



NOvA Project Status

John Cooper & Ron Ray
NOvA Working Group Meeting
November 2, 2005



Where are we on Cost & Schedule?

Status of NOvA Cost & Schedule

11/2/2005

	Initial talks with Bill?	List of Tasks	Durations of Tasks	Relationships among tasks	Assign labor resources	Assign M&S \$ Resources	Add contingency	Provide Task Notes
WBS								
Site and Buildings	X	X	X	x	x	x		
Scintillator	X	x						
Fiber	X	x						
Extrusions	X	x						
Extrusion Modules								
Electronics	X	x						
DAQ	X	x						
Near Assembly	X	X						
Far Assembly	X	X						



Where are we on Requirements Docs?

Status of NOvA Requirements Documents

11/2/2005

WBS

Site and Buildings		
	Site Work Technical Requirements (Steve Dixon)	doc 152
Scintillator		
Fiber		
Extrusions		
Extrusion Modules		
Electronics		
	Front End Electronics Requirements (John Oliver)	doc 147
DAQ		
Near Assembly		
	Liquid Scintillator Handling (Jim Musser)	doc 138
Far Assembly		
	Structural Adhesive (Vic Guarino)	doc 145
	Block Stability (Vic Guarino)	doc 143
	Block Raiser [Dave Pushka]	doc 113
	Assembly Tables (Vic Guarino)	doc 146
	Glue Machine (Vic Guarino)	doc 144
	Liquid Scintillilator Filling Machine	doc142
	Full Scale Prototype (Karen Kephart)	doc 141



Where are we on RFPs?

Status of NOVA RFPs

11/2/2005

Subject	vendor discussions	draft RFP	req in system	final approved RFP	RFPs sent	Date for Responses	Evaluation Board
Extrusions (we provide resin)	PET, Sept 15 Extrutech, June? Itasca, Sept 6	12-Aug	~ Aug 1	vers 1, Sept vers 2, Oct 7	26-Aug 10-Oct	23-Sep 16-Nov	26-Sep
raw PVC	Prime, Oct 17 Ashland & Georgia-Gulf, Sept 8 Aurora, Clairiant, Aug 23						
mixed scintillator	Bicron, Nov 8? Eljen,	17-Oct	21-Oct				
scintillator fluors only	Bicron, Nov 3 Eljen, Nov 8 Curtis Labs, Aug 25	20-Oct	21-Oct				
mineral oil	Penreco, Oct 25	6-Oct	21-Oct				
pseudocumene		17-Oct	21-Oct				
waveshifters	Curtis Labs, Aug 25	20-Oct	21-Oct				
waveshifting fiber	Kuraray, Oct 31 Bicron, Nov 3 Polhitech, Protvino,	17-Oct	21-Oct				

Status of RFIs

APDs	Hamamatsu, Aug 9
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Where are we on the CDR?

- Similar table coming, we have an outline....

- i. Title Page
- ii. Author List
full list of ~ 130 people
- iii. Preface
Just describes the chapters in brief text
- iv. Table of Contents
 1. Executive Summary
 - Detector Overview (~ page)
 - Detector Capabilities (~ page)
 - Cost & Schedule (few sentences, mention R&D, PED??)
 - Acquisition Strategy (short paragraph, reference DOE document?)
 - Line Item?, in-kind site?, perhaps in-kind on other aspects?
 2. NOvA Scientific Requirements (**Gary**)
 - Neutrino Physics Overview (~ few pages)
 - reference Proposal, other documents(?) for additional details
 - Off-Axis Beam description
 - Opportunity to note that the beam exists
 - Site Requirements
 - Physics vs. L
 - Detector Requirements
 - Mass, efficiency for nue detection (but also protons on target?)
 - Required energy resolution, cell size, S/N
 - Near Detector required for backgrounds
 - Detector Hall requirements
 - Overburden & cosmics,



More CDR

3. Overview of the NOvA Detector Design (John)

Site

Detector Technology

Far Detector Structure

Near Detector?

Detector Performance

Cell light output details here, demonstrated S/N here

Event pictures here

Neutrino event efficiency here

Scanning mentioned here

Cost Range

R&D funds, PED funds here?

