
FY05 Shutdown at CDF

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for the CDF Operations Group

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CDF's Bottom Line

- We completed ALL work in the FY04 shutdown that we set out to complete
- The projects that we have proposed will NOT drive the end date of the shutdown
- Much of our upgrade tasks are not located in the collision hall.
- The implementation of the upgrades can be staged -- the net impact will ultimately be on data taking efficiency
- We will not allow work to fill entire time shutdown - significant time will be reserved for calibrations/cosmic ray running/trigger torture tests to ensure we are as ready for beam as possible

Assumptions

- Shutdown will begin on August 8th
- Shutdown will last 8 weeks
- Electron Cooling has been commissioned and we will have more pbars available at collision starting very soon after accelerator startup
- Manpower will be tight - we expect to have access to our entire crew, but probably not a lot of additional help available

Inside the Collision Hall

➤ General Maintenance/Repair

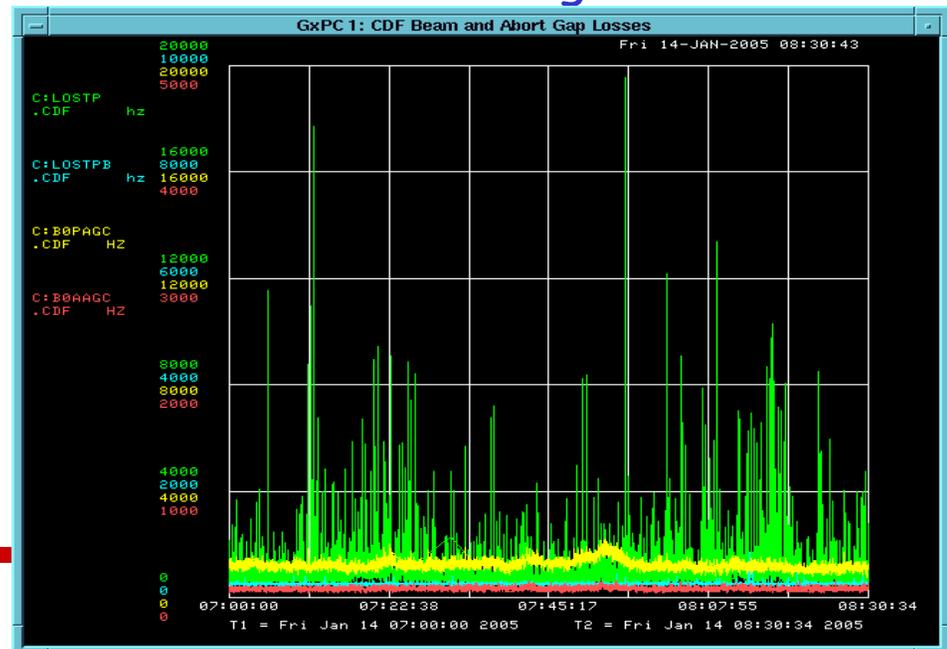
- **COT Maintenance**
 - May want to remove an inner SL wireplane for electron microscope inspection
 - Silicon Junction Card work?
 - Installation of new Diamond Detectors around beampipe on both ends of the CDF detector to better monitor silicon radiation
 - Installation of SNEG beampipes?
 - Alignment of low beta quad magnets
 - Final referencing of deep rod monuments
 - Alignment of CDF detector wrt DRM
 - Replace Air Filters in electronics racks
 - Replace or Rebuild two Hillmann Rollers (NW IMU, SW CMP)
 - Remove a heat exchanger on the detector, cut it open, and inspect for rust/thinning
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Outside the Collision Hall

