



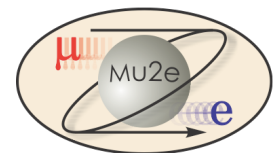
Mu2e Cost and Schedule Development

DOE CD-2/3b Review

F. Leavell

Mu2e Project Controls Lead

10/21/2014



Outline

- Organization of Project Schedule and Cost
- Schedule Development
 - Process
 - Gantt Chart Information
 - Reporting Milestones
 - Critical Path
- Cost Development
 - Total Estimated Cost
 - Resources
 - Cost Book Information
- Reporting
 - Earned Value
 - Schedule

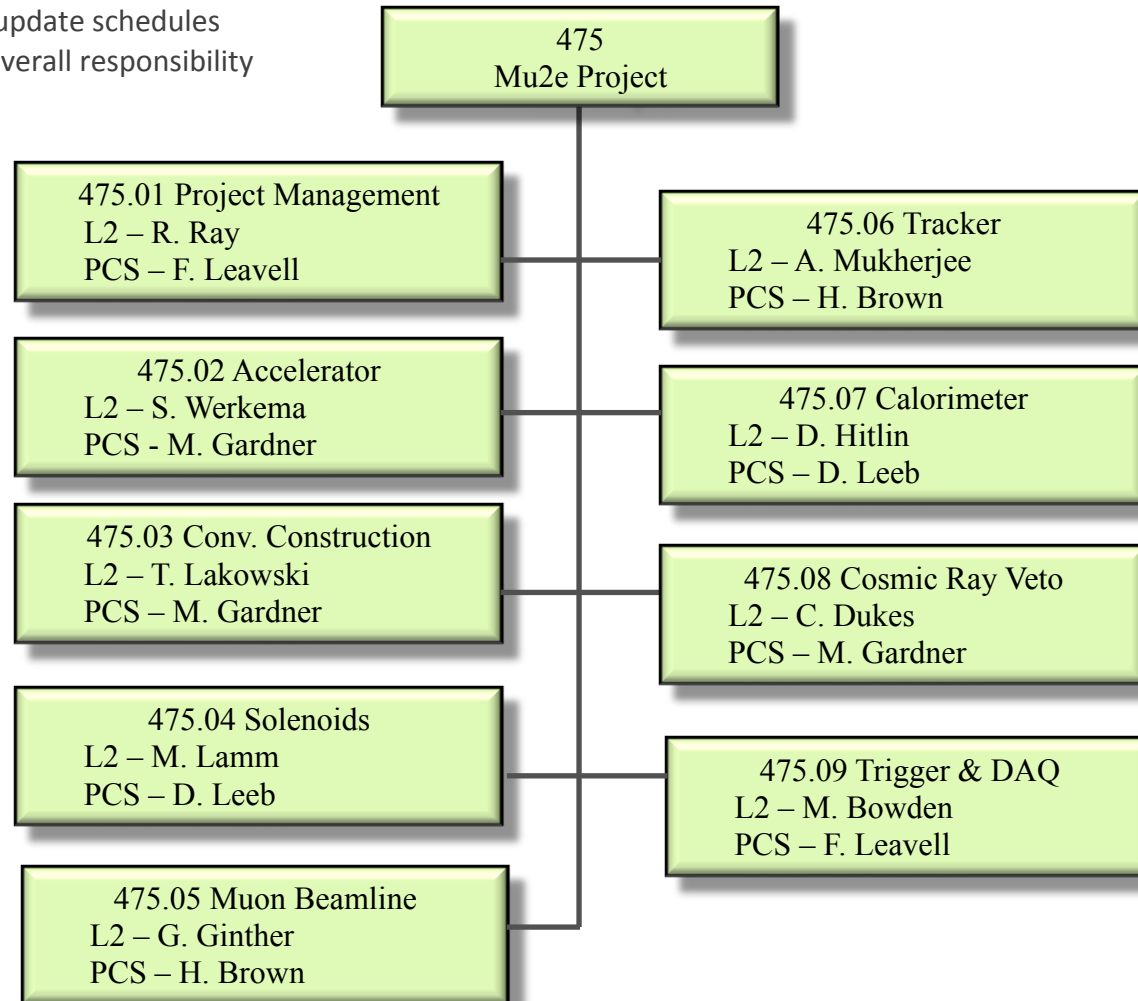
Organization of Project Schedule & Cost

Nine subprojects ("L2" projects)

Each a separate P6 schedule and Cobra project

CAMs develop and update schedules

L2 managers have overall responsibility



Schedule Development

- Scope - WBS Dictionary from Level 1 down to Activity
- Milestones
 - Tiers (Note: TX = External Milestone)
 - Dictionary for each
- Time-phased Logic Network
 - 5-day workweek with holidays
 - Predecessor and Successor for each task-dependent activity
 - Constraints (327) explained in P6 note
 - Reporting Milestone (199), FY peg (103), External (14), Other (12)
 - Lags – accompanied by a note in P6
- Resources Loaded
 - Total Estimated Cost

Resource Loaded Schedule

- Developed in consultation with individuals directly involved with the work
- Estimates, activities, and logic have been refined taking into account requirements, experience from previous projects or knowledge gained from completed prototypes
- L2/L3 managers and CAMs can view the RLS
- Making changes to the P6 schedule is limited
- An internal baseline has been established
- The change control process has been demonstrated and used

Iterative Process

- General
 - Schedule network created in consultation with responsible party
 - Units obtained from Basis of Estimate
 - Data check – Are durations and resources reasonable and realistic?
 - Data check – Has the correct Estimate Uncertainty Factor been assigned?
 - Data check for accuracy
- Critical Path
 - Schedules calculated together
 - Critical path analyzed for accuracy
 - Iterations performed, as needed
 - Critical path for each Subproject can also be evaluated

