

Closeout Report

for the

*Department of Energy
Review Committee Report
on the*

Technical, Cost, Schedule, and
Management Review

of the

LINAC COHERENT LIGHT SOURCE (LCLS) PROJECT

July 10-12, 2007

United States Government
Department of Energy

memorandum

DATE: May 17, 2007

REPLY TO

ATTN OF: SC-22

SUBJECT: DOE REVIEW OF THE LINAC COHERENT LIGHT SOURCE (LCLS) PROJECT

TO: Daniel R. Lehman, Director, Office of Project Assessment, SC-1.3

I request that you organize and lead an Office of Science (SC) status review of the Linac Coherent Light Source (LCLS) project at the Stanford Linear Accelerator Center (SLAC) during July 10-12, 2007. The purpose of this review is two fold; 1) evaluate progress in all aspects of the project: technical, conventional facilities, cost, schedule, management, and environment, safety and health (ES&H), and 2) coordinate with OECM who will conduct a limited External Independent Review (EIR) to validate the revised performance baseline.

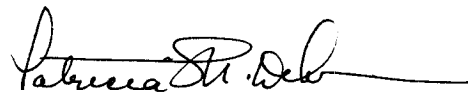
During the past several months, progress has been made in fabricating/assembling the LCLS technical hardware and construction activities. The project was forty-five percent complete as of the end of March 2007. The project team started implementing the plan to reutilize existing facilities to provide office space for LCLS operations in lieu of constructing a Central Laboratory Office Complex (CLOC). The FY07 continuing resolution (CR) has impacted the project cost and schedule due to the delay and shortfall in funding. The project team has evaluated the impacts and prepared a revised performance baseline as a result of the CR. A Baseline Change Request (BCR) has been prepared for the effects of the CR. At the same time, the CLOC construction will be removed from the baseline. The BCR will be processed after the completion of this review.

In carrying out its charge, the Committee should respond to the following questions:

1. Is the proposed baseline sound, considering the reduced funding scenario imposed by the FY07 Continuing Resolution and the FY08 President's Budget? Are the project's cost, schedule, and technical baselines consistent with these limitations and the FY08 LCLS Construction Project Data Sheet? Is the information in the DOE Project Assessment Reporting System consistent with physical progress?
2. Are the construction field activities progressing in a manner consistent with the predicted costs and schedule? Has the CLOC replacement laboratories and office space been integrated into the appropriate project planning and execution documents?
3. Are the designs of the technical systems sufficiently mature to support the planned hardware procurements? Will the procurement plans and equipment installation and commissioning plans support the project schedule?

4. Is there adequate contingency (cost and schedule) to address the risks inherent in the remaining work and is it being properly managed? Is the contingency supported by and consistent with an appropriate project-wide risk analysis?
5. Are ES&H aspects being properly addressed given the project's current stage of development?
6. Is the project being managed (e.g., properly organized, adequately staffed) as needed to continue with construction? Is there adequate support from SLAC in all necessary areas (e.g., contracts, procurement, human resources)? Has the project responded appropriately to recommendations from prior DOE/SC reviews?

Thomas Brown, the LCLS Program Manager, will serve as the Basic Energy Sciences point of contact for this review. I would appreciate receiving your committee's report within 60 days of the review's conclusion.



Patricia M. Dehmer
Associate Director of Science
for the Office of Basic Energy Sciences

cc:

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Review Committee Participants

Daniel R. Lehman, Chairperson, DOE/SC

Office of Science

SC1

SC2

SC3

SC4

Accelerator Physics

* Sam Krinsky, BNL
Glenn Decker, ANL

Injector/Linac

* Richard Sheffield, LANL
John Lewellen, ANL

Undulator

* Erik Johnson, BNL
Steve Marks, LBNL

**Photon Beam
Handling Systems**

* Dennis Mills, ANL
Chi-Chang Kao, BNL

SC5

SC6

SC7

SC8

Control Systems

* Dave Gurd, ORNL
Michael Thout, Consultant

Conventional Facilities

* Dixon Bogert, Fermilab
James Lawson, ORNL
Mike Schaeffer, BNL

Cost and Schedule

* John Post, LLNL
Bob Swale, ANL
Steve Tkaczyk, DOE/SC

**Project Management
Procurement/Pre-Ops**

* Jim Yeck, BNL
Jeff Atherton, LLNL/NIF
Scott Gibbs, LANL
Ed Temple, Fermilab

SC9

ES&H

* Arnold Clobes, LLNL
Joel Becks, DPR Construc.
John Kyle, Jacobs

Observers

Pat Dehmer, DOE/SC
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Thomas Kiess, DOE/SC
Pedro Montano, DOE/SC
Hanley Lee, DOE/SSO
Hannibal Joma, DOE/SSO

