



NOvA Project Status

June 22, 2007

John Cooper

Ron Ray

Nancy Grossman



EA Progress

- June 8 meeting with Directorate
 - Jeff Cotton, Bob Grant suggested URS (EG&G) might help
- Larry Lockett arrived on June 15
 - Health physicist with EIS experience, nuclear
 - Got up to speed via a full set of documentation including emails, TDR drafts, ... and conversations with me, Keith Schuh, Mike Martens, Sally Arnold
- Larry now has 5 people from URS working on an updated EA



EA Schedule (might slip a day or two)

- June 22 (Friday) provide to Project
 - Ch 1 (Intro), Ch 2 (Purpose & Need), Ch 3 (Proposed Action)
 - Ch 4 (Affected Environment)
 - This one depends on seeing updated EAW today, SEH & U of Minn promise it
- June 25 (Monday)
 - Ch 5 (Potential Environmental Impacts)
- June 26 (Tuesday)
 - Ch 6 (Accident Analysis)
- June 27 (Wednesday)
 - Exec Summary, List of Permits, Glossary, References, List of Preparers
 - Cover, Table of Contents, Figures & Tables
- June 28 (Thursday)
 - Consolidated Document, hopefully ready to pass to DOE
 - Above does not include a line by line response to the 265 DOE comments
 - Followed by meeting with DOE NEPA Team after they read and??



Project Cost & Schedule Plan

- Fix errors by June 20
 - Done, will show details in a minute
- Implement Cost Saving Ideas
 - I have lists from L2s, 30 – 40 ideas
 - We discuss in our Technical Board on June 28, July 5
 - Bill Freeman puts ideas approved by me into schedule starting on July 9
 - Hopefully implemented and escalated by July 17 – 19
- Next tune kilotons to match \$ 260 M
 - Version 1 by July 23-25
 - Version 2 (final) by July 30-31
- Ready for one-by-one L2 reviews Aug 6 – 17
- Followed by all day C&S review with everybody in one room on August 21
 - with BOEs, Risks, EVMS method assignments,



Cost (oblig.) at Director's CD-2/3a

- Costs (oblig.) from Open Plan escalated using Cobra

WBS	Items	NOVA 's Cost Estimate AY \$M									
		Estimated Cost (with indirects)			Contingency Estimate			Contingency %			Total Cost
		M&S	Labor ¹	Total	M&S	Labor ¹	Total	M&S	Labor ¹	Total	
TEC	2.0 Accelerator & NuMI Upgrades	\$ 13.2	\$ 20.5	\$ 33.7	\$ 4.4	\$ 6.5	\$ 11.0	34%	32%	33%	\$ 44.7
	2.1 Far Detector Site and Building	\$ -	\$ 1.9	\$ 1.9	\$ -	\$ 0.5	\$ 0.5	0%	24%	24%	\$ 2.4
	2.2 Liquid Scintillator	\$ 23.0	\$ 0.4	\$ 23.4	\$ 6.1	\$ 0.3	\$ 6.5	27%	87%	28%	\$ 29.8
	2.3 Wave-Length-Shifting Fiber	\$ 12.3	\$ 1.2	\$ 13.6	\$ 3.4	\$ 0.1	\$ 3.6	28%	10%	26%	\$ 17.1
	2.4 PVC Extrusions	\$ 28.4	\$ 1.7	\$ 30.1	\$ 8.0	\$ 0.6	\$ 8.6	28%	35%	28%	\$ 38.7
	2.5 PVC Modules	\$ 6.8	\$ 8.6	\$ 15.4	\$ 2.0	\$ 3.7	\$ 5.7	29%	43%	37%	\$ 21.1
	2.6 Electronics Production	\$ 14.3	\$ 1.1	\$ 15.4	\$ 6.2	\$ 0.6	\$ 6.8	43%	53%	44%	\$ 22.2
	2.7 Data Acquisition System	\$ 1.6	\$ 1.8	\$ 3.4	\$ 0.4	\$ 0.5	\$ 0.9	25%	29%	27%	\$ 4.3
	2.8 Near Detector Assembly	\$ 3.6	\$ 0.4	\$ 4.1	\$ 1.5	\$ 0.2	\$ 1.7	40%	50%	41%	\$ 5.7
	2.9 Far Detector Assembly	\$ 7.9	\$ 6.0	\$ 13.9	\$ 4.8	\$ 6.0	\$ 10.8	61%	100%	78%	\$ 24.8
	2.10 Project Management	\$ 0.6	\$ 5.7	\$ 6.3	\$ 0.1	\$ -	\$ 0.1	25%	0%	2%	\$ 6.4
Subtotal Construction		\$ 111.7	\$ 49.5	\$ 161.2	\$ 36.9	\$ 19.1	\$ 56.0	33%	39%	35%	\$ 217.2
OPC	R&D - Accelerator	\$ 1.4	\$ 7.8	\$ 9.3	\$ 0.4	\$ 3.0	\$ 3.4	30%	38%	37%	\$ 12.7
	R&D - Detector	\$ 4.1	\$ 5.0	\$ 9.1	\$ 0.2	\$ 0.1	\$ 0.3	5%	1%	3%	\$ 9.3
	Cooperative Agreement	\$ 46.9	\$ -	\$ 46.9	\$ 9.3	\$ -	\$ 9.3	20%	0%	20%	\$ 56.2
	Operating	\$ 0.2	\$ 1.2	\$ 1.3	\$ 0.1	\$ 0.6	\$ 0.7	36%	51%	49%	\$ 2.0
	Total OPC:	\$ 52.6	\$ 14.0	\$ 66.6	\$ 10.0	\$ 3.6	\$ 13.6	19%	26%	20%	\$ 80.2
TPC:		\$ 164.3	\$ 63.5	\$ 227.8	\$ 46.9	\$ 22.7	\$ 69.6	29%	36%	31%	\$ 297.4

