



CEBAF 12 GeV Upgrade IPR (Lehman) CD-2 Review Overall Comments

(I participated in this as a reviewer of part of the Accelerator Upgrades - last week)

- ~\$300M dollar project, upgrading accelerator from 6 GeV to 12GeV (~\$70M), building a new detector hall and upgrading 3 other detector facilities
- Nuclear physics branch, not HEP, but still DOE and DOE order 413, EVMS, etc.
- They use PED funds (Planning, Engineering & Design) that are not part of the project TPC and can be used even for final design (~\$28M?)
- Very different format than our Director's CD-2 Review (plenary talks done by noon – agenda next page)
- Focused on the EIR (External Independent Review) 16 Lines of Inquiry (LOI)

- Our web page much better to navigate
- Our BOE System very good – their's was very difficult to follow
- Our earned value management system (EVMS) I also think is better - automated



CEBAF 12 GeV Upgrade CD-2 Review Agenda

Tuesday, June 26 Meeting Room F113

- 8:00 – 9:00 (1 hr) DOE Executive Session – D. Lehman
- 9:00 – 9:10 (10 min) Welcome – C. Leemann (JLab Director)
- 9:10 – 9:50 (40 min) 12 GeV Upgrade Overview – C. Rode (12 GeV PM)
- 9:50 – 10:25 (35 min) 12 GeV Upgrade CD-2 Criteria – A. Lung (12 GeV Upgrade DPM)

10:25 - 10:40 (15 min) Break

- 10:40 – 10:55 (15 min) 12 GeV Upgrade ESH&Q Overview
C. Saban (12 GeV Safety Manager)
- 10:55 – 11:10 (15 min) 12 GeV Upgrade Accelerator Technical Overview (WBS 1.3) –
L. Harwood (12 GeV Assoc. Project Manager for Accel.)
- 11:10 – 11:25 (15 min) 12 GeV Upgrade Physics (Experimental Equipment) Technical
Overview (WBS 1.4, 1.5)
W. Brooks (12 GeV Assoc. Project Manager for Physics)
- 11:25 – 11:40 (15 min) 12 GeV Upgrade Civil Technical Overview (WBS 1.6)
R. Yasky (12 GeV Assoc. Project Manager for Civil)



CEBAF 12 GeV Upgrade CD-2 Review Agenda

11:40 – 12:40 Lunch

- 12:40 – 2:00 Tour (Machine, Experimental Hall A, windshield tour of Hall D site)

2:00 – 5:00 Technical Breakout Sessions

- 5:00 – 6:30 DOE Executive Session



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CD-2 Review

In carrying out its charge, the review committee is requested to consider the following questions:

1. Is the design of the 12 GeV CEBAF Upgrade project technically sound and likely to meet the performance expectations? Are there credible plans in place for resolving any remaining technical issues?
2. Can the project be completed within the cost and schedule proposed for the Performance Baseline? Is the project ready to proceed to a CD-2 decision, Approve Performance Baseline?
3. Does the project satisfy all 16 lines-of-inquiry (LOI)?
4. Are ES&H aspects being properly addressed given the project's current stage of development? Are Integrated Safety Management Principles being followed?
(plenary ESH&Q talk)
5. Is the project being properly managed for its successful execution?

All but item 4 are very clearly covered in the 16 LOI, thus there was a plenary ESH&Q talk.

Dan asked the project (first) and the committee (second) to respond to the 16 LOI.

Project responses follow. I can comment on committee responses if people wish.



CEBAF 12 GeV Upgrade CD-2 Review- 16 LOI Project Response

1. Resource Loaded Schedule (**once we have a consistent RLS/BOEs we will be good**)
 - Resource Loaded Schedule for FY07-FY15 has been developed. It is based on the WBS structure for the project which is mapped to the Costbook. Cost basis for the TPC is currently ~1/3 estimates from vendors and ~1/3 previous JLab experience. The Resource Loaded Schedule is matched to the funding profile identified in the PEP.
2. Key Project Cost and Schedule Assumptions
 - Shutdowns, funding assumptions (when get FY funding, when get CD-3a, CD-3b), escalation rates, contingency guidelines, etc. (**12 GeV did not include enough here**)
3. Critical Path (**we need to do this clearly on a 1 page sheet**)
 - The Critical Path and two near critical paths have been defined. The schedule durations are reasonable and are integrated into the Resource Loaded Schedule.
4. Funding Profile (**we should be good here in the end**)
 - The funding profile is consistent with the resource loaded schedule.



CEBAF 12 GeV Upgrade CD-2 Review- 16 LOI Project Response

5. Work Breakdown Structure (need to update/check WBS dictionary)
 - The WBS is developed to a level of detail appropriate for the project and each individual subsystem. It continued to level 5 for almost all subsystems, and down to level 6 or 7 for many. The Costbook is mapped to the WBS. The WBS dictionary has been developed and updated for baseline preparation. It includes a description of scope, tasks, procurements etc. associated with each WBS element.
6. Risk Management (once we have things addressed in WelcomRisk, we will be good)
 - Risks have been identified and classified according to a combination of likelihood and impact. Mitigation plans have been developed for all WBS Level 3 risk other than low, and status is continuously tracked. The Risk Management approach includes documentation, analysis, and mitigation, and continues to be in active use. The identified Risk has decreased from 1 High & 6 Moderate to 6 Moderate by reductions in both the Cryomodule and Civil Hall D Complex Risks. Contingency estimates, including market escalation factors if appropriate, are adequate for the Moderate Risk elements.



