



Vladimir Shiltsev  
[Shiltsev@fnal.gov](mailto:Shiltsev@fnal.gov)

Alessandro Ratti  
[aratti@lbl.gov](mailto:aratti@lbl.gov)

September 24, 2006

Tom Shea  
ORNL

Dear Tom,

thanks for agreeing to chair the LARP "Tune Feedback Final Design Review". The review will take place on Tuesday October 25 at Brookhaven National Laboratory. It will start at 7 AM to allow for participation from CERN on a video link.

The technical specifications for the Tune Feedback (TF) system of the LHC are listed in LHC-B-ES-0004, entitled "On the Measurement of the Tunes, Coupling, and Detunings with Momentum and Amplitude in LHC". These specifications address both the basic diagnostic ability to measure tunes, chromaticities, and coupling, and also the significantly harder task of 'closing the loop' to feedback on these quantities.

The division of responsibilities between CERN and LARP is defined in LHC-BQ-ES-0001, entitled "Definition of the Scope, Boundaries, and Share of Responsibilities for the LHC Tune Feedback Task within the US-LARP Framework". Briefly stated, LARP provides collaborative support of software development, testing of CERN hardware and software with beam at RHIC to the extent that such testing can be integrated with the demands of RHIC Operations, and collaborative support of TF system integration, commissioning, and operation at the LHC. The deliverables projected to meet the LARP responsibilities are defined in the Tune Feedback Task Sheet, available on the LARP website.

In light of these documents and the work presented at this review, please address the following points:

1. Does the current design of the TF system meet the technical specifications for
  - a) Tune,
  - b) Coupling, and
  - c) Chromaticity measurement and control?
  - d) Are the requirements sufficiently precise and detailed?
  - e) Is there anything that can be done to improve the design? To simplify it?

2. Is the division of responsibilities between LARP and CERN sufficiently clear? Is the control system interface sufficiently well defined? What are other potentially difficult areas in the boundary between LARP and CERN responsibilities? How may they be addressed?
3. Is the resource-loaded action plan for the Tune Feedback LARP task for 2007-2008 adequate to support the goal of demonstrating a working system in preparation for LHC commissioning?
  - a. Are sufficient resources (manpower and money) committed to insure that the schedule can be met?
  - b. How relevant are results of RHIC beam studies for the LHC operation?
  - c. Does this plan insure a high probability that a working TF system will be available when LHC energy ramping is first attempted?
  - d. What can be done to improve this plan?
4. Does the problem of chromaticity measurement and feedback receive adequate attention in this plan?
5. Is the LHC beam commissioning plan adequate? Does it adequately address the evolution of requirements from initial low-intensity beam commissioning to high luminosity operations?
6. What are the prioritized action items?

Sincerely

Vladimir Shiltsev  
LARP Accelerator Systems Leader

Alessandro Ratti  
LARP AS/Instrumentation Leader

Co-Reviewers:

Mike Brennan	BNL
Wolfram Fisher	BNL
Mike Lamont	CERN
Dave McGinnis	FNAL
Ralph Pasquinelli	FNAL
Tom Shea (Chair)	ORNL