



# NOvA Project Status

John Cooper & Ron Ray

October 18, 2006



# Interactions with DOE

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- Oct 16, Steve Webster says we do not need a Cyber Security document for CD-2 since NOvA is not an IT project



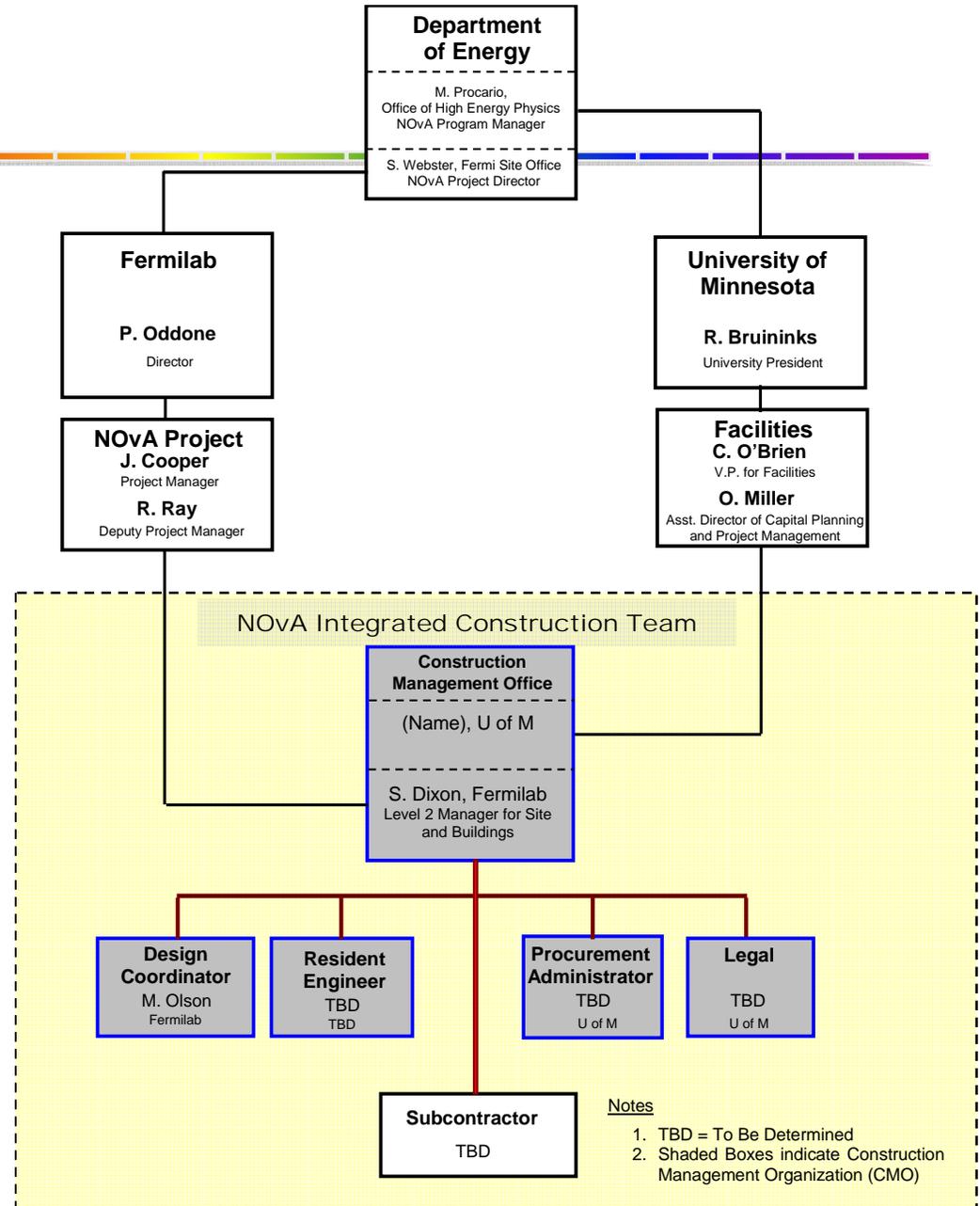
# Interactions with Marvin Marshak

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- Oct 6 asked us for an organization chart detailing how the Cooperative Agreement and the Project would interact.
  - Steve Dixon, Ron and I have iterated this a couple of times, will send it to Marvin today