LEGEND

SC Subcommittee
* Chairperson
[] Part-time Subcom. Member

Count: 24 (excluding observers)

**Department of Energy Review of the
Linac Coherent Light Source (LCLS) Project**

REPORT OUTLINE/WRITING ASSIGNMENTS

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2.1.3 Recommendations	
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2.3 Undulator (CQ#1,3,4)	Johnson/Subcommittee 3
2.4 Photon Beam Handling Systems (CQ#1,3,4)	Mills/Subcommittee 4
2.5 Control Systems (CQ#1,3,4)	Gurd/Subcommittee 5
3. Conventional Facilities (CQ#1,2,6)	Bogert/Subcommittee 6
4. Cost and Schedule (CQ# 1,2,3,4)	Post/Subcommittee 7
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- D. Cost Table
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- G. Action Items

2.1 Accelerator Physics

Samuel Krinsky
Glenn Decker

2.1.1 Findings

- Progress in injector commissioning has been impressive. Injector beam quality meets requirements for commissioning of downstream elements.
- Safety is integrated into all planning for the accelerator systems.
- Availability of diagnostics and controls is critical for BC2 commissioning. Installation schedule for the Fall 2007 shutdown is very tight; it will be challenging to have diagnostics and controls ready in time.
- Undulator commissioning plans, including details of diagnostics provided by ANL and LLNL, are not well advanced. Good interfaces between SLAC, ANL and LLNL will be essential for successful commissioning of the undulator systems.
- There has been progress in comparing simulations of the output of the the photo-injector to experimental results. These simulations are impeded by limited access to high-speed computing resources.

2.1.2 Comments

- It would be beneficial if SLAC could provide enhanced access to on-site computing resources for computation-intensive simulations of LCLS beam dynamics.
- We are pleased that work is underway to make start-to-end simulations available on-line for commissioning. We look forward to hearing more about this in the future.

2.1.3 Recommendations

- Improve the interface between all groups (SLAC, ANL and LLNL) responsible for construction, installation, and commissioning of the undulator systems (September 07). Electron beam and x-ray diagnostics being built at ANL and LLNL must be well integrated into the commissioning plans. X-ray diagnostics must be available continuously as an operational tool.

2.2 - Injector/Linac

Richard Sheffield
John Lewellen

2.2.1 Findings

- Injector commissioning progress and results are excellent
- The technical issues should not impact meeting CD4
- Safety is well integrated into commissioning work
- The linac-to-undulator transport line and beam dump installations are on the critical path for “light from undulator” milestone
- The planned schedule appears to be very tight.

2.2.2 Comments (general)

- Made significant progress. Current performance acceptable for remaining commissioning work
- Significant injector/BC1 underestimates for effort and cost; lessons being applied to remainder of installation
- Beam diagnostics (BPMs and wire scanners) removed from scope will have negative impact on commissioning schedule
- Injector needs changes for beyond-commissioning FEL operation, but are on hold
- Need transition plan for laser handoff to operations

2.2.2 Comments (schedule & cost)

- Schedule tight. No contingency for Fall 07 inst. or slippage to / during co-occupancy in LTU
- Contingency to complete the linac effort (~\$4.5M on ~\$20.5M remaining work) appears low

2.2.3 Recommendations

- Re-evaluate schedule contingency for LTU activity
- Determine cost/schedule/risk impact of removal of beam diagnostics
- Re-evaluate cost to completion

2.3 LCLS Undulator DOE Review 10-12 July 2007



Erik Johnson,
Steve Marks



2.3.1 Findings

Notable good stuff...

