

LCLS Risk Registry  
February 2008

Risk ID	Risk Title	If / Then	POC Owner	Date Last Revised	Risk Values Before Handling				Risk Control Actions			Risk Values After Handling					Risk Retired - Mark "X" for Yes and date	
					Risk Consequence	Risk Probability	Risk Severity Level	Worst Case Cost Impact (AYK\$)	Risk Handling Approach Avoid, Mitigation, Transfer, Accept	Estimated Cost to Implement Handling (AYK\$)	Steps for Handling the Risk (Punch List)	Risk Consequence	Risk Probability	Risk Severity Level	Cost Impact (AYK\$)			
															Best Case	Most Likely		Worst Case
1.1	Management																	
R1.1-020	Contingency Analysis	The project does not have a clear understanding of its contingency needs for the remainder of the project ... then there is the potential for committing to too much (or not enough) scope.	Mark Reichanadter	3/14/2008	Significant technical risk >\$5M but <\$10M L1M delay >3mo <b>Critical Schedule Risk</b>	25%	High	\$10,000	Mitigate	\$80	<ul style="list-style-type: none"> <li>Perform a semi-annual bottoms-up risk-based contingency analysis on remaining work (T. Mast)</li> <li>Perform a Monte-Carlo assessment annually to validate the bottoms-up contingency analysis (T. Mast)</li> <li>Perform monthly assessment of Estimate at Complete (M. Reichanadter)</li> <li>Perform monthly assessment of contingency on 'commitments to go' after reserving adequate contingency for scope under contract.</li> </ul>	Small technical risk >\$100K but <\$1M <b>Marginal Cost Risk</b> Negligible schedule risk	2%	Low	0	250	1,000	
R1.1-026	Installation Schedule	If LCLS installation activities are not well integrated throughout the project ... then there is a risk of not meeting the start of commissioning milestones	R.M Boyce	4/4/2008	Significant schedule risk >\$100K but <\$1M L2M delay >3mo, L1M delay <1mo <b>Critical Schedule Risk</b>	40%	Medium	\$1,000	Mitigate	\$0	<ul style="list-style-type: none"> <li>Establish planning meetings to develop and integrate installation &amp; checkout tasks at systems levels - 10/15/07(Done, weekly integration meetings held).</li> <li>Hold twice monthly meetings between CF/TCCo/LCLS to clearly define EO parameters and dates (Done, started Dec 2007).</li> <li>Define type of work to be allowed by LCLS during EO installations - start in September 2007 (Done)</li> <li>Continue to monitor overall installation schedule taking into account possible delayed BO dates; identify late start EO areas and adjust schedule accordingly - May 15, 2008.</li> <li>Review milestone float on a monthly basis to ensure schedule is maintained</li> </ul>	Significant schedule risk >\$100K but <\$1M L2M delay >3mo, L1M delay <1mo <b>Critical Schedule Risk</b>	10%	Medium	100	500	1,000	
R1.1-027	Safety Incident or Accident	IF a safety incident or accident occurs on the SLAC site that requires a stand-down of work activities, THEN additional cost and possible schedule delays could occur.	Mark Reichanadter	4/8/2008	Significant schedule risk >\$1M but <\$4M L2M delay >3mo, L1M delay <1mo <b>Critical Schedule Risk</b>	5%	Low	\$4,000	Mitigate	\$0	<ul style="list-style-type: none"> <li>Implement LCLS ISM plan including work authorization processes and approvals</li> <li>Conduct contractor toolbox/tailgate meetings</li> <li>Review staff and contractor JSA prior to engaging in activities</li> <li>Conduct regular safety audits (SPOs)</li> <li>Utilize UTR and other SME from SLAC matrix organization as necessary</li> <li>Review lessons learned at the completion of major activities</li> </ul>	Significant schedule risk >\$1M but <\$4M L2M delay >3mo, L1M delay <1mo <b>Critical Schedule Risk</b>	<1%	Low	0	0	4,000	
