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Investigation of A-line Transport Losses

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Date 10/27/77 Time 1800-2000 Experimenters J.W. GlennSubject Investigation of A Line Transport LossesOBSERVATIONS AND CONCLUSION

- 1) Swept beam vertically with CPO33 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 CPO33 and AP109 (Figs. 1,2).
- 2) Increased A line intensity from a typical $\sim 9\%$ (of CE010) to $\sim 15\%$. 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 $\sim 30\%$ while the losses on AD1 dropped $\sim 30\%$. 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 C057 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.

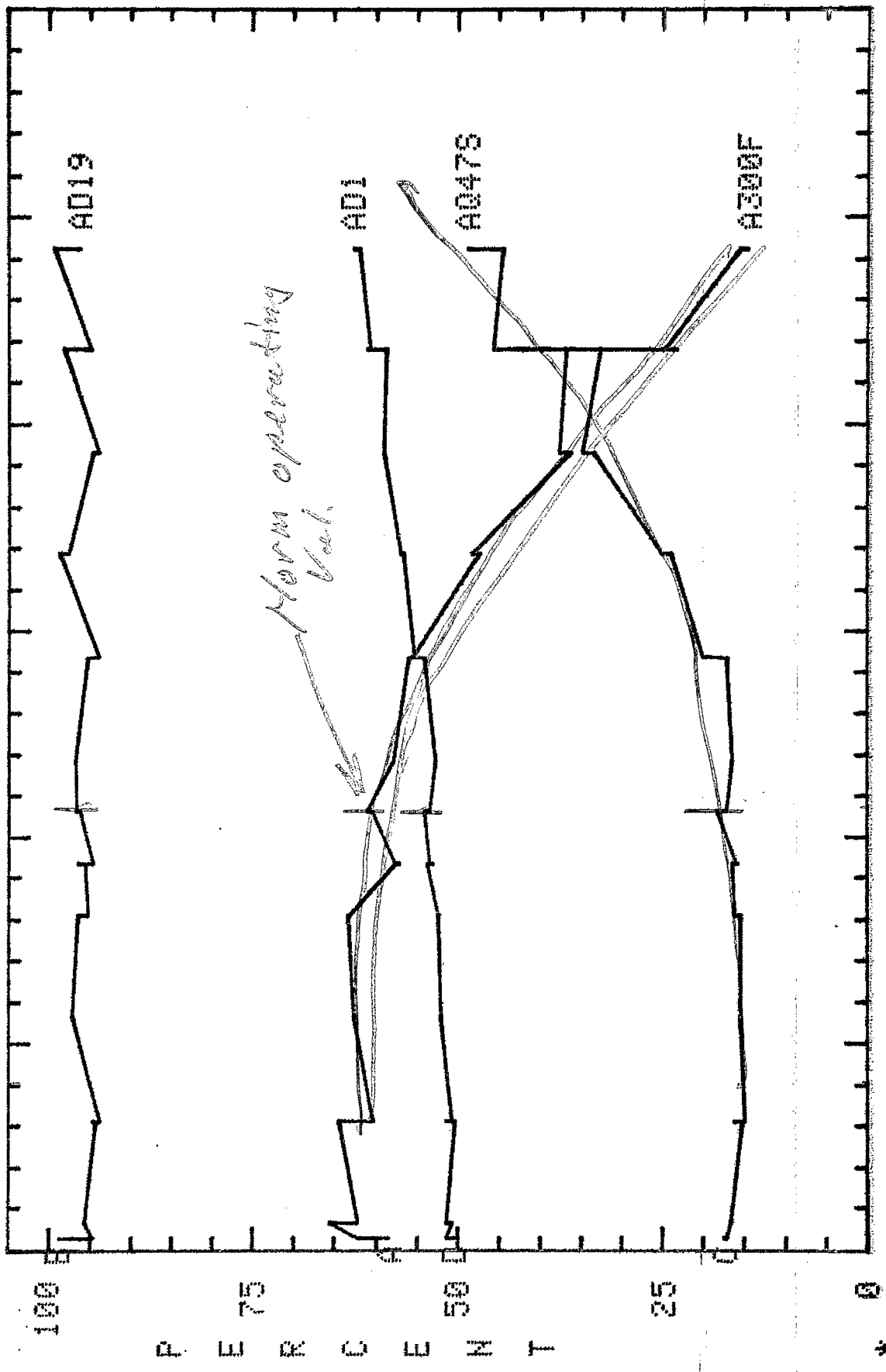
Note of Figures: A300F \equiv A SEC/CE010 SEC
AD19 \equiv AD19 loss monitor/CE010 SEC
AQ47S \equiv AD5-6 loss monitor/CE010 SEC
AD1 \equiv AD1 loss monitor/CE010 SEC

