NOvA Project Overview

John Cooper
Project Manager

NOvA Project History

- CD-0 approved on November 28, 2005
  - For “EvA” = Electron Neutrino Appearance Detector, not explicitly NOvA
- CD-1 approved on May 11, 2007
  - Following direction from OMB, NOvA now includes the Accelerator and NuMI Upgrade as well as Detectors
- CD-2 approved on September 15, 2008
- CD-3a approved on October 24, 2008
  - $ 24 M start on specific items
- CD-3b approved on October 29, 2009
  - Full construction start, TPC is $278 M

- CD-4 scheduled for November 2014

NOvA Scope

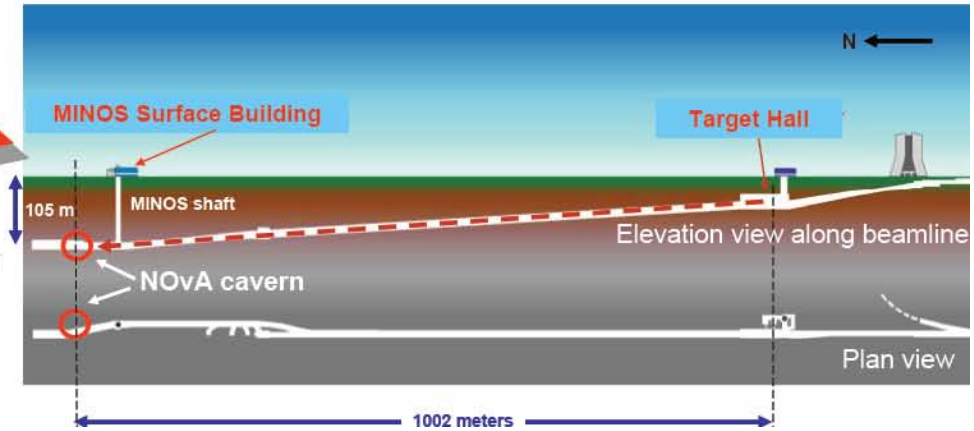
Key Performance Parameters (KPP)	NOvA Threshold KPP	NOvA Objective KPP
Proton Beam Power	Capable of 700 kW to NUMI Target	
Near Detector Mass	0.2 kt	
Long Baseline Distance	810 km	
Detector Angle Off-Axis	14.6 mr	
Far Detector Mass	14 kt	18 kt

» Above from December 22, 2010 revised PEP

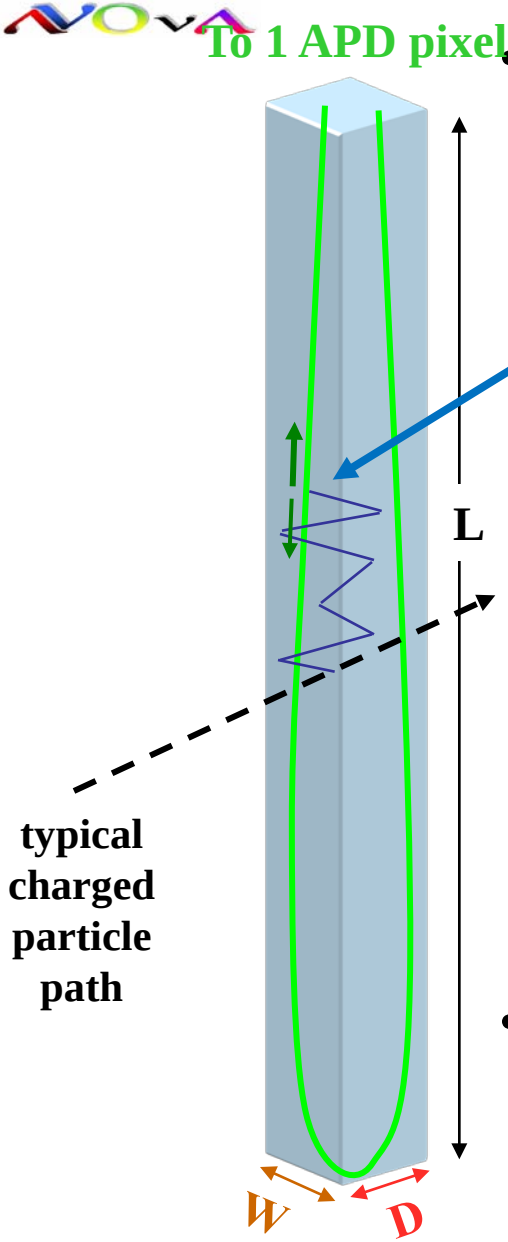
- Proton Beam Power is "capable" of 700 kilowatts, not commissioned
  - We reconfigure the existing Fermilab accelerator complex to increase the proton intensity (beam power) by a factor of two.
- Two Detectors
  - **Near Detector** at Fermilab to measure the electron neutrino content of the muon neutrino beam just after production,
  - **Far Detector** at Ash River, Minnesota near the Canadian border to look for extra electron neutrinos appearing after a 810 kilometer trip north
    - This requires a new building at Ash River done via a Cooperative Agreement between DOE and the University of Minnesota
    - Far Detector mass can be as large as 18 kilotons if we can afford it within the TPC and CD-4 date.

Accelerator & NuMI Upgrades

- **NOvA adds items to an extensive existing accelerator infrastructure**
  - Fermilab is the lead institution here
- **Existing Main Injector & Recycler**
  - Dotted yellow circle in picture
  - Previous ~ $250 M project completed in 1999 for the Tevatron Collider (the other circle in the picture)
  - NOvA:
    - Cycle time reduced by using the Recycler as proton storage ring and by using more RF stations in the Main Injector
    - Faster cycling gives more protons/second
- **Existing NuMI Beamline**
  - Dotted red arrow in picture
  - Previous ~ $175 M project completed in 2004
    - This includes an underground tunnel at Fermilab with space for Near Detectors 300 feet below the surface
  - NOvA:
    - New target, move focusing horn, …
- **NOvA Result:**
  - Increase beam power from 400 to 700 kW
  - More protons to make more neutrinos

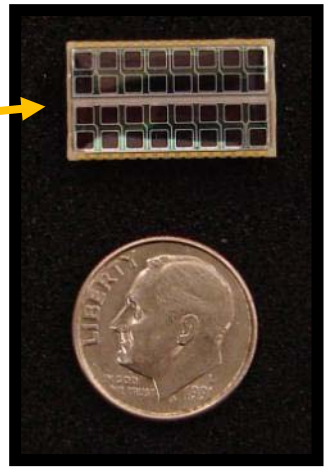


Reminder: NOvA Basic Detector Element



- Liquid scintillator in a highly reflective PVC plastic cell
  - Passage of charged particle through scintillator creates light
  - Light bounces off reflective PVC walls until captured in a thin wavelength-shifting fiber
    - Typically light hits fiber within 50 cm of particle path, ~ 8 reflections
  - The fiber is U-shaped and both ends terminate in one pixel of a 32-pixel avalanche photodiode (APD)
- Simple construction, just repeat 357,120 times
  - Cells are 15 m long, so they just fit in a 53 ft semi-trailer truck

Prototype Near Detector with ~ 16,000 cells is operating at Fermilab



NOvA building

- Building at Ash River, Minnesota for a 18 kt Far Detector
- This is complete.

Review Website

NOvA (E929)

NuMI Off-Axis ν_e Appearance Experiment

FRA EVMS Self Surveillance Review, March. 12, 13, 14, 2012

NOvA Documents
- *Document Database*
- *TDR*
- *CDR*
- *Proposal*

Reference
- *P5 report*
- *NuSAG report*
- *CD-0*
- *CD-1*
- *CD-2*
- *CD-3a*
- *CD-3a Mod 1*
- *CD-3a Mod 2*
- *CD-3b*
- *OPMO web page*

Project Documents
- Project Execution Plan (PEP)
- Project Management Plan (PMP)
- Project Organization Chart
  - from PMP
- Responsibility Assignment Matrix with Dollars – January Excel Format
- Responsibility Assignment Matrix with Dollars – December Excel Format
- Risk Management Plan
  - Risk Registry
  - Risk Registry Contingency Analysis
- WBS Dictionary
- Cost Baseline– Cost Plan by Fiscal Year
- Work Authorization Documents
- Basis of Estimate 2012 Documents
- Charge Code Mapping to WBS
- Link to Project Home Page (and CAM Notebooks, Work Authorizations)

link goes to next page

Open Plan Extracts (under construction)
- Zip file of WBS L2 Gantt Charts
- pdf – milestone Gannt chart – Performance Measurement Baseline
- OP Predecessor/Successor Constraints Sheet
- Critcal Path Gantt Chart
- OP Counts Info for EVMS--All Activity Types
- OP Counts Info for EVMS--ASAP ALAP Only
- "No Pegpoints" Tasks

EVMS
- Earned Value Management System
  - NOvA Project Implemetation of FRA EVMS
  - Certification of FRA EVMS by DOE-OECM
- Monthly Reports, Cost Performance Reports, Basline Change Control Logs, Contingency Analyses & CPR by CTC
- Control Account Page
  - Variance Thresholds
  - Variance Reports (Jan, Dec, Nov, Oct) (NEW)
- Corrective Action Log

Links to CAM Notebooks

NOvA Experiment ✦ NOvA At Work ✦ NuMI at Work ✦ MINOS Experiment ✦
Fermilab at Work ✦ FNAL PhoneBook ✦ Help for link/certificate problems ✦

NOvA Project Office Home Page

General

- NOvA Organization Chart
  - ANU Org Chart
- NOvA ES&H/QA Information
- ANU Subproject
- CAM Notebooks

NOvA Change Requests

- Configuration Management Program
  - Configuration Item Data List (CIDL)
- Change Request Procedures
  - Change Request Form
- Change Request Status Reports

NOvA Review Schedule

- Review of NOvA Near Detector Cavern Construction Impacts, November 7, 2011
- ~~APD Review, October 14, 2011~~
- DOE Review, August 9, 2011
- DOE Review, August 31-Sept. 1, 2010
- Director's Review, August 4-5, 2010
- DOE Mini-Review, January 28, 2010
- DOE CD3b Review July 21-23, 2009
- Director's CD3b Review June 16-18, 2009
- EIR CD2 Review, June, 2008
- DOE Mini-Review April 30, 2008
- Director's Mini-Review April 17, 2008
- Department of Energy CD2/3a October 22-25, 2007
- EIR CD2 Review November 26-30, 2007

Collaborator Effort Reporting

- Scientific Effort Reporting Form
- Instructions

NOvA Experiment ✦ NOvA At Work ✦ NuMI at Work ✦ MINOS Experiment ✦
Fermilab at Work ✦ FNAL PhoneBook ✦ Help for link/certificate problems ✦

NOvA Control Account Manager Page

Common Control Account Documents

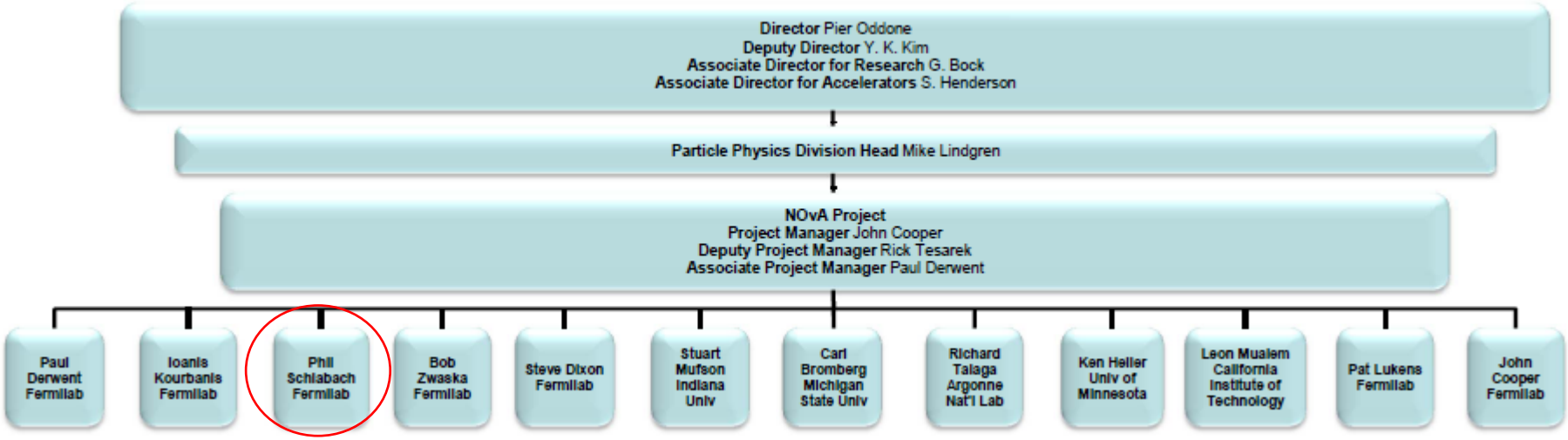
NOVA Organizational Chart	Cost Performance Reports	Dollarized Responsibility Assignment Matrix
Current Milestone Chart	WBS Dictionary	Current Detailed Schedule
Milestones	Project labor detail - hours only	Thresholds

Control Accounts by CAM Name

Paul Derwent	WAD		Ioanis Kourbanis	WAD		Phil Schlabach	WAD
1.0.1	3297		1.0.2	3298		1.0.3	3302
1.0.5	3304		2.0.2.1	3315		2.0.3.1	3317
2.0.1.1	3312		2.0.2.2	3316		2.0.3.2	3318
2.0.1.2	3313					2.0.3.3	3319
2.0.1.3	3314					2.0.3.4	3320
2.0.4	3321						
Bob Zwaska	WAD					Steve Dixon	WAD
1.0.4	3303					1.1	3305
						2.1.1	3322
						2.1.2	3323

more

Organization



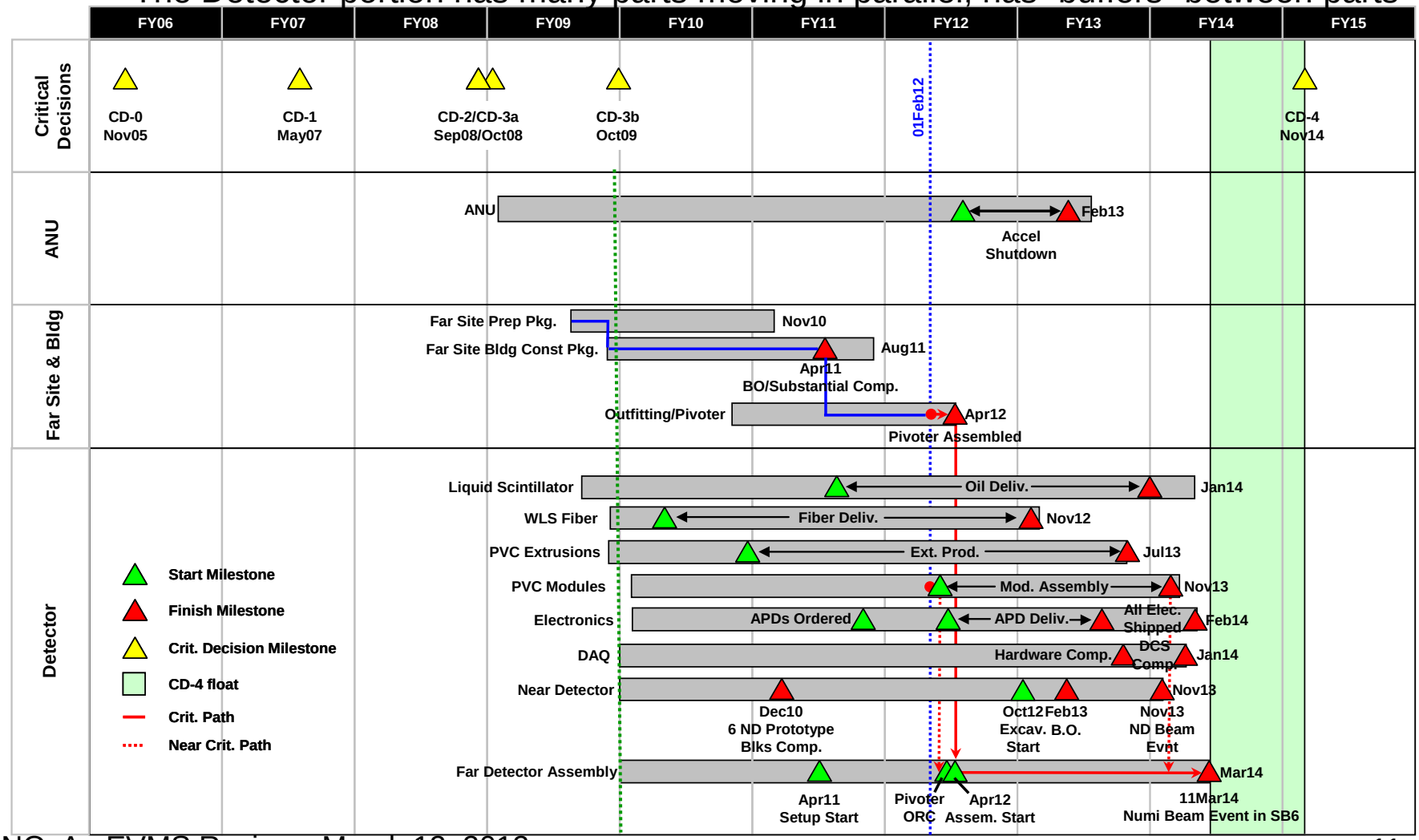
- One new CAM

Planning and Scheduling Process

- **The following statements come from our Certification Review in May 2009. They are still true.**
- **NOvA uses Open Plan**
  - the schedule has ~ 5,000 tasks and milestones
- **Scheduling Guidelines given to CAMs:**
  - Instructed by the Project Manager to provide best estimates for the duration of every task
  - There should be no hidden contingency in the schedule
  - Tasks with schedule uncertainty should have estimated cost contingency designed to speed up the work commensurate with the risk
    - We do have ~250 documented risks and a Risk Registry
- See **NOvA Key Assumptions** document (NOVA-doc-2954) for more details
  - This also has cost assumptions:
    - estimating instructions, labor cost assumptions, materials & services cost assumptions, escalation assumptions, cost guidance from DOE (funding profile), indirect cost assumptions at universities
  - Other key technical assumptions:
    - expectations from other Fermilab efforts assumed as pre-requisites to NOvA, risk of PVC structure,…
  - Other scheduling guidelines:
    - critical path guidance, assumed CD dates, assumptions about the Fermilab operating schedule since NOvA installation must fit within periodic shutdowns

