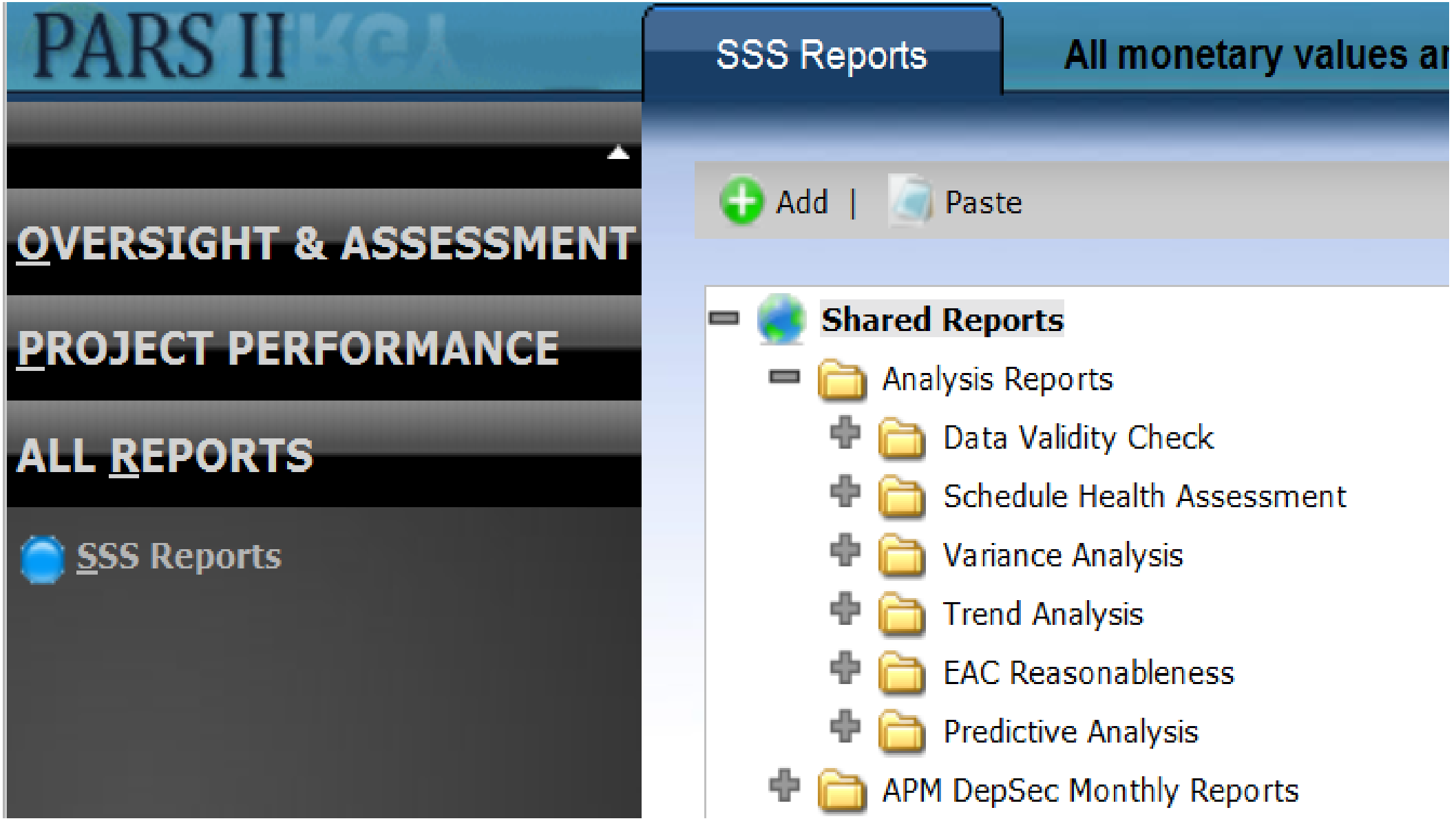
EVMS Training Snippet Library:
PARSII Analysis: EAC Reasonableness and IEAC Development

Office of Acquisition and Project Management (OAPM) MA-60
U. S. Department of Energy
July 2014

