ILC CFS AND GLOBAL SYSTEMS MEETING

CONVENTIONAL FACILITIES AND SITING GROUP

e+ Source Review and EDMS – Daresbury, UK
CERN IR Workshop – CERN, CH

V. Kuchler

E+ Source Review - Daresbury

- Overview Presentations for the e+ source were Presented and Discussed (E. Paterson and N. Collomb)
- CFS e+ Source Criteria was Reviewed and Prepared Questions were Discussed
- N. Collomb Provided a Comprehensive Status Report of Progress to Date of the e+ Design
- S. Riemann Provided a Very Detailed Technical Overview of the e+ Source but the Information Provided was Very Useful from the CFS Standpoint - Each Component of the e+ Source was Identified and will Help to Further the Requirements of the e+ Source with Respect to Underground Volume Requirements

ilc

international linear collider

POSITRON SOURCE DESIGN CRITERIA FOR CFS, for DARESBURY WORKSHOP FEB 10 & 11, 2011

DRAFT

FEBRUARY 7, 2011

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POSITRON SOURCE DESIGN CRITERIA FOR CFS, for DARESBURY WORKSHOP FEB 10 and 11, 2011

Other Utilities Criteria

DRAFT FEB. 07, 2011

		DATA*	NOTES
1	Power Supply typical water pressure drop	?	
2	Power Supply typical water delta T	12-18°FdT (7-10°C DT)	placeholder
3	Power Supplies maximum allowable temperatures	104°F (40°C)	placeholder
4	Magnet typical water pressure drop	100 PSID (placeholder)	from RDR Magnet group (2006)
5	Magnet typical water delta T	per design. Max 40F dt	
6	Magnet maximum allowable temperatures	140°F (60°C)	
7	Dump typical water pressure drop	N/A	CFS not designing RAW
8	Dump typical water delta T	54°Fdt (30°C deltaT)	placeholder
9	RF system typical water pressure drop	Use ML -RDR data	High Cost Impact
10	RF system typical water delta T	Use ML -RDR data	High Cost Impact
11	RF system maximum allowable temperatures	Use ML -RDR data	High Cost Impact
12	Racks system typical water pressure drop	assume air cooled	High Cost Impact
13	Racks system typical water delta T	assume air cooled	High Cost Impact
14	Racks system maximum allowable temperatures	?	High Cost Impact
15	Max Space/Air Temperature in Beam Tunnel	no reqmnt	
16	Max Space/Air Temperature in ServiceTunnel	85°F (29.5°C)	
17	Max Space/Air Temperature in Cavern/Alcove	85°F (29.5°C)	
18	Air Temperature Stability in Beam Tunnel	no reqmnt	Very High Cost Impact
19	Dew Point Temperature	no reqmnt	Very High Cost Impact
20	Maximum Relative Humidity (%)	no reqmnt	
21	Minimum Relative Humidity (%)	no reqmnt	Very High Cost Impact
22	Process Heat Load to Air	See Heat/Power Load Tables	High Cost Impact
23	Process Load to CHW		High Cost Impact
24	Process Load to LCW		High Cost Impact
25	Ventilation (Numer of Persons in space)	no reqmnt	
26	Ventilation (Cu M/Hr or cfm)	no reqmnt	
27	Space Pressurization (Negative milliBars or inch W.C)	no reqmnt	
28	Space Pressurization Stabilization (+/- milliBar or inch W.C.)	no reqmnt	Very High Cost Impact
29	Shaft/Egress Pressurization (Positive milliBar or inch W.C.)	no reqmnt	Very High Cost Impact
30	LCW Supply Temperature	65F (18C) or 95F(35C)	
31	LCW Supply Temperature Stability	no reqmnt	
32	LCW delta T	18F(10C) or 40F(22C)DT	
33	LCW Pipe vibration impact	no reqmnt	
34	ODH Purge (Y/N - Cu M/ Hr if Y)	no reqmnt	Very High Cost Impact
35	Activated Air Purge (Y/N - Cu M /Hr if Y)	no reqmnt	Very High Cost Impact
36	CHW Cooling for Magnets & Power Supplies (Y/N)	Yes, per design	
37	Dessicant Dehumidification	no reqmnt	Very High Cost Impact
38	Any power quality reqmnt (clean / dirty power?)	no reqmnt	Very High Cost Impact
39	Can you maintain min power factor?	no reqmnt	
40	operating power characteristics KW, KVA, PF?	?	Very High Cost Impact
41	Voltage Regulation/Optimum Utilization Voltage (480V? 208V? etc)	?	High Cost Impact
42	Utiltity (water system) interface	no reqmnt	header with valve
43	Utiltity (electrical) interface	no reqmnt	Panelboard
44	How stable are the positron heat loads? Constant w.r.t BDS?	very stable (placeholder)	Very High Cost Impact
45	Whats the largest equipment in the service tunnel? & in transport?		
46	Penetrations between service tunnel and beam tunnel?		
47	Will the positron source consume power at same time as AUX source		
48	Will we be developing reqmnt for remote handling of Target(s)		
49	What's the shaft for above the target pile?		
50	Is shielding reqd above the target shaft?		
51	Whats the relationshop od the injection from e+ to 3ring DR		

