NOνA Project Status

John Cooper & Ron Ray

May 19, 2006

Kuraray Visit, May 8-10

- Ron Ray, Carl Bromberg, Brajesh Choudhary visited Kuraray in Japan
- Toured fiber facility
- Met with business bosses in Tokyo
  - They feared the $ / Yen ratio
  - We said yes, that is why we wanted an indexed quote
  - They will send a new quote by/in June
    - For 0.8mm and 0.7mm
    - Savings implied

Discussions with Italians

- May 2 Phone meeting with M. Morandin & L. Ristori
  - With Feldman, Messier, Cooper
- Italian meeting on May 17 might resolve question of participation
  - They will report our mutual understanding that they could do the following:
    - Pick up Data Concentrator boards (325) after CDiv does initial design and 10 boards, possibly re-design….
    - Do Slow Controls (HV,…)
    - Pick up some Fiber R&D tasks in parallel with US groups
    - Take major responsibility for Near Detector
      - Build 50% of Integration Prototype Near Detector in Italy
- Italians: "Decision to join postponed until P5 decision. Negative impact from EPP2010 and Shapiro. Déjà vu for previously cancelled US experiments."
- We have indicated that we might reduce the height of the detector so that more modules could be built in Italy (~ 40 ft international shipping limit) – see next few slides

Cost Exercise for 40’ x 40’ Detector

----- Original Message -----
From: John Cooper
To: NOvA Technical Board
Sent: Tuesday, May 16, 2006 12:35 PM
Subject: Forty foot version costing exercise

Dear Tech Board,
Some of you have heard parts of this already.

Gary, Mark, and I have agreed to do a cost exercise on a detector with a smaller cross section to the neutrino beam, namely 40' x 40' to the beam.

The idea is that this would allow our potential Italians colleagues to build modules in Italy and likely get more Italian funds for the project. International shipping is not possible for 53' objects but is possible for 40' ones.

This also makes for a less vertically challenging detector, so our unresolved worries about creep will be reduced -- creep may not be completely understood, but it is related to stress and 40' high will put us in less stress hydrostatically and in less stress from the load of fewer horizontals transferred to the verticals. Dave Ayres and Vic Guarino are getting Ang Lee to do his FEA on this size and calculate the various Safety Factors. We will stick with 4.5 mm wall verticals and 3.0 mm wall horizontals and not adjust this parameter since part of the idea is to gain strength. We may not need an edge stiffener.

A spreadsheet from Rich Talaga is attached. The extrusions get a tiny bit narrower, but we end up with 9 modules by 9 modules by 78 blocks (each block is 31 planes). Please look at the yellow highlighted parts of the spreadsheet. The 40' is really the interior size of a shipping container and the extrusion lengths are smaller yet to allow the manifolds to fit in the containers. 78 blocks is 160 m long (~520 ft)

Cost Exercise for 40’ x 40’ Detector

The baseline building would still be for 25 kt, but we have to scale back to 20 kt to get close enough to $ 200 M TPC for DOE. The overburden gets easier to hold with the shorter span of 40 ft, but it gets longer as well.

I am hoping the shorter glue machine will fit in the "unused "5 kt extra space. The block raiser lifts less mass and presumably can be cheaper.

With shorter modules, I think we would have about 30 pe at the far end. The idea is to burn ~ 5 pe by going down to 0.7 mm fiber. We burn another 5 pe by adjusting the pseudocumene / waveshifters for a lower price.

Clearly the number of channels goes up, so some of the L2 WBS will just get more expensive. The number of modules goes up to 21,762 and so the number of channels is 696,384 if I calculated it right. These numbers are slightly higher than in the CDR for the 25 kt version. We need the full cost estimate to see if this strategy gains any ground over a 53' x 53' version of only 20 kt.

I am asking each of the L2 managers to use this spreadsheet as the basis for examining their L2 cost estimate. If you see an error in the spreadsheet, contact me, Ron & Rich.

