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# Tevatron Abort System

Status Update  
PMG 5-19-04

# What has been done

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## ■ Tokyo Pots

### ➤ Locked out pending investigation

- Found problem with brake system - brakes are off as long a pulses are being generated even if at limit. Motor is working against a 700lb vacuum load.
- No physical stops to prevent the pot from getting too close to the beam.

### ➤ Controllers have been fixed

- Brake circuits have been rewired
- Drivers have been changed to provide more current to optical isolators.
- New Hard stops have been fabricated and will be installed

### ➤ System will be tested prior to allowing return to service

- Controller tests have been completed successfully.

# Role of Task Force Expanded

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- Joint Task Force Meeting ~ every two weeks.
  - Meeting chaired by Dave McGinnis(Machines) and Paul Czarapata(Hardware) to address hardware and system questions.
  - One recent topic is the effectiveness of the A48 collimator.
    - Items under discussion were the correct positioning of the collimator and what effect less than perfect machine alignment would have on effectiveness.
    - Other issues are raised as needed

## AC Power in Kicker Room

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- First Step - Reconfigure distribution so kicker and CAMAC controls are on a separate feed from the Substation
  - DONE
    - Now requires a failure of the substation.
  - Uninterruptible Power System being designed for Kicker supplies and CAMAC timing generator. (\$70k-\$100k)
    - CAMAC system will generate an abort pulse, phase locked to the abort gap, if the system timing is lost. With the UPS system in place, if the site power is lost, an abort will occur properly timed by the CAMAC phase locked loop.
      - Given the time constant of the machine this should safely abort the beam even if ComEd goes down.
    - System Specifications are in progress. Vendor bids and installation will follow. Full implementation by end of summer shutdown.

# Changes after the Multi-house Quench

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- Changes made to protect CDF/D0 and Tevatron
  - The Quench Protection System currently samples at a 60Hz rate (16ms.)
    - It has been determined that it can be sped up and made to sample at a 1kHz rate (1 ms.) A change will be made to one system and after successful operation it will be made to all.
  - TeV BLM's (Beam Loss Monitors) are masked off during a store to prevent accidental aborts from the losses.
    - Archived data was examined to determine the level of false trips occurring during stable HEP.
    - A method to add local multiplicity to the existing BLM chassis has been developed. Different options will be available that allow;
      - > 2 blm's, >3 or 2 in a row or 3 in a row before a trip occurs. Other options can be easily programmed
    - Board out for fabrication 5/18/04. We will be able to phase in the installation as downtime allows.

# New BLM System

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- The BLM system.
  - Stephen Pordes is leading the BLM portion of the task force.
    - A review of the proposed new BLM system was held (results in the Accelerator Division Document Database. Beams-doc-1147)
    - PPD (Alan Baumbaugh) is leading the hardware development effort. Alan was the designer of the original BLM system.
    - The new system architecture is described in the Review documentation.
    - Work is progressing but system implementation is not scheduled until next year.

# Vacuum System Failures

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- Two stores were lost due to a failure of a vacuum gauge that controls a gate valve in the TeV beamline.
  - EE Support has a new chassis that will monitor the voltages going to the valves. If the voltage is removed, this new chassis will generate an abort command in approximately 7 milliseconds.
    - Tests have been done to verify this does beat the valve!
    - 1 crate (test) done - 23 to be installed during the shutdown
    - Leon Bartelson is leading this effort.

# Kickers

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- As Yogi Berra said: “deja-vu all over again!”
  - Another round of AAK1 prefires.
    - Lowered the pressure in ALL thyratrons.
    - Replaced every component in the signal chain for AAK1. Nothing was found as being bad.
      - Removing the thyatron from the oil almost guarantees prefires will occur.... They did!
      - After a couple days the prefires stopped but We're not done with them forever!
    - Chris Jensen has been in contact with Eugene Vossenbergh at CERN regarding the solid state switches developed for the LHC.
    - Chris is also receiving quotes from Dynexsemi and Westcode for GTO switch stacks with the same rating as the LHC system (which also matches ours).
    - Carl Bromberg (CDF) also gave us a contact at ABB for a thyatron replacement stack.

## Kicker continued

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- We will explore the feasibility of using solid state switches to replace the thyratrons.
  - PLEASE NOTE:
    - Solid state switches can breakdown from cosmic rays or other ionizing radiation.
    - I have email off to Vossenbergl asking how they are going to handle this given the catastrophic potential for the LHC. More news to follow.