Schedule Critical Path

- The Review Website has a Critical Path plot from Open Plan (~ 5 pages)
- Here is a higher level overview "schedule on a page"
  - The Detector portion has many parts moving in parallel, has "buffers" between parts



Work Authorization

- **The following statements come from our Certification Review in May 2009. They are still true.**
- Project Office authorizes work through Work Authorization Documents
  - Approved by Scheduler, Financial Officer, CAM, Project Manager
  - See the links in the CAM notebooks on our review webpage
- WAD must be in place before a control account, any of its subsidiary chargeable task codes can be opened
  - Suzanne Saxer (Field Financial Officer) is responsible for checking the prerequisites
  - NOvA has 72 control accounts and 201 chargeable task codes
    - Actual costs are accumulated at this chargeable task code level & rolled up to the control accounts.
- Labor at Fermilab is effort reported to open Fermilab chargeable task codes
  - Monthly Effort reports from all divisions available to CAMs for checking the data
- Moving funds outside of Fermilab to other institutions also requires Purchase Order and
  - Memorandum of Understanding (MOU)
    - Over-arching document describing expected contributions and responsibilities of institutions
    - Signed by Fermilab and the Institution's management
  - Statement of Work (SOW)
    - One for each FY detailing amounts expected to be funded by Fermilab
    - Signed by Fermilab, Institution's management, <u>and the CAM(s)</u>

Reports

- You have access to our monthly reports through January 2012
  - 2 types, one for DOE as they requested, a separate one for FRA EVMS

March 8, 2012
NOVA-doc-7145

January, 2012
NOvA Monthly Report

Project Overview

The project remained in "green" EVMS status in January with a Schedule Performance Index of 0.985 and a Cost Performance Index of 0.951. The table below summarizes status:

	January 2012 Status	Change from December
BAC	$ 248.5 M	+ $ 1.4 M
EAC	$ 256.6 M	+ $ 1.9 M
% Complete	61%	
% Obligated	83%	
Assigned Contingency (Management Reserve assigned line by line in the schedule according to estimated risk)	$ 19.3 M	- $ 1.3 M
Available Contingency (for unknown risks)	$ 2.12 M	- $ 0.59 M
Total contingency (% on remaining work)	22%	
Float to CD-4	182 working days	- 1 days

The float to CD-4 remained constant in spite of slipping schedules for the Pivoter Assembly completion and for the University of Minnesota factory production start. To compensate for these slips in the start of Ash River Block assembly we used contingency assigned for this risk to install a 5th 10 hour workday for assembly of Blocks 3 through 11. That is, we now assume we will work overtime to accomplish the Ash River assembly tasks more quickly and retain the float to CD-4. The risk-based estimate of contingency still retains 60% on these tasks.

Progress in areas of the Project is summarized below, and a final section has a table of quantitative financial details and performance for each area.

Accelerator and NuMI Upgrades (ANU)

- Attempts continued to make leak tight, structurally sound, RF capable, copper to copper joints on the Recycler RF cavity. Three vacuum welds were done with ebeam welding and are leak tight. This technical problem is solved.
- CoorsTek successfully brazed three 60" long ceramic beam tubes but shipped them without using our specially designed crates. Flanges on two of the tubes were damaged in shipment. Both have since been repaired at Fermilab.
- 3 Lambertson magnets are under construction (NOvA needs 2), but some flaking of the nickel plating was observed in all three during December. One magnet has now been grit blasted with a special nozzle to remove the nickel from inside the magnet. Vacuum requirements have been re-evaluated and it is believed that recoating the inside will not be necessary. The next step is to bake this one and test the vacuum.

Page 1 of 5

February 29, 2012
NOVA-doc-7145

January 2012
NOvA Monthly Report for FRA EVMS

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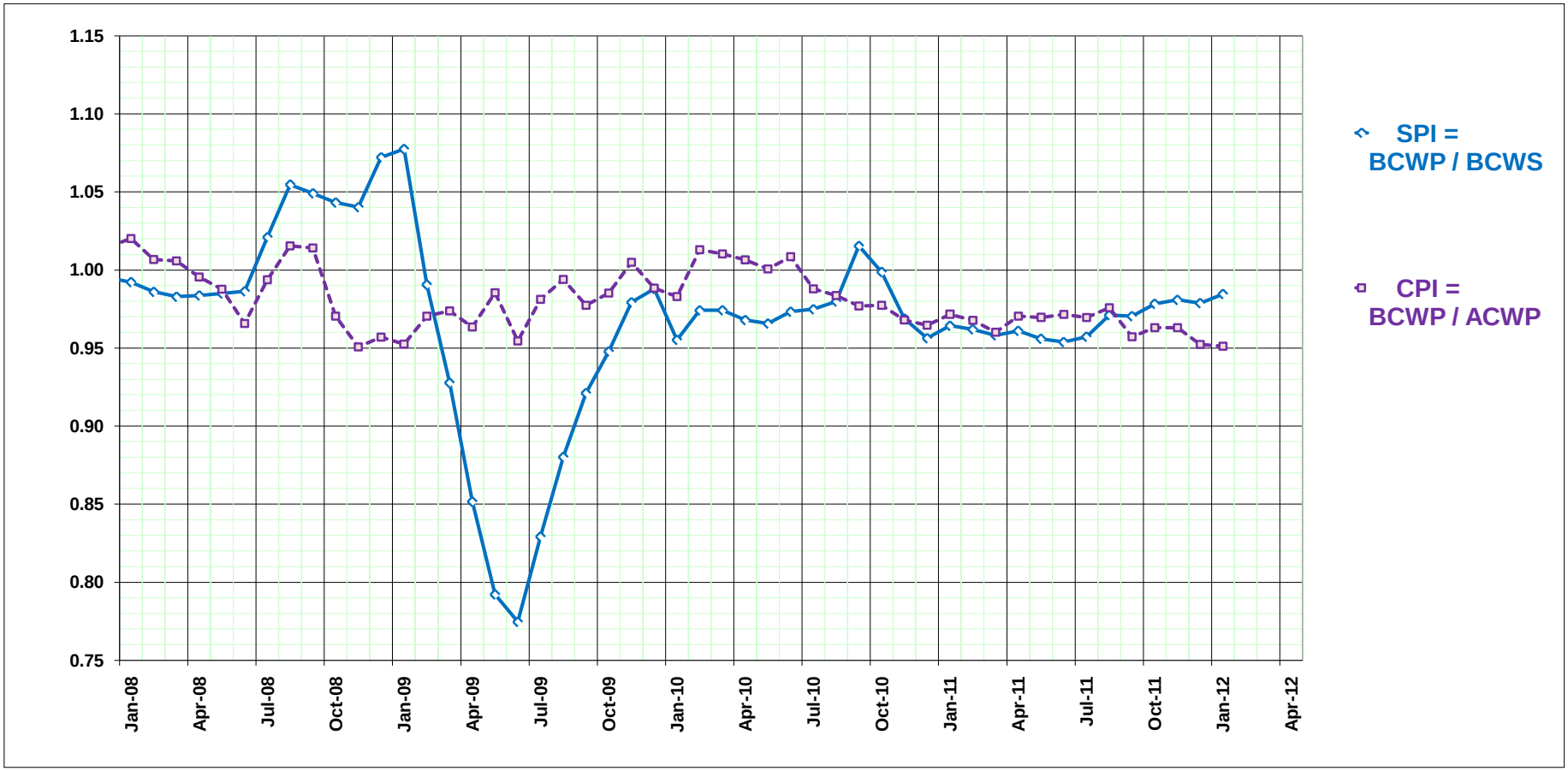
NOvA Project Management Group

- A NOvA PMG meets on the 4th Tuesday of every month
- This is another reporting / oversight path for EVMS data
- The PMG is attended by
  - DOE Germantown
  - DOE Fermilab Site Office
  - Fermilab Directorate
    - Budget Office represented as well
  - Representatives of Fermilab Divisions & Sections
    - Fermilab Procurement specialist for NOvA attends
- Agenda is one talk by me (on EVMS and technical status)
  - 1 or more other talks by managers on EVMS & technical progress of specific parts of the project

- Next slides are essentially my February 28 talk which covered EVMS data just then completed for January 2012.

EVMS Reporting Overview

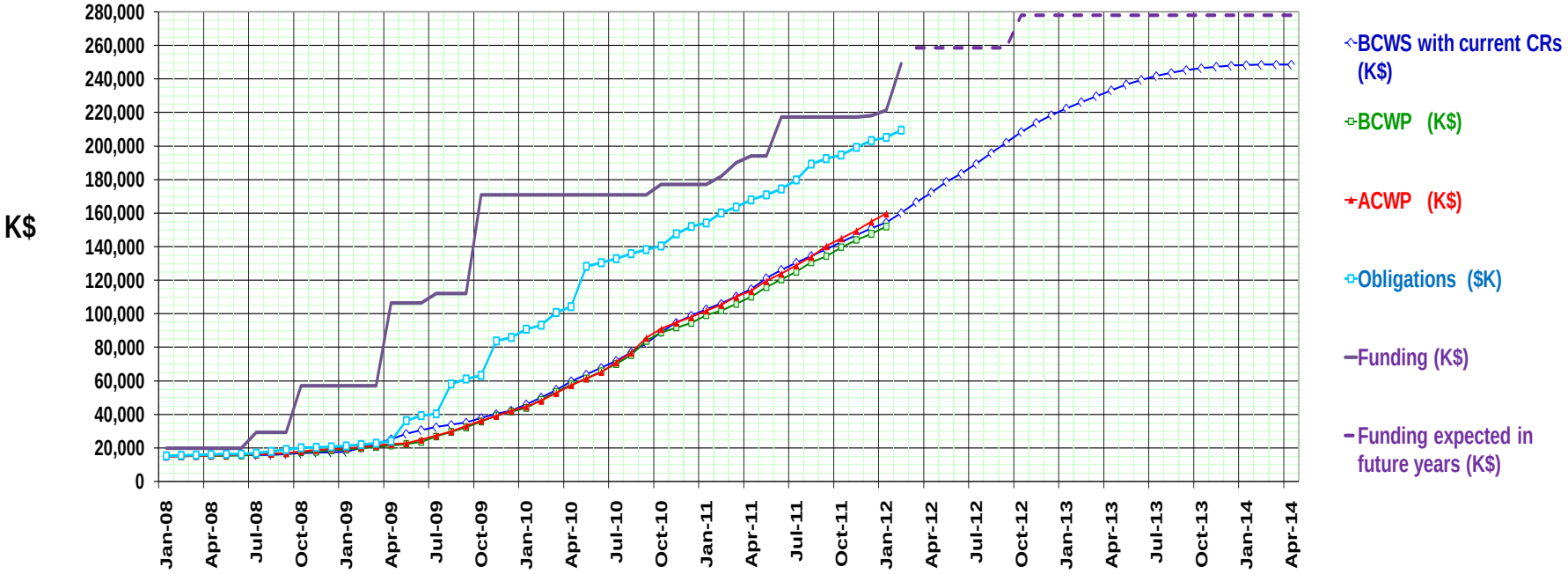
- Data now available through January 2012
  - SPI = **0.985**, compare to 0.979 in Dec, 0.981 in Nov, 0.978 in Oct
  - CPI = **0.951,** compare to 0.952 in Dec, 0.963 in Nov, 0.963 in Oct



EVMS Reporting Overview

- Basic data in BCWS, BCWP, ACWP, **Funding** & **Obligations** through Jan 2012
  - BCWS = Budgeted cost of work Scheduled
  - BCWP = Budgeted cost of work Performed
  - ACWP = Actual cost of work Performed
- Project is 61.1 % complete (BCWP/BAC = 152.0 M$ / 248.5 M$)
  - BAC = Budget at Completion (using EAC, get 59.2%)
- Project is 82.6 % obligated (Obligations/BAC = 205.3 / 248.5)
  - EAC = Estimate at Completion (using EAC, get 80.0%)

43% complete
67% obligated
when you
saw us last year



CPR1 Jan 2012

COST PERFORMANCE REPORT
FORMAT 1 - WORK BREAKDOWN STRUCTURE

CONTRACTOR	CONTRACT	PROGRAM	REPORT PERIOD
NAME	NAME	NAME	FROM 01-Jan-2012
Fermi National Accelerator Laboratory		NOvA Project	TO 31-Jan-2012

PERFORMANCE DATA

CTC-FndSrc	CURRENT PERIOD					CUMULATIVE TO DATE					AT COMPLETION		
CTC[2]			ACTUAL					ACTUAL					
Results...	BUDGETED COST		COST	VARIANCE		BUDGETED COST		COST	VARIANCE			LATEST	
	WORK	WORK	WORK			WORK	WORK	WORK				REVISED	
ITEM	SCHEDULED	PERFORMED	PERFORMED	SCHEDULE	COST	SCHEDULED	PERFORMED	PERFORMED	SCHEDULE	COST	BUDGETED	ESTIMATE	VARIANCE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
DA DOE-ACEL MIE													
2.0 ANU Construction													
Fully burdened AY $K	582	827	793	245	34	21,102	18,550	22,687	(2,552)	(4,137)	33,008	37,256	(4,248)
CTC-FndSrcTotals:	582	827	793	245	34	21,102	18,550	22,687	(2,552)	(4,137)	33,008	37,256	(4,248)
DC DOE-CA													
2.1 Site and Building													
Fully burdened AY $K	0	0	0	0	0	35,060	35,060	34,872	0	188	35,060	34,872	188
CTC-FndSrcTotals:	0	0	0	0	0	35,060	35,060	34,872	0	188	35,060	34,872	188
DD DOE-ACEL R&D													
1.0 ANU R&D													
Fully burdened AY $K	0	0	11	0	(11)	7,025	7,022	6,597	(2)	426	7,025	6,599	425
CTC-FndSrcTotals:	0	0	11	0	(11)	7,025	7,022	6,597	(2)	426	7,025	6,599	425
DE DOE-DET MIE													
2.1 Site and Building													
Fully burdened AY $K	56	69	502	14	(432)	6,928	6,825	5,627	(103)	1,198	6,953	5,759	1,194
2.10 Project Management - Nova Project - Construction													
Fully burdened AY $K	188	188	146	0	41	7,205	7,205	5,985	0	1,220	11,652	10,441	1,211
2.2 Liquid Scintillator													
Fully burdened AY $K	464	332	103	(133)	229	6,911	7,775	7,978	864	(203)	22,246	22,480	(234)
2.3 WLS Fiber													
Fully burdened AY $K	351	354	412	3	(58)	8,520	8,880	9,312	360	(432)	12,403	12,827	(424)
2.4 PVC Extrusions													
Fully burdened AY $K	606	933	906	328	28	11,378	13,027	12,756	1,648	271	30,695	30,285	410
2.5 PVC Modules													
Fully burdened AY $K	243	266	433	23	(166)	9,366	8,880	7,548	(487)	1,331	19,491	18,180	1,311
2.6 Electronics													
Fully burdened AY $K	205	273	239	67	34	5,437	4,818	4,060	(619)	758	12,294	11,580	715
2.7 DAQ													
Fully burdened AY $K	185	263	257	78	7	2,408	2,241	2,645	(167)	(404)	3,904	4,302	(398)
2.8 Near Detector Assembly													
Fully burdened AY $K	253	402	106	150	297	1,245	1,287	2,352	42	(1,066)	6,399	7,512	(1,113)
2.9 Far Detector Assembly													
Fully burdened AY $K	399	417	873	18	(456)	7,514	6,193	8,651	(1,322)	(2,458)	22,043	24,668	(2,626)
CTC-FndSrcTotals:	2,950	3,498	3,976	548	(479)	66,913	67,131	66,915	218	216	148,080	148,034	46

Large negatives last month, small positives this month

50% of last month's negative

CPR1 Jan 2012 continued

COST PERFORMANCE REPORT
FORMAT 1 - WORK BREAKDOWN STRUCTURE

CONTRACTOR	CONTRACT	PROGRAM	REPORT PERIOD
NAME	NAME	NAME	FROM 01-Jan-2012
Fermi National Accelerator Laboratory		NOvA Project	TO 31-Jan-2012

