LARP – Trip to CERN

- Purpose
- Contacts
- Findings
- Comments in context of Beam Commissioning

Purpose

- **U.S. commissioning work/CERN visits to U.S.**
- **Follow-up meetings to Chamonix discussions**
- **Chamonix workshop Summing-Up**
  - **http://ab-div.web.cern.ch/ab-div/Conferences/Chamonix/2004/SciProgramme/sciprog.html#Anchor-Summary-6296**
- **Close-up look at LHC status**

Contacts

- **Roger Bailey – LHC commissioning**
- **Gianluigi Arduini – TI8 commissioning, SPS tests**
- **Mike Lamont – Sector test**
- **Hermann Schmickler – Instrumentation**
- **Rudiger Schmidt – Machine protection**
- **Steve Myers - Generalities**

Findings/Results – Summing Up

- Lots of information in 3 hours
- Greater appreciation for magnitude of LHC
- Injector issues
  - Early/intermediate beam parameters met
  - SPS longitudinal impedance
  - Kicker thermal heating
  - Beam blow-up due to kicker impedance
  - LEIR in 2005

Findings/Results – Summing Up

- Commissioning through 2007
  - TT40 largely successful
  - TI8 in September/October 2004
  - Injection test in 2006 (following 18-month SPS stop)
  - LHC commissioning in Feb/Mar 2007
  - Beam-induced quenching as part of Sector test

Findings/Results – Summing Up

- Running in the LHC
  - Instrumentation vital for machine protection (16-hour quench recovery)
  - Careful commissioning choreography
    - Beam dumps
    - Orbits
    - Collimation
    - Beam loss
  - Year 1 (2009?)
    - 16-week shutdown
    - 4-week checkout
    - 4 X 10^{10} protons/bunch, 25 ns spacing, 10^{33} luminosity

Findings/Results – Summing Up

- LHC Operation from the CCC
  - Single Control Room
    - Expanded PCR (Prevessin site)
    - All operations under one roof
    - On-line in 2006

Findings/Results – Roger Bailey

- 6-8 week visits by U.S. scientists beneficial
- Up to 8-week visits by CERN staff - ditto
- September 2004 busy, interesting time for visitors to CERN

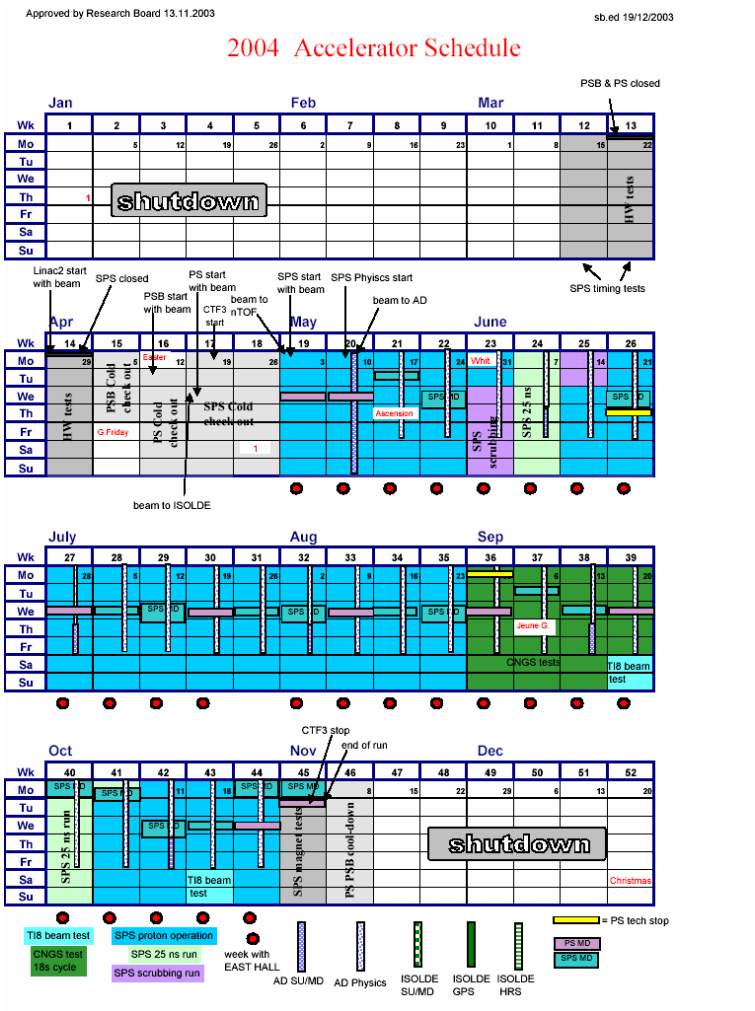
Findings/Results – Mike Lamont

- Sector Test coordinator in May 2006
- Broad scope outlined, details to be worked out
- Remote operations