Analysis Reports – Project Analysis SOP

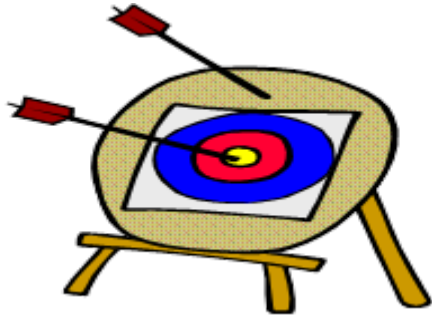


PARS II

- **Analysis Reports**
  - Report use further explained in OAPM's EVMS Project Analysis Standard Operating Procedure (EPASOP)
  - EAC Reasonableness Subfolder
    - EV Data Validity (WBS Level)
    - CPI vs. TCPI (PMB Level)
    - Performance Index Trends (WBS Level)
  - Predictive Analysis Subfolder
    - Funding Status (Monthly at Project Level)
    - IEAC Analysis (WBS Level)

Estimates at Completion

- **What is the EAC?**
  - ACWPcum + estimate to complete (ETC) = EAC
  - So what is the first piece of information you need to begin thinking about the ETC?
    - Budgeted Cost for Work Performed



- **Understanding the common EAC formulas are important as different formulas are selected based on projected contractor performance**
  - Is past contractor performance expected to continue?
  - What in the contractor's operations is expected to change and why?
  - Is the change for the better or worse?

Using the To Complete Performance Index (TCPI)

- **TCPI measures the cost efficiency of performance required to achieve the contractor's EAC or BAC**
  - 1.25 means $1.25 worth of work must be performed for every $1 spent
  - 0.85 means $0.85 worth of work must be performed for every $1 spent

- **Use the TCPI to evaluate reasonableness of a contractor's** Estimate at Completion (EAC)

$$\mathbf{TCPI_{EAC} = (BAC - BCWP_{CUM}) / (EAC - ACWP_{cum})}$$

$$\mathbf{TCPI_{EAC} = work\ remaining / ETC}$$

- **What is the likelihood that project will complete within the BAC?**
  - $TCPI_{BAC}$ = work remaining / (BAC – $ACWP_{CUM}$)
  - This formula is of no value once ACWP exceeds BAC.

EV Data Validity Report

CPI/SPI Thresholds		
Green	<= ±	0.10
Yellow	<= ±	0.20
Red	> ±	0.20

Cum CV	Cum SV	Cum CPI	Cum SPI	BAC	EAC	VAC	% Comp	TCPI to EAC	CPI <> TCPI ±0.05
7,837,731	(8,053,315)	1.15	0.88	78,354,605	89,748,954	(11,394,349)	76.1%	0.49	0.66
1,907,496		1.11	1.00	21,605,095	23,119,989	(1,514,894)	89.8%	0.39	0.72
438,887	(17,992)	1.06	1.00	8,039,240	7,677,082	362,158	95.5%	0.83	0.23

- TCPI > CPI by 0.05 (5%); EAC may be overly optimistic
- TCPI < CPI by 0.05 (5%); EAC may be too pessimistic
- Difference of .1 or 10% indicates EAC needs updating
- Note: This is a partial view of the full report

EV Data Validity Report

CPI/SPI Thresholds		
Green	<= ±	0.10
Yellow	<= ±	0.20
Red	> ±	0.20

Cum CV	Cum SV	Cum CPI	Cum SPI	BAC	EAC	VAC	% Comp	TCPI to EAC	CV < VAC
(65,944)	(7,052,998)	1.00	0.94	118,817,679	118,837,250	(19,571)	93.0%	1.01	(46,373)
(63,109)	(6,899,981)	1.00	0.94	116,957,205	116,972,860	(15,655)	93.5%	1.01	(47,454)