Notes:

¹ Labor costs presented here include all project labor from Fermilab, other DOE facilities and Universities.



June 20 Revised Escalated cost (oblig.) with errors fixed

WBS	Items	NOVA 's Cost Estimate AY \$M									
		Estimated Cost (with indirects)			Contingency Estimate			Contingency %			Total Cost
		M&S	Labor ¹	Total	M&S	Labor ¹	Total	M&S	Labor ¹	Total	
TEC	2.0 Accelerator & NuMI Upgrades	\$ 13.2	\$ 20.6	\$ 33.7	\$ 4.4	\$ 7.0	\$ 11.5	34%	34%	34%	\$ 45.2
	2.1 Far Detector Site and Building	\$ -	\$ 1.9	\$ 1.9	\$ -	\$ 0.5	\$ 0.5	0%	24%	24%	\$ 2.4
	2.2 Liquid Scintillator	\$ 23.9	\$ 0.3	\$ 24.3	\$ 6.5	\$ 0.2	\$ 6.7	27%	62%	28%	\$ 31.0
	2.3 Wave-Length-Shifting Fiber	\$ 12.3	\$ 1.2	\$ 13.6	\$ 3.4	\$ 0.1	\$ 3.6	28%	10%	26%	\$ 17.1
	2.4 PVC Extrusions	\$ 26.6	\$ 2.0	\$ 28.5	\$ 7.2	\$ 0.7	\$ 7.9	27%	36%	28%	\$ 36.5
	2.5 PVC Modules	\$ 6.9	\$ 8.5	\$ 15.4	\$ 2.0	\$ 3.5	\$ 5.5	29%	41%	36%	\$ 20.9
	2.6 Electronics Production	\$ 13.9	\$ 0.9	\$ 14.8	\$ 6.0	\$ 0.4	\$ 6.3	43%	44%	43%	\$ 21.2
	2.7 Data Acquisition System	\$ 1.2	\$ 1.8	\$ 3.0	\$ 0.3	\$ 0.5	\$ 0.8	25%	29%	27%	\$ 3.8
	2.8 Near Detector Assembly	\$ 3.6	\$ 0.4	\$ 4.1	\$ 3.0	\$ 0.3	\$ 3.3	83%	61%	81%	\$ 7.3
	2.9 Far Detector Assembly	\$ 7.9	\$ 6.0	\$ 13.9	\$ 4.9	\$ 6.0	\$ 10.9	62%	100%	78%	\$ 24.8
	2.10 Project Management	\$ 0.6	\$ 5.7	\$ 6.3	\$ 0.1	\$ -	\$ 0.1	25%	0%	2%	\$ 6.4
Subtotal Construction		\$ 110.2	\$ 49.4	\$ 159.6	\$ 38.0	\$ 19.2	\$ 57.2	34%	39%	36%	\$ 216.8
OPC	R&D - Accelerator	\$ 1.4	\$ 7.9	\$ 9.3	\$ 0.4	\$ 3.0	\$ 3.4	30%	38%	37%	\$ 12.7
	R&D - Detector	\$ 3.9	\$ 5.1	\$ 9.0	\$ 0.2	\$ 0.1	\$ 0.3	5%	1%	3%	\$ 9.3
	Cooperative Agreement	\$ 45.5	\$ -	\$ 45.5	\$ 8.9	\$ -	\$ 8.9	20%	0%	20%	\$ 54.4
	Operating	\$ 0.2	\$ 1.1	\$ 1.2	\$ 0.1	\$ 0.4	\$ 0.5	34%	41%	40%	\$ 1.7
	Total OPC:	\$ 51.0	\$ 14.0	\$ 65.0	\$ 9.5	\$ 3.5	\$ 13.1	19%	25%	20%	\$ 78.1
TPC:		\$ 161.2	\$ 63.5	\$ 224.6	\$ 47.5	\$ 22.7	\$ 70.2	29%	36%	31%	\$ 294.8



