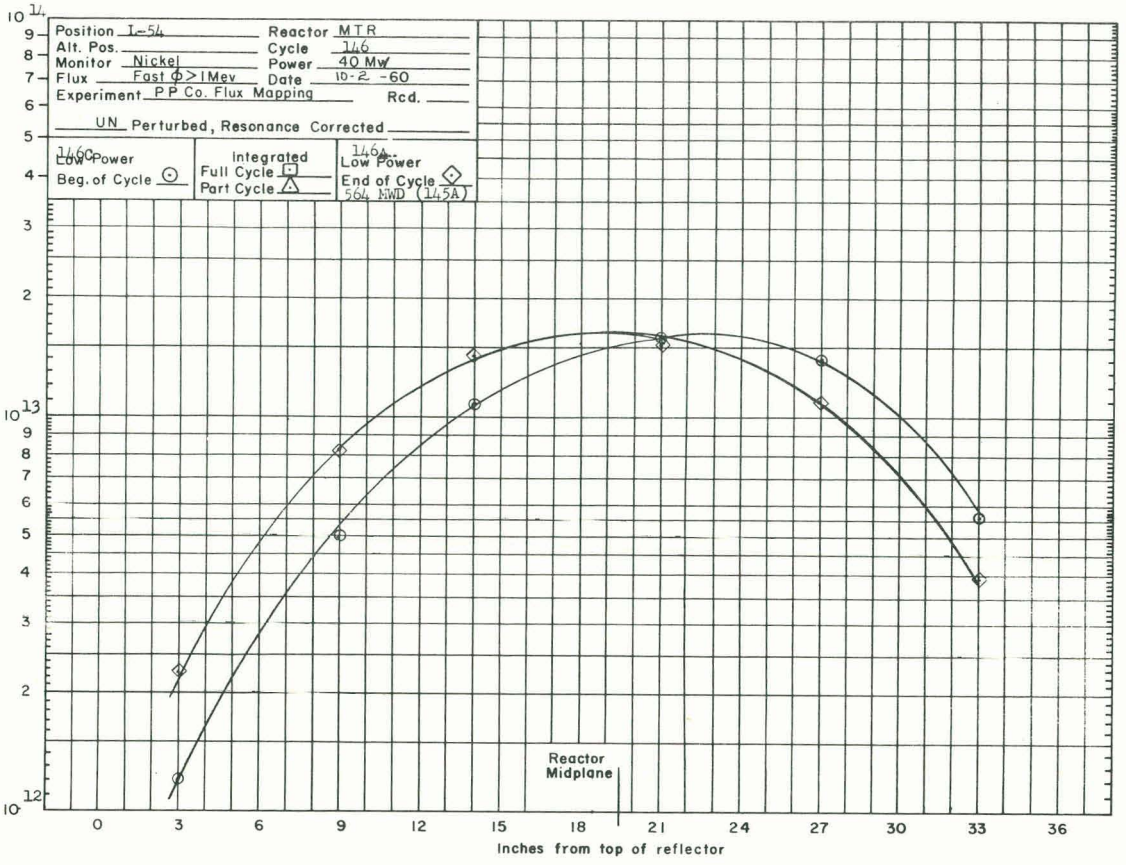

Position I-47
Alt. Pos.
Monitor Nickel
Flux Fast Φ>1Mev
Experiment PP Co. Flux Mapping
Reactor MTR
Cycle 146
Power 40 Mw
Date 10-3-60
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
1¼" x 3" Al slug
Reactor Midplane
Inches from top of reflector