PERFORMANCE DATA

CTC-FndSrc	CURRENT PERIOD					CUMULATIVE TO DATE					AT COMPLETION		
CTC[2] Results...	BUDGETED COST		ACTUAL COST	VARIANCE		BUDGETED COST		ACTUAL COST	VARIANCE			LATEST	
ITEM	WORK SCHEDULED	WORK PERFORMED	WORK PERFORMED	SCHEDULE	COST	WORK SCHEDULED	WORK PERFORMED	WORK PERFORMED	SCHEDULE	COST	BUDGETED	REVISED ESTIMATE	VARIANCE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
DO DOE-ACEL OPS													
1.0 ANU R&D													
Fully burdened AY $K	0	34	2	34	33	390	350	552	(40)	(202)	1,488	1,706	(218)
CTC-FndSrcTotals:	0	34	2	34	33	390	350	552	(40)	(202)	1,488	1,706	(218)
DR DOE-POST CD-1 DET R&D													
1.1 Site and Building R&D													
Fully burdened AY $K	0	0	0	0	0	3,630	3,630	3,168	0	462	3,630	3,168	462
1.2 Liquid Scintillator R&D													
Fully burdened AY $K	0	0	0	0	0	297	297	389	0	(92)	297	389	(92)
1.3 WLS Fiber R&D													
Fully burdened AY $K	0	0	0	0	0	341	341	375	0	(34)	341	375	(34)
1.4 PVC Extrusion R&D													
Fully burdened AY $K	0	0	0	0	(0)	1,369	1,369	2,085	0	(716)	1,369	2,085	(716)
1.5 PVC Module R&D													
Fully burdened AY $K	0	0	0	0	0	2,260	2,260	2,421	0	(160)	2,260	2,421	(160)
1.6 Electronics R&D													
Fully burdened AY $K	0	0	0	0	0	2,028	2,028	2,600	0	(572)	2,028	2,600	(572)
1.7 DAQ R&D													
Fully burdened AY $K	0	0	0	0	0	1,635	1,635	2,822	0	(1,186)	1,635	2,822	(1,186)
1.8 Detector Assembly R&D													
Fully burdened AY $K	0	0	0	0	0	3,123	3,123	4,929	0	(1,806)	3,123	4,929	(1,806)
1.9 Project Management R&D													
Fully burdened AY $K	0	0	0	0	0	383	383	559	0	(176)	383	559	(176)
CTC-FndSrcTotals:	0	0	0	0	(0)	15,067	15,067	19,347	0	(4,281)	15,067	19,347	(4,281)
DY DOE CD-0 TO CD-1 R&D													
1.9 Project Management R&D													
Fully burdened AY $K	0	0	0	0	0	8,801	8,801	8,801	0	0	8,801	8,801	0
CTC-FndSrcTotals:	0	0	0	0	0	8,801	8,801	8,801	0	0	8,801	8,801	0
Undist. Budget											0	0	0
Sub Total	3,533	4,359	4,782	827	(422)	154,357	151,981	159,772	(2,377)	(7,791)	248,528	256,614	(8,087)
Management Resrv.											29,472		
Total	3,533	4,359	4,782	827	(422)	154,357	151,981	159,772	(2,377)	(7,791)	278,000		

~ all ANU

50% ANU, 50% Det R&D

AY$ by Level 2 with MIE/OPC split

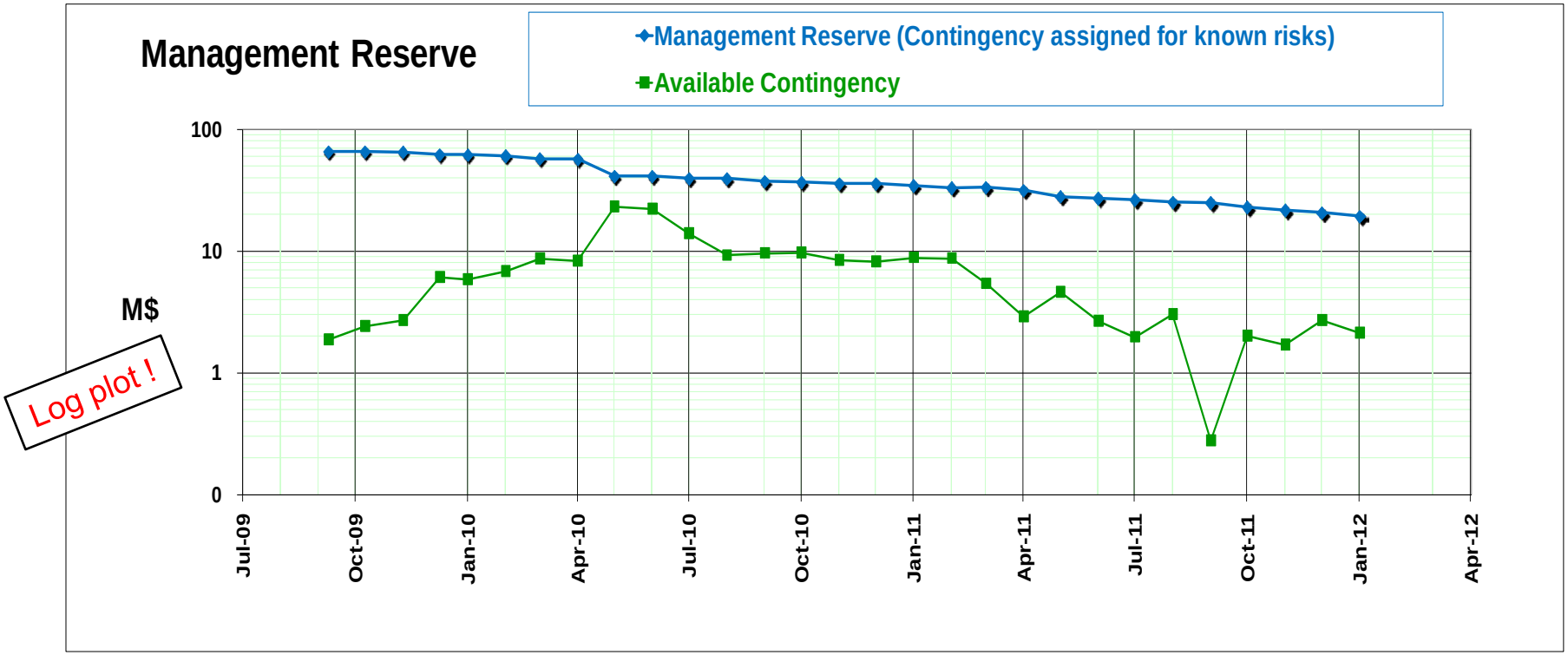
	WBS	Items	NOvA Costs to Date ($M) as of 31-Jan-2012	NOvA 's Cost Estimate AY $M (for February 1, 2012 to project end)									
				Estimated Cost (with indirects)			Mgmt Reserve Estimate			Contingency %			Total
				M&S	Labor[1]	Total	M&S	Labor[1]	Total	M&S	Labor[1]	Total	Cost
TEC	2.0	Accelerator & NuMI Upgrades	$ 22.7	$ 4.2	$ 10.4	$ 14.6	$ 1.4	$ 2.9	$ 4.3	33%	28%	30%	$ 41.6
	2.1	Far Detector Site and Building	$ 5.6	$ 0.1	$ 0.0	$ 0.1	$ 0.0	$ -	$ 0.0	10%	0%	9%	$ 5.8
	2.2	Liquid Scintillator	$ 8.0	$ 14.3	$ 0.2	$ 14.5	$ 3.3	$ 0.1	$ 3.4	23%	41%	23%	$ 25.9
	2.3	Wave-Length-Shifting Fiber	$ 9.3	$ 3.3	$ 0.3	$ 3.5	$ 0.2	$ 0.0	$ 0.2	5%	11%	6%	$ 13.0
	2.4	PVC Extrusions	$ 12.8	$ 16.8	$ 0.7	$ 17.5	$ 1.0	$ 0.1	$ 1.1	6%	20%	6%	$ 31.4
	2.5	PVC Modules	$ 7.5	$ 4.2	$ 6.4	$ 10.6	$ 0.3	$ 1.1	$ 1.5	8%	18%	14%	$ 19.7
	2.6	Electronics Production	$ 4.1	$ 6.4	$ 1.2	$ 7.5	$ 0.5	$ 0.3	$ 0.8	7%	27%	10%	$ 12.3
	2.7	Data Acquisition System	$ 2.6	$ 1.0	$ 0.7	$ 1.7	$ 0.2	$ 0.2	$ 0.4	22%	32%	26%	$ 4.7
	2.8	Near Detector Assembly	$ 2.4	$ 4.7	$ 0.5	$ 5.2	$ 1.3	$ 0.2	$ 1.5	29%	41%	30%	$ 9.1
	2.9	Far Detector Assembly	$ 8.7	$ 7.4	$ 8.6	$ 16.0	$ 1.5	$ 4.0	$ 5.6	21%	47%	35%	$ 30.2
	2.10	Project Management	$ 6.0	$ 0.2	$ 4.3	$ 4.5	$ 0.0	$ -	$ 0.0	25%	0%	1%	$ 10.5
		Subtotal Construction	**$ 89.6**	**$ 62.4**	**$ 33.2**	**$ 95.7**	**$ 9.8**	**$ 9.1**	**$ 18.9**	**16%**	**27%**	**20%**	**$ 204.2**
OPC		**R&D - Accelerator**	$ 6.6	$ -	$ 0.0	$ 0.0	$ -	$ 0.0	$ 0.0	0%	20%	20%	$ 6.6
		R&D - Detector	$ 28.1	$ -	$ -	$ -	$ -	$ -	$ -	0%	0%	0%	$ 28.1
		Cooperative Agreement	$ 34.9	$ -	$ -	$ -	$ -	$ -	$ -	0%	0%	0%	$ 34.9
		Operating	$ 0.6	$ 0.0	$ 1.1	$ 1.2	$ 0.0	$ 0.3	$ 0.4	42%	31%	32%	$ 2.1
		Total OPC:	**$ 70.2**	**$ 0.0**	**$ 1.1**	**$ 1.2**	**$ 0.0**	**$ 0.3**	**$ 0.4**	**42%**	**31%**	**32%**	**$ 71.7**
		Contingency							**$ 2.124**				**$ 2.1**
		TPC:	**$ 159.8**	**$ 62.5**	**$ 34.3**	**$ 96.8**	**$ 9.8**	**$ 9.5**	**$ 21.4**	**16%**	**28%**	**22%**	**$ 278.000**

Management Reserve = $ 19.3

Contingency Status, Jan 2012

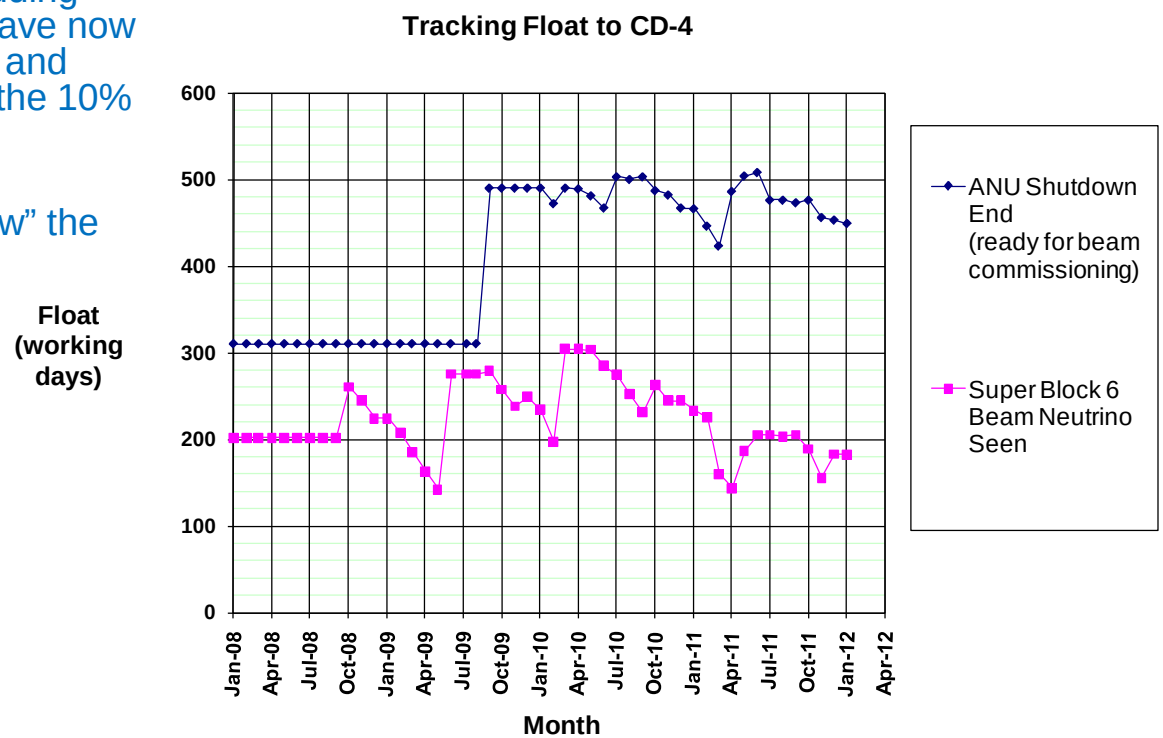
- TPC-EAC is 21.4 M$ (Dec=23.3, Nov = 23.3, Oct = 24.9)
  - 22% of remaining work (Estimated Cost is 96.8 M$)
  - 42% of remaining Obligations (Obligations are ~ 46 M$ ahead of Costs)

- **Contingency = $ 2.124 M$ (Dec = 2.71, Nov = 1.70, Oct = 2.01 M$)**
- Management Reserve = Assigned Contingency (assigned according to estimate of remaining risk)



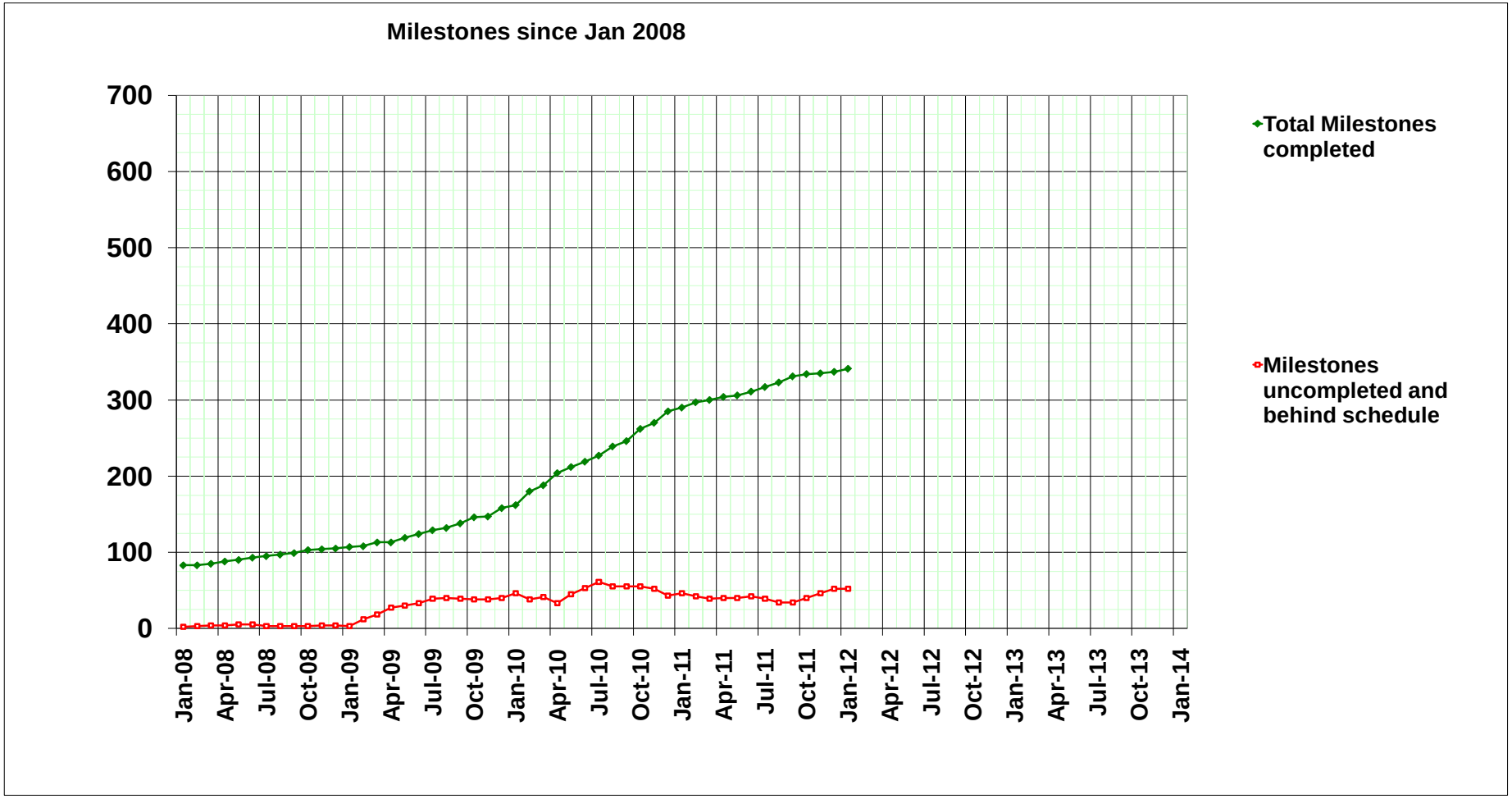
Milestones: What about CD-4 ?

- **ANU lost 4 days of float in Jan** **-- Now at 449 days**
  - Kicker schedule drives this float
- **The Detector lost 1 day of float in Jan** **-- Now at 182 days**
  - Pivoter ready slipped from Feb to April 6 - drives the float to assembly start, Module Production at Minnesota also slipped but only until March 1.
  - We kept the Float to CD-4 approximately constant by adding a 5th workday every week for Ash River assembly of blocks 4 through 11.
    - Our assigned contingency was always set by the cost of perhaps adding overtime or a 3rd shift. We have now put overtime in the schedule and reduced the contingency by the 10% extra cost
    - This does not mean we "know" the assembly schedule better, but shows that we can compensate using our plan.
    - We won't know the required labor at Minnesota or at Ash River until we get to steady production.



