Infrastructure Review Discussion

W.J. Llope
☆ TOF Meeting
Austin, Texas
April 29, 2008

90 trays in Run-9!

Usual "single-tray" model
   won't work anymore!

Significant reliance on STSG

this is not a talk, but a discussion

goal:
   identify all open issues...
   collection of action items..

   establish conditions for
   successful commissioning
   in Run-9

STAR/STSG/Safety review of Detectors & Mechanical Systems, & Electronics Jan 26, 2006 @ BNL

D&M parts:
http://wjllope.rice.edu/~WJLlope/-myPublications/TOF_TechReview20060126_Talk1.pdf
http://wjllope.rice.edu/~WJLlope/-myPublications/TOF_TechReview20060126_Talk2.pdf

included BNL Safety representatives (Makdisi *et al.*)

Still need a "Infrastructure review" by STAR/STSG/Safety

Topics:

- TPC support structure for installation of trays at 3 and 9 o'clock.

- Tray installation fixture

- Cooling water distribution system and paths

- Tray testing stand & facilities in the assembly building

- Tray installation schedule, procedure, and manpower

- LV design & paths

- HV distribution box locations

- Gas system distribution panels and paths

TPC Support Fixture
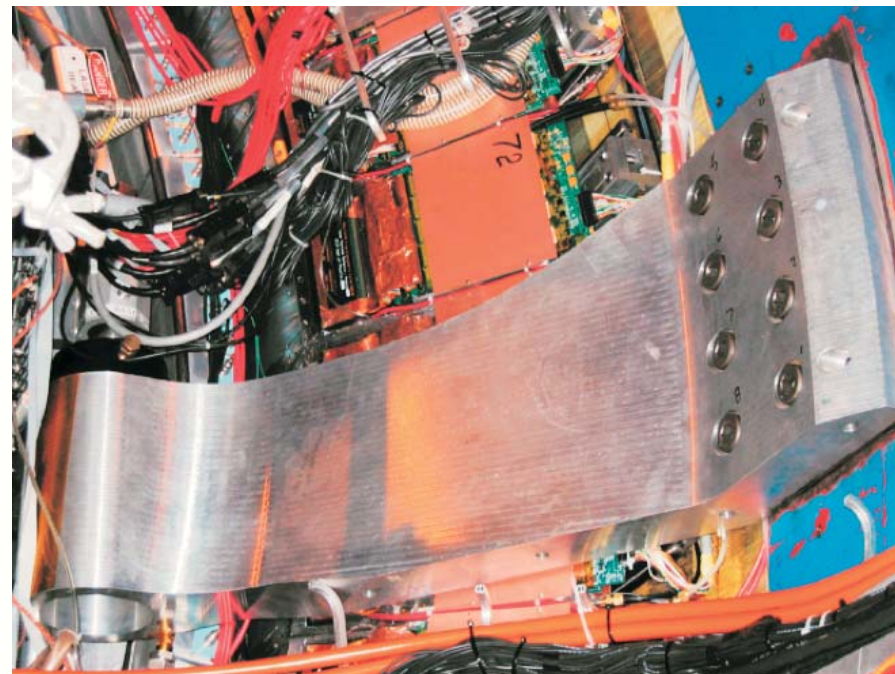
we'd been assuming this was a Run-10 Shutdown item

new comments from Christie imply might be ready during Run-9 Shutdown!