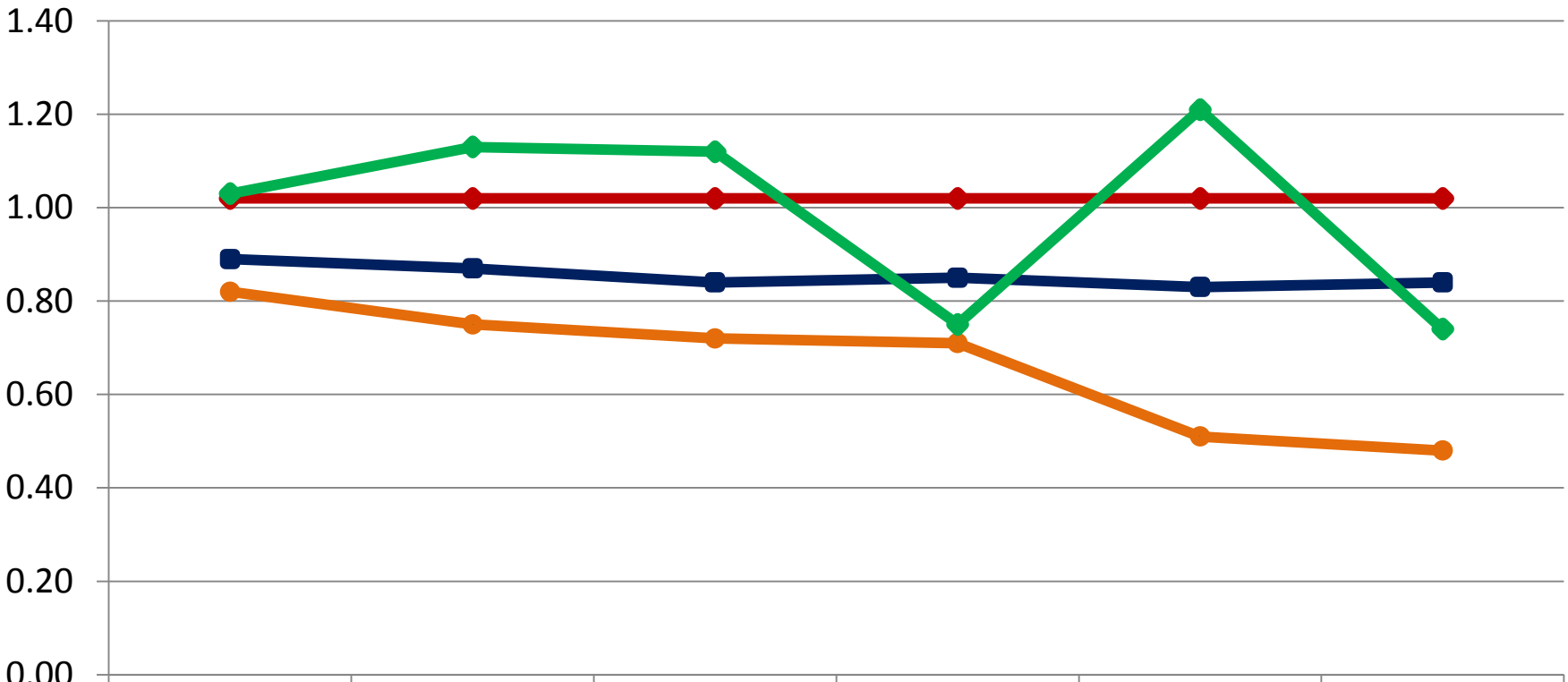
- **Entries in the CV > VAC Column indicate the Cumulative Cost Variance (Cum CV) is more *negative* (smaller number, larger overrun) than the projected cost variance at completion (VAC)**
- **These two WBS elements are 93% complete; would seem difficult to recover that much variance**
- **Note: This is a partial view of the full report**

CPI vs. TCPI (PMB Level)

Status Date	Current				Cumulative				BAC	EAC	TCPI - BAC	TCPI - EAC
	BCWS	BCWP	ACWP	CPI	BCWS	BCWP	ACWP	CPI				
06/30/13	5,323,088	3,638,868	3,534,360	1.03	308,711,525	295,442,525	289,597,742	1.02	340,901,465	345,311,276	0.89	0.82
07/31/13	6,051,202	4,410,678	3,905,223	1.13	314,762,727	299,853,203	293,502,964	1.02	341,124,919	348,569,622	0.87	0.75
08/31/13	4,451,319	4,408,850	3,936,963	1.12	319,214,047	304,262,053	297,439,927	1.02	341,161,425	348,440,509	0.84	0.72
09/30/13	3,515,505	3,158,329	4,233,687	0.75	322,729,551	307,420,382	301,673,614	1.02	341,220,958	349,447,145	0.85	0.71
10/31/13	3,434,083	3,460,448	2,854,031	1.21	326,163,634	310,880,830	304,527,645	1.02	341,611,498	364,830,378	0.83	0.51
11/30/13	2,926,603	2,395,948	3,221,512	0.74	329,090,237	313,276,777	307,749,157	1.02	341,688,907	366,403,597	0.84	0.48

- **Purpose:**
  - Compare current period and cumulative cost performance index to $TCPI_{EAC}$ and $TCPI_{BAC}$

CPI vs. TCPI (PMB Level)



