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Investigation of A-line Transport Losses

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Date 10/27/77 Time 1800-2000 Experimenters J.W. Glenn

Subject Investigation of A Line Transport Losses

OBSERVATIONS AND CONCLUSION

1) Swept beam vertically with CP033 and AP109. Though not at an optimum for A line, the loss at AD5-6 and the A transmission are near minimum and maximum for the typical settings of CP033 and AP109 (Figs. 1,2).

2) Increased A line intensity from a typical ~ 9% (of CE010) to ~ 15%. After a quick optimization of beam to B&C the best delivery [(A+B+C)/C10)] was 68% (vs. 77% for 9% on A). Thus it appears 1.7 protons are required to deliver 1 proton to A target.

3) The beam was swept at the entrance to AD1 with CD014. The delivery to B&C was ignored. The transmission increased by ~ 30% while the losses on AD1 dropped ~ 30%. The losses on AD5-6 went up by a factor of ~ 3 (Fig. 3).

4) Beam was steered with combinations of AD1T, AD1-8 and AD242. Increasing AD1T to its limit helped slightly but increased the losses at AD5-6 (Figs. 4,5,6).

Conclusion: A major part of the loss of beam directed toward A target occurs due to horizontal losses in AD1 and possibly AD2-8.

Recommendations:

1) Vertical positioning should be cleaned up though this is not critical.

2) The optics of CQ1, 2 & 3 should be checked for the possibility of decreasing the focusing of CQ3. This quad could bend the beam into AD1's septum.

3) More loss monitors are needed in the A line with a flag box at the end of AD8. The CO57 SWIC should be operational to check the 1.7:1 ratio.

4) The possibility of running AD019 at higher current should be examined.

Note: The spot was generally centered on the A target but small motions at the A SEC could affect these results.