List of Errors with cost implications

DIFF(current-CD2)									
Activity ID	Activity Description	BAC Material	BAC Labor	BAC Total	M&S Cont. (\$)	Labor Cont. (\$)	Total Cont. (\$)	BAC + Cont. (\$)	
2	Construction Project	(\$2,904,807)	(\$92,701)	(\$2,997,508)	\$473,870	\$69,669	\$543,539	(\$2,453,969)	
2	ANU Construction	(\$20,880)	\$17,614	(\$3,265)	(\$6,264)	\$361,007	\$354,744	\$351,478	
2.0.1	Recycler Upgrades	\$25,520	\$17,614	\$43,134	\$7,656	\$5,285	\$12,940	\$56,074	
2.0.2	Main Injector Upgrades	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
2.0.3	NuMI Upgrades	(\$46,400)	\$0	(\$46,400)	(\$13,920)	\$0	(\$13,920)	(\$60,320)	
2.0.4	Project Management	\$0	\$0	\$0	\$0	\$355,723	\$355,723	\$355,723	added labor contingency in FY12 management task where it had been 0%
2.1	Site and Building	(\$1,334,647)	\$0	(\$1,334,647)	(\$414,942)	\$0	(\$414,943)	(\$1,749,590)	
2.1.1	Site Preparation Package	(\$232,000)	\$0	(\$232,000)	(\$54,300)	\$0	(\$54,300)	(\$286,300)	lowered wetland mitigation + reduce PM and UMN managemetn fees
2.1.2	Far Detector Building	\$0	\$0	\$0	(\$98,400)	\$0	(\$98,400)	(\$98,400)	reduced contingency
2.1.3	(reserved)	(\$1,102,647)	\$0	(\$1,102,647)	(\$262,242)	\$0	(\$262,242)	(\$1,364,889)	eliminated site logistics WBS from project scope
2.1.4	Management	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
2.2	Liquid Scintillator	\$911,505	(\$35,023)	\$876,483	\$373,631	(\$93,528)	\$280,103	\$1,156,586	
2.2.1	Mineral Oil	\$1,406,342	\$0	\$1,406,342	\$373,289	(\$53,037)	\$320,252	\$1,726,595	increased oil cost
2.2.2	Pseudocumene	(\$586,295)	(\$4,933)	(\$591,228)	(\$144,285)	(\$4,933)	(\$149,218)	(\$740,446)	corrected psudocumene estimate
2.2.3	Waveshifters and Stadis 425	\$128	\$0	\$128	\$119	(\$3,995)	(\$3,877)	(\$3,749)	
2.2.4	Blending	\$84,371	(\$30,090)	\$54,280	\$142,769	(\$31,563)	\$111,206	\$165,486	corrected per block cost
2.2.5	Transport	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
2.2.6	Management - Construction Phase	\$6,960	\$0	\$6,960	\$1,740	\$0	\$1,740	\$8,700	
2.3	Wave-Length-Shifting Fiber	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
2.3.1	Procurement	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
2.3.2	Production	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
2.3.3	Management - Construction Phase	\$0	\$0	\$0	\$0	\$0	\$0	\$0	



