Tracking Number	*For PMO use*
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GDE EDR WORK PACKAGE PROPOSAL DESCRIPTION - PHASE 1

Part I: Work Package Definition

Work Package categorization		
Technical Area (EDR Org Chart Level 2)	Accelerator Systems	
Technical Group (EDR Org Chart Level 3)	E+ Source Transport Line	
Technical Group Work Package Number	Power Systems	
Categories (up to 3 keywords)	• Engineering design • Costing	
BCD, ACD, BOTH, or UNDEFINED	BCD	
Time frame for major deliverables	EDR	
Primary Target (one keyword)	ILC Specific	
Local WP dependencies	Requires input from: • Magnets and supports • Systems integration and availability)	Provides output for: • Magnets and supports) • Systems integration and availability)

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Work Package Details	
Work Package Title	Power Systems
Short keyword title	*(For PMO use)*
Abstract	The design concepts established under the Reference Design Report (RDR) permitted a "first-cut" estimate of the RTML magnet power systems cost. Needed now are engineering and design details to move beyond the concepts. This Work Package covers the design and documentation of DC and pulsed magnet power systems and their associated controls for the E+ Source Transport Line. The objectives are to define the interfaces, design the systems, estimate the costs, and document the magnet power systems in a rigorous manner that permits later material acquisition and installation.

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Work Package Details (Continued)

Major tasks and objectives	There are 2,200 power systems. The power system designs will accommodate the interfaces of optics, magnets, controls, and facility. Interfaces include E^+ Source Transport Line physicists, magnet engineers, global control engineers, and facility designers. PCD will develop magnet power systems for the E^+ Source Transport Line to satisfy the requirements for control, ring tuning; the physical constraints of the tunnel and service building layouts, constraints on tunnel heat load, and reliability requirements for a viable power distribution infrastructure. The Designer will explore options to provide a cost-effective design meeting the above criteria and carry out the necessary EDR engineering and design. In conjunction with the Conventional Facilities Systems (CFS) group, define the space needed to accommodate power supplies in the service buildings. As part of this effort, optimize the magnet-power supply interface, and power supply locations to minimize the cable plant, its attendant cost, and tunnel heat loading. The Spin Rotator and several other magnets require currents greater than 500A. Air-cooled conductors connect these magnets are to their power supplies. Air-cooling necessitates paralleled conductors, in sizes typically larger than 750kcmil. Designer should consider the use of water-cooled cable for these circuits to reduce the cable quantity and the cable tray requirements. All power system specifications will include the requirements for power, control, stability, and reliability. The E^+ Source Transport Line might also employ non-fast kicker magnets requiring somewhat conventional pulsers. Because the pulser quantity is small, their impact on the cost and value engineering to be as great as for the DC magnet power systems. However, they might have complex control, layout, and reliability issues. Their costs need capture; therefore, this Work Package includes this work. Work with magnet design personnel, optics personnel and the Cost Account Manager to minimize the variety of power systems used in E^+ Source Transport Line and standardize the power supply types with those in other ILC areas. Throughout the execution of the EDR, PCD will update and refine the magnet power system cost estimates and devise a project execution plan for acquisition of the power systems consistent with ILC milestones and commitments.

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Work Package Details (Continued)

Deliverables from Work Package	1. Magnet / power supply list 2. Power supply/controls designs, specifications 3. Power system layout drawings 4. Electrical interconnect (EI) diagrams 5. Reliability / FMEA analyses 6. Acquisition, build plan and schedule 7. Input for EDR report	
Major Milestones (including key decision points)	1. Interfaces, relationships, collaborations established or strengthened 2. Power system design 3. Reliability / FEMA analyses 4. Equipment profiles, power system and raceway layouts 5. Equipment specifications 6. Cost estimate, acquisition plan, schedule and EDR input	2008 2009 - 2010 2009 - 2010 2009 - 2010 2009 - 2010 2010
Resources required (eg expertise, facilities, leader, …)	1. Power Electronics Engineer, (Lead) 2. Pulsed Power Engineer 3. Controls Engineer 4. Electronic Designer/Coordinator 5. Raceway Systems Designer/Coordinator	

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Part II: Proposed Institute Involvement Levels

The following information is to be considered strictly confidential until further notice.
If there are currently no known or proposed resources for a given WP, leave the tables blank.

Ongoing or newly funded participation
(List all know institutes who are currently participating in this work)

	Institution	Funding Source	Duration (begin/end)	Level of effort FTE / M&S	
Coordinating Institution	SLAC	DOE (ART)	FY08	0.125	$10k
			FY09	2.000	$25k
			FY10	2.000	$25k
Collaborating Institutions	?	?	FY08 / FY10	?	?

Expressions of Interest (offered or submitted)

Institution	Funding available?	Funding Source	Duration (begin/end)	Level of effort FTE / M&S	Comments (*e.g. proposed coordinating role*)