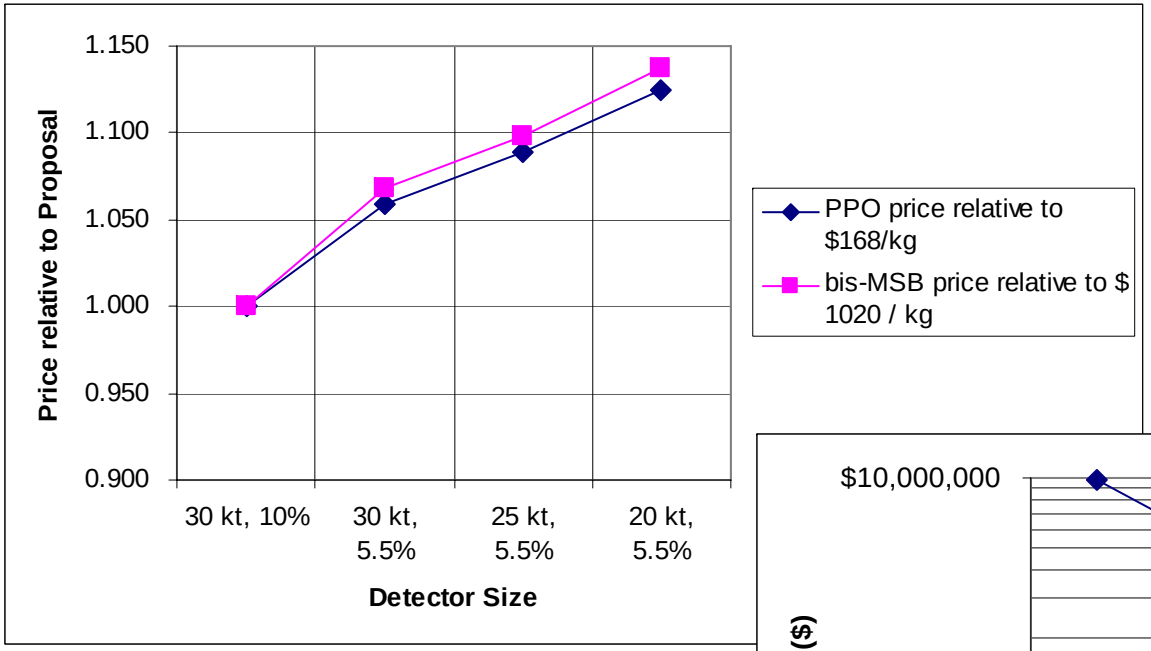
Please use the same metrics we used for the CD-1 review and report a list of differential costs to me and Ron. Ron will have an overview spreadsheet in his talk at NOvA in the North and the details of your work can serve as a quantitative basis for discussions during the week.