List of Errors with cost implications #2

DIFF(current-CD2)									
Activity ID	Activity Description	BAC Material	BAC Labor	BAC Total	M&S Cont. (\$)	Labor Cont. (\$)	Total Cont. (\$)	BAC + Cont. (\$)	
2.4	PVC Extrusions	(\$1,789,924)	\$176,135	(\$1,613,789)	(\$711,886)	\$69,651	(\$642,235)	(\$2,256,024)	
2.4.1	Procurement	\$42,804	\$37,510	\$80,314	\$13,601	\$18,755	\$32,356	\$112,670	added procurement of QC instrumentation
2.4.2	Extrusion Pre-Production	(\$2,069,451)	\$0	(\$2,069,451)	(\$731,398)	\$0	(\$731,398)	(\$2,800,849)	corrected mistake in vendor setup costs- cd2 numbers were still based on 32 cell extrusions with new equipment rather than 16 cell with existing equipment
2.4.3	Extrusion Production	\$328,129	\$262,672	\$590,801	(\$1,424)	\$92,675	\$91,250	\$682,052	resin cost adjustment
2.4.4	Production Quality Assurance and Extrusion Evaluation	(\$63,775)	\$0	(\$63,775)	\$10,868	\$0	\$10,868	(\$52,907)	reduced hardware cost - double counted with R&D
2.4.5	Shipping & Handling	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
2.4.6	Management - Construction Phase	(\$27,631)	(\$124,046)	(\$151,678)	(\$3,532)	(\$41,778)	(\$45,310)	(\$196,988)	reduced assumed FNAL ME labor assignments in subproject management (double-counting)
2.5	PVC Modules	\$107,323	(\$65,060)	\$42,262	\$38,162	(\$132,695)	(\$94,533)	(\$52,271)	
2.5.1	End Seals	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
2.5.2	Optical Connector Production	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
2.5.3	Module Production	\$107,323	(\$65,060)	\$42,262	\$38,162	(\$132,696)	(\$94,533)	(\$52,272)	shipping cost corrections (M&S) + adjustments to near detector labor costs
2.5.4	Management - Construction Phase	\$0	\$0	\$0	\$0	\$0	\$0	\$0	



List of Errors with cost implications #3

DIFF(current-CD2)									
Activity ID	Activity Description	BAC Material	BAC Labor	BAC Total	M&S Cont. (\$)	Labor Cont. (\$)	Total Cont. (\$)	BAC + Cont. (\$)	
2.6	Electronics Production	(\$417,909)	(\$183,210)	(\$601,120)	(\$228,561)	(\$171,066)	(\$399,627)	(\$1,000,747)	
2.6.1	APD Module Production	(\$385,932)	(\$156,001)	(\$541,932)	(\$108,725)	(\$166,791)	(\$275,517)	(\$817,449)	APD array unit cost adjustments (now includes carrier board, machining etc.); resuscitons in testing costs; one site, less hours; WBS rearranged as a result of all the changes
2.6.2	Readout - FEB	(\$58,000)	(\$8,499)	(\$66,499)	\$0	\$0	\$0	(\$66,499)	reduced ASIC quantity (eliminated second run)
2.6.3	Readout Infrastructure	\$26,023	(\$18,711)	\$7,312	(\$119,836)	(\$4,275)	(\$124,110)	(\$116,799)	reduce M&S contingency on LV power supplies 50% to 25% (quotes)
2.6.4	Management - Construction Phase	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
2.7	Data Acquisition System	(\$342,503)	\$0	(\$342,504)	(\$80,355)	\$0	(\$80,355)	(\$422,859)	
2.7.1	DAQ Software	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
2.7.2	DAQ Hardware	(\$265,458)	\$0	(\$265,458)	(\$79,637)	\$0	(\$79,637)	(\$345,095)	DCM reduction; buffer farm reduction
2.7.3	Integration	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
2.7.4	Detector Control System	(\$77,045)	\$0	(\$77,045)	(\$717)	\$0	(\$717)	(\$77,763)	reduced/corrected cooling system controls hardware costs
2.7.5	Management - Construction Phase	\$0	\$0	\$0	\$0	\$0	\$0	\$0	