Note of Figures: A300F ≡ A SEC/CE010 SEC

AD19 ≡ AD19 loss monitor/CE010 SEC

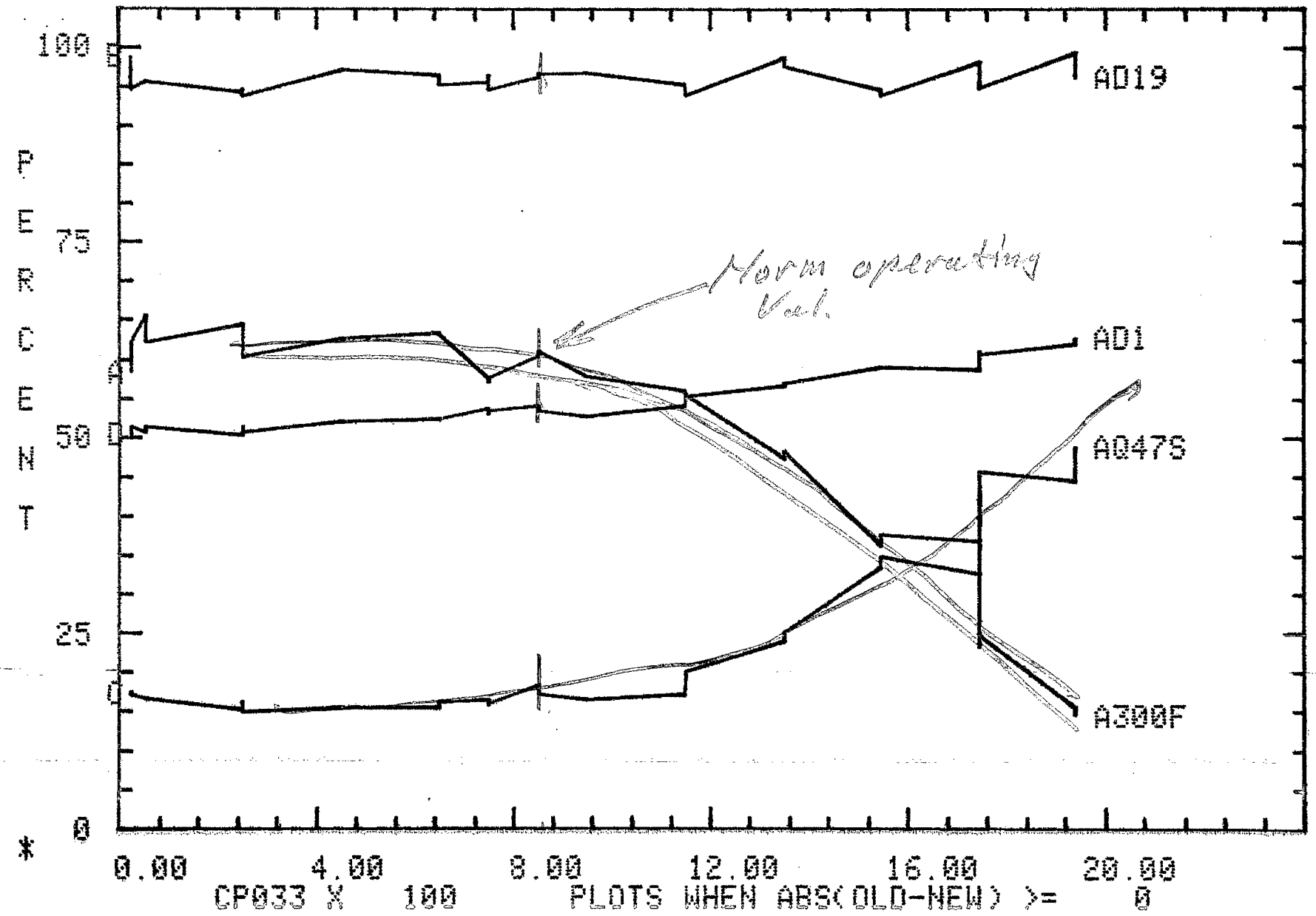
AQ47S ≡ AD5-6 loss monitor/CE010 SEC

AD1 ≡ AD1 loss monitor/CE010 SEC

Fig 1

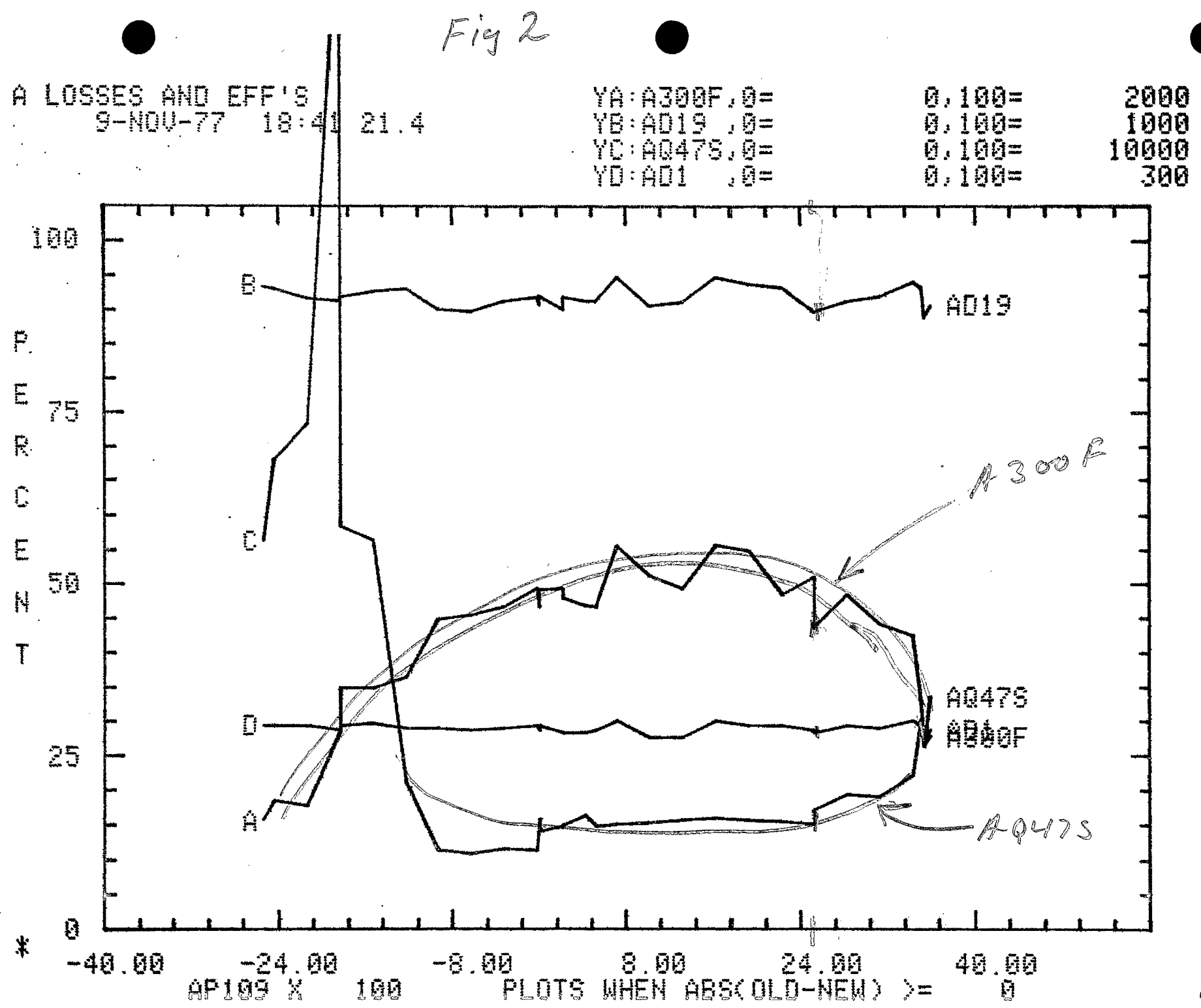
