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ORIC MODEL MAGNET DATA

Part II: Runs 3900 to 6000

(October, 1960)

R. H. Bassel, R. S. Bender, E. D. Hudson
R. S. Lord, and P. A. Dunigan

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ORIC MODEL MAGNET DATA

Part II: Runs 2900 to 6000

E. D. Hudson and R. S. Lord - Magnet Measurements
R. H. Bassel, R. S. Bender, and P. A. Dunigan - Orbit Studies

Electronuclear Division

This report contains the data from the second group* of runs made on the ORIC "quarter-scale" model magnet (actually 0.275 scale). The field measurements were taken over a 120° sector of the magnet; symmetry is assumed. The data were processed on the IBM 704 and the IBM-7090 to obtain the curves of average field (B av), flutter (F), isochronous field (B syn), the difference between B av and B syn (ΔB), and the radial and axial focusing frequencies (NuR and NuZ).

The magnet field is measured with a Hall generator; temperature control and a compensating circuit reduce the error due to temperature drift to less than ±0.01% of the maximum field. The gain of the preamplifier is measured periodically during each run and a correction is made by the computer for changes in the gain or the zero offset of the d-c amplifier. The probe is positioned to about ±0.001 in. at each of 2400 points in the 120°-sector of the model magnet. It is automatically moved azimuthally in 2° increments (or 8°, where indicated) and moved manually in radial increments of one inch (full scale).

In the following pages the available data for each run is summarized. The usual presentation is, first, the physical conditions of the run, followed by the orbit characteristics and then the magnet field curves. As indicated, the data is incomplete for some runs.

The drawings and curves were prepared by L. B. Schneider and the magnetic field measurements were made by C. H. Burbage.

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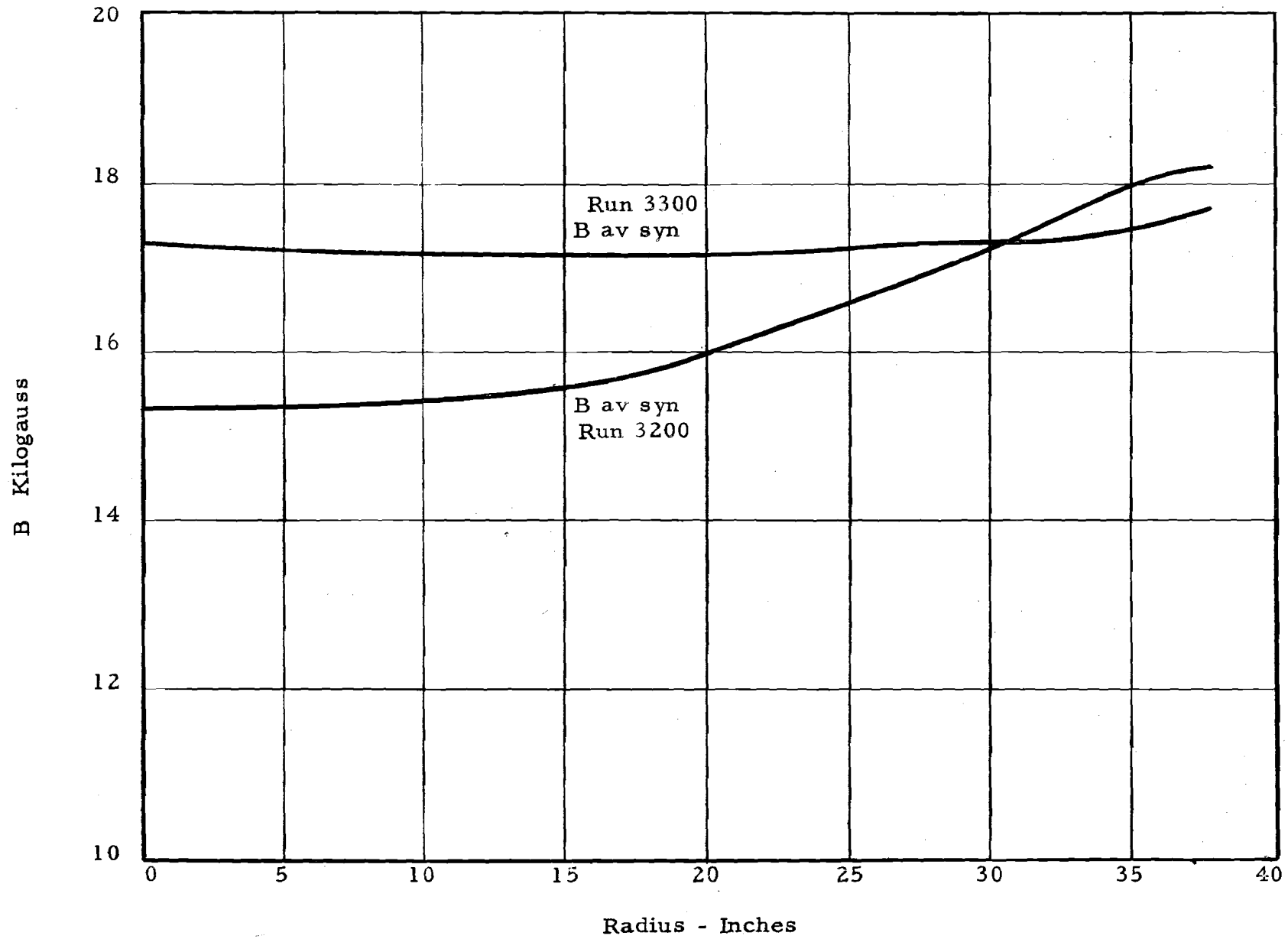
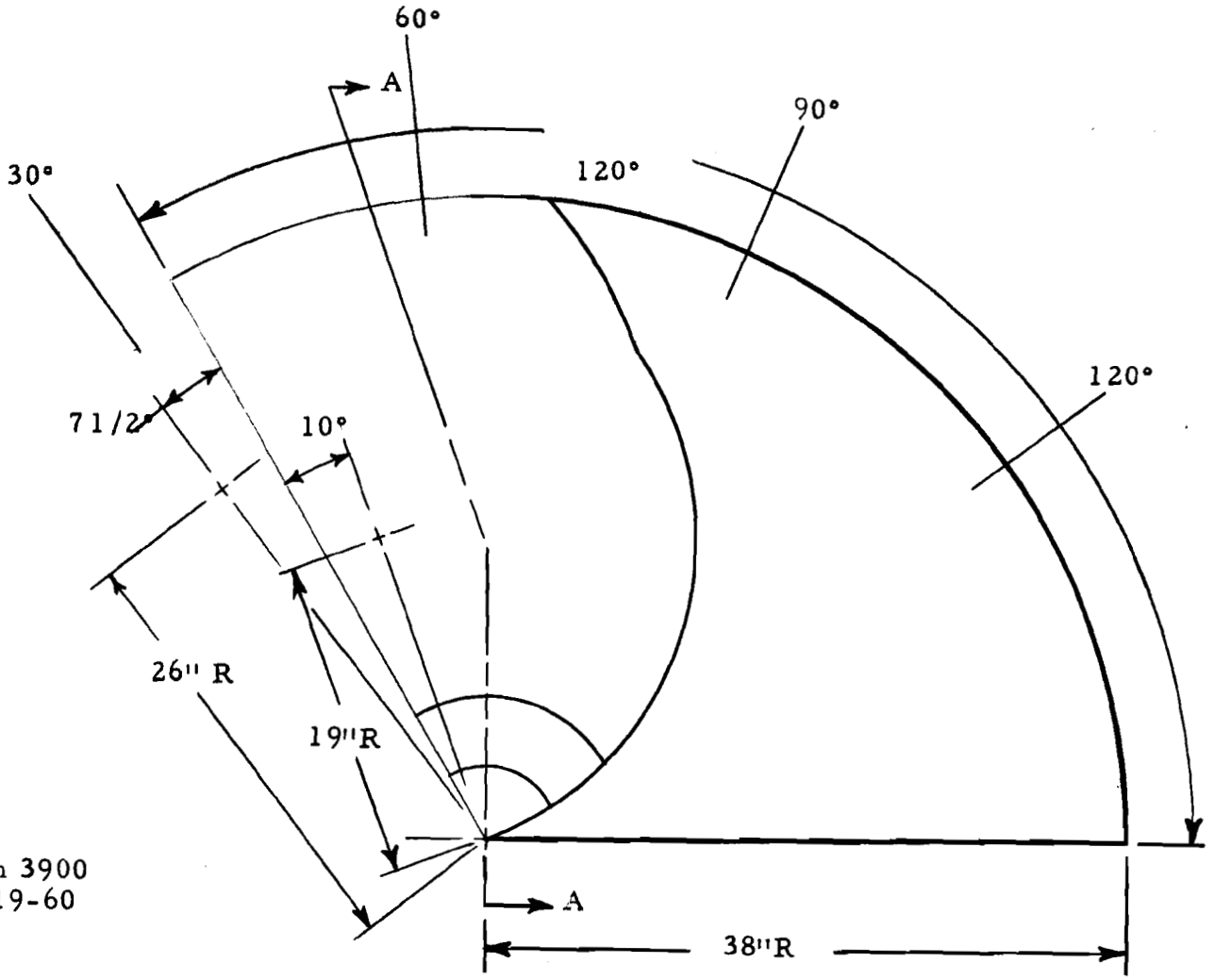
*For Part I: Runs 100 to 3800 see ORNL CF-60-7-38.



Note: For details of Runs 3200 and 3300 see Part I (ORNL CF-60-7-38).

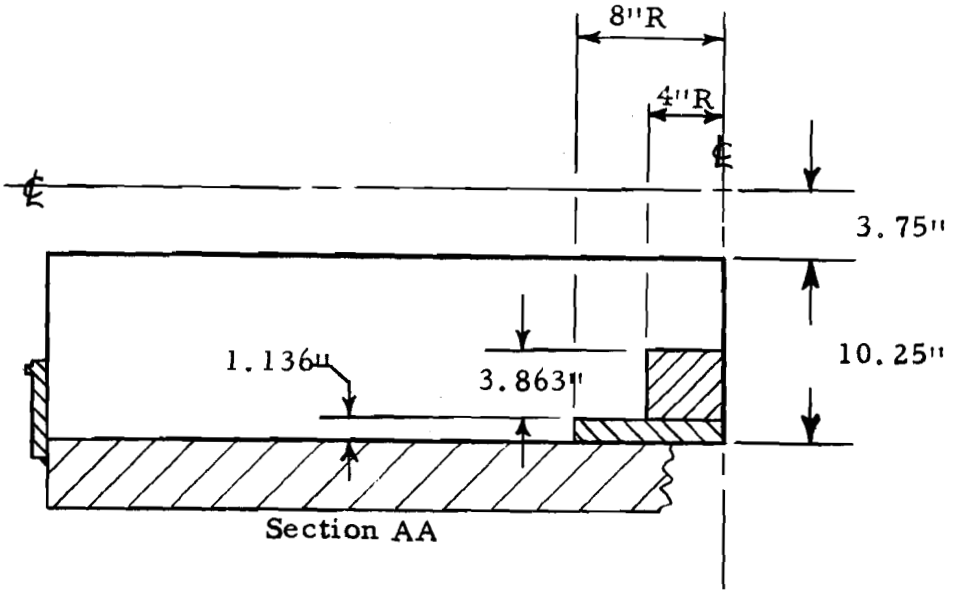


Run 3900
5-19-60

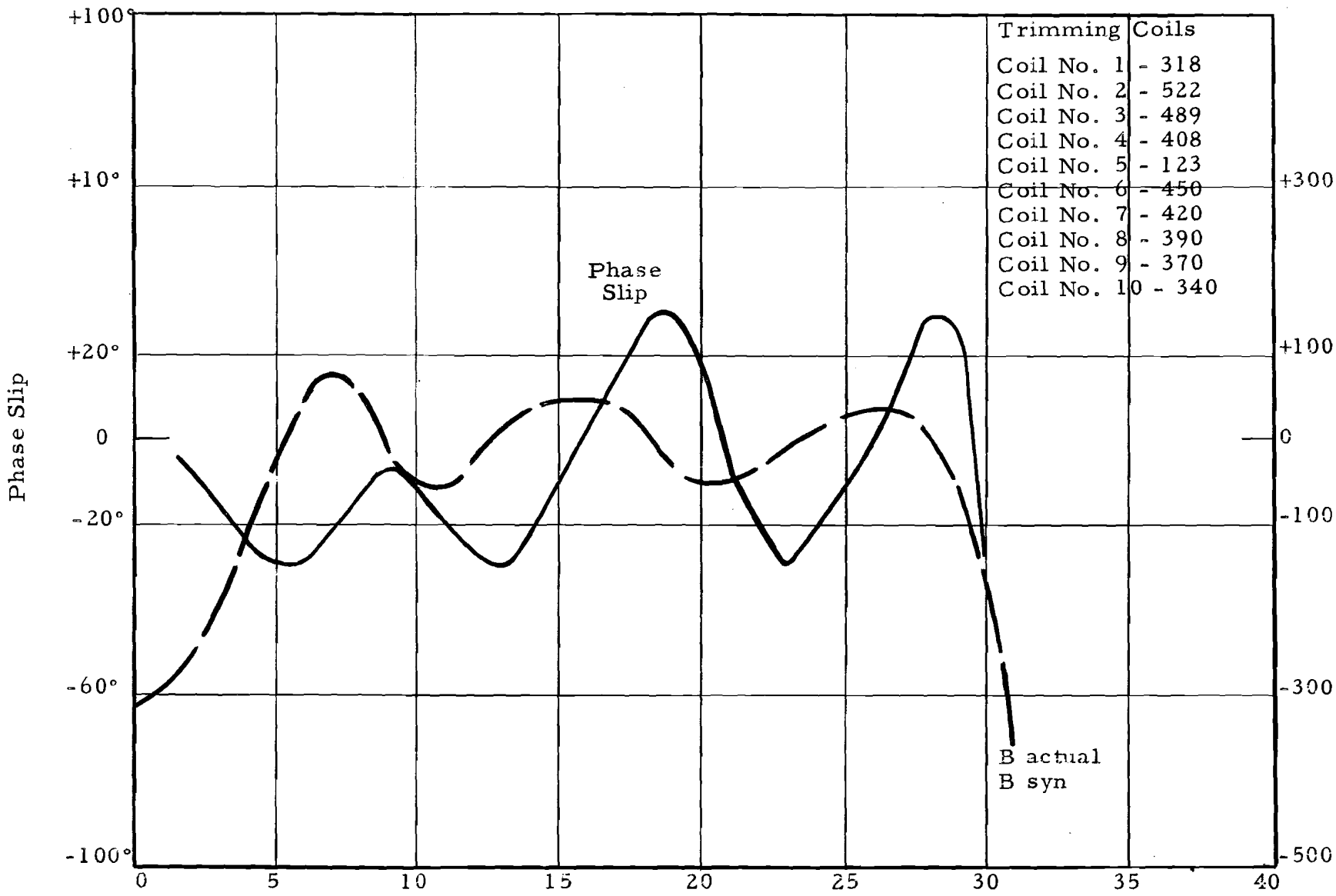
Full Scale Parameters

Main Coils - 1.07×10^6 Ampere Turns/Sector

Data was not processed



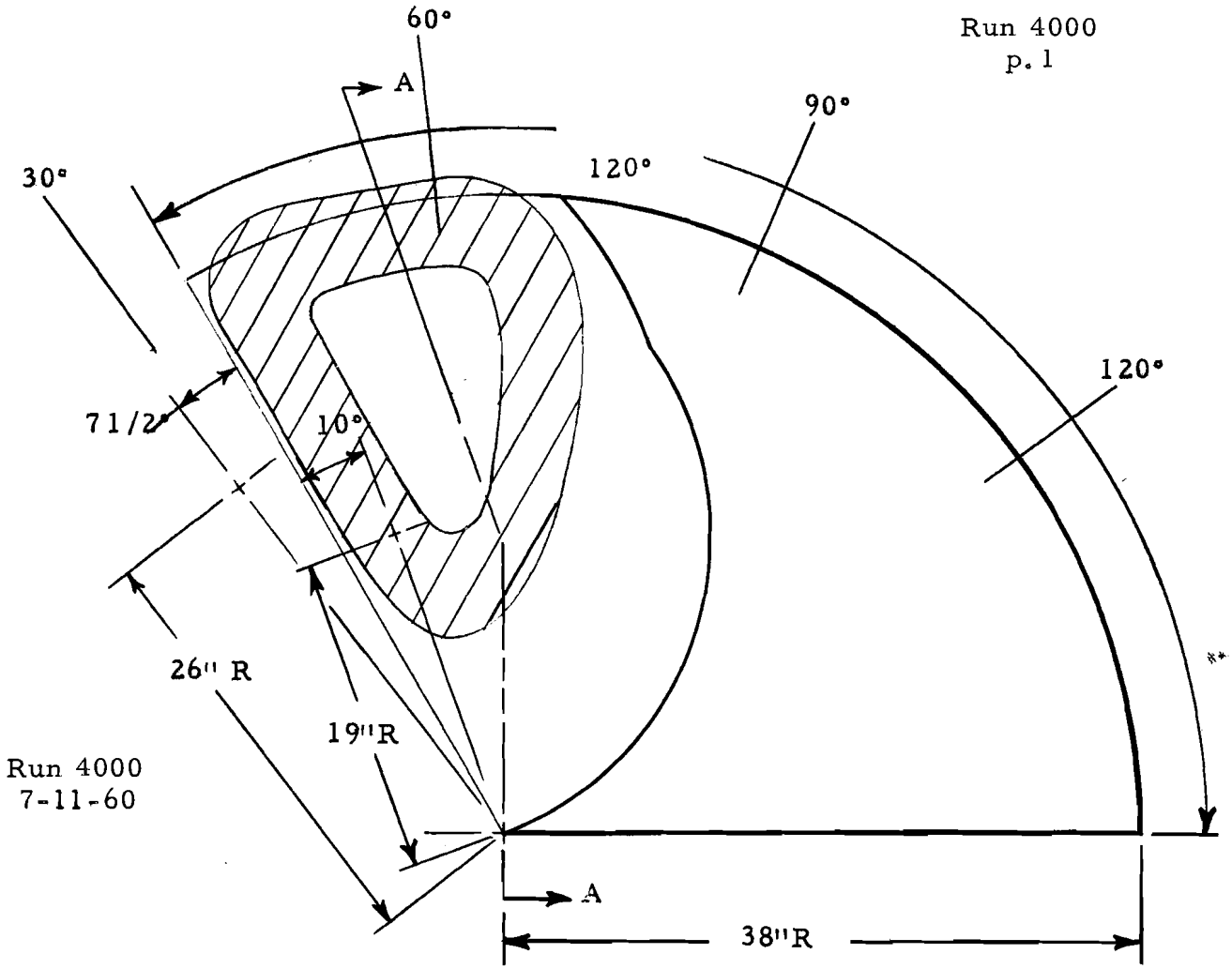
ORIC 1/4 Scale Sector



Proton 75 Mev
0" to 30"

Run 4000 Phase Slip

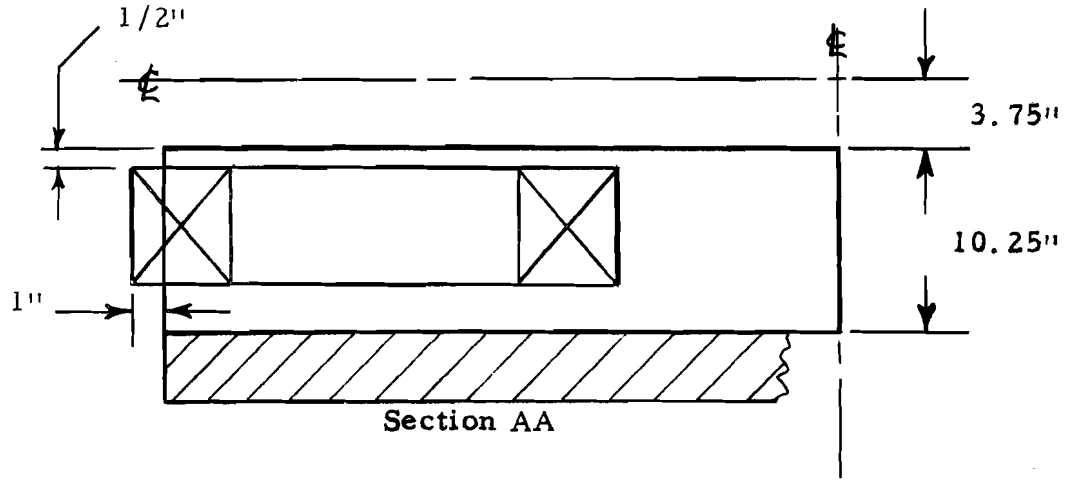
Run 4000



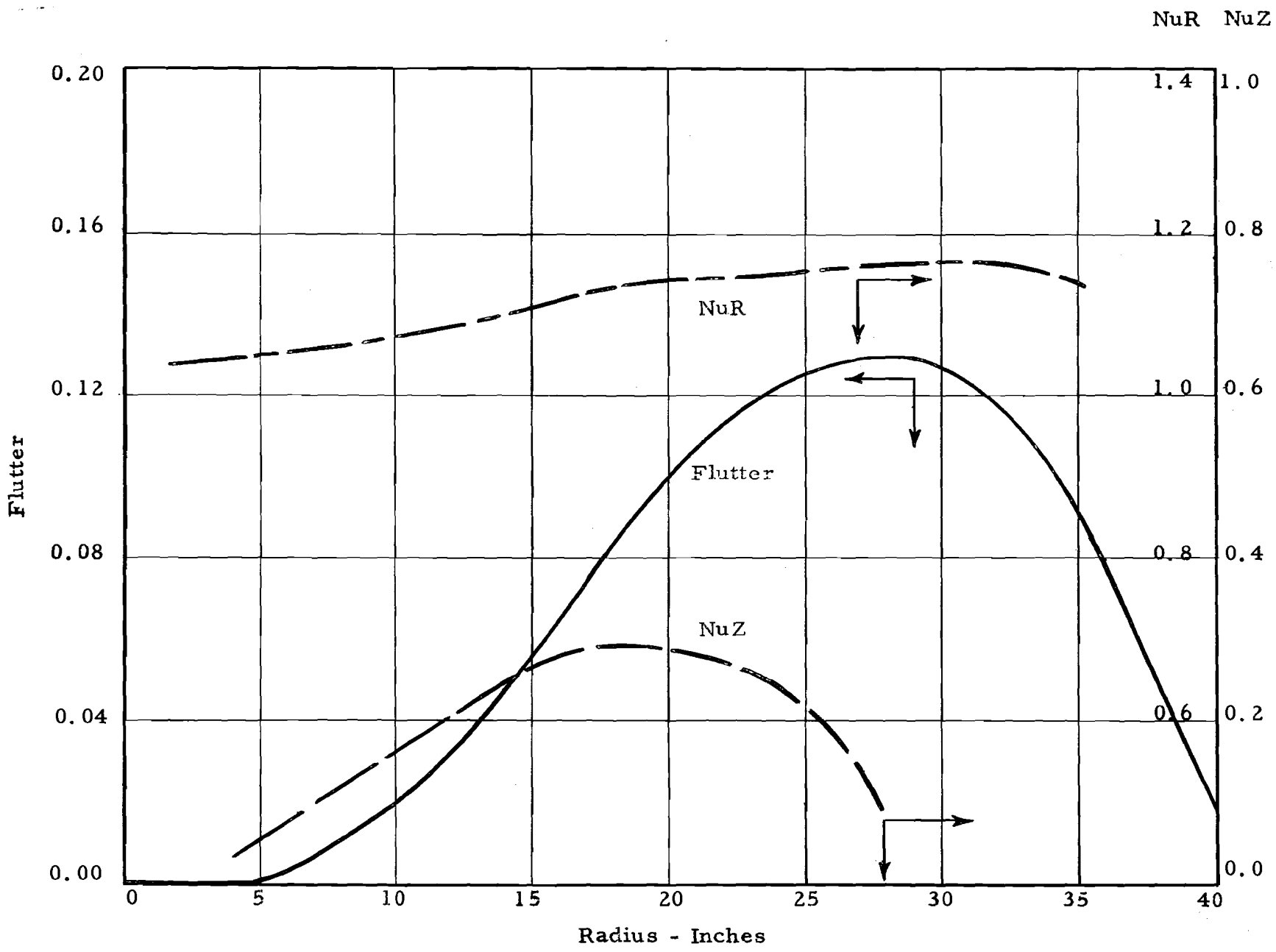
Full **Scale Parameters**

Main Coils 1.07×10^6 Ampere Turns
Valley Coils 0.35×10^6 Ampere Turns/Sector

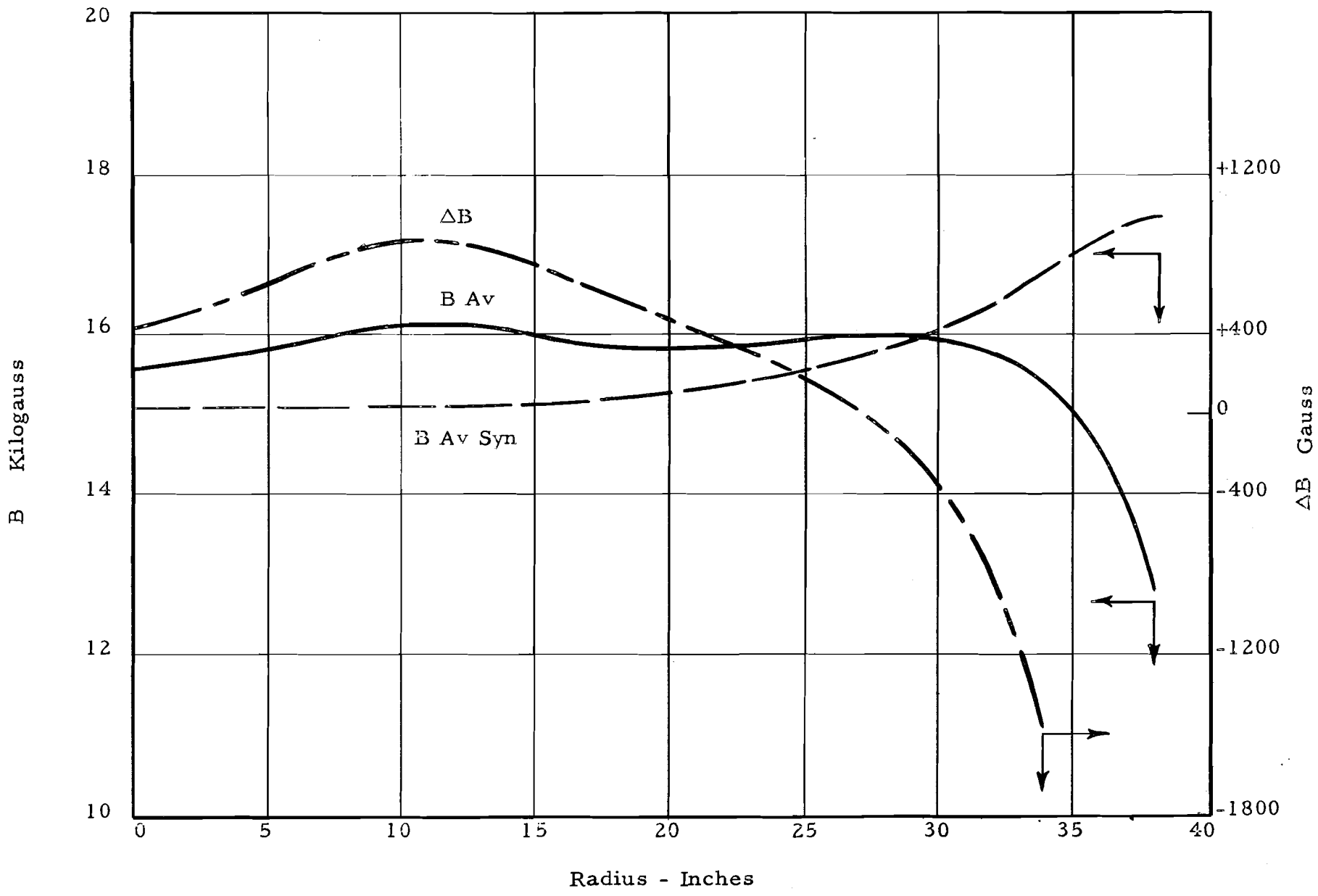
Note: Pole Tips Set II in all sectors
Valley Coils Set II in all sectors



ORIC 1/4 Scale Sector

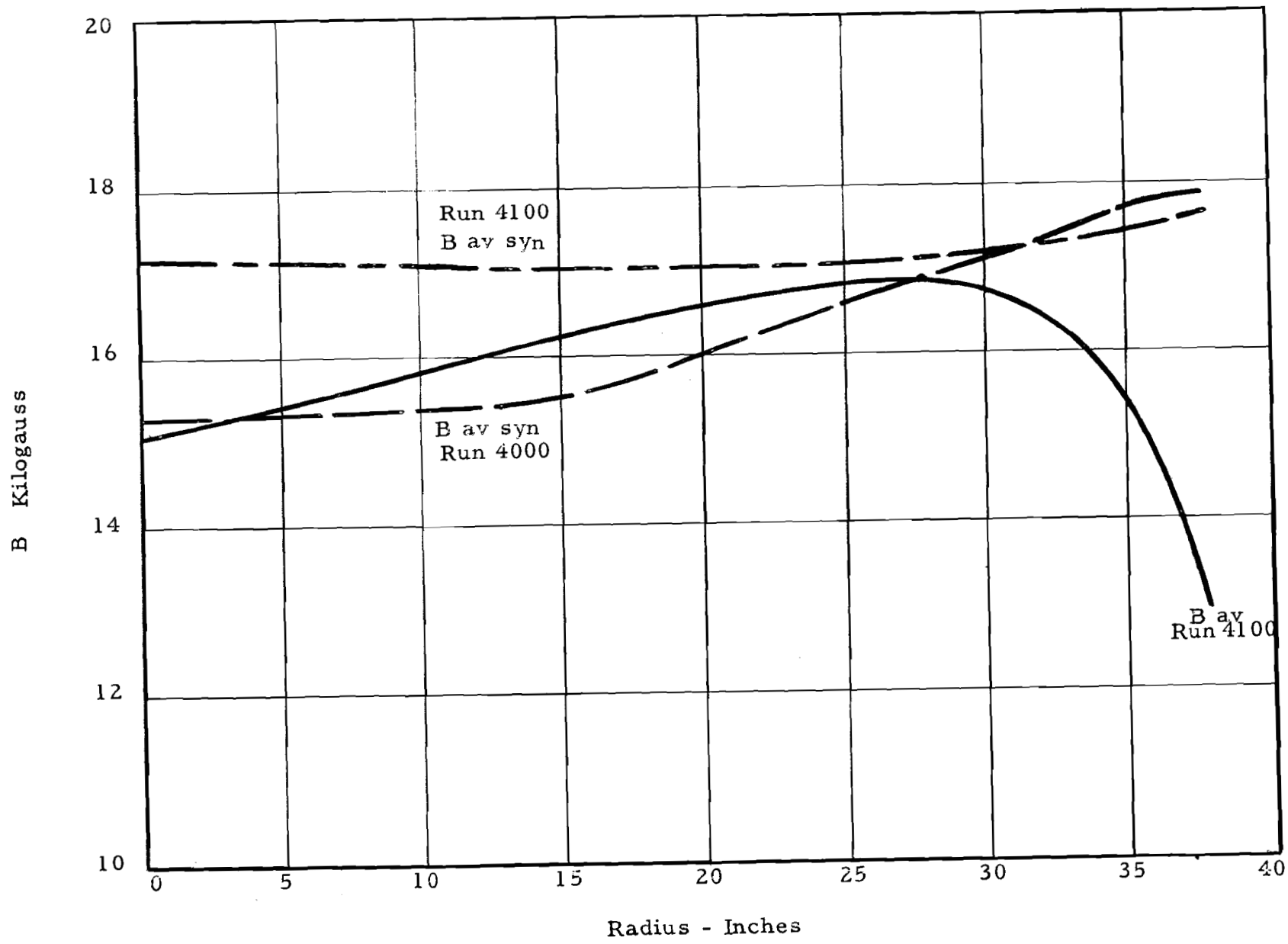

NuR NuZ
0.20
0.16
0.12
0.08
0.04
0.00
Flutter
1.4
1.2
1.0
0.8
0.6
1.0
0.8
0.4
0.2
0.0
NuR
Flutter
NuZ
0
5
10
15
20
25
30
35
40
Radius - Inches

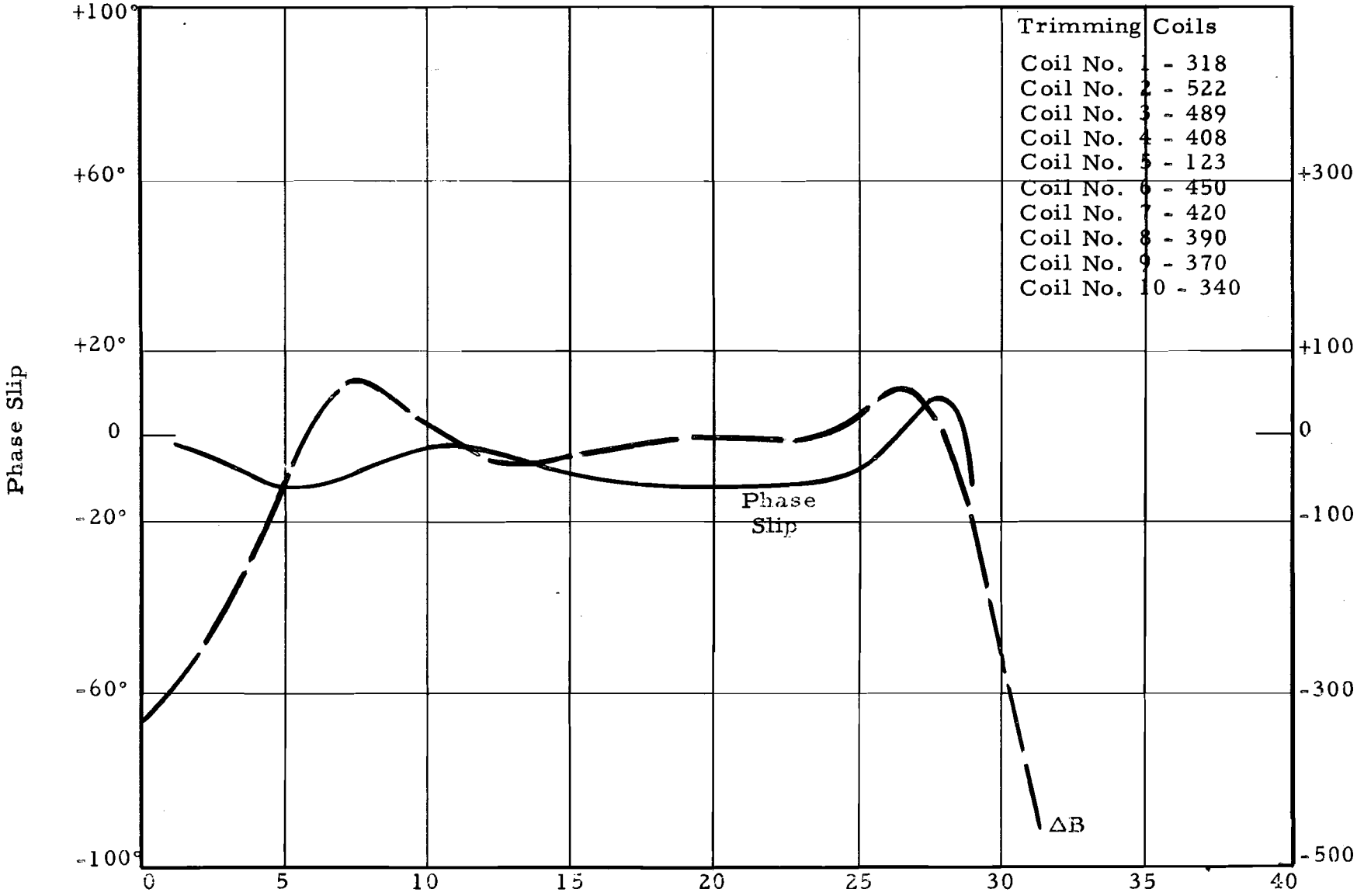
Run 4000



Run 4000

Run 4000
p. 3

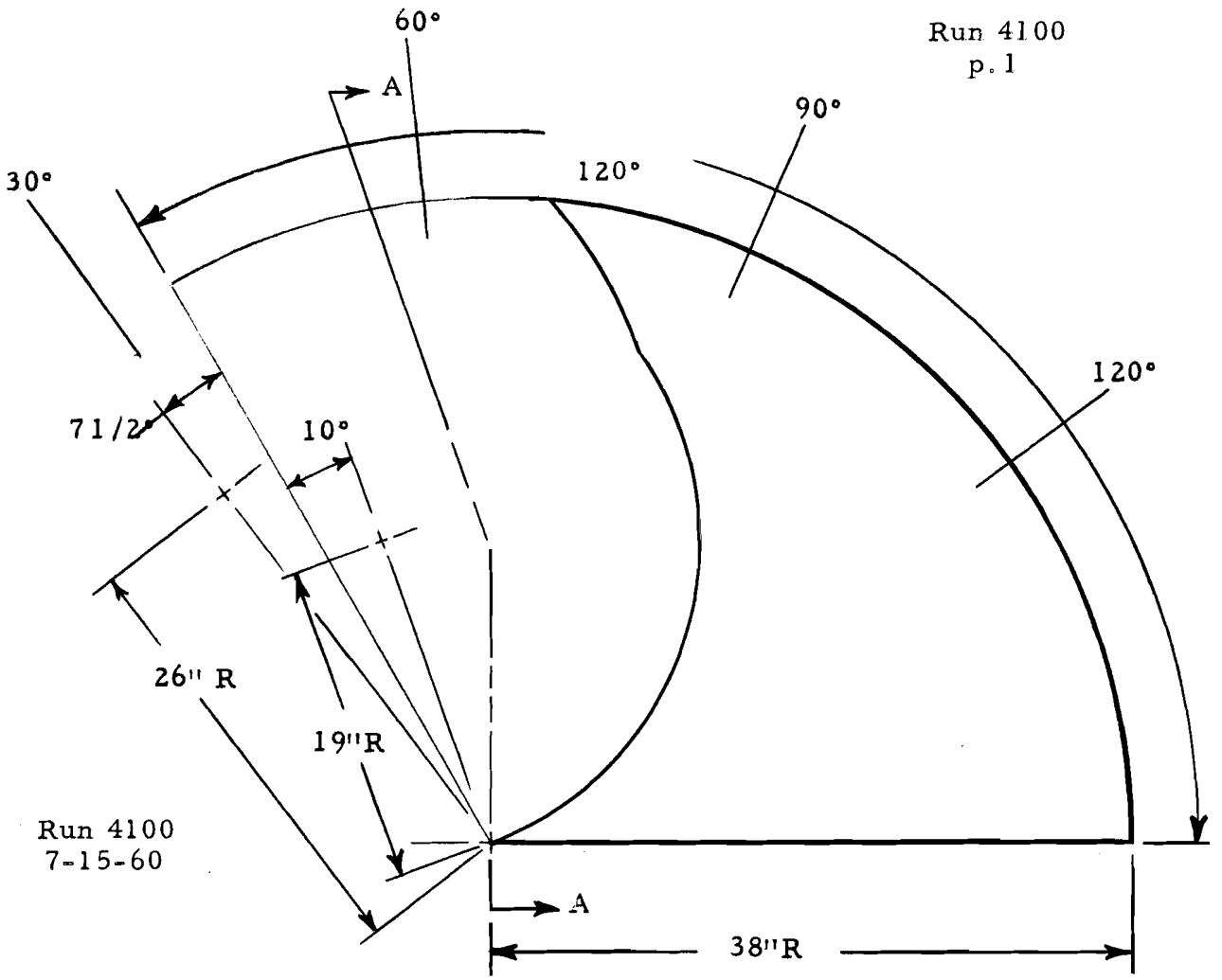

20
18
16
14
12
10
B Kilogauss
0
5
10
15
20
25
30
35
40
Radius - Inches
Run 4100
B av syn
B av syn
Run 4000
B av
Run 4100



N^{+4} at 100 Mev
0" to 30"

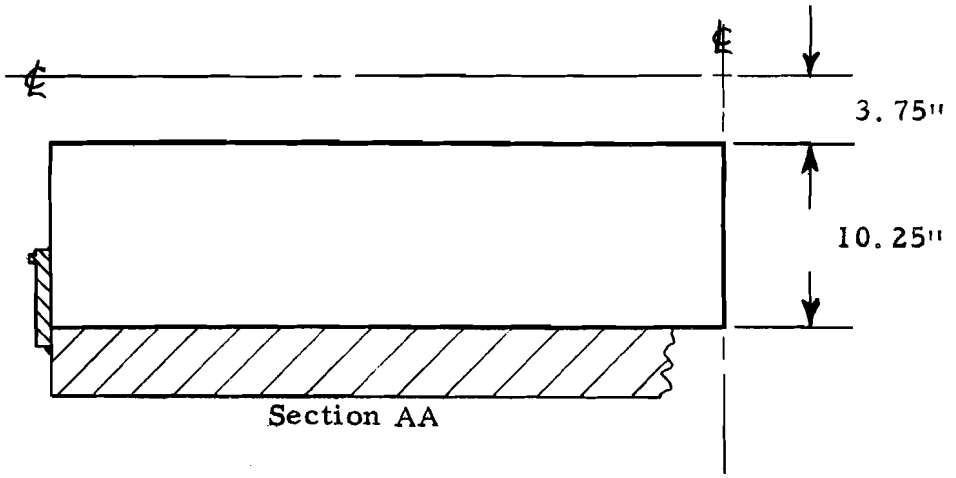
Run 4100 Phase Slip

Run 4100

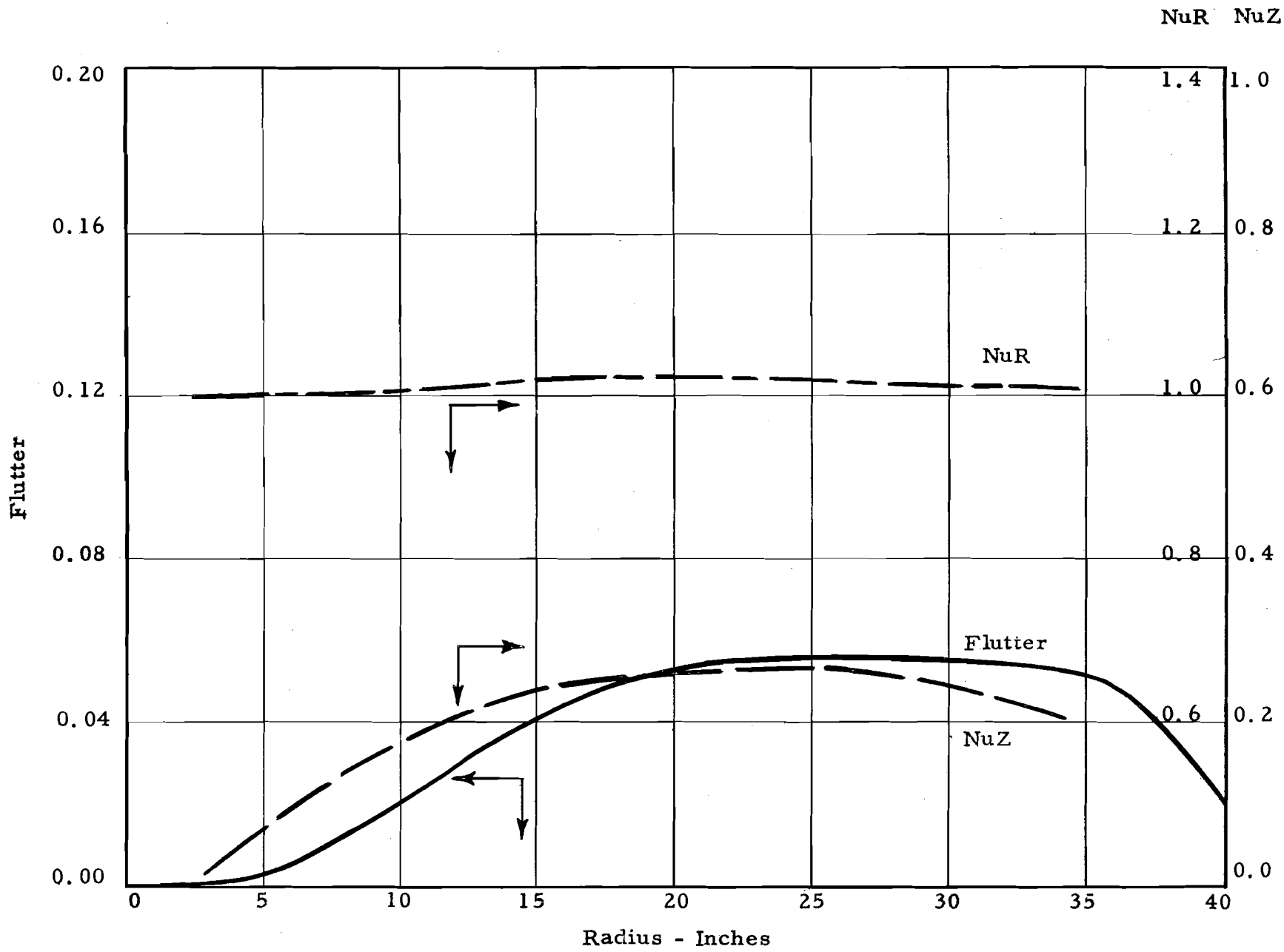


Full Scale Parameters

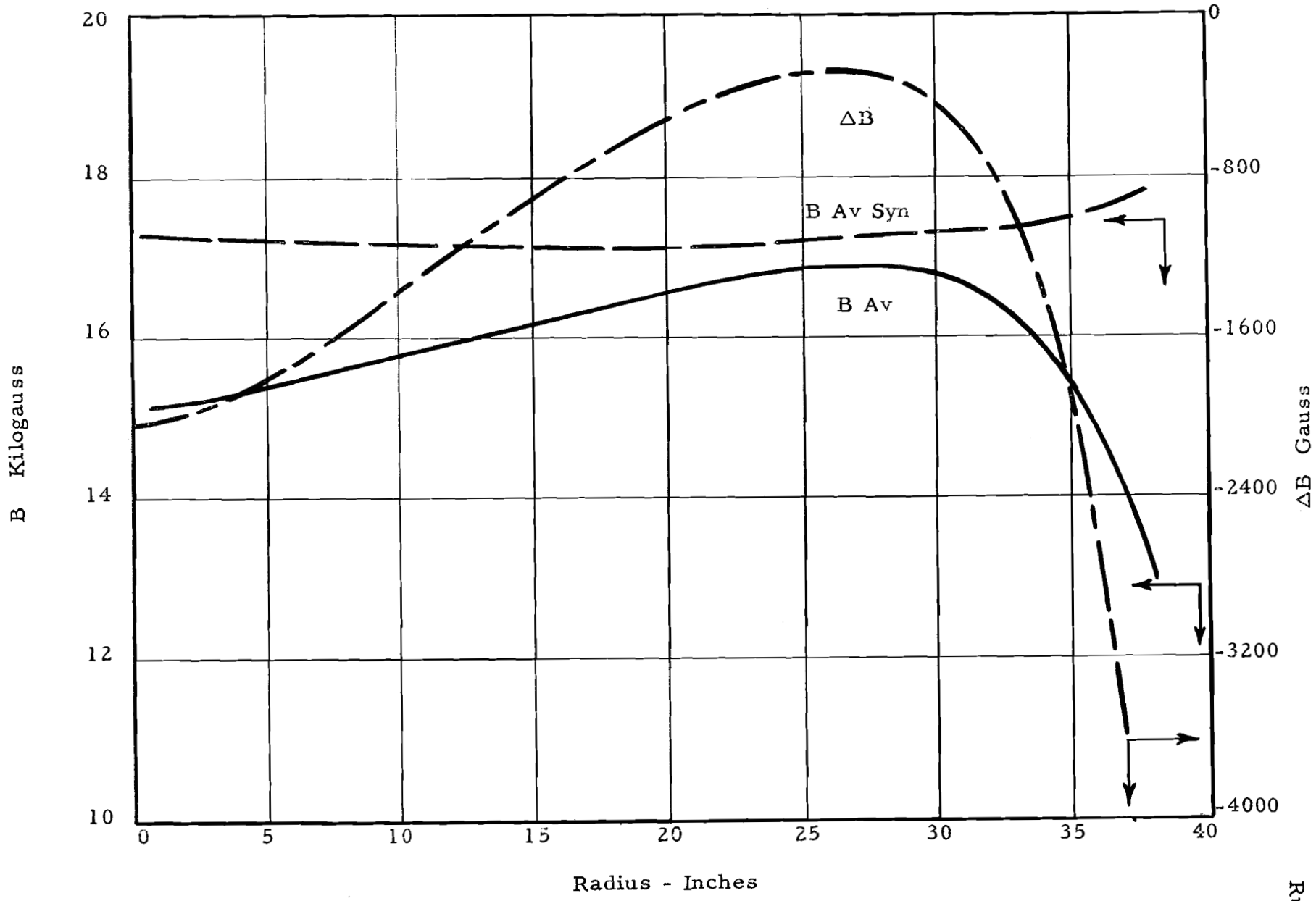
Main Coils 1.07×10^6 Ampere Turns



ORIC 1/4 Scale Sector


NuR NuZ
0.20
0.16
0.12
0.08
0.04
0.00
Flutter
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
NuR
Flutter
NuZ
0
5
10
15
20
25
30
35
40
Radius - Inches

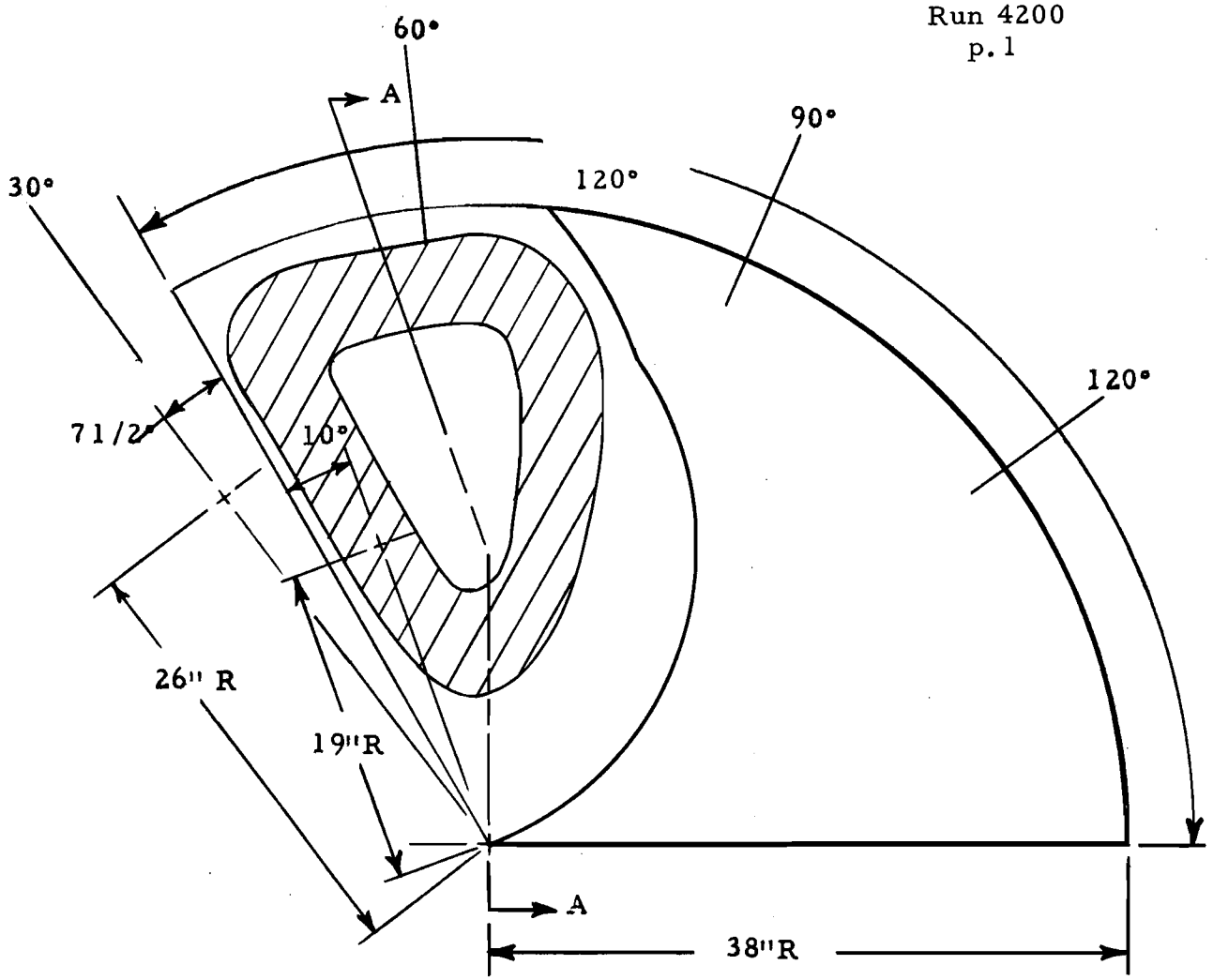
Run 4100



Run 4100

Run 4100
p. 3

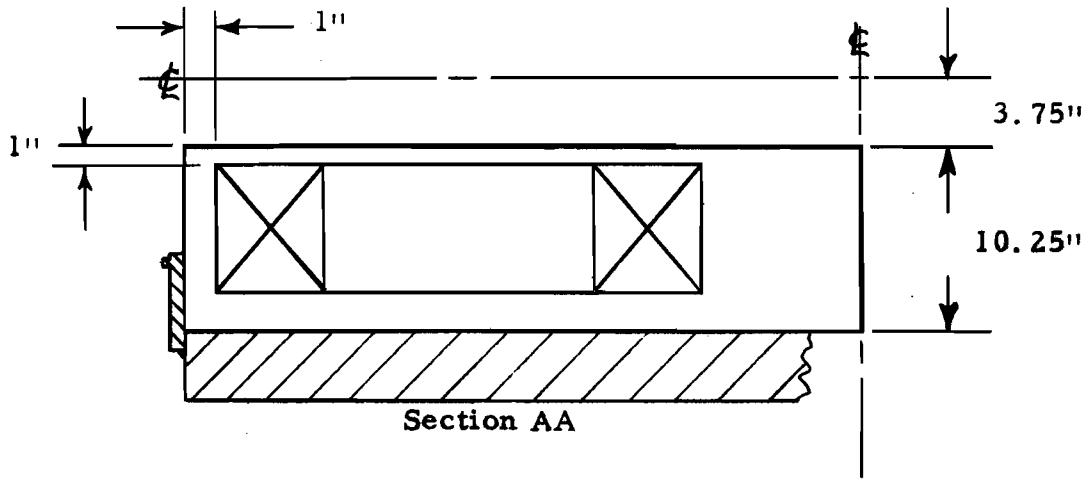
Run 4200
p. 1



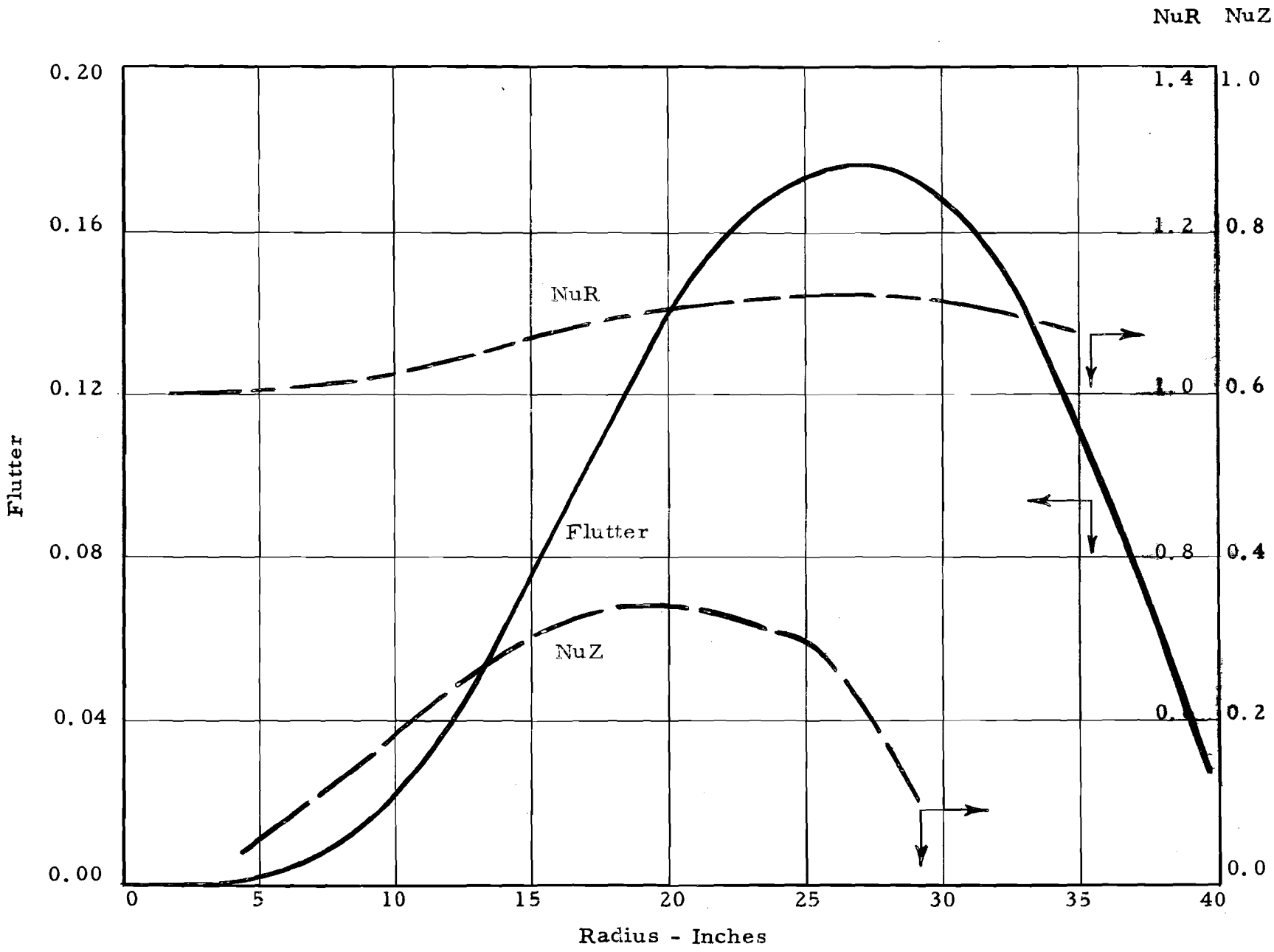
Full **Scale Parameters**

Valley Coils Set II 76.876
Pole Tips II

Note: 2560 x 3/4 turns = 0.9375

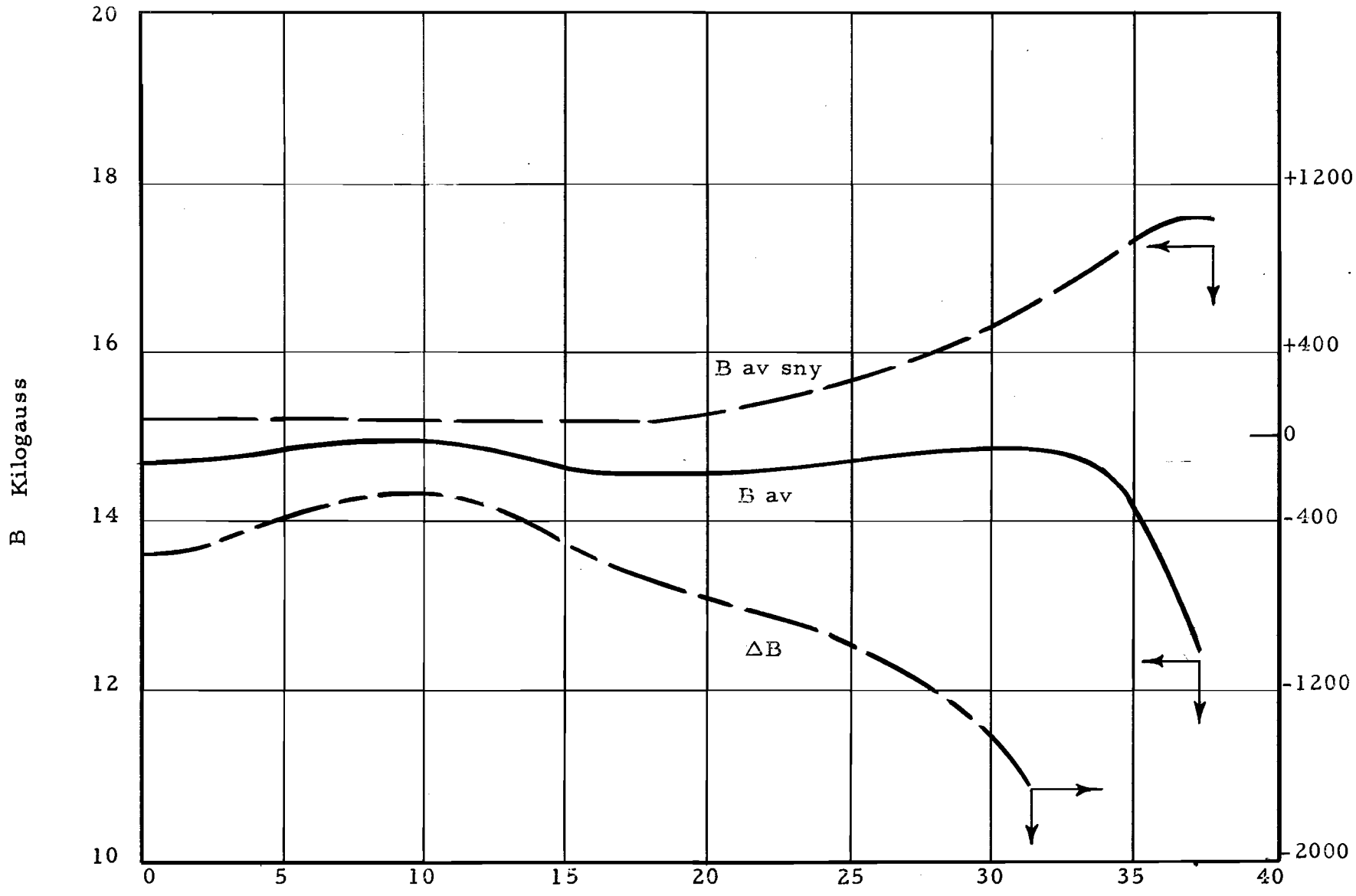


ORIC 1/4 Scale Sector



Protons 75 Mev
at 30.5"

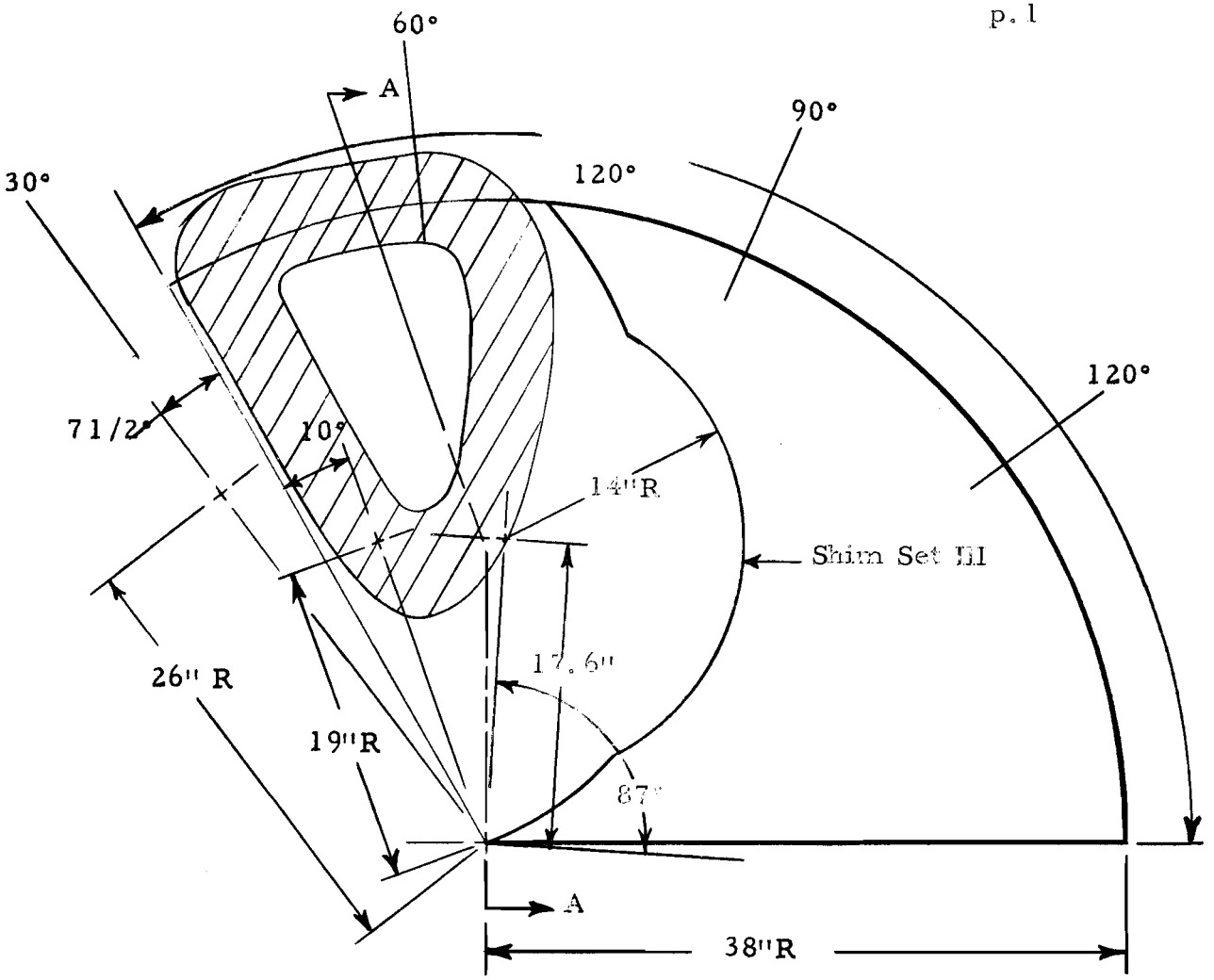
Run 4200



Proton 75 Mev
at 30.5"

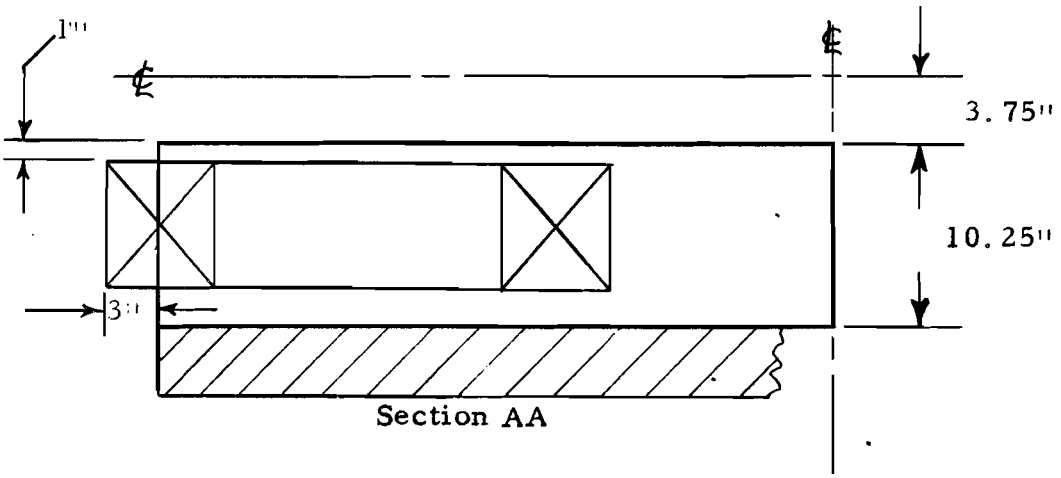
Run 4200

Run 4200
p. 3

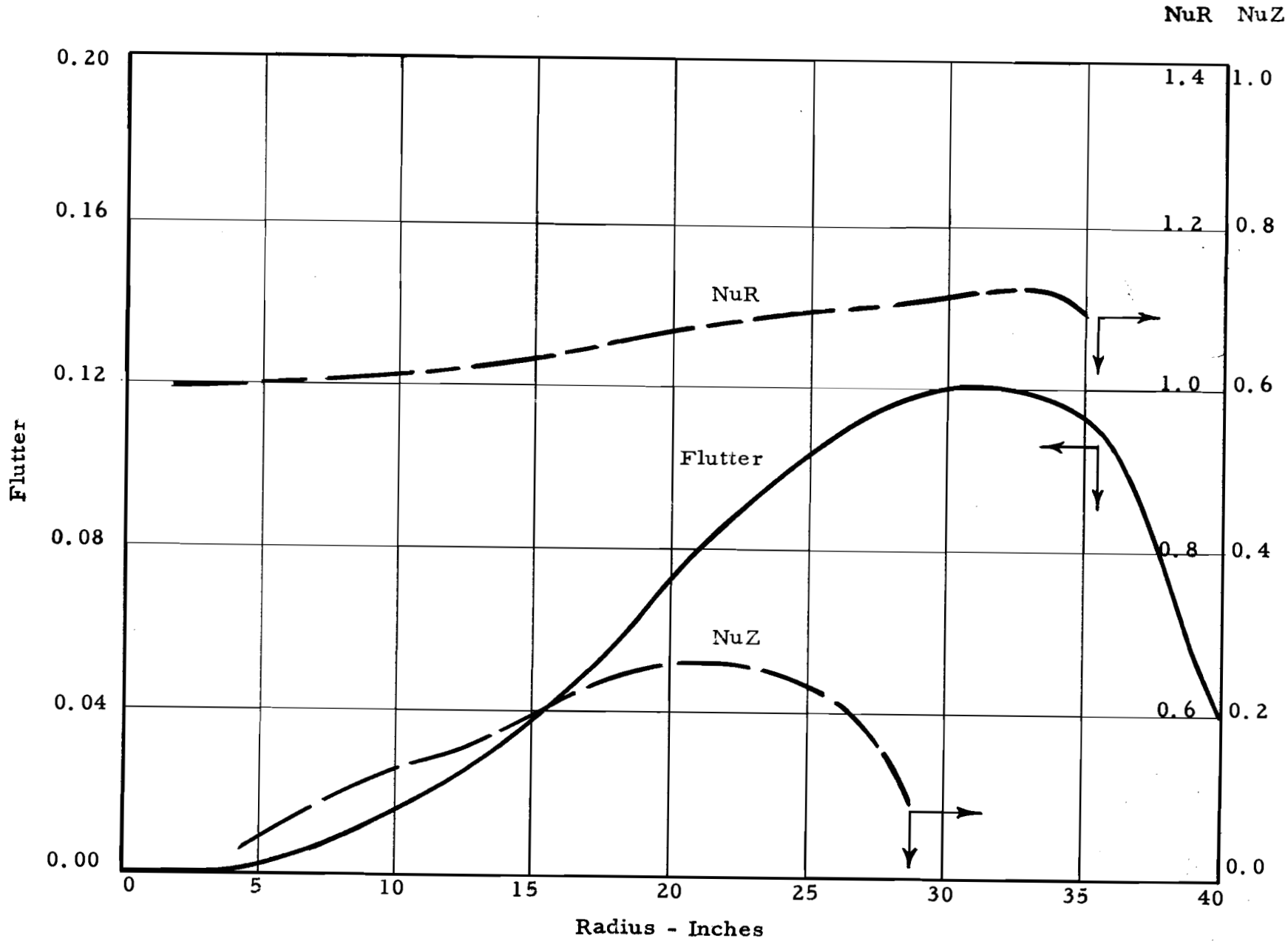


Full Scale Parameters

Main Coils 1.23×10^6 ampere turns
Valley Coils 0.41×10^6 ampere turns
Pole Tips Set III in all sectors