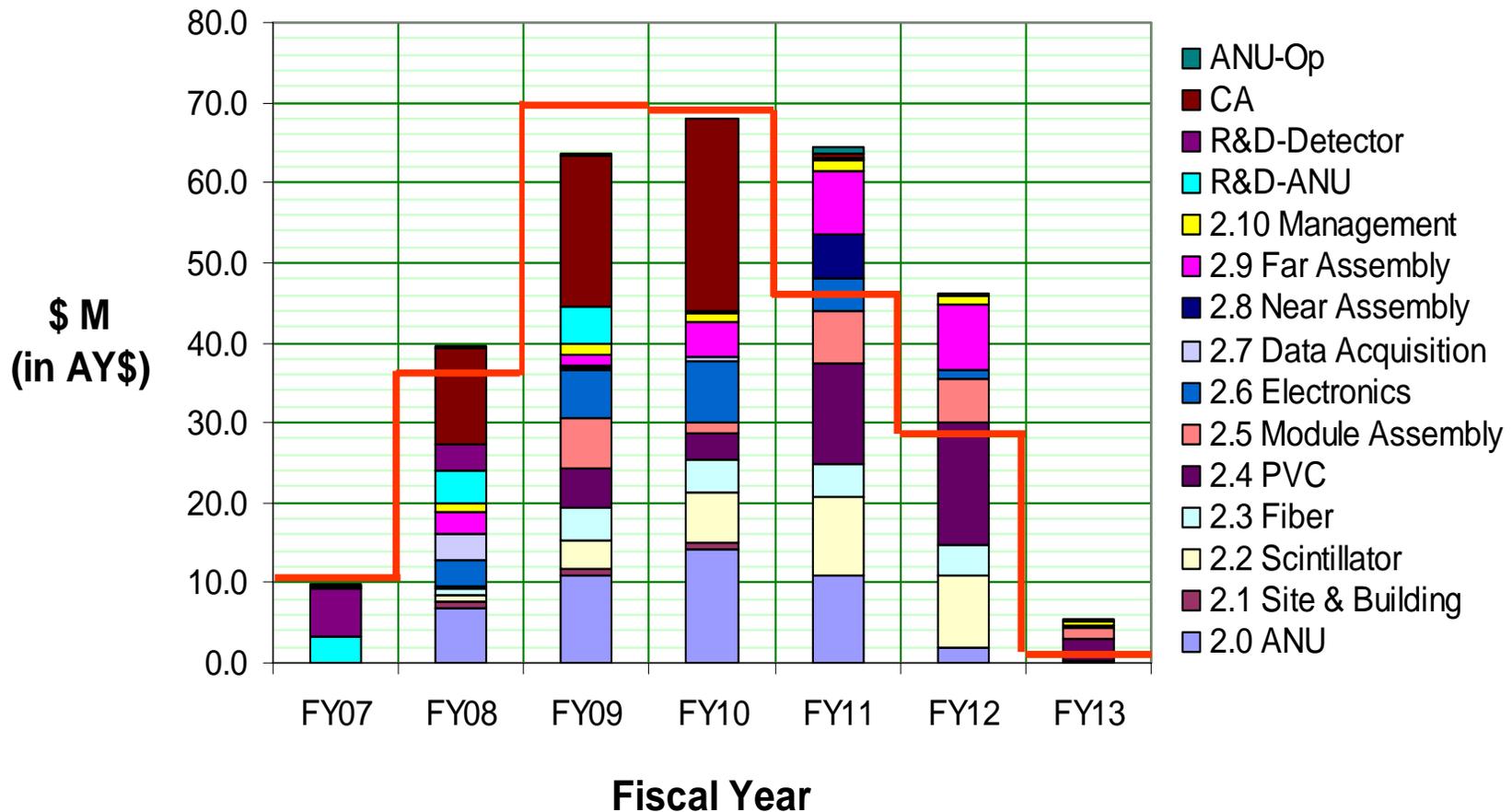
List of Errors with cost implications #4