*some items were discussed in CFS 2010 workshop

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E+ Source Review – Daresbury

CFS Conclusions

- *Current CFS Criteria will be Updated Based on the Information Gained During the e+ Source Review*
- *Due to Resource Constraints it is Unlikely that Further Criteria Development will be Forthcoming*
- *CFS will Proceed with a More Detailed Mechanical Design Effort Based on this Current Set of Criteria*
- *The Main Criteria Point that Still Remains Undefined is the Issue of Activated Air Control*
- *CFS will Develop Criteria Based on Existing Experimental Installations (NuMI, Mu2e) as A Placeholder for the TDR Design*
- *More Detailed Design of the e+ Source will Necessarily be Completed Post TDR*

CFS EDMS – Daresbury

- CFS Presented a Draft WBS Proposal for the Organization of Files in the EDMS System
- This Proposal was Discussed and Divided Into that Portion that will be Included in the Overall ILC WBS Structure and the Portion that will be Used to Organize Contributions Within the CFS EDMS Area
- A Consensus was Reached that CFS Cost Information will Not be Posted Within the CFS EDMS Area - All TDR Cost Information will be Posted in a Separate EDMS Area by the ILC Costing Group
- e+ Source Criteria, Once Updated, will be the First Criteria to be Posted into the New WBS System
- As Further Area System Reviews are Completed, Criteria will be Finalized and Posted to the EDMS System

PROPOSED CFS FILE HIERARCHY FOR THE ILC EDMS SYSTEM - Rev. Draft 02.24.11

1.0 ILC EDMS Project

1.X ILC CFS

1.X.1 CFS SUMMARY CRITERIA

- 1.X.1.1 e- Source
- 1.X.1.2 e+ Source
- 1.X.1.3 Damping Ring
- 1.X.1.4 RTML
- 1.X.1.5 Main Linac
  - 1.X.1.5.1 KCS
  - 1.X.1.5.2 DRFS
- 1.X.1.6 BDS
- 1.X.1.7 Interaction Region
- 1.X.1.8 Dumps
- 1.X.1.9 Overall Machine Parameters

1.X.2 CFS GENERAL DESIGN

- 1.X.2.1 Asian Region
  - 1.X.2.1.1 Overall Design and Siting
  - 1.X.2.1.2 Civil
  - 1.X.2.1.3 Interaction Region
  - 1.X.2.1.4 Mechanical
  - 1.X.2.1.5 Electrical
  - 1.X.2.1.6 Safety Systems
- 1.X.2.2 Americas Region
  - 1.X.2.2.1 Overall Design and Siting
  - 1.X.2.2.2 Civil
  - 1.X.2.2.3 Interaction Region
  - 1.X.2.2.4 Mechanical
  - 1.X.2.2.5 Electrical
  - 1.X.2.2.6 Safety Systems
- 1.X.2.3 European Region
  - 1.X.2.3.1 Overall Design and Siting
  - 1.X.2.3.2 Civil
  - 1.X.2.3.3 Interaction Region
  - 1.X.2.3.4 Mechanical
  - 1.X.3.1.5 Electrical
  - 1.X.3.1.6 Safety Systems

1.X.3 CFS REPORTS AND STUDIES

- 1.X.3.1 Geotechnical
- 1.X.3.2 Unit cost
- 1.X.3.3 Life Safety
- 1.X.3.4 Miscellaneous

IR Workshop - CERN

- The Workshop was Devoted to Briefing ARUP UK Representatives (M. Sykes, S. Macklin, D. Hiller, A. Cunningham) with Work to Date on the CLIC Interaction Region Design, Detector Movement Strategies and LHC Detector Experience w/r/t Settlement and Vibration
- Presentation Topics
  - Civil Engineering Works for Linear Colliders (J. Osborne)
  - Assembling, Lowering and Moving a 14,000 Ton Experiment at CLIC (H. Gerwig)
  - Vibration Issues at Linear Colliders and Consequences for CLIC (A. Gaddi)
  - Reflections on Moving and Aligning Large Masses Around IP at CLIC (A. Herve)
  - CLIC/LHC Sub-Micron Ground Motion and Vibration Measurements (M. Guinchard)
  - LHC Long Term Ground Movement Measurements (JC Gayde)
  - ARUP Experience