A LOSSES AND EFF'S
9-NOV-77 18:25 19.3

YA:A300F,0=	0,100=	2000
YB:AD19 ,0=	0,100=	1000
YC:A047S,0=	0,100=	10000
YD:AD1 ,0=	0,100=	300



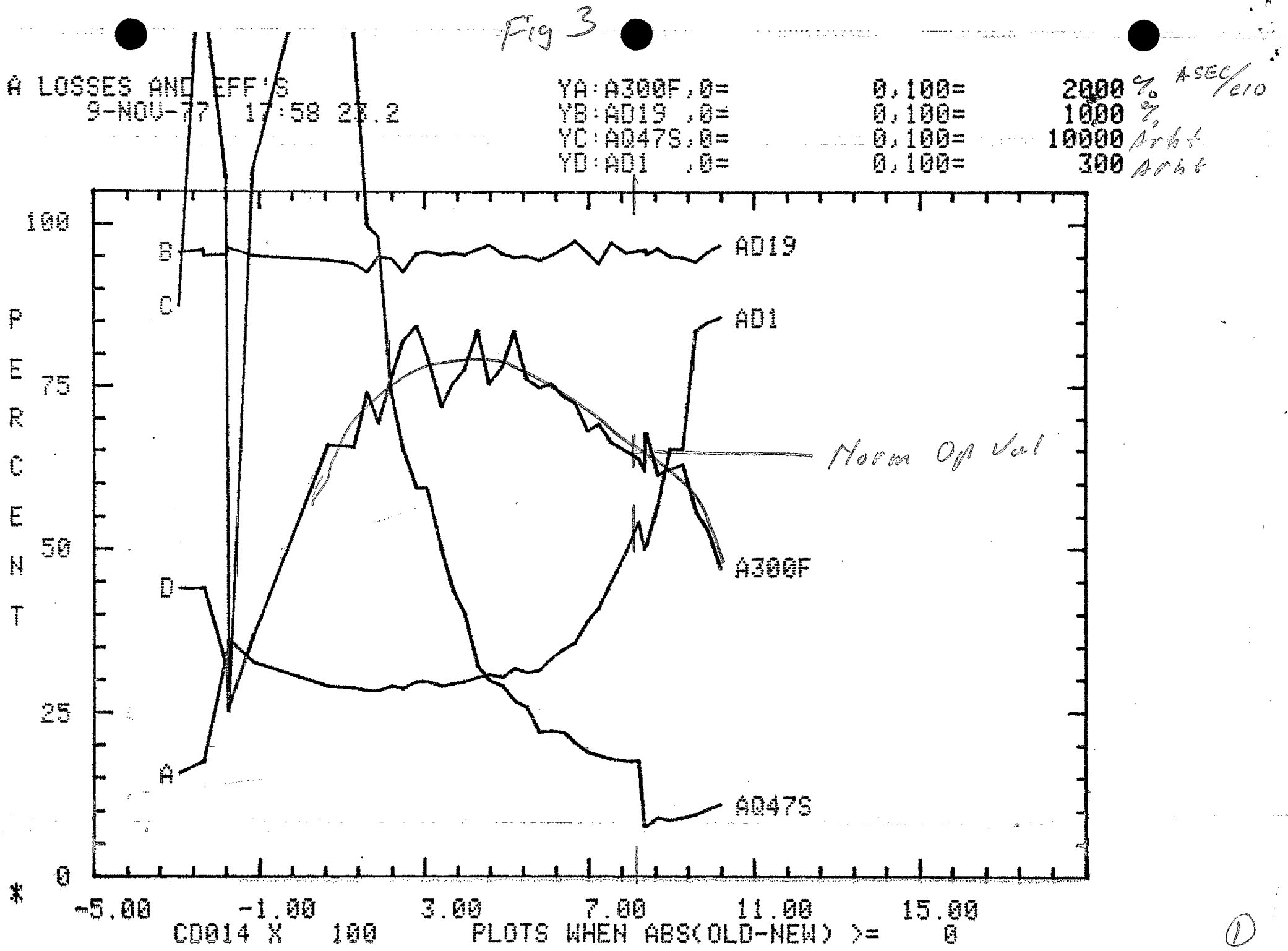
2

Fig 2


A LOSSES AND EFF'S
9-NOV-77 18:41 21.4
YA:A300F,0= 0,100= 2000
YB:AD19 ,0= 0,100= 1000
YC:AQ47S,0= 0,100= 10000
YD:AD1 ,0= 0,100= 300
PERCENT
100
75
50
25
0
B
C
D
A
AD19
A300F
AQ47S
AD00F
AQ47S
-40.00
-24.00
-8.00
8.00
24.00
40.00
AP109 X 100
PLOTS WHEN ABS(OLD-NEW) >= 0