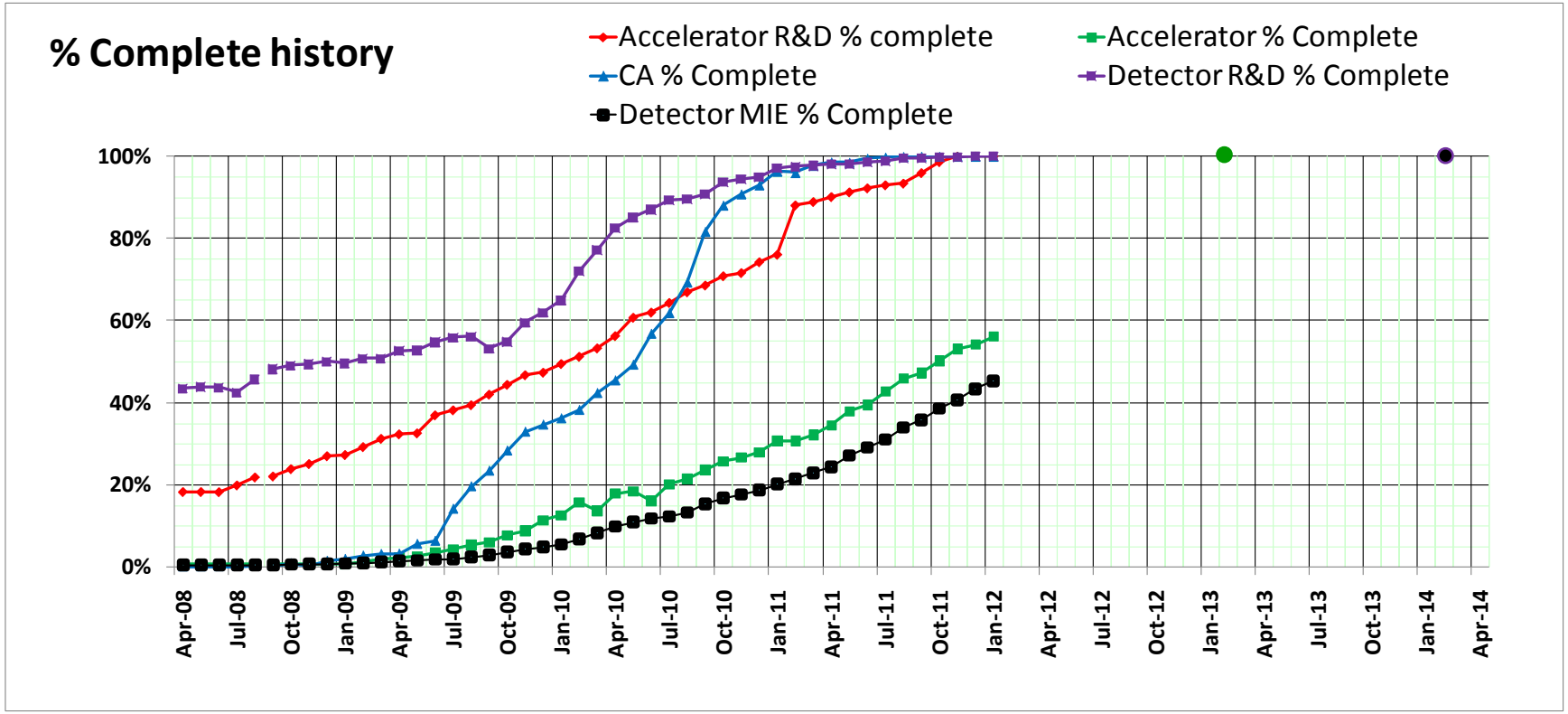
Analysis of all milestones

- **341 of 694 now complete**
  - 4 completed in January
- **Behind on 52**
  - (all are L4 or L5, none are L1-3 = OHEP, FSO Fed Proj Director, Fermilab Assoc Director)



% Complete history

for the 5 Main parts of the Project

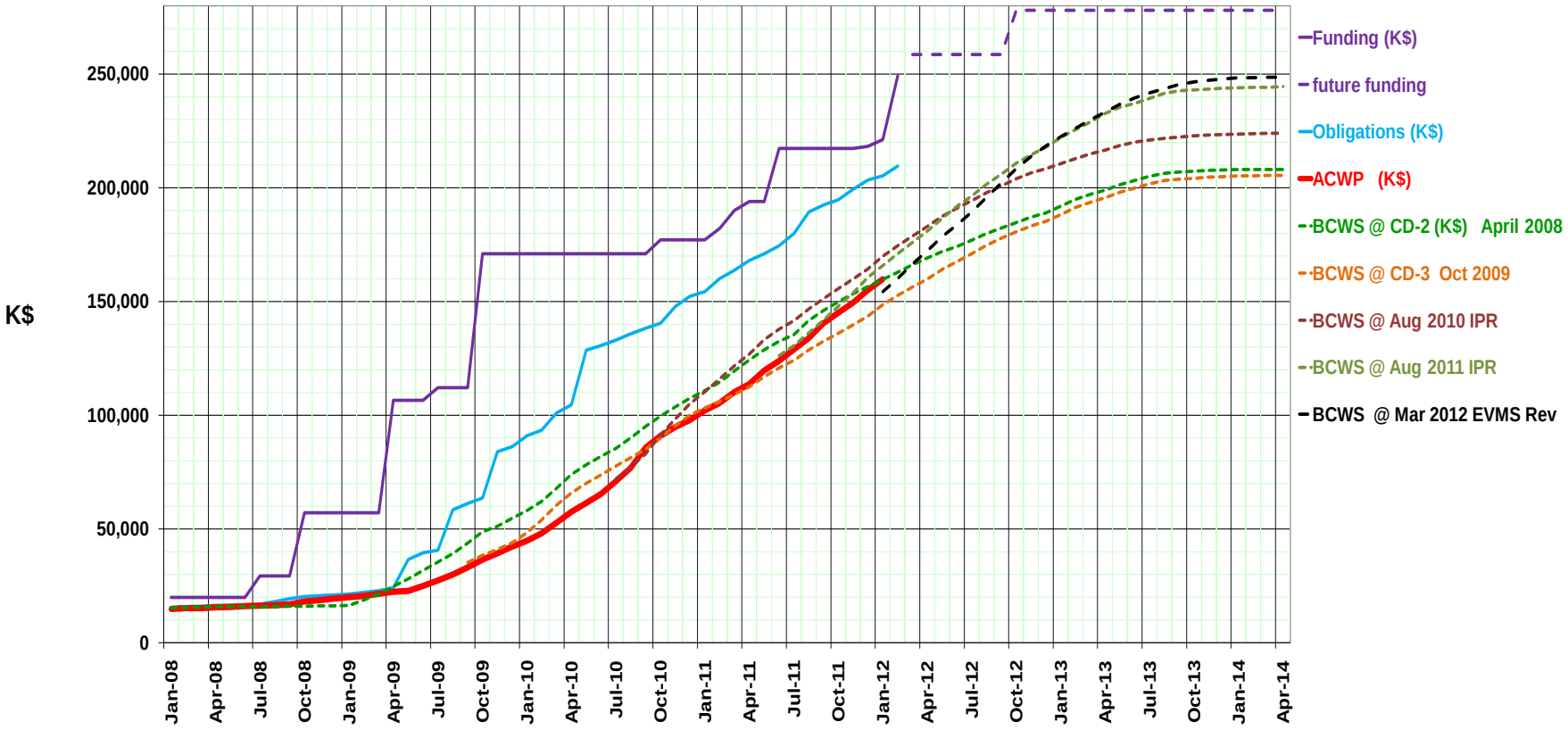


- Building & Detector R&D & ANU R&D are done
  - So all work (except a handful of tasks) are complete and in the past on 1.x and 2.1
- ANU to be complete by ~ Feb 2013
- Detector complete by ~ Feb 2014

End of PMG talk, but here are some other EVMS items of interest

- BAC snapshots vs. time
- Change Control thresholds
- Sample Change Requests
- Variance Thresholds and status
  - At Level 2
  - At Cost Accounts
  - Sample VAR illustrating signature path

BAC snapshots in ~ 1 year intervals



- Both EAC and BAC move

Change Control

- Thresholds from the PEP and PMP

	Performance Baseline Deviation		Routine Project Changes	
	Secretarial Acquisition Executive (Level 0-A) Deputy Secretary	Acquisition Executive (Level 0-B) SC-1	Associate Director OHEP or Program Manager (Level 1)	Federal Project Director (Level 2)
Technical Scope	A change in scope that affects the ability to meet a KPP and the ability to satisfy the mission need.	A change in scope that affects the ability to meet a KPP and the ability to satisfy the mission need.	Any change in the KPPs as referenced in PEP section 3.2.	Any significant change to the technical scope (as described in PEP sect. 5) that affect ES&H requirements or meeting Project Closeout definitions in PEP Table 7.2.
Schedule	> 6 month (cumulative) delay in the CD-4 project completion date.	Up to a 6 month (cumulative) delay in the CD-4 project completion date.	Any change to a level 1 milestone > 3 months.	Any change to a level 2 milestone > 1 month or a level 1 milestone < 3 months.
Cost	Increase in excess of $25M or 25% (cumulative) of the CD-2 Total Project Cost baseline.	Any increase in the CD-2 Total Project Cost baseline.	Any change in Total Estimated Cost or Total Project Cost.	Any cumulative use of contingency of > $1M.[2]

*Changes must be recommended at all applicable lower levels prior to being forwarded to the next higher level for consideration.

Fermilab Associate Director (Level 3)	NOvA Project Manager (Level 4)	Subproject Manager (Level 5)
Major technical changes that are significant departures from the technical baseline. Changes that affect ES&H or impact PoT projections by more than 10%. Out-of-scope changes to upgrade physics capabilities.	Related technical changes to multiple subprojects that do not diminish performance	Minor technical changes to a single subproject that does not diminish performance
Any change that results in the delay of a Level 3 Director's milestone.	Any change that results in the delay of a Level 4 milestone by more than one month.	Any change that results in the delay of a Level 5 milestone by more than one month
Increase in the cost of a single item by more than $250k. Increase in the Project base cost exceeding $500k during the previous 12 months.	Increase in the cost of a single item by more than $100k.	Increase in the cost of a single item by more than $25k.

Change Request examples

- left is for a set of WBSs,
  right is a catch-up CR to keep thresholds in line with PEP and PMP.

NOvA Project Office — CHANGE REQUEST RECORD

L3 (DIRECTORATE)

Level of Change	L4 (NOVA PM)	Date Initiated	2/4/2011	CR No.	266
Status	Submitted	Date Revised:	2/7/2011		
Awaiting:	John Cooper				

PRELIMINARY APPROVAL

Schedule Impact: None — Cost Impact: ($449,874.00) — from/to MR or Contingency: N/A

PM GO-AHEAD — DATE — Date:

FINAL APPROVAL

CONTROL ACCOUNT #	COST IMPACT
46 Control Accounts Affected see attached list	($449,873.66)

CONTROL ACCOUNT MANAGER (+ L2 MGR IF DIFFERENT) — DATE 2/8/11
PROJECT MANAGER — DATE 2/8/11
FINANCIAL OFFICER — DATE 2/8/11
SCHEDULER — DATE 2/9/11
ASSOCIATE DIRECTOR FOR RESEARCH (IF REQ'D) — DATE
DOE FEDERAL PROJECT DIRECTOR (IF REQ'D) — DATE

from/to MR or Contingency: N/A — Final Cost Impact: ($449,873.66) from Project Financial Officer — Final Schedule Impact: none from Project Scheduler

SUBMITTED INFORMATION

CR Title: Two Year wage freeze for Fermilab and Argonne National Lab and revised FY11 FNAL burden rates
Change Type: ☐ Technical ☑ Cost ☐ Schedule ☐ Other
Initiator Name: Suzanne L Saxer — Control Account Manager: John Cooper
Initiator Email: pasek@fnal.gov
Affected WBS #'s: mutilple - all WBSs with FNAL or ANL labor and any WBS with non-exempt resources

NOvA Project Office — CHANGE REQUEST RECORD

Level of Change	L2 (DOE Fermi)	Date Initiated	1/26/2011	CR No.	263
Status	In Process	Date Revised:			
Awaiting:	John Cooper				

PRELIMINARY APPROVAL

Schedule Impact: — Cost Impact: $0.00 — from/to MR or Contingency: N/A

PM GO-AHEAD — DATE — Date:

FINAL APPROVAL

CONTROL ACCOUNT #	COST IMPACT

CONTROL ACCOUNT MANAGER (+ L2 MGR IF DIFFERENT) — DATE 2/7/11
PROJECT MANAGER — DATE
FINANCIAL OFFICER — DATE
SCHEDULER — DATE 2/9/11
ASSOCIATE DIRECTOR FOR RESEARCH (IF REQ'D) — DATE 2/10/11
DOE FEDERAL PROJECT DIRECTOR (IF REQ'D) — DATE

from/to MR or Contingency: N/A — Final Cost Impact: $0.00 from Project Financial Officer — Final Schedule Impact: from Project Scheduler

SUBMITTED INFORMATION

CR Title: Cumulative Change Report for CR263 -Cumulative CR H
Change Type: ☑ Technical ☑ Cost ☑ Schedule ☐ Other
Initiator Name: John Cooper — Control Account Manager: John Cooper
Initiator Email: jcooper@fnal.gov
Affected WBS #'s: Various WBS
Change Description: This change represents a cumulative use of contingency ~$1.33M, which requires approval by DOE Federal Project Director. After this approval, this ~$1.33M running total resets to $0. The summary of changes in this CR are found on the table attached to the CR form.
Total cost = $1,328,064.12
CR File found in: S598

Variance thresholds & January 2012 status

- At Level 2 (we report this in our FRA Monthly Report)

$

Report Period: Jan-12	Current Period							Cumulative						
WBS Level 2	BCWS (AY$)	BCWP (AY$)	ACWP (AY$)	SV (AY$)	SV (%)	CV (AY$)	CV (%)	BCWS (AY$)	BCWP (AY$)	ACWP (AY$)	SV (AY$)	SV (%)	CV (AY$)	CV (%)
R&D														
1.0 ANU R&D	0	34,499	12,365	34,499	100%	22,134	64%	7,414,997	7,372,648	7,149,015	(42,349)	-1%	223,632	3%
1.1 Site and Building R&D	0	0	0	0	0%	0	0%	3,630,248	3,630,248	3,168,480	0	0%	461,768	13%
1.2 Liquid Scintillator R&D	0	0	0	0	0%	0	0%	297,031	297,031	389,205	0	0%	(92,174)	-31%
1.3 WLS Fiber R&D	0	0	0	0	0%	0	0%	340,909	340,909	374,822	0	0%	(33,913)	-10%
1.4 PVC Extrusion R&D	0	0	270	0	0%	(270)	-100%	1,368,848	1,368,848	2,084,600	0	0%	(715,752)	-52%
1.5 PVC Module R&D	0	0	0	0	0%	0	0%	2,260,343	2,260,343	2,420,701	(0)	-0%	(160,358)	-7%
1.6 Electronics R&D	0	0	0	0	0%	0	0%	2,027,555	2,027,555	2,599,633	0	0%	(572,079)	-28%
1.7 DAQ R&D	0	0	0	0	0%	0	0%	1,635,495	1,635,495	2,821,845	0	0%	(1,186,350)	-73%
1.8 Detector Assembly R&D	0	0	0	0	0%	0	0%	3,122,854	3,122,854	4,928,970	0	0%	(1,806,117)	-58%
1.9 Project Mgmt - R&D	0	0	0	0	0%	0	0%	9,184,127	9,184,127	9,359,785	0	0%	(175,658)	-2%
Construction														
2.0 ANU Construction	582,487	827,180	792,727	244,693	42%	34,453	4%	21,102,296	18,550,152	22,687,460	(2,552,143)	-12%	(4,137,307)	-22%
2.1 Site and Building	55,941	69,458	501,611	13,516	24%	(432,153)	-622%	41,987,444	41,884,915	40,499,219	(102,529)	-0%	1,385,696	3%
2.10 Project Mgmt - Construction	187,854	187,854	146,493	0	0%	41,362	22%	7,205,237	7,205,237	5,985,462	0	0%	1,219,774	17%
2.2 Liquid Scintillator	464,221	331,556	102,756	(132,665)	-29%	228,800	69%	6,911,253	7,775,431	7,978,343	864,178	13%	(202,913)	-3%
2.3 WLS Fiber	351,167	353,924	412,193	2,757	1%	(58,269)	-16%	8,520,183	8,880,033	9,312,233	359,850	4%	(432,201)	-5%
2.4 PVC Extrusions	605,918	933,438	905,896	327,520	54%	27,542	3%	11,378,255	13,026,722	12,755,893	1,648,487	14%	270,829	2%
2.5 PVC Modules	242,865	266,321	432,652	23,456	10%	(166,331)	-62%	9,366,201	8,879,511	7,548,273	(486,690)	-5%	1,331,239	15%
2.6 Electronics	205,470	272,950	239,357	67,480	33%	33,593	12%	5,436,881	4,818,370	4,059,956	(618,511)	-11%	758,415	18%
2.7 DAQ	185,324	263,264	256,733	77,940	42%	6,531	2%	2,408,399	2,241,185	2,644,809	(167,214)	-7%	(403,624)	-18%
2.8 Near Detector Assembly	252,595	402,314	105,668	149,719	59%	296,647	74%	1,244,589	1,286,556	2,352,233	41,968	3%	(1,065,677)	-83%
2.9 Far Detector Assembly	398,770	416,667	873,051	17,897	4%	(456,384)	-110%	7,514,178	6,192,578	8,650,686	(1,321,599)	-18%	(2,458,107)	-40%
R&D SubTotal (WBS 1.0-1.9)	0	34,499	12,636	34,499	0%	21,864	63%	31,282,406	31,240,057	35,297,058	(42,349)	-0%	(4,057,001)	-13%
Const. SubTotal (WBS 2.0-2.10	3,532,613	4,324,927	4,769,136	792,314	22%	(444,208)	-10%	123,074,914	120,740,690	124,474,566	(2,334,224)	-2%	(3,733,876)	-3%
Project Total	3,532,613	4,359,427	4,781,771	826,814	23%	(422,345)	-10%	154,357,320	151,980,747	159,771,624	(2,376,573)	-2%	(7,790,877)	-5%