IR Workshop – CERN

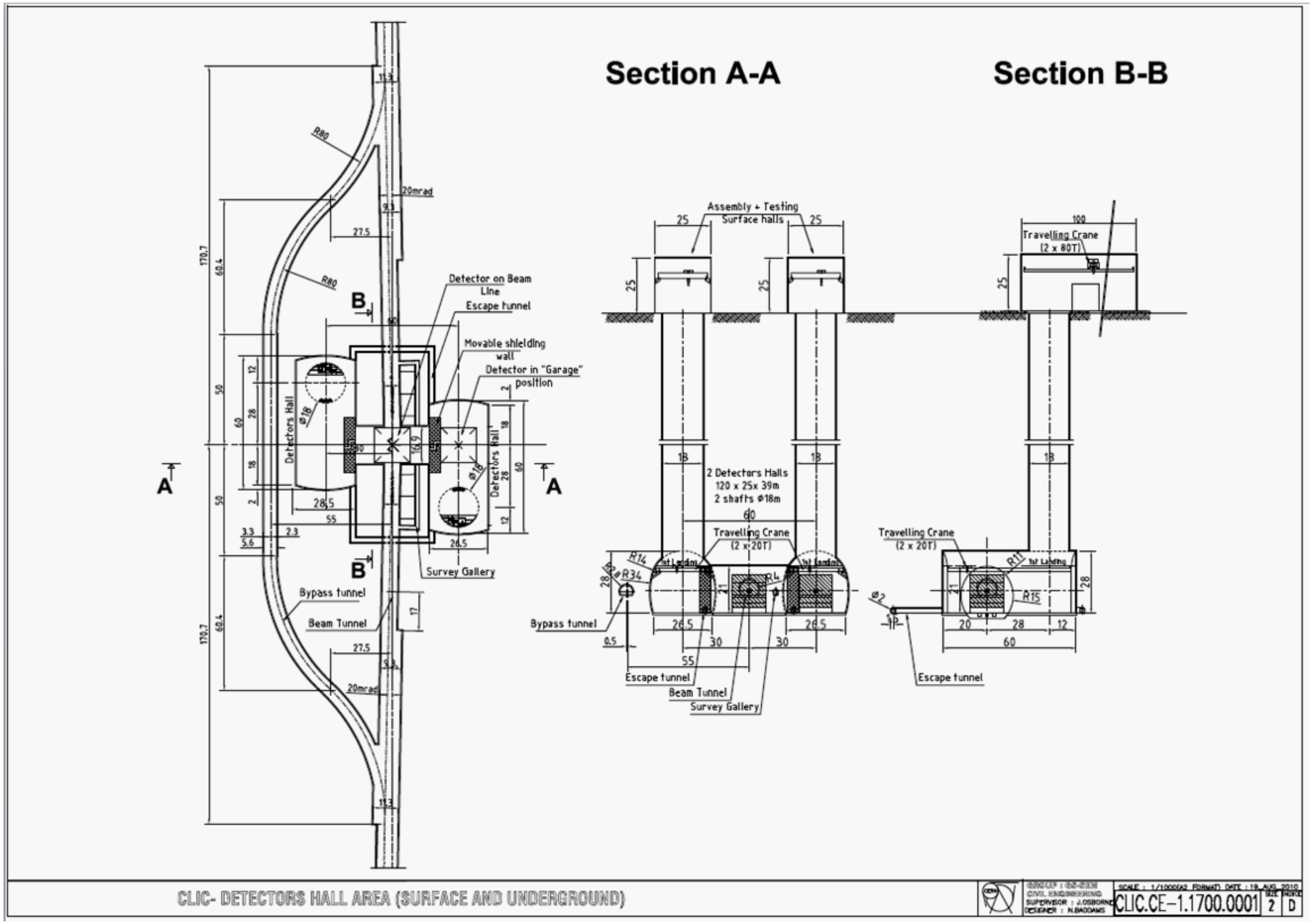
CFS Conclusions

- It is Clear that A Common Design for Both the ILC and CLIC Interaction Regions is not Possible Due to Differences In the ILC and CLIC Detector Designs
  - CLIC Detectors, by Design, have the Same Vertical Dimension
  - ILC Detectors have Different Vertical Dimensions
  - CLIC Detector Movement Platforms will have the Same Depth
  - ILC Detector Movement Platforms will have Different Depths
  - CLIC FF Quads are Supported by the Main Linac Tunnel
  - ILC FF Quads are Supported by the Detectors
- The European Region has Developed Both the ILC and CLIC Interaction Region Design
- These Criteria Need to be Finalized for the TDR at ALCPG11
- Both the Asian and Americas Region will Now Need to Devote Resources to the Development of Regional ILC Interaction Region Design Solutions
- Future ARUP Work TBD