	06/30/13	07/31/13	08/31/13	09/30/13	10/31/13	11/30/13
TCPi to EAC	0.82	0.75	0.72	0.71	0.51	0.48
TCPI to BAC	0.89	0.87	0.84	0.85	0.83	0.84
CPi Cum	1.02	1.02	1.02	1.02	1.02	1.02
CPi Current	1.03	1.13	1.12	0.75	1.21	0.74

Performance Index Trends (WBS Level) Report

- **Report Tab**

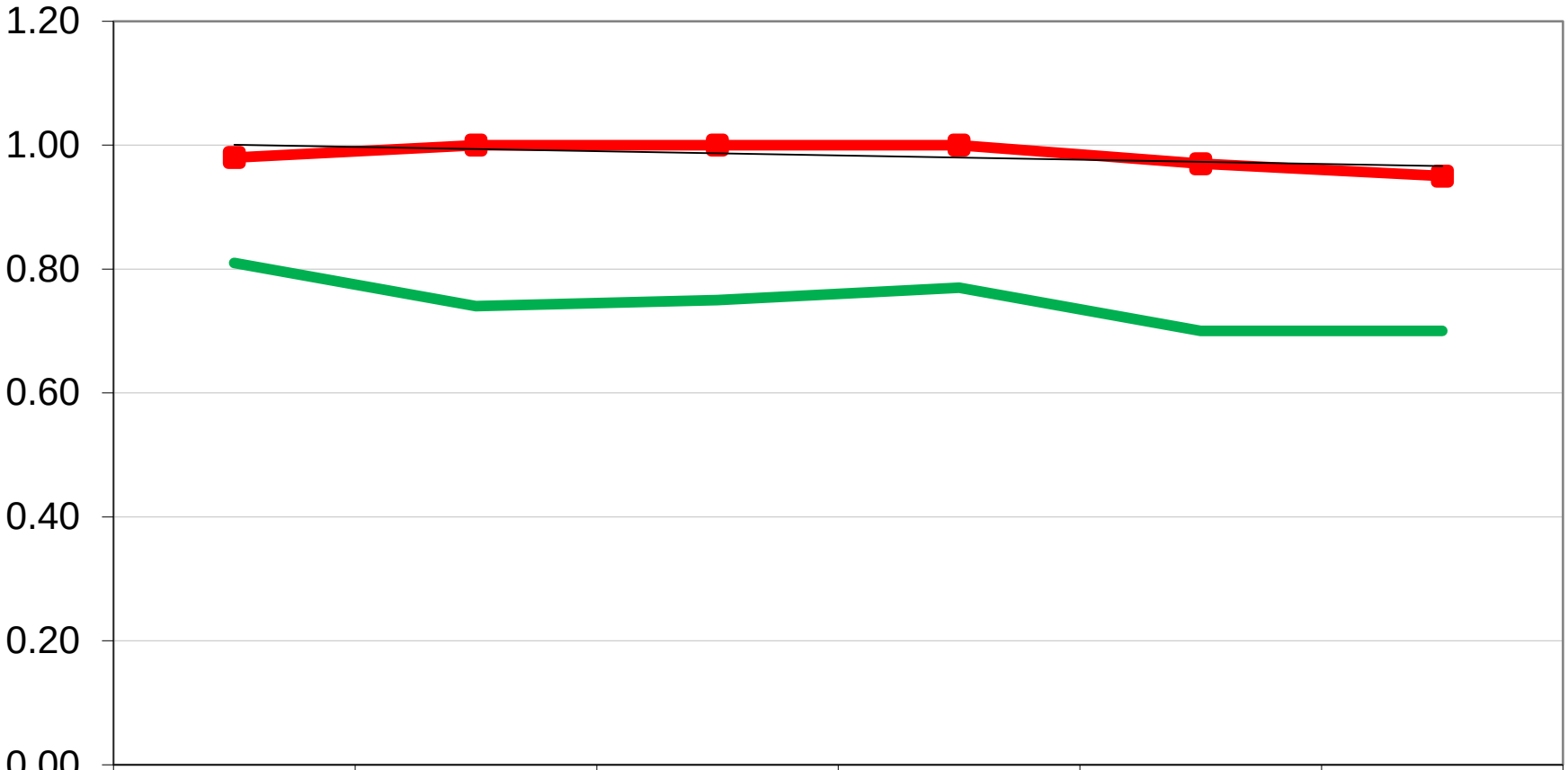
Performance Index Trends (WBS Level)

