



# ***GDE ACCELERATOR ADVISORY PANEL REVIEW***

## ***CONVENTIONAL FACILITIES AND SITING GROUP***

### ***TECHNICAL DESIGN PHASE I OVERVIEW***

**V. KUCHLER**



## CFS TDP Effort

- *The ILC Research and Development Plan Details the CFS Efforts Through TDP I & II*
- *Identify Cost Drivers from the RDR*
- *Use Value Engineering to Identify and Evaluate Alternative Design Options and Costs*
- *Provide Factual Information to the PM's to Assist in the Development of a New Baseline Design Solution*
- *Collect New Criteria from Area and Technical Systems*
- *Develop a New CFS TDP Design Solution, Cost Estimate and Project Schedule*
- *Prepare Text for Inclusion into the Technical Design Report*

## ILC R&D Plan CFS Milestones

**Table 4.1: Functional Requirements and Value Engineering Milestones (stages 1 & 2)**

calendar year	2008	2009	2010	2011	2012
Tech. Design Phase I	[Blue bar spanning 2008-2012]				
Tech. Design Phase II	[Blue bar spanning 2010-2012]				
CFS Design work	[Red bars indicating milestones]				
Process Water and HVAC Value Engineering	[Red bar: Q3 2008 - Q1 2009]				
Main linac Tunnel Configuration Alternative Investigation	[Red bar: Q1 2009 - Q3 2009]				
Minimum Machine CFS design	[Red bar: Q3 2009 - Q1 2010]				
Review and Improve Surface Building Facilities Criteria	[Red bar: Q1 2010 - Q3 2010]				
Functional Requirements template publication	[Red bar: Q3 2009 - Q1 2010]				
Functional Requirements complete for main Linac	[Red bar: Q1 2010 - Q3 2010]				
Functional Requirements complete for BDS and IR	[Red bar: Q3 2010 - Q1 2011]				
Functional Requirements complete for Sources, DR and RTML	[Red bar: Q1 2011 - Q3 2011]				
Update RDR Main Linac design	[Red bar: Q3 2010 - Q1 2011]				
Update RDR design for all other areas	[Red bar: Q1 2011 - Q3 2011]				
Develop Project Schedule	[Blue bar: Q3 2011 - Q1 2012]				



## Specific Value Engineering Areas

- **Process Water and HVAC**
  - *~17% of RDR Cost*
  - *Alternatives to RDR Configuration and Criteria*
  - *Klystron Cluster Alternative*
  - *Distributed Klystron Alternative*
- **Main Linac Tunnel Configuration Alternatives**
  - *~25% of RDR Cost*
  - *A Comprehensive Review of Alternatives*
  - *Evaluation of Associated Life Safety and Egress Issues*
- **Minimum Machine Evaluation**
  - *Develop New Central Area Tunnel Configuration*
  - *Develop New Area System Technical Criteria*
  - *Develop CFS 3D Drawings for Design Modeling*
- **Review and Improve Surface Facilities Criteria**
  - *~8% of RDR Cost*



## Other RDR CFS Cost Drivers

### ■ **Conventional Electrical Distribution**

- **~13% of RDR Cost**
- **Based on RDR Criteria, Electrical Distribution Costs Reasonably Scale with the Technical Power Requirements**
- **Alternatives to RDR Criteria Can Result in Cost Adjustments**
  - **Klystron Cluster Alternative**
  - **Distributed Klystron Alternative**
  - **Alternative Tunnel Configurations**



## Minimum Machine Evaluation

- *Current Focus Centered on the Development of the 3D Drawing Model*
- *DESY is Coordinating the 3D Effort*
- *Webex Meetings are Held Twice Monthly*
- *Guidelines, Coordinate Systems and Common Orientation Conventions are Being Developed*
- *CFS Support is Primarily Provided by CERN*
- *A Consultant Contract is Currently in Place at FNAL to Further Support Both the Minimum Machine 3D Drawing and Eventual Design Evaluation Efforts*
- *A 100m Main Linac/BDS Tunnel Section is the Test Example for Software Compatibility and Model Manipulation*
- *Development of Area Systems Criteria will Follow and Formalize the 3D Model and Evaluation Process*



## Surface Facilities Criteria

- *Least Defined Area in Terms of Actual Criteria*
- *Initial Criteria Were Developed Modeling the Old SSC Design in Terms of Gross Square Footage Required*
- *A Later Model was Developed by CERN and Their Experience with the LHC*
- *Both Models were Based on Essentially a New Laboratory with Full Support Facilities*
- *A Later CFS Review Held at CALTECH in late 2006, Prompted a Reduction in Gross Square Footage Which Eliminated all Facilities Deemed to be Over the Minimum Required for Machine Operation*
- *Since Then, Only cursory Reviews of this Data have been Conducted*
- *More Formal Criteria Needs to be Established*



## Resource and Effort Profile

- *The CFS Group Maintains a Strong and Focused International Effort*
- *The CFS Group has Developed a Strong Collaboration with the CLIC and XFEL Projects with Project X to Follow*
- *Base Resources Remain Fairly Dependable at Present Levels*
- *Additional Asian Resources are Currently Being Considered*
- *Current Resources will Support the Level of Effort for CFS Activities Indicated in the ILC R&D Plan*
- *The Value Engineering Effort will Provide Increased Credibility for the Revised TDR Baseline Design and Cost Estimate*
- *The CFS TDP Effort is Intended to Produce the Technical Information Needed for the International Approval and Site Selection Process to Proceed*



## Summary

- ***Following Presentations will Provide a More Detailed Status of Current CFS Efforts in Specific Areas***
  - ***Process Water and HVAC VE***
  - ***Distributed RF System Studies***
  - ***Main Linac Tunnel Configuration Studies***
  - ***CFS Collaboration Efforts***
  
- ***The Final Presentation will Describe Longer Term Issues Including***
  - ***Site Characterization***
  - ***Site Selection Issues***
  - ***Other Issues that Affect the CFS Effort in the Near and Long Term***