Done

Cumulative
SV: 2+, 3-
CV: 3+, 3-

Non-costed Scientific hours

Report Period: Jan-12	Current Period - SCI Hrs							Cumulative - Since 01Oct09						
WBS Level 2	BCWS (Hrs)	BCWP (Hrs)	ACWP (Hrs)	SV (Hrs)	SV (%)	CV (Hrs)	CV (%)	BCWS (Hrs)	BCWP (Hrs)	ACWP (Hrs)	SV (Hrs)	SV (%)	CV (Hrs)	CV (%)
R&D														
1.0 ANU R&D	0	109	86	109	100%	23	21%	4,321	4,847	5,060	526	12%	(213)	-4%
1.1 Site and Building R&D	0	0	0	0	0%	0	0%	0	0	0	0	0%	0	0%
1.2 Liquid Scintillator R&D	0	0	0	0	0%	0	0%	0	0	0	0	0%	0	0%
1.3 WLS Fiber R&D	0	0	0	0	0%	0	0%	0	29	60	29	100%	(31)	-107%
1.4 PVC Extrusion R&D	0	0	0	0	0%	0	0%	0	179	132	179	100%	47	26%
1.5 PVC Module R&D	0	0	0	0	0%	0	0%	1,224	1,638	3,155	414	34%	(1,517)	-93%
1.6 Electronics R&D	0	0	0	0	0%	0	0%	224	322	5,766	98	44%	(5,444)	-1,691%
1.7 DAQ R&D	0	0	0	0	0%	0	0%	3,668	4,979	1,711	1,311	36%	3,268	66%
1.8 Detector Assembly R&D	0	0	0	0	0%	0	0%	944	1,594	724	650	69%	870	55%
1.9 Project Mgmt - R&D	0	0	0	0	0%	0	0%	0	0	0	0	0%	0	0%
Construction														
2.0 ANU Construction	152	183	428	31	20%	(245)	-134%	8,390	8,436	8,539	46	1%	(103)	-1%
2.1 Site and Building Construction	0	0	0	0	0%	0	0%	0	0	0	0	0%	0	0%
2.10 Project Mgmt - Construction	0	0	31	0	0%	(31)	-100%	0	0	3,867	0	0%	(3,867)	-100%
2.2 Liquid Scintillator	0	0	76	0	0%	(76)	-100%	1,674	1,674	2,568	0	0%	(894)	-53%
2.3 WLS Fiber	23	23	20	1	4%	3	15%	593	594	657	1	0%	(63)	-11%
2.4 PVC Extrusions	48	48	84	0	0%	(36)	-75%	2,211	2,280	1,598	69	3%	682	30%
2.5 PVC Modules	417	362	247	(55)	-13%	115	32%	6,966	6,259	9,143	(707)	-10%	(2,884)	-46%
2.6 Electronics	209	44	229	(165)	-79%	(185)	-420%	1,891	1,750	4,660	(141)	-7%	(2,910)	-166%
2.7 DAQ	352	72	341	(280)	-80%	(269)	-373%	9,020	5,340	7,033	(3,680)	-41%	(1,693)	-32%
2.8 Near Detector Assembly	0	0	53	0	0%	(53)	-100%	468	388	1,308	(80)	-17%	(920)	-237%
2.9 Far Detector Assembly	988	969	163	(19)	-2%	806	83%	8,715	8,463	3,658	(252)	-3%	4,805	57%
R&D SubTotal (WBS 1.0-1.9)	0	109	86	109	0%	23	21%	10,381	13,588	16,608	3,207	31%	(3,020)	-22%
Const. SubTotal (WBS 2.0-2.10)	2,188	1,701	1,671	(487)	-22%	30	2%	39,928	35,184	43,030	(4,744)	-12%	(7,846)	-22%
Project Total	2,188	1,810	1,757	(379)	-17%	53	3%	50,309	48,772	59,639	(1,537)	-3%	(10,867)	-22%

Done

Cumulative
SV: none+, 1-
CV: 1+, 2-

Variance thresholds & January 2012 status

- At the Cost Account level where CAMs write VARs
  - 57 of 72 accounts active, 28 require VARs

Report Period: Jan-12																			
	Current Period									Cumulative									
Control Account	BCWS (AY$)	BCWP (AY$)	ACWP (AY$)	SV (AY$)	SV (%)	CV (AY$)	CV (%)	SPI	CPI	BCWS (AY$)	BCWP (AY$)	ACWP (AY$)	SV (AY$)	SV (%)	CV (AY$)	CV (%)	SPI	CPI	BAC (AY$)
R&D																			
1.0.0 ANU CDR COSTS	0	0	0	0	0%	0	0%	1.00	1.00	0	0	18,630	0	0%	(18,630)	-100%	1.00	0.00	0
1.0.1 RR Upgrades	0	0	6,168	0	0%	(6,168)	-100%	1.00	0.00	4,349,904	4,273,056	4,403,712	(76,848)	-2%	(130,656)	-3%	0.98	0.97	5,257,774
1.0.2 MI Upgrades	0	0	5,295	0	0%	(5,295)	-100%	1.00	0.00	589,742	589,742	680,889	(0)	-0%	(91,147)	-15%	1.00	0.87	679,441
1.0.3 NuMI Upgrades	0	34,499	902	34,499	100%	33,597	97%	N/A	38.25	2,047,460	2,081,960	1,775,938	34,499	2%	306,022	15%	1.02	1.17	2,147,409
1.0.4 ANU Beam Physics	0	0	0	0	0%	0	0%	1.00	1.00	83,191	83,191	11,155	(0)	-0%	72,037	87%	1.00	7.46	83,191
1.0.5 ANU Project Management	0	0	0	0	0%	0	0%	1.00	1.00	344,698	344,698	258,691	0	0%	86,007	25%	1.00	1.33	344,698
1.1 Site and Building R&D	0	0	0	0	0%	0	0%	1.00	1.00	3,630,248	3,630,248	3,168,480	0	0%	461,768	13%	1.00	1.15	3,630,248
1.2 Liquid Scintillator R&D	0	0	0	0	0%	0	0%	1.00	1.00	297,031	297,031	389,205	0	0%	(92,174)	-31%	1.00	0.76	297,031
1.3 WLS Fiber R&D	0	0	0	0	0%	0	0%	1.00	1.00	340,909	340,909	374,822	0	0%	(33,913)	-10%	1.00	0.91	340,909
1.4 PVC Extrusion R&D	0	0	270	0	0%	(270)	-100%	1.00	0.00	1,368,848	1,368,848	2,084,600	0	0%	(715,752)	-52%	1.00	0.66	1,368,848
1.5 PVC Module R&D	0	0	0	0	0%	0	0%	1.00	1.00	2,260,343	2,260,343	2,420,701	(0)	-0%	(160,358)	-7%	1.00	0.93	2,260,343
1.6 Electronics R&D	0	0	0	0	0%	0	0%	1.00	1.00	2,027,555	2,027,555	2,599,633	0	0%	(572,079)	-28%	1.00	0.78	2,027,555
1.7 DAQ R&D	0	0	0	0	0%	0	0%	1.00	1.00	1,635,495	1,635,495	2,821,845	0	0%	(1,186,350)	-73%	1.00	0.58	1,635,495
1.8 Detector Assembly R&D	0	0	0	0	0%	0	0%	1.00	1.00	3,122,854	3,122,854	4,928,970	0	0%	(1,806,117)	-58%	1.00	0.63	3,122,854
1.9 Project Management R&D	0	0	0	0	0%	0	0%	1.00	1.00	9,184,127	9,184,127	9,359,785	0	0%	(175,658)	-2%	1.00	0.98	9,184,127
Construction																			
2.0.1.1 Recycler Ring Modifications	159,590	325,203	257,931	165,612	104%	67,271	21%	2.04	1.26	5,787,127	3,967,808	5,508,658	(1,819,319)	-31%	(1,540,850)	-39%	0.69	0.72	10,441,924
2.0.1.2 Recycler Kicker System	108,965	241,846	309,031	132,881	122%	(67,184)	-28%	2.22	0.78	7,042,694	6,716,036	7,867,296	(326,658)	-5%	(1,151,260)	-17%	0.95	0.85	9,275,416
2.0.1.3 Recycler Instrumentation	78,389	140,528	54,058	62,138	79%	86,470	62%	1.79	2.60	1,113,650	996,014	1,811,162	(117,636)	-11%	(815,148)	-82%	0.89	0.55	1,400,403
2.0.2.1 MI Modifications	8,764	0	287	(8,764)	-100%	(287)	-100%	0.00	0.00	237,362	234,374	560,016	(2,988)	-1%	(325,642)	-139%	0.99	0.42	843,363
2.0.2.2 MI RF Cavities	36,587	6,223	10,106	(30,363)	-83%	(3,882)	-62%	0.17	0.62	1,245,946	1,169,499	1,577,465	(76,447)	-6%	(407,966)	-35%	0.94	0.74	1,466,575
2.0.3.1 NuMI Primary Proton Beam	102,810	6,052	29,038	(96,758)	-94%	(22,986)	-380%	0.06	0.21	1,082,818	971,169	1,262,400	(111,649)	-10%	(291,231)	-30%	0.90	0.77	1,583,594
2.0.3.2 NuMI Target Hall Technical Components	17,773	39,482	44,063	21,709	122%	(4,582)	-12%	2.22	0.90	653,608	639,456	1,090,128	(14,151)	-2%	(450,672)	-70%	0.98	0.59	1,734,009
2.0.3.3 NuMI Target Hall Infrastructure	0	1,621	22,591	1,621	100%	(20,970)	-1,294%	N/A	0.07	1,004,417	1,040,661	989,744	36,244	4%	50,917	5%	1.04	1.05	1,658,550
2.0.3.4 NuMI Decay Pipe-Hadron Absorber-Utilities	26,897	23,513	35,954	(3,384)	-13%	(12,441)	-53%	0.87	1.65	347,023	227,484	679,889	(119,539)	-34%	(452,405)	-199%	0.66	0.33	1,328,386
2.0.4 Project Management - ANU - Construction	42,712	42,712	29,668	0	0%	13,044	31%	1.00	1.44	2,587,651	2,587,651	1,340,700	0	0%	1,246,951	48%	1.00	1.93	3,275,632
2.1.1 Site Preparation Package	0	0	449	0	0%	(449)	-100%	1.00	0.00	14,255,512	14,255,512	13,446,392	0	0%	809,121	6%	1.00	1.06	14,255,512
2.1.2 Far Detector Building	0	0	2,809	0	0%	(2,809)	-100%	1.00	0.00	22,875,787	22,875,787	22,449,220	0	0%	426,567	2%	1.00	1.02	22,875,787
2.1.4 Management - Site and Building - Construction	0	0	0	0	0%	0	0%	1.00	1.00	556,370	556,370	534,210	0	0%	22,160	4%	1.00	1.04	556,370
2.1.5 Far Detector Building Outfitting	39,078	3,782	468,076	(35,295)	-90%	(464,293)	-12,276%	0.10	0.01	3,838,796	3,801,942	3,730,963	(36,854)	-1%	70,979	2%	0.99	1.02	3,864,587
2.1.6 Transition Support Tasks	0	0	2,905	0	0%	(2,905)	-100%	1.00	0.00	192,234	192,234	199,464	0	0%	(7,230)	-4%	1.00	0.96	192,234
2.1.7 Block Pivoter Assembly	16,864	65,675	27,372	48,812	289%	38,304	58%	3.89	2.40	268,746	203,070	138,971	(65,675)	-24%	64,099	32%	0.76	1.46	268,746
2.10 Project Management - Nova Project - Construction	187,854	187,854	146,493	0	0%	41,362	22%	1.00	1.28	7,205,237	7,205,237	5,985,462	0	0%	1,219,774	17%	1.00	1.20	11,652,274
2.2.1 Mineral Oil	443,591	309,858	40,367	(133,733)	-30%	269,491	67%	0.70	7.68	2,122,657	2,973,625	2,993,536	850,968	40%	(19,910)	-1%	1.40	0.99	12,709,665
2.2.2 Pseudocumene	8,389	8,389	4,590	0	0%	3,799	45%	1.00	1.83	274,809	268,502	327,428	(6,306)	-2%	(58,926)	-22%	0.98	0.82	1,597,862
2.2.3 Waveshifters and Stadis 425	0	0	0	0	0%	0	0%	1.00	1.00	3,426,938	3,426,679	3,437,991	(259)	-0%	(11,312)	-0%	1.00	1.00	3,426,938
2.2.4 Blending	9,630	10,698	52,064	1,068	11%	(41,366)	-387%	1.11	0.21	984,120	1,003,895	1,106,505	19,775	2%	(102,609)	-10%	1.02	0.91	2,976,262
2.2.5 Transport - Liquid Scintillator	0	0	0	0	0%	0	0%	1.00	1.00	30,151	30,151	69,573	0	0%	(39,422)	-131%	1.00	0.43	1,409,994
2.2.6 Management - Liquid Scintillator - Construction	2,612	2,612	5,735	0	0%	(3,123)	-120%	1.00	0.46	72,579	72,579	43,312	0	0%	29,267	40%	1.00	1.68	125,217
2.3.1 Procurement - WLS Fiber	0	0	0	0	0%	0	0%	1.00	1.00	84,374	84,374	83,367	0	0%	1,008	1%	1.00	1.01	84,374
2.3.2 Production - WLS Fiber	350,327	351,481	410,193	1,154	0%	(58,712)	-17%	1.00	0.86	8,309,658	8,674,317	9,107,814	364,659	4%	(433,497)	-5%	1.04	0.95	12,185,180
2.3.3 Management - WLS Fiber - Construction	840	840	2,000	0	0%	(1,160)	-138%	1.00	0.42	30,507	30,507	24,498	0	0%	6,009	20%	1.00	1.25	37,646
2.3.4 Additional WLS Fiber-related Tasks	0	1,603	0	1,603	100%	1,603	100%	N/A	N/A	95,643	90,834	96,555	(4,809)	-5%	(5,721)	-6%	0.95	0.94	95,643
2.4.1 Procurement - PVC Extrusions	0	0	0	0	0%	0	0%	1.00	1.00	178,037	178,037	383,182	0	0%	(205,145)	-115%	1.00	0.46	178,037
2.4.2 Extrusion Pre-Production	0	0	0	0	0%	0	0%	1.00	1.00	1,342,931	1,342,931	1,340,162	0	0%	2,770	0%	1.00	1.00	1,342,931
2.4.3 Extrusion Production	530,147	881,364	856,008	351,218	66%	25,357	3%	1.66	1.03	7,695,951	9,276,686	9,232,638	1,580,734	21%	44,048	0%	1.21	1.00	26,124,548
2.4.4 Production Quality Assurance and Extrusion Evaluation	22,350	22,350	36,701	0	0%	(14,351)	-64%	1.00	0.61	741,610	741,610	752,395	0	0%	(10,785)	-1%	1.00	0.99	1,089,687
2.4.5 Shipping & Handling - PVC Extrusions	33,404	9,706	7,422	(23,698)	-71%	2,284	24%	0.29	1.31	971,300	1,039,032	675,386	67,732	7%	363,646	35%	1.07	1.54	1,171,826
2.4.6 Management - PVC Extrusions - Construction	20,017	20,017	5,765	0	0%	14,252	71%	1.00	3.47	448,425	448,425	372,130	0	0%	76,295	17%	1.00	1.21	787,480
2.5.1 End Seals	0	24,663	203,178	24,663	100%	(178,515)	-724%	N/A	0.12	970,920	900,626	927,103	(70,294)	-7%	(26,478)	-3%	0.93	0.97	2,142,686
2.5.2 Optical Connector Production	2,535	22,448	762	19,913	785%	21,686	97%	8.85	29.45	122,882	96,978	8,142	(25,905)	-21%	88,835	92%	0.79	11.91	123,516
2.5.3 Module Production	209,146	188,026	179,273	(21,120)	-10%	8,753	5%	0.90	1.05	7,202,463	6,811,971	5,771,666	(390,491)	-5%	1,040,306	15%	0.95	1.18	15,666,836
2.5.4 Management - PVC Modules - Construction	31,184	31,184	49,439	0	0%	(18,255)	-59%	1.00	0.63	1,069,937	1,069,937	841,361	0	0%	228,575	21%	1.00	1.27	1,557,952
2.6.1 APD Module Production	125,929	38,993	23,295	(86,936)	-69%	15,697	40%	0.31	1.67	1,687,294	1,241,806	1,067,174	(445,488)	-26%	174,631	14%	0.74	1.16	7,085,452
2.6.2 Readout - FEB	23,646	103,852	90,307	80,206	339%	13,545	13%	4.39	1.15	2,032,181	1,890,771	1,570,022	(141,410)	-7%	320,749	17%	0.93	1.20	2,808,130
2.6.3 Readout Infrastructure	52,385	126,595	125,726	74,210	142%	869	1%	2.42	1.01	1,670,513	1,638,901	1,395,140	(31,613)	-2%	243,761	15%	0.98	1.17	2,327,875
2.6.4 Management - Electronics - Construction	3,510	3,510	29	0	0%	3,481	99%	1.00	####	46,893	46,893	27,619	0	0%	19,274	41%	1.00	1.70	69,927
2.7.1 DAQ Software	1,812	4,084	19,583	2,272	125%	(15,499)	-379%	2.25	0.21	736,946	577,780	644,410	(159,166)	-22%	(66,631)	-12%	0.78	0.90	775,001
2.7.2 DAQ Hardware	170,653	220,101	191,173	49,448	29%	28,928	13%	1.29	1.15	1,317,540	1,399,501	1,443,519	81,961	6%	(44,018)	-3%	1.06	0.97	2,457,064
2.7.3 Integration - DAQ	12,168	3,426	16,518	(8,743)	-72%	(13,093)	-382%	0.28	0.21	214,811	207,722	389,702	(7,089)	-3%	(181,980)	-88%	0.97	0.53	430,339
2.7.4 Detector Control System	0	34,962	29,459	34,962	100%	5,503	16%	N/A	1.19	117,883	34,962	157,218	(82,921)	-70%	(122,256)	-350%	0.30	0.22	214,351
2.7.5 Management - DAQ - Construction	691	691	0	0	0%	691	100%	1.00	N/A	21,219	21,219	9,958	0	0%	11,261	53%	1.00	2.13	27,093
2.8.1 Near Detector Site Preparation	252,595	402,314	105,591	149,710	59%	296,723	74%	1.59	3.81	757,333	799,301	1,544,448	41,968	6%	(745,147)	-93%	1.06	0.52	5,708,306
2.8.2 Mechanical Construction and Installation - Near Detecto	0	0	76	0	0%	(76)	-100%	1.00	0.00	386,488	386,488	807,704	0	0%	(421,216)	-109%	1.00	0.48	491,799
2.8.3 Liquid Scintillator Filling Equipment - Near Detector Ass	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	55,743
2.8.4 Installation Coordination - Near Detector Assembly	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	31,228
2.8.5 Management - Near Detector Assembly - Construction	0	0	0	0	0%	0	0%	1.00	1.00	100,768	100,768	82	0	0%	100,686	100%	1.00	0.00	112,285
2.9.1 Mechanical Systems - Far Detector Assembly	148,043	232,429	551,203	84,387	57%	(318,774)	-137%	1.57	0.42	3,786,511	3,239,948	6,117,074	(546,562)	-14%	(2,877,126)	-89%	0.86	0.53	4,340,482
2.9.2 Detector Infrastructure - Far Detector Assembly	23,114	53,934	154,071	30,819	133%	(100,137)	-186%	2.33	0.35	443,390	281,691	398,968	(161,699)	-36%	(117,277)	-42%	0.64	0.71	852,291
2.9.3 Scintillator Filling Equipment - Far Detector Assembly	21,048	0	30,472	(21,048)	-100%	(30,472)	-100%	0.00	0.00	562,937	248,310	331,305	(314,627)	-56%	(82,994)	-33%	0.44	0.75	579,107
2.9.4 Block Assembly and Installation - Far Detector Assemb	136,415	45,622	54,634	(90,793)	-67%	(9,012)	-20%	0.33	0.84	1,273,193	992,566	591,965	(280,627)	-22%	400,601	40%	0.78	1.68	13,303,139
2.9.5 Management - Far Detector Assembly - Construction	47,451	46,525	62,652	(926)	-2%	(16,126)	-35%	0.98	0.74	1,166,860	1,167,412	928,341	552	0%	239,071	20%	1.00	1.26	2,193,744
2.9.6 Other University of Minnesota Far Detector Assembly-4	22,699	38,157	20,020	15,459	68%	18,137	48%	1.68	1.91	281,287	262,650	283,033	(18,637)	-7%	(20,383)	-8%	0.93	0.93	773,820
R&D SubTotal (WBS 1.0-1.9)	0	34,499	12,636	34,499	0%	21,864	63%	0.00	2.73	31,282,406	31,240,057	35,297,058	(42,349)	-0%	(4,057,001)	-13%	1.00	0.89	32,379,923
Const. SubTotal (WBS 2.0-2.10)	3,532,613	4,324,927	4,769,136	792,314	22%	(444,208)	-10%	1.22	0.91	123,074,914	120,740,690	124,474,566	(2,334,224)	-2%	(3,733,876)	-3%	0.98	0.97	216,147,822
Project Total	3,532,613	4,359,427	4,781,771	826,814	23%	(422,345)	-10%	1.23	0.91	154,357,320	151,980,747	159,771,624	(2,376,573)	-2%	(7,790,877)	-5%	0.98	0.95	248,527,745