Level	WBS Number	Description	Type	06/30/2013	07/31/2013	08/31/2013	09/30/2013	10/31/2013	11/30/2013
8	01.25.60.01.(	OPC CONSTR & STARTUP PH/	SPi	0.94	0.92	0.91	0.90	0.89	0.88
View SPi/CPi Trend Chart			CPi	1.14	1.15	1.17	1.15	1.16	1.15
View Actual vs. Projected Performance Chart			TCPi To EAC	0.86	0.78	0.76	0.74	0.53	0.49
View All Indices Trend Chart			TCPi To BAC	0.81	0.78	0.74	0.75	0.71	0.70
9	01.25.60.01.(	DA - DESIGN AUTHORITY & TE	SPi	1.00	1.00	1.00	1.00	1.00	1.00
View SPi/CPi Trend Chart			CPi	1.09	1.10	1.10	1.11	1.11	1.11
View Actual vs. Projected Performance Chart			TCPi To EAC	0.79	0.68	0.64	0.60	0.42	0.39
View All Indices Trend Chart			TCPi To BAC	0.74	0.70	0.66	0.61	0.57	0.54
9	01.25.60.01.(	SU - TESTING & STARTUP	SPi	0.65	0.58	0.53	0.48	0.44	0.41
View SPi/CPi Trend Chart									
View Actual vs. Projected Performance Chart									
View All Indices Trend Chart									
9	01.25.60.01.(	STARTUP MANAGEMENT							
View SPi/CPi Trend Chart									
View Actual vs. Projected Performance Chart									
View All Indices Trend Chart									

Click on the blue hyperlink to view the chart at the WBS level:

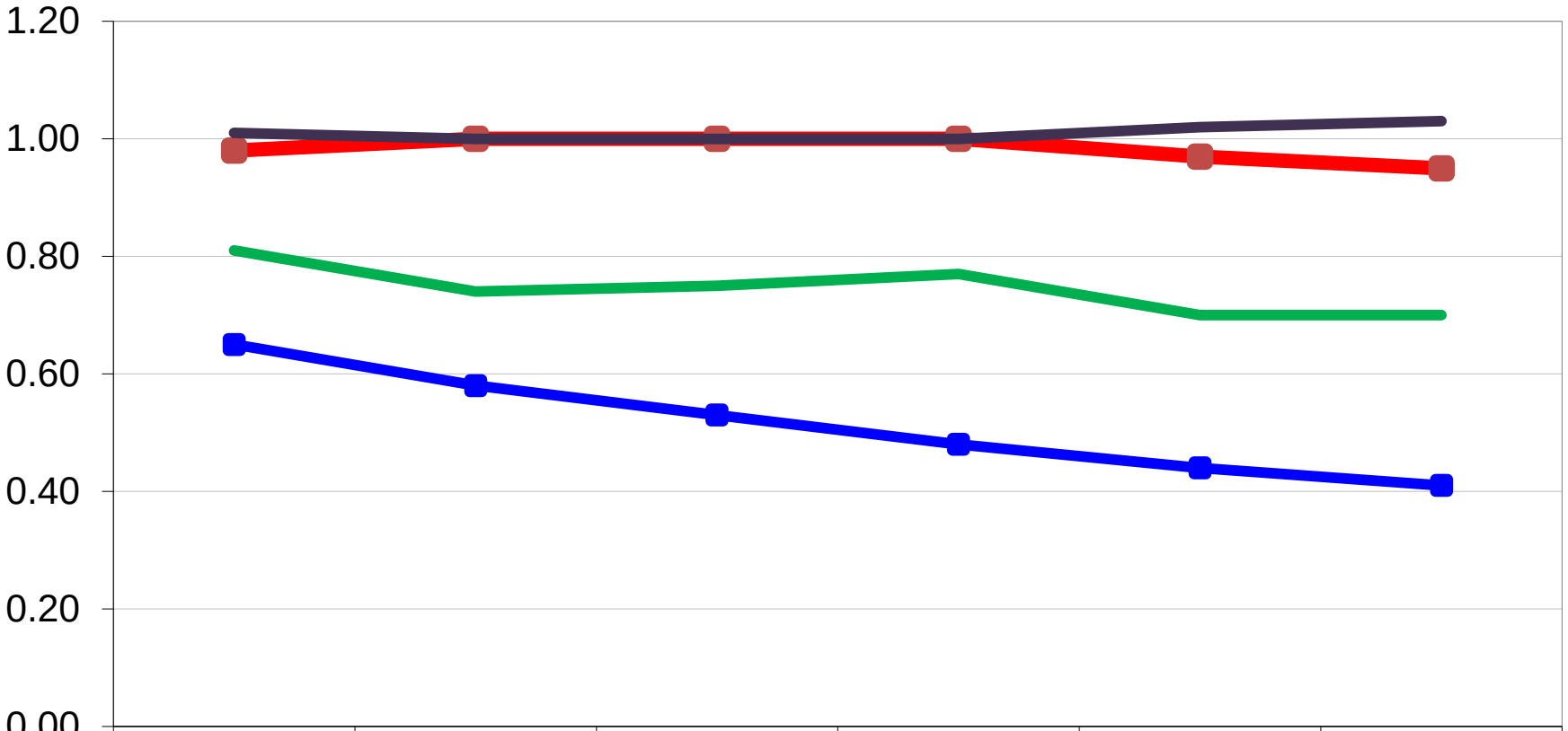
- SPI/CPI Trend Chart
- Actuals vs. Projected Performance Chart
- All Indices Trend Chart (a/k/a Performance Index Trends)