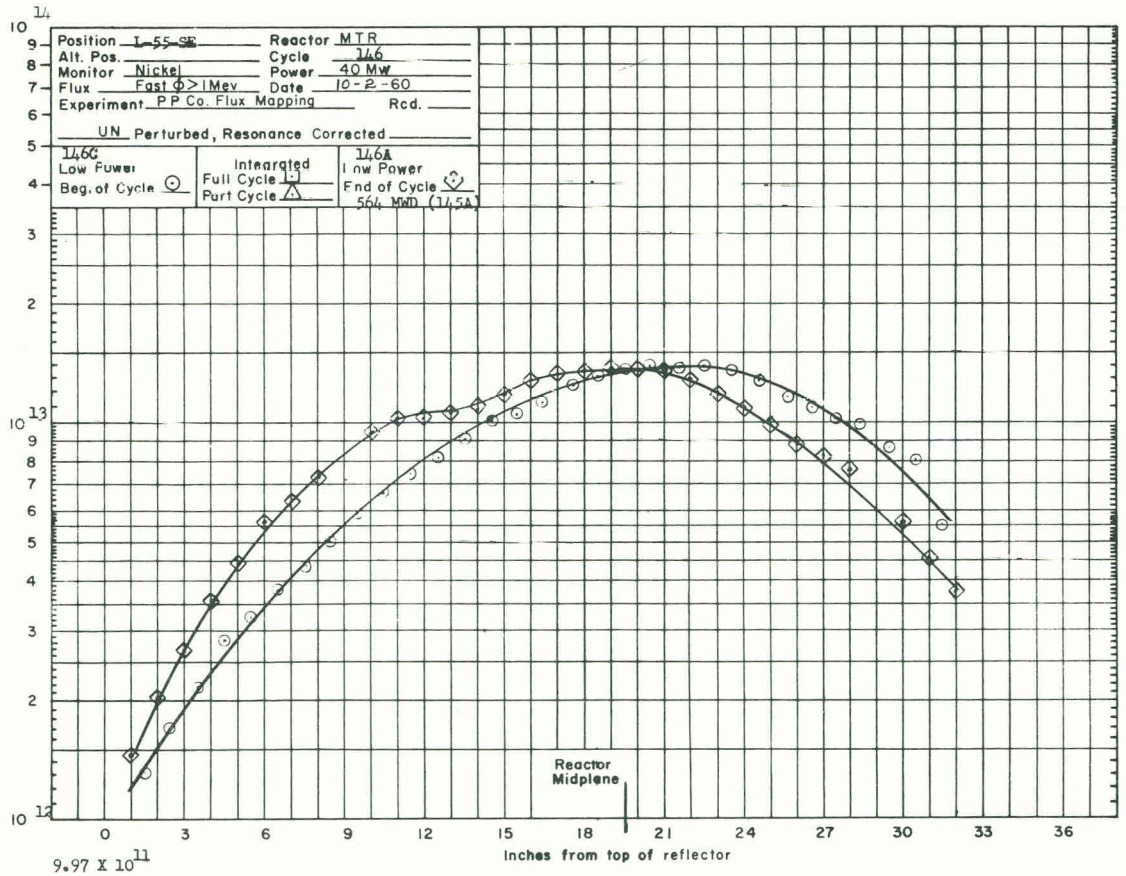

Position L-49
Alt. Pos.
Monitor Nickel
Flux Fast Φ>1Mev
Experiment PP Co. Flux Mapping
Reactor MTR
Cycle 146
Power 40 Mw
Date 10-2-60
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
0 3 6 9 12 15 18 21 24 27 30 33 36
Inches from top of reflector