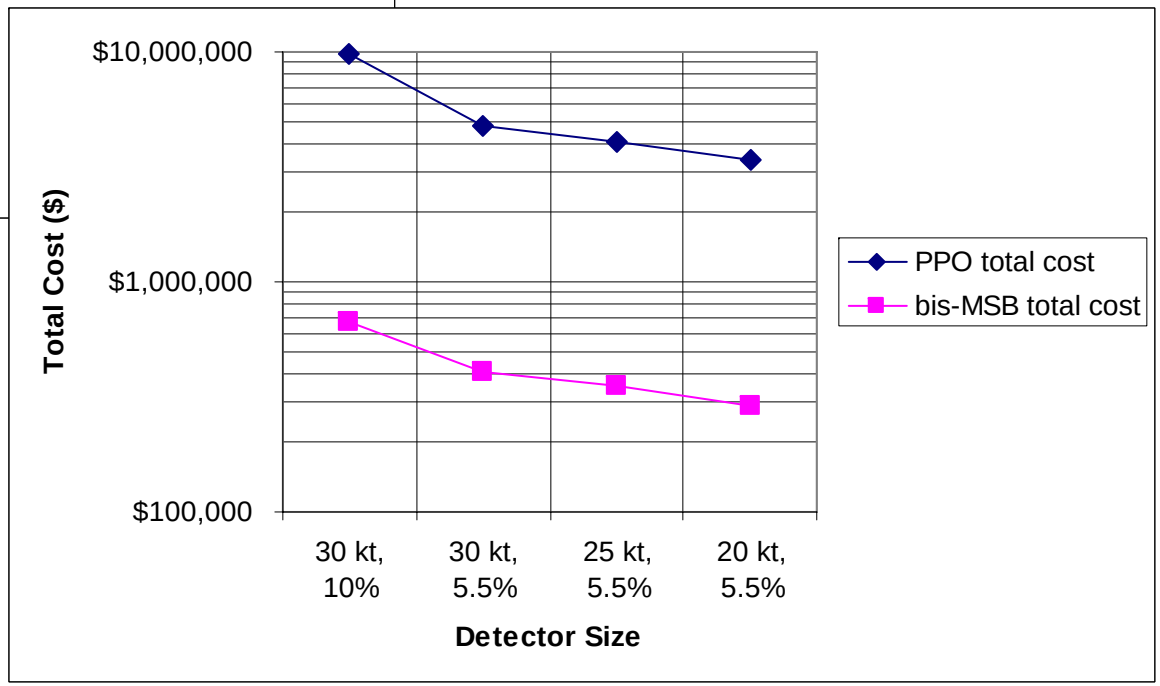
Thanks,
John

First look at 40x40 vs 53x53, both for 20 kt

	Δ	Comments
Building 25 kt	+$2.1M	Less excavation, but almost everything else costs more because of additional length.
Building 20 kt	-$1.9M	Smaller than 25 kt baseline
Scintillator	-$2.4M	Best guess at scaling pseudocumene and waveshifters. Need to measure.
Fiber	-$1.5M	Compare 0.8 mm at $0.70 vs 0.7 mm at $0.60
Extrusions	$0	Just depends on mass.
Extrusion modules	-$4M	2 US factories, 1 in-kind Italian factory
Electronics	+$6.3M	More channels
DAQ	+$318k	More channels
Installation	+$400k	AssemblyGenerally scales with number of modules. Smaller block raiser.
Total	**+$1.2M for 25 kt building** **-$2.8M for 20 kt building**	

Smaller detectors don't realize quantity discount prices





Status of Documents NO CHANGES

	Critical Decision Prerequisites	Current Status	Notes
CD-1	Conceptual Design Report	Done	
	Acquisition Strategy	In progress	Draft complete. Several iterations with M. Procario.
	Baseline range & Cost Estimates and Resource Loaded Schedule	Done	Done at CD1 level.
	Draft Configuration Management Document	Done	Done at CD1 level. CM manager identified.
	Preliminary Project Management Plan (PMP)	Done	Done at CD1 level. Some funding profile details still needed.
	Preliminary Hazard Analysis Report & NEPA	Done	
	Preliminary Project Execution Plan (PEP)	Done	Sent to S. Webster & M. Procario.
	Preliminary Risk Management Plan	Done	Uploaded to docdb
	Project Data Sheet for design	Done	OHEP
	Verification of mission need (NuSAG?)	Done	Positive report from NuSAG
	PARS Reporting		Plan to begin monthly reporting ~May '06 (Narative)
CD-2	Preliminary Design (Detector TDR)		See 6-1 of DOE M 413.3 (3-28-03), "Preliminary Design" level (Title I, ~ 20-35% complete) vs. Conceptual design (5%)
	Advanced Preliminary Design (Building)		part of TDR
	Baseline Cost Estimates and Resource Loaded Schedule		Will move to 20 kt version after Kuraray visit. Have a preliminary budget profile from DOE.
	Final configuration Mangement Document		need to finalize preliminary
	Final Project Management Plan (PMP)		need to finalize preliminary
	National Environmental Policy Act documentation		from Project, Keith Schuh will take lead Keith working on EA draft, has 2 of 6 or 7 chapters
	Draft Preliminary Safety Analysis Report		Harry Ferguson has a draft, Keith is looking at it
	Final Design & Procuremnt Packages for Long Lead Time Items		no LLP, therefore no packages
	Performance Mangement System Document (EVMS)		Suzanne Pasek is writing this Has LCLS & BTeV documents, about 50 pages, will steal for 1st draft
	Review of contractor project management system		Ed's timeline shows this in May
	Final Project Execution Plan (PEP) and performance baseline		need finalize preliminary which is still draft at CD-1
	Final Risk Management Plan		need to finalize preliminary
	Independent cost estimate (part of EIR?)		This is part of the EIR process
	Project Data Sheet for construction		not needed unless a Line Item
	Verification step?		P5 reports in September? Probably part of process (Procario)
	Performance Baseline External Independent Review		in October, but could slide a couple of months in an MIE scenario

Sufficient Project Personnel?

NO CHANGES

- Some identified needs
  - Administrative support high level full time — Req almost in system? (Elaine Phillips)
  - Help for monthly report startup
  - More engineering on Block Raiser
    - Final design, staged design allowing test phase? — Dave Pushka & Vic Guarino taking a few weeks to go back to basics before proceeding
    - More PPD effort
  - More engineering & help on Near Detector — ???
    - Installation transport, containment, fire protection, mobility
    - Have Karen Kephart, losing Rob Plunkett, have ANL engineers — (Really losing Plunkett is rumor)
    - Leon Beverly? John Voirin? Both familiar with shaft & tunnel. — ?????
  - Some decisions on blending — Visit to Renkert Oil April 27
possible blending in Minneapolis
Still a **long** way from concluding this could work without substantial risk to performance
    - **Then** work on structure, containment, pump skid specification
    - Involve PPD process control group?
  - $ for FESS on "design–build"
  - QA person, part time probably OK for now….. — No progress
  - Electronics infrastructure and Slow Controls
    - Italy for Slow controls, but when? — Discussed May 2
    - Leon Beverly for infrastructure? — ????

Status of formal EA process

- PIF submitted
- EENF modified and signed by Cooper May 18