# Integrated Construction Team





# “The world does continue to make sense”, says Ron

- Oct 18 Lube Report

- Conoco-Phillips reduced prices on Group II Viscosity 70 from \$3.09 to \$2.97, in line with other vendors

- History:

– Oct 18	\$ 2.97	(crude @ \$ 59.04)	↕ > 5 weeks to fall back to March level, meanwhile oil fell another 10% below the March level
– Oct 10	\$ 3.09	(crude @ \$ 58.54)	
– Oct 3	\$ 3.09	(crude @ \$ 58.56)	
– Sept 26	\$ 3.09	(crude @ \$ 61.19)	
– Sept 19	\$ 3.24	(crude @ \$ 61.74)	
– Sept 12	\$ 3.26	(crude @ \$ 63.67)	
– Sept 5	\$ 3.26	(crude @ \$ 68.60)	
– Aug 29	\$ 3.26	(crude @ \$ 69.93)	
– Aug 22	\$ 3.26	(crude @ \$ 72.93)	
– Aug 15	\$ 3.26	(crude @ \$ 72.94)	
– Aug 8	\$ 3.09	(crude @ \$ 76.35)	
– Mar 28	\$ 2.87	(crude @ \$ 65.97), this was at CD-1 Review time	



# What we need for CD-2 Review

## NOVA Work List for CD-2

(red means new since last version)

		Original Estimated Finish Date	Current Estimate of Finish Date	Actual Finish Date	comments
<b>Cooperative Agreement</b>					
	U of M proposal draft	30-Sep-06	6-Oct-06		
	U of M final draft	15-Oct-06			
	U of M submits proposal	31-Oct-06			
	Recipient Selected = Site Selection	1-Nov-06	15-Dec-06		Assumes UM proposal 10/31, DOE evaluation 11/30, Orbach acceptance 12/15
	Negotiations concluded	15-Jan-07	1-Mar-07		Maybe this can be done in ~ 2 months?
<b>NEPA</b>					
<b>Scoping Meeting</b>					
	Environmental Impacts Analysis Plan and 5 point timeline	22-Jun-06		22-Jun-06	
		29-Jun-06		20-Jul-06	after iterations on schedule with Sally Arnold
<b>NEPA timeline in Envir. Impacts Analysis Plan</b>					
	Determine EA route	22-Jun-07		22-Jun-06	Siebach to Livengood
	Notify Illinois, Wisconsin, Minnesota of EA intent	15-Jul-06		1-Aug-06	letters from Livengood
	draft EA completed	1-Nov-06	15-Nov-06		date slipping, see below
	final EA ready	1-Dec-06	15-Jan-07		requires CA Recipient
	State / Public Comment period	1-Jan-07	15-Feb-07		
	FONSI drafted	1-Apr-07			not required for CD-2 REVIEW
	FONSI issued	1-Jun-07			not required for CD-2 REVIEW
<b>Minnesota Part</b>					
	RGU (Responsible Government Unit) in place	15-Jan-07	15-Dec-06		see Coop Agreement line above
	Minnesota EAW (site specific)	15-Jan-07	1-Mar-07		This is after the 30 day comment period
	Wetland Permit Processing by USACE	1-Apr-07	1-Dec-07		Need for construction, not for CD-2 review
<b>Fermilab NOVA Part</b>					
	<b>draft Version Ch 3 Proposed Action:</b> description, alternative				
	Integration Prototype on surface	31-Aug-06		31-Aug-06	containment, FP
	Near Detector in MINOS access tunnel	31-Aug-06		31-Aug-06	containment, FP, access issues
	Scintillator Blending & Storage	31-Aug-06		31-Aug-06	containment, transportation
	Module Factory	31-Aug-06		31-Aug-06	construction activity, adhesive ventilation
	Block Raiser construction & tests with load	31-Aug-06		31-Aug-06	construction activity
	Full scale prototype construction & test	31-Aug-06		31-Aug-06	construction activity
	Full flat prototype for time & motion study	31-Aug-06		31-Aug-06	construction activity at ANL
	<b>Final Version (ties to date in NEPA timeline above)</b>				
	Integration Prototype on surface	1-Nov-06			containment, FP
	Near Detector in MINOS access tunnel	1-Nov-06			containment, FP, access issues
	Scintillator Blending & Storage	1-Nov-06			containment, transportation
<b>Fermilab Tritium Part</b>					
	Water Task Force report	21-Sep-06	30-Oct-06		Mike Martens presentation to Water Task Force meeting on NOVA EA. Task Force has 3 Technical Memos in preparation.



