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Further Investigation of A-line transport losses

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Date 12/2/77 Time 1200-1300 Experimenters H. Brown/J.W. Glenn

Subject Further investigation of A-line transport losses

OBSERVATIONS AND CONCLUSION

As the SEB was turned on for this period (on 11/22), CQ3 was moved 1/2" west to steer the A-line beam away from the AD1 septum. Also, the ring vertical bumps were turned on to reduce the losses on AD019 (the A/C splitter). Some of the tests on A-line transmission of 10/27 were repeated.

1) Varied A-line intensity between ~ 0 to $\sim 50\%$ of the total extracted beam. Delivery (A+B+C) only dropped by $\sim 7\%$. This implies ~ 1.15 protons toward A station needed to deliver one proton there. This is within the calibration errors of the SEC's (Fig. 1).

2) Swept beam across the entrance to AD1 with CD014. The transmission to A was near optimum. AD1 losses are within $\sim 15\%$ of minimum (Fig. 2).

3) Scanned beam vertically with CP033. Only a small reduction of AD1 loss was possible and at such a current that beam would not pass through the B/C splitter system (Fig. 3).

Conclusion: 1) Moving CQ3 to steer the beam toward the west seemed to reduce the losses on AD1 by a factor of ~ 2 . Further reduction of $\sim 20\%$ may be possible.

2) The delivery to A is significantly better (59% to $\sim 87\%$).

3) Vertical alignment is better though not perfect.

Recommendations:

1) The SEC's must have closer to identical response for further work.

2) Recommendations of Report #104 still are valid.

Note: During start-up AD1 was rolled as per Report #103. Beam was not observed at A station and the roll was removed. It is not known whether the roll caused this problem. This should be repeated more carefully.

Note on Figures:

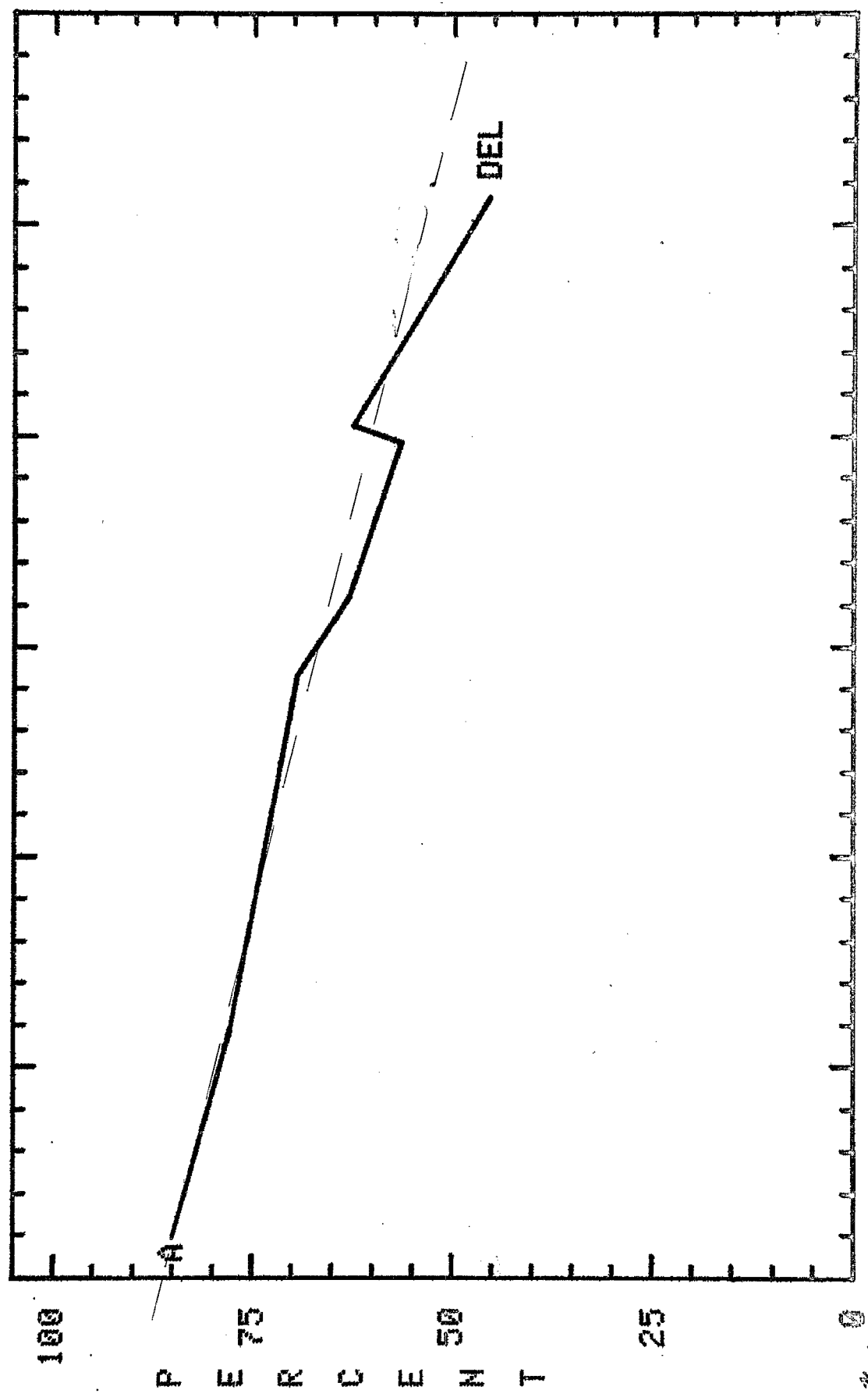
A300F	≡	A SEC/CE010 SEC
AD1	≡	AD1 loss/CE010 SEC
AQ47S	≡	AD5-6 loss/CE010 SEC
DEL	≡	A+B+C SEC's/CE010 SEC