R1.1-028	Owner-Directed Changes to LCLS Conventional Facilities	IF there are excessive owner-directed changes to the LCLS conventional facilities, THEN there could be cost and schedule impacts to the project.	R. M. Boyce	4/4/2008	Significant technical risk >\$100K but <\$5M L2M delay >3mo <b>Critical Schedule Risk</b>	15%	Medium	\$4,000	Mitigate	\$0	<ul style="list-style-type: none"> <li>Implement weekly walk-arounds by LCLS CF staff, LCLS System Managers, and LUSI Staff</li> <li>Include LCLS System Managers and LUSI Staff in the review and approval of trade contractor shop drawings</li> <li>Manage ODC through IMT, DCR and BCR processes</li> </ul>	Marginal schedule risk >\$100K but <\$1M <b>Marginal Cost Risk</b> L2M delay <1mo	10%	Low	0	500	1,000	
R1.1-029	Impact of FY2009 CR	IF there is an extended CR (assume 6 months) in FY2009, THEN work will need to be extended into FY2010	R.M Boyce	3/27/2008	Significant technical & schedule risk >\$1M but <\$5M L2M delay >3mo, L1M delay <1mo <b>Critical Schedule Risk</b>	50%	High	\$5,000	Accept	\$1,000	<ul style="list-style-type: none"> <li>Reprogram FY09 tasks to match BA profile</li> <li>Evaluate cost and contingency monthly</li> </ul>	Significant schedule risk >\$1M but <\$5M L2M delay <6mo <b>Critical Schedule Risk</b>	10%	Medium	0	200	500	

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1.2	Injector System																	
1.3	Linac System																	
R-1.3-007	Emission measurement upstream of BC2	IF Sector 28 wire scan emittance measurement does not provide adequate understanding of wake field effects in L2 THEN wire scanners will have to be installed in sector 24 before undulator commissioning can be successful.	Dave Schultz	3/27/2008	Significant Schedule Risk >\$100K but <\$1M L3M delay >3mo, L2M delay <3mo	Unlikely - ~20%	Medium	\$250	Accept	\$0	<ul style="list-style-type: none"> <li>Perform emittance studies during the 2008 commissioning</li> <li>Reevaluate risk August, 2008</li> </ul>	Significant Schedule Risk >\$100K but <\$1M L3M delay >3mo, L2M delay <3mo	Unlikely - ~20%	Medium	0	0	250	
R-1.3-008	Linac Stripline BPM sensitivity	IF the old linac stripline BPM electronics performance is insufficient to support Undulator commissioning THEN they must be replaced by new-design electronics used in the injector and LTU	Dave Schultz	3/27/2008	Significant Schedule Risk >\$100K but <\$1M L3M delay >3mo, L2M delay <3mo	Unlikely - ~20%	Medium	\$800	Accept	\$0	<ul style="list-style-type: none"> <li>Install coaxial signal cables for linac BPM electronics during 2007 shutdown (done)</li> <li>Perform a trial of new BPM electronics to evaluate the level of improvement possible</li> <li>Reevaluate risk August, 2008</li> </ul>	Significant Schedule Risk >\$100K but <\$1M L3M delay >3mo, L2M delay <3mo	Unlikely - ~20%	Medium	0	0	800	
1.4	Undulator System																	
R1.4-026	RF BPM Schedule	If the schedule for the rf bpms cannot be improved ... then the rf bpms will delay the assembly in the MMF and subsequently delay the turn on for the beam through the complete undulator system.	Dave Schultz	3/27/2008	Marginal technical risk >\$100k but <\$1M L3M delay >3mo Significant Schedule Risk	25%	Medium	\$500	Mitigate	\$0	<ul style="list-style-type: none"> <li>3-BPM test (May 07) (done)</li> <li>Develop work-around plans to mitigate delays (Feb 08) (done)</li> <li>Evaluate first articles (April 08)</li> <li>Reevaluate risk (June 08).</li> </ul>	Marginal technical risk >\$100k but <\$1M L3M delay >3mo Significant Schedule Risk	10%	Medium	0	200	500	
R1.4-027	Undulator Component Deliveries	If components delivered to SLAC need rework or modification ... then there will be delay in system assembly and subsequently delay in undulator system commissioning.	Dave Schultz	3/27/2008	Marginal technical risk >\$100k but <\$1M L3M delay >3mo Significant Schedule Risk	15%	Medium	\$500	Mitigate	\$0	<ul style="list-style-type: none"> <li>Initiate weekly technical status meetings (Oct 07) (done)</li> <li>Continue collaboration communication to identify concerns early (ongoing)</li> <li>Reevaluate risk (June 08).</li> </ul>	Marginal technical risk >\$100k but <\$1M L3M delay >3mo Significant Schedule Risk	10%	Medium	0	200	500	

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<b>1.5 X-Ray, Transport, Optics &amp; Diagnostics System</b>																		