Data on the Gantt Chart

Activity ID	Activity Name	Duration - Work Days	Start	Finish	Predecessors	Total Float	BOE Docdb #	Cobra PMT Code	PMT	Resource Information
47506.02.01.022071	Cut straws, make & install termination parts for single-plane Test (M&S)	75	9/22/15 8	1/12/16 17	47506.02.01.022052, 47506.02.01.022062, 47506.02.01.022033, 47506.02.01.022053, 47506.02.01.022063, 47506.02.01.022042, 47506.02.01.022043, 47506.02.01.022032	106	3899	C	Units	M&S Pass-Thru: FY14 Base Year 5620
47506.03.04.001032	Design assembly rigging- Check and Finalize	40	2/19/15 8	4/15/15 17	47506.03.04.001031	992	3894	C	Percent Complete	Mechanical Design Engineer 163
47506.03.04.001031	Design assembly rigging- 2D design	40	12/18/14 8	2/18/15 17	47506.03.04.001030	992	3894	C	Percent Complete	Mechanical Design Engineer 50; Mechanical Designer 214
47504.5.1.001030	Produce preliminary engineering design -Power Leads from 5/1/14	21	1/22/15 8	2/19/15 17	47504.5.1.001029	96	1646	C	Milestone	Mechanical Design Engineer 18
47504.5.1.001030		45	2/20/15 8	4/23/15 17	47504.5.1.001030	96	1646	C	Milestone	Mechanical Design Engineer 15; Mechanical Designer 150

Docdb # for Basis of Estimate

Resource names and quantities

Step Name	Step Weight	Step % Complete
Specification of leads	20.0	0%
Layout of leads	20.0	0%
Bus attachment design	20.0	0%
Solid model of assembly	40.0	0%

PMT Code Value	Description	Cobra EVT	Cobra Description
Milestone	Weighted Steps	C	% Complete
Percent Complete	Physical % Complete	C	% Complete
Units Complete	Unit Complete	C	% Complete
50-50	50-50	E	50-50
0-100	0-100	F	0-100
LOE	Level of Effort	A	Level of Effort
Planning Pkg	Planning Package	K	Planning Package

Reporting Milestones

Structure



T5 contains logic and the date is the Early date from the technically-driven schedule

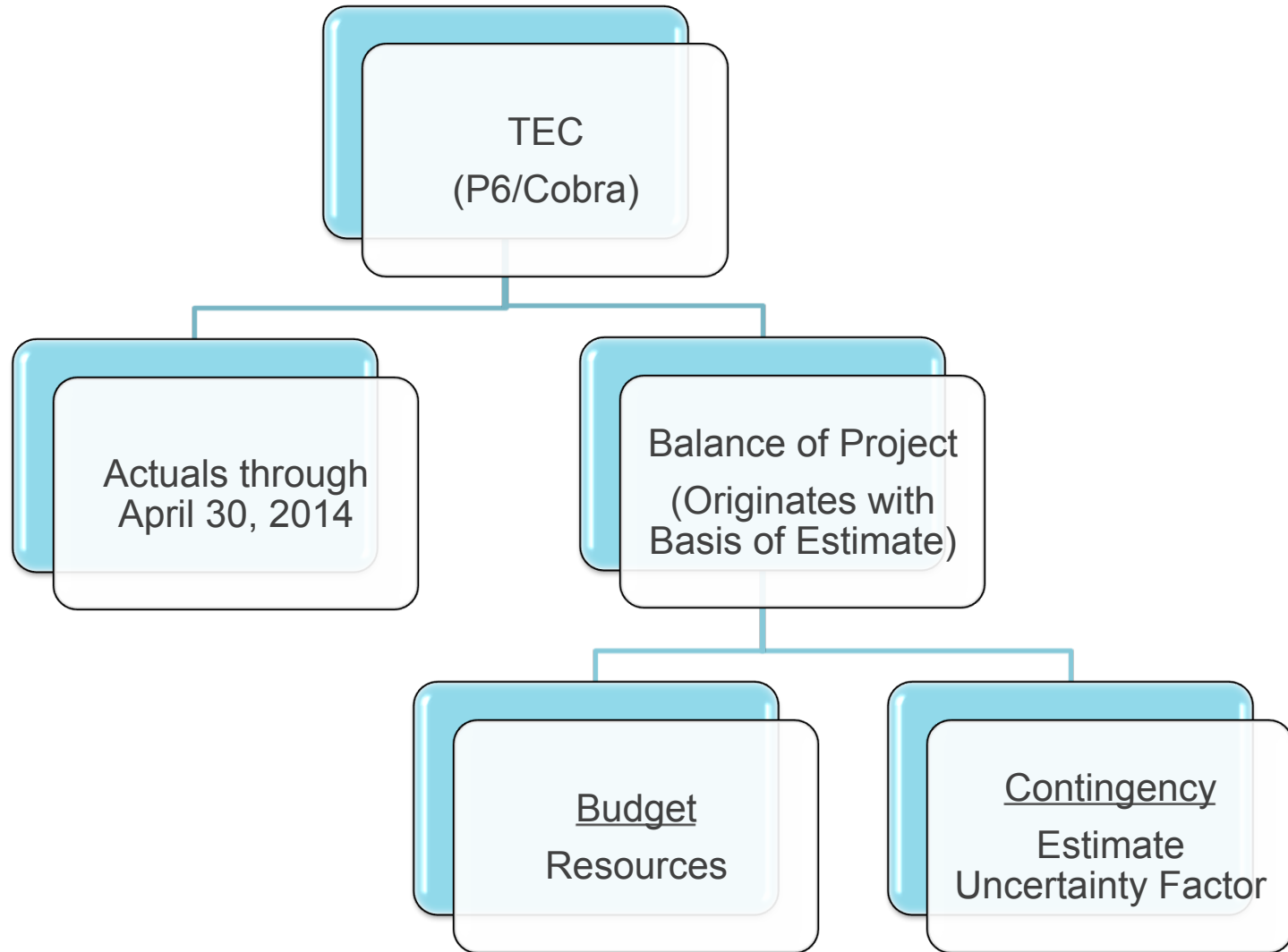
Tier	Quantity	Reporting	Complete*
T0	2	0	1
T1	14	13	0
T2	49	44	4
T3	94	70	7
T4	170	70	17
T5	660	2	96
TOTAL	989	199	125

* As of 30-Apr-2014

Critical Path

- Perform final design of cold mass components
- DOE CD-2/3b approval to award contract for Transport Solenoid (TS) module fabrication (FY15 Q1)
- TS Module fabrication, delivery, and testing (FY15 to FY18)
- Assemble, test, and install TSd Magnet (FY18 to FY20)
- Remainder of magnet system assembly, including cryogenic interconnects and Cryo Operational Readiness Certificate (FY20)
- Followed by cool down and energize magnets (FY20)
- This leads to completion of KPPs end of FY20
- Near critical path (< 1 week TF) also calculated