Actual vs. Projected Performance Trends



	06/30/2013	07/31/2013	08/31/2013	09/30/2013	10/31/2013	11/30/2013
CPi	0.98	1.00	1.00	1.00	0.97	0.95
TCPi To EAC	0.81	0.74	0.75	0.77	0.70	0.70

All Indices Trend Chart (a/k/a Performance Index Trends)



	06/30/2013	07/31/2013	08/31/2013	09/30/2013	10/31/2013	11/30/2013
SPi	0.65	0.58	0.53	0.48	0.44	0.41
CPi	0.98	1.00	1.00	1.00	0.97	0.95
TCPi To EAC	0.81	0.74	0.75	0.77	0.70	0.70
TCPi To BAC	1.01	1.00	1.00	1.00	1.02	1.03

Reports for IEAC and Funding

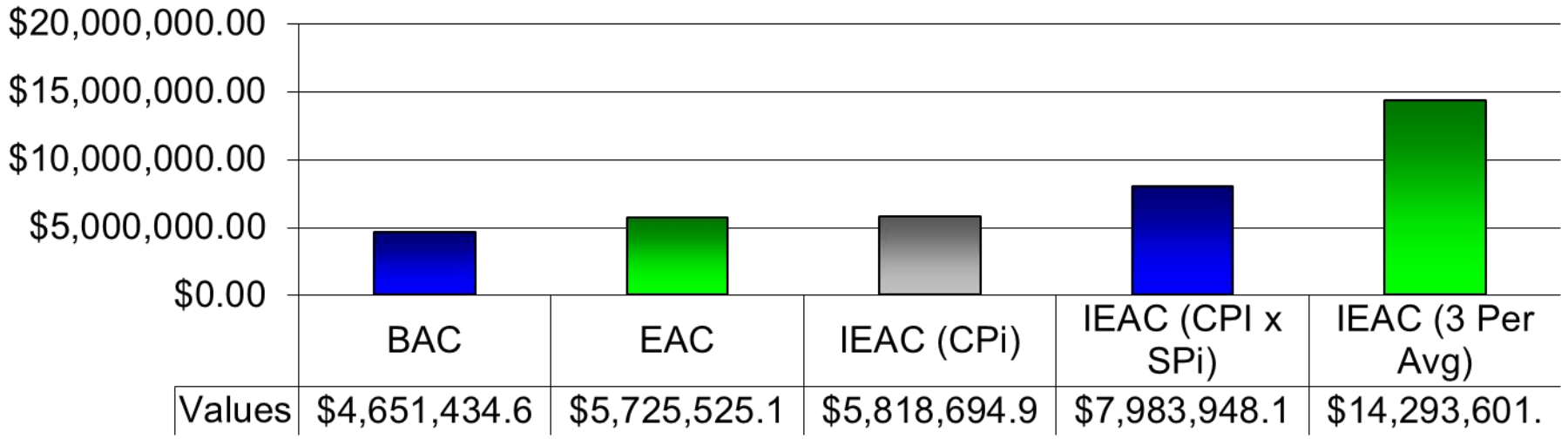
- **IEAC Analysis (WBS Level)**
  - Not just a project-level formula but information is available from PARSII to make independent assessments at the WBS level
- **Funding Status (Monthly at Project Level)**
  - Is sufficient funding available for predicted cost performance issues?