DIFF(current-CD2)									
Activity ID	Activity Description	BAC Material	BAC Labor	BAC Total	M&S Cont. (\$)	Labor Cont. (\$)	Total Cont. (\$)	BAC + Cont. (\$)	
2.8	Near Detector Assembly	\$0	(\$3,155)	(\$3,155)	\$1,440,000	\$36,300	\$1,476,300	\$1,473,144	
2.8.1	Near Detector Site Preparation	\$0	\$6,944	\$6,944	\$1,440,000	\$41,349	\$1,481,349	\$1,488,292	corrected low M&S contingency assignment on excavation contract (40%-->100%)
2.8.2	Mechanical Construction and Installation	\$0	(\$10,099)	(\$10,099)	\$0	(\$5,049)	(\$5,049)	(\$15,148)	eliminated an unnecessary/duplicative task in muon catcher assembly
2.8.3	Liquid Scintillator Filling Equipment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
2.8.4	Installation Coordination	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
2.8.5	Management - Construction Phase	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
2.9	Far Detector Assembly	(\$17,772)	\$0	(\$17,771)	\$64,084	\$0	\$64,084	\$46,313	
2.9.1	Mechanical Systems	(\$29,000)	\$0	(\$29,000)	\$28,768	\$0	\$28,768	(\$232)	
2.9.2	Detector Infrastructure	\$11,600	\$0	\$11,600	\$35,502	\$0	\$35,502	\$47,102	increased M&S on far detector office area cost; added M&S contingency to three tasks where it had been left off.
2.9.3	Scintillator Filling Equipment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
2.9.4	Block Assembly and Installation	(\$371)	\$0	(\$371)	(\$186)	\$0	(\$185)	(\$557)	
2.9.5	Management - Construction Phase	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
2.1	Project Management - Construction	\$0	\$0	\$0	\$0	\$0	\$0	\$0	



Director's Review Cost (oblig.) Profile

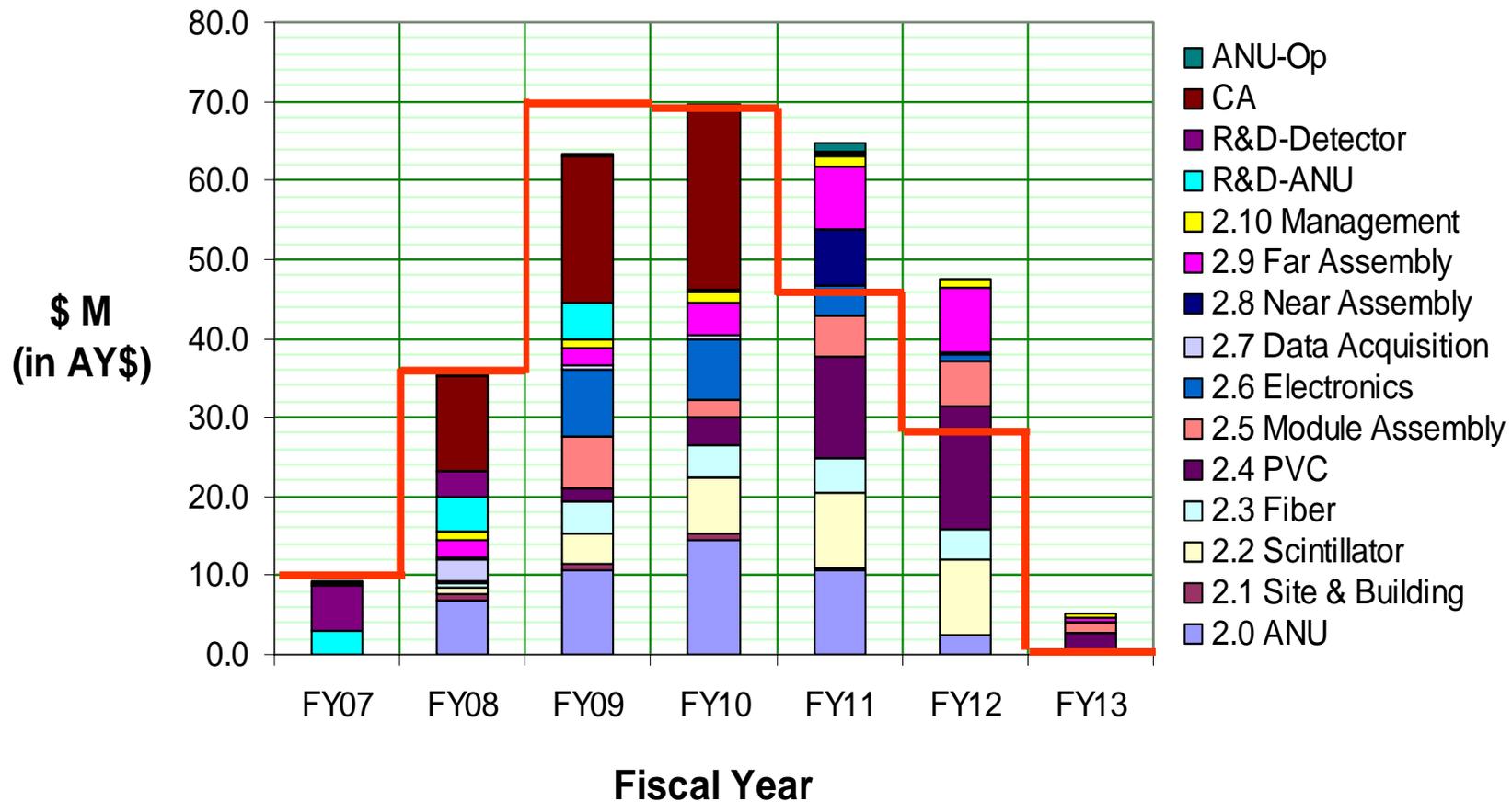
- DOE funding profile in red,
 - costs in stacked histogram from Open Plan escalated using Cobra





