



Cost Estimate Studies for SB2009

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Land of Enchantment

where “pain is a flavor!”

Estimate Checklist for ABQ - Friday morning

<u>Estimate</u>	<u>CFS</u>	<u>Areas</u>	<u>Comments</u>
A = RDR 2007	<u>AmEuAs</u>		Y = yes, I have it, N = no, ? = partial/not evaluated
A' Americas ML	Y		correct shaft base cavern volumes & engineering
A' America RTML	Y		correct base cavern & tunnel invert floor
A'' Americas VE	Y		Value Engineering for cooling for ML only
Alt config studies	Y		America's only – various ML tunnel geometries B-H
RTML 1BC 6.7 DR		?	just new magnet list = match to 6.7 km hex DR
KlystronCluster08	Y	Y	Aug 2008 study for Americas CFS – incl VE Cooling
Central Region	Y Y N	?	QWT collector for e+ source, includes single tunnel for ML & RTML, Klystron Cluster for ML, 3.2 km DR (low-P), shorter BDS, new tunnel configurations to/from DR & impacts on e-/e+/RTML(not understood, no lattices) - European CFS will not include 1 stage BC, Low P, nor DRFS – electrical estimate is not updated from RDR
RTML 1BC 3.2 DR	Y N N N		no optics or components yet for new transfer lines
Low-P	N N N	?	Simply cut # klystrons, what is impact on CFS? have rough BDS est for travelling focus, can we save costs on sources?
DRFS	N N N	Y	Fukuda-san elements 7/09 => Enomoto-san

Note: electrical estimates pass from CERN => Fermilab => not updated for SB2009

Promised Dates for Submitting Estimates

Oct 23 – Americas CFS: DRFS and Low P

Oct 30 – Asian CFS Civil only: Central Region,
single tunnel, DRFS, & Low Power

will provide Klystron Cluster civil, unspecified date

not soon – European CFS: 1 BC RTML, Low Power, DRFS

Oct 23 – Positron Source (incl mods for e- Source)

received Oct 2, 3:45 AM – DR: 3.2 km components

Oct 9 – RTML: Single BC (already have) + transfer lines

Oct 18 - ML: DRFS & its LLRF - finalize quantities & \$

Oct 23 – shorter BDS, plus MPS abort lines (Power?) and
dogleg around e+ target (part of ML in RDR)

Other *personal* SB2009 Observations

- Cost Estimating Information was not available in a timely manner to realize all the goals for this meeting!
- Information flow was less than desirable:
 - Electron Source didn't know CFS drawing showed beamline grew from 450 m => 2200 m or why!
 - Electron Source & RTML don't yet have CFS geometry of transfer tunnels to/from Damping Ring (50 – 60 – 90 meters offset)
 - Need such information written down and published
 - e-/e+ Sources & RTML still developing lattices!
 - RTML & CFS have different lengths for Single Stage BC – still evolving!
- Seems like RDR missed estimate for ML bypass around e+ target by ML = no, by e+ Source = ???, by BDS = no but BDS in SB2009
- Who is calling shots? e.g.
 - CFS bends to/from DR specified as $R \geq 60$ m by RTML, but this may impact Energy Compression for e+/e- Sources but they don't have lattice impact yet (discovered yesterday)



SB2009 Estimate Differentials - ABQ

- New data, less than ~ 1 week old, incomplete, not checked or digested
I apologize, but do not feel guilty, for any errors or omissions....
- Remember RDR expressed in M ILCUs where 1 ILCU = 1 \$ 2007
- **6,618 M** ILCUs = RDR Estimate as starting point = avg of 3 regions ests.
- 6,642 M ILCUs = European RDR Estimate (near CERN)
- 6,533 M ILCUs = Asian RDR Estimate (in mountainous region)
- 6,678 M ILCUs = Americas RDR Estimate (centered at Fermilab)
- The 3 regional estimates differ only for Conventional Facilities & Services
- Since Americas CFS estimate is most complete for SB2009 cost studies,
I will use this as our starting point for these differential comparisons
- BUT, since RDR, there were 3 significant errors found with Americas CFS
est: overestimated cavern volumes, forgot tunnel floor for RTML,
used incorrect ratio for engineering, both contracted and in-house
- Implementing corrections for these reduces the Americas estimate to:
- **6,610 M** ILCUs – use this as our starting point for SB2009 studies