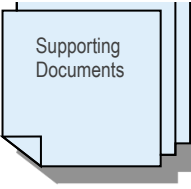
Total Estimated Cost (TEC)



Development of Total Estimated Cost (TEC)

Basis of Estimate (BOE)

Resource	Estimate of TEU (hours)	Cost	Cont. Rate	Comments
Project Manager FNPD_PPJ_MGR	0.851480	0%	L2	R. Fay at 50% contract with actual from past years. No contingency on full-time assignment. Risk category contains only associated with additional effort in Project Agency P13 at 50%. Contingency rate on other assignments not applied as management time on M2e. Risk category contains only associated with additional effort in Project Agency P13 at 50%.
Design Project Manager FNPD_PPJ_DMR	0.601061	0%	L2	Project support for design (containing management). Contingency rate is not applied because effort is encompassed from M2e's experience.
Project Support FNPD_PPJ_SPTT	0.101177	30%	L4	Project support for design (containing management). Contingency rate is not applied because effort is encompassed from M2e's experience.
Project Mechanical Engineer FNPD_MECH_TECH_MGR	0.601061	30%	L4	K. Kowalski. Range of effort from FY14. Contingency rate L4 applies because effort is based on previous effort.
Project Electrical Engineer FNPD_ELEC_TECH_MGR	0.50884	30%	L4	M. Lavelle. Same effort as FY14. Contingency rate L4 applies because effort is based on previous effort.
Finance FNPD_PPJ_FINANCE	1.001768	0%	L2	D. Knapy assigned full-time. No contingency on full-time assignment. Risk category contains only associated with additional effort in Project Office. Previous experience says 1 full-time financial officer is adequate.
Project Controls FNPD_PPJ_CTRL_SPLCT	1.93182	0%	L2	Bernice and Graham assigned at 50% Other 10% goes to assisting other projects and lab activities. Risk category contains only associated with additional effort in Project Office.
Project Controls FNPD_PPJ_CTRL_LEAD	0.801414	0%	L2	P. Lavelle assigned at 50%. Other time goes to 25% and other Lab activities. Risk category contains only associated with additional effort in Project Office.
Risk Manager FNPD_PPJ_SPTT	0.101177	0%	L2	S. Nigam. Director of Contract with L2M. Necessary effort from other area CD-2. No contingency because 510 PTE is full allocated amount. Risk category contains only associated with additional effort in Project Office.
QA manager FNPD_PPJ_SPTT	0.25442	0%	L3	PTE implementation of QA across project. Range of effort FY14 effort. Actual QA activities are accounted for in appropriate subelement. Contingency rate L3 is used because effort is not encompassed from previous M2e's effort. Previous contracts applied.
Procurement Manager (contract) FNPD_U_PROCUREMENT	0.751226	30%	L4	Contract effort from FY14 based on significant procurement of materials and deliverables and director component. Contingency rate L4 applies because effort is based on previous effort.
Admin FNPD_ADMIN_SPTT	0.5884	0%	L2	Assigned upon fraction of effort with PPD.
Team Manager FNPD_MECH_TECH_MGR	0.751226	0%	L2	D. Allen assigned at 75% as Team manager for M2e facility. FY14 job is in plan for facility. No contingency on a specific PTE assignment. Risk category contains only associated with additional effort in Project Office.
Team Manager FNPD_MECH_TECH_MGR	0.25442	0%	L2	P. Kowalski assigned at 75% as team manager for M2e facility. FY14 job is in plan for facility. No contingency on a specific PTE assignment. Risk category contains only associated with additional effort in Project Office.
Total TEU	8.861624	8%		

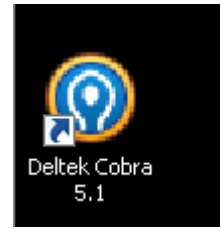


Control Account Managers and technical managers develop estimates

Resources Loaded into Schedule



Pricing



Cost Book

Sum of Value	Columns: Lab, F	Bid Labor Hours	Bid Non-Farm Hours	Bid M&S	B&C	Estimate Uncertainty	Total
476.01		84,548	4,015	2,491,888	30,630,192	867,343	22,694,116
476.01		1,468		1,894,015	6,846,187		4,360,288
20344 Re-plan Actuals				1,944,035	4,678,875		4,678,875
4760.2.1.002176 Guest Scientist Support for M2e II (LOE)		1,648		353,871	6,795,897	88,120	4,813,296
20344 Re-plan Actuals							3,779,624
4760.3.1.002121 Project Management LOE May4 to Sep14 Labo		5,899		531,673	742,712	42,423	761,296
4760.3.1.002131 Project Management LOE May4 to Sep14 Labo		75		10,871	13,801	1,300	15,781
4760.3.1.002141 Project Management LOE May4 to Sep14 (M&S, Equipment & Suppl				20,000	23,778	7,498	31,220
4760.3.1.002151 Project Management LOE May4 to Sep14 (M&S, Controls)				825	97,635	9,783	107,288
4760.3.1.002161 Simulators Infrastructure LOE May4 to Sep14				563	67,899	22,307	67,980
4760.3.1.002176		74,644	4,016	174,000	11,133,188	779,213	11,919,414
4760.4.1.002010 Project Management LOE FY13 (Labor)		15,624		1,934,070	121,889	2,065,940	
4760.4.1.002013 Project Management LOE FY13 (Labor-ES&H)		177		24,514	7,354	31,868	
4760.4.1.002010 Project Management LOE FY13 (M&S)				35,000	44,269	15,266	55,676
4760.4.1.002015 Simulators Infrastructure LOE FY13 (Labor)				244,882	13,463	124,346	
4760.4.1.002010 Project Management LOE FY13 (M&S, Controls)		707		242,540	24,254	266,794	
4760.4.1.002010 Project Management LOE FY13 (Labor-ES&H)		360		25,842	7,759	33,600	
4760.4.1.002040 Project Management LOE FY13 (Labor)		13,088		1,919,221	147,984	2,067,215	
4760.4.1.002050 Project Management LOE FY13 (M&S, Supplies, Equipment & Travel)				35,000	42,865	15,129	56,124
4760.4.1.002012 Simulators Infrastructure LOE FY13 (Labor)				240,131	24,910	274,264	
4760.4.1.002070 Project Management LOE FY13 (Labor)		12,615		1,687,239	64,462	1,718,171	
4760.4.1.002072 Project Management LOE FY13 (Labor-ES&H)		332		25,849	7,755	33,604	
4760.4.1.002075 Project Management LOE FY13 Review (M&S, Supplies, Equipment & Travel)				35,000	43,469	15,790	57,249
4760.4.1.002080 Project Management LOE FY13 (Labor)		3,500		1,264,897	51,115	1,310,710	
4760.4.1.002082 Project Management LOE FY13 (Labor-ES&H)		352		24,611	7,895	34,446	
4760.4.1.002085 Project Management LOE FY13 (M&S, Supplies, Equipment & Travel)				35,000	44,129	16,066	56,394
4760.4.1.002085 Project Management LOE FY13 to CD-4 Approval		20,278		3,269,241	183,128	3,450,269	
4760.4.1.002100 Project Management LOE FY13 to CD-4 Approval		707		62,939	18,882	81,821	
4760.4.1.002110 Project Management LOE FY13 to CD-4 Approval (M&S, Supplies, Equipment & T				34,000	44,010	15,440	59,050