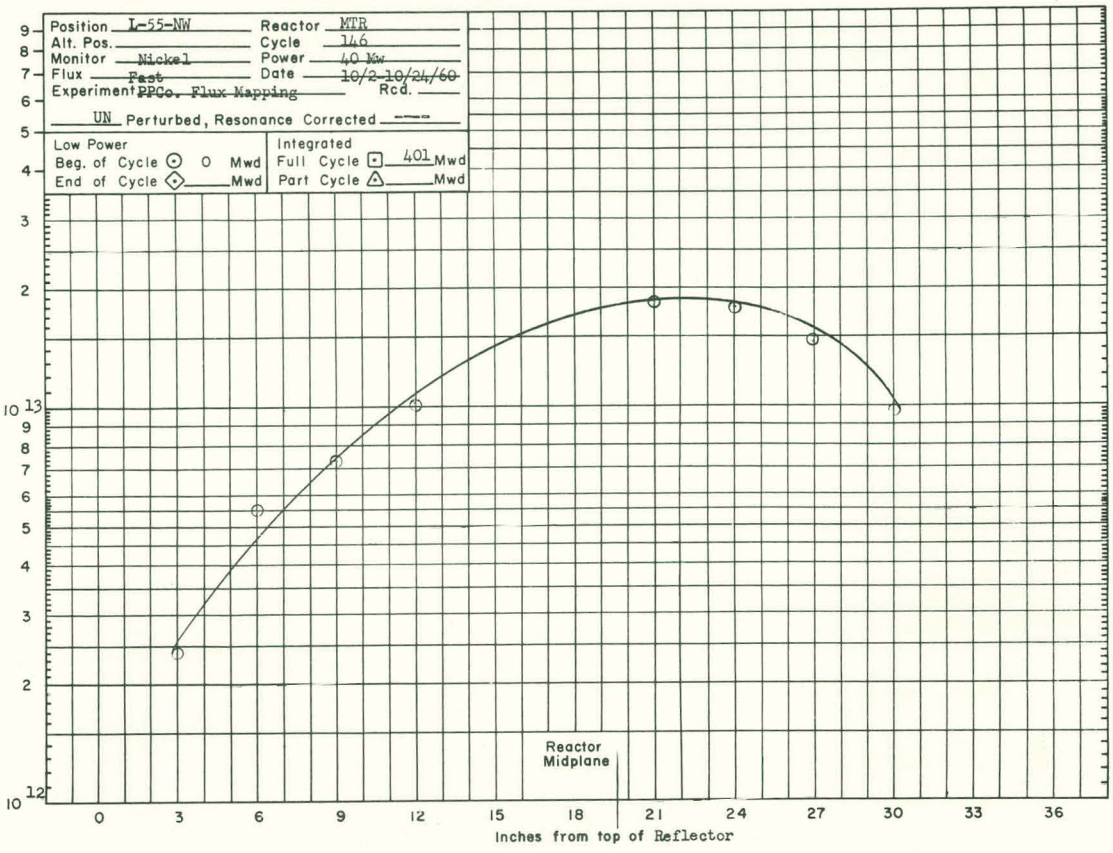

Position L-52-NE
Alt. Pos.
Monitor Nickel
Flux Fast
Experiment PPCo Flux Mapping
Reactor MTR
Cycle 146
Power 40 Mw
Date 10/2-10/24/60
Rcd.
UN Perturbed, Resonance Corrected ----
Low Power
Beg. of Cycle 0 Mwd
End of Cycle Mwd
Integrated
Full Cycle 401 Mwd
Part Cycle Mwd
Reactor Midplane
0 3 6 9 12 15 18 21 24 27 30 33 36
Inches from top of Reflector