6

Fig 3

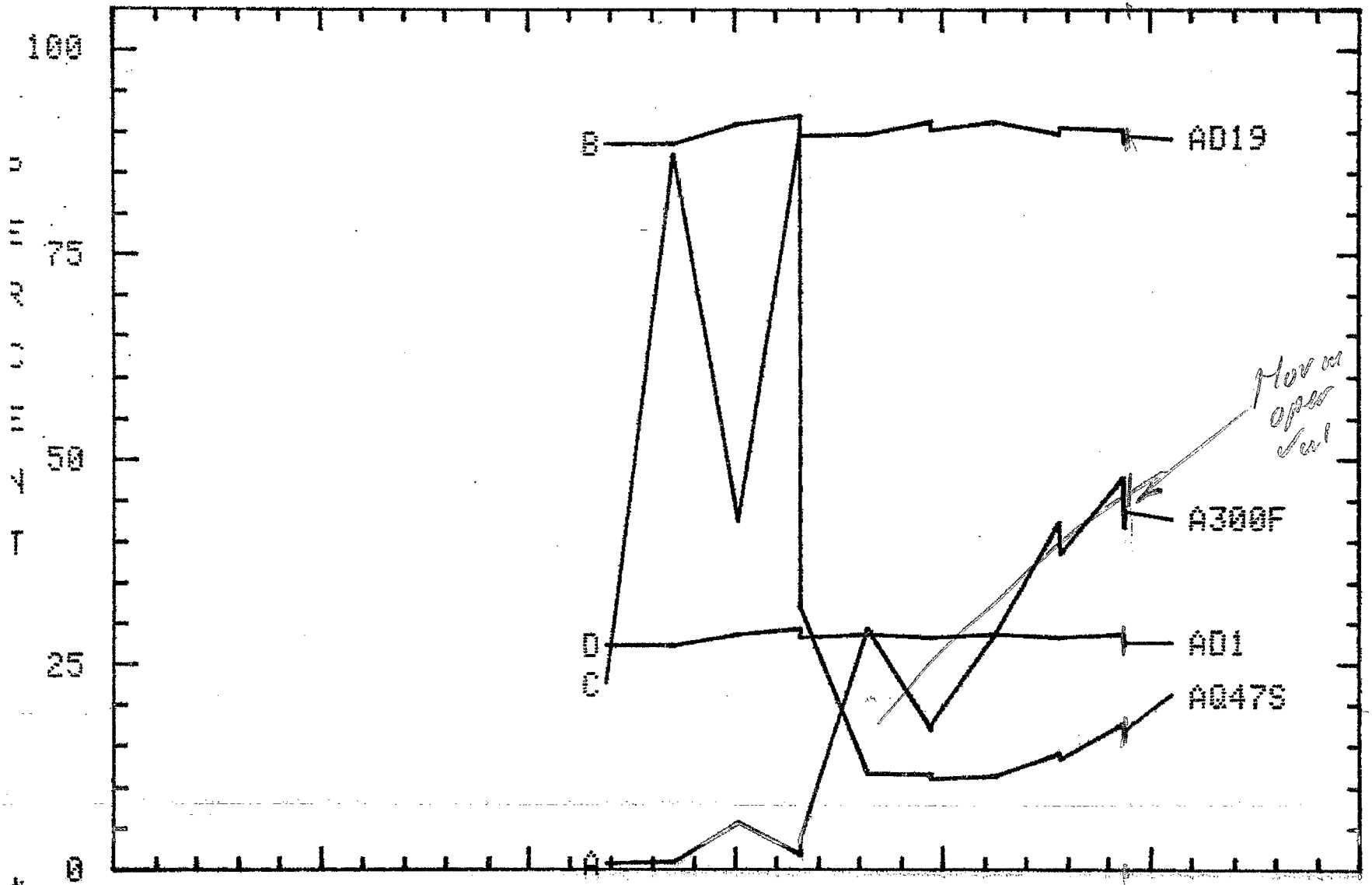

A LOSSES AND EFF'S
9-NOV-77 17:58 25.2
YA:A300F,0= 0,100= 2000 %
YB:AD19 ,0= 0,100= 1000 %
YC:AQ47S,0= 0,100= 10000 Arbt
YD:AD1 ,0= 0,100= 300 Arbt
A SEC/C10
100
75
50
25
0
PERCENT
AD19
AD1
A300F
AQ47S
Norm Op Val
A
B
C
D
-5.00
-1.00
3.00
7.00
11.00
15.00
CD014 X 100
PLOTS WHEN ABS(OLD-NEW) >= 0

(1)