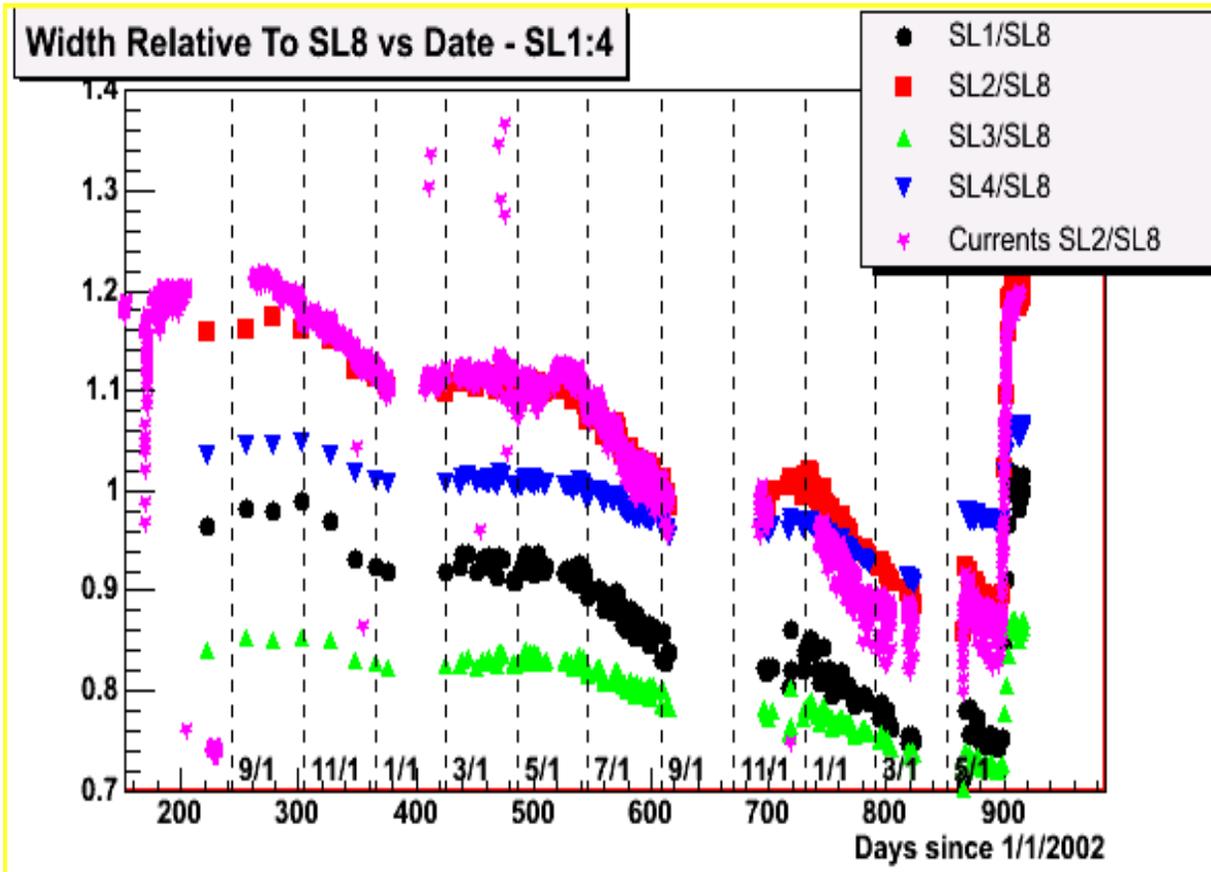
- DAQ/online computer Maintenance/upgrades
- Database maintenance
- HVAC Maintenance
- Motor Generator Maintenance
- Rebuild cryo expansion engines
- Rebuild Solenoid power chokes - requires lab support
- Rebuild water cooling system in Solenoid PEI power supply
- Replace all water hoses on solenoid dump switches and power bus leads
- Install Gas Filtering System on COT recirculation system
- Place a subset of on-line computers on diesel generator

My Major Worries At This Moment

- COT Aging
 - No evidence to date - slides to follow
 - Still early in FY05
 - We have not had luminosities above $80e30$ yet
- Survivability of CDF Electronics in the Collision Hall
 - A number of "single event upset" problems as of late during the ramp, squeeze and scrape
 - Losses during the store have been outstanding for the most part
- Physicist Manpower
- Beam Incidents
 - Losses
 - Kicker Prefires
 - D0 Pots