# What we need for CD-2 Review, page 2

NOvA Work List for CD-2 <small>(red means new since last version)</small>		Original Estimated Finish Date	Current Estimate of Finish Date	Actual Finish Date	comments
<b>Site and Building</b>					
<b>Ash River Site</b>					
	EAW update	1-Nov-06	1-Dec-06		
	Wetland Permit Application prepared	1-Dec-06			
<b>Other Sites</b>					
	EAW	1-Jul-07	30-Sep-07		no longer matters with unsolicited proposal
<b>Building</b>					
	Independent Cost & Schedule Review	15-Sep-06	1-Sep-06	14-Sep-06	
	Decide overburden construction method	15-Oct-06			related to overburden thickness
	Final conceptual design ready for 30% design effort	15-Oct-06			
	30% Drawings	15-Dec-06			P.O. in place for first \$ 260 K
<b>Liquid Scintillator</b>					
	Tests of commercial Tintometer	21-Jul-06		16-Aug-06	tagged, sent on to Indiana for tests, 7/17
	Fermilab blending model description & cost	15-Aug-06	15-Nov-06		Ron 8/15 draft, but we need a complete plan
	issue RFI for off-site blending	1-Aug-06	31-Oct-06		struggling with options, hired consultants
	RFI responses for off-site blending	1-Sep-06	30-Nov-06		6 wks for consultants to develop bid list
	evaluate waveshifter concentration	15-Aug-06		16-Aug-06	
	evaluate pseudocumene concentration	15-Aug-06		1-Apr-06	CDR likely has sufficient info
	decide waveshifter/pseudocumene to match fiber diameter	9-Aug-06	13-Oct-06		likely no scintillator change, only fiber & PVC
<b>Wavelength Shifting Fiber</b>					
	Updated Kuraray quote	1-Jun-06	1-Jul-06	6-Jul-06	
	evaluate fiber diameter	1-Aug-06	13-Oct-06		work in progress
	attenuation length of 0.7 mm fiber	15-Sep-06	30-Oct-06		need 16m fibers and APD readout
	attenuation length of 0.6 mm fiber	30-Sep-06	30-Oct-06		have fiber acceptance loss in hand
	decide fiber diameter	9-Aug-06	30-Oct-06		need PVC and fiber info



# What we need for CD-2 Review, page 3

## NOvA Work List for CD-2

(red means new since last version)