BOE Report

WBS	Activity	Activity Name	Activity Type	Activity Code	Activity Description	Activity Start	Activity End	Activity Duration	Activity Status	Activity Manager	Activity Cost	Activity Cont. Rate	Activity Cont. %	Activity Cont. Type
4760.3.1.002121	Project Management LOE May4 to Sep14 Labo	Project Management LOE May4 to Sep14 Labo	Task	100	Project Management LOE May4 to Sep14 Labo	2013-05-01	2014-09-30	153	Completed	R. Fay	5,899	0%	L2	
4760.3.1.002131	Project Management LOE May4 to Sep14 Labo	Project Management LOE May4 to Sep14 Labo	Task	100	Project Management LOE May4 to Sep14 Labo	2013-05-01	2014-09-30	75	Completed	R. Fay	75	30%	L4	
4760.3.1.002141	Project Management LOE May4 to Sep14 (M&S, Equipment & Suppl	Project Management LOE May4 to Sep14 (M&S, Equipment & Suppl	Task	100	Project Management LOE May4 to Sep14 (M&S, Equipment & Suppl	2013-05-01	2014-09-30		Completed	R. Fay	20,000	0%	L2	
4760.3.1.002151	Project Management LOE May4 to Sep14 (M&S, Controls)	Project Management LOE May4 to Sep14 (M&S, Controls)	Task	100	Project Management LOE May4 to Sep14 (M&S, Controls)	2013-05-01	2014-09-30		Completed	R. Fay	825	0%	L2	
4760.3.1.002161	Simulators Infrastructure LOE May4 to Sep14	Simulators Infrastructure LOE May4 to Sep14	Task	100	Simulators Infrastructure LOE May4 to Sep14	2013-05-01	2014-09-30		Completed	R. Fay	563	0%	L2	



Resources

- Labor
 - Units in hours
 - 8 hours/day
 - Full Time Equivalent (FTE) = 1768 hours/year
- Material & Services (Nonlabor)
 - Material
 - Units in direct dollars (FY14 Base Year)
 - Non-Fermi Labor
 - Other Labs, Universities, Augmented Staff
 - Units in hours

Resource Layout

Control Account	Activity ID	Activity Name	Planned Duration	Start	Finish	BOE Docdb #	Estimate Type	Planned Material Cost	Planned Labor Units	Planned Nonlabor Units	
475.01-BCR001.04.01 Implementation			1783	11/8/13	12/17/20			\$174,000	76388.15h	8179.12h	
475.01.04	47501.4.1.001010	Project Management LOE FY15 (Labor)	251	10/1/14	9/30/15	3863	L2	\$0	15823.80h	0.00h	Non-Fermi Labor
475.01.04	47501.4.1.001015	Project Management LOE FY15 (Labor: ES&H)	251	10/1/14	9/30/15	3863	L2	\$0	176.80h	0.00h	
475.01.04	47501.4.1.001020	Project Management LOE FY15 (M&S)	251	10/1/14	9/30/15	3863	M4	\$35,000	0.00h	0.00h	
475.01.04	47501.4.1.001025	Simulations Infrastructure LOE FY15 (Labor)	251	10/1/14	9/30/15	3863	L4	\$0	707.40h	0.00h	
475.01.04	47501.4.1.001027	Issue PD for Project Management controls: LOE FY15 (Obligation)	1	10/1/14	10/1/14			\$0	0.00h	2044.78h	
475.01.04	47501.4.1.001028	Project Management LOE FY15 (M&S: Controls)	249	10/2/14	9/29/15	3863	M3	\$0	0.00h	2044.78h	
475.01.04	47501.4.1.001030	Project Management LOE FY16 (Labor: ES&H)	252	10/1/15	9/30/16	3863	L2	\$0	362.88h	0.00h	
475.01.04	47501.4.1.001040	Project Management LOE FY16 (Labor)	252	10/1/15	9/30/16	3863	L2	\$0	15087.89h	0.00h	
475.01.04	47501.4.1.001050	Project Management LOE FY16 (M&S: Supplies, Equipment & Travel)	252	10/1/15	9/30/16	3863	M4	\$35,000	0.00h	0.00h	
475.01.04	47501.4.1.001051	Issue PD for Project Management controls: LOE FY16 (Obligation)	1	10/1/15	10/1/15			\$0	0.00h	2044.78h	
475.01.04	47501.4.1.001052	Project Management LOE FY16 (M&S: Controls)	251	10/2/15	9/30/16	3863	M3	\$0	0.00h	2044.78h	
475.01.04	47501.4.1.001070	Project Management LOE FY17 (Labor)	250	10/3/16	9/29/17	3863	L2	\$0	12634.54h	0.00h	
475.01.04	47501.4.1.001072	Project Management LOE FY17 (Labor: ES&H)	250	10/3/16	9/29/17	3863	L2	\$0	352.14h	0.00h	
475.01.04	47501.4.1.001075	Project Management LOE FY17 Review (M&S: Supplies, Equipment & Travel)	250	10/3/16	9/29/17	3863	M4	\$35,000	0.00h	0.00h	
475.01.04	47501.4.1.001080	Project Management LOE FY18 (Labor)	250	10/2/17	9/28/18	3863	L2	\$0	9900.40h	0.00h	
475.01.04	47501.4.1.001082	Project Management LOE FY18 (Labor: ES&H)	250	10/2/17	9/28/18	3863	L2	\$0	352.14h	0.00h	
475.01.04	47501.4.1.001085	Project Management LOE FY18 (M&S: Supplies, Equipment & Travel)	250	10/2/17	9/28/18	3863	M4	\$35,000	0.00h	0.00h	
475.01.04	47501.4.1.001095	Project Management LOE FY19 to CD-4 Approval (Labor)	557	10/1/18	12/17/20	3863	L2	\$0	20205.61h	0.00h	
475.01.04	47501.4.1.001100	Project Management LOE FY19 to CD-4 Approval (Labor: ES&H)	557	10/1/18	12/17/20	3863	L2	\$0	784.56h	0.00h	