TPC range

Funding Profile

Schedule Range

Key Milestones

State deliverable (2 detectors) to satisfy 6th bullet from bottom on pg 5-7 of 413.3

4. Alternate Detector Designs Considered (John)

Sites

Lake Superior to Trans-Canada Highway

Perhaps more detail on Orr-Buyck here?

Reference Scientific Requirements for “farthest in US” choices

Detector Technologies

Water Cherenkov, Sampling Calorimeters, Liquid Argon TPCs

Just like Cooper Prelim Director’s Review talk

Detector Structures Considered

Vee, Containers, Bathtub



5. Optimization of the Selected NOvA Detector Design (John)

Optimized Site

more details on Ash River and Orr-Buyck sites here,

noting multiple sub-sites considered at each spot

reference scientific requirements as basis to optimize at Ash River Reference

reference some value engineering document(s) for more details

comparing Orr-Buyck to Ash River?

Optimized Detector

Light Level vs. Detector parameters, cost & risk vs. ways to get more light

Cost vs. Detector parameters from the point of view of less light, associated risks

e.g. risk effects of more pseudocumene, not just additional cost

Reality is the combination of the two previous viewpoints, some up, some down

Optimized cell size, 2.2 cm → 4.5 cm → 6.0 cm deep, associated PVC structure?

6. Site Description

Ash River in detail

The EAW process, the RGU

7. Conventional Facilities

Far Detector Hall at Ash River

3m overburden design

Outfitting

Safeguards and Security (could reference a separate document?)

Alternate designs considered

30 ft excavation, concrete planks, concrete walls w 1m overburden

Optimization / Value engineering in progress

Optimization of depth, ...

Truss vs. concrete planks

Catwalks vs. lift-a-lofts

Near Detector Hall at Fermilab

Opportunity to note that it all exists.



8. Scintillator "517L"

Components

Describe mechanism for scintillator and waveshifters

Light level

Mix at Fermilab

Shipping Model

Alternate mixing schemes considered

Alternate shipping models considered

Optimization / Value engineering in progress

Investigation of different mixes vs. light level

9. Wavelength Shifting Fiber

0.8 mm double clad

Describe mechanism of waveshifter

Attenuation length

Interaction with pseudocumene is a risk

Results from 10-year old COSMOS device?

Alternate fibers considered

Diameter

Optimization / Value engineering in progress

Different R27 levels, spec on diameter?

10. PVC Extrusions

Describe rigid PVC mechanical properties

Describe 19 psi problem here?

TiO₂ and reflectivity

Plot of # of bounces in a cell?

Alternates Considered

Rutile, anatase, additives

Cell size optimization and PVC thickness here?

Optimization / Value engineering in progress

16 cell vs. 32 cell?

Rutile vs. Anatase

PVC additives and structural properties

Shipping?



More CDR

11. PVC Modules

- Bottom Closure & Top Manifold
- Adhesive & alternates
- Light output vs. fiber position in the cell
- Factory Description
- Factory Tools required
- Optimization / Value engineering
 - # of factories, shipping, spiders
- Two designs for closure
- Two designs for manifold

12. Photodetector and Electronics (Ron)

- APD
 - Spectral response
 - New packaging developed
- HV supply
- Amplifier
 - New design in progress, result in TDR?
- TE Cooler and water cooling system
- Full electronics package description
- Alternates Considered
 - To APD, HV, amp, coolers, air cooling
- Optimization / Value engineering
 - Exploration of gain vs. S/N?
 - Installation of electronics at Far Site?



13. Data Acquisition System (Ron)

Description

Alternates considered

Optimization?

Supernova detection capability preserved, but not in scope

14. Near Detector Assembly (Ron)

Describe detector here (previously just discussed as “identical, 250 tons” in Ch3?)

Describe modular scheme and access restrictions

Alternates

Optimization

15. Far Detector Assembly (Ron)

Structure details, calculations of stability

Adhesive requirements

Block Raiser and other tools

Alternates

Optimization

18. ES&H Overview

Pseudocumene and containment, is this a waste min plan?