IEAC Analysis (WBS Level) – Report Tab

WBS Number	Description	Lvl	BAC	EAC	IEAC (CPi)	IEAC (CPI x SPi)	IEAC (3 Per Avg)	SPi	CPi	CPi (3 Per Avg)
01.25.60.01	OPC	8	$78,354,605.07	$89,748,954.14	$68,059,554.62	$70,252,715.00	$71,152,814.48	0.88	1.15	0.97
01.25.60.01	DA	9	$21,605,095.11	$23,119,989.25	$19,481,754.74	$19,481,754.74	$19,327,582.77	1.00	1.11	1.20
01.25.60.01	PR	9	$8,039,239.55	$7,677,082.09	$7,579,492.55	$7,580,298.79	$7,910,241.24	1.00	1.06	0.54
01.25.60.01	OP	9	$4,651,434.67	$5,725,525.13	$5,818,694.98	$7,983,948.12	$14,293,601.57	0.60	0.80	0.22
01.25.60.01	PS	9	$6,196,978.07	$13,614,462.43	$6,275,526.16	$6,275,526.16	$8,762,489.16	1.00	0.99	0.31
01.25.60.01	SU	9	$8,881,382.46	$11,453,293.30	$9,382,357.10	$17,906,501.01	$19,466,483.06	0.41	0.95	0.35

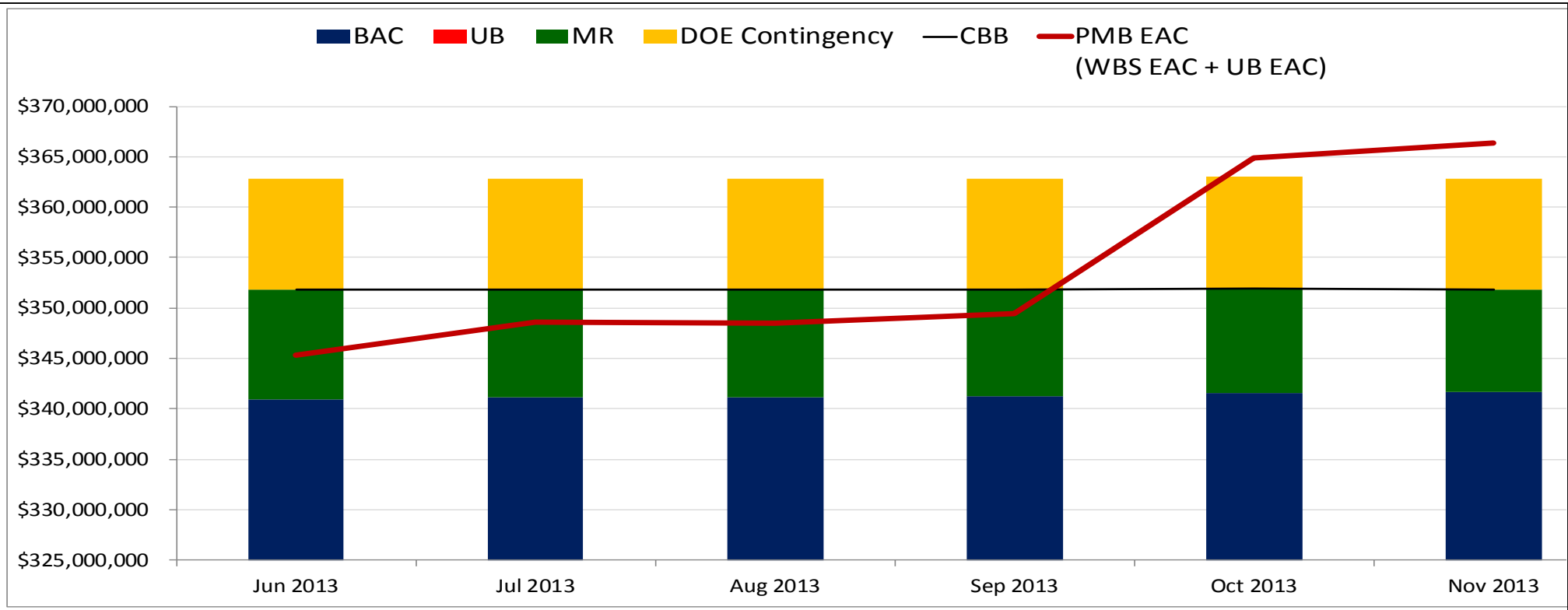
- **Three formula-based IEACs provided**
- **Click on WBS Description blue hyperlink to view WBS level graph of data**
  - WBS Description “OP” selected; chart on next slide
  - Note: This is a partial view of the full report