- Undulator Magnet Fabrication
 - Substantially Complete
 - 39 of 40 at (or near) SLAC as of 12 July 2007, one at APS to support continuing work
 - 12 Devices measured, 8 successfully corrected to date

- Magnet Measurement Facility
 - Generally past shakeout problems
 - Now capable of processing 1 device per week

- Alignment Diagnostics
 - Continued solid progress on challenging metrology system

- ASK (Assemblies, Sub-Assemblies, Kit) system
 - Now fully deployed
 - Potentially powerful Scope and WIP management tool

2.3.1 Findings(2) Response to Previous Recommendations

- Four recommendations in October 2007 for Undulator Systems
(Vacuum Chamber related issues #s 1-3)
 - 1 Cost estimate for development of backup budgeted
Path of work did not lend itself to projecting this cost or capturing in budget
 - 2 Advance the development of backup options
Pursued aluminum clamshell as backup
 - 3 Review backup options and 'down select'
Al clamshell and SS considered
Neither fully satisfied all requirements at decision point
Determined SS was most likely to develop to meet all requirements
 - 4 Undulator Installation and Integration Transition Plan
in process at this time, other issues demanded attention
- **Responsive in spirit, adjust details to circumstances**
 - Reality (continuing resolution, technical issues) crept in to degree not imagined by October Review Team!

2.3.1 Findings(3) Undulator Team Issues

- Evolution in APS Team leadership
 - Geoff Pile stepped into void when Steve Milton left
 - Challenging job at delicate stage of project
 - Geoff adapted to expanded role quickly
 - Very positive influence technical and management

- APS/SLAC Coordination
 - Generally continued improvement, still some room to grow
 - Continue refinement and clarification of technical requirements
 - e.g. Vacuum chamber surface finish requirements (slope error vs. rms roughness)

- Project (and project reviews) are pretty stressful
 - *Not a competition*; project is a TEAM effort to bring LCLS on line

2.3.1 Findings(4)

Vacuum Chamber continuing concern

- Still key technical concern on or near the critical path
 - SS chamber development hit 'show stopper'
 - Unacceptable permeability and impact on undulator field
 - Re-evaluate backup Options

- February down-select favored SS because deemed best to succeed on surface finish requirements
 - Project requirement of 10 mrad slope errors

2.3.1 Findings(5) Elements of the Review Charge

- Cost/Schedule baselines? (April TEC WBS 1.4)
 - *BCWP \$24.7M, ACWP \$26.9M, BAC \$37.4M*
 - *SPI 0.91, CPI 0.92*
 - *WTG \$18.5M, Contingency \$3.8M (CR Revised projection)*

Continuing concerns related to integration but with vigilance should meet baseline objectives
- Designs Mature?
 - Well advanced in most areas
 - Vacuum chamber an identified issue with recovery plan
 - *Beam Loss Monitor needs to get back on the radar.....*
- Adequate Contingency?
 - *~20.5% on WTG; austere but probably adequate*

2.3.2 Comments

Vacuum Chamber

- Options on table now all non-magnetic materials; try to get best practical finish
 - Copper tube
 - Original plan being revised, should get to ~60 mrad
 - Aluminum extrusion
 - Potential improvement in polishing technology to meet surface finish requirements
 - Aluminum clamshell
 - Good access to polish, more development time (potential schedule slip)
 - More fabrication steps/welds than other backup options
 - Aluminum options might get below 60 mrad (25?)
- Commit to one soon or risk major schedule impact

2.3.2 Comments (2)

Diagnostics

Beam Position Monitors

- Advanced to complete prototypes
 - Performance still being evaluated, but seems to be in ballpark with sensitivity (1 micron requirement, 8 micron preliminary, refinement of measurements underway)
 - “Ready” for production
 - Procurement packages to be let
 - Schedule quite tight, but possible

Beam loss monitor system

- Generally deemed to be important for protection of undulators
 - Uncertainty about damage mechanisms & 'important things to monitor' leads to broad approach
 - Currently on hold over concerns for cost/performance of this path
 - Awaiting revision of Physics Requirement Document
- *Need to ramp up quickly if BLM's to be part of machine commissioning*

2.3.3 Recommendations (Vacuum Chamber)

1. Fabricate prototypes of each back-up option by End of August 2007
2. Select 'best' option to move into production by Mid September 2007
3. Evaluate potential impact of any anticipated sub-specification performance. Include in risk registry with any mitigation strategies and potential costs as soon as feasible; in no case later than the next DOE review (TBD??)