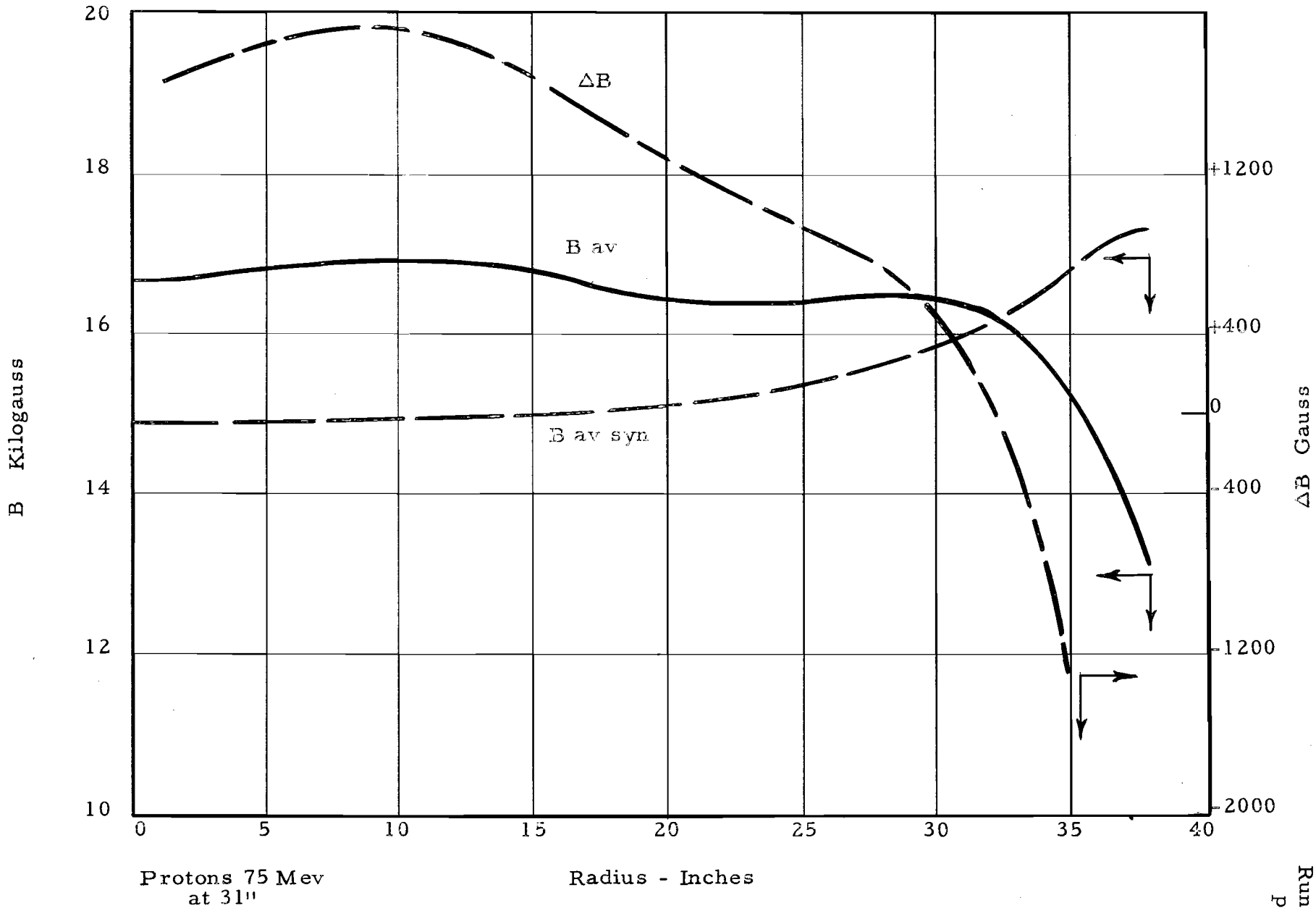


ORIC 1/4 Scale Sector



Proton 75 Mev
at 31"

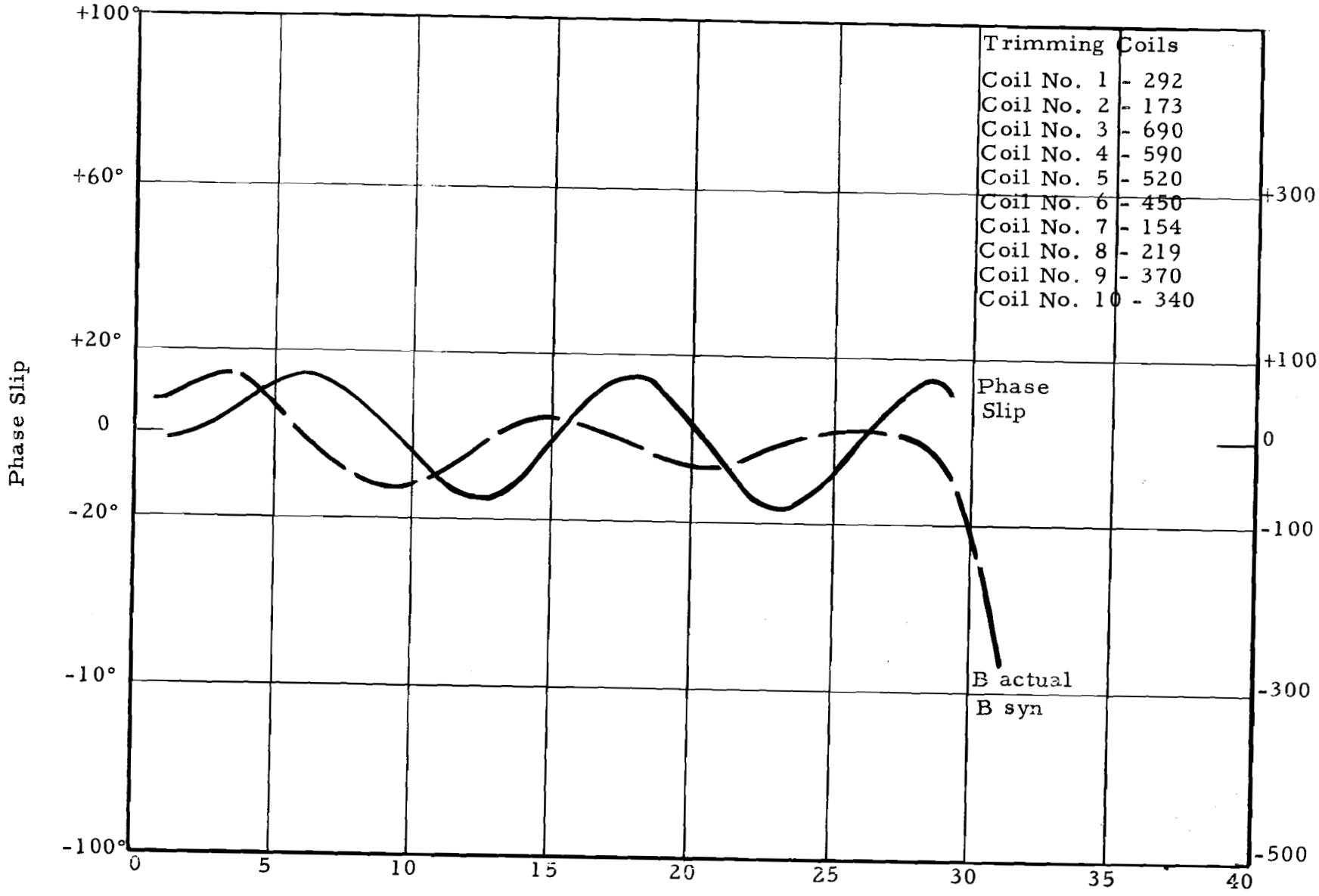
Run 4300



Protons 75 Mev
at 31"

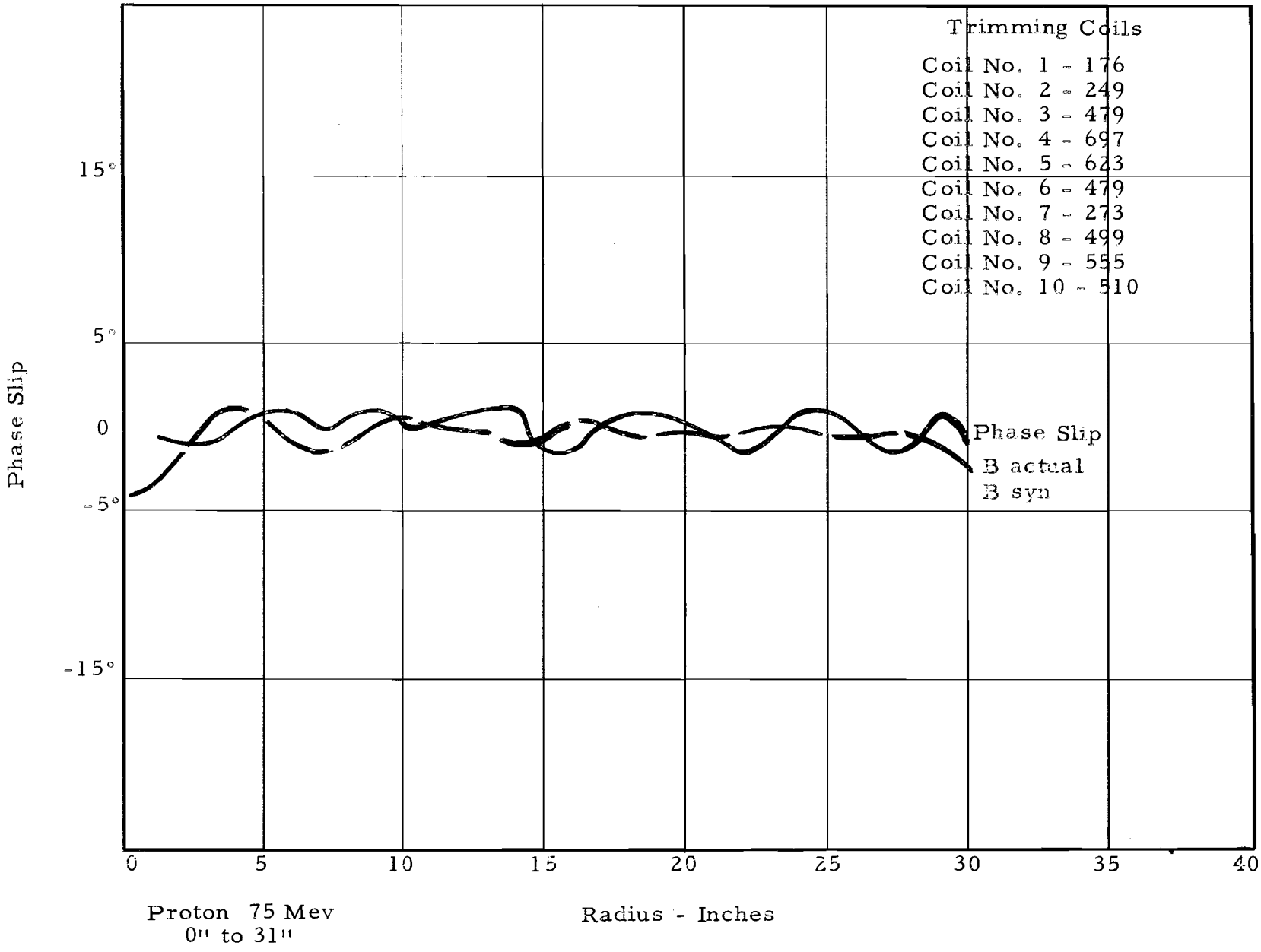
Run 4300

Run 4300
P. 3



Proton 75 Mev
0" to 31"

Run 4300 Phase Slip

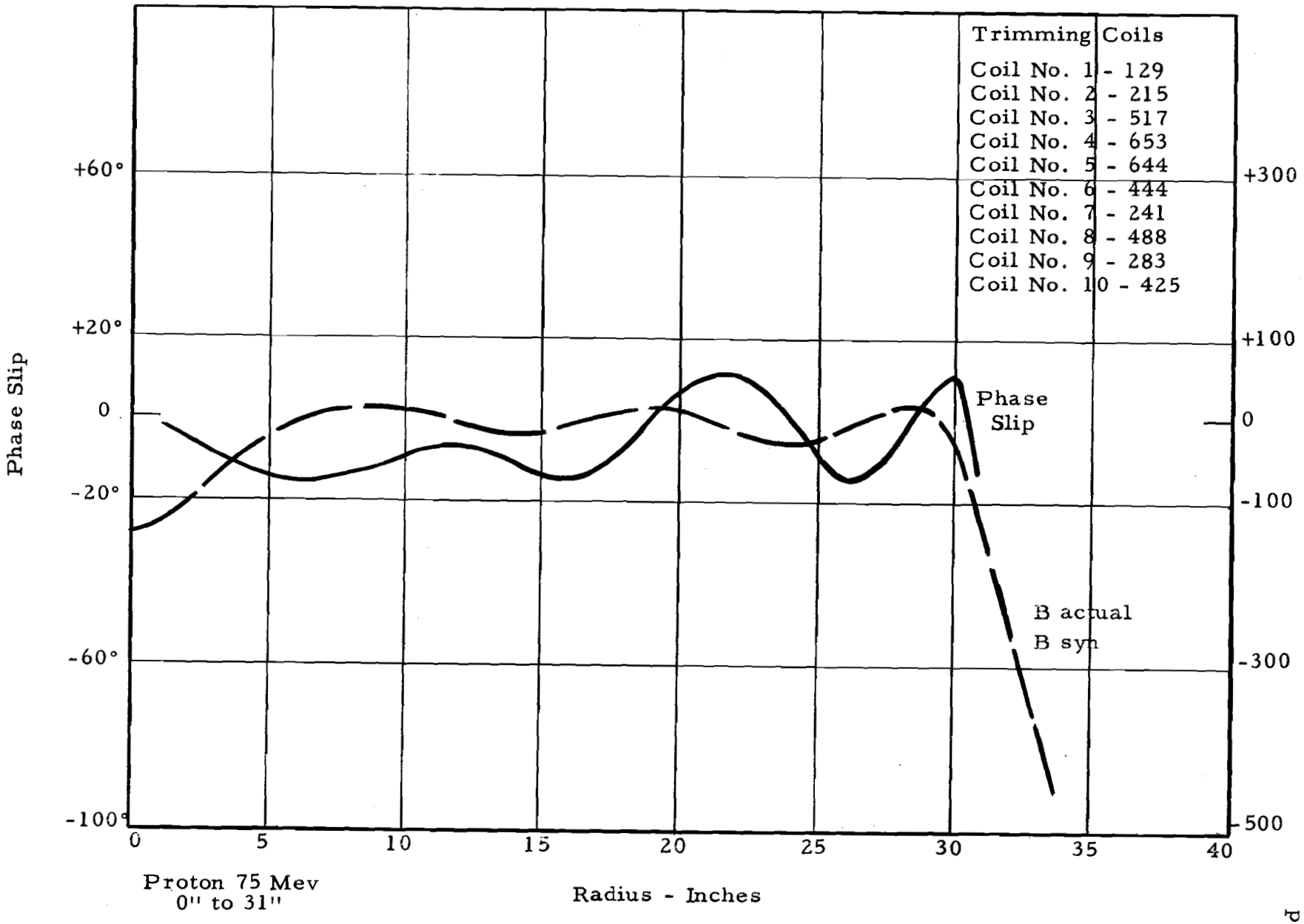


Proton 75 Mev
0" to 31"

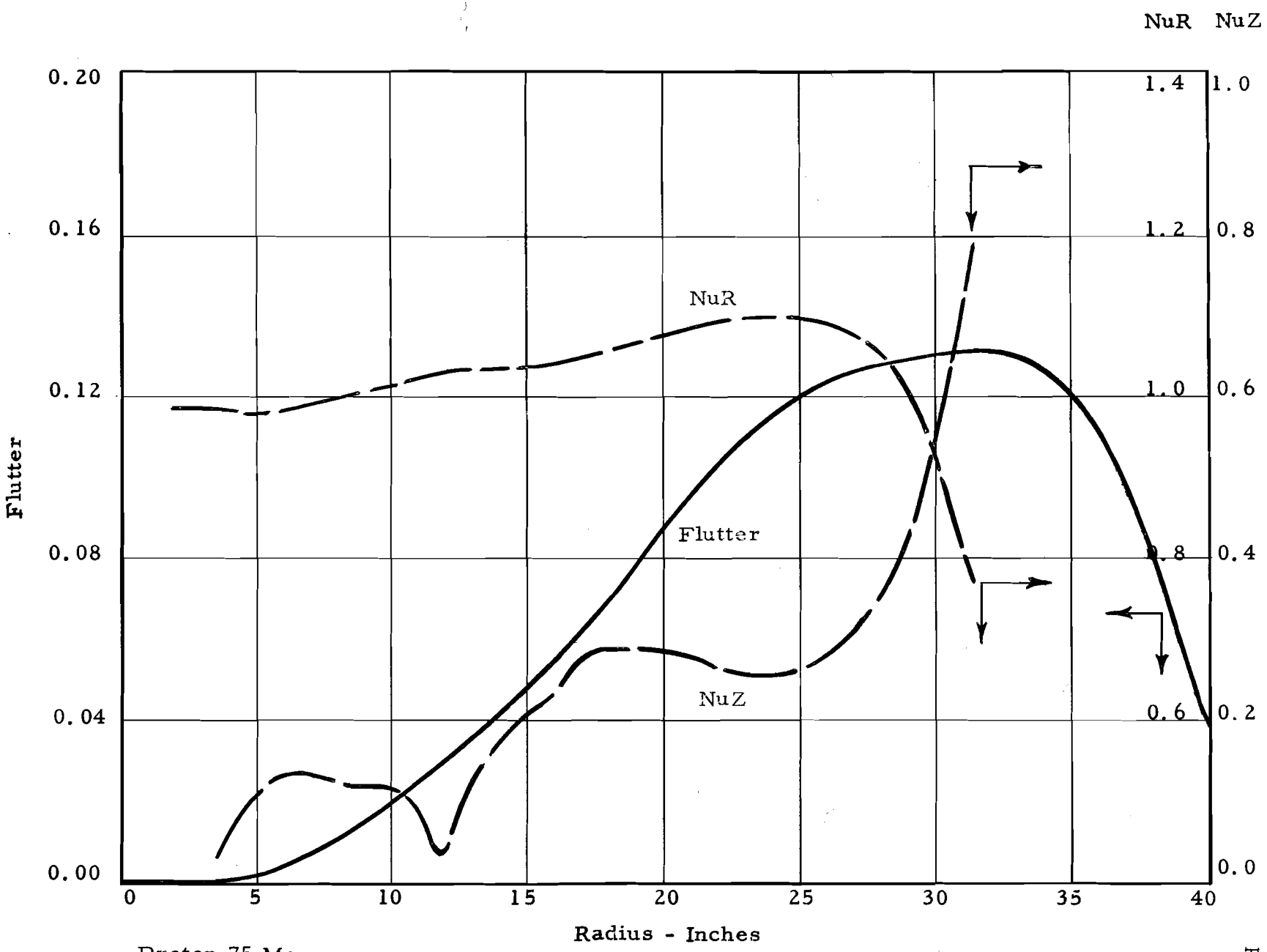
Run 4300 Phase Slip

Gauss

Run 4300
p. 5



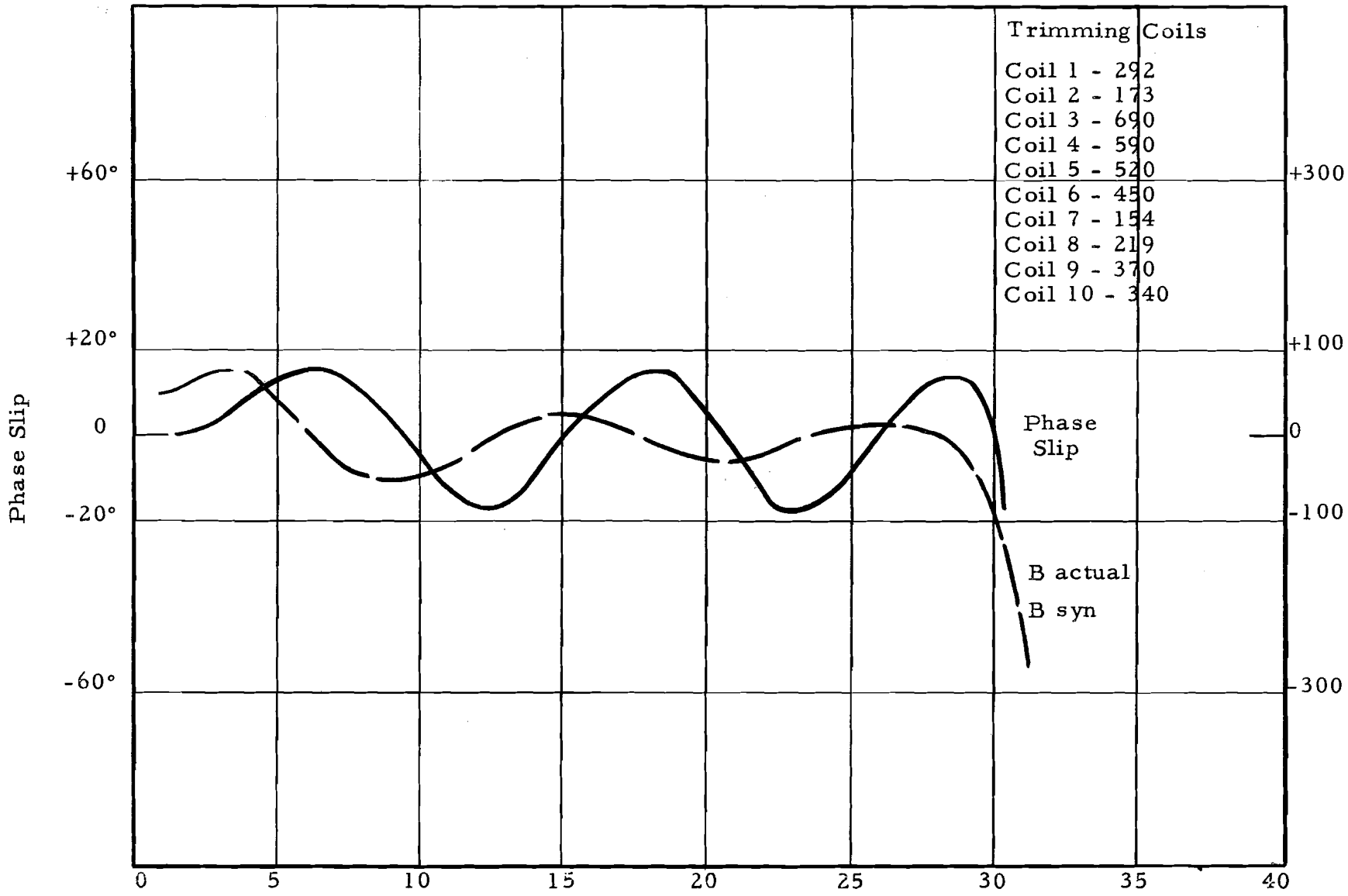
Run 4300 Phase Slip



Proton 75 Mev
at 31"

Falderal Run 4300

Falderal
Run 4300
p. 1

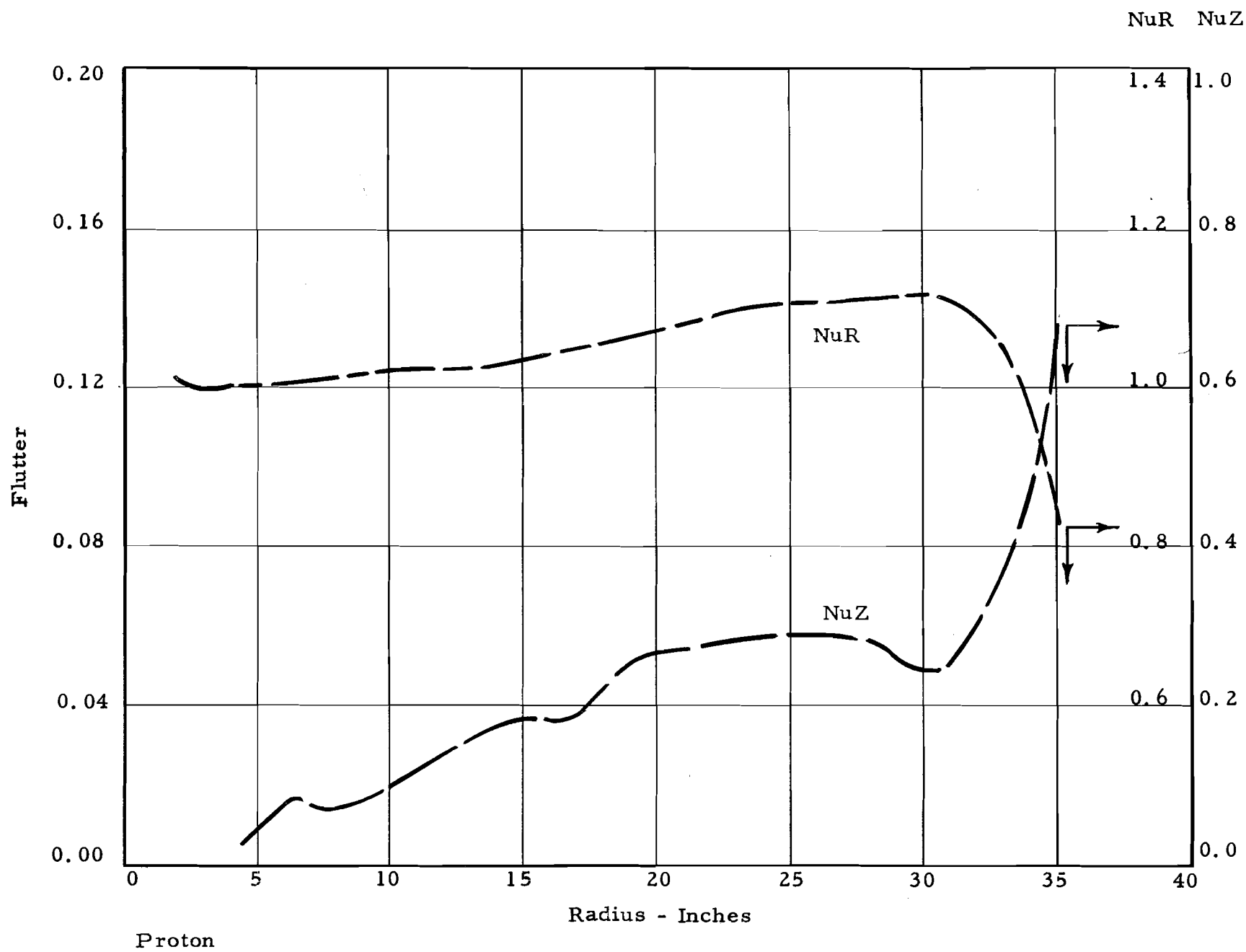


Proton 75 Mev
at 31"

Radius - Inches

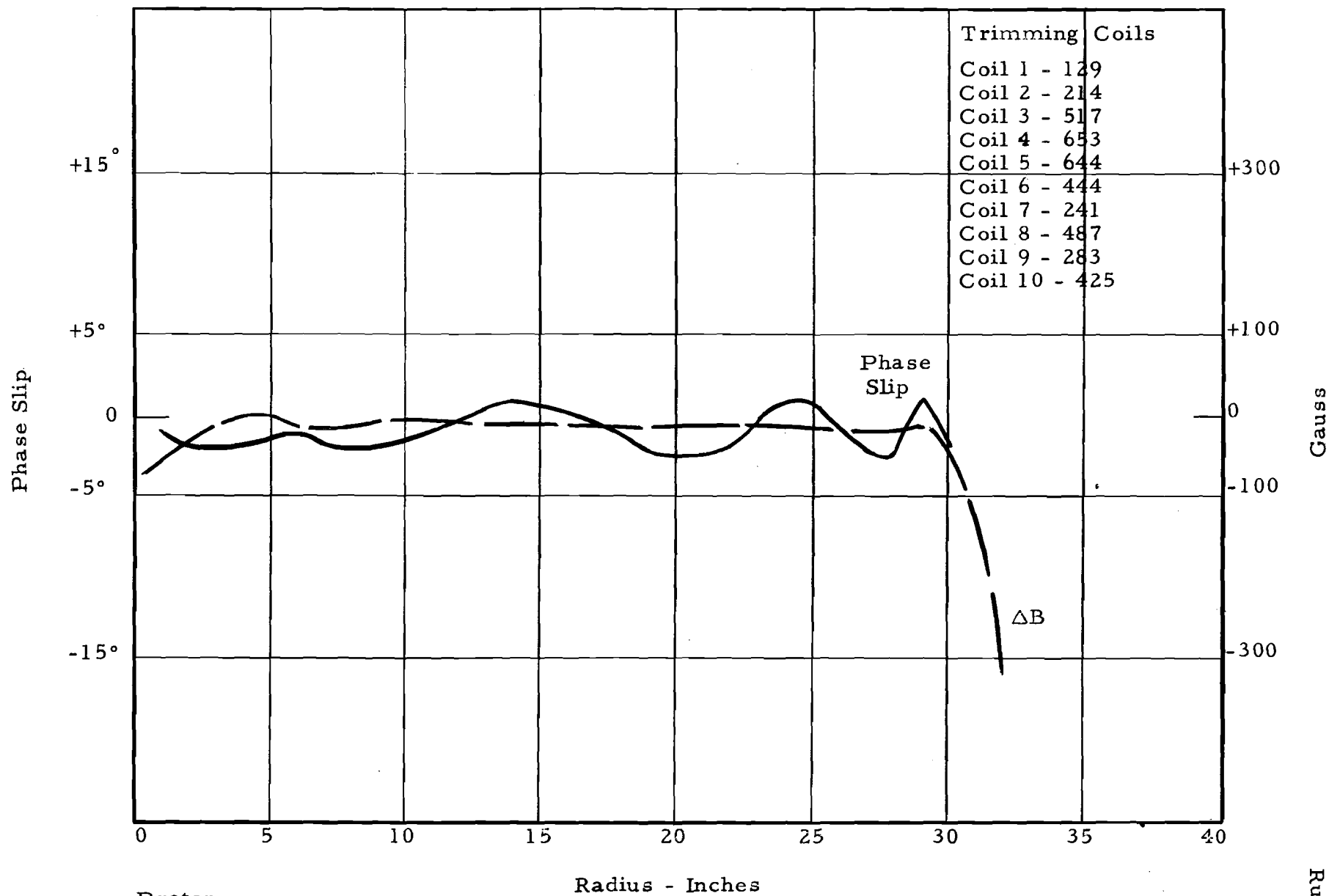
Run 4300 Phase Slip

Run 4300
p. 2



Proton

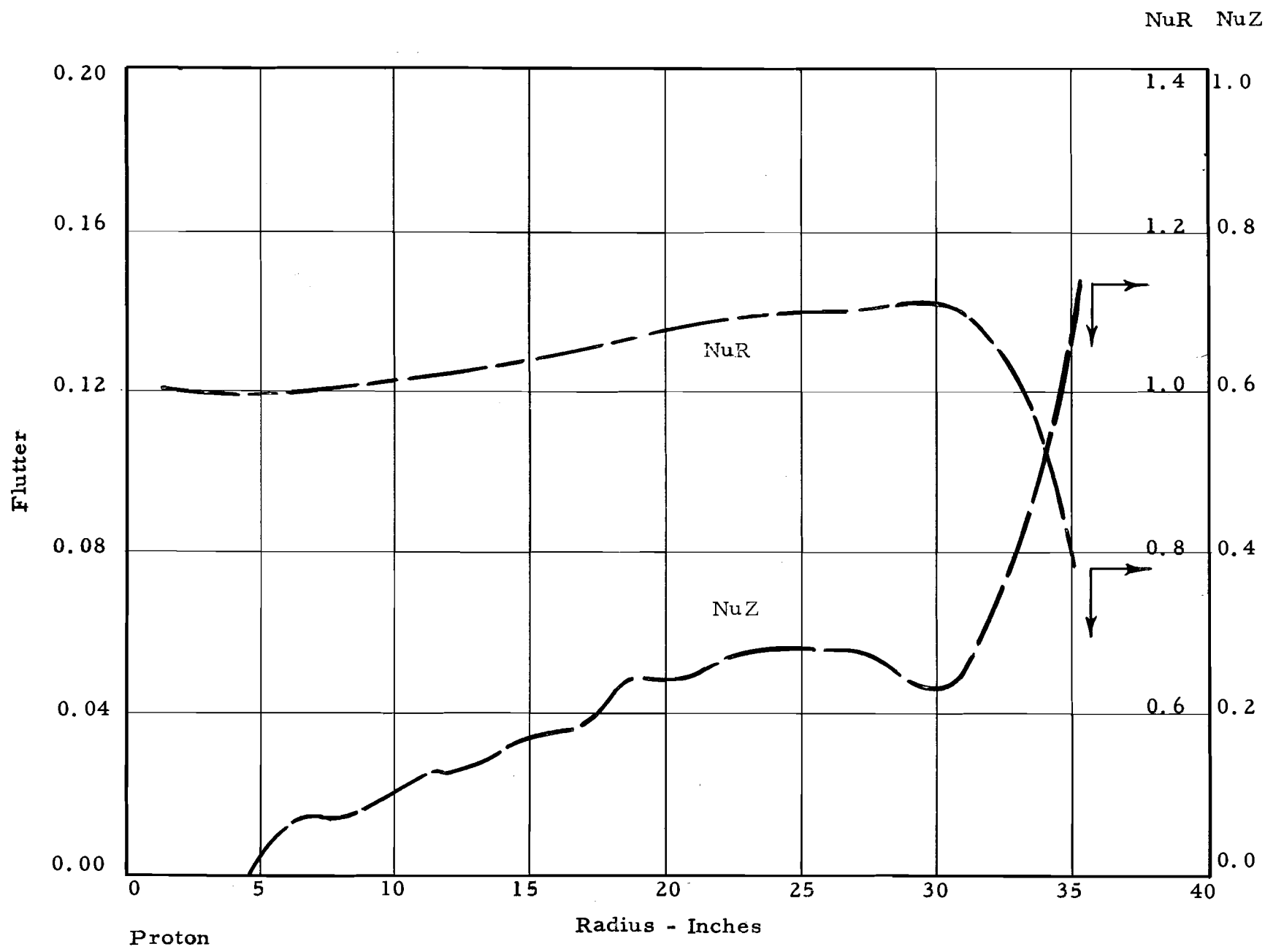
Falderal Run 4302



Proton
25% Overload

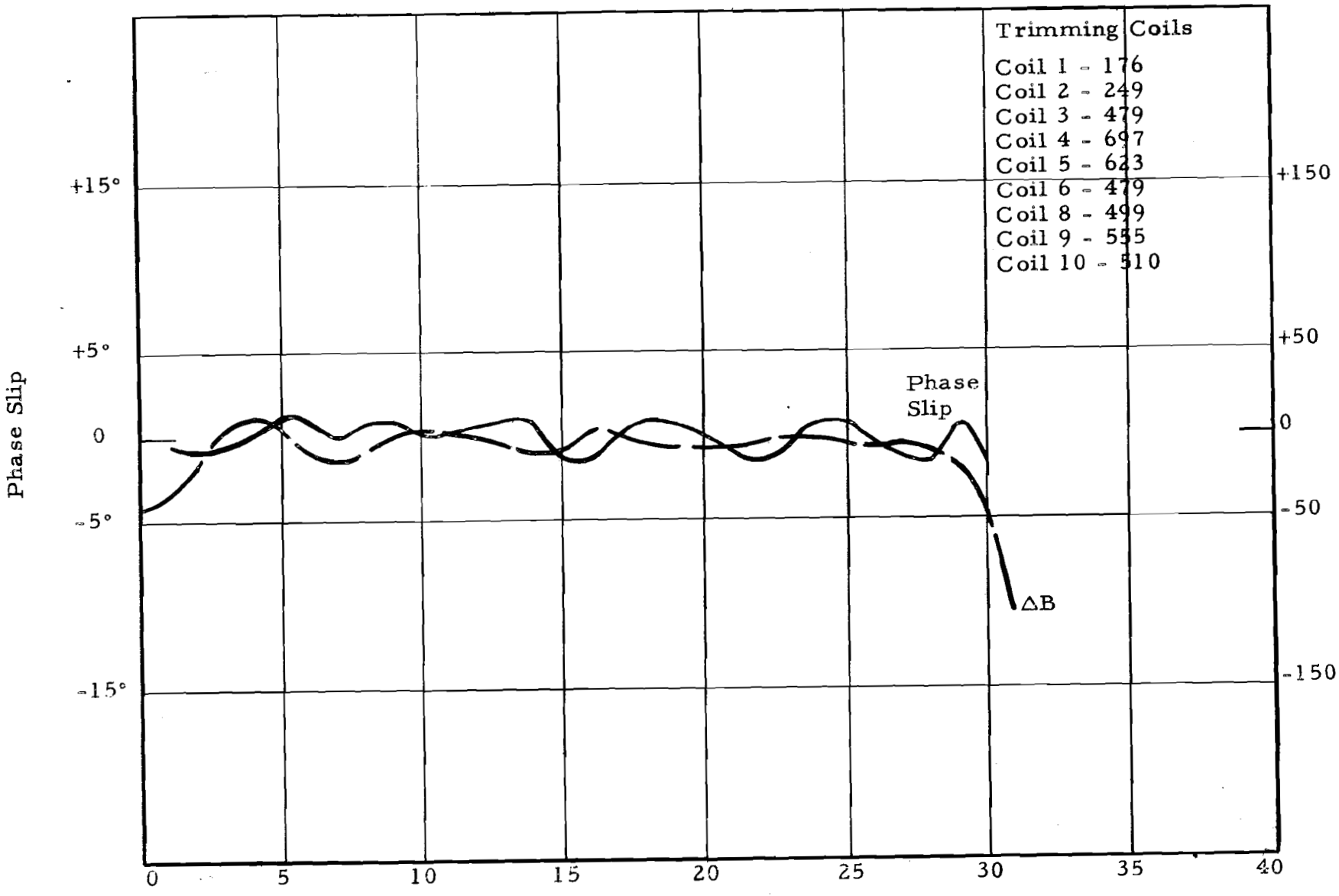
Run 4302 Phase Slip

Run 4302
P. 4



Proton

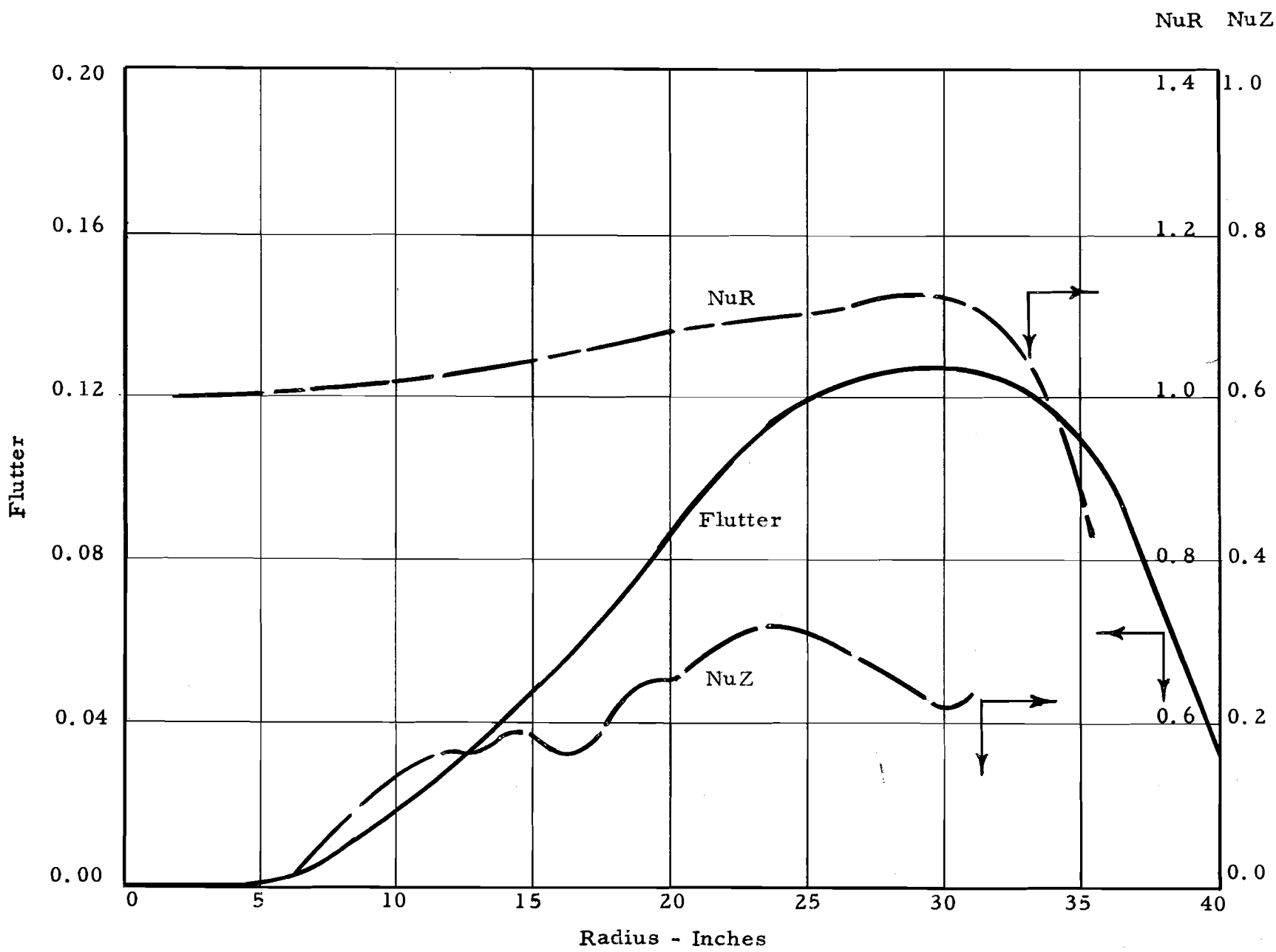
Falderal Run 4303



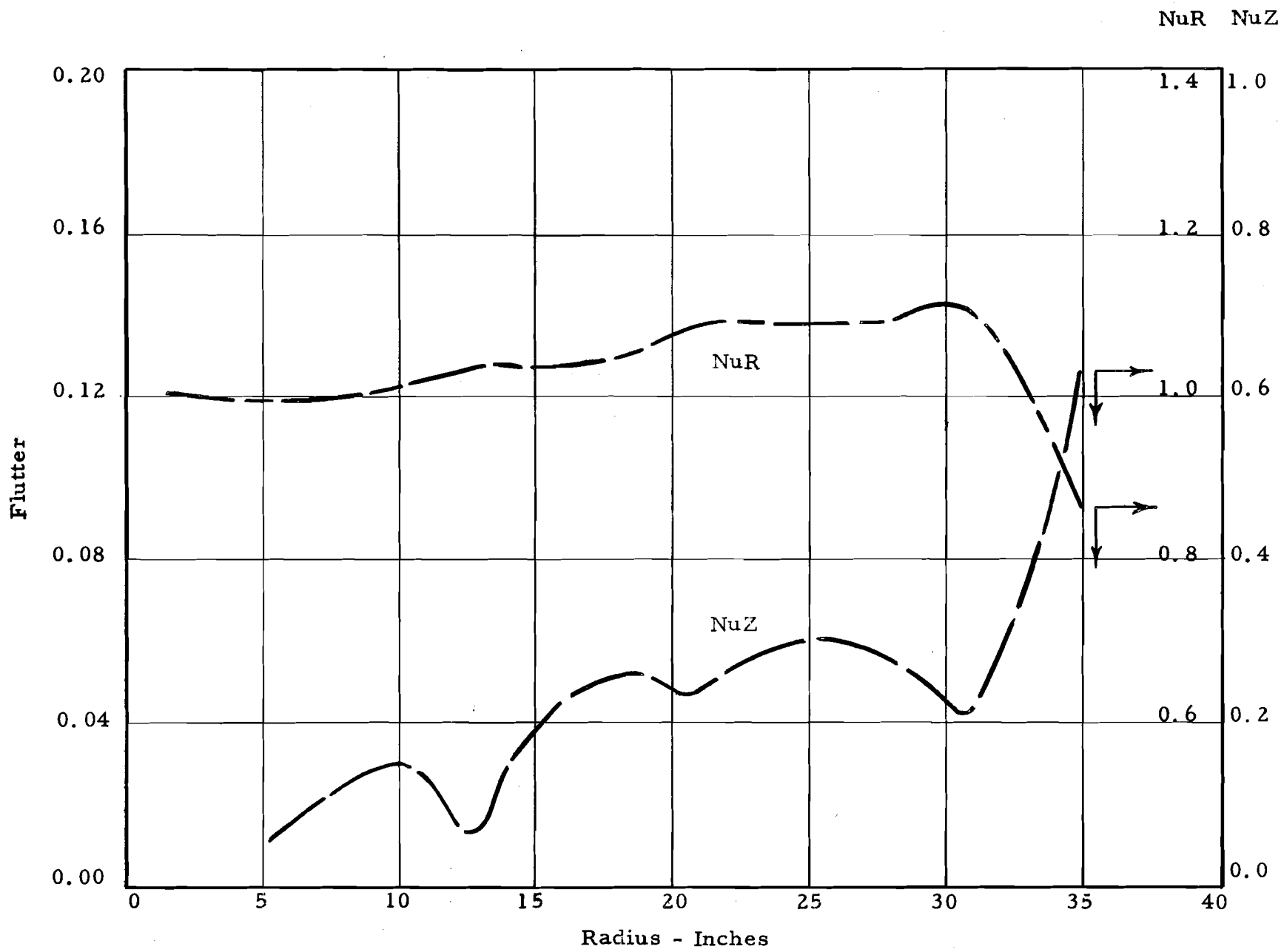
Proton 75 Mev
at 31"

50% Overlaod

Run 4303 Phase Slip

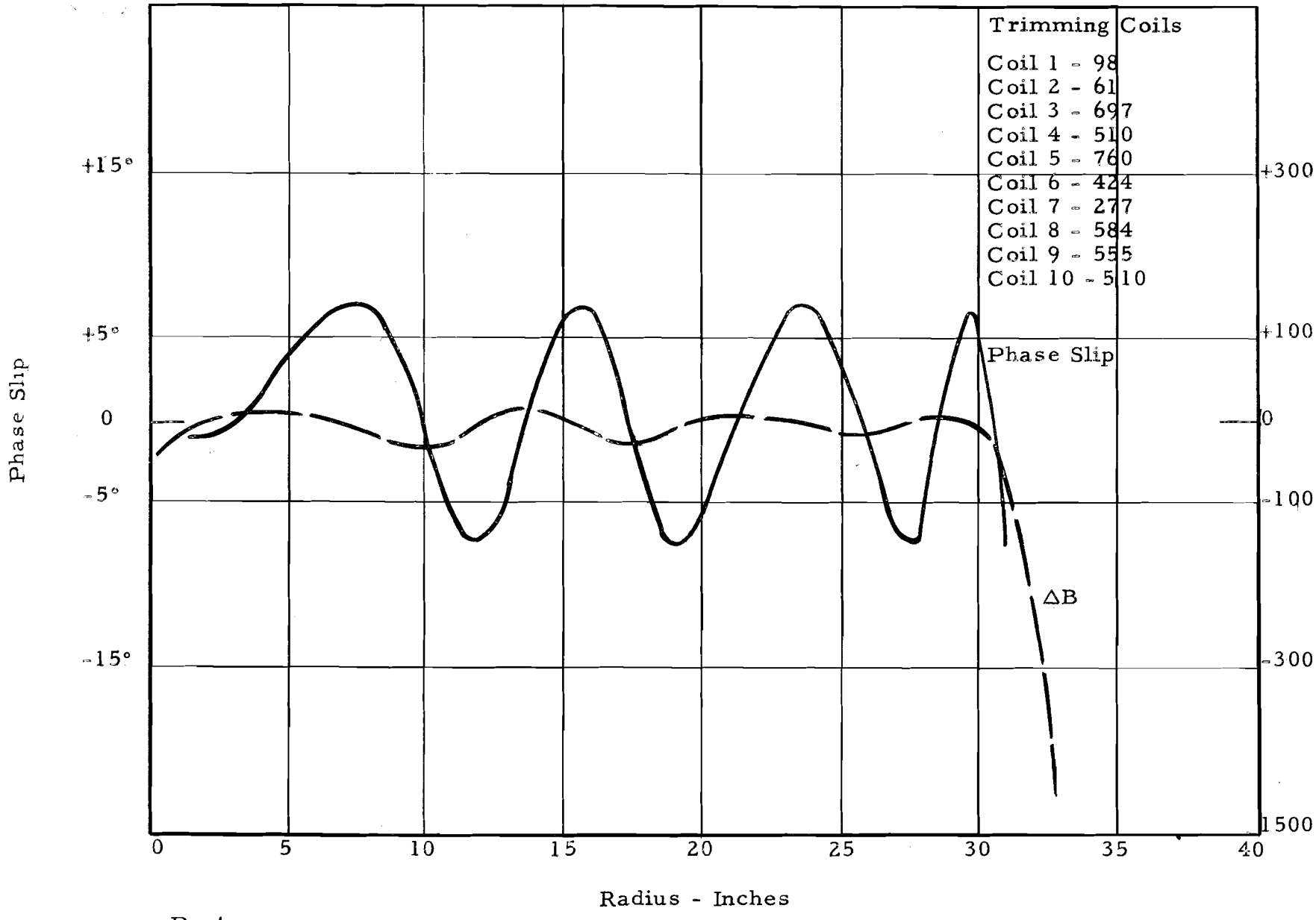


Falderal Run 4304



Proton

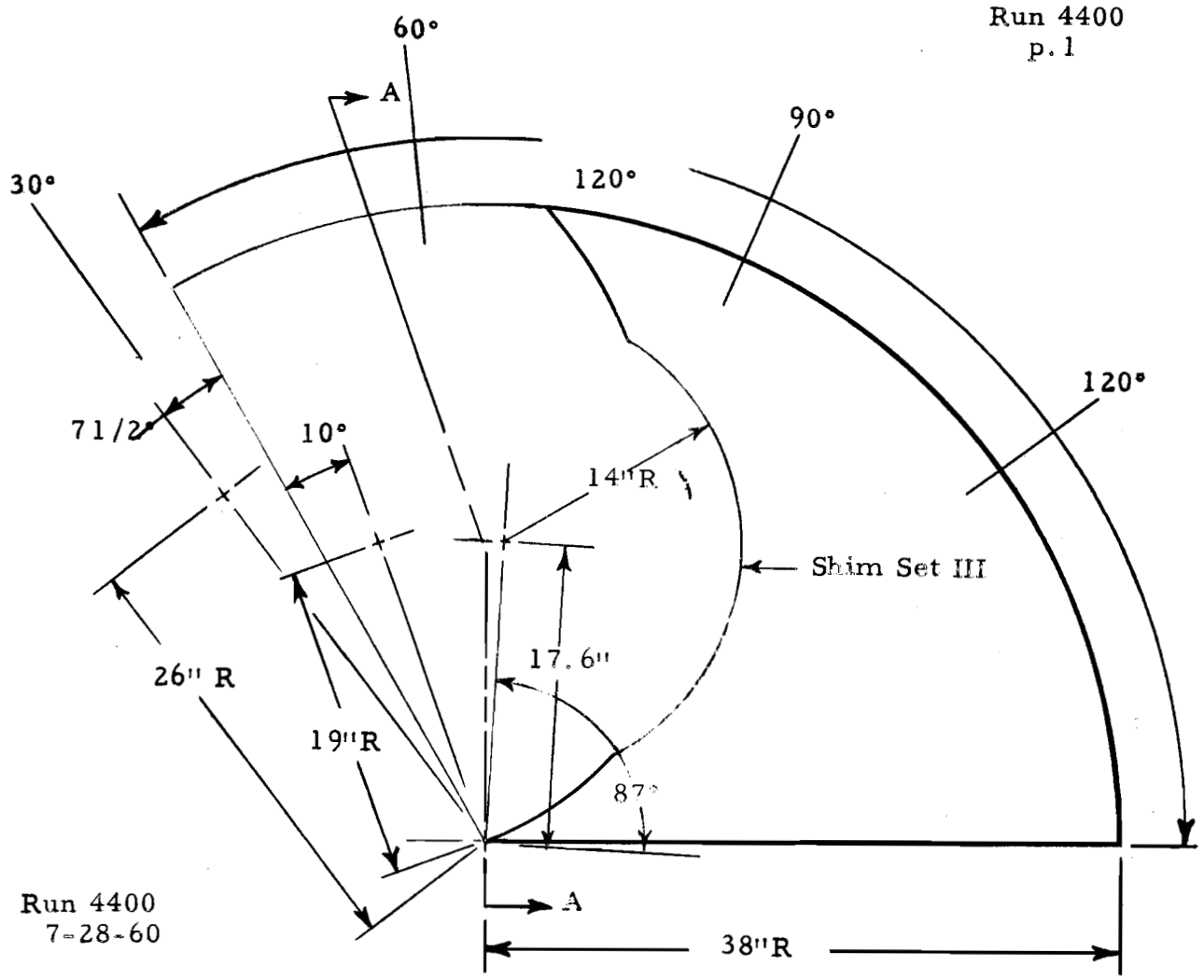
Falderal Run 4305



Proton
50% Overload

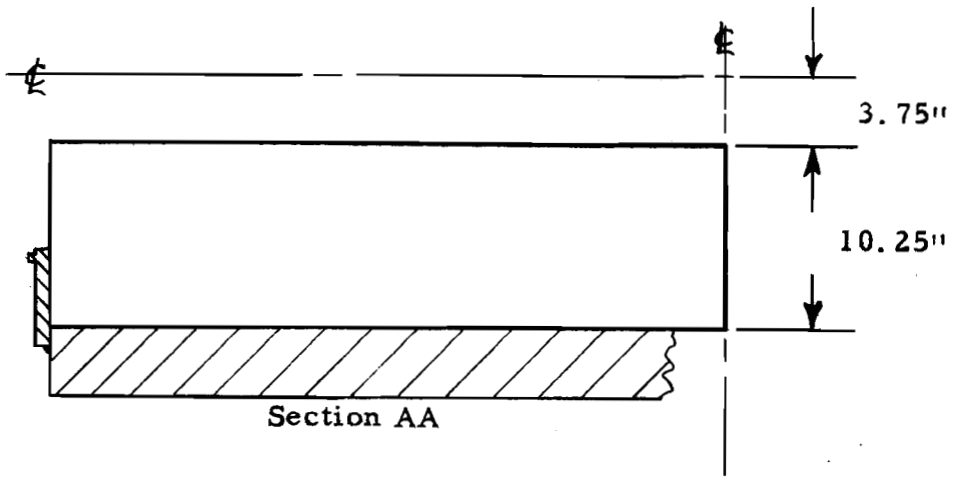
Run 4305 Phase Slip

Run 4400
p. 1

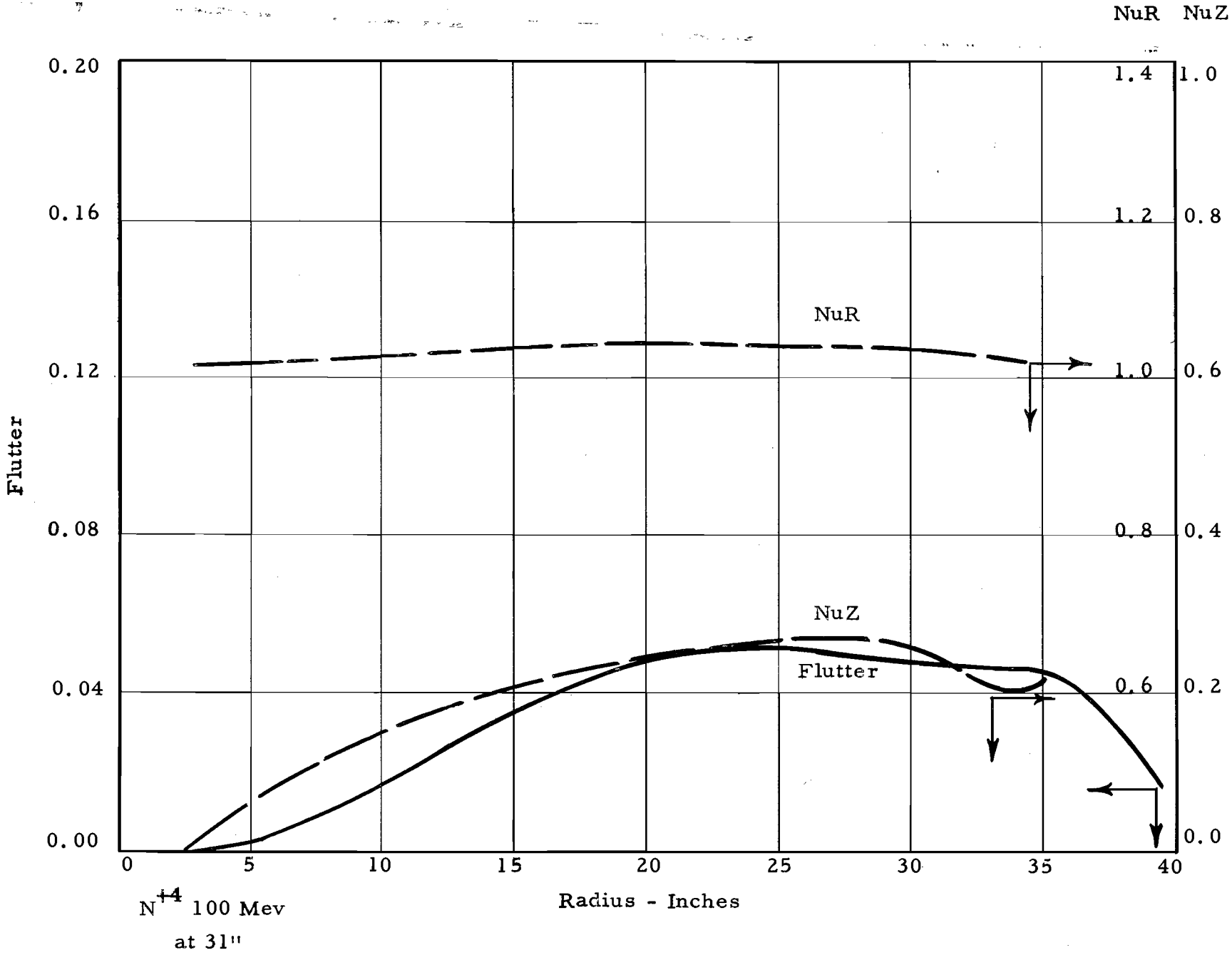


Run 4400
7-28-60

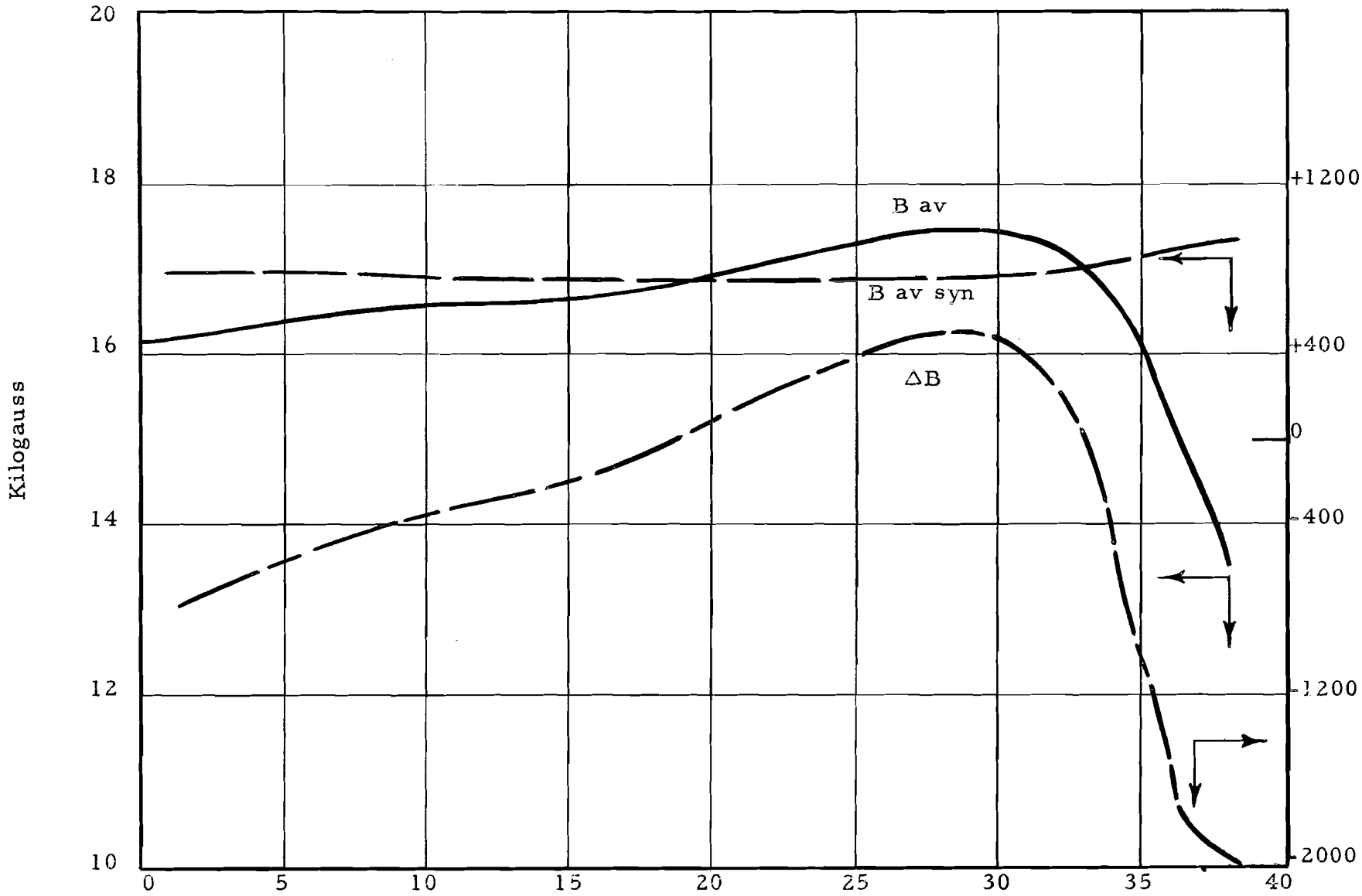
Full Scale Parameters
Main Coils 1.23×10^6 ampere turns
Pole Tips Set III in all sectors



ORIC 1/4 Scale Sector


NuR NuZ
0.20
0.16
0.12
0.08
0.04
0.00
Flutter
1.4 1.0
1.2 0.8
1.0 0.6
0.8 0.4
0.6 0.2
0.0
NuR
NuZ
Flutter
0 5 10 15 20 25 30 35 40
Radius - Inches
N+4 100 Mev
at 31"

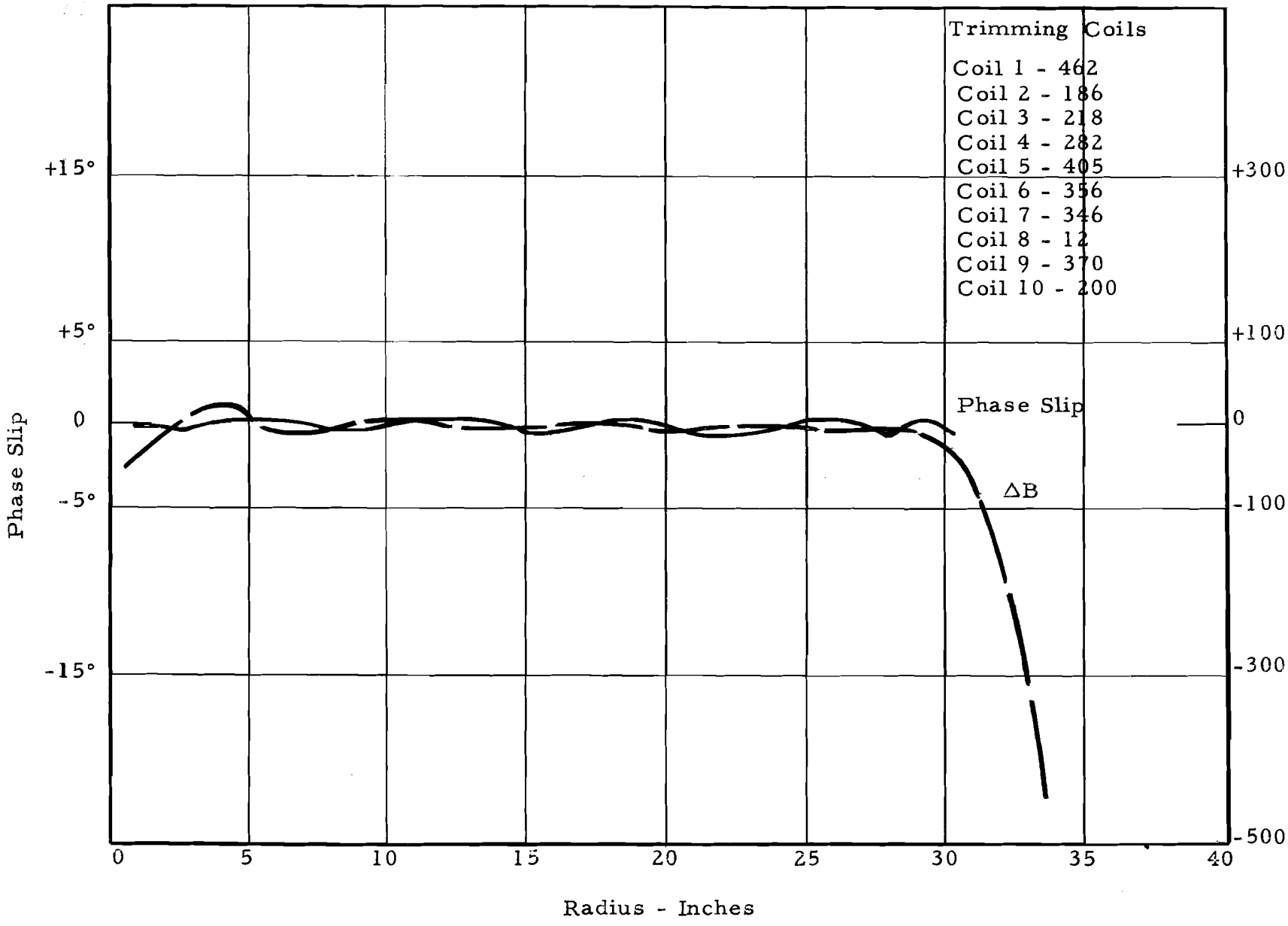
Run 4400



N^{+4} 100 Mev
at 31"

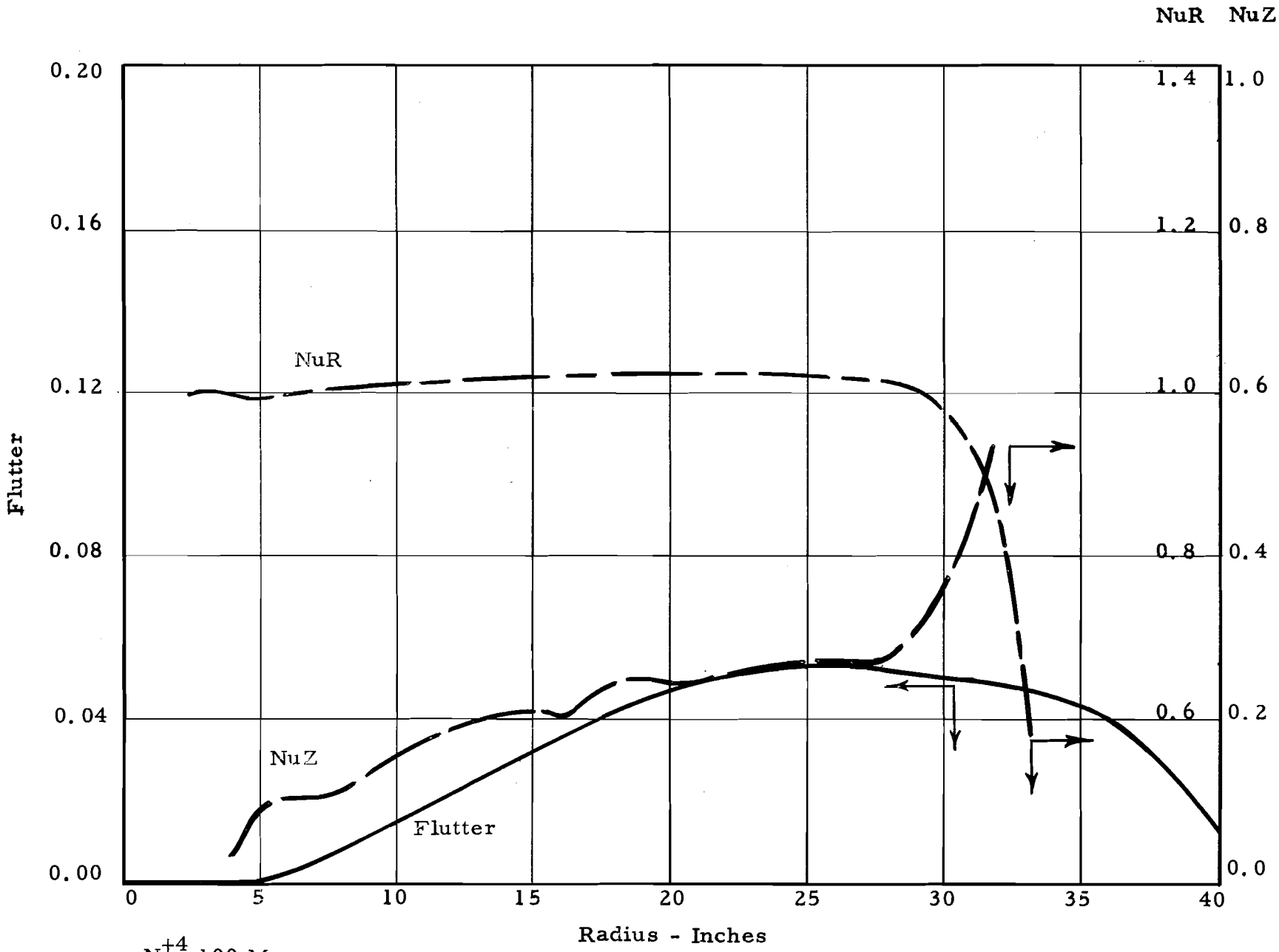
Run 4400

Run 4400
p. 3



Run 4400 Phase Slip

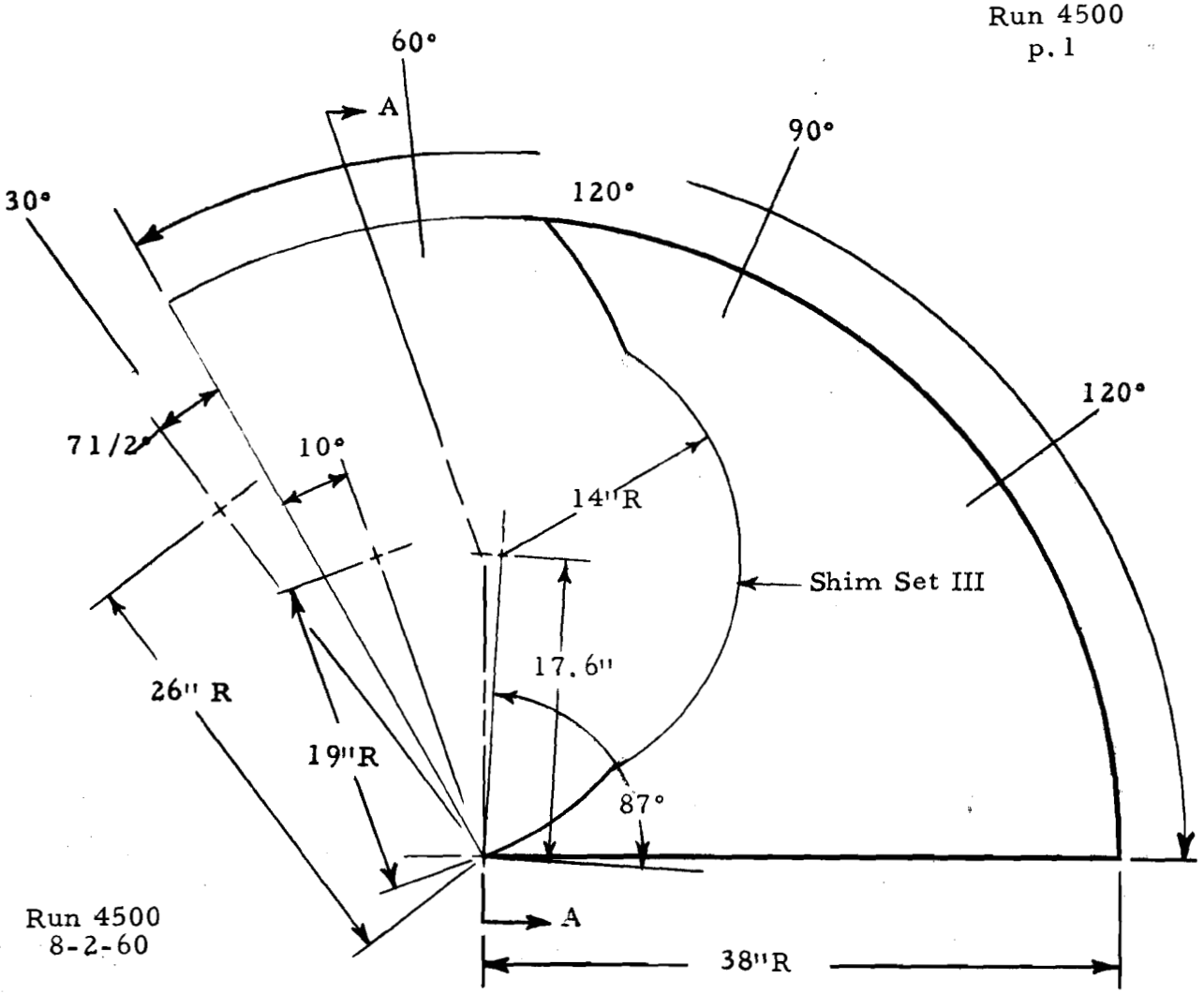
Run 4400
P. 4



N^{+4} 100 Mev
at 31"