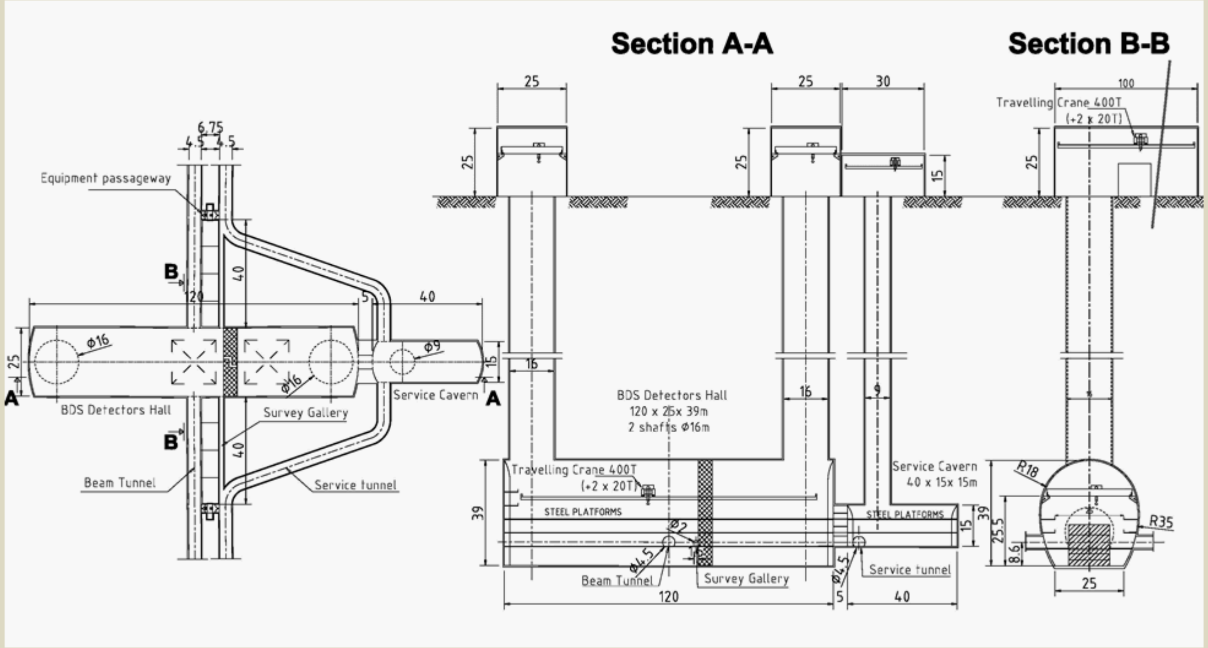
IR Workshop – CERN

CFS Conclusions cont.

- *Future ARUP Work TBD*
- *One Possibility to be Considered is a Model of the Underground Volume Configuration for the CLIC Solution w/r/t Rock Stress and Movement*
- *Once a Model is Developed, it Can be Adjusted for Different Criteria and Configurations*
- *ARUP Representatives Did Not See Any Particular Problem with Pouring Large Amounts of Concrete Underground*


Section A-A
Section B-B
Detector on Beam Line
Escape tunnel
Movable shielding wall
Detector in "Garage" position
Detectors Hall
Survey Gallery
Bypass tunnel
Beam Tunnel
Assembly + Testing Surface halls
2 Detectors Halls
120 x 25x 39m
2 shafts Ø18m
Travelling Crane
(2 x 20T)
(2 x 80T)
1st Landing
Escape tunnel
Beam Tunnel
Survey Gallery
CLIC- DETECTORS HALL AREA (SURFACE AND UNDERGROUND)
CLIC.CE-1.1700.0001

ILC IR Layout (CERN)



Date Event Global Design Effort 15

CFS Preparation for ALCPG11

- CFS Topics have been Established for Parallel Sessions
  - Main Linac/HLRF (KCS & DRFS)
  - MDI/Detectors
  - EDMS
  - CFS Discussion of KCS Shaft Arrangement
  - CFS Discussion of DRFS Civil Drivers
  - CFS Discussion of Regional/Global Cost Estimates for Specific WBS Sections
  - General TDR Planning
  - 1 Tev Upgrade issues
- Joint Sessions have been Established for CFS and Main Linac/HLRF WG and MDI/Detector WG (Unfortunately Both Other WG have Allotted the Same Time for the Joint Session with CFS
- The CFS Group will Split to Attend Both Parallel Sessions
- The CFS Group will Devote one Parallel Session to Finalize the EDMS WBS File Organization Format for the Duration of the TDR Process