Resource ID Name	Role	Institution	Planned Dur	Planned Units	Planned Units/Time	EUF	EU Labor	EU M&S	EU Nonlabor	Resource Assignment Note
FNBS_U_PROCUREMENT		FN	251	1326.00h	66%	0.30	397.80	0.00	0.00	Uncosted procurement support. Continued effort from FY14 based on significant procurements of solenoids and detector hall a
c_FNDO_PRJ_CTRL_LEAD	Project Controls Lead	FN	251	1414.40h	70%	0.00	0.00	0.00	0.00	Project Controls: F. Leavell assigned at 80%. Other time goes to g-2 and other Lab initiatives. Risk registry contains risks associ
c_FNLB_PRJ_SPPRT	Project Support	3 FN	251	176.80h	9%	0.00	0.00	0.00	0.00	Risk Manager, Negotiated fraction of Dinnon with LBNE. Necessary effort goes down after CD-2. No contingency because 0.11
c_FNPD_ADMIN_SPPRT	Administrative Support	FN	251	884.00h	44%	0.00	0.00	0.00	0.00	Admin Support, Agreed upon fraction of effort with PPD
c_FNPD_ELEC_TECH_MNGR	Electrical Technical Manager	FN	251	884.00h	44%	0.30	265.20	0.00	0.00	Project EE, Same effort as FY14. Contingency rule L4 applies because effort is based on previous effort.
c_FNPD_MECH_ASMBY_TECH	Mechanical Assembly Technic	FN	251	442.00h	22%	0.00	0.00	0.00	0.00	Floor Manager: J. Grado assigned at 25% as assistant floor manager for Mu2e facility. FY15 job is to plan for facility. No continge
c_FNPD_MECH_TECH_MNGR	Mechanical Technical Manager	FN	251	1060.80h	53%	0.30	318.24	0.00	0.00	Project ME, Same effort as FY14. Contingency rule L4 applies because effort is based on previous effort.
c_FNPD_MECH_TECH_SPVSR	Mechanical Technician Superv	FN	251	1326.00h	66%	0.00	0.00	0.00	0.00	Floor Manager: D. Allen assigned at 75% as floor manager for Mu2e facility. FY15 job is to plan for facility. No contingency on a s
c_FNPD_PRJ_CTRL_SPCST	Project Controls Specialist	2 FN	251	1591.20h	79%	0.00	0.00	0.00	0.00	Project Controls Specialist: Brown assigned at 90%. Other 10% goes to assisting other projects and lab initiatives. Risk registry
c_FNPD_PRJ_CTRL_SPCST	Project Controls Specialist	3 FN	251	1591.20h	79%	0.00	0.00	0.00	0.00	Project Controls Specialist: Gardner assigned at 90%. Other 10% goes to assisting other projects and lab initiatives. Risk registr
c_FNPD_PRJ_FINANCE	Project Finance	FN	251	1768.00h	88%	0.00	0.00	0.00	0.00	Finance: D. Knapp assigned full-time. No contingency on a full-time assignment. Risk registry contains risks associated with add
c_FNPD_PRJ_MNGR	Project Manager	1 FN	251	1679.60h	84%	0.00	0.00	0.00	0.00	Project Manager: R. Ray at 95%, consistent with actuals from past years. No contingency on a full-time assignment. Risk registr
c_FNPD_PRJ_MNGR	Project Manager	2 FN	251	1060.80h	53%	0.00	0.00	0.00	0.00	Deputy Project Manager: D. Glenzinski at 60%, consistent with actuals from past years. Spends time on other assignments and
c_FNPD_PRJ_SPPRT	Project Support	2 FN	251	442.00h	22%	0.50	221.00	0.00	0.00	QA Manager: Full implementation of QA across project. Ramp-up from FY14 effort. Actual QA activities are accounted for in inapp
c_FNPD_PRJ_SPPRT	Project Support	1 FN	251	177.00h	9%	0.30	53.10	0.00	0.00	Project support for change control, monthly reports. Contingency rule L4 is used because effort is extrapolated from NOV4 exp

Data on the Cost Book

WBS ID(s) and names, down to Activity

Direct labor hours

Budget at Completion, includes escalation & overhead

Contingency for Estimate Uncertainty and Risk

Mu2e Cost Book October 10, 2014 CD-2/3b DoE Review							
WBS	Direct Labor Hours	Direct Non-Fermi Hours	Direct M&S	B A C	Estimate Uncertainty	Total	Contingency on remaining budget
475.01 Project Management	129,045	15,893	1,221,174	20,668,751	2,125,218	22,793,969	19%
475.02 Accelerator	181,125	11,770	10,923,795	40,805,731	9,433,428	50,239,159	33%
475.03 Conventional Construction	27,929	448	16,005,743	21,244,842	2,824,807	24,069,649	15%
475.04 Solenoids	342,034	7,177	44,412,105	87,967,644	24,322,452	112,290,096	34%
475.05 Muon Beamline	80,743	8,765	6,978,363	19,567,153	5,922,437	25,489,589	39%
475.06 Tracker	45,830	40,779	4,609,205	11,523,471	3,759,632	15,283,102	44%
475.07 Calorimeter	4,046	27,469	3,158,315	4,927,821	1,164,288	6,092,109	26%
475.08 Cosmic Ray Veto	20,394	24,189	3,846,811	6,772,668	1,962,633	8,735,302	38%
475.09 Trigger & DAQ	38,112	8,488	592,335	4,800,243	1,206,918	6,007,161	41%
Grand Total	869,258	144,978	91,748,047	218,278,325	52,721,812	271,000,136	32%