Falderal Run 4400

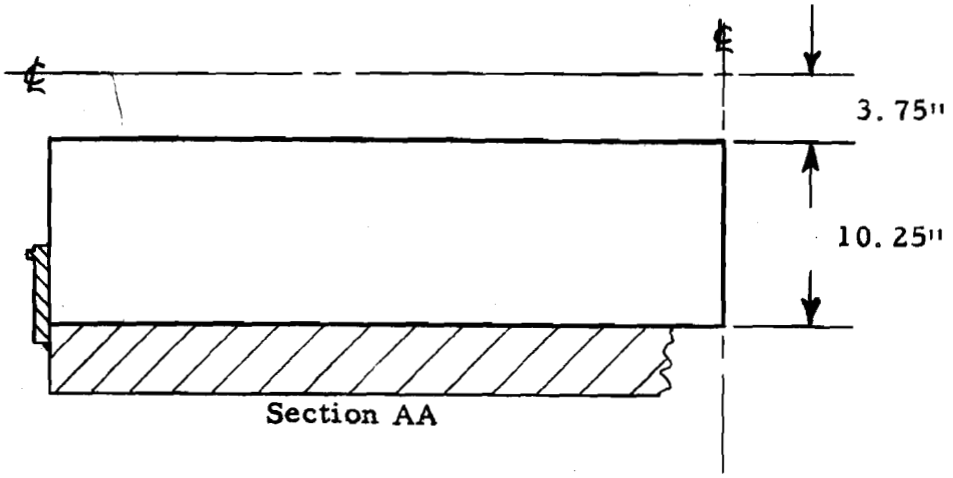
Run 4500
p. 1



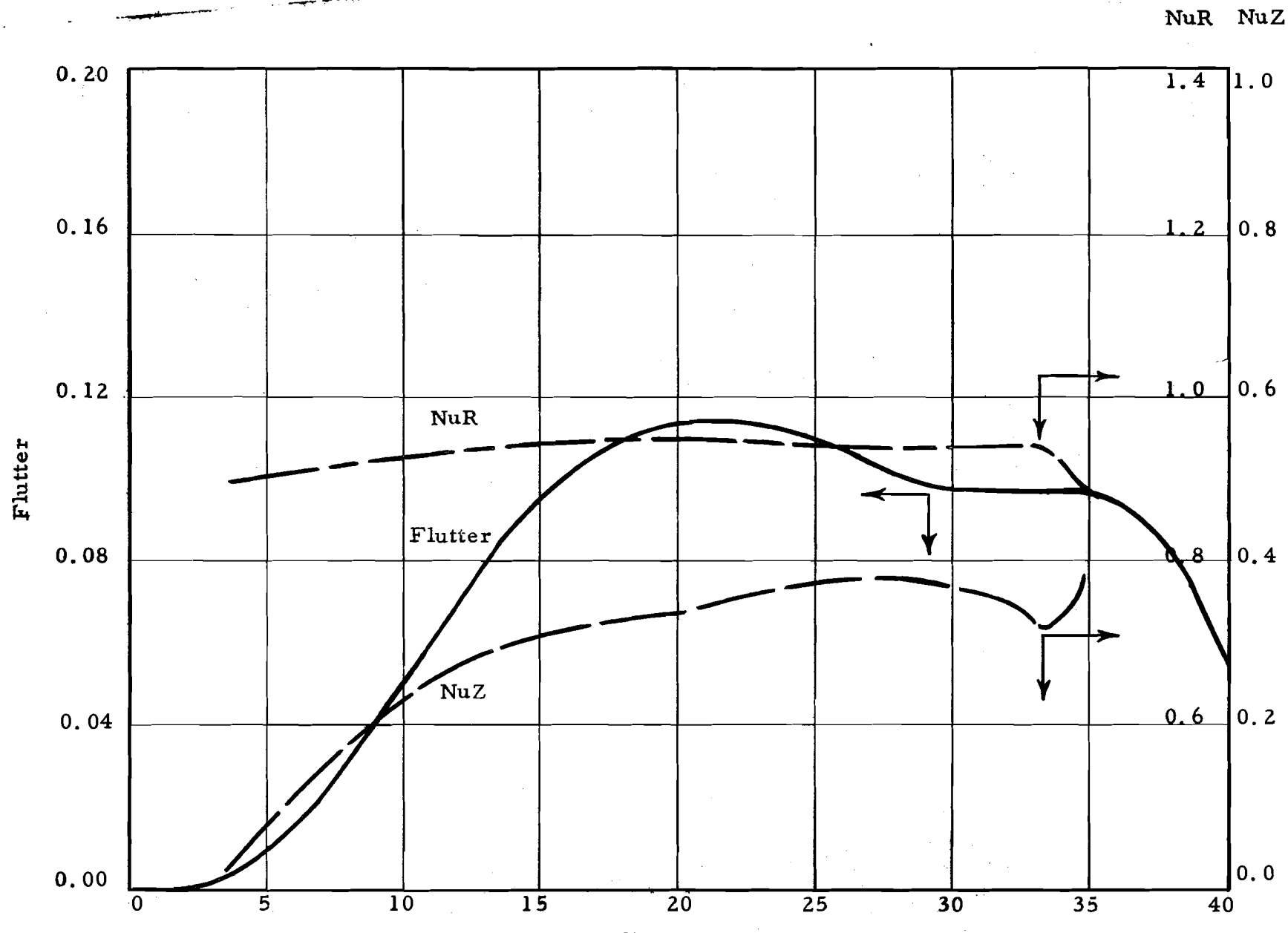
Run 4500
8-2-60

FullScale Parameters

Main Coils 0.135×10^6 ampere turns

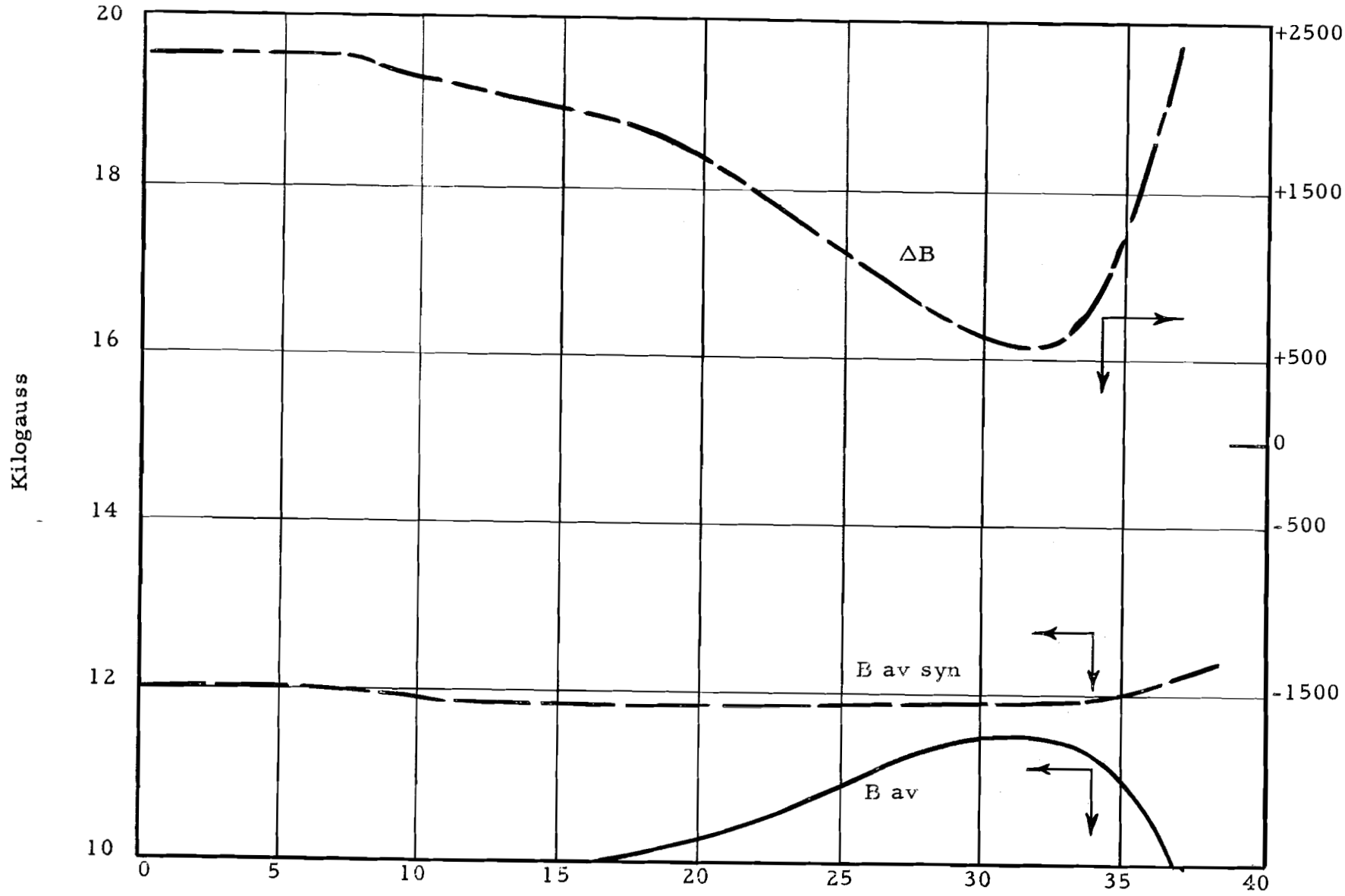


ORIC 1/4 Scale Sector



N^{+4} 50 Mev
at 31"

Run 4500

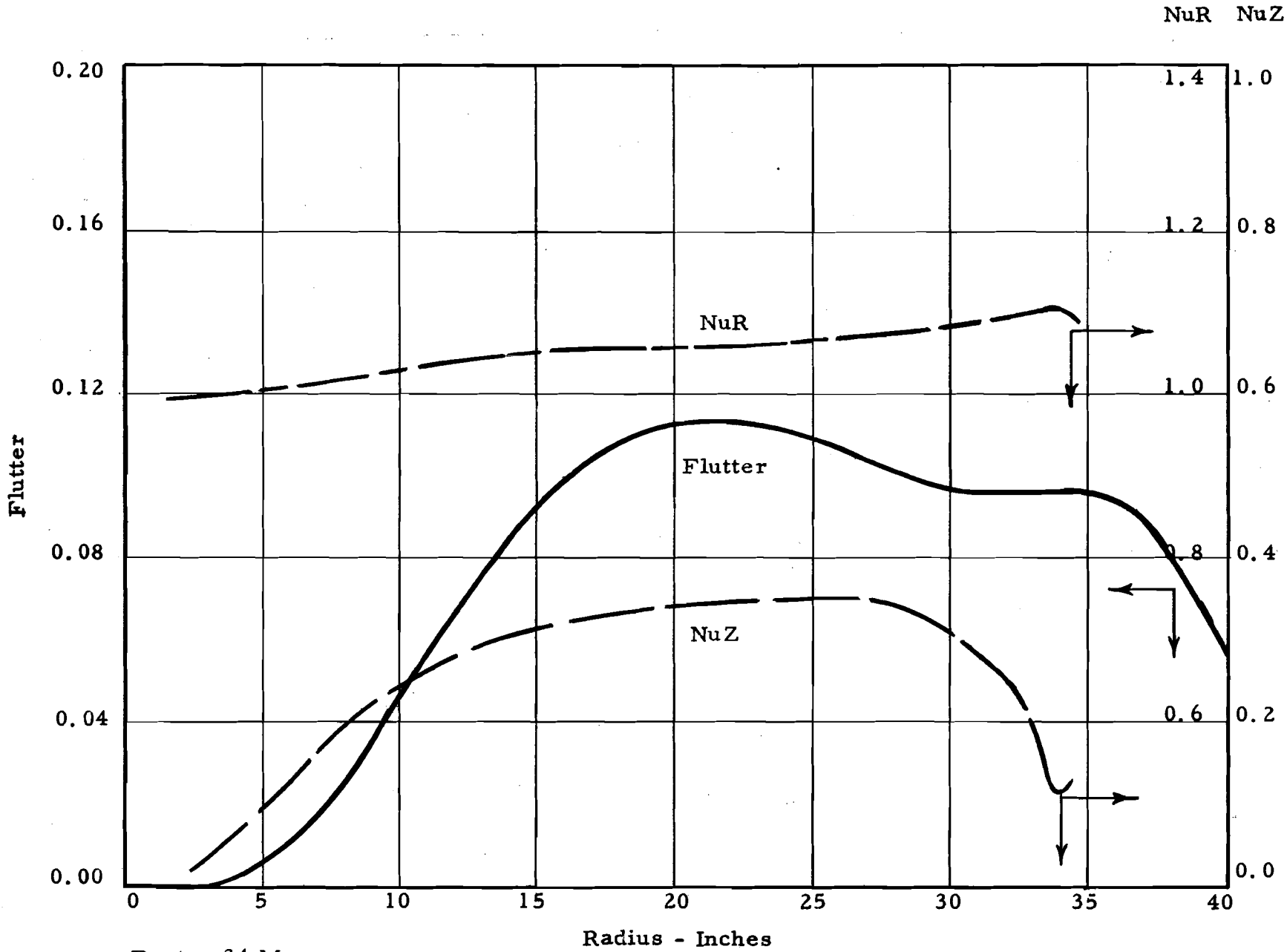


Nitrogen 50 Mev
at 31"

Radius - Inches

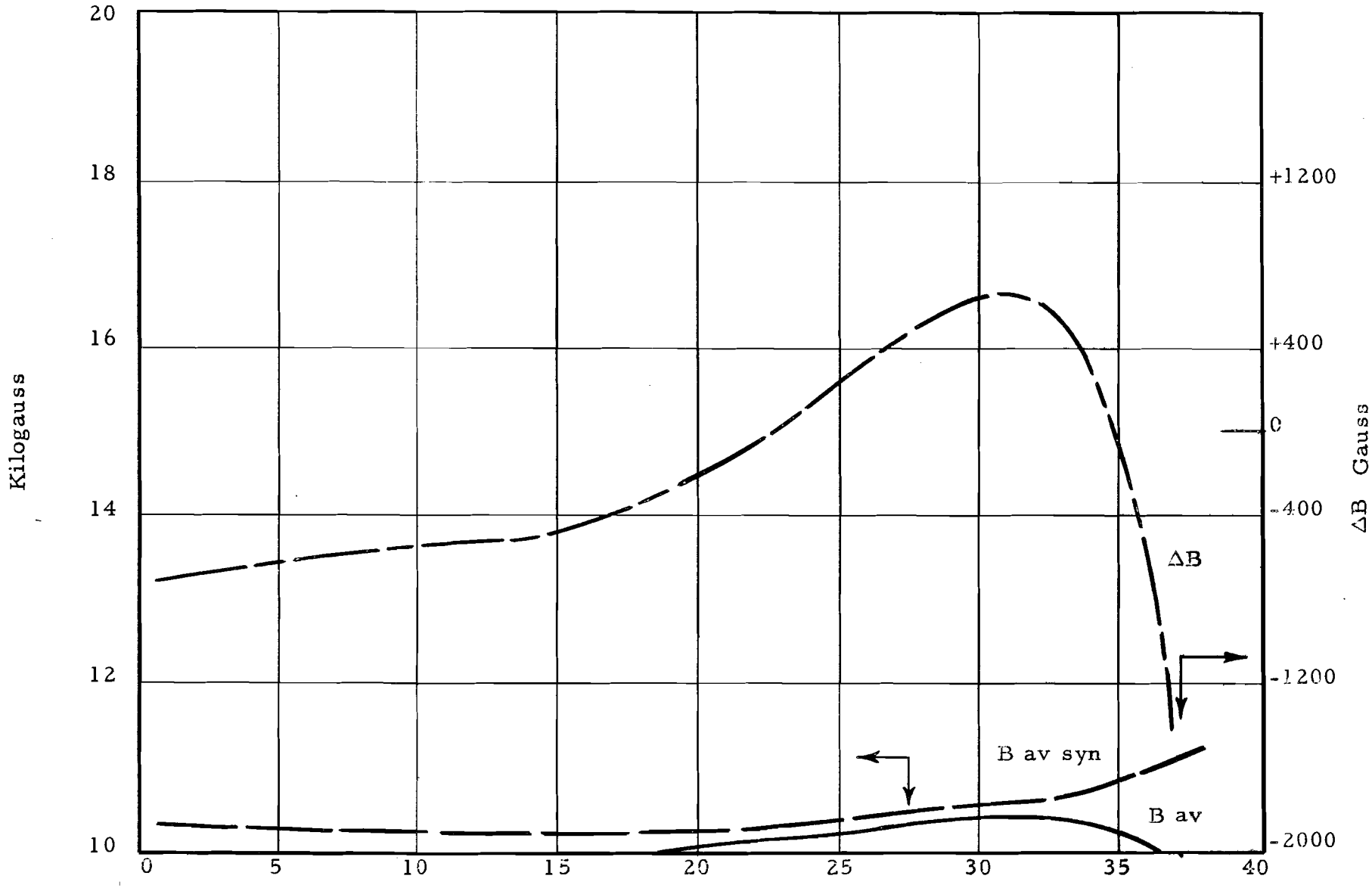
Run 4500

Run 4500
p. 3



Proton 34 Mev
at 31"

Run 4510

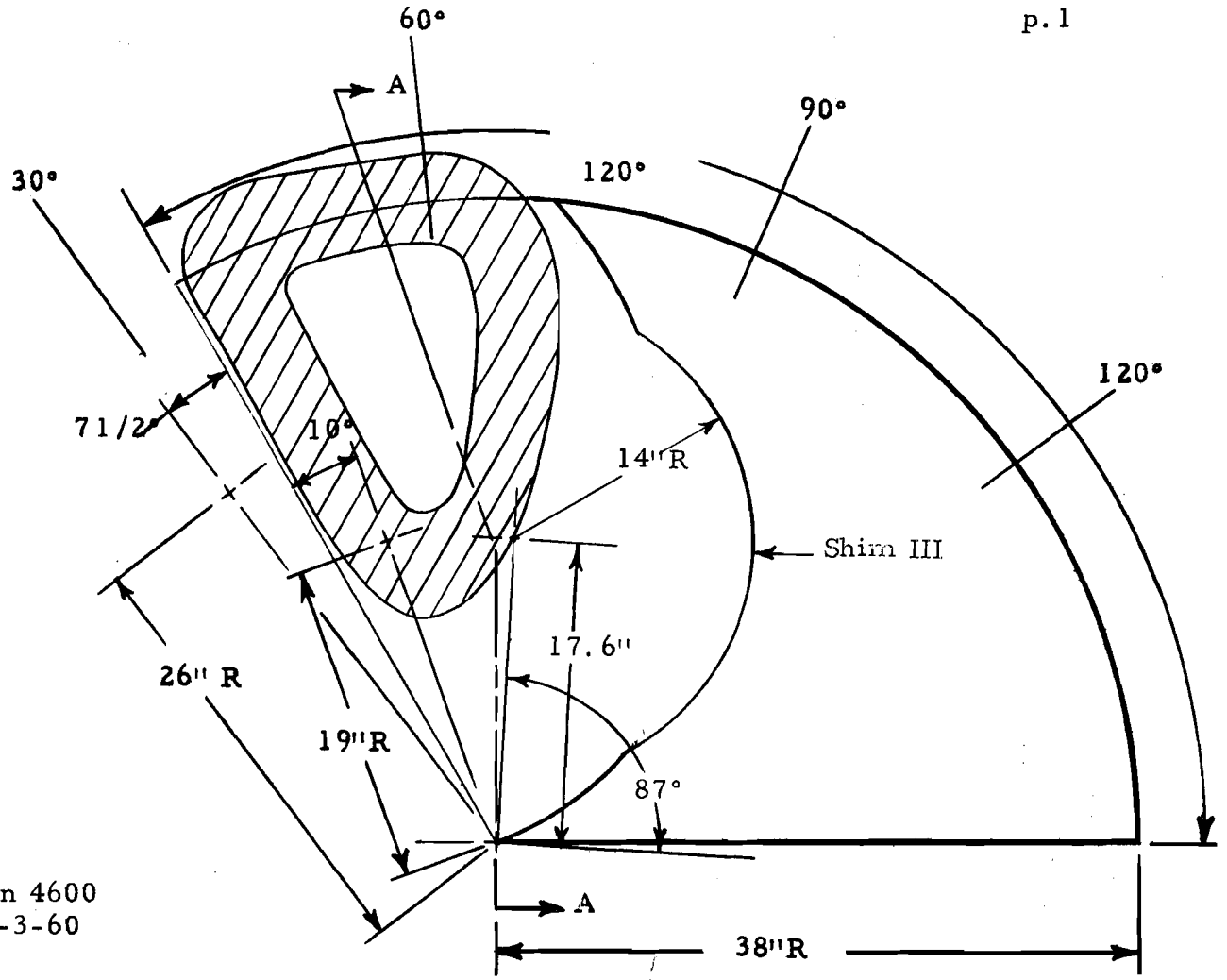


Proton 34 Mev
at 31"

Run 4510

Run 4510
P. 5

Run 4600
p. 1

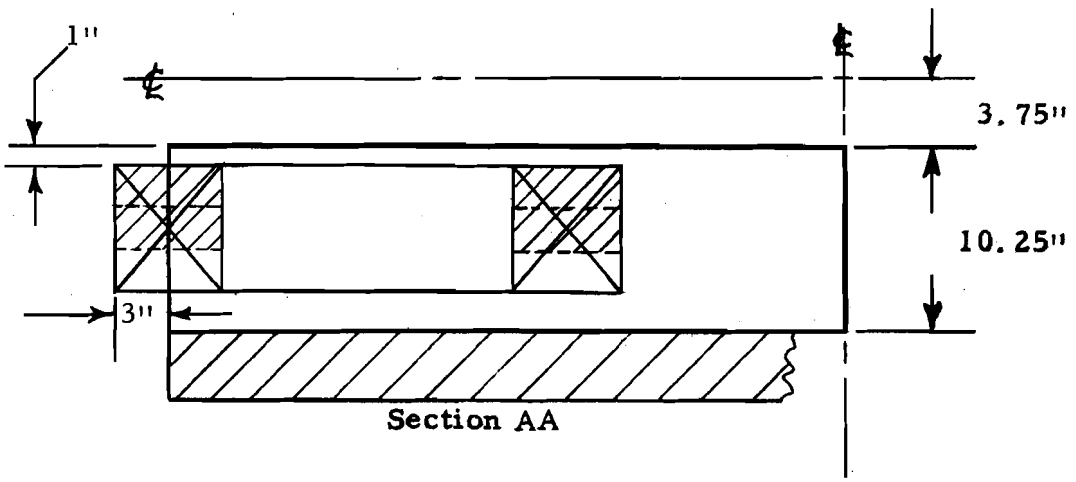


Run 4600
8-3-60

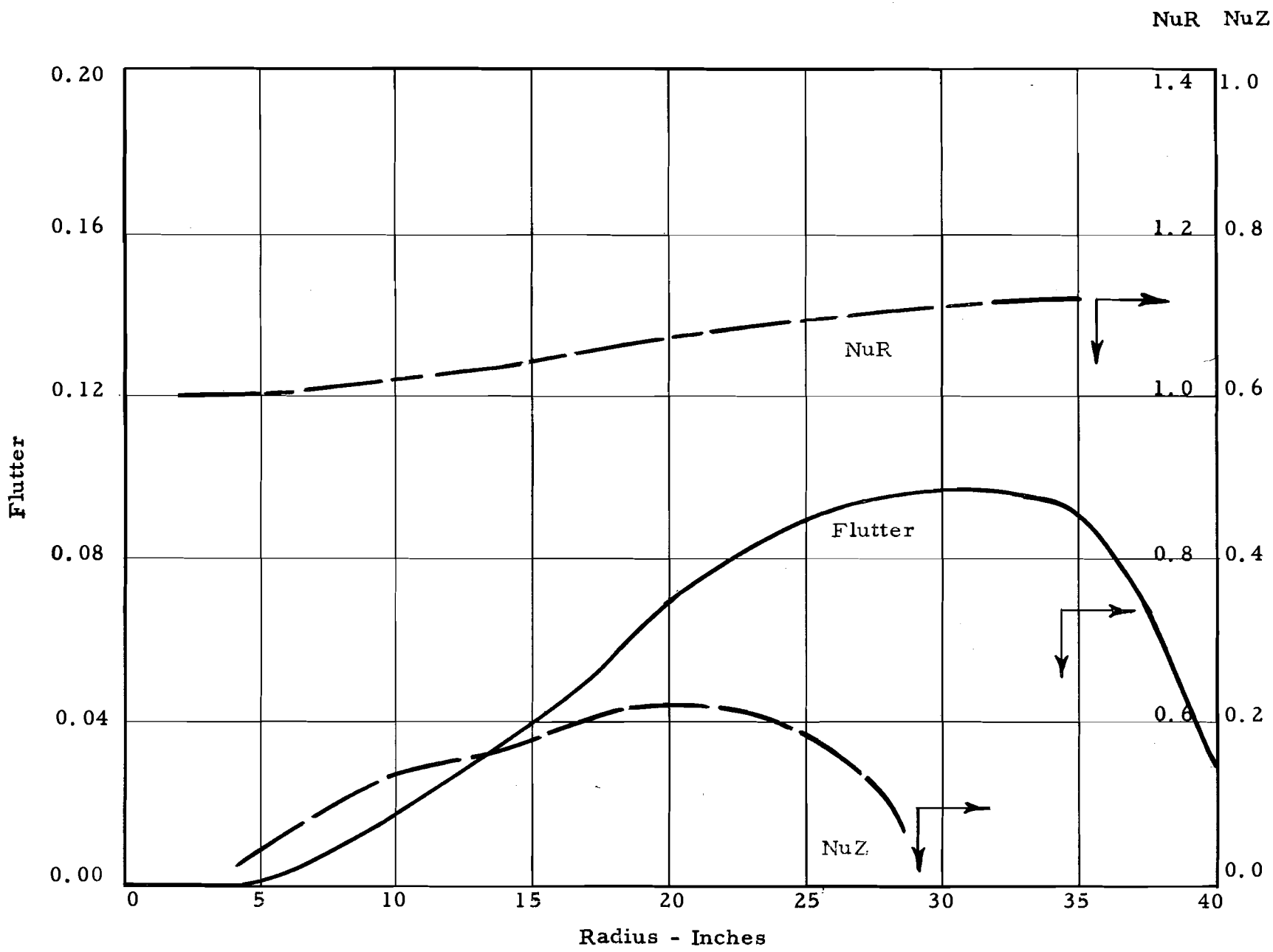
Full **Scale Parameters**

Main Coils 1.07×10^6 ampere turns
Valley Coils 2.383×10^6 ampere turns

Only the top 2/3 of the valley coils were energized

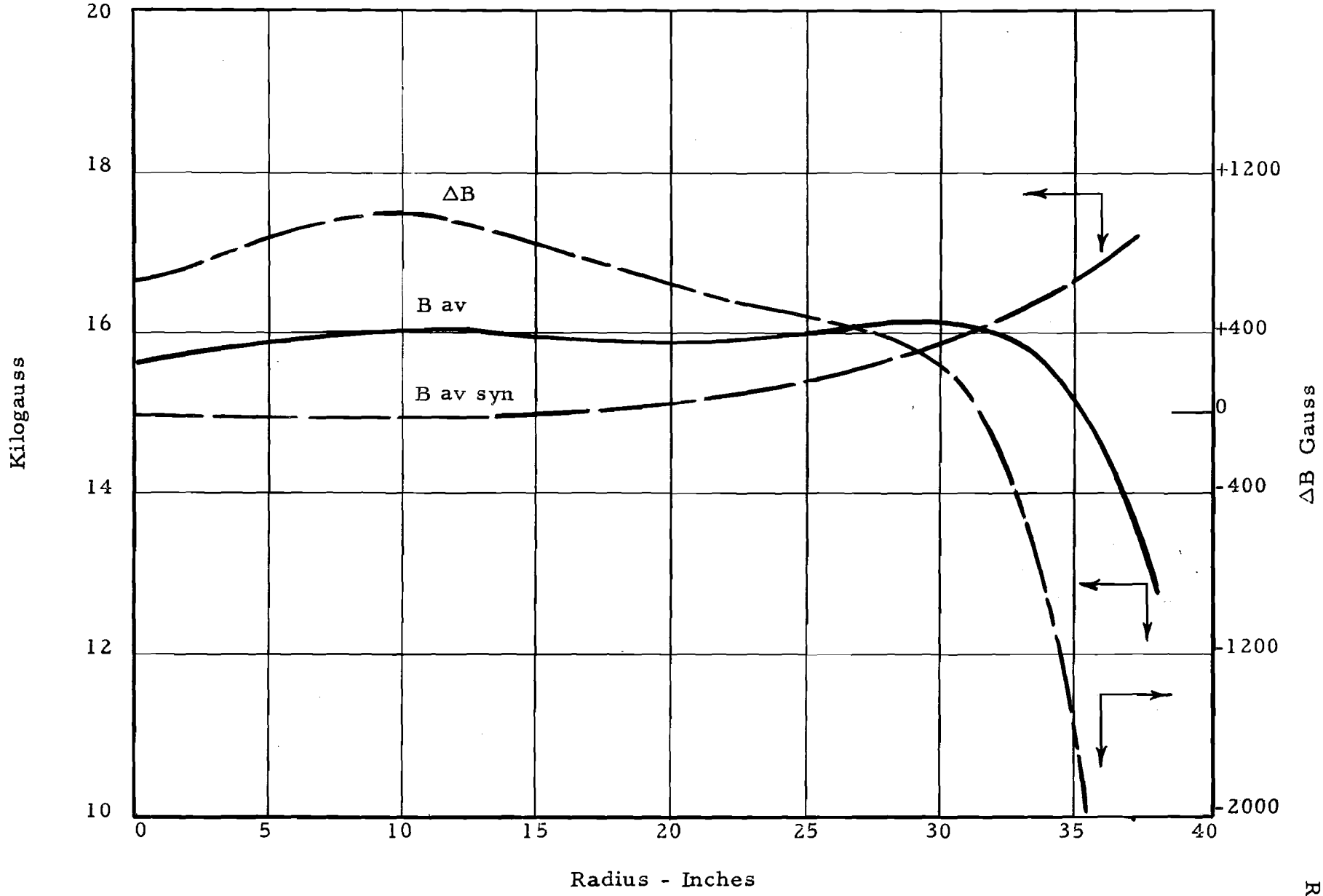


ORIC 1/4 Scale Sector



Proton 75 Mev
at 31"

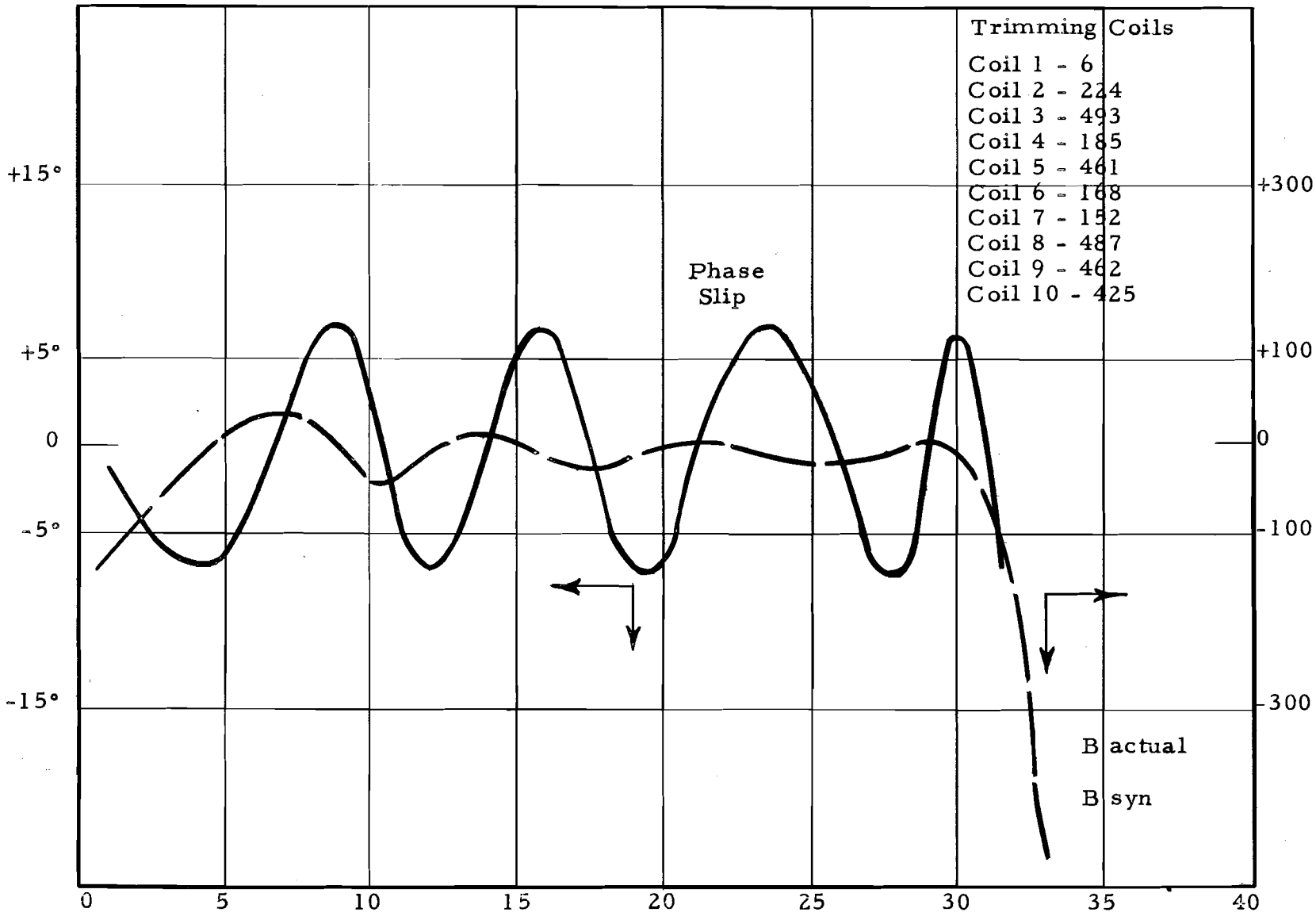
Run 4600



Proton 75 Mev
at 31"

Run 4600

Run 4600
p. 3

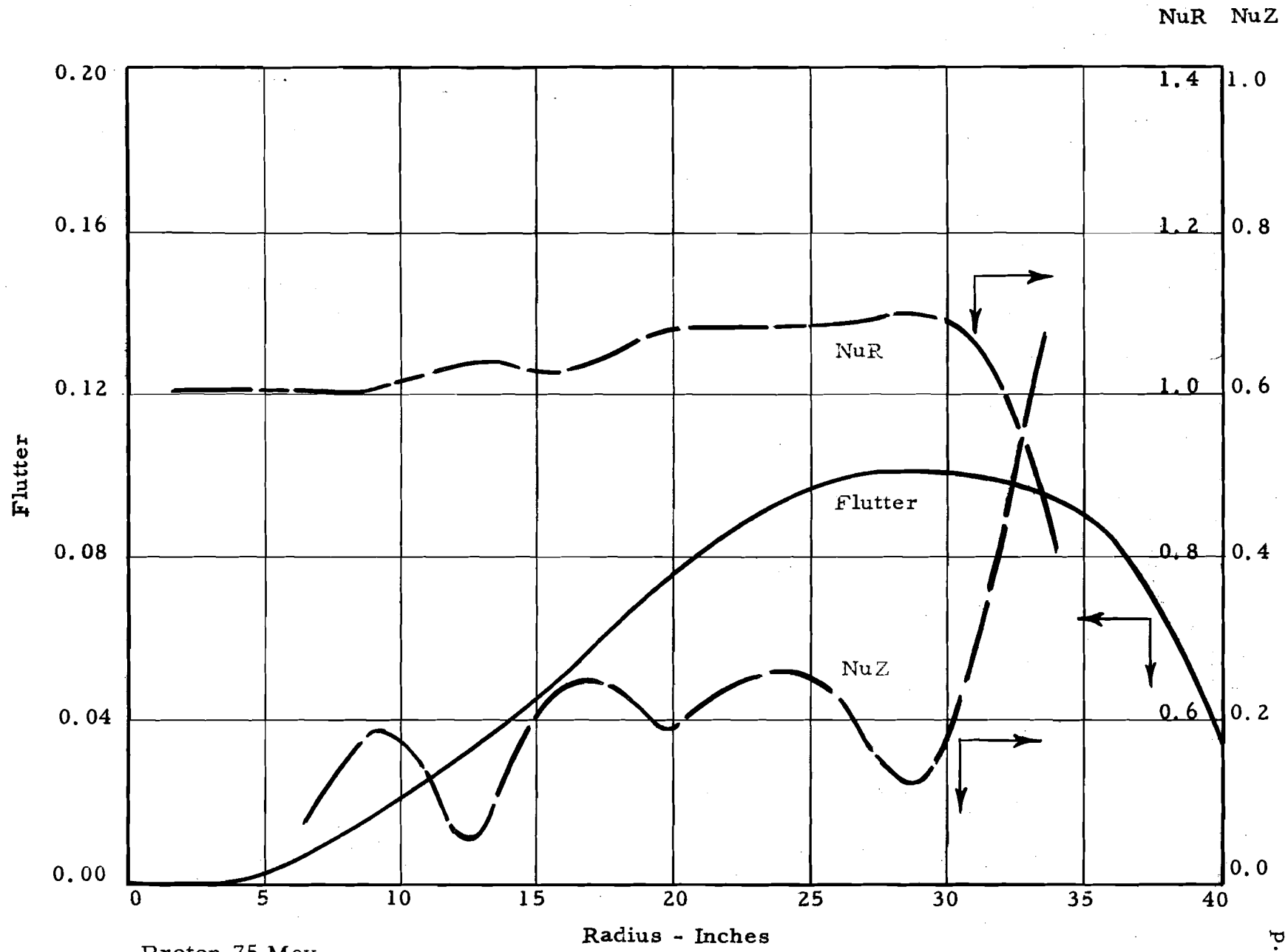


Proton 75 Mev
at 31"

25% Overload

Run 4600

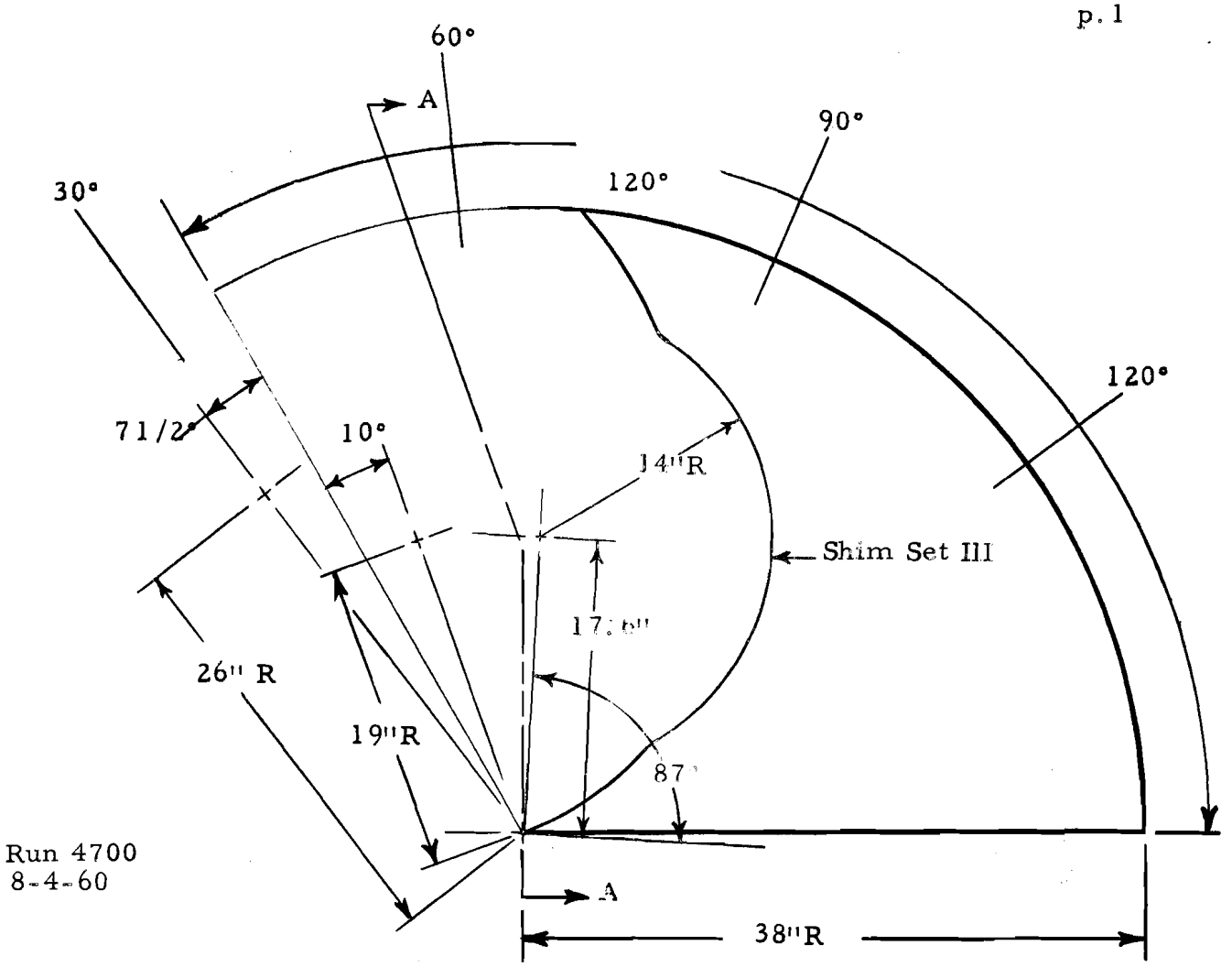
Run 4600
p. 4



Proton 75 Mev
at 31"

Falderal Run 4600

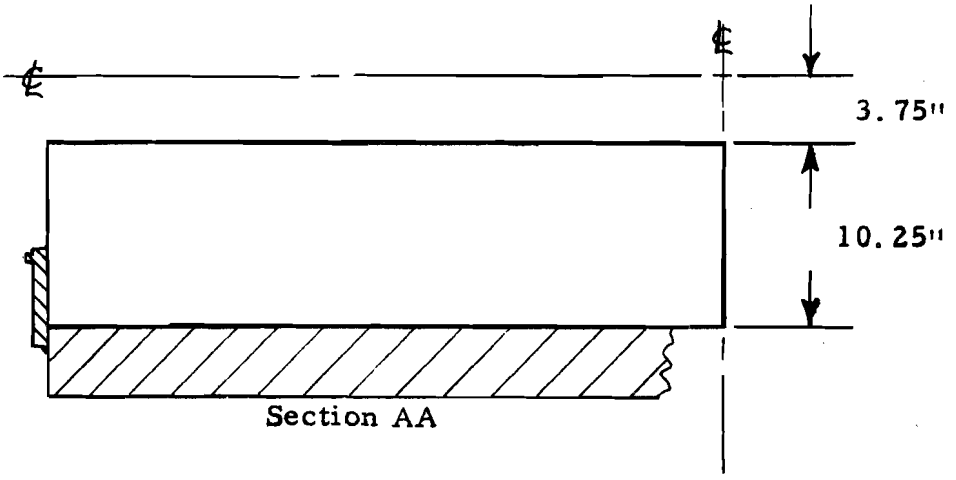
Run 4700
p. 1



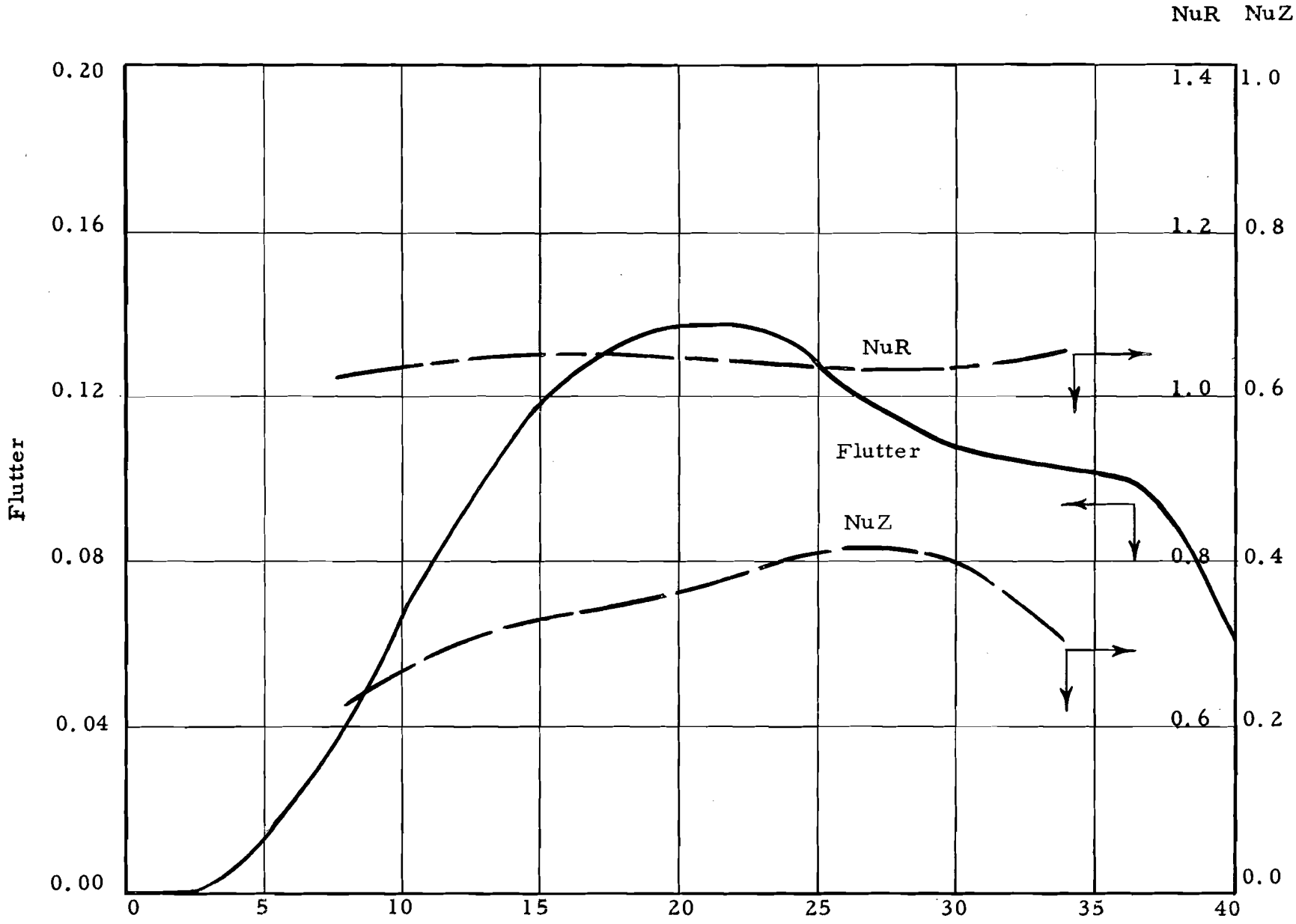
Run 4700
8-4-60

Full Scale Parameters

Main Coils 0.099×10^6 ampere turns



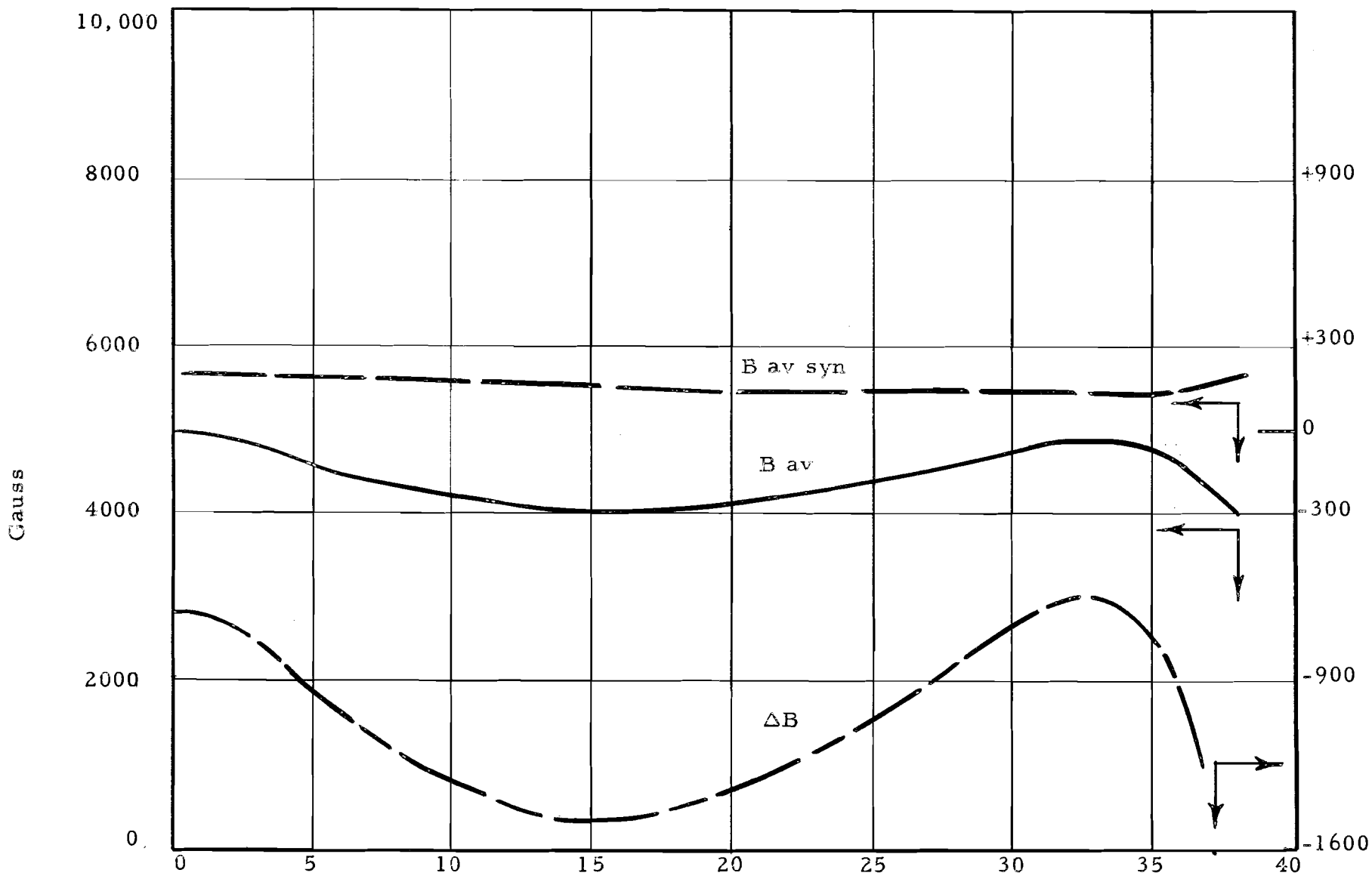
ORIC 1/4 Scale Sector



N^{+4} 11 Mev
at 31"

Run 4700

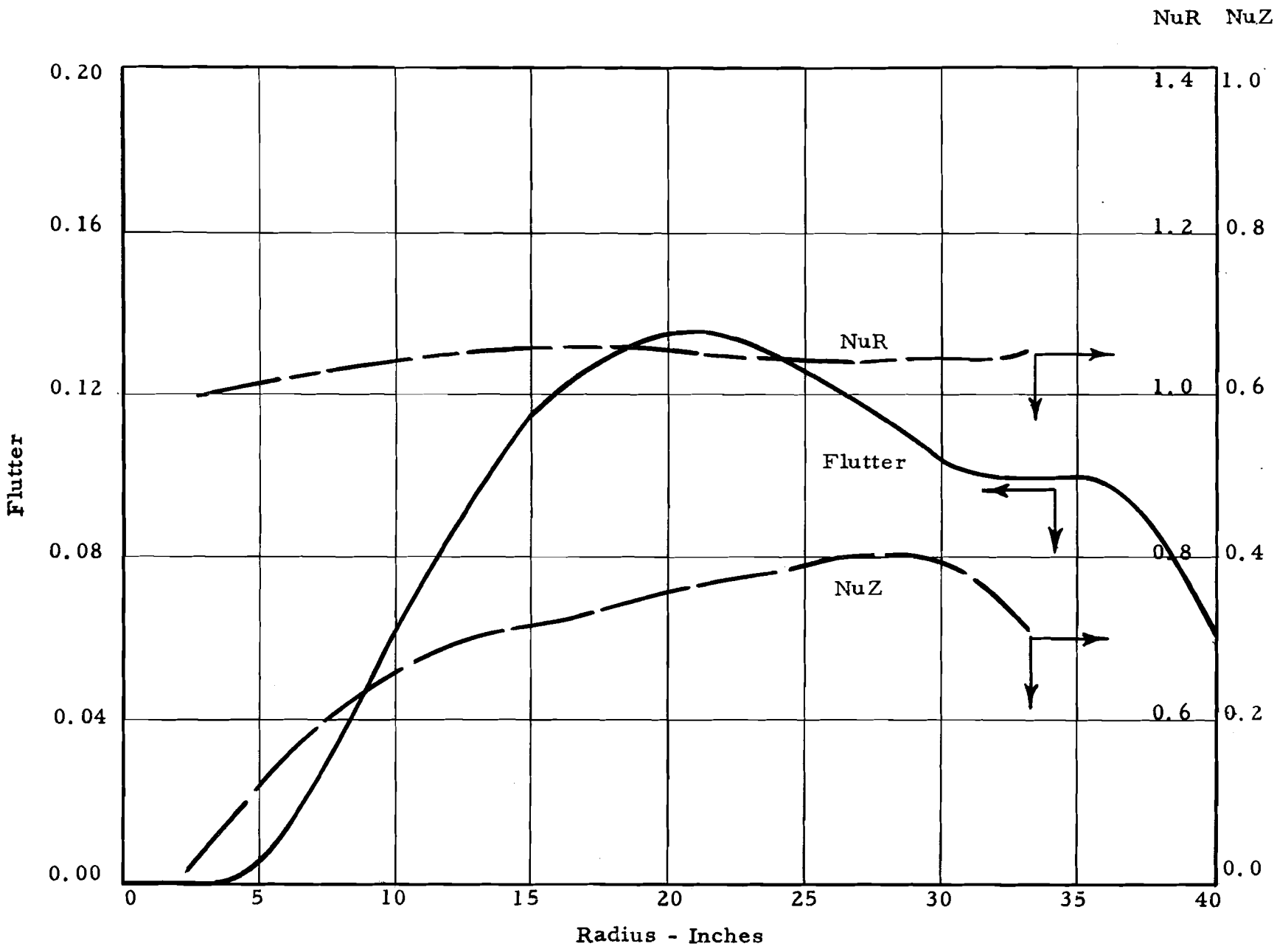
Run 4700
P. 2



N^{+4} 11 Mev
at 31"

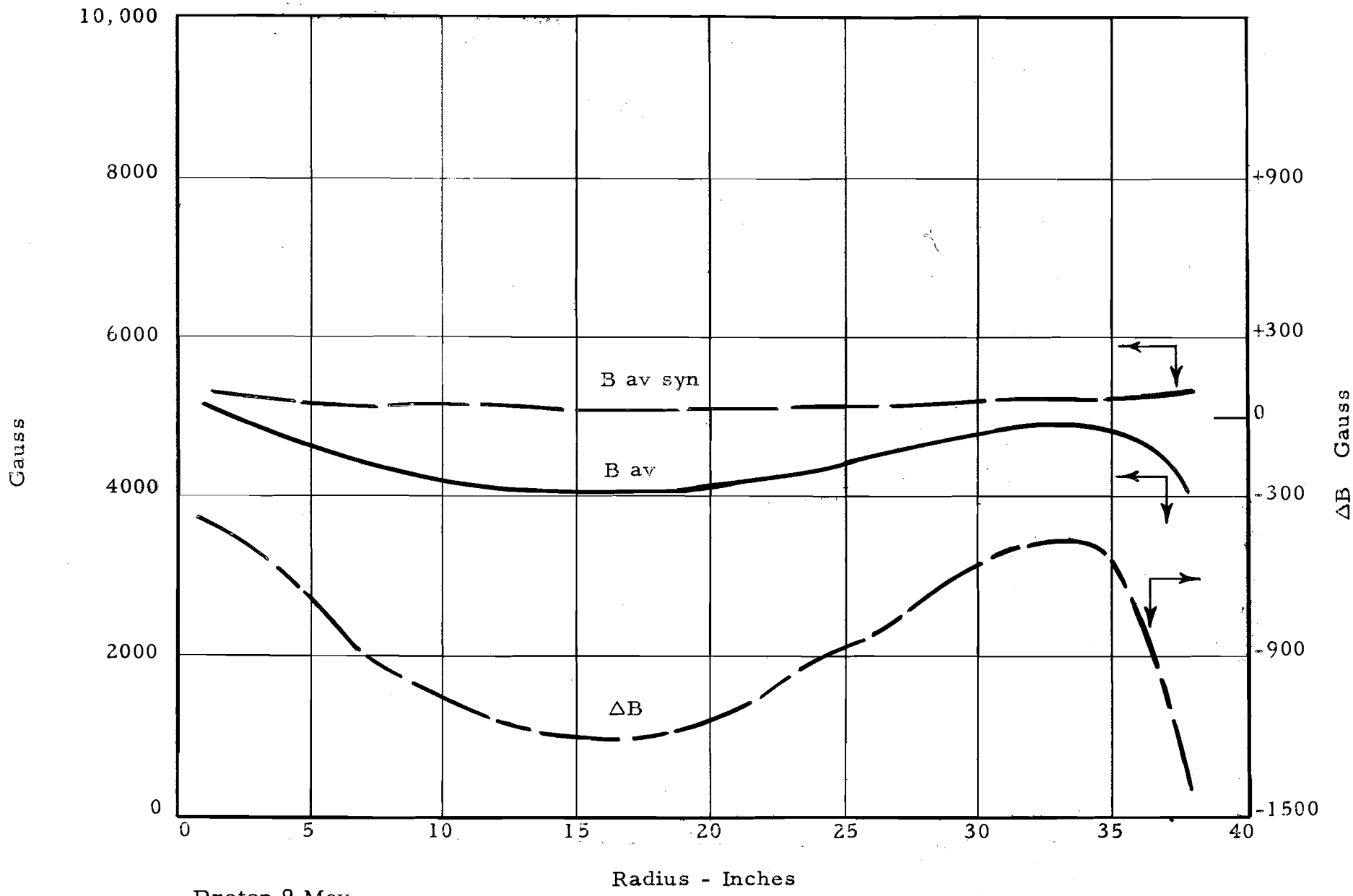
Run 4700

Run 4700
p. 3



Proton 9 Mev
at 31"

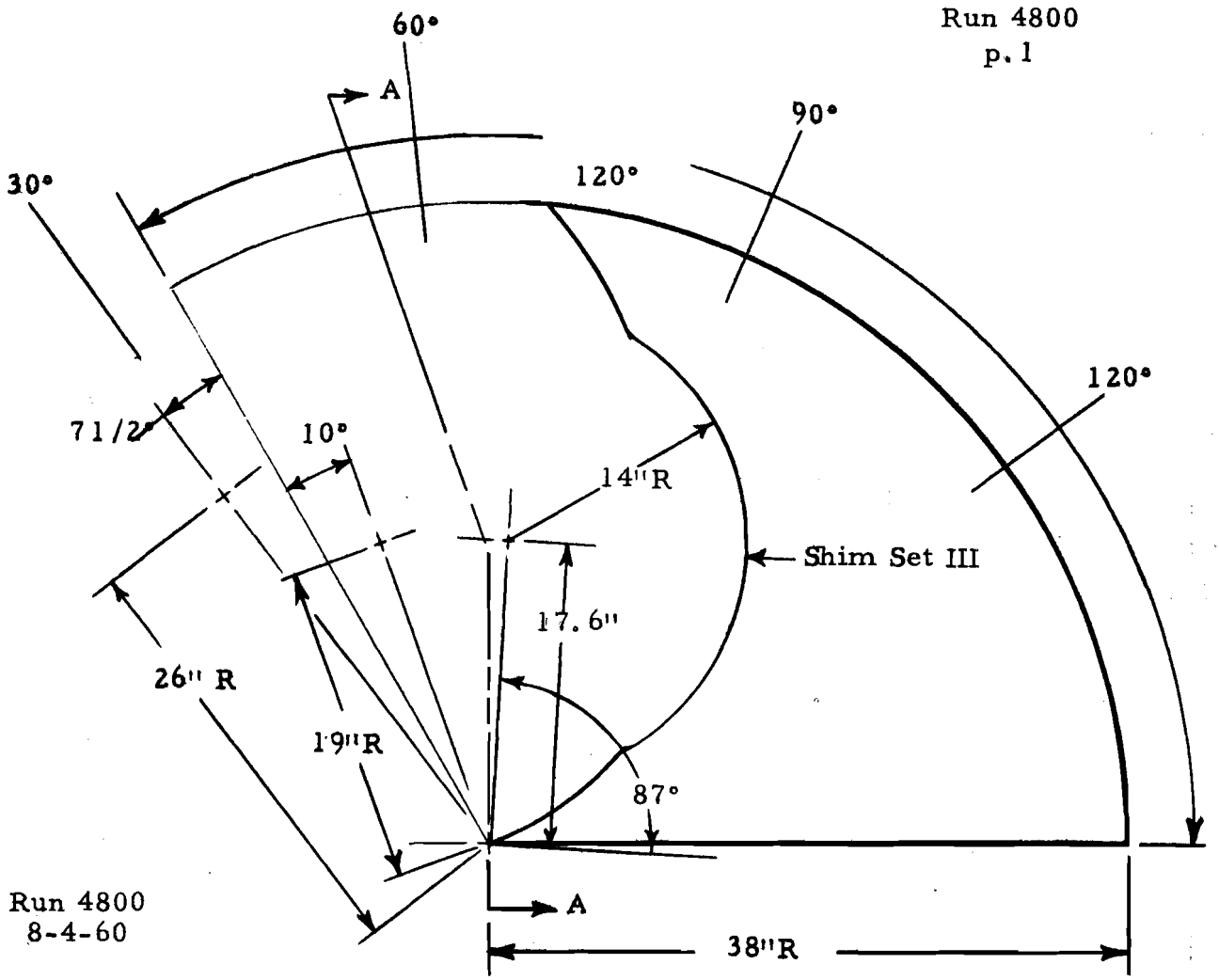
Run 4710



Proton 9 Mev
at 31"

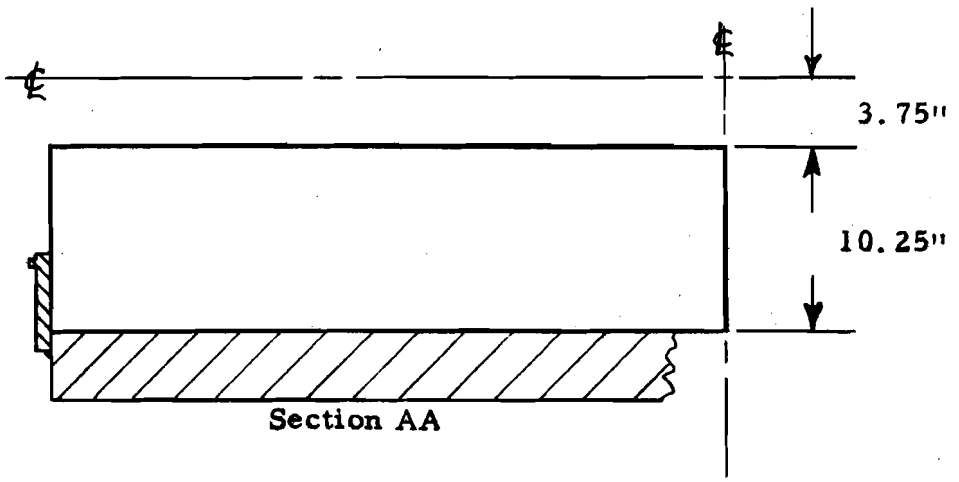
Run 4710

Run 4710
p. 5

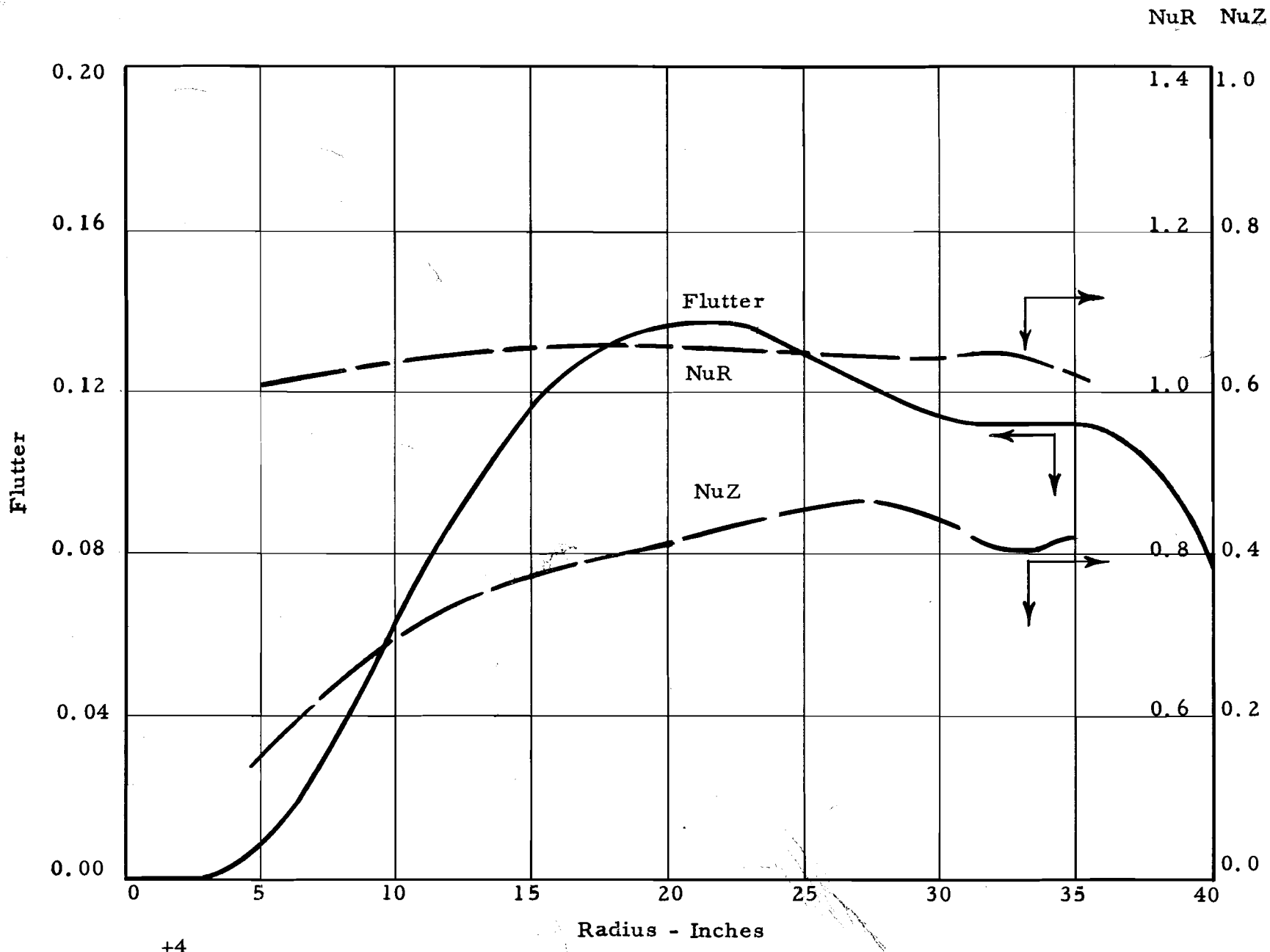


Full Scale Parameters

Main Coils 0.21×10^6 ampere turns

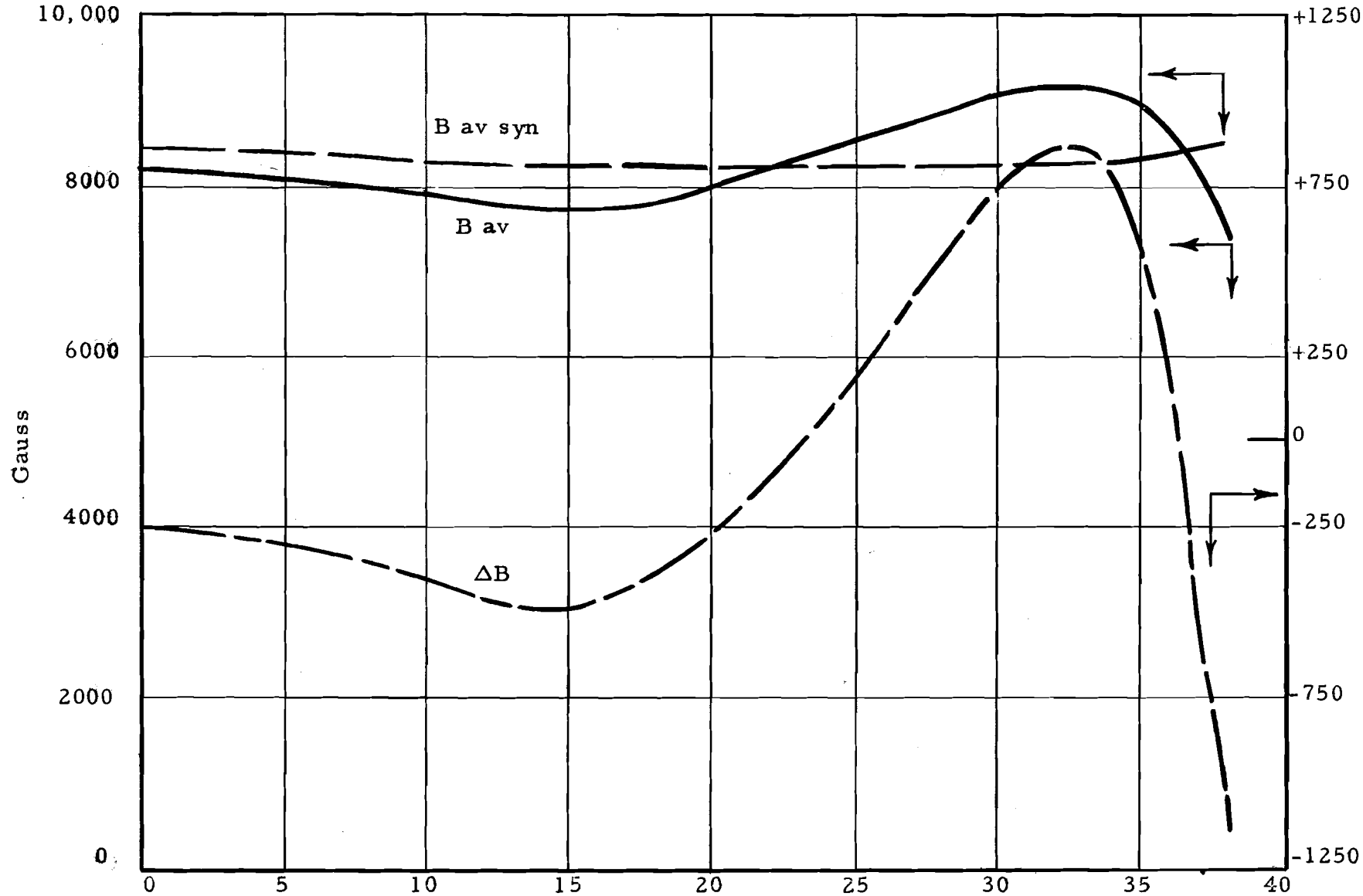


ORIC 1/4 Scale Sector



N^{+4} 25 Mev
at 31"