R-1.5-006	Late changes to design due to evolving user requirements	If there are major changes in the scope, performance, existence or placement of XTOD instrumentation due to evolving user requirements...Then, it will be difficult to meet the schedule and budget as specified in P3.	John Arthur	4/3/2008	Low technical risk Cost risk <\$50K <b>Marginal Schedule Risk</b> L2M delay<1 month	10%	Low	\$50	Mitigate	\$0	<ul style="list-style-type: none"> <li>Adhere to BCR process.</li> <li>Participate in Experimental Area design process</li> <li>Formalize XTOD-LUSI interfaces with ICD</li> <li>Utilize computer beam tools to allow accurate assessment of proposed changes.</li> </ul>	Low technical risk Cost risk <\$50K <b>Marginal Schedule Risk</b> L2M delay <1 month	5%	Low	0	25	50	
R-1.5-013	Mirror procurement delay	IF there are major delays or difficulties with procuring x-ray mirrors that meet technical requirements ... THEN mirror installation may be delayed and/or mirror cost may rise.	J. Arthur	4/3/2008	Low technical risk Cost risk <\$50K <b>Significant Schedule Risk</b> L2M delay < 3 months	10%	Medium	\$50	Mitigation steps completed	\$0	<ul style="list-style-type: none"> <li>Develop mirror specs, begin discussions with vendors early (done).</li> <li>Evaluate specs at SCR's (done).</li> <li>Procure mirrors with sufficient schedule float to activate backup plan if necessary (done).</li> </ul>	Low technical risk Cost risk < \$50K <b>Significant Schedule Risk</b> L2M delay < 3 months	10%	Medium	0	0	50	
R-1.5-014	Mirror mounting design immaturity	IF it proves difficult to meet technical specs for mirror mounting ... THEN the mirror mounting schedule and/or cost plans may be exceeded.	J. Arthur	4/3/2008	Low technical risk Cost risk < \$50K <b>Significant Schedule Risk</b> L2M delay < 3 months	10%	Medium	\$50	Mitigation steps completed	\$10	<ul style="list-style-type: none"> <li>Develop mirror mount specs early (done).</li> <li>Consider both procurement from outside vendors and internal fabrication (done).</li> <li>Consider building small prototype to prove design (done).</li> <li>Allow schedule for evaluation of prototype (done).</li> </ul>	Low technical risk Cost risk < \$50K <b>Marginal Schedule Risk</b> L2M delay < 1 months	10%	Low	0	20	50	
R-1.5-015	Late changes due to evolving shielding requirements	IF there are changes in the size and/or position of the collimators and shielding elements that are required by RP/RSC... THEN the schedule and/or cost plans for these shielding components may be exceeded.	John Arthur	4/3/2008	Low technical risk Cost risk <\$50K <b>Marginal Schedule Risk</b> L2M delay < 1 month	20%	Low	\$50	Mitigate	\$0	<ul style="list-style-type: none"> <li>Monitor evolution of RP/RSC requirements for approval of shielding design for X-ray areas.</li> <li>Respond promptly to RP requests for shielding design concepts, ray traces, etc.</li> </ul>	Low technical risk Cost risk <\$50K <b>Marginal Schedule Risk</b> L2M delay < 1 month	10%	Low	0	25	50	
<b>1.6 X-Ray Endstations System</b>																		
R-1.6-008	Pricing fluctuations for procurement items	IF the prices for procurement items or the exchange rate for foreign procurements increases rapidly in the next years ... THEN the actual cost for procurements will be higher than our current cost estimates	J. Arthur	4/3/2008	Low technical risk Cost risk < \$100K <b>Significant Schedule Risk</b> L2M delay < 2 months	25%	Medium	\$100	Accept	\$0	Monitor prices of items that will be procured in the later years and especially from vendors that are the only suppliers of the items.	Low technical risk Cost risk < \$100K <b>Significant Schedule Risk</b> L2M delay < 2 months	25%	Medium	0	40	100	