COT Operations in FY04



COT Experienced Significant Aging

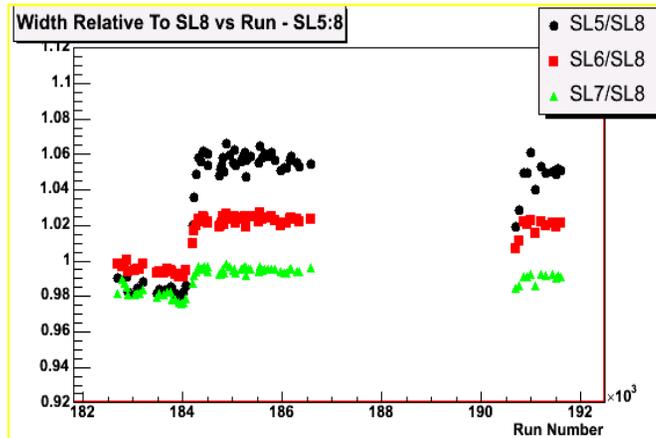
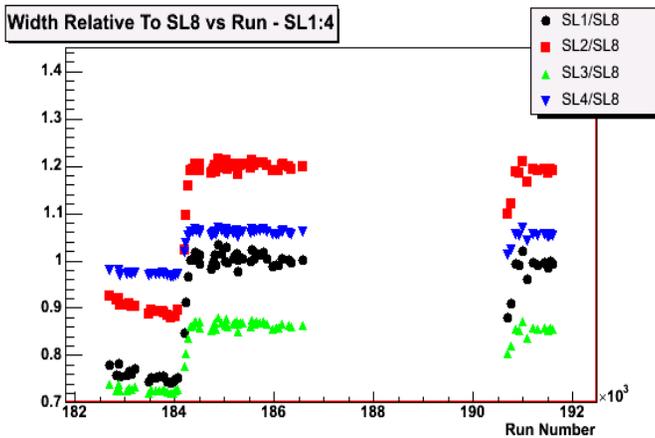
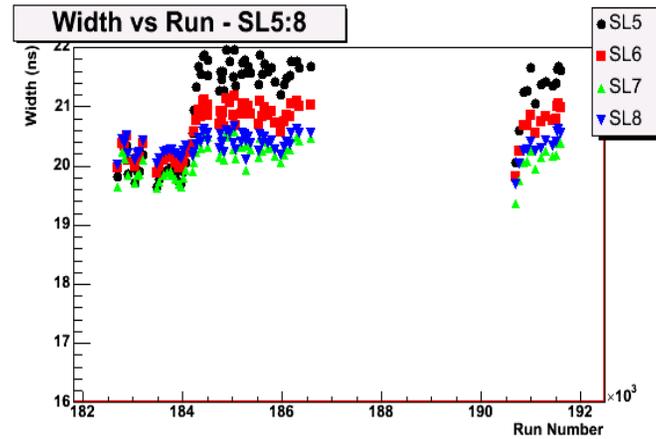
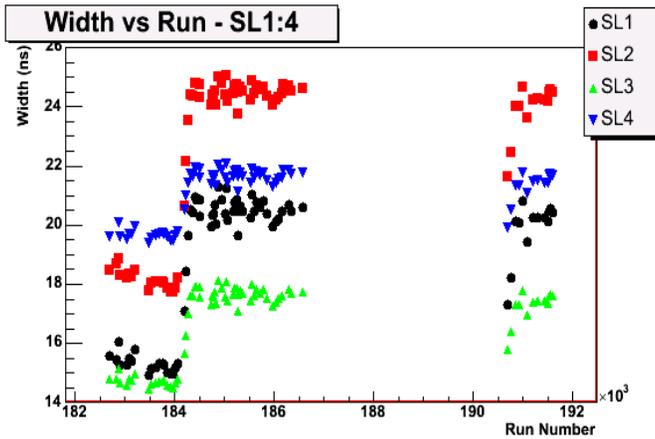
Feb 13-May 15, we operated the COT in a compromised state while we attacked the problem