Fig 1

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

YA: A300F, 0=
YB: AD19, 0=
YC: A0478, 0=
YD: AD1, 0=

2000
1000
10000
300

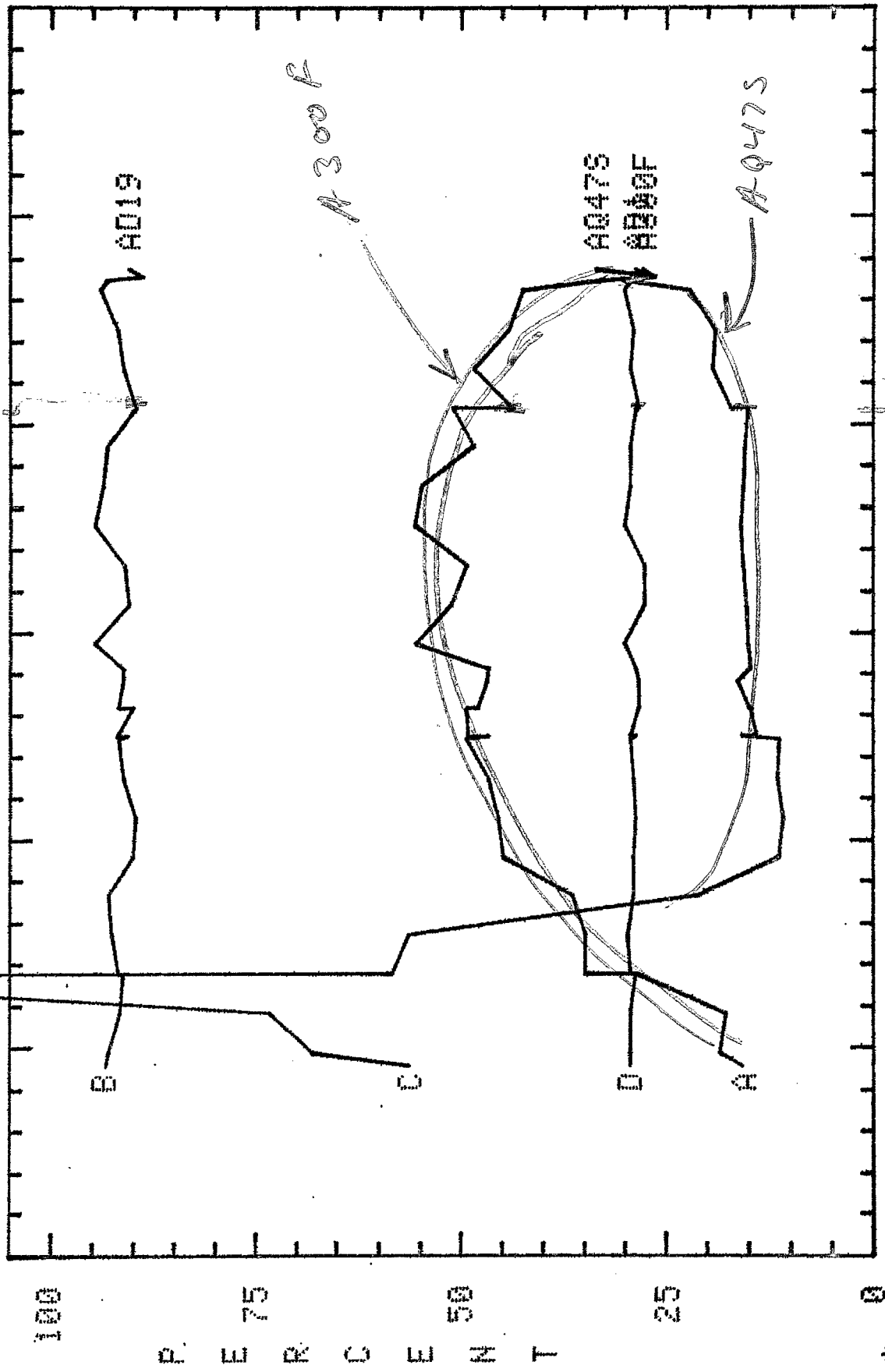


0.00 4.00 8.00 12.00 16.00 20.00
CP033 X 100 PLOTS WHEN ABS(OLD-NEW) >= 0

Fig 2

A LOSSES AND EFF'S 18:41 21.4
 9-NOV-77

