

ISR-OP/DL/svw

26th September, 1978

ISR PERFORMANCE REPORTRun 974, 26 GeV, LBAC, R1 + R2, Solenoid at 1.4 TeslaChecking the programme to switch off the 11 Solenoid and
maintain circulating beams in the ISR1. SUMMARY

With the introduction of the power supply control system and also new hardware for the solenoid power supply, it became necessary to test the procedure for running down the solenoid current. This was carried out successfully during a machine development period with stack of 11 Amps x 15 Amps. The procedure may now be used when required but it still needs some degree of involvement on the part of the operations crew.

2. EXPERIMENTAL DETAIL AND RESULTS

Both ISR rings were set-up to the normal operational conditions, i.e. LBAC and low (longitudinal) density stacks were made to cover the usual stacking aperture. No shaving was performed and the beams were blown up vertically using the Q kickers. The dump block and collimators were set to nominal positions which would protect the vacuum chamber from excessive beam losses without compromising too severely on the available vertical aperture.

The program SORD was initialised at the NORD computer console so as to control the solenoid and all four LBC power supplies.

A slow solenoid speed of 0.5 Amps/s was chosen for the power supply control and the complete rundown was performed in 75 mins. During this period the following observations were made :

current loss R1	= 92 mA
current loss R2	= 5 mA
Variation of vertical beam position in I5, R1 using the beam position monitor (R2 device faulty)	= $\pm .06$ mm.

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The solenoid power supply was then switched off and on to double check the beam dump interlocks in this mode of operation. Finally the current in the solenoid was increased to 12% without undue perturbation of the beams; at this point the experiment had to terminate due to lack of time.

Discussion

The operation of R2 was highly successful but the loss of 90 mA in R1 was disappointing. This is attributed to over-enthusiastically blowing-up of R1 which resulted in a poor initial loss rate of around 70 ppm and accounts for ~ 65% of the total current lost during magnet changes.

Possible improvements which may be implemented are :

- 1) The program is initiated by a program call on the NORD only after having removed control inhibits, any logging programs etc. It is, therefore, not an automatic correction system; further development should be carried out to make the system automatic.
- 2) At a solenoid current level of 60 A it requires manual intervention to switch off the motor generator set for the solenoid power supply. This aspect could be made automatic (probably in January/February 1979).
- 3) At present, repairs to the cryogenic system may be carried out once the solenoid is at zero current. In practice, it could be possible to trigger the beam dump by a false operation on this system.

J. Gamble

G. Kantardjian

D. Lewis

Beam current versus time

Solenoid current versus time

Beam
Current
(Amps)

R1.1
11-4-84