WBS	Estimate Uncertainty	Total	Contingency on remaining budget
475.01 Project Management	2,125,218	22,793,969	19%
475.01.02 Project Office Conceptual Design (Post CD-0: OPC)	4,950,583	4,950,583	0%
475.01.03 Project Office Preliminary & Final Design Phase to CD-2/3	88,757	4,821,895	-
475.01.04 Project Office Implementation & Close-out to CD-4	771,461	11,756,491	7%
475.01.99 Risk Based Contingency	1,265,000	1,265,000	-

Direct material dollars

% Contingency on remaining work, as of 9/30/2014

WBS L2 Line item for Risk Based Contingency

Mu2e

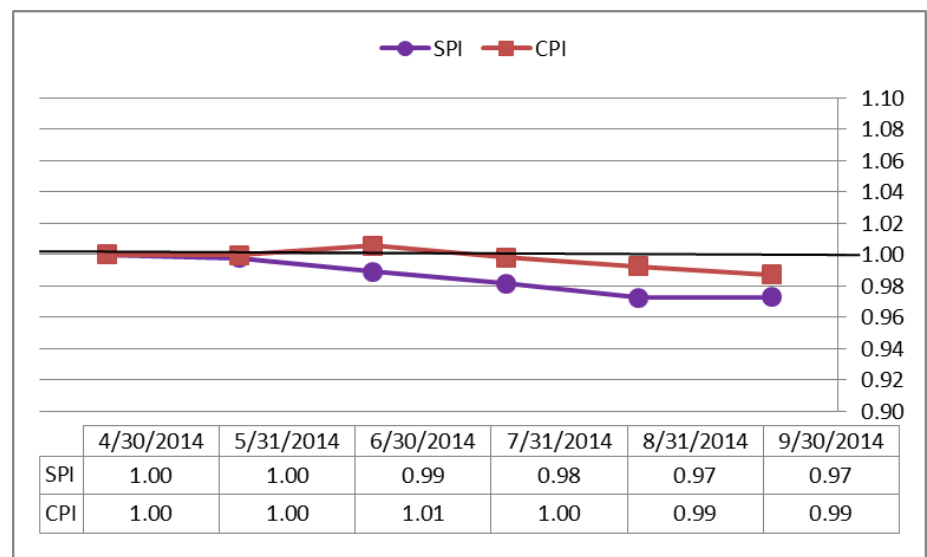
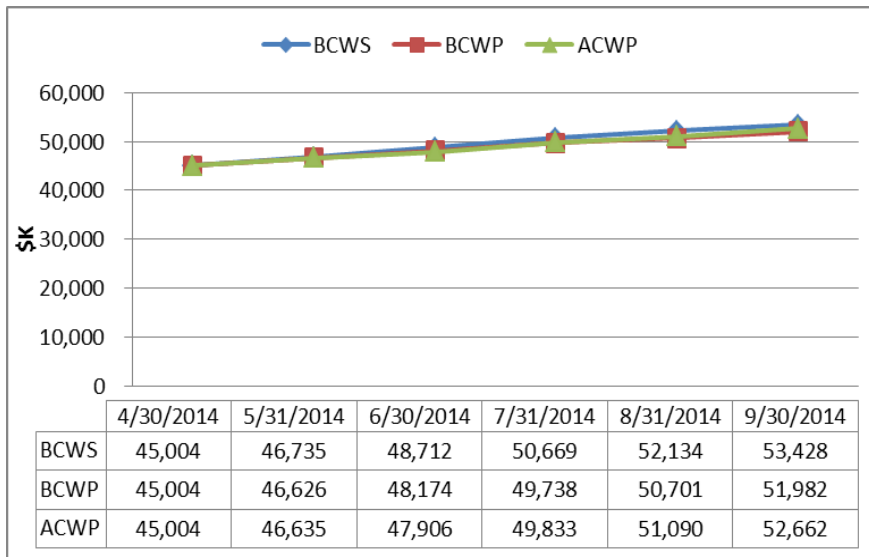


Reporting

- Schedule development and monthly status in parallel since early 2013
- Monthly Earned Value reports since April 2014
- Performance curves / SPI/CPI graphs
- Variance Analysis
 - Corrective Action status until closed
- Forecast review monthly
 - Schedule
 - Resources (475.02 P6 Remaining Units →Cobra)
 - Performance trend
- EVMS Processing Calendar
- Change Request: Before-After Cost/Schedule Reports

Earned Value Reports

Mu2e Project																					
September 30, 2014																					
Currency in: \$K																					
Work Package.WBS (2)	Current Period							Cumulative to Date								At Complete					
	Budget	Earned	Actuals	SV (\$)	SV (%)	CV (\$)	CV (%)	Budget	Earned	Actuals	SV (\$)	SV (%)	CV (\$)	CV (%)	SPI	CPI	BAC	EAC	VAC	% Spent	% Complete
475.01 Project Management	221	221	158	0	0%	63	28%	9,565	9,565	9,490	0	0%	75	1%	1.00	1.01	20,669	20,600	69	46%	46%
475.02 Accelerator	302	179	154	(123)	-41%	26	14%	12,206	11,790	11,612	(416)	-3%	178	2%	0.97	1.02	40,806	40,830	(24)	28%	29%
475.03 Conventional Construction	65	68	25	4	6%	43	63%	2,661	2,642	2,439	(19)	-1%	203	8%	0.99	1.08	21,245	21,055	190	12%	12%
475.04 Solenoids	291	511	860	220	75%	(349)	-68%	16,931	16,743	17,880	(188)	-1%	(1,137)	-7%	0.99	0.94	87,968	89,129	(1,161)	20%	19%
475.05 Muon Beamline	69	96	50	27	39%	46	48%	4,483	4,406	4,382	(78)	-2%	24	1%	0.98	1.01	19,567	19,567	0	22%	23%
475.06 Tracker	107	69	57	(39)	-36%	12	18%	3,238	2,941	3,056	(296)	-9%	(114)	-4%	0.91	0.96	11,523	11,579	(56)	26%	26%
475.07 Calorimeter	52	41	101	(11)	-20%	(59)	-142%	464	522	319	58	12%	203	39%	1.12	1.64	4,928	4,763	165	7%	11%
475.08 Cosmic Ray Veto	111	56	130	(55)	-50%	(74)	-134%	1,962	1,543	1,656	(419)	-21%	(112)	-7%	0.79	0.93	6,773	6,640	133	25%	23%
475.09 Trigger & DAQ	76	40	39	(36)	-47%	2	4%	1,917	1,829	1,828	(88)	-5%	1	0%	0.95	1.00	4,800	4,800	(0)	38%	38%
Total	1,294	1,281	1,572	(13)	-1%	(291)	-23%	53,428	51,982	52,662	(1,446)	-3%	(680)	-1%	0.97	0.99	218,278	218,961	(683)	24%	24%