IEAC Analysis (WBS Level) – Chart Selected for WBS "OP"



- **Two reasons to review EACs at the WBS element:**
  - Verification of the reasonableness of the Comprehensive EAC
  - Identify the need for adjustments to the IEAC based on known issues with one or more WBS elements
    - Contractor's EAC appears to be understated for this WBS
    - Too optimistic EACs do not provide accurate projections for funding purposes
    - Too pessimistic EACs may tie up funding that could be used for other purposes

PARS II Funding Status (Monthly at Project Level)



	Jun 2013	Jul 2013	Aug 2013	Sep 2013	Oct 2013	Nov 2013
DOE Cost Contingency	$11,000,321	$11,000,321	$11,000,321	$11,000,321	$11,000,321	$11,000,321
Management Reserve (MR)	$10,904,847	$10,681,393	$10,644,886	$10,585,353	$10,365,538	$10,117,404
Undistributed Budget (UB)	$0	$0	$0	$0	$0	$0
Budget At Complete (BAC)	$340,901,465	$341,124,919	$341,161,425	$341,220,958	$341,611,498	$341,688,907
Contract Budget Base (CBB)	$351,806,312	$351,806,312	$351,806,311	$351,806,311	$351,977,036	$351,806,312
Estimate At Complete (PMB EAC)	$345,311,276	$348,569,622	$348,440,509	$349,447,145	$364,830,378	$366,403,597

Summary

- **EAC Reasonableness Analysis**
  - Contractor requirement
    - Estimate based; not IEAC formula based
  - Dynamic estimate of projected funding to ‘pay the bill’
  - Reasonableness is vital to DOE
  - Unrealistic EACs
    - Negatively impact project management
    - Non-compliant with ANSI/EIA-748
  - Extensive data available in PARSII to assist the FPD in conducting reasonableness assessment
- **Independent Estimate at Completion**
  - Provides range for determining EAC reasonableness
- **Funding Reports**
  - Assist in revealing potential funding shortfalls

DOE OAPM EVM Home Page

ENERGY.GOV
Office of Management

SEARCH

SERVICES | OPERATIONAL MANAGEMENT | MISSION | About Us | OFFICES

Home » Operational Management » Project Management » Earned Value Management

EARNED VALUE MANAGEMENT

- Aviation Management
- Executive Correspondence
- Energy Reduction at HQ
- Facilities and Infrastructure
- Freedom of Information Act
- Financial Assistance
- Information Systems
- Procurement and Acquisition
- Project Management
- Earned Value
- Lessons Learned
- Reviews and Validations
- Documents and Publications
- RCA and CAP
- Career Development Program
- Real Estate
- History

Earned Value Management (EVM) is a systematic approach to the integration and measurement of cost, schedule, and technical (scope) accomplishments on a project or task. It provides both the government and contractors the ability to examine detailed schedule information, critical program and technical milestones, and cost data.

- EVMS Surveillance Standard Operating Procedure (ESSOP) - 26 Sep 2011 (pdf)
  - EV Guideline Assessment Templates - (MS Word)
  - DOE EVMS Cross Reference Checklist - (pdf)
  - DOE EVMS Risk Assessment Matrix - (MS Word)
- Formulas and Terminology "Gold Card" - Sep 2011 (pdf)
- Slides from the OECM Road Show: Earned Value (EV) Analysis and Project Assessment & Reporting System (PARS II) - May 2012 (pdf)
- DOE EVM Guidance

EVM TUTORIALS

Module 1 - Introduction to Earned Value (pdf 446.86 kb) July 17, 2003

This module is the introduction to a series of online tutorials designed to enhance your understanding of Earned Value Management. This module's objective is to introduce you to Earned Value and outline the blueprint for the succeeding modules. This module defines Earned Value management. It looks at the differences between Traditional management and Earned Value management, examines how Earned Value management fits into a program and project environment, and defines the framework necessary for proper Earned Value management implementation.

http://energy.gov/management/office-management/operational-management/project-management/earned-value-management