TPC 6 o'clock Support Concept
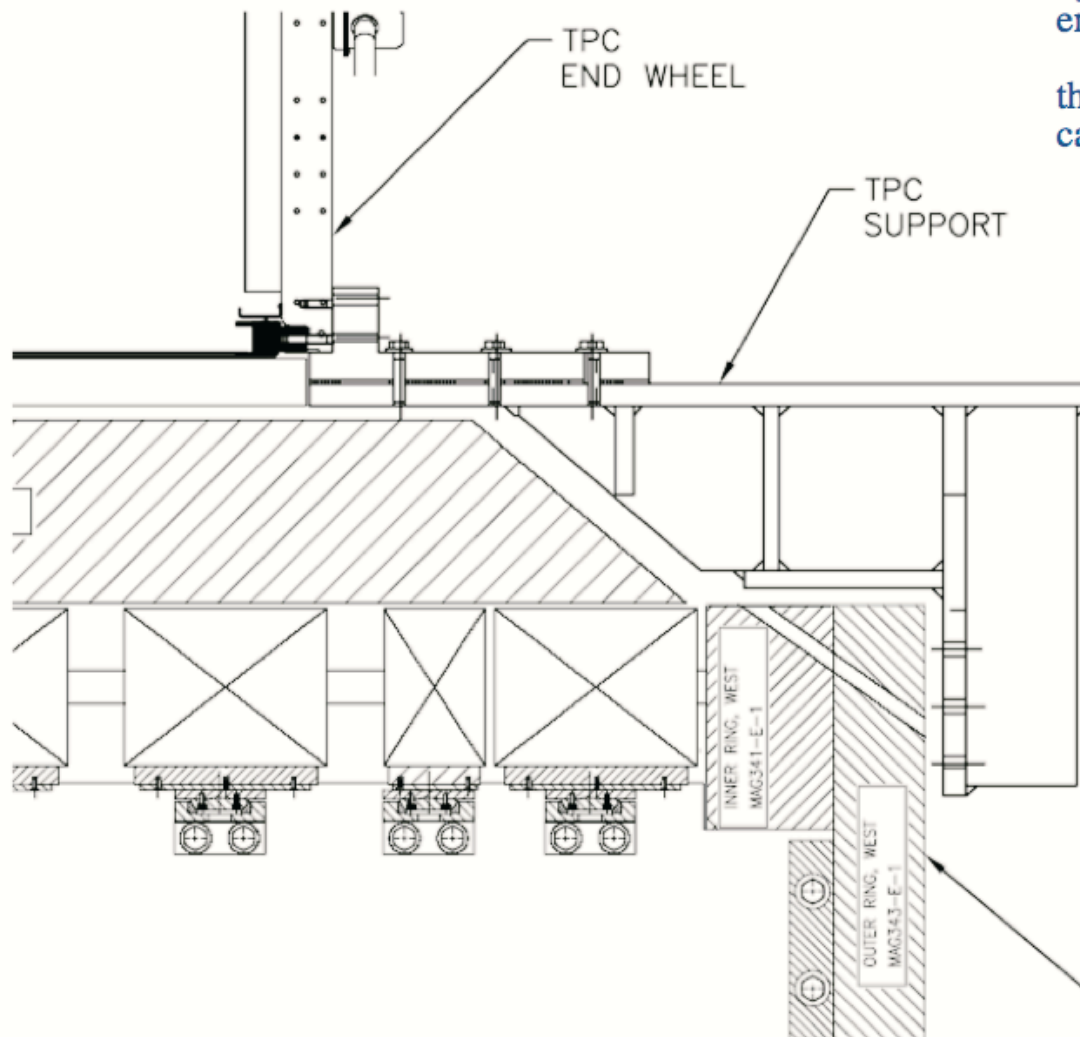
During BEMC installation, hydraulic jack on TPC support endring used to support TPC.

thus know TPC support endrings can support weight of TPC.

Need to a test of tray installation on one rail from same side of STAR

very tight tolerance between MRPC outer width and
    bottom assy inner width requires careful avoidance of tray flexing

simple tray insertion fixture?

TPC rails (full length) exist at Rice.

Build structure to hold a rail at the right position and angle
    to slide trays into star

        Mount off end-ring?
        Hang from crane with spreader bars?
        other ideas

        default seems to be man-lifts. (ugh)
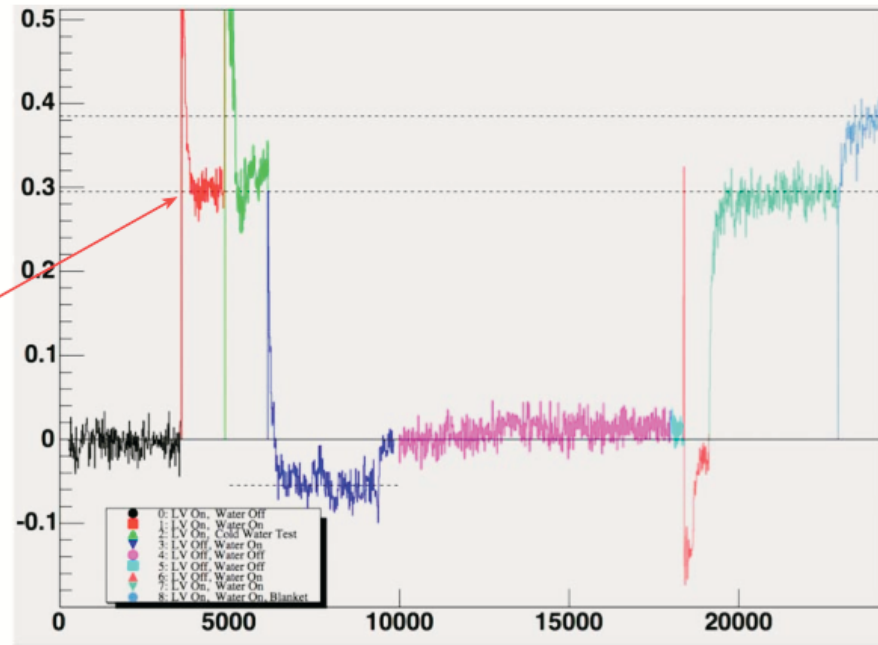
Cooling Efficiency....