Schedule Reports

Milestone Status

Activity ID	Activity Name	Activity Status	BL Start	BL Finish	Start	Finish	Variance - BL Finish	Change from Prior Month	Total Float
Milestone Tier: T0 Milestone - DOE Acquisition Executive for Critical									
47501.1.001010	T0 - DOE Approval of CD-0	Completed	11/25/09	11/11/02	11/25/09	11/11/02	0	0	0
47501.4.3.001110	T0 - DOE CD-4 Approval	Not Started		11/11/02		11/11/22*	0	0	0
Milestone Tier: T1 Milestone - DOE Program									
47501.3.2.001027	T1 - DOE CD-3a Approval	Completed	7/10/14	11/9/21	7/10/14	11/9/21	0	0	253
47504.3.3.0214711	T1 - PO issued for T3 module fabrication	Not Started		4/15/16		4/15/16*	0	0	1652
47507.2.0017871	T1 - Technology choice for crystal and photo sensor completed	Not Started		5/4/16		5/4/16*	0	0	1638
47504.2.051729	T1 - P0 magnet construction authorized	Not Started		2/24/17		2/24/17*	0	0	1437
47504.4.051454	T1 - D0 construction authorized	Not Started		2/24/17		2/24/17*	0	0	1437
47507.2.011990	T1 - PO issued for production crystals	Not Started		1/3/18		1/3/18*	0	0	1223

3-month Lookahead

Activity ID	Activity Name	Remaining Duration	Start	Finish	Total Float	Chargeable Task Code
475.03-20140930	Conventional Construction - 9/24/14 Baseline	251	5/1/14	9/30/15	1787	
475.03-20140930	Conventional Construction - 9/24/14 Baseline aft	0	10/1/14	10/1/14	0	
FY15803 Start of FY2015						
475.03-20140930.02.01	Project Management	10	6/29/14	10/14/14	2028	
47503.02.01.1140	Review of final RLS (for DoE review)	10	6/29/14	10/14/14	2028	
475.03-20140930.02.02	Mu2e Conventional Facilities Engineering & Design	43	5/1/14	12/31/14	4	
47503.02.02.1270	Engineering, Design & Inspection LCE remaining FY14 to Construction I	43	5/1/14	12/31/14	4	475.708
475.03-20140930.02.03	Delivery Ring Engineering & Design	56	6/9/14	12/19/14	249	
47503.02.03.1000	Engineering, Design & Inspection LCE FY14 to Construction Labor	56	6/9/14	12/19/14	249	475.709
47503.02.03.1010	Engineering, Design & Inspection LCE FY14, In-house consultants, Equip	56	6/9/14	12/19/14	249	475.709
475.03-20140930.02.04	Detector Facility A&E Administration	3	12/3/14	12/8/14	33	
47503.02.04.1130	Prepare PO for A/E of Record services (Phase 3: Construction Support)	3	12/3/14	12/8/14	33	
475.03-20140930.02.04.01	Detector Facility A&E Deliverables	40	5/1/14	11/25/14	1988	
47503.02.04.01.1	Consultant support after 100% documents delivered	40	5/1/14	11/25/14	1988	475.161
475.03-20140930.02.06	Fermi Procured Items Design	30	5/1/14	11/11/14	61	
47503.02.06.1005	Prepare Mu2e Conventional Facilities Overhead Crane Contract Docum	30	5/1/14	11/11/14	61	475.163

Driving Critical Path

Activity ID	Activity Name	Start	Finish	Total Float
4781.1.002010	L1 - DOE Approval of CD-0	11/25/09	11/25/09	0
4781.2.2.001080	L2 - DOE CD-3a Approval, release of PED Funding Request	7/2/14	7/2/14	0
4781.2.2.001088	L2 - Release of PED Funding by DOE	7/2/14	7/2/14	0
4781.2.2.001916	Assemble Technical Design Report (TDR)	4/1/14	6/2/14	4.00
4784.4.011300	Evaluate vendor proposals for D0 Final Design and Build	5/13/14	6/18/14	72.00
4784.4.011340	L4 - Issue for D0 Final Design and Build Selected	6/18/14	7/2/14	72.00
4784.4.011350	Prepare contract award for D0 Final Design and Build	7/2/14	7/2/14	72.00
4784.4.011360	Issue Contract and PO for Vendor preparation of D0 Final Design (Obligation)	7/2/14	8/2/14	72.00
4784.4.011370	L2 - DOE CD-3a Approval	7/1/14	24.00	0.00
4784.4.011380	Issue Contract and PO for Vendor preparation of D0 Final Design (Obligation)	8/2/14	8/2/14	72.00
4784.4.011390	L2 - DOE CD-3a Approval	8/2/14	8/2/14	72.00
4784.4.011400	Vendor prepares D0 Final Design	8/2/14	9/2/15	72.00
4781.2.2.001988	L2 - New Start Authorization	10/1/14	11/4/14	14.00
4781.2.2.001988	Vendor delivers D0 Final Design	9/2/15	11/4/14	72.00
4784.4.011410	Contract technical evaluation of D0 final design	6/9/15	9/3/15	72.00
4784.4.011410	L4 - Production readiness review complete, Detector Selected final design complete	9/3/15	9/3/15	72.00
4784.4.011410	DOE CD-3a Detector Selected Mile Review & approval complete	9/3/15	9/3/15	72.00
4781.2.2.002020	L4 - FY16 DOE funds available	10/1/15	10/1/15	0.00
4784.4.011460	Authorize construction of D0 (Obligation)	10/1/15	10/1/15	0.00
4784.4.011470	L2 - D0 construction authorized	10/1/15	10/1/15	0.00
4784.4.011480	Vendor prepares testing for D0 magnet	10/1/15	10/1/15	0.00
4784.4.011490	Vendor builds D0 magnet	10/1/15	10/1/15	0.00
4784.4.011500	Vendor prepares testing for D0 magnet	10/1/15	10/1/15	0.00
4784.4.011510	L2 - MS-10 Issue Benchmark Occupancy	10/1/15	10/1/15	0.00
4784.4.011520	Connect LV HV and signal cables for Disk 1	10/1/15	10/1/15	0.00
4787.0.002100	Prepare disk 1 for reuse	10/1/15	10/24/15	27.00
4784.4.011640	Final acceptance review completion of warm test of D0 magnet	9/1/16	9/1/16	0.00
4784.4.011650	Vendor ships magnet	4/12/16	5/1/16	0.00
4784.4.011660	L3 - D0 Magnet arrival at FNAL	5/1/16	5/1/16	0.00
4784.4.011670	Conduct acceptance testing on D0 magnet	5/1/16	7/19/16	0.00
4784.4.011680	Prepare D0 magnet for installation and delivery to the Mu2e Experimental Hall	7/19/16	8/1/16	0.00
4784.4.011690	Deliver D0 magnet to Mu2e Experimental Hall	8/1/16	8/1/16	0.00
4784.4.011700	L4 - Detector Selected magnet ready for installation	8/1/16	8/1/16	0.00
4784.4.011710	Review D0 Magnet at Mu2e Experimental Hall	8/2/16	8/2/16	0.00
4784.4.011720	Install and align D0 magnet frame	8/2/16	8/2/16	0.00
4784.4.011730	Install and align D0 magnet	8/2/16	8/2/16	0.00
4784.4.011740	Verify alignment of D0 magnet - adjust if necessary	8/2/16	9/1/16	0.00