Run 4800

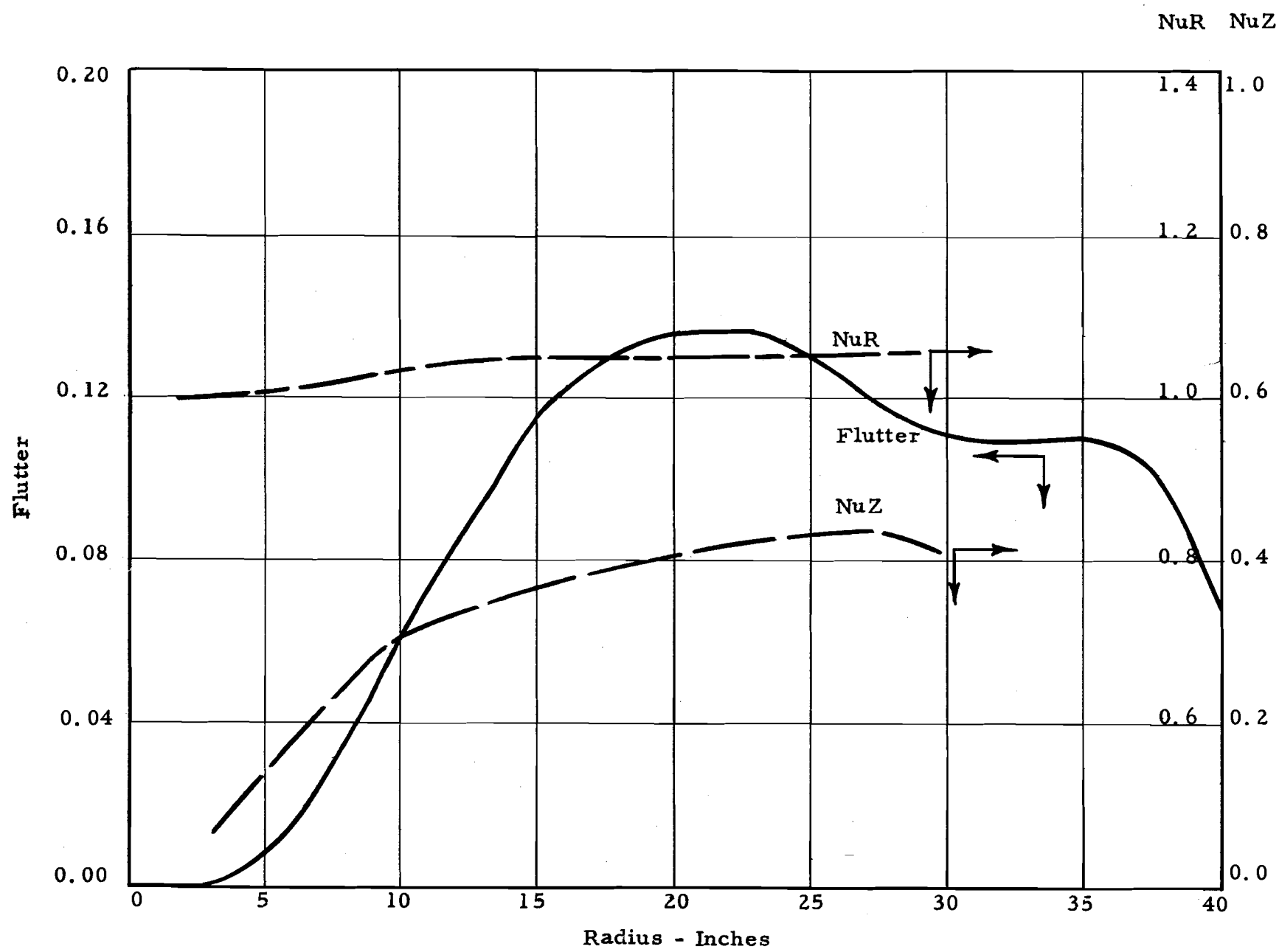


N^{+4} 25 Mev

at 31"

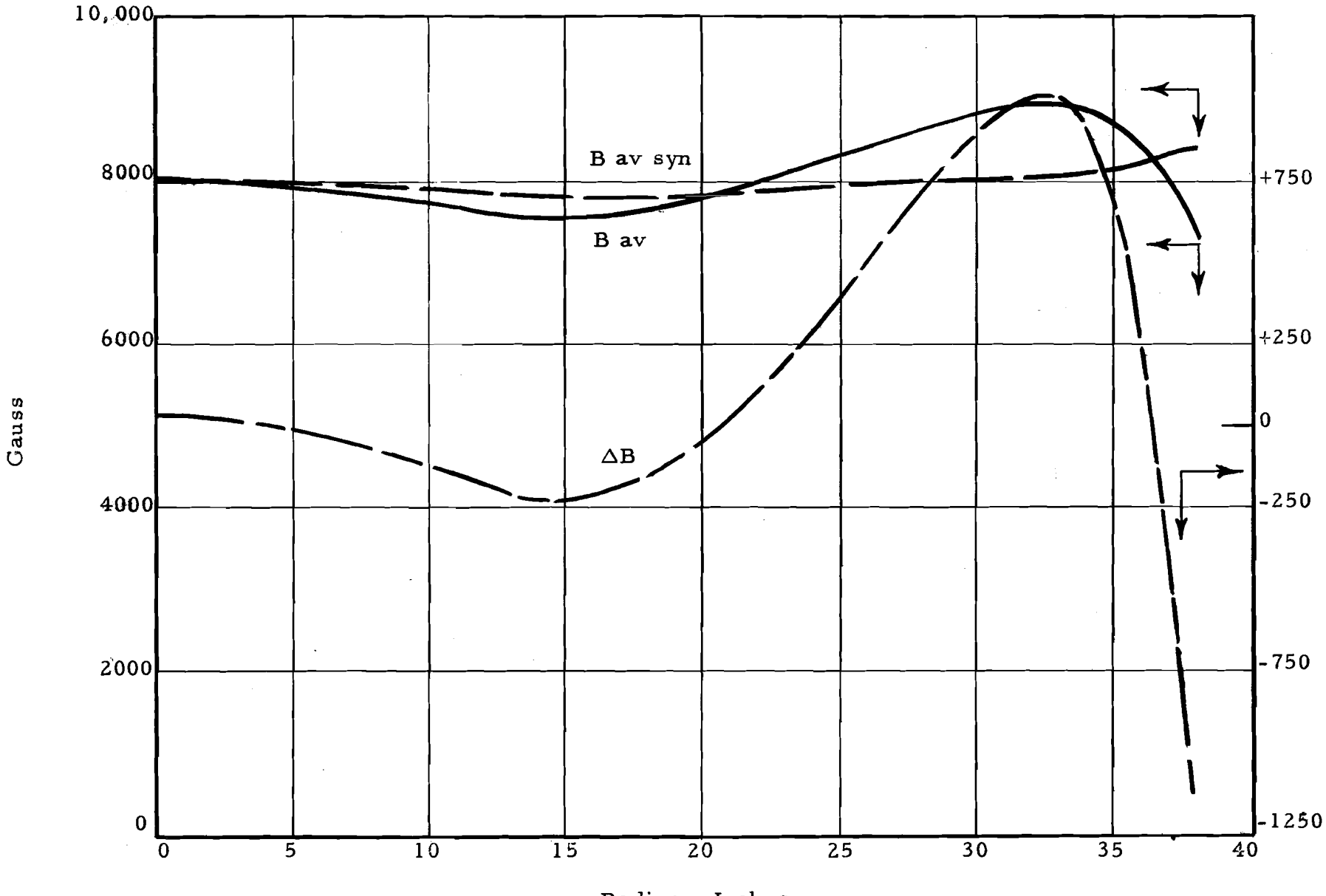
Run 4800

Run 4800
P. 3



Proton 21 Mev
at 31"

Run 4810

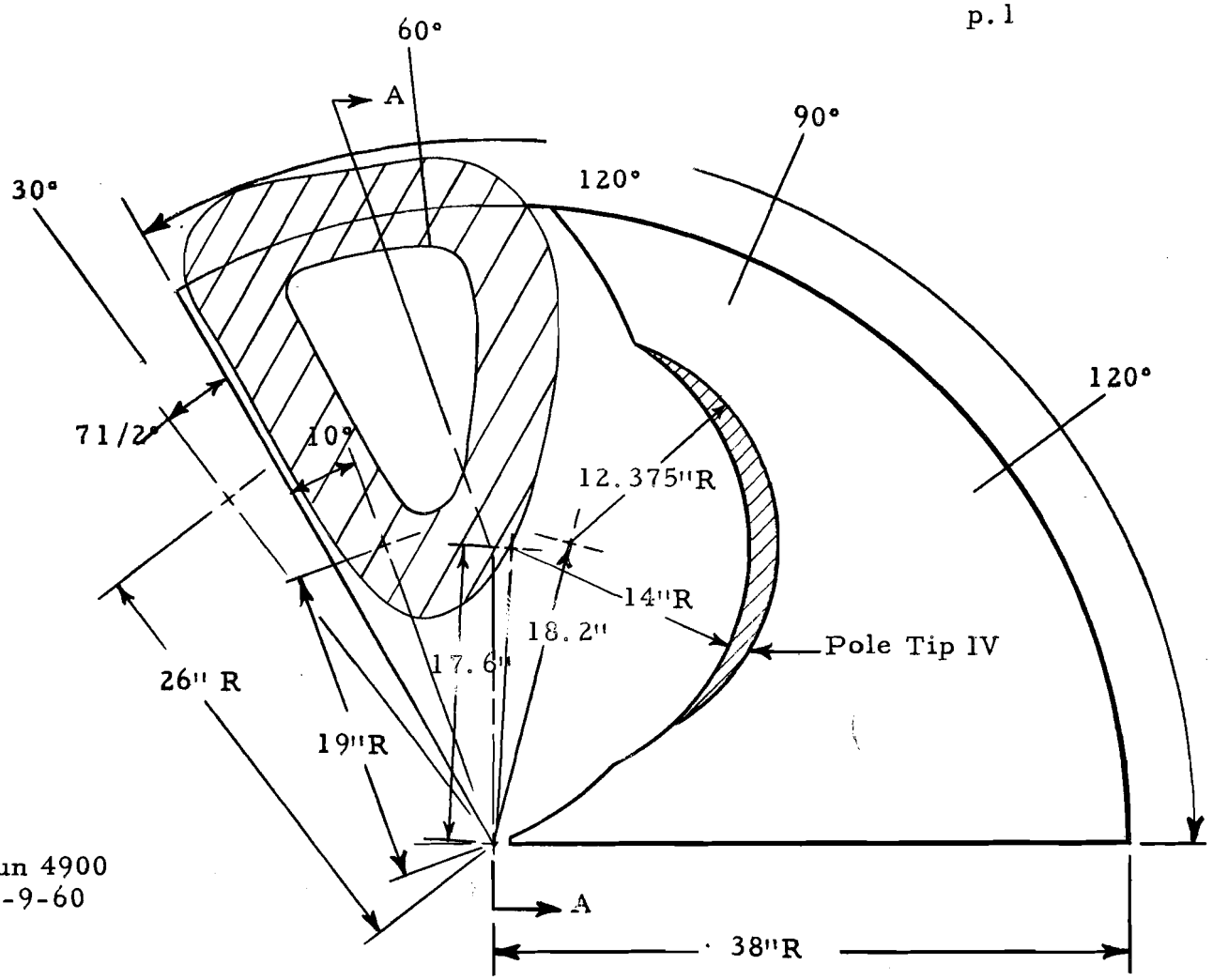


Proton 21 Mev
at 31"

Run 4810

Run 4810
p.5

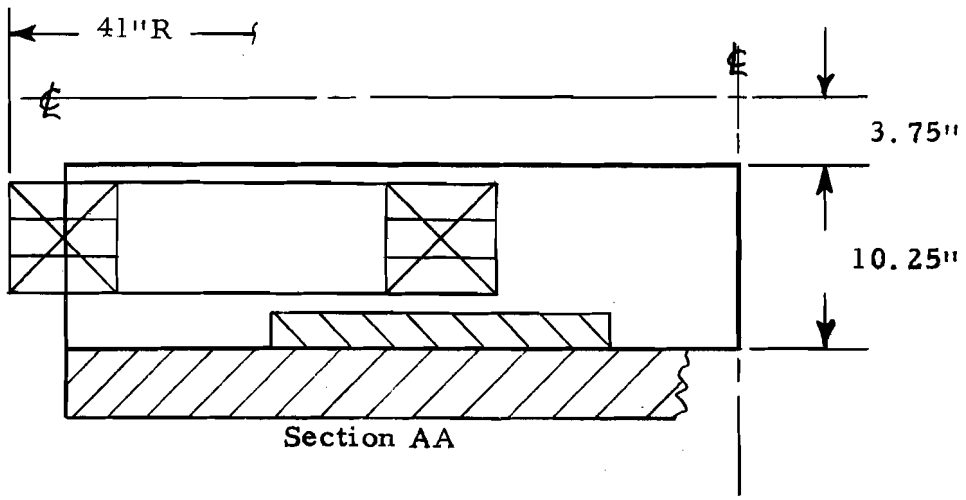
Run 4900
p. 1



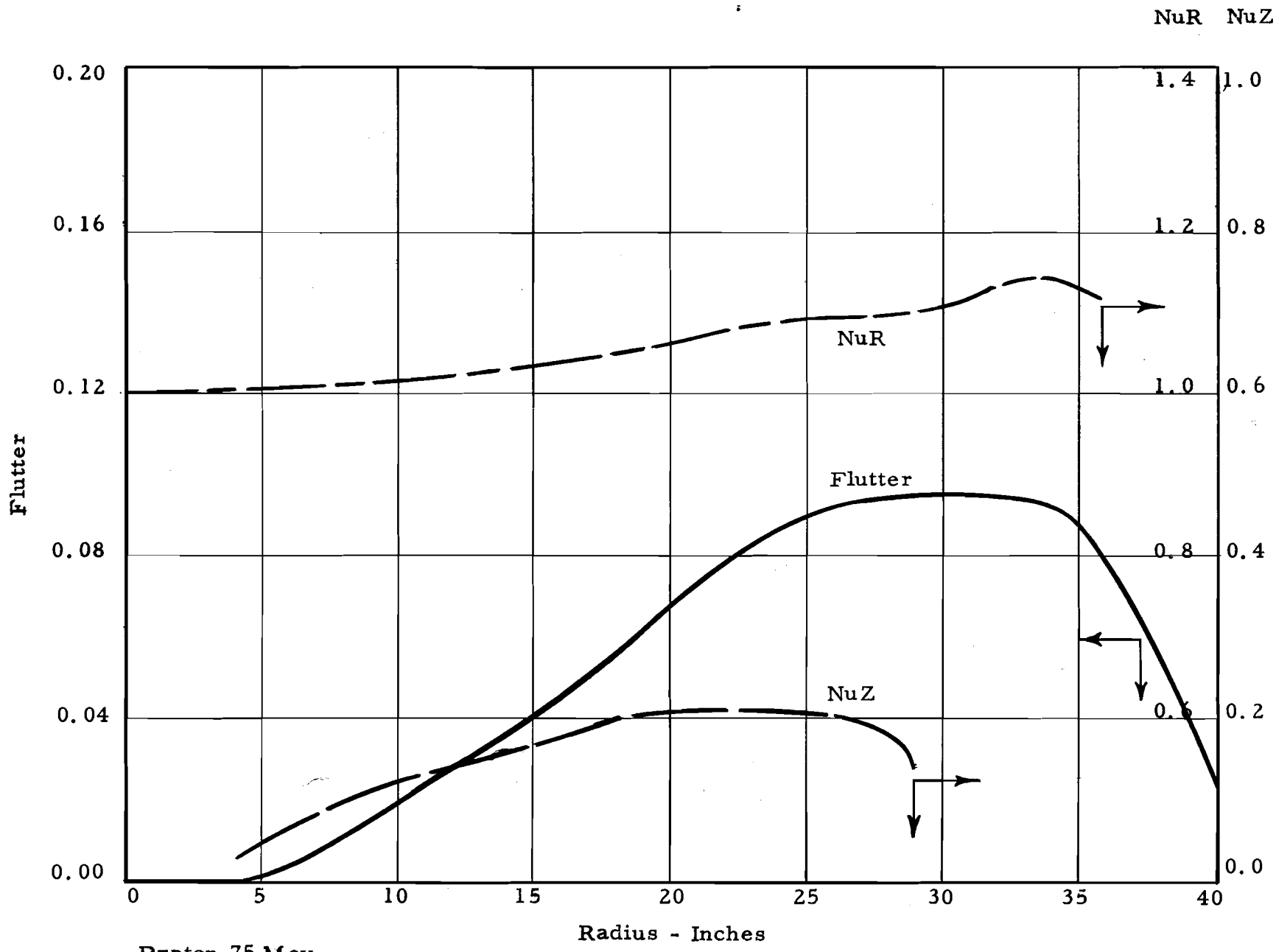
Run 4900
8-9-60

Full Scale Parameters

Main Coils 1.07×10^6 ampere turns
Valley Coils 0.238×10^6 ampere turns



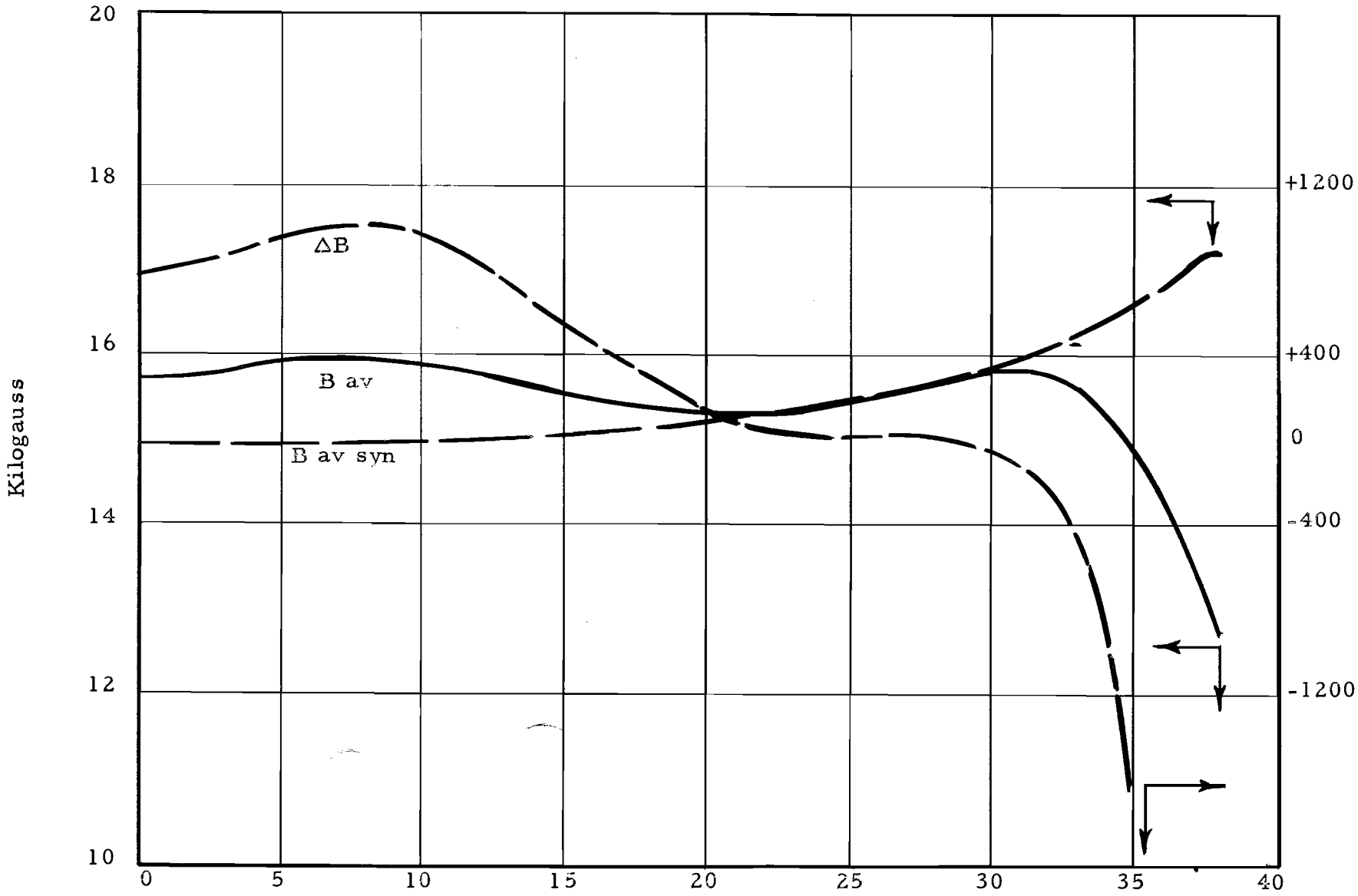
ORIC 1/4 Scale Sector



Proton 75 Mev
at 31"

Run 4900

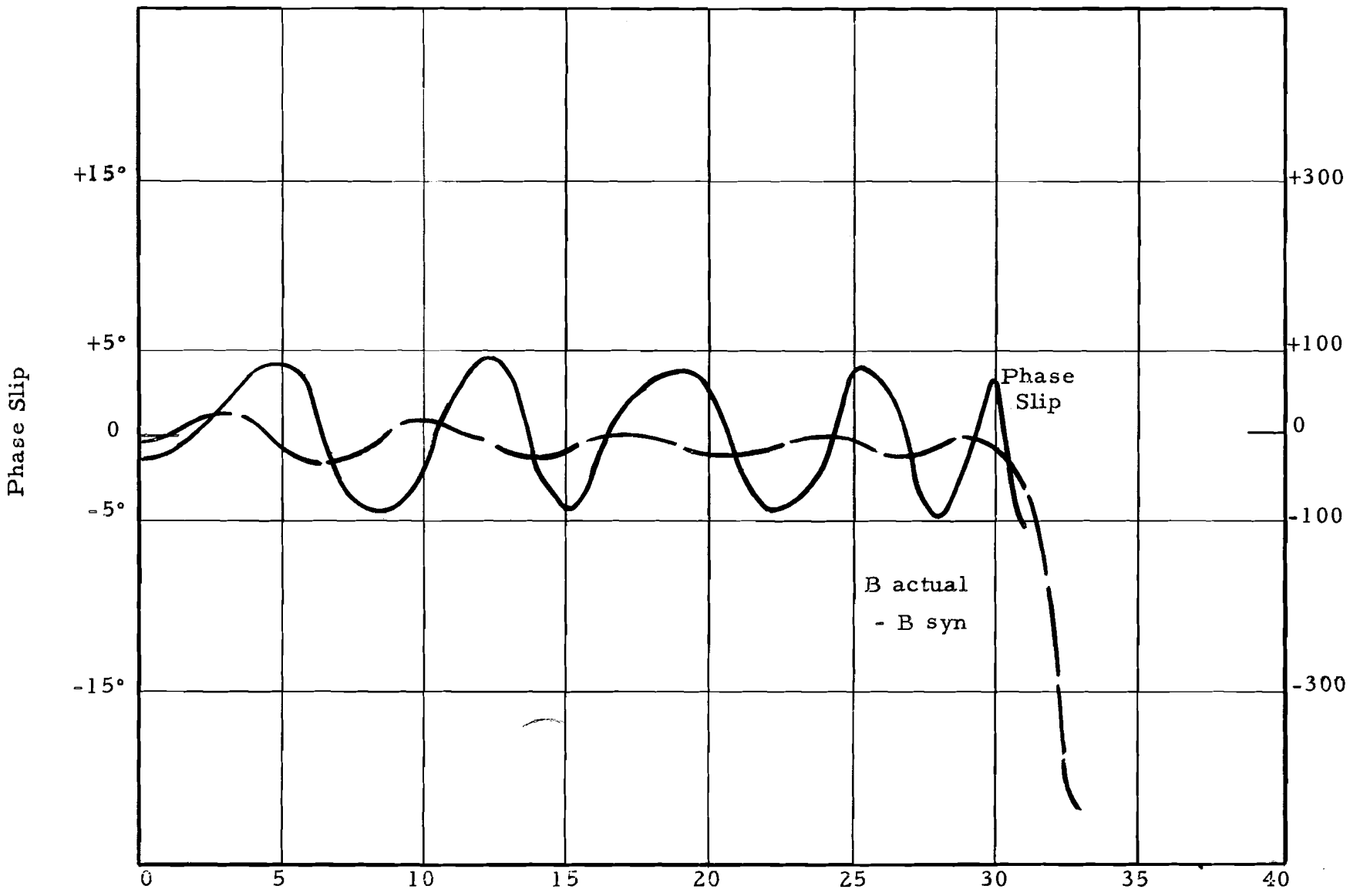
Run 4900
p. 2



Proton 75 Mev
at 31"

Run 4900

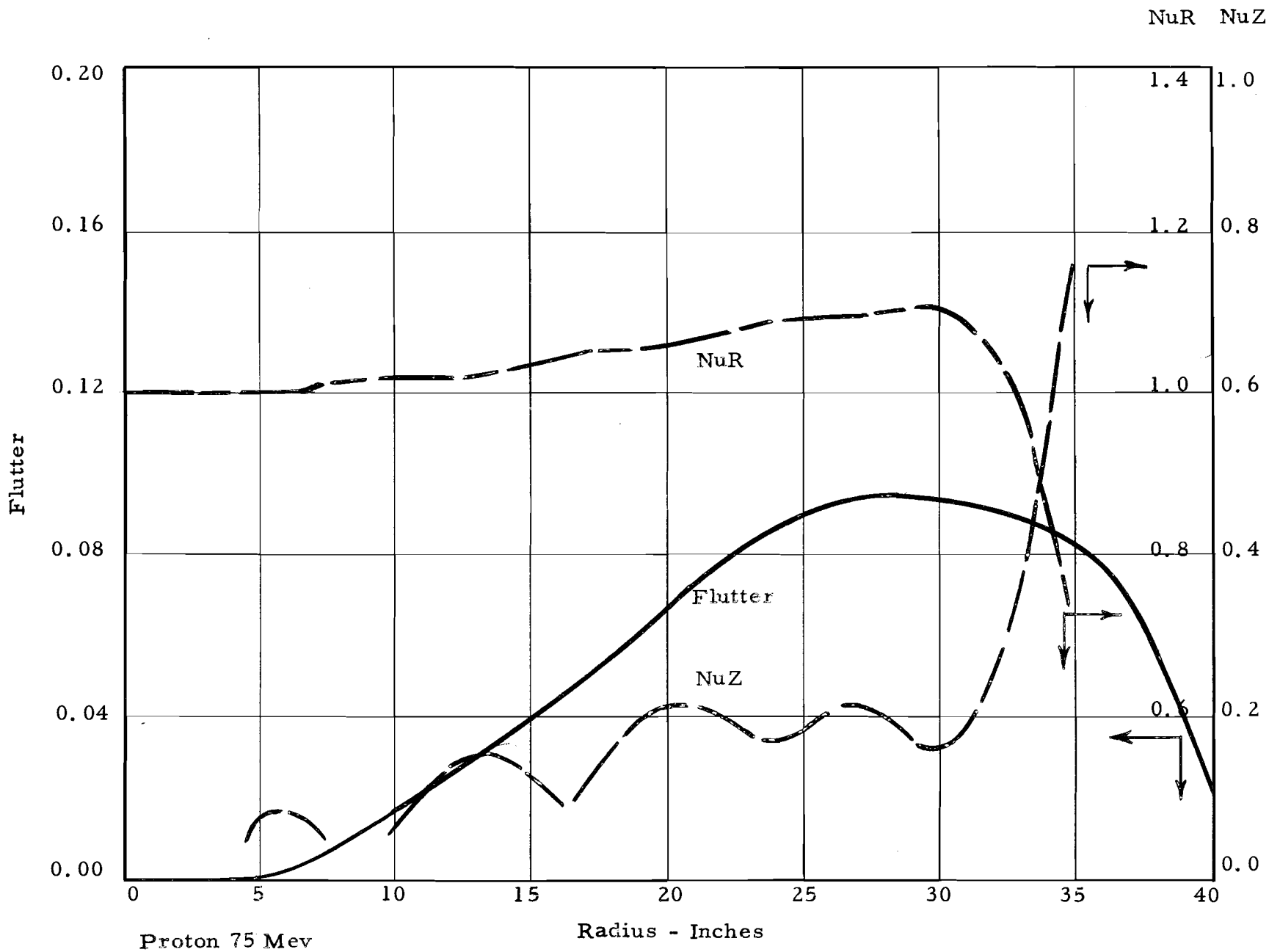
Run 4900
p. 3



Proton 75 Mev
at 31"
25% Overload

Run 4900

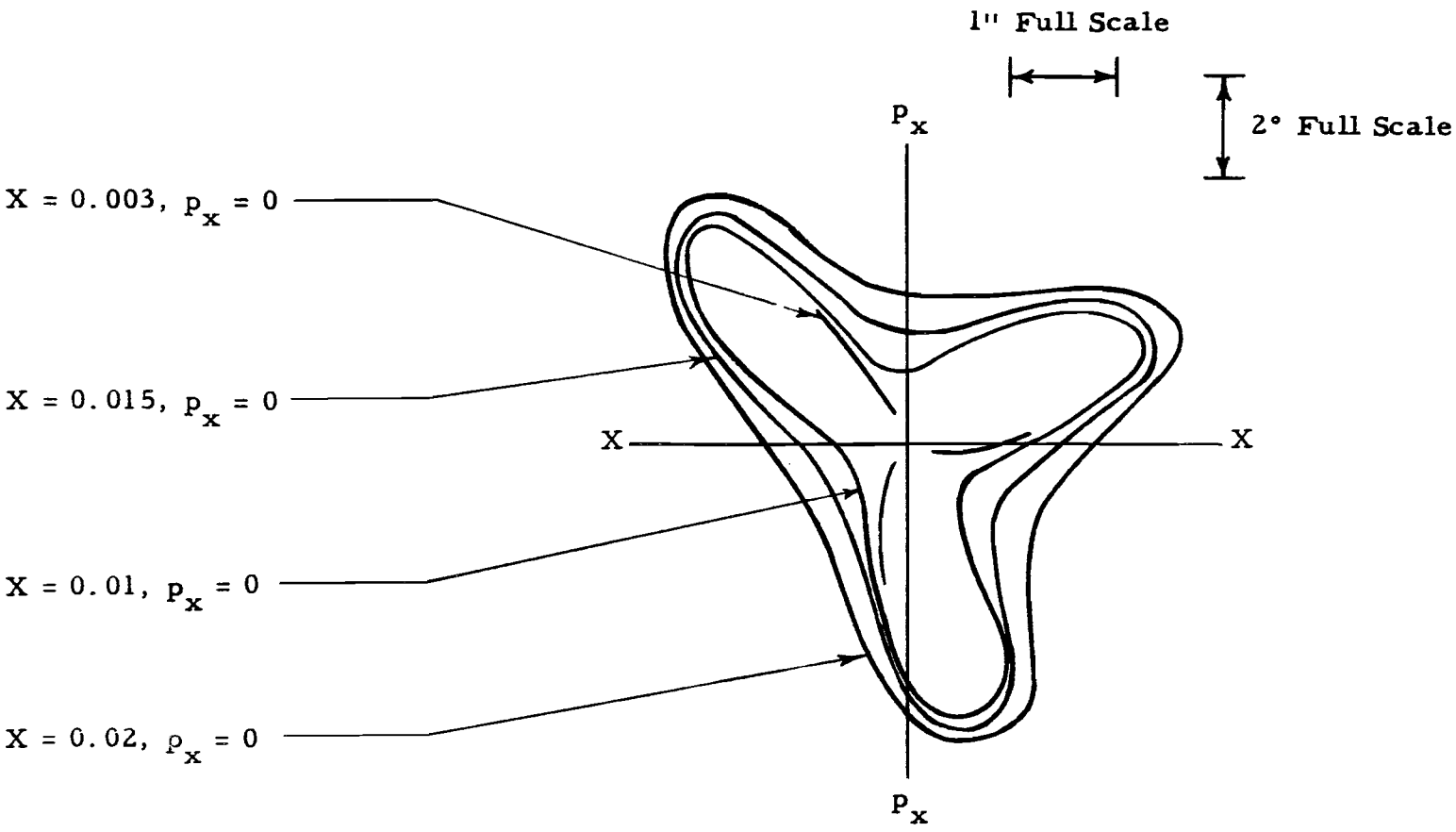
Run 4900
P. 4



Proton 75 Mev
at 31"

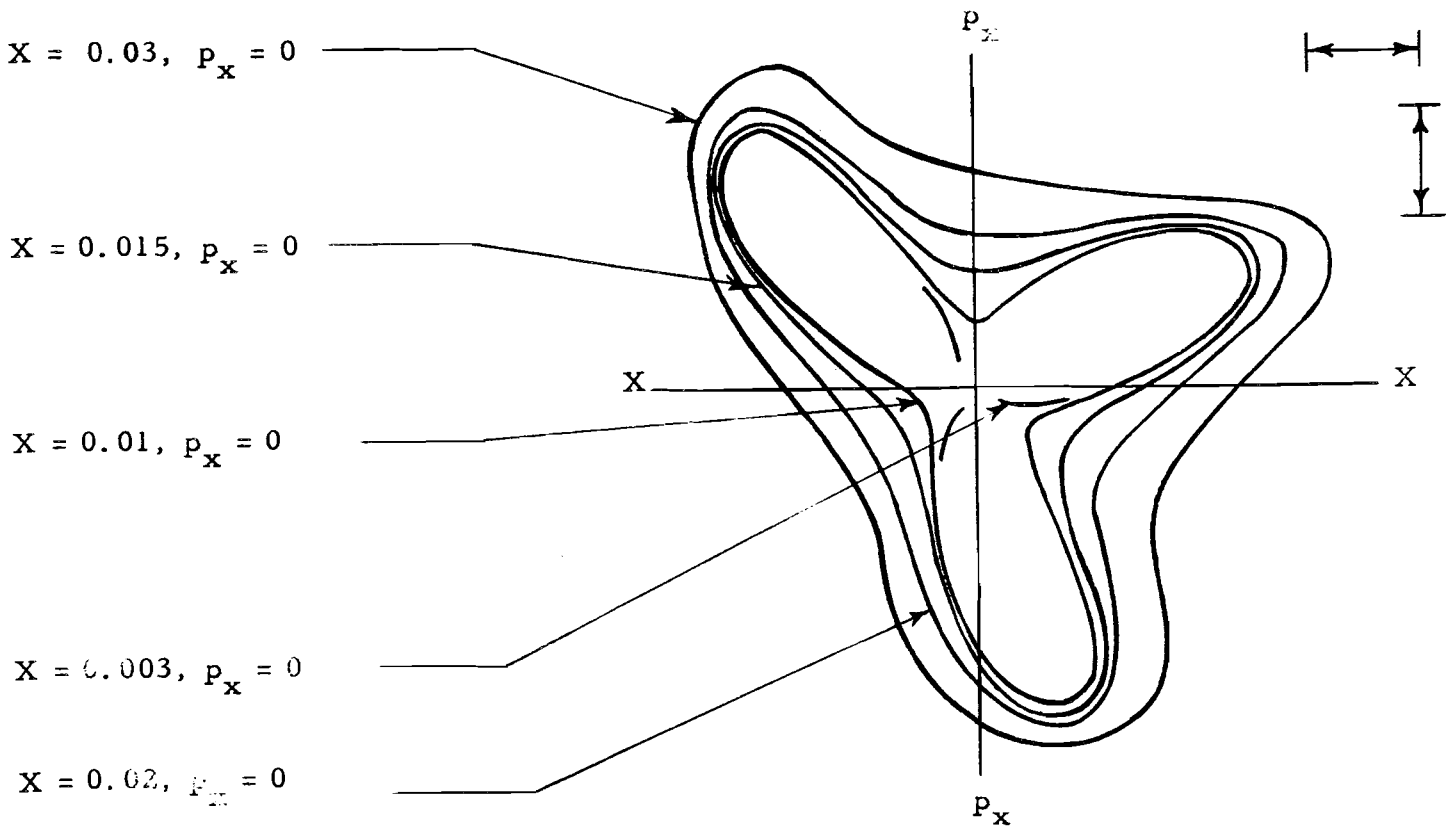
Falderal Run 4900

Falderal
Run 4900
p. 5



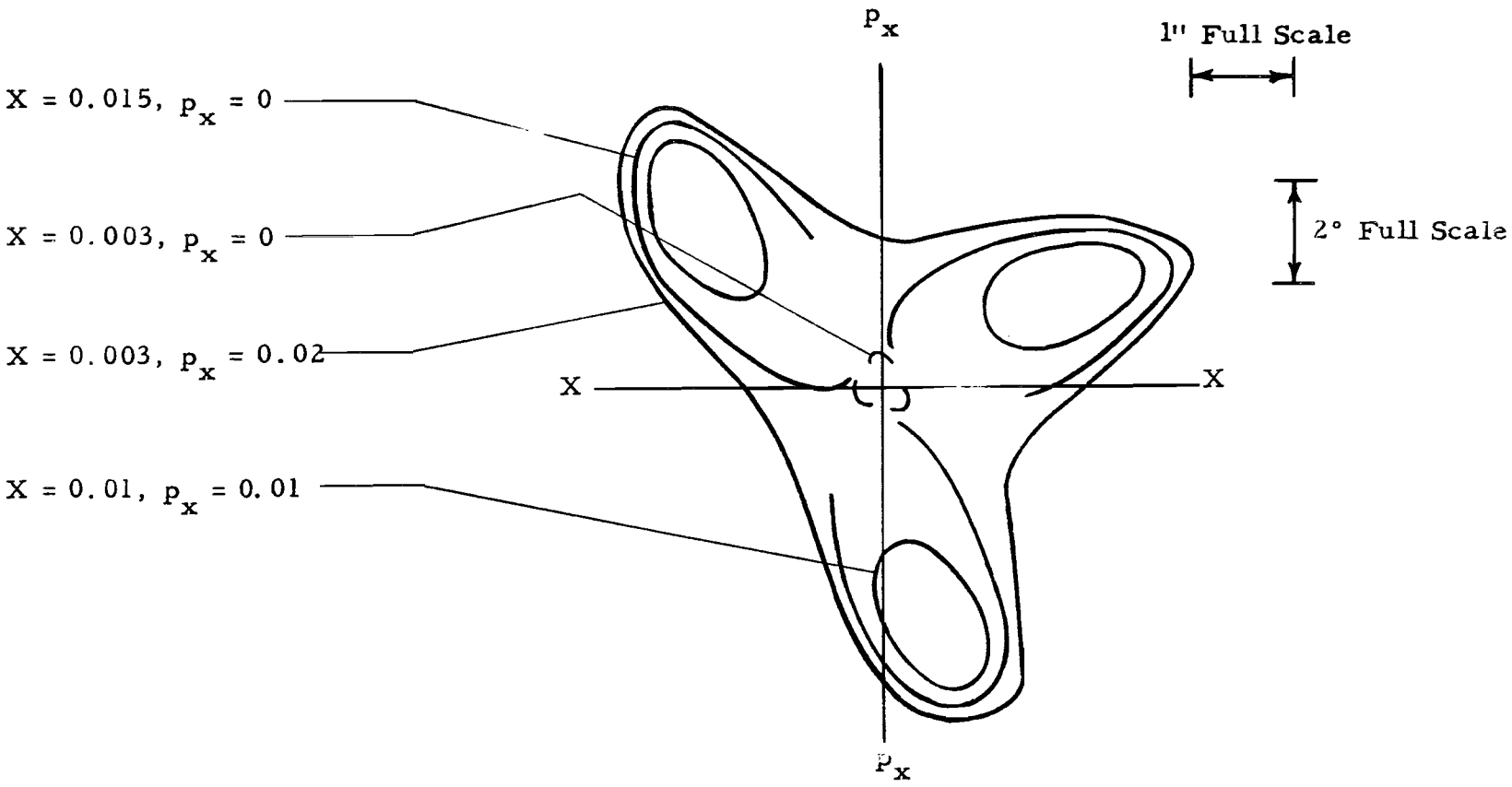
Resonance 1.001

Run 4900



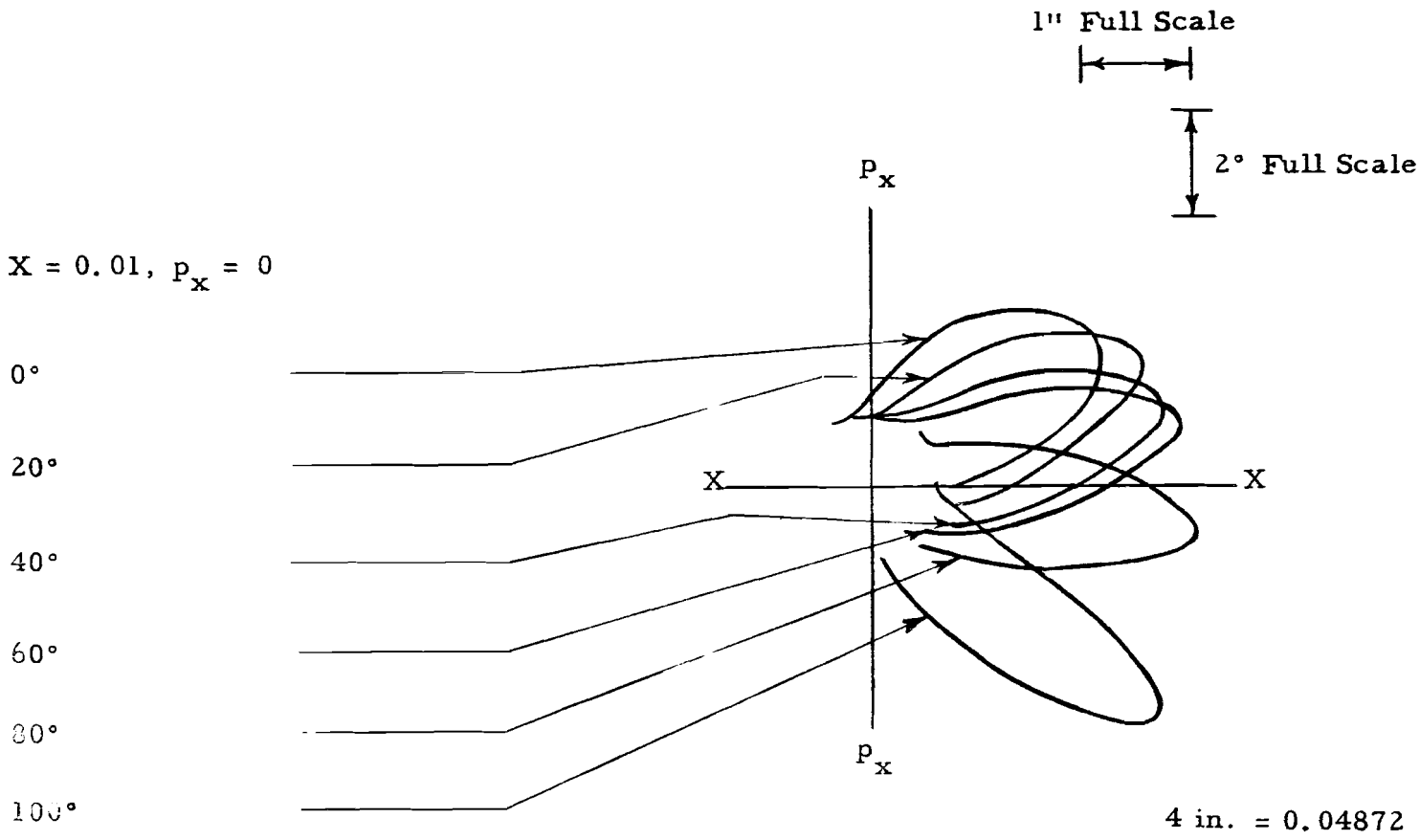
Resonance 1.005

Run 4900



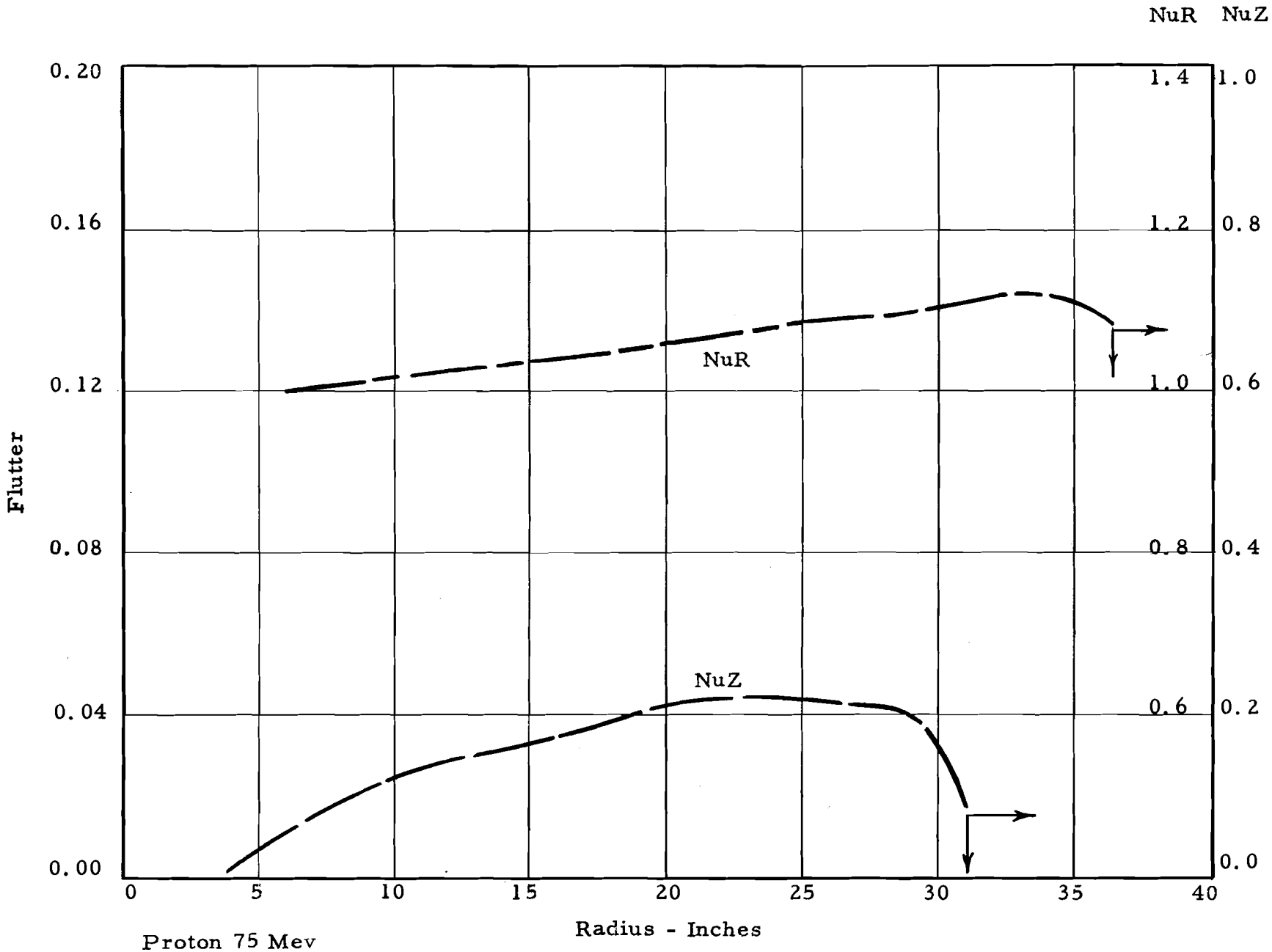
Resonance 1.01

Run 4900



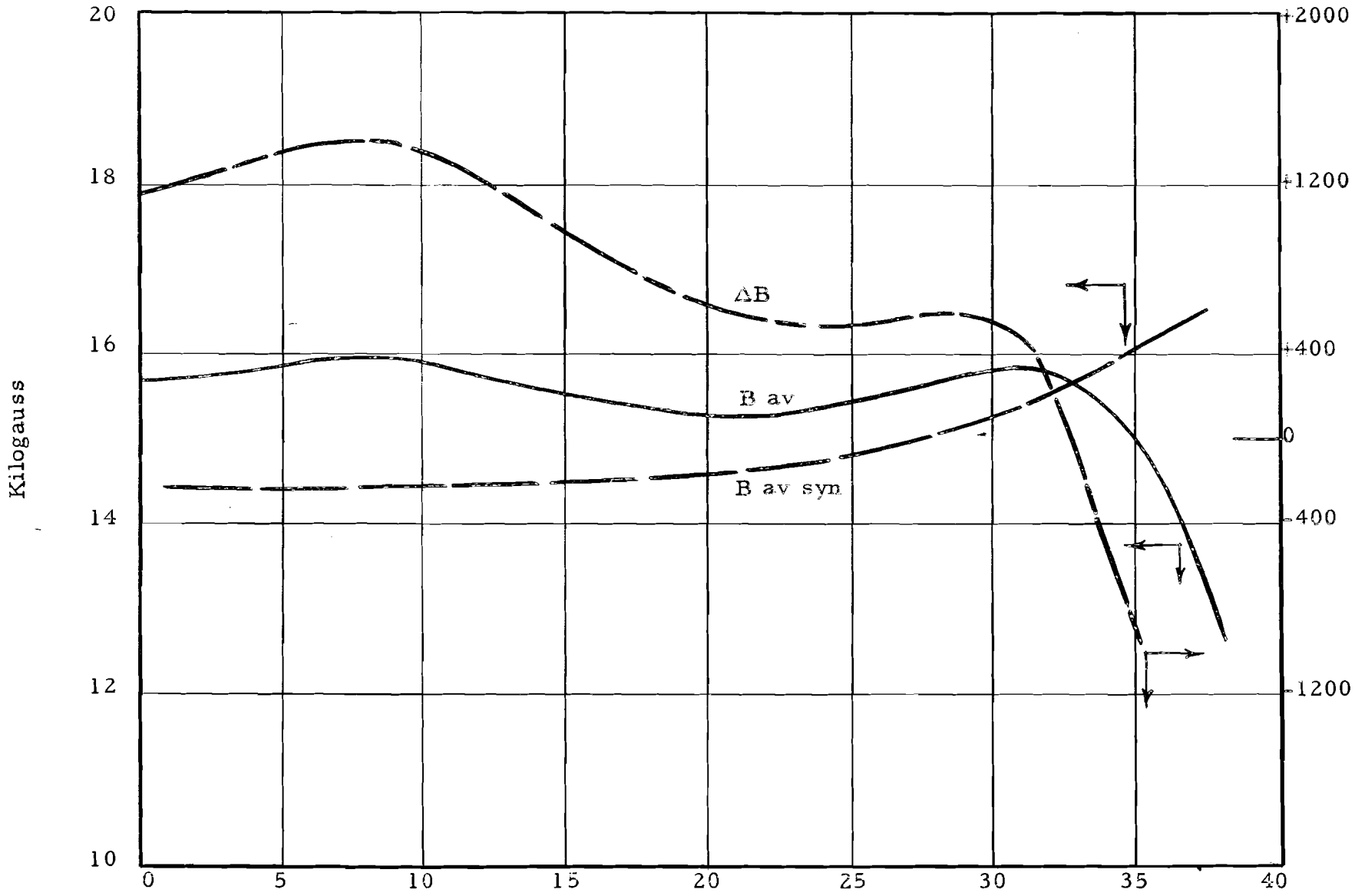
Resonance 1.005

Run 4916



Proton 75 Mev
at 32"

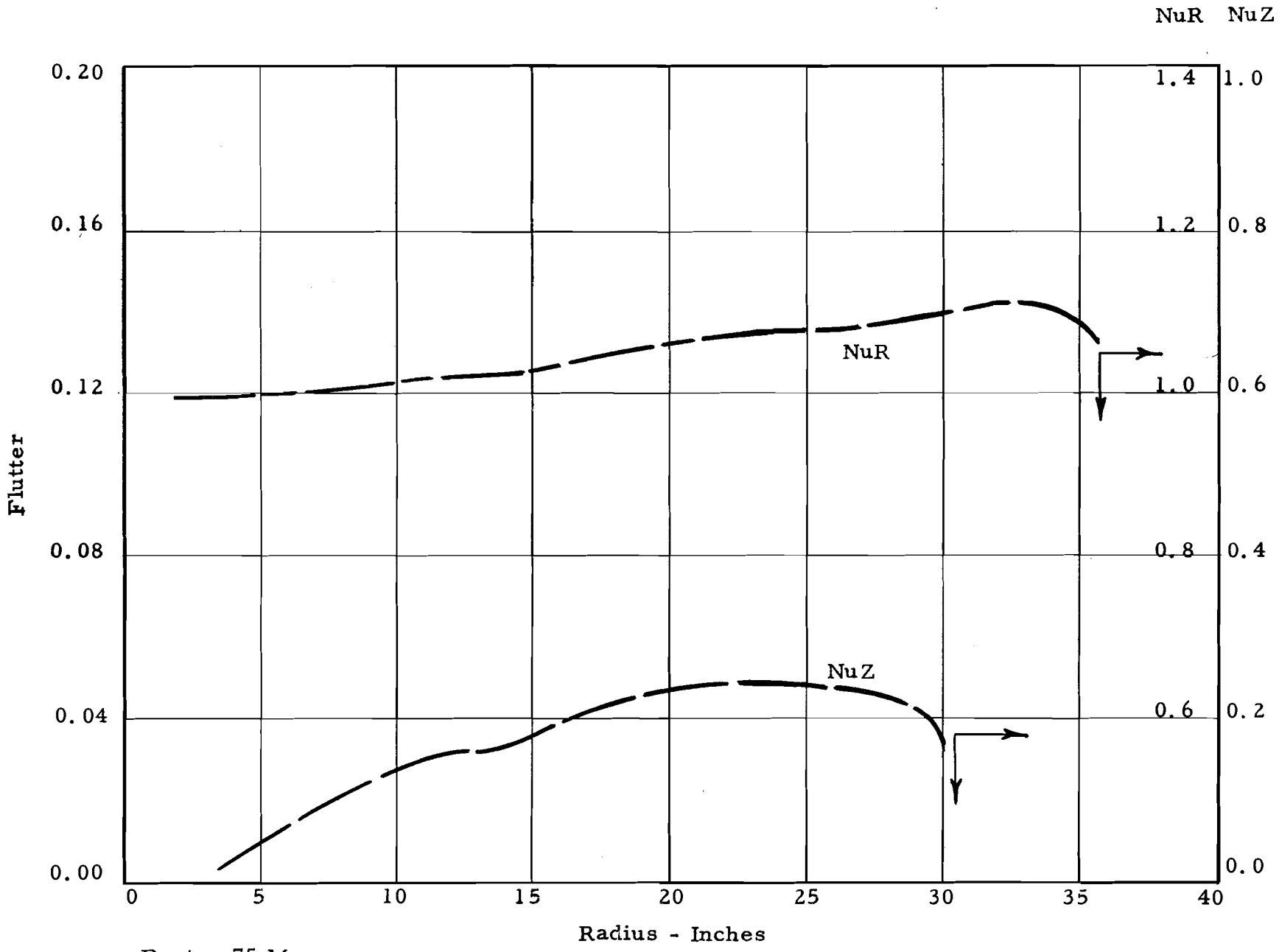
Run 4925



Proton 75 Mev
at 32"

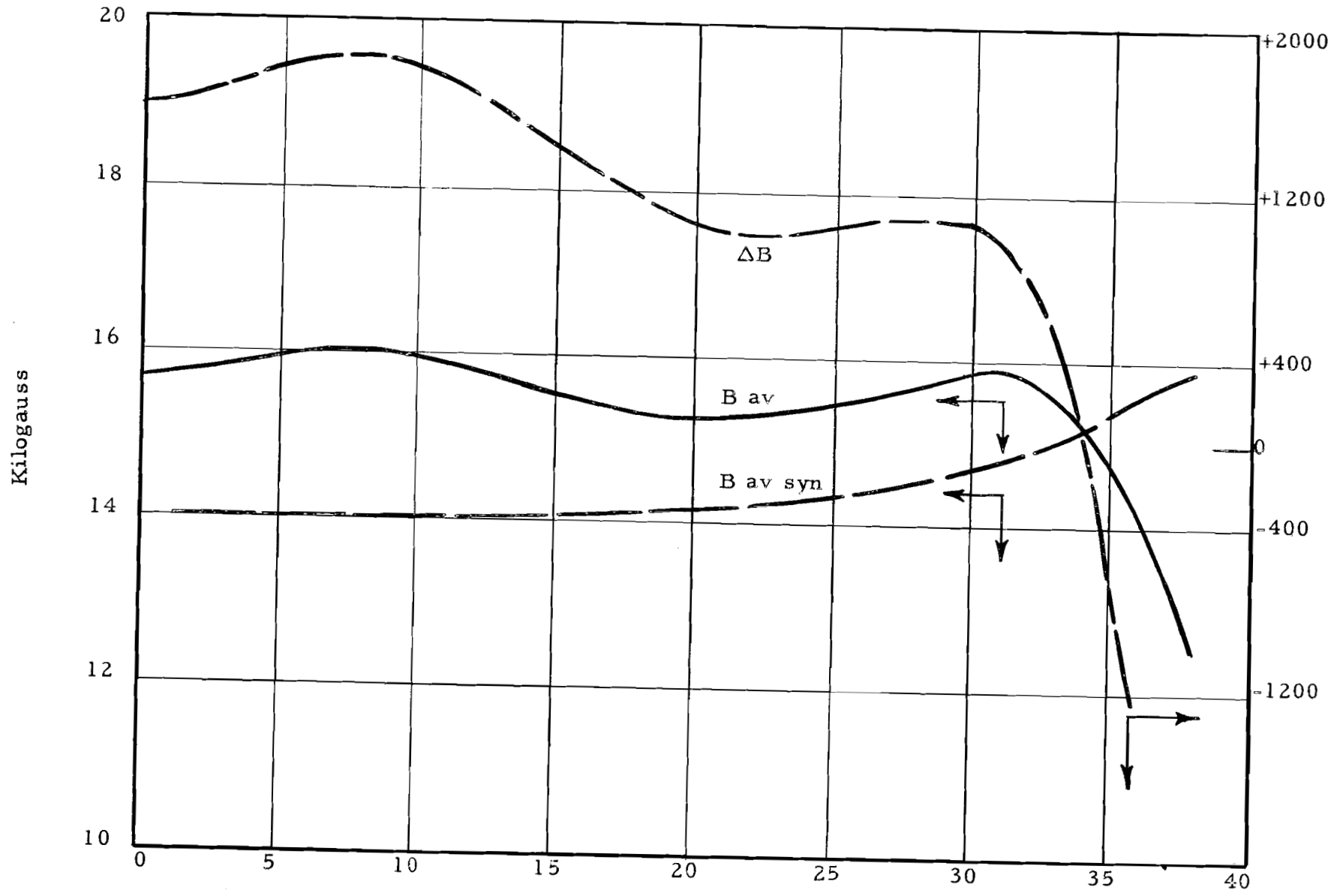
Run 4925

Run 4925
P. 7



Proton 75 Mev
at 33"

Run 4950

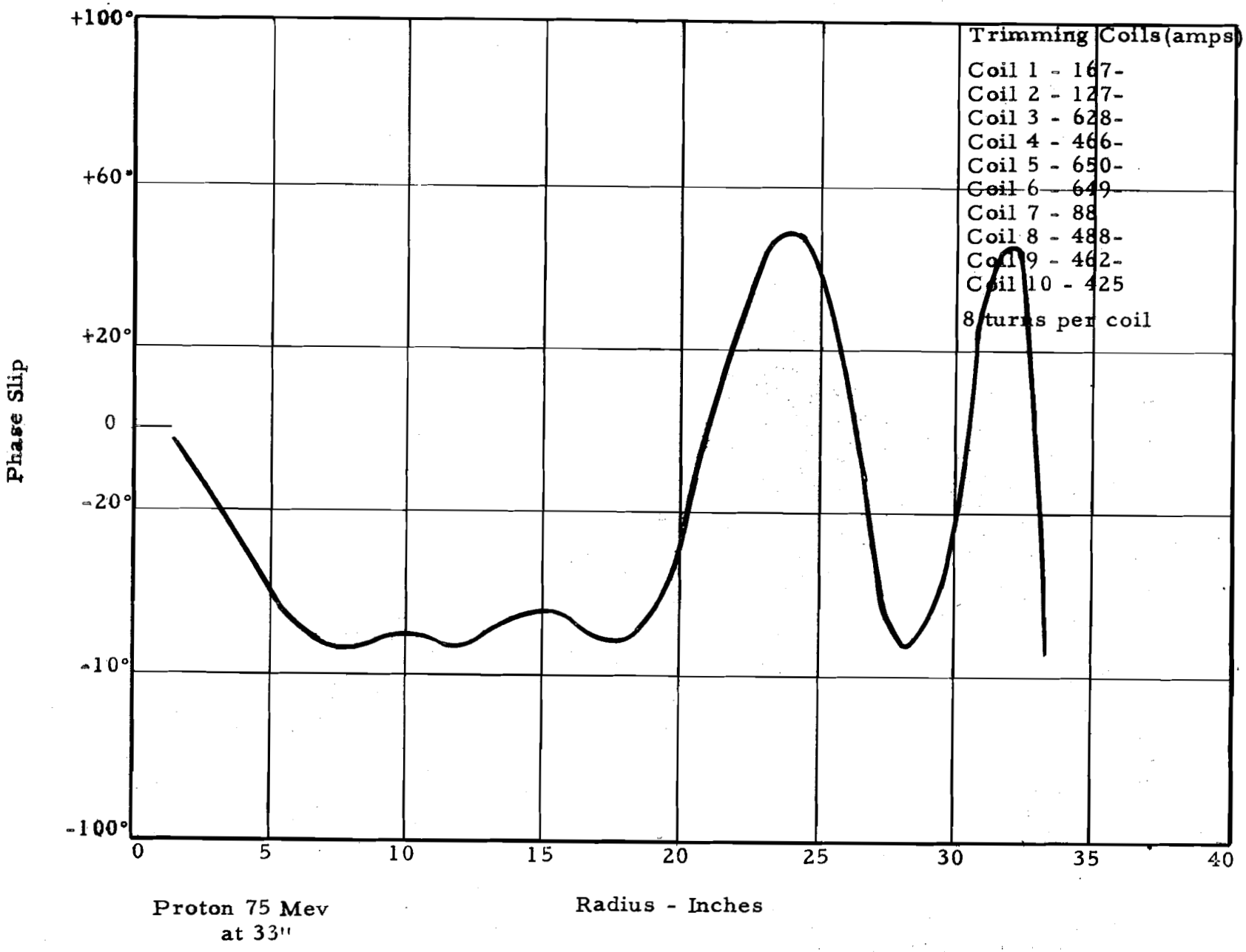


Proton 75 Mev
at 33"

Radius - Inches

Run 4950

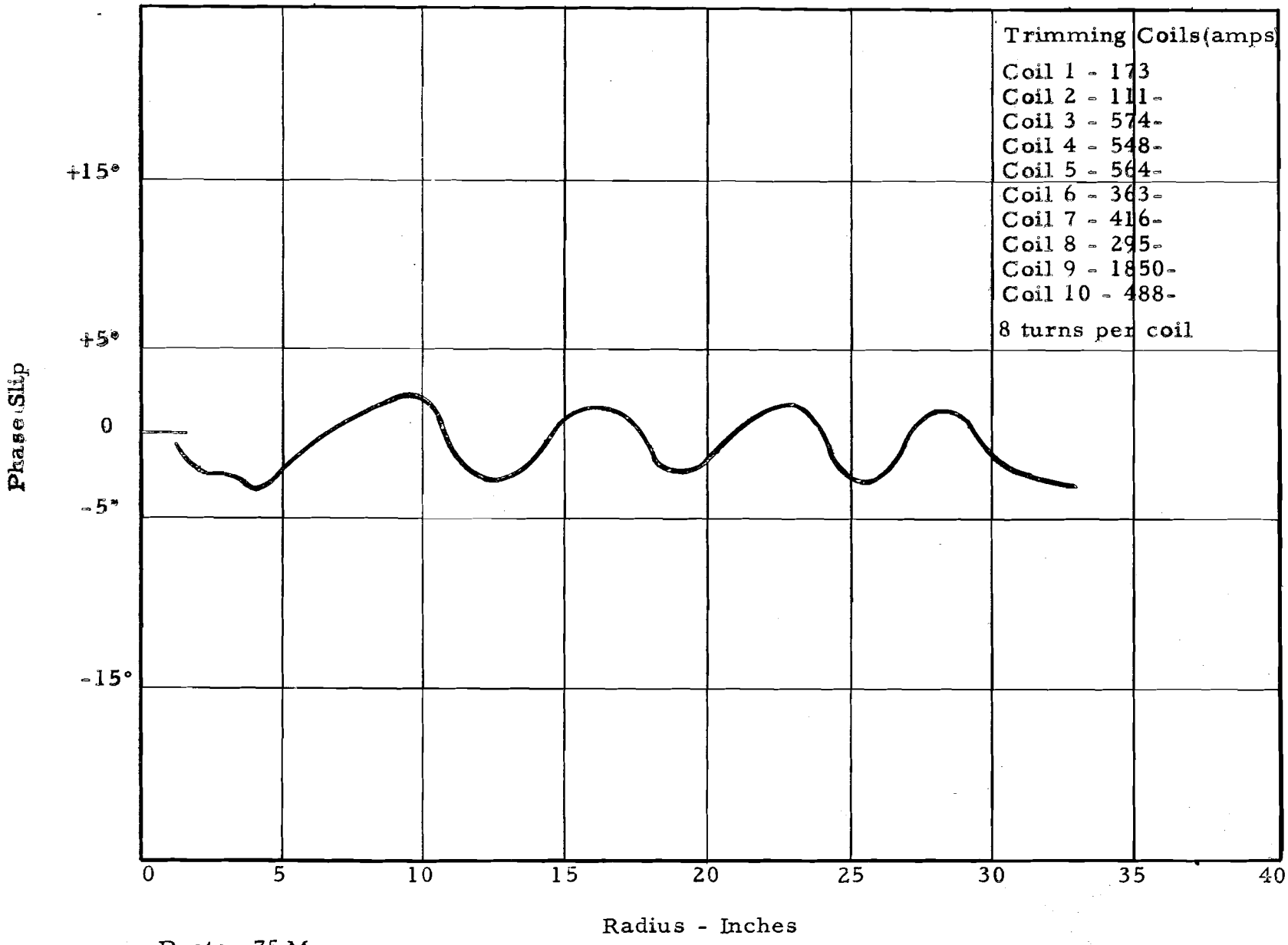
Run 4950
p. 9



Proton 75 Mev
at 33"

Run 4950 Phase Slip

Gauss



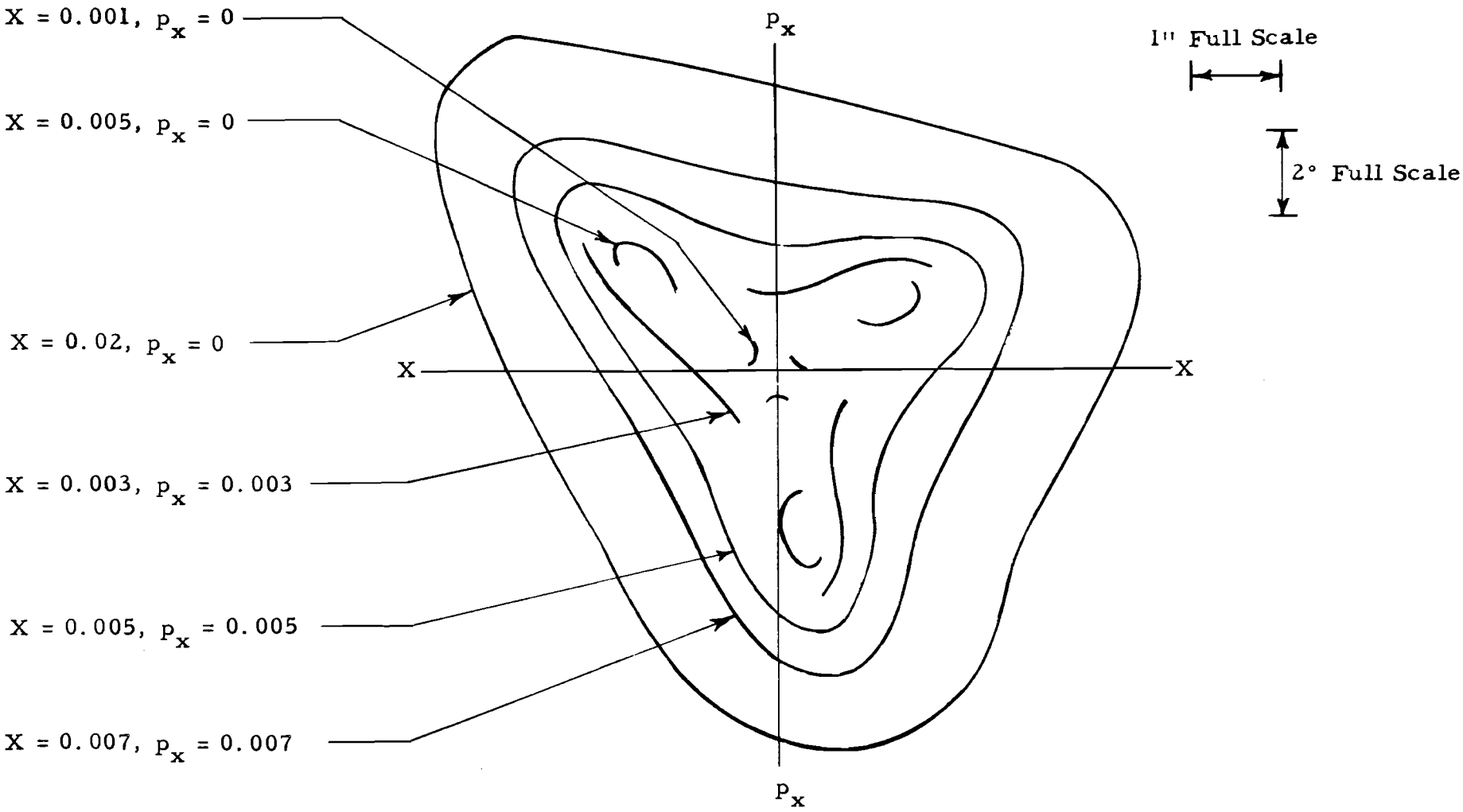
Proton 75 Mev

at 33"