Assembled a team of International experts to help us determine a direction

Problem has been "fixed" if not fully understood

Adding 100ppm of Oxygen to the Ar-Eth Gas

COT Aging Status as of today



- Still Not fully understood but no signs of aging at the moment
- Still Adding Oxygen and monitoring closely
- Building a Filtering system to pass recirculated gas through

Upgrade Projects

➤ Completed Projects

- EM Timing Installation on the central calorimeter
- Calorimeter Crack/Preradiator installation

➤ Work in Progress

- Modify Existing TDC's with fast clear option
- Install PULSAR Level 2 trigger system

- Install new Event Builder
- Install new XFT stereo trigger system
- Install new Secondary Vertex Trigger (SVT)

Pulsar System

- The new Level 2 trigger decision system
- Currently installed and operating in parallel with our existing level 2 system (using fiber splitters to allow this)
- Hardware is complete
- Firmware development and testing is in progress
- Have had several internal reviews of this system

- Committee's belief that this system will be fully operational and turned over to the Operations Crew as the new Level 2 trigger decision system by March 1st

TDC Upgrade

- Goal is to modify ALL existing TDC's with this "fast clear" feature
 - Provide a larger pool of spares
 - Make Operations easier by minimizing the "flavors" of TDC boards
 - In reality, only TDC's used for SL's 5 and 6 need to be modified - 90 of the 204 required for SL 5-8
 - Plan is to modify current spares pool immediately
 - Swap a crates worth of modified TDC's during accesses of an appropriate length (several hours)
 - Plan is to complete most of this upgrade work prior to the shutdown - PPD Tech's have already started modifications
 - Shutdown will be used to finish up the remaining details
 - If for some reason we start this job during the shutdown, we would have enough time to complete SL5 and 6 in the 8 weeks.???
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XFT Upgrade

- Requires some work in the collision hall
 - Route fiber optic cables from the first floor to each of the COT TDC crates on the detector
 - Install transition boards on all of the stereo TDC slots
 - Install XTC cards on at least SL3 (5 and 7 will hopefully be done in conjunction with the TDC work)
 - Again, we plan to make use of accesses during the FY05 run to get as much of this done as possible prior to the shutdown
- Commissioning can be done in parallel - should have minimal impact on data taking efficiency

Event Builder

- All Hardware resides in our counting rooms
- To speed up readout time, we will install more crates and have fewer VRB's/crate
- Given Board density, power and heat load in any given crate is low, we can install as many as 3 VME crates/rack.
 - Simplify installation and not impact our spares pool
 - Most of this work can be done while we are taking data with no impact
- Can test in parallel - should have minimal negative impact on operations

SVT Upgrade

- Hardware resides fully in our 2nd floor trigger room
- Of the upgrades, this is the most disruptive
 - Can not be done in parallel
 - Once you begin, you can't go back easily
 - Requires hardware and software to be ready before we can begin
 - We will try to minimize the downtime by performing vertical slice tests
- We must integrate these crates of electronics with the rest of our trigger/DAQ system

Schedule

- Microsoft project file for the shutdown in progress.
- Many of the jobs we have done before so estimates are solid
- We can fit all of our jobs well within the 8 week time allotment

Labor

➤ Manpower Assumptions

- We will staff the control room 24x7 with a scientific coordinator and a DAQ expert on day and evening shift
- We will be taking all of the process systems technicians off shift rotation for the first 6 weeks of the shutdown.
- We will use ALL of the technicians currently assigned to CDF
- We will be asking for mechanical rigging help from the mechanical support department - 1 week total
- Usually require a few COT tech's for ~2 weeks
- We will require alignment help

Summary of 2005 Shutdown

- A fair amount of work to do in 8 weeks
- We have an experienced crew that has been through this several times before
- Most of the jobs are similar in nature to other work that we have done that we have a high comfort level