Revised “errors fixed” Cost (oblig) Profile

- Again, DOE funding profile in red,
 - Match 1st four years





Revised “errors fixed” Profile

	Totals by YR	DOE Profile	Cumulative Delta
FY07	9.2	10.3	1.11
FY08	35.4	36.05	1.72
FY09	63.2	70	8.50
FY10	69.7	69	7.80
FY11	64.6	45	(11.79)
FY12	47.5	28.2	(31.09)
FY13	5.2	1.4	(34.90)
Totals	294.9	260.0	

	2.0 ANU	2.1 Site & Bu	2.2 Scintillator	2.3 Fiber	2.4 PVC	2.5 Module	2.6 Electro	2.7 Data Ac	2.8 Near A	2.9 Far Ass	2.10 Mana	R&D-ANU	R&D-Detec	CA	ANU-Op	Totals by YR
FY07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	5.9	0.2	0.2	9.2
FY08	6.8	0.8	0.8	0.7	0.1	0.1	0.1	2.8	0.1	2.2	1.1	4.5	3.3	12.0	0.1	35.4
FY09	10.8	0.7	3.7	4.1	1.8	6.4	8.6	0.4	0.1	1.9	1.1	4.6	0.1	18.5	0.2	63.2
FY10	14.5	0.7	7.0	4.2	3.4	2.3	7.6	0.5	0.0	4.2	1.2	0.4	0.0	23.4	0.2	69.7
FY11	10.8	0.1	9.6	4.3	13.0	5.0	3.9	0.1	7.1	7.9	1.2	0.4	0.0	0.3	1.0	64.6
FY12	2.3	0.0	9.6	3.9	15.5	5.7	1.0	0.1	0.1	8.1	1.2	0.0	0.0	0.0		47.5
FY13	0.0	0.0	0.2	0.0	2.5	1.4	0.0	0.0	0.0	0.5	0.6	0.0	0.0	0.0		5.2
Totals	45.2	2.4	31.0	17.1	36.5	20.9	21.2	3.8	7.3	24.8	6.4	12.7	9.3	54.4	1.7	294.9



Other Items

- Task 425 budget still not set
 - Leaving it to Ellie and Connee
 - Everyone needs to remember that we must carry over FY07 into FY08 or suffer a delay
- Admin support
 - Starts July 2
- Office space rearranged
 - Finally scheduled for July 16
- Conference room to replace 12 NE?
- Scheduling support?
 - Maybe after July 9 “to analyze and suggest” ???
- Tech Writing?
 - Maybe in August ???
- Outside Engineering?
 - Not needed for DOE reviews
 - Could keep in mind for final design reviews next year?
- Will need more internal engineering for block pivoter, PPD?