Editorial: The slow beam extraction and transport system will only work as well as the instrumentation shows. The calibrations of the SEC's and the added loss monitor has made possible the 10% improvement in performance over the last two weeks. Further good instrumentation is needed for further improvement. For example, B-line may be only 80% efficient in its transport.

Fig #1

DELIV US A 7-DEC-77 17:48 38.7 YA:DEL ,0= 600,100= 800

$$DEL = \frac{A+B+C}{C10}$$



0.00 10.00 20.00 30.00 40.00 50.00
A300F X 10 PLOTS WHEN ABS(OLD-NEW) >=

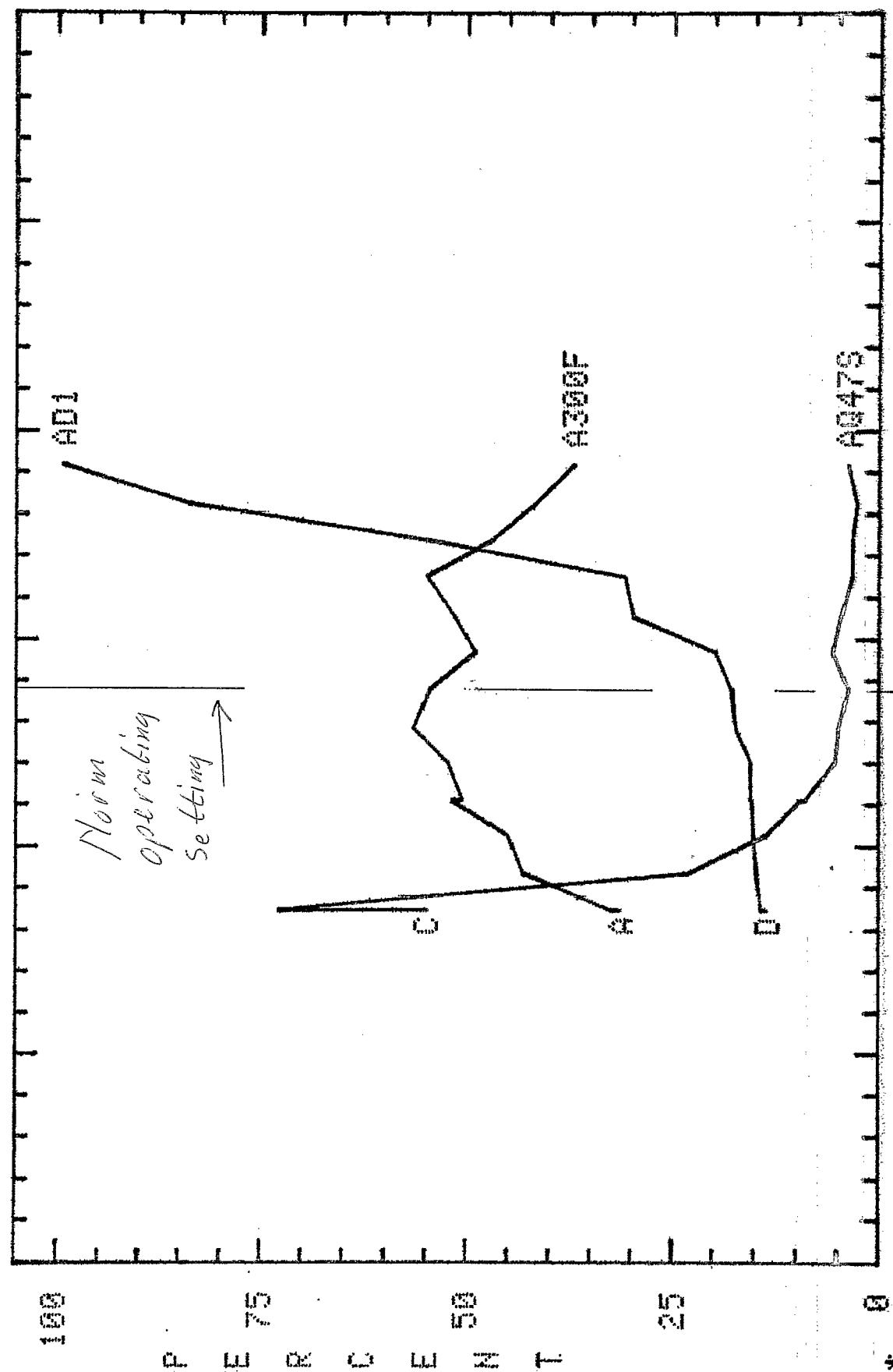
Fig #2

A LOSSES AND EFF'S
7-DEC-77 16:15 50.8

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

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

2000
1000
400



* -5.00 0.00 5.00 10.00 15.00 20.00
 CO014 X 100 PLOTS WHEN ABS(OLD-NEW) >= 0
 Moves Beam East of C.F.C.S. →