Run 4950 Phase Slip

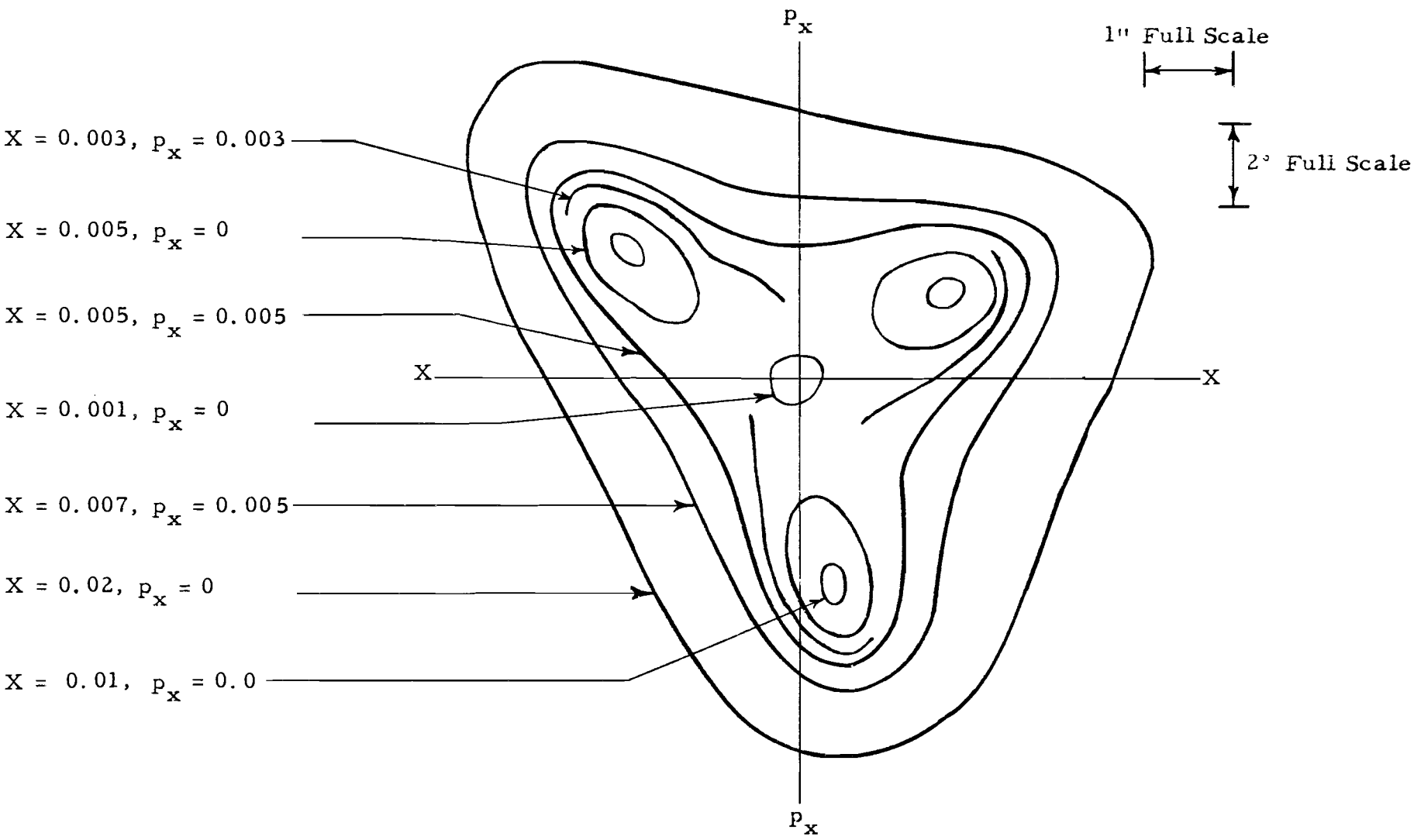
Gauss

Run 4950
p. 11



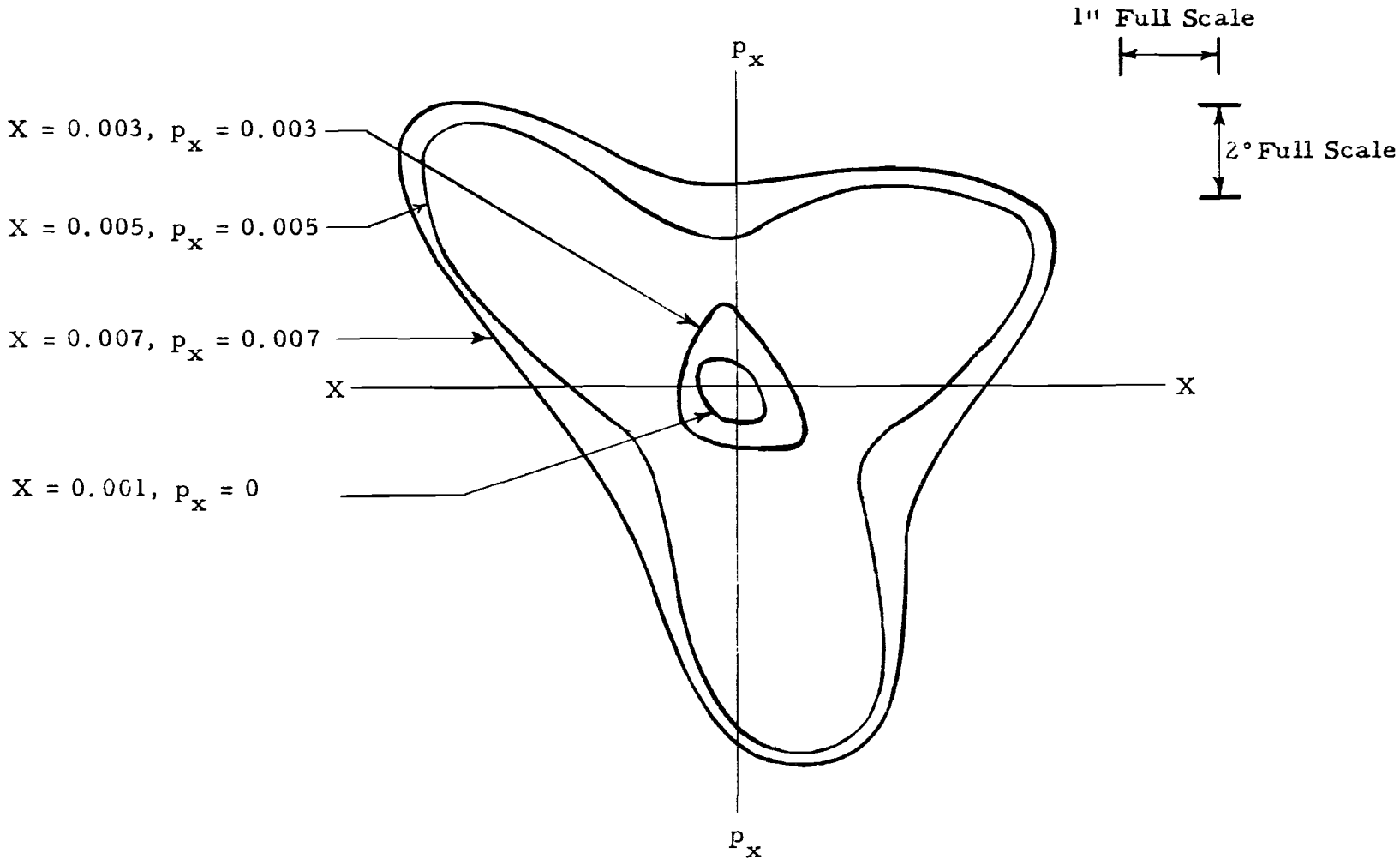
Resonance 1.001

Run 5000



Resonance 1.005

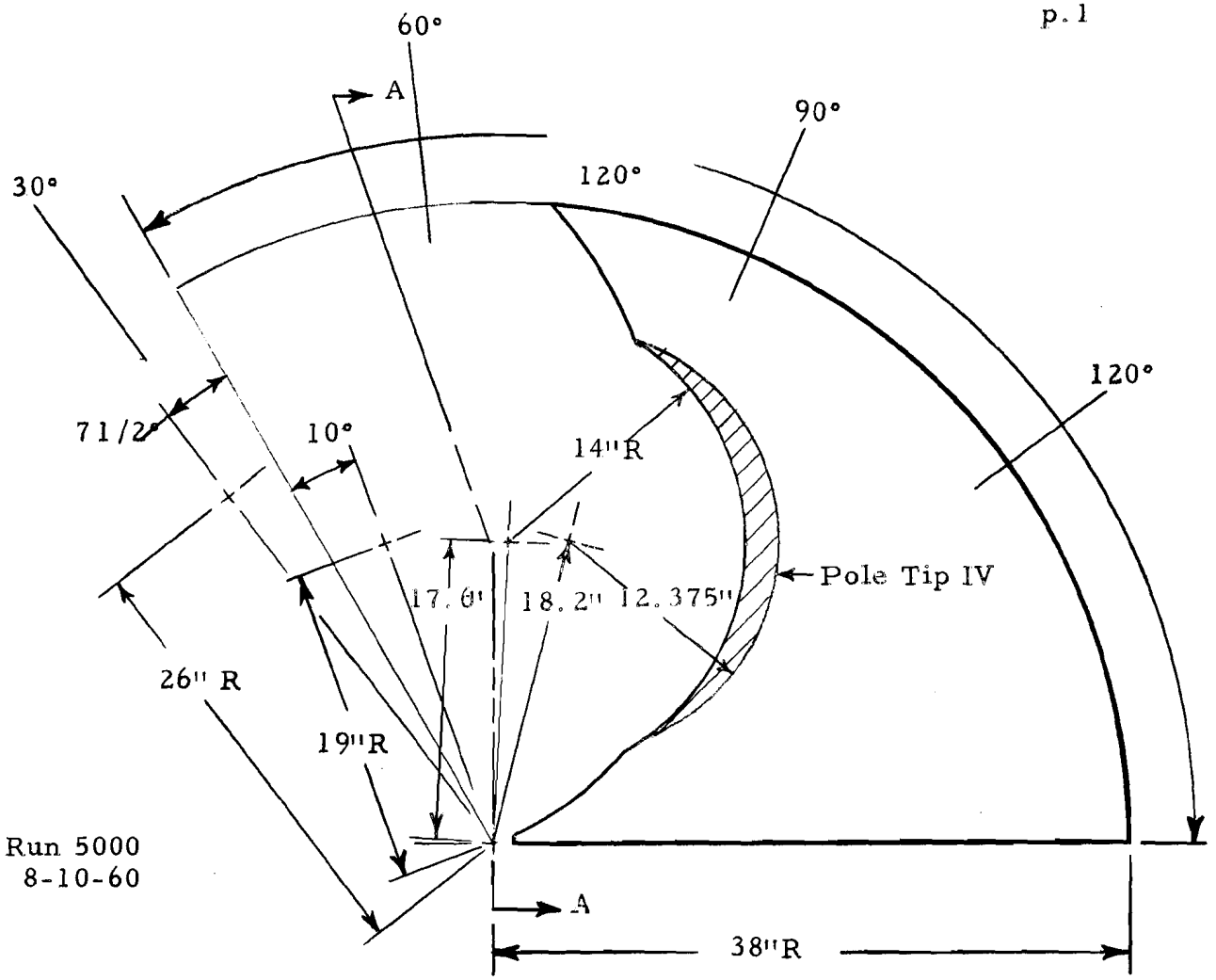
Run 5000



Resonance 1.01

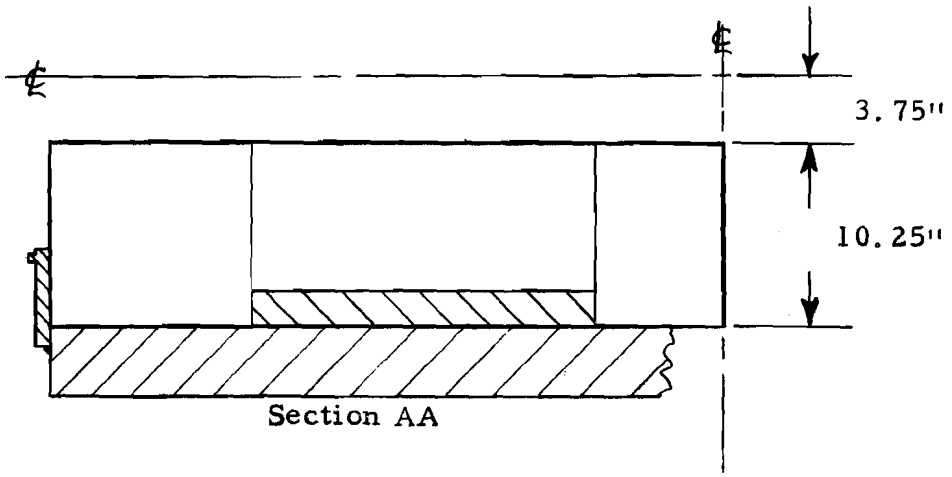
Run 5000

Run 5000
p.1

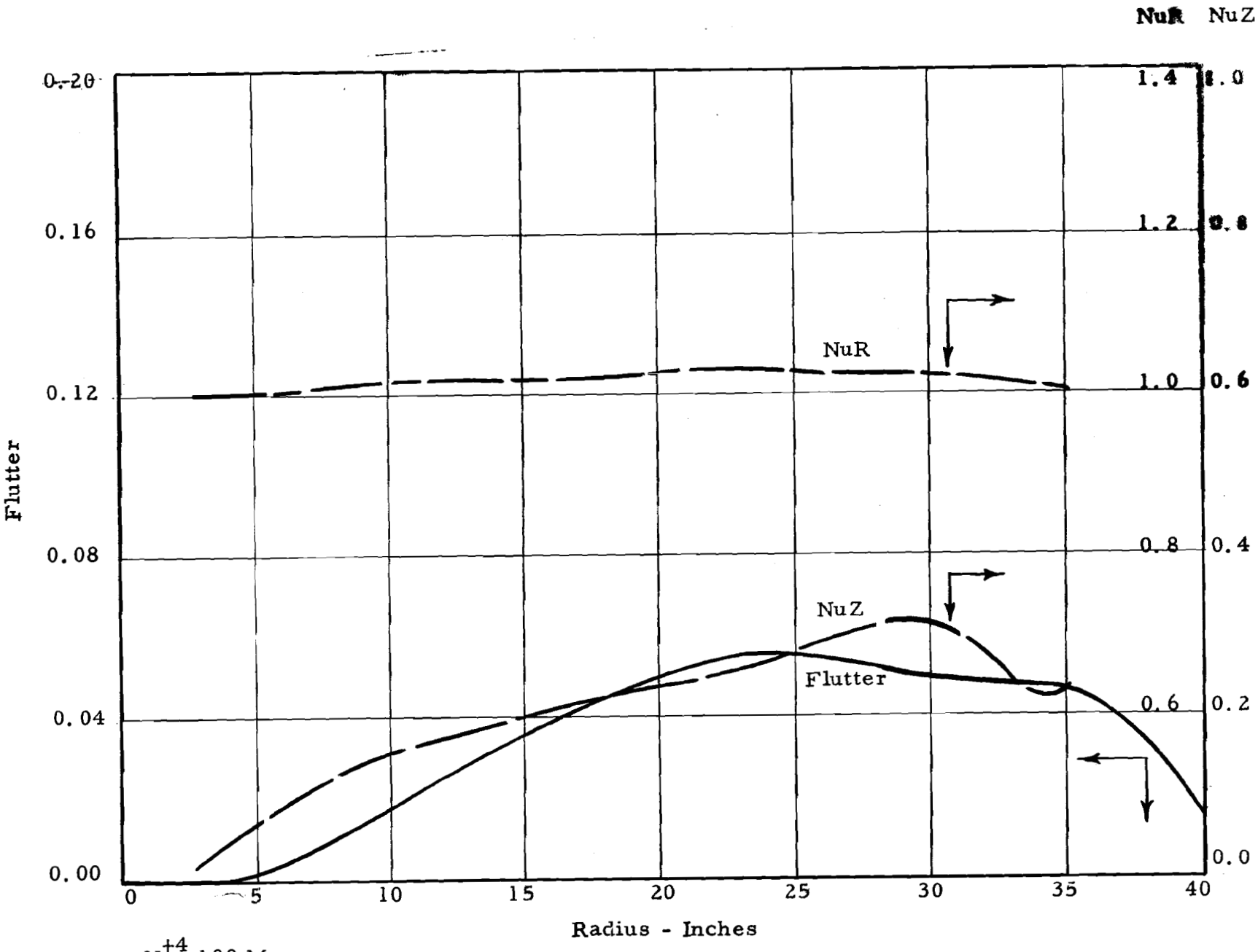


Full Scale Parameters

Main Coils - 1.07×10^6 ampere turns

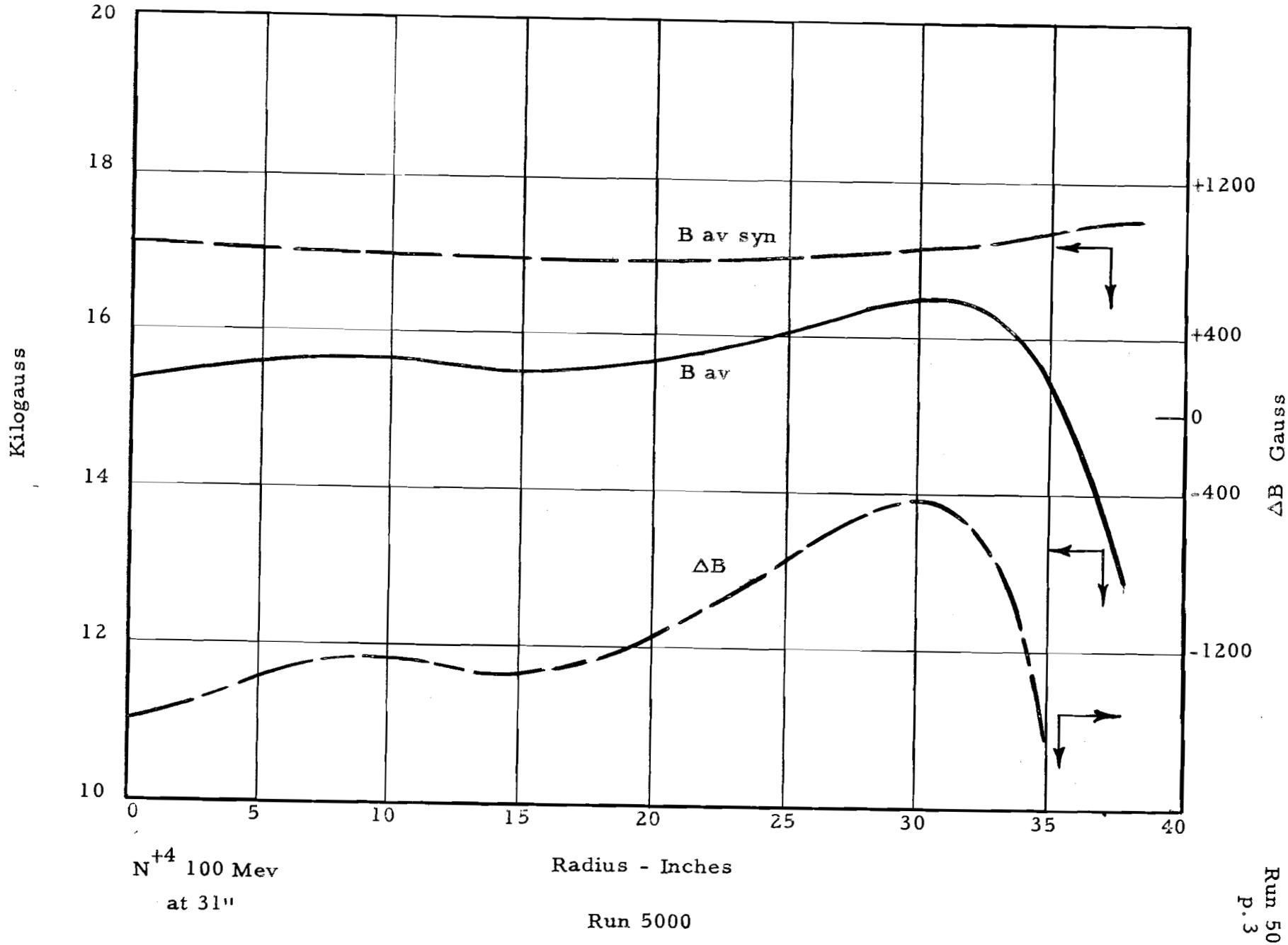


ORIC 1/4 Scale Sector



N^{+4} 100 Mev
at 31"

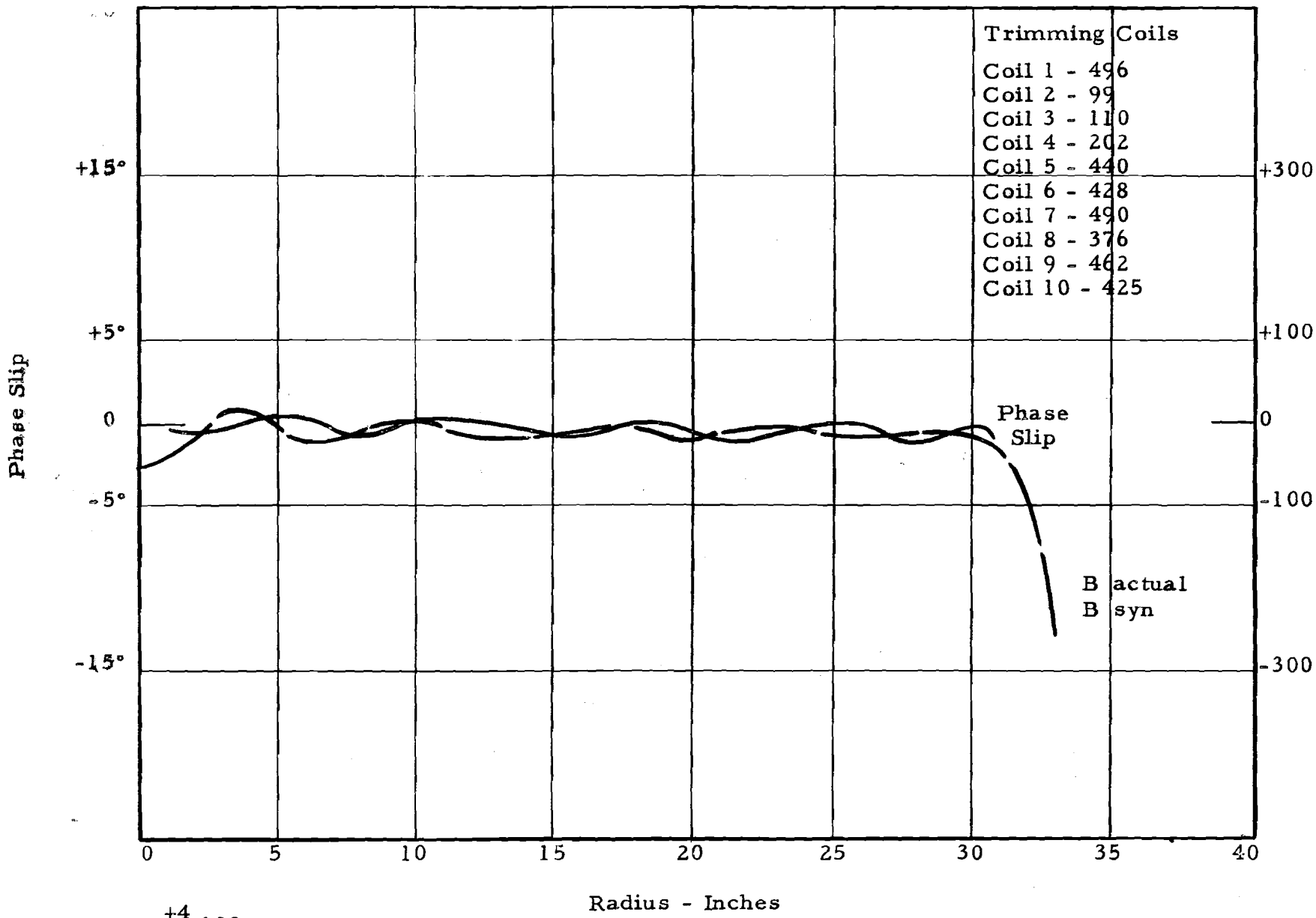
Run 5000



N^{+4} 100 Mev
at 31"

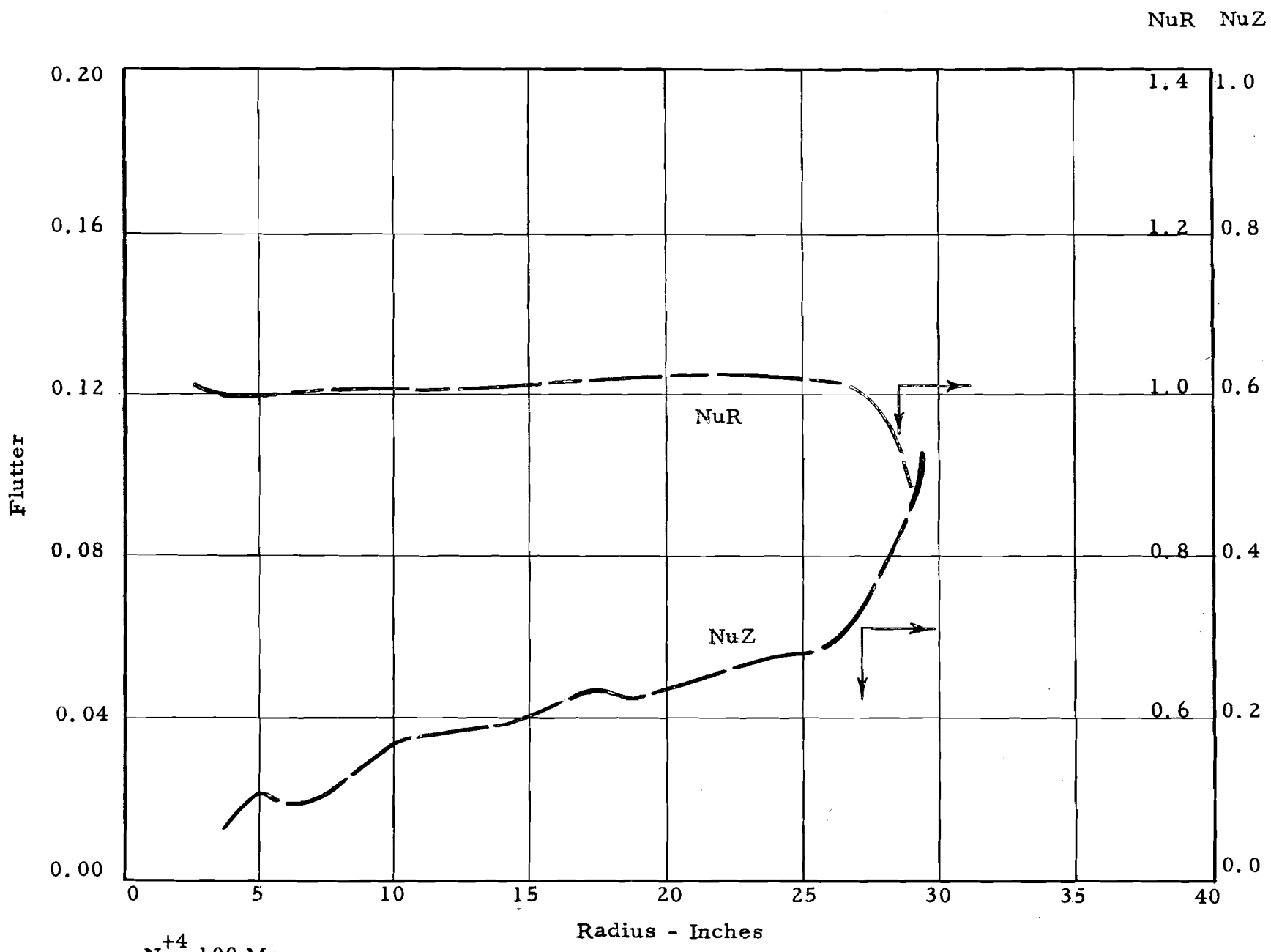
Run 5000

Run 5000
P. 3



N^{+4} 100 Mev
at 31"
25% Overload

Run 5000 Phase Slip

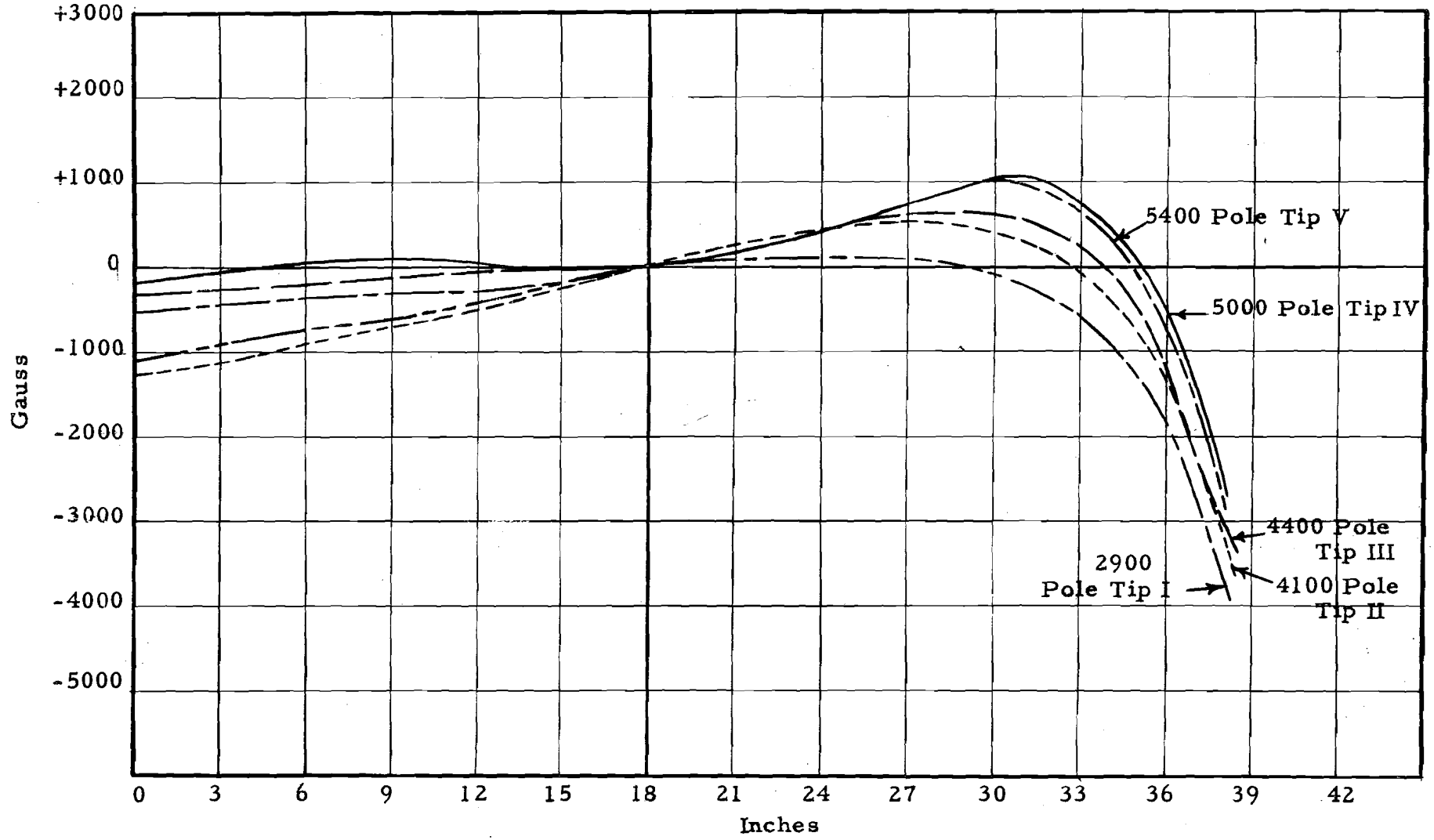


N^{+4} 100 Mev

at 31"

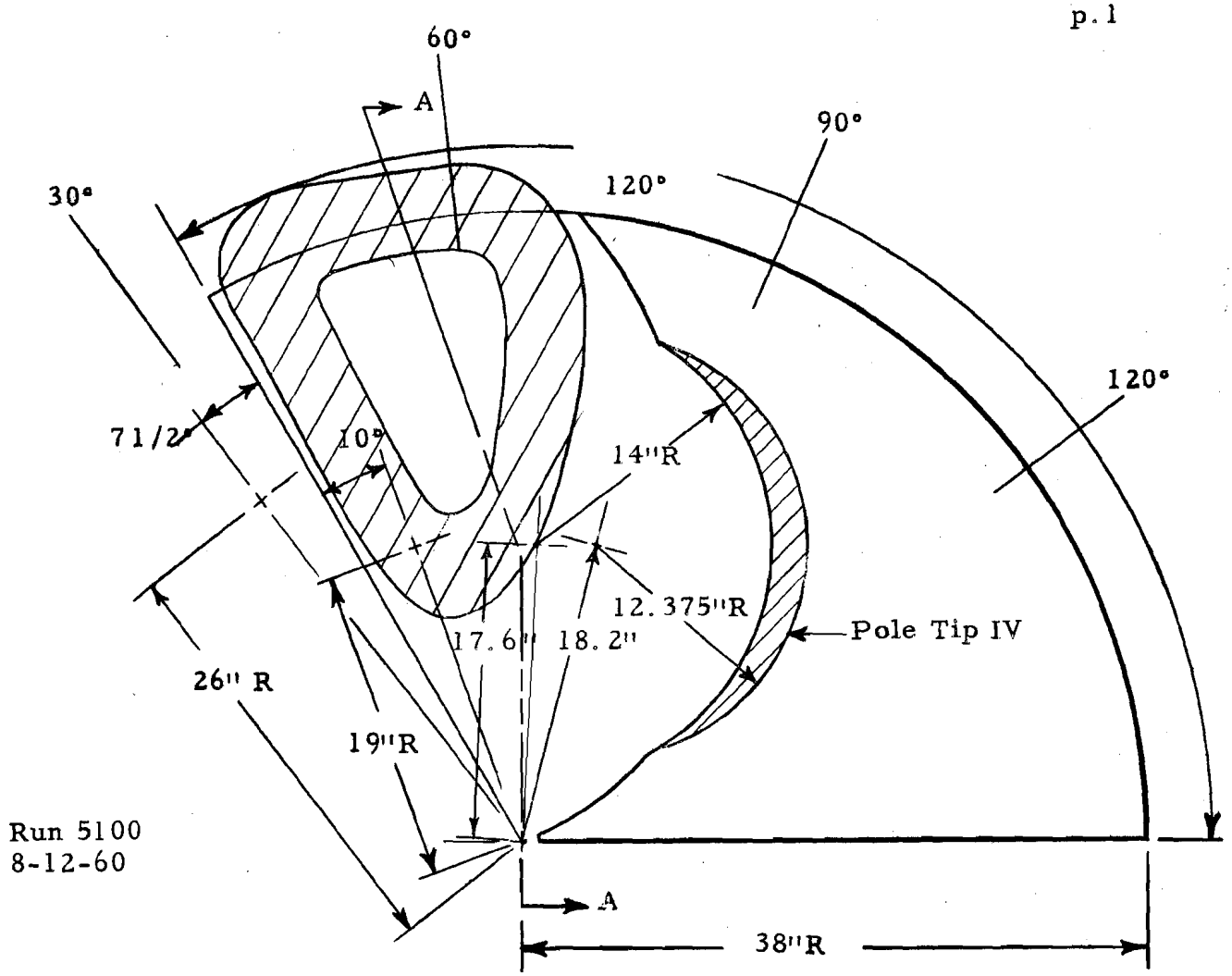
Falderal Run 5000

Falderal Run 5000



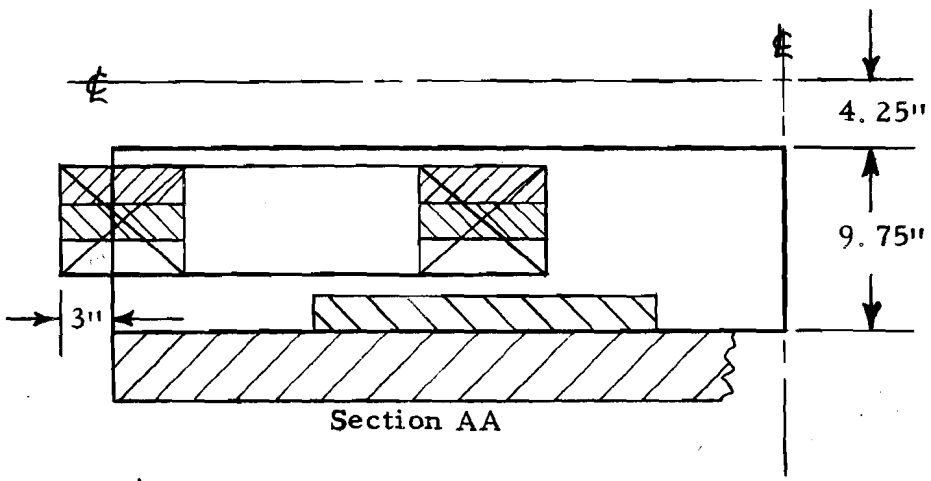
B av, normalized at 18" for Pole Tip I Run 2900, Pole II Run 4100, Pole Tip III Run 4400, Pole Tip IV Run 5000, Pole Tip V Run 5400.

Run 5100
p. 1

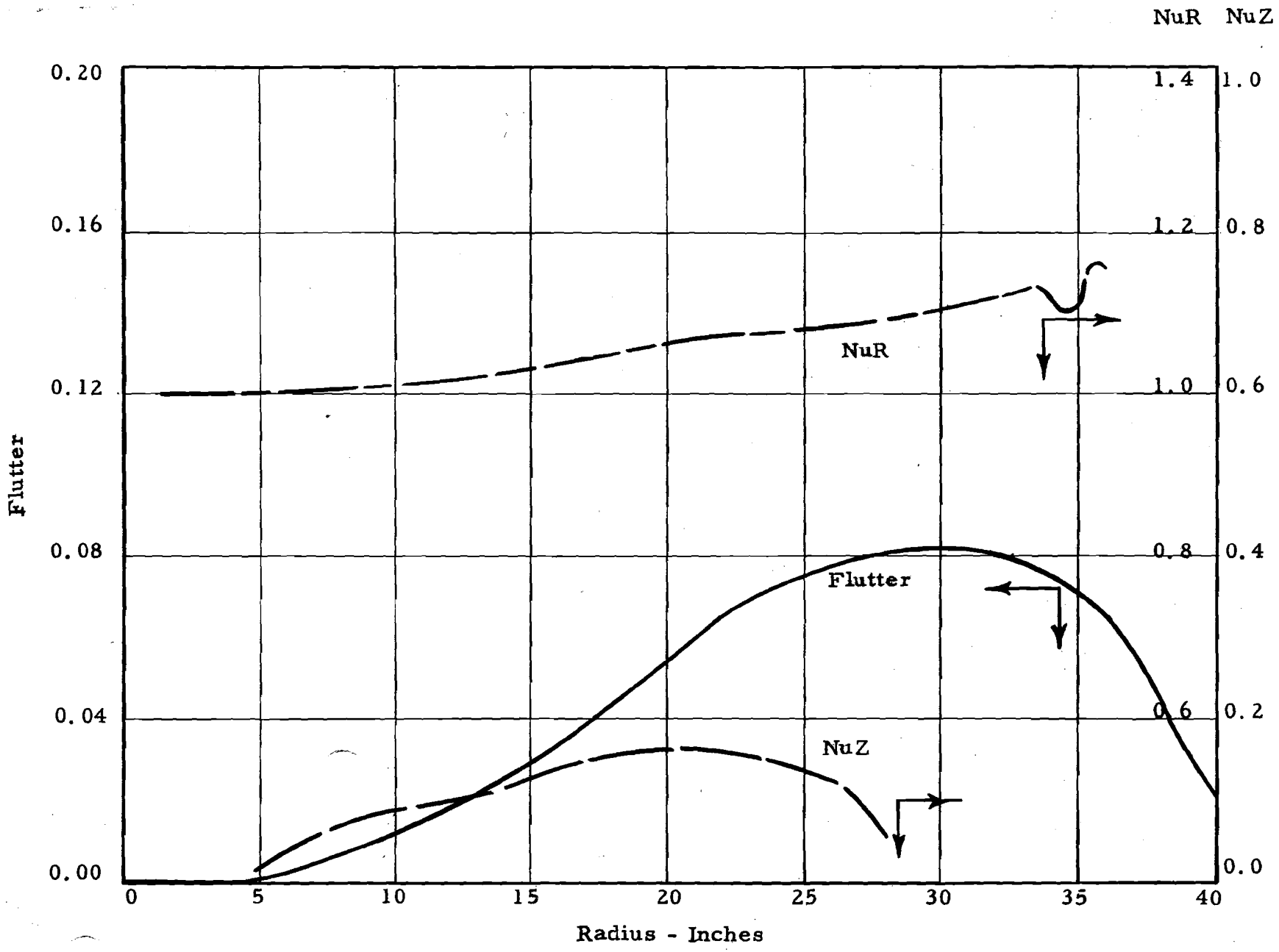


Full **Scale Parameters**

Main Coils 1.23×10^6 ampere turns
Valley Coils 0.273×10^6 ampere turns
2/3 valley coils set I adjacent to the gap were energized
Pole tips Set IV in all sectors



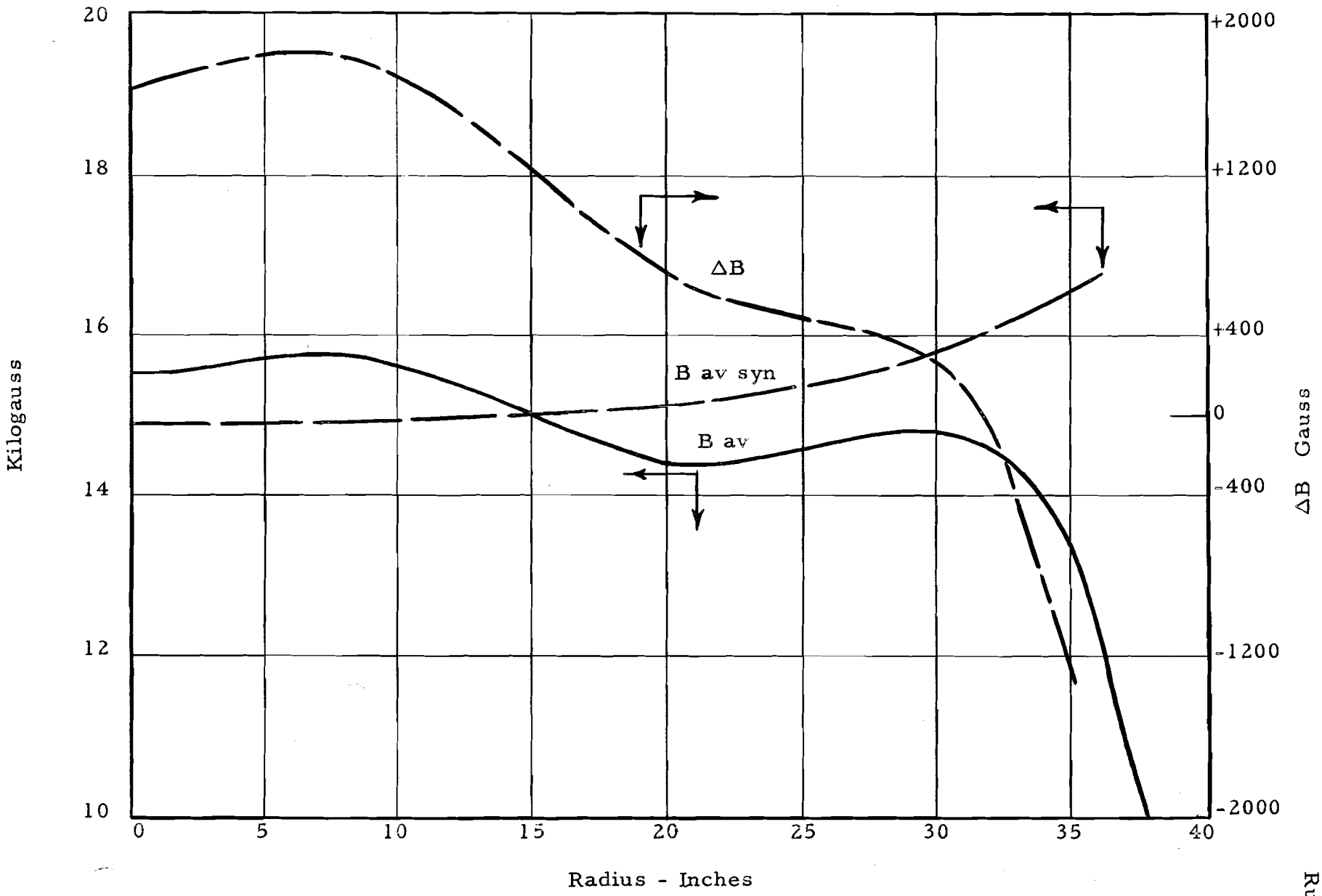
ORIC 1/4 Scale Sector



Proton 75 Mev
at 31"

Run 5100

Run 5100
P. 2

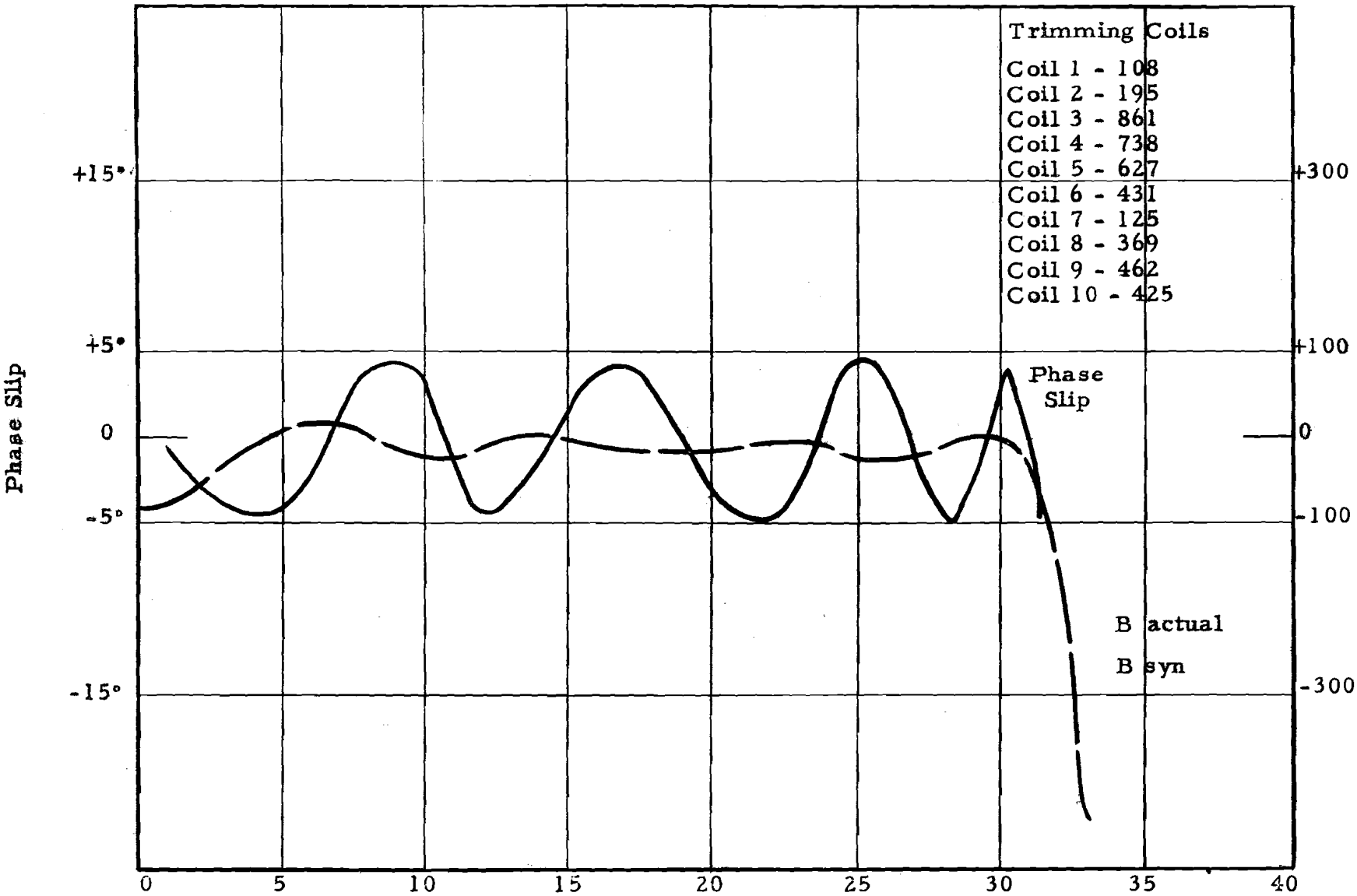


Proton 75 Mev

at 31"

Run 5100

Run 5100
p. 3

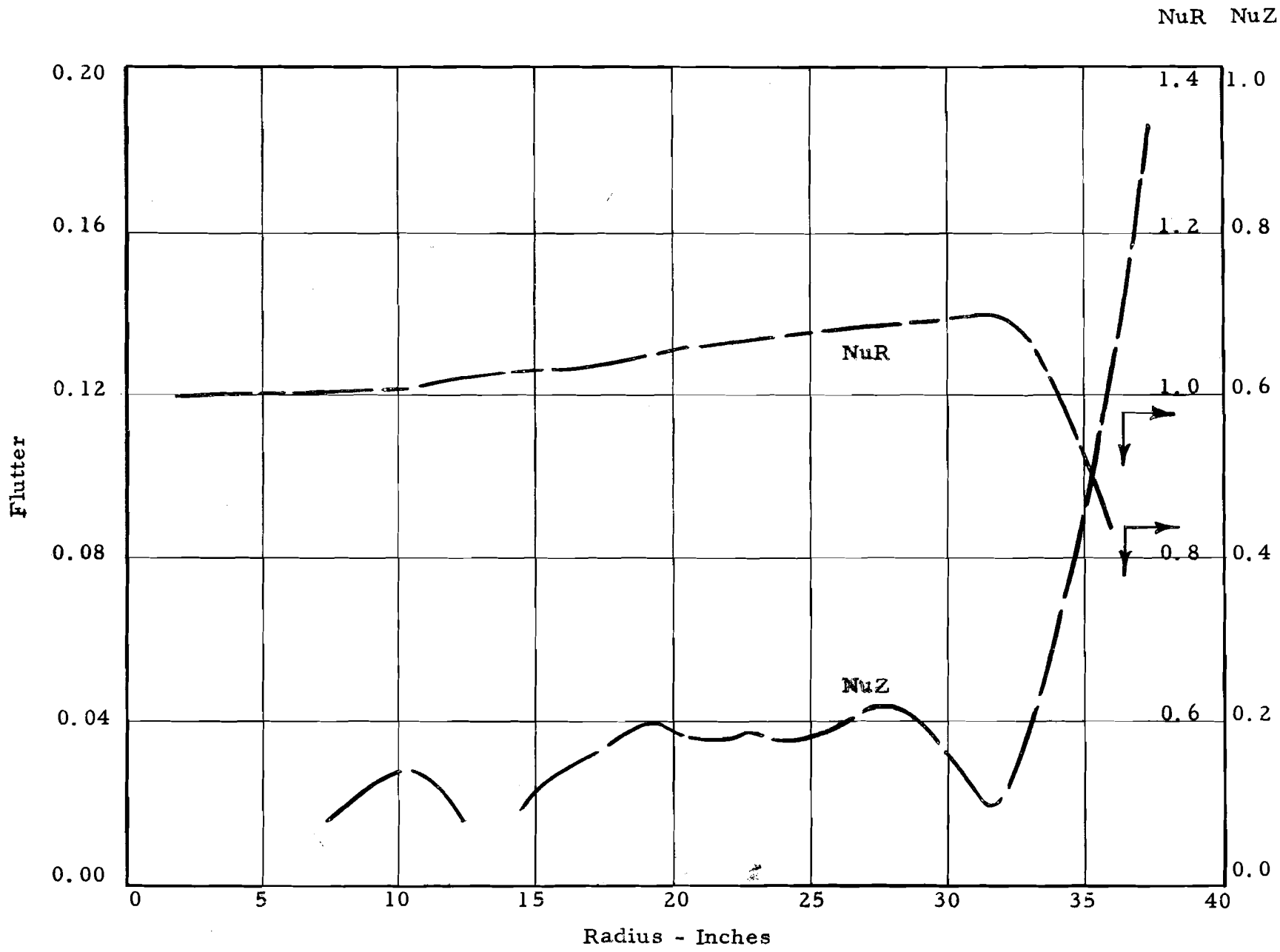


Proton 75 Mev

at 31"

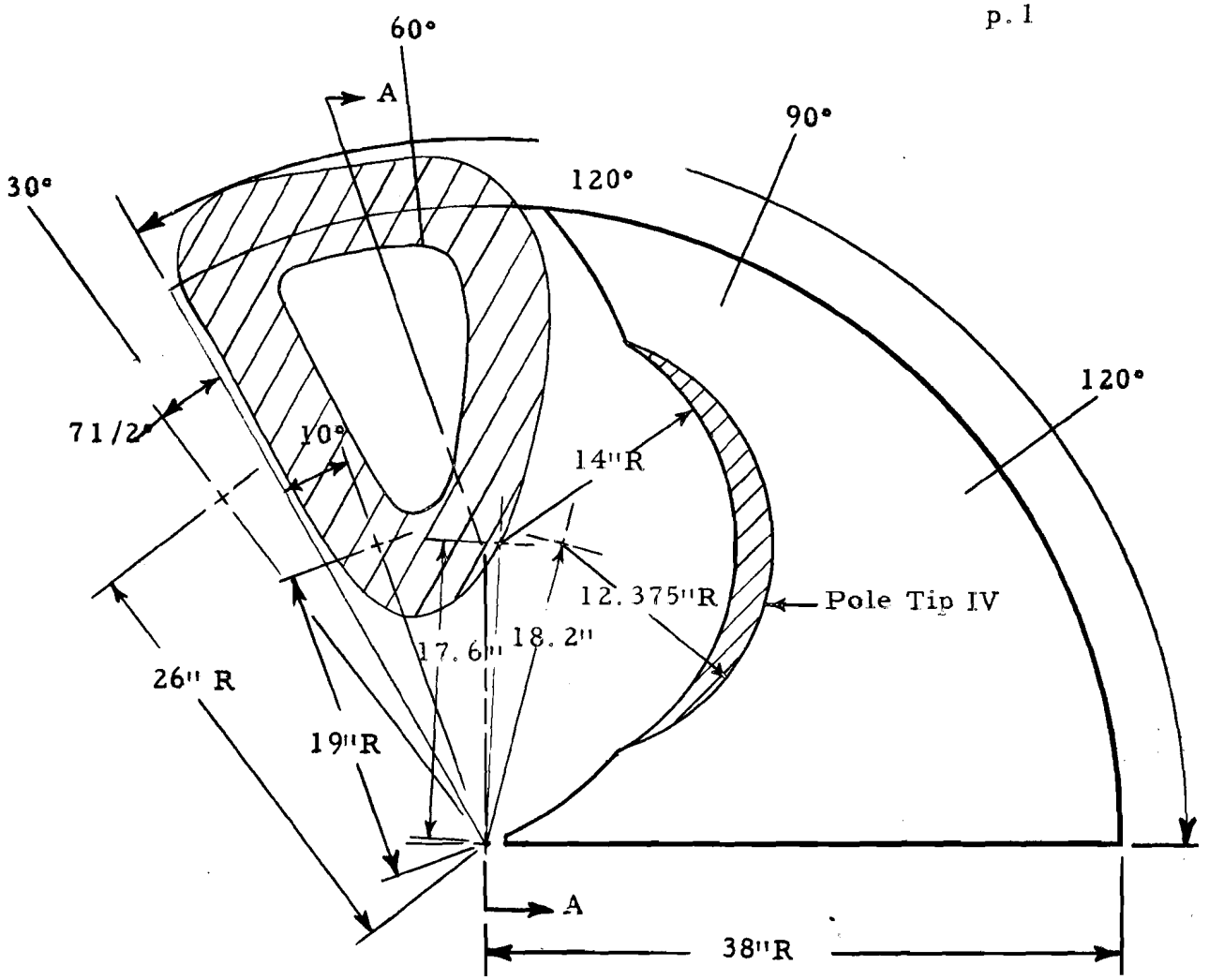
25% Overload

Run 5100



Proton 75 Mev
at 31"

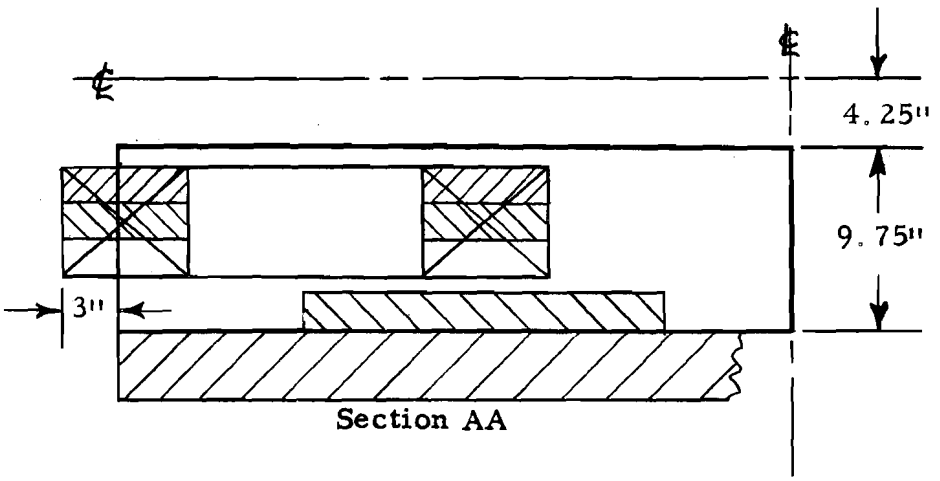
Falderal Run 5100



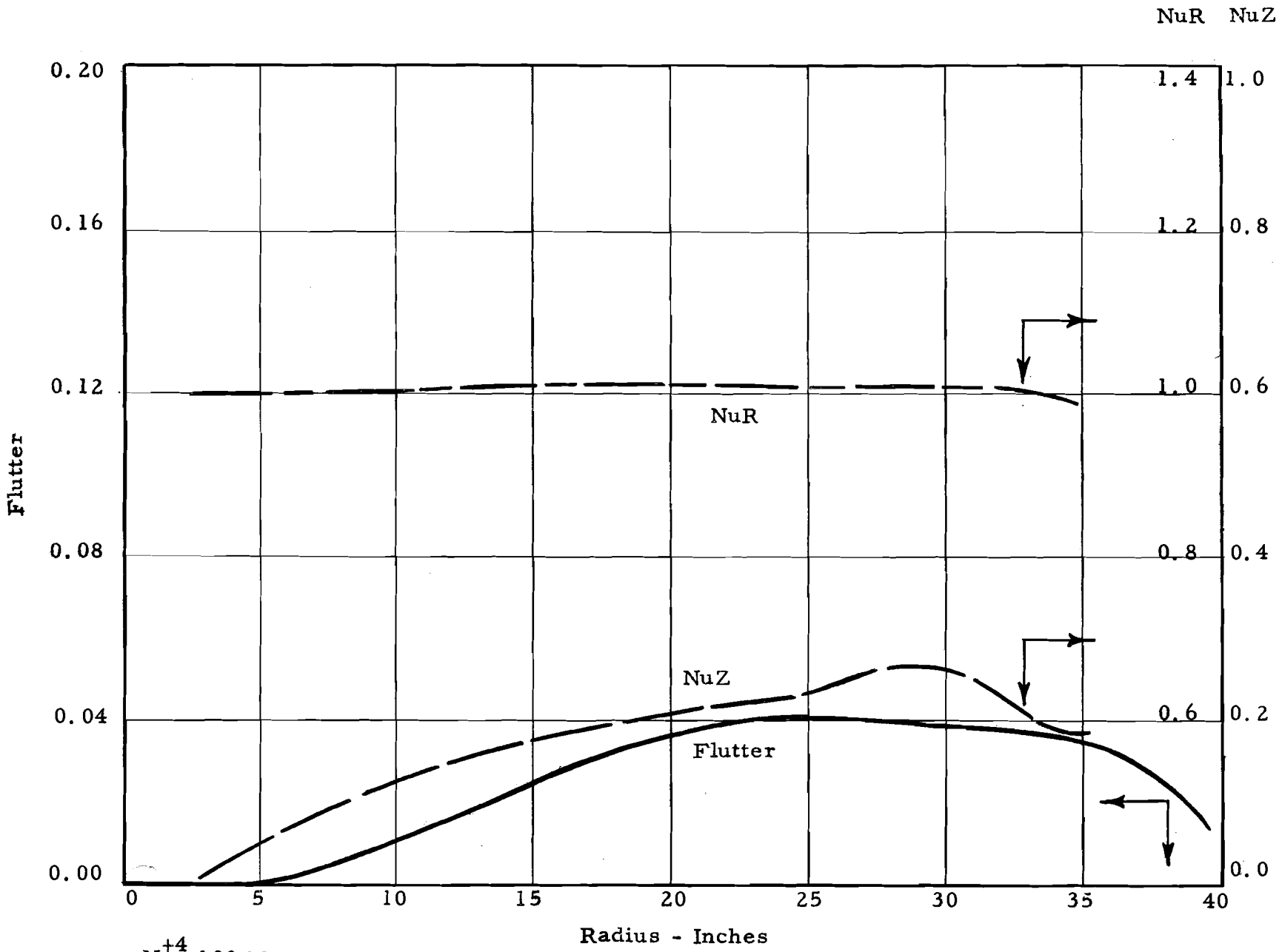
Full Scale Parameters

Main Coils - 1.23×10^6 ampere turns

2/3 valley coils set I adjacent to the gap were energized
Pole tip set IV in all sectors

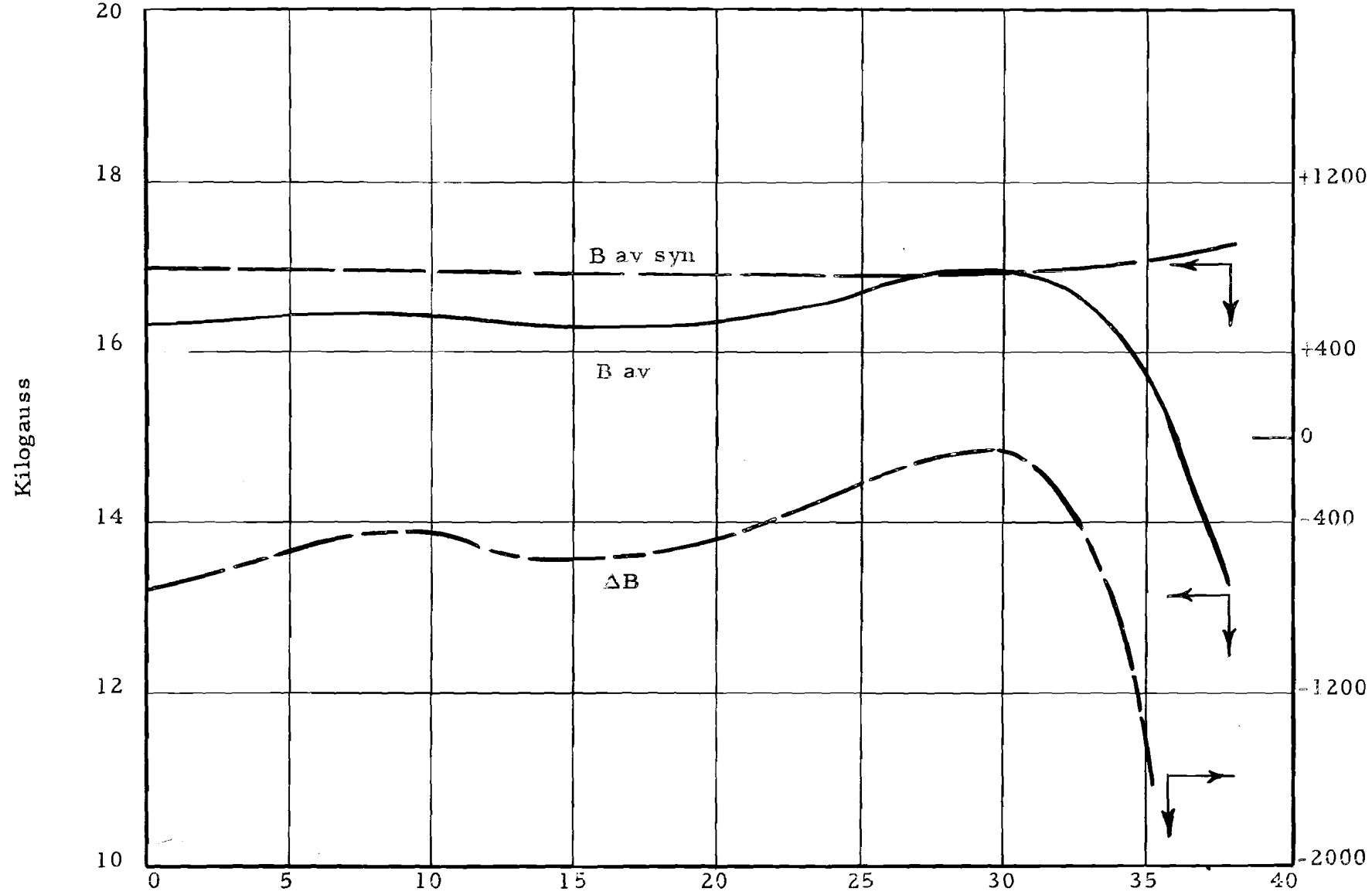


ORIC 1/4 Scale Sector



N^{+4} 100 Mev
at 31"

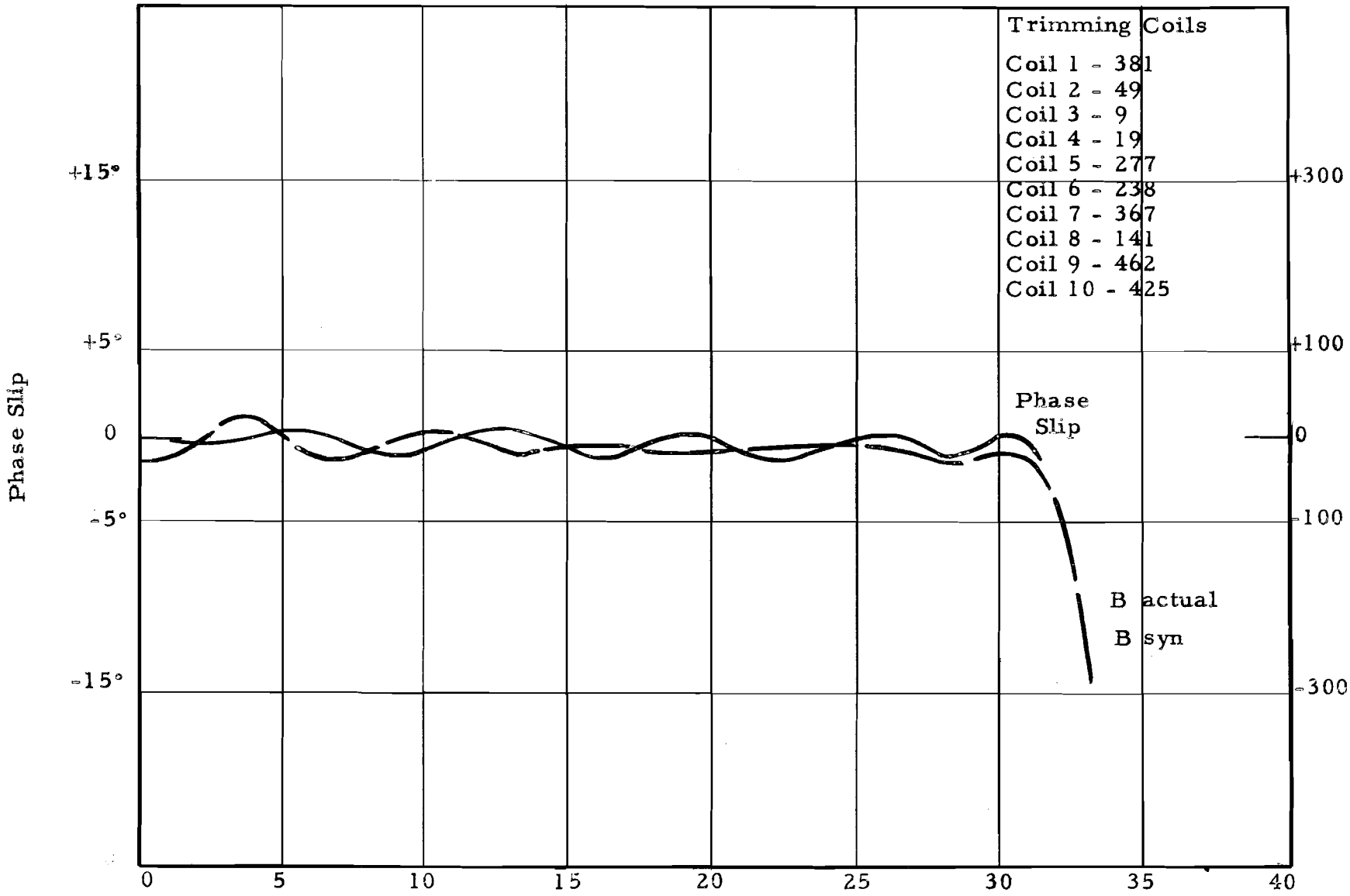
Run 5200



N^{+4} 100 Mev
at 31"

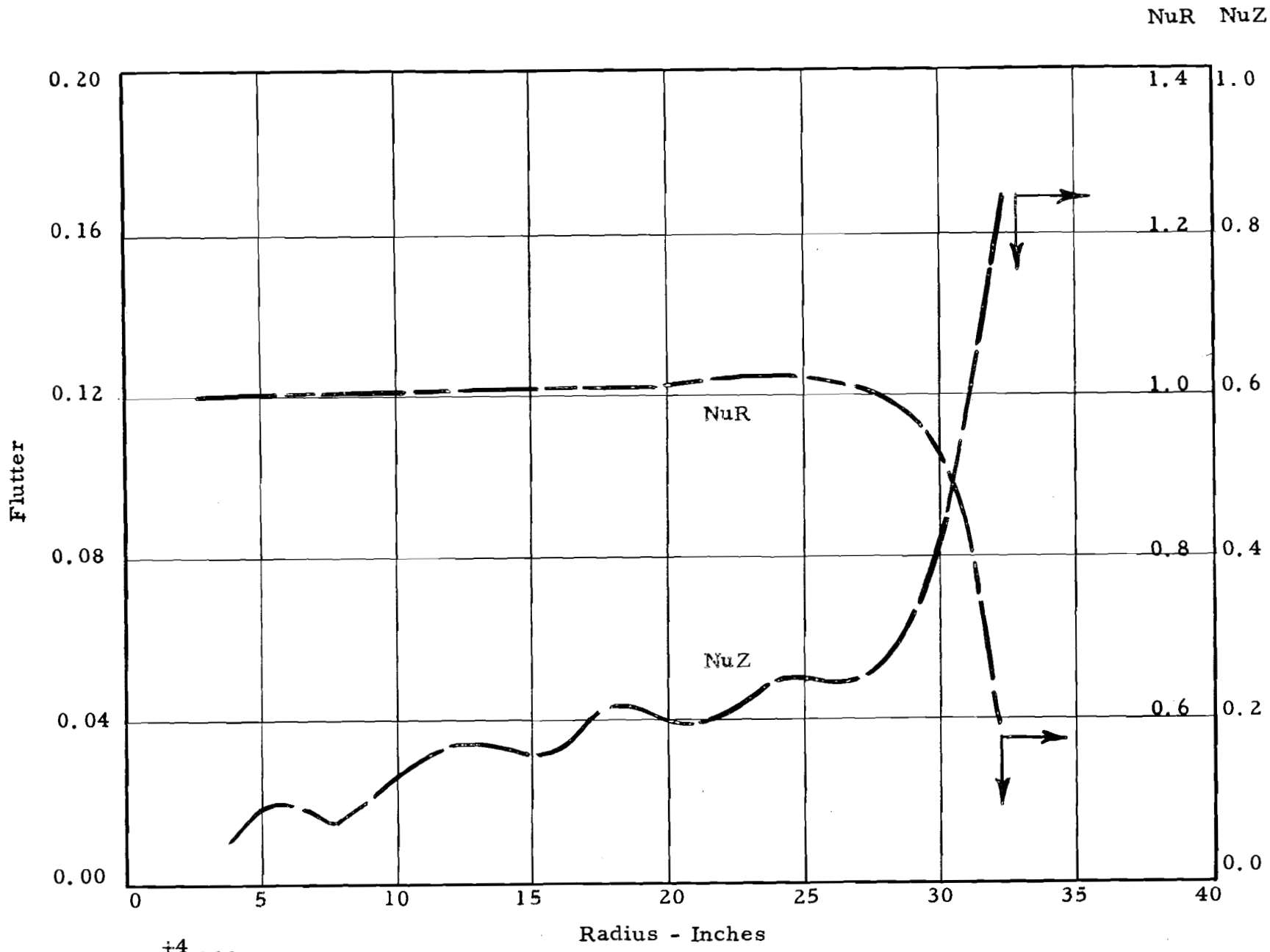
Run 5200

Run 5200
p. 3



Nitrogen 75 Mev
at 31"
25% Overload

Run 5200 Phase Slip

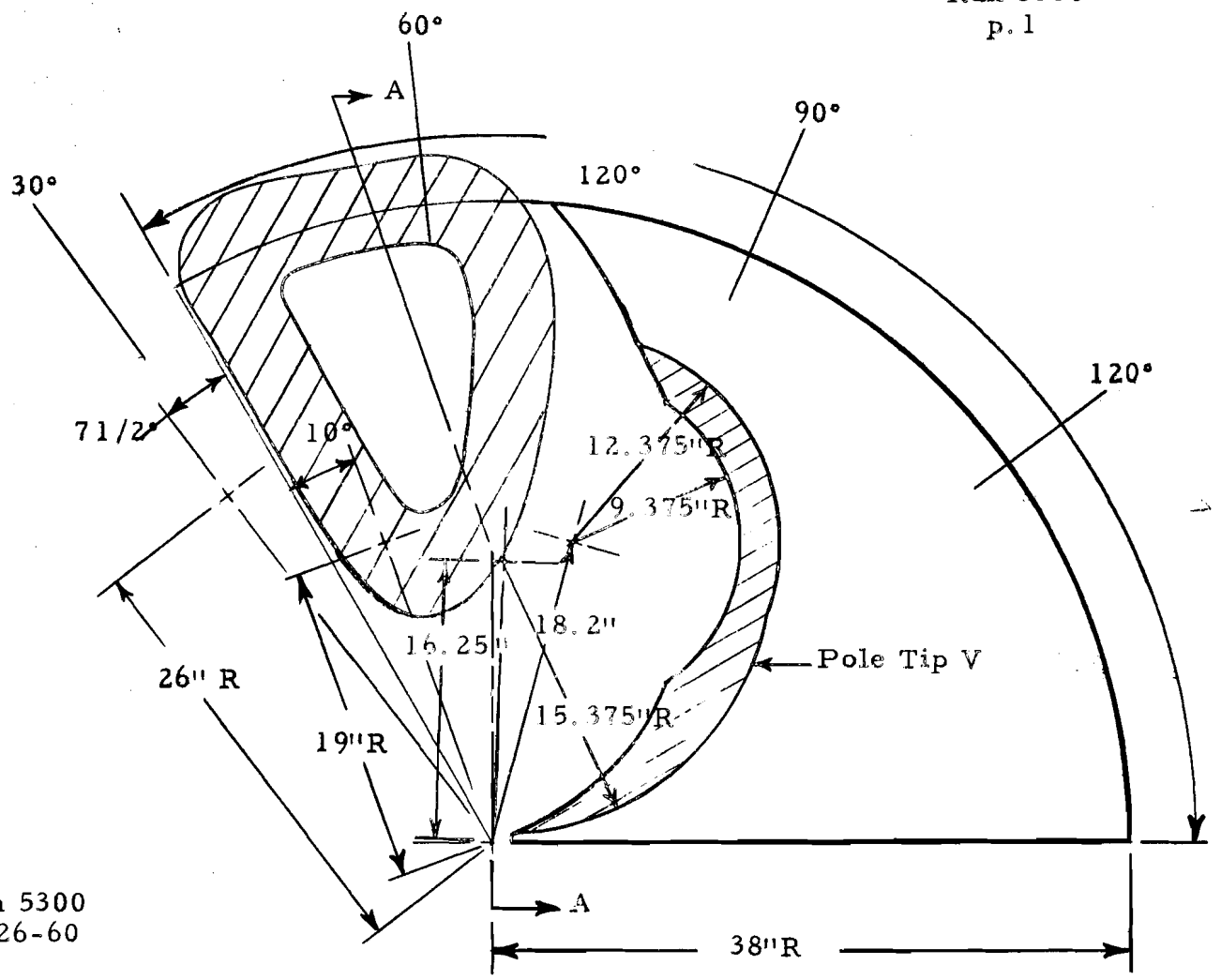


N^{+4} 100 Mev
at 31"