MPCA letter

Fire protection is different

EAW process here instead of in 6) above?

NEPA, EAW expected to lead to FONSI

EAW also satisfies the “public and/or stakeholder input”, pg 5-7

Reference Hazard Analysis?

Decommissioning “plan”? This is part of “alternatives” / Life cycle cost, pg 5-7



More CDR

19. Quality Assurance Overview??

“summary test and acceptance criteria” , page 5-7

Could do this in each WBS section, or is it better to bring them altogether here in one spot? Or both?

Need some language on production readiness reviews here?

20. Risk Analysis?????

Or reference a separate document tied to contingency?

20. Work Breakdown Structure, pg 5-7

Description down through Level 3

Or is the PMP version good enough?

Need advice on these (others also)



Status of other required documents

	Critical Decision Prerequisites	Draft Start Date	Draft Completion Date	Target Completion Date	Date Completed	Date Approved	Current Status	Notes
CD-0	Justification of mission need document							DOE
	Acquisition Strategy	Aug-05	Aug-05	Sep-05			Review	
	Preconceptual Planning						Continuing	Proposal Plus
	Mission Need Independent Project Review (?)							OECM
CD-1	Conceptual Design Report (Detector CDR)		Dec-05					Starting soon.
	Advanced Conceptual Design Report (Building)							Included in CDR
	Baseline range & Cost Estimates and Resource Loaded Schedule		Dec-05					Starting soon
	Draft Configuration Management Document	Aug-05		Dec-05				Early draft - needs more work
	Preliminary Project Management Plan (PMP)	Aug-05	Aug-05	Oct-05			Review	
	Preliminary Hazard Analysis Report & NEPA	Aug-05		Nov-05				Waiting for input from L2 managers
	Preliminary Project Execution Plan (PEP)	Aug-05	Sep-05	Sep-05				DOE
	Project Data Sheet for design							?
	Verification of mission need (NuSAG?)							NuSAG reports this Fall.
PARS Reporting							determine content of monthly reports	
CD-2	Preliminary Design (Detector TDR)							
	Advanced Preliminary Design (Building)							
	Baseline Cost Estimates and Resource Loaded Schedule							
	Final configuration Management Document							
	Final Project Management Plan (PMP)							
	National Environmental Policy Act documentation							
	Draft Preliminary Safety Analysis Report							
	Final Design & Procurement Packages for Long Lead Time Items							
	Performance Management System Document (EVMS)							
	Review of contractor project management system							
	Final Project Execution Plan (PEP) and performance baseline							
	Independent cost estimate (part of EIR?)							
	Project Data Sheet for construction							
Performance Baseline External Independent Review								



Status of Hazard Analysis / PSAD (?)

Status of NOvA Hazard Analysis / PSAD

11/2/2005

L2 manager completed HA sheet? Harry & ES&H meet to review lists Draft PSAD chapter?

WBS

	L2 manager completed HA sheet?	Harry & ES&H meet to review lists	Draft PSAD chapter?
Site and Buildings	X		
Scintillator			
Fiber			
Extrusions			
Extrusion Modules			
Electronics			
DAQ			
Near Assembly			
Far Assembly			



Other bits

- Our first Oil leak is behind us
 - Orr-Buyck < 5 gal spill by sub to Environmental firm
- Information on indexing the price of Mineral Oil
 - Next slide

Stuart,

You can find the posted base oil prices through a publication called Lubes n Greases. They have a website called www.lubereport.com. Look for the Base Oil Price Report. You should see a list of viscosity grades (in SUS at 100 F) for various companies. The best match for the Conosol 340 is Group II, 70 SUS. I checked today and it shows \$2.62/gallon at the Gulf Coast for three companies. **We would take this price as the base-line index and any movement up or down will adjust the price of the Conosol 340. So if we sold an oil two years from now we would simply add whatever price increase there was in the base oil to the price that we quoted today on the 340. One more thing to add confusion. We sometimes sell the Conosol 340 as Parol 60C. It is the same product coming from the same tank. I hope this is helpful.**



Crude Oil and Mineral Oil

Spot Price of Crude Oil vs Paraffinic Base Oil Price