	Original Estimated Finish Date	Current Estimate of Finish Date	Actual Finish Date	comments
<b>PVC Extrusions</b>				
Choose die proof resin (NOvA-2 with rutile TiO2)	5-May-06		5-Jun-06	
Proof 16 cell die at die manufacturer	26-Jun-06	31-Jul-06	24-Jul-06	done at Extrutech, not at die manufacturer
Tune 16 cell die at extruder	14-Jul-06	18-Aug-06	25-Jul-06	got samples but NOvA-2 resin clogged die
Rework die after initial tests	21-Aug-06		18-Sep-06	in progress
2nd test with new rutile PVC resins and reworked die	1-Sep-06	18-Sep-06	18-Sep-06	NOvA-19 and NOvA-22 are rutile resin names
Issue RFP for 70,000 lb test resin + full detector option	5-Jun-06		23-Jun-06	but will have to do best & final, NOvA-2 clog
RFP responses for resin	5-Jun-06	21-Jul-06	21-Jul-06	able to update cost estimate with this info
Order anatase versions of new PVC resins	25-Sep-06	15-Sep-06	18-Sep-06	need anatase analogs of NOvA-19 & -22
First test of anatase TiO2	7-Sep-06	25-Sep-06	3-Oct-06	light output measurements show 15% gain
Another resin tweak, order 1 rutile ASAP based on 9/28 tests	1-Oct-06			extruder parameters at temp/pressure limits
Another resin tweak, order 1 anatase based on 9/28 tests, also light tests	8-Oct-06			extruder parameters at temp/pressure limits
Extrude tweaked resins	23-Oct-06	1-Nov-06		Extruder vendor busy until then
				2nd rework of die will be after tests with third set of resins
React to measurements of 16-cell extrusions	31-Oct-06	15-Oct-06		
Measure mechanical properties of NOvA-2 in 16 cells	30-Sep-06	15-Oct-06		in progress but will repeat for new formula
Issue RFP for 70,000 lb resin, BEST and FINAL	1-Sep-06	23-Oct-06		hold, will update resin formula
Order resin for 1500 m of 16 cell material in anatase	15-Aug-06	23-Oct-06		slipped 1 week
Produce 3500 m of 16 cell material, horizontal, rutile	4-Aug-06	1-Dec-06		takes 8 days of production time, end 12/8
Issue P.O. to modify existing die for vertical extrusions	1-Sep-06		24-Aug-06	4 month turn around on existing die
Decide on TDR baseline resin: rutile or anatase	15-Oct-06	30-Oct-06		<b>This is the one crucial to CD-2</b> , slip 2 wk
Still would not have final 16 vs 32 cell decision				But would have work around concept/tests
Devcon adhesive tests of 32 cell from two 16 cell objects	21-Aug-06		21-Aug-06	still worries about Devcon volatiles, ES&H
RF welding test to make a 32 cell from two 16 cell objects	1-Nov-06			expect proposal any second
Die returns after modification for vertical extrusions	15-Jan-06	1-Feb-07		die not available during January
<b>PVC Modules</b>				
evaluate 0.7 mm fiber fragility in Module Assembly	15-Sep-06		18-Sep-06	0.7 mm OK in first pass, quantitative evaluation in progress on possible handling damage
evaluate 0.6 mm fiber fragility in Module Assembly	22-Sep-06		5-Oct-06	0.6 mm OK in first pass, quantitative evaluation in progress on possible handling damage
test black PVC for conductivity	15-Sep-06			static charge issues in scintillator filling
final endplate design	31-Aug-06	15-Oct-06		modifying design, review on Oct 18
final manifold design	31-Aug-06	15-Oct-06		modifying design, review on Oct 18
adhesive choice	30-Sep-06			
adhesive vs. RF welding	1-Dec-06	1-Apr-07		
factory stringing machine	1-Oct-06	1-Nov-06		have a prototypes but it needs tuning
factory flycutting machine	1-Oct-06		15-Jul-06	MINOS flycutter tested successfully
factory gluing machine	1-Nov-06			if glue, now injected so machine is simpler
Time & Motion studies with 16 cell, 12 ft(early) & 53 ft(later) objects	15-Dec-06			