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



* -40.00 -24.00 -8.00 8.00 24.00 40.00
 AP109 X 100 PLOTS WHEN ABS(OLD-NEW) >= 0

6

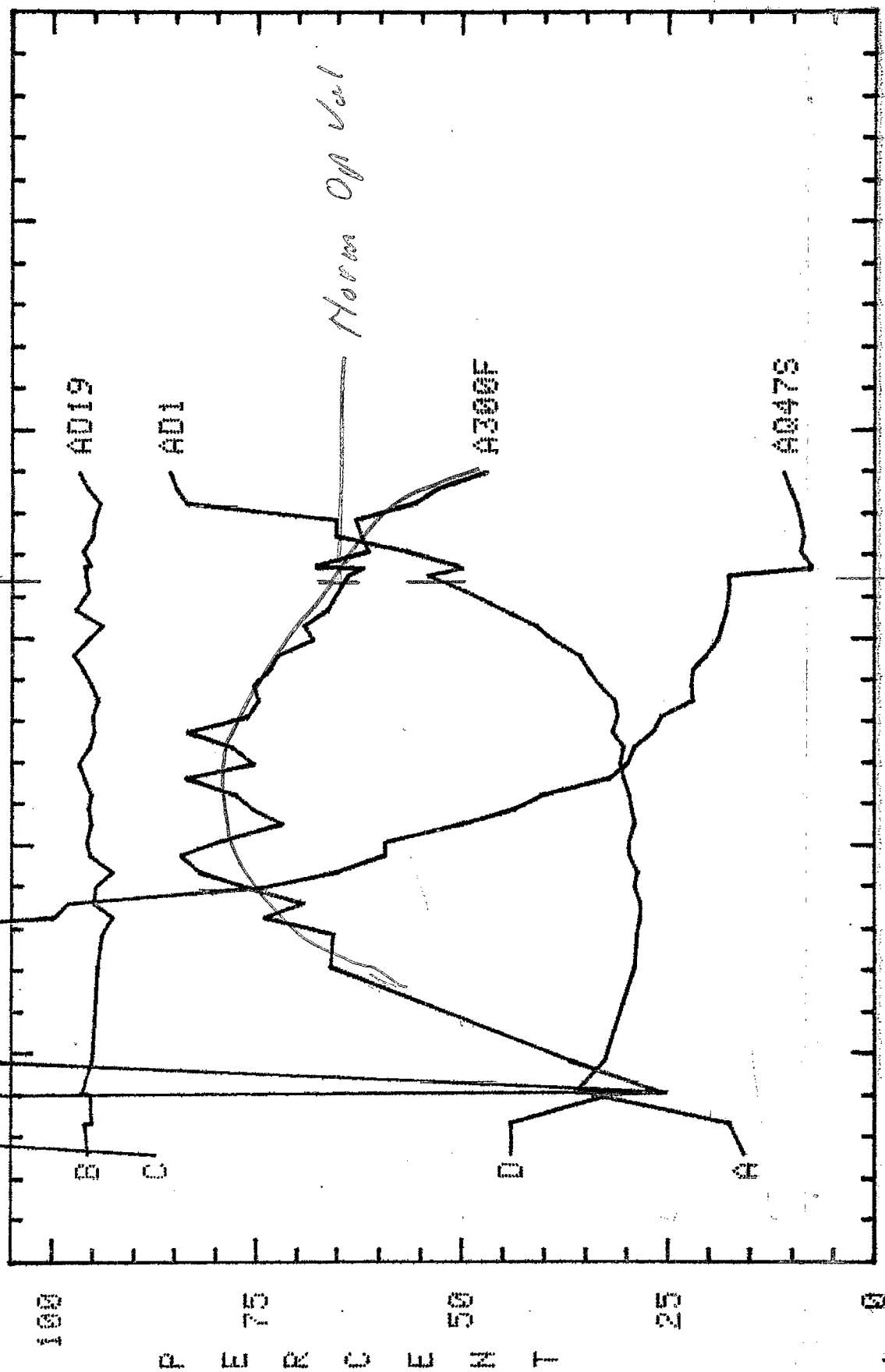
Fig 3

A LOSSES AND EFF'S
9-NOV-77 17:58 27.2

YA:A300F,0=
YB:AD19,0=
YC:A047S,0=
YD:AD1,0=

0,100=
0,100=
0,100=
0,100=