Falderal Run 5200

Falderal
Run 5200
p. 5

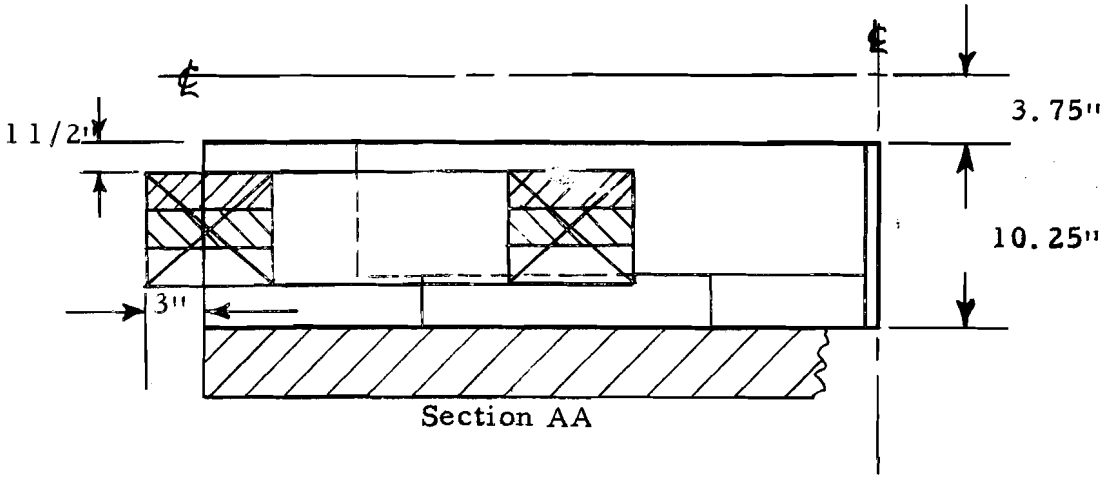
Run 5300
p. 1



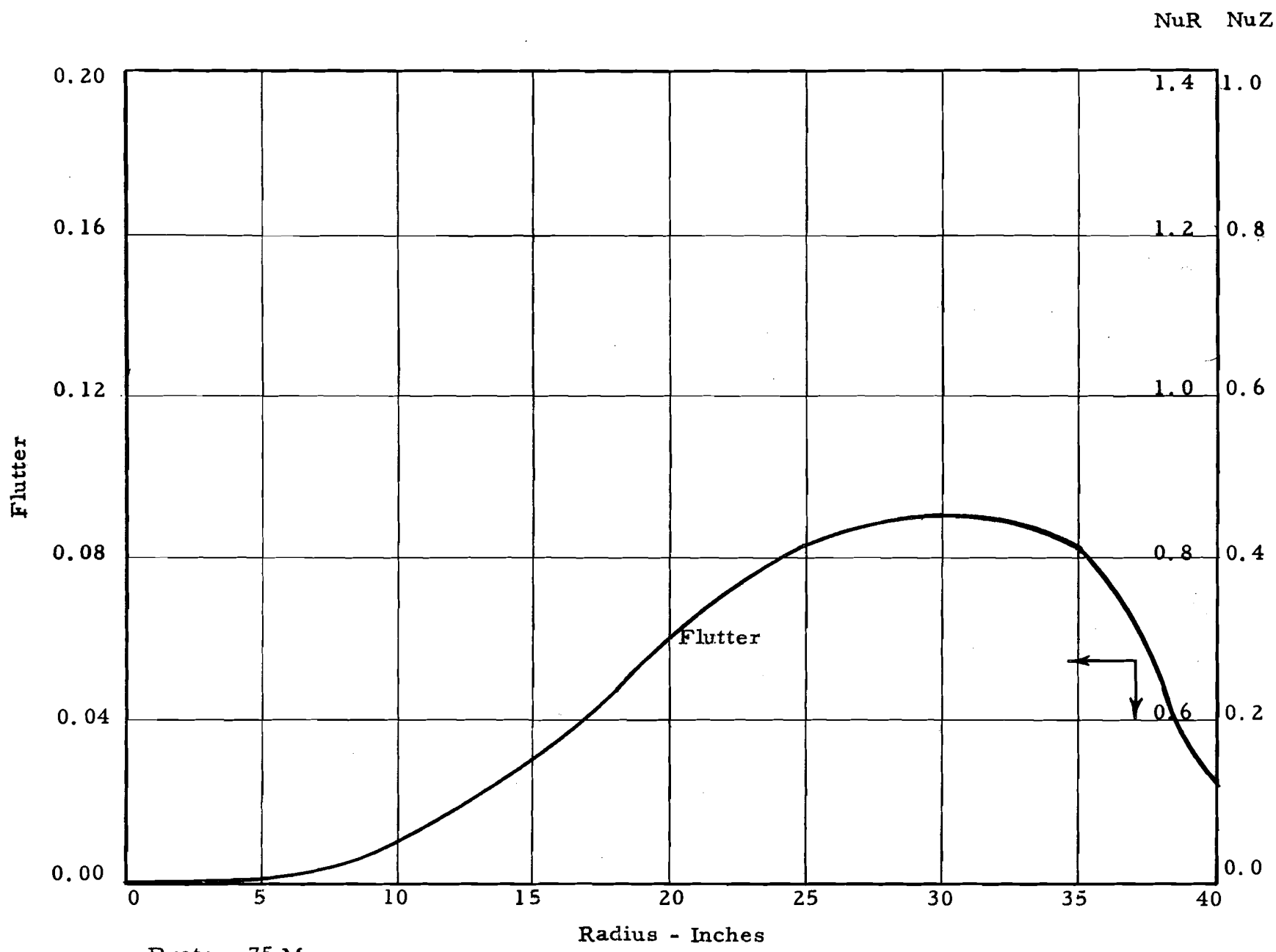
Run 5300
8-26-60

Full **Scale Parameters**

Main Coils 1.18×10^6 ampere turns
Valley Coils 0.262×10^6 ampere turns

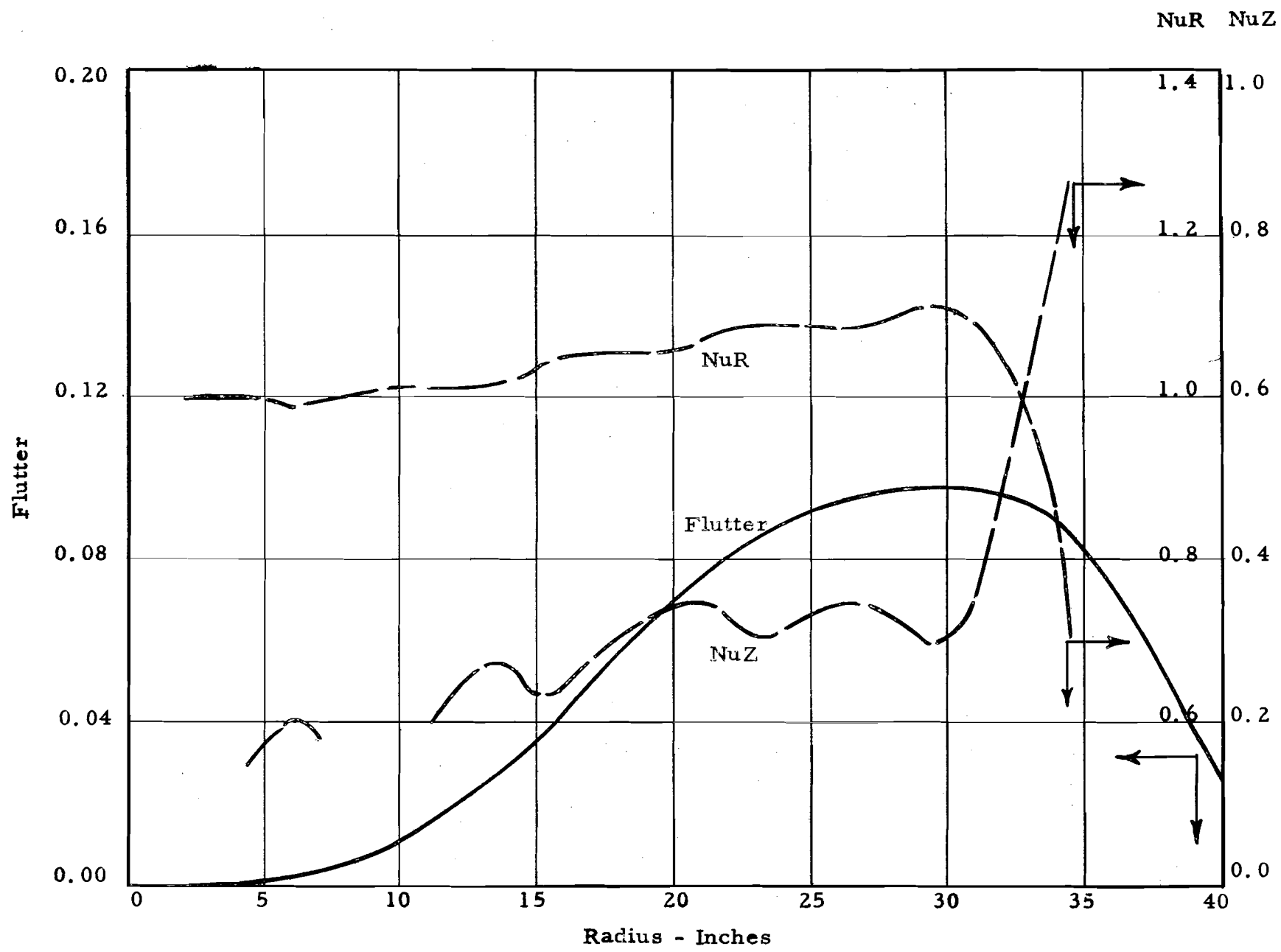


ORIC 1/4 Scale Sector



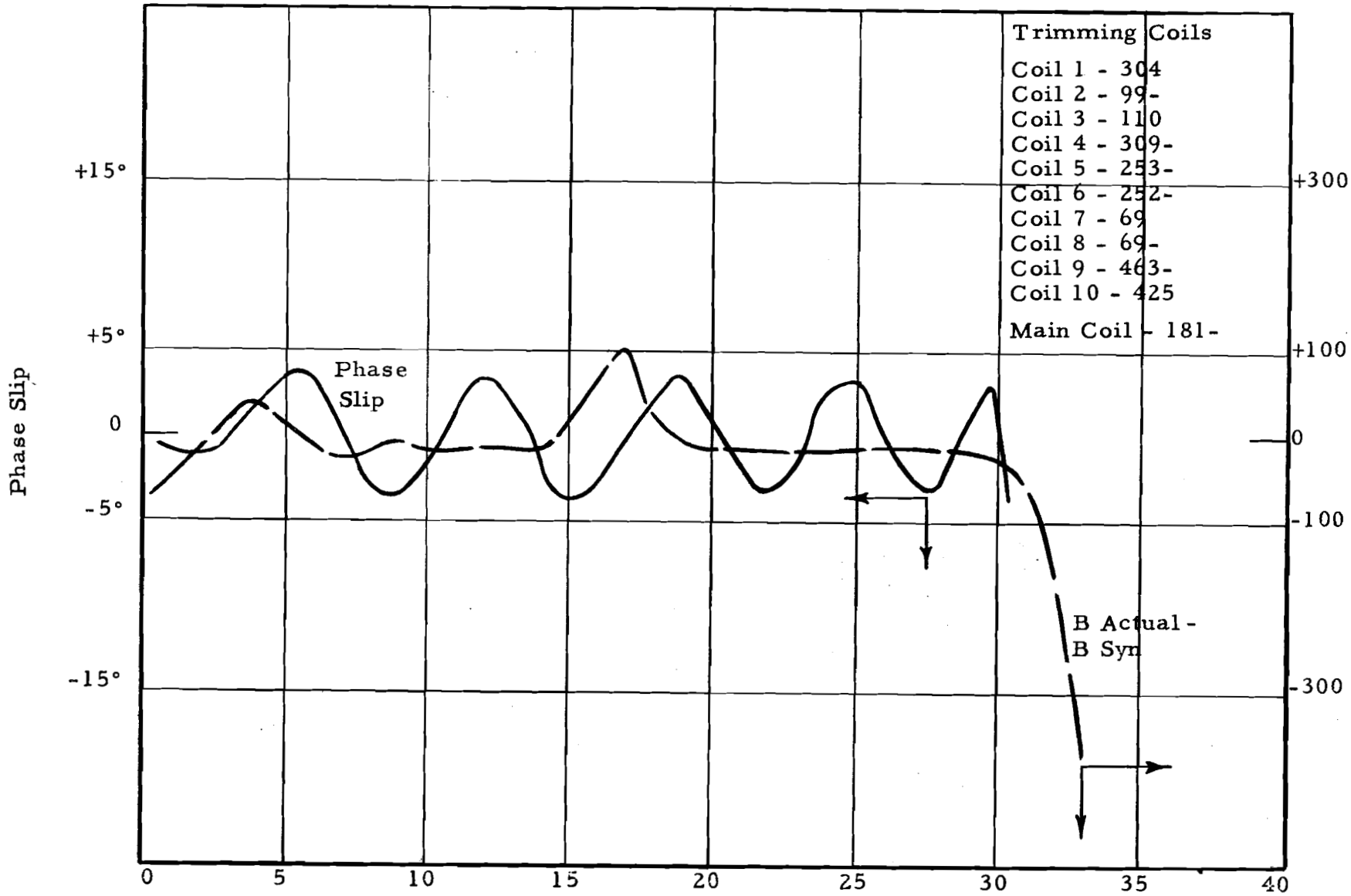
Proton 75 Mev
at 31"

Run 5300



Proton 75 Mev
at 31"

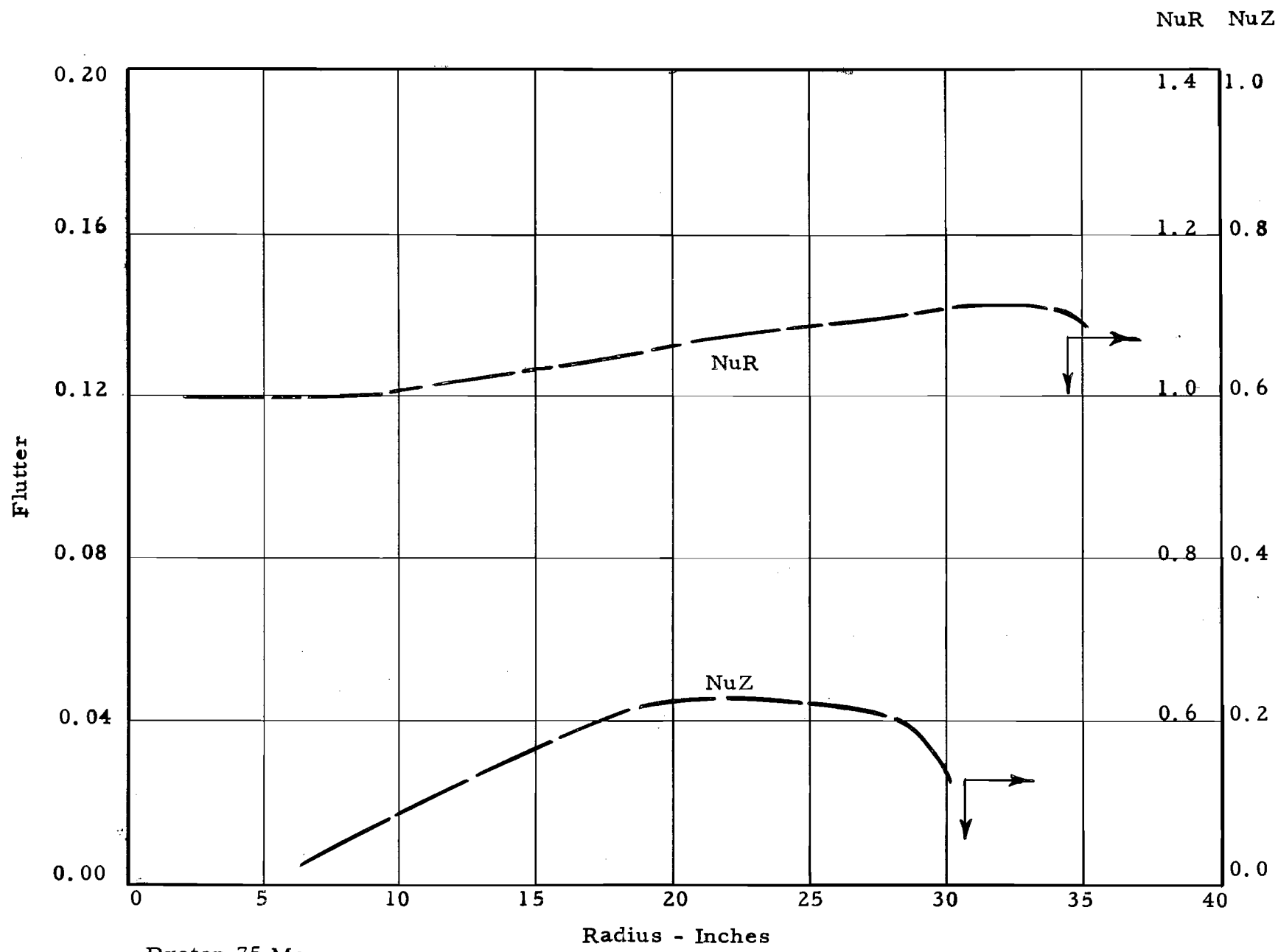
Falderal Run 5300



Proton 75 Mev
at 31"
25% Overload

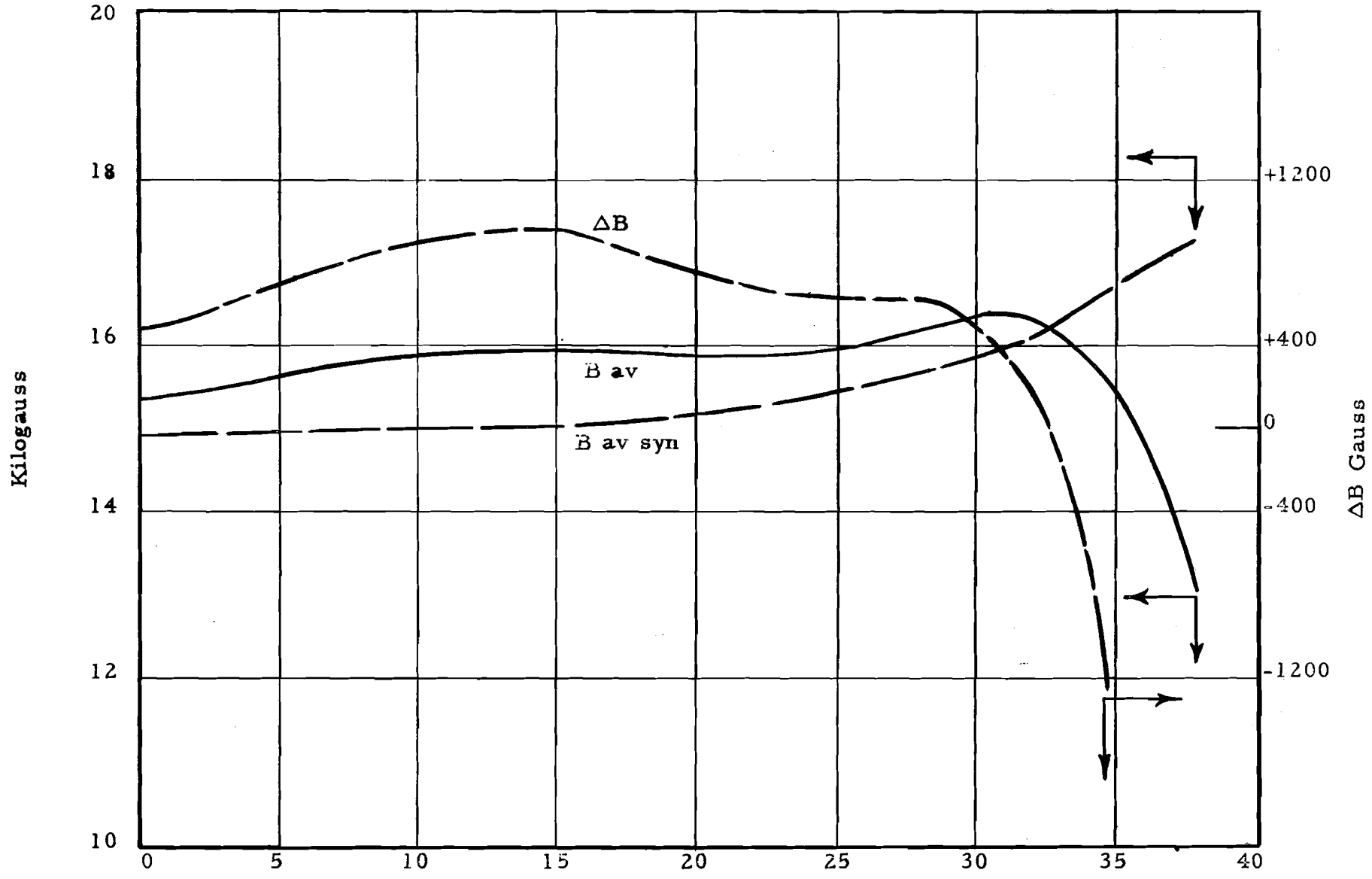
Radius - Inches

Phase Slip Run 5300



Proton 75 Mev
at 32"

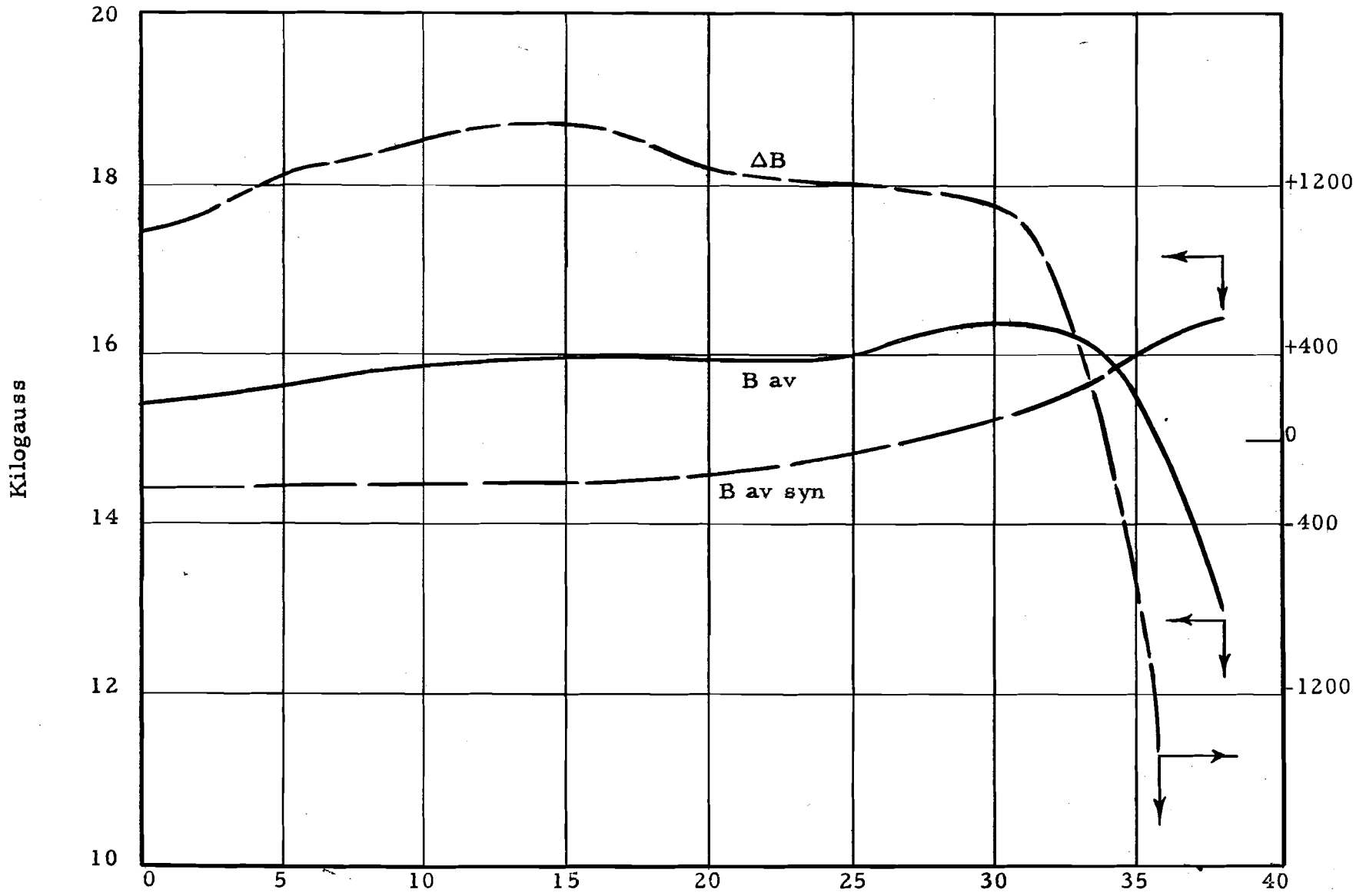
Run 5325



Proton 75 Mev
at 31"

Radius - Inches

Run 5325

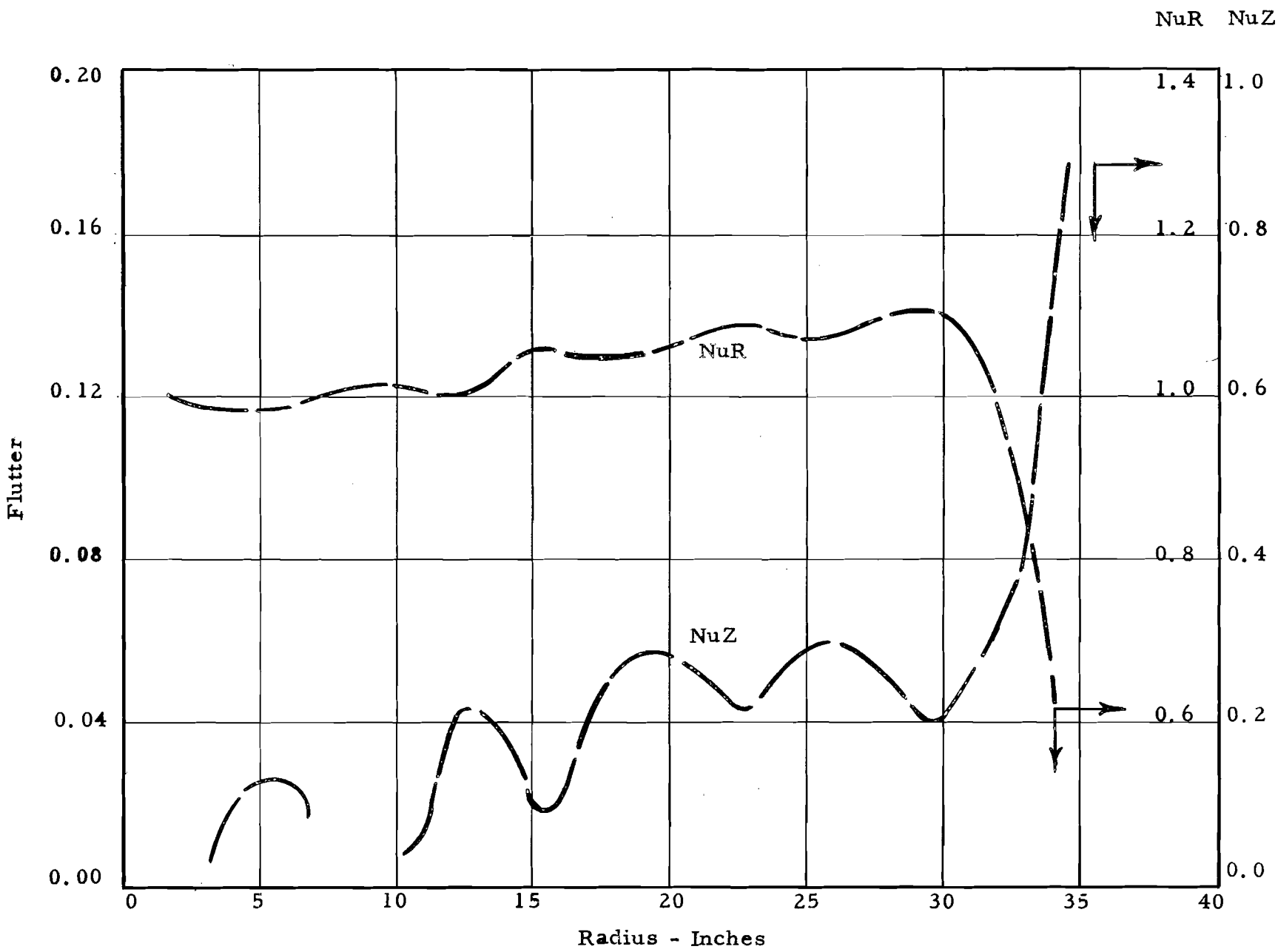


Proton 75 Mev
at 32"

Radius - Inches

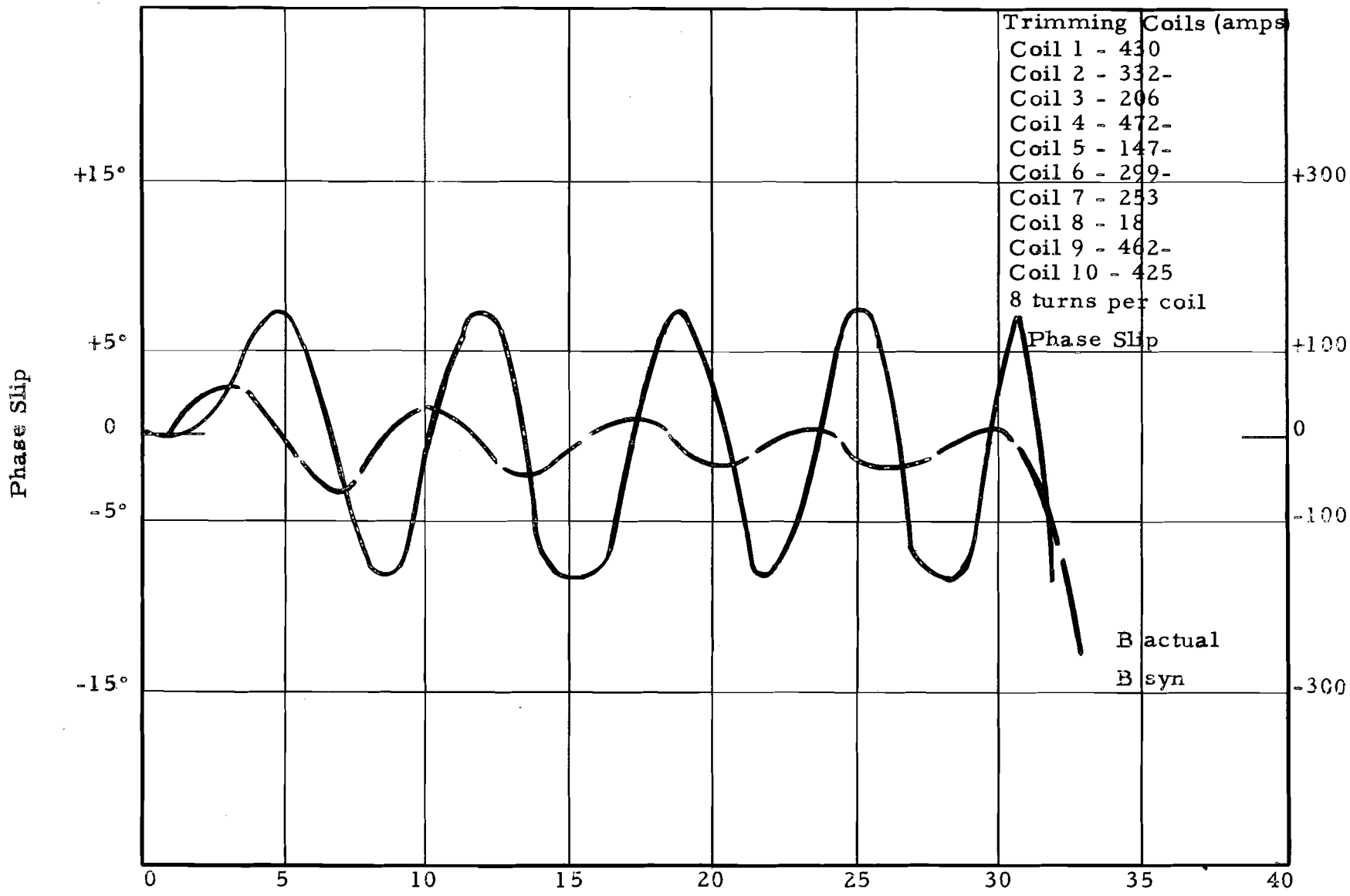
Run 5325

Run 5325
p. 5



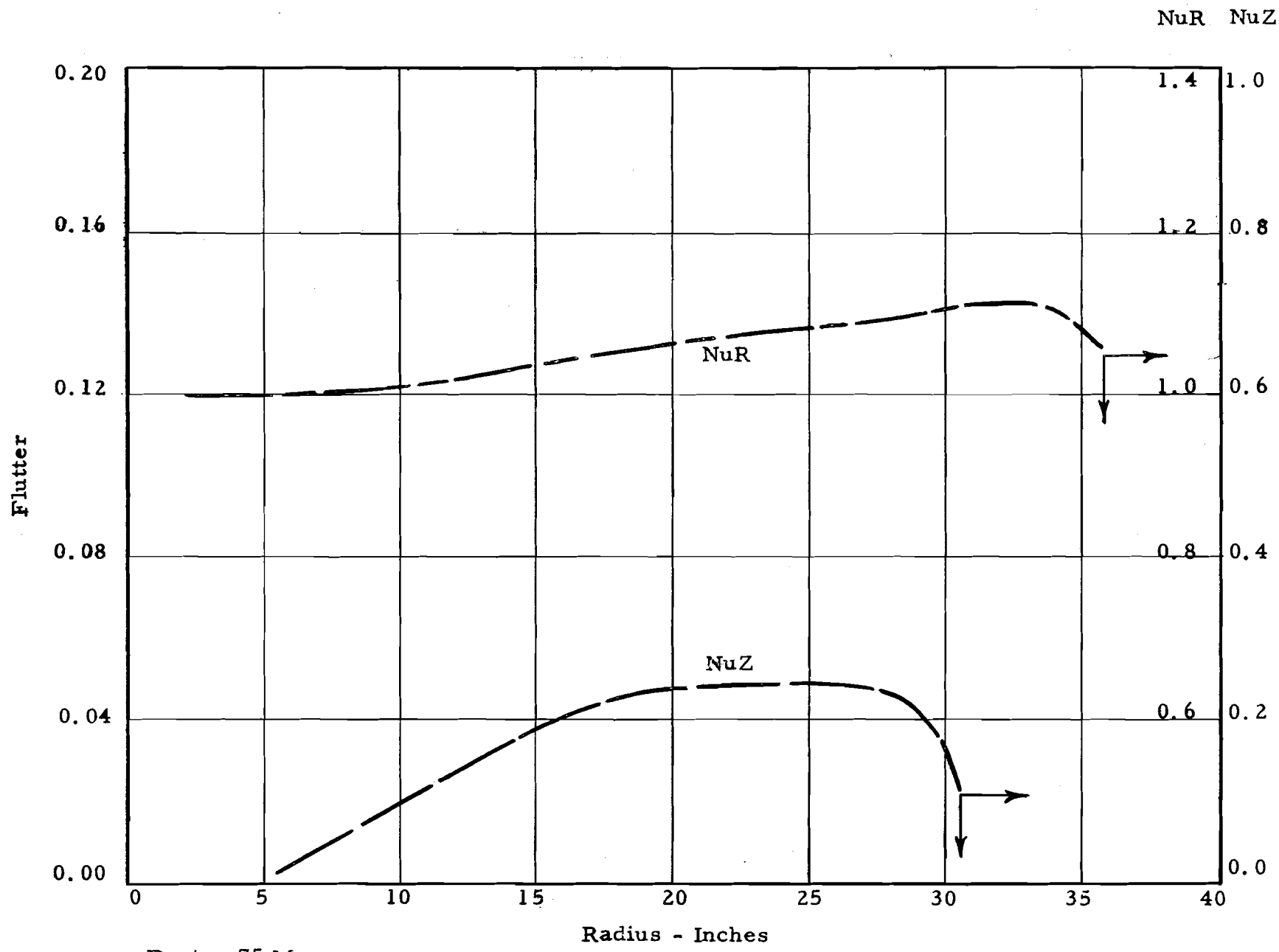
Protons 75Mev
at 32"

Run 5325



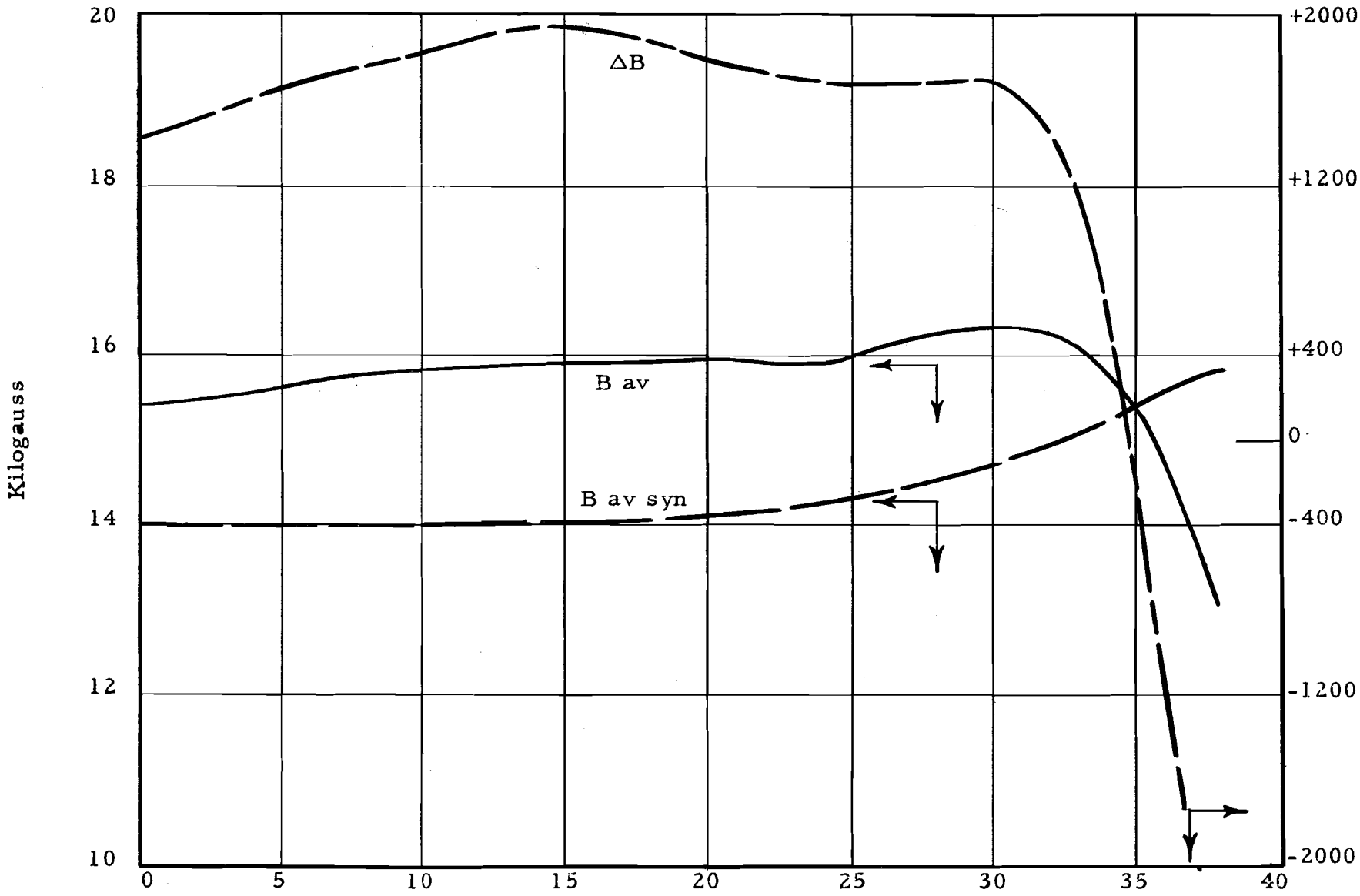
Proton 75 Mev
at 32"
25% overload

Run 5325



Proton 75 Mev
at 33"

Run 5350

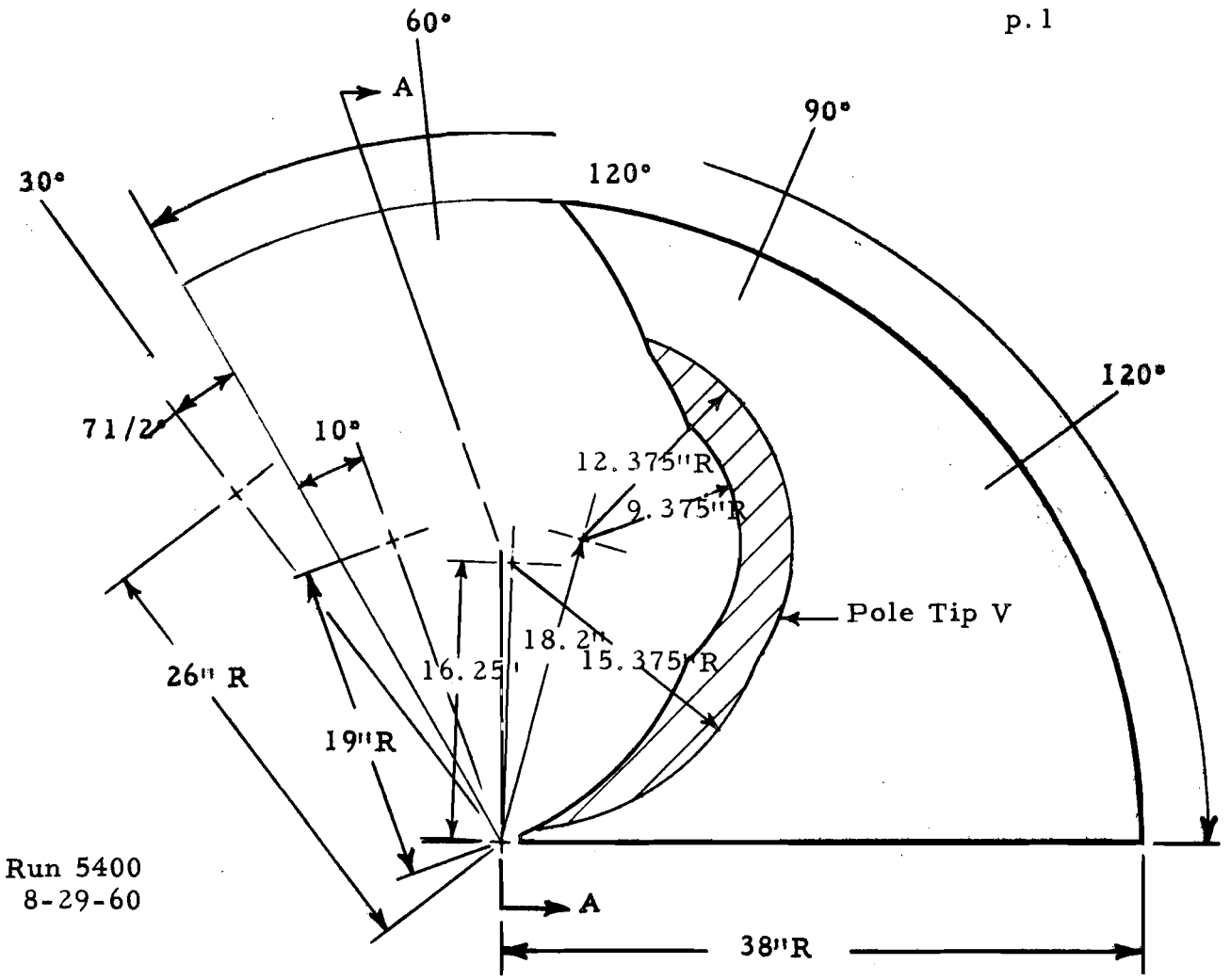


Proton 75 Mev
at 33"

Run 5350

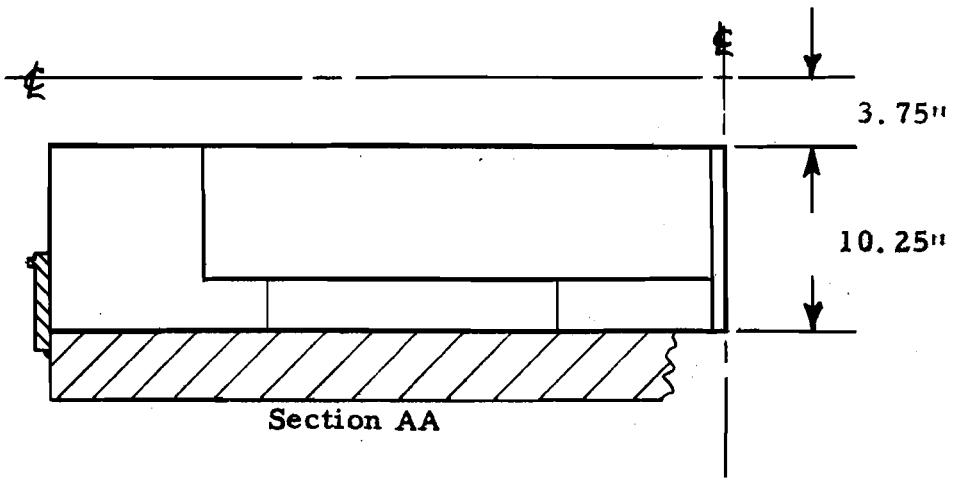
Run 5350
P. 7

Run 5400
p. 1

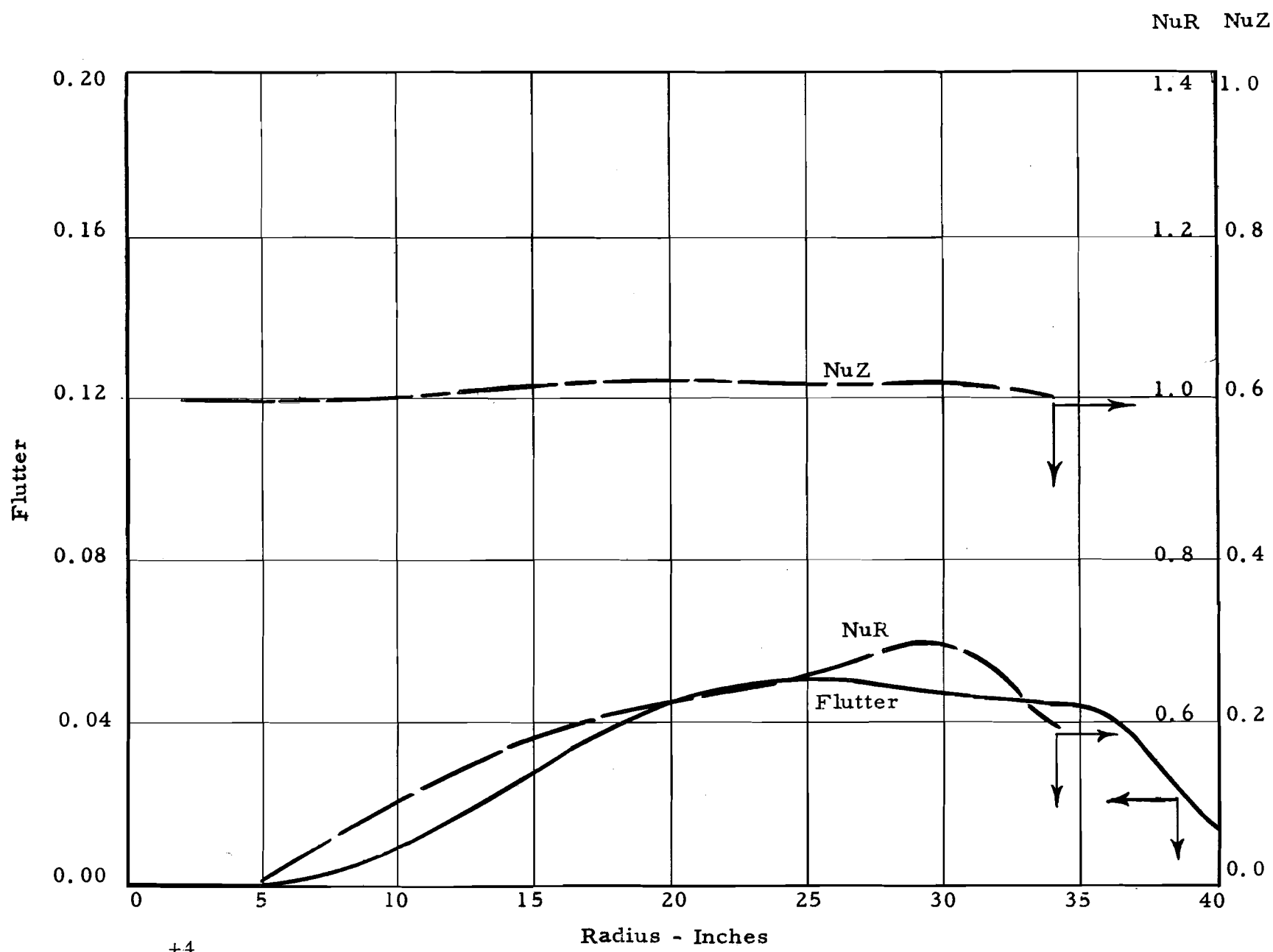


Full Scale Parameters

Main Coils 1.18×10^6 ampere turns
Valley Coils - None

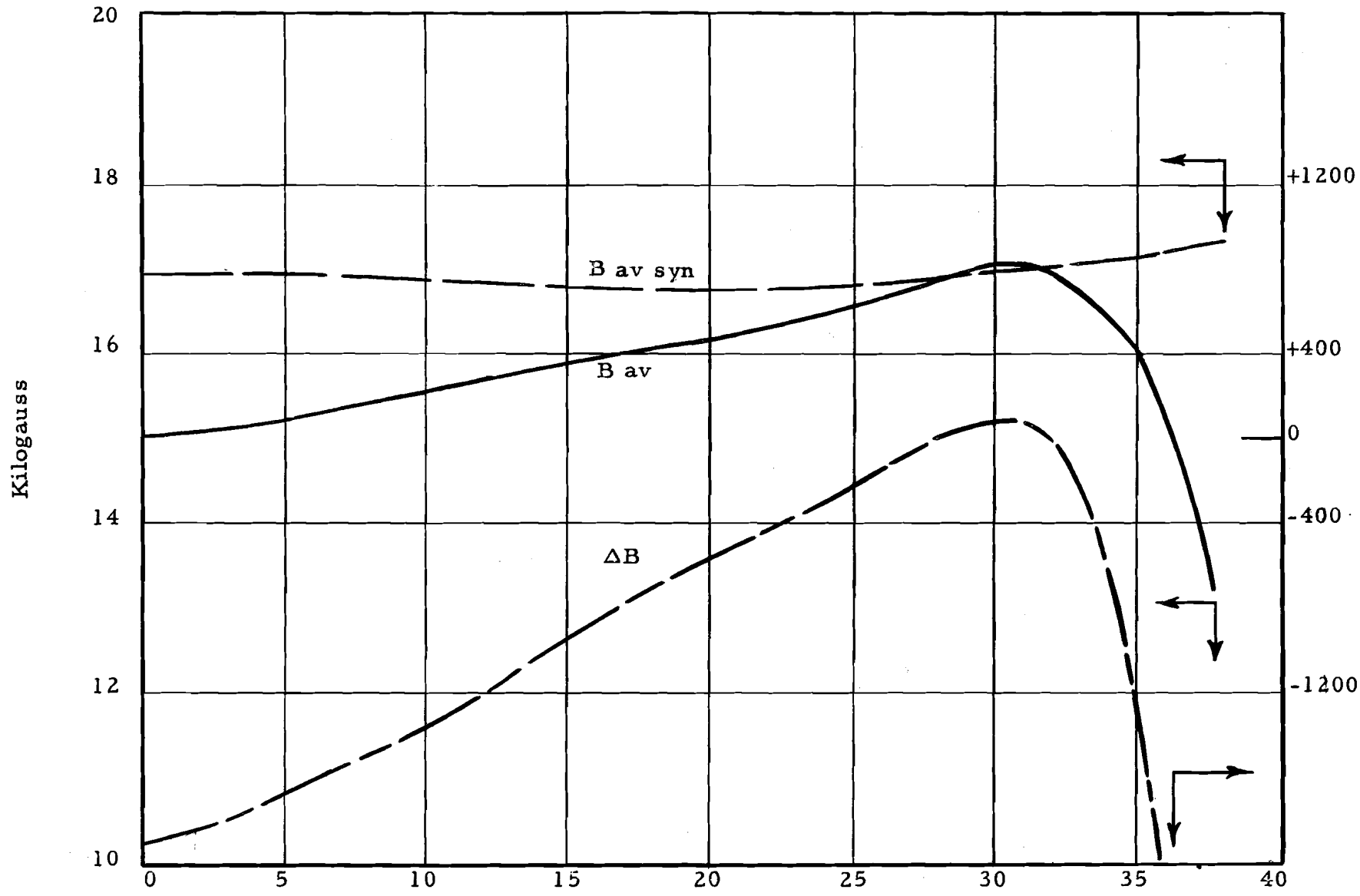


ORIC 1/4 Scale Sector



N^{+4} 100 Mev
at 31"

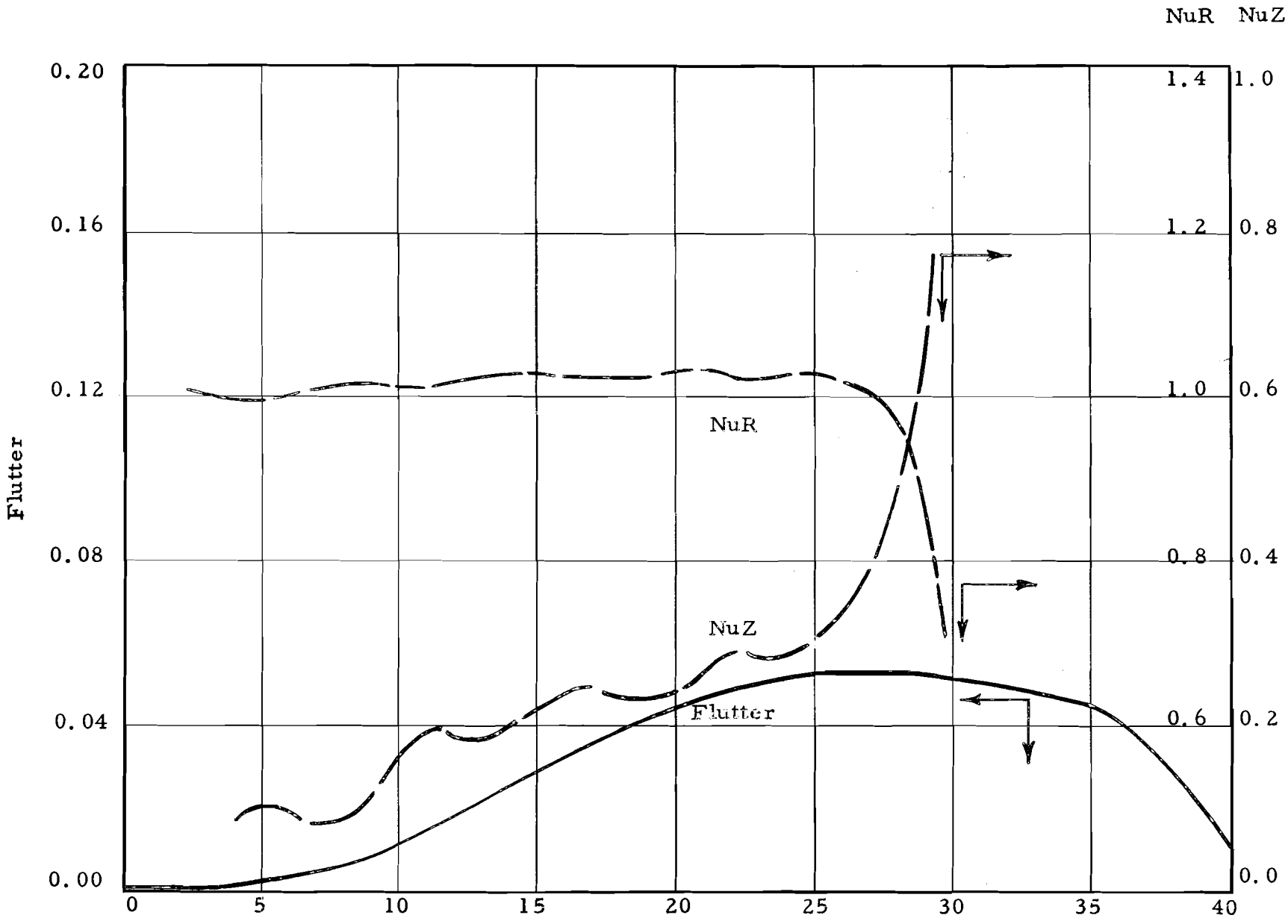
Run 5400



N^{+4} 100 Mev
at 31"

Run 5400

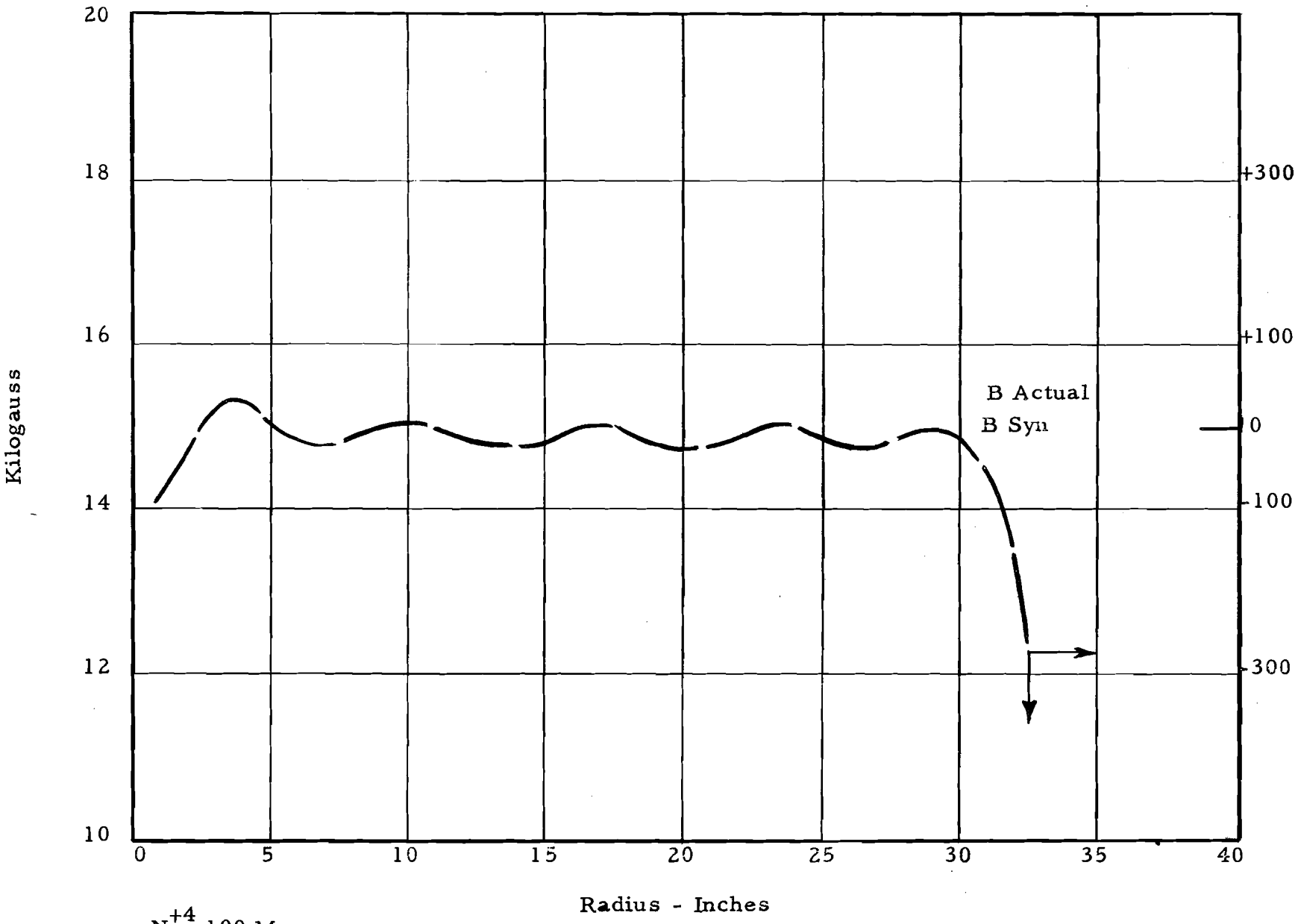
Run 5400
P.3



N^{+4} 100 Mev
at 31"

Falderal Run 5400

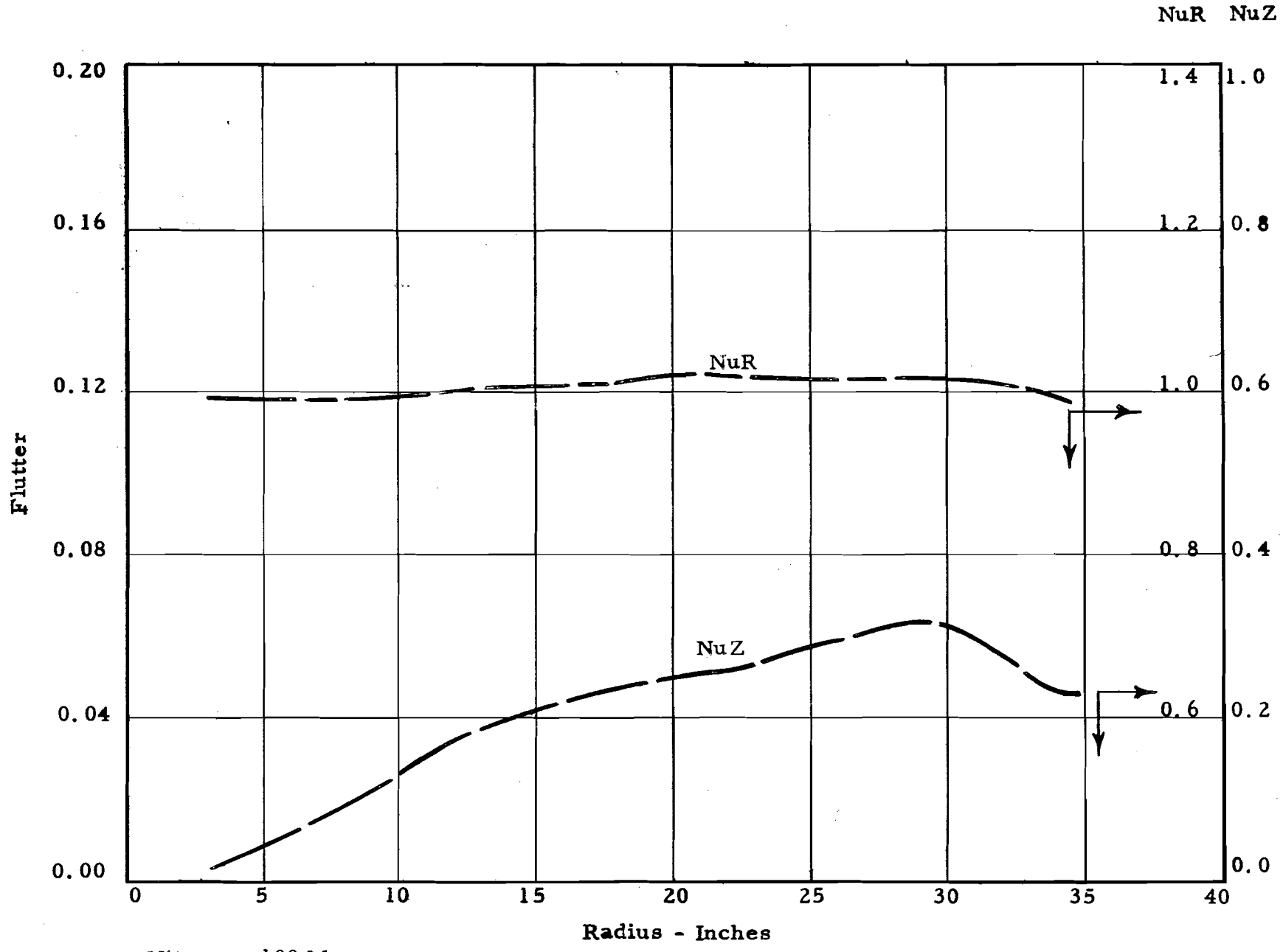
Falderal
Run 5400
p.8



N^{+4} 100 Mev
at 31"

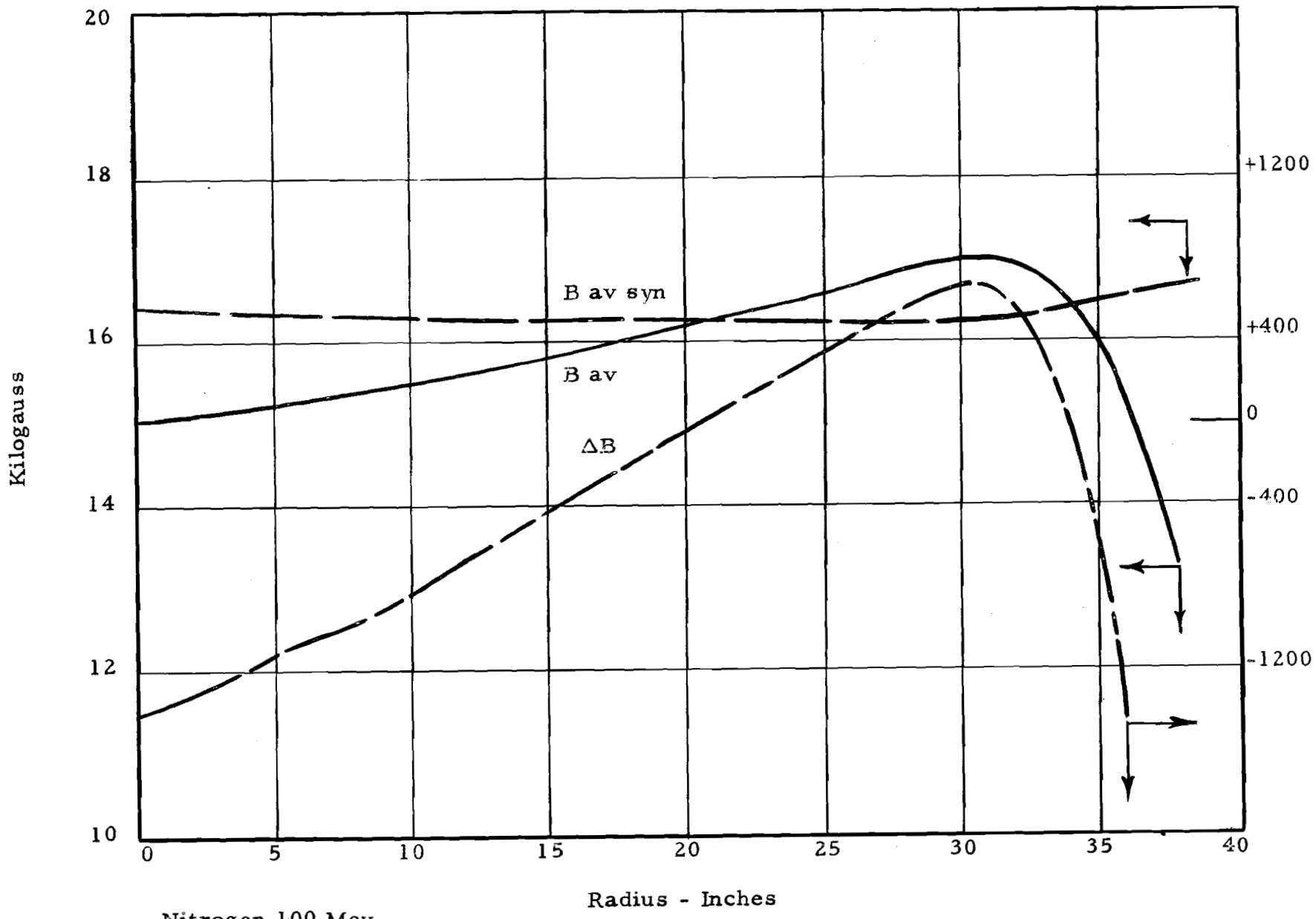
Run 5400

Run 5400
P. 10



Nitrogen 100 Mev
at 32"

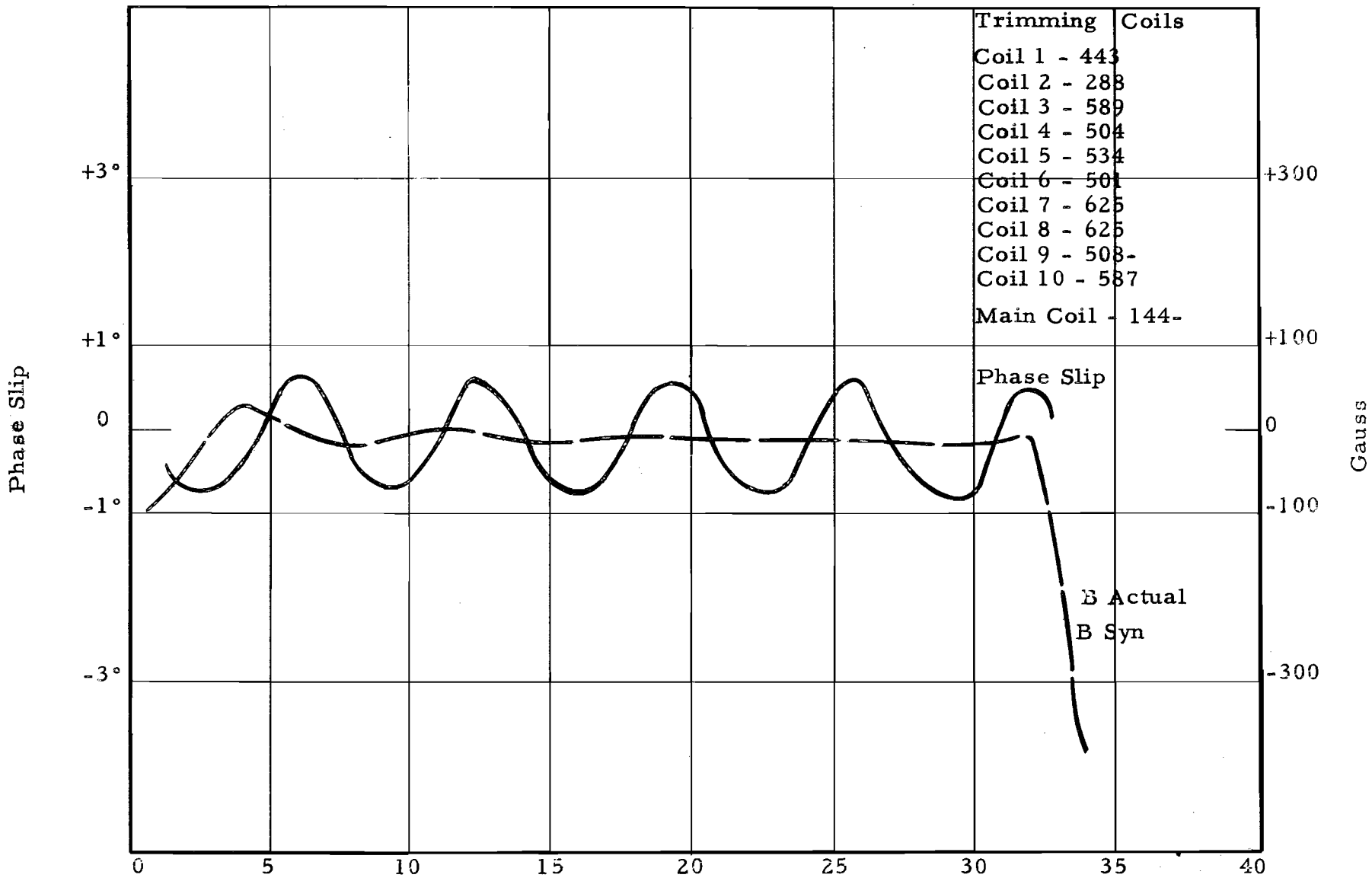
Run 5425



Nitrogen 100 Mev
at 32"