# What we need for CD-2 Review, page 4

NOVA Work List for CD-2 (red means new since last version)		Original Estimated Finish Date	Current Estimate of Finish Date	Actual Finish Date	comments
<b>Electronics</b>					
	Receive 1st 10 APDs from Hamamatsu	1-Oct-06	1-Dec-06		Dec 1 now a very optimistic schedule. a) Hamamatsu pursuing lower temperature bump bonding on current carrier board. b) U of Minn in parallel now looking at a ceramic version. c) Mualem, Rusak, Oliver meet with chief Hamamatsu eng at IEEE San Diego Nov 2
	Get updated "target price" of APDs from Hamamatsu	1-Nov-06	1-Jan-07		
	completed studies of front end ASIC	10-Aug-06		28-Aug-06	Fermilab tests done, packaging for user tests
	Front End Board prototype II testing	6-Oct-06			
	Cooling scheme choice for TDR: water or R-134a	1-Oct-06	1-Nov-06		still looking at options, review Oct 26
	Cooling design for TDR	1-Nov-06			This is just draft 2 of TDR Ch13, tests of alternates likely continue past TDR
<b>Data Acquisition</b>					
	prototype Data Concentrator tests complete	15-Dec-06			
<b>Near Assembly</b>					
	Initial design of mechanical structure	19-Sep-06		19-Sep-06	have initial write-up, now revising
	Initial design of mechanical systems	19-Sep-06		19-Sep-06	have initial write-up, now revising
	Near design at TDR level	1-Nov-06			This is just draft 2 of TDR Ch 15
<b>Far Assembly</b>					
	Validation of plane adhesive choice	16-May-06		11-Jul-06	3M-2216 is the choice
	Tests of 3 plane assemblies with 3M2216 and 16-cell extrusions	22-Sep-06	6-Oct-06		several successive tests for peel and shear
	RF welding, plane to plane, 4 plane test at Ashland	31-Oct-06	1-Dec-06		P.O. out on 9/27
	settle baseline installation procedures	27-Jul-06	5-Oct-06	5-Oct-06	have initial write-up, now revising
	Validation of structural design	17-Aug-06	7-Nov-06		
	Initial design of access system for top of detector	30-Sep-06	19-Oct-06		linked to building design. Concrete ==> rolling platforms. Decide 10/19.
	Initial design of light tightening scheme	3-Oct-06	1-Nov-06		linked to installation procedures. We now believe this is minimal effort due to TiO2 in thick PVC, but needs measurement
	Initial design of scintillator filling scheme	26-Sep-06		26-Sep-06	have initial write-up, now revising
	final scintillator overflow tank design				task moved from modules to assembly
	Block Raiser design review	5-Dec-06			internal engineering review of design & cost
	Designs of mechanical systems & tooling	8-Jan-07			