Performance: Current vs. Target

Activity ID	Activity Name	Performance % (Current)	BL Start	BL Finish	Start	Finish	Planned	At Complete	Variance - BL Finish	Total Float
TDQA & DAQ										
TDQA Project Management										
478.486 ADU10	Internal Baseline Single Point Adjustment (D-A-N)	100%	4/30/14	10/16/14	4/30/14	8/02/14	1547	1547	-22	-1
TDQA System Design and Test										
Conceptual Design - Sys Design and Test										
478.486 ADU10	Internal Baseline Single Point Adjustment (D-A-N)	100%	4/30/14	10/16/14	4/30/14	8/02/14	1547	1547	-22	-1
47809.2.2.001080	Review & Approve Prototype System Tests	0%	6/18/14	6/18/14	6/18/14	6/18/14	1	1	0	0
Prototype System - Sys Design and Test										
478.486 ADU10	Internal Baseline Single Point Adjustment (D-A-N)	100%	4/30/14	10/16/14	4/30/14	8/02/14	1547	1547	-22	-1
47809.2.2.001080	Review & Approve Prototype System Tests	0%	6/18/14	6/18/14	6/18/14	6/18/14	1	1	0	0
Data Acquisition										
Prototype System - Data Acquisition										
478.486 ADU10	Internal Baseline Single Point Adjustment (D-A-N)	100%	4/30/14	10/16/14	4/30/14	8/02/14	1547	1547	-22	-1
47809.3.1.001080	TS - DAQ Prototype Design Complete	100%	4/30/14	10/16/14	4/30/14	8/02/14	1547	1547	-22	-1
Pilot System - Data Acquisition										
47809.3.2.001080	Develop D0G Software - Pilot Design Release 1	0%	5/1/14	6/26/14	5/1/14	8/02/14	267	303	-29	11
47809.3.2.001080	Develop D0G Software - Pilot Design Release 1	100%	5/1/14	6/26/14	5/1/14	8/02/14	267	303	-29	11
47809.3.2.001080	Develop D0G Software - Pilot Design Release 1	100%	5/1/14	6/26/14	5/1/14	8/02/14	267	303	-29	11
47809.3.2.001080	Develop Pilot System - Schematic Designs	100%	5/1/14	6/26/14	5/1/14	8/02/14	267	303	-29	11
47809.3.2.001080	Develop Pilot System - PCB Designs	100%	5/1/14	6/26/14	5/1/14	8/02/14	267	303	-29	11
47809.3.2.001080	Develop D0G Firmware - Pilot Design Release 2	80%	6/27/14	8/22/14	7/16/14	8/02/14	40	27	4	43
47809.3.2.001080	Develop D0G Firmware - Pilot Design Release 2	40%	6/27/14	8/22/14	7/16/14	8/02/14	40	27	-10	48
47809.3.2.001080	Review & Approve Pilot System Hardware Designs	0%	6/18/14	6/26/14	6/18/14	6/18/14	5	5	-33	103
47809.3.2.001080	Develop D0G Firmware - Pilot Design Release 3	0%	8/26/14	10/20/14	8/19/14	8/02/14	59	59	-16	43
47809.3.2.001080	Develop D0G Software - Pilot Design Release 3	0%	8/26/14	10/20/14	8/19/14	8/02/14	59	59	-16	43
47809.3.2.001080	Develop D0G Software - Pilot Design Release 4	0%	10/27/14	12/17/14	11/4/14	8/02/14	40	40	-10	48
47809.3.2.001080	Develop D0G Software - Pilot Design Release 4	0%	10/27/14	12/17/14	11/4/14	8/02/14	40	40	-10	48
47809.3.2.001080	Order Data Acquisition Pilot System Components - Purchase Receipts	0%	10/27/14	12/17/14	11/4/14	8/02/14	16	16	-33	29
47809.3.2.001080	Issue PO for Data Acquisition Pilot System Components (Obligation)	0%	10/28/14	10/28/14	12/16/14	8/02/14	1	1	-33	29
47809.3.2.001080	Deliver Data Acquisition Pilot System Components - Vendor Invoice	0%	10/28/14	12/16/14	12/16/14	8/02/14	30	30	-33	29
47809.3.2.001080	TS - DAQ Pilot System Installed	0%	12/11/14	12/11/14	2/3/15	8/02/14	0	0	-33	29

Mu2e



Summary

- The PMB is based on actuals FY-10 through April 30, 2014 and BOEs May 1, 2014 to project completion
- Resource loaded schedules are mature
- Resources are traceable to BOEs
- Durations and resources are reasonable
- Estimate uncertainty is identified for each incomplete activity
- Critical path is visible and realistic
- The project has been exercising EVMS
- Items for improvement are being addressed
- Project continues to implement FRA EVMS processes