Fig 4

A LOSSES AND EFF'S
9-NOV-77 18:35 51.8

YA:A300F,0=	0,100=	2000
YB:AD19 ,0=	0,100=	1000
YC:AQ47S,0=	0,100=	10000
YD:AD1 ,0=	0,100=	300



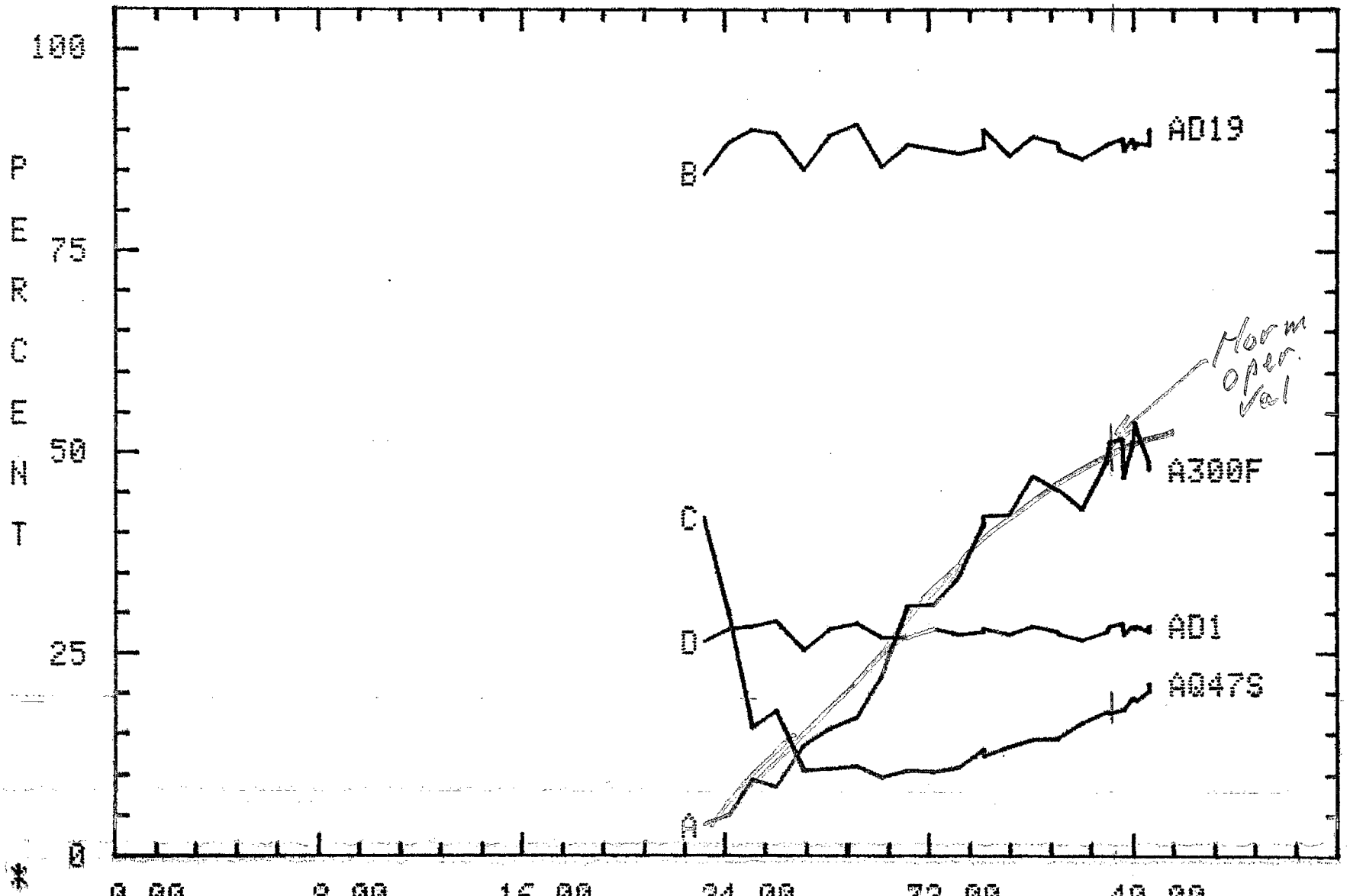
W/AD242 AD1T X 100 PLOTS WHEN ABS(OLD-NEW) >= 0

