
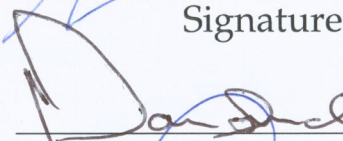
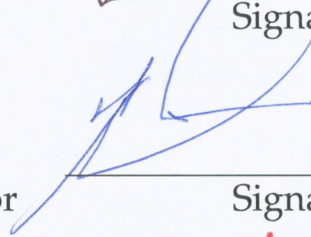
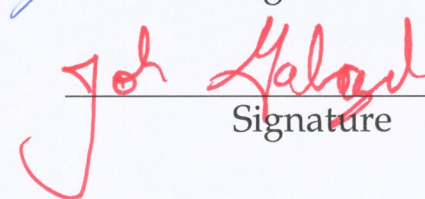
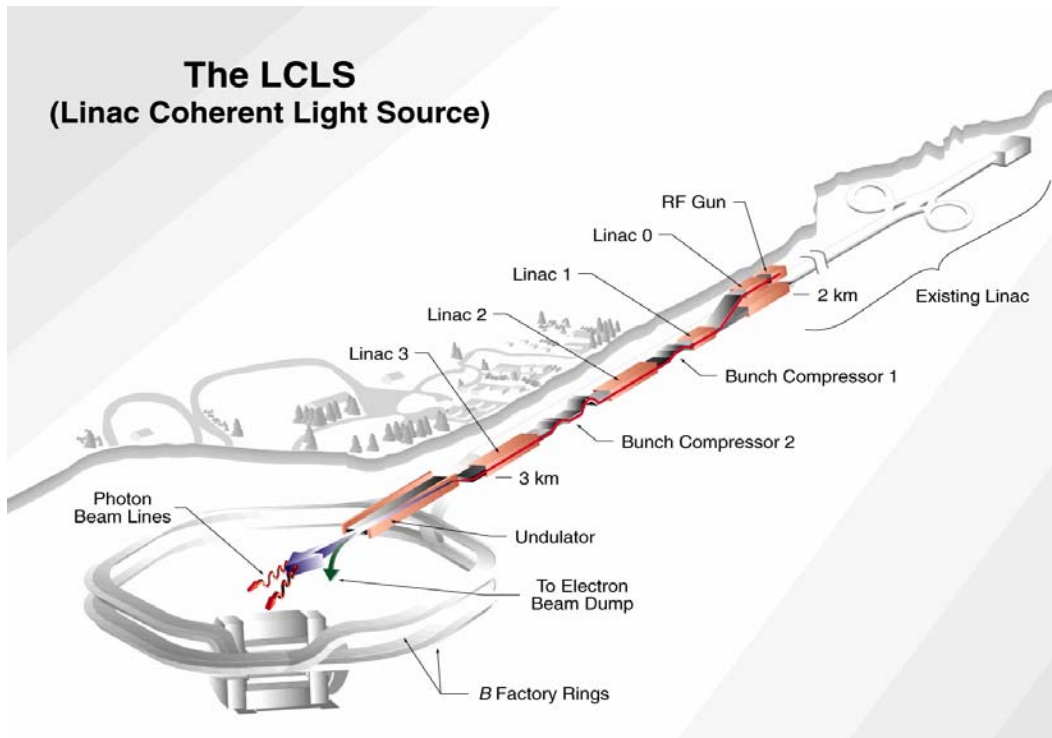


LCLS Project Management Document #		1.1-002	Project Office	Rev. 1
Risk Management Plan				
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Linac Coherent Light Source (LCLS)

An X-Ray Free Electron Laser



Risk Management Plan

May 2007

Prepared for the US Department of Energy under contract numbers:

SLAC	DE-AC03-76SF00515
ANL	W-31-109-ENG-38
LLNL	W-7405-ENG-4

Section 1 - Scope

1.1 Identification

The philosophy of the Linac Coherent Light Source (LCLS) management team is that risk is an inherent part of any large-scale scientific project. To be successful, a risk management process is needed such that risk can be continually evaluated so that risk is controlled such that the consequences of adverse events can be minimized.

This document, the LCLS Risk Management Plan (RMP), describes the management processes used on the LCLS project to identify, categorize, quantify and handle risks associated with the achievement of the project requirements and goals for the LCLS x-ray free-electron laser, which is being constructed at the Stanford Linear Accelerator Center (SLAC).