2.3.3 Recommendations (Diagnostics)

4. Provide adequate support to ensure placement of orders for RF BPMS on or before end of September 07
5. Develop PRD for Beam loss monitors to meet project needs by End of August 07
6. Develop revised estimate for BLM system as soon as feasible; In no case later than the next DOE review (TBD?)

2.3.3 Recommendations (Request really)

We think the really exciting bit is yet to come;
Installation and Commissioning of the undulator
systems are just around the corner...

7. At the next DOE Review Present Installation and Commissioning plans.

2. 4 Photon Beam Handling Systems

1.5/2.5 X-ray Transport, Optics, and Diagnostics (XTOD)
1.6/2.6 X-ray End Stations (XES)

Chi-Chang Kao (BNL) and Dennis Mills (ANL)

2.4.1 Findings

General:

- Considerable progress has been made in the Photon Systems.
- Recently named an account manager for controls/data acquisition is a positive step towards completing the task, but the amount of work to be completed is still considerable.
- The choices and compromises that the Photon Systems Managers have made to accommodate a financially tight FY08 are sound as they still allow for the start of the AMO science program in 09, which the reviewers feel is important.
- When baseline was recently recalculated, the CAMs in the Photon Systems were asked to re-evaluate the budget numbers and make revisions where necessary - no major changes in the baseline cost were made except for the cost increases due to the lengthening of the project due to the CR.

2.4.1 Findings

X-ray Transport, Optics, and Diagnostics (XTOD):

- Significant progress made in most XTOD components that required prototyping, including gas detector and total energy thermal sensor.
- Effectively use existing facilities, SSRL and FLASH, for materials and prototype testing.
- Significant progress made in the soft x-ray mirrors, including testing the damage threshold of the coating material, certifying vendor, developing in-house metrology and an award to vendor has been made. Preservation of the mirror figure in the coating process is well within the experience of Livermore team.
- Most components have been designed through PDR, and in some cases to the FDR-level and FDRs for all components are expected to be completed this calendar year.
- Approximately 50% of work completed - 21% contingency on remaining work is probably adequate.

2.4.1 Findings

X-Ray Endstation Systems (XES):

- As would be expected XES not as far along as XTOD, < 20% work complete
- 26% contingency seems reasonable.
- The particle imaging capabilities and laser amplifier associated with the AMO experiment were removed so that the LCLS laser timing system could be added.

2.4.2 Comments

General:

- There are a significant number of FTEs scheduled to support the controls effort in Oct., Nov., and Dec. 07 (a jump from 8.4 FTEs in Sept 07 to 17.2 FTEs in Oct. 07.) Is the manpower available at SLAC?
- Planning for commissioning activities has started, but more work is needed. For instance, how will the “handoff” of components developed by LLNL to the LCLS staff occur, i.e. will LCLS staff participate in the commissioning of the components? Does the manpower schedule reflect that?

Interfaces/Integration of Photon Systems and LUSI:

- Continue the very important interactions between the Photon Systems and LUSI staff - the shared controls CAM between Photon Sciences and LUSI is a step in the right direction.

2.4.2 Comments

XTOD:

- Although good progress has been made in many areas, a notable exception is the hard x-ray mirrors and associated mech/vacuum system. (The physics requirements document is supposed to be signed this week). These components are CRITICAL to the success of hard x-ray science programs. Since the design of the mechanical and vacuum system for the mirrors is in the early stages, this is an excellent time to bring in experts from other light sources (national and international) to critique the proposed design to see if it will meet the very stringent pointing stability requirements.

XES:

- Prototype pixel array detector (PAD) seems to be progressing well, but continued vigilance is required to ensure that the deliverables are met.
- Work related to radiation safety (PSS hardware, software, shielding, etc.) tends to take longer than expected due to the many groups that are involved and the stringent reviews that are required and therefore a close watch on the schedule and progress of these systems should be maintained by the managers.

2.4.3 Recommendations

General:

- Review commissioning plans to ensure proper staffing (both LLNL and LCLS) and schedule is allocated.