Done

Blue means Closed.

Variance thresholds & January 2012 status

- At the Chargeable Cost level for non-costed scientist HOURS
  - 46 of 61 are active, 8 requiring reports

Report Period: Jan-12	Current Period - SCI Hrs									Cumulative - Since 01Oct09								
Control Account	BCWS (Hrs)	BCWP (Hrs)	ACWP (Hrs)	SV (Hrs)	SV (%)	CV (Hrs)	CV (%)	SPI	CPI	BCWS (Hrs)	BCWP (Hrs)	ACWP (Hrs)	SV (Hrs)	SV (%)	CV (Hrs)	CV (%)	SPI	CPI
R&D																		
1.0.1 RR Upgrades	0	109	27	109	100%	82	75%	N/A	4.03	367	927	2,175	560	153%	(1,248)	-135%	2.53	0.43
1.0.2 MI Upgrades	0	0	0	0	0%	0	0%	1.00	1.00	333	412	271	79	24%	142	34%	1.24	1.52
1.0.3 NUMI Upgrades	0	0	59	0	0%	(59)	-100%	1.00	0.00	1,192	1,553	2,352	361	30%	(799)	-51%	1.30	0.66
1.0.4 ANU Beam Physics	0	0	0	0	0%	0	0%	1.00	1.00	2,428	1,955	263	(473)	-19%	1,692	87%	0.81	7.43
1.0.5 ANU Project Management	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00
1.2 Liquid Scintillator R&D	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00
1.3 WLS Fiber R&D	0	0	0	0	0%	0	0%	1.00	1.00	0	29	60	29	100%	(31)	-107%	N/A	0.48
1.4 PVC Extrusion R&D	0	0	0	0	0%	0	0%	1.00	1.00	0	179	132	179	100%	47	26%	N/A	1.36
1.5 PVC Module R&D	0	0	0	0	0%	0	0%	1.00	1.00	1,224	1,638	3,155	414	34%	(1,517)	-93%	1.34	0.52
1.6 Electronics R&D	0	0	0	0	0%	0	0%	1.00	1.00	224	322	5,766	98	44%	(5,444)	-1,691%	1.44	0.06
1.7 DAQ R&D	0	0	0	0	0%	0	0%	1.00	1.00	3,668	4,979	1,711	1,311	36%	3,268	66%	1.36	2.91
1.8 Detector Assembly R&D	0	0	0	0	0%	0	0%	1.00	1.00	944	1,594	724	650	69%	870	55%	1.69	2.20
1.9 Project Management R&D	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00
Construction																		
2.0.1.1 Recycler Ring Modifications	8	12	208	3	39%	(196)	-1,683%	1.39	0.06	711	737	3,374	26	4%	(2,637)	-358%	1.04	0.22
2.0.1.2 Recycler Kicker System	3	3	92	0	0%	(89)	-2,804%	1.00	0.03	113	137	1,780	24	21%	(1,643)	-1,199%	1.21	0.08
2.0.1.3 Recycler Instrumentation	0	0	0	0	0%	0	0%	1.00	1.00	27	13	5	(14)	-52%	8	62%	0.48	2.60
2.0.2.2 MI RF Cavities	0	0	0	0	0%	0	0%	1.00	1.00	120	120	0	0	0%	120	100%	1.00	N/A
2.0.3.1 NuMI Primary Proton Beam	20	7	0	(14)	-67%	7	100%	0.33	N/A	390	461	59	71	18%	403	87%	1.18	7.88
2.0.3.2 NuMI Target Hall Technical Components	0	41	2	41	100%	39	95%	N/A	20.55	277	215	389	(62)	-22%	(174)	-81%	0.78	0.55
2.0.3.3 NuMI Target Hall Infrastructure	0	0	0	0	0%	0	0%	1.00	1.00	16	16	0	0	0%	16	100%	1.00	N/A
2.0.3.4 NuMI Decay Pipe/Hadron Absorber/Utilities	0	0	0	0	0%	0	0%	1.00	1.00	120	120	0	0	0%	120	100%	1.00	N/A
2.0.4 Project Management - ANU - Construction	120	120	126	0	0%	(6)	-5%	1.00	0.95	6,617	6,617	2,933	0	0%	3,684	56%	1.00	2.26
2.10 Project Management - Nova Project - Construction	0	0	31	0	0%	(31)	-100%	1.00	0.00	0	0	3,867	0	0%	(3,867)	-100%	1.00	0.00
2.2.1 Mineral Oil	0	0	18	0	0%	(18)	-100%	1.00	0.00	128	128	209	0	0%	(81)	-63%	1.00	0.61
2.2.2 Pseudocumene	0	0	0	0	0%	0	0%	1.00	1.00	80	80	16	0	0%	64	80%	1.00	5.00
2.2.3 Waveshifters and Stadis 425	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00
2.2.4 Blending	0	0	0	0	0%	0	0%	1.00	1.00	80	80	98	0	0%	(18)	-23%	1.00	0.82
2.2.5 Transport - Liquid Scintillator	0	0	0	0	0%	0	0%	1.00	1.00	0	0	8	0	0%	(8)	-100%	1.00	0.00
2.2.6 Management - Liquid Scintillator - Construction	0	0	58	0	0%	(58)	-100%	1.00	0.00	1,386	1,386	2,237	0	0%	(851)	-61%	1.00	0.62
2.3.1 Procurement - WLS Fiber	0	0	0	0	0%	0	0%	1.00	1.00	28	0	0	(28)	-100%	0	0%	0.00	1.00
2.3.2 Production - WLS Fiber	16	17	20	1	5%	(3)	-18%	1.05	0.85	380	408	472	28	7%	(64)	-16%	1.07	0.86
2.3.3 Management - WLS Fiber - Construction	6	6	0	0	0%	6	100%	1.00	N/A	186	186	185	0	0%	1	1%	1.00	1.01
2.4.1 Procurement - PVC Extrusions	0	0	0	0	0%	0	0%	1.00	1.00	19	88	64	69	363%	24	27%	4.63	1.38
2.4.2 Extrusion Pre-Production	0	0	0	0	0%	0	0%	1.00	1.00	800	800	156	0	0%	644	81%	1.00	5.13
2.4.3 Extrusion Production	0	0	0	0	0%	0	0%	1.00	1.00	0	0	42	0	0%	(42)	-100%	1.00	0.00
2.4.4 Production Quality Assurance and Extrusion Evaluation	0	0	0	0	0%	0	0%	1.00	1.00	0	0	120	0	0%	(120)	-100%	1.00	0.00
2.4.5 Shipping & Handling - PVC Extrusions	0	0	0	0	0%	0	0%	1.00	1.00	0	0	24	0	0%	(24)	-100%	1.00	0.00
2.4.6 Management - PVC Extrusions - Construction	48	48	84	0	0%	(36)	-75%	1.00	0.57	1,392	1,392	1,192	0	0%	200	14%	1.00	1.17
2.5.1 End Seals	0	0	0	0	0%	0	0%	1.00	1.00	472	432	956	(40)	-8%	(524)	-121%	0.92	0.45
2.5.2 Optical Connector Production	13	24	0	11	88%	24	100%	1.88	N/A	81	68	0	(13)	-16%	68	100%	0.84	N/A
2.5.3 Module Production	401	335	168	(66)	-16%	167	50%	0.84	2.00	5,951	5,297	6,458	(654)	-11%	(1,161)	-22%	0.89	0.82
2.5.4 Management - PVC Modules - Construction	3	3	79	0	0%	(76)	-2,369%	1.00	0.04	463	463	1,729	0	0%	(1,266)	-273%	1.00	0.27
2.6.1 APD Module Production	125	0	0	(125)	-100%	0	0%	0.00	1.00	478	378	215	(100)	-21%	163	43%	0.79	1.76
2.6.2 Readout - FEB	40	0	0	(40)	-100%	0	0%	0.00	1.00	40	0	127	(40)	-100%	(127)	-100%	0.00	0.00
2.6.3 Readout Infrastructure	4	4	152	(0)	-5%	(148)	-3,700%	0.95	0.03	13	12	3,349	(1)	-8%	(3,337)	-27,808%	0.92	0.00
2.6.4 Management - Electronics - Construction	40	40	77	0	0%	(37)	-93%	1.00	0.52	1,360	1,360	969	0	0%	391	29%	1.00	1.40
2.7.1 DAQ Software	280	0	127	(280)	-100%	(127)	-100%	0.00	0.00	6,732	3,052	2,614	(3,680)	-55%	438	14%	0.45	1.17
2.7.2 DAQ Hardware	0	0	10	0	0%	(10)	-100%	1.00	0.00	0	0	233	0	0%	(233)	-100%	1.00	0.00
2.7.3 Integration - DAQ	0	0	40	0	0%	(40)	-100%	1.00	0.00	0	0	810	0	0%	(810)	-100%	1.00	0.00
2.7.4 Detector Control System	0	0	85	0	0%	(85)	-100%	1.00	0.00	0	0	1,175	0	0%	(1,175)	-100%	1.00	0.00
2.7.5 Management - DAQ - Construction	72	72	79	0	0%	(7)	-9%	1.00	0.92	2,288	2,288	2,201	0	0%	87	4%	1.00	1.04
2.8.1 Near Detector Site Preparation	0	0	0	0	0%	0	0%	1.00	1.00	100	20	0	(80)	-80%	20	100%	0.20	N/A
2.8.2 Mechanical Construction and Installation - Near Detecto	0	0	53	0	0%	(53)	-100%	1.00	0.00	48	48	828	0	0%	(780)	-1,624%	1.00	0.06
2.8.3 Liquid Scintillator Filling Equipment - Near Detector Ass	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00
2.8.4 Installation Coordination - Near Detector Assembly	0	0	0	0	0%	0	0%	1.00	1.00	0	0	480	0	0%	(480)	-100%	1.00	0.00
2.8.5 Management - Near Detector Assembly - Construction	0	0	0	0	0%	0	0%	1.00	1.00	320	320	0	0	0%	320	100%	1.00	N/A
2.9.1 Mechanical Systems - Far Detector Assembly	114	120	78	6	6%	42	35%	1.06	1.54	570	452	214	(118)	-21%	238	53%	0.79	2.11
2.9.2 Detector Infrastructure - Far Detector Assembly	0	0	0	0	0%	0	0%	1.00	1.00	40	16	2,889	(24)	-60%	(2,873)	-17,956%	0.40	0.01
2.9.3 Scintillator Filling Equipment - Far Detector Assembly	0	0	5	0	0%	(5)	-100%	1.00	0.00	32	19	5	(13)	-41%	14	74%	0.59	3.80
2.9.4 Block Assembly and Installation - Far Detector Assemb	874	849	40	(25)	-3%	809	95%	0.97	21.22	8,074	7,977	80	(97)	-1%	7,897	99%	0.99	99.71
2.9.5 Management - Far Detector Assembly - Construction	0	0	40	0	0%	(40)	-100%	1.00	0.00	0	0	470	0	0%	(470)	-100%	1.00	0.00
R&D SubTotal (WBS 1.0-1.9)	0	109	86	109	0%	23	21%	0.00	1.27	10,380	13,588	16,608	3,208	31%	(3,020)	-22%	1.31	0.82
Const. SubTotal (WBS 2.0-2.10)	2,188	1,701	1,671	(487)	-22%	30	2%	0.78	1.02	39,932	35,186	43,030	(4,746)	-12%	(7,844)	-22%	0.88	0.82
Project Total	2,188	1,810	1,757	(379)	-17%	53	3%	0.83	1.03	50,312	48,774	59,639	(1,538)	-3%	(10,865)	-22%	0.97	0.82

Done

Blue means Closed.

Variance Analyses

- NOTE: signatures are electronic
  - See CAM notebooks

NOVA Document 3443-v55

[NOvA DocDB Home]

CAM Notebook for 2.10

(Document Status: Approved)

Document #:
NOVA-doc-3443-v55
Document type:
CAM notebook
Submitted by:
Elaine McCluskey
Updated by:
Alan A. Wehmann
Document Created:
30 Oct 2008, 10:35
Contents Revised:
25 Feb 2011, 12:09
DB Info Revised:
25 Feb 2011, 12:09
Last Signed:
25 Feb 2011, 12:09

Update Document
Update DB Info
Add Files
Watch Document

Abstract:
This document contains files or links to other files in NOVA-docdb that pertain to this control account.

Files in Document:

- January Variance Analysis Report
  (VAR-Jan11_for_2.10_Project_Management_-_Nova_Project_-...xls, 35.0 kB)
- January Variance HR Analysis Report
  (VAR-HRs_Jan11_for_2.10_Project_Management_-_Nova_Proje...xls, 34.0 kB)

Get all files as tar.gz, zip.