# What we need for CD-2 Review, page 5

NOVA Work List for CD-2 <small>(red means new since last version)</small>		Original Estimated Finish Date	Current Estimate of Finish Date	Actual Finish Date	comments
<b>Project Management</b>					
	final Project Execution Plan	1-Aug-06	12-Jan-07		just needs final costs and milestones, text settled with Lutha and Webster on July 12
	final Project Management Plan	12-Jan-07			needs EVMS appendix, look at QA plan re:CFR 830 & DOE 414.1c
	final Configuration Management Document				
	final Risk Management Plan				
	draft Procurement Plan (partial)	1-Aug-06		29-Aug-06	request from Lutha
	final Procurement Plan	21-Jan-07			will have for Director's CD-2
	draft Performance Management System Document (EVMS)	21-Jul-06		23-Aug-06	NOVA docdb #1084 (lab-wide plan)
	final Performance Management System Document (EVMS)				
	draft PSAD	1-Apr-06	1-Jan-07		had at CD-1 but not shown, needs update?
	draft Security Vulnerability Assessment Report	18-Sep-06		18-Sep-06	
	final Security Vulnerability Assessment Report				Steve Webster believes this requirement is just for nuclear facilities. Action item to confirm this.
	draft doc on High Performance Sustainable Bldg considerations	13-Sep-06		13-Sep-06	FESS Sustainable Design Review Procedure
	final doc on High Performance Sustainable Bldg considerations				LEED checklist evaluation by project team
	update initial Cyber Security Plan				Steve Webster says not needed since not an IT project
	Outside Review Mechanical Structure: Creep Mitigation	1-Sep-06	1-Nov-06		may drop this review
	begin monthly reports	1-May-06		27-Jun-06	May report finished June 27
	1st draft Technical Design Report (blanks identified)	1-Oct-06	6-Oct-06	17-Oct-06	
	2nd draft Technical Design Report (50% blanks filled)	1-Nov-06			updates from L2 Managers
	final Technical Design Report	15-Dec-06			final updates, final edit by Project Office
	draft construction 20 kt Cost & Schedule matching funding profile	10-Aug-06		15-Aug-06	"match" is approximate
	update R&D portion of C&S	30-Sep-06	15-Oct-06		track starting Oct Monthly Report, might be final for CD-2
	2nd draft construction 20 kt C & S following technical decisions	1-Nov-06			follows update of R&D, parallel TDR 2nd draft
	nearly final C&S	5-Dec-06			
	final Cost & Schedule	15-Dec-06	12-Jan-07		this would include full BOE & notes



# Sufficient Project Personnel?

- **Administrative support high level full time**
  - Elaine Phillips: 4 interviews scheduled, last two are Oct 20. Not clear where this person sits.
- **Help for monthly report startup**
  - Could be admin person?
- **More engineering on Block Raiser**
  - Final design, staged design allowing test phase?
  - Dave Pushka & Vic Guarino go back to basics before proceeding
    - Have agreed to go with a “pivoter” design vs. “raiser” for TDR / CD-2
    - Will look at raiser again as we go from 30% design to 100%.
    - Need FEA help, proposal to PPD on Sept 27 (~ 4 wks FEA between now and Dec 1)
      - PPD accommodated request, part of Bob Wands.
- **More engineering & help on Near Detector**
  - Have Karen Kephart, Peter Lucas, have ANL engineers (Guarino)
    - Issue with design/drafting, lack of access to Don Friend, first reported to PPD Eng Resource Mtg on July 17, PPD and Project continue to watch this
  - Leon Beverly? John Voirin? Both familiar with shaft & tunnel.
    - Installation transport, containment, fire protection, mobility
    - Leon toured MINOS access tunnel with Peter Lucas on August 30
      - Will help on a cost estimate to move utilities
    - Have FESS & Chris Laughton help on crude excavation costs in access tunnel
      - First estimate from Elaine McCluskey, Sept 22



# Sufficient Project Personnel? Continued

- **Scintillator Blending**
  - Off-site: have CCC consultants to develop bid list, then we do an RFI
  - On-site:
    - Getting budgetary quote to hold mineral oil off-site, draw only small amounts at a time for blending
    - Need to understand leased railcars next for possible use as “modest” storage at railhead
    - Still would do prototype blending for spring 2007 on-site
    - Involve PPD process control group?
  - **PPD assigns Bill Pritchard to help with transportation logistics evaluation**
- **QA person, part time probably OK for now.....**
  - No progress
- **Electronics infrastructure and Slow Controls**
  - Craig Dukes (Univ of Virginia) as new L3, understands Italians will join eventually
  - Asked John Oliver & Dave Pushka to look harder at the power & cooling issues across L2 boundaries – led to proposal of new cooling model:
    - Dave Pushka has suggested changing our design from water cooling of the TEC hot side to R-134a cooling with one cooling unit per detector block
      - Still in initial discussions within NOvA
      - Might need PPD Process Control group help for design
    - John Oliver spearheading NOvA meetings to recommend a baseline for the TDR
      - We will chose a baseline by Nov 1.....