Findings/Results – Gianluigi Arduini

- SPS Machine Development coordinator
  - PS to SPS injection matching
    - 10-20% transverse blow-up at present
    - help is welcome
  - TI8 commissioning
    - 2 weekends in September, October 2004
  - Collimator testing
  - Beam Scrubbing
    - Additional week just added
  - 2004 is critical year

Findings/Results – Gianluigi Arduini



Findings/Results – Rudiger Schmidt

- Machine Protection
  - LHC permit loop overview
  - Automation of hardware tests might need help
  - Post-mortem systems needs specification
  - Operational model of collimation – possible help

U. S. participation

- This fall would be prime visit time
  - Sense of CERN
  - Participate in
    - SPS MD for LHC
    - TI8 commissioning
- All machines off in 2005
- Cold Check out and Sector tests are other critical times (2006)
- Encourage CERN visitors to Tevatron and RHIC
- Where else can U.S. contribute for mutual benefit?
  - Machine protection
  - Post-mortem
  - Modeling

Fermilab participation

- Late summer through October would be prime visit time
  - Up to 3 people 3-4 weeks each for SPS/TI8 work
- All machines off in 2005
  - Planning, identify contributions
- Cold Check out
  - Get a feel for LHC, controls system
  - Regular, growing presence
- Sector test
  - Build on Cold Check out experience
- Encourage CERN visitors
  - Tevatron and RHIC day-to-day running

Fermilab participation - Budget

Fermilab/LARP proposed budget through FY 2006

	FY04	FY05	FY06	Comments
Planning visit to CERN	3.25	3.25	3.25	Each year - 1 FTE, 1 week
Tasking/Scheduling	3.25	3.25	3.25	Each year - 1 FTE, 1 week
SPS Machine Development	13	13	13	Each year - 1 FTE, 1 month
TI8 commissioning	6.5	19.5		FY '04 – 1 FTE, 2 weeks FY '05 – 2 FTE's 3 weeks
Cold checkout and preparation		52	104	FY '05 - 0.75 FTE FY '06 – 1 FTE
Sector test			117	FY '06 - 0.9 FTE
Total ($k)	**26**	**91**	**240.5**	

Fermilab participation - Schedule

- FY ’04
  - SPS Machine Development - September
  - TI8 commissioning - September
  - Collimator tests - September
  - Identify areas of need/expertise
  - coordination
- FY ’05
  - Complete SPS work begun in FY ’04
  - Regular and incrementally increasing presence in preparation for and as Cold Checkout commences
  - Solidify, begin to address, specific areas of focus
  - Coordination
- FY ’06
  - Continued presence for cold check out
  - Sector test
  - Dedicated effort on foci identified above
  - Coordination geared towards full-time presence during Beam Commissioning

Fermilab participation - deliverables

- FY ’04 (.3 FTE)
  - Injection mismatch expertise
  - Beam line commissioning expertise
- FY ’05 (1.12 FTE)
  - Participation plan and schedule for Beam Commissioning
- FY ’06 (2.1 FTE)
  - Begin execution of FY’05 deliverable
- Possible areas of focus
  - Machine protection
  - Post-mortem
  - Operational model(s)
  - Commissioning choreography
  - Software support

Summary

- LHC Beam Commissioning activities commence this summer through October
  - LARP should be there
  - Fermilab has willing people
- No beam time in 2005
  - LARP should identify areas of expertise for Cold checkout and Beam Commissioning
  - Fermilab is interested in a growing presence
- Cold Checkout and Sector testing in 2006 are golden opportunities to get pre-beam hands-on experience at CERN
- Coordination between AP and BC activities