XTOD:

- Bring in and/or visit with experts in mirror vacuum tank design from other light sources to critique the proposed design, specifically to determine if the design will meet the very stringent pointing/stability requirements, before finalizing mechanical/vacuum hardware for the hard x-ray mirrors. Explore the capability for in-situ optimization of hard x-ray mirror figure.

Section 2.5 - Controls

Dave Gurd, Mike Thuot

Findings and Comments (1)

- The committee heard an impressive set of technical presentations that showed significant progress and good success in commissioning the injector. All systems were in place on time and performed well, in spite of minimal testing time. We were shown many screens and applications that were valuable to commissioners. Some features a little late.
- The PLC-based PPS system is working and accepted – a first for SLAC.
- Staffing situation looks good in all areas. Ernest Williams is an important addition. A Deputy GL is still missing and still needed.

Findings and Comments (2)

- The decision to defer XAL developments and use Matlab was wise, but is probably not a satisfactory long-term solution for integration. Do not abandon work on XAL.
- There is a new CAM for the XES area controls and Data Acquisition. There appears to be more project confidence that controls will be ready for the X-Ray areas. A lot of work is still required, but the new CAM has available resources.
 - The committee was assured that LCLS standards would be followed in WBS 1.6.2. This will be important cost control and later maintenance.

Findings and Comments (3)

- The rebaseline documents reflect only new costs attributable to CR. Potential costs related to technical risks are found in either the risk registry or the CCB log. (Or possibly not at all?) Examples follow:
 - The linac BPMs may not meet requirements (RR)
 - Additional cable installation is required for FY08 (CCB)
 - The committee found no network costs for LTU, Undulator, XTOD (but there are for XES)

Recommendation

- Insure that all costs-to-complete – including any newly identified costs not related to the CR – are covered in this rebaseline.

3.0 LCLS Conventional Facilities DOE Review 7/10-12/07

Dixon Bogert
James Lawson
Mike Schaeffer

Finding and/or Comment

Substantial progress has been made in the last nine months with the Conventional Facilities construction. The undulator hall tunnel heading has been “holed through.” The lower bench is being removed. The access tunnel has reached the Far Hall. The Near Hall lower level is poured and the upper level is in place except for the roof. About 80% of the beam transfer hall from the linac to the undulator hall is constructed. The Turner contract is 35% complete.

Finding and/or Comment

After a slow start, and a change of project management personnel, Turner Construction has put in place a recovery schedule and states that they should be able to maintain the LCLS Project's baseline schedule. The "recovery schedule" is at present reported two to four weeks behind, but if Turner and subcontractors can perform as scheduled (which requires at least three months of \$8M work to be costed) shared occupancy of some areas by the end of 2007 may be possible

Recommendation

Continue to monitor Turner's schedule recovery plan.

Finding and/or Comment

The Turner schedule requires at least three months of effort during the next four months that exceeds \$8M each month. Each month is reported to consist of about 150 FTE's of effort (approximately \$2M of the \$8M) and about \$6M of materials installation. While possible to achieve, this is an ambitious goal, and various events could prevent reaching this level of accomplishment. The joint occupancy dates may not be met. Possible workarounds could be considered now, including investigating the transfer to Turner of some or all of the work intended for the joint occupancy period. Maintaining the joint occupancy date with less of Turner's work accomplished could complicate all work in the area.

Recommendation

Investigate the impact to the project of a failure to achieve the first joint occupancy date of December 2007. Consider the impact of an up to three month delay of joint occupancy.

Finding and/or Comment

Only conceptual design costs estimates are available for the major remaining work. These areas of work are:

- 1) Building 28 renovations for 45 offices
- 2) Building 751 renovations for 63 offices
- 3) Additional experimental hutch construction

And are shown as totaling about \$8M.

As part of the re-baseline of the project, it would be advisable to have as accurate an estimate as possible of these remaining work elements.

Recommendation

Re-evaluate the cost estimate for the remaining work not under contract.

Finding and/or Comment

Until the designs are completed and contracts awarded for the remaining work discussed above, it will not be known whether the estimating has been better than all previous estimates for the LCLS Conventional Facilities which have run about 50% over estimates as contracted.

Recommendation

Retain a contingency allowance of between 30% and 50% for all Conventional Facilities work for which a final design and an accompanying cost estimate are not in hand today. Retain that level of contingency until contract award.