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7. Basis of Design

- The design is well developed; several areas which are based on existing JLab systems are approaching 100% maturity (Cryomodules, Civil CHL, etc.). System requirements have been identified, and are consistent with the specifications and preliminary drawings. The experimental equipment in the four Halls each have detailed 3D CAD models. Total drawings available at this review total ~2,400.

8. Design Review

- Project and subsystem designs have been well reviewed with a total of four DOE Project Reviews (IPR 2007 being the fifth) from which 73 of 75 total recommendations have been closed. In addition there were 10 JLab-convened Project System Design and Safety Reviews held since CD-0 as well as ~15 JLab initiated subsystem reviews. Recommendations from these design review committees have been evaluated and incorporated into the preliminary design and Performance Baseline.

These two I think we are fine with, but need to document better and set up a project-wide web page to show what we have and what our plans are in these areas.



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9. System Functions and Requirements (Mainly our TDR)
 - System functions and requirements flow down from the 12 GeV PEP to the major systems: Accelerator, Physics, and Civil. They are consistent with Mission Need as described in the PEP. Each major system has then identified the subsystem requirements from which a design solution document is generated. The related documentation for the 12 GeV Upgrade includes System Requirement Documents, Design Solution Documents, Space Programs (civil scope), Design Criteria Documents, and draft Interface Control Documents. The design requirements are appropriately reflected in the baseline, including safety aspects.
10. Hazards Analysis (we have a Preliminary Safety Assessment Document also)
 - The 12 GeV Hazard Assessment has been developed. It includes a hazard profile assessment matrix, hazard risk assessment methodology, hazard risk matrix, and a hazard profile for construction-related activities. Scope, schedule, and costs associated with the safety aspects of the project are incorporated into the baseline.

We mainly have our TDR for Criteria 9 and ANU will have the design documents we will have signed off on and will control.



CEBAF 12 GeV Upgrade CD-2 Review- 16 LOI Project Response

11. Value Management/Engineering **(I think we are good here, need to document better)**
 - Two formal Value Engineering analyses have been performed: Civil Hall D Complex and CHL Addition. The results have been incorporated into the baseline. Additionally, approximately 35 examples of Value Management studies in Accelerator and Physics were provided. In early FY08 two additional formal VE studies are planned for Accelerator Beam Transport and the Hall B spectrometer. The VM/VE process to date has been appropriate and the results are incorporated into the baseline.
12. Project Controls/EVMS **(we should try to get a few months of this under our belts)**
 - The 12 GeV project control systems are developed in compliance with the JLab Project Controls Manual. All controls including Change Control, earned value tracking, and variance reports are in active use.
13. Project Execution Plan **(need to update & finalize our PEP)**
 - The Project Execution Plan reflects and supports the way the project is being managed. It has been updated and expanded from the CD-1 Preliminary PEP to include a section on the Integrated Project Team. It is consistent with other project documents and establishes a plan for successful execution of the project.



CEBAF 12 GeV Upgrade CD-2 Review- 16 LOI Project Response

14. Start-up Test Plan (need to draft one similar to 12 GeV upgrade – not hard)
 - A ten page Start-up Test Plan linked to the CD-4 deliverables identified in the PEP has been drafted. It identifies the acceptance and operational system tests required to demonstrate design performance and safety requirements. Cost and schedule durations for these tests are appropriately incorporated into the baseline. The Start-up Test Plan is well developed for this stage of the Project.
15. Acquisition Strategy (should be fine here)
 - The Acquisition Strategy is consistent with the way the project is being executed. No significant changes in acquisition approach have occurred since its signature by the AE for CD-1 in February 2006. It still represents the best value to the government.
16. Integrated Project Team (should be fine here)
 - The IPT has been formed and meets on a weekly basis. It is chaired by the Federal Project Director. The charter as well as the full membership is incorporated into the PEP (Section 4.1). There is also a monthly videoconference meeting usually also attended by members of the 12 GeV IPT Executive Leadership and IPT Subject Matter Experts. Representatives from DOE-NP, TJSO, and JLab are members of the IPT. The project management staffing level is appropriate, and the necessary disciplines are included.



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CD-2 Review – my notes

- Joe May (FPD) gave a very nice talk in the executive session on how the project meets the 16 Lines of Inquiry (LOI)
- They assumed the continuing resolution would mean a delay in funding increase for next FY for 3 months- this was viewed as overly conservative
- Construction Safety Officer needed for NOvA? (one on this project and was asked about, viewed as needed)
- Issues with procurement authority – who has what, does the project have enough or do they have to go to the FPD frequently (12 GeV had \$1.5M before having to go to the FPD and the review committee thought that was too low).
- Do we need to do CD-4a for running the accelerator? (talk of that for running CEBAF upgrade accelerator part for experimental program as it occurs before CD-4 for the whole project, just like with NOvA)



CEBAF 12 GeV Upgrade IPR (Lehman)

CD-2 Review – my comments

- Dan Lehman comments:
 - Schedule (& cost) contingency for high risk items? Make connection clear .
 - What work are you outsourcing to other labs? What % ?
 - Do you apply same rules for university contracts as for other contracts (wanted to hear about MOU's)
 - How much contributed effort is free from universities?
 - Who looks at overall design integration/how do you do it?
 - CD-2 ESAAB always asks if security issues have been addressed and are they costed in the project (or in operations once operational)?
- My main thoughts:
 - Should have one plenary talk addressing the 16 LOI in more detail than Pepin does in executive session. Talks have more focus on 16 LOI?
 - Need something better organized for design reviews (nice web page with what reviews have been done, links to docs, planned future reviews) – Alan start on
 - Plenary ESH/Q talk
 - Should look to have a few months of looking at earned value
 - Need to draft project start-up plan