CBETA

Date: July 28, 2016
To: File
From: S. Peggs

Subject: **Recommendations from the C-Beta directors review, July 27 2016**

See https://indico.classe.cornell.edu/event/40/

**Technical design:** *"Is the overall technical design conceptually sound and likely to meet the project's technical performance requirements? Does the project's planning include a viable path to arriving at a detailed technical plan on the necessary time frame?"*

1. The magnet design should be completed with high priority and the in-house production of a first article should be performed with high priority in order to validate the feasibility of this most critical cost and schedule item.

2. It is critical that the last major questions for the technical plan (e.g. finalizing magnet specifications) be brought to a rapid conclusion so that a defensible cost estimate can be provided on the 2-month timescale.

3. Every effort should be made to freeze the technical plan by mid-August to ensure that sufficient time is provided to complete and thoroughly review the implications of the final cost estimate.

4. Include as separate WBS level 2 items: a) Controls, b) System Integration and precommissioning.

5. Consider including beam size measurements for separate passes in the baseline. Investigate a possibility of developing kicker + screen system in mergers.

6. Work out fall-back scenarios for delays in schedule / cost creep. In the case of delays with magnet / girders a fall-back scenario (focused on demonstration 1st turn + recovery in time) could include: a) reducing scope of mergers and b) substituting long beam transport line by a set of sparse magnets suitable for matching optics functions on both ends.

**Project Scope:** *"Is a plan in place to establish the project's scope and specifications sufficiently well to support detailed cost and schedule estimates? Are the scope apportionment and deliverables that are split between BNL and Cornell clearly established and well defined?"*

7. Scope contingency must be identified, with assigned costs, decision branch points and technical impact included, and be ready to present at the September review.

8. The project team should continue to define WBS below level three. When developing WBS at the lower levels, the team should clearly define the institution – either BNL or CU -- that each WBS element is uniquely assigned to in order to ensure good cost control and scope capture in project development and execution.

9. An "integration" L2 activity should be inserted to ensure that all activities and costs associated with integrated assembly of the full machine are captured.

10. The Go/No Go decision points requested by NYSERDA should be more thoroughly defined with clear statements of the performance issues that are addressed.

**Cost and Schedule:** *"Are the cost and schedule estimates credible and realistic for this stage of the project? Is a realistic plan in place to develop detailed estimates on the required time scale?"*

11. The project should be segmented into deliverables of appropriate scale, and a clear BoE developed for each deliverable. This will facilitate reviewing the project as it seeks approval for construction.

12. The team should consider developing a WBS that can capture all integration costs, and also assign a responsible person to the integration effort.

13. Begin constructing a resource loaded project file in an appropriate tool (i.e., MS Project or PRIMAVERA) as soon as possible.

14. Expedite the design of the magnets to the extent that a resonably reliable cost for the magnet system can be detemined with highest priority.

15. An assumptions document describing general estimating assumptions, and particularly the manpower availability assumptions for construction and commissioning, should be prepared.

**Management and ES&H:** *"Is the project being appropriately managed at this stage? Will the management model properly support the project goals? Have the anticipated roles and responsibilities of both the institutions and the project principals been adequately defined and understood by all parties? Are plans in place to populate a full project team to the necessary WBS level? Is there sufficient Laboratory and University support to produce a credible technical, cost and schedule baseline on the needed time scales? Is a plan in place to develop a risk analysis and mitigation strategies? Are the plans for establishing ES&H aspects of the project sufficient given the project's current stage of development?"*

16. Create a detailed timeline (milestones) for how the next generation cost and schedule will be developed, and socialize it with the Level 2 and other managers so that they understand what they will be expected to provide over the coming weeks. In order to be useful and effective, this should be generated within the next few working days.

17. Reconsider the roles and responsibilities in the PMP, particularly those in the Project Office, in a manner that takes full consideration of the flow of funds and institutional responsibilities.

18. A clearer definition of how project reporting will be integrated across the institutions should be developed. The project reporting structure and the project tracking/reporting plans at BNL and Cornell should be reviewed to ensure that all reporting needs are satisfied.

**Documentation:** *"Are plans in place to produce the needed documentation in time for approval of a construction start in October 2016?"*

19. Formulate the needs for further support to bring the project plans and documentation to a conclusion by September.