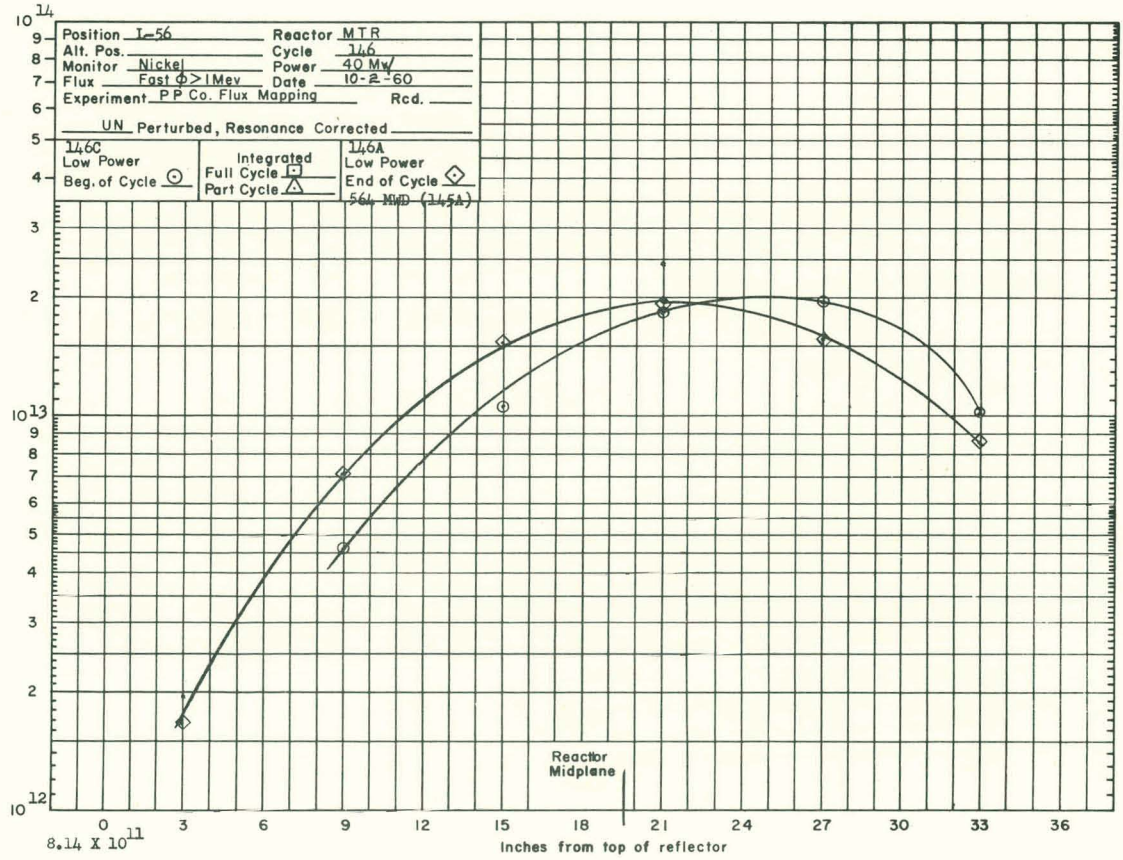

Position I-52-S W
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast Φ>1Mev
Date 10-2-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

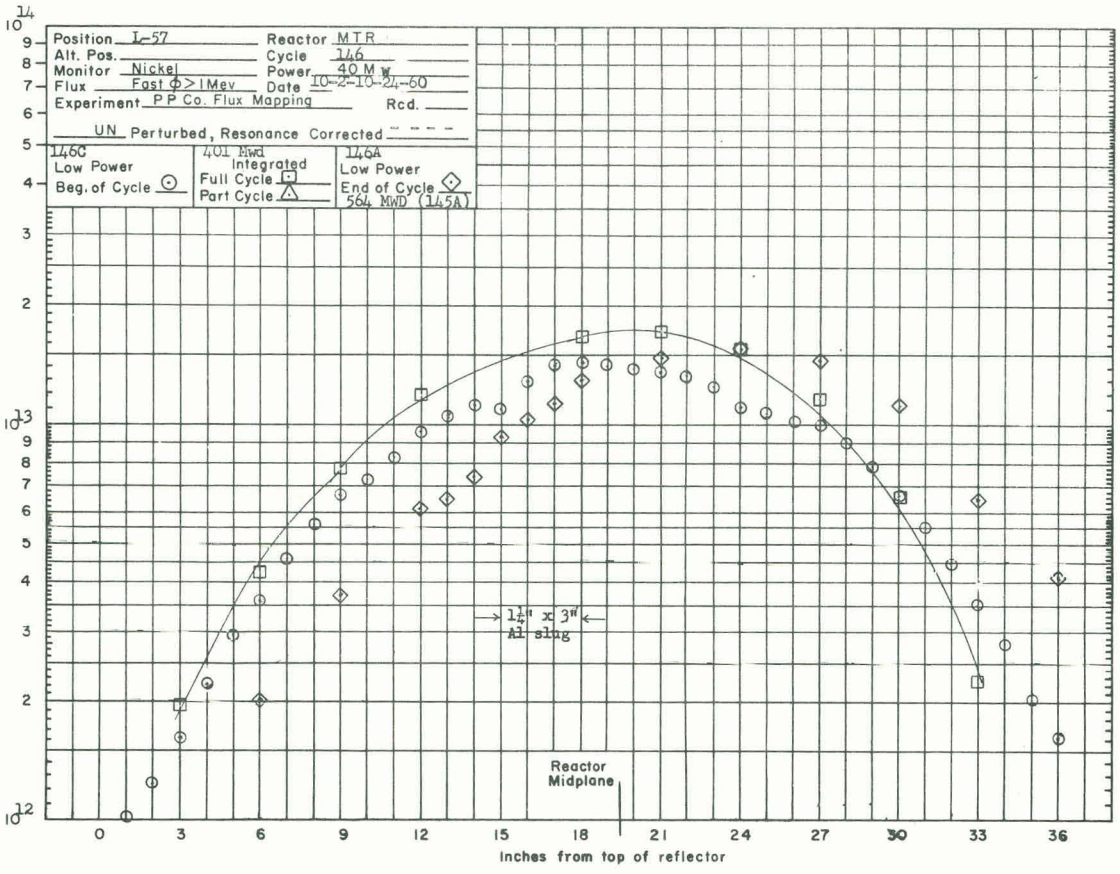

Position I-53
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast Φ>1Mev
Date 10-2-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
Inches from top of reflector