Section 2– Risk Identification & Assessment

Managing risk is a key element of the project management process for both planning and performance phases of the LCLS. As such, this LCLS RMP develops a methodology to identify and quantify specific risks to the LCLS project, determine their consequence and associated probability, and develop mitigation and correction strategies should risks become reality.

2.1 Project Requirements Document

The LCLS Global Requirements Document (GRD 1.1-001) forms the basis for the risk identification. Goals and requirements, consistent with GRD 1.1-001, are used to identify project risks which are intended to address the following categories:

- *Project performance requirement* for the LCLS: the key performance deliverable prerequisite for Critical Decision 4, *Approval of Start of Operations*
- *Performance goals*: intended to serve as guidance for the design of the LCLS
- *Functional requirements*: other requirements, such as compatibility with other functions of the SLAC Linac, that must be satisfied by the LCLS

- *Functional goals* intended to serve as guidance for the design.

2.2 Risk Categories

Risks to the LCLS project are identified according to the following categories:

- Technical
 - Design and Equipment Complexity
 - Environment, Safety & Health (ES&H)
 - Procurements
 - Programmatic (Scientific Mission)
 - Resources (Funding and Staffing)
- Cost (includes currency and inflation)
- Schedule

ES&H hazards associated with the LCLS Project are well within the range of normal SLAC operations, as indicated in the LCLS Preliminary Safety Assessment Document. SLAC will apply its Integrated Safety Management (ISM) System for handling all the ES&H risks entailed in the LCLS Project. However, ES&H impacts that increase the risk severity level of technical parameters or facilities will be managed and mitigated by the LCLS management team.

2.3 Risk Consequences

In terms of risk consequences, each risk category has four assessment levels:

Technical Consequence Level

If the risk occurs:

Level 0- negligible impact

Level 1- minimal impact on, or delay to fulfillment of mission need

Level 2- moderate impact on, or delay to fulfillment of mission need

Level 3- considerable impact on, or delay to fulfillment of mission need

Schedule Consequence Level

If the risk occurs:

Level 0- negligible potential for delay to Level 3 (L3M) or Level 2 (L2M) milestone

Level 1- potential delay to L3M is < 3 month or L2M of < 1 month

Level 2- potential delay to L3M is < 3 months or L2M of ≥ 3 months

Level 3- potential delay to L2M is > 3 months

Cost Consequence Level

If the risk occurs:

Level 0- estimated cost of impact consequence is < \$100K

Level 1- estimated cost of impact consequence is < \$1M

Level 2- estimated cost of impact consequence is < \$5M

Level 3- estimated cost of impact consequence is > \$5M

Overall Consequence Level

An overall consequence level is derived using the greatest of the technical, cost and schedule consequence levels.

2.4 Risk Probabilities

The following risk probability levels are assessed for each risk category:

Risk Probability Level

Level 0- <1% probability that the consequences of the risk will be realized

Level 1- < 5% probability that the consequences of the risk will be realized

Level 2- < 25% probability that the consequences of the risk will be realized

Level 3- > 25% probability that the consequences of the risk will be realized

2.5 Risk Severities

Finally, a risk severity matrix determined from the Overall Consequence Level and the Risk Probability Level provides the overall assessment of each identified risk to the LCLS project, as shown below:

Risk Severity Levels in colored boxes		Consequence Level			
		0	1	2	3
Probability Level	0	0	0	0	0
	1	0	1	2	3
	2	0	2	2	3
	3	0	3	3	3

Items with risk severity level of 2 or greater must be entered in the LCLS Risk Registry.

Section 3 Risk Management & Documentation

3.1 Risk Registry

LCLS System managers are responsible for identification and assessment of risks. This responsibility includes providing regular re-evaluation and a status update of risk entries via the LCLS Risk Registry to the LCLS Project Office. The LCLS Risk Registry is a living document used throughout the life of the LCLS project and is under configuration control.

The LCLS Project Office is responsible for maintenance of the Risk Registry, and for ensuring that LCLS System Managers are monitoring and reassessing risks regularly, and that the Risk Handling Plans are being implanted in a timely and effective manner. The risks identified in the Risk Registry and their respective risk handling plans are reviewed jointly by the Project Office and System Management.

A contingency assessment is provided for all risks captured in the Risk Registry, which is the product of the cost impact and the risk probability. This is to provide a roughly quantitative assessment of the relative risks identified by the project. For high-risk issues, defined as having a risk severity of 3, the contingency assessment is added to the project's overall Estimate at Complete (EAC).