Finding and/or Comment

The Turner contract, although “fixed price,” has already generated some substantial claims, and the elimination of the “CLOC” work has generated further disagreement on the size of credits due the LCLS Project. At 35% completion, it is by no means certain that additional substantial claims will not be generated. Although a good personal working relationship exists between Turner staff and LCLS staff, it is by no means clear that disagreements may not proceed to arbitration and awards unfavorable to the LCLS Project. Contingency consideration at this time should include these possibilities.

Recommendation

Prepare a pessimistic worst case scenario for funding unsettled and future claims arising from the Turner contract. Include these considerations in contingency planning for the project re-baseline. It is essential to avoid forced de-scoping of any remaining project work.

Finding and/or Comment

Sufficient safety incidents have occurred under the Turner contract to suggest consideration of whether the commitment of Turner to safety is permeating all aspects of the work. Some consideration to whether cross communication of all aspects of the work and ownership of all the safety program is fully understood and accepted by all Turner subcontractors and the entire workforce, and whether all the workforce is consistently examining all aspects of their efforts. This commitment by the workforce is as critical as all the safety inspections in place.

Recommendation

Continue to examine and implement proactively all possible factors necessary to achieve an exemplary safety record on the remaining work.

Finding and/or Comment

Consideration should be given to the possibility the FY2008 funding might have to include contingency associated with the Turner contract that exceeds present expectations.

Recommendation

Use care and maintain some financial flexibility in the latter part of FY 2008.

4.0 Cost and Schedule

Lehman Review of the LCLS rebaseline proposal

July 10-12, 2007

Stanford Linear Accelerator Center

John Post, LLNL

Bob Swale, ANL

Steve Tkaczyk, DOE/SC

Cost & schedule

- **Findings**

- **Proposed baseline includes impacts of Continuing Resolution to previous baseline**
- **Last detailed cost estimate was August 2006**
- **Proposed contingency pool includes known costs required to complete the Project in addition to normal risk items**
- **Schedule is logically linked, and resourced appropriately, and is consistent with the available funding profile**

