CDC cable replacement.

by Tom Markiewicz
THINGS TO DO on CDC
before the next run

- NON-STANDARD MAINTENANCE
  * DIAGNOSE L4 HV PROBLEM
  * REPAIR

OPERATIONAL ASSUMPTION: BAD CAPACITOR
- BINARY SEARCH
- REPLACE

- STANDARD MAINTENANCE
  * MOTHER BOARD REPAIRS
  * HV TESTING
  * ORDER ISOButANE & ARGON
  * PRE-QUALIFY ISO BOTTLES
  * NEW O2 CELLS

- MINOR UPGRADE
  * REPLACE GASKETS ON CDC COVERS
    want $O_2 \leq 50\text{ppm}$
  * MEASURE & REPLACE if $O_2 > 100\text{ppm}$
U.I.B. SUGGESTION:

REPLACE CABLE PLANT

WHY?

- LESS BULK: easier H.B. servicing
  better convective cooling
  improved H.B. lifetime

- LESS MASS: less dremstrahlung
  better forward tracking
  better forward ΔE/E

SUPPLIER:

DYNAFLEX TECHNOLOGY, SAN JOSE

INFO:

~ $5K for 170 pieces (top of the head estimate)
3 week delivery

BUT

MAX Length normally only 28''

ABSOLUTE MAX
(set by their tooling)

32''
WHY THIS MAY BE AN EXAMPLE OF "BETTER BEING THE ENEMY OF GOOD ENOUGH"

MASS/LENGTH RIBBON: 20 CONDUCTOR: 28 gauge stranded

7 strand / 16 gauge

effective a.d. = 0.0126

+ SHIELD = .002" poly + .001" Alumin

= 4.4 gm/ft wire

1.1 gm/ft shield

5.5 gm/ft

MASS / LENGTH FLEX:

EACH LAYER 1 oz Cu = .0015"

20 traces on .020" CENTER = .4" WIDE

42% reduction

= 3.2 gm/ft

BUT:

1.) GEANT DESCRIPTION (Cheng-gang Fan, 1991)

\[ \text{WIRE = LV, FC, RIBBON} \]

\[ \text{ALL} \]

= 13% 

2.) To use same controllers, transition boards need longest cables

\[ ^{\frac{1}{3}} \text{circumference @ 80cm} = 5.5 \text{ ft} \]

= 2.4 x MAX L

3.) SYSTEM is working w/ only 2 U.B. failures in 1997/98 Run
Something that would make a real different complete re-think of HV trip system

PRO: Understand / Test existing CAEN system

USE: Equivalent circuit prototype cell fast switch to simulate beam

VARY: Current limit (now 10µA) "Trip time" (now 0)

GOAL: Reduce trip frequency while maintaining protection

CON: Present limits correspond to >10^5 particles w/ Cl

No HV-broken wires in 10 yrs

SLC will degrade to keep pain level constant –CDC trips point to something truly wrong in machine

Estimate that same % of HLF, J.E. & TWH required for this or for cable upgrade