Appendix H - LCLS WBS Dictionary @ Level 2

1 LCLS Project — PED & Construction

This WBS covers the Total Estimated Cost (TEC) Estimate for the LCLS Project being constructed at SLAC. The LCLS TEC is supported through Project Engineering and Design (PED) and Construction funds by the U.S. Department of Energy.

1.1 Project Management, Planning & Administration (TEC)

This WBS covers the project management, planning and organization function of the PED and construction phases (TEC) of the LCLS Project.

1.2 Injector System

The injector generates the electron beam and accelerates it to 135 MeV. This system includes the laser, optical transport, the electron gun, the accelerator sections, the solenoids and other magnets, the diagnostics including a diagnostic section at the end of the injector, the LCLS timing system, and the laser room. The interface to the Linac is at the downstream end of Dog Leg 1 (DL1), ending at the valve at the entrance to linac section L1.

1.3 Linac System

The Linac accelerates the electron beam while preserving the transverse emittance and compressing the longitudinal size. This element includes modifications to the last third of the existing SLAC linac, Bunch Compressor 1 (BC1), Bunch Compressor 2 (BC2), beam transport to the Undulator (LTU), beam transport after the undulator, bend magnets and beam dump, the bypass system for transporting test beams to end station A, and diagnostics including characterizing both the electron and x-ray beams as they pass through the undulator. The interface with the undulator is a vacuum flange at each end of the undulator. This element includes the common beam line beyond the undulator for the electrons and x-rays until the electrons are deflected enough for an interface to the x-ray beam line.

1.4 Undulator System

The LCLS Undulator System, including undulator magnets and supports, undulator diagnostics, vacuum systems, and controls for the undulator equipment are included herein. Integration and installation are also included within this area. Total cost for the LCLS undulator system planning, project management, design, construction, and installation are summed at this level.

1.5 X-Ray Transport, Optics and Diagnostic System

XTOD includes mechanical and vacuum systems for the x-ray beam path, attenuators, x-ray optics and x-ray diagnostics required for manipulation and characterization of the x-ray beam downstream of the undulator. “Manipulation” includes collimation, attenuation, focusing, splitting/delaying, turning, and monochromatizing. “Characterization” includes measurement of x-ray beam properties as necessary for commissioning and operation of the LCLS.

1.6 X-Ray Endstation Systems

This element includes the infrastructure required to integrate x-ray experiments with the LCLS source and conventional facilities. Specifically, this includes safety systems, computer and network systems, experimental chambers, synchronized laser systems, and prototype detectors that will be used by most of the foreseeable LCLS experiments. It also includes additional sample handling equipment needed for the first studies of FEL-atom interactions (Atomic Physics experiments).

1.9 Conventional Facilities

The Conventional Facilities for the Linac Coherent Light Source (LCLS) will include renovations to the existing SLAC facilities and the development of new facilities. Included will be all major systems and subsystems contained herein that will be required to support the facilities related to the LCLS programmatic requirements. The scope of the WBS will include 13 elements: Sector 20 Injector Facilities, Magnetic Measuring Facility, Main Control Center Modifications, Linac Upgrades, Beam Transport Hall, Research Yard Modifications, Undulator Hall, Front End Enclosure, Beam Dump, Near Experimental Hall, X-Ray Transport & Diagnostic Tunnel, Far Experimental Hall and the Free Electron Laser Center. Activities included within these elements are, site preparation and development (including establishment of survey monuments for site alignment), beam line housings including a beam dump, renovations to existing facilities, buildings, service buildings, utility systems (including cooling systems), fire protection systems, roads, sidewalks, landscaping, berms, fencing and parking areas.

2 LCLS Project — R&D, Spares, Commissioning

This WBS covers the Other Project Cost (OPC) Estimate for the LCLS Project being constructed at SLAC. The LCLS OPC is supported through Research & Development (R&D), Spares and Commissioning funds by the U.S. Department of Energy.

2.1 Project Management, Planning & Administration (OPC)

This WBS covers the project management, planning and organization function of the R&D, Spares and Commissioning (OPC) phases of the LCLS Project.

2.2 Injector System (OPC)

Other Project Costs (OPC) Summary for the Injector System. It includes effort and costs associated with R&D, Spares, and Commissioning.

2.3 Linac System (OPC)

OPC Summary for the Linac System. It includes effort and costs associated with R&D, Spares, and Commissioning.

2.4 Undulator System (OPC)

The LCLS Undulator System OPC area includes spares plus any R&D and commissioning for all elements including undulator magnets and supports, undulator diagnostics, vacuum systems, and controls for the undulator equipment are included herein. Total cost for the LCLS undulator system Other Project Costs (OPC) including R&D, spares, and commissioning.

2.4 X-Ray Transport, Optics and Diagnostics System (OPC)

OPC Summary for the S-Ray Transport, Optics and Diagnostics System. It includes effort and costs associated with R&D, Spares, and Commissioning.

2.5 X-Ray End Station Systems (OPC)

OPC Summary for the X-Ray End Station System. It includes effort and costs associated with R&D, Spares, and Commissioning.