2000 % A SEC/EIO
1000 %
10000 Arb.t
300 Arb.t



* -5.00 -1.00 3.00 7.00 11.00 15.00
CD014 X 100 PLOTS WHEN ABS(OLD-MEN) >= 0

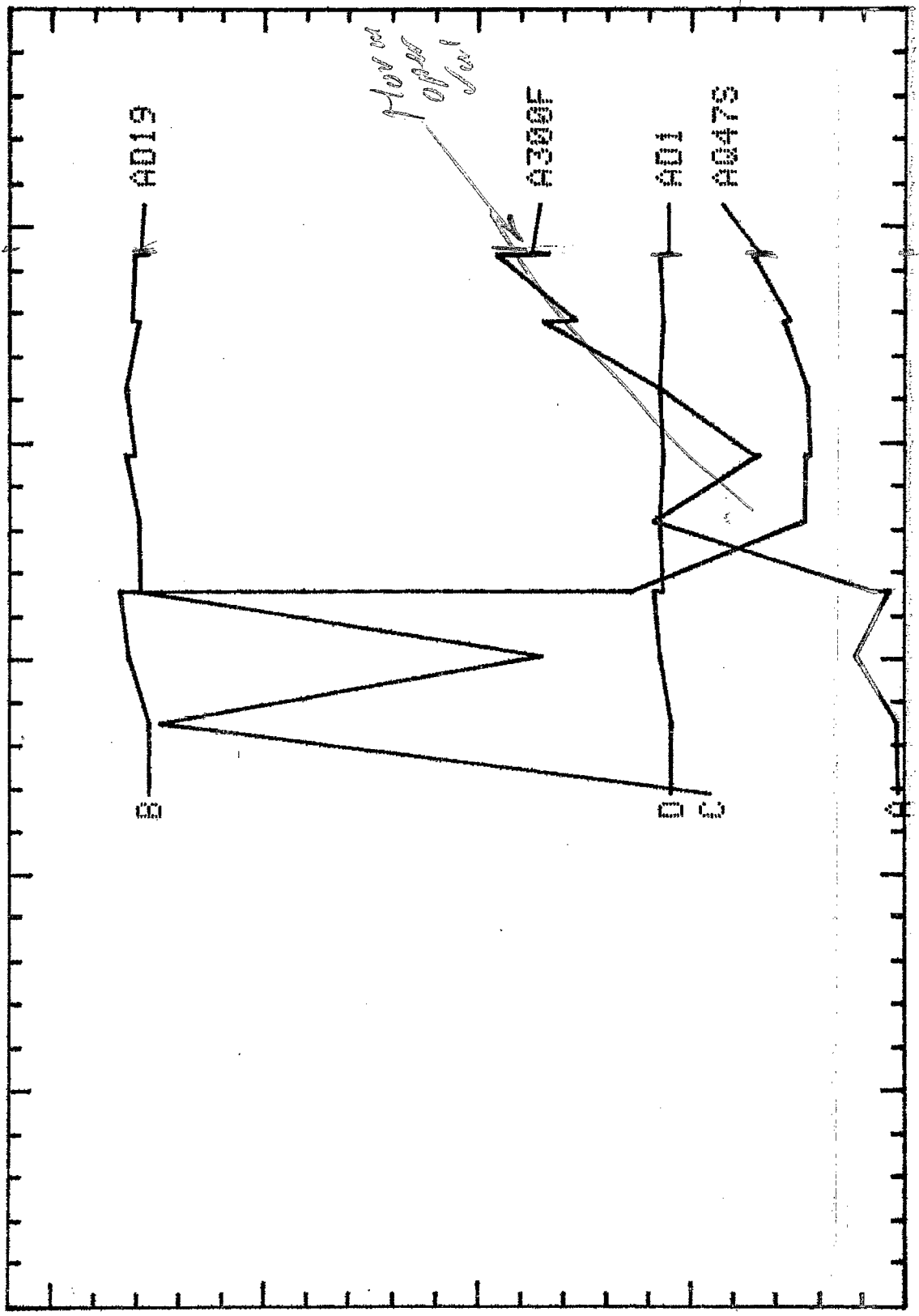
Fig 4

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

YA:A300F,0=
YB:AD19,0=
YC:A047S,0=
YD:AD1,0=

0,100=
0,100=
0,100=
0,100=

2000