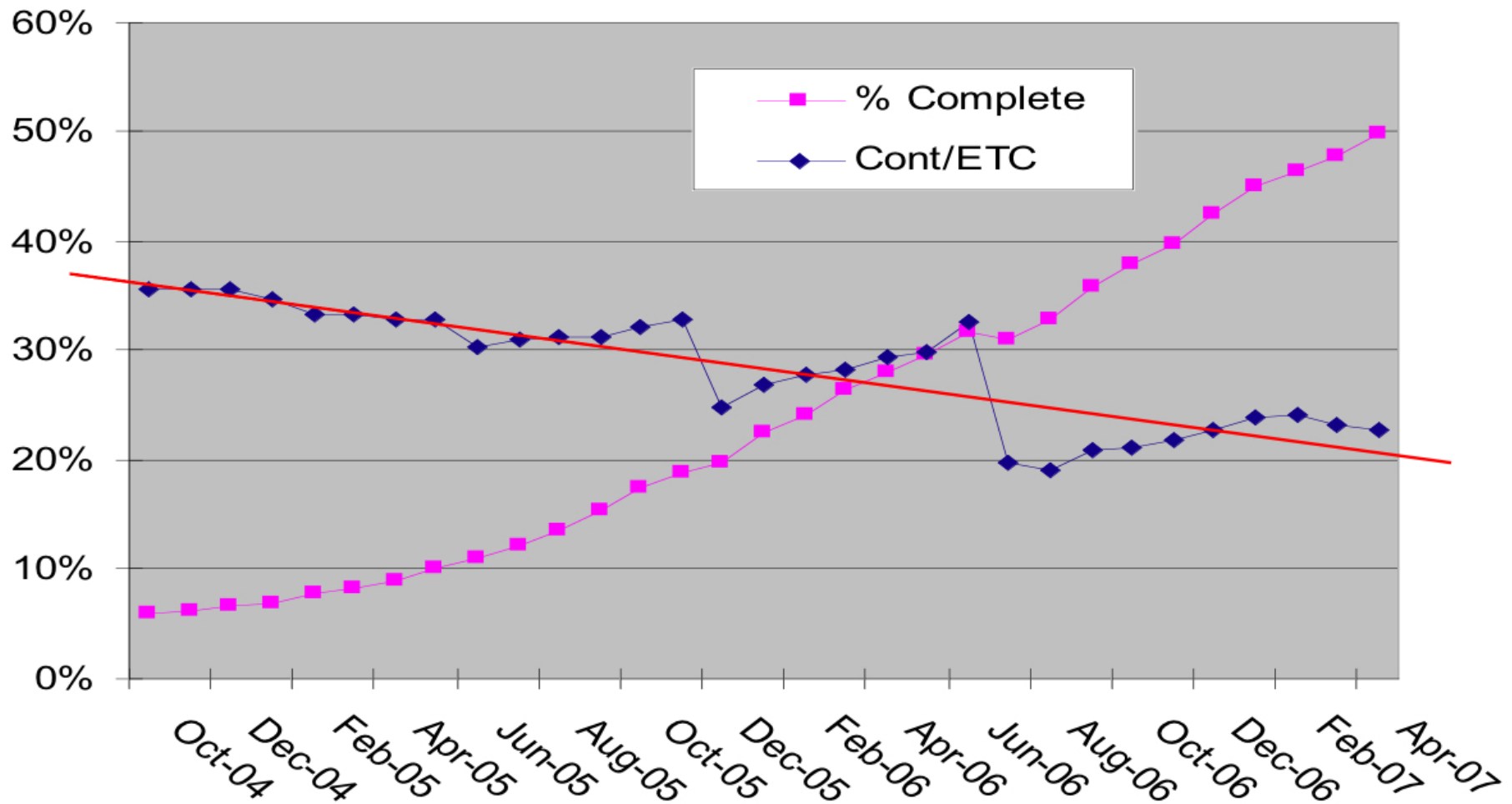
- **Comments**

- **Funding comparison**

	PY	FY2007	FY2008	FY2009	FY2010	Total
Existing Funding						
TEC	147.7	105.9	51.4	10.0		315.0
OPC	11.0	16.0	15.5	21.5		64.0
TPC	158.7	121.9	66.9	31.5		379.0
Proposed Funding						
TEC	147.7	100.8	51.4	31.5	7.4	338.8
OPC	11.0	13.0	15.5	17.0	13.5	70.0
TPC	158.7	113.8	66.9	48.5	20.9	408.8
Delta						
TEC		(5.1)		21.5	7.4	23.8
OPC		(3.0)		(4.5)	13.5	6.0
TPC		(8.1)		17.0	20.9	29.8

Metric of some concern

% Contingency Available (on remaining work)



Cost & schedule

- **Comments (cont.)**
 - **Resource-loaded schedule is actively used by the Project to assess performance and manage future work**
 - **Risks are managed inconsistently between the Risk Registry and the BCR process**
- **Recommendations**
 - **Update proposed baseline with current estimates and all scope identified to complete the project**
 - **Define an interface milestone for enabling science R&D in the FY09 timeframe**
 - **Evaluate work sequencing to manage FY08 funding constraints**
 - **Re-evaluate risk-based contingency derivation based on the updated baseline cost and schedule**
 - **Closely monitor procurement process to manage potential schedule risks**

5.0 Project Management SubCommittee

Jeff Atherton, LLNL

Scott Gibbs, LANL

Ed Temple, FNAL

Jim Yeck, BNL

Project Organization

- Excellent progress since the last review
- Facts on the ground are impressive and the commissioning results are encouraging
- Recent steps to strengthen the organization are important and should continue (Engineering Mgmt, Instrumentation, Controls)
- PD and Deputy PD are continuing to be spread too thin and need more support

Recommendation:

Establish a Senior Scientific Leadership position within the organization of the Associate Laboratory Director for LCLS that can address the increasing demand for coordination of the science program and interactions with the growing user community.

Impacts of the CR

- Extensive documentation on the impacts of the CR
- CR hit at the worst possible time for the LCLS project
- Project leadership established priorities, kept conventional facilities on track, and successfully navigated through this difficult period
- Presentation of the CR impacts presented to the committee were reasonable

Recommendation:

None. The project team has done their job addressing the impacts of the directed change. Now focus on ensuring the final baseline is robust and appropriate for the remaining 3 years of the project.