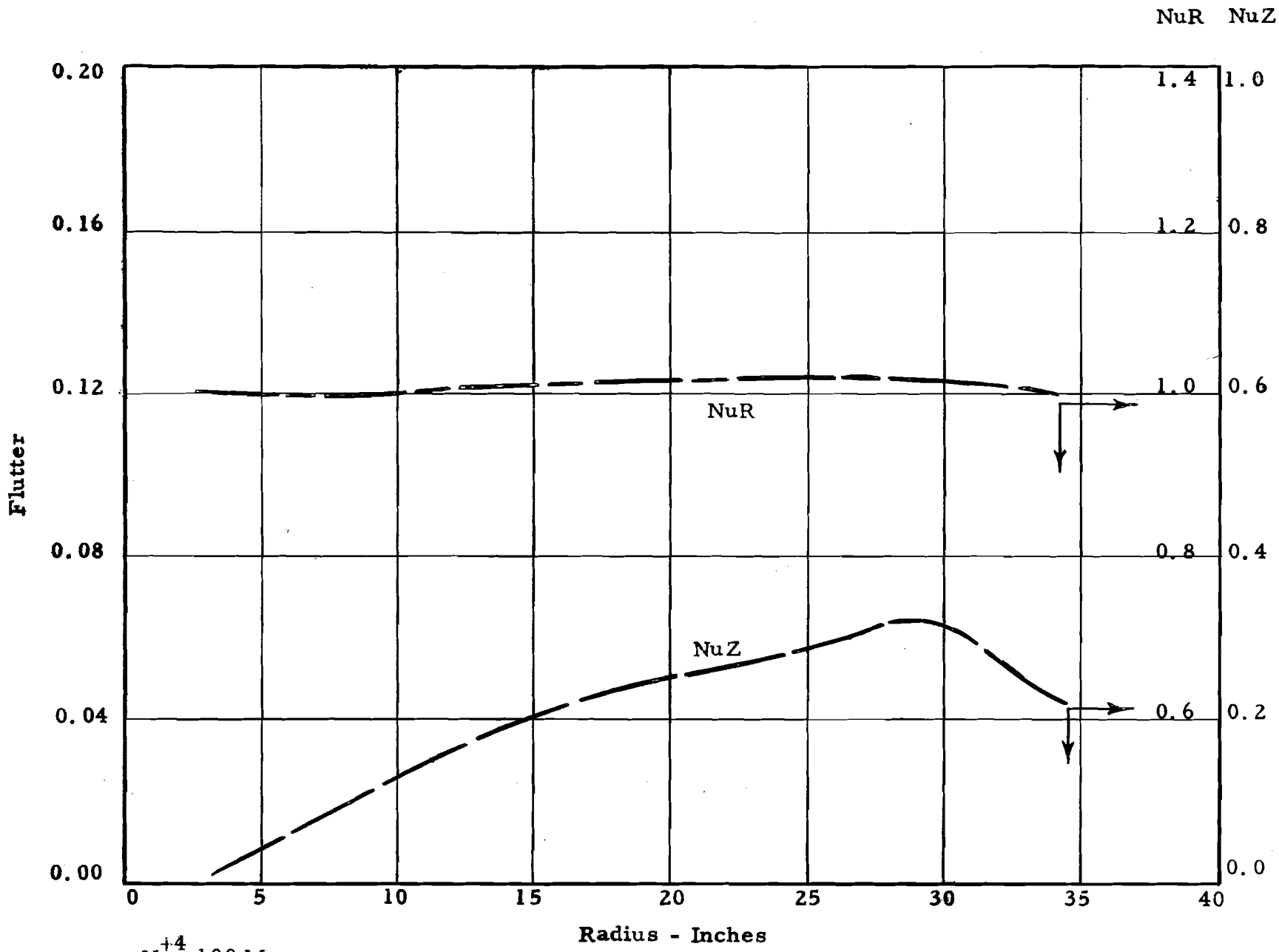
Run 5425

Run 5425
p. 5



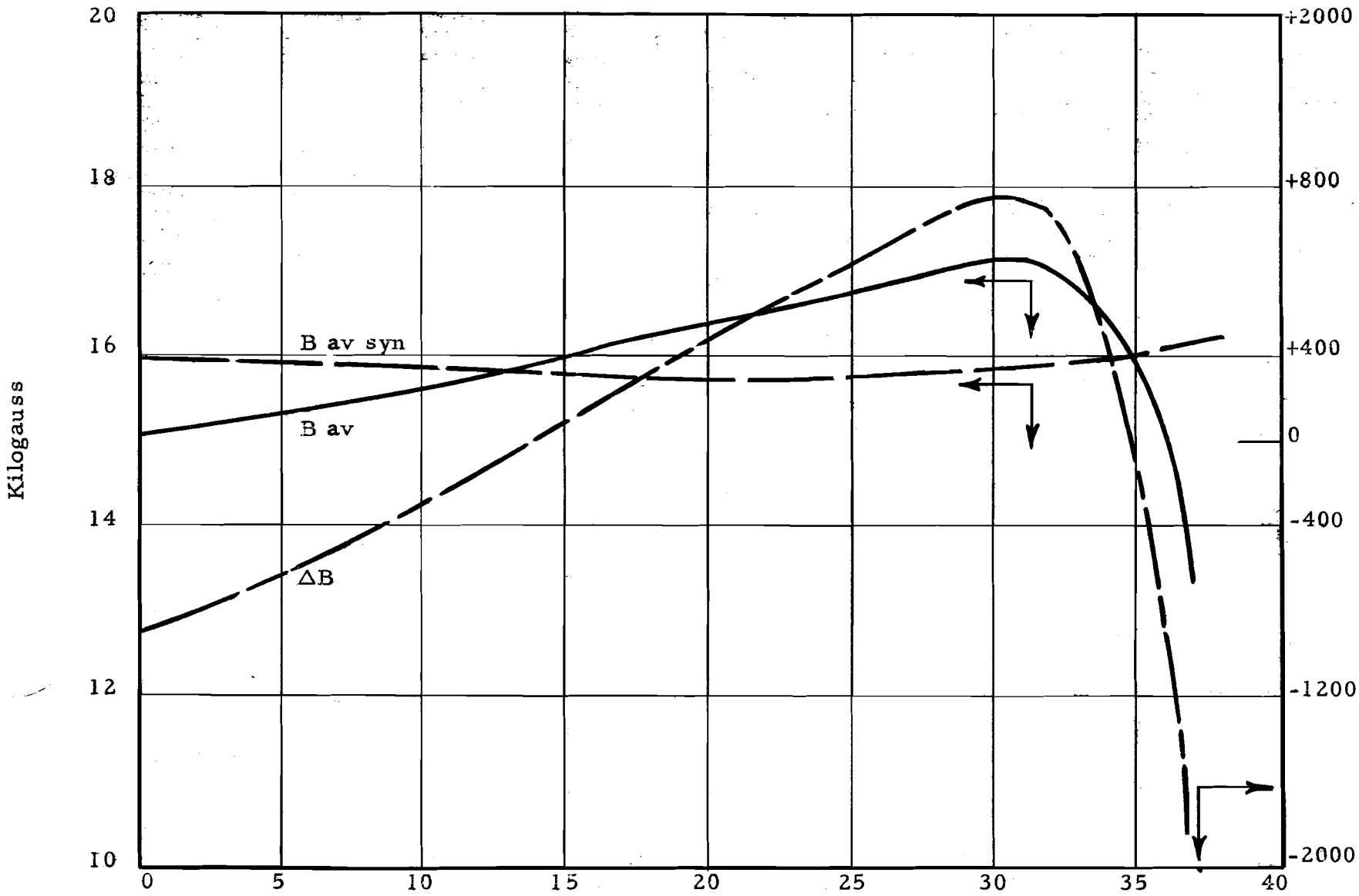
N^{+4} 100 Mev
at 32"

Phase Slip Run 5425



N^{+4} 100 Mev
at 33"

Run 5450



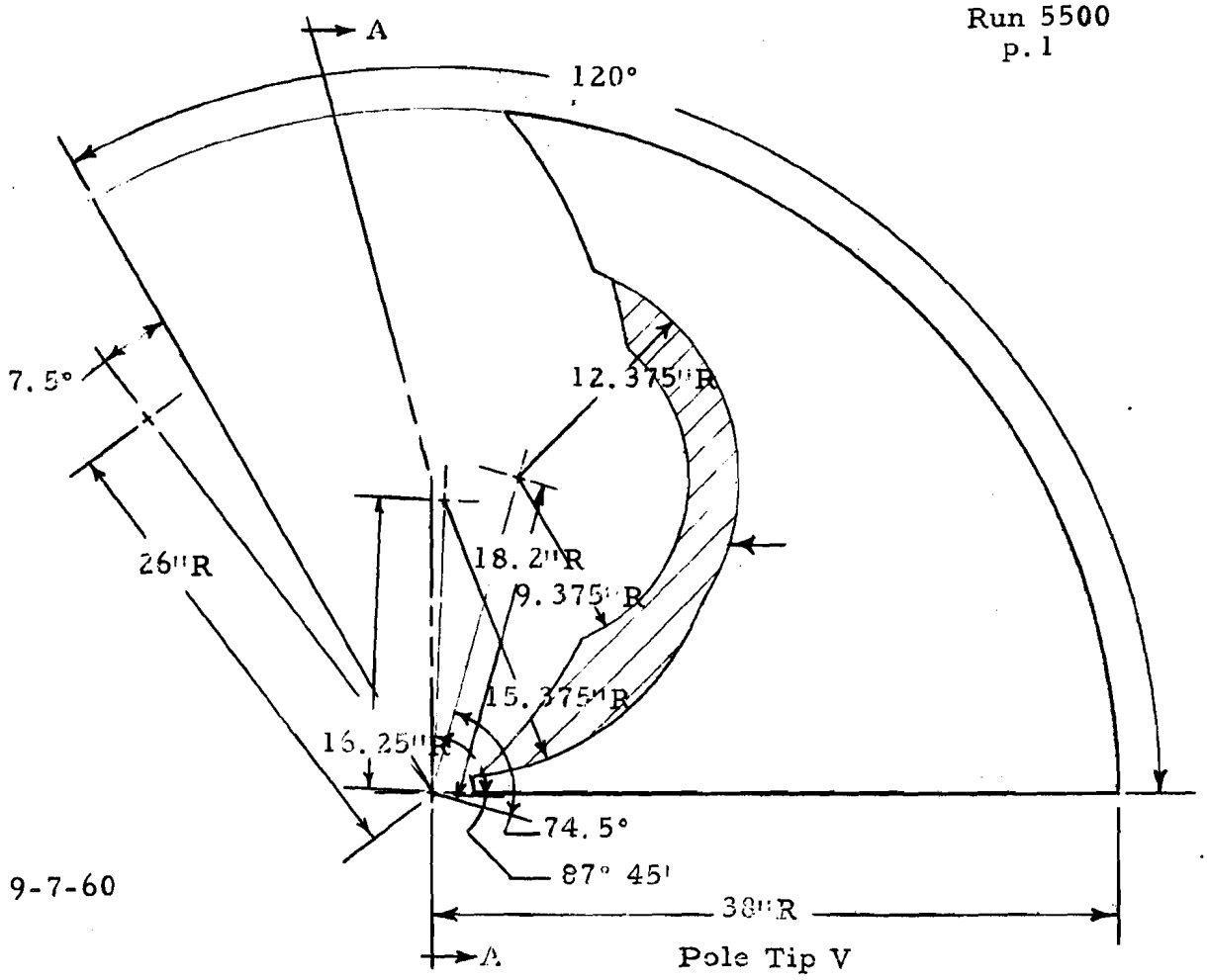
N^{+4} 100 Mev

at 33"

Run 5450

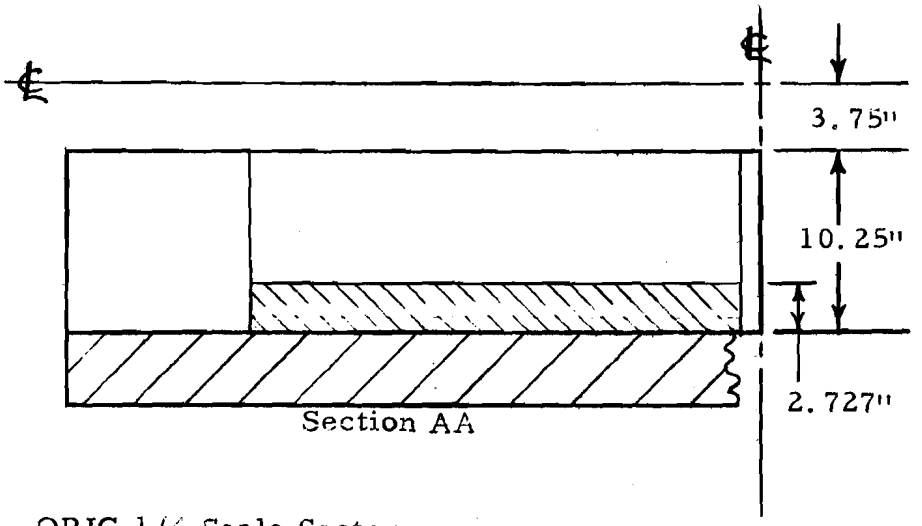
Run 5450
P. 7

Run 5500
p. 1

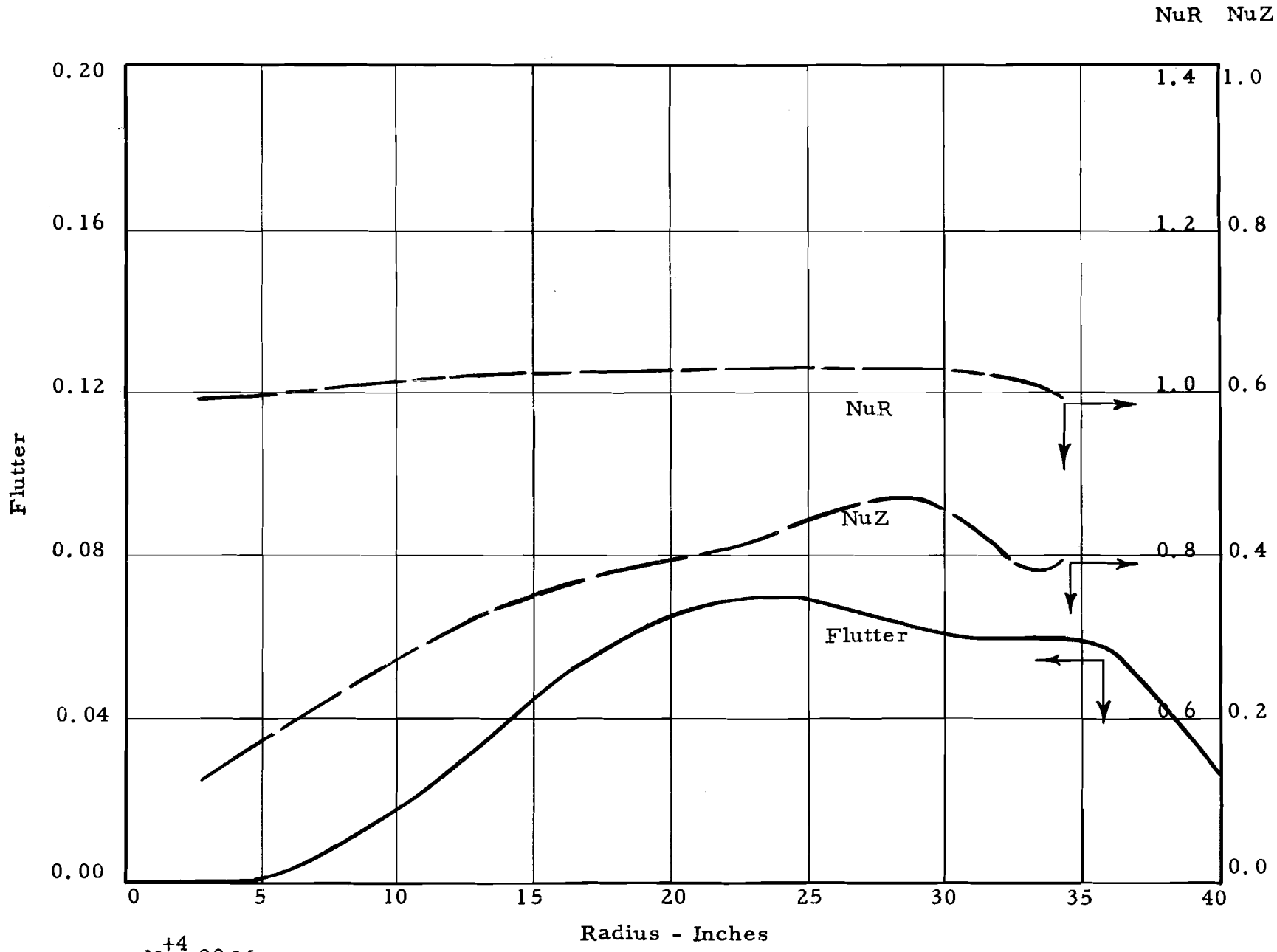


9-7-60

Full Scale Parameters
Main Coils 0.744×10^6 ampere turns
Pole Tip V in all 3 sectors

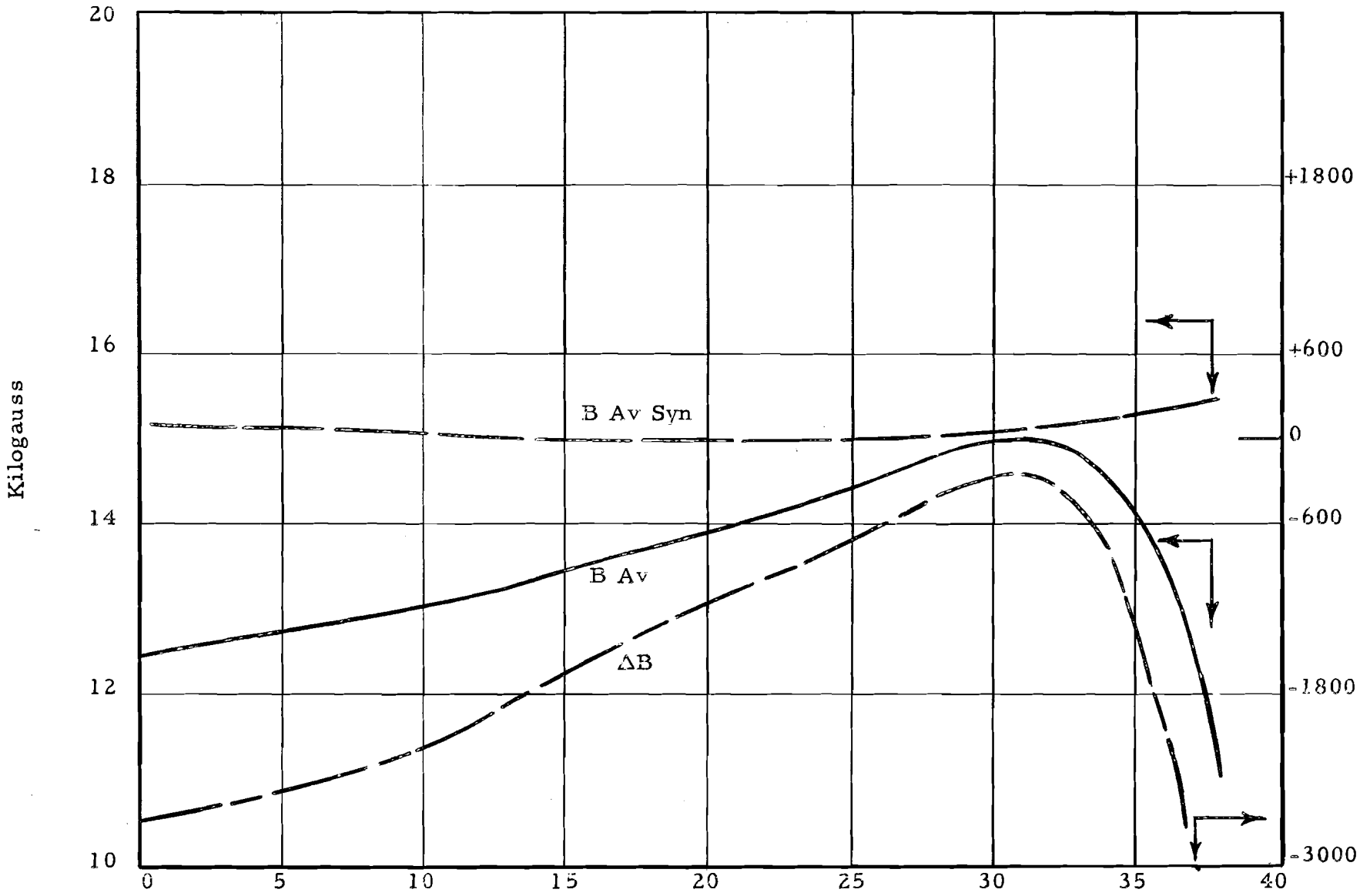


ORIC 1/4 Scale Sector



N^{+4} 80 Mev
at 31"

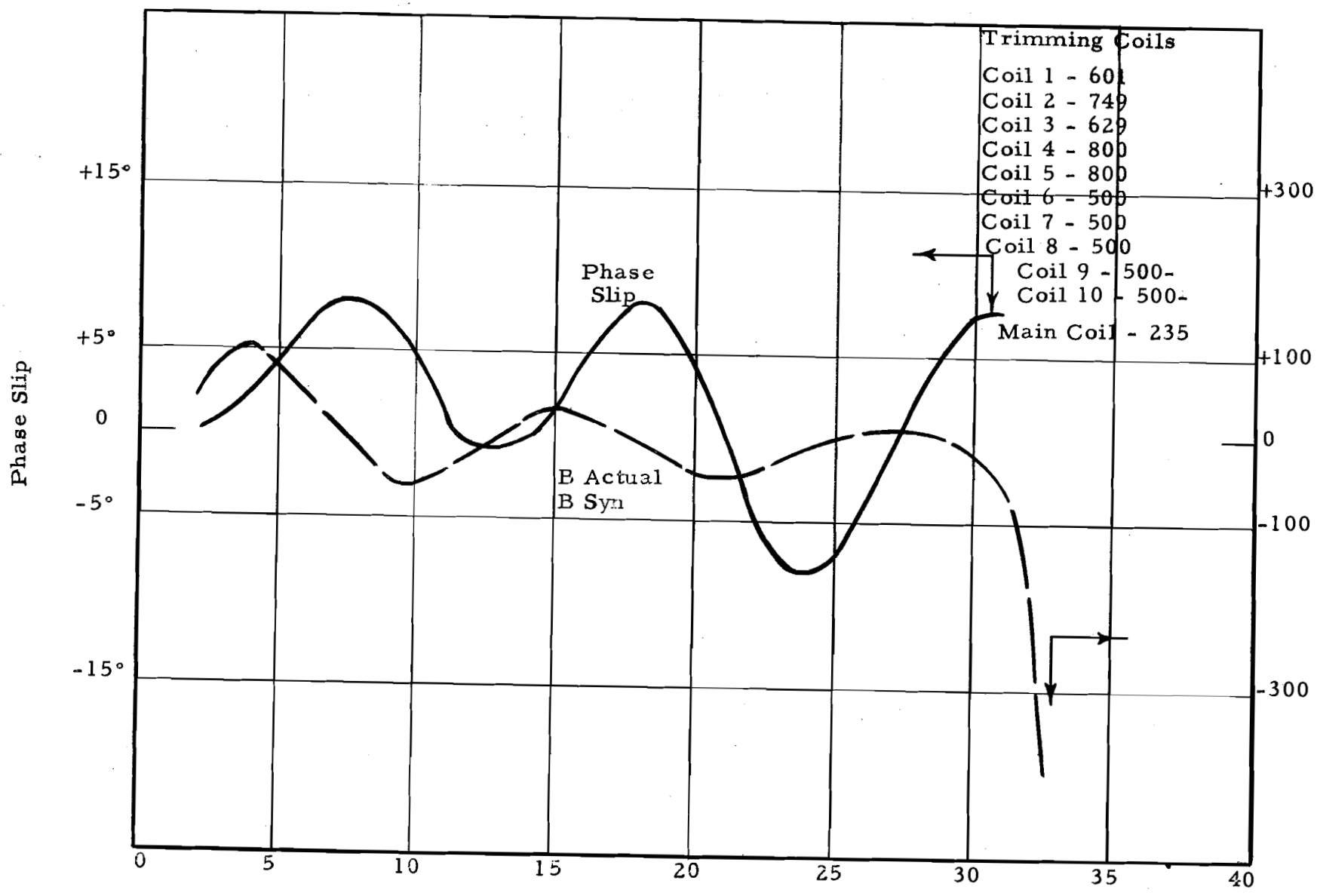
Run 5500



N^{+4} 80 Mev
at 31"

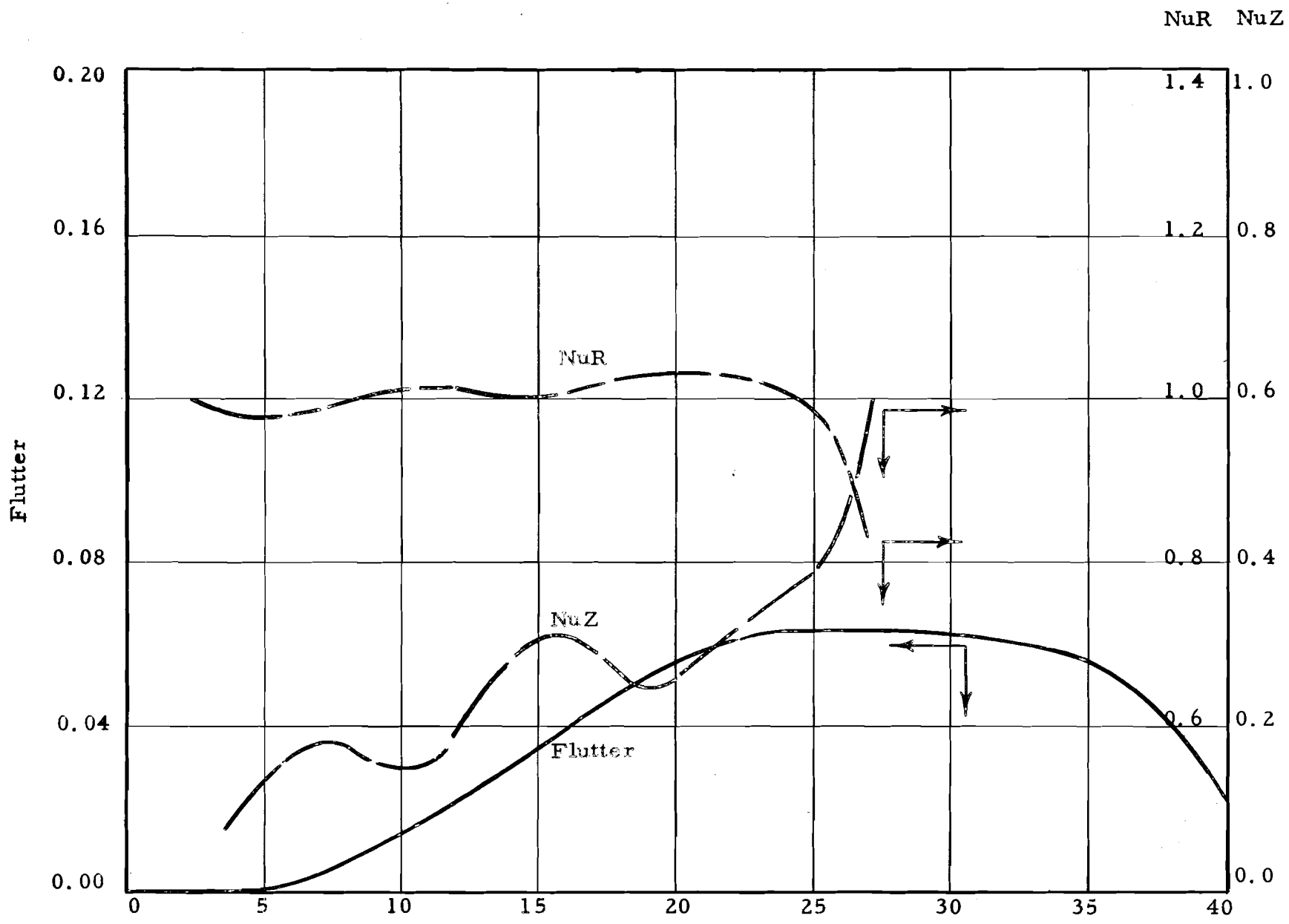
Run 5500

Run 5500
p.3



N^{+4} 80 Mev
at 31"

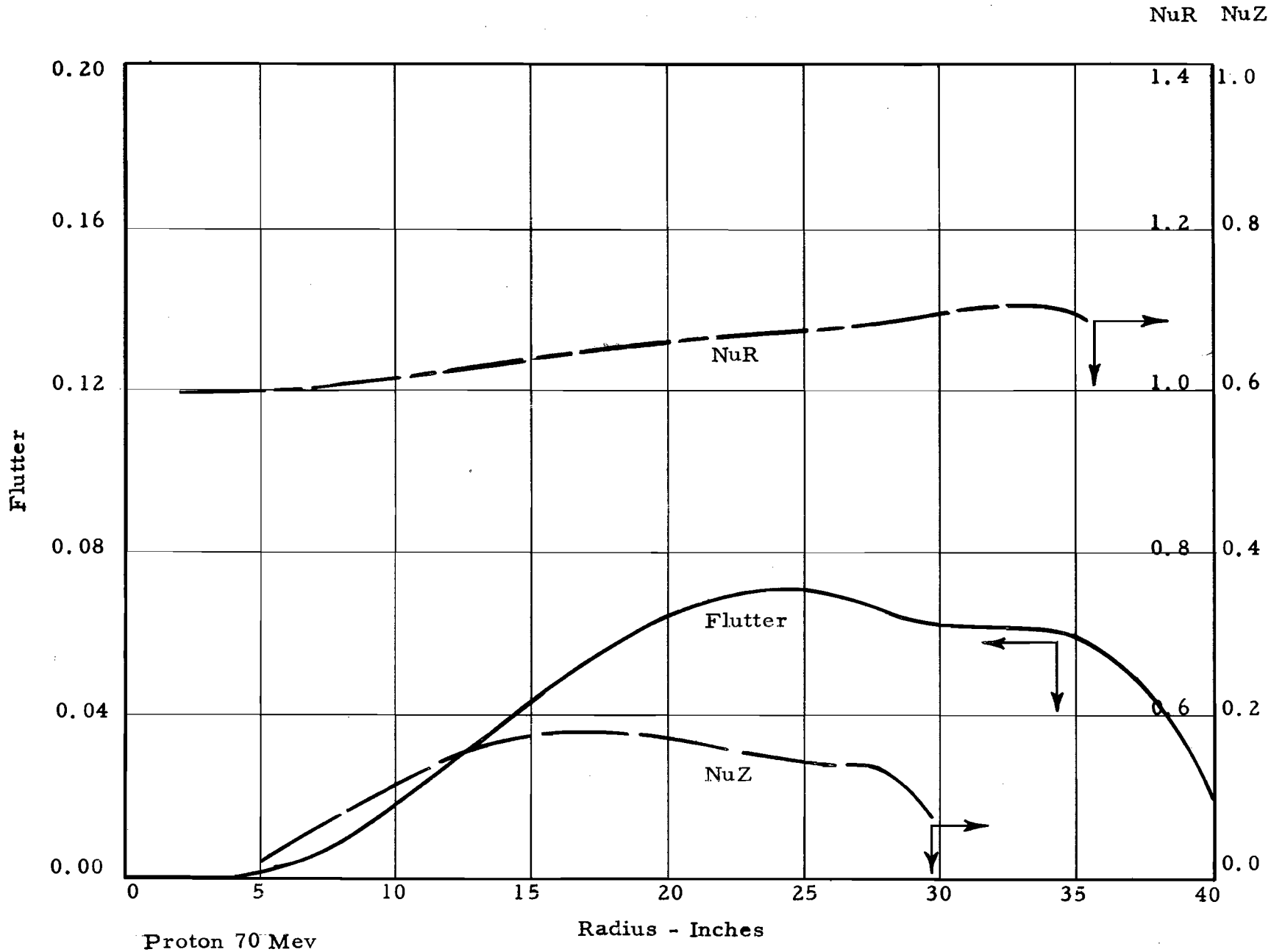
Phase Slip Run 5500



N^{+4} 80 Mev
at 31"

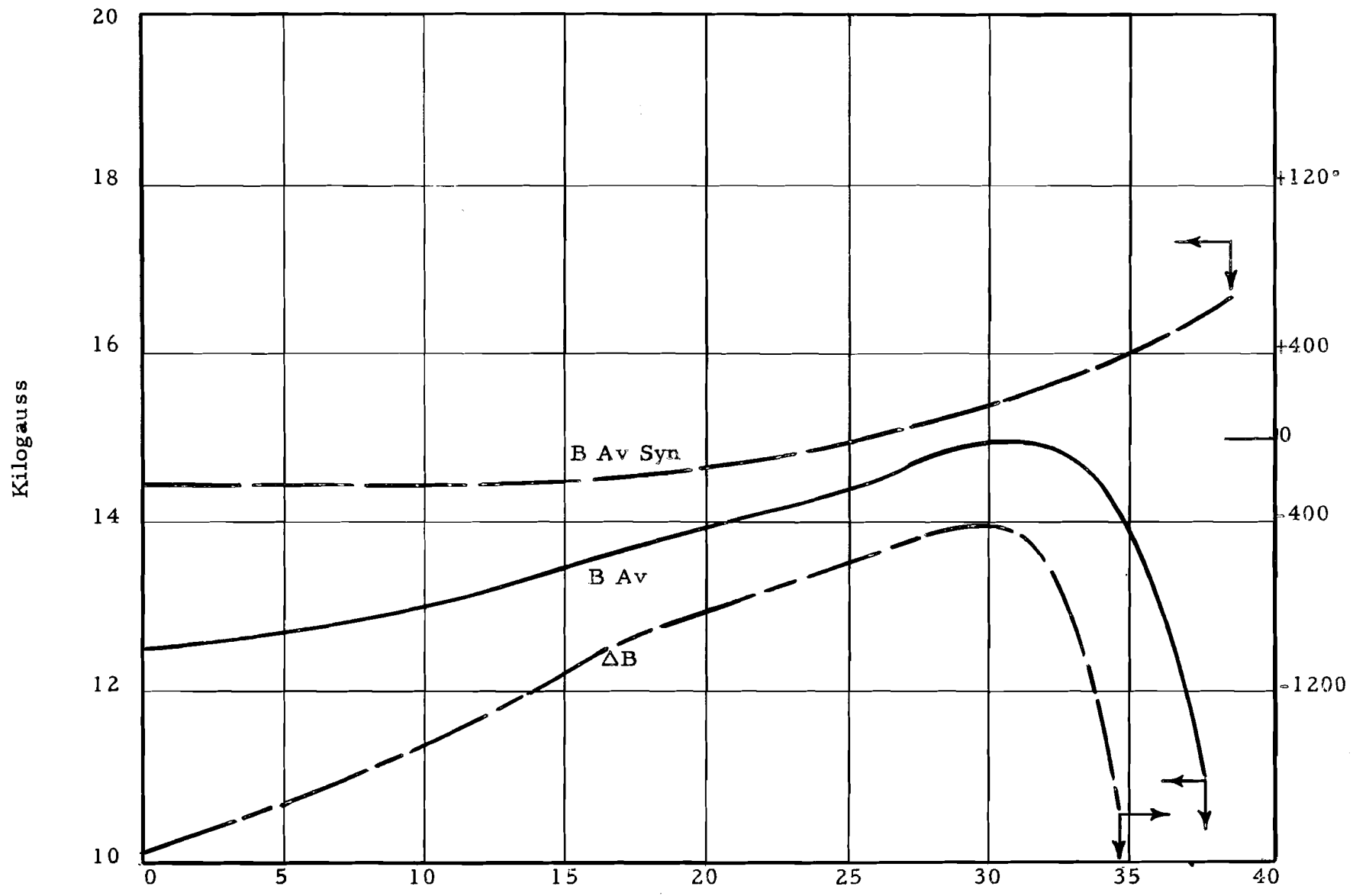
Falderal Run 5500

Falderal
Run 5500
p. 5



Proton 70 Mev
at 31"

Run 5550

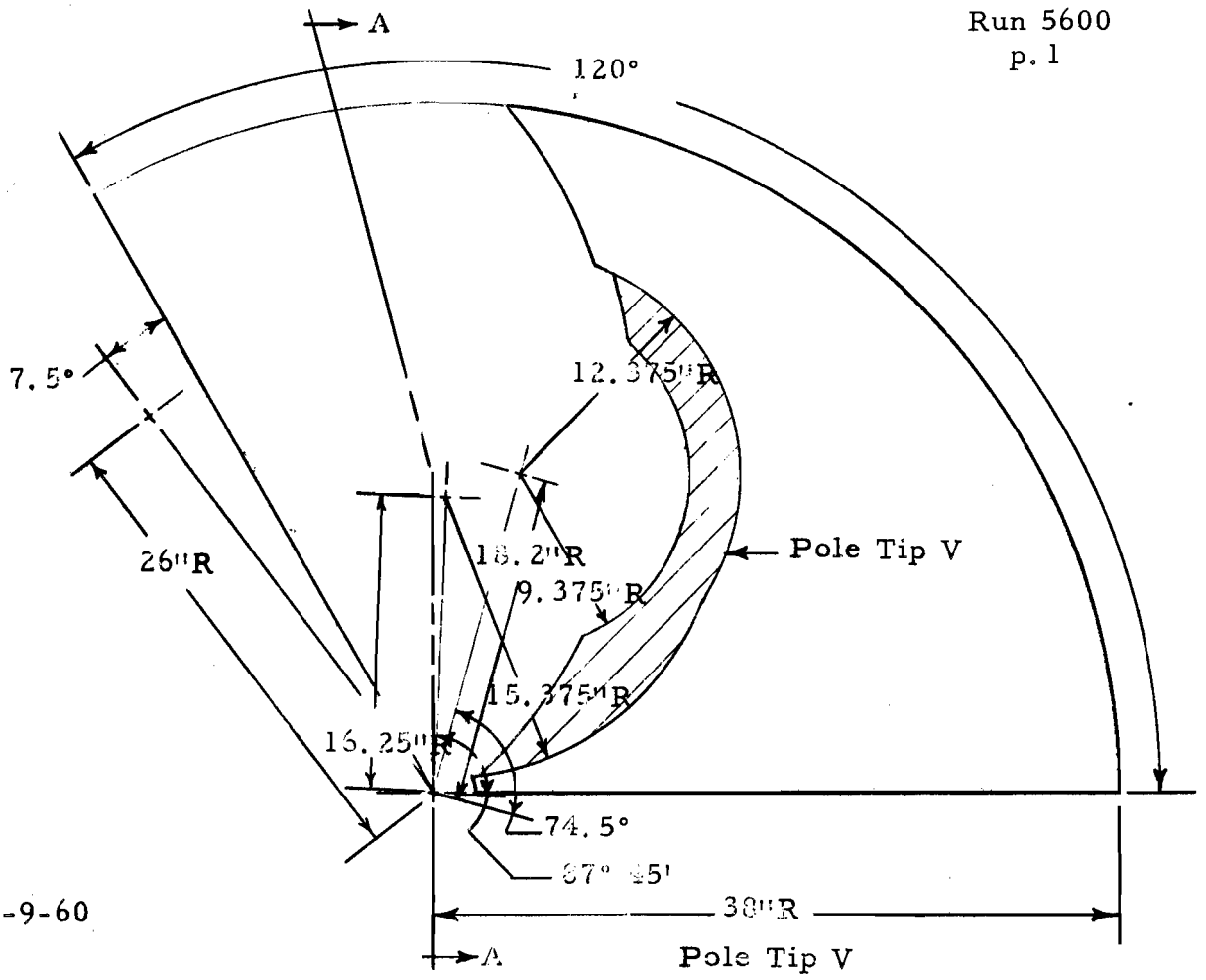


Proton 70 Mev
at 31"

Radius - Inches

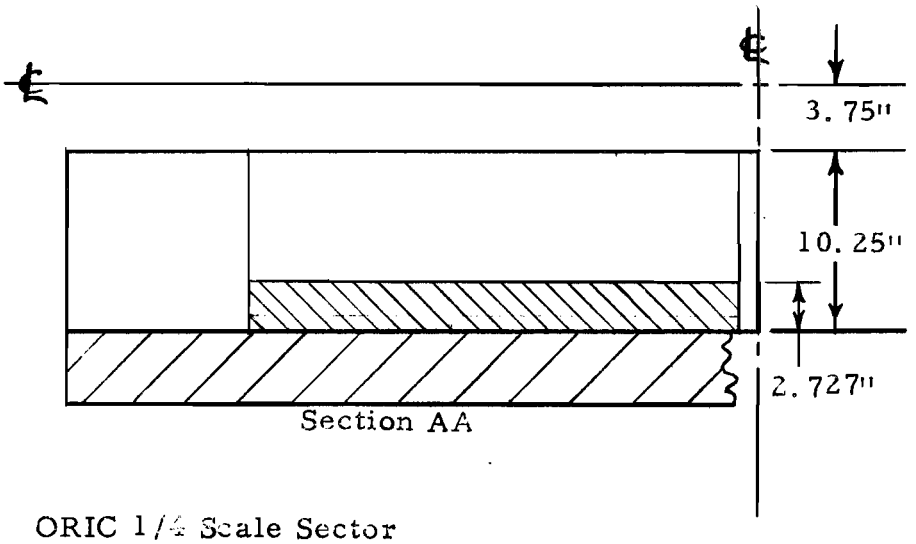
Run 5550

Run 5600
p. 1

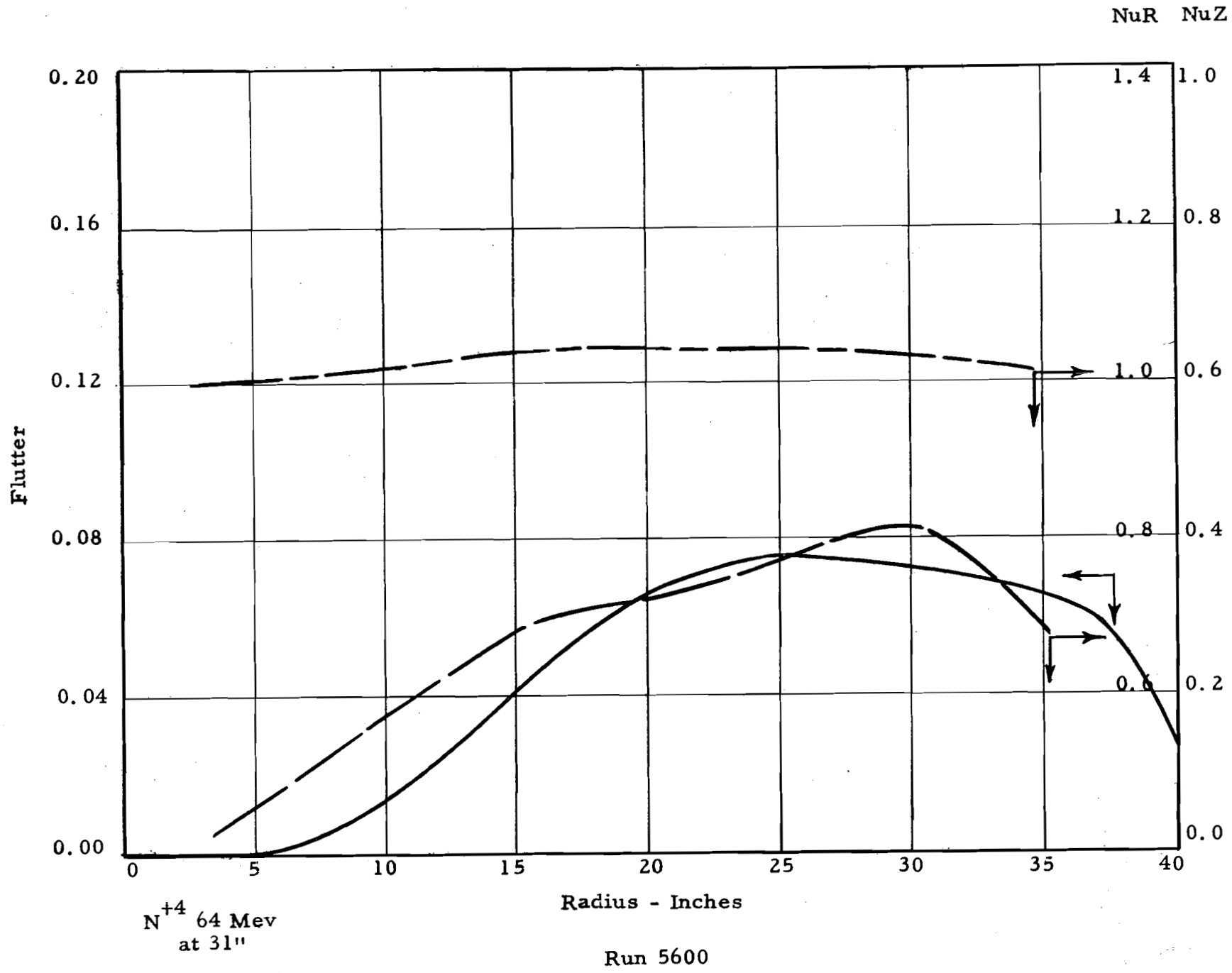


9-9-60

Full Scale Parameters
Main Coils 0.524 x 10^6 ampere turns
Pole Tip V in all 3 sectors

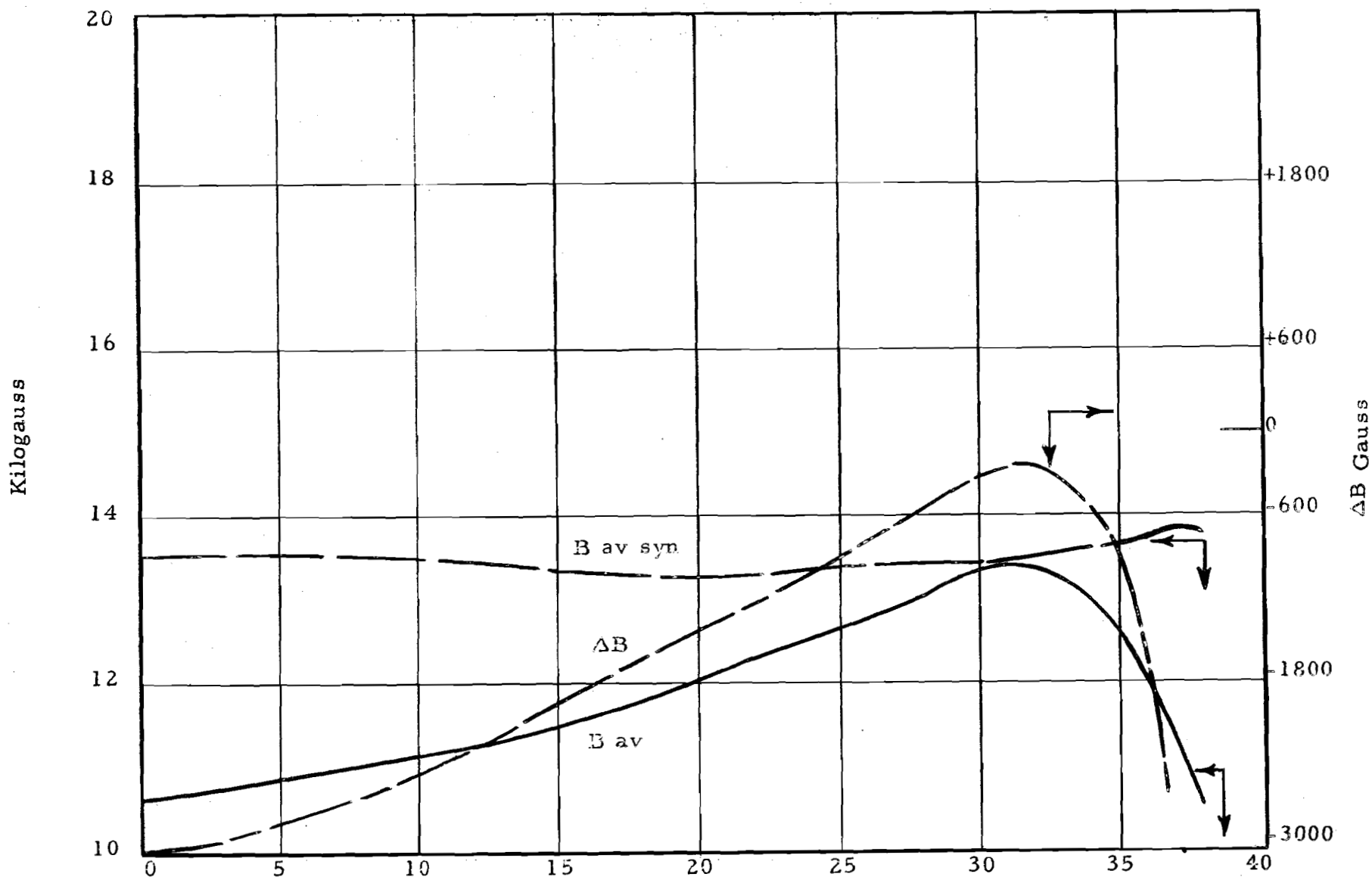


ORIC 1/4 Scale Sector



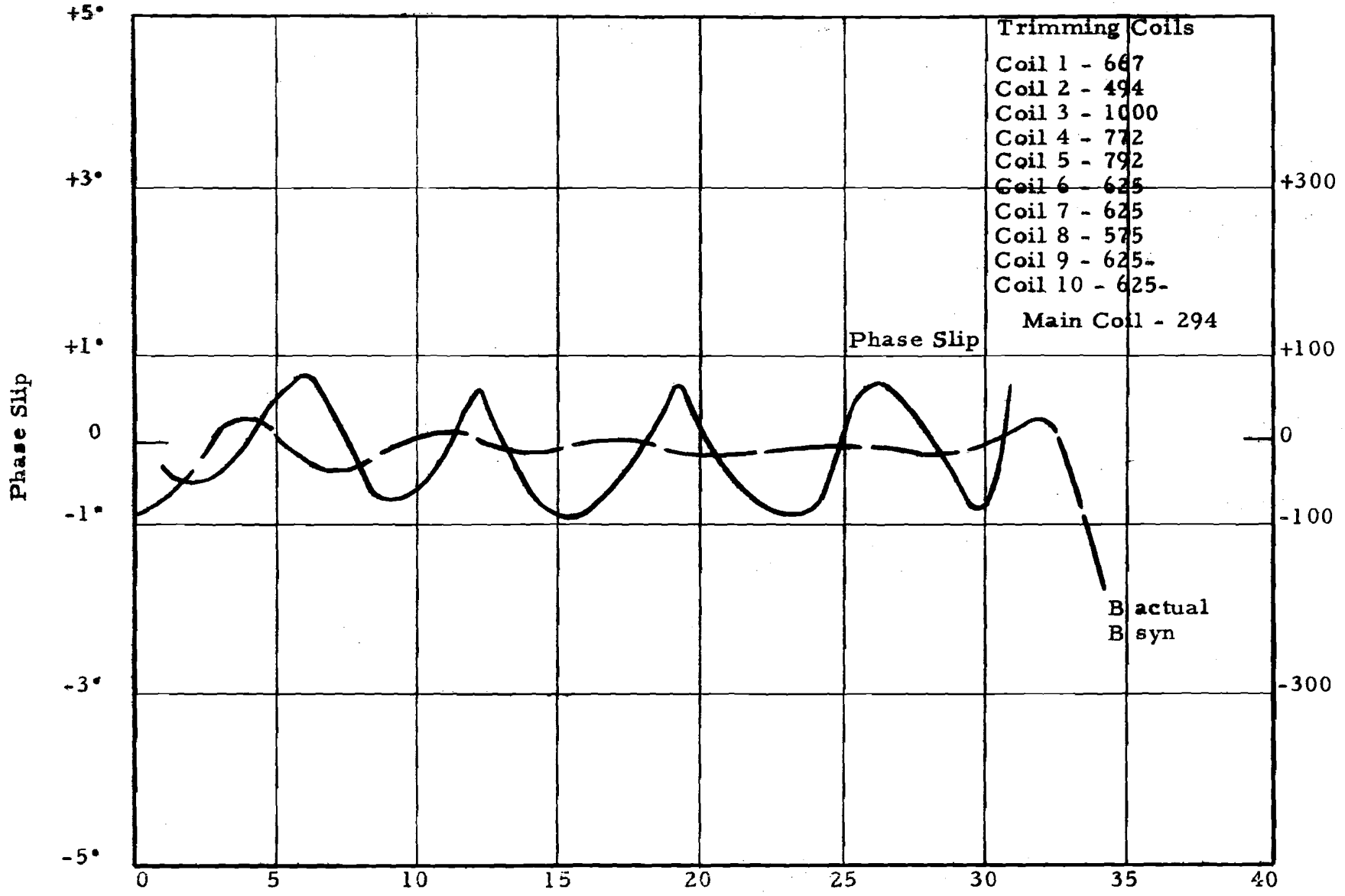
N^{+4} 64 Mev
at 31"

Run 5600



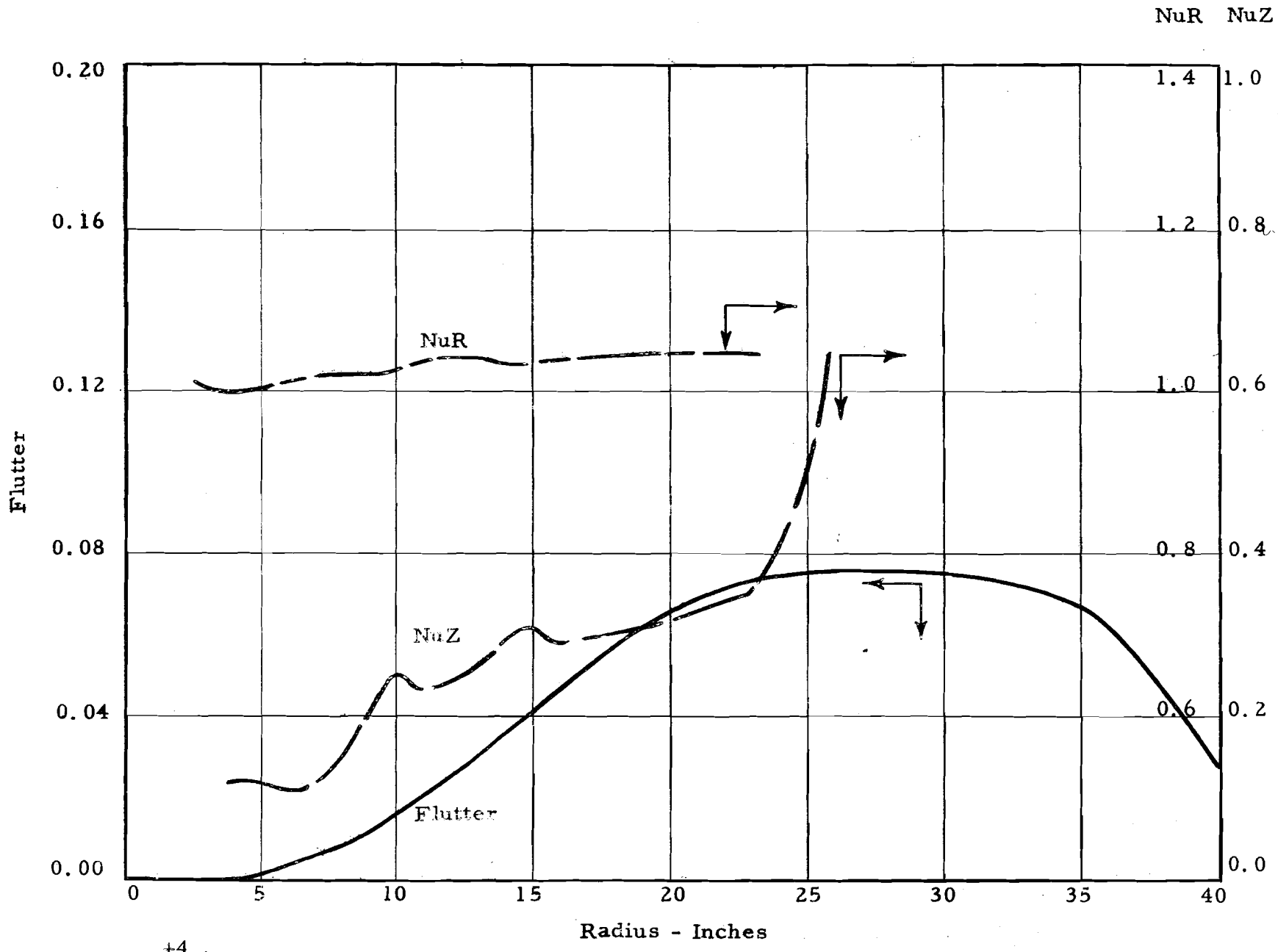
N^{+4} 64 Mev
at 31"

Run 5600



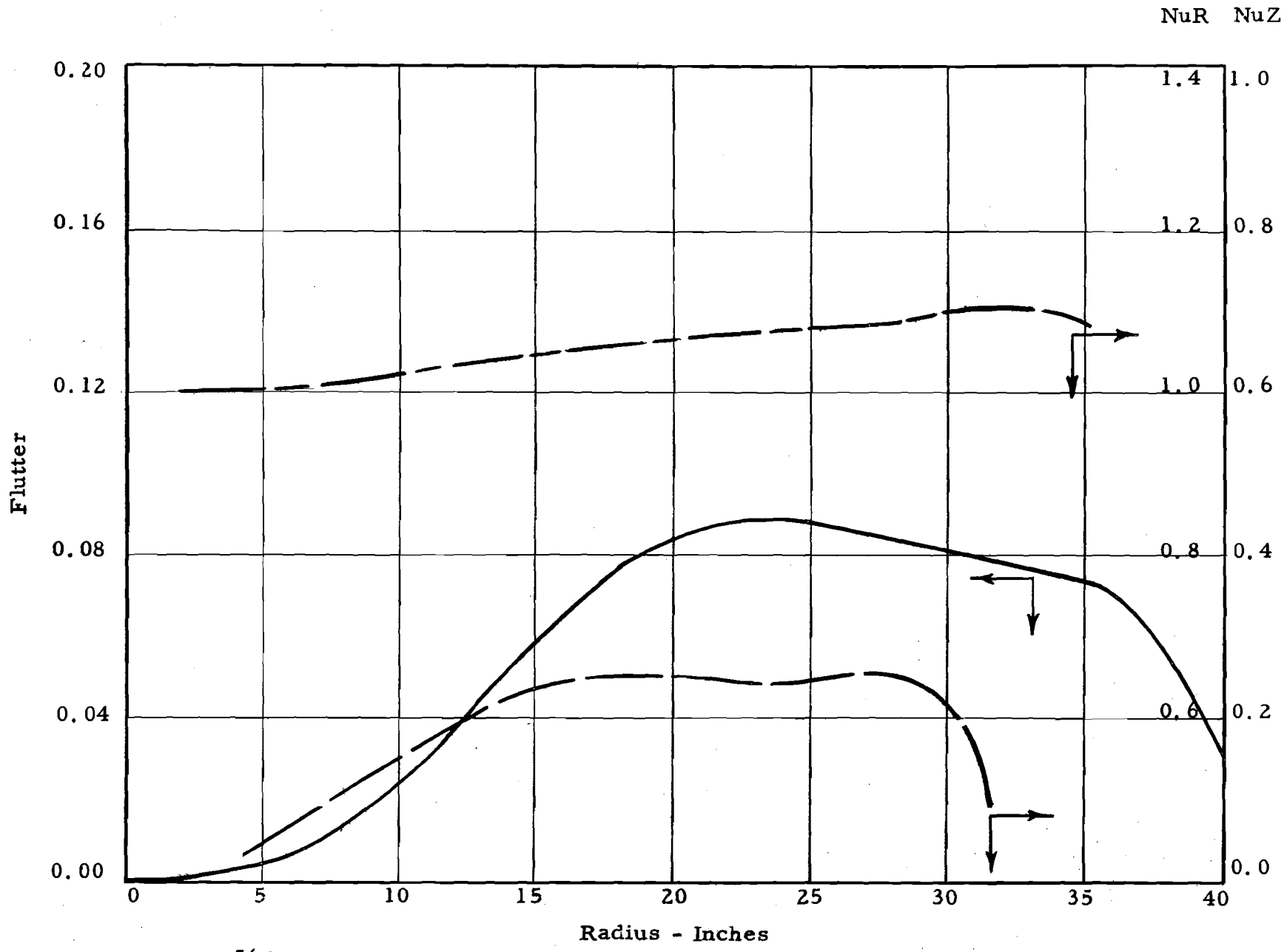
Nitrogen 64 Mev
at 31"

Run 5600



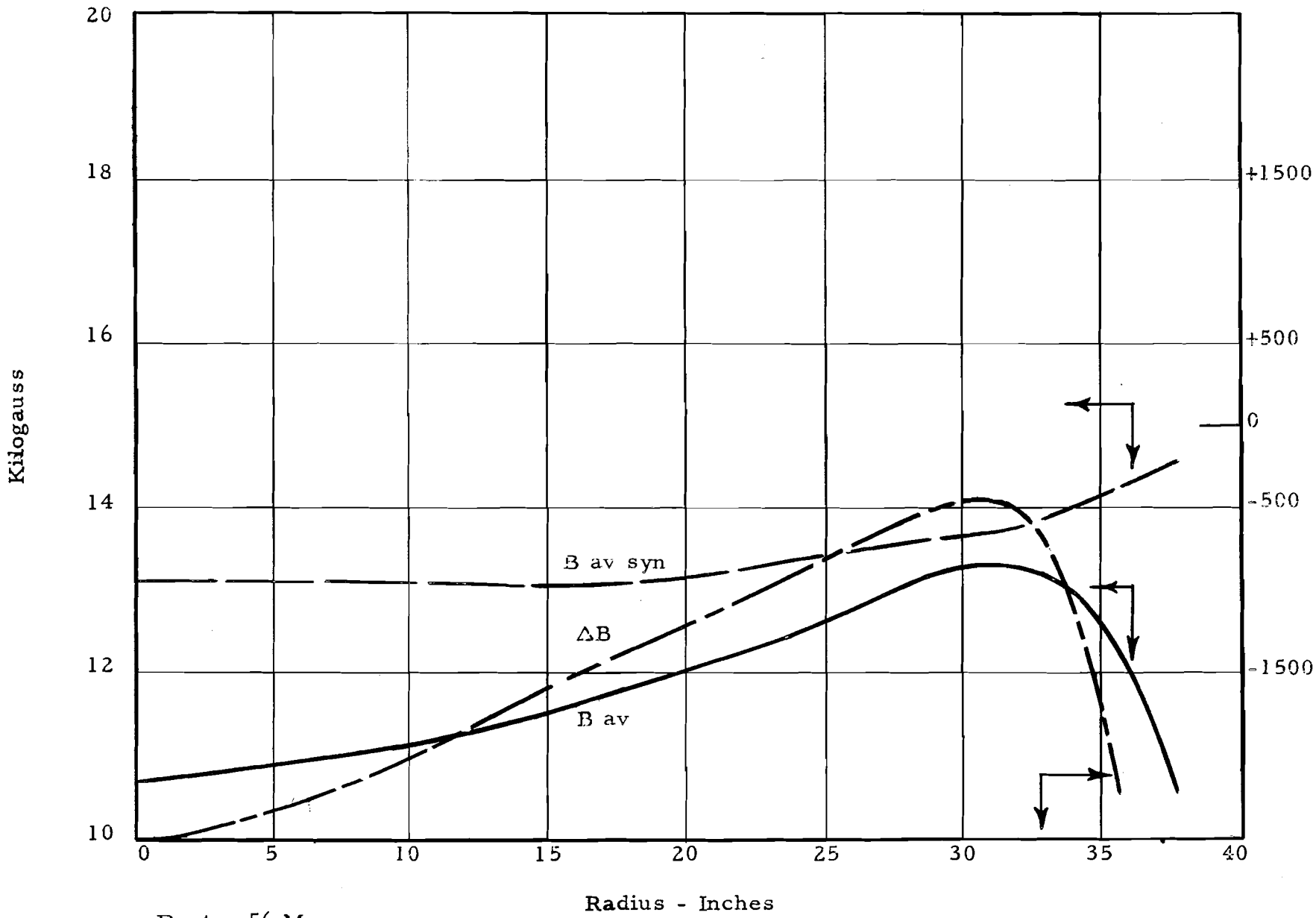
N^{+4} 64 Mev
at 31"

Falderal Run 5600



Proton 56 Mev
at 31"

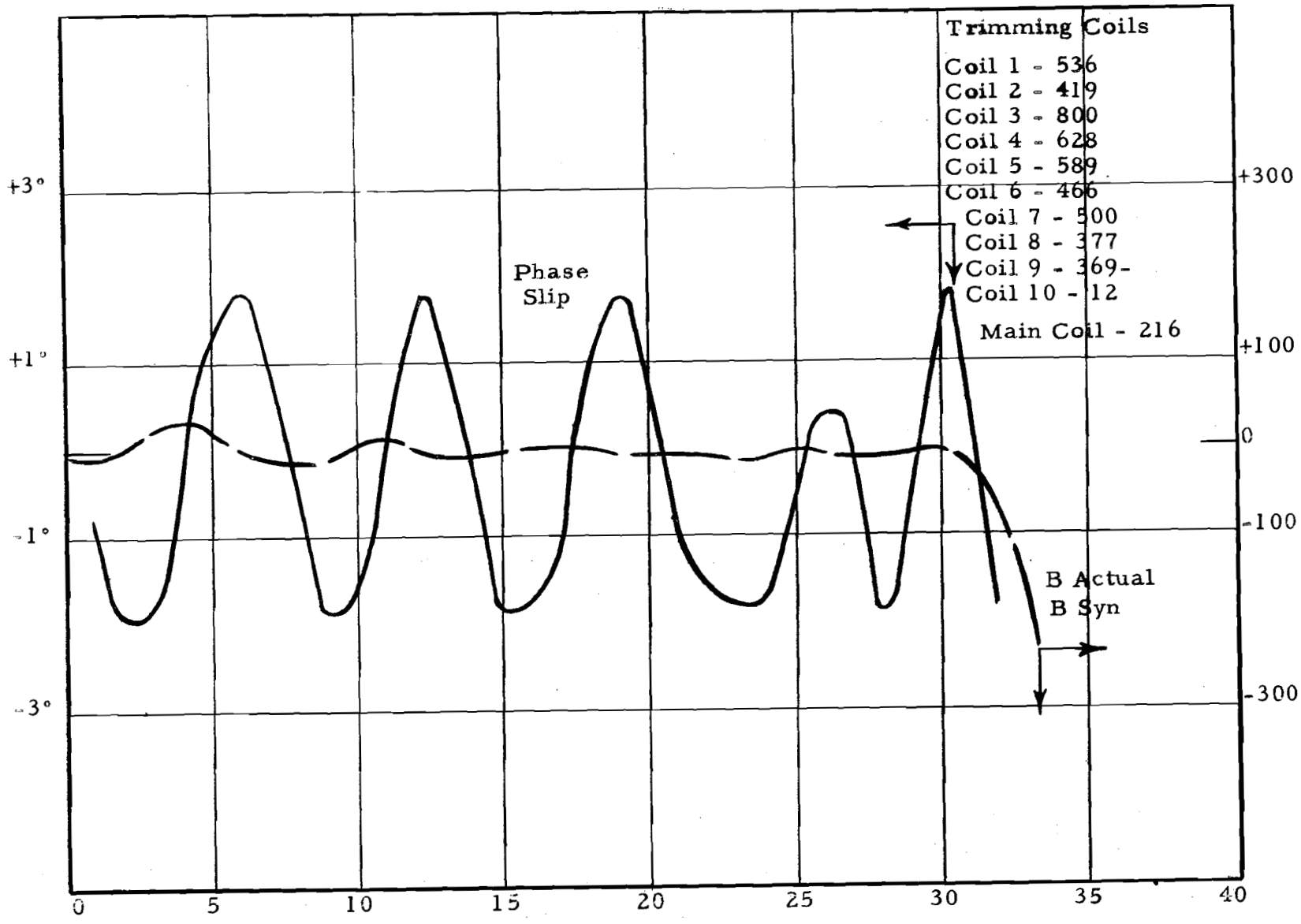
Run 5650



Proton 56 Mev
at 31"

Run 5650

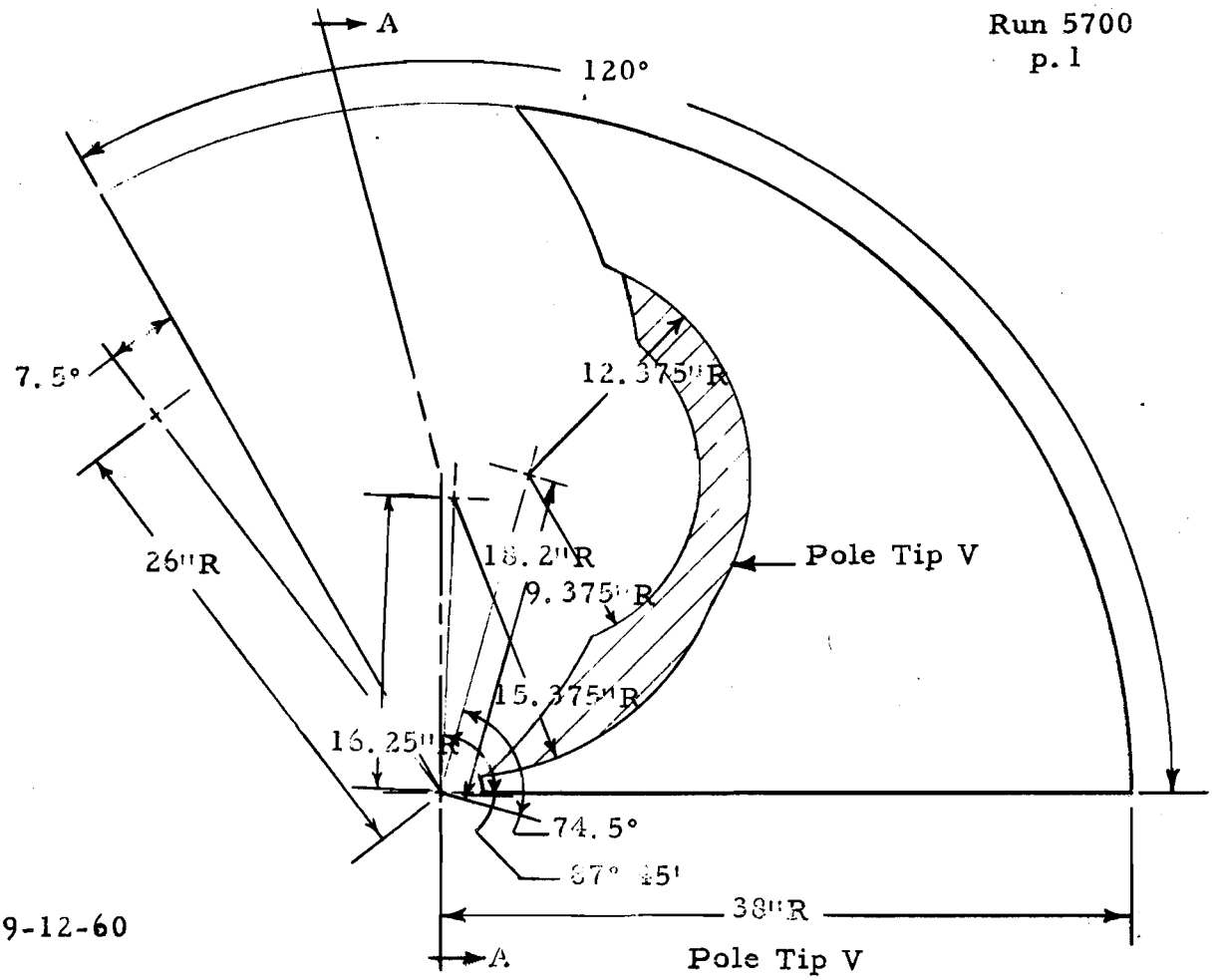
Run 5650
p. 7



Proton 56 Mev
at 31"