Water System -- copper water loop running between TINO & TDIG

Power tests of TOFr5
140W total
square loop + shims
perforated tray cover

water T_{input} ~ 31 deg C
flow rate ~ 1.36 Gpm
water ΔT ~ 0.295 deg C

P(water)   ~ 105 W
P(radiative)   ~ 35 W
P(convective) <   1 W

0: LV On, Water Off
1: LV On, Water On
2: LV On, Cold Water Test
3: LV Off, Water On
4: LV Off, Water Off
5: LV Off, Water Off
6: LV Off, Water On
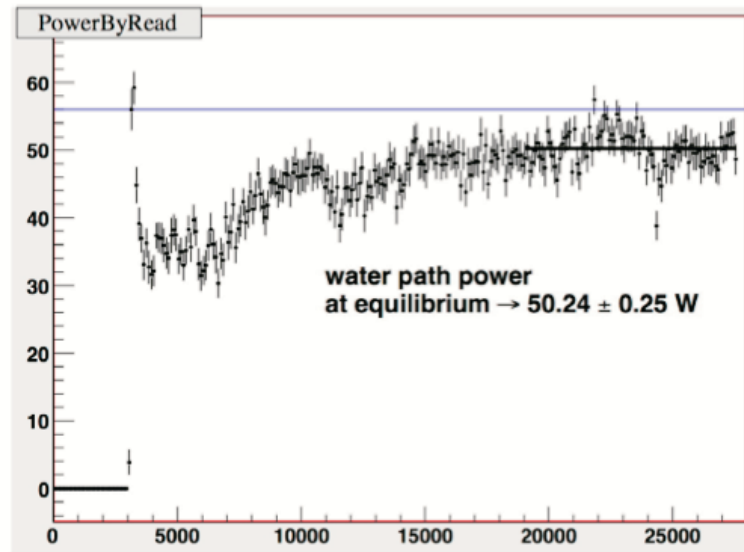7: LV On, Water On
8: LV On, Water On, Blanket

Power tests w/ early TDIG-Ds
55W total
rectangular loop + thinner shims
solid tray cover

water T_{input} ~ 31 deg C

ΔT ~ 0.07 deg C

P(water) ~ 50 W

PowerByRead

water path power
at equilibrium → 50.24 ± 0.25 W

~1 - 1.5 Gpm, ~25 deg C - ΔT<0.1 deg C/tray,
input pressure requirement not clear.

Pre-installation Testing
done onsite after trays shipped to BNL

requires
Freon-only gas system
HV
spare TCPU and one LV supply
laptop with pcan dongle
simple water flow system would be very helpful
~100 sq.ft. of floor space somewhere close to WAH

Test Suite:
HV stability
must hold +/-7125 V for >24 hours
HV currents
must be <40 nA/side after HV on for 24 hours
LV currents
must be to final specification w/in ~0.5A
R/O
all 8 TDIG boards must respond to pcanloop/pc commands over actual data path cabling
Noise rates
must be <40 Hz in all channels
Dead channels
must be <6/tray
Leak Test
must hold initial pressure for 6 hours

Post-installation Testing
done after trays are on rails and fully cabled up.

requires
actual gas system (freon-only)
HV via CAENs
TCPU connection to THUB
STAR water system

Test Suite:
HV stability
must still hold +/-7125 V for >24 hours
HV currents
must still be <40 nA/side after HV on for 24 hours
LV currents
must still be to final specification w/in ~0.5A
R/O
all 8 TDIG boards must respond to pcanloop/pc commands over actual data path cabling
Noise rates
must still be <40 Hz in all channels
Dead channels
must still be <6/tray