R-1.6-009	Scope uncertainties due to evolving requirements early in the design phase of the Atomic Physics Instrument	IF there are major scope changes for the atomic physics instrument ... THEN the actual cost for this instrument may be higher than our current cost estimates, and the schedule may be delayed.	John Arthur	4/3/2008	Low technical risk Cost risk < \$25K <b>Marginal Schedule Risk</b> L2M delay < 1 months	10%	Low	\$25	Mitigation steps completed	\$0	<ul style="list-style-type: none"> <li>Adhere to the Requirements Documents (PRD, ESD, ICD, RDS).</li> <li>Finalize scope at time of PDR (done).</li> </ul>	Low technical risk Cost risk < \$25K <b>Marginal Schedule Risk</b> L2M delay < 1 month	10%	Low	0	10	25	

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1.9	Conventional Facilities																	
R-1.9-028	In place Utility Protection	IF SLAC operational utilities are disrupted during construction ... THEN, SLAC Operations will be impacted and construction schedule will be delayed for repairs and costs will increase	David Saenz	3/19/2008	Minimal technical risk >\$100K but <\$1M <b>Marginal Cost Risk</b> 2 weeks to repair L3M <1mo	15%	Low	\$400	Mitigate	\$50	<ul style="list-style-type: none"> <li>• Potholing</li> <li>• Ground Penetrating radar</li> <li>• Excavation permits</li> <li>• Relocate utilities/improvements to avoid utilities</li> <li>• Put in place contingency plan</li> <li>• Coordinate in advance w/site maintenance</li> </ul>	Minimal technical risk >\$100K but <\$1M <b>Marginal Cost Risk</b> 2 weeks to repair L3M < 1mo	5%	Low	0	0	400	
R1-9-036	Turner Claim on Subcontract Value, bonds, insurance and profit	If TCCo prevails in arbitration/litigation then LCLS is subject to additional costs above budget amount	David Saenz	4/15/2008	Minimal technical risk >\$500K but <\$5M <b>Significant Cost Risk</b> No schedule impact	50%	High	\$2,400	Mitigate	\$650	<ul style="list-style-type: none"> <li>• Claim referred to arbitration</li> <li>• Attorneys "negotiated" and returned for settlement</li> <li>• Negotiate terms with Turner</li> <li>• Issue contract modification</li> <li>• \$2.2M budgeted for claim settlement - total claim \$4.6M</li> </ul>	Minimal technical risk >\$500K but <\$5M <b>Significant Cost Risk</b> No schedule impact	50%	High	300	300	2,200	
R1-9-042	FEH Hutches	If new hutch design more than budget or delayed	David Saenz	3/19/2008	Minimal technical risk >\$1M but <\$5M <b>Significant Cost Risk</b> L2M > 2mo L3M > 3 mo	35%	Medium	\$1,000	Mitigate	\$0	<ul style="list-style-type: none"> <li>• Begin design early 8/08</li> <li>• Scrub design 10/08</li> <li>• Alternate construction contracting (design/build) 10/08</li> <li>• Obtain estimates in advance to final design 7/08</li> </ul>	Minimal technical risk >\$100K but <\$1M <b>Marginal Cost Risk</b> No schedule impact	50%	Medium	0	500	1,000	
R1.9-043	Construction Stand-Down	IF a safety incident occurs that requires any stand-down, THEN additional cost will be incurred	David Saenz	3/19/2008	Minimal Technical Risk Schedule impact: 1 month L2M > 3mo <b>Critical Schedule Risk</b>	20%	Medium	\$2,750	Mitigate	\$0	<ul style="list-style-type: none"> <li>• Workers provide toolbox/tailgate meetings</li> <li>• Workers review JSA prior to engaging in activities</li> <li>• TCCo appoints safety coaches throughout the trades</li> <li>• TCCo Safety Manager routinely walks the site with trades</li> <li>• Review lessons learned</li> </ul>	Minimal technical risk <b>Critical Schedule Risk</b> L2M > 1 mo	10%	Medium	0	200	2,750	
R1.9-044	Major Equipment Failure	If a major piece of new equipment fails (to include boiler, transformer, compressor, air handlers, elevator) then commissioning and final completion will be delayed	David Saenz	3/31/2008	Schedule impact: <3 months <b>Marginal Cost Risk</b> >\$100K but <\$1M L3M < 3mo	20%	Low	\$250	Mitigate	\$0	<ul style="list-style-type: none"> <li>• Field testing/pre-functional testing</li> <li>• Follow proper start up and operations sequence</li> <li>• Safety verifications in place prior to operations</li> </ul>	Minimal technical risk >\$100K but <\$1M <b>Marginal Cost Risk</b>	10%	Low	0	100	250	
								\$33,175		\$1,790					400	3,070	16,475	