1000
10000
300



* 0.00 ADIT X 8.00 16.00 24.00 32.00 40.00
 W/AD242 PLOTS WHEN ABS(OLD-NEW) >= 0

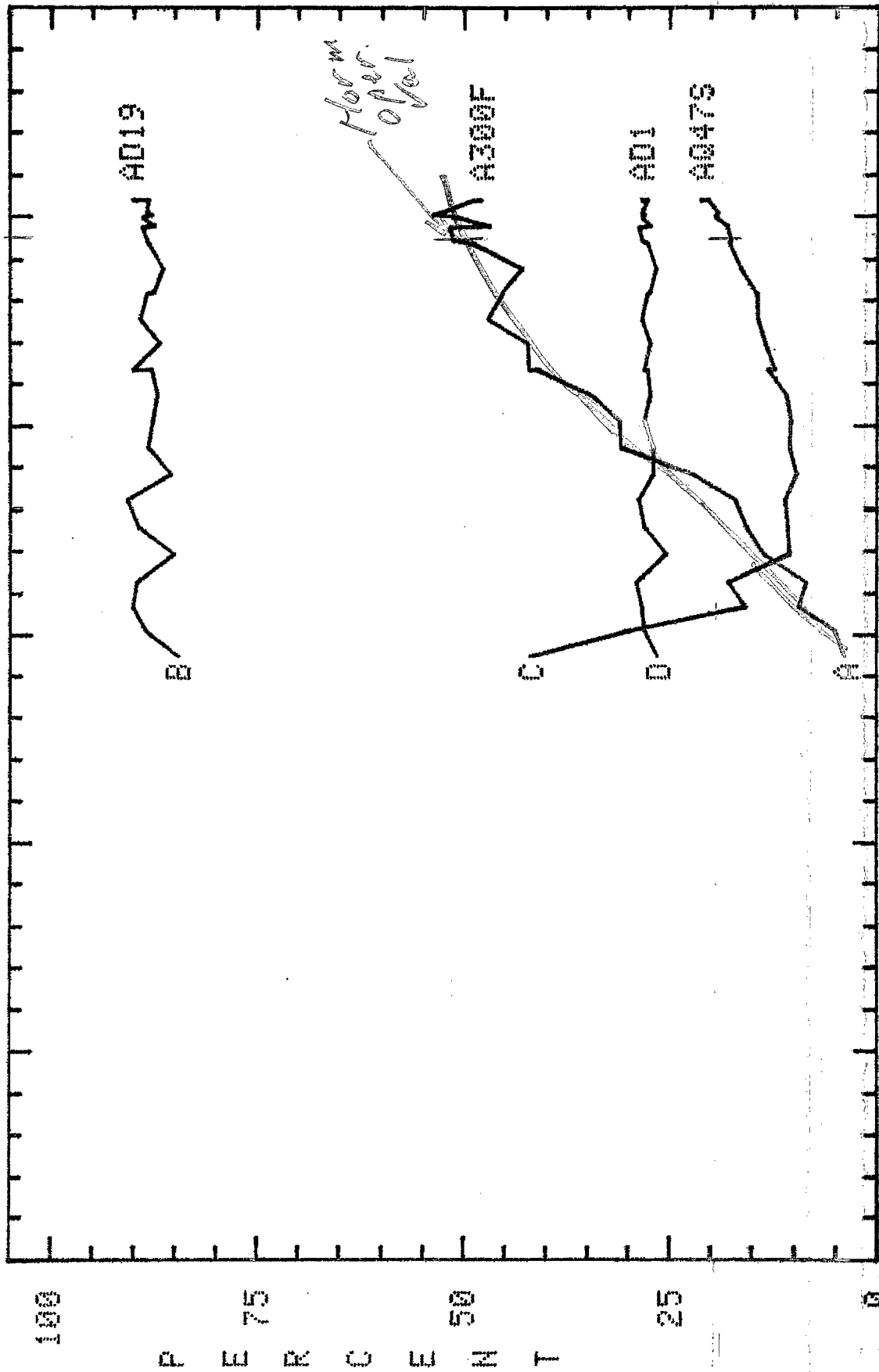
Fig 5

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

YA:A300F,0=
YB:AD19,0=
YC:A0478,0=
YD:AD1,0=

0,100=
0,100=
0,100=
0,100=

2000
10000
100000
300