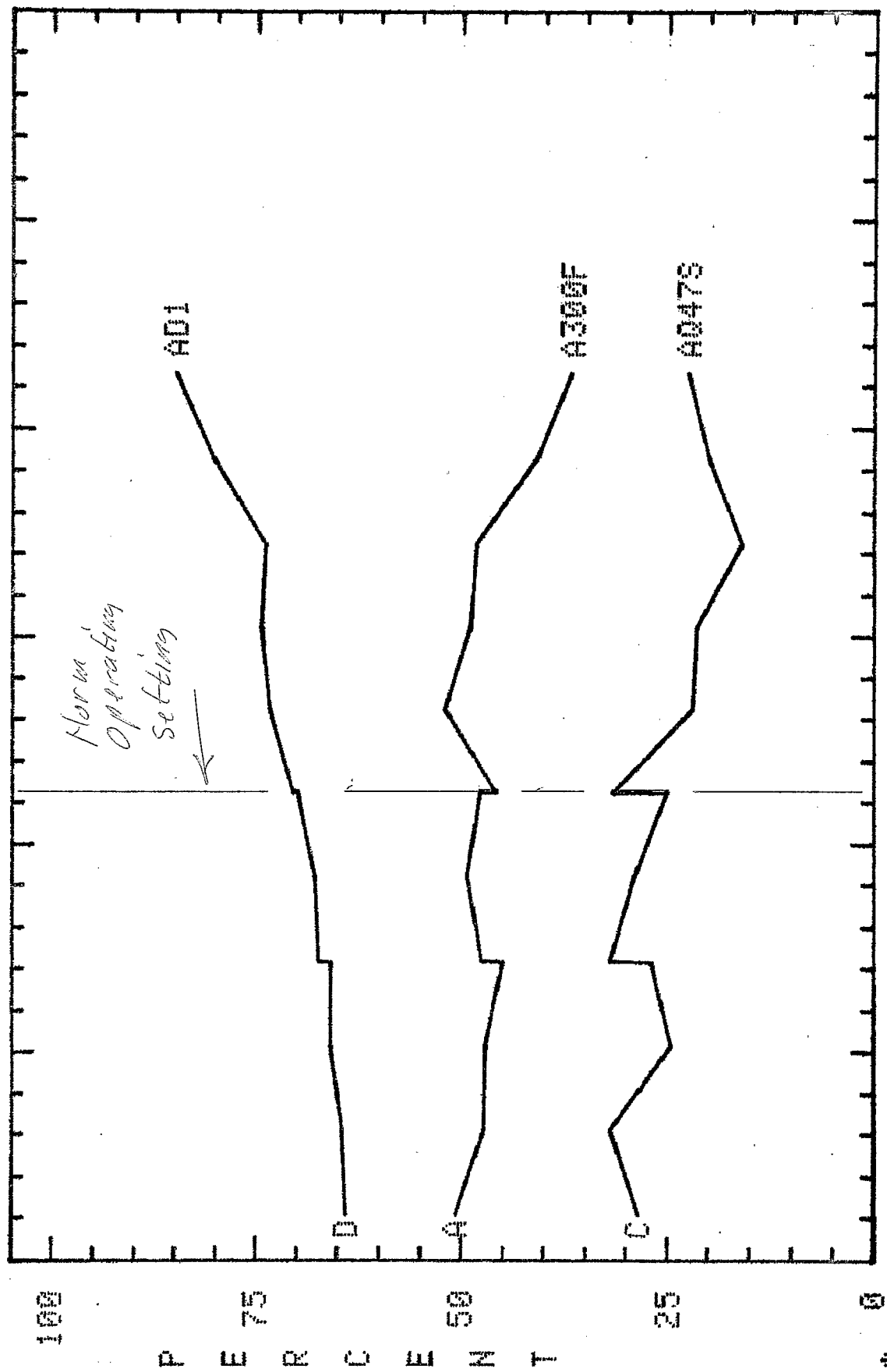
Fig #5

A LOSSES AND EFF'S
7-DEC-77 16:07 33.6

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

0,100=
0,100=
-50,100=

2000
200
150



0.00 5.00 10.00 15.00 20.00 25.00
CP033 X 100 PLOTS WHEN ABS(OLD-NEW) >= 0

Macros Beam down at CF103