4

Fig 5

A LOSSES AND EFF'S
9-NOV-77 18:28 56.0

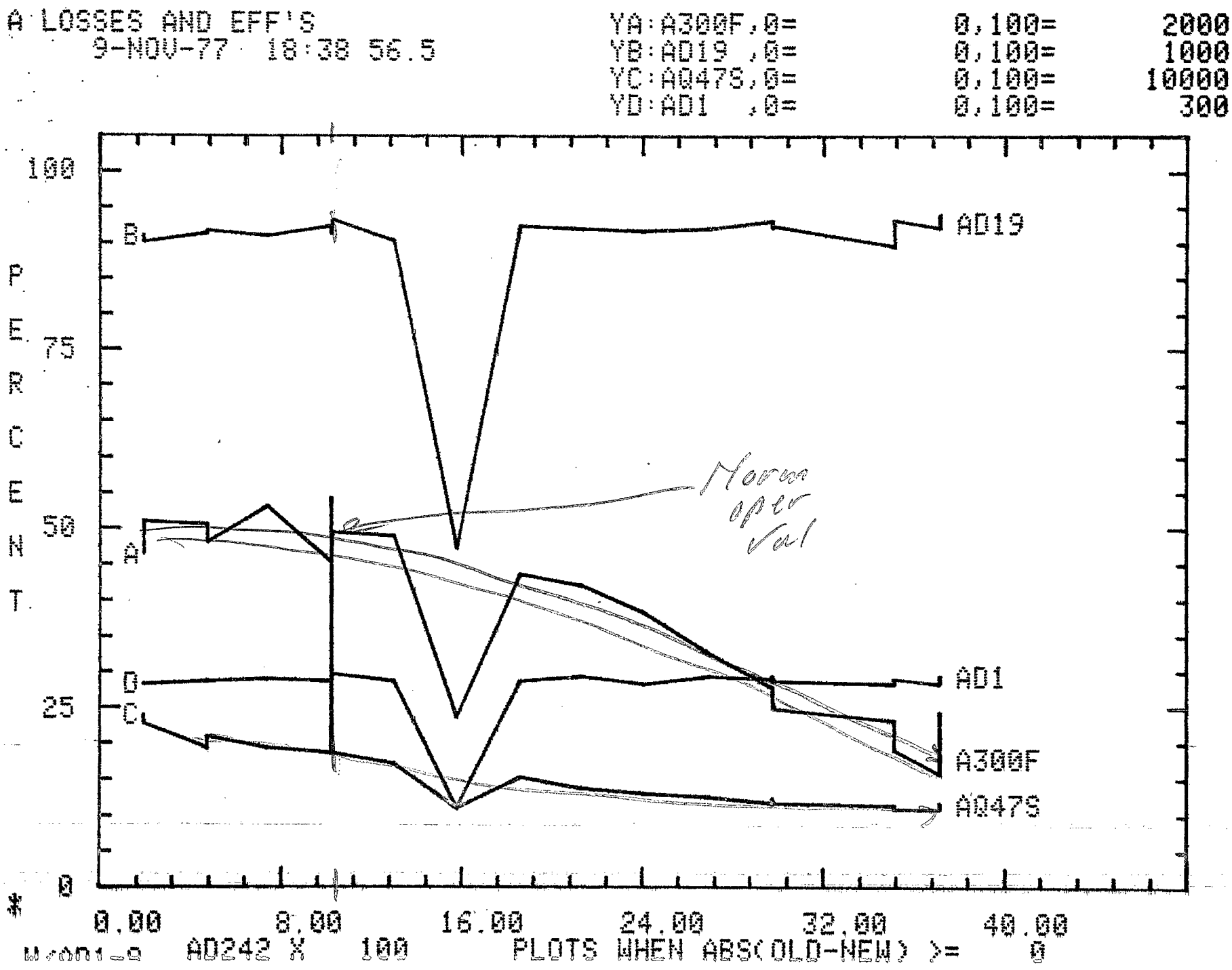
YA:A300F,0= 0,100= 2000
YB:AD19 ,0= 0,100= 1000
YC:A047S,0= 0,100= 10000
YD:AD1 ,0= 0,100= 300



W/AD1-8 AD1T % 100 PLOTS WHEN ABS(OLD-NEW) >= 0

(3)

Fig 6


A LOSSES AND EFF'S
9-NOV-77 18:38 56.5
YA:A300F,0= 0,100= 2000
YB:AD19 ,0= 0,100= 1000
YC:A047S,0= 0,100= 10000
YD:AD1 ,0= 0,100= 300
PERCENT
100
75
50
25
0
B
A
D
C
AD19
AD1
A300F
A047S
Normal operation
0.00
8.00
16.00
24.00
32.00
40.00
W:AD1-9 AD242 X 100 PLOTS WHEN ABS(OLD-NEW) >= 0