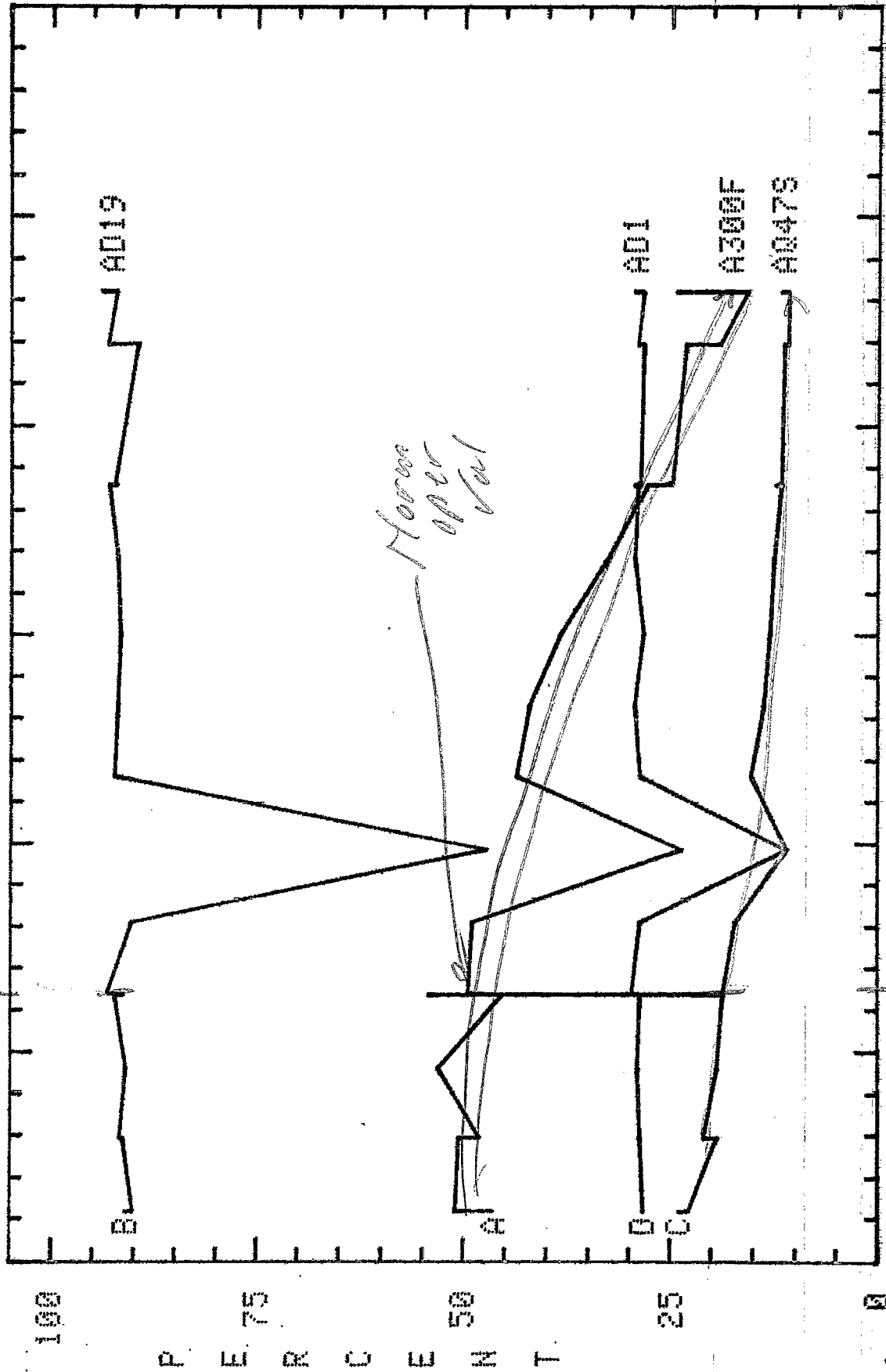
* M/ADI-8 ADIT % 100 16.00 24.00 32.00 40.00
 PLOTS WHEN ABS(OLD-NEW) >=

Fig 6

A LOSSES AND EFF'S
9-NOV-77 18:38 56.5

YA:A300F,0=
YB:AD19,0=
YC:A047S,0=
YD:AD1,0=

0,100=
0,100=
100000
300



0.00 8.00 16.00 24.00 32.00 40.00
Max over Val PLOTS WHEN ABS(OLD-NEW) >=