Topics:

- Project Management

Authors:

- John W. Cooper

Keywords:
control account

Related Documents:

- NOVA-doc-5052: CR185 - Nova Project Management Effort and Budget Adjustments for FY11-FY14
- NOVA-doc-4329: CR109 - Update Cobra Rates to FY10 Fermilab and FESS Chargeback Rates
- NOVA-doc-4240: CR100 - ANU Replan
- NOVA-doc-4234: CR097 - Factory Machines Engineering Review
- NOVA-doc-4171: CR087 - Add L1 & L2 Scientists to Project Budgets
- NOVA-doc-3956: CR075 - Update to FNAL OH Rates, FESS Chargeback Rates, UMN Rates
- NOVA-doc-3644: CR062 - HU Engineering Labor Subsidy Change
- NOVA-doc-3075: CR027 - Move FY08 Management Labor from R&D to MIE
- NOVA-doc-3030: CR024 - FY08 Subproject Management Tasks Changes
- NOVA-doc-2984: CR014 - OP Errata - WBS 2.10 - Add Admin Asst
- NOVA-doc-253: NOvA WBS Dictionary
- NOVA-doc-2573: WBS Level 3 Managers
  (Approved - 24 Jun 2009)
- NOVA-doc-3447: NOvA Dollarized RAM
- NOVA-doc-2638: Nova WBS Level 2 Milestone Gantt Charts By Control Account - Mar09
- NOVA-doc-2844: Monthly Schedule Snapshots with Progress Information - January 2011
- NOVA-doc-3372: Monthly Contract Performance Reports
  (Approved - 22 Feb 2011)
- NOVA-doc-2823: Work Authorization Document for Control Account 2.10
  (Approved - 25 Jan 2011)

Signoffs:

- John W. Cooper 356693 (signature complete)

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17 Nov 2010, 16:05
Approved

NOvA status on CARs & CIOs from the March 2011 Review

CAR and CIO Overview

#	Description	Addressed By
CAR-01	EAC is Not Utilized Correctly on the Project	Cooper
CAR-02	Change Requests to Eliminate Variances, Timing of CR Implementation	Hoffer/ Cooper
CAR-03	Variance Analysis – Not Timely, Not Consistently Used by Project	Hoffer / Cooper
CAR-04	Variance Corrective Action Tracking	Cooper
CAR-06	Uncosted Scientific Labor Charging Inaccurately	Cooper
CAR-07	CAM Refresher Training Not Performed	Hoffer
CAR-10	Risk Assessment Not Formalized & Conducted Regularly	Hoffer / Cooper
CAR-12	Objective Measurement of EV	Cooper
CIO-05	Actual Cost Reconciliation	Hoffer / Cooper
CIO-08	Contingency / Management Reserve – Not Consistently Handled by Project	Hoffer / Cooper
CIO-09	Use and Integrity of Scheduling Data	Cooper
CIO-11	Documentation Inconsistencies	Cooper
CIO-13	EVM Implementation	Hoffer

CAR-01
EAC is Not Utilized Correctly on the Project

- The EAC is being analyzed at the Project level. In interviews, the CAMs indicated they have no input to the EAC. It was found that when the CAMs do their monthly status report, they do not perform an analysis of the project risks (see CAR10) nor do the CAMs include proposed change requests in the EAC.

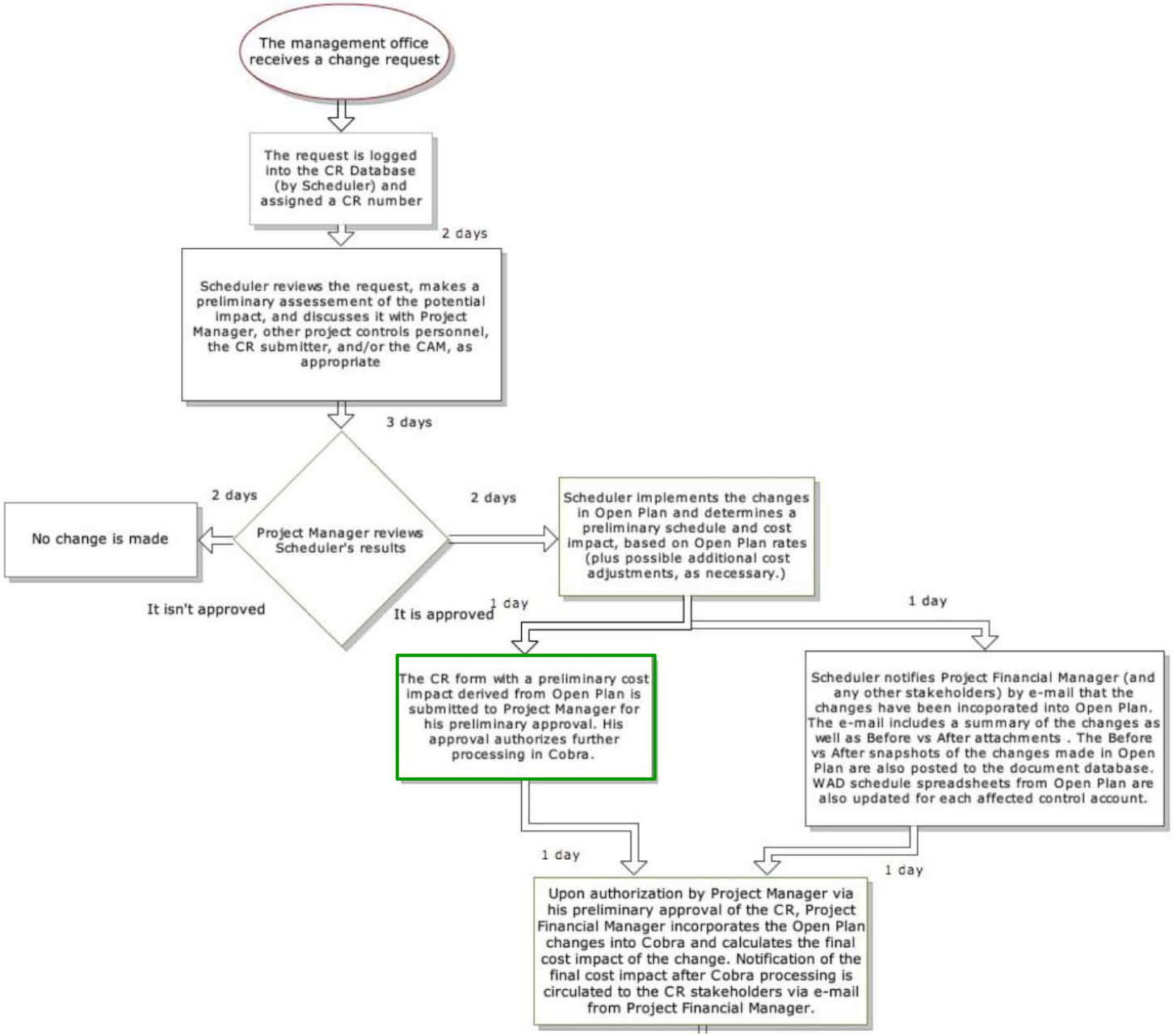
- **NOvA:** Updates to the EAC are made to un-started activities whenever a baseline change is proposed by the CAM's. BAC changes must be preceded by making changes to the EAC for the tasks involved. CAM's are intimately involved when costs and schedules change.
  - The PM holds weekly meetings with L2s & CAMs where progress, successes, problems, variances, risks, and ETC changes are routinely discussed.

CAR-02
Change Requests to Eliminate Variances, Timing of CR Implementation

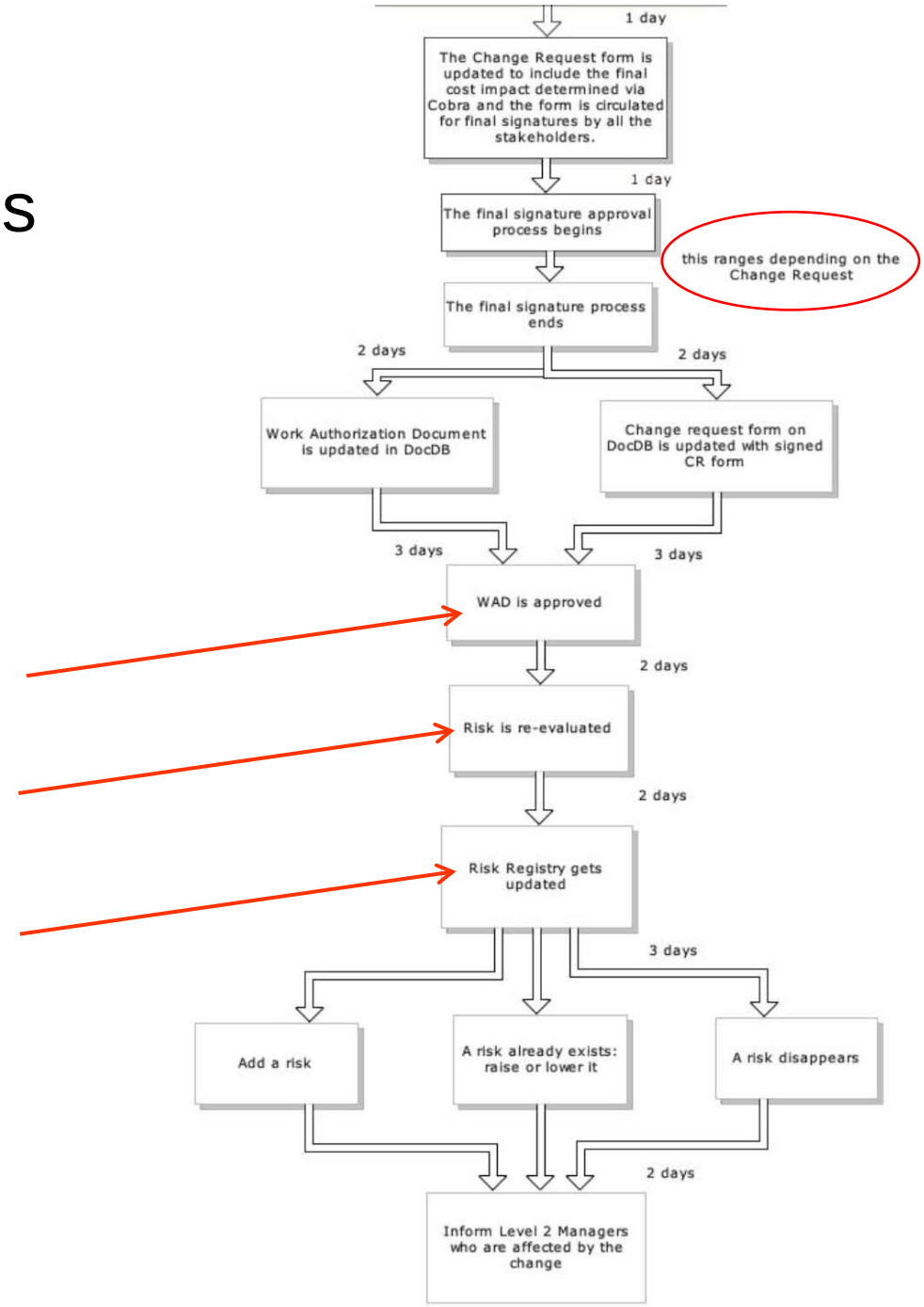
- CR238 “Schedule Adjustments for Selected Detector Assembly Tasks with Baseline Start Dates in Oct 2010” changes the baseline schedule from having start dates in Oct 2010 to start dates in Jan 2011. The CR was initiated on 11/16/10, received “preliminary approval” on 11/16/10” but did not receive final approval until 1/7/11.
- CR 276 changes the baseline schedule according to a re-planning effort for an ongoing activity. The fact that these changes were made without splitting the activity into past and future work packages jeopardizes the integrity of past performance data.

- **NOvA:** We agree that changing the past is not allowed. As to timing of CR implementation, see our new flow chart on the next pages where we now try to describe our CR process
  - The process includes risk evaluation, WADs, signatures,…

NOvA Change Request Flow Chart



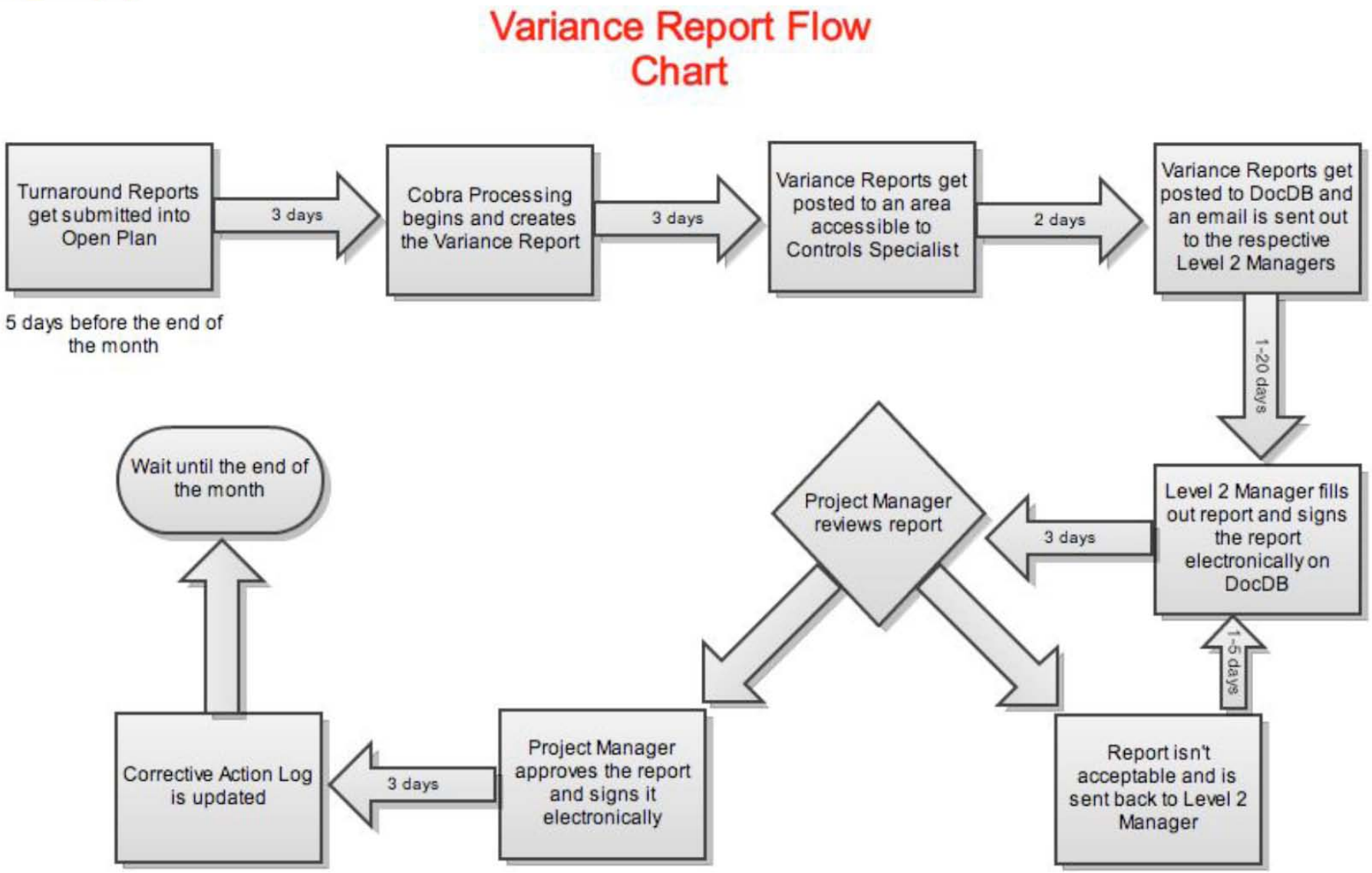
Flow chart continues



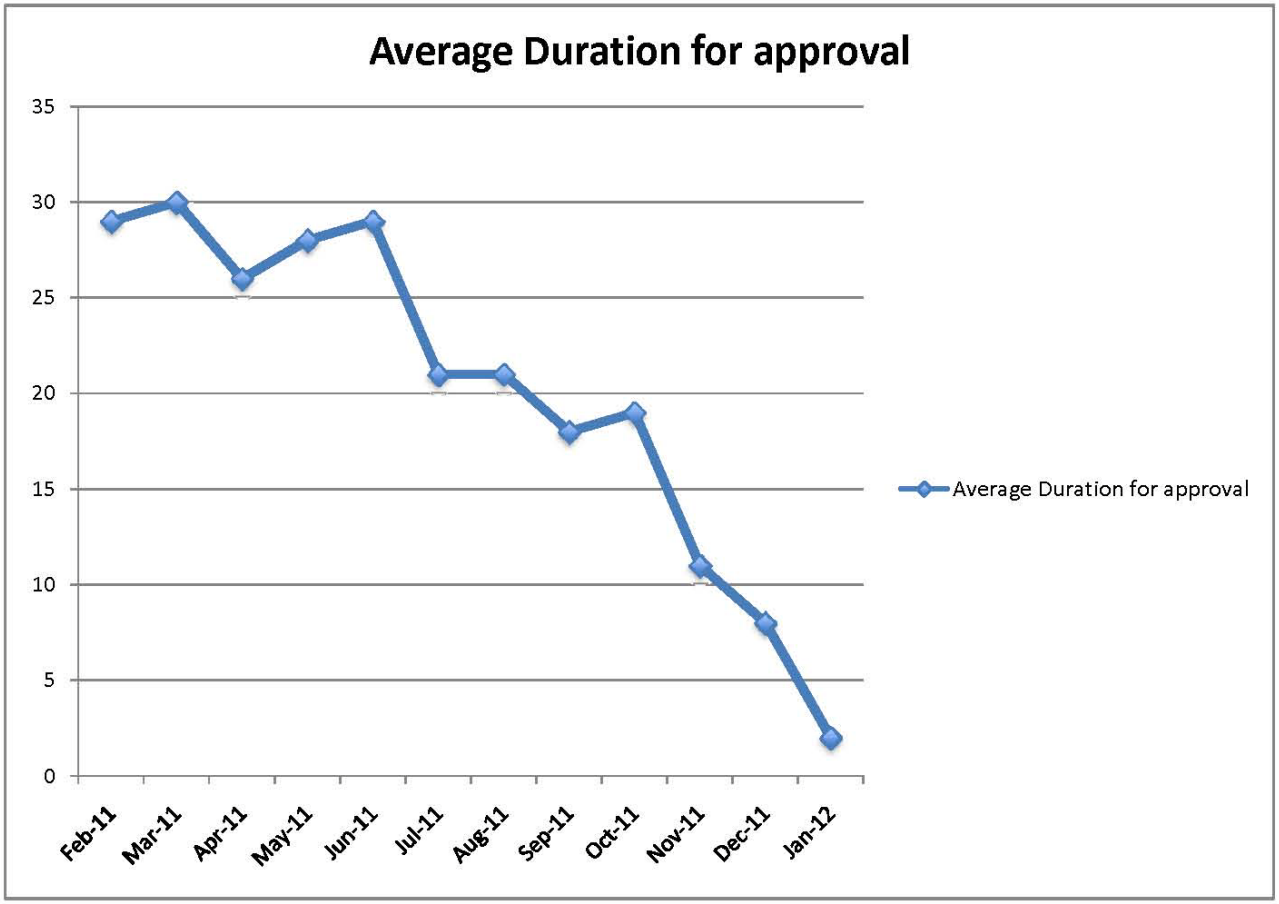
CAR-03
Variance Analysis – Not Timely, Not Consistently Used by Project

- VARs are not completed in a timely manner during the monthly status cycle. VARs were sampled for WBS 2.0.1.2 and found October, November, and December VARs were not prepared, approved, or fully signed until February. This lag in generation versus final approval implies that the information is not being review in a timely manner and therefore not possibly being used by senior management. After further interviews with the PM, CAMS, and Project Controls it was determined that VARs have no formal deadline for completion or approval at the CAM and PM level. A clear project business process/monthly update cycle regarding the VAR process and utilization of its information for management decision-making is absent from the PEP.
- **NOvA:** Additional personnel have been added to the NOvA Project Office to address this issue. VAR's are now completed in a more timely manner and turnaround time has decreased.
  - See the NEW Flow Chart on the following slide.
  - See NEW data on timeliness on slide after next.