Revised Baseline Proposal

- Focused on the impact of the FY07 CR (this was done well)
- Concept of a split CD-4 is not necessary
- Does not allow adequate time for DOE approval of CD-4
- Does not provide adequate contingency for FY2008 and adequate overall contingency

Recommendations:

- Revise the baseline to address the review recommendations within 30 days. Note: The baseline must not only address the impacts of the CR but also a current bottoms-up estimate of the project costs and risks.
- Determine the science program that can be accomplished prior to CD-4 (FY2009-10) and submit a description of this program to DOE for concurrence with the final baseline.

SLAC Support of the LCLS Project

- New Business Manager since last review
- Considerable attention given by all parties to recent “safety incidents”
- LCLS operating organization definition and staff transition planning now underway is essential to LCLS project success
- Transition Working Group established by the SLAC Director and lead by Persis Drell is a good approach

Recommendations:

- Develop an initial staffing transition plan to support the final revised baseline within the next 30 days, proceed to the final plan as soon as possible, secure directorate approval, and adhere rigorously to the plan.
- Continue ongoing efforts to emphasize safety performance improvement.

Staffing

- Past reviews highlighted issues with staff planning across SLAC to support the LCLS project. FY2007 is peak year.
- Staffing considerations must include LUSI, Linac Ops, and LCLS operations
- LCLS project (and SLAC) success depends on the ability to define and follow rigorously a staffing transition plan
- Each individual needs to know the plan for themselves well in advance of a change

Recommendations:

Establish procedures and agreements within SLAC that enable LCLS management to transition staff off the project when it meets the needs of the project.

Procurement

- Dedicated procurement “cell” is a good practice for large projects
- Procurement approval by SSO of \$100k is unusually low for a project of this magnitude. There are twenty contract awards over the threshold in the next six months.
- SLAC needs to work with the SSO to restore higher levels of procurement authority ASAP
- SSO Manager is committed to providing timely review of LCLS procurement packages and working toward higher approval authorities for the LCLS procurement cell

Recommendation:

Work closely with the SSO to improve procurement packages and increase LCLS procurement authority ASAP.

6.0 ES&H SUBCOMMITTEE

Arnold Clobes

John Kyle

Joel Becks

Findings

- There were no Recommendations from the October, 2006 Review.
- The tunneling operations by Affholder is being done with effective line management systems. Appropriate Industrial Hygiene assessments are being conducted per Cal OSHA requirements.
- Concrete forming work has been underway by for 10 months. Conco is effectively managing their work crews based on observations of good housekeeping, use of PPE. An observed tool box talk was conducted effectively in English and Spanish.
- Turner has recently implemented several positive safety initiatives. (Safety Coaches, newsletter, safety observation process.)

More Findings

- The Turner safety staff includes 2 individuals during day and 1 after hours. The safety staff is adequate and their presence on the site is average.
- During interviews with Turner, there were conflicting statements from management whether there is a single TCCo safety plan followed by all the subs, or individual sub plans.
- Overall, there is a lack of uniformity in understanding of roles and responsibilities and common understanding of the Site Safety Program.
- A review of the Turner Site Specific Safety Program revealed several program elements that are not being implemented. (e.g fall protection anchor point requirements, rigger training)

More Findings

- The Project is subject to numerous safety inspections. These inspections are being recorded and the deficiencies tracked.
- The assessment team identified several safety compliance deficiencies during their site walks. We suggest the Project evaluate the thoroughness and quality of the inspections.

Recommendations

- Analyze inspection data to look for leading indicators to predict and prevent future injuries. Complete by July 31
- Provide visible Senior Management (LCLS & Turner) leadership in the safety program implementation to demonstrate management commitment including clearly defined goals and expectations. Complete by July 31
- Increase the frequency of Turner “All-Hands Meeting”. Complete by July 31

**Linac Coherent Light Source (LCLS)
SC Project Review, July 10-12, 2007**

Action Items

Action	Responsible Party	Due Date
1. Re-evaluate the project baseline change request.	SLAC	August 15, 2007
2. Conduct a Mini-Review to evaluate the projects readiness to proceed with Baseline Change Request.	DOE BES, DOE SSO, and SLAC	Late August 2007

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