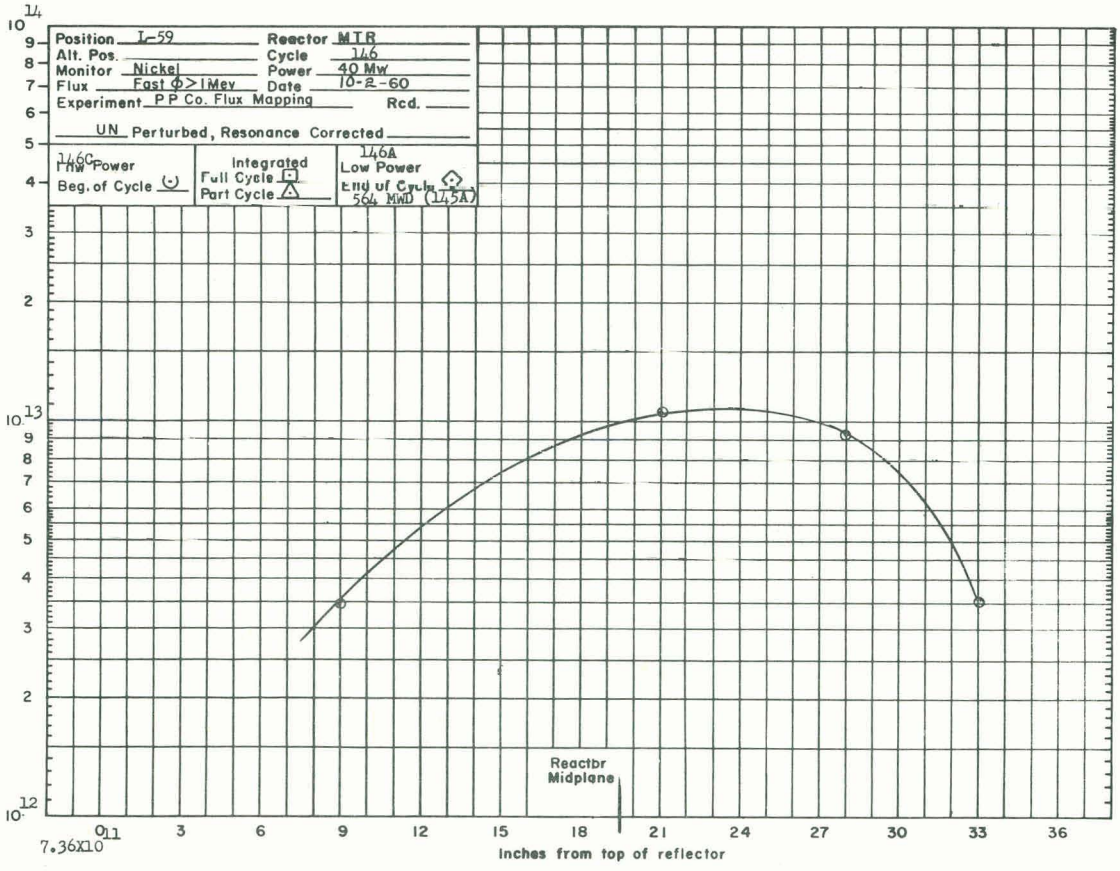

Position I-54
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ>1Mev
Date 10-2-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C Low Power Beg. of Cycle
Integrated Full Cycle Part Cycle
146A Low Power End of Cycle 564 MWD (145A)
Reactor Midplane
Inches from top of reflector


Position I-55-SE
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ>1Mev
Date 10-2-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C Low Power Beg. of Cycle
Integrated Full Cycle Part Cycle
146A Low Power End of Cycle 564 MWD (145A)
Reactor Midplane
Inches from top of reflector
9.97 X 10^11


Position L-55-NW
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast
Date 10/2-10/24/60
Experiment PPCo. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
Low Power
Beg. of Cycle 0 Mwd
End of Cycle Mwd
Integrated
Full Cycle 401 Mwd
Part Cycle Mwd
Reactor Midplane
Inches from top of Reflector


Position L-56
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 Mw
Flux Fast Φ>1Mev
Date 10-2-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
8.14 X 10^11
Inches from top of reflector


Position L-57
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ>1Mev
Date 10-2-10-24-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
401 Mwd
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
1½" x 3" Al slug
Reactor Midplane
Inches from top of reflector


Position L-59
Reactor MTR
Alt. Pos.
Cycle 146
Monitor Nickel
Power 40 MW
Flux Fast Φ>1Mev
Date 10-2-60
Experiment PP Co. Flux Mapping
Rcd.
UN Perturbed, Resonance Corrected
146C
Low Power
Beg. of Cycle
Integrated
Full Cycle
Part Cycle
146A
Low Power
End of Cycle
564 MWD (145A)
Reactor Midplane
7.36X10
Inches from top of reflector

PHILLIPS
PETROLEUM
COMPANY

ATOMIC ENERGY DIVISION