Run 5650

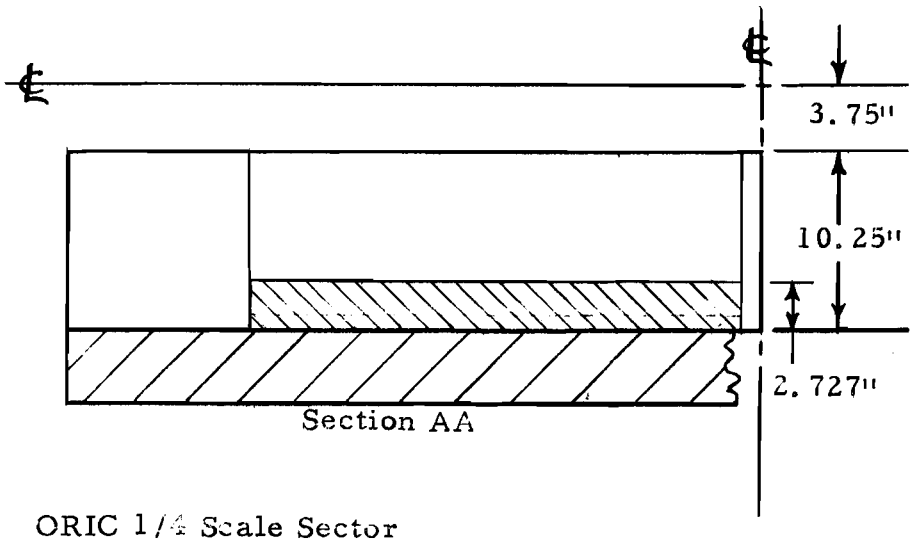
Run 5700
p. 1



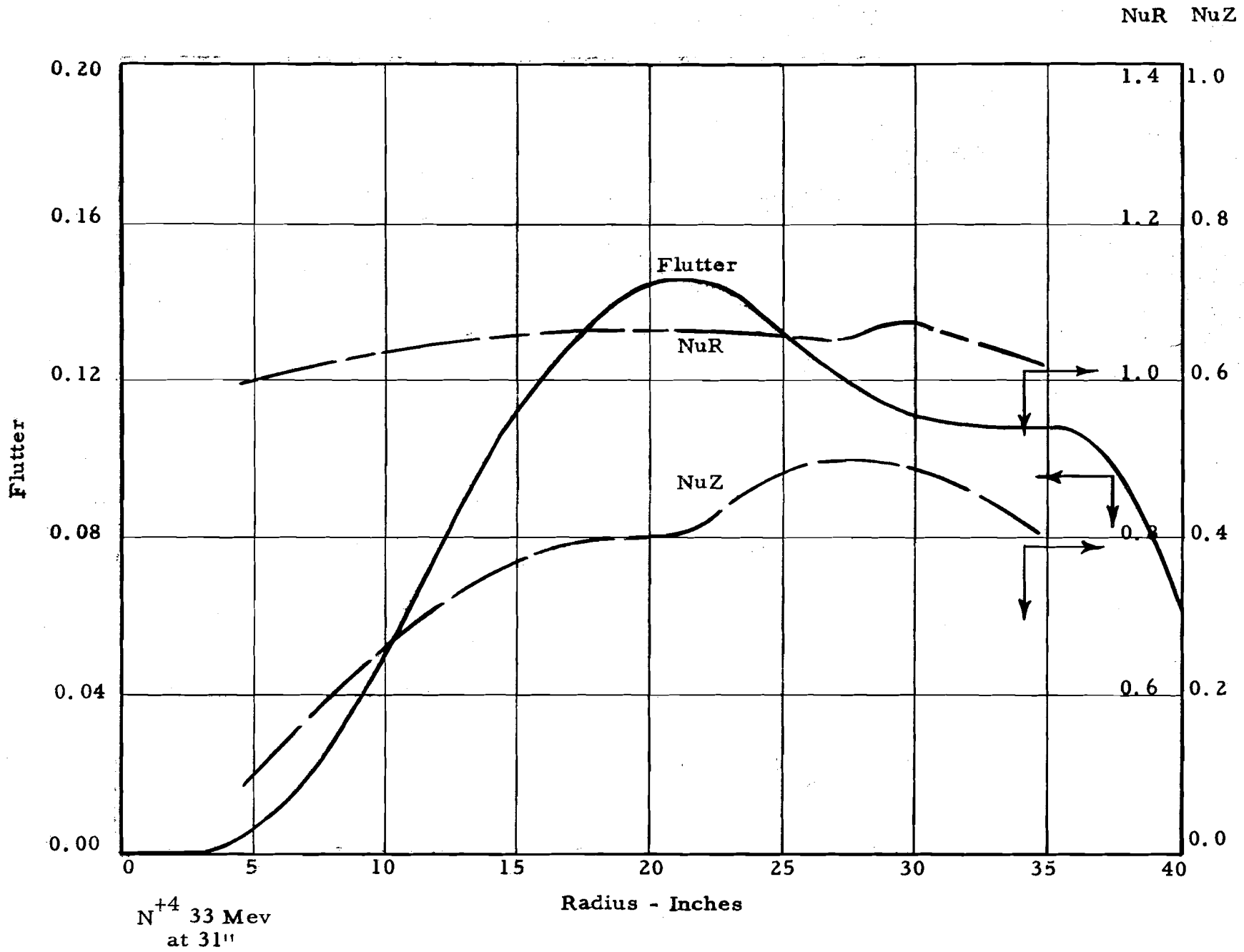
9-12-60

Full Scale Parameters

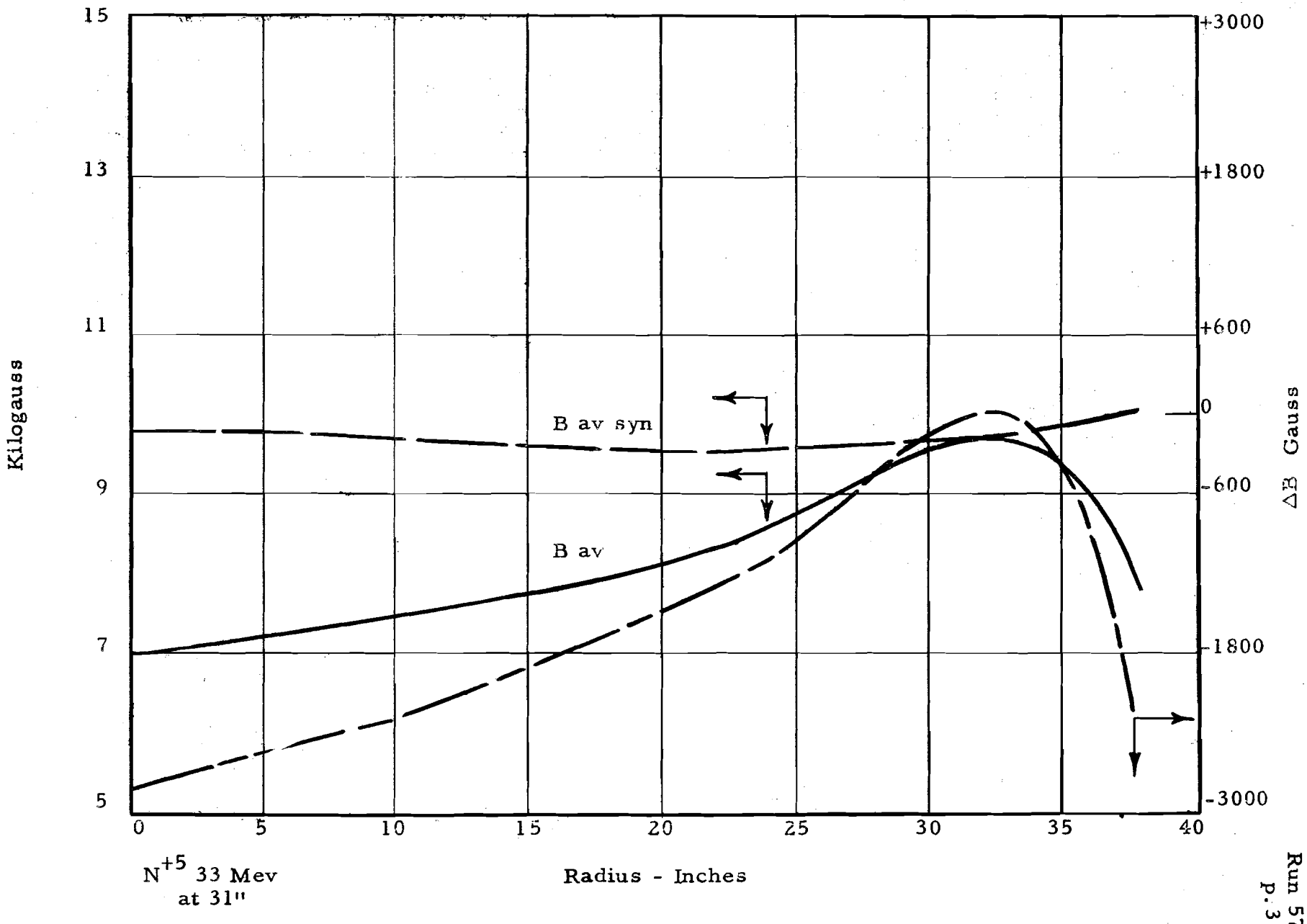
Main Coils 0.231×10^6 ampere turns
Pole Tip V in all 3 sectors



ORIC 1/4 Scale Sector


NuR NuZ
0.20
0.16
0.12
0.08
0.04
0.00
Flutter
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Flutter
NuR
NuZ
0
5
10
15
20
25
30
35
40
Radius - Inches
N^{+4} 33 Mev
at 31"

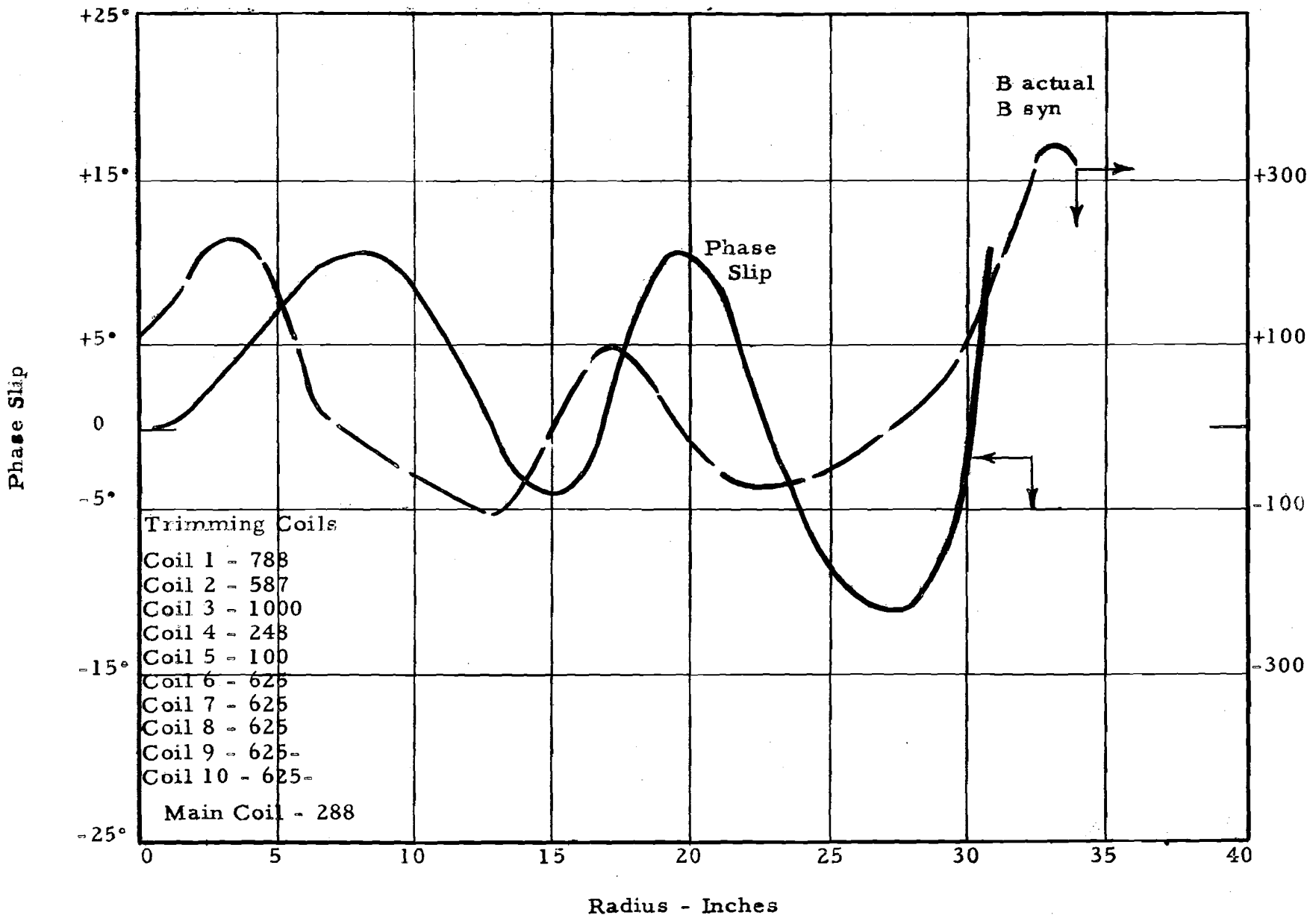
Run 5700



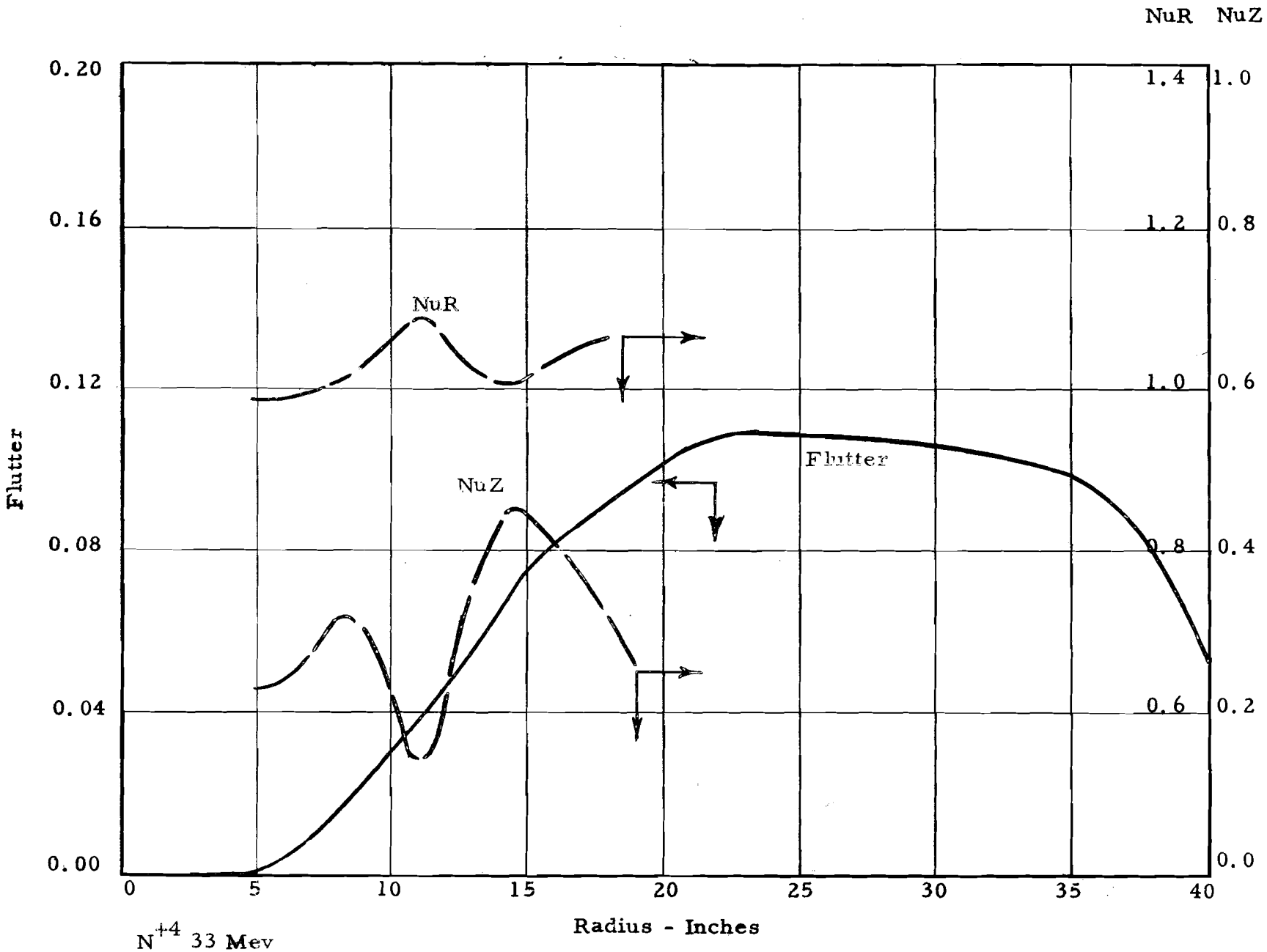
N^{+5} 33 Mev
at 31"

Run 5700

Run 5700
P.3

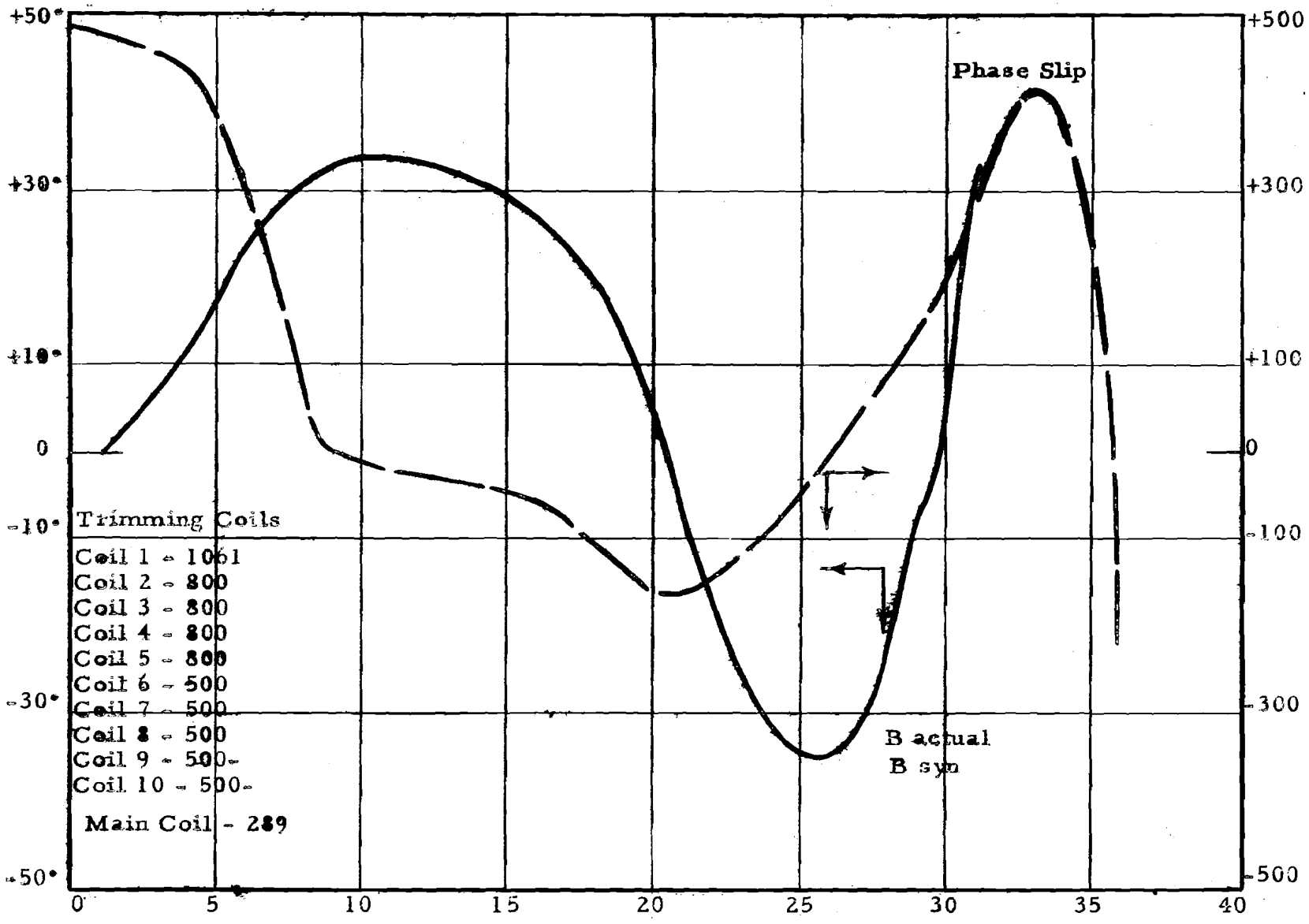


Phase Slip Run 5700



N^{+4} 33 Mev
at 31"

Falderal Run 5700

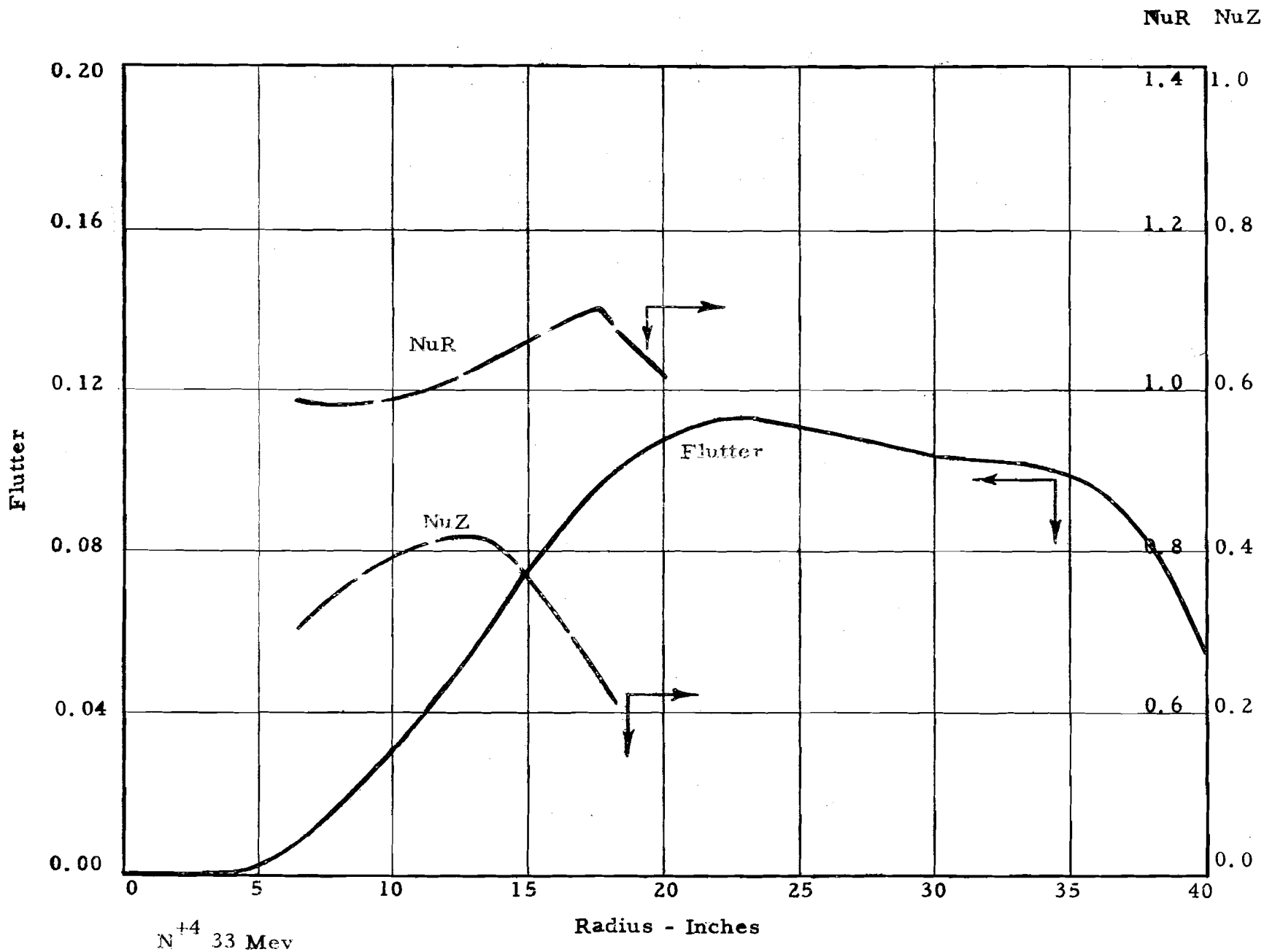


N^{+4} 33 Mev
at 31"

Radius - Inches

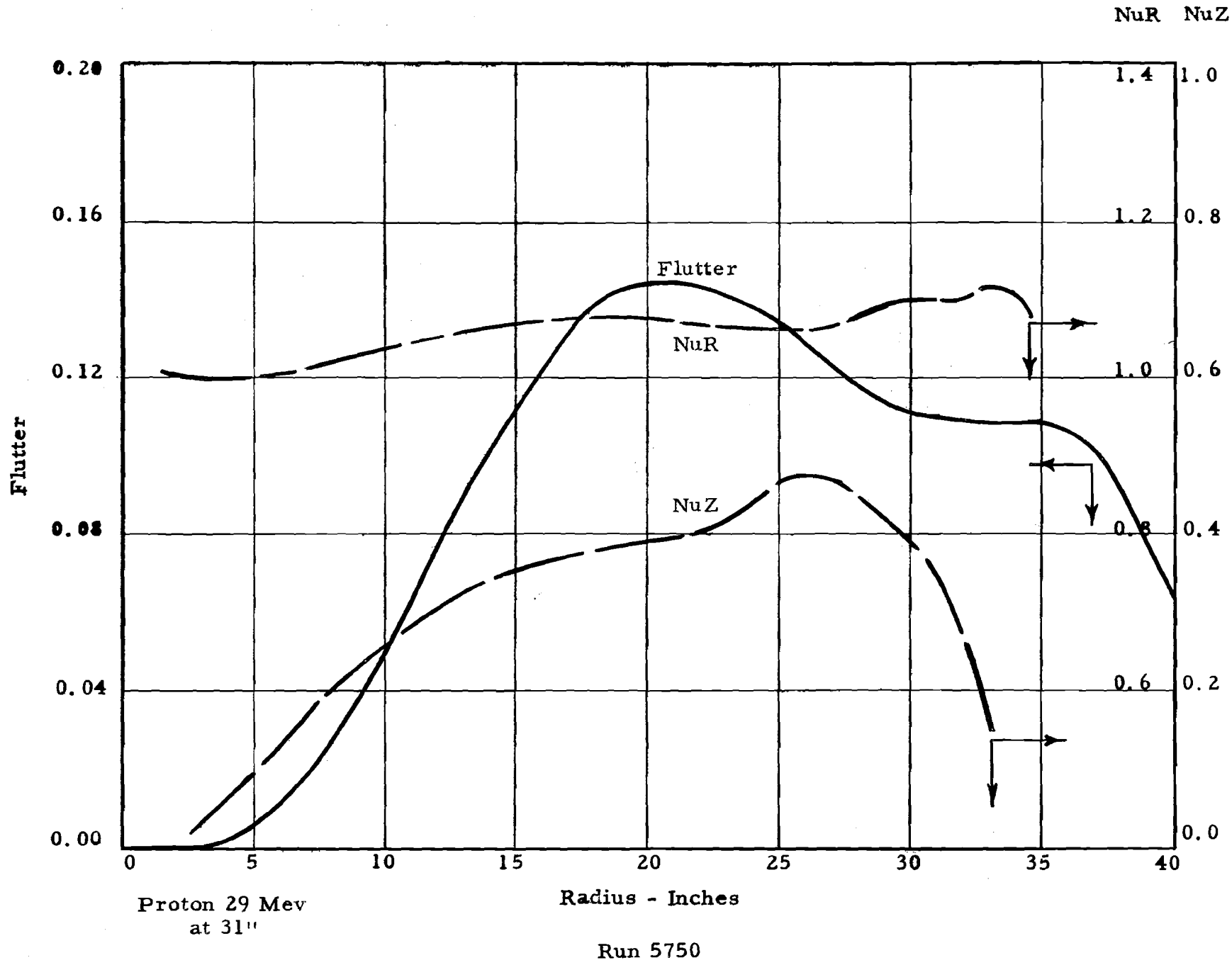
Phase Slip Run 5700

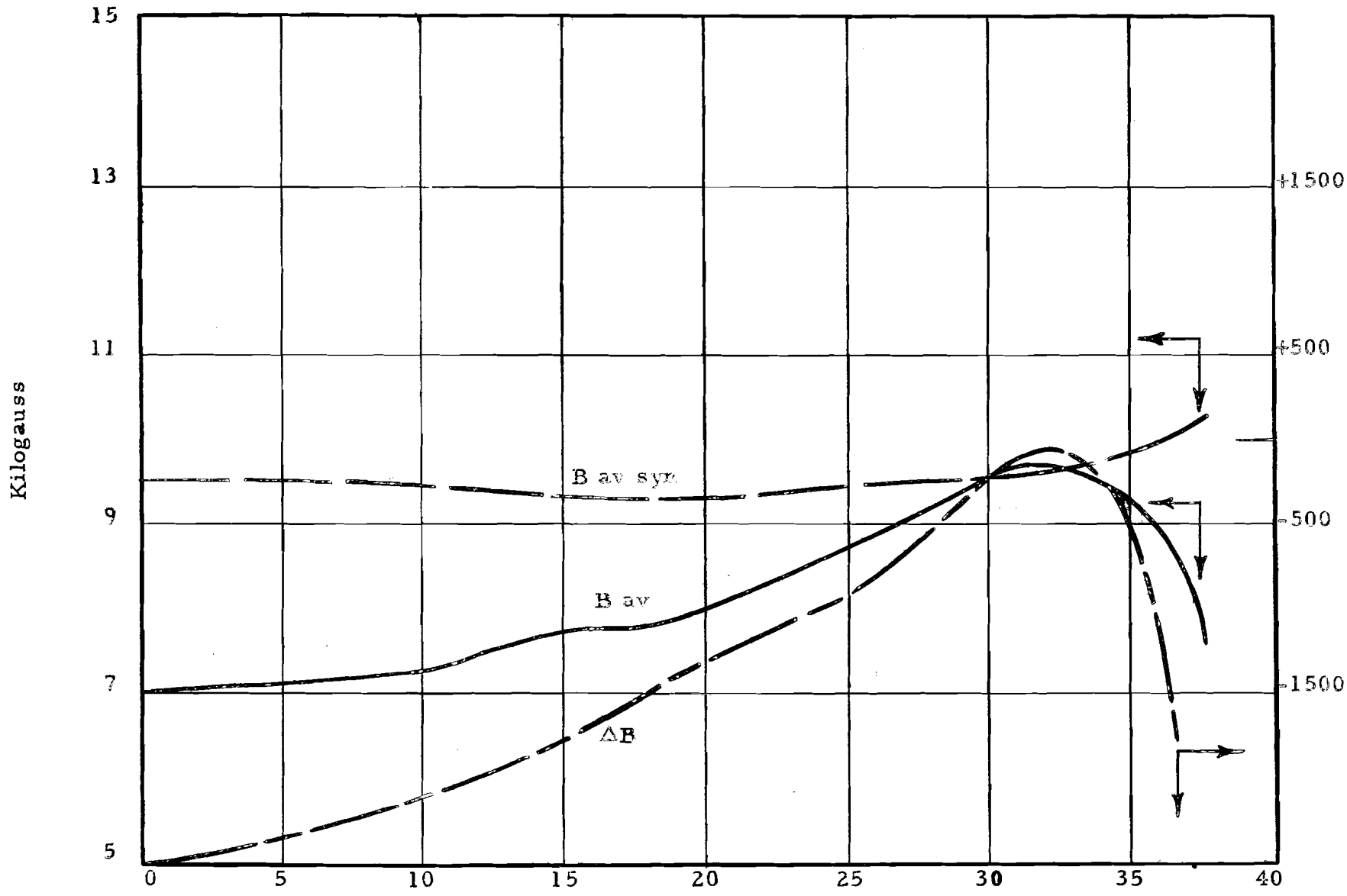
Run 5700
p. 6



N^{+4} 33 Mev
at 31"

Falderal Run 5700

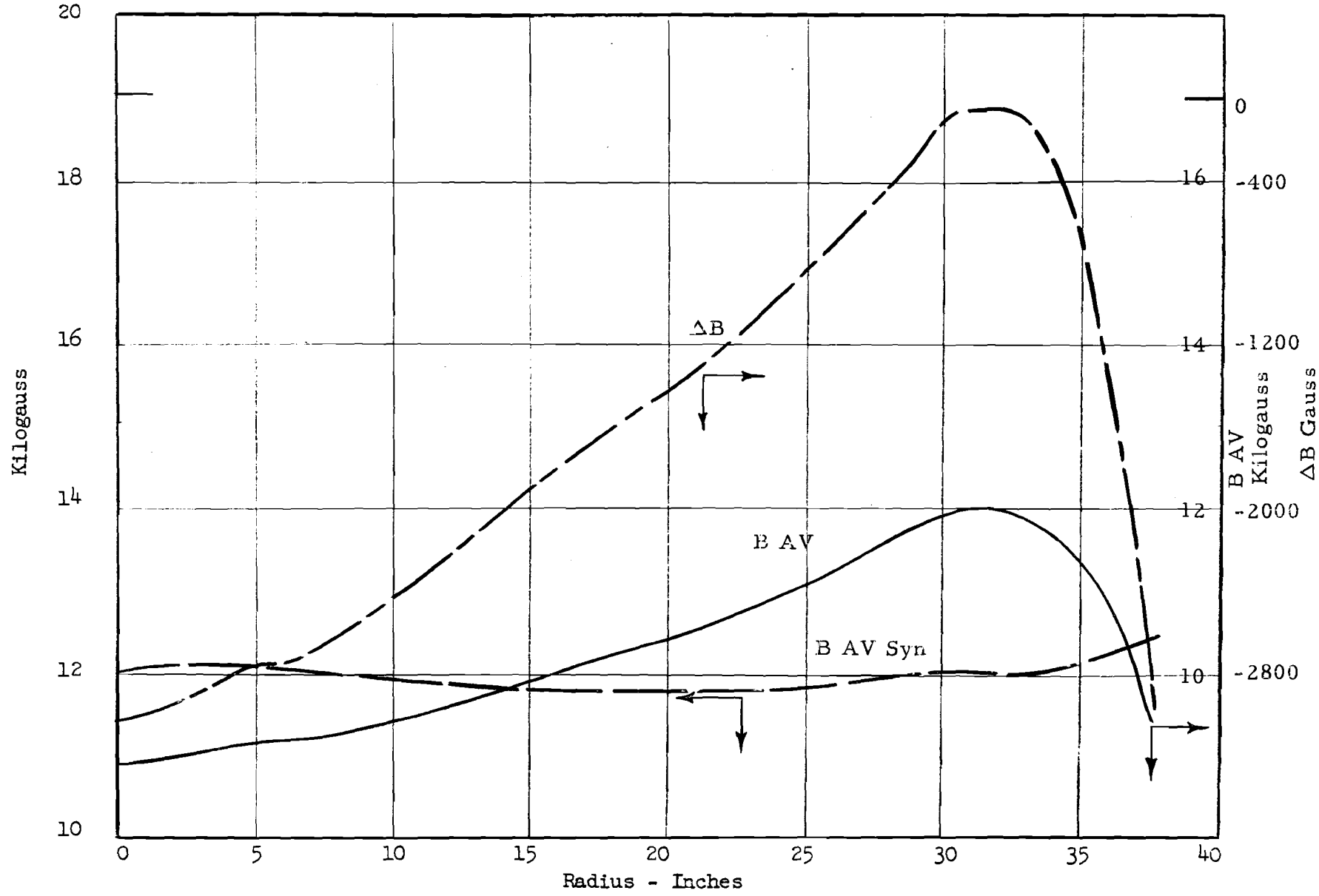

NuR NuZ
0.20
0.16
0.12
0.08
0.04
0.00
Flutter
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1.0
0.8
0.6
Flutter
NuR
NuZ
0
5
10
15
20
25
30
35
40
Radius - Inches
Proton 29 Mev
at 31"
Run 5750



Proton 29 Mev
at 31"

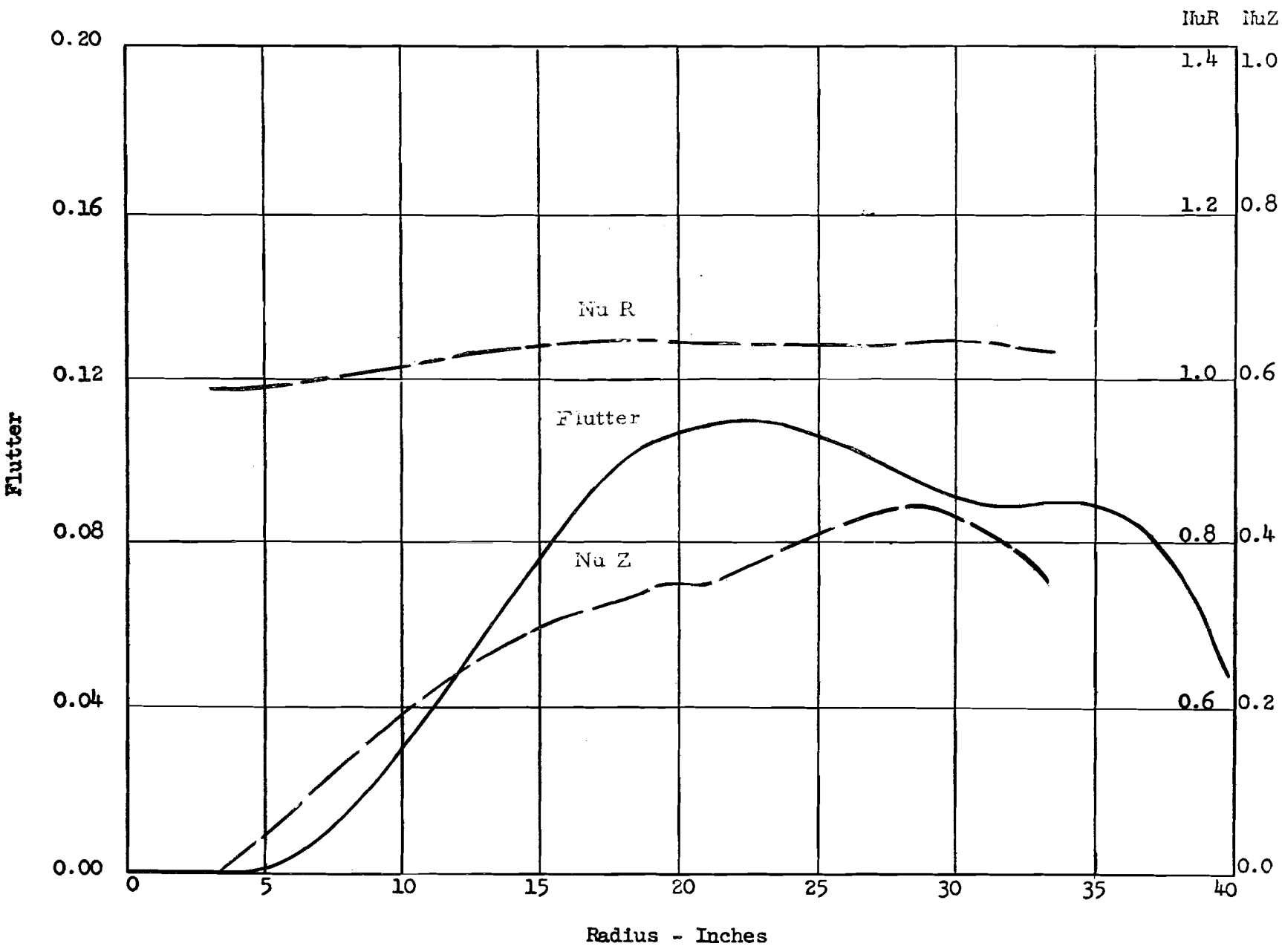
Run 5750

Run 5750
P. 9



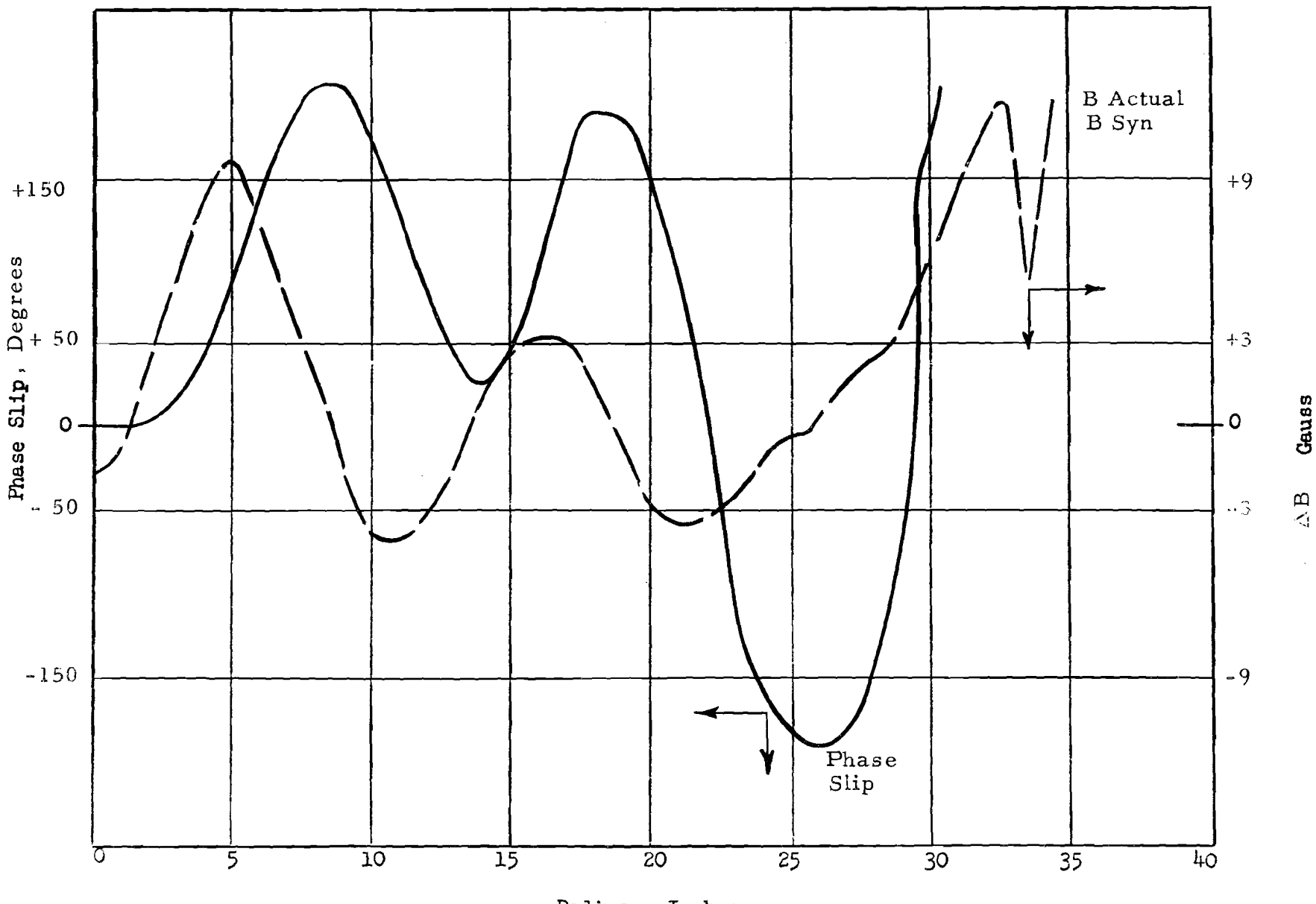
50 Mev Nitrogen

Run 5800



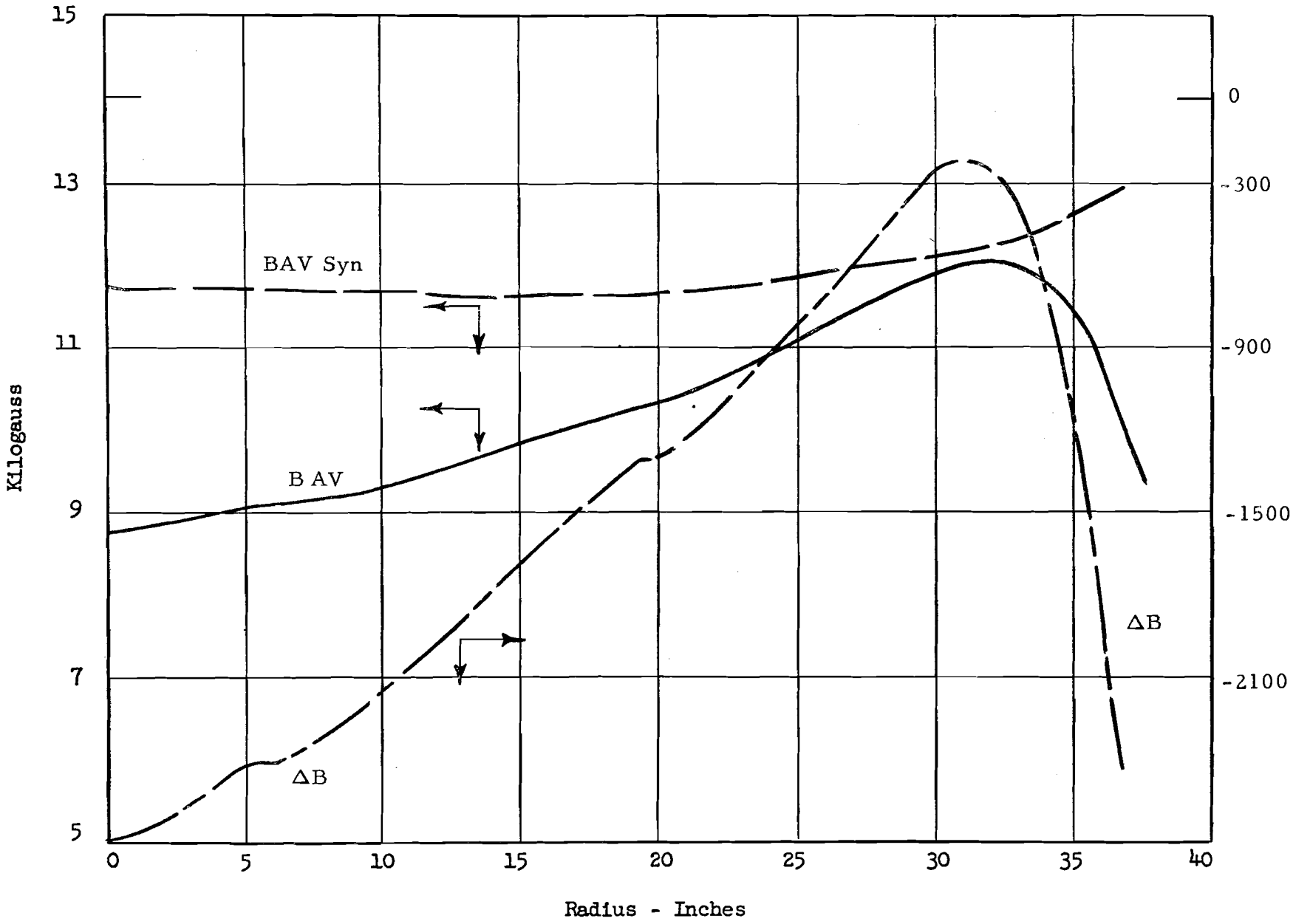
50 Mev Nitrogen

Run 5800



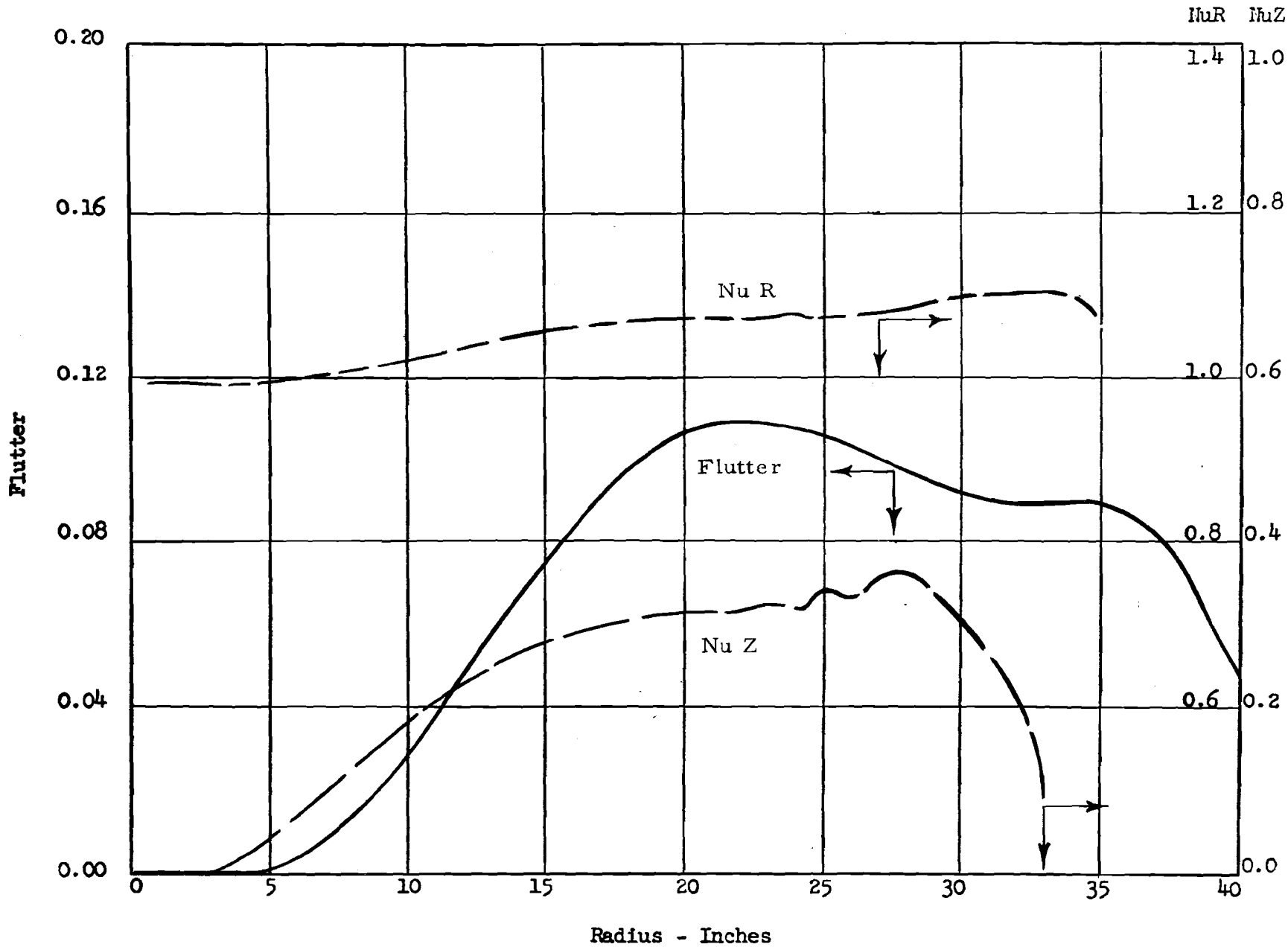
50 Mev Nitrogen

Run 5800



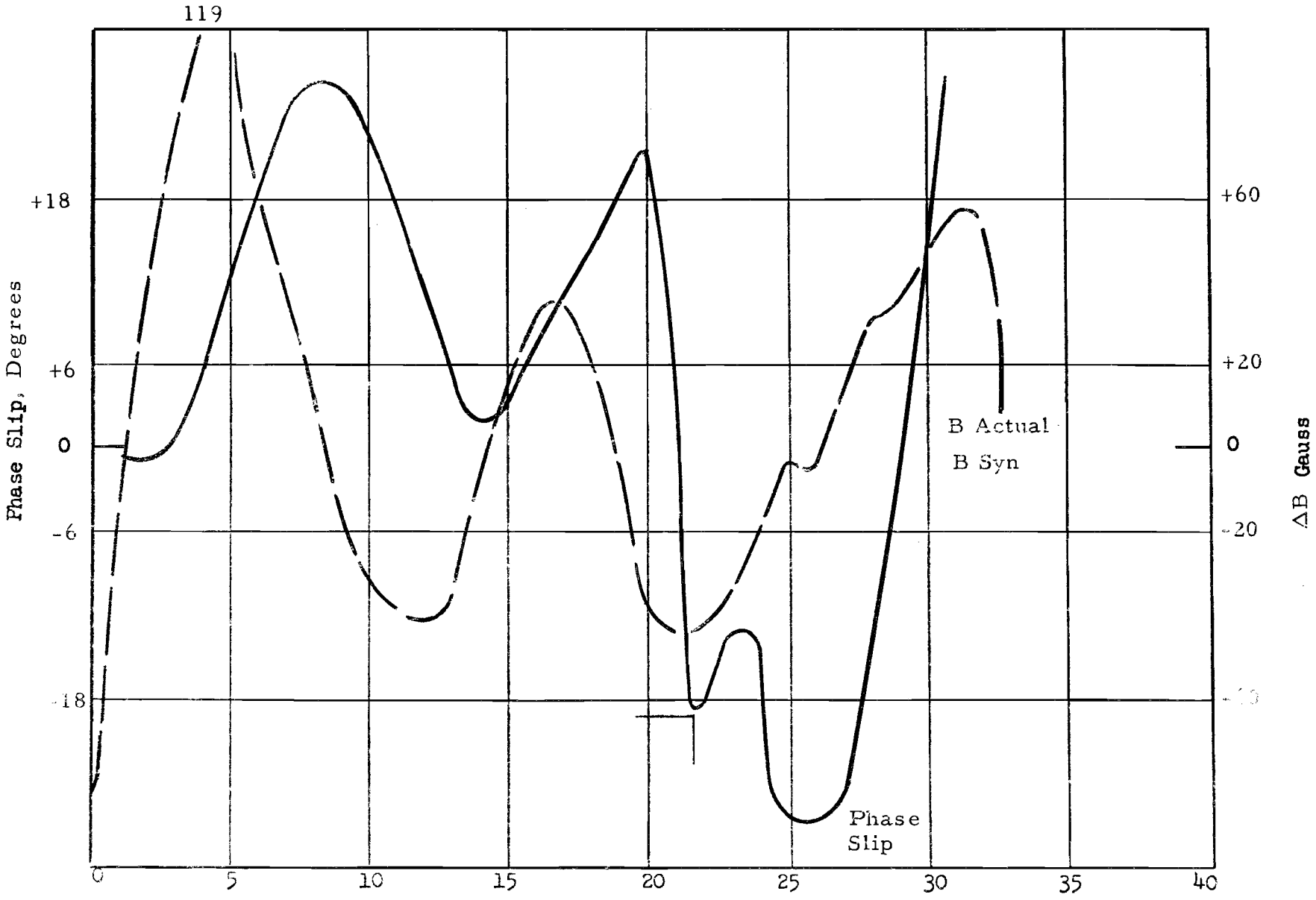
44 Mev Proton

Run 5850



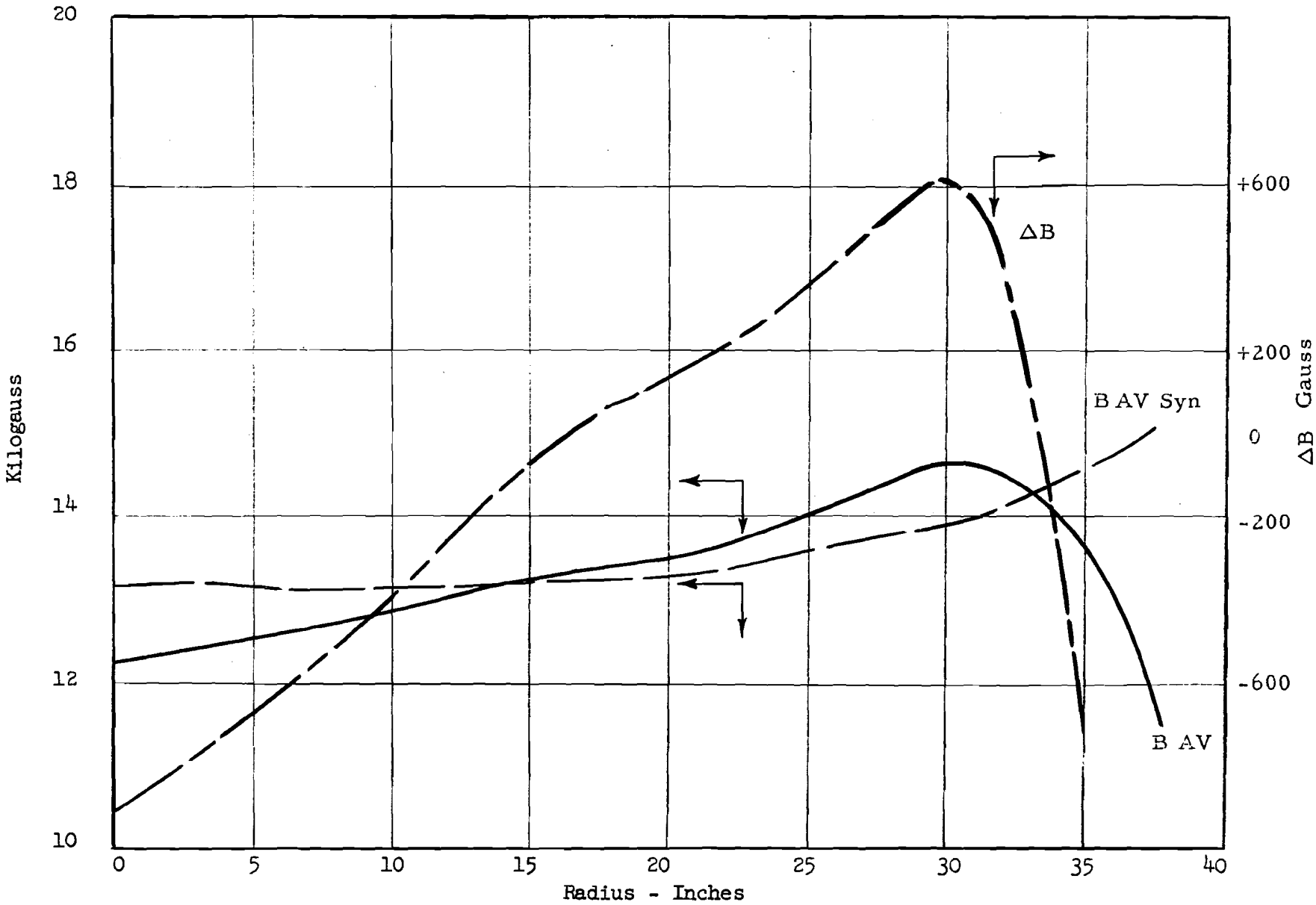
44 Mev Proton

Run 5850



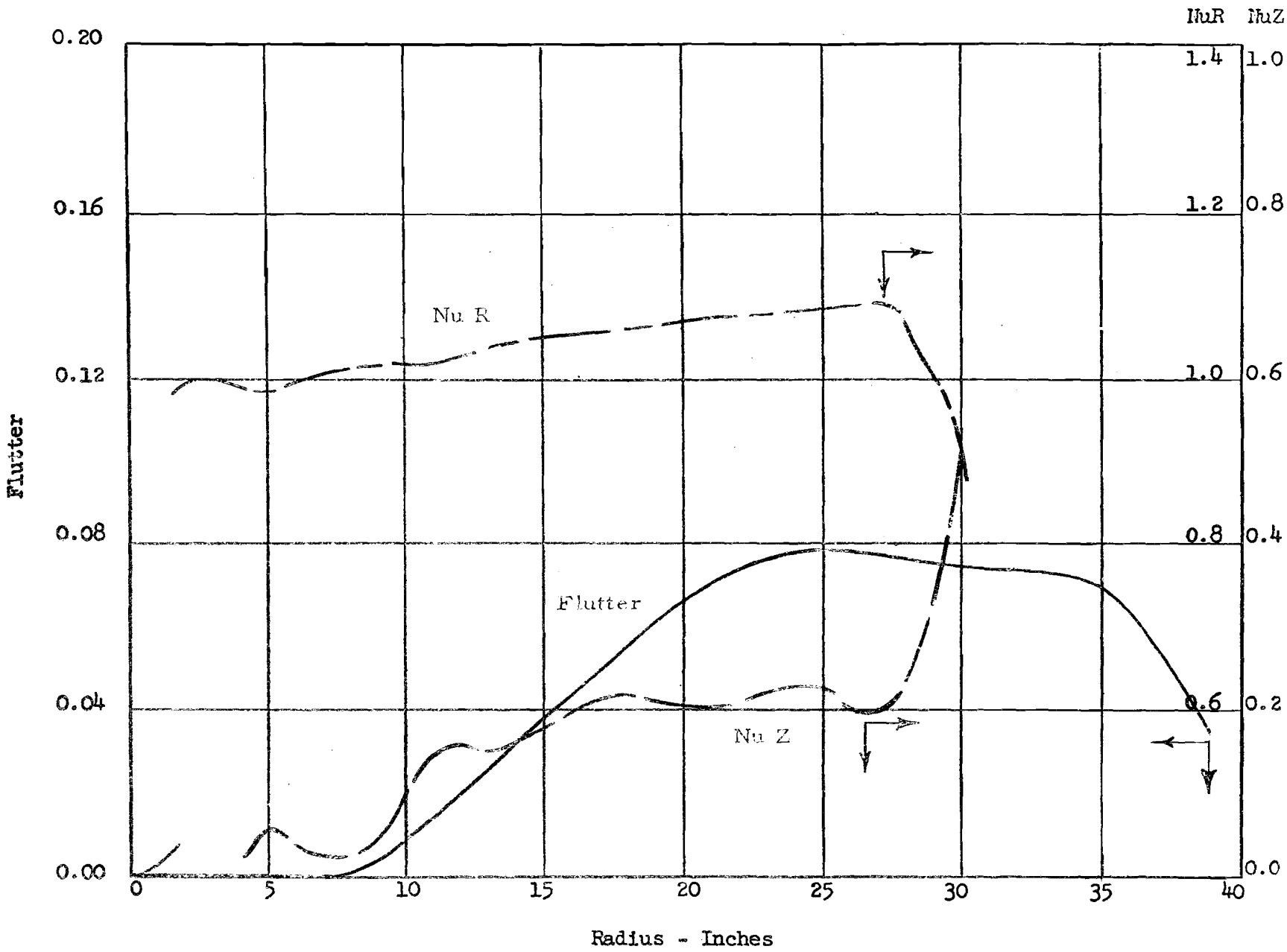
44 Mev Proton

Run 5850



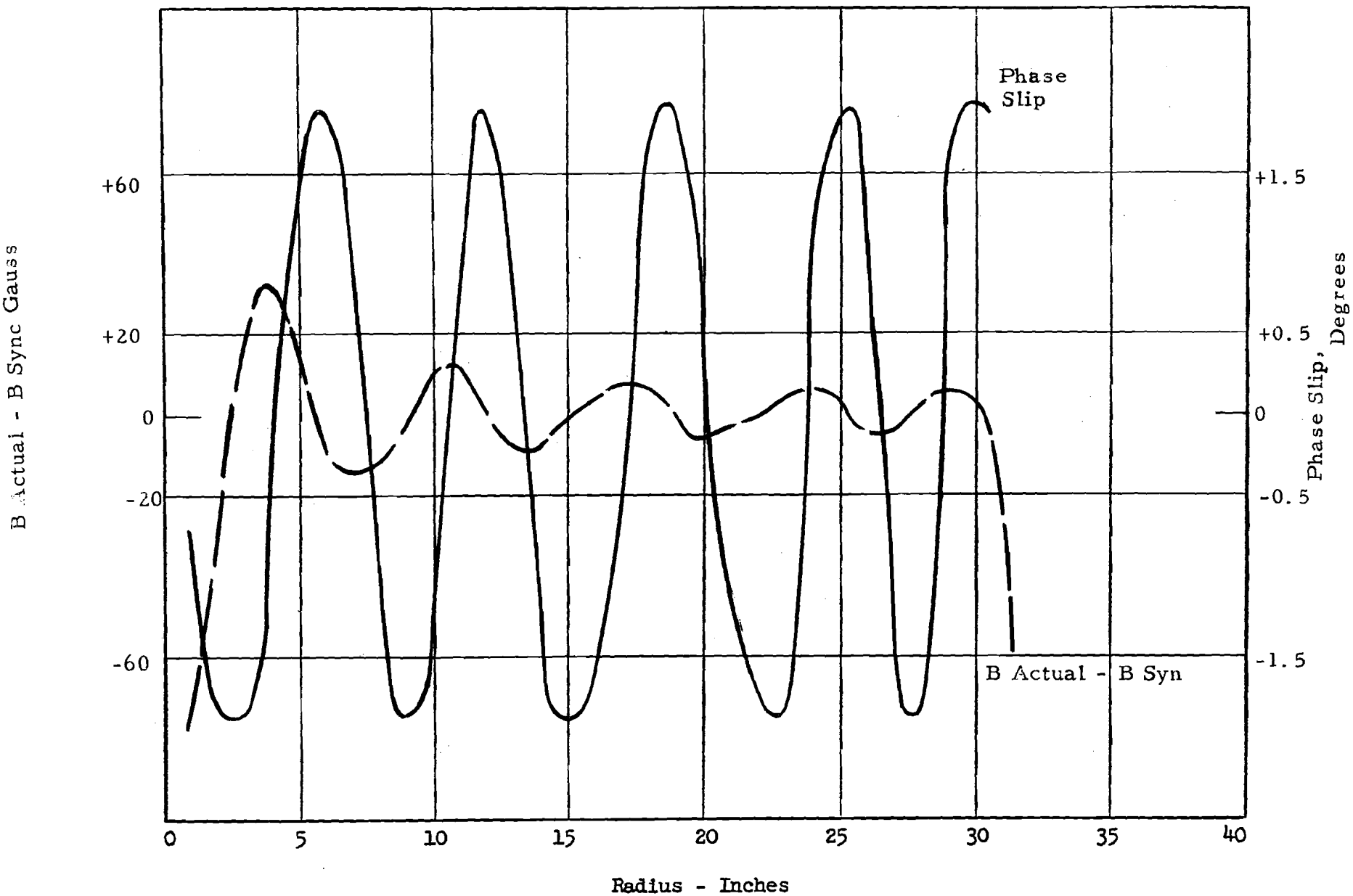
60 Mev Proton

Run 5900



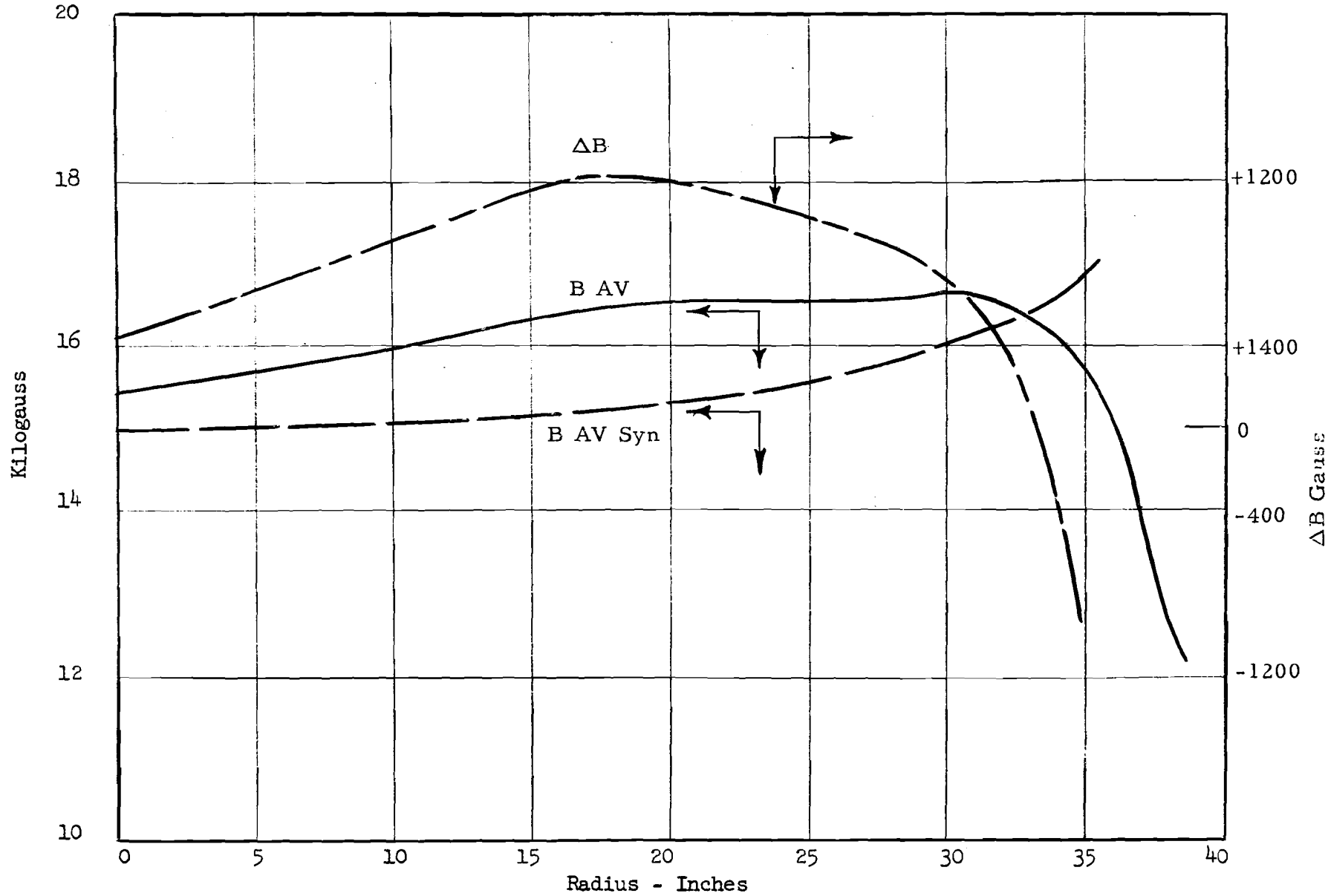
60 Mev Proton

Run 5900



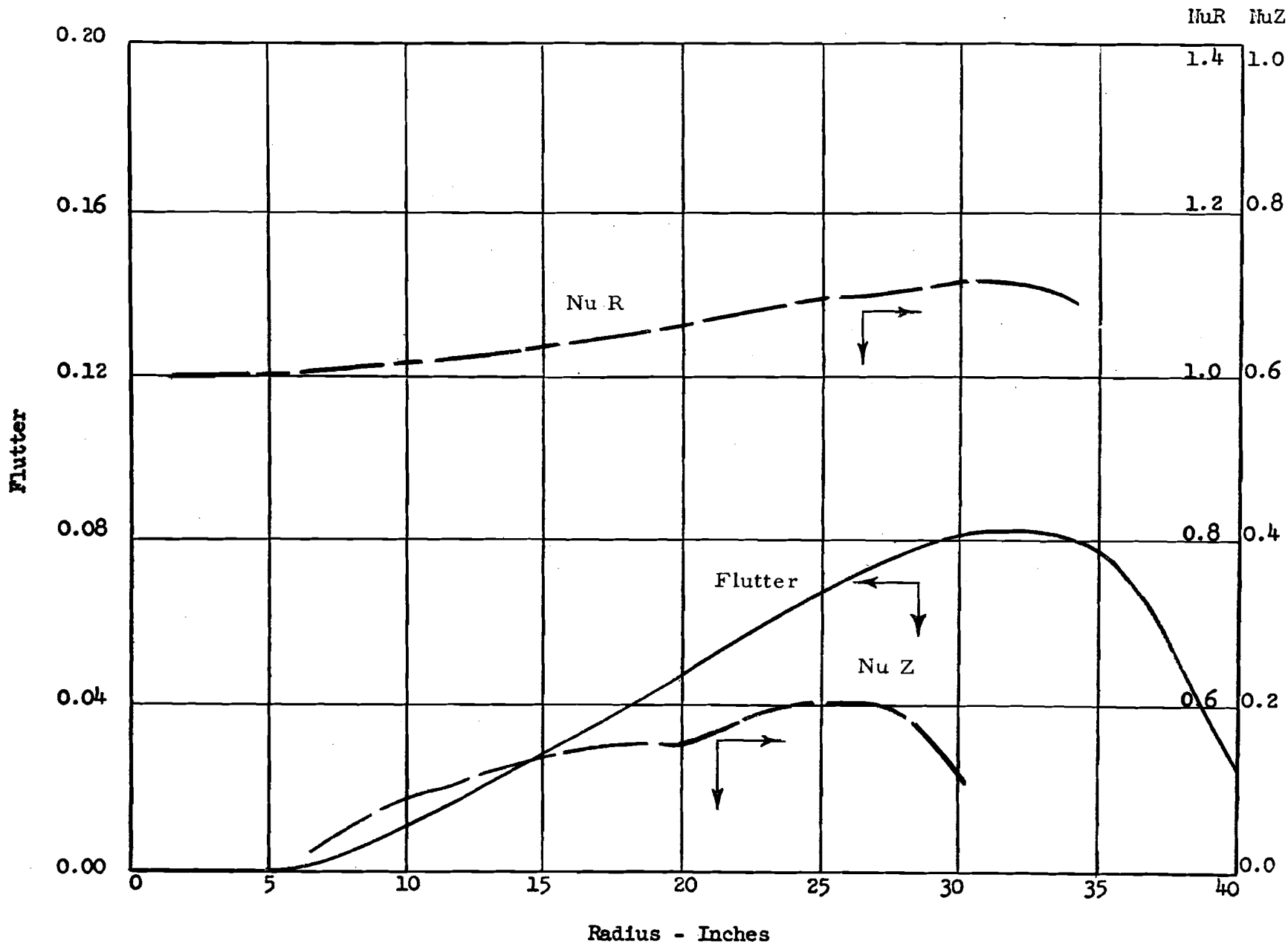
60 Mev Proton

Run 5900



75 Mev Proton

Run 6000



75 Mev Proton

Run 6000

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