CAR03 response



CAR03 response



Plot of the average time for a VAR from being posted to being approved by the PM from February 2011 to present. Only working days are included in the count.

CAR-04

Variance Corrective Action Tracking

- A Corrective Action Log is not created or maintained as required by the FRA EVM System. CA's are not formally tracked to closure.
- **NOvA:** a Corrective Action Log did exist (DocDB #3614) but it was not current at the time of the Review. Additional personnel have been added to the NOvA Project Office to maintain this Log, keep it current, and track CA's to closure.

This log is available on the review website

VARIANCE REPORT CORRECTIVE ACTION LOG

This log only includes Variance Reports that have notes related to Corrective Action

Control Account (CA) #	FOR REPORT MONTH/YI	CORRECTIVE ACTION & Notes	RELEASE DATE	APPROVAL DATE	CLOSED DATE	RESPONSIBILITY (CAM)	COMMENTS
2.0.1.2	Dec-11	Look at future PS assembly tasks and adjust labor allocations based on recent reporting.	1-Feb-12	16-Feb-12	1-Mar-12	Derwent	
2.0.1.3	Dec-11	Will correct any incorrect charges (working on identification)	1-Feb-12	16-Feb-12	1-Mar-12	Derwent	
2.0.2.2	Dec-11	Update the CAP reports with the latest schedule.	1-Feb-12	15-Feb-12	2-Mar-12	Kourbanis	
2.0.3.2	Dec-11	As noted last month, will use this information to re-estimate labor resources associated with IHEP target task.	1-Feb-12	10-Feb-12		Derwent	
2.1.5	Dec-11	The project team will continue to monitor progress as the work activities in the construction phase	29-Feb-12	29-Feb-12	5-Mar-12	Dixon	
2.5.4	Dec-11	Rates updated to account for salary freeze in subsequent months.	1-Feb-12	10-Feb-12		Heller	
2.6.3-HR	Dec-11	Group was requested to evaluate future work and add it to the schedule if there is further unaccounted for labor	24-Feb-12	28-Feb-12	2-Mar-12	Mualam	
2.8.1	Dec-11	The major design task should be statused as partially complete. This will resolve itself. In addition, the schedule will be corrected to make the design task more realistic. This schedule change will occur when the final decision on the cavern size is made.	1-Feb-12	9-Feb-12	1-Mar-12	Lukens	
2.8.2	Dec-11	The costs of commissioning the prototype installation were not budgeted, which produces an unrecoverable variance. The commissioning of the surface installation is substantially complete.	1-Feb-12	16-Feb-12	1-Mar-12	Lukens	
2.9.1	Dec-11	Future requirements should be reevaluated. Every effort will be made to add people to this project, to mitigate the schedule slip. Little can be done at this point in the project to recover the lost time or the underestimate of the pivoter cost. The pivoter assembly is being given our highest priority. The assembly of the pivoter began in Oct. Regular vendor visits are occurring.	1-Feb-12	9-Feb-12	1-Mar-12	Lukens	
2.9.3	Dec-11	There is some concern about possible conflicts between this installation and block pivoter construction. Care will be taken to schedule around possible problems. Additional manpower is applied to this when possible.	1-Feb-12	9-Feb-12	1-Mar-12	Lukens	
2.9.4	Dec-11	The correction to take here is in the pivoter preparation. This will continue to slip until the pivoter is ready.	1-Feb-12	13-Feb-12	1-Mar-12	Lukens	
2.9.5	Dec-11	The NOvA financial staff is meeting with the university and Argonne to determine if the costs are being charged incorrectly and will makes corrections in the Fermilab accounting system when we understand where the costs have been charged. Note, this variance has declined since last month.	1-Feb-12	13-Feb-12	1-Mar-12	Lukens	
2.0.1.2	Jan-12	Looking into adjustments to remaining work to better estimate cost (moving $ from labor contingency to labor b	28-Feb-12	1-Mar-12		Derwent	
2.1.5	Jan-12	The project team will continue to monitor progress as the work activities in the construction phase	28-Feb-12	5-Mar-12		Dixon	
2.0.1.3	Jan-12	Looking into future tasks for labor adjustments (moving $ from labor contingency to labor budget).	28-Feb-12	1-Mar-12		Derwent	
2.0.3.2	Jan-12	Re-estimate labor resources for IHEP target task.	28-Feb-12	7-Mar-12		Schlabach	
2.0.3.4	Jan-12	Will propose moving $ from contingency into labor, reduce contingency	28-Feb-12	8-Mar-12		Schlabach	
2.5.3	Jan-12	Salary rates updated to account for salary freeze in subsequent months.	28-Feb-12	6-Mar-12		Heller	
2.5.4	Jan-12	Rates updated to account for salary freeze in subsequent months.	28-Feb-12	6-Mar-12		Heller	
2.8.1	Jan-12	The major design task was statused as partially complete, which improved the schedule variance. A full reanalysis of the total cavern cost in needed, and is in progress.	28-Feb-12	1-Mar-12		Lukens	
2.8.2	Jan-12	The costs of commissioning the prototype installation were not budgeted, which produces an unrecoverable variance. The commissioning of the surface installation is substantially complete.	28-Feb-12	1-Mar-12		Lukens	
2.9.2	Jan-12	The status of future block sensor tasks will be reviewed, and a better formalism for quantifying the progress will be established.	28-Feb-12	2-Mar-12		Lukens	
2.9.1	Jan-12	Future requirements should be reevaluated. Every effort will be made to add people to this project, to mitigate the schedule slip. Little can be done at this point in the project to recover the lost time or the underestimate of the pivoter cost. The pivoter assembly is being given our highest priority. The vendor appears to be maintaining his revised delivery schedule.	28-Feb-12	1-Mar-12		Lukens	
2.9.3	Jan-12	Design issues have been largely resolved, and major orders have been placed.	28-Feb-12	1-Mar-12		Lukens	
2.9.4	Jan-12	The correction to take here is in the pivoter preparation. This will continue to slip until the pivoter is ready.	28-Feb-12	2-Mar-12		Lukens	
2.9.5	Jan-12	The NOvA financial staff is meeting with the university and Argonne to determine if the costs are being charged incorrectly and will makes corrections in the Fermilab accounting system when we understand where the costs have been charged. Note, this variance has declined since last month.	28-Feb-12	1-Mar-12		Lukens	

CAR-06
Uncosted Scientific Labor Charging Inaccurately

- CAMs interviewed that are uncosted scientists stated that they charge an estimated or an average time per week to the project. They do not report time based on the actual hours worked. They indicated that they work more hours for the project than they charge to the project.
- **NOvA:** The Project Manager has sent an e-mail to scientists reiterating the importance of reporting actual hours worked.
- This topic was covered during the annual refresher training provided to NOvA on 6 Jan 12.
- The reporting form for uncosted hours was revised to include specific instructions and reminders to report actual hours worked.
  - See DocDB #4147.

NOvA PROJECT SCIENTIFIC EFFORT REPORTING BY COLLABORATING INSTITUTIONS TO FERMILAB					Please use actual hours worked
INSTITUTION		EFFORT FOR			
Week Ending*	Name	Resource Type	CTC# **	CTC# (Auto-fills)	Task Name (Auto-fills)

CAR-10 Risk Assessment Not Formalized & Conducted Regularly

- It is clear that the Project Manager is aware of potential impacts and/or opportunities; however that awareness is not documented anywhere.
- There was no evidence provided to the team that a Risk Management Board exists for the project, nor is there clear evidence that the Level 2 managers are fully integrated into the formal process of risk management.
- There does not seem to be any evidence of fluctuations in remaining contingency
- **NOvA:** The NOvA Risk Management Plan states (pg 2) that we have a Risk Management Board (plan is available from the review website). We do meet routinely and we do discuss risk.
  - The Project Manager also meets weekly with L2 Managers and Risks are discussed.
- The Change Request form has been updated to indicate risk and budget impacts.
  - The NOvA Project Controls Specialist reviews each CR and contacts the L2 Manager to discuss and track the risk and budget impacts as necessary.
  - The PM signs the CR as evidence that he is informed of the risks.

CAR10

- Here is the new CR form with reminder to look at Risk Impact.

NOvA Project Office

CHANGE REQUEST RECORD

Level of Change	L4 (NOVA PM)	Date Initiated	2/27/2012	**CR No.**	473
Status	Approved by PM	Date Revised:	1/3/2012		
Awaiting:	Carl Bromberg	☑ BOE Impact		☐ Risk Impact	

PRELIMINARY APPROVAL

Schedule Impact: None

Cost Impact: $202,730.00

from/to MR or Contingency Management Reserve

PM GO-AHEAD

DATE

Date: 2/28/2012

FINAL APPROVAL

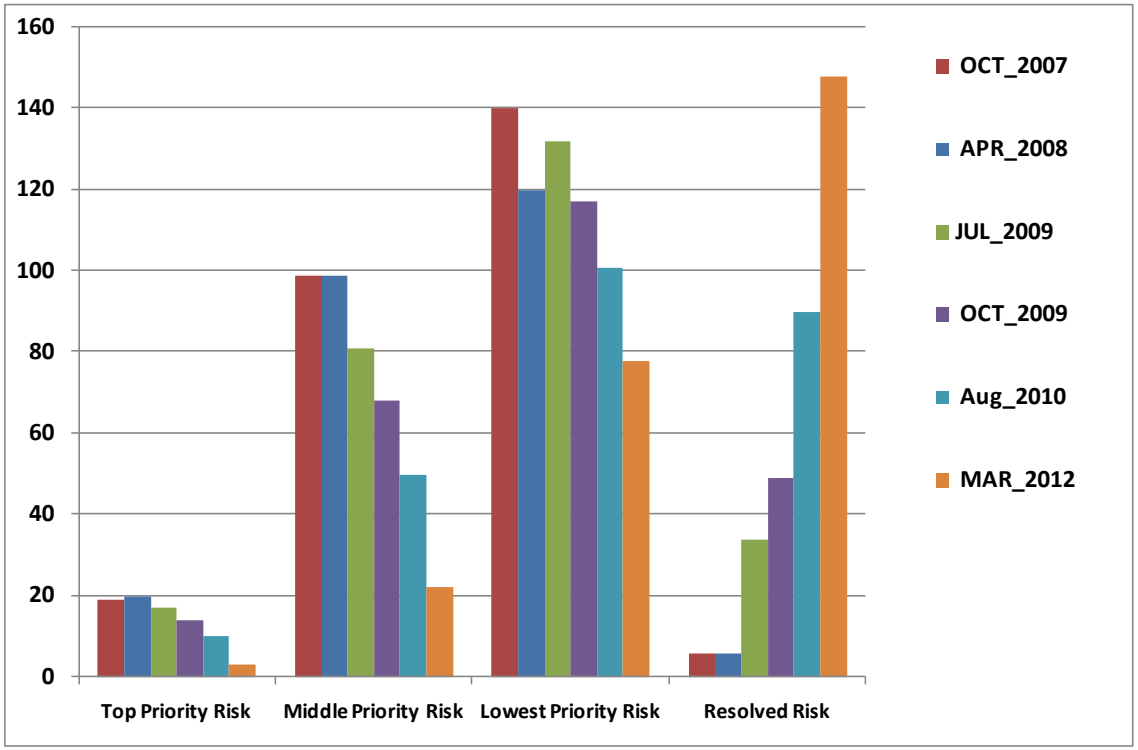
CONTROL ACCOUNT MANAGER (+ L2 MGR IF DIFFERENT) DATE

CONTROL ACCOUNT #	COST IMPACT

PROJECT MANAGER DATE

CAR10

- Here is a graph of Risks vs. time
  - This is a series of snapshots from an Access database.



- On lack of fluctuations in contingency, the CPRs have this information and a history plot of contingency / management reserve was shown on slide 20 in this talk. This is also shown in the Proj Man Group meeting every month, so it is on the record.

CAR-12
Objective Measurement of EV

- Effective, objective measurement was not established for all activities that exceeded a two month duration. This is not in line with FRA's EVMS System Description, and as a result non compliances exist for those activities without objective performance metrics.
- NOvA: We have been mystified by this CAR ever since the 2011 review. The FRA EVMS Description does NOT mandate a specific method, instead notes a "preferred method" to have peg points for tasks > 2 months in duration.
- Late last Friday night it occurred to Assoc. Dir. Peter Garbincius that you may have been referring to our incorrect use of our own implementation plan (& not to our implementation of the FRA system)
- Peter was right !
- Since we have no business having a more restrictive PMT implementation than FRA requires, we changed our implementation plan (NOVA-doc-1436) yesterday afternoon. See link from the review website.
- We are now technically in compliance, but understand if you want to discuss this further.

CIO-05
Actual Cost Reconciliation

- It is recommended that the actual cost file be validated by the Finance Group and entered into the EV system by a person in Project Controls to ensure the integrity of the Actual Cost data reported on a monthly basis.
- The recommendation specified the Finance Group so we considered this to be outside of NOvA's scope of authority. OPMO has since granted us the authority to divide these responsibilities between two employees reporting to the Particle Physics Division Field Financial Manager and Financial Group Head.
  - So, two independent people will look at the cost file -- one does it, one checks it

CIO-08
Contingency / Management Reserve – Not Consistently Handled by Project

- Based on the FRA EVMS description, Contingency and Management Reserve are very clearly defined as being established by unknown and known risks respectively. The Project does not use these same definitions.
- In the Conventional Construction WBS, Contingency was entered into the Performance Measurement Baseline (PMB) and performance was earned on the task that contained the Contingency. This is in clear violation of the FRA EVM System Description and ANSI standard.
  - This was an isolated event, therefore a CIO and not a CAR

- The Project is trying to make our discussion of "Contingency" use the FRA definitions. See slide #20 for example.
  - This is difficult since it is easier to label the 2 types with more descriptive terms when talking within and outside the project, e.g. "assigned contingency" and "available contingency".
- As you noted, the task in question was completed before your last review. We have not entered any new "contingency" tasks and will not do so.

CIO-09
Use and Integrity of Scheduling Data

- As a best practice, the CAMs should be required to understand their milestones and inter-dependencies of tasks and how they impact the project. The PM should be encouraged/trained in the development and use of relevant milestones. The NOvA project schedule should be adjusted to incorporate more meaningful internal milestones rather than the external scheduled milestones (e.g. DOE CD4) to allow the CAMs to understand the true critical path. Project controls and the CAMs should work together on the schedule with the CAMs actually taking ownership of the schedule.

- NOvA: We have over 600 "internal" milestones. More than 100 have been added BY THE CAMs during the last year.
- Plots are generated for all milestones every month and distributed for CAM's to review. These plots are filtered in several different ways and show progress for all WBS sections.
  - The Milestone Gantt chart is available on the Review website.
- We continue to discuss the critical path for the Far Detector at every Technical Board meeting, and in every Collaboration Meeting.

CIO-11
Documentation Inconsistencies

- The WBS Dictionary definitions are not consistent between the highest level of the WBS and the control account (lowest level of the WBS). The scope definitions in the PEP didn't match the WBS Dictionary posted on the website nor did it match the definitions in the scheduling tool. It is recommended that the team modify the WBS Dictionary so it clearly states the scope at the lowest level (control account). It is recommended that the WBS Dictionary be placed under configuration control (version control) and be posted in a location readily available to the project team. If this information is to be kept in the scheduling tool, it is recommended the definitions be updated in the tool as well.
- **NOvA:** The WBS Dictionary definitions in NOvA DocDB #253 have been reviewed and are now in agreement with the Project Execution Plan and the Open Plan scheduling tool.
- The WBS Dictionary is kept as part of the Open Plan scheduling tool. Updates to the WBS Dictionary will be generated from Open Plan and saved to DocDB so that both remain consistent.
  - That is, we have always stated that Open Plan is "the" document, others flow from it